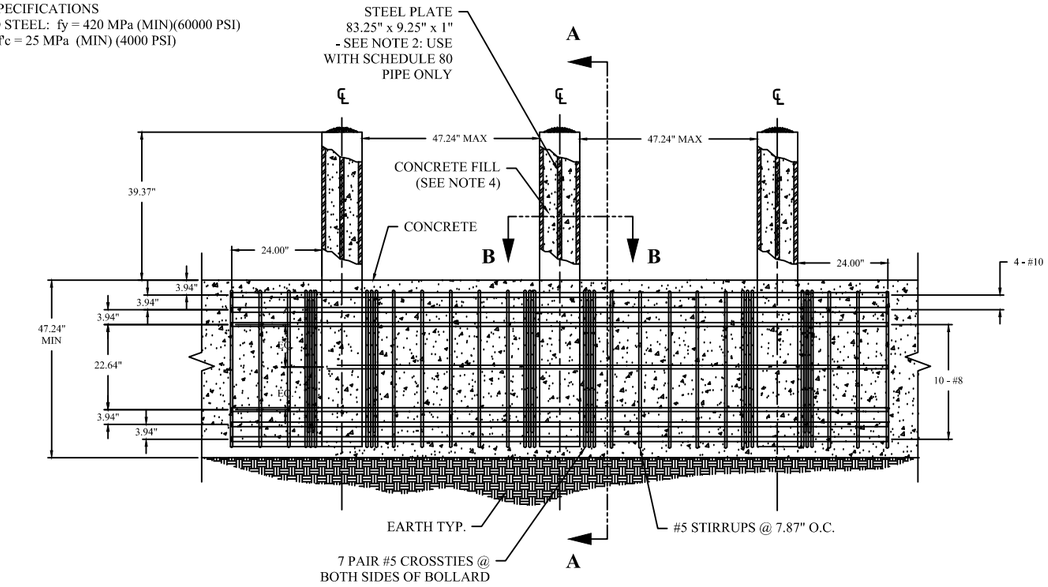
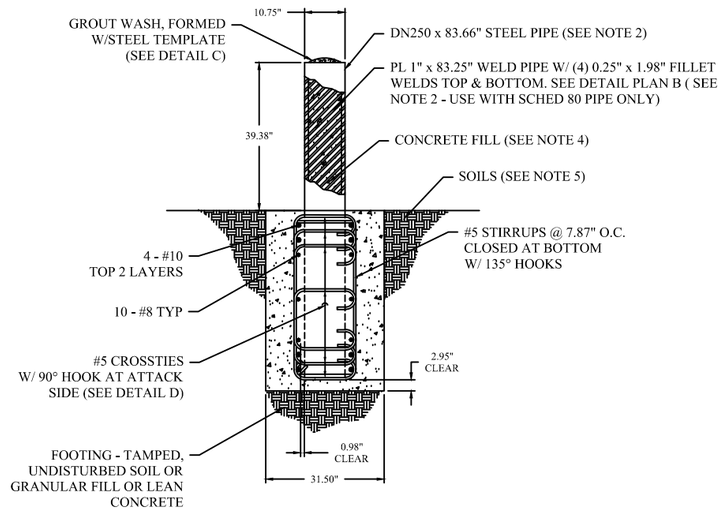
MATERIAL SPECIFICATIONS
REINFORCED STEEL: fy = 420 MPa (MIN)(60000 PSI)
CONCRETE: f'c = 25 MPa (MIN) (4000 PSI)



1 - SECTION - ANTI-RAM BOLLARD - ATTACK SIDE

SCALE: 1:25 NOTE: THIS BOLLARD DESIGN IS USED WHERE K-12 ANTI-RAM PROTECTION IS REQUIRED

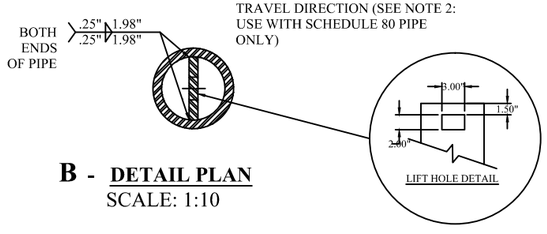
ATTACK SIDE ***PROTECTED SIDE***



2 - SECTION - TYPICAL ANTI-RAM BOLLARD

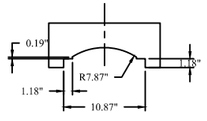
SCALE: 1:25 NOTE: THIS BOLLARD DESIGN IS USED WHERE K-12 ANTI-RAM PROTECTION IS REQUIRED

NOTE: WELD STEEL PLATE WITHIN STEEL PIPE PARALLEL TO VEHICLE TRAVEL DIRECTION (SEE NOTE 2: USE WITH SCHEDULE 80 PIPE ONLY)



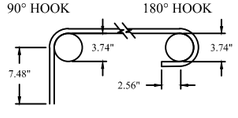
B - DETAIL PLAN

SCALE: 1:10



C - GROUT TEMPLATE

SCALE: 1:10



D - CROSSTIE DETAIL

SCALE: 1:10

NOTES:

1. REINFORCING STEEL - ASTM A-615M fy = 420 MPa (MIN) (60000 PSI) EQUIVALENT INTERNATIONAL REINFORCING BARS ARE SHOWN IN PARENTHESIS. THE SUBSTITUTION OF NON ASTM BAR SIZES MUST BE
2. APPROVED BY CONTRACTING OFFICER
   DN250 STEEL PIPE - ASTM A-53 GRADE B, fy = 250 MPa (MIN) (36000 PSI)
   OPTION 1: SCHEDULE 140 (1" WALL THK)
   OPTION 2: SCHEDULE 80 (.59" WALL THK)
   USE PL 1" x 83.25" WITH OPTION 2
3. STEEL PLATE - ASTM P A-36, fy 250 MPa (MIN) (36000 PSI)
4. CONCRETE - F'c = 25 MPa @ 28 DAY (MIN) (4000 PSI) IN ACCORDANCE WITH ASTM C31, C39, & C470.
5. SOILS - ALL BACKFILL SHALL VI IN COMPLIANCE WITH THE REQUIREMENTS OF SE-STD-02.01, SECTION 5.1.2. IF THE LATERAL CAPACITY OF THE EXISTING SOILS IS NOT IN CONFORMANCE WITH THE REQUIREMENTS OF SD-STD-02.01, SECTION 5.1.2, THEN THE EXISTING SOIL SHALL BE REPLACED
6. STAGGERED, CLASS-A TENSION SPLICES SHALL BE ALLOWED FOR SPLICING OF HORIZONTAL BARS.
7. CROSSTIE: THE #5 CROSSTIE HAS A 90° AND 180° HOOK AT EACH END. (SEE DETAIL D). THE 90° HOOK SHOULD BE PLACED AT THE ATTACK SIDE OF THE FOOTING. PROVIDE 7-PAIR CROSSTIES COMBINING WITH THE FIRST TOW OF THE STIRRUP AT EACH SIDE OF THE BOLLARD. (SEE ELEVATION 1)
8. SEE REBAR CHART

SOIL REQUIREMENTS:
TECH SOIL SHOULD BE LOW-COHESIVE, WELL GRADED CRUSHED OR BROKEN GRAVEL OF A PARTICLE SIZE DISTRIBUTION COMPARABLE TO TABLE 1. SOIL DEPTH SHOULD BE AT LEAST THE FOUNDATION DEPTH AND 1.5 TIMES THE EMBEDMENT DEPTH BEHIND THE INSTALLATION OR 0.6 METERS (2 FEET), WHICHEVER IS GREATER UT TO A MAXIMUM OF 2 METERS (6 FEET). SOIL SHOULD BE COMPACTED TO A DENSITY OF NOT LESS THAN 90 PERCENT MAXIMUM DRY DENSITY.

REBAR CHART		
A615 M-96a & A706M-96a METRIC SIZES	NOMINAL DIAMETER	A615 M-96a & A706M-96a INCH-POUND BAR SIZES
#16 #25 #32	15.9mm/.625" 25.4mm/1.00" 32.3mm/1.27"	#5 #8 #10

TABLE: RECOMMENDED SOIL FOUNDATION MATERIAL	
SIEVE SIZE	MASS PERCENT PASSING
50.0 mm (2 in.)	100
25.0 mm (1 in.)	75-95
9.5 mm (3/8 in.)	40-75
4.75 mm (No. 4)	30-60
2.00 mm (No. 10)	20-45
0.425 mm (No. 40)	15-30
0.075 mm (No. 200)	5-20

Unless Noted Otherwise
.x Decimal ± .040
.xx Decimal ± .030
.xxx Decimal ± .020
.xxxx Decimal ± .010
DO NOT SCALE OFF DRAWING
Angular ± 0.5°

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REVISION HISTORY

REV	ECN	AUTHOR	DATE	DESCRIPTION
B		NJB	09/14/12	Δ CONCRETE 4400PSI → 4000PSI
C		NJB	11/26/12	Δ TITLE/NUMBER "TITAN" → "DS22" - LEGAL
D		NJB	02/07/13	+ LIFT HOLE DETAIL, FULL BOLLARDS, CAGE EXTENSION
E	MCINTYRE	DM	04/23/13	- "HOT DIP GALV" FROM NOTE 2

TITLE: ASP DS22 K12 FIXED BOLLARD
DATE: 09/06/12 SHEET: 1 of 1
DRN BY: NJB REV: E
DRAWING NO: ASP DS22