

SUMMARY OF QUANTITIES (PRIVATE)

ITEM #	ITEM	UNIT	QUANTITY	AS-BUILT
1	DIRT WORK - CUT	CU.YD.	270	
2	DIRT WORK - FILL	CU.YD.	2400	
3	4" WIDE TRICKLE CHANNEL	L.F.	186	
4	24" DRAINAGE PIPE	L.F.	404	
5	18" DRAINAGE PIPE	L.F.	271	
6	10" DRAINAGE PIPE	L.F.	44	
7	6" DRAINAGE PIPE	L.F.	40	
8	24"x10" TEE	EA.	1	
9	24"x6" TEE	EA.	2	
10	18"x6" TEE	EA.	2	
11	18"x11.25" BEND	EA.	1	
12	2'x2' STEEL BAR GRATED INLET	EA.	1	
13	STANDARD 18" GRATED INLET	EA.	1	
14	26" CLEAR ROADWAY GRATED STREET INLET	EA.	1	
15	2'x4.50'x3.20' CONCRETE BOX	EA.	1	
16	STORM SEWER MANHOLE	EA.	3	
17	CONCRETE END WALL w/24" PIPE	EA.	1	
18	CONCRETE END WALL w/18" PIPE	EA.	1	
19	STANDARD 3' CUT OFF WALL	EA.	2	
20	ASPHALT CUT & REPAIR	S.Y.	164	
21	CONCRETE CURB & GUTTER CUT & REPAIR	L.F.	290	
22	REMOVAL OF EXIST. DRAINAGE STRUCTURES	L.S.	1	
23	REMOVAL OF 10" DRAINAGE PIPE	L.S.	1	
24	REMOVAL OF EXIST. NATURAL GAS LINE	L.S.	1	
25	ANCHORS	EA.	3	
26	4" SANITARY SEWER PIPE	L.F.	64	
27	SANITARY SEWER MANHOLE	EA.	1	
28	TIE IN TO EXISTING MANHOLE	EA.	1	
29	DROP CONNECTION	EA.	1	

MOORE WEST JUNIOR HIGH CLASSROOM ADDITION

LOCATED AT

9400 S. PENNSYLVANIA AVE.,

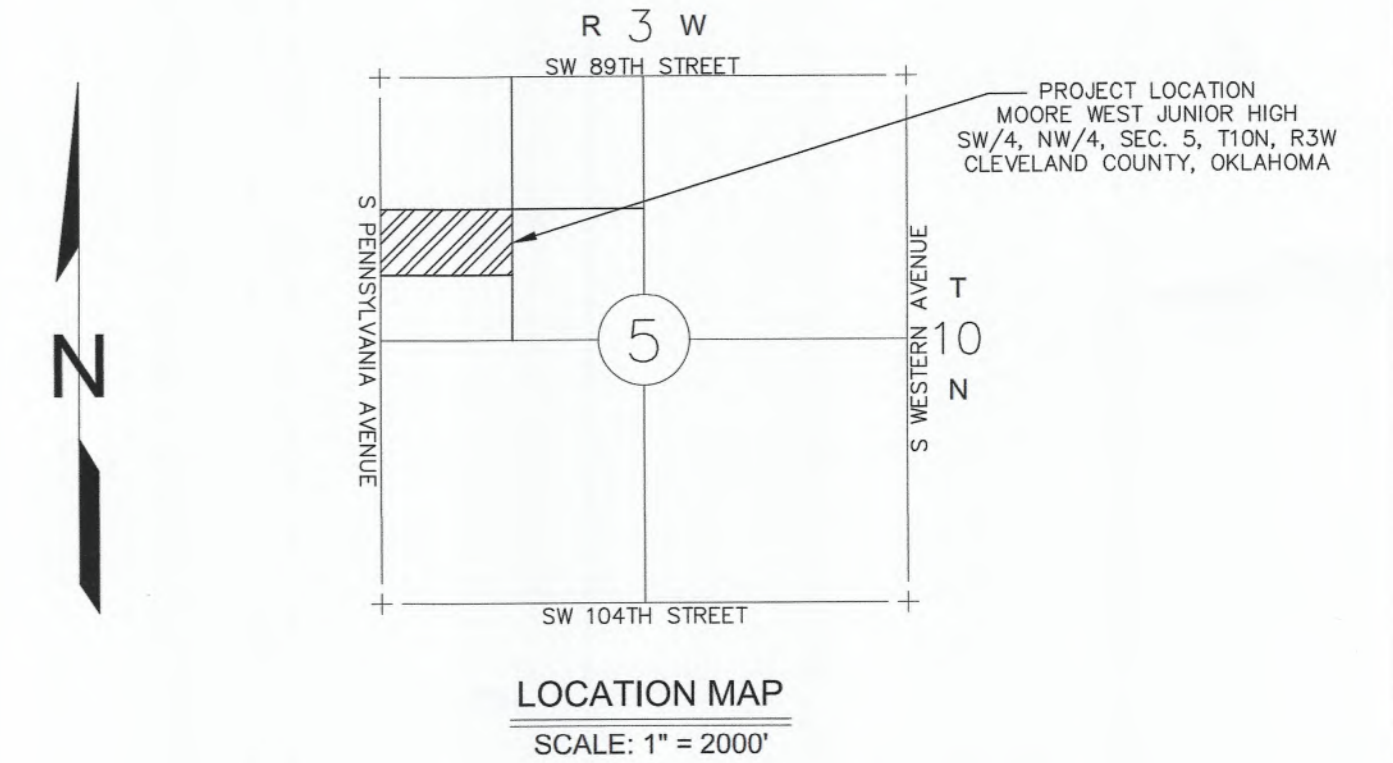
OKLAHOMA CITY, OK 73159

SW/4, NW/4, SECTION 5, T-10-N, R-3-W

CLEVELAND COUNTY



The City of
OKLAHOMA CITY
Public Works Department



SHEET INDEX

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ST02	STORM WATER PROFILE - LINE B
SS01	SANITARY SEWER PROFILE
SWPPP1	STORM WATER MANAGEMENT PLAN
SWPPP2	EROSION CONTROL SITE PLAN
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D-406	OKC STANDARD DETAILS
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S-STD-03	OKC STANDARD DETAILS
S-STD-04	OKC STANDARD DETAILS
S-STD-05	OKC STANDARD DETAILS

ONE CALL UTILITY LOCATION NUMBER

840-5032
1-800-522-6543

This number is to be used for information on the location of all underground utilities. Contact this number and other numbers specified in the plans prior to any excavation.

WDB ENGINEERING P.L.L.C.

(COMPANY)

PREPARED BY:

DAVID B. WYATT
(OK P.E. 15398)

REGISTERED PROFESSIONAL ENGINEER

DATE: 6/13/22



MOORE WEST JUNIOR HIGH
CLASSROOM ADDITION

SUBMITTAL DATES TO OKC

Check Print #1:	Date:
Check Print #2:	Date:
Check Print #3:	Date:
Final Plans:	Date:

CONSTRUCTION MUST BEGIN WITHIN ONE (1) YEAR FROM THE DATE OF APPROVAL, OR THAT APPROVAL IS WITHDRAWN.

DEPARTMENT OF PUBLIC WORKS
ENGINEERING DIVISION

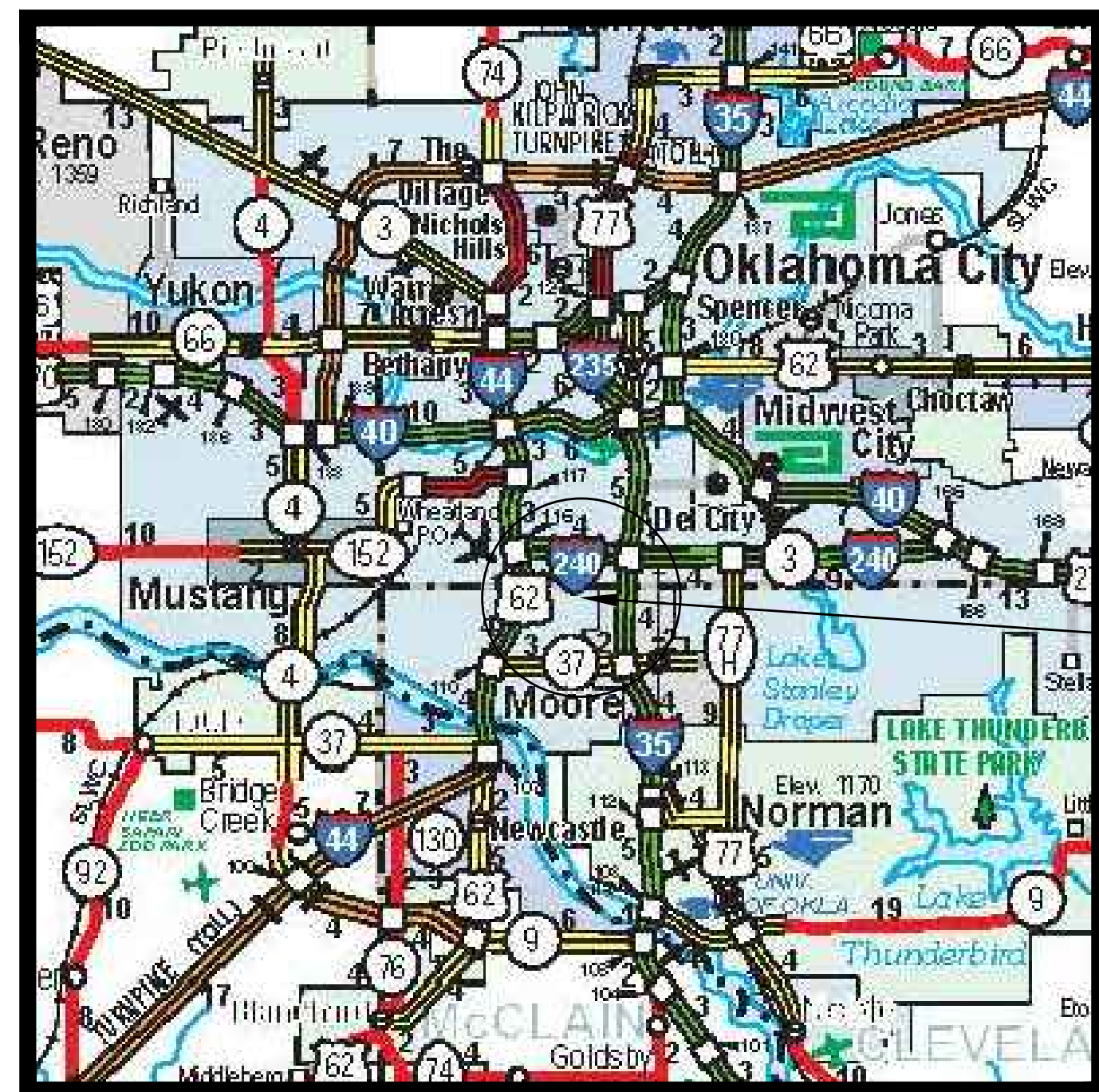
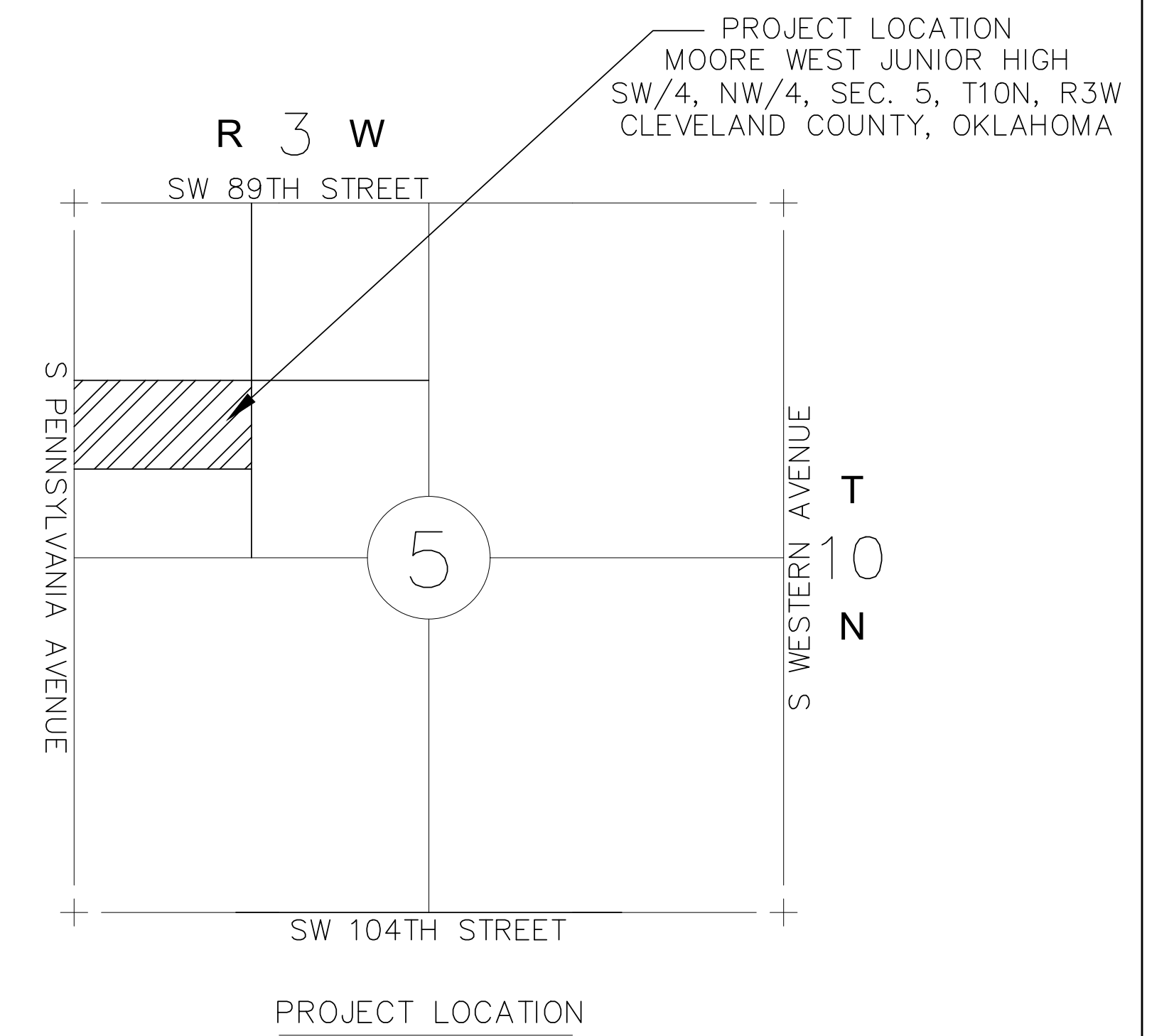
Field Checked by:	Date:
Checked by:	Date:
Checked by:	Date:
Checked by:	Date:
Checked by:	Date:

APPROVED:

City Engineer: _____ Date: _____

GENERAL CONSTRUCTION NOTES

- ALL WORK NOT CLASSIFIED AS A CONTRACT "PAY ITEM", SHALL BE CONSIDERED INCIDENTAL AND THE COST THEREOF AND INCLUDED IN ITEMS CLASSIFIED FOR PAYMENT.
- BEFORE ANY SIDEWALK OR DRIVE IS CUT, THE RESIDENT ON PROPERTY AFFECTED SHALL BE NOTIFIED BY THE CONTRACTOR. NO DRIVE OR SIDEWALK SHALL BE LEFT UNCOVERED OVERNIGHT.
- THE CLEAN-UP OF RIGHT-OF-WAY SHALL NOT BE DELAYED UNTIL FINAL ESTIMATE. THE CLEAN-UP WORK ON SECTIONS OF COMPLETED LINE SHALL BE BROUGHT UP TO DATE AT LEAST EVERY 10 WORKING DAYS. IF CLEAN UP GETS BEHIND TIME, PRODUCTION SHALL BE SUSPENDED TO GIVE MORE MEN AND EQUIPMENT ATTENTION TO CLEAN UP UNTIL IT IS DONE. ALL RUBBISH AND DISCARDED MATERIALS SHALL BE REMOVED FROM THE SITE AND ADJACENT WILL NOT BE CONSIDERED AS HAVING BEEN DISPOSED.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY OF ALL UTILITIES EITHER PUBLIC OR PRIVATE. THE LOCATION OF EXISTING UTILITIES SHOWN ON THE PLANS ARE APPROXIMATE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING THE APPROPRIATE OWNER TO DETERMINE THEIR EXACT LOCATION BEFORE CONSTRUCTION BEGINS.
- THE CONTRACTOR SHALL NOTIFY THE UTILITY OWNER AND ALL PARTIES AFFECTED BEFORE ANY WATER LINE IS TAKEN OUT OF SERVICE.
- ALL CONCRETE SHALL HAVE 3000 PSI COMPRESSIVE STRENGTH AT 28 DAYS.
- THE CONTRACTOR SHALL VERIFY THE DEPTH OF THE EXISTING UTILITIES AND/OR WATER LINES BEFORE STARTING ANY EXCAVATION BEGINS.
- THE LOCATION OF OTHER UTILITIES AS SHOWN ON THESE PLANS ARE APPROXIMATE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGE OF ALL UTILITIES WHETHER SHOWN ON THESE PLANS OR NOT. CALL 1-800-840-5032 48 HOURS PRIOR TO ANY EXCAVATION.
- FILL MATERIAL SHALL BE COMPACTED IN LIFTS NOT TO EXCEED 12" TO 95% STANDARD PROCTOR DENSITY.
- ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH ALL APPLICABLE STATE, FEDERAL AND LOCAL REGULATIONS.
- ANY CONSTRUCTION PROCEDURES NOT COVERED IN PLANS AND SPECIFICATIONS, WILL BE EXECUTED IN ACCORDANCE WITH PROPER CONSTRUCTION TECHNIQUES AND SHALL BE APPROVED BY THE ENGINEER.
- IF DITCHES SUBSIDE LATER, THE CONTRACTOR SHALL REFILL DITCHES AS SOON AS WEATHER PERMITS, AND SHALL NOT LET DITCHES WITH SUBSIDENCE EXIST DURING CONSTRUCTION OR THEREAFTER.
- ALL AREAS DISTURBED DURING CONSTRUCTION SHALL BE FINISHED TO A SMOOTH UNIFORM SURFACE PERMITTING DRAINAGE AND SLOPED IN SUCH CONDITION THAT ALL AREAS MAY BE MOWED WITH ROTARY TYPE MOWING EQUIPMENT.
- CONTRACTOR SHALL BE RESPONSIBLE FOR ALL FENCES DISTURBED DURING CONSTRUCTION.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONSTRUCTION STAKING FOR THE PROJECT.
- THE CONTRACTOR SHALL REFERENCE CITY OF OKLAHOMA CITY STANDARDS.



PROJECT LOCATION

VICINITY

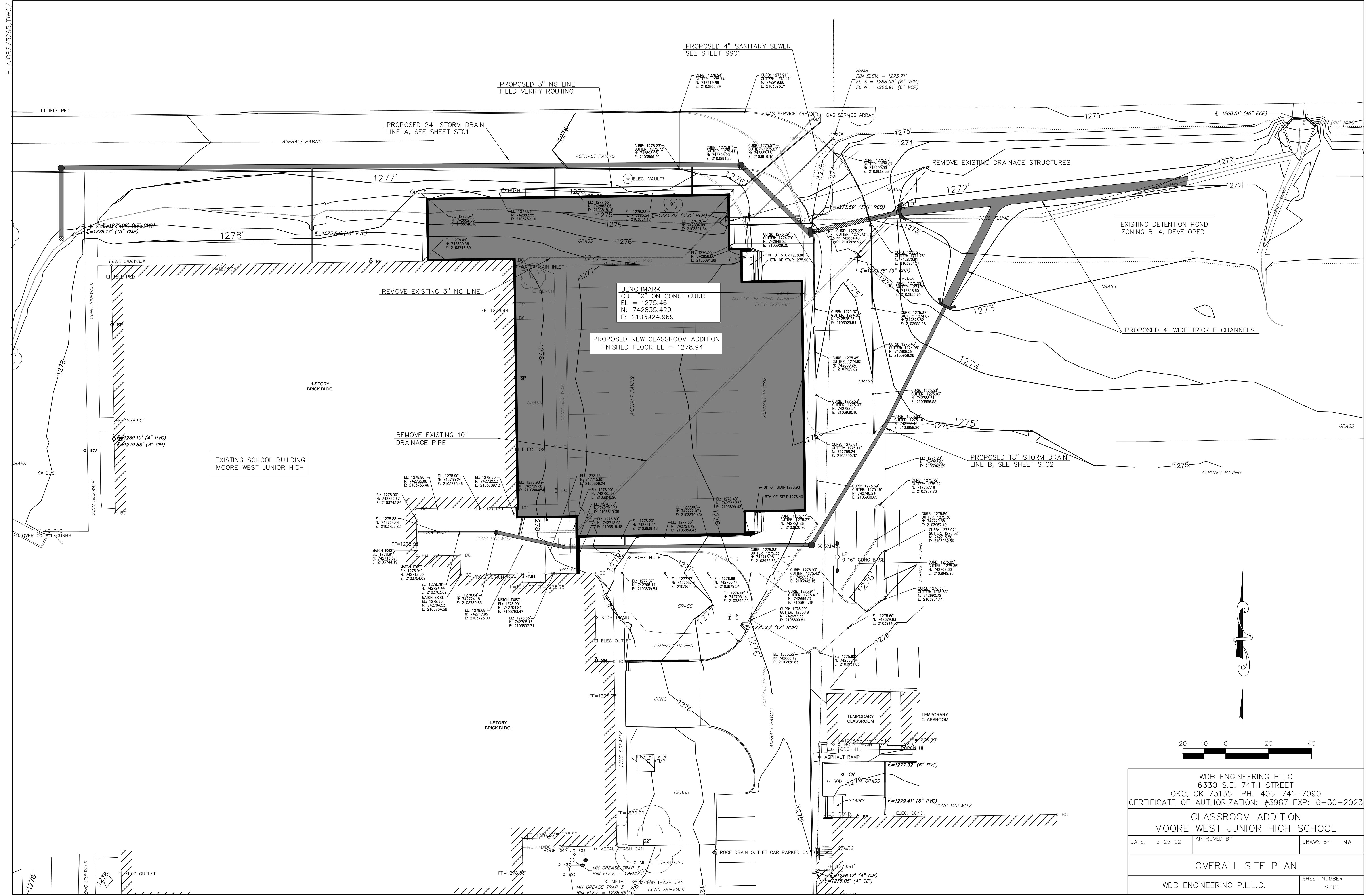


AREA OF DEVELOPMENT

AERIAL VIEW



WDB ENGINEERING PLLC 6330 S.E. 74TH STREET OKC, OK 73135 PH: 405-741-7090 CERTIFICATE OF AUTHORIZATION: #3987 EXP: 6-30-2023		
CLASSROOM ADDITION MOORE WEST JUNIOR HIGH		
DATE: 05-25-22	APPROVED BY:	DRAWN BY: MW
LOCATION MAP & GENERAL NOTES		
WDB ENGINEERING P.L.L.C.		SHEET NUMBER 2

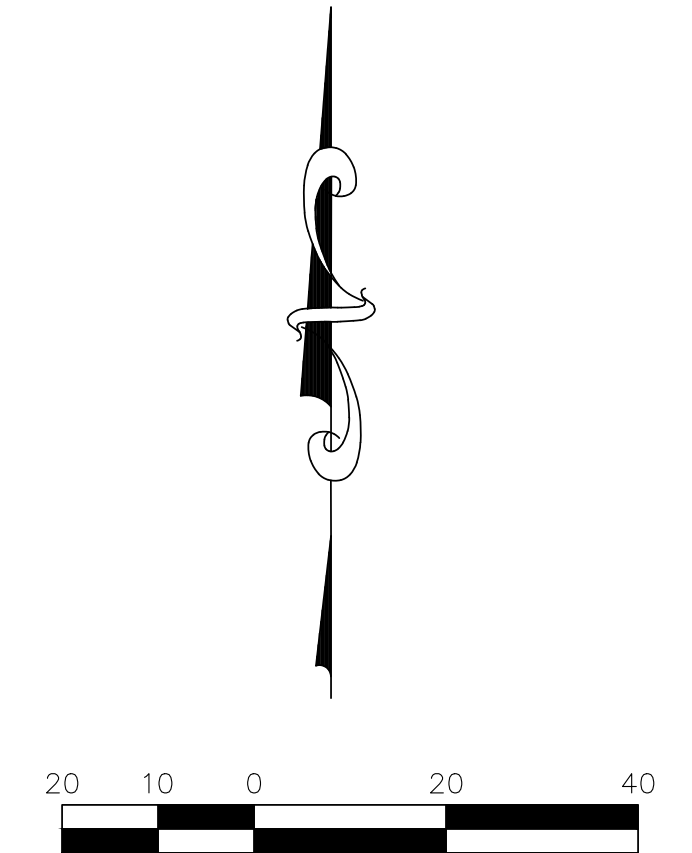


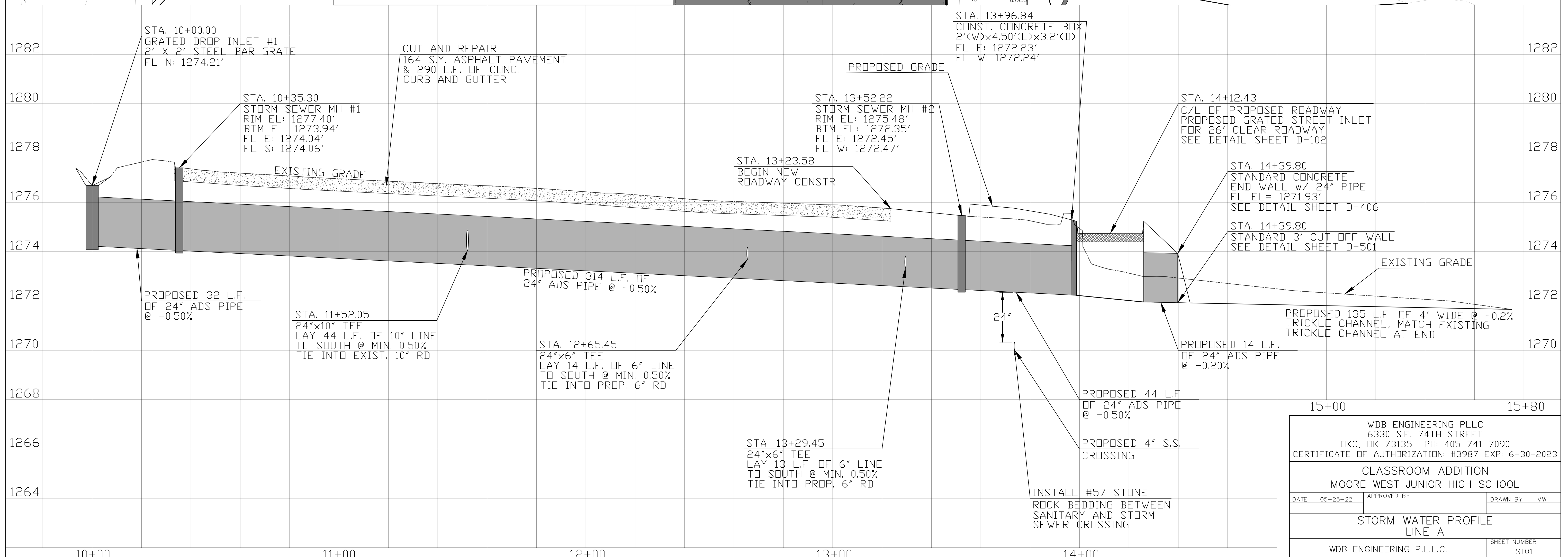
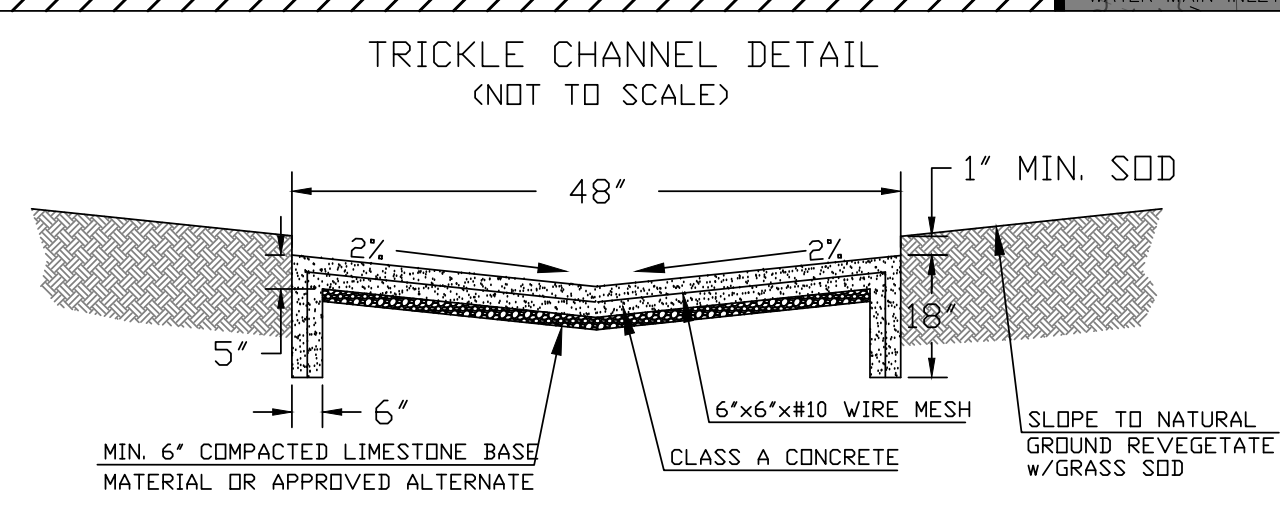
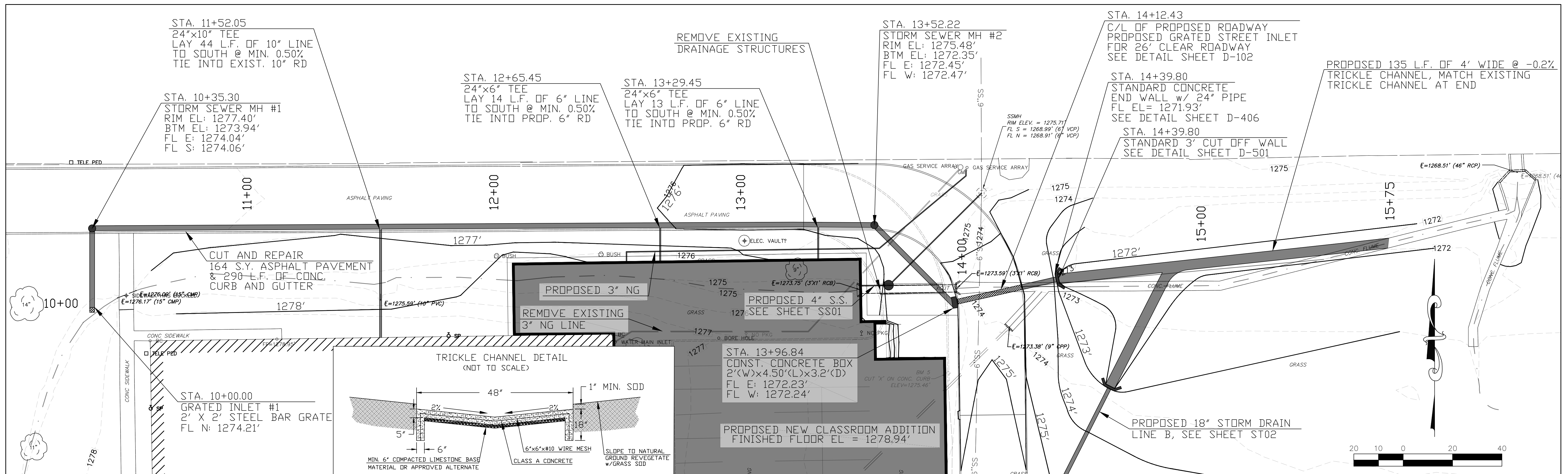
WDB ENGINEERING PLLC
 6330 S.E. 74TH STREET
 OKC, OK 73135 PH: 405-741-7090
 CERTIFICATE OF AUTHORIZATION: #3987 EXP: 6-30-2023

**CLASSROOM ADDITION
 MOORE WEST JUNIOR HIGH SCHOOL**

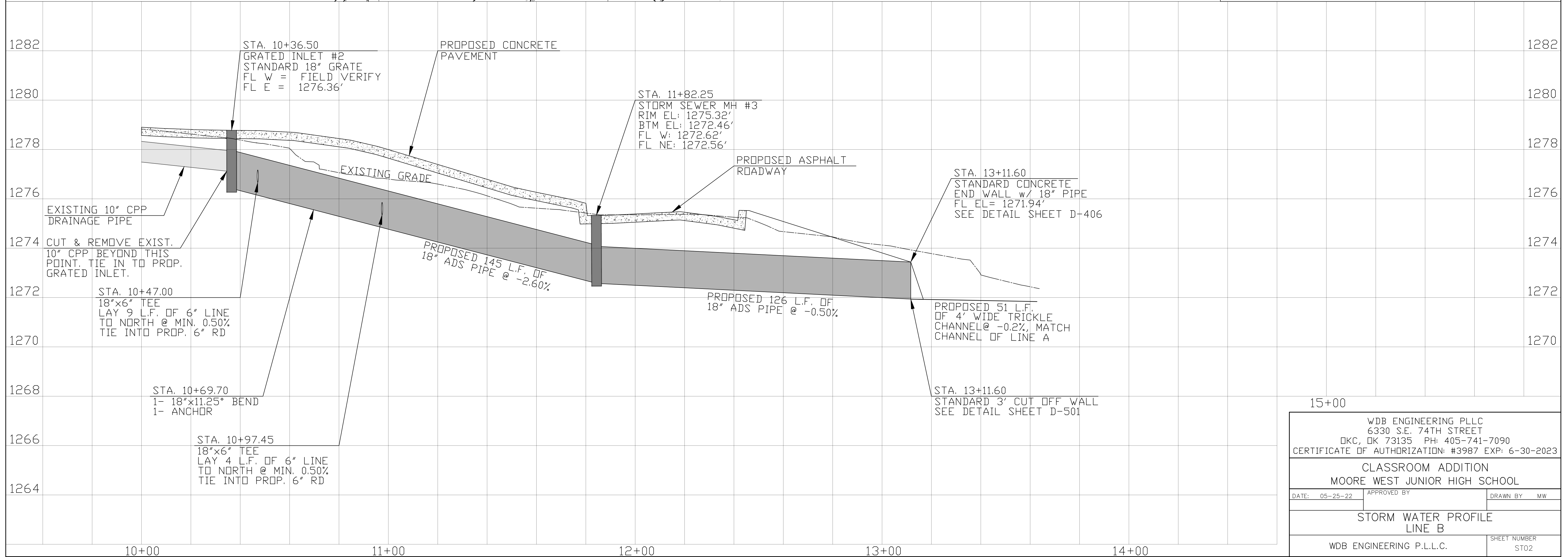
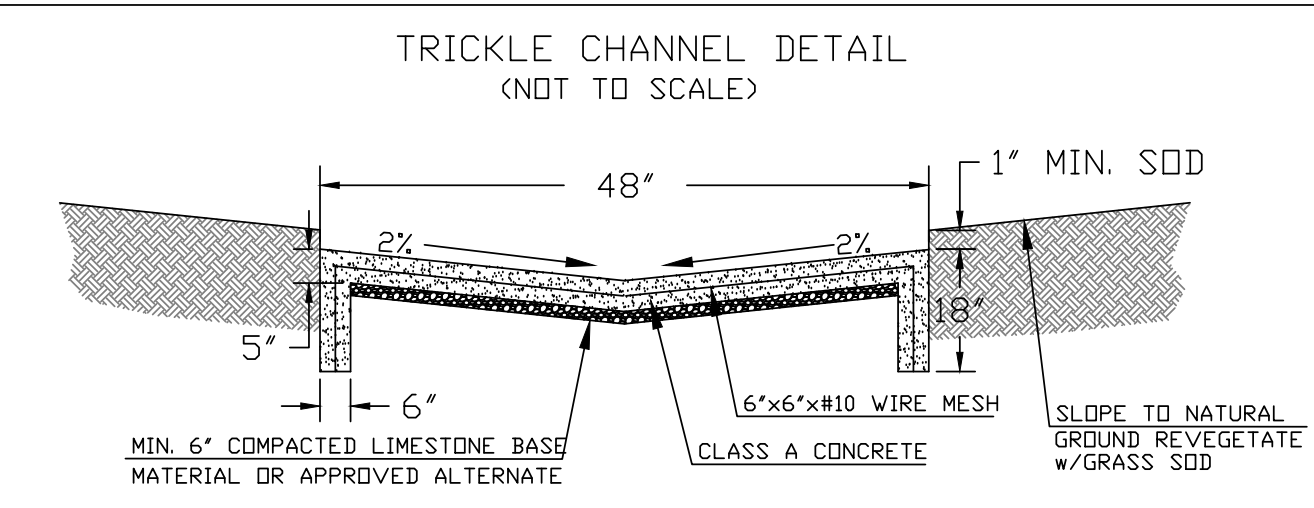
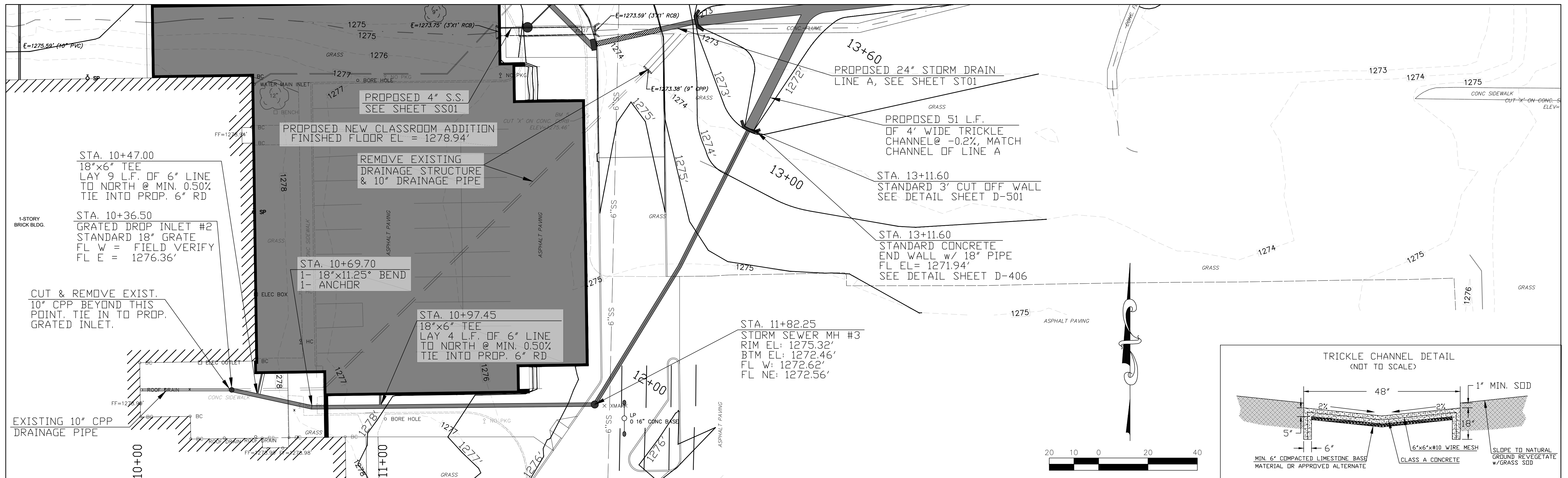
DATE: 5-25-22 APPROVED BY: _____ DRAWN BY: MW

OVERALL SITE PLAN
 WDB ENGINEERING P.L.L.C. SHEET NUMBER SP01

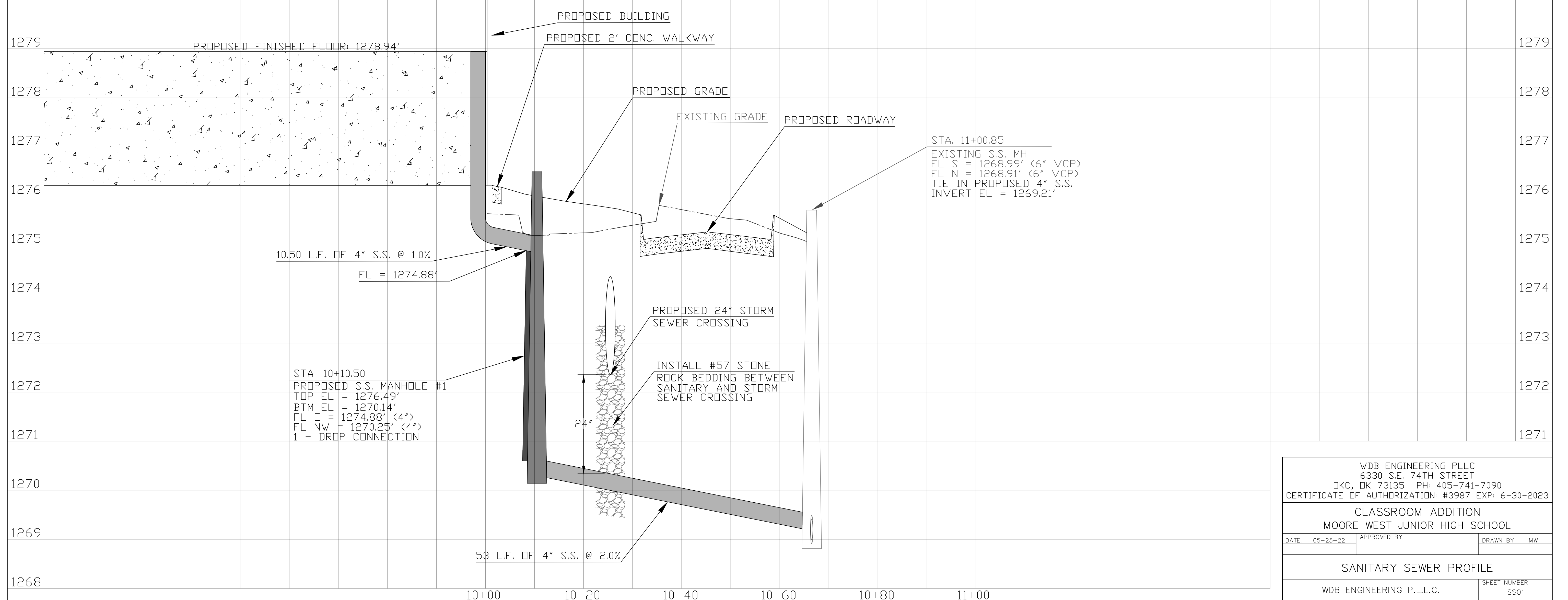
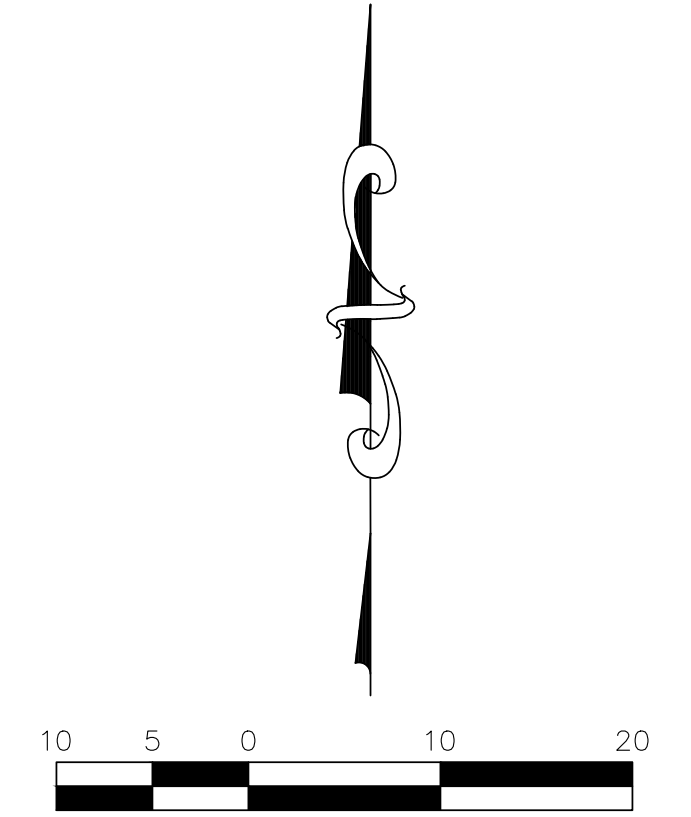
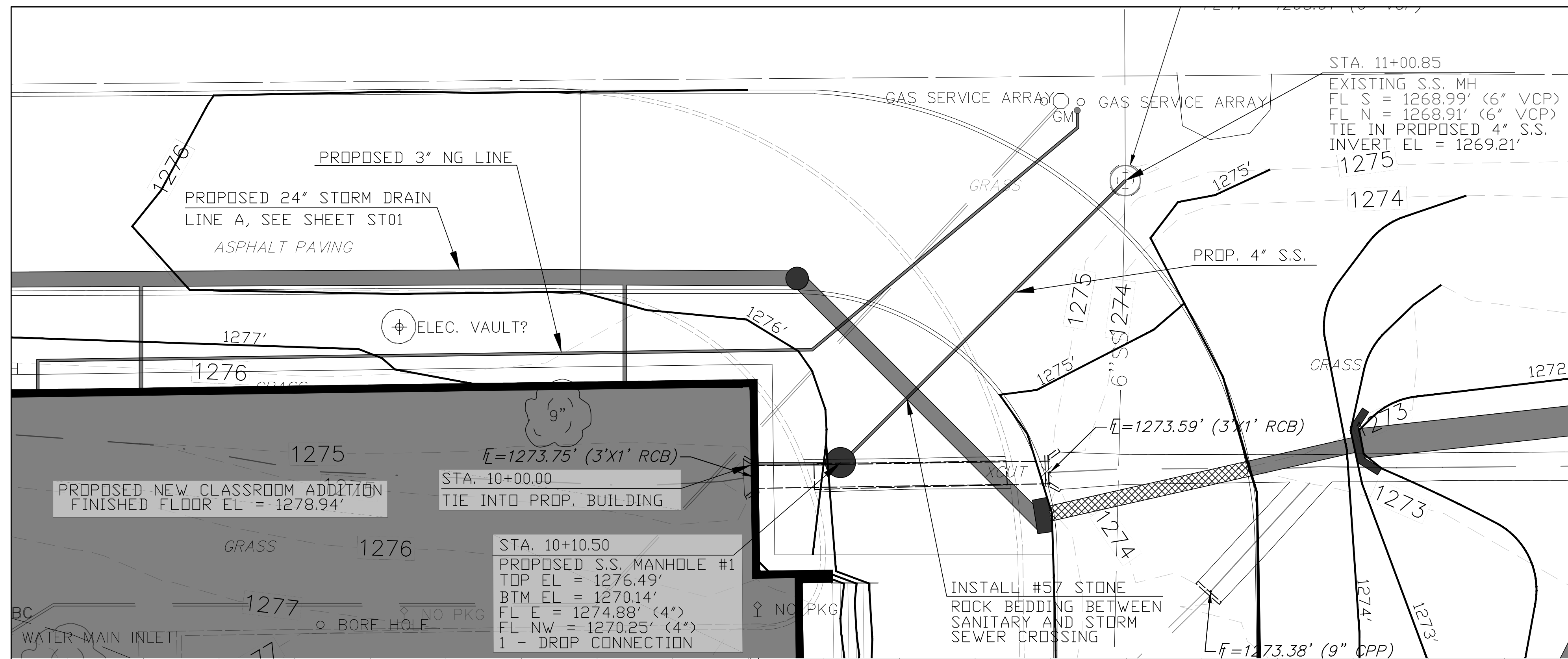




WDB ENGINEERING PLLC 6330 S.E. 74TH STREET OKC, OK 73135 PH: 405-741-7090 CERTIFICATE OF AUTHORIZATION: #3987 EXP: 6-30-2023	
CLASSROOM ADDITION MOORE WEST JUNIOR HIGH SCHOOL	
DATE: 05-25-22	APPROVED BY: _____
DRAWN BY: MW	
STORM WATER PROFILE LINE A	
WDB ENGINEERING P.L.L.C.	SHEET NUMBER ST01



WDB ENGINEERING PLLC 6330 S.E. 74TH STREET OAK, OK 73135 PH: 405-741-7090 CERTIFICATE OF AUTHORIZATION: #3987 EXP: 6-30-2023		
CLASSROOM ADDITION MOORE WEST JUNIOR HIGH SCHOOL		
DATE: 05-25-22	APPROVED BY:	DRAWN BY: MW
STORM WATER PROFILE LINE B		
WDB ENGINEERING P.L.L.C.		SHEET NUMBER ST02



WDB ENGINEERING PLLC 6330 S.E. 74TH STREET OKC, OK 73135 PH: 405-741-7090 CERTIFICATE OF AUTHORIZATION: #3987 EXP: 6-30-2023		
CLASSROOM ADDITION MOORE WEST JUNIOR HIGH SCHOOL		
DATE: 05-25-22	APPROVED BY:	DRAWN BY: MW
SANITARY SEWER PROFILE		
WDB ENGINEERING P.L.L.C.		SHEET NUMBER SS01

STORM WATER MANAGEMENT PLAN

H:\JOBS\20259\PAVING\20259SWMP.DWG

SITE DESCRIPTION

PROJECT LIMITS: SW/4, NW/4, SECTION 5, T-10-N, R-3-W
CLEVELAND COUNTY

PROJECT DESCRIPTION: SITE GRADING, BUILDING CONSTRUCTION AND
DRAINAGE

SUGGESTED SEQUENCE OF EROSION CONTROL ACTIVITIES:
NORTH TO SOUTH

SOIL TYPE: SILT LOAM

AREA TO BE DISTURBED: 1.77 ACRES

OFFSITE AREA TO BE DISTURBED:
 (FOR CONTRACTOR USE) _____

MAXIMUM ACRES TO BE
 DISTURBED AT ANY ONE TIME:
 (FOR CONTRACTOR USE) _____

LATITUDE & LONGITUDE
 OF CENTER OF PROJECT: 35°22'24.4862"N, 97°32'45.7286"W

PROJECT WILL DISCHARGE TO:

NAME OF RECEIVING WATERS: LIGHTNING CREEK

SENSITIVE WATERS OR WATERSHEDS: YES NO

303(d) IMPAIRED WATERS: YES NO

NOTE: THIS SHEET SHOULD BE USED IN CONJUNCTION WITH A DRAINAGE MAP THAT ILLUSTRATES THE DRAINAGE PATTERNS/PATHWAYS AND RECEIVING WATERS FOR THIS PROJECT. THIS SHEET SHOULD ALSO BE USED WITH THE EROSION CONTROL SUMMARIES, PAY ITEMS, & NOTES.

EROSION AND SEDIMENT CONTROLS

SOIL STABILIZATION PRACTICES:

- TEMPORARY SEEDING
- PERMANENT SODDING, SPRIGGING OR SEEDING
- VEGETATIVE MULCHING
- SOIL RETENTION BLANKET
- PRESERVATION OF EXISTING VEGETATION

NOTE: TEMPORARY EROSION CONTROL METHODS MUST BE USED ON ALL DISTURBED AREAS WHERE CONSTRUCTION ACTIVITIES HAVE CEASED FOR OVER 14 DAYS. METHODS USED WILL BE AS SHOWN ON PLANS, OR AS DIRECTED BY THE ENGINEER.

STRUCTURAL PRACTICES:

- STABILIZED CONSTRUCTION EXIT
- TEMPORARY SILT FENCE
- TEMPORARY SILT DIKES
- TEMPORARY FIBER LOG
- DIVERSION, INTERCEPTOR OR PERIMETER DIKES
- DIVERSION, INTERCEPTOR OR PERIMETER SWALES
- ROCK FILTER DAMS
- TEMPORARY SLOPE DRAIN
- PAVED DITCH W/ DITCH LINER PROTECTION
- TEMPORARY DIVERSION CHANNELS
- TEMPORARY SEDIMENT BASINS
- TEMPORARY SEDIMENT TRAPS
- TEMPORARY SEDIMENT FILTERS
- TEMPORARY SEDIMENT REMOVAL
- RIP RAP
- INLET SEDIMENT FILTER
- TEMPORARY BRUSH SEDIMENT BARRIERS
- SANDBAG BERMS
- TEMPORARY STREAM CROSSINGS

OFFSITE VEHICLE TRACKING:

- HAUL ROADS DAMPENED FOR DUST CONTROL
- LOADED HAUL TRUCKS TO BE COVERED W/ TARPULIN
- EXCESS DIRT ON ROAD REMOVED DAILY

NOTES:

THE CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR THE FOLLOWING:

MAINTENANCE AND INSPECTION:
 ALL EROSION AND SEDIMENT CONTROLS WILL BE MAINTAINED IN GOOD WORKING ORDER FROM THE BEGINNING OF CONSTRUCTION UNTIL AN ACCEPTABLE VEGETATIVE COVER IS ESTABLISHED. INSPECTION BY THE CONTRACTOR AND ANY NECESSARY REPAIRS SHALL BE PERFORMED ONCE EVERY 7 CALENDAR DAYS AND WITHIN 24 HOURS AFTER ANY STORM EVENT GREATER THAN 0.5 INCH AS RECORDED BY A NON-FREEZING RAIN GAUGE TO BE LOCATED ON SITE. POTENTIALLY ERODIBLE AREAS, DRAINAGE WAYS, MATERIAL STORAGE, STRUCTURAL DEVICES, CONSTRUCTION ENTRANCES AND EXITS ALONG WITH EROSION AND SEDIMENT CONTROL LOCATIONS ARE EXAMPLES OF SITES THAT NEED TO BE INSPECTED.

WASTE MATERIAL:
 PROPER MANAGEMENT AND DISPOSAL OF CONSTRUCTION WASTE MATERIAL IS REQUIRED BY THE CONTRACTOR. MATERIALS INCLUDE STOCKPILES, SURPLUS, DEBRIS AND ALL OTHER BY-PRODUCTS FROM THE CONSTRUCTION PROCESS. PRACTICES INCLUDE DISPOSAL, PROPER MATERIALS HANDLING, SPILL PREVENTION AND CLEANUP MEASURES. CONTROLS AND PRACTICES SHALL MEET THE REQUIREMENTS OF ALL FEDERAL, STATE AND LOCAL AGENCIES.

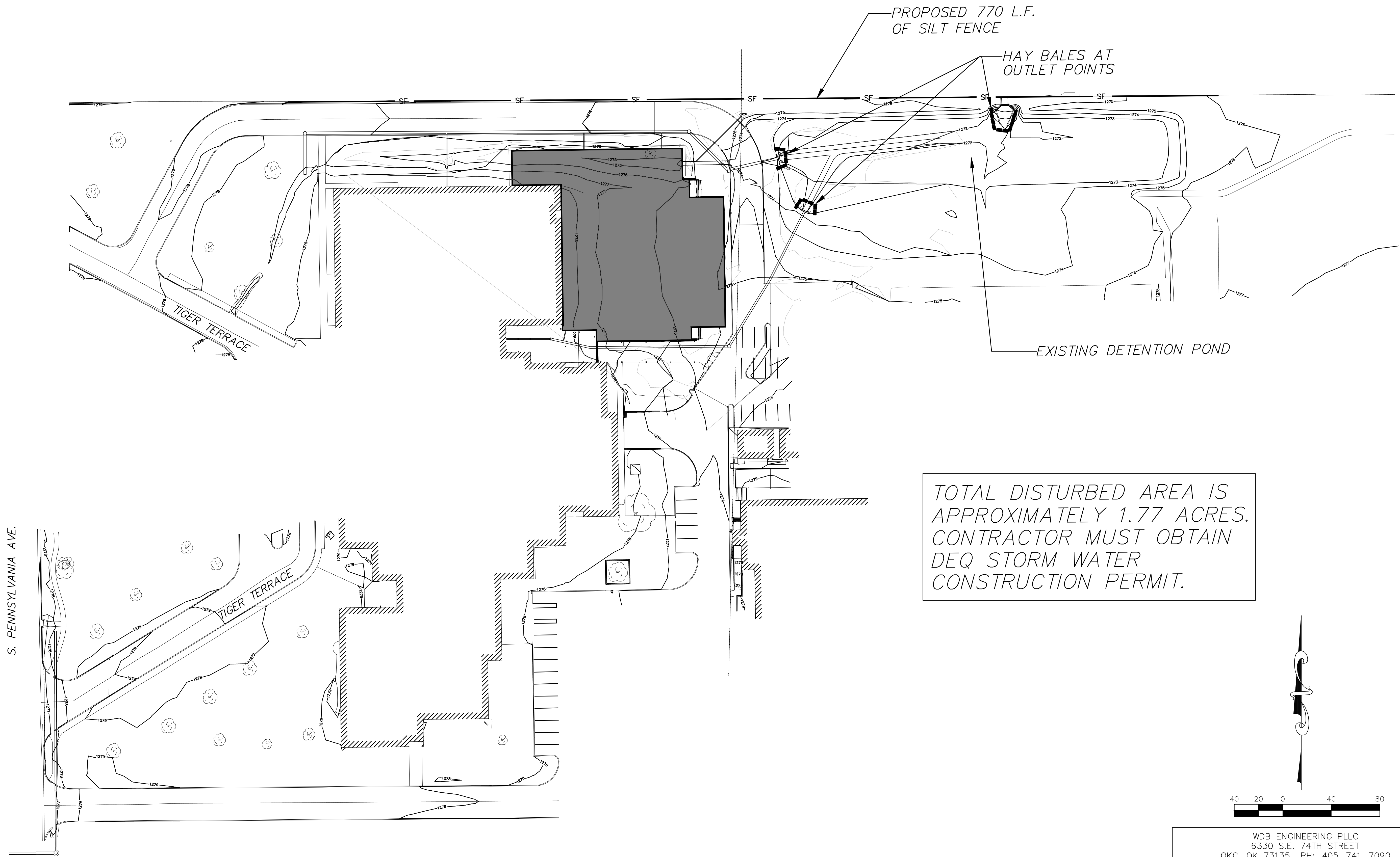
HAZARDOUS MATERIALS:
 PROPER MANAGEMENT AND DISPOSAL OF HAZARDOUS WASTE MATERIALS IS REQUIRED. THE CONTRACTOR IS RESPONSIBLE FOR FOLLOWING MANUFACTURER'S RECOMMENDATIONS, STATE AND FEDERAL REGULATIONS TO ENSURE CORRECT HANDLING, DISPOSAL, SPILL PREVENTION AND CLEANUP MEASURES. EXAMPLES INCLUDE BUT ARE NOT LIMITED TO: PAINTS, ACIDS, CLEANING SOLVENTS, CHEMICAL ADDITIVES, CONCRETE CURING COMPOUNDS AND CONTAMINATED SOILS.

GENERAL NOTES:
 PROPER MANAGEMENT AND DISPOSAL OF HAZARDOUS WASTE MATERIALS IS REQUIRED. THE CONTRACTOR IS RESPONSIBLE FOR FOLLOWING MANUFACTURER'S RECOMMENDATIONS, STATE AND FEDERAL REGULATIONS TO ENSURE CORRECT HANDLING, DISPOSAL, SPILL PREVENTION AND CLEANUP MEASURES. EXAMPLES INCLUDE BUT ARE NOT LIMITED TO: PAINTS, ACIDS, CLEANING SOLVENTS, CHEMICAL ADDITIVES, CONCRETE CURING COMPOUNDS AND CONTAMINATED SOILS.

THE FOLLOWING SECTIONS OF THE 2019 ODOT STANDARD SPECIFICATIONS SHOULD BE NOTED:

- 103.05 BONDING REQUIREMENTS
- 104.10 FINAL CLEANING UP
- 104.12 CONTRACTOR'S RESPONSIBILITY FOR WORK
- 104.13 ENVIRONMENTAL PROTECTION
- 106.08 STORAGE AND HANDLING MATERIAL
- 107.01 LAWS, RULES AND REGULATIONS TO BE OBSERVED
- 107.20 STORM WATER MANGEMENT
- 220 MANAGEMENT OF EROSION, SEDIMENTATION AND STORM WATER POLLUTION PREVENTION AND CONTROL
- 221 TEMPORARY SEDIMENT CONTROL

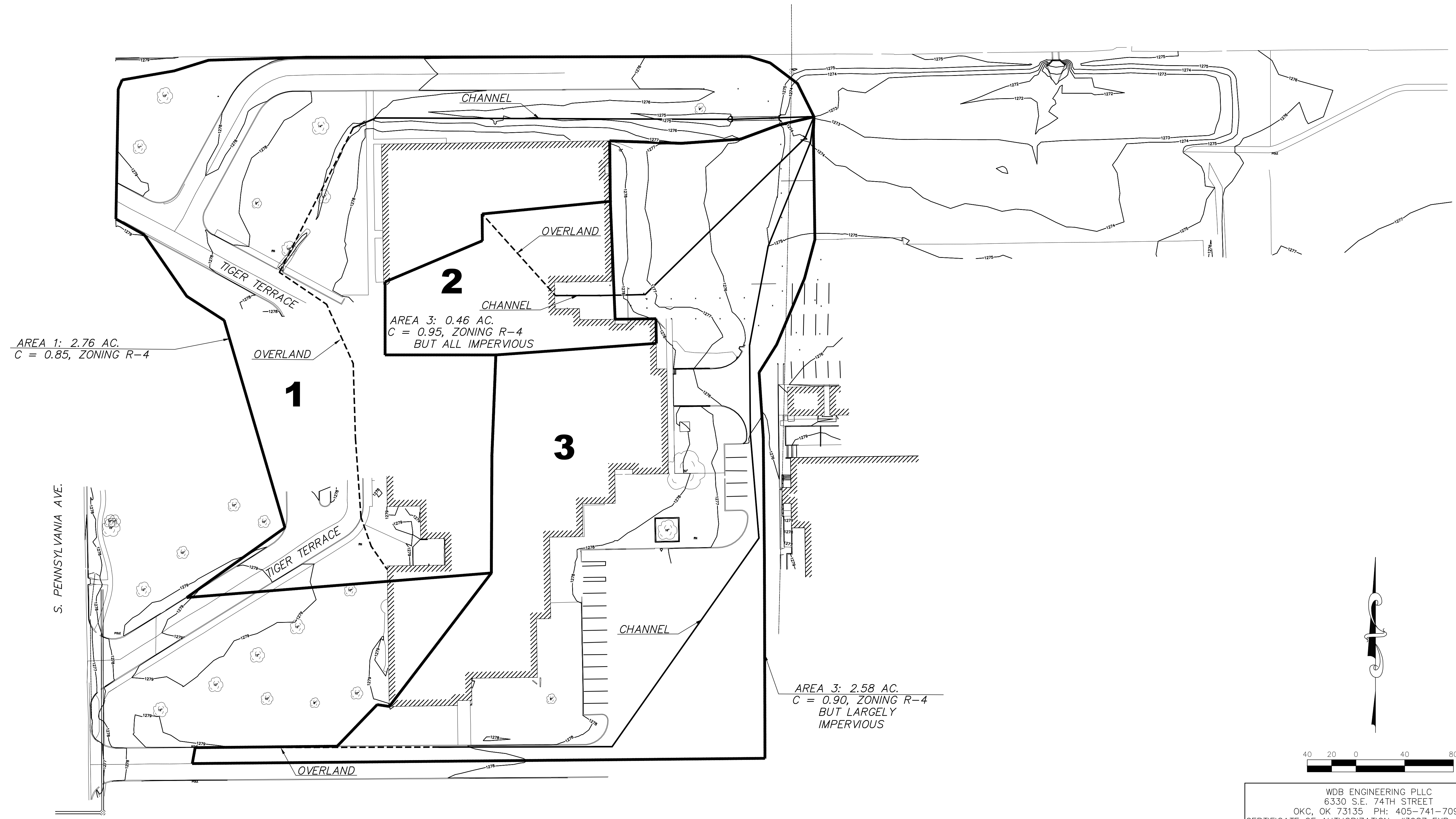
WDB ENGINEERING PLLC 6330 S.E. 74TH STREET OKC, OK 73135 PH: 405-741-7090 CERTIFICATE OF AUTHORIZATION: #3987 EXP: 6-30-2023		
CLASSROOM ADDITION MOORE WEST JUNIOR HIGH SCHOOL		
DATE: 03-14-2022	APPROVED BY	DRAWN BY MW
STORM WATER MANAGEMENT PLAN		
WDB ENGINEERING P.L.L.C.		SHEET NUMBER SWPPP1



TOTAL DISTURBED AREA IS APPROXIMATELY 1.77 ACRES. CONTRACTOR MUST OBTAIN DEQ STORM WATER CONSTRUCTION PERMIT.

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CLASSROOM ADDITION MOORE WEST JUNIOR HIGH SCHOOL		
DATE: 5-25-22	APPROVED BY:	DRAWN BY: MW
EROSION CONTROL SITE PLAN		
WDB ENGINEERING P.L.L.C.		SHEET NUMBER SWPPP2

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AREA 1: 2.76 AC.
C = 0.85, ZONING R-4

AREA 2: 0.46 AC.
C = 0.95, ZONING R-4
BUT ALL IMPERVIOUS

AREA 3: 2.58 AC.
C = 0.90, ZONING R-4
BUT LARGELY IMPERVIOUS

S. PENNSYLVANIA AVE.

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6330 S.E. 74TH STREET
OKC, OK 73135 PH: 405-741-7090
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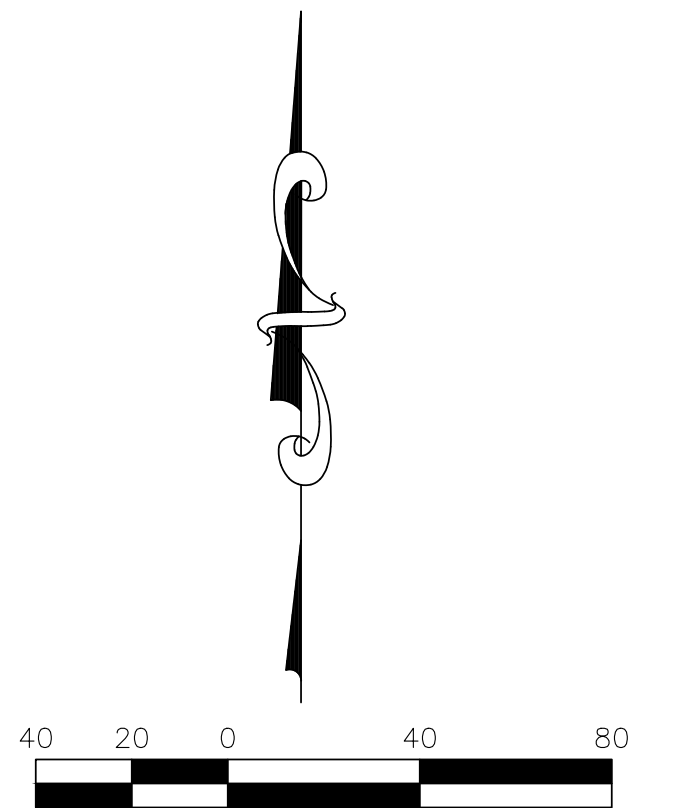
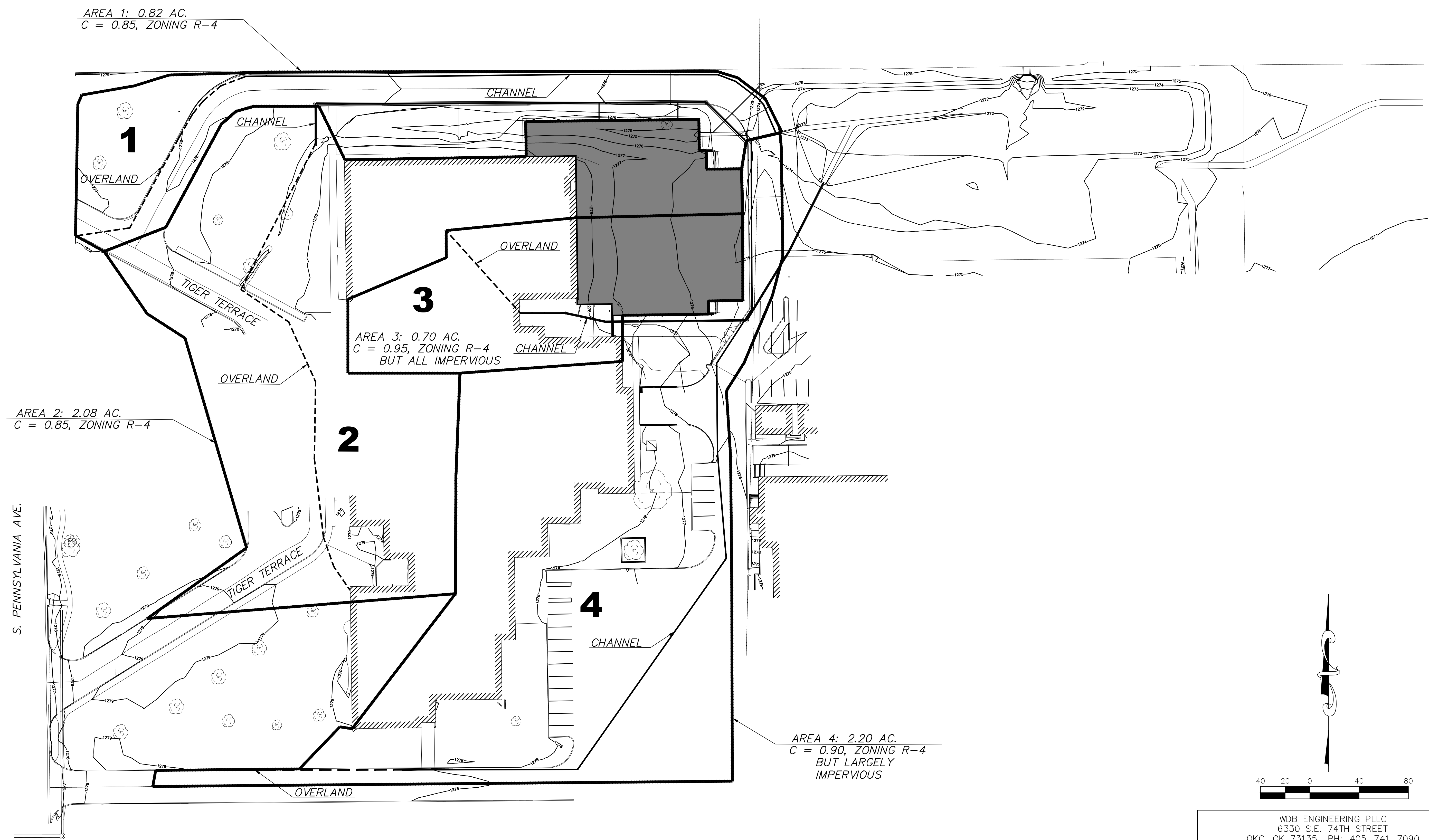
CLASSROOM ADDITION
MOORE WEST JUNIOR HIGH SCHOOL

DATE: 5-25-22 APPROVED BY: DRAWN BY: MW

EXISTING DRAINAGE AREA MAP

WDB ENGINEERING P.L.L.C. SHEET NUMBER DA01

H:\JOBS\3265\DWG\

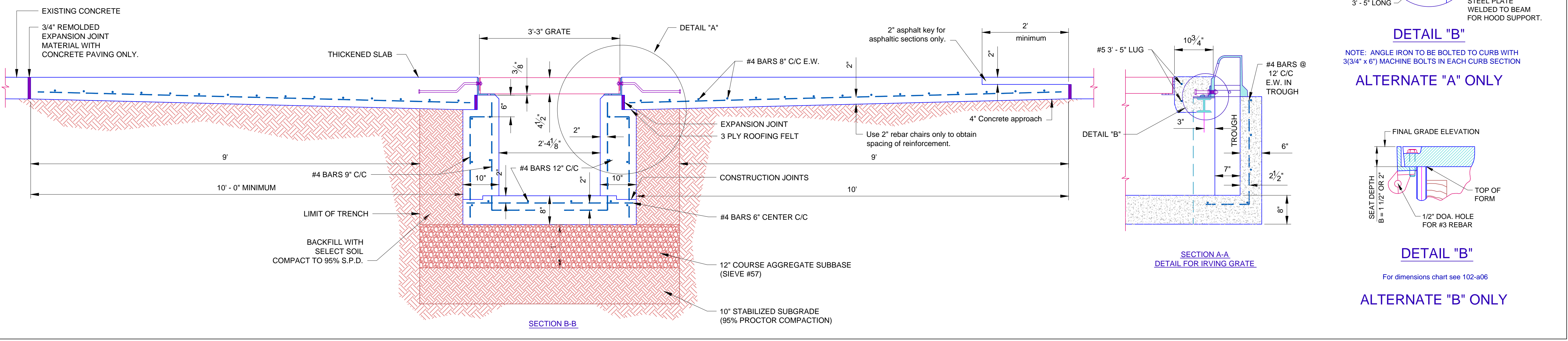
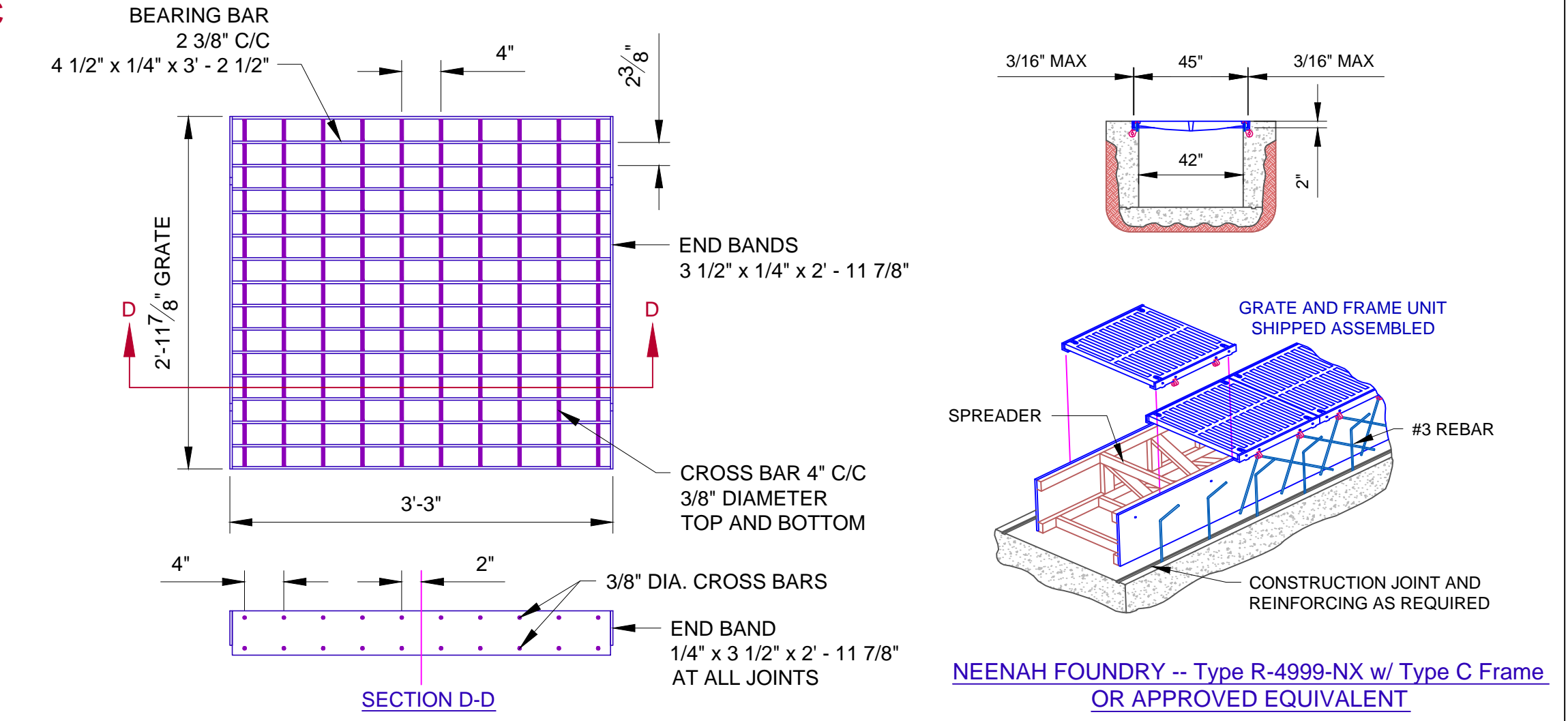
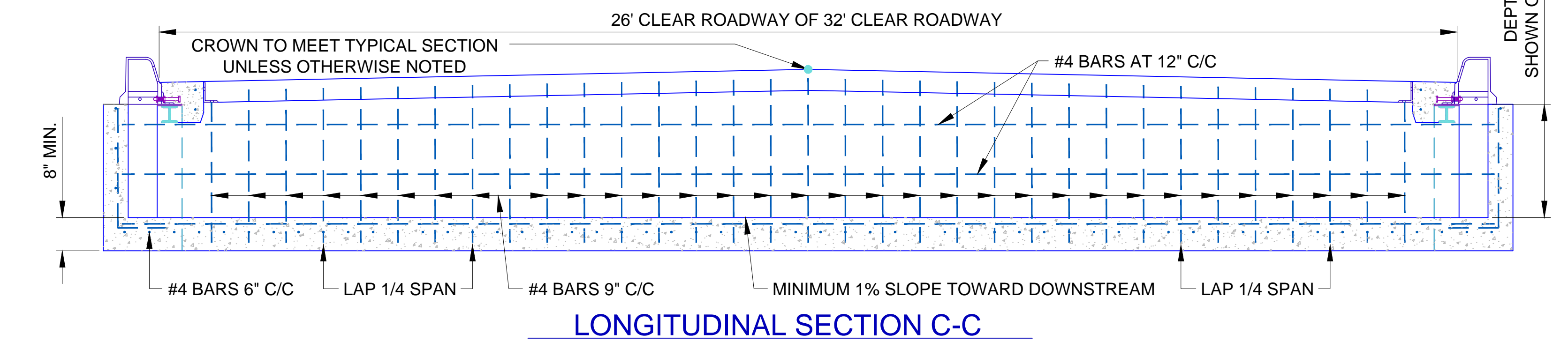
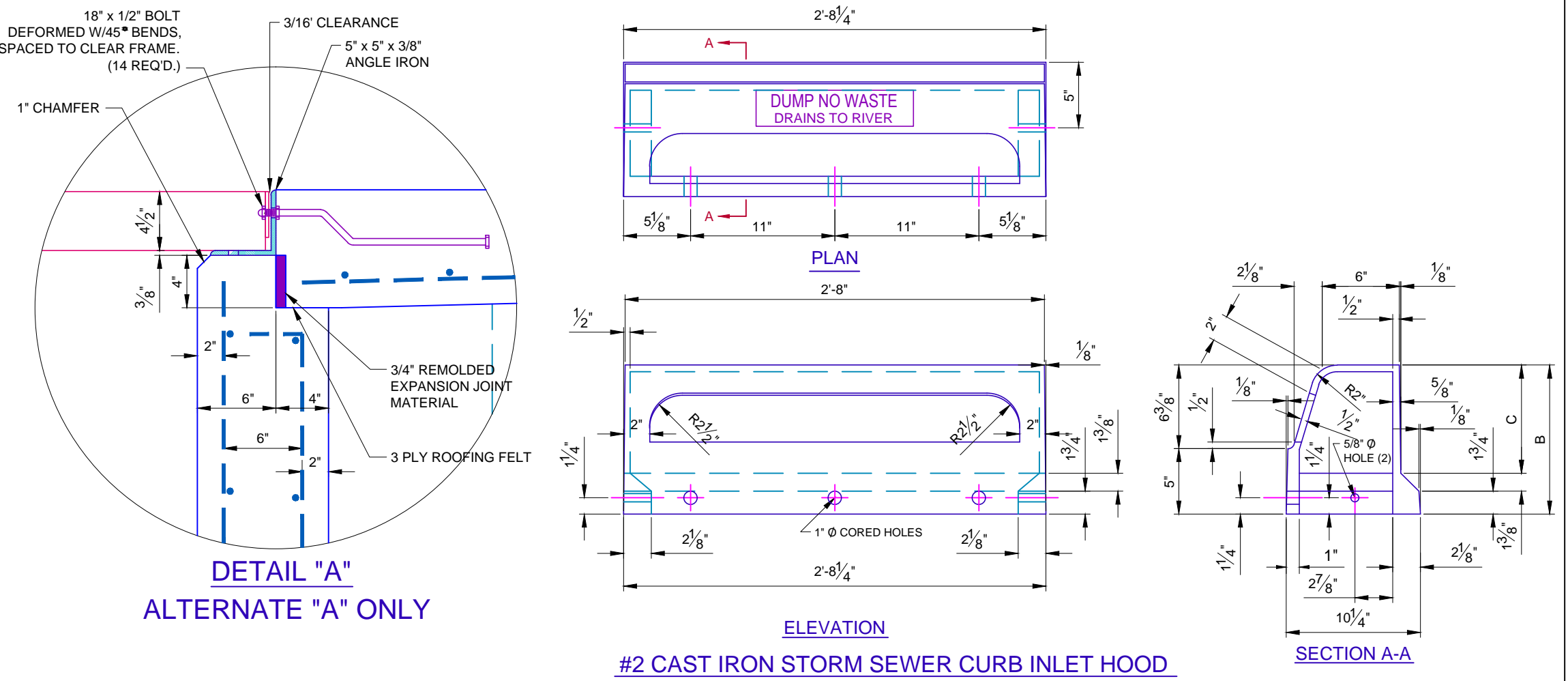
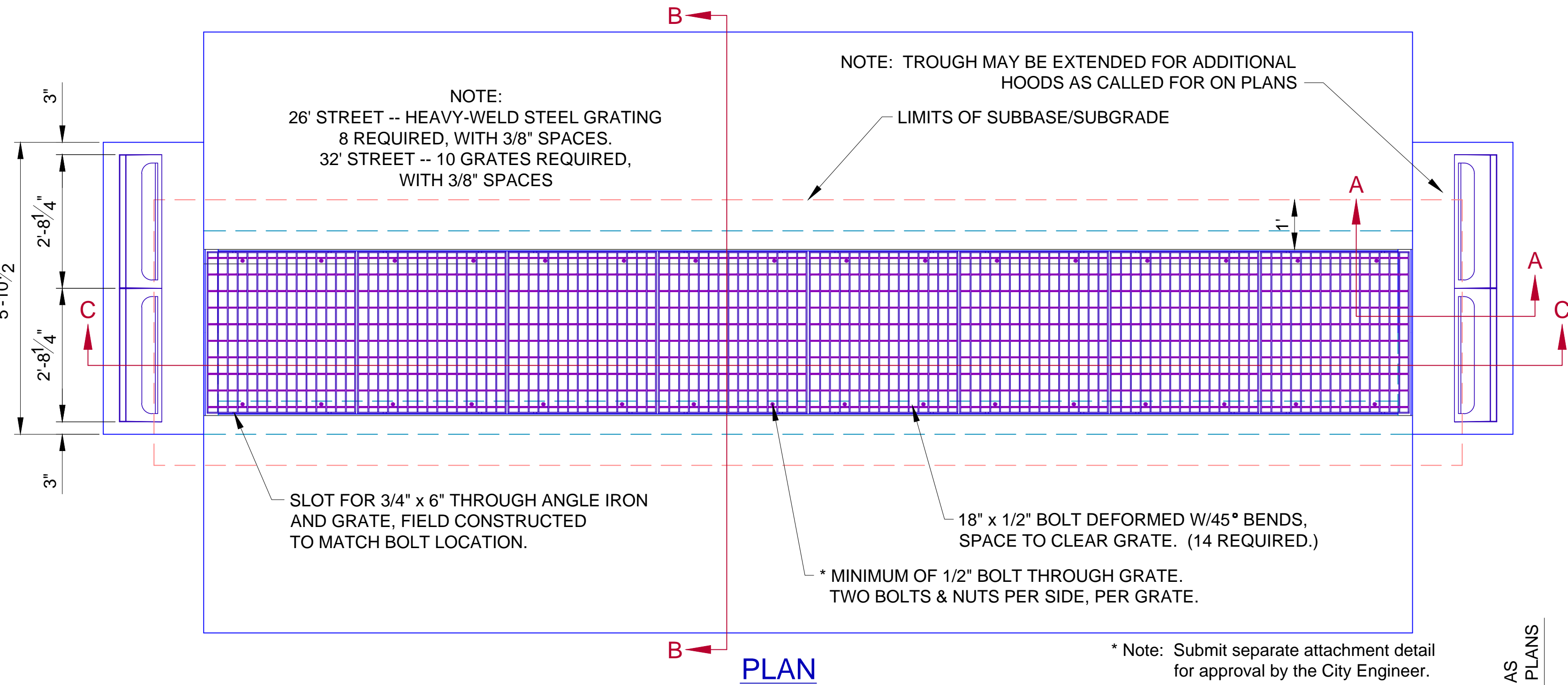


WDB ENGINEERING PLLC 6330 S.E. 74TH STREET OKC, OK 73135 PH: 405-741-7090 CERTIFICATE OF AUTHORIZATION: #3987 EXP: 6-30-2023		
CLASSROOM ADDITION MOORE WEST JUNIOR HIGH SCHOOL		
DATE: 5-25-22	APPROVED BY:	DRAWN BY: MW
PROPOSED DRAINAGE AREA MAP		
WDB ENGINEERING P.L.L.C.		SHEET NUMBER DA02

QUANTITIES OF ANGLE IRON FOR CURB INLETS		
# OF CAST HOODS	# OF PIECES	LENGTH OF 3" x 3" Δ
2 - 0	1	5' - 1 5/8"
2 - 1	1	10' - 6 1/8"
2 - 2	1	15' - 10 5/8"
2 - 3	2	10' - 6 1/8"

VARIABLE DIMENSION FOR ALL CURB CASTINGS			
	A	B	C
6" CURB FACE	7"	11 3/8"	8 1/4"
8" CURB FACE	9"	13 3/8"	10 1/4"

STREET WIDTH	IKG GRATE	
	SUMP	ON GRADE (NOT IN SUMP)
26'	112	67
32'	140	84



The City of Oklahoma City Public Works Department Engineering Division

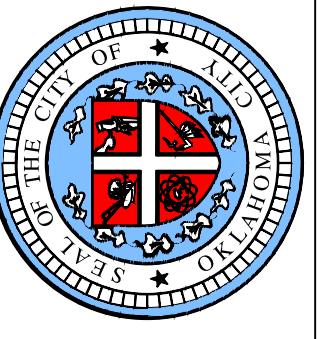
APPROVED BY: DATE: 01-31-13
ERIC J. WENGER, P.E. CITY ENGINEER

DRAWN: VSC DATE: 01-31-13

GRADED STREET INLET DETAIL

Drawing Number D-102

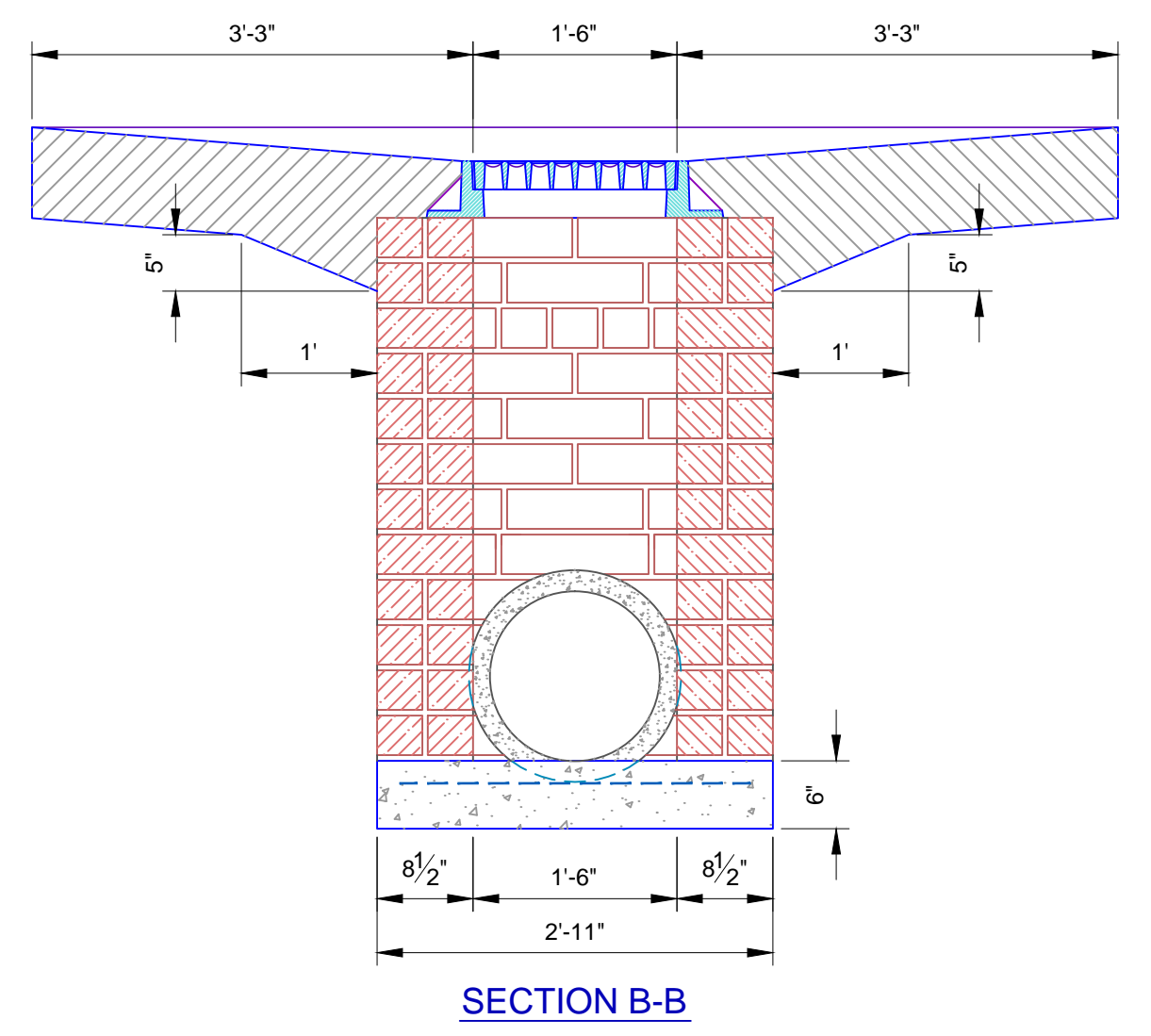
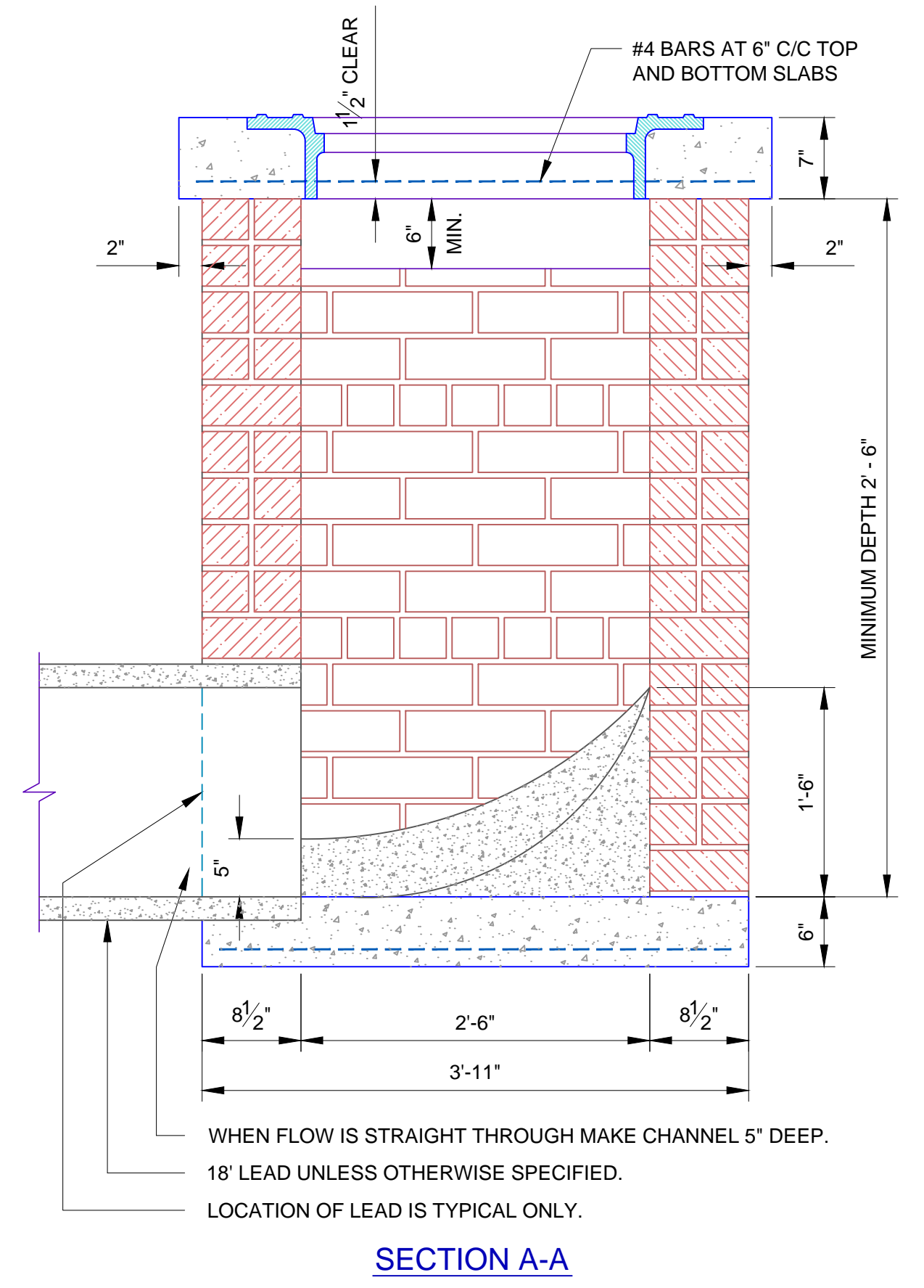
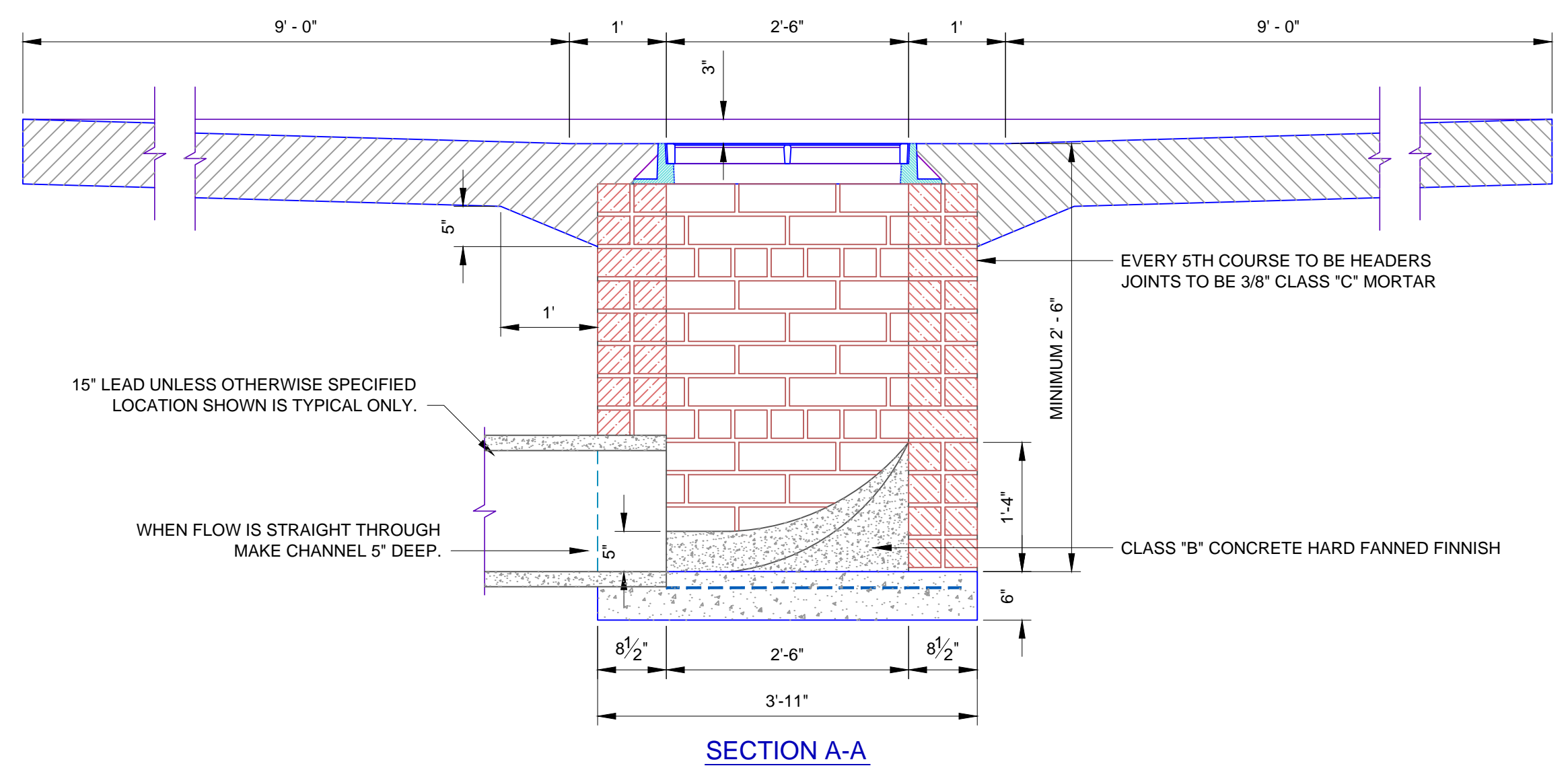
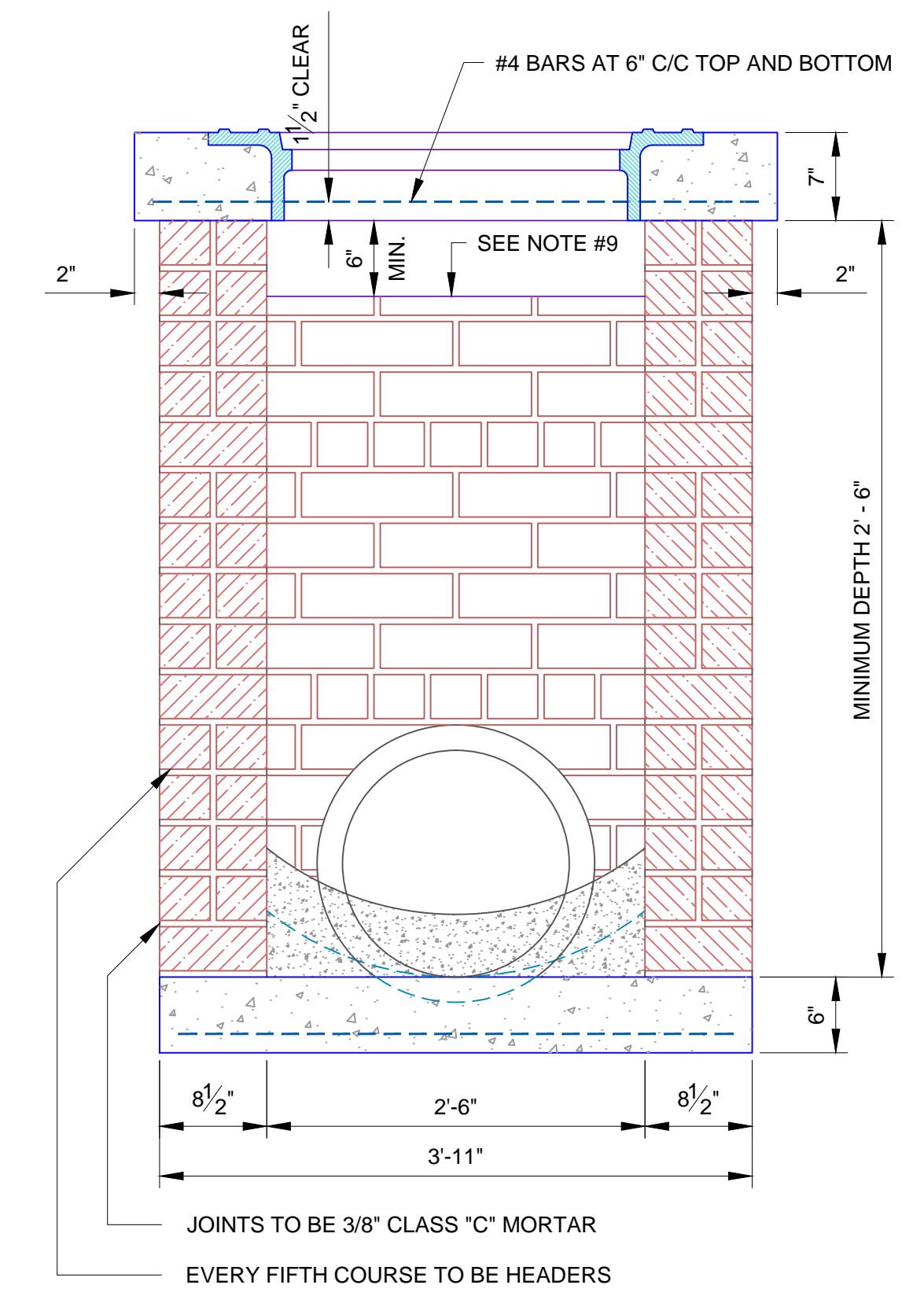
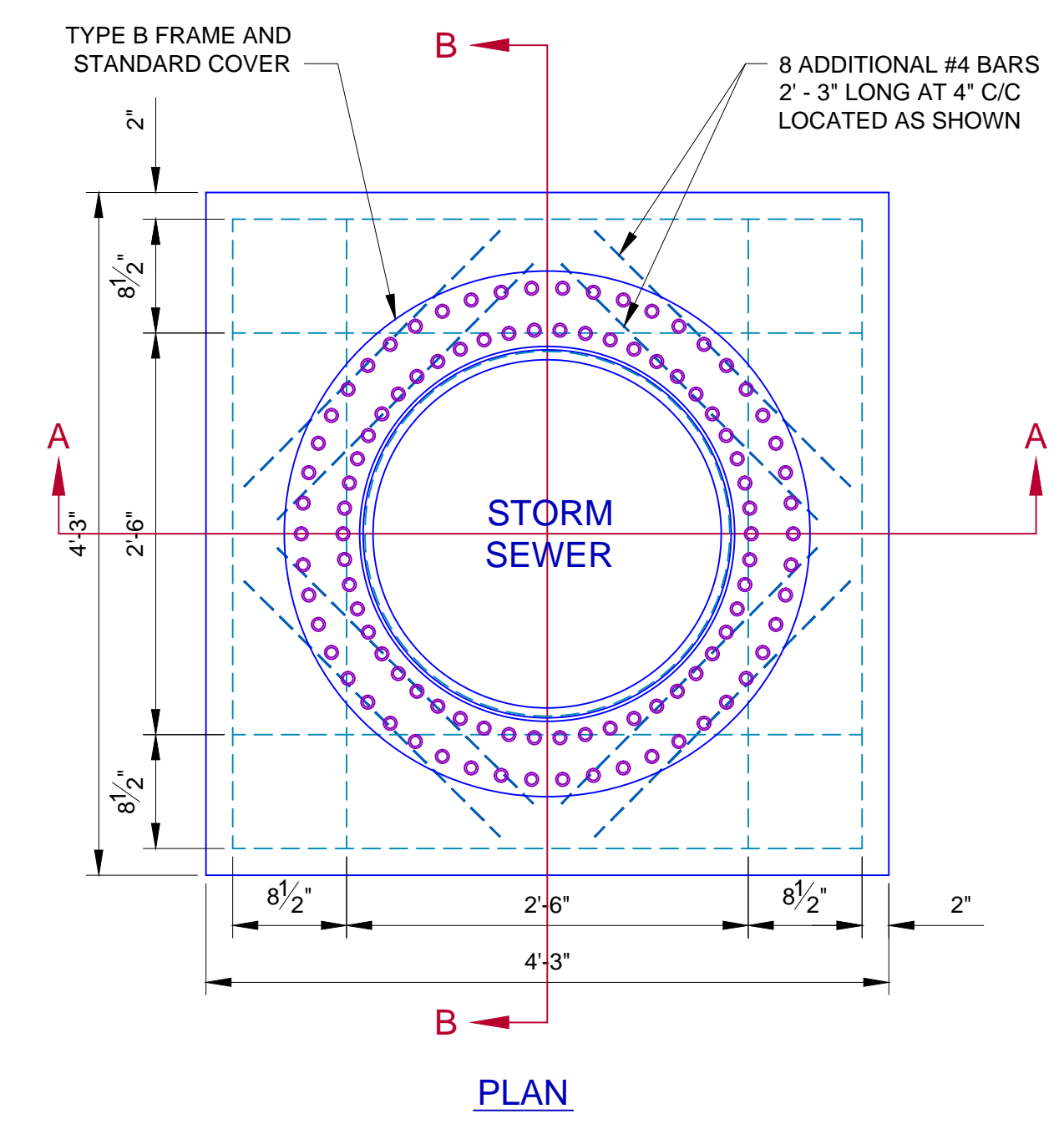
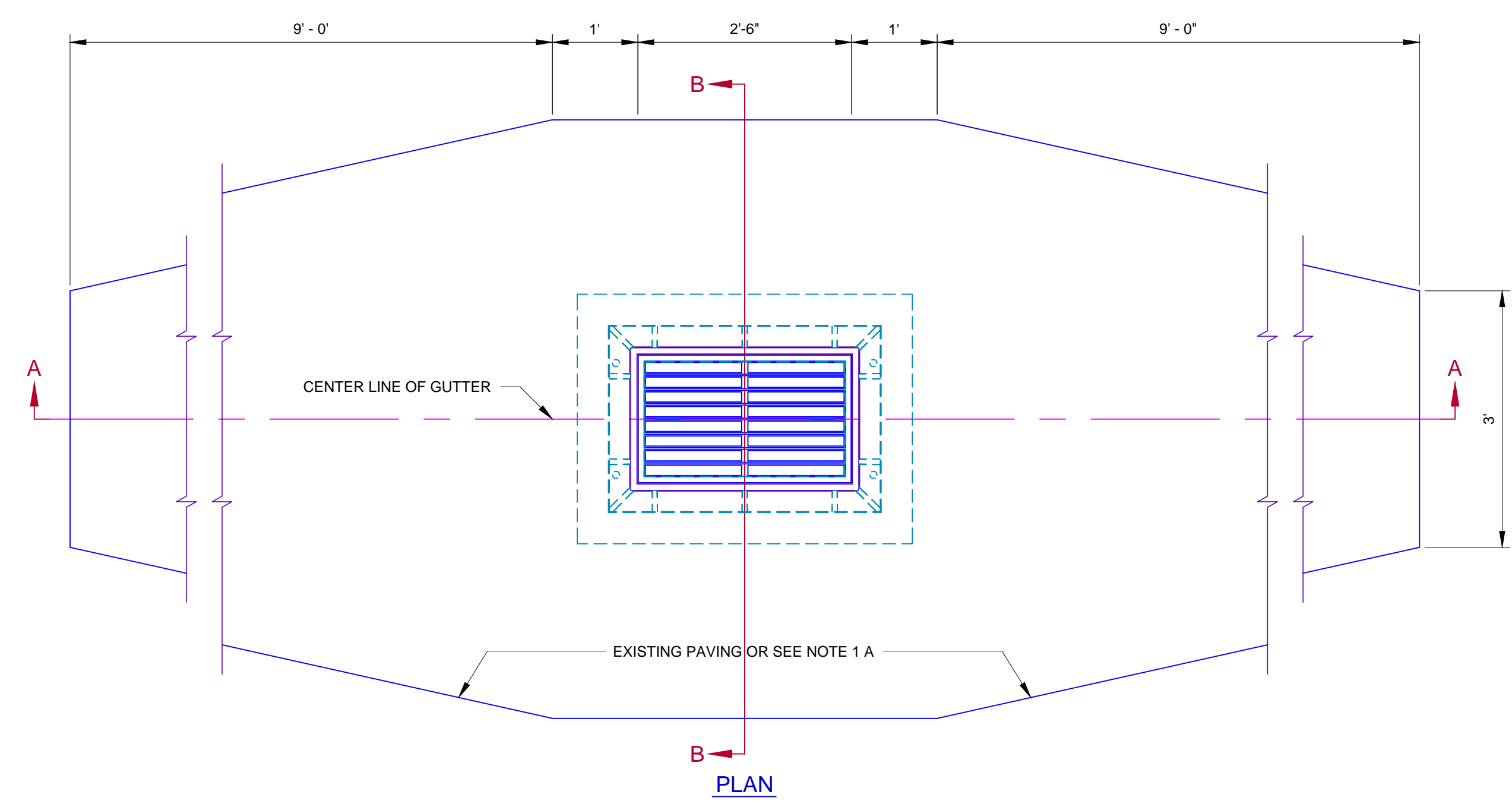
\\a.okc.lncc\pww-section\CITYACAD-STDSD-102 VSC 01-31-13



APPROVED BY: DATE: 01-31-13
ERIC J. WENGER, P.E.
CITY ENGINEER
DRAWN: VSC
DATE: 01-31-13

**STANDARD INLET DETAILS
DESIGN # 5 (SINGLE GRATING)
AND BOX TYPE INLET**

Drawing Number
D-103

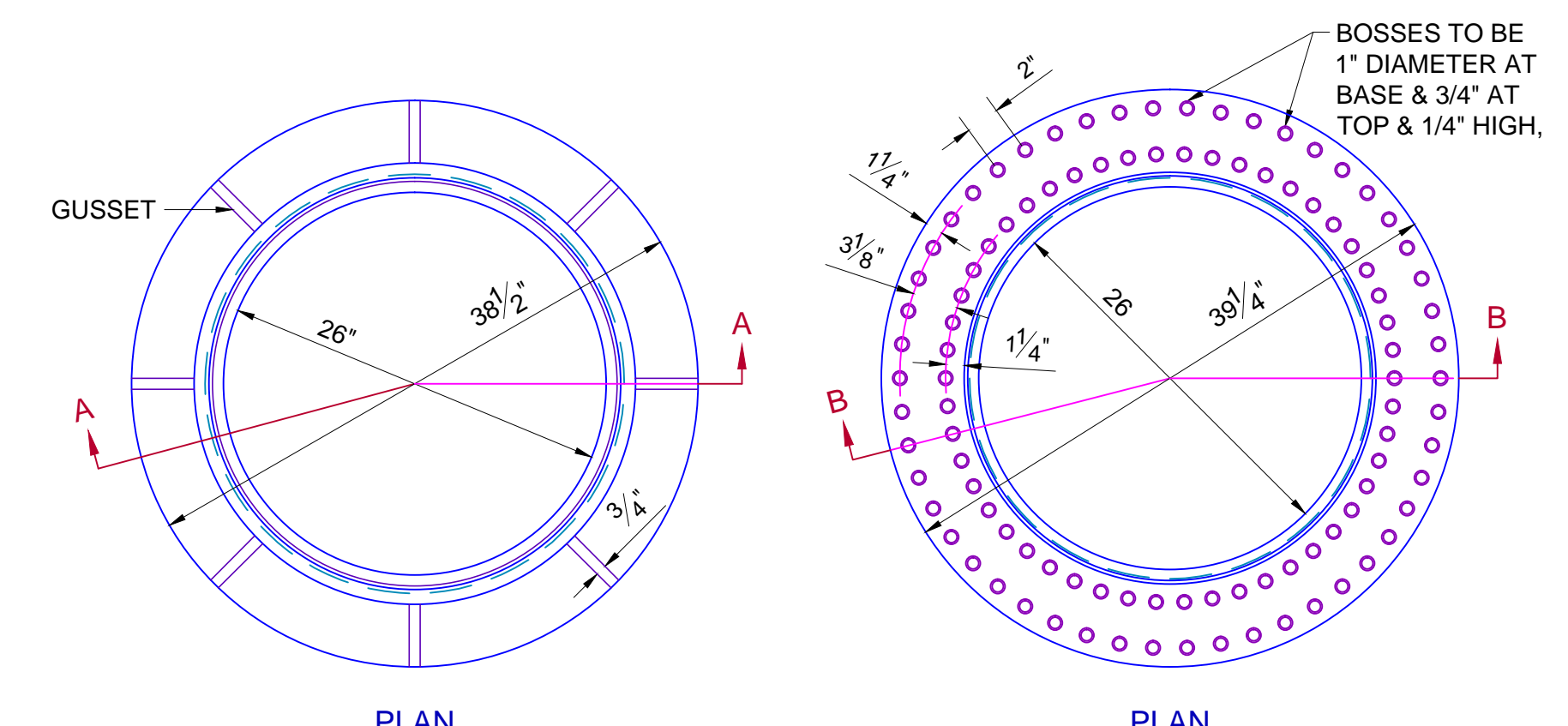


- GENERAL NOTES:**
1. WHEN INLET IS BUILT IN NEW PAVEMENT, THE PAVEMENT SHALL BE MONOLITHIC WITH NEW PAVEMENT AND CONFORM TO PLANS AND SPECIFICATIONS THEREOF.
 2. CAST IRON STEPS SHALL BE PLACED IN ALL INLETS 3' OR MORE IN DEPTH IN CONFORMITY WITH STANDARD SPECIFICATIONS.
 3. THE GRATING TO BE USED IN THIS STRUCTURE WILL BE SHOWN ON THE PLANS OR DESIGNATED IN SPECIAL PROVISIONS.
 4. THIS STRUCTURE WILL BE DESIGNED ON PLANS AS INLET NUMBER 5.
 5. BASIS OF PAYMENT FOR INLETS WILL BE FOR A LUMP SUM AS DETAILED OR UPON THE FOLLOWING ITEMS AS DESIGNATED IN THE PROPOSAL:
CUBIC FEET BRICK MASONRY
EACH TYPE "C" INLET FRAME & TYPE "A" GRATING
CUBIC YARDS TYPE "B" CONCRETE INLET BOTTOMS

**STORM SEWER INLET
DESIGN # 5 - SINGLE GRATING**

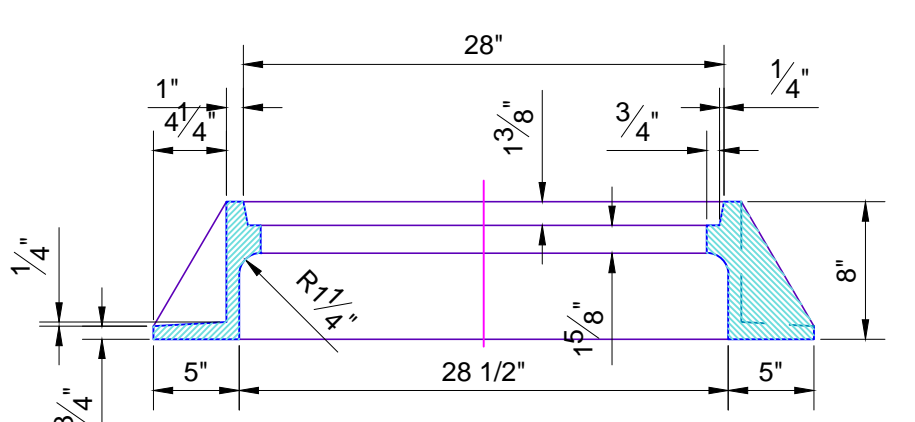
- GENERAL NOTES**
1. THIS TYPE INLET IS STANDARD FOR UNPAVED STREETS AND UNDEVELOPED AREAS.
 2. TOP SLAB MAY BE CAST IN PLACE MORTAR OR PRE-CAST AND SET IN MORTAR.
 3. CONCRETE SHALL BE 3,500 LBS. PER SQUARE INCH.
 4. BASIS OF PAYMENT SHALL BE LUMP SUM OR AS DESIGNED IN THE PROPOSAL.
 5. REINFORCING STEEL IN TOP TO BE #4 BARS 4' - 0" LONG, IN BOTTOM TO BE 3' - 8" LONG, AT 6" ON CENTERS EACH WAY.
 6. OPENINGS MAY BE OMITTED ON 1, 2, OR 3 SIDES.
 7. OKLAHOMA CITY STANDARD TYPE B FRAME STANDARD COVER SHALL BE INSTALLED IN TOP SLAB.
 8. ALL DIMENSIONS SHOWN ARE MINIMUM DIMENSIONS AND MAY VARY ACCORDING TO THE PLANS.
 9. INLET WEIR ELEVATION TO BE CONSTRUCTED TO THE ELEVATION SHOWN IN THE PLANS OR BE A MINIMUM OF 1.0' BELOW EXISTING GROUND LINE.

BOX TYPE INLET

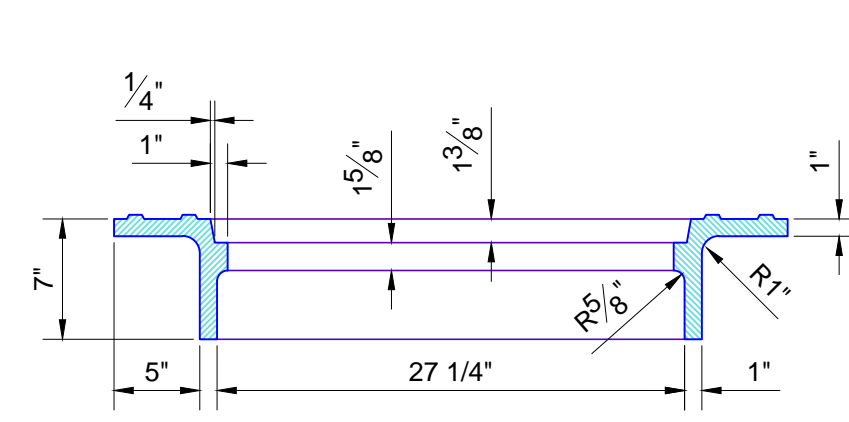


PLAN

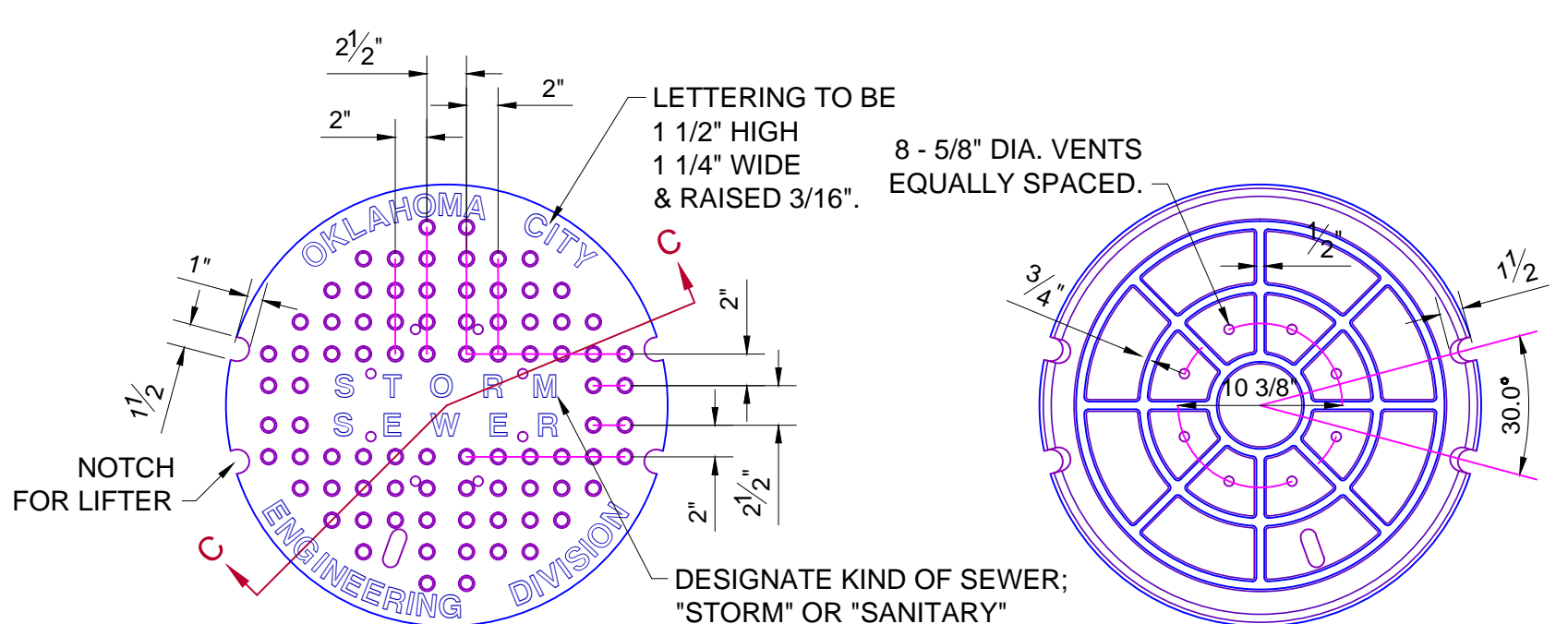
PLAN



SECTION A-A

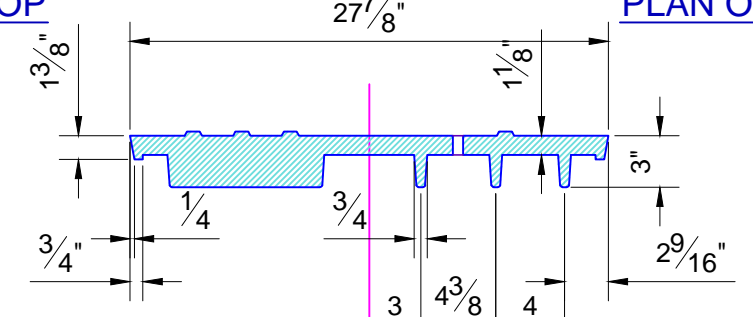


SECTION B-B



PLAN OF TOP

PLAN OF UNDERSIDE



PLAN OF UNDERSIDE

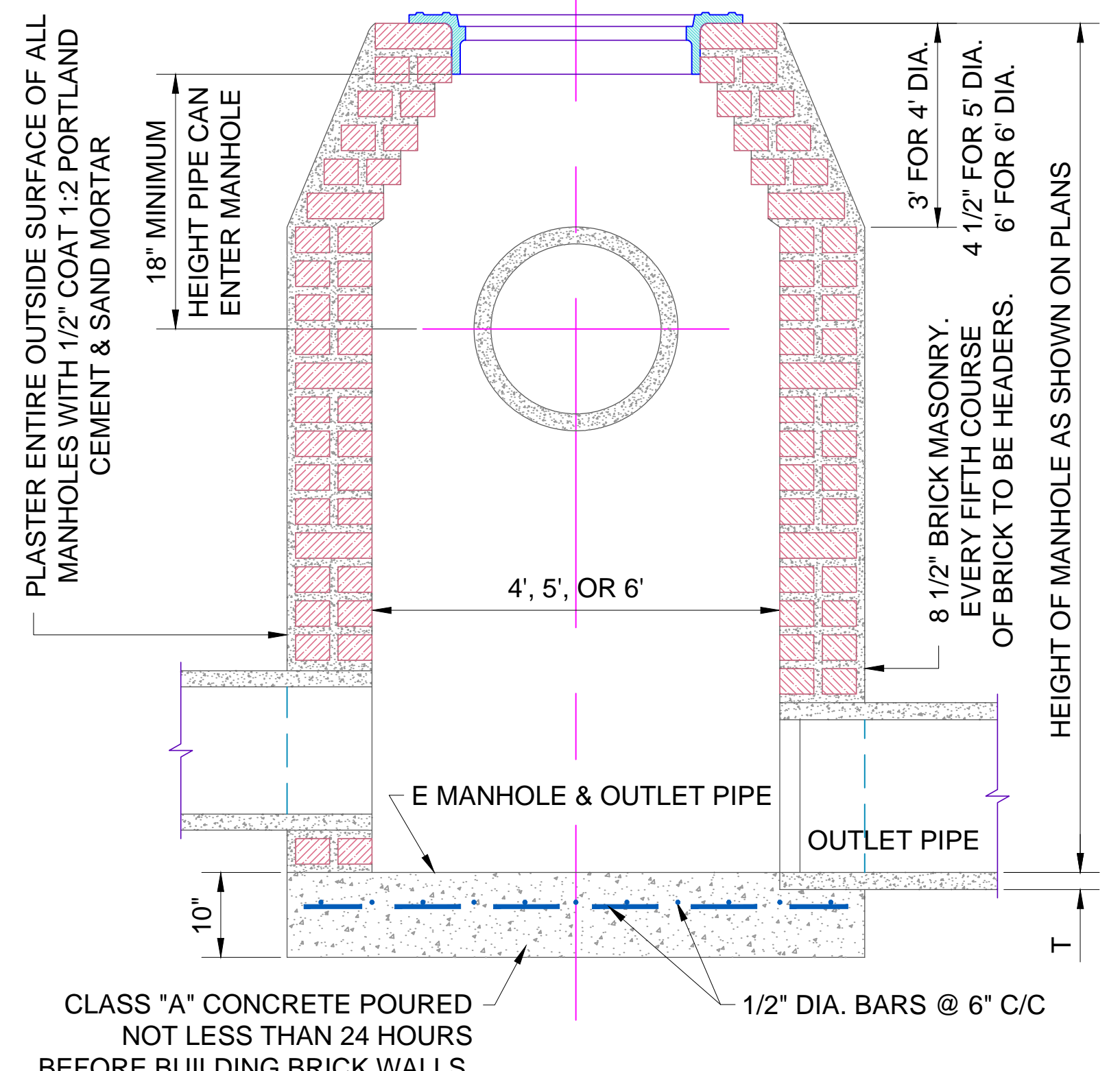
GENERAL NOTES:

1. CASTINGS TO CONFORM TO THE A.S.T.M. SPECIFICATIONS FOR GRAY IRON CASTINGS, SERIAL DESIGNATION A 48-28.
2. WHEN EACH COVER IS PLACED IN ANY POSITION IN ITS ASSOCIATED FRAME, THE SIDE PLAY IN ANY DIRECTION SHALL NOT EXCEED 1/8".
3. TYPE A FRAMES SHALL BE USED ON PAVED STREETS AND ALLEYS.
4. TYPE A FRAMES SHALL BE USED ON UNPAVED STREETS AND ALLEYS.
5. NO WORDING OF MARKINGS OF ANY KIND OTHER THAN THOSE SHOWN ON THIS STANDARD WILL BE PERMITTED ON THESE CASTINGS.
6. THE AVERAGE WEIGHT OF CASTINGS WILL NOT BE LESS THAN 98% OF WEIGHTS SHOWN.
7. REVERSIBLE FRAME AND COVER D-204, MAY BE USED IN LIEU OF FRAME AND COVER SHOWN ON D-201.

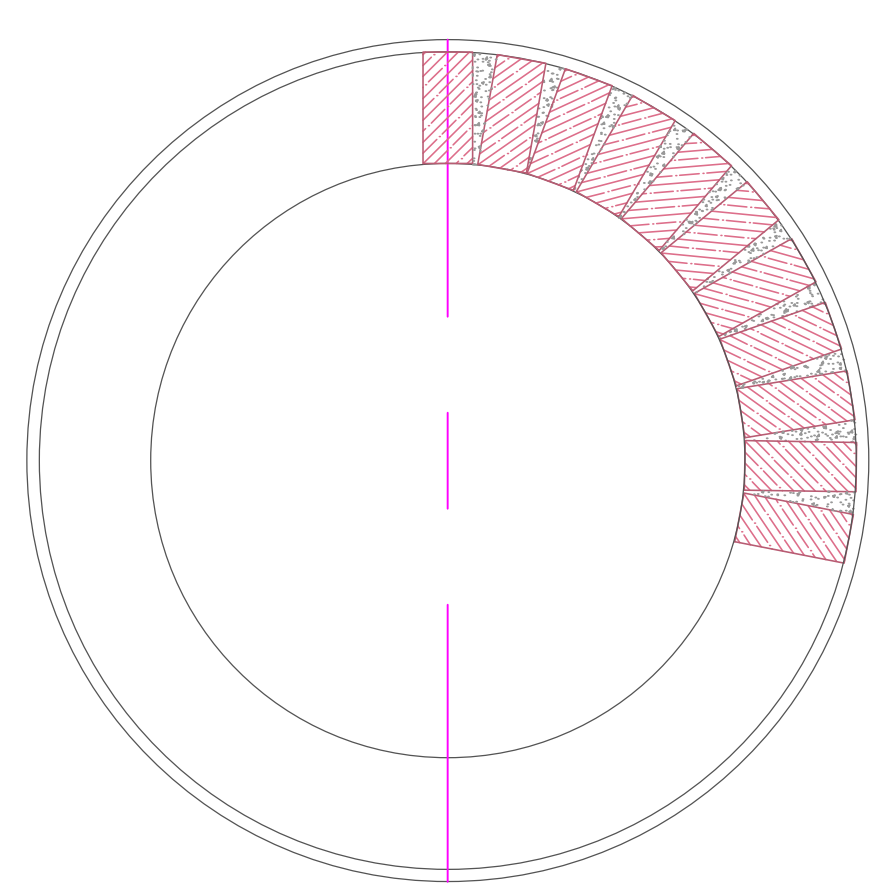
CASTING WEIGHTS

"A" RING ONLY	347 LBS.
"B" RING ONLY	392 LBS.
COVER ONLY	251 LBS.
TOTAL TYPE "A"	598 LBS.
TOTAL TYPE "B"	643 LBS.

PLASTER ENTIRE OUTSIDE SURFACE OF ALL MANHOLES WITH 1/2" COAT 1:2 PORTLAND CEMENT & SAND MORTAR

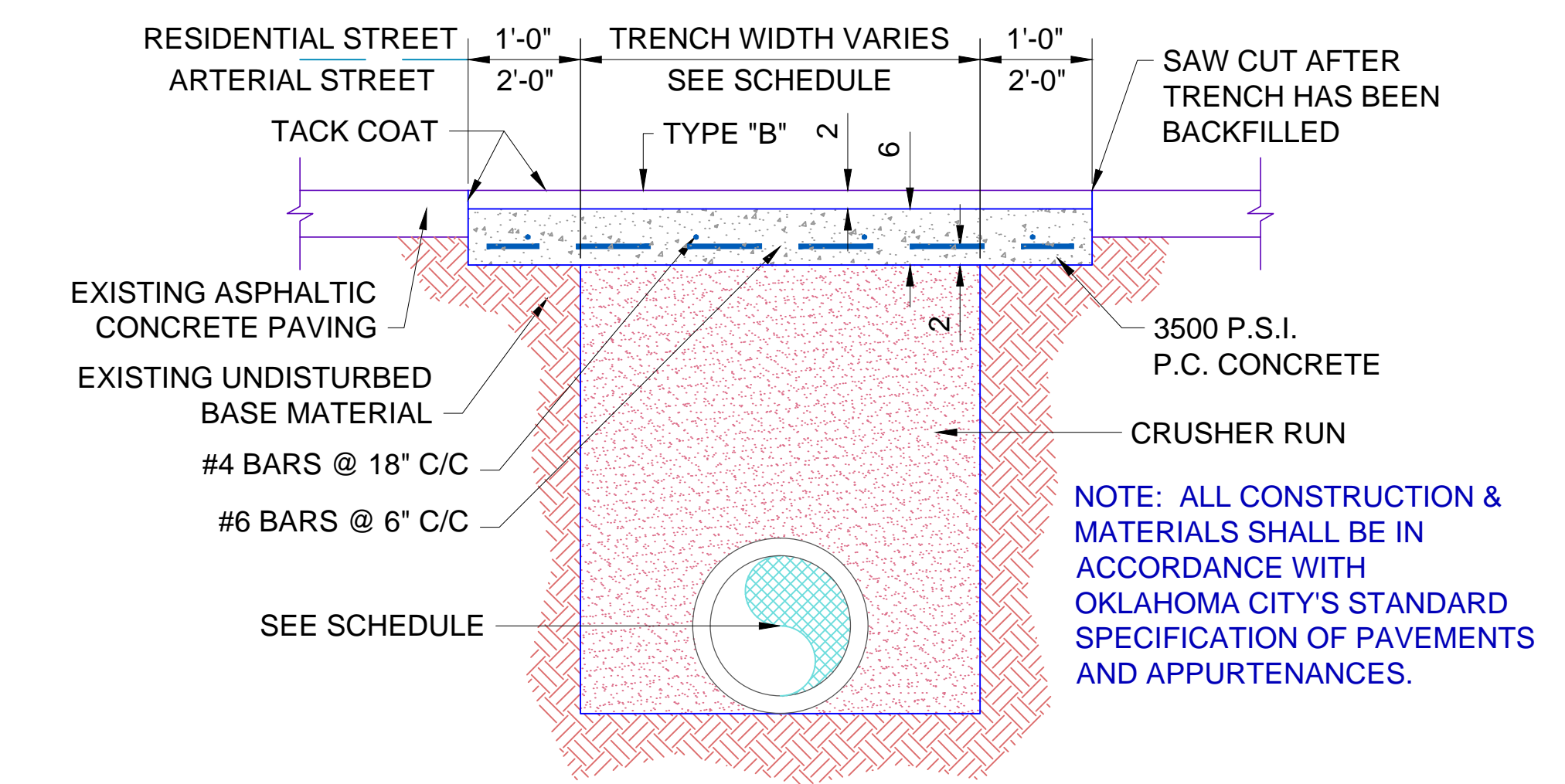


ELEVATION

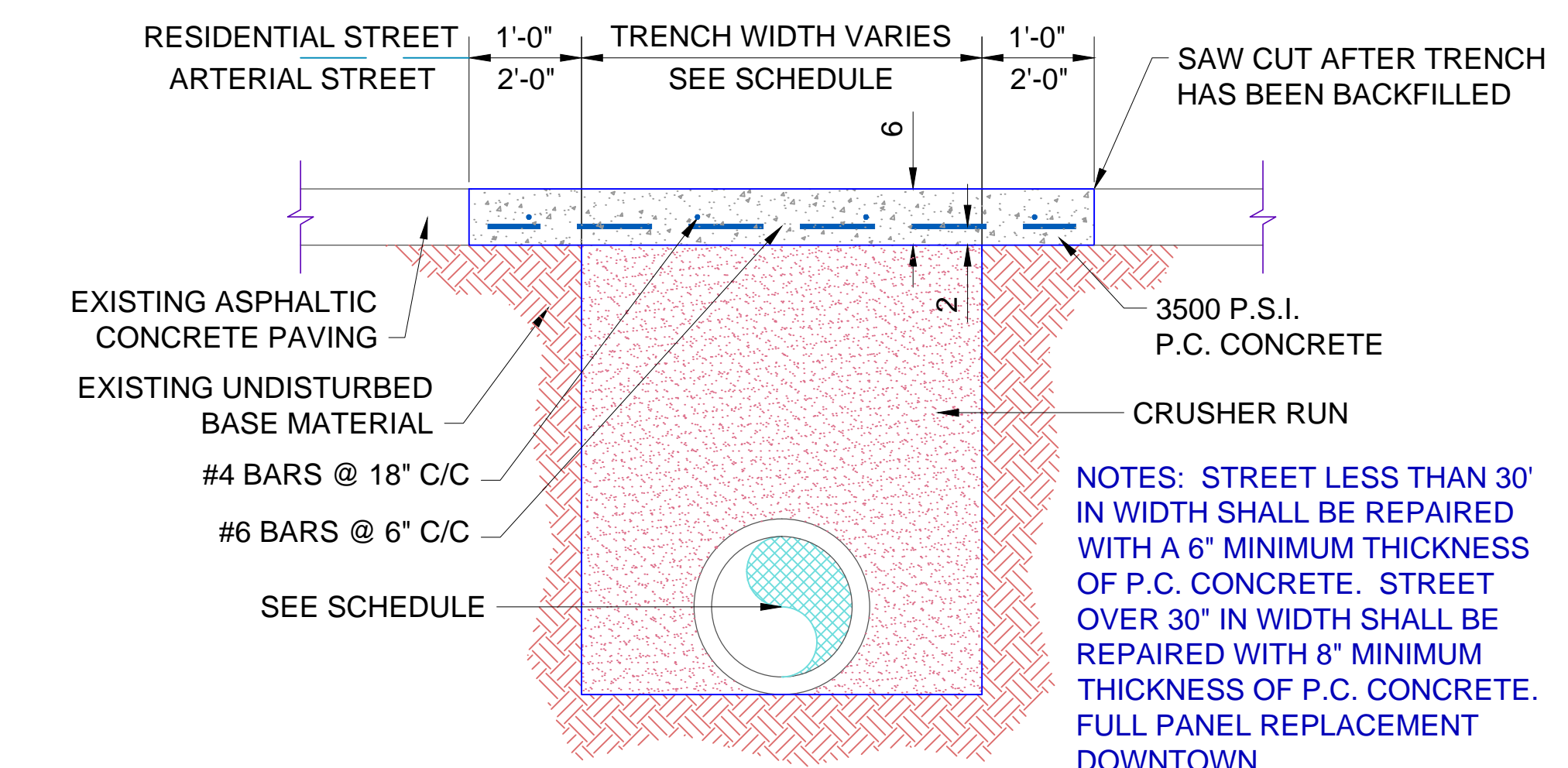


PLAN

DETAIL OF STANDARD MASONRY MANHOLE

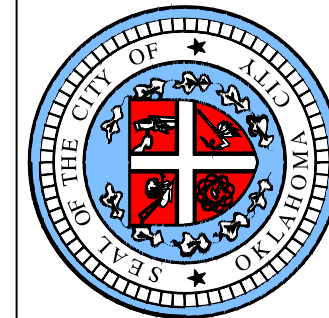


TYPICAL PERMANENT REPAIR SECTION FOR ASPHALT CONCRETE PAVING



TYPICAL PERMANENT REPAIR SECTION FOR P.C. CONCRETE PAVING

	TRENCH WIDTH SCHEDULE				
PIPE SIZE I.D.	12" OR LESS	15" TO 21"	24" TO 30"	33" TO 54"	60" & OVER
TRENCH WIDTH (W/O SHORING)	24"	O.D. + 12"	O.D. + 18"	O.D. + 15"	O.D. + 15"
TRENCH WIDTH (W/ SHORING)	36"	O.D. + 24"	O.D. + 30"	O.D. + 30"	O.D. + 36"

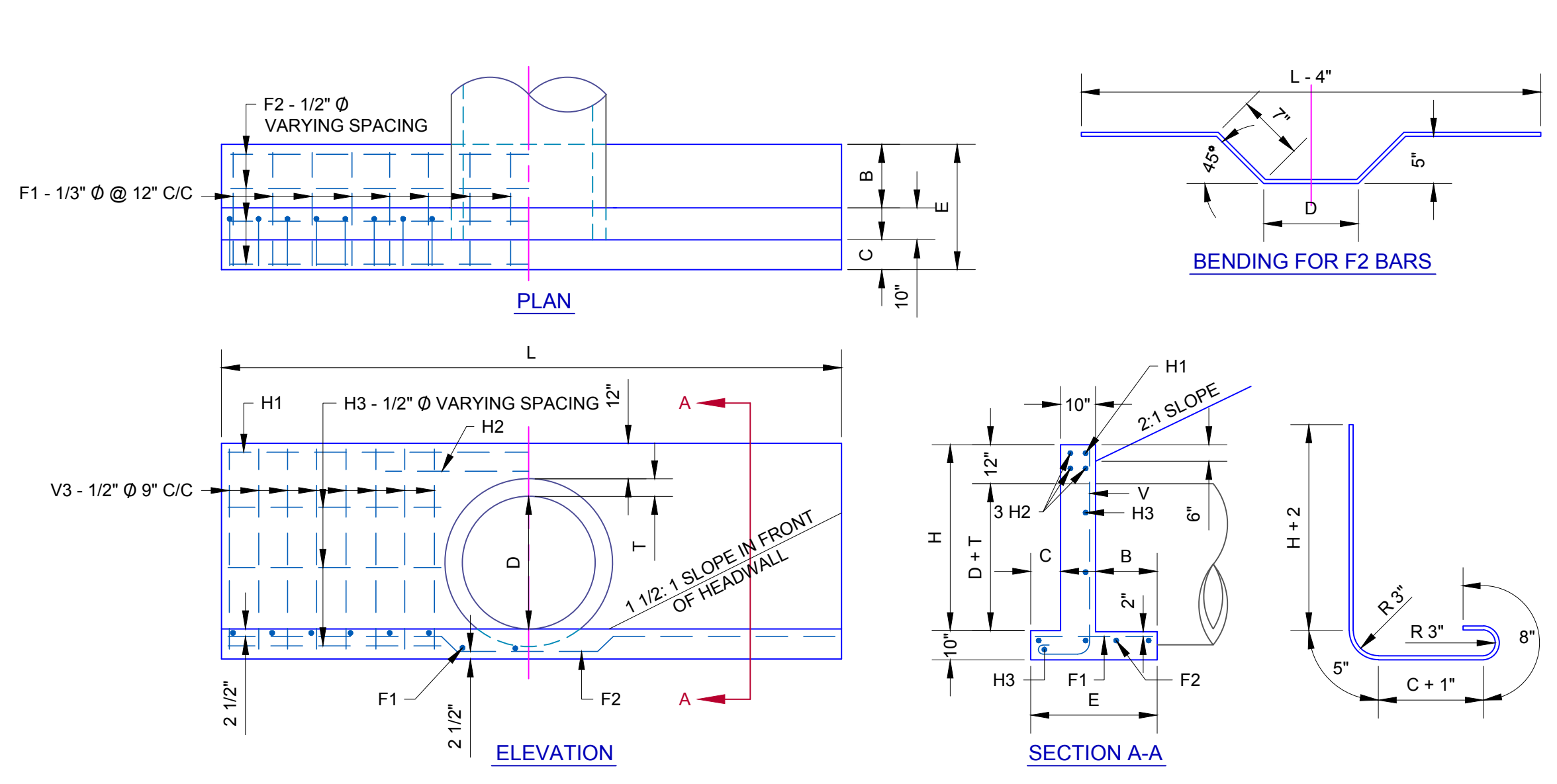


APPROVED BY: DATE: 02-06-13
ERIC J. WENGER, P.E.
CITY ENGINEER

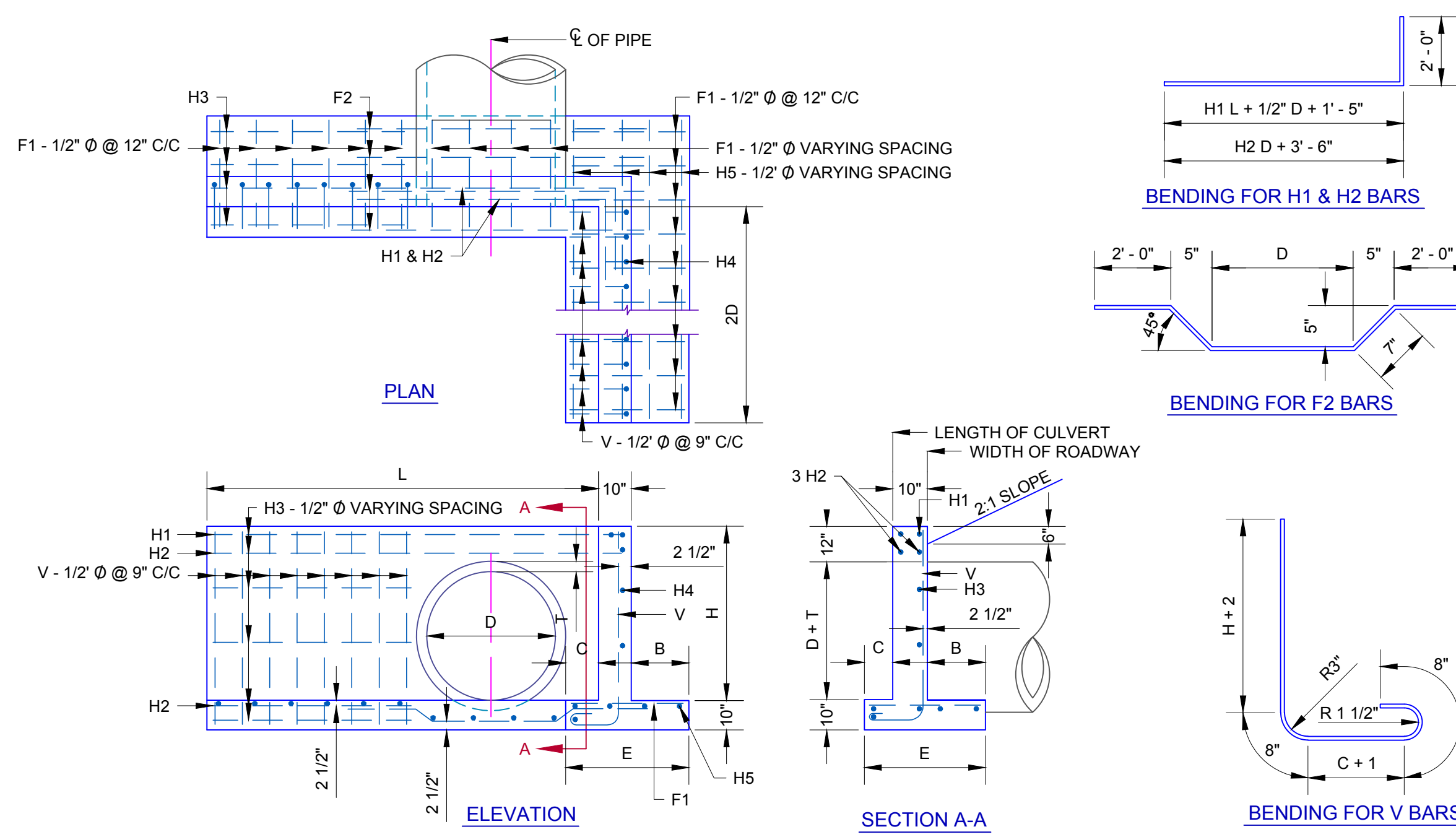
DRAWN: VSC
DATE: 02-06-13

**CAST IN PLACE CONCRETE
HEADWALLS FOR 15" TO 42"
REINFORCED CONCRETE PIPES**

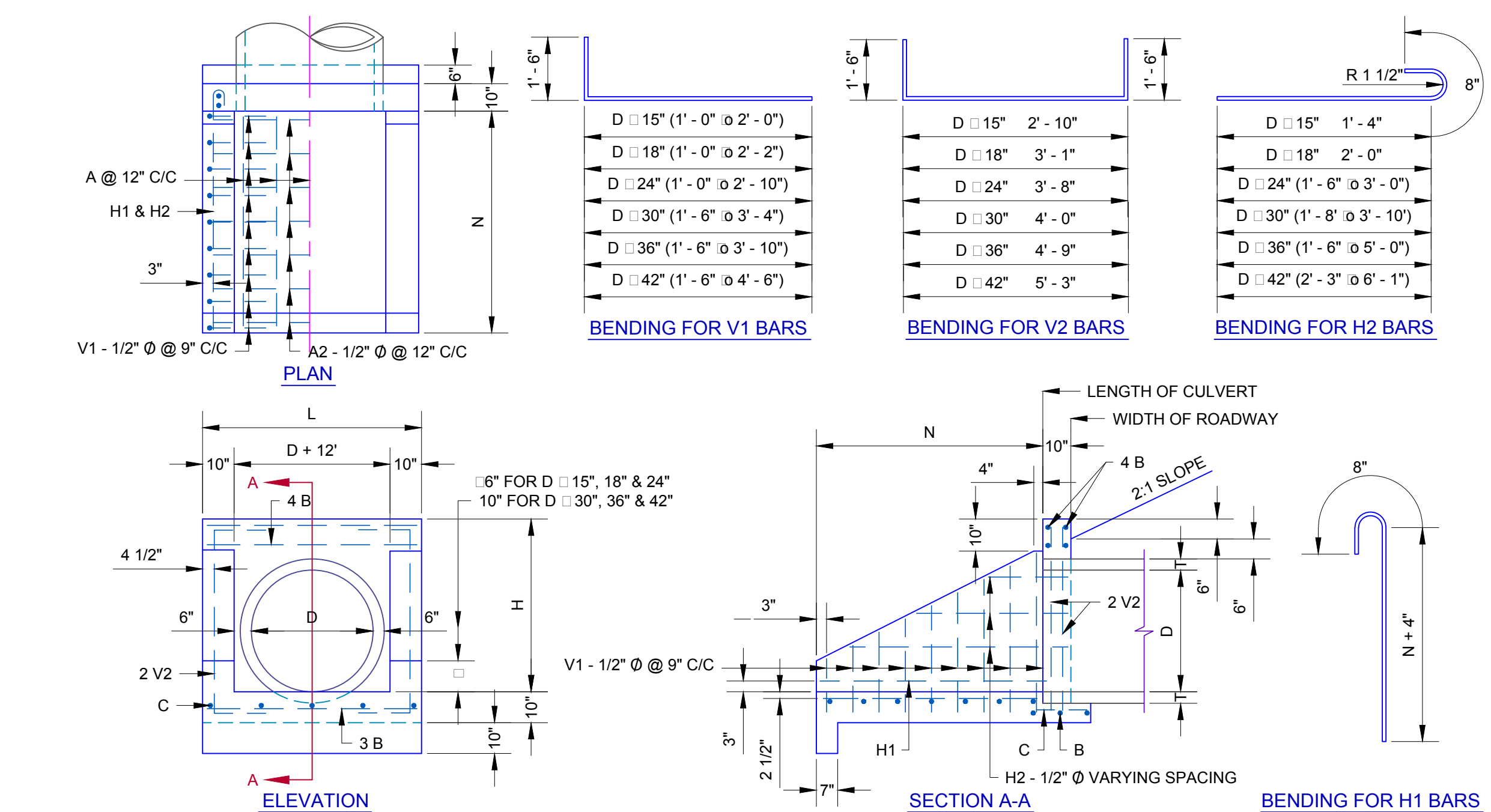
Drawing Number
D-406



DIMENSIONS & QUANTITIES FOR STRAIGHT HEADWALLS											FOR ONE HEADWALL										
D	AREA SQ FT	DIMENSIONS						REINFORCING STEEL						QUANTITIES							
		T	H	L	E	B	C	F1 - 1/2" Ø	F2 - 1/2" Ø	H1 - 1/2" Ø	H2 - 1/2" Ø	H3 - 1/2" Ø	V - 1/2" Ø	CLASS "A" CONC C.Y.	REINF. STEEL LBS						
15"	1.23	2 1/2"	2'-5 1/2"	6'-0"	2'-2"	10"	6"	6	1'-10"	3	6'-0"	1	5'-8"	3	5'-3"	4	2'-0"	6	4'-3"	.78	56
18"	1.77	2 1/2"	2'-8 1/2"	7'-0"	2'-3"	11"	6"	8	1'-11"	3	7'-0"	1	6'-8"	3	5'-6"	4	2'-4"	8	4'-6"	.98	70
24"	3.14	3"	3'-3"	9'-0"	2'-7"	1'-3"	6"	10	2'-3"	3	9'-0"	1	8'-8"	3	6'-0"	4	3'-1"	10	5'-1"	1.46	95
30"	4.91	3 1/2"	3'-9 1/2"	11'-0"	2'-10"	1'-4"	8"	12	2'-6"	3	11'-0"	1	10'-8"	3	6'-6"	6	3'-9"	12	5'-9"	2.00	122
36"	7.07	4"	4'-4"	14'-0"	3'-1"	1'-7"	8"	14	2'-9"	4	14'-0"	1	13'-8"	3	7'-0"	6	5'-0"	14	6'-4"	2.85	170
42"	9.62	4 1/2"	4'-10 1/2"	16'-0"	3'-4"	1'-8"	10"	16	3'-0"	4	16'-0"	1	15'-8"	3	7'-6"	6	5'-8"	16	7'-0"	3.58	198



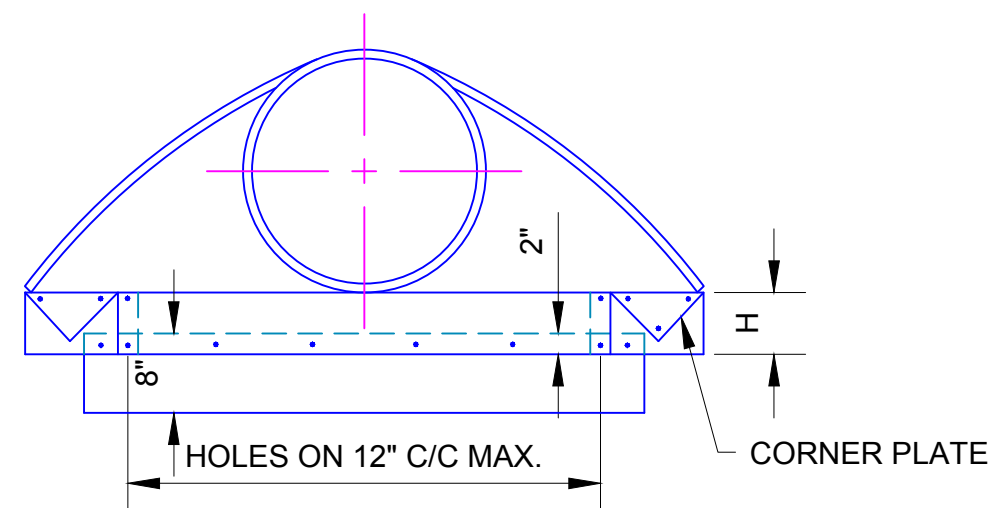
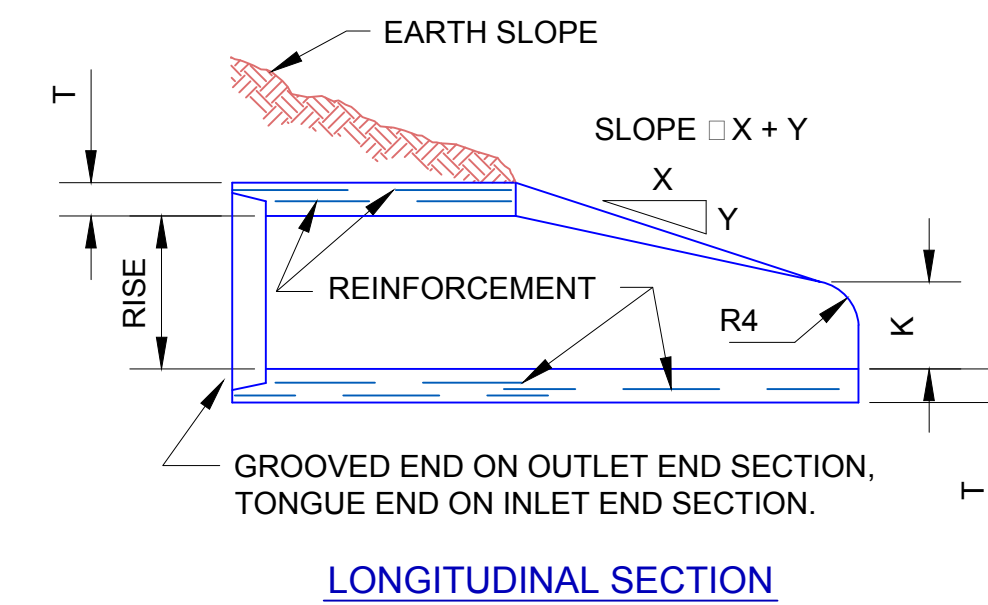
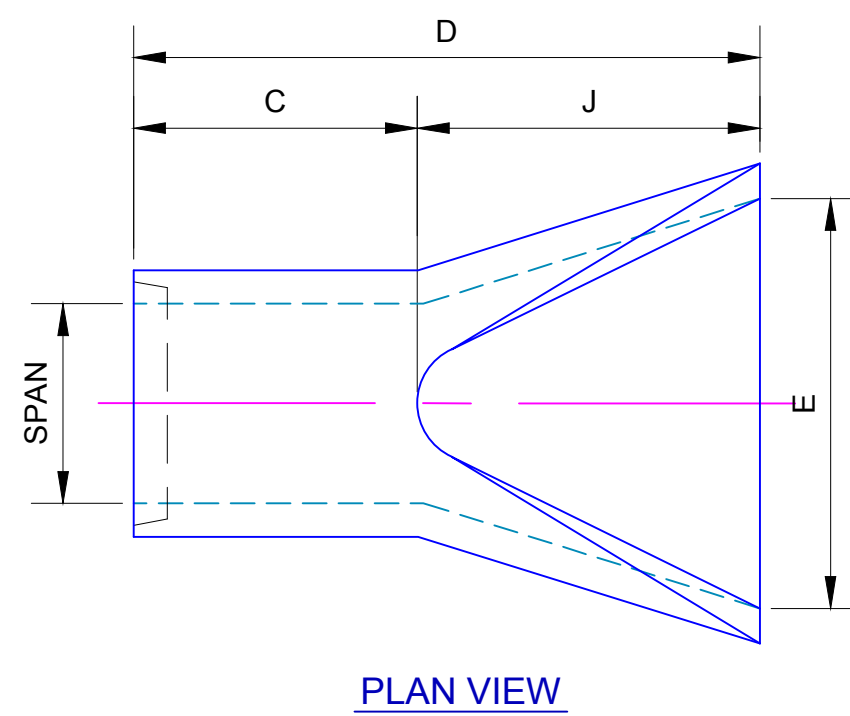
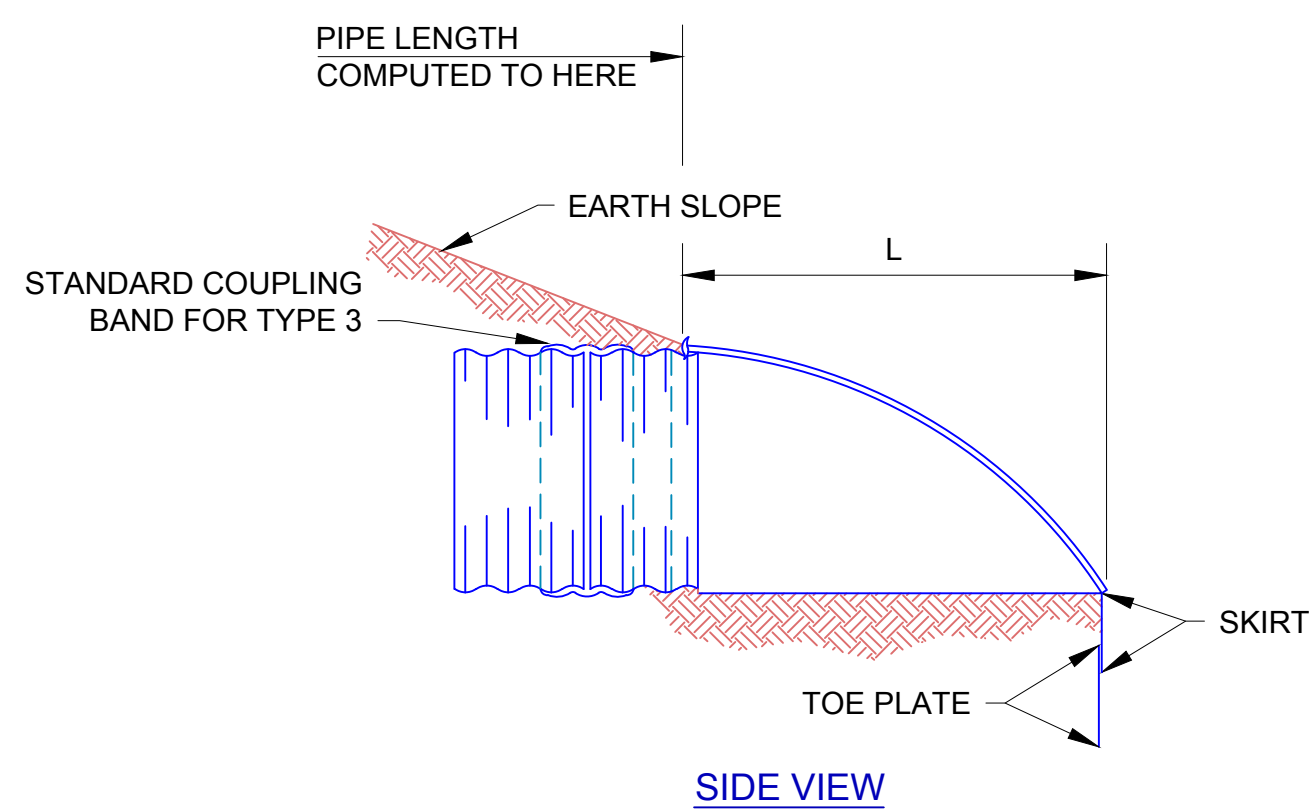
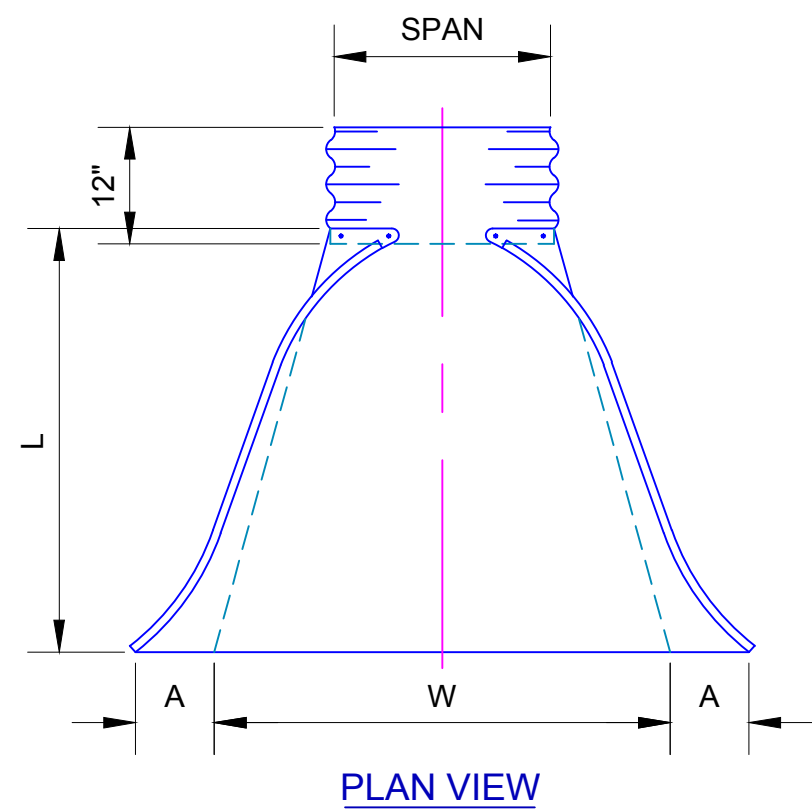
DIMENSIONS & QUANTITIES FOR HEADWALLS WITH 45° WINGS														FOR ONE HEADWALL									
D	AREA SQ FT	DIMENSIONS						REINFORCING STEEL						QUANTITIES									
		T	H	K	L	M	N	A1 - 1/2" Ø	A - 1/2" Ø	B - 1/2" Ø	C - 1/2" Ø	H1 - 1/2" Ø	V1 - 1/2" Ø	V - 1/2" Ø	CLASS "A" CONC C.Y.	REINF. STEEL LBS							
15"	1.23	2 1/4"	2'-5 1/4"	1'-5"	3'-7"	1'-9"	1'-3"	4	1'-0"	2	3'-9" AV.	7	3'-3"	3	1'-6"	4	2'-1"	4	3'-5" AV.	4	5'-10"	.74	57
18"	1.77	2 1/2"	2'-8 1/2"	1'-7"	3'-10"	2'-1 1/2"	1'-6"	4	1'-2"	2	4'-3" AV.	7	3'-6"	3	1'-6"	4	2'-6"	4	3'-8" AV.	4	6'-1"	.91	61
24"	3.14	3"	3'-3"	1'-10 1/2"	4'-4"	2'-10"	2'-0"	5	1'-8"	3	5'-3" AV.	7	4'-0"	3	1'-6"	6	3'-2"	6	4'-1" AV.	4	6'-8"	1.37	85
30"	4.91	3 1/2"	3'-9 1/2"	2'-2"	4'-10"	3'-6 1/2"	2'-6"	5	2'-2"	3	6'-3" AV.	7	4'-6"	4	1'-6"	6	3'-11"	8	4'-6" AV.	4	7'-2"	1.77	104
36"	7.07	4"	4'-4"	2'-5 1/2"	5'-4"	4'-3"	3'-0"	6	2'-8"	4	7'-3" AV.	7	5'-0"	4	1'-6"	6	4'-7"	10	4'-11" AV.	4	7'-9"	2.29	130
42"	9.62	4 1/2"	4'-10 1/2"	2'-9"	5'-10"	4'-1 1/2"	3'-6"	6	3'-2"	4	8'-3" AV.	7	5'-6"	4	1'-6"	6	5'-4"	12	5'-4" AV.	4	8'-3"	2.89	151



DIMENSIONS & QUANTITIES FOR HEADWALLS WITH 90° WINGS														FOR ONE HEADWALL											
D	AREA SQ FT	DIMENSIONS						REINFORCING STEEL						QUANTITIES											
		T	H	L	E	B	C	F1 - 1/2" Ø	F2 - 1/2" Ø	H1 - 1/2" Ø	H2 - 1/2" Ø	H3 - 1/2" Ø	H4 - 1/2" Ø	H5 - 1/2" Ø	V - 1/2" Ø	CLASS "A" CONC C.Y.	REINF. STEEL LBS								
15"	1.23	2 1/4"	2'-5 1/4"	3'-0"	2'-2"	10"	6"	10	1'-10"	3	6'-5"	1	7'-0"	3	6'-9"	5	2'-0"	2	3'-0"	4	3'-10"	7	2'-0"	1.09	84
18"	1.77	2 1/2"	2'-8 1/2"	3'-6"	2'-3"	11"	6"	10	1'-11"	3	6'-8"	1	7'-8"	3	7'-0"	5	2'-4"	2	3'-6"	4	4'-5"	9	2'-4"	1.32	97
24"	3.14	3"	3'-3"	4'-6"	2'-7"	1'-3"	6"	14	2'-3"	3	7'-2"	1	8'-11"	3	7'-6"	6	3'-1"	3	4'-6"	4	5'-9"	11	3'-1"	1.94	131
30"	4.91	3 1/2"	3'-9 1/4"	5'-6"	2'-10"	1'-4"	8"	16	2'-6"	3	7'-8"	1	10'-2"	3	8'-0"	6	3'-9"	3	5'-6"	4	6'-10"	14	3'-9"	2.59	163
36"	7.07	4"	4'-4"	7'-0"	3'-1"	1'-7"	8"	16	2'-9"	4	8'-2"	1	11'-11"	3	8'-6"	7	5'-0"	4	6'-8"	4	8'-1"	17	5'-0"	3.47	216
42"	9.62	4 1/2"	4'-10 1/4"	8'-0"	3'-4"	1'-8"	10"	19	3'-0"	4	8'-8"	1	13'-2"	3	9'-0"	7	5'-8"	4	7'-6"	4	9'-2"	19	5'-8"	4.32	252

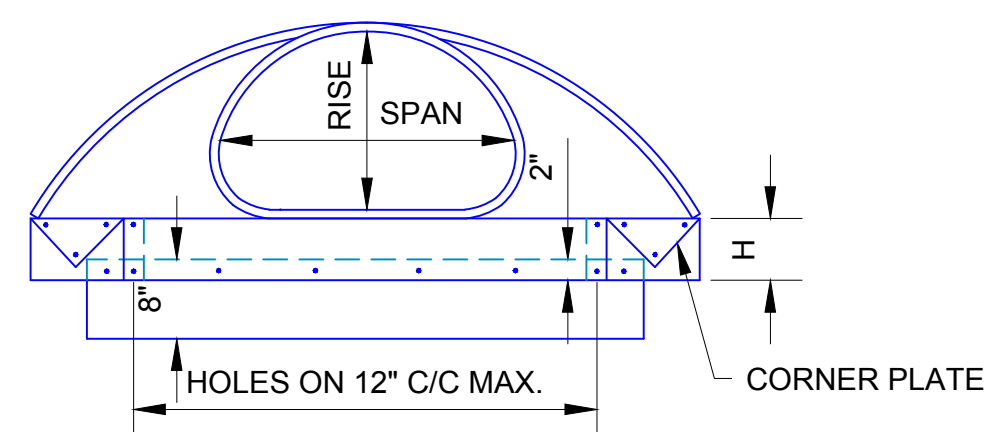
DIMENSIONS & QUANTITIES FOR HEADWALLS WITH U-TYPE WINGS														FOR ONE HEADWALL									
D	AREA SQ FT	DIMENSIONS						REINFORCING STEEL						QUANTITIES									
		T	H	L	N	A1 - 1/2" Ø	A2 - 1/2" Ø	B - 1/2" Ø	C - 1/2" Ø	H1 - 1/2" Ø	H2 - 1/2" Ø	V1 - 1/2" Ø	V2 - 1/2" Ø	CLASS "A" CONC C.Y.	REINF. STEEL LBS								
15"	1.23	2 1/4"	2'-5 1/4"	3'-11"	6'-6"	3	2'-2"	3	3'-7"	7	3'-7"	3	1'-6"	2	3'-6"	2	2'-0"	8	3'-0" AV.	4	5'-10"	.95	71
18"	1.77	2 1/4"	2'-8 1/4"	3'-1"	3'-1"	3	2'-9"	4	3'-10"	7	3'-10"	3	1'-6"	2	4'-1"	2	2'-8"	8	3'-1" AV.	4	6'-1"	1.15	79
24"	3.14	3"	3'-3"	4'-2"	4'-2"	4	3'-10"	5	4'-4"	7	4'-4"	4	1'-6"	2	5'-2"	4	2'-11" AV.	12	3'-5" AV.	4	6'-8"	1.60	109
30"	4.91	3 1/4"	3'-9 1/4"	4'-3"	4'-3"	4	2'-6"	5	4'-10"	7	4'-10"	4	1'-6"	2	5'-3"	4	3'-5" AV.	12	3'-11" AV.	4	7'-2"	1.91	120
36"	7.07	4"	4'-4"	5'-4"	5'-4"	5	2'-9"	6	5'-4"	7	5'-4"	5	1'-6"	2	6'-4"	4	3'-11" AV.	14	4'-2" AV.	4	7'-9"	2.48	152
42"	9.62	4 1/4"	4'-10 1/4"	6'-5"	6'-5"	5	3'-0"	7	5'-10"	7	5'-10"	5	1'-6"	2	7'-5"	6	4'-10" AV.	18	4'-6" AV.	4	8'-3"	3.12	186

- GENERAL NOTES:
- ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH OKLAHOMA CITY STANDARD SPECIFICATIONS.
 - ALL EXPOSED CONCRETE SURFACES SHALL HAVE A CARBORUNDUM FINISH.
 - ALL EXPOSED CONCRETE EDGES SHALL HAVE A 3/4" CHAMFER.
 - ALL REINFORCED STEEL SHALL CONFORM TO ASTM SPEC. A-305-49.



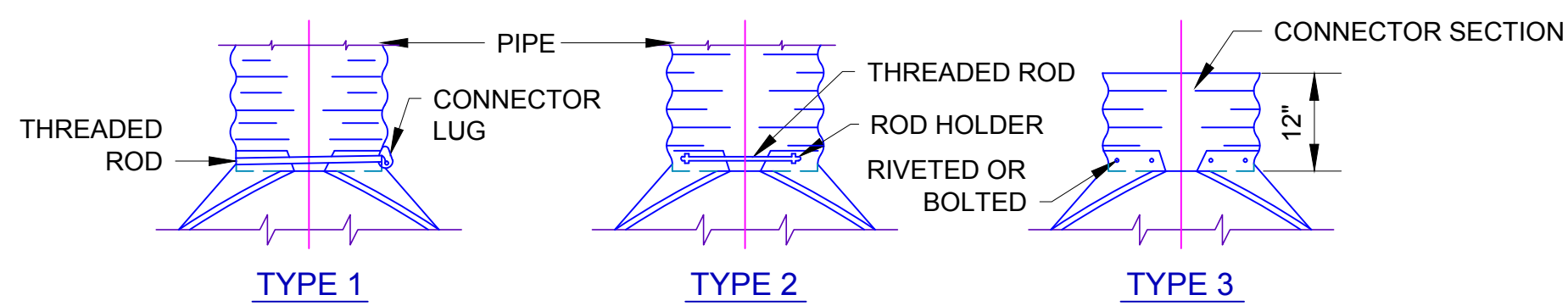
END VIEW
ROUND METAL PIPE END SECTION

DIMENSIONS OF END SECTION FOR ROUND METAL PIPE								
SPAN	GA.	A ± 1	B (MAX.)	H ± 1	L ± 1/2	W ± 2	APPROX. SLOPE	SPAN
IN.		IN.	IN.	IN.	IN.	IN.		IN.
18	16	8	10	6	31	36	2 1/2 : 1	1
24	16	10	13	6	41	48	2 1/2 : 1	1
30	14	12	16	8	51	60	2 1/2 : 1	1
36	14	14	19	9	60	72	2 1/2 : 1	2
42	12	16	22	11	69	84	2 1/2 : 1	2
48	12	18	27	12	78	90	2 1/4 : 1	2



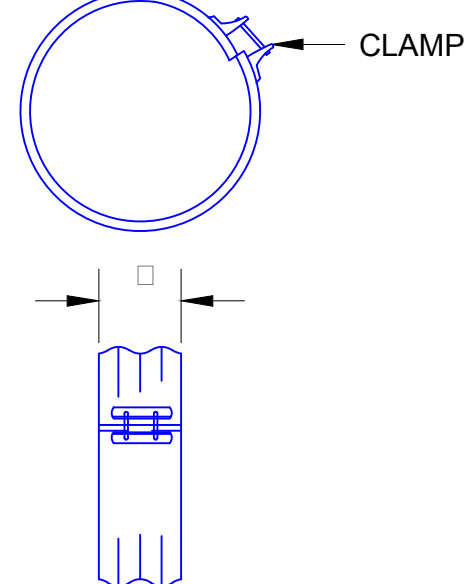
END VIEW
ARCH METAL PIPE END SECTION

DIMENSIONS OF END SECTION FOR METAL PIPE ARCH									
SPAN	RISE	GA.	A ± 1	B (MAX.)	H ± 1	L ± 1/2	W ± 2	APPROX. SLOPE	SPAN
IN.	IN.		IN.	IN.	IN.	IN.	IN.		IN.
22	13	16	7	10	6	23	36	2 1/2 : 1	1
29	18	16	9	14	6	32	48	2 1/2 : 1	1
43	22	14	10	16	8	39	60	2 1/2 : 1	1
36	27	14	12	18	8	46	75	2 1/2 : 1	1
50	31	12	13	21	9	53	85	2 1/2 : 1	2
58	36	12	18	26	12	63	90	2 1/4 : 1	2
65	40	12	18	30	12	70	102	2 1/2 : 1	2
72	44	12	18	33	12	77	114	2 1/4 : 1	3



TYPICAL METAL END SECTION CONNECTIONS

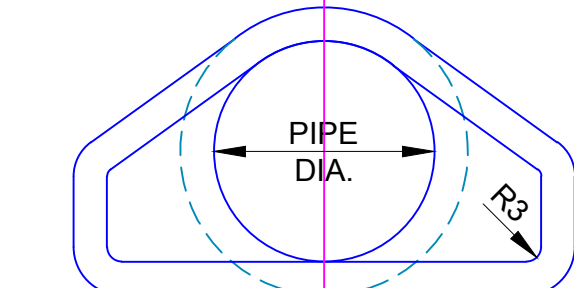
NOTE: COUPLING BAND CLAMP SHALL CLEAR HORIZONTAL LINE



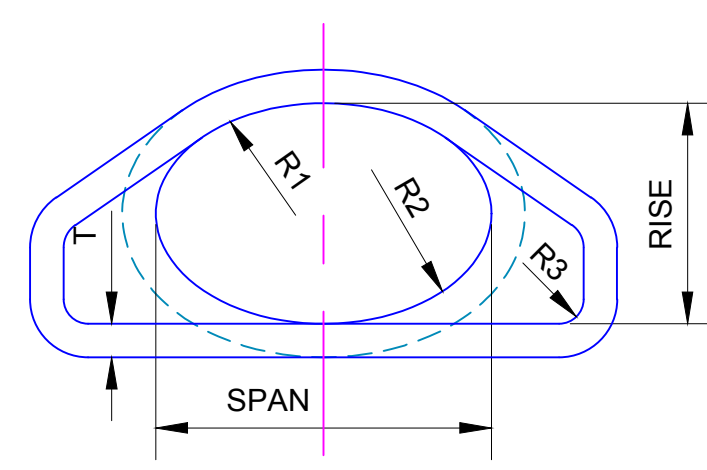
STANDARD COUPLING BAND
7" FOR UP TO 36" DIAMETER, 12" FOR 36" DIAMETER AND UP.

GENERAL NOTES FOR METAL END SECTIONS:

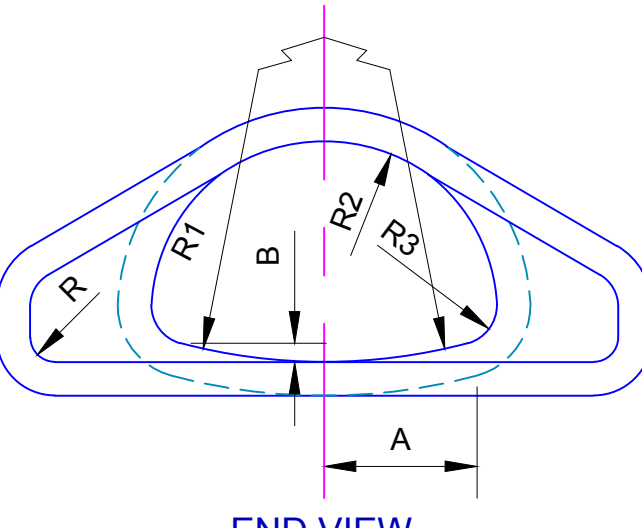
- WHEN PREFABRICATED END SECTIONS ARE OPTIONAL, THEY SHALL BE OF THE SAME MATERIALS AS THAT OF THE PIPE, WHICH THEY ARE INSTALLED.
- FOR MATERIAL OF ALUMINUM ALLOY END SECTION, SEE SUBSECTION 726.65 OF THE CURRENT OKLAHOMA STANDARD SPECIFICATIONS.
- FOR MATERIALS OF GALVANIZED METAL END SECTION, SEE SUBSECTION 726.17 OF THE CURRENT OKLAHOMA STANDARD SPECIFICATIONS.
- CONNECTOR SECTION, CORNER PLATE AND TOE PLATE TO BE OF THE SAME GAGE & MATERIAL AS THE SKIRT AND SHALL BE INCLUDED IN THE BID FOR END SECTION.
- TOE PLATES WILL BE REQUIRED FOR ALL METAL END SECTIONS UNLESS SOLID ROCK IS ENCOUNTERED. HOLES IN TOE PLATE ARE TO BE PUNCHED TO MATCH HOLES IN SKIRT LIP. 3/8" BOLTS TO BE FURNISHED. LENGTH TO TOE PLATES FOR ROUND PIPE SECTION IS W + 10" TO 12" TO 30" DIAMETER PIPE, W + 22" FOR 36" TO 48" DIAMETER PIPE. LENGTH OF TOE PLATES FOR ARCH PIPE END SECTION IS W + 10" FOR A RISE OF 11" TO 27" AND W + 18 FOR A RISE OF 31" TO 44".
- IF TYPE 3 END SECTION IS USED AS OPTIONAL PIPE, THE LENGTH OF PIPE IS TO BE REDUCED BY 12" FOR EACH END SECTION.
- ANY STRUCTURAL EXCAVATION REQUIRED FOR INSTALLATION OF PREFABRICATED END SECTIONS SHALL BE INCLUDED IN THE PRICE BID FOR OTHER ITEMS OF WORK.



END VIEW
ARCH METAL PIPE END SECTION



END VIEW
ELLIPTICAL CONCRETE PIPE END SECTION



END VIEW
ARCH CONCRETE PIPE END SECTION

DIMENSIONS OF PRECAST END SECTION FOR PIPES										
SPAN	K	J	C	D	E	T	R3	R4	R5	SLOPE
IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	
18	9	27	46	73	36	2 1/2	3	3	6	3 TO 1
24	8 1/2	43 1/2	30	73 1/2	48	3	3	3	7	3 TO 1
30	12	54	19 3/4	73 3/4	60	3 1/2	3	3	8	3 TO 1
36	15	63	34 3/4	73 3/4	72	4	3	3	10 1/2	3 TO 1
42	21	63	35	98	78	4 1/2	3	3	10 1/2	3 TO 1
48	24	72	26	98	84	5	6	6	14	3 TO 1

DIMENSIONS OF PRE-CAST END SECTIONS FOR ELLIPTICAL PIPES													
SPAN	RISE	R1	R2	R3	R4	R5	T	K	J	C	D	E	SLOPE
IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	
23	14	6	20	3	3		2 3/4	8	27	45	72	36	3 TO 1
30	19	8 1/4	26 1/4	3	3	7	3 1/4	8 1/2	39	33	72	48	3 TO 1
34	22	9 1/4	29 17/32	3	3	8	3 1/2	9	46	26	72	54	3 TO 1
38	24	10 1/4	32 3/4	3	3	9	3 3/4	9 1/2	54	18	72	60	3 TO 1
42	27	11 7/16	36 3/16	3	3	10 1/2	3 3/4	10 3/8	57	15	72	66	3 TO 1
45	29	12 1/4	39 1/4	3	3	12	4 1/2	11 1/4	60	36	96	72	3 TO 1
49	32	13 9/16	42 21/32	3	3	12 1/2	4 3/4	12	60	36	96	75	3 TO 1
53	34	14 3/4	46	6	6	13	5	15 3/4	60	36	96	78	3 TO 1
60	38	16 1/2	51 3/4	6	6	14	5 1/2	21	60	36	96	84	3 TO 1
68	43	18 21/32	58 13/32	6	6	16	6	25 1/2	60	36	96	90	3 TO 1

DIMENSIONS OF PRE-CAST END SECTION FOR ARCH-PIPES																
SPAN	RISE	A	B	R	R1	R2	R3	R4	R5	T	K	J	C	D	E	SLOPE
IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	
28 1/2	18	10 7/8	3 3/4	3	40 11/16	14 3/4	4 5/8	3	7	3 1/2	8 1/2	39	33	72	48	3 TO 1
36 1/4	22 1/2	13 5/8	3 13/16	3	51	18 3/4	6 1/8	3	8	4	9 1/2	50	46	96	60	3 TO 1
43 3/4	26 5/8	17 1/8	4 1/8	6	62	22 1/2	6 1/2	3	10 1/2	4 1/2	11 1/8	60	36	96	72	3 TO 1
51 1/8	31 1/16	20	5 1/16	6	73	26 1/4	7 3/4	3	12 1/2	4 1/2	15 13/16	60	36	96	78	3 TO 1
58 1/2	36	22 3/4	6	6	84	30	8 7/8	3	14	5	21	60	36	96	84	3 TO 1
65	40	25	6 3/4	6	92 1/2	33 1/2	10	6	16	5 1/2	25 1/2	60	36	96	90	3 TO 1
73	45	28 1/2	7 1/2	6	105	37 1/2	11 1/16	6		6	31	60	36	96	96	3 TO 1

BASIS OF PAYMENT FOR METAL END SECTIONS:

- GALVANIZED METAL END SECTION - ROUND EA.
- GALVANIZED METAL END SECTION - ARCH EA.

WHEN USED AS OPTIONAL END SECTION BETWEEN METAL, ALUMINUM ALLOY & CONCRETE, THE BASIS OF PAYMENT SHALL BE:

- SP. PREFABRICATED CULVERT END SECTION - ROUND EA.
- SP. PREFABRICATED CULVERT END SECTION - ARCH EA.

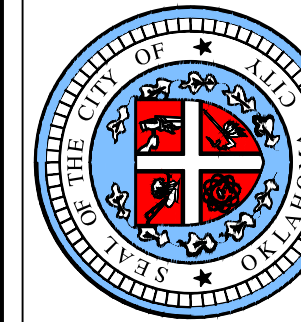
GENERAL NOTES FOR PRECAST END SECTIONS:

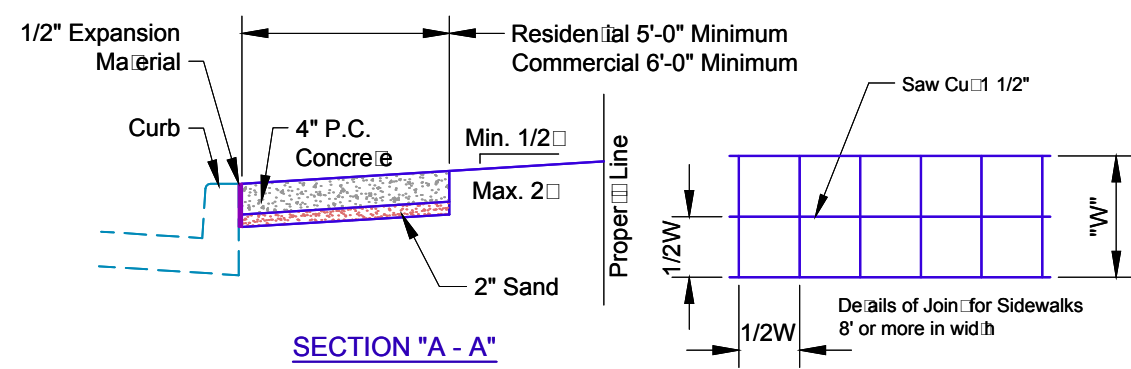
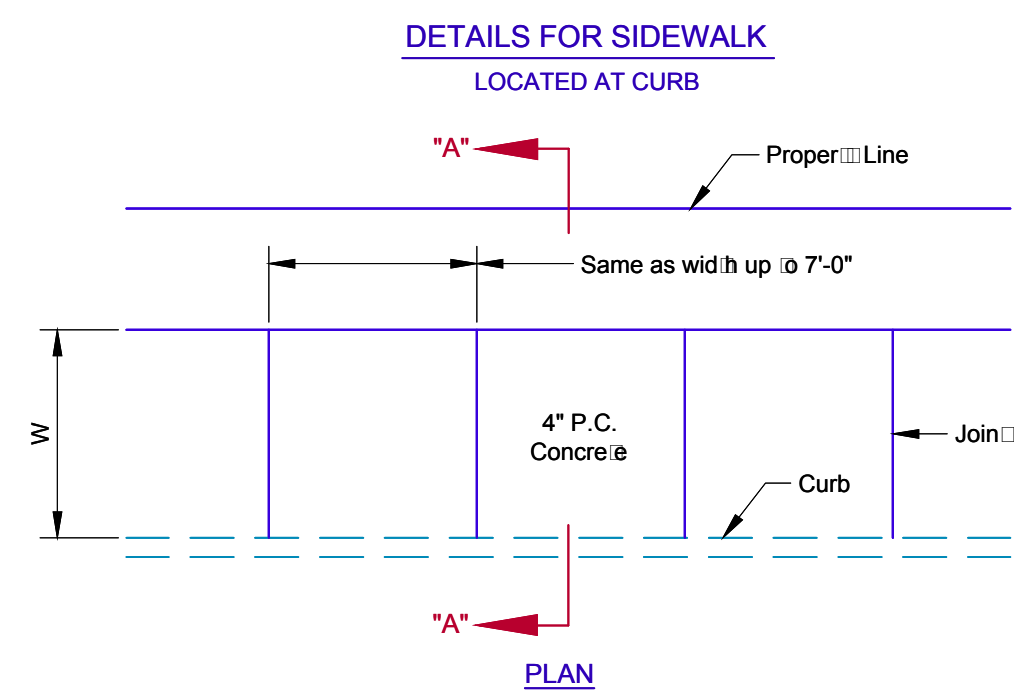
- WHEN PREFABRICATED END SECTIONS ARE OPTIONAL, THEY SHALL BE OF THE SAME MATERIALS AS THAT OF THE PIPE, WHICH THEY ARE INSTALLED.
- DIMENSIONS SHOWN FOR PREFABRICATED END SECTIONS ARE SUBJECT TO MANUFACTURERS TOLERANCES.
- ANY STRUCTURAL EXCAVATION REQUIRED FOR INSTALLATION OF PREFABRICATED END SECTIONS SHALL BE INCLUDED IN THE PRICE BID FOR OTHER ITEMS OF WORK.

BASIS OF PAYMENT FOR PRECAST END SECTIONS:

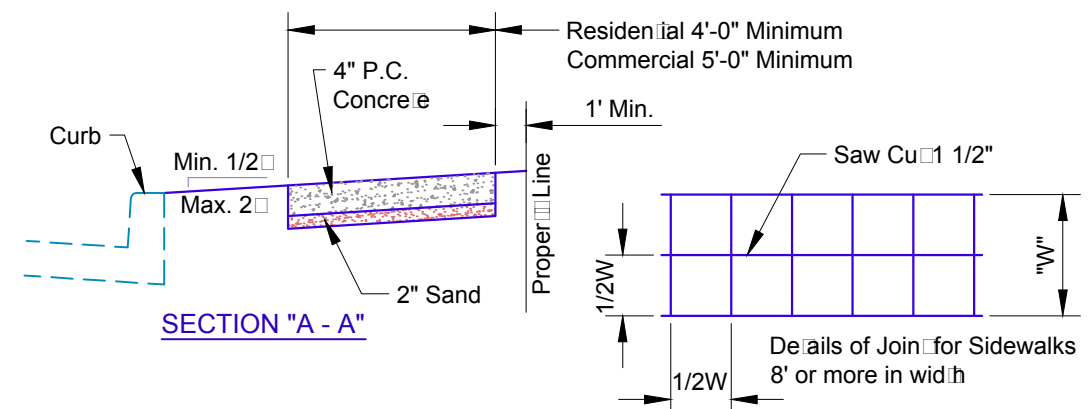
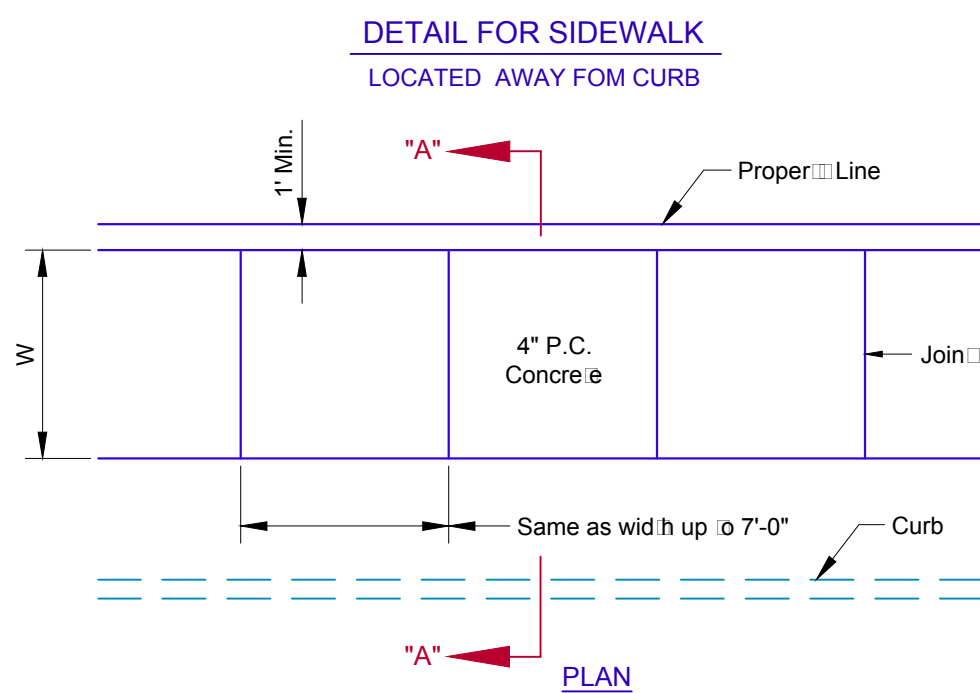
- PRECAST CONCRETE CULVERT END SECTION - ROUNDED EA.
- PRECAST CONCRETE CULVERT END SECTION - ELLIPTICAL EA.
- PRECAST CONCRETE CULVERT END SECTION - ARCH EA.

IF ELLIPTICAL CONCRETE IS USED, THE ELLIPTICAL CONCRETE END SECTION SHALL BE USED.

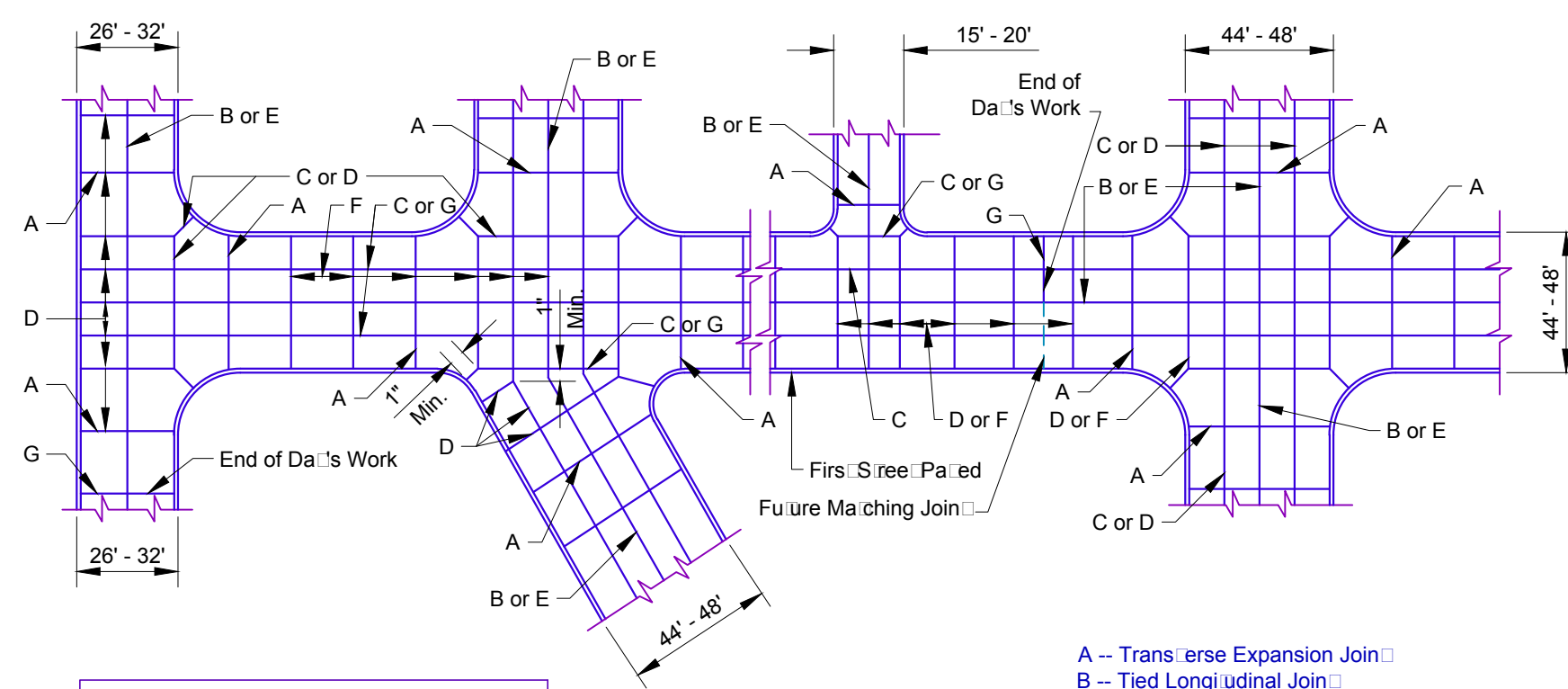




- NOTES:**
- 1/2" x 4" premolded expansion material around Power Poles or other structures in walk with a least 36" of clear travel space.
 - Expansion Joints maximum distance $\leq 100'$, use 1/2" x 4" premolded expansion material.
 - Contraction Joints maximum distance $\leq 7'$, saw cut 1/2" deep and fill with sealant.
 - Saw cuts within 24 hours.
 - Use 1/2" x 4" premolded expansion joint at curb and adjacent Proper Lines.
 - All joints to be sealed. Premolded expansion material to be removed to a depth of 1/2" prior to applying sealant.



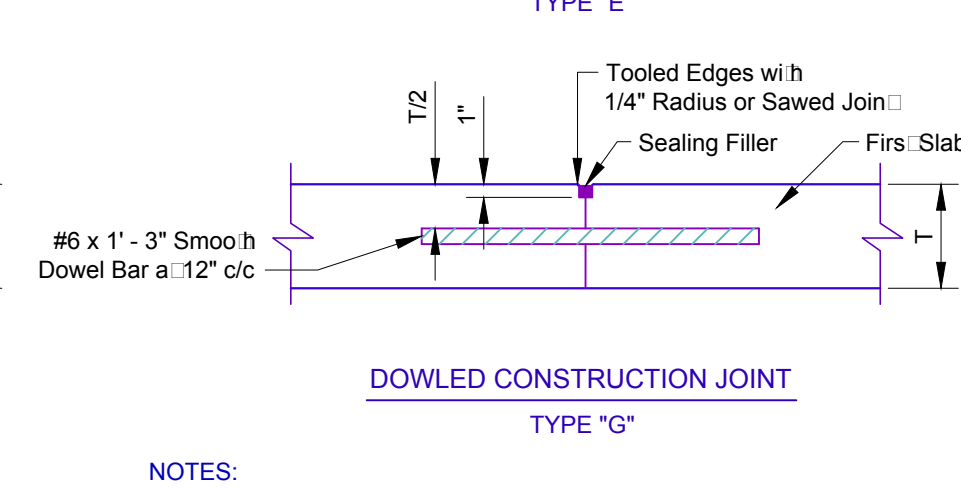
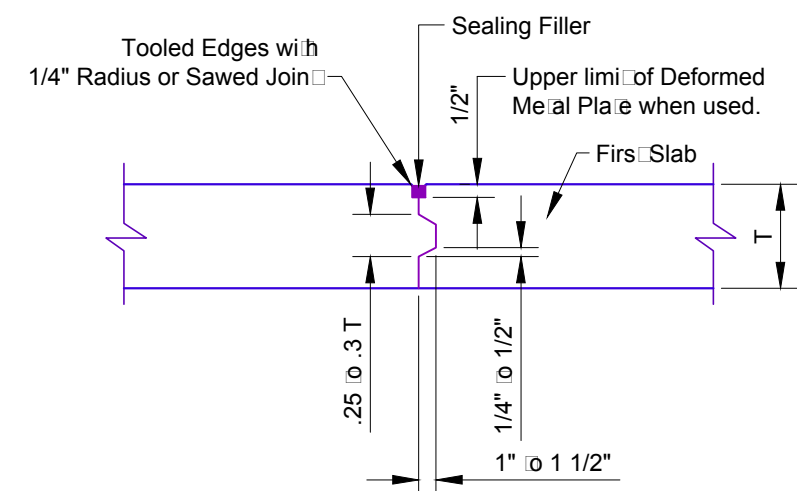
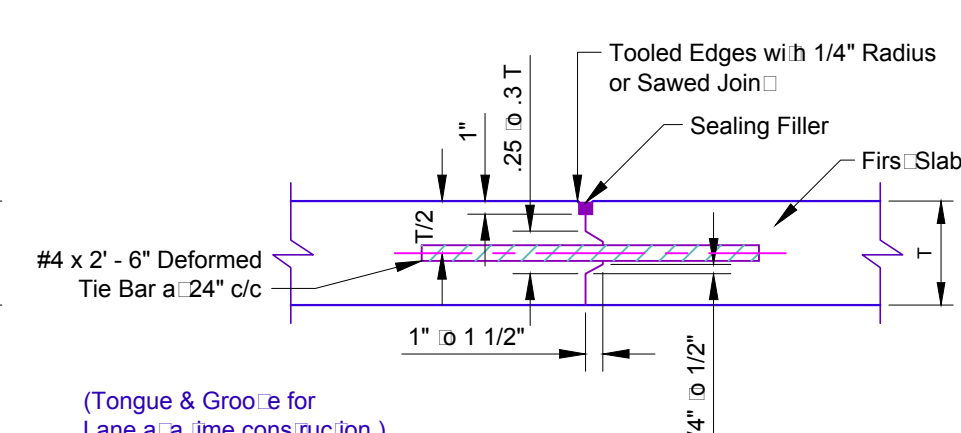
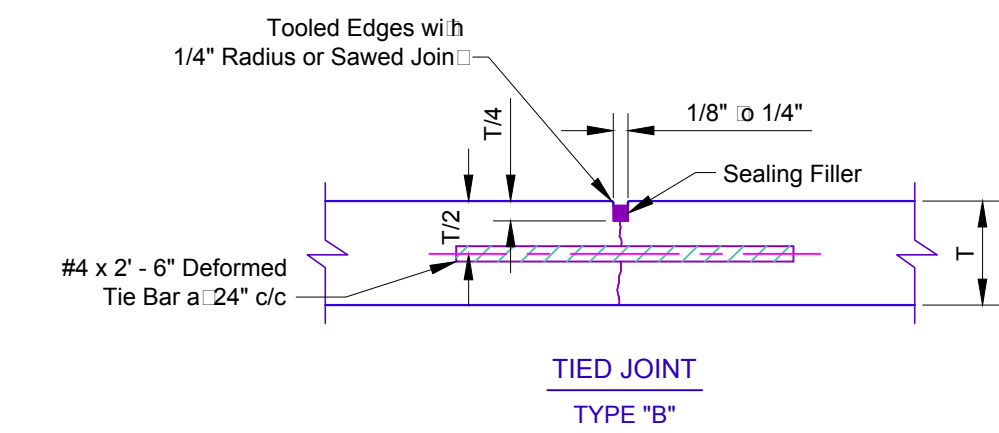
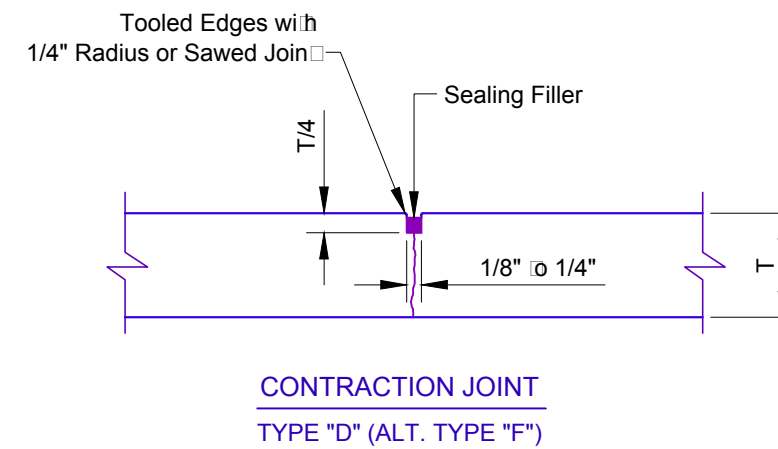
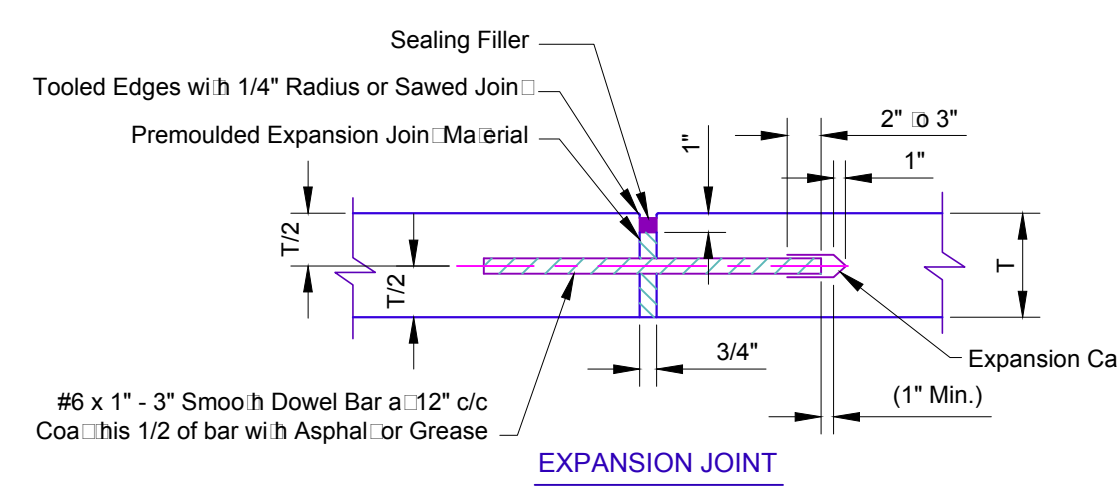
- NOTES:**
- 1/2" x 4" premolded expansion material around Power Poles or other structures in walk with a least 36" of clear travel space.
 - Expansion Joints maximum distance $\leq 100'$, use 1/2" x 4" premolded expansion material.
 - Contraction Joints maximum distance $\leq 7'$, saw cut 1/2" deep and fill with sealant.
 - Saw cuts within 24 hours.
 - All joints to be sealed. Premolded expansion material to be removed to a depth of 1/2" prior to applying sealant.



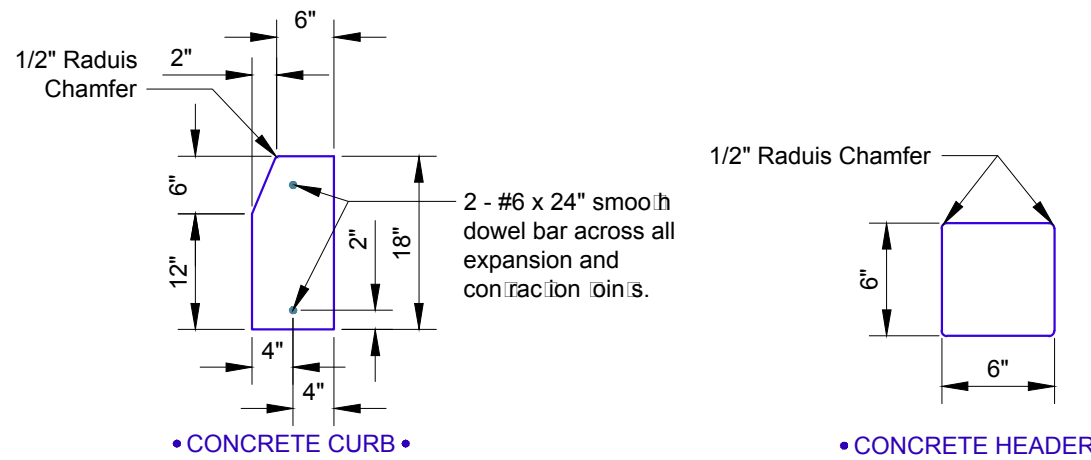
CROWN SCHEDULE

FULL WIDTH	To 33' with 6" Curb	32' and over with 8" Curbs
	2 1/2"	4"

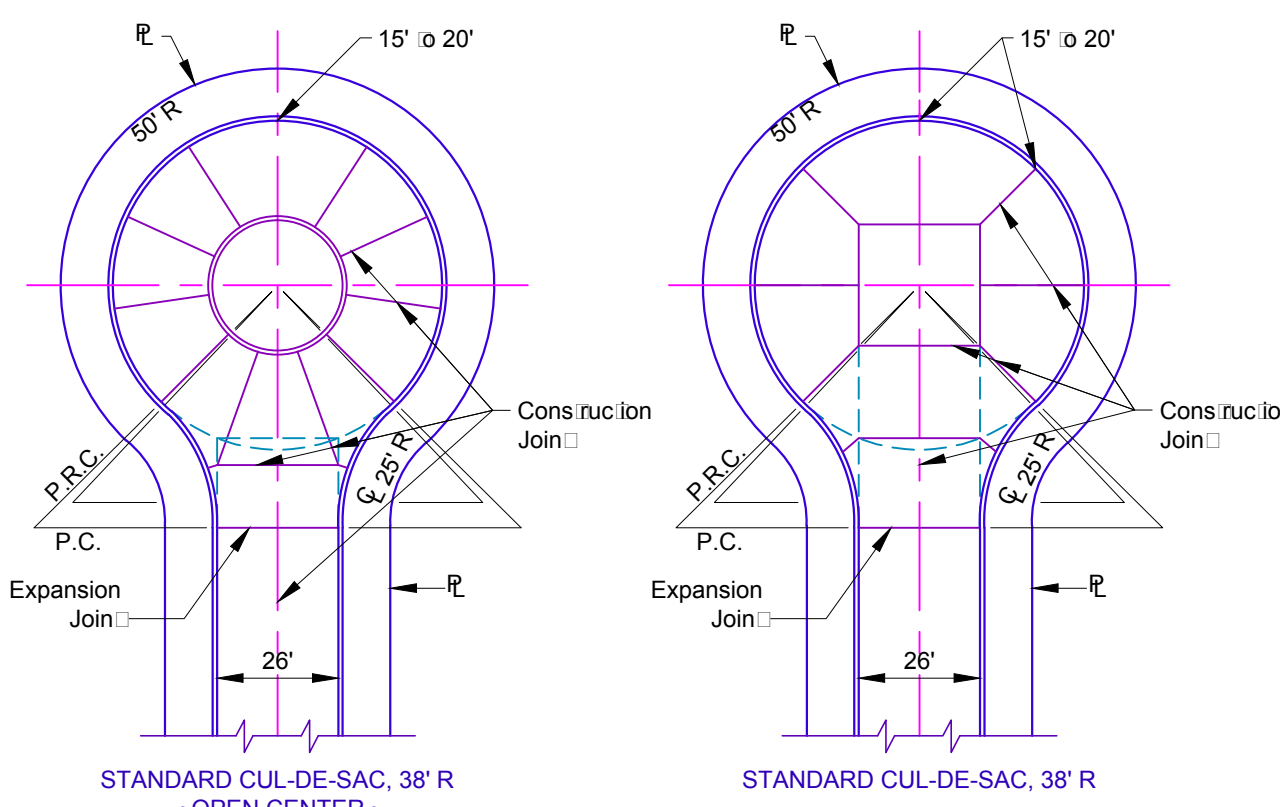
- A -- Transverse Expansion Joint
 B -- Tied Longitudinal Joint
 C -- Tongue & Groove Construction Joint
 D -- Contraction Joint
 E -- Longitudinal Construction Joint
 F -- Doweled Contraction Joint
 G -- Doweled Construction Joint



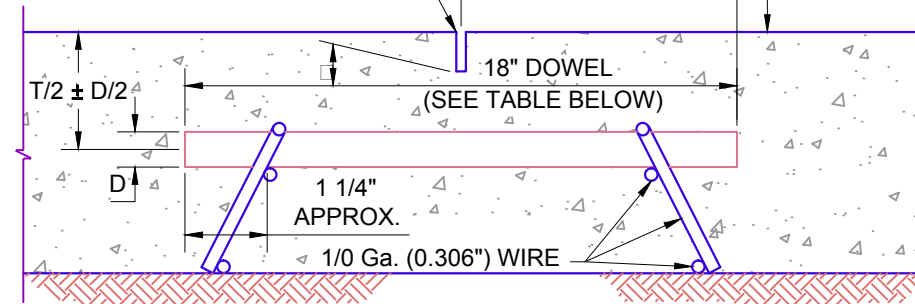
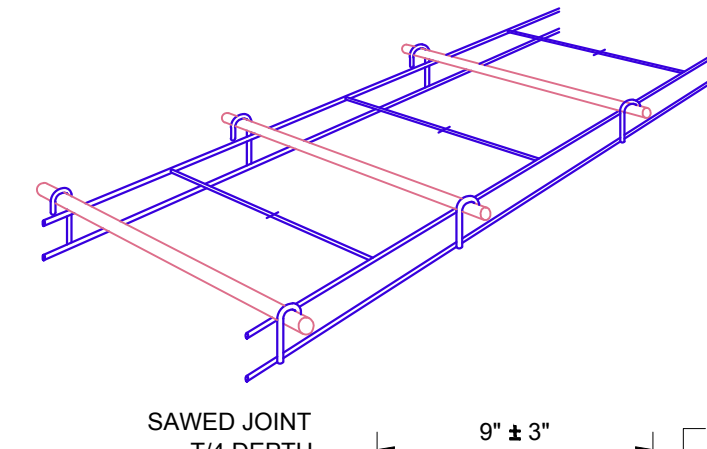
- NOTES:**
- Smooth Dowel Bars across Expansion Joints shall be provided with Expansion Caps, and coated with Asphalt or Grease, (Type A & G).
- Grooves in Joints may be formed by: (1) temporary embedment of a suitable Mandrel, (2) installation of a thin strip of premolded Joint Filler Material, (3) sawing the Pavement after the Concrete has hardened.



MISCELLANEOUS DETAILS

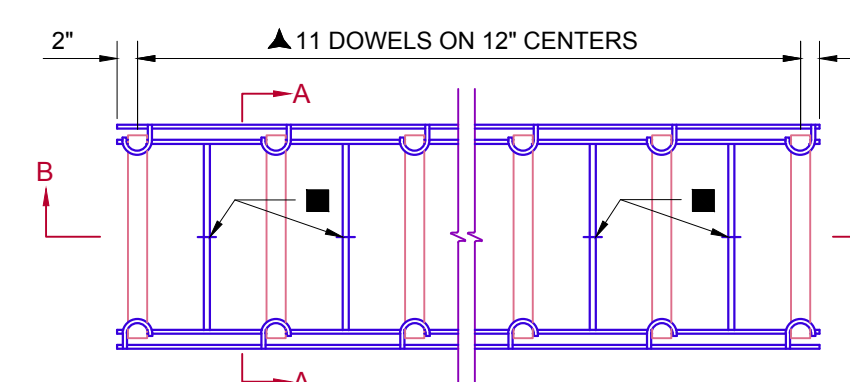


JOINT LAYOUT DETAILS



SECTION A-A

SECTION B-B



DOWEL BARS

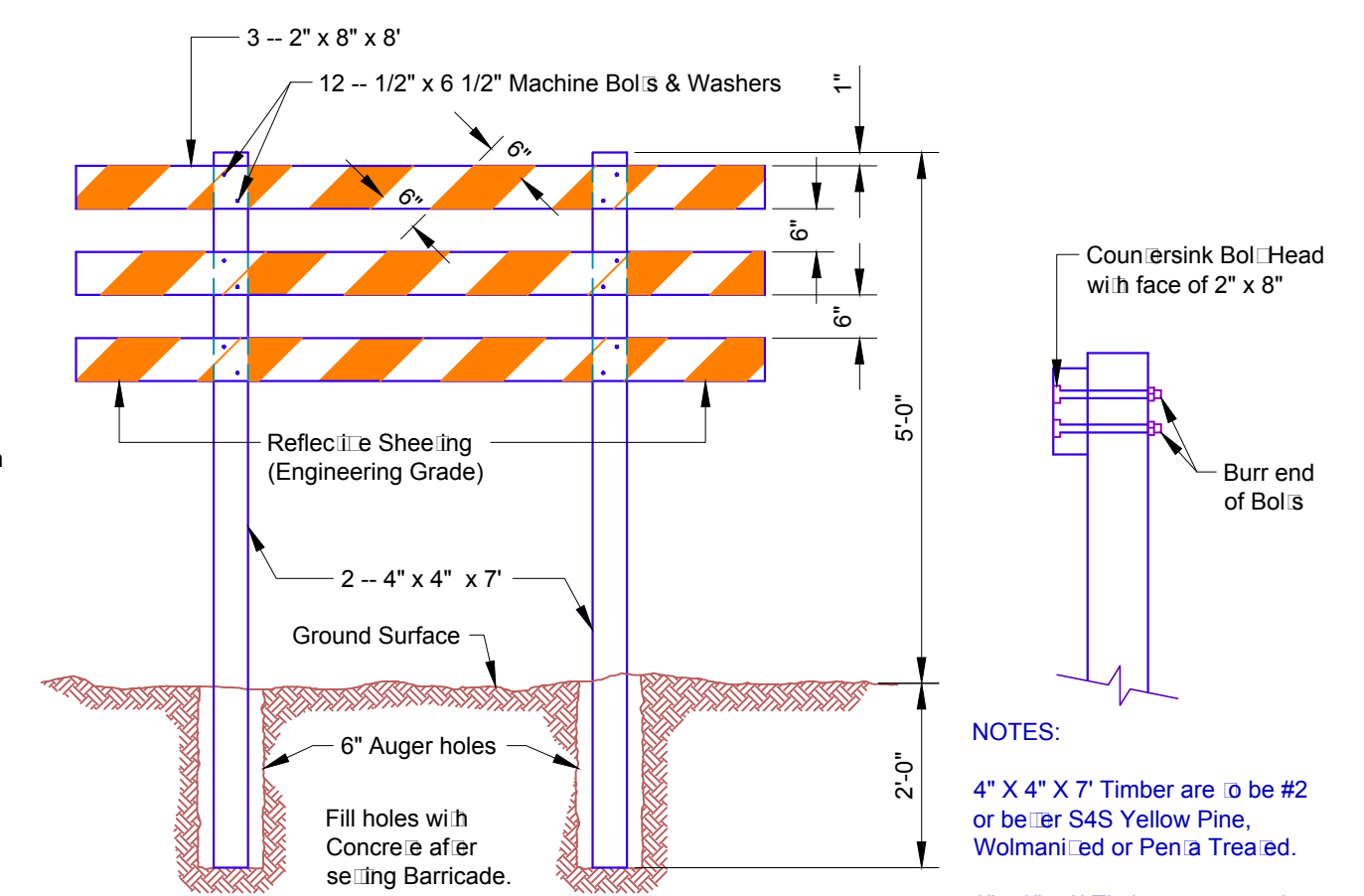
▲ SPACING & SIZE DATA

(T) SLAB DEPTH	DOWEL DIA.	TOTAL DOWEL LENGTH	C/C DOWEL SPACING
6" - 7"	3/4"	15"	12"
8" - 11"	1 1/4"	18"	12"
12" - 16"	1 1/2"	18"	12"

- SPACER: FOUR EA. 7 GAGE (0.177") WIRES PER UNIT, NOTCHED @ MIDPOINT OF WIRE
 SPACER IN FIELD AFTER PLACEMENT
 REGULAR DOWELS GREASED

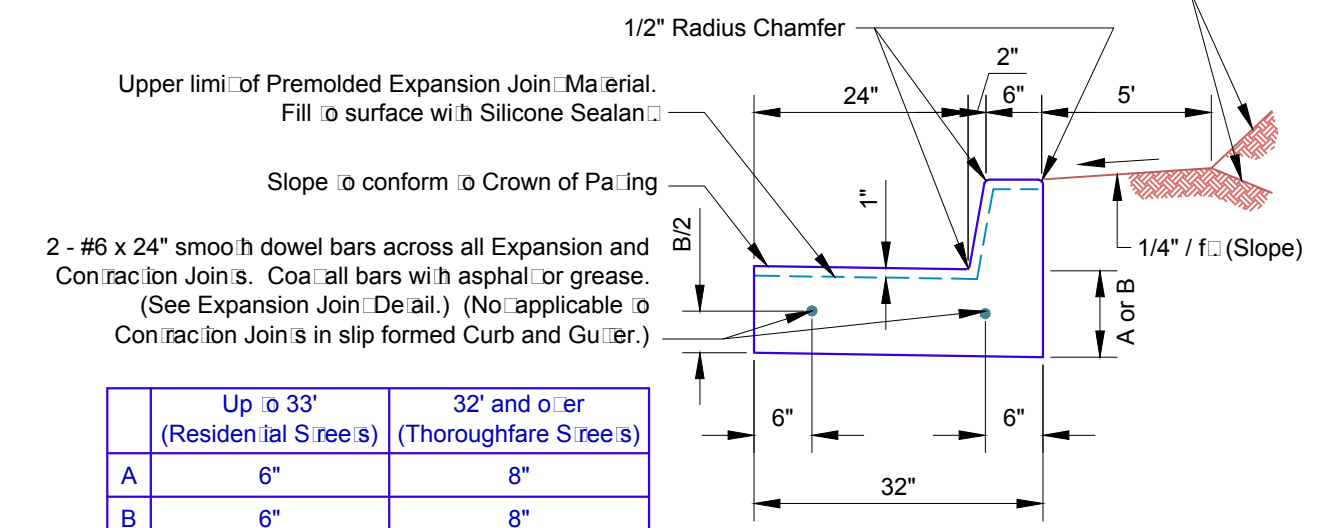
DOWELED CONTRACTION JOINT DETAILS TYPE 'F' (ALT TYPE 'D')

- NOTES:**
- Type 'F' to be used for continuous pours only.
 Do not use for headers at the end of stopping point.

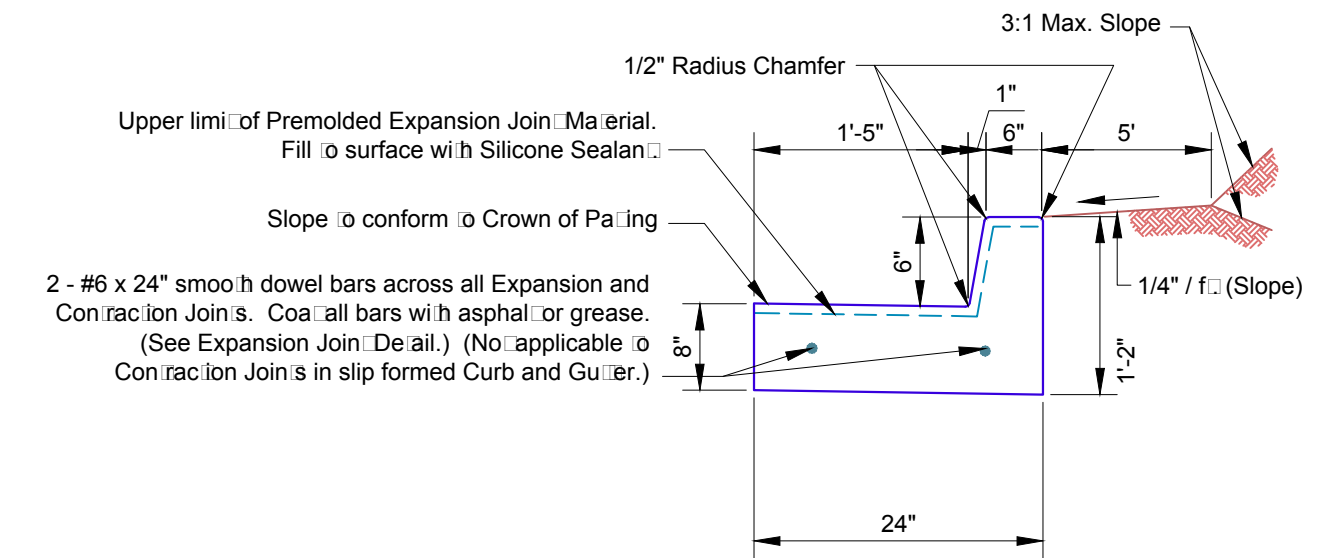


- NOTES:**
- Markings for Barricade Rails are to be Orange and White. Markings are to be 6" wide and attached at 45° angles as set forth in the latest edition of the Uniform Traffic Control Devices Manual.
- 4" x 4" x 7' Timber are to be #2 or better S4S Yellow Pine, Wolmanized or Penatreated.
 2" x 8" x 8' Timber are to be #2 or better S4S Yellow Pine KD.

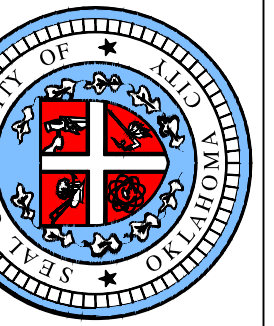
STANDARD REFLECTOR TYPE BARRICADE



CONCRETE CURB & GUTTER DETAIL



CONCRETE CURB & GUTTER DETAIL FOR DOWNTOWN



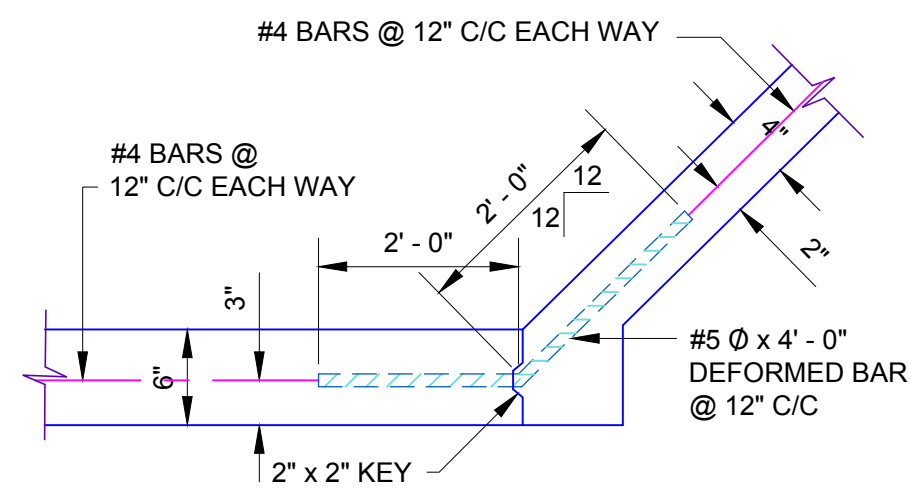
APPROVED BY: DATE: 02-07-13
 ERIC J. WENGER, P.E.
 CITY ENGINEER

DRAWN: VSC
 DATE: 02-07-13

STANDARD TYPICAL SECTIONS
 MISCELLANEOUS DETAILS

Drawing Number

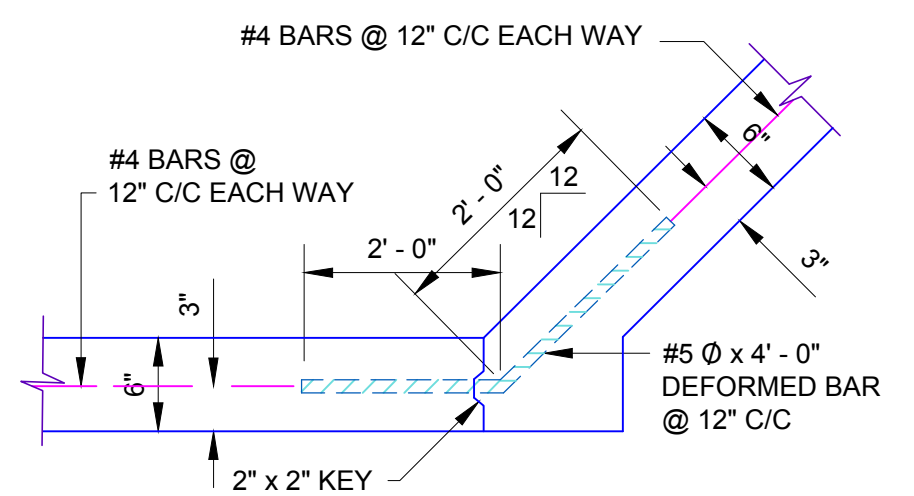
D-500



LONGITUDINAL CONSTRUCTION JOINT

FOR 6" BOTTOM & 4" SIDE WALLS
4" WALLS FOR DEPTH OF 0' TO 5'
WALL DETAIL "A"

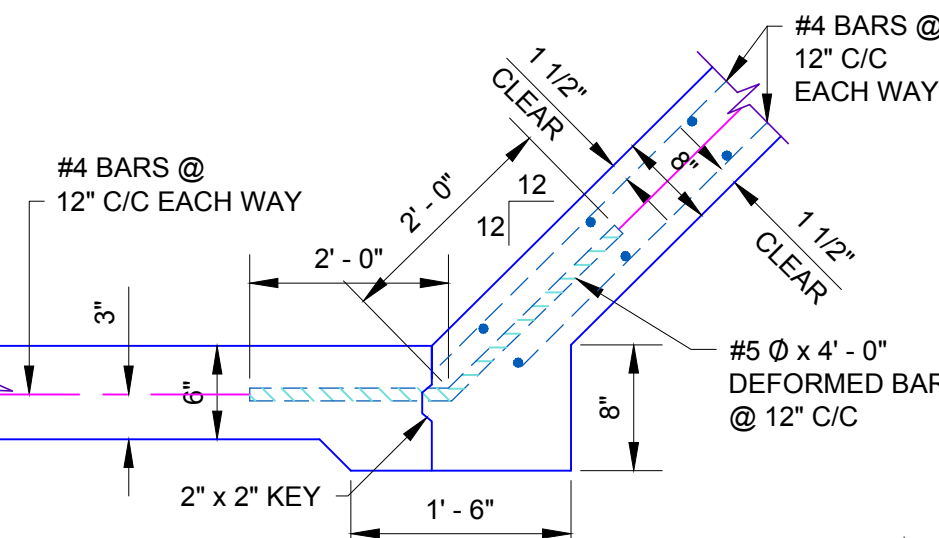
CONCRETE CHANNEL LINER JOINT DETAIL



LONGITUDINAL CONSTRUCTION JOINT

FOR 6" BOTTOM & 4" SIDE WALLS
6" WALLS FOR DEPTH OF 0' TO 5'
WALL DETAIL "B"

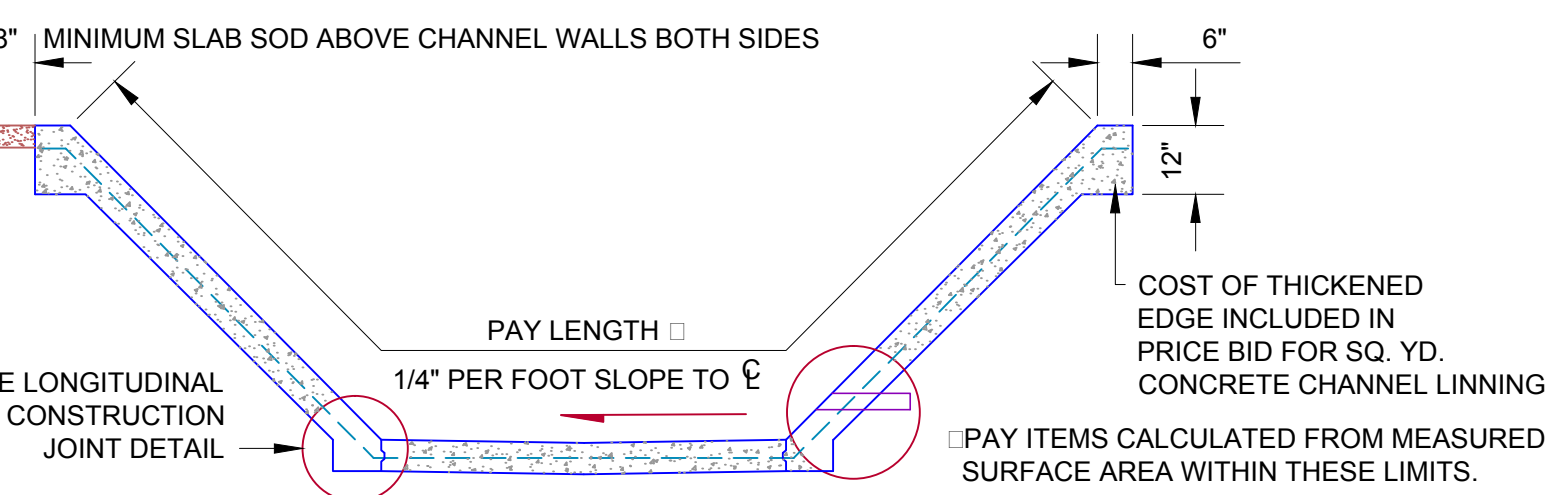
CONCRETE CHANNEL LINER JOINT DETAIL



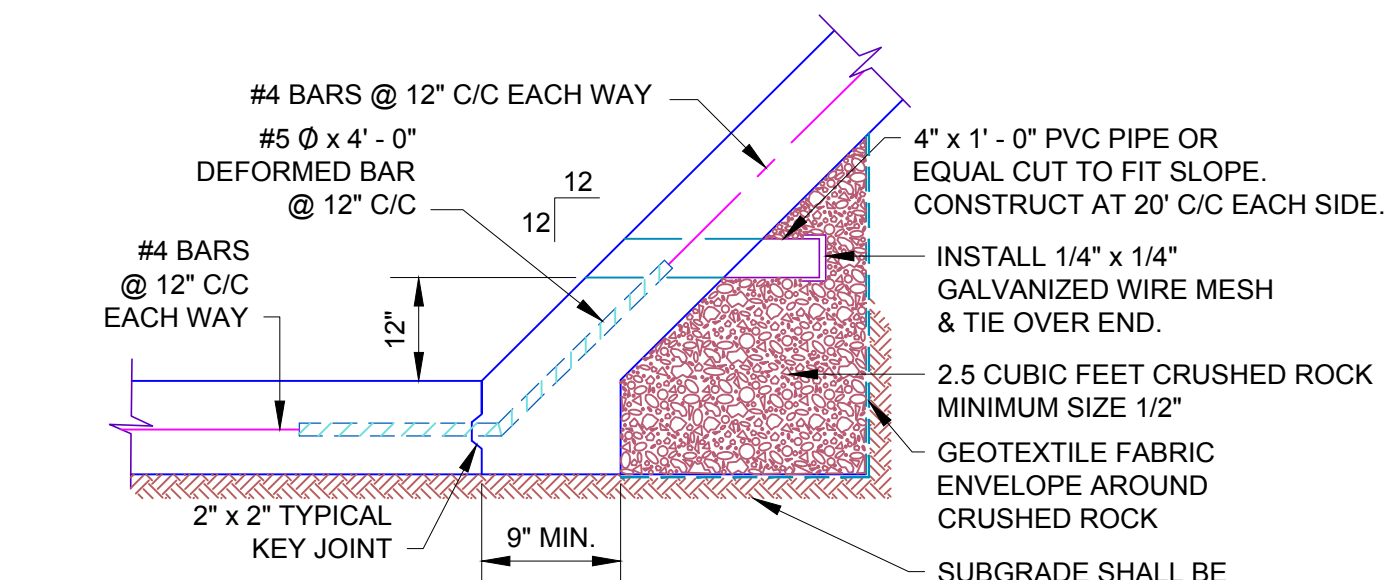
LONGITUDINAL CONSTRUCTION JOINT

FOR 6" BOTTOM & 6" SIDE WALLS
8" WALLS FOR 2/3 THE WALL HEIGHT ABOVE 5'
WALL DETAIL "C"

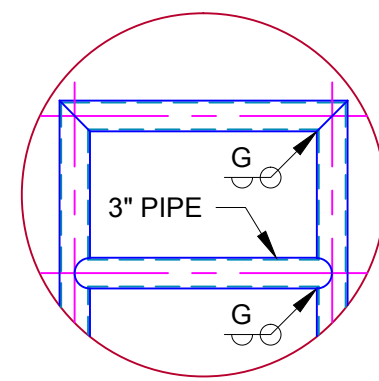
CONCRETE CHANNEL LINER JOINT DETAIL



TYPICAL CONCRETE CHANNEL LINER DETAIL



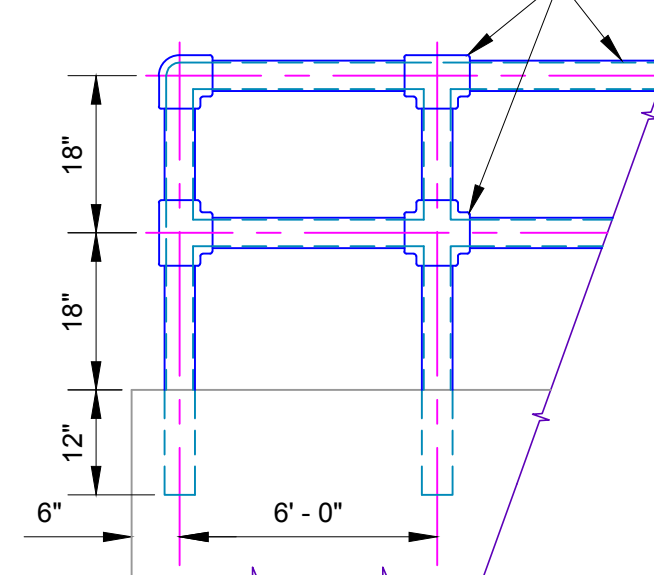
CONCRETE CHANNEL WEEP HOLE DETAIL



ALTERNATE DETAIL

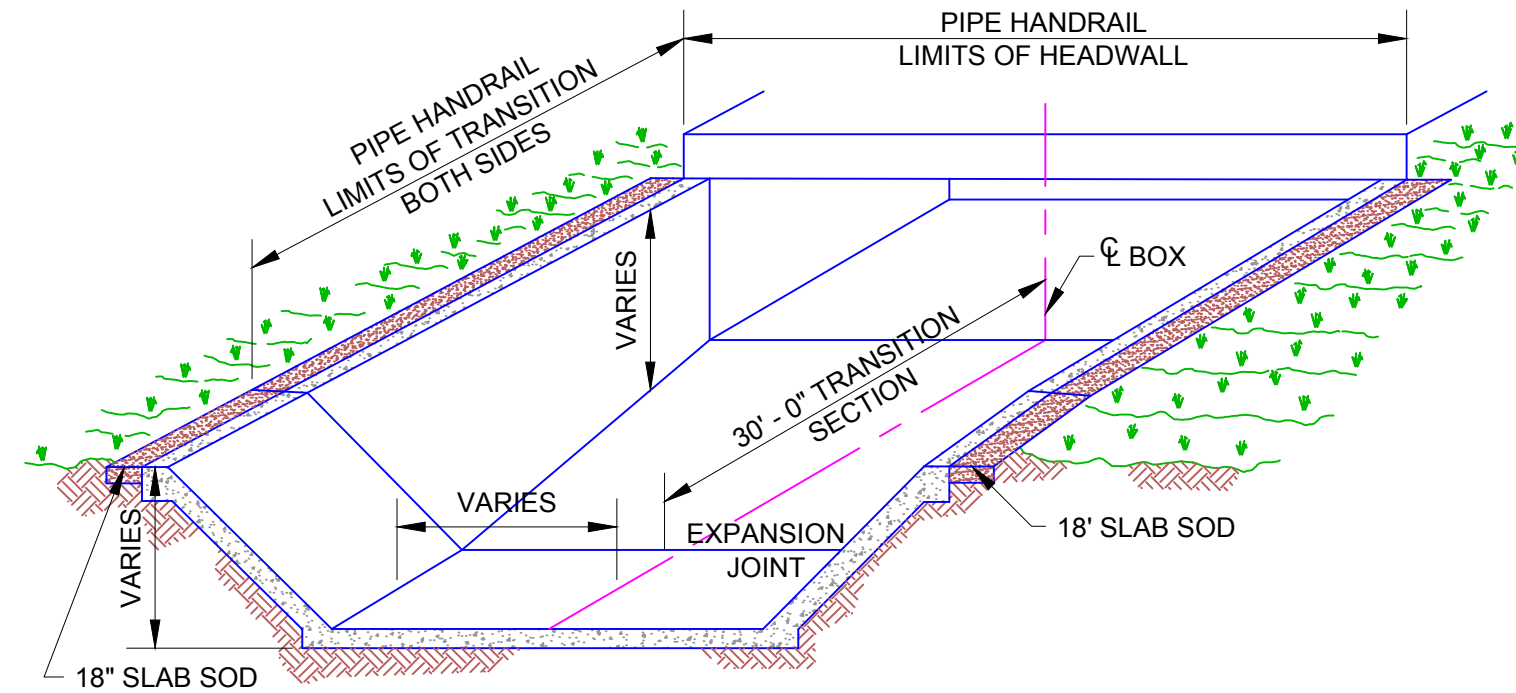
(USING WELD CONNECTIONS ON PIPE HANDRAILS)

3" I.D. GALV. STEEL PIPE WITH PLAIN GALV. FITTINGS.
USE STANDARD & SPECIAL FITTINGS AS NEEDED.

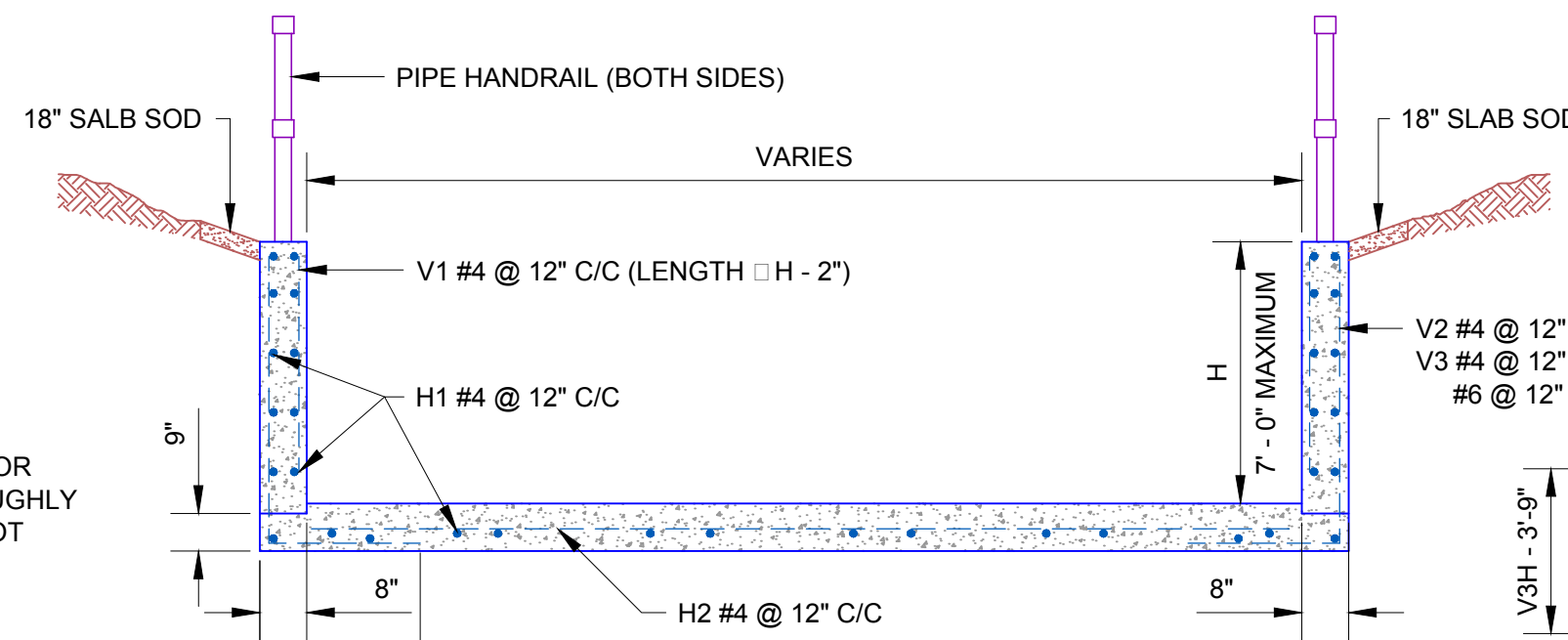


PIPE HANDRAIL DETAIL

HANDRAIL NOTES: WELD CONNECTIONS MAY BE USED FOR
PIPE HANDRAIL. WELD CONNECTIONS SHALL BE THOROUGHLY
CLEANED OF ALL LOOSE SCALE, GROUND SMOOTH & SPOT
POINTED WITH TWO COATS OF ALUMINUM PAINT.

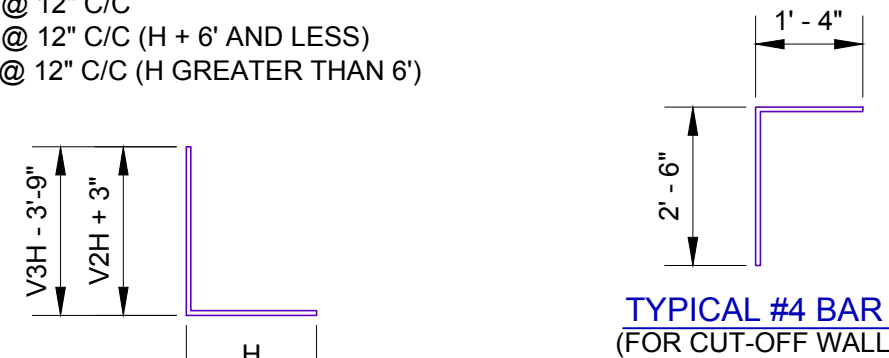


CONCRETE CHANNEL LINER JOINT DETAIL

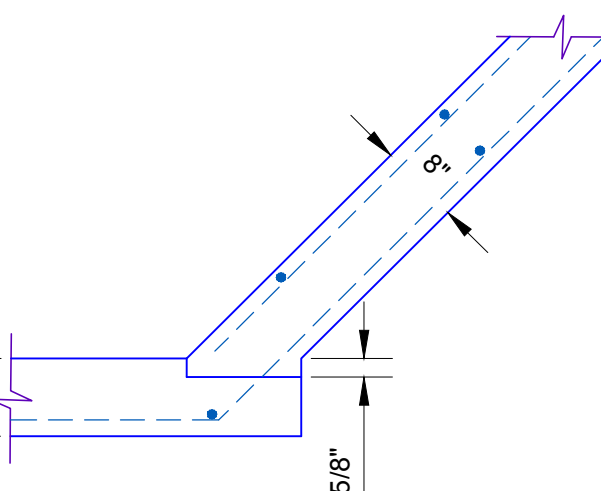


CONCRETE CHANNEL LINER JOINT DETAIL

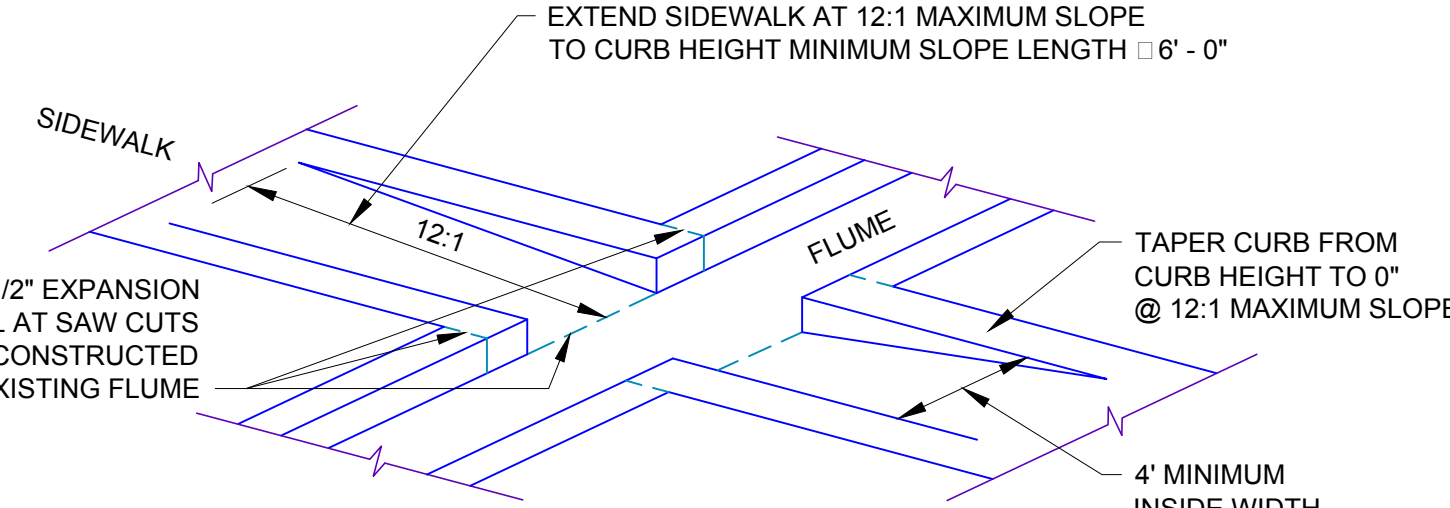
BAR BENDING DIAGRAM



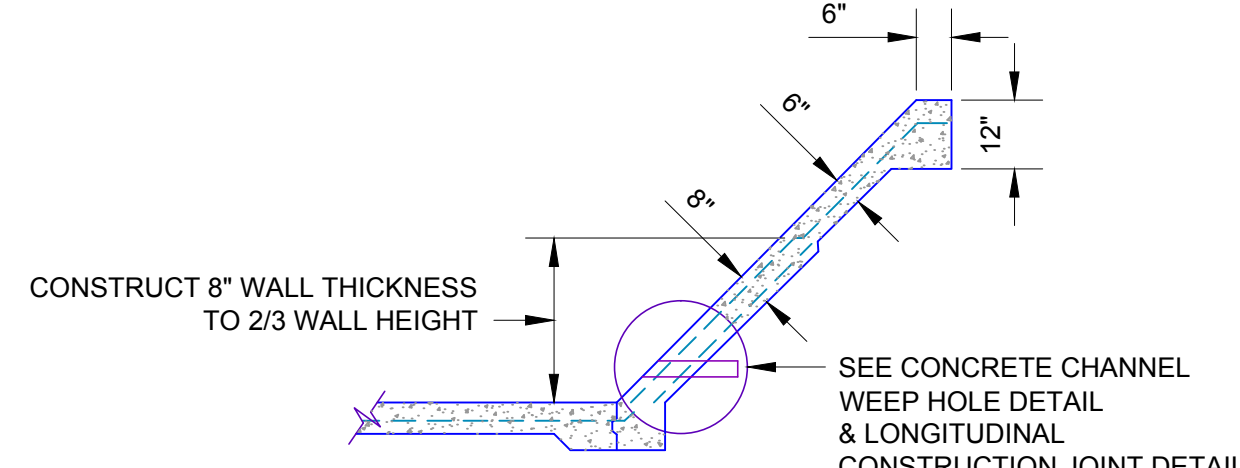
TYPICAL #4 BAR (FOR CUT-OFF WALL)



LONGITUDINAL CONSTRUCTION JOINT THROUGH TRANSITION SECTION

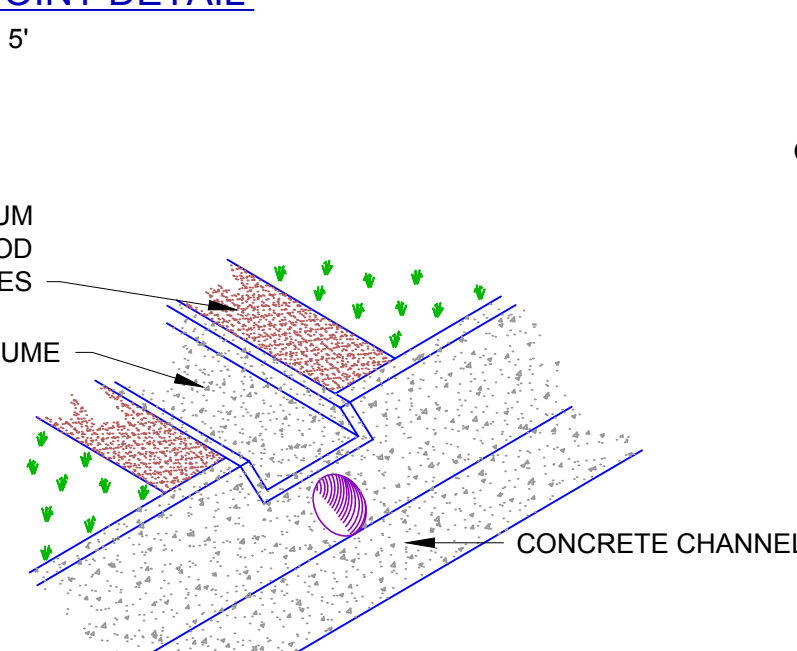


SIDEWALK RAMP AT FLUME CROSSING

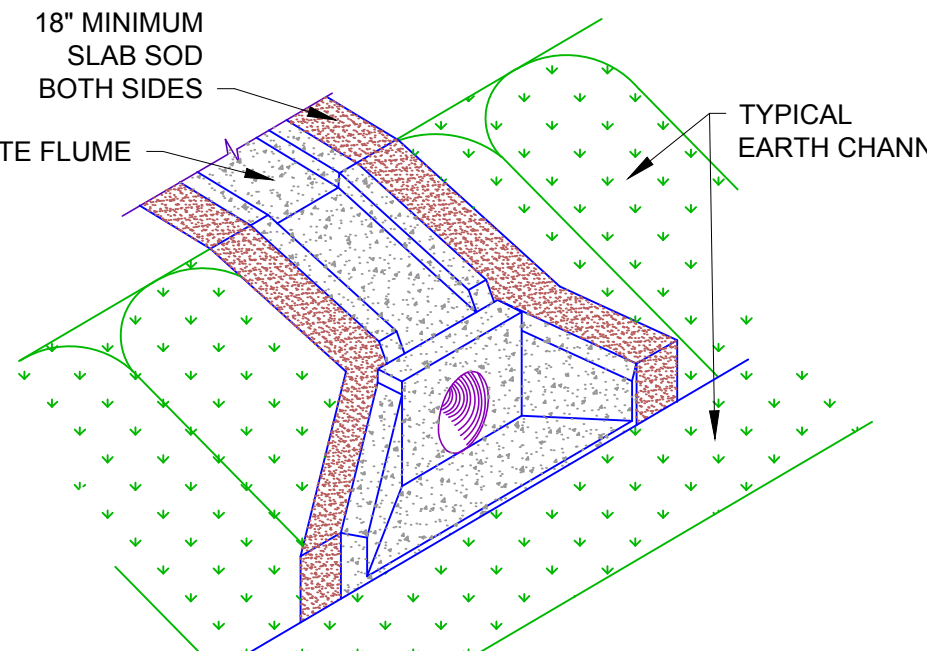


CONCRETE CHANNEL LINER JOINT DETAIL

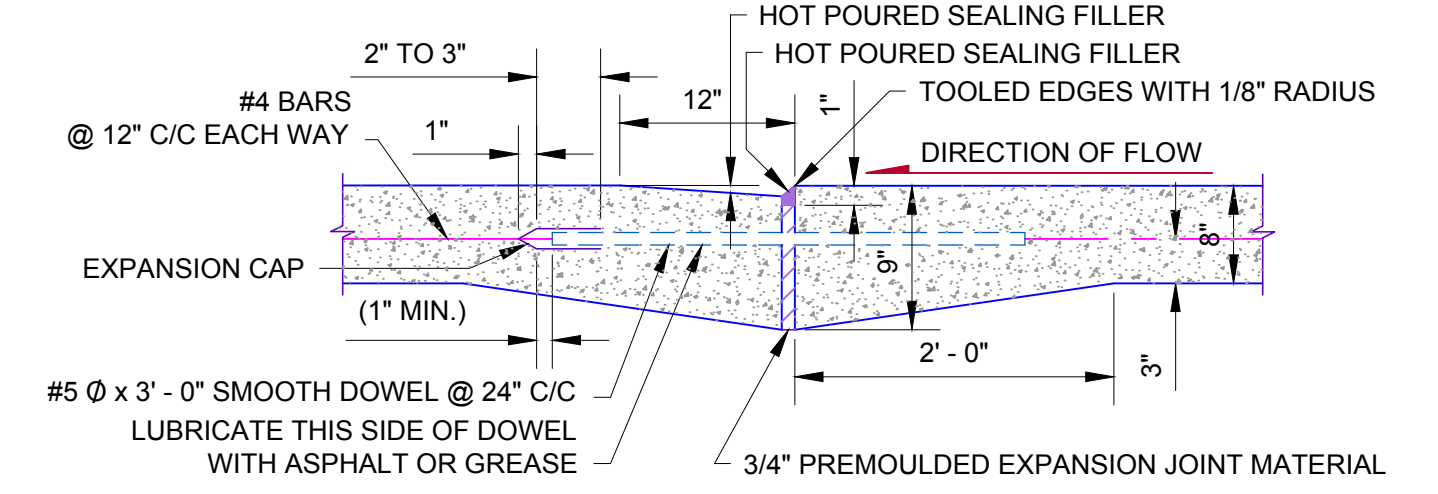
FOR WALL HEIGHT ABOVE 5'



TYPICAL FLUME DETAIL CONCRETE CHANNEL

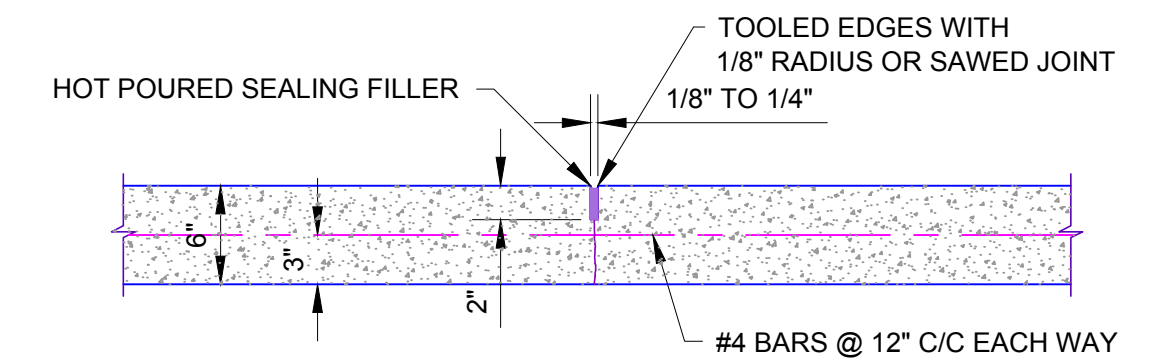


TYPICAL FLUME DETAIL EARTH CHANNEL



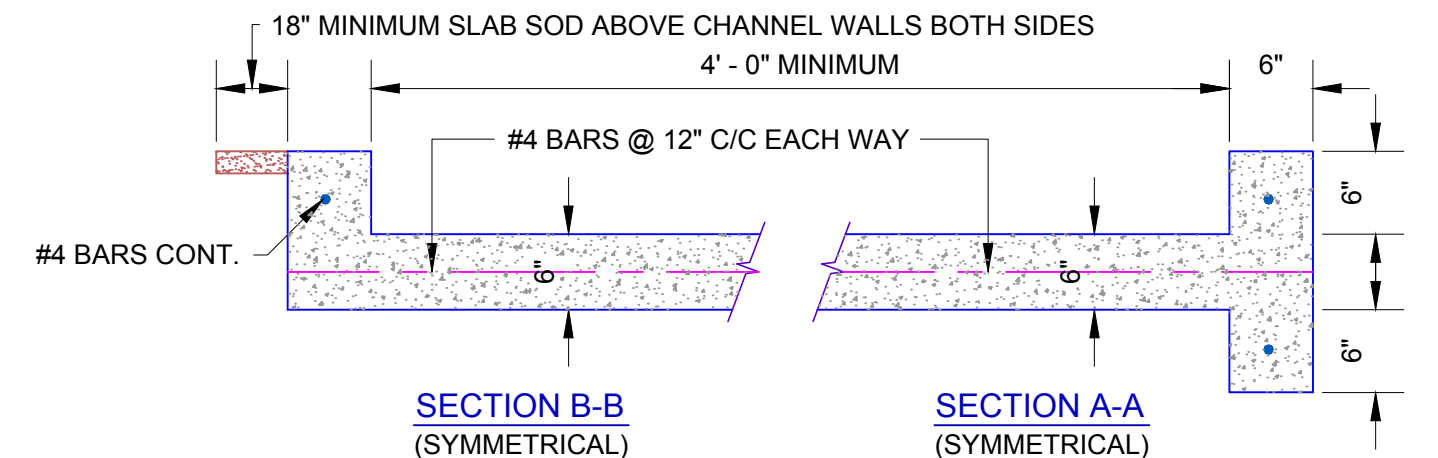
TYPICAL TRANSVERSE EXPANSION JOINT

SPACED AT 100 FOOT C/C MAXIMUM



CONTRACTION JOINT

SPACED AT 20 FOOT C/C
(ALSO USE JOINT LONGITUDINALLY AT CENTERLINE OF CHANNEL FOR BOTTOMS OF 12 FOOT AND OVER)

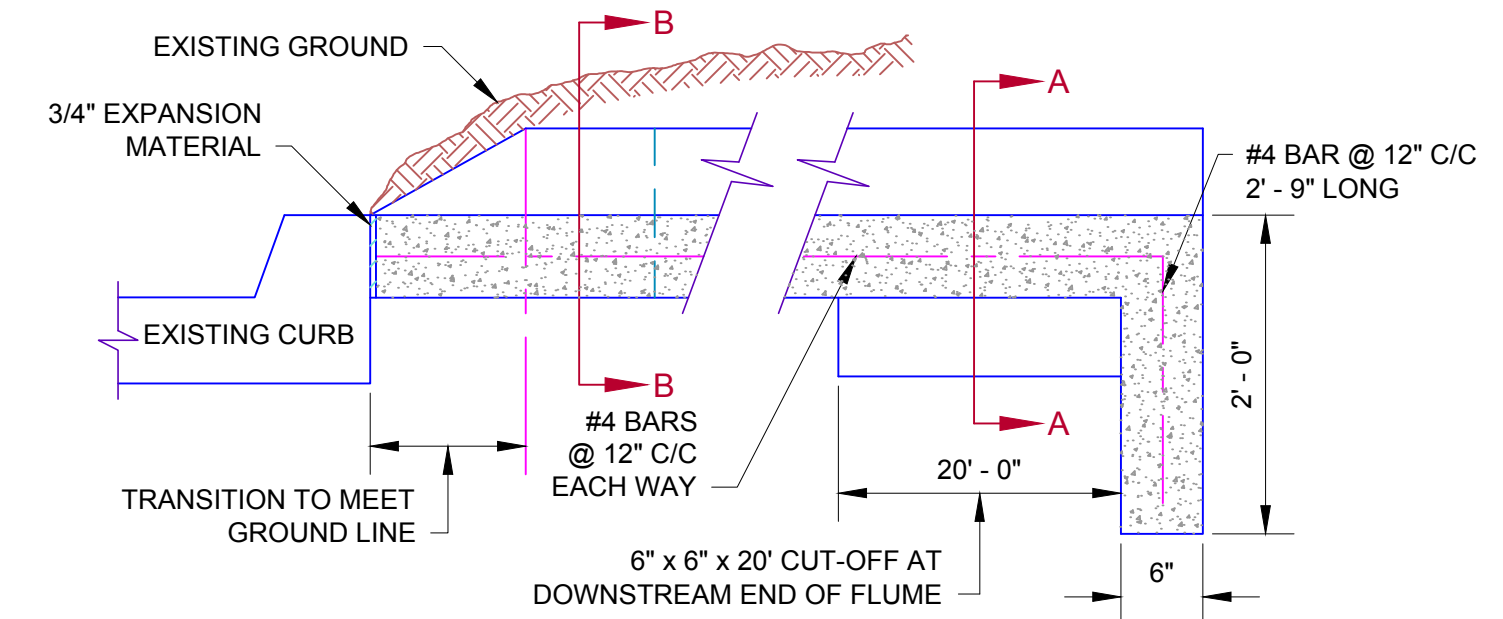


SECTION B-B (SYMMETRICAL)

SECTION A-A (SYMMETRICAL)

CONSTRUCTION JOINT

SPACED AT 20 FOOT C/C
(ALSO USE JOINT LONGITUDINALLY AT CENTERLINE OF CHANNEL FOR BOTTOMS OF 12 FOOT AND OVER)



CONCRETE FLUME DETAIL

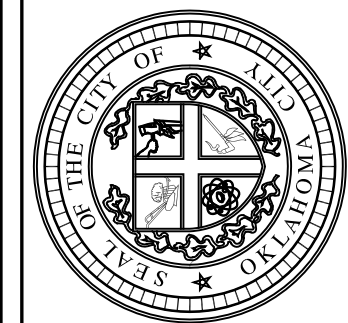
NOTE: 3/4" EXPANSION JOINT @ 100' MAXIMUM
SAWED CONSTRUCTION JOINT @ 20' MAXIMUM

TYPICAL #4 BAR (FOR CONCRETE FLUME)

OKLAHOMA CITY
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION

STANDARD CHANNEL LINER & FLUME DETAILS

APPROVED BY: 	DATE: 7-11-01	DRAWN: V.S.C.	DATE: 06/27/01
CITY ENGINEER		DWG. NO. D-501	



NO. DATE DESCRIPTION

SANITARY SEWER
STANDARD DETAILS

DATE: 03/14/14
DRAWN BY: JDS
CHECKED BY: MWS/EJW

SCALE:
AS SHOWN

SHEET NUMBER
S-STD-02

SANITARY SEWER STANDARD DETAIL

3. COMPACTION METHODS

COMPACTION METHODS MAY VARY DEPENDING ON THE MATERIAL OR AS APPROVED BY THE ENGINEER

A. COHESIVE MATERIALS
COMPACTION OF COHESIVE MATERIALS MAY BE OBTAINED BY USE OF IMPACT TYPE EQUIPMENT IN CONFINED AREAS, PNEUMATIC TAMPERS AND ENGINE DRIVEN RAMMERS MAY ALSO BE USED. IN RELATIVELY NARROW TRENCHES, SELF-PROPELLED RAMMERS MAY BE USED. IN WIDE TRENCHES, SHEEPSFOOT ROLLERS MAY BE USED.

B. COHESIONLESS MATERIALS
COHESIONLESS MATERIALS ARE GRANULAR MATERIALS CLASSIFIED AS NON-PLASTIC. IN GENERAL, VIBRATORY EQUIPMENT MAY BE USED FOR PROPER COMPACTION. IN CONFINED AREAS, VIBRATORY PLATES MAY BE USED. FOR WIDER TRENCHES, VIBRATORY ROLLERS MAY BE USED.

C. FLOODING OR JETTING
WHEN APPROVED BY THE ENGINEER, MATERIALS MAY ALSO BE COMPACTED OR SETTLED BY FLOODING WHERE ADEQUATE QUANTITIES OF WATER ARE AVAILABLE FROM THE CITY'S WATER SYSTEM, PRIVATELY OWNED PONDS, CREEKS OR OTHER SOURCES LOCATED WITHIN THREE HUNDRED FEET (300') OF THE TRENCH. WATER SHALL BE USED TO PRODUCE A SEMI-FLUID MASS ALONG AND OUT OF THE TRENCH AT STREAM CROSSINGS OR OTHER PLACES OF ABRUPT CHANGES IN GROUND PROFILE. THE CONTRACTOR SHALL MAKE NECESSARY ARRANGEMENTS WITH THE CITY FOR THE PURCHASE OF WATER FROM THE CITY WATER MAINS, AND WITH OWNERS OF WATER PROCURED FROM PRIVATELY OWNED WATER SOURCES. NO ADDITIONAL COMPENSATION SHALL BE ALLOWED TO THE CONTRACTOR FOR SETTling THE BACKFILL BY JETTING. THE COST OF SUCH WORK SHALL BE INCLUDED IN THE UNIT PRICE BID FOR TRENCH EXCAVATION AND BACKFILL OR OTHER PAY ITEMS THE CONTRACTOR MAY ELECT.

4. COMPACTION REQUIREMENTS

ALL BACKFILL SHALL BE TESTED BY AN APPROVED LABORATORY FOR COMPLIANCE OF THE COMPACTION REQUIREMENTS.

5. SURFACE RESTORATION

UPON COMPLETION OF BACKFILLING PROCEDURES, THE CONTRACTOR SHALL REPLACE ALL SURFACE MATERIALS AND SHALL RESTORE PAVING, CURBING, SIDEWALKS, GUTTERS, SHRUBBERY, FENCES, SOD AND OTHER SURFACES DISTURBED TO A CONDITION EQUAL TO OR BETTER THAN THE CONDITION BEFORE WORK BEGAN.

BACKFILLING REQUIREMENTS		2 of 2	
03/13/14	APPROVED BY: <i>[Signature]</i> DATE: ERIC J. WENGER, P.E., CITY ENGINEER	03/13/14	APPROVED BY: <i>[Signature]</i> DATE: MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR
OKLAHOMA CITY UTILITIES DEPARTMENT		OKLAHOMA CITY UTILITIES DEPARTMENT	

SANITARY SEWER STANDARD DETAIL

FLEXIBLE PIPE INSTALLATION DETAIL (DIP, HDPE, PVC & RFP)

RIGID PIPE INSTALLATION DETAIL (RCP & VCP)

OD=PIPE OUTSIDE DIAMETER (IN.)
BEDDING CLASS="B"
LOAD FACTOR=1.8

PIPE INSTALLATION DETAILS		S-09	
03/13/14	APPROVED BY: <i>[Signature]</i> DATE: ERIC J. WENGER, P.E., CITY ENGINEER	03/13/14	APPROVED BY: <i>[Signature]</i> DATE: MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR
OKLAHOMA CITY UTILITIES DEPARTMENT		OKLAHOMA CITY UTILITIES DEPARTMENT	

SANITARY SEWER STANDARD DETAIL

BRICK MASONRY OR PRECAST RING (MORTARED)
CONCENTRIC OR ECCENTRIC CONE
CONCRETE PAD
VARIES (4" MIN.)
6" MIN. CRUSHED ROCK

MINIMUM 1'-0"

NOTES:

- CAST-IN-PLACE NON-REINFORCED CONCRETE AND BRICK MANHOLES
 - THE EXISTING CONE AND WALL, IF NECESSARY, SHALL BE REMOVED TO A LEVEL WHICH WILL ALLOW INSTALLATION OF NEW CONE TO THE PROPER GRADE. THE EXPOSED CUT-OFF SURFACES OF THE EXISTING MANHOLE WALL SHALL BE CLEANED BY REMOVING LOOSE MATERIAL AND WETTED, PRIOR TO CONSTRUCTION OF CONCRETE PAD. ALL LOOSE BACKFILL AROUND THE MANHOLE WALL SHALL BE REMOVED AND REPLACED WITH COMPACTED CRUSHED ROCK. THE NEW CONCRETE PAD SHALL BE CONSTRUCTED, AND A NEW CONE SHALL BE FORMED OR PLACED TO THE PROPER GRADE USING FIFTEEN THOUSAND (1500 PSI) POUNDS PER SQUARE INCH MORTAR.
- PRECAST REINFORCED CONCRETE MANHOLES
 - PRECAST SECTIONS SHALL BE REMOVED TO A LEVEL WHERE THE NEW CONE CAN BE INSTALLED TO THE DESIRED GRADE. INSTALLATION SHALL BE IN ACCORDANCE WITH THE APPROPRIATE STANDARD DETAIL FOR PRECAST MANHOLE CONES. A NEW RUBBER GASKET SHALL BE USED TO SEAL EACH SECTION.

REBUILDING MANHOLES STANDARD DETAIL		S-10	
03/13/14	APPROVED BY: <i>[Signature]</i> DATE: ERIC J. WENGER, P.E., CITY ENGINEER	03/13/14	APPROVED BY: <i>[Signature]</i> DATE: MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR
OKLAHOMA CITY UTILITIES DEPARTMENT		OKLAHOMA CITY UTILITIES DEPARTMENT	

SANITARY SEWER STANDARD DETAIL

ABANDONED MANHOLE
REMOVE EXIST. TOP 2'-0" OF MANHOLE
PLUG
EX. SAN. SEWER
COMPACTED SAND BACKFILL
CONC. FILL BOTTOM OF M.H. TO TOP OF PIPE
PLUG
EX. SAN. SEWER

NOTE: SALVAGED MATERIALS, INCLUDING RING AND COVER SHALL BE DELIVERED TO THE LINE MAINTENANCE DIVISION OF THE WATER AND WASTEWATER UTILITIES DEPARTMENT.

ABANDONING MANHOLES STANDARD DETAIL		S-11	
03/13/14	APPROVED BY: <i>[Signature]</i> DATE: ERIC J. WENGER, P.E., CITY ENGINEER	03/13/14	APPROVED BY: <i>[Signature]</i> DATE: MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR
OKLAHOMA CITY UTILITIES DEPARTMENT		OKLAHOMA CITY UTILITIES DEPARTMENT	

SANITARY SEWER STANDARD DETAIL

TRENCH WIDTH
BACKFILL
EMBEDMENT PLUG
O.D.

NOTES:

TWO TYPES OF EMBEDMENT PLUGS MAY BE USED, AT THE CONTRACTORS OPTION, AS FOLLOWS:

- CLAY PLUGS
 - THE EMBEDMENT AND BACKFILL MATERIAL SHALL BE SELECT CLAY SEPARATED FROM EXCAVATED MATERIAL AND SHALL BE APPROVED BY THE ENGINEER PRIOR TO PLACEMENT. THIS MATERIAL SHALL BE FREE OF CLODS, CLUMPS, DEBRIS, ORGANIC MATERIAL AND STONES. ALL CLAY PLUG MATERIAL SHALL BE COMPACTED TO A MINIMUM OF NINETY (90%) PERCENT OF STANDARD PROCTOR DENSITY (ASTM D-698) AT PLUS OR MINUS THREE (3%) PERCENT OF OPTIMUM MOISTURE CONTENT.
- FLOWABLE FILL PLUGS
 - FLOWABLE FILL PLUGS SHALL CONSIST OF A PORTLAND CEMENT GROUT HAVING A MINIMUM TWENTY-EIGHT (28) DAY COMPRESSIVE STRENGTH OF FIVE HUNDRED (500 PSI) POUNDS PER SQUARE INCH.

EMBEDMENT PLUG		S-12	
03/13/14	APPROVED BY: <i>[Signature]</i> DATE: ERIC J. WENGER, P.E., CITY ENGINEER	03/13/14	APPROVED BY: <i>[Signature]</i> DATE: MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR
OKLAHOMA CITY UTILITIES DEPARTMENT		OKLAHOMA CITY UTILITIES DEPARTMENT	

SANITARY SEWER STANDARD DETAIL

- MANHOLES SHALL BE CONSTRUCTED AS SPECIFIED IN ASTM C-478.
- THE MINIMUM WALL THICKNESS IS SPECIFIED IN THE FOLLOWING TABLE AND SHALL NOT BE LESS THAN ONE-TWELFTH (1/12) OF THE INTERNAL DIAMETER OF THE LARGEST CONE OR RISER OR FIVE-INCHES (5") WHICHEVER IS GREATER.
- MINIMUM DEPTH OF MANHOLE TO BE 6'-0".
- ALL LIFTING HOLES PROVIDED IN EACH SECTION SHALL BE REPAIRED WITH A MIXTURE OF CEMENT & SAND GROUT FIRMLY PACKED INTO ENTIRE ORIFICE.
- ALL INSIDES SURFACES OF PRECAST MANHOLES SHALL BE COATED WITH A DRY FILM THICKNESS OF NOT LESS THAN EIGHT (8) MILS OF TNEPEC SERIES 69 HI-BUILD EPOXOLINE II, OR APPROVED EQUAL.
- WHEN DIRECTED BY THE ENGINEER, A SET OF THREE (3) CYLINDERS, THREE-INCHES (3") IN DIAMETER SHALL BE CUT FROM RANDOMLY SELECTED MANHOLES AND TESTED FOR COMPRESSIVE STRENGTH.
- ACCEPTANCE OF THE MANHOLE STRUCTURE SHALL BE BASED ON THE CONFORMANCE AND PERFORMANCE OF MATERIALS REQUIRED IN ASTM C-478 AND THE ENGINEER'S INSPECTION OF THE INSTALLED PRODUCT.

MANHOLE INTERNAL DIAMETER (FEET)	MINIMUM WALL THICKNESS (INCHES)
4	5
5	5
6	6
7	7
8	8

4 FT. - 5 FT. - or 6 FT.
LIFTING HOLES
REINFORCING WIRE PER ASTM C-478
8 FT. - 7 FT. - or 6 FT.

PRECAST REINFORCED CONCRETE MANHOLE TRANSITION SECTION		S-13	
03/13/14	APPROVED BY: <i>[Signature]</i> DATE: ERIC J. WENGER, P.E., CITY ENGINEER	03/13/14	APPROVED BY: <i>[Signature]</i> DATE: MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR
OKLAHOMA CITY UTILITIES DEPARTMENT		OKLAHOMA CITY UTILITIES DEPARTMENT	

SANITARY SEWER STANDARD DETAIL

NOTE:

- ALL CONCRETE FOR MANHOLE STRUCTURE AND BASE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI
- PRECAST MANHOLES SHALL BE CONSTRUCTED AS PER ASTM C-478
- ALL INSIDE SURFACES OF PRECAST MANHOLES SHALL BE COATED WITH A DRY FILM THICKNESS OF NOT LESS THAN EIGHT (8) MILS OF TNEPEC SERIES 69 HI-BUILD EPOXOLINE II, OR APPROVED EQUAL.
- MINIMUM DEPTH OF MANHOLE TO BE 6'-0".

MH WALL SECTION
O-RING SEAL
PIPE OD
REINFORCING WIRE PER ASTM C-478
#4 BARS 8" O.C. BOTH WAYS
2" SLOPE TO TROUGH
INVERT AND BENCH
2 FT MIN. BASE HEIGHT SECTION
6" CRUSHED ROCK FOUNDATION
UNDISTURBED EARTH
"ALOK" GASKET SYSTEM FOR PIPE PENETRATION

REINFORCED CONCRETE PRECAST MANHOLE BASE SECTION		S-14	
03/13/14	APPROVED BY: <i>[Signature]</i> DATE: ERIC J. WENGER, P.E., CITY ENGINEER	03/13/14	APPROVED BY: <i>[Signature]</i> DATE: MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR
OKLAHOMA CITY UTILITIES DEPARTMENT		OKLAHOMA CITY UTILITIES DEPARTMENT	

SANITARY SEWER STANDARD DETAIL

- MANHOLES SHALL BE CONSTRUCTED AS SPECIFIED IN ASTM C-478
- THE MINIMUM WALL THICKNESS IS SPECIFIED IN THE FOLLOWING TABLE AND SHALL NOT BE LESS THAN ONE-TWELFTH (1/12) OF THE INTERNAL DIAMETER OF THE LARGEST CONE OR RISER OF FIVE-INCHES (5") WHICHEVER IS GREATER.
- MINIMUM DEPTH OF MANHOLE TO BE 6'-0".
- ALL LIFTING HOLES PROVIDED IN EACH SECTION SHALL BE REPAIRED WITH A MIXTURE OF CEMENT & SAND GROUT FIRMLY PACKED INTO ENTIRE ORIFICE.
- ALL INSIDE SURFACES OF PRECAST MANHOLES SHALL BE COATED WITH A DRY FILM THICKNESS OF NOT LESS THAN EIGHT (8) MILS OF TNEPEC SERIES 69 HI-BUILD EPOXOLINE II, OR APPROVED EQUAL.
- WHEN DIRECTED BY THE ENGINEER, A SET OF THREE (3) CYLINDERS, THREE-INCHES (3") IN DIAMETER SHALL BE CUT FROM RANDOMLY SELECTED MANHOLES AND TESTED FOR COMPRESSIVE STRENGTH.
- ACCEPTANCE OF THE MANHOLE STRUCTURE SHALL BE BASED ON THE CONFORMANCE AND PERFORMANCE OF MATERIALS REQUIRED IN ASTM C-478 AND THE ENGINEER'S INSPECTION OF THE INSTALLED PRODUCT.

MANHOLE INTERNAL DIAMETER (FEET)	MINIMUM WALL THICKNESS (INCHES)
4	5
5	5
6	6
7	7
8	8

BRICK MASONRY OR PRECAST RING (MORTARED)
STANDARD RING & LID
LIFTING HOLES
2 FT. - 6"
1'-0" MAX. CONE SECTION 3'-0"
REINFORCING WIRE PER ASTM C-478
RUBBER O-RING GASKET MATERIAL
CONCENTRIC CONE
ECCENTRIC CONE

REINFORCED CONCRETE PRECAST 4 FT DIAMETER MANHOLE CONE		S-15	
03/13/14	APPROVED BY: <i>[Signature]</i> DATE: ERIC J. WENGER, P.E., CITY ENGINEER	03/13/14	APPROVED BY: <i>[Signature]</i> DATE: MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR
OKLAHOMA CITY UTILITIES DEPARTMENT		OKLAHOMA CITY UTILITIES DEPARTMENT	

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SANITARY SEWER STANDARD DETAIL

1. MANHOLES SHALL BE CONSTRUCTED AS SPECIFIED IN ASTM C-478
 2. THE MINIMUM WALL THICKNESS IS SPECIFIED IN THE FOLLOWING TABLE AND SHALL NOT BE LESS THAN ONE-TWELTH (1/12) OF THE INTERNAL DIAMETER OF THE LARGEST CONE OR RISER OR FIVE-INCHES (5") WHICHEVER IS GREATER.

MANHOLE INTERNAL DIAMETER (FEET)	MINIMUM WALL THICKNESS (INCHES)
4	5
5	5
6	6
7	7
8	8

3. ALL LIFTING HOLES PROVIDED IN EACH SECTION SHALL BE REPAIRED WITH A MIXTURE OF CEMENT AND SAND GROUT FIRMLY PACKED INTO ENTIRE ORIFICE.
 4. ALL INSIDE SURFACES OF PRECAST MANHOLES SHALL BE COATED WITH A DRY FILM THICKNESS OF NOT LESS THAN EIGHT (8) MILS OF TNE MEC SERIES 69 HI-BUILD EPOXOLINE II, OR APPROVED EQUAL.
 5. WHEN DIRECTED BY THE ENGINEER, A SET OF THREE (3) CYLINDERS, THREE-INCHES (3") IN DIAMETER SHALL BE CUT FROM RANDOMLY SELECTED MANHOLES AND TESTED FOR COMPRESSIVE STRENGTH.
 6. ACCEPTANCE OF THE MANHOLE STRUCTURE SHALL BE BASED ON THE CONFORMANCE AND PERFORMANCE OF MATERIALS REQUIRED IN ASTM C-478 AND THE ENGINEER'S INSPECTION OF THE INSTALLED PRODUCT.

PRECAST MANHOLE WALL DETAIL

APPROVED BY: *Eric J. Wenger* DATE: 3/14/14
 ERIC J. WENGER, P.E., CITY ENGINEER
 APPROVED BY: *Marsha W. Slaughter* DATE: 3/14/14
 MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR
 OKLAHOMA CITY UTILITIES DEPARTMENT S-16

SANITARY SEWER STANDARD DETAIL

1. MANHOLE TOPS SHALL BE CONSTRUCTED IN ACCORDANCE WITH ASTM C-478 LIFTING HOOKS SHALL BE CONSTRUCTED AS PER MANUFACTURERS RECOMMENDATION.
 2. ALL INSIDE SURFACES OF PRECAST FLAT TOP SHALL BE COATED WITH A DRY FILM THICKNESS OF NOT LESS THAN EIGHT (8) MILS OF TNE MEC 69 HI-BUILD EPOXOLINE II, OR APPROVED EQUAL.
 3. WHEN DIRECTED BY THE ENGINEER, A SET OF THREE (3) CYLINDERS, THREE-INCHES (3") IN DIAMETER SHALL BE CUT FROM RANDOMLY SELECTED MANHOLE TOPS AND TESTED FOR A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI.
 4. ACCEPTANCE OF THE MANHOLE TOP STRUCTURE SHALL BE BASED ON THE CONFORMANCE AND PERFORMANCE OF MATERIALS REQUIRED IN ASTM C-478 AND THE ENGINEER'S INSPECTION OF THE INSTALLED PRODUCT.

PRECAST REINFORCED CONCRETE FLAT SLAB MANHOLE TOP

APPROVED BY: *Eric J. Wenger* DATE: 3/14/14
 ERIC J. WENGER, P.E., CITY ENGINEER
 APPROVED BY: *Marsha W. Slaughter* DATE: 3/14/14
 MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR
 OKLAHOMA CITY UTILITIES DEPARTMENT S-17

SANITARY SEWER STANDARD DETAIL

CAST-IN-PLACE CONCRETE MANHOLE BASE SECTION

APPROVED BY: *Eric J. Wenger* DATE: 3/14/14
 ERIC J. WENGER, P.E., CITY ENGINEER
 APPROVED BY: *Marsha W. Slaughter* DATE: 3/14/14
 MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR
 OKLAHOMA CITY UTILITIES DEPARTMENT S-18

SANITARY SEWER STANDARD DETAIL

NOTE:
 1. ALL PIPE CLAMPS SHALL BE STAINLESS STEEL
 2. NEOPRENE EPDM BLENDED COMPOUND BOOT SHALL MEET ASTM C-923

SUGGESTED PIPE O.D. RANGE (IN.)	HOLE & BOOT DIAMETER DIMENSIONS			
	A	B	C	D
3 1/2" - 4 1/2"	7"	6 1/2"	4 1/2"	6"
5 1/4" - 7"	12"	10 1/4"	6 1/2"	8"
7" - 8 1/2"	12"	10 1/4"	8"	8"
8 1/2" - 9 1/2"	12"	10 1/4"	8 1/2"	8"
9 1/2" - 11"	16"	14 1/4"	10 1/2"	8"
10 1/2" - 12"	16"	14 1/4"	12"	8"
12" - 13 1/2"	16"	14 1/4"	13 1/2"	8"
14 1/2" - 16 1/2"	20"	18 1/4"	15 1/2"	8"
15 1/2" - 17 1/2"	20"	18 1/4"	17"	8"
18 1/2" - 21 1/2"	24"	22 1/4"	20 1/2"	8"

MANHOLE PIPE CONNECTION FOR CAST IN PLACE MANHOLES

APPROVED BY: *Eric J. Wenger* DATE: 3/14/14
 ERIC J. WENGER, P.E., CITY ENGINEER
 APPROVED BY: *Marsha W. Slaughter* DATE: 3/14/14
 MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR
 OKLAHOMA CITY UTILITIES DEPARTMENT S-19

SANITARY SEWER STANDARD DETAIL

1. GENERAL -- Cast iron rings, tops, covers, grating and all cast iron fitting shall be sound, true to form and thickness, and neatly finished and shall fit together in a satisfactory manner. Castings shall be clean, uniform and whole without blow or sand holes, deposit, hard spots, shrinkage distortion or any other surface defects which would impair serviceability. Casting surfaces shall be smooth and well-cleaned by shot blasting or other approved cleaning method. Plugging or filling holes or other defects shall not be permitted. Parting fins and pouring gates shall be removed. Sharp edges resulting from fabrication shall be dulled by acceptable method to ensure safety in handling. Casting shall conform to the requirements of the Standard Specification for Grey Iron Fittings ASTM A-48, Class "30 B" for rings and "35 B" for covers and the approved Standard Details for Manhole Rings and Covers.
 All rings and covers shall be accurately and carefully placed. All rings shall be beaded in a substantial layer of mortar, shall have a full bearing and shall be set to the exact grade. Unless other wise shown, top of covers shall be flush with or slightly above the surrounding surface. When each cover is placed in any position on the ring, the side play shall not exceed one-eighth (1/8") inch in any direction.
 2. RINGS -- Rings may be manufactured in accordance with the Standard Detail for Reversible Manhole Rings.
 3. COVERS --
 A GENERAL -- Manhole covers may be manufactured in accordance with the appropriate Standard Details for Vented or Non-Vented Covers.
 B COATING -- When called for on the plans or specified, the underside of all manhole covers shall be given one (1) coat of asphalt varnish after visual inspection and approval on the job site.
 C APPLICATION -- All lids (covers) in street right-of-way shall be non-vented and include rainguard in/low protectors.
 4. CASTING WEIGHTS -- The minimum weight of casting will be not less than shown below:

Ring Only	200 LBS
Cover Only	150 LBS
Totals	350 LBS

MANHOLE LID / RING GENERAL NOTES

APPROVED BY: *Eric J. Wenger* DATE: 3/14/14
 ERIC J. WENGER, P.E., CITY ENGINEER
 APPROVED BY: *Marsha W. Slaughter* DATE: 3/14/14
 MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR
 OKLAHOMA CITY UTILITIES DEPARTMENT S-20

SANITARY SEWER STANDARD DETAIL

REVERSIBLE MANHOLE RING

APPROVED BY: *Eric J. Wenger* DATE: 3/14/14
 ERIC J. WENGER, P.E., CITY ENGINEER
 APPROVED BY: *Marsha W. Slaughter* DATE: 3/14/14
 MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR
 OKLAHOMA CITY UTILITIES DEPARTMENT S-21

SANITARY SEWER STANDARD DETAIL

VENTED MANHOLE COVER

APPROVED BY: *Eric J. Wenger* DATE: 3/14/14
 ERIC J. WENGER, P.E., CITY ENGINEER
 APPROVED BY: *Marsha W. Slaughter* DATE: 3/14/14
 MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR
 OKLAHOMA CITY UTILITIES DEPARTMENT S-22

SANITARY SEWER STANDARD DETAIL

VENTED MANHOLE COVER

APPROVED BY: *Eric J. Wenger* DATE: 3/14/14
 ERIC J. WENGER, P.E., CITY ENGINEER
 APPROVED BY: *Marsha W. Slaughter* DATE: 3/14/14
 MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR
 OKLAHOMA CITY UTILITIES DEPARTMENT S-23

The City of
Oklahoma City
 Utilities Department
 Engineering Division

NO.	DATE	DESCRIPTION

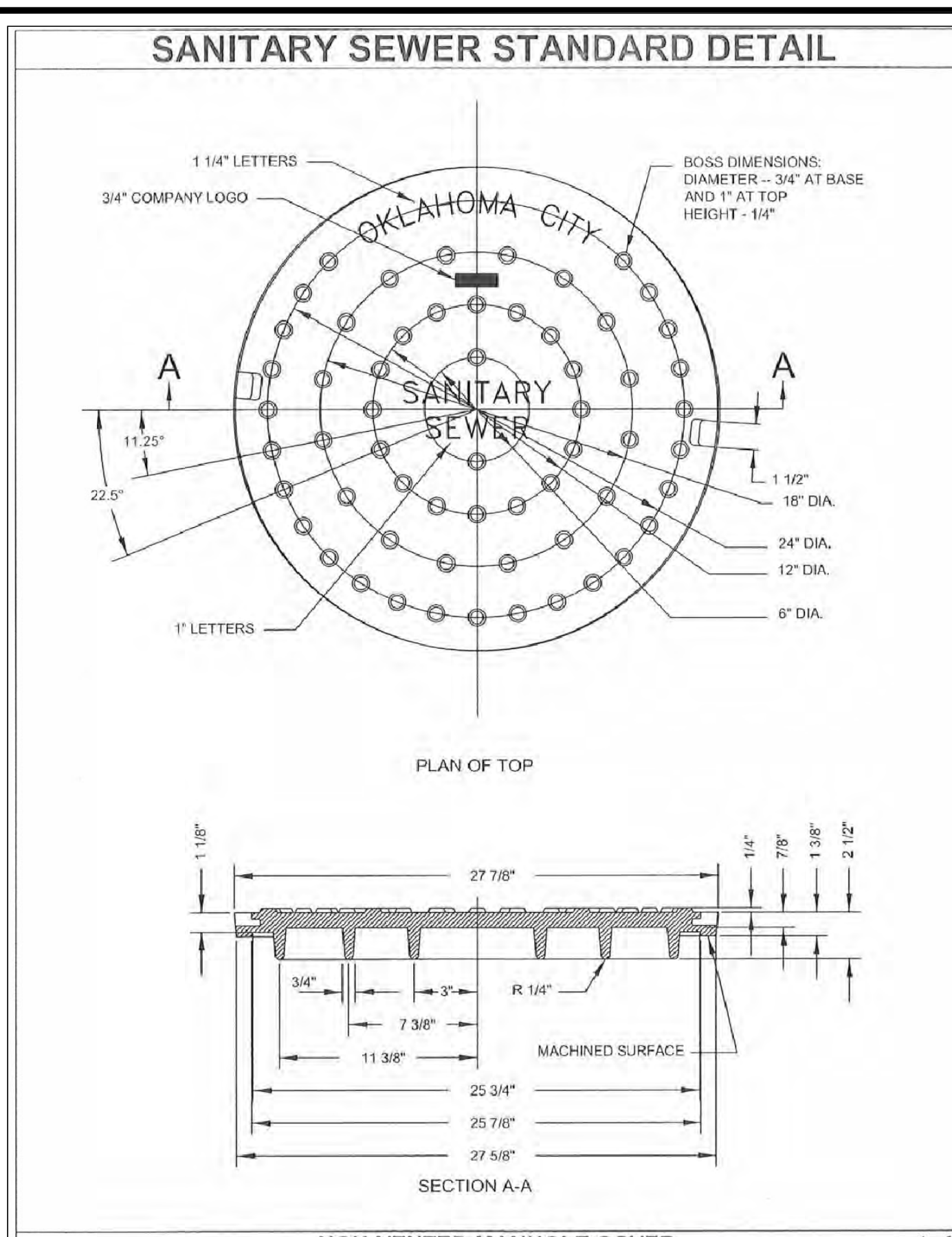
SANITARY SEWER STANDARD DETAILS

DATE: 03/14/14
 DRAWN BY: JDS
 CHECKED BY: MWS/EJW

SCALE:
 AS SHOWN

SHEET NUMBER
S-STD-03

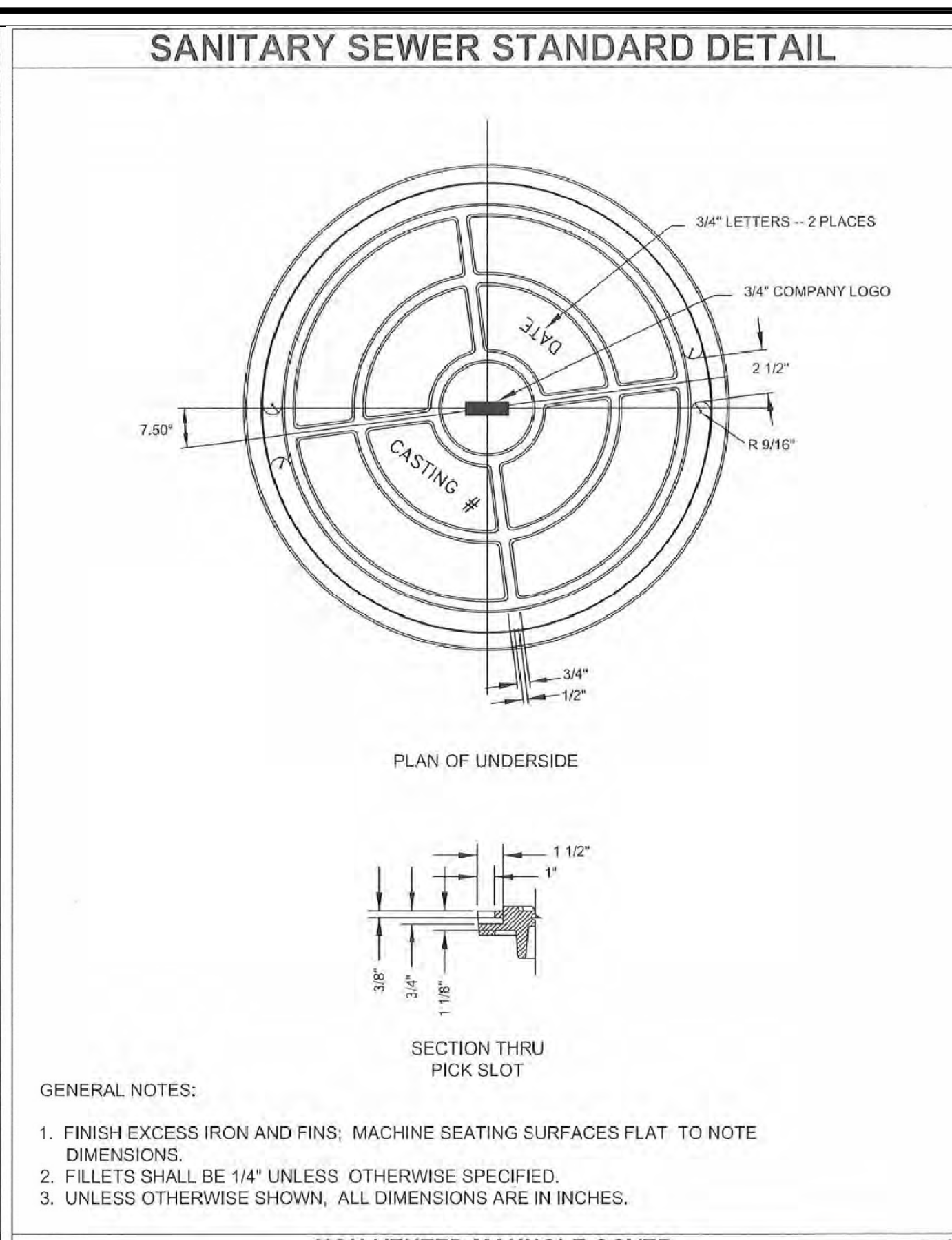
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NON-VENTED MANHOLE COVER 1 of 2

APPROVED BY: *[Signature]* DATE: 3/14/14
 ERIC J. WENGER, P.E., CITY ENGINEER
 MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR

OKLAHOMA CITY UTILITIES DEPARTMENT

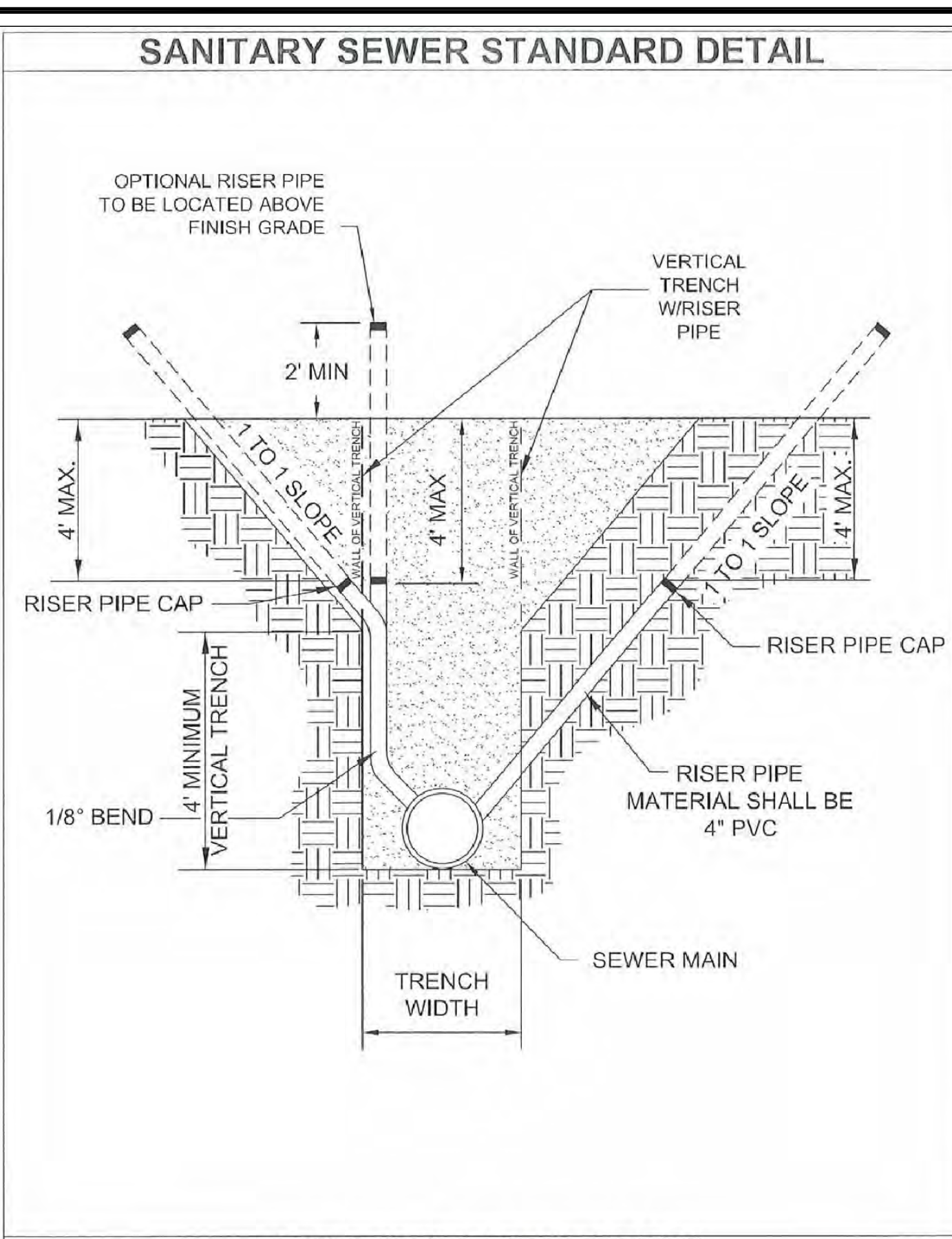


NON-VENTED MANHOLE COVER 2 of 2

APPROVED BY: *[Signature]* DATE: 3/14/14
 ERIC J. WENGER, P.E., CITY ENGINEER
 MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR

OKLAHOMA CITY UTILITIES DEPARTMENT

- GENERAL NOTES:**
1. FINISH EXCESS IRON AND FINIS; MACHINE SEATING SURFACES FLAT TO NOTE DIMENSIONS.
 2. FILLETS SHALL BE 1/4" UNLESS OTHERWISE SPECIFIED.
 3. UNLESS OTHERWISE SHOWN, ALL DIMENSIONS ARE IN INCHES.



SERVICE CONNECTION INSTALLATION S-26

APPROVED BY: *[Signature]* DATE: 3/14/14
 ERIC J. WENGER, P.E., CITY ENGINEER
 MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR

OKLAHOMA CITY UTILITIES DEPARTMENT

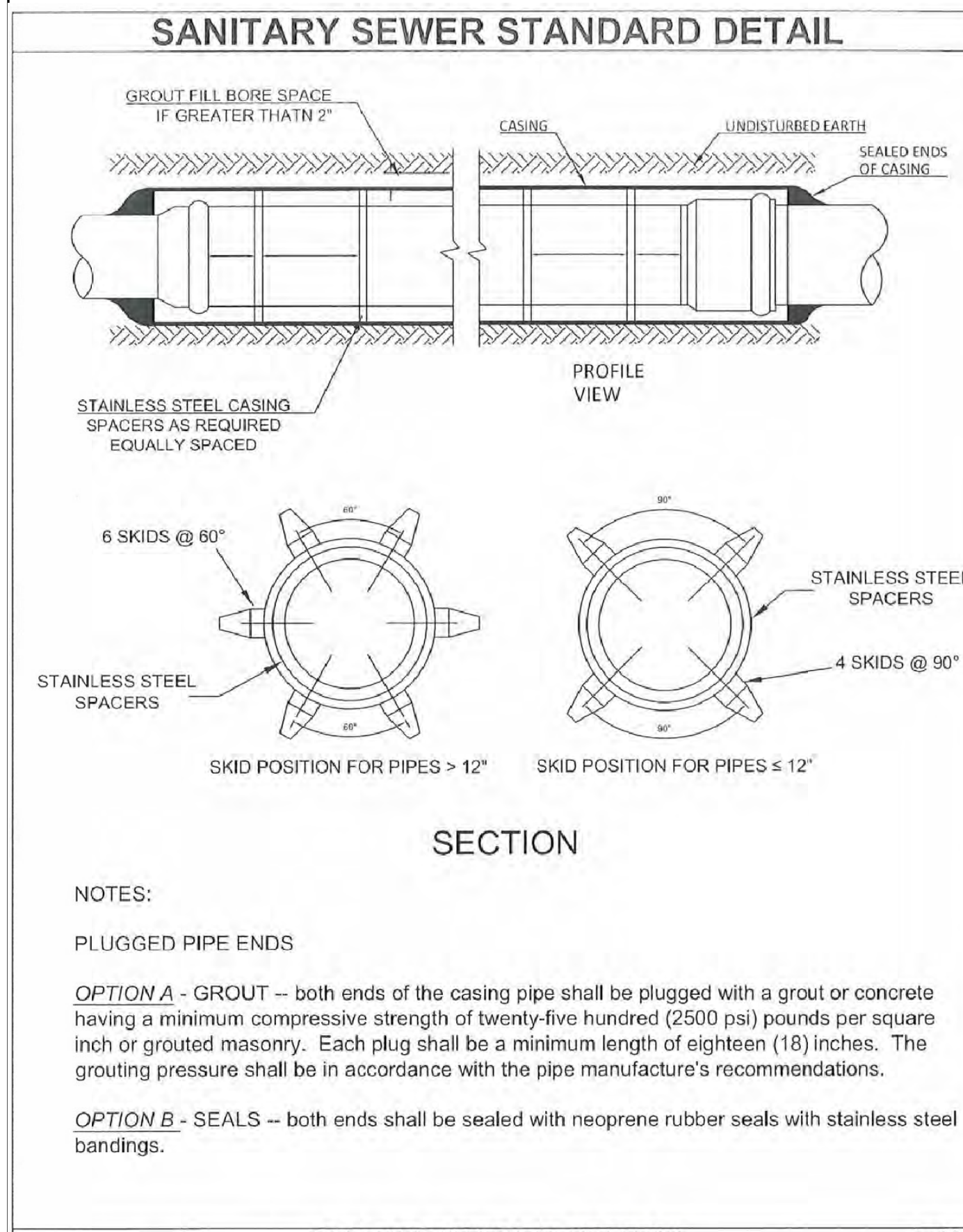
SANITARY SEWER STANDARD DETAIL

1. EXTERNAL CONNECTIONS FOR NEW CONSTRUCTION
 - a. WYE BRANCHES -- For new construction there shall be installed wye branches of size and type shown on the plans with six (6") inch openings at locations shown on the plans or as described by the Engineer.
 - b. ELECTRO FUSION BONDED SADDLES -- For new construction using "Trenchless Construction" technology with HDPE pipe, service connections shall be installed with an electro fusion bonded saddle.
2. EXTERNAL CONNECTION TO EXISTING MAIN -- Connections to existing main may be accomplished as follows:
 - a. SADDLES -- Connections may be made by excavating the existing main and cutting a hole using approved equipment and installing a saddle. Sewer service connections constructed with saddles shall include straps, a one-eighth (1/8") degree bend, and a closure piece. When existing main has been rehabilitated by trenchless method of construction, the saddle connection shall be made to the pipe/or liner.
 - b. TEES -- Connections may be made by removing a section of existing pipe and installing a wye branch. Fittings and closure assembly shall be used to make the connection and shall be supplied in a normal diameter or six (6") inches. The external connection shall be considered complete when backfilling and surface restoration is complete. Service connections constructed with wye branches shall include a one-eighth (1/8") degree bend, elbow, and when required, a closure piece.
3. RISER
 - a. INSTALLATION -- The pipe may be installed in one of four ways shown on "Service Connection Details." Vertical installation is only approved if approved by the City Engineer.
 - b. SIZE AND MATERIAL -- The riser pipe shall be four inch (4") PVC.
4. LOCATOR TAPE -- A locator tape, green in color stating "CAUTION -- SANITARY SEWER RISER BURIED BELOW" shall be attached to the sanitary sewer riser and extended to a minimum of two (2') feet above the ground, the tape shall be three (3") inch wide DuraTac as manufactured by THOR Enterprises, Inc., of Sun Prairie, Wisconsin or approved equal.

SERVICE CONNECTION INSTALLATION S-27

APPROVED BY: *[Signature]* DATE: 3/14/14
 ERIC J. WENGER, P.E., CITY ENGINEER
 MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR

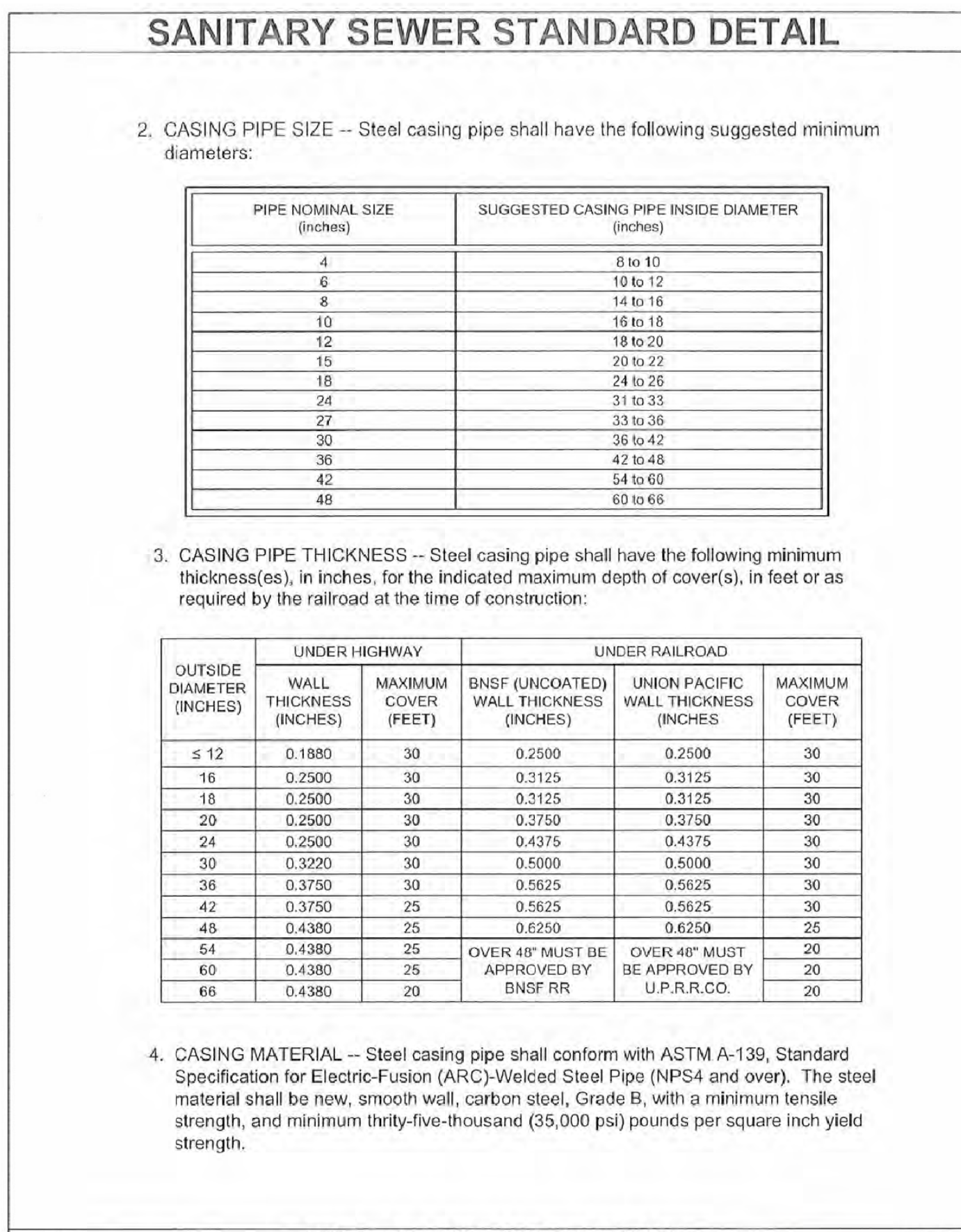
OKLAHOMA CITY UTILITIES DEPARTMENT



BORE AND ENCASEMENT DETAIL 1 of 2

APPROVED BY: *[Signature]* DATE: 3/14/14
 ERIC J. WENGER, P.E., CITY ENGINEER
 MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR

OKLAHOMA CITY UTILITIES DEPARTMENT



BORE AND ENCASEMENT DETAIL 2 of 2

APPROVED BY: *[Signature]* DATE: 3/14/14
 ERIC J. WENGER, P.E., CITY ENGINEER
 MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR

OKLAHOMA CITY UTILITIES DEPARTMENT

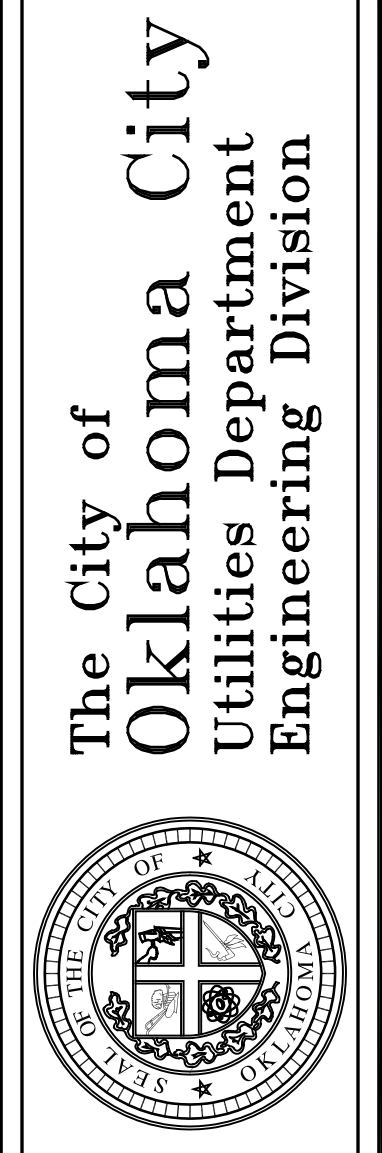
2. CASING PIPE SIZE -- Steel casing pipe shall have the following suggested minimum diameters:

PIPE NOMINAL SIZE (inches)	SUGGESTED CASING PIPE INSIDE DIAMETER (inches)
4	6 to 10
6	10 to 12
8	14 to 16
10	16 to 18
12	18 to 20
15	20 to 22
18	24 to 26
24	31 to 33
27	33 to 36
30	36 to 42
36	42 to 48
42	54 to 60
48	60 to 66

3. CASING PIPE THICKNESS -- Steel casing pipe shall have the following minimum thickness(es), in inches, for the indicated maximum depth of cover(s), in feet or as required by the railroad at the time of construction:

OUTSIDE DIAMETER (INCHES)	UNDER HIGHWAY		UNDER RAILROAD	
	WALL THICKNESS (INCHES)	MAXIMUM COVER (FEET)	BNSF (UNCOATED) WALL THICKNESS (INCHES)	UNION PACIFIC WALL THICKNESS (INCHES)
≤ 12	0.1880	30	0.2500	0.2500
16	0.2500	30	0.3125	0.3125
18	0.2500	30	0.3125	0.3125
20	0.2500	30	0.3750	0.3750
24	0.2500	30	0.4375	0.4375
30	0.3220	30	0.5000	0.5000
36	0.3750	30	0.5625	0.5625
42	0.3750	25	0.5625	0.5625
48	0.4380	25	0.6250	0.6250
54	0.4380	25	0.6250	0.6250
60	0.4380	25	0.6250	0.6250
66	0.4380	20	0.6250	0.6250

4. CASING MATERIAL -- Steel casing pipe shall conform with ASTM A-139, Standard Specification for Electric-Fusion (ARC)-Welded Steel Pipe (NPS4 and over). The steel material shall be new, smooth wall, carbon steel, Grade B, with a minimum tensile strength, and minimum thirty-five-thousand (35,000 psi) pounds per square inch yield strength.



NO.	DATE	DESCRIPTION

SANITARY SEWER STANDARD DETAILS

DATE: 03/14/14
 DRAWN BY: JDS
 CHECKED BY: MWS/EJW

SCALE:
 AS SHOWN

SHEET NUMBER
 S-STD-04

