

Northern Kentucky Water District  
2835 Crescent Springs Road  
Erlanger, KY 41018

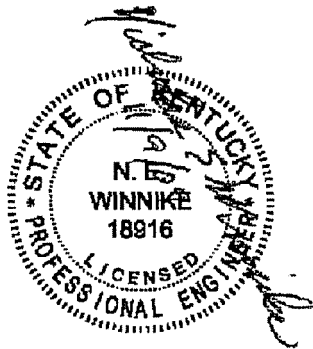
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STANDARD DRAWING DETAILS

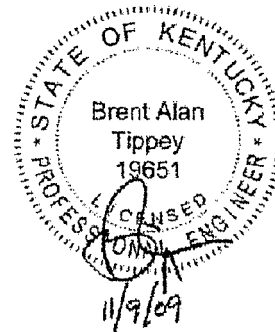
for the construction of the  
Fort Thomas Treatment Plant Advanced Treatment  
Contract No. 184-447



**CH2MHILL**

CH2M HILL

300 E-Business Way, Suite 400  
Cincinnati, Ohio 45241



**HDR**

HDR/Quest

2517 Sir Barton Way  
Lexington, Kentucky 40509

December 1, 2009

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Project No. 380723

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# FORT THOMAS WTP ADVANCED TREATMENT

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# FORT THOMAS WTP ADVANCED TREATMENT

## Section

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**Section**

4442-715

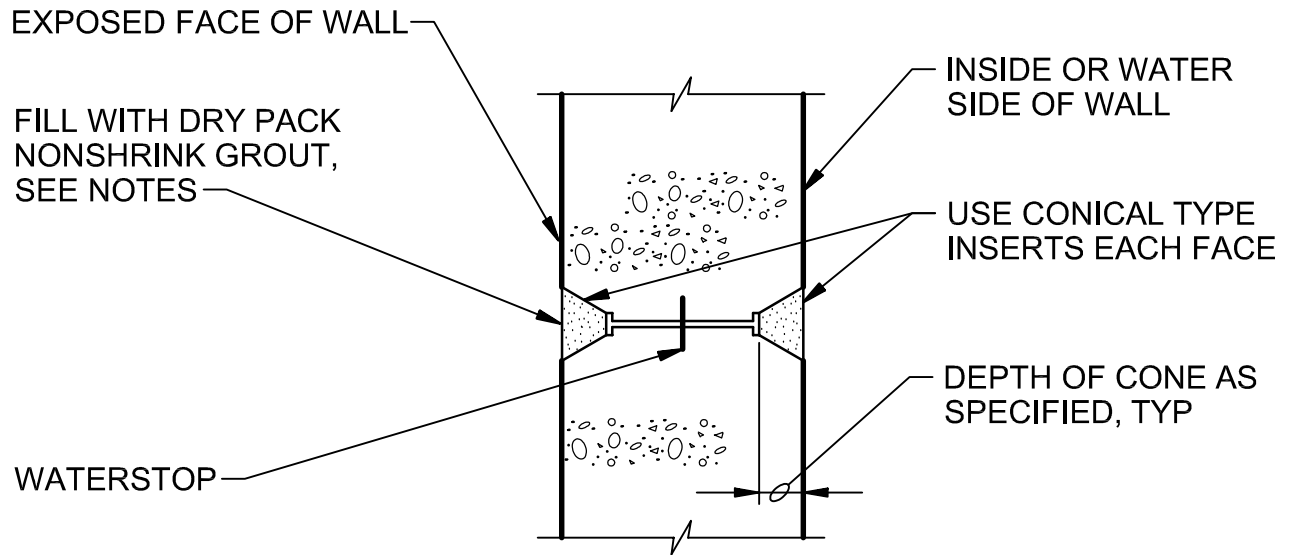
Small Sump Support

**END OF SECTION**

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NOTES:

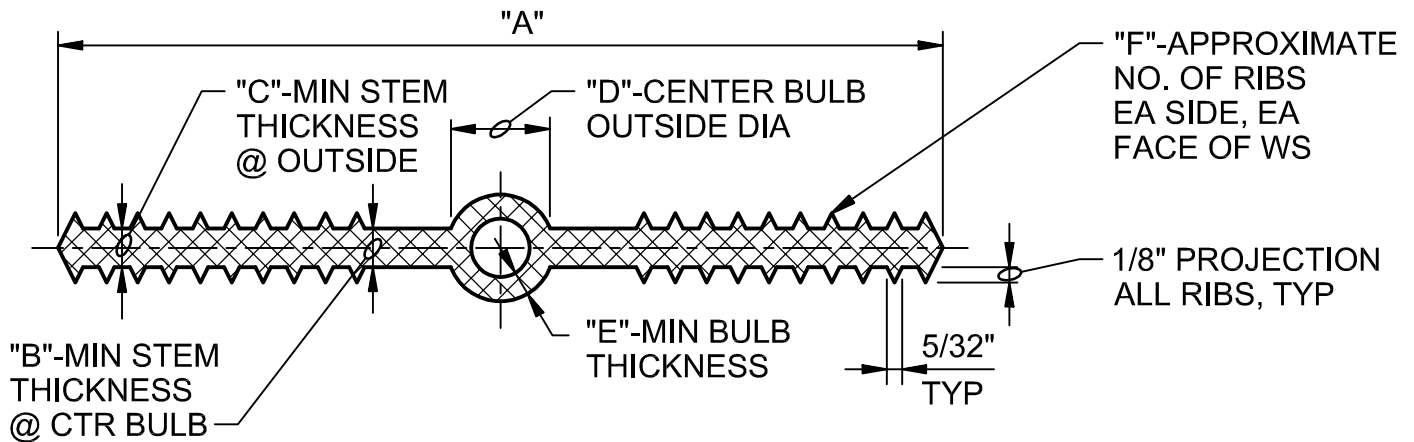
1. THE SPACING OF FORM TIES ON EXPOSED PORTIONS OF WALLS SHALL BE APPROXIMATELY EQUAL HORIZONTALLY AND VERTICALLY AND SHALL BE UNIFORM IN EACH DIRECTION.
2. DRY PACK METHOD SHALL BE AS SPECIFIED USING STEEL TOOLS.

FORM SNAP-TIE HOLE

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

0310-051



SIZE	"A"	"B"	"C"	"D"	"E"	"F"
4"x3/16"	4"	3/16"	3/16"	3/4"	1/4"	4
6"x3/8"	6"	3/8"	3/8"	7/8"	1/4"	6
9"x3/8"	9"	3/8"	3/8"	1"	1/4"	8

**NOTES:**

1. NON-ROUND CENTER BULBS SHALL HAVE A MINIMUM OUTSIDE DIMENSION OF 'D'.
2. SEE SPLICE DETAIL (0315-011)
3. BULB TYPE WATERSTOP SHOWN IS REQUIRED FOR EXPANSION AND CONTROL JOINTS. SIMILAR WATERSTOPS WITHOUT CENTER BULB MAY BE SUBSTITUTED AT CONSTRUCTION JOINTS.
4. USE 6 INCH WATERSTOPS IN ALL CONSTRUCTION JOINTS UNLESS SPECIFICALLY SHOWN OTHERWISE.

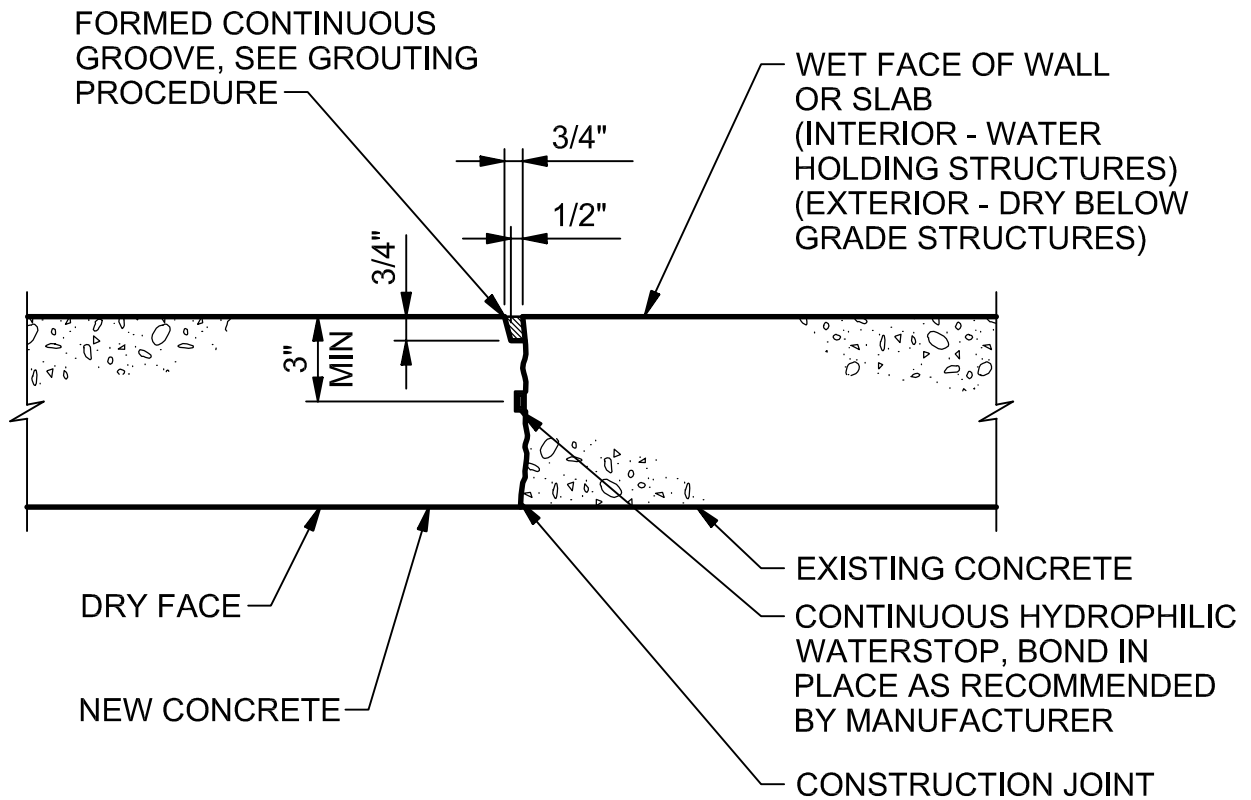
**PLASTIC WATERSTOP**

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

0315-001

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**NOTE:**

FOR USE IN NON-MOVING CONSTRUCTION JOINTS AND ONLY WHERE SPECIFICALLY INDICATED ON PLANS.

**GROUTING PROCEDURE:**

1. WAIT UNTIL NEW CONCRETE MINIMUM 28 DAYS OLD PRIOR TO GROUTING GROOVE.
2. ROUGHEN AND CLEAN SURFACES OF GROOVE WITH POWER WIRE BRUSH OR SANDBLASTING.
3. SATURATE AREA FOR 24 HOURS PRIOR TO GROUTING.
4. DRY PACK WITH TYPE II NON-SHRINK GROUT.
5. USE STEEL HAMMER AND STEEL TOOL TO DENSELY PACK GROUT INTO GROOVE.
6. WATER CURE GROUT FOR 4 DAYS MINIMUM.

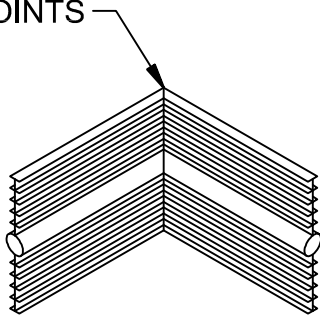
**HYDROPHILIC/GROOVE WATERSTOP**

NTS

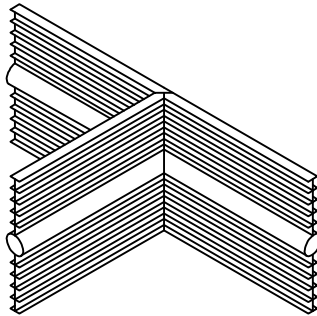
ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

0315-003

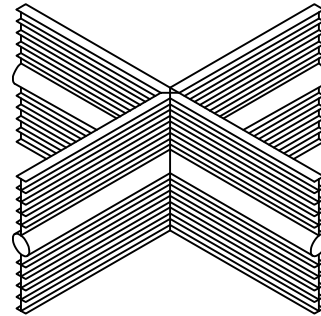
MITER CORNERS OF VERTICAL JOINTS & WELD SIMILAR AS SHOWN BELOW FOR IN-PLANE JOINTS



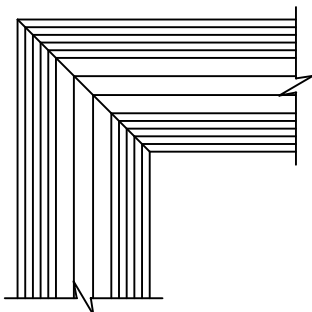
VERTICAL ELL



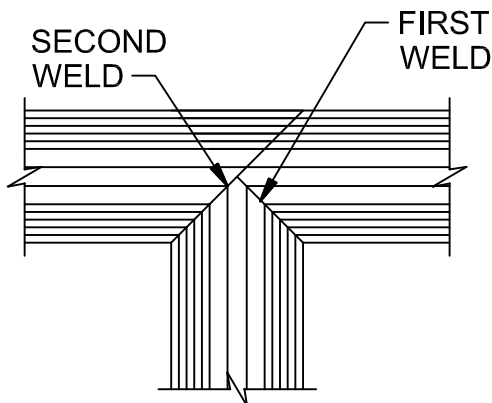
VERTICAL TEE



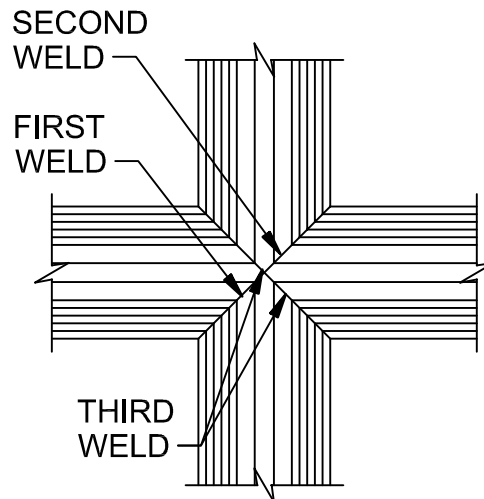
VERTICAL CROSS



FLAT ELL



FLAT TEE



FLAT CROSS

NOTE:

ALL WELDS SHALL BE PER WATERSTOP MANUFACTURER'S RECOMMENDATIONS.

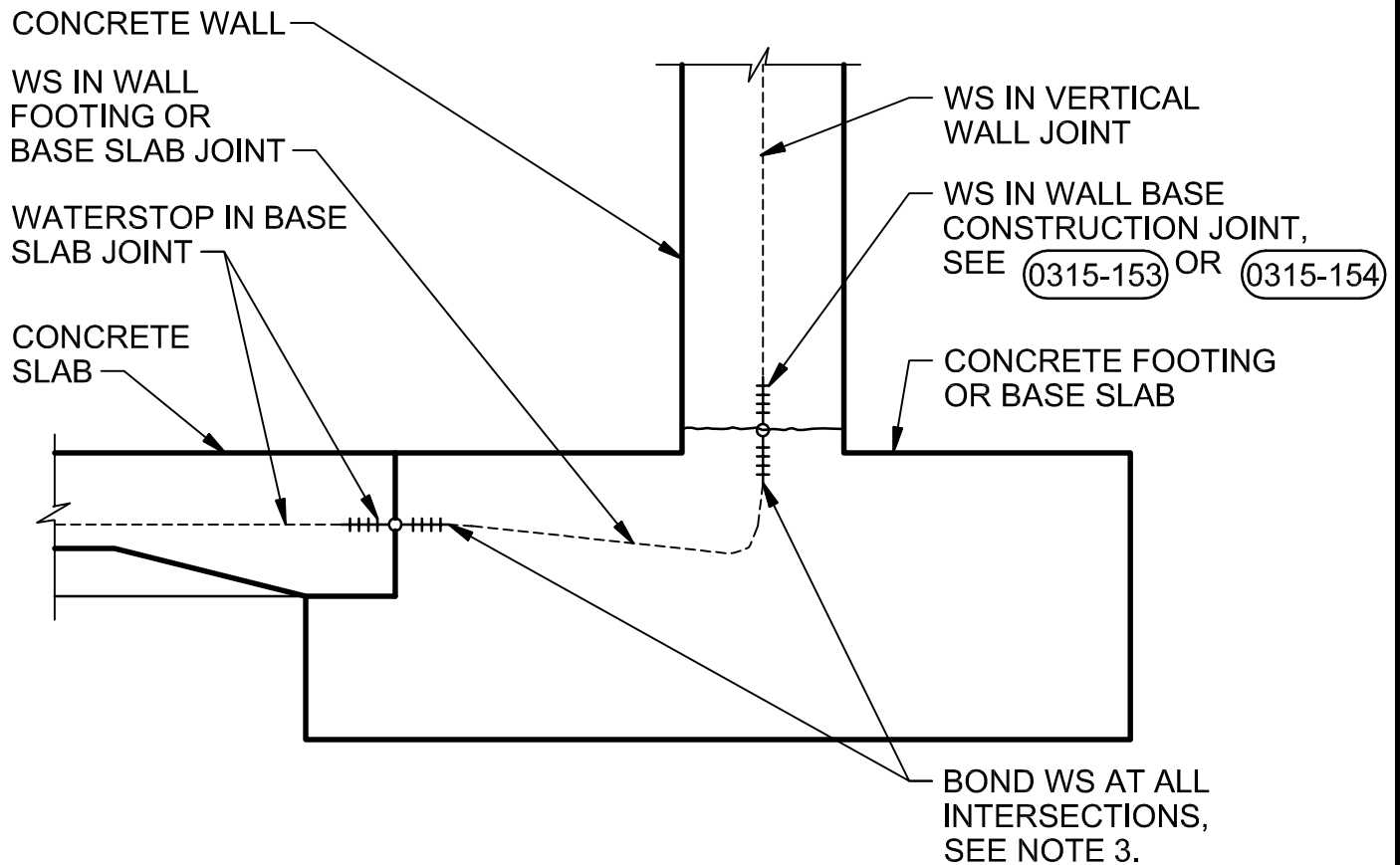
WATERSTOP JOINTS

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

0315-011

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NOTES:

1. SUBMIT DETAILS OF SPLICING AND LOCATION.
2. BOND OR SPLICE ALL HORIZONTAL TRANSVERSE WATERSTOPS IN BASE SLAB JOINTS TO CONTINUOUS LONGITUDINAL WATERSTOP IN WALL BASE FOR COMPLETE SEAL.
3. BOND OR SPLICE ALL VERTICAL WATERSTOPS IN WALL JOINTS TO LONGITUDINAL WATERSTOP IN WALL BASE FOR COMPLETE SEAL, SEE (0315-011) FLAT CROSS JOINT.
4. FOR CONCRETE PLACEMENT SEQUENCE, SEE (0315-133)
5. FOR PLASTIC WATERSTOP DETAILS, SEE (0315-001)

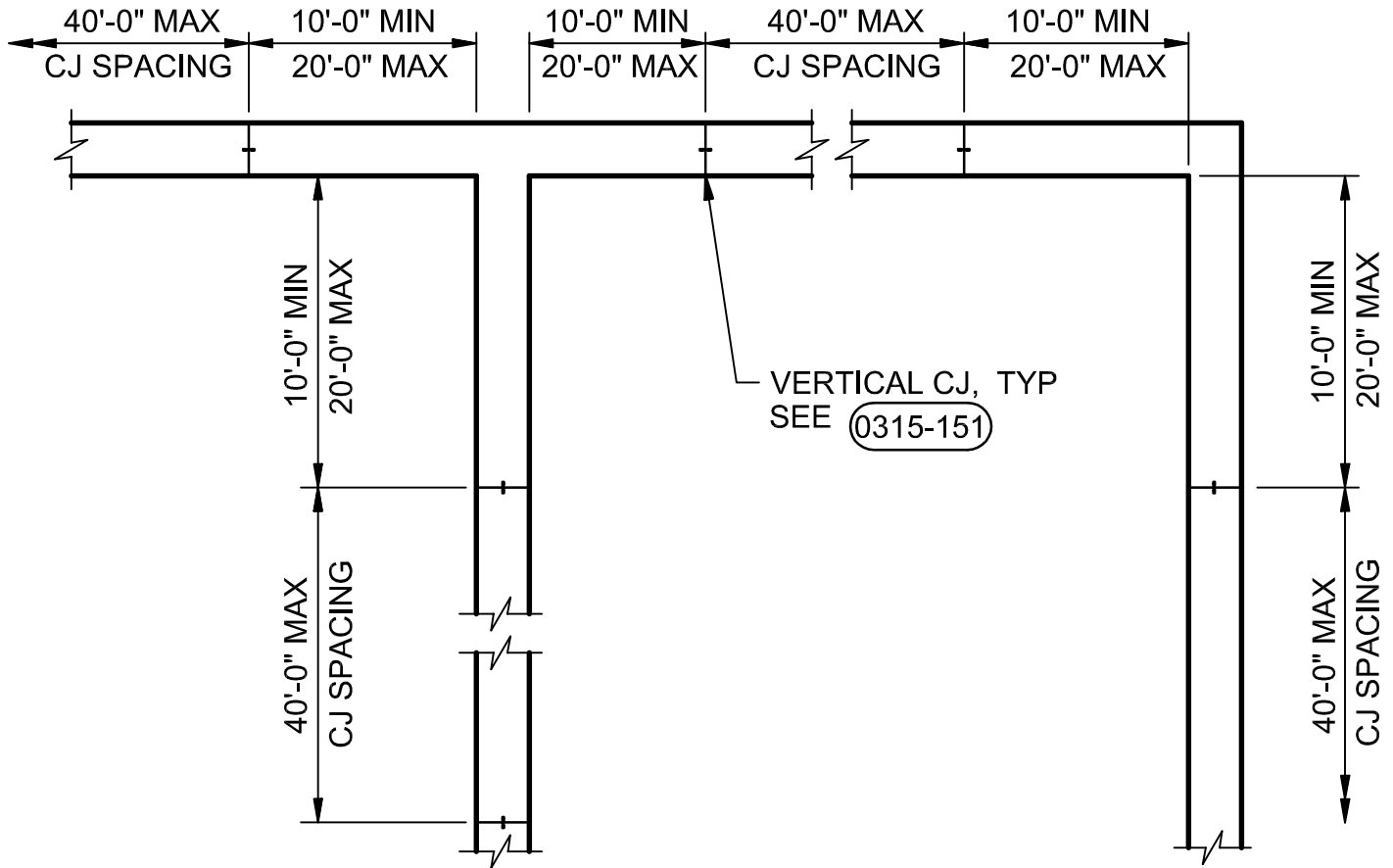
WATERSTOP CONNECTION

NTS

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

(0315-012)

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PLAN

NOTES:

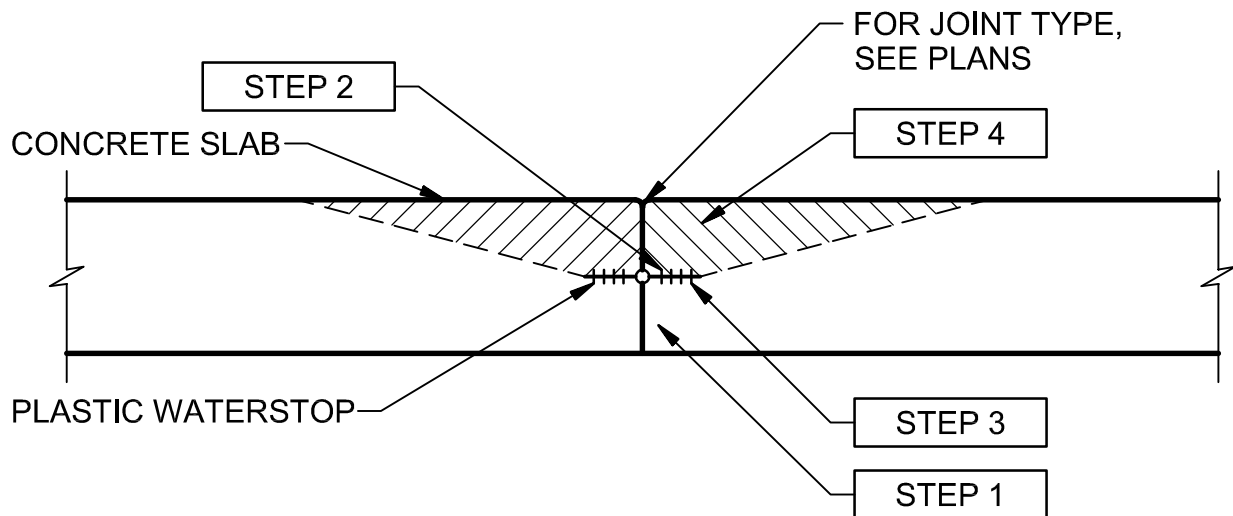
1. COORDINATE CONSTRUCTION JOINT LOCATIONS AND TIME BETWEEN CONCRETE POURS WITH SPECIFICATION 03 30 00.
2. LOCATE WALL CONSTRUCTION JOINTS AS SHOWN, UNLESS INDICATED OTHERWISE.
3. CONSTRUCTION JOINTS SHALL BE LOCATED SUCH THAT THEIR ASPECT RATIO DOES NOT EXCEED 1.5 TO 1.

WALL CONSTRUCTION JOINT SPACING

NTS

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

0315-131



**NOTES:**

PLACEMENT SEQUENCE SHOWN REQUIRED ON BOTH SIDES OF JOINTS, IN ALL CONCRETE SLAB AND FOOTING POURS WITH HORIZONTALLY PLACED PLASTIC WATERSTOPS.

**STEP 1**

PLACE CONCRETE BELOW WATERSTOP FIRST, REMOVE ALL AIR VOIDS BY VIBRATING THOROUGHLY.

**STEP 2**

TO CONFIRM THERE ARE NO AIR VOIDS, LIFT WATERSTOP. A CONTINUOUS IMPRESSION OF THE WATERSTOP, INCLUDING EDGE OF BULB, SHOULD BE VISIBLE IN THE FRESH CONCRETE. CONTINUE THIS PROCEDURE ALONG THE ENTIRE POURED JOINT, END TO END. IF A CONTINUOUS IMPRESSION IS CONFIRMED, PROCEED WITH STEP 4. IF A VOID LARGER THAN 1/4 INCH IN DIAMETER IS PRESENT ANYWHERE IN THE WATERSTOP IMPRESSION, PROCEED WITH STEP 3.

**STEP 3**

IF A VOID LARGER THAN 1/4 INCH IN DIAMETER IS PRESENT IN THE WATERSTOP IMPRESSION, ADDITIONAL CONCRETE SHALL BE PLACED UNDER THE WATERSTOP, VIBRATED, AND STEP 2 REPEATED.

**STEP 4**

FINISH PLACING CONCRETE ABOVE THE WATERSTOP TO TOP OF SLAB.

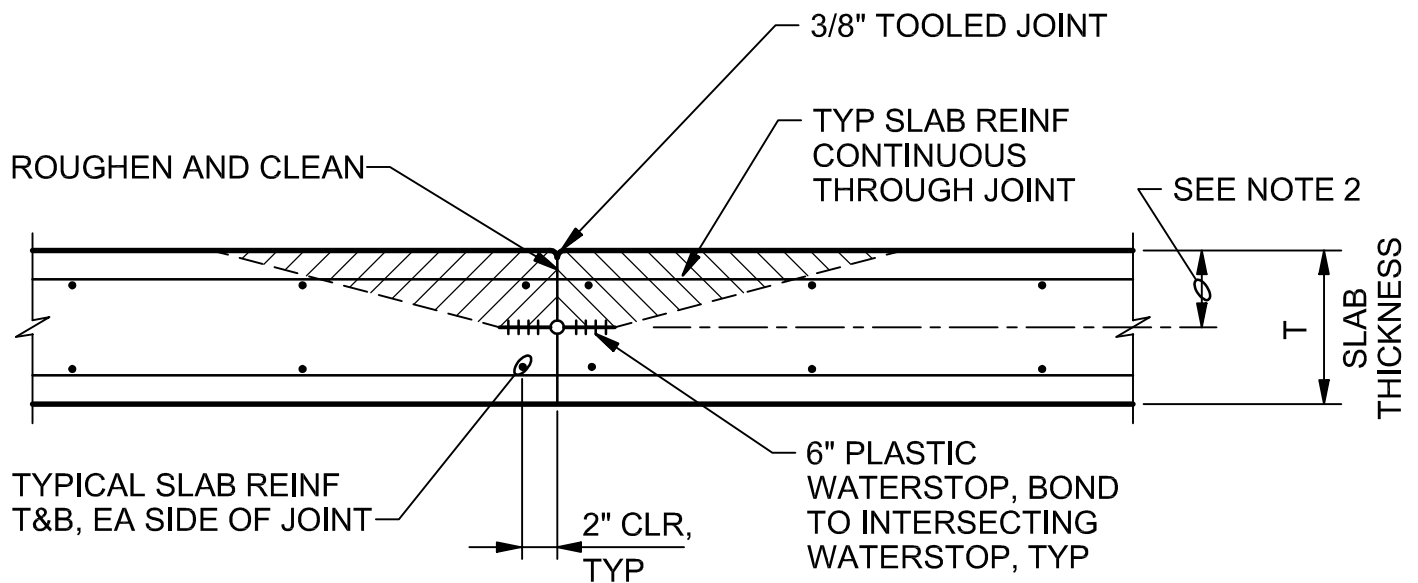
**CONCRETE PLACEMENT SEQUENCE**

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

0315-133

**CH2MHILL**



NOTE:

1. FOR CONCRETE PLACEMENT AROUND WATERSTOP, SEE (0315-133)
2. WATERSTOP DEPTH =  $T/2$  OR 5 1/2" MAXIMUM WHEN USED IN CONJUNCTION WITH DETAIL (0315-153) BUT 6 1/2" MAXIMUM WHEN USED IN CONJUNCTION WITH DETAIL (0315-154).

SLAB CONSTRUCTION JOINT

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

0315-142

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INTERMEDIATE SLAB,  
SEE PLANS FOR  
ELEVATION, THICKNESS  
& REINFORCING

WATERSIDE

DRY SIDE

CONTINUOUS KEYWAY,  
3/4" x SLAB DEPTH + 1"

3/4"

POUR WALLS  
CONTINUOUS PAST  
INTERMEDIATE SLAB

GROOVE, TYP ALL  
WATERSIDE EDGES  
OF INTERMEDIATE  
SLAB FOR COMPLETE  
SEAL (0315-003)

HYDROPHILIC WATERSTOP

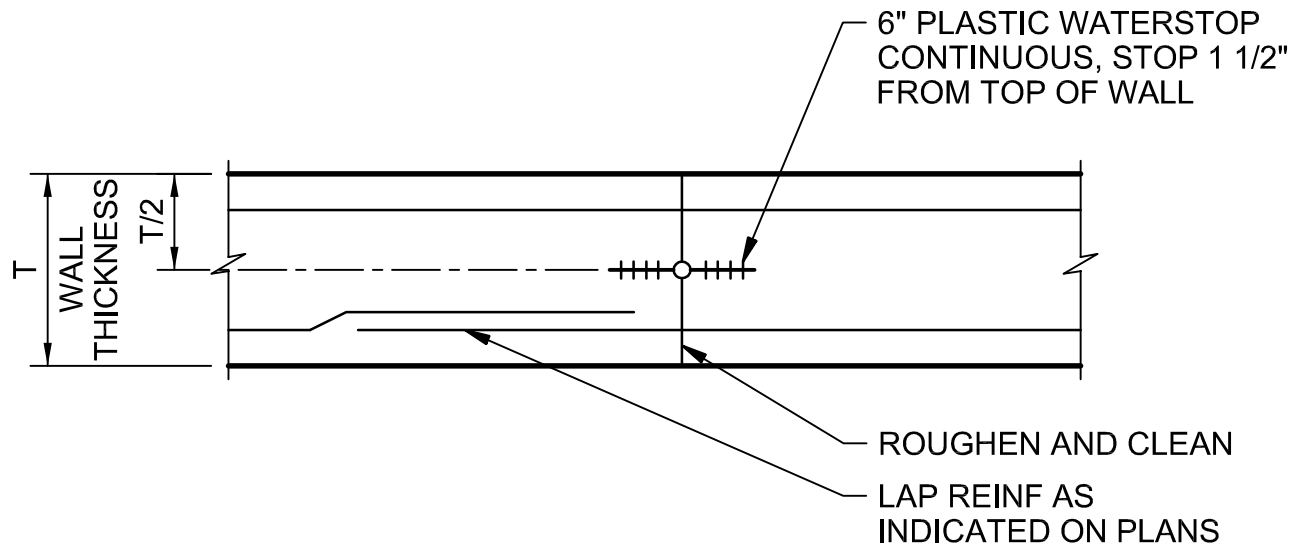
CONTRACTORS  
OPTION TO  
PROVIDE DOWELS  
W/ MECHANICAL  
THREADED  
CONNECTORS TO  
FACILITATE WALL  
FORMING

## SLAB CONSTRUCTION JOINT AT WALL

NTS

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

0315-143



PLAN

NOTES:

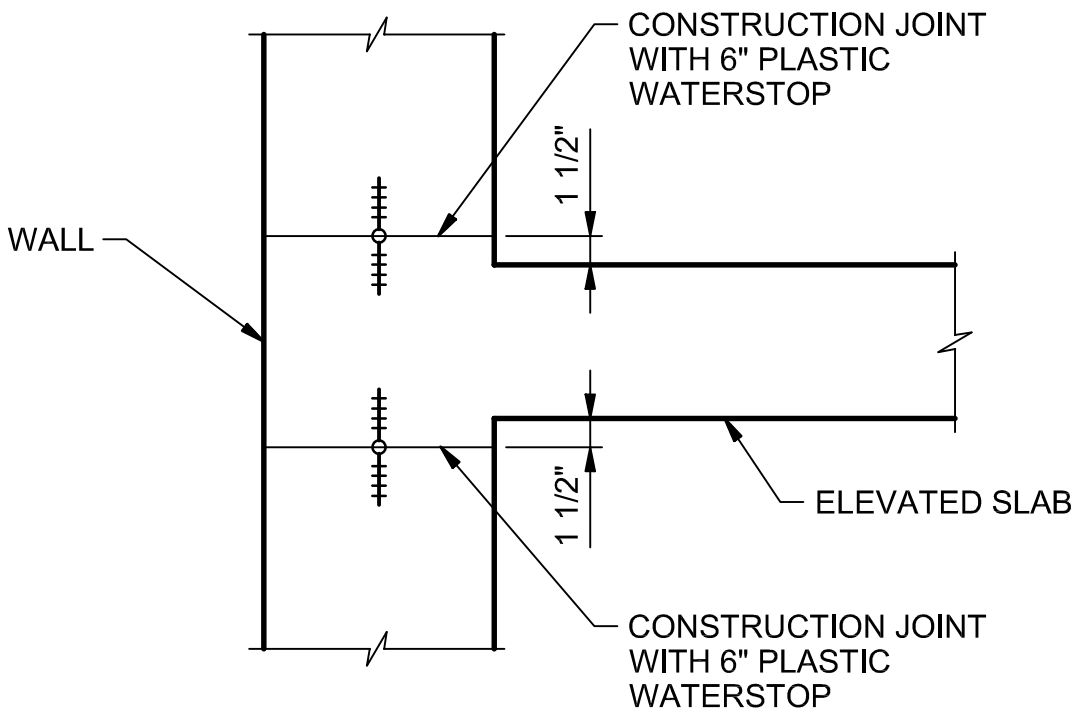
1. ALL REINFORCING CONTINUOUS ACROSS JOINT.
2. FOR LOCATIONS, SEE (0315-131)

WALL VERTICAL CONSTRUCTION JOINT

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

(0315-151)

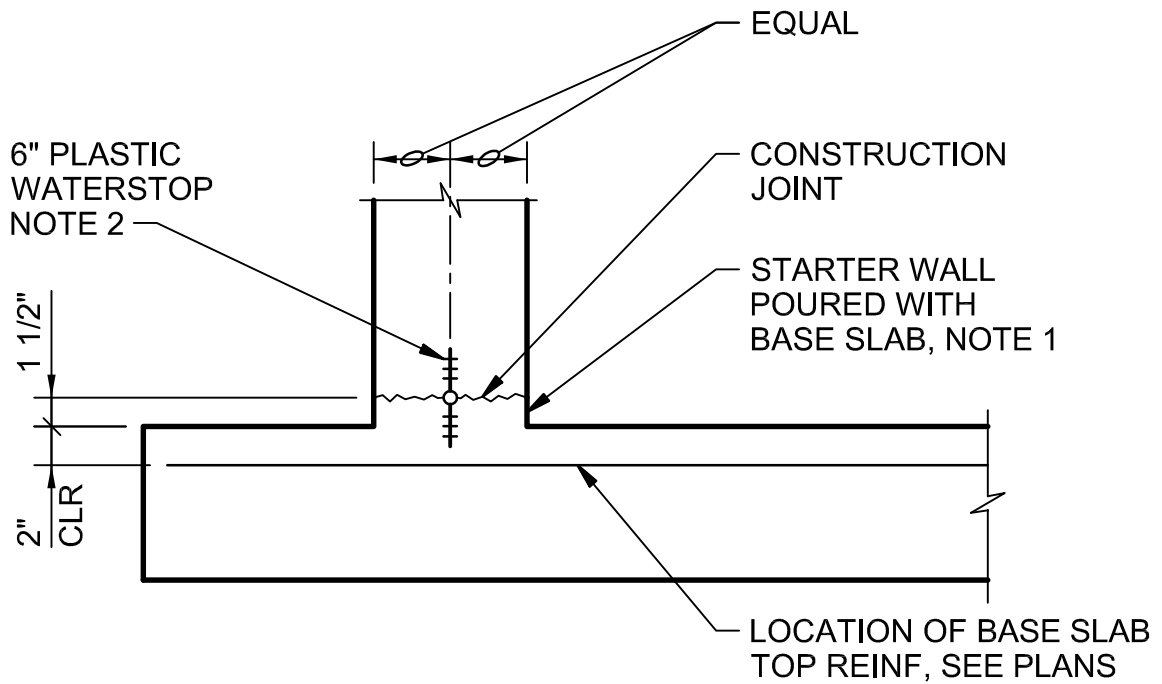


WALL CONSTRUCTION JOINT AT ELEVATED SLAB

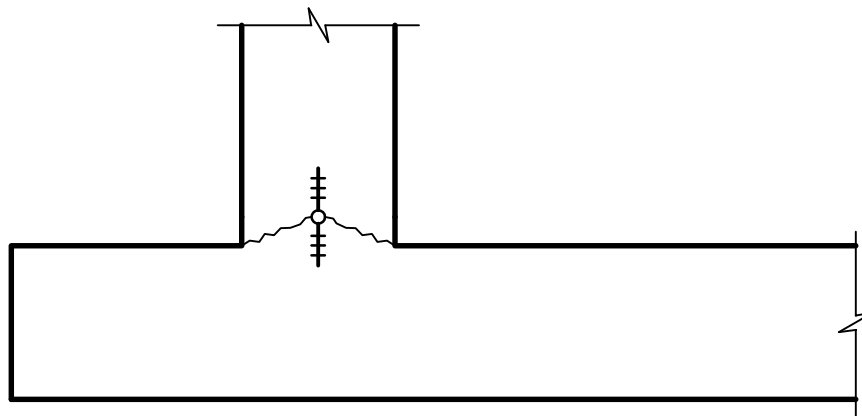
NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

0315-152



TYPICAL BASE



UNACCEPTABLE BASE

NOTES:

1. STARTER WALL REQUIRED FOR ALL CONSTRUCTION JOINTS WITH WATERSTOPS, UNLESS SPECIFICALLY INDICATED OTHERWISE.
2. FOR WALLS W/SINGLE MAT OF REINFORCING LOCATE WATERSTOP ON LIQUID FACE, 1" CLEAR OF REINFORCING.
3. SECURE WATERSTOP IN-PLACE AS SPECIFIED.

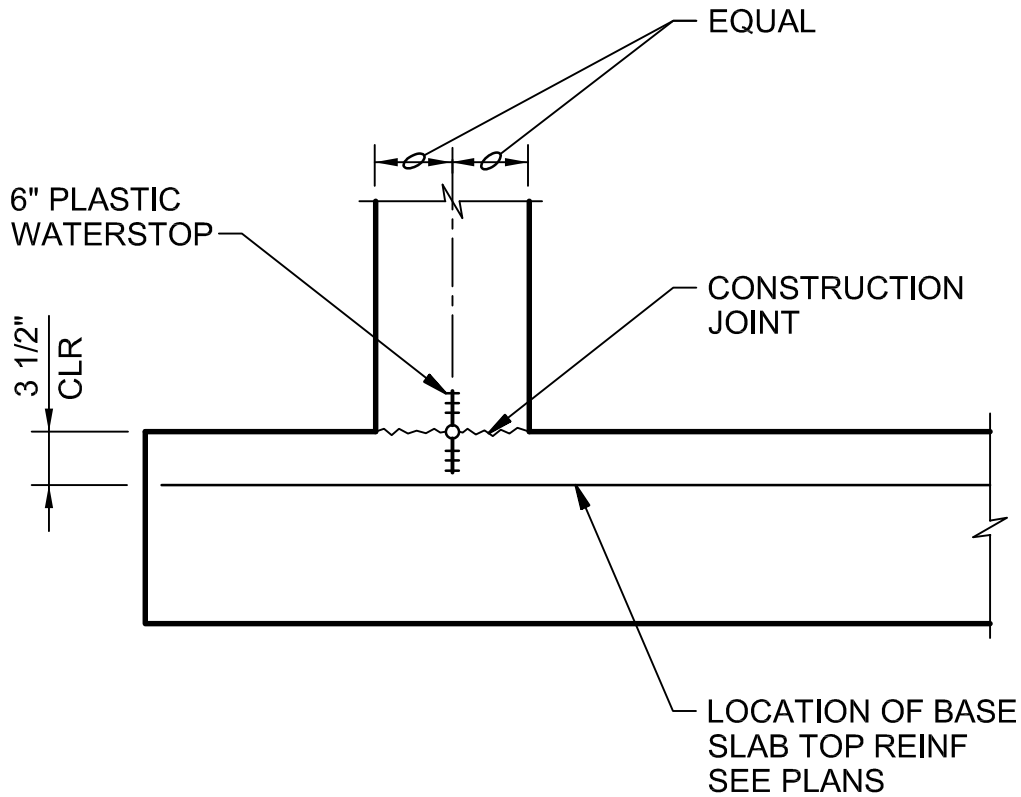
WALL BASE CONSTRUCTION JOINT

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

0315-153

**CH2MHILL**



NOTES:

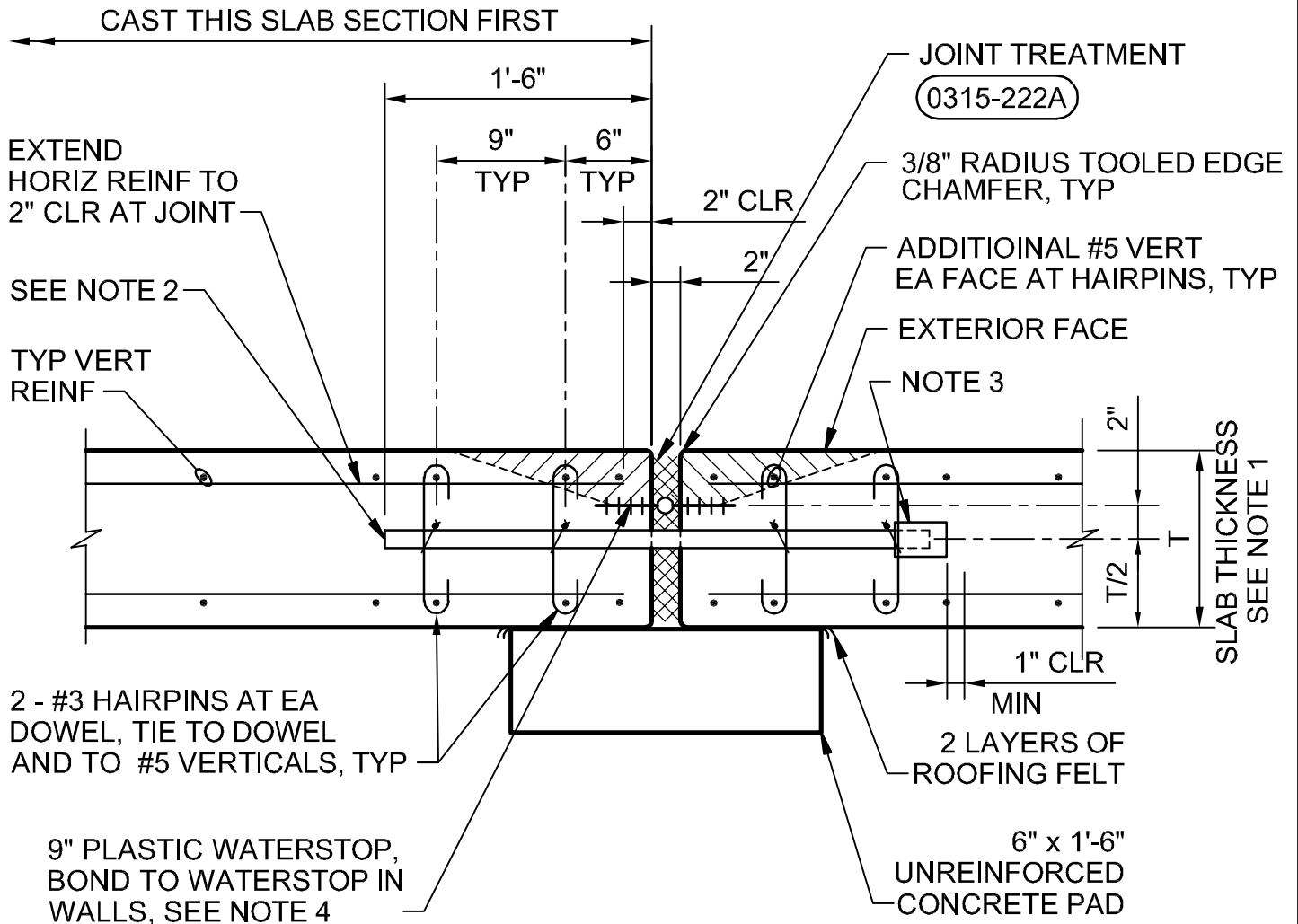
1. FOR WALLS WITH SINGLE MAT OF REINFORCING LOCATE WATERSTOP ON LIQUID FACE, 1" CLEAR OF REINFORCEMENT.
2. SECURE WATERSTOP IN-PLACE AS SPECIFIED.

WALL BASE CONSTRUCTION JOINT

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

0315-154



PLAN

**NOTES:**

1. FOR SLABS WITH THICKNESS OF 10" THRU 24".
2. 1" DIA x 3'-0" SMOOTH COATED BAR DOWELS. LOCATE AT 1'-0" MAX FROM WALLS WITH 2'-0" MAX SPACING. ALIGN AND TIE-IN-PLACE TO REINF. COATING SHALL CONSIST OF A CORROSION RESISTANT COATING PLUS A LUBRICANT COATING AS SPECIFIED.
3. 1" ID x 2" PLASTIC CAP WITH 1" POLYSTYRENE BETWEEN END OF DOWEL AND END CAP. TAPE TO BAR FOR WATERTIGHT SEAL.
4. BEND VERTICAL JOINT WATERSTOP OVER TO CENTERLINE OF WALL IN BOTTOM 2'-0" OF WALL, AND SPLICE TO WATERSTOP IN WALL BASE CONSTRUCTION JOINT. SEE (0315-012)
5. FOR CONCRETE PLACEMENT AROUND WATERSTOP, SEE (0315-133)
6. PROVIDE EXPANSION JOINT COVERS AT ALL EXPOSED AREAS. SEE ARCH DRAWINGS FOR DETAIL.

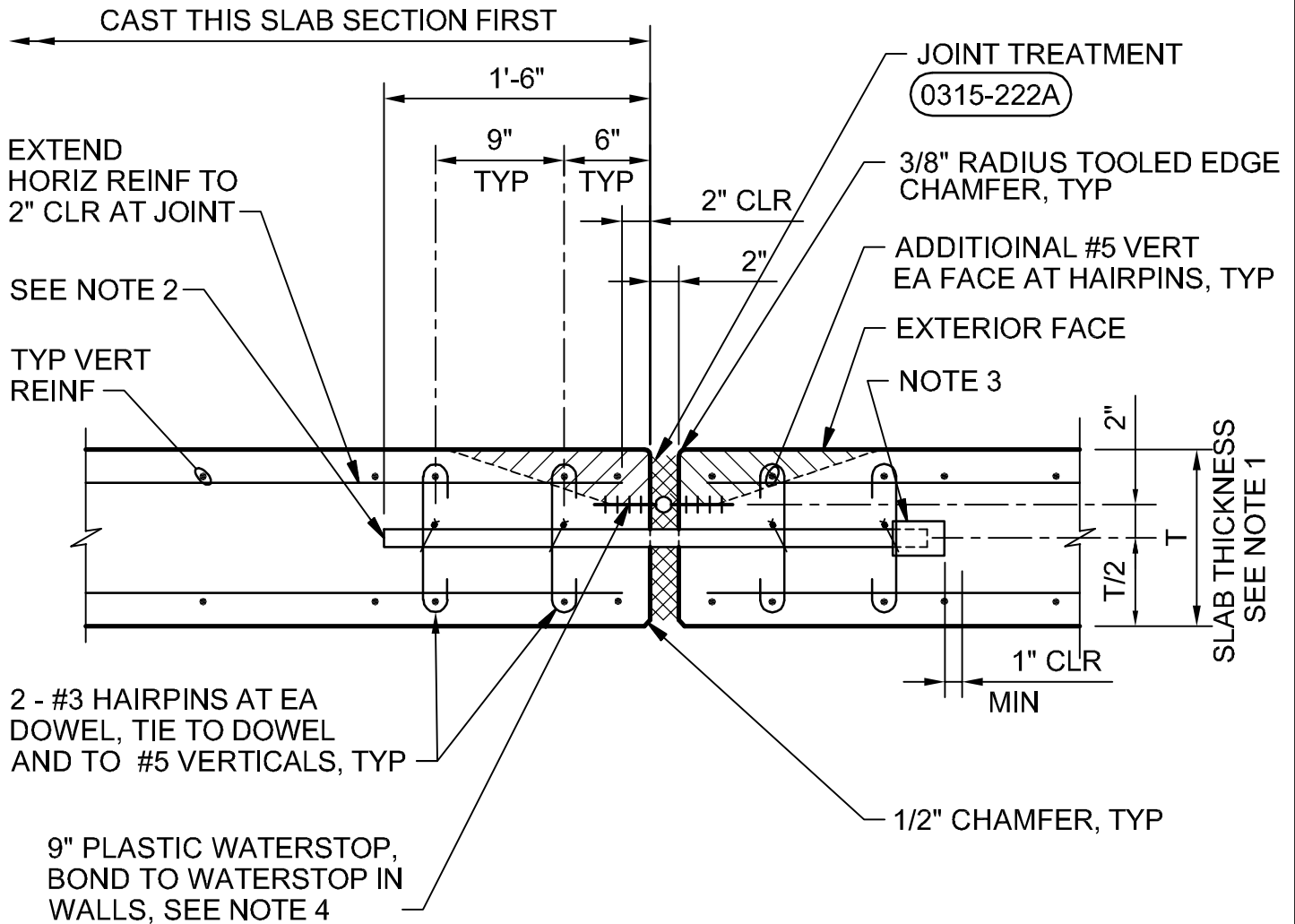
**BASE SLAB EXPANSION JOINT**

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

0315-212

**CH2MHILL**



PLAN

NOTES:

1. FOR SLABS WITH THICKNESS OF 10" THRU 24".
2. 1" DIA x 3'-0" SMOOTH COATED BAR DOWELS. LOCATE AT 1'-0" MAX FROM WALLS WITH 2'-0" MAX SPACING. ALIGN AND TIE-IN-PLACE TO REINF. COATING SHALL CONSIST OF A CORROSION RESISTANT COATING PLUS A LUBRICANT COATING AS SPECIFIED.
3. 1" ID x 2" PLASTIC CAP WITH 1" POLYSTYRENE BETWEEN END OF DOWEL AND END CAP. TAPE TO BAR FOR WATERTIGHT SEAL.
4. BEND VERTICAL JOINT WATERSTOP OVER TO CENTERLINE OF WALL IN BOTTOM 2'-0" OF WALL, AND SPLICE TO WATERSTOP IN WALL BASE CONSTRUCTION JOINT. SEE (0315-012)
5. FOR CONCRETE PLACEMENT AROUND WATERSTOP, SEE (0315-133)
6. PROVIDE EXPANSION JOINT COVERS AT ALL EXPOSED AREAS. SEE ARCH DRAWINGS FOR DETAIL.

ELEVATED SLAB EXPANSION JOINT

NTS

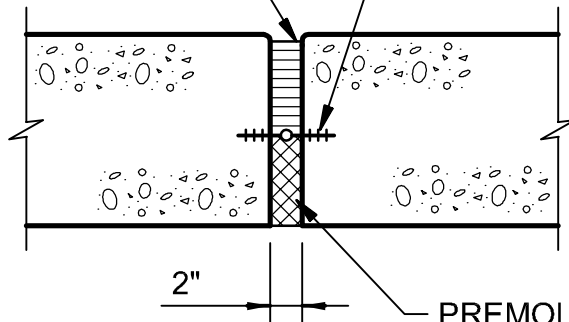
ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

0315-216

**CH2MHILL**

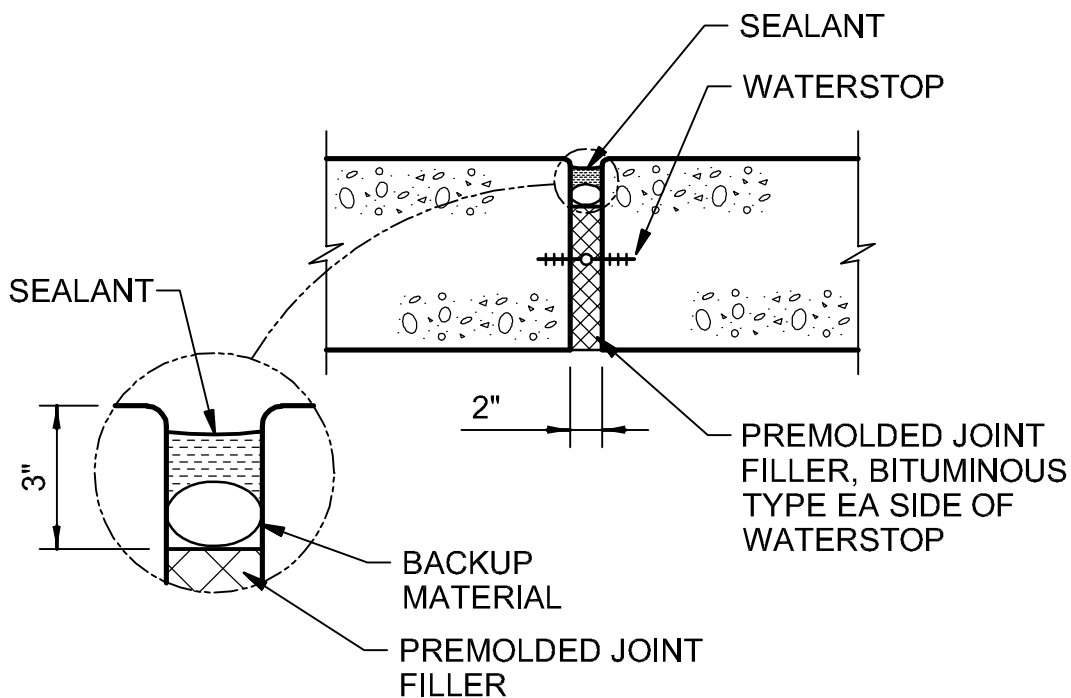
POURED JOINT  
FILLER TO WITHIN  
1/2" OF TOP OF SLAB

WATERSTOP



PREMOLDED JOINT  
FILLER, BITUMINOUS  
TYPE

AT LIQUID SURFACE



AT NON-LIQUID SURFACE

NOTE:

ATTACH PREMOLDED JOINT FILLER WITH 8d GALVANIZED NAILS @ 1'-0" SPACING EMBEDDED IN FIRST SLAB POUR.

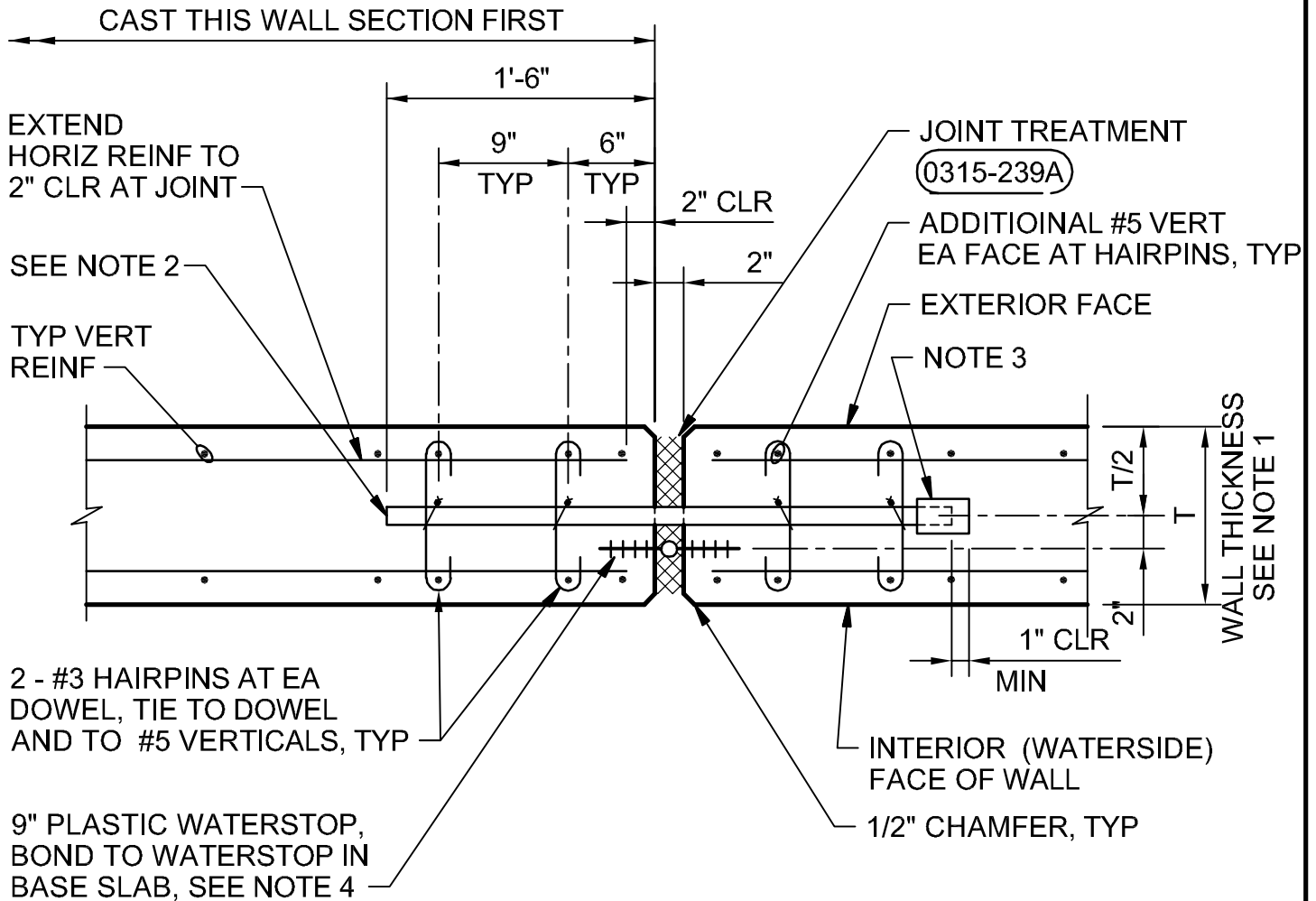
SLAB EXPANSION JOINT TREATMENT

NTS

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

0315-228A





PLAN

NOTES:

1. FOR WALLS WITH THICKNESS OF 10" THRU 24". FOR 10" WALLS LOCATE DOWELS 4" FROM FACE OF WALL INSTEAD OF T/2 INDICATED.
2. 1" DIA x 3'-0" SMOOTH COATED BAR DOWELS. LOCATE AT 1'-0" MAX FROM TOP AND 2'-0" FROM BOTTOM OF WALL AND AT 2'-0" MAX SPACING. ALIGN AND TIE-IN-PLACE TO REINF. COATING SHALL CONSIST OF A CORROSION RESISTANT COATING PLUS A LUBRICANT COATING AS SPECIFIED.
3. 1" ID x 2" PLASTIC CAP WITH 1" POLYSTYRENE BETWEEN END OF DOWEL AND END CAP. TAPE TO BAR FOR WATERTIGHT SEAL.
4. BEND VERTICAL JOINT WATERSTOP OVER TO CENTERLINE OF WALL IN BOTTOM 2'-0" OF WALL, AND SPLICE TO WATERSTOP IN WALL BASE CONSTRUCTION JOINT. SEE (0315-012)
5. PROVIDE EXPANSION JOINT COVERS AT ALL EXPOSED AREAS. SEE ARCHITECTURAL DRAWINGS FOR DETAIL.

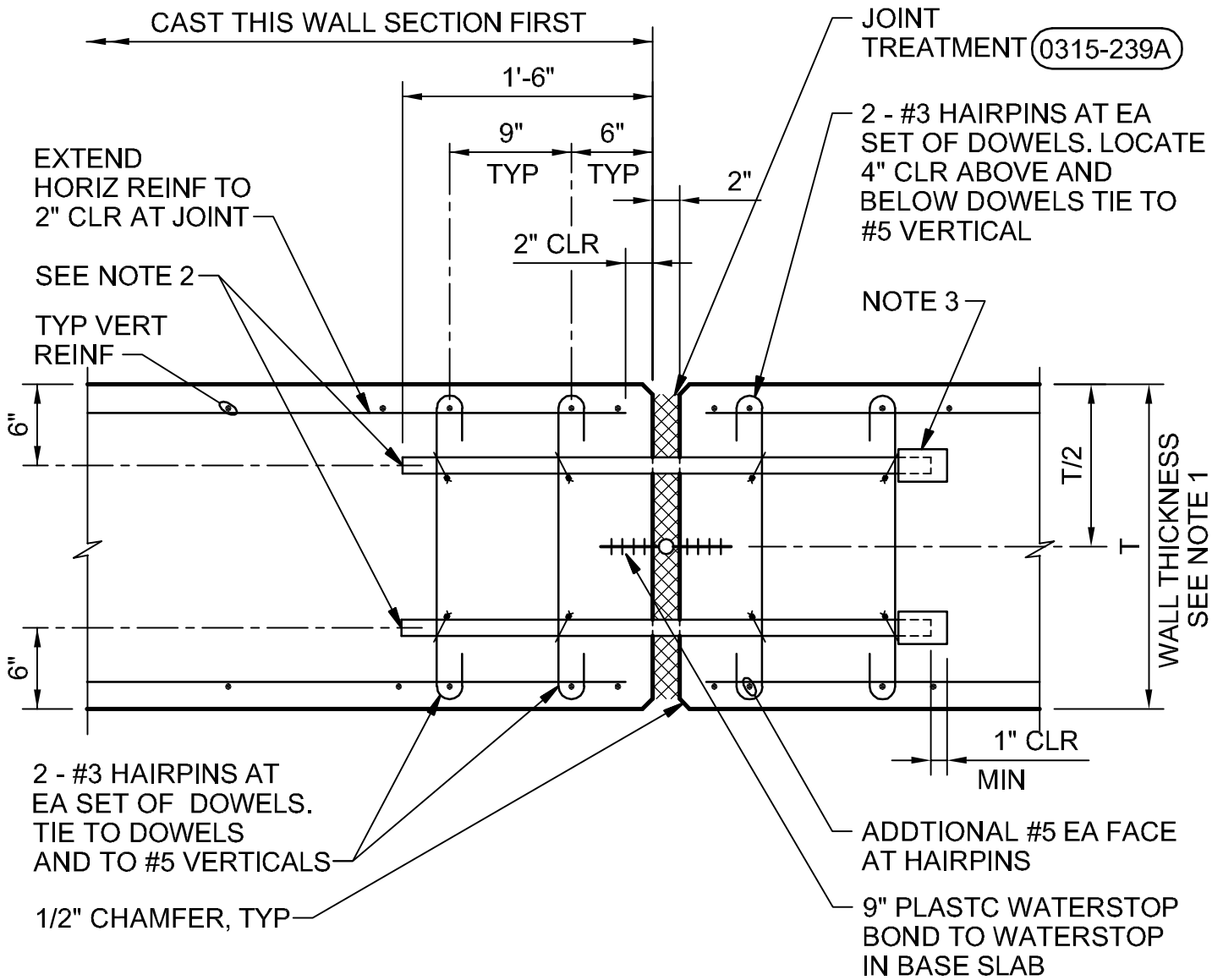
WALL VERTICAL EXPANSION JOINT

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

0315-232

**CH2MHILL**



PLAN

NOTES:

1. FOR WALLS GREATER THAN 24" THICK.
2. 1" DIA x 3'-0" SMOOTH COATED STEEL BAR DOWELS. LOCATE AT 1'-0" MAX FROM T & B OF WALL AND AT 2'-0" MAX SPACING. ALIGN AND TIE IN PLACE TO REINFORCING. COATING SHALL CONSIST OF A CORROSION RESISTANT COATING PLUS A LUBRICANT COATING AS SPECIFIED.
3. 1" ID x 2" PLASTIC EXP CAP WITH 1" POLYSTYRENE BETWEEN END OF DOWEL AND END OF CAP. TAPE TO BAR FOR WATERTIGHT SEAL.

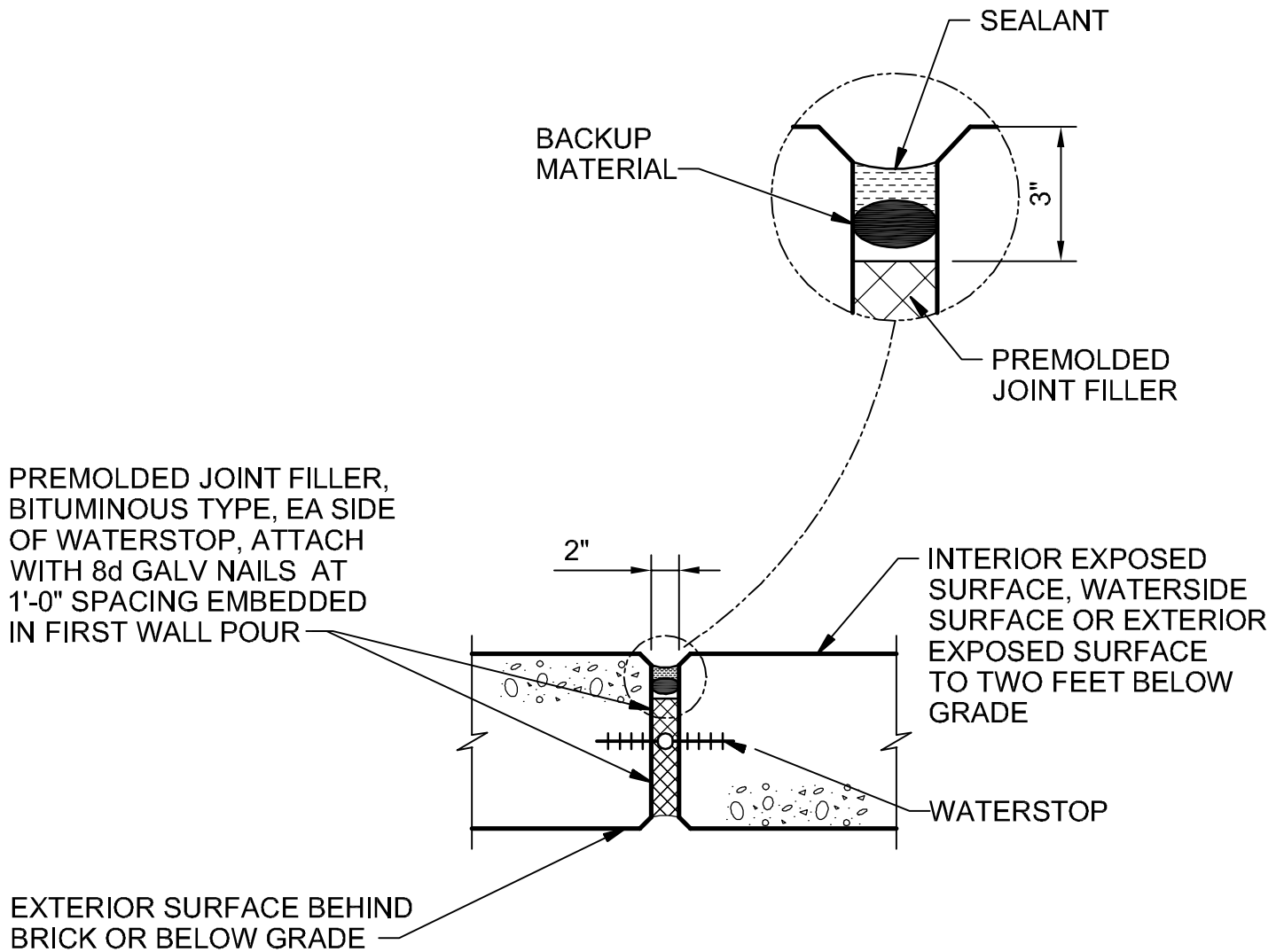
WALL VERTICAL EXPANSION JOINT

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

0315-233

**CH2MHILL**



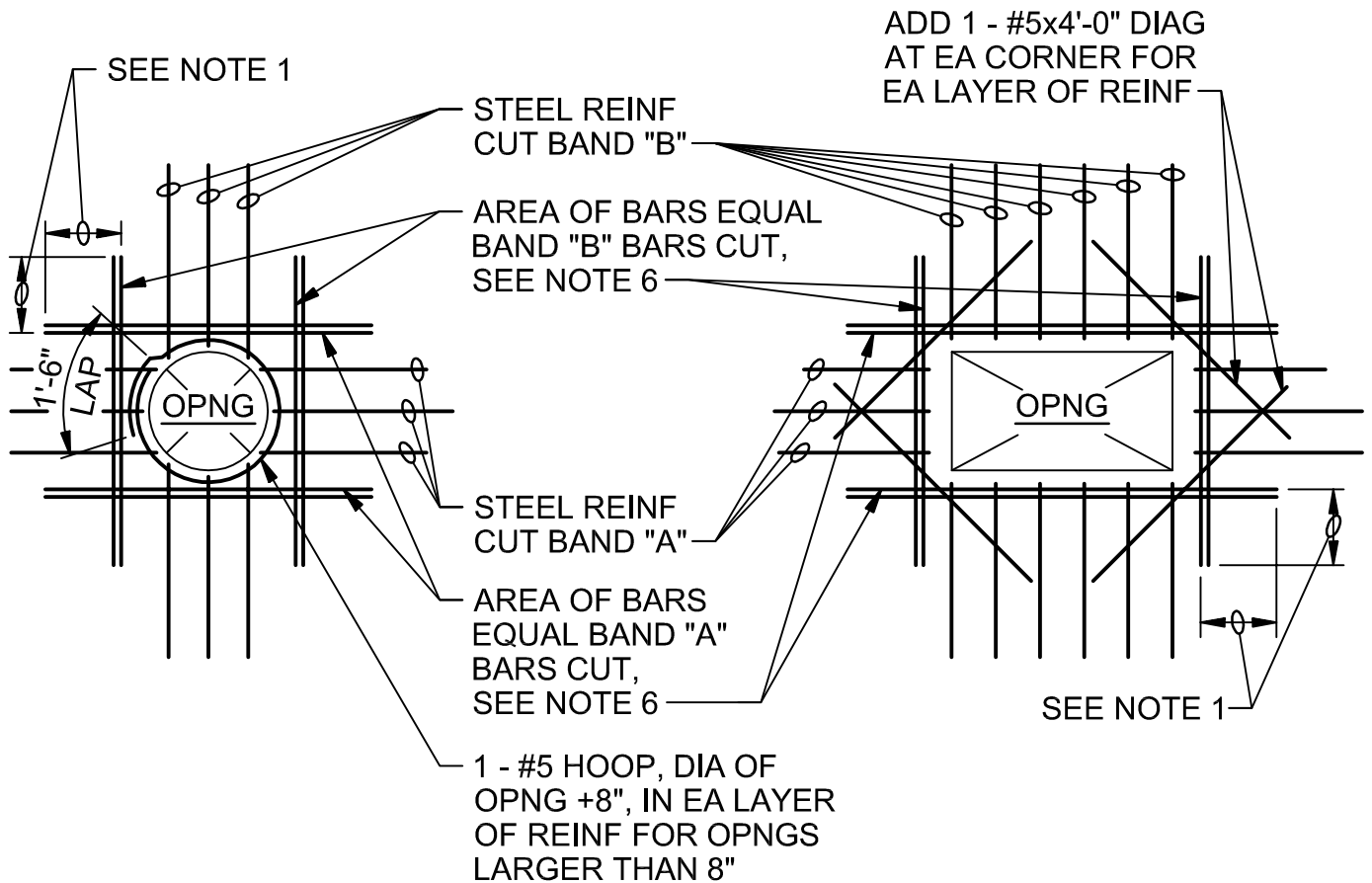
PLAN

## WALL EXPANSION JOINT TREATMENT

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

0315-239A



**NOTES:**

1. PROVIDE MINIMUM LAP, SEE GENERAL STRUCTURAL NOTES.
2. TYPICAL FOR ALL OPENINGS IN CONCRETE WALLS OF BELOW GRADE AND HYDRAULIC STRUCTURES AND ALL STRUCTURAL CONCRETE SLABS UNLESS INDICATED OTHERWISE ON PLANS.
3. DO NOT WELD REINFORCEMENT TO PIPE SLEEVES AND INSERTS.
4. PROVIDE A MINIMUM OF 2 "A" BARS AND 2 "B" BARS EACH SIDE OF OPENING (1 EACH FACE).
5. FOR OPENINGS LARGER THAN 8'-0", REINFORCE SAME AS FOR 8'-0" OPENINGS.
6. SPACE AT 3 BAR DIAMETERS (OR 3" MINIMUM) ON CENTER.

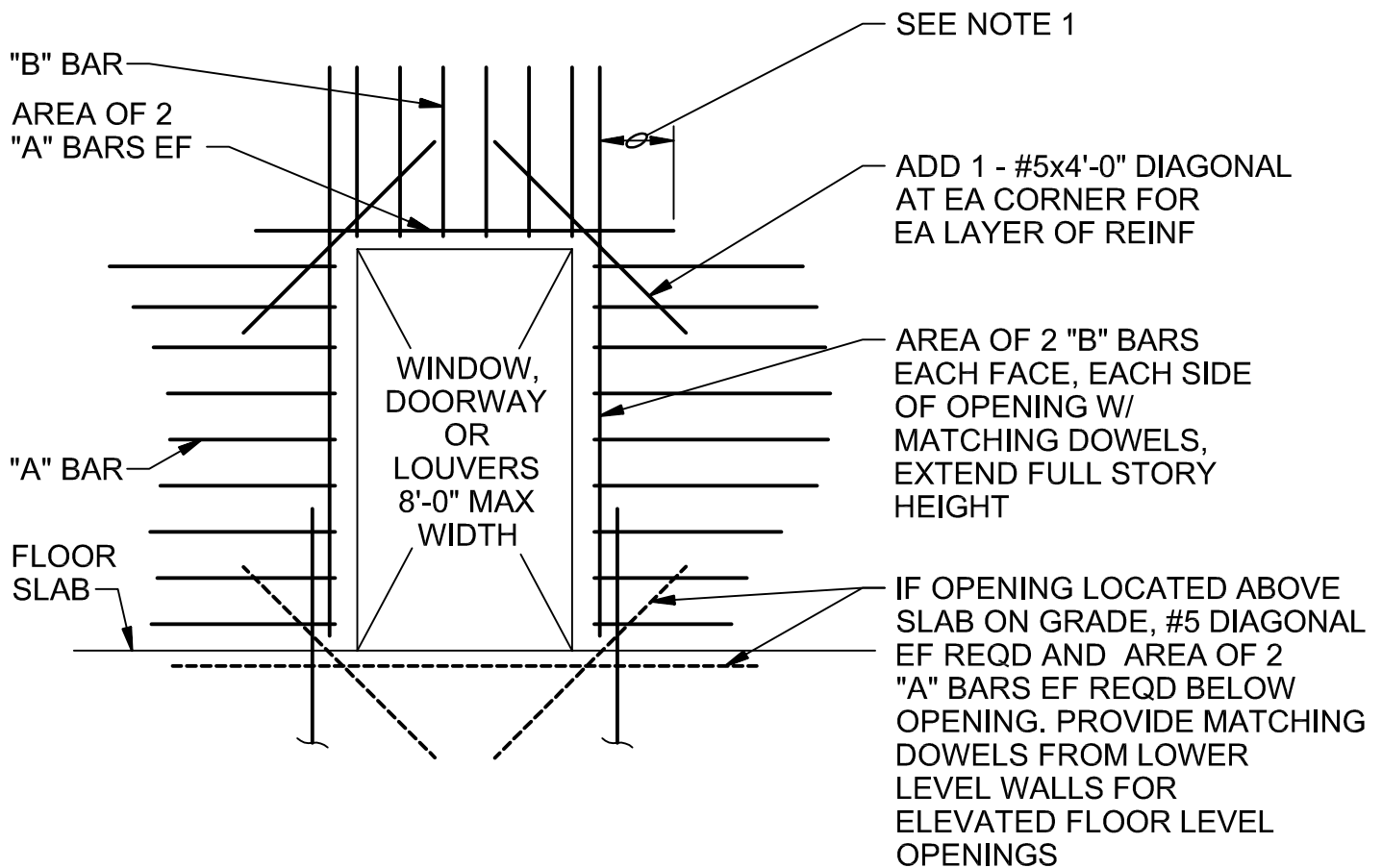
**OPENING REINFORCING**

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

0330-001

**CH2MHILL**



ELEVATION

NOTES:

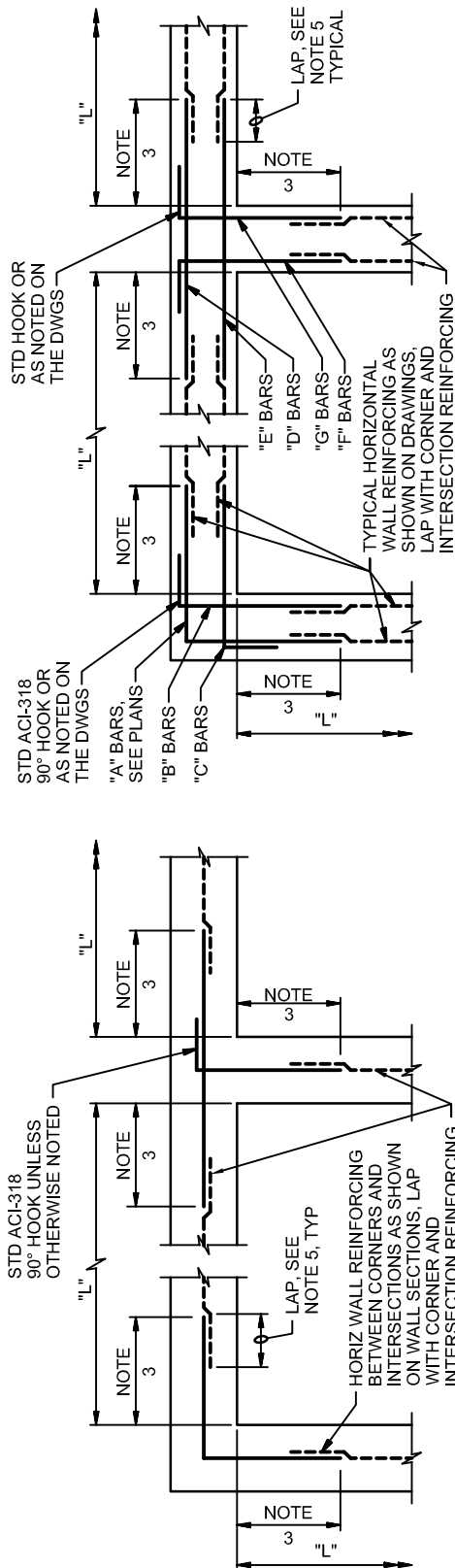
1. PROVIDE MINIMUM LAP, SEE GENERAL STRUCTURAL NOTES.
2. TYPICAL FOR ALL OPENINGS IN ABOVE GROUND BUILDING CONCRETE WALLS UNLESS INDICATED OTHERWISE ON PLANS.
3. DO NOT WELD REINFORCEMENT TO PIPE SLEEVES AND INSERTS.

OPENING REINFORCING

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

0330-002



DOUBLE REINFORCING MAT

SINGLE REINFORCING MAT

NOTES:

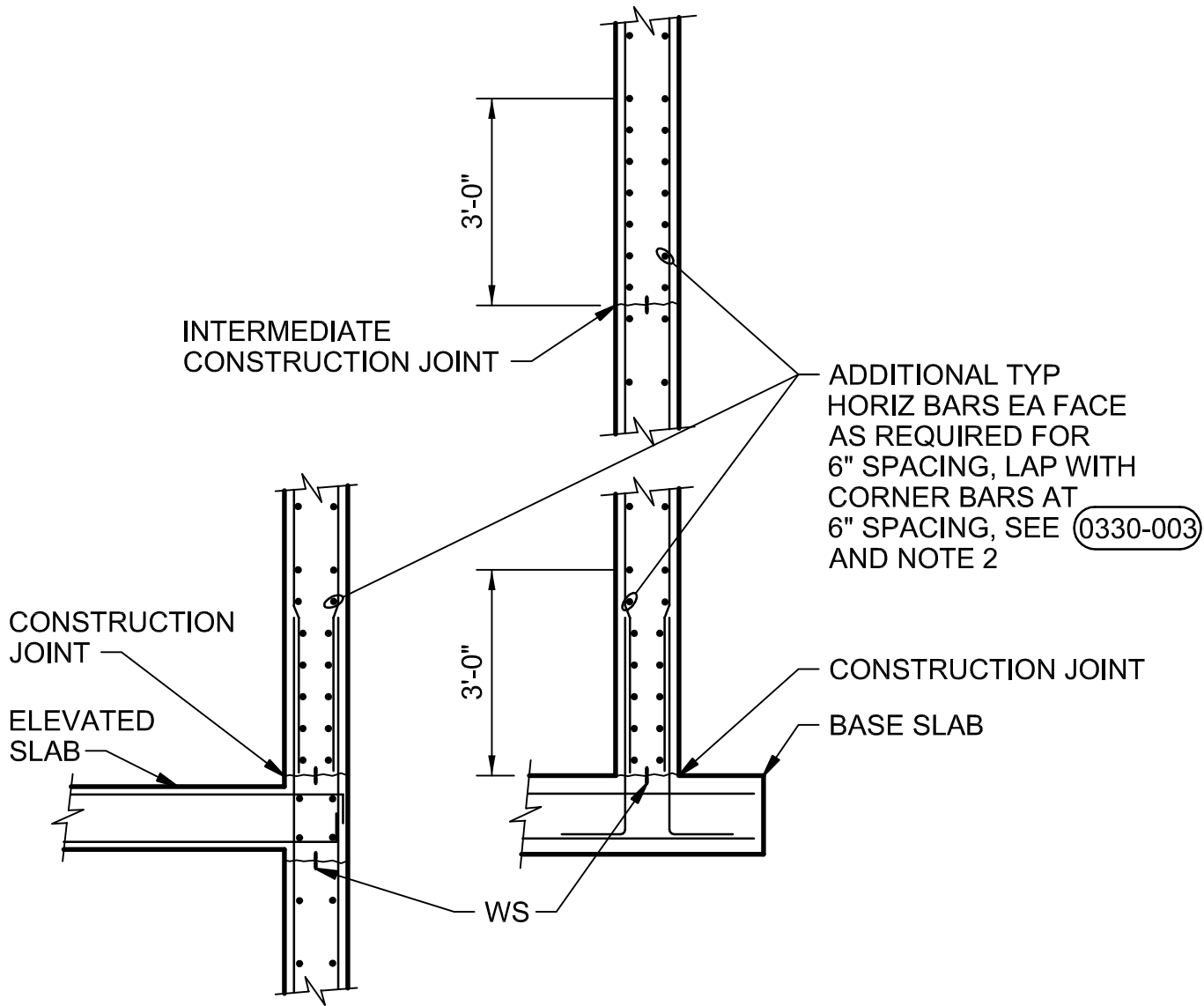
1. TYPICAL HORIZONTAL WALL CORNER AND INTERSECTION REINFORCING LAYOUT IS SHOWN TO AVOID CONGESTION AND PERMIT PROPER PLACEMENT. FOR SIZE AND SPACING SEE PLANS. ALL HORIZONTAL REINFORCING AT CORNERS AND INTERSECTIONS SHALL BE FABRICATED AND INSTALLED WITH SPLICES LOCATED WHERE SHOWN REGARDLESS OF BAR SIZE AND SPACING.
2. WHERE THE CORNER OR INTERSECTION REINFORCING SIZE AND SPACING IS NOT SHOWN, NOTED OR TABULATED ON THE PLANS, THE SIZE AND SPACING SHALL BE THE SAME AS THE WALL HORIZONTAL REINFORCING SHOWN ON THE WALL SECTIONS OR AS NOTED FOR THE REINFORCING BETWEEN THE CORNERS OR INTERSECTIONS.
3. EXCEPT WHERE OTHERWISE SHOWN ON THE DRAWINGS, THE LENGTH INDICATED AS "NOTE 3" SHALL BE THE LESSER OF L/4, 10 FEET, OR 1.0 TIMES THE HEIGHT OF THE WALL, EXCEPT THAT IN NO CASE SHALL IT BE LESS THAN 2 FEET.
4. L = LENGTH OF WALL PARALLEL TO THE BAR LENGTH IN QUESTION.
5. EXCEPT WHERE OTHERWISE SHOWN ON THE DRAWINGS, THE LENGTH INDICATED AS "NOTE 5" SHALL BE EQUAL TO ONE "LAP LENGTH" AS REQUIRED BY THE GENERAL STRUCTURAL NOTES. USE THE LAP LENGTH AS REQUIRED FOR THE SMALLER OF THE TWO REINFORCING BARS BEING SPLICED.
6. UNLESS OTHERWISE NOTED, "B" AND "C" BARS ARE THE SAME SIZE AND SPACING AND, "F" AND "G" BARS ARE THE SAME SIZE AND SPACING.

# TYPICAL WALL CORNER AND INTERSECTION REINFORCING

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

0330-003



WALL SECTION

NOTES:

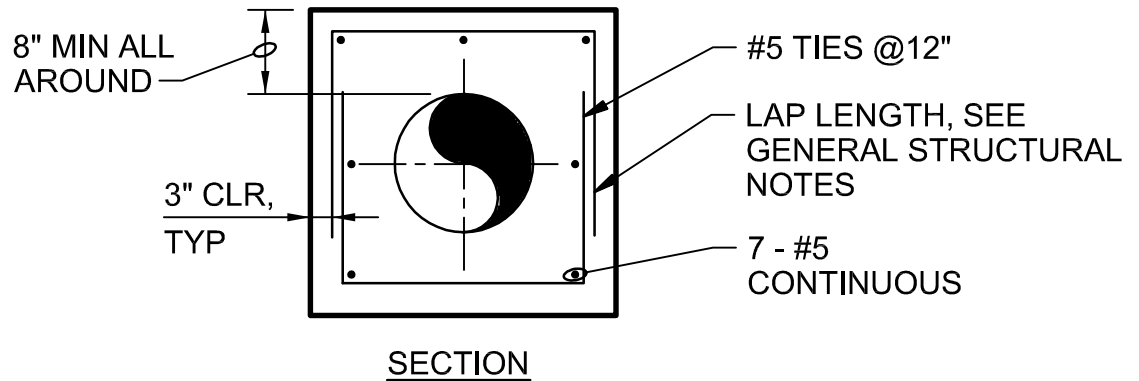
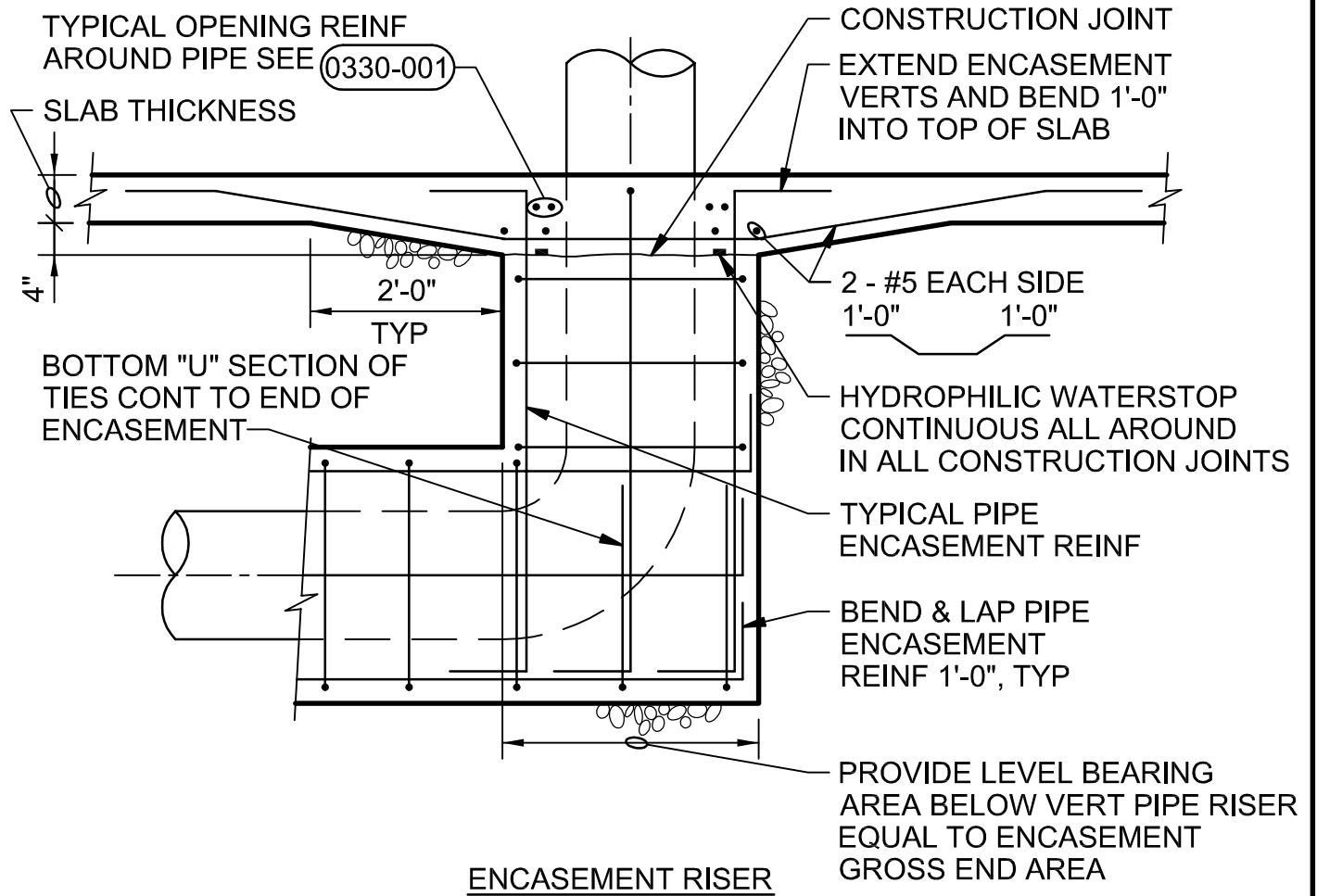
1. PROVIDE ADDITIONAL HORIZONTAL BARS AS SHOWN IN THE FIRST THREE FEET ABOVE ALL HORIZONTAL WALL CONSTRUCTION JOINTS IN HYDRAULIC AND BELOW-GRADE STRUCTURES.
2. PROVIDE ADDITIONAL HORIZONTAL CORNER BARS EACH FACE AS REQUIRED FOR 6" SPACING TO LAP WITH THE ADDITIONAL TYPICAL HORIZONTAL BARS SHOWN.

ADDITIONAL REINFORCING AT HORIZ CONSTRUCTION JOINT

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

0330-004



**NOTES:**

1. SECTION APPLIES TO PIPES W/ DIAMETERS 18" AND SMALLER. FOR 20" DIAMETER PIPES AND LARGER, SEE (0330-017)
2. WHEN PIPE ENCASEMENT IS CLOSER THAN 4" TO SLAB ABOVE, TIE SLAB & ENCASEMENT TOGETHER. SEE (0330-018)

**PIPE ENCASEMENT**

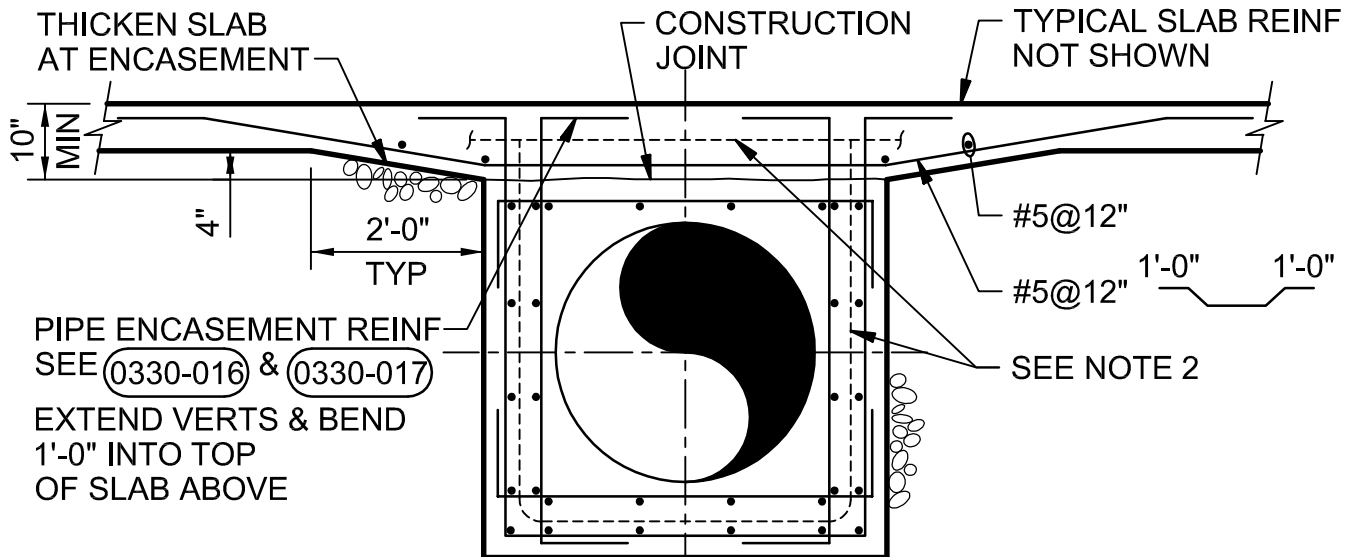
NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

0330-016

**CH2MHILL**





THICKENED SLAB AT ENCASEMENT  
 10" MIN  
 4"  
 2'-0" TYP  
 PIPE ENCASEMENT REINF  
 SEE (0330-016) & (0330-017)  
 EXTEND VERTS & BEND  
 1'-0" INTO TOP  
 OF SLAB ABOVE

CONSTRUCTION JOINT  
 TYPICAL SLAB REINF NOT SHOWN  
 #5@12"  
 #5@12" 1'-0" 1'-0"  
 SEE NOTE 2

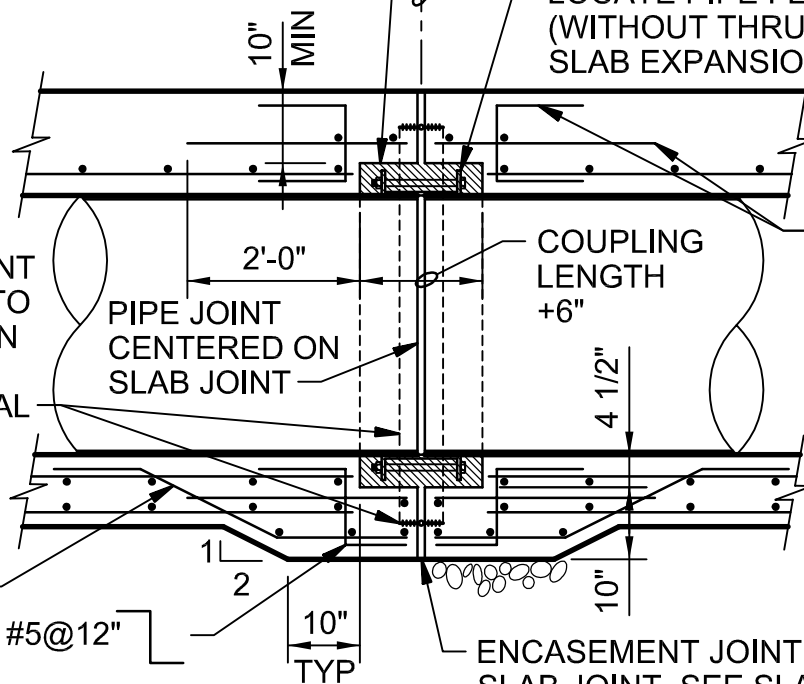
CLOSED CELLULAR SPONGE  
 RUBBER ALL AROUND COUPLING  
 TO ALLOW JOINT MOVEMENT (1" MIN)

SECTION

CL SLAB EXP, CONTRACTION  
 OR CONTROL JOINT, SEE PLANS  
 FOR LOCATION & JOINT TYPE

LOCATE PIPE FLEX COUPLING  
 (WITHOUT THRUST TIES) AT ALL  
 SLAB EXPANSION & CONTROL JOINTS

6" PLASTIC  
 WATERSTOP  
 IN ENCASEMENT  
 JOINT. WELD TO  
 WATERSTOP IN  
 SLAB JOINT  
 FOR CONT SEAL



#5@12" TYPICAL  
 ENCASEMENT REINF  
 DISCONTINUOUS  
 AT JOINT

#5@12", TYP

#5@12"

10" TYP

ENCASEMENT JOINT TYPE SAME AS  
 SLAB JOINT, SEE SLAB JOINT DETAILS

JOINT DETAIL

NOTES:

1. TIE PIPE ENCASEMENT TO SLAB AS SHOWN WHEN DISTANCE BETWEEN PIPE ENCASEMENT AND BOTTOM OF SLAB IS LESS THAN 4".
2. 6" PLASTIC WS IN ENCASEMENT JOINTS. WELD TO WS IN SLAB JOINTS.

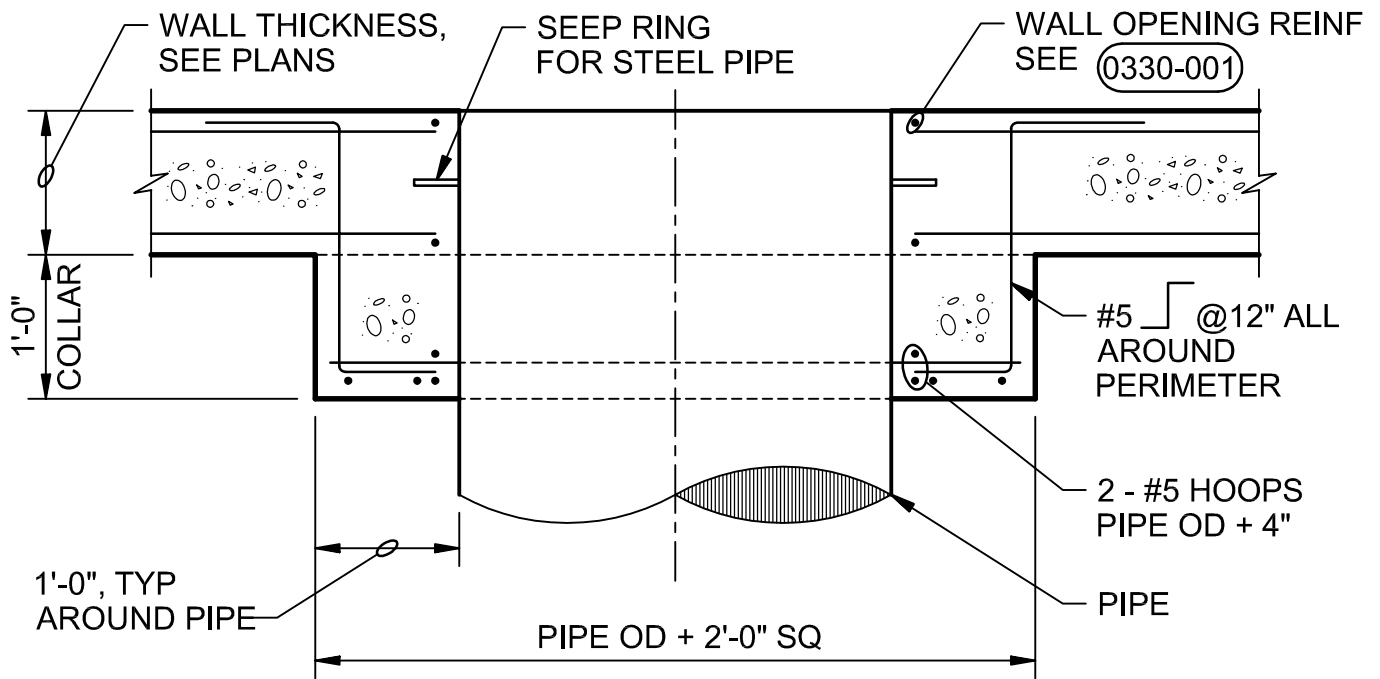
PIPE ENCASEMENT AT SLAB

NTS

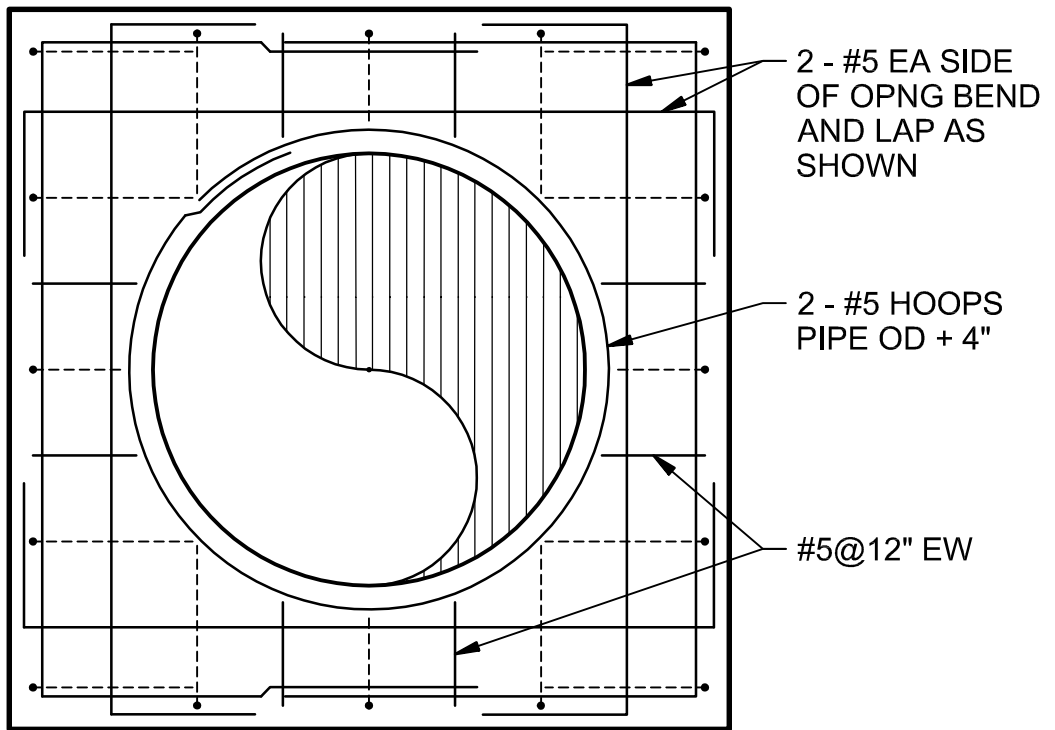
ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

0330-018

**CH2MHILL**



PLAN/SECTION



ELEVATION

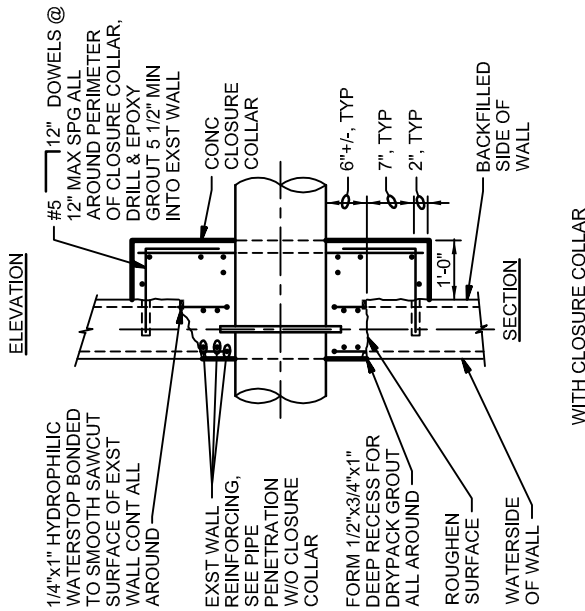
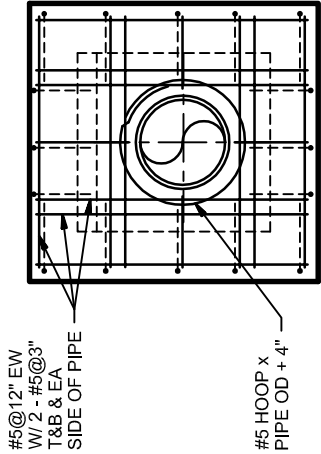
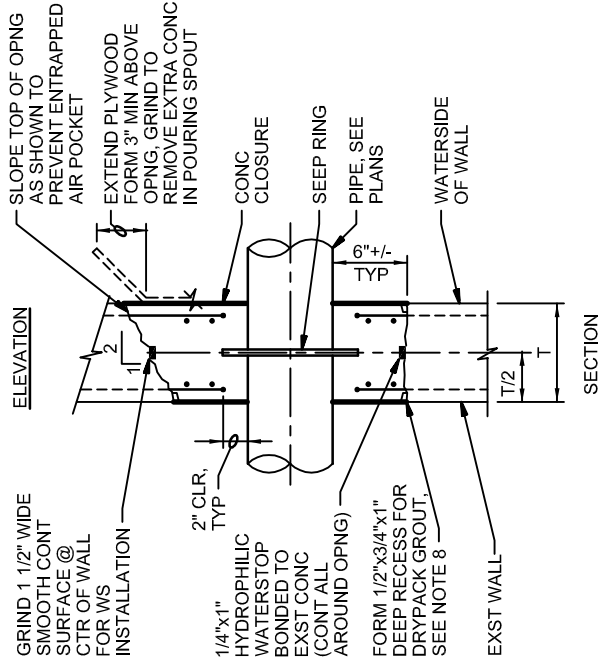
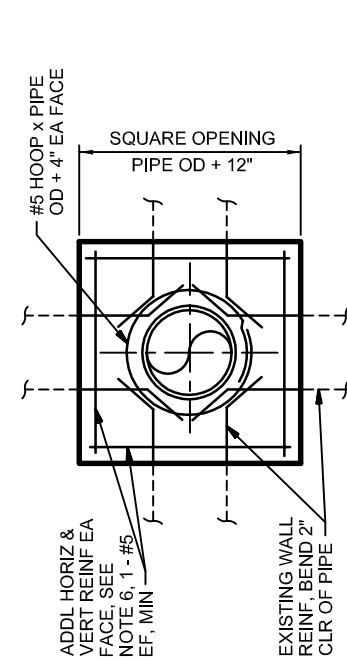
PIPE COLLAR

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

0330-021

**CH2MHILL**



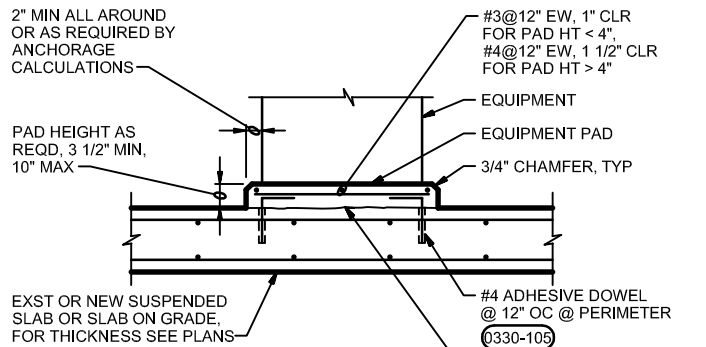
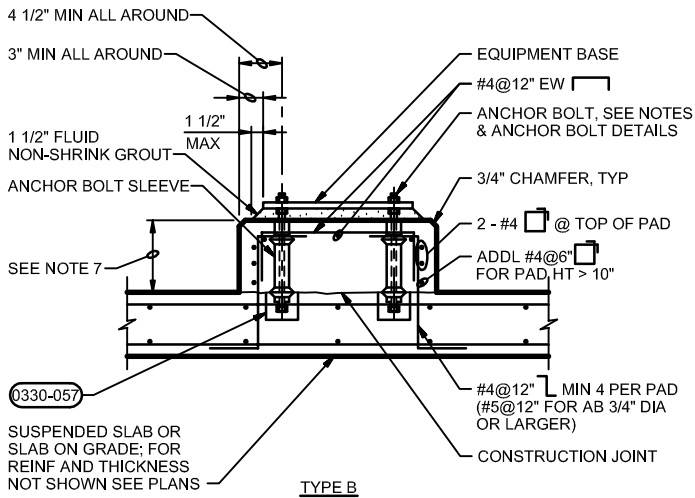
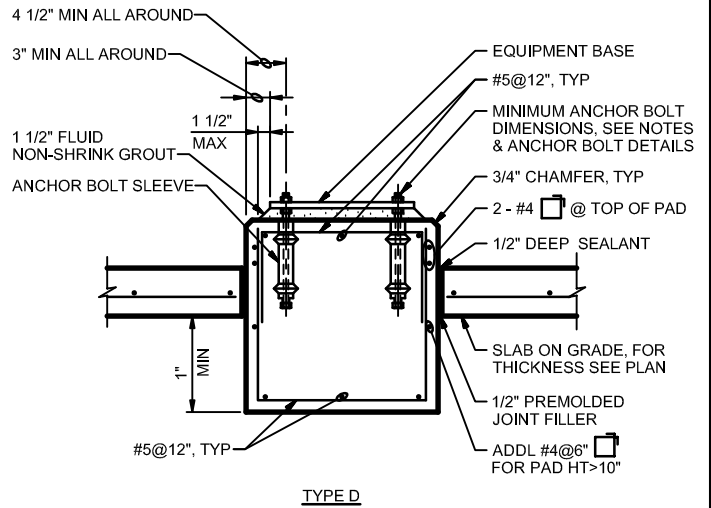
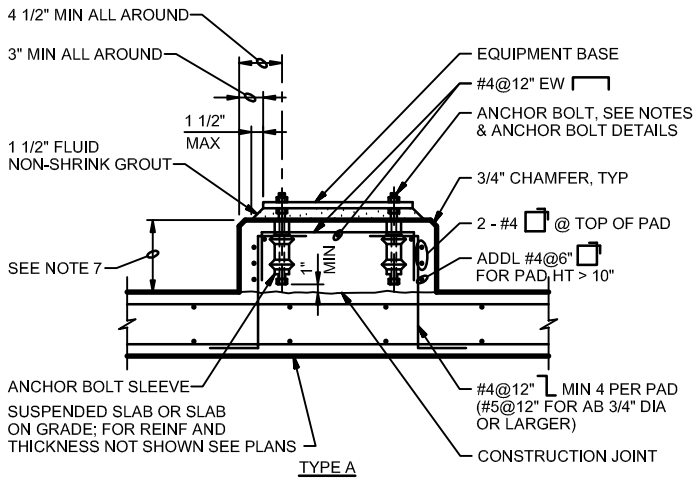
# PIPE PENETRATION - EXISTING WALL

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

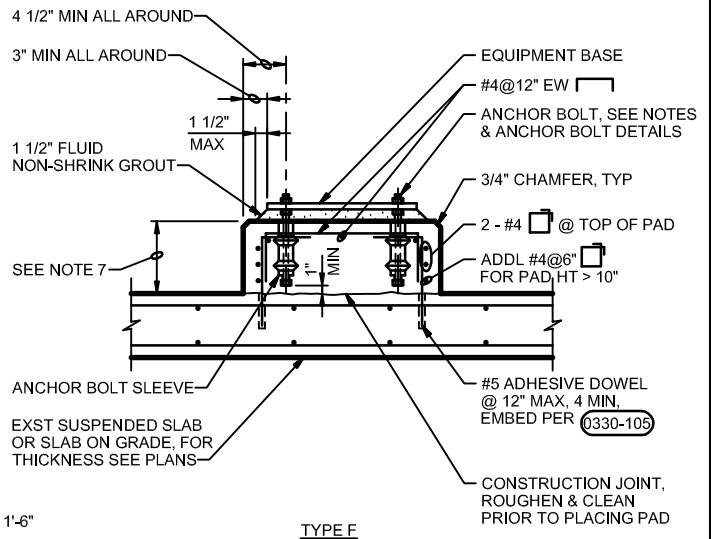
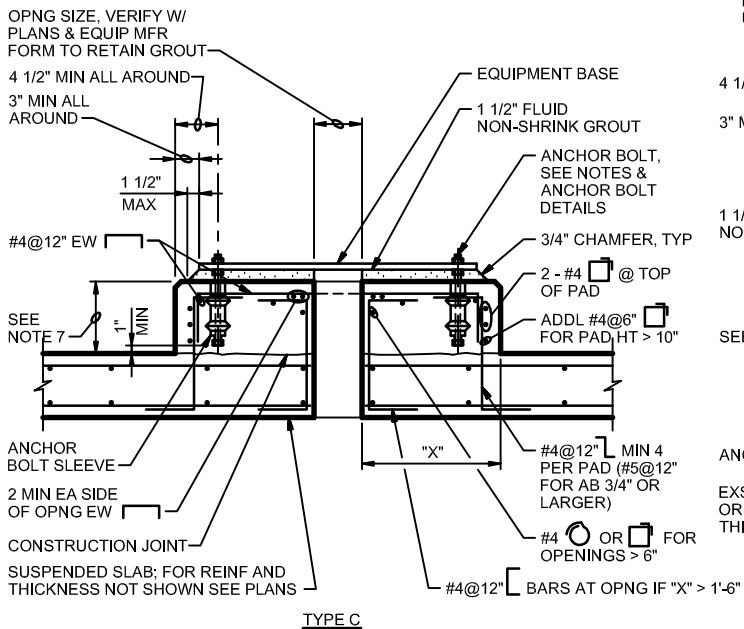
**NOTES:**

1. SAW-CUT 1-INCH DEEP x PIPE OD + 12" SQUARE SCORE LINE ON EACH FACE OF WALL. (VERIFY DEPTH OF CUT TO CLEAR REINFORCING.) (INCREASE HEIGHT AS NOTED AT TOP ON WATERSIDE FACE FOR POURING.)
2. CHIP TO REMOVE THE CONCRETE WITHIN THE SCORE LINE, WHILE PRESERVING THE EXISTING WALL REINFORCING.
3. CUT EXISTING REINFORCING AT CENTER OF OPENING AND BEND TO CLEAR PIPE.
4. GRIND 1 1/2" WIDE x CONT SMOOTH SURFACE ALL AROUND THE OPENING AT CENTER OF WALL. CLEAN SURFACES AND BOND CONTINUOUS HYDROPHILIC WATERSTOP IN PLACE.
5. INSTALL WALL PIPE. (COAT CONCRETE ENCASED PORTION OF PIPE WITH SPECIFIED COATING SYSTEM.)
6. INSTALL ADDITIONAL REINFORCING EACH FACE, EACH SIDE, ABOVE AND BELOW PIPE. HORIZONTAL REINFORCING TO HAVE COMBINED AREA EQUAL TO AREA OF VERTICAL REINFORCING TO HAVE COMBINED AREA EQUAL TO AREA OF VERTICAL REINFORCING CUT. VERTICAL REINFORCING TO HAVE COMBINED AREA EQUAL TO AREA OF VERTICAL REINFORCING CUT.
7. SOAK CONCRETE SURFACES AND WITHIN 15-MINUTES CAST CONCRETE CLOSURE. (CONCRETE CLOSURE MUST BE CAST BEFORE HYDROPHILIC WATERSTOP EXPANDS.) FORM GROOVE ON ALL SIDES OF OPENING EXCEPT AT TOP ON THE POUR SIDE.
8. CLEAN SURFACES OF FORMED GROOVE WITH POWER WIRE BRUSH OR SANDBLASTING AND DRY-PACK WITH NON-SHRINK GROUT AFTER NEW CONCRETE MIN 28-DAYS OLD.



**NOTES:**

1. WHEN ANCHORAGE OF EQUIPMENT TO PAD IS REQUIRED, USE CONCRETE ANCHORS SPECIFIED.
2. CONCRETE PADS FOR ELECTRICAL EQUIPMENT SHALL BE 3 1/2" HIGH, UNLESS NOTED OTHERWISE.



**GENERAL NOTE:**  
 FOR GENERAL NOTES SEE DETAIL 2 OF 2.

# CONCRETE EQUIPMENT PADS

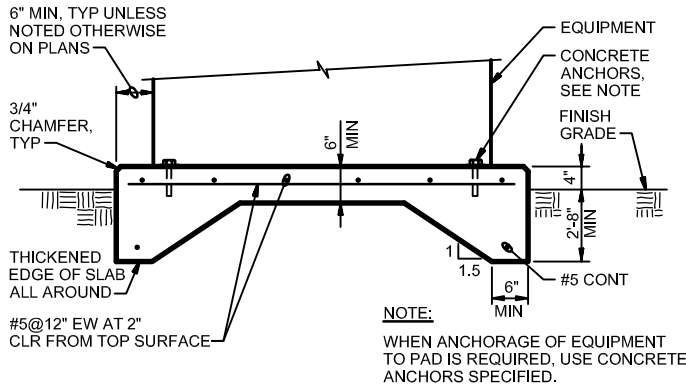
NTS

DETAIL 1 OF 2

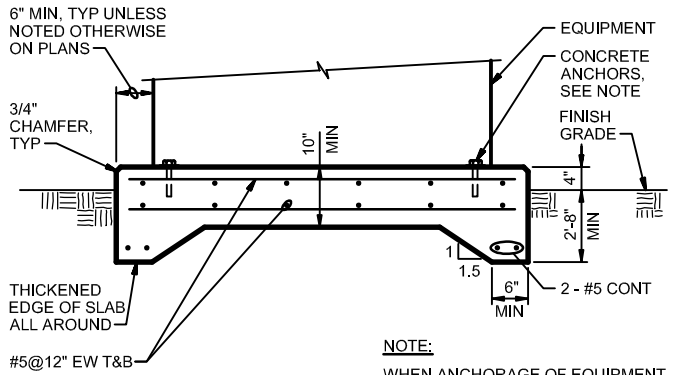
ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

0330-056

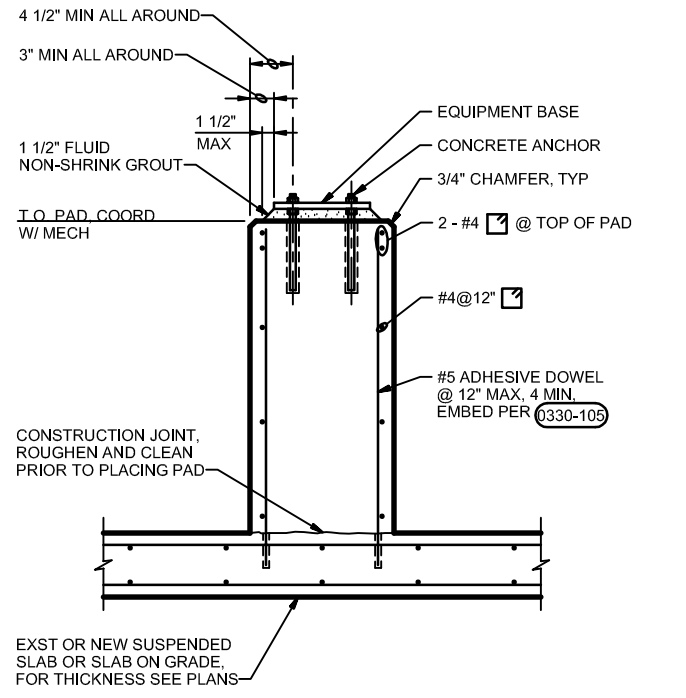
**CH2MHILL**



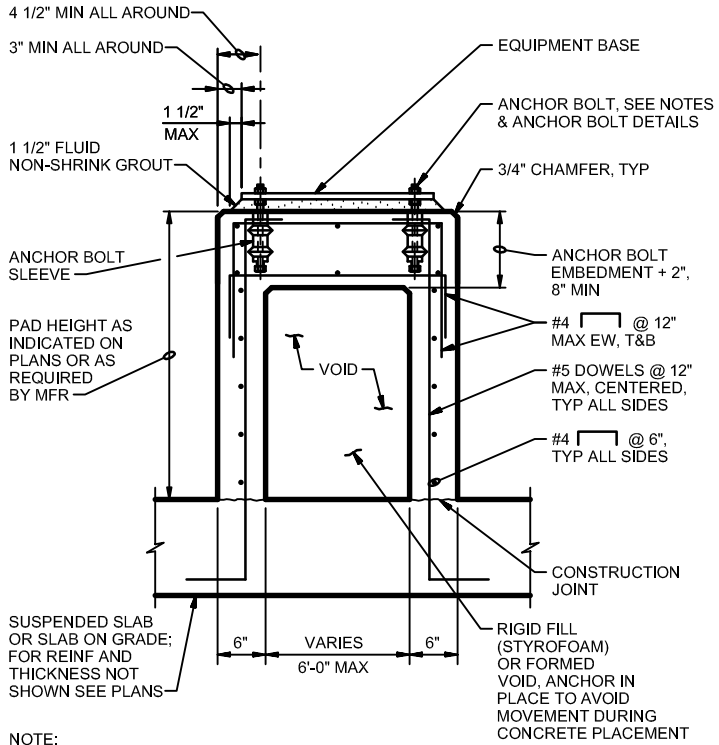
**TYPE G**



**TYPE H**



**TYPE J**



**TYPE K**

**NOTE:**  
DO NOT USE FOR VIBRATORY EQUIPMENT OR FOR EQUIPMENT THAT WEIGHS MORE THAN 2000 POUNDS.

- NOTES:**
- PAD SIZE SHALL BE MINIMUM INDICATED OR AS SHOWN ON THE PLANS OR AS INDICATED BY THE MANUFACTURER AND APPROVED BY THE ENGINEER.
  - THE SIZE, NUMBER, TYPE, LOCATION, AND THREAD PROJECTION OF THE ANCHOR BOLTS SHALL BE DETERMINED BY THE EQUIPMENT MANUFACTURER AND AS APPROVED BY THE ENGINEER. ANCHOR BOLTS SHALL BE HELD IN POSITION WITH A TEMPLATE OR OTHER ACCEPTABLE MEANS, MATCHING THE BASE PLATE, WHILE PAD IS BEING PLACED.
  - ANCHOR BOLT SLEEVES SHALL BE USED TO PROVIDE MINIMUM ANCHOR BOLT MOVEMENT OF 1/2" IN ALL HORIZONTAL DIRECTIONS. THE MINIMUM SLEEVE LENGTH SHALL BE 8 TIMES THE BOLT DIAMETER.
  - ANCHOR BOLT SLEEVES SHALL HAVE A MINIMUM INTERNAL DIAMETER 1" GREATER THAN BOLT DIAMETER AND A MAXIMUM INTERNAL DIAMETER 3" GREATER THAN ANCHOR BOLT DIAMETER. SLEEVES SHALL BE FILLED WITH NON-SHRINK GROUT AFTER BOLTS ARE ALIGNED. SEE (0330-057).
  - EQUIPMENT BASES SHALL BE INSTALLED LEVEL UNLESS INDICATED OTHERWISE.
  - WEDGES, SHIMS, OR LEVELING NUTS SHALL BE USED TO SUPPORT THE BASE WHILE THE NON-SHRINK GROUT IS PLACED. WEDGES OR SHIMS THAT ARE LEFT IN PLACE SHALL NOT BE EXPOSED TO VIEW.
  - HEIGHT OF PADS SHALL BE MINIMUM REQUIRED FOR ANCHOR BOLT CLEARANCE TO KEEP ANCHOR BOLT ABOVE SUPPORTING SLAB (SEE TABLE BELOW). WHERE EQUIPMENT OR PIPING ELEVATION REQUIRE A PAD HEIGHT LESS THAN THE MINIMUM SHOWN, USE TYPE "B" EQUIPMENT PAD WITH BLOCKOUT.
  - TYPE "D" PAD SHALL BE USED ONLY WHERE SPECIFICALLY INDICATED. PLACE THE SURROUNDING FLOOR SLAB AFTER THE EQUIPMENT PAD.
  - AT CONTRACTOR'S OPTION, CONCRETE ANCHORS MAY BE USED IN LIEU OF CAST-IN-PLACE ANCHOR BOLTS FOR EQUIPMENT ANCHOR BOLTS LESS THAN 3/4" DIAMETER WHEN APPROVED BY THE EQUIPMENT MANUFACTURER AND APPROVED BY THE ENGINEER. ANCHORS SHALL BE INSTALLED WITH 4" MINIMUM EDGE DISTANCE IN EACH DIRECTION.

AB DIA (IN.)	1/2	5/8	3/4	7/8	1	1 1/4	1 3/8	1 1/2	1 3/4	2
MIN PAD HT (IN.)	7	8 1/2	10	11	12 1/2	15	16 1/2	18	21	24

# CONCRETE EQUIPMENT PADS

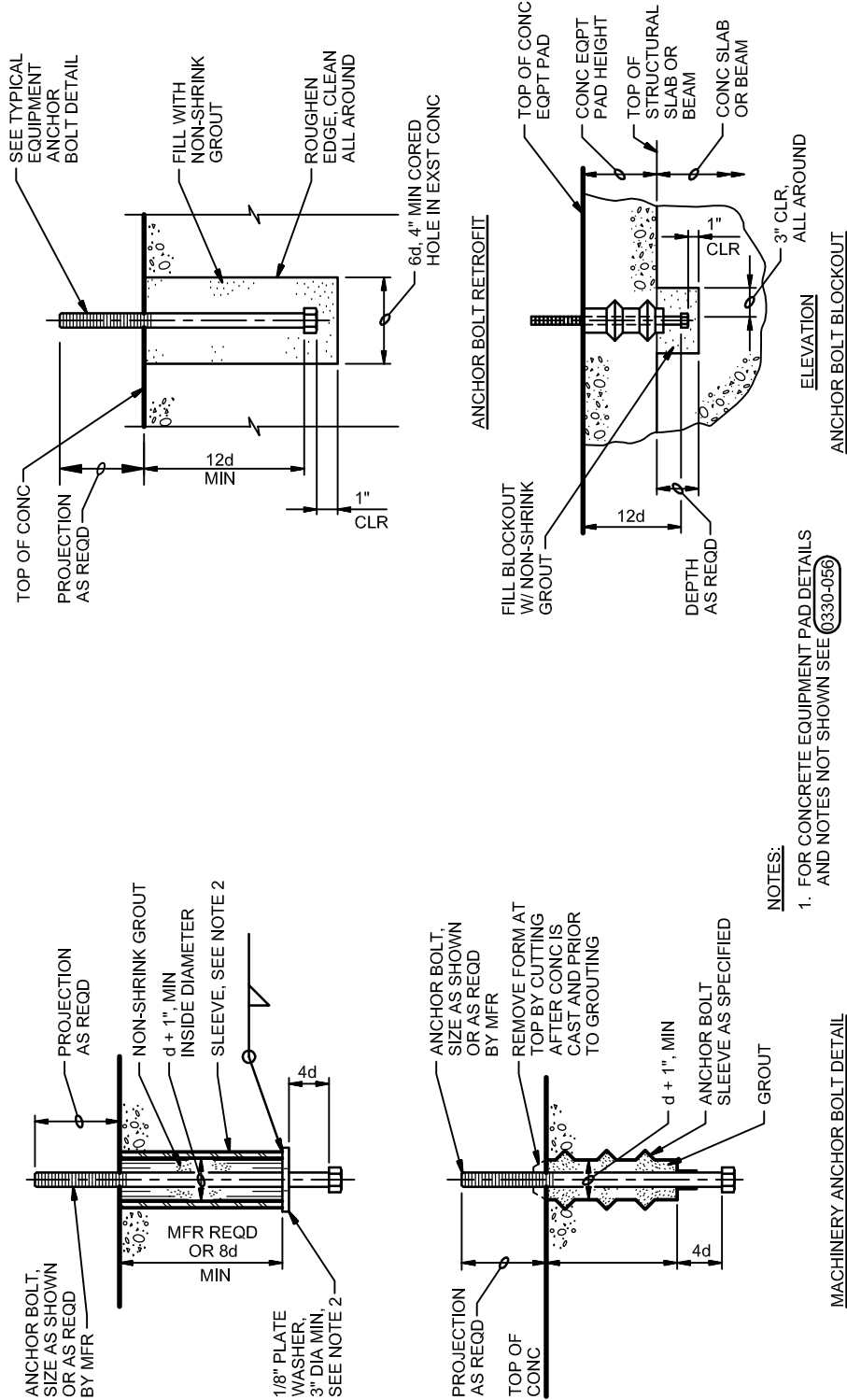
NTS

DETAIL 2 OF 2

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

0330-056





**NOTES:**

1. FOR CONCRETE EQUIPMENT PAD DETAILS AND NOTES NOT SHOWN SEE 0330-050
2. MATERIAL TO MATCH BOLT.

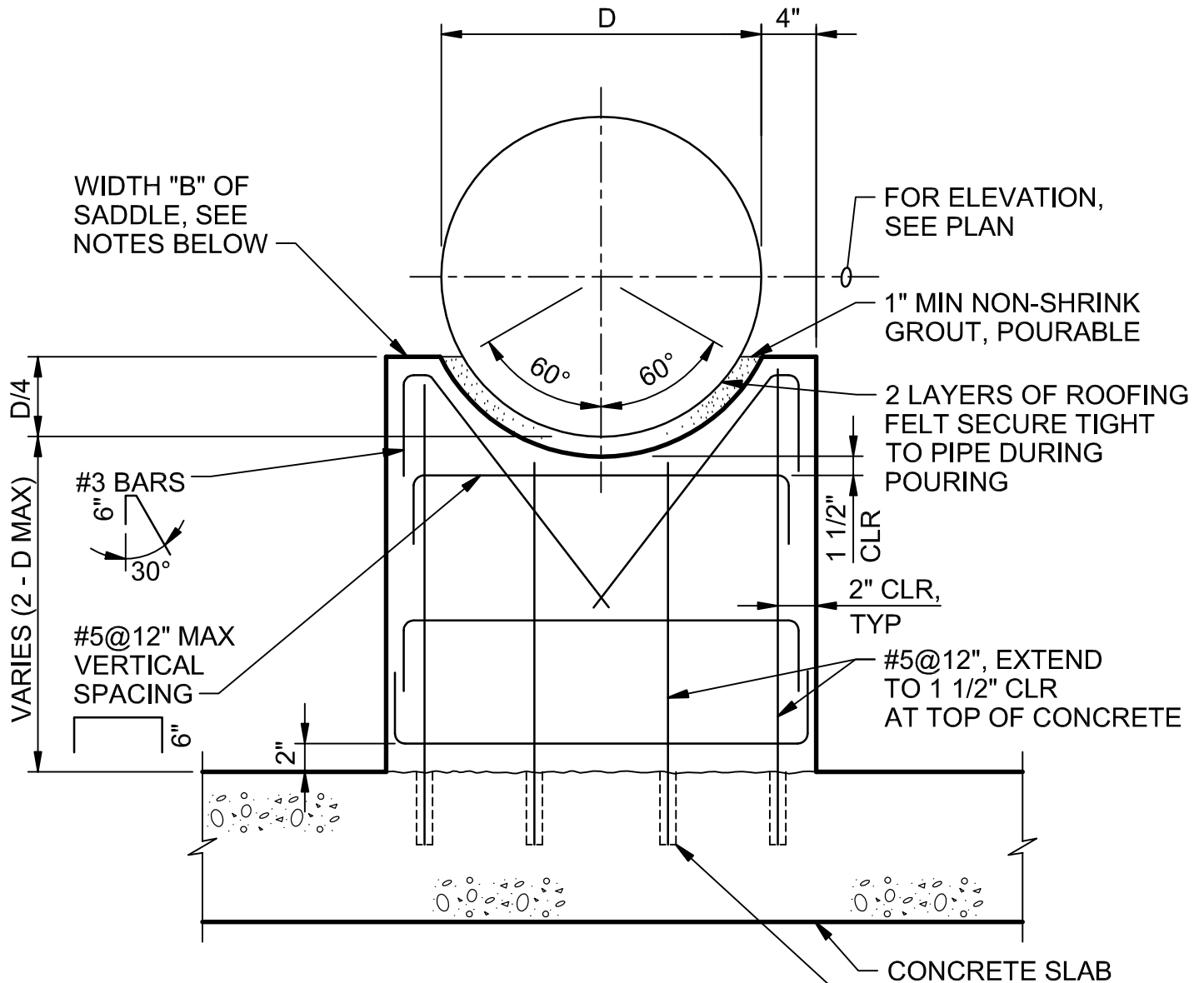
MACHINERY ANCHOR BOLT DETAIL

# ANCHOR BOLT DETAILS

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

0330-057



**NOTES:**

1. THICKNESS "B" OF SADDLE  
 B = 6" WHEN: D < 12"  
 B = 8" WHEN: 12" ≤ D < 24"  
 B = 10" WHEN: 24" ≤ D < 36"  
 B = 12" WHEN: 36" ≤ D < 48"

2. FOR "B"=10" OR THICKER, USE 2 LAYERS OF REINFORCING, TURN HORIZONTAL BARS 90° TO HOOK AROUND VERTICALS , 1 1/2" CLEAR OF CONCRETE
3. FORM 3/4" BEVEL ON ALL EXPOSED CORNERS OF SUPPORT.

CONCRETE SLAB  
 DRILL AND ADHESIVE ANCHOR REINF INTO EXST CONC (0330-105) OR PROVIDE STD HOOKS AT EMBEDDED CONCRETE

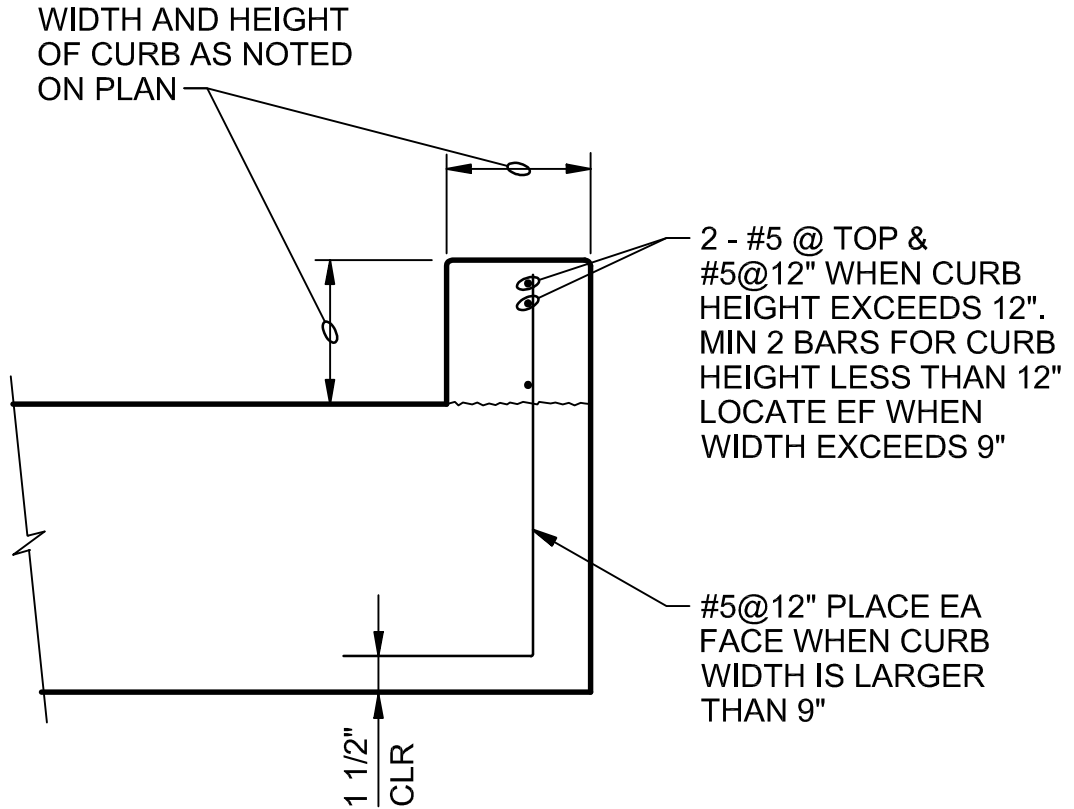
**CONCRETE PIPE SADDLE**

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

0330-061

**CH2MHILL**



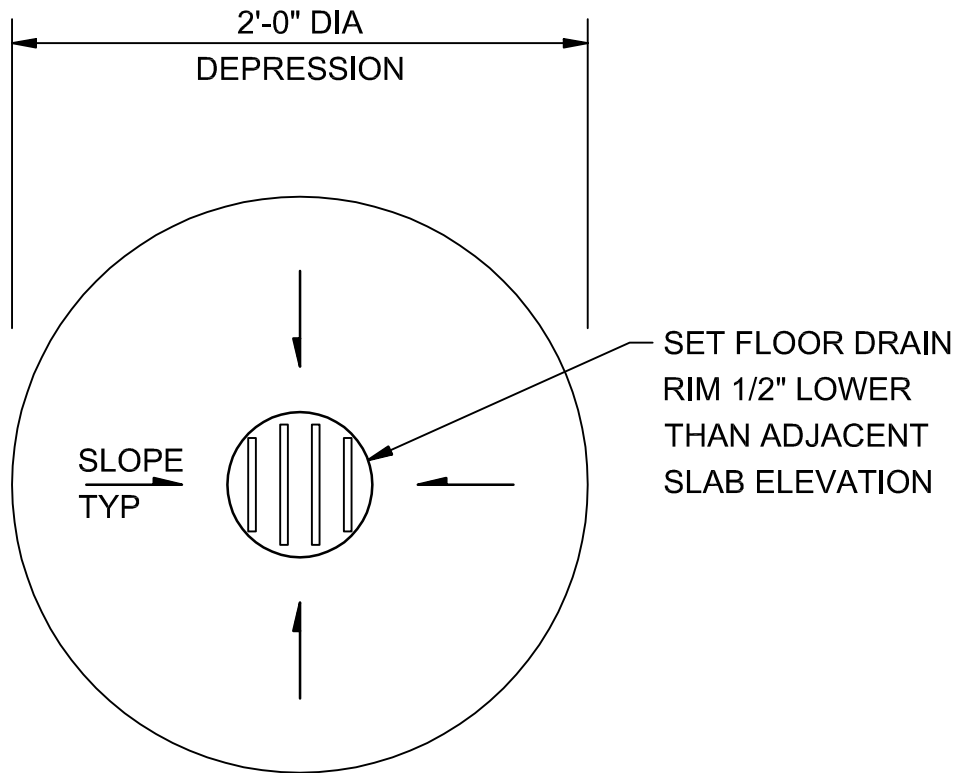
## CONCRETE CURB

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

0330-080



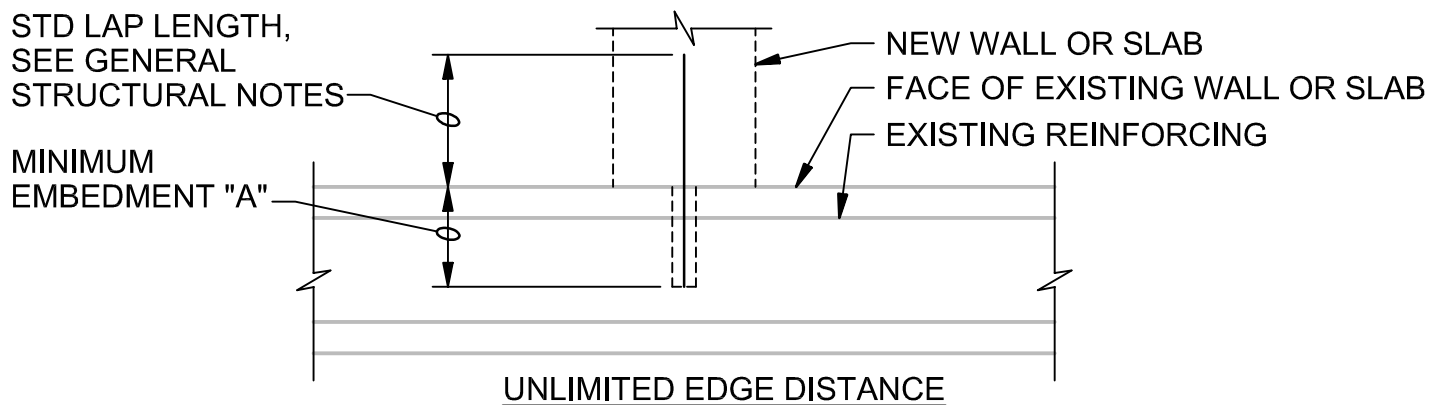
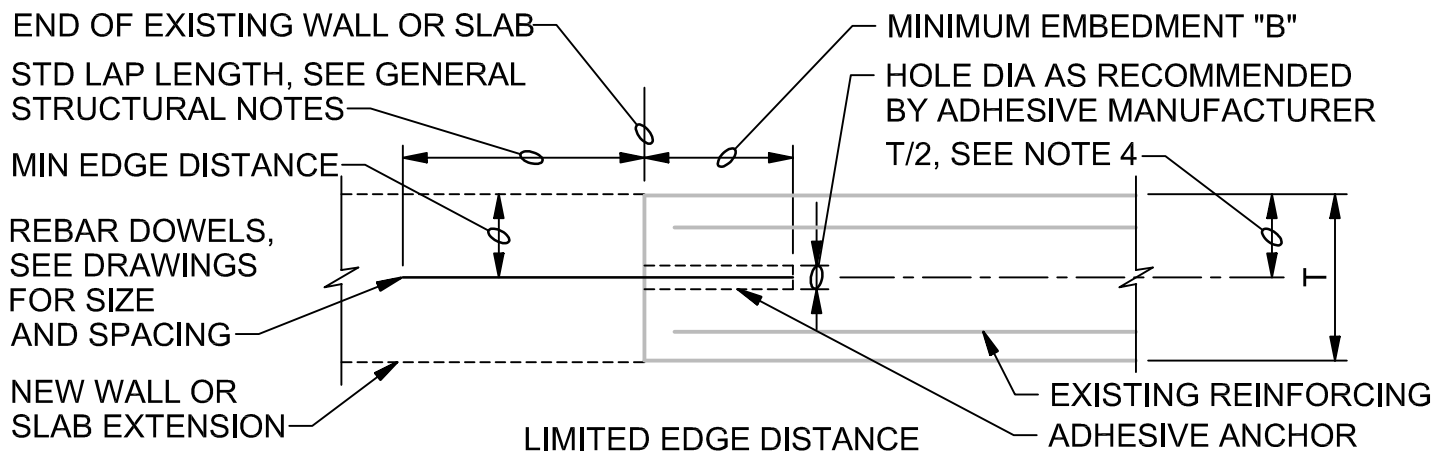


FLOOR DRAIN

NTS

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

0330-082



DOWEL SIZE	MINIMUM EDGE DIST	MINIMUM EMBEDMENT A	MINIMUM EMBEDMENT B
#3	2 1/2"	5"	8"
#4	3 1/2"	7"	11"
#5	4"	8"	13"
#6	5"	10 1/2"	16"
#7	6"	12 1/2"	20"
#8	7"	14"	22"
#9	7 1/2"	15"	24"

**NOTES:**

1. CONFORM TO THE REQUIREMENTS OF SPECIFICATION SECTION 03 63 00, CONCRETE DOWELING.
2. FOLLOW ADHESIVE MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION.
3. USE MINIMUM EMBEDMENTS SHOWN, EXCEPT USE MANUFACTURER'S MINIMUM RECOMMENDED EMBEDMENT IF GREATER.
4. LOCATE DOWELS CENTERED IN WALL OR SLAB UNLESS OTHERWISE NOTED ON DRAWINGS. WHERE 2 ROWS OF DOWELS INDICATED, STAGGER SPACING & LOCATE ALTERNATING DOWELS AT MINIMUM EDGE DISTANCE FROM OPPOSITE FACES.

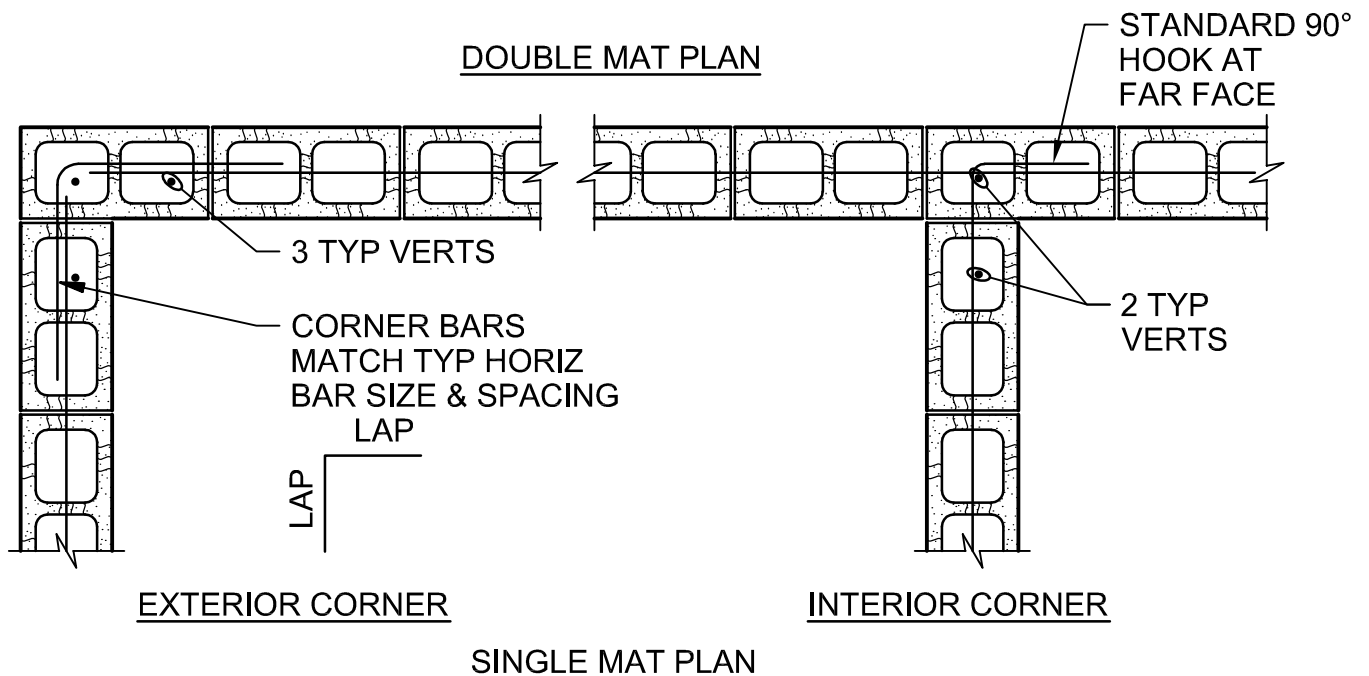
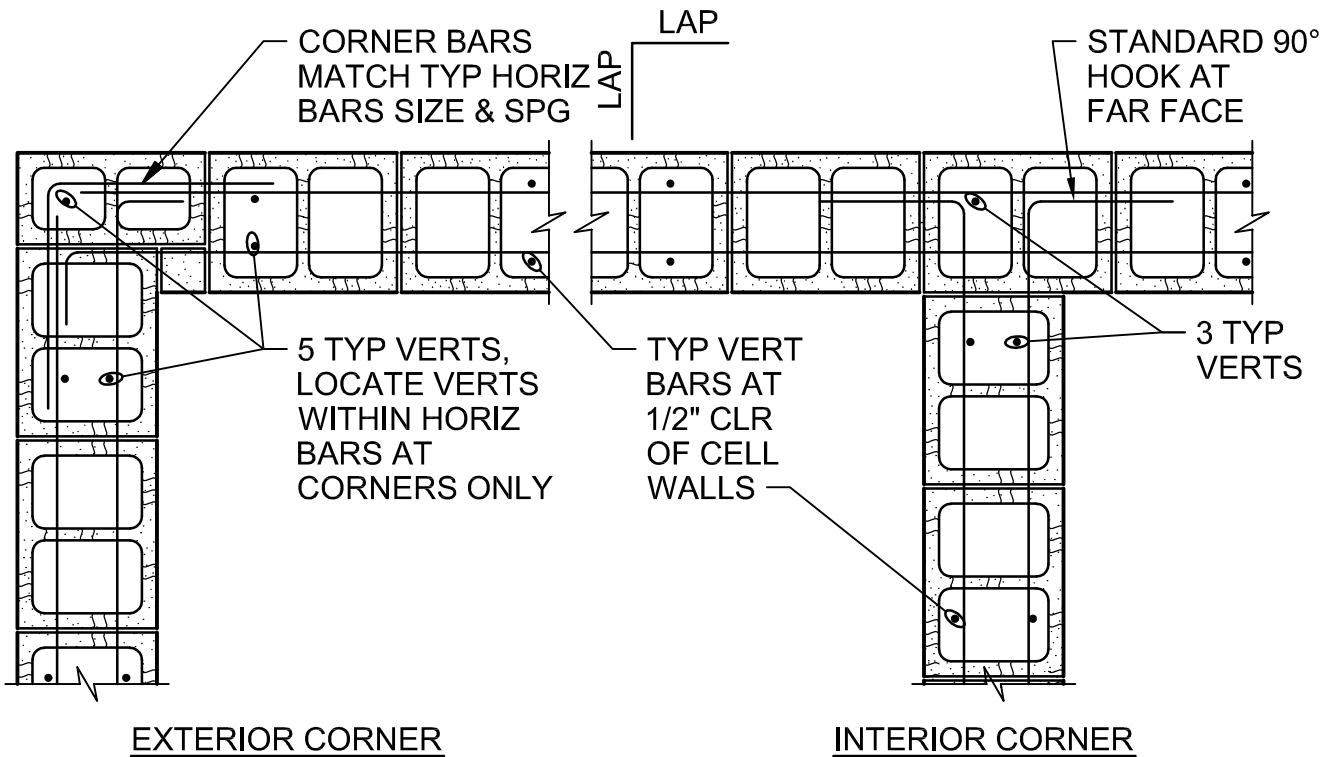
**ADHESIVE DOWEL**

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

0330-105

**CH2MHILL**



NOTES:

1. LAP=48 BAR DIAMETERS OR 2'-0" MINIMUM UNLESS OTHERWISE NOTED.
2. PROVIDE A STANDARD 90° HOOK EACH END ON ANY HORIZONTAL BAR BETWEEN OPENINGS, CONTROL JOINTS, OR CORNERS LESS THAN 6'-0" IN LENGTH.

**CMU WALL CORNERS (SINGLE & DOUBLE MAT)**

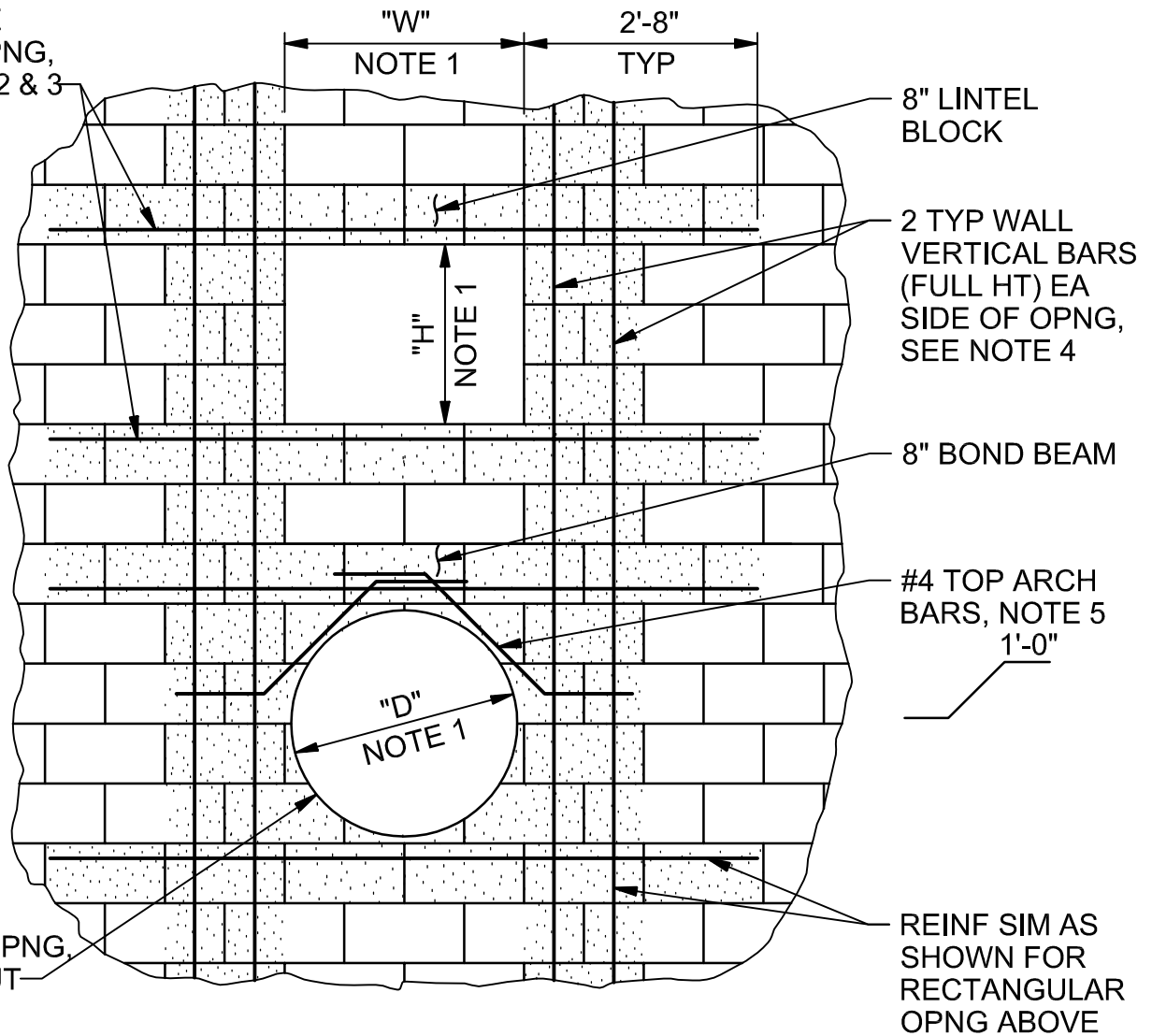
NTS

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

0422-001

**CH2MHILL**

2 - #5 ABOVE  
& BELOW OPNG,  
SEE NOTES 2 & 3



SAW CUT  
BLOCK FOR  
CIRCULAR OPNG,  
SOLID GROUT

**NOTES:**

1. TYPICAL FOR ALL OPENINGS WITH (W, H, OR D) 2'-0" OR GREATER AND 4'-0" OR LESS, UNLESS NOTED OTHERWISE. SEE PLANS FOR LARGER OPENINGS.
2. AT ADJACENT OPENINGS WITH LESS THAN 8'-0" WALL BETWEEN, CONTINUE HORIZONTAL REINFORCING TO 2'-8" BEYOND FURTHEST OPENING.
3. AT OPENINGS LOCATED WITHIN 2'-8" OF CORNER, CONTINUE HORIZONTAL REINFORCING AROUND CORNER PER DETAIL 0422-001
4. LOCATE VERTICAL BARS CENTERED IN 2 ADJACENT CELLS IN 8" WALLS, AND EACH FACE IN SINGLE GROUT CELL IN 12" WALLS. LAP 48 BAR DIAMETERS WITH MATCHING FOUNDATION DOWELS.
5. LOCATE #4 ARCH BARS CENTERED IN 8" WALLS, AND EACH FACE IN 12" WALLS.

**CMU OPENING REINFORCING**

NTS

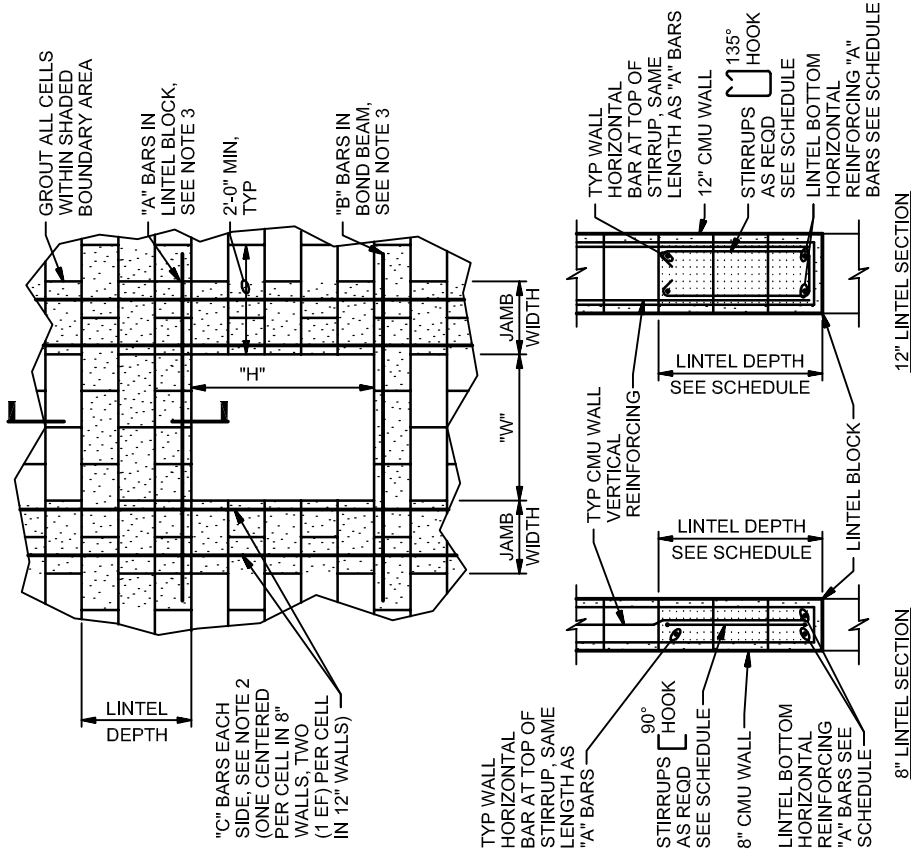
ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

0422-002

**CH2MHILL**

# CMU OPENING REINFORCING

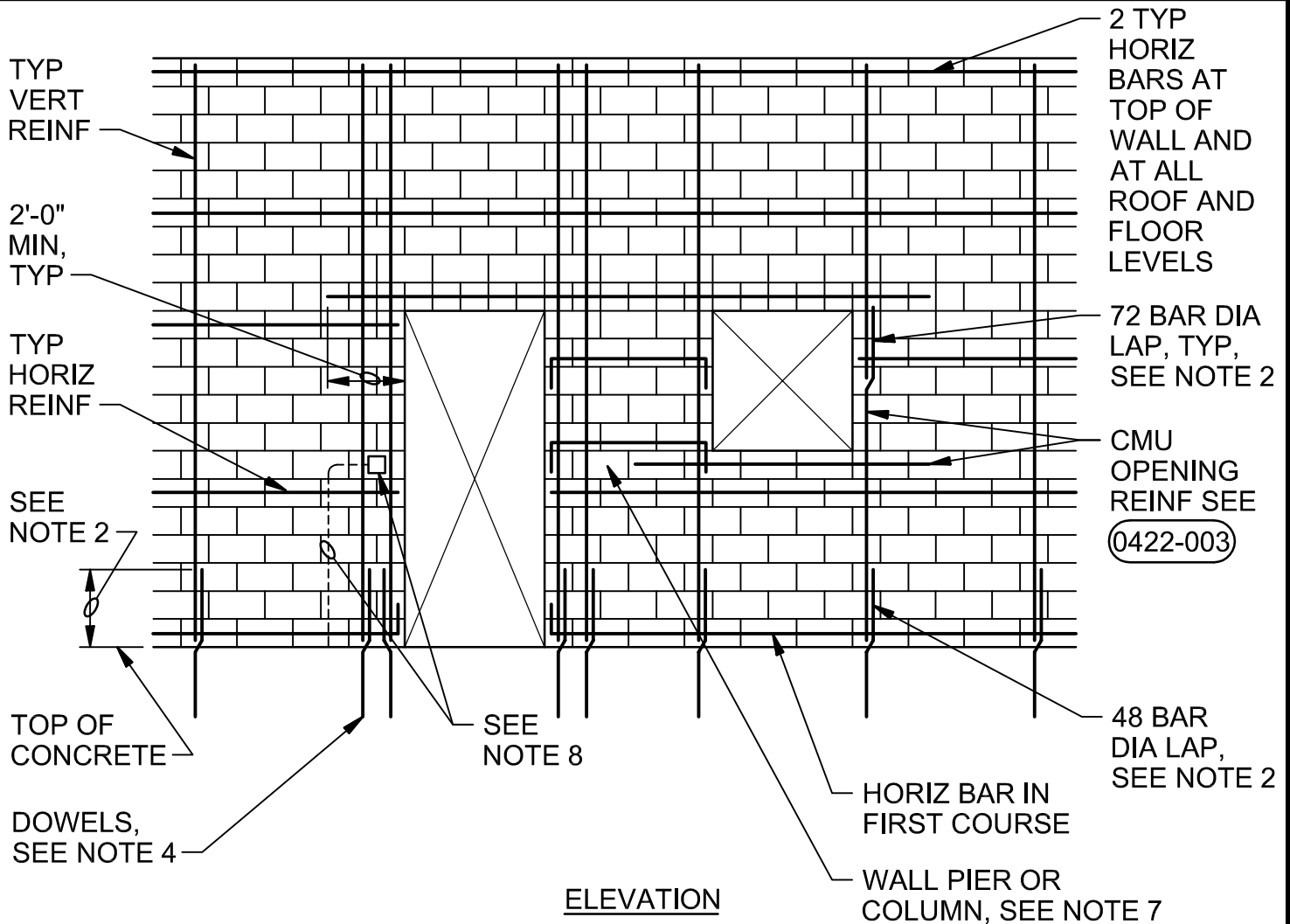
NTS



CMU OPENING REINF SCHEDULE						
8" WALLS						
W	LINTEL DEPTH	STIRRUP SIZE, SPG	"A" BARS	"B" BARS	"C" BARS	JAMB WIDTH
≤2'-8"	8"	-	1	1	1	8"
>2'-8" ≤4'-0"	16"	-	2	1	1	8"
>4'-0" ≤6'-0"	24"	#3@8"	2	1	2	16"
>6'-0" ≤8'-0"	32"	#3@16"	2	2	3	24"
>8'-0" ≤10'-0"	48"	#3@24"	2	2	3	24"
12" WALLS						
W	LINTEL DEPTH	STIRRUP SIZE, SPG	"A" BARS	"B" BARS	"C" BARS	JAMB WIDTH
≤2'-8"	8"	-	2	2	2	8"
>2'-8" ≤4'-0"	16"	-	2	2	2	8"
>4'-0" ≤6'-0"	24"	#3@8"	2	2	4	16"
>6'-0" ≤8'-0"	32"	#3@16"	2	2	6	24"
>8'-0" ≤10'-0"	48"	#3@24"	2	2	6	24"

**NOTES:**

1. USE BAR QUANTITIES AND SIZES GIVEN IN LINTEL SCHEDULE UNLESS OTHERWISE NOTED ON THE DRAWINGS.
2. EXTEND "C" BARS 48 BAR DIAMETERS OR 2'-0" MINIMUM BEYOND TOP AND BOTTOM OF OPENING EXCEPT THAT WHEN "H" OR "W" EXCEEDS 2'-0", "C" BARS SHALL EXTEND FULL HEIGHT. WHERE THERE IS LESS THAN 8'-0" BETWEEN ADJACENT OPENINGS, EXTEND REINFORCING CONTINUOUS TO 2'-8" BEYOND FURTHEST OPENING.
3. "A" AND "B" BARS SHALL EXTEND 48 BAR DIAMETERS OR 2'-0" MINIMUM EACH SIDE OF THE OPENINGS.
4. FOR BAR SIZES, MATCH TYPICAL WALL REINFORCING AS SHOWN ON THE BUILDING WALL SECTIONS.



**NOTES:**

1. FOR TYPICAL WALL REINFORCING, SEE WALL SECTIONS AND DETAILS FOR EACH FACILITY. FOR MINIMUM REINFORCING REQUIREMENTS, SEE GENERAL STRUCTURAL NOTES.
2. LAP VERTICAL REINFORCING WITH WALL DOWELS 48 BAR DIAMETERS (2'-0" MIN), LAP ALL OTHER VERTICAL BARS 72 BAR DIAMETERS.
3. STAGGER SPLICES IN ADJACENT HORIZONTAL BARS IN THE SAME COURSE BY 2'-0".
4. PROVIDE DOWEL BARS IN FOUNDATION TO MATCH ALL VERTICAL REINFORCING.
5. FOR ADDED REINFORCING AT WALL INTERSECTIONS AND CORNERS, SEE (0422-001)
6. GROUT EACH SIDE OF OPENING AS NOTED IN TYPICAL OPENING REINFORCING DETAIL (0422-003)
7. FOR HORIZONTAL REINFORCING AT OPENINGS SEE COLUMN AND PIER DETAILS.
8. DO NOT PLACE VERTICAL CONDUIT IN THE SAME CELL AS VERTICAL REINFORCING.

**REINFORCED CMU WALL**

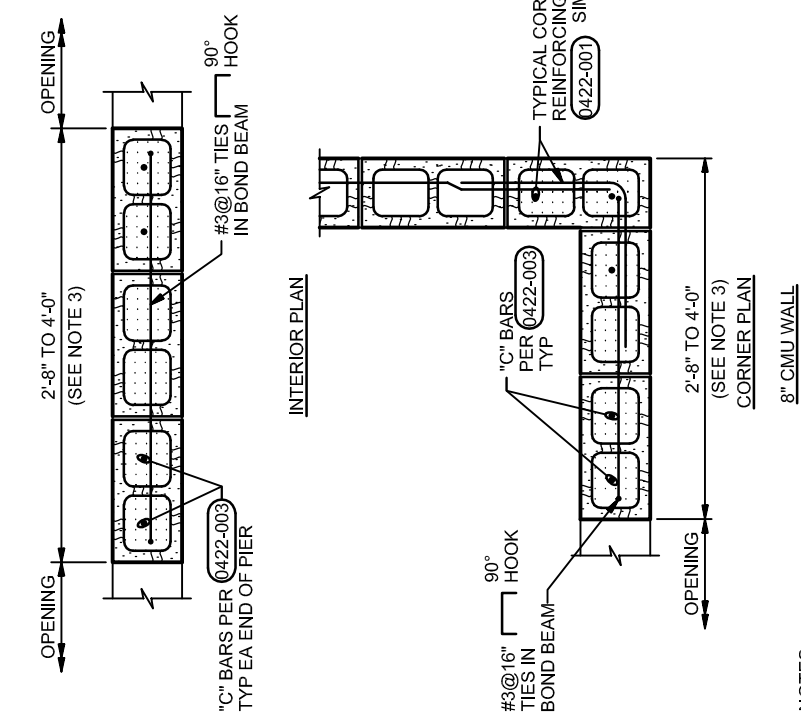
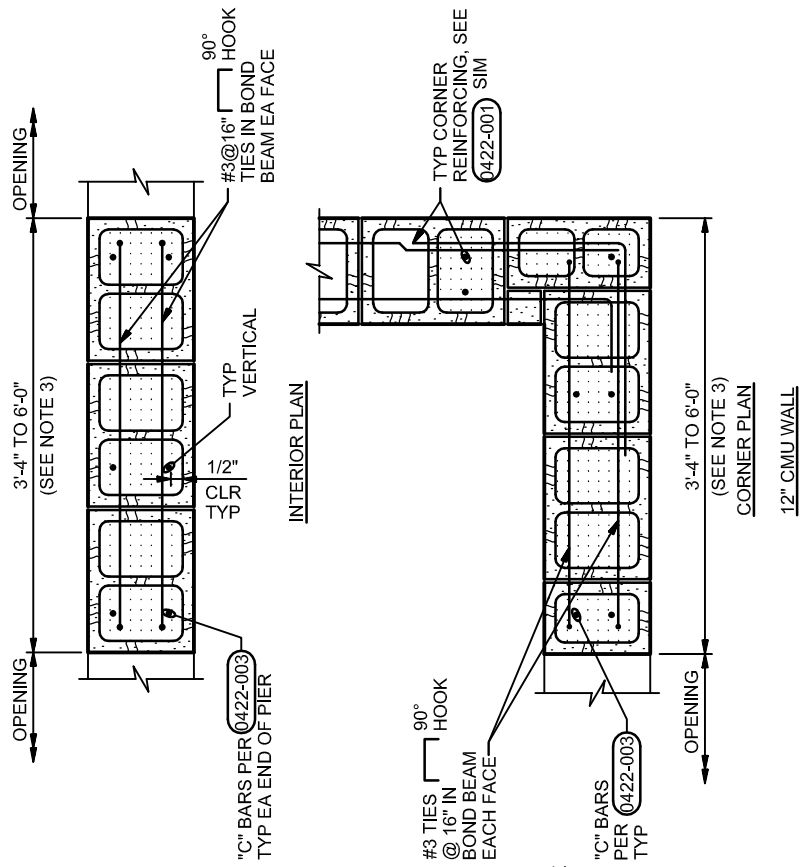
NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

0422-004

# CMU WALL PIER

NTS



**NOTES:**

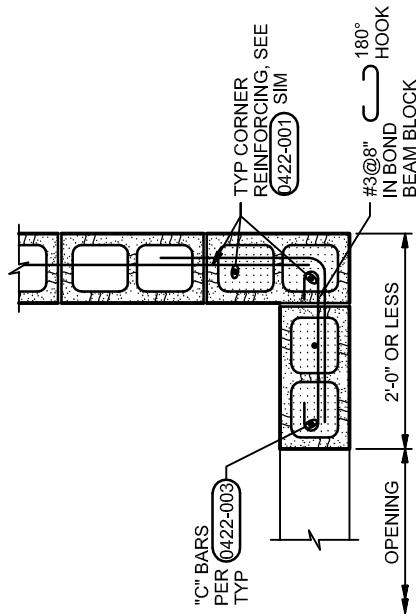
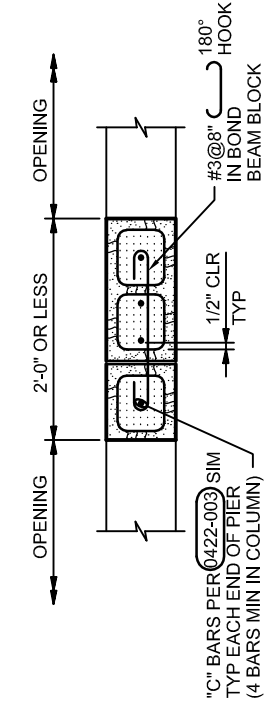
1. SOLID GROUT PIERS FULL WALL HEIGHT.
2. WHERE PIERS ARE CENTERED BELOW BEAM BEARING, REDUCE TIE SPACING TO 8".
3. FOR 8" CMU WALL PIERS 2'-0" AND LESS, AND FOR 12" CMU WALL PIERS 2'-8" AND LESS, SEE WALL COLUMN DETAIL 0422-006

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

0422-005

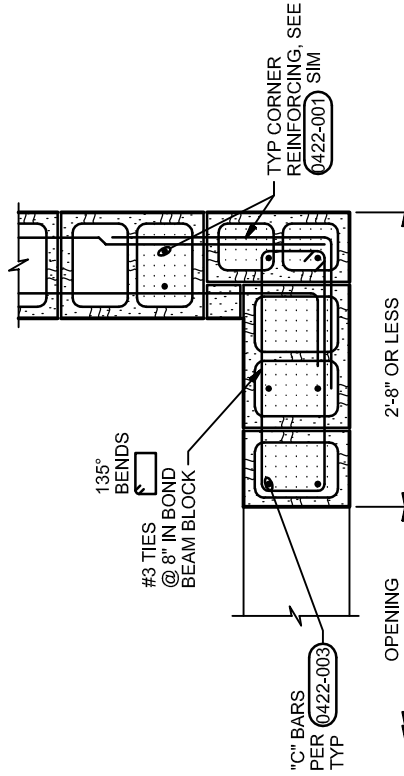
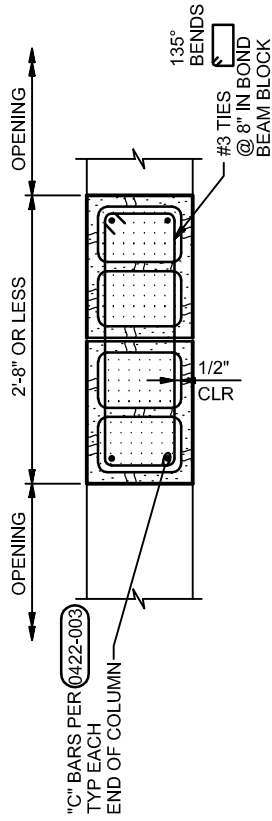
# CMU WALL COLUMN

NTS



NOTE:  
GROUT WALL COLUMNS FULL WALL HEIGHT.

8" CMU WALL



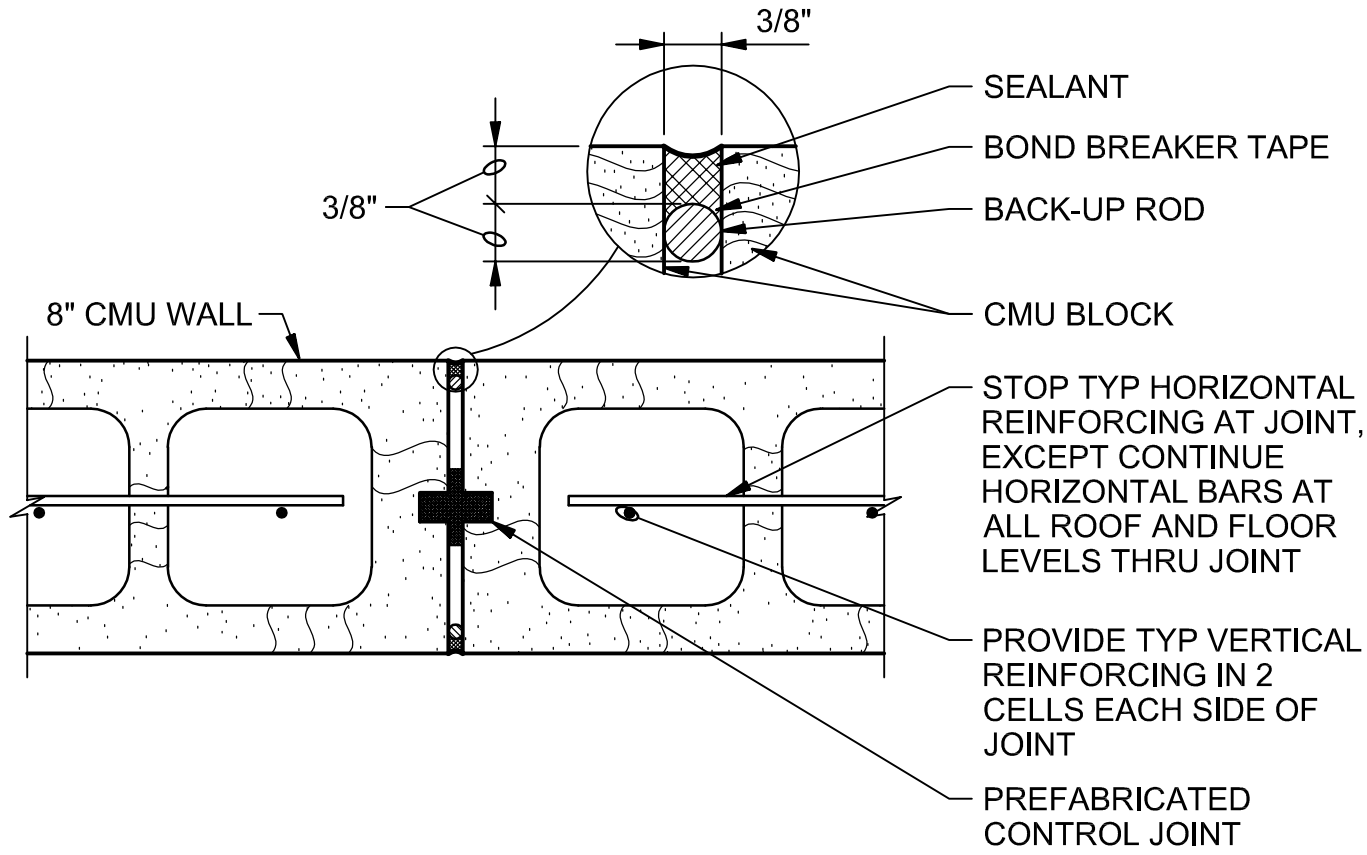
12" CMU WALL

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

0422-006

CH2MHILL





NOTE:

12" CMU WALL WITH 2 LAYERS OF REINFORCING IS SIMILAR.

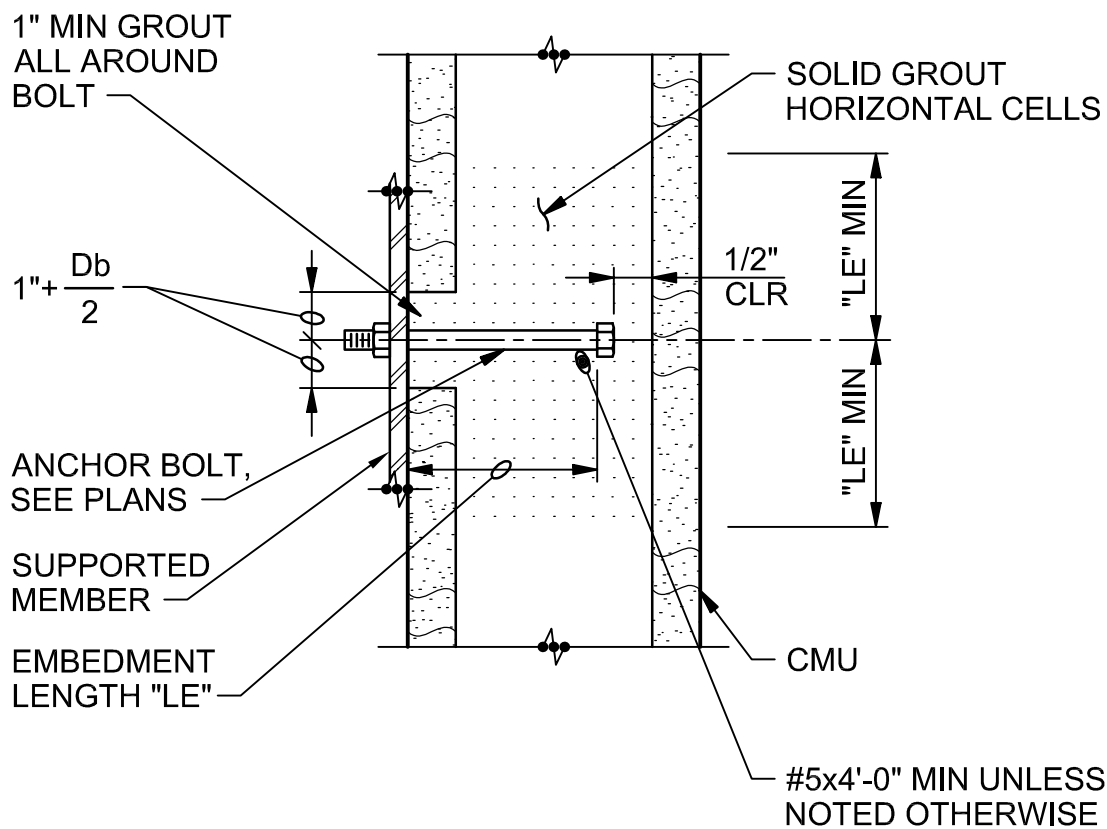
CMU CONTROL JOINT

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

0422-031

**CH2MHILL**



NOTE:

$D_b$  = DIAMETER OF BOLT

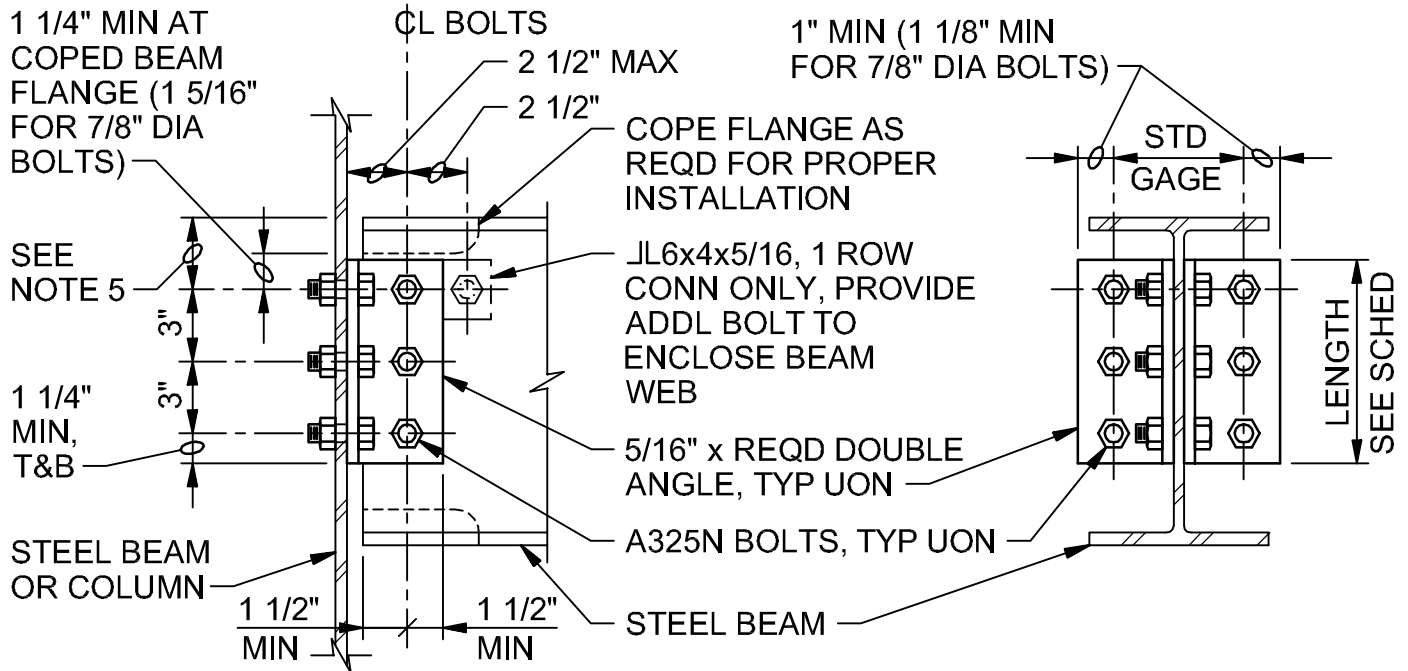
MASONRY ANCHOR BOLT

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

0422-046

**CH2MHILL**



NOMINAL BEAM DEPTH, INCHES	ROWS OF BOLTS	BOLT DIA, INCHES	DOUBLE ANGLE, LENGTH, INCHES	COMMENTS
36	10	7/8"	2'-6"	ANGLE THK = 3/8"
33	9	7/8"	2'-3"	ANGLE THK = 3/8"
30	8	7/8"	2'-0"	ANGLE THK = 3/8"
27	7	3/4"	1'-8 1/2"	-
24	6	3/4"	1'-5 1/2"	-
21	5	3/4"	1'-2 1/2"	-
16-18	4	3/4"	0'-11 1/2"	-
12-15	3	3/4"	0'-8 1/2"	-
8-10	2	3/4"	0'-5 1/2"	-
6	1	3/4"	0'-3"	SEE NOTE 3
4	1	3/4"	0'-2 1/2"	SEE NOTE 3

**NOTES:**

1. UNLESS OTHERWISE NOTED, NUMBER OF ROWS IS EQUAL TO NUMBER OF BOLTS TO ENCLOSE BEAM WEB.
2. ALL BEAM FRAMING CONNECTIONS SHALL CONFORM TO THIS DETAIL UNLESS SPECIFICALLY NOTED OTHERWISE OR APPROVED IN WRITING BY THE ENGINEER.
3. FOR NOMINAL BEAM DEPTHS LESS THAN 8", EXTEND LONG LEG OF DOUBLE ANGLE ALONG BEAM WEB AND PROVIDE ADDITIONAL BOLT TO ENCLOSE BEAM WEB AS SHOWN.
4. PROVIDE ADDITIONAL 1 1/2" LENGTH TO DOUBLE ANGLE FOR STAGGERED BOLT CONNECTIONS WHEN REQUIRED OR USED.
5. DIMENSION SHALL BE 3" UNLESS OTHERWISE REQUIRED FOR PROPER FABRICATION.

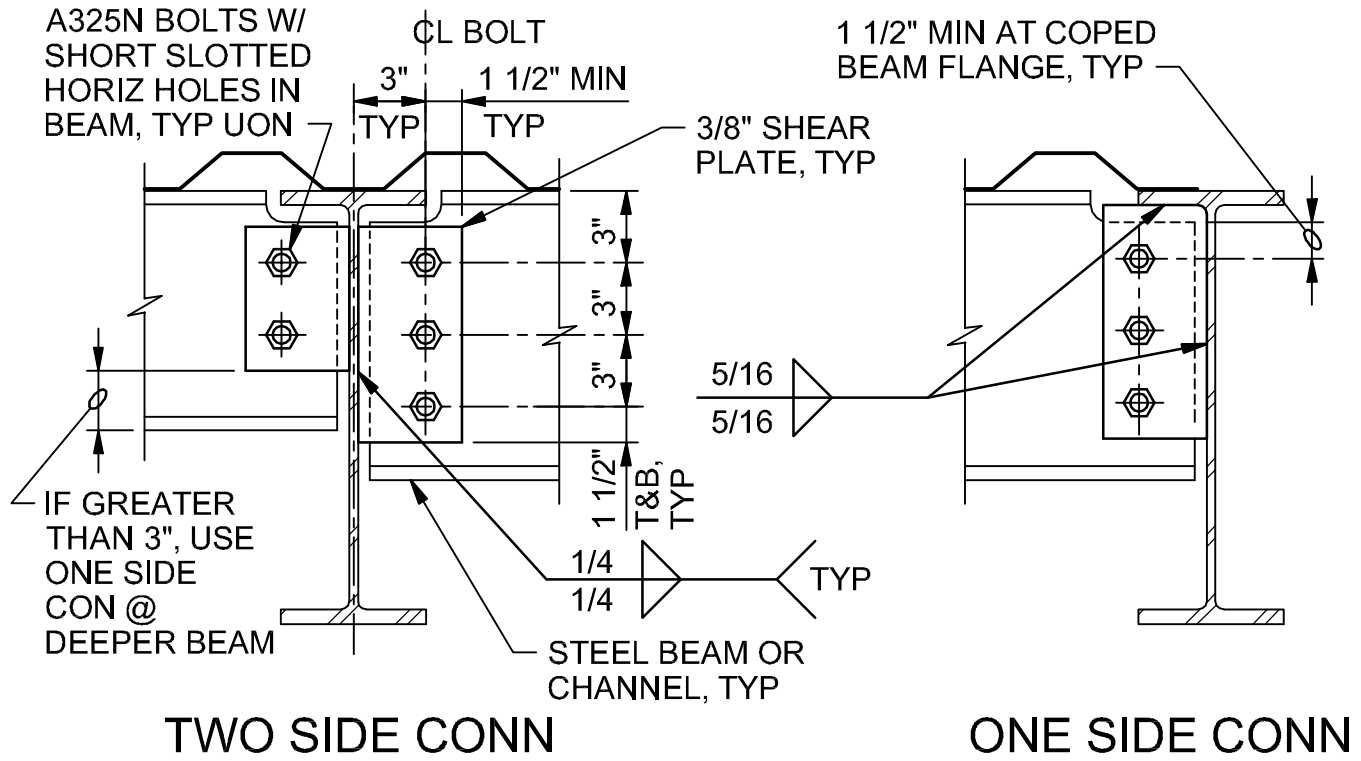
**TYPICAL BEAM CONNECTION - STEEL**

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

0512-020

**CH2MHILL**



**TWO SIDE CONN**

**ONE SIDE CONN**

NOMINAL BEAM DEPTH, INCHES	ROWS OF BOLTS	BOLT DIA, INCHES	LENGTH OF SHEAR PLATE, INCHES, SEE NOTE 3
27	8	7/8"	2'-0"
24	7	3/4"	1'-9"
21	6	3/4"	1'-6"
18	5	3/4"	1'-3"
16	4	3/4"	1'-0"
12-15	3	3/4"	9"
8-10	2	3/4"	6"

**NOTES:**

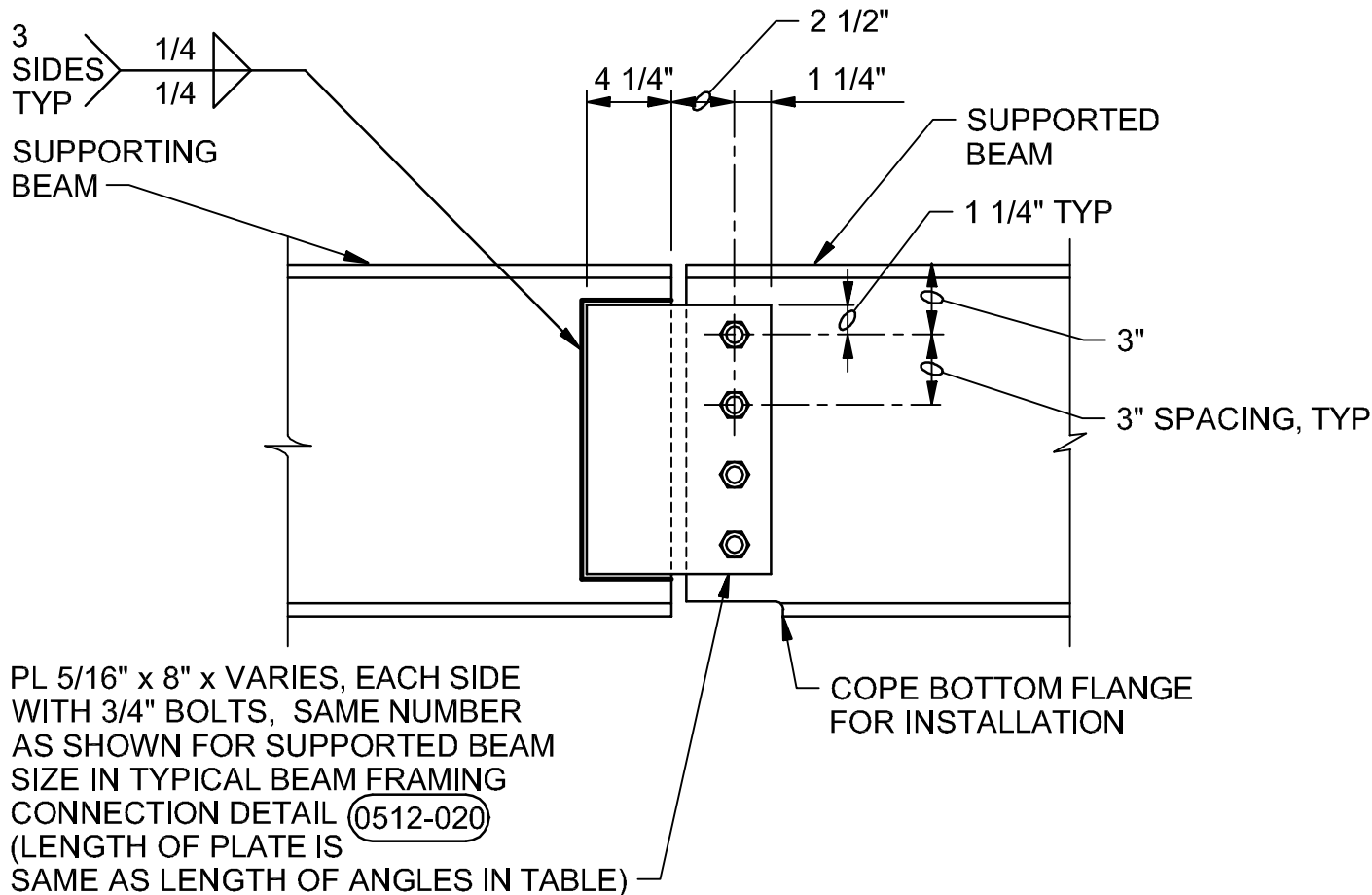
1. NUMBER OF ROWS IS EQUAL TO NUMBER OF BOLTS CONNECTING SHEAR PLATE TO BEAM.
2. THIS DETAIL APPLIES ONLY WHERE SPECIFICALLY SHOWN ON DRAWINGS.
3. AT ONE-SIDE CONNECTIONS, EXTEND TOP OF SHEAR PLATE TO UNDERSIDE OF BEAM TOP FLANGE AS SHOWN.
4. (\*) INDICATES 3" DIMENSION IS TYPICAL EXCEPT AS RECOMMENDED BY AISC FOR LARGER MEMBERS.
5. CONNECTION DETAIL SHOWN APPLICABLE ONLY TO BEAMS BRACED BY METAL DECK (COMPOSITE OR NON-COMPOSITE); FOR OTHER BEAM FRAMING CONDITIONS, SEE DETAIL **0512-020**

**BEAM SINGLE PLATE SHEAR CONNECTION - STEEL**

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

**0512-022**



NOTE:

PROVIDE SHIM PLATES AS REQUIRED.

BEAM SPLICE - STEEL

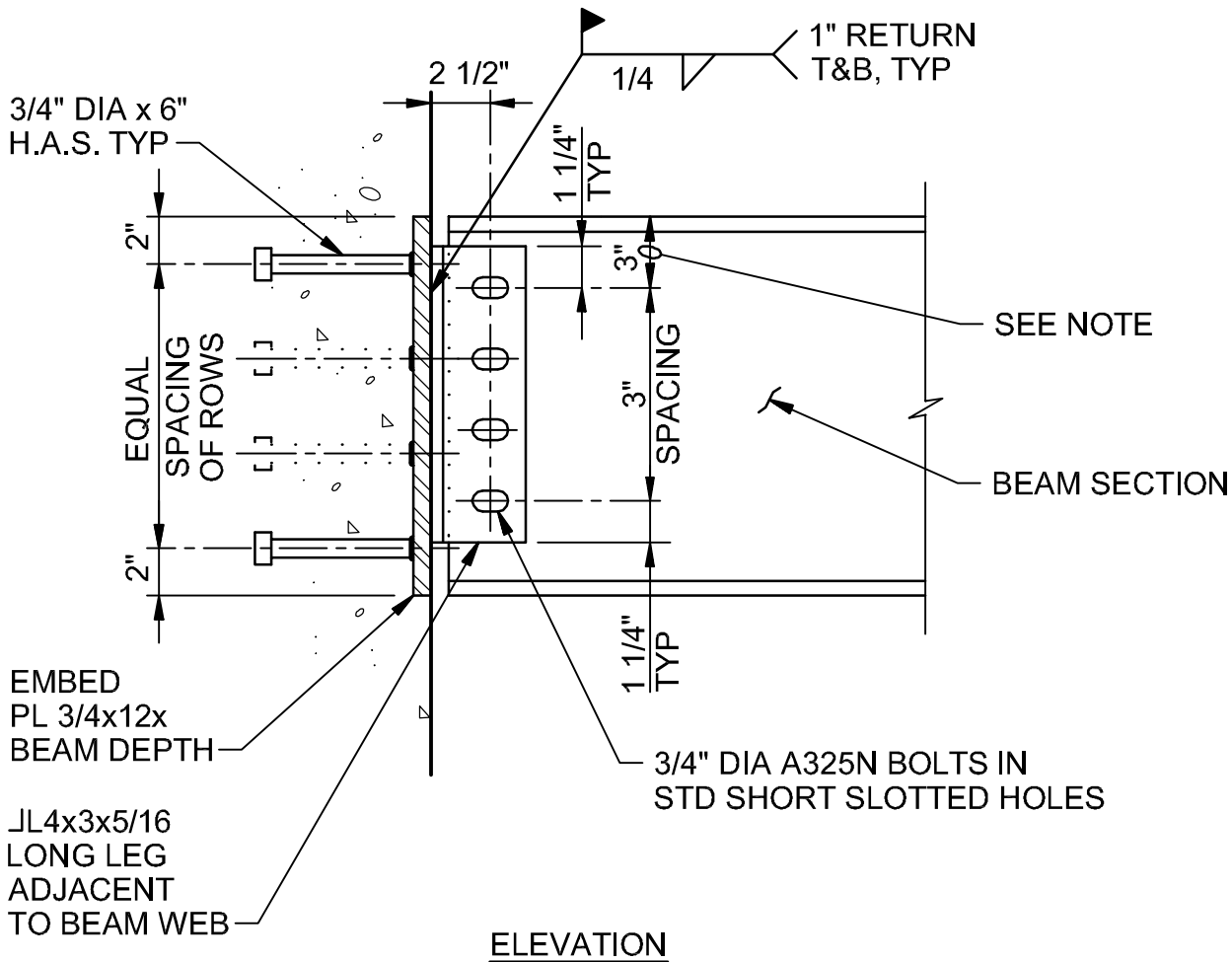
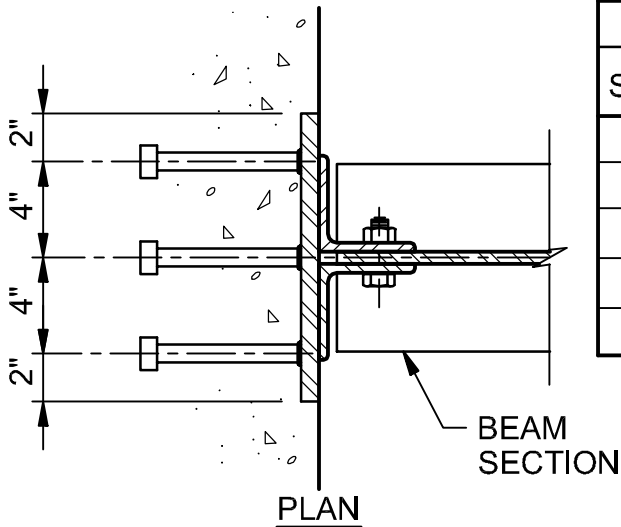
NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

0512-029

**CH2MHILL**

STEEL BEAM		NUMBER OF ROWS OF H.A.S.	NUMBER OF ROWS OF BOLTS
SHAPE	DEPTH		
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-



**NOTE:**

2 1/2" FOR 8" BEAM DEPTH.

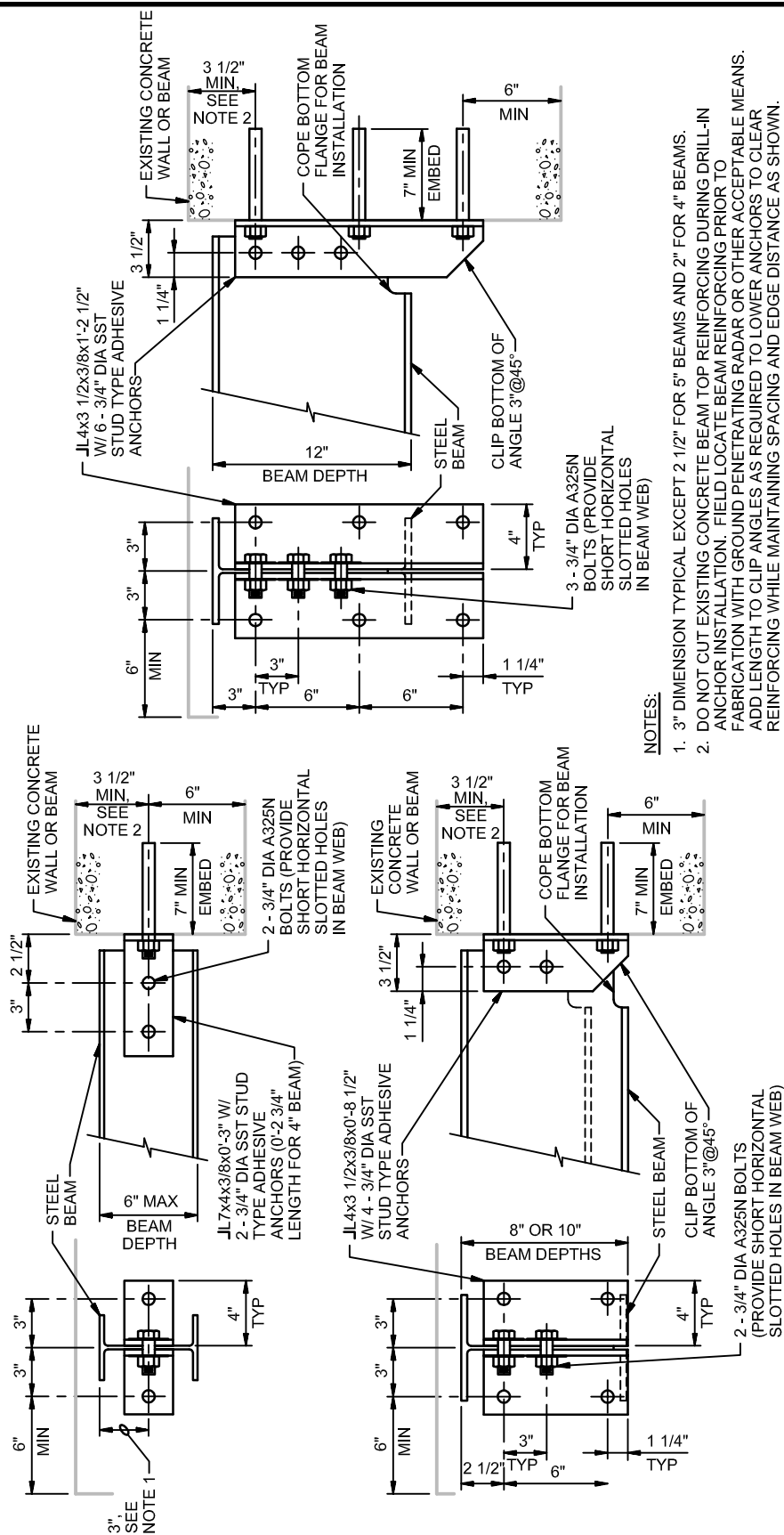
**EMBEDDED CONNECTION - STEEL**

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

0512-055

**CH2MHILL**



**NOTES:**

1. 3" DIMENSION TYPICAL EXCEPT 2 1/2" FOR 5" BEAMS AND 2" FOR 4" BEAMS.
2. DO NOT CUT EXISTING CONCRETE BEAM TOP REINFORCING DURING DRILL-IN ANCHOR INSTALLATION. FIELD LOCATE BEAM REINFORCING PRIOR TO FABRICATION WITH GROUND PENETRATING RADAR OR OTHER ACCEPTABLE MEANS. ADD LENGTH TO CLIP ANGLES AS REQUIRED TO LOWER ANCHORS TO CLEAR REINFORCING WHILE MAINTAINING SPACING AND EDGE DISTANCE AS SHOWN.
3. WHERE BOTH ENDS OF BEAM ARE ATTACHED TO A WALL, PROVIDE LONG HORIZONTALLY SLOTTED HOLES IN BEAM WEB AT ONE END. TIGHTEN NUTS SNUG TIGHT, BACK OFF 1/2 TURN, AND LOCK WITH DOUBLE NUT.

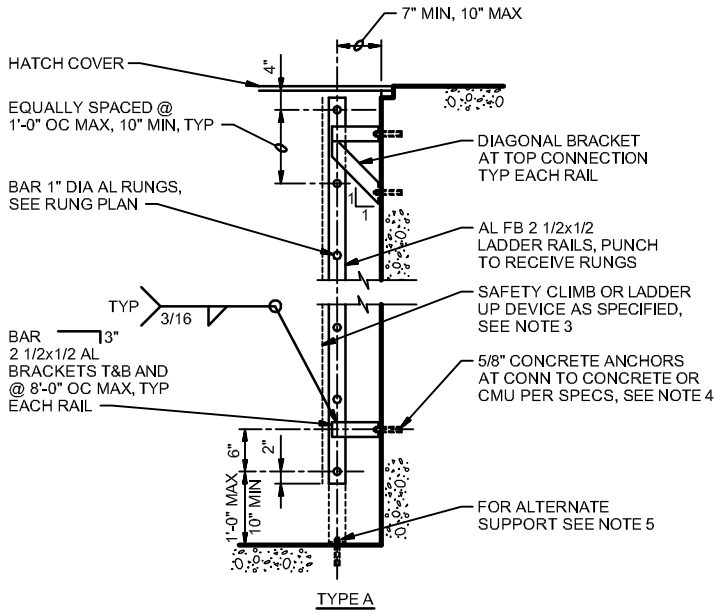
## BEAM/WALL CONNECTION - STEEL

NTS

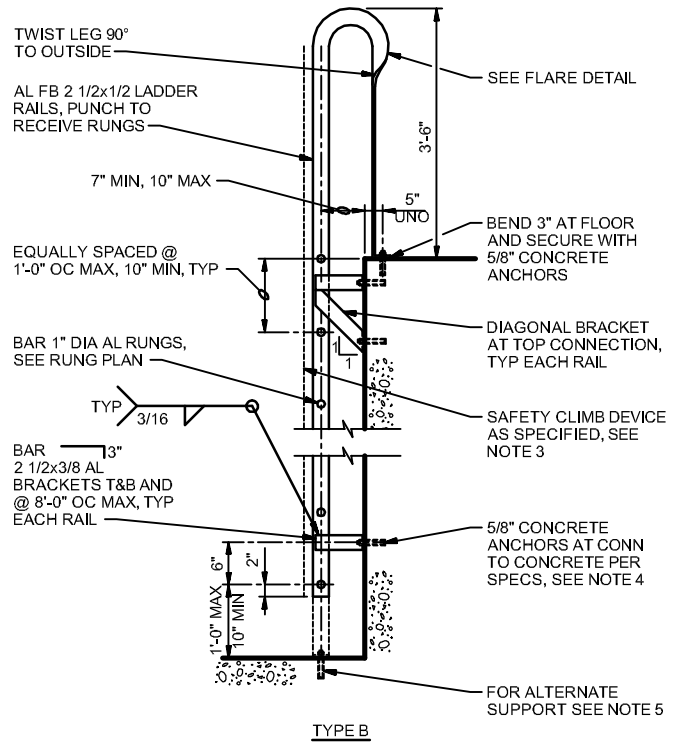
ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

0512-056

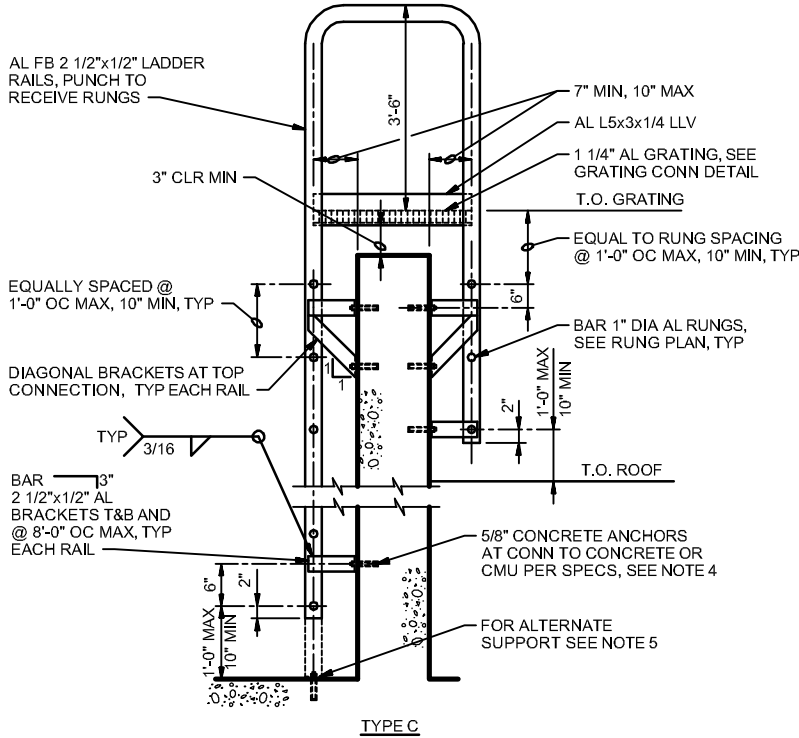
**CH2MHILL**



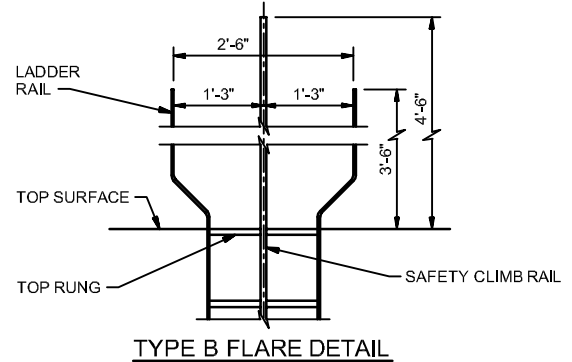
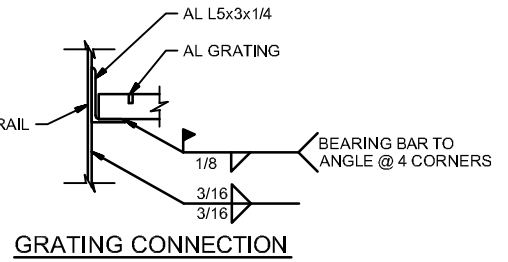
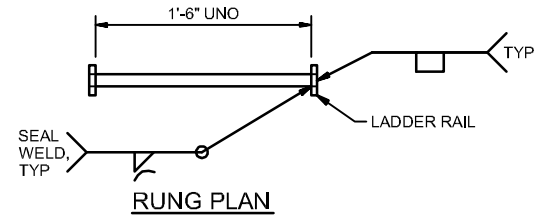
**TYPE A**  
**FLAT BAR LADDER UNDER COVER**



**TYPE B**  
**FLAT BAR LADDER WITH EXTENSION**



**TYPE C**  
**FLAT BAR LADDER UP AND OVER**



**NOTES:**

1. PROVIDE PROTECTION FOR ALUMINUM IN CONTACT WITH CONCRETE AS SPECIFIED.
2. AT CONTRACTOR'S OPTION, PRE-ENGINEERED PIPE LADDER AS SPECIFIED MAY BE USED IN LIEU OF FLAT BAR LADDERS.
3. PROVIDE SAFETY CLIMB DEVICE FOR LADDERS 20' OR GREATER. FOR TYPE A LESS THAN 20' PROVIDE LADDER UP DEVICE.
4. PROVIDE SST CONCRETE ANCHORS LOCATED BELOW MAXIMUM WATER SURFACE.
5. FOR INTERIOR, DRY AREAS, EXTEND RAILS AND BEND 3° AT FLOOR. SECURE WITH 5/8" CONCRETE ANCHORS.

**FLAT BAR LADDER - ALUMINUM**

NTS

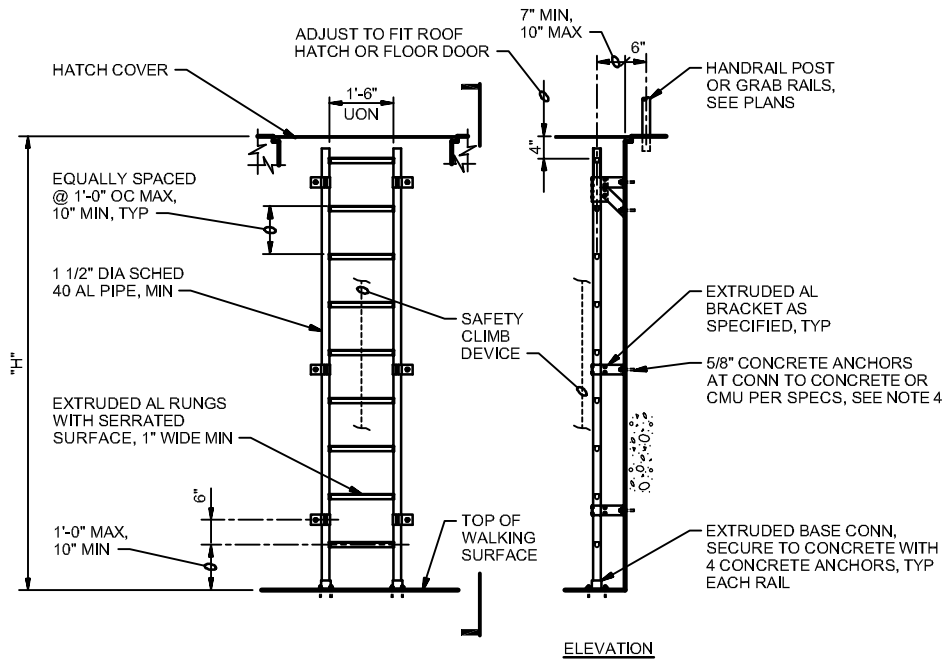
DETAIL 1 OF 2

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

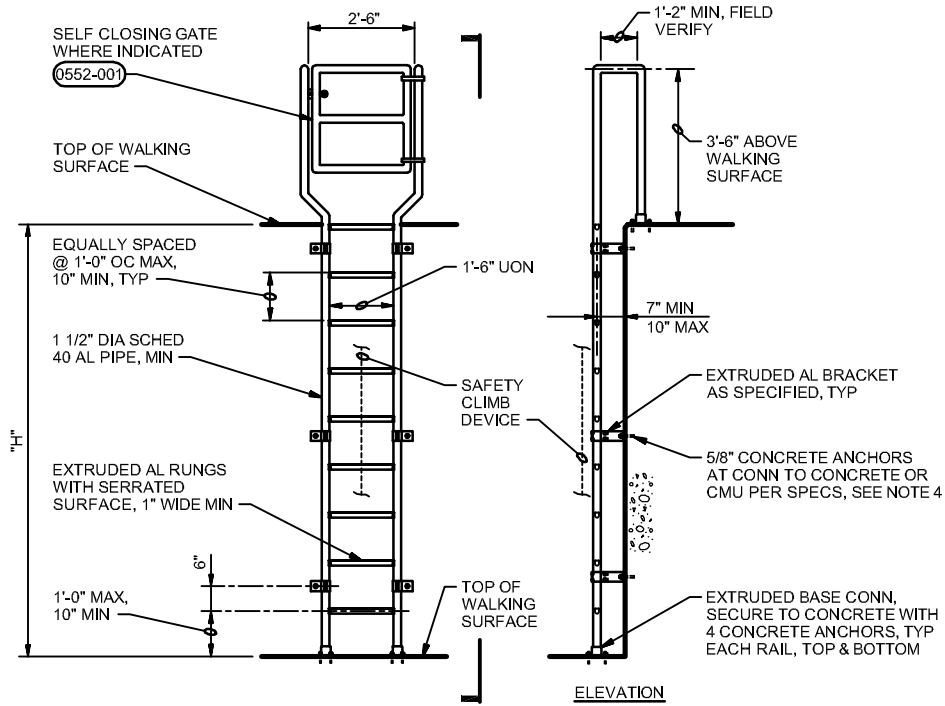
0551-101

**CH2MHILL**





TYPE G  
PIPE LADDER UNDER COVER



TYPE H  
PIPE LADDER WITH EXTENSION

**NOTES:**

1. PROVIDE PROTECTION FOR ALUMINUM IN CONTACT WITH CONCRETE AS SPECIFIED.
2. PROVIDE LADDER SAFETY POST AS SPECIFIED, WHERE INDICATED.
3. PROVIDE SAFETY CLIMB RAIL WITH BELT & EXTENSION RAIL AS SPECIFIED WHERE INDICATED.
4. PROVIDE SST CONC ANCHORS WHEN LOCATED BELOW MAXIMUM WATER SURFACE.

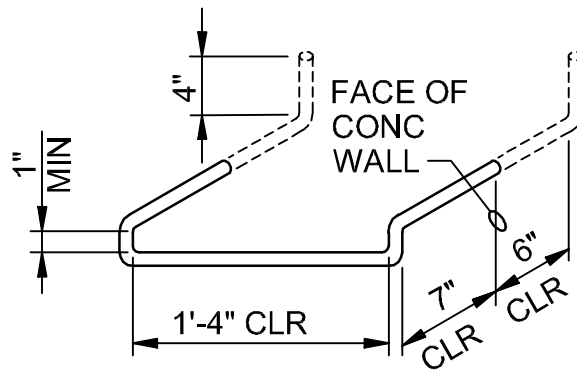
## PRE-ENGINEERED PIPE LADDER - ALUMINUM

NTS

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

DETAIL 2 OF 2

0551-101



NOTES:

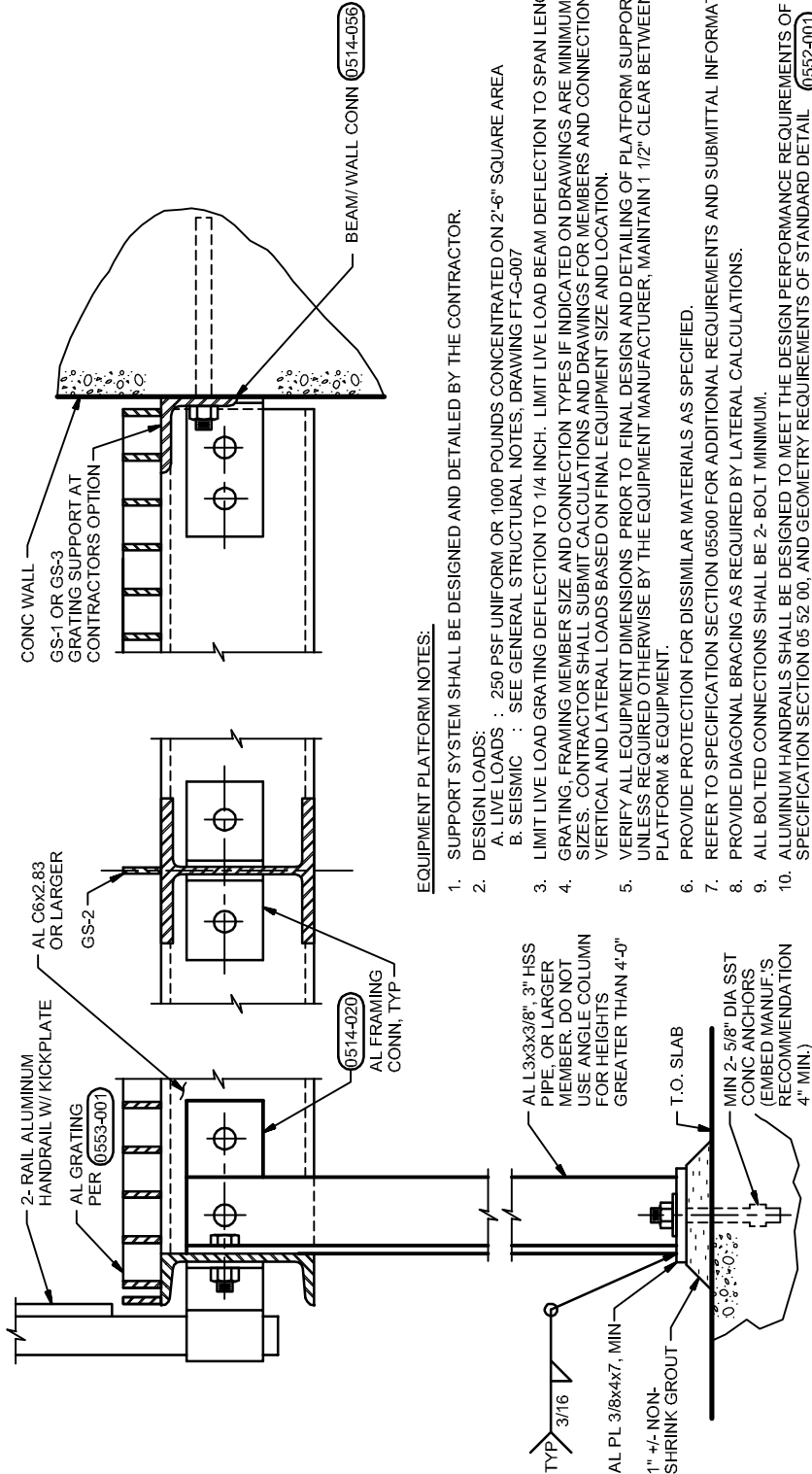
1. RUNGS SHALL BE FABRICATED FROM 1" DIA GRADE 60 STL BAR .
2. RUNGS SHALL BE EQUALLY SPACED VERTICALLY AT 12" OC MAX.
3. RUNGS SHALL BE POLYPROPYLENE ENCASED, WITH MATERIAL CONFORMING TO ASTM D4101.

INDIVIDUAL RUNG LADDER

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

0551-146

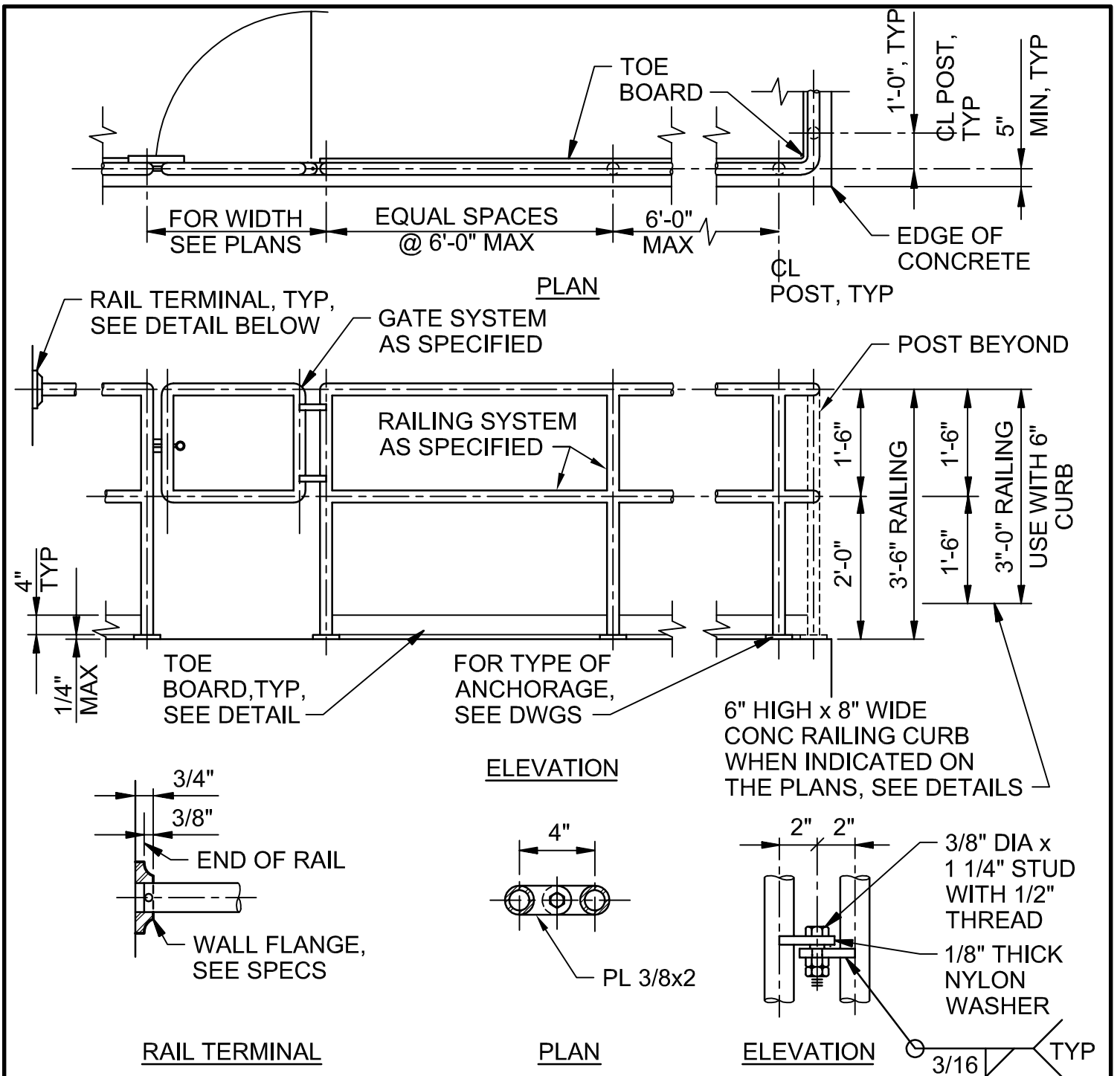


## TYPICAL EQUIPMENT PLATFORM - ALUMINUM

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

0551-201



**NOTES:**

1. FASTEN RAIL TO WALL FLANGE PER MANUFACTURERS RECOMMENDATIONS.
2. WALL FLANGE TO BE MOUNTED TO WALL WITH (2) 3/8" DIA SST WEDGE ANCHORS.
3. AT CONTRACTOR'S OPTION FABRICATE HINGES OR PROVIDE OTHER HINGES AS SPECIFIED. ANODIZE FINISH AFTER ALL WELDING AS SPECIFIED.

**RAILING - TWO RAIL - ALUMINUM**

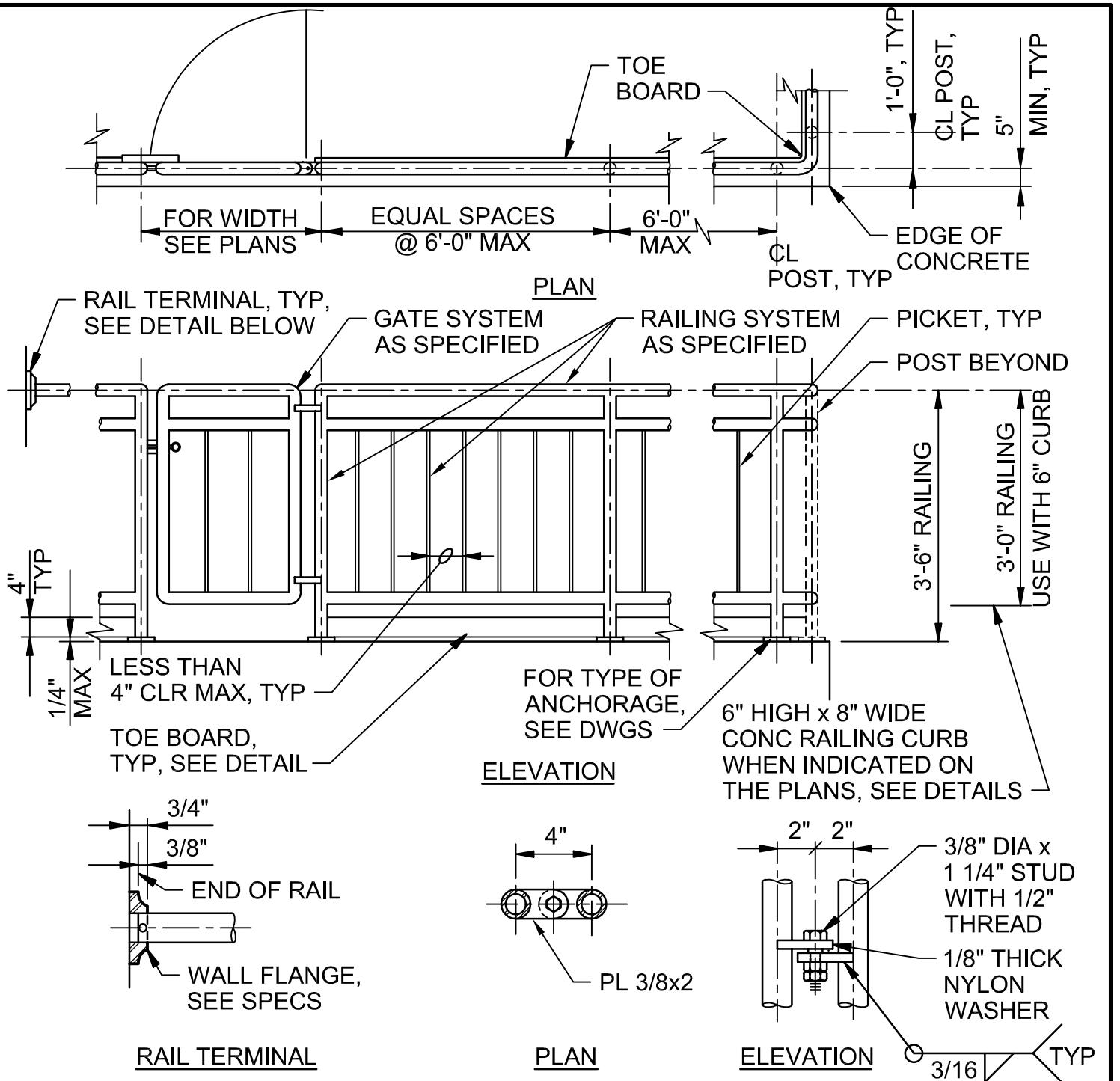
NTS

DETAIL 1 OF 8

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

0552-001

**CH2MHILL**



**NOTES:**

1. FASTEN RAIL TO WALL FLANGE PER MANUFACTURERS RECOMMENDATIONS.
2. WALL FLANGE TO BE MOUNTED TO WALL WITH (2) 3/8" DIA SST WEDGE ANCHORS.
3. AT CONTRACTOR'S OPTION FABRICATE HINGES OR PROVIDE OTHER HINGES AS SPECIFIED. ANODIZE FINISH AFTER ALL WELDING AS SPECIFIED.

**RAILING - PICKET - ALUMINUM**

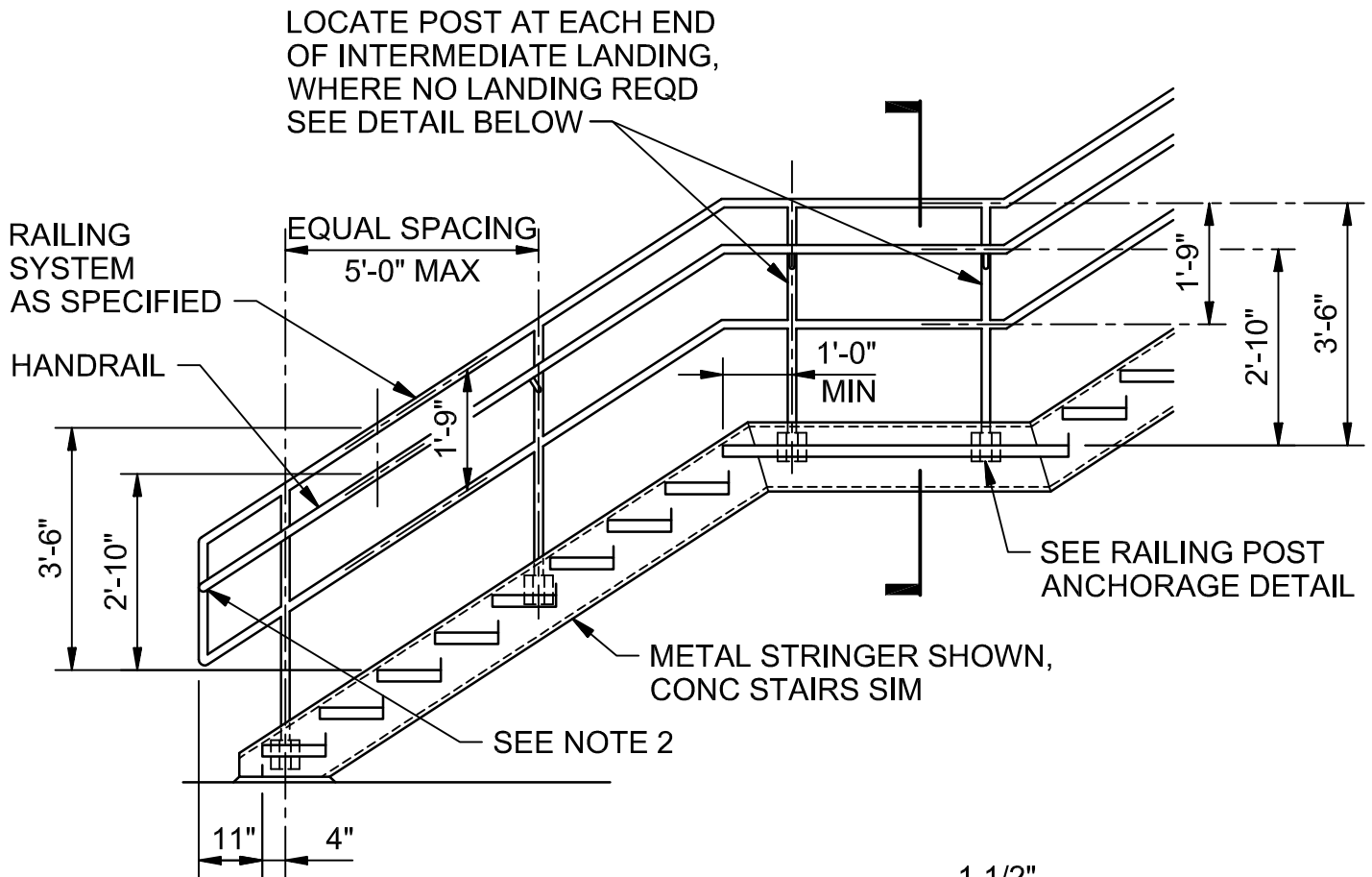
NTS

DETAIL 2 OF 8

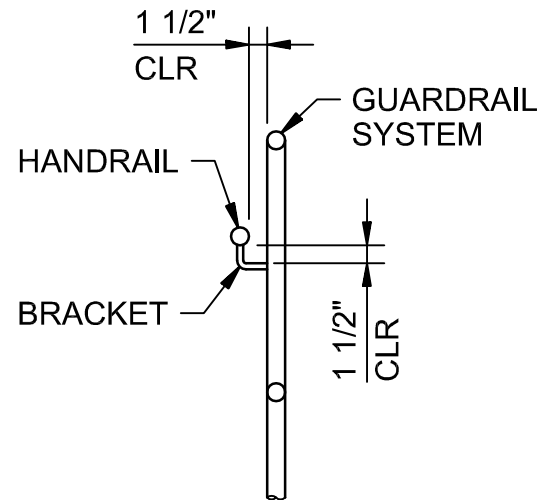
0552-001

ADVANCED TREATMENT  
 FORT THOMAS WTP  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

**CH2MHILL**



RAILING DETAIL WITHOUT LANDING



RAILING SECTION

**NOTES:**

1. PROVIDE TOE BOARD AT LANDING WHERE REQUIRED.
2. RETURN END OF HANDRAIL TO GUARDRAIL AT BOTH ENDS.

**RAILING - TWO RAIL STAIR - ALUMINUM (IBC)**

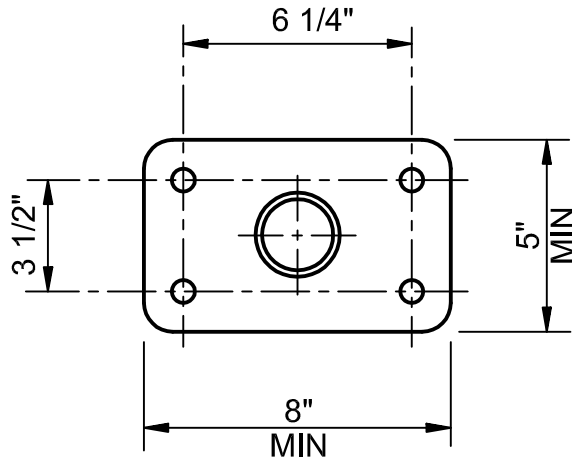
NTS

DETAIL 3 OF 8

0552-001

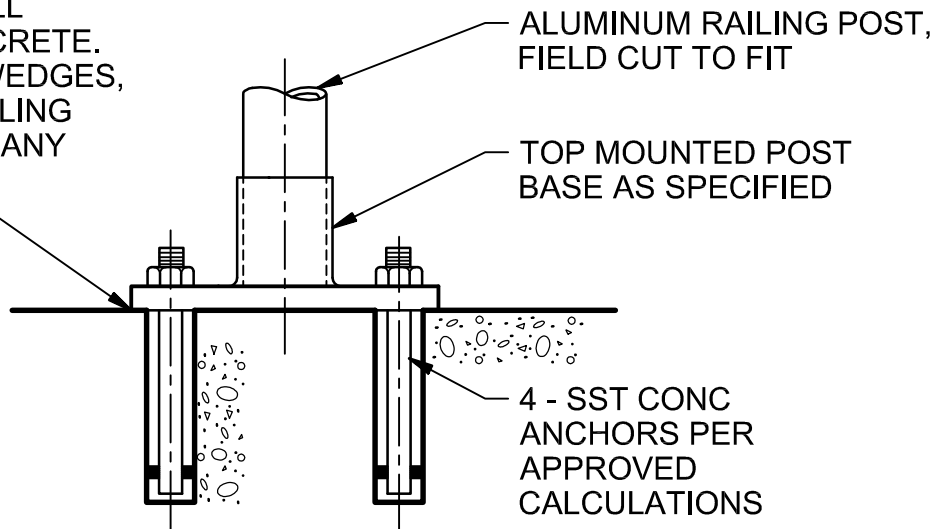
ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

**CH2MHILL**



PLAN

THE BASEPLATE SHALL SIT SOLIDLY ON CONCRETE. THE USE OF SHIMS, WEDGES, GROUT, ETC FOR RAILING POST ALIGNMENT OR ANY OTHER REASON WILL NOT BE PERMITTED



ELEVATION

TYPE "A"

NOTE:

PROVIDE PROTECTION FOR DISSIMILAR METALS AND CONCRETE PER SPECIFICATIONS.

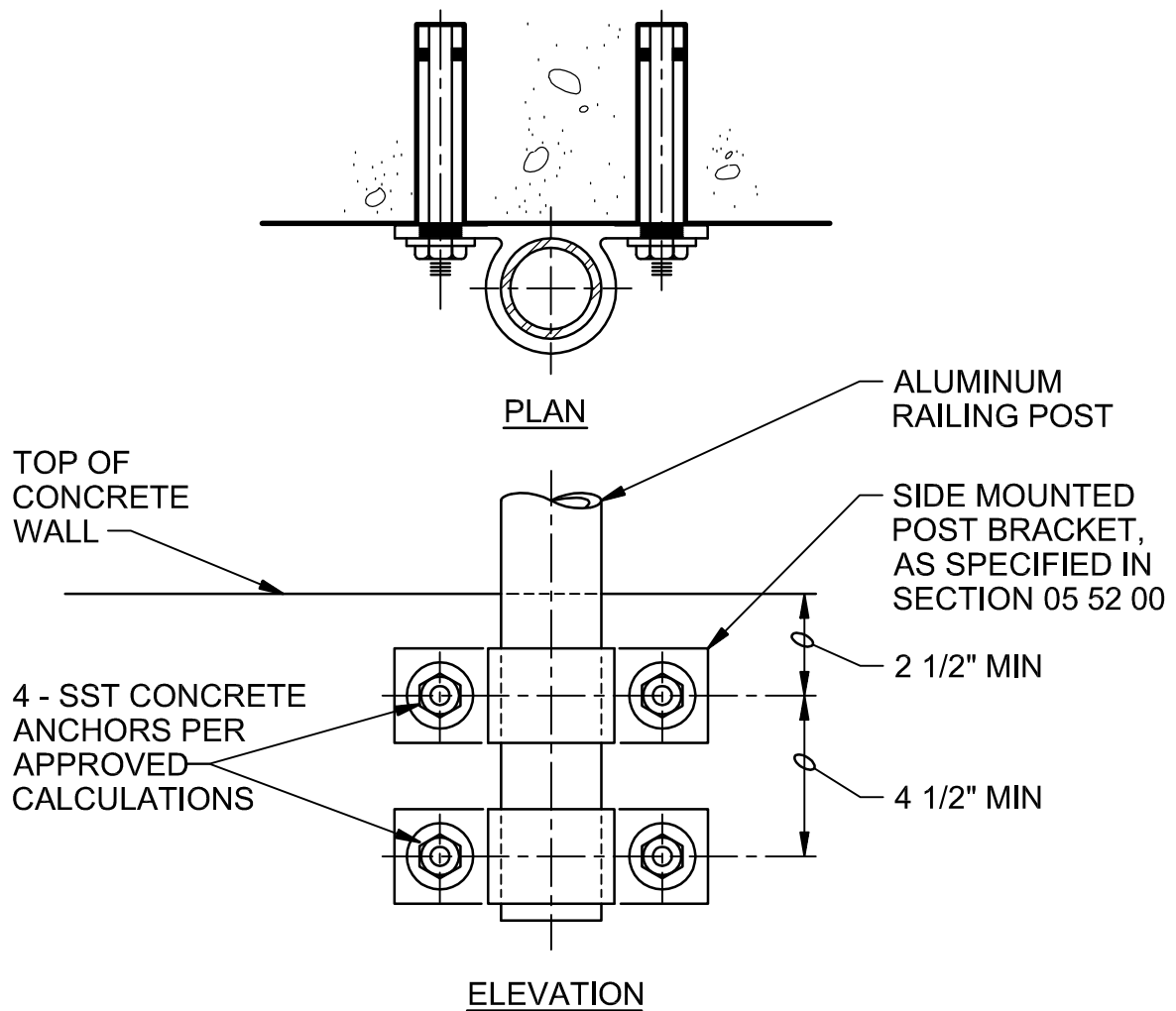
RAILING POST ANCHORAGE TYPE A - ALUMINUM

NTS

DETAIL 4 OF 8

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

0552-001



ELEVATION

TYPE "B"

NOTES:

1. PROVIDE PROTECTION FOR DISSIMILAR METALS AND CONCRETE PER SPECIFICATIONS.
2. USE SIDE MOUNTED POST BRACKET AS A TEMPLATE FOR THE ANCHOR BOLTS.

RAILING POST ANCHORAGE TYPE B - ALUMINUM

NTS

DETAIL 5 OF 8

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

0552-001



REMOVABLE 1 1/2"  
 SCHED 80 AL  
 POST (1.90 OD)  
 @ 4'-0" MAX SPG

3/4" CHAMFER, TYP

6"  
 CURB

3/16

PROVIDE TUBE 3/8" OD x  
 22 GA DRAIN FOR ALL  
 EXTERIOR APPLICATIONS

6"

6"

SST PL 3/8x4" DIA  
 W/ 2 1/8" DIA HOLE

REINF CURB W/ #4@12  
 DOWELS & 2 - #4 CONT,  
 1 EA SIDE OF POST  
 SLEEVE

2 1/2" DIA x 5 3/8" LONG  
 SCHED 40 SST PIPE

3/16

SST BOT PL  
 1/4x3 1/2" SQ

SST PIPE 1 1/4" DIA x 1 1/4"  
 LONG CENTERED

TYPE "E"

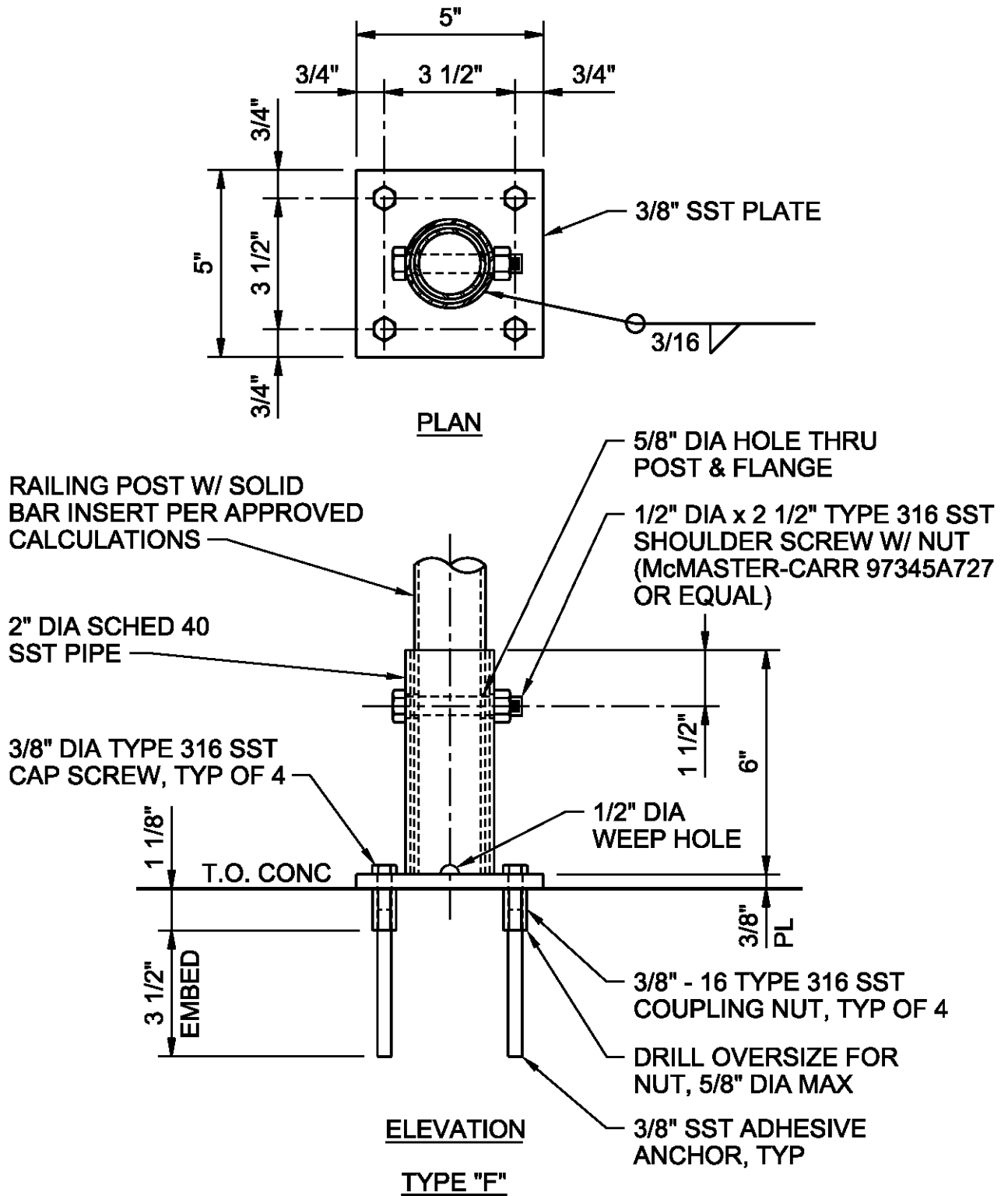
RAILING POST ANCHORAGE TYPE E -  
REMOVABLE - ALUMINUM

NTS

DETAIL 6 OF 8

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

0552-001



**RAILING POST ANCHORAGE TYPE F -  
REMOVABLE - ALUMINUM**

NTS

DETAIL 7 OF 8

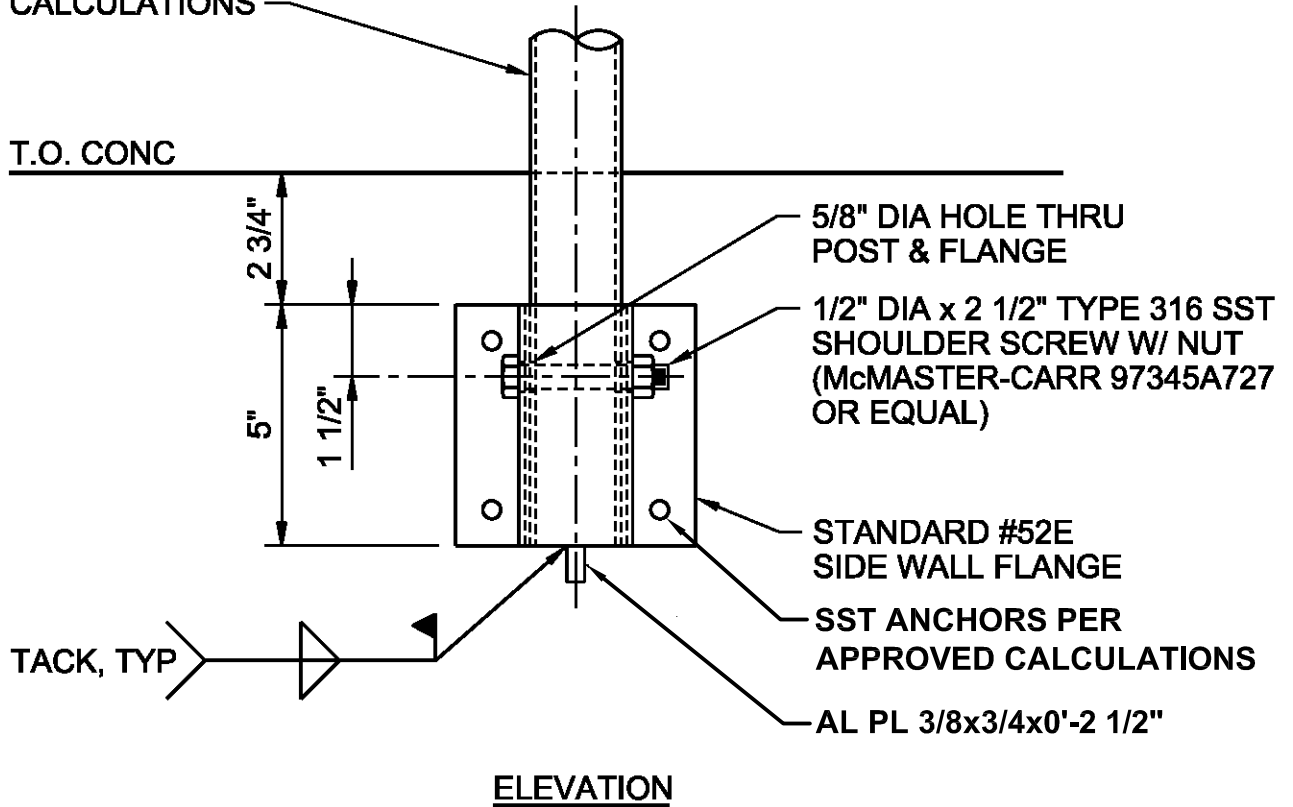
0552-001

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

**CH2MHILL**

RAILING POST W/ SOLID  
BAR INSERT PER APPROVED  
CALCULATIONS

T.O. CONC



RAILING POST ANCHORAGE TYPE G -  
REMOVABLE - ALUMINUM

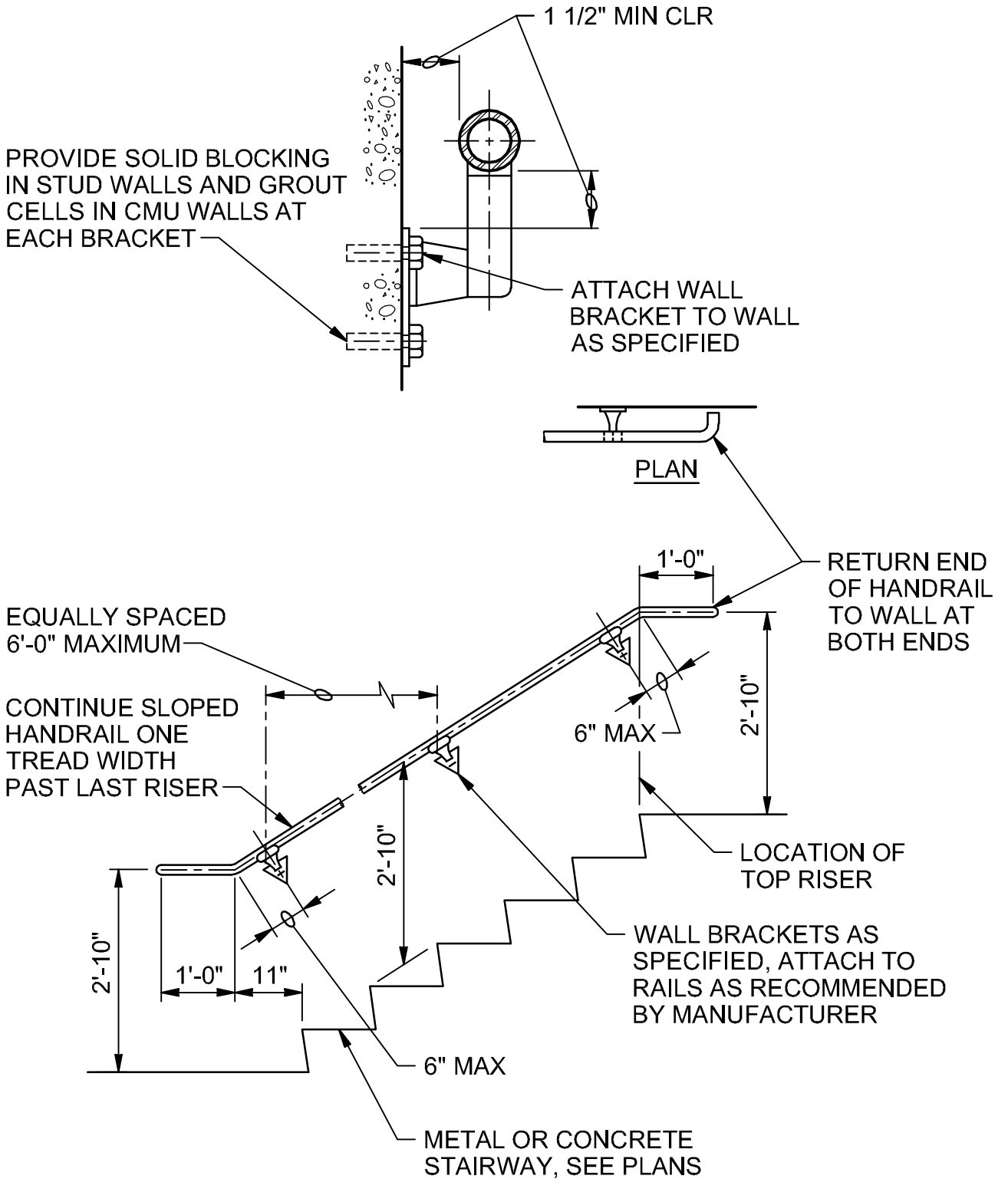
NTS

DETAIL 8 OF 8

0552-001

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

**CH2MHILL**

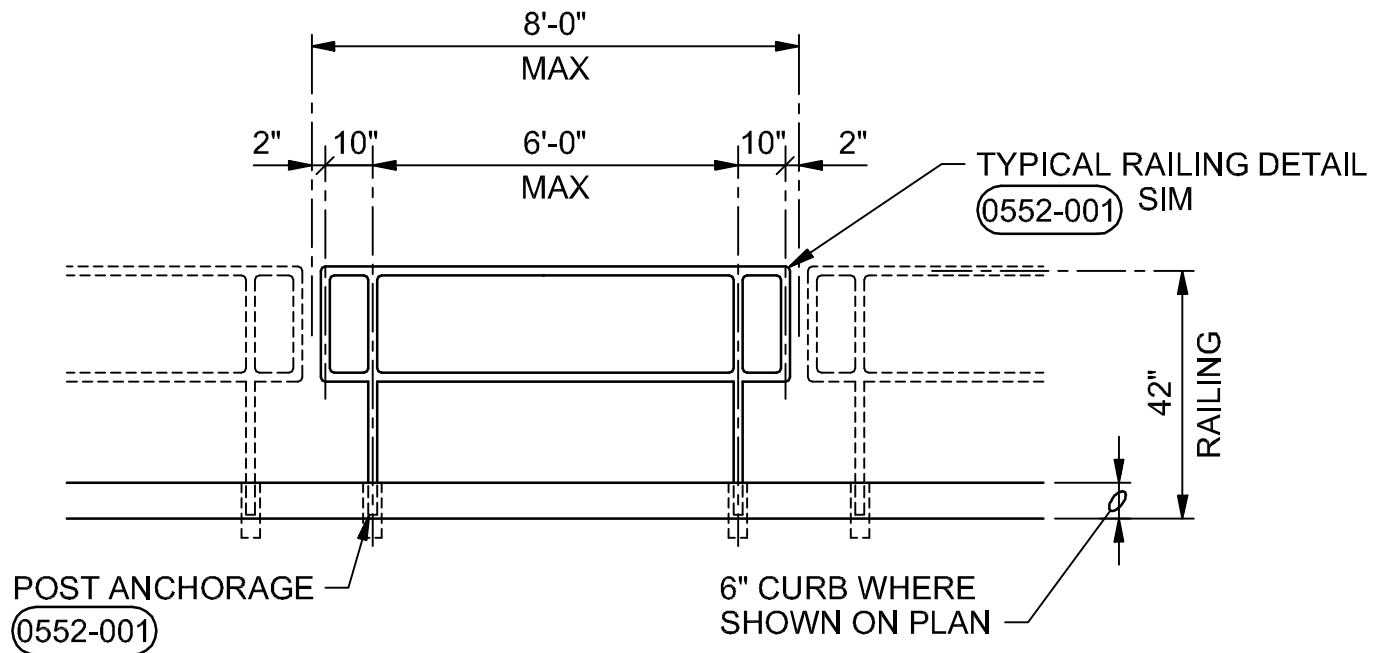


## WALL HANDRAIL - ALUMINUM (ADA)

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

0552-003



**NOTES:**

1. DETAIL SHOWN AT CURBED OPENING. WHERE NO CURB, PROVIDE 6" EDGE DISTANCE AND STIFFENED KICK PLATE ATTACHED TO REMOVABLE RAILING.
2. FABRICATE REMOVABLE RAILING IN MAXIMUM 8'-0" SECTIONS WITH 2 POSTS EACH SECTION.

**RAILING - REMOVABLE TWO RAIL - ALUMINUM**

NTS

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

(0552-004)

# STANDARD GRATING

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

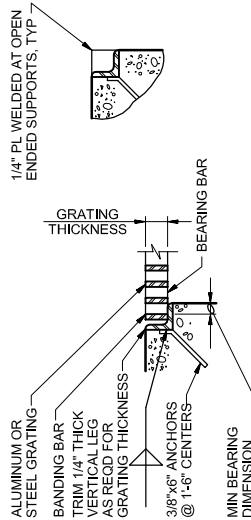
0553-001

**CH2MHILL**

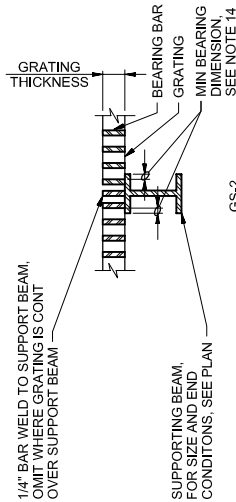
**GENERAL NOTES:**

1. EXTEND GRATING CONTINUOUSLY OVER GATE GUIDES AND GATES.
2. NOTCH GRATING SUPPORTS AT GATES AS REQUIRED.
3. GRATING SPAN → SEE PLAN.
4. WIDTH OF GRATING SECTIONS SHALL NOT EXCEED 3'-0".
5. SHOP DRAWINGS FOR SUPPORTS OF STEEL AND ALUMINUM GRATING TO BE SAME AS GRATING, EXCEPT METAL SUPPORTS THAT ARE TO BE EMBEDDED IN CONCRETE SHALL BE TYPE 316 STAINLESS STEEL.
6. UNLESS NOTED OTHERWISE ON PLANS, GRATING THICKNESS SHALL BE AS TABULATED IN "GRATING THICKNESS TABLE" FOR APPLICABLE TRAFFIC.
7. BEARING BAR THICKNESS FOR GRATING TO BE 3/16" MINIMUM.
8. BAND ALL EDGES WITH 3/16 x DEPTH OF BEARING BAR.
9. PROVIDE MISCELLANEOUS GRATING FASTENERS AS REQUIRED.

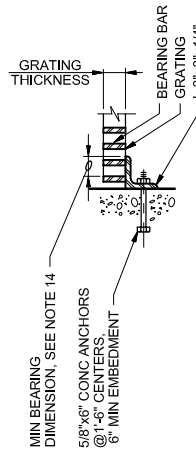
11. TYPE OF MATERIAL USED SHALL BE AS SHOWN ON PLANS OR AS SPECIFIED. THIS STANDARD DETAIL INCLUDES 2 TYPES, ALTHOUGH BOTH MAY NOT BE INCLUDED IN PROJECT.
12. THE HORIZONTAL CLEARANCE BETWEEN THE GRATING AND GRATING SUPPORTS SHALL NOT BE LESS THAN 1/4" NOR GREATER THAN 1/2" AND AS SPECIFIED.
13. ALL GRATING SECTIONS, WHEN IN PLACE, SHALL ALWAYS BE FIRMLY ANCHORED TO THEIR SUPPORTS AS SPECIFIED.
14. MIN BEARING HORIZONTAL DIMENSION = 1" FOR GRATING DEPTH 2 1/4" OR LESS; MIN BEARING HORIZONTAL = 2" FOR GRATING DEPTH GREATER THAN 2 1/4"



GS-1



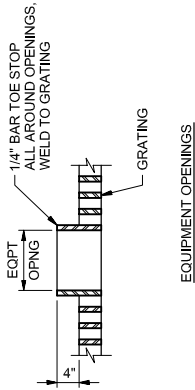
GS-2



NOTE: USE GS-3 ONLY FOR FOOT TRAFFIC GRATING.

GS-3

MAXIMUM SPAN	ALUMINUM	STEEL
3'-6"	1 1/4"	1"
4'-0"	1 1/2"	1"
4'-6"	1 3/4"	1"
5'-0"	1 3/4"	1 1/4"
5'-6"	2"	1 1/4"
6'-0"	2 1/4"	1 1/2"
6'-6"	2 1/4"	1 1/2"
7'-0"	2 1/2"	1 3/4"
8'-0"	2 1/2"	1 3/4"



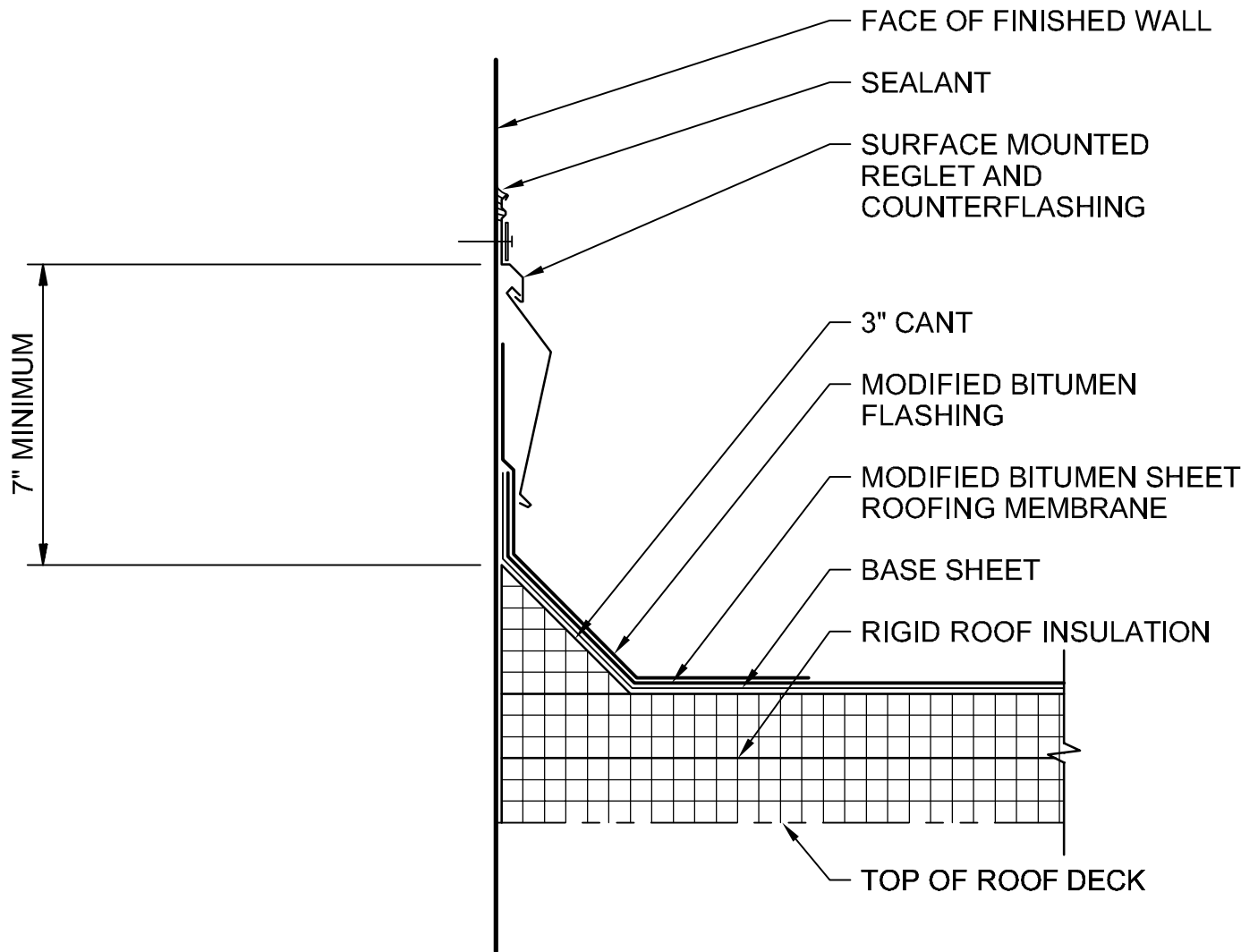
EQUIPMENT OPENINGS

MAXIMUM SPAN	STEEL	ALUMINUM
1'-0"	2"x3/16"	
1'-6"	2 1/2"x1/4"	
2'-0"	2 1/2"x3/8" OR 3"x1/4"	DO NOT USE ALUMINUM GRATING
2'-6"	3"x3/8" OR 4"x1/4"	
3'-3"	3 1/2"x3/8"	
4'-0"	4"x3/8"	
5'-0"	4 1/2"x3/8"	

MAXIMUM SPAN	STEEL	ALUMINUM
1'-0"	1 3/4"x3/16"	1 3/4"x3/16"
1'-6"	1 3/4"x3/16"	1 3/4"x3/16"
2'-0"	2"x3/16"	2"x3/16"
2'-6"	2 1/4"x3/16"	2 1/4"x3/16"
3'-0"	2 1/2"x3/16"	2 1/2"x3/16"
4'-0"	2 1/2"x1/4"	
5'-0"	2 1/2"x3/8"	DO NOT USE ALUMINUM GRATING
6'-0"	2 1/2"x3/8"	
7'-0"	3"x3/8"	

**VEHICULAR TRAFFIC NOTE:**

- STEEL GRATING BEARING BARS FOR VEHICULAR TRAFFIC SHALL BE SPACED AT 11/8" OC; ALUMINUM GRATING BEARING BARS FOR VEHICULAR TRAFFIC SHALL BE SPACED AT 1 3/16" OC.
- SERRATED BEARING BARS:
- INCREASE GRATING THICKNESSES SHOWN IN TABLES BY 1/4" FOR GRATING WITH SERRATED SLIP RESISTANT SURFACES.

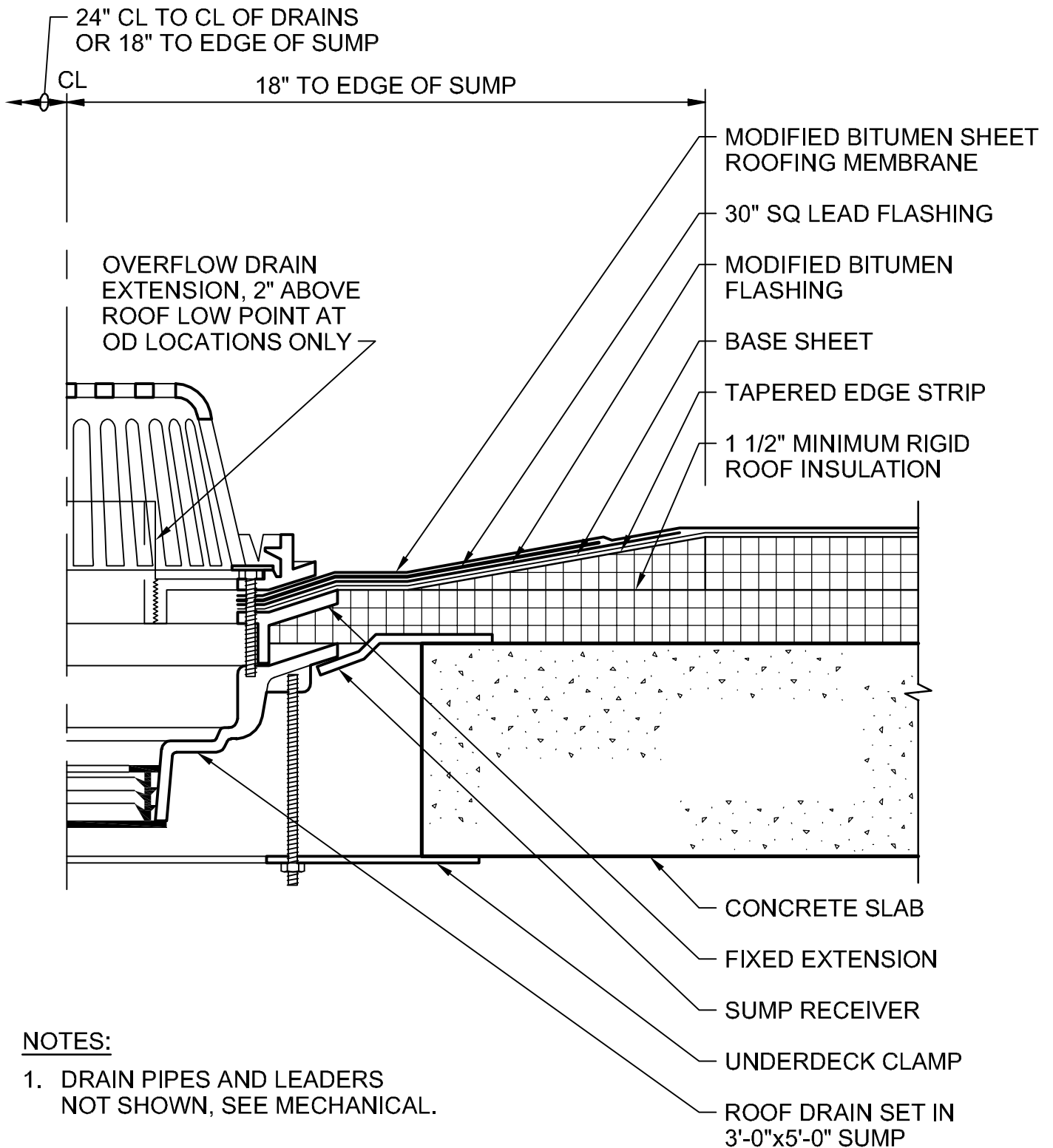


**BASE FLASHING**

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

0752-004



**NOTES:**

1. DRAIN PIPES AND LEADERS  
NOT SHOWN, SEE MECHANICAL.

**ROOF/OVERFLOW DRAIN (CONCRETE DECK)**

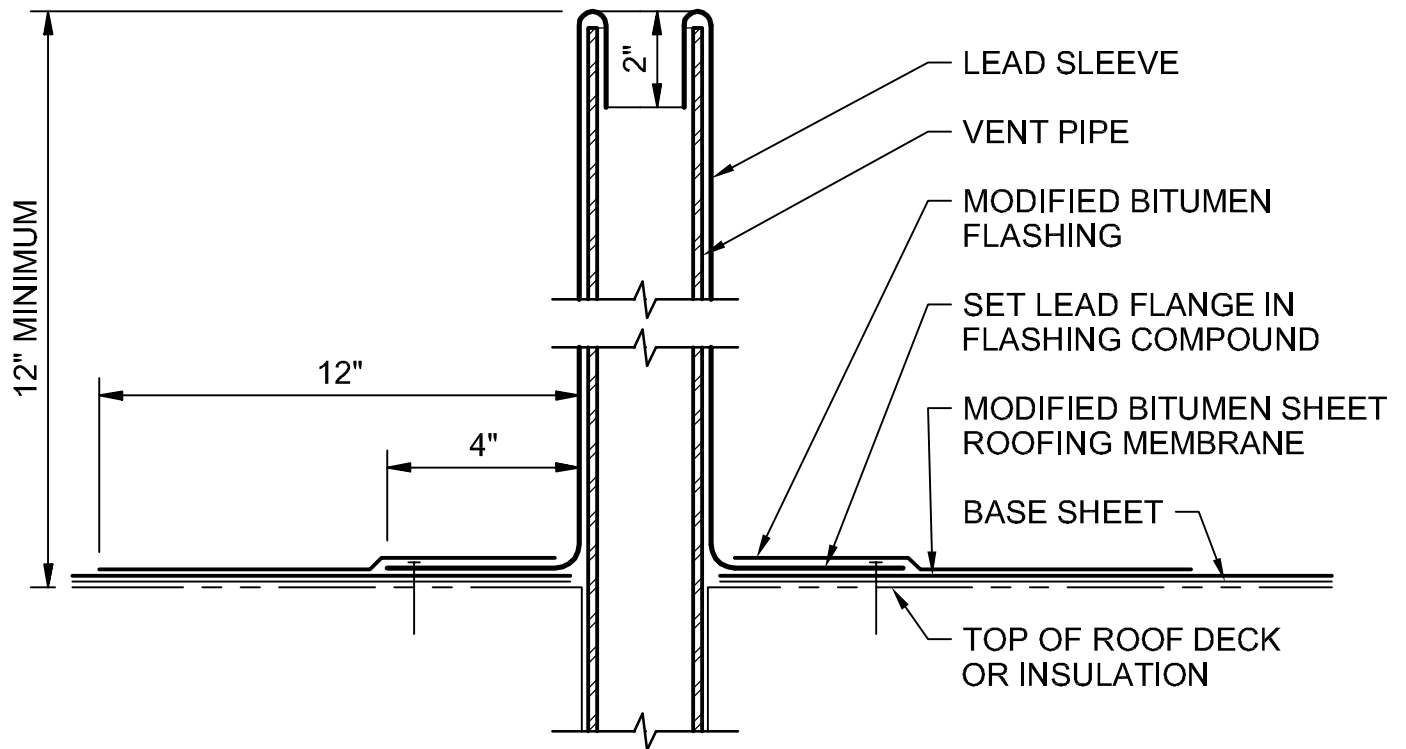
NTS

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

0752-005

**CH2MHILL**



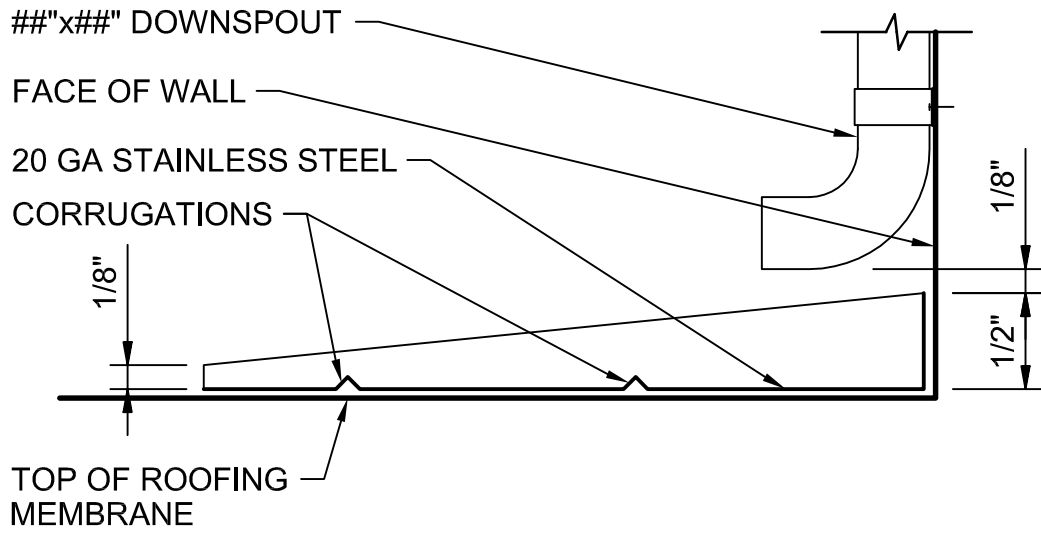


## VENT THROUGH ROOF

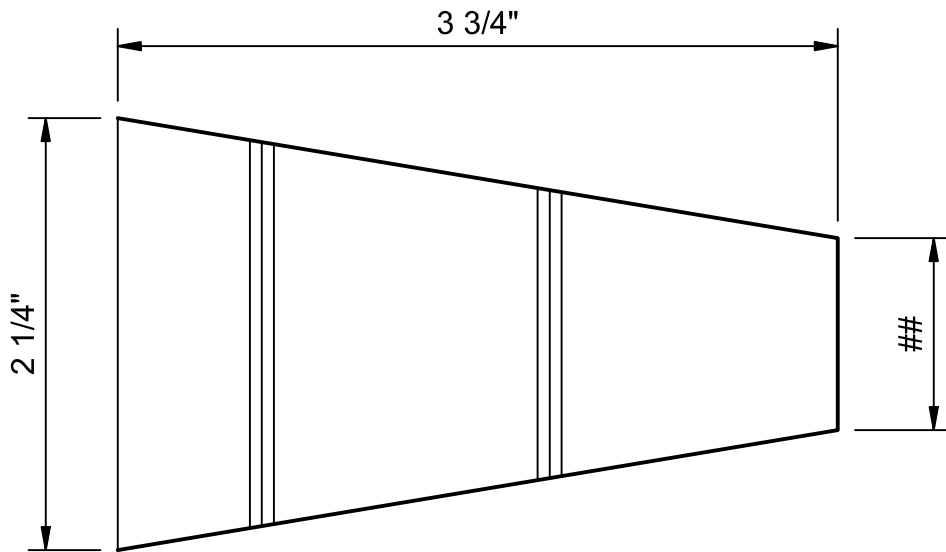
NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

0752-007



SECTION



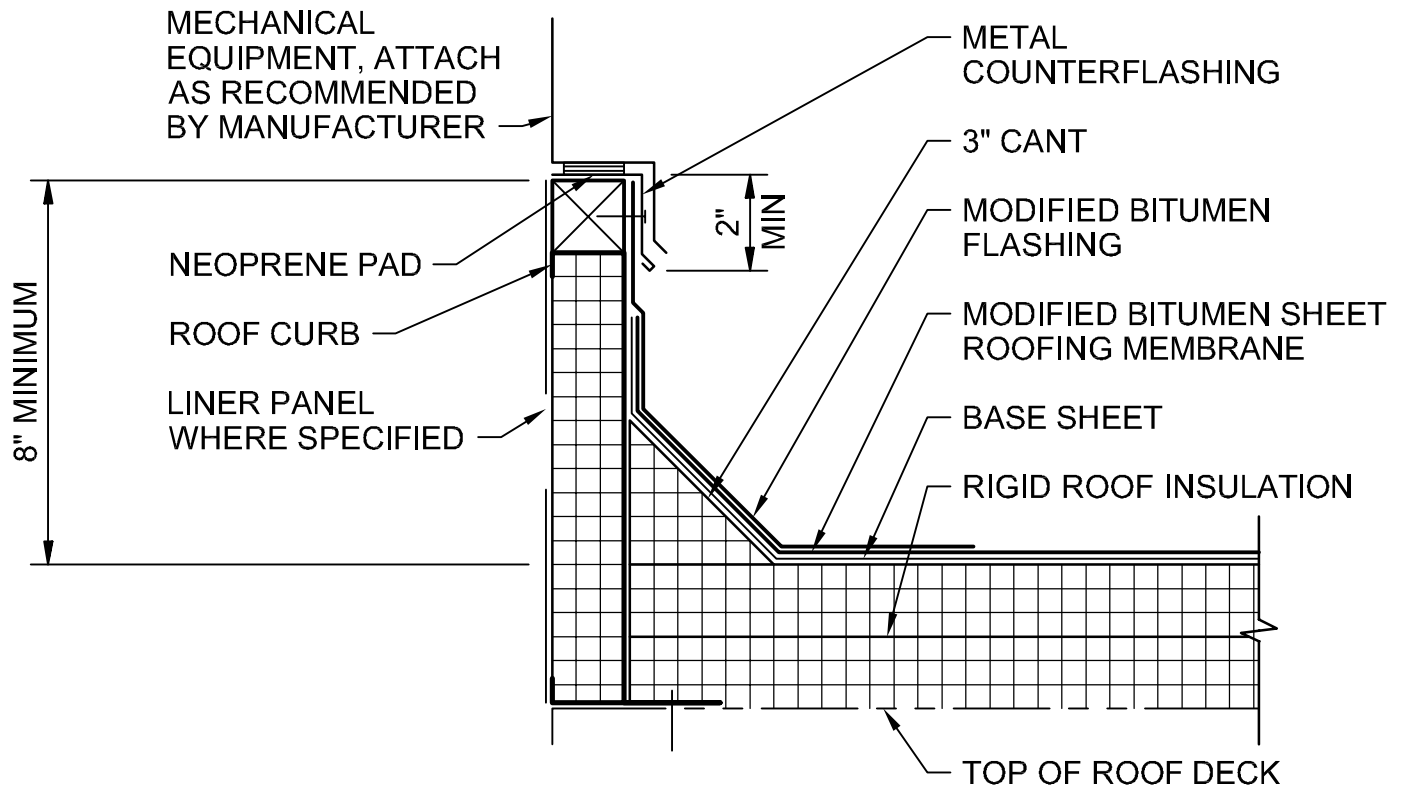
PLAN

SPLASH PAN

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

0762-004



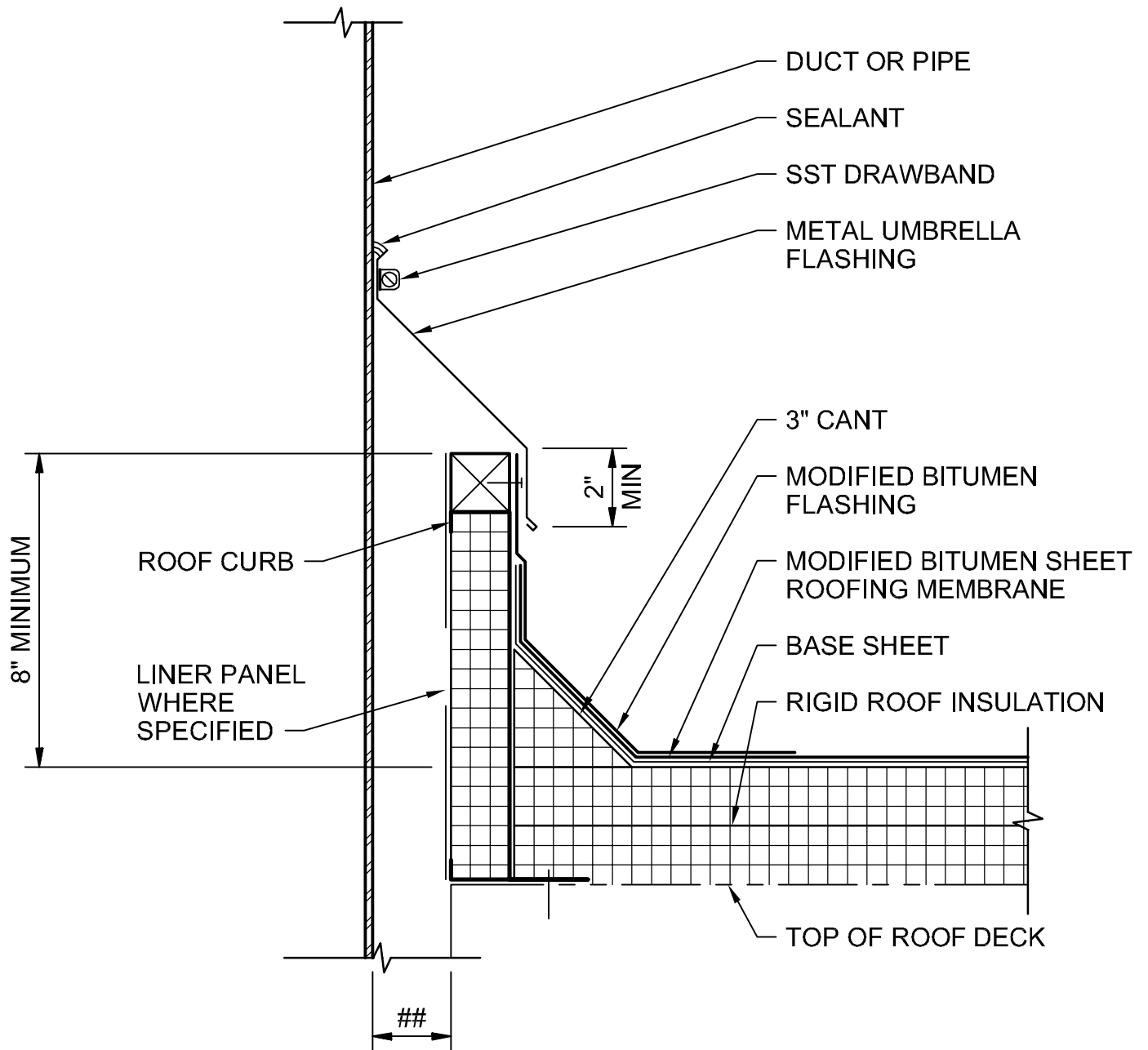
## MECHANICAL EQUIPMENT CURB

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

0770-016

**CH2MHILL**

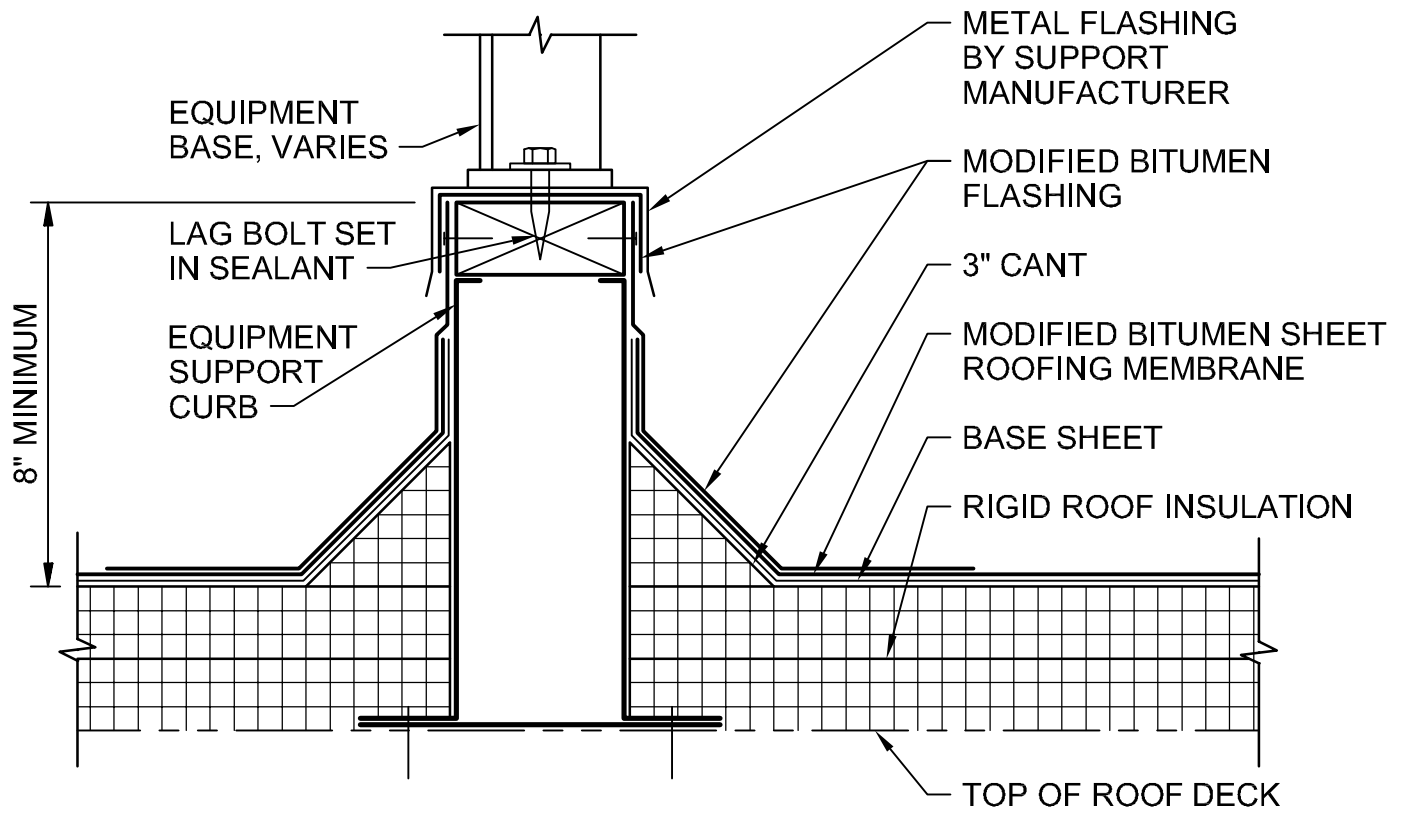


## DUCT/PIPE PENETRATION

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

0770-017

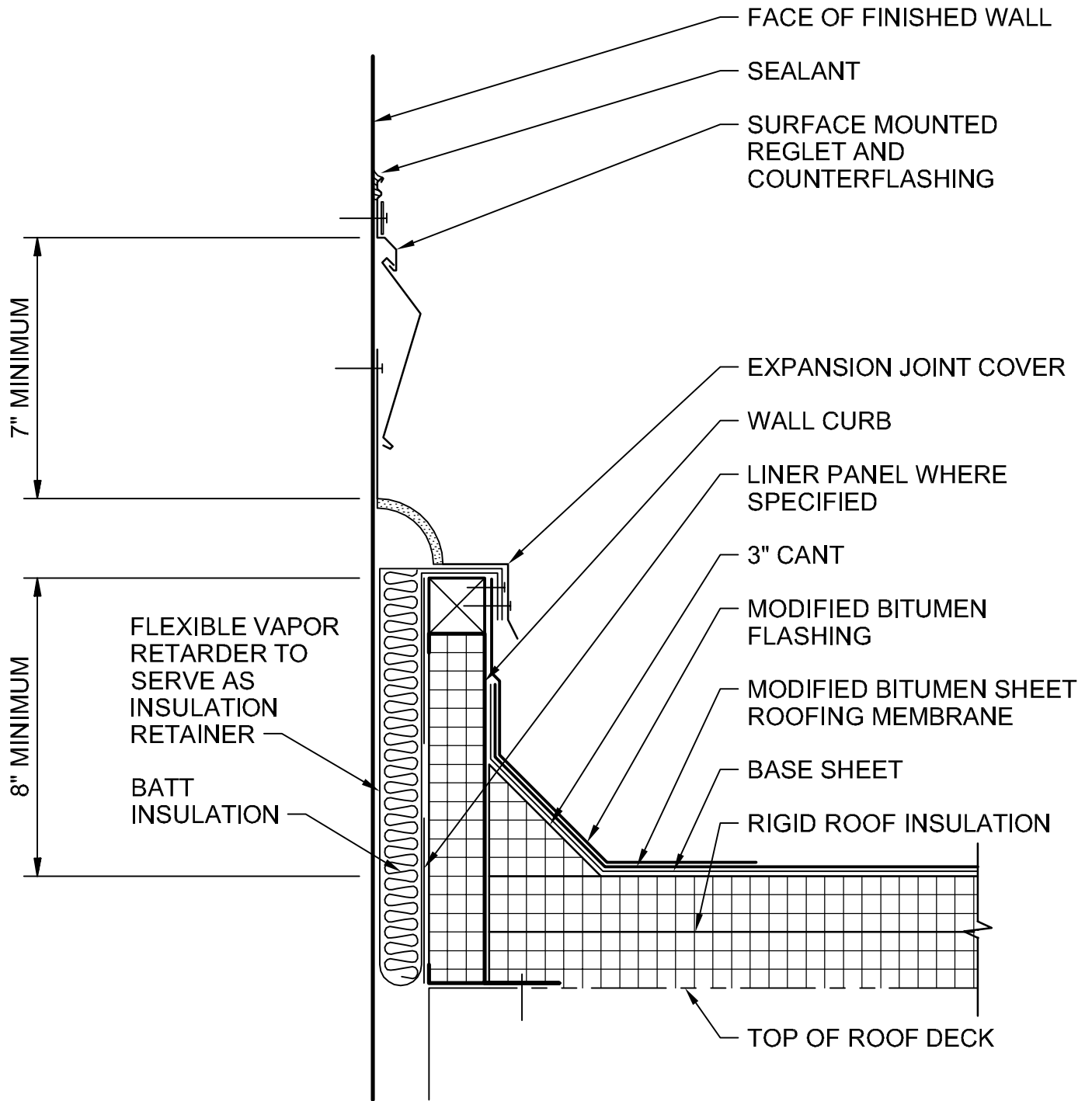


## EQUIPMENT SUPPORT CURB

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

0770-019

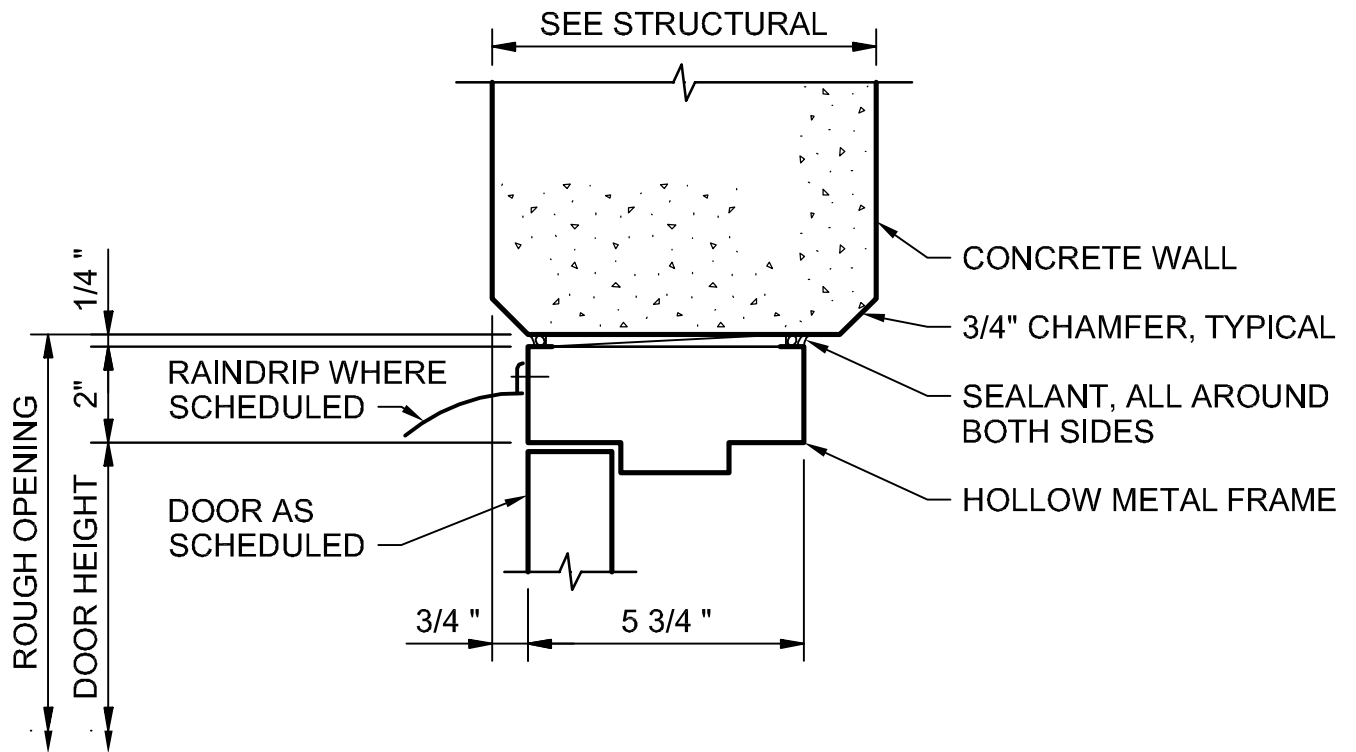


## EXPANSION JOINT (AT WALL)

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

0770-022



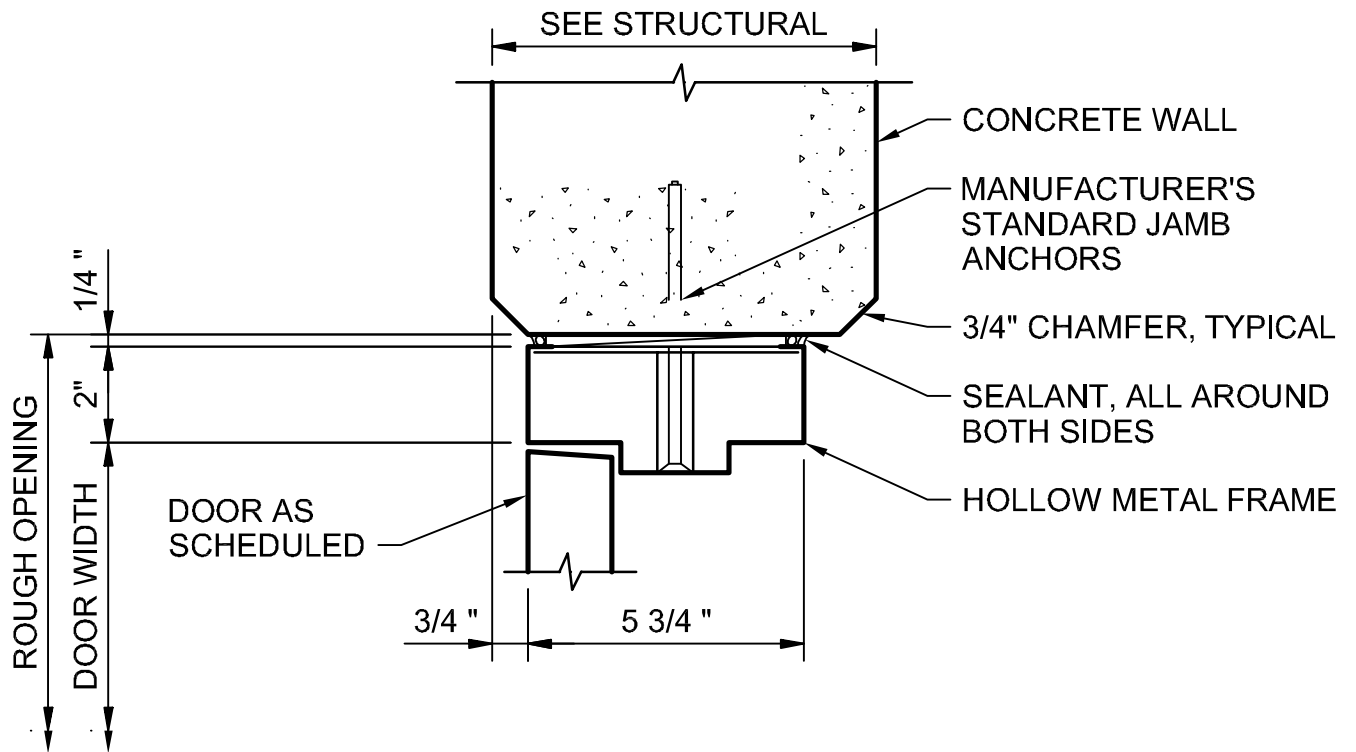
DOOR HEAD

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

0811-001

**CH2MHILL**



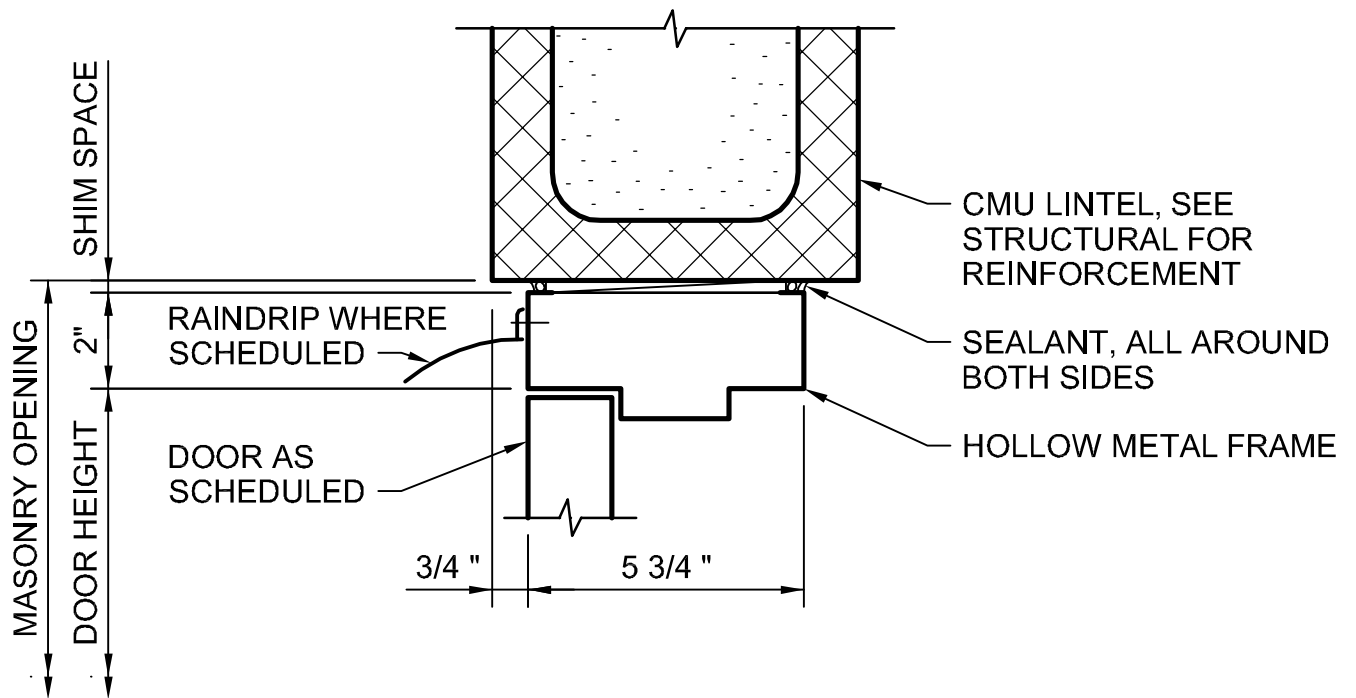
DOOR JAMB

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

0811-002



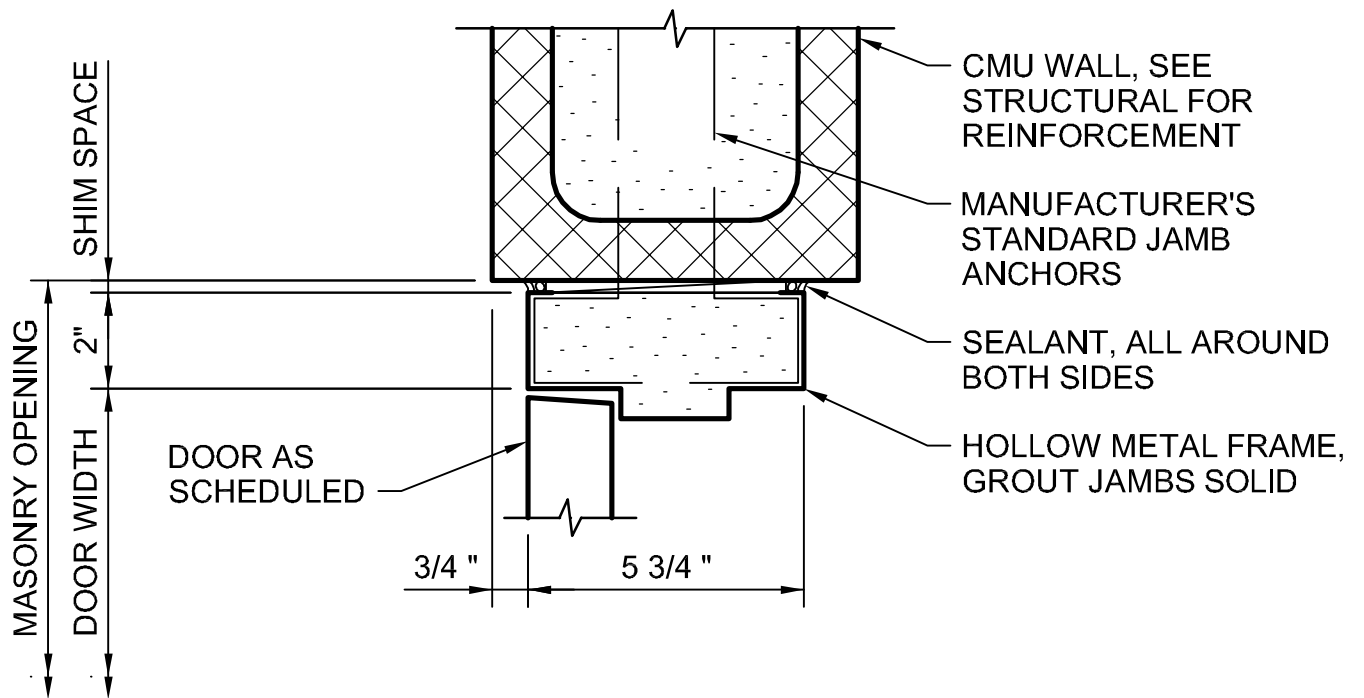


DOOR HEAD

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

0811-003



DOOR JAMB

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

0811-004

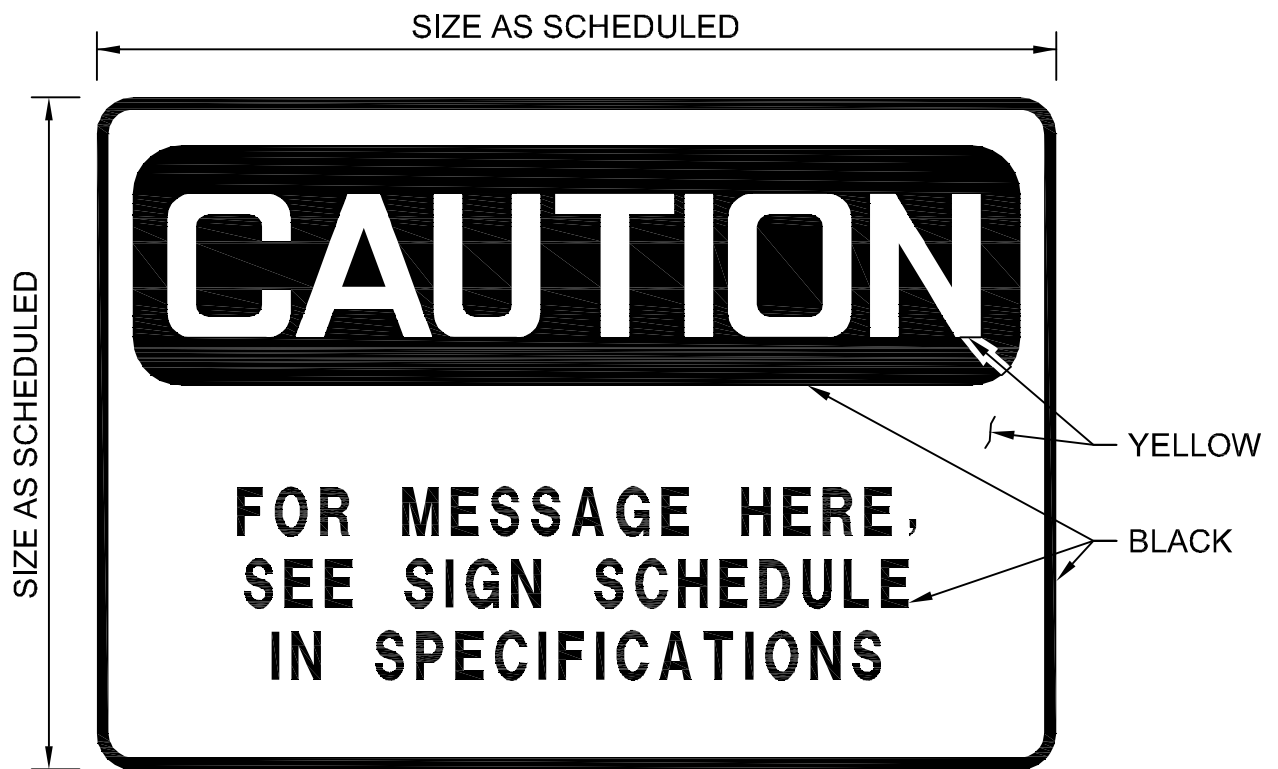


**DANGER SIGN**

NTS

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

1014-001



CAUTION SIGN

NTS

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

1014-002

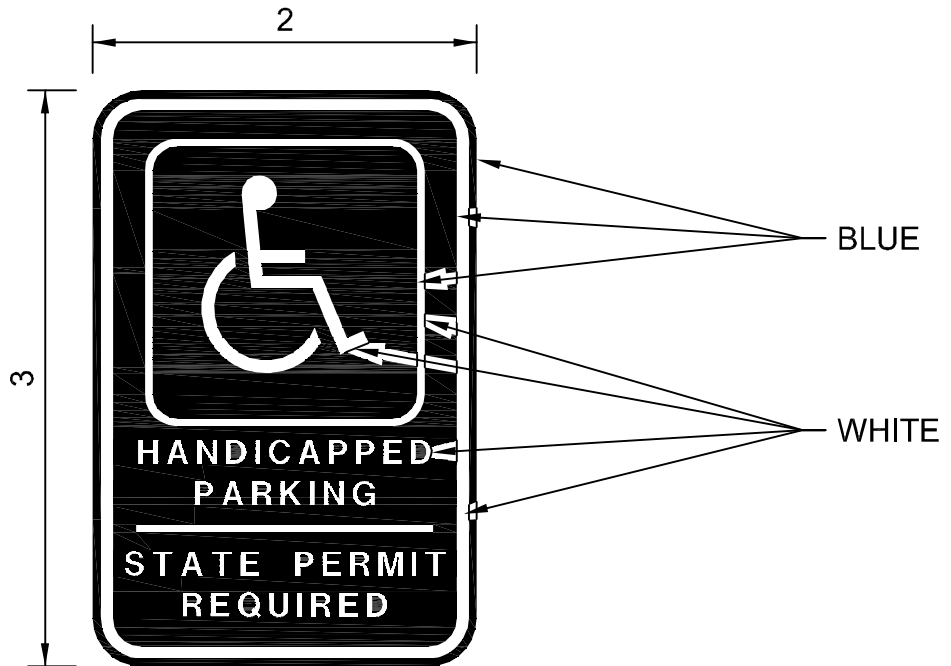


WARNING SIGN

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

1014-003

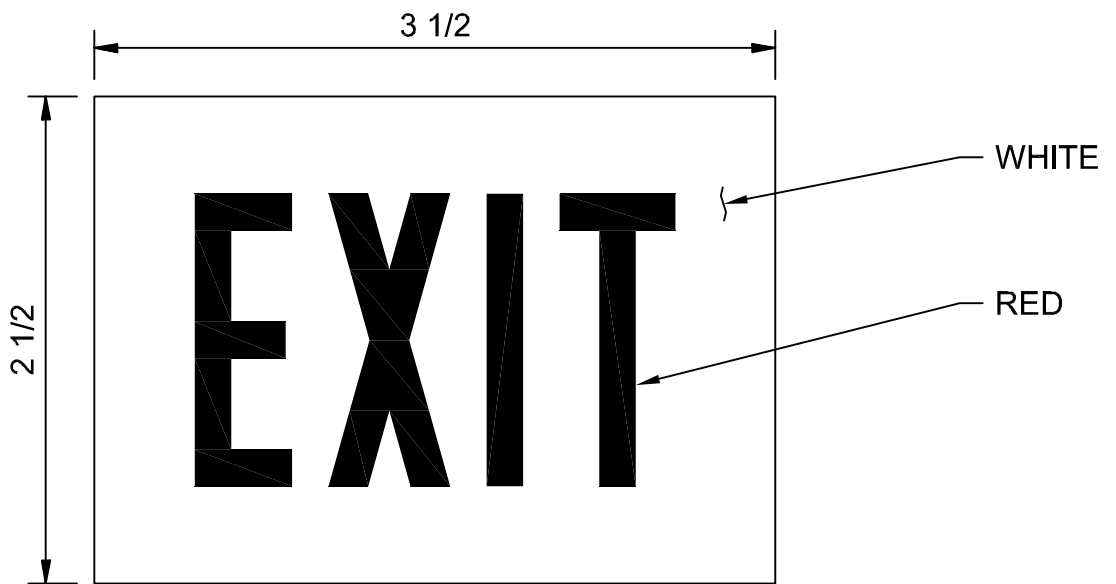


## HANDICAPPED PARKING SIGN

NTS

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

1014-004



EXIT SIGN

NTS

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

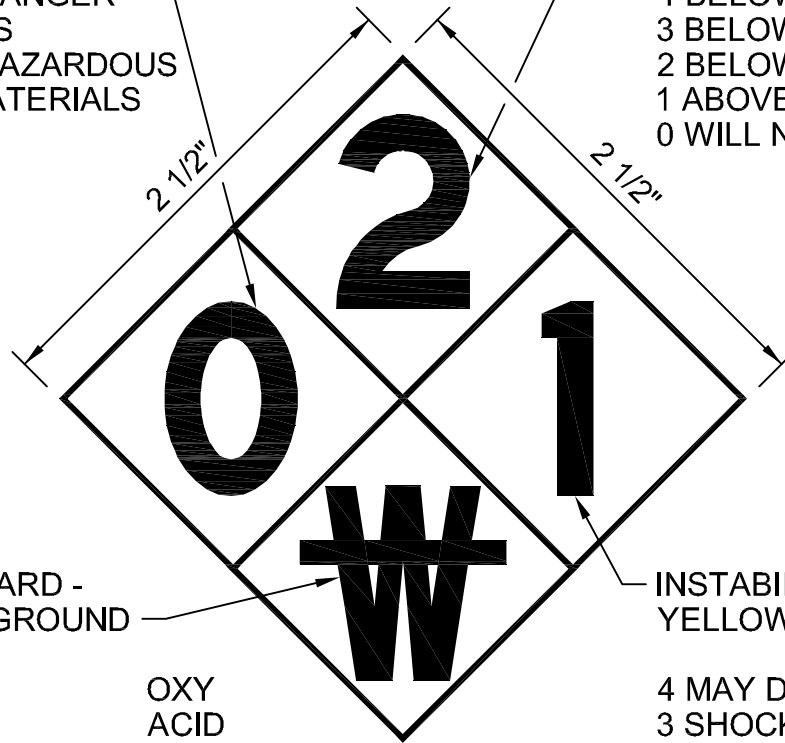
1014-005

HEALTH HAZARD -  
BLUE BACKGROUND

- 4 DEADLY
- 3 EXTREME DANGER
- 2 HAZARDOUS
- 1 SLIGHTLY HAZARDOUS
- 0 NORMAL MATERIALS

FLAMMABILITY HAZARD -  
RED BACKGROUND

- FLASH POINTS
- 4 BELOW 73 F
  - 3 BELOW 100 F
  - 2 BELOW 200 F
  - 1 ABOVE 200 F
  - 0 WILL NOT BURN



SPECIAL HAZARD -  
WHITE BACKGROUND

- OXIDIZER
- ACID
- ALKALI
- CORROSIVE
- USE NO WATER
- RADIATION HAZARD

- OXY
- ACID
- ALK
- COR
- W
- 

INSTABILITY HAZARD -  
YELLOW BACKGROUND

- 4 MAY DETONATE
- 3 SHOCK & HEAT MAY DETONATE
- 2 VIOLENT CHEMICAL CHANGE
- 1 UNSTABLE IF HEATED
- 0 STABLE

NOTES:

1. LETTER HEIGHT: 4"  
LETTER COLOR: BLACK
2. NUMBERS AND LETTERS ON ABOVE SIGNAL DETAIL  
ARE EXAMPLES ONLY. SEE SPECIFICATION 10 14 00  
FOR REQUIREMENTS ON THIS PROJECT.

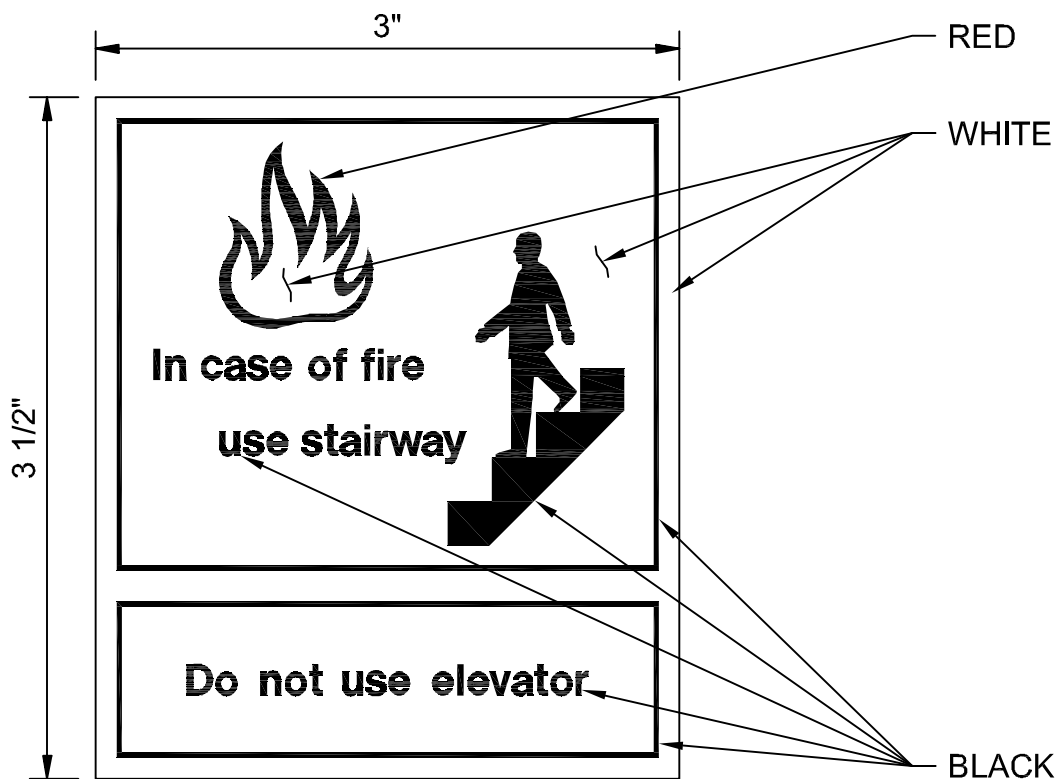
HAZARDOUS MATERIAL SIGNAL

NTS

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

1014-006



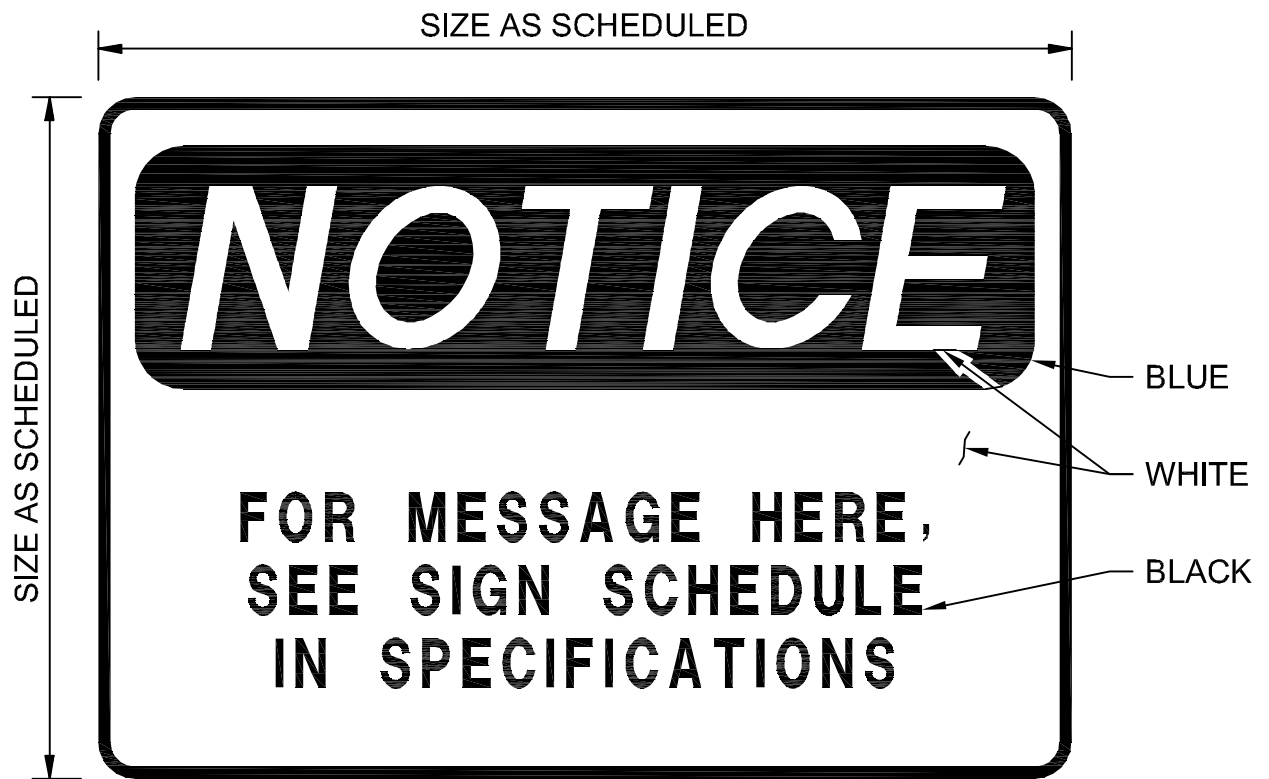


## ELEVATOR WARNING SIGN

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

1014-007

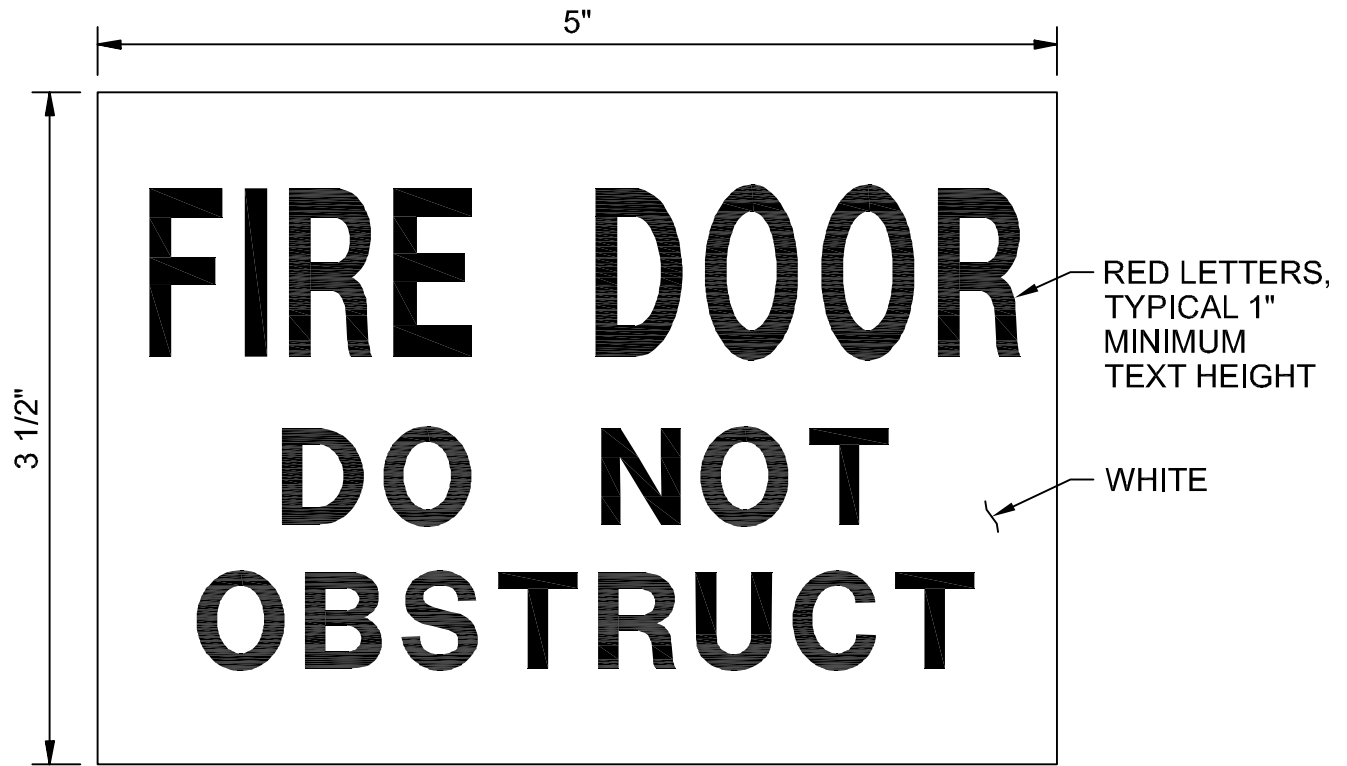


NOTICE SIGN

NTS

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

1014-008

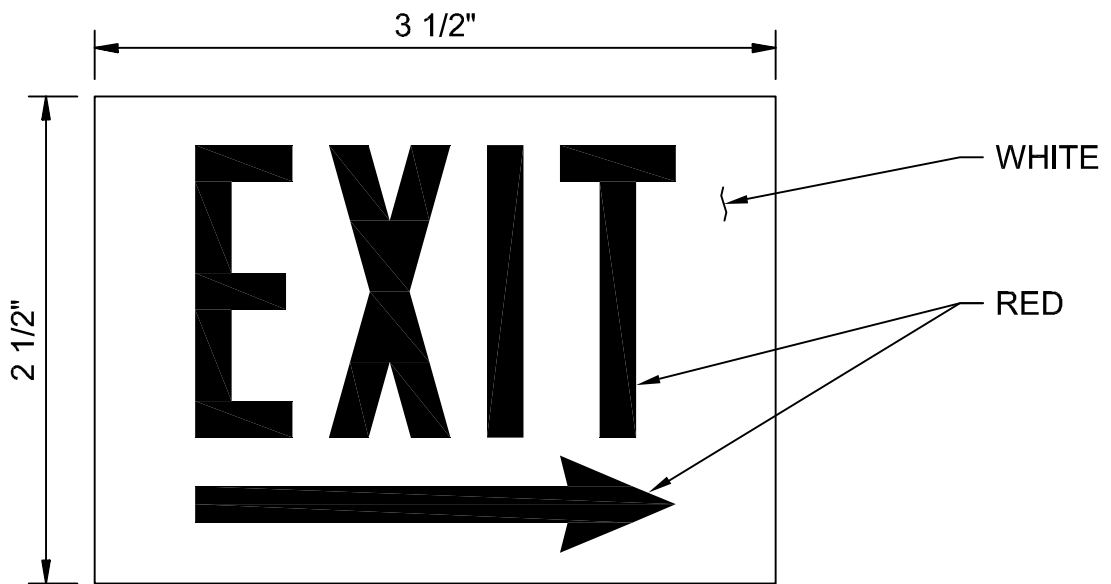


FIRE DOOR SIGN

NTS

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

1014-009



NOTES:

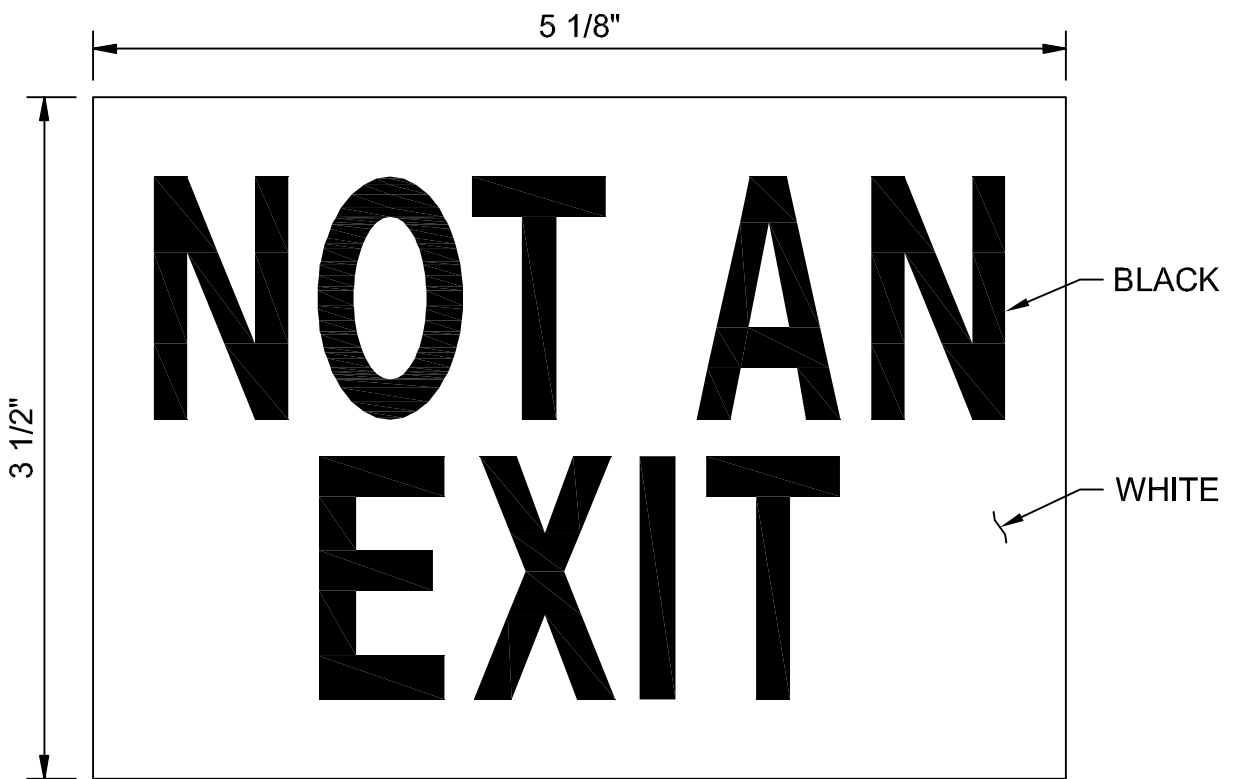
1. DIRECTION ARROW POINTS TO LEFT OR RIGHT, AS SCHEDULED.
2. AT 2-SIDED SIGNS, DIRECTION ARROW POINTS TO LEFT ON ONE FACE AND TO RIGHT ON OTHER FACE. FURNISH BRACKET FOR WALL MOUNTING.

EXIT SIGN

NTS

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

1014-010



EXIT WARNING SIGN

NTS

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

1014-011

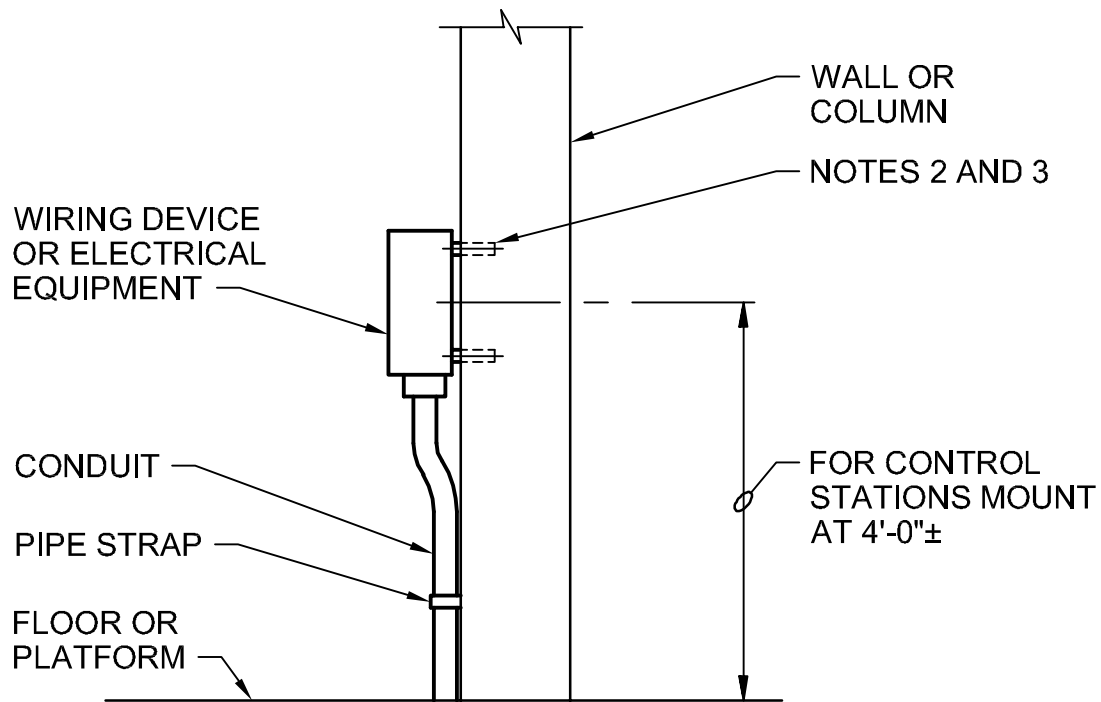


SAFETY FIRST SIGN

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

1014-012



**NOTES:**

1. ALL MOUNTING HARDWARE SHALL BE STAINLESS STEEL. USE WASHER AND SPLIT-LOCK WASHERS UNDER ALL NUTS.
2. ON CONCRETE WALLS USE STAINLESS STEEL CONCRETE ANCHORS. MOUNT ENCLOSURE ON 1/2" SPACERS OF 1/2" SCHEDULE 80 PVC CONDUIT.
3. BOXES 6 INCHES SQUARE AND LESS SHALL BE SUPPORTED BY TWO ANCHORS. LARGER BOXES SHALL BE SUPPORTED BY AT LEAST FOUR.

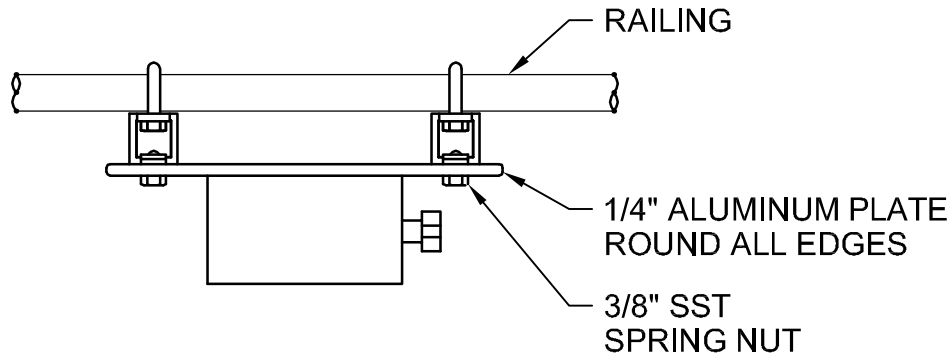
**WALL OR COLUMN MOUNTED DEVICE**

NTS

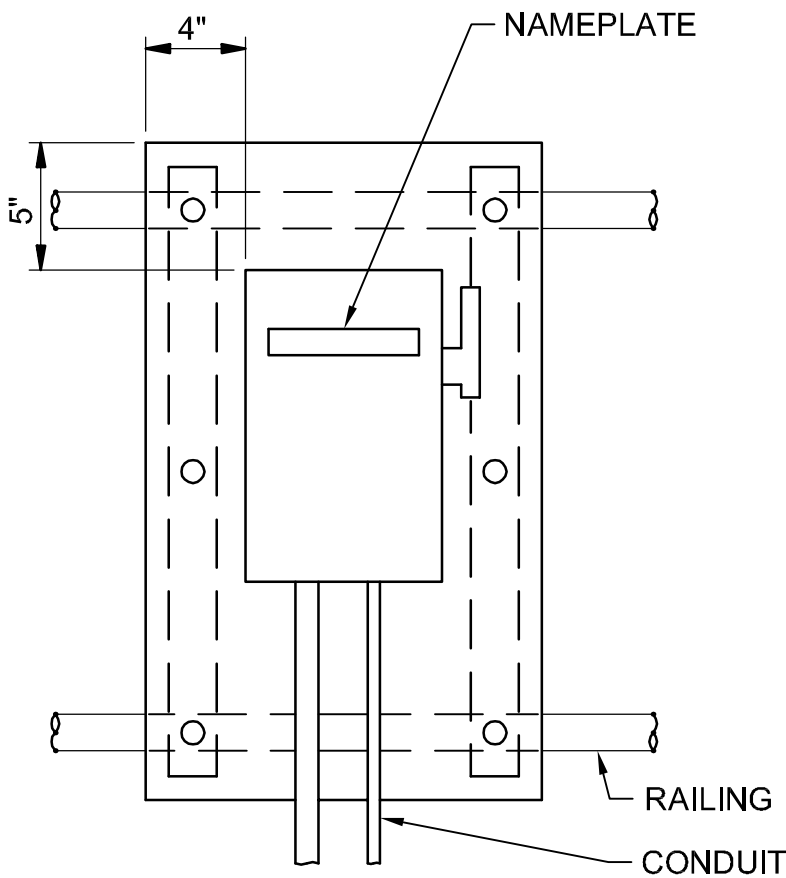
ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

2605-002

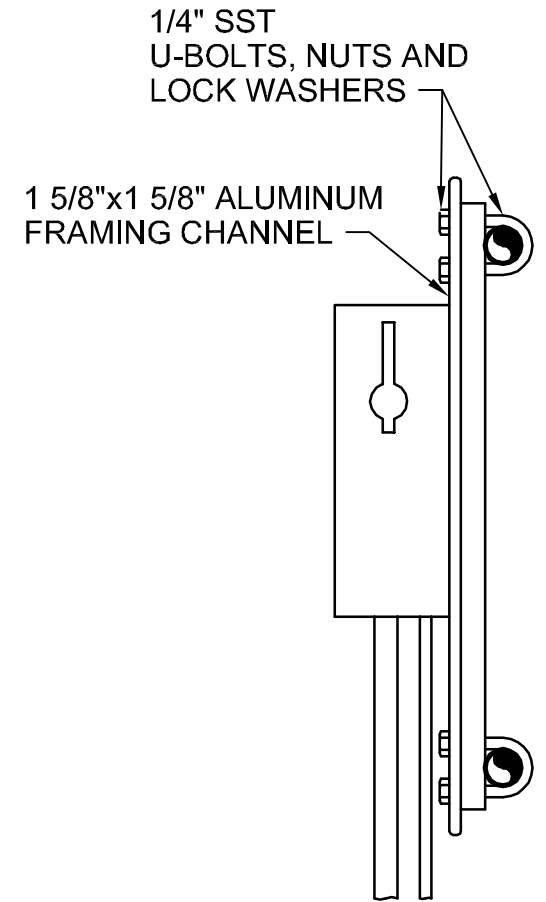
**CH2MHILL**



TOP



FRONT



SIDE

## NONFUSED DISCONNECT SWITCH MOUNTING

NTS

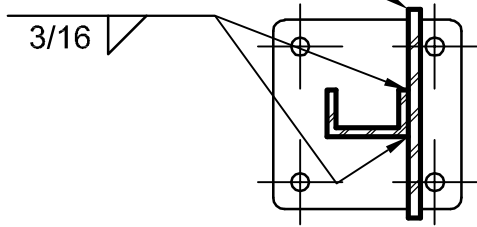
ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

2605-003b

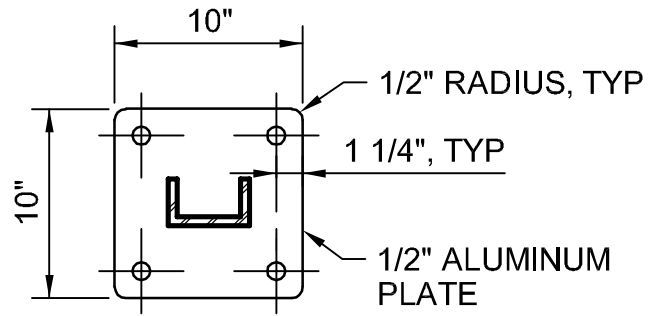
**CH2MHILL**



1/4" ALUMINUM MOUNTING PLATE,  
(18" MAX, WIDTH), ROUND EDGES,  
1/2" RADIUS, TYP

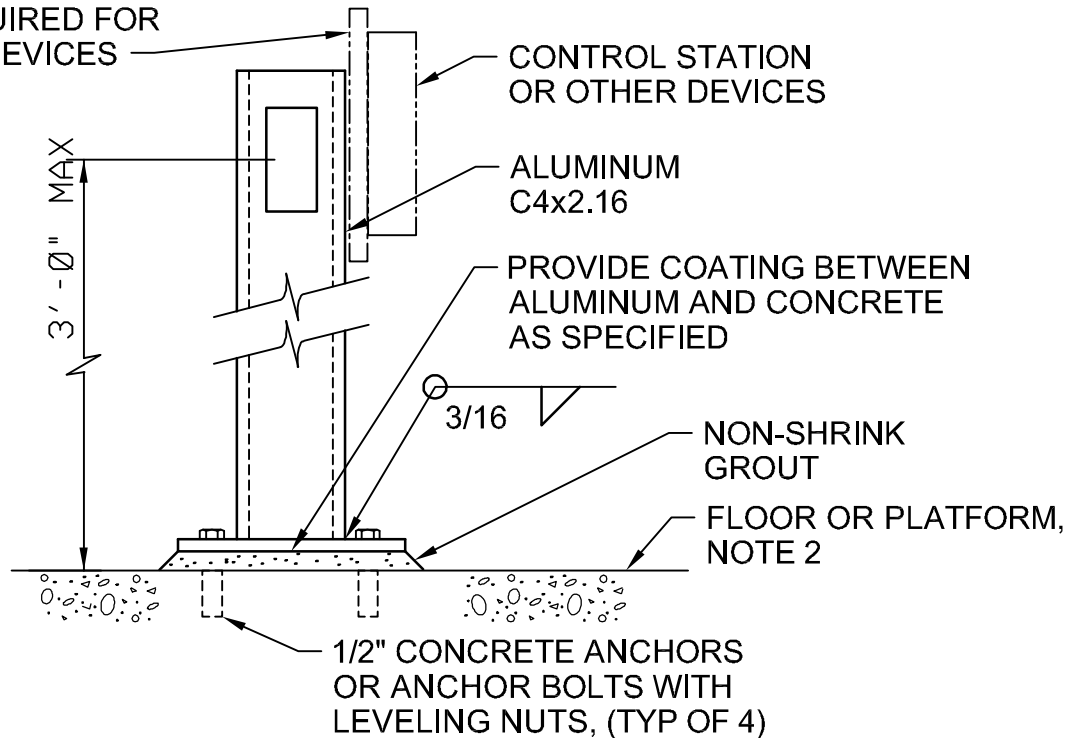


OVERSIZED DEVICES



PLAN

1/4" ALUMINUM PLATE,  
SIZE AS REQUIRED FOR  
OVERSIZED DEVICES



ELEVATION

**NOTES:**

1. USE STAINLESS STEEL MOUNTING HARDWARE. USE WASHERS AND SPLIT-LOCK WASHERS UNDER ALL NUTS.
2. FOR YARD LOCATIONS, PROVIDE 2'-0" SQUARE x 6" THICK CONCRETE PAD AT GRADE WITH 3#4 REBAR EACH WAY, CENTERED.
3. CONTROL STATIONS DEVICES AND EQUIPMENT HAVING A FRONTAL AREA NOT GREATER THAN 2'-0" SQ FT SHALL BE PEDESTAL MOUNTED UNLESS OTHERWISE INDICATED.

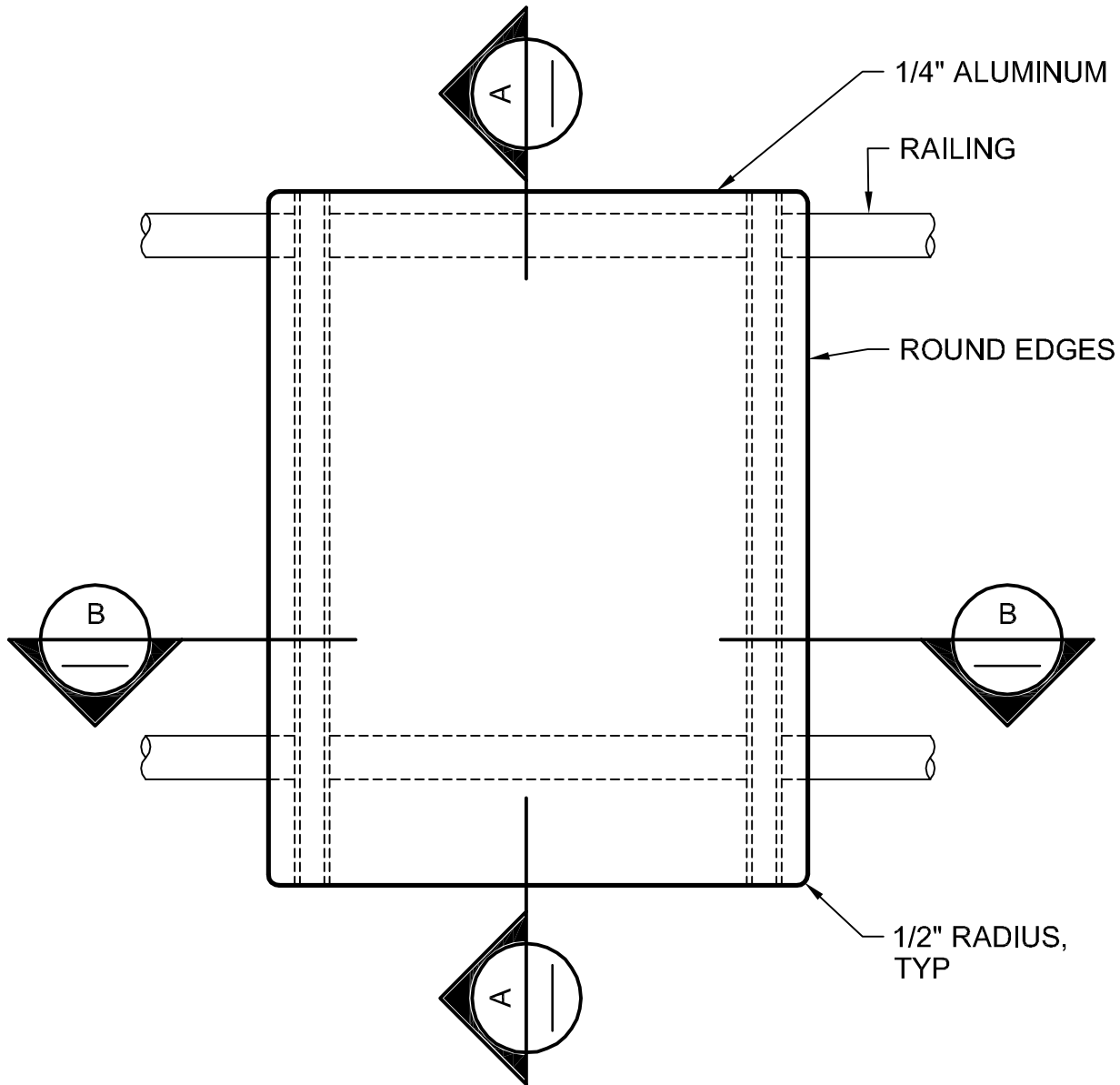
**EQUIPMENT MOUNTING PEDESTAL**

NTS

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

2605-005b

**CH2MHILL**



ELEVATION

NOTES:

1. ALL HARDWARE SHALL BE STAINLESS STEEL. USE WASHERS AND SPLIT-LOCK WASHERS ON ALL NUTS AND BOLTS.
2. DIMENSIONS SHALL BE AS REQUIRED FOR EQUIPMENT TO BE MOUNTED. EDGE OF MOUNTING PLATE SHALL EXTEND A MINIMUM OF 2 INCHES EACH SIDE OF THE MOUNTED EQUIPMENT.
3. THIS DETAIL SHALL BE USED FOR MOUNTING EQUIPMENT AND JUNCTION BOXES WEIGHING LESS THAN 50 LBS ON RAILINGS WHETHER DETAIL IS CALLED OUT OR NOT. EQUIPMENT MOUNTING SHALL NOT REDUCE THE WIDTH OF A WALKWAY TO LESS THAN 3'-0".

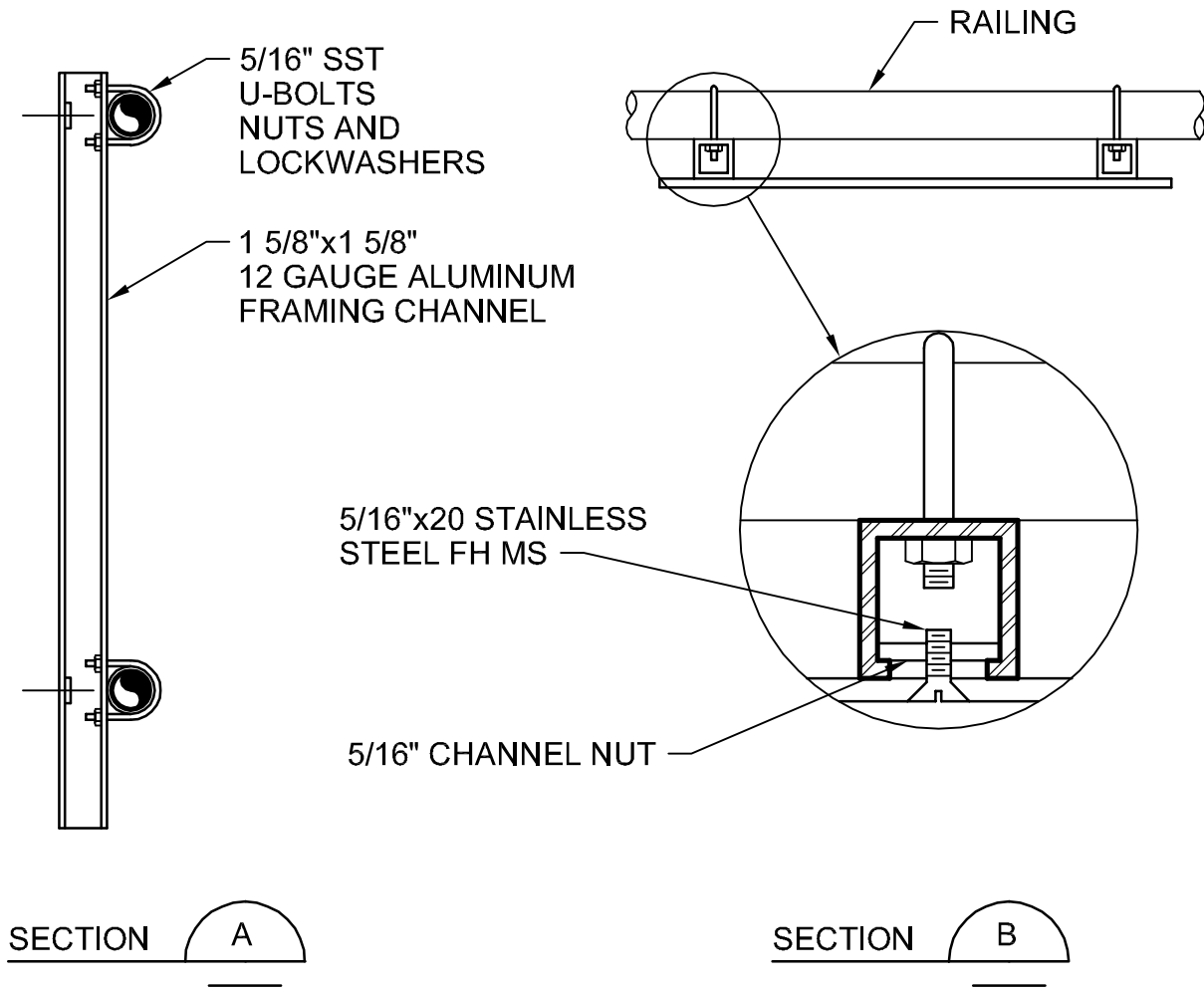
RAILING MOUNTED EQUIPMENT SUPPORT

NTS

DETAIL 1 OF 2

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

2605-007



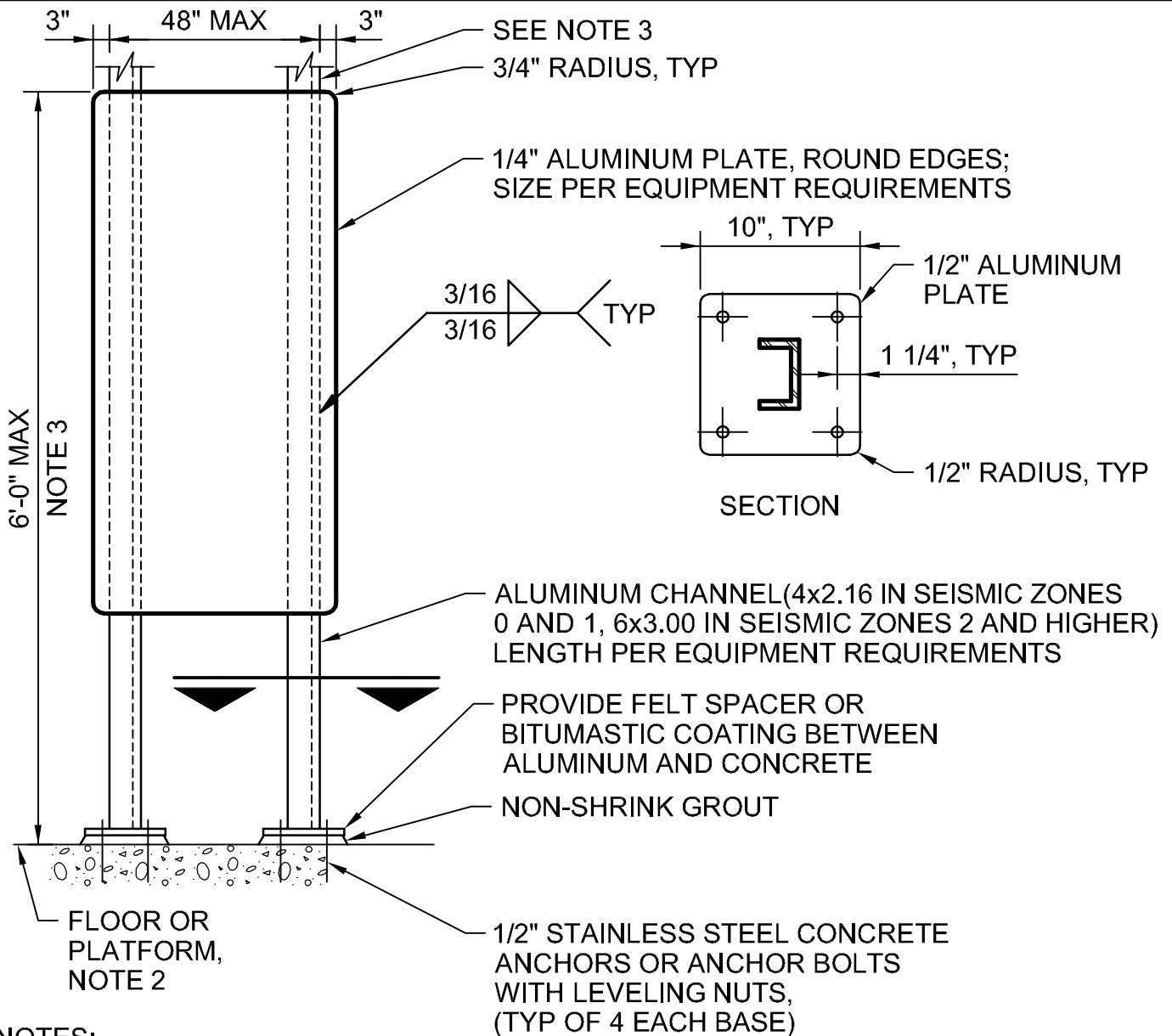
RAILING MOUNTED EQUIPMENT SUPPORT

NTS

DETAIL 2 OF 2

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

2605-007



**NOTES:**

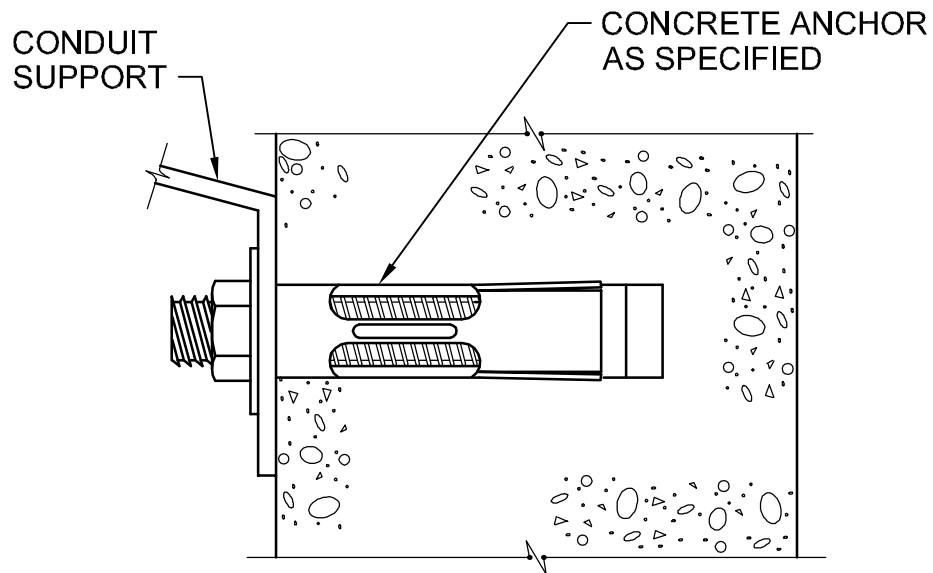
1. USE STAINLESS STEEL MOUNTING HARDWARE. USE WASHER AND SPLIT LOCK WASHER UNDER ALL NUTS.
2. FOR YARD LOCATIONS PROVIDE A 6 INCH THICK CONCRETE PAD AT GRADE WITH #4 BAR @ 12" OC EACH WAY, CENTERED. THE PAD SHALL BE 12 INCHES LONGER THAN THE MOUNTING PLATE BY ONE HALF THE HEIGHT OF THE MOUNTING PLATE ABOVE FINISHED GRADE. MINIMUM WIDTH 24 INCHES.
3. FOR HEIGHTS EXCEEDING 5'-0" OR WEIGHT OF MOUNTED EQUIPMENT EXCEEDING 200 LBS, SIZE POSTS AND CONNECTIONS FOR LATERAL LOADS. EXTEND POSTS TO STRUCTURE ABOVE WHERE REQUIRED BY CALCULATION, SEE GENERAL ELECTRICAL CONSTRUCTION NOTES ON DRAWINGS.

**ELECTRICAL EQUIPMENT SUPPORT**

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

2605-008b

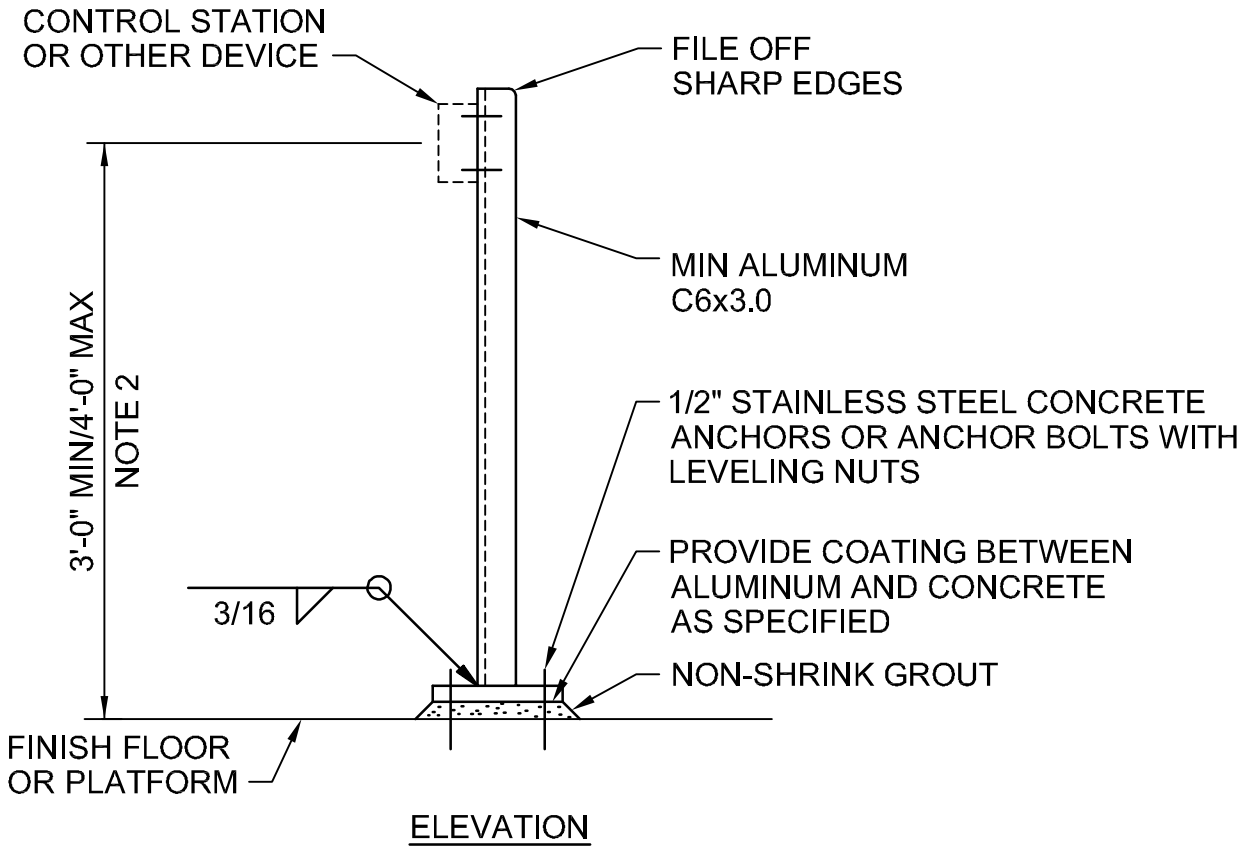
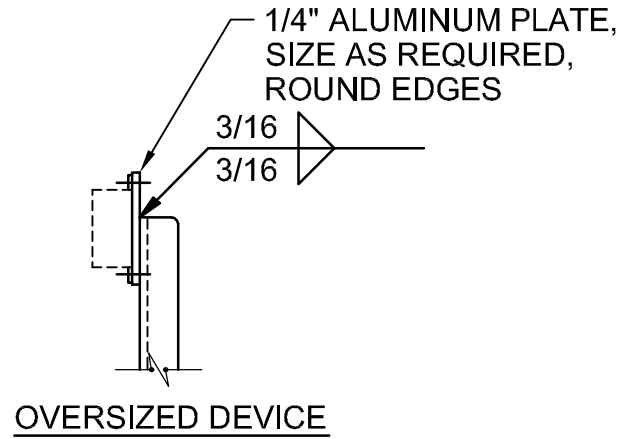
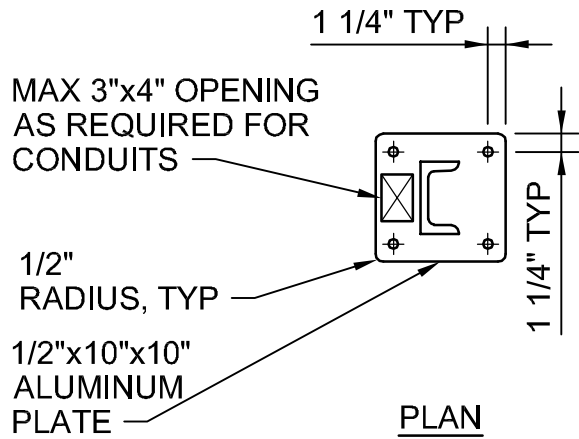


## CONCRETE ANCHOR INSTALLATION

NTS

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

2605-010



NOTES:

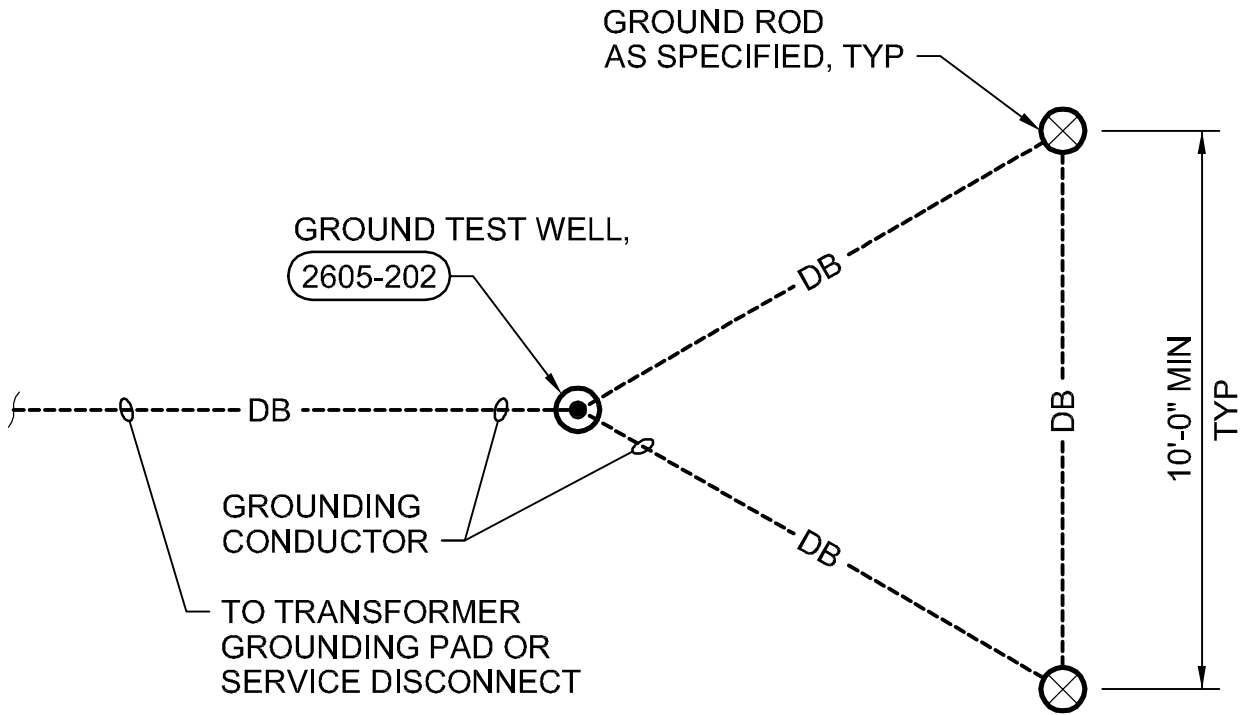
1. ALL MOUNTING HARDWARE SHALL BE STAINLESS STEEL. USE WASHERS AND SPLIT-LOCK WASHERS UNDER ALL NUTS AND BOLTS.
2. FOR HEIGHTS EXCEEDING 4'-0" OR WEIGHTS OF MOUNTED EQUIPMENT EXCEEDING 200 LBS, SIZE POST AND CONNECTION FOR LATERAL LOADS. EXTEND POSTS TO STRUCTURE ABOVE WHERE REQUIRED BY CALCULATION.

PEDESTAL MOUNTED DEVICE

NTS

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

2605-011b

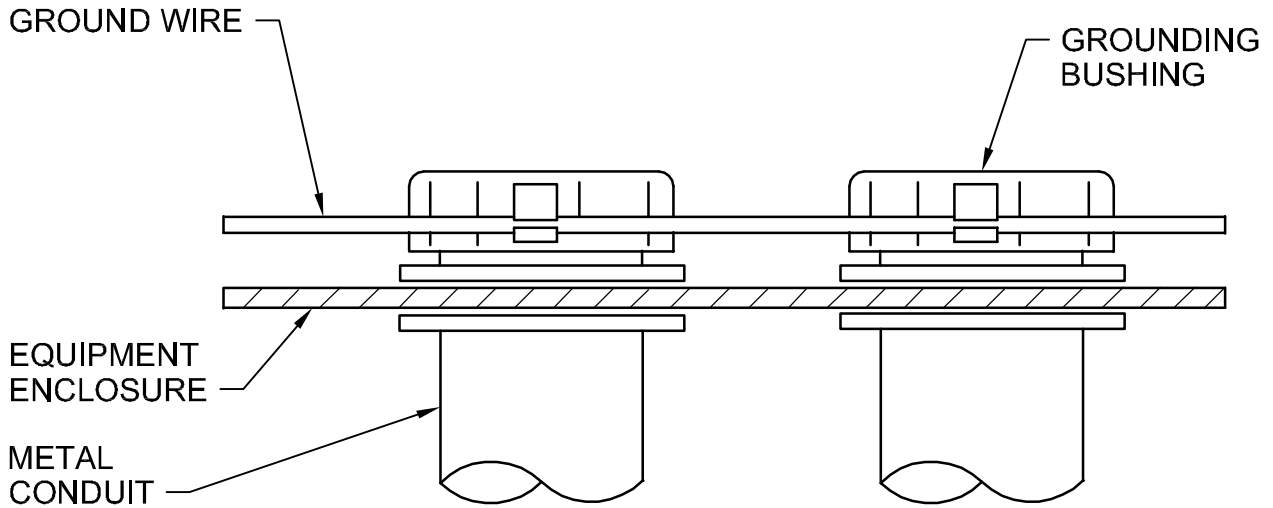


## GROUND TRIANGLE

NTS

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

2605-201



NOTE:

THE ENDS OF ALL CONDUITS REQUIRED TO BE GROUNDED BY THE SPECIFICATIONS SHALL BE GROUNDED IN ACCORDANCE WITH THIS DETAIL.

CONDUIT GROUNTING

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

2605-203

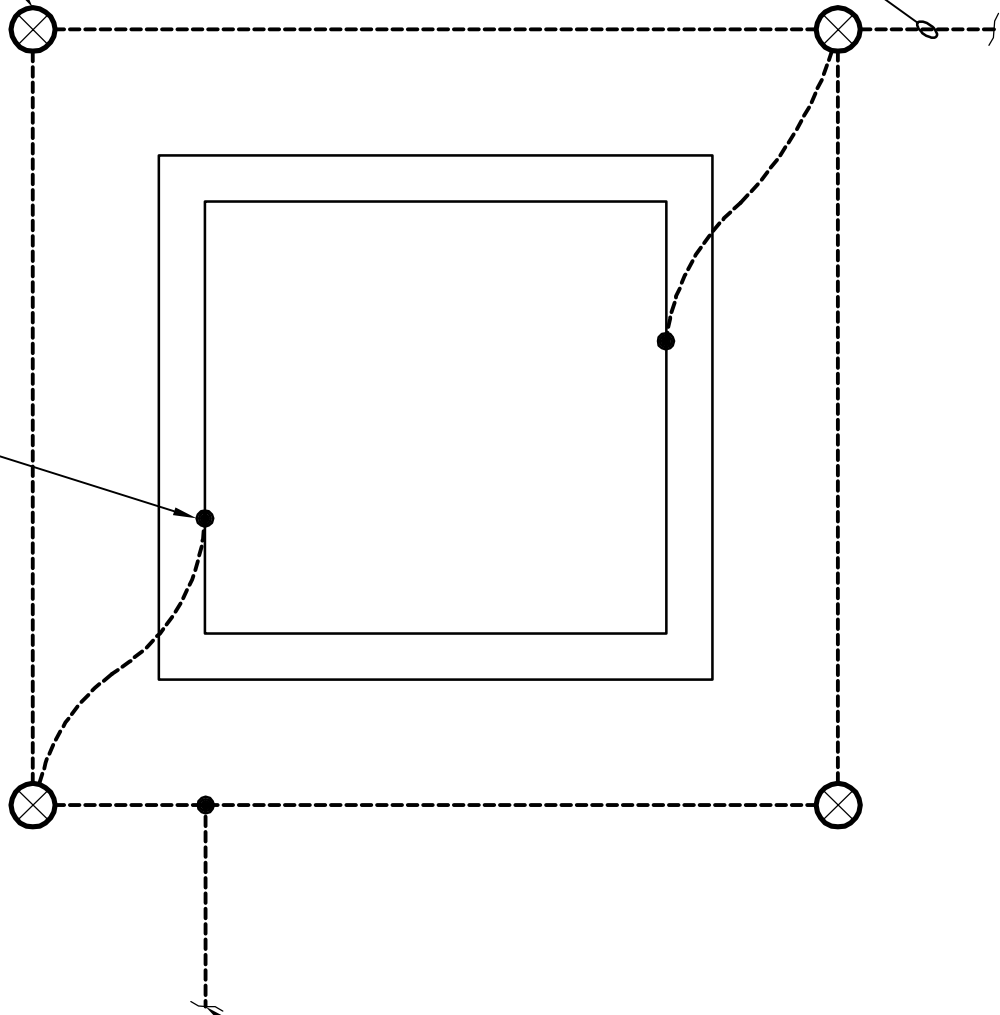


GROUND ROD

TO GROUND  
TRIANGLE,

2605-201

#2/0 BARE CU  
GROUNDING  
CONDUCTOR



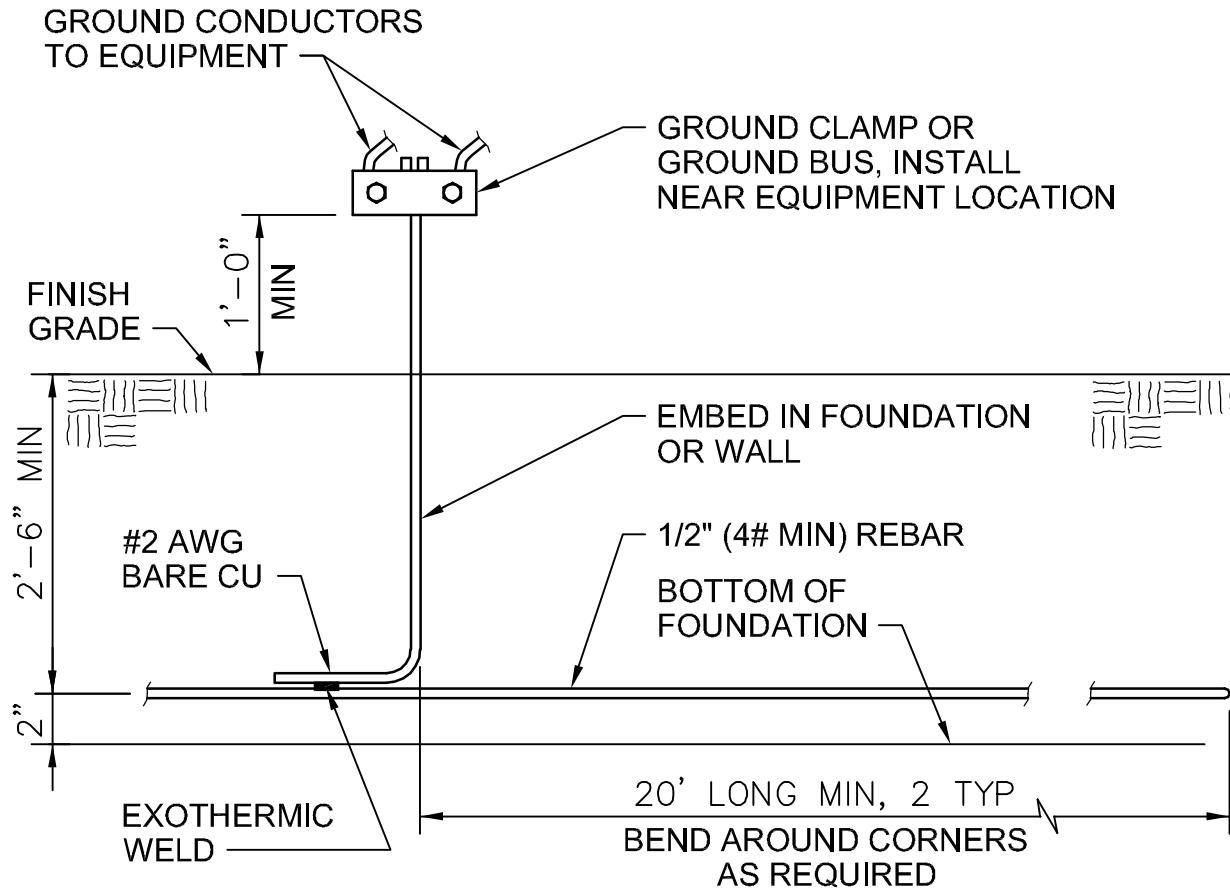
PLAN

## PAD MOUNTED TRANSFORMER AND PAD MOUNTED SWITCH GROUNDING

NTS

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

2605-204



NOTE:

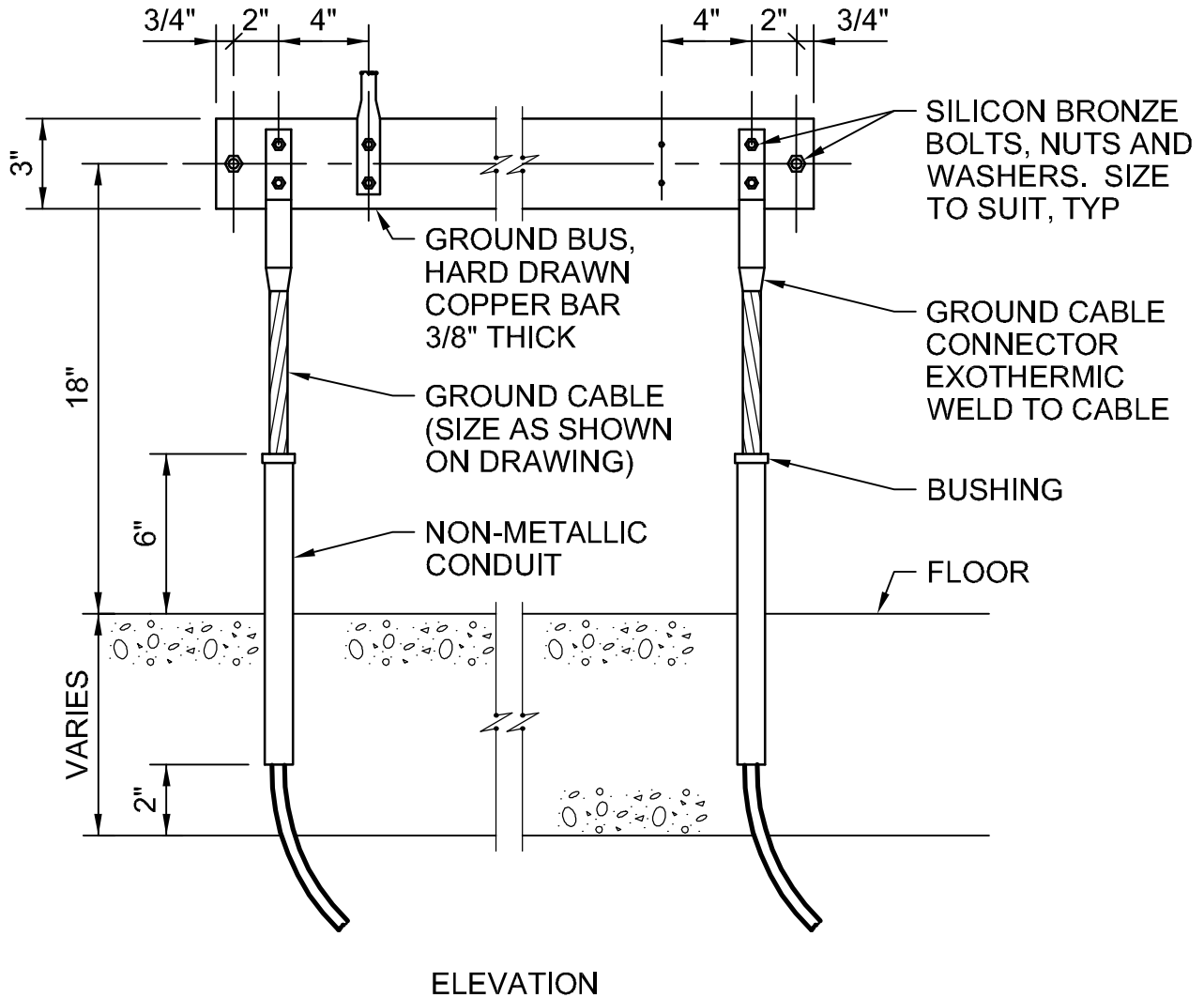
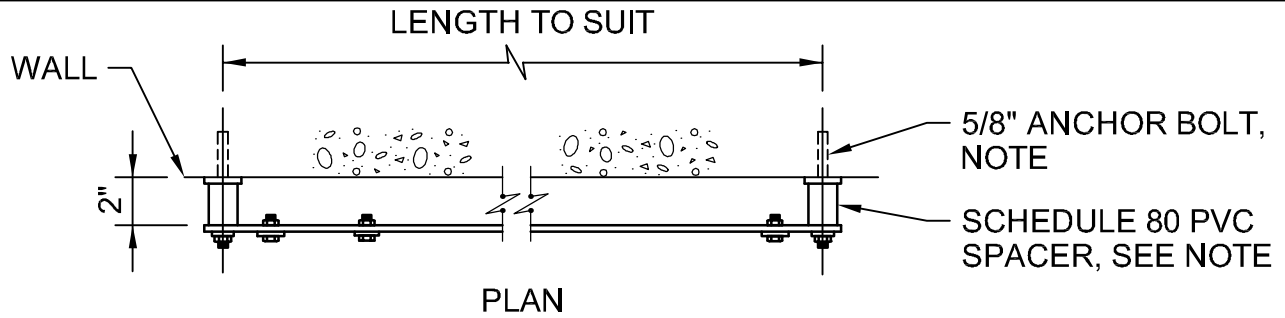
WHERE MULTIPLE INSTRUMENT SURGE SUPPRESSOR GROUNDS MUST BE CONNECTED IN ONE LOCATION, INSTALL A GROUND BUS.

GROUND ELECTRODE

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

2605-206



**NOTE:**

MAXIMUM SPAN BETWEEN SUPPORTS NOT TO EXCEED 24".

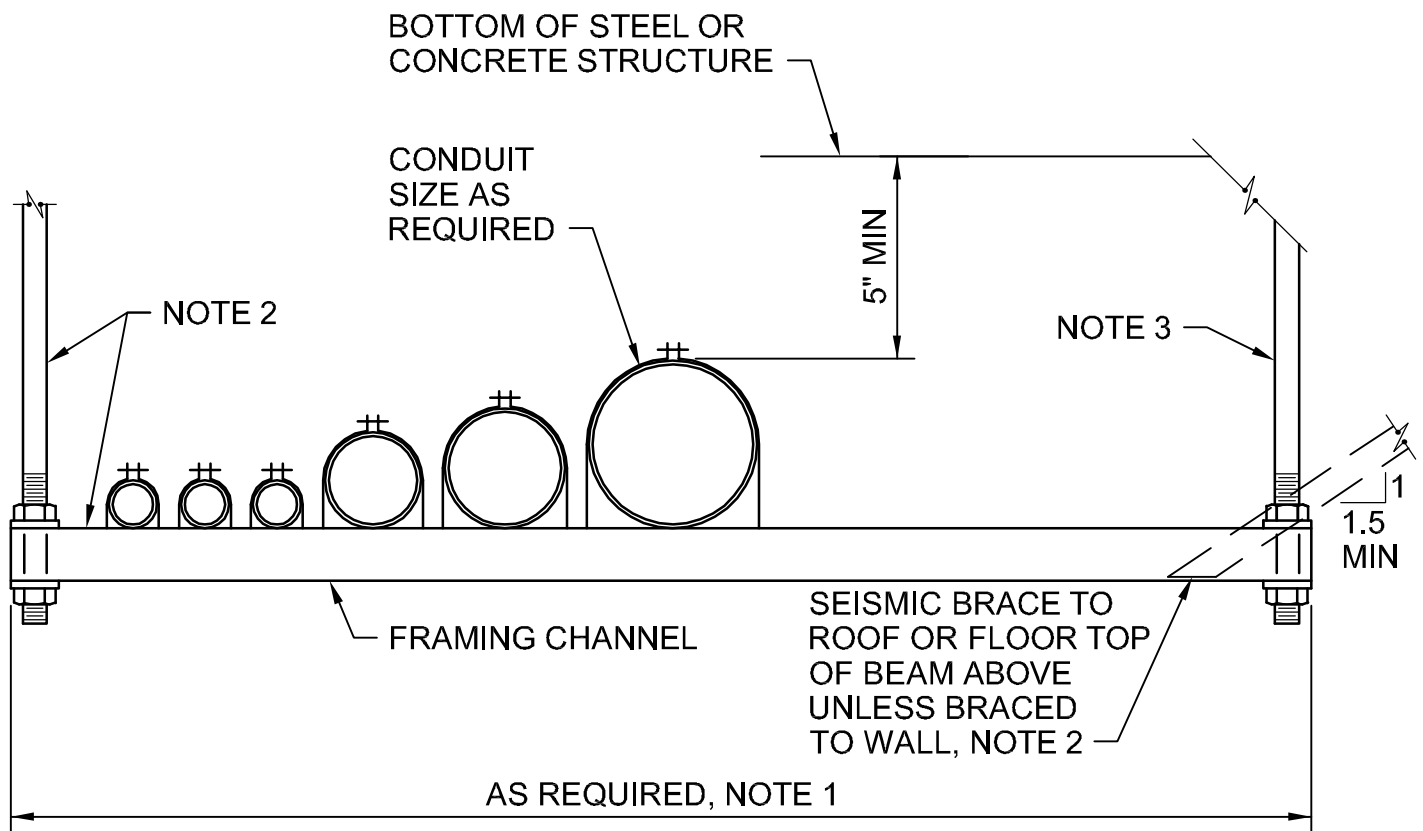
**GROUND BUS**

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

2605-208

**CH2MHILL**



### SINGLE RACK

#### NOTES:

1. LENGTH VARIES WITH NUMBER OF CONDUITS TO BE SUPPORTED AND SPACING BETWEEN CONDUITS.
2. DETERMINE SPAN AND TYPE OF SUPPORTS, LOCATE SUPPORTS, AND SIZE SUPPORT RODS, CONNECTIONS AND BRACES PER MANUFACTURER'S RECOMMENDATIONS AND SEISMIC REQUIREMENTS.
3. AT STEEL STRUCTURE, USE GRINNEL MALLEABLE BEAM CLAMP. AT CONCRETE STRUCTURE, USE UNIVERSAL CONCRETE INSERT, UNISTRUT CHANNEL WITH #4 x 3'-0" BELOW, OR GRINNEL FIGURE 52 ATTACHMENT PLATE, SIMILAR. TYPE AND SIZE AS REQUIRED BY TOTAL LOADS.
4. USE STAINLESS STEEL HARDWARE IN WET AND/OR CORROSIVE AREAS.
5. SPACE CONDUIT SUFFICIENTLY TO ALLOW REMOVAL OF ONE CONDUIT WITHOUT DISTURBING ADJACENT CONDUITS.

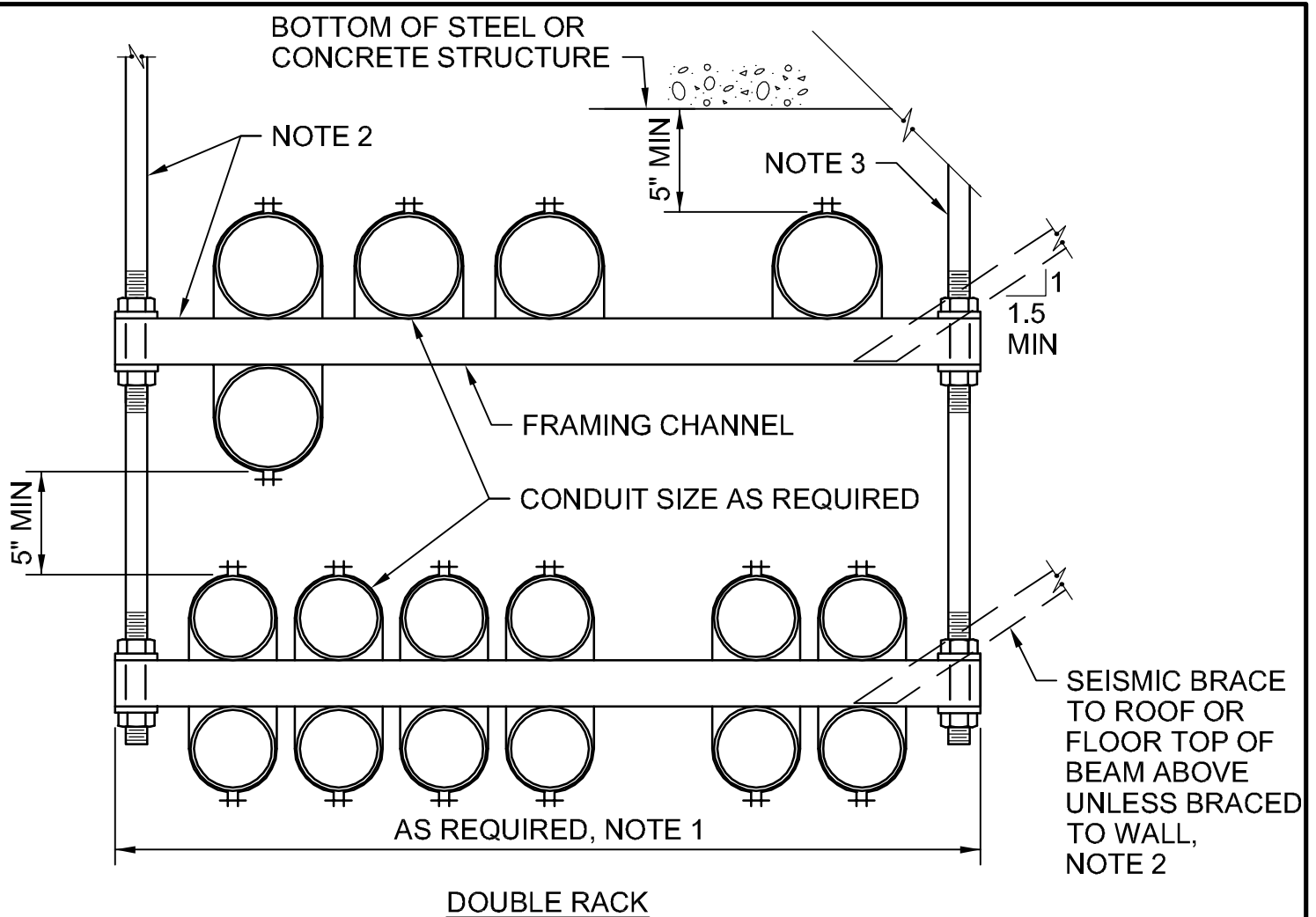
## CONDUIT RACKING SYSTEM

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

2605-300

**CH2MHILL**



**NOTES:**

1. LENGTH VARIES WITH NUMBER OF CONDUITS TO BE SUPPORTED AND SPACING BETWEEN CONDUITS.
2. DETERMINE SPAN AND TYPE OF SUPPORTS, LOCATE SUPPORTS, AND SIZE SUPPORT RODS, CONNECTIONS AND BRACES PER MANUFACTURER'S RECOMMENDATIONS AND SEISMIC REQUIREMENTS.
3. AT STEEL STRUCTURE, USE GRINNEL MALLEABLE BEAM CLAMP. AT CONCRETE STRUCTURE, USE UNIVERSAL CONCRETE INSERT, UNISTRUT CHANNEL WITH #4 x 3'-0" BELOW, OR GRINNEL FIGURE 52 ATTACHMENT PLATE, SIMILAR. TYPE AND SIZE AS REQUIRED BY TOTAL LOADS.
4. USE STAINLESS STEEL HARDWARE IN WET AND/OR CORROSIVE AREAS.
5. SPACE CONDUIT SUFFICIENTLY TO ALLOW REMOVAL OF ONE CONDUIT WITHOUT DISTURBING ADJACENT CONDUITS.

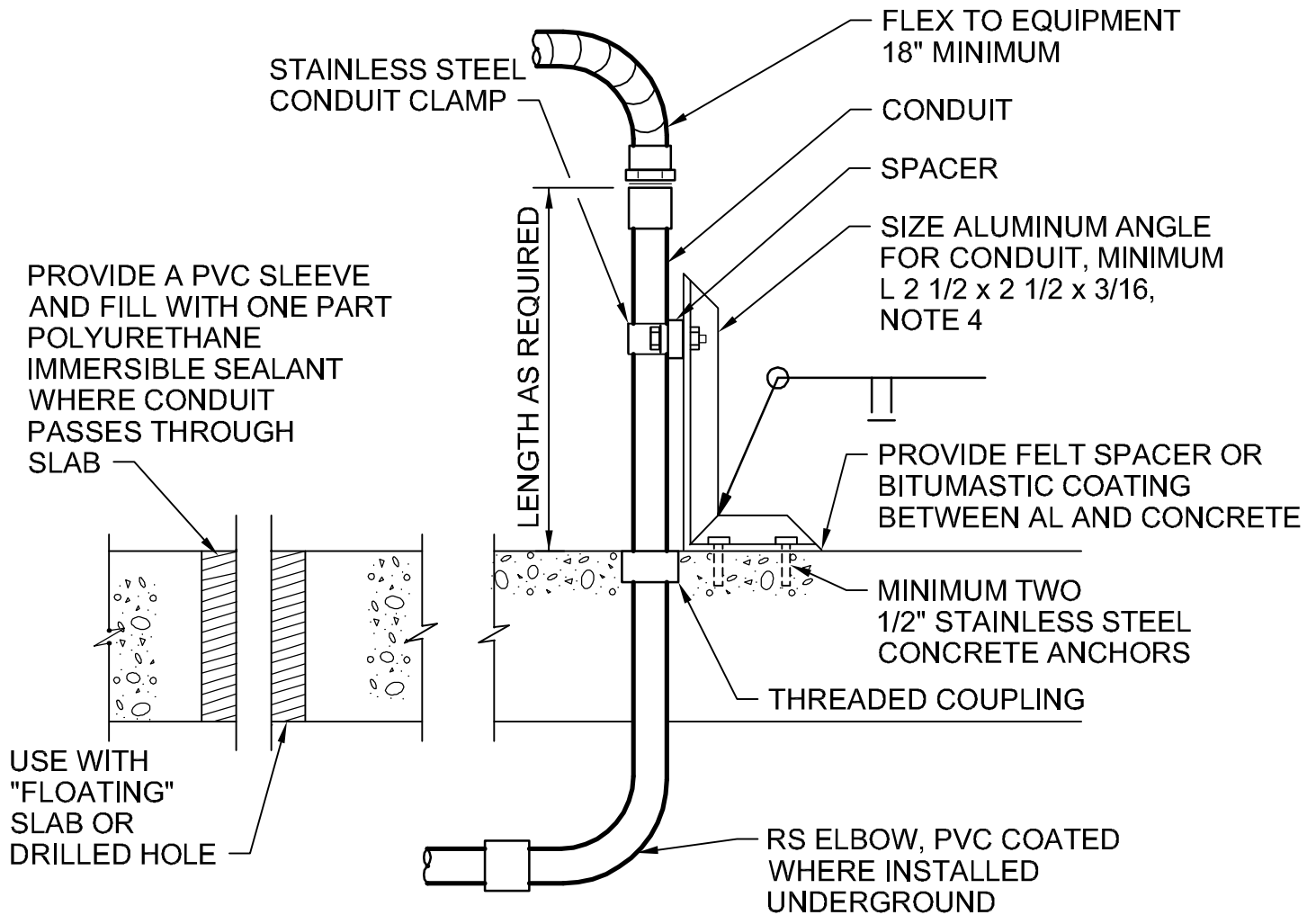
**CONDUIT RACKING SYSTEM**

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

2605-301

**CH2MHILL**



**NOTES:**

1. PROVIDE SUPPORT FOR ALL METAL CONDUITS WHICH EXTEND MORE THAN 18 INCHES OUT OF THE SLAB WITHIN 3 INCHES OF THE END OF THE CONDUIT.
2. PROVIDE SUPPORT FOR ALL PVC CONDUIT WITHIN 3 INCHES OF THE END OF THE CONDUIT.
3. THIS DETAIL SHALL BE USED FOR SUPPORT OF ALL CONDUITS WHICH ARE NOT OTHERWISE SUPPORTED IN A RIGID MANNER SUCH AS AGAINST AN EQUIPMENT BASE, WALL, COLUMN, ETC, AS REQUIRED ABOVE.
4. FOR ANY ANGLE GREATER THAN 2'-6" TALL, SIZE ANGLE SUPPORT AND ANCHORS FOR SEISMIC LOADS.

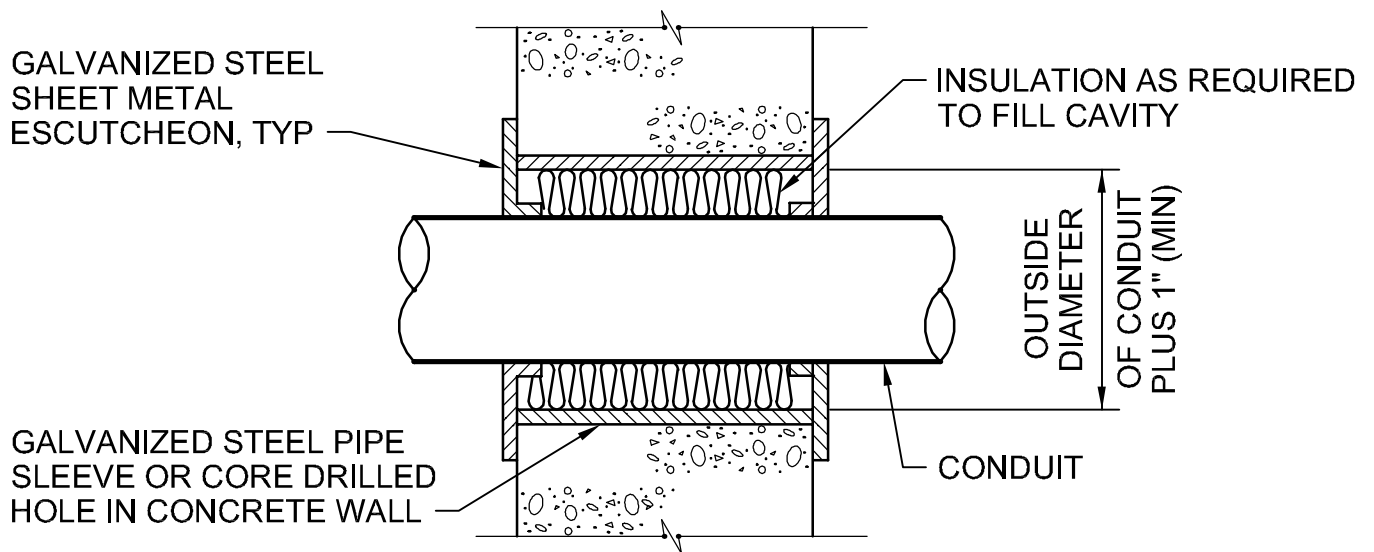
**CONDUIT TRANSITION AND SUPPORT**

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

2605-305

**CH2MHILL**



**NOTE:**

CONDUITS WHICH INDIVIDUALLY PASS THRU AN INTERIOR WALL SHALL BE INSTALLED IN ACCORDANCE WITH THIS DETAIL. IF WALL IS A FIRE WALL, FILL CAVITY WITH FIRE STOP SEALANT SPECIFIED IN SECTION 07 84 00.

**INTERIOR WALL PENETRATION**

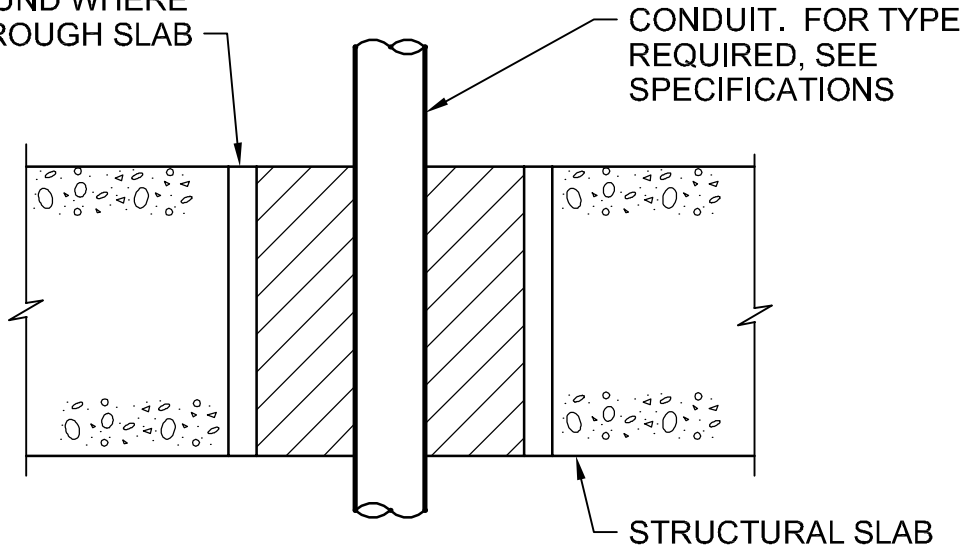
NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

2605-306

**CH2MHILL**

PROVIDE A PVC SLEEVE AND  
FILL WITH A SUITABLE PLASTIC  
EXPANDABLE COMPOUND WHERE  
CONDUIT PASSES THROUGH SLAB



NOTE:

ALL CONDUITS THROUGH CONCRETE FLOOR SLABS AND  
EQUIPMENT PADS SHALL BE INSTALLED IN ACCORDANCE  
WITH THIS DETAIL.

SLAB PENETRATION

NTS

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

2605-310



FLEXIBLE NEOPRENE SLEEVE  
CROUSE-HINDS "XD", APPLETON  
"DF" OR APPROVED EQUAL

PREMOLDED JOINT  
FILLER

ADAPTER REQUIRED  
FOR PVC CONDUITS

CONDUIT, SIZE  
PER PLANS

3/4"

CLOSED CELL  
NEOPRENE

STAINLESS STEEL  
CLAMP, TYP

HUB

GRS CONDUIT,  
TYP

NOTE 3

PROVIDE CONTINUOUS  
GROUND PATH PER  
NEC REQUIREMENTS

#### NOTES:

1. DETAIL APPLIES TO CONDUIT EMBEDDED IN STRUCTURAL CONCRETE AT BUILDING INTERFACES AND AT STRUCTURAL EXPANSION JOINTS.
2. DETAIL APPLIES TO ALL EXPANSION JOINTS FOR THE UNDERGROUND CONCRETE ENCASED CONDUITS.
3. PVC CONDUIT INSTALLATIONS SHALL HAVE 18 INCHES (MIN) LENGTH OF GRS CONDUIT EACH SIDE OF FITTING.

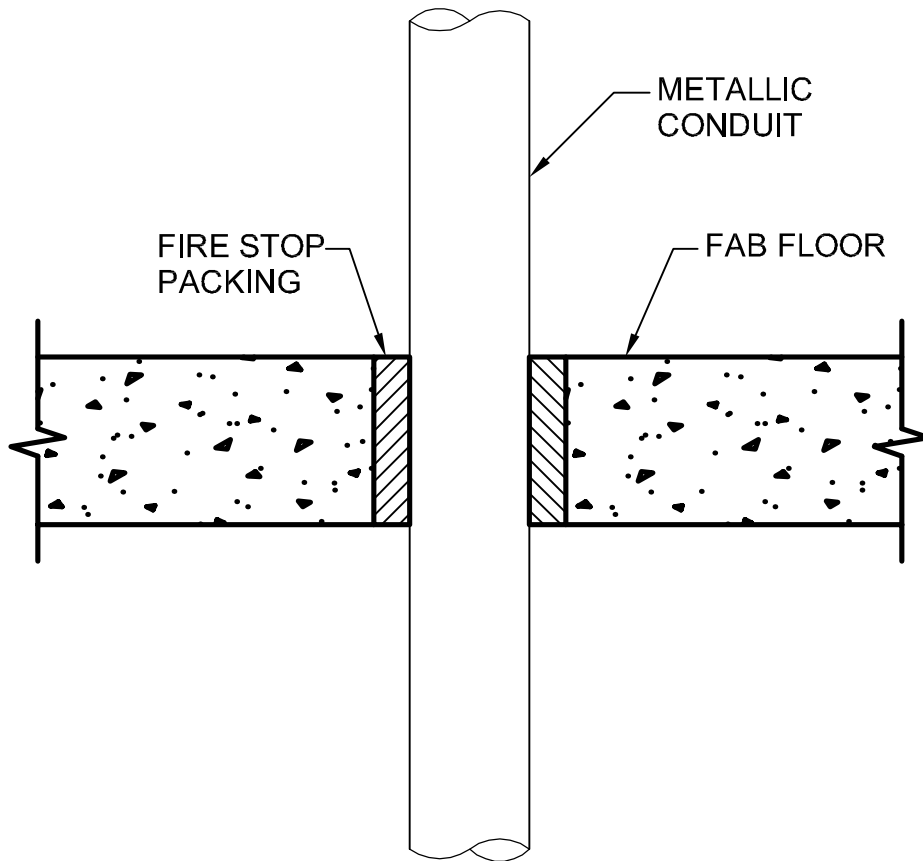
### EXPANSION/DEFLECTION COUPLING

NTS

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

2605-315

**CH2MHILL**

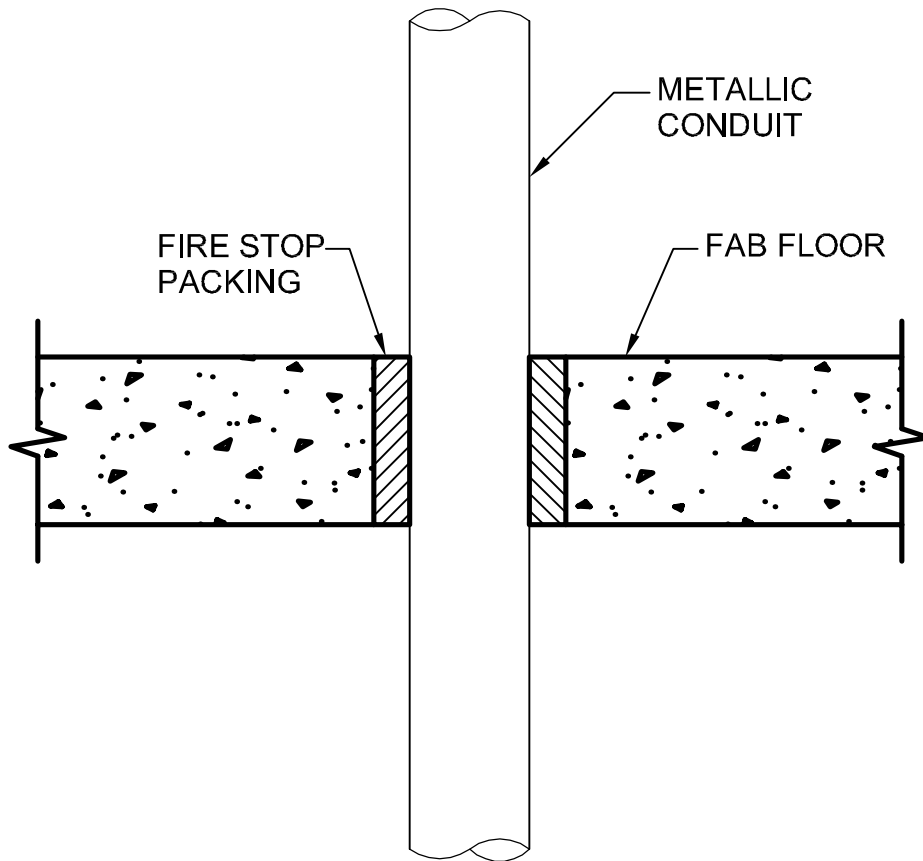


## CONDUIT FLOOR PENETRATION

NTS

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

2605-346

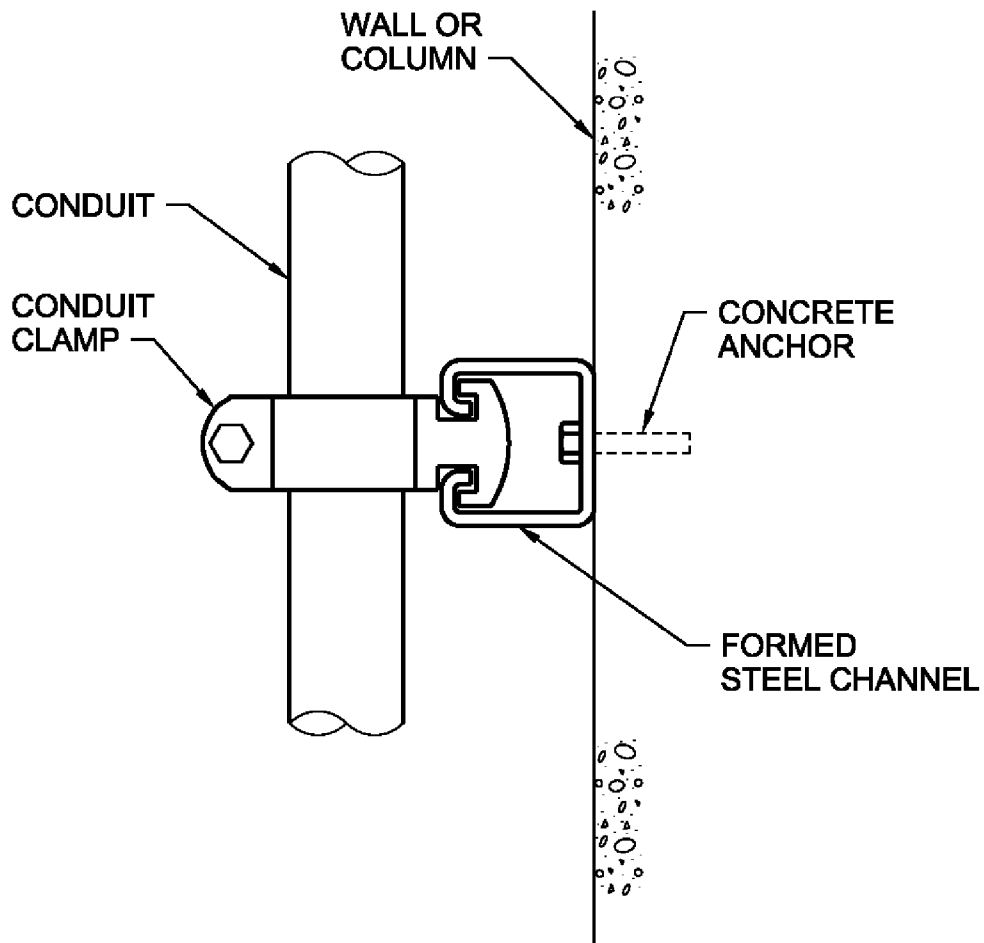


## CONDUIT FLOOR PENETRATION

NTS

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

2605-346



**NOTE:**

SUPPORT ALL EXPOSED CONDUITS ON FORMED STEEL CHANNELS.

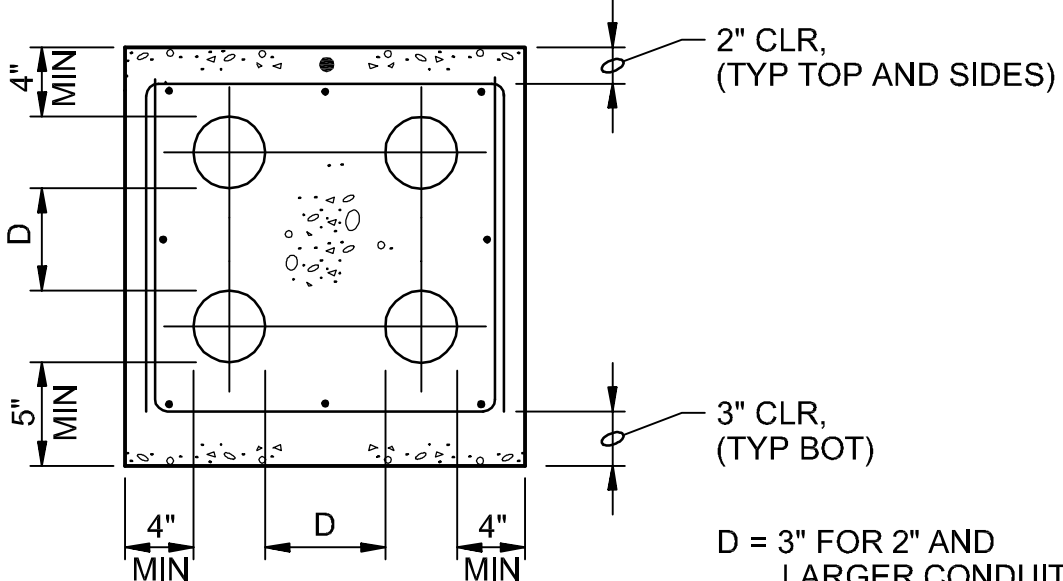
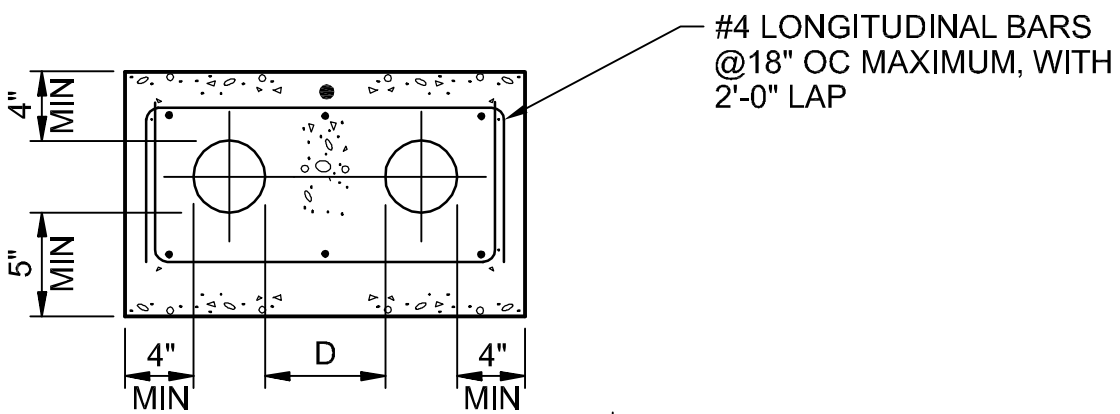
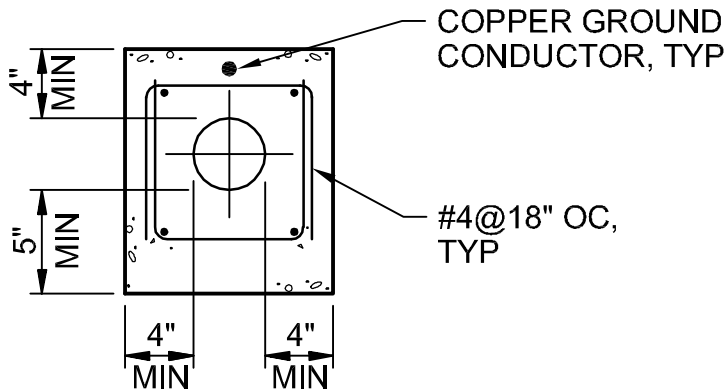
**CONDUIT SUPPORT ON STRUCTURE**

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

2605-348

**CH2MHILL**



D = 3" FOR 2" AND LARGER CONDUITS

D = 2" FOR 1 1/2" AND SMALLER CONDUITS

**NOTE:**

PROVIDE 6" MINIMUM COMPACTED GRAVEL, 3/4" MINUS, UNDER ALL CONCRETE ENCASED DUCT RUNS.

**DUCT BANK**

NTS

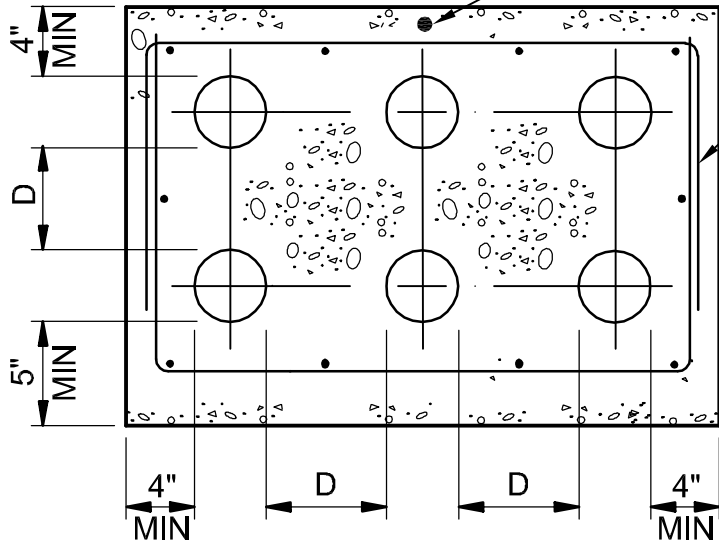
DETAIL 1 OF 2

USE WITH 2605-400c.

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

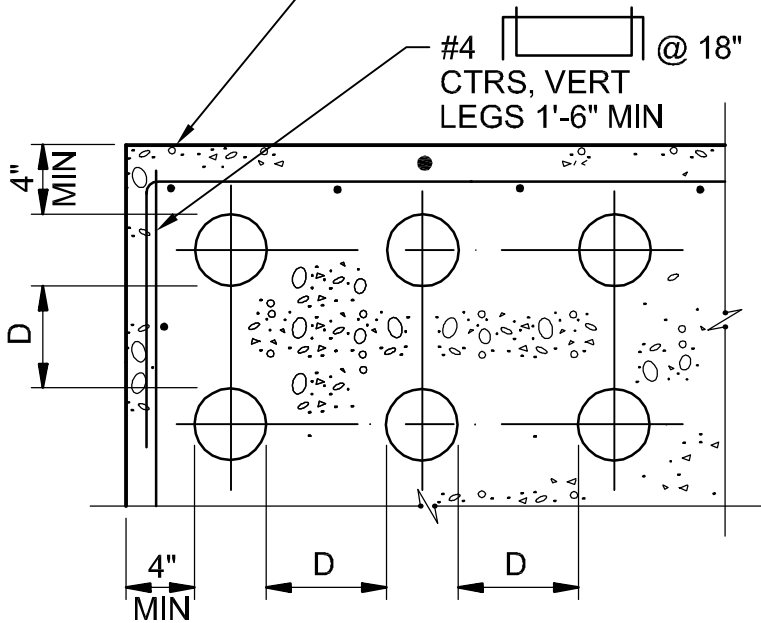
2605-400

COPPER GROUND CONDUCTOR, TYP



#4 CTRS, VERT LEGS 1'-0" MIN @ 18"

FOR LARGER DUCT BANKS, CONTINUE PATTERN OF REBAR, CONDUIT SEPARATION AND CONCRETE COVER.



#4 CTRS, VERT LEGS 1'-6" MIN @ 18"

# DUCT BANK

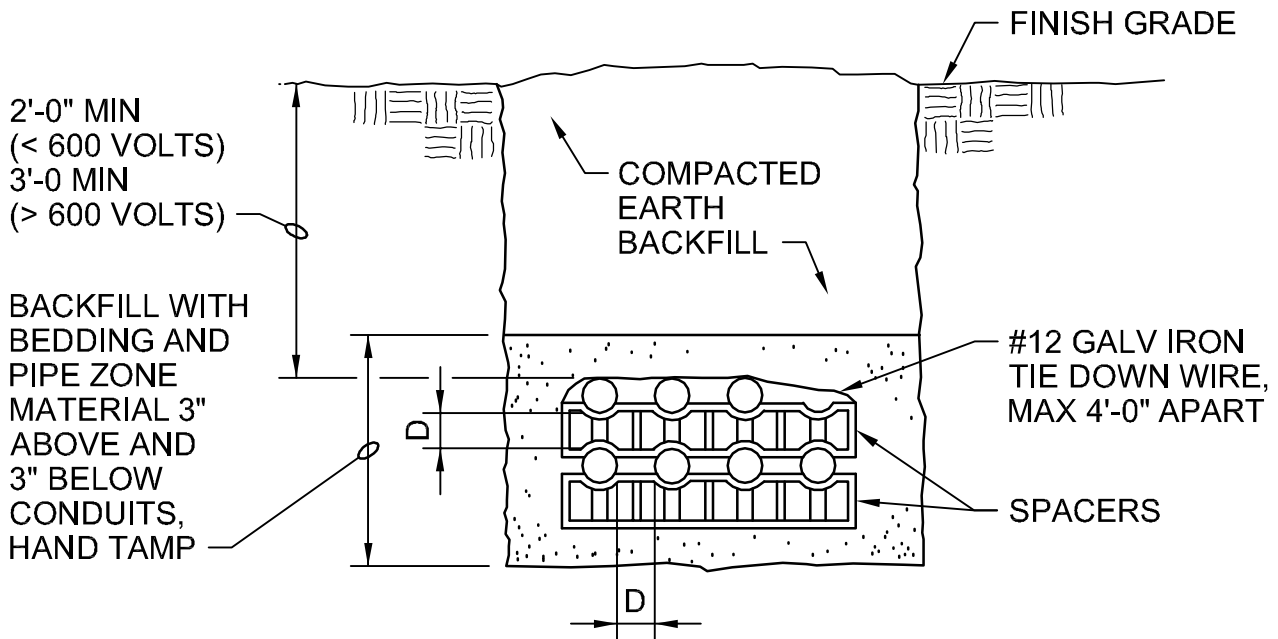
NTS

DETAIL 2 OF 2

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

2605-400

**CH2MHILL**



D = 3"MIN FOR 2"-6" CONDUIT

D = 2"MIN FOR <2 INCH CONDUIT

**NOTE:**

INSTALLATION OF DIRECT BURIAL DUCT BANKS WHICH INCLUDE THREE OR MORE CONDUITS OR DUCTS SHALL BE MADE IN ACCORDANCE WITH THIS DETAIL.

**TYPICAL UNDERGROUND CONDUIT**

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

2605-420

SIZE OPENINGS  
AS REQUIRED BY  
TRANSFORMER  
OR SWITCH  
MANUFACTURER

4'-0" PIGTAIL, TYP

GROUND  
ROD, TYP

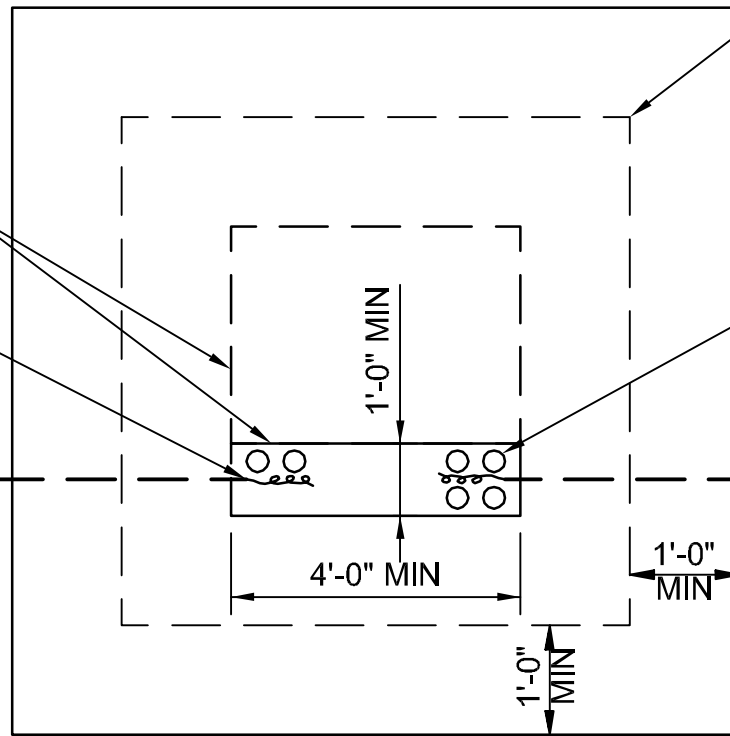
GROUND  
CONDUCTOR,  
TYP

EQUIPMENT BASE,  
(0330-056), TYPE G OR H

GROUNDING LOOP AS  
SHOWN ON PLANS, TYP

TRANSFORMER  
OR SWITCH  
FOOTPRINT

CONDUITS AS  
REQUIRED, TYP



PLAN

NOTES:

1. COORDINATE ALL FINAL PAD DIMENSIONS WITH THE ELECTRICAL UTILITY OR MANUFACTURER'S APPROVED SHOP DRAWINGS.
2. ANCHOR EQUIPMENT TO CONCRETE PAD WITH SST CONCRETE ANCHORS SPECIFIED. SUPPLY ANCHORAGE CALCULATIONS, AS SPECIFIED, FOR ALL EQUIPMENT OVER 400 POUNDS LOCATED IN SEISMIC ZONES 2 OR GREATER.

TRANSFORMER OR SWITCH PAD

NTS

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

2612-001

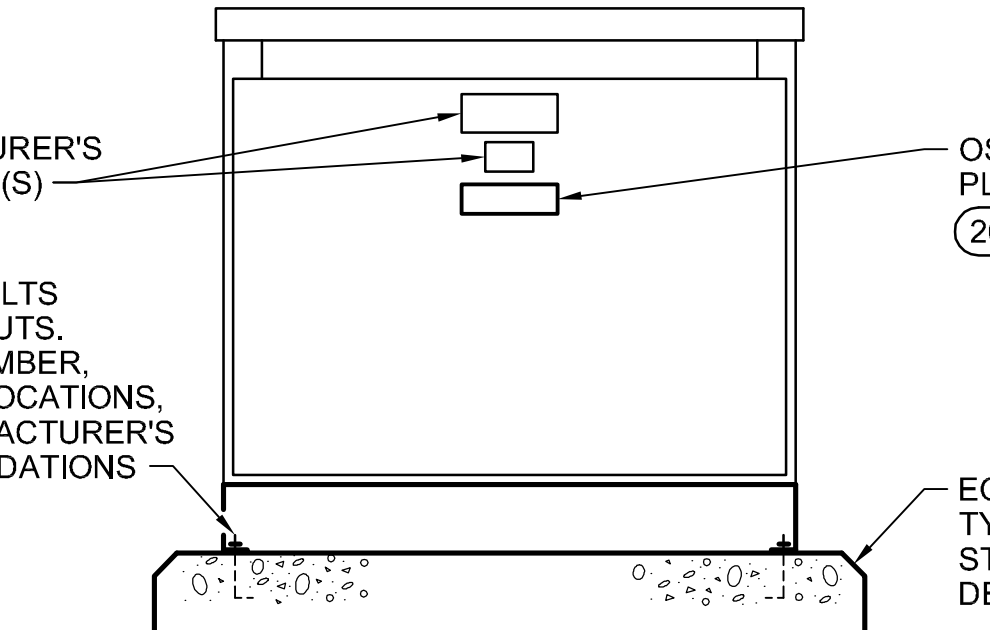


MANUFACTURER'S  
NAMEPLATE(S)

OSHA/NEC  
PLACARD,  
2624-201

ANCHOR BOLTS  
WITH SST NUTS.  
INSTALL NUMBER,  
SIZE, AND LOCATIONS,  
PER MANUFACTURER'S  
RECOMMENDATIONS

EQUIPMENT PAD  
TYPE "F", SEE  
STRUCTURAL  
DETAILS

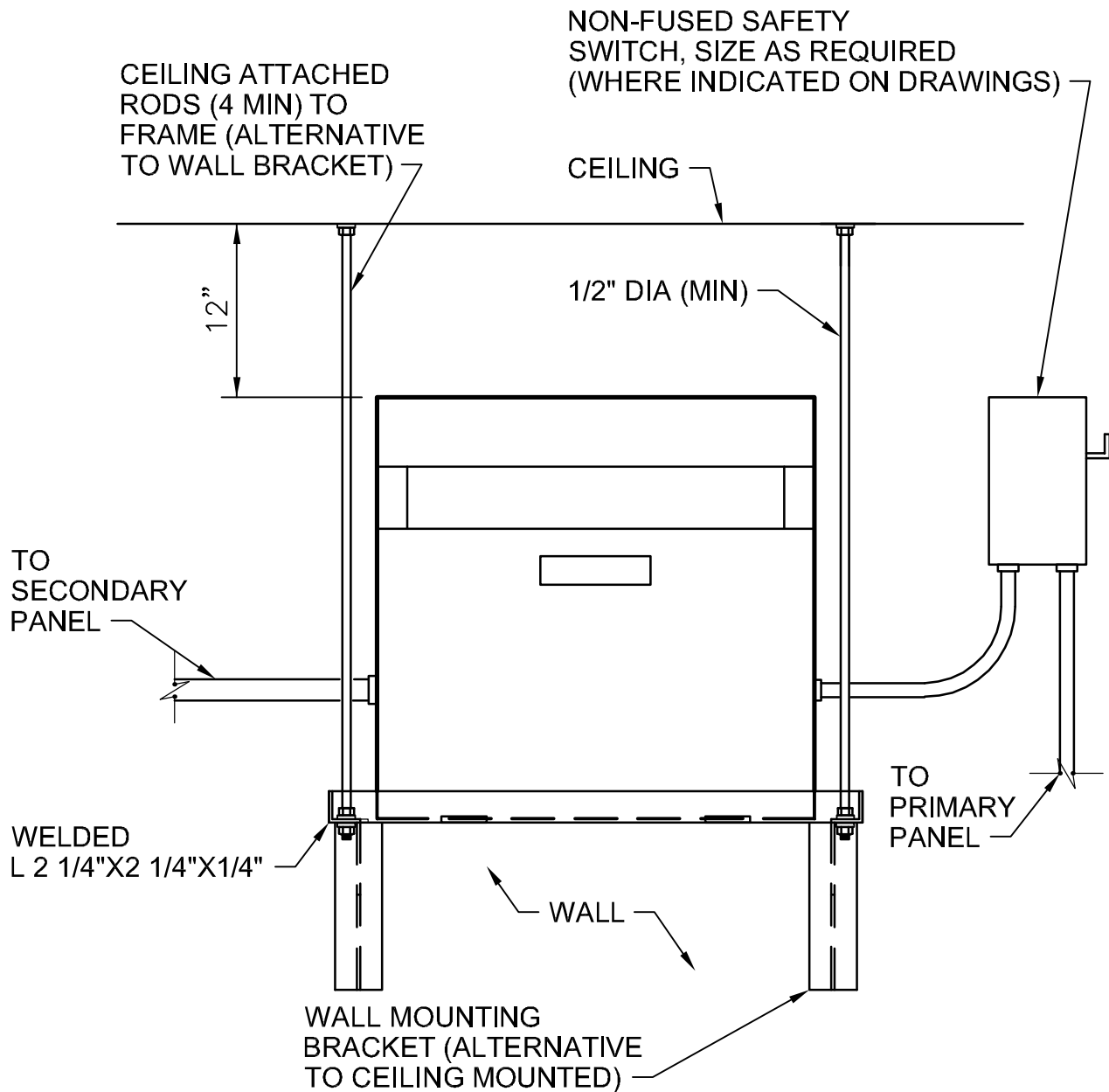


## TRANSFORMER

NTS

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

2622-006



**NOTE:**

WHERE WALL MOUNTING BRACKETS ARE USED THEY SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. PROVIDE REINFORCING OF THE WALL TO ASSURE THAT IT IS CAPABLE OF SUPPORTING THE LOAD.

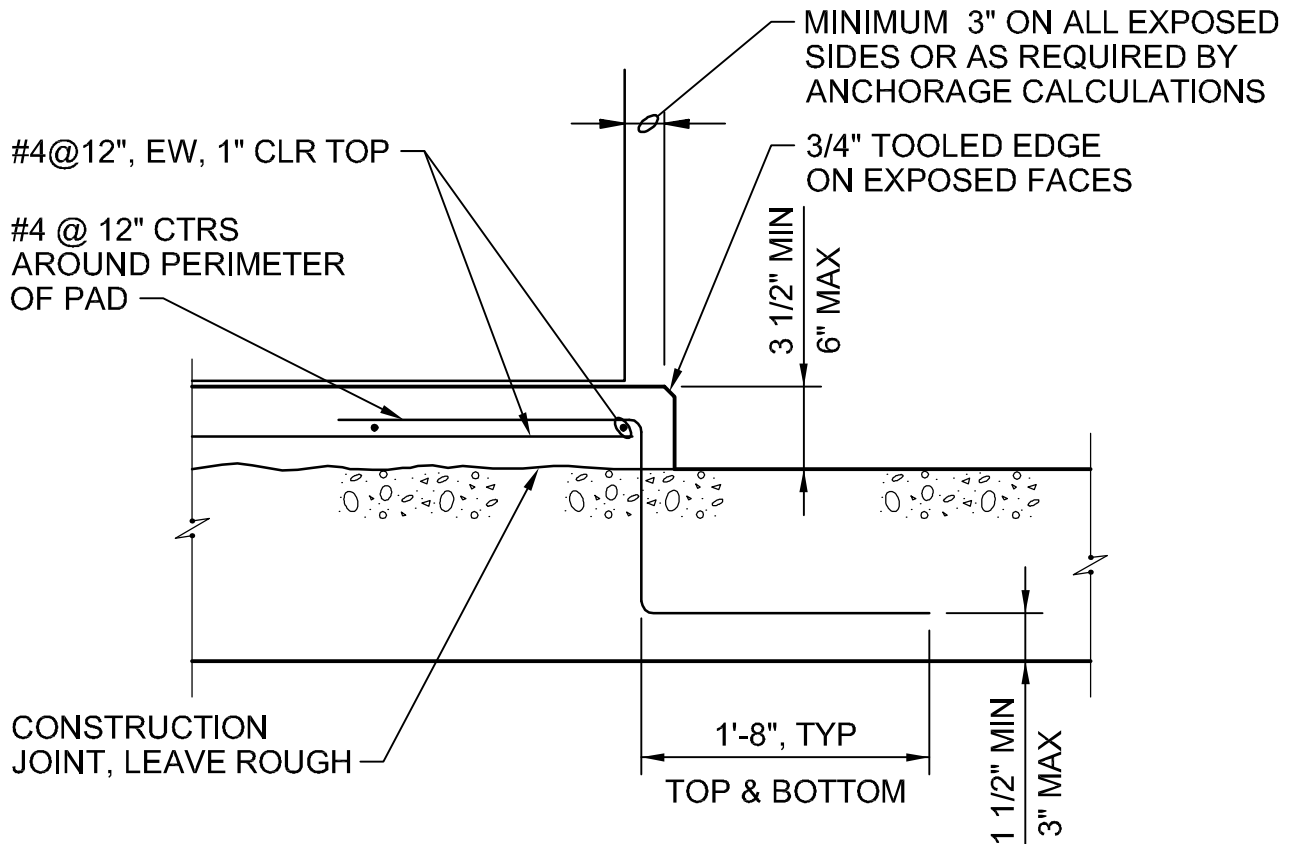
LARGE DRY TYPE TRANSFORMERS SHALL ONLY BE WALL OR CEILING MOUNTED WHERE THERE IS NO REASONABLE ALTERNATIVE AND THEIR INSTALLATION SHOULD BE REVIEWED WITH A STRUCTURAL ENGINEER.

**DRY TYPE TRANSFORMER INSTALLATION**

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

2622-007



**NOTE:**

ANCHOR EQUIPMENT TO CONCRETE PAD WITH SST CONCRETE ANCHORS SPECIFIED. SUPPLY ANCHORAGE CALCULATIONS, AS SPECIFIED, FOR ALL EQUIPMENT OVER 400 POUNDS LOCATED IN SEISMIC ZONES 2 OR GREATER.

**CONCRETE PAD SECTION**

NTS

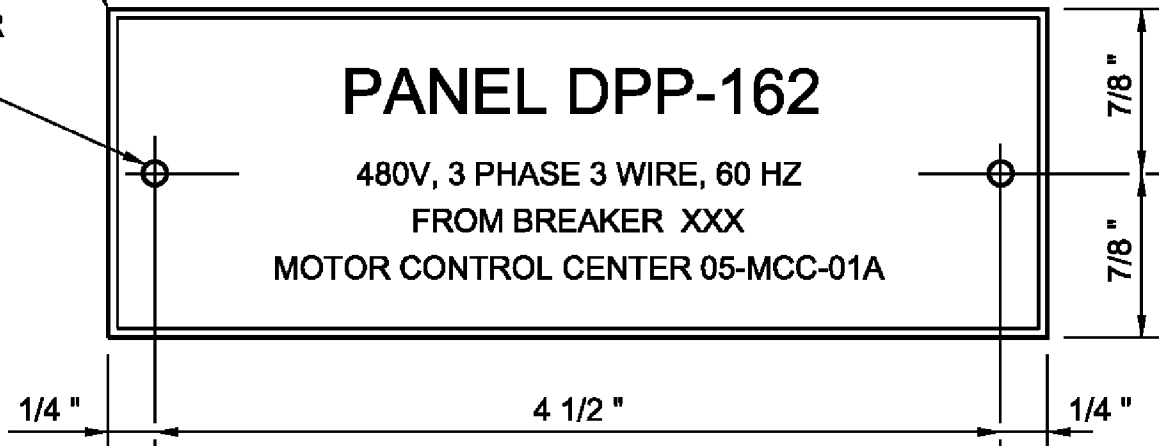
ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

2624-001

**CH2MHILL**

BEVELED EDGES

1/8" HOLE FOR  
POP RIVET,  
(2 PLACES)



TOP ROW: 3/8 " LETTERS  
OTHER ROWS: 1/8 " LETTERS  
1/4 " SPACING BETWEEN FIRST 2 ROWS  
1/8 " SPACING BETWEEN OTHER ROWS

COLOR SCHEDULE		
PANEL TYPE	BACKGROUND	LETTERING
208/120 VOLT, 60 HZ	WHITE	BLACK
480 VOLT, 60 HZ	WHITE	BLACK
EMERGENCY SERVICES	RED	BLACK

REQUIRED DATA

FIRST LINE: PANEL DESIGNATION  
SECOND LINE: PHASE, VOLTAGE, FREQUENCY  
THIRD AND FOURTH LINES: POWER SOURCE AND BREAKER

XXX = BASED ON FINAL DESIGN SHOP DRAWING

PANELBOARD NAMEPLATE

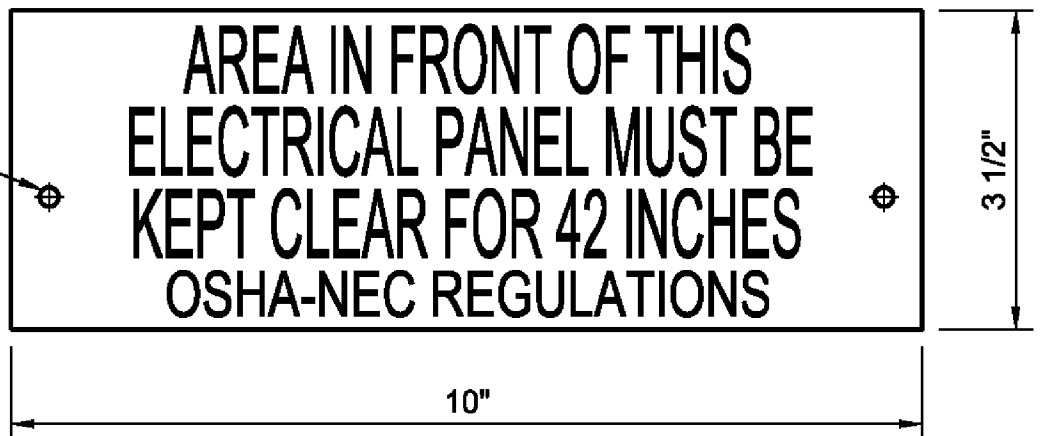
NTS

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

2624-200

**CH2MHILL**

1/8" HOLE FOR  
POP RIVET,  
(2 PLACES)



TOP 3 ROWS: 3/4 " LETTERS  
BOTTOM ROW: 1/2 " LETTERS  
BLACK LETTERING ON WHITE BACKGROUND

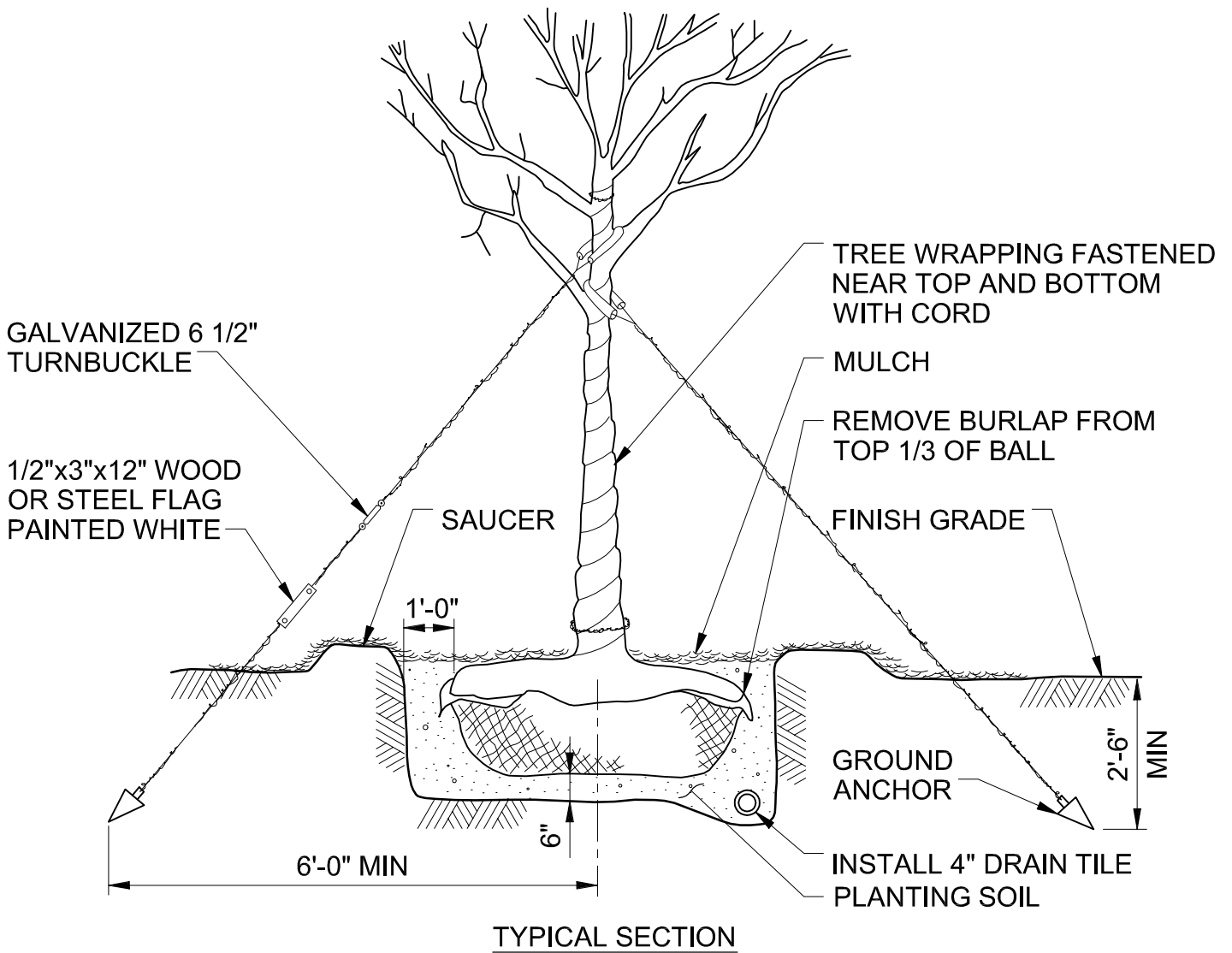
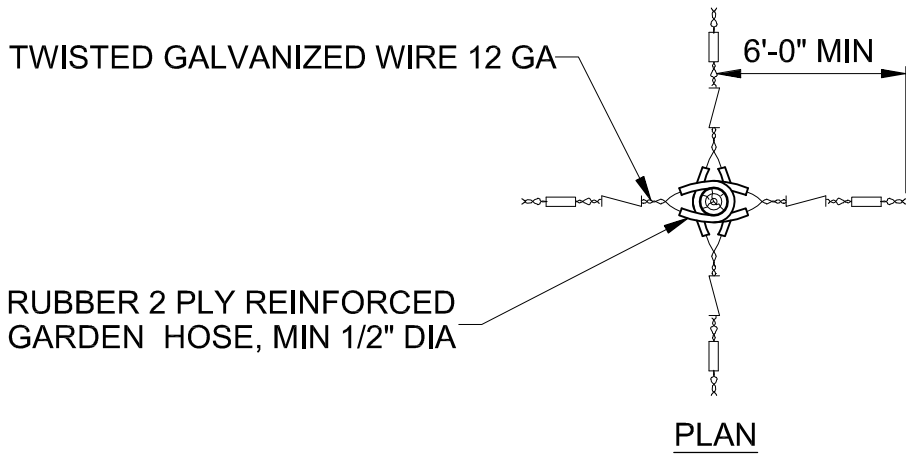
## OSHA/NEC PLACARD

NTS

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

2624-201

**CH2MHILL**



## LARGE TREE PLANTING

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

3293-610

CORD TO SECURE WRAPPING MATERIAL

NO. 18 TIE WIRE

TWO LOOPS OF RUBBER GARDEN HOSE

WRAPPING 6" TO 10" WIDE

STAKING DETAIL

(3) 2"x2" WOOD STAKES

SAUCER

FINISH GRADE

CUT AND REMOVE BURLAP FROM TOP 1/3 OF BALL

PLANTING SOIL

STAKES 1'-6" DEEPER THAN BOTTOM OF PIT

5'-0"

MULCH

LIGHTLY COMPACTED MOUND

6"

MIN 2 x ROOT BALL DIA

NOTE:

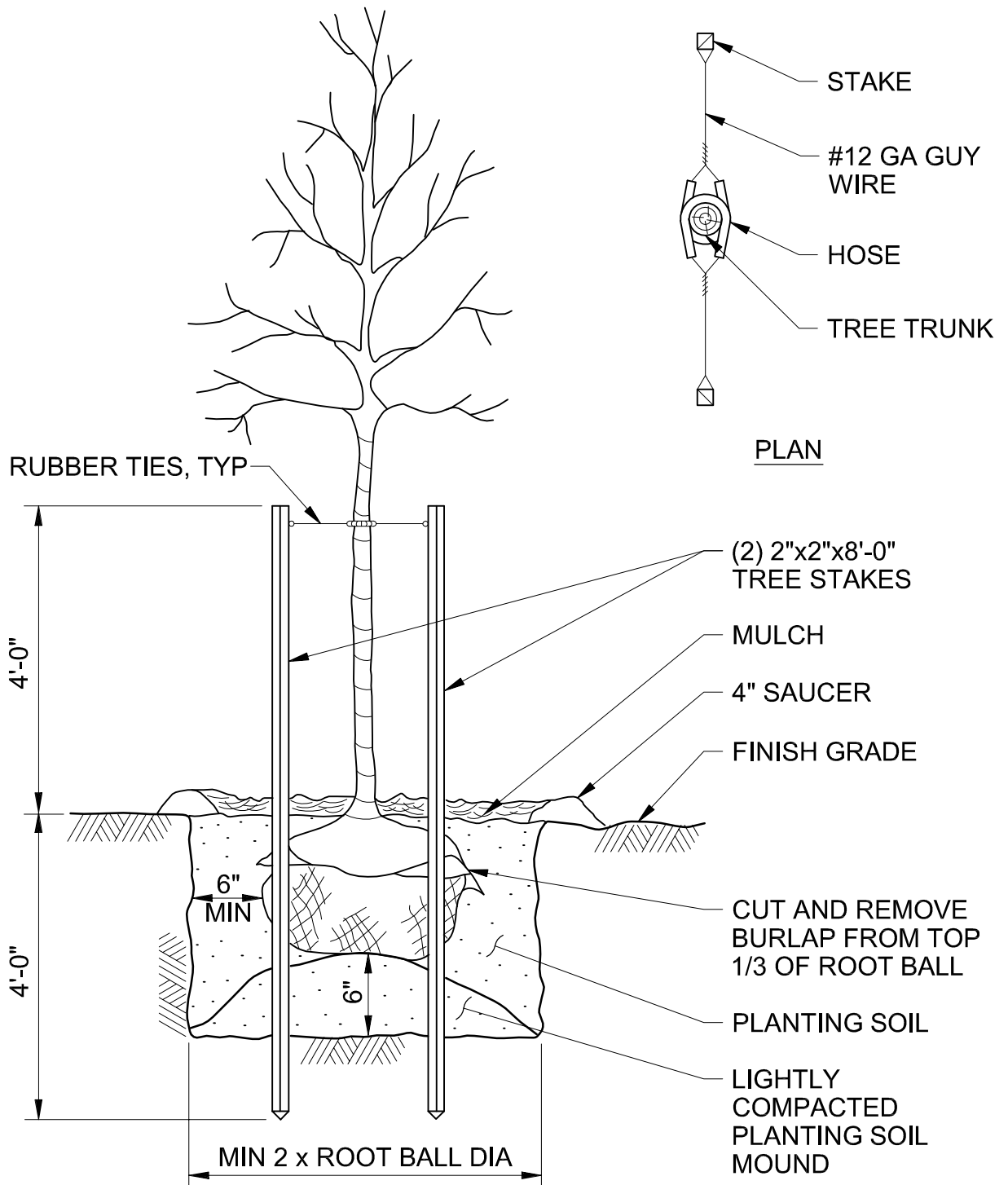
TREE SHALL BEAR SAME RELATION TO FINISH GRADE AS IT BORE TO PREVIOUS GRADE.

MEDIUM TREE PLANTING

NTS

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

3293-611



**NOTE:**

TREE SHALL BEAR SAME RELATION TO FINISH GRADE AS IT BORE TO PREVIOUS GRADE.

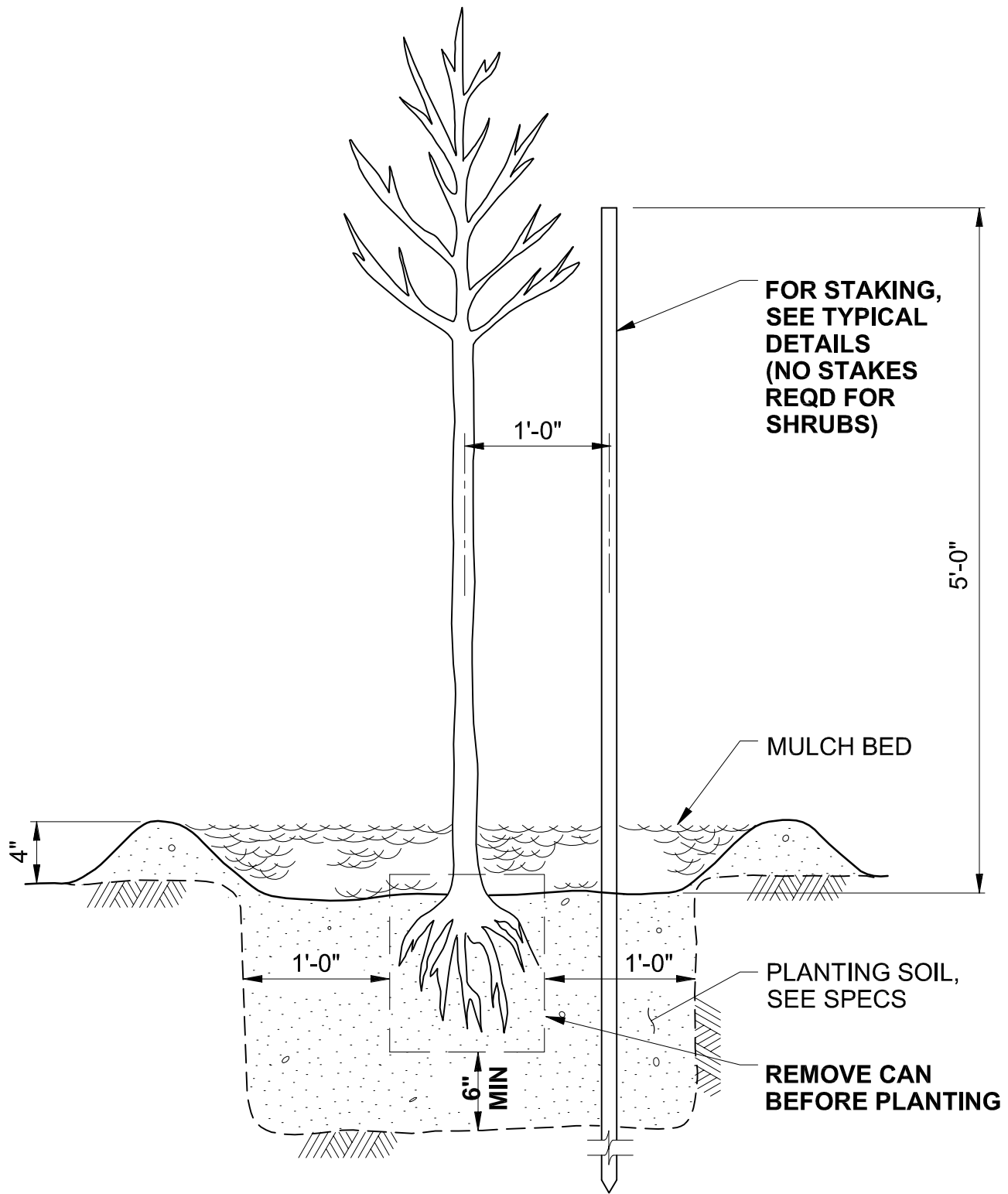
**SMALL TREE PLANTING**

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

3293-612



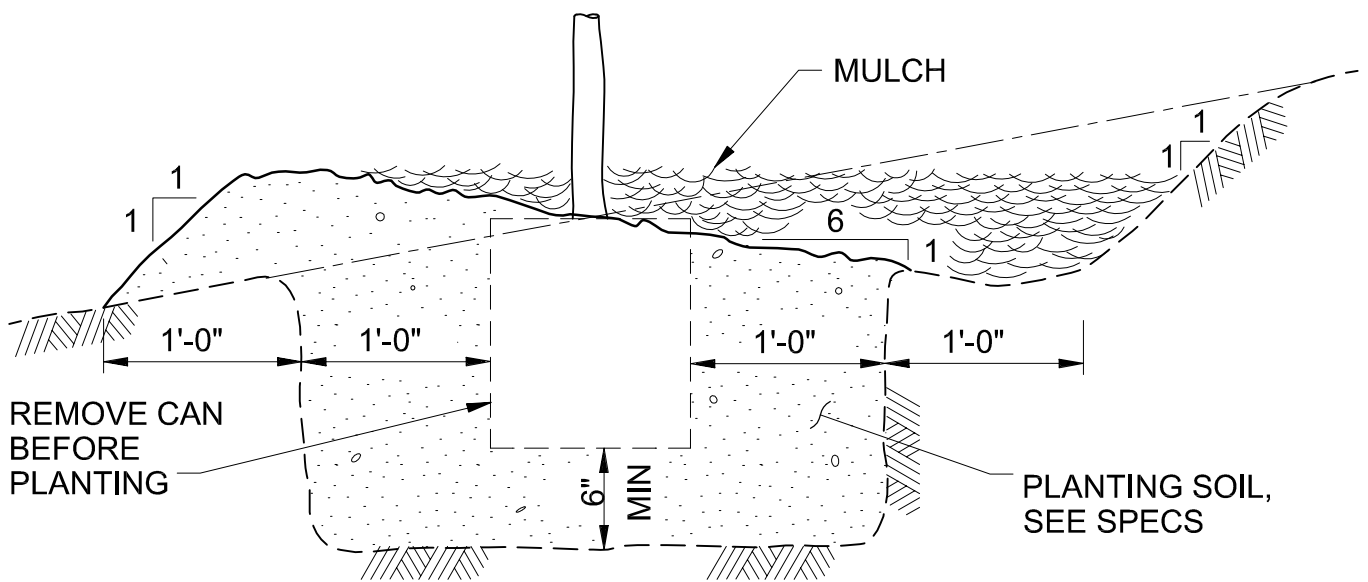


## **CONTAINER TREE PLANTING**

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

**3293-613**

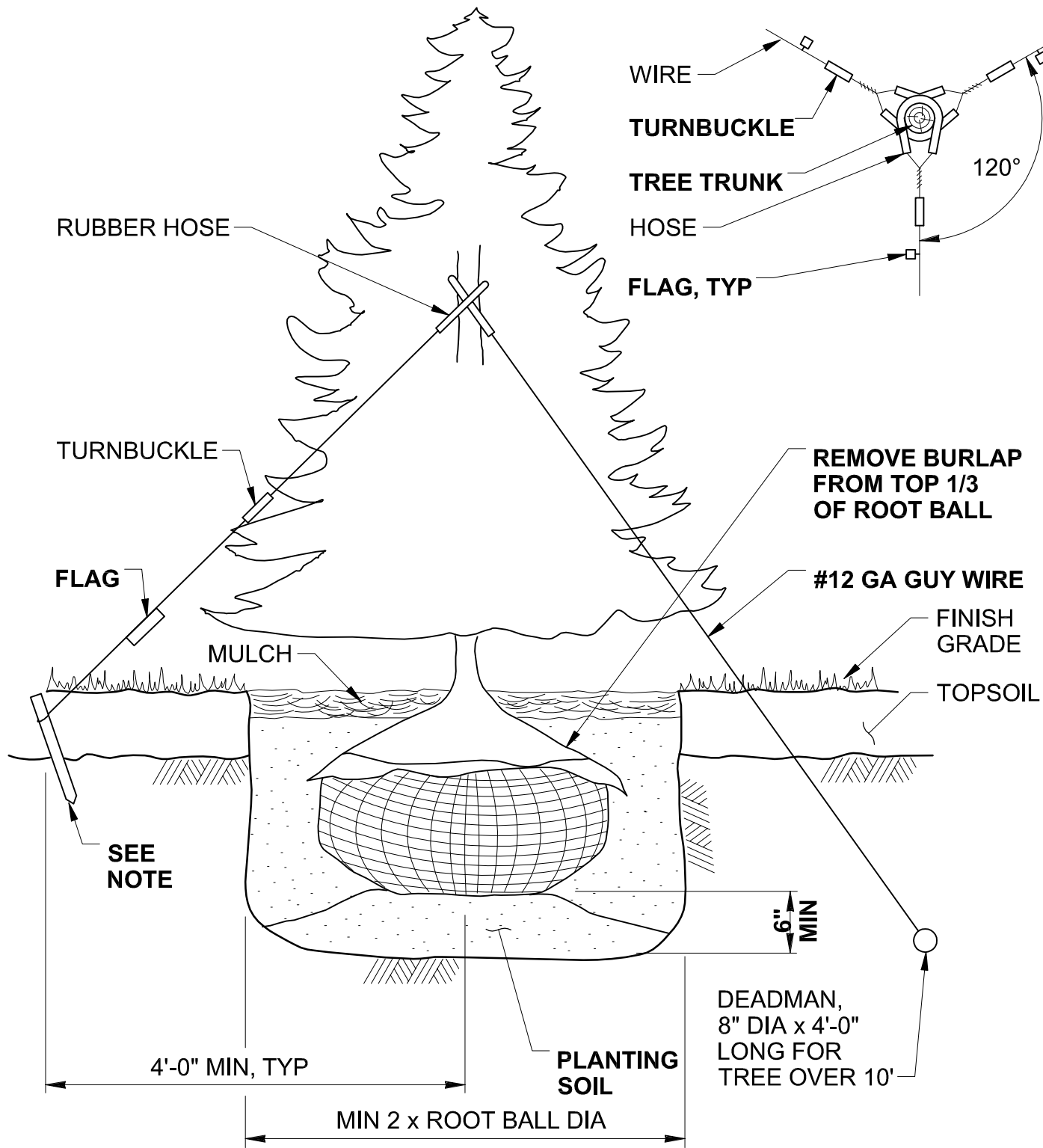


## TREE PLANTING ON SLOPE

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

3293-614



**NOTE:**

3'-0" LONG 2"x2" WOOD STAKE FOR TREES UNDER 10'.

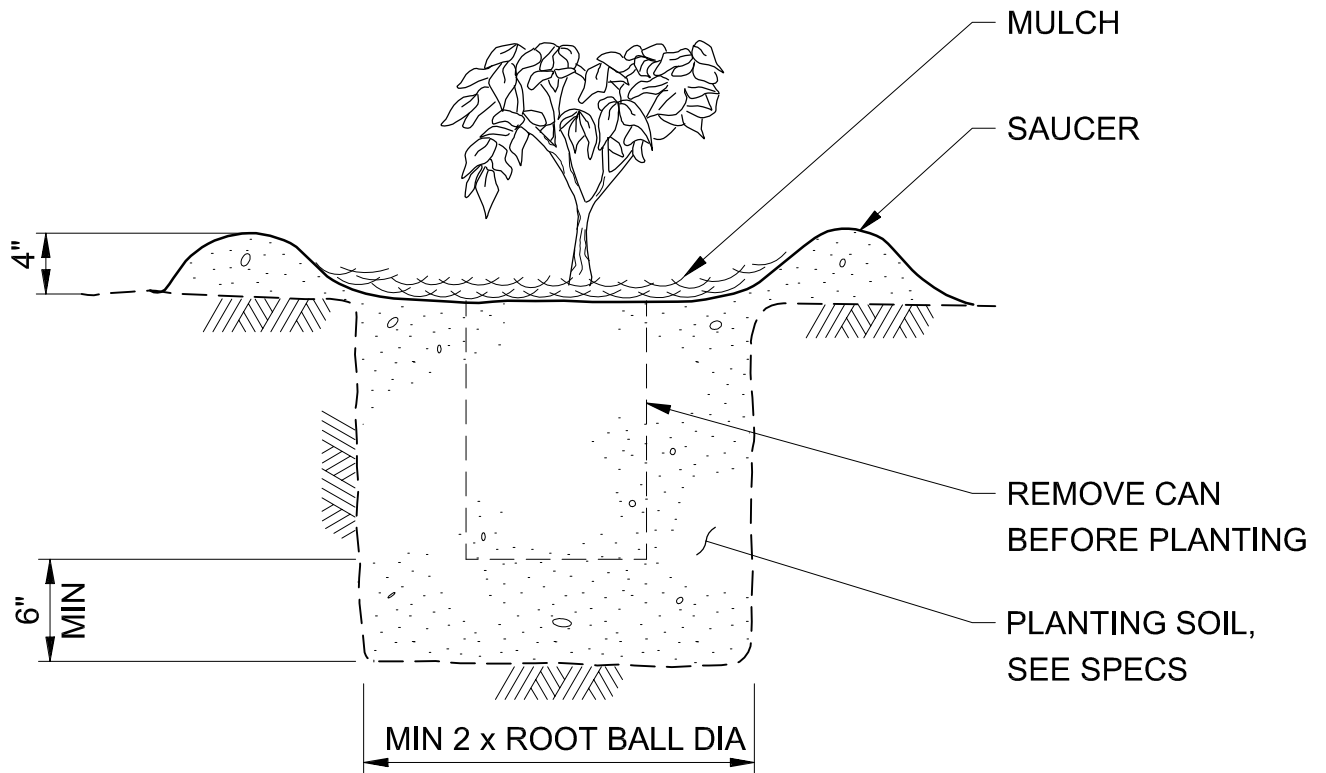
**EVERGREEN TREE PLANTING**

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

**3293-620**

**CH2MHILL**

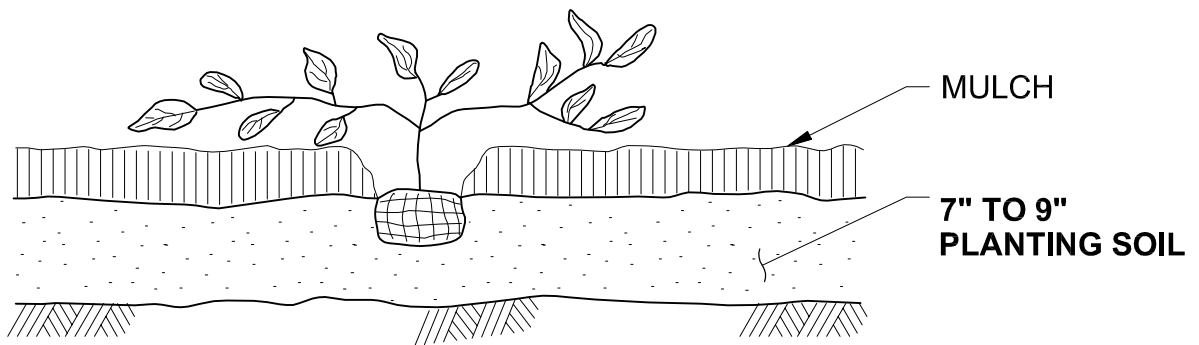


## SHRUB PLANTING FROM CONTAINER

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

3293-630



## GROUND COVER PLANTING

NTS

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

3293-635

CI MANHOLE RING & COVER  
W/ MIN OF 6-3/4" DIA HOLES  
SYMMETRICALLY PLACED

GALVS 90°  
STREET ELBOW  
W/ INSECT SCREEN

GROUT

6" MIN

FINISH GRADE

T-HANDLE  
GUIDE-DOUBLE  
NUTTED EYE  
BOLT & GALV  
ANGLE BRACKET

COMPACTED  
BACKFILL ALL  
AROUND CONC PIPE

AIR RELEASE  
VALVE

GALV T-HANDLE,  
LENGTH AS REQD

BRASS PIPE

3" MIN

BRASS 90° BEND

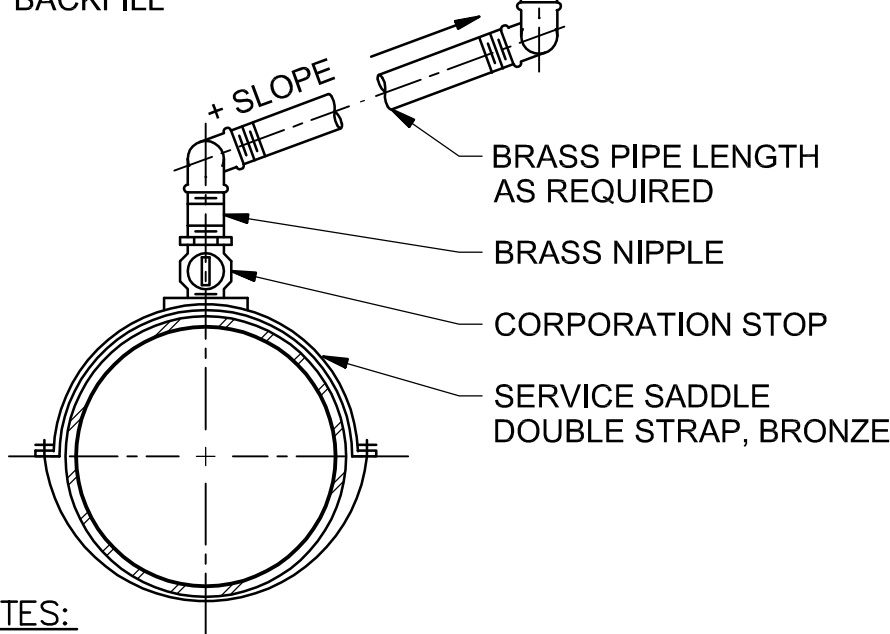
ANGLE VALVE

12"x12"x4" CONC  
BLOCK

B & S CONC  
PIPE

MIN 8", CUT CONC  
PIPE AS REQUIRED

1/3 CY GRAVEL  
BACKFILL



NOTES:

1. CORPORATION STOP, PIPE AND ACCESSORIES AND ANGLE VALVE TO BE SAME DIAMETER AS AIR RELEASE VALVE INLET.

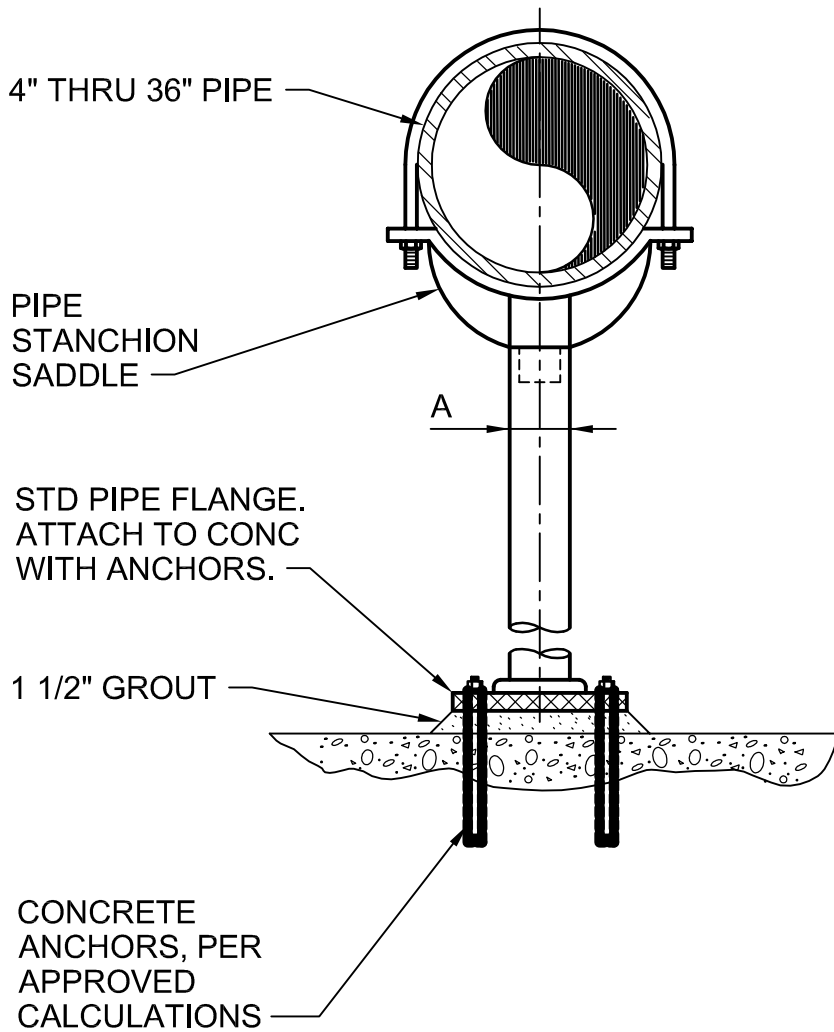
AIR RELEASE VALVE ON YARD PIPING

NTS

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

3312-654

**CH2MHILL**



DIMENSION TABLE	
PIPE SIZE	A
2-1/2"	2-1/2"
3"	2-1/2"
4"	3"
6"	3"
8"	3"
10"	3"
12"	3"
14"	3"
16"	3"
20"	4"
24"	4"
30"	4"
36"	4"

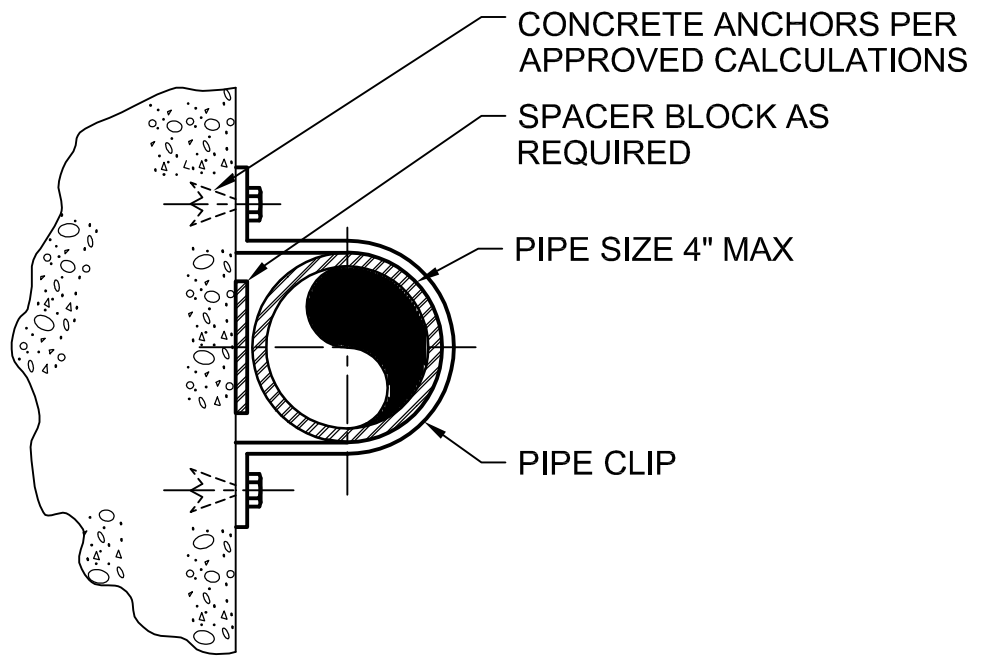
## PIPE SUPPORT

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

4005-501

**CH2MHILL**



NOTES:

1. FOR VERTICAL PIPES ONLY.
2. PROVIDE PIPE PROTECTION BARRIER AS SPECIFIED. FABRICATE OVERSIZE STRAP WHERE REQUIRED.

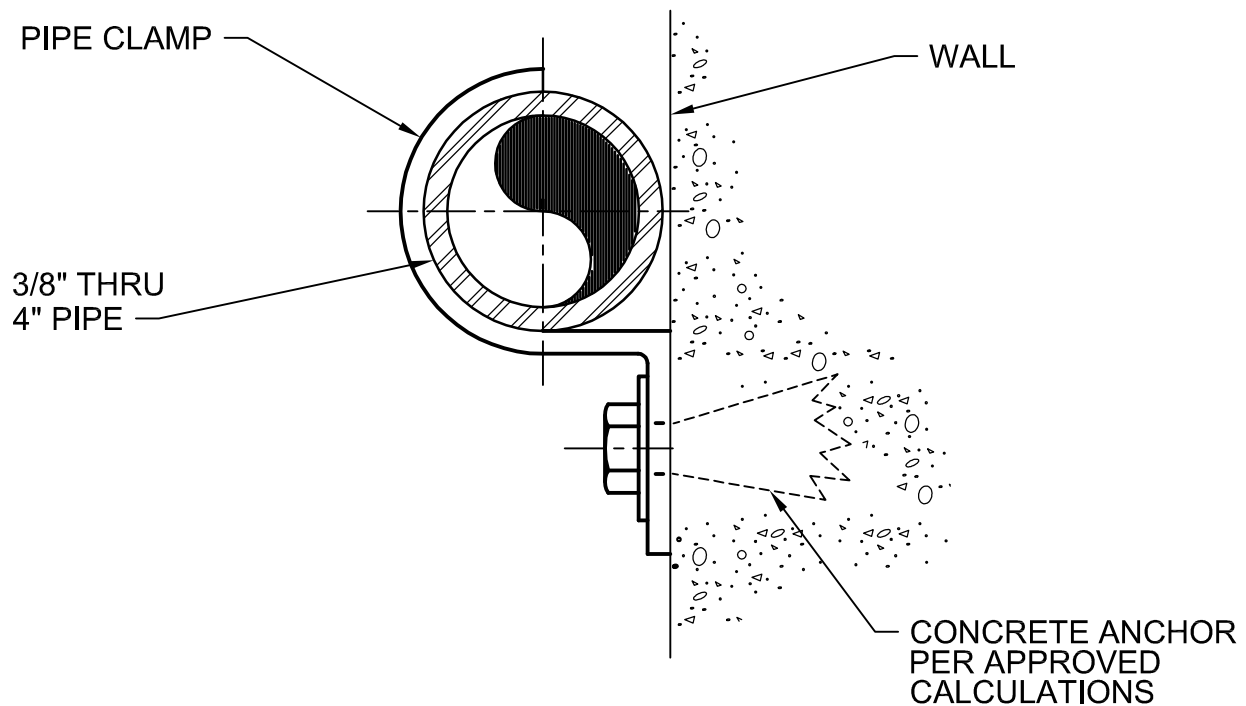
PIPE SUPPORT - WALL MOUNT

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

4005-503





NOTES:

1. FOR INSTALLATION OF PIPES ON WALLS ONLY.
2. NOT FOR USE HORIZONTALLY ON CEILINGS OR BOTTOMS OF BEAMS.
3. PROVIDE PIPE PROTECTION BARRIER AS SPECIFIED.

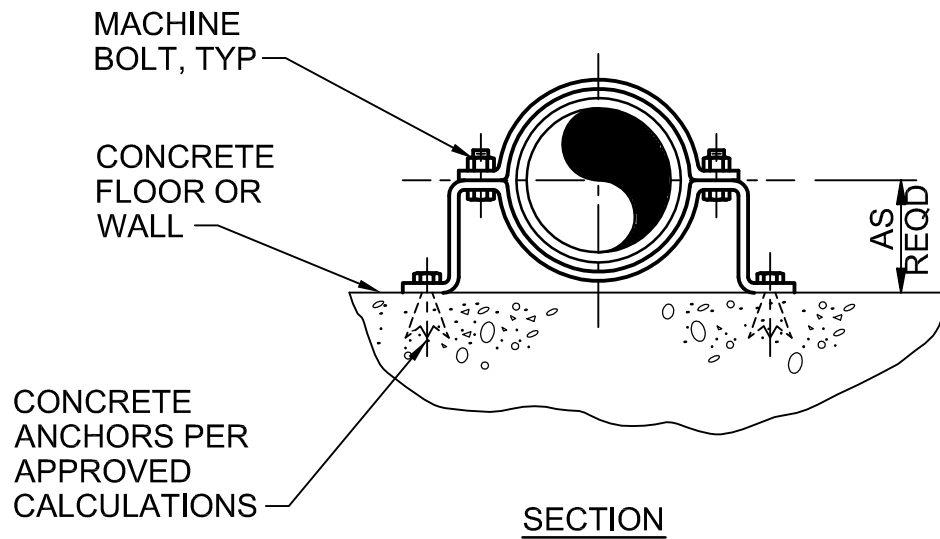
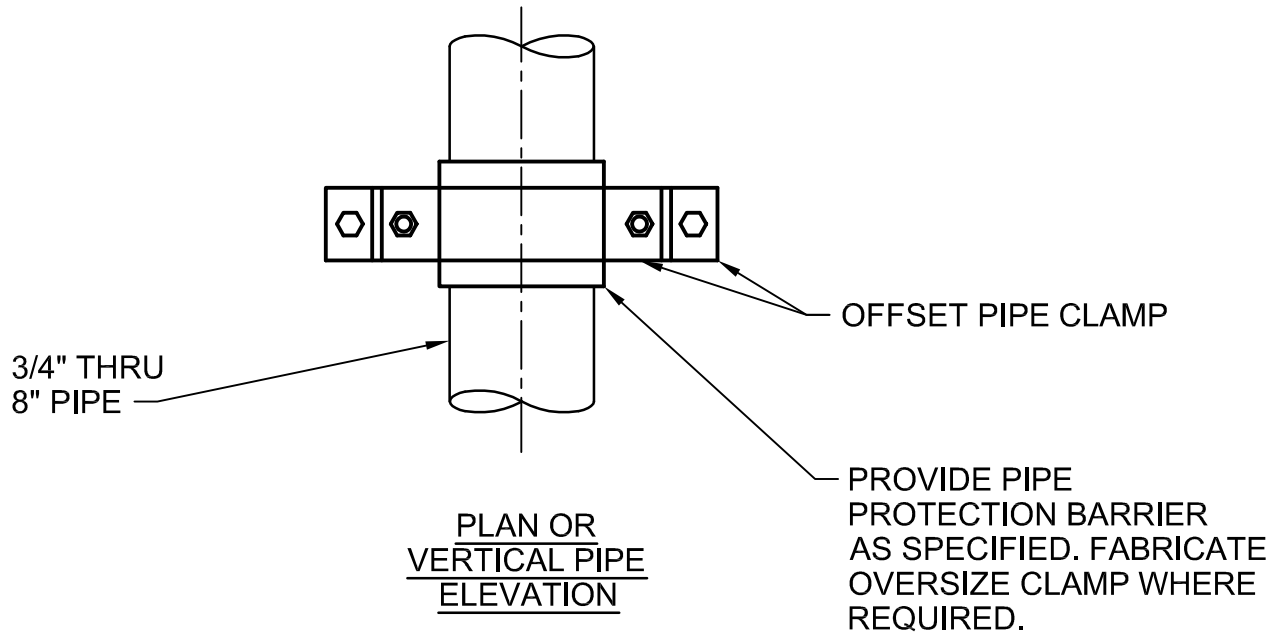
PIPE SUPPORT - WALL MOUNTED

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

4005-504

**CH2MHILL**



## PIPE SUPPORT - WALL MOUNTED

NTS

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

4005-505

18 GA GALV SHEET  
SLEEVE STRAPPED  
AROUND PIPE W/SST  
HOSE CLAMPS

PLASTIC PIPE  
6" OR 8"

BAR 3x3/8  
GALVANIZED

6"  
MIN

PLAN

2" PIPE OD  
PLUS 1/2"

CONC  
ANCHORS, PER  
APPROVED  
CALCULATIONS

HEX NUT  
W/LOCK  
WASHER

CONC  
WALL

1/4" U-BOLT  
GALVANIZED

2"  
2 1/2"  
PIPE OD 2 1/2"  
PLUS 1/8"  
2 1/2"  
2"

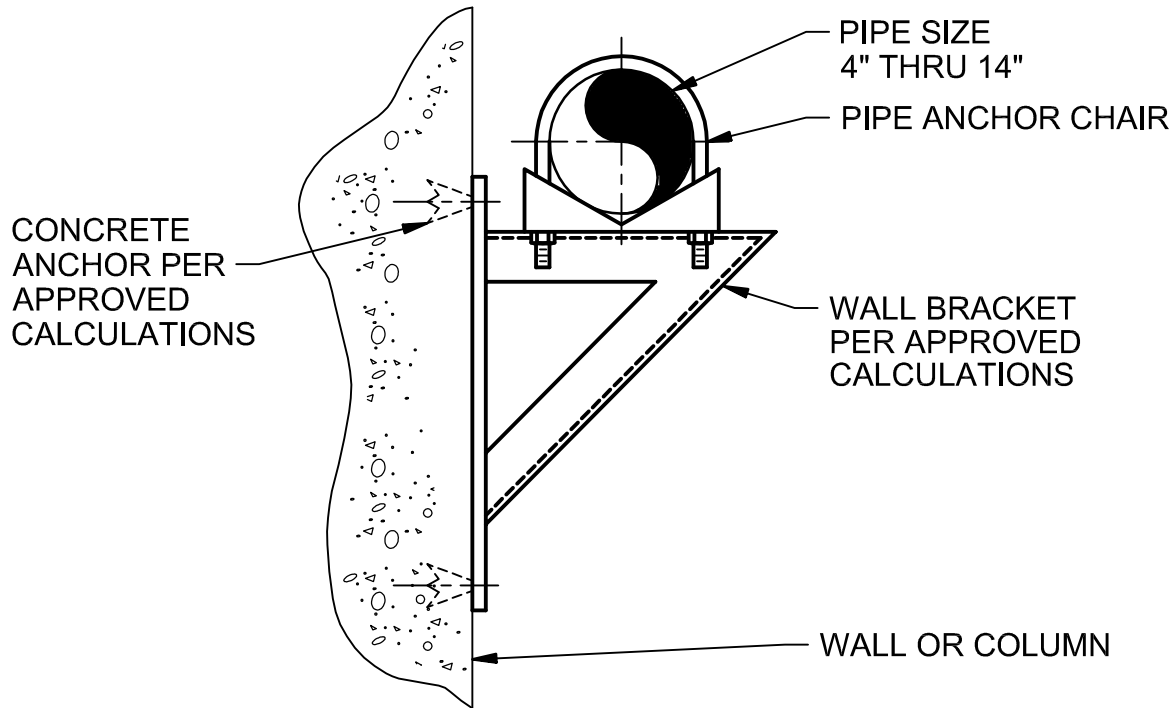
SECTION

## PIPE SUPPORT - WALL MOUNTED

NTS

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

4005-506



NOTES:

1. HOT DIP GALVANIZE AFTER FABRICATION.
2. WALL BRACKET SHALL BE MEDIUM OR HEAVY DUTY DEPENDING ON PIPE LOAD REQUIREMENTS.

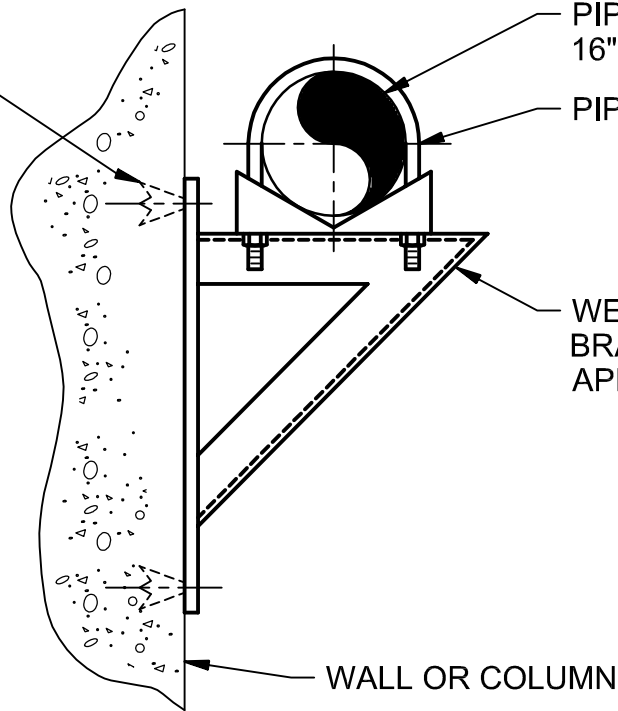
PIPE SUPPORT - WALL MOUNTED MEDIUM

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

4005-508

CONCRETE  
ANCHOR, PER  
APPROVED  
CALCULATIONS



PIPE SIZE  
16" THRU 24"

PIPE ANCHOR CHAIR

WELDED STEEL WALL  
BRACKET, PER  
APPROVED CALCULATIONS

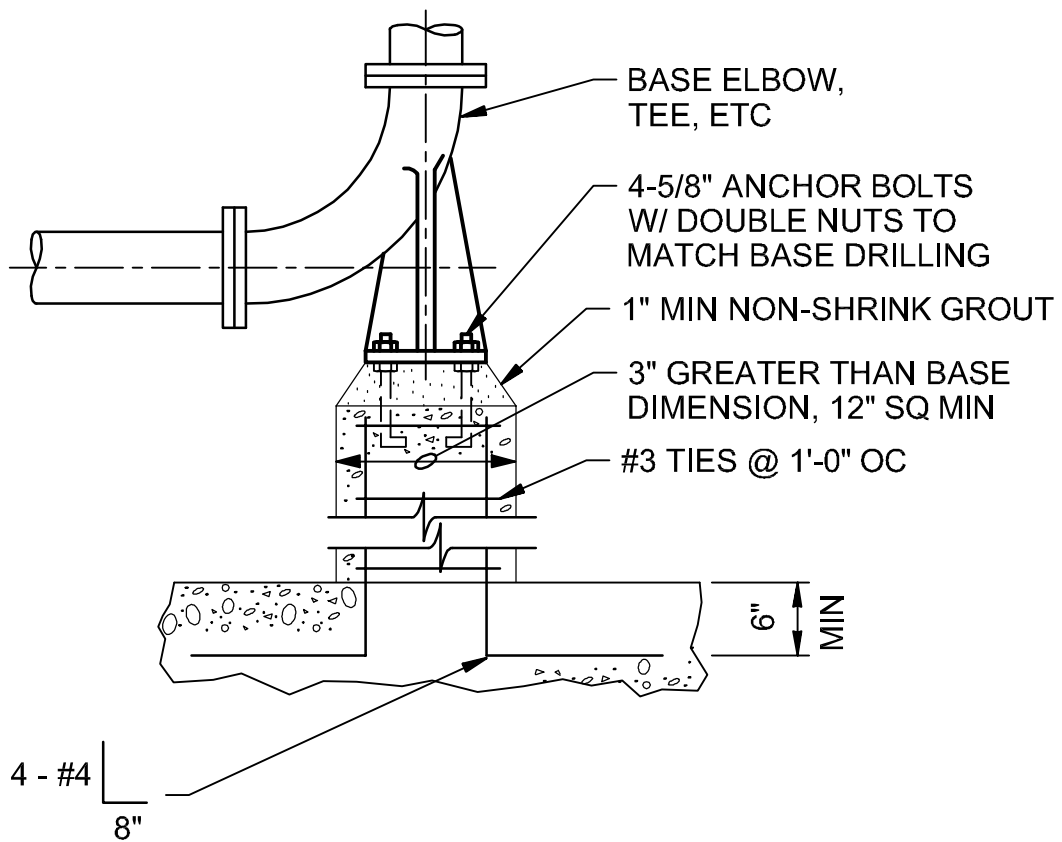
WALL OR COLUMN

## PIPE SUPPORT - WALL MOUNTED HEAVY

NTS

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

4005-510



NOTES:

1. ALSO USE FOR SUPPORT OF HORIZONTAL TEE OR CROSS.

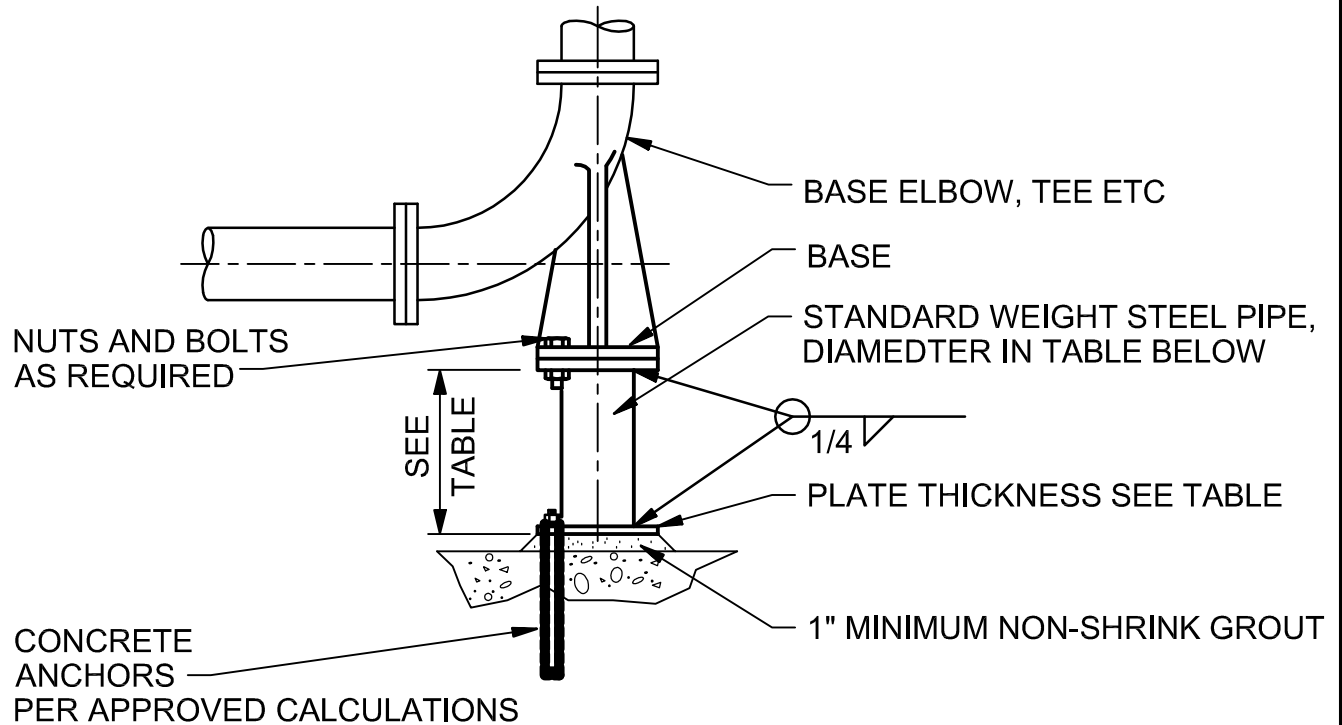
BASE BEND

NTS

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

4005-517

**CH2MHILL**



DIMENSION TABLE				
PIPE SIZE	SUPPORT DIAMETER	PLATE		ANCHOR BOLT DIAMETER
		DIAMETER	THICKNESS	
3"	1 1/2"	5"	3/8"	3/8"
4"	2"	6"	3/8"	3/8"
6"	3"	7"	3/8"	3/8"
8" and 10"	4"	9"	1/2"	1/2"
12" thru 16"	6"	11"	1/2"	1/2"
18" thru 24"	8"	13 1/2"	5/8"	5/8"
30"	10"	16"	5/8"	5/8"
36"	12"	19"	5/8"	5/8"
42"	16"	23 1/2"	3/4"	3/4"
48"	18"	25"	3/4"	3/4"
54"	20"	30"	3/4"	3/4" (USE 6)
60"	24"	32"	3/4"	3/4" (USE 6)

**NOTES:**

1. ALSO USE FOR SUPPORT OF HORIZONTAL TEE OR CROSS.

**BASE BEND**

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

4005-518

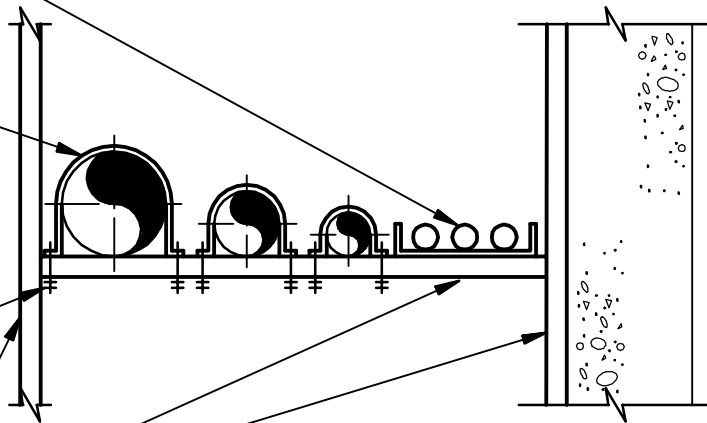
**CH2MHILL**

SAMPLE LINES IN  
CABLE TRAY, TYP

PIPE CLAMP OR  
STRAP AS SPECIFIED

DOUBLE NUT, TYP

PIPE SUPPORT SYSTEM



NOTES:

1. PROVIDE PIPE PROTECTION BARRIER AS SPECIFIED.

GALLERY SAMPLE LINES SUPPORT

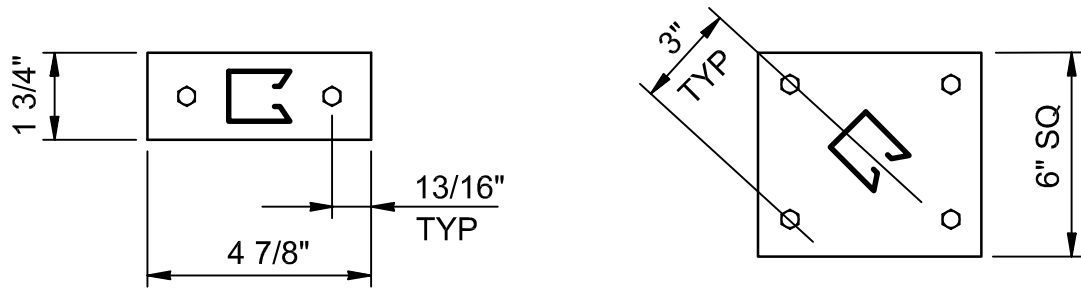
NTS

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

4005-523

**CH2MHILL**





STRUCTURAL  
CHANNEL BRACKET  
SEE NOTE 3

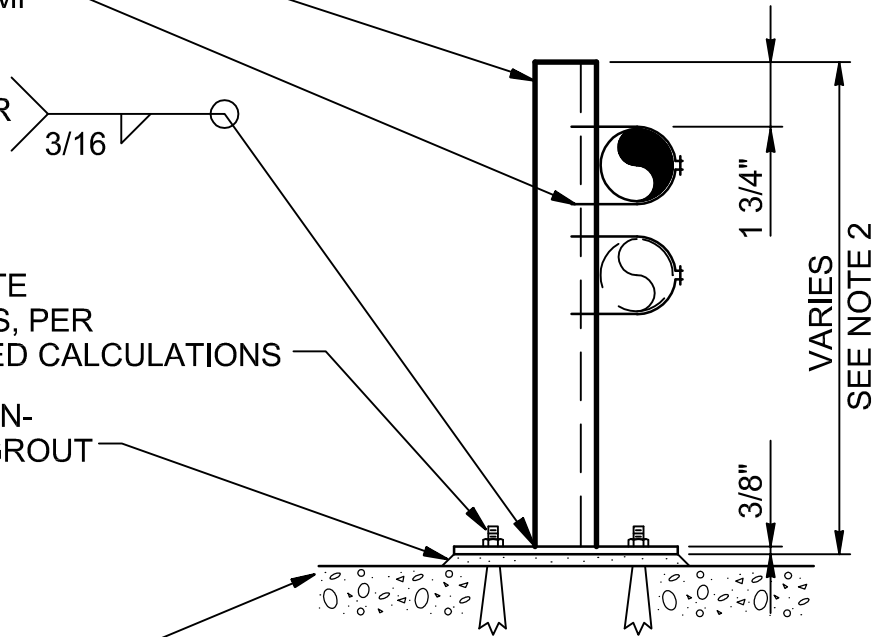
PIPE CLAMP

ALL  
EXTERIOR  
WALLS

CONCRETE  
ANCHORS, PER  
APPROVED CALCULATIONS

1" MIN NON-  
SHRINK GROUT

FINISHED  
CONCRETE



NOTES:

1. MAXIMUM PIPE SIZE TO BE SUPPORTED WITH THIS PIPE SUPPORT IS 4".
2. LENGTH IS DEPENDENT ON PIPE SPACING AND DISTANCE OF PIPE FROM BASE.
3. USE 1 5/8 "x2 7/16 " CHANNEL MINIMUM FOR SINGLE PIPE OR USE 1 5/8 "x3 1/4 " CHANNEL MINIMUM FOR TWO OR MORE PIPES

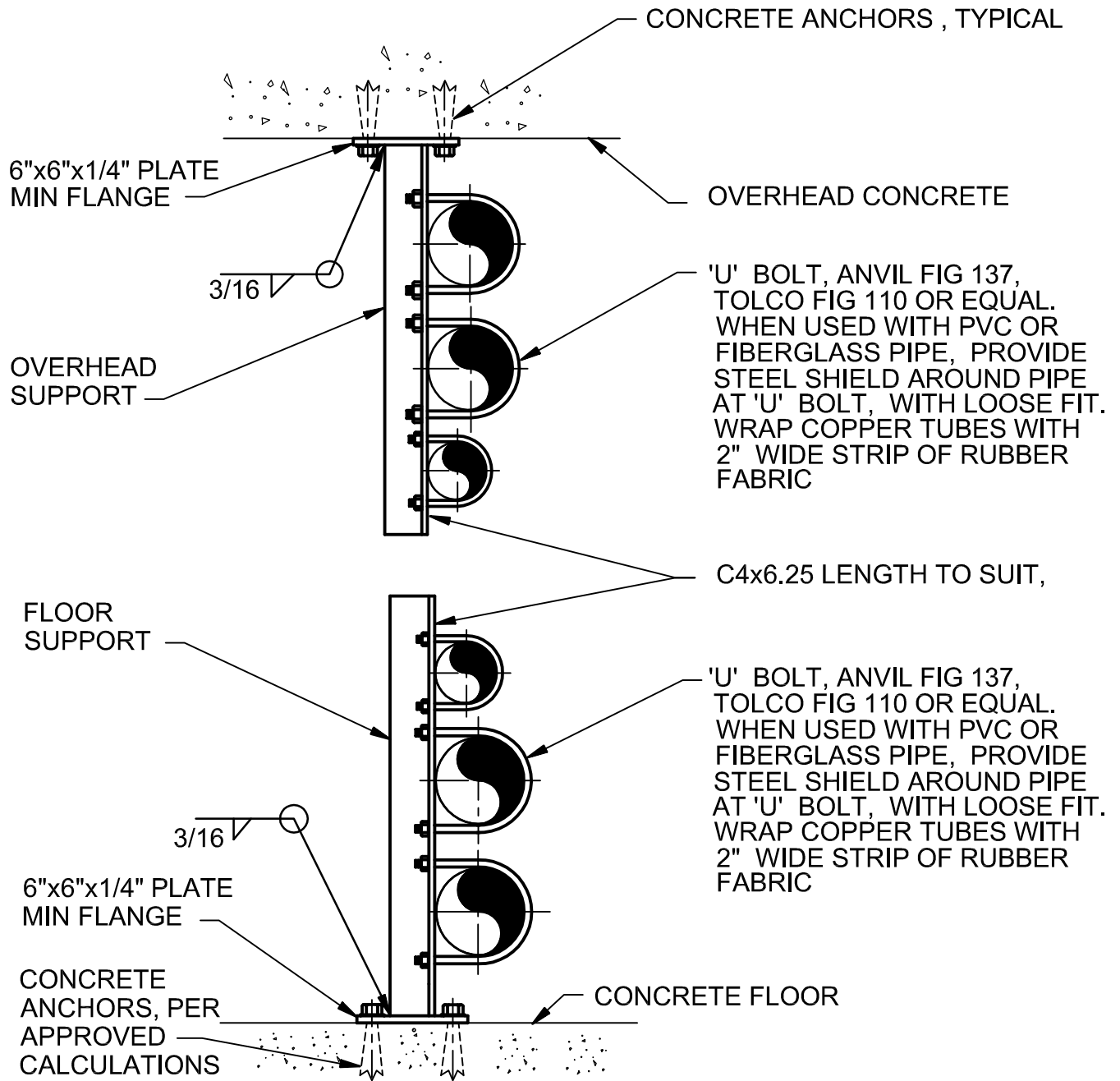
PIPE SUPPORT

NTS

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

4005-524

**CH2MHILL**



NOTES:

1. CHANNEL, 'U' BOLT, LOCKWASHERS, NUTS, FLANGE AND ANCHORS TO BE MATERIAL AS SPECIFIED.

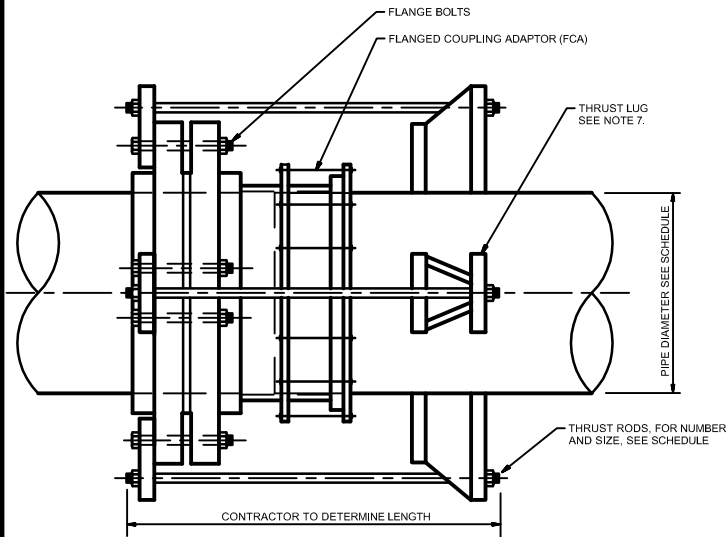
PIPE SUPPORT

NTS

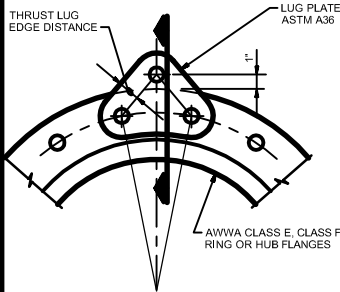
ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

4005-525

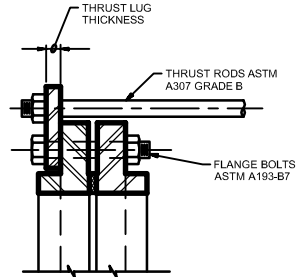
**CH2MHILL**



**PLAN**



**FRONT ELEVATION**



**LUG**

**NOTES:**

- THRUST RODS SHALL CONFORM TO ASTM A307 GRADE B. NUTS SHALL CONFORM TO ASTM A563.
- LUG PLATES SHALL CONFORM TO ASTM A36.
- THRUST ROD NUTS SHALL BE TIGHTENED GRADUALLY AND EQUALLY IN STAGES TO PREVENT UNEVEN ALIGNMENT AND TO ALLOW EQUAL STRESS ON ALL RODS UNDER PRESSURE. TIGHTEN UNTIL SNUG. THREADS SHALL PROTRUDE FROM NUTS. PEEN THREADS AFTER TIGHTENING NUTS.
- LUG PLATES SHALL BE EQUALLY SPACED AROUND PIPE.
- PROVIDE CATHODIC PROTECTION FOR COUPLINGS AS NOTED ON PLANS OR IN THE SPECIFICATIONS.
- CONTRACTOR SHALL USE SCHEDULE DATA FOR ONLY THOSE PIPE SIZES AND TEST PRESSURES SPECIFIED IN THIS CONTRACT.
- FOR THRUST LUG DIMENSIONS SEE LUG SCHEDULE. ON DETAIL 15540. ADJUST HEIGHT OF THRUST ROD LUG SO THAT THRUST ROD IS PARALLEL TO PIPE AXIS.

**THRUST ROD AND LUG PLATE SCHEDULE**

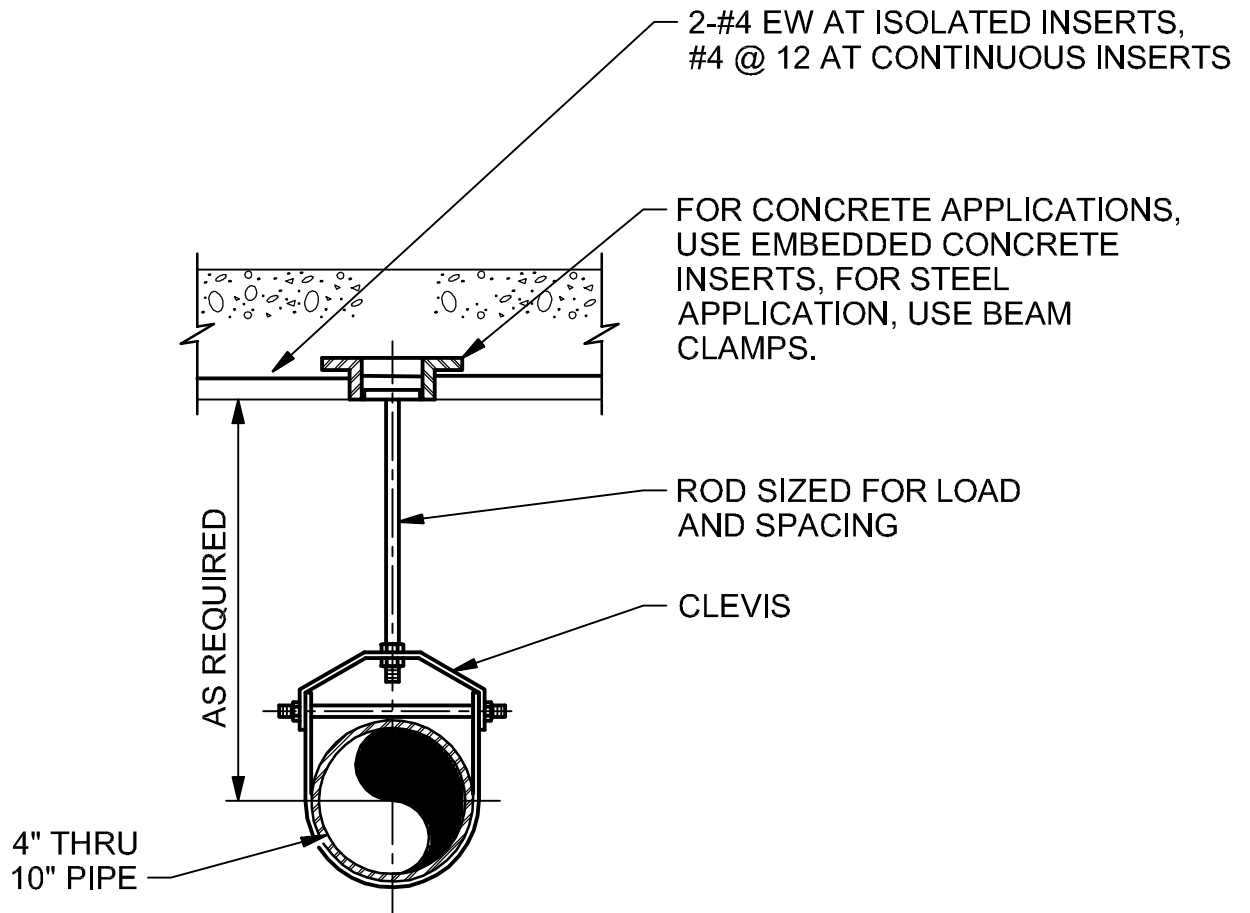
WORKING PRESSURE (PSI)	AWWA C207 FLANGE CLASS	NUMBER OF THRUST RODS	PUBLISHED FLANGE THICKNESS (IN)	REC'D RING FLANGE THICKNESS (IN)	THRUST ROD DIA. (IN)	THRUST ROD FORCE (KIPS)	THRUST LUG THICKNESS (IN)	THRUST LUG EDGE DISTANCE (IN)	REC'D FLANGE BOLT SPEC
100	6" Class E	4	1.31	0.87	0.63	1.2	0.25	1.50	A 193, B7
100	6" Class F	6	1.31	0.75	0.63	1.0	0.25	1.50	A 193, B7
100	8" Class E	4	1.50	0.80	0.63	2.0	0.38	1.50	A 193, B7
100	8" Class F	6	1.31	0.87	0.63	1.5	0.38	1.50	A 193, B7
100	10" Class E	6	1.56	0.63	0.63	2.0	0.38	1.50	A 193, B7
100	10" Class F	8	1.50	0.89	0.63	1.7	0.38	1.50	A 193, B7
100	12" Class E	6	1.75	1.08	0.63	3.0	0.38	1.50	A 193, B7
100	12" Class F	8	1.63	1.13	0.63	2.4	0.38	1.53	A 193, B7
100	14" Class E	6	1.88	1.17	0.63	3.5	0.38	1.50	A 193, B7
100	14" Class F	10	1.94	1.28	0.63	2.5	0.38	1.53	A 193, B7
100	16" Class E	6	2.00	1.30	0.63	3.6	0.38	1.50	A 193, B7
100	16" Class F	10	2.14	1.37	0.63	3.1	0.38	1.59	A 193, B7
100	18" Class E	8	2.13	1.37	0.63	4.2	0.50	1.53	A 193, B7
100	18" Class F	12	2.25	1.49	0.63	3.2	0.50	1.69	A 193, B7
100	20" Class E	10	2.38	1.49	0.63	4.1	0.50	1.53	A 193, B7
100	20" Class F	12	2.33	1.61	0.63	3.9	0.50	1.69	A 193, B7
100	22" Class E	10	2.50	1.58	0.63	4.9	0.50	1.69	A 193, B7
100	22" Class F	12	2.50	1.72	0.63	4.7	0.50	1.89	A 193, B7
100	24" Class E	10	2.63	1.70	0.63	5.8	0.50	1.69	A 193, B7
100	24" Class F	12	2.69	1.86	0.63	5.6	0.50	2.00	A 193, B7
100	30" Class E	14	2.88	2.02	0.75	6.3	0.50	1.69	A 193, B7
100	30" Class F	14	3.15	2.16	0.75	7.3	0.50	2.31	A 193, B7
100	36" Class E	16	3.13	2.34	0.75	7.9	0.63	2.00	A 193, B7
100	36" Class F	16	3.46	2.48	0.88	8.9	0.50	2.63	A 193, B7
100	42" Class E	18	3.38	2.65	0.88	9.9	0.50	2.00	A 193, B7
100	42" Class F	18	3.81	2.76	0.88	10.5	0.63	2.63	A 193, B7
100	48" Class E	20	3.50	2.93	0.88	10.1	0.63	2.00	A 193, B7
100	48" Class F	20	4.50	3.08	1.00	12.8	0.63	2.63	A 193, B7
200	6" Class E	4	1.31	0.86	0.63	2.5	0.38	1.50	A 193, B7
200	6" Class F	6	1.31	1.06	0.63	2.1	0.38	1.50	A 193, B7
200	8" Class E	4	1.50	1.14	0.63	4.0	0.50	1.50	A 193, B7
200	8" Class F	6	1.31	1.24	0.63	3.9	0.38	1.50	A 193, B7
200	10" Class E	6	1.56	1.32	0.63	4.1	0.50	1.50	A 193, B7
200	10" Class F	8	1.50	1.40	0.63	3.4	0.50	1.50	A 193, B7
200	12" Class E	6	1.75	1.53	0.63	6.0	0.50	1.50	A 193, B7
200	12" Class F	8	1.63	1.59	0.63	4.7	0.50	1.53	A 193, B7
200	14" Class E	6	1.88	1.66	0.75	7.3	0.63	1.50	A 193, B7
200	14" Class F	10	1.94	1.78	0.63	6.0	0.50	1.53	A 193, B7
200	16" Class E	6	2.00	1.83	0.75	7.2	0.63	1.50	A 193, B7
200	16" Class F	10	2.14	1.94	0.75	6.3	0.63	1.69	A 193, B7
200	18" Class E	8	2.13	1.94	0.75	8.3	0.63	1.53	A 193, B7
200	18" Class F	12	2.25	2.11	0.75	6.5	0.63	1.69	A 193, B7
200	20" Class E	10	2.38	2.11	0.75	8.2	0.63	1.53	A 193, B7
200	20" Class F	12	2.33	2.27	0.75	7.9	0.63	1.69	A 193, B7
200	22" Class E	10	2.50	2.24	0.88	9.7	0.63	1.69	A 193, B7
200	22" Class F	12	2.50	2.44	0.88	9.3	0.75	1.69	A 193, B7
200	24" Class E	10	2.63	2.41	0.88	11.6	0.75	1.69	A 193, B7
200	24" Class F	12	2.69	2.62	0.88	11.1	0.75	2.00	A 193, B7
200	30" Class E	14	2.88	2.86	1.00	12.8	0.75	1.69	A 193, B7
200	30" Class F	14	3.15	3.05	1.00	14.8	0.75	2.31	A 193, B7
200	36" Class E	16	3.13	3.31	1.13	18.7	0.75	2.00	A 193, B7
200	36" Class F	16	3.46	3.47	1.13	17.7	0.75	2.63	A 193, B7
200	42" Class E	18	3.38	3.75	1.13	19.0	0.88	2.00	A 193, B7
200	42" Class F	18	3.81	3.90	1.25	21.1	0.88	2.63	A 193, B7
200	48" Class E	20	3.50	4.14	1.25	20.2	0.88	2.00	A 193, B7
200	48" Class F	20	4.50	4.35	1.38	25.5	0.88	2.63	A 193, B7
300	6" Class E	4	1.31	1.16	0.63	3.7	0.50	1.50	A 193, B7
300	6" Class F	6	1.31	1.30	0.63	3.1	0.50	1.50	A 193, B7
300	8" Class E	4	1.50	1.39	0.63	6.1	0.50	1.50	A 193, B7
300	8" Class F	6	1.31	1.51	0.63	4.8	0.50	1.50	A 193, B7
300	10" Class E	6	1.56	1.62	0.63	6.1	0.50	1.50	A 193, B7
300	10" Class F	8	1.50	1.72	0.63	5.1	0.50	1.50	A 193, B7
300	12" Class E	6	1.75	1.88	0.88	9.0	0.63	1.50	A 193, B7
300	12" Class F	8	1.63	1.95	0.75	7.4	0.63	1.53	A 193, B7
300	14" Class E	6	1.88	2.03	0.88	10.9	0.75	1.50	A 193, B7
300	14" Class F	10	1.94	2.16	0.75	7.5	0.63	1.53	A 193, B7
300	16" Class E	6	2.00	2.24	0.88	10.8	0.75	1.50	A 193, B7
300	16" Class F	10	2.14	2.38	0.88	9.4	0.63	1.69	A 193, B7
300	18" Class E	8	2.13	2.38	1.00	12.5	0.75	1.53	A 193, B7
300	18" Class F	12	2.25	2.58	0.88	9.7	0.75	1.69	A 193, B7
300	20" Class E	10	2.38	2.59	1.00	12.3	0.75	1.53	A 193, B7
300	20" Class F	12	2.33	2.76	0.88	11.7	0.75	1.69	A 193, B7
300	22" Class E	10	2.50	2.74	1.00	14.8	0.75	1.69	A 193, B7
300	22" Class F	12	2.50	2.99	1.00	14.0	0.88	1.69	A 193, B7
300	24" Class E	10	2.63	2.95	1.13	17.3	0.88	2.00	A 193, B7
300	24" Class F	12	2.69	3.21	1.13	18.7	0.88	2.31	A 193, B7
300	30" Class E	14	2.88	3.50	1.13	19.0	0.88	1.69	A 193, B7
300	30" Class F	14	3.15	4.06	1.25	21.8	0.88	2.31	A 193, B7
300	36" Class E	16	3.13	4.26	1.25	23.8	1.00	2.00	A 193, B7
300	36" Class F	16	3.46	4.46	1.38	26.6	0.88	2.63	A 193, B7
300	42" Class E	18	3.38	4.59	1.38	28.5	1.00	2.00	A 193, B7
300	42" Class F	18	3.81	4.78	1.50	31.6	1.00	2.63	A 193, B7
300	48" Class E	20	3.50	5.07	1.50	30.2	1.13	2.00	A 193, B7
300	48" Class F	20	4.50	5.33	1.63	35.3	1.13	2.63	A 193, B7

**THRUST TIE FOR STEEL PIPE**

**ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY**

**4005-542**

**CH2MHILL**



## PIPE HANGER

NTS

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

4005-550

CONCRETE EMBEDDED  
INSERTS, TYPICAL

TURNBUCKLE

ROD DIA  
PER TABLE

12" THRU 42"  
DIA PIPE

1'-0"  
MIN

1'-0"  
MIN

LENGTH AS REQD  
TO MAINTAIN EL

ROD SIZES FOR CLDI	
PIPE DIA	ROD DIA
12" THRU 16"	1/2"
18" AND 20"	5/8"
24"	3/4"

SADDLE FOR  
24"-42" PIPE

CL PIPE

HANGER ROD

PLACE WITHIN &  
SEAL WELD TO  
U-BOLT FOR FULL  
CONTACT LENGTH

NOTES:

- HANGERS FOR PIPES 24" AND LARGER SHALL BE EQUIPPED WITH 1/4"x4" STEEL PLATE SADDLE.

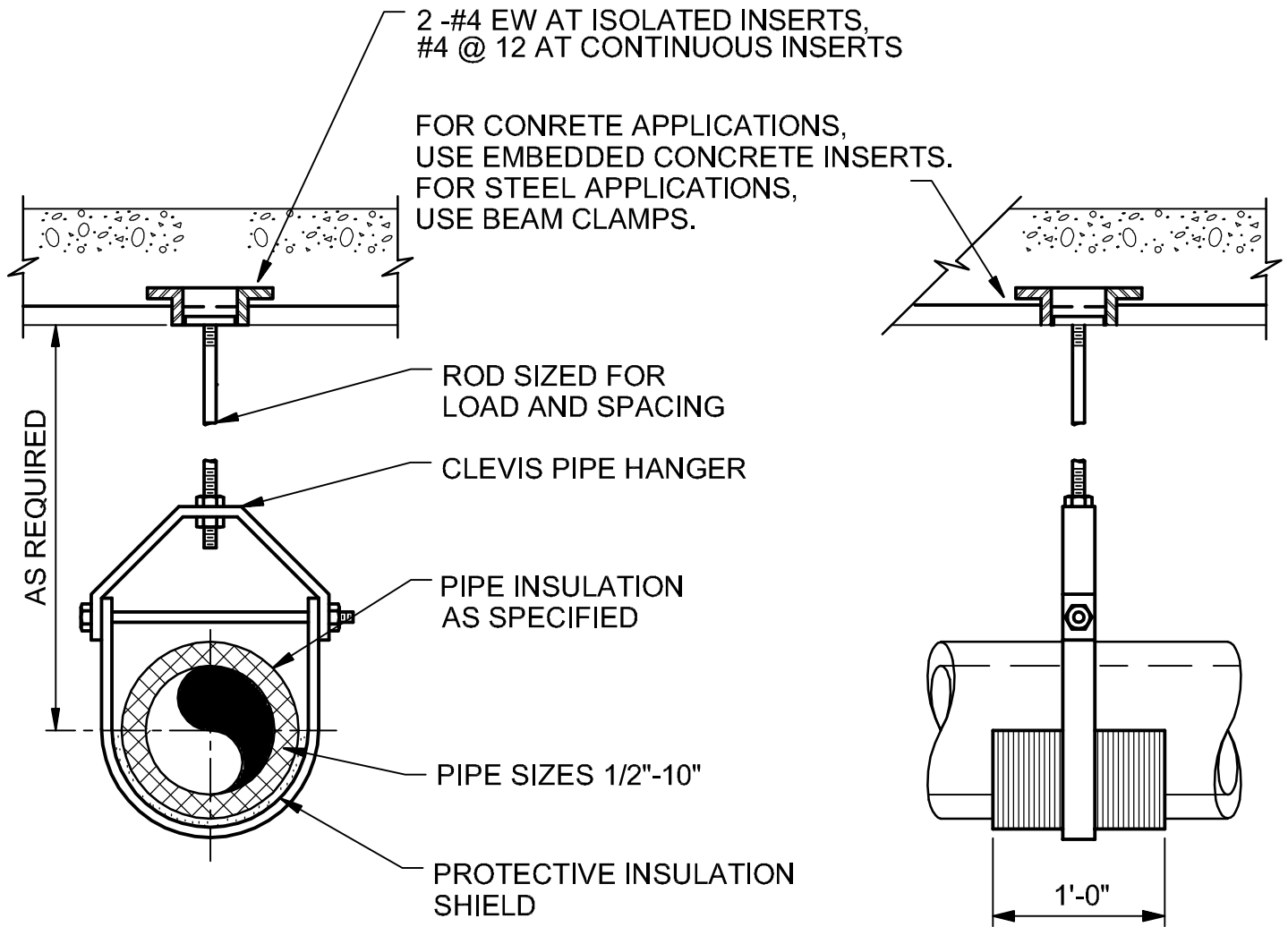
PIPE HANGER

NTS

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

4005-554

**CH2MHILL**



**NOTES:**

1. PIPE HANGERS SHALL BE OVERSIZED AS REQUIRED TO ACCOMMODATE THICKNESS OF INSULATION SPECIFIED. HANGER SHALL NOT COME INTO CONTACT WITH THE INSULATION DIRECTLY, EITHER AT THE VERTICAL YOKE OR AT THE POINT OF SUPPORT. FOR REQUIREMENTS ON INSULATION SHIELD USED WITH PIPE HANGERS, SEE SPECIFICATIONS.

**PIPE HANGER**

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

4005-557

**CH2MHILL**

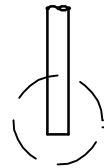
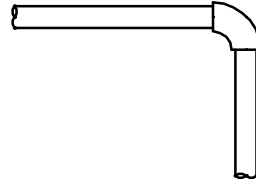
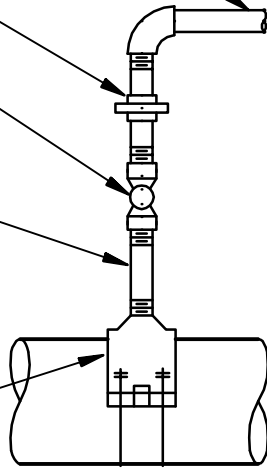
1" GALV STEEL  
VENT PIPE UNLESS  
NOTED OTHERWISE

UNION

1" V300  
BALL VALVE

GALV STEEL  
NIPPLE

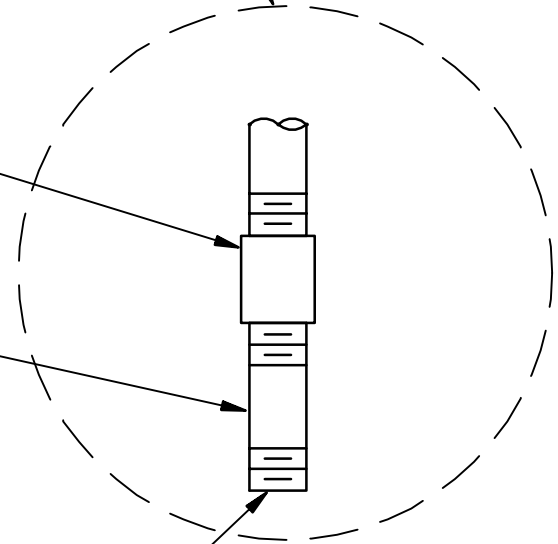
DOUBLE STRAP  
SERVICE SADDLE  
FOR CLDI PIPE OR  
THRED-O-LET  
WELDED TO  
STEEL PIPE



NPT x NPT  
COUPLING

CAST BRASS NPSM x NPT,  
MALE x MALE,  
NIPPLE ADAPTER  
WITH HEXAGONAL  
WRENCH FEATURE.

ROUTE TO HUB DRAIN OR  
SCUPPER IF WITHIN 20-FEET,  
IF FURTHER THAN 20-FEET  
HORIZONTAL DISTANCE  
FROM VENT CONNECTION  
TERMINATE 3'-0" ABOVE FLOOR



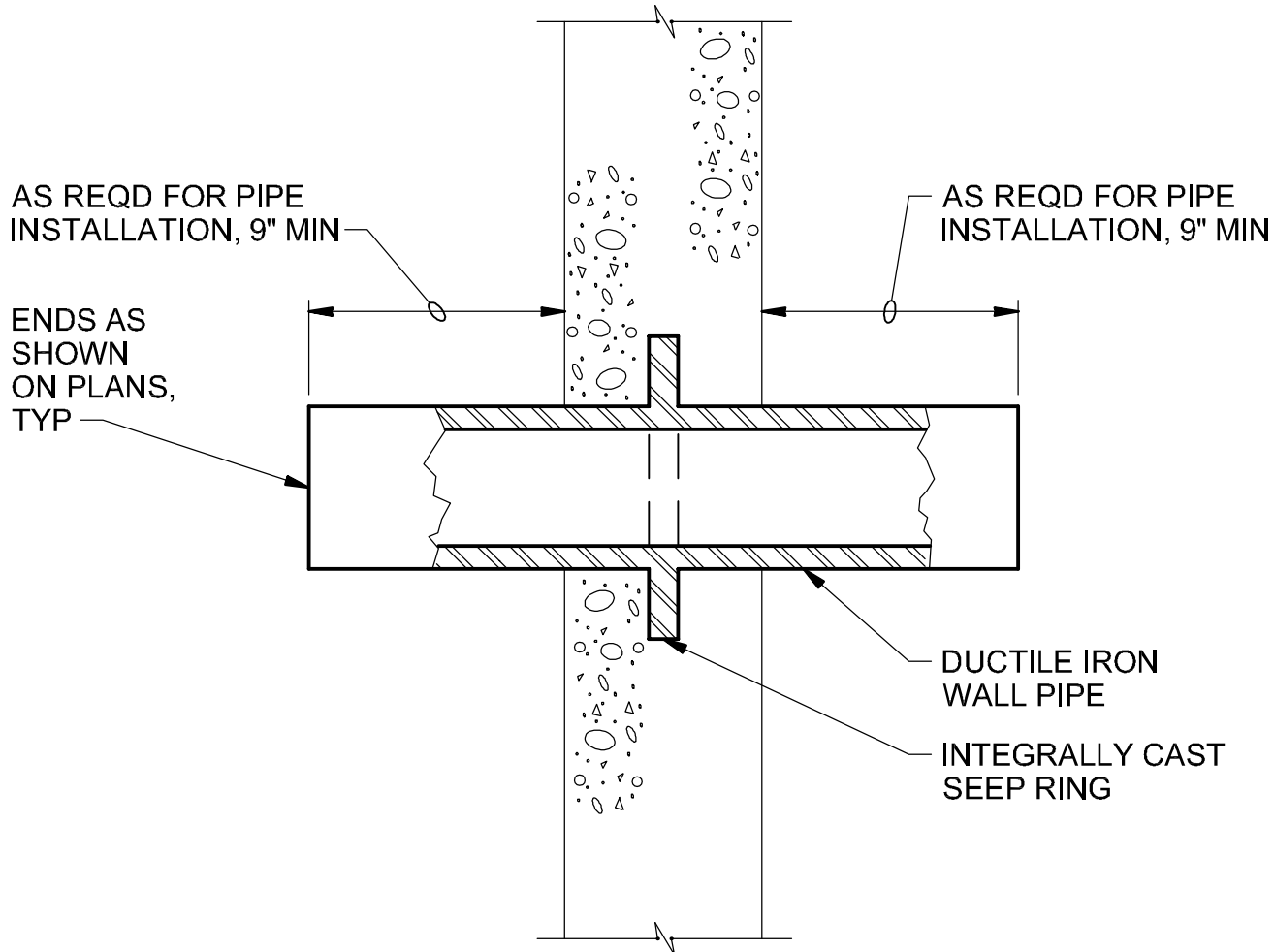
## PIPE HIGH POINT VENT

NTS

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

4027-205

**CH2MHILL**



NOTES:

1. COAT WALL PIPE WITH SPECIFIED PAINT SYSTEM PRIOR TO CONCRETE PLACEMENT.

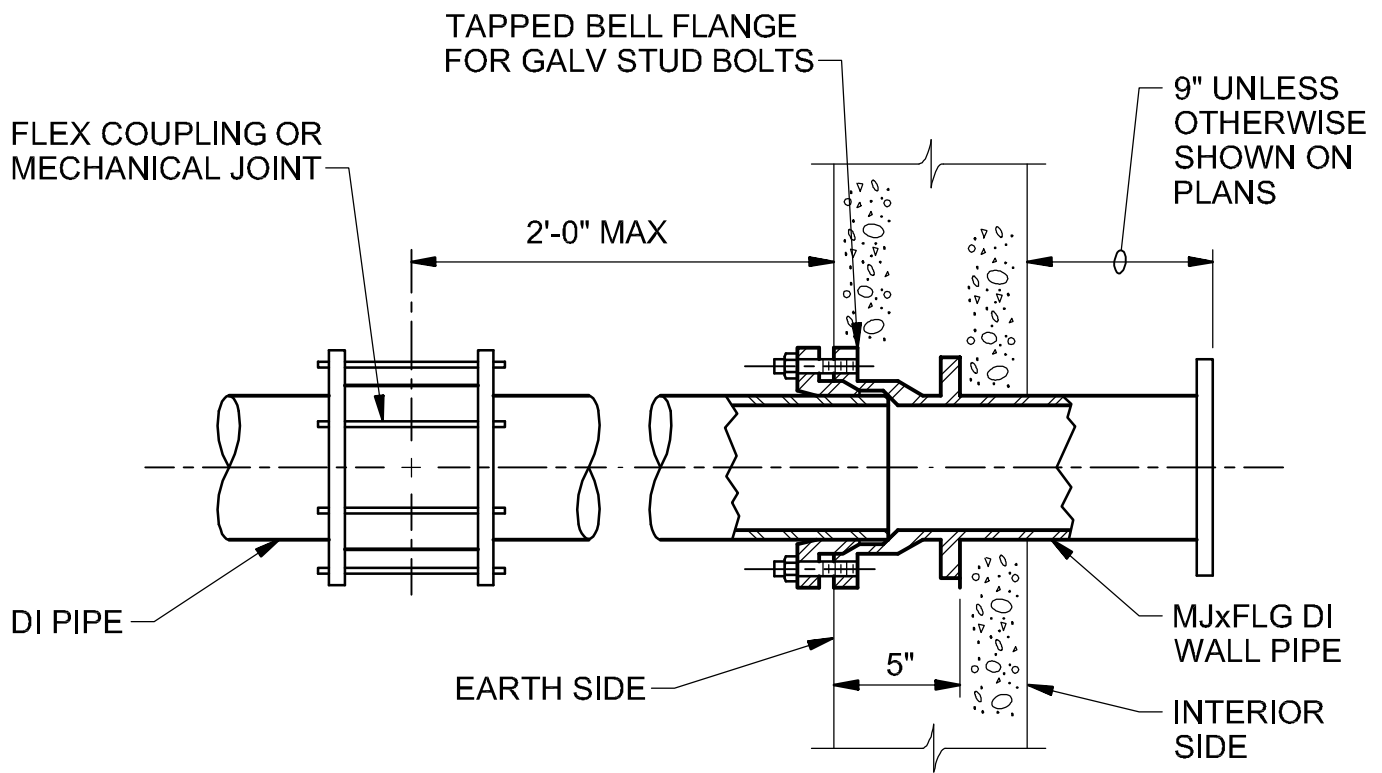
DUCTILE IRON WALL PIPE

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

4027-600





**NOTES:**

1. COAT WALL PIPE WITH SPECIFIED PAINT SYSTEM PRIOR TO CONCRETE PLACEMENT.

**MECHANICAL JOINT WALL PIPE**

NTS

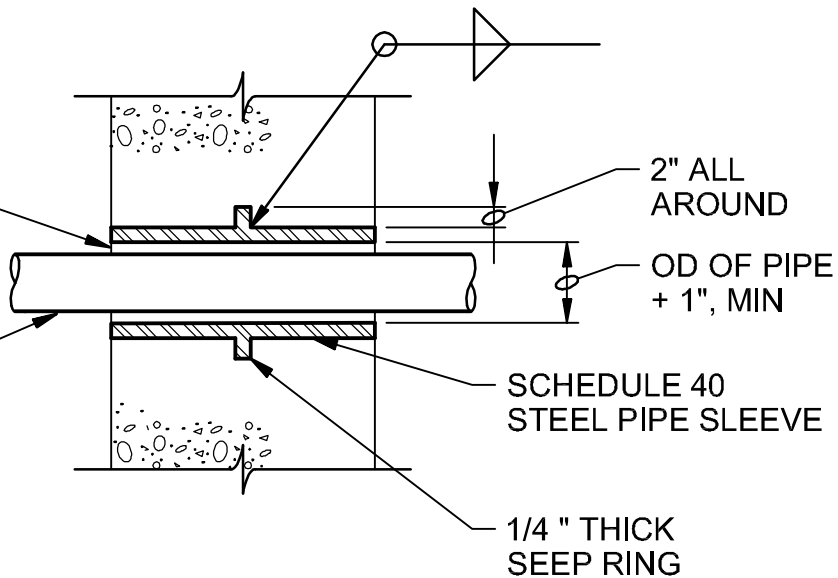
ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

4027-601

**CH2MHILL**

FILL ANNULAR SPACE  
WITH WATERPROOF  
DOW CORNING 732 RTV  
SILICONE SEALANT,  
JOINT SHALL BE  
WATERTIGHT

PASSING PIPE



NOTES:

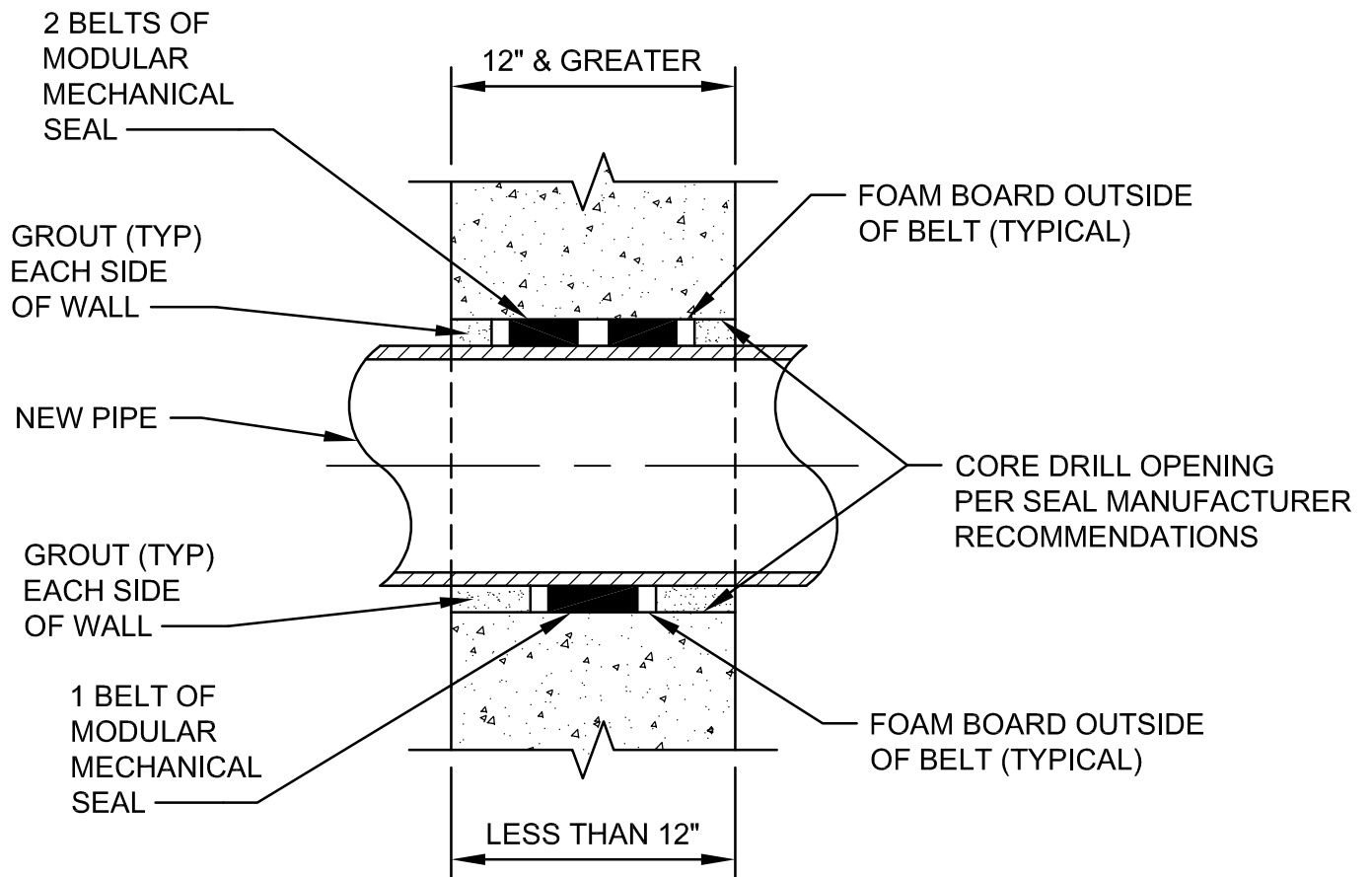
1. DO NOT USE WHERE SUBJECT TO HYDROSTATIC PRESSURE. PAINT ENTIRE SLEEVE AND SEEP RING AS SPECIFIED.

TYPE B PIPE SLEEVE

NTS

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

4027-604

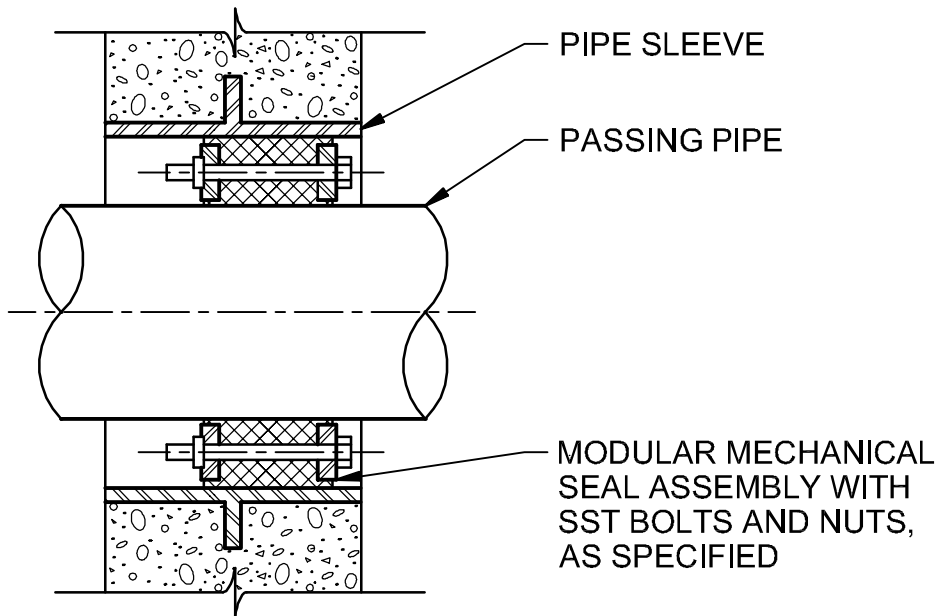


## EXISTING WALL PIPE SLEEVE

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

4027-605

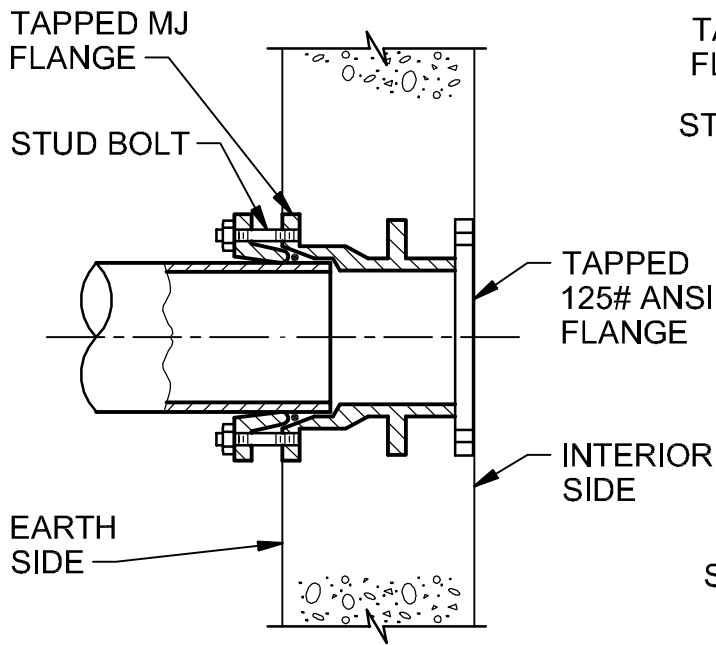


## WALL PIPE PENETRATION SEAL

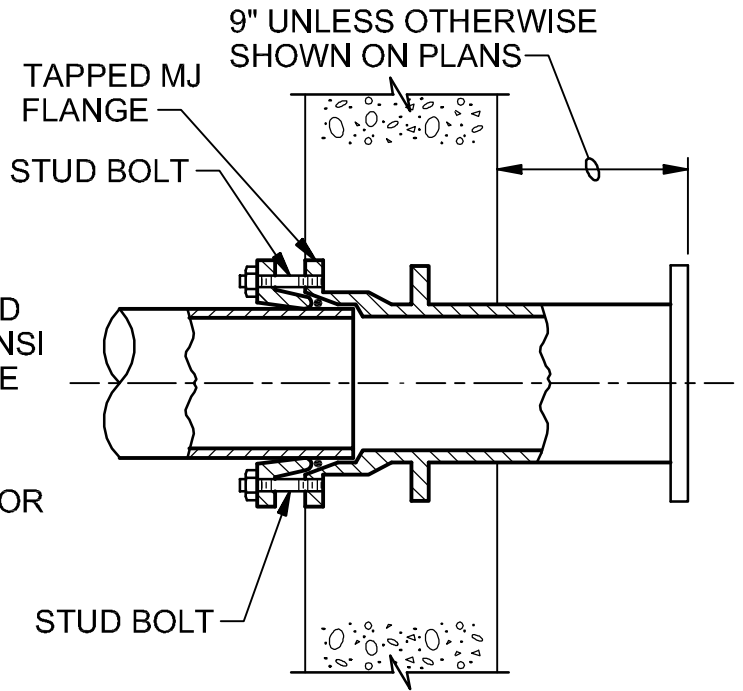
NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

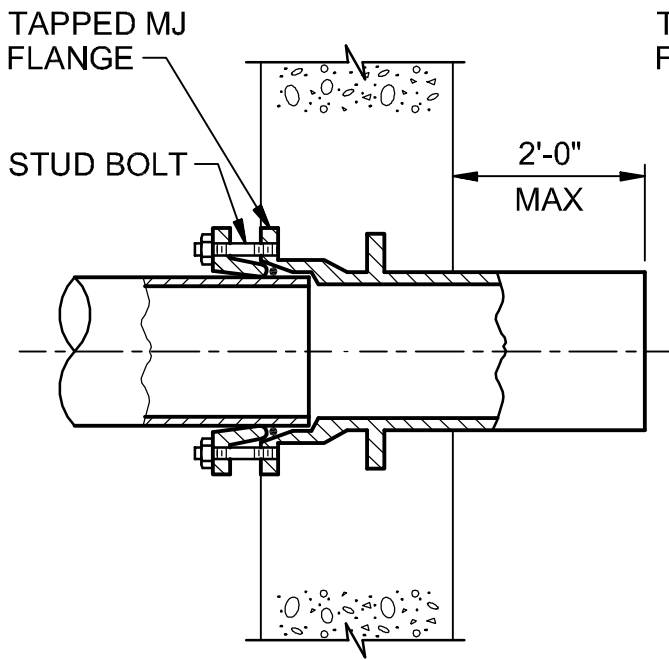
4027-607



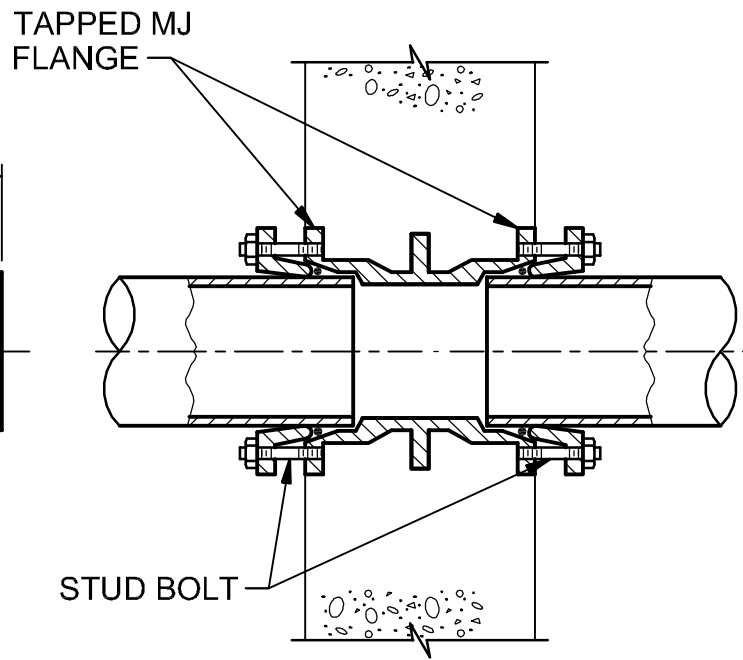
MECHANICAL JOINT X FLUSH FLANGE



MECHANICAL JOINT X FLANGE



MECHANICAL JOINT X PLAIN END



MECHANICAL JOINT X MECHANICAL JOINT

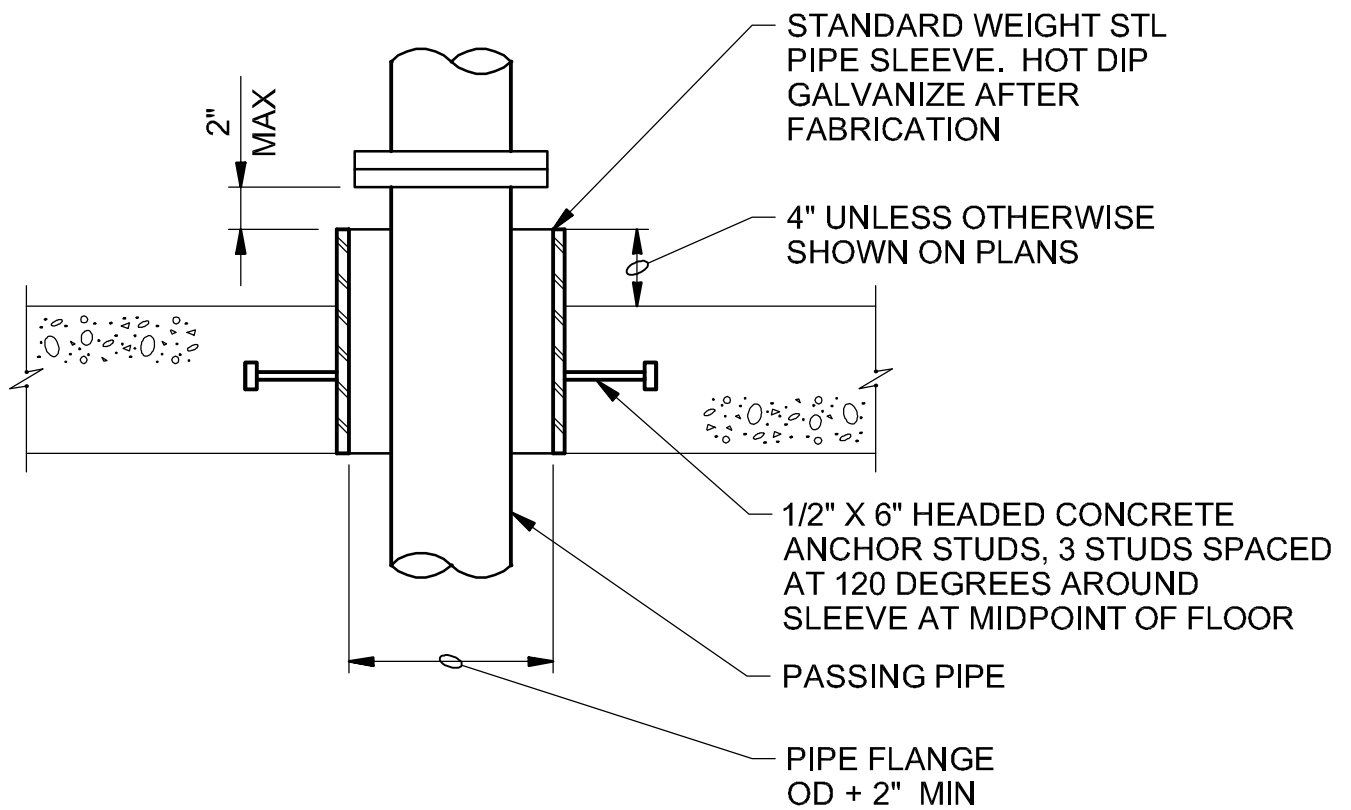
## DUCTILE IRON WALL PIPES

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

4027-609

**CH2MHILL**



## FLOOR SLEEVE

NTS

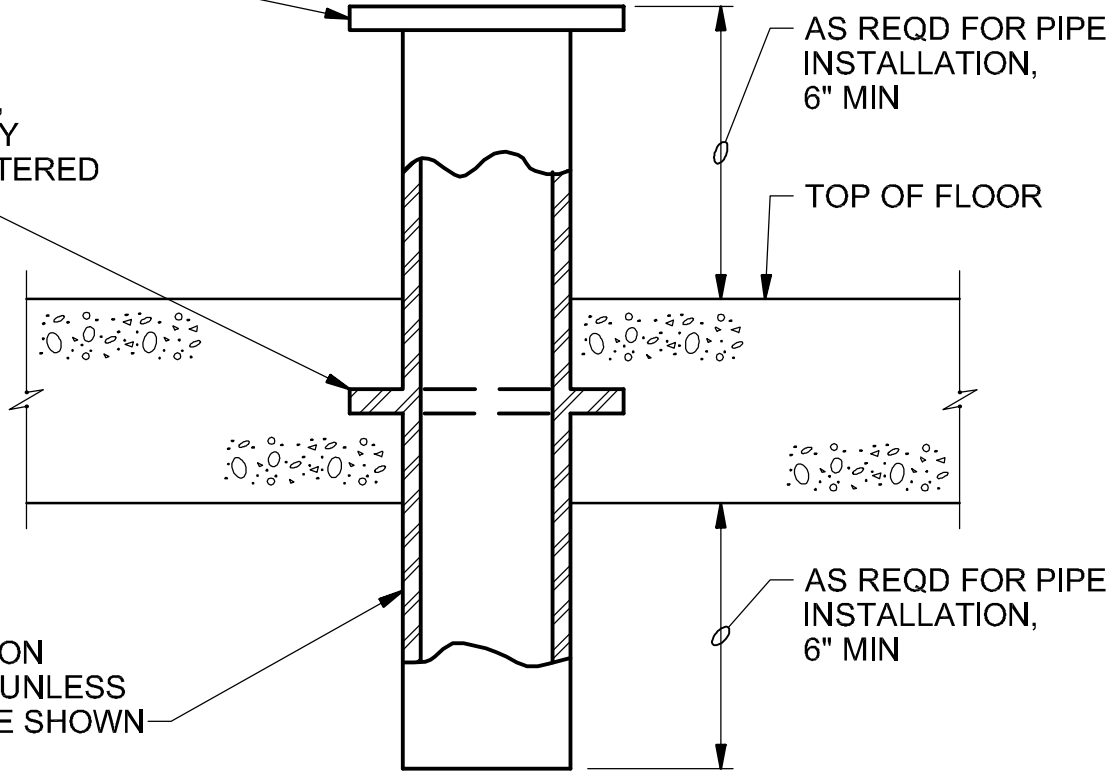
ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

4027-621

FLGxPE PIPE

SEEP RING,  
INTEGRALLY  
CAST, CENTERED  
IN SLAB

DUCTILE IRON  
WALL PIPE UNLESS  
OTHERWISE SHOWN



NOTES:

1. COAT FLOOR PIPE WITH SPECIFIED PAINT SYSTEM PRIOR TO CONCRETE PLACEMENT.

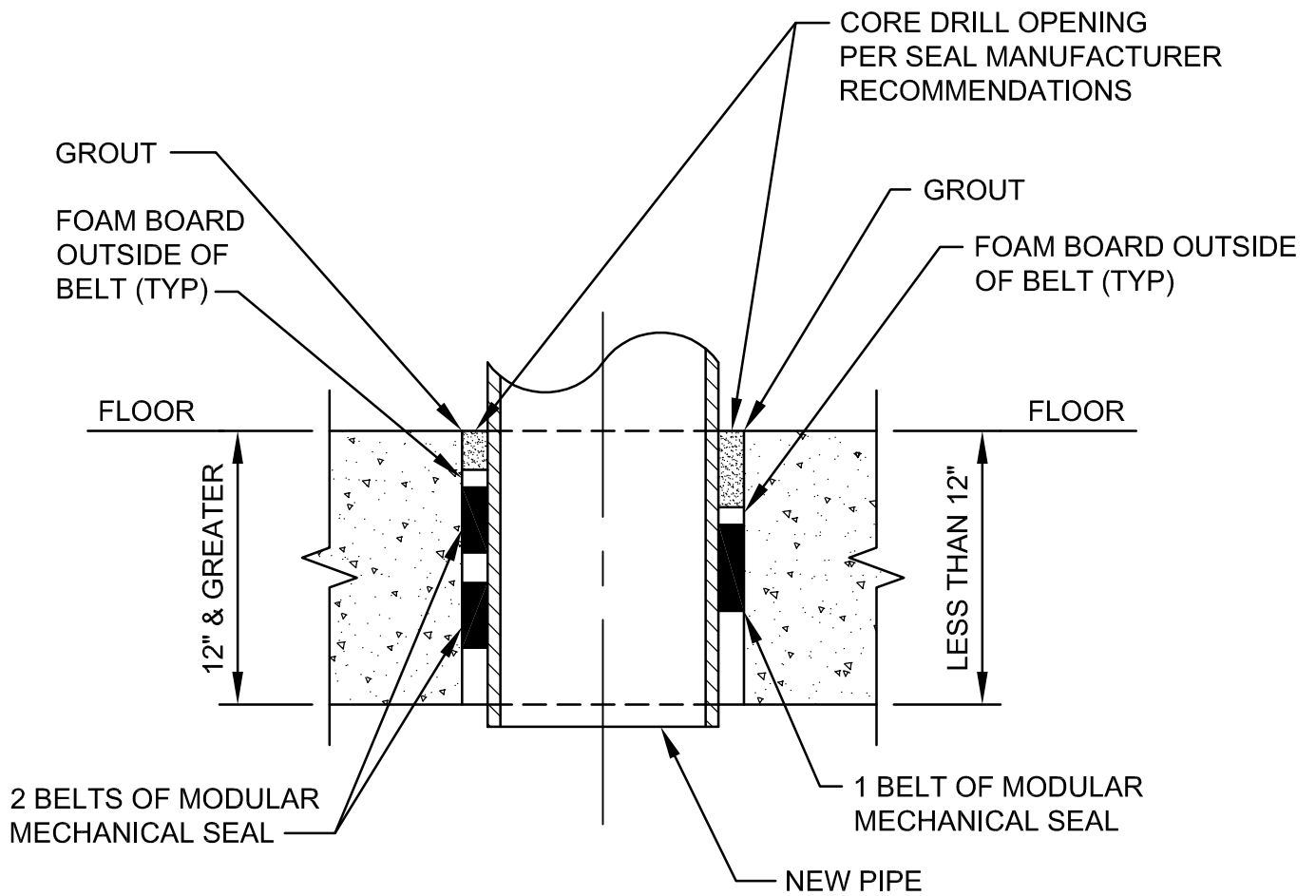
FLOOR PIPE

NTS

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

4027-622

**CH2MHILL**



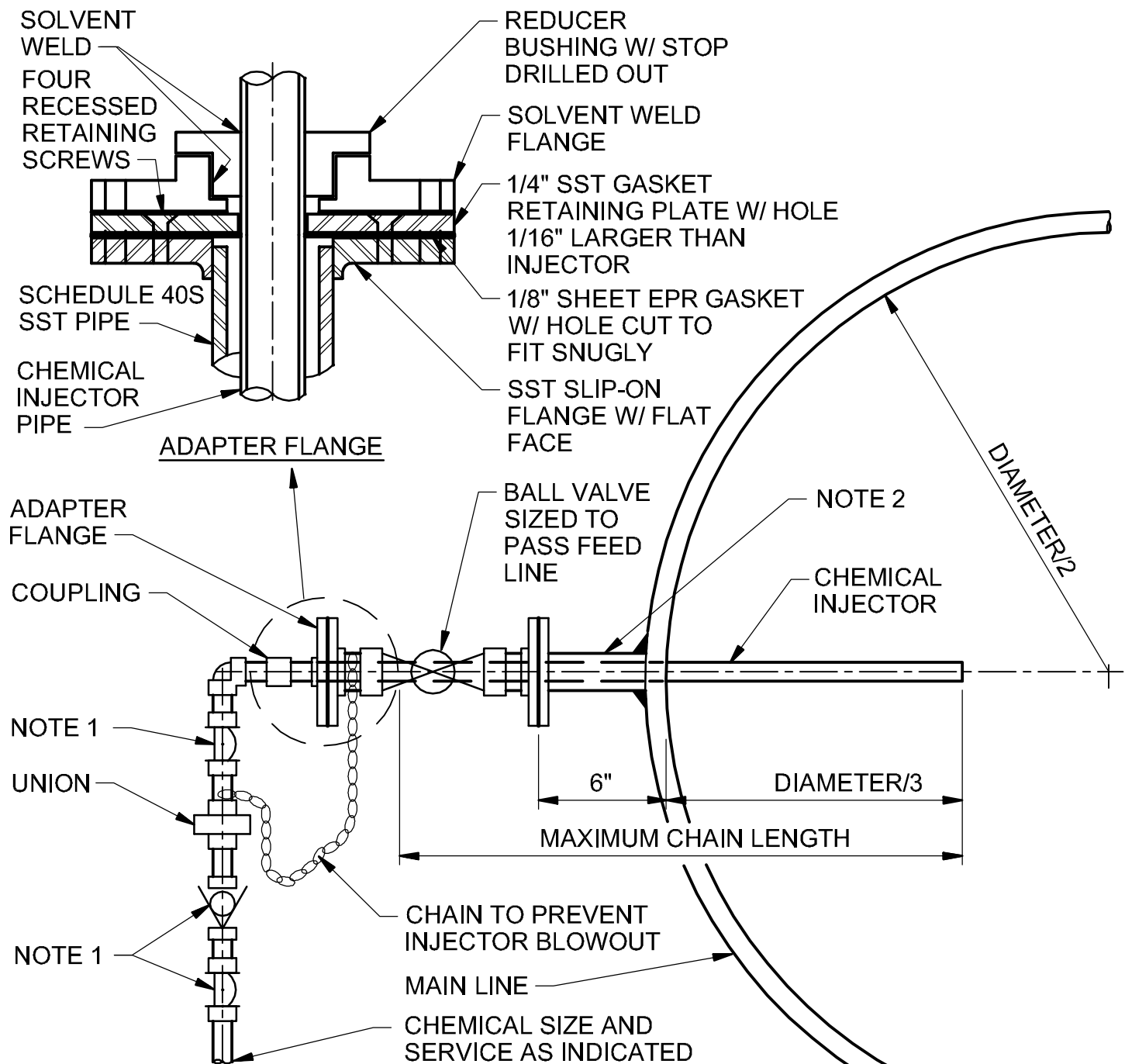
**EXISTING FLOOR PIPE SLEEVE**

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

4027-623





**NOTES:**

1. VALVE SIZE, TYPE, AND MATERIAL TO MATCH FEED LINE SIZE AND TYPE AS SPECIFIED FOR SERVICE. GAS SERVICE CHECK VALVES SHALL BE INSTALLED FOR VERTICAL UPFLOW ONLY.
2. BRANCH NOZZLE 1 1/2" AND SMALLER MAY BE CONNECTED TO DUCTILE IRON PIPE WITH A SERVICE SADDLE.

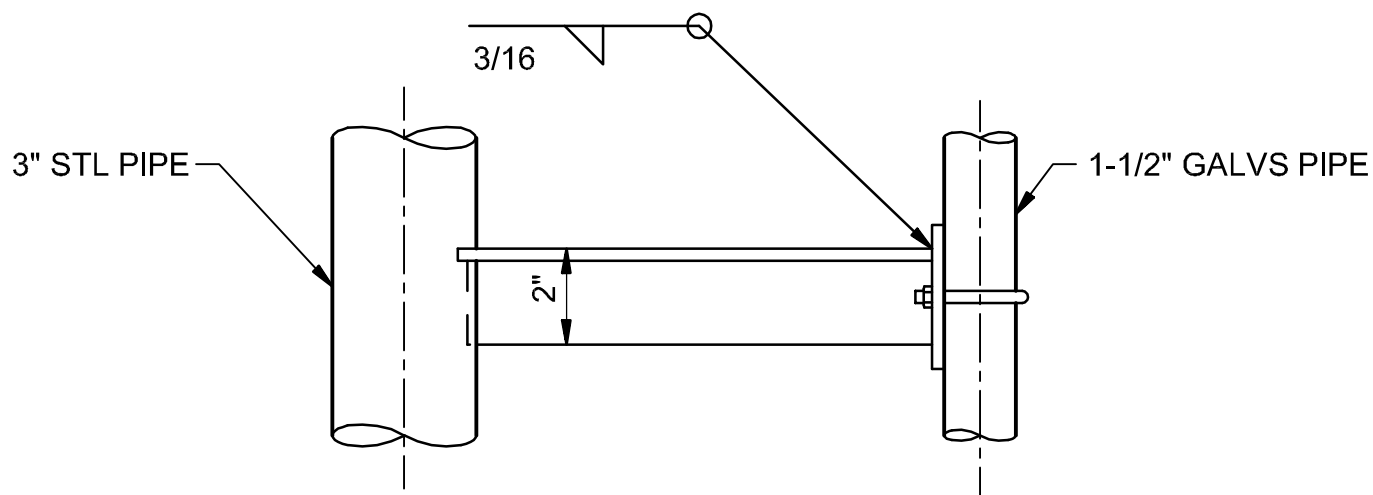
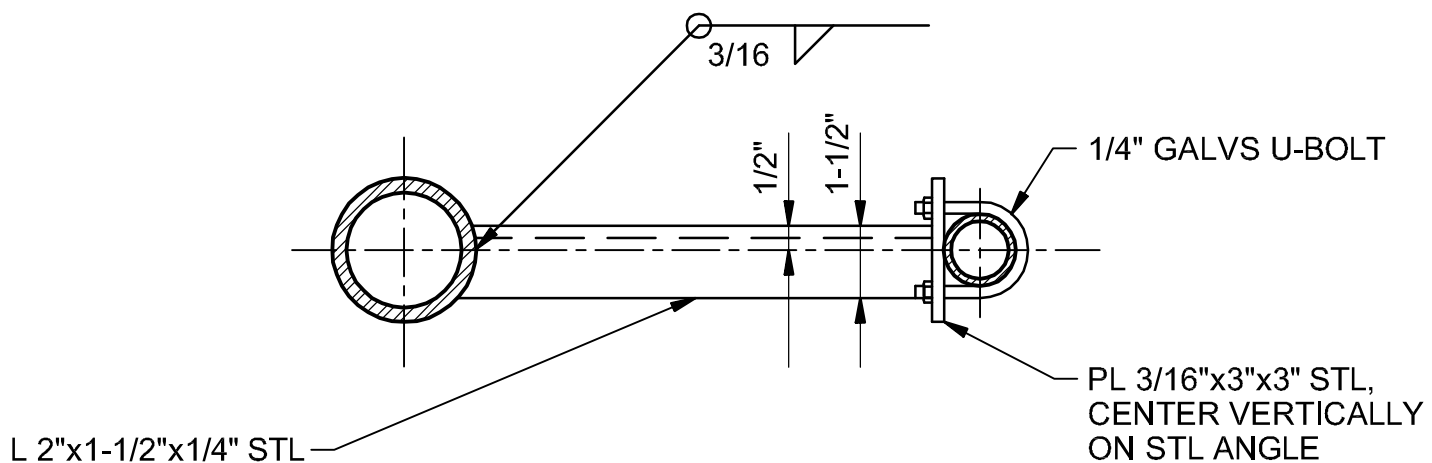
**CHEMICAL INJECTOR**

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

4027-957

**CH2MHILL**

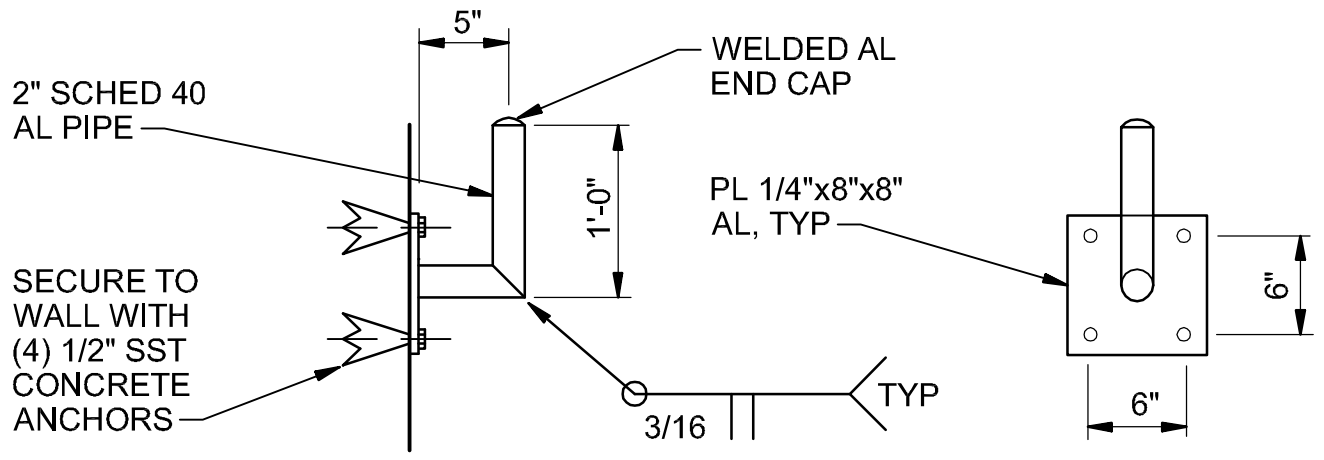


## SUPPORT BRACKET

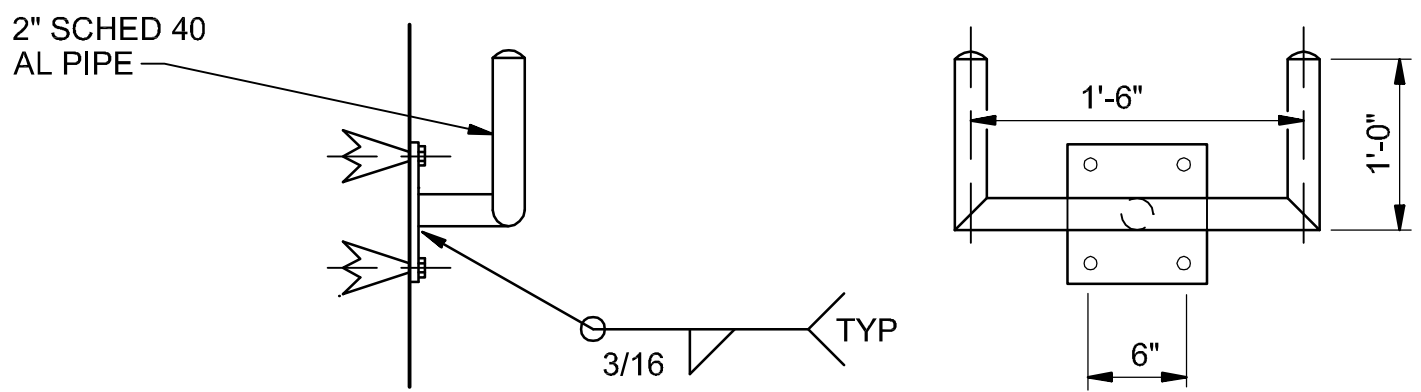
NTS

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

4090-391B



SINGLE PIPE MOUNT



DUAL PIPE MOUNT

NOTES:

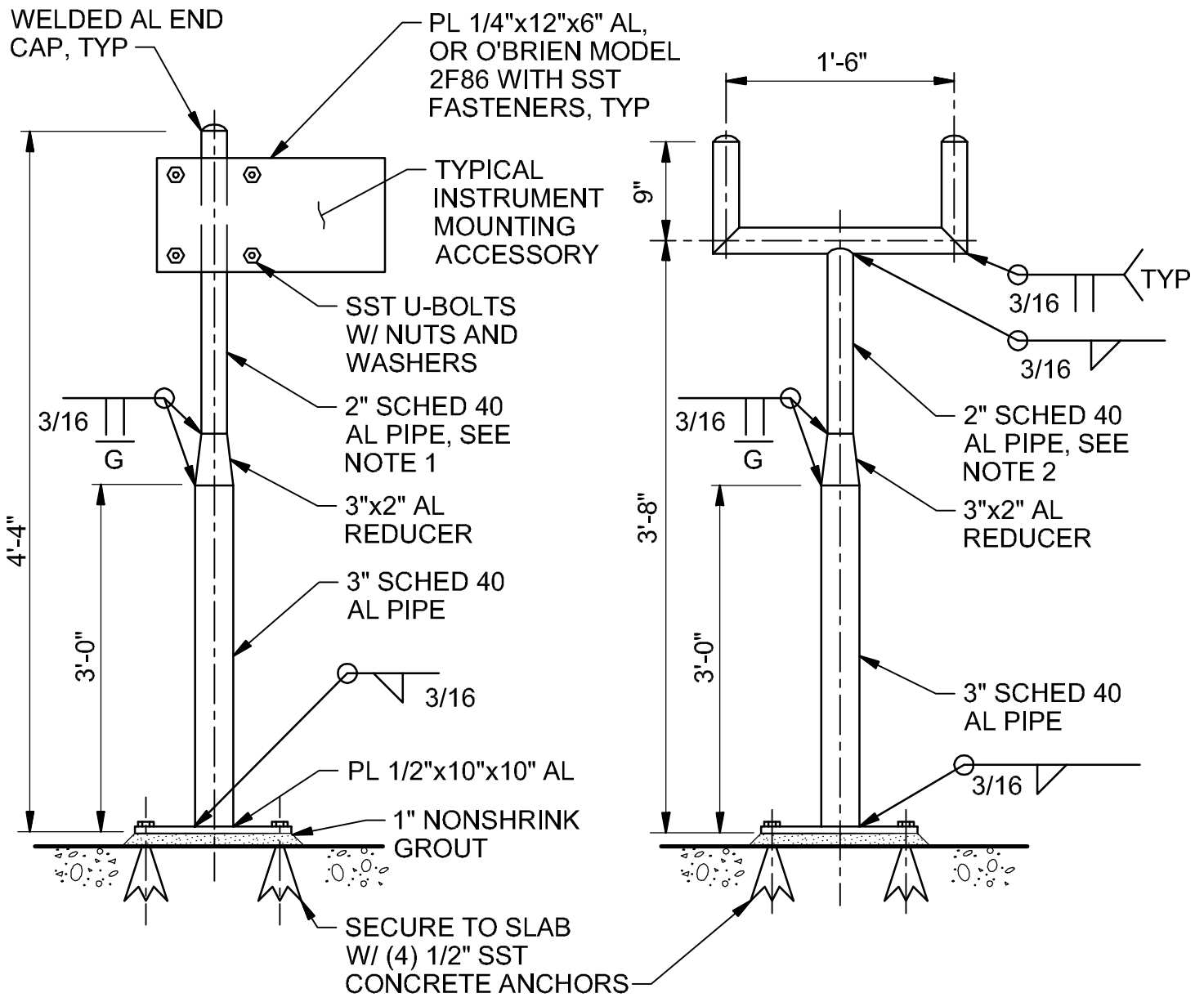
1. ALTERNATIVELY, SINGLE PIPE WALL MOUNT BRACKET SHALL BE O'BRIEN MODEL WE16M WITH 9 MIL ARC SPRAY ZINC METALLIZED COATING; OR EQUAL.
2. ALTERNATIVELY, DUAL PIPE WALL BRACKET SHALL BE O'BRIEN MODEL WTM-AT3M WALL BRACKET WITH MODEL S24M & A8M(2) ACCESSORIES, ALL WITH 9 MIL ARC SPRAY ZINC METALLIZED COATING, OR EQUAL.
3. INSTALL MOUNTING BRACKET SUCH THAT CENTERLINE OF INSTRUMENT OR DEVICE SUPPORTED IS APPROXIMATELY 4'-6" ABOVE FLOOR.
4. PAINT ALUMINUM IN CONTACT WITH CONCRETE ACCORDING TO SPECIFICATIONS FOR PAINTING.

WALL MOUNTED INSTRUMENT PIPE STANDS

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

4090-400



SINGLE PIPE MOUNT

DUAL PIPE MOUNT

NOTES:

1. ALTERNATIVELY, STANCHION SUPPORT SHALL BE O'BRIEN MODEL FP52 WITH 9 MIL ARC SPRAY ZINC METALLIZED COATING; OR EQUAL.
2. ALTERNATIVELY, DUAL SUPPORT SHALL BE O'BRIEN MODEL FP40 STANCHION WITH MODEL AFM, S24M & A8M(2) ACCESSORIES, ALL WITH 9 MIL ARC SPRAY ZINC METALLIZED COATING; OR EQUAL.
3. PAINT ALUMINUM IN CONTACT WITH CONCRETE ACCORDING TO SPECIFICATIONS FOR PAINTING.

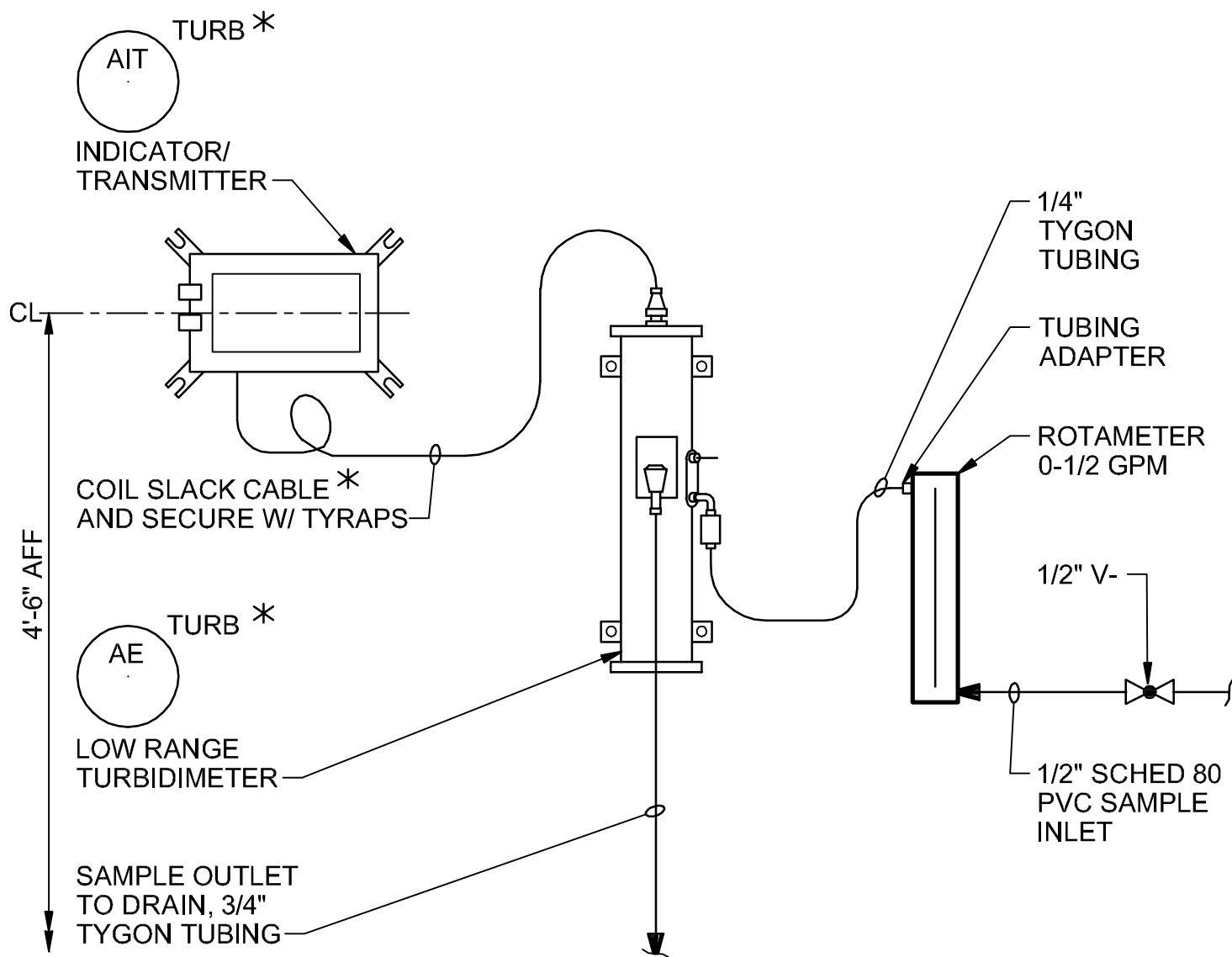
FLOOR MOUNTED INSTRUMENT PIPE STANDS

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

4090-401

**CH2MHILL**



**NOTES:**

1. LOCATE INSTRUMENTS AS SHOWN ON PLANS.
2. SECURE INSTRUMENTS TO WALL WITH (4) 1/2" SST CONCRETE ANCHORS.
3. COMPONENTS DESIGNATED BY \* ARE SUPPLIED BY INSTRUMENT MANUFACTURER.

**LOW RANGE TURBIDIMETER INSTALLATION**

NTS

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

4091-144

**CH2MHILL**

BY MECHANICAL CONTRACTOR

PROCESS CONNECTION

BY I & C CONTRACTOR

MOUNT TRANSMITTER/INDICATOR BELOW ELEMENT CONNECTION

3-VALVE EQUALIZATION MANIFOLD

TO PURGE STATION WHERE REQUIRED

3/8" SST TUBING, TYP

3/8" SST DRAIN VALVE & TEST TAP AT LOW POINT

NOTES:

1. ALL LINES SHALL HAVE A CONTINUOUS SLOPE OF 1/4" PER FOOT MIN (1" PER FOOT PREFERRED).

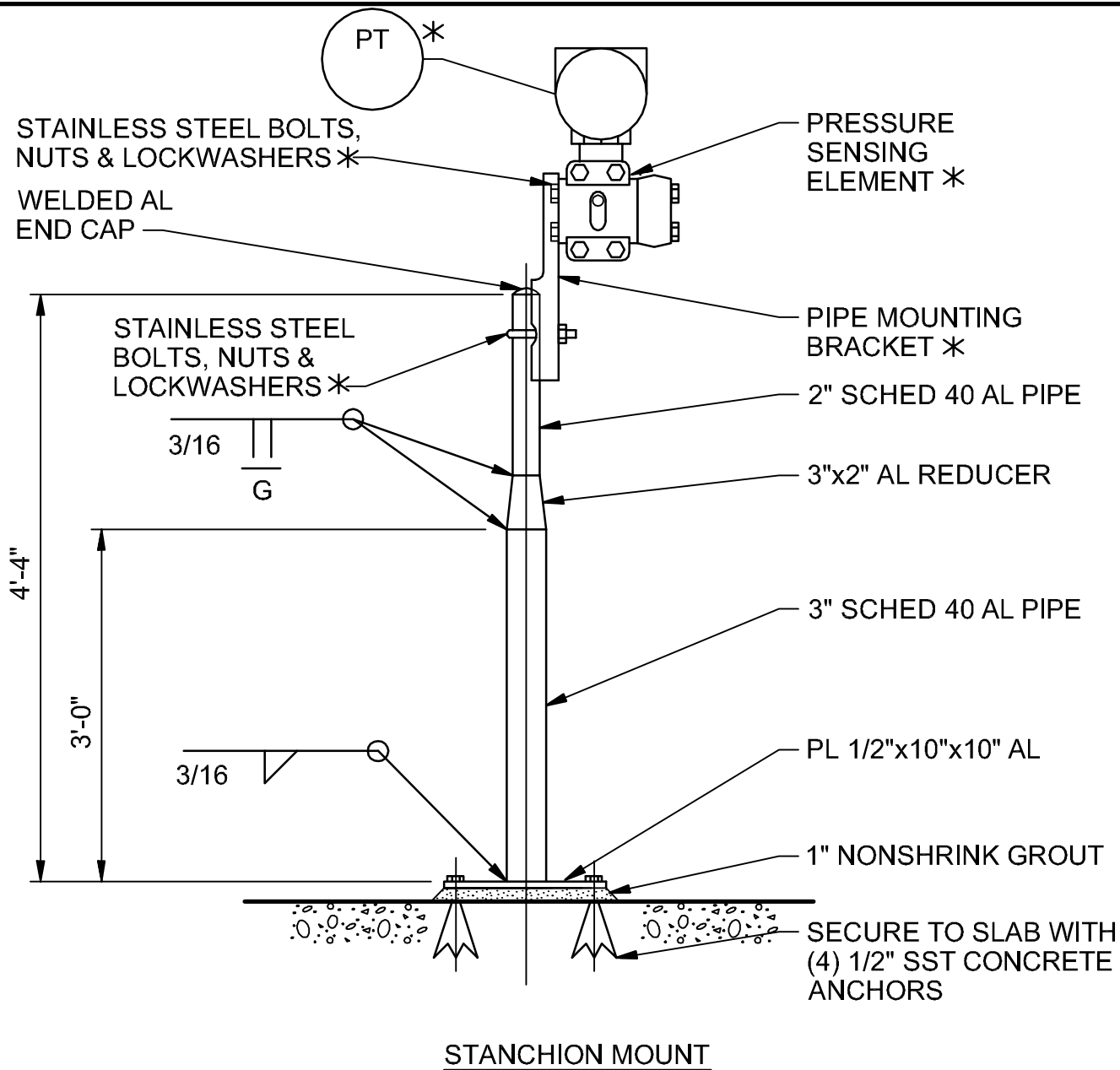
PRESSURE DIFFERENTIAL

TRANSMITTER/INDICATOR FOR LEVEL SERVICE

NTS

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

4091-249



NOTES:

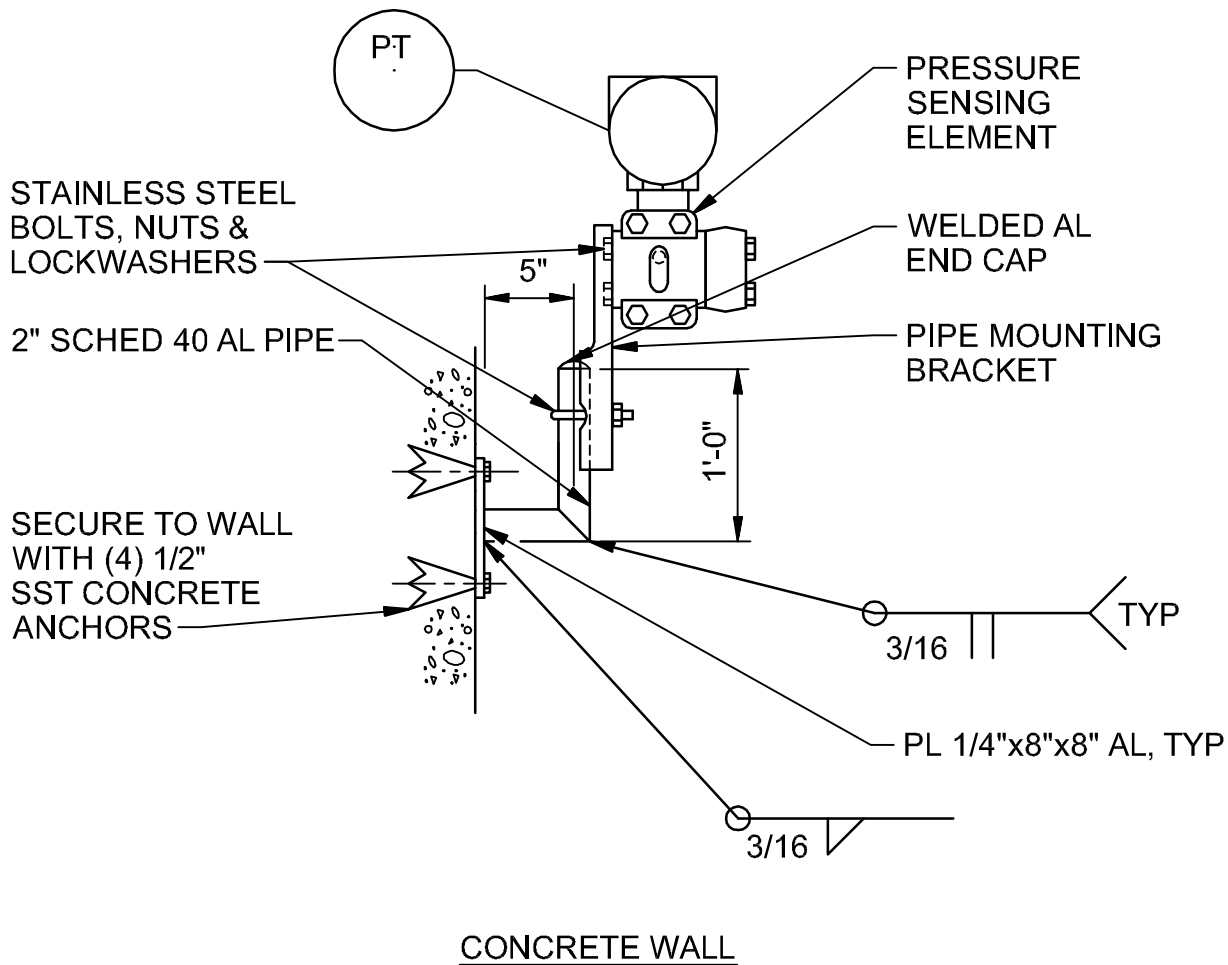
1. PAINT ALUMINUM IN CONTACT WITH CONCRETE ACCORDING TO SPECIFICATIONS FOR PAINTING.
2. ALTERNATIVELY, STANCHION SUPPORT SHALL BE O'BRIEN CORP. MODEL 32FP52 WITH 9 MIL ARC SPRAY ZINC METALLIZED COATING; OR EQUAL.
3. COMPONENTS DESIGNATED BY \* ARE SUPPLIED BY INSTRUMENT MANUFACTURER.

PRESSURE AND PRESSURE  
DIFFERENTIAL TRANSMITTER INSTALLATION

NTS

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

4091-302



CONCRETE WALL

NOTES:

1. ALTERNATIVELY, WALL MOUNT BRACKET SHALL BE O'BRIEN CORP. MODEL WE16M WITH 9 MIL ARC SPRAY ZINC METALLIZED COATING, OR EQUAL.
2. PAINT ALUMINUM IN CONTACT WITH CONCRETE ACCORDING TO SPECIFICATIONS FOR PAINTING.
3. ALL MOUNTING BRACKETS ARE TO BE INSTALLED APPROXIMATELY 4'-0" ABOVE FLOOR OR AS REQUIRED BY PROCESS CONNECTION, SEE (X).

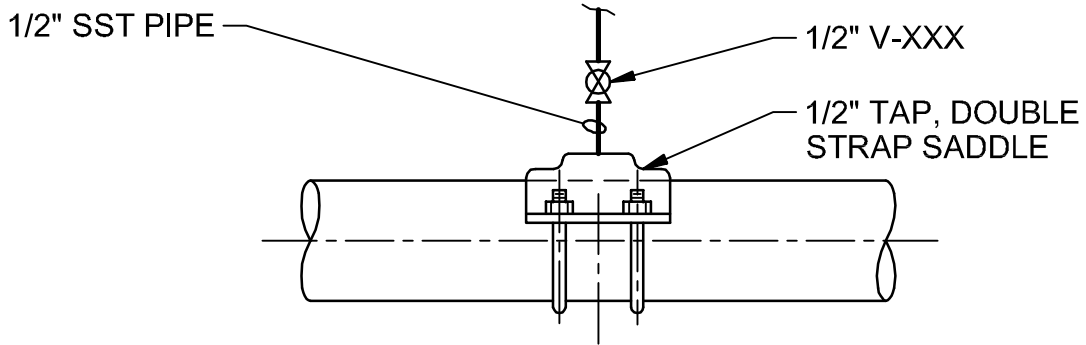
PRESSURE AND PRESSURE  
DIFFERENTIAL TRANSMITTER INSTALLATION

NTS

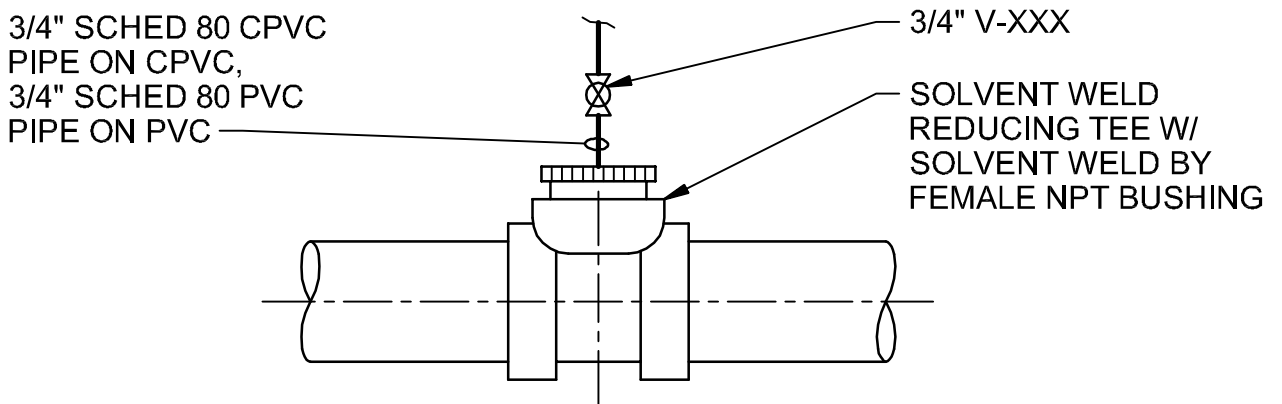
ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

4091-303





CEMENT LINE STEEL PIPE, CAST IRON PIPE AND DUCTILE IRON PIPE



PVC AND CPVC PIPE

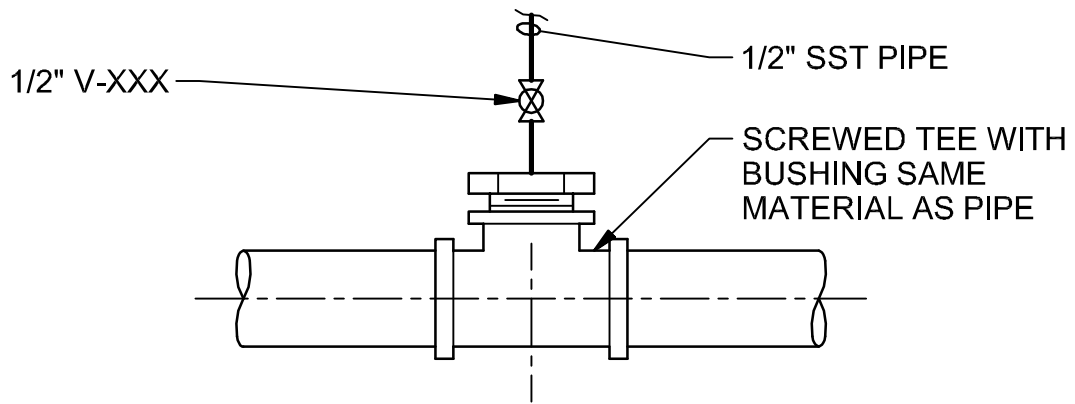
PRESSURE CONNECTION INSTALLATION

NTS

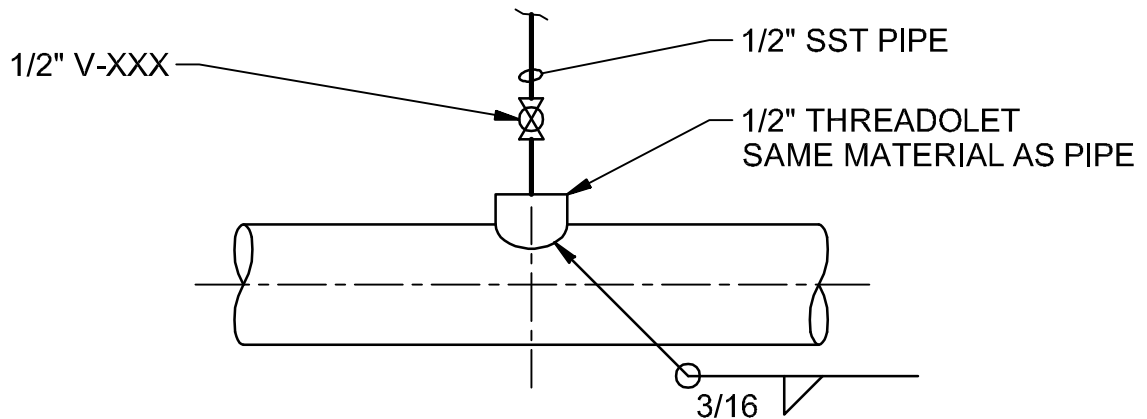
DETAIL 1 OF 2

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

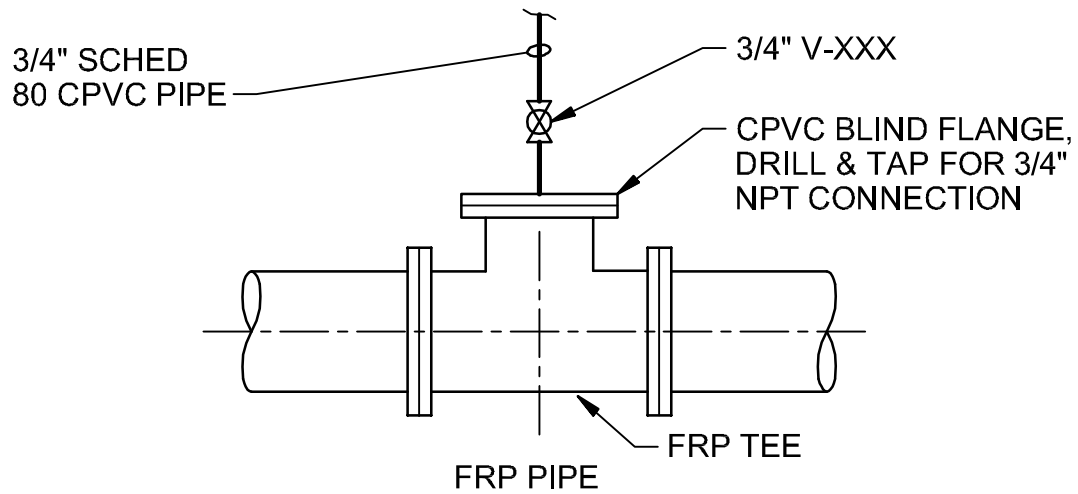
4091-305



STEEL & SST PIPE 3 1/2" & SMALLER



STEEL & SST PIPE 4" & LARGER



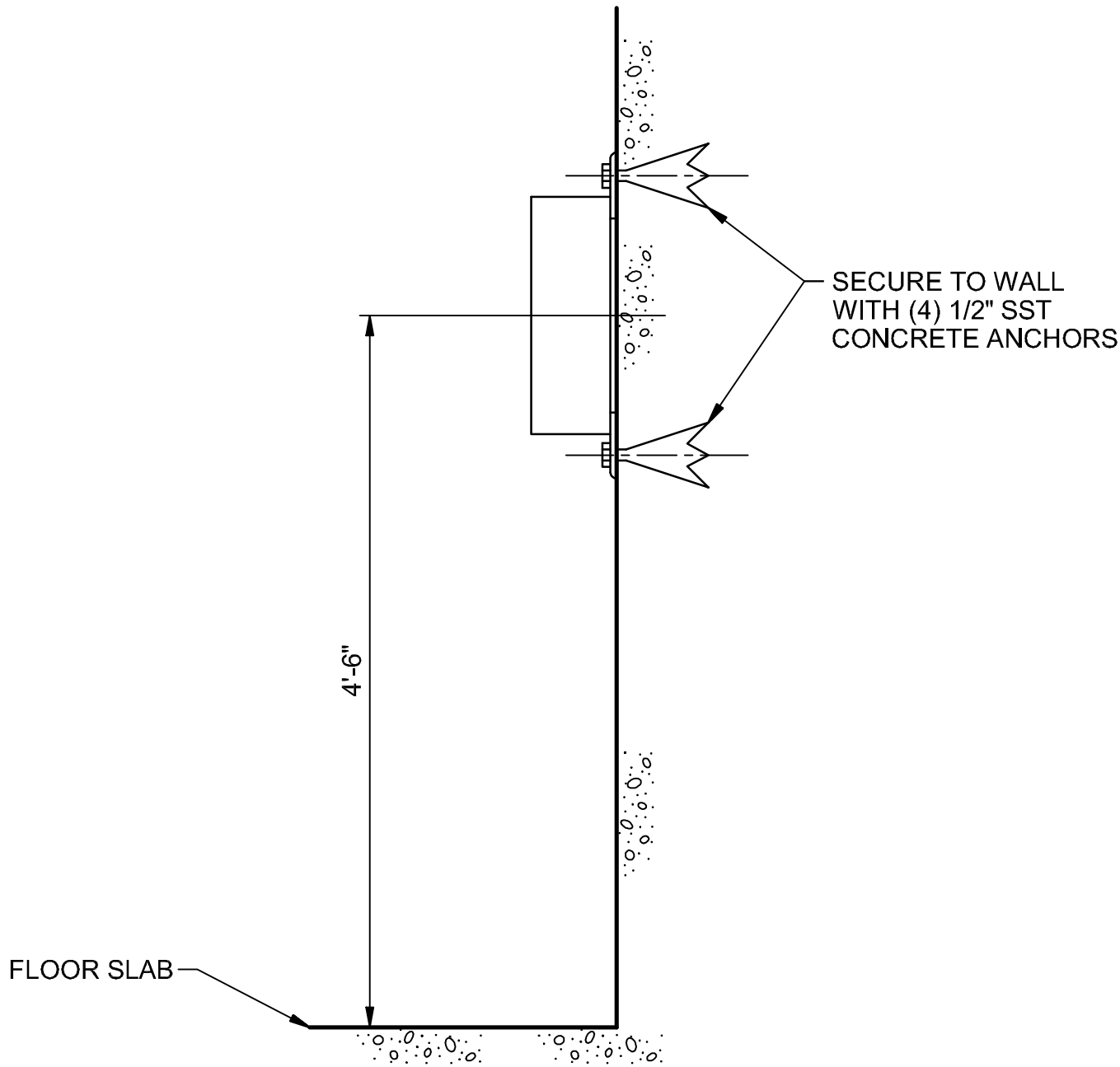
PRESSURE CONNECTION INSTALLATION

NTS

DETAIL 2 OF 2

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

4091-305

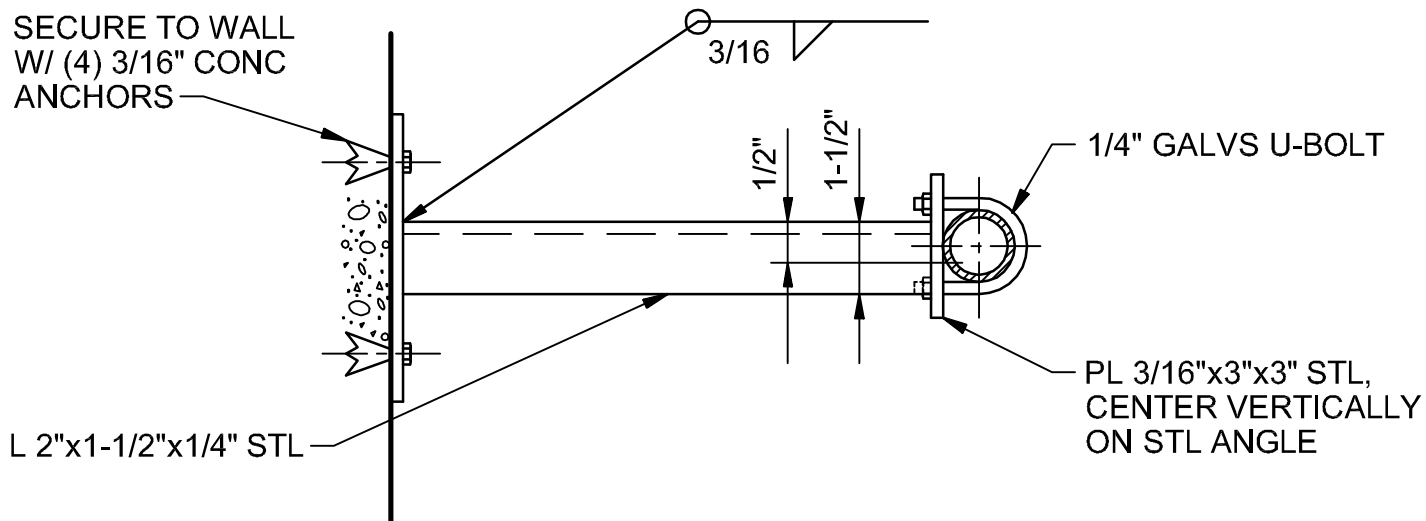


WALL MOUNTED PANEL OR INSTRUMENT INSTALLATION

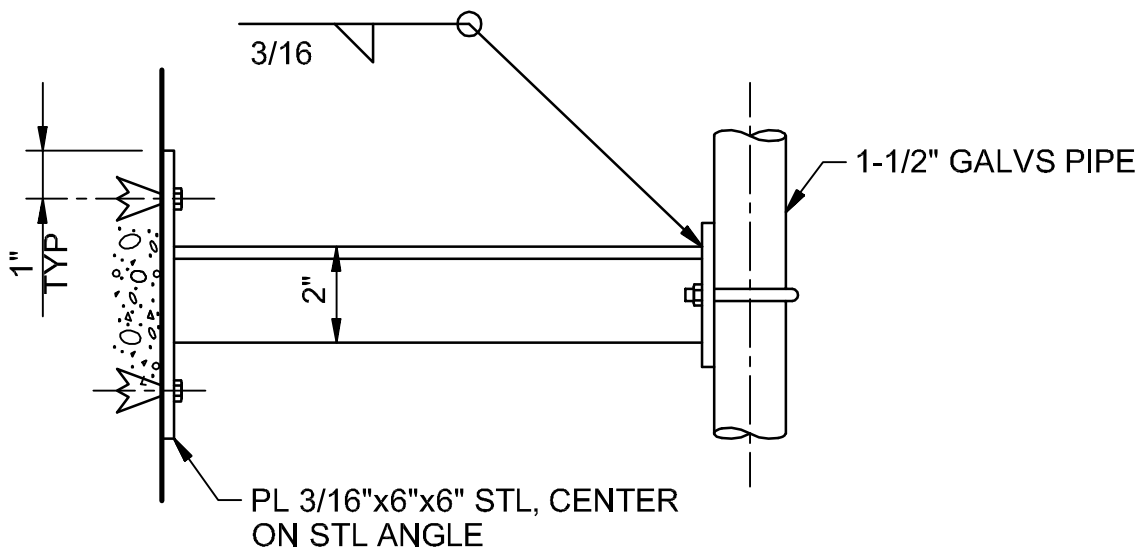
NTS

ADVANCED TREATMENT  
FORT THOMAS TREATMENT PLANT  
NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

4091-388



PLAN



ELEVATION

SUPPORT BRACKET

NTS

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NORTHERN KENTUCKY WATER DISTRICT  
FORT THOMAS, KENTUCKY

4091-391

**CH2MHILL**

SET REGULATOR  
OUTLET PRESSURE  
AS RECOMMENDED  
BY PUMP MFR

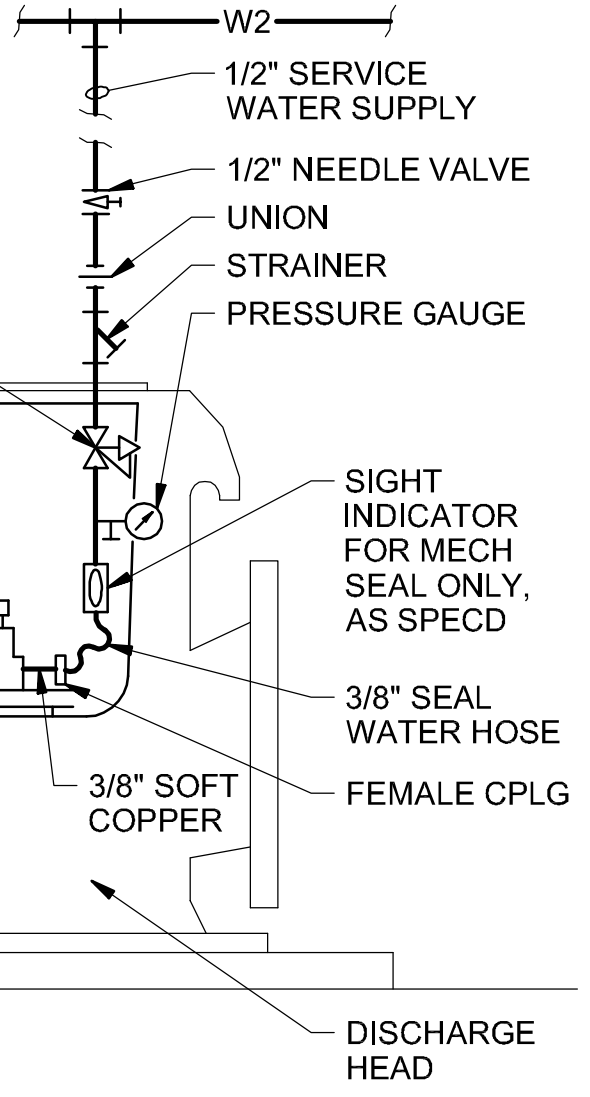
STUFFING BOX W/  
SINGLE MECH  
SEAL OR PACKING  
AS SPECIFIED

3/8" FEMALE CPLG

3/8" SOFT COPPER  
THROTTLE BUSHING.  
BLEED-OFF TO  
SUMP IF REQD

3/4" COPPER PIPE PUMP  
FRAME DRAIN

HUB DRAIN  
OR SCUPPER



**NOTES:**

- 1. USE COPPER TUBE ADAPTERS AND BUSHINGS AS REQUIRED FOR ALL CONNECTIONS TO PUMP.

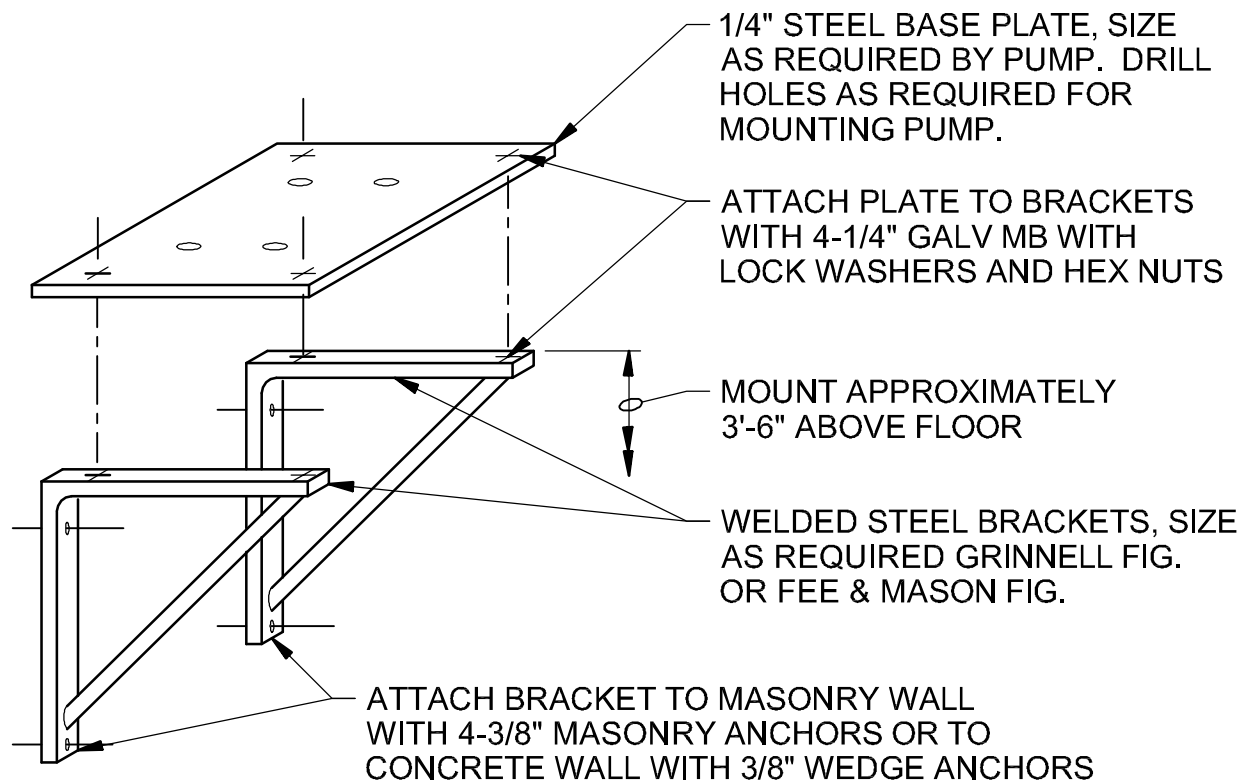
**VERTICAL TURBINE PUMP SEAL WATER PIPING**

NTS

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FORT THOMAS, KENTUCKY

4442-660

**CH2MHILL**



NOTES:

1. HOT DIP GALVANIZE ENTIRE ASSEMBLY AFTER FABRICATION.

SMALL PUMP SUPPORT

NTS

ADVANCED TREATMENT  
 FORT THOMAS TREATMENT PLANT  
 NORTHERN KENTUCKY WATER DISTRICT  
 FORT THOMAS, KENTUCKY

4442-715

**CH2MHILL**