

GENERAL NOTES

- ALL SIGN PANELS USED ON FLASHING BEACONS ARE CLASS II AND SHALL BE FABRICATED IN ACCORDANCE WITH:
 - PANELS SHALL BE SINGLE SHEET ALUMINUM 0.100 MINIMUM THICKNESS.
 - BACKING ZEES ARE 3 IN. X 2 1/16 IN. 2.33 LBS. PER FT. ALUMINUM.
 - ALL SIGNS SHALL BE FABRICATED USING RETROREFLECTIVE SHEETING CONFORMING TO ASTM D4956. THE TYPE SHALL BE DESCRIBED IN THE STANDARD SPECIFICATIONS AND/OR AS SHOWN ON THE PLANS.
 - BOLTS, U-CLAMPS, NUTS AND METAL WASHERS SHALL BE GALVANIZED OR CADMIUM PLATED.
- INSTALLATION DESIGN CONFORMS WITH AASHTO "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS" AND SHALL BE FABRICATED IN ACCORDANCE WITH:
 - STEEL PIPE, POST ANCHOR PLATES AND BREAK-AWAY PLATES SHALL CONFORM TO AASHTO M270 (ASTM A709) GRADE 36.
 - HIGH STRENGTH BOLTS, NUTS AND WASHERS SHALL CONFORM TO ASTM-A325 AND SHALL BE GALVANIZED OR CADMIUM PLATED.
 - HOLES SHALL BE DRILLED AND CUTS SHALL PREFERABLY BE SAW CUTS; HOWEVER, FLAME CUTTING WILL BE PERMITTED PROVIDED ALL EDGES ARE GROUND. METAL SHALL NOT PROJECT BEYOND THE PLANE OF THE PLATE FACE ON BREAK-AWAY PLATES.
 - ALL WELDING IS TO BE CONTINUOUS AND IN ACCORDANCE WITH CURRENT AWS SPECIFICATIONS.
 - A "KEEPER PLATE" OF THIN (28 GAGE) GALVANIZED SHEET METAL, FABRICATED TO MATCH BREAK-AWAY PLATE DIMENSIONS BUT WITH HOLES RATHER THAN SLOTS, SHALL BE USED TO RESTRAIN BOLT LOOSENING DUE TO WIND VIBRATION.
 - PIPE LENGTH VARIES WITH VERTICAL PLACEMENT, MINIMUM GROUND CLEARANCE (7 FT.+) AND THE SIGN PANEL REQUIRED. IT WILL BE AS SHOWN ON THE PLANS, OR AS DETERMINED BY CROSS-SECTION, OR AS DIRECTED BY THE ENGINEER FOR EACH LOCATION (MAXIMUM LENGTH IS APPROXIMATELY 20 FT.-10 IN. AND MINIMUM LENGTH IS APPROXIMATELY 15 FT.-4 IN. IF LENGTH IS NOT SPECIFIED SUPPLY MAXIMUM - MAY REQUIRE FIELD CUT TO CONFORM TO TYPICAL SIGN PLACEMENT DETAILS).
- CONCRETE FOOTINGS FOR FLASHING BEACON INSTALLATIONS SHALL CONFORM TO "DRILLED CAISSONS" AND "STRUCTURAL CONCRETE" (CLASS "BZ").

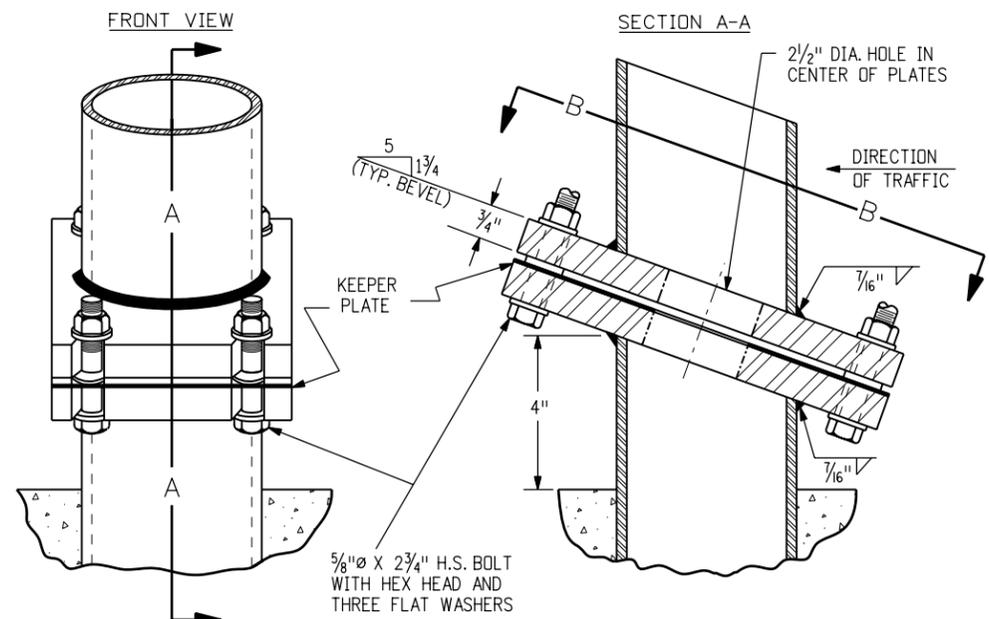
GENERAL NOTES CONTINUED ON SHEET 2.

- WITH PANELS NOT ILLUSTRATED
- 48" CIRCLE (12" YELLOW LENS)
VERTICAL SPACING: 10 1/2"-27"-10 1/2"
BACKING ZEES: 20"
 - 48" PENTAGON (12" YELLOW LENS)
VERTICAL SPACING TOP TO BOTTOM: 12"-25 3/4"-9"
 - 24" X 48" RECTANGLE (12" YELLOW LENS) (SCHOOL SPEED LIMIT)
VERTICAL SPACING: 12"-24"-12"
BACKING ZEES: 20"

TYPICAL ELEVATION FACING TRAFFIC

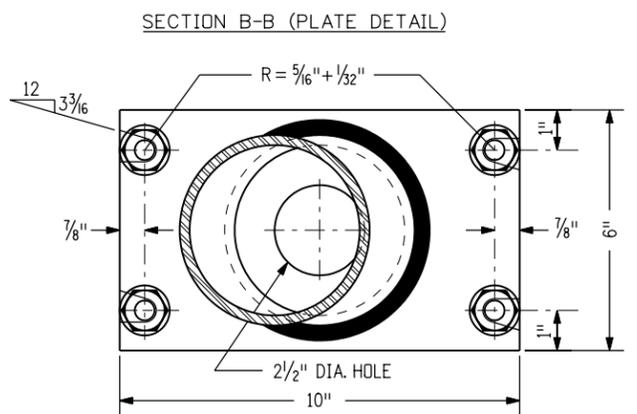
TYPICAL SIGN PLACEMENT

Computer File Information Creation Date: 07/04/06 Initials: JSW Last Modification Date: Initials: Full Path: www.dot.state.co.us/DesignSupport/ Drawing File Name: Sheet_S-614-14_1of3.dgn CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English		Sheet Revisions <table border="1"> <tr> <th>Date:</th> <th>Comments:</th> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </table>		Date:	Comments:							Colorado Department of Transportation  4201 East Arkansas Avenue Denver, Colorado 80222 Phone: (303) 757-9543 Fax: (303) 757-9458 Safety & Traffic Engineering Branch		FLASHING BEACON AND SIGN INSTALLATIONS Issued By: Safety & Traffic Engineering Branch July 4, 2006		STANDARD PLAN NO. S-614-14 Sheet No. 1 of 3	
Date:	Comments:																

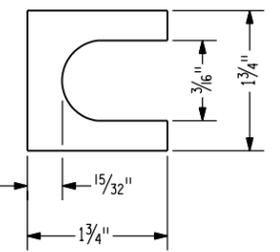


BREAK-AWAY ASSEMBLY BOLTING PROCEDURE

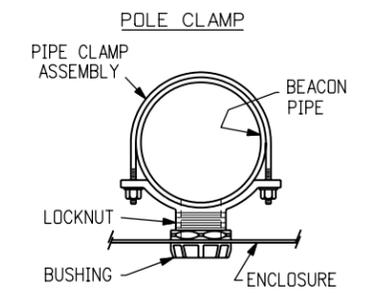
1. ASSEMBLE POST TO FOOTING WITH BOLTS- ONE FLAT WASHER ON EACH BOLT TOP AND BOTTOM, AND ONE FLAT WASHER AND THE KEEPER PLATE BETWEEN THE BREAK-AWAY PLATES. USE BRASS SHIMS TO PLUMB THE POST.
2. TIGHTEN ALL BOLTS TO MAXIMUM POSSIBLE WITH A 12 TO 15 INCH PIPE WRENCH TO BED WASHERS AND SHIMS TO CLEAN BOLT THREADS, THEN LOOSEN EACH BOLT IN TURN AND RETIGHTEN IN A SYSTEMATIC ORDER TO 450 INCH-POUNDS TORQUE.
3. BURR THREADS AT JUNCTION WITH NUT USING A CENTER PUNCH TO PREVENT NUT LOOSENING.



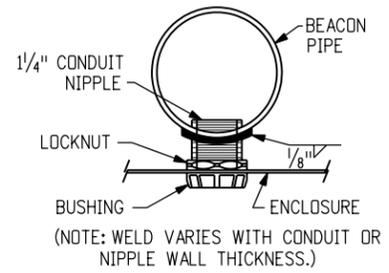
SHIM DETAIL



FURNISH TWO (2) .012 IN.± THICK AND TWO (2) .032 IN.± THICK SHIMS. SHIMS SHALL BE FABRICATED FROM BRASS SHIMS STOCK OR STRIP CONFORMING TO ASTM-B 36.



WELDED NIPPLE

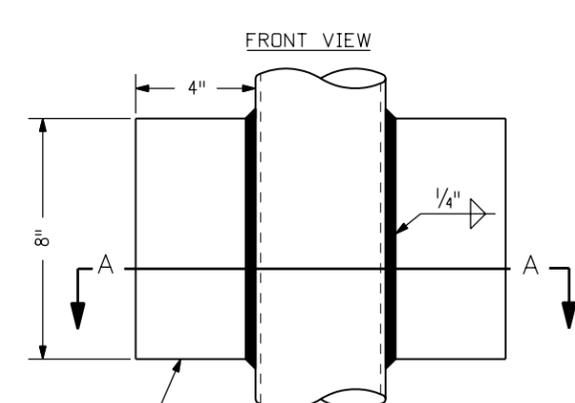


TYPICAL PIPE ATTACHMENTS

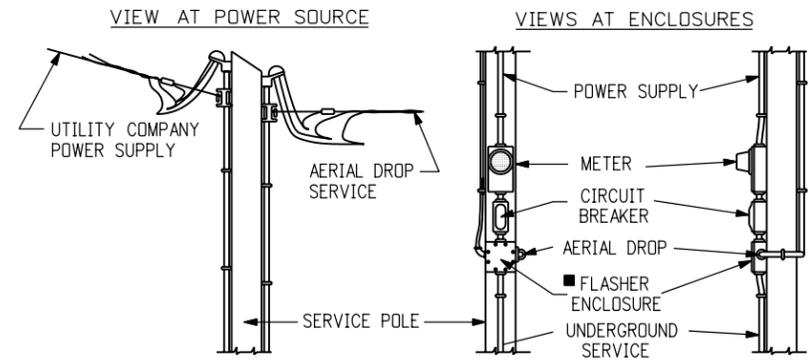
GENERAL NOTES (CONTINUED)

4. ALL ELECTRICAL MATERIALS AND WORKMANSHIP SHALL CONFORM TO THE LATEST REQUIREMENTS OF THE NEC, NEMA, UL OR EIA WHEREVER APPLICABLE; THE COLORADO PUC AND ANY LOCAL CODES OR ORDINANCES WHICH MAY APPLY; AND THE FOLLOWING:
 - A. THE CONTRACTOR IS TO PROVIDE ALL NECESSARY WIRING WITHIN THE BEACON AND FROM THERE TO THE POWER SOURCE PROVIDED BY THE UTILITY COMPANY. THE UTILITY COMPANY WILL MAKE THE CONNECTION WITH THE CONTRACTOR'S WIRING.
 - B. THE ELECTRICAL SERVICE BETWEEN THE POWER SOURCE AND THE FLASHING BEACON SHALL BE UNDERGROUND UNLESS AN AERIAL DROP IS AUTHORIZED BY THE ENGINEER. ALL WIRING EXCLUDING THE AERIAL DROP WIRE SHALL BE IN CONDUIT.
 - C. THE "FLASHER" SHALL BE HOUSED IN A SUITABLE ENCLOSURE ON THE UTILITY POLE AT THE POWER SOURCE UNLESS THE ENGINEER DIRECTS THAT THE ENCLOSURE BE MOUNTED ON THE BEACON PIPE OR THAT THE DEVICE MAY BE CONTAINED WITHIN THE SIGNAL HEAD ITSELF.
 - D. A SUITABLE ENCLOSURE FOR THE FLASHER SHALL BE IN ACCORDANCE WITH "A RAIN TIGHT JUNCTION BOX OR CAN, APPROXIMATELY 8 IN. X 8 IN. X 4 IN., SURFACE MOUNT, WITH A FLANGED SCREW ATTACHED COVER, AND FABRICATED FROM NOT LESS THAN 16 GAGE GALVANIZED STEEL".
 - E. A BUILT-IN RADIO INTERFERENCE SUPPRESSION DEVICE AND A PHOTOCELL SENSOR TYPE SIGNAL LAMP DIMMER SHALL BE PROVIDED FOR EACH FLASHING BEACON.
 - F. BEACONS SHALL FLASH AT A RATE OF NOT LESS THAN 50 AND NOT MORE THAN 60 TIMES PER MINUTE.
5. WHEN SPECIFIED IN THE PLANS, A PEDESTAL BASE INSTALLATION (AS DETAILED ON SHEET 3) MAY BE USED IN PLACE OF THE BREAKAWAY BASE SHOWN ON THIS SHEET.

TYPICAL BREAK-AWAY ASSEMBLY DETAILS

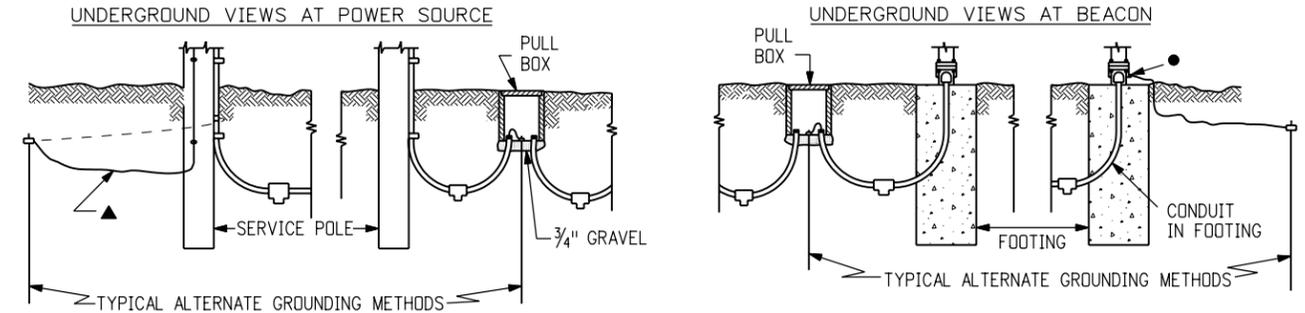
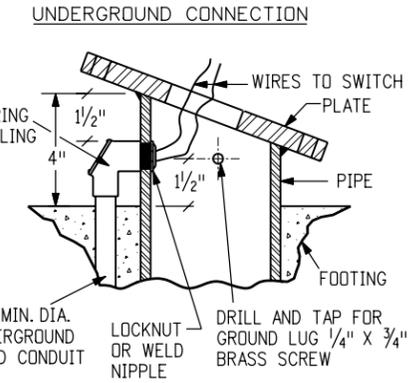
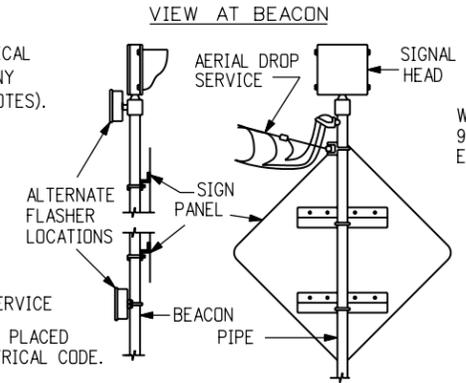


POST ANCHOR DETAILS

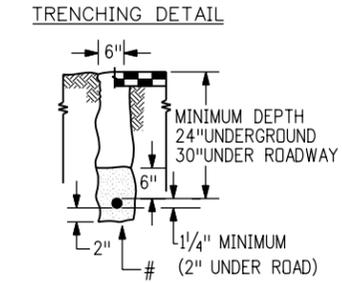


NOTES

- LOCATION AND CONFIGURATION OF ELECTRICAL EQUIPMENT IS DIAGRAMATIC ONLY (USE ANY METHOD COMPLYING WITH THE GENERAL NOTES).
- ▲ EXISTING GROUND AT SERVICE POLE; OTHERWISE PULL THRU CONDUIT OR ATTACH TO CONDUIT AND TAP OFF UNDERGROUND.
 - DRILL AND TAP PIPE FOR 1/4" ROUND ROUND HEAD BRASS SCREW, 3/4" LONG, FOR GROUND LUG.
 - PROVIDE WEEP HOLE WITH AERIAL DROP SERVICE
 - # BEDDING MATERIAL FOR CONDUIT SHALL BE PLACED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE.



TYPICAL ELECTRICAL SERVICE DETAIL



TRENCHING DETAIL

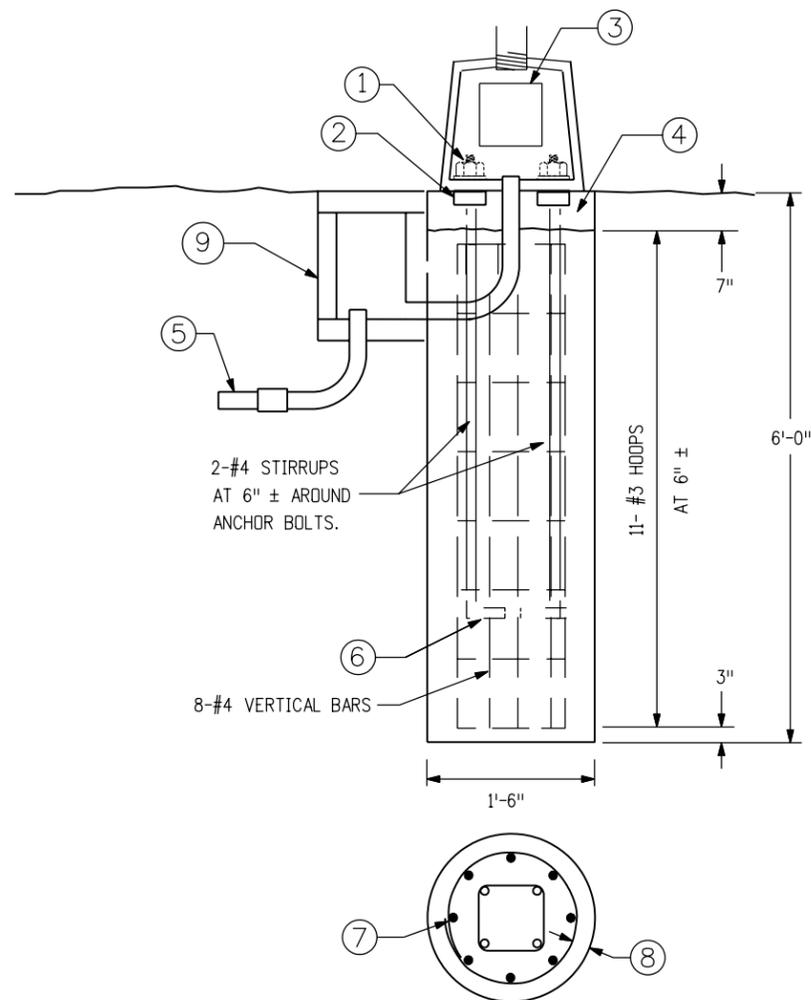
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FLASHING BEACON AND SIGN INSTALLATIONS
 Issued By: Safety & Traffic Engineering Branch July 4, 2006

STANDARD PLAN NO.
 S-614-14
 Sheet No. 2 of 3



ALTERNATE PEDESTAL BASE INSTALLATION

GENERAL NOTES

1. POLE AND PEDESTAL MUST BE DESIGNED TO MEET THE REQUIREMENTS OUTLINED IN THE "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS LUMINAIRES AND TRAFFIC SIGNALS", PUBLISHED BY AASHTO, FOR A WIND VELOCITY OF 100 MPH. THE CONTRACTOR SHALL SUBMIT TWO SETS OF WORKING DRAWINGS, SIGNED AND SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF COLORADO, IN ACCORDANCE WITH SECTION 105.02 OF THE STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION.

DESIGN DATA

THE DESIGNS HEREIN ASSUME THAT FLASHING BEACONS ARE INSTALLED WITHIN THE ROADWAY PRISM WITH THE FOLLOWING SOIL PARAMETERS:
 SOIL DENSITY $\gamma = 110$ LB./CU.FT.
 SOIL COHESION = 750 LB./SQ.FT. FOR MEDIUM STIFF COHESIVE SOIL
 SOIL ϕ ANGLE = 30 DEG. FOR MEDIUM DENSE COHESIONLESS SOIL
 SF = 3.0 FOR FLEXURAL RESISTANCE

CONTACT THE ENGINEER IF THE FLASHING BEACON WILL NOT BE INSTALLED WITHIN THE ROADWAY PRISM OR IF ANY OF THE FOLLOWING SOIL CONDITIONS ARE ENCOUNTERED DURING DRILLING:

- A) THE SOIL HAS A HIGH ORGANIC CONTENT OR CONSISTS OF SATURATED SILT AND CLAY.
- B) THE SITE WON'T SUPPORT THE WEIGHT OF THE DRILLING RIG.
- C) THE FOUNDATION SOILS ARE NOT HOMOGENOUS.
- D) FIRM BEDROCK IS ENCOUNTERED.
- E) A HIGH GROUNDWATER TABLE IS ENCOUNTERED.
- F) LARGE BOULDERS ARE ENCOUNTERED.

FOOTING DESIGN IS BASED ON 100 MPH WIND LOAD ON A 48 IN. X 48 IN. DIAMOND SIGN PANEL MOUNTED 9 FT. ABOVE THE GROUND, WITH A 24 IN. X 24 IN. RECTANGULAR PLAQUE UNDERNEATH AND A FLASHING BEACON 12 IN. ABOVE. IF A SIGN CONFIGURATION IS PROPOSED THAT EXCEEDS THESE DIMENSIONS, THE FOOTING DESIGN MUST BE ENGINEERED AND SIGNED AND SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF COLORADO.

FOOTING NOTES

- ① HEX NUTS
 - ② SQUARE NUTS
 - ③ HAND HOLE SHALL BE PROVIDED.
 - ④ 4 IN. MIN. NON-SHRINKABLE GROUT OVER ROUGH FOUNDATION
 - ⑤ SCHEDULE 80 PVC (24 IN. MIN. DEPTH, 30 IN. MIN. DEPTH UNDER ROADWAY) CONDUIT STUB FROM PULL BOX TO POLE SHALL BE 1-1/4" MIN. DIAMETER.
 - ⑥ INSTALL ANCHOR BOLTS (FURNISHED WITH POLE) PER MANUFACTURER'S TEMPLATE PRINT (FURNISHED WITH ORDER)
 - ⑦ MINIMUM OVERLAP OF 12 IN.
 - ⑧ 1-1/2 IN. CLEARANCE FOR HOOPS
 - ⑨ PULL BOX
- CAISSON DESIGNS REQUIRE THAT THE CAISSON BE FOUNDED IN COMPACT SAND, CLAY OR SANDY CLAY. IF, BY VISUAL INSPECTION OF THE HOLE, OTHER MATERIAL IS PRESENT, THE CAISSON DESIGN SHALL BE MODIFIED AS DETERMINED BY THE ENGINEER.

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