CIVIL PLANS

- C0.00 – GENERAL NOTES

- C1.00 – STORMWATER POLLUTION PREVENTION PLAN
- C1.01 – STORM WATER POLLUTION PREVENTION PLAN
- C1.02 – STORM WATER POLLUTION PREVENTION PLAN
- C1.03 – STORM WATER POLLUTION PREVENTION PLAN

- C2.00 – OVERALL GRADING PLAN
- C2.01 – OVERALL GRADING PLAN
- C2.02 – OVERALL GRADING PLAN
- C2.03 – OVERALL GRADING PLAN
- C2.04 – OVERALL GRADING PLAN

- C3.00 – CCUSD GENERAL NOTES
- C3.01 – UTILITY LAYOUT PLAN
- C3.02 – UTILITY LAYOUT PLAN

- C4.00 – OVERALL SANITARY SEWER PLAN
- C4.01 – SANITARY SEWER PLAN & PROFILE LINE 'A'
- C4.02 – SANITARY SEWER PLAN & PROFILE LINE 'A'
- C4.03 – SANITARY SEWER PLAN & PROFILE LINE 'A'
- C4.04 – SANITARY SEWER PLAN & PROFILE LINE 'A'
- C4.05 – SANITARY SEWER PLAN & PROFILE LINE 'A'
- C4.06 – SANITARY SEWER PLAN & PROFILE LINE 'B'
- C4.07 – SANITARY SEWER PLAN & PROFILE LINE 'B'
- C4.08 – SANITARY SEWER PLAN & PROFILE LINE 'D'
- C4.D1 – SANITARY SEWER STANDARD DETAILS *

- C5.00 – OVERALL WATER DISTRIBUTION PLAN
- C5.01 – OVERALL WATER DISTRIBUTION PLAN
- C5.D1 – WATER DISTRIBUTION STANDARD DETAILS *

- C6.00 – DRAINAGE PLAN & PROFILE – DRAIN "I"
- C6.01 – DRAINAGE PLAN & PROFILE – DRAIN "J"
- C6.02 – DRAINAGE PLAN & PROFILE – DRAIN "L"
- C6.03 – DRAINAGE PLAN & PROFILE – DRAIN "D"
- C6.04 – DRAINAGE PLAN & PROFILE – DRAIN "D"
- C6.05 – DRAINAGE PLAN & PROFILE – DRAIN "D"
- C6.06 – DRAINAGE PLAN & PROFILE – DRAIN "D"
- C6.07 – DETENTION POND 1 PLAN
- C6.08 – DETENTION POND 1 PLAN
- C6.D1 – CONCRETE RIP-RAP & MISC. DRAINAGE DETAILS *
- C6.D2 – HEADWALL & RETAINING WALL DRAINAGE DETAILS *
- C6.D3 – TYPE C CURB INLET PRECAST DRAINAGE DETAILS *

- C7.00 – STREET PLAN & PROFILE – PAWPAW COVE
- C7.01 – STREET PLAN & PROFILE – PAWPAW COVE
- C7.02 – STREET PLAN & PROFILE – LEMON LANE
- C7.03 – STREET PLAN & PROFILE – TEXAS FIG TRAIL
- C7.04 – STREET PLAN & PROFILE – ANACAHUITA WAY
- C7.05 – STREET PLAN & PROFILE – TUPELO VIEW
- C7.06 – STREET PLAN & PROFILE – CHERRYBARK LANE
- C7.D1 – STANDARD STREET DETAILS *
- C7.D2 – SMALL ROADSIDE GENERAL NOTES & DETAILS *
- C7.D3 – TXDOT SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS *
- C7.D4 – TXDOT PAVEMENT MARKING DETAILS *
- C7.D5 – TYPICAL CONCRETE DRIVWAY DETAILS *
- C7.D6 – TXDOT PEDESTRIAN FACILITIES DETAILS CURB RAMPS *
- C7.D7 – WHEELCHAIR RAMPS STANDARDS *
- C7.D8 – CITY OF NEW BRAUNFELS STANDARD DETAILS *

- C8.00 – TRAFFIC SIGNAGE PLAN

- C9.00 – PLAT – SHEET 1
- C9.01 – PLAT – SHEET 2

* DENOTES STANDARD DETAILS ADOPTED FOR USE ON THIS PROJECT

- ALL RESPONSIBILITY FOR THE ADEQUACY OF THESE PLANS REMAINS WITH THE ENGINEER OF RECORD. IN ACCEPTING THESE PLANS, COMAL COUNTY MUST RELY UPON THE ADEQUACY OF THE WORK OF THE ENGINEER OF RECORD.
- GAS UTILITIES ARE NOT INCLUDED IN THE CIVIL CONSTRUCTION PLANS. FINAL GAS UTILITY DESIGN SHALL BE APPROVED BY THE COUNTY FOR ANY WORK WITHIN PUBLIC RIGHT-OF-WAY.
- NO PORTION OF THIS SUBDIVISION IS LOCATED WITHIN THE SPECIAL FLOOD HAZARD AREA, ZONE AE, AS DEFINED BY THE COMAL COUNTY, TEXAS COMMUNITY PANEL NUMBER 48209C0470F, EFFECTIVE DATE SEPTEMBER 9, 2005 AS PREPARED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY.
- THIS SUBDIVISION IS LOCATED WITHIN THE EDWARDS AQUIFER TRANSITION ZONE.

FLYING W MUNICIPAL UTILITY DISTRICT
CONSTRUCTION DOCUMENTS FOR

FLYING W SUBDIVISION UNIT 1

BEING A TOTAL OF 40.46 ACRE TRACT OUT OF THE 361.98 ACRES OF LAND LOCATED IN THE NANCY KENNER SURVEY 3, ABSTRACT 306, COMAL COUNTY, TEXAS AND BEING COMPRISED OF A CALLED 258.9 ACRES OF LAND AS DESCRIBED IN DOCUMENT 202106066282 AND OF A CALLED 103.1 ACRES OF LAND AS DESCRIBED IN 202206006901 BOTH OF THE OFFICIAL PUBLIC RECORDS OF COMAL COUNTY, TEXAS



VICINITY MAP
N.T.S.

EST. 1980 CUDE ENGINEERS

SAN ANTONIO | AUSTIN | SAN MARCOS

4122 POND HILL ROAD, SUITE 101
SAN ANTONIO, TEXAS 78231
P:(210) 681.2951 F:(210) 523.7112
TBPE FIRM NO. 455
TBPLS FIRM NO. 10048500
SBE CERTIFIED FIRM



LOCATION MAP
SCALE: 1" = 1000'

Pulte Homes

DEVELOPER:
PULTE HOMES
CONTACT PERSON: STEPHAN MORENO
927 E. SONTERRA, STE. 316
SAN ANTONIO, 78258
TEL: 210.496.1985
FAX: 210.496.0449

N W E S

PROJECT NUMBER:
04024.017

STATE OF TEXAS
JOSE A. LOZANO
126773
LICENSED
PROFESSIONAL ENGINEER
11/26/25

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

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G:\04024\D\13-DWG\1-Plans\03_CO_CVR_SHEET.dwg, 2025/11/25 3:59pm, Nuzrets

CONSTRUCTION PLAN NOTES

REVISED 03/2020

IF CONSTRUCTION HAS NOT COMMENCED WITHIN ONE-YEAR OF COUNTY APPROVAL FOR CONSTRUCTION INSPECTION, THAT APPROVAL IS NO LONGER VALID.

THE MOST CURRENT EDITIONS OF THE COMAL COUNTY STANDARD SPECIFICATIONS AND THE TEXAS DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION OF HIGHWAYS, STREETS AND BRIDGES SHALL BE FOLLOWED FOR ALL CONSTRUCTION EXCEPT AS AMENDED BY THE COMAL COUNTY STANDARD DETAILS.

ALL RESPONSIBILITY FOR THE ADEQUACY OF THESE PLANS REMAINS WITH THE ENGINEER OF RECORD. IN ACCEPTING THESE PLANS, COMAL COUNTY MUST RELY UPON THE ADEQUACY OF THE WORK OF THE ENGINEER OF RECORD.

PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR SHALL CONTACT COMAL COUNTY TO SCHEDULE A PRECONSTRUCTION MEETING. FOR PUBLIC INFRASTRUCTURE ALL INSPECTIONS ARE TO BE CALLED IN AT 830-608-2090. COMAL COUNTY WILL NOT INSPECT UTILITIES. CONTRACTOR AND UTILITY PROVIDER TO COORDINATE INSPECTIONS AND PROVIDE NOTICE TO THE COUNTY ON INSPECTION TIMELINES.

IT IS THE CONTRACTOR'S RESPONSIBILITY TO SEE THAT ALL TEMPORARY AND PERMANENT TRAFFIC CONTROL DEVICES ARE PROPERLY INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE PLANS AND LATEST EDITION OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES. IF, IN THE OPINION OF THE ENGINEERING REPRESENTATIVE AND THE CONSTRUCTION INSPECTOR, THE BARRICADES AND SIGNS DO NOT CONFORM TO ESTABLISHED STANDARDS OR 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. IF THE NEED ARISES, ADDITIONAL TEMPORARY TRAFFIC CONTROL DEVICES MAY BE ORDERED BY THE ENGINEERING REPRESENTATIVE AT THE CONTRACTOR'S EXPENSE. A TXDOT TYPE II B-B BLUE REFLECTIVE RAISED PAVEMENT MARKER SHALL BE INSTALLED IN THE CENTER OF THE ROADWAY ADJACENT TO ALL FIRE HYDRANTS. IN LOCATIONS WHERE HYDRANTS ARE SITUATED ON CORNERS, BLUE REFLECTIVE RAISED PAVEMENT MARKERS SHALL BE INSTALLED ON BOTH APPROACHES WHICH FRONT THE HYDRANT. THE RAISED PAVEMENT MARKER SHALL MEET TXDOT MATERIAL, EPOXY AND ADHESIVE SPECIFICATIONS.

GROUNDWATER:

IT SHALL BE THE RESPONSIBILITY OF THE DEVELOPER, CONTRACTOR, SUBCONTRACTORS, BUILDERS, GEO-TECHNICAL ENGINEER, AND PROJECT ENGINEER TO IMMEDIATELY NOTIFY THE OFFICE OF THE COUNTY ENGINEER AND PROJECT ENGINEER IF THE PRESENCE OF GROUNDWATER WITHIN THE SITE IS EVIDENT. UPON NOTIFICATION THE PROJECT ENGINEER SHALL RESPOND WITH PLAN REVISIONS FOR THE MITIGATION OF THE GROUNDWATER ISSUE. THE COUNTY ENGINEER SHALL RESPOND WITHIN TWO (2) BUSINESS DAYS UPON RECEIPT OF THE MITIGATION PLAN. ALL CONSTRUCTION ACTIVITY, IMPACTED BY THE DISCOVERY OF GROUNDWATER, SHALL BE SUSPENDED UNTIL THE COUNTY ENGINEER GRANTS A WRITTEN APPROVAL OF THE GROUNDWATER MITIGATION PLAN.

RECORD DRAWINGS:

AS PER PLATTING ORDINANCE SECTION 118-38M.: WHEN ALL OF THE IMPROVEMENTS ARE FOUND TO BE CONSTRUCTED AND COMPLETED IN ACCORDANCE WITH THE APPROVED PLANS AND SPECIFICATIONS AND WITH THE COUNTY'S STANDARDS, AND UPON RECEIPT OF ONE SET OF "RECORD DRAWING" PLANS, AND A DIGITAL COPY OF ALL PLANS (PDF COPY) THE COUNTY ENGINEER SHALL ACCEPT SUCH IMPROVEMENTS FOR COMAL COUNTY, SUBJECT TO THE GUARANTY OF MATERIAL AND WORKMANSHIP PROVISIONS IN THIS SECTION.

CONSTRUCTION NOTE:

ENGINEER OF RECORD IS RESPONSIBLE TO ENSURE THAT EROSION CONTROL MEASURES AND STORMWATER CONTROL SUFFICIENT TO MITIGATE OFF SITE IMPACTS ARE IN PLACE AT ALL STAGES OF CONSTRUCTION.

DRAINAGE NOTE:

DRAINAGE IMPROVEMENTS SUFFICIENT TO MITIGATE THE IMPACT OF CONSTRUCTION SHALL BE INSTALLED PRIOR TO ADDING IMPERVIOUS COVER.

FINISHED FLOOR ELEVATIONS:

THE ELEVATION OF THE LOWEST FLOOR SHALL BE AT LEAST 10 INCHES ABOVE THE FINISHED GRADE OF THE SURROUNDING GROUND, WHICH SHALL BE SLOPED IN A FASHION SO AS TO DIRECT STORMWATER AWAY FROM THE STRUCTURE. PROPERTIES ADJACENT TO STORMWATER CONVEYANCE STRUCTURES MUST HAVE FLOOR SLAB ELEVATION OR BOTTOM OF FLOOR JOISTS A MINIMUM OF ONE FOOT ABOVE THE 100-YEAR WATER FLOW ELEVATION IN THE STRUCTURE. DRIVEWAYS SERVING HOUSES ON THE DOWNHILL SIDE OF THE STREET SHALL HAVE A PROPERLY SIZED CROSS SWALE PREVENTING RUNOFF FROM ENTERING THE GARAGE.

SOILS TESTING:

PROCTORS SHALL BE SAMPLED FROM ON-SITE MATERIAL (ON-SITE IS DEFINED AS LIMITS OF CONSTRUCTION FOR THIS- PLAN SET) AND A COPY OF THE PROCTOR RESULTS SHALL BE DELIVERED TO COMAL COUNTY PRIOR TO ANY DENSITY TESTS.

ROADWAY:

ALL ROADWAY COMPACTION TESTS SHALL BE THE RESPONSIBILITY OF THE DEVELOPER'S GEOTECHNICAL ENGINEER. FLEXIBLE BASE OR FILL/EMBANKMENT MATERIAL SHALL BE PLACED IN UNIFORM LAYERS NOT TO EXCEED EIGHT INCHES (8") LOOSE. THE REQUIRED DENSITY FOR THE FILL/EMBANKMENT MATERIAL SHALL MEET THE REQUIREMENTS OF TXDOT'S SPECIFICATION ITEM 132. THE REQUIRED DENSITY FOR THE FLEXIBLE BASE MATERIAL SHALL MEET THE REQUIREMENTS OF TXDOT'S SPECIFICATION ITEM 247. EACH LAYER OF MATERIAL, INCLUSIVE OF SUBGRADE, SHALL BE COMPACTED AS SPECIFIED AND TESTED FOR DENSITY AND MOISTURE IN ACCORDANCE WITH TEST METHODS TEX-113-E, TEX-114-E, TEX-115-E. THE NUMBER AND LOCATION OF REQUIRED TESTS SHALL BE DETERMINED BY THE GEOTECHNICAL ENGINEER AND APPROVED BY THE COMAL COUNTY INSPECTOR. AT A MINIMUM, TESTS SHALL BE TAKEN EVERY 200 LF FOR EACH LIFT. UPON COMPLETION OF TESTING, THE GEOTECHNICAL ENGINEER WILL PROVIDE THE COMAL COUNTY INSPECTOR WITH ALL TESTING DOCUMENTATION AND A CERTIFICATION STATING THAT THE PLACEMENT OF FLEXIBLE BASE, AND FILL MATERIAL, AND SUBGRADE, HAS BEEN COMPLETED IN ACCORDANCE WITH THE PLANS. ADDITIONAL DENSITY TESTS MAY BE REQUESTED BY THE COMAL COUNTY INSPECTOR.

ITEM 340:

ASPHALTIC CONCRETE PAVEMENT SHALL BE THE TYPE OF HOT MIX ASPHALT AS DEFINED IN TXDOT'S STANDARD SPECIFICATIONS FOR CURRENT TXDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION OF HIGHWAYS, STREET AND BRIDGES.

COMAL COUNTY WILL NOT ACCEPT THE USE OF RECYCLED ASPHALT PAVEMENT (RAP) OR RECYCLED ASPHALT SHINGLES (RAS) IN ASPHALT MIXTURES FOR NEW ROADWAYS. ANY DEBRIS INCLUSIONS WITHIN NEW ASPHALT PAVEMENTS WILL RESULT IN ASPHALT REMOVAL AND REPLACEMENT FROM CURB TO CURB FOR LIMITS TO BE DETERMINED BY THE COMAL COUNTY.

THE ASPHALTIC CONCRETE PAVEMENT SURFACE COURSE SHALL BE PLANT MIXED, HOT LAID TYPE "D" MEETING THE SPECIFICATION REQUIREMENTS OF TXDOT ITEM 340. THE ASPHALTIC CONCRETE PAVEMENT SUB-SURFACE COURSES SHALL BE PLANT MIXED, HOT LAID TYPE "B" MEETING THE SPECIFICATION REQUIREMENTS OF TXDOT ITEM 340. THE MIXTURE SHALL BE DESIGNED PER THE DESIGN REQUIREMENTS SPECIFIED IN TXDOT ITEM 340 AND SHALL BE COMPACTED TO BETWEEN 91 AND 95 PERCENT OF THE MAXIMUM THEORETICAL DENSITY AS DETERMINED BY TXDOT TEST METHOD TEX-227-F. PLACE THE MIXTURE WHEN THE ROADWAY SURFACE TEMPERATURE IS AT OR ABOVE 60°F. COMPLETE ALL COMPACTION OPERATIONS BEFORE THE PAVEMENT TEMPERATURE DROPS BELOW 160°F. THE ASPHALT CEMENT CONTENT BY PERCENT OF TOTAL MIXTURE WEIGHT SHALL FALL WITHIN A TOLERANCE OF +0.5 PERCENT FROM A SPECIFIC MIX DESIGN.

UTILITY TRENCH COMPACTION (ADDED TO THE CONSTRUCTION PLANS ON ALL UTILITY PLAN SHEETS):

ALL UTILITY TRENCH COMPACTION TESTS WITHIN THE STREET PAVEMENT/SIDEWALK SECTION SHALL BE THE RESPONSIBILITY OF THE DEVELOPER'S GEOTECHNICAL ENGINEER. FILL MATERIAL SHALL BE PLACED IN UNIFORM LAYERS NOT TO EXCEED TWELVE INCHES (12") LOOSE. DETERMINE THE MAXIMUM LIFT THICKNESS BASED ON THE ABILITY OF THE COMPACTING OPERATION AND EQUIPMENT USED TO MEET THE REQUIRED DENSITY. EACH LAYER OF MATERIAL SHALL BE COMPACTED TO A MINIMUM 95% DENSITY AND TESTED FOR DENSITY AND MOISTURE IN ACCORDANCE WITH TEST METHODS TEX-113-E, TEX-114-E, TEX-115-E. THE NUMBER AND LOCATION OF REQUIRED TESTS SHALL BE DETERMINED BY THE GEOTECHNICAL ENGINEER AND APPROVED BY THE UTILITY PROVIDER INSPECTOR. AT A MINIMUM, TESTS SHALL BE TAKEN EVERY 200 LF FOR EACH LIFT AND EVERY OTHER SERVICE LINE. UPON COMPLETION OF TESTING THE GEOTECHNICAL ENGINEER SHALL PROVIDE THE UTLITY PROVIDER INSPECTOR WITH ALL TESTING DOCUMENTATION AND A CERTIFICATION STATING THAT THE PLACEMENT OF FILL MATERIAL HAS BEEN COMPLETED IN ACCORDANCE WITH THE PLANS. ADDITIONAL DENSITY TESTS MAY BE REQUESTED BY THE UTILITY PROVIDER INSPECTOR.

CURB CUT DUE TO CONSTRUCTION OF NEW RIGHT-OF-WAY CONSTRUCTION:

1. SAWCUT EXISTING STREET AND MATCH TO NEW CONSTRUCTION.
2. SAWCUT EXISTING CURB TO TIE INTO EXISTING CONSTRUCTION.

CONSTRUCTION STABILIZED ENTRANCE:

SAWCUT CURB FOR CONSTRUCTION ENTRANCE. STABILIZED CONSTRUCTION AREA SHALL BE CONSTRUCTED OF 3"X5" ROCK TO BE PLACED A MINIMUM LENGTH OF 25-FT. AND MAINTAINED SO THAT CONSTRUCTION DEBRIS DOES NOT FALL WITHIN THE COUNTY RIGHT-OF-WAY. RIGHT-OF-WAY MUST BE CLEARED FROM MUD, ROCKS, ETC. AT ALL TIMES.

(NOTES TO BE PLACED ON ALL WW PLAN & DETAIL SHEETS):

ENSURE ALL DRIVEWAY APPROACHES ARE BUILT IN GENERAL ACCORDANCE WITH A.D.A. SPECIFICATIONS. NO VALVES, HYDRANTS, ETC. SHALL BE CONSTRUCTED WITHIN CURBS, SIDEWALKS, OR DRIVEWAYS.

SIGNING AND PAVEMENT MARKING PLAN NOTES:

ALL PAVEMENT MARKINGS SHALL BE THERMOPLASTICS AS PER TXDOT ITEM NO. 666. COMAL COUNTY WILL INSTALL COUNTY ROAD SIGNS AND INVOICE THE OWNER. THE CONTRACTOR IS TO INSTALL PAVEMENT MARKINGS. ALL ROAD SIGNS AND PAVEMENT MARKINGS SHALL BE INSTALLED IN ACCORDANCE WITH THE APPROVED ENGINEERING PLANS. THE COUNTY WILL INSPECT ALL SIGNS AT FINAL INSPECTION. THE CONTRACTOR SHALL INSTALL ALL PAVEMENT MARKINGS IN ACCORDANCE WITH APPROVED ENGINEERING PLANS. THE CONTRACTOR SHALL NOTIFY THE COUNTY AT LEAST 24 HOURS PRIOR TO THE INSTALLATION OF ALL SEALER AND FINAL MARKINGS. THE COUNTY WILL INSPECT ALL MARKINGS AT FINAL APPLICATION.

SEEDING AND ESTABLISHMENT OF VEGETATION WITHIN EARTHEN CHANNELS, STORMWATER BASINS AND DISTURBED AREAS:

SEEDING FOR THE PURPOSE OF ESTABLISHING VEGETATION WITHIN CONSTRUCTED EARTHEN CHANNELS, BASINS AND DISTURBED AREAS SHALL BE CONDUCTED IN ACCORDANCE WITH ITEM 164 (SEEDING FOR EROSION CONTROL OF TXDOT'S STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MAINTENANCE OF HIGHWAYS, STREETS AND BRIDGES MANUAL. ONLY SEED TYPES AND MIXES SPECIFIED FOR THE SAN ANTONIO DISTRICT (DISTRICT 15 IN TABLES 1 AND 2 UNDER ITEM 164 SHALL BE UTILIZED. DURING THE COOL SEASON (SEPT 1-NOV 30, CEREAL RYE AND SEED SPECIES SPECIFIED FOR THE SAN ANTONIO DISTRICT IN TABLE 3 MAY BE USED. FOR COOL SEASON SEEDING APPLICATIONS, COOL SEASON SEED MIXES SHALL BE USED IN CONJUNCTION WITH SEED MIXES FOR THE SAN ANTONIO DISTRICT AS SPECIFIED IN TABLE 1 AND 2 UNDER ITEM 164.

IT MAY BE DEEMED NECESSARY TO INCORPORATE TOPSOIL AND SOIL AMENDMENTS (I.E. COMPOST/ FERTILIZER INTO EXISTING SOIL IN ORDER TO FACILITATE VEGETATION GROWTH. TOPSOIL COMPOST AND FERTILIZER ADDITIONS SHALL BE CONDUCTED ACCORDING TO ITEMS 160, 161 AND 166 OF TXDOT'S STANDARD SPECIFICATIONS MANUAL, RESPECTIVELY.

AREAS REQUIRING PERMANENT VEGETATION (EARTHEN CHANNELS, PONDS, ETC.) ARE REQUIRED TO MEET TXDOT SPECIFICATIONS FOR ITEM 160 TOPSOIL. TESTING PER TEX-128-E WILL BE REQUIRED AT THE COUNTY'S REQUEST.

WATERING MAY ALSO BE NECESSARY TO FACILITATE AND EXPEDITE THE SPROUTING AND GROWTH OF VEGETATION. ITEM 168 OF TXDOT'S STANDARD SPECIFICATIONS MANUAL SHALL BE ADHERED TO FOR VEGETATIVE WATERING.

IF EXTENDED DROUGHT CONDITIONS EXIST THAT HINDER OR PROHIBIT THE GROWTH AND ESTABLISHMENT OF VEGETATION, THE CONTRACTOR/ DEVELOPER SHALL PROVIDE A PLAN TO COMAL COUNTY DESCRIBING THE MEASURES THAT WILL BE TAKEN TO STABILIZE EARTHEN DRAINAGE INFRASTRUCTURE UNTIL A TIME WHEN GROWING CONDITIONS BECOME MORE FAVORABLE.

SEQUENCE OF CONSTRUCTION

A) INSTALLATION OF TEMPORARY CONSTRUCTION ENTRANCE/EXIT
B) INSTALLATION OF EROSION AND SEDIMENTATION CONTROLS
C) SITE CLEARING
D) GRADING
E) SANITARY SEWER INSTALLATION
F) WATER MAIN INSTALLATION
G) DRY UTILITY INSTALLATION
H) STREET AND DRAINAGE INFRASTRUCTURE INSTALLATION
I) REMOVAL OF TEMPORARY EROSION AND SEDIMENTATION CONTROLS
J) SITE CLEAN UP
K) SINGLE-FAMILY RESIDENTIAL HOME CONSTRUCTION

CUDEENGINEERS.COM

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

FLYING W UNIT 1

GENERAL NOTES

DATE
11/24/2025

PROJECT NO.
04024-004

DRAWN BY
C7

CHECKED BY
JL

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

STATE OF TEXAS
JOSE A. LOZANO
126773
LICENSED
PROFESSIONAL ENGINEER
11/26/25

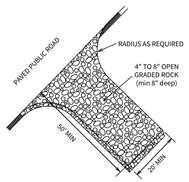
CUDE ENGINEERS
TBPELS No. 10048500

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C0.00

E:\2025\2025-12-20\MEP Plans\CUDE\DETAILED PLANS\C0.00 Aug 2025 11:03:13 AM.dgn

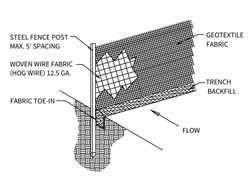
REPRODUCTION OF THE ORIGINAL SIGNED AND SEALED PLAN AND/OR ELECTRONIC MEDIA MAY HAVE BEEN INADVERTENTLY ALTERED. CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE SCALE OF THE DOCUMENT AND CONTACTING CUDE ENGINEERS TO VERIFY DISCREPANCIES PRIOR TO CONSTRUCTION.



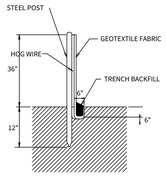
STABILIZED CONSTRUCTION EXIT NOTES:

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.

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

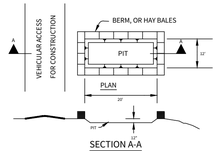


SILT FENCE DETAIL



SECTION DETAIL

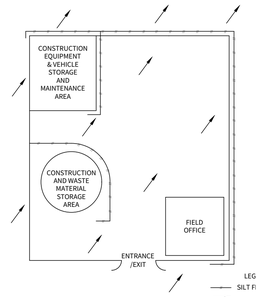
2 STANDARD SILT FENCE
N.T.S.



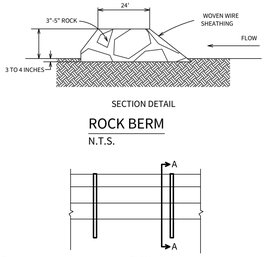
GENERAL NOTES:

- 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.

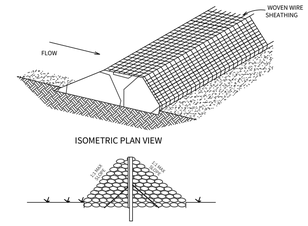
3 CONCRETE TRUCK WASHOUT PIT
N.T.S.



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

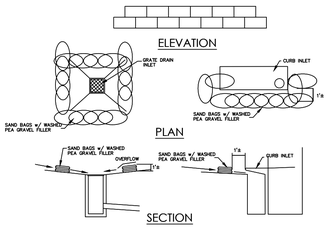


ROCK BERM 5
N.T.S.



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.



BAGGED GRAVEL INLET FILTER NOTES

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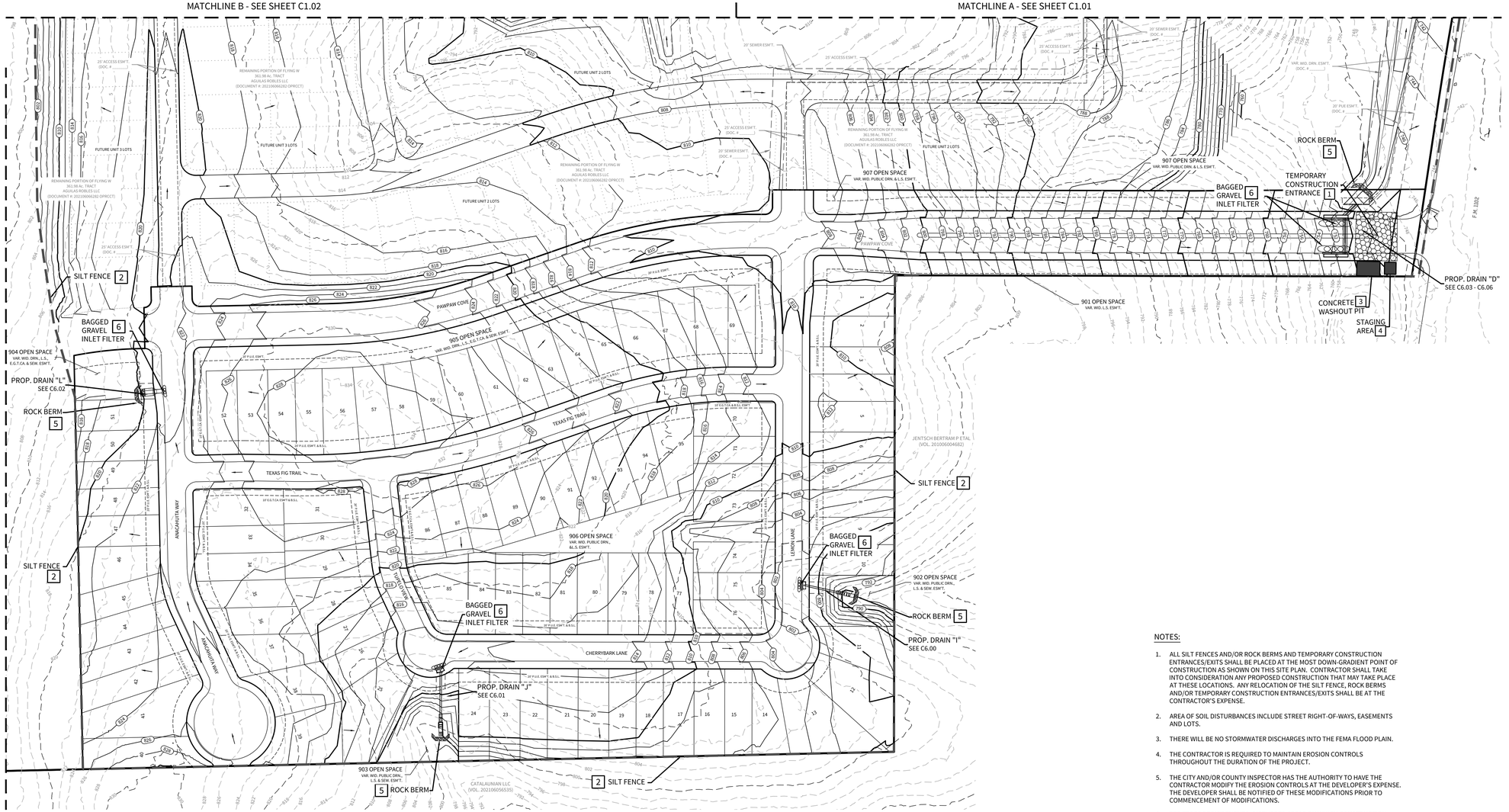
6 BAGGED GRAVEL INLET FILTER NOTES
N.T.S.

SCALE: 1"=80'

0 80 160

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



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

FLYING W UNIT 1

STORM WATER POLLUTION PREVENTION PLAN

DATE
11/25/2025

PROJECT NO.
04024-004

DRAWN BY
C7

CHECKED BY
JL

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

STATE OF TEXAS
JOSE A. LOZANO
126773
LICENSED
PROFESSIONAL ENGINEER
11/26/25

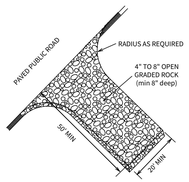
CUDE ENGINEERS
TBPELS No. 10048500

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C1.00

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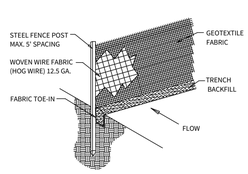
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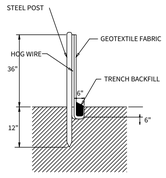
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1 TEMPORARY CONSTRUCTION ENTRANCE/EXIT
N.T.S.

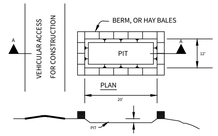


SILT FENCE DETAIL



SECTION DETAIL

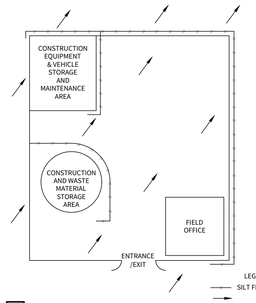
2 STANDARD SILT FENCE
N.T.S.



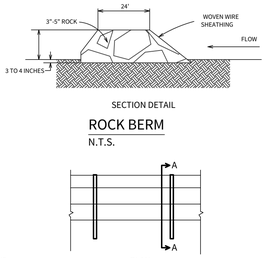
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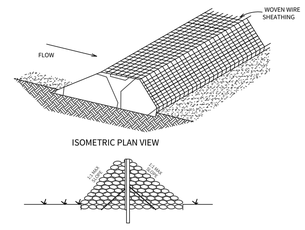
3 CONCRETE TRUCK WASHOUT PIT
N.T.S.



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

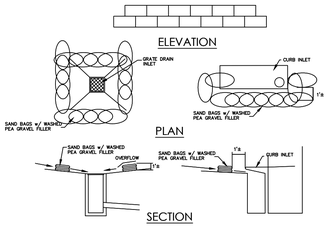


5 ROCK BERM W/ SILT FENCE DETAIL
N.T.S.



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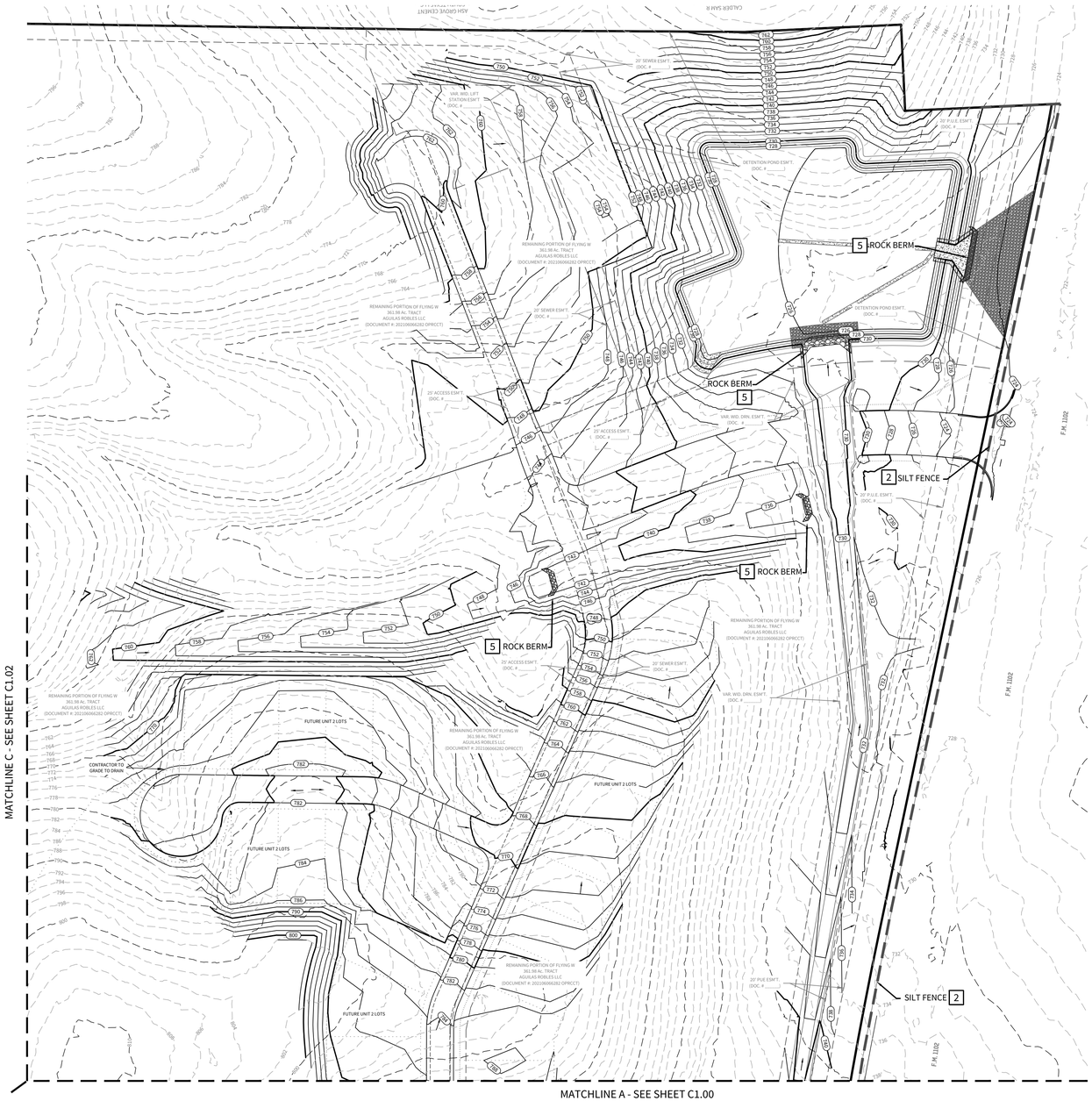


SCALE: 1"=80'

0 80 160

LEGEND

- PROPERTY LINE
- EXISTING CONTOURS — 930 —
- BMP ITEM NUMBER [1]
- TEMPORARY CONSTRUCTION ENTRANCE/EXIT
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FLYING W UNIT 1

STORM WATER POLLUTION PREVENTION PLAN

DATE
11/25/2025

PROJECT NO.
04024-004

DRAWN BY
C7

CHECKED BY
JL

REVISIONS
1 2 3 4 5 6 7 8

STATE OF TEXAS
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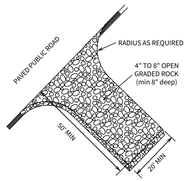
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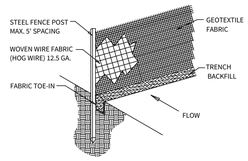
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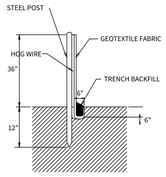
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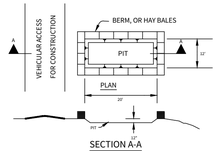


SILT FENCE DETAIL



SECTION DETAIL

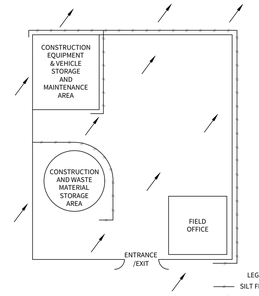
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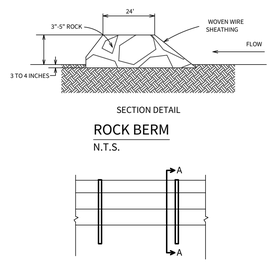
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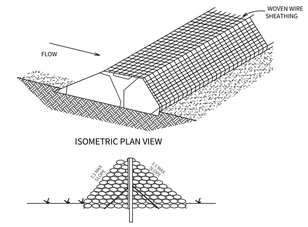
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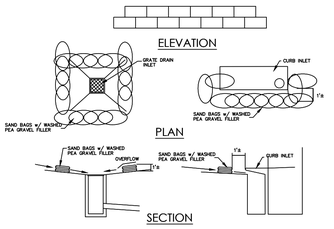


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General Notes

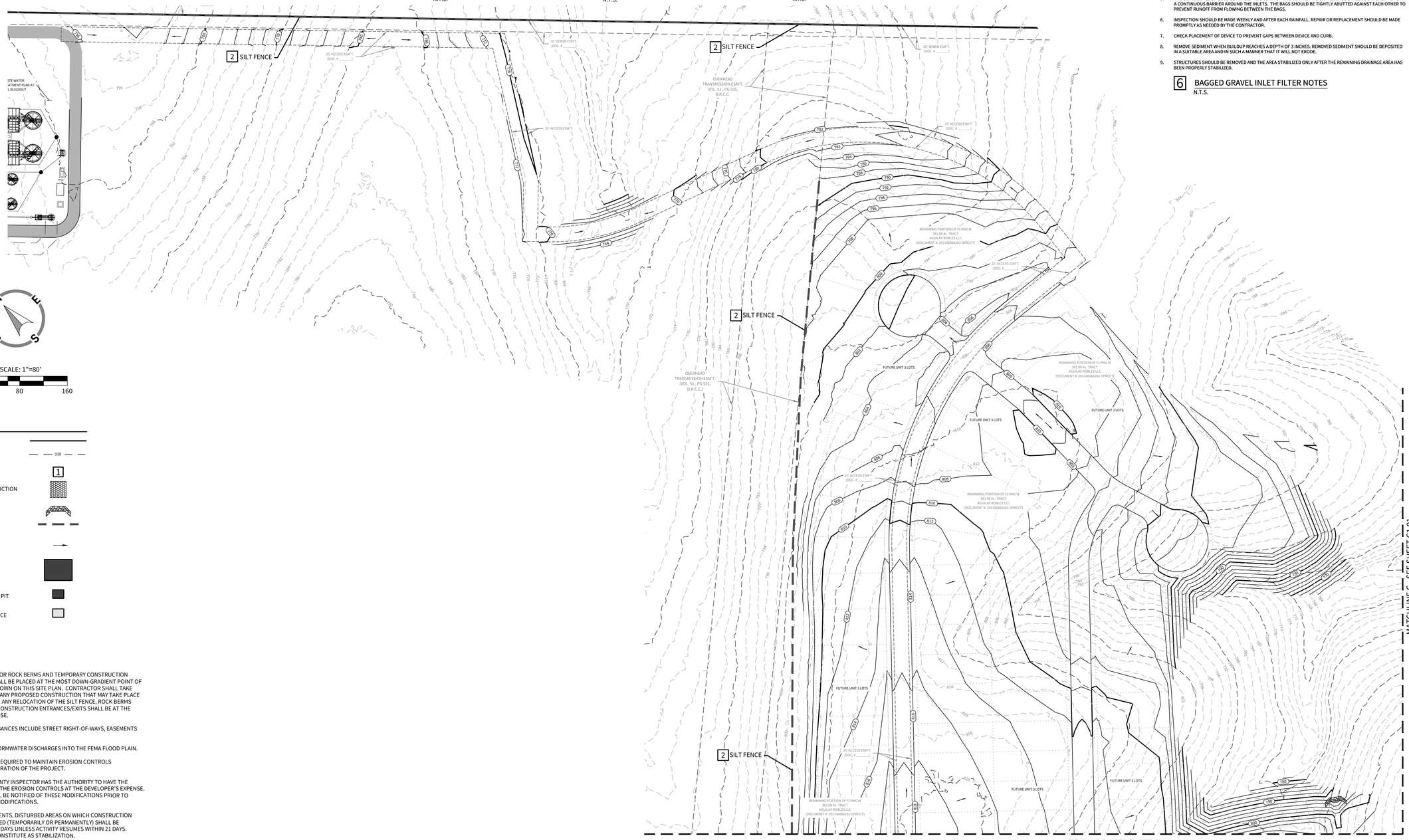
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N.T.S.





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0 80 160

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FLYING W UNIT 1

STORM WATER POLLUTION PREVENTION PLAN

DATE
11/25/2025

PROJECT NO.
04024-004

DRAWN BY
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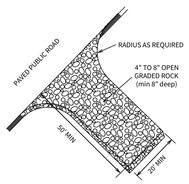
STATE OF TEXAS
JOSE A. LOZANO
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LICENSED
PROFESSIONAL ENGINEER
11/26/25

CUDE ENGINEERS
TBPELS No. 10048500

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C1.02

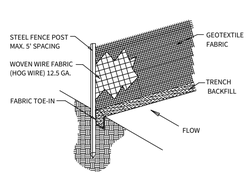
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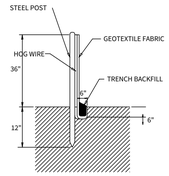
STABILIZED CONSTRUCTION EXIT NOTES:

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.

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

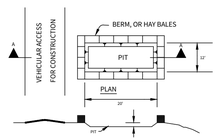


SILT FENCE DETAIL



SECTION DETAIL

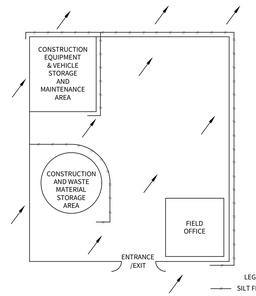
STANDARD SILT FENCE 2
N.T.S.



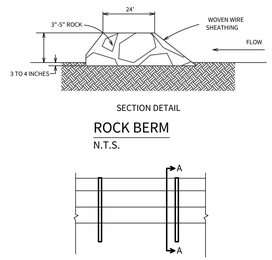
GENERAL NOTES:

- 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.

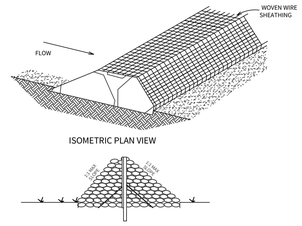
CONCRETE TRUCK WASHOUT PIT 3
N.T.S.



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

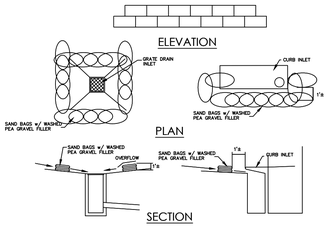


ROCK BERM W/ SILT FENCE DETAIL 5
N.T.S.



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.



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.

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

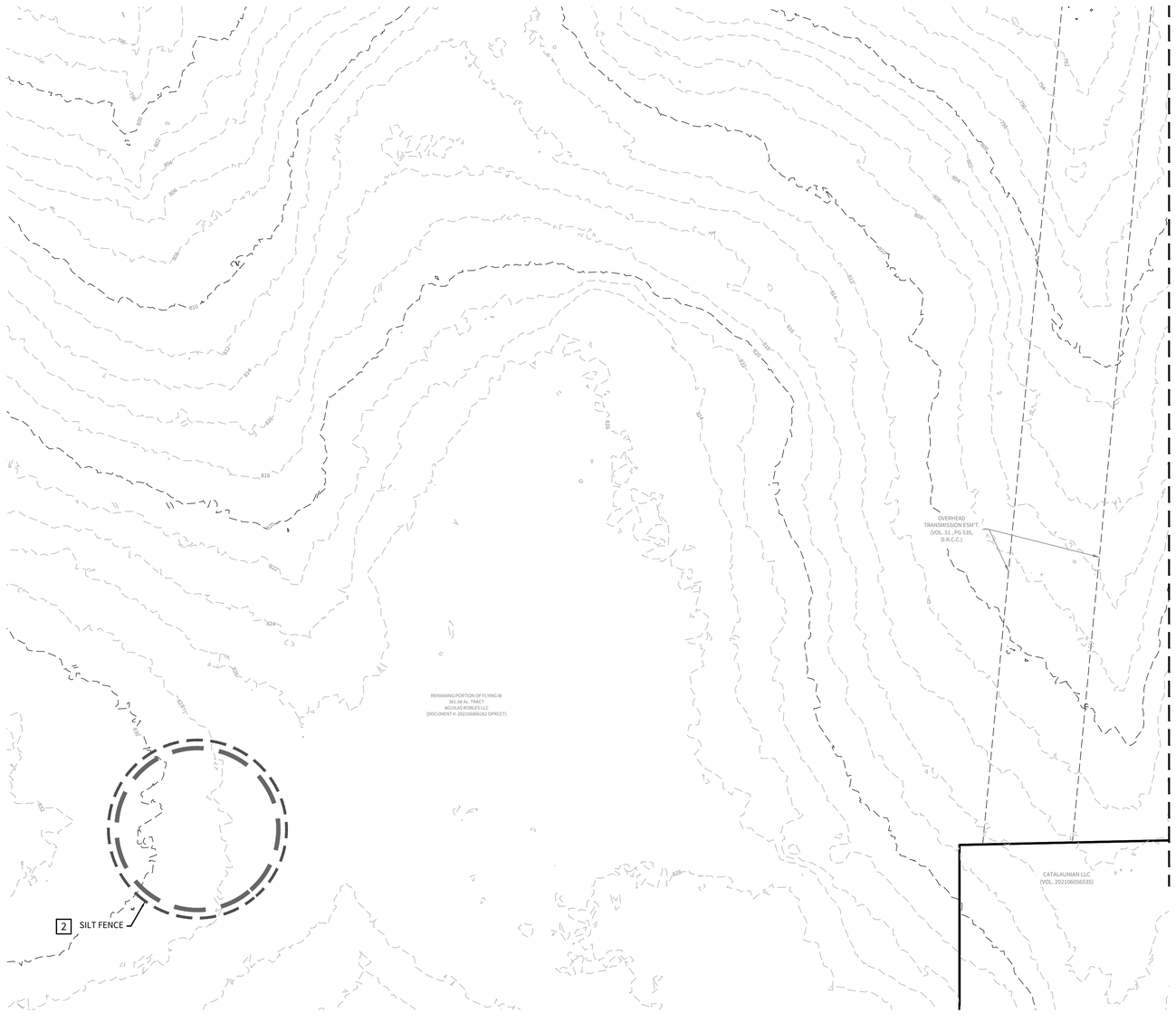


SCALE: 1"=80'

0 80 160

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
- EXCESS MATERIAL STOCKPILE LOCATION



NOTES:

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.
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. PER TPDES REQUIREMENTS, DISTURBED AREAS ON WHICH CONSTRUCTION ACTIVITIES HAVE CEASED (TEMPORARILY OR PERMANENTLY) SHALL BE STABILIZED WITHIN 14 DAYS UNLESS ACTIVITY RESUMES WITHIN 21 DAYS. SEEDING DOES NOT CONSTITUTE AS STABILIZATION.

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

FLYING W UNIT 1

STORM WATER POLLUTION PREVENTION PLAN

DATE
11/25/2025

PROJECT NO.
04024-004

DRAWN BY
C7

CHECKED BY
JL

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

STATE OF TEXAS
JOSE A. LOZANO
126773
LICENSED
PROFESSIONAL ENGINEER
11/26/25

CUDE ENGINEERS
TBPELS No. 10048500

-

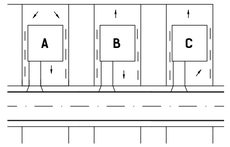
C1.03

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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LEGEND

PROPOSED CONTOUR	1000
EXISTING CONTOUR	1000
PROPOSED ELEVATION	1000.00
TYPE OF LOT GRADING	A, B, OR C
DIRECTION OF FLOW	
LIMITS OF GRADING	
BUILDING SETBACK	
E.G.T.CA. EASEMENT	
SWALE	
PROPOSED RETAINING WALL	
BUILDING PAD (70'-75')	
BUILDING PAD (65'-69')	



TYPICAL LOT SITE PLAN

N.T.S.

NOTES:

LOT GRADING BASED ON SLABS BEING 20' BEHIND FRONT PROPERTY LINE.

MINIMUM SLAB EXPOSURE IS 1.0'.

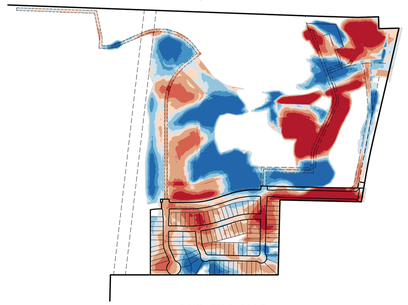
TYPICAL PAD SIZES IS 30' X 80' UNLESS NOTED OTHERWISE ON PLAN.

CONTOURS SHOWN ON STREET ARE TO STREET TOP ELEVATIONS.

Elevations Table			
Number	Minimum Elevation	Maximum Elevation	Color
1	-9999999	-5	
2	-5	-3	
3	-3	-1	
4	-1	0	
5	0	1	
6	1	3	
7	3	5	
8	5	9999999	

CUT/FILL	
CUT	274,409 CY
FILL	249,268 CY
NET (CUT)	25,141 CY

NOTE:
CUT/FILL QUANTITIES BASED ON STREET DATUM.



CUT/FILL MAP

N.T.S.



SCALE: 1"=60'

0 60 120

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.

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. WHERE FILLS ARE MADE ON HILLSIDES OR SLOPES, THE SLOPE OF THE ORIGINAL GROUND UPON WHICH THE FILL IS TO BE PLACED SHALL BE DISKED OR SCARIFIED. WHERE THE SLOPE RATIO OF THE ORIGINAL GROUND IS STEEPER THAN 5 HORIZONTAL TO 1 VERTICAL, THE BANK SHALL BE STEPPED OR BENCHED. GROUND SLOPES WHICH ARE FLATTER THAN 5 TO 1 SHALL BE BENCHED WHEN CONSIDERED NECESSARY BY THE GEOTECHNICAL ENGINEER.

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.

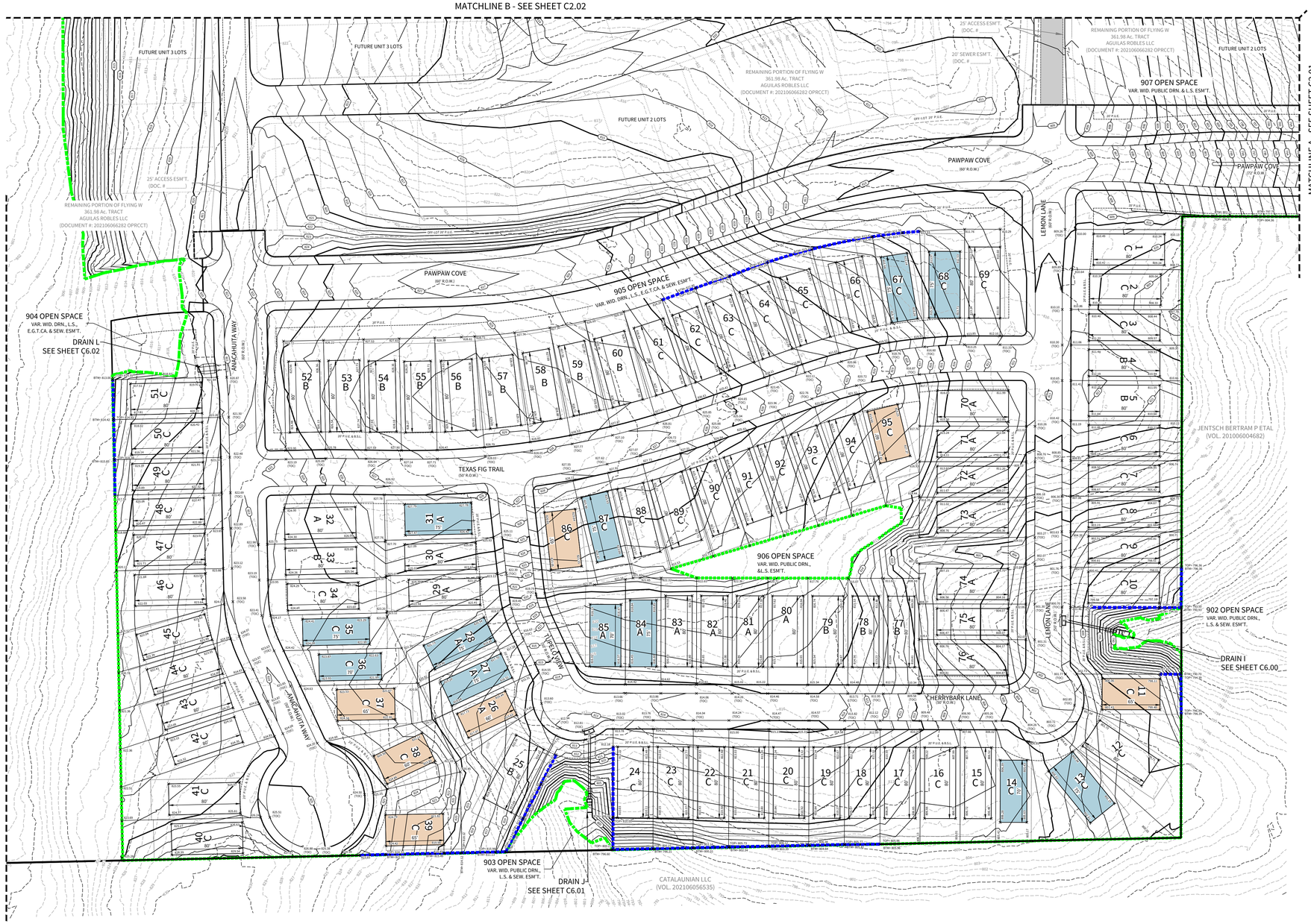
A. THE LAND TO BE FILLED (PREPARED SUBGRADE) SHALL BE PREPARED AND TESTED AT A FREQUENCY AS DETERMINED BY THE GEOTECHNICAL ENGINEER.
B. THE FIRST LIFT OF COMPACTED FILL (GENERALLY 8 TO 12-IN.) SHALL BE TESTED AS DETERMINED BY THE GEOTECHNICAL ENGINEER. ANY AREAS SUPPORTING THE PROPOSED STRUCTURES REQUIRING FILL SHALL BE TESTED FOR DENSITY COMPLIANCE.
C. FILLS SHALL BE TESTED A MAXIMUM OF EACH EIGHTEEN INCHES (18") OF FILL.
D. 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 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.

MATCHLINE B - SEE SHEET C2.02

MATCHLINE F - SEE SHEET C2.04

MATCHLINE A - SEE SHEET C2.01



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

FLYING W UNIT 1

OVERALL GRADING PLAN

DATE
11/25/2025

PROJECT NO.
04024-004

DRAWN BY
C7

CHECKED BY
JL

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

STATE OF TEXAS
JOSE A. LOZANO
126773
LICENSED
PROFESSIONAL ENGINEER
11/26/25

CUDE ENGINEERS
TBPELS No. 10048500

C2.00

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LEGEND

PROPOSED CONTOUR	1000
EXISTING CONTOUR	1000
PROPOSED ELEVATION	1000.00
TYPE OF LOT GRADING	A, B, OR C
DIRECTION OF FLOW	
LIMITS OF GRADING	
BUILDING SETBACK	
E.G.T.CA. EASEMENT	
SWALE	
PROPOSED RETAINING WALL	
BUILDING PAD (70'-75')	
BUILDING PAD (65'-69')	

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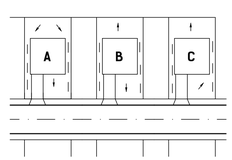
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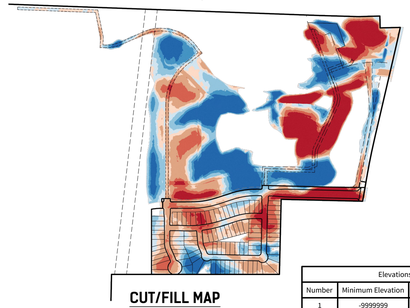
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TYPICAL LOT SITE PLAN
N.T.S.



CUT/FILL MAP
N.T.S.

NOTES:

LOT GRADING BASED ON SLABS BEING 20' BEHIND FRONT PROPERTY LINE.

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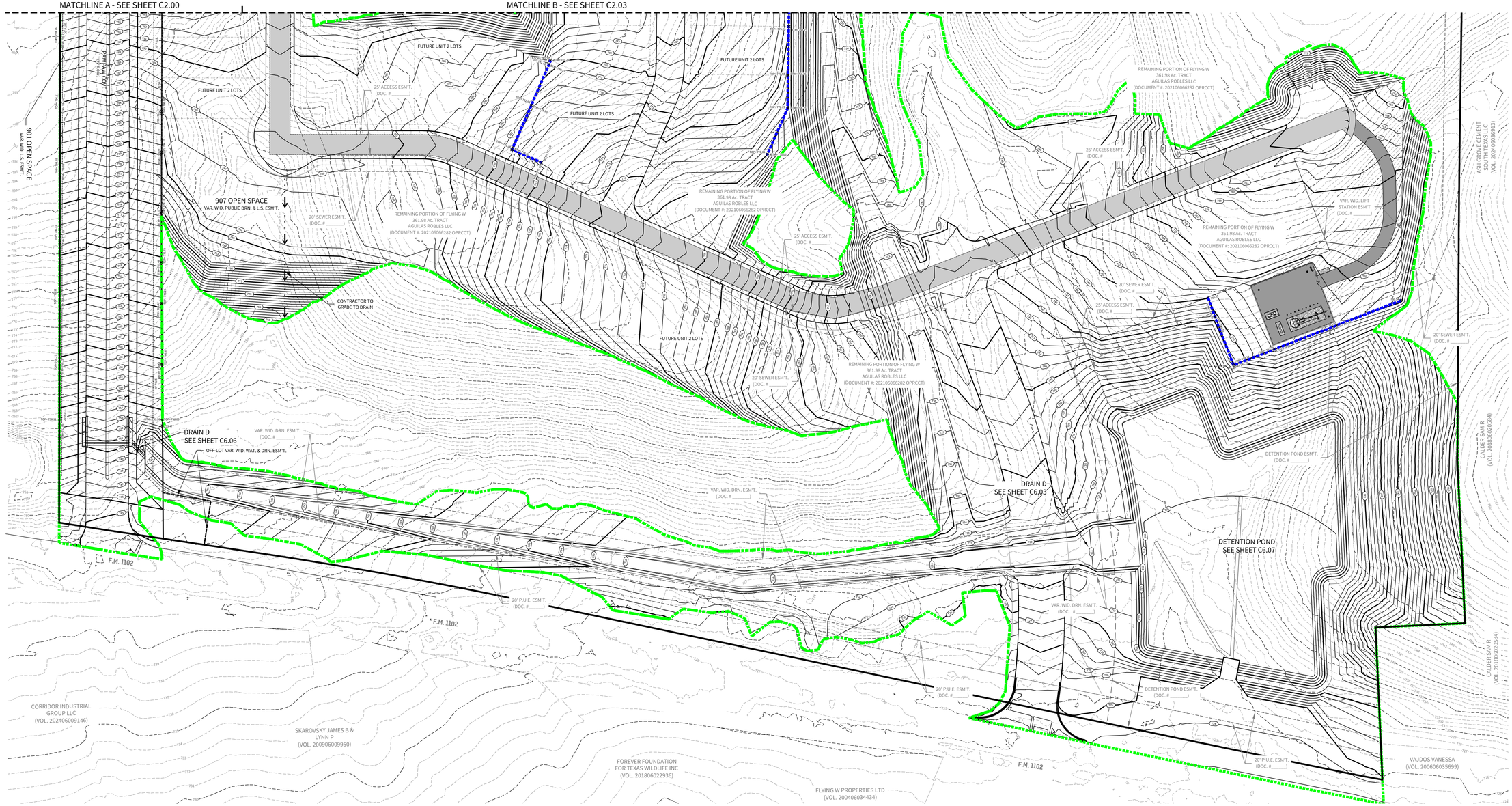
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NOTE:
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FLYING W UNIT 1

OVERALL GRADING PLAN

DATE
11/25/2025

PROJECT NO.
04024-004

DRAWN BY
C7

CHECKED BY
JL

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

STATE OF TEXAS
JOSE A. LOZANO
126773
LICENSED
PROFESSIONAL ENGINEER
11/26/25

CUDE ENGINEERS
TBPELS No. 10048500

C2.01

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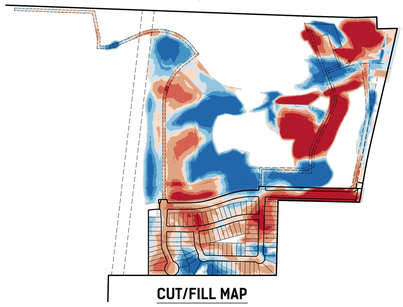
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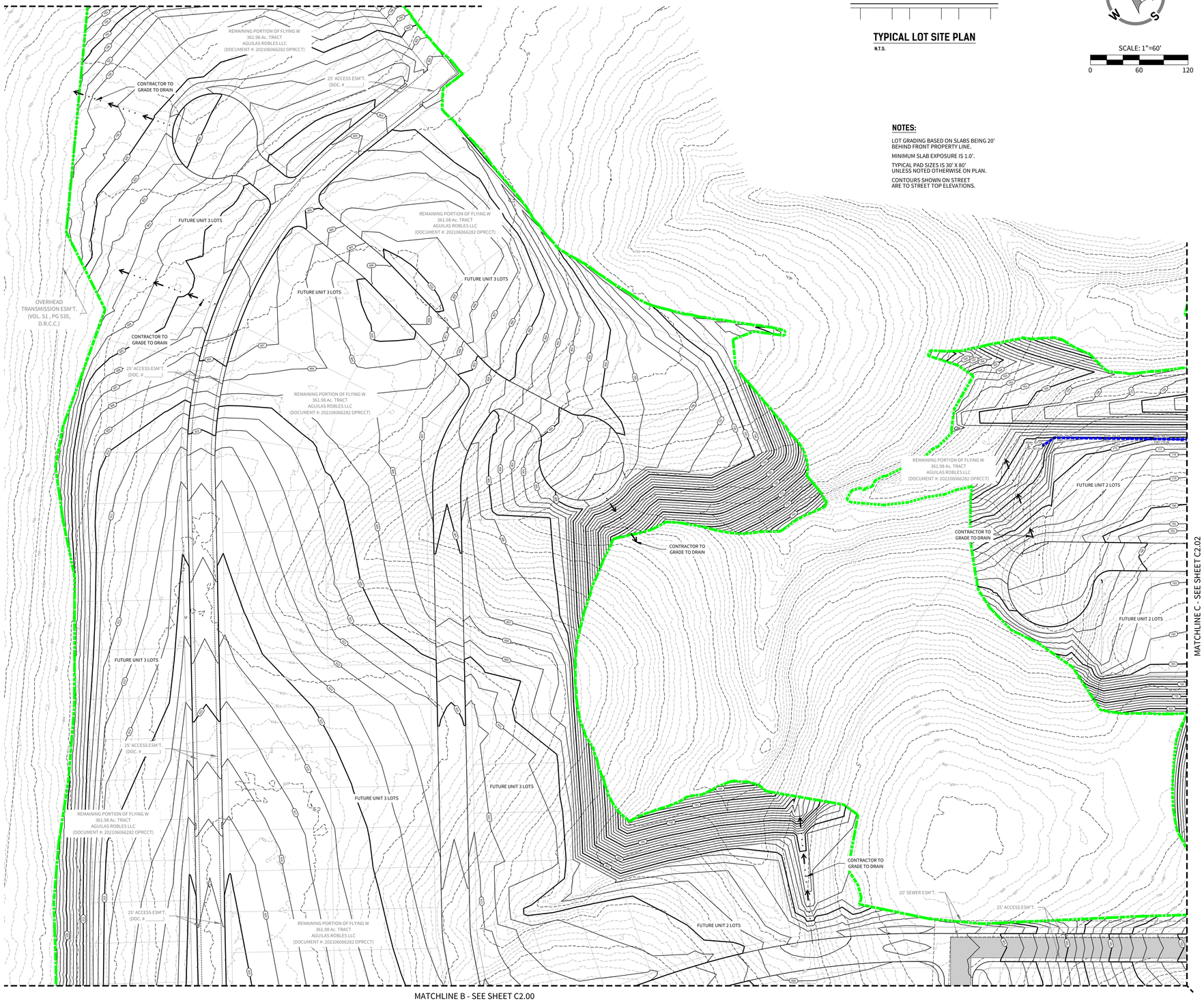
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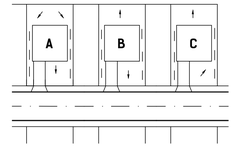
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NOTE:
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CUT/FILL MAP
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TYPICAL LOT SITE PLAN
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SCALE: 1"=60'
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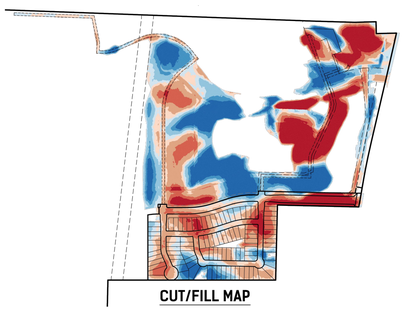
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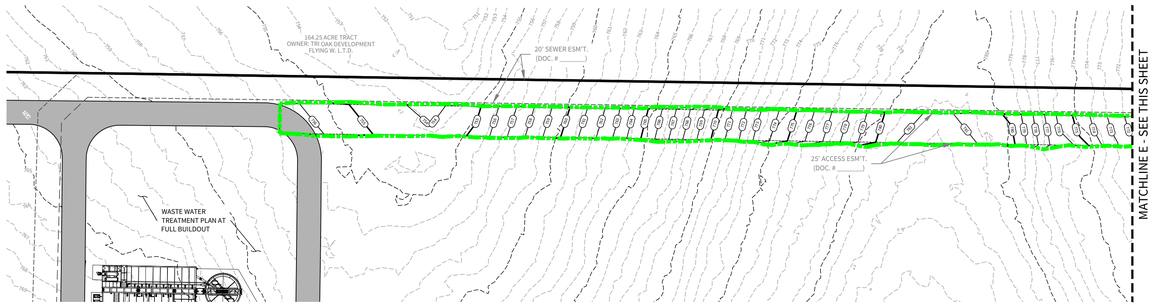
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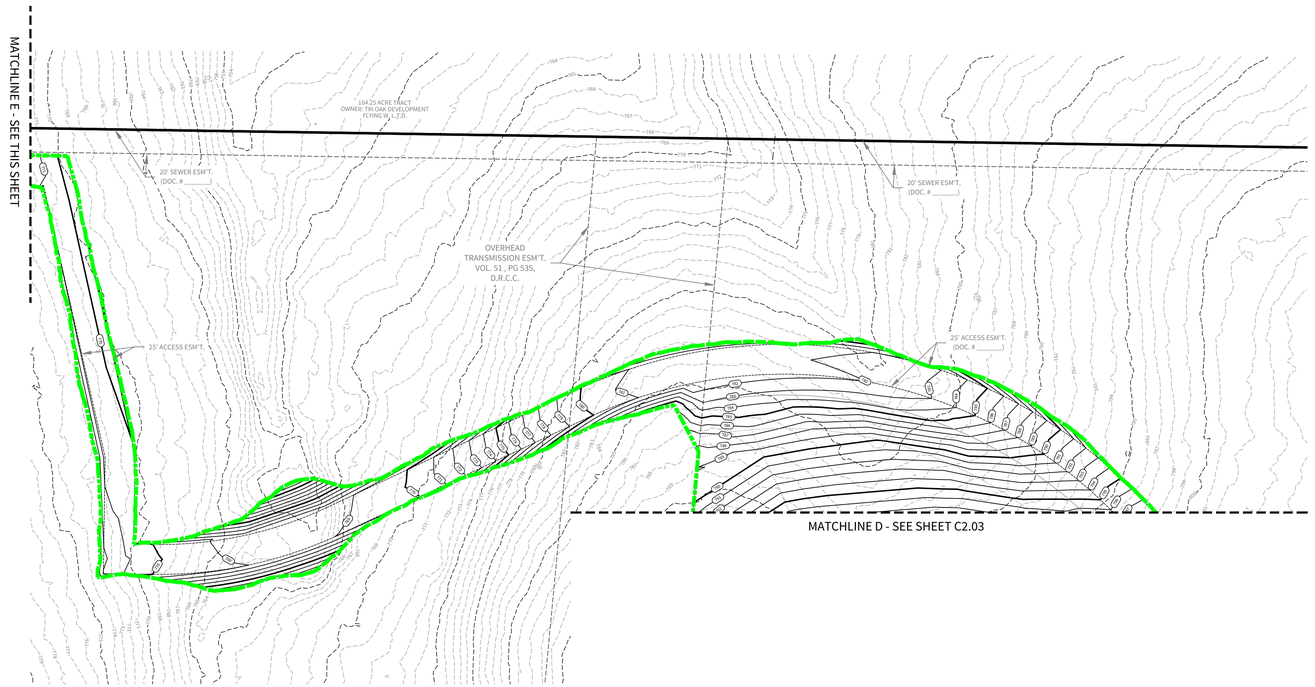
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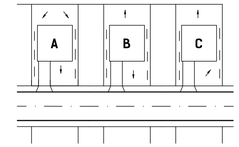
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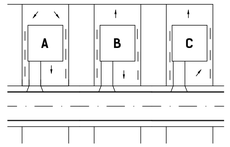
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- BUILDING PAD (65'-69')
- EXCESS MATERIAL STOCKPILE LOCATION



TYPICAL LOT SITE PLAN
N.T.S.

NOTES:

LOT GRADING BASED ON SLABS BEING 20' BEHIND FRONT PROPERTY LINE.

MINIMUM SLAB EXPOSURE IS 1.0'.

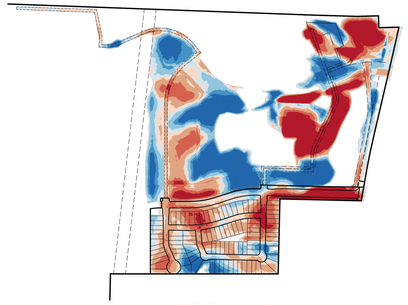
TYPICAL PAD SIZES IS 30' X 80' UNLESS NOTED OTHERWISE ON PLAN.

CONTOURS SHOWN ON STREET ARE TO STREET TOP ELEVATIONS.

Elevations Table			
Number	Minimum Elevation	Maximum Elevation	Color
1	-9999999	-5	
2	-5	-3	
3	-3	-1	
4	-1	0	
5	0	1	
6	1	3	
7	3	5	
8	5	9999999	

CUT/FILL	
CUT	274,409 CY
FILL	249,268 CY
NET (CUT)	25,141 CY

NOTE:
CUT/FILL QUANTITIES BASED ON STREET DATUM.



CUT/FILL MAP
N.T.S.



SCALE: 1"=60'
0 60 120

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.

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. WHERE FILLS ARE MADE ON HILLSIDES OR SLOPES, THE SLOPE OF THE ORIGINAL GROUND UPON WHICH THE FILL IS TO BE PLACED SHALL BE DISKED OR SCARIFIED. WHERE THE SLOPE RATIO OF THE ORIGINAL GROUND IS STEEPER THAN 5 HORIZONTAL TO 1 VERTICAL, THE BANK SHALL BE STEPPED OR BENCHED. GROUND SLOPES WHICH ARE FLATTER THAN 5 TO 1 SHALL BE BENCHED WHEN CONSIDERED NECESSARY BY THE GEOTECHNICAL ENGINEER.

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, BRUISH 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).

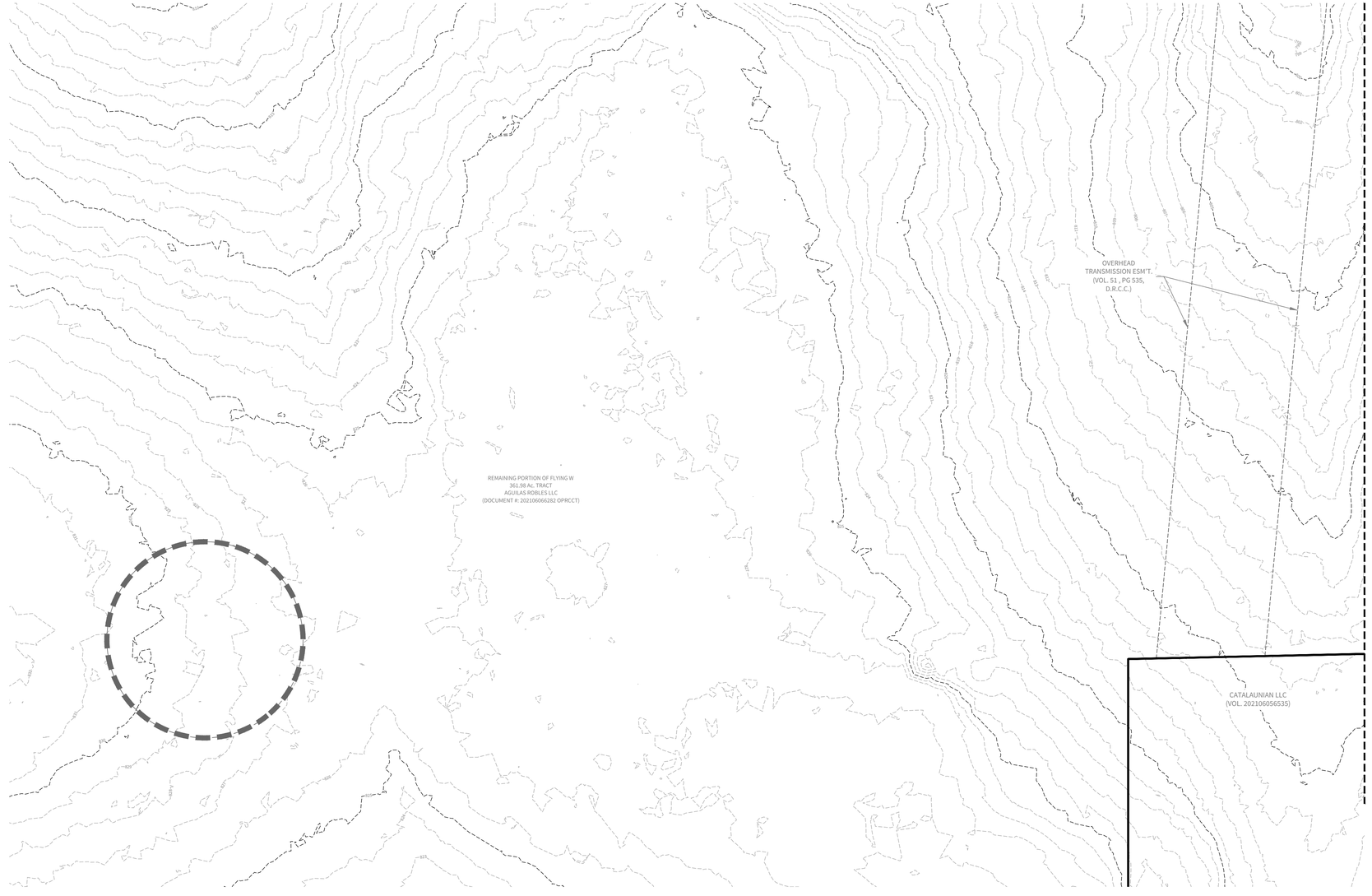
9. COMPACTION OF SLOPES
THE FACES OF FILL SLOPES SHALL BE COMPACTED. COMPACTING OPERATIONS SHALL BE CONTINUED UNTIL THE SLOPE FACES ARE STABLE BUT NOT TOO DENSE FOR PLANTING ON THE SLOPES. COMPACTION OF THE SLOPE FACES MAY BE DONE PROGRESSIVELY IN INCREMENTS OF THREE TO FIVE FEET (3' TO 5') IN FILL HEIGHT 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.

A. THE LAND TO BE FILLED (PREPARED SUBGRADE) SHALL BE PREPARED AND TESTED AT A FREQUENCY AS DETERMINED BY THE GEOTECHNICAL ENGINEER.
B. 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.
C. FILLS SHALL BE TESTED A MAXIMUM OF EACH EIGHTEEN INCHES (18") OF FILL.
D. 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 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.



CUDEENGINEERS.COM

CUDE ENGINEERS

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

FLYING W
UNIT 1

OVERALL GRADING PLAN

DATE
11/25/2025

PROJECT NO.
04024-004

DRAWN BY
C7

CHECKED BY
JL

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

STATE OF TEXAS
JOSE A. LOZANO
126773
LICENSED
PROFESSIONAL ENGINEER
11/26/25

CUDE ENGINEERS
TBPELS No. 10048500

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C2.04

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.

Line	Contrubuting Area to MH	Contributing LUE's	Average Dry Weather Flow (gpd)	Peak Dry Weather Flow (PDFW) (gpd)	Acres	Infiltration/Inflow (gpd)	Peak Wet Weather Flow (PWWF) (gpd)	Peak Wet Weather Flow (cfs)	Slope	Pipe Size I.D. (in)	Velocity @ PWWF Capacity (fps)	100% of Design Q (full flow-min. slope) (cfs)	Capacity (full flow-design. Slope) (gpd)	65% of Design Capacity (gpd)	PDWF Qfull (Not to exceed 65%) (gpd)	PDWF % FULL	85% of Design Capacity (gpd)	PWWF Qfull (Not to exceed 85%) (gpd)	PWWF % FULL
Line A	MH NO. A-27 to MH NO. A-26	5	1200	3000	0.10	30	3030	0.00	0.40%	8 "	0.013	0.77	495,289	321,938	3000	0.61%	420,995.25	3,030.00	0.61%
	MH NO. A-26 to MH NO. A-25	10	2400	6000	0.20	60	6060	0.01	0.40%	8 "	0.027	0.77	495,289	321,938	6000	1.21%	420,995.25	6,060.00	1.22%
	MH NO. A-25 to MH NO. A-24	18	4320	10800	0.30	90	10890	0.02	1.32%	8 "	0.048	1.39	899,736	584,829	10800	1.20%	764,775.86	10,890.00	1.21%
	MH NO. A-24 to MH NO. A-23	25	6000	15000	0.50	150	15150	0.02	0.60%	8 "	0.067	0.94	606,602	394,291	15000	2.47%	515,611.78	15,150.00	2.50%
	MH NO. A-23 to MH NO. A-22	29	6960	17400	0.60	180	17580	0.03	1.73%	8 "	0.078	1.59	1,030,033	669,522	17400	1.69%	875,528.43	17,580.00	1.71%
	MH NO. A-22 to MH NO. A-21	41	9840	24600	0.70	210	24810	0.04	1.39%	8 "	0.110	1.43	923,285	600,135	24600	2.66%	784,792.07	24,810.00	2.69%
	MH NO. A-21 to MH NO. A-20	47	11280	28200	0.80	240	28440	0.04	1.85%	8 "	0.126	1.65	1,065,158	692,353	28200	2.65%	905,384.53	28,440.00	2.67%
	MH NO. A-20 to MH NO. A-19	51	12240	30600	0.90	270	30870	0.05	4.14%	8 "	0.137	2.47	1,593,413	1,035,719	30600	1.92%	1,354,401.34	30,870.00	1.94%
	MH NO. A-19 to MH NO. A-18	98	23520	58800	1.70	510	59310	0.09	0.40%	8 "	0.263	0.77	495,289	321,938	58800	11.87%	420,995.25	59,310.00	11.97%
Line D	MH NO. D-1 to MH NO. A-15	3	720	1800	0.10	30	1830	0.00	0.40%	8 "	0.008	0.77	495,289	321,938	1800	0.36%	420,995.25	1,830.00	0.37%
Line B	MH NO. B-7 to MH NO. B-6	3	720	1800	0.10	30	1830	0.00	7.82%	8 "	0.008	3.39	2,189,937	1,423,459	1800	0.08%	1,861,446.59	1,830.00	0.08%
	MH NO. B-6 to MH NO. B-5	6	1440	3600	0.20	60	3660	0.01	5.17%	8 "	0.016	2.76	1,780,629	1,157,409	3600	0.20%	1,513,535.02	3,660.00	0.21%
	MH NO. B-5 to MH NO. B-4	19	4560	11400	0.30	90	11490	0.02	0.40%	8 "	0.051	0.77	495,289	321,938	11400	2.30%	420,995.25	11,490.00	2.32%
	MH NO. B-4 to MH NO. B-3	27	6480	16200	0.40	120	16320	0.03	3.21%	8 "	0.072	2.17	1,403,075	911,999	16200	1.15%	1,192,613.50	16,320.00	1.16%
	MH NO. B-3 to MH NO. B-2	29	6960	17400	0.50	150	17550	0.03	8.00%	8 "	0.078	3.43	2,214,998	1,439,748	17400	0.79%	1,882,748.01	17,550.00	0.79%
	MH NO. B-2 to MH NO. B-1	38	9120	22800	0.60	180	22980	0.04	0.43%	8 "	0.102	0.79	513,526	333,792	22800	4.44%	436,497.17	22,980.00	4.47%
	MH NO. B-1 to MH NO. A-19	46	11040	27600	0.70	210	27810	0.04	0.40%	8 "	0.123	0.77	495,289	321,938	27600	5.57%	420,995.25	27,810.00	5.61%

CRYSTAL CLEAR SPECIAL UTILITY DISTRICT (CCSUD) WASTEWATER NOTES:

1. THE CONTRACTOR SHALL MAINTAIN SERVICE TO EXISTING WASTEWATER SYSTEM AT ALL TIMES DURING CONSTRUCTION.
2. A MINIMUM OF 8" WASTEWATER PIPE AND FITTINGS (P.V.C. SDR-26, ASTM, D3034, D-3212, F-477) ARE REQUIRED ON NEW INSTALLATION.
3. ALL RESIDENTIAL WASTEWATER SERVICE LATERALS SHALL BE EXTENDED TO THE PROPERTY LINE AND A CLEANOUT SHALL BE INSTALLED AT THE PROPERTY LINE. SERVICES TO LOTS WILL EXTEND FOUR (4) FEET PAST THE UNDERGROUND ELECTRIC CONDUIT IF ELECTRIC IS INSTALLED IN THE FRONT EASEMENT. ALL SEWER CLEANOUTS THAT LEAD TO CCSUD MAINS SHALL BE INSTALLED WITH A PROTECTIVE UTILITY SHROUD AND PIVOTING MARKER POLE DURING TIME OF CONSTRUCTION.
4. PIPE BEDDING MATERIAL OF WASTEWATER MAINS SHALL BE COMPOSED OF WELLGRADED, CRUSHED STONE, OR GRAVEL PER SECTION 01230 OF CCSUD'S SPECIFICATIONS.
5. SECONDARY AND GENERAL BACKFILL OF WASTEWATER MAINS SHALL BE APPROVED SOIL MATERIALS FOR BACKFILL AND FILL, FREE OF CLAY, ROCK, OR GRAVEL LARGER THAN 2-INCHES IN ANY DIMENSION, DEBRIS, WASTE, FROZEN MATERIALS, VEGETABLE, AND OTHER ORGANIC MATTER AND DELETERIOUS MATERIALS. PREVIOUSLY EXCAVATED MATERIALS MEETING THESE REQUIREMENTS MAY BE USED FOR BACKFILL.
6. ALL WASTEWATER MAINS SHALL HAVE COMPRESSION OR MECHANICAL JOINTS AS PER 30 TAC §217.53 (C) (2).
7. FOR WASTEWATER LINES LESS THAN 24" IN DIAMETER, SELECT INITIAL BACKFILL MATERIAL SHALL BE PLACED IN TWO LIFTS.
   a.) THE FIRST LIFT SHALL BE SPREAD UNIFORMLY AND SIMULTANEOUSLY ON EACH SIDE AND UNDER THE SHOULDERS OF THE PIPE TO THE MID POINT OR SPRING LINE OF THE PIPE.
   b.) THE SECOND LIFT SHALL BE PLACED TO A DEPTH AS SHOWN ON THE PIPE BACKFILL DETAIL. MAINS LARGER THAN 24", 12" MAXIMUM LIFTS SHALL BE USED.
8. ALL MANHOLES MUST BE WATERTIGHT, EITHER MONOLITHIC, CAST-IN-PLACE CONCRETE STRUCTURES OR PREFABRICATED MANHOLES SPECIFICALLY APPROVED BY CCSUD. THE MANHOLES SHALL HAVE WATER-TIGHT RINGS AND COVERS. WHEREVER THEY ARE WITHIN THE 100 YEAR FLOODPLAIN, THE MANHOLE COVERS SHALL BE CCSUD. EVERY THIRD MANHOLE IN SEQUENCE SHALL HAVE AN ALTERNATE MEANS OF VENTING. 30 TAC §213.5 (C) (3) (A) AND 30 TAC §217.55 (O).
9. ALL MANHOLES SHALL BE CONSTRUCTED SO THAT THE TOP OF THE RING IS TWO INCHES (2") ABOVE SURROUNDING GROUND EXCEPT WHEN LOCATED IN PAVED AREA. IN PAVED AREAS, THE MANHOLE RING SHALL BE FLUSH WITH PAVEMENT.
10. ALL NEW MANHOLES, UNLESS APPROVED BY CCSUD, ARE TO HAVE COVERS WITH 32" OPENINGS.
11. WASTEWATER MAIN CONNECTIONS TO PRE-CAST MANHOLES WILL BE COMPRESSION JOINTS OR MECHANICAL "BOOT TYPE" JOINT AS APPROVED BY CCSUD.
12. WASTEWATER MAINS SHALL BE TESTED FROM MANHOLE TO MANHOLE. CCSUD. 03/2022
13. IN AREAS WHERE A NEW WASTEWATER MANHOLE IS TO BE CONSTRUCTED OVER AN EXISTING WASTEWATER SYSTEM, IT SHALL BE THE CONTACTOR'S RESPONSIBILITY TO TEST THE EXISTING MANHOLES BEFORE CONSTRUCTION. AFTER THE PROPOSED MANHOLE(S) HAS BEEN BUILT, THE CONTRACTOR SHALL RE-TEST THE EXISTING SYSTEM TO THE SATISFACTION OF THE CONSTRUCTION INSPECTOR. (NO SEPARATE PAY ITEM).
14. WHERE THE MINIMUM 9 FOOT SEPARATION DISTANCE BETWEEN WASTEWATER LINES AND WATER LINES CANNOT BE MAINTAINED, THE INSTALLATION OF WASTEWATER LINES SHALL BE IN STRICT ACCORDANCE WITH TCEQ. THE WASTEWATER LINE SHALL BE CONSTRUCTED OF CAST IRON, DUCTILE IRON OR PVC MEETING THE ASTM SPECIFICATION FOR BOTH PIPES AND JOINTS OF 160 PSI AND SHALL BE IN ACCORDANCE WITH 30 TAC § 217.53 (D) AND 30 TAC § 290.44 (E).
16. NO TESTING WILL BE PERFORMED PRIOR TO 30 DAYS FROM COMPLETE INSTALLATION OF THE WASTEWATER LINES. THE FOLLOWING SEQUENCE WILL BE STRICTLY ADHERED TO:
   a. PULL MANDREL
   b. PERFORM AIR TEST
   c. CLEANING OF ANY DEBRIS
   d. FLUSHING OF SYSTEM
   e. TV INSPECTION (WITHIN 72 HOURS OF FLUSHING)
17. A MINIMUM OF 3 FEET OF COVER IS TO BE MAINTAINED OVER THE WASTEWATER MAIN AND LATERALS AT SUBGRADE, OTHERWISE CONCRETE ENCASEMENT WILL BE REQUIRED.
18. TCEQ AND EPA REQUIRE EROSION AND SEDIMENTATION CONTROL FOR CONSTRUCTION OF WASTEWATER COLLECTION SYSTEMS. DEVELOPER OR AUTHORIZED REPRESENTATIVE SHALL PROVIDE EROSION AND SEDIMENTATION CONTROL AS NOTES ON THE PROJECT'S PLAN AND PROFILE SHEETS. ALL TEMPORARY EROSION AND SEDIMENTATION CONTROLS SHALL BE REMOVED BY THE CONTRACTOR AT FINAL ACCEPTANCE OF THE PROJECT BY CCSUD.
19. ALL MANHOLES NOT WITHIN PAVED STREETS SHALL HAVE LOCKING CONCRETE COLLAR TO SECURE RING AND COVER TO MANHOLE CONE PER CCSUD DETAIL DRAWING #329.
20. ALL MANHOLES OVER THE EDWARDS AQUIFER RECHARGE ZONE SHALL HAVE LOCKING CONCRETE COLLAR TO SECURE RING AND COVER TO MANHOLE CONE PER CCSUD DETAIL DRAWING #329.

CRYSTAL CLEAR SPECIAL UTILITY DISTRICT (CCSUD) WATER MAIN NOTES:

1. THE CONTRACTOR SHALL COORDINATE PRESSURE TESTING OF NEW WATER MAINS WITH OWNER AND ENGINEER AT LEAST TWO BUSINESS DAYS PRIOR. PRESSURE TESTING REQUIREMENTS ARE INCLUDED IN THE SPECIFICATIONS.
2. ALL WATER MAINS SHALL BE DISINFECTED PER AWWA AND TCEQ STANDARDS.
3. THE CONNECTION LOCATIONS LISTED IN THE PLANS ARE BASED ON BEST AVAILABLE INFORMATION. THE CONTRACTOR SHALL FIELD LOCATE EXISTING WATER MAIN LOCATIONS AT ALL TIE-IN LOCATIONS TO VERIFY SIZE, ELEVATION, AND MATERIAL PRIOR TO ORDERING MATERIALS FOR CONNECTION.
4. THE CONTRACTOR SHALL MAINTAIN MINIMUM SEPARATION BETWEEN UTILITIES PER TCEQ STANDARDS.
5. WATER MAINS SHALL BE RESTRAINED WITH RESTRAINT LENGTHS OF FITTINGS SHOWN IN PLANS.
6. UNLESS OTHERWISE SPECIFIED, ALL PVC WATER MAINS SHALL BE C900/C905 DR 18, COLORED BLUE.
7. UNLESS OTHERWISE SPECIFIED, ALL DUCTILE IRON WATER MAINS SHALL BE PRESSURE CLASS 350 CONFORMING TO AWWA C150 AND AWWA C151 AND CEMENT LINED.
8. LOCATIONS OF COMBINATION AIR VALVES SHOWN ARE APPROXIMATE. INSTALL AIR RELEASE VALVES AT THE HIGH POINT IN THE WATER MAIN FOR THE LOCATIONS GIVEN.
9. THRUST BLOCKING IS REQUIRED AT ALL FITTINGS AND BENDS IN ACCORDANCE WITH THE THRUST BLOCKING DETAIL PROVIDED AND SPECIFICATION SECTION 02680 - JOINT RESTRAINTS AND THRUST BLOCKING.
10. THE OWNER SHALL SUPPLY ALL WATER NEEDED FOR CONSTRUCTION TESTING AND DISINFECTION. THE CONTRACTOR SHALL NOT BE REQUIRED TO PAY FOR THIS WATER.
11. UNLESS NOTED OTHERWISE, ALL WATER MAIN P.I.'S SHALL BE ACHIEVED USING THE WATER MAIN MANUFACTURER'S ALLOWABLE JOINT DEFLECTION.
12. WATER MAINS AND VALVES THAT ARE ABANDONED IN PLACE SHALL BE CUT AND PLUGGED PER SPECIFICATION SECTION 02500 – ABANDONMENT OF WATER INFRASTRUCTURE.
13. REMOVE ONLY VEGETATION, TREES, STUMPS, RUBBISH, AND OTHER MATERIAL NECESSARY FOR CONSTRUCTION AND DISPOSE OF OFF SITE.
14. CONSTRUCTION OF ALL CCSUD WATER UTILITY INFRASTRUCTURE MUST ADHERE TO CCSUD'S TECHNICAL SPECIFICATIONS, DETAILS AND APPROVED EQUIPMENT LIST

CUDEENGINEERS.COM

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

FLYING W UNIT 1

CCUSD GENERAL NOTES

DATE
11/24/2025

PROJECT NO.
04024-004

DRAWN BY
C7

CHECKED BY
JL

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

STATE OF TEXAS
JOSE A. LOZANO
126773
LICENSED
PROFESSIONAL ENGINEER
11/26/25

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
-

SAWS JOB NO.
XX-XXXX

C3.00

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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.

LEGEND

- PROPOSED SANITARY SEWER — 8"SS
- PROPOSED SANITARY SEWER MANHOLE
- PROPOSED WATER MAIN — 8"W
- PROPOSED STANDARD FIRE HYDRANT
- PROPOSED STANDARD GATE VALVE
- PUBLIC UTILITY EASMENT — P.U.E. ESMT.
- PROPOSED LIGHT POLE

NOTE:

ENSURE ALL DRIVEWAY APPROACHES ARE BUILT IN GENERAL ACCORDANCE WITH A.D.A. SPECIFICATIONS. NO VALVES, HYDRANTS, ETC. SHALL BE CONSTRUCTED WITHIN CURBS, SIDEWALKS, OR DRIVEWAYS.

NOTES

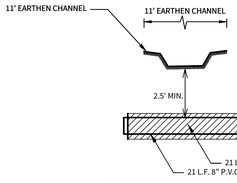
THE LOCATIONS AND DEPTHS OF ALL EXISTING UTILITIES, INCLUDING SERVICE LATERALS AND DRAINAGE STRUCTURES SHOWN ON THE PLANS ARE APPROXIMATE ONLY. THE CONTRACTOR SHALL VERIFY THE EXACT LOCATION AND DEPTHS OF UNDERGROUND UTILITIES AT LEAST 48 HOURS PRIOR TO CONSTRUCTION WHETHER SHOWN ON PLANS OR NOT,AND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

CRYSTAL CLEAR SPECIAL UTILITY DISTRICT 830-372-1032
TEXAS STATE WIDE ONE CALL LOCATOR 1-800-545-6005

BENCHMARK BM-1

BENCHMARK TO BE SET BY ENGINEER PRIOR TO CONSTRUCTION.

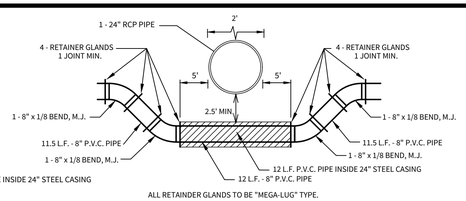
NOTE: ALL LATERALS TO BE INSTALLED @ MIN. 2.0% SLOPE. UNLESS OTHERWISE NOTED, ALL SANITARY SEWER PIPE SHALL BE P.V.C. THAT MEETS ASTM SPECIFICATION D-3034, SDR-26.



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

WATER / DRAIN "L" CROSSING

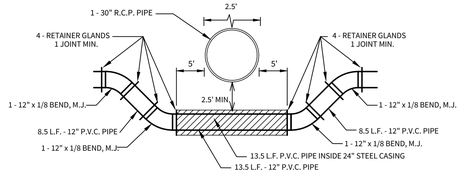
SIDE VIEW (THIS DETAIL IS VERTICAL ONLY, NOT HORIZONTAL.)
(N.T.S.)



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

WATER / DRAIN "J" CROSSING DETAIL

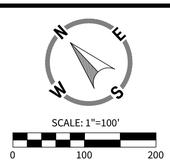
SIDE VIEW (THIS DETAIL IS VERTICAL ONLY, NOT HORIZONTAL.)
(N.T.S.)

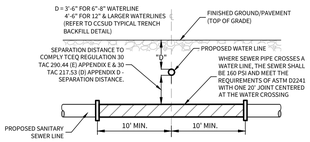


ALL RETAINER GLANDS TO BE "MEGA-LUG" TYPE.

WATER / DRAIN "D" CROSSING DETAIL

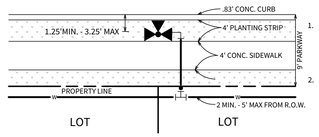
SIDE VIEW (THIS DETAIL IS VERTICAL ONLY, NOT HORIZONTAL.)
(N.T.S.)





TYPICAL SANITARY SEWER/ WATER CROSSING DETAIL

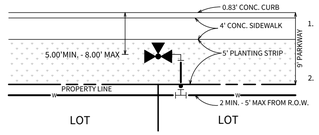
N.T.S.



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.

RESIDENTIAL FIRE HYDRANT DETAIL (4' SIDEWALK / 50' R.O.W.)

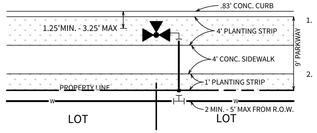
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NOTE:
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RESIDENTIAL FIRE HYDRANT DETAIL (4' SIDEWALK / 50' R.O.W.)

N.T.S.



NOTE:
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MINOR COLLECTOR FIRE HYDRANT DETAIL (4' SIDEWALK / 60' R.O.W.)

N.T.S.

NOTES:

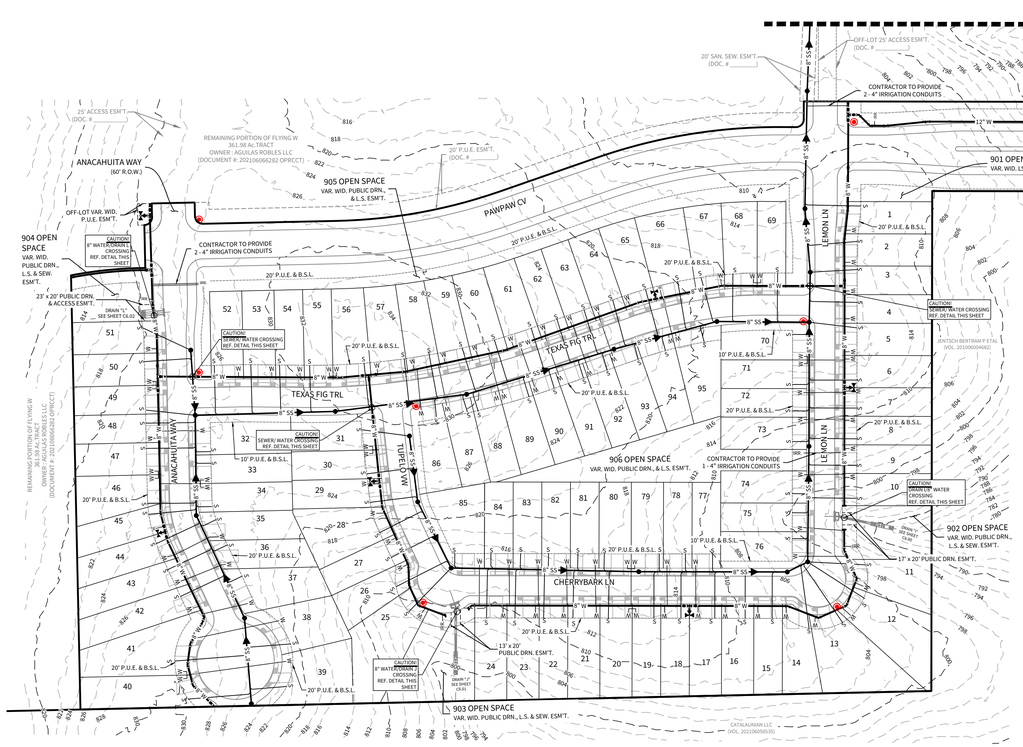
1. ALL EXCAVATED MATERIAL SHALL BE PLACED ON THE UPGRADIENT SIDE OF THE SEWER TRENCH THUS ALLOWING THE TRENCH TO INTERCEPT ANY SILT CONTAMINATED RUNOFF.
2. ALL SANITARY SEWER PIPE SHALL BE P.V.C. THAT MEETS ASTM SPECIFICATION D-3034, SDR-26 UNLESS OTHERWISE NOTED.
3. ALL LATERALS TO BE INSTALLED @ MIN. 2.0% SLOPE. UNLESS OTHERWISE NOTED.
4. LATERALS TO BE BUILT TO FRONT UTILITY EASEMENT LINE OR SANITARY SEWER EASEMENT LINE.
5. ENSURE ALL DRIVEWAY APPROACHES ARE BUILT IN GENERAL ACCORDANCE WITH A.D.A. SPECIFICATIONS. NO VALVES, HYDRANTS, ETC. SHALL BE CONSTRUCTED WITHIN CURBS, SIDEWALKS, OR DRIVEWAYS.
6. 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.
7. ALL UTILITIES TO BE CONSTRUCTED PRIOR TO SHEETS
8. NO VALVES, HYDRANTS, CLEANOUTS ETC. SHALL BE CONSTRUCTED WITHIN CURBS, SIDEWALKS, OR DRIVEWAYS.
9. THIS PROJECT INCLUDES UTILITY INSTALLATIONS GREATER THAN 5-FEET IN DEPTH LOCATED IN PUBLIC RIGHT-OF-WAY OR EASEMENTS. DEEP TRENCHES POSE COMPACTION TESTING AND CONSTRUCTION CHALLENGES AND COUNTY METHODS FOR TESTING AND COMPACTION MAY NOT BE ACHIEVABLE. A UTILITY COMPACTION PLAN WILL BE REQUIRED AND MUST BE SUBMITTED FOR APPROVAL TO THE COUNTY PRIOR TO UTILITY INSTALLATION.
10. UTILITY TRENCH COMPACTION (ADDED TO THE CONSTRUCTION PLANS ON ALL UTILITY PLAN SHEETS): ALL UTILITY TRENCH COMPACTION TESTS WITHIN THE STREET PAVEMENT/SIDEWALK SECTION SHALL BE THE RESPONSIBILITY OF THE DEVELOPER'S GEOTECHNICAL ENGINEER. FILL MATERIAL SHALL BE PLACED IN UNIFORM LAYERS NOT TO EXCEED TWELVE INCHES (12") LOOSE. DETERMINE THE MAXIMUM LIFT THICKNESS BASED ON THE ABILITY OF THE COMPACTING OPERATION AND EQUIPMENT USED TO MEET THE REQUIRED DENSITY. EACH LAYER OF MATERIAL SHALL BE COMPACTED TO A MINIMUM 95% DENSITY AND TESTED FOR DENSITY AND MOISTURE IN ACCORDANCE WITH TEST METHODS TEX-113-E, TEX-114-E, TEX-115-E. THE NUMBER AND LOCATION OF REQUIRED TESTS SHALL BE DETERMINED BY THE GEOTECHNICAL ENGINEER AND APPROVED BY THE COMAL COUNTY STREET INSPECTOR. AT A MINIMUM, TESTS SHALL BE TAKEN EVERY 200 LF FOR EACH LIFT AND EVERY OTHER SERVICE LINE. UPON COMPLETION OF TESTING THE GEOTECHNICAL ENGINEER SHALL PROVIDE THE COMAL COUNTY STREET INSPECTOR WITH ALL TESTING DOCUMENTATION AND A CERTIFICATION STATING THAT THE PLACEMENT OF FILL MATERIAL HAS BEEN COMPLETED IN ACCORDANCE WITH THE PLANS. ADDITIONAL DENSITY TESTS MAY BE REQUESTED BY THE COMAL COUNTY INSPECTOR.
11. FOR WATER METER BOX INSTALLATION, SEE S.D1 - SERVICE CONNECTION DETAILS.
12. CONTRACTOR TO EXTEND WATER SERVICE TRENCH PAST WATER SERVICE METER THROUGH PUBLIC UTILITY EASEMENT AT MINIMUM DEPTH OF 1'. WATER SERVICE PAST METER TO BE INSTALLED WITH HOMEBUILDING.

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 CCSUD 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 CCSUD WITHOUT THIS REQUIREMENT BEING MET AND VERIFIED BY PROVIDING ALL NECESSARY DOCUMENTED TEST RESULTS.

TRENCH EXCAVATION PROTECTION

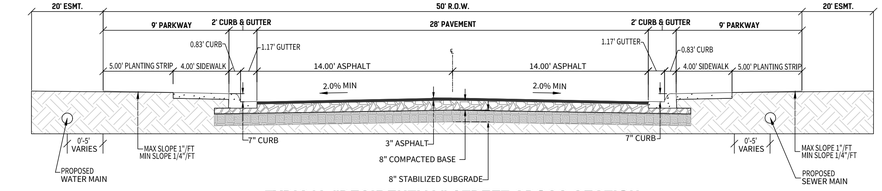
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ALL RETAINER GLANDS TO BE "MEGA-LUG" TYPE.

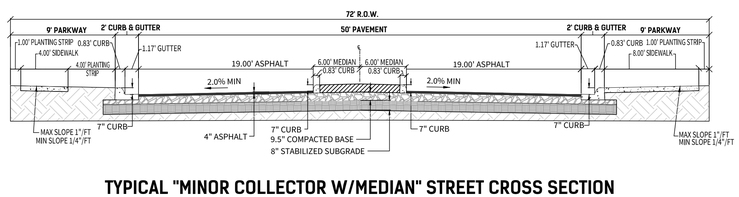
WATER / DRAIN "I" CROSSING DETAIL

SIDE VIEW (THIS DETAIL IS VERTICAL ONLY, NOT HORIZONTAL.)
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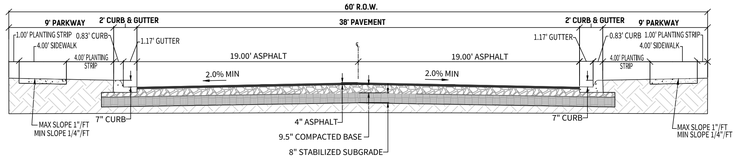
TYPICAL "RESIDENTIAL" STREET CROSS SECTION

N.T.S.



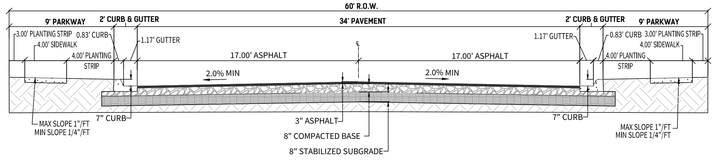
TYPICAL "MINOR COLLECTOR W/MEDIAN" STREET CROSS SECTION

N.T.S.



TYPICAL "MINOR COLLECTOR" STREET CROSS SECTION

N.T.S.



TYPICAL "RESIDENTIAL COLLECTOR" STREET CROSS SECTION

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

FLYING W UNIT 1

UTILITY LAYOUT PLAN

DATE 11/25/2025
PROJECT NO. 04024-004
DRAWN BY C7
CHECKED BY JL

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

STATE OF TEXAS
JOSE A. LOZANO
126773
LICENSED
PROFESSIONAL ENGINEER
11/26/25
CUDE ENGINEERS
TBPELS No. 10048500

C3.01

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.

LEGEND

- PROPOSED SANITARY SEWER — 8"SS
- PROPOSED SANITARY SEWER MANHOLE
- PROPOSED WATER MAIN — 8"W
- PROPOSED STANDARD FIRE HYDRANT
- PROPOSED STANDARD GATE VALVE
- PUBLIC UTILITY EASMENT — P.U.E. ESMT.
- PROPOSED LIGHT POLE

NOTE:

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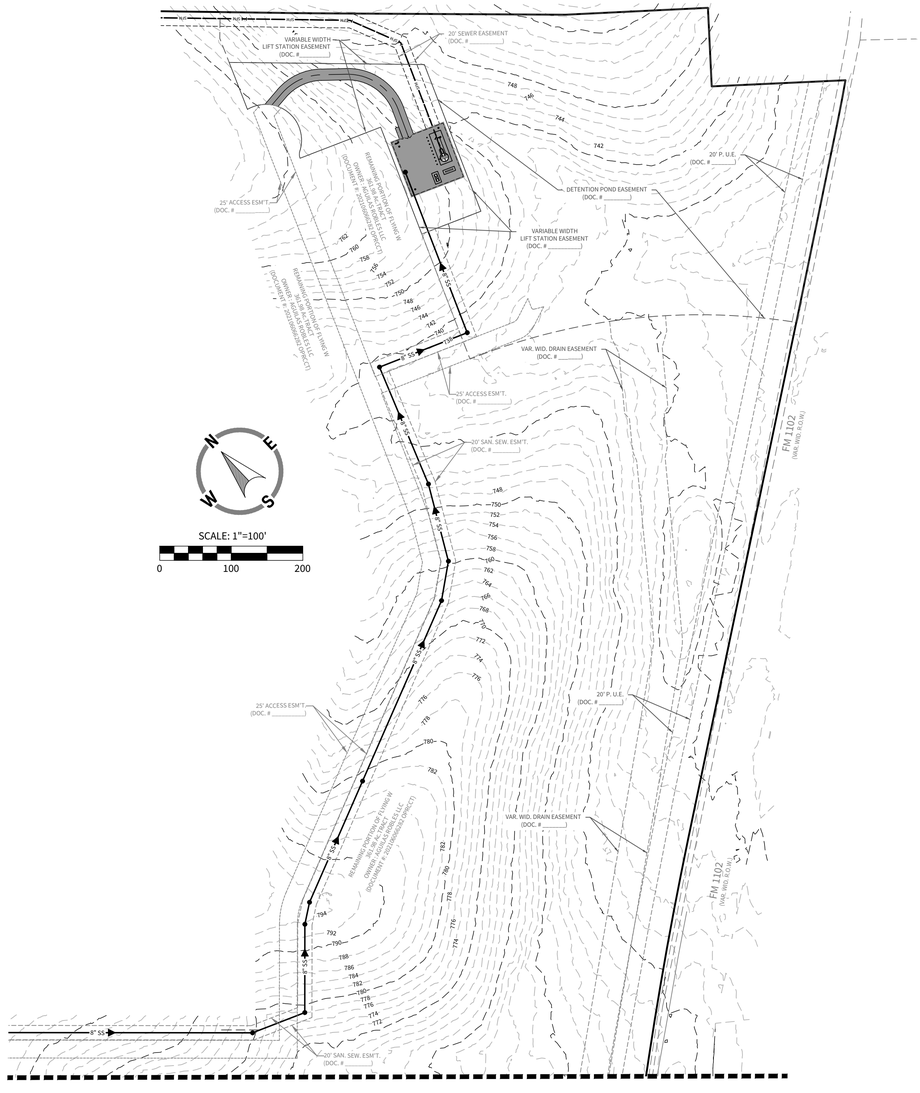
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CRYSTAL CLEAR SPECIAL UTILITY DISTRICT 830-372-1032
TEXAS STATE WIDE ONE CALL LOCATOR 1-800-545-6005

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.



MATCHLINE A - SEE SHEET C3.01

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FLYING W UNIT 1

UTILITY LAYOUT PLAN

DATE
11/24/2025

PROJECT NO.
04024-004

DRAWN BY
C7

CHECKED BY
JL

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

STATE OF TEXAS
JOSE A. LOZANO
126773
LICENSED
PROFESSIONAL ENGINEER
11/26/25

CUDE ENGINEERS
TBPELS No. 10048500

-

C3.02

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LEGEND

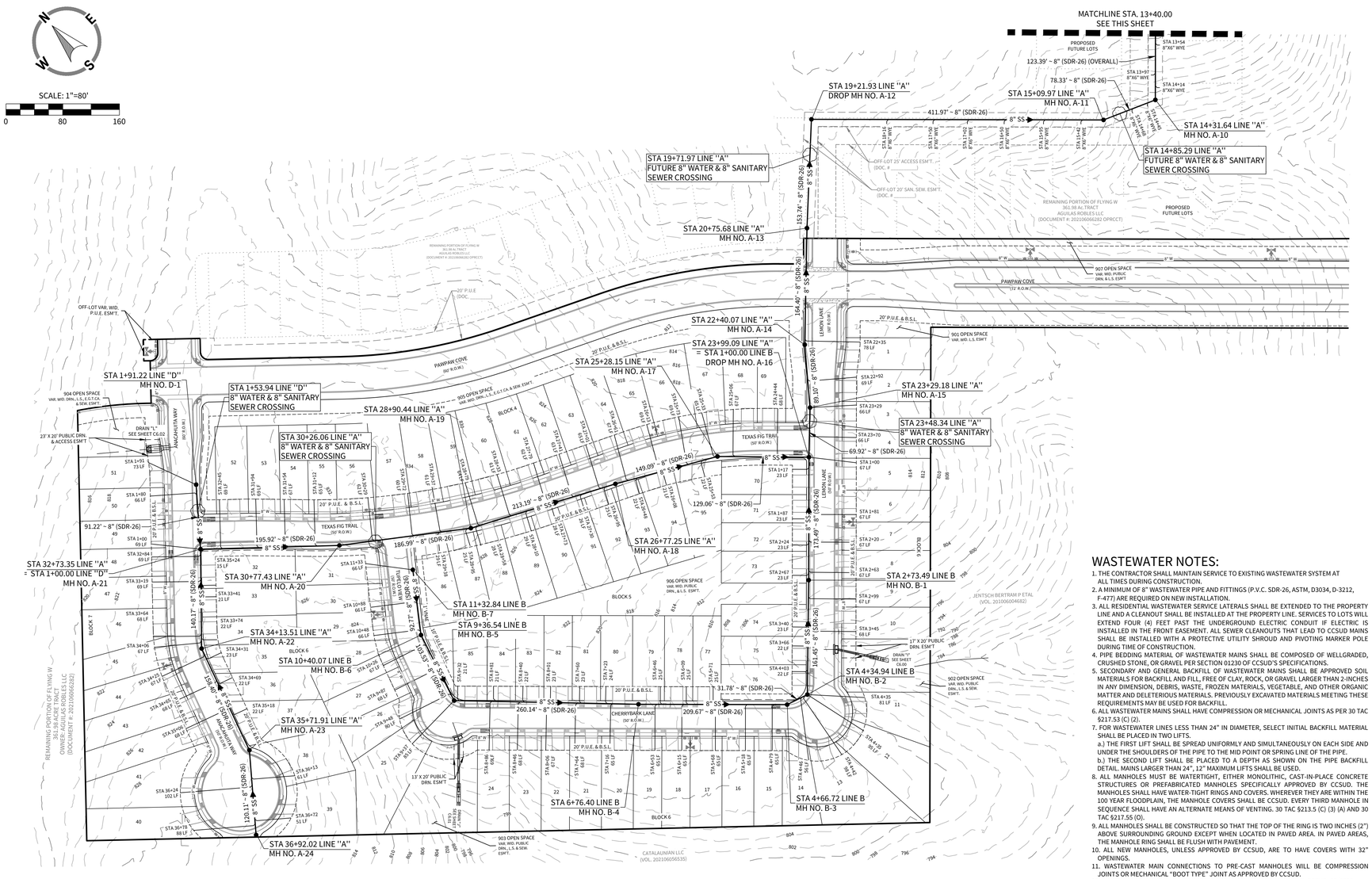
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- PROPOSED SANITARY SEWER MANHOLE
- PROPOSED WATER MAIN — 8" W
- PROPOSED STANDARD FIRE HYDRANT
- PUBLIC UTILITY EASEMENT — P.U.E.

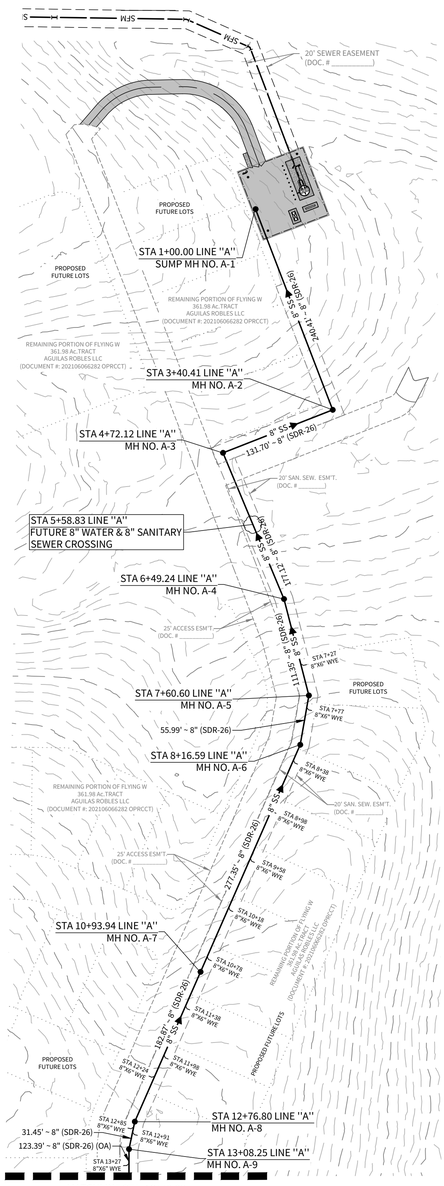
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SCALE: 1"=80'

0 80 160





WASTEWATER NOTES:

1. THE CONTRACTOR SHALL MAINTAIN SERVICE TO EXISTING WASTEWATER SYSTEM AT ALL TIMES DURING CONSTRUCTION.
2. A MINIMUM OF 8" WASTEWATER PIPE AND FITTINGS (P.V.C. SDR-26, ASTM, D3034, D-3212, F-477) ARE REQUIRED ON NEW INSTALLATION.
3. ALL RESIDENTIAL WASTEWATER SERVICE LATERALS SHALL BE EXTENDED TO THE PROPERTY LINE AND A CLEANOUT SHALL BE INSTALLED AT THE PROPERTY LINE. SERVICES TO LOTS WILL EXTEND FOUR (4) FEET PAST THE UNDERGROUND ELECTRIC CONDUIT IF ELECTRIC IS INSTALLED IN THE FRONT EASEMENT. ALL SEWER CLEANOUTS THAT LEAD TO CCSUD MAINS SHALL BE INSTALLED WITH A PROTECTIVE UTILITY SHROUD AND PIVOTING MARKER POLE DURING TIME OF CONSTRUCTION.
4. PIPE BEDDING MATERIAL OF WASTEWATER MAINS SHALL BE COMPOSED OF WELLGRADED, CRUSHED STONE, OR GRAVEL PER SECTION 01230 OF CCSUD'S SPECIFICATIONS.
5. SECONDARY AND GENERAL BACKFILL OF WASTEWATER MAINS SHALL BE APPROVED SOIL MATERIALS FOR BACKFILL AND FILL, FREE OF CLAY, ROCK, OR GRAVEL LARGER THAN 2-INCHES IN ANY DIMENSION, DEBRIS, WASTE, FROZEN MATERIALS, VEGETABLE, AND OTHER ORGANIC MATTER AND DELETERIOUS MATERIALS. PREVIOUSLY EXCAVATED MATERIALS MEETING THESE REQUIREMENTS MAY BE USED FOR BACKFILL.
6. ALL WASTEWATER MAINS SHALL HAVE COMPRESSION OR MECHANICAL JOINTS AS PER 30 TAC §217.55 (C) (2).
7. FOR WASTEWATER LINES LESS THAN 24" IN DIAMETER, SELECT INITIAL BACKFILL MATERIAL SHALL BE PLACED IN TWO LIFTS.
   a.) THE FIRST LIFT SHALL BE SPREAD UNIFORMLY AND SIMULTANEOUSLY ON EACH SIDE AND UNDER THE SHOULDERS OF THE PIPE TO THE MID POINT OR SPRING LINE OF THE PIPE.
   b.) THE SECOND LIFT SHALL BE PLACED TO A DEPTH AS SHOWN ON THE PIPE BACKFILL DETAIL. MAINS LARGER THAN 24", 12" MAXIMUM LIFTS SHALL BE USED.
8. ALL MANHOLES MUST BE WATERTIGHT, EITHER MONOLITHIC, CAST-IN-PLACE CONCRETE STRUCTURES OR PREFABRICATED MANHOLES SPECIFICALLY APPROVED BY CCSUD. THE MANHOLES SHALL HAVE WATER-TIGHT RINGS AND COVERS. WHEREVER THEY ARE WITHIN THE 100 YEAR FLOODPLAIN, THE MANHOLE COVERS SHALL BE CCSUD. EVERY THIRD MANHOLE IN SEQUENCE SHALL HAVE AN ALTERNATE MEANS OF VENTING. 30 TAC §213.5 (C) (3) (A) AND 30 TAC §217.55 (D).
9. ALL MANHOLES SHALL BE CONSTRUCTED SO THAT THE TOP OF THE RING IS TWO INCHES (2") ABOVE SURROUNDING GROUND EXCEPT WHEN LOCATED IN PAVED AREA. IN PAVED AREAS, THE MANHOLE RING SHALL BE FLUSH WITH PAVEMENT.
10. ALL NEW MANHOLES, UNLESS APPROVED BY CCSUD, ARE TO HAVE COVERS WITH 32" OPENINGS.
11. WASTEWATER MAIN CONNECTIONS TO PRE-CAST MANHOLES WILL BE COMPRESSION JOINTS OR MECHANICAL "BOOT TYPE" JOINT AS APPROVED BY CCSUD.
12. WASTEWATER MAINS SHALL BE TESTED FROM MANHOLE TO MANHOLE. CCSUD. 03/2022
13. IN AREAS WHERE A NEW WASTEWATER MANHOLE IS TO BE CONSTRUCTED OVER AN EXISTING WASTEWATER SYSTEM, IT SHALL BE THE CONTACTOR'S RESPONSIBILITY TO TEST THE EXISTING MANHOLES BEFORE CONSTRUCTION. AFTER THE PROPOSED MANHOLE(S) HAS BEEN BUILT, THE CONTRACTOR SHALL RE-TEST THE EXISTING SYSTEM TO THE SATISFACTION OF THE CONSTRUCTION INSPECTOR. (NO SEPARATE PAY ITEM).
14. WHERE THE MINIMUM 9 FOOT SEPARATION DISTANCE BETWEEN WASTEWATER LINES AND WATER LINES CANNOT BE MAINTAINED, THE INSTALLATION OF WASTEWATER LINES SHALL BE IN STRICT ACCORDANCE WITH TCEQ. THE WASTEWATER LINE SHALL BE CONSTRUCTED OF CAST IRON, DUCTILE IRON OR PVC MEETING THE ASTM SPECIFICATION FOR BOTH PIPES AND JOINTS OF 160 PSI AND SHALL BE IN ACCORDANCE WITH 30 TAC § 217.53 (D) AND 30 TAC § 290.44 (E).
16. NO TESTING WILL BE PERFORMED PRIOR TO 30 DAYS FROM COMPLETE INSTALLATION OF THE WASTEWATER LINES. THE FOLLOWING SEQUENCE WILL BE STRICTLY ADHERED TO:
   a. PULL MANDREL
   b. PERFORM AIR TEST
   c. CLEANING OF ANY DEBRIS
   d. FLUSHING OF SYSTEM
   e. TV INSPECTION (WITHIN 72 HOURS OF FLUSHING)
17. A MINIMUM OF 3 FEET OF COVER IS TO BE MAINTAINED OVER THE WASTEWATER MAIN AND LATERALS AT SUBGRADE, OTHERWISE CONCRETE ENCASEMENT WILL BE REQUIRED.
18. TCEQ AND EPA REQUIRE EROSION AND SEDIMENTATION CONTROL FOR CONSTRUCTION OF WASTEWATER COLLECTION SYSTEMS. DEVELOPER OR AUTHORIZED REPRESENTATIVE SHALL PROVIDE EROSION AND SEDIMENTATION CONTROL AS NOTES ON THE PROJECT'S PLAN AND PROFILE SHEETS. ALL TEMPORARY EROSION AND SEDIMENTATION CONTROLS SHALL BE REMOVED BY THE CONTRACTOR AT FINAL ACCEPTANCE OF THE PROJECT BY CCSUD.
19. ALL MANHOLES NOT WITHIN PAVED STREETS SHALL HAVE LOCKING CONCRETE COLLAR TO SECURE RING AND COVER TO MANHOLE CONE PER CCSUD DETAIL DRAWING #329.
20. ALL MANHOLES OVER THE EDWARDS AQUIFER RECHARGE ZONE SHALL HAVE LOCKING CONCRETE COLLAR TO SECURE RING AND COVER TO MANHOLE CONE PER CCSUD DETAIL DRAWING #329.

NOTES:

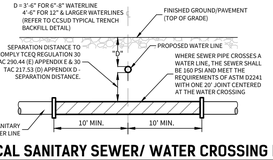
1. ALL EXCAVATED MATERIAL SHALL BE PLACED ON THE UPGRADIENT SIDE OF THE SEWER TRENCH THUS ALLOWING THE TRENCH TO INTERCEPT ANY SILT CONTAMINATED RUNOFF.
2. ALL SANITARY SEWER PIPE SHALL BE P.V.C. THAT MEETS ASTM SPECIFICATION D-3034, SDR-26 UNLESS OTHERWISE NOTED.
3. ALL LATERALS TO BE INSTALLED @ MIN. 2.0% SLOPE. UNLESS OTHERWISE NOTED.
4. LATERALS TO BE BUILT TO FRONT UTILITY EASEMENT LINE OR SANITARY SEWER EASEMENT LINE.
5. ENSURE ALL DRIVEWAY APPROACHES ARE BUILT IN GENERAL ACCORDANCE WITH A.D.A. SPECIFICATIONS. NO VALVES, HYDRANTS, ETC. SHALL BE CONSTRUCTED WITHIN CURBS, SIDEWALKS, OR DRIVEWAYS.
6. 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.
7. ALL UTILITIES TO BE CONSTRUCTED PRIOR TO SHEETS
8. NO VALVES, HYDRANTS, CLEANOUTS ETC. SHALL BE CONSTRUCTED WITHIN CURBS, SIDEWALKS, OR DRIVEWAYS.
9. THE UTILITY TRENCH COMPACTION NOTE FROM THE STANDARD COUNTY CONSTRUCTION PLAN NOTES.
10. THIS PROJECT INCLUDES UTILITY INSTALLATIONS GREATER THAN 5-FEET IN DEPTH LOCATED IN PUBLIC RIGHT-OF-WAY OR EASEMENTS. DEEP TRENCHES POSE COMPACTION TESTING AND CONSTRUCTION CHALLENGES AND COUNTY METHODS FOR TESTING AND COMPACTION MAY NOT BE ACHIEVABLE. A UTILITY COMPACTION PLAN WILL BE REQUIRED AND MUST BE SUBMITTED FOR APPROVAL TO THE COUNTY PRIOR TO UTILITY INSTALLATION.

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 CCUSD 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 CCUSD 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.



TYPICAL SANITARY SEWER/ WATER CROSSING 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

FLYING W UNIT 1

OVERALL SANITARY SEWER PLAN

DATE
11/26/2025

PROJECT NO.
04024-004

DRAWN BY
C7

CHECKED BY
JL

REVISIONS
1 2 3 4 5 6 7 8

STATE OF TEXAS
JOSE A. LOZANO
126773
LICENSED
PROFESSIONAL ENGINEER
11/26/25

CUDE ENGINEERS
TBPELS No. 10048500

C4.00

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.

E:\04024\D3\1-25\04024 FW Unit1 SHEETS\04024 FW Unit1 C4.00 OSP.dwg 2025/11/26 Fri 09:04:56

LEGEND

PROPERTY LINE

PROPOSED SEWER LINE — 8" SS

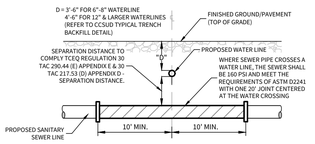
PROPOSED MANHOLE

PROPOSED VERTICAL STACK

VERTICAL STACK WITH END CAP

NOTE:

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TYPICAL SANITARY SEWER/ WATER CROSSING DETAIL

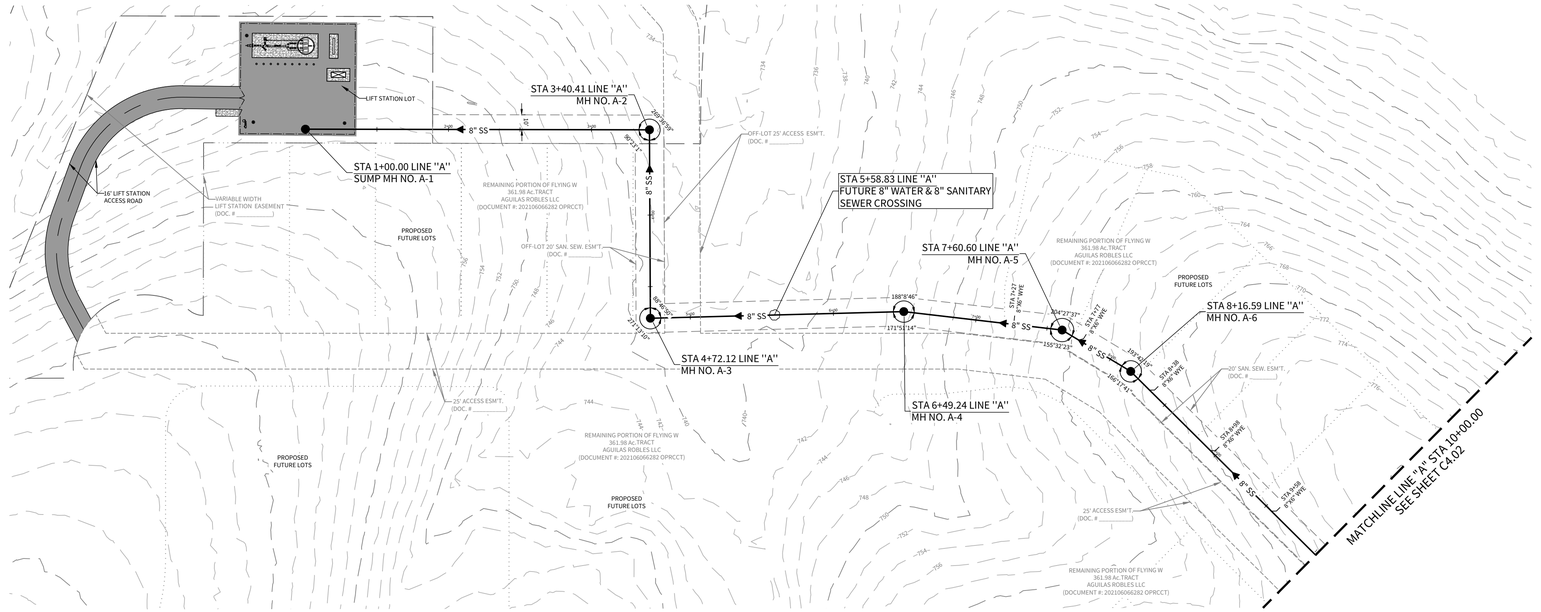
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2. **CONTRACTOR TO MAINTAIN A MINIMUM 2' VERTICAL SEPARATION DISTANCE BETWEEN THE BOTTOM OF EXISTING WATER MAIN AND TOP OF PROPOSED SANITARY SEWER MAIN AT WATER AND SANITARY SEWER CROSSINGS.**
3. **ALL 8" SANITARY SEWER PIPE SHALL BE SDR-26 PS115 ASTM F679.**
4. **ALL LATERALS SHALL BE INSTALLED AT A MINIMUM 2.0% SLOPE UNLESS OTHERWISE NOTED.**

CAUTION!!

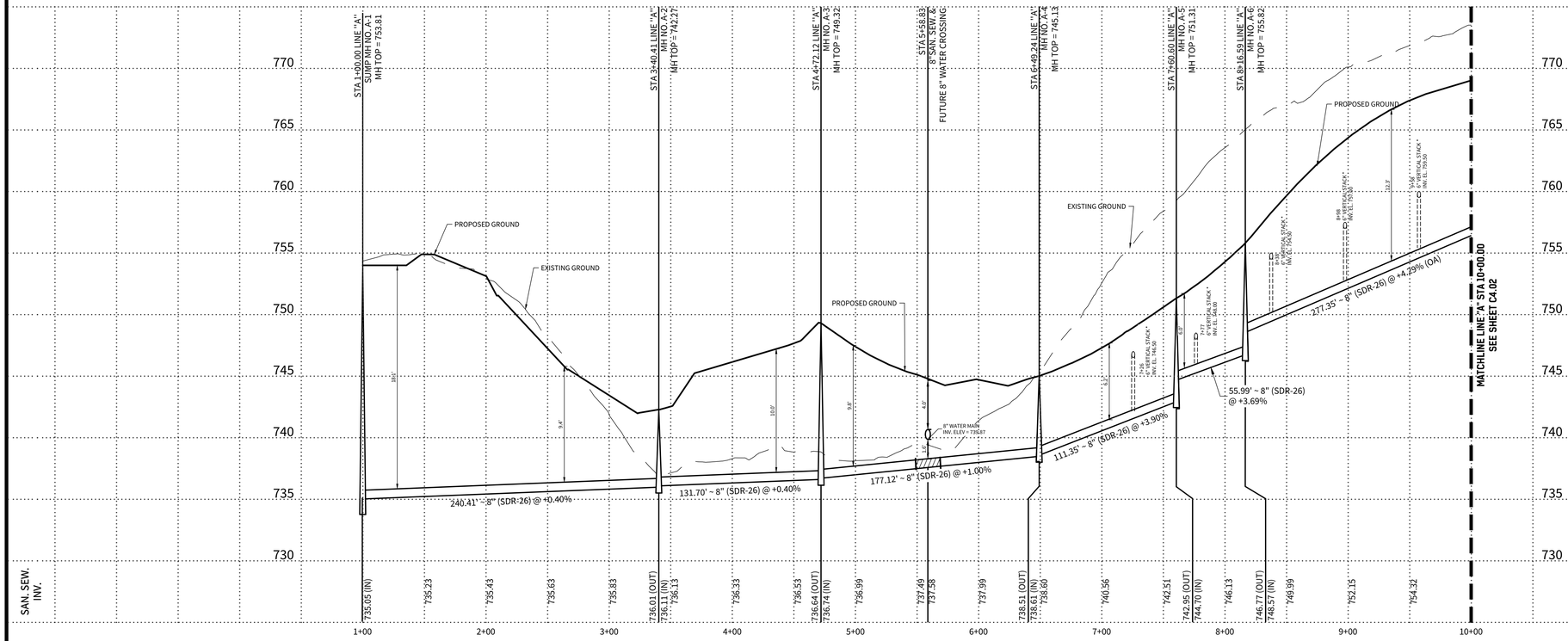
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LINE "A"

STA. 1+00.00 TO 10+00.00

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



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

FLYING W UNIT 1

SANITARY SEWER PLAN & PROFILE LINE 'A'

DATE
11/26/2025

PROJECT NO.
04024-004

DRAWN BY
C7

CHECKED BY
JL

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

STATE OF TEXAS
JOSE A. LOZANO
126773
LICENSED
PROFESSIONAL ENGINEER
11/26/25

CUDE ENGINEERS
TBPE/LS No. 10048500

PLAT NO.
-

C4.01

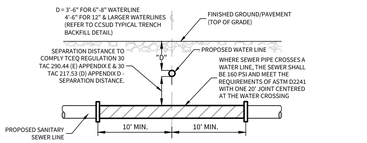
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LEGEND

PROPERTY LINE	
PROPOSED SEWER LINE	8" SS
PROPOSED MANHOLE	
PROPOSED VERTICAL STACK	
VERTICAL STACK WITH END CAP	

NOTE:

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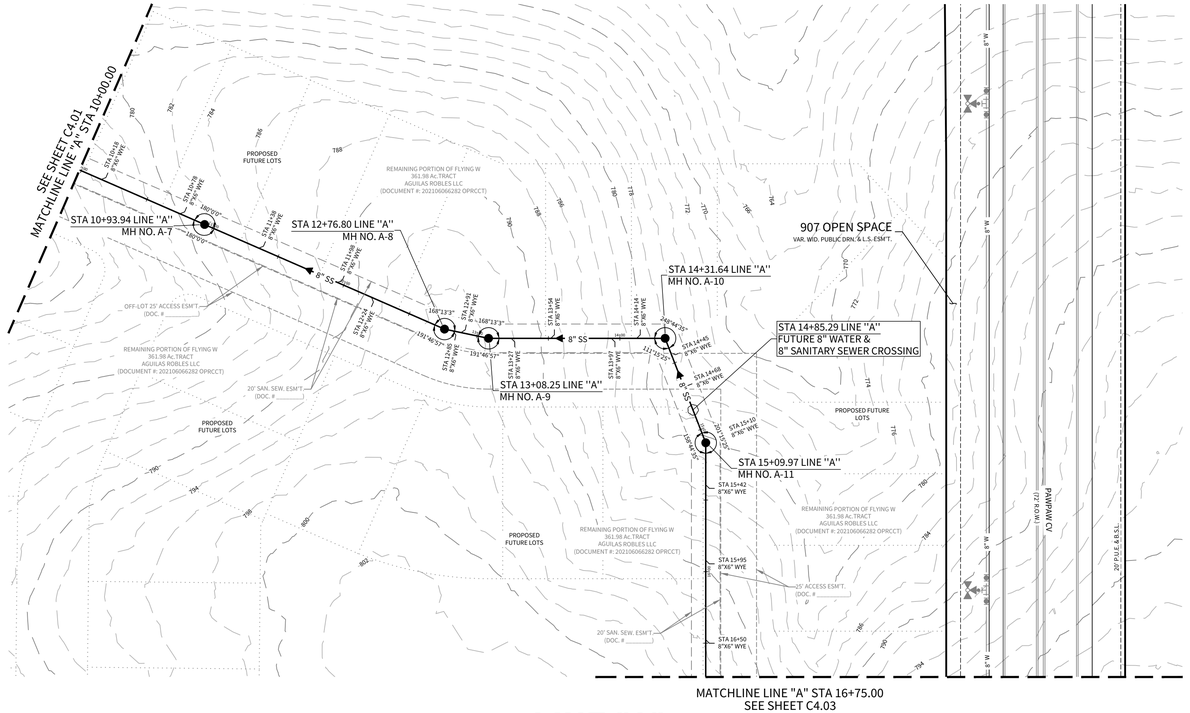
TYPICAL SANITARY SEWER/ WATER CROSSING DETAIL
N.T.S.

NOTES:

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CAUTION!!

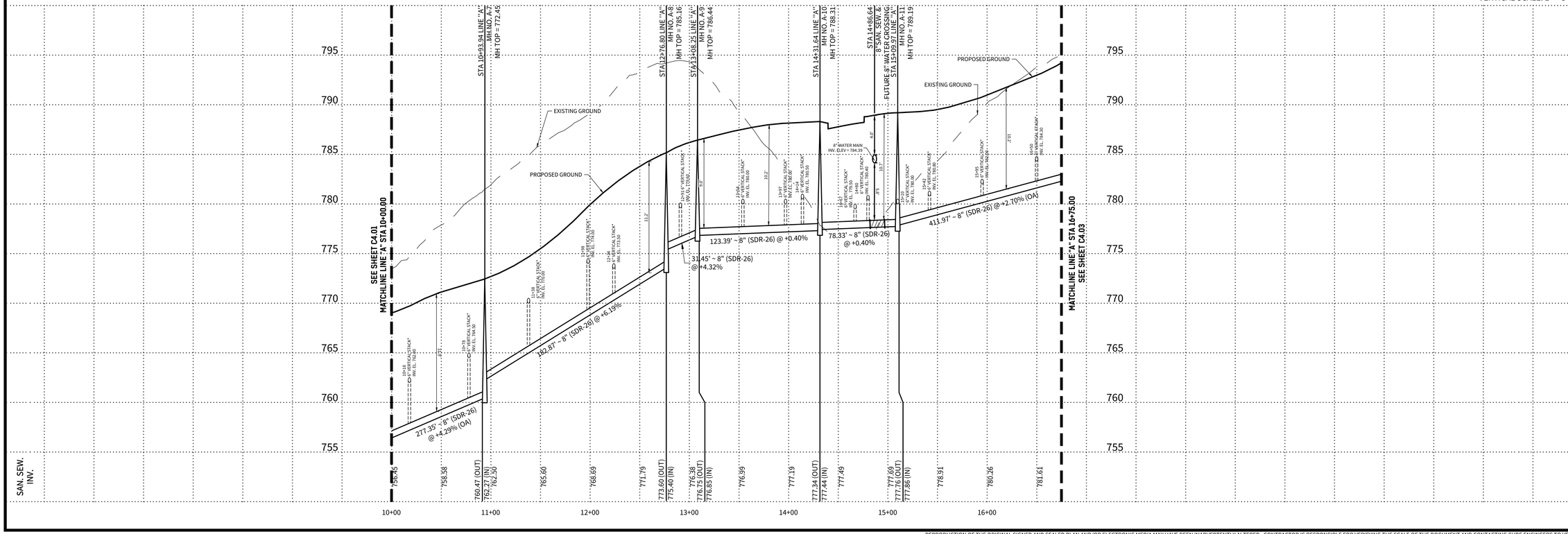
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LINE "A"

STA. 10+00.00 TO 16+75.00

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



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CUDE ENGINEERS EST. 1980

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

FLYING W
UNIT 1

SANITARY SEWER PLAN & PROFILE LINE 'A'

DATE
11/26/2025

PROJECT NO.
04024-004

DRAWN BY
C7

CHECKED BY
JL

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

STATE OF TEXAS
JOSE A. LOZANO
126773
LICENSED
PROFESSIONAL ENGINEER
11/26/25

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
-

C4.02

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LEGEND

PROPERTY LINE

PROPOSED SEWER LINE — 8" SS

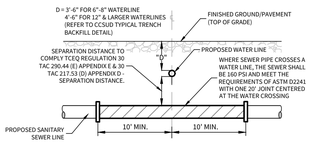
PROPOSED MANHOLE

PROPOSED VERTICAL STACK

VERTICAL STACK WITH END CAP

NOTE:

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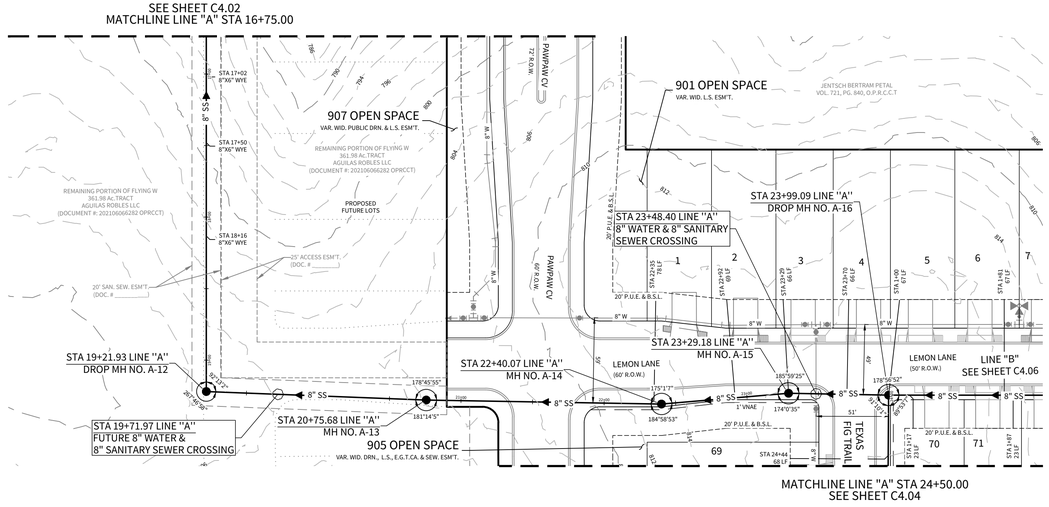
TYPICAL SANITARY SEWER/ WATER CROSSING DETAIL
N.T.S.

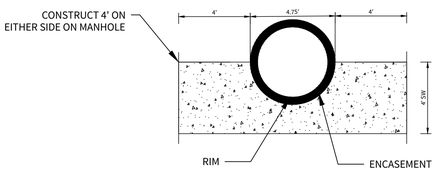
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4. **ALL LATERALS SHALL BE INSTALLED AT A MINIMUM 2.0% SLOPE UNLESS OTHERWISE NOTED.**

CAUTION!!

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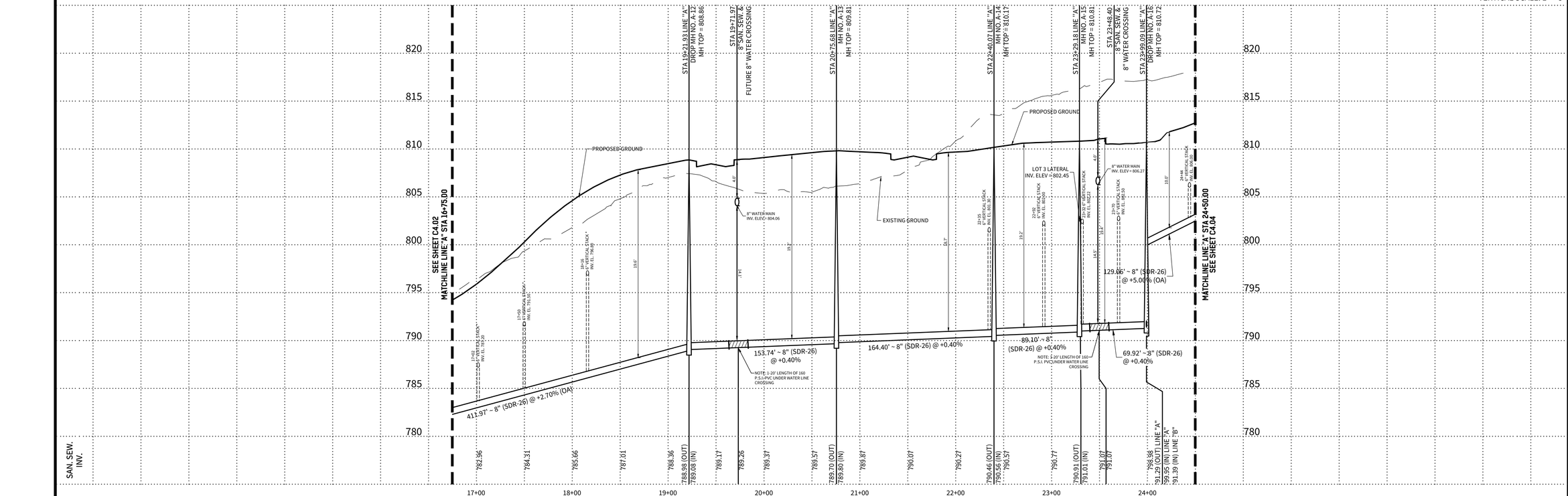


TYPICAL SANITARY SEWER IN SIDEWALLK DETAIL
N.T.S.

LINE "A"

STA. 16+75.00 TO 24+50.00

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



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CUDE ENGINEERS

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

FLYING W
UNIT 1

SANITARY SEWER PLAN & PROFILE LINE 'A'

DATE
11/26/2025

PROJECT NO.
04024-004

DRAWN BY
C7

CHECKED BY
JL

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

STATE OF TEXAS
JOSE A. LOZANO
126773
LICENSED
PROFESSIONAL ENGINEER
11/26/25

CUDE ENGINEERS
TBPELS No. 10048500

C4.03

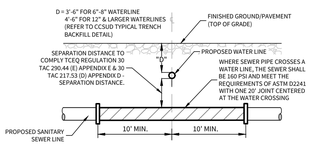
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LEGEND

PROPERTY LINE	
PROPOSED SEWER LINE	8" SS
PROPOSED MANHOLE	
PROPOSED VERTICAL STACK	
VERTICAL STACK WITH END CAP	

NOTE:

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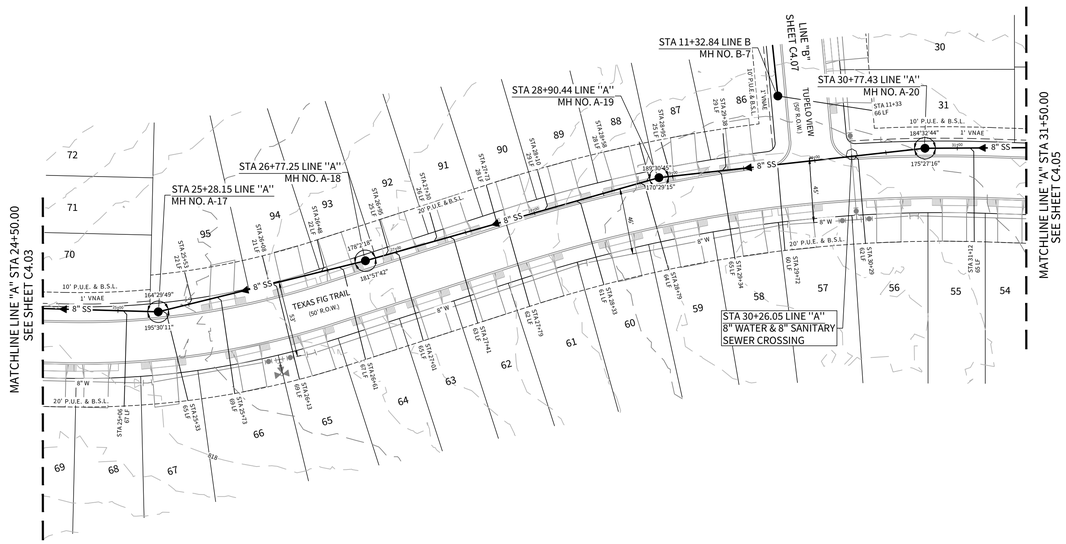
TYPICAL SANITARY SEWER/ WATER CROSSING DETAIL
N.T.S.

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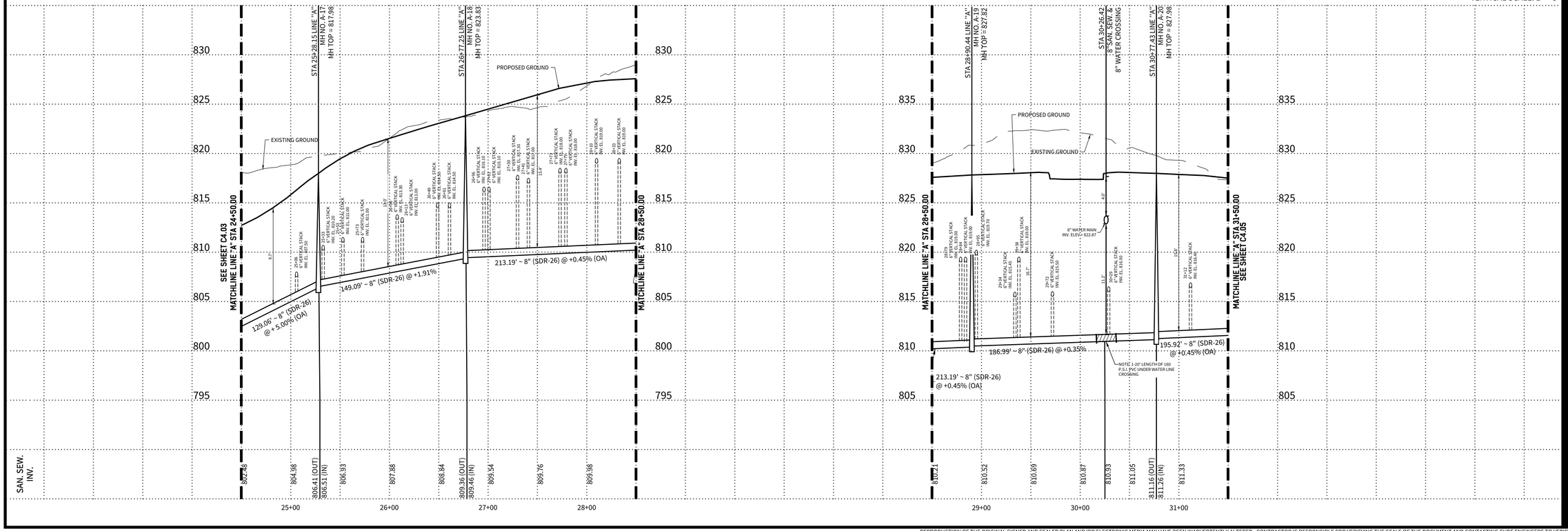
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LINE "A"

STA. 24+50.00 TO 31+50.00

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



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CUDE ENGINEERS

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FLYING W
UNIT 1

SANITARY SEWER PLAN & PROFILE LINE 'A'

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

STATE OF TEXAS
JOSE A. LOZANO
126773
LICENSED
PROFESSIONAL ENGINEER
11/26/25

CUDE ENGINEERS
TBPE/LS No. 10048500

DATE
11/26/2025

PROJECT NO.
04024-004

DRAWN BY
C7

CHECKED BY
JL

PLAT NO.
-

C4.04

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LEGEND

PROPERTY LINE

PROPOSED SEWER LINE — 8" SS

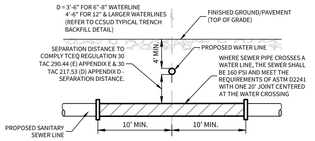
PROPOSED MANHOLE

PROPOSED VERTICAL STACK

VERTICAL STACK WITH END CAP

NOTE:

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TYPICAL SANITARY SEWER/ WATER CROSSING DETAIL

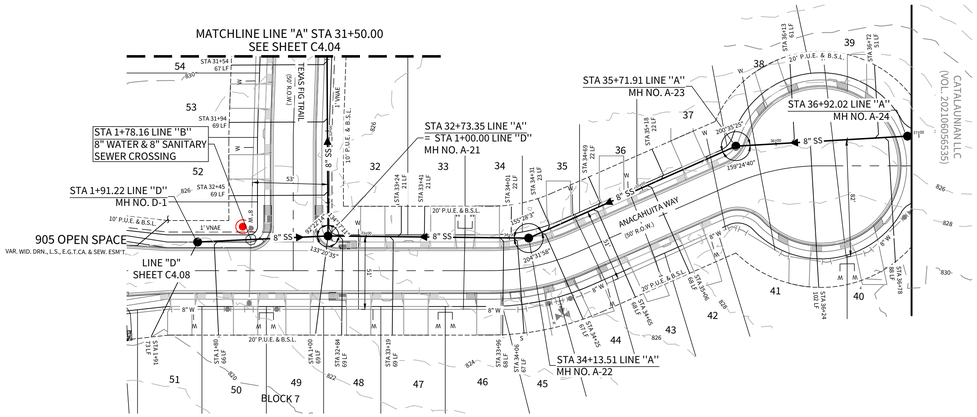
N.T.S.

NOTES:

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2. **CONTRACTOR TO MAINTAIN A MINIMUM 2' VERTICAL SEPARATION DISTANCE BETWEEN THE BOTTOM OF EXISTING WATER MAIN AND TOP OF PROPOSED SANITARY SEWER MAIN AT WATER AND SANITARY SEWER CROSSINGS.**
3. **ALL 8" SANITARY SEWER PIPE SHALL BE SDR-26 PS115 ASTM F679.**
4. **ALL LATERALS SHALL BE INSTALLED AT A MINIMUM 2.0% SLOPE UNLESS OTHERWISE NOTED.**

CAUTION!!

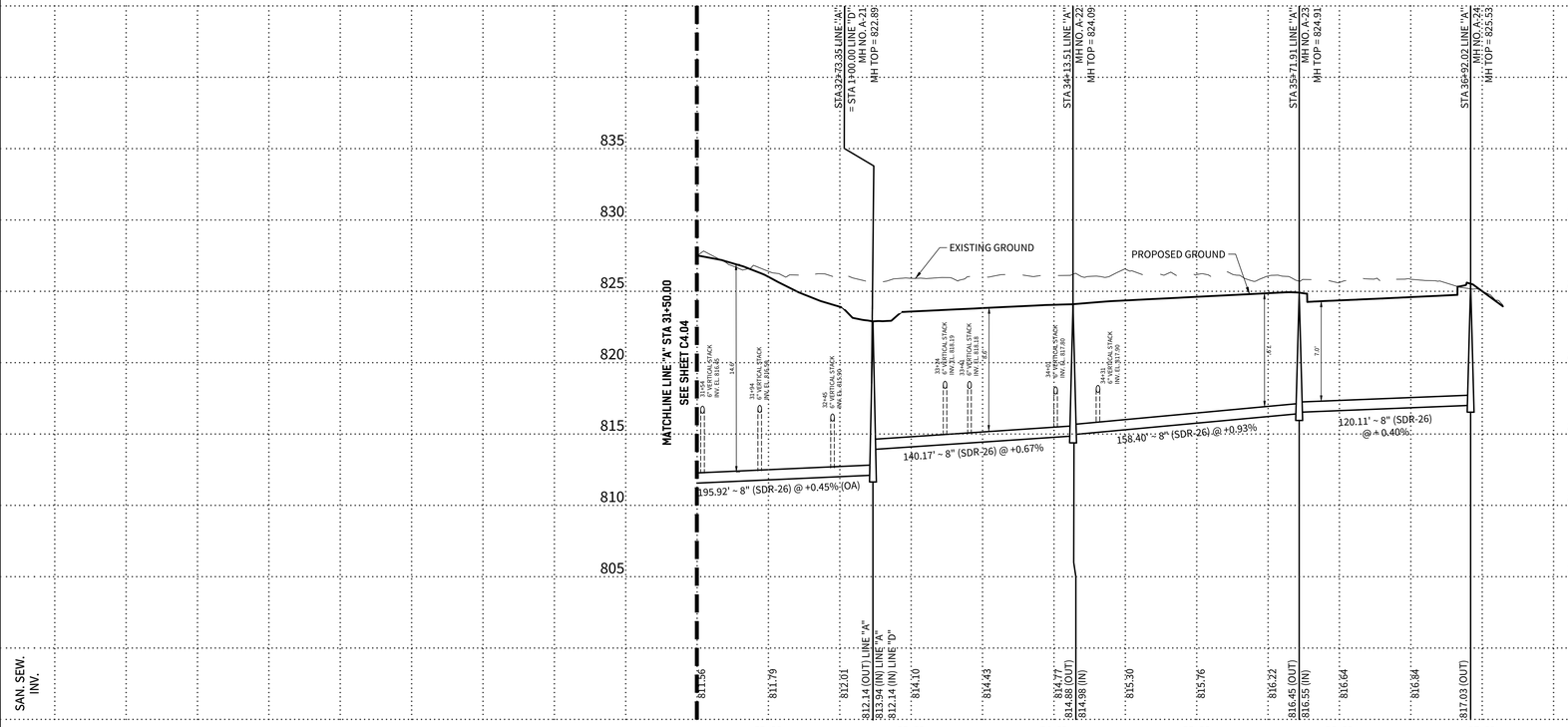
EXISTING UTILITIES ARE WITHIN THE LIMITS OF CONSTRUCTION. CONTRACTORS SHALL EXERCISE EXTRA CARE IN DIGGING ANY TRENCH FOR PROPOSED UTILITIES. THE CONTRACTOR SHALL BE RESPONSIBLE TO COORDINATE, VERIFY THE EXACT LOCATION & IDENTIFY AREA OF CONFLICTS WITH EXISTING UTILITIES AND SHALL NOTIFY THE ENGINEER IF CONFLICT IS FOUND.



LINE "A"

STA. 31+50.00 TO END

NOTE: A TxDOT PERMIT MUST BE OBTAINED BEFORE WORKING IN A TxDOT RIGHT OF WAY
HORIZONTAL SCALE: 1" = 50'
VERTICAL SCALE: 1" = 5'



CUDEENGINEERS.COM

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

FLYING W
UNIT 1

SANITARY SEWER PLAN & PROFILE LINE 'A'

DATE
11/26/2025

PROJECT NO.
04024-004

DRAWN BY
C7

CHECKED BY
JL

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

STATE OF TEXAS
JOSE A. LOZANO
126773
LICENSED
PROFESSIONAL ENGINEER
11/26/25

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
-

SAWS JOB NO.
XX-XXXX

C4.05

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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LEGEND

PROPERTY LINE

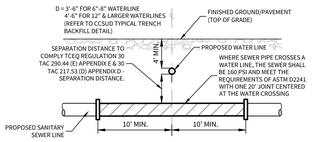
PROPOSED SEWER LINE — 8" SS

PROPOSED MANHOLE

PROPOSED VERTICAL STACK

NOTE:

ENSURE ALL DRIVEWAY APPROACHES ARE BUILT IN GENERAL ACCORDANCE WITH A.D.A. SPECIFICATIONS. NO VALVES, HYDRANTS, ETC. SHALL BE CONSTRUCTED WITHIN CURBS, SIDEWALKS, OR DRIVEWAYS.



TYPICAL SANITARY SEWER/ WATER CROSSING DETAIL

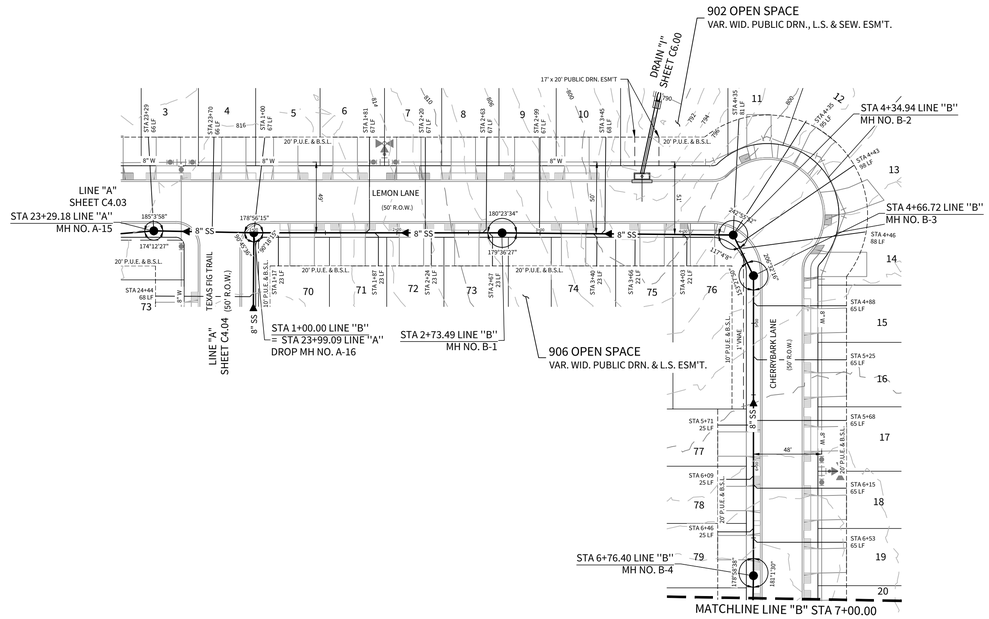
N.T.S.

NOTES:

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3. **ALL 8" SANITARY SEWER PIPE SHALL BE SDR-26 PS115 ASTM F679.**
4. **ALL LATERALS SHALL BE INSTALLED AT A MINIMUM 2.0% SLOPE UNLESS OTHERWISE NOTED.**

CAUTION!!

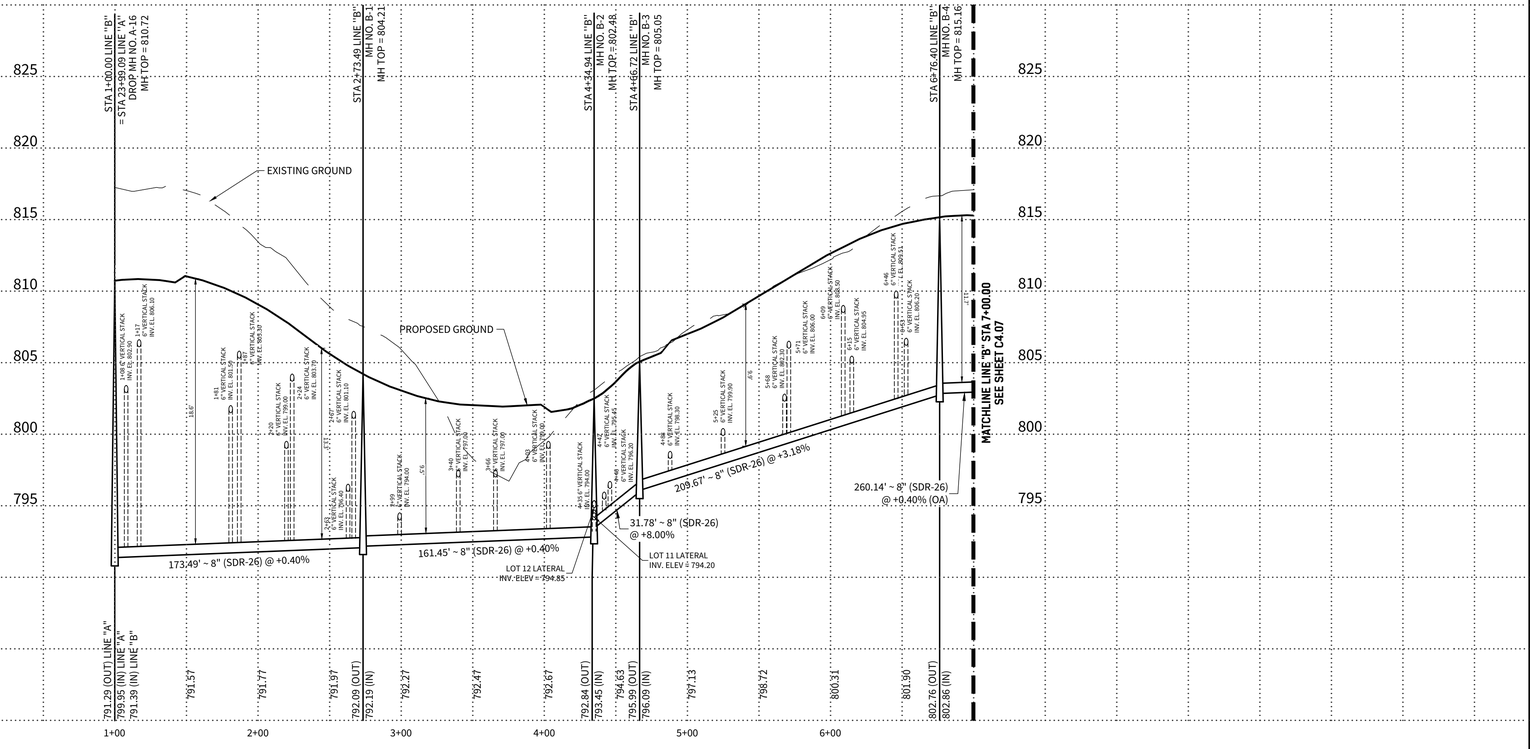
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LINE "B"

STA. 1+00.00 TO 7+00.00

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

FLYING W
UNIT 1

SANITARY SEWER PLAN & PROFILE LINE 'B'

DATE
11/26/2025

PROJECT NO.
04024-004

DRAWN BY
C7

CHECKED BY
JL

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

STATE OF TEXAS
JOSE A. LOZANO
126773
LICENSED
PROFESSIONAL ENGINEER
11/26/25

CUDE ENGINEERS
TBPELS No. 10048500

C4.06

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.

LEGEND

PROPERTY LINE

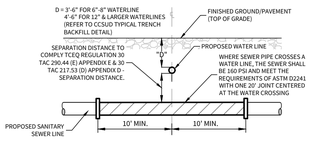
PROPOSED SEWER LINE — 8" SS

PROPOSED MANHOLE

PROPOSED VERTICAL STACK

NOTE:

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TYPICAL SANITARY SEWER/ WATER CROSSING DETAIL

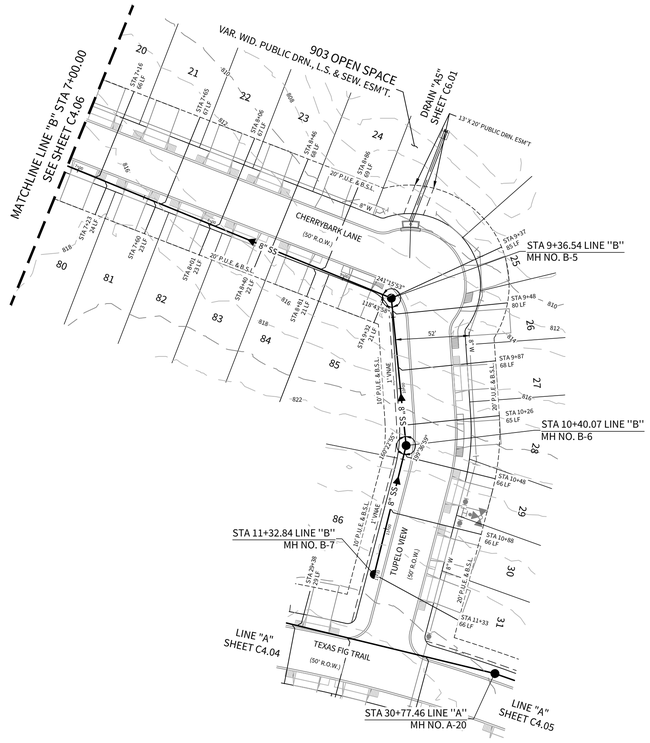
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CAUTION!!

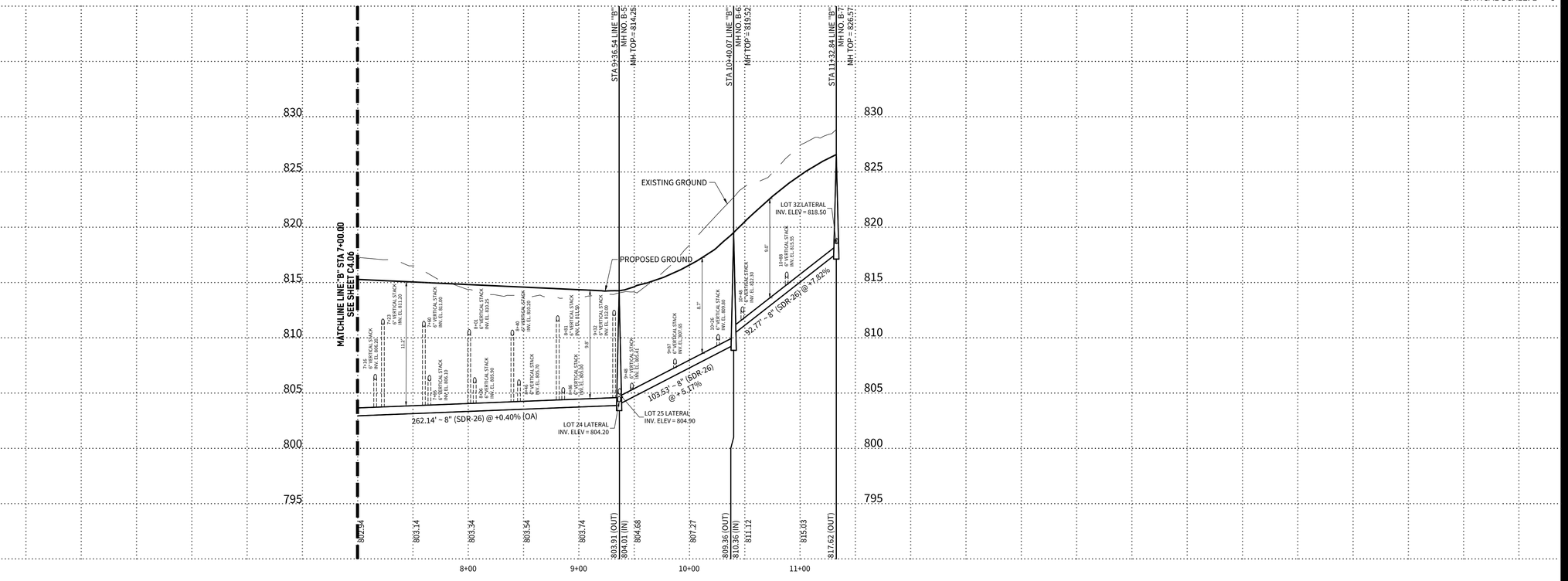
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LINE "B"

STA. 7+00.00 TO END

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



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San Antonio, Texas 78231
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FLYING W
UNIT 1

SANITARY SEWER PLAN & PROFILE LINE 'B'

DATE
11/25/2025

PROJECT NO.
04024-004

DRAWN BY
C7

CHECKED BY
JL

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

STATE OF TEXAS
JOSE A. LOZANO
126773
LICENSED
PROFESSIONAL ENGINEER
11/26/25

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
-

C4.07

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LEGEND

PROPERTY LINE

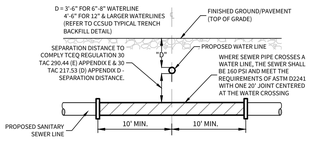
PROPOSED SEWER LINE — 8" SS

PROPOSED MANHOLE

PROPOSED VERTICAL STACK

NOTE:

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TYPICAL SANITARY SEWER/ WATER CROSSING DETAIL

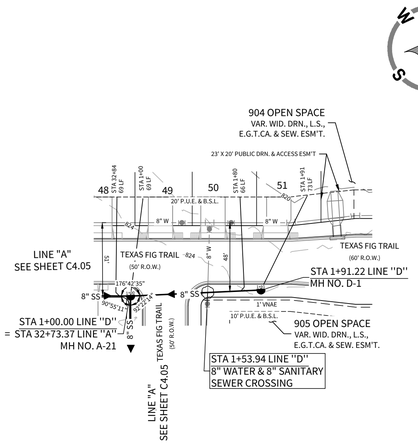
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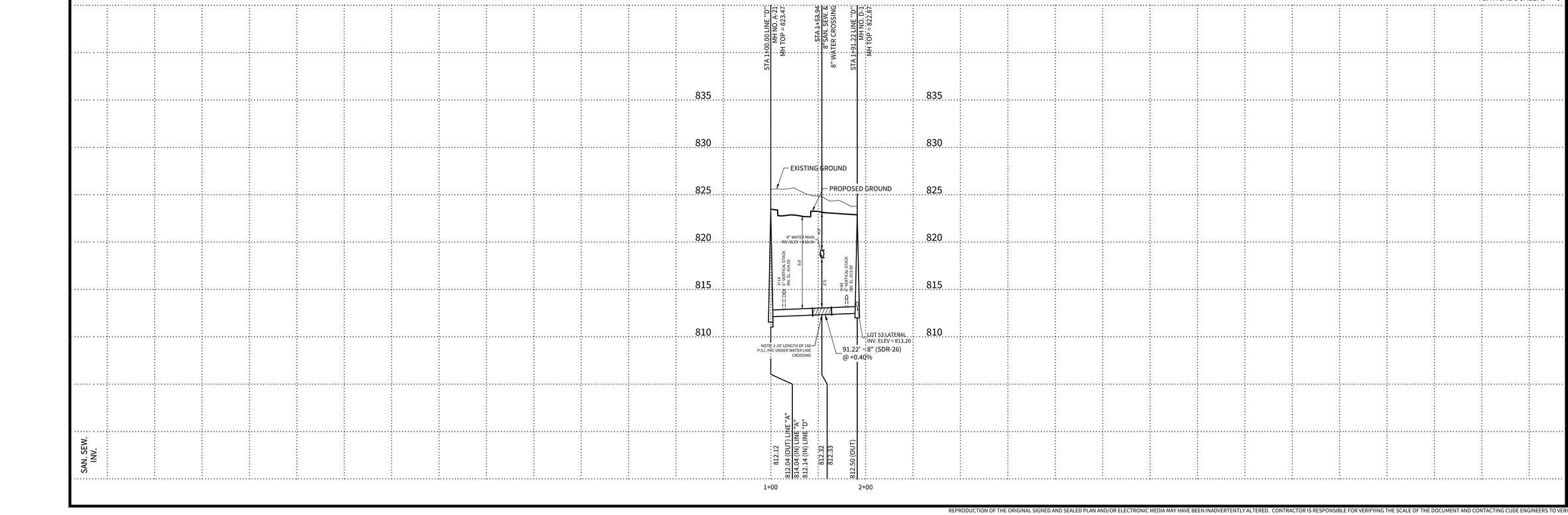
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LINE D

STA. 1+00.00 TO END

HORIZONTAL SCALE: 1" = 50'
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FLYING W UNIT 1

SANITARY SEWER PLAN & PROFILE LINE 'D'

DATE
11/24/2025

PROJECT NO.
04024-004

DRAWN BY
C7

CHECKED BY
JL

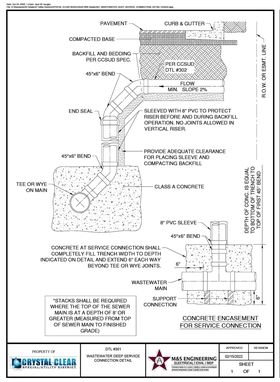
REVISIONS
1. 2. 3. 4. 5. 6. 7. 8.

STATE OF TEXAS
JOSE A. LOZANO
126773
LICENSED
PROFESSIONAL ENGINEER
11/26/25

CUDE ENGINEERS
TBPELS No. 10048500

C4.08

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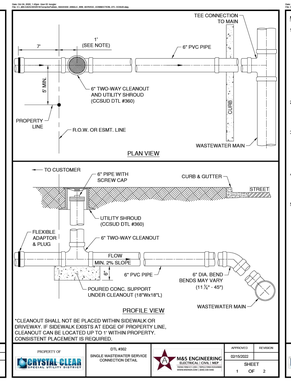
PROPERTY OF CRYSTAL CLEAR WATER SUPPLY, INC.

DTL #301
WASTEWATER SERVICE CONNECTION DETAIL

M&S ENGINEERING ELECTRICAL | CIVIL | MEP

APPROVED	REVISION
02/15/2022	

SHEET 1 OF 1



*CLEANOUT SHALL NOT BE PLACED WITHIN SIDEWALK OR DRIVEWAY. IF SIDEWALK EXISTS AT EDGE OF PROPERTY LINE, CLEANOUT CAN BE LOCATED NOT TO 1' WITHIN PROPERTY. CONSISTENT PLACEMENT IS REQUIRED.

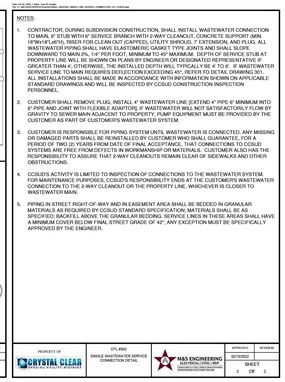
PROPERTY OF CRYSTAL CLEAR WATER SUPPLY, INC.

DTL #302
SINGLE WASTEWATER SERVICE CONNECTION DETAIL

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APPROVED	REVISION
02/15/2022	

SHEET 1 OF 2



NOTES:

1. CONTRACTOR, DURING SUBDIVISION CONSTRUCTION, SHALL INSTALL WASTEWATER CONNECTION TO MAIN, 6" STUB WITH 6" SERVICE BRANCH WITH 6-WAY CLEANOUT, CONCRETE SUPPORT (MIN. 18"Wx18"Lx6"H), RISER FOR CLEAN OUT (CAPPED), UTILITY SHROUD, 1" EXTENSION, AND PLUG. ALL WASTEWATER PIPING SHALL HAVE ELASTOMERIC GASKET TYPE JOINTS AND SHALL SLOPE DOWNWARD TO MAIN 2%, 1/4" PER FOOT, MINIMUM TO 45° MAXIMUM. DEPTH OF SERVICE STUB AT PROPERTY LINE SHALL BE 8' MINIMUM (MEASURED FROM TOP OF SEWER MAIN TO FINISHED GRADE) GREATER THAN 4', OTHERWISE, THE INSTALLED DEPTH WILL TYPICALLY BE 4' TO 6'. IF WASTEWATER SERVICE LINE TO MAIN REQUIRES DEFLECTION EXCEEDING 45°, REFER TO DETAIL DRAWING 301. ALL INSTALLATIONS SHALL BE MADE IN ACCORDANCE WITH INFORMATION SHOWN ON APPLICABLE STANDARD DRAWINGS AND WILL BE INSPECTED BY CCSUD CONSTRUCTION INSPECTION PERSONNEL.
2. CUSTOMER SHALL REMOVE PLUG, INSTALL 4" WASTEWATER LINE (EXTEND 4" PIPE 4" MINIMUM INTO 6" PIPE AND JOINT WITH FLEXIBLE ADAPTOR), IF WASTEWATER WILL NOT SATISFACTORILY FLOW BY GRAVITY TO SEWER MAIN ADJACENT TO PROPERTY, PUMP EQUIPMENT MUST BE PROVIDED BY THE CUSTOMER AS PART OF CUSTOMER'S WASTEWATER SYSTEM.
3. CUSTOMER IS RESPONSIBLE FOR PIPING SYSTEM UNTIL WASTEWATER IS CONNECTED. ANY MISSING OR DAMAGED PARTS SHALL BE RECEIVED LED BY CUSTOMER MAY SHALL GUARANTEE FOR A PERIOD OF TWO (2) YEARS FROM DATE OF FINAL ACCEPTANCE BY CCSUD THAT WASTEWATER SYSTEMS ARE FREE FROM DEFECTS IN WORKMANSHIP OR MATERIALS. CUSTOMER ALSO HAS THE RESPONSIBILITY TO ASSURE THAT 2-WAY CLEANOUTS REMAIN CLEAR OF SIDEWALKS AND OTHER OBSTRUCTIONS.
4. CCSUD'S ACTIVITY IS LIMITED TO INSPECTION OF CONNECTIONS TO THE WASTEWATER SYSTEM. FOR MAINTENANCE PURPOSES, CCSUD'S RESPONSIBILITY ENDS AT THE CUSTOMER'S WASTEWATER SERVICE LINE TO THE MAIN, 2-WAY CLEANOUT OR THE PROPERTY LINE, WHICHEVER IS CLOSER TO THE WASTEWATER MAIN.
5. PIPING IN STREET RIGHT-OF-WAY AND IN EASEMENT AREA SHALL BE BEDDED IN GRANULAR MATERIALS AS REQUIRED BY CCSUD STANDARD SPECIFICATION; MATERIALS SHALL BE AS SPECIFIED; BACKFILL ABOVE THE GRANULAR BEDDING, SERVICE LINES IN THESE AREAS SHALL HAVE A MINIMUM COVER BELOW FINAL STREET GRADE OF 42"; ANY EXCEPTION MUST BE SPECIFICALLY APPROVED BY THE ENGINEER.

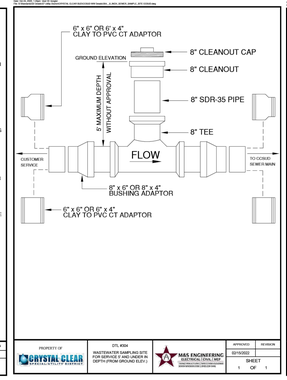
PROPERTY OF CRYSTAL CLEAR WATER SUPPLY, INC.

DTL #302
SINGLE WASTEWATER SERVICE CONNECTION DETAIL

M&S ENGINEERING ELECTRICAL | CIVIL | MEP

APPROVED	REVISION
02/15/2022	

SHEET 2 OF 2



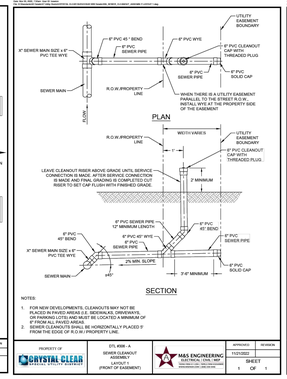
PROPERTY OF CRYSTAL CLEAR WATER SUPPLY, INC.

DTL #304
WASTEWATER SAMPLING BOX FOR SERVICE 6" AND UNDER IN DEPTH (FROM GROUND ELEV.)

M&S ENGINEERING ELECTRICAL | CIVIL | MEP

APPROVED	REVISION
02/15/2022	

SHEET 1 OF 1



NOTES:

1. FOR NEW DEVELOPMENTS, CLEANOUTS MAY NOT BE PLACED IN PAVED AREAS (I.E. SIDEWALKS, DRIVEWAYS, OR PARKING LOTS) AND MUST BE LOCATED A MINIMUM OF 5' FROM BACK OF CURB WHERE APPLICABLE.
2. SEWER CLEANOUTS SHALL BE HORIZONTALLY PLACED 3' FROM THE EDGE OF R.O.W./PROPERTY LINE.

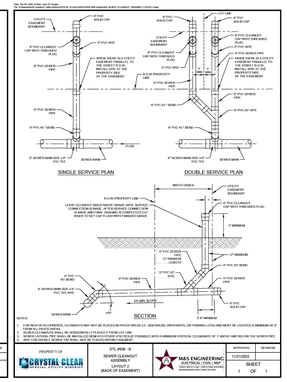
PROPERTY OF CRYSTAL CLEAR WATER SUPPLY, INC.

DTL #306 - A
SEWER CLEANOUT ASSEMBLY
LAYOUT 1 (FRONT OF EASEMENT)

M&S ENGINEERING ELECTRICAL | CIVIL | MEP

APPROVED	REVISION
11/21/2022	

SHEET 1 OF 1



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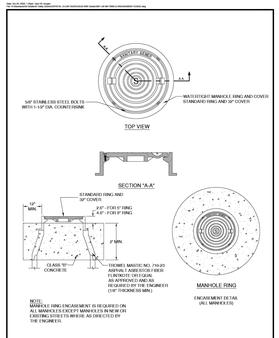
PROPERTY OF CRYSTAL CLEAR WATER SUPPLY, INC.

DTL #306 - B
SEWER CLEANOUT ASSEMBLY
LAYOUT 2 (BACK OF EASEMENT)

M&S ENGINEERING ELECTRICAL | CIVIL | MEP

APPROVED	REVISION
11/21/2022	

SHEET 1 OF 1



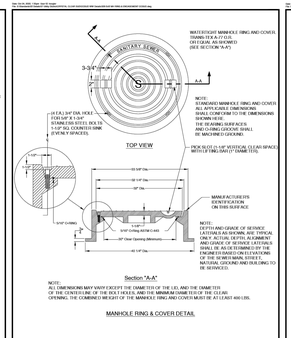
PROPERTY OF CRYSTAL CLEAR WATER SUPPLY, INC.

DTL #307
SECURITY POST FOR SEWER MONITORING EQUIPMENT

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APPROVED	REVISION
02/15/2022	

SHEET 1 OF 1



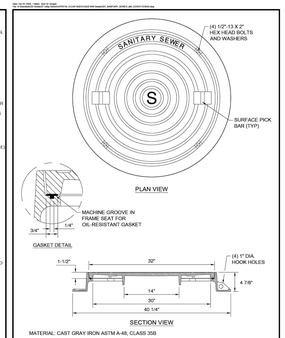
PROPERTY OF CRYSTAL CLEAR WATER SUPPLY, INC.

DTL #320
MANHOLE INVERT PLAN

M&S ENGINEERING ELECTRICAL | CIVIL | MEP

APPROVED	REVISION
02/15/2022	

SHEET 1 OF 2



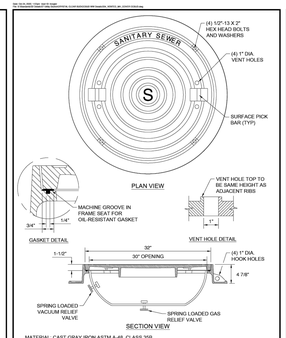
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DTL #320
STANDARD MANHOLE MANHOLE FLOOR PLAN

M&S ENGINEERING ELECTRICAL | CIVIL | MEP

APPROVED	REVISION
02/15/2022	

SHEET 2 OF 2



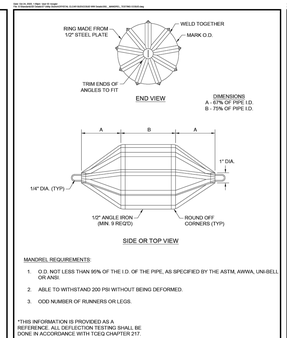
PROPERTY OF CRYSTAL CLEAR WATER SUPPLY, INC.

DTL #322
NEW MANHOLE CONSTRUCTION AND MINOR MANHOLE ADJUSTMENT

M&S ENGINEERING ELECTRICAL | CIVIL | MEP

APPROVED	REVISION
02/15/2022	

SHEET 1 OF 1



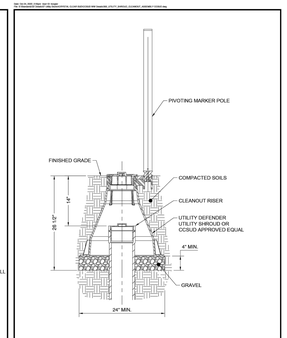
PROPERTY OF CRYSTAL CLEAR WATER SUPPLY, INC.

DTL #327
WASTEWATER MANHOLE ON CAST IN PLACE FOUNDATION

M&S ENGINEERING ELECTRICAL | CIVIL | MEP

APPROVED	REVISION
02/15/2022	

SHEET 1 OF 1



*CONTRACTOR SHALL LEVEL AND PLUMB THE BASE PRIOR TO SETTING THE PRECAST MANHOLE RISER SECTIONS ON THE PRECAST CONCRETE BASE.

PROPERTY OF CRYSTAL CLEAR WATER SUPPLY, INC.

DTL #328
WASTEWATER MANHOLE ON PRECAST BASE

M&S ENGINEERING ELECTRICAL | CIVIL | MEP

APPROVED	REVISION
02/15/2022	

SHEET 1 OF 1

PROPERTY OF CRYSTAL CLEAR WATER SUPPLY, INC.

DTL #329
MANHOLE RING & ENCASEMENT DETAIL

M&S ENGINEERING ELECTRICAL | CIVIL | MEP

APPROVED	REVISION
02/15/2022	

SHEET 1 OF 2

PROPERTY OF CRYSTAL CLEAR WATER SUPPLY, INC.

DTL #329
MANHOLE RING & ENCASEMENT DETAIL

M&S ENGINEERING ELECTRICAL | CIVIL | MEP

APPROVED	REVISION
02/15/2022	

SHEET 2 OF 2

PROPERTY OF CRYSTAL CLEAR WATER SUPPLY, INC.

DTL #331
SANITARY SEWER MANHOLE COVER

M&S ENGINEERING ELECTRICAL | CIVIL | MEP

APPROVED	REVISION
02/15/2022	

SHEET 1 OF 1

PROPERTY OF CRYSTAL CLEAR WATER SUPPLY, INC.

DTL #334
VENTED SANITARY SEWER MANHOLE COVER

M&S ENGINEERING ELECTRICAL | CIVIL | MEP

APPROVED	REVISION
02/15/2022	

SHEET 1 OF 1

MANDREL REQUIREMENTS:

1. O.D. NOT LESS THAN 95% OF THE I.D. OF THE PIPE, AS SPECIFIED BY THE ASTM, AWWA, UNI-BELL OR ANSI.
2. ABLE TO WITHSTAND 200 PSI WITHOUT BEING DEFORMED.
3. ODD NUMBER OF RUNNERS OR LEGS.

*THIS INFORMATION IS PROVIDED AS A REFERENCE. ALL DEFLECTION TESTING SHALL BE DONE IN ACCORDANCE WITH TCEQ CHAPTER 217.

PROPERTY OF CRYSTAL CLEAR WATER SUPPLY, INC.

DTL #350
GO, NO GO DEFLECTION TESTING MANDREL

M&S ENGINEERING ELECTRICAL | CIVIL | MEP

APPROVED	REVISION
02/15/2022	

SHEET 1 OF 1

PROPERTY OF CRYSTAL CLEAR WATER SUPPLY, INC.

DTL #360
UTILITY SHROUD FOR SEWER CLEANOUT ASSEMBLY

M&S ENGINEERING ELECTRICAL | CIVIL | MEP

APPROVED	REVISION
02/15/2022	

SHEET 1 OF 1

CUDEENGINEERS.COM

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

FLYING W
UNIT 1

SANITARY SEWER STANDARD DETAILS

DATE
11/24/2025

PROJECT NO.
04024-004

DRAWN BY
C7

CHECKED BY
JL

REVISIONS
1 2 3 4 5 6 7 8

STATE OF TEXAS
JOSE A. LOZANO
126773
LICENSED
PROFESSIONAL ENGINEER
11/26/25

CUDE ENGINEERS
TBPELS No. 10048500

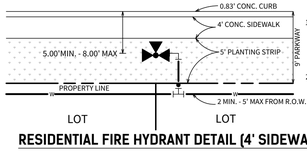
PLAT NO.
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C4.D1

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.

LEGEND

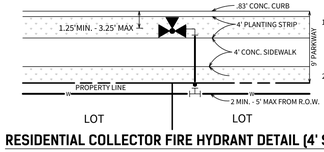
- PROPOSED 3/4" SINGLE WATER SERVICE — W
- PROPOSED 3/4" DUAL WATER SERVICE — W W
- PROPOSED 3/4" IRRIGATION WITH 5/8" METER — IRR
- PROPOSED SANITARY SEWER — 8"SS
- PROPOSED SANITARY SEWER MANHOLE
- PROPOSED WATER MAIN — XXX L.F. - XX" PVC C-900
- PROPOSED STANDARD FIRE HYDRANT
- PROPOSED STANDARD GATE VALVE
- PUBLIC UTILITY EASEMENT — P.U.E.



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.

RESIDENTIAL FIRE HYDRANT DETAIL (4' SIDEWALK / 50' R.O.W.)

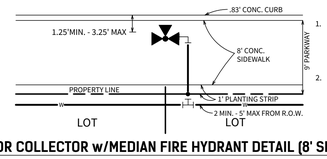
N.T.S.



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.

RESIDENTIAL COLLECTOR FIRE HYDRANT DETAIL (4' SIDEWALK / 50' R.O.W.)

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.

MINOR COLLECTOR w/MEDIAN FIRE HYDRANT DETAIL (8' SIDEWALK / 72' R.O.W.)

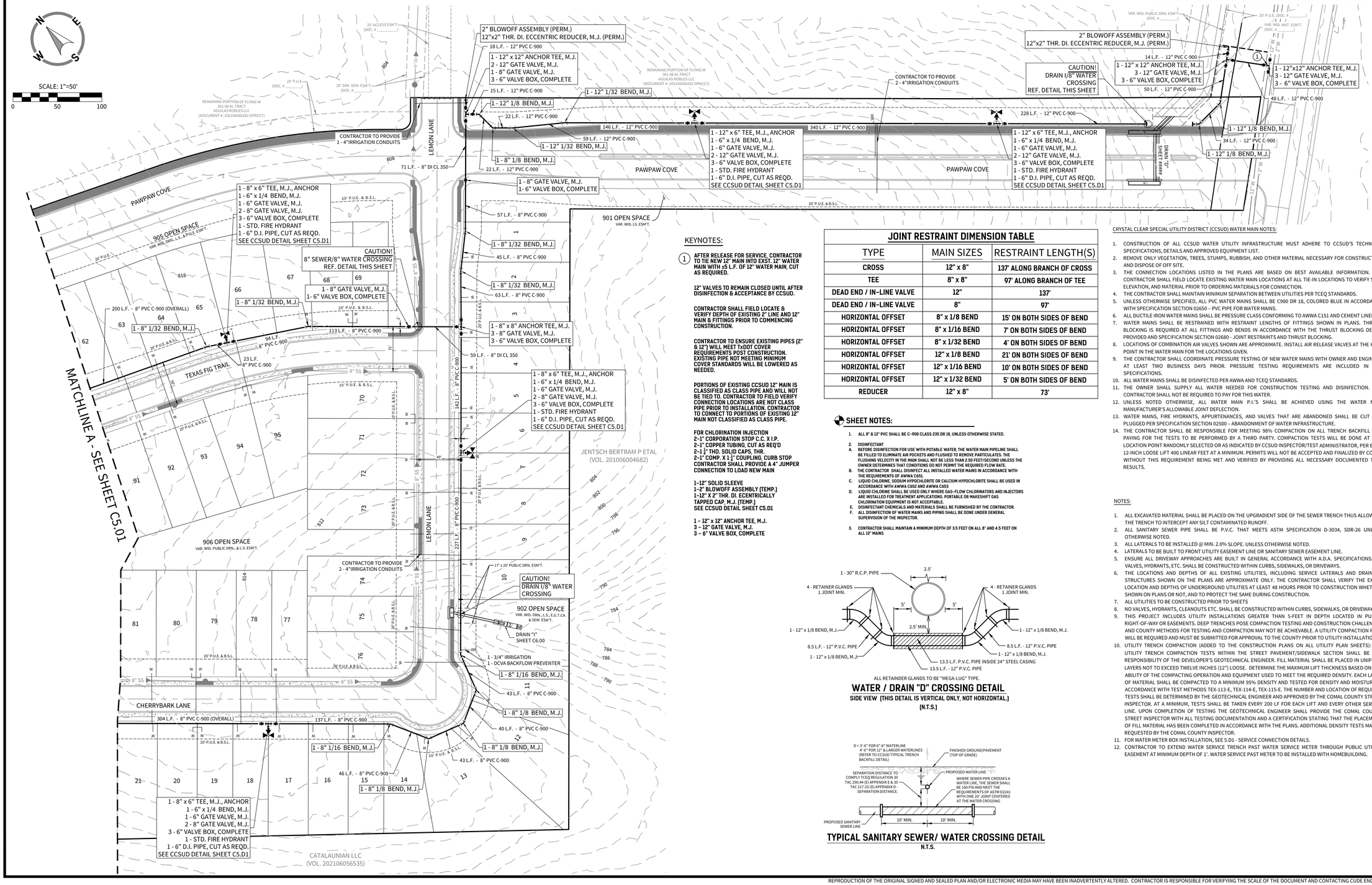
N.T.S.

CAUTION!

THE CONTRACTOR SHALL BE AWARE THAT UNDERGROUND UTILITY LINES EXIST ALONG FM 1102. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO HAVE THESE UTILITIES LOCATED PRIOR TO COMMENCING CONSTRUCTION. THE CONTRACTOR SHALL USE EXTREME CAUTION WHEN WORKING IN THIS AREA. ANY DAMAGE DONE TO THESE EXISTING FACILITIES WILL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO REPAIR.

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.



KEYNOTES:

1. **AFTER RELEASE FOR SERVICE, CONTRACTOR TO TIE NEW 12" MAIN INTO EXST. 12" WATER MAIN WITH ±5 L.F. OF 12" WATER MAIN, CUT AS REQUIRED.**

12" VALVES TO REMAIN CLOSED UNTIL AFTER DISINFECTION & ACCEPTANCE BY CCSUD.

CONTRACTOR SHALL FIELD LOCATE & VERIFY DEPTH OF EXISTING 2" LINE AND 12" MAIN & FITTINGS PRIOR TO COMMENCING CONSTRUCTION.

CONTRACTOR TO ENSURE EXISTING PIPES (2" & 12") WILL MEET TxDOT COVER REQUIREMENTS POST CONSTRUCTION. EXISTING PIPE NOT MEETING MINIMUM COVER STANDARDS WILL BE LOWERED AS NEEDED.

PORTIONS OF EXISTING CCSUD 12" MAIN IS CLASSIFIED AS CLASS PIPE AND WILL NOT BE TIED TO. CONTRACTOR TO FIELD VERIFY CONNECTION LOCATIONS ARE NOT CLASS PIPE PRIOR TO INSTALLATION. CONTRACTOR TO CONNECT TO PORTIONS OF EXISTING 12" MAIN NOT CLASSIFIED AS CLASS PIPE.

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

1-12" SOLID SLEEVE
1-2" BLOWOFF ASSEMBLY (TEMP.)
1-12" X 2" THR. DI. ECENTRICALLY TAPPED CAP, M.J. (TEMP.)
SEE CCSUD DETAIL SHEET C5.01

1 - 12" x 12" ANCHOR TEE, M.J.
3 - 12" GATE VALVE, M.J.
3 - 6" VALVE BOX, COMPLETE

JOINT RESTRAINT DIMENSION TABLE

TYPE	MAIN SIZES	RESTRAINT LENGTH(S)
CROSS	12" x 8"	137' ALONG BRANCH OF CROSS
TEE	8" x 8"	97' ALONG BRANCH OF TEE
DEAD END / IN-LINE VALVE	12"	137'
DEAD END / IN-LINE VALVE	8"	97'
HORIZONTAL OFFSET	8" x 1/8 BEND	15' ON BOTH SIDES OF BEND
HORIZONTAL OFFSET	8" x 1/16 BEND	7' ON BOTH SIDES OF BEND
HORIZONTAL OFFSET	8" x 1/32 BEND	4' ON BOTH SIDES OF BEND
HORIZONTAL OFFSET	12" x 1/8 BEND	21' ON BOTH SIDES OF BEND
HORIZONTAL OFFSET	12" x 1/16 BEND	10' ON BOTH SIDES OF BEND
HORIZONTAL OFFSET	12" x 1/32 BEND	5' ON BOTH SIDES OF BEND
REDUCER	12" x 8"	73'

SHEET NOTES:

1. **ALL 8" & 12" PVC SHALL BE C-900 CLASS 235 DR 18, UNLESS OTHERWISE STATED.**
2. **DISINFECTANT**
   A. **BEFORE DISINFECTION FOR USE WITH POTABLE WATER, THE WATER MAIN PIPELINE SHALL BE FILLED TO ELIMINATE AIR POCKETS AND FLUSHED TO REMOVE PARTICULATES. THE FLUSHING VELOCITY IN THE MAIN SHALL NOT BE LESS THAN 2.50 FEET/SECOND UNLESS THE OWNER DETERMINES THAT CONDITIONS DO NOT PERMIT THE REQUIRED FLOW RATE.**
   B. **THE CONTRACTOR SHALL DISINFECT ALL INSTALLED WATER MAINS IN ACCORDANCE WITH THE REQUIREMENTS OF AWWA C651.**
   C. **LIQUID CHLORINE, SODIUM HYPOCHLORITE OR CALCIUM HYPOCHLORITE SHALL BE USED IN ACCORDANCE WITH AWWA C652 AND AWWA C653**
   D. **LIQUID CHLORINE SHALL BE USED ONLY WHERE GAS-FLOW CHLORINATORS AND INJECTORS ARE INSTALLED FOR TREATMENT APPLICATIONS. PORTABLE OR MAKESHIFT GAS CHLORINATION EQUIPMENT IS NOT ACCEPTABLE.**
   E. **DISINFECTANT CHEMICALS AND MATERIALS SHALL BE FURNISHED BY THE CONTRACTOR.**
   F. **ALL DISINFECTION OF WATER MAINS AND PIPING SHALL BE DONE UNDER GENERAL SUPERVISION OF THE INSPECTOR.**
3. **CONTRACTOR SHALL MAINTAIN A MINIMUM DEPTH OF 3.5 FEET ON ALL 8" AND 4.5 FEET ON ALL 12" MAINS**

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

WATER / DRAIN "D" CROSSING DETAIL

SIDE VIEW (THIS DETAIL IS VERTICAL ONLY, NOT HORIZONTAL.)

(N.T.S.)

TYPICAL SANITARY SEWER/ WATER CROSSING DETAIL

N.T.S.

CRYSTAL CLEAR SPECIAL UTILITY DISTRICT (CCSUD) WATER MAIN NOTES:

1. CONSTRUCTION OF ALL CCSUD WATER UTILITY INFRASTRUCTURE MUST ADHERE TO CCSUD'S TECHNICAL SPECIFICATIONS, DETAILS AND APPROVED EQUIPMENT LIST.
2. REMOVE ONLY VEGETATION, TREES, STUMPS, RUBBISH, AND OTHER MATERIAL NECESSARY FOR CONSTRUCTION AND DISPOSE OF OFF SITE.
3. THE CONNECTION LOCATIONS LISTED IN THE PLANS ARE BASED ON BEST AVAILABLE INFORMATION. THE CONTRACTOR SHALL FIELD LOCATE EXISTING WATER MAIN LOCATIONS AT ALL TIE-IN LOCATIONS TO VERIFY SIZE, ELEVATION, AND MATERIAL PRIOR TO ORDERING MATERIALS FOR CONNECTION.
4. THE CONTRACTOR SHALL MAINTAIN MINIMUM SEPARATION BETWEEN UTILITIES PER TCEQ STANDARDS.
5. UNLESS OTHERWISE SPECIFIED, ALL PVC WATER MAINS SHALL BE C900 DR 18, COLORED BLUE IN ACCORDANCE WITH SPECIFICATION SECTION 02650 – PVC PIPE FOR WATER MAINS.
6. ALL DUCTILE IRON WATER MAINS SHALL BE PRESSURE CLASS CONFORMING TO AWWA C151 AND CEMENT LINED.
7. WATER MAINS SHALL BE RESTRAINED WITH RESTRAINT LENGTHS OF FITTINGS SHOWN IN PLANS. THRUST BLOCKING IS REQUIRED AT ALL FITTINGS AND BENDS IN ACCORDANCE WITH THE THRUST BLOCKING DETAIL PROVIDED AND SPECIFICATION SECTION 02680 - JOINT RESTRAINTS AND THRUST BLOCKING.
8. LOCATIONS OF COMBINATION AIR VALVES SHOWN ARE APPROXIMATE. INSTALL AIR RELEASE VALVES AT THE HIGH POINT IN THE WATER MAIN FOR THE LOCATIONS GIVEN.
9. THE CONTRACTOR SHALL COORDINATE PRESSURE TESTING OF NEW WATER MAINS WITH OWNER AND ENGINEER AT LEAST TWO BUSINESS DAYS PRIOR. PRESSURE TESTING REQUIREMENTS ARE INCLUDED IN THE SPECIFICATIONS.
10. ALL WATER MAINS SHALL BE DISINFECTED PER AWWA AND TCEQ STANDARDS.
11. THE OWNER SHALL SUPPLY ALL WATER NEEDED FOR CONSTRUCTION TESTING AND DISINFECTION. THE CONTRACTOR SHALL NOT BE REQUIRED TO PAY FOR THIS WATER.
12. UNLESS NOTED OTHERWISE, ALL WATER MAIN P.I.'S SHALL BE ACHIEVED USING THE WATER MAIN MANUFACTURER'S ALLOWABLE JOINT DEFLECTION.
13. WATER MAINS, FIRE HYDRANTS, APPURTENANCES, AND VALVES THAT ARE ABANDONED SHALL BE CUT AND PLUGGED PER SPECIFICATION SECTION 02500 – ABANDONMENT OF WATER INFRASTRUCTURE.
14. 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 TESTS WILL BE DONE AT ONE LOCATION POINT RANDOMLY SELECTED OR AS INDICATED BY CCSUD INSPECTOR/TEST ADMINISTRATOR, PER EACH 12-INCH LOOSE LIFT 400 LINEAR FEET AT A MINIMUM. PERMITS WILL NOT BE ACCEPTED AND FINALIZED BY CCSUD WITHOUT THIS REQUIREMENT BEING MET AND VERIFIED BY PROVIDING ALL NECESSARY DOCUMENTED TEST RESULTS.

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.
5. ENSURE ALL DRIVEWAY APPROACHES ARE BUILT IN GENERAL ACCORDANCE WITH A.D.A. SPECIFICATIONS. NO VALVES, HYDRANTS, ETC. SHALL BE CONSTRUCTED WITHIN CURBS, SIDEWALKS, OR DRIVEWAYS.
6. 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.
7. ALL UTILITIES TO BE CONSTRUCTED PRIOR TO SHEETS
8. NO VALVES, HYDRANTS, CLEANOUTS ETC. SHALL BE CONSTRUCTED WITHIN CURBS, SIDEWALKS, OR DRIVEWAYS.
9. THIS PROJECT INCLUDES UTILITY INSTALLATIONS GREATER THAN 5-FEET IN DEPTH LOCATED IN PUBLIC RIGHT-OF-WAY OR EASEMENTS. DEEP TRENCHES POSE COMPACTION TESTING AND CONSTRUCTION CHALLENGES AND COUNTY METHODS FOR TESTING AND COMPACTION MAY NOT BE ACHIEVABLE. A UTILITY COMPACTION PLAN WILL BE REQUIRED AND MUST BE SUBMITTED FOR APPROVAL TO THE COUNTY PRIOR TO UTILITY INSTALLATION.
10. UTILITY TRENCH COMPACTION (ADDED TO THE CONSTRUCTION PLANS ON ALL UTILITY PLAN SHEETS): ALL UTILITY TRENCH COMPACTION TESTS WITHIN THE STREET PAVEMENT/SIDEWALK SECTION SHALL BE THE RESPONSIBILITY OF THE DEVELOPER'S GEOTECHNICAL ENGINEER. FILL MATERIAL SHALL BE PLACED IN UNIFORM LAYERS NOT TO EXCEED TWELVE INCHES (12") LOOSE. DETERMINE THE MAXIMUM LIFT THICKNESS BASED ON THE ABILITY OF THE COMPACTING OPERATION AND EQUIPMENT USED TO MEET THE REQUIRED DENSITY. EACH LAYER OF MATERIAL SHALL BE COMPACTED TO A MINIMUM 95% DENSITY AND TESTED FOR DENSITY AND MOISTURE IN ACCORDANCE WITH TEST METHODS TEX-113-E, TEX-114-E, TEX-115-E. THE NUMBER AND LOCATION OF REQUIRED TESTS SHALL BE DETERMINED BY THE GEOTECHNICAL ENGINEER AND APPROVED BY THE COMAL COUNTY STREET INSPECTOR. AT A MINIMUM, TESTS SHALL BE TAKEN EVERY 200 LF FOR EACH LIFT AND EVERY OTHER SERVICE LINE. UPON COMPLETION OF TESTING THE GEOTECHNICAL ENGINEER SHALL PROVIDE THE COMAL COUNTY STREET INSPECTOR WITH ALL TESTING DOCUMENTATION AND A CERTIFICATION STATING THAT THE PLACEMENT OF FILL MATERIAL HAS BEEN COMPLETED IN ACCORDANCE WITH THE PLANS. ADDITIONAL DENSITY TESTS MAY BE REQUESTED BY THE COMAL COUNTY INSPECTOR.
11. FOR WATER METER BOX INSTALLATION, SEE S.D1 - SERVICE CONNECTION DETAILS.
12. CONTRACTOR TO EXTEND WATER SERVICE TRENCH PAST WATER SERVICE METER THROUGH PUBLIC UTILITY EASEMENT AT MINIMUM DEPTH OF 1'. WATER SERVICE PAST METER TO BE INSTALLED WITH HOMEBUILDING.

CUDEENGINEERS.COM

CUDE ENGINEERS

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

FLYING W
UNIT 1

OVERALL WATER DISTRIBUTION PLAN

DATE
11/26/2025

PROJECT NO.
04024-004

DRAWN BY
C7

CHECKED BY
JL

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

STATE OF TEXAS
JOSE A. LOZANO
126773
LICENSED
PROFESSIONAL ENGINEER
11/26/25

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
-

C5.00

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.

LEGEND

PROPOSED 3/4" SINGLE WATER SERVICE	3/4"
PROPOSED 3/4" DUAL WATER SERVICE	3/4" 3/4"
PROPOSED 3/4" IRRIGATION WITH 5/8" METER	IRR
PROPOSED SANITARY SEWER	8"SS
PROPOSED SANITARY SEWER MANHOLE	
PROPOSED WATER MAIN	XXX L.F. - XX" PVC C-900
PROPOSED STANDARD FIRE HYDRANT	
PROPOSED STANDARD GATE VALVE	
PUBLIC UTILITY EASEMENT	P.U.E.

NOTE:

ENSURE ALL DRIVEWAY APPROACHES ARE BUILT IN GENERAL ACCORDANCE WITH A.D.A. SPECIFICATIONS. NO VALVES, HYDRANTS, ETC. SHALL BE CONSTRUCTED WITHIN CURBS, SIDEWALKS, OR DRIVEWAYS.

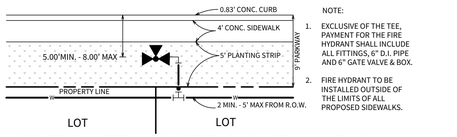
SHEET NOTES:

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

WATER / DRAIN "L" CROSSING

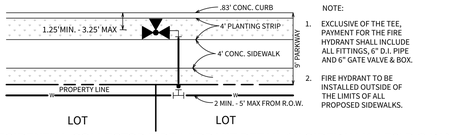
SIDE VIEW (THIS DETAIL IS VERTICAL ONLY, NOT HORIZONTAL.) (N.T.S.)



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.

RESIDENTIAL FIRE HYDRANT DETAIL (4' SIDEWALK / 50' R.O.W.)

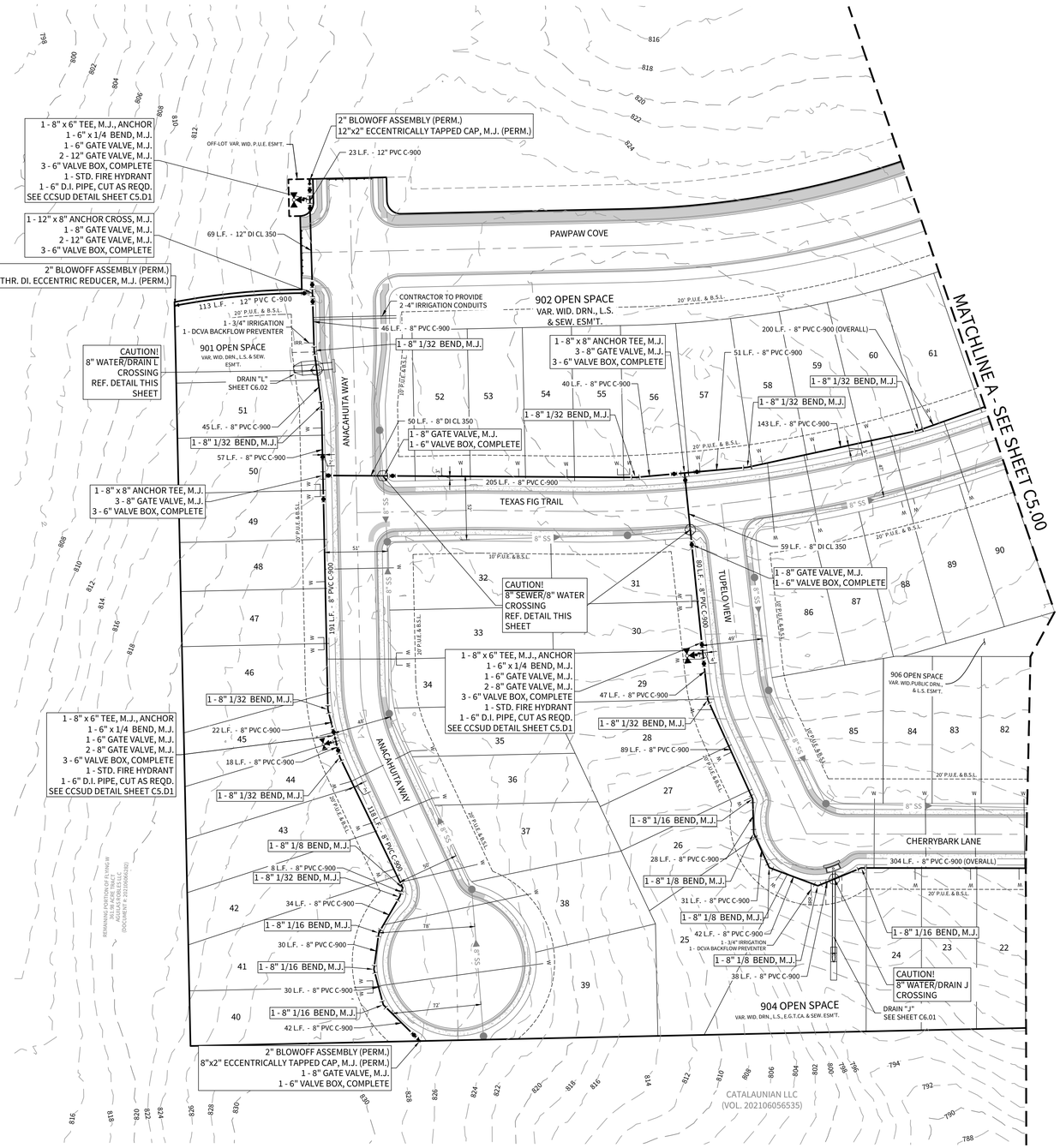
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RESIDENTIAL COLLECTOR FIRE HYDRANT DETAIL (4' SIDEWALK / 50' R.O.W.)

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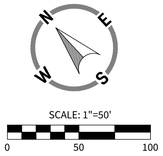


CAUTION!

THE CONTRACTOR SHALL BE AWARE THAT UNDERGROUND UTILITY LINES EXIST ALONG FM 1102 IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO HAVE THESE UTILITIES LOCATED PRIOR TO COMMENCING CONSTRUCTION. THE CONTRACTOR SHALL USE EXTREME CAUTION WHEN WORKING IN THIS AREA. ANY DAMAGE DONE TO THESE EXISTING FACILITIES WILL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO REPAIR.

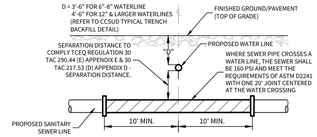
TRENCH EXCAVATION PROTECTION

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.



JOINT RESTRAINT DIMENSION TABLE

TYPE	MAIN SIZES	RESTRAINT LENGTH(S)
CROSS	12" x 8"	137' ALONG BRANCH OF CROSS
TEE	8" x 8"	97' ALONG BRANCH OF TEE
DEAD END / IN-LINE VALVE	12"	137'
DEAD END / IN-LINE VALVE	8"	97'
HORIZONTAL OFFSET	8" x 1/8 BEND	15' ON BOTH SIDES OF BEND
HORIZONTAL OFFSET	8" x 1/16 BEND	7' ON BOTH SIDES OF BEND
HORIZONTAL OFFSET	8" x 1/32 BEND	4' ON BOTH SIDES OF BEND
HORIZONTAL OFFSET	12" x 1/8 BEND	21' ON BOTH SIDES OF BEND
HORIZONTAL OFFSET	12" x 1/16 BEND	10' ON BOTH SIDES OF BEND
HORIZONTAL OFFSET	12" x 1/32 BEND	5' ON BOTH SIDES OF BEND
REDUCER	12" x 8"	73'



TYPICAL SANITARY SEWER/ WATER CROSSING DETAIL

N.T.S.

CRYSTAL CLEAR SPECIAL UTILITY DISTRICT (CCSUD) WATER MAIN NOTES:

1. CONSTRUCTION OF ALL CCSUD WATER UTILITY INFRASTRUCTURE MUST ADHERE TO CCSUD'S TECHNICAL SPECIFICATIONS, DETAILS AND APPROVED EQUIPMENT LIST.
2. REMOVE ONLY VEGETATION, TREES, STUMPS, RUBBISH, AND OTHER MATERIAL NECESSARY FOR CONSTRUCTION AND DISPOSE OF OFF SITE.
3. THE CONNECTION LOCATIONS LISTED IN THE PLANS ARE BASED ON BEST AVAILABLE INFORMATION. THE CONTRACTOR SHALL FIELD LOCATE EXISTING WATER MAIN LOCATIONS AT ALL TIE-IN LOCATIONS TO VERIFY SIZE, ELEVATION, AND MATERIAL PRIOR TO ORDERING MATERIALS FOR CONNECTION.
4. THE CONTRACTOR SHALL MAINTAIN MINIMUM SEPARATION BETWEEN UTILITIES PER TCEQ STANDARDS.
5. UNLESS OTHERWISE SPECIFIED, ALL PVC WATER MAINS SHALL BE C900 DR 18, COLORED BLUE IN ACCORDANCE WITH SPECIFICATION SECTION 02650 - PVC PIPE FOR WATER MAINS.
6. ALL DUCTILE IRON WATER MAINS SHALL BE PRESSURE CLASS CONFORMING TO AWWA C151 AND CEMENT LINED.
7. WATER MAINS SHALL BE RESTRAINED WITH RESTRAINT LENGTHS OF FITTINGS SHOWN IN PLANS. THRUST BLOCKING IS REQUIRED AT ALL FITTINGS AND BENDS IN ACCORDANCE WITH THE THRUST BLOCKING DETAIL PROVIDED AND SPECIFICATION SECTION 02680 - JOINT RESTRAINTS AND THRUST BLOCKING.
8. LOCATIONS OF COMBINATION AIR VALVES SHOWN ARE APPROXIMATE. INSTALL AIR RELEASE VALVES AT THE HIGH POINT IN THE WATER MAIN FOR THE LOCATIONS GIVEN.
9. THE CONTRACTOR SHALL COORDINATE PRESSURE TESTING OF NEW WATER MAINS WITH OWNER AND ENGINEER AT LEAST TWO BUSINESS DAYS PRIOR. PRESSURE TESTING REQUIREMENTS ARE INCLUDED IN THE SPECIFICATIONS.
10. ALL WATER MAINS SHALL BE DISINFECTED PER AWWA AND TCEQ STANDARDS.
11. THE OWNER SHALL SUPPLY ALL WATER NEEDED FOR CONSTRUCTION TESTING AND DISINFECTION. THE CONTRACTOR SHALL NOT BE REQUIRED TO PAY FOR THIS WATER.
12. UNLESS NOTED OTHERWISE, ALL WATER MAIN P.I.'S SHALL BE ACHIEVED USING THE WATER MAIN MANUFACTURER'S ALLOWABLE JOINT DEFLECTION.
13. WATER MAINS, FIRE HYDRANTS, APPURTENANCES, AND VALVES THAT ARE ABANDONED SHALL BE CUT AND PLUGGED PER SPECIFICATION SECTION 02500 - ABANDONMENT OF WATER INFRASTRUCTURE.
14. 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 TESTS WILL BE DONE AT ONE LOCATION POINT RANDOMLY SELECTED OR AS INDICATED BY CCSUD INSPECTOR/TEST ADMINISTRATOR, PER EACH 12-INCH LOOSE LIFT 400 LINEAR FEET AT A MINIMUM. PERMITS WILL NOT BE ACCEPTED AND FINALIZED BY CCSUD WITHOUT THIS REQUIREMENT BEING MET AND VERIFIED BY PROVIDING ALL NECESSARY DOCUMENTED TEST RESULTS.

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.
5. ENSURE ALL DRIVEWAY APPROACHES ARE BUILT IN GENERAL ACCORDANCE WITH A.D.A. SPECIFICATIONS. NO VALVES, HYDRANTS, ETC. SHALL BE CONSTRUCTED WITHIN CURBS, SIDEWALKS, OR DRIVEWAYS.
6. 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.
7. ALL UTILITIES TO BE CONSTRUCTED PRIOR TO SHEETS
8. NO VALVES, HYDRANTS, CLEANOUTS ETC. SHALL BE CONSTRUCTED WITHIN CURBS, SIDEWALKS, OR DRIVEWAYS.
9. THIS PROJECT INCLUDES UTILITY INSTALLATIONS GREATER THAN 5-FEET IN DEPTH LOCATED IN PUBLIC RIGHT-OF-WAY OR EASEMENTS. DEEP TRENCHES POSE COMPACTION TESTING AND CONSTRUCTION CHALLENGES AND COUNTY METHODS FOR TESTING AND COMPACTION MAY NOT BE ACHIEVABLE. A UTILITY COMPACTION PLAN WILL BE REQUIRED AND MUST BE SUBMITTED FOR APPROVAL TO THE COUNTY PRIOR TO UTILITY INSTALLATION.
10. UTILITY TRENCH COMPACTION (ADDED TO THE CONSTRUCTION PLANS ON ALL UTILITY PLAN SHEETS): ALL UTILITY TRENCH COMPACTION TESTS WITHIN THE STREET PAVEMENT/SIDEWALK SECTION SHALL BE THE RESPONSIBILITY OF THE DEVELOPER'S GEOTECHNICAL ENGINEER. FILL MATERIAL SHALL BE PLACED IN UNIFORM LAYERS NOT TO EXCEED TWELVE INCHES (12") LOOSE. DETERMINE THE MAXIMUM LIFT THICKNESS BASED ON THE ABILITY OF THE COMPACTING OPERATION AND EQUIPMENT USED TO MEET THE REQUIRED DENSITY. EACH LAYER OF MATERIAL SHALL BE COMPACTED TO A MINIMUM 95% DENSITY AND TESTED FOR DENSITY AND MOISTURE IN ACCORDANCE WITH TEST METHODS TEX-113-E, TEX-114-E, TEX-115-E. THE NUMBER AND LOCATION OF REQUIRED TESTS SHALL BE DETERMINED BY THE GEOTECHNICAL ENGINEER AND APPROVED BY THE COMAL COUNTY STREET INSPECTOR. AT A MINIMUM, TESTS SHALL BE TAKEN EVERY 200 LF FOR EACH LIFT AND EVERY OTHER SERVICE LINE. UPON COMPLETION OF TESTING THE GEOTECHNICAL ENGINEER SHALL PROVIDE THE COUNTY STREET INSPECTOR WITH ALL TESTING DOCUMENTATION AND A CERTIFICATION STATING THAT THE PLACEMENT OF FILL MATERIAL HAS BEEN COMPLETED IN ACCORDANCE WITH THE PLANS. ADDITIONAL DENSITY TESTS MAY BE REQUESTED BY THE COMAL COUNTY INSPECTOR.
11. FOR WATER METER BOX INSTALLATION, SEE S.D1 - SERVICE CONNECTION DETAILS.
12. CONTRACTOR TO EXTEND WATER SERVICE TRENCH PAST WATER SERVICE METER THROUGH PUBLIC UTILITY EASEMENT AT MINIMUM DEPTH OF 1'. WATER SERVICE PAST METER TO BE INSTALLED WITH HOMEBUILDING.

CUDEENGINEERS.COM

CUDE ENGINEERS

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

FLYING W UNIT 1

OVERALL WATER DISTRIBUTION PLAN

DATE
11/26/2025

PROJECT NO.
04024-004

DRAWN BY
C7

CHECKED BY
JL

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

STATE OF TEXAS
JOSE A. LOZANO
126773
LICENSED
PROFESSIONAL ENGINEER
11/26/25

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
-

C5.01

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.

R:\04024\2021\2-DWG\Plans\C5.01 OVERALL WATER DISTRIBUTION PLAN.dwg 2025/11/25 12:20pm JoshMcDaniel

CUDEENGINEERS.COM

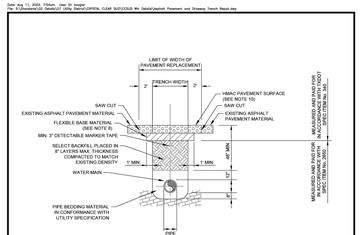
CUDE ENGINEERS

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

FLYING W UNIT 1

WATER DISTRIBUTION STANDARD DETAILS

Date: Aug 11, 2023, 7:04am User: ID Image=
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TRENCH AND BACKFILL NOTES:

1. ADEQUATE BARRICADES & WARNING SIGNS SHALL BE ERECTED BEFORE ANY WORK IS STARTED IN PUBLIC RIGHT-OF-WAY.
2. THE ROADWAY SHALL BE CUT ONLY WHERE REQUIRED.
3. NO MORE THAN HALF OF THE WIDTH OF THE ROAD SHALL BE CUT & OPENED AT ONE TIME.
4. SAW CUTS SHALL BE MADE PRIOR TO EXCAVATION OF TRENCH.
5. BACKFILL SHALL BE COMPLETED IMMEDIATELY AFTER PIPELINE LAYING WITHIN PUBLIC RIGHT-OF-WAYS OR CROSSING PUBLIC RIGHT-OF-WAYS & PRIVATE DRIVEWAYS.
6. THE EXISTING PAVING SURFACE SHALL SAW CUT IN A STRAIGHT LINE A MINIMUM OF 12" WIDER THAN UNDISTURBED SIDE OF THE EXCAVATION AND VERTICAL SAW CUTS ALONG LINE OF THE EXCAVATION.
7. CONCRETE PAVEMENT SHALL BE SAW CUT 6" WIDER THAN UNDISTURBED SIDES OF THE EXCAVATION.
8. LOCAL STREETS SHALL BE 18" HD MAUSOMINOR STREETS SHALL BE 12" THICK. BASE MATERIAL SHALL BE PLACED 2' WIDER THAN TRENCH WIDTH ON BOTH SIDES. FLEXIBLE BASE SHALL BE TXDOT ITEM 247 TYPE A, GRADE 1.
9. COLLECTOR/ARTERIAL STREETS SHALL BE 12" THICK. BASE MATERIAL SHALL BE TXDOT ITEM 247 TYPE A BASE. THICKNESS OF 10" OR A THICKNESS MATCHING EXISTING, WHICHEVER IS GREATER, AT NO ADDITIONAL COST TO THE OWNER.
10. REPLACEMENT AC SURFACE LAYER SHALL BE OF THE TYPE AND THICKNESS BASED ON FUNCTIONAL CLASSIFICATION.
    a. MIN. 2" HMAC SHALL BE TXDOT ITEM 340, TYPE D FOR TRENCH REPAIR IN LOCAL RESIDENTIAL STREETS AND DRIVEWAYS.
    b. MIN. 3" HMAC SHALL BE TXDOT ITEM 340, TYPE D FOR TRENCH REPAIR IN COLLECTOR/ARTERIAL STREETS.

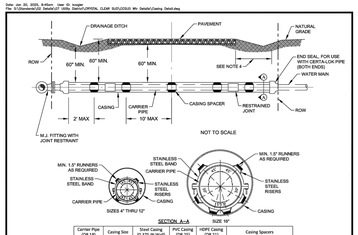
TRENCH SAFETY NOTES

1. TRENCH SAFETY SYSTEM, SHORING OR SIDE SLOPE TO BE IN ACCORDANCE WITH OSHA STANDARDS.
2. TRENCH SAFETY SYSTEM PLAN TO BE PROVIDED BY CONTRACTOR PRIOR TO CONSTRUCTION.

NOT TO SCALE

PROPERTY OF		APPROVED	REVISION
CRYSTAL CLEAR SPECIAL UTILITY DISTRICT	ASPHALT PAVEMENT AND DRIVEWAY (TRENCH REPAIR)	OCTOBER 2016	OCTOBER 2019
M&S ENGINEERING ELECTRICAL | CIVIL | MEP		SHEET 1 OF 1	

Date: Jan. 20, 2025, 8:45am User: ID Image=
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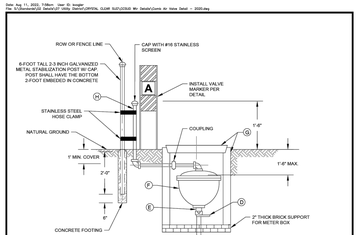
Carrier Pipe (DR 18)	Casing Size	Steel Casing (0.375 IN Wall)	PVC Casing (DR 22)	HDPE Casing (DR 22)	Casing Spacers	
Nominal Size (IN)		Inside Diameter (IN)			Min. Band Width (IN)	No. of Runners Per Tie
4	16	15.25	15.92	13.755	7	2 TOP, 2 BOTTOM
6	16	15.25	15.92	15.643	7	2 TOP, 2 BOTTOM
8	24	23.25	23.61	19.419	7	2 TOP, 2 BOTTOM
12	24	23.25	23.61	23.035	7	2 TOP, 2 BOTTOM
16	30	29.25	29.29	28.769	7	2 TOP, 4 BOTTOM

NOTES:

1. POLYVINYL CHLORIDE (PVC) CARRIER PIPE THAT IS 4-INCH IN DIAMETER SHALL BE C900 DR 18, FULLY RESTRAINED THROUGH THE CASING. POLYVINYL CHLORIDE (PVC) CARRIER PIPE SHALL BE CERTA-LOK (DR 18) FOR 6-INCH TO 12-INCH AND CERTA-LOK (DR18) OR APPROVED EQUAL FOR 16-INCH TO 24-INCH PIPE DIAMETERS.
2. STEEL CASING SHALL BE STANDARD WEIGHT OR HEAVIER PIPE CONFORMING TO ASTM A-36, ASTM A-606, ASTM A-135, ASTM A-139 OR OTHER ACCEPTABLE STANDARD SPECIFICATION. PIPE JOINTS SHALL BE WELDED IN ACCORDANCE WITH AWWA C-206. HDPE CASING MAY BE USED IN LIEU OF STEEL CASING PER FIGURE 40 TAC §71.40(e)(2)(A).
3. SUBSEQUENT CASING SPACERS ARE REQUIRED FOR 4" TO 14" PIPE SIZES TO BE AT 10 FEET APART AND FOR 16" TO 30" PIPE SIZES TO BE AT 6 FEET APART WITHIN THE CASING WITH AT LEAST 3 SPACERS PER JOINT ON PIPE. ONE CASING SPACER SHALL BE REPLACED WITHIN 2 FEET OF ENDS OF CASING FOR ALL PIPE SIZES.
4. LENGTHS OF ENCASEMENT SHALL BE PER TAC §71.40(e)(2)(A). THE LENGTHS OF ANY ENCASEMENT SHALL EXTEND, AS APPLICABLE, TO WITHIN 5 FEET OF THE RIGHT OF WAY, TWO FEET OF A CONNECTING LONGITUDINAL LINE, OR FIVE FEET BEYOND THE FACE OF THE CURB, WHICHEVER IS GREATEST. THESE LENGTHS OF ENCASEMENT INCLUDE AREAS UNDER CENTER medians AND OUTER SEPARATIONS.
5. CASING SPACERS SHALL BE MADE FROM T-304 STAINLESS STEEL OF A MINIMUM 14 GAUGE THICKNESS.
6. CASING SPACERS SHALL HAVE A SYNTHETIC RUBBER OR PVC LINER TO INSULATE THE PIPELINE FROM THE SPACER.
7. CASING SPACERS SHALL HAVE A MIN. 1.5" WIDE GLASS REINFORCED PLASTIC OR UHMW POLYMER RUNNERS TO INSULATE THE SPACER FROM THE CASING.
8. CASING END SEALS SHALL BE MADE OF 1/8" THICK NEOPRENE RUBBER AND INCLUDE 1/2" WIDE T-304 STAINLESS STEEL BANDINGS.

PROPERTY OF		APPROVED	REVISION
CRYSTAL CLEAR SPECIAL UTILITY DISTRICT	CASING DETAIL	JUNE 2015	JULY 2024
M&S ENGINEERING ELECTRICAL | CIVIL | MEP		SHEET 1 OF 1	

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NOTES:

1. COMBINATION AIR VALVE SHALL BE SET NEXT TO FENCE AND/OR ROW LINE WITH GALVANIZED RISER PIPE AT FENCE/ROW LINE. THE RISER SHALL BE STABILIZED WITH A 6 FT TALL, 2-3 INCH GALVANIZED POST. THE GALVANIZED POST SHALL HAVE THE BOTTOM 2 FT EMBEDDED IN CONCRETE. THE RISER PIPE SHALL BE SECURED TO THE STABILIZATION POST WITH STEEL HOSE CLAMP.
2. COMBINATION AIR VALVES SHALL BE INSTALLED AT HIGH POINTS IN THE WATER MAIN (SEE PLANS).
3. SERVICE SADDLES SHALL BE SECURED WITH A MINIMUM OF THREE LAYERS CIRCUMFERENTIAL TURNS OF POLY TAPE.

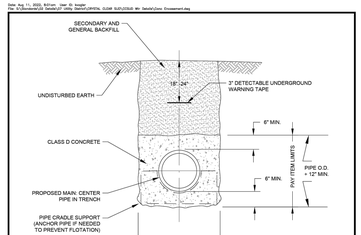
TAP MATERIAL LIST		MATERIAL LIST SIZES	
LABEL	ITEM	1-INCH TAP	2-INCH TAP
A	APPROVED TAPPING SADDLE	1"	2"
B	CORPORATION STOP	1"	2"
C	CTS NORTH HERE TUBING	1"	2"
D	BRASS BALL VALVE WITH LEVER	1"	2"
E	BRASS NIPPLE THREADED	1"	2"
F	COMBINATION AIR VALVE	PER AEL*	
G	METER BOX AND LID	DFW/DEW/SO OR DFW/DEW/PO**	
H	GALVANIZED IRON PIPE AND FITTINGS	1"	2"

* AEL = APPROVED EQUIPMENT LIST
** METER BOX TO BE INSTALLED AS NECESSARY TO COVER FULL DEPTH OF COMBINATION AIR RELEASE VALVE.

NOT TO SCALE

PROPERTY OF		APPROVED	REVISION
CRYSTAL CLEAR SPECIAL UTILITY DISTRICT	COMBINATION AIR VALVE DETAIL	JUNE 2015	OCTOBER 2020
M&S ENGINEERING ELECTRICAL | CIVIL | MEP		SHEET 1 OF 1	

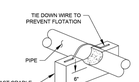
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CONCRETE ENCASEMENT

NOTES:

1. ALL CONCRETE ENCASEMENT SHALL BE POURED AT A PLANE 6" ABOVE THE PIPE BETWEEN EXCAVATED TRENCH WALLS.
2. CONCRETE ENCASEMENT WILL BE USED ONLY WHERE CALLED OUT IN THE PLANS AND LIMITS OF PAYMENT WILL BE PER THIS DETAIL.
3. BACKFILL AND RESTORATION WORK WILL BE PER APPROPRIATE TRENCH DETAIL WITH EMBEDMENT FOLLOWING THIS DETAIL.
4. SUPPORTS ARE SUBSIDIARY TO CONCRETE ENCASEMENT

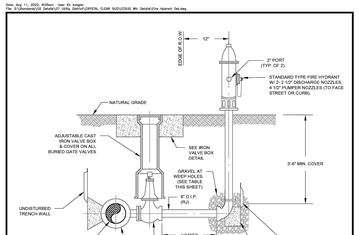


PIPE CRADLE SUPPORT

NOT TO SCALE

PROPERTY OF		APPROVED	REVISION
CRYSTAL CLEAR SPECIAL UTILITY DISTRICT	CONCRETE ENCASEMENT DETAIL	MAY 2016	FEB 2022
M&S ENGINEERING ELECTRICAL | CIVIL | MEP		SHEET 1 OF 1	

Date: Aug 11, 2022, 8:05am User: ID Image=
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NOT TO SCALE

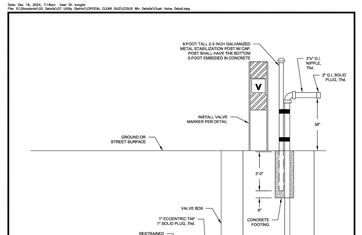
GRAVEL AT WEEPHOLE	
LENGTH OF HYDRANT RISER	CU. FT OF GRAVEL REQUIRED
2'	2.5
3'	3.5
4'	4.5
>5'	TBD BY CCSUD

NOTE:

1. THE EARTHBEARING SURFACE SHALL BE THE UNDISTURBED TRENCH WALL.
2. ALL PIPE JOINTS SHALL BE KEPT FREE FROM CONCRETE.
3. ALL FITTINGS AND FITTING JOINTS MUST BE WRAPPED W/ THREE LAYERS OF 8-MIL POLYETHYLENE WRAP OR APPROVED CLARKWRAP TO THE LATEST REVISION IN EFFECT.
4. 12"x12"x6" THICK CONCRETE BLOCKS SHALL BE INSTALLED DIRECTLY UNDER ALL VALVES, FITTINGS, ETC.

PROPERTY OF		APPROVED	REVISION
CRYSTAL CLEAR SPECIAL UTILITY DISTRICT	FIRE HYDRANT DETAIL	JUNE 2015	JULY 2021
M&S ENGINEERING ELECTRICAL | CIVIL | MEP		SHEET 1 OF 1	

Date: Dec. 16, 2024, 7:49am User: ID Image=
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NOTE:

BURIED PIPING, FITTINGS, AND FITTINGS JOINTS SHALL BE WRAPPED IN POLYWRAP.

1. THE EARTHBEARING SURFACE SHALL BE THE UNDISTURBED TRENCH WALL.
2. ALL PIPE JOINTS SHALL BE KEPT FREE FROM CONCRETE.
3. POLYWRAP SHALL BE SECURED WITH A MINIMUM OF THREE CIRCUMFERENTIAL TURNS OF POLY TAPE.

NOT TO SCALE

PROPERTY OF		APPROVED	REVISION
CRYSTAL CLEAR SPECIAL UTILITY DISTRICT	FLUSH VALVE DETAIL	OCTOBER 2020	DECEMBER 2024
M&S ENGINEERING ELECTRICAL | CIVIL | MEP		SHEET 1 OF 1	

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NOTES:

1. THE COUNTY DEPUTY CONSTRUCTING THE VALVE SIDE OF THE METER BOX SHALL BE LOCATED 3 FEET FROM THE EDGE OF ROW/PROPERTY LINE MARK RAISED PAVEMENT BETWEEN THE WATER MAIN AND THE HOUSE OR BUILDING THAT IS BEING SERVED WITH "W" OR "WL"
2. ALL SHORT SERVICES SHALL HAVE THEIR OWN CORPORATION STOP.
3. ONE (1) 3/4" CORPORATION STOP SHALL BE ALLOWED ON EACH 1" OR LARGER SERVICE LINE REFER TO LONG SERVICE DETAIL FOR LAYOUT AND TYPE.
4. METER BOXES ARE HORIZONTALLY PLACED 5 FEET FROM THE LOT LINE.

NOTES:

1. HDPE CASING SHALL BE USED WHEN SERVICE LINES ARE BORED.
2. SCHEDULE 80 PVC MAY BE USED FOR OPEN CUT INSTALLATIONS.
3. THE COUNTY DEPUTY CONSTRUCTING THE VALVE SIDE OF THE METER BOX SHALL BE 5 FEET INSIDE THE EASEMENT/ IN PRIVATE PROPERTY.
4. METERS SHALL BE HORIZONTALLY PLACED 5 FEET FROM THE LOT LINE.

SHORT SERVICE DETAIL

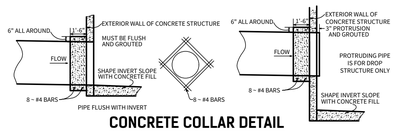
LONG SERVICE DETAIL

NOTES:

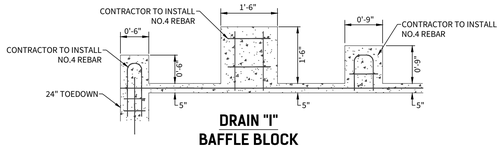
1. METER BOX SHALL BE SET INTO GROUND TO BE SLIGHTLY ABOVE NATURAL GRADE (NO MORE THAN 2").
2. USE NATIVE TOP SOIL TO BACKFILL TO EDGE OF METER BOX LID. BACKFILL TO NATURAL GRADE.

METER BOX PROFILE

MATERIAL LIST		
	SHORT SERVICE	LONG SERVICE
A	5/8" (SINGLE), 3/4(SD), 1" (DUAL) METER YOKE 3/4" X 3/4" COMPLETE W/ 3/4" FIP X 3/4" MIP	
B	3/4" X 3/4" X 3/4" BRASS TEE	
C	PLASTIC METER BOX, MODEL NO. 37 BY BBI OR TO OWN	
D	METER BOX LID, MODEL NO. 37 BY BBI OR TO OWN	
E	3/4" BALL VALVE (METER SIDE), 3/4"MIP X FIP	
F	3/4" BALL VALVE (METER SIDE)	
G	3/4" X 3/4" PIPE (CUT TO LENGTH AS REQUIRED)	
H	3/4" SIGNAL CHECK VALVE (METER SIDE)	
I	3/4" X 3/4" X 3/4" BRASS TEE	
J	CASTINGS 3/4(SD), 1" (DUAL)	
K	1" DOUBLE SWING CHECK VALVE (METER SIDE)	
L	1" X 3/4" X 1" BRASS TEE	
M	1" GATE VALVE	
N	1" X CLOSE NIPPLE (METER SIDE)	
O	1" X 3/4" BRASS REDUCING BUSHING	
P	1" X 3/4" X 3/4" BRASS TEE	
Q	1" X 3/4" X 3/4" BRASS REDUCING BUSHING	
R	1" X CLOSE NIPPLE (METER SIDE)	
S	1" X 3/4" X 3/4" BRASS TEE	
T	1" X 3/4" X 3/4" BRASS REDUCING BUSHING	
U	1" X CLOSE NIPPLE (METER SIDE)	
V	1" X 3/4" X 3/4" BRASS TEE	
W	1" X 3/4" X 3/4" BRASS REDUCING BUSHING	
X	1" X CLOSE NIPPLE (METER SIDE)	
Y	1" X 3/4" X 3/4" BRASS TEE	
Z	1" X 3/4" X 3/4" BRASS REDUCING BUSHING	
AA	1" X CLOSE NIPPLE (METER SIDE)	
BB	1" X 3/4" X 3/4" BRASS TEE	
CC	1" X 3/4" X 3/4" BRASS REDUCING BUSHING	
DD	1" X CLOSE NIPPLE (METER SIDE)	
EE	1" X 3/4" X 3/4" BRASS TEE	
FF	1" X 3/4" X 3/4" BRASS REDUCING BUSHING	
GG	1" X CLOSE NIPPLE (METER SIDE)	
HH	1" X 3/4" X 3/4" BRASS TEE	
II	1" X 3/4" X 3/4" BRASS REDUCING BUSHING	
JJ	1" X CLOSE NIPPLE (METER SIDE)	
KK	1" X 3/4" X 3/4" BRASS TEE	
LL	1" X 3/4" X 3/4" BRASS REDUCING BUSHING	
MM	1" X CLOSE NIPPLE (METER SIDE)	
NN	1" X 3/4" X 3/4" BRASS TEE	
OO	1" X 3/4" X 3/4" BRASS REDUCING BUSHING	
PP	1" X CLOSE NIPPLE (METER SIDE)	
QQ	1" X 3/4" X 3/4" BRASS TEE	
RR	1" X 3/4" X 3/4" BRASS REDUCING BUSHING	
SS	1" X CLOSE NIPPLE (METER SIDE)	
TT	1" X 3/4" X 3/4" BRASS TEE	
UU	1" X 3/4" X 3/4" BRASS REDUCING BUSHING	
VV	1" X CLOSE NIPPLE (METER SIDE)	
WW	1" X 3/4" X 3/4" BRASS TEE	
XX	1" X 3/4" X 3/4" BRASS REDUCING BUSHING	
YY	1" X CLOSE NIPPLE (METER SIDE)	
ZZ	1" X 3/4" X 3/4" BRASS TEE	
AAA	1" X 3/4" X 3/4" BRASS REDUCING BUSHING	
BBB	1" X CLOSE NIPPLE (METER SIDE)	
CCC	1" X 3/4" X 3/4" BRASS TEE	
DDD	1" X 3/4" X 3/4" BRASS REDUCING BUSHING	
EEE	1" X CLOSE NIPPLE (METER SIDE)	
FFF	1" X 3/4" X 3/4" BRASS TEE	
GGG	1" X 3/4" X 3/4" BRASS REDUCING BUSHING	
HHH	1" X CLOSE NIPPLE (METER SIDE)	
III	1" X 3/4" X 3/4" BRASS TEE	
JJJ	1" X 3/4" X 3/4" BRASS REDUCING BUSHING	
KKK	1" X CLOSE NIPPLE (METER SIDE)	
LLL	1" X 3/4" X 3/4" BRASS TEE	
MMM	1" X 3/4" X 3/4" BRASS REDUCING BUSHING	
NNN	1" X CLOSE NIPPLE (METER SIDE)	
OOO	1" X 3/4" X 3/4" BRASS TEE	
PPP	1" X 3/4" X 3/4" BRASS REDUCING BUSHING	
QQQ	1" X CLOSE NIPPLE (METER SIDE)	
RRR	1" X 3/4" X 3/4" BRASS TEE	
SSS	1" X 3/4" X 3/4" BRASS REDUCING BUSHING	
TTT	1" X CLOSE NIPPLE (METER SIDE)	
UUU	1" X 3/4" X 3/4" BRASS TEE	
VVV	1" X 3/4" X 3/4" BRASS REDUCING BUSHING	
WWW	1" X CLOSE NIPPLE (METER SIDE)	
XXX	1" X 3/4" X 3/4" BRASS TEE	
YYY	1" X 3/4" X 3/4" BRASS REDUCING BUSHING	
ZZZ	1" X CLOSE NIPPLE (METER SIDE)	
AAAA	1" X 3/4" X 3/4" BRASS TEE	
BBBB	1" X 3/4" X 3/4" BRASS REDUCING BUSHING	
CCCC	1" X CLOSE NIPPLE (METER SIDE)	
DDDD	1" X 3/4" X 3/4" BRASS TEE	
EEEE	1" X 3/4" X 3/4" BRASS REDUCING BUSHING	
FFFF	1" X CLOSE NIPPLE (METER SIDE)	
GGGG	1" X 3/4" X 3/4" BRASS TEE	
HHHH	1" X 3/4" X 3/4" BRASS REDUCING BUSHING	
IIII	1" X CLOSE NIPPLE (METER SIDE)	
JJJJ	1" X 3/4" X 3/4" BRASS TEE	
KKKK	1" X 3/4" X 3/4" BRASS REDUCING BUSHING	
LLLL	1" X CLOSE NIPPLE (METER SIDE)	
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ZZZZ	1" X 3/4" X 3/4" BRASS REDUCING BUSHING	
AAAAA	1" X CLOSE NIPPLE (METER SIDE)	
BBBBB	1" X 3/4" X 3/4" BRASS TEE	
CCCCC	1" X 3/4" X 3/4" BRASS REDUCING BUSHING	
DDDDD	1" X CLOSE NIPPLE (METER SIDE)	
EEEEE	1" X 3/4" X 3/4" BRASS TEE	
FFFFF	1" X 3/4" X 3/4" BRASS REDUCING BUSHING	
GGGGG	1" X CLOSE NIPPLE (METER SIDE)	
HHHHH	1" X 3/4" X 3/4" BRASS TEE	
IIIII	1" X 3/4" X 3/4" BRASS REDUCING BUSHING	
JJJJJ	1" X CLOSE NIPPLE (METER SIDE)	
KKKKK	1" X 3/4" X 3/4" BRASS TEE	
LLLLL	1" X 3/4" X 3/4" BRASS REDUCING BUSHING	
MMMMM	1" X CLOSE NIPPLE (METER SIDE)	
NNNNN	1" X 3/4" X 3/4" BRASS TEE	
OOOOO	1" X 3/4" X 3/4" BRASS REDUCING BUSHING	
PPPPP	1" X CLOSE NIPPLE (METER SIDE)	
QQQQQ	1" X 3/4" X 3/4" BRASS TEE	
RRRRR	1" X 3/4" X 3/4" BRASS REDUCING BUSHING	
SSSSS	1" X CLOSE NIPPLE (METER SIDE)	
TTTTT	1" X 3/4" X 3/4" BRASS TEE	
UUUUU	1" X 3/4" X 3/4" BRASS REDUCING BUSHING	
VVVVV	1" X CLOSE NIPPLE (METER SIDE)	
WWWWW	1" X 3/4" X 3/4" BRASS TEE	
XXXXX	1" X 3/4" X 3/4" BRASS REDUCING BUSHING	
YYYYY	1" X CLOSE NIPPLE (METER SIDE)	
ZZZZZ	1" X 3/4" X 3/4" BRASS TEE	
AAAAAA	1" X 3/4" X 3/4" BRASS REDUCING BUSHING	
BBBBBB	1" X CLOSE NIPPLE (METER SIDE)	
CCCCCC	1" X 3/4" X 3/4" BRASS TEE	
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EEEEEE	1" X CLOSE NIPPLE (METER SIDE)	
FFFFFF	1" X 3/4" X 3/4" BRASS TEE	
GGGGGG	1" X 3/4" X 3/4" BRASS REDUCING BUSHING	
HHHHHH	1" X CLOSE NIPPLE (METER SIDE)	
IIIIII	1" X 3/4" X 3/4" BRASS TEE	
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KKKKKK	1" X CLOSE NIPPLE (METER SIDE)	
LLLLLL	1" X 3/4" X 3/4" BRASS TEE	
MMMMMM	1" X 3/4" X 3/4" BRASS REDUCING BUSHING	
NNNNNN	1" X CLOSE NIPPLE (METER SIDE)	
OOOOOO	1" X 3/4" X 3/4" BRASS TEE	
PPPPPP	1" X 3/4" X 3/4" BRASS REDUCING BUSHING	
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RRRRRR	1" X 3/4" X 3/4" BRASS TEE	
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TTTTTT	1" X CLOSE NIPPLE (METER SIDE)	
UUUUUU	1" X 3/4" X 3/4" BRASS TEE	
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IIIIIII	1" X CLOSE NIPPLE (METER SIDE)	
JJJJJJJ	1" X 3/4" X 3/4" BRASS TEE	
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TTTTTTT	1" X 3/4" X 3/4" BRASS REDUCING BUSHING	
UUUUUUU	1" X CLOSE NIPPLE (METER SIDE)	
VVVVVVV	1" X 3/4" X 3/4" BRASS TEE	
WWWWWWW	1" X 3/4" X 3/4" BRASS REDUCING BUSHING	
XXXXXXX	1" X CLOSE NIPPLE (METER SIDE)	
YYYYYYY	1" X 3/4" X 3/4" BRASS TEE	
ZZZZZZZ	1" X 3/4" X 3/4" BRASS REDUCING BUSHING	
AAAAAAAA	1" X CLOSE NIPPLE (METER SIDE)	
BBBBBBBB



CONCRETE COLLAR DETAIL
(N.T.S.)



DRAIN "I"
BAFFLE BLOCK
REINFORCEMENT DETAIL
(N.T.S.)

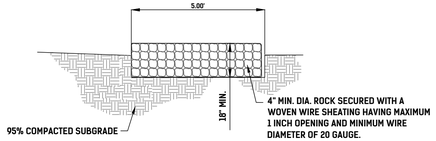
KEYNOTES:

1 CONCRETE COLLARS SHALL BE INSTALLED FOR CAST-IN-PLACE & PRECAST CURB INLETS FOR EVERY PIPE CONNECTION

LEGEND

PROPOSED 12' ACCESS PATH

PROPOSED ROCK GABION MATTRESS

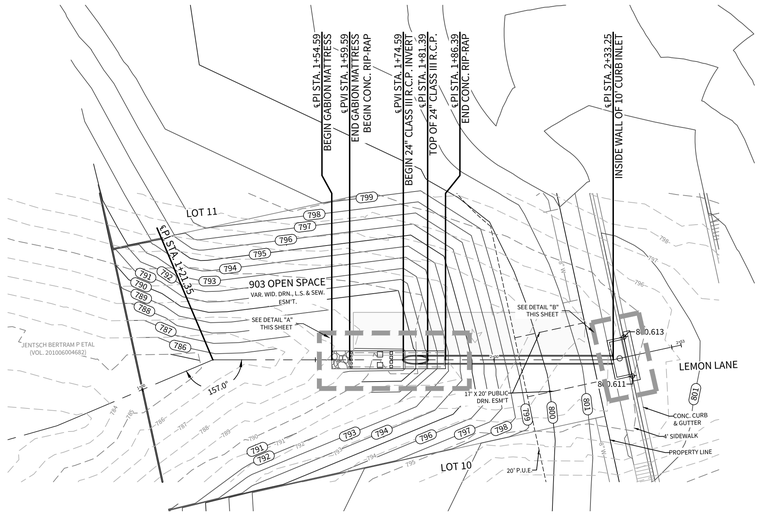


NOTE: GABION MATTRESS TO BE FREE OF GEO-TEXTILE FABRIC LINING.

GABION MATTRESS DETAIL (N.T.S.)

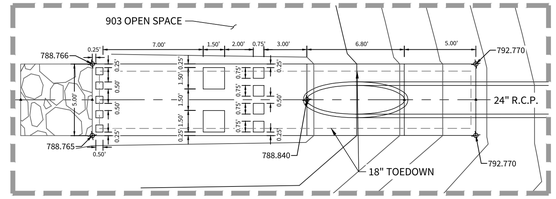
GENERAL NOTES

1. ALL CONCRETE LINING SHALL DEVELOP A MINIMUM COMPRESSIVE STRENGTH OF NOT LESS THAN 3000 PSI IN 28 DAYS.
2. REFERENCE TYPICAL CONCRETE CHANNEL RIP-RAP STANDARDS FOUND ON SHEET C6.D1

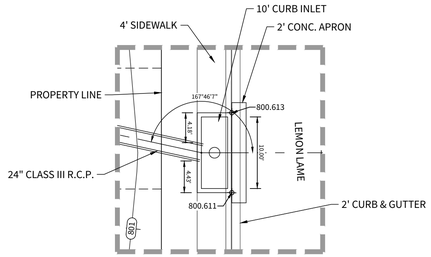


DRAIN "I"

STA. 1+00.00 TO END

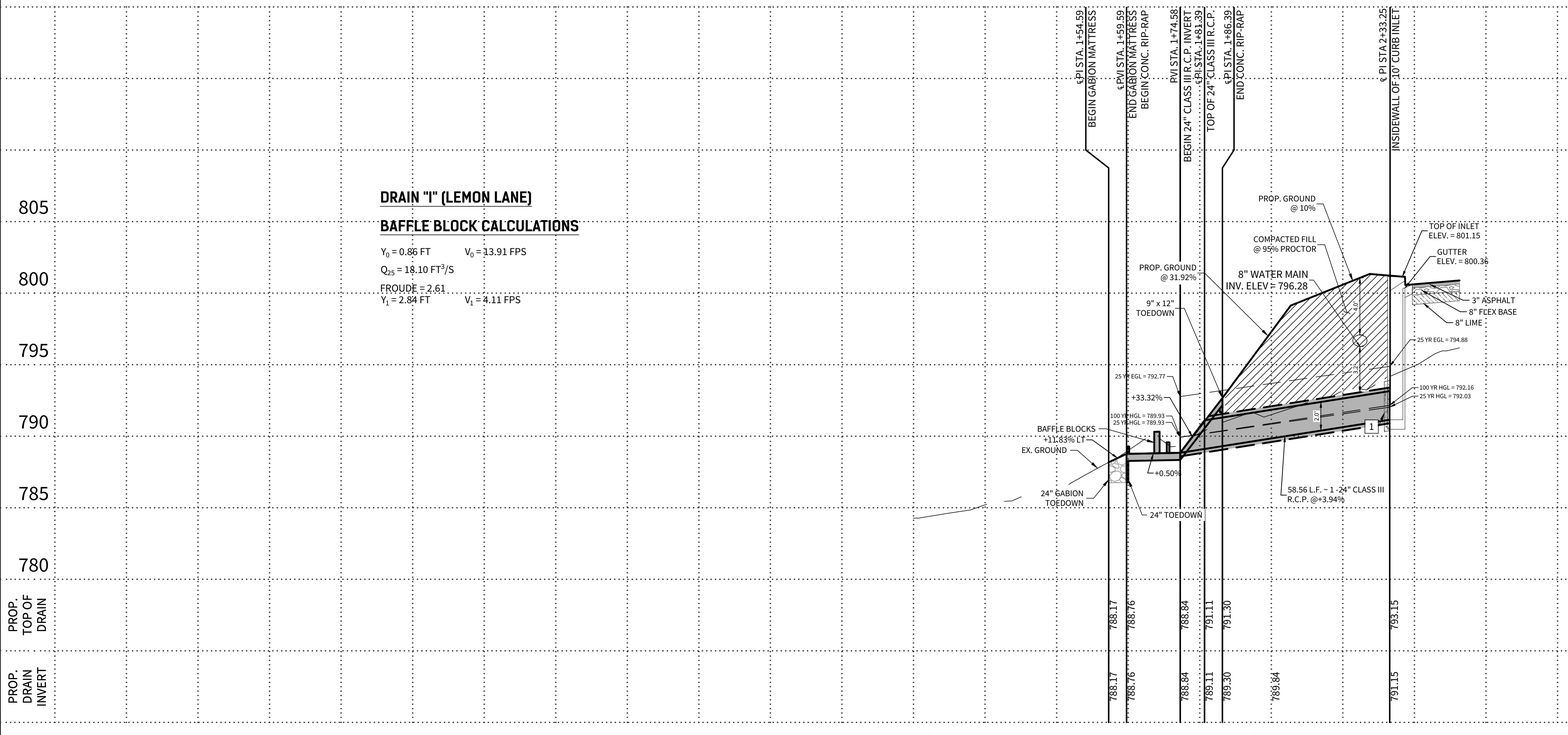


DRAIN "I" BAFFLE BLOCK DETAIL "A"
(SCALE 1" = 5')



DRAIN "I" INLET DETAIL "B"
(SCALE 1" = 10')

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



DRAIN "I" (LEMON LANE)

BAFFLE BLOCK CALCULATIONS

Y_0 = 0.86 FT V_0 = 13.91 FPS

Q_{25} = 18.10 FT^3/S

FROUDE = 2.61

Y_1 = 2.84 FT V_1 = 4.11 FPS

24" CLASS III R.C.P. DRAIN "I"

PIPE SLOPE = 3.94 %

Q_{25} = 18.10 c.f.s.

DEPTH OF FLOW = 0.88 ft

FLOW AREA = 1.34 ft^2

WETTED PERIMETER = 2.91 FT

% FULL = 44.0%

$VELOCITY_{25}$ = 13.51 ft/s

n = 0.013

10' CURB INLET OPENING
DRAIN "I"

$Q_{25\ PROJECT}$ = 18.10 c.f.s.

$Q_{25\ ULTIMATE}$ = 18.10 c.f.s.

$L = Q/(C*w*(2*g*h)^{1/2}) = \frac{18.1}{0.7*0.50*(2*32.2*0.54)^{1/2}}$

L = 8.77' INLET REQ'D.

USED - 10' INLET (TYPE C-1)

A = 3.14 s.f. (1 - 2.0' DIAMETER OPENING(S))

V = 5.76 f.p.s.

Hv = 0.52'

1.5Hv = 0.77'

Hw = z + y + 1.5Hv

Hw = 791.06+2.0+0.77

Hw = 793.83

GUTTER = 800.36

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

FLYING W UNIT 1

DRAINAGE PLAN & PROFILE - DRAIN "I"

DATE
11/24/2025

PROJECT NO.
04024-004

DRAWN BY
C7

CHECKED BY
JL

REVISIONS 1 2 3 4 5 6 7 8

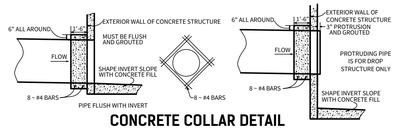
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PROFESSIONAL ENGINEER
11/26/25

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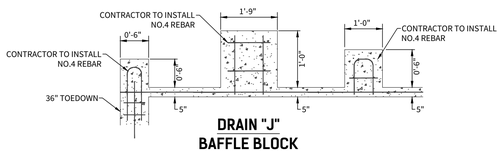
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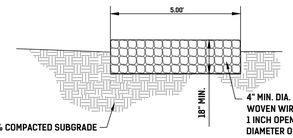
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CONCRETE COLLAR DETAIL
(N.T.S.)



DRAIN "J"
BAFFLE BLOCK
REINFORCEMENT DETAIL
(N.T.S.)



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

GABION MATTRESS DETAIL (N.T.S.)

KEYNOTES:

1 CONCRETE COLLARS SHALL BE INSTALLED FOR CAST-IN-PLACE & PRECAST CURB INLETS FOR EVERY PIPE CONNECTION

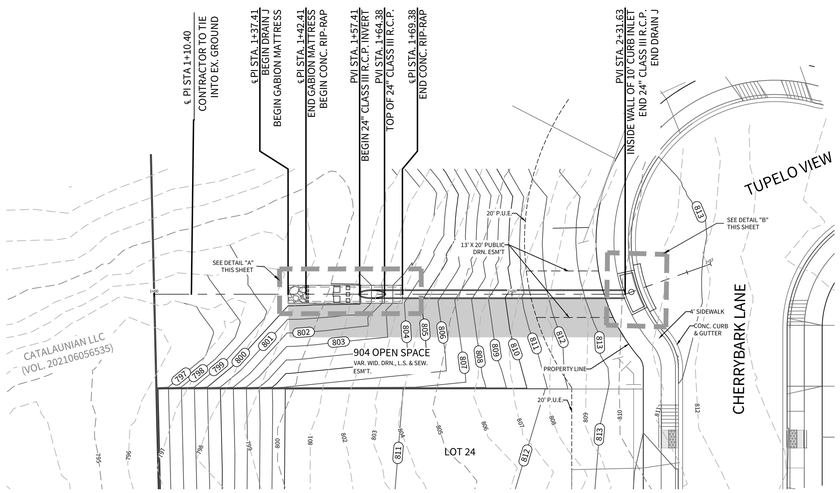
LEGEND

PROPOSED 12' ACCESS PATH

PROPOSED ROCK GABION MATTRESS

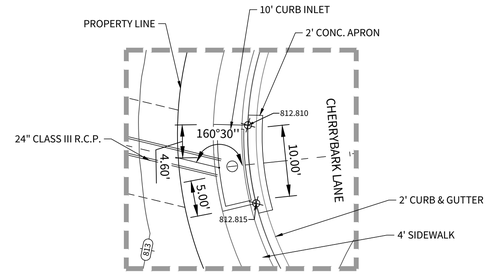
GENERAL NOTES

1. ALL CONCRETE LINING SHALL DEVELOP A MINIMUM COMPRESSIVE STRENGTH OF NOT LESS THAN 3000 PSI IN 28 DAYS.
2. REFERENCE TYPICAL CONCRETE CHANNEL RIP-RAP STANDARDS FOUND ON SHEET C6.D1

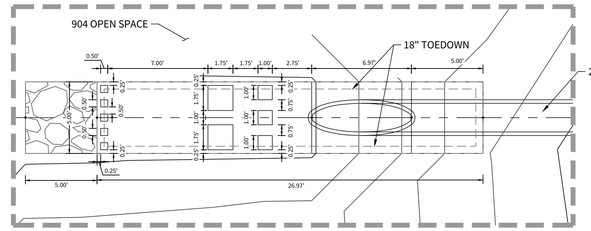


DRAIN "J"

STA. 1+00.00 TO STA. END

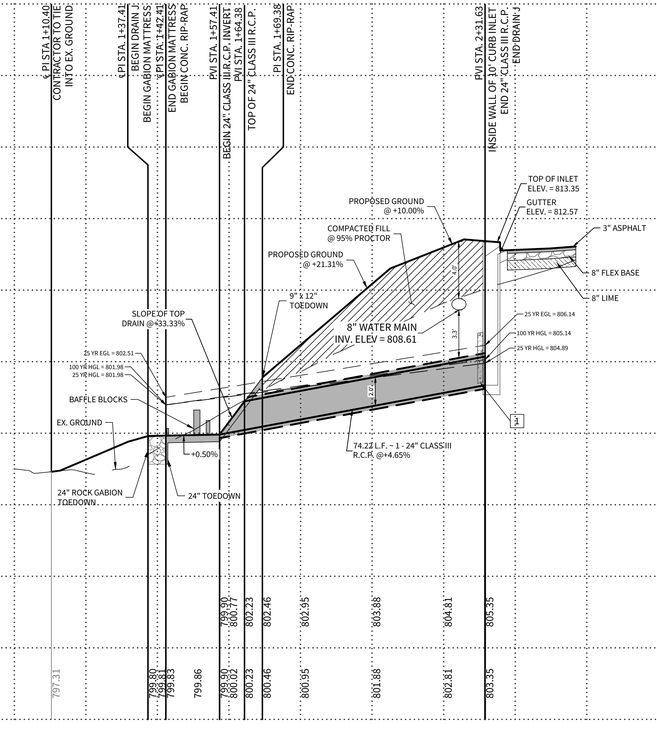


DRAIN "J" 10' INLET DETAIL "B"
(SCALE 1" = 10')



DRAIN "J" BAFFLE BLOCK DETAIL "A"
(SCALE 1" = 5')

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



24" CLASS III R.C.P. DRAIN "J"

PIPE SLOPE = 4.65 %
Q_{25} = 18.37 c.f.s.
DEPTH OF FLOW = 0.85 ft
FLOW AREA = 1.28 ft²
WETTED PERIMETER = 2.85 FT
% FULL = 42.5%
VELOCITY$_{25}$ = 14.34 ft/s.
n = 0.013

10' CURB INLET OPENING
DRAIN "J"

$Q_{25\,PROJECT}$ = 18.37 c.f.s.
$Q_{25\,ULTIMATE}$ = 18.37 c.f.s.

$$L = Q/(C*w*(2*g*h)^{1/2}) = \frac{18.37}{0.7*0.50*(2*32.2*0.54)^{1/2}}$$

L = 8.90' INLET REQ'D.
USED - 10' INLET (TYPE C-1)
A = 3.14 s.f. (1 - 2.0' DIAMETER OPENING(S))
V = 5.85 f.p.s.
Hv = 0.53'
1.5Hv = 0.80'
Hw = z + y + 1.5Hv
Hw = 804.53+2.0+0.80
Hw = 807.33
GUTTER = 812.57

DRAIN "J" (STREET 14)
BAFFLE BLOCK CALCULATIONS

Y_0 = 0.85 FT V_0 = 14.34 FPS
Q_{25} = 18.37 FT³/S
FROUDE = 2.74
Y_1 = 2.90 FT V_1 = 4.32 FPS

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

FLYING W
UNIT 1

DRAINAGE PLAN & PROFILE - DRAIN " J"

DATE
11/24/2025
PROJECT NO.
04024-004
DRAWN BY
C7
CHECKED BY
JL

REVISIONS
1 2 3 4 5 6 7 8

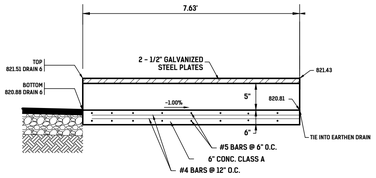
STATE OF TEXAS
JOSE A. LOZANO
126773
LICENSED
PROFESSIONAL ENGINEER
11/26/25

CUDE ENGINEERS
TBPELS No. 10048500

-

C6.01

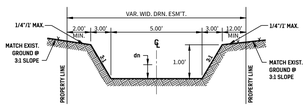
REPRODUCTION OF THE ORIGINAL SIGNED AND SEALED PLAN AND/OR ELECTRONIC MEDIA MAY HAVE BEEN INADVERTENTLY ALTERED. CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE SCALE OF THE DOCUMENT AND CONTACTING CUDE ENGINEERS TO VERIFY DISCREPANCIES PRIOR TO CONSTRUCTION.



DRAIN "L" INLET SECTION

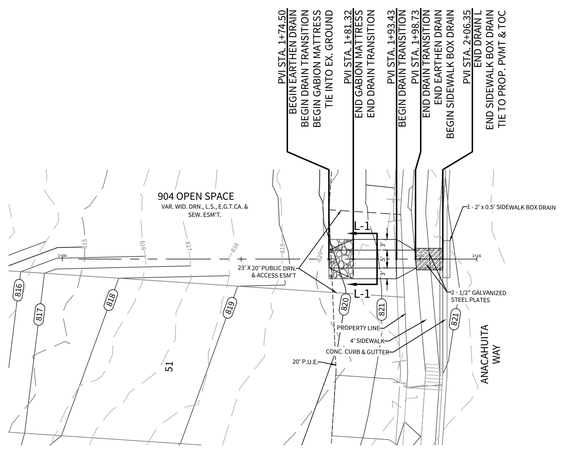
(N.T.S)

Name	"L-1"
BEGIN STA	1+84.30
END STA	1+93.43
Qᴅ5 (cfs)	9.57
h (ft)	1.00'
D_W (ft)	5.00'
z [_:1] left	3
z [_:1] right	3
t_W (ft)	11
n	0.035
Slope (%)	2.00%
d_n (ft)	0.48'
V (fps)	3.10



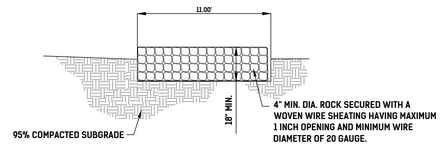
DRAIN "L-1" SECTION

(N.T.S.)



DRAIN "L"

STA. 1+00.00 TO END



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

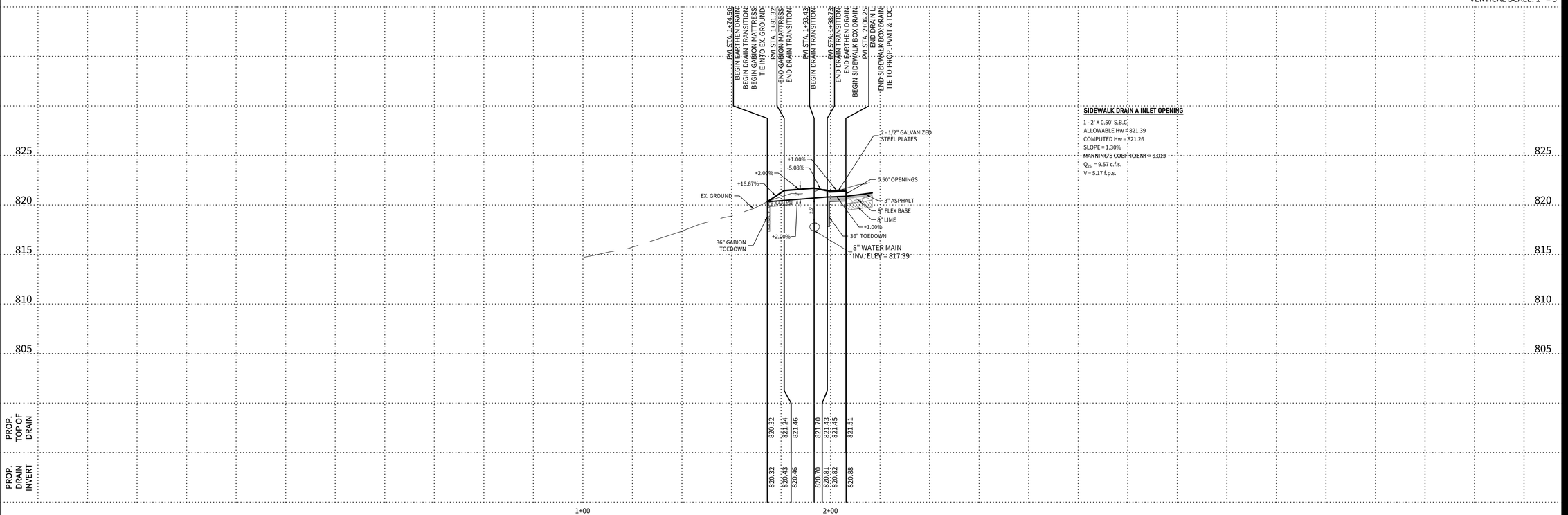
GABION MATTRESS DETAIL (N.T.S.)

LEGEND:

GABION MATTRESS

PROPOSED 12' ACCESS PATH

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



SIDEWALK DRAIN A INLET OPENING

1 - 2' X 0.50' S.B.C.
ALLOWABLE Hw = 821.39
COMPUTED Hw = 821.26
SLOPE = 1.30%
~~MANNING'S COEFFICIENT = 0.013~~
Q_{25} = 9.57 c.f.s.
V = 5.17 f.p.s.

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FLYING W
UNIT 1

DRAINAGE PLAN & PROFILE - DRAIN "L"

DATE
11/24/2025

PROJECT NO.
04024-004

DRAWN BY
C7

CHECKED BY
JL

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JOSE A. LOZANO
126773
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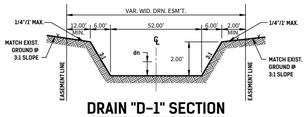
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C6.02

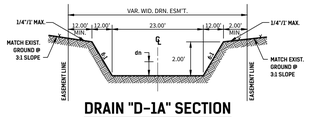
E:\2024\04-23 DOWLA Ranch\04 GIS\DRAINAGE PLANS & PROFILE - DRAIN "L".dwg, 2025/11/24 9:43:24 AM, sgonzales

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 "D-1" SECTION

(N.T.S.)



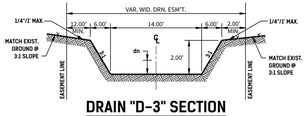
DRAIN "D-1A" SECTION

(N.T.S.)



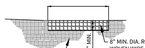
DRAIN "D-2" SECTION

(N.T.S.)



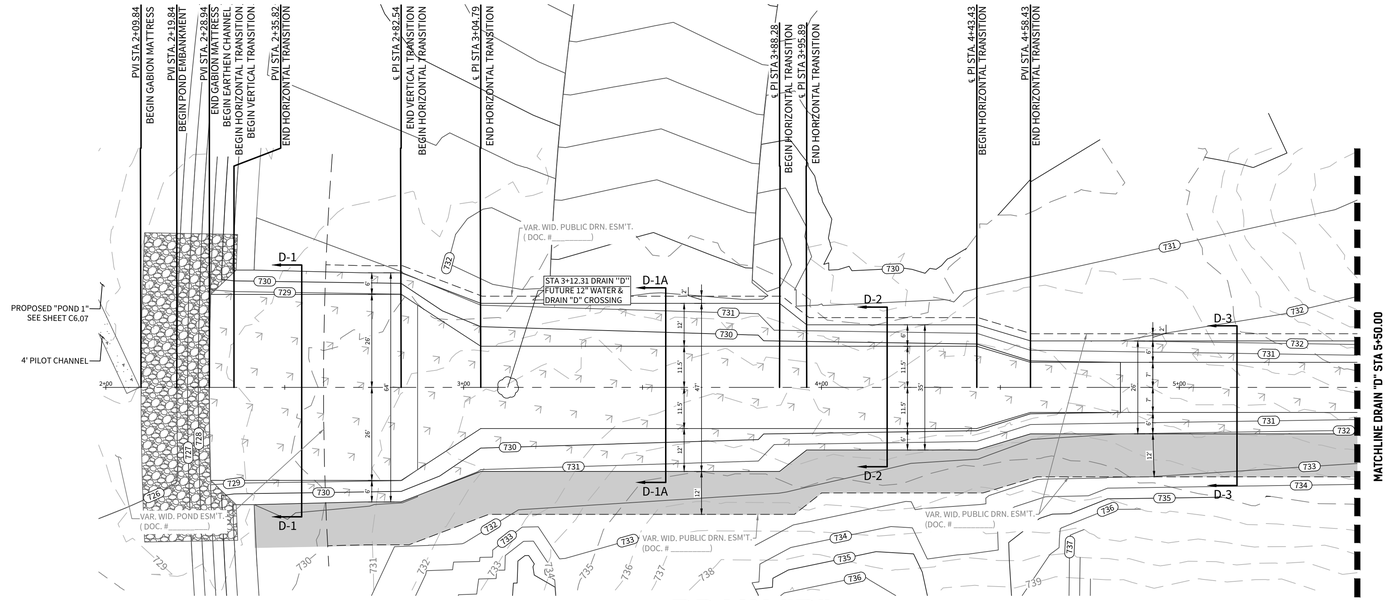
DRAIN "D-3" SECTION

(N.T.S.)



GABION STYLE ROCK EROSION CONTROL MATRESS DETAIL

NOTE: GABION MATTRESS TO BE FREE OF GEO-TEXTILE FABRIC LINING.
(N.T.S.)



DRAIN "D"

STA. 2+09.84 TO 5+50.00

Name	D-1	D-1A	D-2	D-3
BEGIN STA	2+35.82	3+04.79	3+95.89	4+58.43
END STA	2+82.54	3+88.28	4+43.42	8+59.43
Q25 (cfs)	315.89	147.42	147.42	86.58
h (ft)	2.00'	2.00'	2.00'	2.00'
b_w (ft)	52.00'	23.00'	23.00'	14.00'
z [_:1] left	3	6	3	3
z [_:1] right	3	6	3	3
t_w (ft)	64	47	35	26
n	0.035	0.035	0.035	0.035
Slope (%)	0.50%	0.51%	0.51%	0.51%
d_n (ft)	1.50'	1.43'	1.50'	1.43'
V (fps)	3.73	3.27	3.57	3.31

KEYNOTES:

1 CONCRETE COLLARS SHALL BE INSTALLED FOR CAST-IN-PLACE & PRECAST CURB INLETS FOR EVERY PIPE CONNECTION

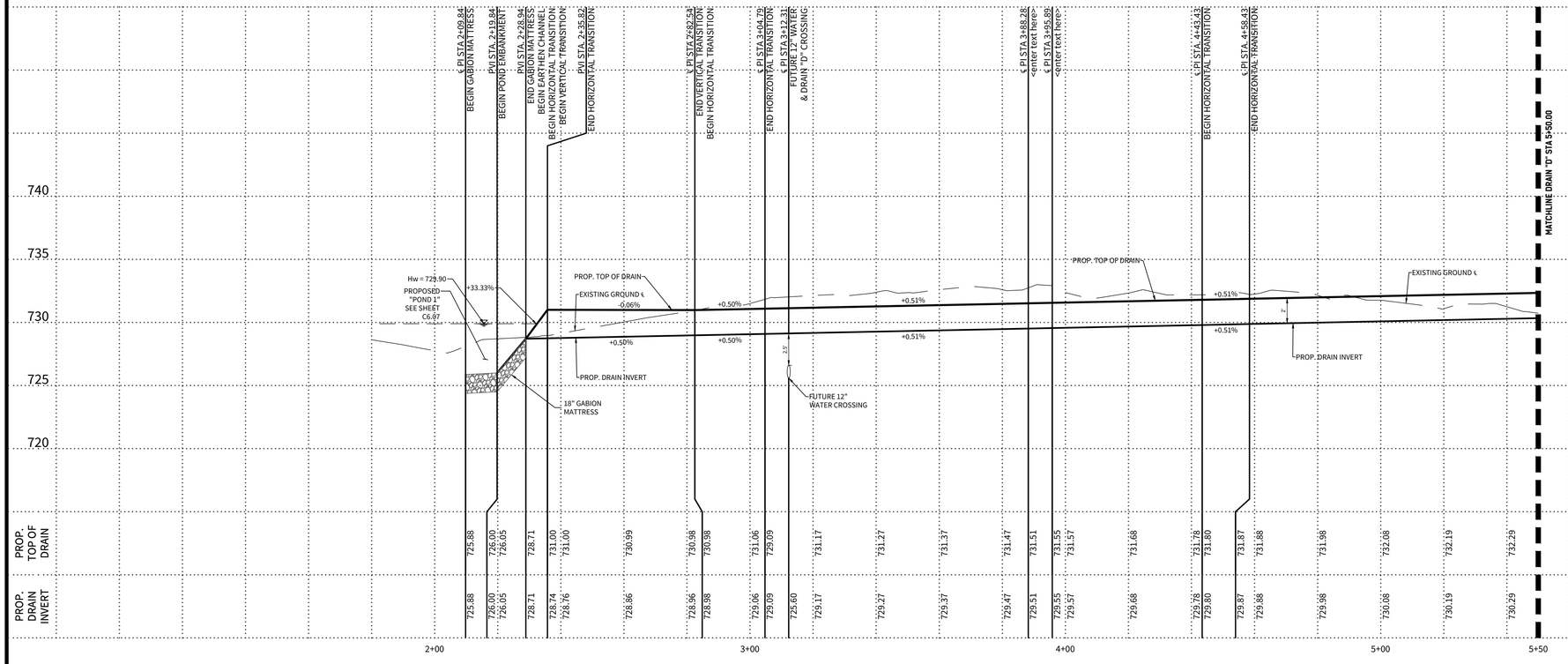
LEGEND:

- REVEGETATION
- PROPOSED R.C.P.
- PROPOSED CONCRETE RIP-RAP
- GABION MATTRESS
- PROPOSED 12' MAINTENANCE PATH

GENERAL NOTES

1. ALL CONCRETE LINING SHALL DEVELOP A MINIMUM COMPRESSIVE STRENGTH OF NOT LESS THAN 3000 PSI IN 28 DAYS.
2. REFERENCE CITY OF SAN ANTONIO TYPICAL CONCRETE CHANNEL RIP-RAP STANDARDS FOUND ON SHEET C6.D1

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



PROP. TOP OF DRAIN

PROP. DRAIN INVERT

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FLYING W UNIT 1

DRAINAGE PLAN & PROFILE - DRAIN "D"

DATE
11/24/2025

PROJECT NO.
04024-004

DRAWN BY
C7

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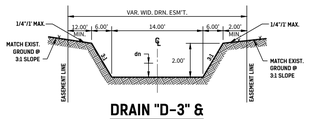
REVISIONS
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STATE OF TEXAS
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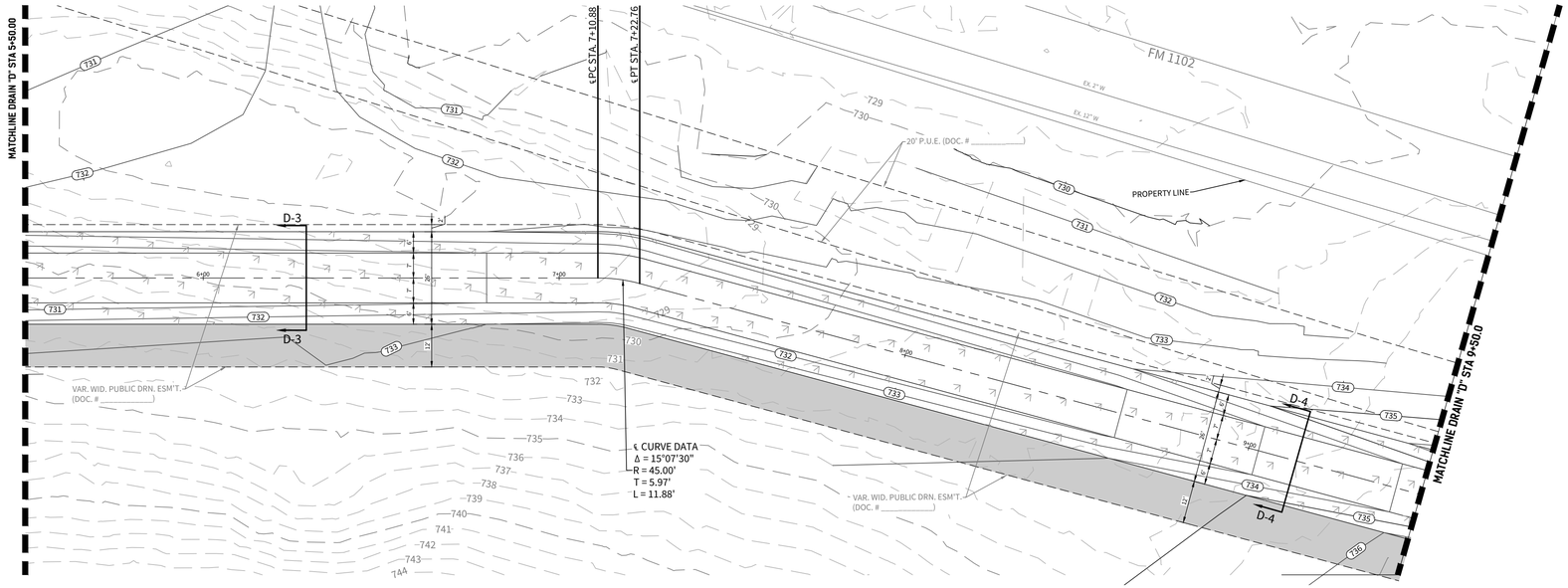
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DRAIN "D-3" & "D-4" SECTION

(N.T.S.)

Name	D-3	D-4
BEGIN STA	4+58.43	8+59.43
END STA	8+59.43	14+12.74
Q25 (cfs)	86.58	86.58
h (ft)	2.00'	2.00'
b_w (ft)	14.00'	14.00'
z [_]:1 left	3	3
z [_]:1 right	3	3
t_w (ft)	26	26
n	0.035	0.035
Slope (%)	0.51%	2.50%
d_n (ft)	1.43'	0.91'
V (fps)	3.31	5.67



LEGEND:

- REVEGETATION
- GABION MATTRESS
- PROPOSED 12' MAINTENANCE PATH

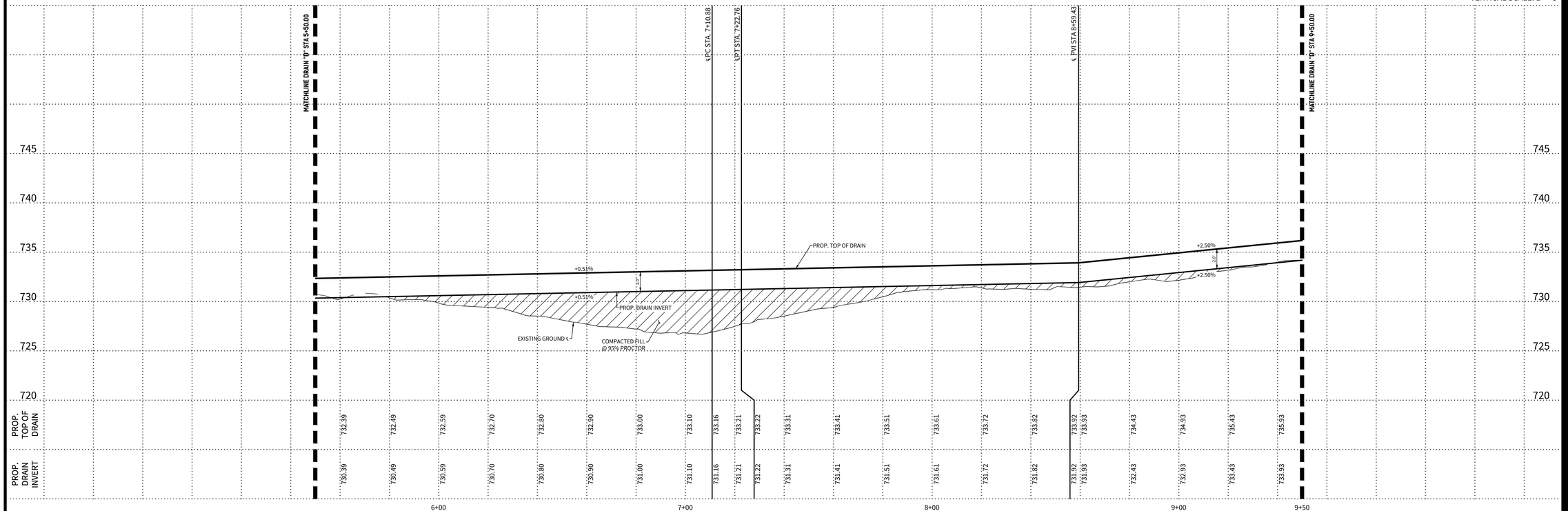
GENERAL NOTES

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2. REFERENCE CITY OF SAN ANTONIO TYPICAL CONCRETE CHANNEL RIP-RAP STANDARDS FOUND ON SHEET C6.D1

DRAIN "D"

STA. 5+50.00 TO 9+50.00

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



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DRAINAGE PLAN & PROFILE - DRAIN "D"

DATE
11/24/2025

PROJECT NO.
04024-004

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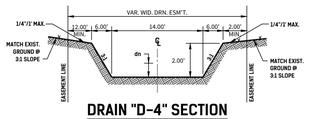
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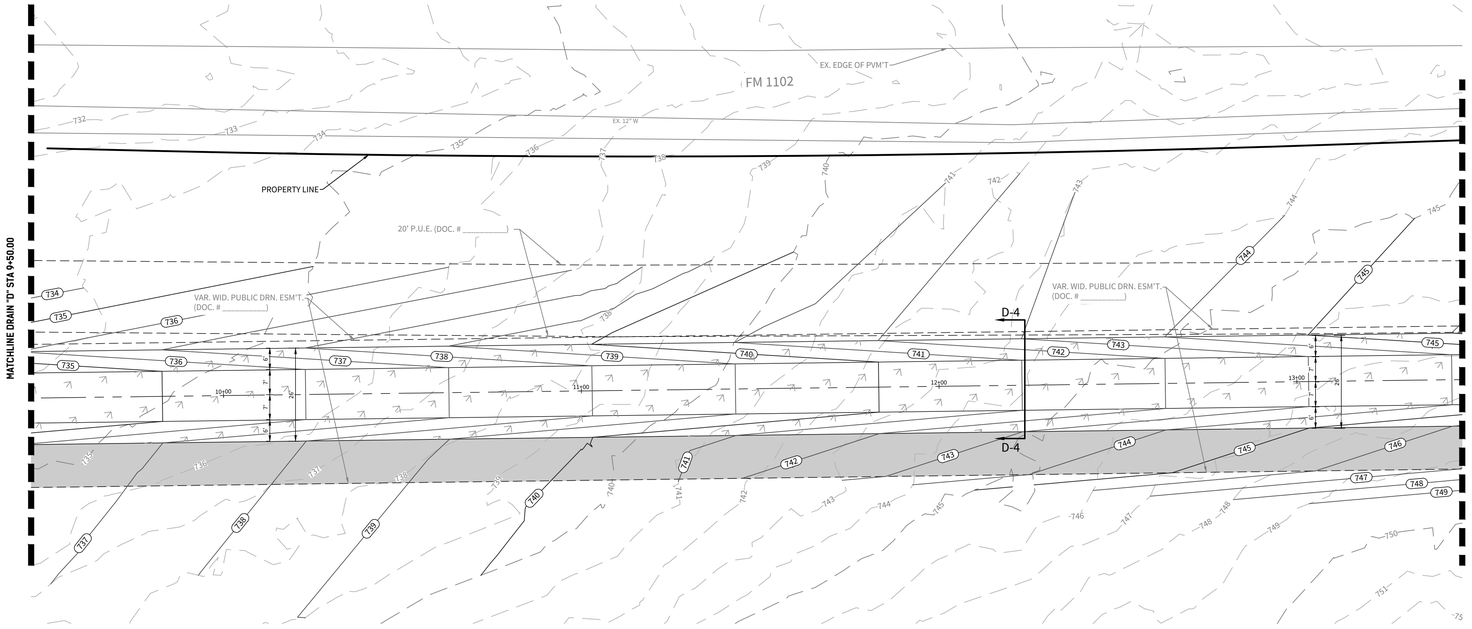
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DRAIN "D-4" SECTION

(N.T.S.)

Name	D-4
BEGIN STA	8+59.43
END STA	14+12.74
Q25 (cfs)	86.58
h (ft)	2.00'
b_W (ft)	14.00'
z (_):1 left	3
z (_):1 right	3
t_W (ft)	26
n	0.035
Slope (%)	2.50%
d_n (ft)	0.91'
V (fps)	5.67



DRAIN "D"

STA. 9+50.00 TO 13+50.00

LEGEND:

REVEGETATION

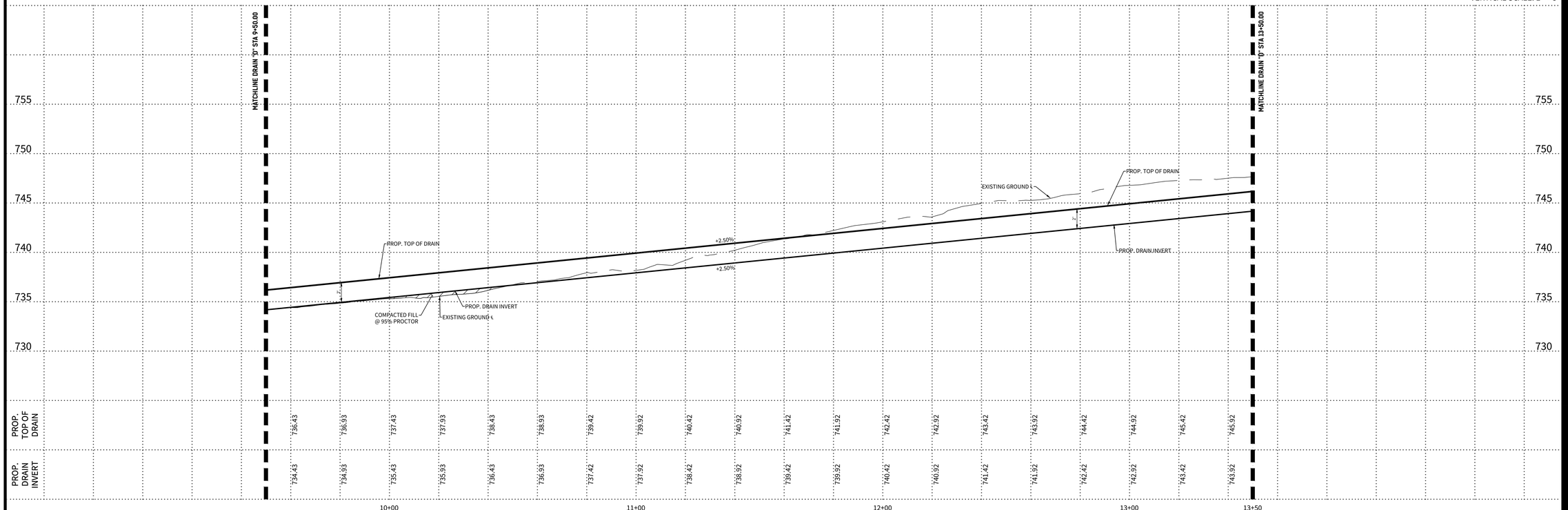
GABION MATTRESS

PROPOSED 12' MAINTENANCE PATH

GENERAL NOTES

1. ALL CONCRETE LINING SHALL DEVELOP A MINIMUM COMPRESSIVE STRENGTH OF NOT LESS THAN 3000 PSI IN 28 DAYS.
2. REFERENCE CITY OF SAN ANTONIO TYPICAL CONCRETE CHANNEL RIP-RAP STANDARDS FOUND ON SHEET C6.D1

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



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FLYING W UNIT 1

DRAINAGE PLAN & PROFILE - DRAIN "D"

DATE
11/24/2025

PROJECT NO.
04024-004

DRAWN BY
C7

CHECKED BY
JL

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STATE OF TEXAS
JOSE A. LOZANO
126773
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11/26/25

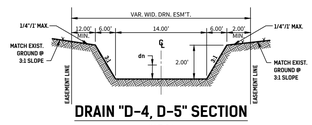
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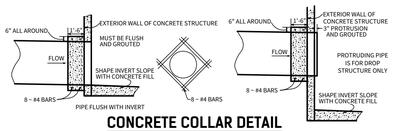
S:\04024\2021\2-DWG\Exh\Civil\03-DRAINAGE PLAN & PROFILE Drawing "D" dwg, 2025/11/24 9:53am, jlgonzales

Name	D-4	D-5
BEGIN STA	8+59.43	14+12.74
END STA	14+12.74	14+73.53
Q25 (cfs)	86.58	86.58
h (ft)	2.00'	3.00'
b_w (ft)	14.00'	14.00'
z [_]:1 left	3	3
z [_]:1 right	3	3
t_w (ft)	26	32
n	0.035	0.035
Slope (%)	2.50%	0.51%
d_n (ft)	0.91'	1.43'
V (fps)	5.67	3.31



DRAIN "D-4, D-5" SECTION

(N.T.S.)



CONCRETE COLLAR DETAIL

(N.T.S.)

KEYNOTES:

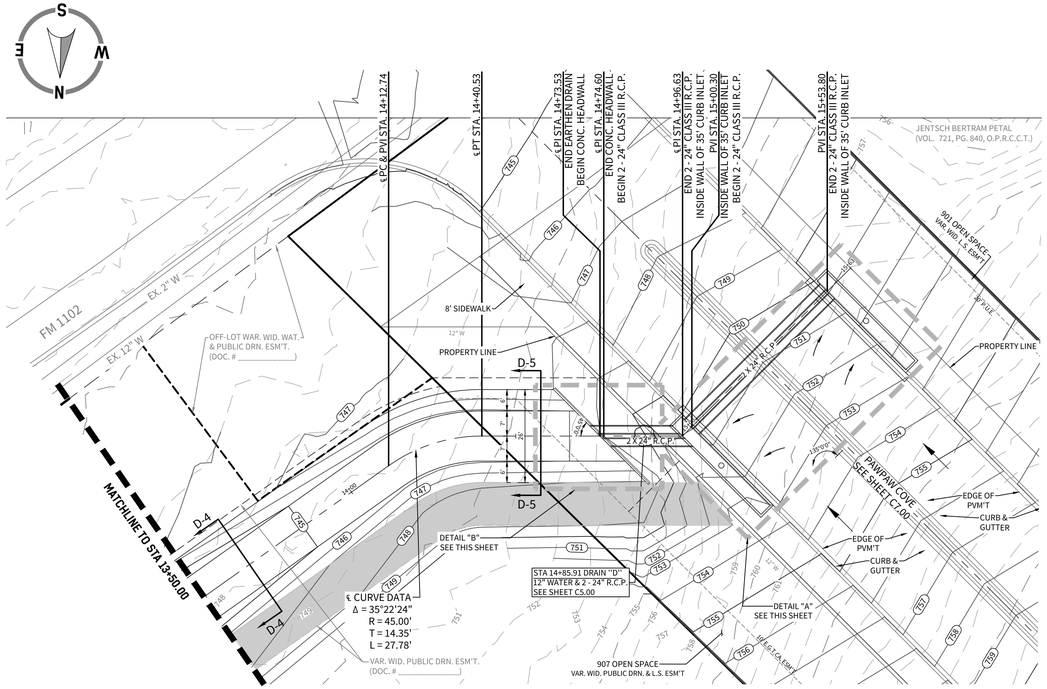
1 CONCRETE COLLARS SHALL BE INSTALLED FOR CAST-IN-PLACE & PRECAST CURB INLETS FOR EVERY PIPE CONNECTION

LEGEND:

- PROPOSED R.C.P.
- PROPOSED CONCRETE RIP-RAP
- GABION MATTRESS
- PROPOSED 12' MAINTENANCE PATH

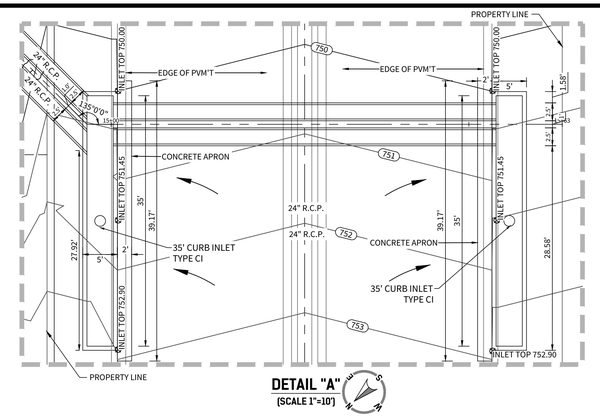
GENERAL NOTES

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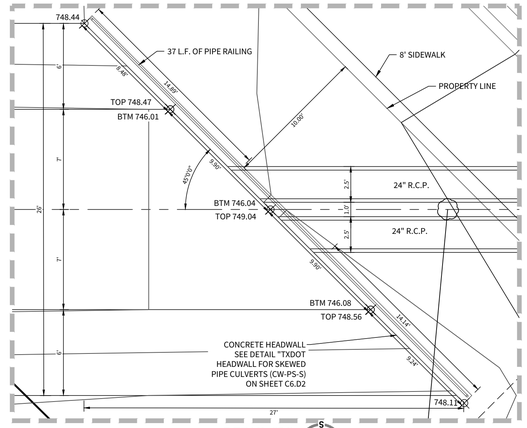
DRAIN "D"

STA. 13+50.00 TO END



DETAIL "A"

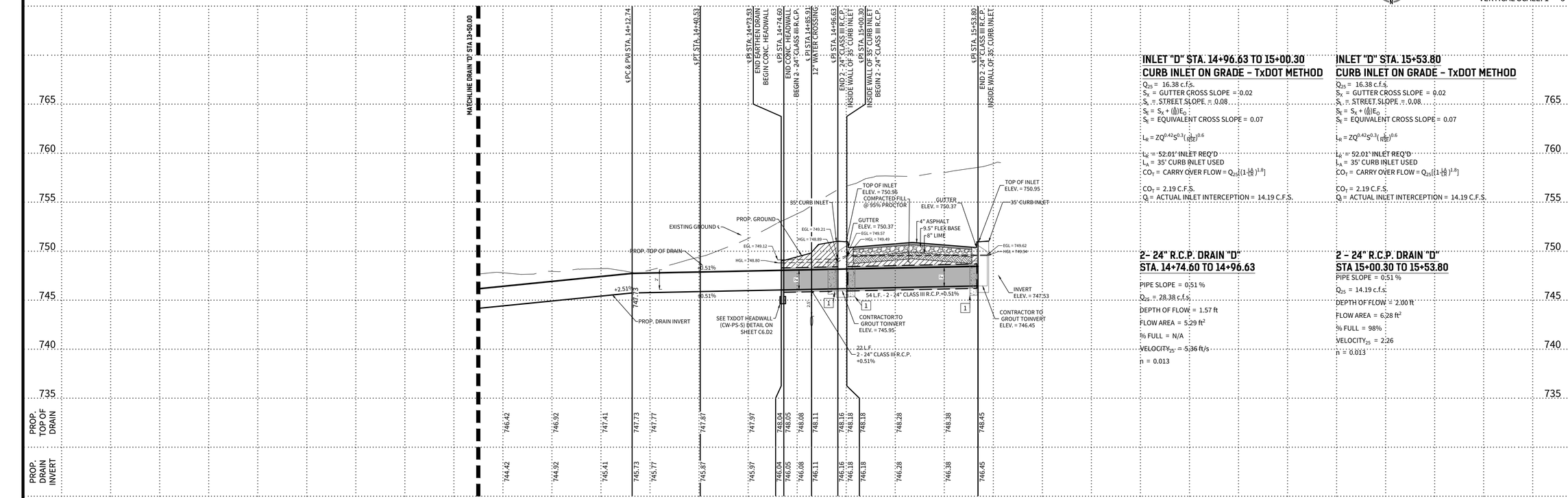
(SCALE 1"=10')



DETAIL "B"

(SCALE 1"=5')

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



INLET "D" STA. 14+96.63 TO 15+00.30
CURB INLET ON GRADE – TxDOT METHOD

Q_{25} = 16.38 c.f.s.
S_x = GUTTER CROSS SLOPE = 0.02
S_s = STREET SLOPE = 0.08
$S_E = S_x + (\frac{a}{b})E_o$
S_E = EQUIVALENT CROSS SLOPE = 0.07

$L_R = ZQ^{0.42}S^{0.3}(\frac{1}{nSE})^{0.6}$

L_T = 52.01' INLET REQ'D
L_A = 35' CURB INLET USED
CO_T = CARRY OVER FLOW = $Q_{25}[(1-\frac{L_A}{L_T})^{1.8}]$

CO_T = 2.19 C.F.S.
Q = ACTUAL INLET INTERCEPTION = 14.19 C.F.S.

INLET "D" STA. 15+53.80
CURB INLET ON GRADE – TxDOT METHOD

Q_{25} = 16.38 c.f.s.
S_x = GUTTER CROSS SLOPE = 0.02
S_s = STREET SLOPE = 0.08
$S_E = S_x + (\frac{a}{b})E_o$
S_E = EQUIVALENT CROSS SLOPE = 0.07

$L_R = ZQ^{0.42}S^{0.3}(\frac{1}{nSE})^{0.6}$

L_T = 52.01' INLET REQ'D
L_A = 35' CURB INLET USED
CO_T = CARRY OVER FLOW = $Q_{25}[(1-\frac{L_A}{L_T})^{1.8}]$

CO_T = 2.19 C.F.S.
Q = ACTUAL INLET INTERCEPTION = 14.19 C.F.S.

2- 24" R.C.P. DRAIN "D"
STA. 14+74.60 TO 14+96.63

PIPE SLOPE = 0.51 %
Q_{25} = 28.38 c.f.s.
DEPTH OF FLOW = 1.57 ft
FLOW AREA = 5.29 ft²
% FULL = N/A
VELOCITY$_{25}$ = 5.36 ft/s
n = 0.013

2 - 24" R.C.P. DRAIN "D"
STA 15+00.30 TO 15+53.80

PIPE SLOPE = 0.51 %
Q_{25} = 14.19 c.f.s.
DEPTH OF FLOW = 2.00 ft
FLOW AREA = 6.28 ft²
% FULL = 98%
VELOCITY$_{25}$ = 2.26
n = 0.013

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FLYING W
UNIT 1

DRAINAGE PLAN & PROFILE - DRAIN "D"

DATE
11/24/2025
PROJECT NO.
04024-004
DRAWN BY
C7
CHECKED BY
JL

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

STATE OF TEXAS
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126773
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LEGEND

- CONC. RIP RAP
- GABION MATTRESS
- EARTHEN VEGETATION
- PROPOSED CONTOUR
- EXISTING CONTOUR
- PROPOSED SLOPE

SCALE: 1"=30'

0 30 60

GENERAL NOTES:

CONTRACTOR TO HYDROMULCH ENTIRE DISTURBED LIMITS OF EARTHEN PORTION OF POND. 85% OF POND SURFACE MUST HAVE ESTABLISHED VEGETATION PRIOR TO ACCEPTANCE BY COMAL COUNTY & THE DISTRICT.

THE CONTRACTOR SHALL NOTIFY A UTILITY LOCATOR AT LEAST 48 HOURS PRIOR TO PERFORMING ANY EXCAVATION ACTIVITY ADJACENT TO THE CONSTRUCTION OF ANY ON-SITE DRAINAGE FACILITIES TO PROTECT ANY UNIDENTIFIED EXISTING UNDERGROUND UTILITY FACILITY FROM DAMAGE OR HARM. THE CONTRACTOR SHALL HAVE THE SOLE RESPONSIBILITY FOR ANY DAMAGES TO UTILITIES AS A RESULT OF NOT LOCATING UNDERGROUND UTILITY RESOURCES.

ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE SUBDIVISION REGULATIONS OF COMAL COUNTY.

ANY AREAS EXPOSED TO HIGH VELOCITY FLOWS SHALL EITHER HAVE A 6" THICK ROCK GABION MATTRESS INSTALLED OR THE INSTALLATION OF APPROPRIATE GEOTECHNICAL LINER AS DIRECTED BY THE CONSTRUCTION ENGINEER IN CHARGE.

ALL CONCRETE SHALL BE A MINIMUM OF 4000 PSI @ 28 DAYS COMPRESSIVE STRENGTH UNLESS OTHERWISE SPECIFIED HEREIN ON THESE DOCUMENTS.

A 6 FOOT HIGH FENCE (WOOD, CHAINLINK, OR OTHER DECORATIVE FENCE AS SPECIFIED BY THE OWNER OR BY RESTRICTIVE COVENANT) SHALL BE INSTALLED AT THE TOP OF THE WATER QUALITY BASIN ALONG ALL SIDES. AT THE LOCATION OF THE 12' WIDE (MIN) MAINTENANCE RAMP, A DOUBLE SWING GATE WITH MINIMUM OPEN WIDTH OF 12', WITH LOCK SHALL BE PROVIDED TO ALLOW ACCESS TO THE DETENTION POND.

ALL REBAR SPLICES AND LAPS SHALL BE A MINIMUM OF 40 BAR DIAMETERS UNLESS OTHERWISE SPECIFIED.

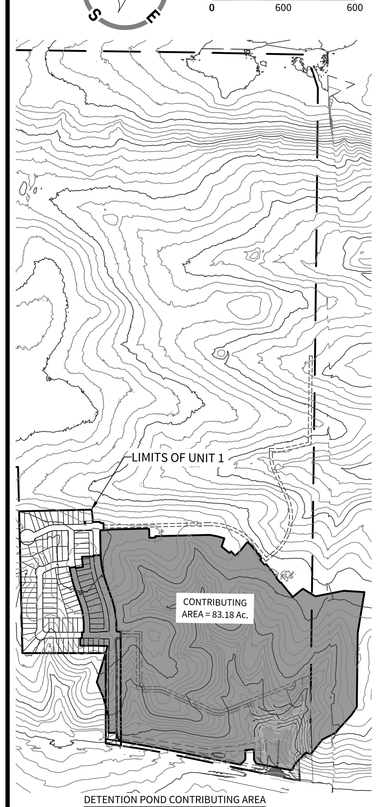
UPON COMPLETION OF CONSTRUCTION, AND IN ACCORDANCE WITH TCEQ REGULATIONS, ALL PERMANENT BMP'S (FILTERSTRIPS AND BASIN) MUST BE CERTIFIED BY A REGISTERED PROFESSIONAL ENGINEER.

ALL AREAS DISTURBED AS PART OF CONSTRUCTION OF BASIN SHALL BE REVEGETATED PRIOR TO COMPLETION.

UPON COMPLETION OF CONSTRUCTION, AND IN ACCORDANCE WITH TCEQ REGULATIONS, ALL PERMANENT BMP'S MUST BE CERTIFIED BY A REGISTERED PROFESSIONAL ENGINEER.

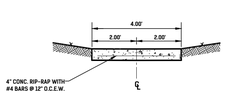
SCALE: 1"=600'

0 600 600

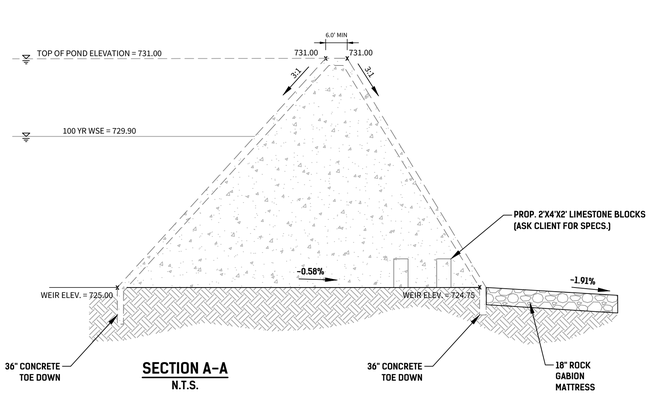


DETENTION POND CONTRIBUTING AREA
1" = 600'

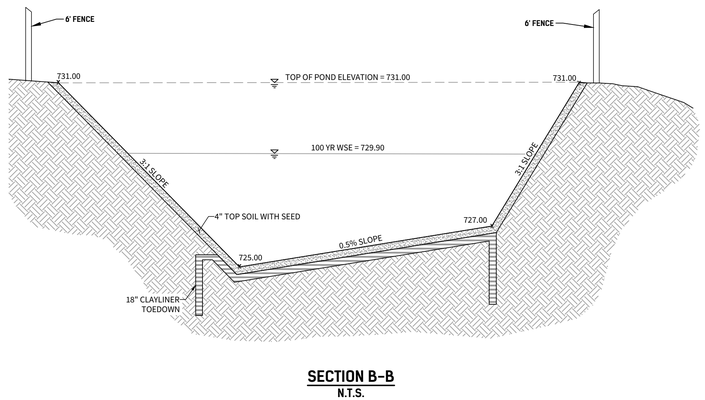




PILOT CHANNEL DETAIL
(N.T.S.)



SECTION A–A
N.T.S.



SECTION B–B
N.T.S.

CUDEENGINEERS.COM

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

FLYING W UNIT 1

DETENTION POND 1 PLAN

DATE
11/26/2025

PROJECT NO.
04024-002

DRAWN BY
RC/AM/JG/HN

CHECKED BY
AL

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

STATE OF TEXAS
JOSE A. LOZANO
126773
LICENSED
PROFESSIONAL ENGINEER
11/26/25

CUDE ENGINEERS
TBPELS No. 10048500

C6.07

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.

NOTES TO CONTRACTOR

(EACH PHASE OF BASIN CONSTRUCTION)

1. CONTRACTOR SHALL NOTIFY CERTIFYING ENGINEER WHEN BASIN CONSTRUCTION HAS PROGRESSED TO THE FOLLOWING MILESTONES:

   - REINFORCING STEEL FOR BASIN OVERFLOW WALL HAS BEEN SET, CONCRETE HAS NOT BEEN PLACED AND DRAIN PIPE AND RISER PIPE IS IN PLACE. CONTRACTOR SHALL PROVIDE ENGINEER WITH SURVEY DATA WHICH DEMONSTRATES THE RISER PIPE HAS BEEN SET AT PROPER ELEVATION AND GRADE.

   - BASIN HAS BEEN COMPLETELY FINISHED INCLUDING SOD OR SEED PLACEMENT ON SIDE SLOPES (WHERE APPLICABLE)

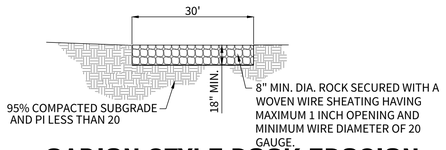
2. CONTRACTOR IS ADVISED THAT TCEQ DOES NOT ALLOW CHANGES TO PERMANENT POLLUTION ABATEMENT MEASURES WITHOUT THEIR APPROVAL.

3. UPON SUBSTANTIAL COMPLETION, OR AS REQUIRED BY ENGINEER, CONTRACTOR TO PROVIDE CERTIFYING ENGINEER WITH FIELDS SHOTS VERIFYING ELEVATIONS OF THE FOLLOWING:

   - TOP OF BANK/WALL AT EACH CORNER OF BASIN
   - TOE OF SLOPE AT EACH CORNER OF BASIN (INSIDE BASIN TOE)
   - OVERFLOW WEIRS

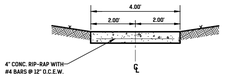
4. WORK SHALL NOT CONTINUE ON THE BASIN UNTIL THE ENGINEER HAS HAD AN OPPORTUNITY TO OBSERVE THE STATUS OF CONSTRUCTION AT EACH STAGE. CONTRACTOR SHALL PROVIDE ENGINEER A MINIMUM OF 24 HOURS ADVANCE NOTICE PRIOR TO TIME THE BASIN WILL BE AT THE REQUIRED STAGE.

5. BEFORE FINAL ACCEPTANCE OF CONSTRUCTION BY THE OWNER, THE CONTRACTOR WILL REMOVE ALL TRASH, DEBRIS AND ACCUMULATED SILT FROM THE BASINS AND REESTABLISH THEM TO THE PROPER OPERATING CONDITION.



GABION STYLE ROCK EROSION CONTROL MATRESS DETAIL

NOTE: GABION MATTRESS TO BE FREE OF GEO-TEXTILE FABRIC LINING.
(N.T.S.)



PILOT CHANNEL DETAIL
(N.T.S.)

EXISTING CONDITIONS	
	100 Yr
	Peak Discharge (cfs)
AP 1	568.80

POND A STAGE-STORAGE TABLE

Elevation	Depth	Accumulated Depth (ft.)	Area (sf.)	Volume (cf.)	Accumulated Volume (cf.)
725	0	0	0.00	0.00	0.00
726	1	1	40883.00	40883.00	40883.00
727	1	2	66192.00	66192.00	107075.00
728	1	3	69855.24	69855.24	176930.24
729	1	4	75468.00	75468.00	252398.24
730	1	5	80710.55	80710.55	333108.79
731	1	6	84481.01	84481.01	417589.80

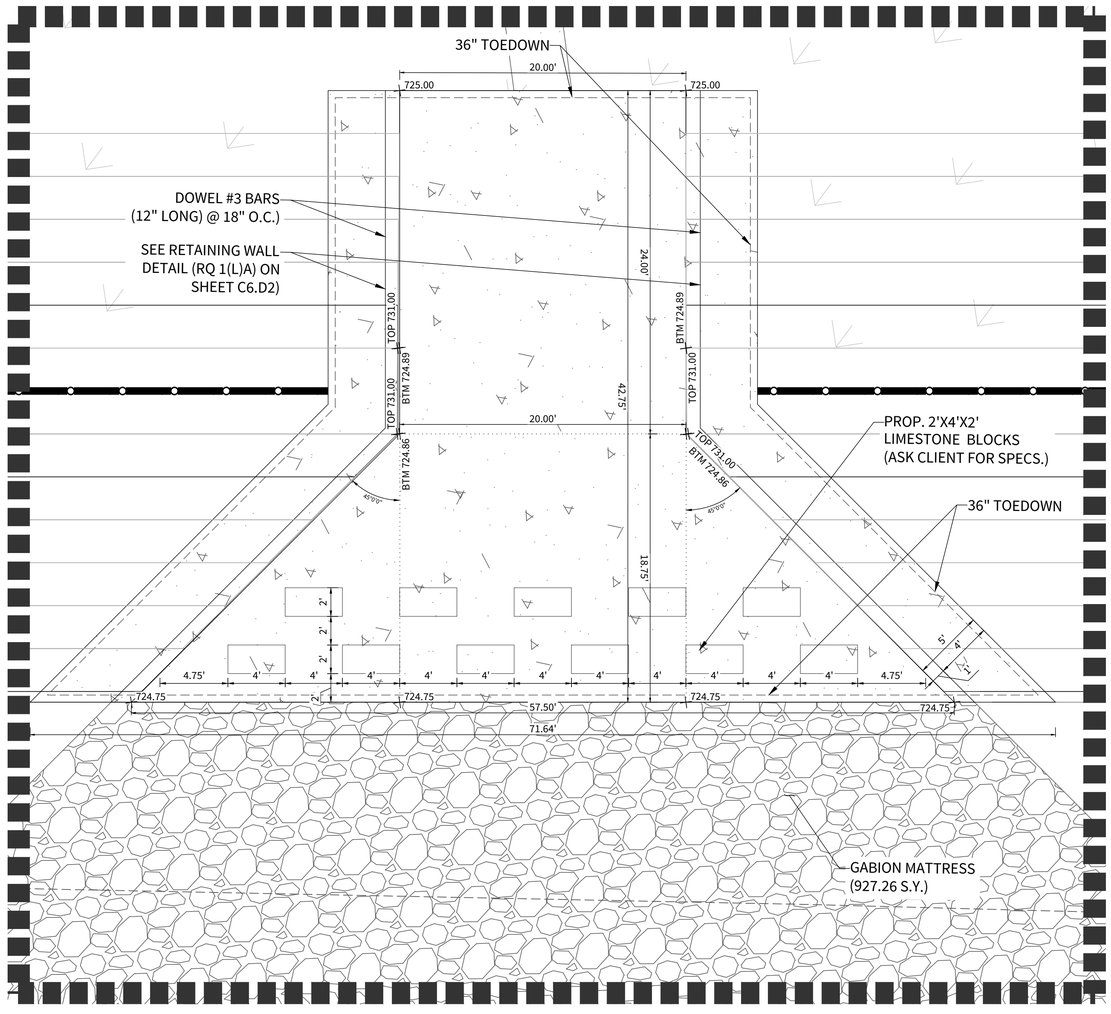
POND A OUTLET CONFIGURATION

Weir	Elevation	Length (ft)	Weir Coefficient
1	725	21	2.9

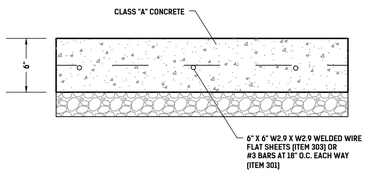
POND A	
	100 Yr
Peak Discharge, cfs	553.50
Peak Elevation, ft.	729.40
Peak Storage, AC-ft	5.40

DEVELOPED CONDITIONS	
	100 Yr
	Peak Discharge (cfs)
AP 1	553.50

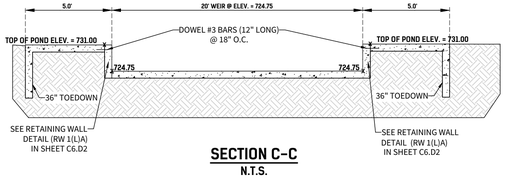
	100 Yr. Peak Discharge Comparison
AP 1	-15.30



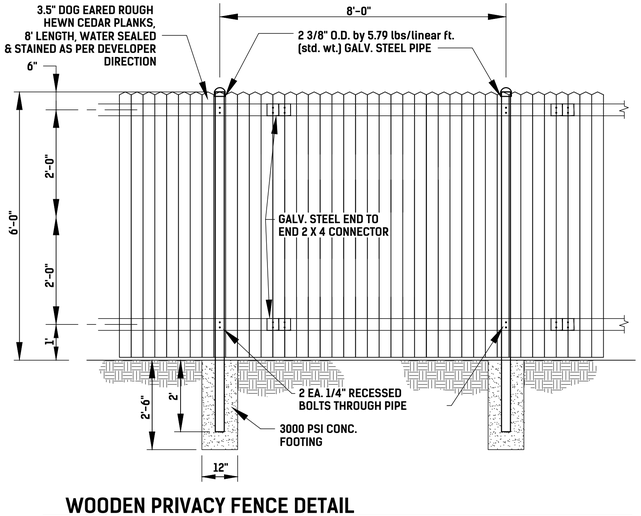
BASIN OUTFALL DETAIL
SCALE : 1" = 5'



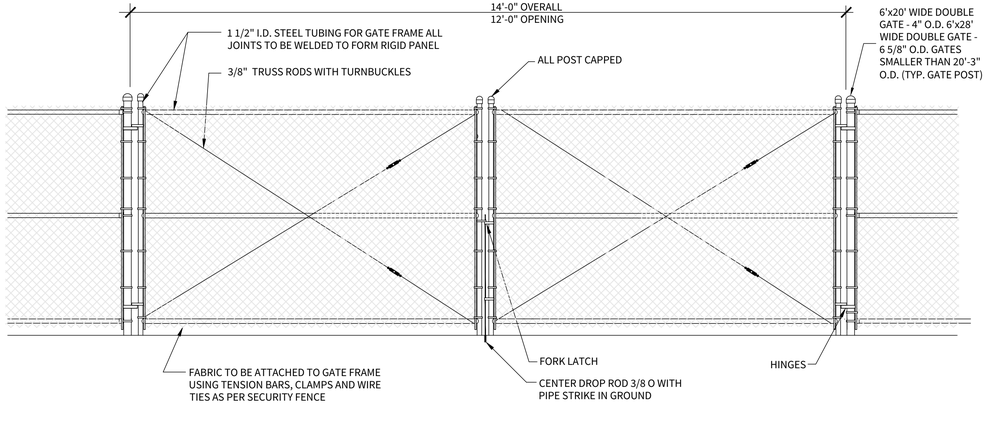
CONCRETE RIP-RAP DETAIL
N.T.S.



SECTION C-C
N.T.S.



WOODEN PRIVACY FENCE DETAIL
NTS



CHAIN LINK FENCE GATE DETAIL
NTS

CUDEENGINEERS.COM

CUDE ENGINEERS EST. 1980

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

FLYING W UNIT 1

DETENTION POND 1 PLAN

DATE
11/26/2025

PROJECT NO.
04024-002

DRAWN BY
RC/AM/JG/HN

CHECKED BY
AL

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

STATE OF TEXAS
JOSE A. LOZANO
126773
LICENSED
PROFESSIONAL ENGINEER
11/26/25

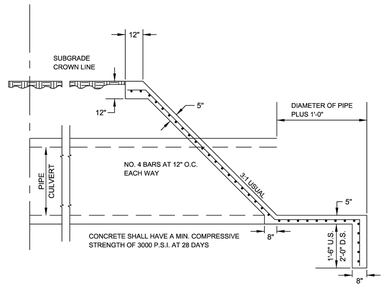
CUDE ENGINEERS
TBPELS No. 10048500

C6.08

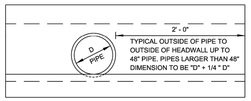
REPRODUCTION OF THE ORIGINAL SIGNED AND SEALED PLAN AND/OR ELECTRONIC MEDIA MAY HAVE BEEN INADVERTENTLY ALTERED. CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE SCALE OF THE DOCUMENT AND CONTACTING CUDE ENGINEERS TO VERIFY DISCREPANCIES PRIOR TO CONSTRUCTION.

RIPRAP HEADWALL

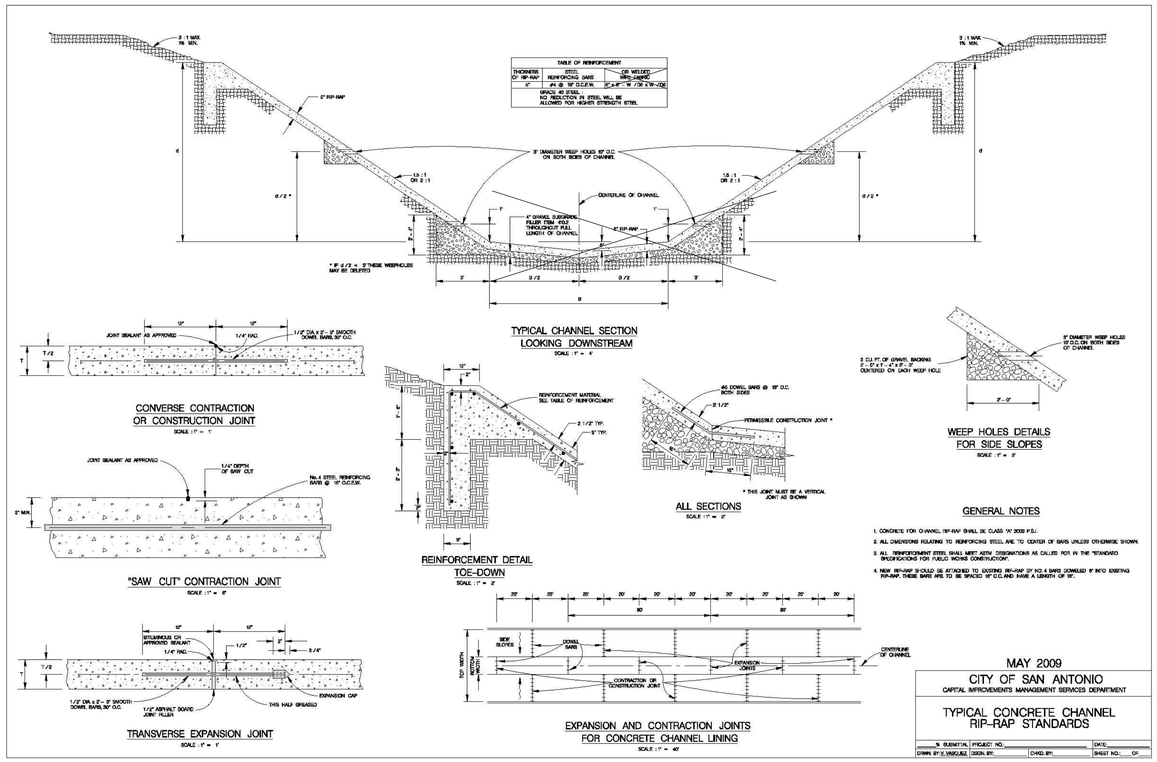
HALF SECTION

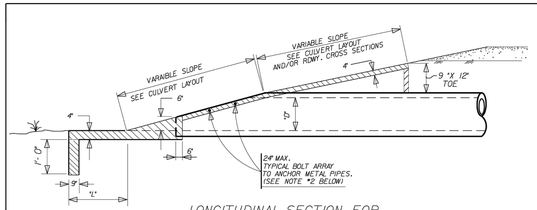


END VIEW

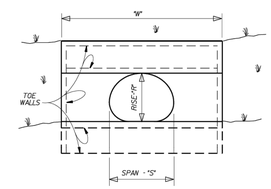


DATE APPROVED: 07/2008	DWG. NO: ST-023	SCALE: N.T.S.	City of New Braunfels ENGINEERING DEPARTMENT
DRAWN BY: RAS	SHEET: 1 OF 1		
FILENAME: RIPRAP HEADWALL			

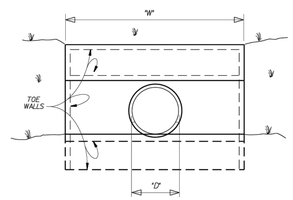




LONGITUDINAL SECTION FOR CIRCULAR & ARCH PIPES



SINGLE C.M.P. ARCH PIPE CULVERT

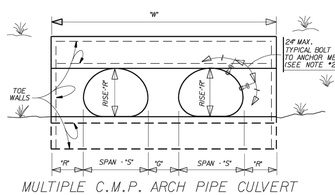


SINGLE CIRCULAR PIPE CULVERT (CMP or RCP)

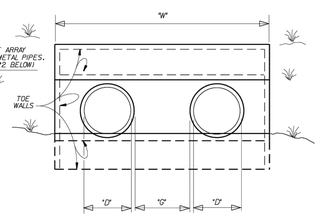
DIMENSIONS FOR CIRCULAR (CMP and RCP) PIPE CULVERTS

"D" INSIDE DIA. of PIPE	"L"	"G"		SINGLE	DOUBLE	TRIPLE	QUADRUPLE
		CGM	RCP	"W"			
18"	2'- 0"	1'- 2"	0'- 9"	4'- 6"	7'- 2"	9'- 10"	12'- 6"
21"	2'- 6"	1'- 3"	0'- 10"	5'- 3"	8'- 4"	11'- 4"	13'- 4"
24"	3'- 0"	1'- 5"	0'- 11"	6'- 0"	9'- 5"	12'- 10"	16'- 3"
30"	4'- 0"	1'- 8"	1'- 1"	7'- 6"	11'- 8"	15'- 10"	20'- 0"
36"	5'- 0"	1'- 11"	1'- 3"	9'- 0"	13'-11"	18'- 10"	23'- 9"
42"	6'- 0"	2'- 2"	1'- 5"	10'- 6"	16'- 2"	21'- 10"	27'- 6"
48"	7'- 0"	2'- 5"	1'- 7"	12'- 0"	18'- 5"	24'- 10"	31'- 3"
54"	8'- 0"	2'- 10"	1'- 11"	13'- 6"	20'- 10"	28'- 2"	35'- 6"
60"	9'- 0"	3'- 2"	2'- 0"	15'- 0"	23'- 2"	31'- 4"	39'- 6"

*"G" IS MEASURED BETWEEN THE OUTER SURFACES OF THE PIPES.



MULTIPLE C.M.P. ARCH PIPE CULVERT



MULTIPLE CIRCULAR PIPE CULVERT (CMP or RCP)

DIMENSIONS FOR C.M.P. ARCH PIPE CULVERTS

DESIGN SIZE	APPROX. ARCH DIM. SPAN "S"	APPROX. ARCH DIM. RISE "R"	"L"	"G"	SINGLE	DOUBLE	TRIPLE	QUADRUPLE
					"W"			
2	21"	15"	2'- 0"	1'- 2"	4'- 3"	7'- 2"	10'- 1"	13'- 0"
3	28"	20"	3'- 0"	1'- 5"	5'- 8"	9'- 5"	13'- 2"	16'- 11"
4	35"	24"	4'- 0"	1'- 8"	6'- 11"	11'- 6"	16'- 1"	20'- 8"
5	42"	29"	5'- 0"	1'- 11"	8'- 4"	13'- 9"	19'- 2"	24'- 7"
6	49"	33"	6'- 0"	2'- 2"	9'- 7"	15'- 10"	22'- 1"	28'- 4"
7	57"	38"	7'- 0"	2'- 5"	11'- 1"	18'- 3"	26'- 5"	32'- 7"
8	64"	43"	8'- 0"	2'- 10"	12'- 5"	20'- 8"	28'- 10"	37'- 0"
9	71"	47"	9'- 0"	3'- 2"	13'- 9"	22'- 10"	31'- 11"	41'- 0"

BASED ON 2-2/3" X 1/2" CORRUGATION
*"G" IS MEASURED BETWEEN THE OUTER SURFACES OF THE PIPES.

NOTES:

1.) FOR RIPRAP QUANTITIES AND SLOPES, SEE CULVERT LAYOUT SHEET. CONCRETE SHALL BE CLASS B UNLESS OTHERWISE SHOWN IN THE PLANS.

2.) ALL METAL PIPES (CIRCULAR AND/OR ARCH) SHALL HAVE 5/8" X 6" GALVANIZED BOLTS WITH 2 HEX NUTS AT 24" CENTERS TO ANCHOR THE PIPE TO THE CONCRETE. THIS WORK WILL BE SUBSIDIARY TO THE RIPRAP HEADWALL.

3.) FOR CONCRETE ARCH PIPES, THE CMP ARCH PIPE CULVERT DIMENSIONS WILL HAVE TO BE ADJUSTED FOR THE PIPE WALL THICKNESS.

4.) FOR PIPES LARGER THAN SHOWN, USE THE CLEAR DISTANCE BETWEEN PIPES SHOWN IN ITEMS 460 AND/OR 464.

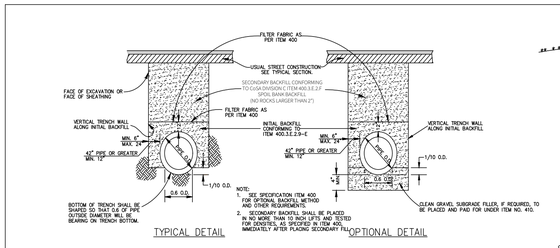
5.) IF THE SIDES OF THE HEADWALL IS ADJACENT TO A RIPRAP SLOPE AND IF THE TOP OF THE HEADWALL IS ADJACENT TO THE ROADWAY FOUNDATION OR RIPRAP SLOPE, THE SIDE AND TOP TOE WALLS MAY BE ELIMINATED IF APPROVED BY THE ENGINEER.

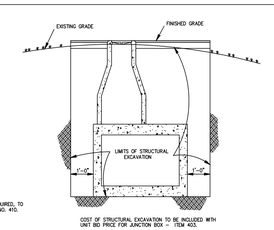
SAN ANTONIO DISTRICT STANDARD
RIPRAP HEADWALL

© 1998 Texas Department of Transportation

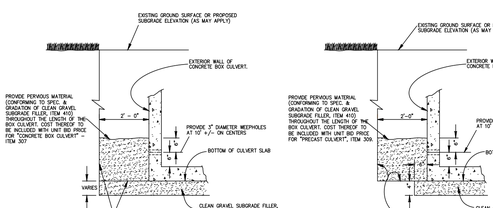
FED.RD. DIV.NO.	PROJECT NO.			SHEET NO.
6				
STATE	DIST. DIVISION	COUNTY		
TEXAS	SAT			
CONT.	SECT.	JOB	HIGHWAY NO.	

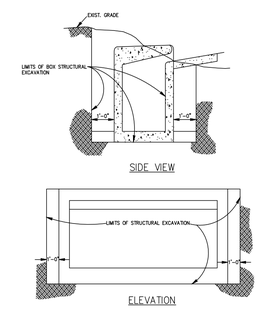
10/95





STRUCTURAL EXCAVATION AT JUNCTION BOXES
NO SCALE





STRUCTURAL EXCAVATIONS AT DRAINAGE INLETS
NO SCALE

MAY 2009
CITY OF SAN ANTONIO
CAPITAL IMPROVEMENTS MANAGEMENT SERVICES DEPARTMENT
PIPE BEDDING & MISCELLANEOUS DRAINAGE DETAILS
N. QUENTAL
PROJECT NO.
DATE:
DRWN. BY:
DSGN. BY:
CHKD. BY:
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

FLYING W
UNIT 1
CONCRETE RIP-RAP & MISC. DRAINAGE DETAILS

DATE
11/24/2025
PROJECT NO.
04024-004
DRAWN BY
C7
CHECKED BY
JL

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

STATE OF TEXAS
JOSE A. LOZANO
126773
LICENSED
PROFESSIONAL ENGINEER
11/26/25
CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
-
SAWS JOB NO.
XX-XXXX

C6.D1

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.

STRUCTURE: DESIGN
Z:\PROJECTS\04024-004\Civil\...dgn

TABLE OF VARIABLE DIMENSIONS AND QUANTITIES FOR ONE HEADWALL (5)

Slope	Dia of Pipe (D)	15° Skew: Values for One Pipe W	15° Skew: Reinf (Lbs) (1)	15° Skew: Conc (CY) (2)	15° Skew: Values To Be Added for Each Add'l Pipe W	15° Skew: Reinf (Lbs) (1)	15° Skew: Conc (CY) (2)	30° Skew: Values for One Pipe W	30° Skew: Reinf (Lbs) (1)	30° Skew: Conc (CY) (2)	30° Skew: Values To Be Added for Each Add'l Pipe W	30° Skew: Reinf (Lbs) (1)	30° Skew: Conc (CY) (2)	45° Skew: Values for One Pipe W	45° Skew: Reinf (Lbs) (1)	45° Skew: Conc (CY) (2)	45° Skew: Values To Be Added for Each Add'l Pipe W	45° Skew: Reinf (Lbs) (1)	45° Skew: Conc (CY) (2)
4:1	12"	9'-4"	124	1.1	1'-9 3/4"	15	0.2	10'-5"	130	1.2	2'-0"	16	0.2	12'-9"	159	1.5	2'-5 3/4"	17	0.3
	15"	10'-7"	136	1.3	2'-3"	17	0.2	11'-10"	159	1.5	2'-6"	18	0.2	14'-6"	191	1.8	3'-0 3/4"	20	0.3
	18"	11'-11"	165	1.5	2'-9"	19	0.3	13'-3"	174	1.7	3'-1"	29	0.3	16'-3"	207	2.1	3'-9 1/2"	33	0.4
	21"	13'-2"	203	1.9	3'-2 1/2"	31	0.4	14'-9"	233	2.1	3'-6 3/4"	33	0.4	18'-0"	276	2.6	4'-4 1/2"	36	0.5
	24"	14'-6"	240	2.1	3'-8 1/2"	34	0.4	16'-2"	251	2.4	4'-1 3/4"	36	0.5	19'-10"	318	2.9	5'-0 3/4"	39	0.6
	27"	15'-9"	258	2.5	4'-0 3/4"	38	0.5	17'-7"	292	2.8	4'-6 1/2"	39	0.6	21'-7"	342	3.4	5'-6 1/2"	44	0.7
	30"	17'-1"	297	2.8	4'-5 3/4"	40	0.6	19'-1"	311	3.1	5'-0"	42	0.6	23'-4"	388	3.8	6'-1 3/4"	47	0.8
	33"	18'-5"	320	3.3	4'-9 3/4"	43	0.6	20'-6"	358	3.6	5'-4 3/4"	46	0.7	25'-1"	439	4.4	6'-7 1/2"	51	0.9
	36"	19'-8"	401	4.0	5'-3"	47	0.9	21'-11"	422	4.5	5'-10 3/4"	50	0.9	26'-10"	517	5.5	7'-2 1/2"	55	1.2
	42"	22'-3"	476	5.0	6'-0 3/4"	53	1.1	24'-10"	528	5.6	6'-8 3/4"	56	1.2	30'-5"	634	6.9	8'-3"	76	1.4
	48"	25'-11"	577	6.6	6'-9 3/4"	60	1.3	28'-10"	637	7.3	7'-7 1/2"	79	1.5	35'-4"	791	9.0	9'-3 1/2"	88	1.8
	54"	28'-6"	711	7.8	7'-5"	83	1.6	31'-9"	781	8.7	8'-8"	81	1.8	38'-11"	958	10.7	10'-7 1/2"	97	2.2
	60"	31'-1"	805	9.2	8'-6 1/2"	91	1.9	34'-8"	881	10.2	9'-6 1/2"	97	2.1	42'-5"	1,113	12.5	11'-8"	124	2.6
	66"	33'-8"	907	10.6	9'-0 3/4"	98	2.1	37'-6"	1,028	11.8	10'-1 1/2"	102	2.4	46'-0"	1,235	14.5	12'-4 1/2"	132	2.9
	72"	36'-3"	1,071	12.1	9'-8"	105	2.4	40'-5"	1,207	13.5	10'-9 1/2"	110	2.6	49'-6"	1,446	16.6	13'-2 1/2"	141	3.2
3:1	12"	13'-6"	178	1.6	1'-9 3/4"	15	0.2	15'-0"	189	1.8	2'-0"	15	0.2	18'-5"	237	2.2	2'-5 3/4"	17	0.2
	15"	15'-3"	212	1.9	2'-3"	17	0.2	17'-0"	223	2.1	2'-6"	17	0.3	20'-10"	276	2.6	3'-0 3/4"	20	0.3
	18"	17'-1"	231	2.3	2'-9"	19	0.3	19'-1"	259	2.5	3'-1"	29	0.3	23'-4"	318	3.1	3'-9 1/2"	32	0.4
	21"	18'-11"	306	2.7	3'-2 1/2"	31	0.4	21'-1"	339	3.0	3'-6 3/4"	33	0.4	25'-10"	413	3.7	4'-4 1/2"	36	0.5
	24"	20'-8"	345	3.1	3'-8 1/2"	35	0.4	23'-1"	384	3.5	4'-1 3/4"	36	0.5	28'-3"	462	4.2	5'-0 3/4"	40	0.6
	27"	22'-6"	376	3.7	4'-0 3/4"	38	0.5	25'-1"	438	4.1	4'-6 1/2"	39	0.6	30'-9"	522	5.0	5'-6 1/2"	44	0.7
	30"	24'-4"	422	4.1	4'-5 3/4"	40	0.6	27'-2"	466	4.6	5'-0"	42	0.6	33'-3"	578	5.6	6'-1 3/4"	47	0.8
	33"	26'-2"	476	4.8	4'-10"	43	0.6	29'-2"	522	5.3	5'-4 3/4"	46	0.7	35'-9"	644	6.5	6'-7 1/2"	51	0.9
	36"	27'-11"	580	5.9	5'-3"	47	0.8	31'-2"	645	6.6	5'-10 1/2"	50	0.9	38'-2"	787	8.0	7'-2 1/2"	56	1.2
	42"	31'-7"	684	7.3	6'-0 3/4"	53	1.1	35'-3"	776	8.2	6'-8 3/4"	56	1.2	43'-2"	933	10.0	8'-3"	79	1.4
	48"	36'-9"	880	9.6	6'-9 3/4"	61	1.3	41'-0"	953	10.7	7'-7 1/2"	81	1.5	50'-2"	1,166	13.1	9'-3 1/2"	88	1.8
	54"	40'-5"	1,065	11.4	7'-9"	85	1.6	45'-0"	1,185	12.7	8'-8"	89	1.8	55'-2"	1,435	15.5	10'-7 1/2"	97	2.2
	60"	44'-0"	1,224	13.3	8'-6 1/2"	93	1.9	49'-1"	1,356	14.8	9'-6 1/2"	96	2.1	60'-1"	1,635	18.2	11'-8"	124	2.6
	66"	47'-7"	1,357	15.4	9'-1"	98	2.1	53'-1"	1,497	17.2	10'-1 1/2"	103	2.3	65'-1"	1,892	21.1	12'-4 1/2"	130	2.9
	72"	51'-3"	1,624	17.7	9'-8"	105	2.3	57'-2"	1,787	19.7	10'-9 1/2"	109	2.6	70'-0"	2,218	24.1	13'-2 1/2"	139	3.2
2:1	12"	17'-7"	232	2.1	1'-9 3/4"	15	0.2	19'-8"	259	2.4	2'-0"	16	0.2	24'-0"	314	2.9	2'-5 3/4"	18	0.2
	15"	19'-11"	272	2.5	2'-3"	17	0.2	22'-3"	301	2.8	2'-6"	18	0.3	27'-3"	361	3.5	3'-0 3/4"	21	0.3
	18"	22'-3"	313	3.0	2'-9"	19	0.3	24'-10"	344	3.3	3'-1"	29	0.3	30'-5"	421	4.0	3'-9 1/2"	32	0.4
	21"	24'-7"	407	3.6	3'-2 1/2"	31	0.4	27'-5"	446	4.0	3'-6 3/4"	33	0.4	33'-7"	549	4.9	4'-4 1/2"	36	0.5
	24"	26'-11"	455	4.1	3'-8 1/2"	35	0.4	30'-0"	499	4.5	4'-1 3/4"	36	0.5	36'-9"	609	5.6	5'-0 3/4"	40	0.6
	27"	29'-3"	514	4.8	4'-0 3/4"	38	0.5	32'-7"	562	5.4	4'-6 1/2"	40	0.6	39'-11"	703	6.6	5'-6 1/2"	43	0.7
	30"	31'-7"	568	5.4	4'-5 3/4"	40	0.6	35'-3"	620	6.0	5'-0"	42	0.6	43'-2"	768	7.4	6'-1 1/2"	49	0.8
	33"	33'-11"	634	6.2	4'-10"	43	0.7	37'-10"	710	7.0	5'-4 3/4"	46	0.7	46'-4"	848	8.5	6'-7 1/2"	52	0.9
	36"	36'-3"	776	7.7	5'-3"	48	0.9	40'-5"	868	8.6	5'-10 3/4"	49	0.9	49'-6"	1,058	10.6	7'-2 1/2"	56	1.1
	42"	40'-11"	921	9.6	6'-0 1/2"	53	1.0	45'-7"	1,022	10.7	6'-8 3/4"	57	1.2	55'-10"	1,262	13.1	8'-3"	78	1.4
	48"	47'-7"	1,152	12.6	6'-10"	61	1.3	53'-1"	1,268	14.0	7'-7 1/2"	80	1.5	65'-1"	1,587	17.2	9'-3 1/2"	86	1.8
	54"	52'-3"	1,416	14.9	7'-9 1/2"	86	1.6	58'-4"	1,589	16.6	8'-8"	89	1.8	71'-5"	1,924	20.4	10'-7 1/2"	95	2.2
	60"	56'-11"	1,606	17.5	8'-6 3/4"	92	1.9	63'-6"	1,806	19.5	9'-6 1/2"	95	2.1	77'-9"	2,192	23.9	11'-8"	122	2.6
	66"	61'-7"	1,819	20.2	9'-0 3/4"	97	2.1	68'-8"	2,019	22.5	10'-1 1/2"	101	2.4	84'-2"	2,472	27.6	12'-4 1/2"	131	2.9
	72"	66'-3"	2,150	23.2	9'-8"	104	2.4	73'-11"	2,379	25.9	10'-9 1/2"	108	2.6	90'-6"	2,937	31.7	13'-2 1/2"	138	3.2
6:1	12"	25'-11"	342	3.1	1'-9 3/4"	15	0.2	28'-10"	374	3.5	2'-0"	16	0.2	35'-4"	456	4.3	2'-5 3/4"	17	0.2
	15"	29'-3"	390	3.7	2'-3"	17	0.2	32'-7"	442	4.2	2'-6"	18	0.2	39'-11"	549	5.1	3'-0 3/4"	20	0.3
	18"	32'-7"	459	4.4	2'-9"	20	0.3	36'-4"	515	4.9	3'-1"	29	0.3	44'-7"	629	6.0	3'-9 1/2"	33	0.4
	21"	36'-0"	608	5.3	3'-2 1/2"	31	0.4	40'-2"	660	5.9	3'-6 3/4"	33	0.4	49'-2"	823	7.2	4'-4 1/2"	38	0.5
	24"	39'-4"	672	6.0	3'-8 1/2"	35	0.4	43'-11"	748	6.7	4'-1 3/4"	36	0.5	53'-9"	920	8.2	5'-0 3/4"	42	0.6
	27"	42'-8"	770	7.1	4'-0 3/4"	38	0.5	47'-8"	852	8.0	4'-6 1/2"	41	0.5	58'-4"	1,039	9.7	5'-6 1/2"	45	0.7
	30"	46'-1"	839	8.0	4'-5 3/4"	40	0.6	51'-5"	949	8.9	5'-0"	44	0.6	62'-11"	1,162	10.9	6'-1 3/4"	48	0.8
	33"	49'-5"	947	9.2	4'-10"	45	0.7	55'-2"	1,040	10.3	5'-4 3/4"	48	0.7	67'-6"	1,292	12.6	6'-7 1/2"	50	0.9
	36"	52'-10"	1,151	11.4	5'-3"	49	0.8	58'-11"	1,287	12.7	5'-10 1/2"	51	1.0	72'-1"	1,583	15.6	7'-2 1/2"	55	1.1
	42"	59'-6"	1,365	14.2	6'-0 1/2"	55	1.0	66'-5"	1,530	15.8	6'-8 3/4"	57	1.2	81'-4"	1,875	19.4	8'-3"	76	1.4
	48"	69'-4"	1,737	18.5	6'-10"	59	1.3	77'-4"	1,942	20.7	7'-7 1/2"	79	1.5	94'-9"	2,368	25.3	9'-3 1/2"	86	1.8
	54"	76'-1"	2,138	22.0	7'-9 1/2"	83	1.6	84'-10"	2,378	24.6	8'-8"	87	1.8	103'-11"	2,912	30.1	10'-7 1/2"	95	2.2
	60"	82'-10"	2,426	25.8	8'-6 3/4"	90	1.9	92'-5"	2,681	28.8	9'-6 1/2"	94	2.1	113'-2"	3,294	35.3	11'-8"	122	2.6
	66"	89'-7"	2,730	29.3	9'-0 3/4"	96	2.1	99'-11"	3,038	33.3	10'-1 1/2"	101	2.4	122'-4"	3,697	40.8	12'-4 1/2"	130	2.9
	72"	96'-3"	3,218	34.2	9'-8"	102	2.4	107'-5"	3,580	38.2	10'-9 1/2"	108	2.6	131'-6"	4,372	46.8	13'-2 1/2"	139	3.2

DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act." No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT has made all reasonable efforts to prepare this standard in accordance with sound engineering practices but cannot be responsible for its accuracy or subsequent revisions. The engineer using this standard bears responsibility for its application and is solely responsible for the results obtained from its use.

DATE:
FILE:

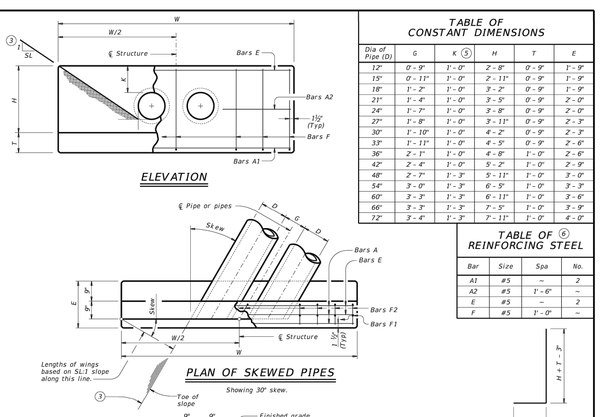
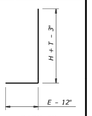


TABLE OF CONSTANT DIMENSIONS

Dia of Pipe (D)	G	K (5)	H	T	E
12"	0'-9"	1'-0"	2'-8"	0'-9"	1'-9"
15"	0'-11"	1'-0"	2'-11"	0'-9"	1'-9"
18"	1'-2"	1'-0"	3'-2"	0'-9"	1'-9"
21"	1'-4"	1'-0"	3'-5"	0'-9"	2'-0"
24"	1'-7"	1'-0"	3'-8"	0'-9"	2'-0"
27"	1'-8"	1'-0"	3'-11"	0'-9"	2'-3"
30"	1'-10"	1'-0"	4'-2"	0'-9"	2'-3"
33"	1'-11"	1'-0"	4'-5"	0'-9"	2'-6"
36"	2'-1"	1'-0"	4'-8"	1'-0"	2'-6"
42"	2'-4"	1'-0"	5'-2"	1'-0"	2'-9"
48"	2'-7"	1'-0"	5'-11"	1'-0"	3'-0"
54"	3'-0"	1'-0"	6'-5"	1'-0"	3'-3"
60"	3'-3"	1'-0"	6'-11"	1'-0"	3'-6"
66"	3'-8"	1'-0"	7'-5"	1'-0"	3'-9"
72"	3'-4"	1'-0"	7'-11"	1'-0"	4'-0"

TABLE OF (6) REINFORCING STEEL

Bar	Size	Spa	No.
A1	#5	~	2
A2	#5	1'-6"	~
E	#5	~	2
F	#5	1'-0"	~



BARS F2

MATERIAL NOTES:
Provide Grade 60 reinforcing steel.
Provide Class C concrete (f'c = 3,600 psi).

GENERAL NOTES:
Designed according to AASHTO LRFD Bridge Design Specifications.
Do not mount bridge rails of any type directly to these culvert headwalls.
This standard may not be used for wall heights, H, exceeding the values shown.

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

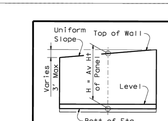
1. Total quantities include one 3'-1" lap for bars over 60' in length.
2. Quantities shown are for concrete pipe and will increase slightly for metal pipe installations.
3. Indicated slope is perpendicular to centerline pipe or pipes.
4. For vehicle safety, construct curbs no more than 3" above finished grade. Reduce curb heights, if necessary, to meet these requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
5. Dimensions shown are usual and maximum.
6. Quantities shown are for one structure end only (one headwall).

Texas Department of Transportation | Bridge Division Standard

CONCRETE HEADWALLS WITH PARALLEL WINGS FOR SKEWED PIPE CULVERTS

CH-PW-S

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



H DEFINITION

PROPERTIES

Wall Height "H" (Ft)	WALL DIMENSIONS Fw	Tw	Sw	Hw	Ft	Kw	Max Soil Press T/SF
2	1'-8"	8"	1'-0"	0	9"	9"	0.11
3	2'-0"	1'-0"	1'-0"	0	9"	9"	0.15
4	2'-8"	1'-4"	1'-0"	4"	1'-0"	9"	0.21
5	3'-6"	1'-9"	1'-0"	9"	1'-0"	9"	0.23
6	4'-3"	2'-2"	1'-0"	1'-1"	1'-0"	9"	0.24
7	5'-0"	2'-6"	1'-0"	1'-6"	1'-0"	9"	0.27
8	5'-8"	2'-10"	1'-0"	1'-10"	1'-0"	9"	0.30
9	6'-4"	3'-2"	1'-0"	2'-2"	1'-0"	9"	0.33
10	7'-0"	3'-6"	1'-0"	2'-6"	1'-0"	9"	0.36
11	7'-9"	3'-10"	1'-0"	2'-11"	1'-0"	9"	0.39
12	8'-6"	4'-3"	1'-0"	3'-3"	1'-0"	9"	0.40
13	9'-2"	4'-7"	1'-0"	3'-7"	1'-0"	9"	0.43
14	9'-10"	4'-11"	1'-0"	3'-11"	1'-0"	1'-0"	0.47
15	10'-6"	5'-3"	1'-1 1/4"	4'-1 3/4"	1'-0"	1'-0"	0.50
16	11'-2"	5'-7"	1'-2"	4'-5"	1'-3"	1'-0"	0.54
17	11'-10"	5'-11"	1'-3 1/4"	4'-7 3/4"	1'-3"	1'-3"	0.58
18	12'-6"	6'-3"	1'-4"	4'-11"	1'-6"	1'-3"	0.63
19	13'-3"	6'-7"	1'-5"	5'-3"	1'-6"	1'-6"	0.66
20	13'-10"	6'-11"	1'-6 1/4"	5'-4 3/4"	1'-6"	1'-6"	0.70
21	14'-6"	7'-3"	1'-7"	5'-8"	1'-9"	1'-6"	0.75
22	15'-2"	7'-7"	1'-8 1/4"	5'-10 3/4"	1'-9"	1'-6"	0.78
23	16'-0"	8'-0"	1'-9 1/4"	6'-2 3/4"	1'-9"	1'-6"	0.79
24	16'-6"	8'-3"	1'-10 1/4"	6'-4 3/4"	2'-0"	1'-6"	0.86
25	17'-3"	8'-7"	1'-11 1/4"	6'-8 3/4"	2'-0"	1'-6"	0.89
26	18'-0"	9'-0"	2'-0 1/4"	6'-11 3/4"	2'-3"	1'-6"	0.93
27	18'-6"	9'-3"	2'-1 1/4"	7'-1"	2'-3"	1'-6"	0.97
28	19'-3"	9'-7"	2'-2 3/4"	7'-5 3/4"	2'-3"	1'-9"	1.00
29	20'-0"	10'-0"	2'-3 1/2"	7'-8 1/2"	2'-3"	1'-9"	1.02
30	20'-6"	10'-4"	2'-4 3/4"	7'-9 3/4"	2'-3"	1'-9"	1.06
31	21'-3"	10'-7"	2'-5 3/4"	8'-2 1/4"	2'-3"	1'-9"	1.09
32	22'-0"	11'-0"	2'-6 1/2"	8'-5 1/2"	2'-6"	1'-9"	1.13

REINFORCING STEEL FOR ONE 32' PANEL (DESIGN A)

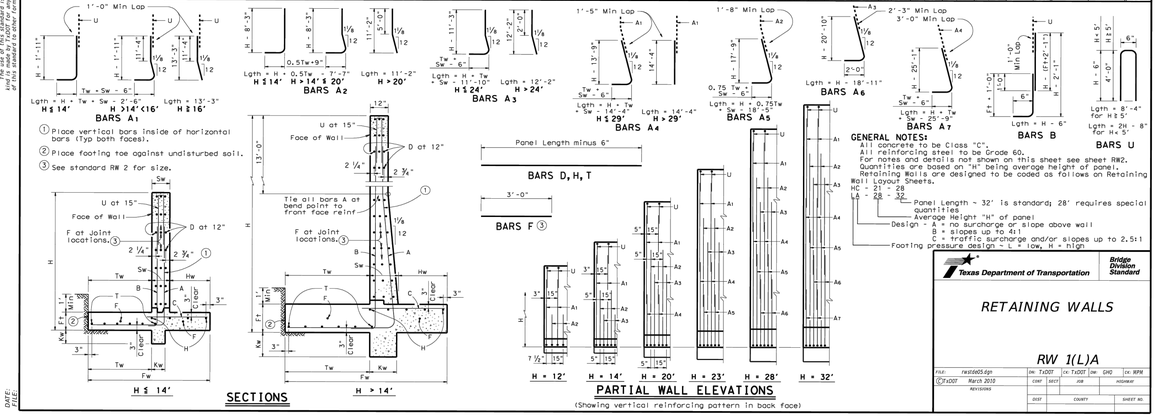
Wall Height "H" (Ft)	A1 ~ 26 #5 at 15" c-c Lgth	Wt	A2 ~ 25 #6 at 15" c-c Lgth	Wt	A3 ~ 25 #7 at 15" c-c Lgth	Wt	A4 ~ 26 #8 at 15" c-c Lgth	Wt	A5 ~ 25 #9 at 15" c-c Lgth	Wt	A6 ~ 25 #11 at 15" c-c Lgth	Wt	A7 ~ 26 #11 at 15" c-c Lgth	Wt	B ~ 26 #5 at 15" c-c Lgth	Wt	C Lgth	Wt	Size	No	Spa	Lgth	Wt
2																	3'-6"	95	#4	26	15"	1'-10"	32
3																	4'-6"	122	#4	26	15"	2'-3"	39
4			3'-10"	104													5'-6"	149	#4	26	15"	2'-8"	46
5			6'-8"	181													6'-6"	176	#4	26	15"	3'-0"	52
6			9'-4"	253													7'-6"	203	#4	26	15"	3'-4"	58
7			10'-8"	284													8'-6"	231	#4	26	15"	3'-8"	64
8			12'-0"	325	4'-2"	156											9'-6"	258	#4	38	10"	4'-0"	102
9			13'-4"	362	5'-4"	200											10'-6"	285	#6	38	10"	4'-4"	247
10			14'-9"	400	6'-7"	247											11'-6"	312	#6	38	10"	4'-9"	271
11			16'-1"	436	7'-8"	288	6'-9"	345									12'-6"	339	#7	38	10"	5'-1"	395
12			17'-5"	472	8'-11"	335	8'-1"	413									13'-6"	366	#8	38	10"	5'-5"	550
13			18'-10"	511	10'-1"	379	9'-6"	485									14'-6"	393	#9	38	10"	5'-9"	743
14			20'-2"	547	11'-3"	423	10'-11"	558	8'-5"	584							15'-6"	420	#9	38	10"	6'-1"	786
15			21'-6"	583	12'-5"	466	12'-4"	630	9'-10"	683							16'-6"	447	#9	38	10"	6'-5"	829
16			22'-11"	621	13'-7"	510	13'-9"	703	11'-2"	775							17'-6"	475	#9	38	10"	6'-9"	872
17			24'-3"	659	14'-9"	554	15'-2"	775	12'-8"	879							18'-6"	502	#9	38	10"	7'-2"	926
18			25'-7"	695	15'-11"	598	16'-7"	847	14'-1"	978							19'-6"	529	#10	38	10"	7'-5"	1213
19			26'-11"	732	17'-1"	642	17'-11"	919	15'-4"	1070	9'-7"	815					20'-6"	556	#10	38	10"	7'-9"	1267
20			28'-4"	768	18'-4"	686	19'-5"	992	16'-7"	1174	10'-11"	928					21'-6"	583	#10	38	10"	8'-1"	1322
21			29'-8"	805	19'-6"	730	20'-11"	1069	18'-0"	1278	12'-4"	1048					22'-6"	610	#8	76	5"	8'-6"	1725
22			31'-0"	841	20'-8"	774	22'-5"	1137	19'-3"	1371	13'-7"	1155					23'-6"	637	#8	76	5"	8'-9"	1776
23			32'-4"	877	21'-10"	818	23'-11"	1219	20'-6"	1475	14'-11"	1268					24'-6"	664	#8	76	5"	9'-2"	1860
24			33'-8"	914	23'-0"	862	25'-5"	1302	21'-9"	1579	16'-2"	1388	7'-1"	941			25'-6"	692	#8	76	5"	9'-6"	1928
25			35'-1"	950	24'-2"	906	26'-11"	1386	23'-0"	1684	17'-8"	1502	8'-1"	1074			26'-6"	719	#9	76	5"	9'-10"	2541
26			36'-5"	987	25'-4"	950	28'-5"	1469	24'-3"	1788	19'-0"	1615	9'-1"	1206			27'-6"	746	#9	76	5"	10'-1"	2606
27			37'-9"	1023	26'-6"	994	29'-11"	1552	25'-6"	1893	20'-5"	1735	10'-1"	1339			28'-6"	773	#9	76	5"	10'-5"	2692
28			39'-2"	1060	27'-8"	1038	31'-5"	1636	26'-9"	1997	21'-9"	1849	11'-1"	1472	17'-0"	2348	29'-6"	800	#10	76	5"	10'-9"	3516
29			40'-6"	1096	28'-10"	1082	32'-11"	1719	28'-0"	2102	22'-11"	1964	12'-1"	1605	18'-4"	2533	30'-6"	827	#10	76	5"	11'-2"	3652
30			41'-10"	1133	30'-0"	1126	34'-5"	1803	29'-3"	2207	24'-5"	2075	13'-1"	1738	19'-10"	2740	31'-6"	854	#10	76	5"	11'-6"	3761
31			43'-3"	1169	31'-2"	1170	35'-11"	1886	30'-6"	2312							32'-6"	881					
32			44'-7"	1206	32'-4"	1214	37'-5"	1969	31'-9"	2417							33'-6"	908					

Wall Height "H" (Ft)	CONC (CY)	REINF (LB)
2	3.6	312
3	5.1	506
4	7.4	873
5	9.6	1079
6	11.6	1259
7	13.7	1401
8	15.7	1575
9	17.7	1714
10	19.6	2082
11	21.7	2436
12	23.8	2651
13	25.8	3364
14	28.2	3771
15	30.3	4253
16	36.0	4974
17	38.5	5369
18	44.3	5682
19	48.1	6057
20	50.9	6692
21	57.7	7681
22	61.0	8126
23	64.8	8997
24	72.4	9416
25	76.4	10112
26	85.2	10698
27	89.0	11757
28	94.5	12293
29	99.2	12874
30	103.3	15515
31	108.2	16209
32	118.9	16837

QUANTITY FOR ONE 32' PANEL

DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act." No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT has made all reasonable efforts to prepare this standard in accordance with sound engineering practices but cannot be responsible for its accuracy or subsequent revisions. The engineer using this standard bears responsibility for its application and is solely responsible for the results obtained from its use.

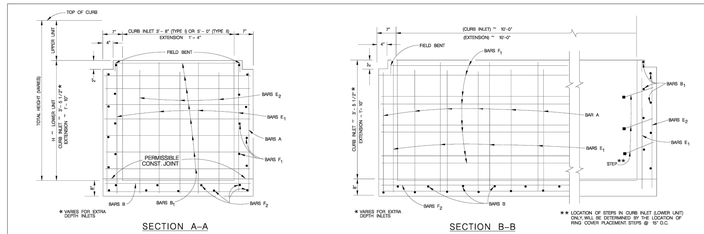
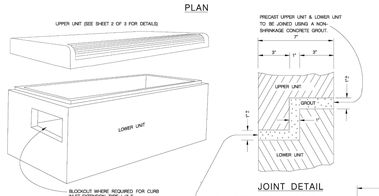
DATE:
FILE:

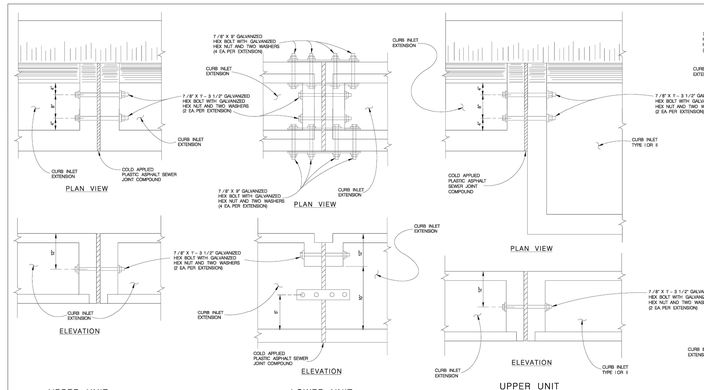


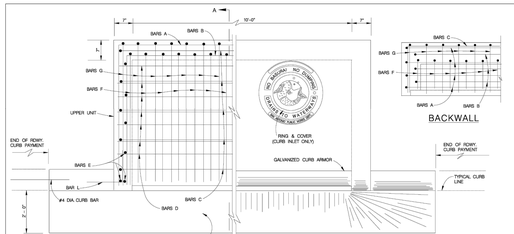
1. Place vertical bars inside of horizontal bars (typ both faces).
2. Place footing toe against undisturbed soil.
3. See standard RW 2 for size.

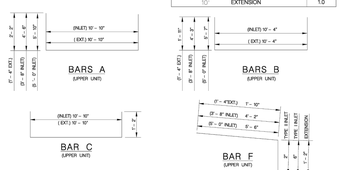
GENERAL NOTES:
All concrete to be Class "C".
All reinforcing steel to be Grade 60.
For notes and details not shown on this sheet see sheet RW2.
Quantities are based on "H" being average height of panel.
Retaining Walls are designed to be coded as follows on Retaining Wall Layout Sheets.
HC - 21 - 28
LA - 28 - 32
- Panel Length - 32' is standard; 28' requires special quantities
- Average Height "H" of panel
- Design - A = no surcharge or slope above wall; B = slopes up to 4:1; C = traffic surcharge and/or slopes up to 2.5:1
- Footing pressure design - L = low, H = high

Texas


TOP OF CURB
CURB INLET 3'-8" (TYPE I) OR 5'-0" (TYPE II) EXTENSION 1'-4"
FIELD BENT
UPPER UNIT
LOWER UNIT
TOTAL HEIGHT (VARIES)
PERMISSIBLE CONST JOINT
BARS E2
BARS E1
BARS A
BARS F1
BARS B1
BARS F2
* VARIES FOR EXTRA DEPTH INLETS
SECTION A-A
CURB INLET 3'-8" (TYPE I) OR 5'-0" (TYPE II) EXTENSION 1'-4"
(CURB INLET) = 10'-0" (EXTENSION) = 10'-0"
BARS F1
BARS B1
BARS A
BARS E2
BARS E1
STEP**
BARS B
BARS F2
* 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
BARS E1
BARS F1
BARS A
BARS B
BARS E2
BARS E
BARS F2
FLOOR STEEL
WALL STEEL
PLAN
SEE NOTE 2
JOINT
JOINT
5" MINIMUM
H4=S+T+4" (11" MIN.)
S=DEPTH OF PAVEMENT SECTION
T="PLATE" THICKNESS
PHASE CONSTRUCTION
NOTES FOR PHASE CONSTRUCTION: (WHEN DIRECTED BY THE ENGINEER)
1. THE CURB INLET AND EXTENSION SHALL BE CONSTRUCTED TO A DEPTH "H4" BELOW THE INLET AND EXTENSION GUTTER LINE 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 PAVING OVERLAY, SAW CUT THE PAVEMENT, REMOVE THE PLATE AND CONSTRUCT THE UPPER PORTION OF THE CURB INLET AND / OR EXTENSION.
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"
B1 VARIES #4 12" 4'-8"
C1 20 #4 18"± VARIES
E2 6 #4 18"± VARIES
F1 VARIES #4 12"± 10'-10"
F2 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"
B1 VARIES #4 12" 5'-10"
C1 22 #4 18"± VARIES
E2 8 #4 18"± VARIES
F1 VARIES #4 12"± 12'-10"
F2 11 #4 --- 10'-10"
GENERAL NOTES
1. S INLETS AND S' EXTENSIONS MUST BE IN ACCORDANCE WITH THE LATEST TXDOT CURB INLET TYPE "C" AND EXTENSION TYPE E (L-C).
2. TYPE C-II INLET TO BE USED ONLY WHEN STORM SEWER 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 PAVED A MAXIMUM OF 6".






SEE SHEET 1 OF 3 FOR GENERAL NOTES.
REINFORCING STEEL (FOR Hu=11')
UPPER UNIT 10' X 3'-8" (TYPE I)
BAR NO. SIZE SPAC. LENGTH WEIGHT
A 4 #4 --- 19'-10" 53
B 3 #4 --- 18'-10" 38
C 5 #4 11" 13'-2" 44
D 7 #4 6" 10'-10" 51
E 12 #4 11" 1'-2" 9
F 21 #5 6" 4'-0" 147
G 22 #6 6" 5'-4" 167
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' (TYPE II)
BAR NO. SIZE SPAC. LENGTH WEIGHT
A 4 #4 --- 22'-6" 60
B 3 #4 --- 21'-6" 43
C 7 #4 11" 13'-2" 62
D 11 #4 6" 10'-10" 80
E 16 #4 11" 1'-2" 13
F 21 #5 6" 4'-0" 179
G 22 #6 6" 7'-0" 191
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


MAY 2009
CITY OF SAN ANTONIO
CAPITAL IMPROVEMENTS MANAGEMENT SERVICES DEPARTMENT
TYPE "C" INLET (TYPE I & II) & INLET EXTENSION STANDARDS
SHEET 1 OF 3
% SUBMITTAL PROJECT NO.: DATE:
DRAWN BY: V. VASQUEZ DESIGN BY: L.E. MALTOS, P.E. CHKD. BY: B.S. HOSSEINI, P.E. SHEET NO.: 1 OF 3
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 DESIGN BY: L.E. MALTOS, P.E. CHKD. BY: B.S. HOSSEINI, P.E. SHEET NO.: 2 OF 3
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 DESIGN BY: L.E. MALTOS, P.E. CHKD. BY: B.S. HOSSEINI, P.E. SHEET NO.: 3 OF 3

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

FLYING W
UNIT 1

TYPE C CURB INLET PRECAST DRAINAGE DETAILS

DATE
11/24/2025
PROJECT NO.
04024-004
DRAWN BY
C7
CHECKED BY
JL

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

STATE OF TEXAS
JOSE A. LOZANO
126773
LICENSED
PROFESSIONAL ENGINEER
11/26/25
CUDE ENGINEERS
TBPE LS No. 10048500

PLAT NO.
-

C6.D3

S:\04024\03\12-2000\C4 Files\03_C6.D3.DWG Aug 2023 A1 (24.00 x 36.00in) - Inglenook

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.

ELEVATIONS:

XXXX.XX PROPOSED TOP OF CONCRETE CURB ELEVATION

XXXX.XX$_a$ PROPOSED ASPHALT PAVEMENT ELEVATION

KEYNOTES:

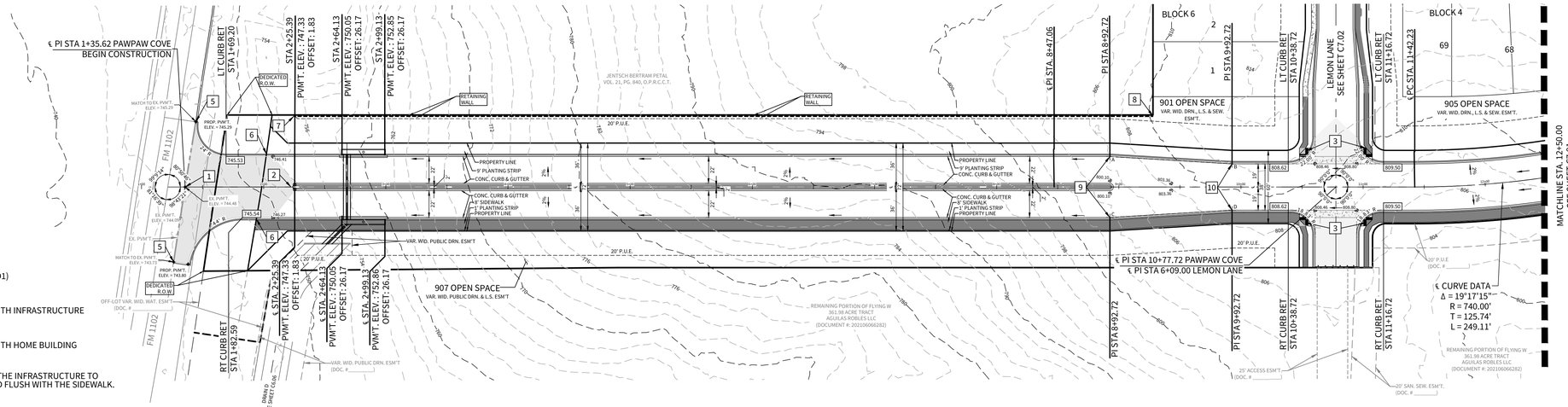
1. BEGIN WASHOUT STA. 1+35.62
2. END WASHOUT STA. 2+22.05
3. ADA RAMP TO BE BUILT WITH INFRASTRUCTURE
4. CONTRACTOR TO INSTALL 5' X 5' SIDEWALK PASSING SPACE WITH INFRASTRUCTURE
5. BEGIN HEADER CURB
6. END HEADER CURB
7. BEGIN RETAINING WALL
8. END RETAINING WALL
9. BEGIN STREET TRANSITION FROM MAJOR COLLECTOR TO MINOR COLLECTOR (SEE POINT AND LINE TABLE) STA. 8+92.72
10. END STREET TRANSITION FROM MAJOR COLLECTOR TO MINOR COLLECTOR (SEE POINT AND LINE TABLE) STA. 9+92.69

LEGEND

- CROSS GUTTER
- STREET WASHOUT (SEE SHEET C7.D1)
- SIDEWALK TO BE CONSTRUCTED WITH INFRASTRUCTURE
- SIDEWALK TO BE CONSTRUCTED WITH HOME BUILDING
- SIDEWALK TO BE INSTALLED WITH THE INFRASTRUCTURE TO ENSURE MANHOLES ARE INSTALLED FLUSH WITH THE SIDEWALK.

SPEED LIMIT DESIGNATED BY STREET TYPE;
RESIDENTIAL 20 MPH
RESIDENTIAL COLLECTOR 30 MPH
MINOR COLLECTOR 35 MPH
TxDOT TYPE "2" WHEEL CHAIR RAMPS ARE INDICATED THUS " " OR " " UNLESS OTHERWISE NOTED. (SHEET C7.D7)
FOR ADA RAMPS AT SIDEWALK INTERSECTIONS
TYPE "10" DIRECTIONAL WHEEL CHAIR RAMPS ARE INDICATED THUS " " OR " " UNLESS OTHERWISE NOTED.

FOR ADA RAMPS AT SIDEWALK INTERSECTIONS .
DETECTABLE WARNING PAVER WITH TRUNCATED DOMES ONLY. ALL PEDESTRIAN CROSSING RAMPS TO BE BUILT WITH INFRASTRUCTURE DURING STREET CONSTRUCTION (SEE DETAIL SHEET C7.D7)

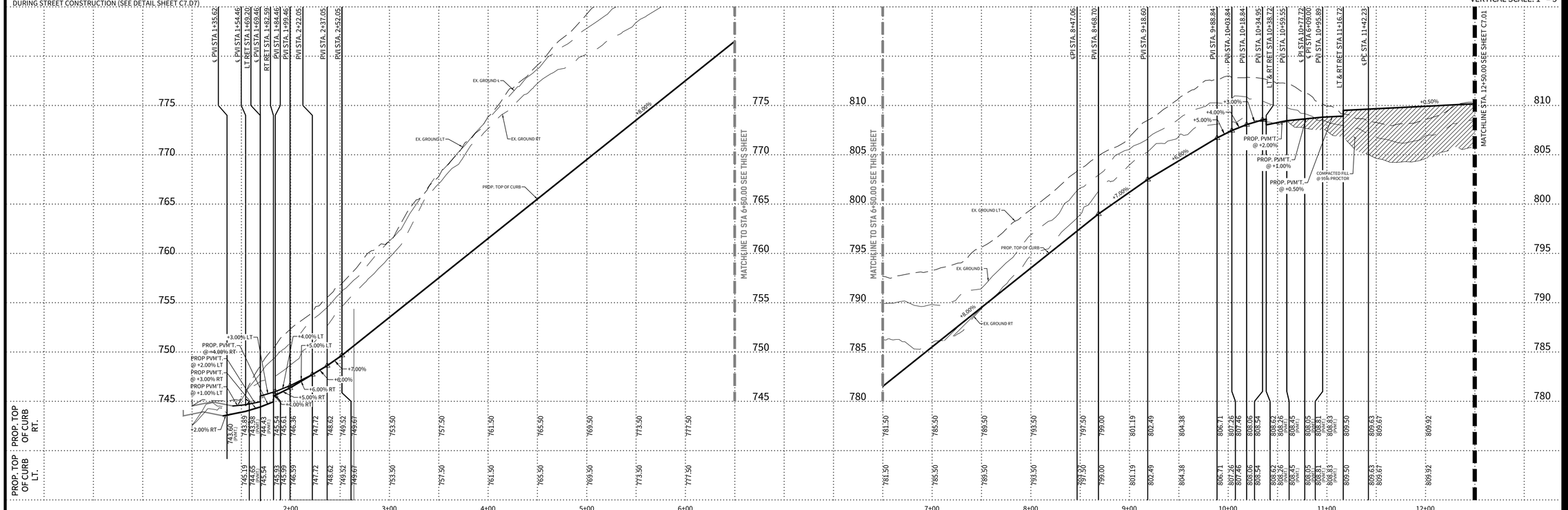


Point	Elevation	Description
A	800.68	PVMT
B	806.9	PVMT
C	800.68	PVMT
D	806.9	PVMT

PAWPAW COVE

STA. 1+41.54 TO 12+50.00

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



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P:(210) 681.2951 F: (210) 523.7112

FLYING W UNIT 1

STREET PLAN & PROFILE - PAWPAW COVE

DATE 11/26/2025

PROJECT NO. 04024-004

DRAWN BY C7

CHECKED BY JL

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

STATE OF TEXAS
JOSE A. LOZANO
126773
LICENSED
PROFESSIONAL ENGINEER
11/26/25

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO. -

C7.00

© 2025 CUDE ENGINEERS

ELEVATIONS:

XXXX.XX PROPOSED TOP OF CONCRETE CURB ELEVATION

XXXX.XX$_a$ PROPOSED ASPHALT PAVEMENT ELEVATION

KEYNOTES:

1. CONTRACTOR TO CONSTRUCT ADA RAMP WITH INFRASTRUCTURE
2. CONTRACTOR TO INSTALL SIDEWALK WITH INFRASTRUCTURE
3. CONTRACTOR TO INSTALL 8' SIDEWALK WITH INFRASTRUCTURE
4. CONTRACTOR TO INSTALL 5' X 5' SIDEWALK PASSING SPACE WITH INFRASTRUCTURE

LEGEND

CROSS GUTTER

STREET WASHOUT (SEE SHEET C7.D1)

SIDEWALK TO BE CONSTRUCTED WITH INFRASTRUCTURE

SIDEWALK TO BE CONSTRUCTED WITH HOME BUILDING

SIDEWALK TO BE INSTALLED WITH THE INFRASTRUCTURE TO ENSURE MANHOLES ARE INSTALLED FLUSH WITH THE SIDEWALK.

SPEED LIMIT DESIGNATED BY STREET TYPE;

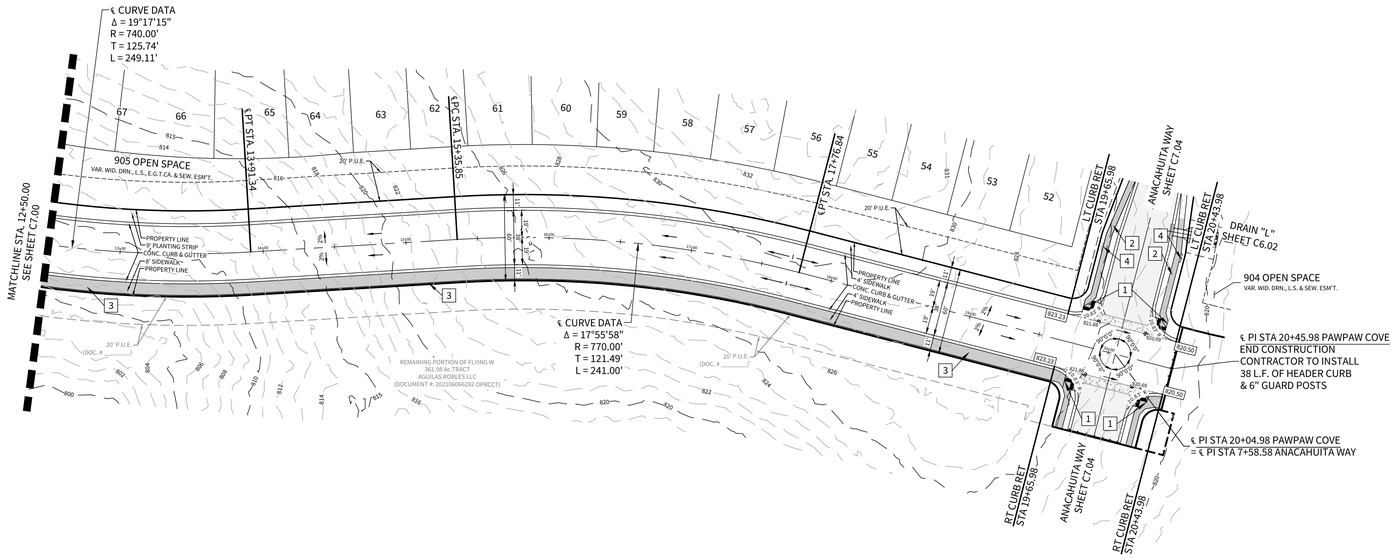
RESIDENTIAL	20 MPH
RESIDENTIAL COLLECTOR	30 MPH
MINOR COLLECTOR	35 MPH

TxDOT TYPE "2" WHEEL CHAIR RAMPS ARE INDICATED THUS " " OR " " UNLESS OTHERWISE NOTED. (SHEET C7.D7)

FOR ADA RAMPS AT SIDEWALK INTERSECTIONS

TYPE "10" DIRECTIONAL WHEEL CHAIR RAMPS ARE INDICATED THUS " " OR " " UNLESS OTHERWISE NOTED.

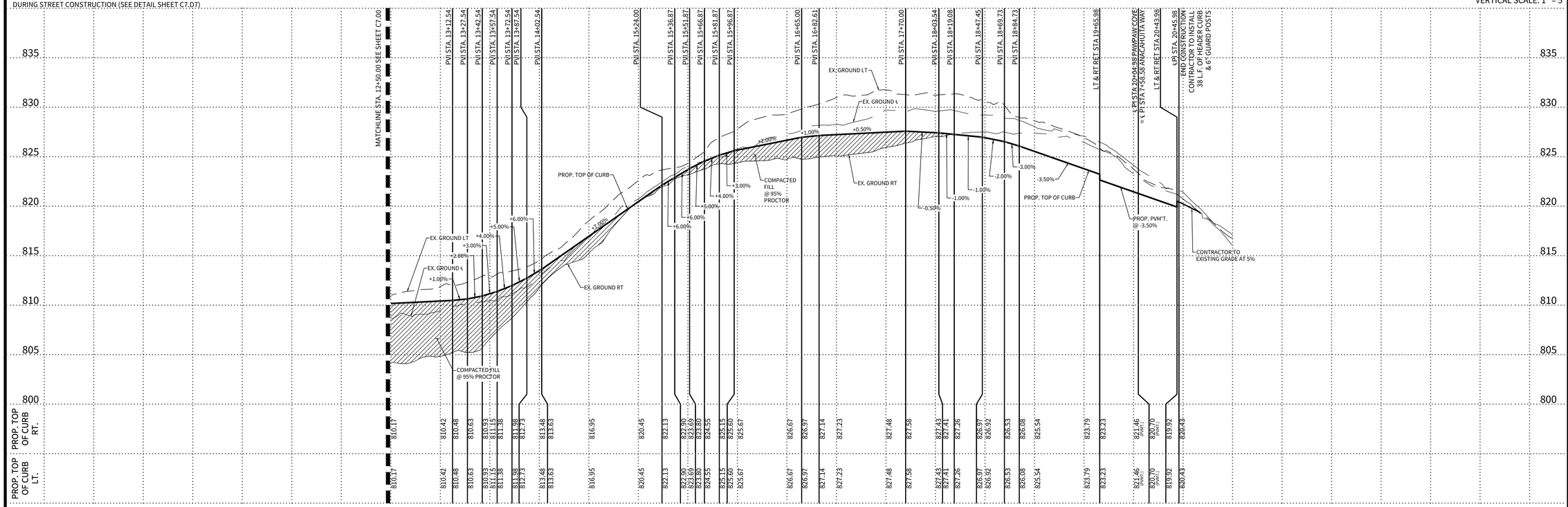
FOR ADA RAMPS AT SIDEWALK INTERSECTIONS . DETECTABLE WARNING PAVER WITH TRUNCATED DOMES ONLY. ALL PEDESTRIAN CROSSING RAMPS TO BE BUILT WITH INFRASTRUCTURE DURING STREET CONSTRUCTION (SEE DETAIL SHEET C7.D7)



PAWPAW COVE

STA. 12+50.00TO END

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



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FLYING W UNIT 1

STREET PLAN & PROFILE - PAWPAW COVE

DATE
11/26/2025

PROJECT NO.
04024-004

DRAWN BY
C7

CHECKED BY
JL

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

STATE OF TEXAS
JOSE A. LOZANO
126773
LICENSED
PROFESSIONAL ENGINEER
11/26/25

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
-

C7.01

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R:\04024\04012-SWGM\Plans\C7.01 STREET PLAN & PROFILE - PAWPAW COVE.dwg, 8/5/2025 5:00pm, hsantos

ELEVATIONS:

XXXX.XX PROPOSED TOP OF CONCRETE CURB ELEVATION

XXXX.XX$_{a}$ PROPOSED ASPHALT PAVEMENT ELEVATION

KEYNOTES:

1. CONTRACTOR TO INSTALL 5' X 5' SIDEWALK PASSING SPACE WITH HOMEBUILDING
2. CONTRACTOR TO CONSTRUCT ADA RAMP WITH INFRASTRUCTURE
3. CONTRACTOR TO INSTALL SIDEWALK WITH INFRASTRUCTURE
4. BEGIN WASHOUT STA. 0+03.90 PVM'T. ELEV. = 803.23'
5. END WASHOUT STA. 1+73.86 PVM'T ELEV. = 805.46'
6. BEGIN STREET TRANSITION STA. 4+80.00 FROM RESIDENTIAL TO RESIDENTIAL COLLECTOR (SEE POINT AND LINE TABLE)
7. END STREET TRANSITION STA. 5+25.00 FROM RESIDENTIAL TO RESIDENTIAL COLLECTOR (SEE POINT AND LINE TABLE)
8. BEGIN WASHOUT STA. 5+52.53 PVM'T. ELEV. = 808.99'
9. END WASHOUT STA. 5+88.83 PVM'T ELEV. = 808.81'
10. CONTRACTOR TO INSTALL 5' X 5' SIDEWALK PASSING SPACE WITH INFRASTRUCTURE

LEGEND

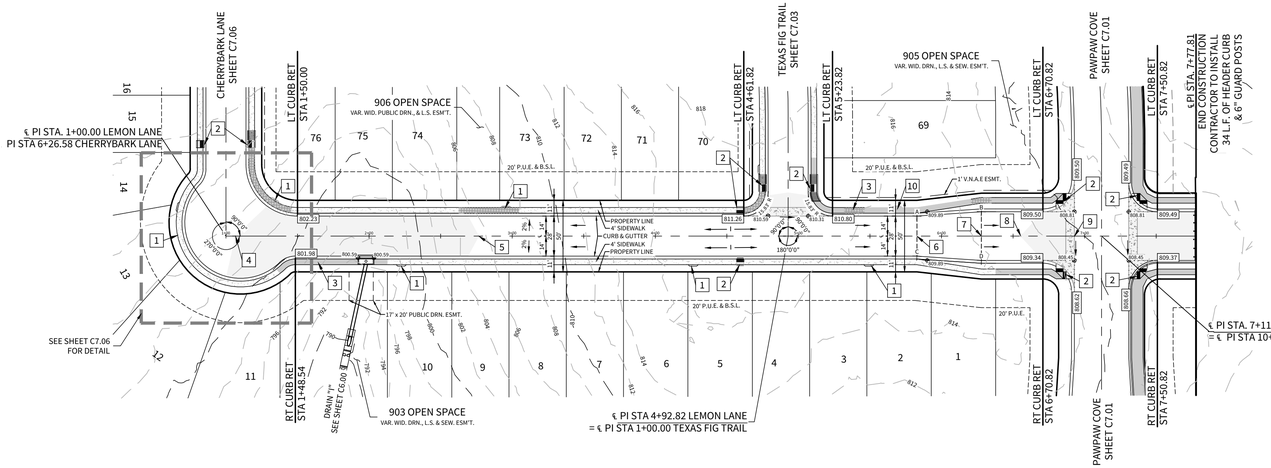
- CROSS GUTTER
- STREET WASHOUT (SEE SHEET C7.D1)
- SIDEWALK TO BE CONSTRUCTED WITH INFRASTRUCTURE
- SIDEWALK TO BE CONSTRUCTED WITH HOME BUILDING
- SIDEWALK TO BE INSTALLED WITH THE INFRASTRUCTURE TO ENSURE MANHOLES ARE INSTALLED FLUSH WITH THE SIDEWALK.

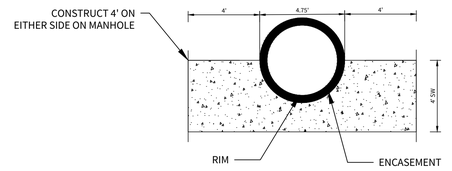
SPEED LIMIT DESIGNATED BY STREET TYPE;

RESIDENTIAL	20 MPH
RESIDENTIAL COLLECTOR	30 MPH
MINOR COLLECTOR	35 MPH

TxDOT TYPE "2" WHEEL CHAIR RAMPS ARE INDICATED THUS " " OR " " UNLESS OTHERWISE NOTED. (SHEET C7.D7)
FOR ADA RAMPS AT SIDEWALK INTERSECTIONS
TYPE "10" DIRECTIONAL WHEEL CHAIR RAMPS ARE INDICATED THUS " " OR " " UNLESS OTHERWISE NOTED.

FOR ADA RAMPS AT SIDEWALK INTERSECTIONS . DETECTABLE WARNING PAVER WITH TRUNCATED DOMES ONLY. ALL PEDESTRIAN CROSSING RAMPS TO BE BUILT WITH INFRASTRUCTURE DURING STREET CONSTRUCTION (SEE DETAIL SHEET C7.D7).





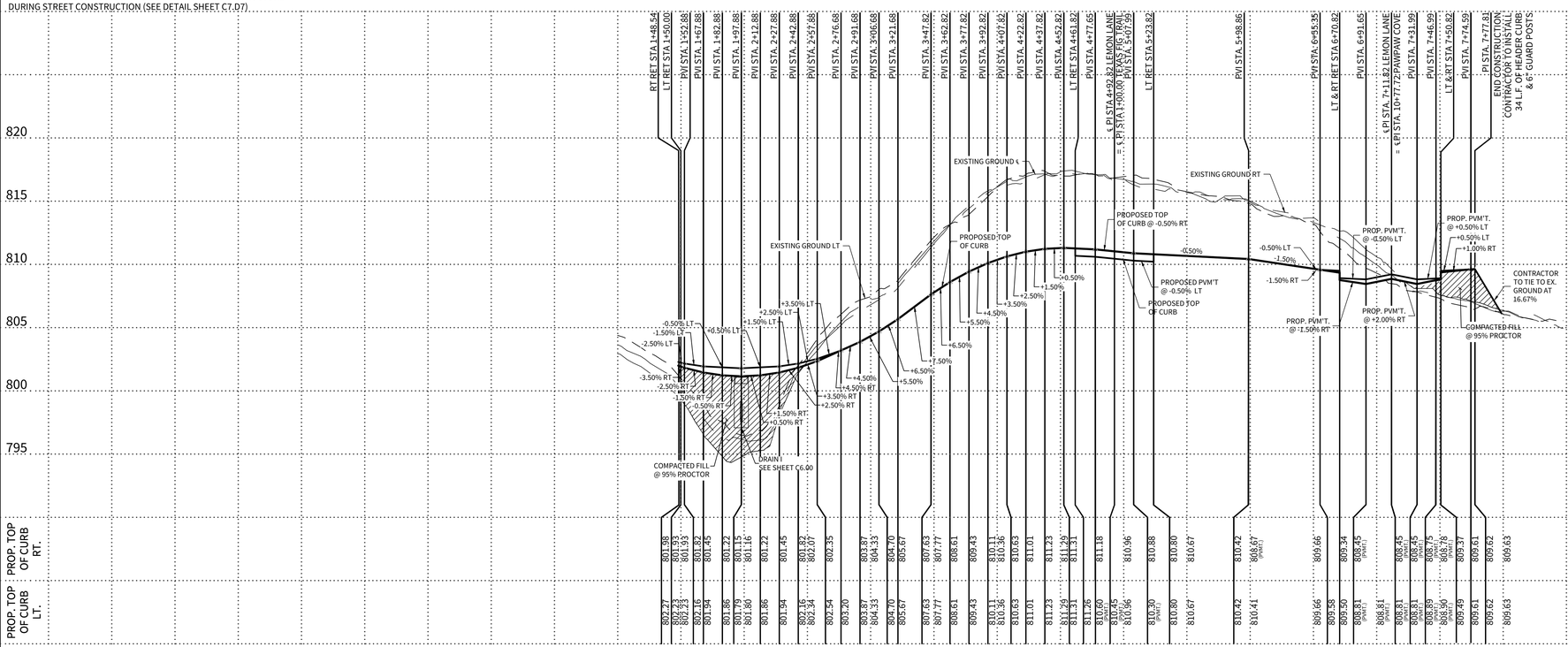
TYPICAL SANITARY SEWER IN SIDEWALLK DETAIL
N.T.S.

Point	Elevation	Description
A	809.92	PVMT
B	809.41'	PVMT
C	809.92	PVMT
D	809.41'	PVMT

LEMON LANE

STA. 1+00.00 TO END

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

FLYING W UNIT 1

STREET PLAN & PROFILE - LEMON LANE

DATE
11/26/2025

PROJECT NO.
04024-004

DRAWN BY
C7

CHECKED BY
JL

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

STATE OF TEXAS
JOSE A. LOZANO
126773
LICENSED
PROFESSIONAL ENGINEER
11/26/25

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
-

C7.02

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.

S:\04024\04-02 Plans\C7.02 STREET PLANS & PROFILE - LEMON LANE.dwg 2025.11.26 5:43pm hsowers

ELEVATIONS:

XXXX.XX PROPOSED TOP OF CONCRETE CURB ELEVATION

XXXX.XX$_{a}$ PROPOSED ASPHALT PAVEMENT ELEVATION

KEYNOTES:

1. CONTRACTOR TO INSTALL 5' X 5' SIDEWALK PASSING SPACE WITH HOMEBUILDING
2. CONTRACTOR TO CONSTRUCT ADA RAMP WITH INFRASTRUCTURE
3. CONTRACTOR TO INSTALL SIDEWALK WITH INFRASTRUCTURE
4. BEGIN WASHOUT STA. 1+15.17 PVM'T. ELEV. = 810.55
5. END WASHOUT STA. 1+30.37 PVM'T. ELEV. = 811.06
6. BEGIN WASHOUT STA. 5+99.39 PVM'T. ELEV. = 827.39
7. END WASHOUT STA. 8+49.27 PVM'T. ELEV. = 827.39
8. BEGIN WASHOUT STA. 9+59.23 PVM'T. ELEV. = 824.74
9. END WASHOUT STA. 10+06.57 PVM'T. ELEV. = 823.45
10. CONTRACTOR TO INSTALL 5' X 5' SIDEWALK PASSING SPACE WITH INFRASTRUCTURE

LEGEND

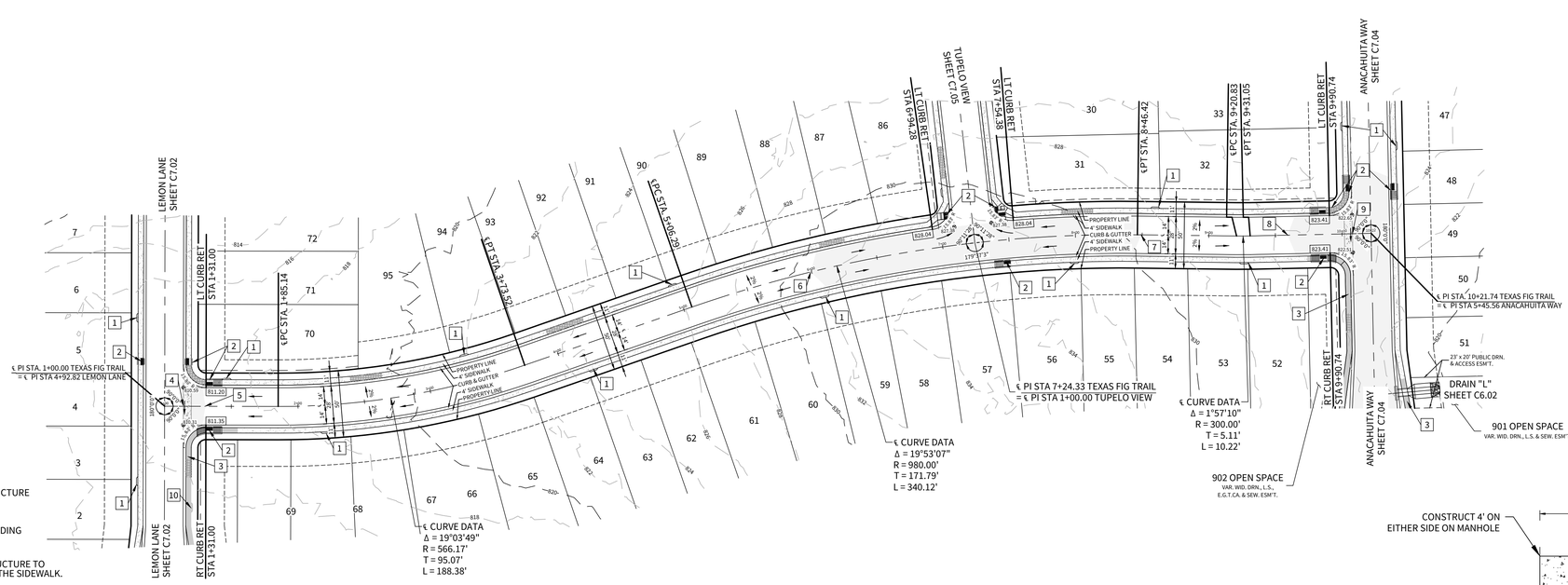
- CROSS GUTTER
- STREET WASHOUT (SEE SHEET C7.D1)
- SIDEWALK TO BE CONSTRUCTED WITH INFRASTRUCTURE
- SIDEWALK TO BE CONSTRUCTED WITH HOME BUILDING
- SIDEWALK TO BE INSTALLED WITH THE INFRASTRUCTURE TO ENSURE MANHOLES ARE INSTALLED FLUSH WITH THE SIDEWALK.

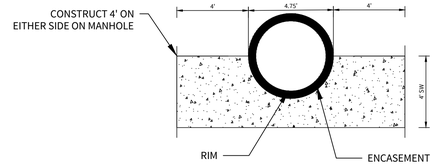
SPEED LIMIT DESIGNATED BY STREET TYPE;

RESIDENTIAL	20 MPH
RESIDENTIAL COLLECTOR	30 MPH
MINOR COLLECTOR	35 MPH

TxDOT TYPE "2" WHEEL CHAIR RAMPS ARE INDICATED THUS " " OR " " UNLESS OTHERWISE NOTED. (SHEET C7.D7)
FOR ADA RAMPS AT SIDEWALK INTERSECTIONS
TYPE "10" DIRECTIONAL WHEEL CHAIR RAMPS ARE INDICATED THUS " " OR " " UNLESS OTHERWISE NOTED.

FOR ADA RAMPS AT SIDEWALK INTERSECTIONS .
DETECTABLE WARNING PAVER WITH TRUNCATED DOMES ONLY. ALL PEDESTRIAN CROSSING RAMPS TO BE BUILT WITH INFRASTRUCTURE DURING STREET CONSTRUCTION (SEE DETAIL SHEET C7.D7)



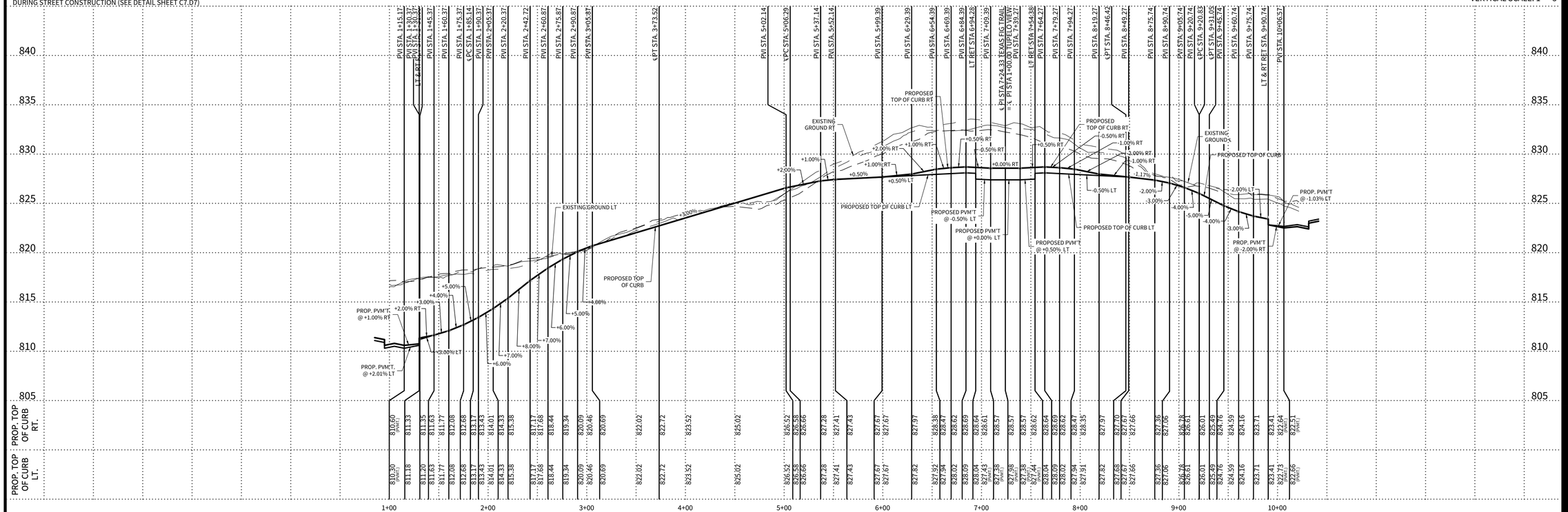


TYPICAL SANITARY SEWER IN SIDEWALLK DETAIL
N.T.S.

TEXAS FIG TRAIL

STA. 1+00.00 TO END

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



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FLYING W UNIT 1

STREET PLAN & PROFILE - TEXAS FIG TRAIL

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

DATE 11/26/2025

PROJECT NO. 04024-004

DRAWN BY C7

CHECKED BY JL

STATE OF TEXAS
JOSE A. LOZANO
126773
LICENSED
PROFESSIONAL ENGINEER
11/26/25

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO. -

C7.03

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.

ELEVATIONS:

XXXX.XX PROPOSED TOP OF CONCRETE CURB ELEVATION

XXXX.XX$_a$ PROPOSED ASPHALT PAVEMENT ELEVATION

KEYNOTES:

1. CONTRACTOR TO INSTALL 5' X 5' SIDEWALK PASSING SPACE WITH HOMEBUILDING
2. CONTRACTOR TO INSTALL 5' X 5' SIDEWALK PASSING SPACE WITH INFRASTRUCTURE
3. CONTRACTOR TO INSTALL SIDEWALK WITH INFRASTRUCTURE
4. BEGIN WASHOUT STA. 1+00.00 PVM'T. ELEV. = 825.53
5. END WASHOUT STA. 2+93.95 PVM'T. ELEV. = 826.38
6. BEGIN WASHOUT STA. 4+97.67 PVM'T. ELEV. = 824.34
7. END WASHOUT STA. 7+38.41 PVM'T. ELEV. = 821.32
8. BEGIN WASHOUT STA. 7+78.75 PVM'T. ELEV. = 821.32
9. BEGIN STREET TRANSITION STA. 6+33.58 FROM RESIDENTIAL TO RESIDENTIAL COLLECTOR (SEE POINT AND LINE TABLE)
10. END STREET TRANSITION STA. 6+78.58 FROM RESIDENTIAL TO RESIDENTIAL COLLECTOR (SEE POINT AND LINE TABLE)
11. CONTRACTOR TO CONSTRUCT ADA RAMP WITH INFRASTRUCTURE

LEGEND

CROSS GUTTER

STREET WASHOUT (SEE SHEET C7.D1)

SIDEWALK TO BE CONSTRUCTED WITH INFRASTRUCTURE

SIDEWALK TO BE CONSTRUCTED WITH HOME BUILDING

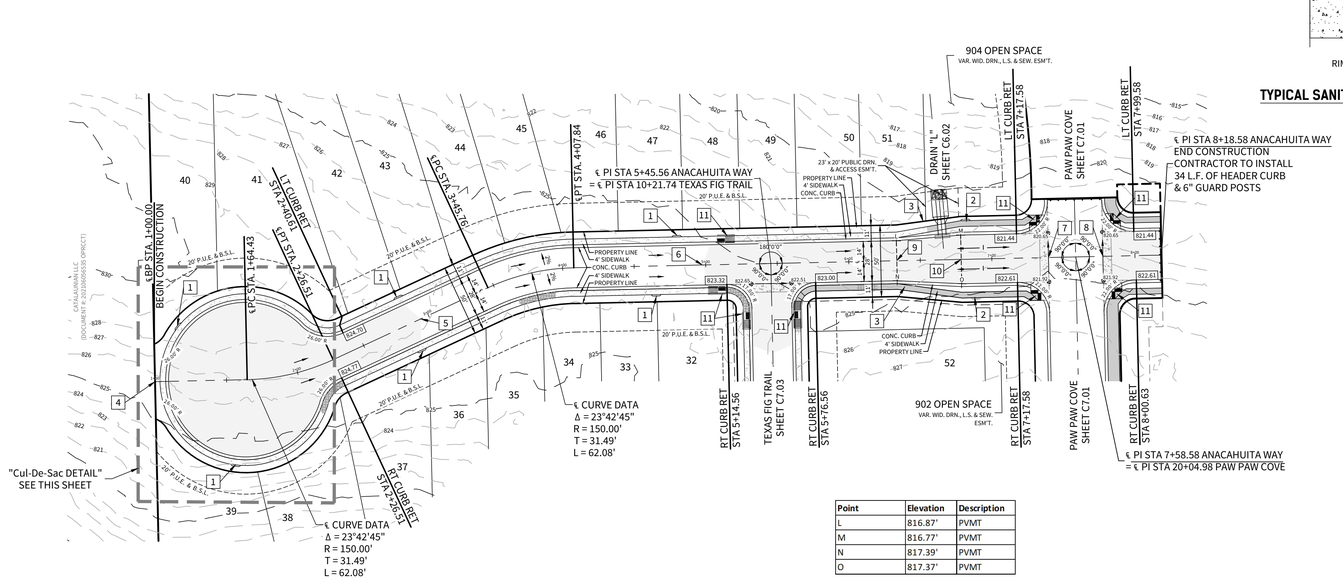
SIDEWALK TO BE INSTALLED WITH THE INFRASTRUCTURE TO ENSURE MANHOLES ARE INSTALLED FLUSH WITH THE SIDEWALK.

SPEED LIMIT DESIGNATED BY STREET TYPE;

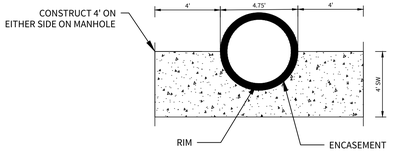
RESIDENTIAL	20 MPH
RESIDENTIAL COLLECTOR	30 MPH
MINOR COLLECTOR	35 MPH

TxDOT TYPE "2" WHEEL CHAIR RAMPS ARE INDICATED THUS " " OR " " UNLESS OTHERWISE NOTED. (SHEET C7.D7)
FOR ADA RAMPS AT SIDEWALK INTERSECTIONS
TYPE "10" DIRECTIONAL WHEEL CHAIR RAMPS ARE INDICATED THUS " " OR " " UNLESS OTHERWISE NOTED.

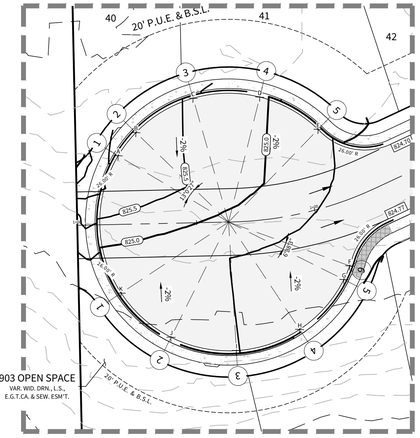
FOR ADA RAMPS AT SIDEWALK INTERSECTIONS .
DETECTABLE WARNING PAVER WITH TRUNCATED DOMES ONLY. ALL PEDESTRIAN CROSSING RAMPS TO BE BUILT WITH INFRASTRUCTURE DURING STREET CONSTRUCTION (SEE DETAIL SHEET C7.D7)



Point	Elevation	Description
L	816.87'	PVMT
M	816.77'	PVMT
N	817.39'	PVMT
O	817.37'	PVMT



TYPICAL SANITARY SEWER IN SIDEWALLK DETAIL
N.T.S.



Cul-De-Sac DETAIL

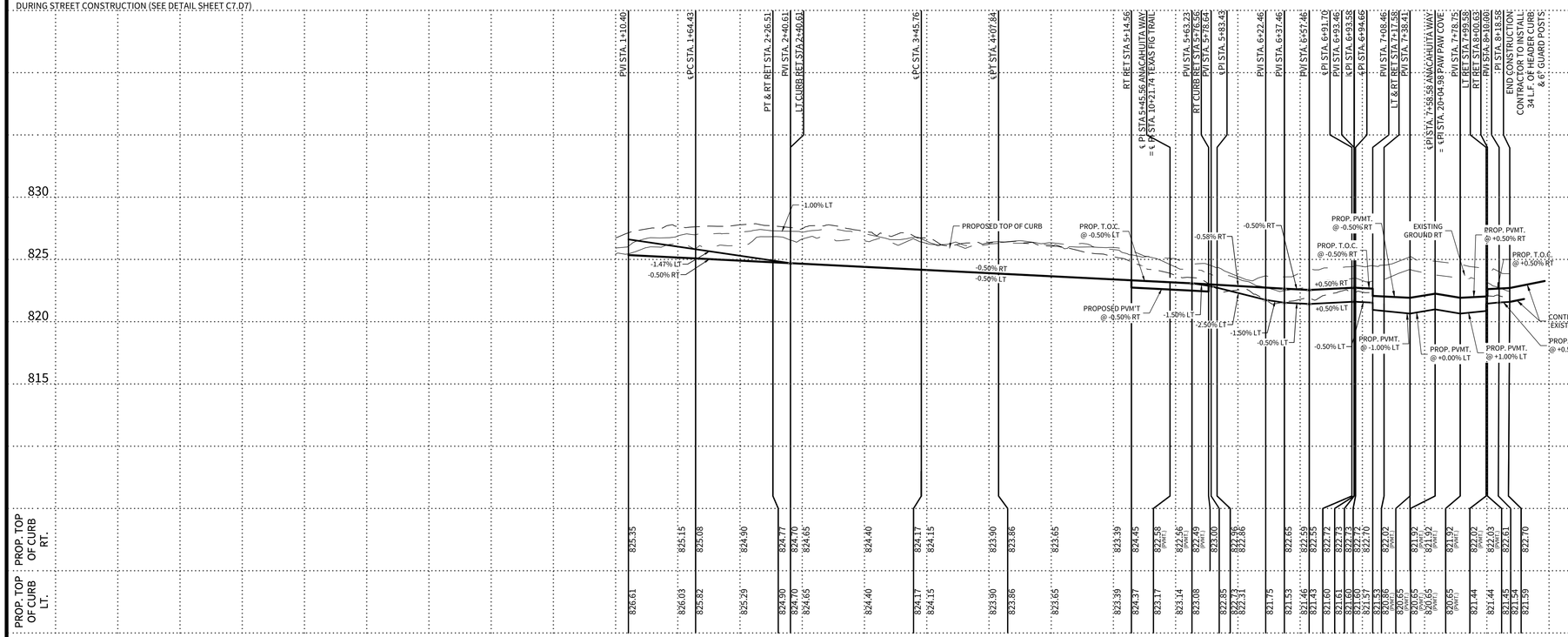
SCALE: 1" = 30'

Point	Elevation	Description
A	826.64'	PVMT
B	826.71'	PVMT
C	826.87'	PVMT
D	827.03'	PVMT
E	827.17'	PVMT
F	826.69'	PVMT
G	826.72'	PVMT
H	826.81'	PVMT
I	826.82'	PVMT
J	826.13	PVMT
K	825.44'	PVMT

ANACAHUITA WAY

STA. 1+00.00 TO END

NOTE: A TxDOT PERMIT MUST BE OBTAINED BEFORE WORKING IN A TxDOT RIGHT OF WAY
HORIZONTAL SCALE: 1" = 50'
VERTICAL SCALE: 1" = 5'



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FLYING W UNIT 1

STREET PLAN & PROFILE - ANACAHUITA WAY

DATE
11/26/2025

PROJECT NO.
04024-004

DRAWN BY
C7

CHECKED BY
JL

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

STATE OF TEXAS
JOSE A. LOZANO
126773
LICENSED
PROFESSIONAL ENGINEER
11/26/25
CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
-

C7.04

K:\04024\04024-12-SWDv4\Plans\C7.04-STREET PLAN & PROFILE - ANACAHUITA WAY.dwg, 2025/11/26 5:50:pm, thorntes

ELEVATIONS:

XXXX.XX PROPOSED TOP OF CONCRETE CURB ELEVATION

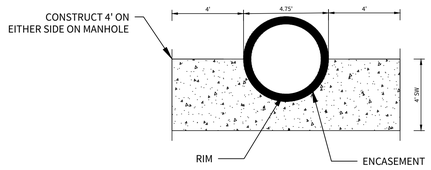
XXXX.XX$_{a}$ PROPOSED ASPHALT PAVEMENT ELEVATION

KEYNOTES:

1 CONTRACTOR TO INSTALL 5' X 5' SIDEWALK PASSING SPACE WITH HOMEBUILDING

2 CONTRACTOR TO CONSTRUCT ADA RAMP AT THE TIME OF INFRASTRUCTURE

3 BEGIN WASHOUT STA. 3+25.00
PVM'T. ELEV. = 815.33



TYPICAL SANITARY SEWER IN SIDEWALLK DETAIL
N.T.S.

LEGEND

CROSS GUTTER

STREET WASHOUT (SEE SHEET C7.D1)

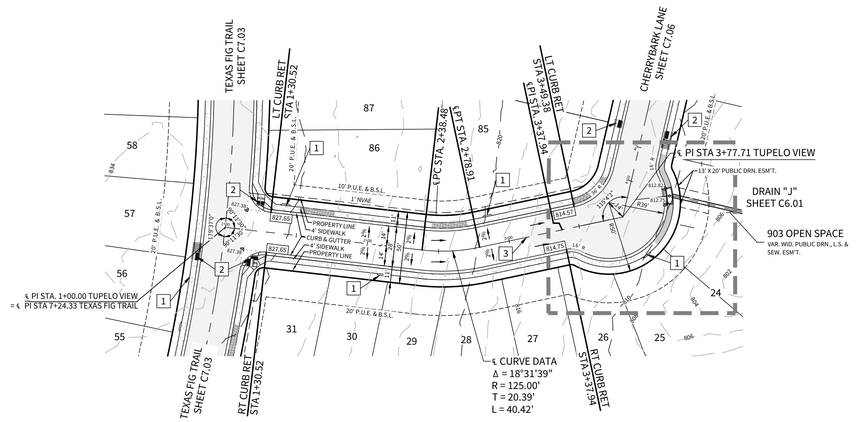
SIDEWALK TO BE CONSTRUCTED WITH INFRASTRUCTURE

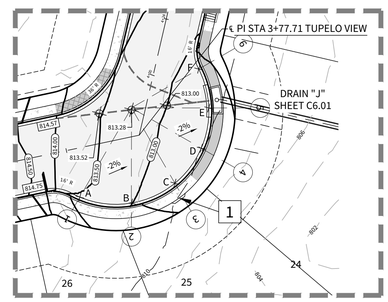
SIDEWALK TO BE CONSTRUCTED WITH HOME BUILDING

SIDEWALK TO BE INSTALLED WITH THE INFRASTRUCTURE TO ENSURE MANHOLES ARE INSTALLED FLUSH WITH THE SIDEWALK.

SPEED LIMIT DESIGNATED BY STREET TYPE;
RESIDENTIAL 20 MPH
RESIDENTIAL COLLECTOR 30 MPH
MINOR COLLECTOR 35 MPH
TxDOT TYPE "2" WHEEL CHAIR RAMPS ARE INDICATED THUS " " OR " " UNLESS OTHERWISE NOTED. (SHEET C7.D7)
FOR ADA RAMPS AT SIDEWALK INTERSECTIONS
TYPE "10" DIRECTIONAL WHEEL CHAIR RAMPS ARE INDICATED
THUS " " OR " " UNLESS OTHERWISE NOTED.

FOR ADA RAMPS AT SIDEWALK INTERSECTIONS .
DETECTABLE WARNING PAVER WITH TRUNCATED DOMES ONLY. ALL PEDESTRIAN CROSSING RAMPS TO BE BUILT WITH INFRASTRUCTURE DURING STREET CONSTRUCTION (SEE DETAIL SHEET C7.D7)




℄ PI STA 3+77.71 TUPELO VIEW
DRAIN "J"
SHEET C6.01
A
B
C
D
E
F
813.41
813.15
813.12
812.94
812.89
812.91
813.28
813.52
814.57
814.57
814.57

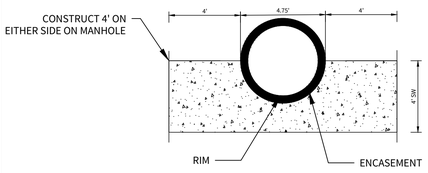
ELEVATIONS:

XXXX.XX PROPOSED TOP OF CONCRETE CURB ELEVATION

XXXX.XX$_A$ PROPOSED ASPHALT PAVEMENT ELEVATION

KEYNOTES:

1. CONTRACTOR TO INSTALL 5' X 5' SIDEWALK PASSING SPACE WITH HOMEBUILDING
2. CONTRACTOR TO INSTALL SIDEWALK WITH INFRASTRUCTURE
3. END WASHOUT STA. 1+98.27 PVMT. ELEV. = 814.16
4. CONTRACTOR TO CONSTRUCT ADA RAMP AT THE TIME OF INFRASTRUCTURE



TYPICAL SANITARY SEWER IN SIDEWALLK DETAIL

N.T.S.

LEGEND

CROSS GUTTER

STREET WASHOUT (SEE SHEET C7.D1)

SIDEWALK TO BE CONSTRUCTED WITH INFRASTRUCTURE

SIDEWALK TO BE CONSTRUCTED WITH HOME BUILDING

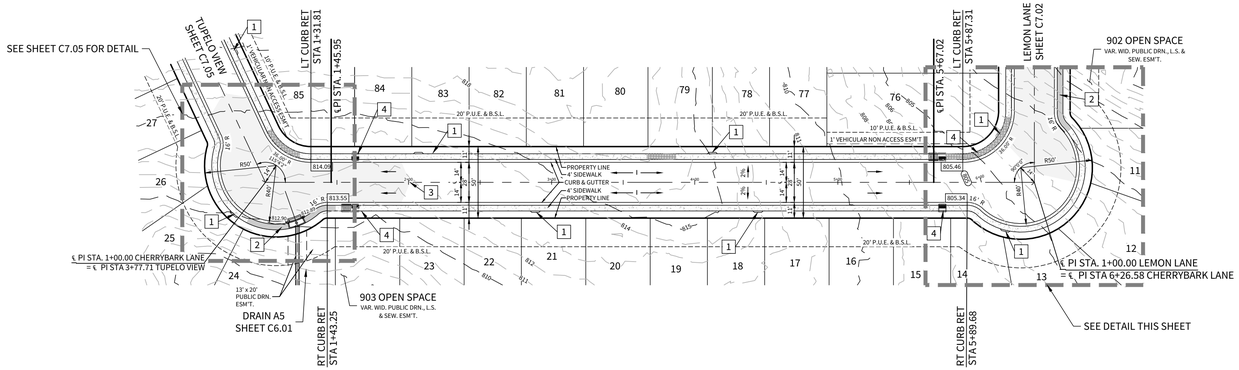
SIDEWALK TO BE INSTALLED WITH THE INFRASTRUCTURE TO ENSURE MANHOLES ARE INSTALLED FLUSH WITH THE SIDEWALK.

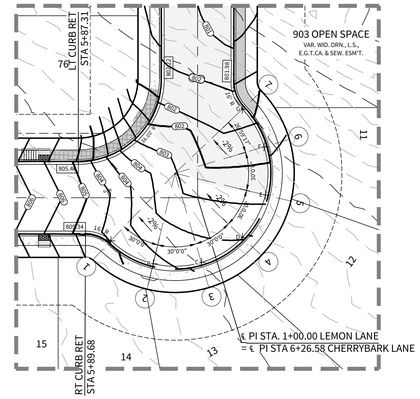
SPEED LIMIT DESIGNATED BY STREET TYPE;

RESIDENTIAL	20 MPH
RESIDENTIAL COLLECTOR	30 MPH
MINOR COLLECTOR	35 MPH

TxDOT TYPE "2" WHEEL CHAIR RAMPS ARE INDICATED THUS " " OR " " UNLESS OTHERWISE NOTED. (SHEET C7.D7)
FOR ADA RAMPS AT SIDEWALK INTERSECTIONS
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FOR ADA RAMPS AT SIDEWALK INTERSECTIONS .
DETECTABLE WARNING PAVER WITH TRUNCATED DOMES ONLY. ALL PEDESTRIAN CROSSING RAMPS TO BE BUILT WITH INFRASTRUCTURE DURING STREET CONSTRUCTION (SEE DETAIL SHEET C7.D7)





KNUCKLE DETAIL

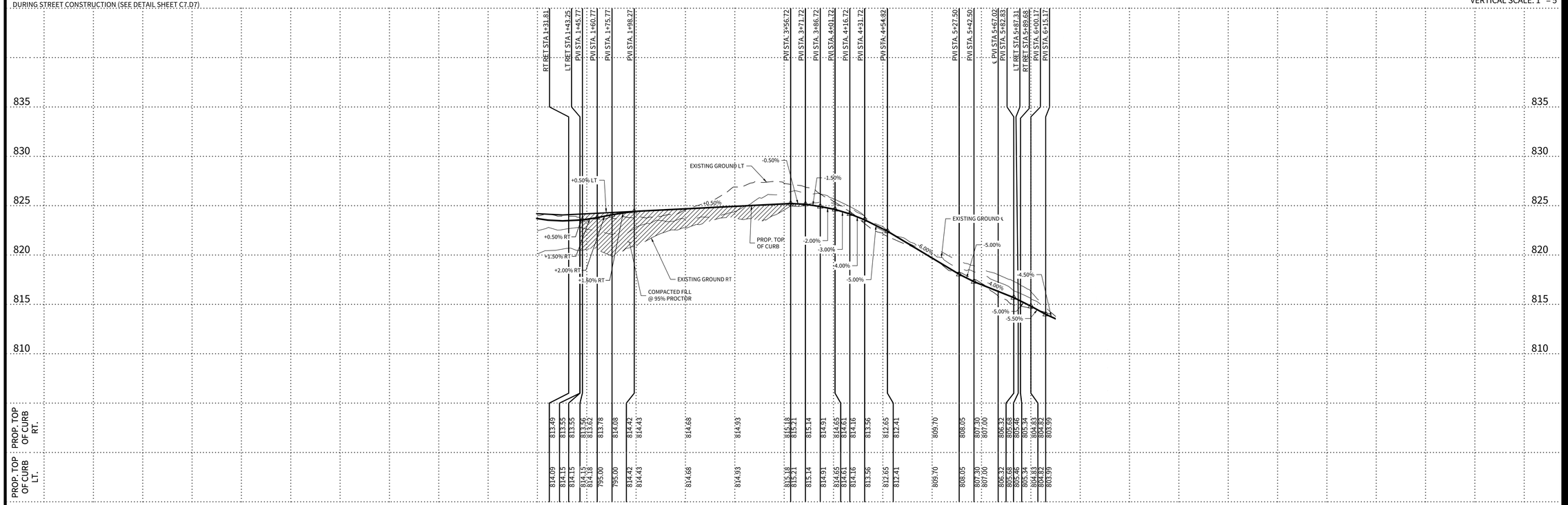
SCALE: 1" = 30'

Point	Elevation	Description
A	804.59'	PVMT
B	804.50'	PVMT
C	804.44'	PVMT
D	804.45'	PVMT
E	804.51'	PVMT
F	804.56'	PVMT
G	804.63'	PVMT

CHERRYBARK LANE

STA. 1+31.81 TO END

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.

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CUDE ENGINEERS EST. 1980

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

FLYING W UNIT 1

STREET PLAN & PROFILE - CHERRYBARK LANE

DATE
11/26/2025

PROJECT NO.
04024-004

DRAWN BY
C7

CHECKED BY
JL

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

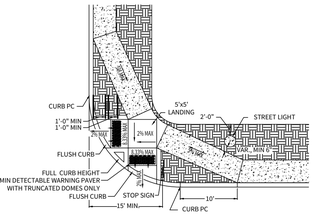
STATE OF TEXAS
JOSE A. LOZANO
126773
LICENSED
PROFESSIONAL ENGINEER
11/26/25

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
-

C7.06

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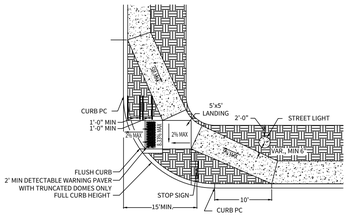


ADA RAMP INTERSECTION LAYOUT DETAIL (TYPE 10 DIRECTIONAL RAMPS) N.T.S.

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.

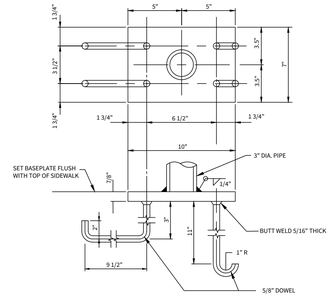


ADA RAMP INTERSECTION LAYOUT DETAIL (TYPE 10 DIRECTIONAL RAMPS - SINGLE DIRECTION) N.T.S.

NOTES:

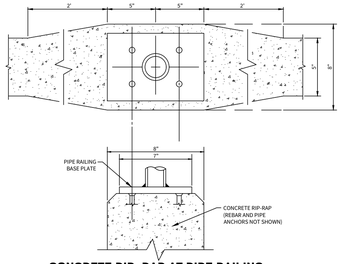
1) STREET LIGHTS SHALL BE INSTALLED 2' WITHIN R.O.W. AND A MINIMUM DISTANCE OF 6" FROM THE PROPOSED SIDEWALK, AND A MINIMUM DISTANCE OF 4' FROM FACE OF CURB.

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.

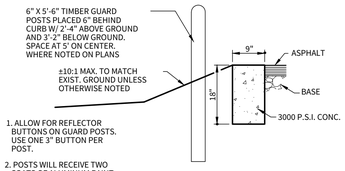


CONCRETE RIP-RAP AT PIPE RAILING BASE PLATE DETAIL

NOTES:

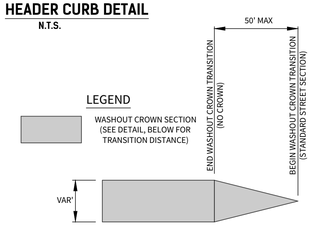
1) CONTRACTOR TO FLARE CONCRETE RIP-RAP TO 8" AT PROPOSED PIPE RAILING BASE PLATE LOCATIONS.

N.T.S.



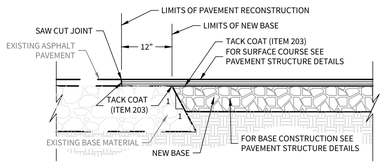
HEADER CURB DETAIL

N.T.S.



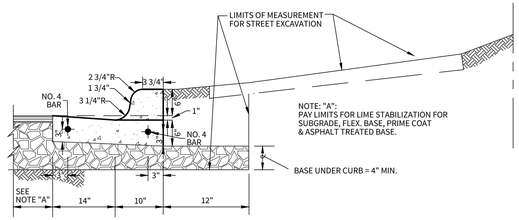
WASHOUT CROWN TRANSITION DETAIL

N.T.S.



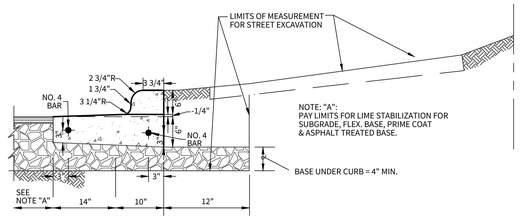
PAVEMENT JUNCTION DETAILS

N.T.S.



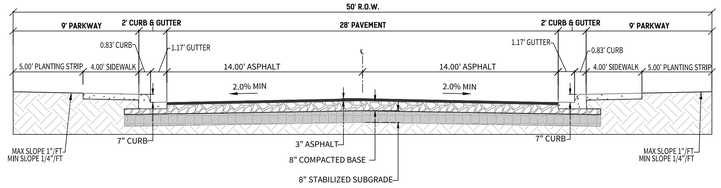
TYPICAL CURB SECTIONS

N.T.S.



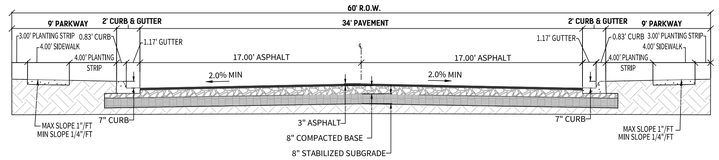
SPILL CURB SECTIONS

N.T.S.



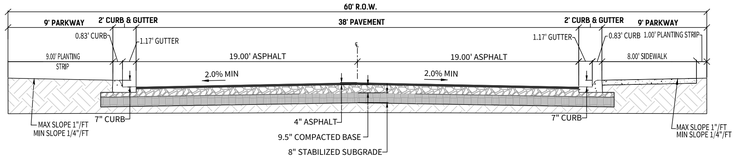
TYPICAL "RESIDENTIAL" STREET CROSS SECTION

N.T.S.



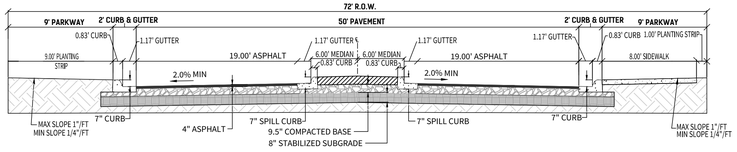
TYPICAL "RESIDENTIAL COLLECTOR" STREET CROSS SECTION

N.T.S.



TYPICAL "MINOR COLLECTOR" STREET CROSS SECTION

N.T.S.



TYPICAL "MINOR COLLECTOR W/MEDIAN" STREET CROSS SECTION

N.T.S.

STREET PAVEMENT DESIGN OPTIONS (ECS SOUTHWEST No. 20:1609)

1. IF THE SUBGRADE PLASTICITY INDEX VALUE IS GREATER THAN 20, SUBGRADE STABILIZATION IS REQUIRED.

2. PAVEMENT SECTION REQUIRED IS TO BE DETERMINED BY GEOTECHNICAL ENGINEER ON-SITE.

3. PAVEMENT MATERIALS
RECOMMENDATIONS REGARDING MATERIAL REQUIREMENTS FOR THE VARIOUS PAVEMENT SECTIONS ARE SUMMARIZED BELOW:

- HOT MIX ASPHALT CONCRETE (HMAC) SURFACE COURSE - THE ASPHALT CONCRETE SURFACE COURSE SHOULD BE PLANT MIXED, HOT LAID TYPE D (FINE GRADED SURFACE) OR TYPE C (COARSE GRADED SURFACE COURSE) MEETING THE SPECIFICATIONS REQUIREMENTS OF TXDOT ITEM 340 AND SPECIFIC CRITERIA FOR THE JOB MIX FORMULA. THE MIX SHOULD BE COMPACTED TO BETWEEN 92 AND 97 PERCENT OF THE MAXIMUM THEORETICAL DENSITY AS ESTABLISHED BY TEX-227-F.

- CRUSHED LIMESTONE BASE COURSE - CRUSHED LIMESTONE BASE SHOULD BE PLACED IN MAXIMUM 6-INCH COMPACTED LIFTS. THE BASE MATERIALS SHOULD BE COMPACTED TO AT LEAST 98 PERCENT OF THE MAXIMUM DRY DENSITY AS ESTABLISHED BY TXDOT TEX-113-E. FLEXIBLE BASE MATERIALS SHOULD BE MOISTURE CONDITIONED TO BETWEEN -2 AND +3 PERCENTAGE POINTS OF THE OPTIMUM MOISTURE CONTENT DURING COMPACTION. FLEXIBLE BASE MATERIALS SHOULD MEET THE REQUIREMENTS SPECIFIED IN 2014 TXDOT STANDARD SPECIFICATION ITEM 247, TYPE A, GRADE 1-2.

- LIME-TREATED SUBGRADE – LIME MIXING AND PLACEMENT SHOULD BE PERFORMED IN ACCORDANCE WITH TXDOT ITEM 260. AFTER PROPER CURING TIME, THE LIME-TREATED SOILS SHOULD BE COMPACTED TO A MINIMUM 95 PERCENT OF THE MAXIMUM DRY DENSITY AS ESTABLISHED BY TXDOT TEX-113-E, AT MOISTURE CONTENTS BETWEEN OPTIMUM AND +4 PERCENTAGE POINTS OF OPTIMUM. SUFFICIENT LIME SHOULD BE MIXED WITH SUBGRADE SOILS TO RESULT IN A SOIL-LIME MIXTURE WITH PH OF AT LEAST 12.4 WHEN TESTED IN ACCORDANCE WITH ASTM D6276 OR TXDOT TEST METHOD TEX-121-E. WE ANTICIPATE THAT APPROXIMATELY 6 TO 8 PERCENT HYDRATED LIME (BY DRY UNIT WEIGHT) IS REQUIRED TO TREAT THE SUBGRADE SOILS. WE RECOMMEND THAT THE SUBGRADE SOILS AT THE PROPOSED FINAL SUBGRADE ELEVATION BE FURTHER EVALUATED FOR SULFATE CONTENT. EXCESSIVE CONCENTRATIONS OF SULFATE IN THE SUBGRADE SOILS CAN RESULT IN POOR PERFORMANCE OF LIME-TREATED SUBGRADE. LIME STABILIZATION SHOULD EXTEND AT LEAST 1 FOOT BEYOND THE EDGE OF THE PLANNED PAVEMENT, WHERE PRACTICAL.

GENERAL FILL:

- GENERAL FILL SHOULD CONSIST OF ON-SITE OR IMPORTED SOILS, PROVIDED THEY MEET THE REQUIREMENTS DESCRIBED BELOW. GENERAL FILL MATERIALS SHOULD BE WITHOUT ORGANICS, CONSTRUCTION DEBRIS, DELETERIOUS MATERIALS, AND SHOULD BE WITHOUT ROCKS LARGER THAN 4 INCHES IN GREATEST DIMENSION. GENERAL FILL SHOULD HAVE A PLASTICITY INDEX OF 30 AND LOWER. PROPOSED GENERAL FILL SHOULD BE EVALUATED AND TESTED BY ECS PRIOR TO PLACEMENT IN THE BELOW.

- ECS RECOMMENDS THAT GENERAL FILL BE PLACED IN HORIZONTAL LOOSE LIFTS OF NOT MORE THAN 8 INCHES IN THICKNESS. LIFT THICKNESS SHOULD BE DECREASED WHEN USING LIGHT COMPACTION EQUIPMENT. GENERAL FILL SHOULD BE COMPACTED TO AT LEAST 95% OF THE MAXIMUM DRY DENSITY AT MOISTURE CONTENTS WITHIN THE RANGE OF OPTIMUM TO +4 PERCENTAGE POINTS OF THE OPTIMUM MOISTURE CONTENT (TEX-114-E).

SELECT FILL:

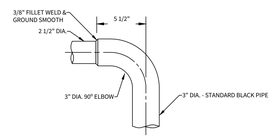
- SELECT FILL MATERIALS SHOULD BE WITHOUT ORGANICS, CONSTRUCTION DEBRIS, DELETERIOUS MATERIALS, AND SHOULD BE WITHOUT ROCKS LARGER THAN 4 INCHES IN GREATEST DIMENSION. SELECT FILL SHOULD HAVE A PLASTICITY INDEX OF BETWEEN 5 AND 20. SELECT FILL SHOULD BE EVALUATED AND TESTED BY ECS PRIOR TO PLACEMENT IN THE FIELD.

- ECS RECOMMENDS THAT SELECT FILL BE PLACED IN HORIZONTAL LOOSE LIFTS OF NOT MORE THAN 8 INCHES IN THICKNESS. SELECT FILL SHOULD BE COMPACTED TO AT LEAST 95% OF THE MAXIMUM DRY DENSITY AT MOISTURE CONTENTS WITHIN THE RANGE OF -1 TO +3 PERCENTAGE POINTS OF THE OPTIMUM MOISTURE CONTENT (TEX-114-E).

SUBGRADE VERIFICATION:

- AT THE TIME OF CONSTRUCTION, THE FINAL PAVEMENT SUBGRADE SHOULD BE OBSERVED AND VERIFIED BY A REPRESENTATIVE OF INTEC

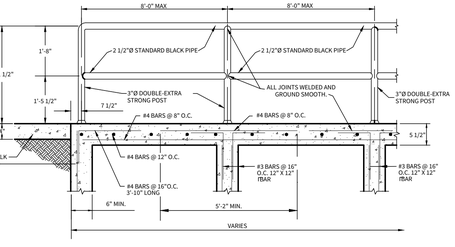
STREET TYPE	HMAC TYPE "D"	CRUSHED LIMESTONE BASE COURSE THICKNESS	LIME-TREATED SUBGRADE DEPTH OF COMPACTION
RESIDENTIAL	3"	8"	8"
RESIDENTIAL COLLECTOR	3"	8"	8"
MINOR COLLECTOR	4"	9.5"	8"



DETAIL OF 90° WELDING ELBOWS

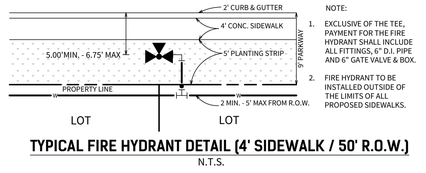
* A NEAT END SECTION, SATISFACTORY TO THE ENGINEER, FROM SUBMITTED SHOP DRAWINGS, MAY BE USED IN LIEU OF THE 90° WELDING ELBOW SHOWN.

SCALE: 1" = 8"



TYPICAL SIDEWALK BRIDGE SECTION AND SIDEWALK PIPE RAILING

N.T.S.

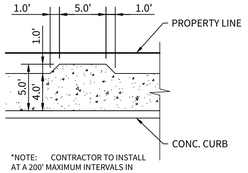


NOTE:

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.



*NOTE: CONTRACTOR TO INSTALL AT A 200' MAXIMUM INTERVALS IN 4' SIDEWALKS

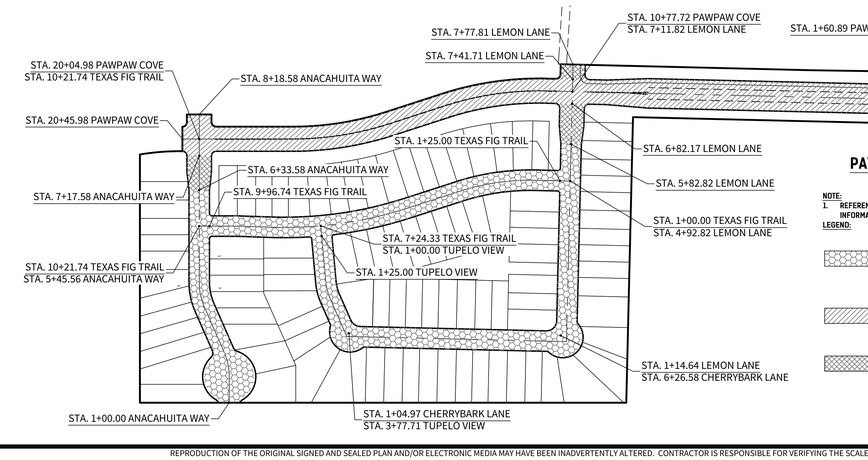
5'x5' SIDEWALK PASSING LANE

N.T.S.

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.

CRYSTAL CLEAR SPECIAL UTILITY DISTRICT 830-372-1031
TEXAS STATE WIDE ONE CALL LOCATOR 1-800-545-6005



PAVEMENT DESIGN SCHEMATIC N.T.S.

NOTE:
1. REFERENCE GEOTECHNICAL REPORT (ECS SOUTHWEST 20:1609) FOR BORING INFORMATION AND CBR LOCATIONS.

LEGEND:

LOCAL STREET		
LEMON LANE		1+00.00–4+80.00
TEXAS FIG TRAIL		1+25.00–9+96.74
ANACAHUITA WAY		1+00.00–6+33.58
TUPELO VIEW		1+25.00–3+84.49
CHERRYBARK LANE		1+00.00 –6+43.35
MINOR COLLECTOR		
PAWPAW COVE		1+60.89–20+45.98
RESIDENTAL COLLECTOR		
ANACAHUITA WAY		6+33.58–8+18.58
LEMON LANE		4+80.00–5+79.35
LEMON LANE		6+38.89–6+74.99

CUDEENGINEERS.COM
EST. 1980 CUDE ENGINEERS
4122 Pond Hill Road, Suite 101
San Antonio, Texas 78231
P:(210) 681.2951 F: (210) 523.7112

FLYING W
UNIT 1

STANDARD STREET DETAILS

DATE
11/26/2025
PROJECT NO.
04024-004
DRAWN BY
C7
CHECKED BY
JL

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

STATE OF TEXAS
JOSE A. LOZANO
126773
LICENSED
PROFESSIONAL ENGINEER
11/26/25
CUDE ENGINEERS
TBPELS No. 10048500

C7.D1

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.

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purposes whatsoever. TxDOT assumes no responsibility for the manner in which this standard is used and for any omissions from, or incorrect results or damages resulting from its use.

DATE/FILE:

SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

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

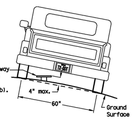
Post Type
- FRP = Fiberglass Reinforced Plastic Pipe (see SMD(FRP))
- TWT = Thin-Walled Tubing (see SMD(TWT))
- 10SWG = 10 SWG Tubing (see SMD(SLIP-1) to (SLIP-3))
- S80 = Schedule 80 Pipe (see SMD(SLIP-1) to (SLIP-3))

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. "Post" (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
- (EXT or ZEXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
- BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))
- WC = 1, 1/2, or 3/4"ft Wing Channel (see SMD(SLIP-1) to (SLIP-3))
- EXAL = Extruded Aluminum Sign Panels (see SMD(SLIP-1))

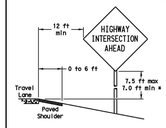
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



To avoid vehicle undercarriage snagging, any substantial rosettes 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).

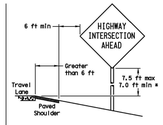
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

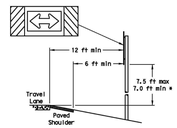
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



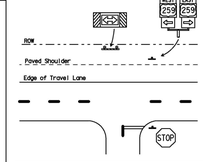
GREATER THAN 6 FT. WIDE

When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

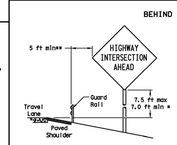
T-INTERSECTION



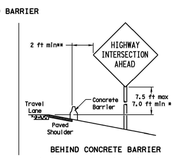
When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



BEHIND BARRIER



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

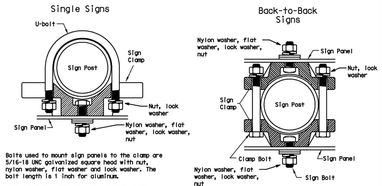
(2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

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

TYPICAL SIGN ATTACHMENT DETAIL



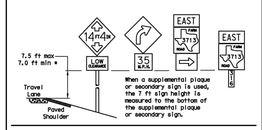
Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

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.

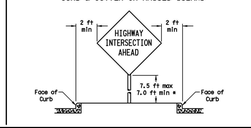
Sign clamps may be either the specific size clamp or the universal clamp.

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

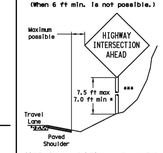


CURB & GUTTER OR RAISED ISLAND



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

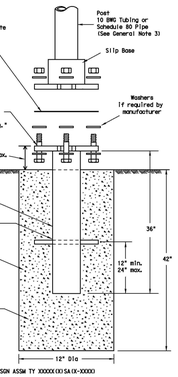
SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

©TxDOT July 2002	Tex TXDOT	CIV TXDOT	TPK TXDOT	CIV TXDOT
9-08 REVISIONS	DIST	SECT	JOB	HIGHWAY
	TEST	DIVISTI		SHEET No.

26A

TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



SM RD SGN ASSM TY XXXXX(10)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. http://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:

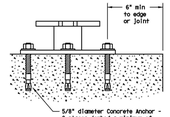
1. Slip base shall be permanently marked to indicate manufacturer, Method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
2. Material used as post with this system shall conform to the following specifications:
   10 BWG Tubing (2.875" outside diameter)
   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 2.857" to 2.893"
   Galvanization per ASTM A123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter with zinc base 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
   21% 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 2.857" to 2.893"
   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 and 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 traveleay (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 traveleay. 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(10)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 and adhesive recommended by the manufacturer. 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.

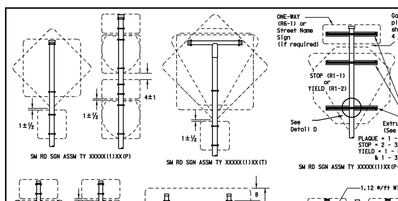
Texas Department of Transportation
Traffic Operations Division

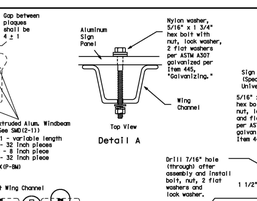
SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-1)-08

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26B





REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(11)XX(T) TY 10BWG(11)XX(P-SM)
	60-inch YIELD sign (R1-2)	TY 10BWG(11)XX(T) TY 10BWG(11)XX(P-SM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(11)XX(T) TY 10BWG(11)XX(P-SM)
	36x48, 48x36, and 48x48-inch signs	TY S80(11)XX(T)
	48x60-inch signs	TY S80(11)XX(T)
	48x48-inch signs (diamond or square)	TY 10BWG(11)XX(T)
	48x60-inch signs	TY S80(11)XX(T)
Warning	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(11)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(11)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(11)XX(T)

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 Gr 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 sign blanks required on the "T-bracket" post 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.

Texas Department of Transportation
Traffic Operations Division

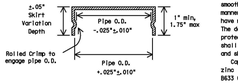
SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-2)-08

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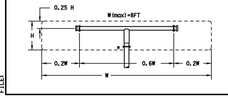
FRICTION CAP DETAIL



Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes.

The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp creases or indentations and show no evidence of metal fractures.

Caps shall have an electrodeposited coating of zinc in accordance with the requirements of ASTM B633 Class FE/ZN 8.

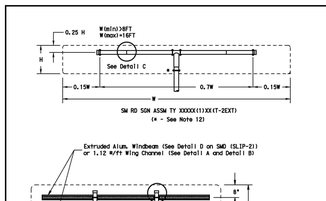


SM RD SGN ASSM TY XXXXX(11)XX(T)
(+ See Note 12)

All dimensions are in english unless detailed otherwise.

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DATE/FILE:



REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(11)XX(T) TY 10BWG(11)XX(P-SM)
	60-inch YIELD sign (R1-2)	TY 10BWG(11)XX(T) TY 10BWG(11)XX(P-SM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(11)XX(T) TY 10BWG(11)XX(P-SM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(11)XX(T)
	48x60-inch signs	TY S80(11)XX(T)
	48x48-inch signs (diamond or square)	TY 10BWG(11)XX(T)
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Warning	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(11)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(11)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(11)XX(T)

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 Gr 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 height signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-3)-08

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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

FLYING W
UNIT 1

SMALL ROADSIDE GENERAL NOTES & DETAILS

DATE
11/24/2025

PROJECT NO.
04024-004

DRAWN BY
C7

CHECKED BY
JL

REVISIONS
1 2 3 4 5 6 7 8

STATE OF TEXAS
JOSE A. LOZANO
126773
LICENSED
PROFESSIONAL ENGINEER
11/26/25

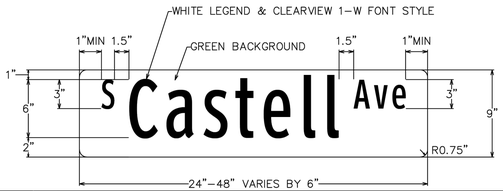
CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
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C7.D2

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.

STREET SIGN DETAIL - GROUND MOUNT



Height	9"
Length	24" min 48" max 6" increments in length
Thickness	0.080"
Substrate	Flat aluminum sheeting with ¾" radius circular fillets at corners conforming to the requirements of ASTM B 209, Alloys 6061–T–6, or 5052–H38.
Sign Face Materials	Green film over High Intensity Prismatic sheeting
Legend	Legends shall be Clearview 1–W font style. Reduced spacing between the letters or words should not be used as a means of reducing the overall size of a street name sign unless approved by the City Traffic Engineer.
Color	White legend on green background

Notes:

1. Street name signs shall be double sided when center mounted on top of sign post. Only one street name sign should be installed on top of sign post with STOP or YIELD sign.
2. When two sets of street name signs are required (e.g. at "T" intersections), one double-sided street name sign shall be mounted on sign post. The sign assembly shall meet minimum height requirements as required in the Texas Manual on Uniform Traffic Control Devices (TMUTCD). When required, DEAD END (W14-1a) or NO OUTLET (W14-2a) signs shall also be mounted on the sign post.
3. Street name signs greater than 36" long and center mounted on top of sign post shall be mounted on post top bracket with 12" slot. All other street name signs center mounted on top of sign post shall be mounted on post top bracket with 5 ¼" slot.
4. Street name signs mounted on sign post shall be mounted with double-sided round pole brackets. Two holes should be punched in the center of the 9" street name sign blank 1" from edge of the blank with 7"spacing between holes.
5. The lettering for names of streets shall be composed of a combination of lower-case letters with initial upper-case letters. Acceptable abbreviations per TMUTCD may be used except for the street name itself.
6. Red background (red film over High Intensity Prismatic) should be used for private street name signs.

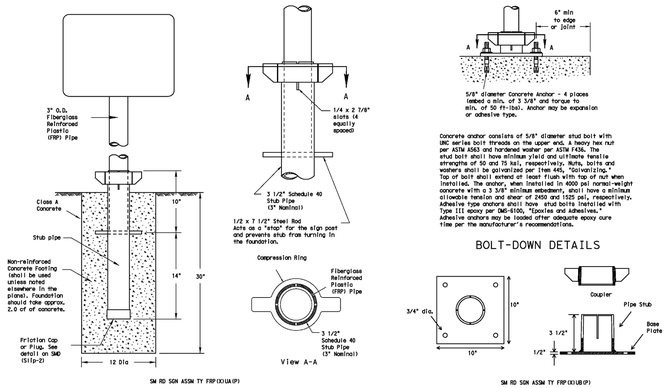
Street Sign Detail - Ground Mount			ENGINEERING DIVISION
ISSUE DATE: February 2013	DWG. NO: ST-024	SCALE: N.T.S.	424 S. CASTELL AVE. NEW BRAUNFELS, TEXAS 78130 PHONE: 830.221.4020 FAX: 830.626.3600
DRAWN BY: RAS	CONTACT: GF	SHEET: 1 OF 1	

P:\2010 ENGINEERING-AUTOCAD\DETAILS\NB-PUBLIC WORKS DETAILS\NB-UNAPPROVED DETAILS-2013\ST-2013.024 STREET SIGN DETAIL - GROUND MOUNT.DWG

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DATED: FILE:

Universal Anchor System with Fiberglass Reinforced Plastic (FRP) Post



SM RD SGN ASSM TY FRP(XX)A(P)

SM RD SGN ASSM TY FRP(XX)B(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: http://www.txdot.gov/publications/traffic.htm

FRP POST REQUIREMENTS

1. Materials shall conform to the requirements of Departmental Material Specification DMS-6410 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 detailed by writing:
   Texas Department of Transportation
   Traffic Operations Division
   125 East 11th Street
   Austin, Texas 78701-2483

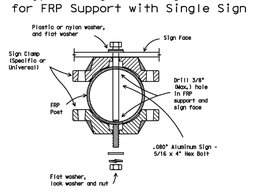
UNIVERSAL ANCHOR SYSTEM INSTALLATION PROCEDURES

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 16". Any material removed from the socket/stub shall be from the bottom and the clearance requirements given on SMD(SIGN) 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, mortar 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 coupler.
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.

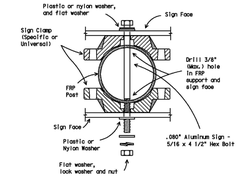
BOLT DOWN SIGN SUPPORT

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

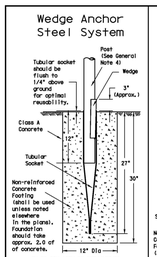
©TxDOT July 2002	Tex-T6001	Chk T6001	Mm T6001	Chk T6001
9-08 REVISIONS	Dsn?	Ck?	Jck	Quantity
	Plot?	Date/Tr		Sheet No.

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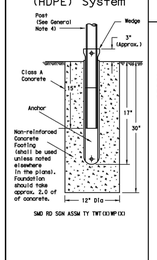
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Wedge Anchor Steel System



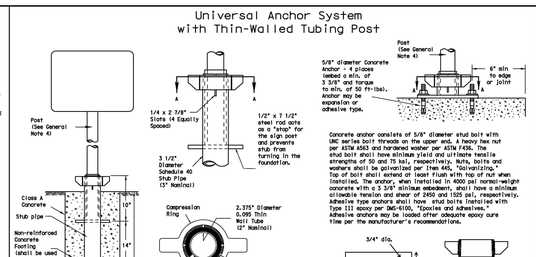
SM RD SGN ASSM TY TWT(XX)WS(X)

Wedge Anchor High Density Polyethylene (HDPE) System



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

Universal Anchor System with Thin-Walled Tubing Post

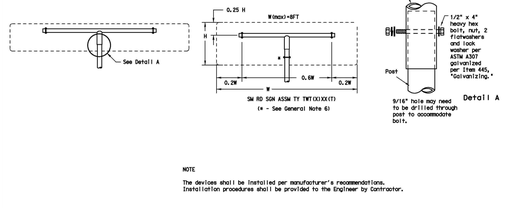


SM RD SGN ASSM TY TWT(XX)UA(P)

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 sign 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.

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

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



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

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. Methods, 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: http://www.txdot.gov/business/producer list.htm
4. Material used on 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 HSLA-65 per ASTM A1011 or ASTM A1008
   Other steel may be used if it meets the followings
   65,000 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 pregalvated steel tubing (ASTM A653), precoat 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 clamps 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: https://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 16". Any material removed from the socket/stub shall be from the bottom and the clearance requirements given on SMD(SIGN) 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, mortar 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. Drill 5/16" hole into socket and install wedge to secure post. This will leave approximately 2 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 16". Any material removed from the socket/stub shall be from the bottom and the clearance requirements given on SMD(SIGN) 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.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
WEDGE & UNIVERSAL ANCHOR
WITH THIN WALL TUBING POST

SMD (TWT)-08

©TxDOT July 2002	Tex-T6001	Chk T6001	Mm T6001	Chk T6001
9-08 REVISIONS	Dsn?	Ck?	Jck	Quantity
	Plot?	Date/Tr		Sheet No.

26E

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

FLYING W
UNIT 1

TXDOT SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS

DATE
11/24/2025

PROJECT NO.
04024-004

DRAWN BY
C7

CHECKED BY
JL

REVISIONS
1 2 3 4 5 6 7 8

STATE OF TEXAS
JOSE A. LOZANO
126773
LICENSED
PROFESSIONAL ENGINEER
11/26/25
CUDE ENGINEERS
TBPELS No. 10048500

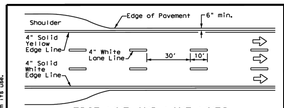
PLAT NO.
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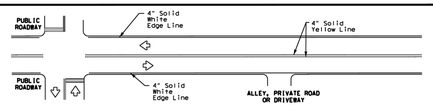
REPRODUCTION OF THE ORIGINAL SIGNED AND SEALED PLAN AND/OR ELECTRONIC MEDIA MAY HAVE BEEN INADVERTENTLY ALTERED. CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE SCALE OF THE DOCUMENT AND CONTACTING CUDE ENGINEERS TO VERIFY DISCREPANCIES PRIOR TO CONSTRUCTION.

DISCLAIMER
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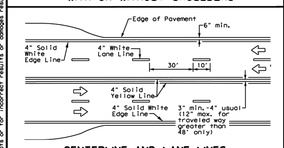
EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



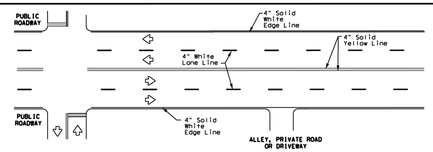
TYPICAL TWO-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



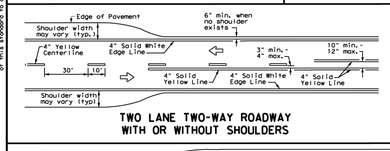
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



TYPICAL MULTI-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



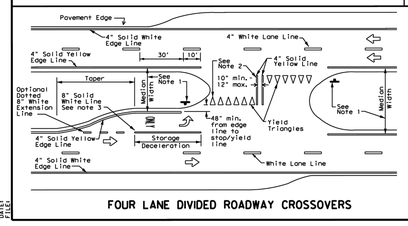
TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



YIELD LINES



FOUR LANE DIVIDED ROADWAY CROSSOVERS



NOTES

1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs are optional as determined by the Engineer.
2. Install median striping (double yellow centerlines and stop bars/yield triangles) when a 50' or greater median centerline can be placed. Stop bars shall only be used with stop signs. Yield traingles shall only be used with yield signs.
3. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

GENERAL NOTES

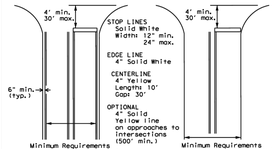
1. Edgeline striping shall be as shown in the plans or as directed by the Engineer. The edgeline should not be placed less less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edgelines are not required in curb and gutter sections of roadways.
2. The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the inside of edgeline to the inside of edgeline of a two lane roadway.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.

GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Highways



Texas Department of Transportation — Traffic Safety Division Standard

TYPICAL STANDARD PAVEMENT MARKINGS

PM(1)-20

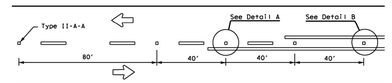
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©TxDOT	November 1978	CONT	SECT	JOB	HIGHWAY
REVISIONS					
9-98	2-10	DIST	COUNTY		SHEET NO.
5-00	2-12				
8-00	6-20				

FOR

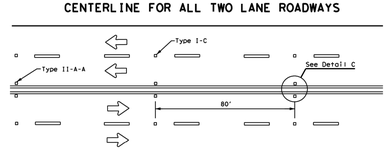
DISCLAIMER
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REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE

CENTERLINE FOR ALL TWO LANE ROADWAYS



CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY HIGHWAYS

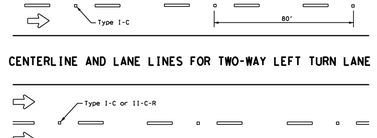


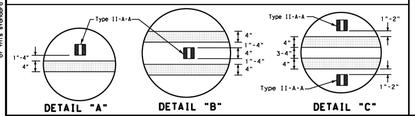
CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE

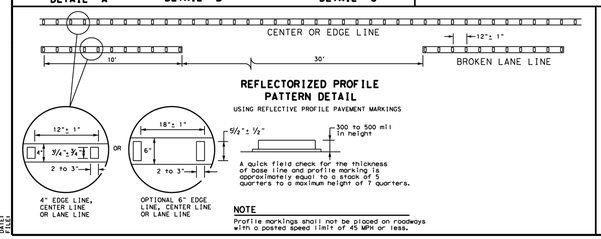


LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.







NOTE

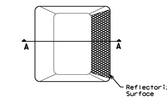
Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

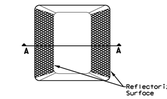
1. All raised pavement markers placed in broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

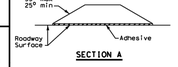
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)



Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS

Texas Department of Transportation — Traffic Safety Division Standard

POSITION GUIDANCE USING RAISED MARKERS RELECTORIZED PROFILE MARKINGS

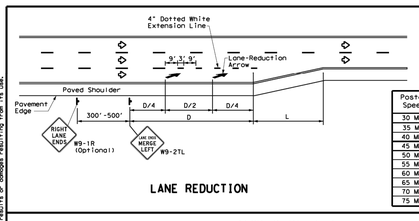
PM(2)-20

FILE:	pm2-20.dgn	DN:	CK:	DW:	CK:
©TxDOT	April 1977	CONT	SECT	JOB	HIGHWAY
REVISIONS					
4-92	2-10	DIST	COUNTY		SHEET NO.
5-00	2-12				
8-00	6-20				

FOR

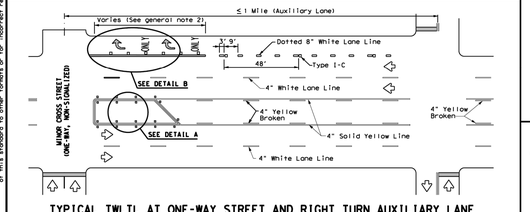
DISCLAIMER
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LANE REDUCTION

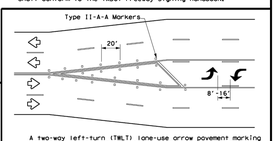


Posted Speed	D (ft)	L (ft)
30 MPH	460	$L=\frac{WS^2}{60}$
35 MPH	565	
40 MPH	670	
45 MPH	775	
50 MPH	885	
55 MPH	990	L=WS
60 MPH	1,100	
65 MPH	1,200	
70 MPH	1,250	
75 MPH	1,350	

TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE

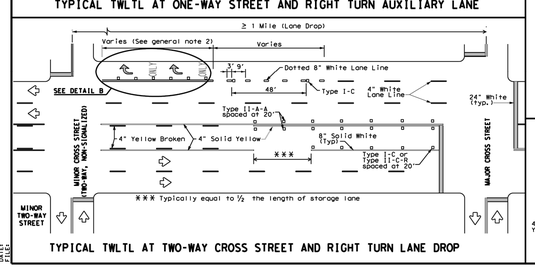


TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY

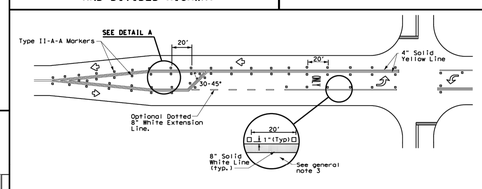


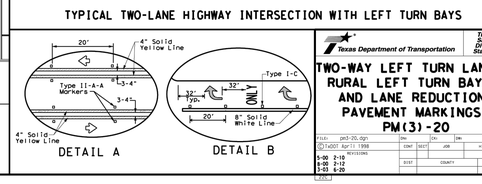
A two-way left-turn (TWLT) lane-use arrow pavement marking should be used at or just downstream from the beginning of a two-way left-turn lane within a corridor. Repeating the marking at intervals between the beginning and end of turn bay is not required unless stated elsewhere in the plans.

TYPICAL TWLTL AT TWO-WAY CROSS STREET AND RIGHT TURN LANE DROP



TYPICAL TWO-LANE HIGHWAY INTERSECTION WITH LEFT TURN BAYS





NOTES

1. Lane reduction pavement markings are used where the number of through lanes is reduced because of narrowing of the roadway or because of a section of on-street parking in what would otherwise be a through lane. For Texas Super 2 Passing Lanes, see TS2(PL) standard sheets.
2. On divided highways, an additional W9-1R "RIGHT LANE ENDS" sign may be installed in the median aligned with the W9-1R sign on the right side of the highway.
3. Lane reduction arrows are required for speeds of 45 mph or greater. An optional third lane reduction arrow may be added based on engineering judgement. If used, the optional third lane reduction arrow should be centered between the first and last lane reduction arrows.
4. For reductions on Freeways and Expressways, signing shall conform to the TxDOT Freeway Signing Handbook.

GENERAL NOTES

1. Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings without word markings may be used in short lanes and turn bays for emphasis. Details for words and arrows are as shown in the Standard Highway Sign Designs for Texas.
2. When lane-use words and arrow markings are used, two sets of arrows should be used if the length of the bay is greater than 180 feet. When a single lane use arrow or word and arrow marking is used for a short turn lane, it should be located at or near the upstream end of the full-width turn lane.
3. Use raised pavement marker Type I-C with undivided highways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.
4. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.

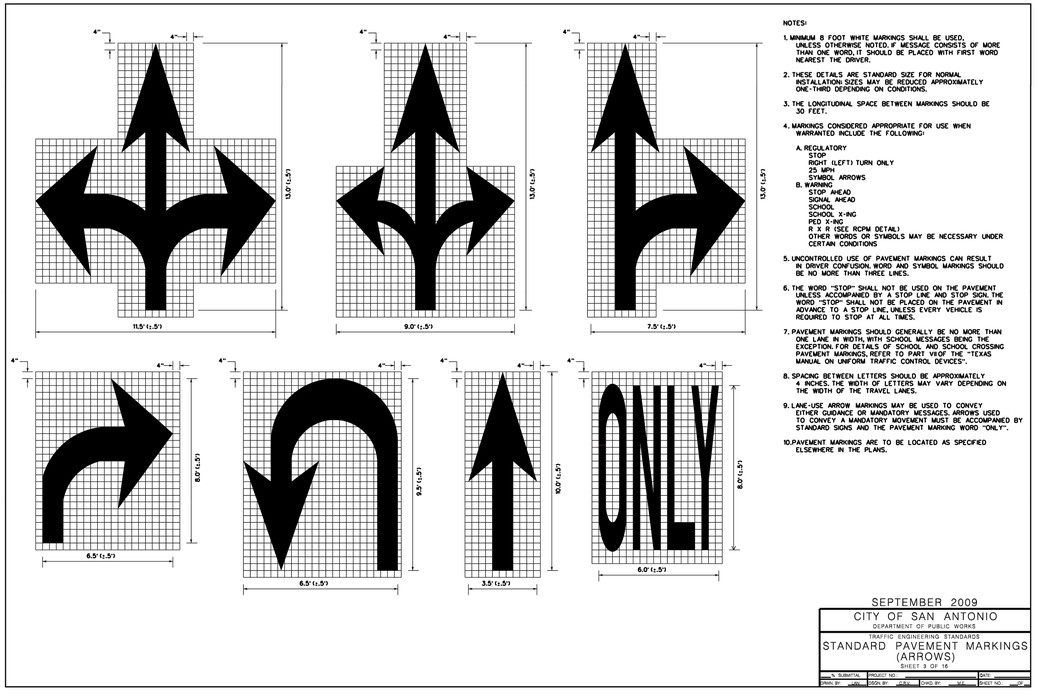
Texas Department of Transportation — Traffic Safety Division Standard

TWO-WAY LEFT TURN LANES, RURAL LEFT TURN BAYS, AND LANE REDUCTION PAVEMENT MARKINGS

PM(3)-20

FILE:	pm3-20.dgn	DN:	CK:	DW:	CK:
©TxDOT	April 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS					
5-00	2-10	DIST	COUNTY		SHEET NO.
8-00	2-12				
7-03	6-20				

FOR



NOTES:

1. MINIMUM 8 FOOT WHITE MARKINGS SHALL BE USED, UNLESS OTHERWISE NOTED. IF MESSAGE CONSISTS OF MORE THAN ONE WORD, IT SHOULD BE PLACED WITH FIRST WORD NEAREST THE DRIVER.
2. THESE DETAILS ARE STANDARD SIZE FOR NORMAL INSTALLATION. SIZES MAY BE REDUCED APPROXIMATELY ONE-THIRD DEPENDING ON CONDITIONS.
3. THE LONGITUDINAL SPACE BETWEEN MARKINGS SHOULD BE 30 FEET.
4. MARKINGS CONSIDERED APPROPRIATE FOR USE WHEN WARRANTED INCLUDE THE FOLLOWING:
   - A. REGULATORY
     - STOP
     - RIGHT (LEFT) TURN ONLY
     - 25 MPH
     - SYMBOL ARROWS
   - B. WARNING
     - STOP AHEAD
     - SIGNAL AHEAD
     - SCHOOL
     - SCHOOL X-ING
     - PED X-ING
     - R X R (SEE RCPM DETAIL)
     - OTHER WORDS OR SYMBOLS MAY BE NECESSARY UNDER CERTAIN CONDITIONS
5. UNCONTROLLED USE OF PAVEMENT MARKINGS CAN RESULT IN DRIVER CONFUSION. WORD AND SYMBOL MARKINGS SHOULD BE NO MORE THAN THREE LINES.
6. THE WORD "STOP" SHALL NOT BE USED ON THE PAVEMENT UNLESS ACCOMPANIED BY A STOP LINE AND STOP SIGN. THE WORD "STOP" SHALL NOT BE PLACED ON THE PAVEMENT IN ADVANCE TO A STOP LINE UNLESS EVERY VEHICLE IS REQUIRED TO STOP AT ALL TIMES.
7. PAVEMENT MARKINGS SHOULD GENERALLY BE NO MORE THAN ONE LANE IN WIDTH, WITH SCHOOL MESSAGES BEING THE EXCEPTION. FOR DETAILS OF SCHOOL AND SCHOOL CROSSING PAVEMENT MARKINGS, REFER TO PART VI OF THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES".
8. SPACING BETWEEN LETTERS SHOULD BE APPROXIMATELY 4 INCHES. THE WIDTH OF LETTERS MAY VARY DEPENDING ON THE WIDTH OF THE TRAVEL LANES.
9. LANE-USE ARROW MARKINGS MAY BE USED TO CONVEY EITHER GUIDANCE OR MANDATORY MESSAGES. ARROWS USED TO CONVEY A MANDATORY MOVEMENT MUST BE ACCOMPANIED BY STANDARD SIGNS AND THE PAVEMENT MARKING WORD "ONLY".
10. PAVEMENT MARKINGS ARE TO BE LOCATED AS SPECIFIED ELSEWHERE IN THE PLANS.

SEPTEMBER 2009

CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS
TRAFFIC ENGINEERING STANDARDS

STANDARD PAVEMENT MARKINGS (ARROWS)

SHEET 3 OF 16

SUBMITTAL	PROJECT NO.		DATE
DRWN BY	DSGN BY	CHKD BY	SHEET NO.

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
EST. 1980 CUDE ENGINEERS
4122 Pond Hill Road, Suite 101
San Antonio, Texas 78231
P:(210) 681.2951 F: (210) 523.7112

FLYING W
UNIT 1

TXDOT PAVEMENT MARKING DETAILS

DATE
11/24/2025

PROJECT NO.
04024-004

DRAWN BY
C7

CHECKED BY
JL

REVISIONS
1 2 3 4 5 6 7 8

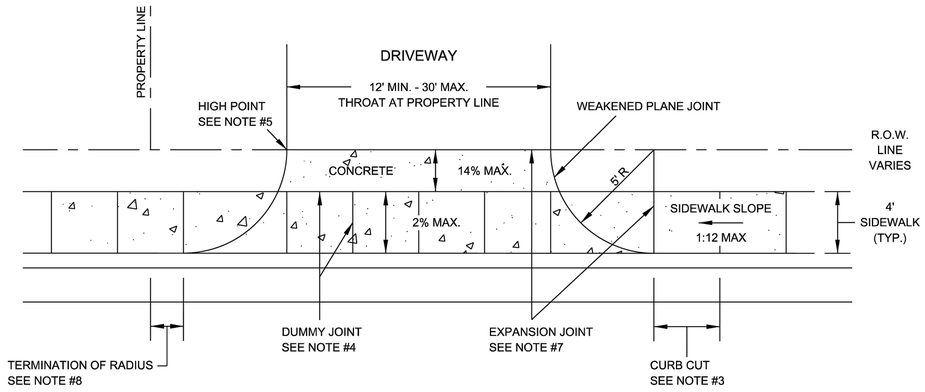
STATE OF TEXAS
JOSE A. LOZANO
126773
LICENSED
PROFESSIONAL ENGINEER
11/26/25
CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
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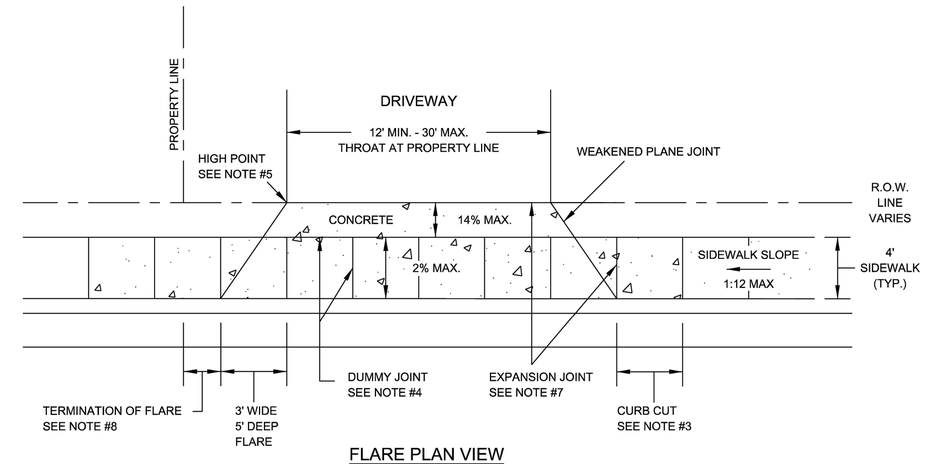
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DRIVEWAY APRON
(RESIDENTIAL - ONE OR TWO FAMILY)



RADIUS PLAN VIEW

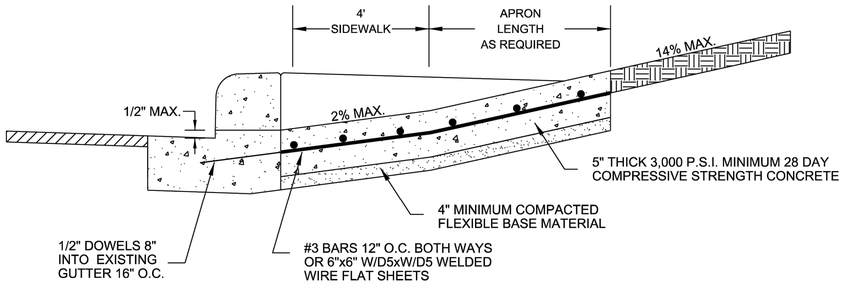


FLARE PLAN VIEW

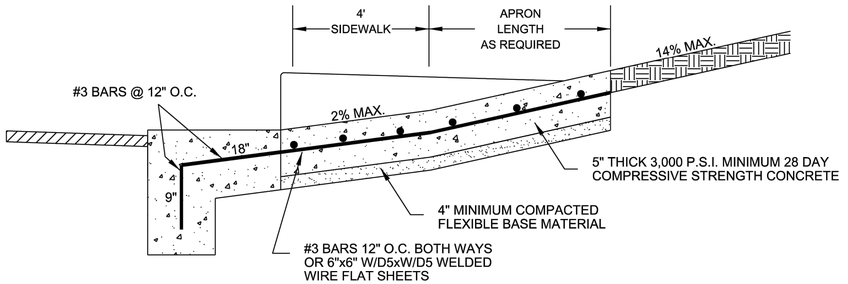
DATE APPROVED: 04/2016	DWG. NO: ST-014.1	SCALE: N.T.S.
DRAWN BY: RAS	SHEET: 1 OF 2	
FILENAME: DRIVEWAY (RESIDENTIAL - ONE OR TWO FAMILY)		

City of New Braunfels — ENGINEERING DEPARTMENT

DRIVEWAY APRON
(RESIDENTIAL - ONE OR TWO FAMILY)



STRUCTURAL SECTION



NOTES:

NO EXISTING CURB STRUCTURAL SECTION

1. WHERE GUTTER DOES NOT EXIST DRIVEWAY APRON SHALL EXTEND TO EDGE OF ASPHALT AND SHALL HAVE A MINIMUM 6" WIDE 1' DEEP GRADE BEAM MONOLITHIC AND REINFORCED SIMILAR TO APRON.
2. PLACEMENT OF SIDEWALK SHOWN IS TYPICAL; HOWEVER, ALTERNATIVE SIDEWALK PLACEMENT COMMON TO DRIVEWAY APRON WILL BE CONSIDERED PROVIDED CROSS SLOPE OF SIDEWALK IS NO GREATER THAN 2%.
3. CURB CUT LENGTH NO GREATER THAN AS REQUIRED TO MATCH SLOPE OF ADJACENT SIDEWALK.
4. DUMMY JOINTS TO BE PROVIDED AT MINIMUM 4-FT. INTERVALS PERPENDICULAR TO THE CURB LINE WITHIN THE SIDEWALK AREA AND PARALLEL TO THE SIDEWALK AREA.
5. PROVIDE A MINIMUM 7" HIGH POINT. HIGH POINT HEIGHT SHALL BE MEASURED FROM THE GUTTER FLOW LINE TO THE DRIVEWAY APRON. NOTE HIGH POINT MAY OCCUR OUTSIDE OF ROW.
6. DRIVEWAY THROAT TRANSITION MAY OCCUR OUTSIDE OF ROW.
7. PROVIDE EXPANSION JOINTS AT ALL SIDEWALK AND DRIVEWAY THROAT JOINTS. EXPANSION JOINTS SHALL BE PLACED USING 1/2" ASPHALTIC MATERIAL WITH 1/2" DOWELS 16" O.C.
8. THE TANGENT POINT OF THE DRIVEWAY CURB RETURN AT THE PUBLIC ROADWAY LINE OR FLARE SHALL BE A MINIMUM DISTANCE OF 1' OFF THE PROPERTY PROJECTED PERPENDICULAR TO THE STREET CENTERLINE, EXCEPT SINGLE FAMILY OR ZERO LOT LINE LOTS. ON SINGLE FAMILY ZERO LOT LINE LOTS WHERE THE DRIVE IS ON THE ZERO LOT LINE, THE TANGENT POINT OR FLARE SHALL BE NO GREATER THAN 3' BEYOND THE ADJOINING PROPERTY LINE PROJECTED PERPENDICULAR TO THE STREET CENTERLINE.

DATE APPROVED: 04/2016	DWG. NO: ST-014.2	SCALE: N.T.S.
DRAWN BY: RAS	SHEET: 2 OF 2	
FILENAME: DRIVEWAY (RESIDENTIAL - ONE OR TWO FAMILY)		

City of New Braunfels — ENGINEERING DEPARTMENT

CUDEENGINEERS.COM

CUDE ENGINEERS

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

FLYING W
UNIT 1

TYPICAL CONCRETE DRIVWAY DETAILS

DATE
11/24/2025

PROJECT NO.
04024-004

DRAWN BY
C7

CHECKED BY
JL

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

STATE OF TEXAS
JOSE A. LOZANO
126773
LICENSED
PROFESSIONAL ENGINEER
11/26/25

CUDE ENGINEERS
TBPELS No. 10048500

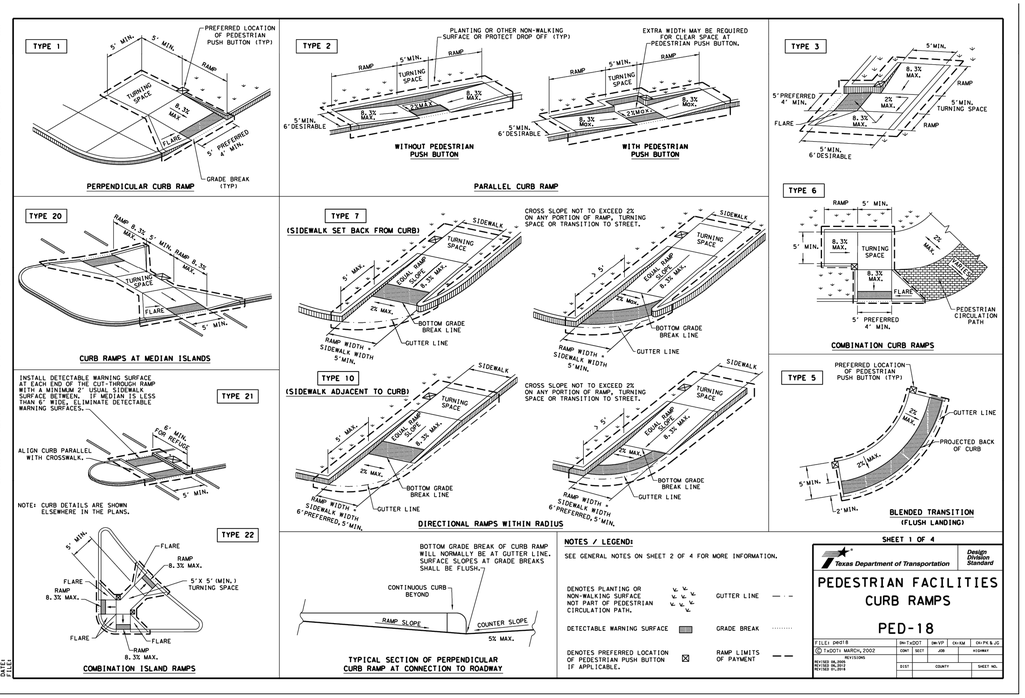
PLAT NO.
-

C7.D5

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DATE:
FILE:



NOTES / LEGEND:

SEE GENERAL NOTES ON SHEET 2 OF 4 FOR MORE INFORMATION.

DENOTES PLANTING OR NON-WALKING SURFACE NOT PART OF PEDESTRIAN CIRCULATION PATH.

DETECTABLE WARNING SURFACE

DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON IF APPLICABLE.

GUTTER LINE

GRADE BREAK

RAMP LIMITS OF PAYMENT

SHEET 1 OF 4

Texas Department of Transportation — Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

FILE: ped18	DN: TxDOT	CK: VP	CK: KM	CK: FK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS				
REVISED 08-2010	DIST	COUNTY		SHEET NO.
REVISED 07-2014				

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DATE:
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GENERAL NOTES

CURB RAMPS

1. Install a curb ramp or blended transition at each pedestrian street crossing.
2. All slopes shown are maximum allowable. Cross slopes of 1.5% and lesser running should be used. Adjust curb ramp length or grade of approach sidewalks as directed.
3. Maximum allowable cross slope on sidewalk and curb ramp surfaces is 2%.
4. The minimum sidewalk width is 5'. Where the sidewalk is adjacent to the back of curb, a 6' sidewalk width is desirable. Where a 5' sidewalk cannot be provided due to site constraints, sidewalk width may be reduced to 4' for short distances. 5'x 5' passing areas at intervals not to exceed 200' are required.
5. Turning Spaces shall be 5'x 5' minimum. Cross slope shall be maximum 2%.
6. Clear space at the bottom of curb ramps shall be a minimum of 4'x 4' wholly contained within the crosswalk and wholly outside the parallel vehicular travel path.
7. Provide flared sides where the pedestrian circulation path crosses the curb ramp. Flared sides shall be sloped at 10% maximum, measured parallel to the curb. Returned curbs may be used only where pedestrians would not normally walk across the ramp, either because the adjacent surface is planted, substantially obstructed, or otherwise protected.
8. Additional information on curb ramp location, design, light reflective value and texture may be found in the latest draft of the Proposed Guidelines for Pedestrian Facilities in the Public Right of Way (PROWAG) as published by the U.S. Architectural and Transportation Barriers Compliance Board (Access Board).
9. To serve as a pedestrian refuge area, the median should be a minimum of 6' wide, measured from back of curbs. Medians should be designed to provide accessible passage over or through them.
10. Small channelization islands, which do not provide a minimum 5'x 5' landing at the top of curb ramps, shall be cut through level with the surface of the street.
11. Crosswalk dimensions, crosswalk markings and stop bar locations shall be as shown elsewhere in the plans. At intersections where crosswalk markings are not required, curb ramps shall align with theoretical crosswalks unless otherwise directed.
12. Provide curb ramps to connect the pedestrian access route at each pedestrian street crossing. Handrails are not required on curb ramps.
13. Curb ramps and landings shall be constructed and paid for in accordance with Item 531 "Sidewalks".
14. Place concrete at a minimum depth of 5" for ramps, flares and landings, unless otherwise directed.
15. Furnish and install No. 3 reinforcing steel bars at 18" o.c. both ways, unless otherwise directed.
16. Provide a smooth transition where the curb ramps connect to the street.
17. Curbs shown on sheet 1 within the limits of payment are considered part of the curb ramp for payment, whether it is concrete curb, gutter, or combined curb and gutter.
18. Existing features that comply with applicable standards may remain in place unless otherwise shown on the plans.

DETECTABLE WARNING MATERIAL

19. Curb ramps must contain a detectable warning surface that consists of raised truncated domes complying with the PROWAG. The surface must contrast visually with adjoining surfaces, including side flares. Furnish and install an approved cast-in-place dark brown or dark red detectable warning surface material adjacent to uncolored concrete, unless specified elsewhere in the plans.
20. Detectable Warning Materials must meet TxDOT Departmental Materials Specification DMS 4350 and be listed on the Material Producer List. Install products in accordance with manufacturer's specifications.
21. Detectable warning surfaces must be firm, stable and slip resistant.
22. Detectable warning surfaces shall be a minimum of 24 inches in depth in the direction of pedestrian travel, and extend the full width of the curb ramp or landing where the pedestrian access route enters the street.
23. Detectable warning surfaces shall be located so that the edge nearest the curb line is at the back of curb and neither end of that edge is greater than 5 feet from the back of curb. Detectable warning surfaces may be curved along the corner radius.
24. Shaded areas on Sheet 1 of 4 indicate the approximate location for the detectable warning surface for each curb ramp type.

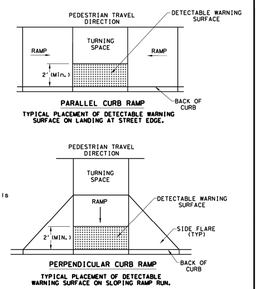
DETECTABLE WARNING PAVERS (IF USED)

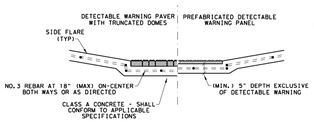
25. Furnish detectable warning paver units meeting all requirements of ASTM C-936, C-33. Lay in a two by two unit basket weave pattern or as directed.
26. Lay full-size units first followed by closure units consisting of at least 25 percent (25%) of a full unit. Cut detectable warning paver units using a power saw.

SIDEWALKS

27. Provide clear ground space at operable parts, including pedestrian push buttons. Operable parts shall be placed within unobstructed reach range specified in PROWAG section R406.
28. Place traffic signal or illumination poles, ground boxes, controller boxes, signs, drainage facilities and other items so as not to obstruct the pedestrian access route or clear ground space.
29. Street grades and cross slopes shall be as shown elsewhere in the plans.
30. Changes in level greater than 1/4 inch are not permitted.
31. The least possible grade should be used to maximize accessibility. The running slope of sidewalks and crosswalks within the public right of way may follow the grade of the parallel roadway. Where a continuous grade greater than five percent (5%) must be provided, handrails may be desirable to improve accessibility. Handrails may also be needed to protect pedestrians from potentially hazardous conditions. If provided, handrails shall comply with PROWAG R409.
32. Handrail extensions shall not protrude into the usable landing area or into intersecting pedestrian routes.
33. Driveways and turnouts shall be constructed and paid for in accordance with Item "Intersections, Driveways and Turnouts". Sidewalks shall be constructed and paid for in accordance with Item, "Sidewalks".
34. Sidewalk details are shown elsewhere in the plans.

DETECTABLE WARNING SURFACE DETAILS





SECTION VIEW DETAIL
CURB RAMP AT DETECTIBLE WARNINGS

SHEET 2 OF 4

Texas Department of Transportation — Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

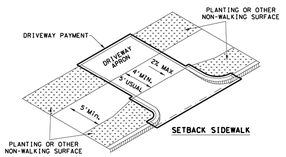
PED-18

FILE: ped18	DN: TxDOT	CK: VP	CK: KM	CK: FK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS				
REVISED 08-2010	DIST	COUNTY		SHEET NO.
REVISED 07-2014				

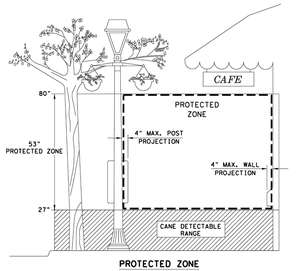
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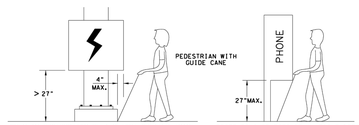
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SIDEWALK TREATMENT AT DRIVEWAYS



NOTES:
* WHERE DRIVEWAYS CROSS THE PEDESTRIAN ROUTE, SIDES SHALL BE FLARED AT 10% MAX SLOPE.
** IF CURB HEIGHT IS GREATER THAN 6 INCHES, USE GRADE LESS THAN OR EQUAL TO 5%. HANDRAIL AND DETECTABLE WARNING ARE NOT REQUIRED.





SHEET 3 OF 4

Texas Department of Transportation — Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

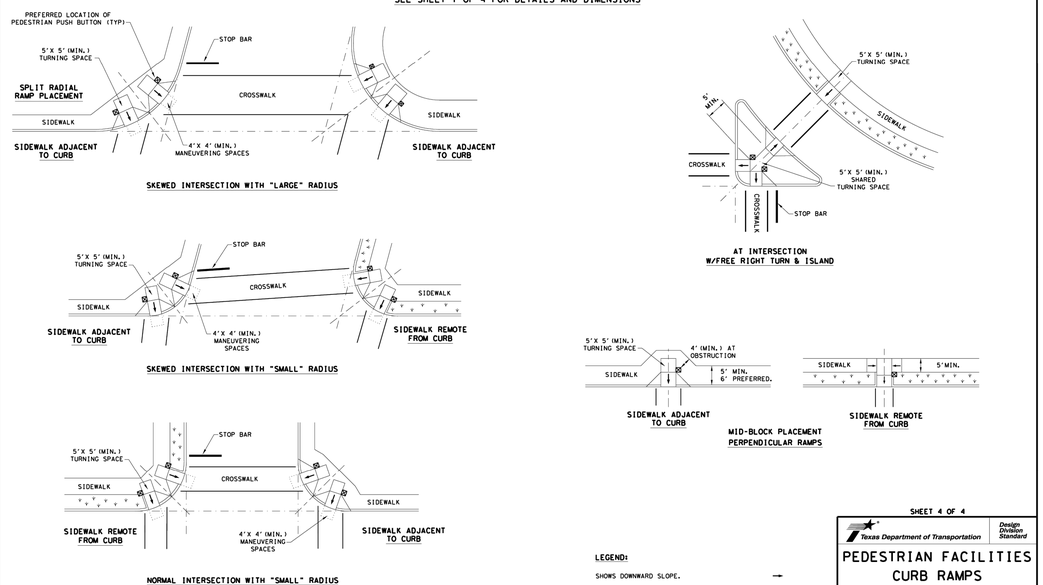
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TYPICAL CROSSING LAYOUTS

SEE SHEET 1 OF 4 FOR DETAILS AND DIMENSIONS



LEGEND:

SHOWS DOWNWARD SLOPE.

DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON (IF APPLICABLE).

DENOTES PLANTING OR NON-WALKING SURFACE NOT PART OF PEDESTRIAN CIRCULATION PATH.

SHEET 4 OF 4

Texas Department of Transportation — Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

FILE: ped18	DN: TxDOT	CK: VP	CK: KM	CK: FK & JG
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REVISIONS				
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EST. 1980 CUDE ENGINEERS
4122 Pond Hill Road, Suite 101
San Antonio, Texas 78231
P:(210) 681.2951 F: (210) 523.7112

FLYING W
UNIT 1

TXDOT PEDESTRIAN FACILITIES DETAILS CURB RAMPS

DATE
11/24/2025

PROJECT NO.
04024-004

DRAWN BY
C7

CHECKED BY
JL

REVISIONS
1 2 3 4 5 6 7 8

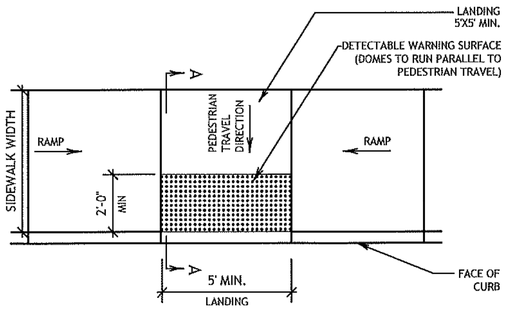
STATE OF TEXAS
JOSE A. LOZANO
126773
LICENSED
PROFESSIONAL ENGINEER
11/26/25

CUDE ENGINEERS
TBPELS No. 10048500

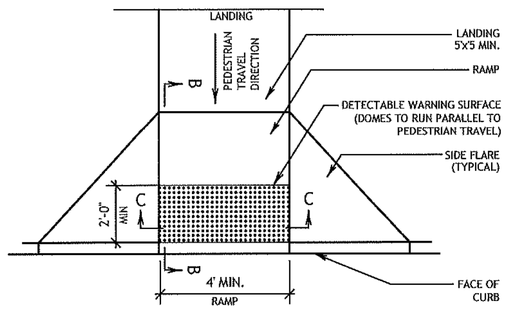
PLAT NO.
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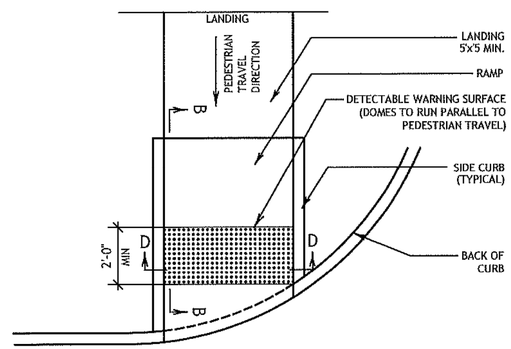
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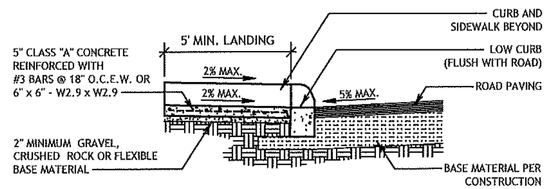
TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON LANDING FOR PARALLEL CURB RAMP.



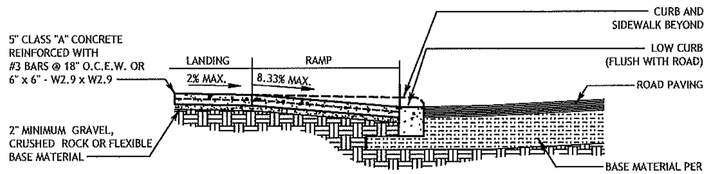
TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE FOR PERPENDICULAR CURB RAMP.



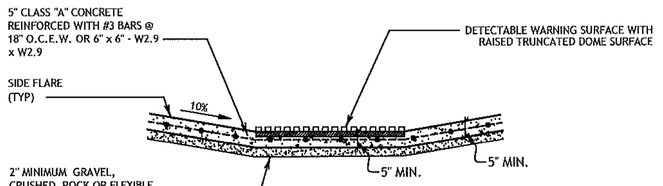
TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN FOR DIRECTIONAL CURB RAMP.



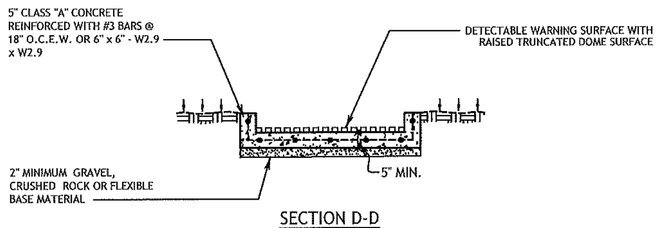
SECTION A-A



SECTION B-B



SECTION C-C



SECTION D-D

CURB RAMP NOTES

1. ALL SLOPES ARE MAXIMUM ALLOWABLE. THE LEAST POSSIBLE SLOPE THAT WILL STILL DRAIN PROPERLY SHOULD BE USED. ADJUST CURB RAMP LENGTH OR GRADE OF APPROACH SIDEWALKS AS DIRECTED.
2. THESE DETAILS ARE FOR REFERENCE ONLY. ACTUAL LOCATIONS OF CURB RAMPS ARE TO BE SHOWN ON THE CONSTRUCTION PLANS. ALL ACCESSIBLE WALK WAYS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE REQUIREMENTS SET FORTH IN THE AMERICAN'S WITH DISABILITIES ACT (ADA) AND TEXAS ACCESSIBILITY STANDARDS (TAS). CITY ENGINEER OR BUILDING OFFICIAL MAY ADJUST LOCATIONS FOR SAFETY OR UTILITY CLEARANCE.
3. THE MINIMUM STANDARD SIDEWALKS SHALL BE PROVIDED IN ACCORDANCE WITH SECTION 118-49 OF THE NEW BRAUNFELS CODE OF ORDINANCES.
4. ALL LANDINGS WHERE REQUIRED SHALL BE 5'X 5' (60"X60") MINIMUM WITH A MAXIMUM 2% SLOPE IN ANY DIRECTION.
5. RAMP LENGTHS SHALL BE SUFFICIENT TO MAINTAIN A MAXIMUM SLOPE OF 8.33% (1V:12H). MAXIMUM ALLOWABLE CROSS SLOPE ON SIDEWALK AND CURB RAMP SURFACES IS 2% (1V:50H).
6. SIDEWALK GRADES SHALL NOT EXCEED THE GRADE ESTABLISHED FOR THE ADJACENT ROADWAY, ANY SIDEWALK CONSTRUCTION THAT DEVIATES FROM THE GRADE OF THE NATURAL GRADE OF THE ROADWAY TO CREATE A GRADE STEEPER THAN THE EXISTING ROADWAY WILL REQUIRE RAMPS, HANDRAILS, AND LANDINGS IN ACCORDANCE WITH CURRENT ADA AND TAS REQUIREMENTS.
7. PROVIDE FLARED RAMP SIDES WITH A MAXIMUM SLOPE OF 10% (1V:10H) MEASURED ALONG THE CURB LINE. CURB RETURNS MAY BE USED IN-LIEU OF SIDE FLARES IN AREAS NOT NORMALLY WALKED ACROSS BY PEDESTRIANS, BECAUSE THE ADJACENT SURFACE IS VEGETATION OR OTHER NON-WALKING SURFACE OR WHERE THE SIDE APPROACH IS SUBSTANTIALLY OBSTRUCTED.
8. MANEUVERING SPACE AT THE BOTTOM OF CURB RAMPS SHALL BE A MINIMUM OF 4'X 4' (48"X48") WHOLLY CONTAINED WITHIN THE CROSSWALK AND WHOLLY OUTSIDE THE PARALLEL VEHICULAR TRAVEL PATH.
9. CROSSWALK DIMENSIONS, CROSSWALK MARKINGS AND STOP BAR LOCATIONS SHALL BE AS SHOWN ELSEWHERE IN THE PLANS. AT INTERSECTIONS WHERE CROSSWALK MARKINGS ARE NOT REQUIRED, CURB RAMPS SHALL BE ALIGNED WITH THEORETICAL CROSSWALKS, OR AS DIRECTED BY THE CITY ENGINEER OR BUILDING OFFICIAL.
10. EXISTING FEATURES THAT COMPLY WITH CURRENT TAS REQUIREMENTS MAY REMAIN IN PLACE UNLESS OTHERWISE SHOWN ON THE PLANS.
11. HANDRAILS ARE NOT REQUIRED ON CURB RAMPS. PROVIDE CURB RAMPS WHEREVER AN ACCESSIBLE ROUTE CROSSES (PENETRATES) A CURB.
12. SEPARATE CURB RAMP AND LANDINGS FROM ADJACENT SIDEWALK AND ANY OTHER ELEMENTS WITH PRE-MOLD OR BOARD JOINT OF 1/2" UNLESS OTHERWISE DIRECTED BY THE CITY ENGINEER OR BUILDING OFFICIAL.
13. PROVIDE A SMOOTH TRANSITION WHERE THE CURB RAMPS CONNECT TO THE STREET.
14. 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%.
15. 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.
16. ADA RAMP SHALL BE CONSTRUCTED WITH 5" CLASS "A" CONCRETE WITH 2" MINIMUM GRAVEL,CRUSHED ROCK OR FLEXIBLE BASE MATERIAL. REINFORCING STEEL SHALL BE #3 BARS AT 18" O.C.E.W. OR 6"x6" - W2.9 X W2.9 WIRE MESH.
17. THE EXTENTS OF ADA COMPLIANCE IN ALTERATIONS SHALL BE WITHIN THE LIMITS, BOUNDARIES OR SCOPE OF A PLANNED PROJECT AND AS DETERMINED BY THE CITY BUILDING OFFICIAL.

DETECTABLE WARNING NOTES

1. CURB RAMPS OR LANDINGS ABUTTING THE CROSSWALK MUST HAVE A DETECTABLE WARNING SURFACE THAT CONSISTS OF RAISED TRUNCATED DOMES COMPLYING WITH SECTION 705 OF THE TEXAS ACCESSIBILITY STANDARDS (TAS). THE SURFACE MUST CONTRAST VISUALLY WITH ADJOINING SURFACES, INCLUDING SIDE FLARES. FURNISH DARK BROWN OR DARK RED DETECTABLE WARNING SURFACE ADJACENT TO UNCOLORED CONCRETE, UNLESS SPECIFIED ELSEWHERE IN THE PLANS.
2. DETECTABLE WARNING SURFACES MUST BE SLIP RESISTANT AND NOT ALLOW WATER TO ACCUMULATE.
3. ALIGN TRUNCATED DOMES IN THE DIRECTION OF PEDESTRIAN TRAVEL WHEN ENTERING THE STREET.
4. DETECTABLE WARNING SURFACES SHALL BE A MINIMUM OF 24" IN DEPTH IN THE DIRECTION OF PEDESTRIAN TRAVEL, AND EXTEND THE FULL WIDTH OF THE CURB RAMP OR LANDING WHERE THE PEDESTRIAN ACCESS ROUTE ENTERS THE STREET.
5. DETECTABLE WARNING SURFACES SHALL BE LOCATED SO THAT THE EDGE NEAREST THE CURB LINE IS AT THE BACK OF CURB. ALIGN THE ROWS OF DOMES TO BE PERPENDICULAR TO THE GRADE BREAK BETWEEN THE RAMP RUN AND THE STREET. DETECTABLE WARNING SURFACES MAY BE CURVED ALONG THE CORNER RADIUS.
6. DETECTABLE WARNING MATERIALS MUST MEET TXDOT DEPARTMENTAL MATERIALS SPECIFICATION DMS 4350 AND BE LISTED ON THE MATERIAL PRODUCER LIST. INSTALL PRODUCTS IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
7. DETECTABLE WARNING PAVERS SHALL NOT BE PERMITTED WITHOUT THE APPROVAL BY THE PUBLIC WORKS DEPARTMENT.

City of New Braunfels

ENGINEERING DIVISION
550 LANDA STREET
NEW BRAUNFELS, TEXAS 78130
PHONE: 830 221 4020
FAX: 830 626 3600

CURB RAMP STANDARDS

APPROVED DATE: 05/18/2017	DWG. NO.: ST-019	SCALE: AS NOTED
DRAWN BY: RC	CONTACT: GF	SHEET: 1 OF 1

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

FLYING W
UNIT 1

WHEELCHAIR RAMPS STANDARDS

DATE
11/24/2025
PROJECT NO.
04024-004
DRAWN BY
C7
CHECKED BY
JL

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

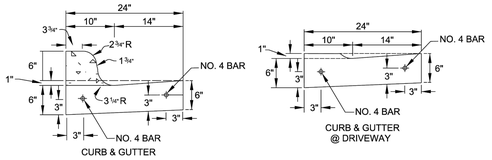
STATE OF TEXAS
JOSE A. LOZANO
126773
LICENSED
PROFESSIONAL ENGINEER
11/26/25
CUDE ENGINEERS
TBPELS No. 10048500

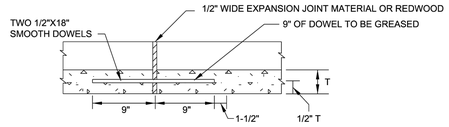
PLAT NO.
-

C7.D7

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.

CURB AND GUTTER





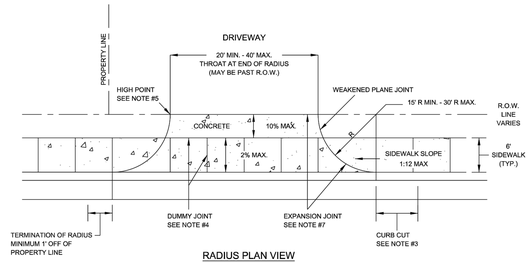
LONGITUDINAL SECTION THRU CURB AND GUTTER
SHOWING TYPICAL EXPANSION JOINT DETAILS.
REINFORCING STEEL SHALL NOT CROSS EXPANSION JOINTS.
STEEL SHALL BE TERMINATED 3" (+ OR -) 1" FROM FACE OF THE JOINT.

NOTES:

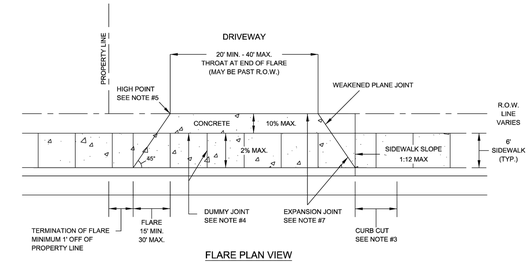
1. REINFORCING BARS SHALL BE LAPPED A MINIMUM OF 18".
2. CURB AND GUTTER SHALL HAVE FORMED TOOLED OR SAWED CONTRACTION JOINTS AT ± 10'. THE DEPTH OF THESE JOINTS SHALL BE SUFFICIENT TO ENSURE CRACKING AT THE JOINTS.
3. CURB OR CURB AND GUTTER SHALL HAVE EXPANSION JOINTS AT POINTS OF CURVATURE, AT INTERVALS NO GREATER THAN 100' AND AT ALL ADJACENT STRUCTURES.
4. UNLESS OTHERWISE SHOWN, TRANSITIONS BETWEEN CURBS OR CURBS AND GUTTER OF DIFFERING CROSS SECTION SHALL BE ACCOMPLISHED OVER A 10' LENGTH OR AS APPROVED BY THE CITY ENGINEER.
5. ALL CONCRETE TO BE CLASS "A" 3000 PSI CONCRETE.
6. ALL EXPOSED CONCRETE SURFACES TO BE BRUSHED SMOOTH AND UNIFORM.

DATE APPROVED: 07/2008	DWG. NO: ST-013	SCALE: N.T.S.	City of New Braunfels ENGINEERING DEPARTMENT
DRAWN BY: RAS	SHEET: 1 OF 1		
FILENAME: CURB & GUTTER			

DRIVEWAY APRON
(COMMERCIAL - MULTIFAMILY - INDUSTRIAL)
(RADIAL/FLARED)



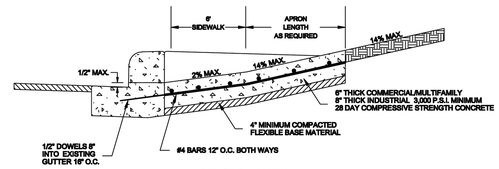
RADIUS PLAN VIEW



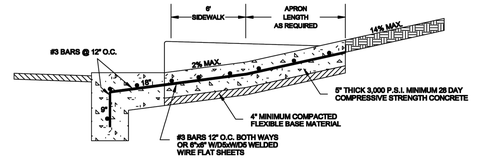
FLARE PLAN VIEW

DATE APPROVED: 07/2008	DWG. NO: ST-015.1	SCALE: N.T.S.	City of New Braunfels ENGINEERING DEPARTMENT
DRAWN BY: RAS	SHEET: 1 OF 2		
FILENAME: DRIVEWAY (COMMERCIAL - MULTIFAMILY - INDUSTRIAL)			

DRIVEWAY APRON
(COMMERCIAL - MULTIFAMILY - INDUSTRIAL)



STRUCTURAL SECTION



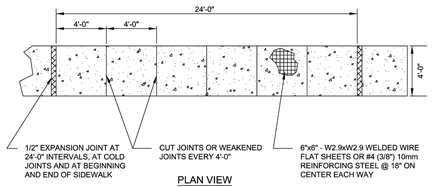
NO EXISTING CURB STRUCTURAL SECTION

NOTES:

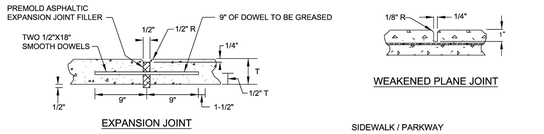
1. **WHERE GUTTER DOES NOT EXIST DRIVEWAY APRON SHALL EXTEND TO EDGE OF ASPHALT AND SHALL HAVE A MINIMUM 6" WIDE 1' DEEP GRADE BEAM MONOLITHIC AND REINFORCED SIMILAR TO APRON.**
2. **PLACEMENT OF SIDEWALK SHOWN IS TYPICAL; HOWEVER, ALTERNATIVE SIDEWALK PLACEMENT COMMON TO DRIVEWAY APRON WILL BE CONSIDERED PROVIDED CROSS SLOPE OF SIDEWALK IS NO GREATER THAN 2%.**
3. **CURB CUT LENGTH NO GREATER THAN AS REQUIRED TO MATCH SLOPE OF ADJACENT SIDEWALK.**
4. **DUMMY JOINTS TO BE PROVIDED AT MINIMUM 4-FT. INTERVALS PERPENDICULAR TO THE CURB LINE WITHIN THE SIDEWALK AREA AND PARALLEL TO THE SIDEWALK AREA.**
5. **PROVIDE A MINIMUM 7" HIGH POINT. HIGH POINT HEIGHT SHALL BE MEASURED FROM THE GUTTER FLOW LINE TO THE DRIVEWAY APRON. NOTE HIGH POINT MAY OCCUR OUTSIDE OF ROW.**
6. **DRIVEWAY THROAT TRANSITION MAY OCCUR OUTSIDE OF ROW.**
7. **PROVIDE EXPANSION JOINTS AT ALL SIDEWALK AND DRIVEWAY THROAT JOINTS. EXPANSION JOINTS SHALL BE PLACED USING 1/2" ASPHALTIC MATERIAL WITH 1/2" DOWELS 16" O.C.**
8. **ALL SIDEWALK AND DRIVEWAY CONSTRUCTION SHALL MEET A.D.A. SPECIFICATIONS.**

DATE APPROVED: 7/08	DWG. NO: ST-015.2	SCALE: N.T.S.	City of New Braunfels ENGINEERING DEPARTMENT
DRAWN BY: RAS	SHEET: 2 OF 2		
FILENAME: DRIVEWAY (Commercial - Multifamily - Industrial)			
P:\CURRENT NEW BRAUNFELS DETAILS\2008\			

SIDEWALK
(RESIDENTIAL)

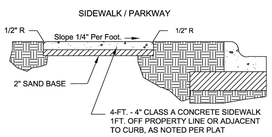


PLAN VIEW



EXPANSION JOINT

WEAKENED PLANE JOINT



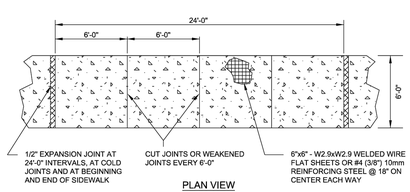
TYPICAL SECTION

NOTES:

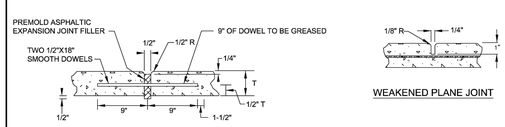
1. EXPANSION JOINTS ARE TO BE USED BETWEEN CONCRETE DRIVEWAY AND SIDEWALK.
2. SCORED JOINTS DENOTE SIDEWALK ACROSS THE DRIVEWAY AND ARE TO BE PLACED AT LEAST 1/3 rd. THROUGH THE SLAB THICKNESS.
3. ALL SIDEWALK AND DRIVEWAY CONSTRUCTION SHALL MEET A.D.A. SPECIFICATIONS.

DATE APPROVED: 07/2008	DWG. NO: ST-016	SCALE: N.T.S.	City of New Braunfels ENGINEERING DEPARTMENT
DRAWN BY: RAS	SHEET: 1 OF 1		
FILENAME: SIDEWALK (RESIDENTIAL)			

SIDEWALK
(COMMERCIAL - INDUSTRIAL)

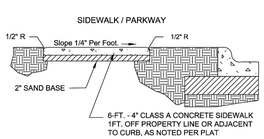


PLAN VIEW



EXPANSION JOINT

WEAKENED PLANE JOINT



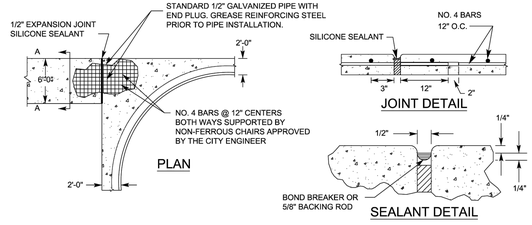
TYPICAL SECTION

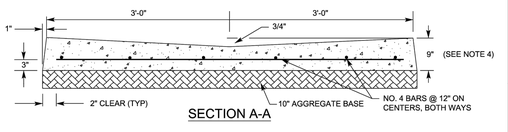
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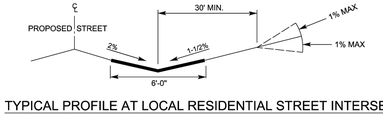
1. EXPANSION JOINTS ARE TO BE USED BETWEEN CONCRETE DRIVEWAY AND SIDEWALK.
2. SCORED JOINTS DENOTE SIDEWALK ACROSS THE DRIVEWAY AND ARE TO BE PLACED AT LEAST 1/3 rd. THROUGH THE SLAB THICKNESS.
3. ALL SIDEWALK AND DRIVEWAY CONSTRUCTION SHALL MEET A.D.A. SPECIFICATIONS.

DATE APPROVED: 07/2008	DWG. NO: ST-017	SCALE: N.T.S.	City of New Braunfels ENGINEERING DEPARTMENT
DRAWN BY: RAS	SHEET: 1 OF 1		
FILENAME: SIDEWALK (COMMERCIAL - INDUSTRIAL)			

CROSS GUTTER







TYPICAL PROFILE AT LOCAL RESIDENTIAL STREET INTERSECTION

NOTES:

1. ALL CONCRETE SHALL BE CLASS "A" 3,000 PSI.
2. FINISHED ASPHALT CONCRETE SURFACE TO BE FLUSH WITH CROSS GUTTER LIP.
3. CONSTRUCTION OF CROSS GUTTER IS NOT ALLOWED ACROSS MAJOR COLLECTOR OR ARTERIAL STREETS.
4. ADJACENT SPANDREL SHALL BE 9" THICK CLASS "A" 3,000 PSI CONCRETE.

DATE APPROVED: 07/2008	DWG. NO: ST-020	SCALE: N.T.S.	City of New Braunfels ENGINEERING DEPARTMENT
DRAWN BY: RAS	SHEET: 1 OF 1		
FILENAME: CROSS GUTTER			

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

FLYING W
UNIT 1

CITY OF NEW BRAUNFELS STANDARD DETAILS

DATE
11/24/2025
PROJECT NO.
04024-004
DRAWN BY
C7
CHECKED BY
JL

REVISIONS
1 2 3 4 5 6 7 8

STATE OF TEXAS
JOSE A. LOZANO
126773
LICENSED
PROFESSIONAL ENGINEER
11/26/25
CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
-

C7.D8

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.

1. ALL PAVEMENT MARKINGS SHALL BE THERMOPLASTICS AS PER TXDOT ITEM NO. 666.
2. COMAL COUNTY WILL INSTALL COUNTY ROAD SIGNS AND INVOICE THE OWNER. THE CONTRACTOR IS TO INSTALL PAVEMENT MARKINGS. ALL ROAD SIGNS AND PAVEMENT MARKINGS SHALL BE INSTALLED IN ACCORDANCE WITH THE APPROVED ENGINEERING PLANS. THE COUNTY WILL INSPECT ALL SIGNS AT FINAL INSPECTION.
3. THE CONTRACTOR SHALL INSTALL ALL PAVEMENT MARKINGS IN ACCORDANCE WITH APPROVED ENGINEERING PLANS. THE CONTRACTOR SHALL NOTIFY THE COUNTY AT LEAST 24 HOURS PRIOR TO THE INSTALLATION OF ALL SEALER AND FINAL MARKINGS. THE COUNTY WILL INSPECT ALL MARKINGS AT FINAL APPLICATION.

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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FLYING W UNIT 1

TRAFFIC SIGNAGE PLAN

DATE
11/24/2025

PROJECT NO.
04024-004

DRAWN BY
C7

CHECKED BY
JL

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

STATE OF TEXAS
JOSE A. LOZANO
126773
LICENSED
PROFESSIONAL ENGINEER
11/26/25

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
-

C8.00

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