CONSTRUCTION PLANS

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Sheet List Table	
Sheet Number	Sheet Title
C1	GENERAL NOTES
C2	ULTIMATE MASTER DRAINAGE PLAN
C3	STREET PLAN & PROFILE - SWEET CICELY
C4	STREET PLAN & PROFILE - SWEET CICELY
C5	STREET PLAN & PROFILE - SWEET CICELY
C6	STREET PLAN & PROFILE - LEMONGRASS WOOD
C7	STREET PLAN & PROFILE - SUMMER SAVORY
C8	STREET PLAN & PROFILE - TARRAGON HEIGHTS
C9	TRAFFIC SIGNAGE PLAN
C10 *	STANDARD STREET DETAILS
C11 *	SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS
C12 *	TXDOT SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS
C13 *	TYPICAL CONCRETE DRIVEWAY DETAILS
C14 *	WHEELCHAIR RAMPS STANDARDS
C15	DRAINAGE PLAN & PROFILE - DRAIN "3A-2"
C16	DRAINAGE PLAN & PROFILE - DRAIN "3A-3"
C17 *	TXDOT WINGWALL & CONC. RIP-RAP & TURF REINFORCEMENT DETAILS
C18 *	CoSA DRAIN INLET DETAILS TYPE "C" - CAST - IN - PLACE
C19 *	CoSA DRAIN INLET DETAILS - TYPE "C" - PRECAST
C20 *	TXDOT PRE-CAST BOX CULVERT DETAILS
C21 *	TXDOT CAST - IN - PLACE BOX CULVERT DETAILS
C22	SANITARY SEWER GENERAL NOTES
C23	OVERALL SANITARY SEWER PLAN
C24	OVERALL SANITARY SEWER PLAN
C25	SANITARY SEWER PLAN & PROFILE - LINE A
C26	SANITARY SEWER PLAN & PROFILE - LINE A
C27	SANITARY SEWER PLAN & PROFILE - LINE A
C28	SANITARY SEWER PLAN & PROFILE - LINE C
C29	SANITARY SEWER PLAN & PROFILE - LINE D&E
C30 *	SANITARY SEWER STANDARD DETAILS
C31	WATER DISTRIBUTION PLAN
C32	WATER DISTRIBUTION PLAN
C33 *	WATER DISTRIBUTION STANDARD DETAILS
C34	OVERALL UTILITY PLAN
C35	STORM WATER POLLUTION PREVENTION PLAN
C36	OVERALL GRADING PLAN

* STANDARD DETAILS ADOPTED FOR THIS CONSTRUCTION SET.

LOCATION MAP



VICINITY MAP

HICKORY RIDGE UNIT 3A

CONSTRUCTION PLANS

DEVELOPER/OWNER/APPLICANT

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DRAWN BY	DATE	
RC/JG/JRR/MOH/MAS	11/17/2025	
CHECKED BY	**PROJECT NO.**	CUDE ENGINEERS
CJC/KMH	03278.101	TBPE No. 455 TBPLS No. 10048500

STATE OF TEXAS
KYLE M. HUDEK
138753
LICENSED
PROFESSIONAL ENGINEER
11/18/2025

I HAVE REVIEWED THIS PLAN SET FOR QUALITY ASSURANCE AND QUALITY CONTROL PURPOSES.

THIS PLAN SET HAS BEEN PREPARED, DESIGNED AND REVIEWED UNDER MY DIRECT SUPERVISION.

GENERAL NOTES

1. ALL CONSTRUCTION SHALL CONFORM TO THE CITY OF SAN ANTONIO STANDARD SPECIFICATIONS FOR CONSTRUCTION JUNE 2008 OR LATEST.
2. NO EXTRA PAYMENT SHALL BE ALLOWED FOR WORK CALLED FOR ON THE PLANS, BUT NOT INCLUDED IN THE BID PROPOSAL. THIS INCIDENTAL WORK WILL BE REQUIRED ANO SHALL BE INCLUDED IN THE PAY ITEM TO WHICH IT RELATES.
3. THE CONTRACTOR SHALL PROVIDE ACCESS FOR THE DELIVERY OF MAIL BY THE U.S. POSTAL SERVICE.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR RESTORING TO ITS ORIGINAL OR BETTER CONDITION ANY DAMAGE DONE TO EXISTING FENCES. CONCRETE ISLANDS, STREET PAVING, CURBS, SHRUBS. BUSHES OR DRIVEWAYS. (NO SEPARATE PAY ITEM).
5. IT IS THE CONTRACTOR'S RESPONSIBILITY TO SEE THAT ALL SIGNS AND BARRICADES ARE PROPERLY INSTALLED AND MAINTAINED. ALL LOCATIONS AND DISTANCES WILL BE DECIDED UPON IN THE FIELD BY THE CONTRACTOR, USING THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES'. THE CITY'S CONSTRUCTION INSPECTOR AND TRAFFIC ENGINEERING REPRESENTATIVE WILL ONLY BE RESPONSIBLE TO INSPECT BARRICADES AND SIGNS. IF, IN THE OPINION OF THE TRAFFIC ENGINEERING REPRESENTATIVE AND THE CONSTRUCTION INSPECTOR, THE BARRICADES AND SIGNS DO NOT CONFORM TO ESTABLISHED STANDARDS ARE INCORRECTLY PLACED OR ARE INSUFFICIENT IN QUANTITY TO PROTECT THE GENERAL PUBLIC. THE CONSTRUCTION INSPECTOR SHALL HAVE THE OPTION TO STOP OPERATIONS UNTIL SUCH TIME AS THE CONDITIONS ARE CORRECTED.
6. IF THE NEED ARISES, ADDITIONAL BARRICADES AND DIRECTIONAL DEVICES MAY BE ORDERED BY THE TRAFFIC ENGINEERING REPRESENTATIVE AT THE CONTRACTOR'S EXPENSE.
7. DUE TO FEDERAL REGULATIONS TITLE 49, PART 192.171 C.P.S. MUST MAINTAIN ACCESS TO GAS VALVES AT ALL TIMES. THE CONTRACTOR MUST PROTECT AND WORK AROUND ANY GAS VALVES THAT ARE IN THE PROJECT AREA.
8. CONTRACTOR SHALL NOTIFY THE CITY INSPECTOR TWENTY FOUR {24) HOURS PRIOR TO INSPECTION FOR THE FOLLOWING ITEMS:
   - BEDDING SAND
   - PIPE WITH TRACER WIRE
   - TOP SAND AND DETECTOR TAPE
   - BACKFILL

9. DENSITY TESTING IS THE RESPONSIBILITY OF THE CONTRACTOR AT THEIR COST.
10. CONTRACTOR TO COORDINATE SEWER INSPECTIONS WITH SAN ANTONIO RIVER AUTHORITY (SARA) AS NEEDED.
11. CONTRACTOR SHALL PRESERVE ALL CONSTRUCTION STAKES, MARKS, ETC. IF ANY ARE DESTROYED OR REMOVED BY THE CONTRACTOR OR HIS EMPLOYEES, THEY SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.
12. CONTRACTOR SHALL NOTIFY ALL UTILITY COMPANIES PRIOR TO CONSTRUCTION TO DETERMINE THE LOCATION OF EXISTING UTILITIES. CONTRACTOR SHALL NOTIFY THE FOLLOWING AT LEAST FORTY-EIGHT (48) HOURS PRIOR TO EXCAVATION OPERATION:

SAN ANTONIO RIVER AUTHORITY (SARA)	210-227-1373
CITY OF ELMENDORF	210-635-8210
TEXAS STATE WIDE ONE CALL LOCATOR	1-800-344-8377
- CITY PUBLIC SERVICE ENERGY	"
- SPECTRUM	"
- MCI	"

13. THE EXISTENCE AND LOCATION OF UNDERGROUND UTILITIES INDICATED ON THE PLANS ARE TAKEN FROM AVAILABLE RECORDS AND ARE NOT GUARANTEED, BUT SHALL BE INVESTIGATED AND VERIFIED BY THE CONTRACTOR BEFORE STARTING WORK. THE CONTRACTOR SHALL BE HELD RESPONSIBLE FOR ANY DAMAGE TO AND FOR THE MAINTENANCE AND PROTECTION OF THE EXISTING UTILITIES EVEN IF THEY ARE NOT SHOWN ON THE PLANS. LOCATION AND DEPTH OF EXISTING UTILITIES SHOWN HERE ARE APPROXIMATE ONLY. ACTUAL LOCATIONS AND DEPTHS MUST BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION AND HE SHALL BE RESPONSIBLE FOR PROTECTION OF SAME DURING CONSTRUCTION.
14. ALL WASTE MATERIAL SHALL BECOME PROPERTY OF THE CONTRACTOR AND SHALL BE HIS SOLE RESPONSIBILITY TO DISPOSE OF THIS MATERIAL OFF THE LIMITS OF THE PROJECT. NO WASTE MATERIAL SHALL BE PLACED IN EXISTING LOWS THAT WILL BLOCK OR ALTER FLOW LIMITS OF EXISTING ARTIFICIAL OR NATURAL DRAINAGE.
15. THE CONTRACTOR SHALL NOT PLACE ANY WASTE MATERIAL IN THE IOO-YEAR FLOOD PLAIN WITHOUT FIRST OBTAINING AN APPROVED FLOOD PLAIN DEVELOPMENT PERMIT.
16. THE CONTRACTOR SHALL MAINTAIN ALL ADJOINING STREETS AND TRAVELED ROUTES FREE FROM SPILLED AND /OR TRACKED CONSTRUCTION MATERIALS AND 'OR DEBRIS.
17. IF THE CONTRACTOR ENCOUNTERS ANY ARCHAEOLOGICAL DEPOSITS DURING CONSTRUCTION OPERATIONS. THE CONTRACTOR MUST STOP EXCAVATION IMMEDIATELY. CONTACT THE CITY INSPECTOR AT 635-8210 FOR AN ARCHAEOLOGICAL INVESTIGATION. THE CONTRACTOR CANNOT BEGIN EXCAVATION AGAIN WITHOUT WRITTEN PERMISSION FROM THE CITY. IF MORE THAN THREE (3) DAYS ARE REQUIRED FOR INVESTIGATION (NOT INCLUDING HOLIDAY AND WEEKENDS) AND IF THE CONTRACTOR IS UNABLE TO WORK IN OTHER AREAS, THEN THE CONTRACTOR WILL BE ALLOWED TO NEGOTIATE FOR ADDITIONAL CONSTRUCTION TIME UPON WRITTEN REQUEST WITHIN TEN (10) DAYS AFTER THE FIRST NOTICE TO THE CITY OF ARCHAEOLOGICAL INVESTIGATION FOR EACH EVENT.
    IF THE TIME REQUIRED FOR INVESTIGATION IS LESS THAN OR EQUAL TO THREE (3) DAYS FOR EACH EVENT. CONTRACT DURATION WILL NOT BE EXTENDED.
18. IF SUSPECTED CONTAMINATION IS ENCOUNTERED DURING CONSTRUCTION OPERATIONS. CITY OF ELMENDORF SHALL BE NOTIFIED IMMEDIATELY WHEN CONTAMINATED SOILS AND 'OR GROUNDWATER ARE ENCOUNTERED AT LOCATIONS NOT IDENTIFIED IN THE PLANS. THE NOTIFICATION SHOULD INCLUDE THE STATION NUMBER. TYPE OF CONTAMINATED MEDIA, EVIDENCE OF CONTAMINATION AND MEASURES TAKEN TO CONTAIN THE CONTAMINATED MEDIA AND PREVENT PUBLIC ACCESS.
    THE CONTAMINATED SOIL AND 'OR GROUNDWATER SHALL NOT BE REMOVED FROM THE LOCATION WITHOUT PRIOR CITY APPROVAL.
    THE CONTRACTOR MUST STOP THE EXCAVATION IMMEDIATELY AND CONTACT THE CITY OF ELMENDORF INSPECTOR. THE CONTRACTOR CANNOT BEGIN EXCAVATION ACTIVITIES WITHOUT WRITTEN PERMISSION FROM THE CITY.

TESTING REQUIREMENTS

1. ALL SEWER LINES MUST BE TESTED IN ACCORDANCE WITH THE FOLLOWING:

A. TAC 217.2(A)(5)(B); DEFLECTION TEST FOR FLEXIBLE AND SEMI-RIGID PIPE CONDUCTED AFTER FINAL BACKFILL HAS BEEN IN PLACED AT LEAST 30 DAYS.

B. TAC 217.2(A)(4)(A) & (B) OR SARA SPECIFICATIONS INFILTRATION AND/OR EXFILTRATION AND/OR LOW-PRESSURE AIR TEST.

C. TAC 313.5(C)(10)(C) OR SARA SPECIFICATIONS: ALL MANHOLES AND WET WELLS MUST BE TESTED SEPARATELY AND INDEPENDENTLY OF THE COLLECTION LINES.

D. IN THE EVENT THAT TESTING REQUIREMENTS CONFLICT, THE LATEST TCEQ DESIGN CRITERIA SHALL BE USED.

2. ALL PIPE TRENCHING, BEDDING AND BACKFILL SHALL BE DONE IN ACCORDANCE WITH APPROPRIATE ASTM/ANSI SPECIFICATIONS [REFERENCE 30 TAC 217.2(A)(5)(A); ASTM C-12 (ANSI A106.2) OR ASTM D-2321 (ANSI K65.171)]. ALL COMPACTION @ 98% DENSITY TESTS ACROSS THE BOARD, 1 RANDOM DENSITY TEST PER LIFT FOR EVERY 400 FEET.
3. CHLORINATION SHALL BE PERFORMED BY SARA. THE CONTRACTOR IS REQUIRED TO PROVIDE ALL APPURTENANCES TO THE MAIN(S) TO ALLOW MACHINE CHLORINATION.

TREE PROTECTION AND PRESERVATION GENERAL NOTES

1. NO UTILITY OR STREET EXCAVATION WORK SHALL BEGIN IN AREAS WHERE TREE PRESERVATION AND TREATMENT MEASURES HAVE NOT BEEN COMPLETED AND APPROVED.
2. TREE PROTECTION FENCING SHALL BE REQUIRED. TREE PROTECTION FENCING SHALL BE INSTALLED. MAINTAINED AND REPAIRED BY THE CONTRACTOR DURING SITE CONSTRUCTION. DURING CONSTRUCTION ACTIVITY. AT LEAST A SIX-INCH LAYER OF COARSE MULCH SHALL BE PLACED AND MAINTAINED OVER THE ROOT PROTECTION ZONE (NO SEPARATE PAY ITEM).
3. THE CONTRACTOR SHALL AVOID CUTTING ROOTS LARGER THAN ONE INCH IN DIAMETER WHEN EXCAVATING NEAR EXISTING TREES. EXCAVATION IN THE VICINITY OF TREES SHALL PROCEED WITH CAUTION. THE CONTRACTOR SHALL CONTACT THE CITY INSPECTOR FOR GUIDANCE.
4. ROOTS WILL BE CUT WITH A ROCK SAW OR BY HAND. NOT BY AN EXCAVATOR OR OTHER ROAD CONSTRUCTION EQUIPMENT.
5. ALL CURB AND SIDEWALK WORK SHALL USE ALTERNATIVE CONSTRUCTION METHODS TO MINIMIZE EXTENSIVE ROOT DAMAGE TO TREES (REFER TO DETAILS).
6. EXPOSED ROOTS SHALL BE COVERED AT THE END OF THE DAY USING TECHNIQUES SUCH AS COVERING WITH SOIL, MULCH, OR WET BURLAP.
7. NO EQUIPMENT, VEHICLES OR MATERIALS SHALL OPERATE OR BE STORED WITHIN THE ROOT PROTECTION ZONE OF ANY TREE NEAR THE PROJECT. ROOT PROTECTION ZONE IS 1 FOOT OF RADIUS PER INCH OF TREE'S DIAMETER. A IO-INCH DIAMETER TREE WOULD HAVE A 10 FOOT RADIUS ROOT PROTECTION ZONE AROUND THE TREE. ROOTS OR BRANCHES IN CONFLICT WITH THE CONSTRUCTION SHALL BE CUT CLEANLY ACCORDING TO PROPER PRUNING METHODS. OAK WOUNDS SHALL BE PAINTED OVER WITHIN 30 MINUTES TO PREVENT OAK WILT.
8. SAPLINGS, SHRUBS OR BUSHES TO BE CLEARED FROM THE PROTECTED ROOT ZONE AREA OF A LARGE TREE SHALL BE REMOVED BY HAND AS DESIGNATED BY THE INSPECTOR.
9. NO WIRES, NAILS OR OTHER MATERIAL MAY BE ATTACHED TO PROTECTED TREES.
10. TREES, TREE LIMBS, BUSHES AND SHRUBS LOCATED IN THE CITY STREET OR ALLEY RIGHT-OF-WAY OR PERMANENT EASEMENTS WHICH INTERFERE WITH PROPOSED CONSTRUCTION ACTIVITIES SHALL BE PROPERLY PRUNED FOLLOWING THE ANSI A-300 STANDARDS FOR PRUNING. ALL TREE PRUNING SHALL BE COMPLETED BY A LICENSED CONTRACTOR (ARTICLE 21-171, C.O.S.A. CODE) ONLY AFTER APPROVAL FROM THE CAPITAL PROJECTS MANAGEMENT THROUGH THE INSPECTOR.
11. NO EXCESSIVE TREE TRIMMING WILL BE PERMITTED.
12. ALL DEBRIS GENERATED BY THE PRUNING AND TRIMMING OF THE TREES AND 'OR BUSHES SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE DISPOSED OF PROPERLY (NO SEPARATE PAY ITEM).
13. TREES MUST BE MAINTAINED IN GOOD HEALTH THROUGHOUT THE CONSTRUCTION PROCESS. MAINTENANCE MAY INCLUDE, BUT NOT LIMITED TO: WATERING THE ROOT PROTECTION ZONE, WASHING FOLIAGE. FERTILIZATION. PRUNING, ADDITIONAL MULCH APPLICATIONS AND OTHER MAINTENANCE AS NEEDED ON THE PROJECT.
14. ANY TREE REMOVAL SHALL BE APPROVED BY THE CITY.
15. TREES WHICH ARE DAMAGED OR LOST DUE TO THE CONTRACTOR'S NEGLIGENCE DURING CONSTRUCTION SHALL BE MITIGATED TO THE CITY'S SATISFACTION.
16. TREE PLANTING FOR MITIGATION OR ENHANCEMENT: ALL PLANTED TREES SHALL BE MAINTAINED IN A HEALTHY CONDITION AT ALL TIMES. THIS INCLUDES IRRIGATION. FERTILIZING. PRUNING AND OTHER MAINTENANCE AS NEEDED ON THE PROJECT. TREES THAT DIE WITHIN TWELVE (12) MONTHS SHALL BE REPLACED WITH A TREE OF EQUAL SIZE AND SPECIES

ACCESSIBILITY REQUIREMENTS

1. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN VEHICULAR AND PEDESTRIAN ACCESS AT ALL TIMES TO LOCAL RESIDENCES AND BUSINESSES.
2. WHEN THE WORK REQUIRES THE EXCAVATION OF THE STREET AND THE REMOVAL OF THE EXISTING DRIVEWAY APPROACHES AND SIDEWALKS, THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING TEMPORARY ALL-WEATHER ACCESS TO THE BUSINESSES AND RESIDENCES. THE TEMPORARY DRIVEWAY APPROACHES SHALL BE CONSTRUCTED WITH FLEXIBLE BASE OR GRAVEL MATERIAL AT NO SEPARATE COST TO THE CITY
3. PRIOR TO INITIATING THE CONSTRUCTION OF NEW DRIVEWAY APPROACHES, THE CONTRACTOR SHALL GIVE ADVANCE WARNING IN PERSON. OR IN WRITING, OF AT LEAST 4B HOURS TO EACH RESIDENCE THAT WILL BE IMMEDIATELY AFFECTED, SO THAT ALTERNATE PLANS MAY BE MADE BY THE RESIDENTS.
4. FOR BUSINESSES WITH MORE THAN ONE DRIVEWAY, AT LEAST ONE DRIVEWAY SHALL REMAIN OPEN WHILE THE OTHER NEW DRIVEWAY APPROACHES ARE CONSTRUCTED. FOR BUSINESSES WITH ONLY ONE DRIVEWAY, THE NEW DRIVEWAY APPROACH SHALL BE CONSTRUCTED IN HALF WIDTHS, UNLESS A TEMPORARY ASPHALT DRIVEWAY IS FIRST INSTALLED AT NO SEPARATE COST TO THE CITY.
5. CONTRACTOR TO PROVIDE ACCESS TO SITE FOR ANY CONSULTANTS, CONTRACTORS, STAFF, AND AGENTS OF THE CITY OF ELMENDORF WATER PROJECT.

CUDEENGINEERS.COM

CUDE ENGINEERS EST. 1980

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HICKORY RIDGE UNIT 3A

GENERAL NOTES

DATE
11/12/2025

PROJECT NO.
03278.101

DRAWN BY
RC/JG/JRR/MOH/MAS

CHECKED BY
CJC/KMH

REVISIONS
1. 2. 3. 4. 5. 6. 7. 8.

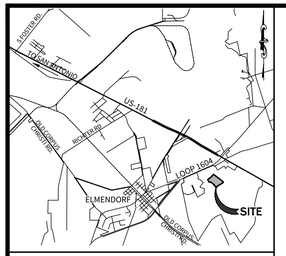
STATE OF TEXAS
KYLE M. HUDEK
138753
LICENSED
PROFESSIONAL ENGINEER
11/18/2025

CUDE ENGINEERS
TBPELS No. 10048500

C1

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REPRODUCTION OF THE ORIGINAL SIGNED AND SEALED PLAN AND/OR ELECTRONIC MEDIA MAY HAVE BEEN INADVERTENTLY ALTERED. CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE SCALE OF THE DOCUMENT AND CONTACTING CUDE ENGINEERS TO VERIFY DISCREPANCIES PRIOR TO CONSTRUCTION.



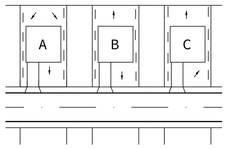
LOCATION MAP N.T.S.

SCALE: 1"=200'

0 200 400

LEGEND

- SITE BOUNDARY
- DRAINAGE AREA
- Tc FLOW PATH
- ACCUMULATION POINT (X)



TYPICAL LOT SITE PLAN
N.T.S.



Project Name: Hickory Ridge Unit 3 – Drainage Master Plan Precipitation PA4

Calculation Summary for Time of Concentrations & Proposed Flow (USED FOR SIZING CURB INLET AND VERIFYING STREET CAPACITY)

HYDROLOGY				Sheet Flow Tc Compuations						Shallow Conc. Tc Compuations					Concentrated Tc Computations			Overall	INTENSITY			Q FLOW			
Drainage Shed/ Computation Point	Shed Area (Ac.)	AREA OF ACCUMULATION (Ac.)	C	*Length < 300'*	Paved (Y or N)	Upstream Elev.	Downstream Elev	Slope	Time of Concentration	*Length < 650'*	Paved (Y or N)	Downstream Elev	Slope	Time of Concentration	*Length*	Velocity (fps)	Time of Concentration	Time of Concentration (min)	I5	I25	I100	Q5	Q25	Q100	Drainage Shed
A1A	**1.35**	=A1A	0.72	*144.67*	N	515.69	513.50	1.51%	16.20						*161.14*	6	0.45	**17.00**	4.91	6.76	8.42	**4.77**	**6.57**	**8.18**	**A1A**
A1B	**3.08**	=A1B	0.64	*300.00*	N	518.00	504.74	4.42%	17.58	*233.70*	N	497.09	3.27%	1.33				**19.00**	4.63	6.37	7.93	**9.06**	**12.46**	**15.51**	**A1B**
A3	**24.41**	=A3	0.72	*300.00*	N	521.26	519.79	0.49%	20.00	*485.44*	N	512.25	1.55%	4.03	*811.71*	6	2.25	**27.00**	3.88	5.32	6.60	**68.19**	**93.50**	**116.00**	**A3**
A4	**8.16**	=A4	0.72	*540.11*	N	540.11	537.38	0.51%	20.00						*1313.64*	6	3.65	**24.00**	4.12	5.65	7.01	**24.21**	**33.19**	**41.19**	**A4**
A5	**3.64**	=A5	0.59	*300.00*	N	501.21	495.54	1.89%	20.00	*231.92*	N	488.99	2.82%	1.43				**22.00**	4.30	5.91	7.34	**9.19**	**12.63**	**15.68**	**A5**
A6	**6.47**	=A6	0.56	*300.00*	N	493.21	488.41	1.60%	20.00	*650.00*	N	488.00	0.06%	9.29	*46.38*	6	0.13	**30.00**	3.68	5.04	6.25	**13.45**	**18.42**	**22.84**	**A6**
A7	**9.52**	=A7	0.72	*300.00*	N	515.97	509.94	2.01%	19.98	*45.84*	N	509.01	2.03%	0.34	*895.38*	6	2.49	**23.00**	4.21	5.77	7.17	**28.86**	**39.55**	**49.15**	**A7**
A8	**10.73**	=A8	0.72	*87.15*	N	525.02	522.04	3.42%	11.58						*1774.97*	6	4.93	**17.00**	4.91	6.76	8.42	**37.93**	**52.23**	**65.05**	**A8**
A9	**1.61**	=A9	0.46	*105.40*	N	528.86	526.88	1.88%	13.51						*500.67*	6	1.39	**15.00**	5.24	7.24	9.03	**3.88**	**5.36**	**6.69**	**A9**
A10	**3.29**	=A10	0.53	*223.61*	N	498.23	491.95	2.81%	16.56						*316.12*	6	0.88	**18.00**	4.76	6.56	8.16	**8.37**	**11.53**	**14.35**	**A10**
A11	**2.38**	=A11	0.58												*477.60*	6	1.33	**2.00**	8.83	12.23	15.30	**12.21**	**16.92**	**21.16**	**A11**
OS1	**2.55**	=OS1	0.46	*300.00*	N	540.08	529.71	3.46%	18.00	*36.74*	N	529.06	1.77%	0.28				**19.00**	4.63	6.37	7.93	**5.43**	**7.47**	**9.30**	**OS1**
OS2	**10.00**	=OS2	0.46	*300.00*	N	537.68	532.79	1.63%	20.00	*462.44*	N	509.27	5.09%	2.11				**23.00**	4.21	5.77	7.17	**19.37**	**26.54**	**32.98**	**OS2**
OS3	**10.13**	=OS3	0.46	*300.00*	N	521.81	512.94	2.96%	18.09	*559.12*	N	495.62	3.10%	3.28				**22.00**	4.30	5.91	7.34	**20.04**	**27.54**	**34.20**	**OS3**
CP1	**32.57**	=A3+A4	0.72	*300.00*	N	519.76	517.65	0.70%	20.00	*650.00*	N	503.49	2.18%	4.54	*445.37*	6	1.24	**26.00**	3.96	5.42	6.73	**92.86**	**127.10**	**157.82**	**CP1**
CP2	**4.16**	=A9+OS1	0.46	*300.00*	N	540.1	529.7	3.46%	18.00	*36.74*	N	529.06	1.77%	0.28	*500.67*	6	1.39	**20.00**	4.51	6.21	7.71	**8.63**	**11.88**	**14.75**	**CP2**
CP3	**17.45**	=A10+OS2 +CP2	0.47	*300.00*	N	537.68	532.79	1.63%	20.00	*462.44*	N	504.41	6.14%	1.92	*316.12*	6	0.88	**23.00**	4.21	5.77	7.17	**34.82**	**47.73**	**59.31**	**CP3**
CP4	**29.96**	=A11+OS3 +CP3	0.48	*300.00*	N	537.7	532.8	1.63%	20.00	*610.48*	N	504.41	4.65%	2.91	*793.72*	6	2.20	**26.00**	3.96	5.42	6.73	**56.69**	**77.59**	**96.34**	**CP4**
CP5	**15.99**	=A6+A7	0.66	*300.00*	N	515.97	509.94	2.01%	19.98	*45.84*	N	509.01	2.03%	0.34	*1547.24*	6	4.30	**25.00**	4.04	5.53	6.86	**42.46**	**58.12**	**72.10**	**CP5**
CP6	**40.69**	=CP4+A8	0.54	*300.00*	N	537.70	532.80	1.63%	20.00	*610.48*	N	504.41	4.65%	2.90	*793.72*	6	2.20	**26.00**	3.96	5.42	6.73	**87.28**	**119.46**	**148.33**	**CP6**

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HICKORY RIDGE UNIT 3B

ULTIMATE MASTER DRAINAGE PLAN

DATE
11/12/2025

PROJECT NO.
03278.101

DRAWN BY
RC/JG/JRR

CHECKED BY
CJC / KMH

REVISIONS
1. 2. 3. 4. 5. 6. 7. 8.

STATE OF TEXAS
KYLE M. HUDEK
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LICENSED
PROFESSIONAL ENGINEER
11/18/2025

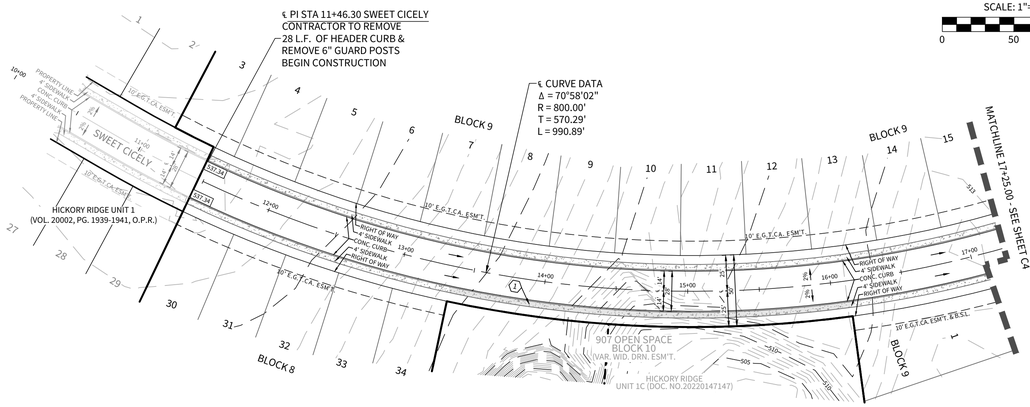
CUDE ENGINEERS
TBPELS No. 10048500

C2

REPRODUCTION OF THE ORIGINAL SIGNED AND SEALED PLAN AND/OR ELECTRONIC MEDIA MAY HAVE BEEN INADVERTENTLY ALTERED. CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE SCALE OF THE DOCUMENT AND CONTACTING CUDE ENGINEERS TO VERIFY DISCREPANCIES PRIOR TO CONSTRUCTION.

KEYNOTES:

1. SIDEWALK TO BE CONSTRUCTED WITH INFRASTRUCTURE
2. ADA RAMP TO BE INSTALLED WITH INFRASTRUCTURE
3. ADA RAMP TO BE INSTALLED AT THE TIME OF HOMEBUILDING
4. BEGIN WASHOUT STA. 23+50.00
5. END WASHOUT STA. 25+50.14



SCALE: 1"=50'
0 50 100

LEGEND

COSA TYPE "1" WHEEL CHAIR RAMPS ARE INDICATED THUS " ▬ " UNLESS OTHERWISE NOTED.

- SIDEWALK CONSTRUCTED WITH INFRASTRUCTURE
- STREET WASHOUT (SEE DETAIL SHEET C10)

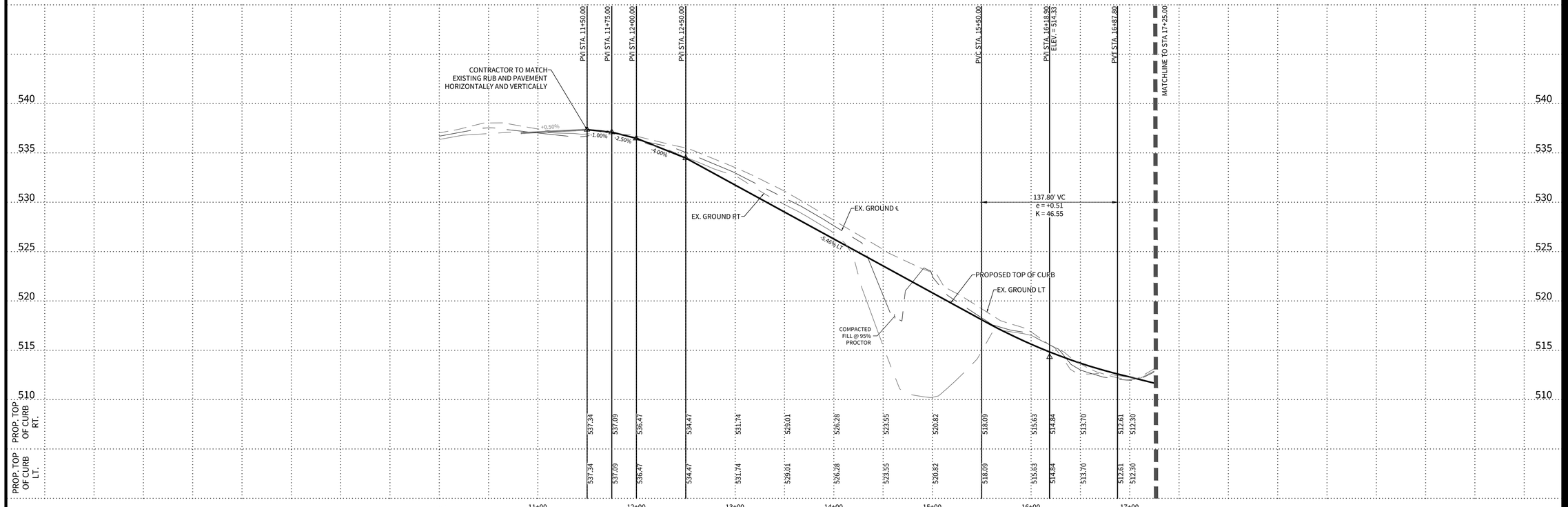
(SEE DETAIL SHEET S5) FOR ADA RAMPS AT SIDEWALK INTERSECTIONS . DETECTABLE WARNING PAVER WITH TRUNCATED DOMES ONLY.

- XXXX.XX — PROPOSED TOP OF CONCRETE CURB ELEVATION
- XXXX.XX$_{ASP}$ — PROPOSED ASPHALT PAVEMENT ELEVATION
- EXISTING MAJOR CONTOUR LINES
- EXISTING MINOR CONTOUR LINES
- PROPOSED RIGHT OF WAY
- PROPOSED STREET CENTERLINE

SWEET CICELY

STA. 11+46.30 TO STA. 17+25.00

HORIZONTAL SCALE: 1" = 50'
VERTICAL SCALE: 1" = 5'



REPRODUCTION OF THE ORIGINAL SIGNED AND SEALED PLAN AND/OR ELECTRONIC MEDIA MAY HAVE BEEN INADVERTENTLY ALTERED. CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE SCALE OF THE DOCUMENT AND CONTACTING CUDE ENGINEERS TO VERIFY DISCREPANCIES PRIOR TO CONSTRUCTION.

CUDEENGINEERS.COM

4122 Pond Hill Road, Suite 101
San Antonio, Texas 78231
P:(210) 681.2951 F: (210) 523.7112

HICKORY RIDGE UNIT 3A

STREET PLAN & PROFILE - SWEET CICELY

DATE
11/17/2025

PROJECT NO.
03278.101

DRAWN BY
RC/JG/JRR/MOH/MAS

CHECKED BY
CJC/KMH

REVISIONS 1 2 3 4 5 6 7 8

STATE OF TEXAS
KYLE M. HUDEK
138753
LICENSED PROFESSIONAL ENGINEER
11/18/2025

CUDE ENGINEERS
TBPELS No. 10048500

C3

P:\03278\103\3 Drawings\Civil\3A\3A_S1-C3.STPP - SWEET CICELY.dwg 2025/11/17 5:54pm khudek

KEYNOTES:

1. SIDEWALK TO BE CONSTRUCTED WITH INFRASTRUCTURE
2. ADA RAMP TO BE INSTALLED WITH INFRASTRUCTURE
3. ADA RAMP TO BE INSTALLED AT THE TIME OF HOMEBUILDING
4. BEGIN WASHOUT STA. 23+50.00
5. END WASHOUT STA. 25+50.14

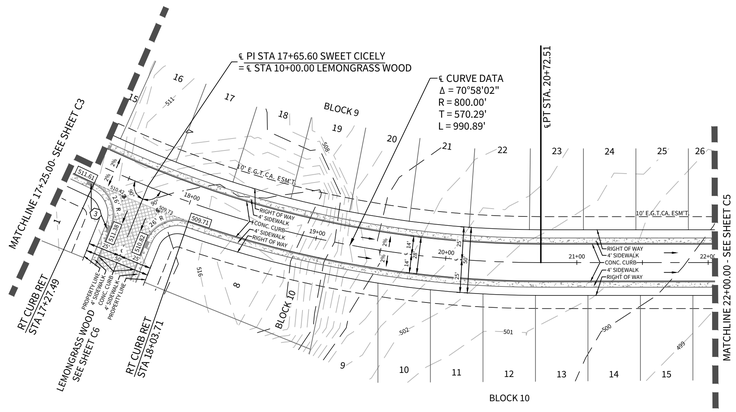
LEGEND

COSA TYPE "1" WHEEL CHAIR RAMPS ARE INDICATED THUS " ▬ " UNLESS OTHERWISE NOTED.

- SIDEWALK CONSTRUCTED WITH INFRASTRUCTURE
- STREET WASHOUT (SEE DETAIL SHEET C10)

(SEE DETAIL SHEET S5) FOR ADA RAMPS AT SIDEWALK INTERSECTIONS . DETECTABLE WARNING PAVER WITH TRUNCATED DOMES ONLY.

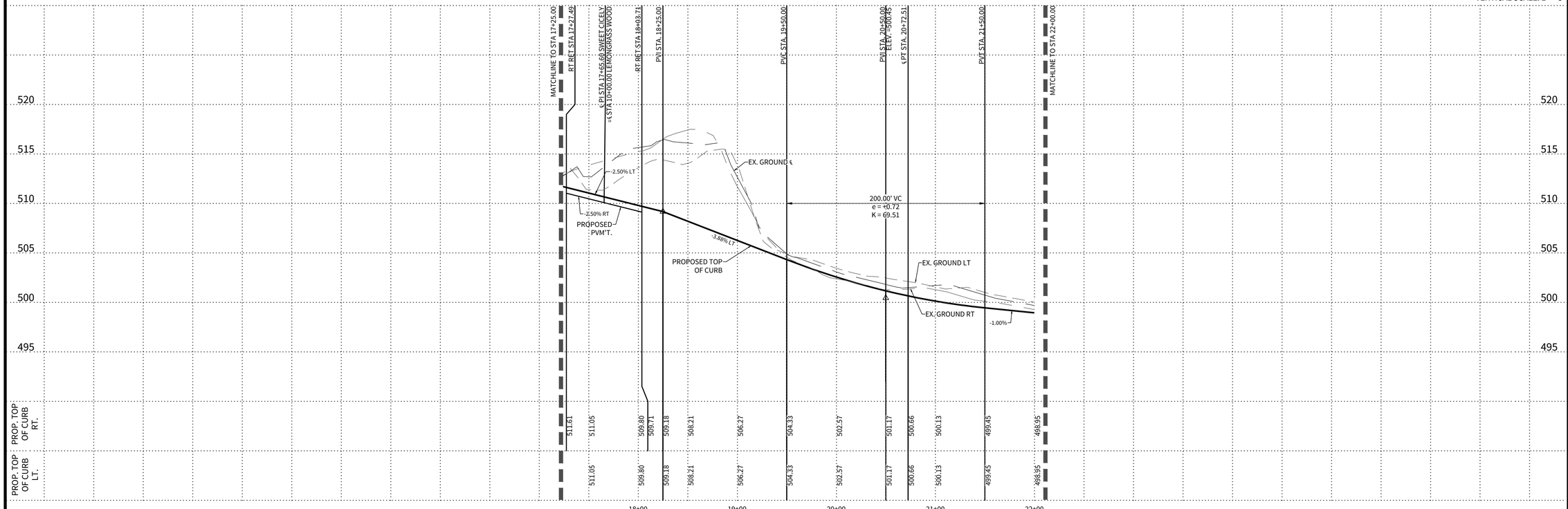
- xxxx.xx — PROPOSED TOP OF CONCRETE CURB ELEVATION
- xxxx.xx$_{ⓐ}$ — PROPOSED ASPHALT PAVEMENT ELEVATION
- EXISTING MAJOR CONTOUR LINES
- EXISTING MINOR CONTOUR LINES
- PROPOSED RIGHT OF WAY
- PROPOSED STREET CENTERLINE



SWEET CICELY

STA. 17+25.00 TO STA. 22+00.00

HORIZONTAL SCALE: 1" = 50'
VERTICAL SCALE: 1" = 5'



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HICKORY RIDGE UNIT 3A

STREET PLAN & PROFILE - SWEET CICELY

DATE
11/17/2025

PROJECT NO.
03278.101

DRAWN BY
RC/JG/JRR/MOH/MAS

CHECKED BY
CJC/KMH

REVISIONS
1. 2. 3. 4. 5. 6. 7. 8.

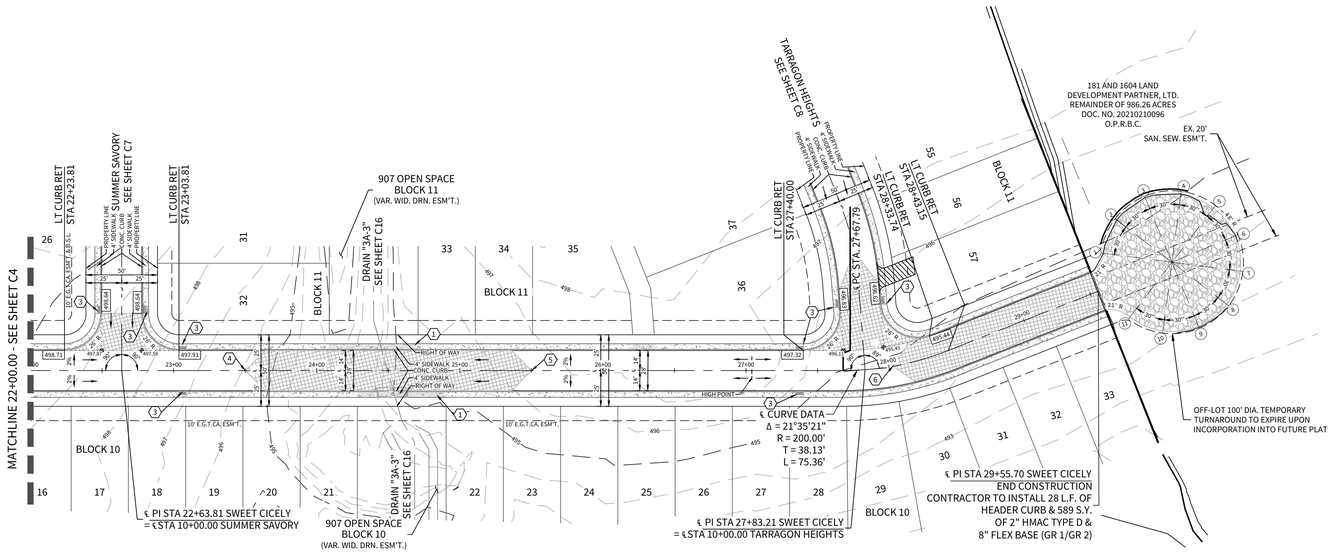
STATE OF TEXAS
KYLE M. HUDEK
138753
LICENSED
PROFESSIONAL ENGINEER
11/18/2025
CUDE ENGINEERS
TBPELS No. 10048500

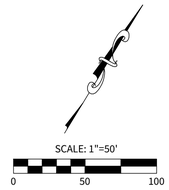
C4

REPRODUCTION OF THE ORIGINAL SIGNED AND SEALED PLAN AND/OR ELECTRONIC MEDIA MAY HAVE BEEN INADVERTENTLY ALTERED. CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE SCALE OF THE DOCUMENT AND CONTACTING CUDE ENGINEERS TO VERIFY DISCREPANCIES PRIOR TO CONSTRUCTION.

KEYNOTES:

1. SIDEWALK TO BE CONSTRUCTED WITH INFRASTRUCTURE
2. ADA RAMP TO BE INSTALLED WITH INFRASTRUCTURE
3. ADA RAMP TO BE INSTALLED AT THE TIME OF HOMEBUILDING
4. BEGIN WASHOUT STA. 23+50.00
5. END WASHOUT STA. 25+50.14
6. BEGIN WASHOUT STA. 28+18.74





SWEET CICELY TURNAROUND	
POINT	TOP OF PVM'T. ELEVATION
1	493.86
2	493.73
3	493.61
4	493.86
5	494.11
6	493.92
7	493.73
8	493.54
9	493.29
10	493.41
11	493.56

LEGEND

COSA TYPE "1" WHEEL CHAIR RAMPS ARE INDICATED THUS " ▬ " UNLESS OTHERWISE NOTED.

- SIDEWALK CONSTRUCTED WITH INFRASTRUCTURE
- STREET WASHOUT (SEE DETAIL SHEET C10)

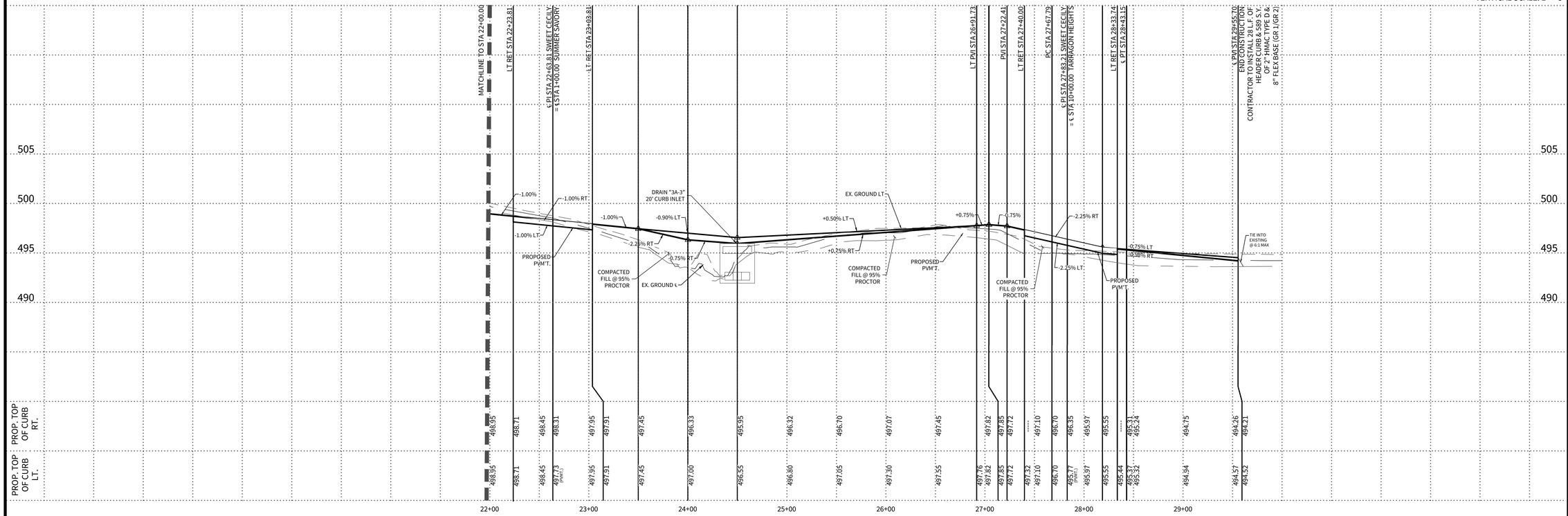
(SEE DETAIL SHEET S5) FOR ADA RAMPS AT SIDEWALK INTERSECTIONS . DETECTABLE WARNING PAVER WITH TRUNCATED DOMES ONLY.

- XXXX.XX — PROPOSED TOP OF CONCRETE CURB ELEVATION
- XXXX.XX$_{ASPH}$ — PROPOSED ASPHALT PAVEMENT ELEVATION
- EXISTING MAJOR CONTOUR LINES
- EXISTING MINOR CONTOUR LINES
- PROPOSED RIGHT OF WAY
- PROPOSED STREET CENTERLINE

SWEET CICELY

STA. 22+00.00 TO STA. 29+55.70

HORIZONTAL SCALE: 1" = 50'
VERTICAL SCALE: 1" = 5'



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HICKORY RIDGE UNIT 3A

STREET PLAN & PROFILE - SWEET CICELY

DATE
12/15/2025

PROJECT NO.
03278.101

DRAWN BY
RC/JG/JRR/MOH/MAS

CHECKED BY
CJC/KMH

REVISIONS
1. 2. 3. 4. 5. 6. 7. 8.

STATE OF TEXAS
KYLE M. HUDEK
138753
LICENSED PROFESSIONAL ENGINEER
12/15/2025
CUDE ENGINEERS
TBPELS No. 10048500

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C5

REPRODUCTION OF THE ORIGINAL SIGNED AND SEALED PLAN AND/OR ELECTRONIC MEDIA MAY HAVE BEEN INADVERTENTLY ALTERED. CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE SCALE OF THE DOCUMENT AND CONTACTING CUDE ENGINEERS TO VERIFY DISCREPANCIES PRIOR TO CONSTRUCTION.

KEYNOTES:

1. SIDEWALK TO BE CONSTRUCTED WITH INFRASTRUCTURE
2. ADA RAMP TO BE INSTALLED WITH INFRASTRUCTURE
3. ADA RAMP TO BE INSTALLED AT THE TIME OF HOMEBUILDING
4. BEGIN WASHOUT STA. 10+14.00

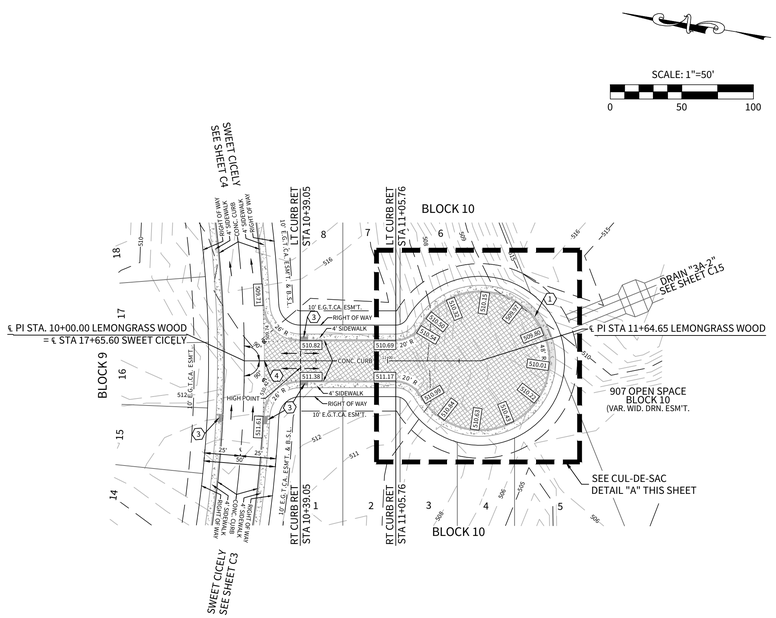
LEGEND

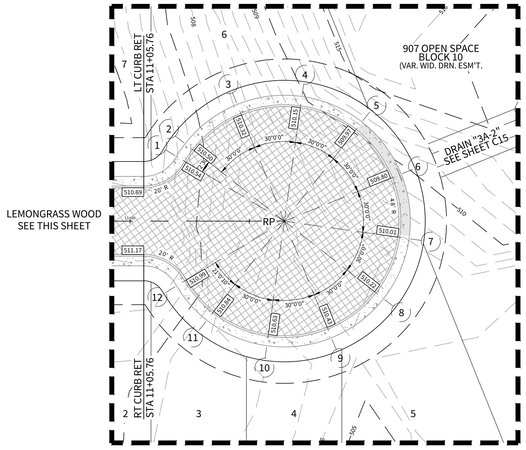
COSA TYPE "1" WHEEL CHAIR RAMPS ARE INDICATED THUS " ▬ " UNLESS OTHERWISE NOTED.

- SIDEWALK CONSTRUCTED WITH INFRASTRUCTURE
- STREET WASHOUT (SEE DETAIL SHEET C10)

(SEE DETAIL SHEET S5) FOR ADA RAMPS AT SIDEWALK INTERSECTIONS . DETECTABLE WARNING PAVER WITH TRUNCATED DOMES ONLY.

- XXXX.XX — PROPOSED TOP OF CONCRETE CURB ELEVATION
- XXXX.XX$_B$ — PROPOSED ASPHALT PAVEMENT ELEVATION
- —— —— EXISTING MAJOR CONTOUR LINES
- —— —— EXISTING MINOR CONTOUR LINES
- ———— PROPOSED RIGHT OF WAY
- —— – —— PROPOSED STREET CENTERLINE
- RP — RADIAL POINT





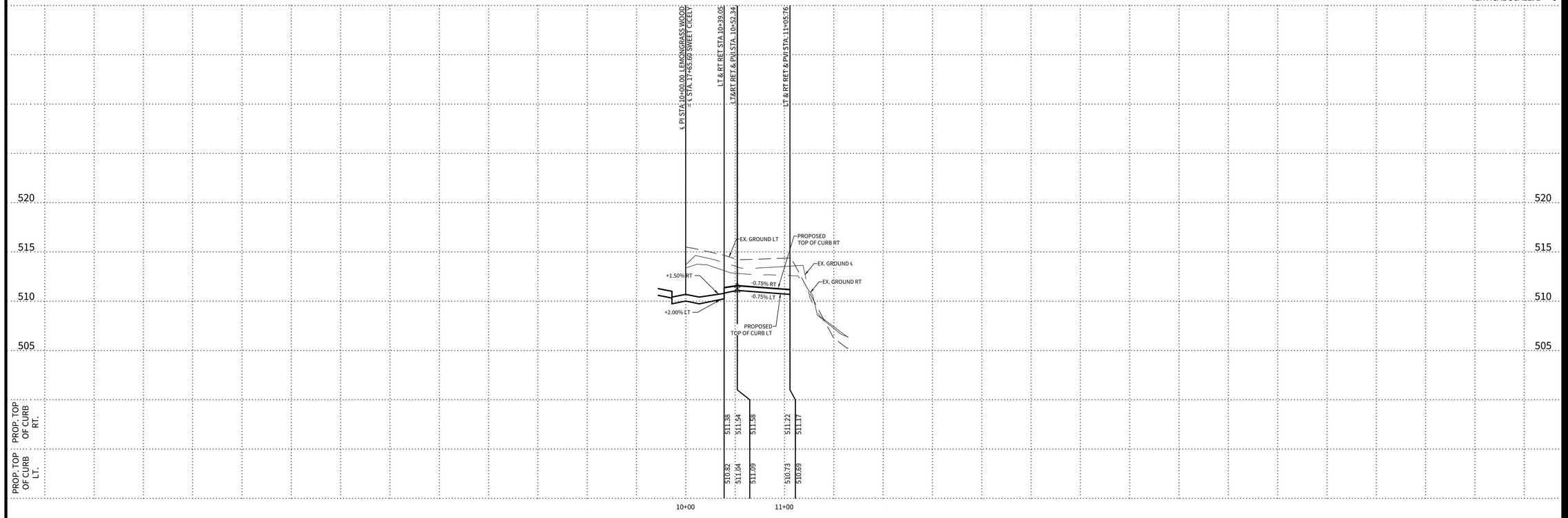
CUL-DE-SAC DETAIL"A"

SCALE: 1" = 30'

LEMONGRASS WOOD

STA. 10+00.00 TO 11+64.65

HORIZONTAL SCALE: 1" = 50'
VERTICAL SCALE: 1" = 5'



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HICKORY RIDGE UNIT 3A

STREET PLAN & PROFILE - LEMONGRASS WOOD

DATE
11/17/2025

PROJECT NO.
03278.101

DRAWN BY
RC/JG/JRR/MOH/MAS

CHECKED BY
CJC/KMH

REVISIONS
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STATE OF TEXAS
KYLE M. HUDEK
138753
LICENSED
PROFESSIONAL ENGINEER
11/18/2025
CUDE ENGINEERS
TBPELS No. 10048500

C6

REPRODUCTION OF THE ORIGINAL SIGNED AND SEALED PLAN AND/OR ELECTRONIC MEDIA MAY HAVE BEEN INADVERTENTLY ALTERED. CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE SCALE OF THE DOCUMENT AND CONTACTING CUDE ENGINEERS TO VERIFY DISCREPANCIES PRIOR TO CONSTRUCTION.

KEYNOTES:

1. SIDEWALK TO BE CONSTRUCTED WITH INFRASTRUCTURE
2. ADA RAMP TO BE INSTALLED WITH INFRASTRUCTURE
3. ADA RAMP TO BE INSTALLED AT THE TIME OF HOMEBUILDING
4. BEGIN WASHOUT STA.10+14.00
5. END WASHOUT STA. 10+40.00

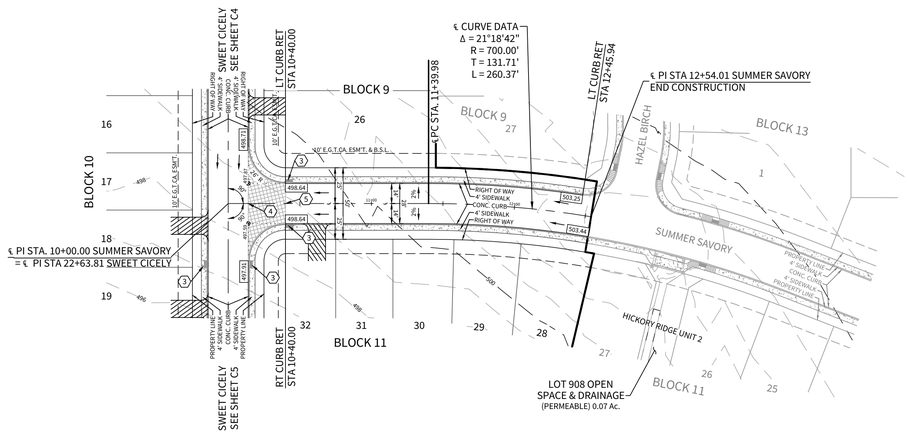
LEGEND

COSA TYPE "1" WHEEL CHAIR RAMPS ARE INDICATED THUS " ▬ " UNLESS OTHERWISE NOTED.

- SIDEWALK CONSTRUCTED WITH INFRASTRUCTURE
- STREET WASHOUT (SEE DETAIL SHEET C10)

(SEE DETAIL SHEET S5) FOR ADA RAMPS AT SIDEWALK INTERSECTIONS . DETECTABLE WARNING PAVER WITH TRUNCATED DOMES ONLY.

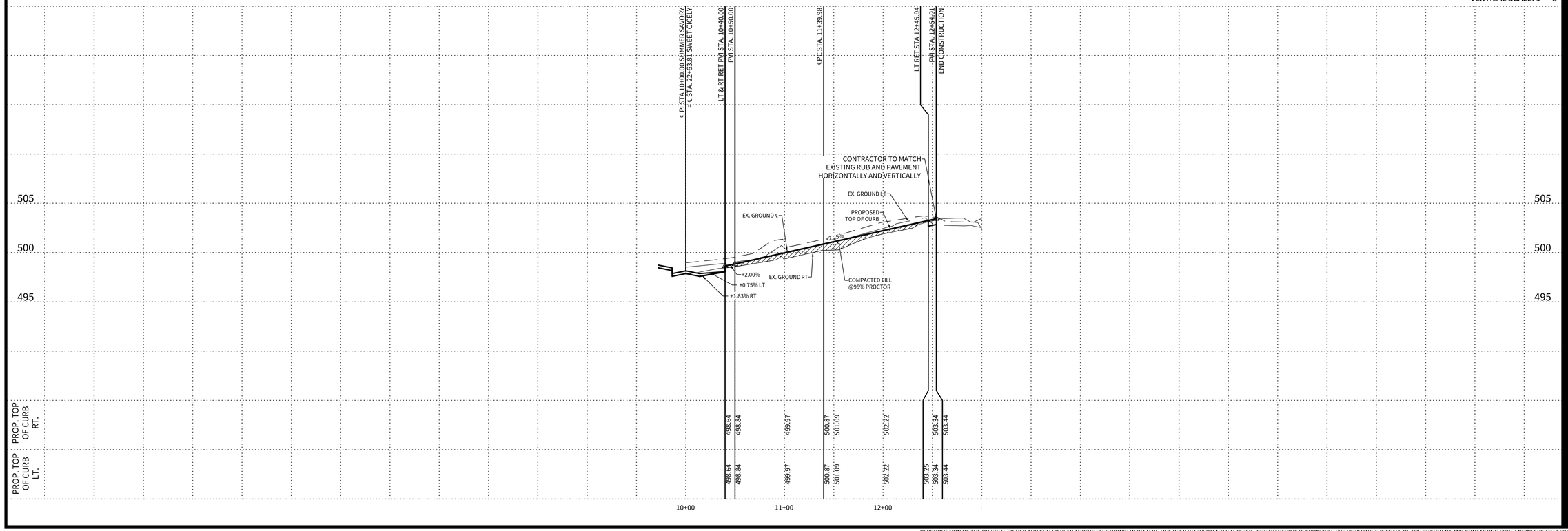
- XXXX.XX — PROPOSED TOP OF CONCRETE CURB ELEVATION
- XXXX.XX$_{ß}$ — PROPOSED ASPHALT PAVEMENT ELEVATION
- EXISTING MAJOR CONTOUR LINES
- EXISTING MINOR CONTOUR LINES
- PROPOSED RIGHT OF WAY
- PROPOSED STREET CENTERLINE



SUMMER SAVORY

STA. 10+00.00 TO 12+54.01

HORIZONTAL SCALE: 1" = 50'
VERTICAL SCALE: 1" = 5'



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HICKORY RIDGE UNIT 3A

STREET PLAN & PROFILE - SUMMER SAVORY

DATE
11/17/2025

PROJECT NO.
03278.101

DRAWN BY
RC/JG/JRR/MOH/MAS

CHECKED BY
CJC/KMH

REVISIONS
1 2 3 4 5 6 7 8

STATE OF TEXAS
KYLE M. HUDEK
138753
LICENSED PROFESSIONAL ENGINEER
11/18/2025

CUDE ENGINEERS
TBPELS No. 10048500

C7

REPRODUCTION OF THE ORIGINAL SIGNED AND SEALED PLAN AND/OR ELECTRONIC MEDIA MAY HAVE BEEN INADVERTENTLY ALTERED. CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE SCALE OF THE DOCUMENT AND CONTACTING CUDE ENGINEERS TO VERIFY DISCREPANCIES PRIOR TO CONSTRUCTION.

KEYNOTES:

1. SIDEWALK TO BE CONSTRUCTED WITH INFRASTRUCTURE
2. ADA RAMP TO BE INSTALLED WITH INFRASTRUCTURE
3. ADA RAMP TO BE INSTALLED AT THE TIME OF HOMEBUILDING
4. BEGIN WASHOUT STA. 10+14.00
5. END WASHOUT STA. 10+83.05

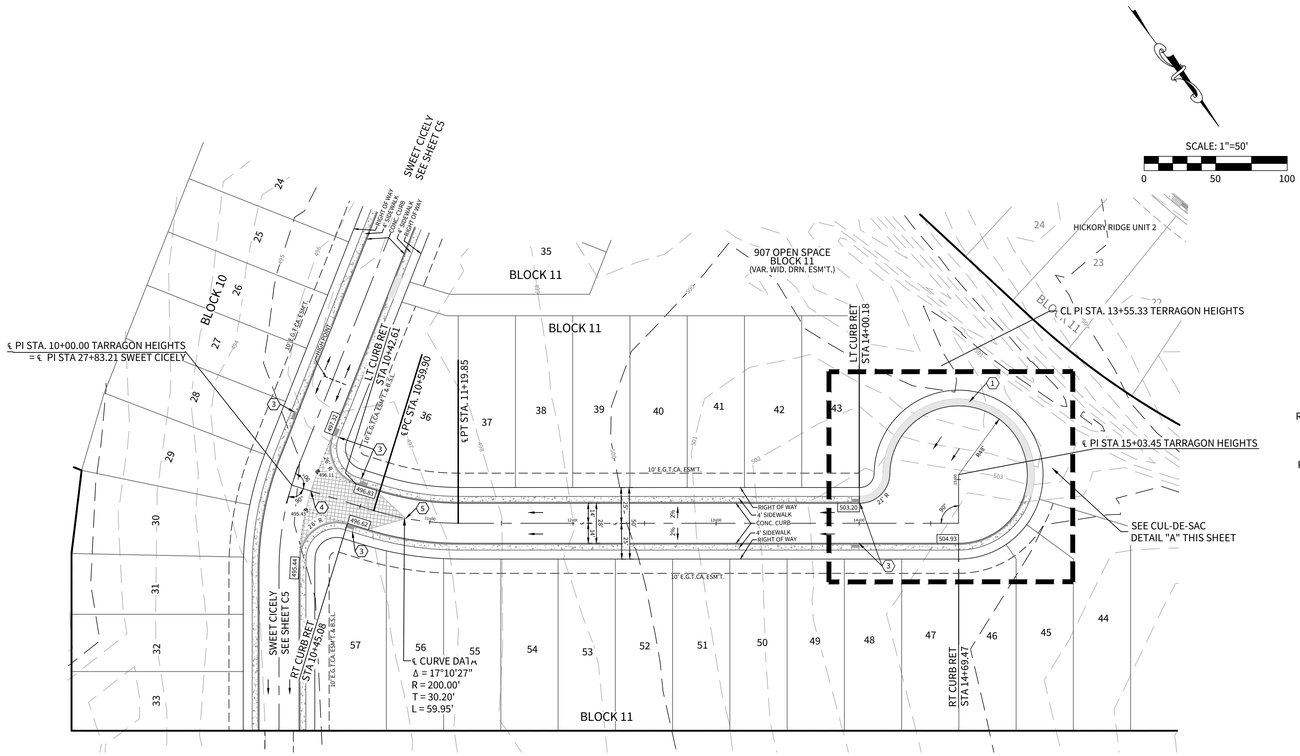
LEGEND

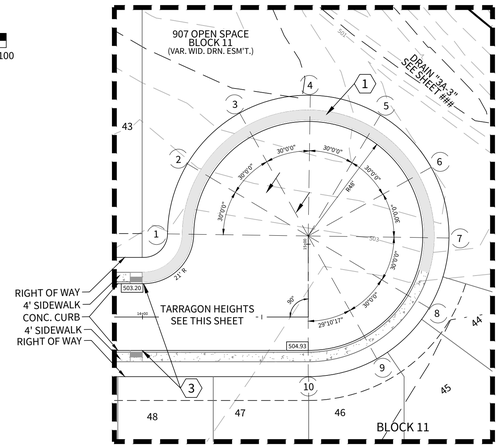
COSA TYPE "1" WHEEL CHAIR RAMPS ARE INDICATED THUS " ▬ " UNLESS OTHERWISE NOTED.

- SIDEWALK CONSTRUCTED WITH INFRASTRUCTURE
- STREET WASHOUT (SEE DETAIL SHEET C10)

(SEE DETAIL SHEET S5) FOR ADA RAMPS AT SIDEWALK INTERSECTIONS . DETECTABLE WARNING PAVER WITH TRUNCATED DOMES ONLY.

- XXXX.XX — PROPOSED TOP OF CONCRETE CURB ELEVATION
- XXXX.XX$_B$ — PROPOSED ASPHALT PAVEMENT ELEVATION
- EXISTING MAJOR CONTOUR LINES
- EXISTING MINOR CONTOUR LINES
- PROPOSED RIGHT OF WAY
- PROPOSED STREET CENTERLINE
- RP — RADIAL POINT





CUL-DE-SAC DETAIL"A"

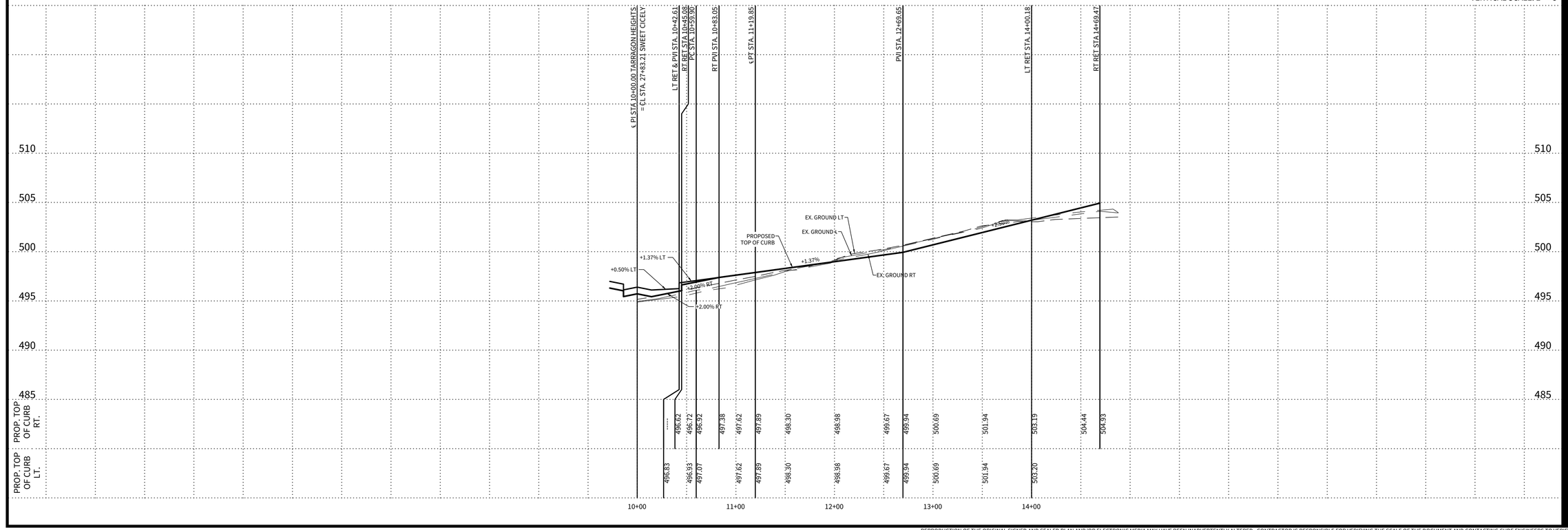
SCALE: 1" = 30'

CUL-DE-SAC TABLE	
POINT	ELEVATION
1	503.84
2	504.36
3	504.86
4	505.37
5	505.87
6	506.10
7	505.81
8	505.51
9	505.22
10	504.93

TARRAGON HEIGHTS

STA. 10+00.00 TO 15+03.45

HORIZONTAL SCALE: 1" = 50'
VERTICAL SCALE: 1" = 5'



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HICKORY RIDGE UNIT 3A

STREET PLAN & PROFILE - TARRAGON HEIGHTS

DATE
11/12/2025

PROJECT NO.
03278.101

DRAWN BY
RC/JG/JRR/MOH/MAS

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CJC/KMH

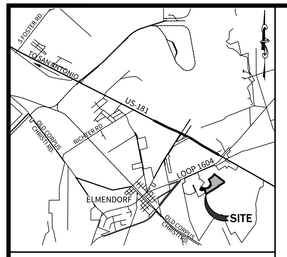
REVISIONS
1. 2. 3. 4. 5. 6. 7. 8.

STATE OF TEXAS
KYLE M. HUDEK
138753
LICENSED
PROFESSIONAL ENGINEER
11/18/2025
CUDE ENGINEERS
TBPELS No. 10048500

C8

P:\03278\03\13 drawings\plans\Sht\Sht_C8.DWG - TARRAGON HEIGHTS 3A.dwg, 2025/11/12 8:23:16 AM, jflores

REPRODUCTION OF THE ORIGINAL SIGNED AND SEALED PLAN AND/OR ELECTRONIC MEDIA MAY HAVE BEEN INADVERTENTLY ALTERED. CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE SCALE OF THE DOCUMENT AND CONTACTING CUDE ENGINEERS TO VERIFY DISCREPANCIES PRIOR TO CONSTRUCTION.



LOCATION MAP

N.T.S.

DEVELOPER:

ELMENDORF DEVELOPMENT COMPANY
1401 WOODLANDS PARKWAY
THE WOODLANDS, TEXAS 773880
TEL: (210) 403-6282
CONTACT PERSON: JUANITA ORSAK

CIVIL ENGINEER:

CUDE ENGINEERS
CONTACT PERSON: CHRIS CHAFFEE, P.E.
4122 POND HILL ROAD, SUITE 101
SAN ANTONIO, TX 78231
TEL: (210) 681-2951
FAX: (210) 523-7112



SCALE: 1"=100'

0 100 200

SIGNAGE NOTES:

1. TRAFFIC SIGNS SHALL BE USED IN ACCORDANCE WITH THE LATEST REVISION OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) AND WHERE JUSTIFIED BY ENGINEERING JUDGEMENT OR STUDY. TRAFFIC SIGNS INCLUDE REGULATORY SIGNS, WARNING SIGNS, STREET NAME SIGNS AND OBJECT MARKERS.
2. ALL SIGNS SHALL BE SHOWN IN THE ENGINEERING PLANS FOR REVIEW AND APPROVAL AS PART OF THE PLAN AND PROFILE SHEET OR SEPERATE SIGNING & PAVEMENT MARKING LAYOUT SHEET. THE ENGINEERING PLANS SHALL INCLUDE SIGN LOCATION, NAME, DESIGNATION AND SIZE. SIGN STANDARDS SHALL BE INCLUDED IN THE ENGINEERING PLANS.

INSTALLATION:

1. THE CONTRACTOR SHALL FURNISH AND INSTALL ALL REGULATORY, WARNING AND STREET NAME SIGNS AND SIGN MOUNTS IN ACCORDANCE WITH APPROVED ENGINEERING PLANS.
2. ALL SIGNAGE SHALL BE INSTALLED WITHIN STREET R.O.W.

MOUNTING:

1. THE WEDGE ANCHOR STEEL SYSTEM AND THIN-WALLED TUBING POST SHALL BE USED FOR SIGNS WITH UP TO 10 SQUARE FEET OF SIGN AREA. MATERIALS AND INSTALLATION SHOULD FOLLOW THE TxDOT TRAFFIC STANDARDS SMD (GEN) - 08 AND SMD (TWT) - 08.
2. THE TRIANGULAR SLIP BASE SYSTEM AND 10 BWG TUBING POST SHALL BE USED FOR SIGNS THAT HAVE 10 TO 16 SQUARE FEET OF SIGN AREA. MATERIALS AND INSTALLATION SHOULD FOLLOW THE TxDOT TRAFFIC STANDARDS SMD (GEN) - 08 AND SMD (SLIP-1 - 3) - 08.
3. OBJECT MARKER MATERIALS AND INSTALLATION SHOULD FOLLOW THE TxDOT TRAFFIC STANDARDS D & OM (1-5) - 10.

MATERIALS:

1. SIGN MATERIALS INCLUDING ALUMINUM SIGN BLANKS AND SIGN FACE MATERIALS SHOULD FOLLOW THE TxDOT TRAFFIC STANDARDS TSR (1-5) - 08 AND DEPARTMENT MATERIAL SPECIFICATIONS DMS-7110 AND DMS-8300.

THE CITY OF ELMENDORF WILL INSPECT ALL SIGNS FOR FINAL INSPECTION.

PAVEMENT MARKING NOTES:

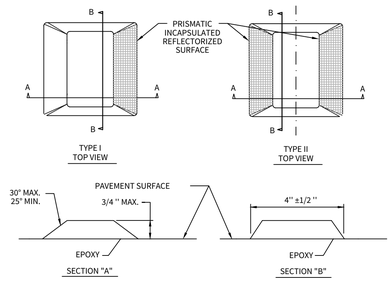
1. PAVEMENT MARKINGS SHALL BE USED IN ACCORDANCE WITH THE LATEST REVISION OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) AND WHERE JUSTIFIED BY ENGINEERING JUDGEMENT OR STUDY.
2. ALL PAVEMENT MARKINGS SHALL BE SHOWN IN THE ENGINEERING PLANS FOR REVIEW AND APPROVAL AS PART OF THE PLAN AND PROFILE SHEET OR SEPARATE SIGNING & PAVEMENT MARKING LAYOUT SHEET. DESIGN, MATERIALS AND INSTALLATION SHOULD FOLLOW TxDOT TRAFFIC STANDARDS PM (1-4)-12. CITY OF SAN ANTONIO TRAFFIC ENGINEERING STANDARDS FOR PAVEMENT MARKINGS DESIGNATING TRAFFIC LANES, LANE USAGE & LANE REGULATIONS AND PEDESTRIAN/BICYCLIST ACCOMMODATIONS MAY BE USED FOR ADDITIONAL STANDARD DESIGN DETAILS. MARKING STANDARDS SHALL BE INCLUDED IN THE ENGINEERING PLANS.
3. ALL PAVEMENT MARKINGS SHALL BE TYPE I HOT APPLIED THERMOPLASTIC AND MEET TxDOT DEPARTMENTAL SPECIFICATIONS DMS-8220. TYPE II TRAFFIC PAINT MARKINGS SHALL ONLY BE USED AS SEALER AND MEET TxDOT DEPARTMENTAL SPECIFICATIONS DMS-8200.
4. THE CONTRACTOR SHALL NOTIFY THE CITY OF ELMENDORF AT LEAST TWENTY-FOUR (24) HOURS PRIOR TO THE INSTALLATION OF ALL SEALER AND FINAL MARKINGS. THE CONTRACTOR MAY BE RESPONSIBLE FOR PLACING SPOT TABS BEFORE MARKING APPLICATION. THE CITY WILL INSPECT ALL MARKINGS AND FINAL APPLICATION.

1) REFLECTORIZED BLUE - FIRE HYDRANT

2) ADHENSIVE SHALL BE APPLIED IN SUFFICIENT TO ENSURE THE FOLLOWING:
   a) 100 PERCENT OF THE BONDING AREA OF RAISED PAVEMENT MARKERS SHALL BE IN CONTACT WITH THE ADHESIVE.
   b) RAISED PAVEMENT MARKERS SHALL NOT BE IN CONTACT WITH THE PAVEMENT SURFACE, BUT SHALL BE SEATED ON A CONTINUOUS LAYER OF ADHESIVE.
   c) BITUMINOUS ADHESIVE FOR MARKERS ON BITUMIOUS PAVEMENTS. EPOXY ADHENSIVE FOR MARKERS ON PORTLAND CEMENT CONCRETE PAVEMENTS. EPOXY ADHESIVE SHALL BE MACHINE MIXED.

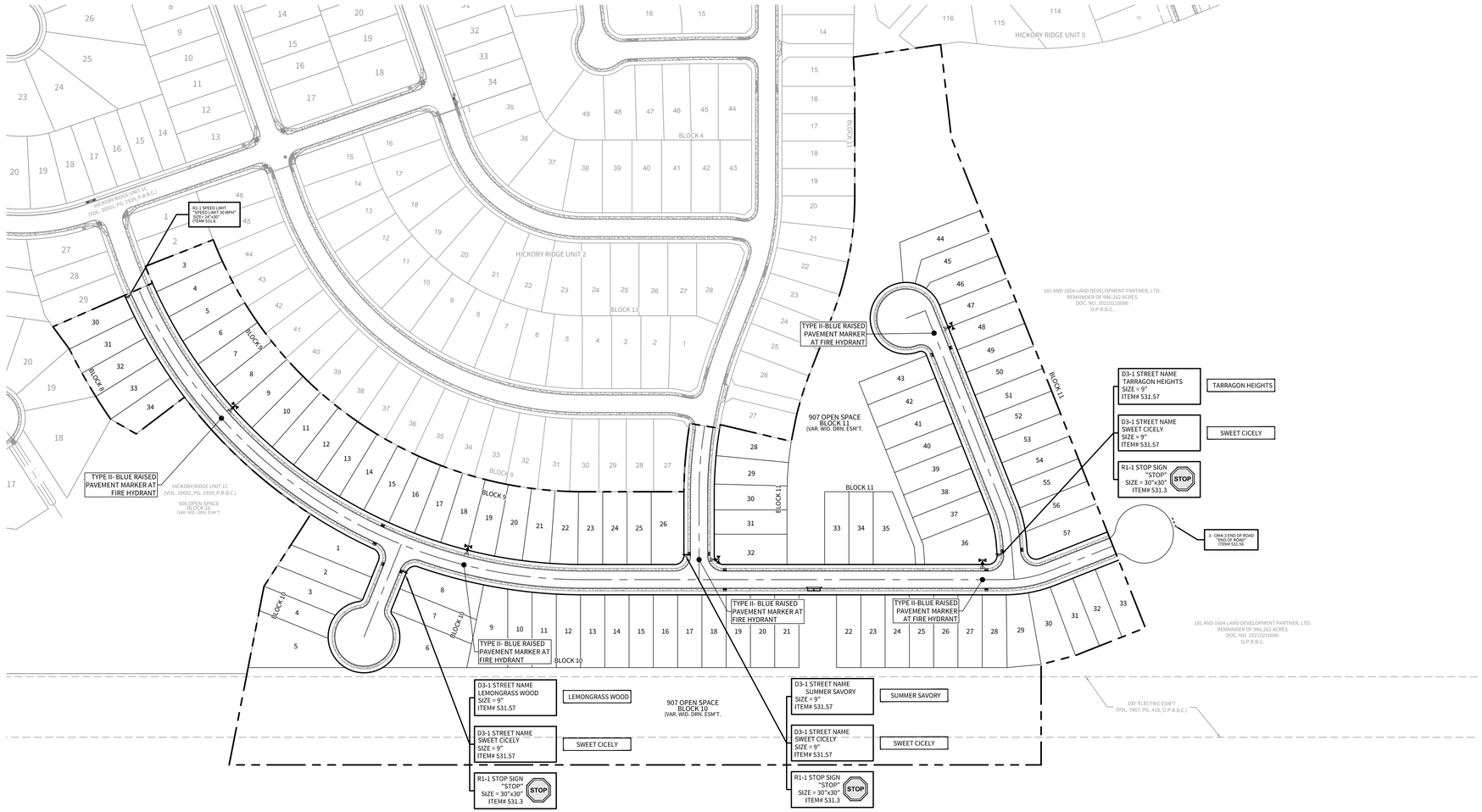
3) RAISED PAVEMENT MARKERS SHALL BE FREE OF RUST, SCALE, DIRT, OIL, GREASE, MOISTURE, OR CONTAMINATES WHICH MIGHT ADVERSELY AFFECT THE ADHESIVE BOND. ADHESIVE OR ANY OTHER MATERIAL THAT IMPAIRS THE FUNCTIONAL RETLECTIVITY WILL NOT BE ACCEPTABLE.

4) PLACEMENT OF RAISED PAVEMENT MARKERS SHALL BE 4 FEET OFF STREET CENTELINE TOWARD ITEM MARKED.



PAVEMENT REFLECTORS DETAIL

N.T.S.



CUDEENGINEERS.COM

CUDE ENGINEERS

4122 Pond Hill Road, Suite 101
San Antonio, Texas 78231
P:(210) 681.2951 F: (210) 523.7112

HICKORY RIDGE UNIT 3A

TRAFFIC SIGNAGE PLAN

DATE
12/16/2025

PROJECT NO.
03278.101

DRAWN BY
RC/JG/JRR/MOH/MAS

CHECKED BY
CJC/KMH

REVISIONS
1. 2. 3. 4. 5. 6. 7. 8.

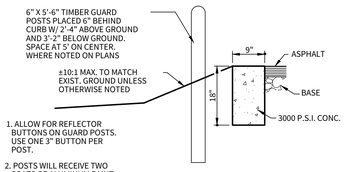
STATE OF TEXAS
KYLE M. HUDEK
138753
LICENSED
PROFESSIONAL ENGINEER
12/16/2025

CUDE ENGINEERS
TBPELS No. 10048500

C9

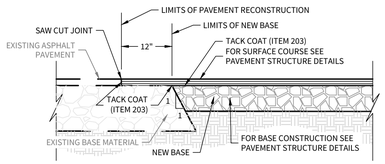
© 2021 CUDE ENGINEERS | G:\Drawings\Units 3A\3A_C9_SIGN.dwg, 12/15/2025 12:39:21 PM, Jhon Flores

REPRODUCTION OF THE ORIGINAL SIGNED AND SEALED PLAN AND/OR ELECTRONIC MEDIA MAY HAVE BEEN INADVERTENTLY ALTERED. CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE SCALE OF THE DOCUMENT AND CONTACTING CUDE ENGINEERS TO VERIFY DISCREPANCIES PRIOR TO CONSTRUCTION.



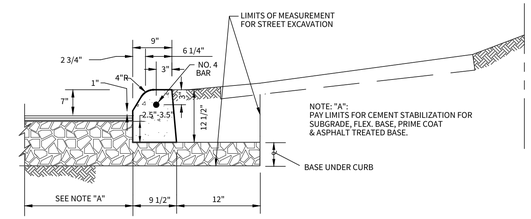
HEADER CURB DETAIL

N.T.S.



PAVEMENT JUNCTION DETAILS

N.T.S.



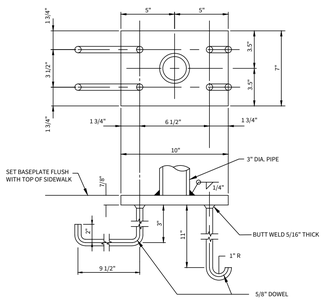
CURB SECTIONS

N.T.S.

NOTES:

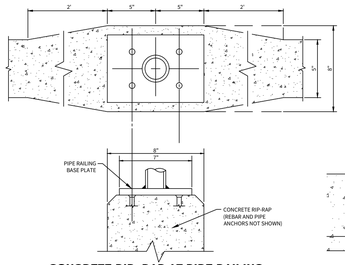
1) STREET LIGHTS SHALL BE INSTALLED 2' WITHIN R.O.W. AND A MINIMUM DISTANCE OF 6" FROM THE PROPOSED SIDEWALK, AND A MINIMUM DISTANCE OF 4' FROM FACE OF CURB.

2) FIRE HYDRANTS (AS APPLICABLE) SHALL BE INSTALLED WITHIN THE R.O.W. A MINIMUM OF 1' FROM THE BACK OF THE CURB AND A MINIMUM OF 1' AWAY FROM THE PROPOSED SIDEWALK.



PIPE ANCHORAGE DETAILS

N.T.S.

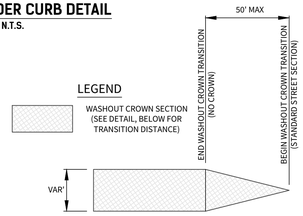


CONCRETE RIP-RAP AT PIPE RAILING BASE PLATE DETAIL

NOTES:

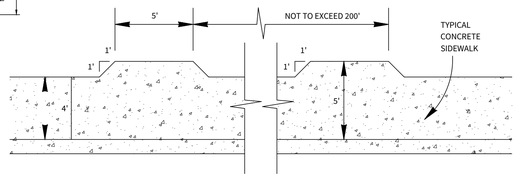
1) CONTRACTOR TO FLARE CONCRETE RIP-RAP TO 8" AT PROPOSED PIPE RAILING BASE PLATE LOCATIONS.

N.T.S.



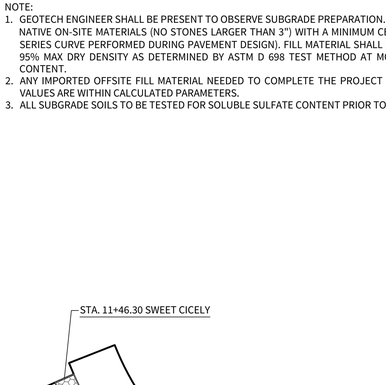
WASHOUT CROWN TRANSITION DETAIL

N.T.S.



SIDEWALK PASSING SPACE

1. FOR LOCAL TYPE "A" STREETS, SIDEWALKS SHALL HAVE A MINIMUM UNOBSTRUCTED WIDTH OF 4' AND IF SEPARATED FROM THE CURB, THE SIDEWALK SHALL BE LOCATED A MINIMUM OF 3' FROM THE BACK OF CURB.
2. SIDEWALKS LESS THAN 5 FEET IN WIDTH SHALL BE PROVIDED WITH A PASSING SPACE AT A MAXIMUM SPACING OF 200 FEET.



MAIL BOX PAD NOTE:

1. THE CONTRACTOR WILL CONSTRUCT SLABS FOR "TEMPORARY MAIL BOX COLLECTION PAD" FOR THE UNITED STATES POSTAL SERVICE WITH LOCATIONS AND SIZES SPECIFIED BY THE CITY ENGINEER DURING CONSTRUCTION.

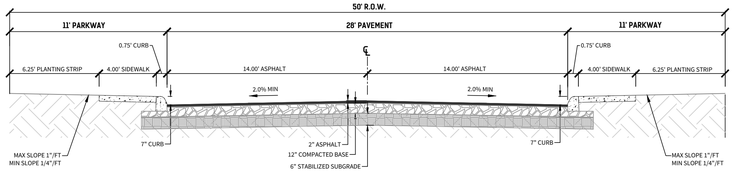
2. THE CONSTRUCTION OF SLABS SHALL CONFORM TO ITEM 513 "REMOVING AND RELOCATING MAILBOXES".

3. PAYMENT WILL BE MADE UNDER ITEM 513.2 "COMMUNITY MAILBOX SLAB - PER SQUARE YARD".

4. UNIT PRICE WILL INCLUDE REMOVAL OF "TEMPORARY MAIL BOX COLLECTION PAD" SLABS AT THE END OF THE PROJECT. NO SEPARATE PAY ITEM.

COMMUNITY MAIL BOX SLAB

ITEM 513.2

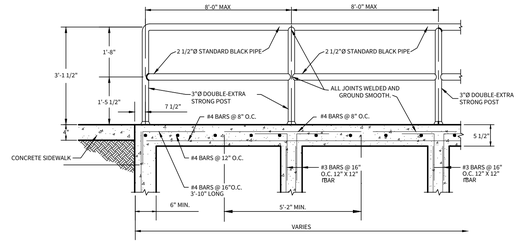


TYPICAL "LOCAL A" STREET CROSS SECTION

N.T.S

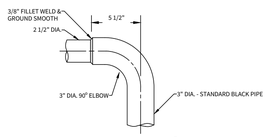
STREET TYPE	HMAC TYPE "D"	AGGREGATE BASE (TYPE A GRADE 2)	CEMENT STABILIZED SUBGRADE (23 LB/SY)	BASE UNDER CURB	STRUCTURAL NUMBER
LOCAL A (CBR = 2.0)	2"	12"	6"	6.5"	2.28

NOTE:
1. GEOTECH ENGINEER SHALL BE PRESENT TO OBSERVE SUBGRADE PREPARATION. FILL MATERIAL FOR SUBGRADES BELOW PAVED AREAS SHALL BE OF NATIVE ON-SITE MATERIALS (NO STONES LARGER THAN 3") WITH A MINIMUM CBR VALUE OF 2.0 AND A MAXIMUM PI VALUE OF 20 (BASED ON LIME SERIES CURVE PERFORMED DURING PAVEMENT DESIGN). FILL MATERIAL SHALL BE PLACED IN MAX 8" LOOSE LIFTS & BE COMPACTED TO AT LEAST 95% MAX DRY DENSITY AS DETERMINED BY ASTM D 698 TEST METHOD AT MOISTURE CONTENT WITHIN 3 PERCENT OF THE OPTIMUM WATER CONTENT.
2. ANY IMPORTED OFFSITE FILL MATERIAL NEEDED TO COMPLETE THE PROJECT SHALL BE TESTED BY GEOTECH ENGINEER TO VERIFY PI AND CBR VALUES ARE WITHIN CALCULATED PARAMETERS.
3. ALL SUBGRADE SOILS TO BE TESTED FOR SOLUBLE SULFATE CONTENT PRIOR TO INSTALLATION OF LIME OR CEMENT.



TYPICAL SIDEWALK BRIDGE SECTION AND SIDEWALK PIPE RAILING

N.T.S.



DETAIL OF 90° WELDING ELBOWS

* A NEAT END SECTION, SATISFACTORY TO THE ENGINEER, FROM SUBMITTED SHOP DRAWINGS, MAY BE USED IN LIEU OF THE 90° WELDING ELBOW SHOWN.

SCALE: 1" = 8"

GENERAL NOTES

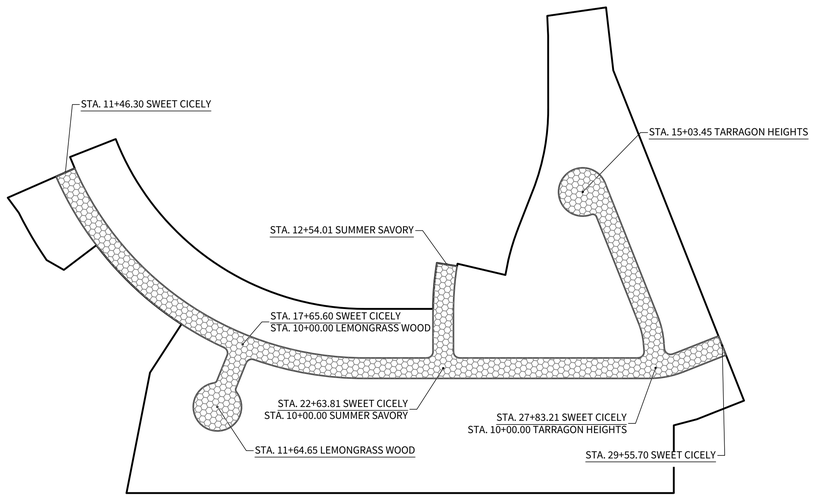
THE LOCATIONS AND DEPTHS OF ALL EXISTING UTILITIES, INCLUDING SERVICE LATERALS AND DRAINAGE STRUCTURES SHOWN ON THE PLANS ARE APPROXIMATE ONLY. THE CONTRACTOR SHALL VERIFY THE EXACT LOCATION AND DEPTHS OF UNDERGROUND UTILITIES AT LEAST 48 HOURS PRIOR TO CONSTRUCTION WHETHER SHOWN ON PLANS OR NOT, AND TO PROTECT THE SAME DURING CONSTRUCTION.

AQUA TEXAS	512-990-4400
CITY OF ELMENDORF	210-635-8210
TEXAS STATE WIDE ONE CALL LOCATOR	1-800-545-6005
C.P.S. ENERGY	"
AT&T	"
CHARTER COMMUNICATION	"
VALERO ENERGY CO.	"

DETAILS ON THIS DRAWING ARE NOT TO SCALE

STREET PAVEMENT DESIGN OPTIONS

GEOTECH ENGINEER WILL BE PRESENT TO DETERMINE IF LIME OR CEMENT TREATMENT IS REQUIRED. IF LIME OR CEMENT TREATMENT IS REQUIRED, CITY OF ELMENDORF WILL BE INFORMED OF ALL CHANGES. REVISIONS WILL BE SUBMITTED INDICATING WHERE LIME OR CEMENT TREATMENT WAS USED, ALONG WITH STATIONING. CONTRACTOR TO REVIEW GEOTECH RECOMMENDATIONS PRIOR TO FINAL SUBGRADE PREP.
(REF. HICKORY RIDGE, UNIT 3 GEOTECH REPORT, INTEC PROJECT NO. S221419 DATED DECEMBER 08, 2022)



PAVEMENT DESIGN SCHEMATIC N.T.S.

NOTE:
1. REFERENCE GEOTECHNICAL REPORT (InTEC NO. S191183-P) FOR BORING INFORMATION AND CBR LOCATIONS.

LEGEND:

	LOCAL "A"	
	SWEET CICELY	11+46.30–29+55.70
	LEMONGRASS WOOD	10+00.00–11+64.65
	SUMMER SAVORY	10+00.00–12+54.01
	TARRAGON HEIGHTS	10+00.00–15+03.45

CUDEENGINEERS.COM
4122 Pond Hill Road, Suite 101
San Antonio, Texas 78231
P:(210) 681.2951 F: (210) 523.7112

HICKORY RIDGE UNIT 3A

STANDARD STREET DETAILS

DATE
12/11/2025
PROJECT NO.
03278.101
DRAWN BY
RC/JG/JRR/MOH/MAS
CHECKED BY
CJC/KMH

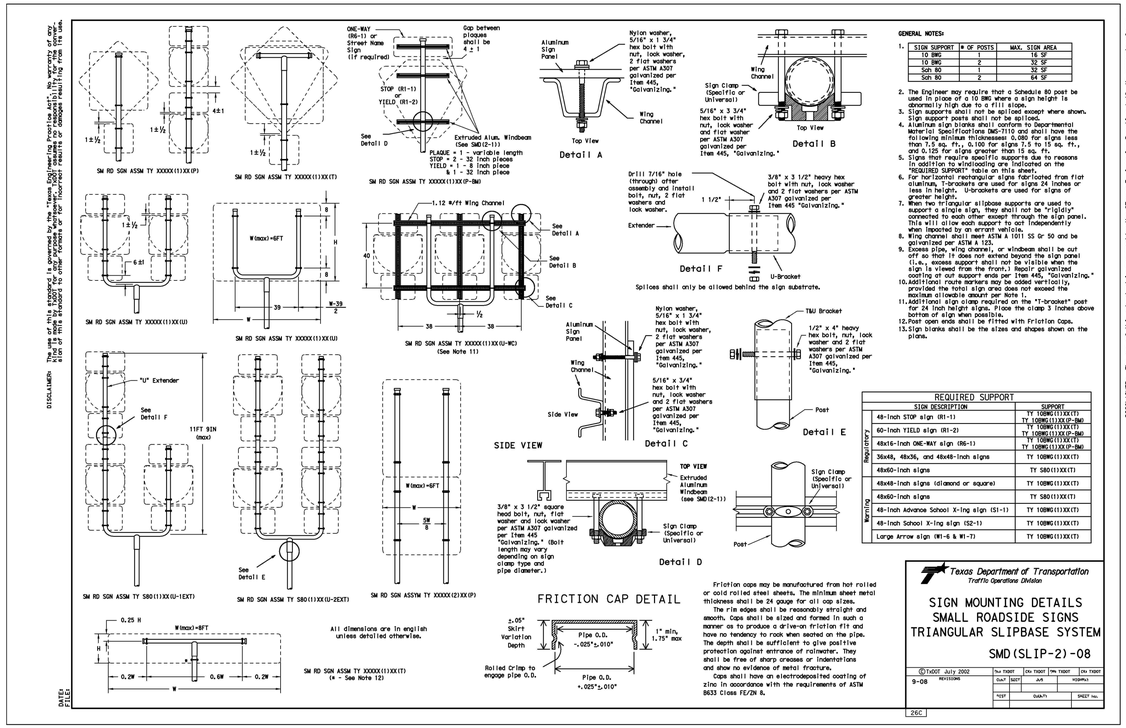
REVISIONS
1. 2. 3. 4. 5. 6. 7. 8.

STATE OF TEXAS
KYLE M. HUDEK
138753
LICENSED
PROFESSIONAL ENGINEER
12/15/2025
CUDE ENGINEERS
TBPELS No. 10048500

C10

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C:\Users\kyleh\Desktop\Work\Hickory Ridge\Unit 3A\Hickory Ridge Unit 3A_12-15-25.dwg 12/15/2025 11:22:00 pm by kyleh

REPRODUCTION OF THE ORIGINAL SIGNED AND SEALED PLAN AND/OR ELECTRONIC MEDIA MAY HAVE BEEN INADVERTENTLY ALTERED. CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE SCALE OF THE DOCUMENT AND CONTACTING CUDE ENGINEERS TO VERIFY DISCREPANCIES PRIOR TO CONSTRUCTION.



GENERAL NOTES:

1. | SIGN SUPPORT | # OF POSTS | MAX. SIGN AREA |
   |---|---|---|
   | 10 BWG | 1 | 16 SF |
   | 10 BWG | 2 | 32 SF |
   | Sch 80 | 1 | 32 SF |
   | Sch 80 | 2 | 64 SF |
2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS or 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Additional route markers may be added vertically, provided the total sign area does not exceed the maximum allowable amount per Note 1.
11. Additional sign clamp required on the "T-bracket" post for 24 inch height signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.
13. Sign blanks shall be the sizes and shapes shown on the plans.

REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-Inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-Inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-Inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-Inch signs	TY 10BWG(1)XX(T)
	48x60-Inch signs	TY S80(1)XX(T)
Warning	48x48-Inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-Inch signs	TY S80(1)XX(T)
	48-Inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-Inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM
SMD(SLIP-2)-08

©TxDOT July 2002	Tex TXDOT	Div TXDOT	Tex TXDOT	Div TXDOT
9-08 REVISIONS	DAN	SCOTT	AVR	HUGHES
	TEST		DATA TY	SHEET No.

26C

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DATED:
FILE:

SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

SM RD SGN ASSM TY XXXXX(X)XX(X-XXXX)

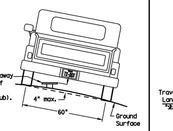
Post Type
- FRP = Fiberglass Reinforced Plastic Pipe (see SMD(FRP))
- TWT = Thin-Walled Tubing (see SMD(TWT))
- 10BWG = 10 BWG Tubing (see SMD(SLIP-1) to (SLIP-3))
- S80 = Schedule 80 Pipe (see SMD(SLIP-1) to (SLIP-3))

Number of Posts (1 or 2)

Anchor Type
- UA = Universal Anchor - Concreted (see SMD(FRP) and (TWT))
- UB = Universal Anchor - Bolted down (see SMD(FRP) and (TWT))
- WS = Wedge Anchor Steel - (see SMD(TWT))
- WP = Wedge Anchor Plastic (see SMD(TWT))
- SA = Slipbase - Concreted (see SMD(SLIP-1) to (SLIP-3))
- SB = Slipbase - Bolted Down (see SMD(SLIP-1) to (SLIP-3))

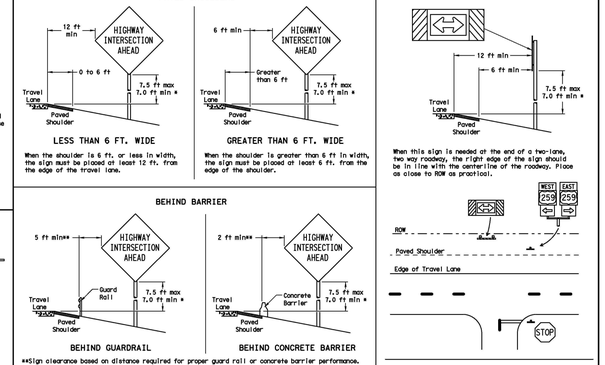
Sign Mounting Designation
- P = Prefab. "P1ain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))
- T = Prefab. "T" (see SMD(SLIP-1) to (SLIP-3), (TWT))
- U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))
  IF REQUIRED:
- 1EXT or 2EXT - Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
- BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))
- WC = 1.12 W/ft Wing Channel (see SMD(SLIP-1) to (SLIP-3))
- EXAL = Extruded Aluminum Sign Panels (see SMD(SLIP-3))

REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

SIGN LOCATION



BEHIND GUARDRAIL **BEHIND CONCRETE BARRIER**

**Sign clearance based on distance required for proper guard rail or concrete barrier performance.

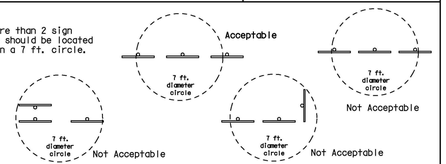
* Signs shall be mounted using the following condition that results in the greatest sign elevation:
(1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or
(2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

The maximum values may be increased when directed by the Engineer.

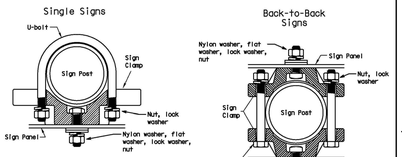
See the Traffic Operations Division website for detailed drawings of sign clamps, Triangular Slipbase System components and Wedge Anchor System components.

The website address is:
https://www.txdot.gov/publications/traffic.htm

No more than 2 sign posts should be located within a 7 ft. circle.



TYPICAL SIGN ATTACHMENT DETAIL



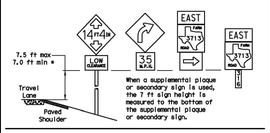
Bolts used to mount sign panels to the clamps are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

When two sign clamps are used to mount signs back-to-back, use a 5/16-18 UNC galvanized hex head per ASTM A307 with nut and helical-spring lock washer. The approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted depending upon field conditions.

Sign clamps may be either the specific size clamp or the universal clamp.

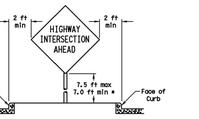
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



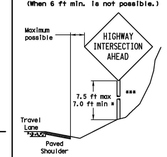
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY

(When 6 ft min. is not possible.)



Right-of-way restrictions may be created by rocks, water, vegetation, forest, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

*** Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to extreme slope.

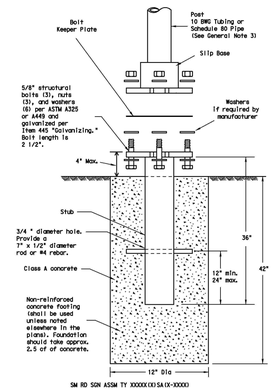
Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
GENERAL NOTES & DETAILS
SMD(GEN)-08

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9-08 REVISIONS	DAN	SCOTT	AVR	HUGHES
	TEST		DATA TY	SHEET No.

26A

TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



SM RD SGN ASSM TY XXXXX(X)SA(X-XXXX)

NOTE

There are various devices approved for the Triangular Slipbase System. Please reference the Material Producer List for approved slip base systems. https://www.txdot.gov/business/producer_list.htm The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

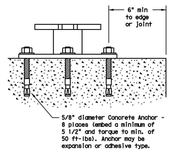
1. Slip base shall be permanently marked to indicate manufacturer, Method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
2. Material used as post with this system shall conform to the following specifications:
   10 BWG Tubing (2.875" outside diameter)
   0.134" nominal wall thickness
   Seamless or electric-resistance welded steel tubing or pipe
   Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
   Other steels may be used if they meet the followings
   55,000 PSI minimum yield strength
   70,000 PSI minimum tensile strength
   20% minimum elongation in 2"
   Wall thickness (uncoated) shall be within the range of 0.122" to 0.138"
   Outside diameter (uncoated) shall be within the range of 2.853" to 2.895"
   Galvanization per ASTM A123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.
   Schedule 80 Pipe (2.875" outside diameter)
   0.276" nominal wall thickness
   Steel tubing per ASTM A500 Gr C
   Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the followings
   46,000 PSI minimum yield strength
   62,000 PSI minimum tensile strength
   215 minimum elongation in 2"
   Wall thickness (uncoated) shall be within the range of 0.248" to 0.304"
   Outside diameter (uncoated) shall be within the range of 2.853" to 2.895"
   Galvanization per ASTM A123
3. See the Traffic Operations Division website for detailed drawings of sign clamps and Texas Universal Triangular Slipbase System components. The website address is:
   http://www.txdot.gov/publications/traffic.htm
4. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

ASSEMBLY PROCEDURE

Foundation
1. Prepare 12-inch diameter by 42-inch deep hole. If solid rock is encountered, the depth of the foundation may be reduced such that it is embedded a minimum of 18 inches into the solid rock.
2. The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor-driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
3. Push the pipe end of the slip base stub into the center of the concrete. Rotate the stub back and forth while pushing it down into the concrete to assure good contact between the concrete and stub. Continue to work the stub into the concrete until it is between 2 to 4 inches above the ground.
4. Plumb the stub. Allow a minimum of 4 days to set, unless otherwise directed by the Engineer.
5. The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

Support
1. Cut support so that the bottom of the sign will be 7 to 7.5 feet above the edge of the travelway (i.e., edge of the closest lane) when slip plate is below the edge of pavement or 7 to 7.5 feet above slip plate when the slip plate is above the edge of the travelway. The cut shall be plumb and straight.
2. Attach sign to support using connections shown. When multiple signs are installed on the same support, ensure the minimum clearance between each sign is maintained. See SMD(SLIP-2) for clearances based on sign types.

CONCRETE ANCHOR



SM RD SGN ASSM TY XXXXX(X)SB(X-XXXX)

Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end, Heavy hex nut per ASTM A563, and hardened washer per ASTM F436. The stud bolt shall have a minimum yield and ultimate tensile strength of 50 and 75 KSI, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations. Top of bolt shall extend at least flush with top of the nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 5 1/2" minimum embedment, shall have a minimum allowable tension and shear of 3900 and 3100 psi, respectively.

Texas Department of Transportation
Traffic Operations Division

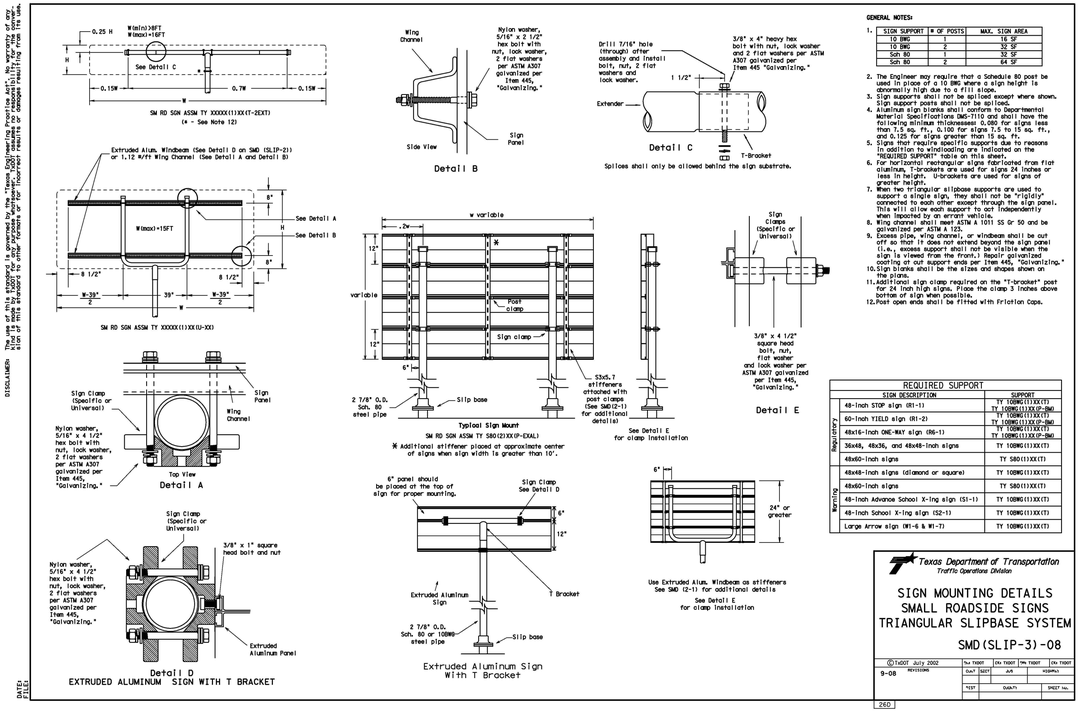
SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM
SMD(SLIP-1)-08

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26B

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DATED:
FILE:



GENERAL NOTES:

1. | SIGN SUPPORT | # OF POSTS | MAX. SIGN AREA |
   |---|---|---|
   | 10 BWG | 1 | 16 SF |
   | 10 BWG | 2 | 32 SF |
   | Sch 80 | 1 | 32 SF |
   | Sch 80 | 2 | 64 SF |
2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS or 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Sign blanks shall be the sizes and shapes shown on the plans.
11. Additional sign clamp required on the "T-bracket" post for 24 inch high signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.

REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-Inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-Inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-Inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-Inch signs	TY 10BWG(1)XX(T)
	48x60-Inch signs	TY S80(1)XX(T)
Warning	48x48-Inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-Inch signs	TY S80(1)XX(T)
	48-Inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-Inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

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Traffic Operations Division

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM
SMD(SLIP-3)-08

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26D

CUDEENGINEERS.COM
CUDE ENGINEERS
4122 Pond Hill Road, Suite 101
San Antonio, Texas 78231
P:(210) 681.2951 F: (210) 523.7112

HICKORY RIDGE UNIT 3A

SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

DATE
11/12/2025

PROJECT NO.
03278.101

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RC/JG/JRR/MOH/MAS

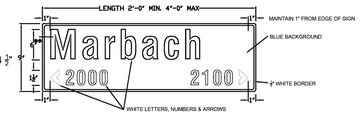
CHECKED BY
CJC/KMH

REVISIONS
1 2 3 4 5 6 7 8

STATE OF TEXAS
KYLE M. HUDEK
138753
LICENSED PROFESSIONAL ENGINEER
11/18/2025
CUDE ENGINEERS
TBPELS No. 10048500

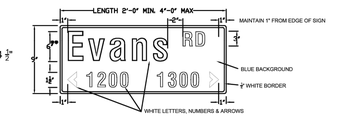
C11

REPRODUCTION OF THE ORIGINAL SIGNED AND SEALED PLAN AND/OR ELECTRONIC MEDIA MAY HAVE BEEN INADVERTENTLY ALTERED. CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE SCALE OF THE DOCUMENT AND CONTACTING CUDE ENGINEERS TO VERIFY DISCREPANCIES PRIOR TO CONSTRUCTION.



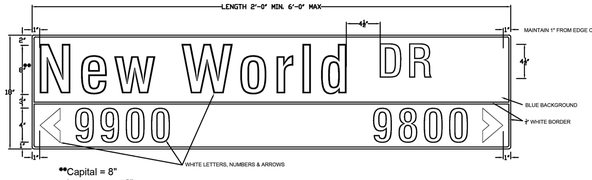
**Capital = 6"
Lower case =4 $\frac{3}{4}$"

9" GROUND MOUNT STREET NAME SIGNS



**Capital = 6"
Lower case =4 $\frac{3}{4}$"

9" GROUND MOUNT STREET NAME SIGNS
WITH STREET DESIGNATION

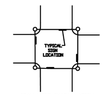


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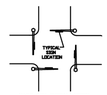
18" OVERHEAD STREET NAME SIGNS

	18" OVERHEAD SIGN	9" GROUND MOUNT SIGNS
HEIGHT	18" (381 mm)	9" (229 mm)
LENGTH	48" (1200 mm) MIN. 72" (1800 mm) MAX. *1'-0(305mm) INCREMENTS OF LENGTH	24" (600 mm) MIN. 48" (1200 mm) MAX. *1'-0(305mm) INCREMENTS OF LENGTH
THICKNESS	0.125" (3 mm)	
SUBSTRATE	ALUMINUM ALLOY, 5052-H38 (ASTM B-209 GOLD CHROMATE FINISH	
SIGN FACE MATERIALS	BLUE FILM✱ OVER DIAMOND GRADE ASTM Type XI Non-Fluorescent	BLUE FILM ✱ OVER HIGH INTENSITY PRISMATIC- ASTM Type IV
LEGENDS AND SYMBOLS	SERIES D, B OR C IF NAME OTHERWISE EXCEEDS MAXIMUM SIGN LENGTH	
COLOR	WHITE LEGEND ON BLUE BACKGROUND	
LETTER TRACKING	17% (USUAL) 10% (MIN.)	10%

✱ ACRYLIC ELECTRONIC CUTTABLE FILM



SPAN WIRE INSTALLATION



MAST ARM INSTALLATION

SIGN FACE MATERIALS SHALL CONFORM TO:

1. STANDARD SPECIFICATIONS FOR CONSTRUCTION OF ROADS & BRIDGES ON FEDERAL HIGHWAY PROJECTS - FP-03 U.S. CUSTOMARY UNITS SECTION 718
2. GENERAL SERVICES ADMINISTRATION FEDERAL SPECIFICATIONS L-S-300C
3. ASTM D 4956 - 01e1

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INFRASTRUCTURE SERVICES DEPARTMENT
PUBLIC WORKS DIVISION

STREET NAME SIGNING DETAILS

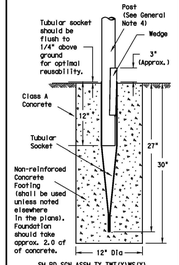
ISSUED	ISSUED ON
BY	DATE
CHANGED BY	DATE CHANGED
BY	DATE(S)
USE AS CONSTRUCTED	

SHEET 1

DATE:
FILE:

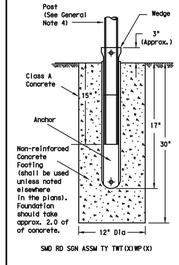
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Wedge Anchor Steel System



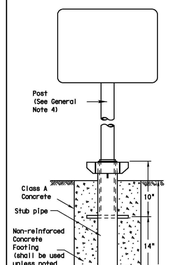
SM RD SGN ASSM TY TWT(X)WS(X)

Wedge Anchor High Density Polyethylene (HDPE) System

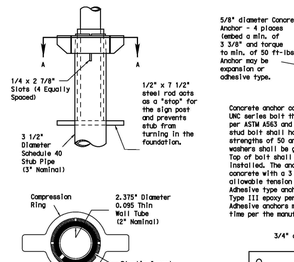


SMD RD SGN ASSM TY TWT(X)WP(X)

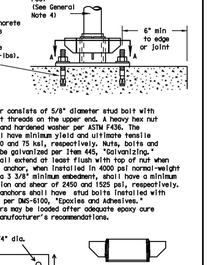
Universal Anchor System with Thin-Walled Tubing Post



SM RD SGN ASSM TY TWT(X)UA(P)

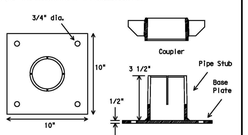


Plastic Insert must be used when using the TWT with either the Universal Anchor System or the Bolt Down Universal Anchor System. The insert should be approx. 10" long and cover the tubing from just above the top of the stub pipe to the bottom of the slip post when using the Universal Anchor System. The insert should be cut to approx. 4 1/2" when used with the Bolt Down Universal Anchor System.



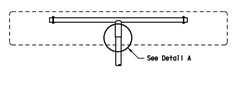
5/8" diameter Concrete Anchor - 4 places (embed a min. of 3 3/8" and torque to min. of 50 ft-lbs). Anchor may be expansion or adhesive type.

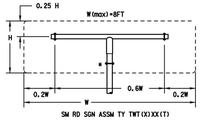
Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. A heavy hex nut per ASTM A563 and hardened washer per ASTM F436. The stud bolt shall have minimum yield and ultimate tensile strengths of 50 and 75 ksi, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Top of bolt shall extend at least flush with top of nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 3 3/8" minimum embedment, shall have a minimum allowable tension and shear of 2450 and 1525 psi, respectively. Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations.



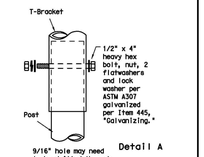
SM RD SGN ASSM TY TWT(X)UB(P)

Sign Installation Using a Prefabricated T-Bracket for Thin-Wall Tubing Post





SM RD SGN ASSM TY TWT(X)XX(T)
(* - See General Note 6)



Detail A

NOTE

The devices shall be installed per manufacturer's recommendations.
Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

1. The Wedge Anchor System and the Universal Anchor System with thin wall tubing post may be used to support up to 10 square feet of sign area.
2. The tubular socket, wedge and prefabricated T-bracket shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to the approval of the TxDOT Traffic Standards Engineer.
3. Except for posts (13 BWG Tubing), clamps, nuts and bolts, all components shall be prequalified. A list of prequalified vendors may be obtained from the Material Producer List web page. The website address is: https://www.txdot.gov/business/producer list.html
4. Material used as post with this system shall conform to the following specifications:
   13 BWG Tubing (2.375" outside diameter) (TWT)
   0.095" nominal wall thickness
   Seamless or electric-resistance welded steel tubing
   Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
   Other steels may be used if they meet the followings
   55,000 PSI minimum yield strength
   70,000 PSI minimum tensile strength
   18% minimum elongation in 2"
   Wall thickness (uncoated) shall be within the range of .083" to .099"
   Outside diameter (uncoated) shall be within the range of 2.369" to 2.381"
   Galvanization per ASTM 123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.
5. Sign blanks shall be the sizes and shapes shown on the plans.
6. Additional sign clamp required on the "T-bracket" post for 24" high signs. Place clamp at least 3" above bottom of sign when possible.
7. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
8. See the Traffic Operations Division website for detailed drawings of sign clamps and Wedge Anchor System components. The website address is: http://www.txdot.gov/publications/traffic.htm

WEDGE ANCHOR SYSTEM INSTALLATION PROCEDURE

1. Dig foundation hole. Where solid rock is encountered at ground level, the foundation shall be a minimum depth of 18". When solid rock is encountered below ground level, the foundation shall extend in the solid rock a minimum depth of 18" or provide a minimum foundation depth of 30". If solid rock is encountered, the socket/stub may be reduced in length as required to a minimum length of 18". Any material removed from the socket/stub shall be from the bottom and the clearance requirements given on SMD(GEN) must be followed. The inner surfaces of the socket/stub must remain free of concrete or other debris.
2. The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Place concrete into hole until it is approximately flush with the ground. Concrete shall be Class A.
3. Insert tubular socket into concrete until top of socket is approximately 1/4 " above the concrete footing.
4. Plumb the socket. Allow a minimum 4 days for concrete to set, unless otherwise directed by Engineer..
5. Attach the sign to the sign post.
6. Insert the sign post into socket and align sign face with roadway.
7. Drive the wedge into the socket to secure post. This will leave approximately 3 inches of the wedge exposed.

UNIVERSAL ANCHOR SYSTEM INSTALLATION PROCEDURE

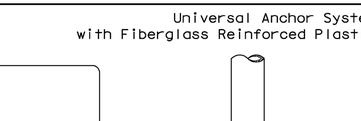
1. Dig foundation hole. Where solid rock is encountered at ground level, the foundation shall be a minimum depth of 18". When solid rock is encountered below ground level, the foundation shall extend in the solid rock a minimum depth of 18" or provide a minimum foundation depth of 30". If solid rock is encountered, the socket/stub may be reduced in length as required to a minimum length of 18". Any material removed from the socket/stub shall be from the bottom and the clearance requirements given on SMD(GEN) must be followed. The inner surfaces of the socket/stub must remain free of concrete or other debris.
2. Insert base post in hole to depths shown and backfill hole with concrete.
3. Level and plumb the base post using a torpedo level and allow concrete adequate time to set. The bottom of the slots provided in the stub pipe shall remain above the top of the concrete foundation.
4. Attach the sign to the sign post.
5. Install plastic insert around bottom of post.
6. Insert sign post into base post. Lower until the post comes to rest on steel rod.
7. Seat compression ring using a hammer. Typically, the top of compression ring will be approximately level with top of stub post when optimally installed.
8. Check sign post by hand to ensure it is unable to turn. If loose, increase the tightening of the compression ring.

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Traffic Operations Division

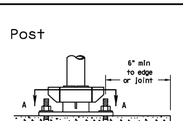
SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
WEDGE & UNIVERSAL ANCHOR
WITH THIN WALL TUBING POST
SMD(TWT)-08

©TxDOT July 2002	?w TXDOT	CK: TXDOT	?PK TXDOT	CK: TXDOT
9-08 REVISIONS	DATE	JOB	HIGHWAY	
	DIST	COUNTY		SHEET NO.

266



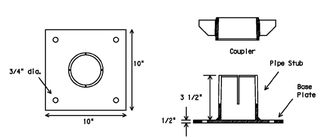
SM RD SGN ASSM TY FRP(X)UA(P)



5/8" diameter Concrete Anchor - 4 places (embed a min. of 3 3/8" and torque to min. of 50 ft-lbs). Anchor may be expansion or adhesive type.

Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. A heavy hex nut per ASTM A563 and hardened washer per ASTM F436. The stud bolt shall have minimum yield and ultimate tensile strengths of 50 and 75 ksi, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Top of bolt shall extend at least flush with top of nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 3 3/8" minimum embedment, shall have a minimum allowable tension and shear of 2450 and 1525 psi, respectively. Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations.

BOLT-DOWN DETAILS



SM RD SGN ASSM TY FRP(X)UB(P)

GENERAL NOTES:

1. FRP sign supports for a single type sign support may be used for signs up to and including 16 square feet. Dual post installation may be used for signs up to and including 32 square feet.
2. All nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing."
3. See the Traffic Operations Division website for detailed drawings of sign clamps. The website address is: https://www.txdot.gov/publications/traffic.htm

FRP POST REQUIREMENTS

1. Materials shall conform to the requirements of Departmental Material Specification DMS-4610 and will be furnished in a yellow or gray color as specified elsewhere in the plans.
2. Thickness of FRP sign support is 0.125" + 0.031", - 0.0".
3. FRP sign supports are prequalified by the Traffic Operations Division. Prequalification procedures are obtained by writing:
   Texas Department of Transportation
   Traffic Operations Division
   125 East 11th Street
   Austin, Texas 78701-2483

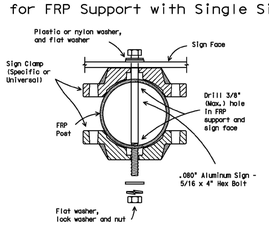
UNIVERSAL ANCHOR SYSTEM INSTALLATION PROCEDURES

1. Dig foundation hole. Where solid rock is encountered at ground level, the foundation shall be a minimum depth of 18". When solid rock is encountered below ground level, the foundation shall extend in the solid rock a minimum depth of 18" or provide a minimum foundation depth of 30". If solid rock is encountered, the socket/stub may be reduced in length as required to a minimum length of 18". Any material removed from the socket/stub shall be from the bottom and the clearance requirements given on SMD(GEN) must be followed. The inner surfaces of the socket/stub must remain free of concrete or other debris.
2. The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
3. Insert base post in foundation hole to depths shown and fill hole with concrete. Cut base post from bottom and ensure a minimum of 18" embedment if installed in solid rock.
4. Level and plumb the base post with coupler using a torpedo level and let concrete set a minimum of 4 days, unless otherwise directed by Engineer. Bottom of base post slots shall be above the concrete footing.
5. Attach sign to FRP post.
6. Insert sign post into base post. Lower until the post comes to rest on the steel rod.
7. Use hammer to ensure the coupler is firmly seated. Top of coupler should be level with top of base post in most instances.
8. Check sign to ensure there is no twist. If loose, increase the tightening of coupler.

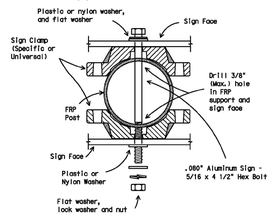
BOLT DOWN SIGN SUPPORT

1. Position base plate with coupler on existing concrete.
2. Drill holes into concrete and insert the 5/8" diameter bolts with wedge anchors, and tighten nuts.
3. Attach sign to FRP post.
4. Insert bottom of sign post into pipe stub.
5. Use hammer to ensure the coupler is firmly seated. Top of coupler should be level with top of base post in most instances.
6. Check sign to ensure there is no twist. If loose, increase the tightening of coupler.

Typical Sign Mounting Detail for FRP Support with Single Sign



Typical Sign Mounting Detail for FRP Support with Back-to-Back Signs



Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
UNIVERSAL ANCHOR SYSTEM
WITH FRP POST
SMD(FRP)-08

©TxDOT July 2002	?w TXDOT	CK: TXDOT	?PK TXDOT	CK: TXDOT
9-08 REVISIONS	DATE	JOB	HIGHWAY	
	DIST	COUNTY		SHEET NO.

26F

DATE:
FILE:

CUDEENGINEERS.COM
CUDE ENGINEERS
4122 Pond Hill Road, Suite 101
San Antonio, Texas 78231
P:(210) 681.2951 F: (210) 523.7112

HICKORY RIDGE UNIT 3A

TXDOT SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS

DATE
11/12/2025

PROJECT NO.
03278.101

DRAWN BY
RC/JG/JRR/MOH/MAS

CHECKED BY
CJC/KMH

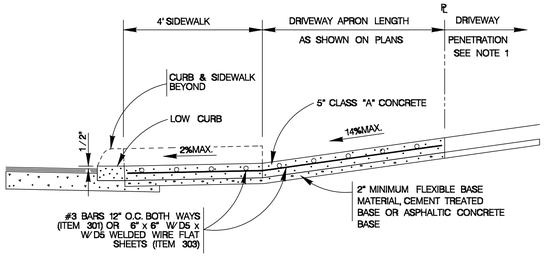
REVISIONS
1 2 3 4 5 6 7 8

STATE OF TEXAS
KYLE M. HUDEK
138753
LICENSED
PROFESSIONAL ENGINEER
11/18/2025

CUDE ENGINEERS
TBPELS No. 10048500

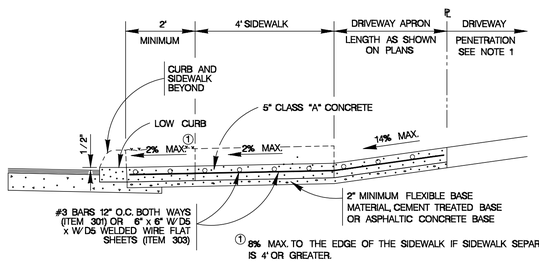
C12

REPRODUCTION OF THE ORIGINAL SIGNED AND SEALED PLAN AND/OR ELECTRONIC MEDIA MAY HAVE BEEN INADVERTENTLY ALTERED. CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE SCALE OF THE DOCUMENT AND CONTACTING CUDE ENGINEERS TO VERIFY DISCREPANCIES PRIOR TO CONSTRUCTION.



TYPICAL RESIDENTIAL DRIVEWAY SECTION

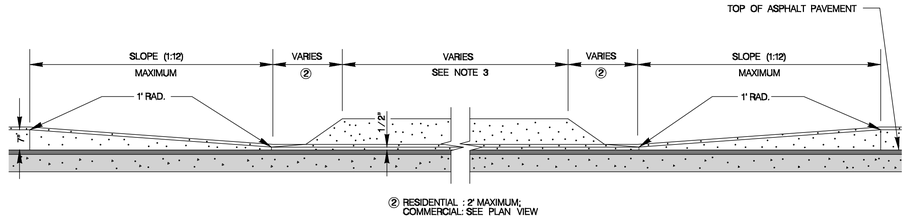
WITH SIDEWALK ABUTTING CURB
ITEM 503.1



TYPICAL RESIDENTIAL DRIVEWAY SECTION

WITH SIDEWALK SEPARATED FROM CURB
ITEM 503.1

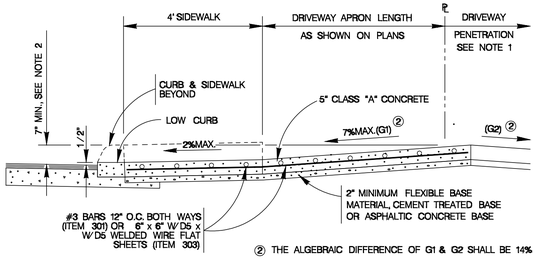
① 8% MAX. TO THE EDGE OF THE SIDEWALK IF SIDEWALK SEPARATION IS 4' OR GREATER.



② RESIDENTIAL : 2' MAXIMUM; COMMERCIAL: SEE PLAN VIEW

CURB PROFILE AT DRIVEWAY

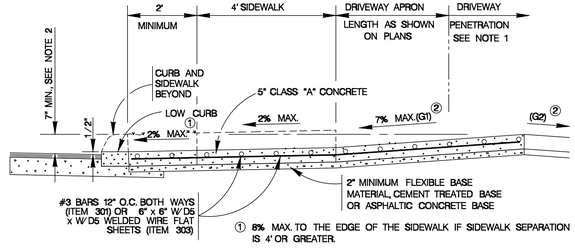
WITH SIDEWALK ABUTTING CURB



② THE ALGEBRAIC DIFFERENCE OF G1 & G2 SHALL BE 14% OR LESS

TYPICAL RESIDENTIAL DRIVEWAY SECTION

WHERE PROPERTY IS LOWER THAN STREET & SIDEWALK IS ABUTTING CURB
ITEM 503.1

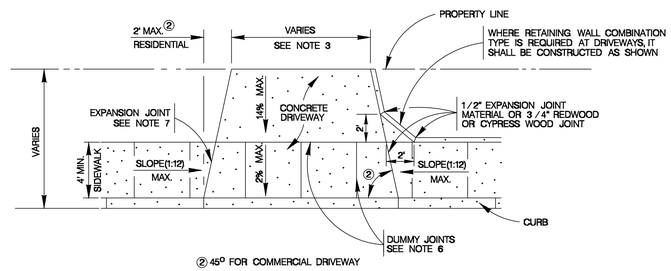


① 8% MAX. TO THE EDGE OF THE SIDEWALK IF SIDEWALK SEPARATION IS 4' OR GREATER.

② THE ALGEBRAIC DIFFERENCE OF G1 & G2 SHALL BE 14% OR LESS

TYPICAL RESIDENTIAL DRIVEWAY SECTION

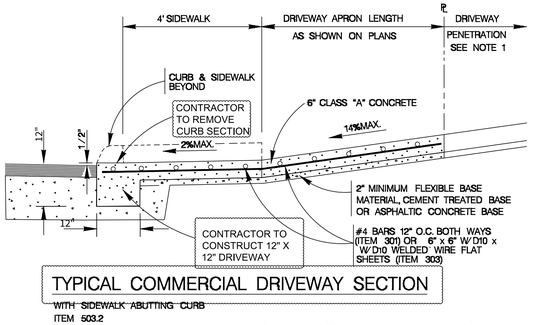
WHERE PROPERTY IS LOWER THAN STREET & SIDEWALK IS SEPARATED FROM CURB
ITEM 503.1



② 45° FOR COMMERCIAL DRIVEWAY

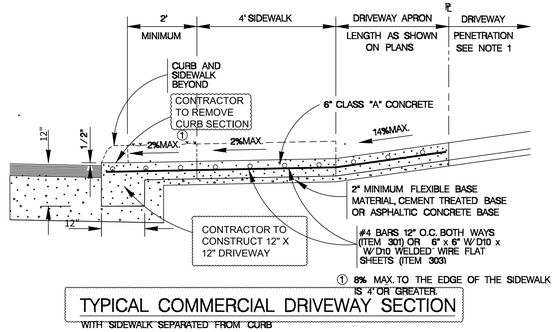
TYPICAL DRIVEWAY PLAN VIEW

WITH SIDEWALK ABUTTING CURB



TYPICAL COMMERCIAL DRIVEWAY SECTION

WITH SIDEWALK ABUTTING CURB
ITEM 503.2



① 8% MAX. TO THE EDGE OF THE SIDEWALK IF SIDEWALK SEPARATION IS 4' OR GREATER.

TYPICAL COMMERCIAL DRIVEWAY SECTION

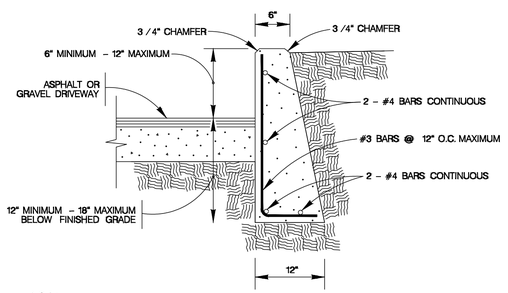
WITH SIDEWALK SEPARATED FROM CURB
ITEM 503.2

CONCRETE DRIVEWAY NOTES

1. DRIVEWAY PENETRATION REFERS TO A PORTION OF THE DRIVEWAY THAT MAY BE NECESSARY TO RECONSTRUCT WITHIN PRIVATE PROPERTY TO COMPLY WITH A MAXIMUM DRIVEWAY SLOPE. THIS PORTION OF THE DRIVEWAY SHALL BE PAID FOR UNDER THE FOLLOWING ITEMS AS MAY APPLY:
   A.) CONCRETE DRIVEWAY PAID FOR UNDER ITEM NO. 503.1 OR 503.2.
   B.) ASPHALTIC CONCRETE DRIVEWAY PAID FOR UNDER ITEM NO. 503.4 AND SHALL INCLUDE A MINIMUM OF 1" ASPHALT TYPE 'D' & 6" FLEXIBLE BASE
   C.) GRAVEL DRIVEWAY PAID FOR UNDER ITEM NO. 503.5 AND SHALL INCLUDE A MINIMUM OF 6" FLEXIBLE BASE
2. 7" MINIMUM HEIGHT WILL NOT NECESSARILY OCCUR AT THE PROPERTY LINE. IT MAY OCCUR WITHIN THE RIGHT OF WAY OR WITHIN THE DRIVEWAY PENETRATION ON PRIVATE PROPERTY.
3. THE PROPOSED DRIVEWAY SHOULD MATCH THE EXISTING WIDTH AT THE PROPERTY LINE BUT UNLESS AUTHORIZED BY THE CITY TRAFFIC ENGINEER, THE WIDTH SHALL BE WITHIN THE FOLLOWING VALUES:

TYPE	MINIMUM	MAXIMUM
RESIDENTIAL	10'	20'
COMMERCIAL – ONE WAY	12'	20'
COMMERCIAL – TWO WAY	24'	30'

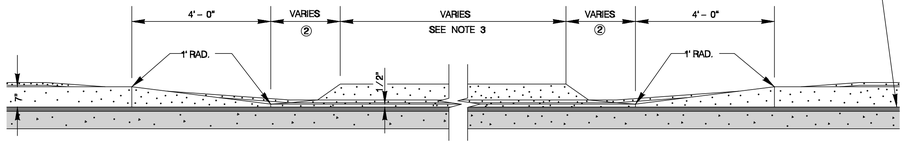
4. FOR LOCAL TYPE "A" STREETS, SIDEWALK SHALL HAVE A MINIMUM WIDTH OF 4' AND IF SEPARATED FROM THE CURB, THE SIDEWALK SHALL BE LOCATED A MINIMUM OF 3' FROM THE BACK OF CURB.
5. FOR OTHER THAN LOCAL TYPE "A" STREETS, THE SIDEWALK SHALL HAVE A MINIMUM WIDTH OF 4' AND SEPARATED A MINIMUM OF 3' FROM THE BACK OF CURB OR, AS AN OPTION, THE SIDEWALK SHALL HAVE A MINIMUM WIDTH OF 6' WHEN LOCATED AT THE BACK OF CURB.
6. DUMMY JOINTS PARALLEL TO THE CURB SHALL BE PLACED WHERE THE SIDEWALK MEETS THE DRIVEWAY. DUMMY JOINTS PERPENDICULAR TO THE CURB, AND WITHIN THE BOUNDARIES OF THE PARALLEL DUMMY JOINTS, SHALL BE PLACED AT INTERVALS EQUAL TO THE WIDTH OF THE SIDEWALK.
7. A MINIMUM OF TWO ROUND AND SMOOTH DOWEL BARS 3/8" IN DIAMETER AND 18" IN LENGTH SHALL BE SPACED 18" APART AT EACH EXPANSION JOINT.
8. SIDEWALK RAMP LENGTHS SHALL BE OF SUFFICIENT LENGTH TO MAINTAIN 8.33% (1:12) MAXIMUM SLOPE. WHERE SIDEWALKS CROSS DRIVEWAYS, SIDEWALK CROSS SLOPE SHALL NOT EXCEED 2%.
9. SIDEWALK RAMP SURFACE SHALL BE BRUSH FINISHED.



NOTE:
1. COST OF REINFORCEMENT TO BE INCLUDED IN UNIT COST OF ITEM 307.1.
2. CONCRETE RETAINING WALL COMBINATION TYPE SHALL BE USED FOR CONCRETE DRIVEWAYS.

DRIVEWAY – CONCRETE RETAINING WALL

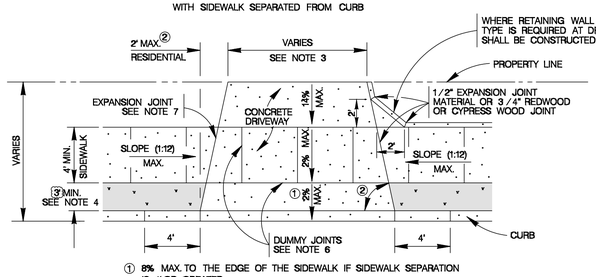
ON COMPACTED SUBGRADE
ITEM 307.1



② RESIDENTIAL : 2' MAXIMUM; COMMERCIAL: SEE PLAN VIEW

CURB PROFILE AT DRIVEWAY

WITH SIDEWALK SEPARATED FROM CURB



① 8% MAX. TO THE EDGE OF THE SIDEWALK IF SIDEWALK SEPARATION IS 4' OR GREATER.

② 45° FOR COMMERCIAL DRIVEWAY

TYPICAL DRIVEWAY PLAN VIEW

WITH SIDEWALK SEPARATED FROM CURB

MAY 2009

CITY OF SAN ANTONIO
CAPITAL IMPROVEMENTS MANAGEMENT SERVICES DEPARTMENT

CONCRETE DRIVEWAY STANDARDS

____% SUBMITTAL	PROJECT NO.:____	DATE:____
DRWN. BY: V. VASQUEZ	DSGN. BY:____	CHKD. BY: R.S. HOSSEINI, P.E.	SHEET NO.:____OF____

CUDEENGINEERS.COM
CUDE ENGINEERS
4122 Pond Hill Road, Suite 101
San Antonio, Texas 78231
P:(210) 681.2951 F: (210) 523.7112

HICKORY RIDGE UNIT 3A

TYPICAL CONCRETE DRIVEWAY DETAILS

DATE
11/12/2025
PROJECT NO.
03278.101
DRAWN BY
RC/JG/JRR/MOH/MAS
CHECKED BY
CJC/KMH

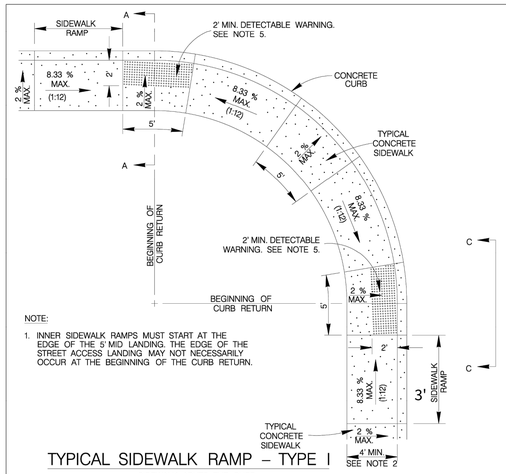
REVISIONS
1. 2. 3. 4. 5. 6. 7. 8.

STATE OF TEXAS
KYLE M. HUDEK
138753
LICENSED
PROFESSIONAL ENGINEER
11/18/2025
CUDE ENGINEERS
TBPELS No. 10048500

C13

P:\03278\101\2-drawings\cad\3A\TYPICAL CONCRETE DRIVEWAY DETAILS.dwg 2025-11-12 2:22pm jflores

REPRODUCTION OF THE ORIGINAL SIGNED AND SEALED PLAN AND/OR ELECTRONIC MEDIA MAY HAVE BEEN INADVERTENTLY ALTERED. CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE SCALE OF THE DOCUMENT AND CONTACTING CUDE ENGINEERS TO VERIFY DISCREPANCIES PRIOR TO CONSTRUCTION.



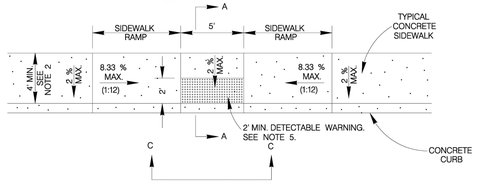
NOTE:

1. INNER SIDEWALK RAMPS MUST START AT THE EDGE OF THE 5' MID LANDING. THE EDGE OF THE STREET ACCESS LANDING MAY NOT NECESSARILY OCCUR AT THE BEGINNING OF THE CURB RETURN.

TYPICAL SIDEWALK RAMP – TYPE I

SIDEWALK ABUTS THE CURB

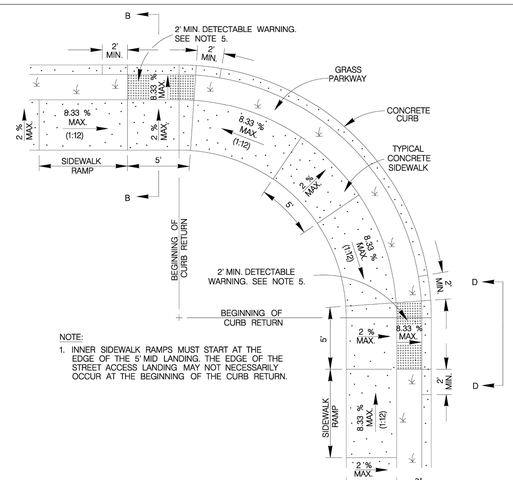
SCALE : 1" = 10'



TYPICAL SIDEWALK RAMP – TYPE II

USED AT TEE INTERSECTIONS WHERE SIDEWALK ABUTS CURB

SCALE : 1" = 10'



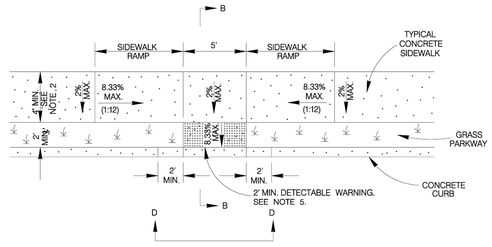
NOTE:

1. INNER SIDEWALK RAMPS MUST START AT THE EDGE OF THE 5' MID LANDING. THE EDGE OF THE STREET ACCESS LANDING MAY NOT NECESSARILY OCCUR AT THE BEGINNING OF THE CURB RETURN.

TYPICAL SIDEWALK RAMP – TYPE III

SIDEWALK SEPARATED FROM CURB

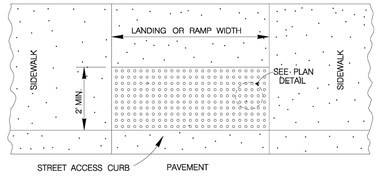
SCALE : 1" = 10'



TYPICAL SIDEWALK RAMP – TYPE IV

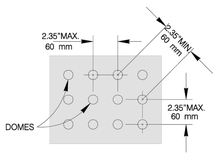
USED AT TEE INTERSECTIONS WHERE SIDEWALK IS SEPARATED FROM CURB

SCALE : 1" = 10'



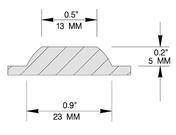
DETECTABLE WARNING SURFACE

SCALE : 1" = 4'



PLAN DETAIL

NO SCALE

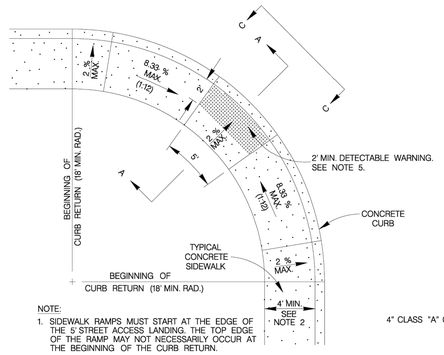


DOME SECTION

NO SCALE

NOTE:

STAMPED CONCRETE TRUNCATED DOMES WILL NOT BE ALLOWED TO BE USED FOR DETECTABLE WARNING ON WHEELCHAIR RAMPS. CONTRACTOR MUST SUBMIT TRUNCATED DOME INFORMATION THAT IS TO BE USED ON WHEELCHAIR RAMPS TO THE PROJECT MANAGER FOR APPROVAL AT LEAST 30 DAYS PRIOR TO INSTALLATION.



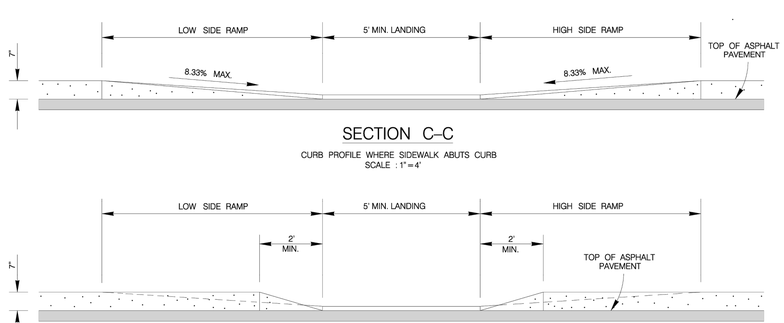
NOTE:

1. SIDEWALK RAMPS MUST START AT THE EDGE OF THE 5' STREET ACCESS LANDING. THE TOP EDGE OF THE RAMP MAY NOT NECESSARILY OCCUR AT THE BEGINNING OF THE CURB RETURN.
2. TYPE V RAMPS MUST HAVE 18' MIN. RADIUS.

TYPICAL SIDEWALK RAMP – TYPE V

SIDEWALK ABUTS CURB

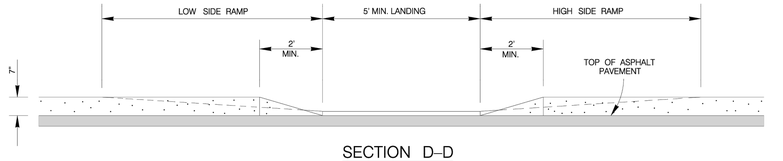
SCALE : 1" = 10'



SECTION C–C

CURB PROFILE WHERE SIDEWALK ABUTS CURB

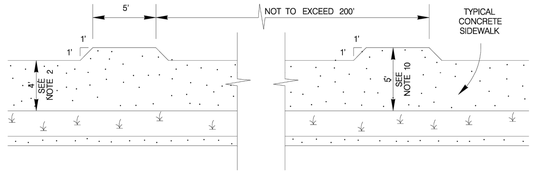
SCALE : 1" = 4'



SECTION D–D

CURB PROFILE WHERE SIDEWALK IS SEPARATED FROM CURB

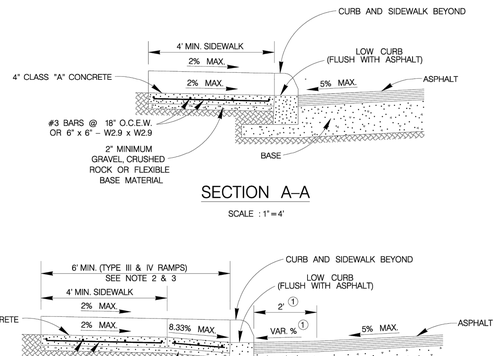
SCALE : 1" = 4'



SIDEWALK PASSING SPACE

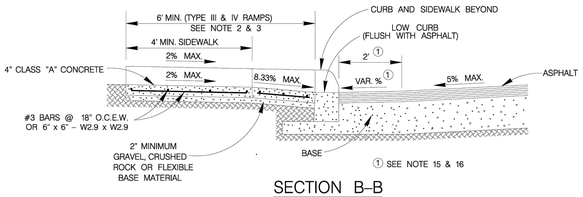
SCALE : 1" = 10'

TABLE 1 (SEE NOTE 4)		
GUTTER SLOPE	SIDEWALK RAMP LENGTH (1:12)	
	LOW SIDE	HIGH SIDE
1%	5'–6"	7'–2"
2%	5'–0"	8'–4"
3%	4'–6"	10'–0"
4%	4'–2"	12'–6"
5%	3'–10"	16'–8"



SECTION A–A

SCALE : 1" = 4'



SECTION B–B

SCALE : 1" = 4'

GENERAL NOTES

1. WHEN POSSIBLE SIDEWALKS SHOULD BE PLACED NEXT TO THE PROPERTY LINE, ALLOWING A MININMUM OF 1 FOOT BUFFER. DEVIATION OF THE PATHWAY FROM A STRAIGHT LINE IS ENCOURAGED TO AVOID TREES OR OTHER OBSTRUCTIONS.
2. FOR LOCAL TYPE "A" STREETS, SIDEWALKS SHALL HAVE A MINIMUM UNOBSTRUCTED WIDTH OF 4' AND IF SEPARATED FROM THE CURB, THE SIDEWALK SHALL BE LOCATED A MINIMUM OF 2' FROM THE BACK OF CURB.
3. FOR OTHER THAN LOCAL TYPE "A" STREETS, SIDEWALKS SHALL HAVE A MINIMUM UNOBSTRUCTED WIDTH OF 4' AND SEPARATED A MINIMUM OF 2' FROM THE BACK OF CURB OR AS AN OPTION, THE SIDEWALK SHALL HAVE A MINIMUM WIDTH OF 6' WHEN LOCATED AT THE BACK OF CURB.
4. SIDEWALK RAMP LENGTHS PRESENTED IN TABLE 1 ARE GUIDELINES ONLY. SIDEWALK RAMP LENGTHS SHALL BE OF SUFFICIENT LENGTH TO MAINTAIN 8.33% (1:12) MAXIMUM SLOPE.
5. ALL CURB-RAMPS OR LANDINGS ABUTTING THE CROSSWALK SHALL HAVE A DETECTABLE WARNING 24 INCHES DEEP (IN THE DIRECTION OF PEDESTRIAN TRAVEL) AND EXTENDING THE FULL WIDTH OF THE CURB RAMP OR LANDING. THE DETECTABLE WARNING SHALL CONSIST OF RAISED TRUNCATED DOMES, ALIGNED IN A GRID PATTERN WITH A DIAMETER OF A NOMINAL 0.9 INCHES (23 MM), A HEIGHT OF NOMINAL 0.2 INCHES (5 MM) AND A CENTER-TO-CENTER SPACING OF NOMINAL 2.35 INCHES (60 MM). THE DETECTABLE WARNING SURFACE SHALL BE A CAST-IN-PLACE TILE CONFORMING TO THE CITY OF SAN ANTONIO STANDARD SPECIFICATIONS OR PAVERS CONFORMING TO TXDOT STANDARD PED-05, PEDESTRIAN FACILITIES.
6. DETECTABLE WARNINGS SHALL CONTRAST VISUALLY WITH ADJOINING SURFACES, EITHER LIGHT-ON-DARK, OR DARK-ON-LIGHT. THE MATERIAL USED TO PROVIDE CONTRAST SHALL BE AN INTEGRAL PART OF THE WALKING SURFACE.
7. SIDEWALK RAMP TYPE V SHALL BE USED ONLY WHERE THERE IS SIGNIFICANT RESTRICTION WITHIN THE PARKWAY TO CONSTRUCT TYPE I OR TYPE III RAMPS.
8. CONSTRUCTION OF ALL WHEELCHAIR RAMPS TO BE INCLUDED UNDER ITEMS "500 – CONCRETE CURB, GUTTER, AND CONCRETE CURB AND GUTTER" AND / OR "502 – CONCRETE SIDEWALKS". RAMP SURFACE SHALL BE BRUSH FINISHED.
9. THESE DETAILS ARE FOR REFERENCE ONLY. ACTUAL LOCATIONS OF WHEELCHAIR RAMPS TO BE SHOWN ON CONSTRUCTION PLANS. CITY CONSTRUCTION INSPECTOR CAN ADJUST LOCATIONS FOR SAFETY OR UTILITY CLEARANCE.
10. SIDEWALKS LESS THAN 5 FEET IN WIDTH SHALL BE PROVIDED WITH A PASSING SPACE AT A MAXIMUM SPACING OF 200 FEET.
11. WHEELCHAIR RAMP SHALL BE CONSTRUCTED WITH 4" CLASS "A" CONCRETE AND 2" MINIMUM GRAVEL, CRUSHED ROCK OR FLEXIBLE BASE MATERIAL.
12. REINFORCING STEEL SHALL BE #3 BARS AT 18" O.C.E.W. OR 6" x 6" – W2.9 x W2.9 WIRE MESH.
13. SIDEWALK GRADES SHALL NOT EXCEED THE GRADE ESTABLISHED FOR THE ADJACENT ROADWAY, ANY SIDEWALK CONSTRUCTION THAT DEVIATES FROM THE NATURAL GRADE OF THE ROADWAY TO CREATE A GRADE STEEPER THAN THE EXISTING ROADWAY WILL REQUIRE RAMPS, HANDRAILS AND RESTING PLATFORMS TO BE CONSTRUCTED IN ACCORDANCE WITH ADA AND TAS STANDARDS.
14. SIDEWALK CROSS GRADE SHALL HAVE A MAXIMUM SLOPE OF 2%. LANDINGS SHALL HAVE A MAXIMUM SLOPE OF 2% IN ANY DIRECTION.
15. THE CHANGE OF GRADE BETWEEN ADJACENT SURFACES SHALL BE LESS THAN 11%. THE CHANGE OF GRADE SHALL BE DEFINED AS THE ALGEBRAIC DIFFERENCE OF THE ADJACENT SURFACE SLOPES. IN THE CASE OF A STREET ACCESS RAMP DESIGNED AT THE 8.33% MAXIMUM SLOPE, THE ADJACENT PAVEMENT CROSS SLOPE SHALL BE LESS THAN 2.67% (I.E. 8.33–(–2.67) = 11). IN ADDITION, THE ADJACENT PAVEMENT CROSS SLOPE SHALL BE LESS THAN OR EQUAL TO 5%.
16. IF THE CHANGE OF GRADE BETWEEN ADJACENT SURFACES IS GREATER THAN OR EQUAL TO 11%, A LEVELING STRIP, 2 FEET IN LENGTH, SHALL BE PROVIDED TO TRANSITION THE ADJACENT SURFACES.
17. ADA COMPLIANCE IN ALTERATIONS INCLUDE ONLY THAT WORK WITHIN THE LIMITS, BOUNDARIES OR SCOPE OF A PLANNED PROJECT.

MAY 2009

CITY OF SAN ANTONIO

CAPITAL IMPROVEMENTS MANAGEMENT SERVICES DEPARTMENT

WHEELCHAIR RAMP STANDARDS

_____% SUBMITTAL	PROJECT NO.:_____	DATE:_____
DRWN. BY: V. VASQUEZ	DSGN. BY:_____	CHKD. BY: R.S. HOSSEINI, P.E.	SHEET NO.:____OF____

CUDEENGINEERS.COM

4122 Pond Hill Road, Suite 101
San Antonio, Texas 78231
P:(210) 681.2951 F: (210) 523.7112

HICKORY RIDGE UNIT 3A

WHEELCHAIR RAMPS STANDARDS

DATE
11/12/2025

PROJECT NO.
03278.101

DRAWN BY
RC/JG/JRR/MOH/MAS

CHECKED BY
CJC/KMH

REVISIONS
1. 2. 3. 4. 5. 6. 7. 8.

STATE OF TEXAS
KYLE M. HUDEK
138753
LICENSED
PROFESSIONAL ENGINEER
11/18/2025

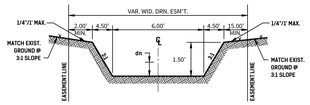
CUDE ENGINEERS
TBPELS No. 10048500

C14

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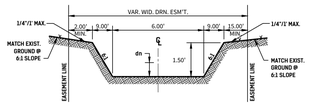
REPRODUCTION OF THE ORIGINAL SIGNED AND SEALED PLAN AND/OR ELECTRONIC MEDIA MAY HAVE BEEN INADVERTENTLY ALTERED. CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE SCALE OF THE DOCUMENT AND CONTACTING CUDE ENGINEERS TO VERIFY DISCREPANCIES PRIOR TO CONSTRUCTION.

DRAIN "3A-2" HYDRAULIC SUMMARY		
SECTION	A-A	B-B
STATION	10+24.92 - 12+40.00	12+60.00 - 12+99.00	12+45.00 - 12+55.00
Q_{25} (cfs)	6.57	6.57	6.57
n	0.035	0.035	0.035
S (%)	0.50	0.50	0.50
D (ft)	1.50	1.50	1.50
d_n (ft)	0.52	0.52	0.49
V (fps)	1.67	1.67	1.50
Bw (ft)	6	6	6



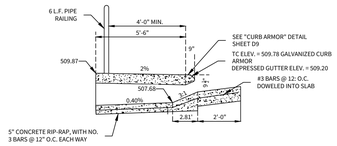
DRAIN "A-A" SECTION

(N.T.S.)



DRAIN "B-B" SECTION

(N.T.S.)



DRAIN 3A-2 SECTION "D-D"
SIDEWALK BOX DETAIL SECTION

(N.T.S.)

NOTES:

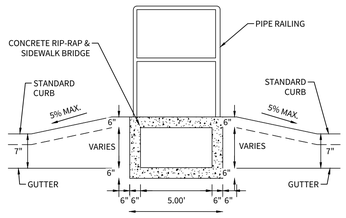
1. **ALL CONCRETE LINING SHALL DEVELOP A MINIMUM COMPRESSIVE STRENGTH OF NOT LESS THAN 3000 PSI IN 28 DAYS.**
2. **85% OF CHANNEL SURFACE MUST HAVE ESTABLISHED VEGETATION PRIOR TO ACCEPTANCE OF THE CHANNEL BY THE CITY OF ELMENDORF. HYDROMULCH PAY ITEM TO INCLUDE SOIL, SEEDING, OR SODDING & WATERING FOR THE TIME PERIOD NEEDED TO ACHIEVE 85% VEGETATION.**
3. **REFERENCE TYPICAL CONCRETE CHANNEL RIP-RAP STANDARDS FOUND ON SHEET C17.**

LEGEND:

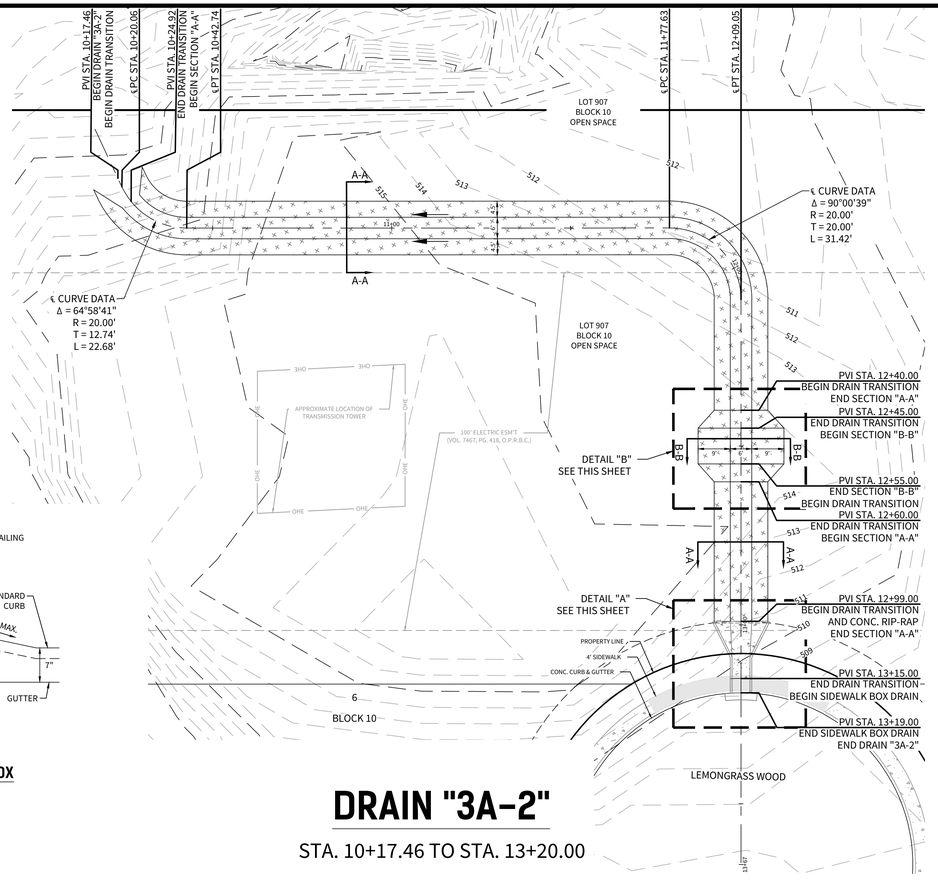
DEVELOPER RESPONSIBILITY SIDEWALK

PROPOSED DRAIN REVEGETATION

PROPOSED CONCRETE RIP-RAP

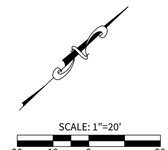


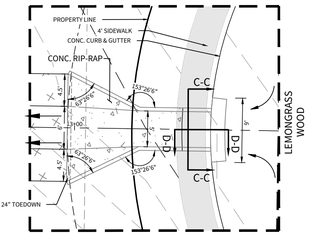
DRAIN 3A-2
SECTION "C-C" THRU SIDEWALK BOX



DRAIN "3A-2"

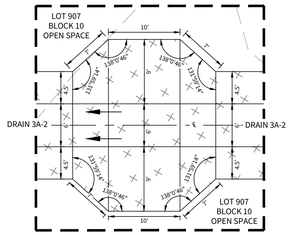
STA. 10+17.46 TO STA. 13+20.00





DETAIL "A"

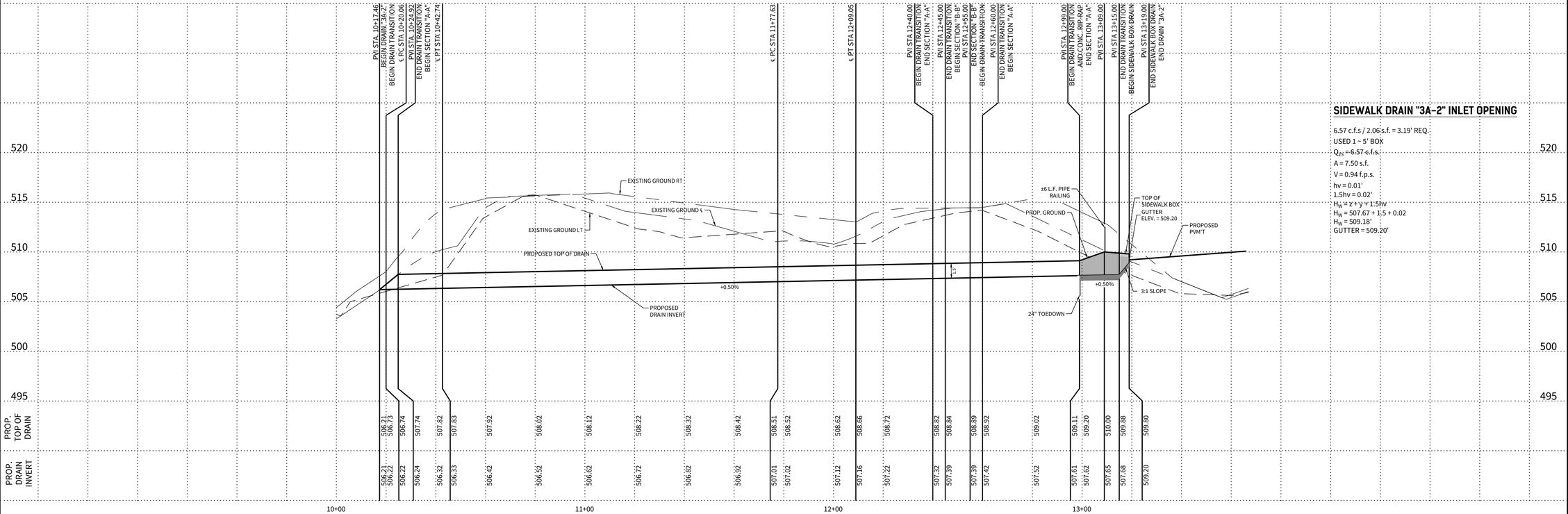
SCALE: 1" = 10'



DETAIL "B"

SCALE: 1" = 10'

HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 5'



SIDEWALK DRAIN "3A-2" INLET OPENING

6.57 c.f.s / 2.06 s.f. = 3.19' REQ.
USED 1 ~ 5' BOX
Q_{25} = 6.57 c.f.s.
A = 7.50 s.f.
V = 0.94 f.p.s.
hv = 0.01'
1.5hv = 0.02'
$H_W = z + y + 1.5hv$
H_W = 507.67 + 1.5 + 0.02
H_W = 509.18'
GUTTER = 509.20'

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HICKORY RIDGE UNIT 3A

DRAINAGE PLAN & PROFILE - DRAIN "3A-2"

DATE
11/14/2025

PROJECT NO.
03278.101

DRAWN BY
RC/JG/JRR/MOH/MAS

CHECKED BY
CJC/KMH

REVISIONS
1. 2. 3. 4. 5. 6. 7. 8.

STATE OF TEXAS
KYLE M. HUDEK
138753
LICENSED
PROFESSIONAL ENGINEER
11/18/2025

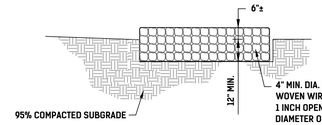
CUDE ENGINEERS
TBPELS No. 10048500

C15

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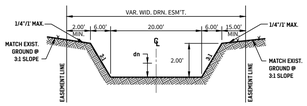
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DRAIN "3A-3" HYDRAULIC SUMMARY	
SECTION	A-A
STATION	11+14.69 - 12+05.46
Q_{25} (cfs)	127.10
n	0.035
S (%)	0.59
D (ft)	2.00
d_n (ft)	1.42
V (fps)	3.69
Bw (ft)	20



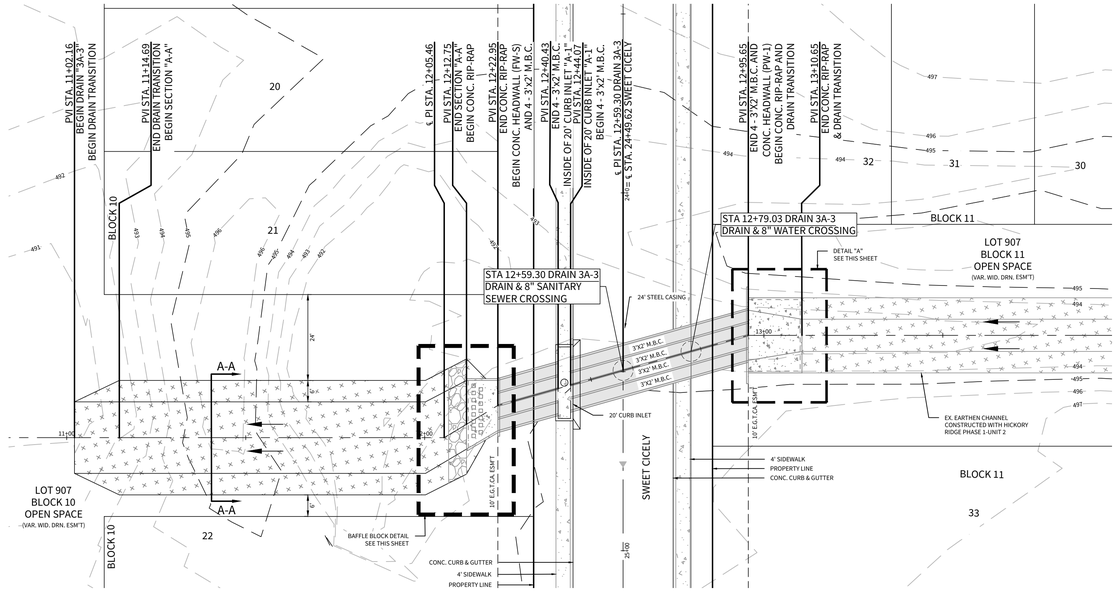
NOTE: GABION MATTRESS TO BE FREE OF GEO-TEXTILE FABRIC LINING.

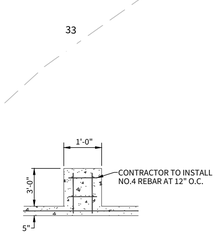
GABION MATTRESS DETAIL (N.T.S.)



DRAIN "A-A" SECTION

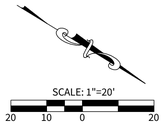
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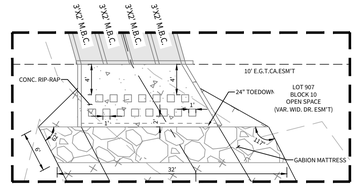




BAFFLE BLOCK DRAIN "3A-3" REINFORCEMENT DETAIL

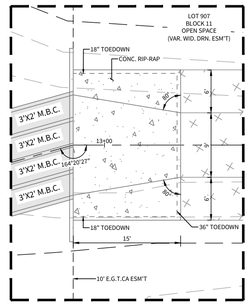
(N.T.S.)





BAFFLE BLOCK DETAIL

SCALE: 1" = 10'



DETAIL "A"

SCALE: 1" = 10'

NOTES:

1. ALL CONCRETE LINING SHALL DEVELOP A MINIMUM COMPRESSIVE STRENGTH OF NOT LESS THAN 3000 PSI IN 28 DAYS.
2. 85% OF CHANNEL SURFACE MUST HAVE ESTABLISHED VEGETATION PRIOR TO ACCEPTANCE OF THE CHANNEL BY THE CITY OF ELMENDORF. HYDROMULCH PAY ITEM TO INCLUDE SOIL, SEEDING, OR SODDING & WATERING FOR THE TIME PERIOD NEEDED TO ACHIEVE 85% VEGETATION.
3. REFERENCE TYPICAL CONCRETE CHANNEL RIP-RAP STANDARDS FOUND ON SHEET C17.

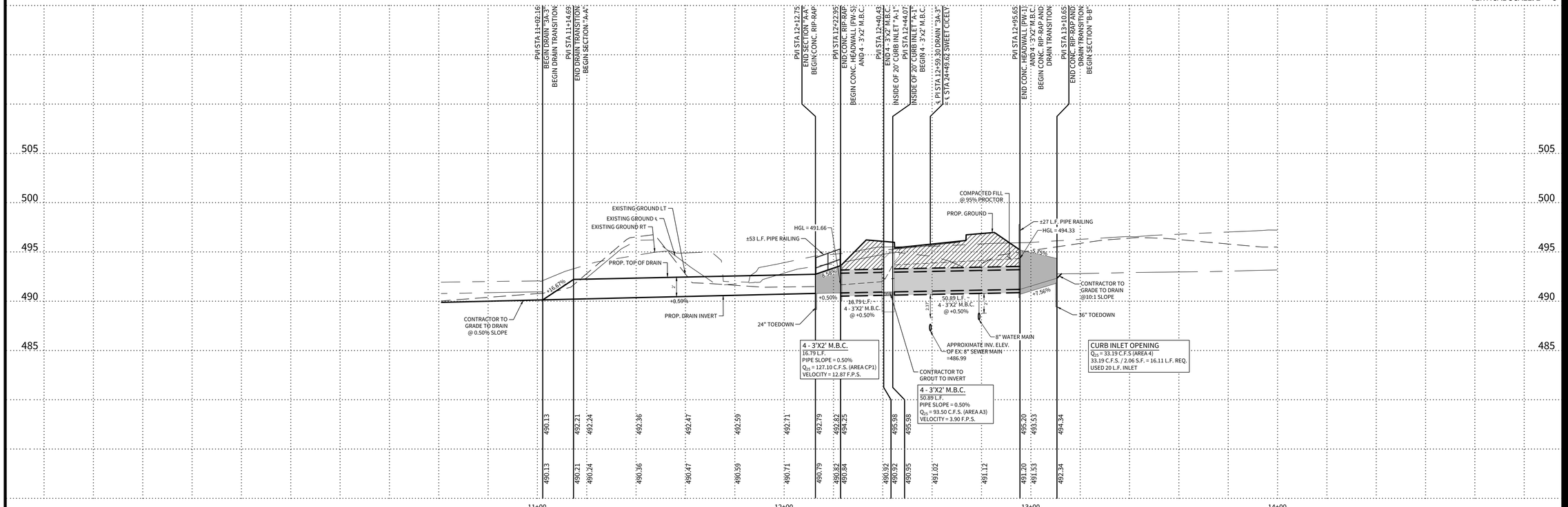
LEGEND:

- PROPOSED DRAIN REVEGETATION
- PROPOSED CONCRETE RIP-RAP
- PROPOSED ROCK GABION MATTRESS
- DEVELOPER RESPONSIBILITY SIDEWALK

DRAIN 3A-3

STA. 11+02.16 TO 14+00.00

VERTICAL SCALE: 1" = 5'



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HICKORY RIDGE UNIT 3A

DRAINAGE PLAN & PROFILE - DRAIN "3A-3"

DATE
11/14/2025

PROJECT NO.
03278.101

DRAWN BY
RC/JG/JRR/MOH/MAS

CHECKED BY
CJC/KMH

REVISIONS
1. 2. 3. 4. 5. 6. 7. 8.

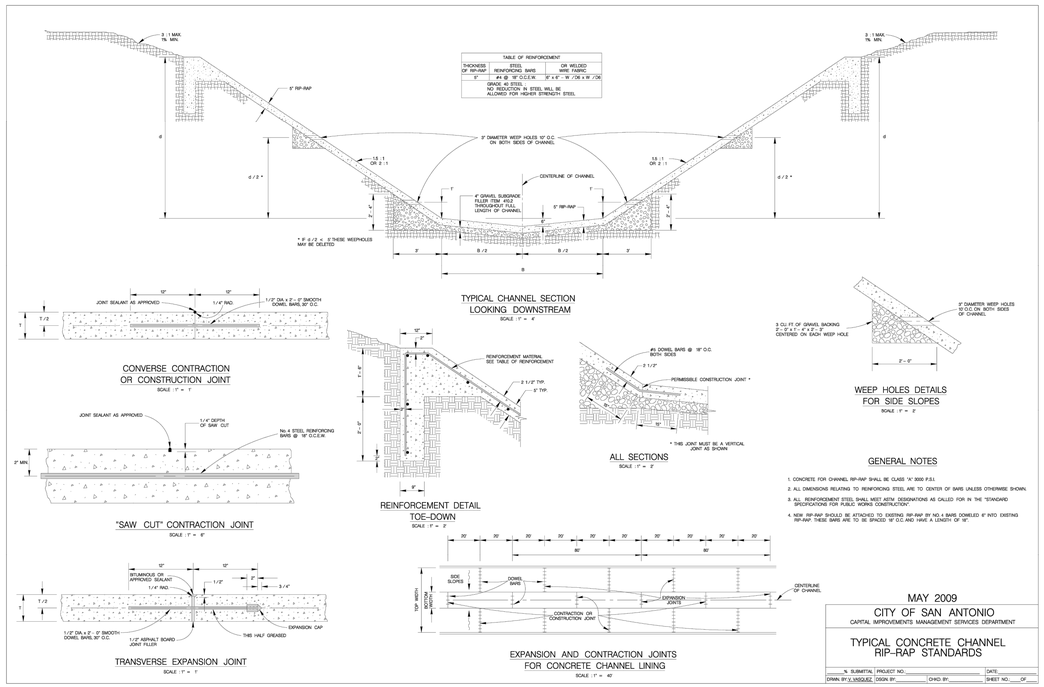
STATE OF TEXAS
KYLE M. HUDEK
138753
LICENSED
PROFESSIONAL ENGINEER
11/18/2025

CUDE ENGINEERS
TBPELS No. 10048500

C16

REPRODUCTION OF THE ORIGINAL SIGNED AND SEALED PLAN AND/OR ELECTRONIC MEDIA MAY HAVE BEEN INADVERTENTLY ALTERED. CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE SCALE OF THE DOCUMENT AND CONTACTING CUDE ENGINEERS TO VERIFY DISCREPANCIES PRIOR TO CONSTRUCTION.

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TYPICAL CHANNEL SECTION
LOOKING DOWNSTREAM
SCALE : 1" = 4'

TABLE OF REINFORCEMENT		
THICKNESS OF RIP-RAP	STEEL REINFORCING BARS	OR WELDED WIRE FABRIC
5"	#4 @ 18" O.C.E.W.	6" x 6" - W /06 x W /06
GRADE 40 STEEL NO REDUCTION IN STEEL WILL BE ALLOWED FOR HIGHER STRENGTH STEEL		

CONVERSE CONTRACTION
OR CONSTRUCTION JOINT
SCALE : 1" = 1'

"SAW CUT" CONTRACTION JOINT
SCALE : 1" = 4"

TRANSVERSE EXPANSION JOINT
SCALE : 1" = 1'

REINFORCEMENT DETAIL
TOE-DOWN
SCALE : 1" = 2'

ALL SECTIONS
SCALE : 1" = 2'

WEEP HOLES DETAILS
FOR SIDE SLOPES
SCALE : 1" = 2'

EXPANSION AND CONTRACTION JOINTS
FOR CONCRETE CHANNEL LINING
SCALE : 1" = 40'

GENERAL NOTES

1. CONCRETE FOR CHANNEL RIP-RAP SHALL BE CLASS "A" 3000 P.S.I.
2. ALL DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS UNLESS OTHERWISE SHOWN.
3. ALL REINFORCEMENT STEEL SHALL MEET ASTM DESIGNATIONS AS CALLED FOR IN THE "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION."
4. NEW RIP-RAP SHOULD BE ATTACHED TO EXISTING RIP-RAP BY NO. 4 BARS, DOWELED 6" INTO EXISTING RIP-RAP. THESE BARS ARE TO BE SPACED 18" O.C. AND HAVE A LENGTH OF "W".

MAY 2009
CITY OF SAN ANTONIO
CAPITAL IMPROVEMENTS MANAGEMENT SERVICES DEPARTMENT

TYPICAL CONCRETE CHANNEL
RIP-RAP STANDARDS

_% SUBMITTAL PROJECT NO.: _____ DATE: _____
DRAWN BY: V. VASQUEZ DESIGN BY: _____ CHKD. BY: _____ SHEET NO.: ___OF___

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DATE: 2/2021

TABLE OF DIMENSIONS & REINFORCING STEEL
(Wings for One Structure End)

Dimensions					Variable Reinforcing				Estimated Quantities per Ft of Wing Length (2-Wings)		Estimated Quantities per Ft of Toewall (1-Toewall)	
					Bars J1		Bars J2					
Maximum Wingwall Height Hw	W	X	Y	Z	Size	Spa	Size	Spa	Reinf (LB/FT)	Conc (CY/FT)	Reinf (LB/FT)	Conc (CY/FT)
2'-6"	2'-10"	10"	1'- 0"	7"	#4	1'-0"	#4	1'-0"	48.64	0.406	6.85	0.071
2'-9"	2'-10"	10"	1'- 0"	7"	#4	1'-0"	#4	1'-0"	49.31	0.424	6.85	0.071
3'-0"	2'-10"	10"	1'- 0"	7"	#4	1'-0"	#4	1'-0"	49.98	0.444	6.85	0.071
3'-3"	2'-10"	10"	1'- 0"	7"	#4	1'-0"	#4	1'-0"	53.32	0.462	6.85	0.071
3'-6"	2'-10"	10"	1'- 0"	7"	#4	1'-0"	#4	1'-0"	53.98	0.480	6.85	0.071
4'-0"	3'- 2"	1'- 2"	1'- 0"	7"	#4	1'-0"	#4	1'-0"	55.77	0.532	6.85	0.071
4'-6"	3'- 2"	1'- 2"	1'- 0"	7"	#4	1'-0"	#4	1'-0"	59.77	0.568	6.85	0.071
5'-0"	3'- 9"	1'- 7"	1'- 2"	7"	#4	1'-0"	#4	1'-0"	63.45	0.632	6.96	0.075
5'-6"	3'- 9"	1'- 7"	1'- 2"	7"	#4	1'-0"	#4	1'-0"	67.46	0.668	6.96	0.075
6'-0"	4'- 4"	2'- 0"	1'- 4"	7"	#5	1'-0"	#5	1'-0"	80.67	0.730	7.07	0.078
6'-6"	4'- 4"	2'- 0"	1'- 4"	7"	#5	1'-0"	#5	1'-0"	85.05	0.768	7.07	0.078
7'-0"	5'- 0"	2'- 3"	1'- 9"	8"	#5	1'-0"	#5	1'-0"	92.15	0.864	8.07	0.093
7'-6"	5'- 0"	2'- 3"	1'- 9"	8"	#5	1'-0"	#5	1'-0"	96.54	0.902	8.07	0.093
8'-0"	5'- 6"	2'- 8"	1'-10"	8"	#5	6"	#5	6"	139.04	0.962	8.13	0.095
8'-6"	5'- 6"	2'- 8"	1'-10"	8"	#5	6"	#5	6"	144.47	1.000	8.13	0.095
9'-6"	6'- 0"	2'-10"	2'- 2"	9"	#5	6"	#5	6"	156.93	1.136	8.41	0.110
10'-6"	6'- 5"	3'- 2"	2'- 5"	9"	#6	6"	#5	6"	196.27	1.234	8.57	0.117
11'-6"	7'- 2"	3'- 6"	2'- 8"	11"	#6	6"	#6	6"	230.13	1.438	9.52	0.140
12'-6"	7'- 8"	3'- 9"	2'-11"	1'- 0"	#7	6"	#6	6"	283.41	1.592	9.74	0.157
13'-6"	8'- 2"	4'- 0"	3'- 2"	1'- 2"	#8	6"	#6	6"	348.72	1.804	10.02	0.186
14'-6"	8'-10"	4'- 5"	3'- 5"	1'- 4"	#9	6"	#6	6"	432.94	2.046	10.30	0.218
15'-6"	9'- 6"	4'-10"	3'- 8"	1'- 6"	#9	6"	#7	6"	489.52	2.302	11.24	0.253
16'-0"	9'-11"	5'- 0"	3'-11"	1'- 7"	#9	6"	#7	6"	505.72	2.448	11.47	0.278

TABLE OF TOEWALL REINFORCING (2-Wings)

Bar	Size	No.	Spa
D1	#6	~	1'-0"
D2	#6	~	1'-0"
E1	#4	~	1'-0"
F	#4	~	1'-0"
G	#6	~	8"
M1	#4	4	~
P	#4	~	1'-0"
V	#4	~	1'-0"

TABLE OF TOEWALL REINFORCING

Bar	Size	No	Spa
M2	#4	2	~
E2	#4	~	1'-0"

BARS D1

BARS D2

BARS J1 BARS J2 BARS J3 BARS V

WING DIMENSION CALCULATIONS:

Formulas: (All values are in Feet)

Hw = H + T + C
Lw = (Hw) (SL) ÷ Cosine θ for Ty PW-1
+ (Hw + 1') (SL) ÷ Cosine θ for Ty PW-2 and Hw ≥ 4'
+ (Hw - 0.5') (SL) ÷ Cosine θ for Ty PW-2 and Hw < 4'

For Cast-in-place culverts:
Ltw = [(N) (S) + (N + 1) (U)] ÷ Cosine θ

For Precast culverts:
Ltw = [(N) (2 U + S) + (N - 1) (0.5')] ÷ Cosine θ
Total Wingwall Area (Two Wings - SF)
+ (2) (Hw) (Lw) for Ty PW-1
+ (2) (Hw) (Lw) - 6 SF for Ty PW-2 and Hw ≥ 4'
+ (2) (Hw) (Lw) - 1.5 SF for Ty PW-2 and Hw < 4'

Hw = Height of Wingwall
Lw = Length of Wingwall
Ltw = Culvert Toewall Length
N = Number of Culvert Spans
SL1 = Change in Slope ratio. (Horizontal: 1 Vertical, Usual value is 2:1)
θ = Culvert Skew

See applicable box culvert standard for S, H, T and U values.

1. Skew Angle = 0°
2. At discharge end, chamfer may be ¾".
3. For 15° Skew ~ 1"
   For 30° Skew ~ 2"
   For 45° Skew ~ 3"
4. Quantities shown are for two Type PW-1 wings. Adjust concrete volume for Type PW-2 wings. To determine estimated quantities for two wings, multiply the tabulated values by Lw. Quantities shown do not include weight of Bars D.
5. Provide weepholes for Hw = 5'-0" and greater. Fill ground weepholes with coarse gravel.
6. Extend Bars E2 1'-6" minimum into the wingwall footing.
7. Lap Bars M1 1'-6" minimum with Bars M2.
8. Bars G equally spaced at 8" maximum, place as shown. Provide at least two pair Bars G per wing.
9. 0" min to 5'-0" max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail, bicycle rail or curbs taller than 1'-0", refer to ECD standard. For structures with 16 bridge rail, refer to 16-DW standard. For structures with traffic rail, other than T6, refer to RAC standard.
10. For vehicle safety, curb heights and wall heights must be measured from finished grade to provide a minimum 3" projection above finished grade. No changes will be made in quantities and no additional compensation will be allowed for this work.
11. 1'-0" typical. 2'-0" typical when RAC standard is referenced elsewhere in the plans.
12. 3'-0" for Hw < 4'.
13. 6" for Hw < 4'.

GENERAL NOTES:

Designed in accordance with AASHTO LRFD Bridge Design Specifications.
Provide Class "C" Concrete (f'c = 3,600 psi Min) and Grade 60 reinforcing steel.
Provide 1 ½" Min clear cover to reinforcing steel.
Depth of toewalls for wingwalls and culverts may be reduced or eliminated when founded on solid rock, when directed by the Engineer.
See BCS sheet for wingwall type and additional dimensions and information.
The quantities for concrete and reinforcing steel resulting from the formulas given on this sheet are for the Contractor's information only.

DESIGNER NOTES:

Type PW-1 can be used for all applications and must be used if railing is to be mounted to the wingwall.
Type PW-2 can only be used for applications without a railing mounted to the wingwall.

Texas Department of Transportation — Bridge Division Standard

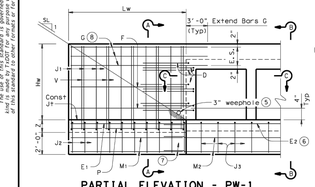
CONCRETE WINGWALLS
WITH PARALLEL WINGS FOR
BOX CULVERTS
TYPES PW-1 AND PW-2

PW

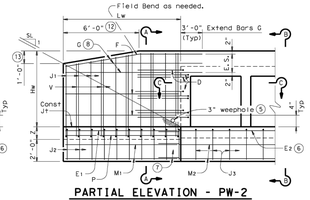
FILE: pw1to2d1.dgn	DN: CAP	CK: CAT	DW: TxDOT	CK: CAP
©TxDOT February 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS				
10-09 Reinforcing Quantities. 01-12 PW-1 & PW-2.	DIST	COUNTY		SHEET NO.

DISCLAIMER:
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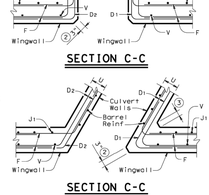
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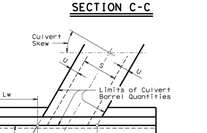
PARTIAL ELEVATION - PW-1



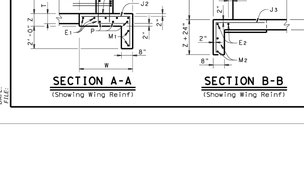
PARTIAL ELEVATION - PW-2



SECTION C-C

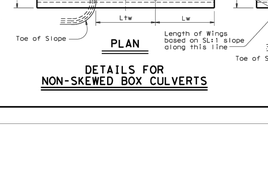


SECTION C-C



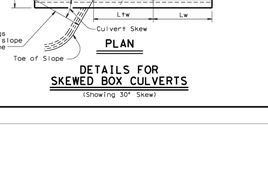
SECTION A-A (Showing Wing Reinf)

SECTION B-B (Showing Wing Reinf)



PLAN

DETAILS FOR
NON-SKEWED BOX CULVERTS



PLAN

DETAILS FOR
SKEWED BOX CULVERTS
(Showing 30° Skew)

Texas Department of Transportation — Bridge Division Standard

CONCRETE WINGWALLS
WITH PARALLEL WINGS FOR
BOX CULVERTS
TYPES PW-1 AND PW-2

PW

FILE: pw1to2d2.dgn	DN: CAP	CK: CAT	DW: TxDOT	CK: CAP
©TxDOT February 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS				
10-09 Reinforcing Quantities. 01-12 PW-1 & PW-2.	DIST	COUNTY		SHEET NO.

WING DIMENSION CALCULATIONS:

Formulas: (All values are in Feet)

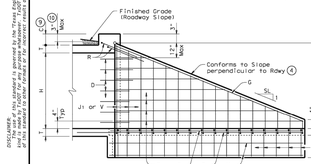
Hw = H + T + C - 0.250'
A = (Hw - 0.333') (SL)
B = (A) (Tangent (θ + 15°))
Lw = (A) ÷ (Cosine (θ + 15°))

For Cast-in-place culverts:
Ltw = [(N) (S) + (N + 1) (U)] ÷ Cosine θ

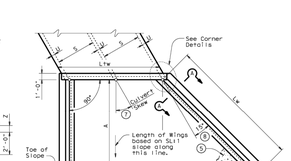
For Precast culverts:
Ltw = [(N) (2 U + S) + (N - 1) (0.5')] ÷ Cosine θ
Total Wingwall Area (Two Wings - S.F.) =
(0.5) (Hw + 0.333') (Lw + A)

Hw = Height of Wingwall
SL = Slope Ratio (Horizontal: Vertical)
A = Length of Short Wingwall
Lw = Length of Long Wingwall
Ltw = Culvert Toewall Length
N = Number of Culvert Spans
θ = Culvert Skew

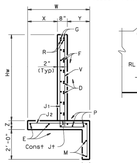
See applicable box culvert standard for H, S, T, and U values.



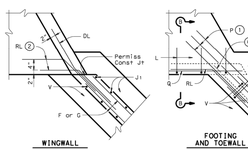
INSIDE ELEVATION
(Showing reinforcing. Culvert and Culvert Toewall reinforcing not shown for clarity.)



PLAN
(Showing dimensions and 30° Skew.)



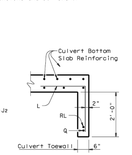
SECTION A-A



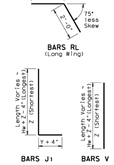
WINGWALL

CORNER DETAILS
(Culvert and Culvert Toewall reinforcing not shown for clarity.)

FOOTING AND TOEWALL



SECTION B-B



1. Extend Bars F 3'-0" minimum into bottom slab of Box Culvert.
2. Adjust to fit as necessary to maintain 1 ½" clear cover and 4" minimum between bars.
3. Quantities shown are based on an average wing height for two wings (one structure end). To determine total quantities for two wings multiply the tabulated values by 0.5 x (Hw+Lw).
4. Recommended values of Slope are: 2:1, 3:1, 4:1, & 6:1.
5. When shown elsewhere on the plans, a 5" deep concrete riprap shall be constructed. Payment for riprap shall be as required by Item 432, "Riprap". Unless otherwise shown on the plans or directed by the Engineer, the riprap shall extend 2'-0" up the slope. Where concrete toewall along end edges adjacent to natural ground, the toewall shall be reinforced by extending typical riprap reinforcing into the toewall; construction joints or grooved joints, oriented in the direction of flow, shall extend across the full distance of the riprap, at intervals of approximately 20'. When such joints are not shown on the plans, they shall be shown in SECTION B-B will not be required.
6. At Contractor's option, Culvert Toewall may be ended flush with Wingwall Toewall. Adjust reinforcing from that shown as necessary.
7. Applicable values of of Skew are: 15°, 30°, and 45°.
8. Typical wingwall angle for all skews.
9. 0" min to 5'-0" max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail, bicycle rail or curbs taller than 1'-0", refer to ECD standard. For structures with 16 bridge rail, refer to 16-DW standard. For structures with traffic rail, other than T6, refer to RAC standard.
10. For vehicle safety, curb heights and wall heights must be measured from finished grade to provide a minimum 3" projection above finished grade. No changes will be made in quantities and no additional compensation will be allowed for this work.

GENERAL NOTES:

Designed according to AASHTO LRFD Specifications.
All reinforcing steel shall be Grade 60.
Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of Mesh reinforcing in riprap concrete unless noted otherwise.
All concrete shall be Class "C" and shall have a minimum compressive strength of 3600 psi.
All reinforcing bars shall be adjusted to provide a minimum of 1 ½" clear cover.
Depth of toewalls for wingwalls and culverts may be reduced or eliminated when founded on solid rock, when directed by the Engineer.
See BCS sheet for wingwall type and additional dimensions and information.
The quantities for concrete and reinforcing steel resulting from the formulas given on this sheet are for the Contractor's information only.

CUDEENGINEERS.COM

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4122 Pond Hill Road, Suite 101
San Antonio, Texas 78231
P:(210) 681.2951 F: (210) 523.7112

HICKORY RIDGE UNIT 3A

TXDOT WINGWALL & CONC. RIP-RAP & TURF REINFORCEMENT DETAILS

DATE
11/12/2025

PROJECT NO.
03278.101

DRAWN BY
RC/JG/JRR/MOH/MAS

CHECKED BY
CJC/KMH

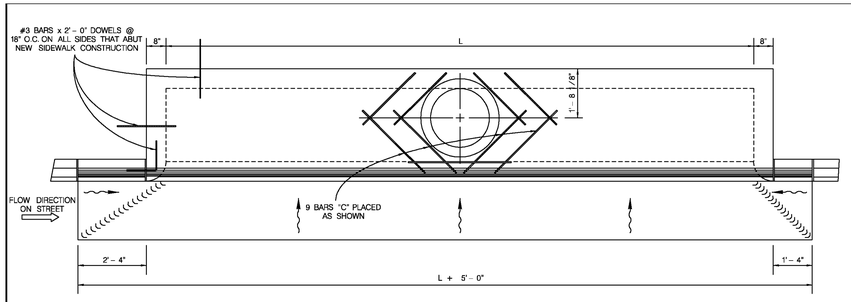
REVISIONS
1. 2. 3. 4. 5. 6. 7. 8.

STATE OF TEXAS
KYLE M. HUDEK
138753
LICENSED
PROFESSIONAL ENGINEER
11/18/2025
CUDE ENGINEERS
TBPELS No. 10048500

P:\03278.101\2-drawing\Civil\3A\04_CD-RIPP - DRAIN (F.dwg 2025-11-12 8:34am Mark

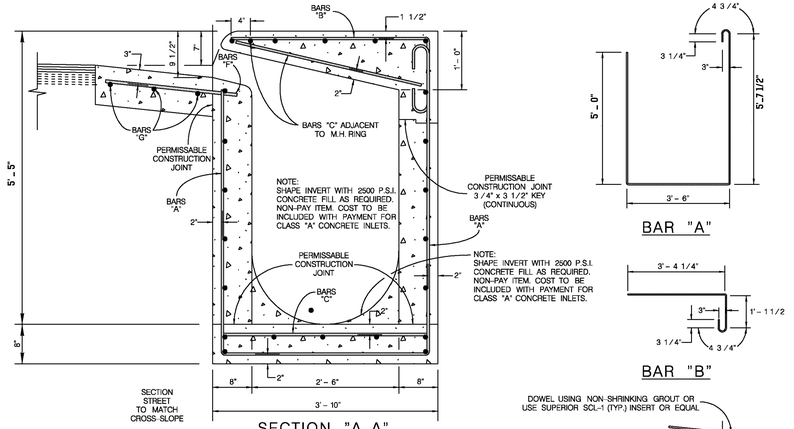
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REPRODUCTION OF THE ORIGINAL SIGNED AND SEALED PLAN AND/OR ELECTRONIC MEDIA MAY HAVE BEEN INADVERTENTLY ALTERED. CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE SCALE OF THE DOCUMENT AND CONTACTING CUDE ENGINEERS TO VERIFY DISCREPANCIES PRIOR TO CONSTRUCTION.



PLAN VIEW

SCALE : 1" = 2'

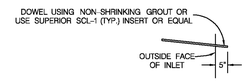


SECTION "A-A"

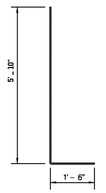
SCALE : 1" = 1'

BAR "A"

BAR "B"



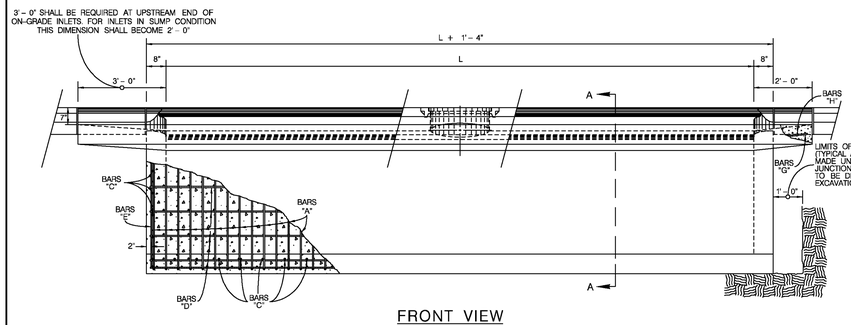
BAR "F"



BAR "E"

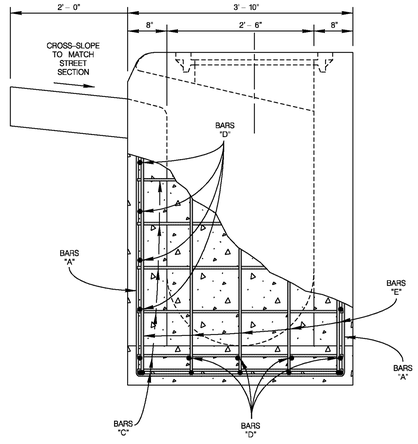
INLET LENGTH	REINFORCING STEEL SCHEDULE					
	BAR	No.	Size	Spa.	Length	Weight lbs.
	A	51	4	5" o.c.	15' 9 1/2"	537.99
DRAIN "3A-3"	B	51	4	5"	6' 7 3/4"	226.41
L= 20'	C	51	4	9"	4' 6"	153.31
DEPTH= 5.5'	D	25	4	10"	21' 1"	352.09
	E	12	4	10 1/2"	7' 4"	58.78
	F	22	5	12"	2' 3"	51.63
	G	3	4	12"	24' 8"	49.43
	H	5	5	12"	1' 8"	8.69

*Concrete Total = 11.77 C.Y. Manhole Casting = 260 lbs. Steel Total = 1698.33 lbs.



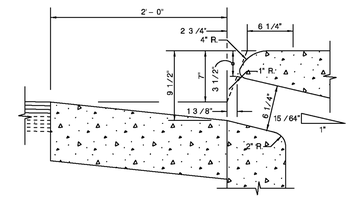
FRONT VIEW

SCALE : 1" = 2'



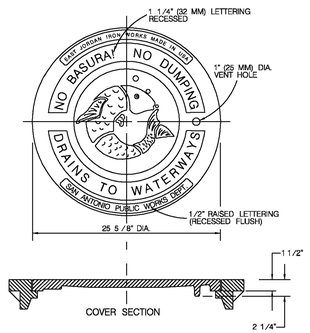
SIDE VIEW

SCALE : 1" = 1'



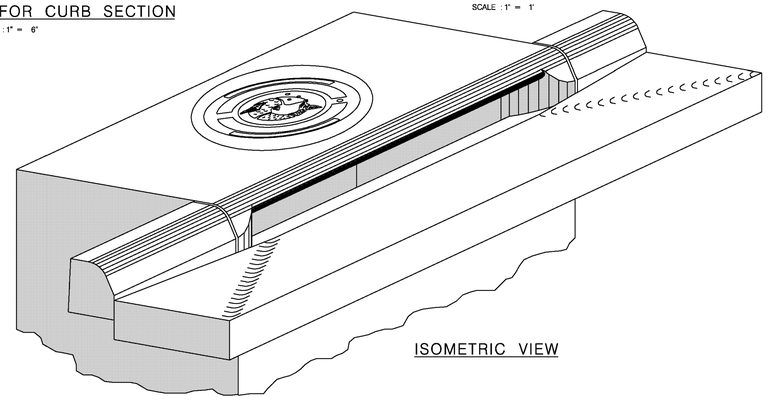
OPENING DETAIL FOR CURB SECTION

SCALE : 1" = 6"



MANHOLE LID & RING DETAIL (ITEM 409)

SCALE : 1" = 8"



ISOMETRIC VIEW

NOTES FOR MANHOLE LID AND RING

1. FOR LID DESIGN OUTSIDE OF CITY OF SAN ANTONIO, DELETE "SAN ANTONIO PUBLIC WORKS DEPT.".
2. CASTING NUMBER AND MANUFACTURER'S I.D. ON LID AND RING.
3. LOAD BEARING CAPABILITY OF HS-20 MINIMUM.
4. THE LOAD BEARING SURFACES SHALL BE MACHINE GROUND.
5. THE COMBINED WEIGHT OF THE MANHOLE RING AND COVER MUST BE AT LEAST 260 LBS.

GENERAL NOTES

1. ALL BARS INTERCEPTING MANHOLE RING & REINFORCING CONCRETE PIPE SHALL BE FIELD CUT.
2. CONCRETE FOR STRUCTURES SHALL BE CLASS "A", 3000 PSI IN 28 DAYS.
3. ALL DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER BARS.
4. ALL EXPOSED CORNERS SHALL BE CHAMFERED TO 3 /4"
5. CONSTRUCTION JOINT SHOWN AT FLOWLINE MAY BE RAISED A MAXIMUM OF 6" AT THE CONTRACTOR'S DISCRETION. ADJUST LENGTH OF VERTICAL STEEL AS REQUIRED.
6. ALL REINFORCING STEEL SHALL CONFORM TO A.S.T.M. A-615, GRADE 60 REQUIREMENTS.
7. INVERT OF DROP INLET TO BE SHAPED WITH CONCRETE FILL TO AFFECT DRAINAGE TO OUTLET PIPE.
8. DELETE 4 "C" BARS FROM SCHEDULE QUANTITIES IF MANHOLE RING AND COVER ARE PLACED AT END OF INLET.
9. CAST IRON MANHOLE RING AND COVER TO BE PLACED NEXT TO OUTLET PIPE EXCEPT FOR VERTICAL OUTLET PIPE IN WHICH CASE MANHOLE RING AND COVER WILL BE OFFSET.
10. PAYMENT FOR ALL EXCAVATION, BACK FILLING, CONCRETE, REINFORCING STEEL, RING AND COVER SHALL BE INCLUDED IN THE UNIT COST OF ITEM 403 "STORM SEWER JUNCTION BOXES AND INLETS".

JANUARY 2005

STANDARD PLANS
CITY OF SAN ANTONIO, TEXAS
DEPARTMENT OF PUBLIC WORKS

TYPE "C" INLET DETAILS

DRAWN BY: V. VASQUEZ	DATE	REVISIONS	SCALE: SEE ABOVE
CHECKED BY: NAT HARDY, P.E.			DATE:
			SHEET: OF

CUDEENGINEERS.COM
CUDE ENGINEERS
4122 Pond Hill Road, Suite 101
San Antonio, Texas 78231
P:(210) 681.2951 F: (210) 523.7112

HICKORY RIDGE UNIT 3A

COSA DRAIN INLET DETAILS TYPE "C" - CAST - IN - PLACE

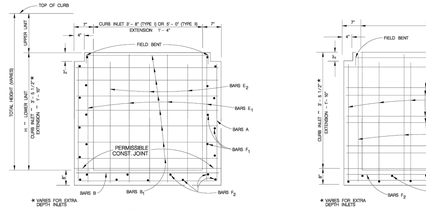
DATE
11/12/2025
PROJECT NO.
03278.101
DRAWN BY
RC/JG/JRR/MOH/MAS
CHECKED BY
CJC/KMH

REVISIONS
1 2 3 4 5 6 7 8

STATE OF TEXAS
KYLE M. HUDEK
138753
LICENSED
PROFESSIONAL ENGINEER
11/18/2025
CUDE ENGINEERS
TBPELS No. 10048500

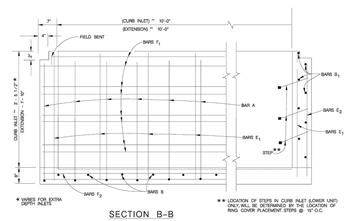
C18

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★ VARIES FOR EXTRA DEPTH INLETS

SECTION A–A



★ VARIES FOR EXTRA DEPTH INLETS

★★ LOCATION OF STEPS IN CURB INLET (LOWER UNIT) ONLY WILL BE DETERMINED BY THE LOCATION OF RING COVER PLACEMENT. STEPS @ 16" O.C.

SECTION B–B

REINFORCING STEEL

LOWER UNIT 10'X 3' – 8" (TYPE I)

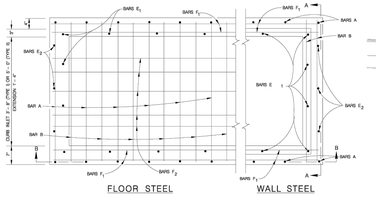
BAR	NO.	SIZE	SPAC.	LENGTH
A	12	#4	12"	VARIES
B	11	#4	12"	4'-8"
B_1	VARIES	#4	12"	4'-8"
F_1	20	#4	18"±	VARIES
F_2	6	#4	18"±	VARIES
F_3	VARIES	#4	12"±	10'-10"
F_2	9	#4	----	10'-10"

LOWER UNIT 10'X 5' – 0" (TYPE II)

BAR	NO.	SIZE	SPAC.	LENGTH
A	12	#4	12"	VARIES
B	11	#4	12"	5'-10"
B_1	VARIES	#4	12"	5'-10"
F_1	22	#4	18"±	VARIES
F_2	6	#4	18"±	VARIES
F_3	VARIES	#4	12"±	10'-10"
F_2	11	#4	----	10'-10"

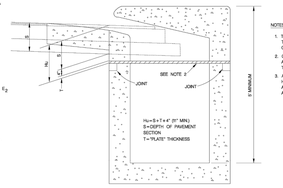
GENERAL NOTES

1. 5' INLETS AND 5' EXTENSIONS MUST BE IN ACCORDANCE WITH THE LATEST TXDOT CURB INLET TYPE "C" AND EXTENSION TYPE E DETAILS.
2. TYPE C-6 INLET TO BE USED ONLY WHEN STORM DRAIN PIPE IS IN-LINE WITH CURB INLET AND APPROVED BY THE ENGINEER.
3. QUANTITIES SHOWN ARE FOR CONTRACTORS INFORMATION ONLY.
4. CONCRETE FOR STRUCTURES SHALL BE CLASS "A", 3000 PSI IN 28 DAYS.
5. ALL DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS.
6. ALL REINFORCING STEEL SHALL HAVE A MINIMUM COVER OF 1 1/2".
7. ALL REINFORCING STEEL SHALL CONFORM TO A.S.T.M. A-615, GRADE 60 REQUIREMENTS.
8. ALL EXPOSED CORNERS SHALL BE CHAMFERED 3 /4".
9. DEPRESSION SLAB SHALL RECEIVE A WOOD FLOAT FINISH.
10. FACE OF INLET TO CONFORM TO FACE OF CURB LINE.
11. ALL BARS INTERCEPTING MANHOLE RING & COVER SHALL BE CUT OR BENT.
12. PAYMENT FOR ALL EXCAVATION, BACK-FILLING CONCRETE, REINFORCING STEEL, RING AND COVER, CURB ARMOR AND STEPS SHALL BE INCLUDED IN THE UNIT COST OF ITEM 403 "STORM SEWER JUNCTION BOXES AND INLETS".
13. CAST IRON MANHOLE RING AND COVER TO BE PLACED NEXT TO OUTLET PIPE, EXCEPT FOR VERTICAL OUTLET PIPE IN WHICH CASE MANHOLE RING AND COVER WILL BE OFFSET.
14. GALVANIZED BOLTS, NUTS, WASHERS, PLATES AND GASKETS ARE SUBSIDIARY TO INLETS.
15. THE CONTRACTOR SHALL PROVIDE AN ADEQUATE MEANS TO LIFT AND PLACE THE INLETS WHEN USING PRECAST UNITS.
16. ALL BARS AT PIPE BLOCKOUT LOCATIONS SHALL BE CUT OR BENT.
17. ALL LOWER UNITS SHALL RECEIVE INVERT MORTAR SHAPING.
18. PIPE BLOCKOUTS IN INLET WALLS SHOULD NOT EXCEED 3" BEYOND THE OUTER SHELL OF THE PIPE, TAKING INTO ACCOUNT THE SKEW OF THE PIPE AS NECESSARY. CONSTRUCTION JOINT MAY BE RAISED A MAXIMUM OF 8".



FLOOR STEEL

WALL STEEL

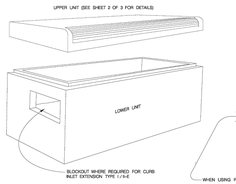


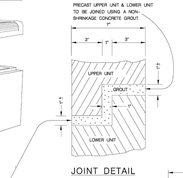
PHASE CONSTRUCTION

NOTES FOR PHASE CONSTRUCTION (WHEN DIRECTED BY THE ENGINEER):

1. THE CURB INLET AND EXTENSION SHALL BE CONSTRUCTED TO A SLOPE 1/4" BELOW THE INLET AND EXTENSION. TO ALLOW FOR ELEVATION.
2. CAP THE CURB INLET AND EXTENSION WITH A STEEL PLATE APPROVED BY THE ENGINEER AND CONSTRUCT THE ROADWAY OVER THE PLATE.
3. AFTER THE ROADWAY IS COMPLETED BUT PRIOR TO THE FINAL HMAC OVERLAY, SAW CUT THE PAVEMENT, REMOVE THE PLATE AND COMPLETE THE UPPER PORTION OF THE CURB INLET AND /OR EXTENSION.

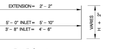
PLAN



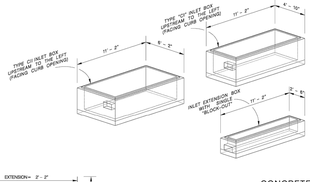


JOINT DETAIL

WHEN USING PRECAST UPPER UNIT, THIS SPACE IS FOR MAKING MINOR HORIZONTAL AND VERTICAL ADJUSTMENTS TO ACCOMODATE A FIT BETWEEN THE UPPER AND LOWER UNIT THAT ALLOWS FOR A MATCH LINE, AND GRADE BETWEEN THE ROADWAY CURB AND THE UPPER UNIT OF THE INLET.



BARS A
(LOWER UNIT)





CONCRETE INLET BOX CONFIGURATIONS (LOWER UNITS)

REINFORCING STEEL (FOR Hu = 11")

UPPER UNIT 10' X 3'-8" (TYPE I)

BAR	NO.	SIZE	SPAC.	LENGTH	WEIGHT
A	1	#4	----	19'-10"	53
B	3	#4	----	10'-10"	38
C	5	#4	11"	13'-2"	44
D	7	#4	6"	10'-10"	51
E	10	#4	11"	1'-2"	9
F	21	#6	6"	4'-8"	147
G	22	#6	6"	5'-8"	187
H	4	#4	----	10'-10"	29
J	12	#4	12"	3'-6"	28
L	4	#4	----	2'-0"	5
M	3	#4	----	14'-8"	29
TOTAL WEIGHT					620 LBS.

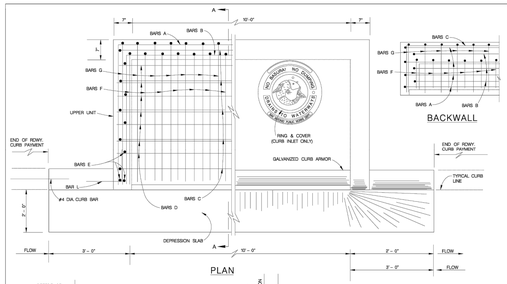
UPPER UNIT 10' X 5'-0" (TYPE II)

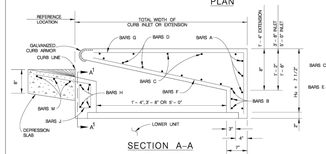
BAR	NO.	SIZE	SPAC.	LENGTH	WEIGHT
A	4	#4	----	22'-8"	60
B	3	#4	----	21'-8"	43
C	7	#4	11"	13'-2"	62
D	11	#4	6"	10'-10"	80
E	16	#4	11"	1'-2"	13
F	21	#6	6"	5'-8"	179
G	22	#6	6"	7'-0"	231
H	4	#4	----	10'-10"	29
J	12	#4	12"	3'-6"	28
L	4	#4	----	2'-0"	5
M	3	#4	----	14'-8"	29
TOTAL WEIGHT					759 LBS.

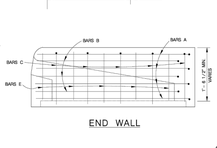
CLASS "A" CONCRETE QUANTITIES (FOR Hu = 11")

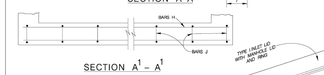
DEPRESSION SLAB	C.Y.
10' INLET	0.7
10' EXTENSION	0.7

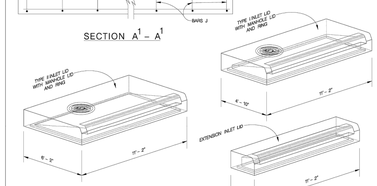
UPPER UNIT (ONLY)	C.Y.
10' X 3'-8" CURB INLET	1.9
10' X 5'-0" CURB INLET	2.7
10' EXTENSION	1.0



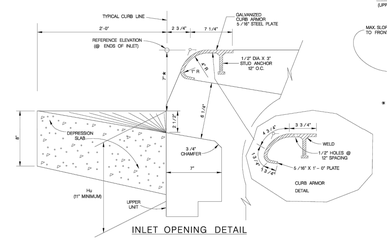








CONCRETE INLET LID CONFIGURATIONS (UPPER UNITS)



INLET OPENING DETAIL

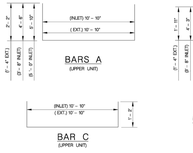


MANHOLE LID & RING DETAIL (ITEM 409)

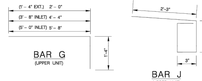
NOTES FOR MANHOLE LID AND RING

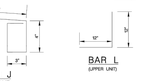
1. FOR LID DESIGN, OUTSIDE OF CITY OF SAN ANTONIO, DELETE "SAN ANTONIO PUBLIC WORKS DEPT."
2. CASTING NUMBER AND MANUFACTURER'S I.D. ON LID AND RING.
3. LOAD BEARING CAPABILITY OF HS-20 MINIMUM.
4. THE LOAD BEARING SURFACES SHALL BE MACHINE GROUND.
5. THE COMBINED WEIGHT OF THE MANHOLE RING AND COVER MUST BE AT LEAST 280 LBS.

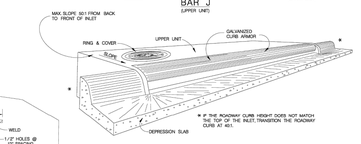
SEE SHEET 1 OF 3 FOR GENERAL NOTES.



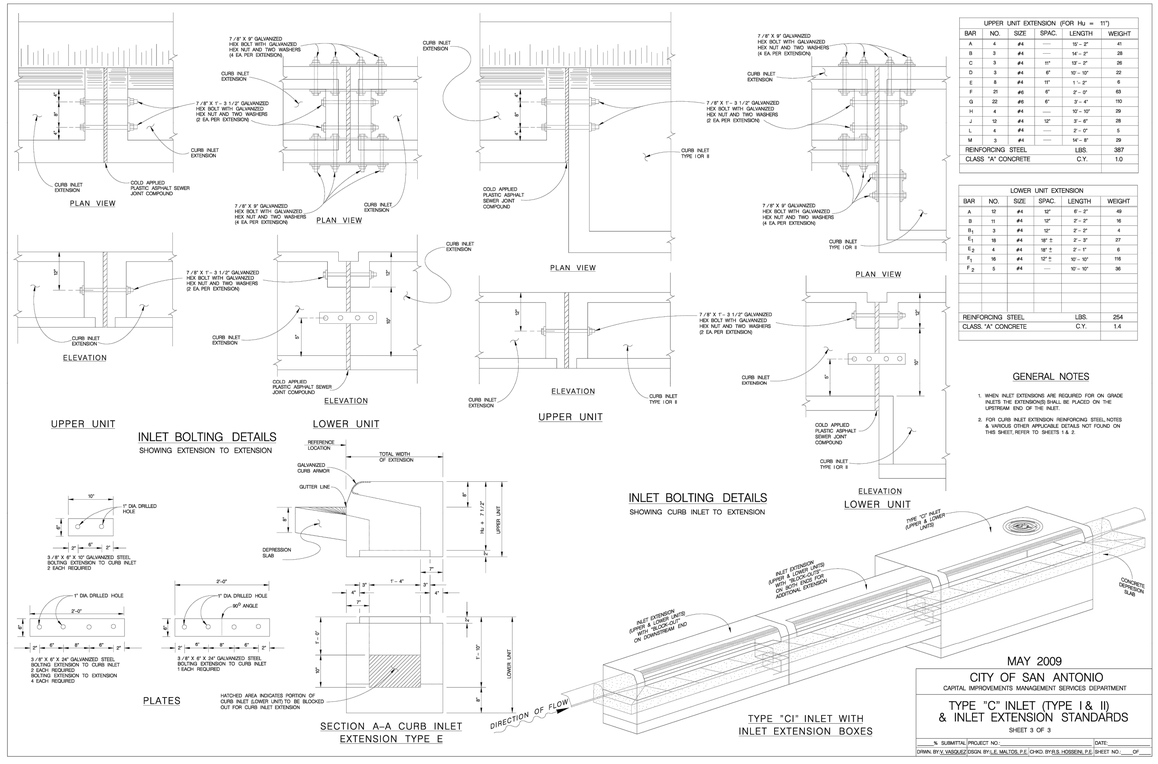








MAY 2009
CITY OF SAN ANTONIO
CAPITAL IMPROVEMENTS MANAGEMENT SERVICES DEPARTMENT
TYPE "C" INLET (TYPE I & II) & INLET EXTENSION STANDARDS
SHEET 2 OF 3
% SUBMITTAL | PROJECT NO.: | DATE:
DRAWN BY: V. VASQUEZ DSIGN BY: L.E. MALTOS, P.E. CHKD BY: R.S. HOSSEINI, P.E. SHEET NO.: OF



INLET BOLTING DETAILS
SHOWING EXTENSION TO EXTENSION

INLET BOLTING DETAILS
SHOWING CURB INLET TO EXTENSION

TYPE "CI" INLET WITH INLET EXTENSION BOXES

UPPER UNIT EXTENSION (FOR Hu = 11")					
BAR	NO.	SIZE	SPAC.	LENGTH	WEIGHT
A	4	#4	----	10' – 2"	41
B	3	#4	----	14' – 2"	28
C	3	#4	11"	13' – 2"	26
D	3	#4	6"	10' – 10"	22
E	5	#4	11"	1' – 2"	6
F	21	#6	6"	2' – 0"	63
G	22	#6	6"	3' – 4"	110
H	4	#4	----	10'-10"	29
J	12	#4	12"	3' – 6"	28
L	4	#4	----	2' – 0"	5
M	3	#4	----	14' – 8"	29
REINFORCING STEEL				LBS.	387
CLASS "A" CONCRETE				C.Y.	1.0

LOWER UNIT EXTENSION					
BAR	NO.	SIZE	SPAC.	LENGTH	WEIGHT
A	12	#4	12"	6' – 2"	48
B	11	#4	12"	2' – 2"	16
B_1	3	#4	12"	2' – 2"	4
F_1	18	#4	18" ±	2' – 3"	27
F_2	4	#4	18" ±	2' – 1"	6
F_3	16	#4	12" ±	10' – 10"	116
F_2	5	#4	----	10' – 10"	36
REINFORCING STEEL				LBS.	254
CLASS. "A" CONCRETE				C.Y.	1.4

GENERAL NOTES

1. WHEN INLET EXTENSIONS ARE REQUIRED FOR ON GRADE INLETS THE EXTENSION(S) SHALL BE PLACED ON THE UPSTREAM END OF THE INLET.
2. FOR CURB INLET EXTENSION, REINFORCING STEEL, NOTES & VARIOUS OTHER APPLICABLE DETAILS NOT FOUND ON THIS SHEET, REFER TO SHEETS 1 & 2.

MAY 2009
CITY OF SAN ANTONIO
CAPITAL IMPROVEMENTS MANAGEMENT SERVICES DEPARTMENT
TYPE "C" INLET (TYPE I & II) & INLET EXTENSION STANDARDS
SHEET 3 OF 3
% SUBMITTAL | PROJECT NO.: | DATE:
DRAWN BY: V. VASQUEZ DSIGN BY: L.E. MALTOS, P.E. CHKD BY: R.S. HOSSEINI, P.E. SHEET NO.: OF

CUDEENGINEERS.COM
CUDE ENGINEERS
4122 Pond Hill Road, Suite 101
San Antonio, Texas 78231
P:(210) 681.2951 F: (210) 523.7112

HICKORY RIDGE UNIT 3A

COSA DRAIN INLET DETAILS - TYPE "C" - PRECAST

DATE
11/12/2025

PROJECT NO.
03278.101

DRAWN BY
RC/JG/JRR/MOH/MAS

CHECKED BY
CJC/KMH

REVISIONS
1. 2. 3. 4. 5. 6. 7. 8.

STATE OF TEXAS
KYLE M. HUDEK
138753
LICENSED
PROFESSIONAL ENGINEER
11/18/2025

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C19

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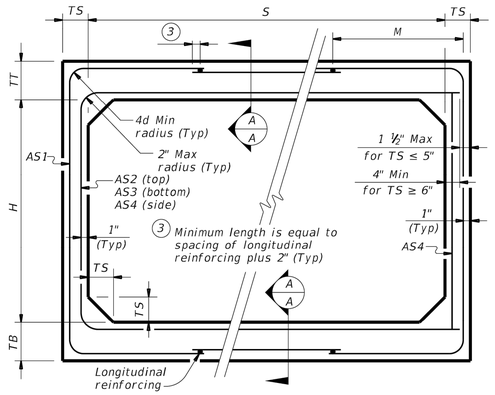
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BOX DATA

SECTION DIMENSIONS					Fill Height	M (Min)	REINFORCING (sq. in. / ft.) (2)							(1) Lift Weight
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)	(ft.)	(in.)	AS1	AS2	AS3	AS4	AS5	AS7	AS8	(tons)
3	2	7	6	4	< 2	–	0.17	0.25	0.16	0.10	0.17	0.17	0.14	3.3
3	2	4	4	4	2 < 3	31	0.13	0.19	0.18	0.10	–	–	–	2.4
3	2	4	4	4	3 – 5	31	0.10	0.11	0.12	0.10	–	–	–	2.4
3	2	4	4	4	10	31	0.10	0.10	0.10	0.10	–	–	–	2.4
3	2	4	4	4	15	31	0.10	0.13	0.13	0.10	–	–	–	2.4
3	2	4	4	4	20	31	0.11	0.17	0.17	0.10	–	–	–	2.4
3	2	4	4	4	25	31	0.14	0.21	0.21	0.10	–	–	–	2.4
3	2	4	4	4	30	31	0.17	0.25	0.25	0.10	–	–	–	2.4
3	2	4	4	4	35	31	0.20	0.29	0.30	0.10	–	–	–	2.4
3	3	7	6	4	< 2	–	0.17	0.27	0.17	0.10	0.17	0.17	0.14	3.7
3	3	4	4	4	2 < 3	31	0.10	0.22	0.21	0.10	–	–	–	2.8
3	3	4	4	4	3 – 5	31	0.10	0.14	0.14	0.10	–	–	–	2.8
3	3	4	4	4	10	31	0.10	0.11	0.11	0.10	–	–	–	2.8
3	3	4	4	4	15	31	0.10	0.14	0.15	0.10	–	–	–	2.8
3	3	4	4	4	20	31	0.10	0.18	0.19	0.10	–	–	–	2.8
3	3	4	4	4	25	31	0.10	0.23	0.23	0.10	–	–	–	2.8
3	3	4	4	4	30	31	0.12	0.27	0.28	0.10	–	–	–	2.8
3	3	4	4	4	35	31	0.14	0.32	0.32	0.10	–	–	–	2.8

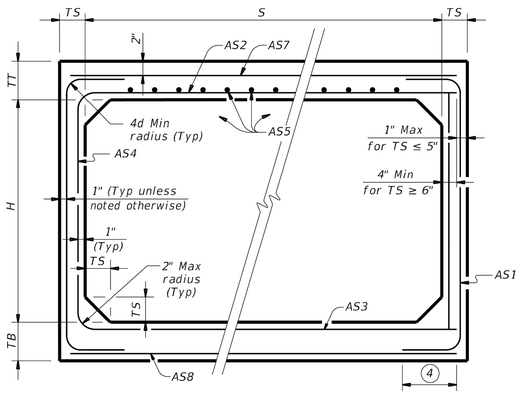
(1) For box length = 8'-0"

(2) AS1 thru AS4, AS7 and AS8 are minimum required areas of reinforcement per linear foot of box length. AS5 is minimum required area of reinforcement per linear foot of box width.



CORNER OPTION "A" CORNER OPTION "B"

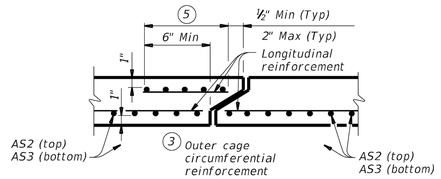
FILL HEIGHT 2 FT AND GREATER



CORNER OPTION "A" CORNER OPTION "B"

FILL HEIGHT LESS THAN 2 FT

(4) Length is equal to spacing of longitudinal reinforcing plus 2". (10" Min) (Typ)



SECTION A-A

(Showing top and bottom slab joint reinforcement.)

MATERIAL NOTES:

Provide 0.03 sq. in./ft. minimum longitudinal reinforcement at each face in slabs and walls. This minimum requirement may be met by the transverse wires when wire mesh reinforcement is used.

Provide Class H concrete (f`c = 5,000 psi).

GENERAL NOTES:

Designs shown conform to ASTM C1577. Refer to ASTM C1577 for information or details not shown.

See Box Culverts Precast Miscellaneous Details (SCP-MD) standard sheet for details and notes not shown.

In lieu of furnishing the designs shown on this sheet, the contractor may furnish an alternate design that is equal to or exceeds the box design for the design fill height in the table. Submit shop plans for alternate designs in accordance with Item "Precast Concrete Structural Members (Fabrication)".

HL93 LOADING

Texas Department of Transportation — Bridge Division Standard

SINGLE BOX CULVERTS PRECAST

3'-0" SPAN

SCP-3

FILE:	scp03sts-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS					
		DIST	COUNTY		SHEET NO.

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HICKORY RIDGE UNIT 3A

TXDOT PRE-CAST BOX CULVERT DETAILS

DATE
11/12/2025

PROJECT NO.
03278.101

DRAWN BY
RC/JG/JRR/MOH/MAS

CHECKED BY
CJC/KMH

REVISIONS
1 2 3 4 5 6 7 8

STATE OF TEXAS
KYLE M. HUDEK
138753
LICENSED
PROFESSIONAL ENGINEER
11/18/2025

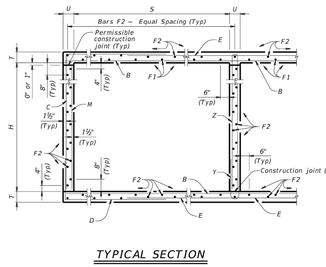
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C20

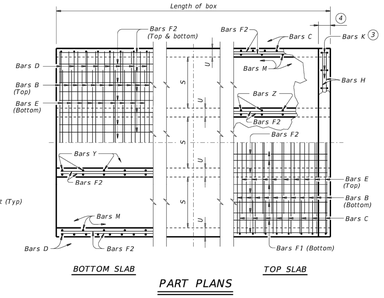
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FILE:



TYPICAL SECTION

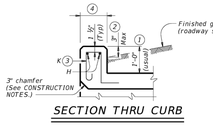


BOTTOM SLAB

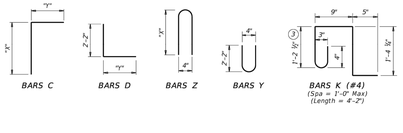
PART PLANS

TOP SLAB

TABLE OF BAR DIMENSIONS		
H	"X"	"Y"
2'-0"	2'-6 ½"	2'-8"
3'-0"	3'-6 ½"	3'-8"



SECTION THRU CURB



BARS C | BARS D | BARS Z | BARS Y | BARS K (#4) (Spa = 1'-0" Max) ((Length = 4'-2")

1. 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0", refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Rail Anchorage Curb (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.
2. For vehicle safety, the following requirements must be met:
   - For structures without bridge rail, construct curbs no more than 3" above Finished grade.
   - For structures with bridge rail, construct curbs flush with finished grade.

   Reduce curb heights, if necary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
3. For curbs less than 1'-0" high, tilt Bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, Bars K may be omitted.
4. 1'-0" typical. 2'-3" when the Rail Anchorage Curb (RAC) standard sheet is referred to elsewhere in the plans.

The Contractor may replace Bars B, C, D, E, F1, F2, M, Y, and/or Z with deformed welded wire reinforcement (WWR) meeting the requirements of ASTM A1064. The area of required reinforcement may be reduced by the ratio of 60 ksi / 70 ksi. Spacing of WWR is limited to 4" Min and 18" Max. When required, provide lap splices in the WWR of the same length required for the equivalent bar size, rounded up for wire sizes between conventional bar sizes. The lap length required for WWR is never less than the lap length required for uncoated #4 bars.

Example conversion: Replacing No. 6 Gr 60 at 6" Spacing with WWR
Required WWR = (0.44 sq. in. per 0.5 ft.) x (60 ksi / 70 ksi) = 0.755 sq. in. per ft.
If D30.6 wire is used to meet the 0.755 sq. in. per ft. requirement in this example, the required spacing = (0.306 sq. in.) / (0.755 sq. in. per ft.) x (12 in. per ft.) = 4.86" Max spacing. Required lap length for the provided D30.6 wire is 2'-1" (the same minimum lap length required for uncoated #5 bars, as listed under MATERIAL NOTES).

CONSTRUCTION NOTES:
Do not use permanent forms.
Chamfer the bottom edge of the top slab 3" at the entrance.
Optionally, raise construction joints shown at the flow line by a maximum of 6". If this option is taken, Bars M may be cut off or raised, Bars C and D may be reversed, and Bars Y and Z may be reversed.

MATERIAL NOTES:
Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
Provide Class C concrete (f'c = 3,600 psi) for culvert barrel and curb, with the following exceptions: provide Class S concrete (f'c = 4,000 psi) for top slabs of:
- culverts with overlay,
- culverts with 1-to-2 course surface treatment, or
- culverts with the top slab as the final riding surface.

Provide bar laps, where required, as follows:
- Uncoated or galvanized – #4 = 1'-8" Min
- Uncoated or galvanized – #5 = 2'-1" Min

GENERAL NOTES:
Designed according to AASHTO LRFD Bridge Design Specifications for the range of fill heights shown.
See the Multiple Box Culverts Cast-In-Place Miscellaneous Detail (MC-MD) standard sheet for details pertaining to skewed ends, angle sections, and lengthening.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

Use this standard only when lengthening existing multiple box culverts.

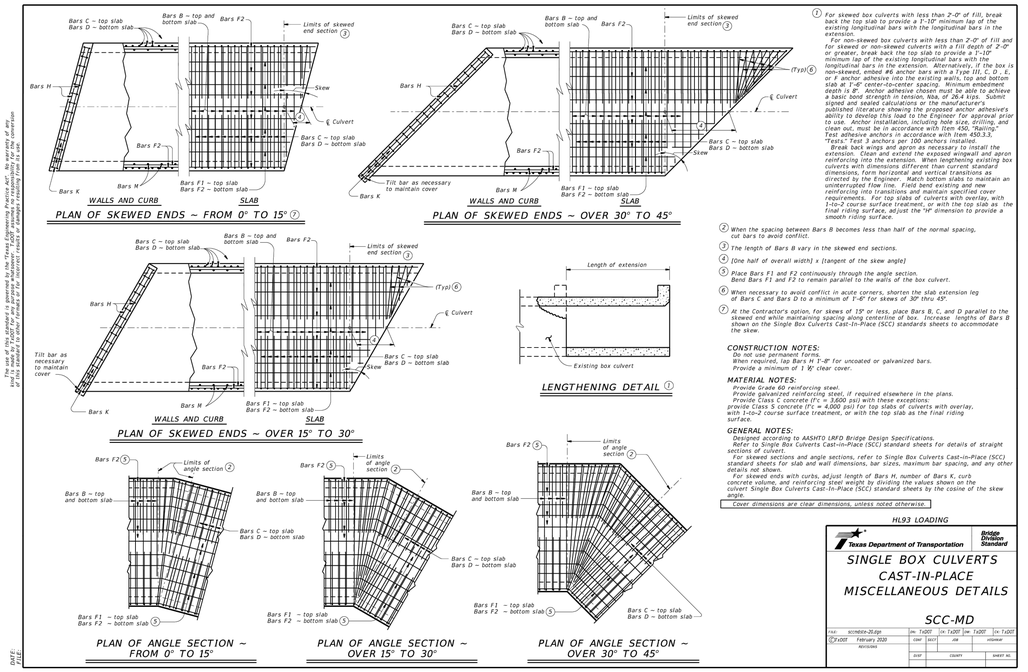
HL93 LOADING SHEET 1 OF 2

Texas Department of Transportation | Bridge Division Standard

MULTIPLE BOX CULVERTS CAST-IN-PLACE 3'-0" SPAN 0' TO 23' FILL FOR LENGTHENING ONLY MC-3-23

FILE: mc323ste-20.dgn	DN: TBE	CK: BKP	DW: TxDOT	CK: TxDOT
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	DIST	COUNTY		SHEET NO.

DATE:
FILE:



PLAN OF SKEWED ENDS ~ FROM 0° TO 15° 7

PLAN OF SKEWED ENDS ~ OVER 30° TO 45°

PLAN OF SKEWED ENDS ~ OVER 15° TO 30°

LENGTHENING DETAIL 1

PLAN OF ANGLE SECTION ~ FROM 0° TO 15°

PLAN OF ANGLE SECTION ~ OVER 15° TO 30°

PLAN OF ANGLE SECTION ~ OVER 30° TO 45°

1. For skewed box culverts with less than 2'-0" of fill, break back the top slab to provide a 1'-10" minimum lap of the existing longitudinal bars with the longitudinal bars in the extension.
   For non-skewed box culverts with less than 2'-0" of fill and for skewed or non-skewed culverts with a fill depth of 2'-0" or greater, break back the top slab to provide a 1'-10" minimum lap of the existing longitudinal bars with the longitudinal bars in the extension. Alternatively, if the box is non-skewed, embed #6 anchor bars with a Type III, C, D, E, or F adhesive meeting DMS-4600 into the existing top slab at 1'-6" center-to-center spacing. Minimum embedment depth is 8". Anchor adhesive chosen must be able to achieve a basic bond strength in tension, τ_{cr}, of 29.4 ksi. Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing." Test adhesive anchors in accordance with Item 450.3.3, "Testing." Epoxy anchors per manufacturer's published recommendations. Break back wingwall as necessary to install the extension. Clean and extend the exposed wingwall and apron reinforcing into the extension. When lengthening existing box culverts with dimensions different than current standard dimensions, form horizontal and vertical transitions as directed by the Engineer. Match bottom slabs to maintain an uninterrupted flow line. Field bend existing and new reinforcing into transitions and maintain specified cover requirements. For top slabs of culverts with overlay, with 1-to-2 course surface treatment, or with the top slab as the final riding surface, adjust the "H" dimension to provide a smooth riding surface.
2. When the spacing between Bars B becomes less than half of the normal spacing, cut bars to avoid conflict.
3. The length of Bars B vary in the skewed end sections.
4. (One half of overall width) x (tangent of the skew angle)
5. Place Bars F1 and F2 continuously through the angle section. Bend Bars F1 and F2 to remain parallel to the walls of the box culvert.
6. When necessary to avoid conflict in acute corners, shorten the slab extension leg of Bars C and Bars D to a minimum of 1'-6" for skews of 30° thru 45°.
7. At the Contractor's option, for skews of 15° or less, place Bars B, C, and D parallel to the skewed end while maintaining spacing along centerline of box. Increase lengths of Bars B shown on the Single Box Culverts Cast-In-Place (SCC) standards sheets to accommodate the skew.

CONSTRUCTION NOTES:
Do not use permanent forms.
When required, lap Bars H 1'-8" for uncoated or galvanized bars.
Provide a minimum of 1 ½" clear cover.

MATERIAL NOTES:
Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel, if required elsewhere in the plans.
Provide Class C concrete (f'c = 3,600 psi) with these exceptions:
provide Class S concrete (f'c = 4,000 psi) for top slabs of culverts with overlay, with 1-to-2 course surface treatment, or with the top slab as the final riding surface.

GENERAL NOTES:
Designed according to AASHTO LRFD Bridge Design Specifications.
Refer to Single Box Culverts Cast-in-Place (SCC) standard sheets for details of straight sections of culvert.
For skewed sections and angle sections, refer to Single Box Culverts Cast-in-Place (SCC) standard sheets for slab and wall dimensions, bar sizes, maximum bar spacing, and any other details not shown.
For skewed ends with curbs, adjust length of Bars H, number of Bars K, curb concrete volume, and reinforcing steel weight by dividing the values shown on the culvert Single Box Culverts Cast-in-Place (SCC) standard sheets by the cosine of the skew angle.

Cover dimensions are clear dimensions, unless noted otherwise.

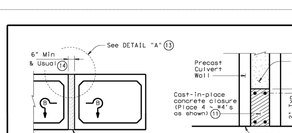
HL93 LOADING

Texas Department of Transportation | Bridge Division Standard

SINGLE BOX CULVERTS CAST-IN-PLACE MISCELLANEOUS DETAILS

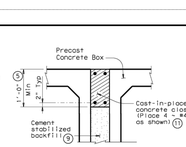
SCC-MD

FILE: scmdetx-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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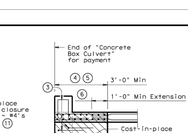


MULTIPLE UNIT PLACEMENT

SECTION B-B

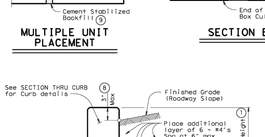


DETAIL "A" 13

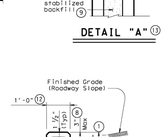


WINGWALL CONNECTION

(Also applies to Safety End Treatment)

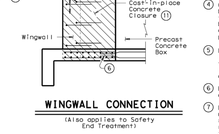


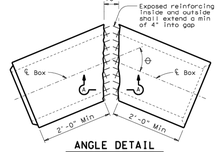
SECTION THRU TOP SLABS LESS THAN 7"



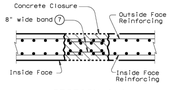
SECTION THRU CURB

10 QUANTITIES PER FOOT OF CURB	
Reinforcing Steel	4.18 LB
Concrete	0.037 CY

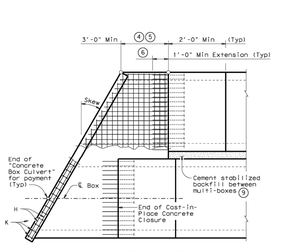




ANGLE DETAIL



SECTION A-A



PLAN OF SKEWED ENDS

(Showing multi-box placement)

1. 0" min to 5'-0" max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail, bicycle rail or curbs taller than 1'-0", refer to ECD standard. For structures with T6 traffic rail, refer to T6-CM standard. For structures with traffic rail, other than T6, refer to RAC standard.
2. For curbs less than 1'-0" high, tilt Bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, Bars K may be omitted.
3. Curb, Wingwall or Safety End Treatment reinforcing shall extend into concrete closure. Any reinforcing that does not fit into the closure shall be bent or trimmed as necessary.
4. Cast-in-place concrete closure shall be 3'-0" min. Boxes shall be constructed per precast box details. All reinforcing in the closure shall be the same size and spacing as in the precast box section. Except where shown otherwise, the cast-in-place closure shall be flush with the inside and outside faces of the precast box section.
5. For multiple unit placements the length of the closure for the interior walls may be adjusted as necessary. The length of the top slab, bottom slab, and exterior wall closure shall not be less than 3'-0". See Section B-B details when interior walls are cast full length.
6. Precast box reinforcing shall extend a minimum of 1'-0" into concrete closure (Typ).
7. Bands of reinforcing matching the inside and outside face reinforcing shall be placed in the gaps of the top and bottom slabs. A band matching the outside face reinforcing of the wall shall be placed in the gaps of the walls (placed in the outside face only). The bands shall be tack welded to the exposed reinforcing at each point of contact.
8. For vehicle safety, the following requirements must be met:
   - For structures without bridge rail, curbs shall project no more than 3" above finished grade.
   - For structures with bridge rail, curbs shall be flush with finished grade.

   Curb heights shall be reduced, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
9. Cement Stabilized Backfill between boxes is considered part of the Box Culvert for payment.
10. All curb concrete and reinforcing is considered part of the Box Culvert for payment.
11. Any additional concrete and reinforcing required for the closures shall be considered as subsidiary to the Concrete Box Culvert.
12. 1'-0" typical. 2'-0" when RAC standard is referred to elsewhere in the plans.
13. For multiple unit placement with overlay, with 1 to 2 course surface treatment, or with the top slab as the final riding surface, provide wall closure as shown in DETAIL "A".
14. This dimension may be increased with approval of the Engineer to allow the precast boxes to be tunneled or jacked in accordance with Item 476, "Jacking, Boring, or Tunneling Pipe or Box". No payment will be made for any additional material in the gap between adjacent boxes.

GENERAL NOTES:
Designed according to AASHTO LRFD Specifications.
All closure concrete shall be Class "C" with a minimum compressive strength of 3600 psi and shall be placed according to the item, "Concrete Substructures".
Any additional concrete required for the closures shall be considered as subsidiary to the Concrete Box Culvert.
Refer to the Single Box Culverts Precast standard for details not shown.
The bottom edge of the top slab closure shall be chamfered 3 inches at the entrance.

HL93 LOADING

Texas Department of Transportation | Bridge Division Standard

BOX CULVERTS PRECAST MISCELLANEOUS DETAILS

SCP-MD

FILE: scpmdetx.dgn	DN: GAF	CK: LMW	DW: BWH/TxDOT	CK: GAF
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NUMBER OF SPANS	SECTION DIMENSIONS				BILLS OF REINFORCING STEEL (For Box Length = 40 feet)																												QUANTITIES			
					Bars B				Bars C & D						Bars E				Bars F1 ~ #4			Bars F2 ~ #4			Bars M ~ #4			Bars Y & Z ~ #4						Bars H 4 ~ #4		Bars K		Per Foot of Barrel		Curb		Total	
									Bars C		Bars D																	Bars Y		Bars Z											
	S	H	T	U	No.	Size	Spa	Length	Wt	No.	Size	Spa	Length	Wt	Length	Wt	No.	Size	Spa	Length	Wt	No.	Size	Spa	Length	Wt	No.	Size	Spa	Length	Wt	Length	Wt	No.	Wt	No.	Wt	Conc (CY)	Reinf (Lb)	Conc (CY)	Reinf (Lb)	Conc (CY)	Reinf (Lb)
2	3'-0"	2'-0"	8"	7"	108	#5	9"	7'-6"	845	108	#4	9"	5'-4"	385	5'-0"	361	108	#4	9"	5'-11"	427	6	18"	39'-9"	159	32	18"	39'-9"	850	108	9"	2'-0"	144	54	9"	4'-7"	165	5'-3"	189	7'-6"	20	18	50	0.512	88.1	0.6	70	21.1	3,595
3	3'-0"	2'-0"	8"	7"	108	#5	9"	11'-1"	1,248	108	#4	9"	5'-4"	385	5'-0"	361	108	#4	9"	9'-6"	685	9	18"	39'-9"	239	45	18"	39'-9"	1,195	108	9"	2'-0"	144	108	9"	4'-7"	331	5'-3"	379	11'-1"	30	26	72	0.733	124.2	0.8	102	30.2	5,069
4	3'-0"	2'-0"	8"	7"	108	#5	9"	14'-8"	1,652	108	#4	9"	5'-4"	385	5'-0"	361	108	#4	9"	13'-1"	944	12	18"	39'-9"	319	58	18"	39'-9"	1,540	108	9"	2'-0"	144	162	9"	4'-7"	496	5'-3"	568	14'-8"	39	32	89	0.953	160.2	1.1	128	39.2	6,537
5	3'-0"	2'-0"	8"	7"	108	#5	9"	18'-3"	2,056	108	#4	9"	5'-4"	385	5'-0"	361	108	#4	9"	16'-8"	1,202	15	18"	39'-9"	398	71	18"	39'-9"	1,885	108	9"	2'-0"	144	216	9"	4'-7"	661	5'-3"	758	18'-3"	49	40	111	1.173	196.3	1.4	160	48.3	8,010
6	3'-0"	2'-0"	8"	7"	108	#5	9"	21'-10"	2,459	108	#4	9"	5'-4"	385	5'-0"	361	108	#4	9"	20'-3"	1,461	18	18"	39'-9"	478	84	18"	39'-9"	2,230	108	9"	2'-0"	144	270	9"	4'-7"	827	5'-3"	947	21'-10"	58	46	128	1.393	232.3	1.6	186	57.4	9,478
2	3'-0"	3'-0"	8"	7"	108	#5	9"	7'-6"	845	108	#4	9"	6'-4"	457	5'-0"	361	108	#4	9"	5'-11"	427	6	18"	39'-9"	159	38	18"	39'-9"	1,009	108	9"	3'-0"	216	54	9"	4'-7"	165	7'-3"	262	7'-6"	20	18	50	0.577	97.5	0.6	70	23.7	3,971
3	3'-0"	3'-0"	8"	7"	108	#5	9"	11'-1"	1,248	108	#4	9"	6'-4"	457	5'-0"	361	108	#4	9"	9'-6"	685	9	18"	39'-9"	239	53	18"	39'-9"	1,407	108	9"	3'-0"	216	108	9"	4'-7"	331	7'-3"	523	11'-1"	30	26	72	0.819	136.7	0.8	102	33.6	5,569
4	3'-0"	3'-0"	8"	7"	108	#5	9"	14'-8"	1,652	108	#4	9"	6'-4"	457	5'-0"	361	108	#4	9"	13'-1"	944	12	18"	39'-9"	319	68	18"	39'-9"	1,806	108	9"	3'-0"	216	162	9"	4'-7"	496	7'-3"	785	14'-8"	39	32	89	1.061	175.9	1.1	128	43.5	7,164
5	3'-0"	3'-0"	8"	7"	108	#5	9"	18'-3"	2,056	108	#4	9"	6'-4"	457	5'-0"	361	108	#4	9"	16'-8"	1,202	15	18"	39'-9"	398	83	18"	39'-9"	2,204	108	9"	3'-0"	216	216	9"	4'-7"	661	7'-3"	1,046	18'-3"	49	40	111	1.302	215.0	1.4	160	53.4	8,761
6	3'-0"	3'-0"	8"	7"	108	#5	9"	21'-10"	2,459	108	#4	9"	6'-4"	457	5'-0"	361	108	#4	9"	20'-3"	1,461	18	18"	39'-9"	478	98	18"	39'-9"	2,602	108	9"	3'-0"	216	270	9"	4'-7"	827	7'-3"	1,308	21'-10"	58	46	128	1.544	254.2	1.6	186	63.4	10,355

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Use this standard only when lengthening existing multiple box culverts.

HL93 LOADING SHEET 2 OF 2

Texas Department of Transportation | Bridge Division Standard

MULTIPLE BOX CULVERTS CAST-IN-PLACE 3'-0" SPAN 0' TO 23' FILL FOR LENGTHENING ONLY MC-3-23

FILE: mc323ste-20.dgn	DN: TBE	CK: BKP	DW: TxDOT	CK: TxDOT
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CUDEENGINEERS.COM
CUDE ENGINEERS
4122 Pond Hill Road, Suite 101
San Antonio, Texas 78231
P:(210) 681.2951 F: (210) 523.7112

HICKORY RIDGE UNIT 3A

TXDOT CAST - IN - PLACE BOX CULVERT DETAILS

DATE
11/12/2025

PROJECT NO.
03278.101

DRAWN BY
RC/JG/JRR/MOH/MAS

CHECKED BY
CJC/KMH

REVISIONS
1 2 3 4 5 6 7 8

STATE OF TEXAS
KYLE M. HUDEK
138753
LICENSED
PROFESSIONAL ENGINEER
11/18/2025
CUDE ENGINEERS
TBPELS No. 10048500

C21

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ALL DEVELOPER PROJECTS

AQUA TEXAS GENERAL NOTES

1. PROPOSED AQUA TEXAS FACILITIES INCLUDE ITEMS OF THE PROPOSED WORK THE DEVELOPER PLANS TO CONVEY TO AQUA TEXAS TO OWN AND OPERATE UPON COMPLETION OF THE WORK AND AFTER SATISFYING CERTAIN OTHER REQUIREMENTS.

2. AQUA TEXAS HAS NO AGREEMENT OR CONTRACT WITH THE CONTRACTOR, THE PROPOSED AQUA TEXAS FACILITIES DESCRIBE ON THESE PLAN SHEETS ARE BEING CONSTRUCTED BY AND FOR THE BENEFIT OF THE PROJECT OWNER.

3. AQUA TEXAS HAS NOT PROVIDED REVIEW RELATED TO ITEMS OF WORK NOT RELATED TO PROPOSED OR EXISTING AQUA TEXAS FACILITIES OR CONTRACTORS' SAFETY PRECAUTIONS OR MEANS, METHODS, TECHNIQUES, SQUENCES OR PROCEDURES REQUIRED FOR THE CONTRACTOR TO PEFORM THEIR WORK.

4. ANY CONTRACTOR(S) USING THESE DRAWINGS SHALL OBTAIN AND THEREAFTER KEEP IN FORCE THROUGH THE DURATION OF THAT USE CUSTOMARY AND APPROPRIATE INSURANCE COVERAGE, WHICH SHALL INCLUDE WORKERS COMPENSATION AND EMPLOYERS' LIABILITY, COMMERCIAL GENERAL LIABILITY, COMMERCIAL AUTOMOBILE LIABILITY, AND UMBRELLA LIABILITY. CERTIFICATE(S) OF INSURANCE BY THE INSURER(S) ISSUING THE POLICIES SHALL BE FILED WITH AQUA TEXAS PRIOR TO COMMENCING CONSTRUCTION OF AQUA TEXAS FACILITIES

5. ANY CONTRACTOR(S) USING THESE DRAWINGS, BY SAID USE, SHALL INDEMNIFY, DEFEND AND HOLD HARMLESS AQUA TEXAS, ITS OFFICERS, DIRECTORS, EMPLOYEES AND AGENTS FROM AND AGAINST ANY AND ALL CLAIMS, DEMANDS, DEBTS, SUITS, CAUSES OF ACTION, LOSSES, DAMAGES, JUDGMENTS, FINES, PENALTIES, LIABILITIES, AND COSTS, INCLUDING REASONABLE ATTORNEY FEES AND DEFENSE COSTS (COLLECTIVELY "DAMAGES") INCURRED BY AQUA ARISING OUT OF CONSTRUCTION OF THE AQUA TEXAS FACILITIES.

6. THE DEVELOPER, ENGINEER, OR CONTRACTOR SHALL CHAIR OR ATTEND A PRECONSTRUCTION MEETING WHICH INCLUDES AQUA TEXAS PERSONNEL, CONTACT AQUA TEXAS' BUSINESS DEVELOPMENT ENGINEER TO COORDINATE THE MEETING ATTENDANCE, SCHEDULE, AND CONTENT.

7. THE CONTRACTOR SHALL WORK WITH FINAL ENGINEERING PLANS MARKED TO INDICATE APPROVAL BY AQUA TEXAS' ENGINEERING DEPARTMENT. THE CONTRACTOR SHALL HAVE APPROVED PLANS ON HAND AT ANYTIME PROPOSED AQUA TEXAS FACILITIES ARE BEING CONSTRUCTED OR DISTURBED. AQUA TEXAS' APPROVAL SHOULD BE NOTED ON THE COVER SHEET ALONG WITH THE DATE THE PLANS WERE APPROVED.

8. NO PLAN CHANGES OR FIELD CHANGES RELATED TO THE CONSTRUCTION OF PROPOSED AQUA TEXAS FACILITIES SHALL BE ALLOWED WITHOUT THE WRITTEN APPROVAL OF AN AQUA TEXAS ENGINEERING DEPARTMENT REPRESENTATIVE.

10. CONTRACTOR SHALL NOTIFY AQUA TEXAS 48 HOURS BEFORE:

    a. BEGINNING CONSTRUCTION OF PROPOSED AQUA TEXAS FACILITIES
    NOTIFY: AQUA ENGINEERING AND AQUA OPERATIONS*

    b. CONDUCTING REQUIRED SAMPLING OR TESTING
    NOTIFY: AQUA OPERATIONS*

    c. TAPPING, CONNECTING, MODIFYING OR IN ANY OTHER WAY DISTURBING AQUA TEXAS FACILITIES
    NOTIFY: AQUA OPERATIONS*

    *(AQUA ENGINEERING AND OPERATIONS CONTACTS SHALL BE DESIGNATED AT THE PRE-CONSTRUCTION MEETING)

9. AN AQUA TEXAS REPRESENTATIVE MAY BE ON SITE FROM TIME TO TIME TO OBERVE AND RECORD:

    a. CONNECTION TO AQUA FACILITIES
    b. CONSTRUCTION PROGRESS AND CONDITIONS
    c. TESTING AND SAMPLING.

    THESE OBSERVATIONS AND RECORDS IN NO WAY CONSTITUTE APPROVAL OR ACCEPTANCE OF WORK BY THE CONTRACTOR.

10. A CONTRACTOR'S REPRESENTATIVE SHALL ATTEND A PRE-FINAL AND FINAL WALK THROUGH CALLED BY THE DEVELOPER. FOLLOWING THE PREFINAL WALK THROUGH THE CONTRACTOR AND OTHER ATTENDEES SHALL PREPARE AN AGREED, WRITTEN PUNCH LIST OF WORK NECESSARY FOR COMPLETION OF PROPOSED AQUA TEXAS FACILITIES IN ACCORDANCE WITH THE APPROVED FINAL ENGINEERING PLANS. THE PURPOSE OF THE FINAL WALK THROUGH IS TO CONFIRM COMPLETION OF THE PUNCH LIST WORK ITEMS.

EXISTING MANHOLES/SEWER

4. CONTRACTOR WILL MAINTAIN SERVICE TO ALL EXISTING SANITARY SEWER AT ALL TIMES DURING CONSTRUCTION. CONTRACTOR WILL MARK, CLEAN ALL DEBRIS, GRAVEL, DIRT, ETC, OUT OF MANHOLES AND ANY STOPPAGES CAUSED BY DEBRIS DURING CONSTRUCTION. CONTRACTOR WILL UNPLUG STOPPAGE AT CONTRACTOR'S EXPENSE. ANY DAMAGE TO EXISTING MANHOLES OR SEWER MAIN WILL BE CORRECTED AT CONTRACTOR'S EXPENSE. CONTRACTOR SHALL TAKE ALL NECESSARY MEASURES TO PREVENT DAMAGE TO EXISTING OR NEW RINGS, COVERS, OR CONES FROM EQUIPMENT AND MATERIALS USED OR TAKEN THROUGH THE WORK AREA. IF AN EXISTING OR NEW MANHOLE COVER, RING, OR CONE IS DAMAGED BY THE CONTRACTOR IT SHALL BE REPLACED AS DIRECTED BY THE SARA INSPECTOR. MANHOLES WILL NEED TO BE RESEALED WITH THE SARA APPROVED SEALING. IF SEAL COATING IS BROKEN, CONTRACTOR WILL HAVE MANHOLE RECOATED AND RESEAL ALL LEAKS AT CONTRACTOR EXPENSE.

    A. CONTRACTOR TO ENSURE ALL PLUGS USED TO PLUG SEWER LINES, WHILE TESTING THE PROJECT (SUCH AS AIR PLUGS, SCREW TYPE PLUGS, ETC.) ARE LABELED, MARKED OR TAGGED. PROJECT INSPECTOR WILL RECORD HOW MANY PLUGS ARE BEING USED, LOCATION AND I.D., WITHIN COLLECTION SYSTEM. CONTRACTOR WILL REPORT TO PROJECT INSPECTOR OF ANY LOST OR UNRESTRAINED PLUGS INTO SEWER COLLECTION SYSTEM.

    B. CONTRACTOR WILL BE HELD LIABLE FOR ANY DAMAGES TO SEWER COLLECTION SYSTEM STOPPAGES, OVER-FLOWS, BACKUP INTO HOMES CAUSED BY LOST RUN AWAY SEWER PLUGS THAT WERE USED ON THAT PROJECT OR OUTFALL LINE WASTEWATER TREATMENT PLANTS.

    C. CONTRACTOR WILL ALSO BE RESPONSIBLE FOR ANY DAMAGE TO WASTEWATER TREATMENT APPARATUS, SUCH AS SCREW PUMPS, ETC, CAUSED BY LOST OR RUN AWAY SEWER PLUGS. CONTRACTOR WILL BE HELD LIABLE FOR DAMAGES, AS WELL AS COST OF REPAIRS.

5. ALL WORK IN THE TEXAS HIGHWAY DEPARTMENT AND BEXAR COUNTY RIGHT OF WAY SHALL BE DONE IN ACCORDANCE WITH RESPECTIVE CONSTRUCTION SPECIFICATIONS AND PERMIT.

6. ALL WORK ON PUBLIC STREETS SHALL BE COORDINATED WITH AND APPROVED BY THE BEXAR COUNTY PUBLIC WORKS DEPARTMENT TRAFFIC DIVISION AND STREET ENGINEER.

7. DUE TO FEDERAL REGULATIONS TITLE 49, PART 192.161, CITY PUBLIC SERVICE MUST MAINTAIN ACCESS TO GAS VALVES AT ALL TIMES. THE CONTRACTOR MUST PROTECT AND WORK AROUND VALVES THAT ARE IN THE PROJECTED AREAS.

8. NO TESTING WILL BE PERFORMED PRIOR TO 30 DAYS FROM THE COMPLETE INSTALLATION OF THE SANITARY SEWER LINES.

THE FOLLOWING SEQUENCE WILL BE STRICTLY ADHERED TO:

A. PULL MANDREL - AFTER 30 DAYS OF INSTALLATION
B. PERFORM AIR TEST
C. PULL WIPER (AFTER STREET HAS BEEN ASPHALTED IN NEW SUBDIVISIONS)
D. VACUUM TEST ALL MANHOLES WITHIN THE PROJECT
E. CCTV - ALL NEW LINE - PAN/TILT ALL SERVICE LATERALS TO 6"X6" CLEAN OUT, FLOOD ALL LINES BEFORE CCTV, SUMMIT DVD

9. CONTRACTOR SHALL SUBMIT FILED COPY PLANS AND PROFILES SHOWING AS-BUILT WORK AT END OF PROJECT, CCTV DVD AND COMPACTION DENSITY REPORTS FOR MAIN SEWER LINE AND ALL SERVICE LATERALS TRENCHES AND WARRANTY LETTERS ON MATERIALS, WORKMANSHIP FOR 24 MONTHS AFTER FINAL ACCEPTANCE.

MANHOLES

10. ALL MANHOLES SHALL BE CONSTRUCTED SO THAT THE TOP OF THE RING IS AT LEAST FOUR (4) INCHES ABOVE THE FINISHED GRADE OF THE SURROUNDING GROUND EXCEPT WHEN LOCATED IN PAVED AREAS. IN PAVED AREAS THE MANHOLE RING SHALL BE FLUSH WITH THE PAVEMENT. ALL NEW INSTALLED MANHOLES WILL BE INSTALLED WITH A 30" INCH OPENING, MINIMUM, WITH THE SARA LOGO ON THE COVER. EVERY THIRD MANHOLE COVER WILL HAVE A 1" INCH HOLE FOR A VENT.

11. ALL MANHOLES SHALL HAVE A 30" INCH OPENING, HAVE WATERTIGHT RING AND COVERS, WITH THE SARA LOGO, I/I BARRIER, IN ACCORDANCE WITH THE SARA TECHNICAL SPECIFICATIONS FOR UTILITIES CONSTRUCTION. ON PRIVATE PROPERTY, MANHOLE RING AND COVER SHALL BE TYPICAL MANHOLE COVER WATER TIGHT.

    A. BEFORE BACK FILLING/COMPACTION/CONCRETE ENCASEMENT ALL MANHOLE JOINT SECTION RISERS, CONE SECTIONS AND GRADE RING SHALL BE WRAPPED WITH GATOR WRAP SEALING SYSTEMS, BUTYL ADHESIVE SEALANT WITH A MINIMUM THICKNESS OF 30 MILS. INFI-SHIELD WRAPPED WITH RISER-WRAP SEALING SYSTEM, GATOR WRAP MATERIAL (RUBBER MEETS ASTM C923/MASTIC MEETS ASTM C 990 OR APPROVED BY THE SARA ENGINEER SUBSTITUTION ON OUTSIDE FOR I/I, GROUND WATER TABLE).

12. IF CONCRETE THROAT RINGS ARE TO BE INSTALLED THEY MUST BE USED IN CONJUNCTION WITH A UV STABILIZED POLYETHYLENE LINER AND I/I BARRIER. I/I BARRIER MUST MEET THE FOLLOWING ASTM STANDARDS: ASTM D-790/1505 DENSITY OF POLYETHLENE MATERIALS, ASTM D-1238 MELT FLOW INDEX, ASTM 638 TENSILE STRENGTH @ YIELD (50 mm/min), ASTM 790 FLEXURAL MODULUS, ASTM 648 HEAT DEFLECTION TEMPERATURE @ ICEPAL, ASTM 1693 ESCR, 100% IGEPAL/10% ICEPAL. A MINIMUM OF TWO AND A MAXIMUM OF FOUR THROAT RINGS WILL BE USED AT EACH MANHOLE FOR ADJUSTMENT.

13. INFILTRATION DISHES WILL BE REQUIRED IN MANHOLES WHERE APPLICABLE (I.E. SUCH AS LOW DRAINAGE AREAS) AND EVERY THIRD MANHOLE SHALL BE VENTED, 30" INCH MANHOLE COVER WITH 1" INCH HOLE CENTER OF COVER WHERE APPLICABLE/OR WATER TIGHT/BOLT DOWN.

    NOTE: MANHOLE COVER INSERTS SHALL BE FRW INDUSTRIES, INC., "INFLOW PROTECTOR-COVER" "PRECO INDUSTRIES, LTD.", "SEWER GUARD", OR APPROVED EQUAL AND SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAKING THE NECESSARY FIELD MEASUREMENTS FOR THE MANUFACTURER PRIOR TO PRODUCTION.

    ALL MANHOLES MUST HAVE 350-400 FEET SPACING BETWEEN MANHOLES TO PROVIDE ACCESS TO SEWER LINES FOR CLEANING, ON THE SARA PUBLIC SEWER EASEMENT. A 16 FOOT GATE WITH LOCK WILL BE PROVIDED BY CONTRACTOR FOR ACCESS TO CLEANING AND MAINTAINING SEWER LINES.

    A. DROP MANHOLES SHALL BE REQUIRED WHEN THE INFLOW ELEVATION IS MORE THAN TWENTY-FOUR (24) INCHES ABOVE THE OUTFLOW ELEVATION. DROP SHALL BE LOCATED OUTSIDE THE MANHOLE WITH ITS FLOWLINE ELEVATION LOCATED BETWEEN THE CENTER LINE AND TOP OF SEWER LINE.

14. ALL MANHOLES WILL BE CONCRETE ENCASEMENT 1 FOOT AROUND RING, 28-INCH DEEP AFTER GATOR WRAP SEALING SYSTEM HAS BEEN APPLIED.

15. NEW MANHOLE PROTECTIVE COATING AND LINER IS FOR THE PURPOSE OF I/I INFILTRATION BECAUSE OF HIGH WATER TABLE, APPLICATION PROCEDURES ARE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATION
AND PER THE FOLLOWING SPECIFICATIONS:

    A. MANHOLE PROTECTIVE COATING: CONTRACTOR WILL BE RESPONSIBLE FOR MANHOLES ON PROJECT SAFETY ASSESSMENT; CONFINED SPACE ENTRY SET BY OCCUPATIONAL SAFETY AND HEALTH STANDARDS, 29 CFR 1910.146 APP, E.

    B. THE CONTRACTOR, SHALL NOTIFY THE SARA, UTILITIES INSPECTIONS DEPARTMENT WITH A MINIMUM OF 2 DAYS ADVANCE NOTICE OF THE START OF ANY FIELD SURFACE PREPARATION WORK OF COATING APPLICATION WORK OF MANHOLES.

    C. ALL NEW MANHOLES IN NEW DEVELOPMENTS SHALL BE 30" INCH OPENING, WATERTIGHT AND THE INTERIOR WALL COATED WITH A SARA APPROVED SEWER STRUCTURE FOR ALL MANHOLES. APPLY A COMBINATION OF BOTH PRODUCTS WITH THE CEMENTITIOUS COATING FIRST, FOLLOWED BY THE EPOXY COATING LAFARGE SEWERCOAT 3000 HR REGULAR. WITH THE REQUIRED ONE-INCH THICK APPLICATION. THIS IS THE ONLY PRODUCT YET APPROVED WHICH SATISFIES THE REQUIREMENT OF APPLYING THE COMBINATION OF BOTH THE CEMENTITIOUS COATING AND EPOXY COATING.

APPROVED MATERIALS ARE AS FOLLOWS:

CEMENTITIOUS COATING WITH REQUIRED ONE-INCH THICK APPLICATION

- PERMACAST CR-5000
- STRONG-SEAL MS-2C
- STANDARD CEMENT MATERIAL INC PELINER
- QUADEX ALUMINALINER

EPOXY COATING: WITH SPECIFIED THICKNESS APPLICATION.

* RAVEN 405 SERIES HIGH BUILD EPOXY LINER REQUIRED THICKNESS 125 MILS
* SPRAY WALL POLYURETHANE SYSTEM REQUIRED THICKNESS 150 MILS

D. WARRANTY LETTER ON MANHOLE PROTECTIVE COATING FOR 10 YEARS AFTER FINAL ACCEPTANCE OF PROTECTIVE COATINGS. CONTRACTOR IS NOT RELIEVED OF ITS RESPONSIBILITIES UNDER THE CONTRACT DOCUMENTS.

    i. ANY CONNECTIONS TO EXISTING MANHOLES WILL REQUIRE A 36" INCH CRADLE TO SUPPORT INCOMING PIPE. A RUBBER GASKET WILL ALSO BE REQUIRED (CENTERED AT MANHOLE WALL) WITH GROUTING AT INTERIOR AND EXTERIOR PENETRATIONS.

    PENETRATION INTO MANHOLE WILL BE CORE DRILLED. ANY DAMAGE EXITING MANHOLE WILL BE REPLACED AT CONTRACTOR'S EXPENSE. IF COATING SEAL IS BROKEN, THE MANHOLE WILL BE RECOATED WITH THE SAME MATERIALS. IF EXISTING SEWER MANHOLE SEAL COATING IS BROKEN, ALL OF MANHOLE WILL BE RESEALED WITH SAME MATERIALS.

    ii. ANY AND ALL EXISTING MANHOLES WITHIN CONSTRUCTION PROJECT THAT TIE IN, ARE DONE BY CONTRACTOR TO STUB-OUT ADJUSTMENT, RECONSTRUCTION, OR LEAKING. MANHOLE WILL BE COAT SEALED AT CONTRACTOR'S EXPENSE.

    iii. MANHOLES WITH STUB-OUTS (8") INCH OR LARGER MUST BE LOCATED AT THE END OF ALL SEWER LINES THAT MAY BE EXTENDED IN THE FUTURE. MANHOLES PLACED AT THE END OF THE WASTEWATER COLLECTION SYSTEM PIPES THAT MAY BE EXTENDED IN THE FUTURE MUST INCLUDE PIPE STUB-OUTS WITH PLUGS.

PIPING

****** NEW NOTE *******

16. THE KIND AND DESCRIPTION OF THE PIPE CONDUIT IS SHOWN ON THE PLANS (IF PVC, SDR AND ASTM/ANSI DESIGNATION CLASS) AS SDR 26 PVC, ASTM D-3034 WITH A MINIMUM STIFFNESS OF 115 PSI TEXAS ADMINISTRATIVE CODE (TAC) RILES TO INCLUDE 30 TAC & 213, OR ANY REVISIONS THERE TO APPLICABLE TCEQ, 30 TAC & 217, FOR ALL NEW DEVELOPMENT.

17. THE USE OF ASBESTOS CEMENT PIPE WILL BE PROHIBITED UNDER THIS CONTRACT. ALL DUCTILE IRON PIPE USED IN THIS SYSTEM SHALL BE CORROSION PROTECTED ON BOTH THE INTERIOR AND EXTERIOR SURFACES. ALL CORROSION PROTECTION SHALL BE APPLIED AND INSTALLED IN SUCH A MANNER AS TO MAINTAIN A CONTINUOUSLY PROTECTED SURFACE AFTER FINAL PIPE INSTALLATION.

18. ALL PVC SEWER PIPE WITH OVER 14 FEET OF COVER SHALL BE EXTRA STRENGTH; MINIMUM PIPE STIFFNESS OF 115 PSI.

19. ALL SEWER PIPES SHALL HAVE COMPRESSION OR MECHANICAL JOINTS.

20. SEWER PIPE CONNECTIONS TO PRECAST MANHOLES SHALL BE APPROVED BY THE SARA. THIS CONNECTION SHALL USE A FLEXIBLE "BOOT" TYPE CONNECTOR SUCH AS THE PSX POSITIVE SEAL SYSTEM OR ENGINEER APPROVED EQUAL AND COMPLY WITH ASTM C-923. SEWER PIPE CONNECTIONS TO MONOLITHIC MANHOLES WILL BE AS SHOWN ON THE STANDARD DETAIL SHEET. ANY CHANGES IN THESE METHODS MUST BE APPROVED BY SARA ENGINEER.

21. ALL PIPE TRENCHING, BEDDING AND BACKFILL SHALL BE DONE IN ACCORDANCE WITH APPROPRIATE ASTM/ANSI SPECIFICATIONS [REFERENCE 30 TAC 217.2(A)(5)(A); ASTM C-12 (ANSI A106.2) OR ASTM D-2321 (ANSI K65.171)], A8 COMPACTION @ 98% DENSITY TESTS ACROSS THE BOARD, 1 RANDOM DENSITY TEST PER LIFT FOR EVERY 400 FEET.

    A. SAND MIGRATION PREVENTION COLLAR WHEN CHANGING THE INITIAL BACKFILL FROM SELECT INITIAL BACKFILL TO OPTIONAL SELECT INITIAL BACKFILL. A TWO (2) FOOT LONG CLASS D CONCRETE ENCASEMENT OR FIRMLY COMPACTED, CONSOLIDATED CLAY ENCASEMENT BETWEEN THE TWO SHALL BE PROVIDED FOR THE ENTIRE HEIGHT OF THE INITIAL BACKFILL. EVERY 180 FEET ALONG PIPE AND 20 FEET FROM WALL OF MANHOLE IN EACH DIRECTION.

    B. SEWER LINE LOCATION:

        i. SEWER LINES SHALL BE SIZED AND EXTENDED THROUGH THE LIMITS OF A DEVELOPMENT TO SERVE ADJACENT PROPERTY, WITH MANHOLE AND STUB-OUT AT END OF SEWER LINE.

        a. IN PHASED CONSTRUCTION OF THOROUGHFARES, THE SEWER LINE SHALL BE EXTENDED THE ENTIRE LENGTH OF THOROUGHFARE BEING CONSTRUCTED.

        ii. NO PUBLIC SEWER LINE SHALL BE LOCATED NEARER THAN FIVE (5) FEET FROM ANY TREE.

        iii. SIZES AND GRADES FOR SANITARY SEWER SHALL BE AS REQUIRED BY THE SARA ENGINEER AND CONSIDERATION SHALL BE GIVEN AS TO POSSIBLE EXTENSIONS FOR FUTURE DEVELOPMENT. NO SANITARY SEWERS, OTHER THAN LATERALS AND FORCE MAINS, SHALL BE LESS THAN EIGHT (8) INCH IN DIAMETER.

22. WHEN SEWER LATERALS ARE TO BE CONNECTED TO EXISTING SEWER MAINS AND NO STUB-OUT HAS BEEN EARLIER PROVIDED, THE CONNECTION MUST BE MADE WITH AN APPROVED SERVICE SADDLE AS PER 30 TAC 313.5(C) (7). NEW INVERT TO BE BUILT, SMOOTH CHANNEL FOR NEW PIPE/SLOPE AT 2% FLOW.

23. ALL RESIDENTIAL SERVICE LATERALS SHALL BE SDR 26 PVC WITH RATING OF 115 PSI, BE EXTENDED TO THE PROPERTY LINE AT (6 x 6) CAPPED AND SEALED. ATTACH SEWER BURIAL TAPE TO THE END OF ALL SEWER LATERALS AND BRING UP TO THE GROUND LEVEL FOR MARKER (GREEN). (SEE HOUSE LATERALS DETAILS).

    A. SEWER SERVICE LATERALS. THE SIZES AND LOCATIONS OF LATERALS SHALL BE DESIGNATED AS FOLLOWS UNLESS OTHERWISE DIRECTED BY THE SARA ENGINEER:

        i. IN GENERAL FOR SINGLE FAMILY DWELLINGS, THE LATERAL SIZE SHALL BE A FOUR (4) INCH MINIMUM. HOUSE LATERALS SHALL BE INSTALLED CENTER OF THE LOT AND SHALL HAVE A TEN (10) FOOT SEPARATION FROM THE WATER SERVICE. THE SERVICE SHALL THEN BE EXTENDED AT A FORTY-FIVE (45) DEGREE ANGLE TO FOUR (4) FEET ABOVE THE FINISHED GRADE AND CAPPED. USE SEWER BURIAL TAPE TO MARK ALL SEWER SERVICE LATERALS.

        ii. MULTIPLE UNITS, APARTMENTS, LOCAL RETAIL AND COMMERCIAL SIX (6) INCH MINIMUM, MANUFACTURING AND INDUSTRIAL - EIGHT (8) INCH MINIMUM OR LARGER AS REQUIRED.

        iii.

        TRAPS AND INTERCEPTORS (FOG - TCEQ)

        UNIFORM PLUMBING CODE, CITY OF ELMENDORF BUILDING INSPECTIONS DEPARTMENT. ALL COMMERCIAL BUILDINGS WILL HAVE TRAPS (FOG -TCEQ).

        OIL SEPARATORS

        WHICH INCLUDE OIL SEPARATOR - GASOLINE SERVICE STATIONS, CAR WASHES, GARAGES, DRY CLEANERS, CHEMICAL PLANTS, GAS PLANTS, HIDE PROCESSORS, TESTING LABORATORIES OR ANY PLACE WHERE OIL OR SOLVENTS MAY BE INTRODUCED INTO THE SANITARY SEWER SYSTEM. THE SIZING CRITERIA FOR OIL SEPARATORS SHALL BE BASED ON THE G.P.M. RATE OF ALL FIXTURES, APPLIANCE OR APPURTENANCE, DRAINING INTO SEWER SYSTEM.

        SAND INTERCEPTORS

        SAND INTERCEPTORS SHALL BE INSTALLED IN THE SEWER SYSTEM OF THE FOLLOWING ESTABLISHMENTS, GARAGES, CAR WASHES, SERVICE STATIONS OR ANY PLACE OF BUSINESS WHERE HEAVY SOLIDS MAY BE INTRODUCED INTO THE SANITARY SEWER SYSTEM. THE SIZING CRITERIA FOR A SAND INTERCEPTOR SHALL BE BASED ON THE REQUIRED G.P.M. x 12 MINUTE RETENTION TIMES TO OBTAIN THE TANK SIZE IN GALLONS CAPACITY.

        AUTOMATIC CAR WASHES

        WITH HIGH PRESSURE SPRAYS AND/OR BRUSHES INSTALL A 50 G.P.M INTERCEPTOR MINIMUM, FOR A 4-BAY VEHICLE WASH. THE SIZE OF THE INTERCEPTOR SHALL INCREASE 10 G.P.M. FOR EACH ADDITIONAL WASH BAY OVER 4. SINGLE BAY OR PORTABLE WASHER TYPE VEHICLE WASHES SHALL INSTALL A 20 G.P.M. INTERCEPTOR MINIMUM.

        NEUTRALIZING DEVICES

        IN NO CASE SHALL CORROSIVE LIQUIDS, SPENT ACIDS, OR OTHER HARMFUL CHEMICALS WHICH MIGHT DESTROY OR INJURE A DRAIN, SEWER, SOIL, OR WASTE PIPE, OR WHICH MIGHT CREATE NOXIOUS OR TOXIC FUMES, DISCHARGE INTO THE SANITARY SEWER SYSTEM WITHOUT BEING THOROUGHLY NEUTRALIZED BY PASSING THROUGH A PROPERLY CONSTRUCTED AND ACCEPTABLE NEUTRALIZING DEVICE. SUCH DEVICE SHALL BE PROVIDED WITH A SUFFICIENT INTAKE OF NEUTRALIZING MEDIUM, CONSISTING OF LIMESTONE OR MARBLE CHIPS, SO AS TO MAKE ITS CONTENTS NON-INJURIOUS BEFORE BEING DISCHARGED INTO THE SANITARY SEWER SYSTEM.

        LINT TRAPS

        PUBLIC AND PRIVATE WASHATERIAS AND COMMERCIAL LAUNDRIES SHALL INSTALL A LINT TRAP EQUIPPED WITH A CONVENIENTLY LOCATED AND EASILY REMOVABLE WIRE BASKET OR OTHER SIMILAR DEVICE THAT WILL PREVENT THE STRINGS, RAGS, BUTTONS, OR OTHER PROHIBITED MATERIAL FROM ENTERING THE SANITARY SEWER SYSTEM. THE BASKET OR OTHER SIMILAR DEVICE SHALL PREVENT PASSAGE TO THE SANITARY SEWER SYSTEM OF SOLIDS GREATER THAN ½ INCH IN DIAMETER. THE LINT TRAP SIZE SHALL BE BASED ON THE TOTAL G.P.M. OF ALL FIXTURES, APPLIANCES AND APPURTENANCES DRAINING TO IT IN LIEU OF A LINT TRAP, A LINT INTERCEPTOR MAY BE INSTALLED. THE INTERCEPTOR SHALL BE SIZED AND DESIGNED BY A TEXAS REGISTERED ENGINEER WITH HIS SEAL AND SIGNATURE ON THE DRAWINGS.

        SILVER RECOVERY UNITS

        SILVER RECOVERY UNITS SHALL BE INSTALLED IN WASTE LINE(S) LEADING FROM X-RAY PROCESSING, PHOTOGRAPHIC PROCESSING, AND/OR ANY PROCEDURES IN ESTABLISHMENT SUCH AS MEDICAL LABS, DENTAL LABS, PHOTO FINISHERS, PRINTERS, GRAPHIC ARTS PRODUCTION FACILITIES, HOSPITAL, FACILITIES, VETERINARY HOSPITALS, OR OTHER ESTABLISHMENTS WHERE SILVER MAY BE INTRODUCED INTO THE SANITARY SEWER SYSTEM.

        SOLIDS INTERCEPTORS

        SOLIDS INTERCEPTORS SHALL BE INSTALLED WHEN PRE-TREATMENT OF WASTE STREAMS IS NECESSARY TO PREVENT SOLIDS GREATER THAN ½" INCH IN DIAMETER, WHICH MAY CAUSE LINE STOPPAGE FROM ENTERING THE SANITARY SEWER SYSTEM.

        INTERCEPTORS

        a. INTERCEPTORS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE DESIGN APPROVED BY THE SAN ANTONIO RIVER AUTHORITY CONSISTING OF A MINIMUM OF TWO COMPARTMENTS WITH FITTINGS DESIGNED FOR GREASE RETENTION AND PROVIDE FOR A MINIMUM OF TWELVE (12) MINUTES RETENTION.

        b. THERE SHALL BE AN ADEQUATE NUMBER OF MANHOLES TO PROVIDE ACCESS FOR CLEANING ALL AREAS OF AN INTERCEPTOR, ONE MANHOLE PER TRAP COMPARTMENT, MANHOLE COVERS SHALL BE GAS TIGHT IN CONSTRUCTION HAVING A MINIMUM OPENING DIMENSION OF 20 INCHES (0.5 M).

        c. IN AREAS WHERE TRAFFIC MAY EXIST THE INTERCEPTOR SHALL BE DESIGNED TO HAVE ADEQUATE REINFORCEMENT AND COVER.

        d. ALL INTERCEPTORS SHALL HAVE THE SIZE OF THE INTERCEPTOR (IN GALLONS PER MINUTE OR GALLON CAPACITY) PERMANENTLY AFFIXED TO THE DEVICE.

        e. ALL CONCRETE UTILIZED IN THE CONSTRUCTION OF INTERCEPTOR SHALL HAVE A MINIMUM STRENGTH OF 3000 PSI.

        f. AN EFFLUENT SAMPLING WELL ON ALL INTERCEPTORS SHALL BE REQUIRED. THE SAMPLE WELL SHALL HAVE A RISER A MINIMUM OF 6" INCHES IN DIAMETER AND SHALL BE INSTALLED AFTER THE CONFLUENCE OF ALL WASTE STREAMS FROM THE FACILITY AND PRIOR TO DISCHARGING INTO SANITARY SEWER COLLECTION SYSTEM. THE WELL SHALL BE PERPENDICULAR TO THE EFFLUENT LATERAL TO ALLOW VISUAL OBSERVATION OF THE FLOW STREAM AND PROVIDE FOR SAMPLING OF WASTE WATER.

        WATER TIGHT TESTING (24 HOURS)

        g. ALL INTERCEPTORS SHALL BE WATER TESTED OUT AT JOB SITE AFTER BEING INSTALLED (PLUG BOTH ENDS AND FILL TO TOP OF INTERCEPTOR). INTERCEPTOR SHALL SHOW NO LEAKAGE FROM SECTION SEAMS, PINHOLES, OR OTHER IMPERFECTIONS. ANY LEAKAGE IS CAUSE FOR REJECTION. WHEN LEAKAGE OCCURS, ADDITIONAL WATER TESTING SHALL BE MADE. AFTER CORRECTING MEASURE TEST, REPORTS SHALL SHOW TOTAL NUMBER OF INTERCEPTORS TESTED. WHEN LEAKAGE OCCURS CORRECTIVE MEASURES TAKEN SHALL BE REPORTED BY THE SARA INSPECTORS. SARA INSPECTORS SHALL RECORD IN DAILY LOG WITH PROJECT NAME, DATE IT WAS TESTED AND COMPLETED.

A. MANHOLES WILL BE REQUIRED ON SIX (6) INCH AND LARGER LATERALS WHERE THEY CONNECT TO THE MAIN.

B. LATERALS WILL NOT BE ATTACHED TO SEWER MAINS THAT ARE DEEPER THAN TWELVE (12) FEET.

C. FITTINGS ARE NOT PERMITTED ON LATERALS BETWEEN THE WYE AND THE PROPERTY LINE.

D. DEEP CUT OR DROP CONNECTIONS SHALL NOT BE PERMITTED.

E. A MINIMUM OF ONE (1) LATERAL PER BUILDING SHALL BE REQUIRED. ALSO, A MINIMUM OF ONE (1) LATERAL PER RESIDENTIAL LOT SHALL BE REQUIRED. DUPLEXES SHALL HAVE TWO (2) LATERALS THAT SHALL BE INDEPENDENTLY ATTACHED TO THE MAIN.

F. ALL SEWER LATERAL CROSSING WATER MAINS SHALL CONFORM TO THE REQUIREMENTS OF THE TCEQ CHAPTER 217 (DESIGN CRITERIA FOR SEWERAGE SYSTEMS) LATEST REVISION, SDR 26 150 PSI, OR DUCT IRON PIPE, CONCRETE ENCASEMENT.

24. WHERE REQUIRED CONCRETE ENCASEMENT SHALL BE PLACED FOR FULL WIDTH OF THE TRENCH TO A PLAIN SIX (6) INCHES ABOVE THE TOP OF THE PIPE WITH PAY UNITS AS SHOWN ON THE STANDARD DETAIL SHEET.

25. A MINIMUM OF FOUR (4) FEET OF COVER IS TO BE MAINTAINED OVER THE SANITARY SEWER MAIN AND LATERALS AT GRADE, OTHERWISE CONCRETE ENCASEMENT IS REQUIRED.

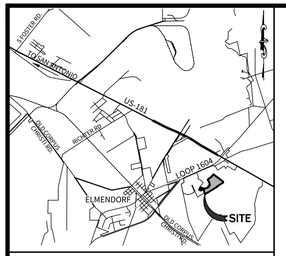
26. WHERE POROUS MATERIAL INCLUDING "SUBGRADE FILLER" IS USED FOR BACKFILL IN THE BEDDING AND INITIAL BACKFILL ZONES, SEEPAGE RETAINERS ARE REQUIRED AT AN APPROXIMATE OF 180 FEET. RETAINERS SHALL CONSIST OF CLASS 'D' CONCRETE ENCASEMENT OR FIRMLY COMPACTED CONSOLIDATED CLAY ENCASEMENT. THE RETAINERS SHALL EXTEND FROM THE BOTTOM OF THE TRENCH TO THE TOP OF THE GRANULAR MATERIAL FOR THE ENTIRE TRENCH WIDTH. ENCASEMENT SHALL BE 24" INCHES LONG, NO EXTRA PAY ITEM.

BLASTING

27. WHEN ALLOWABLE, BLASTING SHALL BE PERFORMED IN ACCORDANCE WITH THE ABOVE CRITERIA ESTABLISHED BY THE NATIONAL FIRE PROTECTION ASSOCIATION 30 TAC 313.5(C)(6).

28. BLASTING SEWER LINE EXCAVATION MUST BE DONE IN SUCH A MANNER AS TO MINIMIZE THE FRACTURING OF ROCK BEYOND THE REQUIRED EXCAVATION. THE CONTRACTOR SHALL CONSIDER THE ELEVATION OF THE EXISTING SANITARY SEWER MAIN IN RELATION TO THE BLASTING CHARGE AND RELATIVE DIRECTION OF EXISTING AND PROPOSED TRENCHES. BLASTING WITHIN SUCH AREAS SHALL BE ACCOMPLISHED ONLY BY QUALIFIED BLASTING CONTRACTORS WHO HOLD BLASTING LICENSES FROM A QUALIFIED AGENCY SUCH AS BEXAR COUNTY FIRE MARSHALS OFFICE. ANY DAMAGE TO EXISTING SANITARY SEWERS RESULTING FROM BLASTING SHALL BE REPAIRED AND RESTORED BY THE CONTRACTOR AT HIS OWN EXPENSE.

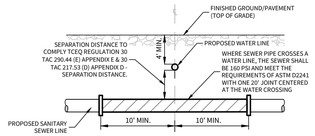
29. NO BLASTING SHALL BE PERFORMED WITHIN 75 FEET OF EXISTING



LOCATION MAP N.T.S.

LEGEND

EXISTING SANITARY SEWER	EX.8"SS
PROPOSED SANITARY SEWER	8"SS
EXISTING SANITARY SEWER MANHOLE	
PROPOSED SANITARY SEWER MANHOLE	
EXISTING WATER MAIN	EX.8"W
PROPOSED WATER MAIN	8"W



TYPICAL SANITARY SEWER/ WATER CROSSING DETAIL
N.T.S.

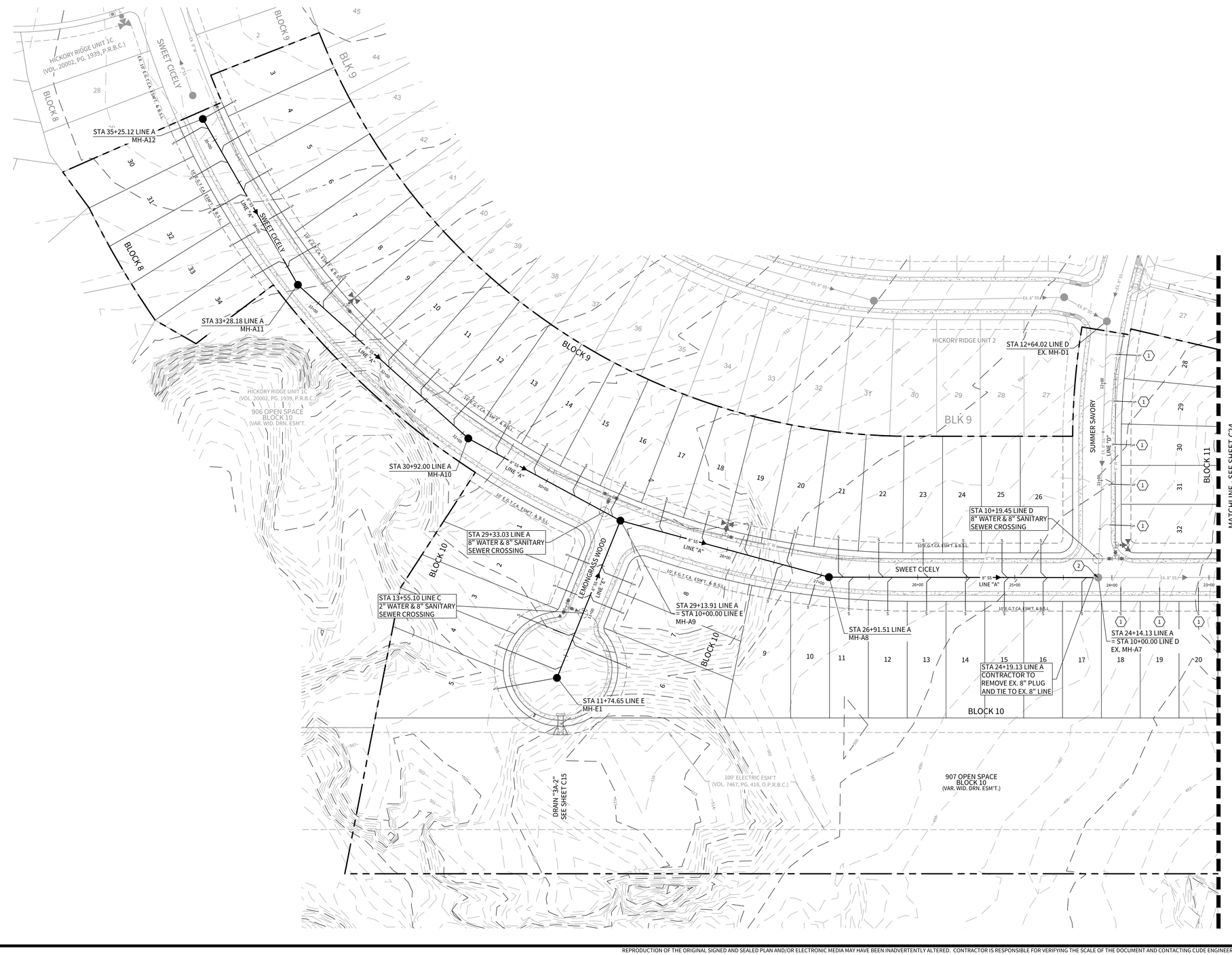
DEVELOPER:

ELMENDORF DEVELOPMENT COMPANY
1401 WOODLANDS PARKWAY
THE WOODLANDS, TEXAS 773880
TEL: (210) 403-6282
CONTACT PERSON: JUANITA ORSAK

CIVIL ENGINEER:

CUDE ENGINEERS
CONTACT PERSON: CHRIS CHAFFEE, P.E.
4122 POND HILL ROAD, SUITE 101
SAN ANTONIO, TX 78231
TEL: (210) 681-2951
FAX: (210) 523-7112

SCALE: 1"=50'
0 50 100



KEYNOTE:

1. EXISTING SANITARY SEWER LATERAL STUBOUT. CONTRACTOR TO EXTEND LATERAL (@2.0% MIN. SLOPE) TO UTILITY EASEMENT UNLESS SPECIFIED OTHERWISE.
2. CONTRACTOR TO ADJUST MANHOLE TOP TO MATCH PROPOSED GRADING AND RECOAT MANHOLE PER AQUA SPECIFICATIONS.

SAN ANTONIO RIVER AUTHORITY (SARA)	210-227-1373
CITY OF ELMENDORF	210-635-8210
TEXAS STATE WIDE ONE CALL LOCATOR	1-800-545-6005
C.P.S. ENERGY	"
AT&T	"
CHARTER COMMUNICATION	"
VALERO ENERGY CO.	"
TIME WARNER CABLE	"
VALERO ENERGY CO.	"
GREY FOREST UTILITIES	"

NOTES:

1. ALL EXCAVATED MATERIAL SHALL BE PLACED ON THE UPGRADIENT SIDE OF THE SEWER TRENCH THUS ALLOWING THE TRENCH TO INTERCEPT ANY SILT CONTAMINATED RUNOFF.
2. ALL SANITARY SEWER PIPE SHALL BE P.V.C. THAT MEETS ASTM SPECIFICATION D-3034, SDR-26 UNLESS OTHERWISE NOTED.
3. ALL LATERALS TO BE INSTALLED @ MIN. 2.0% SLOPE. UNLESS OTHERWISE NOTED.
4. LATERALS TO BE BUILT TO FRONT UTILITY EASEMENT LINE OR SANITARY SEWER EASEMENT LINE.
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6. FOR WASTEWATER IN THE FIVE-YEAR FLOODPLAIN OF A DRAINAGE-WAY. MANHOLES MUST BE SHALLOW PROFILE, MONOLITHIC STRUCTURED AND ANCHORED TO SUBGRADE.
7. WASTEWATER MAINS SHOULD BE LAID WITH THE TOP OF THE PIPE AT A MINIMUM OF THREE FEET BELOW SURFACE OF THE GROUND. WHERE THIS MINIMUM COVER IS NOT POSSIBLE OR WHERE THE WASTEWATER MAIN IS LOCATED WITHIN OR CROSSING THE FIVE-YEAR FLOODPLAIN OF A DRAINAGE-WAY THE WASTEWATER MAIN MUST BE ENCASED WITH 2000 PSI CONCRETE WITH A MINIMUM THICKNESS OF SIX INCHES.

TRENCH EXCAVATION PROTECTION

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CUDE ENGINEERS

4122 Pond Hill Road, Suite 101
San Antonio, Texas 78231
P:(210) 681.2951 F: (210) 523.7112

HICKORY RIDGE UNIT 3A

OVERALL SANITARY SEWER PLAN

DATE
11/18/2025

PROJECT NO.
03278.101

DRAWN BY
RC/JG/JRR/MOH/MAS

CHECKED BY
CJC/KMH

REVISIONS
1. 2. 3. 4. 5. 6. 7. 8.

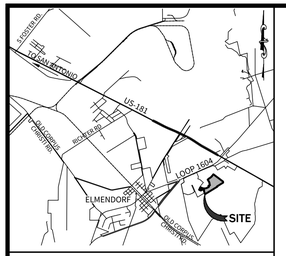
STATE OF TEXAS
KYLE M. HUDEK
138753
LICENSED
PROFESSIONAL ENGINEER
11/18/2025

CUDE ENGINEERS
TBPELS No. 10048500

C23

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REPRODUCTION OF THE ORIGINAL SIGNED AND SEALED PLAN AND/OR ELECTRONIC MEDIA MAY HAVE BEEN INADVERTENTLY ALTERED. CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE SCALE OF THE DOCUMENT AND CONTACTING CUDE ENGINEERS TO VERIFY DISCREPANCIES PRIOR TO CONSTRUCTION.



LOCATION MAP N.T.S.

LEGEND

- EXISTING SANITARY SEWER — EX.8"SS
- PROPOSED SANITARY SEWER — 8"SS
- EXISTING SANITARY SEWER MANHOLE
- PROPOSED SANITARY SEWER MANHOLE
- EXISTING WATER MAIN — EX.8"W
- PROPOSED WATER MAIT — 8"W

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0 50 100

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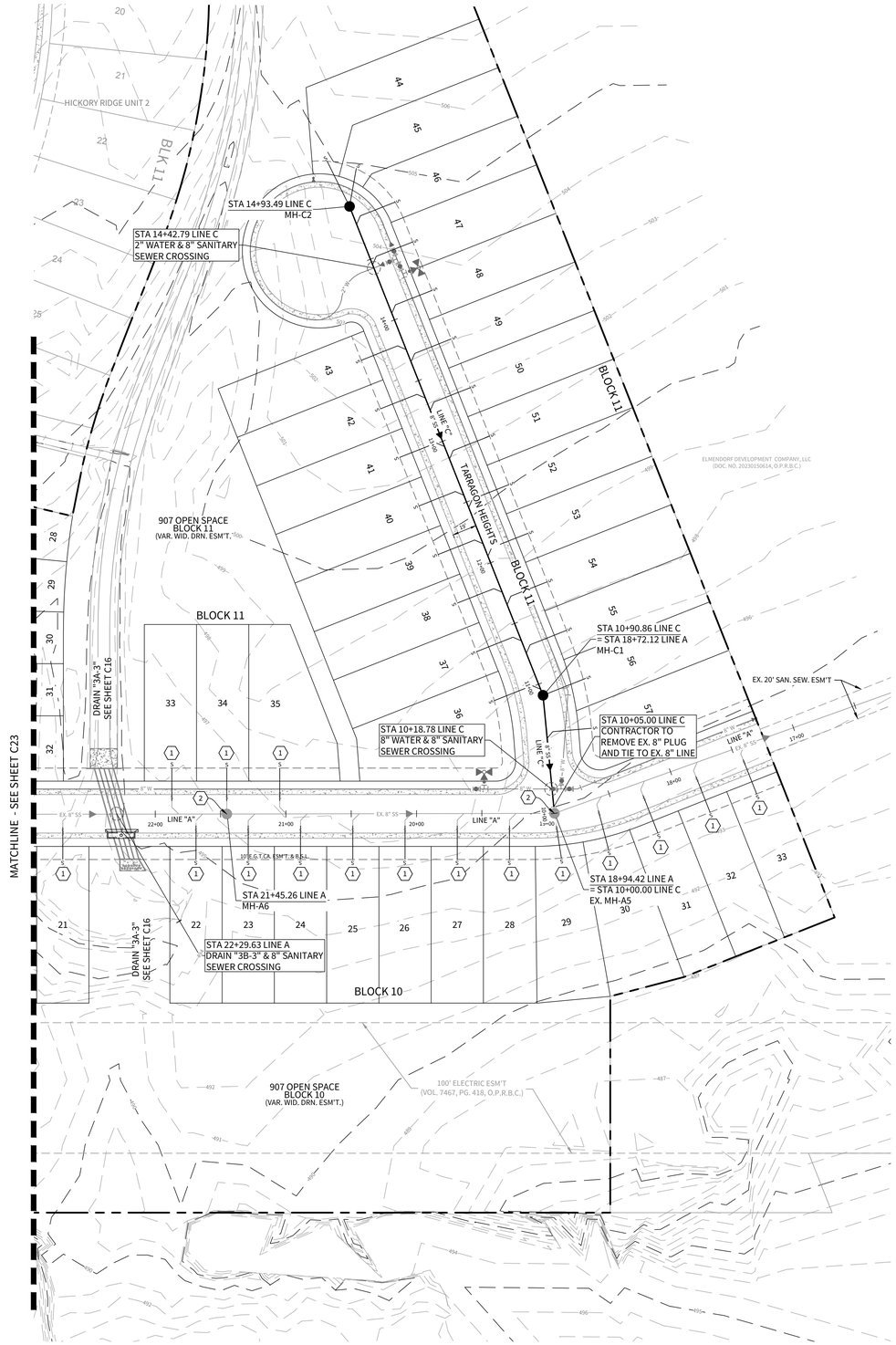
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HICKORY RIDGE UNIT 3A

OVERALL SANITARY SEWER PLAN

DATE
11/18/2025

PROJECT NO.
03278.101

DRAWN BY
RC/JG/JRR/MOH/MAS

CHECKED BY
CJC/KMH

REVISIONS
1. 2. 3. 4. 5. 6. 7. 8.

STATE OF TEXAS
KYLE M. HUDEK
138753
LICENSED
PROFESSIONAL ENGINEER
11/18/2025

CUDE ENGINEERS
TBPELS No. 10048500

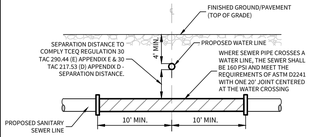
C24

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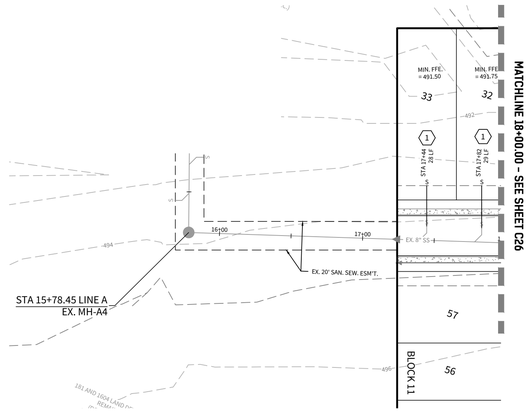
TYPICAL SANITARY SEWER/ WATER CROSSING DETAIL
N.T.S.

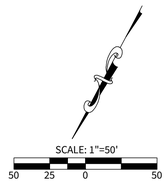
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LINE A

STA. 15+78.45 TO STA. 18+00.00

SAN. SEW. INV.

CUDEENGINEERS.COM

4122 Pond Hill Road, Suite 101
San Antonio, Texas 78231
P:(210) 681.2951 F: (210) 523.7112

HICKORY RIDGE UNIT 3A

SANITARY SEWER PLAN & PROFILE - LINE A

DATE
11/18/2025

PROJECT NO.
03278.101

DRAWN BY
RC/JG/JRR/MOH/MAS

CHECKED BY
CJC/KMH

REVISIONS
1 2 3 4 5 6 7 8

STATE OF TEXAS
KYLE M. HUDEK
138753
LICENSED
PROFESSIONAL ENGINEER
11/18/2025

CUDE ENGINEERS
TBPELS No. 10048500

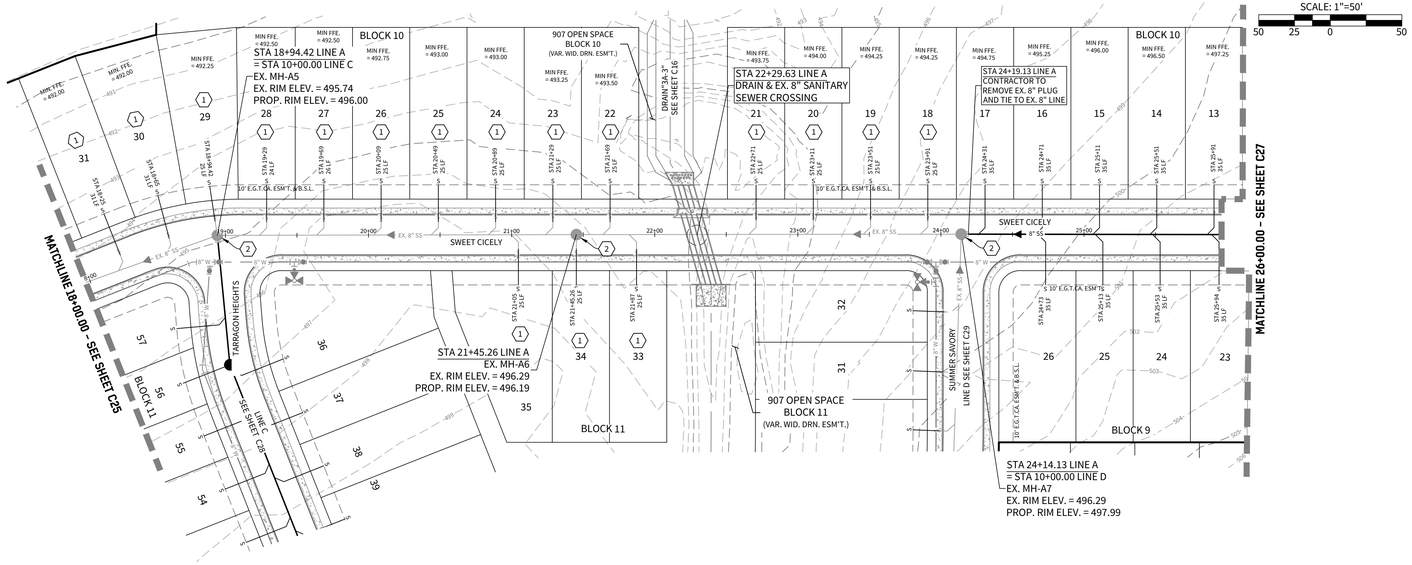
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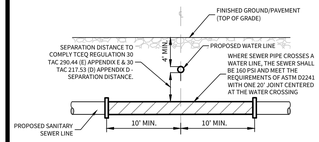
REPRODUCTION OF THE ORIGINAL SIGNED AND SEALED PLAN AND/OR ELECTRONIC MEDIA MAY HAVE BEEN INADVERTENTLY ALTERED. CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE SCALE OF THE DOCUMENT AND CONTACTING CUDE ENGINEERS TO VERIFY DISCREPANCIES PRIOR TO CONSTRUCTION.

C:\03278\101\3 Drawings\Civil\SANITARY SEWER PLANS & PROFILE - LINE A.dwg 2025/11/18 7:13am kmudek

KEYNOTE:

1. EXISTING SANITARY SEWER LATERAL STUBOUT. CONTRACTOR TO EXTEND LATERAL (@2.0% MIN. SLOPE) TO UTILITY EASEMENT UNLESS SPECIFIED OTHERWISE.
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TYPICAL SANITARY SEWER/ WATER CROSSING DETAIL
N.T.S.

NOTES:

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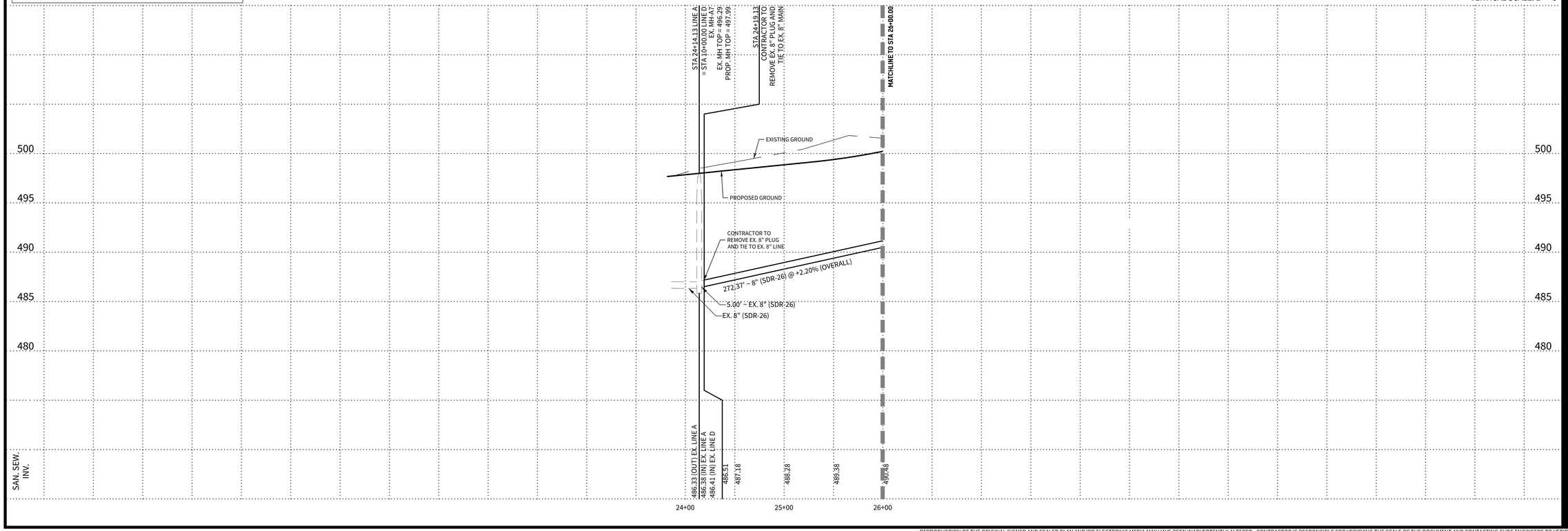
TRENCH EXCAVATION SAFETY PROTECTION

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LINE A

STA. 18+00.00 TO STA. 26+00.00

HORIZONTAL SCALE: 1" = 50'
VERTICAL SCALE: 1" = 5'



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CUDE ENGINEERS

4122 Pond Hill Road, Suite 101
San Antonio, Texas 78231
P:(210) 681.2951 F: (210) 523.7112

HICKORY RIDGE UNIT 3A

SANITARY SEWER PLAN & PROFILE - LINE A

DATE
11/18/2025

PROJECT NO.
03278.101

DRAWN BY
RC/JG/JRR/MOH/MAS

CHECKED BY
CJC/KMH

REVISIONS
1. 2. 3. 4. 5. 6. 7. 8.

STATE OF TEXAS
KYLE M. HUDEK
138753
LICENSED
PROFESSIONAL ENGINEER
11/18/2025
CUDE ENGINEERS
TBPELS No. 10048500

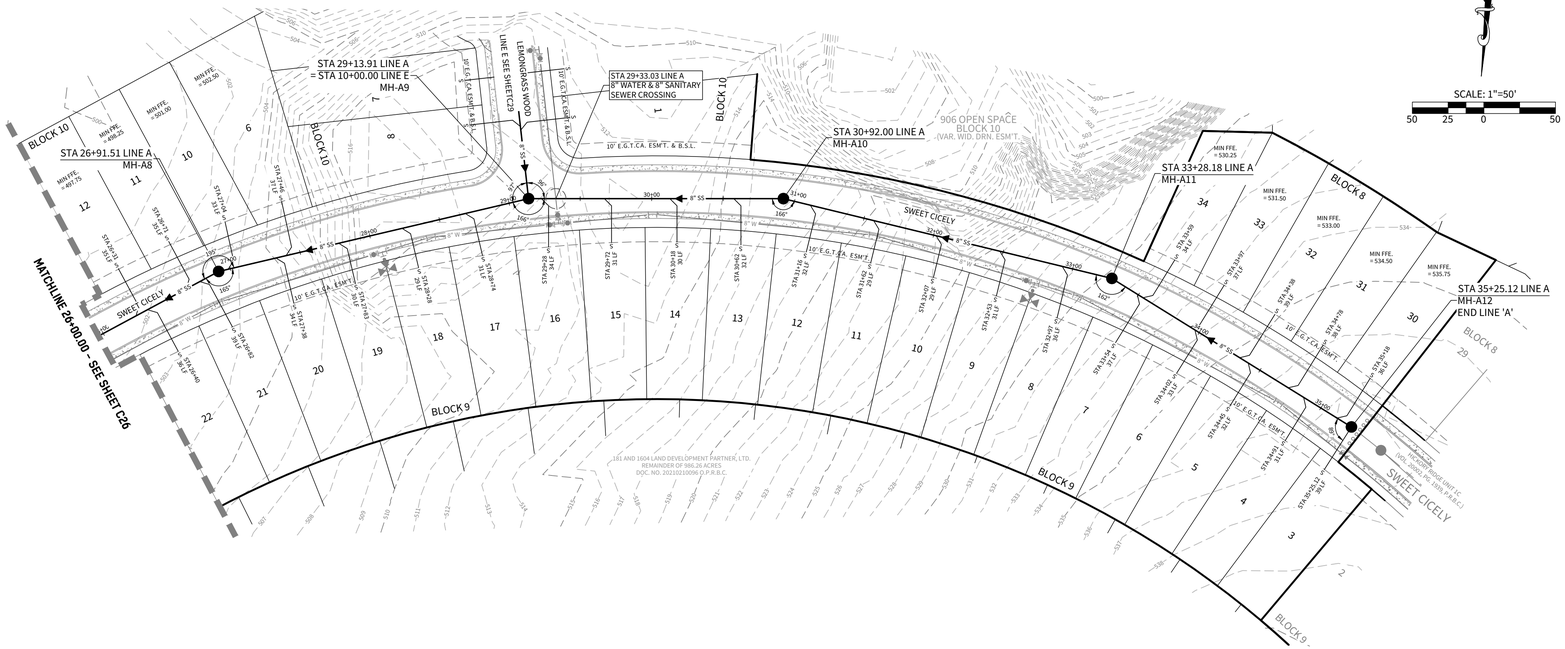
C26

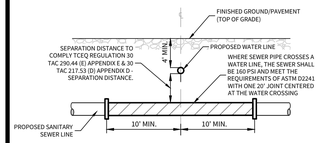
P:\03278\03-0 Drawings\Line A\SANITARY SEWER PLAN & PROFILE - LINE A.dwg 11/18/2025 11:18:13 AM by khudek

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TYPICAL SANITARY SEWER/ WATER CROSSING DETAIL

N.T.S.

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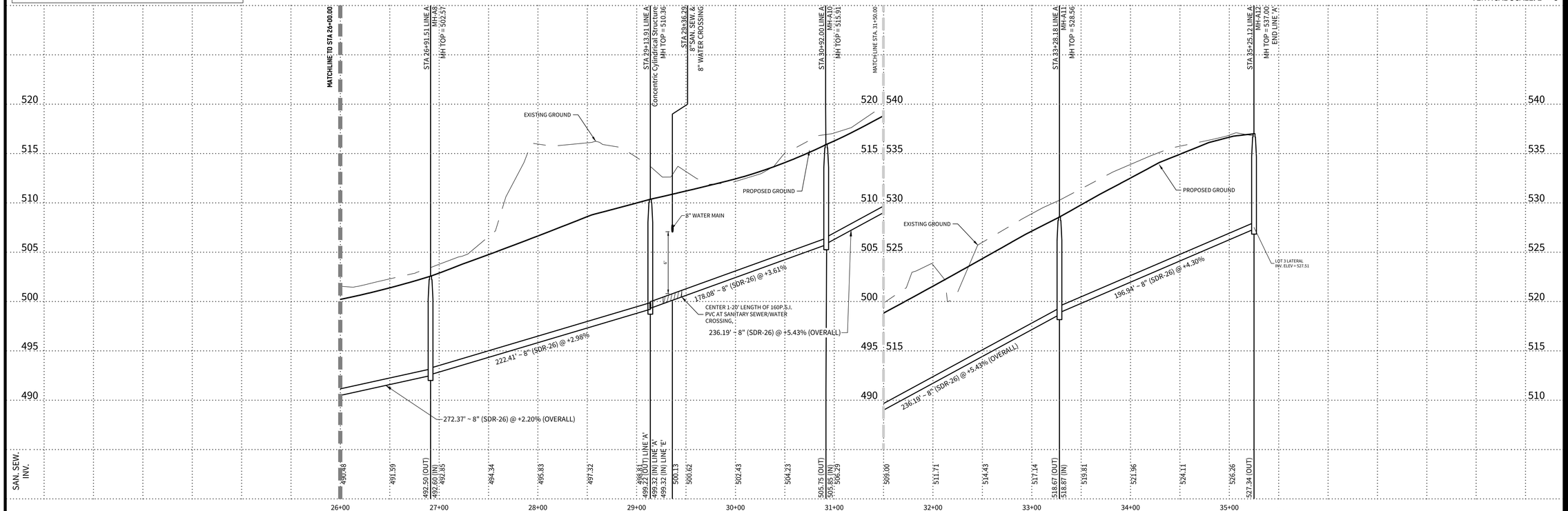
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LINE A

STA. 26+00.00 TO STA. 35+25.12

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VERTICAL SCALE: 1" = 5'



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HICKORY RIDGE UNIT 3A

SANITARY SEWER PLAN & PROFILE - LINE A

DATE
11/18/2025

PROJECT NO.
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DRAWN BY
RC/JG/JRR/MOH/MAS

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CUDE ENGINEERS
TBPELS No. 10048500

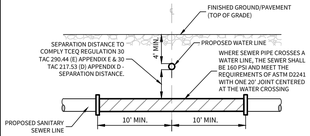
C27

P:\03278.101\3 Drawings\Line A\SANITARY SEWER PLAN & PROFILE - LINE A.dwg 2025.11.18 7:16am khudek

REPRODUCTION OF THE ORIGINAL SIGNED AND SEALED PLAN AND/OR ELECTRONIC MEDIA MAY HAVE BEEN INADVERTENTLY ALTERED. CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE SCALE OF THE DOCUMENT AND CONTACTING CUDE ENGINEERS TO VERIFY DISCREPANCIES PRIOR TO CONSTRUCTION.

KEYNOTE:

(2) CONTRACTOR TO ADJUST MANHOLE TOP TO MATCH PROPOSED GRADING AND RECOAT MANHOLE PER AQUA SPECIFICATIONS.



TYPICAL SANITARY SEWER/ WATER CROSSING DETAIL

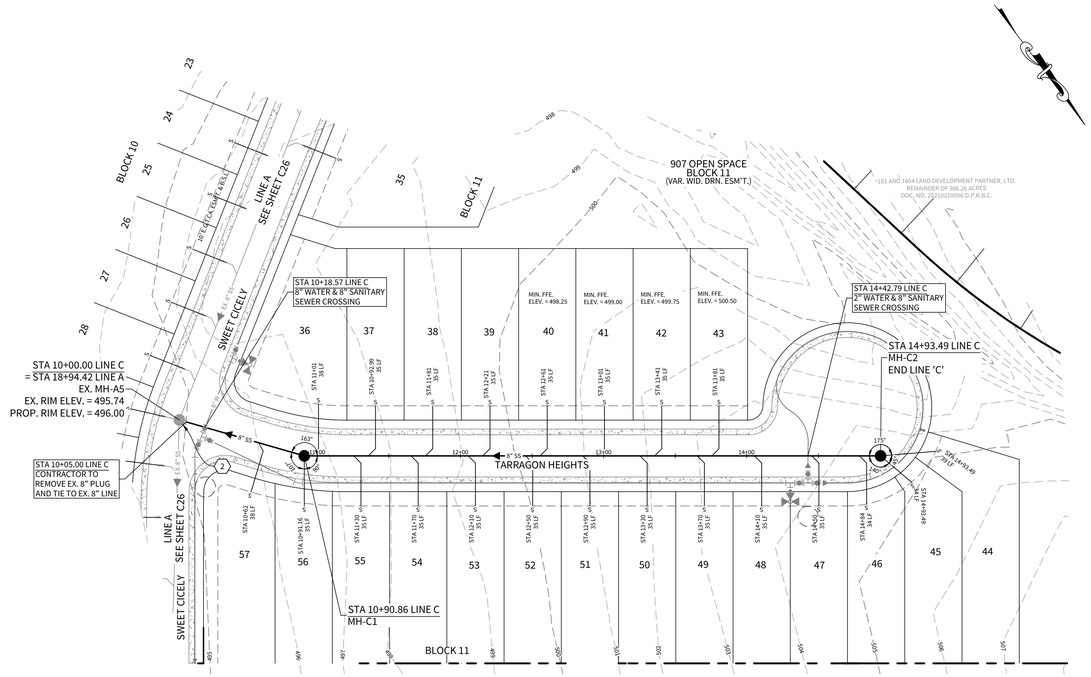
N.T.S.

NOTES:

1. CONTRACTOR TO MAINTAIN A MINIMUM 2' VERTICAL SEPARATION DISTANCE BETWEEN OF THE BOTTOM EXISTING WATER MAIN AND TOP OF PROPOSED SANITARY SEWER MAIN AT WATER AND SANITARY SEWER CROSSINGS.
2. ALL LATERALS SHALL BE INSTALLED AT A MINIMUM 2.0% SLOPE UNLESS OTHERWISE NOTED.

TRENCH EXCAVATION SAFETY PROTECTION

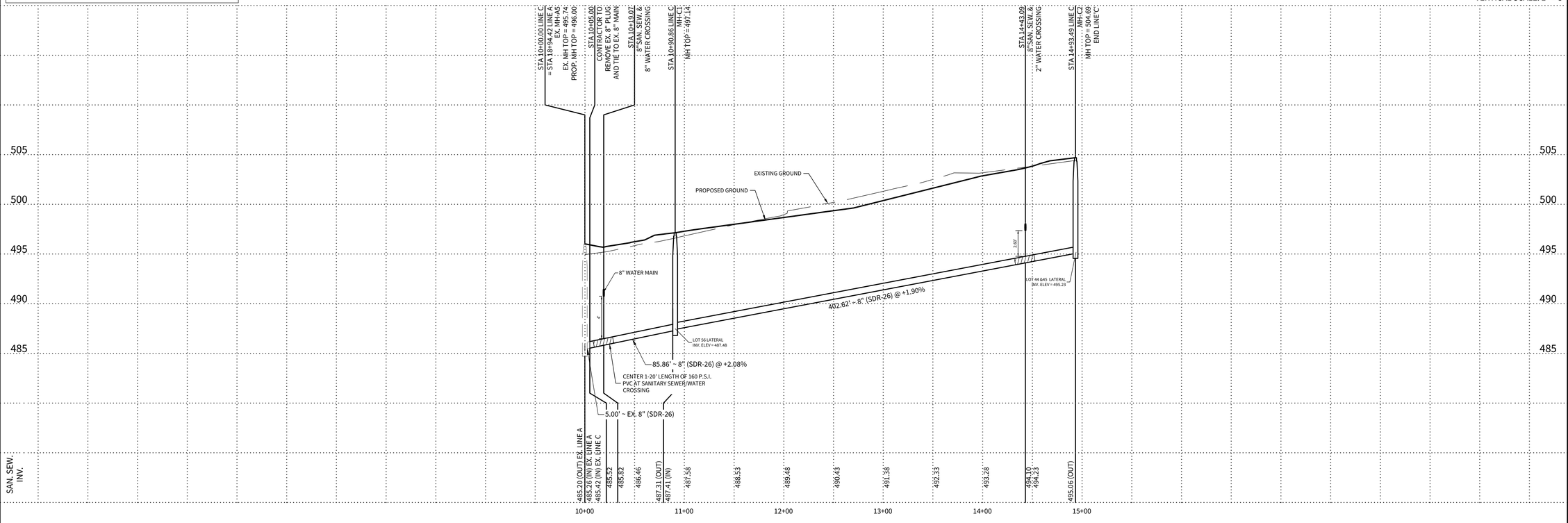
CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR STRUCTURAL DESIGN/GEOTECHNICAL/SAFETY/EQUIPMENT CONSULTANT, IF ANY, SHALL REVIEW THESE PLANS AND AVAILABLE GEOTECHNICAL INFORMATION AND THE ANTICIPATED INSTALLATION SITE(S) WITHIN THE PROJECT WORK AREA IN ORDER TO IMPLEMENT CONTRACTOR'S TRENCH EXCAVATION SAFETY PROTECTION SYSTEMS, PROGRAMS AND/OR PROCEDURES FOR THE PROJECT DESCRIBED IN THE CONTRACT DOCUMENTS. THE CONTRACTOR'S IMPLEMENTATION OF THESE SYSTEMS, PROGRAMS AND/OR PROCEDURES SHALL PROVIDE FOR ADEQUATE TRENCH EXCAVATION SAFETY PROTECTION THAT COMPLY WITH AS A MINIMUM, OSHA STANDARDS FOR TRENCH EXCAVATIONS. SPECIFICALLY, CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR SAFETY CONSULTANT SHALL IMPLEMENT A TRENCH SAFETY PROGRAM IN ACCORDANCE WITH OSHA STANDARDS GOVERNING THE PRESENCE AND ACTIVITIES OF INDIVIDUALS WORKING IN AND AROUND TRENCH EXCAVATION.



LINE C

STA. 10+00.00 TO STA. 14+93.78

HORIZONTAL SCALE: 1" = 50'
VERTICAL SCALE: 1" = 5'



CUDEENGINEERS.COM

CUDE ENGINEERS

4122 Pond Hill Road, Suite 101
San Antonio, Texas 78231
P:(210) 681.2951 F: (210) 523.7112

HICKORY RIDGE UNIT 3A

SANITARY SEWER PLAN & PROFILE - LINE C

DATE
11/18/2025

PROJECT NO.
03278.101

DRAWN BY
RC/JG/JRR/MOH/MAS

CHECKED BY
CJC/KMH

REVISIONS
1. 2. 3. 4. 5. 6. 7. 8.

STATE OF TEXAS
KYLE M. HUDEK
138753
LICENSED
PROFESSIONAL ENGINEER
11/18/2025
CUDE ENGINEERS
TBPELS No. 10048500

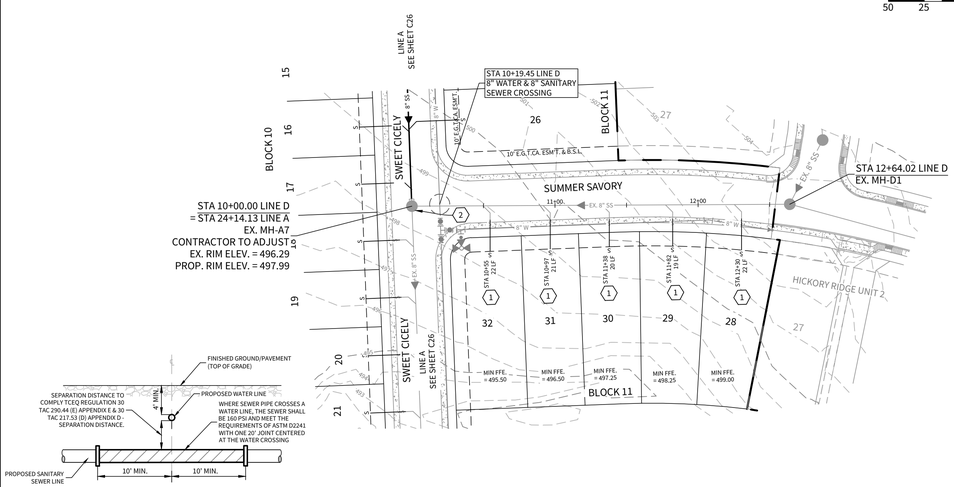
C28

REPRODUCTION OF THE ORIGINAL SIGNED AND SEALED PLAN AND/OR ELECTRONIC MEDIA MAY HAVE BEEN INADVERTENTLY ALTERED. CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE SCALE OF THE DOCUMENT AND CONTACTING CUDE ENGINEERS TO VERIFY DISCREPANCIES PRIOR TO CONSTRUCTION.

KEYNOTE:

1. EXISTING SANITARY SEWER LATERAL STUBOUT. CONTRACTOR TO EXTEND LATERAL (@2.0% MIN. SLOPE) TO UTILITY EASEMENT UNLESS SPECIFIED OTHERWISE.
2. CONTRACTOR TO ADJUST MANHOLE TOP TO MATCH PROPOSED GRADING AND RECOAT MANHOLE PER AQUA SPECIFICATIONS.

SCALE: 1"=50'
50 25 0 50



TYPICAL SANITARY SEWER/ WATER CROSSING DETAIL

N.T.S.

NOTES:

1. CONTRACTOR TO MAINTAIN A MINIMUM 2' VERTICAL SEPARATION DISTANCE BETWEEN OF THE BOTTOM EXISTING WATER MAIN AND TOP OF PROPOSED SANITARY SEWER MAIN AT WATER AND SANITARY SEWER CROSSINGS.
2. ALL LATERALS SHALL BE INSTALLED AT A MINIMUM 2.0% SLOPE UNLESS OTHERWISE NOTED.

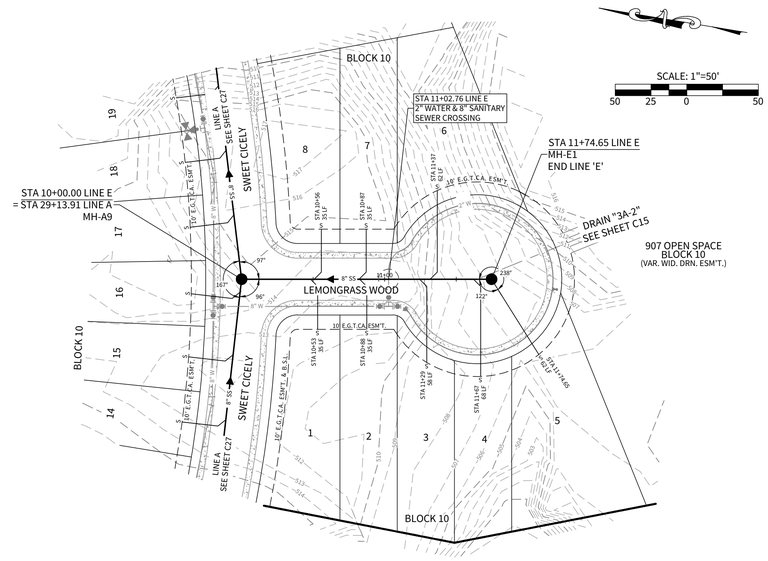
TRENCH EXCAVATION SAFETY PROTECTION

CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR STRUCTURAL DESIGN/GEOTECHNICAL/SAFETY/EQUIPMENT CONSULTANT, IF ANY, SHALL REVIEW THESE PLANS AND AVAILABLE GEOTECHNICAL INFORMATION AND THE ANTICIPATED INSTALLATION SITE(S) WITHIN THE PROJECT WORK AREA IN ORDER TO IMPLEMENT CONTRACTOR'S TRENCH EXCAVATION SAFETY PROTECTION SYSTEMS, PROGRAMS AND/OR PROCEDURES FOR THE PROJECT DESCRIBED IN THE CONTRACT DOCUMENTS. THE CONTRACTOR'S IMPLEMENTATION OF THESE SYSTEMS, PROGRAMS AND/OR PROCEDURES SHALL PROVIDE FOR ADEQUATE TRENCH EXCAVATION SAFETY PROTECTION THAT COMPLY WITH AS A MINIMUM, OSHA STANDARDS FOR TRENCH EXCAVATIONS. SPECIFICALLY, CONTRACTOR AND/OR CONTRACTORS INDEPENDENTLY RETAINED EMPLOYEE OR SAFETY CONSULTANT SHALL IMPLEMENT A TRENCH SAFETY PROGRAM IN ACCORDANCE WITH OSHA STANDARDS GOVERNING THE PRESENCE AND ACTIVITIES OF INDIVIDUALS WORKING IN AND AROUND TRENCH EXCAVATION.

LINE D

STA. 10+00.00 TO STA. 12+64.02

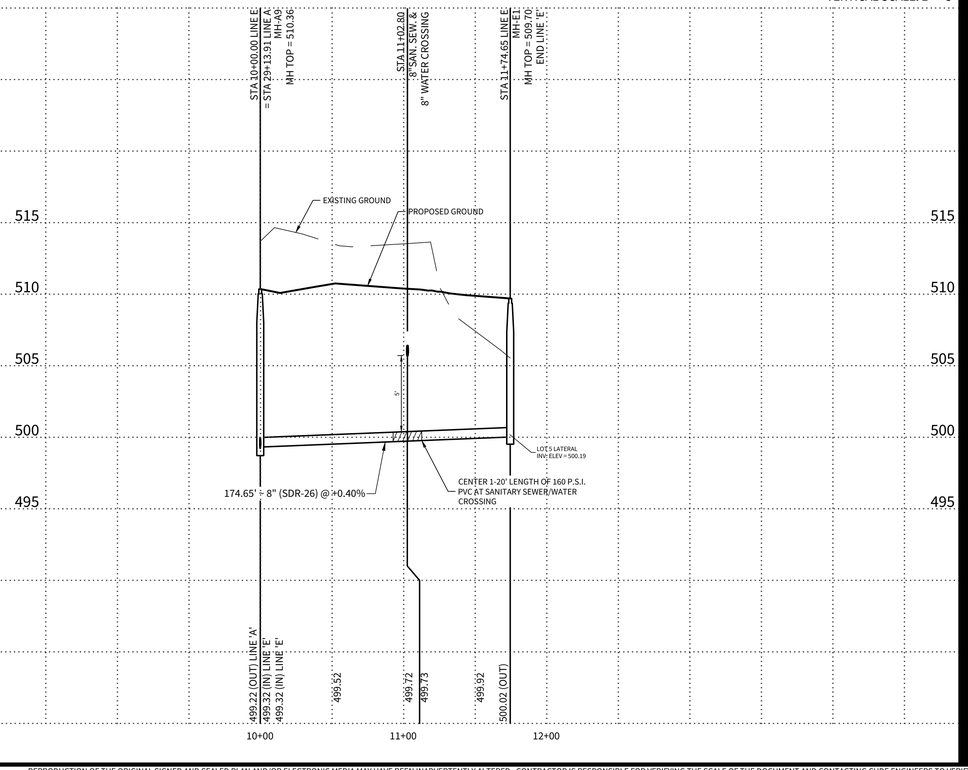
SCALE: 1"=50'
50 25 0 50



LINE E

STA. 10+00.00 TO STA. 11+74.65

HORIZONTAL SCALE: 1" = 50'
VERTICAL SCALE: 1" = 5'



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CUDE ENGINEERS EST. 1980

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HICKORY RIDGE UNIT 3A

SANITARY SEWER PLAN & PROFILE - LINE D&E

DATE
11/18/2025

PROJECT NO.
03278.101

DRAWN BY
RC/JG/JRR/MOH/MAS

CHECKED BY
CJC/KMH

REVISIONS
1. 2. 3. 4. 5. 6. 7. 8.

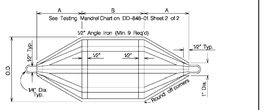
STATE OF TEXAS
KYLE M. HUDEK
138753
LICENSED
PROFESSIONAL ENGINEER
11/18/2025

CUDE ENGINEERS
TBPELS No. 10048500

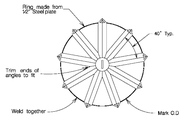
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P:\03278\03\CD Drawings\Civil\SANITARY SEWER PLAN & PROFILE - LINE D&E.dwg 2025/11/18 3:54am bhuelsk

REPRODUCTION OF THE ORIGINAL SIGNED AND SEALED PLAN AND/OR ELECTRONIC MEDIA MAY HAVE BEEN INADVERTENTLY ALTERED. CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE SCALE OF THE DOCUMENT AND CONTACTING CUDE ENGINEERS TO VERIFY DISCREPANCIES PRIOR TO CONSTRUCTION.



SIDE OR TOP VIEW



END VIEW

Note:
All mandrels must be approved by SAWS Construction Inspections and stamped before use.

GO, NO GO DEFLECTION TESTING MANDREL	APPROVED	REVISED
	March 2008	
	DD-848-01	SHEET 1 of 2

SIZE	A	B*	MANDREL O.D. PVC (SDR-26)	RING O.D. PVC (SDR-26)
6"	4.0"	4.5"	5.50	4.79
8"	5.5"	6"	7.37	6.66
10"	7.0"	7.5"	9.21	8.50
12"	8.0"	9"	10.96	10.25
15"	10.0"	11"	13.42	12.71
18"	12.0"	13.5"	———	———
21"	14.0"	16"	———	———
24"	16.0"	18"	———	———
27"	18.0"	20"	———	———

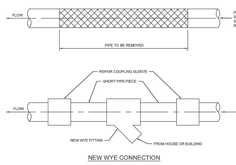
* Minimum Length

CHART

Notes:
PVC pipes and fittings 6" to 15" in diameter shall conform to ASTM D-3034-08.
PVC pipes and fittings 18" to 27" in diameter shall conform to ASTM F-679-08.

This information is provided as a reference. All deflection testing shall be done in accordance with TCEQ Chapter 217.

GO, NO GO DEFLECTION TESTING MANDREL CHART	APPROVED	REVISED
	MARCH 2008	APRIL 2014
	DD-848-01	SHEET 2 of 2



NEW WYE CONNECTION

INSTALLATION PROCEDURE:

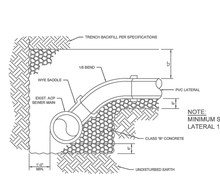
A) LOCATE MAIN WHERE NEW WYE WILL BE INSTALLED.

B) CUT OUT PVC MAIN FOR NEW WYE AND TWO (2) REPAIR COUPLINGS (SLEEVES) WITH RUBBER GASKETS AND TWO (2) SMALL PIECES OF PIPE.

C) INSTALL NEW WYE AND FITTINGS AND TEST PER SUBURBAN STANDARDS.

D) CONTINUE INSTALLATION OF SANITARY SEWER LATERAL PER TOWNSHIP REQUIREMENTS.

AQUA TEXAS INC.
LATERAL CONNECTION TO EXISTING PVC MAIN
AQUA
DATE: JUNE 2022 SCALE: N.T.S.

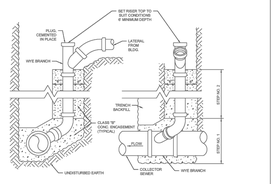


NOTE:
MINIMUM SLOPE ON LATERAL 1/4" PER FOOT.

NOTES:

1. WYE SADDLE SHALL BE SEALITE TYPE "E" OR APPROVED EQUAL FOR CONNECTION OF ASBESTOS CEMENT PIPE TO PVC SDR 35 PIPE.
2. CONTRACTOR SHALL CUT MAIN FOR THE LATERAL CONNECTION IN ACCORDANCE WITH THE SADDLE MANUFACTURER'S REQUIREMENTS.
3. CONTRACTOR SHALL USE EXTREME CARE IN CUTTING THE MAIN SO AS NOT TO DAMAGE THE EXISTING PIPE.
4. NEW SADDLE SHALL BE AIR TESTED BY THE CONTRACTOR IN ACCORDANCE WITH THE SUBURBAN WASTEWATER COMPANY STANDARD SPECIFICATIONS FOR CONSTRUCTION OF SANITARY SEWERS.

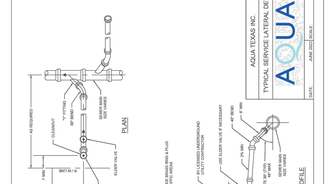
AQUA TEXAS INC.
LATERAL CONNECTION TO EXISTING ACP MAIN
AQUA
DATE: JUNE 2022 SCALE: N.T.S.



STEP DESCRIPTION:

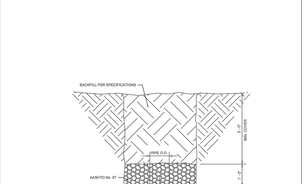
1. INSTALL LOWER WYE BRANCH, 1/8 BEND, AND CONCRETE ENCASEMENT PROTECT LOWER CONCRETE ENCASEMENT FOR 24 HOUR CURING PERIOD
2. INSTALL RISER, UPPER WYE BRANCH, AND CONCRETE ENCASEMENT

AQUA TEXAS INC.
DEEP CUT LATERAL
AQUA
DATE: JUNE 2022 SCALE: N.T.S.

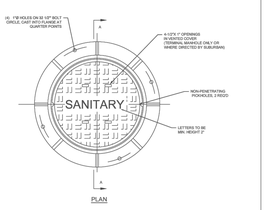


NOTES:
1. ALL WYE SADDLES SHALL LEAVE THE CENTERLINE OF THE SEWER MAIN AT AN ANGLE OF 45 DEGREES.
2. CONTRACTOR TO INSTALL A MINIMUM OF 18" CLEARANCE BETWEEN ADJACENT PIPE OR FITTINGS. REMOVE PIPE AS REQUIRED.
3. CONTRACTOR TO INSTALL A MINIMUM OF 12" CLEARANCE FROM ANY FLANGES & STRUCTURES
4. ALL PIPE SHALL BE SUPPORTED WITH SMALL BLOCKS OF CONCRETE PLACED UNDER BELL AND SPIGOT JOINTS.
5. ALL LATERALS ARE TO BE CAPPED WITH SMALL BLOCKS OF CONCRETE AT THE END OF THE LATERAL.
6. ALL LATERALS SHALL BE TESTED AND/OR INSPECTED AS REQUIRED BY THE TOWNSHIP OR SUBURBAN WASTEWATER.
7. ALL LATERALS ARE TO BE CAPPED WITH SMALL BLOCKS OF CONCRETE AT THE END OF THE LATERAL.
8. ALL LATERALS SHALL BE TESTED AND/OR INSPECTED AS REQUIRED BY THE TOWNSHIP OR SUBURBAN WASTEWATER.
9. ALL LATERALS SHALL BE TESTED AND/OR INSPECTED AS REQUIRED BY THE TOWNSHIP OR SUBURBAN WASTEWATER.
10. ALL LATERALS SHALL BE TESTED AND/OR INSPECTED AS REQUIRED BY THE TOWNSHIP OR SUBURBAN WASTEWATER.
11. ALL LATERALS SHALL BE TESTED AND/OR INSPECTED AS REQUIRED BY THE TOWNSHIP OR SUBURBAN WASTEWATER.
12. ALL LATERALS SHALL BE TESTED AND/OR INSPECTED AS REQUIRED BY THE TOWNSHIP OR SUBURBAN WASTEWATER.
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16. ALL LATERALS SHALL BE TESTED AND/OR INSPECTED AS REQUIRED BY THE TOWNSHIP OR SUBURBAN WASTEWATER.

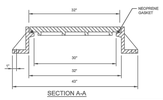
AQUA TEXAS INC.
TYPICAL SERVICE LATERAL DETAIL
AQUA
DATE: JUNE 2022 SCALE: N.T.S.



AQUA TEXAS INC.
TYPICAL P.V.C. PIPE TRENCH
AQUA
DATE: JUNE 2022 SCALE: N.T.S.

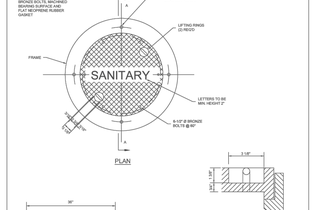


PLAN

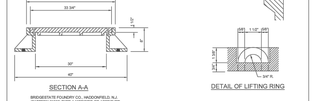


SECTION A-A

AQUA TEXAS INC.
CAST IRON MANHOLE FRAME & COVER
AQUA
DATE: JUNE 2022 SCALE: N.T.S.



PLAN

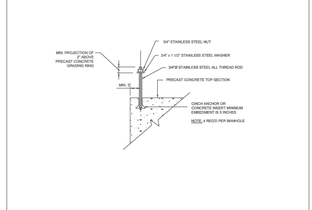


SECTION A-A

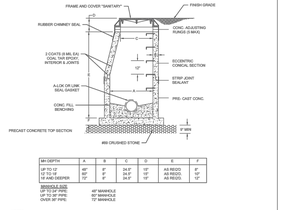
BRIDGESTEIN FOUNDRY CO., HACCONFIELD, N.J.
NEENAH FOUNDRY CO., NEENAH, WI OR APPROVED EQUAL, MINIMUM WEIGHT 500#

DETAIL OF LIFTING RING

AQUA TEXAS INC.
BOLT DOWN WATERTIGHT MANHOLE FRAME & COVER
AQUA
DATE: JUNE 2022 SCALE: N.T.S.



AQUA TEXAS INC.
ANCHOR BOLT DETAIL FOR PRECAST MANHOLE
AQUA
DATE: JUNE 2022 SCALE: N.T.S.



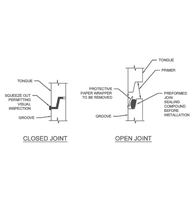
MH DEPTH	A	B	C	D	E	F
UP TO 12'	48"	6"	24.5"	12"	AS REQ'D	12"
12' TO 18'	60"	8"	24.5"	12"	AS REQ'D	12"
18' TO DEEPER	72"	8"	24.5"	12"	AS REQ'D	12"

MANHOLE SIZE
UP TO 24' PIPE 48" MANHOLE
OVER 24" PIPE 60" MANHOLE
OVER 30" PIPE 72" MANHOLE

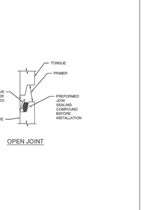
NOTES:

1. PRE - CAST CONCRETE SHALL BE TYPE II CEMENT (4,000 PSI).
2. LIFT HOLES NOT PERMITTED THROUGH PRE-CAST SECTIONS.
3. ALL OPENINGS SHALL BE SEALED WITH NON-SHRINK GROUT.
4. INSTALL FLOW CHANNEL INSIDE MANHOLE.
5. SERVICE LATERALS SHALL GENERALLY NOT BE PERMITTED DIRECTLY INTO MANHOLES.
6. PLACE TWO HALF MOON SHAPED PLYWOOD (3/8" TH. MIN.) IN BOTTOM OF MANHOLE AFTER PIPES HAVE BEEN CONNECTED TO KEEP DEBRIS FROM ENTERING SEWER.
7. REINFORCING STEEL PER ASTM C478-95A
8. PROVIDE 6" X 6" X 12" CONCRETE COLLAR AROUND COVER FRAME WITH 4 - #4 REBAR E.W. IN UNPAVED AREAS.
9. PROVIDE PVC TO MANHOLE SEAL. A LOK GASKET PER ASTM C-443 SPECIFICATION CAST INTERGRALLY IN MANHOLE WALL AND DESIGNED TO MEET TEST AND PERFORMANCE REQUIREMENT OF ASTM C-425 SPECIFICATION.
10. JOINT SEALANT SHALL BE BUTYL RUBBER OR BITUMINOUS MASTIC GASKET PER ASTM C-990 SPECIFICATION. PROVIDE BUTYL-LOK BY A-LOK PRODUCTS INC.
11. MANHOLE STEPS SHALL BE 12 INCH GRADE 60 STEEL ENCAPSULATED IN POLYPROPYLENE CONFORMING TO ASTM C478.
12. SEAL MANHOLE FRAME AND GRADE RINGS WITH WRAP-SEAL HEAT SHRINK ENCAPSULATION SYSTEM BY CANSEAL-CPS, INC.
13. MANHOLES GREATER THAN 10' SHALL HAVE AN INTERMEDIATE LANDING CONSTRUCTED OF PRECAST CONCRETE.
14. MANHOLE UPSTREAM OF WW PLANT SHALL BE A DRY TRAP TYPE WITH 2" SUMP.

AQUA TEXAS INC.
STANDARD MANHOLE DETAIL
AQUA
DATE: JUNE 2022 SCALE: N.T.S.

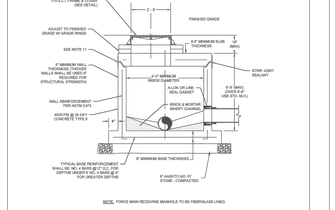


CLOSED JOINT



OPEN JOINT

AQUA TEXAS INC.
JOINT DETAIL FOR PRECAST MANHOLE
AQUA
DATE: JUNE 2022 SCALE: N.T.S.

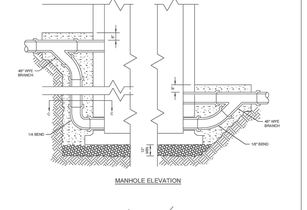


NOTE: FORCE MAIN RECEIVING MANHOLE TO BE FIBERGLASS LINED

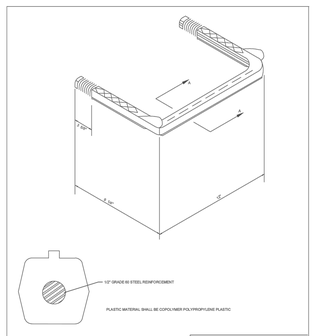
NOTES:

1. PRE-CAST CONCRETE SHALL BE TYPE II CEMENT (4,000 PSI).
2. LIFT HOLES NOT PERMITTED THROUGH PRE-CAST SECTIONS.
3. ALL OPENINGS SHALL BE SEALED WITH NON-SHRINK GROUT.
4. INSTALL FLOW CHANNEL INSIDE MANHOLE.
5. SERVICE LATERALS SHALL GENERALLY NOT BE PERMITTED DIRECTLY INTO MANHOLES.
6. PLACE TWO HALF MOON SHAPED PLYWOOD (3/8" TH. MIN.) IN BOTTOM OF MANHOLE AFTER PIPES HAVE BEEN CONNECTED TO KEEP DEBRIS FROM ENTERING SEWER.
7. REINFORCING STEEL PER ASTM C478-95A
8. PROVIDE 6" X 6" X 12" CONCRETE COLLAR AROUND COVER FRAME WITH 4 - #4 REBAR E.W. IN UNPAVED AREAS.
9. PROVIDE PVC TO MANHOLE SEAL. A LOK GASKET PER ASTM C-443 SPECIFICATION CAST INTERGRALLY IN MANHOLE WALL AND DESIGNED TO MEET TEST AND PERFORMANCE REQUIREMENT OF ASTM C-425 SPECIFICATION.
10. JOINT SEALANT SHALL BE BUTYL RUBBER OR BITUMINOUS MASTIC GASKET PER ASTM C-990 SPECIFICATION. PROVIDE BUTYL-LOK BY A-LOK PRODUCTS INC.
11. MANHOLE STEPS SHALL BE 12 INCH GRADE 60 STEEL ENCAPSULATED IN POLYPROPYLENE CONFORMING TO ASTM C478.
12. SEAL MANHOLE FRAME AND GRADE RINGS WITH WRAP-SEAL HEAT SHRINK ENCAPSULATION SYSTEM BY CANSEAL-CPS, INC.
13. MANHOLES GREATER THAN 10' SHALL HAVE AN INTERMEDIATE LANDING CONSTRUCTED OF PRECAST CONCRETE.
14. MANHOLE UPSTREAM OF WW PLANT SHALL BE A DRY TRAP TYPE WITH 2" SUMP.

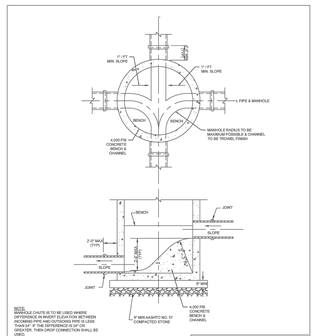
AQUA TEXAS INC.
SHALLOW MANHOLE DETAIL
AQUA
DATE: JUNE 2022 SCALE: N.T.S.



AQUA TEXAS INC.
DROP MANHOLE CONNECTION
AQUA
DATE: JUNE 2022 SCALE: N.T.S.

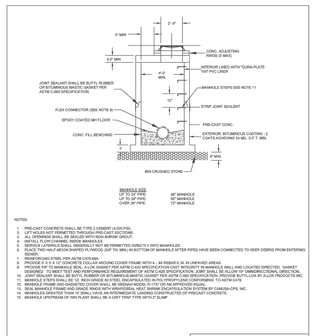


AQUA TEXAS INC.
POLYPROPYLENE MANHOLE STEP
AQUA
DATE: JUNE 2022 SCALE: N.T.S.



NOTE:
MANHOLE CHUTE IS TO BE USED WHERE DIFFERENCE IN INVERT ELEVATION BETWEEN INCOMING PIPE AND OUTGOING PIPE IS LESS THAN 18" AND GREATER THAN 12". WHEN DIFFERENCE THEN DROP CONNECTION SHALL BE USED.

AQUA TEXAS INC.
MANHOLE CHUTE
AQUA
DATE: JUNE 2022 SCALE: N.T.S.



MANHOLE SIZE
UP TO 24" PIPE — 48" MANHOLE
OVER 24" PIPE — 60" MANHOLE
OVER 30" PIPE — 72" MANHOLE

NOTES:

1. PRE-CAST CONCRETE SHALL BE TYPE II CEMENT (4,000 PSI).
2. LIFT HOLES NOT PERMITTED THROUGH PRE-CAST SECTIONS.
3. ALL OPENINGS SHALL BE SEALED WITH NON-SHRINK GROUT.
4. INSTALL FLOW CHANNEL INSIDE MANHOLE.
5. SERVICE LATERALS SHALL GENERALLY NOT BE PERMITTED DIRECTLY INTO MANHOLES.
6. PLACE TWO HALF MOON SHAPED PLYWOOD (3/8" TH. MIN.) IN BOTTOM OF MANHOLE AFTER PIPES HAVE BEEN CONNECTED TO KEEP DEBRIS FROM ENTERING SEWER.
7. REINFORCING STEEL PER ASTM C478-95A
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15. MANHOLE UPSTREAM OF WW PLANT SHALL BE A DRY TRAP TYPE WITH 2" SUMP.

AQUA TEXAS INC.
FORCE MAIN RECEIVING MANHOLE DETAIL
AQUA
DATE: JUNE 2022 SCALE: N.T.S.

TRENCH EXCAVATION PROTECTION

CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR STRUCTURAL DESIGN/GEOTECHNICAL/SAFETY/EQUIPMENT CONSULTANT, IF ANY, SHALL REVIEW THESE PLANS AND AVAILABLE GEOTECHNICAL INFORMATION AND THE ANTICIPATED INSTALLATION SITE[S] WITHIN THE PROJECT WORK AREA IN ORDER TO IMPLEMENT CONTRACTOR'S TRENCH EXCAVATION SAFETY PROTECTION SYSTEMS, PROGRAMS AND/OR PROCEDURES FOR THE PROJECT DESCRIBED IN THE CONTRACT DOCUMENTS. THE CONTRACTOR'S IMPLEMENTATION OF THESE SYSTEMS, PROGRAMS AND/OR PROCEDURES SHALL PROVIDE FOR ADEQUATE TRENCH EXCAVATION SAFETY PROTECTION THAT COMPLY WITH AS A MINIMUM, OSHA STANDARDS FOR TRENCH EXCAVATIONS. SPECIFICALLY, CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR SAFETY CONSULTANT SHALL IMPLEMENT A TRENCH SAFETY PROGRAM IN ACCORDANCE WITH OSHA STANDARDS GOVERNING THE PRESENCE AND ACTIVITIES OF INDIVIDUALS WORKING IN AND AROUND TRENCH EXCAVATION.

CUDEENGINEERS.COM

CUDE ENGINEERS — EST. 1980

4122 Pond Hill Road, Suite 101
San Antonio, Texas 78231
P:(210) 681.2951 F: (210) 523.7112

HICKORY RIDGE UNIT 3A

SANITARY SEWER STANDARD DETAILS

DATE
11/12/2025

PROJECT NO.
03278.101

DRAWN BY
RC/JG/JRR/MOH/MAS

CHECKED BY
CJC/KMH

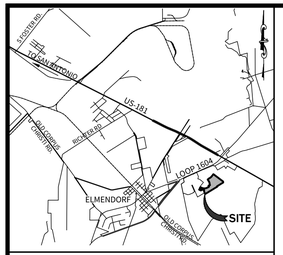
REVISIONS
1. 2. 3. 4. 5. 6. 7. 8.

STATE OF TEXAS
KYLE M. HUDEK
138753
LICENSED PROFESSIONAL ENGINEER
11/18/2025

CUDE ENGINEERS
TBPELS No. 10048500

C30

REPRODUCTION OF THE ORIGINAL SIGNED AND SEALED PLAN AND/OR ELECTRONIC MEDIA MAY HAVE BEEN INADVERTENTLY ALTERED. CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE SCALE OF THE DOCUMENT AND CONTACTING CUDE ENGINEERS TO VERIFY DISCREPANCIES PRIOR TO CONSTRUCTION.



LOCATION MAP N.T.S.

LEGEND

- EXISTING SANITARY SEWER — EX.8"SS
- PROPOSED SANITARY SEWER — 8"SS
- EXISTING SANITARY SEWER MANHOLE
- PROPOSED WATER MAIN — 8"W
- EXISTING WATER MAIN — EX. 8"W
- EXISTING STANDARD FIRE HYDRANT
- PROPOSED STANDARD FIRE HYDRANT
- PROPOSED STANDARD GATE VALVE
- PROPOSED PERMANENT BLOWOFF
- ELECTRIC, GAS, TELEPHONE, & CABLE T.V. EASEMENT — E.G.T.CA. ESM'T
- PROPOSED 3/4" WATER SERVICE WITH 5/8" METER — M

DEVELOPER:

ELMENDORF DEVELOPMENT COMPANY
1401 WOODLANDS PARKWAY
THE WOODLANDS, TEXAS 773880
TEL: (210) 403-6282
CONTACT PERSON: JUANITA ORSAK

CIVIL ENGINEER:

CUDE ENGINEERS
CONTACT PERSON: CHRIS CHAFFEE, P.E.
4122 POND HILL ROAD, SUITE 101
SAN ANTONIO, TX 78231
TEL: (210) 681-2951
FAX: (210) 523-7112

NOTES:

TRACER WIRE

a. TRACER WIRE SHALL BE UTILIZED FOR LOCATION PURPOSES AND TAPER DIRECTLY TO THE TOP OF PIPE.
b. TRACER WIRE SHALL BE OF SOLID CORE (14 GAUGE INSULATED), AND SHALL BE TAPED TO THE MAIN IN MINIMUM OF 10 INCH INCREMENTS.
c. WIRE SHALL ALSO COME UP OUTSIDE AND TO THE TOP OF VALVE EXTENSIONS AND FIRE HYDRANTS STEMS, AS DIRECTED BY THE INSPECTOR. SEE DETAILS.
d. DETECTION TAPE SHALL NOT BE USED IN LIEU OF TRACE WIRE.

KEYNOTES:

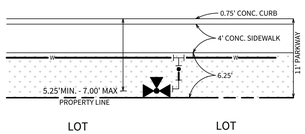
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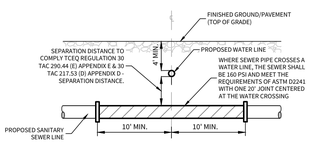
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2-1" CORPORATION STOP C.C. X I.P.
2-1" COPPER TUBING, CUT AS REQ'D
2-1 ½" THD. SOLID CAPS, THR.
2-1" COMP. X 1 ½" COUPLING, CURB STOP
CONTRACTOR SHALL PROVIDE A 4" JUMPER CONNECTION TO LOAD NEW MAIN

1-8" SOLID SLEEVE
1-2" BLOWOFF ASSEMBLY (TEMP.)
1-8" X 2" THR. DI. ECENTRICALLY TAPPED CAP, M.J. (TEMP.)
SEE SAWS STD DETAIL DWG DD-844-01



NOTE:
1. EXCLUSIVE OF THE TEE, PAVMENT FOR THE FIRE HYDRANT SHALL INCLUDE ALL FITTINGS, 6" D.I. PIPE AND 6" GATE VALVE & BOX.
2. FIRE HYDRANT TO BE INSTALLED OUTSIDE OF THE LIMITS OF ALL PROPOSED SIDEWALKS.

TYPICAL FIRE HYDRANT DETAIL (4' SIDEWALK / 50' R.O.W.)
N.T.S.



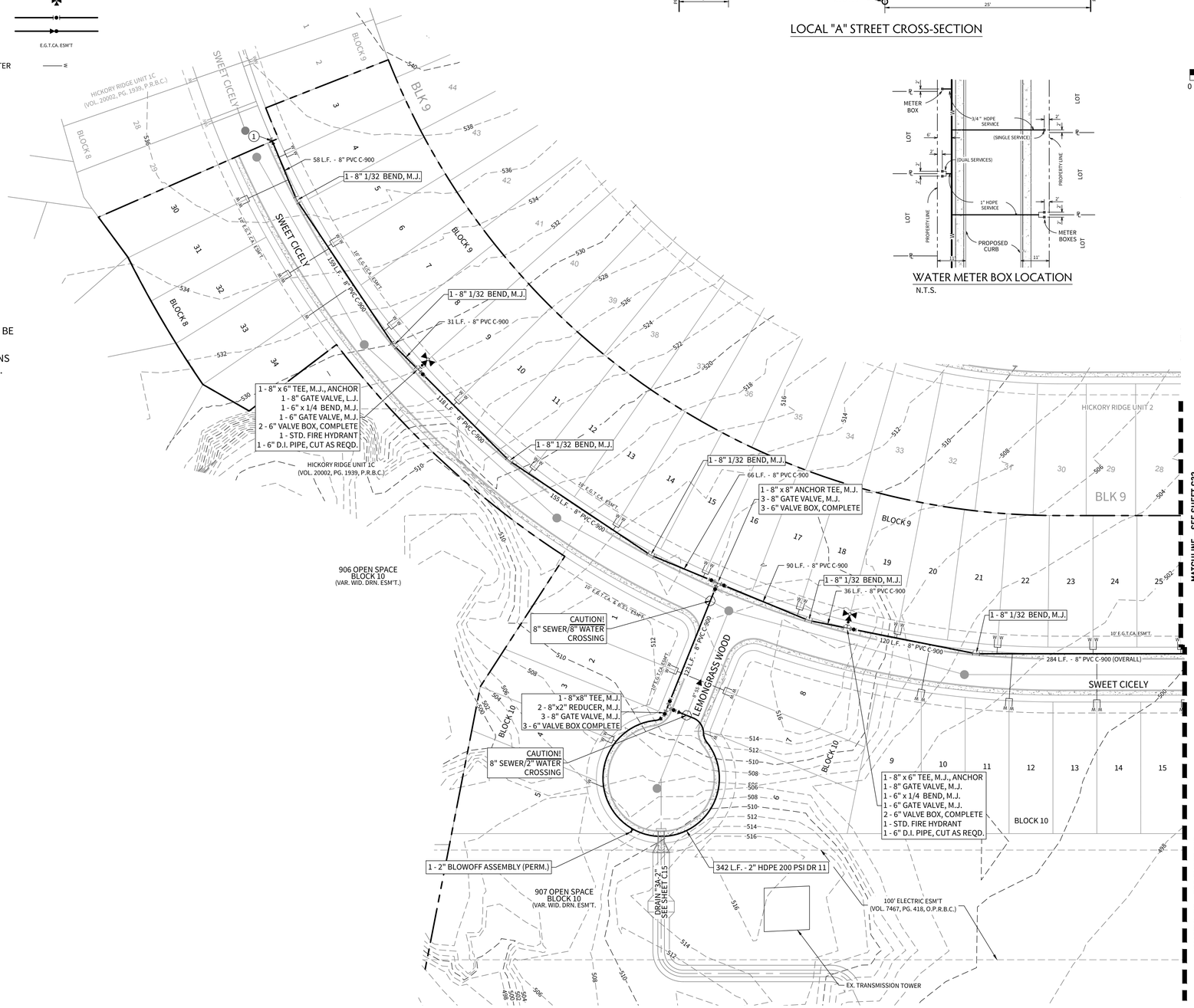
TYPICAL SANITARY SEWER/ WATER CROSSING DETAIL
N.T.S.

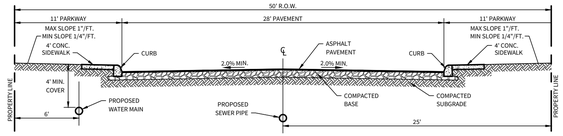
CAUTION!

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TRENCH EXCAVATION PROTECTION

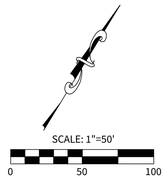
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LOCAL "A" STREET CROSS-SECTION

WATER METER BOX LOCATION
N.T.S.



CUDEENGINEERS.COM
CUDE ENGINEERS
4122 Pond Hill Road, Suite 101
San Antonio, Texas 78231
P:(210) 681.2951 F: (210) 523.7112

HICKORY RIDGE UNIT 3A

WATER DISTRIBUTION PLAN

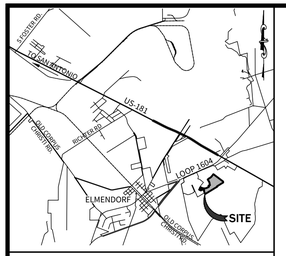
DATE
12/18/2025
PROJECT NO.
03278.101
DRAWN BY
RC/JG/JRR/MOH/MAS
CHECKED BY
CJC/KMH

REVISIONS 1 2 3 4 5 6 7 8

STATE OF TEXAS
KYLE M. HUDEK
138753
LICENSED PROFESSIONAL ENGINEER
12/18/2025
CUDE ENGINEERS
TBPELS No. 10048500

C31

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- PROPOSED 3/4" WATER SERVICE WITH 5/8" METER

DEVELOPER:

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THE WOODLANDS, TEXAS 773880
TEL: (210) 403-6282
CONTACT PERSON: JUANITA ORSAK

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KEYNOTES:

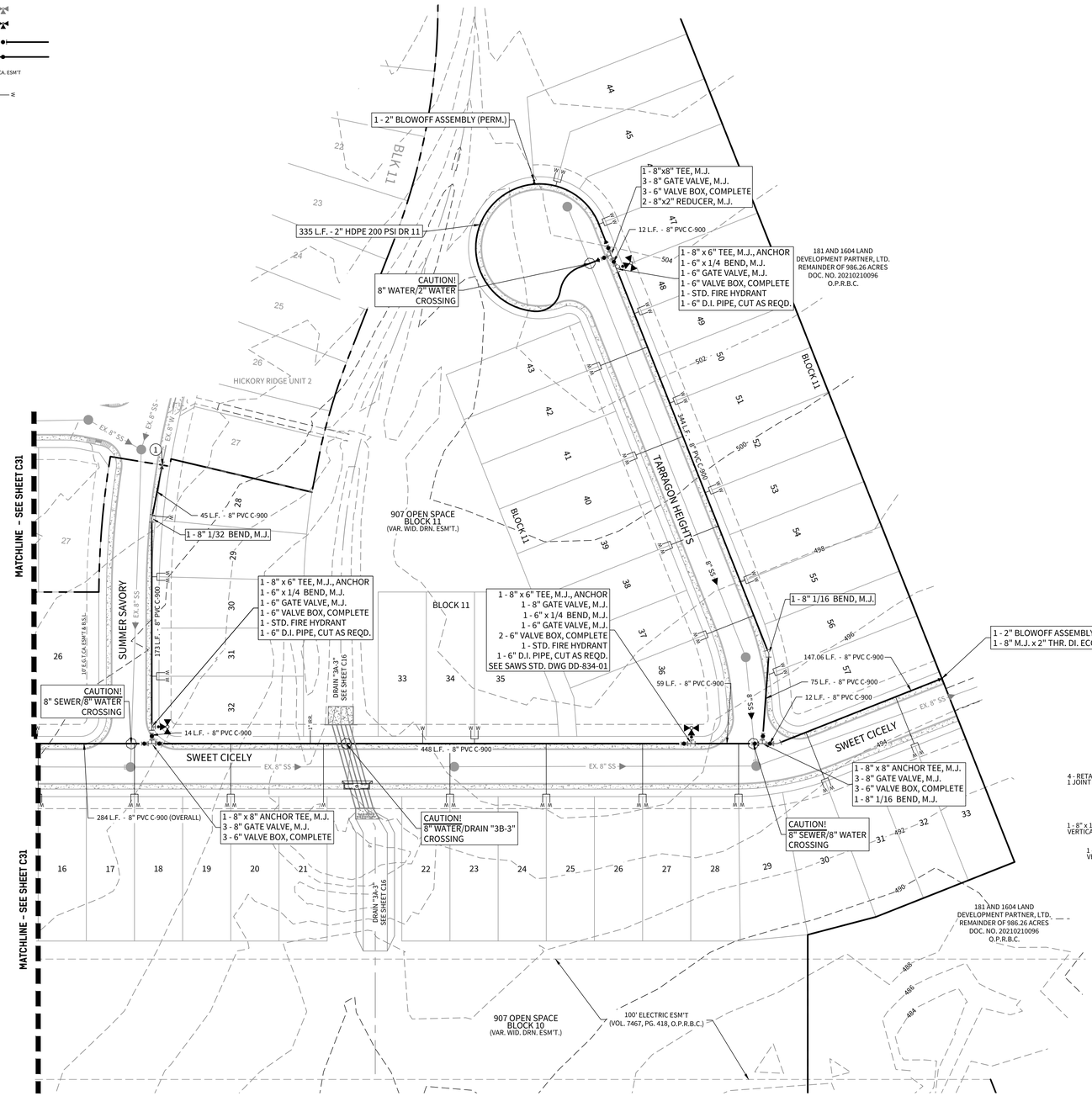
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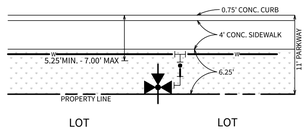
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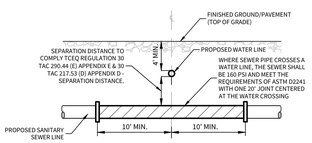


SCALE: 1"=50'
0 50 100

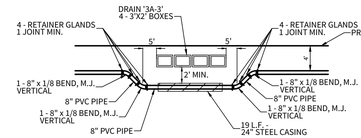


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N.T.S.

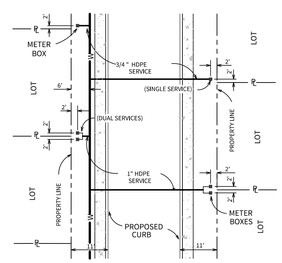


TYPICAL SANITARY SEWER/ WATER CROSSING DETAIL
N.T.S.



ALL RETAINER GLANDS TO BE "MEGA-LUG" TYPE.

PIPE / WATER CROSSING ~ DETAIL 1
SIDE VIEW (THIS DETAIL IS VERTICAL ONLY) N.T.S.



WATER METER BOX LOCATION
N.T.S.

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HICKORY RIDGE UNIT 3A

WATER DISTRIBUTION PLAN

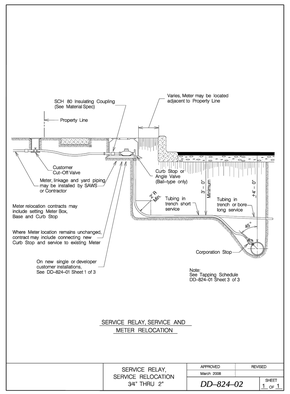
DATE 12/18/2025
PROJECT NO. 03278.101
DRAWN BY RC/JG/JRR/MOH/MAS
CHECKED BY CJC/KMH

REVISIONS 1. 2. 3. 4. 5. 6. 7. 8.

STATE OF TEXAS — KYLE M. HUDEK — 138753 — LICENSED PROFESSIONAL ENGINEER — 12/18/2025
CUDE ENGINEERS
TBPELS No. 10048500

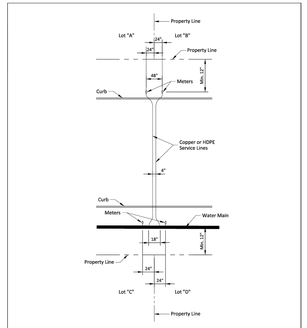
C32

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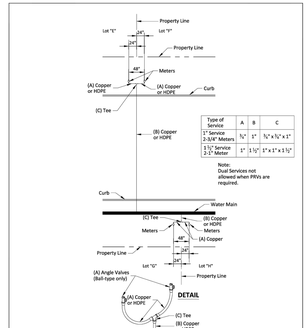
SERVICE RELAY, SERVICE AND METER RELOCATION

SERVICE RELAY, SERVICE RELOCATION 3/4" THRU 2"	APPROVED	REVISED
	March 2008	
DD-824-02		SHEET 1 OF 1



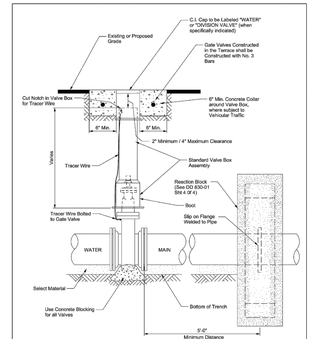
SINGLE SERVICE LINE - SINGLE METER

TYPICAL NEW DEVELOPMENT SERVICE ARRANGEMENT	APPROVED	REVISED
	March 2008	December 2018
DD-824-05		SHEET 1 OF 3

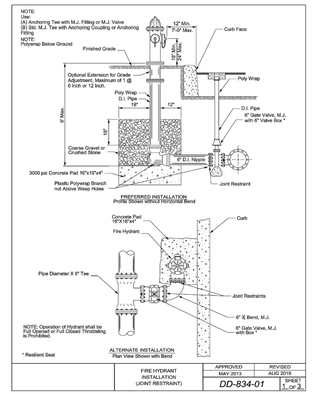


SINGLE SERVICE LINE - DUAL METER

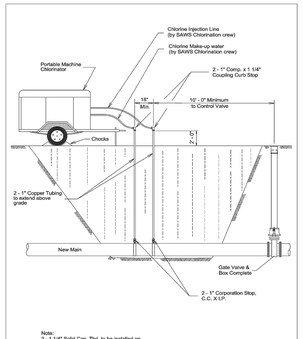
TYPICAL SERVICE ARRANGEMENT	APPROVED	REVISED
	March 2008	
DD-824-05		SHEET 2 OF 3



INSTALLATION OF NON-GEARED GATE VALVE WITH VALVE BOX AND EXTENSION	APPROVED	REVISED
	MARCH 2008	AUG 2019
DD 828-01		SHEET 1 OF 1

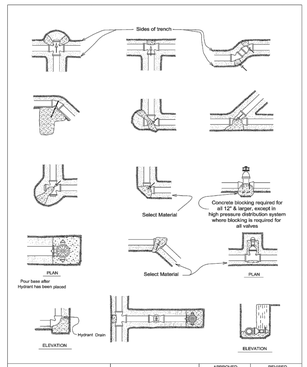


FIRE HYDRANT INSTALLATION (JOINT RESTRAINT)	APPROVED	REVISED
	MAY 2013	AUG 2019
DD-834-01		SHEET 1 OF 2

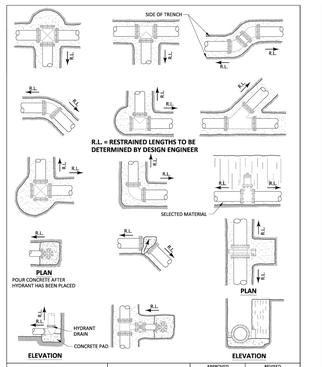


Note:
2 - 1 1/4" Solid Cap, Thd. to be installed on Corporation Stop after chlorination

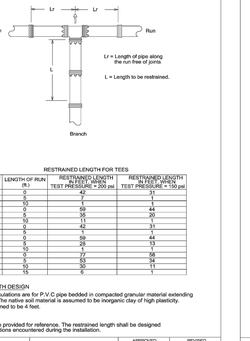
STANDARD CHLORINATION INSTALLATION	APPROVED	REVISED
	March 2008	AUG 2019
DD-847-01		SHEET 1 OF 1



THRUST BLOCKS FOR FITTINGS (WATER ONLY)	APPROVED	REVISED
	March 2008	AUG 2019
DD-839-01		SHEET 1 OF 2



JOINT RESTRAINTS FOR FITTINGS (WATER ONLY)	APPROVED	REVISED
	March 2008	December 2023
DD-839-01		SHEET 2 OF 2



RESTRAINED LENGTH FOR TEES

PIPE SIZE (inch)	BRANCH SIZE (inch)	LENGTH OF RUN (ft.)	RESTRAINED LENGTH IN FEET, WHEN TEST PRESSURE = 200 psi	RESTRAINED LENGTH IN FEET, WHEN TEST PRESSURE = 150 psi
12	4	0	42	31
12	4	5	1	1
12	6	0	59	44
12	6	5	35	20
12	6	10	11	1
12	8	0	42	31
12	8	5	1	1
12	8	0	59	44
8	6	0	28	13
8	6	5	1	1
8	8	0	77	58
8	8	5	53	34
8	8	10	30	11
8	8	15	6	1

RESTRAINED LENGTH DESIGN

Restrained length calculations are for P.V.C pipe bedded in compacted granular material extending to the top of the pipeThe native soil material is assumed to be inorganic clay of high plasticity. Depth of bury is assumed to be 4 feet.

Note:
These calculations are provided for reference. The restrained length shall be designed based upon the conditions encountered during the installation.

RESTRAINED LENGTHS FOR TEES	APPROVED	REVISED
	March 2008	AUG 2019
DD-839-04		SHEET 1 OF 2

RESTRAINED LENGTH FOR TEES (Cont'd)

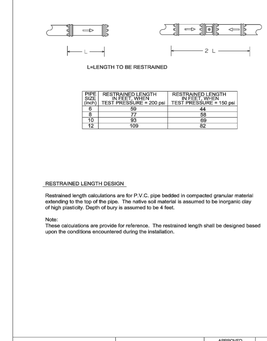
PIPE SIZE (inch)	BRANCH SIZE (inch)	LENGTH OF RUN (ft.)	RESTRAINED LENGTH IN FEET, WHEN TEST PRESSURE = 200 psi	RESTRAINED LENGTH IN FEET, WHEN TEST PRESSURE = 150 psi
12	4	0	42	31
12	4	5	1	1
12	6	0	59	44
12	6	5	13	1
12	6	10	1	1
12	8	0	77	58
12	8	5	42	23
12	8	10	7	1
12	8	15	1	1
12	12	0	130	92
12	12	5	86	59
12	12	10	63	35
12	12	15	39	12

RESTRAINED LENGTH DESIGN

Restrained length calculations are for P.V.C pipe bedded in compacted granular material extending to the top of the pipe. The native soil material is assumed to be inorganic clay of high plasticity. Depth of bury is assumed to be 4 feet.

Note:
These calculations are provide for reference. The restrained length shall be designed based upon the conditions encountered during the installation.

RESTRAINED LENGTHS FOR TEES	APPROVED	REVISED
	MARCH 2008	AUG 2019
DD-839-04		SHEET 2 OF 2



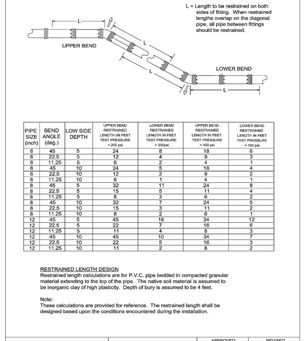
PIPE SIZE (inch)	RESTRAINED LENGTH IN FEET, WHEN TEST PRESSURE = 200 psi	RESTRAINED LENGTH IN FEET, WHEN TEST PRESSURE = 150 psi
6	77	58
8	102	77
10	93	69
12	109	82

RESTRAINED LENGTH DESIGN

Restrained length calculations are for P.V.C. pipe bedded in compacted granular material extending to the top of the pipe. The native soil material is assumed to be inorganic clay of high plasticity. Depth of bury is assumed to be 4 feet.

Note:
These calculations are provide for reference. The restrained length shall be designed based upon the conditions encountered during the installation.

RESTRAINED LENGTHS FOR DEAD ENDS / INLINE VALVES	APPROVED	REVISED
	MARCH 2008	AUG 2019
DD-839-05		SHEET 1 OF 1



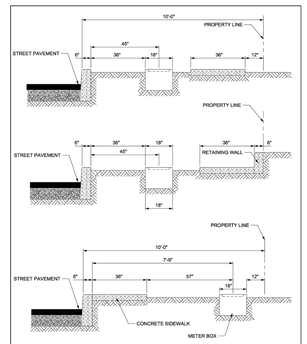
PIPE SIZE (inch)	BEND ANGLE (deg.)	LOW SIDE DEPTH	UPPER BEND RESTRAINED LENGTH IN FEET TEST PRESSURE = 200 psi	LOWER BEND RESTRAINED LENGTH IN FEET TEST PRESSURE = 200psi	UPPER BEND RESTRAINED LENGTH IN FEET TEST PRESSURE = 150 psi	LOWER BEND RESTRAINED LENGTH IN FEET TEST PRESSURE = 150 psi
6	90	5	19	6	14	5
6	45	5	8	4	6	3
6	22.5	5	4	3	3	1
6	11.25	5	2	2	1	1
6	90	10	24	5	18	4
6	22.5	10	12	2	8	2
6	11.25	10	6	1	4	1
8	90	5	32	11	24	8
8	45	5	16	5	12	4
8	22.5	5	8	2	6	2
8	11.25	5	4	2	3	2
8	90	10	32	7	24	5
8	45	10	15	3	11	2
8	22.5	10	8	2	6	2
8	11.25	10	4	2	3	1.5
12	90	5	22	7	16	5
12	45	5	11	4	8	3
12	22.5	5	5	2	4	2
12	11.25	5	2	2	2	2
12	90	10	45	10	34	7
12	45	10	22	5	16	3
12	22.5	10	11	2	8	2
12	11.25	10	5	2	4	2

RESTRAINED LENGTH DESIGN

Restrained length calculations are for P.V.C. pipe bedded in compacted granular material extending to the top of the pipe. The native soil material is assumed to be inorganic clay of high plasticity. Depth of bury is assumed to be 4 feet.

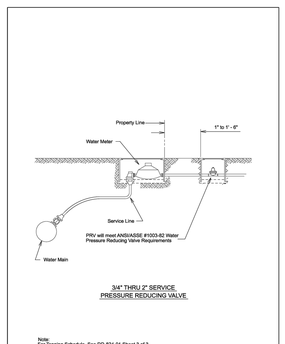
Note:
These calculations are provided for reference. The restrained length shall be designed based upon the conditions encountered during the installation.

RESTRAINED LENGTHS VERTICAL OFFSETS	APPROVED	REVISED
	MARCH 2008	AUG 2019
DD-839-06		SHEET 1 OF 1



NOTE: METER BOX LOCATION IN COMMERCIAL AND INDUSTRIAL AREAS WILL BE AS DIRECTED BY THE INSPECTOR.

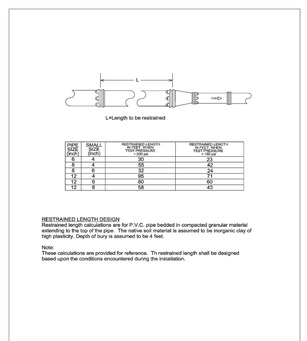
TYPICAL METER BOX LOCATION	APPROVED	REVISED
	MARCH 2008	MAY 2013
DD-833-01		SHEET 1 OF 1



3/4" THRU 2" SERVICE PRESSURE REDUCING VALVE

Note:
For Tapping Schedule, See DD-824-01 Sheet 3 of 3.

SERVICE INSTALLATION FOR PRESSURE REDUCING VALVE	APPROVED	REVISED
	MARCH 2008	APRIL 2014
DD-833-03		SHEET 1 OF 1



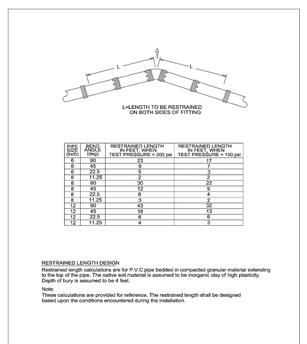
PIPE SIZE (inch)	SMALL END (inch)	RESTRAINED LENGTH IN FEET, WHEN TEST PRESSURE = 200 psi	RESTRAINED LENGTH IN FEET, WHEN TEST PRESSURE = 150 psi
8	4	90	23
8	4	58	42
8	6	32	24
12	4	90	23
12	6	90	70
12	8	58	43

RESTRAINED LENGTH DESIGN

Restrained length calculations are for P.V.C. pipe bedded in compacted granular material extending to the top of the pipe. The native soil material is assumed to be inorganic clay of high plasticity. Depth of bury is assumed to be 4 feet.

Note:
These calculations are provided for reference. Th restrained length shall be designed based upon the conditions encountered during the installation.

RESTRAINED LENGTHS FOR REDUCERS	APPROVED	REVISED
	MARCH 2008	AUG 2019
DD-839-07		SHEET 1 OF 1



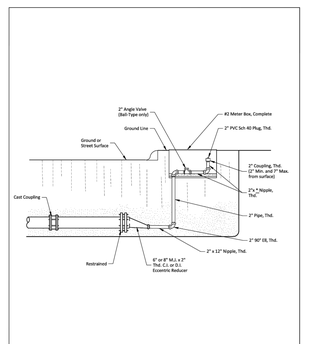
PIPE SIZE (inch)	BEND ANGLE (deg.)	RESTRAINED LENGTH IN FEET, WHEN TEST PRESSURE = 200 psi	RESTRAINED LENGTH IN FEET, WHEN TEST PRESSURE = 150 psi
6	90	5	7
6	45	2	1
6	22.5	1	1
6	11.25	1	1
8	90	10	22
8	45	4	3
8	22.5	2	2
8	11.25	1	1
12	90	43	32
12	45	18	13
12	22.5	8	6
12	11.25	4	3

RESTRAINED LENGTH DESIGN

Restrained length calculations are for P.V.C pipe bedded in compacted granular material extending to the top of the pipe. The native soil material is assumed to be inorganic clay of high plasticity. Depth of bury is assumed to be 4 feet.

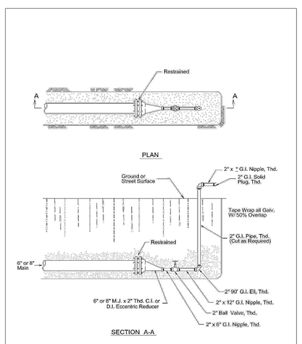
Note:
These calculations are provided for reference. The restrained length shall be designed based upon the conditions encountered during the installation.

RESTRAINED LENGTHS FOR HORIZONTAL BENDS	APPROVED	REVISED
	MARCH 2008	AUG 2019
DD-839-08		SHEET 1 OF 1



* Cut to fit in meter box

2" PERMANENT BLOW-OFF ASSEMBLY ON 6" & 8" MAINS	APPROVED	REVISED
	MARCH 2008	AUG 2019
DD-844-02		SHEET 3 OF 3



* Cut as required to extend beyond excavation

2" TEMPORARY BLOW-OFF ASSEMBLY ON 6" & 8" MAINS	APPROVED	REVISED
	MARCH 2008	AUG 2019
DD-844-01		SHEET 1 OF 1

NOTE:

CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR STRUCTURAL DESIGN/GEOTECHNICAL/SAFETY/EQUIPMENT CONSULTANT, IF ANY, SHALL REVIEW THESE PLANS AND AVAILABLE GEOTECHNICAL INFORMATION AND THE ANTICIPATED INSTALLATION SITE(S) WITHIN THE PROJECT WORK AREA IN ORDER TO IMPLEMENT CONTRACTOR'S TRENCH EXCAVATION SAFETY PROTECTION SYSTEMS, PROGRAMS AND/OR PROCEDURES FOR THE PROJECT DESCRIBED IN THE CONTRACT DOCUMENTS. THE CONTRACTOR'S IMPLEMENTATION OF THESE SYSTEMS, PROGRAMS AND/OR PROCEDURES SHALL PROVIDE FOR ADEQUATE TRENCH EXCAVATION SAFETY PROTECTION THAT COMPLY WITH AS A MINIMUM, OSHA STANDARDS FOR TRENCH EXCAVATIONS. SPECIFICALLY, CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR SAFETY CONSULTANT SHALL IMPLEMENT A TRENCH SAFETY PROGRAM IN ACCORDANCE WITH OSHA STANDARDS GOVERNING THE PRESENCE AND ACTIVITIES OF INDIVIDUALS WORKING IN AND AROUND TRENCH EXCAVATION.

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CUDE ENGINEERS

4122 Pond Hill Road, Suite 101
San Antonio, Texas 78231
P:(210) 681.2951 F: (210) 523.7112

HICKORY RIDGE UNIT 3A

WATER DISTRIBUTION STANDARD DETAILS

DATE
11/12/2025

PROJECT NO.
03278.101

DRAWN BY
RC/JG/JRR/MOH/MAS

CHECKED BY
CJC/KMH

REVISIONS
1. 2. 3. 4. 5. 6. 7. 8.

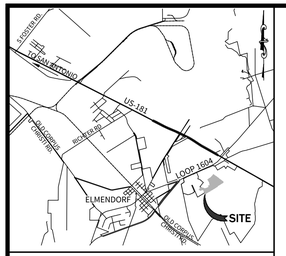
STATE OF TEXAS
KYLE M. HUDEK
138753
LICENSED
PROFESSIONAL ENGINEER
11/18/2025

CUDE ENGINEERS
TBPELS No. 10048500

C33

REPRODUCTION OF THE ORIGINAL SIGNED AND SEALED PLAN AND/OR ELECTRONIC MEDIA MAY HAVE BEEN INADVERTENTLY ALTERED. CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE SCALE OF THE DOCUMENT AND CONTACTING CUDE ENGINEERS TO VERIFY DISCREPANCIES PRIOR TO CONSTRUCTION.

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LOCATION MAP N.T.S.

LEGEND

EXISTING SANITARY SEWER	EX.8"SS
PROPOSED SANITARY SEWER	8"SS
EXISTING SANITARY SEWER MANHOLE	
PROPOSED SANITARY SEWER MANHOLE	
EXISTING WATER MAIN	EX.8"W
PROPOSED WATER MAIN	8"W
PROPOSED STANDARD FIRE HYDRANT	
PROPOSED STANDARD GATE VALVE	
ELECTRIC, GAS, TELEPHONE, & CABLE T.V.	E.G.T.C.A. ESMT.
EASEMENT	
PROPOSED LIGHT POLE	

BENCHMARK **BM-1**

BENCHMARK TO BE SET BY ENGINEER PRIOR TO CONSTRUCTION.

NOTE: ALL LATERALS TO BE INSTALLED @ MIN. 2.0% SLOPE. UNLESS OTHERWISE NOTED, ALL SANITARY SEWER PIPE SHALL BE P.V.C. THAT MEETS ASTM SPECIFICATION D-3034, SDR-26.

NOTE:

THE LOCATIONS AND DEPTHS OF EXISTING UTILITIES, INCLUDING SERVICE LATERALS AND DRAINAGE STRUCTURES SHOWN ON THE PLANS ARE APPROXIMATE ONLY. THE CONTRACTOR SHALL VERIFY THE EXACT LOCATION AND DEPTHS OF UNDERGROUND UTILITIES AT LEAST 48 HOURS PRIOR TO CONSTRUCTION WHETHER SHOWN ON PLANS OR NOT, AND TO PROTECT THE SAME DURING CONSTRUCTION.

CITY OF ELMENDORF	210-635-8210
AQUA TEXAS	512-990-4400
TEXAS STATE WIDE ONE CALL LOCATOR	1-800-545-6005
CITY PUBLIC SERVICE	"
AT&T	"
CHARTER COMMUNICATIONS	"
VALERO ENERGY CO.	"

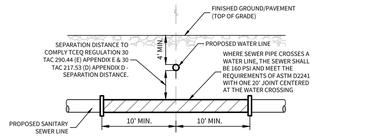
AT&T AND SPECTRUM COMMUNICATION LINES TO GO INTO JOINT TRENCH WITH C.P.S. ENERGY
LOTS WITH CONFLICTING TRANSFORMER / SECONDARY ENCLOSURE ELECTRIC SERVICE AND WATER METER PLACED 5' FROM PROPERTY LINE WHERE THE CONFLICT OCCURS.

TYPICAL UTILITY CROSSINGS WILL HAVE
3 - 6" SCH 80 PVC CONDUIT WITH SWEEPS,
2 - 4" SCH 40 PVC CONDUIT WITH SWEEPS,
THE TOTAL AMOUNT OF CONDUIT TO BE USED WILL BE DETERMINED DURING CONSTRUCTION.

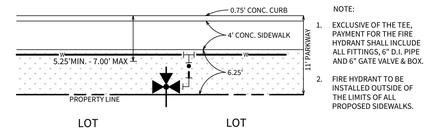
TYPICAL IRRIGATION CROSSING WILL HAVE
3 - 4" SCH 40 PVC CONDUIT WITH SWEEPS,

* CONDUIT ONLY TO BE INSTALLED IF:

1.) STREET BASE AND DRAINAGE COMPLETION PRECEDES CPS UTILITY LINE INSTALLATION.
2.) INSTALLATION IS AUTHORIZED BY THE DEVELOPER.



TYPICAL SANITARY SEWER/ WATER CROSSING DETAIL
N.T.S.



NOTE:
1. EXCLUSIVE OF THE TEE, PAYMENT FOR THE FIRE HYDRANT SHALL INCLUDE ALL FITTINGS, 6" D.I. PIPE AND 6" GATE VALVE & BOX.
2. FIRE HYDRANT TO BE INSTALLED OUTSIDE OF THE LIMITS OF ALL PROPOSED SIDEWALKS.

TYPICAL FIRE HYDRANT DETAIL (4' SIDEWALK / 50' R.O.W.)
N.T.S.

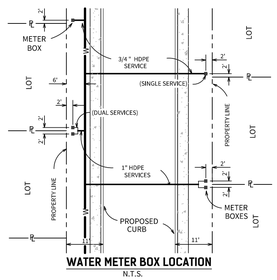
DEVELOPER:

ELMENDORF DEVELOPMENT COMPANY
1401 WOODLANDS PARKWAY
THE WOODLANDS, TEXAS 773880
TEL: (210) 403-6282
CONTACT PERSON: JUANITA ORSAK

CIVIL ENGINEER:

CUDE ENGINEERS
CONTACT PERSON: CHRIS CHAFFEE, P.E.
4122 POND HILL ROAD, SUITE 101
SAN ANTONIO, TX 78231
TEL: (210) 681-2951
FAX: (210) 523-7112

SCALE: 1"=100'
0 100 200



WATER METER BOX LOCATION
N.T.S.

NOTES

THE LOCATIONS AND DEPTHS OF ALL EXISTING UTILITIES, INCLUDING SERVICE LATERALS AND DRAINAGE STRUCTURES SHOWN ON THE PLANS ARE APPROXIMATE ONLY. THE CONTRACTOR SHALL VERIFY THE EXACT LOCATION AND DEPTHS OF UNDERGROUND UTILITIES AT LEAST 48 HOURS PRIOR TO CONSTRUCTION WHETHER SHOWN ON PLANS OR NOT,AND TO PROTECT THE SAME DURING CONSTRUCTION.

NOTE

THE CONTRACTOR SHALL BE RESPONSIBLE FOR MEETING 98% COMPACTION ON ALL TRENCH BACKFILL AND PAYING FOR THE TESTS TO BE PERFORMED BY A THIRD PARTY. COMPACTION TEST WILL BE DONE AT ONE LOCATION POINT RANDOMLY SELECTED OR AS INDICATED BY THE SAWS INSPECTOR/TEST ADMINISTER. PER EACH 12-INCH LOOSE LIFT PER 400 LINEAR FEET AT A MINIMUM. THIS PROJECT WILL NOT BE ACCEPTED AND FINALIZED BY SAWS WITHOUT THIS REQUIREMENT BEING MET AND VERIFIED BY PROVIDING ALL NECESSARY DOCUMENTED TEST RESULTS.

TRENCH EXCAVATION PROTECTION

CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR STRUCTURAL DESIGN/GEOTECHNICAL/SAFETY/EQUIPMENT CONSULTANT, IF ANY, SHALL REVIEW THESE PLANS AND AVAILABLE GEOTECHNICAL INFORMATION AND THE ANTICIPATED INSTALLATION SITE(S) WITHIN THE PROJECT WORK AREA IN ORDER TO IMPLEMENT CONTRACTOR'S TRENCH EXCAVATION SAFETY PROTECTION SYSTEMS, PROGRAMS AND/OR PROCEDURES FOR THE PROJECT DESCRIBED IN THE CONTRACT DOCUMENTS. THE CONTRACTOR'S IMPLEMENTATION OF THESE SYSTEMS, PROGRAMS AND/OR PROCEDURES SHALL PROVIDE FOR ADEQUATE TRENCH EXCAVATION SAFETY PROTECTION THAT COMPLY WITH AS A MINIMUM, OSHA STANDARDS FOR TRENCH EXCAVATIONS. SPECIFICALLY, CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR SAFETY CONSULTANT SHALL IMPLEMENT A TRENCH SAFETY PROGRAM IN ACCORDANCE WITH OSHA STANDARDS GOVERNING THE PRESENCE AND ACTIVITIES OF INDIVIDUALS WORKING IN AND AROUND TRENCH EXCAVATION.



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San Antonio, Texas 78231
P:(210) 681.2951 F: (210) 523.7112

HICKORY RIDGE UNIT 3A

OVERALL UTILITY PLAN

DATE 11/18/2025
PROJECT NO. 03278.101
DRAWN BY RC/JG/JRR/MOH/MAS
CHECKED BY CJC/KMH

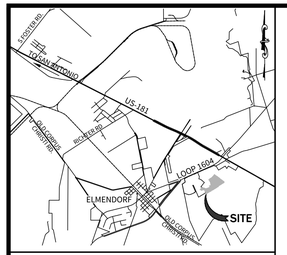
REVISIONS
1. 2. 3. 4. 5. 6. 7. 8.

STATE OF TEXAS
KYLE M. HUDEK
138753
LICENSED
PROFESSIONAL ENGINEER
11/18/2025
CUDE ENGINEERS
TBPELS No. 10048500

C34

P:\03278\101\2-Drawings\Civil\3A\OVERALL UTILITY PLAN.dwg, 2025-11-18 8:50:44 am, hmalik

REPRODUCTION OF THE ORIGINAL SIGNED AND SEALED PLAN AND/OR ELECTRONIC MEDIA MAY HAVE BEEN INADVERTENTLY ALTERED. CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE SCALE OF THE DOCUMENT AND CONTACTING CUDE ENGINEERS TO VERIFY DISCREPANCIES PRIOR TO CONSTRUCTION.



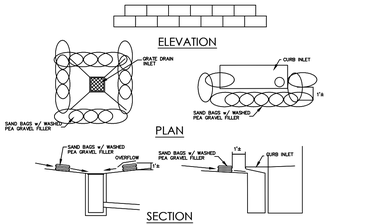
LOCATION MAP N.T.S.

DEVELOPER:

ELMENDORF DEVELOPMENT COMPANY
1401 WOODLANDS PARKWAY
THE WOODLANDS, TEXAS 773880
TEL: (210) 403-6282
CONTACT PERSON: JUANITA ORSAK

CIVIL ENGINEER:

CUDE ENGINEERS
CONTACT PERSON: CHRIS CHAFFEE, P.E.
4122 POND HILL ROAD, SUITE 101
SAN ANTONIO, TX 78231
TEL: (210) 681-2951
FAX: (210) 523-7112



BAGGED GRAVEL INLET FILTER NOTES

1. THE GRAVEL BAG MATERIAL SHOULD BE POLYPROPYLENE, POLYETHYLENE, POLYAMIDE OR COTTON BURLAP WOVEN FABRIC, MINIMUM UNIT WEIGHT 4 OZ/YD 2 , MULLEN BURST STRENGTH EXCEEDING 300 PSI AND ULTRAVIOLET STABILITY EXCEEDING 70 PERCENT.
2. THE BAG LENGTH SHOULD BE 24 INCHES, WIDTH SHOULD BE 18 INCHES AND THICKNESS SHOULD BE 6 INCHES.
3. THE GRAVEL BAGS SHOULD BE FILLED WITH ¾" GRAVEL .
4. WHEN A GRAVEL BAG IS FILLED WITH GRAVEL, THE OPEN END OF THE GRAVEL BAG SHOULD BE STAPLED OR TIED WITH NYLON OR POLY CORD.
5. THE GRAVEL BAGS SHOULD BE PLACED AS SHOWN ON THE DETAIL. THE GRAVEL BAGS SHALL BE STACKED TO FORM A CONTINUOUS BARRIER AROUND THE INLETS. THE BAGS SHOULD BE TIGHTLY ABUTTED AGAINST EACH OTHER TO PREVENT RUNOFF FROM FLOWING BETWEEN THE BAGS.
6. INSPECTION SHOULD BE MADE WEEKLY AND AFTER EACH RAINFALL. REPAIR OR REPLACEMENT SHOULD BE MADE PROMPTLY AS NEEDED BY THE CONTRACTOR.
7. CHECK PLACEMENT OF DEVICE TO PREVENT GAPS BETWEEN DEVICE AND CURB.
8. REMOVE SEDIMENT WHEN BUILDUP REACHES A DEPTH OF 3 INCHES. REMOVED SEDIMENT SHOULD BE DEPOSITED IN A SUITABLE AREA AND IN SUCH A MANNER THAT IT WILL NOT ERODE.
9. STRUCTURES SHOULD BE REMOVED AND THE AREA STABILIZED ONLY AFTER THE REMAINING DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.

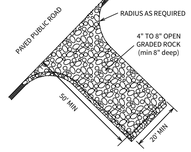
6 BAGGED GRAVEL INLET FILTER NOTES
N.T.S.

LEGEND

- PROPERTY LINE
- EXISTING CONTOURS — 930 —
- BMP ITEM NUMBER 1
- TEMPORARY CONSTRUCTION ENTRANCE/EXIT
- ROCK BERM
- SILT FENCE
- FLOW ARROW
- STAGING AREA
- CONCRETE WASHOUT PIT
- LIMITS OF DISTURBANCE
- BAGGED GRAVEL INLET FILTER

NOTE:

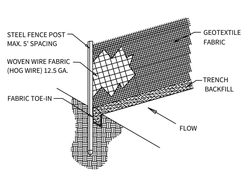
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2. AREA OF SOIL DISTURBANCES INCLUDE STREET RIGHT-OF-WAYS, EASEMENTS AND LOTS.
3. THERE WILL BE NO STORMWATER DISCHARGES INTO THE FEMA FLOOD PLAIN.
4. THE CONTRACTOR IS REQUIRED TO MAINTAIN EROSION CONTROLS THROUGHOUT THE DURATION OF THE PROJECT.
5. THE CITY AND/OR COUNTY INSPECTOR HAS THE AUTHORITY TO HAVE THE CONTRACTOR MODIFY THE EROSION CONTROLS AT THE DEVELOPER'S EXPENSE. THE DEVELOPER SHALL BE NOTIFIED OF THESE MODIFICATIONS PRIOR TO COMMENCEMENT OF MODIFICATIONS.
6. A BEXAR COUNTY PERMIT MUST BE OBTAINED BEFORE WORKING IN BEXAR COUNTY RIGHT OF WAY.



STABILIZED CONSTRUCTION EXIT NOTES:

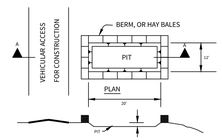
1. WHEN NECESSARY, WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ON PUBLIC ROADWAY.
2. THE EXIT SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC ROADWAYS. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND, AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED, OR TRACKED ONTO PUBLIC ROADWAYS MUST BE REMOVED IMMEDIATELY.

1 TEMPORARY CONSTRUCTION ENTRANCE/EXIT
N.T.S.



SILT FENCE DETAIL — SECTION DETAIL

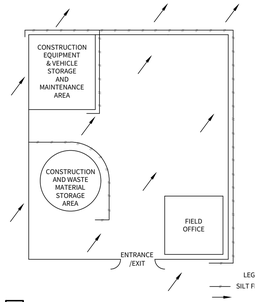
2 STANDARD SILT FENCE
N.T.S.



GENERAL NOTES:

- Detail above illustrates minimum dimensions. Pit can be increased in size depending on expected frequency of use.
- If hay bales are used, they shall be placed in accordance with details shown on Exhibit for hay bales.
- Washout pit shall be located in an area easily accessible to construction traffic.
- Washout pit shall not be located in areas subject to inundation from storm water runoff.
- Washout pit shall be lined with a 10-mil thick polyethylene sheeting free of holes, tears and other defects.

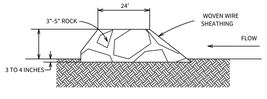
3 CONCRETE TRUCK WASHOUT PIT
N.T.S.



4 TYP. CONSTRUCTION STAGING AREA
N.T.S.

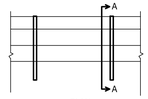


SCALE: 1"=100'
0 100 200

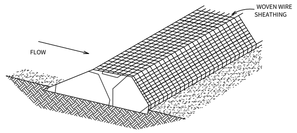


SECTION DETAIL

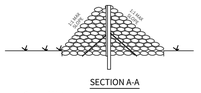
ROCK BERM
N.T.S.



5 ROCK BERM W/ SILT FENCE DETAIL
N.T.S.



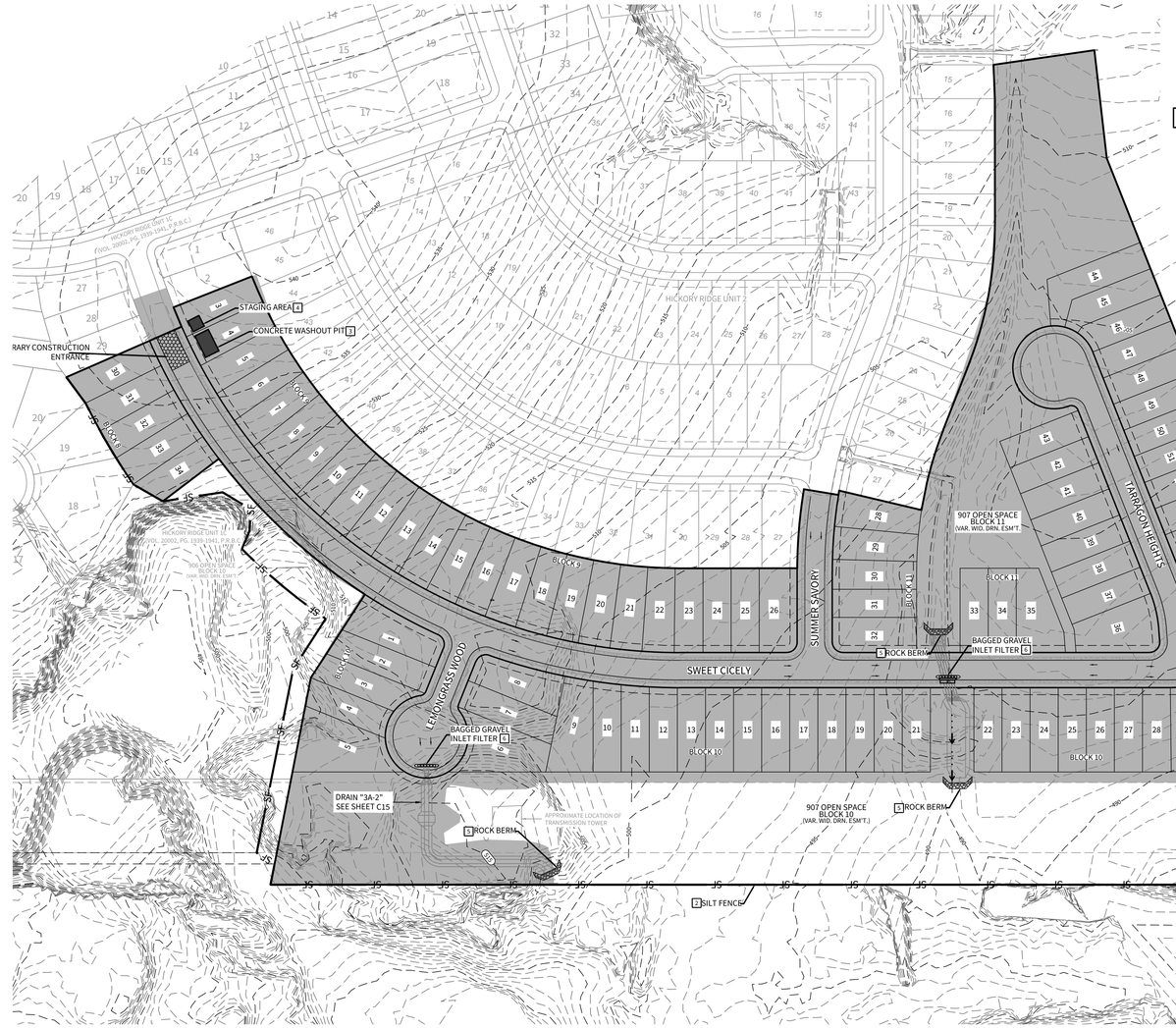
ISOMETRIC PLAN VIEW



SECTION A-A

General Notes

1. The rock berm shall be inspected weekly or after each rain and the stone shall be replaced when the structure ceases to function as intended due to silt accumulation, washout, etc.
2. When silt reaches a depth of 12", the silt shall be removed and disposed of at an approved site.



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HICKORY RIDGE UNIT 3A

STORM WATER POLLUTION PREVENTION PLAN

DATE
12/11/2025

PROJECT NO.
03278.101

DRAWN BY
RC/JG/JRR/MOH/MAS

CHECKED BY
CJC/KMH

REVISIONS
1. 2. 3. 4. 5. 6. 7. 8.

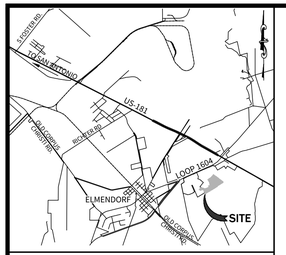
STATE OF TEXAS
KYLE M. HUDEK
138753
LICENSED
PROFESSIONAL ENGINEER
12/15/2025

CUDE ENGINEERS
TBPELS No. 10048500

C35

REPRODUCTION OF THE ORIGINAL SIGNED AND SEALED PLAN AND/OR ELECTRONIC MEDIA MAY HAVE BEEN INADVERTENTLY ALTERED. CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE SCALE OF THE DOCUMENT AND CONTACTING CUDE ENGINEERS TO VERIFY DISCREPANCIES PRIOR TO CONSTRUCTION.

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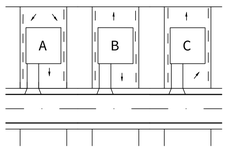


LOCATION MAP N.T.S.

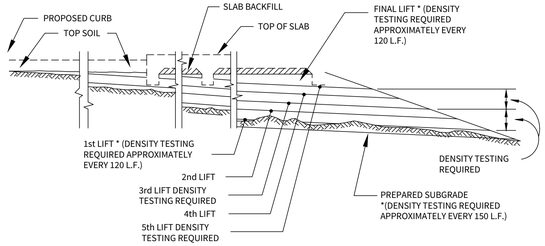
LEGEND

- PROPOSED CONTOUR — 1000
- EXISTING CONTOUR — 1000
- PROPOSED ELEVATION — 656.58
- EXISTING ELEVATION — 672.00E
- GRADE BREAK — GRADE BREAK
- BUILDING SETBACK
- SWALE

NOTE:



TYPICAL LOT SITE PLAN
N.T.S.



DENSITY TEST FREQUENCY
NOT TO SCALE

NOTE:

1. ALL SILT FENCES AND/OR ROCK BERMS AND TEMPORARY CONSTRUCTION ENTRANCES/EXITS SHALL BE PLACED AT THE MOST DOWN-GRADIENT POINT OF CONSTRUCTION AS SHOWN ON THIS SITE PLAN. CONTRACTOR SHALL TAKE INTO CONSIDERATION ANY PROPOSED CONSTRUCTION THAT MAY TAKE PLACE AT THESE LOCATIONS. ANY RELOCATION OF THE SILT FENCE, ROCK BERMS AND/OR TEMPORARY CONSTRUCTION ENTRANCES/EXITS SHALL BE AT THE CONTRACTOR'S EXPENSE.
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6. A BEXAR COUNTY PERMIT MUST BE OBTAINED BEFORE WORKING IN BEXAR COUNTY RIGHT OF WAY.

NOTE:

LOT GRADING BASED ON SLABS BEING 10' BEHIND FRONT PROPERTY LINE.

MINIMUM SLAB EXPOSURE IS 1.0'.

ALL ELEVATIONS AT FRONT PROPERTY LINE ARE 0.20' ABOVE CURB ELEVATION ON LOCAL TYPE "A" STREETS.

TYPICAL PAD SIZES ARE 80' x 30' ON LOCAL TYPE "A" STREETS.

CONTOURS SHOWN ON STREET ARE TOP OF STREET.

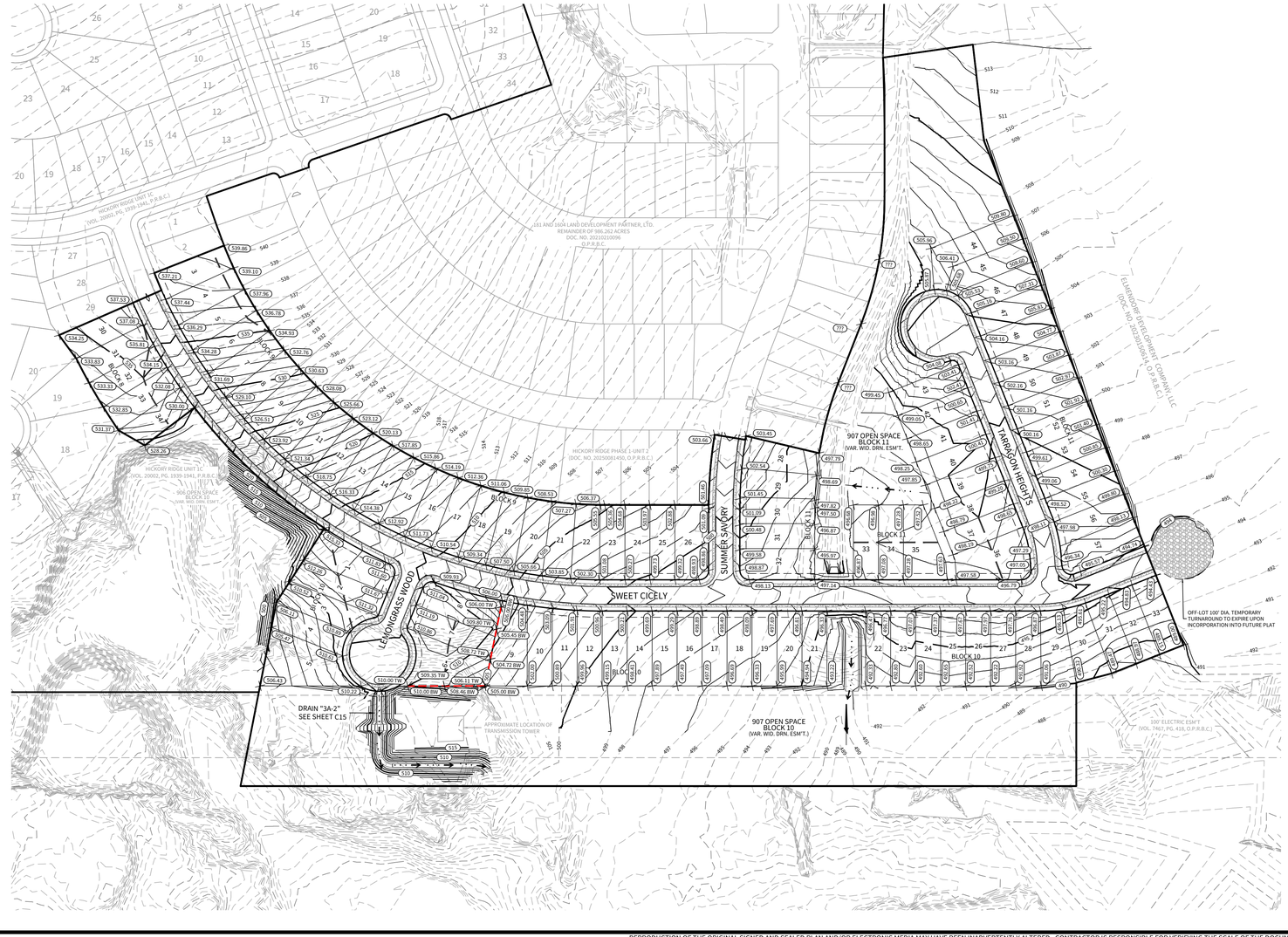
DEVELOPER:

ELMENDORF DEVELOPMENT COMPANY
1401 WOODLANDS PARKWAY
THE WOODLANDS, TEXAS 773880
TEL: (210) 403-6282
CONTACT PERSON: JUANITA ORSAK

CIVIL ENGINEER:

CUDE ENGINEERS
CONTACT PERSON: CHRIS CHAFFEE, P.E.
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TEL: (210) 681-2951
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SCALE: 1"=100'
0 100 200



GENERAL SPECIFICATIONS FOR SITE PREPARATION

1. GENERAL DESCRIPTION

THIS ITEM SHALL CONSIST OF ALL CLEARING AND GRUBBING, DEMOLITION, PREPARATION OF LAND TO BE FILLED, FILLING OF THE LAND, SPREADING, COMPACTION TESTING AND INSPECTION OF THE FILL, AND ALL SUBSIDIARY WORK NECESSARY TO COMPLETE THE GRADING OF THE CUT AND FILL AREAS TO CONFORM WITH THE LINES, GRADES AND SLOPES AS SHOWN ON THE APPROVED PLANS.

ALL LOT GRADING MUST MEET REQUIREMENTS OF FHA/HUD HANDBOOK 4140.3, SPECIFICATIONS FOR LAND DEVELOPMENTS ON CONTROLLED EARTHWORK, DATASHEET 79G. HUD 79G REQUIREMENTS FOR FILL MATERIAL OF 6 INCHES AND MORE WILL BE CONDUCTED. ALL CUT AREAS WILL ALSO MEET THE REQUIREMENTS FOR HUD 79G COMPACTION TESTING. IN ADDITION, ENGINEERS MUST PROVIDED VERIFICATION OF ALL AREAS WHICH DO NOT REQUIRE HUD 79G.

2. CLEARING THE AREA TO BE FILLED

ALL TIMBER, LOGS, TREES, BRUSH AND RUBBISH SHALL BE REMOVED FROM THE SITE.

3. SCARIFYING THE AREA TO BE FILLED

ALL ORGANIC MATTER SHALL BE REMOVED FROM THE SURFACE UPON WHICH THE FILL IS TO BE PLACED, AND THE SURFACE SHALL THEN BE DISKED OR SCARIFIED TO A MINIMUM DEPTH OF SIX INCHES (6"), ALL SURFACE RUTS OR OTHER UNEVEN FEATURES WILL BE LEVELED PRIOR TO FIELD DENSITY TESTING.

4. COMPACTING THE AREA TO BE FILLED

FOLLOWING THE CLEARING AND DISKING OR SCARIFYING OF THE FILL AREA, IT SHALL BE BLADED UNTIL IT IS UNIFORM AND FREE FROM LARGE CLODS. THE AREA SHALL BE BROUGHT TO THE ADEQUATE MOISTURE CONTENT AND COMPACTED (TYPICALLY) TO NOT LESS THAN NINETY PERCENT (90%) OF MAXIMUM DENSITY IN ACCORDANCE WITH THE CURRENT ASTM D 1557 COMPACTION PROCEDURE, OR 95% OF MAXIMUM DENSITY IN ACCORDANCE WITH THE CURRENT THD--TEX--113--E COMPACTION PROCEDURE.

5. FILL MATERIALS

THE MATERIALS USED SHALL BE FREE FROM ORGANIC MATTER AND OTHER DELETERIOUS SUBSTANCES, SUCH AS TREES, BRUSH AND RUBBISH.

6. DEPTH AND MIXING OF FILL LAYERS

THE SELECTED FILL MATERIAL SHALL BE PLACED IN LEVEL, UNIFORM LAYERS WHICH, WHEN COMPACTED, SHALL HAVE A DENSITY CONFORMING TO THAT STIPULATED ABOVE. EACH LAYER SHALL BE THOROUGHLY MIXED DURING THE SPREADING TO ENSURE UNIFORMITY OF MATERIAL IN EACH LAYER. COMPACTED LAYER THICKNESS MAY VARY DEPENDING ON THE COMPACTION EQUIPMENT OF DEMONSTRATED CAPABILITY. THE MAXIMUM LOOSE DEPTH FOR ANY MATERIAL SHALL NOT EXCEED TWELVE INCHES (12"). FOR TESTING REQUIREMENTS OF FILL MATERIAL, SEE DENSITY TESTING.

7. ROCK

WHEN FILL MATERIAL INCLUDES ROCK, THE MAXIMUM ROCK SIZE SHALL BE AS APPROVED BY THE GEOTECHNICAL ENGINEER. NO LARGE ROCKS SHALL BE ALLOWED TO NEST AND ALL VOIDS MUST BE FILLED WITH SMALL STONES OR SOIL AND ADEQUATELY COMPACTED. NO LARGE ROCKS WILL BE PERMITTED WITHIN EIGHTEEN INCHES (18") OF THE FINISHED GRADE.

8. COMPACTION OF FILL LAYER

COMPACTION EQUIPMENT SHALL BE CAPABLE OF COMPACTING THE FILL TO THE SPECIFIED DENSITY. COMPACTION SHALL BE ACCOMPLISHED WHILE THE FILL MATERIAL IS AT OR NEAR THE APPROPRIATE MOISTURE CONTENT. COMPACTION OF EACH LAYER SHALL BE CONTINUOUS OVER THE ENTIRE STRUCTURAL AREA (BENEATH PROPOSED STRUCTURES).

9. COMPACTION OF SLOPES

THE FACES OF FILL SLOPES SHALL BE COMPACTED. COMPACTING OPERATIONS SHALL BE CONTINUED UNTIL THE SLOPE FACES ARE STABLE BUT NOT TOO DENSE FOR PLANTING ON THE SLOPES. COMPACTION OF THE SLOPE FACES MAY BE DONE PROGRESSIVELY IN INCREMENTS OF THREE TO FIVE FEET (3' TO 5') IN FILL HEIGHT AS THIS FILL PROGRESSES OR AFTER THE FILL HAS BEEN BROUGHT TO ITS TOTAL HEIGHT.

10. MOISTURE CONTENT

THE FILL MATERIAL SHALL BE COMPACTED AT THE APPROPRIATE MOISTURE CONTENT SPECIFIED FOR THE SOILS BEING USED. APPROPRIATE MOISTURE CONTENT IS DEFINED, TYPICALLY, AS OPTIMUM MOISTURE CONTENT; HOWEVER, FOR EXPANSIVE SOILS IT MAY BE GREATER THAN OPTIMUM MOISTURE CONTENT, AND OTHER MOISTURE CONTENTS MAY BE NECESSARY TO PRODUCE THE DESIRED RESULTS WITH CERTAIN SOILS.

11. DENSITY TESTS

FIELD DENSITY TESTS SHALL BE PERFORMED ON LAYERS OF FILL WHEN THE FILL IS BEING PLACED AS DIRECTED BY THE GEOTECHNICAL ENGINEER. THE MAXIMUM FILL HEIGHT BETWEEN DENSITY TESTING SHALL BE EIGHTEEN INCHES (18"). ALL TESTING SHALL BE REQUESTED BY THE CONTRACTOR TO MEET THE CONTRACTOR'S CONSTRUCTION SCHEDULE. NOTIFICATION BY THE CONTRACTOR TO CONDUCT TESTS SHALL BE AT LEAST THE DAY BEFORE. THIS NOTIFICATION SHALL INCLUDE THE FILL AREA LOCATION (LOT AND BLOCK), THE LIFT OR HEIGHT OF FILL AND APPROXIMATE DESIRED TIME OF TESTING. WHEN THESE TESTS INDICATE THAT THE DENSITY OF ANY LAYER OF FILL OR PORTION THEREOF IS BELOW THE REQUIRED DENSITY, THE PARTICULAR LAYER OR PORTION SHALL BE REWORKED AND RETESTED AT THE EXPENSE OF THE CONTRACTOR UNLESS THE CONTRACTOR CAN SHOW EVIDENCE THAT CIRCUMSTANCES BEYOND HIS CONTROL REQUIRED THE RETESTING. GENERALLY, THE SPECIFIC TESTING WILL BE AS FOLLOWS AND CONDUCTED BY GEOTECHNICAL ENGINEER.

1. THE LAND TO BE FILLED (PREPARED SUBGRADE) SHALL BE PREPARED AND TESTED AT A FREQUENCY AS DETERMINED BY THE GEOTECHNICAL ENGINEER.
2. THE FIRST LIFT OF COMPACTED FILL (GENERALLY 8 TO 12-IN.) SHALL BE TESTED AS DETERMINED BY THE GEOTECHNICAL ENGINEER. ANY AREAS SUPPORTING THE PROPOSED STRUCTURES REQUIRING FILL SHALL BE TESTED FOR DENSITY COMPLIANCE.
3. FILLS SHALL BE TESTED A MAXIMUM OF EACH EIGHTEEN INCHES (18") OF FILL.
4. TEST RESULTS WILL BE PROVIDED BY THE FIELD TECHNICIAN TO THE CONTRACTOR WHEN POSSIBLE; HOWEVER, ALL TEST RESULTS ARE TO BE REVIEWED BY THE GEOTECHNICAL ENGINEER FOR COMPLIANCE. THE ENGINEER WILL NOTIFY THE CONTRACTOR OF ALL THE TEST RESULTS.

12. CUT/FILL LOTS

AREAS INVOLVING CUT ON ONE PORTION AND FILL ON ANOTHER PORTION OF A SPECIFIC LOT SHALL BE PREPARED TO A MINIMUM DEPTH OF 6-IN. AND WILL BE THE SAME MATERIAL CLASSIFICATION AT THE SAME COMPACTION AND MOISTURE CONTENT. A MINIMUM OF TWO (2) FIELD DENSITY TESTS SHALL BE REQUIRED ON EACH CUT/FILL LOT FOR THE PURPOSE OF DETERMINING UNIFORMITY OF THE AREA SUPPORTING THE PROPOSED STRUCTURES.

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HICKORY RIDGE UNIT 3A

OVERALL GRADING PLAN

REVISIONS 1 2 3 4 5 6 7 8

DATE
12/15/2025

PROJECT NO.
03278.101

DRAWN BY
RC/JG/JRR/MOH/MAS

CHECKED BY
CJC/KMH

STATE OF TEXAS
KYLE M. HUDEK
136753
LICENSED
PROFESSIONAL ENGINEER
12/15/2025

CUDE ENGINEERS
TBPELS No. 10048500

C36

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