Terra Buona

Unit 10

September 2025
SAN ANTONIO, TEXAS

BID PACKAGE

09/11/2025

PREPARED FOR:

KB HOME LONE STAR, LLC

4800 FREDERICKSBURG Rd., SUITE 100

SAN ANTONIO, TX 78229

BID FORM

M.W. CUDE ENGINEERS, L.L.C 4122 Pond Hill Road, Suite 101 San Antonio, Texas 78231 210.681.2951 (tel) 210.523.7112 (fax)

TERRA BUONA – UNIT 10
CONSTRUCTION PLANS

M.W. CUDE ENGINEERS, L.L.C 4122 Pond Hill Road, Suite 101 San Antonio, Texas 78231 210.681.2951 (tel) 210.523.7112 (fax)

CIVIL PLANS

- C0.00 GENERAL NOTES
- C0.01 – SUPPLEMENTARY GENERAL NOTES

- C1.00 – STORMWATER POLLUTION PREVENTION PLAN

- C2.00 – EXISTING CONDITIONS AND DEMOLITION PLAN

- C3.00 – GRADING PLAN
- C3.01 – GRADING PLAN

- C4.00 – UTILITY LAYOUT PLAN

- C5.00 – SANITARY SEWER MASTER PLAN
- C5.01 – SANITARY SEWER PLAN & PROFILE – LINE A
- C5.02 – SANITARY SEWER PLAN & PROFILE – LINE B
- C5.03 – SANITARY SEWER PLAN & PROFILE – LINE B
- C5.04 – SANITARY SEWER PLAN & PROFILE – LINE C
- C5.05 – SANITARY SEWER PLAN & PROFILE – LINE C
- C5.06 – SANITARY SEWER PLAN & PROFILE – LINE D
- C5.07 – SANITARY SEWER PLAN & PROFILE – LINE E
- C5.08 – SANITARY SEWER PLAN & PROFILE – LINE F
- C5.D1 – SANITARY SEWER GENERAL NOTES
- C5.D2 – SANITARY SEWER STANDARD DETAILS

- C6.00 – WATER DISTRIBUTION PLAN
- C6.01 – WATER DISTRIBUTION PLAN
- C6.D1 – WATER DISTRIBUTION SYSTEM GENERAL NOTES

- C7.00 – PROPOSED MASTER DRAINAGE PLAN
- C7.01 – ULTIMATE MASTER DRAINAGE PLAN
- C7.02 – DRAIN PLAN & PROFILE – DRAIN 10A
- C7.03 – DRAIN PLAN & PROFILE – DRAIN 10B
- C7.04 – DRAIN PLAN & PROFILE – DRAIN 10C
- C7.05 – DRAIN PLAN & PROFILE – DRAIN 10D
- C7.06 – DRAIN PLAN & PROFILE – GROSENBACHER CULVERT
- C7.07 – DRAIN PLAN & PROFILE – DRAIN 10E
- C7.08 – DETENTION POND PLAN
- C7.D1 – DETENTION POND DETAILS
- C7.D2 – COSA DRAIN INLET DETAILS TYPE C
- C7.D3 – TYPE 'C' INLET DETAILS
- C7.D4 – DRAINAGE DETAILS

- C8.00 – STREET PLAN & PROFILE – HOMESTEAD COVE
- C8.01 – STREET PLAN & PROFILE – CHISUM WAY
- C8.02 – STREET PLAN & PROFILE – CEDAR TREE
- C8.03 – STREET PLAN & PROFILE – BISON PLAINS TRAIL
- C8.04 – STREET PLAN & PROFILE – HOPE RANCH
- C8.05 – STREET PLAN & PROFILE – HOMESTEAD CREST AND LANCASTER COV
- C8.D1 – STANDARD STREET DETAILS
- C8.D2 – TXDOT DETAILS
- C8.D3 – COSA DETAILS

- C9.00 – TRAFFIC SIGNAGE PLAN
- C9.01 – GROSENBACHER RD TURN LANE PLAN
- C9.D1 – TURN LANE DETAILS
- C9.D2 – TXDOT & BEXAR COUNTY DETAILS – SIGN MOUNTING
- C9.D3 – TXDOT DETAILS – SIGN MOUNTING

SEWER: UPPER MEDINA RIVER SEWERSHED – DOS RIOS W.R.C.

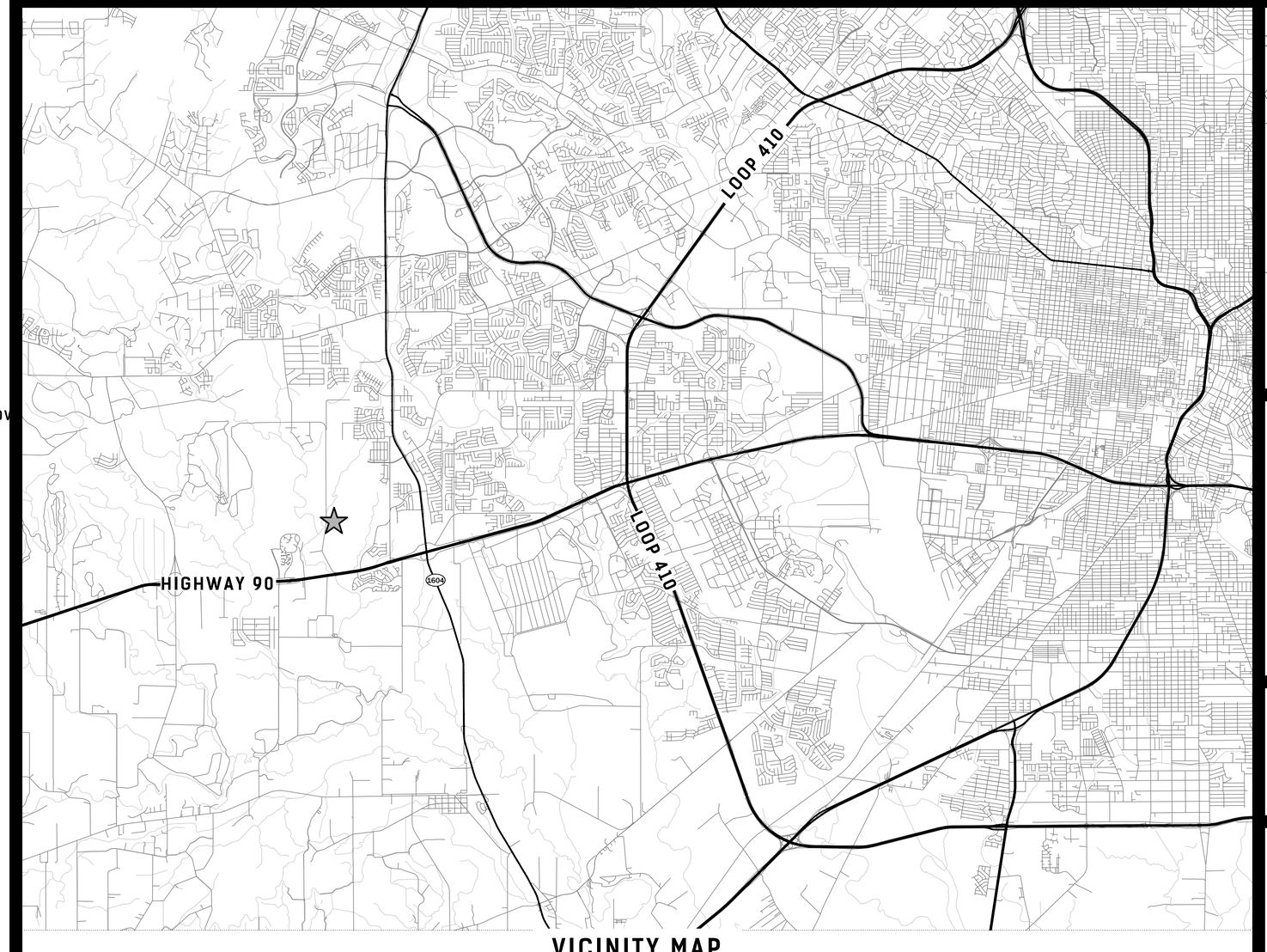
Developer's Name	KB HOME				
Developer's Address	4800 FREDERICKSBURG ROAD				
City	SAN ANTONIO	State	TEXAS	Zip	78229
Phone #	(210) 301-5485	Fax #	–		
SAWS Block Map #	086564/088564	Total EDU's	116	Total Acreage	21.27
Total Linear Footage of Pipe	4,132 L.F. OF 8" SS – SDR 26			Plat No.	25-11800307
Number of Lots	116	SAWS Job No.	XX-XXXX		

SAWS PRESSURE ZONE 950W

Developer's Name	KB HOME				
Developer's Address	4800 FREDERICKSBURG ROAD				
City	SAN ANTONIO	State	TEXAS	Zip	78229
Phone #	(210) 301-5485	Fax #	–		
SAWS Block Map #	086564/088564	Total EDU's	119	Total Acreage	21.27
Total Linear Footage of Pipe	8" PVC – 3,854 L.F., 2" PVC – 582 L.F.			Plat No.	25-11800307
Number of Lots	116	SAWS Job No.	XX-XXXX		

CONSTRUCTION DOCUMENTS FOR

TERRA BUONA UNIT 10



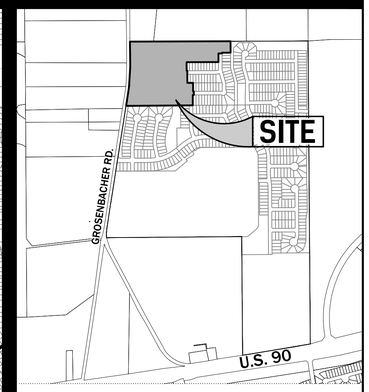
VICINITY MAP
N.T.S.

CUDEENGINEERS.COM

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'

DEVELOPER:
KB HOME
CONTACT PERSON: SEAN MILLER
4800 FREDERICKSBURG ROAD
SAN ANTONIO,TX 78229
TEL. (210) 301-5485

N W E S

MDP NUMBER: 25-1100024

PLAT NUMBER: 25-11800307

PROJECT NUMBER: 03209.019

09/11/2025

STATE OF TEXAS
SEAN P. McFARLAND
138893
LICENSED PROFESSIONAL ENGINEER

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

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

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GENERAL NOTES

1. ALL CONSTRUCTION SHALL CONFORM TO THE CITY OF SAN ANTONIO STANDARD SPECIFICATIONS FOR CONSTRUCTION JUNE 2008, OR LATEST.
2. NO EXTRA PAYMENT SHALL BE ALLOWED FOR WORK CALLED FOR ON THE PLANS, BUT NOT INCLUDED IN THE BID PROPOSAL. THIS INCIDENTAL WORK WILL BE REQUIRED AND SHALL BE INCLUDED IN THE PAY ITEM TO WHICH IT RELATES.
3. THE CONTRACTOR SHALL PROVIDE ACCESS FOR THE DELIVERY OF MAIL BY THE U.S. POSTAL SERVICE.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR RESTORING TO ITS ORIGINAL OR BETTER CONDITION ANY DAMAGE DONE TO EXISTING FENCES, CONCRETE ISLANDS, STREET PAVING, CURBS, SHRUBS, BUSHES OR DRIVEWAYS. (NO SEPARATE PAY ITEM).
5. IT IS THE CONTRACTOR'S RESPONSIBILITY TO SEE THAT ALL SIGNS AND BARRICADES ARE PROPERLY INSTALLED AND MAINTAINED. ALL LOCATIONS AND DISTANCES WILL BE DECIDED UPON IN THE FIELD BY THE CONTRACTOR, USING THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES". THE CITY'S CONSTRUCTION INSPECTOR AND TRAFFIC ENGINEERING REPRESENTATIVE WILL ONLY BE RESPONSIBLE TO INSPECT BARRICADES AND SIGNS. IF, IN THE OPINION OF THE TRAFFIC ENGINEERING REPRESENTATIVE AND THE CONSTRUCTION INSPECTOR, THE BARRICADES AND SIGNS DO NOT CONFORM TO ESTABLISHED STANDARDS 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.
6. IF THE NEED ARISES, ADDITIONAL BARRICADES AND DIRECTIONAL DEVICES MAY BE ORDERED BY THE TRAFFIC ENGINEERING REPRESENTATIVE AT THE CONTRACTOR'S EXPENSE.
7. DUE TO FEDERAL REGULATIONS TITLE 49, PART 192.171 C.P.S. MUST MAINTAIN ACCESS TO GAS VALVES AT ALL TIMES. THE CONTRACTOR MUST PROTECT AND WORK AROUND ANY GAS VALVES THAT ARE IN THE PROJECT AREA.
8. CONTRACTOR SHALL NOTIFY THE CITY INSPECTOR TWENTY FOUR (24) HOURS PRIOR TO BACKFILL OF ANY UTILITY TRENCHES TO SCHEDULE FOR DENSITY TEST AS REQUIRED.
9. CONTRACTOR SHALL PRESERVE ALL CONSTRUCTION STAKES, MARKS, ETC. IF ANY ARE DESTROYED OR REMOVED BY THE CONTRACTOR OR HIS EMPLOYEES, THEY SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.
10. CONTRACTOR SHALL NOTIFY ALL UTILITY COMPANIES PRIOR TO CONSTRUCTION TO DETERMINE THE LOCATION OF EXISTING UTILITIES. CONTRACTOR SHALL NOTIFY THE FOLLOWING AT LEAST FORTY-EIGHT (48) HOURS PRIOR TO EXCAVATION OPERATION:

SAN ANTONIO WATER SYSTEM (SAWS)	233-2010
BEXAR METROPOLITAN WATER DISTRICT (BEXAR MET)	354-6538 / 357-5741
COSA DRAINAGE	207-8048
COSA SIGNAL OPERATIONS	207-7720 / 207-7765
TEXAS STATE WIDE ONE CALL LOCATOR	1-800-344-8377

- CITY PUBLIC SERVICE ENERGY
- TIME WARNER
- AT&T
- MCI

11. THE EXISTENCE AND LOCATION OF UNDERGROUND UTILITIES INDICATED ON THE PLANS ARE TAKEN FROM AVAILABLE RECORDS AND ARE NOT GUARANTEED, BUT SHALL BE INVESTIGATED AND VERIFIED BY THE CONTRACTOR BEFORE STARTING WORK. THE CONTRACTOR SHALL BE HELD RESPONSIBLE FOR ANY DAMAGE TO AND FOR THE MAINTENANCE AND PROTECTION OF THE EXISTING UTILITIES EVEN IF THEY ARE NOT SHOWN ON THE PLANS LOCATION AND DEPTH OF EXISTING UTILITIES SHOWN HERE ARE APPROXIMATE ONLY ACTUAL LOCATIONS AND DEPTHS MUST BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION AND HE SHALL BE RESPONSIBLE FOR PROTECTION OF SAME DURING CONSTRUCTION.
12. ALL WASTE MATERIAL SHALL BECOME PROPERTY OF THE CONTRACTOR AND SHALL BE HIS SOLE REPONSIBILITY TO DISPOSE OF THIS MATERIAL OFF THE LIMITS OF THE PROJECT. NO WASTE MATE-RIAL SHALL BE PLACED IN EXISTING LOWS THAT WILL BLOCK OR ALTER FLOW LIMITS OF EXISTING ARTIFICIAL OR NATURAL DRAINAGE.
13. THE CONTRACTOR SHALL NOT PLACE ANY WASTE MATERIAL IN THE 100-YEAR FLOOD PLAIN WITHOUT FIRST OBTAINING AN APPROVED FLOOD PLAIN DEVELOPMENT PERMIT.
14. THE CONTRACTOR SHALL MAINTAIN ALL ADJOINING STREETS AND TRAVELED ROUTES FREE FROM SPILLED AND /OR TRACKED CONSTRUCTION MATERIALS AND /OR DEBRIS.
15. IF THE CONTRACTOR ENCOUNTERS ANY ARCHAEOLOGICAL DEPOSITS DURING CONSTRUCTION OPERATIONS, THE CONTRACTOR MUST STOP EXCAVATION IMMEDIATELY, CONTACT THE CITY INSPECTOR, AND CALL THE CITY HISTORIC PRESERVATION OFFICE AT 207-7306 OR 207-3327 FOR AN ARCHAEOLOGICAL INVESTIGATION. THE CONTRACTOR CANNOT BEGIN EXCAVATION AGAIN WITHOUT WRITTEN PERMISSION FROM THE CITY.
    IF MORE THAN THREE (3) DAYS ARE REQUIRED FOR INVESTIGATION (NOT INCLUDING HOLIDAY AND WEEKENDS) AND IF THE CONTRACTOR IS UNABLE TO WORK IN OTHER AREAS, THEN THE CONTRACTOR WILL BE ALLOWED TO NEGOTIATE FOR ADDITIONAL CONSTRUCTION TIME UPON WRITTEN REQUEST WITHIN TEN (10) DAYS AFTER THE FIRST NOTICE TO THE CITY OF ARCHAEOLOGICAL INVESTIGATION FOR EACH EVENT.
    IF THE TIME REQUIRED FOR INVESTIGATION IS LESS THAN OR EQUAL TO THREE (3) DAYS FOR EACH EVENT, CONTRACT DURATION WILL NOT BE EXTENDED.
16. IF SUSPECTED CONTAMINATION IS ENCOUNTERED DURING CONSTRUCTION OPERATIONS, C.O.S.A. SHALL BE NOTIFIED IMMEDIATELY WHEN CONTAMINATED SOILS AND /OR GROUNDWATER ARE ENCOUNTERED AT LOCATIONS NOT IDENTIFIED IN THE PLANS. THE NOTIFICATION SHOULD INCLUDE THE STATION NUMBER, TYPE OF CONTAMINATED MEDIA, EVIDENCE OF CONTAMINATION AND MEASURES TAKEN TO CONTAIN THE CONTAMINATED MEDIA AND PREVENT PUBLIC ACCESS. THE CONTAMINATED SOIL AND /OR GROUNDWATER SHALL NOT BE REMOVED FROM THE LOCATION WITHOUT PRIOR C.O.S.A. APPROVAL.
    THE CONTRACTOR MUST STOP THE EXCAVATION IMMEDIATELY AND CONTACT THE C.O.S.A. INSPECTOR. THE CONTRACTOR CANNOT BEGIN EXCAVATION ACTIVITIES WITHOUT WRITTEN PERMISSION FROM THE CITY.
17. CONTRACTOR IS TO INCLUDE A MAILBOX POST BLOCKOUT FOR VACANT LOTS AND ALL RESIDENCES WHICH DO NOT HAVE MAILBOXES AT THE CURB. BLOCKOUTS ARE PROVIDED FOR FUTURE USE BY THE POST OFFICE.
18. CONTRACTOR SHALL NOT REMOVE OR ADJUST ANY VIA FACILITIES. THE CONTRACTOR MUST CONTACT VIA FOURTEEN DAYS PRIOR, FOR THE REMOVAL OF BENCHES, STOP POLES OR ANY OTHER VIA FACILITIES THAT MAY BE PRESENT. PLEASE PROVIDE THIRTY DAYS PRIOR NOTICE FOR SHELTER REMOVAL (TELEPHONE NOS: (210) 362-2155 OR (210) 362-2096). THE CONTRACT-OR WILL BE LIABLE FOR ANY DAMAGES TO VIA FACILITIES NOT REMOVED BY VIA. THE CON-TRACTOR IS REQUIRED TO REPLACE ALL FLATWORK REMOVED OR DAMAGED IN THE COURSE OF EXECUTING THE CONTRACT UNLESS OTHERWISE NOTED BY VIA. THE CONTRACTOR WILL BE RESPONSIBLE FOR PROTECTING VIA FACILITIES IF ADJACENT TO WORK AREA.

TREE PROTECTION AND PRESERVATION GENERAL NOTES

1. NO UTILITY OR STREET EXCAVATION WORK SHALL BEGIN IN AREAS WHERE TREE PRESERVATION AND TREATMENT MEASURES HAVE NOT BEEN COMPLETED AND APPROVED.
2. TREE PROTECTION FENCING SHALL BE REQUIRED. TREE PROTECTION FENCING SHALL BE INSTALLED, MAINTAINED AND REPAIRED BY THE CONTRACTOR DURING SITE CONSTRUCTION. DURING CONSTRUCTION ACTIVITY, AT LEAST A SIX-INCH LAYER OF COARSE MULCH SHALL BE PLACED AND MAINTAINED OVER THE ROOT PROTECTION ZONE (NO SEPARATE PAY ITEM).
3. THE CONTRACTOR SHALL AVOID CUTTING ROOTS LARGER THAN ONE INCH IN DIAMETER WHEN EXCAVATING NEAR EXISTING TREES. EXCAVATION IN THE VICINITY OF TREES SHALL PROCEED WITH CAUTION. THE CONTRACTOR SHALL CONTACT THE CITY INSPECTOR FOR GUIDANCE.
4. ROOTS WILL BE CUT WITH A ROCK SAW OR BY HAND, NOT BY AN EXCAVATOR OR OTHER ROAD CONSTRUCTION EQUIPMENT.
5. ALL CURB AND SIDEWALK WORK SHALL USE ALTERNATIVE CONSTRUCTION METHODS TO MINIMIZE EXTENSIVE ROOT DAMAGE TO TREES (REFER TO DETAILS).
6. EXPOSED ROOTS SHALL BE COVERED AT THE END OF THE DAY USING TECHNIQUES SUCH AS COVERING WITH SOIL, MULCH, OR WET BURLAP.
7. NO EQUIPMENT, VEHICLES OR MATERIALS SHALL OPERATE OR BE STORED WITHIN THE ROOT PROTECTION ZONE OF ANY TREE NEAR THE PROJECT. ROOT PROTECTION ZONE IS 1 FOOT OF RADIUS PER INCH OF TREE'S DIAMETER. A 10-INCH DIAMETER TREE WOULD HAVE A 10 FOOT RADIUS ROOT PROTECTION ZONE AROUND THE TREE. ROOTS OR BRANCHES IN CONFLICT WITH THE CONSTRUCTION SHALL BE CUT CLEANLY ACCORDING TO PROPER PRUNING METHODS. OAK WOUNDS SHALL BE PAINTED OVER WITHIN 30 MINUTES TO PREVENT OAK WILT.
8. SAPLINGS, SHRUBS OR BUSHES TO BE CLEARED FROM THE PROTECTED ROOT ZONE AREA OF A LARGE TREE SHALL BE REMOVED BY HAND AS DESIGNATED BY THE INSPECTOR.
9. NO WIRES, NAILS OR OTHER MATERIAL MAY BE ATTACHED TO PROTECTED TREES.
10. TREES, TREE LIMBS, BUSHES AND SHRUBS LOCATED IN THE CITY STREET OR ALLEY RIGHT-OF-WAY OR PERMANENT EASEMENTS WHICH INTERFERE WITH PROPOSED CONSTRUCTION ACTIVITIES SHALL BE PROPERLY PRUNED FOLLOWING THE ANSI A-300 STANDARDS FOR PRUNING. ALL TREE PRUNING SHALL BE COMPLETED BY A CITY OF SAN ANTONIO TREE MAINTENANCE LICENSED CONTRACTOR (ARTICLE 21-171, CITY CODE) ONLY AFTER APPROVAL FROM THE CAPITAL PROJECTS MANAGEMENT THROUGH THE INSPECTOR.
11. NO EXCESSIVE TREE TRIMMING WILL BE PERMITTED.
12. ALL DEBRIS GENERATED BY THE PRUNING AND TRIMMING OF THE TREES AND /OR BUSHES SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE DISPOSED OF PROPERLY (NO SEPARATE PAY ITEM).
13. TREES MUST BE MAINTAINED IN GOOD HEALTH THROUGHOUT THE CONSTRUCTION PROCESS. MAINTENANCE MAY INCLUDE, BUT NOT LIMITED TO: WATERING THE ROOT PROTECTION ZONE, WASHING FOLIAGE, FERTILIZATION, PRUNING, ADDITIONAL MULCH APPLICATIONS AND OTHER MAINTENANCE AS NEEDED ON THE PROJECT.
14. ANY TREE REMOVAL SHALL BE APPROVED BY THE CITY ARBORIST. (207-8053)
15. TREES WHICH ARE DAMAGED OR LOST DUE TO THE CONTRACTOR'S NEGLIGENCE DURING CONSTRUCTION SHALL BE MITIGATED TO THE CITY'S SATISFACTION.
16. TREE PLANTING FOR MITIGATION OR ENHANCEMENT: ALL PLANTED TREES SHALL BE MAINTAINED IN A HEALTHY CONDITION AT ALL TIMES. THIS INCLUDES IRRIGATION, FERTILIZING, PRUNING AND OTHER MAINTENANCE AS NEEDED ON THE PROJECT. TREES THAT DIE WITHIN TWELVE (12) MONTHS SHALL BE REPLACED WITH A TREE OF EQUAL SIZE AND SPECIES.

ACCESSIBILITY REQUIREMENTS

1. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN VEHICULAR AND PEDESTRIAN ACCESS AT ALL TIMES TO LOCAL RESIDENCES AND BUSINESSES.
2. WHEN THE WORK REQUIRES THE EXCAVATION OF THE STREET AND THE REMOVAL OF THE EXISTING DRIVEWAY APPROACHES AND SIDEWALKS, THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING TEMPORARY ALL-WEATHER ACCESS TO THE BUSINESSES AND RESIDENCES. THE TEMPORARY DRIVEWAY APPROACHES SHALL BE CONSTRUCTED WITH FLEXIBLE BASE OR GRAVEL MATERIAL AT NO SEPARATE COST TO THE CITY.
3. PRIOR TO INITIATING THE CONSTRUCTION OF NEW DRIVEWAY APPROACHES, THE CONTRACTOR SHALL GIVE ADVANCE WARNING IN PERSON, OR IN WRITING, OF AT LEAST 48 HOURS TO EACH RESIDENCE THAT WILL BE IMMEDIATELY AFFECTED, SO THAT ALTERNATE PLANS MAY BE MADE BY THE RESIDENTS.
4. FOR BUSINESSES WITH MORE THAN ONE DRIVEWAY, AT LEAST ONE DRIVEWAY SHALL REMAIN OPEN WHILE THE OTHER NEW DRIVEWAY APPROACHES ARE CONSTRUCTED. FOR BUSINESSES WITH ONLY ONE DRIVEWAY, THE NEW DRIVEWAY APPROACH SHALL BE CONSTRUCTED IN HALF WIDTHS, UNLESS A TEMPORARY ASPHALT DRIVEWAY IS FIRST INSTALLED AT NO SEPARATE COST TO THE CITY.

NOTE TO CONSULTANT

DO NOT MODIFY, DELETE OR ADD TO THE CITY OF SAN ANTONIO'S GENERAL NOTES STANDARD SHEET. IF MODIFI-CATIONS ARE REQUIRED, FOLLOW THE INSTRUCTIONS ON THE "SUPPLEMENTAL GENERAL NOTES" SHEET.

DECEMBER 2009

CITY OF SAN ANTONIO
CAPITAL IMPROVEMENTS MANAGEMENT SERVICES DEPARTMENT

CITY OF SAN ANTONIO
GENERAL NOTES

% SUBMITTAL	PROJECT NO.:	DATE:
DRWN. BY:	DSGN. BY: / CHKD. BY:	SHEET NO.: OF

CUDEENGINEERS.COM

CUDE ENGINEERS EST. 1980

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

TERRA BUONA
UNIT 10

CITY OF SAN ANTONIO GENERAL NOTES

DATE
09/11/2025

PROJECT NO.
03209.019

DRAWN BY
JW/SG/LB/DF

CHECKED BY
SPM

REVISIONS
1.
2.
3.
4.
5.
6.
7.
8.
9.
10.

09/11/2025

STATE OF TEXAS
SEAN P. McFARLAND
138893
LICENSED
PROFESSIONAL ENGINEER

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
25-11800307

C0.00

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.

GENERAL NOTES

1. ALL CONSTRUCTION IS TO BE IN ACCORDANCE WITH THE FOLLOWING REGULATIONS AND SPECIFICATIONS. THE FIRST LISTED WILL HAVE PRIORITY OF THOSE LIST BELOW: PERMITS ISSUED FOR PROJECT BY ANY REGULATORY AGENCIES, BEXAR COUNTY CONSTRUCTION STANDARDS, PLANS FOR THIS PROJECT

2. VERIFY EXACT LOCATION OF UNDER GROUND UTILITIES AND DRAINAGE STRUCTURES WHETHER SHOWN ON PLANS OR NOT.
   WATER/WASTEWATER S.A.W.S. (210) 704-7107
   ELECTRIC CITY PUBLIC SERVICE (210) 978-3500
   GAS CITY PUBLIC SERVICE (210) 978-3500
   TELEPHONE AT&T (800) 288-2020
   FIRE MARSHALL BEXAR COUNTY (210) 207-8410
   BUILDING OFFICIAL BEXAR COUNTY (210) 207-1111

3. TRENCH EXCAVATION PROTECTION SHALL BE ACCOMPLISHED AS REQUIRED BY THE PROVISIONS OF PART 1926, SUBPART P-EXCAVATION, TRENCHING AND SHORING OF THE OCCUPATIONAL SAFETY AND HEALTH STANDARDS AND INTERPRETATIONS, THE CONTRACTOR SHALL COMPLY WITH THE PROVISIONS INCLUDED IN ITEM 700, TRENCH EXCAVATION PROTECTION, BEXAR COUNTY STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION.

4. ALL CONSTRUCTION ACTIVITIES SHALL BE CONFINED TO PROPERTY OWNED BY THE DEVELOPER OR PUBLIC RIGHT-OF-WAY AND EASEMENT UNLESS WRITTEN PERMISSION IS OBTAINED BY THE CONTRACTOR FROM THE PROPERTY OWNER AFFECTED.

5. 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.

6. IN ACCORDANCE WITH THE LAWS OF THE STATE OF THE TEXAS AND THE U.S. OCCUPATION SAFETY AND HEALTH ADMINISTRATION REGULATIONS, ALL TRENCHES OVER 5FEET IN DEPTH IN EITHER HARD OR STABLE OR SOFT AND UNSTABLE SOIL SHALL BE SLOPED, SHORED, SHEETED, BRACED OR OTHERWISE SUPPORTED. FURTHERMORE, ALL TRENCHES LESS THAN 5 FEET IN DEPTH SHALL ALSO BE EFFECTIVELY PROTECTED WHEN HAZARDOUS GROUND MARKET MAY BE EXPECTED. TRENCH SAFETY SYSTEMS TO BE UTILIZED FOR THIS PROJECT SHALL BE PROVIDED BY THE CONTRACTOR.

7. 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.

8. IN ACCORDANCE WITH THE U.S. OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION REGULATION, WHEN EMPLYEES ARE REQUIRED TO BE IN TRENCHES 4 FEET DEEP OR MORE, ADEQUATE MEANS OF EXIT, SUCH AS A LADDER OR STEPS, MUST BE PROVIDED AND LOCATED SO AS TO REQUIRE TO MORE THAT 25 FEET OF LATERAL TRAVEL.

9. PRIOR TO THE BEGINNING OF CONSTRUCTION, THE DEVELOPER SHALL ARRANGE A PRE-CONSTRUCTION CONFERENCE AT THE CITY SAN ANTONIO. REPRESENTATIVES FROM THE FOLLOWING ORGANIZATIONS SHALL BE INVITED:
   BEXAR COUNTY STAFF, INCLUDING THE DIRECTOR OF PUBLIC WORKS
   CITY ENGINEER AND THE PUBLIC WORKS INSPECTOR.
   CONTRACTOR DESIGN ENGINEER ELECTRIC, GAS, PHONE AND CABLE UTILITY REPRESENTATIVES, IF APPROPRIATE.

10. IMPROVEMENTS AND ELEVATIONS SHOWN ARE EXISTING ON THE DATE OF THIS SURVEY AND MAY BE SUBJECT TO SUBSEQUENT CHANGES.

11. IF CONTRACTOR FINDS A DISCREPANCY WITH THE TOPOGRAPHICAL INFORMATION ON THESE PLANS, HE/SHE SHALL CONTACT THE CONSTRUCTION MANAGER/SUPERVISOR AND CIVIL ENGINEER IMMEDIATELY.

12. CONTRACTOR TO PROTECT ALL BENCHMARKS AND PROPERTY MONUMENTATION AND SHALL REPLACE OR REPAIR, AT HIS OR HER OWN EXPENSE, BENCHMARKS AND MONUMENTATION DISTURBED DURING CONSTRUCTION.

13. IF CONTRACTOR RELOCATES OR SETS NEW BENCHMARKS, THE VERTICAL ELEVATIONS OF THE BENCHMARKS SHALL BE SET TO A TOLERANCE OF 0.010 FT.

14. TREES SHOWN FOR REFERENCE ONLY, TREE REMOVAL, PROTECTION, AND TRANSPLANTING SHALL BE ACCORDING TO PROJECT TREE PRESERVATION PLAN AND LANDSCAPE PLANS AS APPLICABLE.

15. ALL STORMWATER POLLUTION PREVENTION PERMITS, BMP'S TO BE IN PLACE PRIOR TO COMMENCEMENT OF ANY WORK.

16. NO EDWARDS AQUIFER RECHARGE/CONTRIBUTING ZONE REQUIREMENTS FOR THIS SITE.

17. THE INFORMATION CONTAINED ON THESE DRAWINGS IN REGARDS TO EXISTING UTILITIES, TOPOGRAPHY, CONTOURS, OR SUBSURFACE CONDITIONS IS FURNISHED SOLELY AS THE BEST INFORMATION AVAILABLE AT THIS TIME. ITS ACCURACY IS NOT GUARANTEED AND ITS USE IN NO WAY RELIEVES THE CONTRACTOR OF ANY RESPONSIBILITY FOR LOSSES FOR TO ANY INACCURACIES.

18. THE LOCATION OF ALL EXISTING UTILITIES SHOWN ON THESE PLANS HAVE BEEN BASED UPON RECORD INFORMATION AND SURVEY INFORMATION FOR UTILITIES VISIBLE AT THE TIME OF SURVEY AND MAY NOT MATCH LOCATIONS AND/OR DEPTHS AS CONSTRUCTED. THE CONTRACTOR SHALL CONTACT EACH INDIVIDUAL UTILITY, FOR ASSISTANCE IN DETERMINING EXISTING UTILITY LOCATIONS AND DEPTHS PRIOR TO BEGINNING ANY CONSTRUCTION. CONTRACTOR SHALL FIELD VERIFY LOCATIONS OF ALL UTILITY CROSSINGS PRIOR TO BEGINNING ANY CONSTRUCTION. THE CONTRACTOR IS TO MAKE EXPLORATORY EXCAVATIONS AND LOCATE EXISTING UNDERGROUND UTILITIES.

19. ALL REQUIRED RELOCATION'S OR ALTERATIONS OF TELEPHONE POLES, UNDERGROUND CONDUIT, POWER POLES AND ANY OTHER FACILITIES SHALL BE DONE BY THIS CONTRACTOR, UNLESS NOTED AS "BY OTHERS". THIS CONTRACTOR SHALL SCHEDULE AND COORDINATE HIS WORK WITH THAT OF OTHER CONTRACTORS AND UTILITY COMPANIES SO AS NOT TO DELAY THE PROJECT.

20. CONTRACTOR SHALL SECURE ALL PERMITS REQUIRED FOR CONSTRUCTION AND SHALL NOTIFY ALL RESPECTIVE GOVERNMENTAL OR UTILITY AGENCIES AFFECTED BY CONSTRUCTION PRIOR TO STARTING CONSTRUCTION.

21. ALL CONSTRUCTION OPERATIONS SHALL BE ACCOMPLISHED IN ACCORDANCE WITH APPLICABLE REGULATIONS OF THE U.S. OCCUPATIONAL HEALTH AND SAFETY ADMINISTRATION.

22. CONTRACTOR OR THE DEIGN ENGINEER SHALL BE RESPONSIBLE FOR ALL CONSTRUCTION STAKING AND CUT SHEETS FOR PIPE LINES LAID ON GRADE AND ROAD CONSTRUCTION. CUT SHEETS SHALL BE DELIVERED TO THE CITY INSPECTOR 36 HOURS PRIOR TO CONSTRUCTION.

23. CONTRACTOR SHALL GIVE THE CITY A MINIMUM O F48 HOURS NOTICE BEFORE BEGINNING EACH PHASE OF CONSTRUCTION.

24. CONTRACTOR SHALL GIVE THE CITY INSPECTOR 36 HOURS NOTICE OF THE NEED FOR MATERIALS TESTING. ALL TESTING WILL BE ARRANGED AND PAID FOR BY THE CONTRACTOR. THE CITY SHALL RECEIVE A COPY OF TEST RESULTS.

25. CONTRACTOR IS RESPONSIBLE FOR TAKING (AND INCLUDING IN BID) ALL OF THE APPROPRIATE SECURITY MEASURES AT THE SITE, FOR THE DURATION OF THE CONSTRUCTION PERIOD.

26. CONTRACTOR IS TO PROVIDE "AS BUILTS" ON ALL UTILITY AND DRAINAGE IMPROVEMENTS, PUBLIC OR PRIVATE.
27. PERMANENT EROSION CONTROL/VEGETATION WILL BE COMPLETED BY CONTRACTOR.

28. CONTRACTOR SHALL MAKE ARRANGEMENTS WITH BEXAR COUNTY FOR THE USE OF ALL WATER FOR CONSTRUCTION.

SITE CLEARING NOTES:

1. CONDUCT SITE CLEARING OPERATIONS TO THE EXTENT SHOWN ON THE DRAWINGS, INCLUDING BUT NOT LIMITED TO: REMOVAL OF TREES AND OTHER VEGETATION, TOPSOIL, STRIPPING. CLEARING AND GRUBBING, AND REMOVAL OF ALL IMPROVEMENTS ABOVE OR BELOW GRADE. REFER TO THE GEOTECHNICAL REPORT FOR THIS PROJECT FOR ADDITIONAL SITE PREPARATION REQUIREMENTS.

2. EXECUTION:
   A. SITE CLEARING OPERATIONS SHALL NOT DAMAGE OR INTERFERE WITH THE PUBLIC USE OF ROADS, WALKS, ADJACENT LAND OR FACILITIES AND EXISTING IMPROVEMENTS INTENDED TO REMAIN.

   B. EXISTING TREES TO REMAIN SHALL BE PROTECTED IN COMPLIANCE WITH - LANDSCAPE PLANS.

   C. CONTRACTOR SHALL REMOVE TREES, SHRUBS, GRASS AND OTHER VEGETATION, IMPROVEMENTS OR OBSTRUCTIONS INTERFERING WITH THE INSTALLATION OF NEW CONSTRUCTION OR AS SHOWN ON PLANS. CLEARING OPERATIONS SHALL INCLUDE REMOVAL OF STUMPS AND ROOTS.

   D. CONTRACTOR SHALL STRIP TOPSOIL IN A MANNER APPROPRIATE TO SEGREGATE FROM UNDERLYING SUBSOIL. TOPSOIL STRIPPING NEAR TREES INTENDED TO REMAIN SHALL BE COMPLETED IN COMPLIANCE LANDSCAPE PLANS.

3. SPOIL SHALL BE STORED ONLY IN AREAS SHOWN ON THE PLANS AND SHALL BE MAINTAINED IN ACCORDANCE WITH APPLICABLE POLLUTION PREVENTION PLANS OR PERMITS.

4. WASTE MATERIAL OR EXCESS TOPSOIL GENERATED AS A RESULT OF CLEARING AND GRADING OPERATIONS SHALL BECOME THE PROPERTY OF THE CONTRACTOR. APPROPRIATE DISPOSAL OF ALL SPOIL MATERIAL SHALL BE AT THE CONTRACTOR'S EXPENSE. BURNING ON THE OWNER'S PROPERTY IS NOT PERMITTED.

DEMOLITION NOTES:

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ACQUIRING ALL NECESSARY PERMITS/APPROVALS BEFORE BEGINNING DEMOLITION.

2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVING FROM THE SITE AL L ITEMS SHOWN TO BE DEMOLISHED UNLESS OTHERWISE INDICATED. ALL MATERIALS SHALL BE DEMOLISHED AND REMOVED FROM SITE IN ACCORDANCE WITH ALL APPLICABLE, FEDERAL, STATE AND LOCAL REGULATIONS.

3. ALL EXISTING ITEMS NOT SPECIFICALLY NOTED TO BE DEMOLISHED SHALL REMAIN. CONTRACTOR IS RESPONSE FOR REPLACING EXISTING ITEMS REMOVED DURING DEMOLITION THAT WERE TO REMAIN.

4. CONTRACTOR IS RESPONSIBLE FOR COORDINATION WITH ALL UTILITY COMPANIES REGARDING REMOVAL OF EXISTING SERVICES, POWER POLES TO BE REMOVED, VERIFYING UTILITIES ARE SHUT OFF OR DISCONNECTED, AND THAT ALL POSSIBLE SAFETY PRECAUTIONS HAVE BEEN ENACTED TO ENSURE THE SAFEST ENVIRONMENT FOR ALL PERSONNEL.

5. LOCATION AND DEPTH OF EXISTING UTILITIES SHOWN HERE ON ARE APPROXIMATE ONLY . ACTUAL LOCATIONS AN DEPTHS MUST BE VERIFIED BY THE CONTRACTOR PRIOR TO THE CONSTRUCTION AND THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL UTILITIES, WHETHER SHOWN ON THE PLANS OR NOT, THROUGHOUT ALL PHASES OF CONSTRUCTION.

6. ALL NECESSARY EROSION CONTROL MEASUR3ES ARE TO BE IN PLACE PRIOR TO CONSTRUCTION. EROSION CONTROL MEASURES ARE TO BE MAINTAINED AND IN WORKING CONDITIONS AT ALL TIMES.

7. CONTRACTOR SHALL CONFIRM WITH THE OWNER OF HIS DESIGNATE WHETHER TO SALVAGE AND MAKE ARRANGEMENTS TO STORE TRANSPLANTABLE TREES PRIOR TO REMOVAL.

8. FOR TREES SHOWN TO REMAIN, THE CONTRACTOR SHALL INSTALL TREE PROTECTION IN ACCORDANCE WITH THE PROJECT PLANS AND SPECIFICATIONS. THE CONTRACTOR SHALL NOT REMOVE OR DAMAGE ANY TREES WITHOUT A PERMIT TO DO SO.

9. NO PARKING AND/OR STORAGE SHALL BE ALLOWED WITHIN THE DRIP LINE OF THE TREES TO REMAIN.

10. THE CONTRACTOR SHALL SAW CUT EXISTING PAVEMENT, CURBS AND SIDEWALKS AT THE NEW PAVEMENT, CURB AND SIDEWALK JUNCTURES, NO JAGGED OR IRREGULAR CUTS WILL BE ACCEPTED.

11. THE CONTRACTOR SHALL PROTECT ALL PROPERTY PINS, BENCH MARKS, CONSTRUCTION STAKES, HUBS, OR OTHER KEY CONTROL POINTS. THE CONTRACTOR SHALL BE RESPONSIBLE TO RE-ESTABLISH ANY SUCH POINTS AT THEIR OWN EXPENSE.

12. DEMOLITION CONTRACTOR IS RESPONSE FOR CLEARING THE SITE OF ALL OBSTRUCTIONS THAT EXIST ON THIS SITE PRIOR TO THE START OF CONSTRUCTION OR DURING THE CONSTRUCTION SO AS TO NOT IMPEDE THE BUILDING CONSTRUCTION CONTRACTOR.

13. CONTRACTOR SHALL COORDINATE WITH THE OWNER TO IDENTIFY ANY MATERIAL OR EQUIPMENT SCHEDULED FOR REMOVAL TO BE SALVAGED AND/OR REUSED. CONTRACTOR SHALL REPLACE AT HIS EXPENSE ANY DESTROYED MATERIAL OR EQUIPMENT THAT WAS MARKED FOR SALVAGE.

14. NO EXISTING ASPHALT OR CONCRETE PAVING SCHEDULED FOR REMOVAL SHALL REMAIN ON-SITE OR BE USED AS FILL MATERIAL. CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVAL AND DISPOSAL OF ALL HAZARDOUS MATERIAL OFFSITE FOLLOWING ALL APPLICABLE DISPOSABLE REGULATIONS.

15. CONTRACTOR SHALL ADJUST IRRIGATION LATERALS TO ALLOW PROPER FUNCTION OF ZONES AT COMPLETIONS OF CONSTRUCTION. WORK TO BE COORDINATED WITH THE OWNER.

16. CONTRACTOR SHALL NOT DEMOLISH ANY PUBLIC WATER OR SANITARY SEWER LINES WITHOUT APPROVAL. EXISTING WATER AND SANITARY SEWER SERVICES SHALL REMAIN OPERATIONAL UNTIL NEW SERVICE IS COMPLETE. CUT AND CAP ANY ABANDONED SANITARY SEWER AND WATER SERVICES AT THE EXISTING MAIN. NO ABANDONED SERVICES SHALL REMAIN CONNECTED TO THE PUBLIC MAIN.

17. THE USE OF EXPLOSIVES WILL NOT BE PROHIBITED.

18. ALL WASTE MATERIAL REMAINING AFTER THE OWNER SALVAGE IS COMPLETE AND RESULTING FROM DEMOTION OPERATIONS BECOMES THE PROPERTY OF THE CONTRACTOR. APPROPRIATE DISPOSAL OF WASTE MATERIAL SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AT HIS OWN EXPENSE. OWNER WILL PROVIDE LIST OF ITEMS TO BE SALVAGED.

19. THE CONTRACTOR SHALL BE REQUIRED TO LOCATE ALL PUBLIC OR PRIVATE UTILITIES INCLUDED BUT NOT LIMITED TO: WATER, SEWER, TELEPHONE, FIBER OPTIC LINES, SITE LIGHTING ELECTRIC, SECONDARY ELECTRIC, PRIMARY ELECTRICAL DUCT BANKS, LANDSCAPE IRRIGATION FACILITIES, AND GAS LINES. ANY UTILITY CONFLICTS THAT ARISE SHOULD BE COMMUNICATED TO THE ENGINEER IMMEDIATELY AND PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL CONTACT 1-800-DIG-TESS A MINIMUM OF 48 HOURS PRIOR TO THE START OF CONSTRUCTION. ANY DAMAGE TO EXISTING UTILITIES SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND THE REPAIR SHALL BE AT THE CONTRACTORS SOLE EXPENSE WHETHER THE UTILITY IS SHOWN ON THESE PLANS OR NOT.

20. THE CONTRACTOR SHALL MAINTAIN THE SITE IN A CLEAN AND ORDERLY MANNER.

21. THE CONTRACTOR SHALL MEET ALL LOCAL, STATE, AND FEDERAL REGULATIONS FOR DUST CONTROL. THE CONTRACTOR SHALL BE RESPONSIBLE AT THEIR OWN EXPENSE FOR ANY FUGITIVE DUST ON ADJOINING PROPERTIES.

UTILITY NOTES:

1. ALL MATERIALS AND CONSTRUCTION PROCEDURES WITHIN THE SCOPE OF THIS PROJECT SHALL FOLLOW TxDOT'S UTILITY ACCOMMODATION RULES (UAR) AND BE APPROVED BY TxDOT, BEXAR COUNTY TO COMPLY WITH THE FOLLOWING AS APPLICABLE:
   A. CURRENT SAN ANTONIO WATER SYSTEM STANDARD SPECIFICATIONS FOR CONSTRUCTION
   B. CURRENT SAN ANTONIO WATER SYSTEM UTILITY SERVICE REGULATIONS.
   C. CURRENT CPS UTILITY SERVICE REQUIREMENTS.
   D. CURRENT INTERNATIONAL BUILDING, PLUMBING & FIRE CODE.

2. UTILITIES SHOWN ON THE PLANS ARE FROM THE BEST INFORMATION SOURCES AVAILABLE AT THE TIME OF DESIGN BUT MAY NOT REPRESENT ALL EXISTING UTILITIES ON SITE. THE CONTRACTOR SHALL UNCOVER KNOWN EXISTING UTILITIES PRIOR TO CONSTRUCTION TO VERIFY SIZE, GRADE AND LOCATION. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY OF ANY DEVIATIONS FROM THE PLANS, OR UPON THE DISCOVERY OF ADDITIONAL UTILITIES NOT SHOWN ON THE PLANS, PRIOR TO BEGINNING CONSTRUCTION. ANY DAMAGE TO EXISTING UTILITIES SHALL BE IMMEDIATELY REPORTED TO THE OWNER AND THE ENGINEER.

3. ALL UTILITY CONNECTIONS SHALL BE COORDINATED WITH THE ENGINEER.

4. CONTRACTOR SHALL PROVIDE FOR THE SAFE PASSAGE OF PEDESTRIAN AND VEHICULAR TRAFFIC DURING UTILITY CONSTRUCTION WITHIN PUBLIC RIGHT-OF-WAY PER BEXAR COUNTY AND TEXAS DEPARTMENT OF TRANSPORTATION REQUIREMENTS.

5. NO WATER JETTING WILL BE ALLOWED ON THIS PROJECT.

6. THE CONTRACTOR SHALL PROVIDE PLAN OF RECORD DRAWING(S), WITH FINAL MEASUREMENTS, TYPE OF PIPE, FITTINGS, AND APPURTENANCES TO THE OWNER PRIOR TO FINAL ACCEPTANCE OF ALL UTILITY SYSTEMS. PLAN(S) SHALL BE DIMENSIONED TO ACCURATELY LOCATE BURIED FITTINGS.

7. UNDER NO CIRCUMSTANCES WILL THE CONTRACTOR BE ALLOWED TO PROCEED WITH THE CONSTRUCTION OF ANY UTILITIES, BOTH UNDERGROUND AND OVERHEAD, UNTIL EVERYTHING HAS BEEN COORDINATED AND ALL PERMITS AND APPROVALS BY ALL GOVERNING AGENCIES ARE IN ORDER.

8. THE CONTRACTOR SHALL COMPLY WITH ALL NECESSARY GOVERNMENTAL REGULATIONS AND SHALL OBTAIN ALL REQUIRED PERMITS AND BEAR COST FOR THE SAME.

9. CONTRACTOR TO SUPPORT AND KEEP INTACT STORM DRAINS AND INLET STRUCTURES, EXISTING DRAINAGE PATTERNS AND FACILITIES ARE TO BE MAINTAINED THROUGHOUT PROJECT DURATION. ANY DAMAGES INCURRED WILL BE REPLACED AT THE CONTRACTOR'S EXPENSE.

10. AFTER CONSTRUCTION IS COMPLETED, THE CONTRACTOR SHALL STABILIZE ALL DISTURBED SOIL AREAS IN ACCORDANCE WITH THE STORMWATER POLLUTION PREVENTION PLAN AND RE-SOD DISTURBED SOIL AREAS IN COMPLIANCE WITH LANDSCAPE PLANS OR WITH BERMUDA SODDING OR HYDROMULCH TO MATCH CONDITIONS PRIOR TO CONSTRUCTION.

11. THE CONTRACTOR SHALL BE REQUIRED TO COMMENCE CONSTRUCTION AND LAYING OF PIPE AT THE DOWNSTREAM END OF THE GRAVITY FLOW OUTFALL LINE AND PROCEED NON-STOP IN A FORWARD UPSTREAM DIRECTION. NO PIPE SHALL BE LAID WITHIN TEN FEET (10') OF ANY POINT WHERE EXCAVATION IS IN PROGRESS. PIPE LAYING SHALL PROCEED UPGRADE WITH THE TONGUE OR SPIGOT POINTING IN THE DIRECTION OF FLOW. PIPE SHALL BE LOWERED INTO THE TRENCH WITHOUT DISTURBING THE PREPARED FOUNDATION OR THE TRENCH SIDES.

12. ALL EXCAVATION SHALL BE UNCLASSIFIED AND SHALL INCLUDE ALL MATERIAL ENCOUNTERED REGARDLESS OF THEIR NATURE OR THE MANNER IN WHICH THEY ARE REMOVED.

13. ADJUST ALL EXISTING VALVES, UTILITY MANHOLES, METER BOXES, PULL BOXES, VALVE BOXES, ETC. TO REMAIN TO FINAL GRADE, UNLESS NOTED OTHERWISE. REFERENCE GRADING PLAN.

14. WHEN PRESSURE UTILITY SYSTEMS ARE IN VERTICAL CONFLICT WITH GRAVITY UTILITY SYSTEMS THE CONTRACTOR SHALL REROUTE PRESSURE UTILITY SYSTEMS VERTICAL AS NECESSARY FOR PROPOSED CONSTRUCTION.

15. NO OTHER UTILITY SERVICE/APPURTENANCES SHALL BE PLACED NEAR THE PROPERTY LINE, OR OTHER ASSIGNED LOCATION DESIGNATED FOR WATER AND WASTEWATER UTILITY SERVICE THAT WOULD INTERFERE WITH THE WATER AND WASTEWATER SERVICES.

16. CONTRACTOR SHALL FURNISH ALL UTILITY PIPE FITTINGS, MATERIALS, EQUIPMENT, ETC. AS NECESSARY FOR PROPOSED CONSTRUCTION.

17. FOR PRESSURE TAPS, FURNISH, INSTALL AND AIR TEST THE SLEEVE AND VALVE. CONCRETE BLOCKING SHALL BE PLACED BEHIND AND UNDER ALL TAP SLEEVES TWENTY-FOUR (24) HOURS PRIOR TO MAKING THE WET TAP.

18. JOINT RESTRAINTS SHALL BE IN ACCORDANCE WITH SAWS REQUIREMENTS.

19. CONTRACTOR SHALL INSTALL ALL GRAVITY LINES FROM DOWNSTREAM END TO UPSTREAM END.

20. REFER TO LANDSCAPE PLANS FOR IRRIGATION SERVICE.

21. ALL PROPOSED ELECTRIC, GAS, PHONE, AND CABLE UTILITIES SHOWN FOR REFERENCE ONLY. CONTRACTOR TO VERIFY AND COORDINATE WITH UTILITY COMPANIES AND/OR ENGINEER.

22. IF REQUIRED, ALL WORK ASSOCIATED WITH PROVIDING NATURAL GAS INCLUDING TRENCHING, CONDUIT INSTALLATION, PAVEMENT REPLACEMENT/BACKFILL AND METER INSTALLATION AS DESCRIBED ON THESE PLANS SHALL BE COORDINATED WITH NATURAL GAS PROVIDER.

23. ALL PROPOSED ELECTRIC, PHONE AND CABLE CONDUITS SHALL BE PROVIDED WITH PULL STRINGS.

24. DUE TO FEDERAL REGULATIONS TITLE 49, PART 192.181, CITY PUBLIC SERVICE BOARD (C.P.S.B.) MUST MAINTAIN ACCESS TO ALL GAS VALVES AT ALL TIMES. THE CONTRACTOR MUST PROTECT AND WORK AROUND ANY GAS VALVES THAT ARE IN THE PROJECT AREA.

SOIL STABILIZATION PROCEDURE:

1. STABILIZATION MEASURES SHALL BE INITIATED AS SOON AS PRACTICABLE IN PORTIONS OF THE SITE WHERE CONSTRUCTION ACTIVITIES HAVE TEMPORARILY OR PERMANENTLY CEASED, BUT IN NO CASE MORE THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF THE SITE HAS TEMPORARILY OR PERMANENTLY CEASED. WHERE THE INITIATION OF STABILIZATION MEASURES BY THE 14TH DAY AFTER CONSTRUCTION ACTIVITY TEMPORARILY OR PERMANENTLY CEASE IS PRECLUDED BY WEATHER CONDITIONS, STABILIZATION MEASURES SHALL BE INITIATED AS SOON AS PRACTICABLE. WHERE CONSTRUCTION ACTIVITY ON A PORTION OF THE SITE IS TEMPORARILY CEASED, AND EARTH DISTURBING ACTIVITIES WILL BE RESUMED WITHIN 21 DAYS, TEMPORARY STABILIZATION MEASURES DO NOT HAVE TO BE INITIATED ON THAT PORTION OF SITE. IN AREAS EXPERIENCING DROUGHTS WHERE THE INITIATION OF STABILIZATION MEASURES BY THE 14TH DAY AFTER CONSTRUCTION ACTIVITY HAS TEMPORARILY OR PERMANENTLY CEASED IS PRECLUDED BY SEASONAL ARID CONDITIONS, STABILIZATION MEASURES SHALL BE INITIATED AS SOON AS PRACTICABLE.

SITE PLAN NOTES:

1. ALL IMPROVEMENTS SHALL BE MADE IN ACCORDANCE WITH THE APPROVED PLANS. ANY ADDITIONAL IMPROVEMENTS WILL REQUIRE PLAN REVISIONS AND APPROVAL OF THE BEXAR COUNTY.

2. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS PRIOR TO BEGINNING CONSTRUCTION.

3. ALL DIMENSIONS SHOWN ARE TO FACE OF CURB, BUILDING FACE OF MATERIAL, AND FACE OF WALLS, UNLESS OTHERWISE NOTED.

4. REFER TO ARCHITECTURAL/STRUCTURAL PLANS FOR DETAILED BUILDING DIMENSIONS.

5. PUMPING RUNOFF OR RAINWATER FROM A BUILDING EXCAVATION IS NOT AN EXTRA PAY ITEM.

6. CONTRACTOR SHALL COMPLY WITH ALL RELEVANT BUILDING CODES, CONSTRUCTION SPECIFICATIONS FROM ANY POLITICAL SUBDIVISION HAVING JURISDICTION (INCLUDING BUT NOT LIMITED TO BEXAR COUNTY, TXDOT, TCEQ, AND THE TEXAS ACCESSIBILITY STANDARDS OF THE TEXAS DEPARTMENT OF LICENSING AND REGULATION).

7. CONTRACTOR AGREES THAT HE SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE CONSTRUCTION OF THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS; AND THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY AND HOLD THE OWNER HARMLESS FROM ANY AND ALL LIABILITY IN CONNECTION WITH THE WORK PERFORMED ON THIS PROJECT EXCEPT FROM LIABILITY ARISING FROM SOLE NEGLIGENCE OF THE OWNER OR ENGINEER.

8. CONTRACTOR AND SUBCONTRACTORS SHALL CONTRACT WITH A SURVEYOR AS REQUIRED TO VERIFY PROJECT ELEVATIONS AND BENCHMARK ELEVATION(S) PRIOR TO CONSTRUCTION. "MATCH EXISTING" SHALL BE UNDERSTOOD TO SIGNIFY BOTH VERTICAL AND HORIZONTAL ALIGNMENT. ALL FINISHED EARTHEN GRADES SHALL NOT EXCEED 3:1 (H:V) SLOPE.

9. BARRICADES, WARNING SIGNS & LIGHTS SHALL CONFORM TO THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES AND ARE GENERALLY LOCATED TO AFFORD MAXIMUM PROTECTION TO THE PUBLIC AS WELL AS CONSTRUCTION PERSONNEL AND EQUIPMENT AND TO ASSURE AN EXPEDITIOUS TRAFFIC FLOW AT ALL TIMES. DURING THE PROGRESS OF WORK, THE CONTRACTOR SHALL PROVIDE ACCESS FOR LOCAL TRAFFIC.

PAVEMENT NOTES:

1. DESIGN MIX SUBMITTALS SHALL BE PROVIDED FOR REVIEW BY THE GEOTECHNICAL AND/OR CIVIL ENGINEER AT LEAST 7 DAYS PRIOR TO PLACEMENT.

2. DO NOT UNLOAD OR USE ANY HEAVY CONSTRUCTION EQUIPMENT ON NEW CONCRETE FOR AT LEAST 7 DAYS AFTER CONCRETE IS POURED.

3. GENERAL CONTRACTOR OR APPLICABLE SUB-CONTRACTOR IS RESPONSIBLE FOR COORDINATING WORK SUCH THAT UTILITIES ARE INSTALLED PRIOR TO PAVEMENT BASE BEING INSTALLED OR ELSE LOCATE AND PLACE LINES FOR PROPOSED UNDERGROUND UTILITIES. LOCATE AND PLACE LINES OR SLEEVES FOR UNDERGROUND UTILITIES PRIOR TO PLACEMENT OF PAVEMENT BASE.

4. UNLESS OTHERWISE SHOWN ON THE PLANS, RECOMMENDED BY THE GEOTECHNICAL ENGINEER OR APPROVED BY THE ENGINEER, CONCRETE AREAS SHALL COMPLY WITH THE FOLLOWING ITEMS WITHIN THE TEXAS DEPARTMENT OF TRANSPORTATION 2014 STANDARD SPECIFICATIONS FOR CONSTRUCTION OF HIGHWAYS, STREETS AND BRIDGES:

* ITEM 247 - FLEXIBLE BASE
* ITEM 360 - CONCRETE PAVING
* ITEM 421 - PORTLAND CEMENT CONCRETE
* ITEM 529 - CONCRETE CURBS, GUTTER AND COMBINED CURB AND GUTTER
* ITEM 531 - SIDEWALKS

5. JOINTS SHALL BE PLACED IN ANY PROPOSED CONCRETE PAVEMENT AND CURBING AS RECOMMENDED IN THE APPLICABLE GEOTECHNICAL STUDY FOR THIS PROJECT. IF A GEOTECHNICAL STUDY WAS NOT PERFORMED OR IF DESIGN IS NOT INCLUDED IN CIVIL PLANS, THE JOINT LAYOUT AND DESIGN SHALL CONFORM TO THE AMERICAN CONCRETE PAVEMENT ASSOCIATION (ACPA) TECHNICAL PUBLICATION 150 61.01P, TABLE Z AND FIGURE 13.

6. ALL CONCRETE PAVING AND FLATWORK SHALL BE CURED IN CONFORMANCE WITH CURRENT AMERICAN CONCRETE PAVEMENT ASSOCIATION GUIDELINES.

7. ALL CONCRETE WORK SHALL CONFORM TO ALL APPLICABLE REQUIREMENTS OF ACI 330. FLY ASH CAN BE USED IN MIX DESIGNS WHERE SUITABLE.

8. ALL EXPOSED CORNERS FOR CONCRETE WORK SHALL BE CHAMFERED 1"

PAVEMENT MARKING NOTES:

1. UNLESS OTHERWISE NOTED, THE PAVEMENT MARKING PAINT TO BE USED ON THIS PROJECT WILL BE WHITE OR YELLOW ACRYLIC-LATEX PAINT. ALL PAVEMENT MARKINGS WITHIN PUBLIC ROW SHALL BE THERMOPLASTIC.

2. SURFACE PREPARATION: SURFACES WILL BE CLEAN, DRY AND FREE FROM LOOSE OR PEELING SURFACES. DO NOT APPLY WHEN AIR TEMPERATURES ARE BELOW 50° F. OR WHEN THE RELATIVE HUMIDITY EXCEEDS 85%, OR WHEN THE TEMPERATURE FALLS BELOW THE DEW POINT. IT IS RECOMMENDED TO PLACE AN INCONSPICUOUS TEST STRIP TO DETERMINE IF THE NEW PAVEMENT SURFACES HAVE CURED SUFFICIENTLY TO PAINT. WAIT 24 HOURS AFTER ANY RAIN TO PAINT ASPHALT SURFACES.

3. APPLICATION RATES: APPLY PAINT AT FILM THICKNESS AND SPREADING RATE AS RECOMMENDED BY THE PAINT SUPPLIER. ALL NEW STRIPING IN PARKING LOTS WILL BE PAINTED WITH TWO (2) COATS OF 15.0 MILS WET, 8.0 MILS DRY. THE FIRST COAT MUST BE COMPLETELY DRY BEFORE THE SECOND COAT IS APPLIED. WAIT A MINIMUM OF 10 DAYS BETWEEN THE ASPHALT SEAL COAT APPLICATION AND THE PERMANENT TRAFFIC STRIPING AND MARKINGS.

4. CLOSE AREAS TO TRAFFIC FOR DURATION OF DRYING TIME, WHICH SHALL BE NO LESS THAN THE MINIMUM RECOMMENDED BY THE PAINT MANUFACTURER.

5. MINIMUM LINE WIDTH IS 4 INCHES. PAVEMENT MARKINGS MUST COMPLY WITH LOCAL FIRE STANDARDS AND CURRENT ACCESSIBILITY CODE.

EARTHWORK NOTES:

1. SITE PREPARATION AND GRADING, FOUNDATION EXCAVATION AND FILL SHALL BE PERFORMED IN ACCORDANCE WITH THE GEOTECHNICAL REPORT AND CONCURRENTLY WITH THESE PLANS.

2. ALL FILL MATERIAL PROVIDED SHALL BE APPROVED BY THE GEOTECHNICAL ENGINEER PRIOR TO PLACING AND COMPACTING.

3. ALL EXCAVATION, BACKFILL AND COMPACTION SHALL BE PERFORMED AS SHOWN IN THE PLANS AND GEOTECHNICAL REPORT FOR THE SITE.

4. OWNER WILL ENGAGE, AT THE OWNER'S COST, SOIL TESTING AND INSPECTION SERVICE IN ACCORDANCE WITH MATERIAL TESTING SPECIFICATION TO VERIFY COMPLIANCE WITH THE PLANS & SPECIFICATIONS. REPLACEMENT AND RETESTING OF DEFICIENT WORK SHALL BE DONE BY THE CONTRACTOR AT NO ADDITIONAL COMPENSATION.

5. IF DATA ON SUBSURFACE CONDITIONS IS AVAILABLE TO THE CONTRACTOR. THE OWNER MAKES NO WARRANTY AS TO THE CORRECTIVENESS OF THESE REPORTS. THE CONTRACTOR MAY, AT HIS OWN EXPENSE, PERFORM ADDITIONAL TEST BORINGS.

6. THE EXCAVATION IS UNCLASSIFIED, AND CONTRACTOR SHALL PERFORM EXCAVATION TO THE ELEVATIONS INDICATED IN THE PLANS, REGARDLESS OF CHARACTER OF MATERIAL, WITH NO ADDITIONAL COMPENSATION FROM THE OWNER.

7. CONTRACTOR IS RESPONSIBLE FOR PROTECTING ADJACENT FACILITIES FROM DAMAGE.

8. EARTHWORK SHALL BE PERFORMED IN COMPLIANCE WITH LANDSCAPE PROTECTION.

9. OVER-EXCAVATION IS UNCOMPENSATED, AND SHALL BE BACKFILLED AND COMPACTED AS DIRECTED BY THE ENGINEER OR GEOTECH REPORT AT NO ADDITIONAL COST TO THE OWNER.

10. EARTHWORK SHALL BE PERFORMED TO THE TOLERANCES SHOWN IN THE PLANS AND/OR SPECIFIED IN THE GEOTECHNICAL REPORT FOR THE PROJECT.

11. TRENCHES SHALL BE BACKFILLED ONLY AFTER INSPECTION AND APPROVAL OF THE ENGINEER. BACKFILL MATERIAL AND PROCEDURES FOR TRENCHES (WITHIN THE TxDOT ROW) SHALL BE IN COMPLIANCE WITH THE TEXAS DEPARTMENT OF TRANSPORTATION 2014 STANDARD SPECIFICATION FOR CONSTRUCTION OF HIGHWAYS, STREETS AND BRIDGES, ITEM 400 - EXCAVATION AND BACKFILL FOR STRUCTURES AMD/OR THE DETAIL SPECIFICATIONS PROVIDED HEREIN. TRENCHES SHALL ALSO COMPLY WITH SAWS STANDARDS WHERE APPLICABLE.

GRADING NOTES:

1. CONTRACTOR IS REQUIRED TO SET AND VERIFY ALL PROJECT ELEVATIONS PRIOR TO THE START OF CONSTRUCTION. "MATCH EXISTING" SHALL BE UNDERSTOOD TO SIGNIFY THE SAME MATERIALS AS WELL AS VERTICAL AND HORIZONTAL ALIGNMENT.

2. GENERAL CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSION & GRADE CONDITIONS (BOTH NEW AND EXISTING). CONTRACTOR SHALL REPORT ANY DISCREPANCIES TO THE ENGINEER AND PROJECT ARCHITECT BEFORE PROCEEDING WITH ANY PHASE OF THE WORK AS HE WILL BE RESPONSIBLE FOR ALL WORK AS INTENDED BY THE DRAWINGS AND SPECIFICATIONS. MINOR ADJUSTMENTS TO FINISHED GRADE TO ACCOMPLISH SPOT DRAINAGE IS ACCEPTABLE, IF NECESSARY, UPON APPROVAL OF THE ENGINEER.

3. CONTRACTOR SHALL BE RESPONSIBLE FOR RESTORING TO ITS ORIGINAL OR BETTER CONDITION ANY DAMAGE DONE TO EXISTING FENCES, CURBS, CONCRETE DRIVEWAYS, SIDEWALK STRUCTURES, PAVEMENT, ETC. THAT ARE NOT INDICATED TO BE REMOVED. AN INVENTORY OF EXISTING CONDITIONS SHALL BE CONDUCTED WITH CONTRACTOR AND PROJECT ARCHITECT PRIOR TO CONSTRUCTION.

4. ALL AREAS DISTURBED BY CONSTRUCTION SHALL BE RESTORED AND GRADED TO DRAIN.

5. ALL SLOPES 3:1 OR GREATER SHALL BE OVERLAID WITH TRM 450 AND ANCHORED PER MANUFACTURERS RECOMMENDATIONS.

6. NOTIFY OWNER, HOMEOWNER'S ASSOCIATION, AND UTILITY PURVEYOR (IF APPLICABLE) A MINIMUM OF 72 HOURS IN ADVANCE OF ANY UTILITY SHUTDOWN.

7. MATCH GRADE AT PROPERTY LINE UNLESS OTHERWISE NOTED.

8. UNLESS NOTED OTHERWISE, ALL GRADES ARE TO INVERT OF GUTTER. ADD 0.5' TO GUTTER GRADE FOR TOP OF CURB GRADE EXCEPT WHERE CURB IS FLUSH WITH PAVEMENT.

9. ACHIEVE GRADE CHANGES WITH SMOOTH TRANSITIONS. REFER TO DETAIL SHEETS.

10. REFER TO CIVIL AND/OR LANDSCAPE PLANS FOR RETAINING WALL LOCATIONS AND ELEVATIONS. REFER TO STRUCTURAL RETAINING WALL PLANS FOR CONSTRUCTION DETAILS.

11. FINAL PAVING SURFACES TO BE FLOOD TESTED OR OBSERVED DURING RAINFALL - ANY PONDING AREAS TO BE CORRECTED/ELIMINATED.

12. REFER TO PAVEMENT MARKING/SIGNAGE/PARKING PLAN SHEETS FOR ADDITIONAL INFORMATION.

13. SURFACE DRAINAGE AND UTILITY FEATURES SHOWN FOR REFERENCE ONLY.

14. REFER TO SITE PLAN FOR HORIZONTAL DIMENSIONS.

GEOTECHNICAL RECOMMENDATIONS:

1. CONTRACTOR IS TO REFER TO THE GEOTECHNICAL ENGINEERING REPORT, DATED MAY 02, 2025, PREPARED BY InTECH (PROJECT NO. S251104-P) FOR ALL PROPOSED PAVEMENTS AND SUBGRADES.

EXISTING FOUNDATIONS

EXISTING FOUNDATIONS AT THE PROJECT SITE SHOULD BE COMPLETELY REMOVED PRIOR TO COMMENCEMENT OF MASS GRADING OR CONSTRUCTION OF PAVEMENTS OR NEW FOUNDATIONS. UPON DEMOLITION OF THE EXISTING FOUNDATIONS AND THE REMOVAL OF ALL DEBRIS, THE AREA SHOULD BE RESTORED TO THE DESIRED GRADE BY THE BACKFILLING THE HOLE WITH LEAN CLAY SELECT FILL MEETING THE SPECIFICATION PROVIDED IN THE SECTION 4.2 OF THIS REPORT. THE LEAN CLAY SELECT FILL SHOULD BE PLACED IN LIFTS AND COMPACTED AS SPECIFIED IN THE SECTION 4.2 OF THIS REPORT. IN LIEU OF THE PLACEMENT OF A LEAN CLAY SELECT FILL, THE GRADE MAY BE RESTORED WITH FLOWABLE FILL MEETING THE SPECIFICATION OF 2014 TXDOT ITEM 401 AND HAVING A MINIMUM STRENGTH OF 100 PSI AT 28 DAYS. ALL OLD UTILITIES SHOULD BE REMOVED AND BACKFILLED WITH FLOWABLE FILL.

UNDERGROUND STORAGE TANKS AND SEPTIC TANKS

UNDERGROUND STORAGE TANKS, SEPTIC TANKS, AND ANY ASSOCIATED PIPING SHOULD BE EXCAVATED AND COMPLETELY REMOVED. ON-SITE SOILS (I.E., GENERAL FILL) OR SELECT FILL MEETING THE SPECIFICATIONS PROVIDED IN SECTION 4.2 OF THIS REPORT SHOULD THEN BE PLACED TO THE MATCH THE DESIRED FINAL GRADE. IT IS LIKELY THAT THE EXCAVATION REQUIRED TO REMOVE THESE TANKS AND PIPING WILL RESULT IN EXCAVATION DEPTHS GREATER THAN 5 FEET. EVEN WITH PROPER COMPACTION, IT IS LIKELY THAT FILL SOILS PLACED WITHIN THIS EXCAVATION WILL EXPERIENCE SETTLEMENT OVER TIME. AS A RESULT, RESIDENTIAL FOUNDATIONS, PAVEMENTS, AND/OR UTILITIES MAY BE ADVERSELY AFFECTED BY THAT SETTLEMENT. ONCE FINAL GRADES ARE DETERMINED AND THE TANKS AND PIPING ARE REMOVED, AN EVALUATION SHOULD BE UNDERTAKEN TO DETERMINE THE MOST APPROPRIATE APPROACH FOR BACKFILLING THE EXCAVATION TO ENSURE THAT ANY STRUCTURES OR OTHER FACILITIES CONSTRUCTED OVER THE AREA PERFORM AS INTENDED.

POND AREA

THE AREA OF THE EXISTING POND SHOULD BE DRAINED (IF WATER IS PRESENT) AND THE SOILS WITHIN THE POND BE MUCKED OUT DOWN TO STABLE SOILS. MUCK FROM THE POND SHOULD BE REMOVED FROM THE SITE OR DISPOSED OF AT DESIGNATED ON-SITE AREAS LOCATED OUTSIDE THE LIMITS OF CURRENT OR FUTURE DEVELOPMENT. ON-SITE SOILS (I.E., GENERAL FILL) OR SELECT FILL MEETING THE SPECIFICATIONS PROVIDED IN SECTION 4.2 OF THIS REPORT SHOULD THEN BE PLACED TO THE MATCH THE DESIRED FINAL GRADE. IT IS LIKELY THAT THE EXCAVATION REQUIRED TO REACH STABLE SOILS WILL RESULT IN EXCAVATION DEPTHS GREATER THAN 5 FEET. EVEN WITH PROPER COMPACTION, IT IS LIKELY THAT FILL SOILS PLACED WITHIN THIS EXCAVATION WILL EXPERIENCE SETTLEMENT OVER TIME. AS A RESULT, RESIDENTIAL FOUNDATIONS, PAVEMENTS, AND/OR UTILITIES MAY BE ADVERSELY AFFECTED BY THAT SETTLEMENT. ONCE FINAL GRADES ARE DETERMINED AND THE POND IS MUCKED OUT, AN EVALUATION SHOULD BE UNDERTAKEN TO DETERMINE THE MOST APPROPRIATE APPROACH FOR BACKFILLING THE EXCAVATION TO ENSURE THAT ANY STRUCTURES OR OTHER FACILITIES CONSTRUCTED OVER THE AREA PERFORM AS INTENDED.

GAS NOTES:

REQUIREMENTS FOR CONSTRUCTION NEAR GAS:

AN UNDERGROUND GAS LINE PASSES THROUGH THE SUBJECT SITE. ALL UTILITIES THAT CROSS THIS GAS LINE MUST CROSS AT RIGHT ANGLES TO THE GAS MAIN. SEPARATION DISTANCE BETWEEN UTILITIES AND THE GAS MAIN SHALL BE 4'-0" BETWEEN OUTSIDE DIAMETER TO OUTSIDE DIAMETER. THE CONTRACTOR MUST PROTECT THE GAS LINE AT ALL TIMES DURING CONSTRUCTION.

EXISTING UTILITIES NOTES:

1. THE CONTRACTOR SHALL BE AWARE THAT GAS, SANITARY SEWER, WATER, OVERHEAD ELECTRIC AND OVERHEAD/UNDERGROUND CABLE AND TELEPHONE LINES EXIST WITHIN THE LIMITS OF THIS PROJECT. 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. THE POSITION AND DEPTH OF ALL UTILITIES LOCATED IN THE VICINITY OF THE PROPOSED WORK SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
2. UTILITY CONFLICTS THAT ARE DISCOVERED SHALL BE COMMUNICATED TO THE ENGINEER IMMEDIATELY AND PRIOR TO COMMENCEMENT OF CONSTRUCTION.
3. DAMAGE TO EXISTING UTILITIES, WETHER SHOWN ON THESE PLANS OR NOT, SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND REPAIRED AT THE CONTRACTOR'S OWN EXPENSE.
4. NOTIFY OWNER 72 HOURS IN ADVANCE OF UTILITY SHUTDOWN.
5. ONE CALL NOTE - CONTRACTOR MUST CALL BEXAR COUNTY (811 OR 2111-353-2970) FOR LOCATION OF CITY UTILITIES.

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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

TERRA BUONA
UNIT 10

SUPPLEMENTARY GENERAL NOTES

DATE	09/11/2025
PROJECT NO.	03209.019
DRAWN BY	JW/SG/LB/DF
CHECKED BY	SPM

REVISIONS
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09/11/2025

STATE OF TEXAS
SEAN P. McFARLAND
138893
LICENSED
PROFESSIONAL ENGINEER

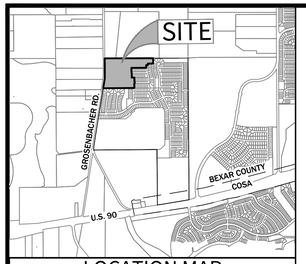
CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
25-11800307

C0.01

P:\03209\019\2-DWG\4-Plans\00_01 SuppNotes.dwg 2025/09/11 3:29am lbarba

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



LOCATION MAP
N.T.S.

OWNER/DEVELOPER:

KB HOME
CONTACT PERSON: SEAN MILLER
4800 FREDERICKSBURG ROAD
SAN ANTONIO,TX 78229
TEL: (210) 301-5485

CIVIL ENGINEER:

M.W. CUDE ENGINEERS, L.L.C.
CONTACT PERSON: SEAN McFARLAND, P.E.
4122 POND HILL ROAD, SUITE 101
SAN ANTONIO, TX 78231
TEL: (210) 681-2951
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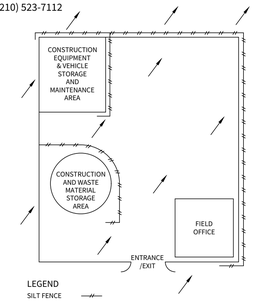
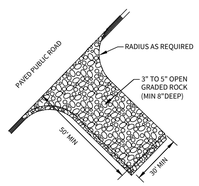


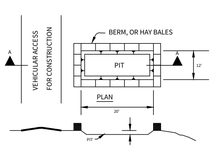
TYP. CONSTRUCTION STAGING AREA 1
N.T.S.



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 2
N.T.S.



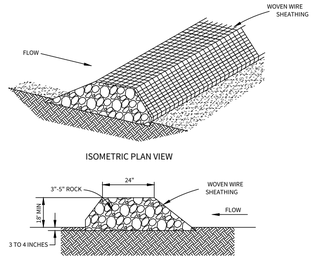
GENERAL NOTES:

- DETAIL ABOVE ILLUSTRATES MINIMUM DIMENSIONS. PIT CAN BE INCREASED IN SIZE DEPENDING ON EXPECTED FREQUENCY 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 STORMWATER RUNOFF.
- WASHOUT PIT SHALL BE LINED WITH A 10-MIL THICK POLYETHLENE SHEETING FREE OF HOLES, TEARS AND OTHER DEFECTS.

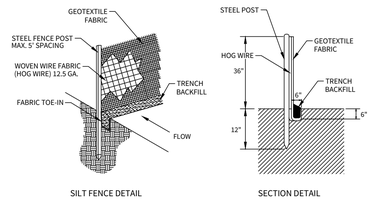
CONCRETE TRUCK WASHOUT PIT 3
N.T.S.

NOTE:

1. ALL SILT FENCES AND/OR ROCK BERMS AND TEMPORARY CONSTRUCTION ENTRANCES/EXITS SHALL BE PLACED AT THE MOST DOWN-GRADIENT POINT OF CONSTRUCTION AS SHOWN ON THIS SITE PLAN. CONTRACTOR SHALL TAKE INTO CONSIDERATION ANY PROPOSED CONSTRUCTION THAT MAY TAKE PLACE AT THESE LOCATIONS. ANY RELOCATION OF SILT FENCE, ROCK BERMS AND/OR TEMPORARY CONSTRUCTION ENTRANCES/EXITS SHALL BE AT THE CONTRACTOR'S EXPENSE.
2. CONTRACTOR TO PROVIDE SILT FENCE ALONG BACK OF CURB POST-CONSTRUCTION OF STREET RIGHT-OF-WAY AND PRIOR TO COMMENCEMENT OF HOME CONSTRUCTION.
3. AREA OF SOIL DISTURBANCES INCLUDE STREET RIGHT-OF-WAYS, UTILITY EASEMENTS & LOTS.
4. THE CITY 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.
5. INSTALL SILT FENCE "J" HOOKS AS NECESSARY AT AN INTERVAL NO GREATER THAN 50' TO COMPLETE INSTALLATION.
6. ALL SWPPP PERMITS AND TEMPORARY CONTROLS TO BE IN PLACE PRIOR TO COMMENCEMENT OF CONSTRUCTION.
7. THE SWPPP PLAN AND BMP'S SHOWN ARE INTENDED TO BE PLACED BY THE CONTRACTOR PRIOR TO THE RESPECTIVE WORK TO BE PERFORMED. THE CONTRACTOR WILL BE REQUIRED TO PERFORM ROUTINE INSPECTIONS, MAINTAIN/ADJUST ALL BMP'S, AND LIKEWISE PROVIDE ADDITIONAL BMP'S IF ANY PROVE TO BE INEFFECTIVE AS REQUIRED BY TPDES CONSTRUCTION GENERAL PERMIT TXR150000.
8. FLOODPLAIN TO BE STAKED



ROCK BERM 5
N.T.S.



STANDARD SILT FENCE 4
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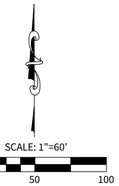
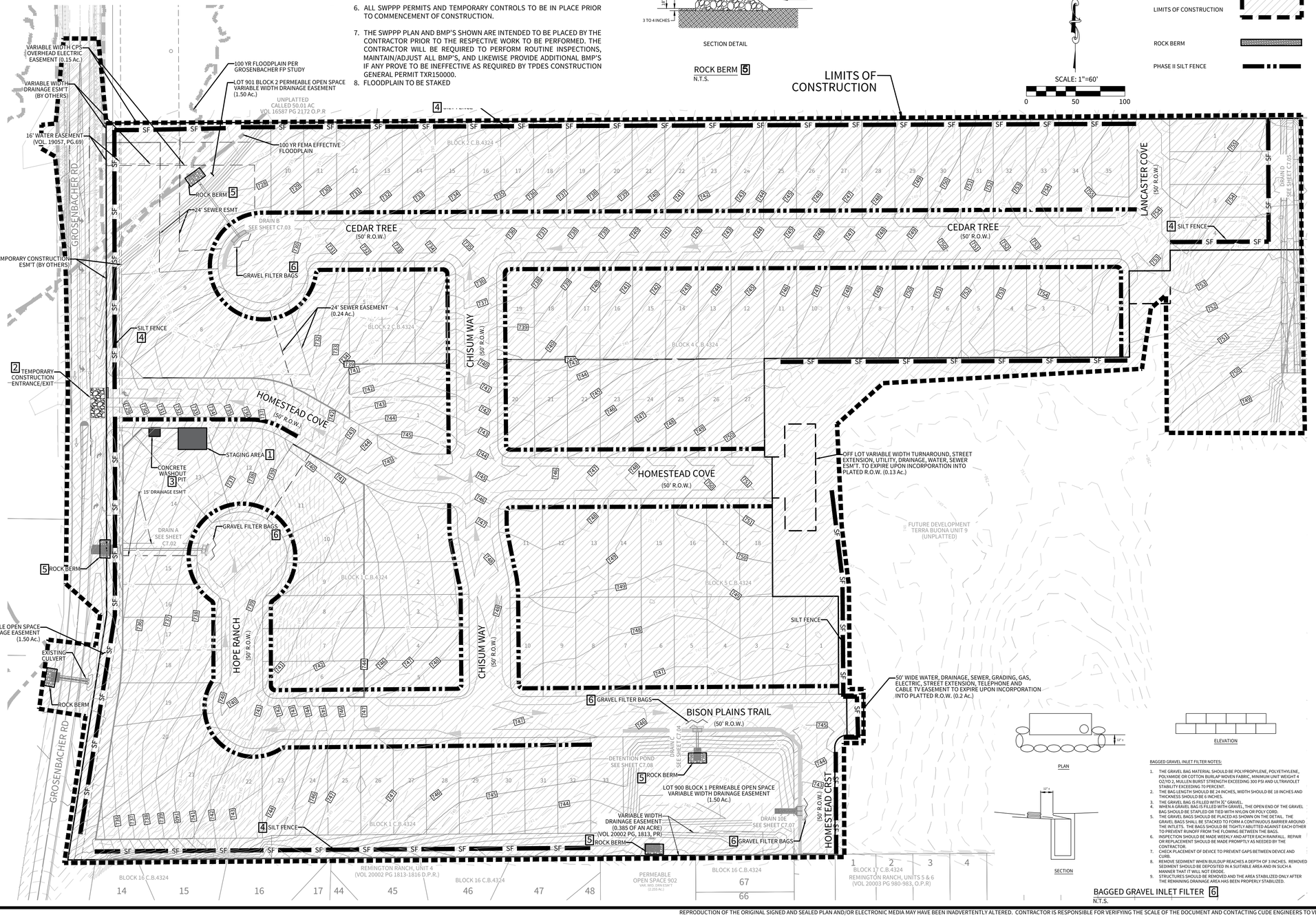


LEGEND

- PROPERTY LINE
- EXISTING CONTOURS — 930 —
- PROPOSED CONTOURS 930
- BMP ITEM NUMBER 1
- TEMPORARY CONSTRUCTION ENTRANCE/EXIT
- SILT FENCE SF
- FLOW ARROW
- STAGING AREA
- CONCRETE WASHOUT PIT
- LIMITS OF CONSTRUCTION
- ROCK BERM
- PHASE II SILT FENCE



BAGGED GRAVEL INLET FILTER 6
N.T.S.

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 BAG IS 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 INTLETS. THE BAGS SHOULD BE TIGHTLY ABUTTED AGAINST EACH OTHER TO PREVENT RUNOFF FROM THE 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.

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TERRA BUONA UNIT 10

STORMWATER POLLUTION PREVENTION PLAN

DATE
09/11/2025

PROJECT NO.
03209.019

DRAWN BY
JW/SG/LB/DF

CHECKED BY
SPM

REVISIONS
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09/11/2025
STATE OF TEXAS
SEAN P. McFARLAND
138893
LICENSED PROFESSIONAL ENGINEER

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
25-11800307

C1.00

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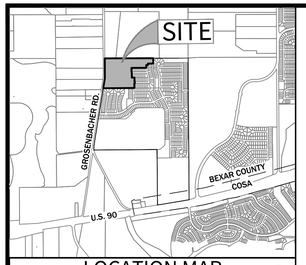

LOCATION MAP
N.T.S.

OWNER/DEVELOPER:

KB HOME
CONTACT PERSON: SEAN MILLER
4800 FREDERICKSBURG ROAD
SAN ANTONIO,TX 78229
TEL: (210) 301-5485

CIVIL ENGINEER:

M.W. CUDE ENGINEERS, L.L.C.
CONTACT PERSON: SEAN McFARLAND, P.E.
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TEL: (210) 681-2951
FAX: (210) 523-7112

DEMOLITION KEYNOTES:

1. DEMO EXISTING BARBED WIRE FENCE, GATES AND APPURTENANCES WITHIN LIMITS OF UNIT 10.
2. EXISTING WATER METER SERVICE LINE, AND ALL APPURTENANCES TO BE REMOVED. CONTRACTOR TO COORDINATE WITH SAWS PRIOR TO DEMO.
3. REMOVE EXISTING SIGN
4. REMOVE GUARD POSTS
5. REMOVE EXISTING CONCRETE, 2 - 1" CONDUITS
6. ELECTRICAL BOX TO REMAIN
7. REMOVE ELECTRICAL BOX
8. FLOOD GAUGE TO REMAIN
9. EXISTING CULVERT AND SIGNAGE TO BE REMOVED AND REPLACED

PLAT:

TERRA BUONA UNIT 10 (PLAT NO. 24-11800307)

BENCHMARKS / CONTROL POINT DATA:

ELEVATIONS SHOWN HEREON ARE NAVD 88.

POINT NO.	NORTHING	EASTING	ELEVATION	DESCRIPTION
1	13688876.57	2055592.49	724.56	1/2" IRON ROD (CUDE)

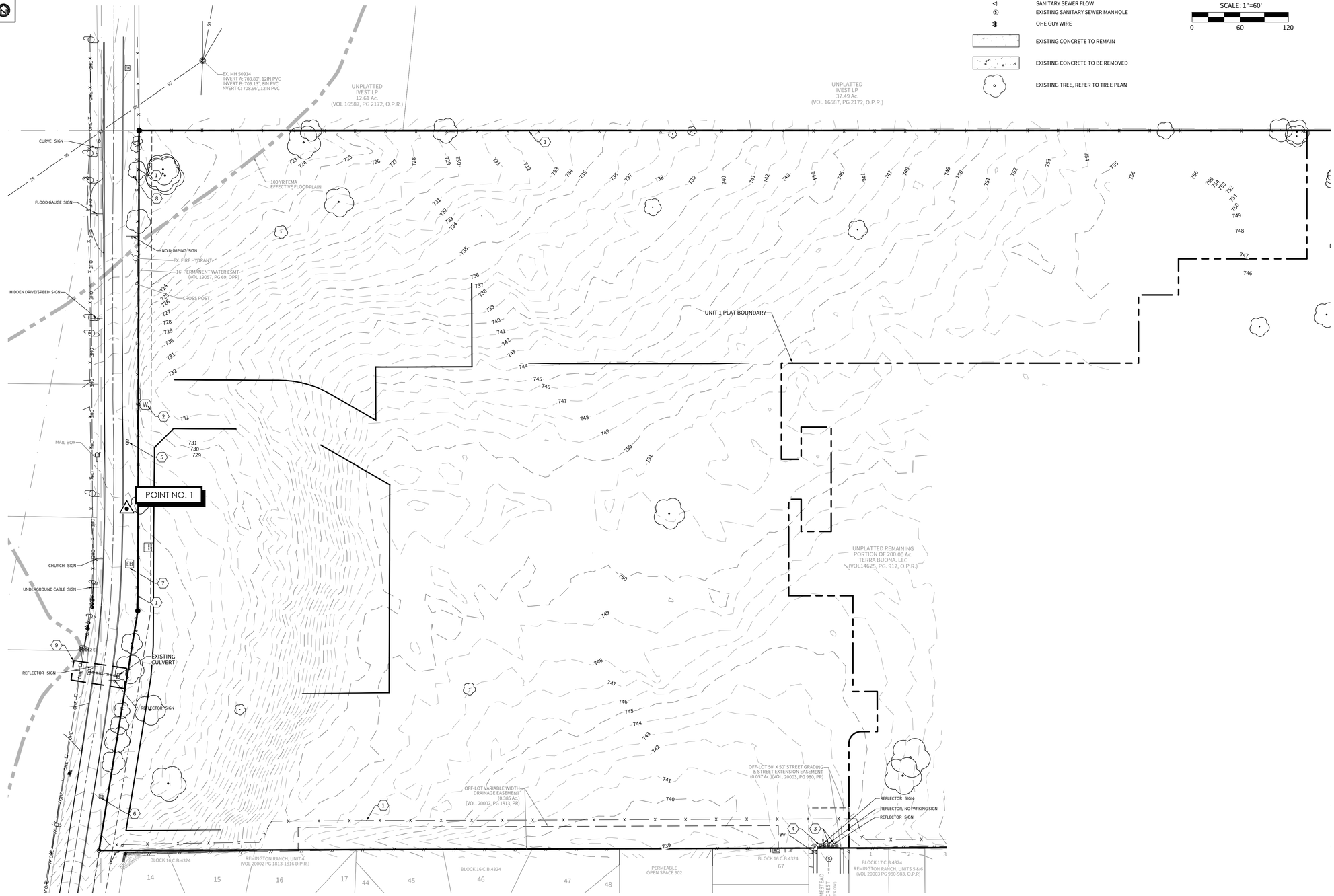
NOTE:
CONTRACTOR TO RUN LEVEL LOOP THROUGH BM'S PROVIDED TO CONFIRM BEFORE CONSTRUCTION. CONTACT ENGINEER/SURVEYOR IMMEDIATELY IF ELEVATIONS DO NOT MATCH THOSE SHOWN.

LEGAL DESCRIPTION:

LEGEND

- PROPERTY LINE
- 901 EXISTING MINOR CONTOUR
- 900 EXISTING MAJOR CONTOUR
- EXISTING EASEMENT
- SS EXISTING SANITARY SEWER MAIN
- W EXISTING WATER MAIN
- OHE EXISTING OVERHEAD ELECTRIC
- EXIST. FIRE HYDRANT
- EXIST. WATER VALVE
- EXIST. SANITARY SEWER MANHOLE
- EXIST. UTILITY POLE
- EXIST. SIGN
- PROPERTY CORNER
- SANITARY SEWER FLOW
- EXISTING SANITARY SEWER MANHOLE
- OHE GUY WIRE
- EXISTING CONCRETE TO REMAIN
- EXISTING CONCRETE TO BE REMOVED
- EXISTING TREE, REFER TO TREE PLAN

SCALE: 1"=60'
0 60 120



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TERRA BUONA UNIT 10

EXISTING CONDITIONS AND DEMOLITION PLAN

DATE
09/11/2025

PROJECT NO.
03209.019

DRAWN BY
JW/SG/LB/DF

CHECKED BY
SPM

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09/11/2025

STATE OF TEXAS
SEAN P. McFARLAND
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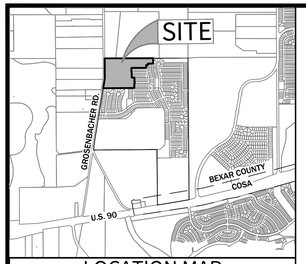

LOCATION MAP
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SAN ANTONIO, TX 78231
TEL: (210) 681-2951
FAX: (210) 523-7112

SCALE: 1"=50'

0 50 100

LEGEND

PROPOSED CONTOUR	1000
EXISTING CONTOUR	1000
PROPOSED ELEVATION	1000
EXISTING ELEVATION	ME +/-1000
GRADE BREAK	GRADE BREAK
BUILDING SETBACK	
SWALE	
100 YEAR FLOODPLAIN	
100 YEAR FEMA EFFECTIVE FLOODPLAIN	
TOP OF WALL	TW +/-1000
BOTTOM OF WALL	BW +/-1000

NOTE:

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

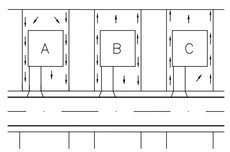
MINIMUM SLAB EXPOSURE IS 14".

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

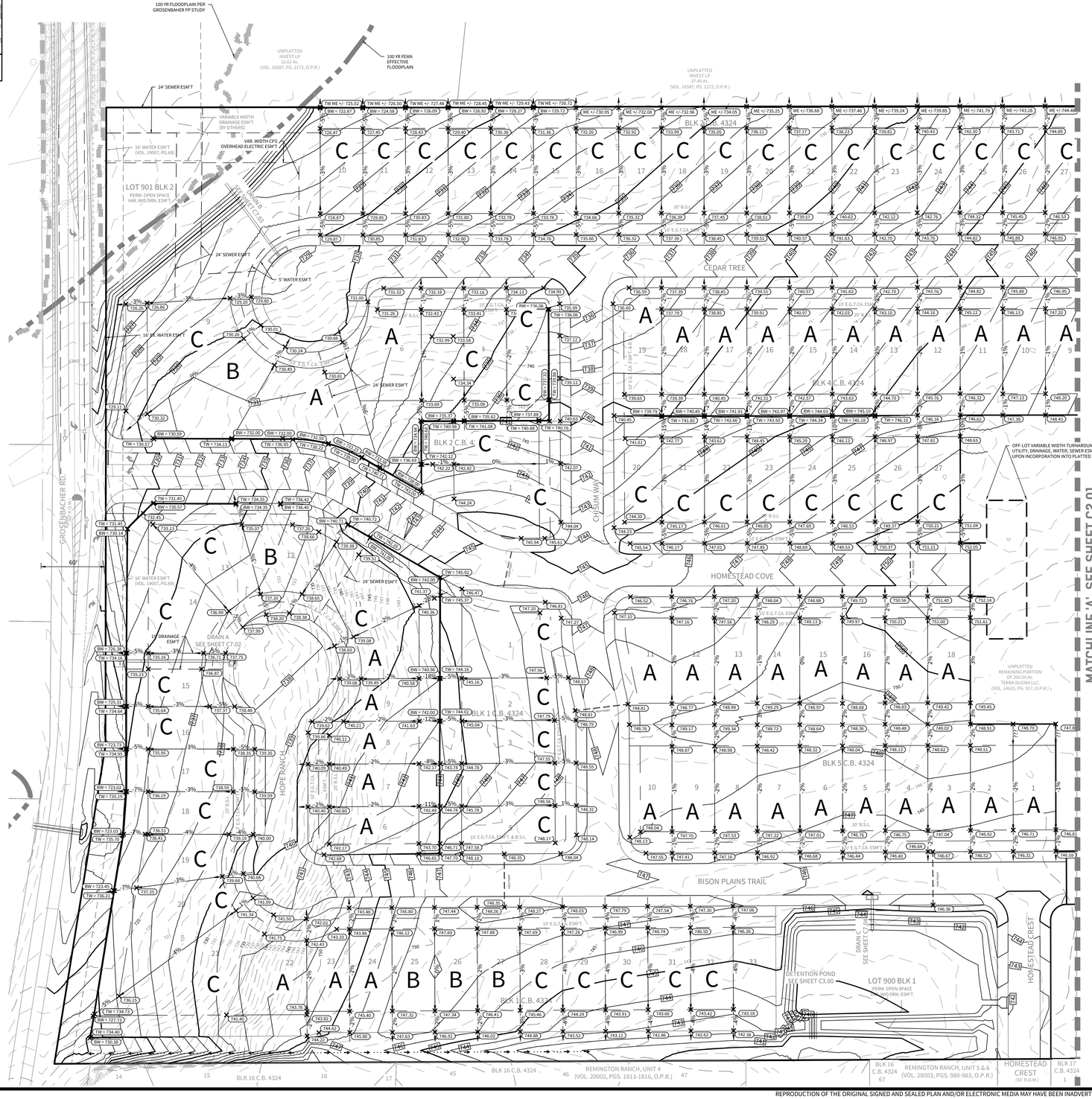
TYPICAL PAD SIZES ARE 80' x 40' ON LOCAL TYPE "A" STREETS.

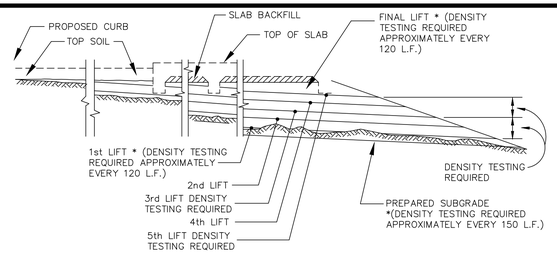
CONTRACTOR TO REFERENCE TREE PRESERVATION PLAN.

CONTOURS SHOWN ON STREET ARE TOP OF STREET.



TYPICAL LOT SITE PLAN
N.T.S.





DENSITY TEST FREQUENCY

NOT TO SCALE

GENERAL SPECIFICATIONS FOR SITE PREPARATION

1. General Description

This item shall consist of all clearing and grubbing, demolition, preparation of land to be filled, filling of the land, spreading, compaction testing and inspection of the fill, and all subsidiary work necessary to complete the grading of the cut and fill areas to conform with the lines, grades and slopes as shown on the approved plans.

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

2. Clearing the Area to be Filled

All timber, logs, trees, brush and rubbish shall be removed from the site.

3. Scarifying the Area to be Filled

All organic matter shall be removed from the surface upon which the fill is to be placed, and the surface shall then be disked or scarified to a minimum depth of six inches (6"), all surface ruts or other uneven features will be leveled prior to field density testing.

4. Compacting the Area to be Filled

Following the clearing and disking or scarifying of the fill area, it shall be bladed until it is uniform and free from large clods. The area shall be brought to the adequate moisture content and compacted (typically) to not less than ninety percent (90%) of maximum density in accordance with the current ASTM D 1557 Compaction Procedure, or 95% of maximum density in accordance with the current THD–TEX–113–E Compaction Procedure.

5. Fill Materials

The materials used shall be free from organic matter and other deleterious substances, such as trees, brush and rubbish.

6. Depth and Mixing of Fill Layers

The selected fill material shall be placed in level, uniform layers which, when compacted, shall have a density conforming to that stipulated above. Each layer shall be thoroughly mixed during the spreading to ensure uniformity of material in each layer. Compacted layer thickness may vary depending on the compaction equipment of demonstrated capability. The maximum loose depth for any material shall not exceed twelve inches (12"). For testing requirements of fill material, see density testing.

7. Rock

When fill material includes rock, the maximum rock size shall be as approved by the Geotechnical Engineer. No large rocks shall be allowed to nest and all voids must be filled with small stones or soil and adequately compacted. No large rocks will be permitted within eighteen inches (18") of the finished grade.

8. Compaction of Fill Layer

Compaction equipment shall be capable of compacting the fill to the specified density. Compaction shall be accomplished while the fill material is at or near the appropriate moisture content. Compaction of each layer shall be continuous over the entire structural area (beneath proposed structures).

9. Compaction of Slopes

The faces of fill slopes shall be compacted. Compacting operations shall be continued until the slope faces are stable but not too dense for planting on the slopes. Compaction of the slope faces may be done progressively in increments of three to five feet (3' to 5') in fill height as this fill progresses or after the fill has been brought to its total height.

10. Moisture Content

The fill material shall be compacted at the appropriate moisture content specified for the soils being used. Appropriate moisture content is defined, typically, as optimum moisture content; however, for expansive soils it may be greater than optimum moisture content, and other moisture contents may be necessary to produce the desired results with certain soils.

11. Density Tests

Field density tests shall be performed on layers of fill when the fill is being placed as directed by the Geotechnical Engineer. The maximum fill height between density testing shall be eighteen inches (18"). All testing shall be requested by the contractor to meet the contractor's construction schedule. Notification by the contractor to conduct tests shall be at least the day before. This notification shall include the fill area location (Lot and Block), the lift or height of fill and approximate desired time of testing. When these tests indicate that the density of any layer of fill or portion thereof is below the required density, the particular layer or portion shall be reworked and retested at the expense of the contractor unless the contractor can show evidence that circumstances beyond his control required the retesting. Generally, the specific testing will be as follows and conducted by Geotechnical Engineer.

1. The land to be filled (prepared subgrade) shall be prepared and tested at a frequency as determined by the Geotechnical Engineer.
2. The first lift of compacted fill (generally 8 to 12-in.) shall be tested as determined by the Geotechnical Engineer. Any areas supporting the proposed structures requiring fill shall be tested for density compliance.
3. Fills shall be tested a maximum of each eighteen inches (18") of fill.
4. Test results will be provided by the field technician to the contractor when possible; however, all test results are to be reviewed by the Geotechnical Engineer for compliance. The engineer will notify the contractor of all the test results.

12. Cut/Fill Lots

Areas involving cut on one portion and fill on another portion of a specific lot shall be prepared to a minimum depth of 6-in. and will be the same material classification at the same compaction and moisture content. A minimum of two (2) field density tests shall be required on each cut/fill lot for the purpose of determining uniformity of the area supporting the proposed structures.

CUDEENGINEERS.COM

EST. 1980 CUDE ENGINEERS

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

TERRA BUONA UNIT 10

GRADING PLAN

DATE
09/11/2025

PROJECT NO.
03209.019

DRAWN BY
JW/SG/LB/DF

CHECKED BY
SPM

REVISIONS
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09/11/2025

STATE OF TEXAS
SEAN P. McFARLAND
138893
LICENSED PROFESSIONAL ENGINEER

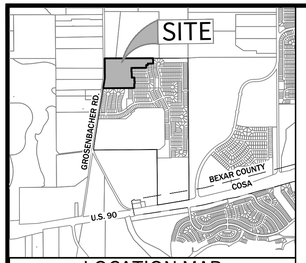
CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
25-11800307

C3.00

P:\03209\2025\3-SWGR\Plans\03_GRADE\dwg\25SWGR11.3.dwg Modified: 9/11/2025 2:34:00 PM Modified By: JWilliams

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



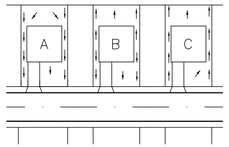
LOCATION MAP
N.T.S.

OWNER/DEVELOPER:

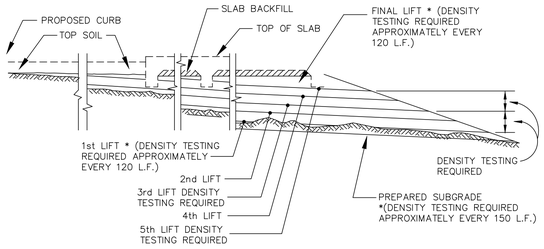
KB HOME
CONTACT PERSON: SEAN MILLER
4800 FREDERICKSBURG ROAD
SAN ANTONIO,TX 78229
TEL: (210) 301-5485

CIVIL ENGINEER:

M.W. CUDE ENGINEERS, L.L.C.
CONTACT PERSON: SEAN McFARLAND, P.E.
4122 POND HILL ROAD, SUITE 101
SAN ANTONIO, TX 78231
TEL: (210) 681-2951
FAX: (210) 523-7112



TYPICAL LOT SITE PLAN
N.T.S.



DENSITY TEST FREQUENCY
NOT TO SCALE

NOTE:

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

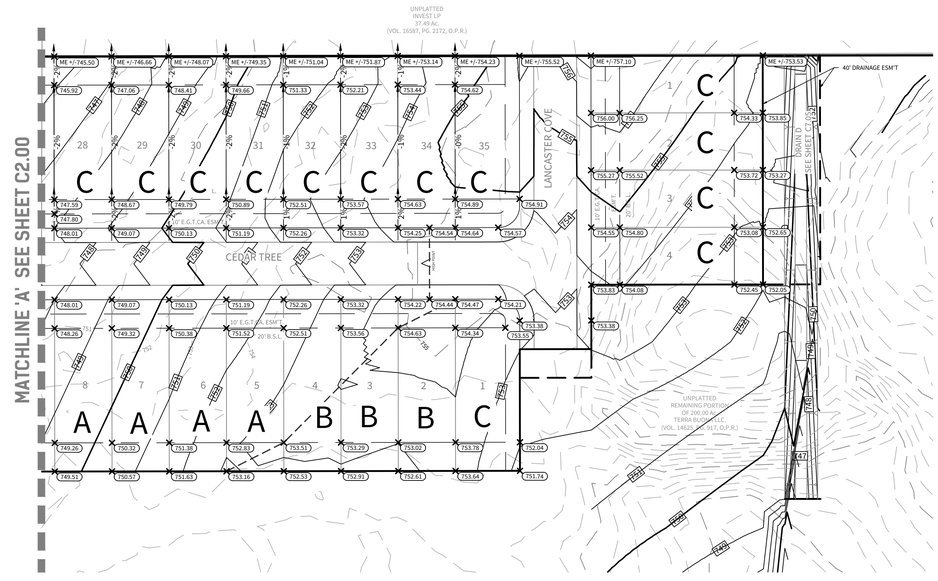
MINIMUM SLAB EXPOSURE IS 1.0'.

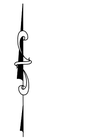
ALL ELEVATIONS AT FRONT PROPERTY LINE ARE 0.22' ABOVE CURB ELEVATION ON LOCAL TYPE "A" STREETS.

TYPICAL PAD SIZES ARE 80' x 35' ON LOCAL TYPE "A" STREETS.

CONTRACTOR TO REFERENCE TREE PRESERVATION PLAN.

CONTOURS SHOWN ON STREET ARE TOP OF STREET.





SCALE: 1"=50'
0 50 100

LEGEND

- PROPOSED CONTOUR — 1000
- EXISTING CONTOUR — 1000
- PROPOSED ELEVATION — 1000
- EXISTING ELEVATION — ME +/-1000
- GRADE BREAK — GRADE BREAK
- BUILDING SETBACK
- SWALE
- 100 YEAR FLOODPLAIN
- 100 YEAR FEMA EFFECTIVE FLOODPLAIN
- TOP OF WALL — TW +/-1000
- BOTTOM OF WALL — BW +/-1000

GENERAL SPECIFICATIONS FOR SITE PREPARATION

1. General Description

This item shall consist of all clearing and grubbing, demolition, preparation of land to be filled, filling of the land, spreading, compaction testing and inspection of the fill, and all subsidiary work necessary to complete the grading of the cut and fill areas to conform with the lines, grades and slopes as shown on the approved plans.

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

2. Clearing the Area to be Filled

All timber, logs, trees, brush and rubbish shall be removed from the site.

3. Scarifying the Area to be Filled

All organic matter shall be removed from the surface upon which the fill is to be placed, and the surface shall then be disked or scarified to a minimum depth of six inches (6"), all surface ruts or other uneven features will be leveled prior to field density testing.

4. Compacting the Area to be Filled

Following the clearing and disking or scarifying of the fill area, it shall be bladed until it is uniform and free from large clods. The area shall be brought to the adequate moisture content and compacted (typically) to not less than ninety percent (90%) of maximum density in accordance with the current ASTM D 1557 Compaction Procedure, or 95% of maximum density in accordance with the current THD--TEX--113--E Compaction Procedure.

5. Fill Materials

The materials used shall be free from organic matter and other deleterious substances, such as trees, brush and rubbish.

6. Depth and Mixing of Fill Layers

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EST. 1980 CUDE ENGINEERS

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

TERRA BUONA UNIT 10

GRADING PLAN

DATE
09/11/2025

PROJECT NO.
03209.019

DRAWN BY
JW/SG/LB/DF

CHECKED BY
SPM

REVISIONS
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09/11/2025

STATE OF TEXAS
SEAN P. McFARLAND
138893
LICENSED PROFESSIONAL ENGINEER

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
25-11800307

C3.01

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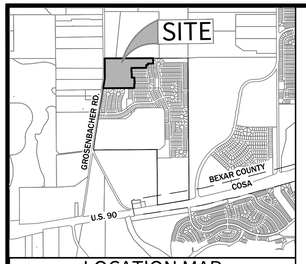

LOCATION MAP
N.T.S.

OWNER/DEVELOPER:

KB HOME
CONTACT PERSON: SEAN MILLER
4800 FREDERICKSBURG ROAD
SAN ANTONIO,TX 78229
TEL: (210) 301-5485

CIVIL ENGINEER:

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SAN ANTONIO, TX 78231
TEL: (210) 681-2951
FAX: (210) 523-7112

LEGEND

EXISTING SANITARY SEWER	EX.8"SS
PROPOSED SANITARY SEWER	8"SS
EXISTING SANITARY SEWER MANHOLE	
PROPOSED SANITARY SEWER MANHOLE	
EXISTING WATER MAIN	EX.8"W
PROPOSED WATER MAIN	8"W
EXISTING STANDARD FIRE HYDRANT	
PROPOSED STANDARD FIRE HYDRANT	
EXISTING STANDARD GATE VALVE	
PROPOSED STANDARD GATE VALVE	
EXISTING PERMANENT BLOWOFF	
PROPOSED PERMANENT BLOWOFF	
EXISTING OVERHEAD ELECTRIC	EX. OHE
PROPOSED OVERHEAD ELECTRIC	OHE
EXISTING GAS MAIN	EX.2"GAS
PROPOSED GAS MAIN	8"GAS
EXISTING POWER POLE	
PROPOSED POWER POLE	
PROPOSED LIGHT POLE	
ELECTRIC, GAS, TELEPHONE, & CABLE T.V. EASEMENT	E.G.T.C.A. ESM'T
BUILDING SETBACK LINE	B.S.L.
LANDSCAPE	L.S.
UTILITY CONDUIT CROSSING	UTIL
IRRIGATION CONDUIT CROSSING	IRR
PROPOSED CLEANOUT	

NOTE:

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

SAN ANTONIO WATER SYSTEM	210-233-2010
COSA DRAINAGE	210-207-2800
CITY SIDEWALK AND TRENCHING DIVISION	210-821-3240
COSA TRAFFIC SIGNAL OPERATIONS	210-207-7765
TEXAS STATE WIDE ONE CALL LOCATOR	1-800-545-6005
CITY PUBLIC SERVICE	"
AT&T	"
TIME WARNER	"
VALERO ENERGY CO.	"

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

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

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

* PRIVATE STREET LIGHTS TO BE PROVIDED BY DEVELOPER.

* CONDUIT ONLY TO BE INSTALLED IF:

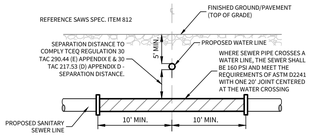
1.) STREET BASE AND DRAINAGE COMPLETION PRECEDES CPS UTILITY LINE INSTALLATION.
2.) INSTALLATION IS AUTHORIZED BY THE DEVELOPER.

TRENCH EXCAVATION SAFETY PROTECTION

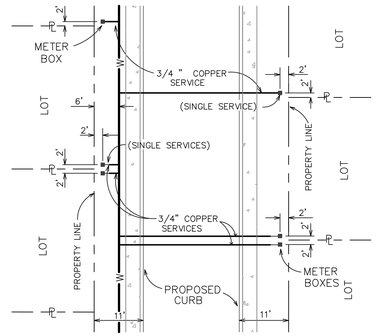
Contractor and/or Contractor's independently retained employee or structural design/geotechnical/safety/equipment consultant, if any, shall review these plans and available geotechnical information and the anticipated installation site(s) within the project work area in order to implement Contractor's trench excavation safety protection systems, programs and/or procedures for the project described in the contract documents. the Contractor's implementation of these systems, programs and/or procedures shall provide for adequate trench excavation safety protection that comply with as a minimum, OSHA standards for trench excavations. specifically, Contractor and/or Contractor's independently retained employee or safety consultant shall implement a trench safety program in accordance with OSHA standards governing the presence and activities of individuals working in and around trench excavation.

CAUTION!!!

THE CONTRACTOR SHALL BE AWARE THAT UNDERGROUND ELECTRIC, GAS, SEWER AND WATER LINES EXIST ALONG SWAYBACK RANCH. 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.



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



WATER METER BOX LOCATION
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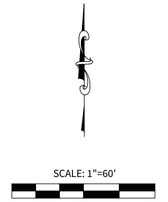

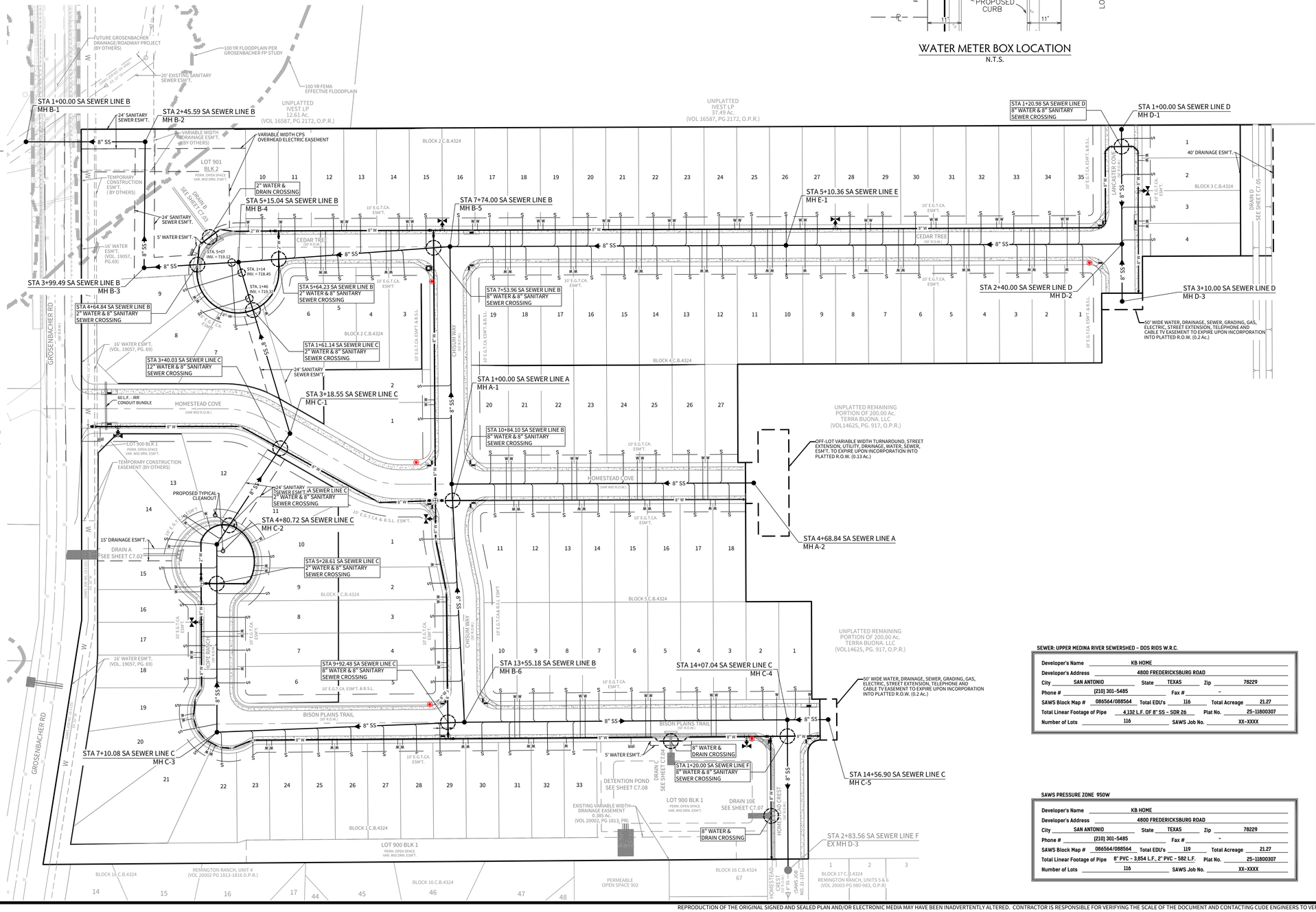

SEWER: UPPER MEDINA RIVER SEWERSHED – DOS RIOS W.R.C.

Developer's Name	KB HOME		
Developer's Address	4800 FREDERICKSBURG ROAD		
City	SAN ANTONIO	State TEXAS	Zip 78229
Phone #	(210) 301-5485	Fax #	-
SAWS Block Map #	086564/088564	Total EDU's 116	Total Acreage 21.27
Total Linear Footage of Pipe	4,132 L.F. OF 8" SS – SDR 26		Plat No. 25-11800307
Number of Lots	116	SAWS Job No.	XX-XXXX

SAWS PRESSURE ZONE 950W

Developer's Name	KB HOME		
Developer's Address	4800 FREDERICKSBURG ROAD		
City	SAN ANTONIO	State TEXAS	Zip 78229
Phone #	(210) 301-5485	Fax #	-
SAWS Block Map #	086564/088564	Total EDU's 116	Total Acreage 21.27
Total Linear Footage of Pipe	8" PVC – 3,854 L.F., 2" PVC – 582 L.F.		Plat No. 25-11800307
Number of Lots	116	SAWS Job No.	XX-XXXX

CUDEENGINEERS.COM
M.W. CUDE ENGINEERS
4122 Pond Hill Road, Suite 101
San Antonio, Texas 78231
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TERRA BUONA UNIT 10

UTILITY LAYOUT PLAN

DATE 09/11/2025
PROJECT NO. 03209.019
DRAWN BY JW/SG/LB/DF
CHECKED BY SPM

REVISIONS
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09/11/2025
STATE OF TEXAS
SEAN P. McFARLAND
138893
LICENSED
PROFESSIONAL ENGINEER
SURVEYOR

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO. 25-11800307
SAWS JOB NO.

C4.00

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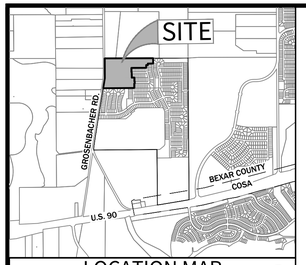

LOCATION MAP
N.T.S.

OWNER/DEVELOPER:

KB HOME
CONTACT PERSON: SEAN MILLER
4800 FREDERICKSBURG ROAD
SAN ANTONIO,TX 78229
TEL: (210) 301-5485

CIVIL ENGINEER:

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SAN ANTONIO, TX 78231
TEL: (210) 681-2951
FAX: (210) 523-7112

SEWER/WATER LINE CROSSINGS	
LINE	STATION
B	4+64.84
B	5+64.23
B	7+53.96
B	10+84.03
C	1+61.14
C	4+52.83
C	5+28.61
C	9+92.48
D	1+20.98

SCALE: 1"=50'
0 50 100

*SANITARY SEWER SERVICE IS PROVIDED PER USA-20033

SEWER: UPPER MEDINA RIVER SEWERSHED – DOS RIOS W.R.C.

Developer's Name	KB HOME		
Developer's Address	4800 FREDERICKSBURG ROAD		
City	SAN ANTONIO	State TEXAS	Zip 78229
Phone #	(210) 301-5485	Fax #	-
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Total Linear Footage of Pipe	4,132 L.F. OF 8" SS – SDR 26	Plat No.	25-11800307
Number of Lots	116	SAWS Job No.	XX-XXXX

MATCHLINE 'A' SEE THIS SHEET

MATCHLINE 'A' SEE THIS SHEET

CUDEENGINEERS.COM

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

TERRA BUONA
UNIT 10

SANITARY SEWER MASTER PLAN

DATE
09/11/2025

PROJECT NO.
03209.019

DRAWN BY
JW/SG/LB/DF

CHECKED BY
SPM

REVISIONS
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09/11/2025

STATE OF TEXAS
SEAN P. McFARLAND
138893
LICENSED
PROFESSIONAL ENGINEER

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
25-11800307

SAWS JOB NO.
XX-XXXX

C5.00

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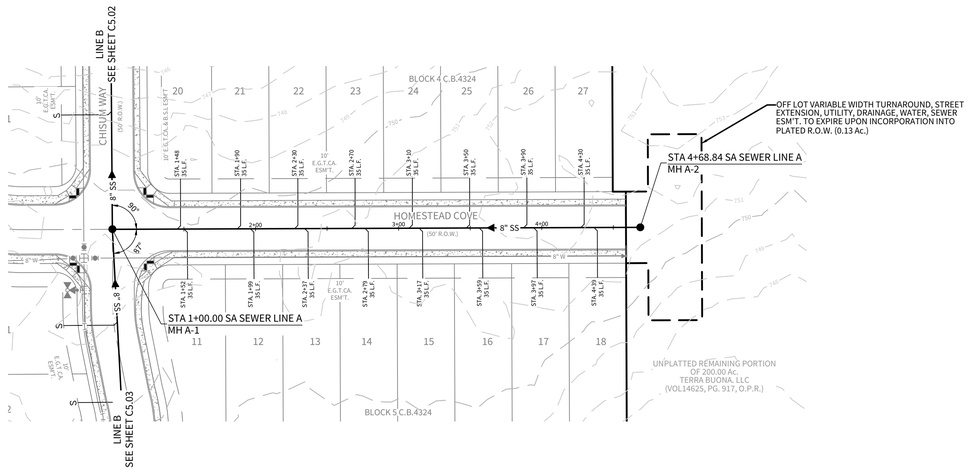
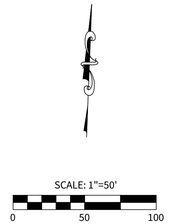




TRENCH EXCAVATION PROTECTION

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.

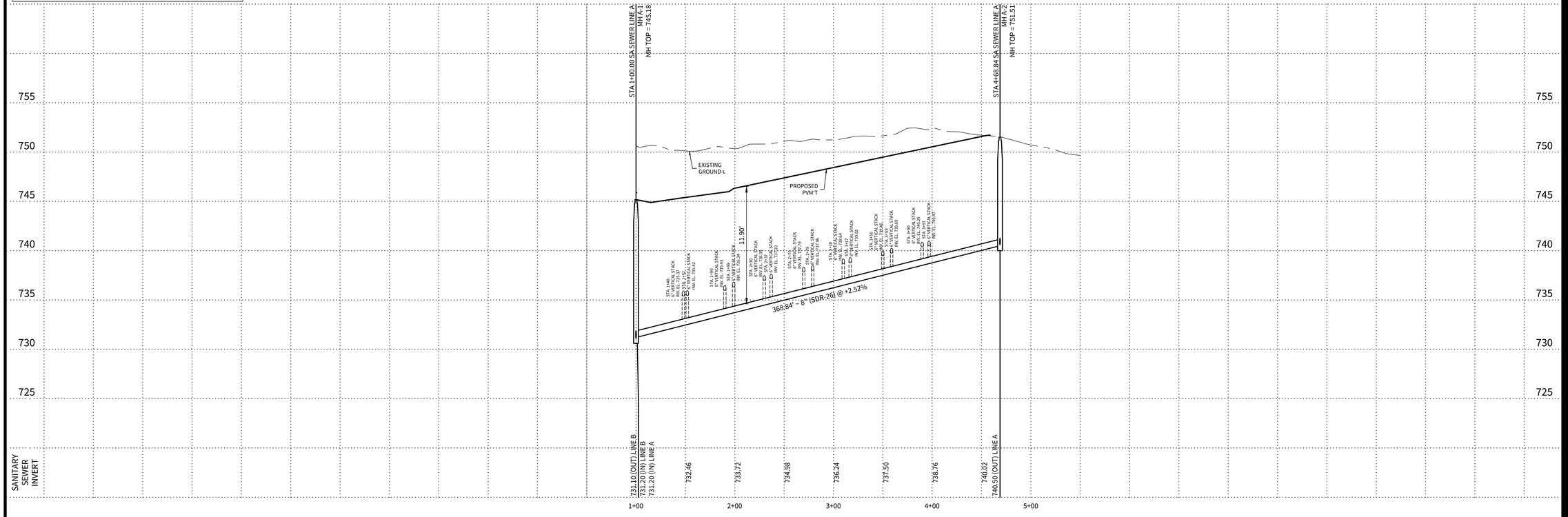
LINE A

STA. 1+00.00 TO STA. 4+68.84

SEWER: UPPER MEDINA RIVER SEWERSHED – DOS RIOS W.R.C.

Developer's Name	KB HOME				
Developer's Address	4800 FREDERICKSBURG ROAD				
City	SAN ANTONIO	State	TEXAS	Zip	78229
Phone #	(210) 301-5485	Fax #	-		
SAWS Block Map #	086564/088564	Total EDU's	116	Total Acreage	21.27
Total Linear Footage of Pipe	4,132 L.F. OF 8" SS – SDR 26			Plat No.	25-11800307
Number of Lots	116	SAWS Job No.	XX-XXXX		

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



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TERRA BUONA
UNIT 10

SANITARY SEWER PLAN & PROFILE - LINE A

DATE
09/11/2025

PROJECT NO.
03209.019

DRAWN BY
JW/SG/LB/DF

CHECKED BY
SPM

REVISIONS
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09/11/2025

STATE OF TEXAS
SEAN P. McFARLAND
138893
LICENSED PROFESSIONAL ENGINEER

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
25-11800307

SAWS JOB NO.
XX-XXXX

C5.01

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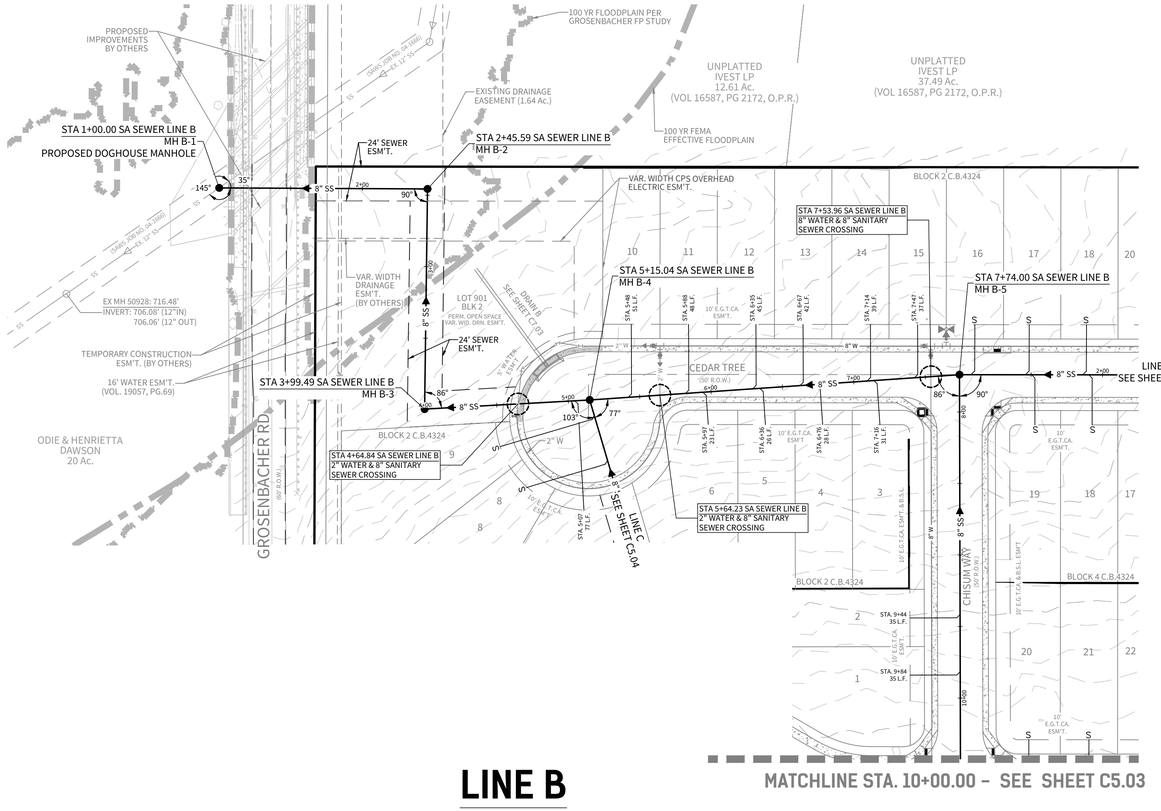
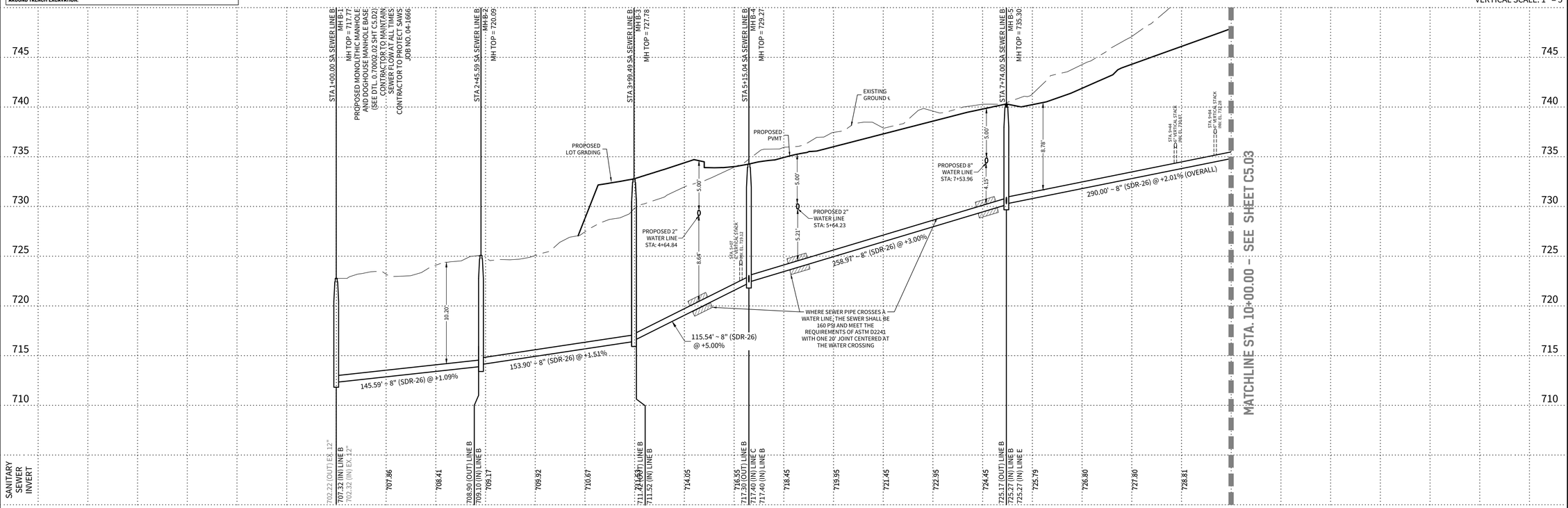
REPRODUCTION OF THE ORIGINAL SIGNED AND SEALED PLAN AND/OR ELECTRONIC MEDIA MAY HAVE BEEN INADVERTENTLY ALTERED. CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE SCALE OF THE DOCUMENT AND CONTACTING CUDE ENGINEERS TO VERIFY DISCREPANCIES PRIOR TO CONSTRUCTION.



LINE B

STA. 1+00.00 TO STA. 10+00.00

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



TRENCH EXCAVATION PROTECTION

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SCALE: 1"=50'
0 50 100

SEWER: UPPER MEDINA RIVER SEWERSHED – DOS RIOS W.R.C.

Developer's Name	KB HOME		
Developer's Address	4800 FREDERICKSBURG ROAD		
City	SAN ANTONIO	State TEXAS	Zip 78229
Phone #	(210) 301-5485	Fax #	–
SAWS Block Map #	086564/088564	Total EDU's 116	Total Acreage 21.27
Total Linear Footage of Pipe	4,132 L.F. OF 8" SS – SDR 26		Plat No. 25-11800307
Number of Lots	116	SAWS Job No.	XX-XXXX

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TERRA BUONA UNIT 10

SANITARY SEWER PLAN & PROFILE - LINE B

DATE 09/11/2025

PROJECT NO. 03209.019

DRAWN BY JW/SG/LB/DF

CHECKED BY SPM

REVISIONS
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09/11/2025

STATE OF TEXAS
SEAN P. McFARLAND
138893
LICENSED PROFESSIONAL ENGINEER

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO. 25-11800307

SAWS JOB NO. XX-XXXX

C5.02

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.

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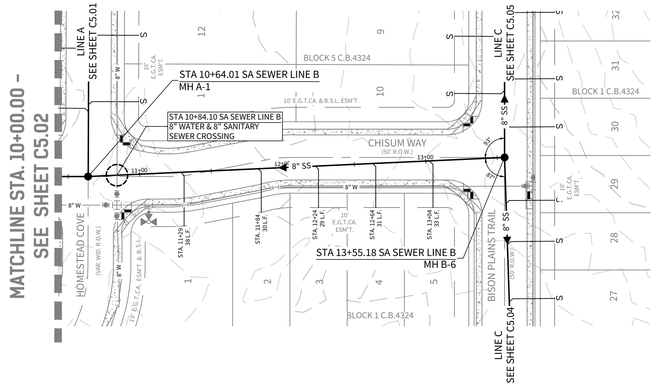
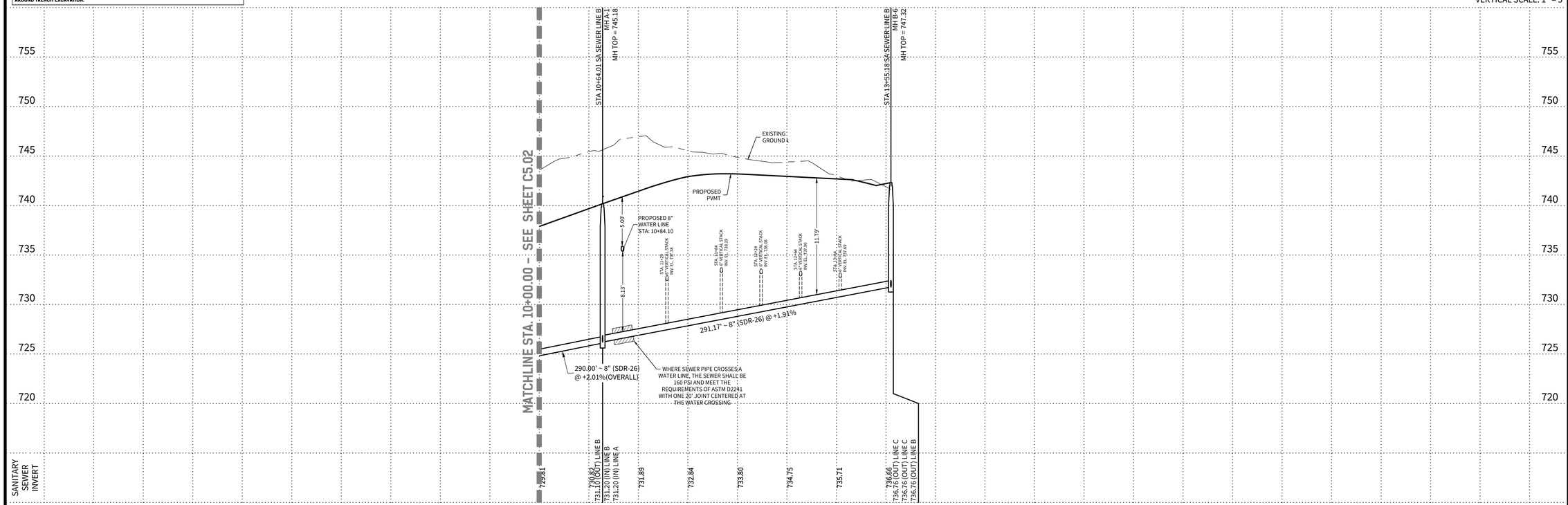


LINE B

STA. 10+00.00 TO STA. 13+12.21

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



TRENCH EXCAVATION PROTECTION

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SEWER: UPPER MEDINA RIVER SEWERSHED – DOS RIOS W.R.C.

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City	SAN ANTONIO	State	TEXAS	Zip	78229
Phone #	(210) 301-5485	Fax #	-		
SAWS Block Map #	086564/088564	Total EDU's	116	Total Acreage	21.27
Total Linear Footage of Pipe	4,132 L.F. OF 8" SS – SDR 26			Plat No.	25-11800307
Number of Lots	116	SAWS Job No.	XX-XXXX		

SCALE: 1"=50'
0 50 100

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TERRA BUONA
UNIT 10

SANITARY SEWER PLAN & PROFILE - LINE B

DATE
09/11/2025

PROJECT NO.
03209.019

DRAWN BY
JW/SG/LB/DF

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SPM

REVISIONS
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09/11/2025

STATE OF TEXAS
SEAN P. McFARLAND
138893
LICENSED PROFESSIONAL ENGINEER

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
25-11800307

SAWS JOB NO.
XX-XXXX

C5.03

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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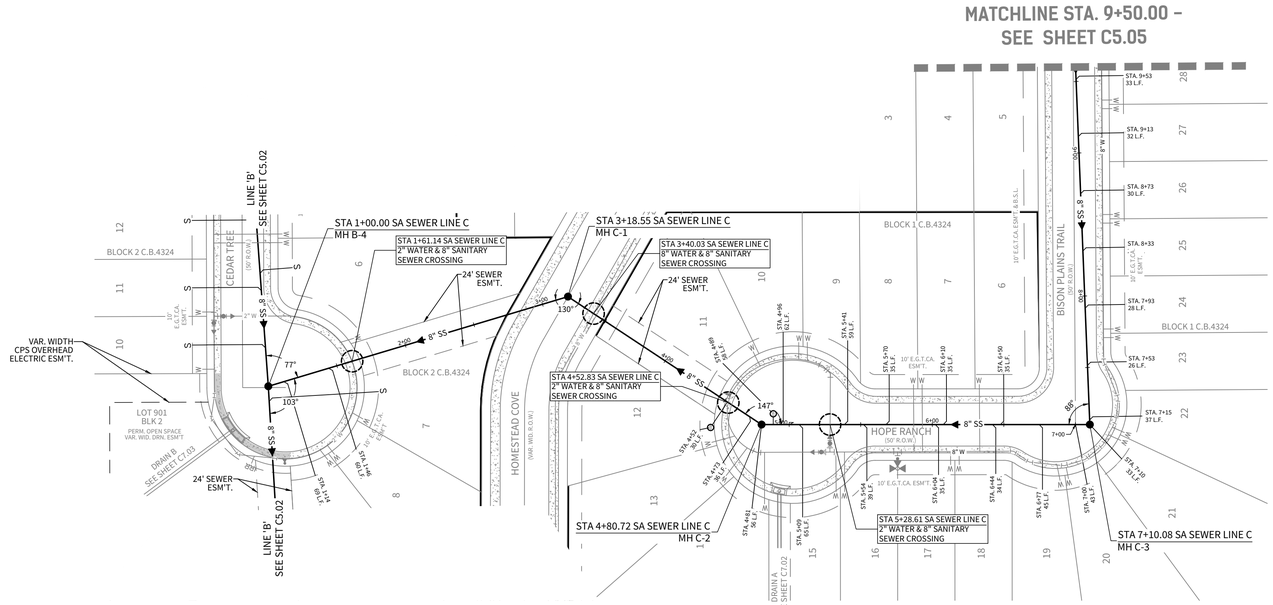
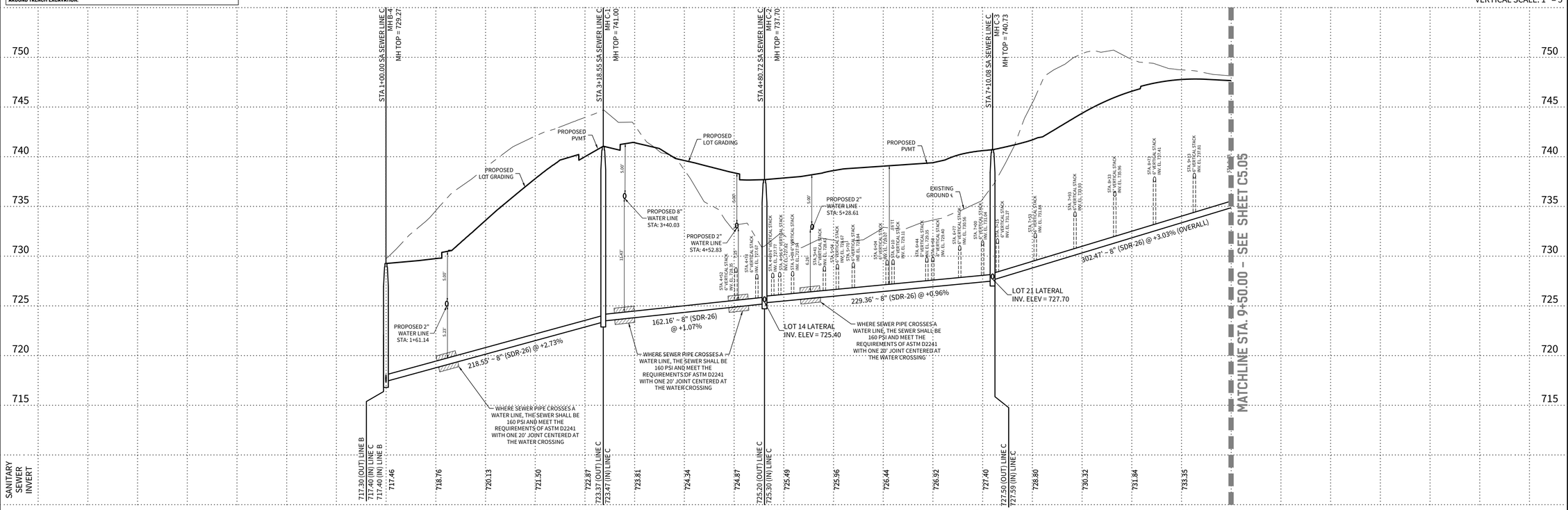


LINE C

STA. 1+00.00 TO STA. 9+50.00

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



TRENCH EXCAVATION PROTECTION

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SEWER: UPPER MEDINA RIVER SEWERSHED – DOS RIOS W.R.C.

Developer's Name	KB HOME		
Developer's Address	4800 FREDERICKSBURG ROAD		
City	SAN ANTONIO	State TEXAS	Zip 78229
Phone #	(210) 301-5485	Fax #	-
SAWS Block Map #	086564/088564	Total EDU's 116	Total Acreage 21.27
Total Linear Footage of Pipe	4,132 L.F. OF 8" SS – SDR 26		Plat No. 25-11800307
Number of Lots	116	SAWS Job No.	XX-XXXX

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TERRA BUONA
UNIT 10

SANITARY SEWER PLAN & PROFILE - LINE C

DATE
09/11/2025

PROJECT NO.
03209.019

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JW/SG/LB/DF

CHECKED BY
SPM

REVISIONS
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09/11/2025

STATE OF TEXAS
SEAN P. McFARLAND
138893
LICENSED
PROFESSIONAL ENGINEER

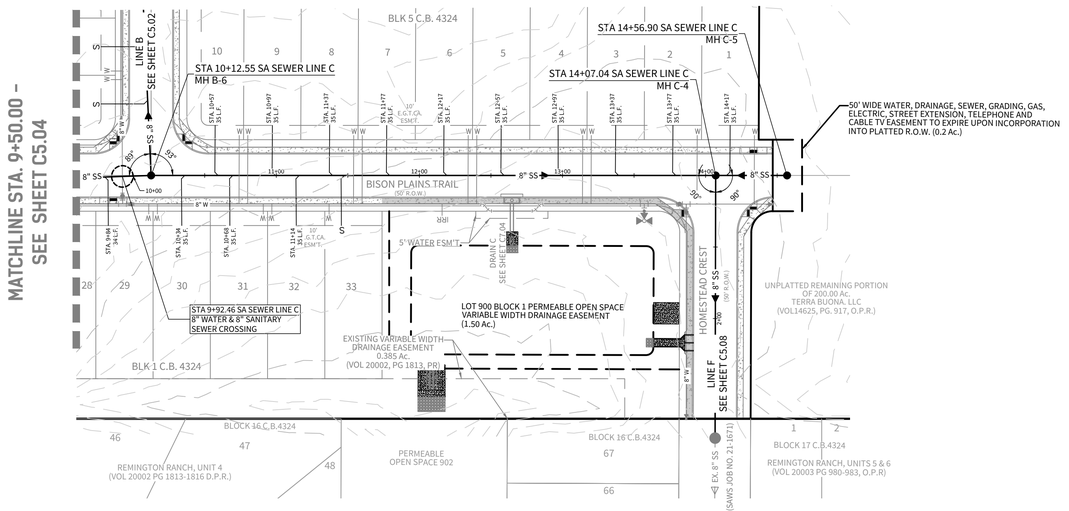
CUDE ENGINEERS
TBPELS No. 10048500

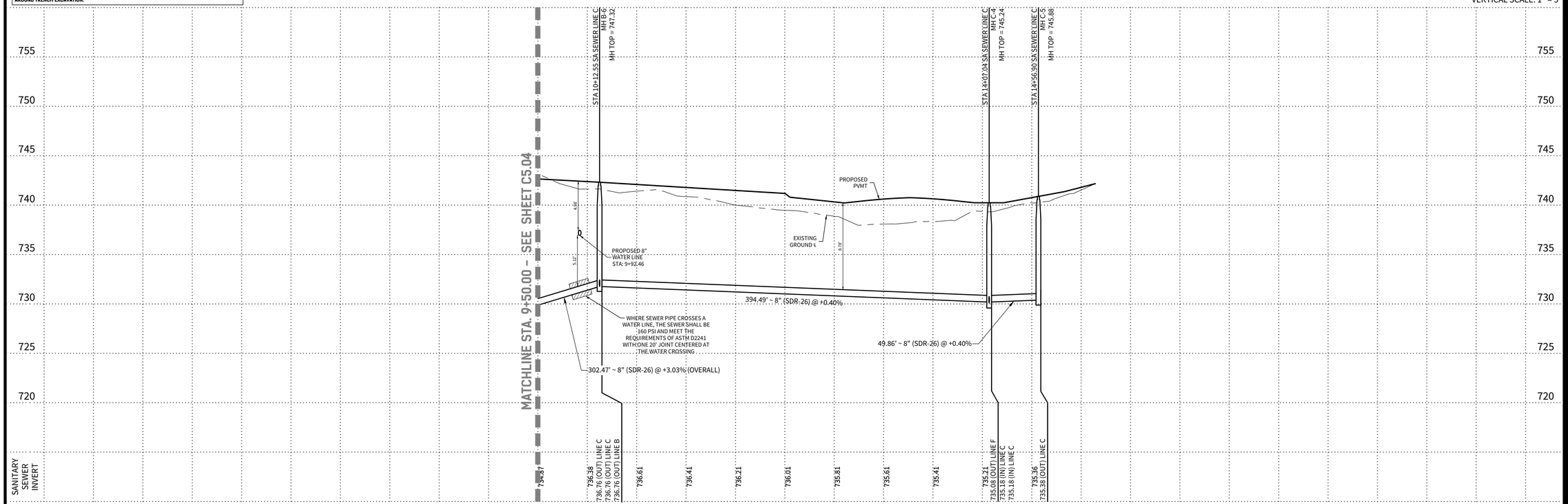
PLAT NO.
25-11800307

SAWS JOB NO.
XX-XXXX

C5.04

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.





TRENCH EXCAVATION PROTECTION

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LINE C

STA. 9+50.00 TO STA. 14+56.90

SCALE: 1"=50'
0 50 100

SEWER: UPPER MEDINA RIVER SEWERSHED – DOS RIOS W.R.C.

Developer's Name	KB HOME				
Developer's Address	4800 FREDERICKSBURG ROAD				
City	SAN ANTONIO	State	TEXAS	Zip	78229
Phone #	(210) 301-5485	Fax #	–		
SAWS Block Map #	086564/088564	Total EDU's	116	Total Acreage	21.27
Total Linear Footage of Pipe	4,132 L.F. OF 8" SS – SDR 26			Plat No.	25-11800307
Number of Lots	116	SAWS Job No.	XX-XXXX		

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

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TERRA BUONA
UNIT 10

SANITARY SEWER PLAN & PROFILE - LINE C

DATE
09/11/2025

PROJECT NO.
03209.019

DRAWN BY
JW/SG/LB/DF

CHECKED BY
SPM

REVISIONS
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09/11/2025
STATE OF TEXAS
SEAN P. McFARLAND
138893
LICENSED
PROFESSIONAL ENGINEER

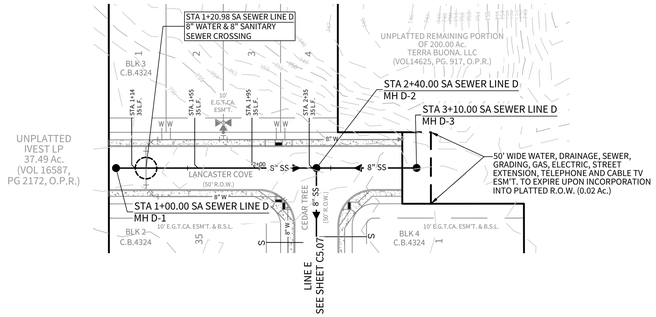
CUDE ENGINEERS
TBPELS No. 10048500

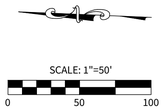
PLAT NO.
25-11800307

SAWS JOB NO.
XX-XXXX

C5.05

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.

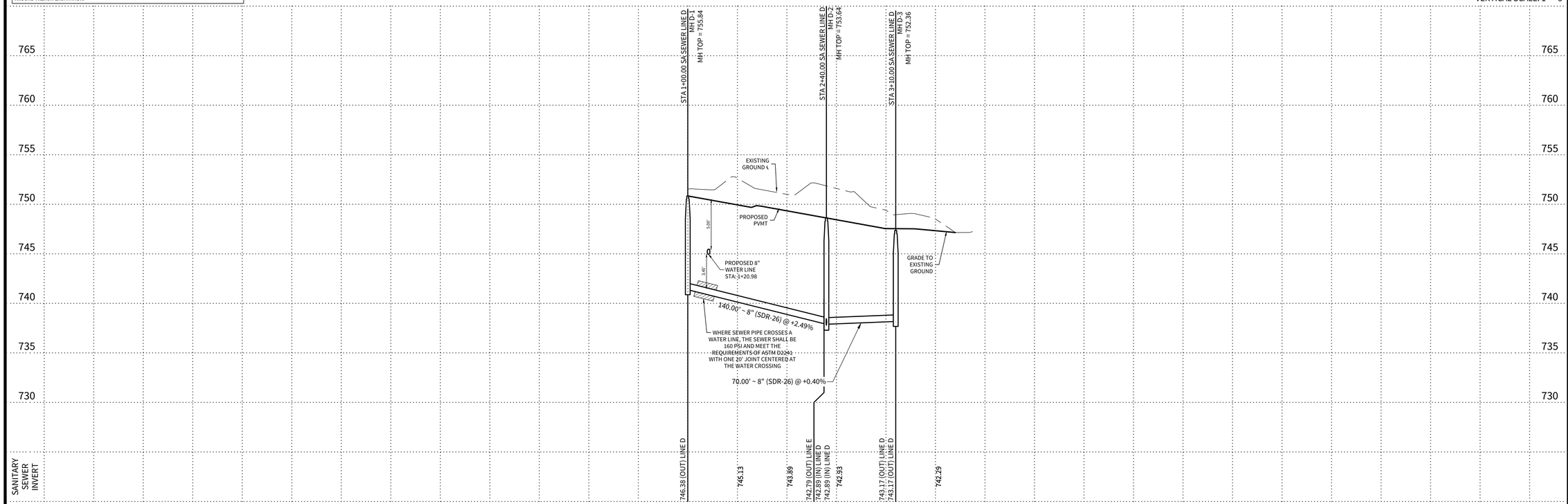




LINE D

STA. 1+00.00 TO STA. 2+90.00

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



TRENCH EXCAVATION PROTECTION

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SEWER: UPPER MEDINA RIVER SEWERSHED – DOS RIOS W.R.C.

Developer's Name	KB HOME				
Developer's Address	4800 FREDERICKSBURG ROAD				
City	SAN ANTONIO	State	TEXAS	Zip	78229
Phone #	(210) 301-5485	Fax #	-		
SAWS Block Map #	086564/088564	Total EDU's	116	Total Acreage	21.27
Total Linear Footage of Pipe	4,132 L.F. OF 8" SS – SDR 26	Plat No.	25-11800307		
Number of Lots	116	SAWS Job No.	XX-XXXX		

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CUDE ENGINEERS

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San Antonio, Texas 78231
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TERRA BUONA UNIT 10

SANITARY SEWER PLAN & PROFILE - LINE D

DATE
09/11/2025

PROJECT NO.
03209.019

DRAWN BY
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CHECKED BY
SPM

REVISIONS
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09/11/2025

STATE OF TEXAS
SEAN P. McFARLAND
138893
LICENSED PROFESSIONAL ENGINEER

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
25-11800307

SAWS JOB NO.
XX-XXXX

C5.06

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.

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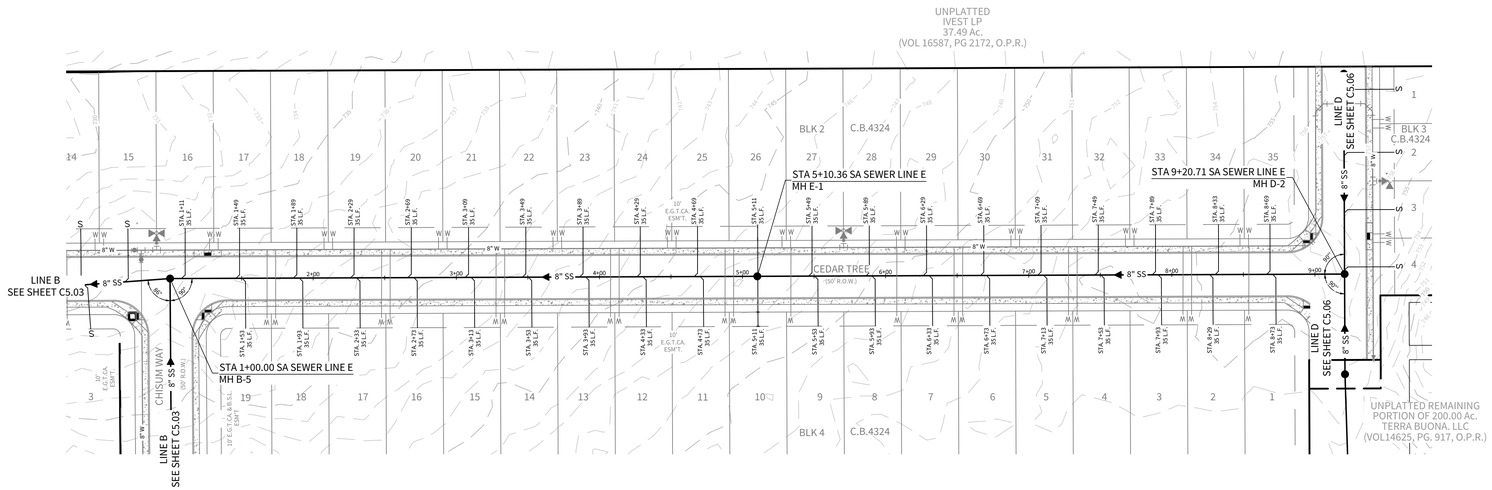


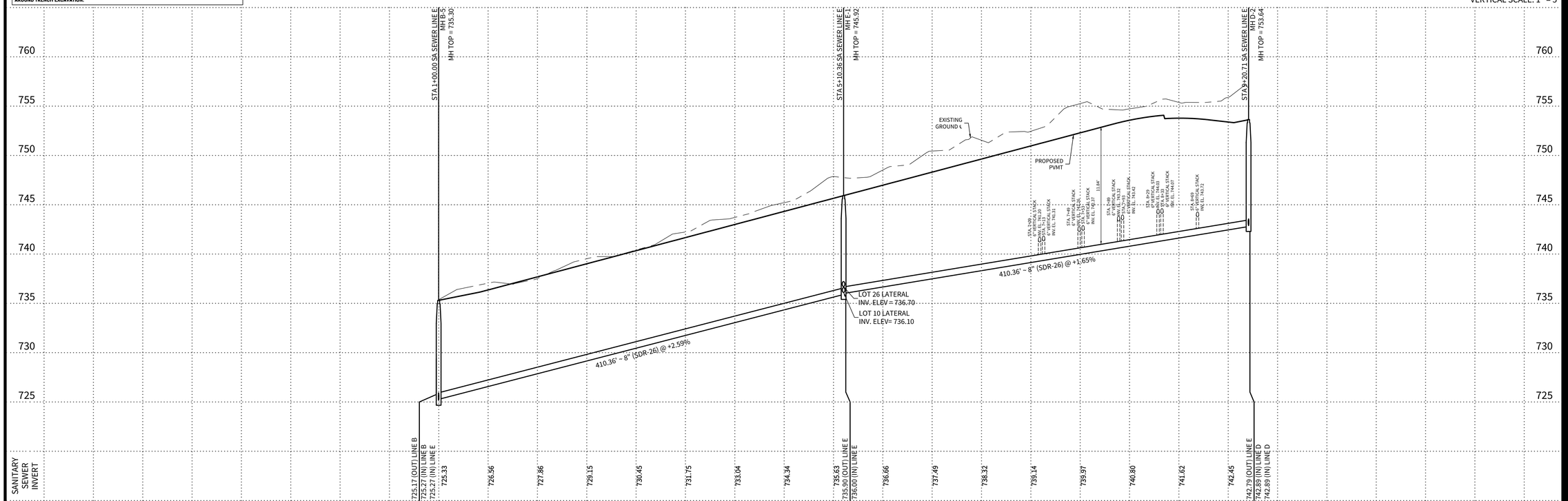
SCALE: 1"=50'

0 50 100

LINE E

STA. 1+00.00 TO STA. 9+20.71

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



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SEWER: UPPER MEDINA RIVER SEWERSHED – DOS RIOS W.R.C.

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City	SAN ANTONIO	State TEXAS	Zip 78229
Phone #	(210) 301-5485	Fax #	-
SAWS Block Map #	086564/088564	Total EDU's 116	Total Acreage 21.27
Total Linear Footage of Pipe	4,132 L.F. OF 8" SS – SDR 26	Plat No.	25-11800307
Number of Lots	116	SAWS Job No.	XX-XXXX

CUDEENGINEERS.COM

CUDE ENGINEERS

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

TERRA BUONA
UNIT 10

SANITARY SEWER PLAN & PROFILE - LINE E

DATE
09/11/2025

PROJECT NO.
03209.019

DRAWN BY
JW/SG/LB/DF

CHECKED BY
SPM

REVISIONS
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09/11/2025

STATE OF TEXAS
SEAN P. McFARLAND
138893
LICENSED
PROFESSIONAL ENGINEER

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
25-11800307

SAWS JOB NO.
XX-XXXX

C5.07

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.

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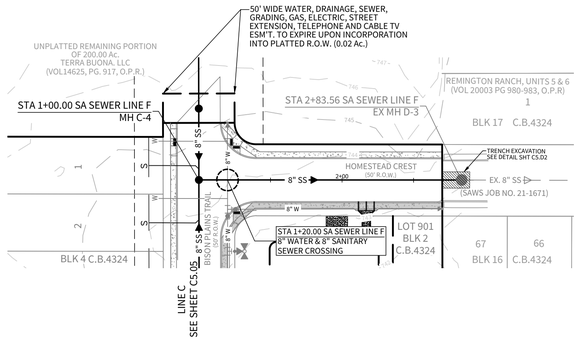


SCALE: 1"=50'

0 50 100

SEWER: UPPER MEDINA RIVER SEWERSHED – DOS RIOS W.R.C.

Developer's Name	KB HOME				
Developer's Address	4800 FREDERICKSBURG ROAD				
City	SAN ANTONIO	State	TEXAS	Zip	78229
Phone #	(210) 301-5485	Fax #	-		
SAWS Block Map #	086564/088564	Total EDU's	116	Total Acreage	21.27
Total Linear Footage of Pipe	4,132 L.F. OF 8" SS – SDR 26			Plat No.	25-11800307
Number of Lots	116	SAWS Job No.		XX-XXXX	

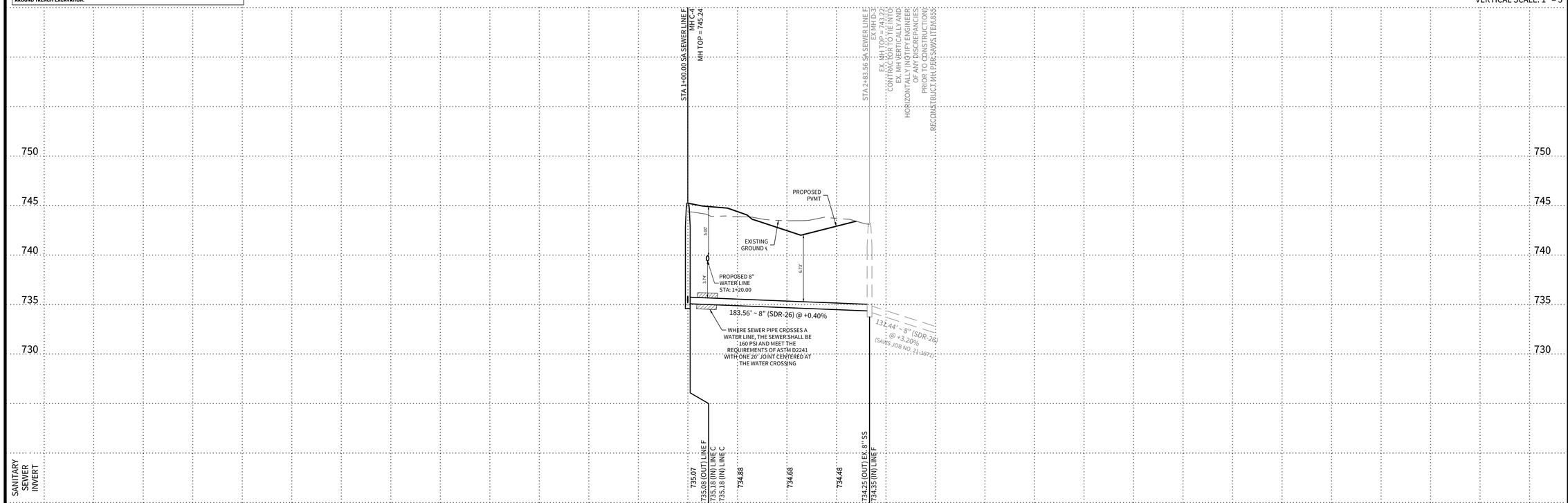
TRENCH EXCAVATION PROTECTION

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.

LINE F

STA. 1+00.00 TO STA. 2+83.56

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



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

TERRA BUONA UNIT 10

SANITARY SEWER PLAN & PROFILE - LINE F

DATE
09/11/2025

PROJECT NO.
03209.019

DRAWN BY
JW/SG/LB/DF

CHECKED BY
SPM

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09/11/2025

STATE OF TEXAS
SEAN P. McFARLAND
138893
LICENSED PROFESSIONAL ENGINEER

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
25-11800307

SAWS JOB NO.
XX-XXXX

C5.08

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.

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SAWS CONSTRUCTION NOTES
COUNTER PERMIT AND GENERAL CONSTRUCTION PERMIT *REVISED JANUARY 2022*

GENERAL SECTION

1. ALL MATERIALS AND CONSTRUCTION PROCEDURES WITHIN THE SCOPE OF THIS CONTRACT SHALL BE APPROVED BY THE SAN ANTONIO WATER SYSTEM (SAWS) AND COMPLY WITH THE PLANS, SPECIFICATIONS, GENERAL CONDITIONS AND WITH THE FOLLOWING AS APPLICABLE:

A. CURRENT TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ) "DESIGN CRITERIA FOR DOMESTIC WASTEWATER SYSTEM", TEXAS ADMINISTRATIVE CODE (TAC) TITLE 30 PART 1 CHAPTER 217 AND "PUBLIC DRINKING WATER", TAC TITLE 30 PART 1 CHAPTER 290.

B. CURRENT TXDOT "STANDARD SPECIFICATIONS FOR CONSTRUCTION OF HIGHWAYS, STREETS AND DRAINAGE".

C. CURRENT "SAN ANTONIO WATER SYSTEM STANDARD SPECIFICATIONS FOR WATER AND SANITARY SEWER CONSTRUCTION".

D. CURRENT CITY OF SAN ANTONIO "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION".

E. CURRENT CITY OF SAN ANTONIO "UTILITY EXCAVATION CRITERIA MANUAL" (UECM).

2. THE CONTRACTOR SHALL NOT PROCEED WITH ANY PIPE INSTALLATION WORK UNTIL THEY OBTAIN A COPY OF THE APPROVED COUNTER PERMIT OR GENERAL CONSTRUCTION PERMIT (GCP) FROM THE CONSULTANT AND HAS BEEN NOTIFIED BY SAWS CONSTRUCTION INSPECTION DIVISION TO PROCEED WITH THE WORK AND HAS ARRANGED A MEETING WITH THE INSPECTOR AND CONSULTANT FOR THE WORK REQUIREMENTS. WORK COMPLETED BY THE CONTRACTOR WITHOUT AN APPROVED COUNTER PERMIT AND/OR A GCP WILL BE SUBJECT TO REMOVAL AND REPLACEMENT AT THE EXPENSE OF THE CONTRACTORS AND/OR THE DEVELOPER.

3. THE CONTRACTOR SHALL OBTAIN THE SAWS STANDARD DETAILS FROM THE SAWS WEBSITE, HTTP://WWW.SAWS.ORG/BUSINESS_CENTER/SPECS. UNLESS OTHERWISE NOTED WITHIN THE DESIGN PLANS.

4. THE CONTRACTOR IS TO MAKE ARRANGEMENTS WITH THE SAWS CONSTRUCTION INSPECTION DIVISION AT 233-2973, ON NOTIFICATION PROCEDURES THAT WILL BE USED TO NOTIFY AFFECTED HOME RESIDENTS AND/OR PROPERTY OWNERS 48 HOURS PRIOR TO BEGINNING ANY WORK.

5. LOCATION AND DEPTH OF EXISTING UTILITIES AND SERVICE LATERALS SHOWN ON THE PLANS ARE UNDERSTOOD TO BE APPROXIMATE. ACTUAL LOCATIONS AND DEPTHS MUST BE FIELD VERIFIED BY THE CONTRACTOR AT LEAST 1 WEEK PRIOR TO CONSTRUCTION. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO LOCATE UTILITY SERVICE LINES AS REQUIRED FOR CONSTRUCTION AND TO PROTECT THEM DURING CONSTRUCTION AT NO COST TO SAWS.

6. THE CONTRACTOR SHALL VERIFY THE EXACT LOCATION OF UNDERGROUND UTILITIES AND DRAINAGE STRUCTURES AT LEAST 1-2 WEEKS PRIOR TO CONSTRUCTION WHETHER SHOWN ON PLANS OR NOT. PLEASE ALLOW UP TO 7 BUSINESS DAYS FOR LOCATES REQUESTING PIPE LOCATION MARKERS ON SAWS FACILITIES. THE FOLLOWING CONTACT INFORMATION ARE SUPPLIED FOR VERIFICATION PURPOSES:

- ☐ SAWS UTILITY LOCATES: HTTP://WWW.SAWS.ORG/SERVICE/LOCATES
- ☐ COSA DRAINAGE (210) 207-0724 OR (210) 207-6026
- ☐ COSA TRAFFIC SIGNAL OPERATIONS (210) 206-8480
- ☐ COSA TRAFFIC SIGNAL DAMAGES (210) 207-3951
- ☐ TEXAS STATE WIDE ONE CALL LOCATOR 1-800-545-6005 OR 811

7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR RESTORING EXISTING FENCES, CURBS, STREETS, DRIVEWAYS, SIDEWALKS, LANDSCAPING AND STRUCTURES TO ITS ORIGINAL OR BETTER CONDITION IF DAMAGES ARE MADE AS A RESULT OF THE PROJECT'S CONSTRUCTION.

8. ALL WORK IN TEXAS DEPARTMENT OF TRANSPORTATION (TXDOT) AND/OR BEXAR COUNTY RIGHT-OF-WAY SHALL BE DONE IN ACCORDANCE WITH RESPECTIVE CONSTRUCTION SPECIFICATIONS AND PERMIT REQUIREMENTS.

9. THE CONTRACTOR SHALL COMPLY WITH CITY OF SAN ANTONIO OR OTHER GOVERNING MUNICIPALITY'S TREE ORDINANCES WHEN EXCAVATING NEAR TREES.

10. THE CONTRACTOR SHALL NOT PLACE ANY WASTE MATERIALS IN THE 100-YEAR FLOOD PLAIN WITHOUT FIRST OBTAINING AN APPROVED FLOOD PLAIN PERMIT.

11. HOLIDAY WORK: CONTRACTORS WILL NOT BE ALLOWED TO PERFORM SAWS WORK ON SAWS RECOGNIZED HOLIDAYS. REQUEST SHOULD BE SENT TO CONSTWORKREQ@SAWS.ORG.

WEEKEND WORK: CONTRACTORS ARE REQUIRED TO NOTIFY THE SAWS INSPECTION CONSTRUCTION DEPARTMENT 48 HOURS IN ADVANCE TO REQUEST WEEKEND WORK. REQUEST SHOULD BE SENT TO CONSTWORKREQ@SAWS.ORG.

ANY AND ALL SAWS UTILITY WORK INSTALLED WITHOUT HOLIDAY/WEEKEND APPROVAL WILL BE SUBJECT TO BE UNCOVERED FOR PROPER INSPECTION.

12. COMPACTION NOTE (ITEM 804): THE CONTRACTOR SHALL BE RESPONSIBLE FOR MEETING THE COMPACTION REQUIREMENTS ON ALL TRENCH BACKFILL AND FOR PAYING FOR THE TESTS PERFORMED BY A THIRD PARTY. COMPACTION TESTS WILL BE DONE AT ONE LOCATION POINT RANDOMLY SELECTED, OR AS INDICATED BY THE SAWS INSPECTOR AND/OR THE TEST ADMINISTRATOR, PER EACH 12-INCH LOOSE LIFT PER 400 LINEAR FEET AT A MINIMUM. THIS PROJECT WILL NOT BE ACCEPTED AND FINALIZED BY SAWS WITHOUT THIS REQUIREMENT BEING MET AND VERIFIED BY PROVIDING ALL NECESSARY DOCUMENTED TEST RESULTS.

13. A COPY OF ALL TESTING REPORTS SHALL BE FORWARDED TO SAWS CONSTRUCTION INSPECTION DIVISION.

SEWER NOTES

1. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT NO SANITARY SEWER OVERFLOW (SSO) OCCURS AS A RESULT OF THEIR WORK. ALL CONTRACTOR PERSONNEL RESPONSIBLE FOR SSO PREVENTION AND CONTROL SHALL BE TRAINED ON PROPER RESPONSE. SHOULD AN SSO OCCUR, THE CONTRACTOR SHALL:

A. IDENTIFY THE SOURCE OF THE SSO AND NOTIFY SAWS EMERGENCY OPERATIONS CENTER (EOC) IMMEDIATELY AT (210) 233-2014. PROVIDE THE ADDRESS OF THE SPILL AND AN ESTIMATED VOLUME OR FLOW.

B. ATTEMPT TO ELIMINATE THE SOURCE OF THE SSO.

C. CONTAIN SEWAGE FROM THE SSO TO THE EXTENT OF PREVENTING A POSSIBLE CONTAMINATION OF WATERWAYS.

D. CLEAN UP SPILL SITE (RETURN CONTAINED SEWAGE TO THE COLLECTION SYSTEM IF POSSIBLE) AND PROPERLY DISPOSE OF CONTAMINATED SOIL/MATERIALS.

E. CLEAN THE AFFECTED SEWER MAINS AND REMOVE ANY DEBRIS.

F. MEET ALL POST-SSO REQUIREMENTS AS PER THE EPA CONSENT DECREE, INCLUDING LINE CLEANING AND TELEVISING THE AFFECTED SEWER MAINS (AT SAWS DIRECTION) WITHIN 24 HOURS. SHOULD THE CONTRACTOR FAIL TO ADDRESS AN SSO IMMEDIATELY AND TO SAWS SATISFACTION, THEY WILL BE RESPONSIBLE FOR ALL COSTS INCURRED BY SAWS, INCLUDING ANY FINES FROM EPA, TCEQ AND/OR ANY OTHER FEDERAL, STATE OR LOCAL AGENCIES. -NO SEPARATE MEASUREMENT OR PAYMENT SHALL BE MADE FOR THIS WORK. ALL WORK SHALL BE DONE ACCORDING TO GUIDELINES SET BY THE TCEQ AND SAWS.

2. IF BYPASS PUMPING IS REQUIRED, THE CONTRACTOR SHALL PERFORM SUCH WORK IN ACCORDANCE WITH SAWS STANDARD SPECIFICATION FOR WATER AND SANITARY SEWER CONSTRUCTION, ITEM NO. 864, "BYPASS PUMPING".

3. PRIOR TO TIE-INS, ANY SHUTDOWNS OF EXISTING FORCE MAINS OF ANY SIZE MUST BE COORDINATED WITH THE SAWS CONSTRUCTION INSPECTION DIVISION AT (210) 233-2973 AT LEAST ONE WEEK IN ADVANCE OF THE SHUTDOWN. THE CONTRACTOR MUST ALSO PROVIDE A SEQUENCE OF WORK AS RELATED TO THE TIE-INS; THIS IS AT NO ADDITIONAL COST TO SAWS OR THE PROJECT AND IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO SEQUENCE THE WORK ACCORDINGLY.

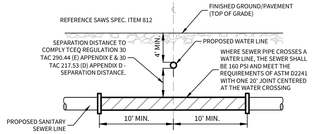
4. SEWER PIPE WHERE WATER LINE CROSSES SHALL BE 160 PSI AND MEET THE REQUIREMENTS OF ASTM D2241, TAC 217.53 AND TCEQ 290.44(E)(4)(B). CONTRACTOR SHALL CENTER A 20' JOINT OF 160 PSI PRESSURE RATED PVC AT THE PROPOSED WATER CROSSING.

5. ELEVATIONS POSTED FOR TOP OF MANHOLES ARE FOR REFERENCE ONLY: IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO MAKE ALLOWANCES AND ADJUSTMENTS FOR TOP OF MANHOLES TO MATCH THE FINISHED GRADE OF THE PROJECT'S IMPROVEMENTS. (NSPI)

6. SPILLS, OVERFLOWS, OR DISCHARGES OF WASTEWATER: ALL SPILLS, OVERFLOWS, OR DISCHARGES OF WASTEWATER, RECYCLED WATER, PETROLEUM PRODUCTS, OR CHEMICALS MUST BE REPORTED IMMEDIATELY TO THE SAWS INSPECTOR ASSIGNED TO THE COUNTER PERMIT OR GENERAL CONSTRUCTION PERMIT (GCP). THIS REQUIREMENT APPLIES TO EVERY SPILL, OVERFLOW, OR DISCHARGE REGARDLESS OF SIZE.

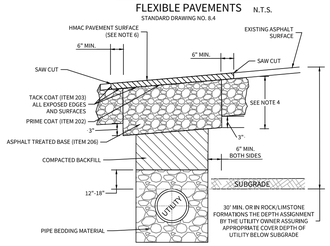
7. MANHOLE AND ALL PIPE TESTING (INCLUDING THE TV INSPECTION) MUST BE PERFORMED AND PASSED PRIOR TO FINAL FIELD ACCEPTANCE BY SAWS CONSTRUCTION INSPECTION DIVISION, AS PER THE SAWS SPECIFICATIONS FOR WATER AND SANITARY SEWER CONSTRUCTION.

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



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

TRENCH REPAIRS IN EXISTING
FLEXIBLE PAVEMENTS N.T.S.
STANDARD DRAWING NO. 8.4



NOTES:
1. THE EXISTING PAVING SURFACE SHALL BE SAW CUT IN A STRAIGHT LINE A MINIMUM OF 12" WIDER THAN UNDISTURBED SIDES OF THE TRENCH SYMMETRICAL ABOUT THE CENTER LINE OF THE EXCAVATION.
2. ANY CONCRETE PAVING SHALL BE SAW CUT 6" WIDER THAN UNDISTURBED SIDES OF EXCAVATION.
3. IF EXCAVATION AREA IS OPEN FOR TEMPORARY PUBLIC USE, THE SURFACE SHALL BE MAINTAINED LEVEL WITH ADJACENT RIDING SURFACE WITH COLD MIX AC OR TEMPORARY HMAC.
4. LOCAL STREETS SHALL BE 10' AND MAJOR/MINOR STREETS SHALL BE 12'.
5. DAMAGED PAVEMENT OUTSIDE THE TRENCH-CUT SHALL BE REMOVED AND REPLACED WITH A BASE THICKNESS OF 10" OR A THICKNESS MATCHING EXISTING, WHICHEVER IS GREATER.
6. REPLACEMENT AC SURFACE LAYER SHALL BE OF THE TYPE AND THICKNESS BASED ON FUNCTIONAL CLASSIFICATION:
   A) MIN. 3" HMAC TYPE "D" FOR TENCH REPAIR IN LOCAL/RESIDENTIAL STREETS.
   B) MIN. 4" HMAC TYPE "C" MODIFIED FOR TRENCH REPAIR IN COLLECTOR/ARTERIAL STREETS.
SEE ITEM 340, SECTION .4.5.12.
7. CLASS "C" PCC CONCRETE (ITEM 462) OR CONTROLLED LOW STRENGTH MATERIAL (CLSM) MAY BE SUBSTITUTED IN THESE REPAIRS FOR THE FLEXIBLE BASE AND COMPACTED BACKFILL. PCC CONCRETE GREATER THAN A 2 SACK MIX WILL NOT BE ALLOWED.

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.

NOTES:

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

SUPPLEMENTARY

No extra-payment shall be allowed for work called for on the plans but not included on the bid schedule. This incidental work will be required and shall be included under the pay item to which it relates.

The Developer dedicates the sanitary sewer mains upon completion by the Developer and acceptance by the San Antonio Water System. The San Antonio Water System will own and maintain said sanitary sewer mains which are located within this particular subdivision. (As applicable)

The Developer will be responsible for the lift station maintenance fee in effect at the time of certification. The current maintenance fee per lift station will be collected prior to plat recordation.

All PVC Sewer Pipe with over 14 feet of cover shall be extra strength pipe, Minimum Stiffness of 115 PSI.

WORK COMPLETED BY THE CONTRACTOR WHICH HAS NOT RECEIVED A WORK ORDER OR THE NOTICE TO PROCEED WITH THE SAN ANTONIO WATER SYSTEM CONSTRUCTION INSPECTION DIVISION WILL BE SUBJECT TO REMOVAL AND REPLACEMENT BY AND AT THE EXPENSE OF THE CONTRACTOR.

The Contractor is responsible to ensure that no overflows of sewage occurs. Should this occur the Contractor shall:

A. Identify the source of the spill and attempt to eliminate any additional spillage. Notify SAWS Construction Inspections Division at 233-3500.

B. Contain the spill in place and prevent contamination of streams.

C. Clean up the spill and dispose of contaminated materials.

D. Disinfect the area of the spill with a mixture of HTH chlorine and water.

E. Identify and train personnel responsible for spillage prevention and control.

No separate measurement or payment shall be made for this work. All work shall be done in according to guidelines set by the Texas Natural Resource Contamination Commission (TNRCC) and the San Antonio Water System.

Service Lateral Connections:

A. The exact location and elevation of the service laterals and manholes shall be field verified by the Contractor (NSPI).

B. A minimum of 3 feet of cover is to be maintained over the sanitary sewer laterals or subgrade.

C. All sewer lateral services for future connections as identified on plan and profiles, shall be capped and sealed.

D. The Contractor shall be responsible for disconnecting each existing service line from the existing water main and re-connecting the service to the new service main. The Contractor shall be responsible for maintaining continuous service (NSPI).

E. Laterals shall be constructed to serve all existing houses and vacant lots.

The Contractor shall provide by-pass pumping of sewage around each segment of pipe to be replaced, in accordance with SAWS special specification "Sanitary Sewer". Payment for such work will be made under the bid item "Sanitary Sewer (By-Pass Pumping)" as per SAWS special specification "Sanitary Sewer".

Prior to tie-ins, any shutdowns of existing force mains of any size must be coordinated with the SAWS inspection and/or SAWS production groups at least one week or more in advance of the shutdown. The Contractor must also provide a sequence of work as related to the tie-ins; this is at no additional cost to SAWS or the project and it is the responsibility of the Contractor to sequence the work accordingly.

WASTEWATER SPILLS, OVERFLOWS OR DISCHARGES

1. ATTENTION CONTRACTORS: ALL SPILLS, OVERFLOWS, OR DISCHARGES OF WASTEWATER, RECYCLED WATER, PETROLEUM PRODUCTS, OR CHEMICALS MUST BE REPORTED IMMEDIATELY TO THE SAWS INSPECTOR ASSIGNED TO YOUR COUNTER PERMIT OR GENERAL CONSTRUCTION PERMIT (GCP). THIS REQUIREMENT APPLIES TO EVERY SPILL, OVERFLOW, OR DISCHARGE - REGARDLESS OF SIZE. YOUR COMPLIANCE WILL ENABLE SAWS TO FULFILL REGULATORY REPORTING REQUIREMENTS.

   IT IS THE CONTRACTOR'S RESPONSIBILITY TO CONTROL SEWER FLOWS SO THAT A SPILL OVERFLOW, OR DISCHARGE DOES NOT OCCUR. IN THE EVENT THAT A SPILL, OVERFLOW, OR DISCHARGE OCCURS, THE CONTRACTOR MAY BE LIABLE FOR:

2. ALL FINES, PENALTIES, OR OTHER COSTS ASSESSED TO OR AGAINST SAWS BY ANY STATE, FEDERAL, OR OTHER GOVERNMENTAL AGENCY.

3. SAWS STAFF AND MATERIAL COSTS TO RESPOND TO THE SPILL, OVERFLOW, OR DISCHARGE, OR TO MITIGATE THE EFFECTS OF THE SPILL, OVERFLOW, OR DISCHARGE, OR TO SUPPORT THE CLEANUP EFFORT.

4. ALL DAMAGES CAUSED TO SAWS, OR ANY OTHER PERSONS OR ENTITIES THAT RESULT FROM THE SPILL, OVERFLOW OR DISCHARGE.

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 LATERALS TO BE BUILT TO FRONT UTILITY EASEMENT LINE.
3. ALL LATERAL SHALL BE INSTALLED @ MIN. 2.0% SLOPE, UNLESS OTHERWISE NOTED.
4. ALL SANITARY SEWER PIPE SHALL BE PVC THAT MEETS ASTM SPECIFICATION, SDR-26, UNLESS OTHERWISE NOTED ON THE PLANS.
5. 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.

SAN ANTONIO WATER SYSTEM	210-233-2010
CoSA DRAINAGE	210-207-2800
CITY SIDEWALK TRENCHING DIVISION	210-821-3240
CoSA TRAFFIC SIGNAL OPERATIONS	210-207-7765
TEXAS STATE WIDE ONE CALL LOCATOR	1-800-545-6005
CITY PUBLIC SERVICE	"
AT&T	"
TIME WARNER	"
VALERO ENERGY CO.	"

SAN ANTONIO WATER SYSTEM
CRITERIA FOR SEWER MAIN CONSTRUCTION
IN THE VICINITY OF WATER MAINS

I. FOR SEPARATION DISTANCE REQUIREMENTS BETWEEN SEWER MAINS & WATER MAINS, SEE THE 30 TAC §217.53 PIPE DESIGN NOTES INCLUDED ON THIS SHEET.

II. CORROSION PROTECTED MECHANICAL COUPLING DEVICES OF A CAST IRON OR DUCTILE IRON MATERIAL SHALL BE USED.

III. PLAN & PROFILE MUST SHOW TYPE OF CROSSING AND MATERIAL TO USE.

TCEQ - 30 TAC290.44(e)

(e) LOCATION OF WATERLINES. THE FOLLOWING RULES APPLY TO INSTALLATIONS OF WATERLINES, WASTEWATER MAINS OR LATERALS, AND OTHER CONVEYANCES/APPURTENANCES IDENTIFIED AS POTENTIAL SOURCES OF CONTAMINATION. FURTHERMORE, ALL RATINGS SPECIFIED SHALL BE DEFINED BY ASTM OR AWWA STANDARDS UNLESS STATED OTHERWISE. NEW MAINS, SERVICE LINES, OR LATERALS ARE THOSE THAT ARE INSTALLED WHERE NO MAIN, SERVICE LINE, OR LATERAL PREVIOUSLY EXISTED, OR WHERE EXISTING MAINS, SERVICE LINES, OR LATERALS ARE REPLACED WITH PIPES OF DIFFERENT SIZE OR MATERIAL.

(1) WHEN NEW POTABLE WATER DISTRIBUTION LINES ARE CONSTRUCTED, THEY SHALL BE INSTALLED NO CLOSER THAN NINE FEET IN ALL DIRECTIONS TO WASTEWATER COLLECTION FACILITIES. ALL SEPARATION DISTANCES SHALL BE MEASURED FROM THE OUTSIDE SURFACE OF EACH OF THE RESPECTIVE PIECES.

(2) POTABLE WATER DISTRIBUTION LINES AND WASTEWATER MAINS OR LATERALS THAT FORM PARALLEL UTILITY LINES SHALL BE INSTALLED IN SEPARATE TRENCHES.

(3) NO PHYSICAL CONNECTION SHALL BE MADE BETWEEN A DRINKING WATER SUPPLY AND A SEWER LINE. ANY APPURTENANCE SHALL BE DESIGNED AND CONSTRUCTED SO AS TO PREVENT ANY POSSIBILITY OF SEWAGE ENTERING THE DRINKING WATER SYSTEM.

(4) WHERE THE NINE-FOOT SEPARATION DISTANCE CANNOT BE ACHIEVED, THE FOLLOWING CRITERIA SHALL APPLY.

(A) NEW WATERLINE INSTALLATION - PARALLEL LINES.

(i) WHERE A NEW POTABLE WATERLINE PARALLELS AN EXISTING, NON-PRESSURE OR PRESSURE RATED WASTEWATER MAIN OR LATERAL AND THE LICENSED PROFESSIONAL ENGINEER LICENSED IN THE STATE OF TEXAS IS ABLE TO DETERMINE THAT THE EXISTING WASTEWATER MAIN OR LATERAL IS NOT LEAKING, THE NEW POTABLE WATERLINE SHALL BE LOCATED AT LEAST TWO FEET ABOVE THE EXISTING WASTEWATER MAIN OR LATERAL, MEASURED VERTICALLY, AND AT LEAST FOUR FEET AWAY, MEASURED HORIZONTALLY, FROM THE EXISTING WASTEWATER MAIN OR LATERAL. EVERY EFFORT SHALL BE EXERTED NOT TO DISTURB THE BEDDING AND BACKFILL OF THE EXISTING WASTEWATER MAIN OR LATERAL.

(ii) WHERE A NEW POTABLE WATERLINE PARALLELS AN EXISTING PRESSURE-RATED WASTEWATER MAIN OR LATERAL AND IT CANNOT BE DETERMINED BY THE LICENSED PROFESSIONAL ENGINEER IF THE EXISTING LINE IS LEAKING, THE EXISTING WASTEWATER MAIN OR LATERAL SHALL BE REPLACED WITH AT LEAST 150 PSI PRESSURE-RATED PIPE. THE NEW POTABLE WATERLINE SHALL BE LOCATED AT LEAST TWO FEET ABOVE THE NEW WASTEWATER LINE, MEASURED VERTICALLY, AND AT LEAST FOUR FEET AWAY, MEASURED HORIZONTALLY, FROM THE REPLACED WASTEWATER MAIN OR LATERAL.

(iii) WHERE A NEW POTABLE WATERLINE PARALLELS A NEW WASTEWATER MAIN, THE WASTEWATER MAIN OR LATERAL SHALL BE CONSTRUCTED OF AT LEAST 150 PSI PRESSURE-RATED PIPE. THE NEW POTABLE WATERLINE SHALL BE LOCATED AT LEAST TWO FEET ABOVE THE WASTEWATER MAIN OR LATERAL, MEASURED VERTICALLY, AND AT LEAST FOUR FEET AWAY, MEASURED HORIZONTALLY, FROM THE WASTEWATER MAIN OR LATERAL.

(B) NEW WATERLINE INSTALLATION - CROSSING LINES.

(i) WHERE A NEW POTABLE WATERLINE CROSSES ABOVE A WASTEWATER MAIN OR LATERAL, THE SEGMENT OF THE WATERLINE PIPE SHALL BE CENTERED OVER AND MUST BE PERPENDICULAR TO THE WASTEWATER MAIN OR LATERAL SUCH THAT THE JOINTS OF THE WATERLINE PIPE ARE EQUIDISTANT AND AT LEAST NINE FEET HORIZONTALLY FROM THE CENTERLINE OF THE WASTEWATER MAIN OR LATERAL. WHEN CROSSING AN EXISTING WASTEWATER MAIN OR LATERAL AND IT IS DISTURBED OR SHOWS SIGNS OF LEAKING, THE WASTEWATER MAIN OR LATERAL SHALL BE REPLACED FOR AT LEAST NINE FEET IN BOTH DIRECTIONS (18 FEET TOTAL) WITH AT LEAST 150 PSI PRESSURE-RATED PIPE EMBEDDED IN CEMENT STABILIZED SAND (SEE CLAUSE (V) OF THIS SUBPARAGRAPH) FOR THE TOTAL LENGTH OF ONE PIPE SEGMENT PLUS 12 INCHES BEYOND THE JOINT ON EACH END.

(I) THE POTABLE WATERLINE SHALL BE AT LEAST TWO FEET ABOVE AN EXISTING, NON-PRESSURE RATED WASTEWATER MAIN OR LATERAL.

(II) THE POTABLE WATERLINE SHALL BE AT LEAST SIX INCHES ABOVE AN EXISTING, PRESSURE-RATED WASTEWATER MAIN OR LATERAL.

(ii) WHERE A NEW POTABLE WATERLINE CROSSES A NEW, NON-PRESSURE RATED WASTEWATER MAIN OR LATERAL, THE SEGMENT OF THE WATERLINE PIPE SHALL BE CENTERED OVER AND SHALL BE PERPENDICULAR TO THE WASTEWATER MAIN OR LATERAL SUCH THAT THE JOINTS OF THE WATERLINE PIPE ARE EQUIDISTANT AND AT LEAST NINE FEET HORIZONTALLY FROM THE CENTERLINE OF THE WASTEWATER MAIN OR LATERAL. THE POTABLE WATERLINE SHALL BE AT LEAST TWO FEET ABOVE THE WASTEWATER MAIN OR LATERAL. WHENEVER POSSIBLE, THE CROSSING SHALL BE CENTERED BETWEEN THE JOINTS OF THE WASTEWATER MAIN OR LATERAL. THE WASTEWATER PIPE SHALL HAVE A MINIMUM PIPE STIFFNESS OF 115 PSI AT 5.0% DEFLECTION. THE WASTEWATER MAIN OR LATERAL SHALL BE EMBEDDED IN CEMENT STABILIZED SAND (SEE CLAUSE (V) OF THIS SUBPARAGRAPH) FOR THE TOTAL LENGTH OF ONE PIPE SEGMENT PLUS 12 INCHES BEYOND THE JOINT ON EACH END. THE MATERIALS AND METHOD OF INSTALLATION SHALL CONFORM TO ONE OF THE FOLLOWING OPTIONS:

(I) WITHIN NINE FEET HORIZONTALLY OF EITHER SIDE OF THE WATERLINE, THE WASTEWATER PIPE AND JOINTS SHALL BE CONSTRUCTED WITH PIPE MATERIAL HAVING A MINIMUM PRESSURE RATING OF AT LEAST 150 PSI. AN ABSOLUTE MINIMUM VERTICAL SEPARATION DISTANCE OF TWO FEET SHALL BE PROVIDED. THE WASTEWATER MAIN OR LATERAL SHALL BE LOCATED BELOW THE WATERLINE.

SEWER: UPPER MEDINA RIVER SEWERSHED – DOS RIOS W.R.C.

Developer's Name	KB HOME		
Developer's Address	4800 FREDERICKSBURG ROAD		
City	SAN ANTONIO	**State** TEXAS	**Zip** 78229
Phone #	(210) 301-5485	**Fax #**	-
SAWS Block Map #	086564/088564	**Total EDU's** 116	**Total Acreage** 21.27
Total Linear Footage of Pipe	4,132 L.F. OF 8" SS – SDR 26	**Plat No.**	25-11800307
Number of Lots	116	**SAWS Job No.**	XX-XXXX

CUDEENGINEERS.COM

CUDE ENGINEERS

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

TERRA BUONA UNIT 10

SANITARY SEWER GENERAL NOTES

DATE 09/11/2025

PROJECT NO. 03209.019

DRAWN BY JW/SG/LB/DF

CHECKED BY SPM

REVISIONS

1. 2. 3. 4. 5. 6. 7. 8. 9. 10.

09/11/2025

STATE OF TEXAS
SEAN P. McFARLAND
138893
LICENSED PROFESSIONAL ENGINEER

CUDE ENGINEERS
TBPELS No. 10048500

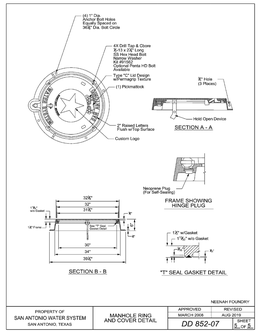
PLAT NO. 25-11800307

SAWS JOB NO. XX-XXXX

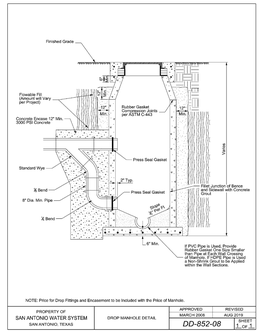
C5.D1

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.

P:\3209\03209-20\04-Plans\05_D1 NOTES_SEWER.dwg 09/10/2025 3:33pm Barba

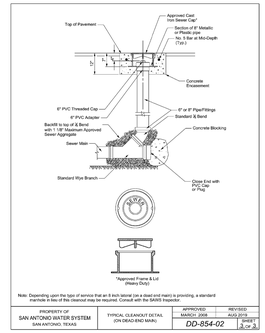


PROPERTY OF		APPROVED	REVISED
SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	MANHOLE RING AND COVER DETAIL	MARCH 2008	AUG 2016
		DD 852-07	SHEET 5 OF 5



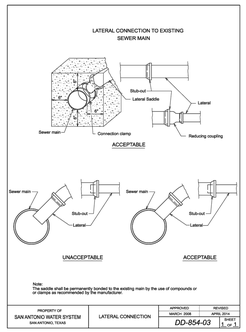
NOTE: Price for Drop Fittings and Encasement to be Included with the Price of Manhole.

PROPERTY OF		APPROVED	REVISED
SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	DROP MANHOLE DETAIL	MARCH 2008	AUG 2016
		DD-852-08	SHEET 3 OF 5



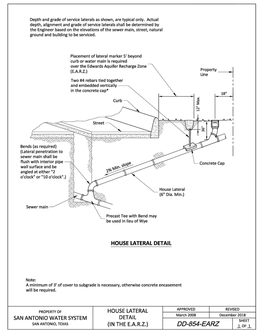
Note: Depending upon the type of service that an X-inch lateral (on a dead-end main) is providing, a standard manhole in lieu of this cleanout may be required. Consult with the SAWS Inspector.

PROPERTY OF		APPROVED	REVISED
SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	TYPICAL CLEANOUT DETAIL (ON DEAD END MAIN)	MARCH 2008	APRIL 2014
		DD-854-02	SHEET 1 OF 1



Note:
The saddle shall be permanently bonded to the existing main by the use of compounds or or clamps as recommended by the manufacturer.

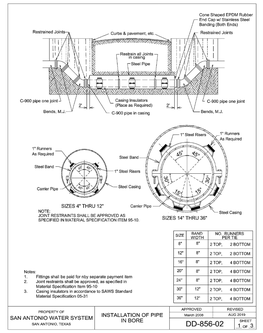
PROPERTY OF		APPROVED	REVISED
SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	LATERAL CONNECTION	MARCH 2008	APRIL 2014
		DD-854-03	SHEET 1 OF 1



Note:
A minimum of 3' of cover to subgrade is necessary, otherwise concrete encasement will be required.

HOUSE LATERAL DETAIL

PROPERTY OF		APPROVED	REVISED
SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	HOUSE LATERAL DETAIL (ON THE E.A.R.Z.)	March 2008	December 2018
		DD-854-EARZ	SHEET 2 OF 3

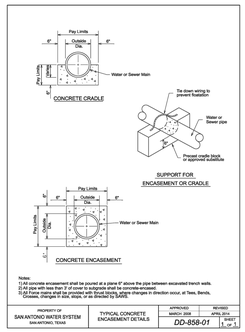


NOTE:
JOINT RESTRAINTS SHALL BE APPROVED AS SPECIFIED IN MATERIAL SPECIFICATION ITEM 06-10.

Notes:
1. Fittings shall be paid for w/o separate payment item
2. Joint restraints shall be approved, as specified in Material Specification Item 95-10
3. Casing insulators in accordance to SAWS Standard Material Specification 05-01

SIZE	RAND. JOISTS	NO. RUNNERS PER I.E.
4"	6"	2 TOP, 2 BOTTOM
6"	6"	2 TOP, 2 BOTTOM
12"	8"	2 TOP, 2 BOTTOM
16"	8"	2 TOP, 4 BOTTOM
20"	8"	2 TOP, 4 BOTTOM
24"	8"	2 TOP, 4 BOTTOM
30"	12"	2 TOP, 4 BOTTOM
36"	12"	2 TOP, 4 BOTTOM

PROPERTY OF		APPROVED	REVISED
SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	INSTALLATION OF PIPE IN BORE	March 2008	AUG 2016
		DD-856-02	SHEET 1 OF 3



Notes:
1) All concrete encasement shall be poured at a plane 6" above the pipe between excavated trench walls.
2) Concrete shall be 3000 PSI at 28 days unless otherwise specified.
3) All Frame mains shall be provided with Grout spouts, where changes in direction occur, at Tees, Bends, Crosses, changes in size, slope, or as directed by SAWS.

PROPERTY OF		APPROVED	REVISED
SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	TYPICAL CONCRETE ENCASEMENT DETAILS	MARCH 2008	APRIL 2014
		DD-858-01	SHEET 1 OF 1

PROPERTY OF		APPROVED	REVISED
SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	TYPICAL CONCRETE DETAILS	MARCH 2008	DEC 2016
		DD 858-02	SHEET 1 OF 5

PROPERTY OF		APPROVED	REVISED
SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	TYPICAL VERTICAL STACK DETAIL	MARCH 2008	AUG 2016
		DD 860-01	SHEET 1 OF 1

PROPERTY OF		APPROVED	REVISED
SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	MANHOLE RING AND COVER DETAIL	MARCH 2008	AUG 2016
		DD 852-07	SHEET 4 OF 5

NOTES:
1. DOGHOUSE OPENINGS IN PRECAST UNITS SHALL HAVE A RADIUS OF 4 TO 8 INCHES LARGER THAN THE EXISTING PIPE DIAMETER.
2. CAST-IN-PLACE CONCRETE SHALL BE 4000 PSI, PER ASTM C-94.
3. ALL PRECAST MANHOLE COMPONENTS SHALL MEET ASTM C-478.
4. BENCH SHALL SLOPE UPWARD FROM THE SPRINGLINE TO THE PROJECTED LEVEL OF THE PIPE CROWN OR 6 INCHES ABOVE THE SPRINGLINE, WHICHEVER IS LESS.

STANDARD PRECAST CONCRETE DOGHOUSE MANHOLE

DETAIL No. 07000.02
SHEET 1 OF 1

CUDEENGINEERS.COM

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

TERRA BUONA
UNIT 10

SANITARY SEWER STANDARD DETAILS

DATE
09/11/2025

PROJECT NO.
03209.019

DRAWN BY
JW/SG/LB/DF

CHECKED BY
SPM

REVISIONS
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8.
9.
10.

09/11/2025

STATE OF TEXAS
SEAN P. McFARLAND
138893
LICENSED
PROFESSIONAL ENGINEER

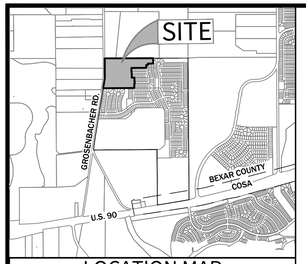
CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
25-11800307

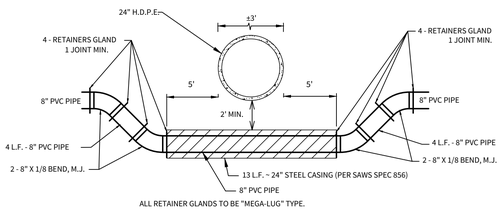
SAWS JOB NO.
XX-XXXX

C5.D2

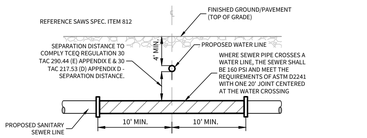
P:\03209\03209.019\CAD\Plans\05_01 NOTES, SP, PAVE, Key Plan\05_01 13.dwg, 2025-09-11 13:34:44, Bartlett
REPRODUCTION OF THE ORIGINAL SIGNED AND SEALED PLAN AND/OR ELECTRONIC MEDIA MAY HAVE BEEN INADVERTENTLY ALTERED. CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE SCALE OF THE DOCUMENT AND CONTACTING CUDE ENGINEERS TO VERIFY DISCREPANCIES PRIOR TO CONSTRUCTION.



LOCATION MAP
N.T.S.



DETAIL 'A' - DRAIN / WATER CROSSING
SIDE VIEW (THIS DETAIL IS VERTICAL ONLY, NOT HORIZONTAL.) N.T.S.



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

KEYNOTES:

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

   AFTER RELEASED FOR SERVICE, CONTRACTOR TO TIE NEW 8" WATER MAIN INTO EXIST. 16" WATER MAIN WITH ±5 L.F. OF 16" WATER MAIN. CUT AS REQUIRED.

   1 - 16" X 8" CUT IN TEE
   1 - 8" GATE VALVE
   1 - 2 BLOWOFF ASSEMBLY (TEMP.)

   8" VALVE TO REMAIN CLOSED UNTIL AFTER DISINFECTION & ACCEPTANCE BY SAWS

   1 - 12" SOLID SLEEVE, M.J.

   1 - 2" BLOWOFF ASSEMBLY (TEMP.)
   1 - 8" M.J. X 2" THR. DI. ECCENTRIC REDUCER (TEMP.)
   SEE SAWS STD. DWG. DD-844-01 (SHEET 2 OF 4)

2. 1 - STD. FIRE HYDRANT ASSEMBLY (SEE S.A.W.S. STD. DWG. DD-834-01)
   1 - 8" X 6" TEE, M.J., ANCHOR
   1 - 6" x 1/4 BEND, M.J.
   1 - 6" GATE VALVE, M.J.
   1 - 6" VALVE BOX, COMPLETE
   1 - 6" D.I. PIPE, CUT AS REQ'D.

3. 1 - 2" BLOWOFF ASSEMBLY (PERM.)
   1 - 2" X 2" TEE, M.J. ANCHOR
   SEE S.A.W.S. STD. DWG DD-844-02

4. CONTRACTOR TO POTHOLE EXISTING WATER MAIN AND DETERMINE IF REQUIRED TO BE LOWERED DUE TO CUT IN STREET. MAINTAIN 4' DEPTH FROM TOP OF PAVEMENT.

LEGEND

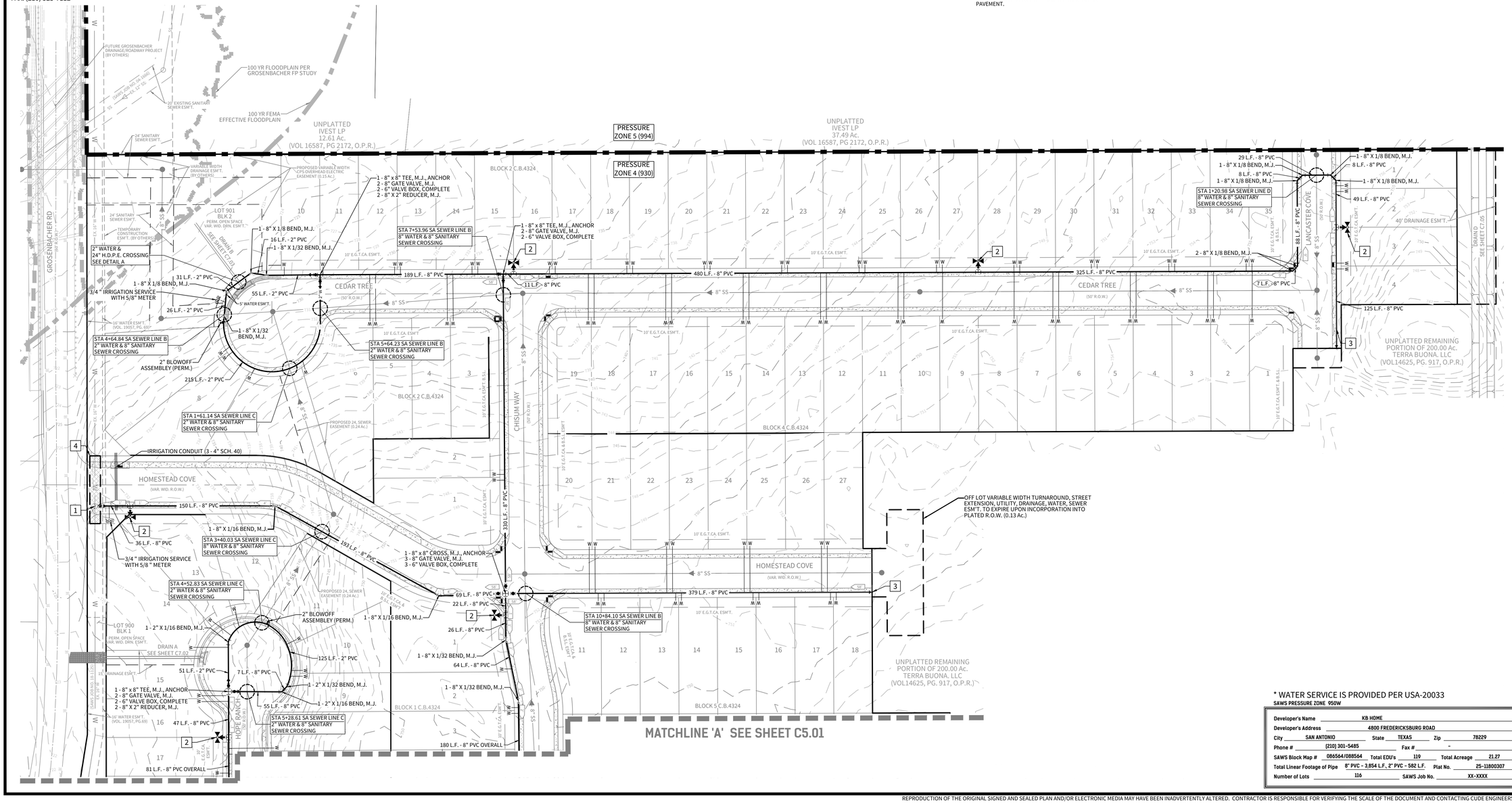
EXISTING SANITARY SEWER	EX.12"SS
PROPOSED SANITARY SEWER	8"SS
EXISTING SANITARY SEWER MANHOLE	
PROPOSED SANITARY SEWER MANHOLE	
PROPOSED WATER MAIN	8"W
EXISTING WATER MAIN	W
EXISTING STANDARD FIRE HYDRANT	
PROPOSED STANDARD FIRE HYDRANT	
PROPOSED STANDARD GATE VALVE	
PROPOSED PERMANENT BLOWOFF	
ELECTRIC, GAS, TELEPHONE, & CABLE T.V. EASEMENT	E.G.T.C.A. ESM'T
PROPOSED 3/4" WATER SERVICE WITH 5/8" METER	
JOINT RESTRAINT	X'
JOINT RESTRAINT ENTIRE LENGTH	X
PRESSURE ZONE DIVIDE	
DEMOLITION AREA	

OWNER/DEVELOPER:

KB HOME
CONTACT PERSON: SEAN MILLER
4800 FREDERICKSBURG ROAD
SAN ANTONIO,TX 78229
TEL: (210) 301-5485

CIVIL ENGINEER:

M.W. CUDE ENGINEERS, L.L.C.
CONTACT PERSON: SEAN McFARLAND, P.E.
4122 POND HILL ROAD, SUITE 101
SAN ANTONIO, TX 78231
TEL: (210) 681-2951
FAX: (210) 523-7112



* WATER SERVICE IS PROVIDED PER USA-20033
SAWS PRESSURE ZONE 950W

Developer's Name	KB HOME		
Developer's Address	4800 FREDERICKSBURG ROAD		
City	SAN ANTONIO	State TEXAS	Zip 78229
Phone #	(210) 301-5485	Fax #	-
SAWS Block Map #	0865&4/0885&4	Total EDU's 119	Total Acreage 21.27
Total Linear Footage of Pipe	8" PVC - 3,854 L.F., 2" PVC - 582 L.F.	Plat No.	25-11800307
Number of Lots	116	SAWS Job No.	XX-XXXX

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

TERRA BUONA UNIT 10

WATER DISTRIBUTION PLAN

DATE
09/11/2025

PROJECT NO.
03209.019

DRAWN BY
JW/SG/LB/DF

CHECKED BY
SPM

REVISIONS
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09/11/2025
STATE OF TEXAS
SEAN P. McFARLAND
138893
LICENSED PROFESSIONAL ENGINEER

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
25-11800307

SAWS JOB NO.
XX-XXXX

C6.00

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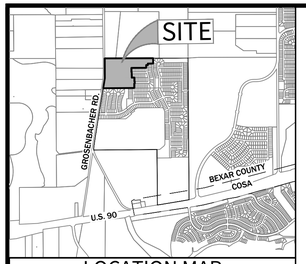

LOCATION MAP
N.T.S.

OWNER/DEVELOPER:
KB HOME
CONTACT PERSON: SEAN MILLER
4800 FREDERICKSBURG ROAD
SAN ANTONIO,TX 78229
TEL: (210) 301-5485

CIVIL ENGINEER:
M.W. CUDE ENGINEERS, L.L.C.
CONTACT PERSON: SEAN McFARLAND, P.E.
4122 POND HILL ROAD, SUITE 101
SAN ANTONIO, TX 78231
TEL: (210) 681-2951
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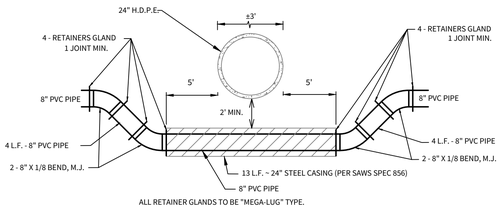
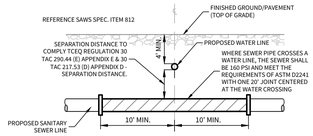
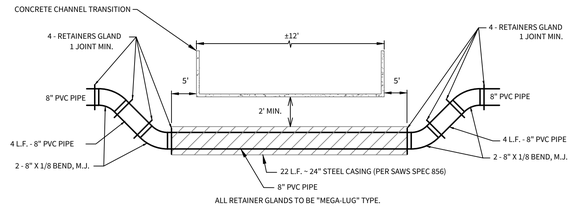


DETAIL 'B' - DRAIN / WATER CROSSING
SIDE VIEW (THIS DETAIL IS VERTICAL ONLY, NOT HORIZONTAL.) N.T.S.



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

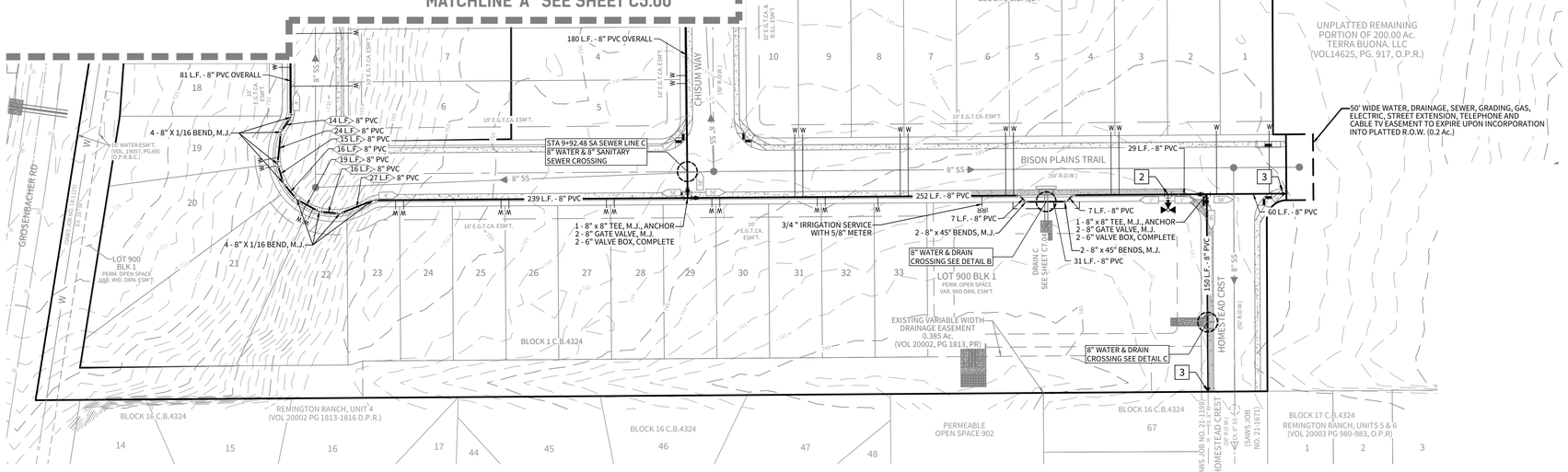


DETAIL 'C' - DRAIN '10E'/ WATER CROSSING
SIDE VIEW (THIS DETAIL IS VERTICAL ONLY, NOT HORIZONTAL.) N.T.S.

LEGEND

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

SCALE: 1"=50'
0 50 100



KEYNOTES:

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

AFTER RELEASED FOR SERVICE,
CONTRACTOR TO TIE NEW 12" WATER MAIN
INTO EXIST. 16" WATER MAIN WITH
±5 L.F. OF 16" WATER MAIN. CUT AS REQUIRED.

1 - 16" X 8" CUT IN TEE
1 - 8" GATE VALVE
1 - 2 BLOWOFF ASSEMBLY (TEMP.)

8" VALVE TO REMAIN CLOSED UNTIL AFTER
DISINFECTION & ACCEPTANCE BY SAWS

1 - 12" SOLID SLEEVE, M.J.

1 - 2" BLOWOFF ASSEMBLY (TEMP.)
1 - 8" M.J. X 2" THR. DI. ECCENTRIC REDUCER (TEMP.)
SEE SAWS STD. DWG. DD-844-01
(SHEET 2 OF 4)

2 1 - STD. FIRE HYDRANT ASSEMBLY
(SEE S.A.W.S. STD. DWG. DD-834-01)
1 - 8" x 6" TEE, M.J., ANCHOR
1 - 6" x 1/4 BEND, M.J.
1 - 6" GATE VALVE, M.J.
1 - 6" VALVE BOX, COMPLETE
1 - 6" D.I. PIPE, CUT AS REQ'D.

3 1 - 2" BLOWOFF ASSEMBLY (PERM.)
1 - 2" X 2" TEE, M.J. ANCHOR
SEE S.A.W.S. STD. DWG DD-844-02

* WATER SERVICE IS PROVIDED PER USA-20033
SAWS PRESSURE ZONE 950W

Developer's Name	KB HOME		
Developer's Address	4800 FREDERICKSBURG ROAD		
City	SAN ANTONIO	**State** TEXAS	**Zip** 78229
Phone #	(210) 301-5485	**Fax #**	-
SAWS Block Map #	086564/088564	**Total EDU's** 119	**Total Acreage** 21.27
Total Linear Footage of Pipe	8" PVC - 3,854 L.F., 2" PVC - 582 L.F.	**Plat No.**	25-11800307
Number of Lots	116	**SAWS Job No.**	XX-XXXX

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

TERRA BUONA UNIT 10

WATER DISTRIBUTION PLAN

DATE
09/11/2025

PROJECT NO.
03209.019

DRAWN BY
JW/SG/LB/DF

CHECKED BY
SPM

REVISIONS
1.
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10.

09/11/2025
STATE OF TEXAS
SEAN P. McFARLAND
138893
LICENSED
PROFESSIONAL ENGINEER
CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
25-11800307

SAWS JOB NO.
XX-XXXX

C6.01

P:\03209\03209-2-ENG\C4 Plans\06_SUB\07.Aug 2025\09\11 3 Mains\Sheets

SAWS CONSTRUCTION NOTES
COUNTER PERMIT AND GENERAL CONSTRUCTION PERMIT *REVISED JANUARY 2022*

GENERAL SECTION

1. ALL MATERIALS AND CONSTRUCTION PROCEDURES WITHIN THE SCOPE OF THIS CONTRACT SHALL BE APPROVED BY THE SAN ANTONIO WATER SYSTEM (SAWS) AND COMPLY WITH THE PLANS, SPECIFICATIONS, GENERAL CONDITIONS AND WITH THE FOLLOWING AS APPLICABLE:

A. CURRENT TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ) "DESIGN CRITERIA FOR DOMESTIC WASTEWATER SYSTEM", TEXAS ADMINISTRATIVE CODE (TAC) TITLE 30 PART 1 CHAPTER 217 AND "PUBLIC DRINKING WATER", TAC TITLE 30 PART 1 CHAPTER 290.

B. CURRENT TXDOT "STANDARD SPECIFICATIONS FOR CONSTRUCTION OF HIGHWAYS, STREETS AND DRAINAGE".

C. CURRENT "SAN ANTONIO WATER SYSTEM STANDARD SPECIFICATIONS FOR WATER AND SANITARY SEWER CONSTRUCTION".

D. CURRENT CITY OF SAN ANTONIO "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION".

E. CURRENT CITY OF SAN ANTONIO "UTILITY EXCAVATION CRITERIA MANUAL" (UECM).

2. THE CONTRACTOR SHALL NOT PROCEED WITH ANY PIPE INSTALLATION WORK UNTIL THEY OBTAIN A COPY OF THE APPROVED COUNTER PERMIT OR GENERAL CONSTRUCTION PERMIT (GCP) FROM THE CONSULTANT AND HAS BEEN NOTIFIED BY SAWS CONSTRUCTION INSPECTION DIVISION TO PROCEED WITH THE WORK AND HAS ARRANGED A MEETING WITH THE INSPECTOR AND CONSULTANT FOR THE WORK REQUIREMENTS. WORK COMPLETED BY THE CONTRACTOR WITHOUT AN APPROVED COUNTER PERMIT AND/OR A GCP WILL BE SUBJECT TO REMOVAL AND REPLACEMENT AT THE EXPENSE OF THE CONTRACTORS AND/OR THE DEVELOPER.

3. THE CONTRACTOR SHALL OBTAIN THE SAWS STANDARD DETAILS FROM THE SAWS WEBSITE, HTTP://WWW.SAWS.ORG/BUSINESS_CENTER/SPECS. UNLESS OTHERWISE NOTED WITHIN THE DESIGN PLANS.

4. THE CONTRACTOR IS TO MAKE ARRANGEMENTS WITH THE SAWS CONSTRUCTION INSPECTION DIVISION AT 233-2973, ON NOTIFICATION PROCEDURES THAT WILL BE USED TO NOTIFY AFFECTED HOME RESIDENTS AND/OR PROPERTY OWNERS 48 HOURS PRIOR TO BEGINNING ANY WORK.

5. LOCATION AND DEPTH OF EXISTING UTILITIES AND SERVICE LATERALS SHOWN ON THE PLANS ARE UNDERSTOOD TO BE APPROXIMATE. ACTUAL LOCATIONS AND DEPTHS MUST BE FIELD VERIFIED BY THE CONTRACTOR AT LEAST 1 WEEK PRIOR TO CONSTRUCTION. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO LOCATE UTILITY SERVICE LINES AS REQUIRED FOR CONSTRUCTION AND TO PROTECT THEM DURING CONSTRUCTION AT NO COST TO SAWS.

6. THE CONTRACTOR SHALL VERIFY THE EXACT LOCATION OF UNDERGROUND UTILITIES AND DRAINAGE STRUCTURES AT LEAST 1-2 WEEKS PRIOR TO CONSTRUCTION WHETHER SHOWN ON PLANS OR NOT. PLEASE ALLOW UP TO 7 BUSINESS DAYS FOR LOCATES REQUESTING PIPE LOCATION MARKERS ON SAWS FACILITIES. THE FOLLOWING CONTACT INFORMATION ARE SUPPLIED FOR VERIFICATION PURPOSES:

   - ☐ SAWS UTILITY LOCATES: HTTP://WWW.SAWS.ORG/SERVICE/LOCATES
   - ☐ COSA DRAINAGE (210) 207-0724 OR (210) 207-6026
   - ☐ COSA TRAFFIC SIGNAL OPERATIONS (210) 206-8480
   - ☐ COSA TRAFFIC SIGNAL DAMAGES (210) 207-3951
   - ☐ TEXAS STATE WIDE ONE CALL LOCATOR 1-800-545-6005 OR 811

7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR RESTORING EXISTING FENCES, CURBS, STREETS, DRIVEWAYS, SIDEWALKS, LANDSCAPING AND STRUCTURES TO ITS ORIGINAL OR BETTER CONDITION IF DAMAGES ARE MADE AS A RESULT OF THE PROJECT'S CONSTRUCTION.

8. ALL WORK IN TEXAS DEPARTMENT OF TRANSPORTATION (TXDOT) AND/OR BEXAR COUNTY RIGHT-OF-WAY SHALL BE DONE IN ACCORDANCE WITH RESPECTIVE CONSTRUCTION SPECIFICATIONS AND PERMIT REQUIREMENTS.

9. THE CONTRACTOR SHALL COMPLY WITH CITY OF SAN ANTONIO OR OTHER GOVERNING MUNICIPALITY'S TREE ORDINANCES WHEN EXCAVATING NEAR TREES.

10. THE CONTRACTOR SHALL NOT PLACE ANY WASTE MATERIALS IN THE 100-YEAR FLOOD PLAIN WITHOUT FIRST OBTAINING AN APPROVED FLOOD PLAIN PERMIT.

11. HOLIDAY WORK: CONTRACTORS WILL NOT BE ALLOWED TO PERFORM SAWS WORK ON SAWS RECOGNIZED HOLIDAYS. REQUEST SHOULD BE SENT TO CONSTWORKREQ@SAWS.ORG.

WEEKEND WORK: CONTRACTORS ARE REQUIRED TO NOTIFY THE SAWS INSPECTION CONSTRUCTION DEPARTMENT 48 HOURS IN ADVANCE TO REQUEST WEEKEND WORK. REQUEST SHOULD BE SENT TO CONSTWORKREQ@SAWS.ORG.

ANY AND ALL SAWS UTILITY WORK INSTALLED WITHOUT HOLIDAY/WEEKEND APPROVAL WILL BE SUBJECT TO BE UNCOVERED FOR PROPER INSPECTION.

12. COMPACTION NOTE (ITEM 804): THE CONTRACTOR SHALL BE RESPONSIBLE FOR MEETING THE COMPACTION REQUIREMENTS ON ALL TRENCH BACKFILL AND FOR PAYING FOR THE TESTS PERFORMED BY A THIRD PARTY. COMPACTION TESTS WILL BE DONE AT ONE LOCATION POINT RANDOMLY SELECTED, OR AS INDICATED BY THE SAWS INSPECTOR AND/OR THE TEST ADMINISTRATOR, PER EACH 12-INCH LOOSE LIFT PER 400 LINEAR FEET AT A MINIMUM. THIS PROJECT WILL NOT BE ACCEPTED AND FINALIZED BY SAWS WITHOUT THIS REQUIREMENT BEING MET AND VERIFIED BY PROVIDING ALL NECESSARY DOCUMENTED TEST RESULTS.

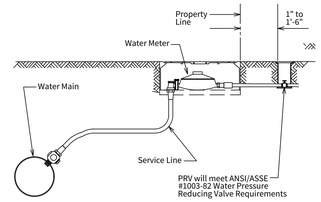
13. A COPY OF ALL TESTING REPORTS SHALL BE FORWARDED TO SAWS CONSTRUCTION INSPECTION DIVISION.

WATER SECTION

1. PRIOR TO TIE-INS, ANY SHUTDOWNS OF EXISTING MAINS OF ANY SIZE MUST BE COORDINATED WITH THE SAWS CONSTRUCTION INSPECTION DIVISION AT LEAST ONE WEEK IN ADVANCE OF THE SHUTDOWN. THE CONTRACTOR MUST ALSO PROVIDE A SEQUENCE OF WORK AS RELATED TO THE TIE-INS; THIS IS AT NO ADDITIONAL COST TO SAWS OR THE PROJECT AND IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO SEQUENCE THE WORK ACCORDINGLY. FOR WATER MAINS 12" OR HIGHER: SAWS EMERGENCY OPERATIONS CENTER (210) 233-2014
2. ASBESTOS CEMENT (AC) PIPE, ALSO KNOWN AS TRANSITE PIPE WHICH IS KNOWN TO CONTAIN ASBESTOSCONTAINING MATERIAL (ACM), MAY BE LOCATED WITHIN THE PROJECT LIMITS. SPECIAL WASTE MANAGEMENT PROCEDURES AND HEALTH AND SAFETY REQUIREMENTS WILL BE APPLICABLE WHEN REMOVAL AND/OR DISTURBANCE OF THIS PIPE OCCURS. SUCH WORK IS TO BE MADE UNDER SPECIAL SPECIFICATION ITEM NO. 3000, "SPECIAL SPECIFICATION FOR HANDLING ASBESTOS CEMENT PIPE".
3. VALVE REMOVAL: WHERE THE CONTRACTOR IS TO ABANDON A WATER MAIN, THE CONTROL VALVE LOCATED ON THE ABANDONING BRANCH WILL BE REMOVED AND REPLACED WITH A CAP/PLUG. (NSPI)
4. SUITABLE ANCHORAGE/THRUST BLOCKING OR JOINT RESTRAINT SHALL BE PROVIDED AT ALL OF THE FOLLOWING MAIN LOCATIONS: DEAD ENDS, PLUGS, CAPS, TEES, CROSSES, VALVES, AND BENDS, IN ACCORDANCE WITH THE STANDARD DRAWINGS DD-839 SERIES AND ITEM NO. 839, IN THE SAWS STANDARD SPECIFICATIONS FOR CONSTRUCTION.
5. ALL VALVES SHALL READ "OPEN RIGHT".
6. PRVS REQUIRED: CONTRACTOR TO VERIFY THAT NO PORTION OF THE TRACT IS BELOW GROUND ELEVATION OF 985 FEET WHERE THE STATIC PRESSURE WILL NORMALLY EXCEED 80 PSI. AT ALL SUCH LOCATIONS WHERE THE GROUND LEVEL IS BELOW 985 FEET, THE DEVELOPER OR BUILDER SHALL INSTALL AT EACH LOT, ON THE CUSTOMER'S SIDE OF THE METER, AN APPROVED TYPE PRESSURE REGULATOR IN CONFORMANCE WITH THE PLUMBING CODE OF THE CITY OF SAN ANTONIO. NO DUAL SERVICES ALLOWED FOR ANY LOT(S) IF *PRV IS/ARE REQUIRED FOR SUCH LOT(S), ONLY SINGLE SERVICE CONNECTIONS SHALL BE ALLOWED. *NOTE: A PRESSURE REGULATOR IS ALSO KNOWN AS A PRESSURE REDUCING VALVE (PRV).
7. PIPE DISINFECTION WITH DRY HTH FOR PROJECTS LESS THAN 800 LINEAR FEET. (ITEM NO. 847.3): MAINS SHALL BE DISINFECTED WITH DRY HTH WHERE SHOWN IN THE CONTRACT DOCUMENTS OR AS DIRECTED BY THE INSPECTOR, AND SHALL NOT EXCEED A TOTAL LENGTH OF 800 FEET. THIS METHOD OF DISINFECTION WILL ALSO BE FOLLOWED FOR MAIN REPAIRS. THE CONTRACTOR SHALL UTILIZE ALL APPROPRIATE SAFETY MEASURE TO PROTECT HIS PERSONNEL DURING DISINFECTION OPERATIONS.
8. BACKFLOW PREVENTION DEVICES:

   ☐ ALL IRRIGATION SERVICES WITHIN RESIDENTIAL AREAS ARE REQUIRED TO HAVE BACKFLOW PREVENTION DEVICES.

   ☐ ALL COMMERCIAL BACKFLOW PREVENTION DEVICES MUST BE APPROVED BY SAWS PRIOR TO INSTALLATION.
9. FINAL CONNECTION TO THE EXISTING WATER MAIN SHALL NOT BE MADE UNTIL THE WATER MAIN HAS BEEN PRESSURE TESTED, CHLORINATED, AND SAWS HAS RELEASED THE MAIN FOR TIE-IN AND USE.
10. DIVISION VALVES SHOWN ON PLANS OR NOT SHOWN ON PLANS BUT FOUND IN THE FIELD SHALL ONLY BE OPERATED BY SAWS DISTRIBUTION AND COLLECTION STAFF AND ONLY WITH PRIOR WRITTEN APPROVAL OF THE SAWS DIRECTOR OF PRODUCTION AND OPERATIONS AND PROPER COORDINATION WITH ALL SAWS DEPARTMENTS. CONTRACTOR SHALL PROVIDE WRITTEN NOTIFICATION TO THE INSPECTOR A MINIMUM OF TWO WEEKS IN ADVANCE TO START THE COORDINATION PROCESS AND WILL BE INFORMED BY THE INSPECTOR WHEN THE DIVISION VALVE WILL BE OPERATED BY THE SAWS DISTRIBUTION AND COLLECTION STAFF. THE DIVISION VALVE CAN ONLY BE OPERATED BY SAWS DISTRIBUTION AND COLLECTION STAFF MEMBER NOT THE INSPECTOR OR THE CONTRACTOR. OPERATION OF A DIVISION VALVE WITHOUT THE EXPRESS PRIOR WRITTEN APPROVAL OF THE SAWS DISTRIBUTION AND COLLECTION STAFF WILL CONSTITUTE A MATERIAL BREACH OF ANY WRITTEN SAWS CONTRACT OR PERMIT IN ADDITION TO SUBJECTING THE CONTRACTOR TO LIABILITY FOR ANY AND ALL FINES, FEES, OR OTHER DAMAGES, DIRECT OR CONSEQUENTIAL, THAT MAY ARISE FROM OR BE CAUSED BY THE OPERATION OF THE VALVE WITHOUT PRIOR WRITTEN PERMISSION. PLEASE BE INFORMED THAT THE APPROVAL OF THE OPERATION OR OPENING OR CLOSING OF A DIVISION VALVE CAN TAKE SEVERAL WEEKS FOR APPROVAL. DIVISION VALVES WILL ALSO HAVE A VALVE LID LABELED DIVISION VALVE AND A LOCKING MECHANISM INSTALLED WITH A KEY. THE LOCK AND KEY MECHANISM WILL BE PAID FOR BY THE CONTRACTOR BUT WILL BE INSTALLED BY SAWS DISTRIBUTION AND COLLECTION STAFF.
11. ALL PIPES SHALL BE C900 CLASS 235 DR-18, UNLESS OTHERWISE NOTED.
12. ALL METERS SHALL BE 5/8", UNLESS OTHERWISE NOTED.



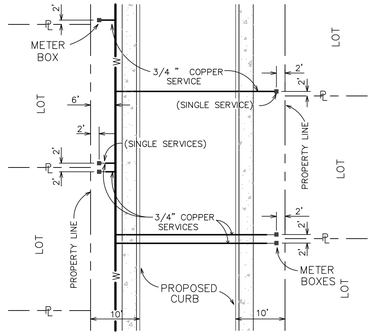
3/4" THRU 2" SERVICE PRESSURE REDUCING VALVE
N.T.S.

CAUTION!!!

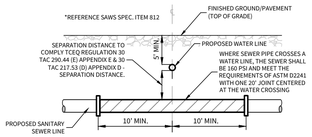
THE CONTRACTOR SHALL BE AWARE THAT AN 8" SANITARY SEWER LINE EXIST ALONG PACKHORSE KNOLL AND ZIMMER. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO HAVE THESE UTILITIES LOCATED PRIOR TO COMMENCING CONSTRUCTION. THE CONTRACTOR SHALL USE EXTREME CAUTION WHEN WORKING IN THIS AREA. ANY DAMAGE DONE TO THESE EXISTING FACILITIES WILL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO REPAIR.

TRENCH EXCAVATION SAFETY PROTECTION

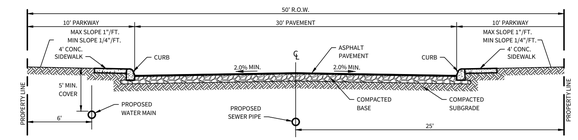
Contractor and/or Contractor's independently retained employee or structural design/geotechnical/safety/equipment consultant, if any, shall review these plans and available geotechnical information and the anticipated installation site(s) within the project work area in order to implement Contractor's trench excavation safety protection systems, programs and/or procedures for the project described in the contract documents. the Contractor's implementation of these systems, programs and/or procedures shall provide for adequate trench excavation safety protection that comply with as a minimum, OSHA standards for trench excavations. specifically, Contractor and/or Contractor's independently retained employee or safety consultant shall implement a trench safety program in accordance with OSHA standards governing the presence and activities of individuals working in and around trench excavation.



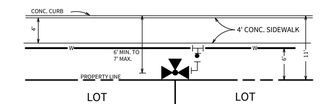
WATER METER BOX LOCATION
N.T.S.



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



LOCAL "A" STREET CROSS-SECTION



TYPICAL FIRE HYDRANT DETAIL (4' SIDEWALK / 50' ROW)
N.T.S.

1. NOTE: 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.

SAWS PRESSURE ZONE 950W

Developer's Name	KB HOME		
Developer's Address	4800 FREDERICKSBURG ROAD		
City	SAN ANTONIO	**State** TEXAS	**Zip** 78229
Phone #	(210) 301-5485	**Fax #**	-
SAWS Block Map #	086564/088564	**Total EDU's** 119	**Total Acreage** 21.27
Total Linear Footage of Pipe	8" PVC – 3,854 L.F., 2" PVC – 582 L.F.	**Plat No.**	25-11800307
Number of Lots	116	**SAWS Job No.**	XX-XXXX

CUDEENGINEERS.COM

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San Antonio, Texas 78231
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TERRA BUONA UNIT 10

WATER DISTRIBUTION SYSTEM GENERAL NOTES

DATE 09/11/2025
PROJECT NO. 03209.019
DRAWN BY JW/SG/LB/DF
CHECKED BY SPM

REVISIONS
1. 2. 3. 4. 5. 6. 7. 8. 9. 10.

09/11/2025

STATE OF TEXAS · SEAN P. McFARLAND · 138893 · LICENSED PROFESSIONAL ENGINEER

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO. 25-11800307
SAWS JOB NO. XX-XXXX

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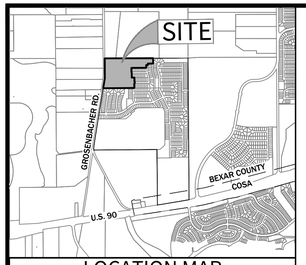
REPRODUCTION OF THE ORIGINAL SIGNED AND SEALED PLAN AND/OR ELECTRONIC MEDIA MAY HAVE BEEN INADVERTENTLY ALTERED. CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE SCALE OF THE DOCUMENT AND CONTACTING CUDE ENGINEERS TO VERIFY DISCREPANCIES PRIOR TO CONSTRUCTION.



LOCATION MAP
N.T.S.

OWNER/DEVELOPER:

KB HOME
CONTACT PERSON: SEAN MILLER
4800 FREDERICKSBURG ROAD
SAN ANTONIO,TX 78229
TEL: (210) 301-5485

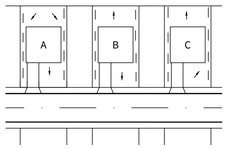
CIVIL ENGINEER:

M.W. CUDE ENGINEERS, L.L.C.
CONTACT PERSON: SEAN McFARLAND, P.E.
4122 POND HILL ROAD, SUITE 101
SAN ANTONIO, TX 78231
TEL: (210) 681-2951
FAX: (210) 523-7112

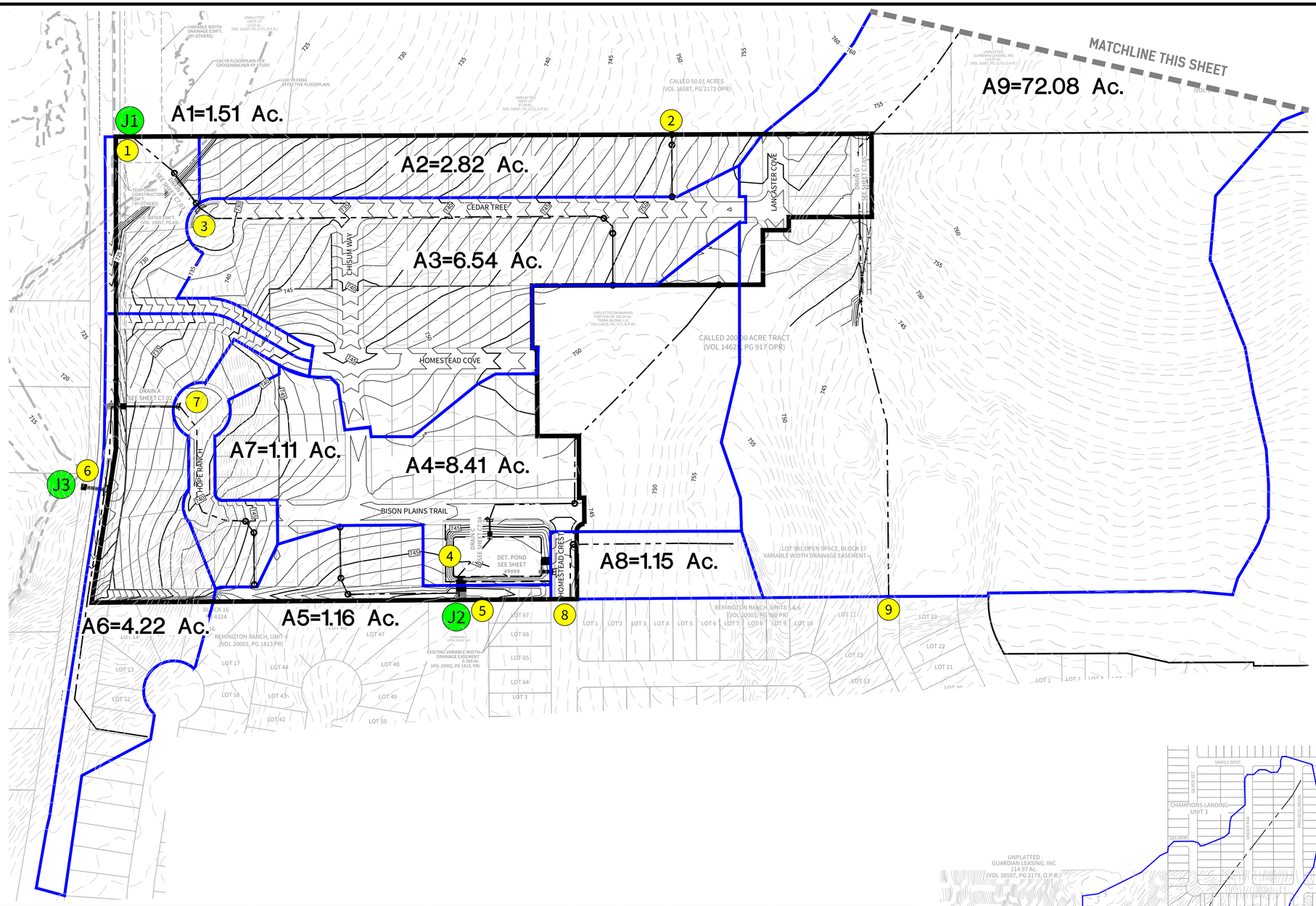
SCALE: 1"=100'
0 100 200

LEGEND

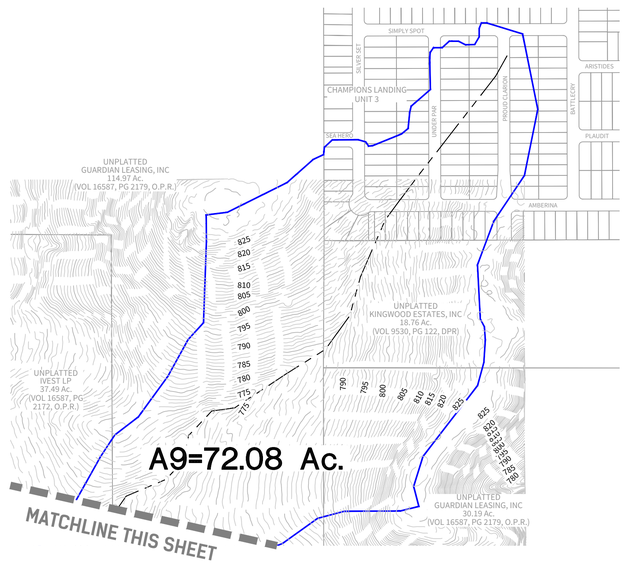
- SITE BOUNDARY
- 1% CHANCE ANNUAL FEMA F/P
- DRAINAGE AREA
- Tc FLOW PATH
- ACCUMULATION POINT
- JUNCTION POINT (XX)



TYPICAL LOT SITE PLAN
N.T.S.



HYDROLOGY				Sheet Flow Tc Compuations						Shallow Conc. Tc Compuations					Concentrated Tc Computations			Overall		INTENSITY			Q FLOW			
Drainage Shed	Shed Area (Ac.)	AREA OF ACCUMULATION (Ac.)	C	*Length* x 100'	Paved (Y or N)	Upstream Elev.	Downstream Elev	Slope	Time of Concentration	*Length*	Paved (Y or N)	Downstream Elev	Slope	Time of Concentration	*Length*	Velocity (fps)	Time of Concentration	Time of Concentration (min)	Lag Time (0.6 x Tc) (hrs)	I5	I25	I100	Q5	Q25	Q100	Drainage Shed
1	1.51	= 1	0.75	*100.00*	N	727.21	722.98	4.23%	11.00	*100.00*	N	719.50	3.48%	0.55				11.00	0.110	6.02	8.43	10.54	6.82	9.55	11.94	1
2	2.82	= 2	0.75	*100.00*	N	752.30	750.75	1.55%	13.90	*20.00*	N	750.63	0.60%	0.27				14.00	0.140	5.42	7.53	9.39	11.46	15.93	19.86	2
3	6.45	= 3	0.75	*100.00*	N	750.5	748.97	1.53%	13.94	*36.00*	N	748.25	2.00%	0.27	*784.00*	6	2.18	16.00	0.160	5.06	6.99	8.71	24.48	33.81	42.13	3
J1	10.78	= 1+2+3	0.75	*100.00*	N	750.5	748.97	1.53%	13.94	*36.00*	N	748.25	2.00%	0.27	*972.00*	6	2.70	16.00	0.160	5.06	6.99	8.71	40.91	56.51	70.42	J1
4	8.77	= 4	0.59	*100.00*	N	752.60	751.12	1.48%	14.04	*431.00*	N	745.19	1.38%	3.81	*183.00*	6	0.51	18.00	0.180	4.76	6.56	8.16	24.77	34.14	42.46	4
5	1.16	= 5	0.75	*100.00*	N	747.90	744.00	3.90%	11.10	*32.00*	N	741.24	8.62%	0.11	*211.00*	6	0.59	11.00	0.110	6.02	8.43	10.54	5.24	7.33	9.17	5
J2	9.93	= 4+5	0.61	*100.00*	N	752.60	751.12	1.48%	14.04	*431.00*	N	745.19	1.38%	3.81	*355.00*	6	0.99	18.00	0.180	4.76	6.56	8.16	28.91	39.84	49.56	J2
6	4.22	= 6	0.75	*100.00*	N	753.48	749.46	4.02%	11.00	*70.00*	N	742.51	9.93%	0.23	*408.00*	6	1.13	12.00	0.120	5.81	8.12	10.14	18.39	25.70	32.09	6
7	1.11	= 7	0.75	*100.00*	N	747.58	745.49	2.09%	12.82	*27.00*	N	744.39	4.07%	0.14	*303.00*	7.83	0.64	13.00	0.130	5.61	7.82	9.76	4.67	6.51	8.13	7
J3	5.33	= 6+7	0.75	*100.00*	N	747.58	745.49	2.09%	12.82	*27.00*	N	744.39	4.07%	0.14	*469.00*	7.83	1.00	13.00	0.130	5.61	7.82	9.76	22.43	31.26	39.02	J3
8	1.15	= 8	0.45	*100.00*	N	758.09	753.66	4.43%	11.00	*208.00*	N	744.98	4.17%	1.05	*105.00*	6	0.29	12.00	0.120	5.81	8.12	10.14	3.04	4.24	5.30	8
9	72.08	= 9	0.41	*100.00*	N	830.00	825.00	5.00%	11.00	*650.00*	N	803.65	3.28%	3.69	*3036.00*	6	8.43	23.00	0.230	4.21	5.77	7.17	125.72	172.30	214.11	9



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TERRA BUONA UNIT 10

PROPOSED MASTER DRAINAGE PLAN

DATE
09/11/2025

PROJECT NO.
03209.019

DRAWN BY
JW/SG/LB/DF

CHECKED BY
SPM

REVISIONS
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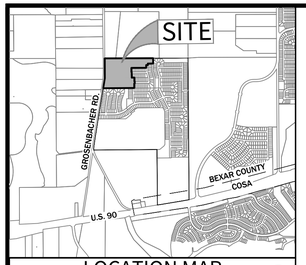
09/11/2025
STATE OF TEXAS
SEAN P. McFARLAND
138893
LICENSED
PROFESSIONAL ENGINEER

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
25-11800307

C7.00

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.



LOCATION MAP
N.T.S.

OWNER/DEVELOPER:

KB HOME
CONTACT PERSON: SEAN MILLER
4800 FREDERICKSBURG ROAD
SAN ANTONIO,TX 78229
TEL: (210) 301-5485

CIVIL ENGINEER:

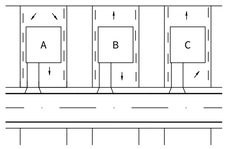
M.W. CUDE ENGINEERS, L.L.C.
CONTACT PERSON: SEAN McFARLAND, P.E.
4122 POND HILL ROAD, SUITE 101
SAN ANTONIO, TX 78231
TEL: (210) 681-2951
FAX: (210) 523-7112

SCALE: 1"=100'

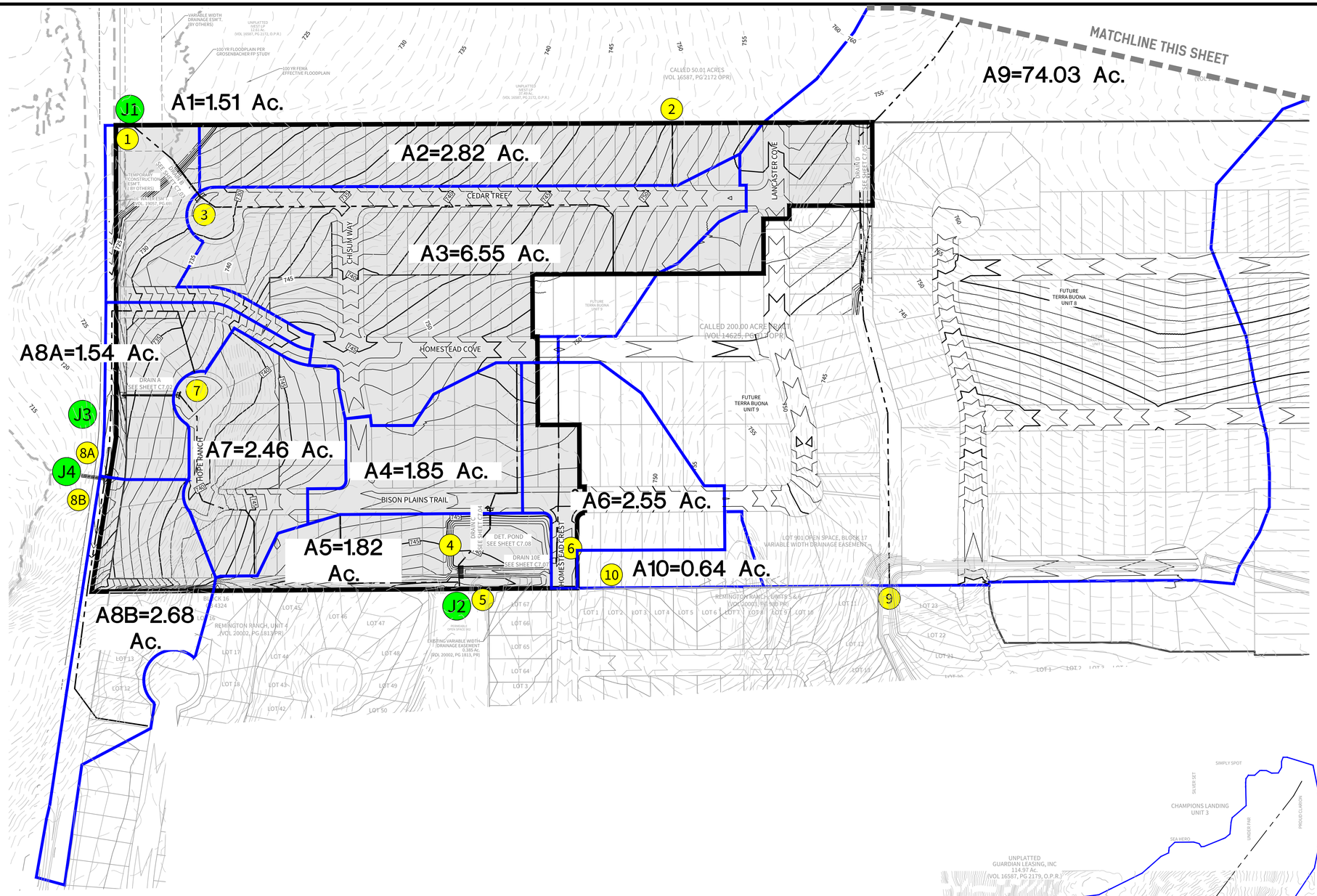
0 100 200

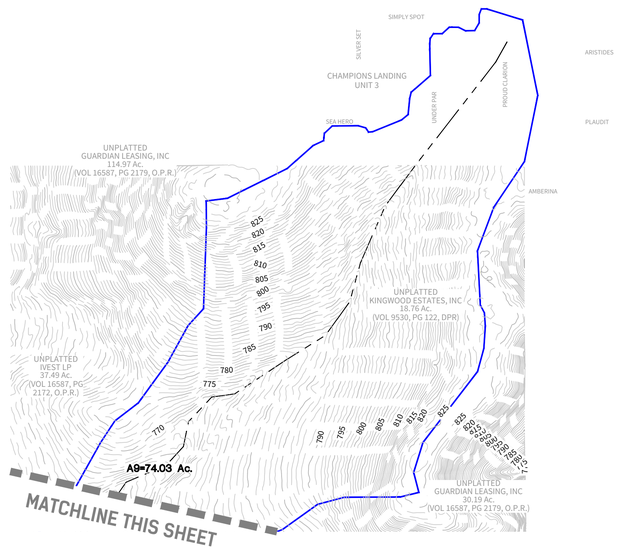
LEGEND

- SITE BOUNDARY
- 1% CHANCE ANNUAL FEMA F/P
- DRAINAGE AREA
- Tc FLOW PATH
- ACCUMULATION POINT
- JUNCTION POINT (XX)



TYPICAL LOT SITE PLAN
N.T.S.





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

TERRA BUONA UNIT 10

ULTIMATE MASTER DRAINAGE PLAN

DATE
09/11/2025

PROJECT NO.
03209.019

DRAWN BY
JW/SG/LB/DF

CHECKED BY
SPM

REVISIONS

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09/11/2025

STATE OF TEXAS
SEAN P. McFARLAND
138893
LICENSED
PROFESSIONAL ENGINEER

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
25-11800307

C7.01

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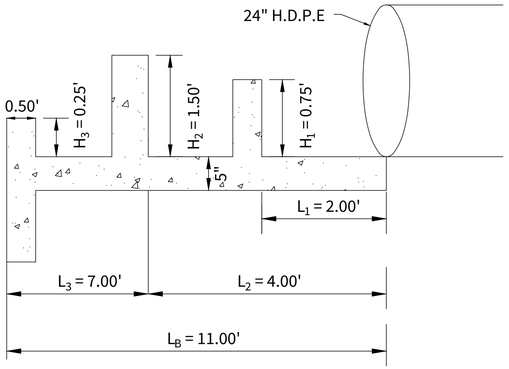
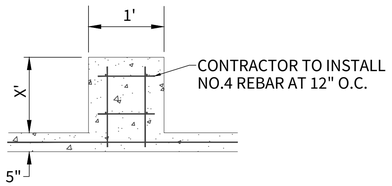
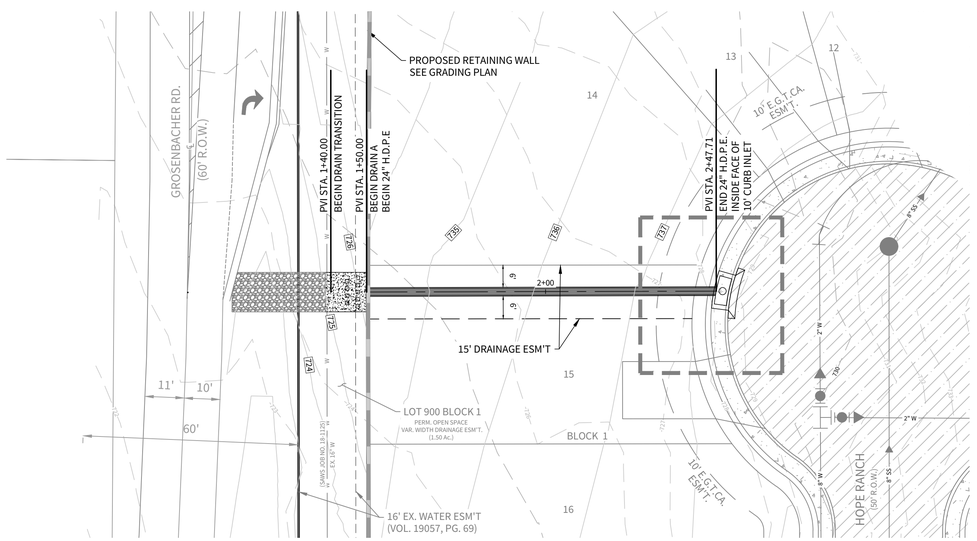


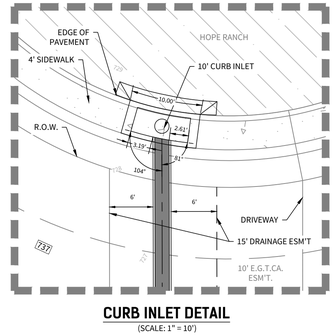
DRAIN A BAFFLE BLOCK DETAIL AND CALCULATIONS
(N.T.S.)

TAILWATER DEPTH = 0.00'
Fr = 2.67
Y_C = 0.52 FT
Y_2 = 2.72 FT
Y_3 = 0.52 FT
BASIN OUTLET VELOCITY = 3.94 FT/S

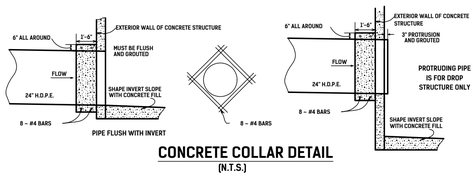


BAFFLE BLOCK REINFORCEMENT DETAIL
(N.T.S.)





CURB INLET DETAIL
(SCALE: 1" = 10')



CONCRETE COLLAR DETAIL
(N.T.S.)

GENERAL SPECIFICATIONS FOR COMPACTED FILL

1. 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.
2. THE MATERIALS USED SHALL BE FREE FROM ORGANIC MATTER AND OTHER DELETERIOUS SUBSTANCES, SUCH AS TREES, BRUSH AND RUBBISH.
3. 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.

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.

NOTES:

1. REFER TO GENERAL NOTES AND SPECIFICATIONS C0.00.
2. CONTRACTOR TO ENSURE POSITIVE DRAINAGE AT ALL GRADE BREAKS.
3. THE CONTRACTOR SHALL NOTIFY A UTILITY COORDINATOR AT LEAST 48 HOURS PRIOR TO PERFORMING ANY EXCAVATION ACTIVITY ADJACENT TO THE CONSTRUCTION OF AN 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.
4. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE STANDARDS AND SPECIFICATIONS OF THE CITY OF SAN ANTONIO.
5. ANY AREAS EXPOSED TO HIGH VELOCITY FLOWS SHALL EITHER HAVE A 6" THICK GABION MATTRESS INSTALLED OR THE INSTALLATION OF APPROPRIATE GEOTECHNICAL LINER AS DIRECTED BY THE CONSTRUCTION ENGINEER IN CHARGE.
6. ALL CONCRETE SHALL BE A MINIMUM OF 3500 PSI @ 28 DAYS COMPRESSIVE STRENGTH UNLESS OTHERWISE SPECIFIED HEREIN ON THESE DOCUMENTS.
7. 85% OF CHANNEL SURFACE MUST HAVE ESTABLISHED VEGETATION PRIOR TO ACCEPTANCE OF THE CHANNEL BY THE CITY OF SAN ANTONIO & BEXAR COUNTY. HYDROMULCH PAY ITEM TO INCLUDE SOIL, SEEDING, OR SODDING & WATERING FOR THE TIME PERIOD NEEDED TO ACHIEVE 85% VEGETATION.
8. REFERENCE TYPICAL CONCRETE CHANNEL RIP-RAP STANDARDS FOUND ON SHEET C7.D3.
9. A BEXAR COUNTY R.O.W. PERMIT MUST BE OBTAINED PRIOR TO WORKING IN EXISTING BEXAR COUNTY R.O.W.
10. CONTRACTOR TO RECONSTRUCT EXISTING SIDEWALK, AS NECESSARY, FOR PROPOSED SIDEWALK TRANSITION.
11. CONTRACTOR TO GROUT BOTTOM/FLOW LINE OF SEWER MANHOLE AND/OR CURB INLETS AS NECESSARY TO PROVIDE POSITIVE DRAINAGE.
12. CONTRACTOR TO REFER TO WALL DESIGN FOR PROTRUDING PIPE DESIGN.
13. CONTRACTOR TO PROVIDE POSITIVE DRAINAGE AWAY FROM WALL AND WITHIN ROW, TOWARDS EXISTING CULVERT ALONG GROSENBACHER ROAD.

GENERAL NOTES

1. 85% OF CHANNEL SURFACE MUST HAVE ESTABLISHED VEGETATION PRIOR TO ACCEPTANCE OF THE CHANNEL BY THE CITY OF SAN ANTONIO & BEXAR COUNTY. HYDROMULCH PAY ITEM TO INCLUDE SOIL, SEEDING, OR SODDING & WATERING FOR THE TIME PERIOD NEEDED TO ACHIEVE 85% VEGETATION.
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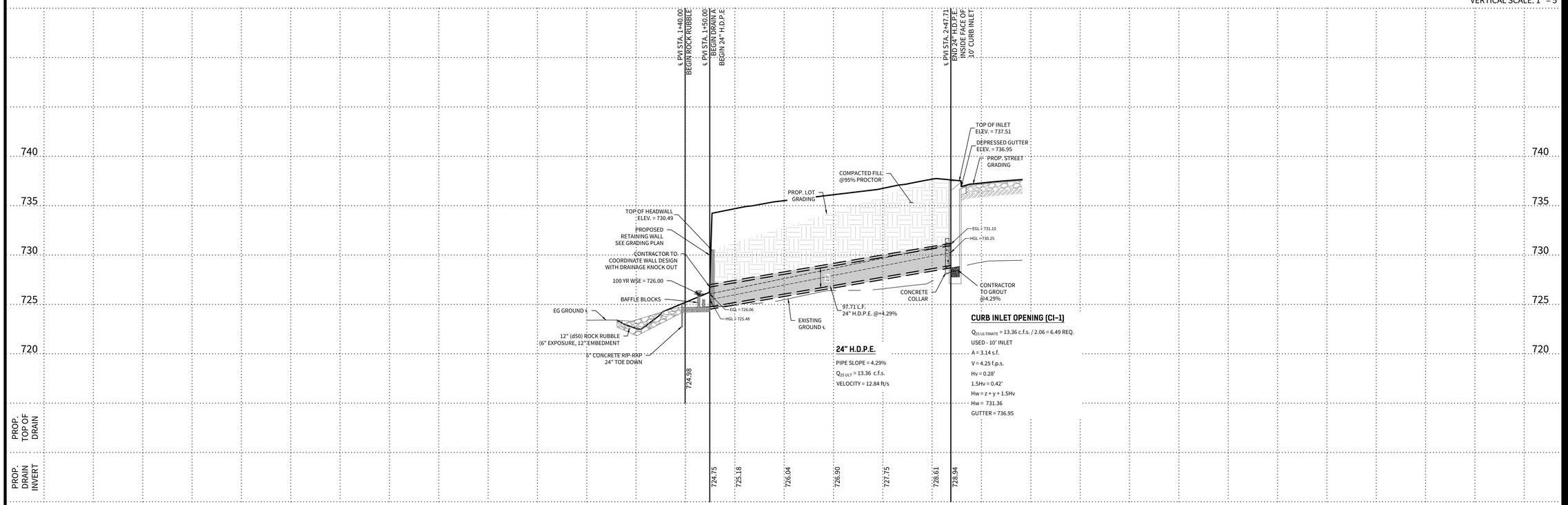
DRAIN A

STA. 1+50.00 TO STA. 2+47.71

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



24" H.D.P.E.
PIPE SLOPE = 4.29%
$Q_{25\ ULT}$ = 13.36 c.f.s.
VELOCITY = 12.84 ft/s

CURB INLET OPENING (CI–1)
$Q_{25\ ULTIMATE}$ = 13.36 c.f.s. / 2.06 = 6.49 REQ.
USED - 10' INLET
A = 3.14 s.f.
V = 4.25 f.p.s.
Hv = 0.28'
1.5Hv = 0.42'
Hw = z + y + 1.5Hv
Hw = 731.36
GUTTER = 736.95

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

TERRA BUONA UNIT 10

DRAINAGE PLAN & PROFILE - DRAIN 10A

DATE
09/11/2025
PROJECT NO.
03209.019
DRAWN BY
JW/SG/LB/DF
CHECKED BY
SPM

REVISIONS
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09/11/2025
STATE OF TEXAS
SEAN P. McFARLAND
138893
LICENSED
PROFESSIONAL ENGINEER

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
25-11800307

C7.02

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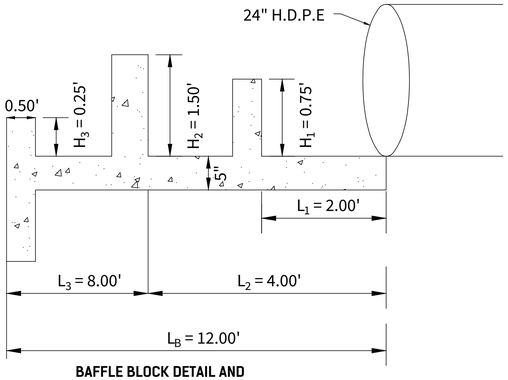
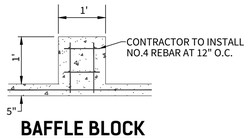


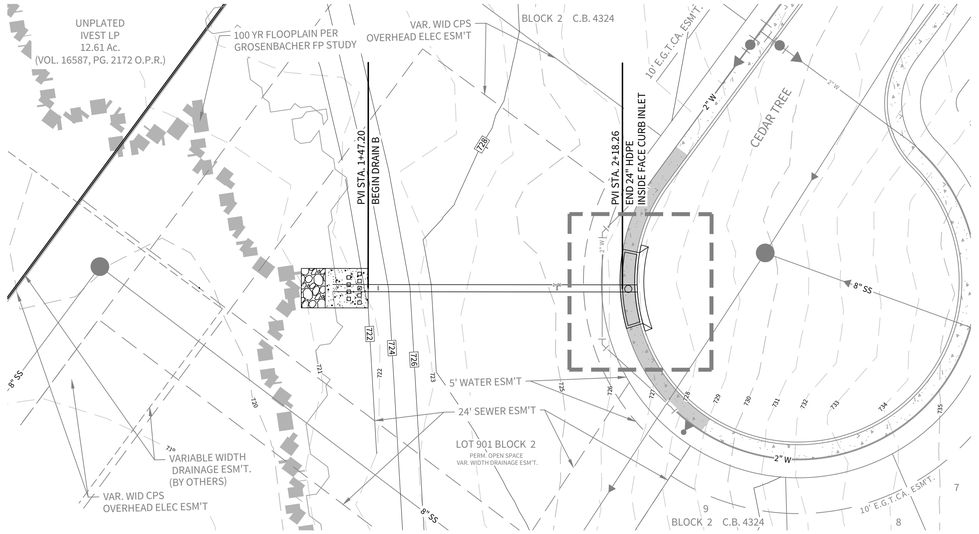
BAFFLE BLOCK DETAIL AND CALCULATIONS

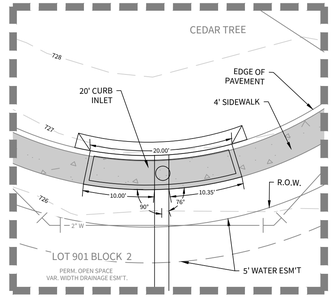
(N.T.S.)

TAILWATER DEPTH = 0.00'
Fr = 1.67
Y_C = 0.93 FT
Y_2 = 2.82 FT
Y_3 = 0.93FT
BASIN OUTLET VELOCITY = 5.14 FT/S



BAFFLE BLOCK REINFORCEMENT DETAIL





CURB INLET DETAIL

(SCALE: 1" = 10')

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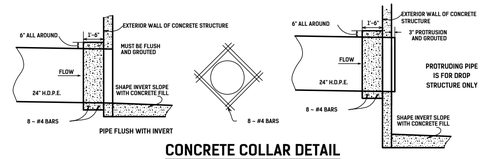

CONCRETE COLLAR DETAIL

(N.T.S.)

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DRAIN 10B

STA. 1+47.20 TO STA. 2+18.26

NOTES:

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2. **CONTRACTOR TO ENSURE POSITIVE DRAINAGE AT ALL GRADE BREAKS.**
3. **THE CONTRACTOR SHALL NOTIFY A UTILITY COORDINATOR AT LEAST 48 HOURS PRIOR TO PERFORMING ANY EXCAVATION ACTIVITY ADJACENT TO THE CONSTRUCTION OF AN 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.**
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9. **A BEXAR COUNTY R.O.W. PERMIT MUST BE OBTAINED PRIOR TO WORKING IN EXISTING BEXAR COUNTY R.O.W.**
10. **CONTRACTOR TO RECONSTRUCT EXISTING SIDEWALK, AS NECESSARY, FOR PROPOSED SIDEWALK TRANSITION.**
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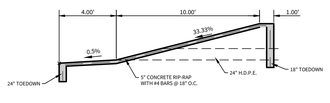
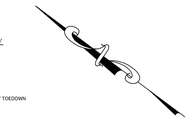
12. **CONTRACTOR TO PROVIDE POSITIVE DRAINAGE.**

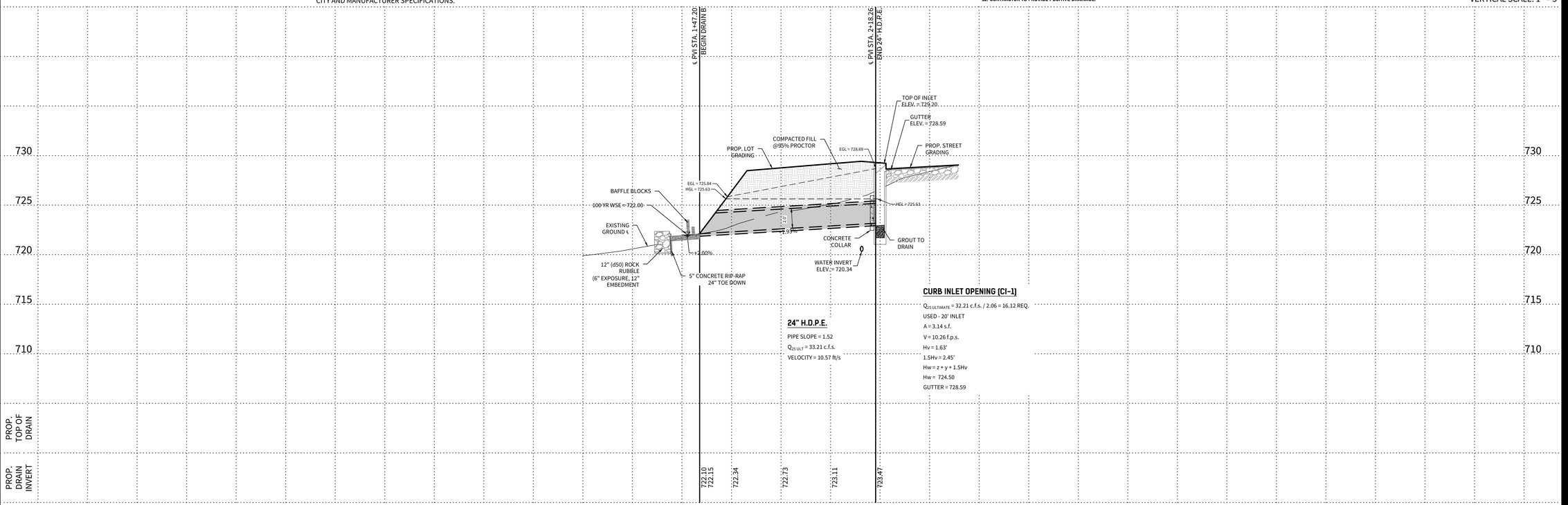


DRAIN "B" CONCRETE RIP-RAP DETAIL

(N.T.S.)



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



24" H.D.P.E.

PIPE SLOPE = 1.52
$Q_{25\ ULT}$ = 33.21 c.f.s.
VELOCITY = 10.57 ft/s

CURB INLET OPENING (CI-1)

$Q_{25\ ULTIMATE}$ = 32.21 c.f.s. / 2.06 = 16.12 REQ.
USED - 20' INLET
A = 3.14 s.f.
V = 10.26 f.p.s.
Hv = 1.63'
1.5Hv = 2.45'
Hw = z + y + 1.5Hv
Hw = 724.50
GUTTER = 728.59

CUDEENGINEERS.COM

CUDE ENGINEERS

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

TERRA BUONA UNIT 10

DRAINAGE PLAN & PROFILE - DRAIN 10B

DATE
09/11/2025

PROJECT NO.
03209.019

DRAWN BY
JW/SG/LB/DF

CHECKED BY
SPM

REVISIONS
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09/11/2025

STATE OF TEXAS
SEAN P. McFARLAND
138893
LICENSED PROFESSIONAL ENGINEER

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
25-11800307

C7.03

© 03209019 D:\DWGS Files\03 SHEETS\C7.03 DRAIN 10B.dwg Aug 25, 2025 09:13:41 AM sean.mcfarland

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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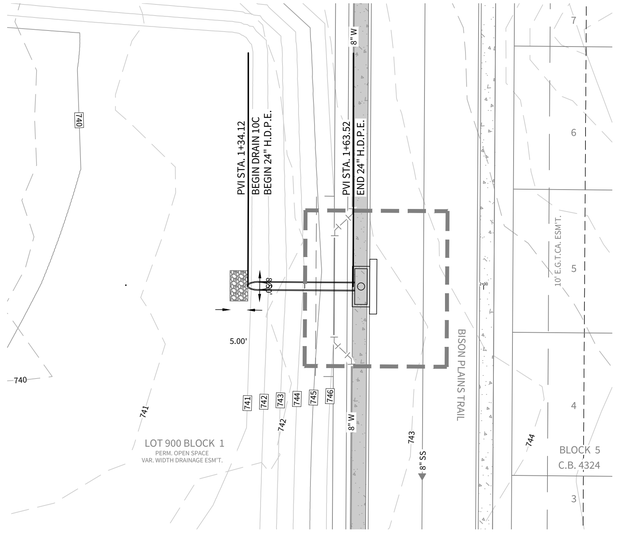
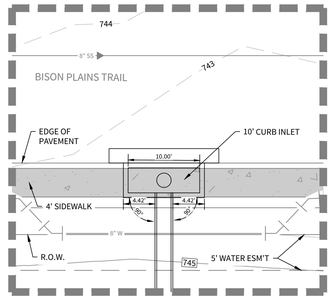
3. AT THE PRE-FINAL INSPECTION: THE ENGINEER MUST ISSUE CERTIFICATION TO THE CITY INSPECTOR THAT THE TURF REINFORCEMENT MAT (TRM) WAS INSTALLED IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS. THE CERTIFICATION MUST ALSO NOTE THAT THE MATERIAL AND INSTALLATION HAS MET CITY AND MANUFACTURER SPECIFICATIONS.



GENERAL NOTES



CURB INLET DETAIL
(SCALE: 1" = 10')

GENERAL SPECIFICATIONS FOR COMPACTED FILL

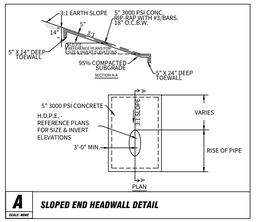
1. FOLLOWING THE CLEARING AND DISKING OR SCARIFYING OF THE FILL AREA, IT SHALL BE BLADED UNTIL IT IS UNIFORM AND FREE FROM LARGE CLODS. THE AREA SHALL BE BROUGHT TO THE ADEQUATE MOISTURE CONTENT AND COMPACTED (TYPICALLY) TO NOT LESS THAN NINETY PERCENT (90%) OF MAXIMUM DENSITY IN ACCORDANCE WITH THE CURRENT ASTM D 1557 COMPACTION PROCEDURE, OR 95% OF MAXIMUM DENSITY IN ACCORDANCE WITH THE CURRENT THD--TEX--113--E COMPACTION PROCEDURE.
2. THE MATERIALS USED SHALL BE FREE FROM ORGANIC MATTER AND OTHER DELETERIOUS SUBSTANCES, SUCH AS TREES, BRUSH AND RUBBISH.
3. 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.

NOTES:

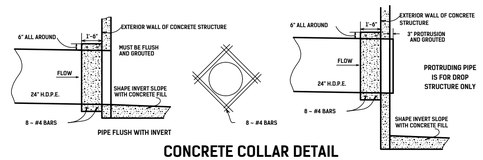
1. **REFER TO GENERAL NOTES AND SPECIFICATIONS C0.00.**
2. **CONTRACTOR TO ENSURE POSITIVE DRAINAGE AT ALL GRADE BREAKS.**
3. **THE CONTRACTOR SHALL NOTIFY A UTILITY COORDINATOR AT LEAST 48 HOURS PRIOR TO PERFORMING ANY EXCAVATION ACTIVITY ADJACENT TO THE CONSTRUCTION OF AN ON-SITE DRAINAGE FACILITIES 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.**
4. **ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE STANDARDS AND SPECIFICATIONS OF THE CITY OF SAN ANTONIO.**
5. **ANY AREAS EXPOSED TO HIGH VELOCITY FLOWS SHALL EITHER HAVE A 6" THICK GABION MATTRESS INSTALLED OR THE INSTALLATION OF APPROPRIATE GEOTECHNICAL LINER AS DIRECTED BY THE CONSTRUCTION ENGINEER IN CHARGE.**
6. **ALL CONCRETE SHALL BE A MINIMUM OF 3500 PSI @ 28 DAYS COMPRESSIVE STRENGTH UNLESS OTHERWISE SPECIFIED HEREIN ON THESE DOCUMENTS.**
7. **85% OF CHANNEL SURFACE MUST HAVE ESTABLISHED VEGETATION PRIOR TO ACCEPTANCE OF THE CHANNEL BY THE CITY OF SAN ANTONIO & BEXAR COUNTY. HYDROMULCH PAY ITEM TO INCLUDE SOIL, SEEDING, OR SODDING & WATERING FOR THE TIME PERIOD NEEDED TO ACHIEVE 85% VEGETATION.**
8. **REFERENCE TYPICAL CONCRETE CHANNEL RIP-RAP STANDARDS FOUND ON SHEET C7.D3.**
9. **A BEXAR COUNTY R.O.W. PERMIT MUST BE OBTAINED PRIOR TO WORKING IN EXISTING BEXAR COUNTY R.O.W.**
10. **CONTRACTOR TO RECONSTRUCT EXISTING SIDEWALK, AS NECESSARY, FOR PROPOSED SIDEWALK TRANSITION.**
11. **CONTRACTOR TO GROUT BOTTOM/FLOW LINE OF SEWER MANHOLES AND/OR CURB INLETS AS NECESSARY TO PROVIDE POSITIVE DRAINAGE.**

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.



A SCALE: 40SC — **SLOPED END HEADWALL DETAIL**

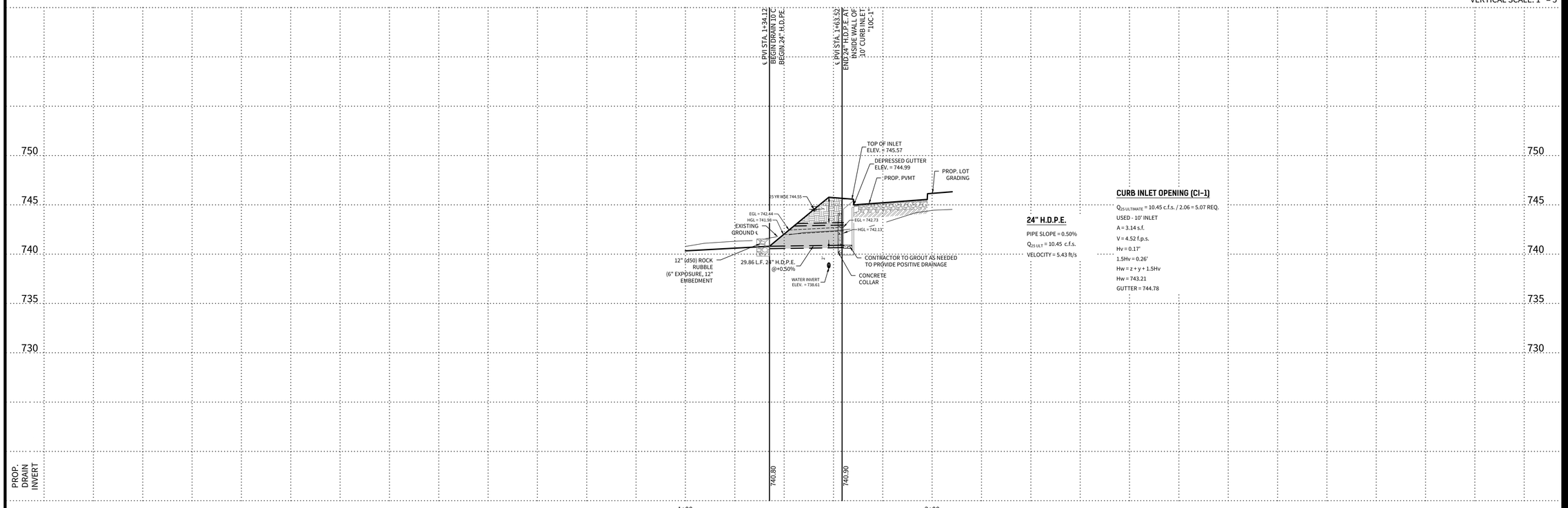


CONCRETE COLLAR DETAIL
(N.T.S.)

DRAIN 10C

STA. 1+39.12 TO STA. 1+63.52

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



24" H.D.P.E.

PIPE SLOPE = 0.50%
$Q_{25\ ULT}$ = 10.45 c.f.s.
VELOCITY = 5.43 ft/s

CURB INLET OPENING (CI-1)

$Q_{25\ ULTIMATE}$ = 10.45 c.f.s. / 2.06 = 5.07 REQ.
USED - 10' INLET
A = 3.14 s.f.
V = 4.52 f.p.s.
Hv = 0.17"
1.5Hv = 0.26'
Hw = z + y + 1.5Hv
Hw = 743.21
GUTTER = 744.78

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CUDE ENGINEERS

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

TERRA BUONA UNIT 10

DRAINAGE PLAN & PROFILE - DRAIN 10C

DATE
09/11/2025

PROJECT NO.
03209.019

DRAWN BY
JW/SG/LB/DF

CHECKED BY
SPM

REVISIONS
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09/11/2025

STATE OF TEXAS
SEAN P. McFARLAND
138893
LICENSED PROFESSIONAL ENGINEER

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
25-11800307

C7.04

P:\03209\03.D Civil\CAD Files\03 Plan\04 Prof\C7.04 DRAIN 10C.dwg 2025/09/11 8:55am smcfarland

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NOTES:

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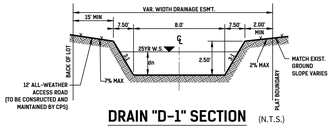
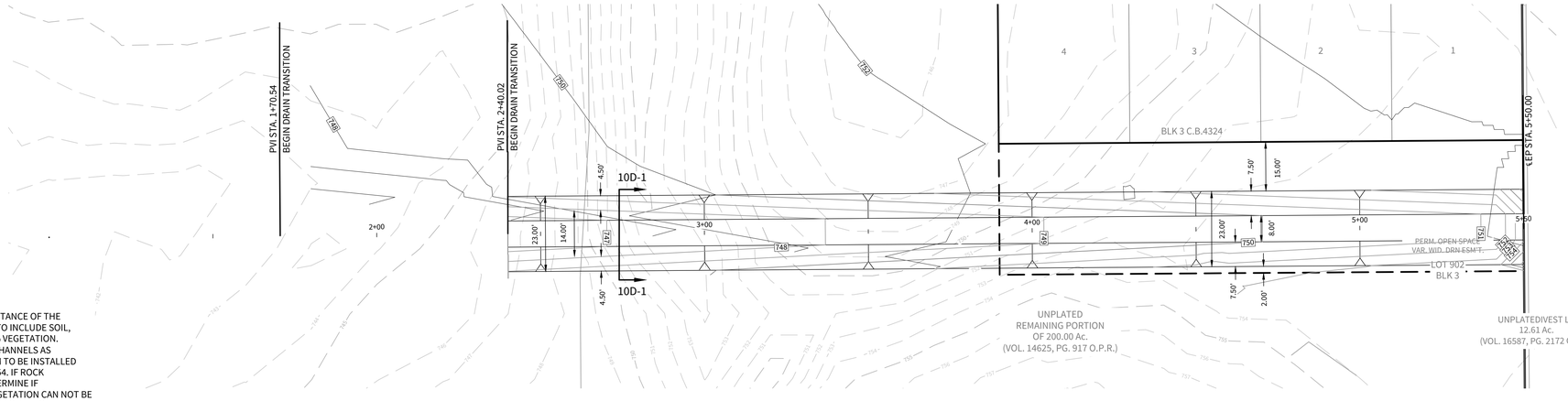


DRAIN "D-1" SECTION (N.T.S.)

"10D-1" STA. 0+00.00 TO STA. 5+50.00

	"10D-1"
Q_{25YR} (cfs)	163.48
Bw (ft)	8.00'
z	3:1
n	0.035
S (%)	1.50
d_n (ft)	1.92
V (fps)	6.19

SCALE: 1"=20'
0 10 20



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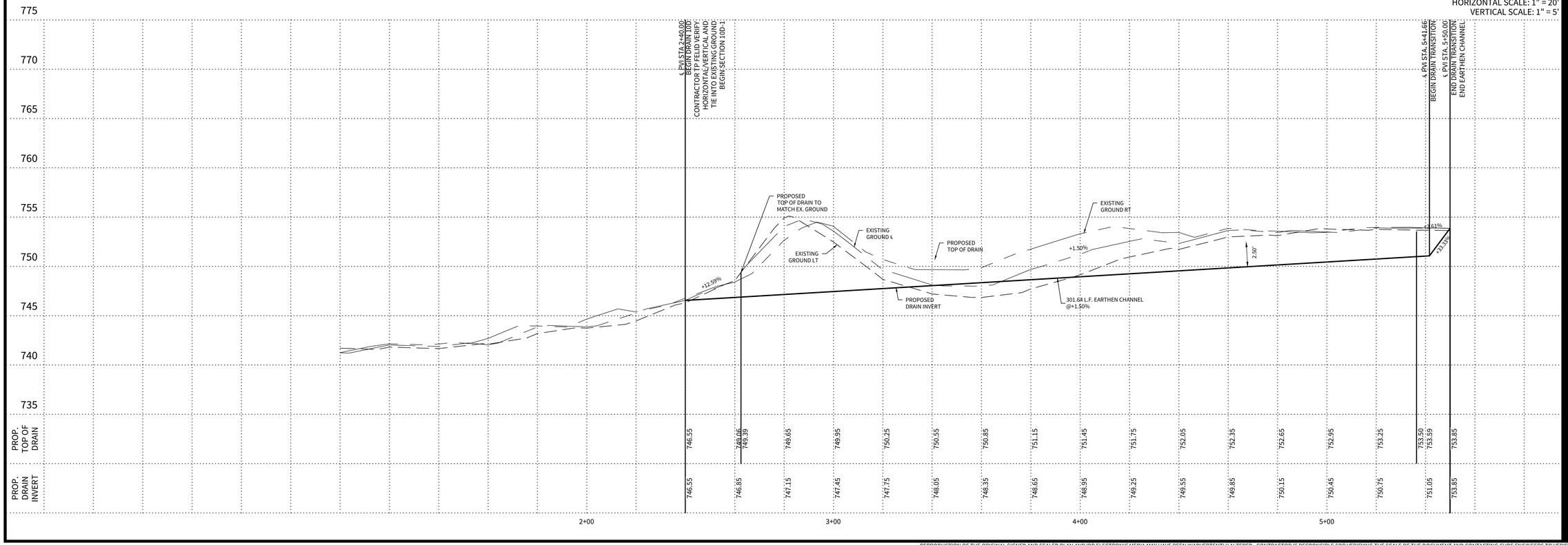
DRAIN 'D'

STA. 1+70.54 TO STA. 5+50.00

HORIZONTAL SCALE: 1" = 20'
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

TERRA BUONA UNIT 10

DRAINAGE PLAN & PROFILE - DRAIN 10D

DATE
09/11/2025

PROJECT NO.
03209.019

DRAWN BY
JW/SG/LB/DF

CHECKED BY
SPM

REVISIONS
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09/11/2025

STATE OF TEXAS
SEAN P. McFARLAND
138893
LICENSED PROFESSIONAL ENGINEER

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
25-11800307

C7.05

P:\2025\03209\2 DWG\4 Sheets\07_C7.05D10P.dwg 2025/09/11 4:02pm Jburks

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:

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11. CONTRACTOR TO GROUT BOTTOM/FLOW LINE OF SEWER MANHOLE AND/OR CURB INLETS AS NECESSARY TO PROVIDE POSITIVE DRAINAGE.
12. CONTRACTOR TO REFER TO WALL DESIGN FOR PROTRUDING PIPE DESIGN.
13. CONTRACTOR TO PROVIDE POSITIVE DRAINAGE AWAY FROM WALL AND WITHIN ROW, TOWARDS EXISTING CULVERT ALONG GROSENBACHER ROAD.

TRENCH EXCAVATION PROTECTION

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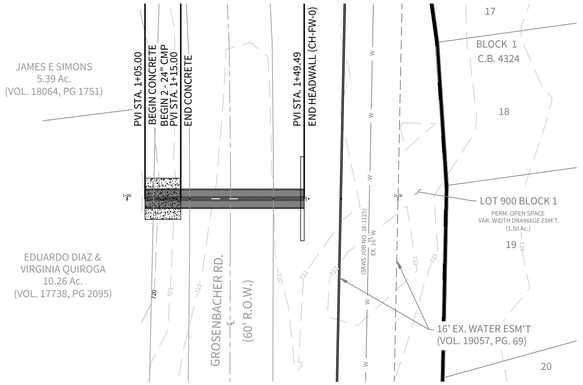

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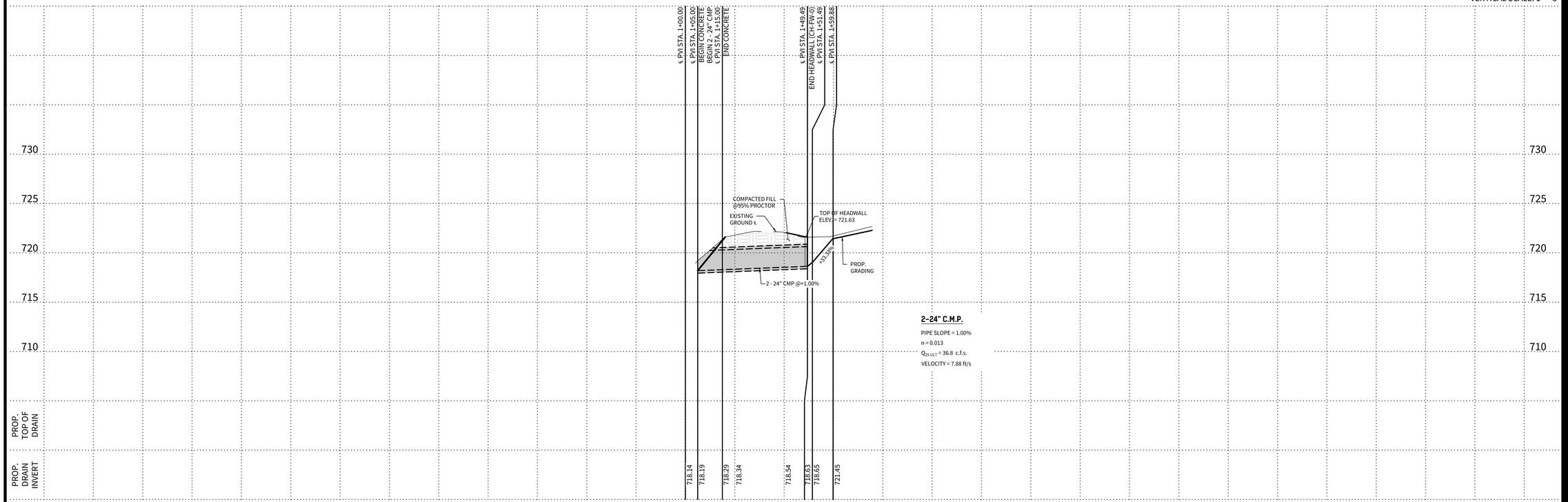
GROSENBACHER CULVERT

STA. 1+00.00 TO STA. 1+59.88

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



2-24" C.M.P.

PIPE SLOPE = 1.00%
n = 0.013
$Q_{25\,ULT}$ = 36.8 c.f.s.
VELOCITY = 7.88 ft/s

CUDEENGINEERS.COM

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

TERRA BUONA UNIT 10

DRAINAGE PLAN & PROFILE - GROSENBACHER CULVERT

DATE
09/11/2025

PROJECT NO.
03209.019

DRAWN BY
JW/SG/LB/DF

CHECKED BY
SPM

REVISIONS
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09/11/2025

STATE OF TEXAS
SEAN P. McFARLAND
138893
LICENSED
PROFESSIONAL ENGINEER

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
25-11800307

C7.06

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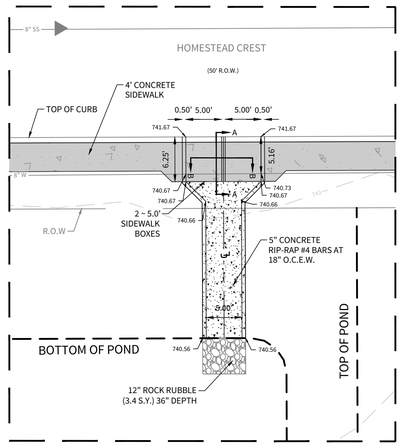
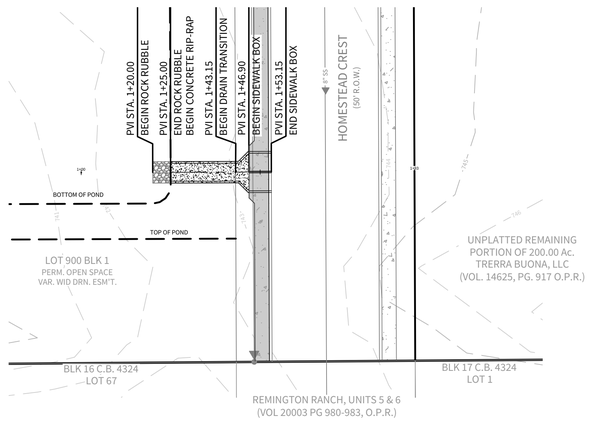
8. REFERENCE TYPICAL CONCRETE CHANNEL RIP-RAP STANDARDS FOUND ON SHEET C7.D3.
9. A BEXAR COUNTY R.O.W. PERMIT MUST BE OBTAINED PRIOR TO WORKING IN EXISTING BEXAR COUNTY R.O.W.
10. CONTRACTOR TO RECONSTRUCT EXISTING SIDEWALK, AS NECESSARY, FOR PROPOSED SIDEWALK TRANSITION.
11. CONTRACTOR TO GROUT BOTTOM/FLOW LINE OF SEWER MANHOLE AND/OR CURB INLETS AS NECESSARY TO PROVIDE POSITIVE DRAINAGE.
12. CONTRACTOR TO REFER TO WALL DESIGN FOR PROTRUDING PIPE DESIGN.
13. CONTRACTOR TO PROVIDE POSITIVE DRAINAGE AWAY FROM WALL AND WITHIN ROW, TOWARDS EXISTING CULVERT ALONG GROSENBACHER ROAD.

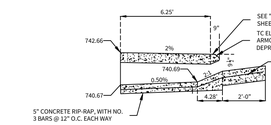
TRENCH EXCAVATION PROTECTION

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.

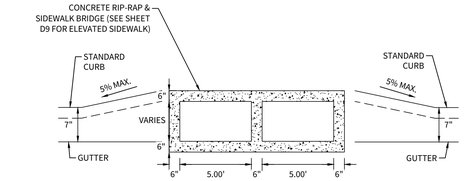


DETAIL "A"
(SCALE: 1" = 10')





DRAIN 10E
SECTION "A-A"
SIDEWALK BOX DETAIL SECTION
(N.T.S.)



DRAIN 10E
SECTION "B-B"
SECTION THRU SIDEWALK BOX
(N.T.S.)

GENERAL NOTES

1. 85% OF CHANNEL SURFACE MUST HAVE ESTABLISHED VEGETATION PRIOR TO ACCEPTANCE OF THE CHANNEL BY THE CITY OF SAN ANTONIO & BEXAR COUNTY. HYDROMULCH PAY ITEM TO INCLUDE SOIL, SEEDING, OR SODDING & WATERING FOR THE TIME PERIOD NEEDED TO ACHIEVE 85% VEGETATION.
2. TURF REINFORCEMENT MAT (TRM) TO BE INSTALLED THROUGHOUT THE EARTHEN CHANNELS AS DENOTED WHERE VELOCITY OF STORM WATER RUNOFF IS GREATER THAN 6 FPS. TRM TO BE INSTALLED PER CITY OF SAN ANTONIO STANDARD SPECIFICATIONS FOR CONSTRUCTION ITEM 554. IF ROCK SUBGRADE IS ENCOUNTERED DURING CONSTRUCTION, THEN ENGINEER SHALL DETERMINE IF VEGETATION CAN BE ESTABLISHED. IF IT IS DETERMINED BY THE ENGINEER THAT VEGETATION CAN NOT BE ESTABLISHED AND SUBGRAGE MATERIAL IS SUITABLE TO CONVEY STORM WATER FLOWS WITHOUT EROSION OR SCOUR, THEN TRM WILL NOT BE INSTALLED.
3. AT THE PRE-FINAL INSPECTION: THE ENGINEER MUST ISSUE CERTIFICATION TO THE CITY INSPECTOR THAT THE TURF REINFORCEMENT MAT (TRM) WAS INSTALLED IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS. THE CERTIFICATION MUST ALSO NOTE THAT THE MATERIAL AND INSTALLATION HAS MET CITY AND MANUFACTURER SPECIFICATIONS.

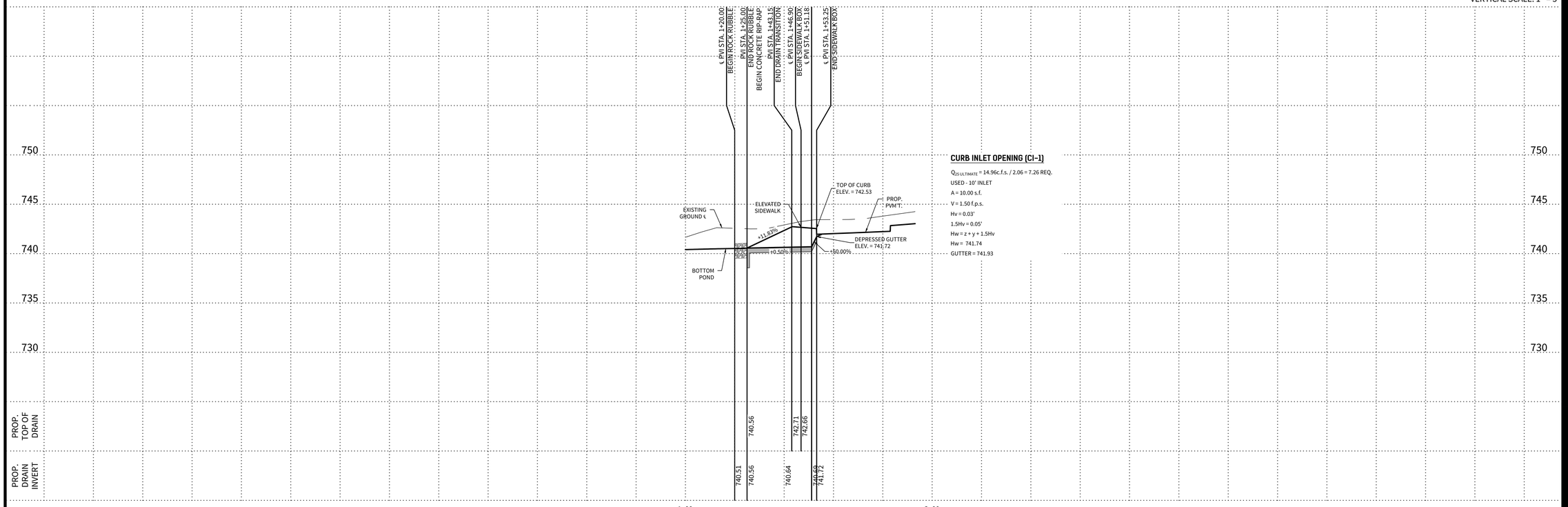
GENERAL SPECIFICATIONS FOR COMPACTED FILL

1. 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.
2. THE MATERIALS USED SHALL BE FREE FROM ORGANIC MATTER AND OTHER DELETERIOUS SUBSTANCES, SUCH AS TREES, BRUSH AND RUBBISH.
3. 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.

DRAIN 10E

STA. 1+20.00 TO STA. 1+53.25

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



CURB INLET OPENING (CI-1)

$Q_{25\,ULTIMATE}$ = 14.96c.f.s. / 2.06 = 7.26 REQ.
USED - 10' INLET
A = 10.00 s.f.
V = 1.50 f.p.s.
Hv = 0.03'
1.5Hv = 0.05'
Hw = z + y + 1.5Hv
Hw = 741.74
GUTTER = 741.93

CUDEENGINEERS.COM

CUDE ENGINEERS

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

TERRA BUONA
UNIT 10

DRAINAGE PLAN & PROFILE - DRAIN 10E

DATE
09/11/2025

PROJECT NO.
03209.019

DRAWN BY
JW/SG/LB/DF

CHECKED BY
SPM

REVISIONS
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7.
8.
9.
10.

09/11/2025

STATE OF TEXAS
SEAN P. McFARLAND
138893
LICENSED
PROFESSIONAL ENGINEER

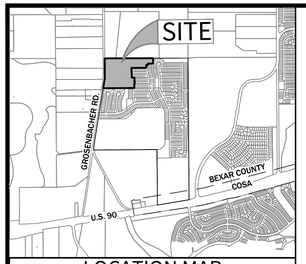
CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
25-11800307

C7.07

P:\03209\03-DWG\Plans\07_C7.D8.DP1.dwg 2025/09/11 4:21pm lbadia

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



LOCATION MAP
N.T.S.

LEGEND:

- 1290 = EXISTING CONTOUR
- 1290 = PROPOSED CONTOUR
- = JUNG UNIT 1 PLAT BOUNDARY
- 0.67% = PROPOSED FLOW ARROW
- = SWALE

GENERAL SPECIFICATIONS FOR SITE PREPARATION

1. 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.

2. FILL MATERIALS

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

3. 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.

4. 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.

NOTES:

1. ELEVATIONS SHOWN ARE TO FINISH GRADE. ADDITIONAL EXCAVATION REQUIRED FOR PLACEMENT OF CONCRETE, PAVEMENT, AND GABIONS ARE CONSIDERED SUBSIDIARY TO EACH RESPECTIVE ITEM. ADDITIONAL EXCAVATION REQUIRED FOR PLACEMENT OF TOPSOIL.
2. ALL AREAS DISTURBED BY CONSTRUCTION SHALL BE RESTORED AND GRADED TO DRAIN. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING THE REESTABLISHMENT OF VEGETATION IN ALL DISTURBED AREAS, INCLUDING BOTH ON-SITE AND OFF-SITE DRAINAGE IMPROVEMENTS.

GENERAL NOTES:

1. THE DETENTION POND FACILITY SHALL ALSO BE USED AS A TEMPORARY SEDIMENT TRAP FOR THE PURPOSES OF THE TEXAS POLLUTION DISCHARGE ELIMINATION SYSTEM CONSTRUCTION PERMIT FOR THIS SITE. THE CONTRACTOR SHALL CLEAN ALL SEDIMENT OUT OF THE DETENTION FACILITY UPON FINAL STABILIZATION OF THE SITE.
2. CONTRACTOR TO HYDROMULCH ENTIRE DRAINAGE EASEMENT 85% OF CHANNEL SURFACE MUST HAVE ESTABLISHED VEGETATION PRIOR TO ACCEPTANCE OF THE POND.
3. 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.
4. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE STANDARDS AND SPECIFICATIONS OF THE CITY OF SAN ANTONIO.
5. ANY AREAS EXPOSED TO HIGH VELOCITY FLOWS SHALL EITHER HAVE A 6" THICK ROCK GABION MATRESS INSTALLED OR THE INSTALLATION OF APPROPRIATE GEOTECHNICAL LINER AS DIRECTED BY THE CONSTRUCTION ENGINEER IN CHARGE.
6. ALL CONCRETE SHALL BE A MINIMUM OF 3500 PSI @ 28 DAYS COMPRESSIVE STRENGTH UNLESS OTHERWISE SPECIFIED HEREIN ON THESE DOCUMENTS.
7. THE OWNER SHALL SPECIFY THE USE OF EITHER A CHAIN LINK FENCE OR A WOODEN PRIVACY FENCE. THE CONTRACTOR SHALL COORDINATE WITH THE OWNER PRIOR TO INSTALLATION AND CONSTRUCTION.
8. CONTRACTOR SHALL PHASE CONSTRUCTION AND/OR PROVIDE NECESSARY BMPS TO MITIGATE INTERIM CONDITIONS RUNOFF DURING CONSTRUCTION DUE TO CLEARING, GRADING, SUBGRADE PREPARATION, PAVING, BUILDINGS, ETC., AND TO PREVENT ADVERSE IMPACTS TO OTHER PROPERTY, STRUCTURES, AND INFRASTRUCTURE DURING CONSTRUCTION.
9. DETENTION POND EXCAVATION AND/OR EMBANKMENT NECESSARY FOR PROVIDING STORAGE MUST BE SUBSTANTIALLY COMPLETE PRIOR TO CITY INSPECTION OF STREET SUBGRADE, CURB, FLEX BASE, AND PAVEMENT WITHIN THE WATERSHED DRAINING TO THE DETENTION POND.

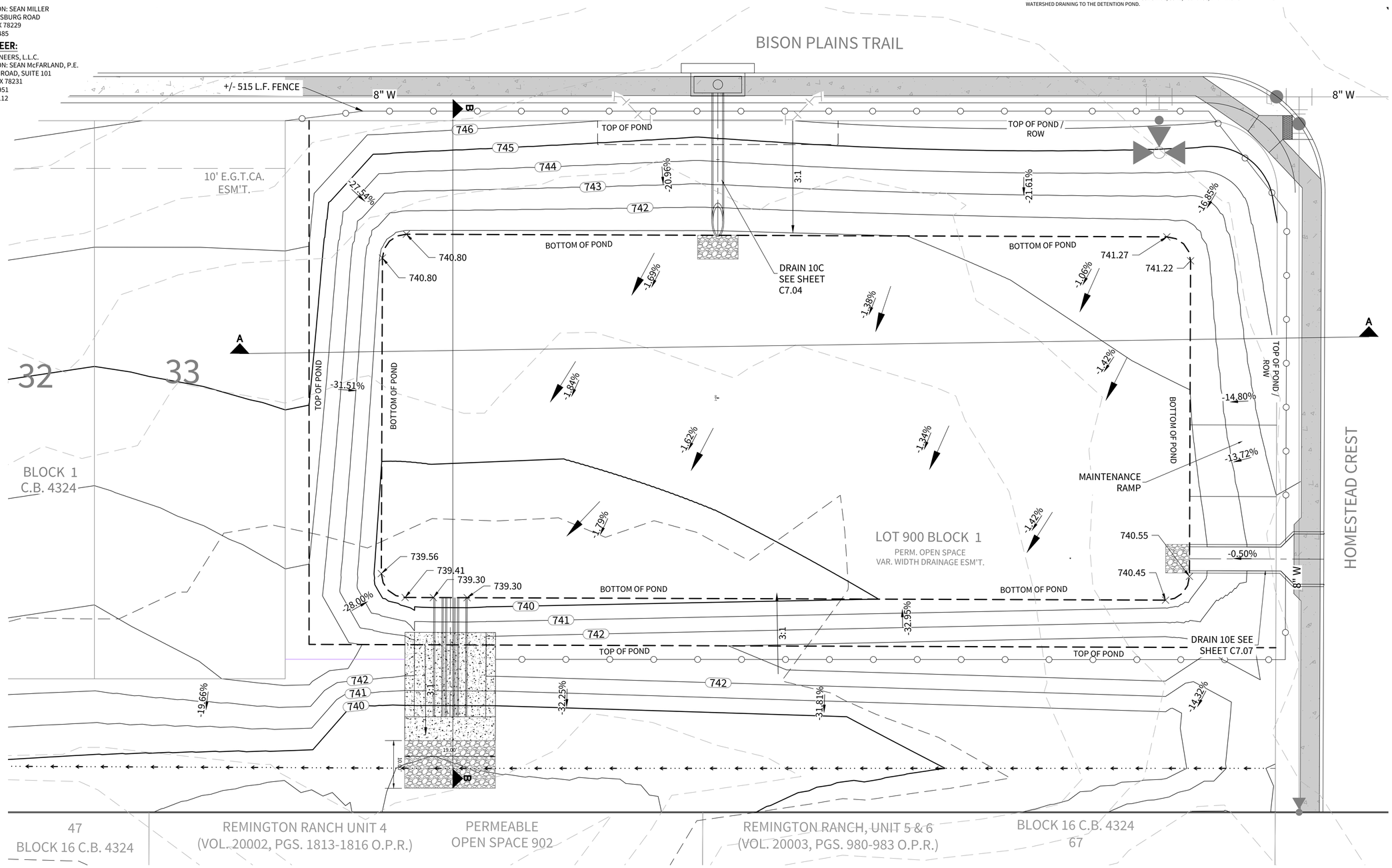
SCALE: 1"=10'
0 10 20

OWNER/DEVELOPER:

KB HOME
CONTACT PERSON: SEAN MILLER
4800 FREDERICKSBURG ROAD
SAN ANTONIO,TX 78229
TEL: (210) 301-5485

CIVIL ENGINEER:

M.W. CUDE ENGINEERS, L.L.C.
CONTACT PERSON: SEAN McFARLAND, P.E.
4122 POND HILL ROAD, SUITE 101
SAN ANTONIO, TX 78231
TEL: (210) 681-2951
FAX: (210) 523-7112



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TERRA BUONA UNIT 10

DETENTION POND

DATE
09/11/2025

PROJECT NO.
03209.019

DRAWN BY
JW/SG/LB/DF

CHECKED BY
SPM

REVISIONS
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09/11/2025

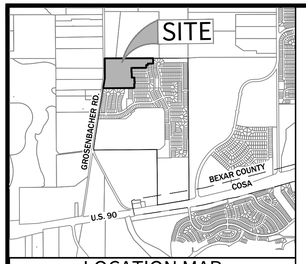
STATE OF TEXAS
SEAN P. McFARLAND
138893
LICENSED PROFESSIONAL ENGINEER

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
25-11800307

C7.08

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.



LOCATION MAP
N.T.S.

OWNER/DEVELOPER:

KB HOME
CONTACT PERSON: SEAN MILLER
4800 FREDERICKSBURG ROAD
SAN ANTONIO,TX 78229
TEL: (210) 301-5485

CIVIL ENGINEER:

M.W. CUDE ENGINEERS, L.L.C.
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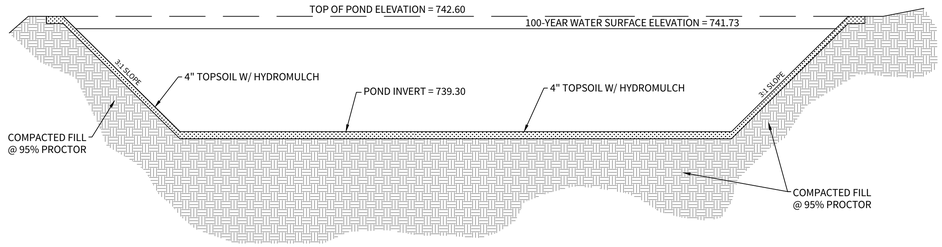
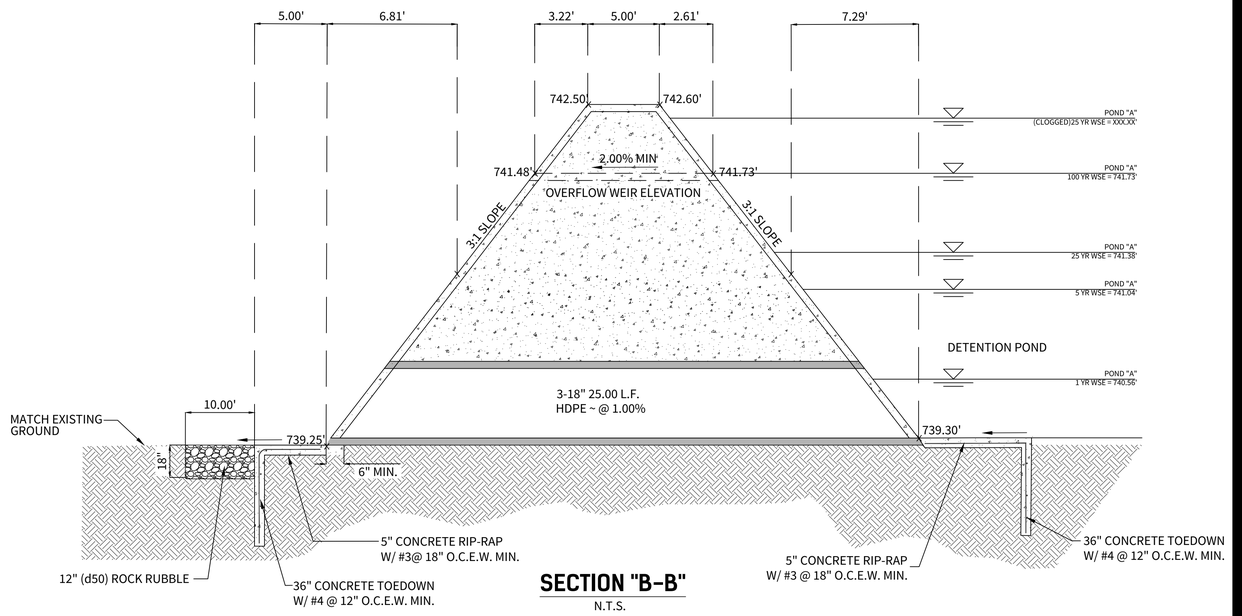


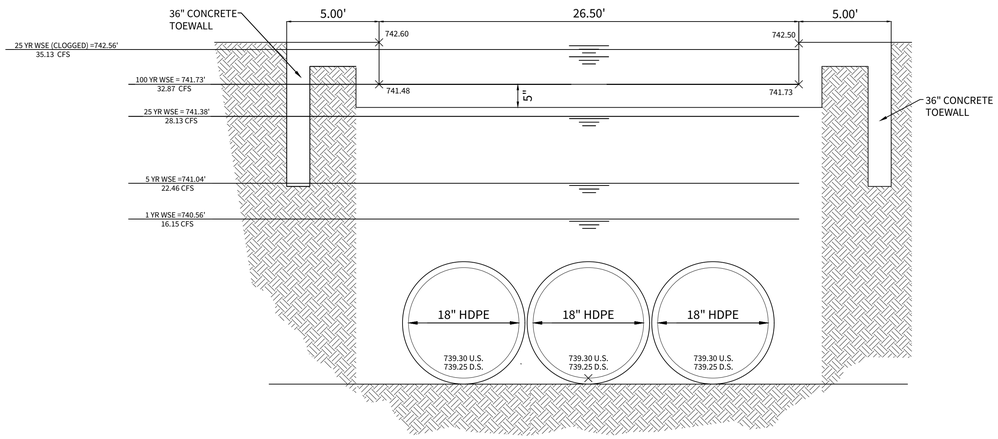
SECTION "A-A"
N.T.S.



SECTION "B-B"
N.T.S.

DETENTION POND OVERFLOW WEIR SUMMARY:

STORM EVENT	POND OUTLET FLOW (CFS)	VELOCITY (FPS)	DEPTH (FT)
25 YR	35.13	2.69	0.87



SECTION "C-C"
N.T.S.

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TERRA BUONA UNIT 10

DETENTION POND DETAILS

DATE
09/11/2025

PROJECT NO.
03209.019

DRAWN BY
JW/SG/LB/DF

CHECKED BY
SPM

REVISIONS
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09/11/2025

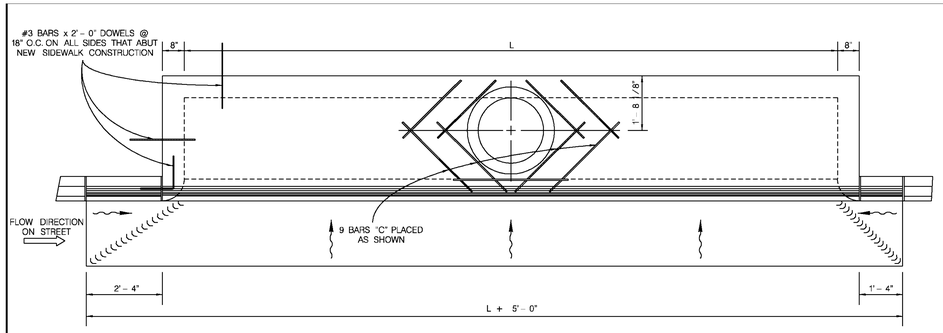
STATE OF TEXAS
SEAN P. McFARLAND
138893
LICENSED PROFESSIONAL ENGINEER

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
25-11800307

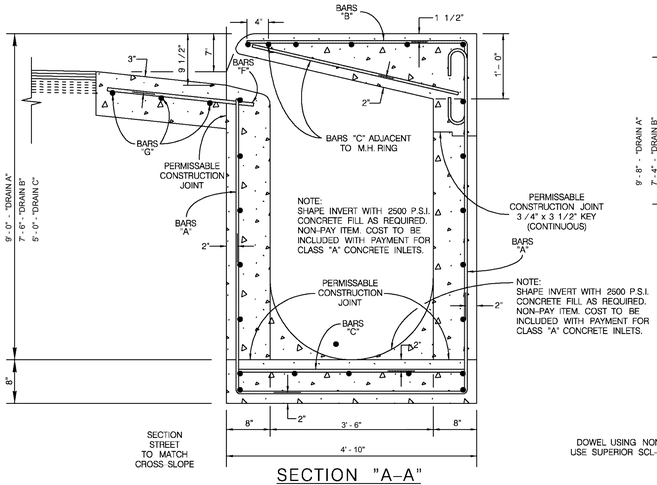
C7.D1

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.



PLAN VIEW

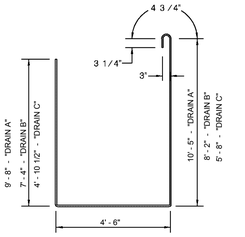
SCALE : 1" = 2'



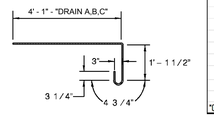
SECTION STREET TO MATCH CROSS SLOPE

SECTION "A-A"

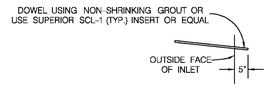
SCALE : 1" = 1'



BAR "A"



BAR "B"



BAR "F"

BAR "E"

INLET LENGTH	REINFORCING STEEL SCHEDULE						
	BAR	No.	Size	Spa.	Length	Weight lbs.
	A	27	4	5" o.c.	22' 9 1/2"	411.07
DRAIN "A"	B	27	4	5"	10' 1 3/4"	182.99
L= 10'	C	27	4	9"	4' 6"	141.28
DEPTH= 9'	D	47	4	10"	11' 1"	222.11
	E	30	4	10 1/2"	10' 10"	86.84
	F	12	5	12"	2' 3"	28.16
	G	12	4	12"	14' 8"	29.39
	H	3	5	12"	1' 8"	8.69

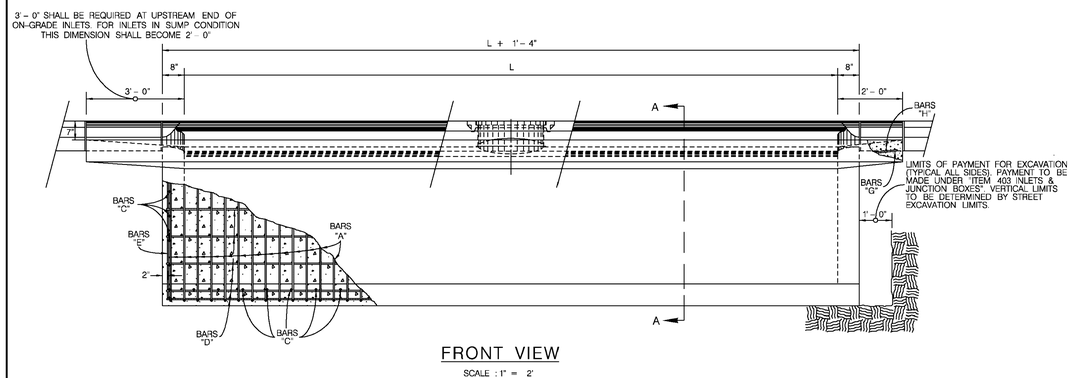
*Concrete Total = 9.18 C.Y. Manhole Casting = 260 lbs. Steel Total = 1370.54 lbs.

INLET LENGTH	REINFORCING STEEL SCHEDULE						
	BAR	No.	Size	Spa.	Length	Weight lbs.
	A	51	4	5" o.c.	19' 9 1/2"	674.26
DRAIN "B"	B	51	4	5"	8' 7 3/4"	294.55
L= 20'	C	51	4	9"	4' 6"	168.34
DEPTH= 7.5'	D	50	4	10"	21' 1"	401.38
	E	28.5	4	10 1/2"	9' 4"	74.62
	F	12	5	12"	2' 3"	51.63
	G	22	4	12"	24' 8"	40.43
	H	3	5	12"	1' 8"	8.69

*Concrete Total = 14.22 C.Y. Manhole Casting = 260 lbs. Steel Total = 1983.1 lbs.

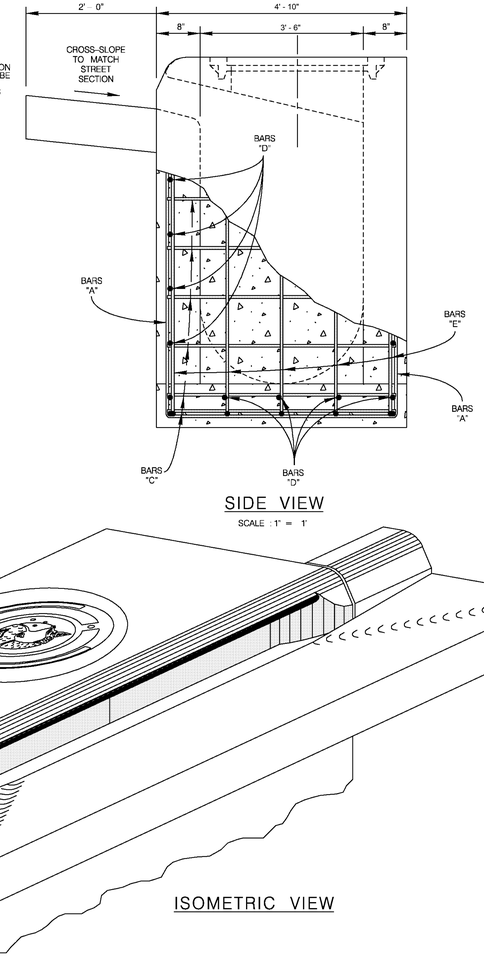
INLET LENGTH	REINFORCING STEEL SCHEDULE						
	BAR	No.	Size	Spa.	Length	Weight lbs.
	A	39	4	5" o.c.	14' 9 1/2"	385.35
DRAIN "C"	B	39	4	5"	6' 1 3/4"	160.11
L= 15'	C	43	4	9"	4' 6"	129.26
DEPTH= 5'	D	24	4	10"	16' 1"	257.85
	E	12	4	10 1/2"	6' 10"	54.78
	F	17	5	12"	2' 3"	39.89
	G	3	4	12"	19' 8"	39.41
	H	5	5	12"	1' 8"	8.69

*Concrete Total = 8.7 C.Y. Manhole Casting = 260 lbs. Steel Total = 1335.34 lbs.



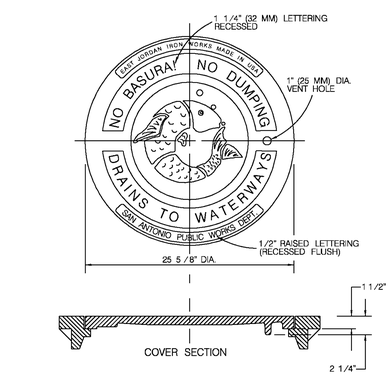
FRONT VIEW

SCALE : 1" = 2'



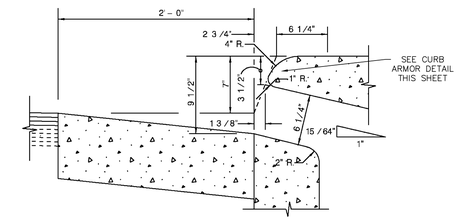
SIDE VIEW

SCALE : 1" = 1'



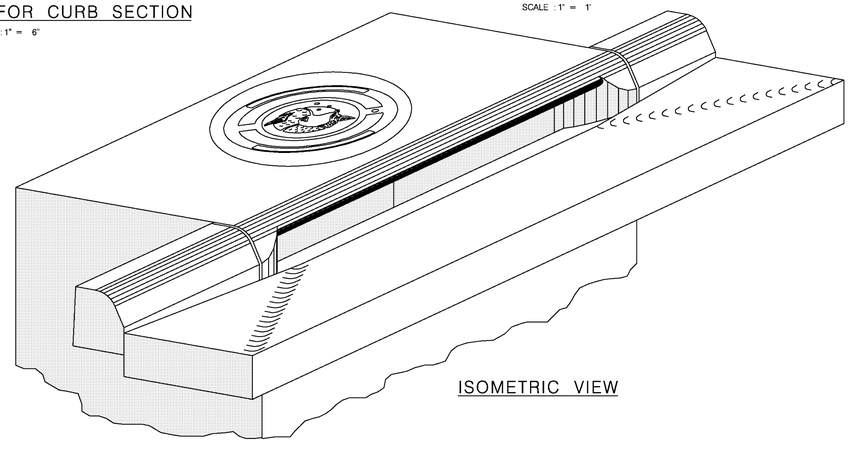
MANHOLE LID & RING DETAIL (ITEM 409)

SCALE : 1" = 8"



OPENING DETAIL FOR CURB SECTION

SCALE : 1" = 6"



ISOMETRIC VIEW

NOTES FOR MANHOLE LID AND RING

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

* THESE FIGURES DO NOT EXCLUDE CONCRETE & STEEL INTERCEPTED BY MANHOLE AND REINFORCED CONC. PIPE
* INCLUDES CONCRETE GUTTER FOR ON GRADE INLET. REDUCE BY .06 C.Y. FOR INLETS IN SUMP.

GENERAL NOTES

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

JANUARY 2005

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

TYPE "C" INLET DETAILS

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

CUDEENGINEERS.COM

CUDE ENGINEERS

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

TERRA BUONA UNIT 10

COSA DRAIN INLET DETAILS TYPE C

DATE 09/11/2025

PROJECT NO. 03209.019

DRAWN BY JW/SG/LB/DF

CHECKED BY SPM

REVISIONS

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09/11/2025

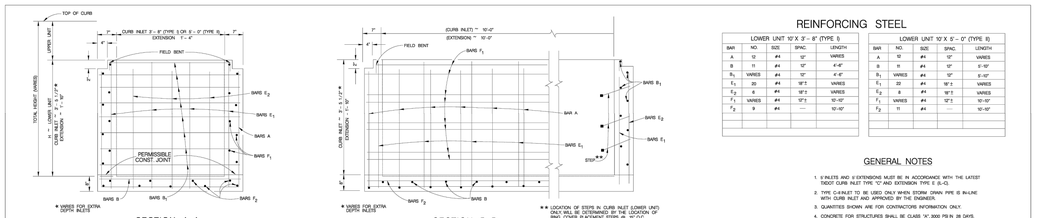
STATE OF TEXAS
SEAN P. McFARLAND
138893
LICENSED
PROFESSIONAL ENGINEER

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO. 25-11800307

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.



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'-4"
B_1	VARIES	#4	12"	4'-4"
E_1	20	#4	18"±	VARIES
E_2	6	#4	18"±	VARIES
F_1	VARIES	#4	12"±	VARIES
F_2	9	#4	----	10'-10"

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

BAR	NO.	SIZE	SPAC.	LENGTH
A	12	#4	12"	VARIES
B	11	#4	12"	6'-10"
B_1	VARIES	#4	12"	6'-10"
E_1	22	#4	18"±	VARIES
E_2	8	#4	18"±	VARIES
F_1	VARIES	#4	12"±	10'-10"
F_2	11	#4	----	10'-10"

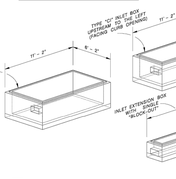
GENERAL NOTES

1. 5"-INLETS AND 5' EXTENSIONS MUST BE IN ACCORDANCE WITH THE LATEST TXDOT CURB INLET TYPE "C" AND EXTENSION TYPE E (5-C).
2. TYPE C-8 INLET TO BE USED ONLY WHEN STORM DRAIN PIPE IS IN-LINE WITH CURB INLET AND APPROVED BY THE ENGINEER.
3. QUANTITIES SHOWN ARE FOR CONTRACTORS INFORMATION ONLY.
4. CONCRETE FOR STRUCTURES SHALL BE CLASS "A", 3000 PSI IN 28 DAYS.
5. ALL DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS.
6. ALL REINFORCING STEEL SHALL HAVE A MINIMUM COVER OF 1 1/2".
7. ALL REINFORCING STEEL SHALL CONFORM TO A.S.T.M. A-615, GRADE 60 REQUIREMENTS.
8. ALL EXPOSED CORNERS SHALL BE CHAMFERED 3 /4".
9. DEPRESSION SLAB SHALL RECEIVE A WOOD FLOAT FINISH.
10. FACE OF INLET TO CONFORM TO FACE OF CURB LINE.
11. ALL BARS INTERCEPTING MANHOLE RING & COVER SHALL BE CUT OR BENT.
12. PAYMENT FOR ALL EXCAVATION, BACK-FILLING, CONCRETE, REINFORCING STEEL, RING AND COVER, CURB ARMOR AND STEPS SHALL BE INCLUDED IN THE UNIT COST OF ITEM 459 "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 SURFACE OF THE PIPE. WHERE THE BLOCKOUT EXCEEDS 3" OF THE PIPE AS NECESSARY, CONSTRUCTION JOINT MAY BE RAISED A MAXIMUM OF 6".

PHASE CONSTRUCTION

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

1. THE CURB INLET AND EXTENSION SHALL BE CONSTRUCTED TO A DEPTH "Hu" 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 ASSC. OVERLAY SAW CUT THE PAVEMENT, REMOVE THE PLATE AND COMPLETE THE UPPER PORTION OF THE CURB INLET AND /OR EXTENSION.



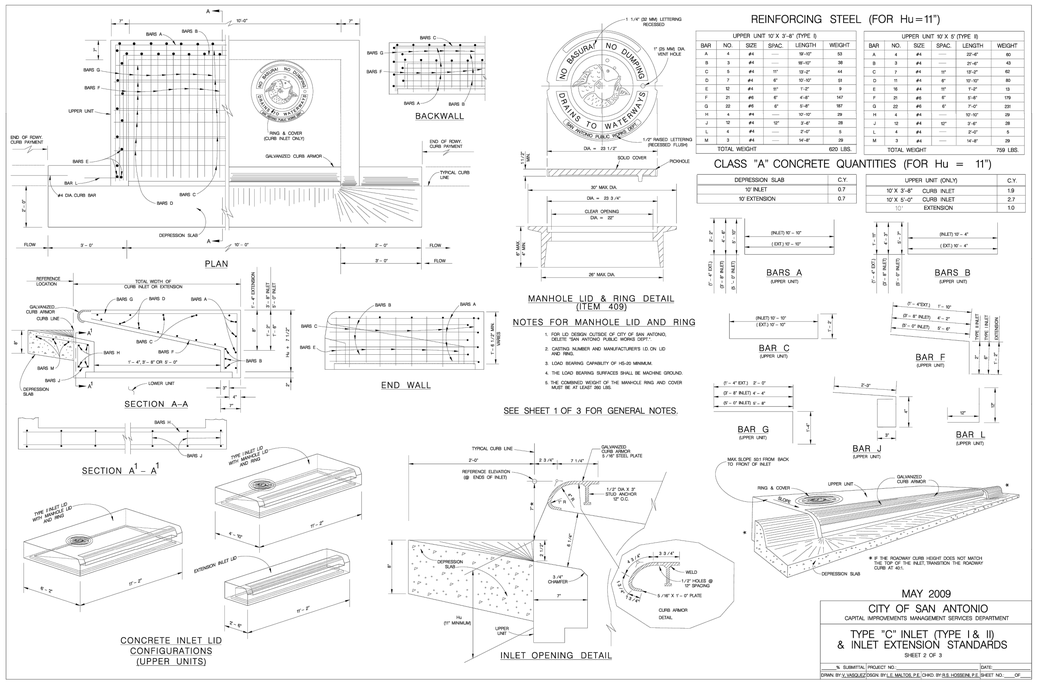
MAY 2009

CITY OF SAN ANTONIO
CAPITAL IMPROVEMENTS MANAGEMENT SERVICES DEPARTMENT

TYPE "C" INLET (TYPE I & II)
& INLET EXTENSION STANDARDS
SHEET 1 OF 3

NO.	SUBMITTAL	PROJECT NO.:	DATE:

DRAWN BY: V. VASQUEZ DESIGN BY: L.E. MALTOS, P.E. CHKD. BY: R.S. HOSSEINI, P.E. SHEET NO.: ___OF___


A
10'-0"
3"
BARS A
BARS B
BARS G
BARS F
UPPER UNIT
BARS E
BAR L
#4 DIA CURB BAR
BARS C
BARS D
DEPRESSION SLAB
FLOW
3'-0"
2'-0"
NO BASURA / NO DUMPING
DRAINS TO WATERWAYS
1" DIS. MIN. DIA. VENT HOLE
RING & COVER (CURB INLET ONLY)
GALVANIZED CURB ARMOR
END OF ROW/ CURB PAVMENT
TYPICAL CURB LINE
PLAN
BACKWALL
1 1/4" (32 MM) LETTERING RECESSED
1" DIS. MM. DIA. VENT HOLE
1/2" RAISED LETTERING (RECESSED FLUSH)
DIA. = 23 1/2"
SOLID COVER
MANHOLE
30" MAX. DIA.
DIA. = 23 3/4"
CLEAR OPENING DIA. = 22"
4" MIN. 8" MAX.
36" MAX. DIA.
MANHOLE LID & RING DETAIL (ITEM 409)
REFERENCE LOCATION
TOTAL WIDTH OF CURB INLET OR EXTENSION
GALVANIZED CURB ARMOR
CURB LINE
BARS H
BARS J
LOWER UNIT
SECTION A–A
SECTION A1 – A1
END WALL
TYPE 'C' INLET LID WITH HANDLE AND RING
EXTENSION INLET LID
CONCRETE INLET LID CONFIGURATIONS (UPPER UNITS)
TYPICAL CURB LINE
REFERENCE ELEVATION (@ ENDS OF INLET)
1/2" DIA X 3" STUD ANCHOR 18" O.C.
3/4" CHAMFER
7"
Hu (1" MINIMUM)
UPPER UNIT
WELD
1/2" HOLES @ 12" SPACING
5 1/8" X 1'-0" PLATE
CURB ARMOR DETAIL
INLET OPENING DETAIL
REINFORCING STEEL (FOR Hu = 11")
UPPER UNIT 10' X 3'-8" (TYPE I)

BAR	NO.	SIZE	SPAC.	LENGTH	WEIGHT
A	4	#4	----	18'-10"	53
B	3	#4	----	18'-10"	38
C	5	#4	11"	13'-2"	44
D	7	#4	8"	10'-10"	51
E	12	#4	11"	1'-2"	9
F	21	#6	6"	4'-8"	147
G	22	#6	6"	5'-8"	187
H	4	#4	----	10'-10"	29
J	12	#4	12"	3'-8"	28
L	4	#4	----	2'-0"	5
M	3	#4	----	14'-8"	29
TOTAL WEIGHT					620 LBS.

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

BAR	NO.	SIZE	SPAC.	LENGTH	WEIGHT
A	4	#4	----	22'-6"	60
B	3	#4	----	21'-6"	43
C	7	#4	11"	13'-2"	62
D	11	#4	8"	10'-10"	80
E	16	#4	11"	1'-2"	13
F	25	#6	6"	5'-8"	179
G	22	#6	6"	7'-0"	231
H	4	#4	----	10'-10"	29
J	12	#4	12"	3'-8"	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

NOTES FOR MANHOLE LID AND RING

1. FOR LID DESIGN OUTSIDE OF CITY OF SAN ANTONIO, DELETE "SAN ANTONIO PUBLIC WORKS DEPT."
2. CASTING NUMBER AND MANUFACTURER'S I.D. ON LID AND RING.
3. LOAD BEARING CAPABILITY OF HS-20 MINIMUM.
4. THE LOAD BEARING SURFACES SHALL BE MACHINE GROUND.
5. THE COMBINED WEIGHT OF THE MANHOLE RING AND COVER MUST BE AT LEAST 360 LBS.

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	----	18'-10"	53
B	3	#4	----	18'-10"	38
C	5	#4	11"	13'-2"	44
D	7	#4	8"	10'-10"	51
E	12	#4	11"	1'-2"	9
F	21	#6	6"	4'-8"	147
G	22	#6	6"	5'-8"	187
H	4	#4	----	10'-10"	29
J	12	#4	12"	3'-8"	28
L	4	#4	----	2'-0"	5
M	3	#4	----	14'-8"	29
TOTAL WEIGHT					620 LBS.

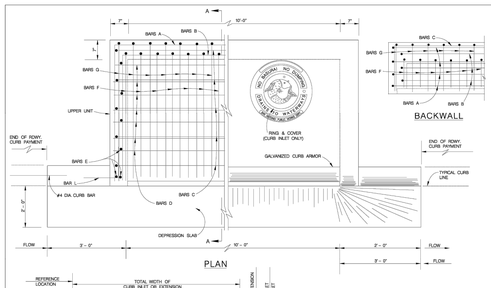
UPPER UNIT 10' X 5'-0" (TYPE II)

BAR	NO.	SIZE	SPAC.	LENGTH	WEIGHT
A	4	#4	----	22'-6"	60
B	3	#4	----	21'-6"	43
C	7	#4	11"	13'-2"	62
D	11	#4	8"	10'-10"	80
E	16	#4	11"	1'-2"	13
F	25	#6	6"	5'-8"	179
G	22	#6	6"	7'-0"	231
H	4	#4	----	10'-10"	29
J	12	#4	12"	3'-8"	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



NOTES FOR MANHOLE LID AND RING

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5. THE COMBINED WEIGHT OF THE MANHOLE RING AND COVER MUST BE AT LEAST 360 LBS.

SEE SHEET 1 OF 3 FOR GENERAL NOTES.

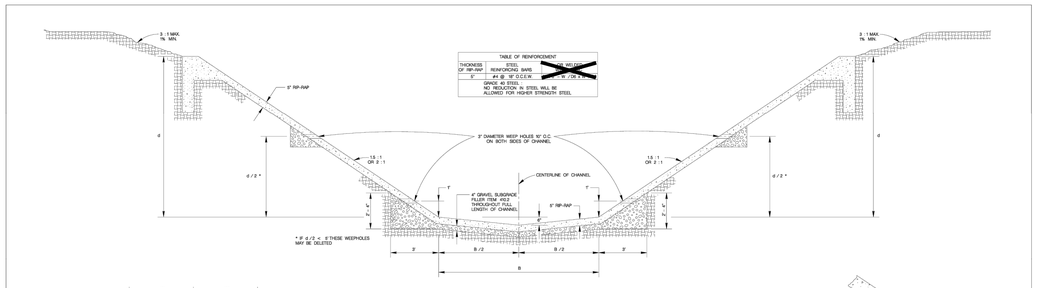
MAY 2009

CITY OF SAN ANTONIO
CAPITAL IMPROVEMENTS MANAGEMENT SERVICES DEPARTMENT

TYPE "C" INLET (TYPE I & II)
& INLET EXTENSION STANDARDS
SHEET 2 OF 3

NO.	SUBMITTAL	PROJECT NO.:	DATE:

DRAWN BY: V. VASQUEZ DESIGN BY: L.E. MALTOS, P.E. CHKD. BY: R.S. HOSSEINI, P.E. SHEET NO.: ___OF___



MAY 2009

CITY OF SAN ANTONIO
CAPITAL IMPROVEMENTS MANAGEMENT SERVICES DEPARTMENT

TYPICAL CONCRETE CHANNEL RIP–RAP STANDARDS
SHEET 3 OF 3

NO.	SUBMITTAL	PROJECT NO.:	DATE:

DRAWN BY: V. VASQUEZ DESIGN BY: _____ CHKD. BY: _____ SHEET NO.: ___OF___

CUDEENGINEERS.COM

CUDE ENGINEERS EST. 1980

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

TERRA BUONA UNIT 10

TYPE 'C' INLET DETAILS

DATE
09/11/2025

PROJECT NO.
03209.019

DRAWN BY
JW/SG/LB/DF

CHECKED BY
SPM

REVISIONS
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10.

09/11/2025

STATE OF TEXAS
SEAN P. McFARLAND
138893
LICENSED PROFESSIONAL ENGINEER

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
25-11800307

C7.D3

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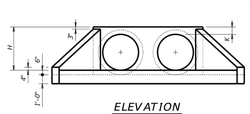
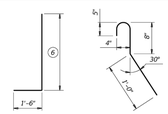
DATE:
FILE:

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

Slope	Dia of Pipe (D)	Values for One Pipe W	X	Y	L	Reinf (lbs)	Conc (C.Y.) (1)	Values to be Added for Each Add'l Pipe x and W	Reinf (lbs)	Conc (C.Y.) (1)
2:1	12"	4' - 7 1/2"	2' - 6"	2' - 10"	3' - 3 1/4"	88	0.6	1' - 9"	20	0.2
	15"	5' - 5 3/4"	2' - 9 1/2"	3' - 4"	3' - 10 1/4"	103	0.7	2' - 2"	24	0.3
	18"	6' - 4 1/4"	3' - 1"	3' - 10"	4' - 5"	124	0.9	2' - 8"	32	0.3
	21"	7' - 2 3/4"	3' - 4 1/2"	4' - 4"	5' - 0"	143	1.1	3' - 1"	43	0.4
	24"	8' - 2 1/2"	3' - 9 1/2"	4' - 10"	5' - 7"	164	1.3	3' - 7"	50	0.5
	27"	9' - 1"	4' - 1"	5' - 4"	6' - 2"	179	1.5	3' - 11"	56	0.6
	30"	9' - 11 1/2"	4' - 4 1/2"	5' - 10"	6' - 8 3/4"	203	1.7	4' - 4"	65	0.8
	33"	10' - 10"	4' - 8"	6' - 4"	7' - 3 3/4"	224	2.0	4' - 8"	71	0.9
	36"	11' - 8 1/4"	4' - 11 1/2"	6' - 10"	7' - 10 3/4"	249	2.2	5' - 1"	81	1.0
	42"	13' - 5 1/4"	5' - 6 1/2"	7' - 10"	9' - 0 1/2"	298	2.8	5' - 10"	97	1.3
	48"	15' - 9"	6' - 1 1/2"	9' - 4"	10' - 9 1/2"	360	3.8	6' - 7"	117	1.7
	54"	17' - 5 3/4"	6' - 8 1/2"	10' - 4"	11' - 11 1/2"	427	4.5	7' - 6"	151	2.1
	60"	19' - 2 3/4"	7' - 3 1/2"	11' - 4"	13' - 1"	481	5.3	8' - 3"	174	2.5
	66"	20' - 11 1/2"	7' - 10 1/2"	12' - 4"	14' - 3"	544	6.2	8' - 9"	194	2.9
	72"	22' - 8 1/2"	8' - 5 1/2"	13' - 4"	15' - 4 3/4"	601	7.1	9' - 4"	213	3.3
3:1	12"	6' - 3"	2' - 6"	4' - 3"	4' - 11"	118	0.8	1' - 9"	22	0.2
	15"	7' - 5"	2' - 9 1/2"	5' - 0"	5' - 9 1/2"	137	1.1	2' - 2"	28	0.3
	18"	8' - 6 3/4"	3' - 1"	5' - 9"	6' - 7 3/4"	170	1.3	2' - 8"	37	0.5
	21"	9' - 8 3/4"	3' - 4 1/2"	6' - 6"	7' - 6"	195	1.6	3' - 1"	48	0.6
	24"	11' - 0"	3' - 9 1/2"	7' - 3"	8' - 4 1/2"	227	2.0	3' - 7"	58	0.7
	27"	12' - 2"	4' - 1"	8' - 0"	9' - 2 3/4"	251	2.3	3' - 11"	67	0.8
	30"	13' - 4"	4' - 4 1/2"	8' - 9"	10' - 1 1/4"	293	2.7	4' - 4"	77	1.0
	33"	14' - 5 3/4"	4' - 8"	9' - 6"	10' - 11 3/4"	318	3.1	4' - 8"	84	1.2
	36"	15' - 7 3/4"	4' - 11 1/2"	10' - 3"	11' - 10"	351	3.5	5' - 1"	96	1.4
	42"	17' - 11 1/2"	5' - 6 1/2"	11' - 9"	13' - 6 3/4"	432	4.5	5' - 10"	119	1.7
	48"	21' - 1 3/4"	6' - 1 1/2"	14' - 0"	16' - 2"	537	6.1	6' - 7"	146	2.3
	54"	23' - 5 1/2"	6' - 8 1/2"	15' - 6"	17' - 10 3/4"	630	7.3	7' - 6"	186	2.9
	60"	25' - 9 1/4"	7' - 3 1/2"	17' - 0"	19' - 7 1/2"	719	8.7	8' - 3"	219	3.4
	66"	28' - 1"	7' - 10 1/2"	18' - 6"	21' - 4 1/4"	811	10.1	8' - 9"	242	3.9
	72"	30' - 4 3/4"	8' - 5 1/2"	20' - 0"	23' - 1 1/4"	924	11.7	9' - 4"	272	4.4
4:1	12"	7' - 10 3/4"	2' - 6"	5' - 8"	6' - 6 1/2"	148	1.1	1' - 9"	24	0.3
	15"	9' - 4"	2' - 9 1/2"	6' - 8"	7' - 8 1/2"	181	1.5	2' - 2"	32	0.4
	18"	10' - 9 1/2"	3' - 1"	7' - 8"	8' - 10 1/2"	221	1.9	2' - 8"	42	0.5
	21"	12' - 2 3/4"	3' - 4 1/2"	8' - 8"	10' - 0"	260	2.3	3' - 1"	57	0.7
	24"	13' - 9 1/2"	3' - 9 1/2"	9' - 8"	11' - 2"	301	2.8	3' - 7"	67	0.9
	27"	15' - 3"	4' - 1"	10' - 8"	12' - 3 3/4"	334	3.3	3' - 11"	77	1.0
	30"	16' - 8 1/4"	4' - 4 1/2"	11' - 8"	13' - 5 3/4"	385	3.8	4' - 4"	89	1.3
	33"	18' - 1 3/4"	4' - 8"	12' - 8"	14' - 7 1/2"	425	4.5	4' - 8"	101	1.4
	36"	19' - 7"	4' - 11 1/2"	13' - 8"	15' - 9 1/4"	472	5.1	5' - 1"	115	1.7
	42"	22' - 5 3/4"	5' - 6 1/2"	15' - 8"	18' - 1"	583	6.5	5' - 10"	141	2.1
	48"	26' - 6 1/4"	6' - 1 1/2"	18' - 8"	21' - 6 3/4"	730	8.9	6' - 7"	175	2.8
	54"	29' - 5"	6' - 8 1/2"	20' - 8"	23' - 10 1/2"	875	10.7	7' - 6"	226	3.6
	60"	32' - 3 3/4"	7' - 3 1/2"	22' - 8"	26' - 2"	996	12.7	8' - 3"	264	4.3
	66"	35' - 2 1/2"	7' - 10 1/2"	24' - 8"	28' - 5 3/4"	1,140	14.9	8' - 9"	300	4.9
	72"	38' - 1 1/4"	8' - 5 1/2"	26' - 8"	30' - 9 1/2"	1,297	17.3	9' - 4"	334	5.6
6:1	12"	11' - 2"	2' - 6"	8' - 6"	9' - 9 3/4"	224	1.9	1' - 9"	28	0.4
	15"	13' - 2 1/4"	2' - 9 1/2"	10' - 0"	11' - 6 1/2"	264	2.5	2' - 2"	37	0.5
	18"	15' - 2 1/2"	3' - 1"	11' - 6"	13' - 3 1/4"	330	3.2	2' - 8"	50	0.7
	21"	17' - 2 3/4"	3' - 4 1/2"	13' - 0"	15' - 0 1/4"	387	3.9	3' - 1"	69	0.9
	24"	19' - 4 1/2"	3' - 9 1/2"	14' - 6"	16' - 9"	453	4.8	3' - 7"	80	1.2
	27"	21' - 4 3/4"	4' - 1"	16' - 0"	18' - 5 3/4"	512	5.7	3' - 11"	96	1.4
	30"	23' - 5 1/4"	4' - 4 1/2"	17' - 6"	20' - 2 1/2"	593	6.7	4' - 4"	110	1.7
	33"	25' - 5 1/2"	4' - 8"	19' - 0"	21' - 11 1/2"	675	7.8	4' - 8"	127	2.0
	36"	27' - 5 3/4"	4' - 11 1/2"	20' - 6"	23' - 8"	735	9.0	5' - 1"	144	2.3
	42"	31' - 6 1/4"	5' - 6 1/2"	23' - 6"	27' - 1 1/2"	922	11.5	5' - 10"	179	3.0
	48"	37' - 3 1/2"	6' - 1 1/2"	28' - 0"	32' - 4"	1,191	15.9	6' - 7"	231	4.0
	54"	41' - 4 1/4"	6' - 8 1/2"	31' - 0"	35' - 9 1/2"	1,424	19.2	7' - 6"	300	5.0
	60"	45' - 4 3/4"	7' - 3 1/2"	34' - 0"	39' - 3"	1,631	22.9	8' - 3"	353	6.0



ELEVATION
(Showing dimensions.)



BARS V

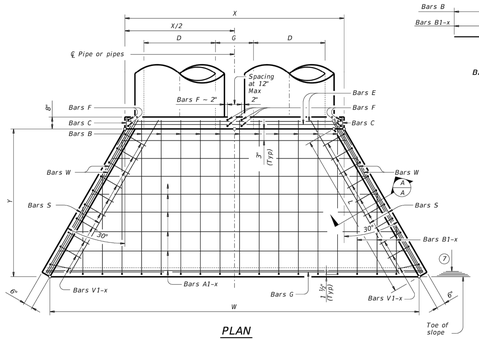
BARS CL
(Length = 2'-5")

TABLE OF (5) REINFORCING STEEL

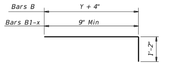
Bar	Size	Spa	No.
A	#4	1' - 0"	~
B	#3	1' - 6"	~
C	#4	1' - 0"	~
D	#3	1' - 0"	~
E	#5	~	4
F	#5	~	~
G	#3	~	2
S	#4	~	6
V	#4	1' - 0"	~
W	#5	~	4

TABLE OF CONSTANT DIMENSIONS

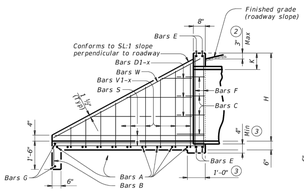
Dia of Pipe (D)	G	K (4)	H
12"	0' - 9"	1' - 0"	2' - 0"
15"	0' - 11"	1' - 0"	2' - 3"
18"	1' - 2"	1' - 0"	2' - 6"
21"	1' - 4"	1' - 0"	2' - 9"
24"	1' - 7"	1' - 0"	3' - 0"
27"	1' - 8"	1' - 0"	3' - 3"
30"	1' - 10"	1' - 0"	3' - 6"
33"	1' - 11"	1' - 0"	3' - 9"
36"	2' - 1"	1' - 0"	4' - 0"
42"	2' - 4"	1' - 0"	4' - 6"
48"	2' - 7"	1' - 3"	5' - 3"
54"	3' - 0"	1' - 3"	5' - 9"
60"	3' - 3"	1' - 3"	6' - 3"
66"	3' - 3"	1' - 3"	6' - 9"
72"	3' - 4"	1' - 3"	7' - 3"



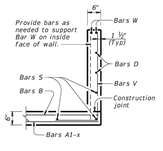
PLAN



BARS B and B1-x



TYPICAL WING ELEVATION



SECTION A-A

(1) Quantities shown are for concrete pipe and will increase slightly for metal pipe installations.

(2) 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.

(3) Provide a 1'-0" footing as shown where required to maintain 4" minimum cover for pipes.

(4) Dimensions shown are usual and maximum.

(5) Quantities shown are for one structure end only (one headwall).

(6) Min Length = 6" + 3" x $\left(\frac{12 \times H - 7}{12 \times L}\right)$

Max Length = 12 x H – 3" x $\left(\frac{12 \times H - 7}{12 \times L}\right)$ – 1"

(7) Lengths of wings based on SL:1 slope along this line.

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.

Texas Department of Transportation | Bridge Division Standard

CONCRETE HEADWALLS WITH FLARED WINGS FOR 0° SKEW PIPE CULVERTS

CH-FW-0

FILE: CD-CH-FW0-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT	
©TxDOT February 2020	CONT	SECT	JOB		HIGHWAY
REVISIONS	DIST	COUNTY			SHEET NO.

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CUDE ENGINEERS (EST. 1980)

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

TERRA BUONA UNIT 10

DRAINAGE DETAILS

DATE
09/11/2025

PROJECT NO.
03209.019

DRAWN BY
JW/SG/LB/DF

CHECKED BY
SPM

REVISIONS
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10.

09/11/2025

STATE OF TEXAS
SEAN P. McFARLAND
138893
LICENSED
PROFESSIONAL ENGINEER

CUDE ENGINEERS
TBPELS No. 10048500

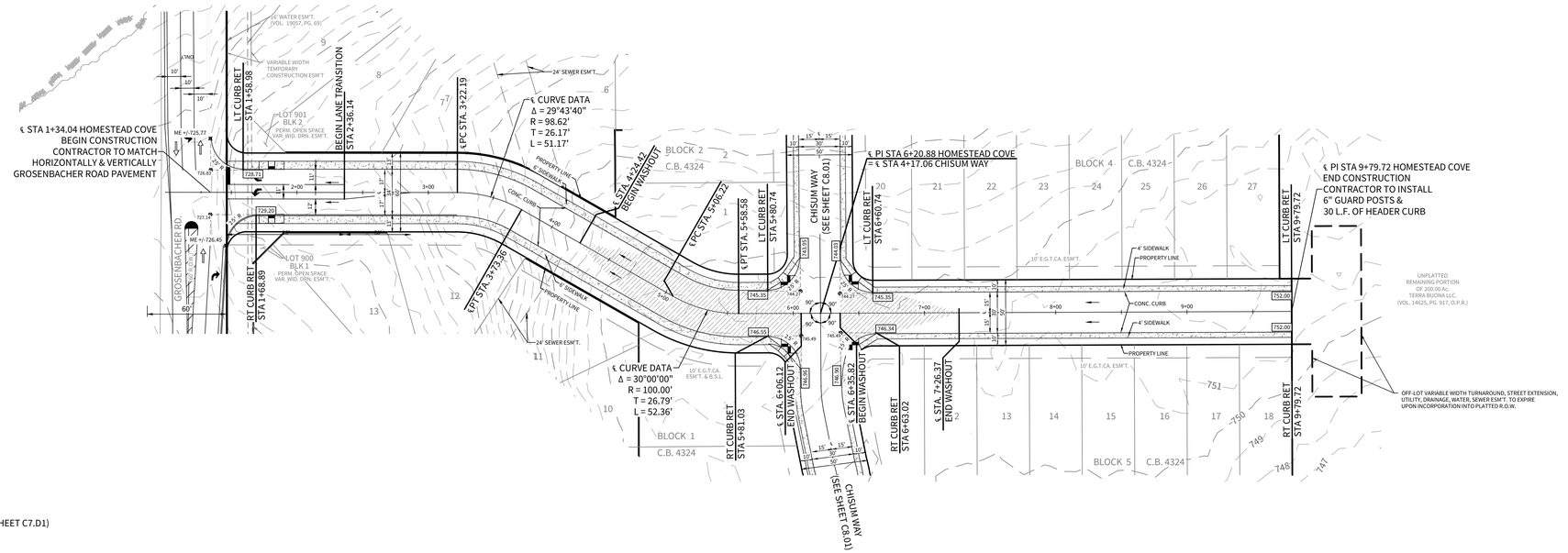
PLAT NO.
25-11800307

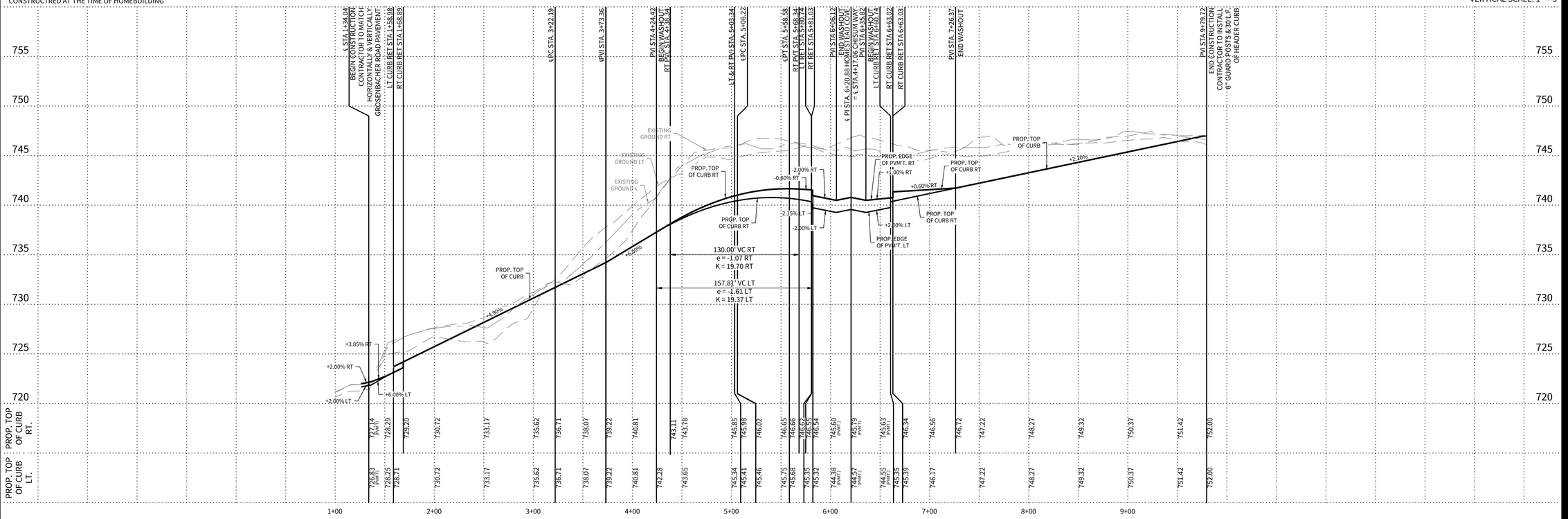
SAWS JOB NO.

C7.D4

P:\03209\03209.3.1\Work\4 Plans\01_04 Misc\Drainage\20250911 2 Sean mcfarland

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 PROPOSED ASPHALT PAVEMENT ELEVATION

- STREET WASHOUT (SEE DETAIL SHEET C7.D1)

- SIDEWALK TO BE CONSTRUCTED WITH INFRASTRUCTURE

TxDOT TYPE "2" WHEEL CHAIR RAMPS ARE INDICATED THUS " " UNLESS OTHERWISE NOTED. (SHEET C13)

TYPE "10" DIRECTIONAL WHEEL CHAIR RAMPS ARE INDICATED THUS " " UNLESS OTHERWISE NOTED. (SHEET C8)

FOR ADA RAMPS AT SIDEWALK INTERSECTIONS . DETECTABLE WARNING PAVER WITH TRUNCATED DOMES ONLY. ADA RAMPS TO BE CONSTRUCTED WITH INFRASTRUCTURE. WHERE RESIDENTIAL LOT FRONTAGE DOES NOT EXIST, ALL ADA RAMPS ADJACENT TO A RESIDENTIAL LOT SHALL BE CONSTRUCTRED AT THE TIME OF HOMEBUILDING

HOMESTEAD COVE

STA. 1+26.94 TO STA. 9+79.72

NOTE: A BEXAR COUNTY PERMIT MUST BE OBTAINED BEFORE WORKING IN BEXAR COUNTY RIGHT OF WAY

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

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San Antonio, Texas 78231
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TERRA BUONA UNIT 10

STREET PLAN & PROFILE - HOMESTEAD COVE

DATE
09/11/2025

PROJECT NO.
03209.019

DRAWN BY
JW/SG/LB/DF

CHECKED BY
SPM

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09/11/2025

STATE OF TEXAS
SEAN P. McFARLAND
138893
LICENSED PROFESSIONAL ENGINEER

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
25-11800307

C8.00

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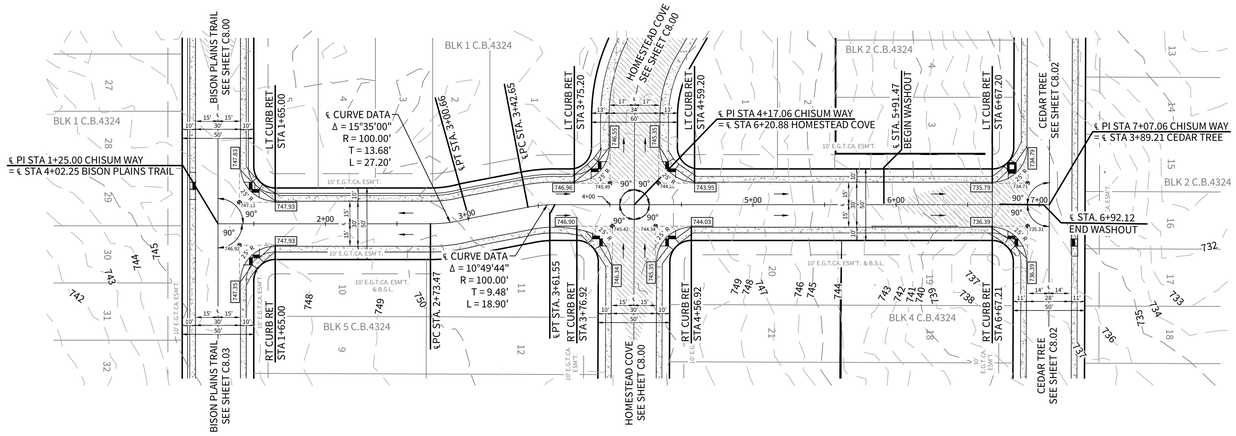

CHISUM WAY

STA. 1+25.00 TO STA. 7+07.06

ELEVATIONS:

XXXX.XX PROPOSED TOP OF CONCRETE CURB ELEVATION

XXXX.XX PROPOSED ASPHALT PAVEMENT ELEVATION

- STREET WASHOUT (SEE DETAIL SHEET C7.D1)

- SIDEWALK TO BE CONSTRUCTED WITH INFRASTRUCTURE

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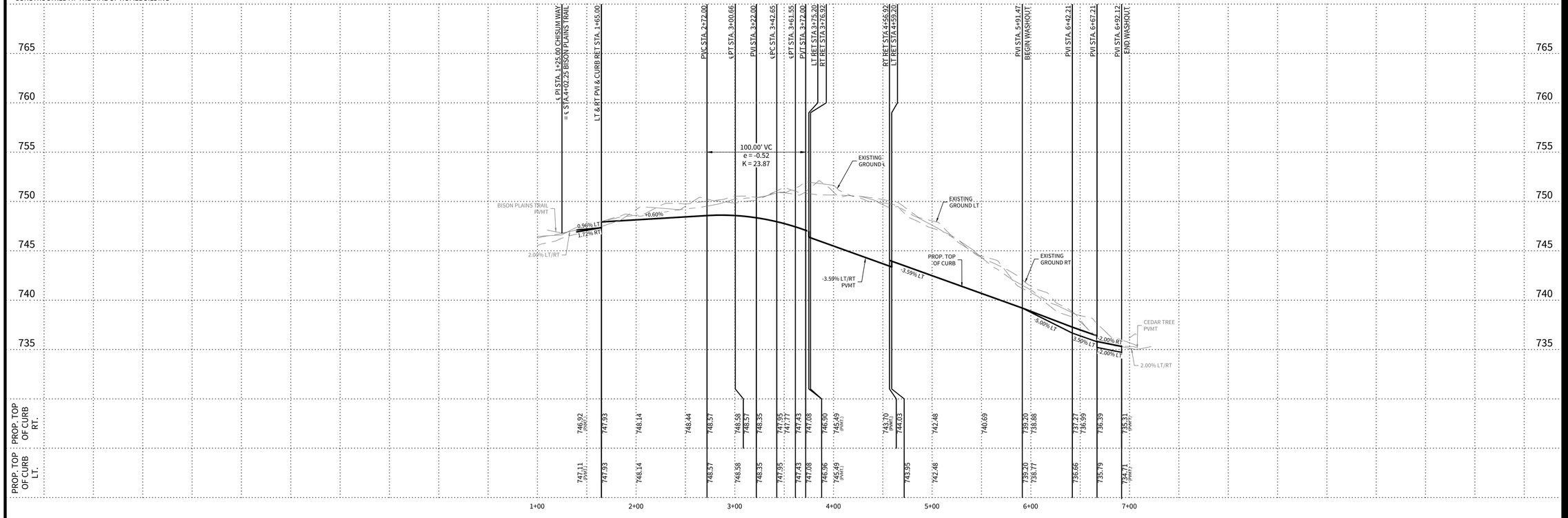

NOTE: A BEXAR COUNTY PERMIT MUST BE OBTAINED BEFORE WORKING IN BEXAR COUNTY RIGHT OF WAY

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

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TERRA BUONA
UNIT 10

STREET PLAN & PROFILE - CHISUM WAY

DATE
09/11/2025

PROJECT NO.
03209.019

DRAWN BY
JW/SG/LB/DF

CHECKED BY
SPM

REVISIONS
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09/11/2025

STATE OF TEXAS
SEAN P. McFARLAND
138893
LICENSED PROFESSIONAL ENGINEER

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
25-11800307

C8.01

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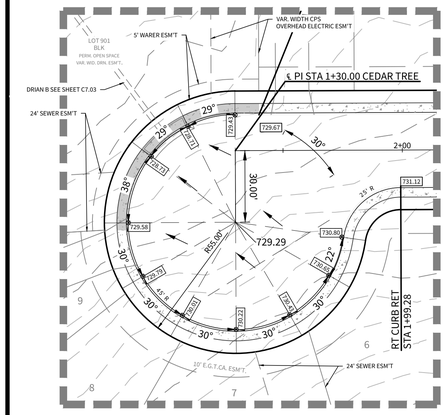
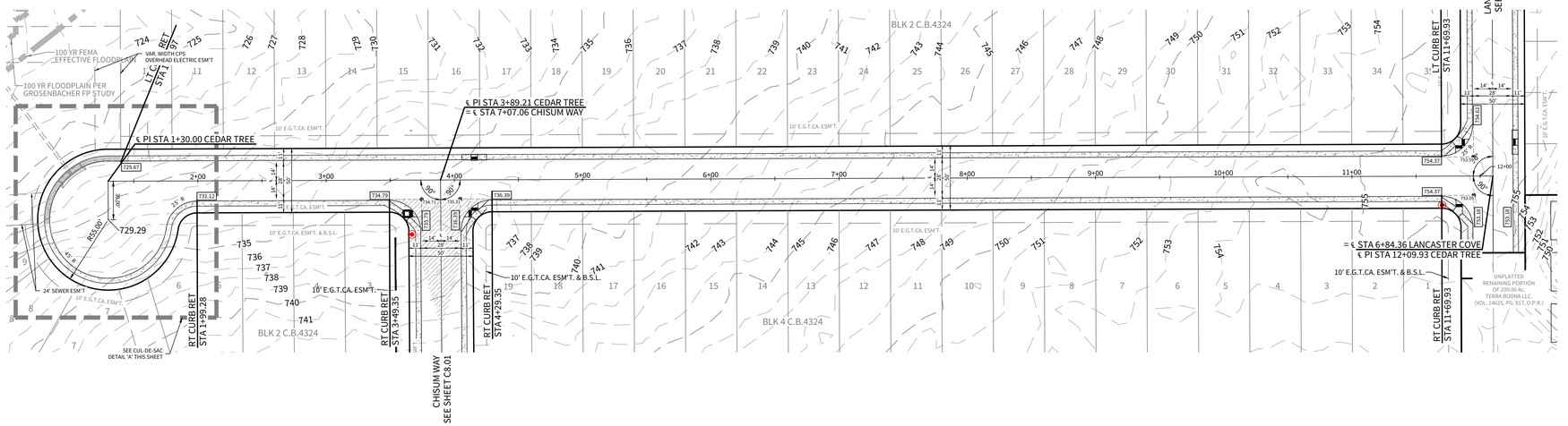


CUL-DE-SAC DETAIL 'A'

SCALE: 1" = 30'



ELEVATIONS:

XXXX.XX PROPOSED TOP OF CONCRETE CURB ELEVATION

XXXX.XX PROPOSED ASPHALT PAVEMENT ELEVATION

- STREET WASHOUT (SEE DETAIL SHEET C7.D1)

- SIDEWALK TO BE CONSTRUCTED WITH INFRASTRUCTURE

TxDOT TYPE "2" WHEEL CHAIR RAMPS ARE INDICATED THUS " " UNLESS OTHERWISE NOTED. (SHEET C13)

TYPE "10" DIRECTIONAL WHEEL CHAIR RAMPS ARE INDICATED THUS " " UNLESS OTHERWISE NOTED. (SHEET C8)

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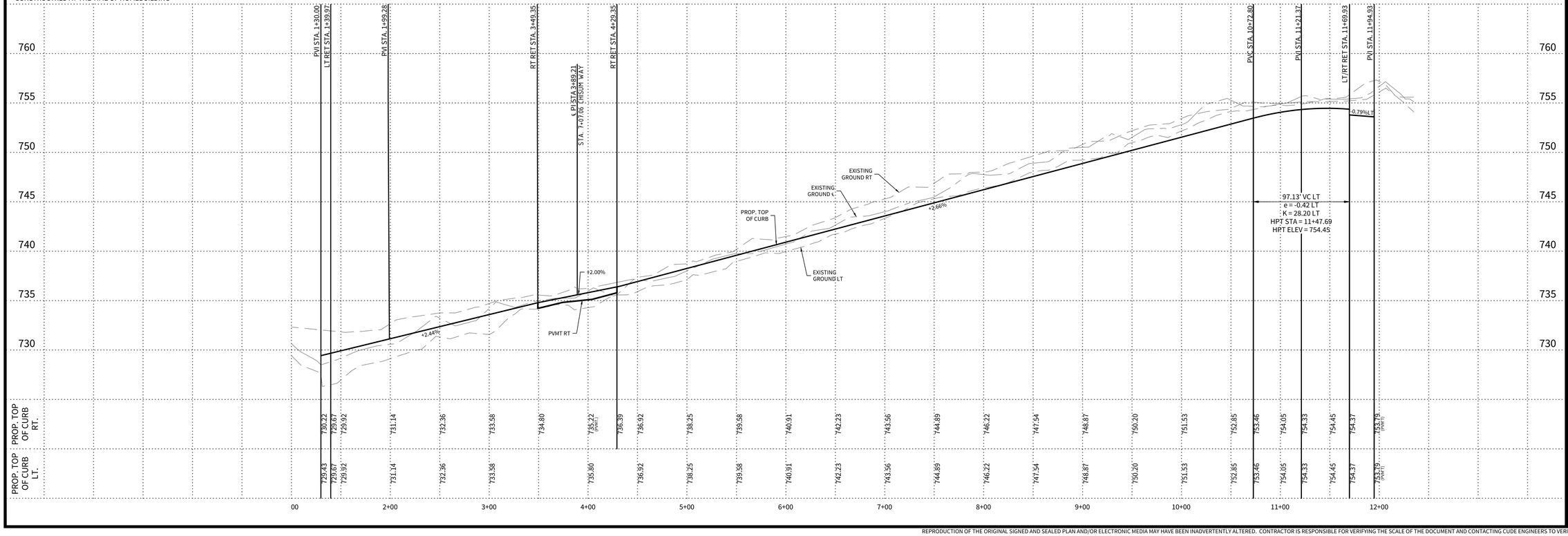
CEDAR TREE

STA. 1+30.00 TO STA. 12+09.93



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TERRA BUONA
UNIT 10

STREET PLAN & PROFILE - CEDAR TREE

DATE
09/11/2025

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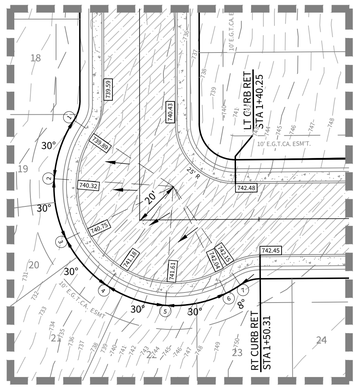

KNUCKLE DETAIL 'A'

SCALE: 1" = 30'

ELEVATIONS:

XXXX.XX PROPOSED TOP OF CONCRETE CURB ELEVATION

XXXX.XX PROPOSED ASPHALT PAVEMENT ELEVATION

- STREET WASHOUT (SEE DETAIL SHEET C7.D1)

- SIDEWALK TO BE CONSTRUCTED WITH INFRASTRUCTURE

TxDOT TYPE "2" WHEEL CHAIR RAMPS ARE INDICATED THUS " " UNLESS OTHERWISE NOTED. (SHEET C13)

TYPE "10" DIRECTIONAL WHEEL CHAIR RAMPS ARE INDICATED THUS " " UNLESS OTHERWISE NOTED. (SHEET C8)

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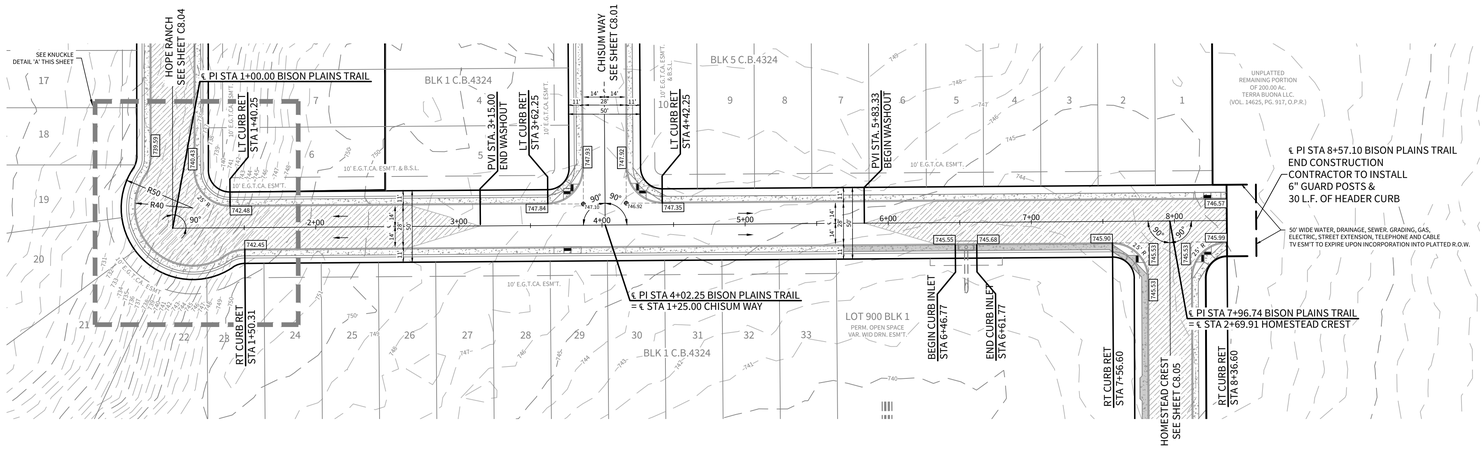
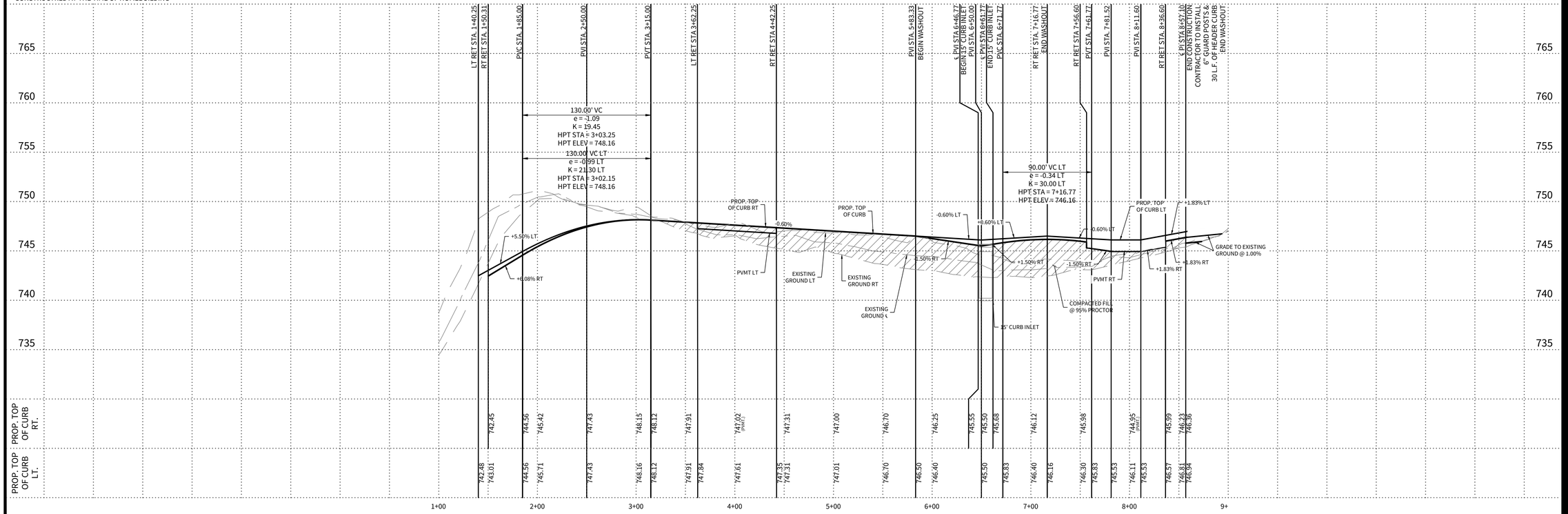


BISON PLAINS TRAIL

STA. 1+00.00 TO STA. 8+36.60



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

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TERRA BUONA
UNIT 10

STREET PLAN & PROFILE - BISON PLAINS TRAIL

DATE
09/11/2025

PROJECT NO.
03209.019

DRAWN BY
JW/SG/LB/DF

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09/11/2025

STATE OF TEXAS
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LICENSED PROFESSIONAL ENGINEER

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
25-11800307

C8.03

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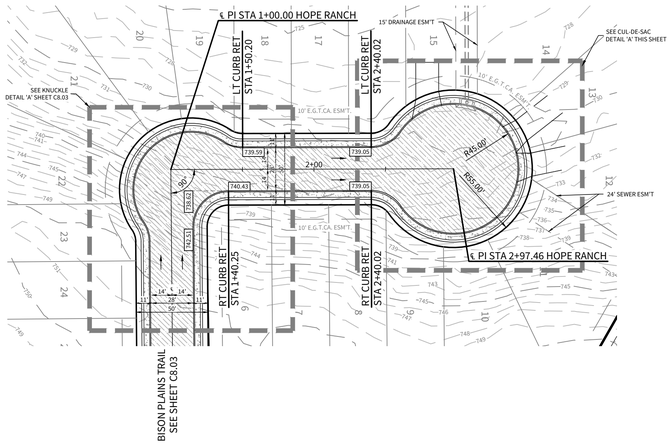

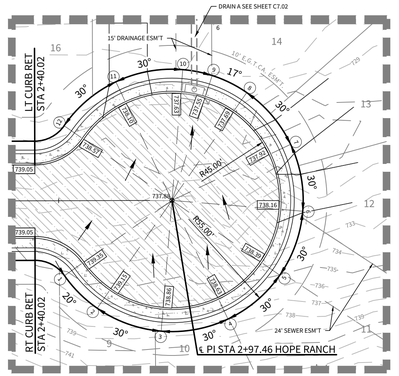

CUL-DE-SAC DETAIL 'A'

SCALE: 1" = 30'

ELEVATIONS:

xxxx.xx PROPOSED TOP OF CONCRETE CURB ELEVATION

xxxx.xx PROPOSED ASPHALT PAVEMENT ELEVATION

- STREET WASHOUT (SEE DETAIL SHEET C7.D1)

- SIDEWALK TO BE CONSTRUCTED WITH INFRASTRUCTURE

TxDOT TYPE "2" WHEEL CHAIR RAMPS ARE INDICATED THUS " " UNLESS OTHERWISE NOTED. (SHEET C13)

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HOPE RANCH

STA. 1+40.25 TO STA. 2+40.02

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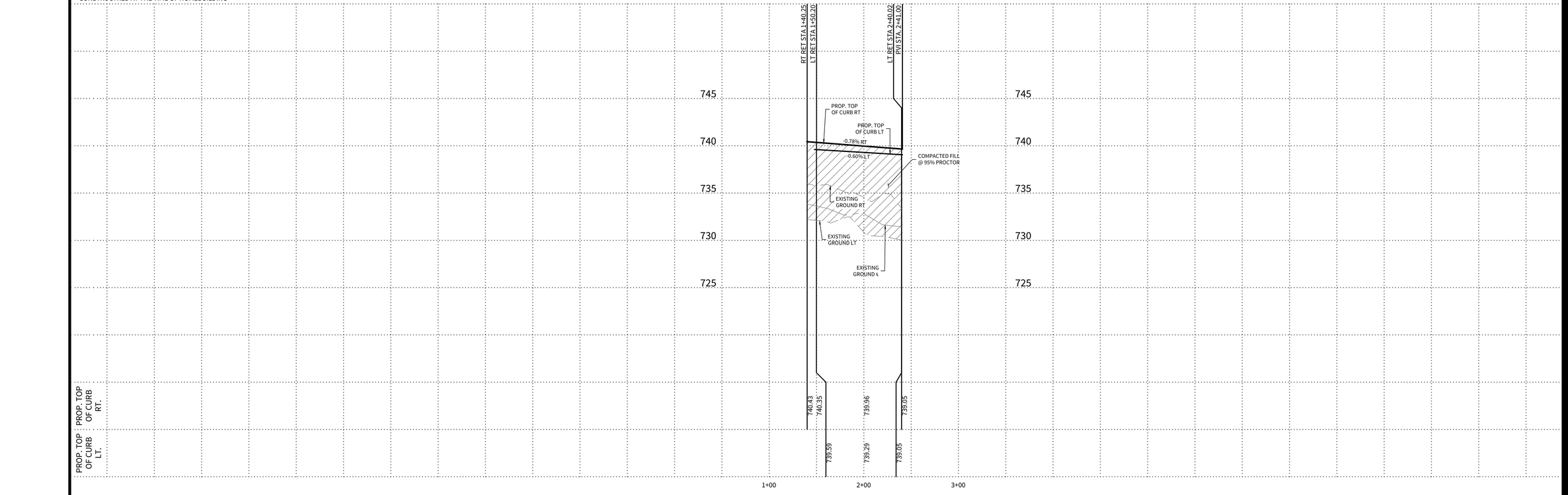
HORIZONTAL SCALE: 1" = 50'
VERTICAL SCALE: 1" = 5'



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TERRA BUONA UNIT 10

STREET PLAN & PROFILE - HOPE RANCH

DATE
09/11/2025

PROJECT NO.
03209.019

DRAWN BY
JW/SG/LB/DF

CHECKED BY
SPM

REVISIONS
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09/11/2025

STATE OF TEXAS
SEAN P. McFARLAND
138893
LICENSED PROFESSIONAL ENGINEER

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
25-11800307

C8.04

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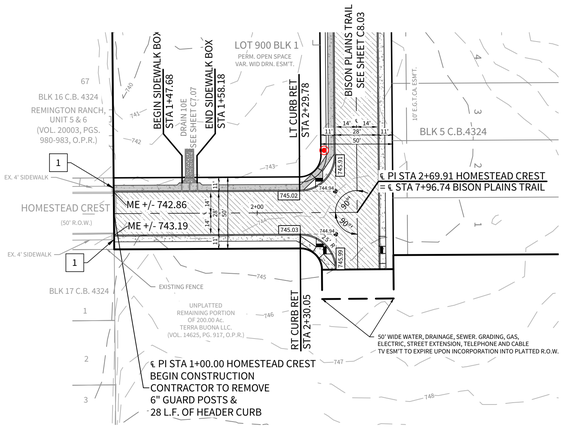
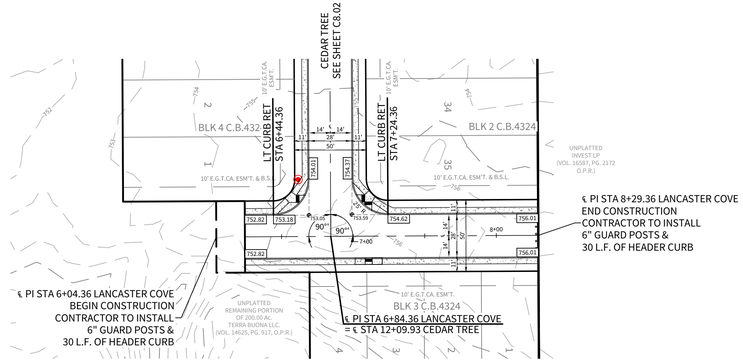




KEYNOTES:

1 CONTRACTOR TO TIE INTO EXISTING SIDEWALK, CURB AND PAVEMENT HORIZONTALLY AND VERTICALLY. ALL IMPROVEMENTS TO REMAIN AND BE PROTECTED. NOTIFY ENGINEER OF ANY DISCREPANCIES.

ELEVATIONS:

XXXX.XX PROPOSED TOP OF CONCRETE CURB ELEVATION

XXXX.XX PROPOSED ASPHALT PAVEMENT ELEVATION

- STREET WASHOUT (SEE DETAIL SHEET C7.D1)

- SIDEWALK TO BE CONSTRUCTED WITH INFRASTRUCTURE

TxDOT TYPE "2" WHEEL CHAIR RAMPS ARE INDICATED THUS " " UNLESS OTHERWISE NOTED. (SHEET C13)

TYPE "10" DIRECTIONAL WHEEL CHAIR RAMPS ARE INDICATED THUS " " UNLESS OTHERWISE NOTED. (SHEET C8)

FOR ADA RAMPS AT SIDEWALK INTERSECTIONS . DETECTABLE WARNING PAVER WITH TRUNCATED DOMES ONLY. ADA RAMPS TO BE CONSTRUCTED WITH INFRASTRUCTURE. WHERE RESIDENTIAL LOT FRONTAGE DOES NOT EXIST, ALL ADA RAMPS ADJACENT TO A RESIDENTIAL LOT SHALL BE CONSTRUCTRED AT THE TIME OF HOMEBUILDING

HOMESTEAD CREST

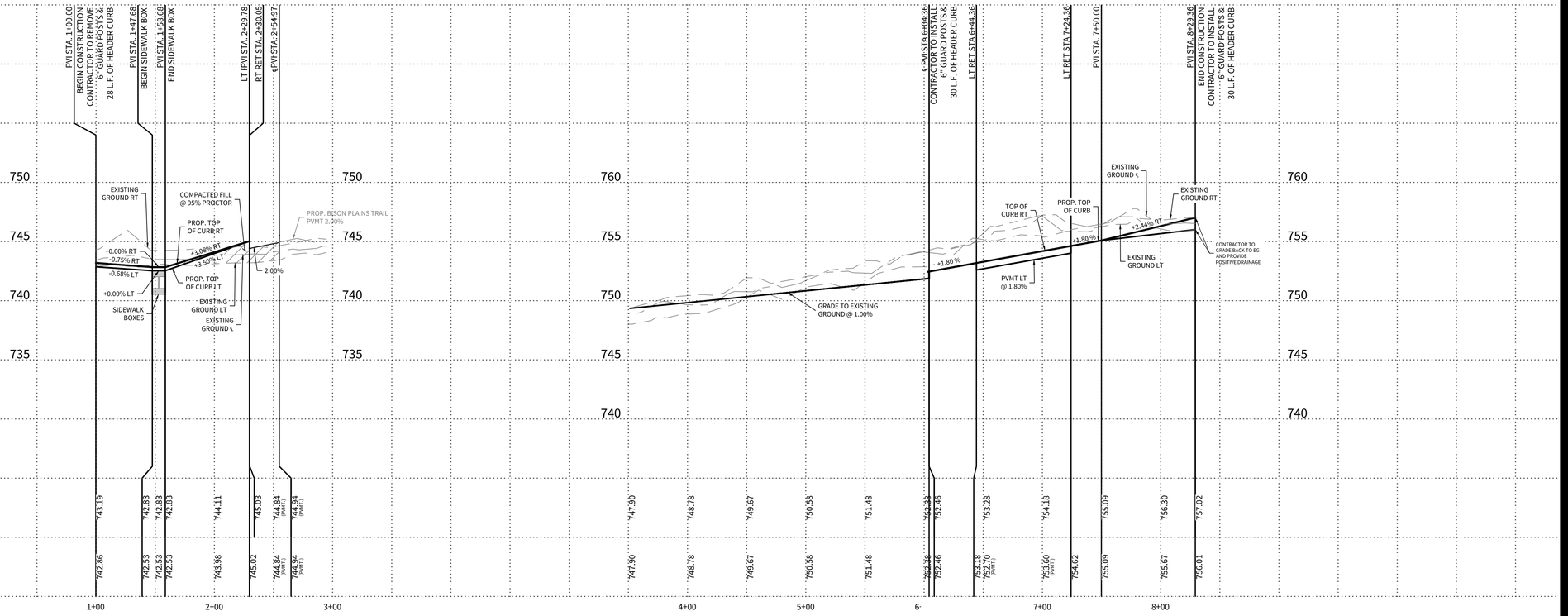
STA. 1+00.00 TO STA. 2+54.97

LANCASTER COVE

STA. 6+04.36 TO STA. 8+29.36

NOTE: A BEXAR COUNTY PERMIT MUST BE OBTAINED BEFORE WORKING IN BEXAR COUNTY RIGHT OF WAY

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



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TERRA BUONA UNIT 10

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STATE OF TEXAS
SEAN P. McFARLAND
138893
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CUDE ENGINEERS
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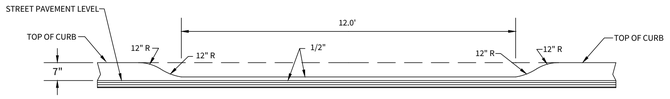
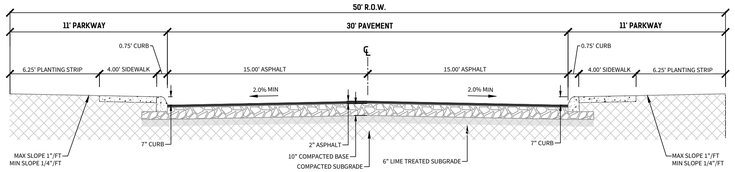
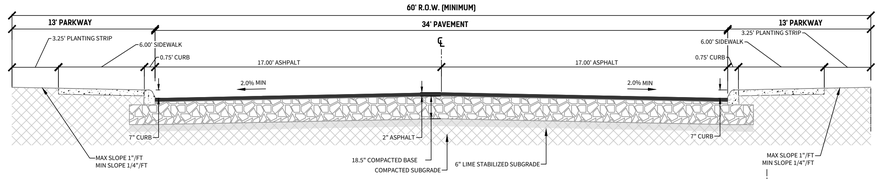


TYPICAL DRIVEWAY CUT SECTION



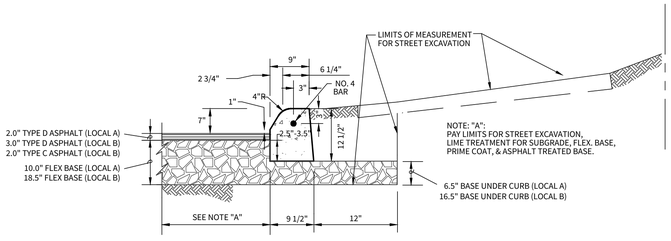
TYPICAL "LOCAL A" STREET CROSS SECTION

1" = 5'



TYPICAL LOCAL "B" STREET CROSS SECTION

1" = 5'



CURB SECTIONS

N.T.S.

STREET TYPE (CBR = 4.0)	HMAC TYPE "D"	HMAC TYPE "C"	FLEX BASE (TY A GR 2)	LIME TREATMENT SUBGRADE	BASE UNDER CURB	STRUCTURAL NUMBER
LOCAL "A"	2"	--	10.00"	8" (42 LB/SY)	6.5"	2.92
LOCAL "B"	2"	2"	18.50"	8" (42 LB/SY)	15"	4.99

STREET PAVEMENT DESIGN OPTIONS

NOTES:

1. THE SUBGRADE SOILS SHOULD BE TESTED FOR SOIL SULFATE CONTENT PRIOR TO TREATMENT. IF SOIL SULFATE CONTENT IS HIGH, AN ALTERNATE PROCEDURE WILL BE NEEDED.
2. LIME APPLICATION RATE OF 42.0 LBS PER SQ YD FOR 8 INCH DEPTH TREATMENT IS RECOMMENDED.
3. IF CEMENT APPLICATION RATES ARE NEEDED, PLEASE CONTACT INTECT TO RUN THE TESTS.
4. IF FILL IS USED TO RAISE THE GRADE, FILL MATERIAL UNDERNEATH THE PAVEMENT SHOULD BE APPROVED FILL MATERIAL, FREE OF DELETERIOUS MATERIAL AND WITH A MINIMUM CBR VALUE OF 4.0. LIME APPLICATION RATES SHOULD BE RE-EVALUATED AND TESTED FOR SULFATE CONTENT PRIOR TO USE OF THE FILL MATERIAL. THE MATERIAL SHOULD BE PLACED AS PER APPLICABLE CITY OR COUNTY GUIDELINES.
5. THE FINAL PAVEMENT SUBGRADE SHOULD BE DELINEATED FOR DIFFERENT SUBGRADE TYPES AND VERIFIED BY INTEC.

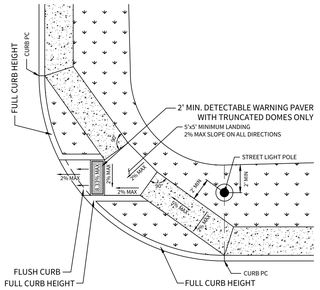
LIME TREATMENT

FOR CONSTRUCTION VERIFICATION THE FOLLOWING SHALL BE CONDUCTED IN THE FIELD:

- AFTER INITIAL MIXING, THE SOIL-LIME MIXTURE SHALL MELLOW FOR A PERIOD OF TWO TO THREE (2-3) DAYS. MAINTAIN A MOISTURE DURING MELLOWING;
- AFTER MELLOWING AND FINAL MIXING, THE PULVERIZATION SHALL BE CHECKED USING THE FOLLOWING CRITERIA (REMOVE NON-SLAKING AGGREGATES RETAINED ON THE ¾ INCH SIEVE FOR THE SAMPLE:

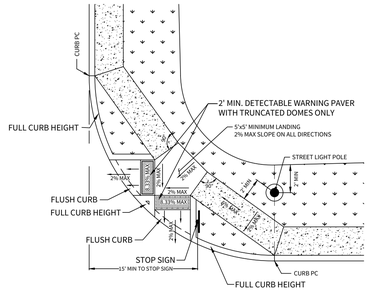
MINIMUM PASSING 1 ¾" SIEVE	100
MINIMUM PASSING ¾" SIEVE	85
MINIMUM PASSING NO. 4 SIEVE	60

- SAMPLE SOIL-LIME MIXTURE FOR DETERMINATION OF MDD. IN THE LABORATORY, MOLD SPECIMENS TO 95% OF MDD AT OPTIMUM MOISTURE CONTENT AND VERIFY UCS TO BE AT LEAST 160 PSI IN ACCORDANCE WITH PROCEDURE OUTLINED ABOVE FOR MIXTURE DESIGN.
- COMPACT AND CHECK FIELD DENSITY (MINIMUM OF 95% MDD REQUIRED);
- CURE FOR AN ADDITIONAL 2 TO 5 DAYS (TOTAL MELLOWING AND CURING TIME SHOULD TOTAL AT LEAST 5 DAYS).
- VERIFY DEPTH OF LIME STABILIZED LAYER TO DEPTH AS NOTED ON PLAN WITHIN +/- 1.0 INCHES.



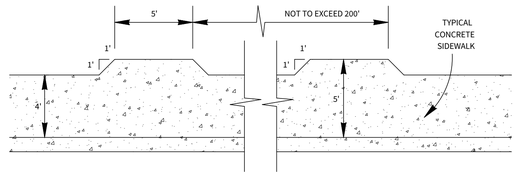
SINGLE ADA RAMP INTERSECTION LAYOUT DETAIL (TYPE 10 DIRECTIONAL RAMPS)

N.T.S.



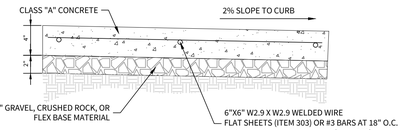
DUAL ADA RAMP INTERSECTION LAYOUT DETAIL (TYPE 10 DIRECTIONAL RAMPS)

N.T.S.



SIDEWALK PASSING SPACE

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

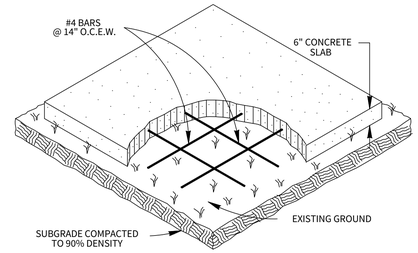


CONCRETE SIDEWALK

N.T.S.

GENERAL SPECIFICATIONS FOR COMPACTED FILL

1. 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.
2. THE MATERIALS USED SHALL BE FREE FROM ORGANIC MATTER AND OTHER DELETERIOUS SUBSTANCES, SUCH AS TREES, BRUSH AND RUBBISH.
3. 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.

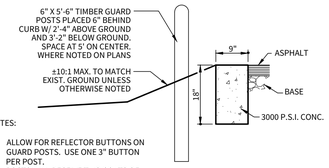


MAIL BOX PAD NOTE:

1. THE CONTRACTOR WILL CONSTRUCT SLABS FOR "TEMPORARY MAIL BOX COLLECTION PAD" FOR THE UNITED STATES POSTAL SERVICE WITH LOCATIONS AND SIZES SPECIFIED BY THE CITY ENGINEER DURING CONSTRUCTION.
2. THE CONSTRUCTION OF SLABS SHALL CONFORM TO ITEM 513 "REMOVING AND RELOCATING MAILBOXES".
3. PAYMENT WILL BE MADE UNDER ITEM 513.2 "COMMUNITY MAILBOX SLAB - PER SQUARE YARD".
4. UNIT PRICE WILL INCLUDE REMOVAL OF "TEMPORARY MAIL BOX COLLECTION PAD" SLABS AT THE END OF THE PROJECT. NO SEPARATE PAY ITEM.

COMMUNITY MAIL BOX SLAB

ITEM 513.2

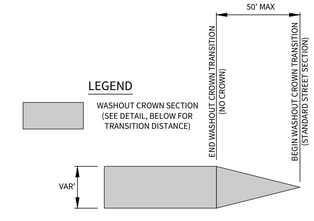


NOTES:

1. ALLOW FOR REFLECTOR BUTTONS ON GUARD POSTS. USE ONE 3" BUTTON PER POST.
2. POSTS WILL RECEIVE TWO COATS OF ALUMINUM PAINT.

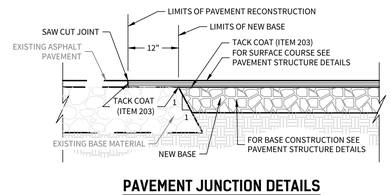
HEADER CURB DETAIL

N.T.S.



WASHOUT CROWN TRANSITION DETAIL

N.T.S.



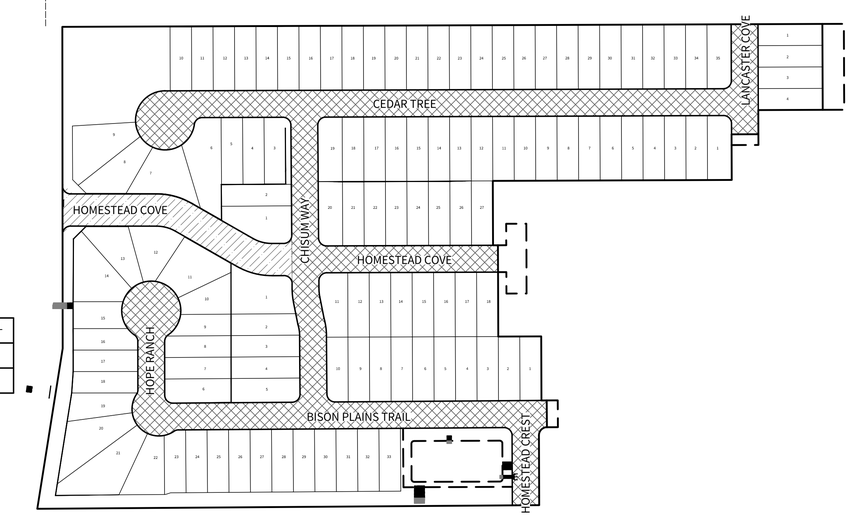
PAVEMENT JUNCTION DETAILS

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.

SAN ANTONIO WATER SYSTEM	233-3010
TEXAS STATE WIDE ONE CALL LOCATOR	1-800-545-6005
C.P.S. ENERGY	"
AT&T	"
TIME WARNER CABLE	"
VALERO ENERGY CO.	"
GREY FOREST UTILITIES	"



PAVEMENT DESIGN SCHEMATIC

NOTE:
1. REFERENCE GEOTECHNICAL REPORT (#S251104-P) FOR BORING INFORMATION AND CBR LOCATIONS.

LEGEND:

	LOCAL "A"	
	HOMESTEAD COVE	STA 5+80.74 – 9+79.72
	CHISUM WAY	STA 1+25.00 – 7+07.06
	CEDAR TREE	STA 1+00.00 – 12+09.93
	BISON PLAINS TRAIL	STA 1+00.00 – 8+36.58
	HOPE RANCH	STA 1+00.00 – 2+97.46
	HOMESTEAD CREST	STA1+00.00 – 2+54.97
	LANCASTER COVE	STA 6+24.36 – 8+29.36
	LOCAL "B"	
	HOMESTEAD COVE	STA 1+34.04 – 5+80.74

NOTE:
LIME TREATMENT IS NOT REQUIRED, ONLY IF ON-SITE FILL CONTAINS PI VALUES LESS THAN 20.

STREET PAVEMENT DESIGN DETAIL

N.T.S.

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TERRA BUONA UNIT 10

STANDARD STREET DETAILS

DATE 09/11/2025

PROJECT NO. 03209.019

DRAWN BY JW/SG/LB/DF

CHECKED BY SPM

REVISIONS

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09/11/2025

STATE OF TEXAS · SEAN P. McFARLAND · 138893 · LICENSED PROFESSIONAL ENGINEER

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO. 25-11800307

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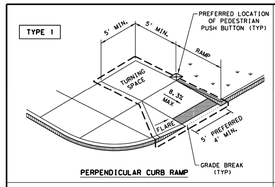
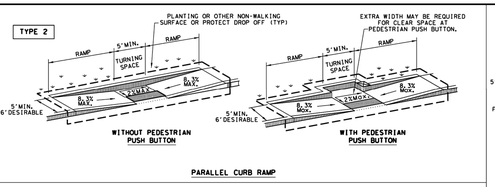
DATE:
FILE:

TYPE 1



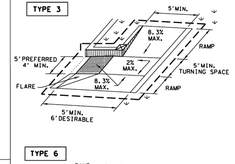
PERPENDICULAR CURB RAMP

TYPE 2

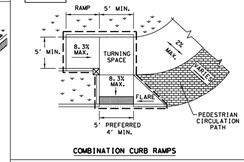


PARALLEL CURB RAMP

TYPE 3

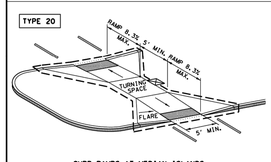


TYPE 6



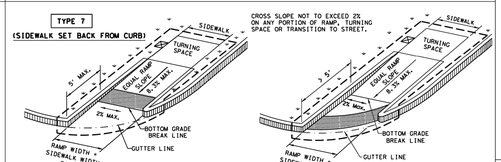
COMBINATION CURB RAMPS

TYPE 20

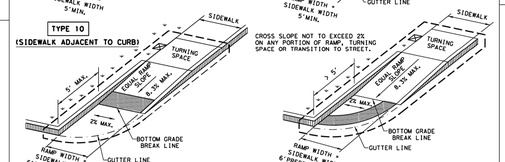


CURB RAMPS AT MEDIAN ISLANDS

TYPE 7
(SIDEWALK SET BACK FROM CURB)

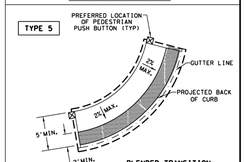


TYPE 10
(SIDEWALK ADJACENT TO CURB)



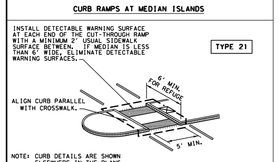
DIRECTIONAL RAMPS WITHIN RADIUS

TYPE 5



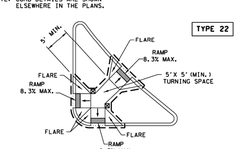
BLENDED TRANSITION (FLUSH LANDING)

TYPE 21

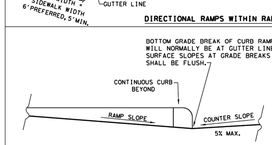


NOTE: CURB DETAILS ARE SHOWN ELSEWHERE IN THE PLANS.

TYPE 22



COMBINATION ISLAND RAMPS



TYPICAL SECTION OF PERPENDICULAR CURB RAMP AT CONNECTION TO ROADWAY

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
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REVISIONS	DIST	COUNTY		SHEET NO.
REVISED ON: 2012				
REVISED ON: 2014				

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DATE:
FILE:

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 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.

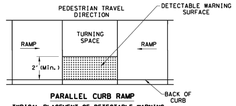
DETECTABLE WARNING PAVERS (IF USED)

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.

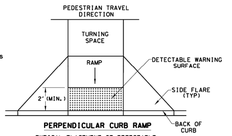
SIDEWALKS

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 406b.
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.

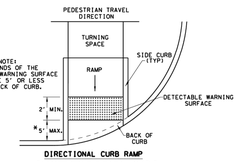
DETECTABLE WARNING SURFACE DETAILS



PARALLEL CURB RAMP
TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON LANDING AT STREET EDGE.

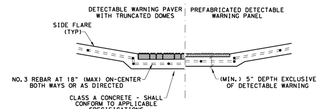


PERPENDICULAR CURB RAMP
TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.



*NOTE: BOTH ENDS OF THE DETECTABLE WARNING SURFACE SHALL BE 5' OR LESS FROM BACK OF CURB.

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



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	DIST	COUNTY		SHEET NO.
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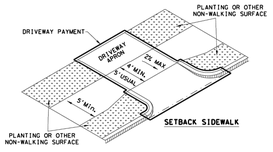
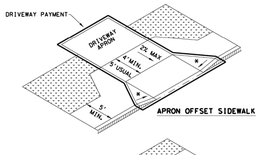
DATE:
FILE:

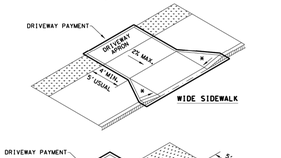
SIDEWALK TREATMENT AT DRIVEWAYS



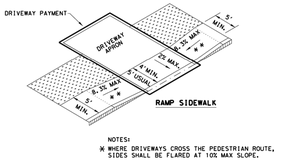
SETBACK SIDEWALK



APRON OFFSET SIDEWALK

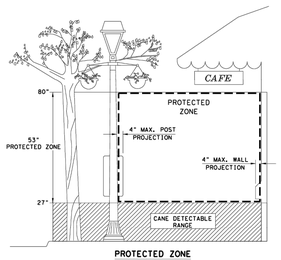


WIDE SIDEWALK



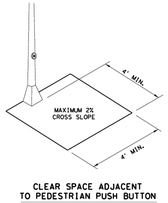
RAMP SIDEWALK

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.

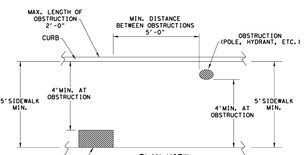


PROTECTED ZONE

NOTE: IN PEDESTRIAN CIRCULATION AREA, MAXIMUM 4" PROJECTION FOR POST OR WALL MOUNTED OBJECTS BETWEEN 27" AND 80" ABOVE THE SURFACE.

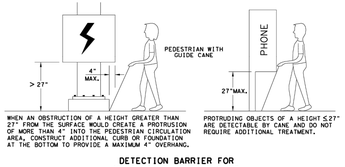


CLEAR SPACE ADJACENT TO PEDESTRIAN PUSH BUTTON



PLAN VIEW
PLACEMENT OF STREET FIXTURES

NOTE: ITEMS NOT INTENDED FOR PUBLIC USE. MINIMUM 4' X 4' CLEAR GROUND SPACE REQUIRED AT PUBLIC USE FIXTURES.



DETECTION BARRIER FOR VERTICAL CLEARANCE < 80"

WHEN AN OBSTRUCTION OF A HEIGHT GREATER THAN 27" FROM THE SURFACE WOULD CREATE A PROTRUSION OF MORE THAN 4" INTO THE PEDESTRIAN CIRCULATION AREA, CONSTRUCT ADDITIONAL CURB OR FOUNDATION AT THE BOTTOM TO PROVIDE A MAXIMUM 4" OVERHANG.

PROTRUDING OBJECTS OF A HEIGHT ≤27" ARE DETECTABLE BY CANE AND DO NOT REQUIRE ADDITIONAL TREATMENT.

SHEET 3 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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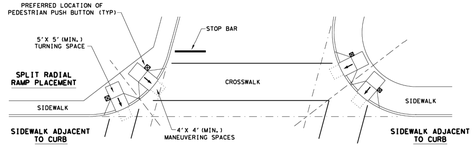
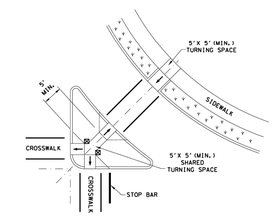
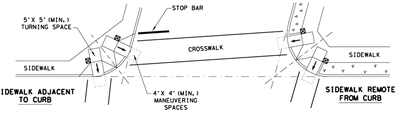
TYPICAL CROSSING LAYOUTS
SEE SHEET 1 OF 4 FOR DETAILS AND DIMENSIONS



SKEWED INTERSECTION WITH "LARGE" RADIUS

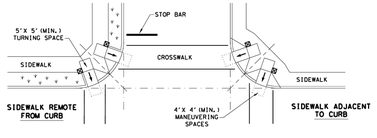


AT INTERSECTION W/FREE RIGHT TURN & ISLAND



SKEWED INTERSECTION WITH "SMALL" RADIUS

MID-BLOCK PLACEMENT
PERPENDICULAR RAMPS



NORMAL INTERSECTION WITH "SMALL" RADIUS

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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REVISED ON: 2014				

CUDEENGINEERS.COM

CUDE ENGINEERS EST. 1980

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

TERRA BUONA UNIT 10

TXDOT DETAILS

DATE
09/11/2025

PROJECT NO.
03209.019

DRAWN BY
JW/SG/LB/DF

CHECKED BY
SPM

REVISIONS
1.
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10.

09/11/2025

STATE OF TEXAS
SEAN P. McFARLAND
138893
LICENSED
PROFESSIONAL ENGINEER

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
25-11800307

C8.D2

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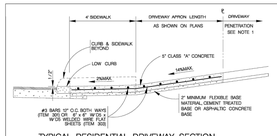
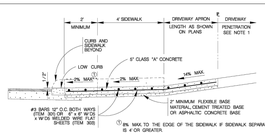


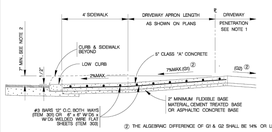
TYPICAL RESIDENTIAL DRIVEWAY SECTION

WITH SIDEWALK ABUTTING CURB
ITEM 503.1



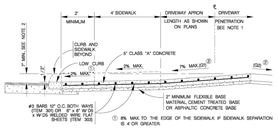
TYPICAL RESIDENTIAL DRIVEWAY SECTION

WITH SIDEWALK SEPARATED FROM CURB
ITEM 503.1



TYPICAL COMMERCIAL DRIVEWAY SECTION

WITH SIDEWALK ABUTTING CURB
ITEM 503.2



TYPICAL COMMERCIAL DRIVEWAY SECTION

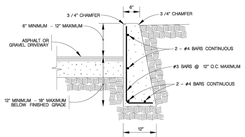
WITH SIDEWALK SEPARATED FROM CURB
ITEM 503.2

CONCRETE DRIVEWAY NOTES

1. DRIVEWAY PENETRATION REFERS TO A PORTION OF THE DRIVEWAY THAT MAY BE NECESSARY TO RECONSTRUCT WITHIN PRIVATE PROPERTY TO COMPLY WITH A MAXIMUM DRIVEWAY SLOPE. THIS PORTION OF THE DRIVEWAY SHALL BE PAID FOR UNDER THE FOLLOWING ITEMS AS MAY APPLY:
   A.) CONCRETE DRIVEWAY PAD FOR UNDER ITEM NO.583 OR 503.2
   B.) CONCRETE RETAINING WALL COMBINATION TYPE FOR ITEM NO. 522.4 AND SHALL INCLUDE A MINIMUM OF 7' ASPHALT TYPE 'D' & 6" FLEXIBLE BASE
   C.) GRAVEL DRIVEWAY PAD FOR UNDER ITEM NO.583.8 AND SHALL INCLUDE A MINIMUM OF 6" FLEXIBLE BASE
2. 2" MINIMUM HEIGHT WILL NOT NECESSARILY OCCUR AT THE PROPERTY LINE, IT MAY OCCUR WITHIN THE RIGHT OF WAY OR WITHIN THE DRIVEWAY PENETRATION ON PRIVATE PROPERTY.
3. THE PROPOSED DRIVEWAY SHOULD MATCH THE EXISTING WIDTH AT THE PROPERTY LINE BUT UNLESS AUTHORIZED BY THE CITY TRAFFIC ENGINEER, THE WIDTH SHALL BE WITHIN THE FOLLOWING VALUES:

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

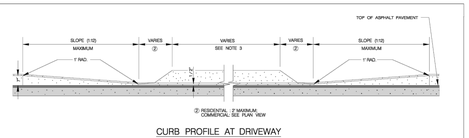
4. FOR LOCAL TYPE 'A' STREETS, SIDEWALK SHALL HAVE A MINIMUM WIDTH OF 4' AND 8' SEPARATED FROM THE CURB.THE SIDEWALK SHALL BE LOCATED A MINIMUM OF 2' FROM THE BACK OF CURB.
5. FOR OTHER THAN LOCAL TYPE 'A' STREETS,THE SIDEWALK SHALL HAVE A MINIMUM WIDTH OF 4' AND SEPARATED A MINIMUM OF 2' FROM THE BACK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



NOTE:
1. COST OF REINFORCEMENT TO BE INCLUDED IN UNIT COST OF ITEM 301.
2. CONCRETE RETAINING WALL COMBINATION TYPE SHALL BE USED FOR DRIVEWAY.

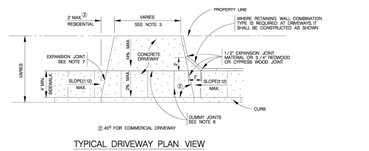
DRIVEWAY – CONCRETE RETAINING WALL

ON COMPACTED SUBGRADE
ITEM 301.1



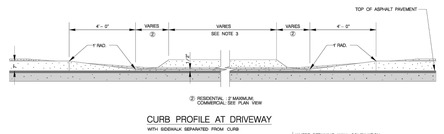
CURB PROFILE AT DRIVEWAY

WITH SIDEWALK ABUTTING CURB



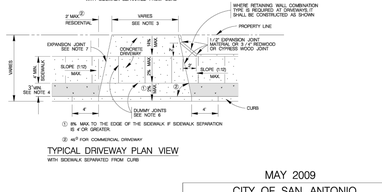
TYPICAL DRIVEWAY PLAN VIEW

WITH SIDEWALK ABUTTING CURB



CURB PROFILE AT DRIVEWAY

WITH SIDEWALK SEPARATED FROM CURB



TYPICAL DRIVEWAY PLAN VIEW

WITH SIDEWALK SEPARATED FROM CURB

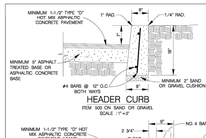
MAY 2009

CITY OF SAN ANTONIO
CAPITAL IMPROVEMENTS MANAGEMENT SERVICES DEPARTMENT

CONCRETE DRIVEWAY STANDARDS

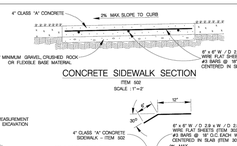
% SUBMITTAL	PROJECT NO.:	DATE:
DRWN. BY: V. VASQUEZ	DSGN. BY:	CHKD. BY: R.S. HOSSEIN, P.E.

SHEET NO.: ___ OF ___



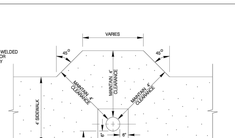
HEADER CURB

ITEM 500 ON SAND OR GRAVEL
SCALE : 1"=2"



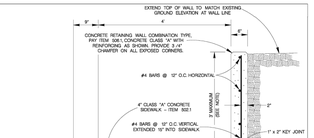
CONCRETE SIDEWALK SECTION

ITEM 502
SCALE : 1"=2"



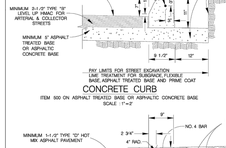
CONCRETE SIDEWALK @ UTILITY POWER POLE DETAIL

SCALE : 1"=4"



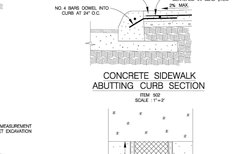
CONCRETE RETAINING WALL – COMBINATION TYPE

ITEM 522
SCALE : 1"=2"



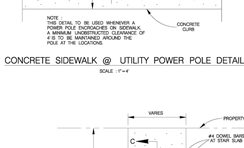
CONCRETE CURB

ITEM 500 ON ASPHALT TREATED BASE OR ASPHALTIC CONCRETE BASE
SCALE : 1"=2"



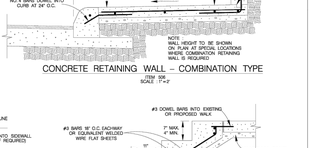
CONCRETE SIDEWALK ABUTTING CURB SECTION

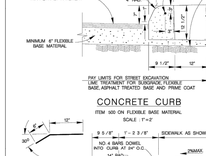
ITEM 502
SCALE : 1"=2"



CONCRETE STEPS

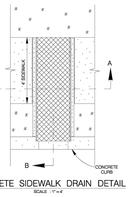
ITEM 524



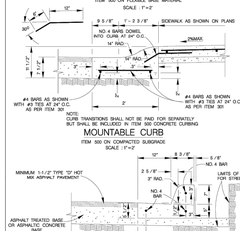


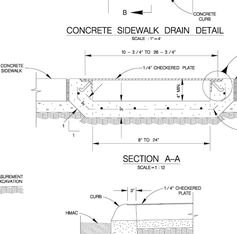
CONCRETE CURB

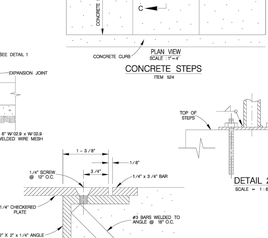
ITEM 500 ON FLEXIBLE BASE MATERIAL
SCALE : 1"=2"

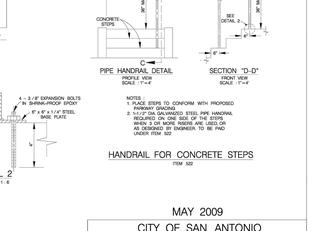


CONCRETE SIDEWALK DRAIN DETAIL









HANDRAIL FOR CONCRETE STEPS

ITEM 522

NOTES :
1. PLACE STEPS TO CONFORM WITH PROPOSED OR EXISTING GRADING.
2. 1-1/2" DIA.GALVANIZED STEEL PIPE HANDRAIL REQUIRED ON ONE SIDE OF THE STEPS WHEN 3 OR MORE RISERS ARE USED, OR AS DIRECTED BY THE ENGINEER TO BE PAID UNDER ITEM 522

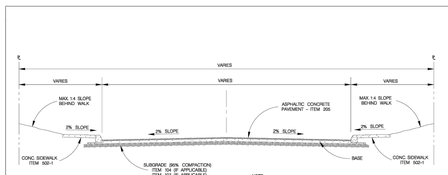
MAY 2009

CITY OF SAN ANTONIO
CAPITAL IMPROVEMENTS MANAGEMENT SERVICES DEPARTMENT

MISCELLANEOUS CONSTRUCTION STANDARDS I

% SUBMITTAL	PROJECT NO.:	DATE:
DRWN. BY: V. VASQUEZ	DSGN. BY:	CHKD. BY: R.S. HOSSEIN, P.E.

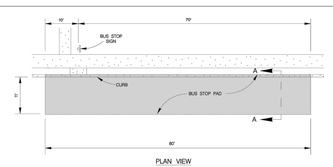
SHEET NO.: ___ OF ___



NOTE
FOR STREETS OTHER THAN LOCAL TYPE "A" STREETS, THE EDGE OF THE SIDEWALK MUST BE LOCATED A MINIMUM OF TWO FEET AWAY FROM THE BACK OF THE CURB.

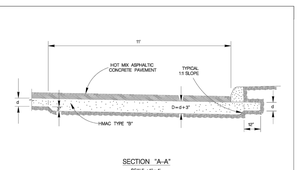
TYPICAL STREET SECTION

SCALE : 1"=8'



PLAN VIEW

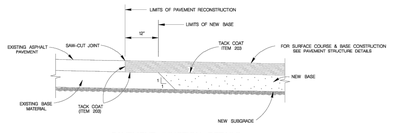
SCALE : 1"=20'



SECTION "A–A"

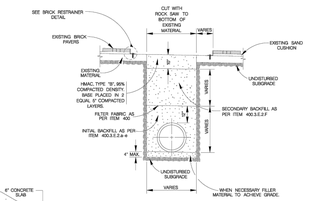
SCALE : 1"=4"

NOTES
1. EXCAVATION FOR THICKENED PAVEMENT SECTION WILL BE PAID UNDER ITEM NO.104 "STREET EXCAVATION".
2. BASE MATERIALS
   A.) FOR THE MEASUREMENT FOR THE HMAC MATERIAL IS PER TON,THICKENED PAVEMENT SHALL BE PAID FOR UNDER ITEM NO.292,TYPE "B" – PER TON.
   B.) IF THE MEASUREMENT FOR THE HMAC MATERIAL IS PER SQUARE YARD, NO EXTRA PAYMENT WILL BE MADE FOR THE THICKENED PAVEMENT.



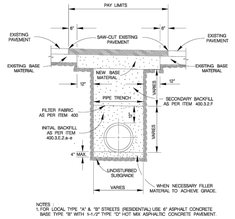
PAVEMENT JUNCTION DETAILS

SCALE : 1"=2"



TYPICAL BASE REPLACEMENT FOR BRICK SURFACED STREET SECTION

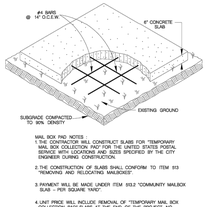
ITEM 913
SCALE : 1"=4"



NOTES
1.FOR LOCAL TYPE "A" & "B" STREETS (RESIDENTIAL) USE 6" ASPHALT CONCRETE BASE TYPE "B" WITH 1-1/2" TYPE "D" HOT MIX ASPHALTIC CONCRETE PAVEMENT.
2.FOR ARTERIAL & SECONDARY STREETS (COMMERCIAL) USE 10.5" TYPE "B" HOT MIX ASPHALTIC CONCRETE PAVEMENT LEVELING-UP COURSE & 1-1/2" TYPE "D" HOT MIX ASPHALTIC CONCRETE PAVEMENT SURFACE COURSE.

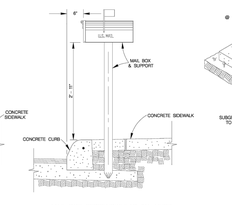
TYPICAL PAVEMENT REPLACEMENT

ITEM 911
SCALE : 1"=4"



MAIL BOX PERPENDICULAR TO CURB

WHEN SIDEWALK IS DETACHED FROM CURB
SCALE : 1"=2"



MAIL BOX PERPENDICULAR TO CURB

WHEN SIDEWALK IS ATTACHED TO CURB
SCALE : 1"=2"

MAIL BOX PAD NOTES
1.THE CONTRACTOR WILL CONSTRUCT SLABS FOR "TEMPORARY MAIL BOX COLLECTION PAD"FOR THE UNITED STATES POSTAL SERVICE AT LOCATIONS AS SHOWN ON PLANS OR SPECIFIED BY THE CITY ENGINEER DURING CONSTRUCTION.
2.THE CONSTRUCTION OF SLABS SHALL CONFORM TO ITEM 913 "REMOVING AND RELOCATING MAILBOXES".
3.PAYMENT WILL BE MADE UNDER ITEM 913.2 "COMMUNITY MAILBOX SLAB – PER SQUARE YARD."
4.UNIT PRICE WILL INCLUDE REMOVAL OF "TEMPORARY MAIL BOX COLLECTION PAD"SLABS AT THE END OF THE PROJECT. NO SEPARATE PAY ITEM.

COMMUNITY MAIL BOX SLAB

ITEM 913.2
SCALE : 1"=4"

MAIL BOX LOCATION

ITEM 913.1

BRICK RESTRAINER DETAIL

SCALE = 1 : 6

FEBRUARY 2010

CITY OF SAN ANTONIO
CAPITAL IMPROVEMENTS MANAGEMENT SERVICES DEPARTMENT

MISCELLANEOUS CONSTRUCTION STANDARDS II

% SUBMITTAL	PROJECT NO.:	DATE:
DRWN. BY: V. VASQUEZ	DSGN. BY:	CHKD. BY: R.S. HOSSEIN, P.E.

SHEET NO.: ___ OF ___

CUDEENGINEERS.COM

CUDE ENGINEERS

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

TERRA BUONA
UNIT 10

COSA DETAILS

DATE
09/11/2025

PROJECT NO.
03209.019

DRAWN BY
JW/SG/LB/DF

CHECKED BY
SPM

REVISIONS
1.
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3.
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9.
10.

09/11/2025

STATE OF TEXAS
SEAN P. McFARLAND
138893
LICENSED PROFESSIONAL ENGINEER

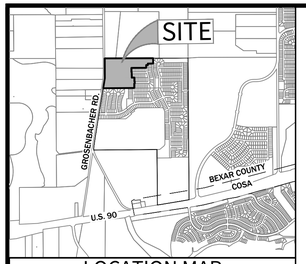
CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
25-11800307

C8.D3

P:\2025\03209.019\CAD\4-Sheets\8.23.1\SP\COSA DETAILS\TERRA BUONA UNIT 10 COSA DETAILS 8.23.1.dwg, 9/11/2025 11:54:44 AM, lbarba

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



LOCATION MAP
N.T.S.

OWNER/DEVELOPER:

KB HOME
CONTACT PERSON: SEAN MILLER
4800 FREDERICKSBURG ROAD
SAN ANTONIO,TX 78229
TEL: (210) 301-5485

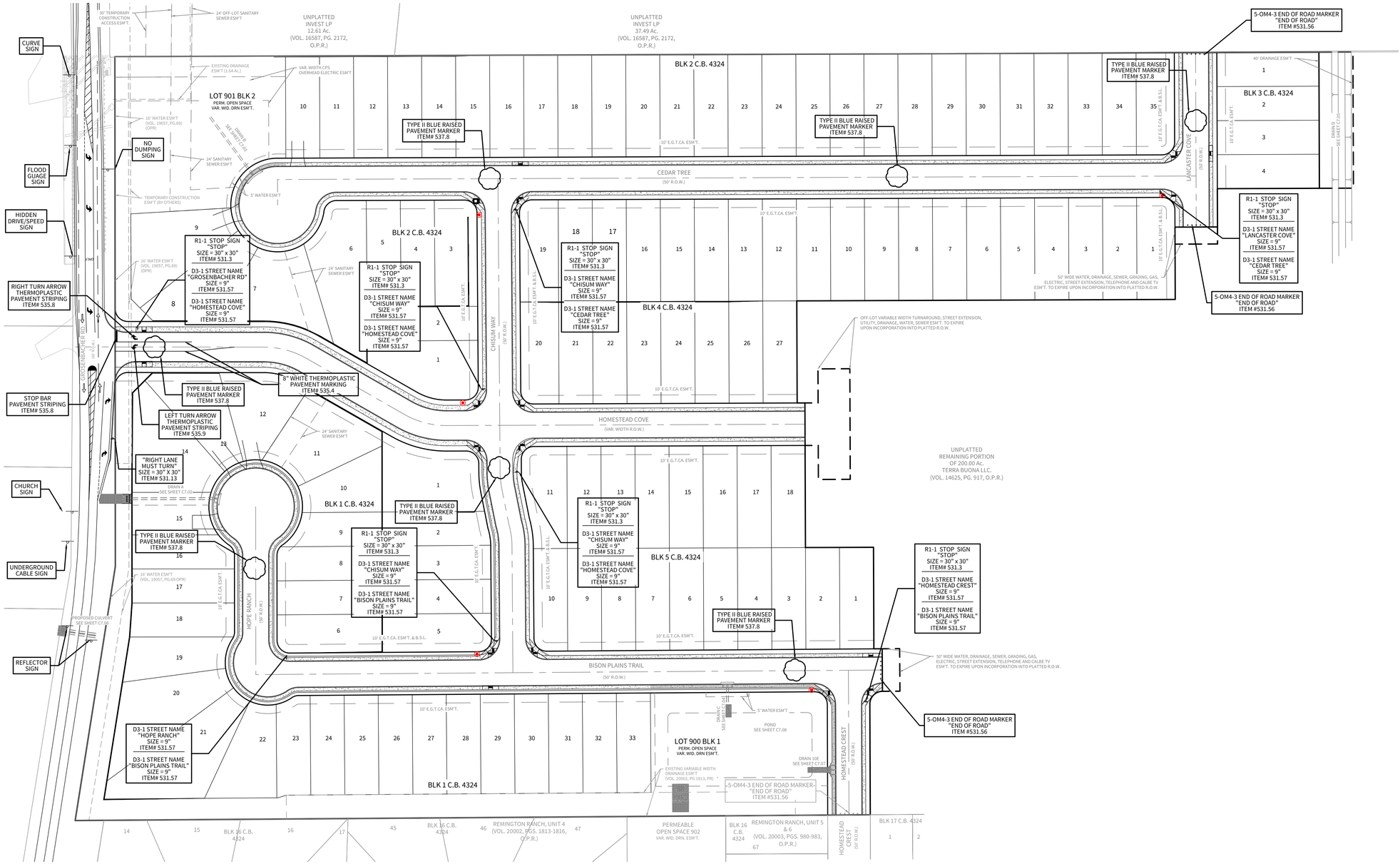
CIVIL ENGINEER:

M.W. CUDE ENGINEERS, L.L.C.
CONTACT PERSON: SEAN McFARLAND, P.E.
4122 POND HILL ROAD, SUITE 101
SAN ANTONIO, TX 78231
TEL: (210) 681-2951
FAX: (210) 523-7112

SCALE: 1"=60'
0 60 120

LEGEND

- SIDEWALK TO BE CONSTRUCTED WITH INFRASTRUCTURE



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

TERRA BUONA UNIT 10

TRAFFIC SIGNAGE PLAN

DATE
09/11/2025

PROJECT NO.
03209.019

DRAWN BY
JW/SG/LB/DF

CHECKED BY
SPM

REVISIONS
1.
2.
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09/11/2025

STATE OF TEXAS
SEAN P. McFARLAND
138893
LICENSED PROFESSIONAL ENGINEER

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
25-11800307

SAWS JOB NO.

C9.00

P:\03209\019\D-SWM\4 Plans\09_05 TRAF.dwg 2025/09/11 3:30pm jmadkins

DEMOLITION KEYNOTES:

1. EXISTING ASPHALT PAVEMENT SECTION TO REMAIN, UNLESS NOTED OTHERWISE. CONTRACTOR TO PROVIDE TWO COURSE SURFACE TREATMENT PER COSA ITEM 204.2. SEAL COAT TO BE APPLIED TO LIMITS OF RE-STRIPING OF ABBOTT ROAD PRIOR TO PROPOSED IMPROVEMENTS. UPON COMPLETION OF PAVEMENT WIDENING AND STRIPING, ANOTHER SEAL COAT SHALL BE APPLIED.
2. EXISTING BARBED WIRE FENCE TO BE REMOVED.
3. EXISTING OHE POLES AND SERVICE TO REMAIN & BE PROTECTED.
4. NOT USED
5. EXISTING BARBED WIRE FENCE TO REMAIN.
6. EXISTING MAILBOX TO REMAIN
7. EXISTING FIRE HYDRANT TO REMAIN
8. EXISTING WATER METER SERVICE LINE, AND ALL APPURTENANCES TO BE REMOVED. CONTRACTOR TO COORDINATE WITH SAWS PRIOR TO DEMO.
9. EXISTING CONCRETE TO BE REMOVED
10. NOT USED
11. TREE TO REMAIN

NOTE:
1. ASPHALT PAVEMENT JUNCTURE ALONG ALL NEW PAVEMENT AND EXISTING PAVEMENT
2. EXISTING STRIPING TO BE REMOVED. CONTRACTOR TO CLEAN AND REMOVE EXISTING STRIPING AS NEEDED & IN ACCORDANCE WITH COSA STANDARD SPECIFICATIONS FOR CONSTRUCTION ITEM#533 (CLEANING AND REMOVAL OF PAVEMENT MARKINGS & MARKERS). EXISTING PAVEMENT MARKINGS ON EXISTING ROAD TO BE REMOVED AND SEAL COAT THE ROAD PAVEMENT FROM EDGE TO EDGE. THERMOPLASTIC PAVEMENT MARKINGS CONTRACTOR TO CLEAN AND PREPARE IN ACCORDANCE WITH COSA STANDARD SPECIFICATIONS FOR CONSTRUCTION ITEM #535 (HOT APPLIED THERMOPLASTIC PAVEMENT MARKINGS)
3. CONTRACTOR IS RESPONSIBLE FOR PROVIDING OWN TRAFFIC CONTROL PLAN AND SUBMIT/ACQUIRE ANY AND ALL CoSA ROW PERMITS, AS WELL AS COORDINATE INSPECTIONS WITH CoSA THROUGHOUT CONSTRUCTION.

**********GENERAL NOTES**********

TXDOT 2014 SPECIFICATION BOOK (REVISED JANUARY 22, 2015)

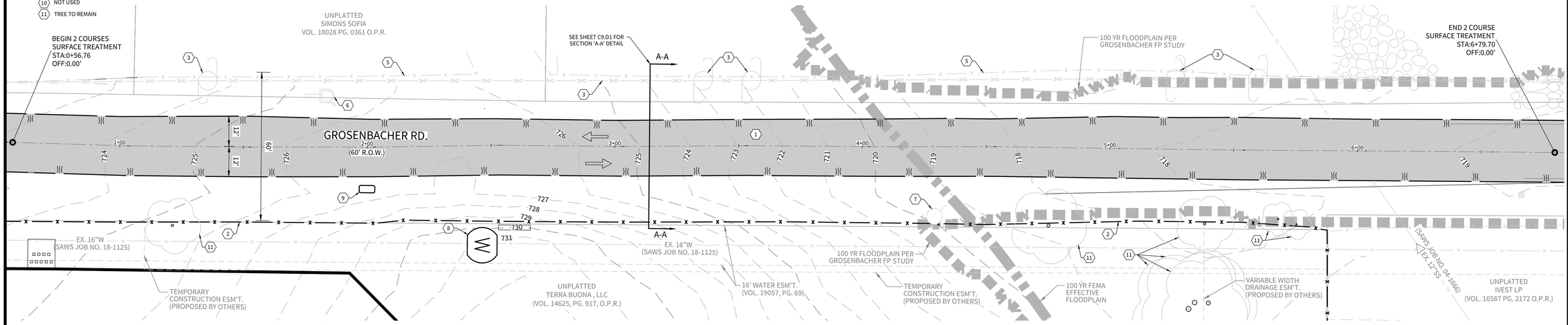
========== SURFACE TREATMENT DATA ==========

DESCRIPTION	1ST COURSE	2ND COURSE
AREA	813 SY	813 SY
-----SEE BID ITEM-----		
ASPHALT--TYPE	AC-15P	
ASPHALT--RATE(GAL/SY)	0.24/1	
AGGRATE--TYPE/GR	TY PB/GR 5	
AGGRATE--RATE(CY/SY)	1/140	

--ITEM 300--
THE ASPHALT BINDER USED IN THE MANUFACTURE OF ALL TYPES OF HOT MIX ASPHALT CONCRETE, SHALL BE PG 64-22.

THE ASPHALT BINDER USED IN THE MANUFACTURE OF THE NON-SURFACE LAYERS OF HOT MIX ASPHALT CONCRETE, SHALL BE PG 64-22.

SCALE: 1"=20'
0 10 20



PROPOSED KEYNOTES:

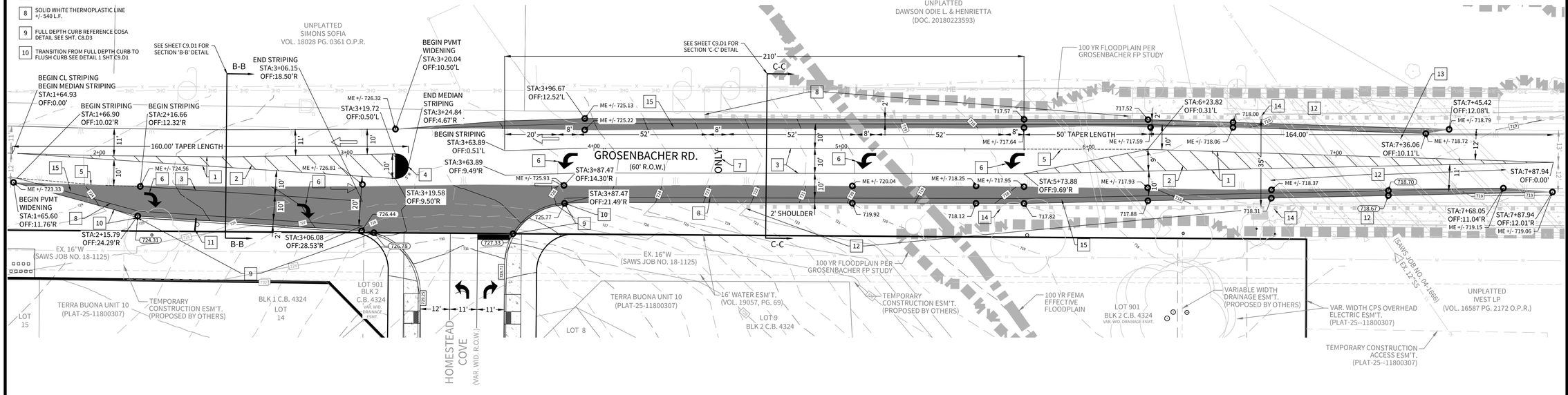
1. PROP. 4" DOUBLE YELLOW THERMOPLASTIC PAVEMENT MARKING W/ TYPE II A-A RPMs (ITEM #537.8) +/- 374 L.F.
2. 24" YELLOW DIAGONALS @ 20' #535.7) +/- 374 L.F.
3. 8" WHITE THERMOPLASTIC PAVEMENT MARKING (ITEM #535.4) & TYPE 1-C RPMs MARKERS @30 O.C. (ITEM #537.6) +/- 510 L.F.
4. PROP. YELLOW THERMOPLASTIC MEDIAN NOSE PAVEMENT MARKER W/ TYPE II A-A RPMs 42 S.F.
5. 8" BROKEN WHITE THERMOPLASTIC PAVEMENT MARKING (ITEM #535.4) 50 L.F.
6. THERMOPLASTIC LEFT/RIGHT WHITE ARROW (ITEM #535.8)
7. THERMOPLASTIC WORD "ONLY" (ITEM #535.12)
8. SOLID WHITE THERMOPLASTIC LINE +/- 540 L.F.
9. FULL DEPTH CURB REFERENCE COSA DETAIL SEE SHT. C8.D3
10. TRANSITION FROM FULL DEPTH CURB TO FLUSH CURB SEE DETAIL 1 SHT C9.D1
11. 30" X 30" "RIGHT LANE MUST TURN RIGHT" SIGN (ITEM #535.8)
12. GROSENBACHER ROAD IMPROVEMENTS (PROPOSED) BY OTHERS
13. MBC IMPROVEMENTS (PROPOSED BY OTHERS)
14. METAL BEAM GUARD FENCE (BY OTHERS)
15. PAVEMENT WIDENING +/- 721 L.F.

ELEVATIONS:

- (XXX.XX) PROPOSED TOP OF CONCRETE CURB ELEVATION
- XXXX.XX PROPOSED ASPHALT PAVEMENT ELEVATION
- ME +/- XXXX.XX MATCH EXISTING ELEVATION

GROSENBACHER RD - TURN LANES

EXISTING/DEMO CONDITIONS



GROSENBACHER RD - TURN LANES

PROPOSED

CUDEENGINEERS.COM

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

TERRA BUONA UNIT 10

GROSENBACHER RD TURN LANE PLAN

DATE 09/11/2025

PROJECT NO. 03209.019

DRAWN BY JW/SG/LB/DF

CHECKED BY SPM

REVISIONS

1. 2. 3. 4. 5. 6. 7. 8. 9. 10.

09/11/2025

STATE OF TEXAS
SEAN P. McFARLAND
138893
LICENSED PROFESSIONAL ENGINEER

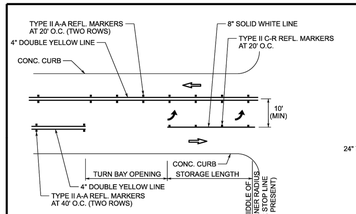
CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO. 25-11800307

C9.01

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.

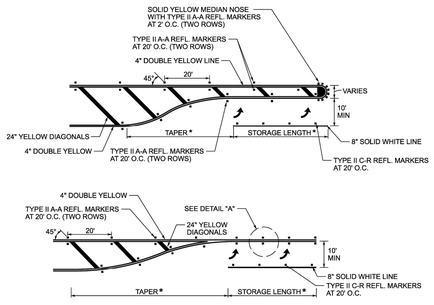
P:\03209\03209.019\CAD\Civil Plans\09_01 TBAF TURN LANE.dwg 2025/09/11 11:38am Bertha



MINIMUM TURN BAY OPENINGS	
POSTED SPEED (MPH)	MINIMUM OPENING (FT)
25-35	60'
≥ 40	100'

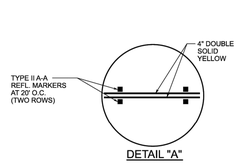
MINIMUM STORAGE LENGTH	
POSTED SPEED (MPH)	MINIMUM OPENING (FT)
40 OR LESS	110'
45 OR MORE	150'

LEFT-TURN LANE



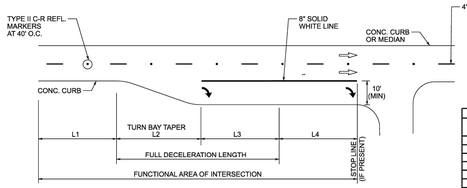
PAINTED MEDIAN LEFT TURN BAY DETAILS

* USE MINIMUM TURN BAY REVERSE CURVE TAPER LENGTH AND MINIMUM STORAGE LENGTH TABLES FOR "LEFT-TURN LANE (RAISED MEDIAN)".



GENERAL NOTES:

1. THE POSTED SPEED LIMIT IS TYPICALLY EQUAL TO THE DESIGN SPEED MINUS 5 MPH.
2. STORAGE LENGTHS LONGER THAN THE MINIMUMS LISTED ON THIS DRAWING MAY BE DETERMINED USING TRAFFIC ENGINEERING ANALYSIS OR APPROXIMATE CALCULATIONS.
3. FOR THE PLACEMENT OF PAVEMENT ARROWS AND WORDS SEE TURN LANE PAVEMENT MARKINGS STANDARD SHEET.
4. REFER TO APPLICABLE STANDARD PAVEMENT MARKINGS WITH REFLECTIVE RAISED PAVEMENT MARKERS AND TURN LANE DETAILS STANDARD SHEETS.
5. REFER TO BICYCLE PAVEMENT MARKINGS STANDARD SHEET FOR TYPE AND PLACEMENT.
6. WHITE EDGE LINES AT EDGE OF PAVEMENT ARE REQUIRED WHERE CURBS ARE NOT PRESENT.
7. WHITE EDGE LINE ADJACENT TO CURB AND GUTTER IS NOT REQUIRED.
8. BICYCLE SYMBOL MARKING SHALL FACE THRU LANE OF TRAFFIC.
9. ASIDE FROM LONG LANE LINE MARKINGS, ALL OTHER PAVEMENT MARKINGS SHALL BE PERFORMED. HOT-APPLIED PAVEMENT MARKINGS MAY BE USED ONLY IF APPROVED BY PWD TRAFFIC ENGINEERING & OPERATIONS.
10. ASSUMES A TURNING VEHICLE HAS "CLEARED THE THROUGH LANE" WHEN IT HAS MOVED LATERALLY APPROXIMATELY 9 FT SO THAT A FOLLOWING THROUGH VEHICLE CAN PASS WITHOUT ENCROACHING UPON THE ADJACENT TRAFFIC LANE.
11. THE SPEED DIFFERENTIAL BETWEEN THE TURNING VEHICLE AND FOLLOWING THROUGH VEHICLES IS 10 MPH WHEN THE TURNING VEHICLE "CLEARS THE THROUGH TRAFFIC LANE".
12. 5.8 FT/S^2 DECELERATION WHILE MOVING FROM THE THROUGH LANE INTO THE TURN LANE; 6.5 FT/S^2 AVERAGE DECELERATION AFTER COMPLETING LATERAL SHIFT INTO THE TURN LANE.
13. YELLOW EDGE LINES ADJACENT TO RAISED ISLAND ARE REQUIRED, REFER TO TRMRM-24.



UNSIGNALIZED RIGHT-TURN LANE

L1	
POSTED SPEED (MPH)	LENGTH (FT)
20	70'
25	95'
30	115'
35	130'
40	150'
45	170'
50	185'
55	205'
60	225'
65	240'
70	260'

DESIRABLE FULL DECELERATION LENGTHS (L2+L3)	
POSTED SPEED (MPH)	LENGTH (FT)
20	70'
25	115'
30	160'
35	220'
40	275'
45	350'
50	425'
55	515'
60	605'
65	720'
70	820'

SEPTEMBER 2024

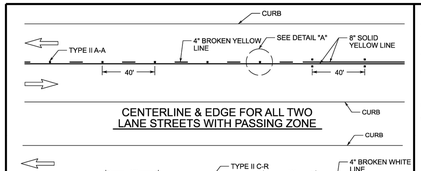
CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

TRAFFIC ENGINEERING AND OPERATIONS STANDARDS

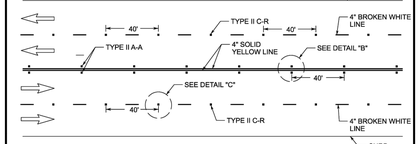
TURN LANE DETAILS 2

SHEET 02 OF 02 TLD-(2)-24

% SUBMITTAL	PROJECT NO.	DATE: 8/24/18
DRWN. BY:	DSGN. BY:	CHKD. BY: I. BANDA, P.E.

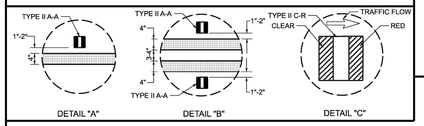


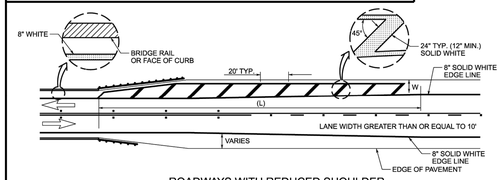
CENTERLINE & EDGE FOR ALL TWO LANE STREETS WITH PASSING ZONE



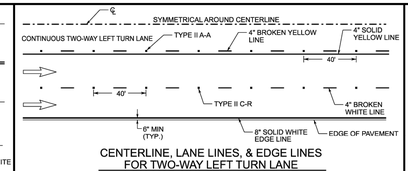
CENTERLINE, LANE LINES, & EDGE LINES FOR FOUR LANE TWO-WAY STREETS

RAISED PAVEMENT MARKERS TYPE II C-R SHALL HAVE CLEAR FACE TOWARD NORMAL TRAFFIC AND RED FACE TOWARD WRONG-WAY TRAFFIC.

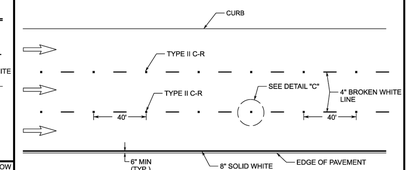




ROADWAYS WITH REDUCED SHOULDER WIDTHS ACROSS BRIDGE OR CULVERT



CENTERLINE, LANE LINES, & EDGE LINES FOR TWO-WAY LEFT TURN LANE



LANE LINES & EDGE LINES FOR ONE-WAY MULTILANE STREET

RAISED PAVEMENT MARKERS TYPE II C-R SHALL HAVE CLEAR FACE TOWARD NORMAL TRAFFIC AND RED FACE TOWARD WRONG-WAY TRAFFIC.

*POSTED SPEED	FORMULA
<45	L= $\frac{WS^2}{60}$
≥45	L= WS

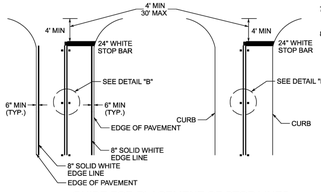
TABLE 1 - TYPICAL LENGTH (L)

*85TH PERCENTILE SPEED MAY BE USED ON ROADS WHERE TRAFFIC SPEEDS NORMALLY EXCEED THE POSTED SPEED LIMIT. CROSSHATCHING LENGTH SHOULD BE ROUNDED UP TO NEAREST 5 FOOT INCREMENT.

L= LENGTH OF CROSSHATCHING (FT)
W= WIDTH OF OFFSET (FT)
S= POSTED SPEED (MPH)

GENERAL NOTES:

1. EDGELINE ADJACENT TO CURB AND GUTTER IS NOT REQUIRED IN ALL CASES, HOWEVER SHALL BE PLACED AS DIRECTED BY THE ENGINEER.
2. THE TRAVELED WAY INCLUDES ONLY THAT PORTION OF THE ROADWAY USED FOR VEHICULAR TRAVEL AND NOT THE PARKING LANES, SIDEWALKS, BERMS AND SHOULDERS. THE TRAVELED WAYS SHALL BE MEASURED FROM THE INSIDE OF EDGELINE TO INSIDE OF EDGELINE OF A TWO LANE ROADWAY.
3. ALL RAISED PAVEMENT MARKERS PLACED IN BROKEN LINES SHALL BE PLACED IN LINE WITH AND MIDWAY BETWEEN THE STRIPES.
4. ON CONCRETE PAVEMENTS THE RAISED PAVEMENT MARKERS SHOULD BE PLACED TO ONE SIDE OF THE LONGITUDINAL JOINTS.
5. ALL PAVEMENT MARKING MATERIAL SHALL MEET THE REQUIRED MATERIAL SPECIFICATIONS AS SPECIFIED BY CITY OF SAN ANTONIO STANDARD SPECIFICATIONS.
6. ASIDE FROM LONG LANE LINE MARKINGS, ALL OTHER PAVEMENT MARKINGS SHALL BE PREFORMED MATERIAL. HOT-APPLIED MARKINGS MAY BE USED ONLY IF APPROVED BY PWD - TRAFFIC ENGINEERING AND OPERATIONS.
7. FOR GUARD FENCE DETAILS, REFER ELSEWHERE IN THE PLANS.
8. YELLOW EDGE LINES ADJACENT TO RAISED ISLAND ARE REQUIRED. REF TRMRM-24



GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

SEPTEMBER 2024

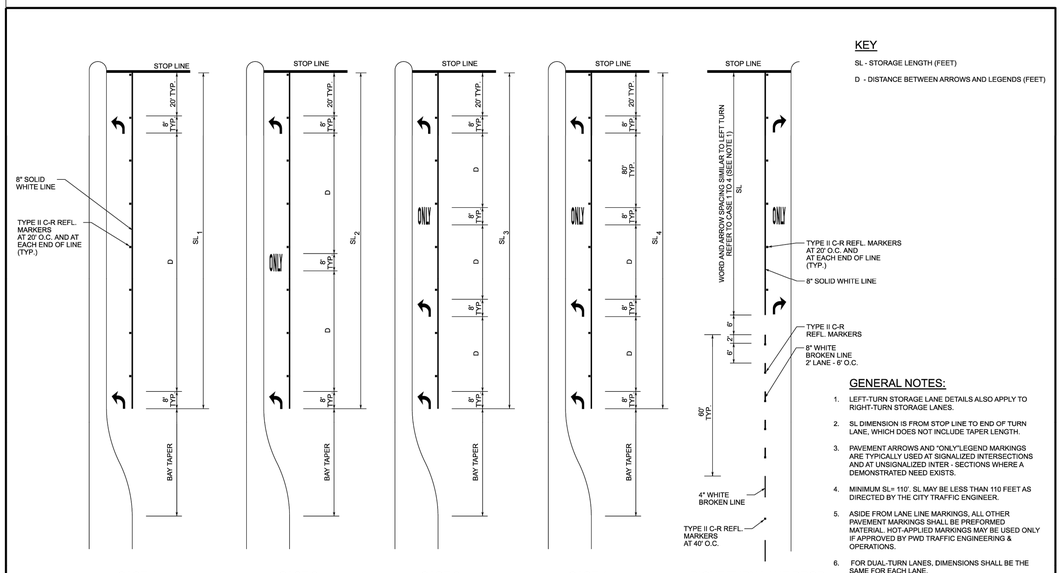
CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

TRAFFIC ENGINEERING AND OPERATIONS STANDARDS

PAVEMENT MARKINGS WITH RAISED PAVEMENT MARKERS

SHEET 01 OF 01 PM&RPM-24

% SUBMITTAL	PROJECT NO.	DATE: 8/24/18
DRWN. BY:	DSGN. BY:	CHKD. BY: I. BANDA, P.E.



CASE 1
SL < 110'
D = SL - 36

CASE 2
110' < SL < 200'
D = $\frac{(SL - 44)}{2}$

CASE 3
201' < SL < 300'
D = $\frac{(SL - 52)}{3}$

CASE 4
SL > 300'
D = $\frac{(SL - 132)}{2}$

RIGHT TURN LANE DROP

KEY

SL - STORAGE LENGTH (FEET)

D - DISTANCE BETWEEN ARROWS AND LEGENDS (FEET)

GENERAL NOTES:

1. LEFT-TURN STORAGE LANE DETAILS ALSO APPLY TO RIGHT-TURN STORAGE LANES.
2. SL DIMENSION IS FROM STOP LINE TO END OF TURN LANE, WHICH DOES NOT INCLUDE TAPER LENGTH.
3. PAVEMENT ARROWS AND "ONLY"LEGEND MARKINGS ARE TYPICALLY USED AT SIGNALIZED INTERSECTIONS AND AT UNSIGNALIZED INTER - SECTIONS WHERE A DEMONSTRATED NEED EXISTS.
4. MINIMUM SL= 110'. SL MAY BE LESS THAN 110 FEET AS DIRECTED BY THE CITY TRAFFIC ENGINEER.
5. ASIDE FROM LANE LINE MARKINGS, ALL OTHER PAVEMENT MARKINGS SHALL BE PREFORMED MATERIAL. HOT-APPLIED MARKINGS MAY BE USED ONLY IF APPROVED BY PWD TRAFFIC ENGINEERING & OPERATIONS.
6. FOR DUAL-TURN LANES, DIMENSIONS SHALL BE THE SAME FOR EACH LANE.
7. YELLOW EDGE LINES ADJACENT TO RAISED ISLAND ARE REQUIRED. REFER TO TRMRM-24.

SEPTEMBER 2024

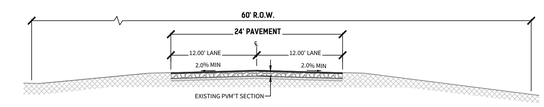
CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

TRAFFIC ENGINEERING AND OPERATIONS STANDARDS

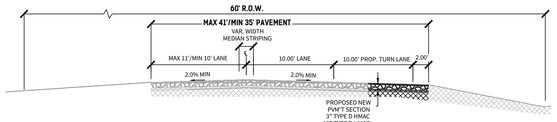
TURN LANE PAVEMENT MARKINGS

SHEET 01 OF 01 TLPM-24

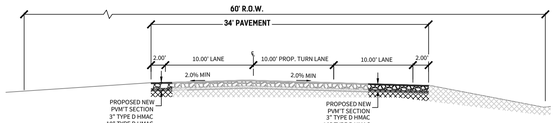
% SUBMITTAL	PROJECT NO.	DATE: 8/24/18
DRWN. BY:	DSGN. BY:	CHKD. BY: I. BANDA, P.E.



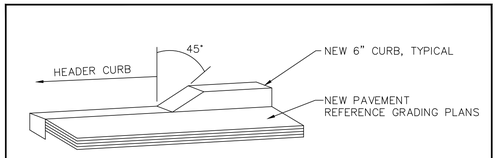
EXISTING GROSENBACHER ROAD SECTION A-A



PROPOSED JUNG ROAD SECTION B-B - RIGHT TURN LANE



PROPOSED JUNG ROAD SECTION C-C - LEFT TURN LANE



1 CURB TRANSITION DETAIL

SCALE: NONE

CUDEENGINEERS.COM

CUDE ENGINEERS EST. 1980

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

TERRA BUONA UNIT 10

TURN LANE DETAILS

DATE
09/11/2025

PROJECT NO.
03209.019

DRAWN BY
JW/SG/LB/DF

CHECKED BY
SPM

REVISIONS
1.
2.
3.
4.
5.
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7.
8.
9.
10.

09/11/2025

STATE OF TEXAM
SEAN P. McFARLAND
138893
LICENSED PROFESSIONAL ENGINEER

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
25-11800307

C9.D1

P:\03209\03\12 DWG\4 Sheets\05 Jul Trial\ TURN LANE DETAILS.dwg 10/25/2025 11:54am Ibarba

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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))
10BWG = 10 BWG Tubing (see SMD(SLIP-1) to (SLIP-3))
SBO = Schedule 80 Pipe (see SMD(SLIP-1) to (SLIP-3))

Number of Posts (1 or 2)

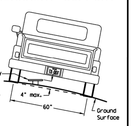
Anchor Type

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))

Supporting Designation

P = Prefab. "Plain" (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 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))
WC = 1.12 #/ft Wing Channel (see SMD(SLIP-1) to (SLIP-3))
EXAL = Extruded Aluminum Sign Panels (see SMD(SLIP-3))

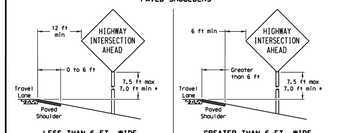
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



To avoid vehicle undercarriage snagging, any substantial length 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 pans).

SIGN LOCATION

PAVED SHOULDERS



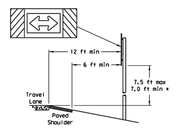
LESS THAN 6 FT. WIDE

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.

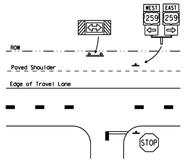
GREATER THAN 6 FT. WIDE

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.

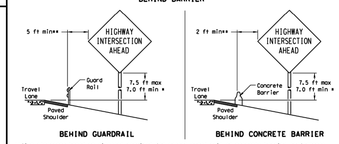
T-INTERSECTION



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.

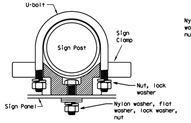
The maximum values may be increased when directed by the Engineer.

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

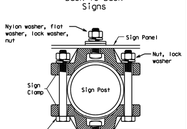
The website address is: http://www.txdot.gov/publications/traffic.htm

TYPICAL SIGN ATTACHMENT DETAIL

Single Signs



Back-to-Back Signs



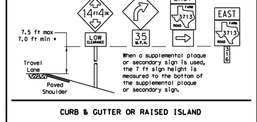
Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

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.

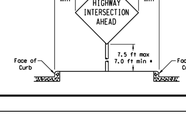
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



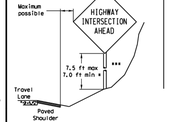
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY

(When 6 ft min. is not possible.)



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

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

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

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

©TxDOT July 2002	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
9-08 REVISIONS	CONT	SECT	JOB	HIGHWAY
	DIST	COUNTY		SHEET NO.

26A

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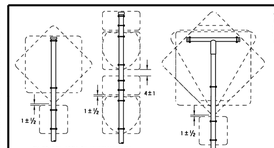
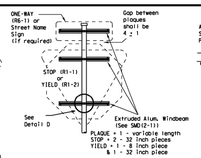
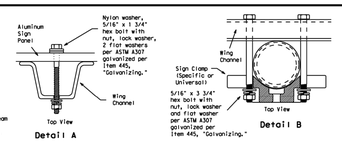
DATE:
FILE:



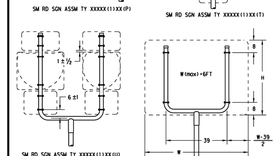


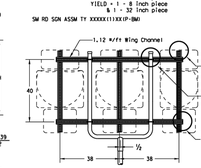


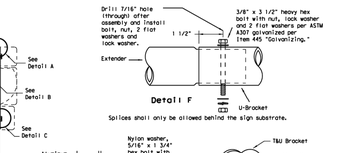
GENERAL NOTES:

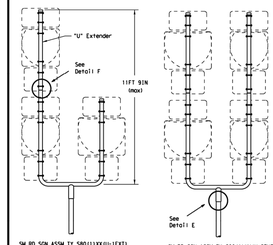
SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

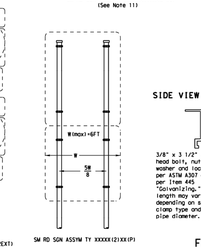
1. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
2. Sign supports shall not be spliced except where shown.
3. Sign supports shall be ASTM A595 Gr A.
4. Aluminum sign blanks shall conform to Departmental Material 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. Extruded aluminum wing channels, or windbeam shall be cut square so that the channel extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Additional route markers may be added vertically, provided the total sign area does not exceed the maximum allowable amount per Note 1.
11. Additional sign clamp required on the "T-bracket" post for 24 inch height signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.
13. Sign blanks shall be the sizes and shapes shown on the plans.

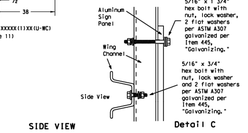


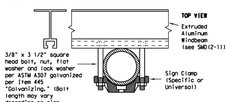






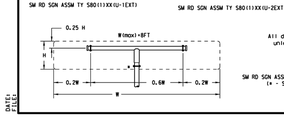






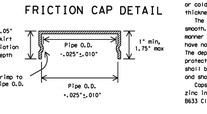
REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BW)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BW)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BW)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY SB0(1)XX(T)
	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY SB0(1)XX(T)
Warning	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

FRICTION CAP DETAIL



All dimensions are in english unless detailed otherwise.

SM RD SGN ASSM TY XXXXX(1)XX(T) (* - See Note 12)



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 grooves or indentations and show no evidence of metal fracture.

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

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-2)-08

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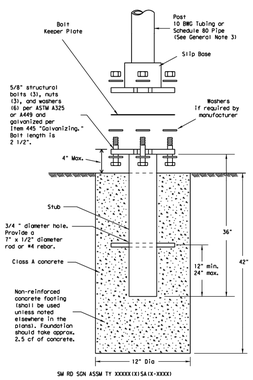
TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



NOTE

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

GENERAL NOTES:

1. Slip base shall be permanently marked to indicate manufacturer, Method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
2. Material used as post with this system shall conform to the following specifications:
   10 BWG Tubing (2.875" outside diameter)
   0.134" nominal wall thickness
   Seamless or electric-resistance welded steel tubing or pipe
   Steel shall be 80LAS Or 55 per ASTM A1011 or ASTM A1008
   Other steels may be used if they meet the following:
   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 2.867" to 2.883"
   Galvanization per ASTM A653 G210, for precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.
   Schedule 80 Pipe (2.875" outside diameter)
   0.276" nominal wall thickness
   Steel tubing per ASTM A500 Gr C
   Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
   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 2.855" to 2.895"
   Galvanization per ASTM A123
3. See the Traffic Operations Division website for detailed drawings of sign clamps and Texas Universal Triangular Slipbase System components. The website address is: https://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

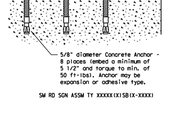
Foundation

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 maintenance-free 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 traveway (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 traveway. 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



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

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-1)-08

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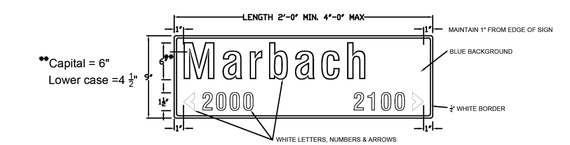
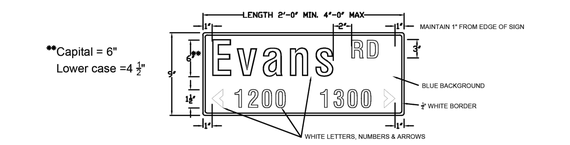
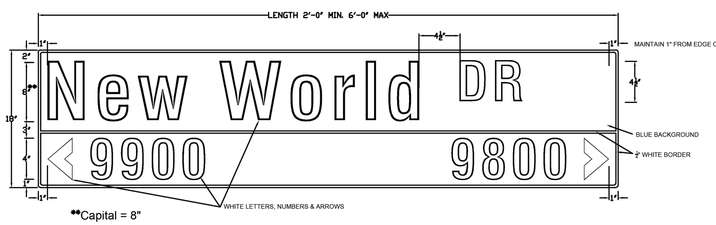


9" GROUND MOUNT STREET NAME SIGNS



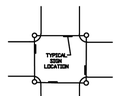
9" GROUND MOUNT STREET NAME SIGNS WITH STREET DESIGNATION



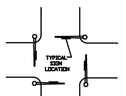
18" OVERHEAD STREET NAME SIGNS

	18" OVERHEAD SIGN	9" GROUND MOUNT SIGNS
HEIGHT	18" (381 mm)	9" (228 mm)
LENGTH	48" (1200 mm) MIN. 72" (1800 mm) MAX. 1" (300mm) INCREMENTS OF LENGTH	24" (600 mm) MIN. 48" (1200 mm) MAX. 6" (150mm) INCREMENTS OF LENGTH
THICKNESS	0.125" (3 mm)	
SUBSTRATE	ALUMINUM ALLOY, 5052 H38 (ASTM B-209 GOLD CHROMATE FINISH	
SIGN FACE MATERIALS	BLUE FILM ✱ OVER DIAMOND GRADE - ASTM Type XI Non-Fluorescent	BLUE FILM ✱ OVER HIGH INTENSITY PRISMATIC- ASTM Type IV
LEGENDS AND SYMBOLS	SERIES D, B OR C IF NAME OTHERWISE EXCEEDS MAXIMUM SIGN LENGTH	
COLOR	WHITE LEGEND ON BLUE BACKGROUND	
LETTER TRACKING	17% (USUAL) 10% (MIN.)	10%

✱ ACRYLIC ELECTRONIC CUTTABLE FILM



SPAN WIRE INSTALLATION



MAST ARM INSTALLATION

SIGN FACE MATERIALS SHALL CONFORM TO:

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

INFRASTRUCTURE SERVICES DEPARTMENT
PUBLIC WORKS DIVISION

STREET NAME SIGNING DETAILS

REVISIONS	
DESIGNED BY:	DRAWN BY:
MT	MK
CHECKED BY:	DATE:
MT	09/09/11
FILE No.:	
03209.dgn	

SHEET 1

CUDEENGINEERS.COM

CUDE ENGINEERS

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

TERRA BUONA UNIT 10

TXDOT & BEXAR COUNTY DETAILS - SIGN MOUNTING

DATE
09/11/2025

PROJECT NO.
03209.019

DRAWN BY
JW/SG/LB/DF

CHECKED BY
SPM

REVISIONS
1.
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09/11/2025

STATE OF TEXAS
SEAN P. McFARLAND
138893
LICENSED PROFESSIONAL ENGINEER

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
25-11800307

C9.D2

P:\03209\03\CAD\C4-Stand\D-Z\C-Text\SIGN DETAILS.dwg, 2025/09/11 9:56am, Burke

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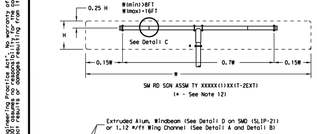

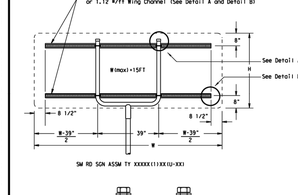

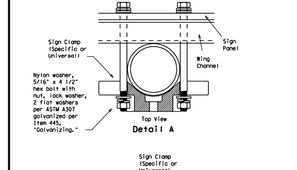

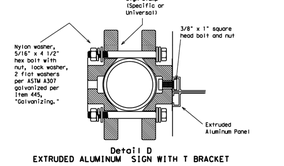

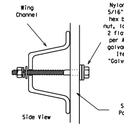

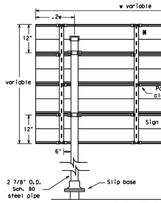

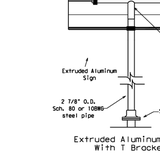

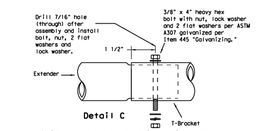

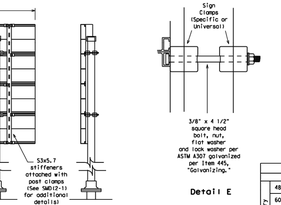

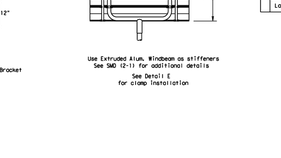

GENERAL NOTES:

1. Sign supports shall not be spliced except where shown.

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	2	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 signs 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., 0.125 for signs 15 to 30 sq. ft., and 0.150 for signs over 30 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 sign heights 7' 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. Each slip base shall operate 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.) Hacksaw galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Slip base plates shall be the sizes and shapes shown on the plans.
11. Additional sign clamp required on the "T-bracket" post for 24 inch high signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.

REQUIRED SUPPORT

	SIGN DESCRIPTION	SUPPORT
Regulatory	48-Inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(T)-BM
	60-Inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(T)-BM
	48x16-Inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(T)-BM
	36x48, 48x36, and 48x48-Inch signs	TY 10BWG(1)XX(T)
	48x60-Inch signs	TY SB0(1)XX(T)
	48x48-Inch signs (diamond or square)	TY 10BWG(1)XX(T)
Warning	48x60-Inch signs	TY SB0(1)XX(T)
	48-Inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-Inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-3)-08

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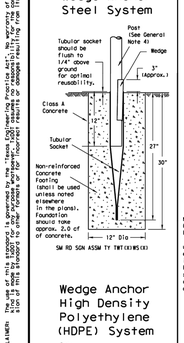
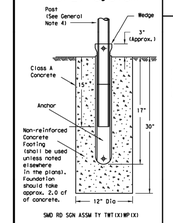
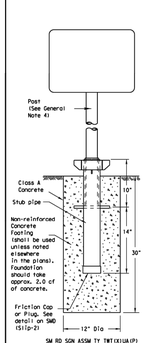
Wedge Anchor Steel System

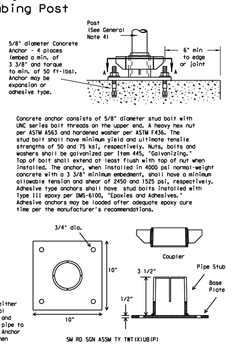


Wedge Anchor High Density Polyethylene (HDPE) System



Universal Anchor System with Thin-Walled Tubing Post





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

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

GENERAL NOTES:

1. The Wedge Anchor System and the Universal Anchor System with thin wall tubing post may be used to support up to 10 square feet of sign area.
2. The tubular socket, wedge and prefabricated T-bracket shall be permanently marked to indicate manufacturer, Method, design, and location of marking are subject to the approval of the TxDOT Traffic Standards Engineer.
3. Except for posts (13 BWG Tubing), clamps, nuts and bolts, all components shall be prequalified. A list of prequalified vendors may be obtained from the Material Producer List web page. The website address is: http://www.txdot.gov/business/producer list.htm
4. Material used as post with thin% system shall conform to the following specifications:
   13 BWG Tubing (0.375" outside diameter TWT)
   0.095" nominal wall thickness
   Seamless or electric-resistance welded steel tubing
   Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
   Other steels may be used if they meet the following:
   55,000 PSI minimum yield strength
   70,000 PSI minimum tensile strength
   18% minimum elongation in 2"
   Wall thickness (uncoated) shall be within the range of .083" to .099"
   Outside diameter (uncoated) shall be within the range of 2.369" to 2.381"
   Galvanization per ASTM 123 or ASTM A653 G210. For prepainted steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.
5. Sign blanks shall be the sizes and shapes shown on the plans.
6. Additional sign clamp required on the "T-bracket" post for 24" high signs. Place clamp at least 3" above bottom of sign when possible.
7. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
8. See the Traffic Operations Division website for detailed drawings of sign clamps and Wedge Anchor System components. The website address is: http://www.txdot.gov/publications/traffic.htm

WEDGE ANCHOR SYSTEM INSTALLATION PROCEDURE:

1. Dig foundation hole. Where solid rock is encountered at ground level, the foundation shall be a minimum depth of 18". When solid rock is encountered below ground level, the foundation shall extend in the solid rock a minimum depth of 18" or provide a minimum foundation depth of 30". If solid rock is encountered, the socket/stub may be reduced in length as required to a minimum length of 18". Any material removed from the socket/stub shall be free 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, motor driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
3. Insert 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 slip post into socket and align sign face with roadway.
7. Drive the wedge into the socket to secure post. This will leave approximately 3 inches of the wedge exposed.

UNIVERSAL ANCHOR SYSTEM INSTALLATION PROCEDURE

1. Dig foundation hole. Where solid rock is encountered at ground level, the foundation shall be a minimum depth of 18". When solid rock is encountered below ground level, the foundation shall extend in the solid rock a minimum depth of 18" or provide a minimum foundation depth of 30". If solid rock is encountered, the socket/stub may be reduced in length as required to a minimum length of 18". Any material removed from the socket/stub shall be free 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 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.
3. 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.
4. Attach sign to FRP post.
5. Insert sign post into base post. Lower until the post comes to rest on the steel rod.
6. Use hammer to ensure the coupler is firmly seated. Top of coupler should be level with top of base post in most instances.
7. Check sign to ensure there is no twist. If loose, increase the tightening of coupler.

Texas Department of Transportation
Traffic Operations Division

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

SMD(TWT)-08

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266

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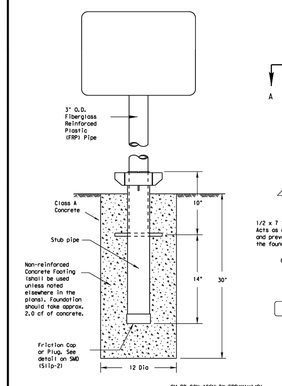
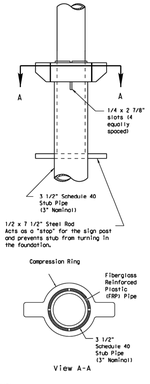
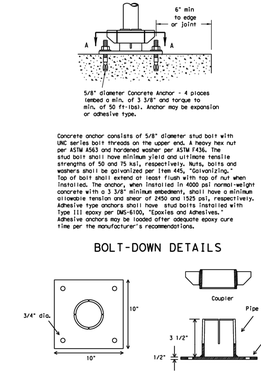
DATE:
FILE:

Universal Anchor System with Fiberglass Reinforced Plastic (FRP) Post







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-4410 and will be furnished in a yellow or gray color as specified elsewhere in the plans.
2. Thickness of FRP sign support is 0.125" + 0.031", - 0.0".
3. FRP sign supports are prequalified by the Traffic Operations Division. Prequalification procedures are obtained by writing:
   Texas Department of Transportation
   Traffic Operations Division
   125 East 11th Street
   Austin, Texas 78701-2483

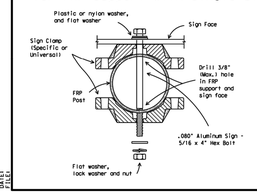
UNIVERSAL ANCHOR SYSTEM INSTALLATION PROCEDURES

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

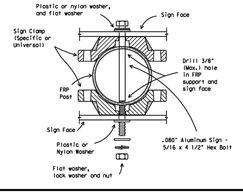
BOLT DOWN SIGN SUPPORT

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

Typical Sign Mounting Detail for FRP Support with Single Sign



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



Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS UNIVERSAL ANCHOR SYSTEM WITH FRP POST

SMD(FRP)-08

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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

TERRA BUONA UNIT 10

TXDOT DETAILS - SIGN MOUNTING

DATE
09/11/2025

PROJECT NO.
03209.019

DRAWN BY
JW/SG/LB/DF

CHECKED BY
SPM

REVISIONS
1.
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8.
9.
10.

09/11/2025
STATE OF TEXAS
SEAN P. McFARLAND
138893
LICENSED PROFESSIONAL ENGINEER

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
25-11800307

C9.D3

P:\03209\03D\CAD\4-Sheets\D_03 TWT SIGN DETAILS.dwg, 2025/09/11 9:56am, Burke

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.

GEOTECHNICAL REPORT
(Intec Project No. S251104-P)

M.W. CUDE ENGINEERS, L.L.C 4122 Pond Hill Road, Suite 101 San Antonio, Texas 78231 210.681.2951 (tel) 210.523.7112 (fax)

Subsurface Exploration and Pavement Analysis
Proposed New Streets
Terra Buona, Take III & Take IV
San Antonio, Texas

InTEC Project No. S251104-P
May 02, 2025

4800 Fredericksburg Road
San Antonio, Texas 78229

Integrated Testing and Engineering Company of San Antonio, L.P.
12028 Radium, San Antonio, Texas 78216—Phone: (210) 525 9033—Fax: (210) 525 9032—www.InTEC-SA.com

Integrated Testing and Engineering Company of San Antonio, L.P.
Geotechnical & Environmental Engineering • Construction Services • Geologic Assessment

May 02, 2025

KBHOME

4800 Fredericksburg Road

San Antonio, Texas 78229

Attention: **Mr. Jason Townsley**

Email: jtownsley@kbhome.com

Re: Subsurface Exploration and Pavement Analysis
Proposed New Streets
Terra Buona, Take III & Take IV
San Antonio, Texas

InTEC Project No. S251104-P

Ladies & Gentlemen:

Integrated Testing and Engineering Company of San Antonio (InTEC) has completed a **subsurface exploration and pavement thickness evaluation report** at the above referenced project site. The results of the exploration are presented in this report.

We appreciate and wish to thank you for the opportunity to be of service to you on this project. If we can be of additional assistance during the foundations explorations, and materials testing-quality control phase of construction, please call us.

Sincerely,

InTEC of San Antonio

Murali Subramaniam, Ph. D., P.E.
Vice President

STATE OF TEXAS
MURALI SUBRAMANIAM
102417
LICENSED PROFESSIONAL ENGINEER
InTEC of SAN ANTONIO
F-7623

05/07/2025

EXECUTIVE SUMMARY

The soil conditions at the location of **Terra Buona, Take III & Take IV in San Antonio, Texas** were obtained from **excavating 13 test pits to depths of 5 to 8 feet.** Laboratory tests were performed on selected specimens to evaluate the engineering characteristics of various soil strata encountered in the test pits.

- The subsurface soils at the test pit locations primarily consist of brown clays, dark brown clays, brown sandy clays, tan clays, tan and gray clays, and tan calcareous clays.
- The results of our exploration, laboratory testing, and engineering evaluation indicate the underlying shallow clays at this site are **moderately plastic to highly plastic in character.** Potential vertical movements on the order of **2 to 4 ½ inches** were estimated.
- The proposed pavements at this site may be supported by flexible pavement sections.
- Cut and fill information is not available for our review at this time. Clay subgrades are anticipated.
- At the time of construction, if the final street subgrade consists of material other than encountered in our test pits, the recommendations may have to be revised. Pavement section recommendations for Local and Collector type streets are presented.
- Ground water was not encountered in the test pits at the time of excavation.

Detailed descriptions of subsurface conditions, engineering analysis, and design recommendations are included in this report.

Summary Table A – Input Parameters used in Asphalt Pavement Section Calculation

	Local Type A (no bus traffic)	**Local Type A** (with bus traffic)	**Local B**	**Collector**
ESAL	100,000	1,000,000	2,000,000	2,000,000
Reliability Level	R-70	R-70	R-90	R-90
Initial and Terminal Serviceability	4.2 and 2.0	4.2 and 2.0	4.2 and 2.0	4.2 and 2.5
Standard Deviation	0.45	0.45	0.45	0.45
Service Life	20 years	20 years	20 years	20 years
If heavy truck traffic is anticipated, please contact InTEC with anticipated traffic data for revised recommendations.				

Summary Table B – Minimum Flexible Pavement Recommendations – CBR = 2.0

Street Classification	Asphaltic Concrete			Aggregate Base, Inches	Geogrid	Stabilized Subgrade, Inches	Structural Number
	Type D, inches	Type C, inches	Type B, inches				
Local Type A (no bus traffic)	2.00	-	-	10.00	No	8"	2.92
	2.00	-	-	8.00	Yes	8"	2.89
	2.00	-	5.00	-	No	8"	3.22
Local Type A (with bus traffic)	3.00	-	-	15.00	No	8"	4.06
	3.00	-	-	12.50	Yes	8"	4.08
	2.00	-	8.00	-	No	8"	4.24
Local Type B	2.00	2.00	-	18.50	No	8"	4.99
	2.00	2.00	-	15.50	Yes	8"	5.03
	3.00	-	9.00	-	No	8"	5.02
Collector	2.00	2.00	-	21.00	No	8"	5.34
	2.00	2.00	-	17.50	Yes	8"	5.37
	3.00	-	10.00	-	No	8"	5.36

Design Notes:

- The results of our laboratory testing and engineering evaluation indicate that the underlying shallow clays are **moderately plastic to highly plastic in character.** Potential vertical movement on the order of **2 to 4 ½ inches** is estimated at existing grade elevation.
- Final Subgrade Plasticity Index values greater than 20 are anticipated.
- Pavement section recommendations are based on the design CBR value of 2.0 and the input parameters. The pavement can experience cracking and deformation due to shrinkage and swelling characteristics of the soils as described in the *Vertical Movements* section of this report.
- Cut and fill information is not available at this time. Anticipated potential vertical movements and recommended pavement sections should be re-evaluated after cut and fill information is made available.
- Recommend stabilizing 8 inches of subgrade soils.
- Local and Collector type street recommendations are presented.
- Input parameters are shown in Table No. 3 (Summary Table A). Please call us to provide pavement recommendations, if needed, for different input values.
- If repetitive truck or heavy truck traffic is anticipated, please contact us for revised pavement recommendations.

Subgrade Notes:

- Based on the thickness of the clays encountered in the test pits, we anticipate the final pavement subgrade Plasticity Index value to be greater than 20. Subgrade stabilization is recommended.
    - The subgrade soils should be tested for soil sulfate content prior to stabilization. If the soil sulfate content is higher than 3000 ppm an alternate / modified procedure will be needed.
    - Lime or cement may be used to stabilize the subgrade.
    - An application rate of 7 ½ percent is recommended. Application rate of cement, if needed, should be determined at the time construction.
    - Lime application rate of **42 lbs per sq yard for 8-inch depth** of stabilization is recommended.
    - Field mixed subgrade soils should meet a minimum Unconfined compressive strength value of 160 psi.
- Fill used to raise the grade:
    - approved fill material free should have a minimum CBR value of 2.0 and a maximum Plasticity Index value of 60. Lime application rates should be re-evaluated and tested for sulfate content prior to use of the fill material.
    - The fill material should be approved by the geotechnical engineer, free of deleterious material, and the gravel size should not exceed 3 inches in size. The material should be placed and compacted as per applicable city / county guidelines.
    - The subgrade, prior to placement of fill, should be proof rolled to identify weak areas. Any identified weak areas should be recompacted.

General Notes:

- Significant pavement distress has been observed during construction phase with the combination of construction traffic and irrigation water / rain water getting underneath the asphalt.
- If water is allowed to get underneath the asphalt or if moisture content of the base or subgrade soil changes significantly, then pavement distress will occur.
    - Minimizing moisture penetration underneath the asphalt will lower the chances of pavement distress.
    - Significant pavement distress, more often caused by water getting underneath the asphalt, is noted during home construction.
    - Aggregate base extending beyond the back of the curb increases the likelihood of water getting underneath the asphalt. Moisture penetration may be reduced by using a deeper curb, such as curb extending a minimum of 6 inches into subgrade or compacted clays backfilled against the curbs.
    - In addition, water should not be allowed to get underneath the pavement section at the time of home construction.

Geogrid:

- One layer of geogrid, Tensar Triax 130 or better (Bexar County), installed on top of compacted (stabilized) subgrade as per manufacturer's guidelines.

Aggregate Base:

- TxDOT Item 247 A1-A2 aggregate base is recommended. The lift thickness and the compaction should follow all applicable city / county guidelines.

Asphalt:

- The asphalt material and installation should follow all applicable city / county guidelines.

Subgrade Verification:

- At the time of construction, the final pavement subgrade should be observed / verified by a representative of InTEC.

Summary Table C – Summary of Pavement Materials

Pavement Section	Material	Stabilization or Treatment	Thickness
Subgrade	Clays (Plasticity Index > 20)	Sulfate content should be tested prior to stabilization	As recommended in pavement options (8 inches)
			-
Base	TxDOT Item 247 A1-A2	-	As recommended in pavement options (maximum of 6 inches per lift)
Asphalt	Type B, C, D	-	As recommended in pavement options
Geogrid	Tensar Triax TX130 or better	One layer	As per manufacturer's recommendations

See report for more details

Summary Table D – Applicable procedures and minimum density and moisture percentages

All applicable City of San Antonio Standard Specifications for Construction, June 2008, should be followed. Some of the relevant procedures are shown below.

Pavement Material	Procedure *	Density and Moisture Control
Subgrade fill (maximum 6 inch thick lifts)	Item 107	As per construction specifications
Treated Subgrade (6 inch thick lift)	Item 108- lime	As per construction specifications
Aggregate Base TxDOT Item 247 A1-2 (maximum 6 inch thick lift)	Item 200	As per construction specifications
Asphalt HMAC Type B, C, D	Item 205, 206	As per construction specifications
Geogrid	Manufacturer's Guidelines	-

(*) City of San Antonio Standard Specifications for Construction, June 2008

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INTRODUCTION

General

This report presents the results of our **subsurface exploration and pavement thickness evaluation** for the **proposed new streets at Terra Buona, Take III & Take IV in San Antonio, Texas.** This project was authorized by **Mr. Jason Townsley.**

Purpose and Scope of Services

The purpose of our subsurface investigation was to evaluate the site's subsurface and ground water conditions and provide pavement thickness recommendations for the planning and development phases of the project. Our scope of services includes the following:

1) excavating and sampling of 13 test pits – to depths of 5 to 8 feet;

2) observation of the ground water conditions during excavation operations;

3) performing laboratory tests such as Atterberg limits, California Bearing Ratio (C.B.R.), Lime Series, and Moisture content tests;

4) review and evaluation of the field and laboratory test programs during their execution with modifications of these programs, when necessary, to adjust to subsurface conditions revealed by them;

5) compilation, generalization and analyses of the field and laboratory data in relation to the project requirements;

6) estimate of potential vertical movements;

7) preparation of pavement guidelines;

8) preparation of a written geotechnical engineering report for use by the members of the design team in their preparation of construction, contract, and specifications documents.

The Scope of Services **did not include slope stability or any environmental assessment** for the presence or absence of wetlands or hazardous or toxic materials in the soil, surface water, groundwater, or air, on or below or around this site. Any statements in this report or on the Test Pit Logs regarding odors, colors or unusual or suspicious items or conditions are strictly for the information of the client.

Project Description

The proposed project involves the development of the new streets at Terra Buona, Take III & Take IV in San Antonio, Texas. The proposed pavement areas are anticipated to include Local and Collector type streets. Cut and fill information are not available for our use at this time. Clay subgrades are anticipated.

- A review of the aerial map indicates the site contains numerous trees and dense vegetation throughout.

- Review of the topographic map indicates (a) the site is generally slopes from the northeast to the southwest, (b) a drainage area running north-south in the mid-section of tract, and (c) the site contains two ponds near the mid-section of the property.

- Review of the geologic map indicates the site is located within Kknm, Navarro Group and Marlbrook Marl (generally on the eastern section) Kac, Anacacho Limestone, and Qal, Alluvium (generally on the western section), formations.

SUBSURFACE EXPLORATION

Scope

The field exploration to determine the engineering characteristics of the subsurface materials included a reconnaissance of the project site, excavating the test pits, and obtaining bulk samples.

Thirteen soil test pits were excavated at the approximate locations shown on the Test Pit Location Plan, Plate 1, included in the Illustration section of this report. These test pits were **excavated to depths of 5 to 8 feet below the presently existing ground surface**. Test pit locations were selected by the project geotechnical engineer and established in the field by the excavation crew using normal taping procedures.

Excavating and Sampling

The excavation was performed with a back-hoe excavator. Bulk samples were collected by hand**.** The samples were identified according to test pit number and depth, encased in polyethylene plastic wrapping to protect against moisture loss, and transported to our laboratory in special containers.

Water Level Measurements

Ground water was not encountered in the test pits at the time of excavation. In relatively pervious soils, such as sandy soils, the indicated elevations are considered reliable ground water levels. In relatively impervious soils, the accurate determination of the ground water elevation may not be possible even after several days of observation. Seasonal variations, temperature and recent rainfall conditions may influence the levels of the ground water table and volumes of water will depend on the permeability of the soils.

Field Logs

A field log was prepared for each test pit. Each log contained information concerning the sampling method, samples attempted and recovered, indications of the presence of various materials such as silt, clay, gravel or sand and observations of ground water. It also contained an interpretation of subsurface conditions between samples. **Therefore, these logs included both factual and interpretive information.**

Presentation of the Data

The final logs represent our interpretation of **the contents of the field logs for the purpose delineated by our client.** The final logs are included on **Plates 2 thru 14** included in the Illustration section. A key to classification terms and symbols used on the logs is presented on **Plate 15.**

LABORATORY TESTING PROGRAM

Purpose

In addition to the field exploration, a supplemental laboratory testing program was conducted to determine additional **pertinent engineering characteristics** of the subsurface materials necessary in evaluating the soil parameters.

Laboratory Tests

All phases of the laboratory testing program were performed **in general accordance with the indicated applicable** ASTM Specifications as indicated in Table No. 1.

Table No. 1 – Laboratory Test Procedures

Laboratory Test	Applicable Test Standard
Liquid Limit, Plastic Limit and Plasticity Index of the Soils	ASTM D 4318
Moisture Content	ASTM D 2216
California Bearing Ratio	ASTM D 1883
pH	ASTM D 6276

In the laboratory, each sample **was observed and classified by a geotechnical engineer.** As a part of this classification procedure, the natural water contents of selected specimens were determined. Liquid and plastic limit tests were performed on representative specimens to determine the plasticity characteristics of the different soil strata encountered.

Presentation of the Data

The tests were conducted in the laboratory to evaluate the engineering characteristics of the subsurface materials. The results of all these tests are presented on appropriate Test Pit Logs. These laboratory test results were used to classify the soils encountered generally according to the Unified Soil Classification System (ASTM D 2487).

GENERAL SUBSURFACE CONDITIONS

Soil Stratigraphy

The soils underlying the site may be grouped into **one to two generalized strata** with similar physical and engineering properties. The lines designating the interface between soil strata on the logs represent approximate boundaries. Transition between materials may be gradual. The soil stratigraphy information at the test pit locations are presented in **Test Pit Logs, Plates 2 thru 14.**

The engineering characteristics of the underlying soils, based on selected samples that were tested, are summarized and presented in the following paragraph.

The underlying brown clays, dark brown clays, brown sandy clays, tan clays, tan and gray clays, and tan calcareous clays are moderately plastic to highly plastic with tested liquid limit values varying from 31 to 110 and plasticity index values ranging from 13 to 76.

Soil stratigraphy may vary between test pit locations. If deviations from the noted subsurface conditions are encountered during construction, they should be brought to the attention of InTEC. We may revise the recommendations after evaluating the significance of the changed conditions.

Ground Water Observations

Ground water was not encountered in the test pits at the time of excavation. Short term field observations generally do not provide accurate ground water levels. The contractor should check the subsurface water conditions prior to any excavation activities. The low permeability of the soils would require several days or longer for ground water to enter and stabilize in the test pit holes. Ground water levels will fluctuate with seasonal climatic variations and changes in the land use.

It is not unusual to encounter shallow groundwater during or after periods of rainfall. The surface water tends to percolate down through the surface until it encounters a relatively impervious layer.

PAVEMENTS ON EXPANSIVE SOIL

General

There are many plastic clays that swell considerably when water is added to them and then shrink with the loss of water. Pavements constructed on these clays (such as if thicker stratum I clays are encountered or if clayey backfills are used) are subjected to large uplifting forces caused by the swelling.

In the characterization of a pavement site, two major factors that contribute to potential shrink-swell problems must be considered. Problems can arise if a) the soil has expansive and shrinkage properties and b) the environmental conditions that cause moisture changes to occur in the soil.

Evaluation of the Shrink-Swell Potential of the Soils

Subsurface sampling, laboratory testing and data analyses are used in the evaluation of the shrink-swell potential of the soils under the pavements.

The Mechanism of Swelling

The mechanism of swelling in expansive clays is complex and is influenced by a number of factors. Basically, expansion is a result of changes in the soil-water system that disturbs the internal stress equilibrium. Clay particles in general have negative electrical charges on their surfaces and positively charged ends. The negative charges are balanced by actions in the soil water and give rise to an electrical interparticle force field. In addition, adsorptive forces exist between the clay crystals and water molecules, and Van Der Waals surface forces exist between particles. Thus, there exists an internal electro-chemical force system that must be in equilibrium with the externally applied stresses and capillary tension in the soil water. If the soil water chemistry is changed either by changing the amount of water or the chemical composition, the interparticle force field will change. If the change in internal forces is not balanced by a corresponding change in the state of stress, the particle spacing will change so as to adjust the interparticle forces until equilibrium is reached. This change in particle spacing manifests itself as a shrinkage or swelling.

Initial Moisture Condition and Moisture Variation

Volume change in an expansive soil mass is the result of increases or decreases in water content. The initial moisture content influences the swell and shrink potential relative to possible limits, or ranges, in moisture content. Moisture content alone is useless as an indicator or predictor of shrink-swell potential. The

relationship of moisture content to limiting moisture contents such as the plastic limit and liquid limit must be known.

If the moisture content is below or near plastic limit, the soils have high potential to swell. It has been reported that expansive soils with liquidity index* in the range of 0.20 to 0.40 will tend to experience little additional swell.

The availability of water to an expansive soil profile is influenced by many environmental and manmade factors. Generally, the upper few feet of the profile are subjected to the widest ranges of moisture variation, and are least restrained against movement by overburden. This upper stratum of the profile is referred to as the active zone. Moisture variation in the active zone of a natural soil profile is affected by climatic cycles at the surface, and fluctuating groundwater levels at the lower moisture boundary. The surficial boundary moisture conditions are changed significantly simply by placing a barrier such as a building floor slab or pavement between the soil and atmospheric environment. Other obvious and direct causes of moisture variation result from altered drainage conditions or man-made sources of water, such as irrigation or leaky plumbing. The latter factors are difficult to quantify and incorporate into the analysis, but should be controlled to the extent possible for each situation. For example, proper drainage and attention to landscaping are simple means of minimizing moisture fluctuations near structures, and should always be taken into consideration.

Man Made Conditions That Can Be Altered

There are a number of factors that can influence whether a soil might shrink or swell and the magnitude of this movement. For the most part, either the owner or the designer has some control over whether the factor will be avoided altogether or if not avoided, the degree to which the factor will be allowed to influence the shrink-swell process.

Antecedent Rainfall Ratio This is a measure of the local climate and is defined as the total monthly rainfall for the month of and the month prior to laying the pavement divided by twice the average monthly rate measured for the period. The intent of this ratio is to give a relative measure of ground moisture conditions at the time the pavement is placed. Thus, if a pavement is placed at the end of a wet period, the pavement should be expected to experience some loss of support around the perimeter as the wet soils begin to dry out and shrink. The opposite effect could be

* LIQUIDITY INDEX = (NATURAL WATER CONTENT - PLASTIC LIMIT) / (LIQUID LIMIT - PLASTIC LIMIT)

anticipated if the pavement is placed at the end of an extended dry period; as the wet season occurs, uplift around the perimeter may occur as the soil at the edge of the slab pavement in moisture content.

Age of Pavement The length of time since the pavement was cast provides an indication of the type of swelling of the soil profile that can be expected to be found beneath the pavement.

Drainage This provides a measure of the slope of the ground surface with respect to available free surface water that may accumulate around the pavement. Most builders are aware of the importance of sloping the final grade of the soil away from the pavement so that rain water is not allowed to collect and pond against or adjacent to the pavement. If water were allowed to accumulate next to the pavement, it would provide an available source of free water to the expansive soil underlying the pavement. Similarly, surface water drainage patterns or swales must not be altered so that runoff is allowed to collect next to the pavement.

Pre-Construction Vegetation Large amount of vegetation existing on a site before construction may have desiccated the site to some degree, especially where large trees grew before clearing. Constructing over a desiccated soil can produce some dramatic instances of heave and associated structural distress and damage as it wets up.

Post-Construction Vegetation The type, amount, and location of vegetation that has been allowed to grow since construction can cause localized desiccation. Planting trees or large shrubs near a pavement can result in loss of foundation support as the tree or shrub removes water from the soil and dries it out. Conversely, the opposite effect can occur if flowerbeds or shrubs are planted next to the pavement and these beds are kept well-watered or flooded. This practice can result in swelling of the soil around the perimeter where the soil is kept wet.

Utilities Underneath the Pavement The utilities such as sewer, water, electricity, gas, and communication lines are often installed underneath the streets. The sewer utility construction, for example, typically involves trenching to the desired depth, installing gravel a gravel bed underneath the sewer main, installing primary backfill (gravel), and placing back the secondary backfill (generally excavated soils). The secondary backfill material is compacted in lifts. In addition, sewer service lines run laterally from each house (for a typical subdivision, approximately every 50-ft). These trenches with gravel and onsite material backfill are conducive to carrying water. In addition,

the sewer service lines can carry water from behind the curb. Occasionally, the sewer line may be encased in concrete which will cause ponding of any travelling water within the sewer trenches. Any water travelling within these trenches can cause expansive clays to swell. If the backfill is not adequately compacted or if excessive water is flowing in these trenches, the trench backfill can potentially settle.

Summation

It is beyond the scope of this investigation to do more than point out that the above factors have a definite influence on the amount and type of swell to which a pavement is subjected during its useful life. The design engineer must be aware of these factors as he develops his design and make adjustments as necessary according to the results of special measurements or from his engineering experience and judgment.

DESIGN ENGINEERING ANALYSIS

Pavement Design Considerations

Review of the test pits and test data indicates that the following factors will affect the pavement design and construction at this site:

1) The site is underlain by moderately plastic to highly plastic subsoils. Structures supported on or within these soils will be subjected to potential vertical movements on the order of **2 to 4 ½ inches.**

2) The strengths of the underlying soils are adequate to support the proposed new streets.

3) Based on the stratigraphy observed at this site, the final street subgrade is anticipated to be in the Clay strata. The final street subgrade should be verified by InTEC at the time of construction.

4) Ground water was not encountered in the test pits at the time of excavation.

Vertical Movements

The potential vertical rise (PVR) for slab-on grade construction at the location of the structures had been estimated using Texas Department of Transportation Procedure TXDOT-124-E. This method utilizes the liquid limits, plasticity indices, and in-situ moisture contents for soils in the seasonally active zone, estimated to be about ten feet at the project site.

The estimated PVR value provided is based on the proposed floor system applying a sustained surcharge load of approximately 1.0 lb. per square inch on the subgrade materials**. Potential vertical movement on the order of 2 to 4 ½ inches was estimated at the existing grade elevation**.

The PVR values are based on the current site grades. If cut and fill operations in excess of 6 inches are performed, the PVR values could change significantly. Higher PVR values than the above-mentioned values will occur in areas where water is allowed to pond for extended periods.

If the thickness of the stabilized soils is increased to 12 inches, potential vertical movement on the order of 3 inches is anticipated.

If proper drainage is not maintained (allowing subgrade moisture content to change significantly) and / or if the pavement is underlain by utility trenches and the utilities leak (a) potential vertical movements will be much greater than 2 to 3 times the anticipated vertical movements will be realized and (b) the subgrade strength may be significantly lowered.

It should be noted that expansive clay does not shrink/swell without changes in moisture content, and thus good site design is very important to minimize movements. Coping with problems of shrink/swell due to expansive clays is a “fact of life” in the Texas region of south western U.S.A.

PAVEMENT GUIDELINES

General

Pavement area at this unit is expected to include Local and Collector type streets. The following recommendations are presented as a guideline for pavement design and construction. These recommendations are based on a) our previous experience with subgrade soils like those encountered at this site, b) pavement sections which have proved to be successful under similar design conditions, c) final pavement grades will provide adequate drainage for the pavement areas and that water will not be allowed to enter the pavement system by either edge penetration adjacent to landscape areas or penetration from the surface due to surface ponding, or inadequate maintenance of pavement joints, or surface cracks that may develop.

Pavement Design

Pavement designs provide an adequate thickness of structural sections over a particular subgrade (in order to reduce the wheel load to a distributed level so that the subgrade can support load). The support characteristics of the subgrade are based on strength characteristics of the subgrade soils and not on the shrinkage and swelling characteristics of the clays. Therefore, the pavement sections may be adequate from a structural stand point, may still experience cracking and deformation due to shrinkage and swelling characteristics of the soils. In addition, if the proposed new pavements are used to carry temporary construction traffic, then heavier sections may be needed. Please contact InTEC to discuss options.

It is very important to minimize moisture changes in the subgrade to lower the shrinkage and swell movements of the subgrade clays. The pavement and adjacent areas should be well drained. Proper maintenance should be performed by sealing the cracks as soon as they develop to prevent further water penetrations and damage. In our experience,

(a) majority of the pavement distress observed over the years were caused by changes in moisture content of the underlying subgrade and / or excessive moisture in the base section,

(b) pavements with a grade of one percent or more have performed better than the pavements with allowable minimum grade,

(c) pavements with no underground utilities have performed better than pavements with underground utilities and the associated laterals,

(d) pavements that are at a higher-grade elevation than the surrounding lots have performed better, and

(e) any design effort that minimizes moisture penetration into the pavement layers have performed better.

"Alligator" Type Cracks

A layer of aggregate base is typically used underneath the concrete curbs around the pavement areas. This layer of aggregate base underneath the concrete curb is conducive to the infiltration of surface water into the pavement areas. Water infiltration into the subgrade and / or base layer can result in "alligator type" cracks especially when accompanied by construction traffic. Increased moisture content of the pavement sections will significantly impact its support characteristics. Moisture penetration into pavement layers can be reduced by (a) penetrating the concrete curbs at least three inches into the native clays soils, (b) installing French Drains on the outside of the curbs, or (c) installing a moisture barrier such as a trench filled with bentonite or flowable fill. Alligator type cracks are also caused by weak / soft pockets within the pavement layers. Thoroughly proof rolling the subgrade and base layers will help identify the soft softs and densify as needed.

Longitudinal Cracks

Asphalt pavements in highly expansive soil conditions, such as the soils encountered at this site, can develop longitudinal cracks along the pavement edges. The longitudinal cracking typically occurs about 1 to 4 feet inside of the pavement edges and they run parallel to the pavement edge. Longitudinal or reflective cracks may also be observed over utility trenches. The longitudinal cracks are generally caused by differential drying and shrinkage of the underlying expansive clays. The moisture content change of the underlying subgrade clays can be reduced by installing moisture barriers. Vertical moisture barriers along the edge of the pavement or horizontal moisture barriers such as paved sidewalks or geogrid will help control the development of the longitudinal cracks.

Periodic Maintenance

The pavements constructed on clay subgrades such as the one encountered at this site will be subjected to shrink / swell related movements. Hence, proper maintenance should be performed by sealing the cracks as soon as they develop to prevent further water penetrations and damage.

Pavement Sections

Local and Collector type residential streets may be designed with flexible pavements. The final finish street subgrade is expected to be in Clay subgrade areas. Minimum flexible pavement sections for the anticipated subgrades are presented in Table No. 2 in the following page. The project geotechnical engineer should delineate the streets for different subgrades at the time of construction. Input parameters used in the pavement section calculations are presented in Table No. 3.

- If pavement design for parameters other than those shown in Table No. 3 is needed or if repetitive / heavy truck traffic is anticipated, please contact us for additional pavement section recommendations.
- The recommended pavement sections are based on the subgrade soil support characteristics.
- The pavement sections are not based on shrink / swell characteristics of the subgrade soils.
- The subgrade soil support characteristics will be significantly affected by changes in moisture content.

The cut and fill information is not available at this time. The final street subgrade should be verified by InTEC at the time of construction.

Table No. 2 – Minimum Flexible Pavement Recommendations – CBR = 2.0

Street Classification	Asphaltic Concrete			Aggregate Base, Inches	Geogrid	Stabilized Subgrade, Inches	Structural Number
	Type D, inches	Type C, inches	Type B, inches				
Local Type A (no bus traffic)	2.00	-	-	10.00	No	8"	2.92
	2.00	-	-	8.00	Yes	8"	2.89
	2.00	-	5.00	-	No	8"	3.22
Local Type A (with bus traffic)	3.00	-	-	15.00	No	8"	4.06
	3.00	-	-	12.50	Yes	8"	4.08
	2.00	-	8.00	-	No	8"	4.24
Local Type B	2.00	2.00	-	18.50	No	8"	4.99
	2.00	2.00	-	15.50	Yes	8"	5.03
	3.00	-	9.00	-	No	8"	5.02
Collector	2.00	2.00	-	21.00	No	8"	5.34
	2.00	2.00	-	17.50	Yes	8"	5.37
	3.00	-	10.00	-	No	8"	5.36

Design Notes:

- The results of our laboratory testing and engineering evaluation indicate that the underlying shallow clays are **moderately plastic to highly plastic in character.** Potential vertical movement on the order of **2 to 4 ½ inches** is estimated at existing grade elevation.
- Final Subgrade Plasticity Index values greater than 20 are anticipated.
- Pavement section recommendations are based on the design CBR value of 2.0 and the input parameters. The pavement can experience cracking and deformation due to shrinkage and swelling characteristics of the soils as described in the *Vertical Movements* section of this report.
- Cut and fill information is not available at this time. Anticipated potential vertical movements and recommended pavement sections should be re-evaluated after cut and fill information is made available.
- Recommend stabilizing 8 inches of subgrade soils.
- Local and Collector type street recommendations are presented.
- Input parameters are shown in Table No. 3 (Summary Table A). Please call us to provide pavement recommendations, if needed, for different input values.
- If repetitive truck or heavy truck traffic is anticipated, please contact us for revised pavement recommendations.

Subgrade Notes:

- Based on the thickness of the clays encountered in the test pits, we anticipate the final pavement subgrade Plasticity Index value to be greater than 20. Subgrade stabilization is recommended.
    - The subgrade soils should be tested for soil sulfate content prior to stabilization. If the soil sulfate content is higher than 3000 ppm an alternate / modified procedure will be needed.
    - Lime or cement may be used to stabilize the subgrade.
    - An application rate of 7 ½ percent is recommended. Application rate of cement, if needed, should be determined at the time construction.
    - Lime application rate of **42 lbs per sq yard for 8-inch depth** of stabilization is recommended.
    - Field mixed subgrade soils should meet a minimum Unconfined compressive strength value of 160 psi.
- Fill used to raise the grade:
    - approved fill material free should have a minimum CBR value of 2.0 and a maximum Plasticity Index value of 60. Lime application rates should be re-evaluated and tested for sulfate content prior to use of the fill material.
    - The fill material should be approved by the geotechnical engineer, free of deleterious material, and the gravel size should not exceed 3 inches in size. The material should be placed and compacted as per applicable city / county guidelines.
    - The subgrade, prior to placement of fill, should be proof rolled to identify weak areas. Any identified weak areas should be recompacted.

General Notes:

- Significant pavement distress has been observed during construction phase with the combination of construction traffic and irrigation water / rain water getting underneath the asphalt.
- If water is allowed to get underneath the asphalt or if moisture content of the base or subgrade soil changes significantly, then pavement distress will occur.
    - Minimizing moisture penetration underneath the asphalt will lower the chances of pavement distress.
    - Significant pavement distress, more often caused by water getting underneath the asphalt, is noted during home construction.
    - Aggregate base extending beyond the back of the curb increases the likelihood of water getting underneath the asphalt. Moisture penetration may be reduced by using a deeper curb, such as curb extending a minimum of 6 inches into subgrade or compacted clays backfilled against the curbs.
    - In addition, water should not be allowed to get underneath the pavement section at the time of home construction.

Geogrid:

- One layer of geogrid, Tensar Triax 130 or better (Bexar County), installed on top of compacted (stabilized) subgrade as per manufacturer's guidelines.

Aggregate Base:

- TxDOT Item 247 A1-A2 aggregate base is recommended. The lift thickness and the compaction should follow all applicable city / county guidelines.

Asphalt:

- The asphalt material and installation should follow all applicable city / county guidelines.

Subgrade Verification:

- At the time of construction, the final pavement subgrade should be observed / verified by a representative of InTEC.

Table No. 3 – Input Parameters used in Asphalt Pavement Section Calculation

	Local Type A (no bus traffic)	**Local Type A** (with bus traffic)	**Local B**	**Collector**
ESAL	100,000	1,000,000	2,000,000	2,000,000
Reliability Level	R-70	R-70	R-90	R-90
Initial and Terminal Serviceability	4.2 and 2.0	4.2 and 2.0	4.2 and 2.0	4.2 and 2.5
Standard Deviation	0.45	0.45	0.45	0.45
Service Life	20 years	20 years	20 years	20 years
If heavy truck traffic is anticipated, please contact InTEC with anticipated traffic data for revised recommendations.				

Subgrade Preparation

It is important that any existing pavement and organic and compressible soils are removed and the exposed subgrade is properly prepared prior to pavement installation. The subgrade should be prepared as described in the applicable city / county Guidelines. Base course material should be placed immediately upon completion of the subgrade compaction operation to prevent drying of the soils due to exposure.

The finish grade elevation of the subgrade should be such that water drains downward freely towards a drainage area. At the drainage area, 3x5 rock may be provided at the subgrade level and the collected

water at the drainage area should be taken out (such as into the existing concrete drainage channel). If any voids in the subgrade should be filled in with the same subgrade material and compacted in lifts.

The approved fill material should be placed in 8-inch lifts (6 inches compacted) and compacted as recommended in the Site Preparation section of the Construction Guidelines presented in this report. If the fill depth exceeds 4 feet, the potential subgrade settlement should be considered. Please contact InTEC with the cut and fill information to evaluate the effect of proposed cut and fill on the recommendations and to provide fill material and compaction recommendations.

Base Course

Based on the survey of available materials in the area, a base course of crushed limestone aggregate or gravel appears to be the most practical material for asphalt pavement project. The base course should conform to Texas State Department of Highways and Public Transportation Standard Specification, Item 247, Type A, Grade 1 or 2. The aggregate base course should be installed as per applicable city / county Guidelines.

At a minimum the base course should be brought to near optimum moisture conditions and compacted in lifts to at least 95 percent of maximum dry density as determined by test method TxDOT 113E.

Asphaltic Concrete

The asphaltic concrete surface course should conform to City of San Antonio Standard Construction Guidelines, 2008. The asphaltic concrete should be installed as per applicable city / county Guidelines.

Perimeter Drainage

It is important that proper perimeter drainage be provided so that infiltration of surface water from compacted areas surrounding the pavement is minimized, or if this is not possible, curbs should extent through the base and into the subgrade. A crack sealant compatible to both asphalt and concrete should be installed at the concrete-asphalt interfaces.

Wherever there are drastic grade changes in the pavement area (such as from 3 to 4 percent grade to 1 to 2 percent grade) 3 x 5 inch gravel subgrade with a subsurface drain system (such as Akwadrain® on the sides of the pavement) and outlet should be considered. This aspect will provide for a better drainage system in this area. Please contact InTEC for drainage recommendations.

CONSTRUCTION GUIDELINES

Construction Monitoring

As Geotechnical Engineer of Record for this project, InTEC should be involved in monitoring the pavement construction and earth work activities. Performance of any pavement system is not only dependent on the pavement design, but is strongly influenced by the quality of construction. Please contact our office prior of construction so that a plan for pavement construction and earthwork monitoring can be incorporated in the overall project quality control program. The testing requirements shall comply with the minimum testing requirements as per applicable city and county guidelines.

Site Preparation

Site preparation will consist of **preparation of the subgrade, and placement of select structural fill.** The project geotechnical **engineer InTEC should approve the subgrade preparation, the fill materials, and the method of fill placement and compaction.**

In any areas where soil-supported concrete structure or pavement are to be used, vegetation and all loose or excessively organic material should be stripped to a minimum depth of six inches and removed from the site. Subsequent to stripping operations, the pavement subgrade should be proof rolled prior to fill placement and recompacted to as per City of San Antonio Standard Construction Guidelines, 2008. The exposed subgrade should not be allowed to dry out prior to placing structural fill. Each lift should be tested by InTEC geotechnical engineer or his representative prior to placement of the subsequent lift.

Voids caused by site preparation, such as removal of trees or disturbed areas, should be compacted as described below.

Compaction

Site grading plan is not available for review at this time. If any low areas or disturbed areas encountered during construction should be appropriately prepared and compacted. Any deleterious or wet materials should be removed and wasted. The fill placement in the low areas should not be in a "bowl shape". The sides of the fill area should be "squared up" and the excavated bottom should be proof rolled as described in *Proof Rolling* section of this report. On site material, with no deleterious material, may be used to raise the grade. After proof rolling operation, the fill should be placed in 6-inch lifts and compacted to a

minimum of **95 percent of the maximum dry density as determined by ASTM D 698 test method within optimum and three percent above optimum moisture content.** Each lift should be tested by InTEC for compaction compliance and approved before placement of the subsequent lifts. The exposed subgrade should not be allowed to dry out prior to placing structural fill. It is recommended that any given lot does not straddle filled areas and natural areas to help reduce differential movement of the structures.

The excavation boundaries should be set such that building or pavement areas do not straddle fill and natural areas. The anticipated potential vertical movement may be significantly affected after the cut and fill operations are performed in this area.

Proof Rolling

Proof rolling should be accomplished in order to locate and densify any weak compressible zones under the structure and pavement areas and prior to placement of the select fill or base. A minimum of 10 passes of a 25-ton pneumatic roller should be used for planning purposes. The operating load and tire pressure should conform to the manufactures specification to produce a minimum ground contact pressure of 90 pound per square inch. Proof rolling should be performed under the observation of the InTEC Geotechnical Engineer or his representative. The soils that yield or settle under proof rolling operations should be removed, dried and compacted or replaced with compacted select fill to grade. Density tests should be conducted as specified under *Control Testing and Filed Observation* after satisfactory proof rolling operation.

Proper site drainage should be maintained during construction so that ponding of surface run-off does not occur and cause construction delays and/or inhibit site access.

Select Fill

Any select fill used under the building should have a liquid limit less than 40 and a plasticity index in between 5 and 20 and be crushed limestone. The fill should contain no particles greater than 3 inches in diameter. **The percent passing Sieve No. 200 should be less than 30 percent**.

Crushed limestone with sufficient fines to bind the aggregate together is a suitable select structural fill material. The fill materials should be placed in loose lifts not to exceed 8 inches thick (6-inches compacted) and compacted to 95 percent of the maximum dry density as determined by ASTM D 698 procedure at a moisture content within 2 percent of the optimum water content.

General Fill

General fill materials may consist of clean on-site material, select fill materials, or any clean imported fill material. The purpose of a general fill is to provide soils with good compaction characteristics that will provide uniform support for any non-habitable structures that are not movement sensitive. The general fill material should be free of any deleterious material, construction debris, organic material, and should not have gravels larger than 6 inches in maximum dimension. The top two feet of fill material used underneath pavement areas should not have gravels larger than 3 inches in maximum dimension.

It should be understood that the use of the general fill may result in greater than anticipated potential vertical movements and differential movements. If the greater potential vertical movements or differential soil movements cannot be tolerated, then select fill material should be used and should conform to the Select Fill recommendations.

General Fill Compaction

The general fill materials should be placed in lifts not to exceed 8 inches thick and compacted to a minimum of 95 percent of the maximum dry density as determined by test method ASTM D 698 at a moisture content within 3 percent of the optimum water content. Each lift should be compacted and tested by a representative of a geotechnical laboratory to verify compaction compliance and approved before placement of the subsequent lifts.

The general fill compaction requirements can also be discussed and determined in consultation with the owner prior to construction.

Ground Water

In any areas where significant cuts (2-ft or more) are made to establish final grades for pavement, attention should be given to possible seasonal water seepage that could occur through natural cracks and fissures in the newly exposed stratigraphy. Subsurface drains may be required to intercept seasonal groundwater seepage. The need for these or other dewatering devices on should be carefully addressed during construction. Our office could be contacted to visually inspect final pads to evaluate the need for such drains.

The ground water seepage may happen several years after construction if the rainfall rate or drainage changes within the project site or outside the project site. If seepage run off occurs towards the pavement areas an engineer should be called on to evaluate its effect and provision of French Drains at this location.

Drainage

Ground water seepage was not encountered in the test pits at the time of excavation. However, minor ground water seepage may be encountered within the pavement areas and grading excavations at the time of construction, especially after periods of heavy precipitation. **Small quantities of seepage may be handled by conventional sump and pump methods of dewatering.**

Temporary Drainage Measures

Temporary drainage provisions should be established, as necessary, to minimize water runoff into the construction areas. If standing water does accumulate, it should be removed by pumping as soon as possible.

Adequate protection against sloughing of soils should be provided for workers and inspectors entering the excavations. This protection should meet O.S.H.A. and other applicable building codes.

Temporary Construction Slopes

Temporary slopes on the order of 1H to 1V may be provided for excavations through Strata I clays.

Fill slopes on the order of 1H to 1V may be used provided a) the fill materials are compacted as recommended and b) the slopes are temporary.

Fill slopes should be compacted. Compacting operations shall be continued until the slopes are stable but not too dense for planting on the slopes. Compaction of the slopes may be done in increments of 3 to 5-ft in fill height or the fill is brought to its total height for shallow fills.

Permanent Slopes

Maximum permanent slope of 1V to 3H is recommended in Stratum I clays. In areas where people walk on sloped areas, a slope of 1V to 5H is recommended.

Time of Construction

If the pavement is installed during or after an extended dry period, the subgrade may experience greater movement around the edges when the soil moisture content increases, such as due to rain or irrigation. Similarly, a pavement installed during or after a wet period may experience greater movement around the edges during the subsequent drying of the soils.

Control Testing and Field Observation

Subgrade preparation and base and asphalt placement should be monitored by the project geotechnical engineer or his representative of InTEC. As a guideline, at least one in-place density test should be **performed for every 100 lineal feet (or as per respective city and county requirements, whichever requires more frequent testing) of street of compacted surface lift.** However, a minimum of three density tests should be performed by InTEC on the subgrade or subsequent lifts of compaction. Any areas not meeting the required compaction should be re-compacted and retested until compliance is met.

DRAINAGE AND MAINTENANCE

Final drainage is very important for the performance of the proposed pavement. Landscaping, plumbing, and downspout drainage is also very important. It is vital that drainage be transported away from the pavement so that no water ponds around the pavement (such as behind the curbs) which can result in soil volume change under the pavement. Any leaks or drainage issues should be repaired as soon as possible in order to minimize the magnitude of moisture change under the pavement. Large trees and shrubs should not be planted in the immediate vicinity of the pavement, since root systems can cause a substantial reduction in soil volume in the vicinity of the trees during dry periods. Silt fences placed adjacent to the curb can potentially allow water to get into the pavement area.

Trench backfill for utilities should be properly placed and compacted as outlined in this report and in accordance with all applicable requirements such local City / County / SAWS Standards. Since granular bedding backfill is used for most utility lines, the backfilled trench should be prevented from becoming a conduit and allowing an access for surface or subsurface water to travel toward the new pavement. Concrete cut-off collars or clay plugs should be provided where utility lines cross curbs to prevent water traveling in the trench backfill and entering beneath the pavement. If concrete encasing is used around the sewer pipes, an alternate path for water to continue to drain should be installed.

In areas with sidewalks or other structures adjacent to the new pavement, a positive seal must be provided and maintained between the structures and the pavement or sidewalk to minimize seepage of water into the underlying supporting soils. **Post-construction movement of pavement and flat-work is not uncommon.** Maximum grades practical should be used for paving and flatwork to prevent areas where water can pond. In addition, allowances in final grades should take into consideration post construction movement of flatwork particularly if such movement would be critical. **Normal maintenance should include inspection of all joints in paving and sidewalks, etc. as well as re-sealing where necessary.**

Several factors relate to civil and architectural design and/or maintenance which can significantly affect future movements of the pavement systems:

1. Where positive surface drainage cannot be achieved by sloping away of the ground surface adjacent to the pavement, a drainage system should carry runoff water away from the completed pavement.

2. Planters located adjacent to the pavement should preferably be **self-contained**. Sprinkler mains should be located a minimum of five feet from the pavement.

3. Planter box structures placed adjacent to pavement should be provided with a means to assure concentrations of water are not available to the subsoils stratigraphy.

4. Large trees and shrubs should not be allowed closer to the pavement than a horizontal distance equal to roughly their mature height due to their significant moisture demand upon maturing.

5. Moisture conditions should be maintained **"constant" around the edge of the pavements.** Ponding of water in planters, in unpaved areas, and around joints in paving and sidewalks can cause movements beyond those predicted in this report and significantly reduce the subgrade support.

Adequate drainage should be provided to reduce seasonal variations in moisture content of soils around the pavement. The PVR values estimated and stated under *Vertical Movements* are based on provision and maintenance of positive drainage to divert water away from the pavement areas. If the drainage is not maintained, the wetted front may move below the assumed twelve feet depth, and resulting **PVR will be much greater than 2 to 3 times the stated values under *Vertical Movements*. Utility line leaks may contribute water and cause similar movements to occur. In addition, if the soil is allowed to dry, the associated shrinkage can cause pavement cracks. Similarly, significant changes in moisture content of the underlying pavement layers, will impact the support characteristics of the subgrade.**

Dry Periods

Close observations should be made around pavements during extreme dry periods to ensure that adequate watering is being provided to keep soil from separating or pulling back from the curb and to minimize the shrinkage related cracks.

LIMITATIONS

The analyses and recommendations submitted in this report are based upon the data obtained from **13 test pits** excavated at the site. This report may not reflect the exact variations of the soil conditions across the site. Based on the noted topography within the site, cut and fill are anticipated. The pavement recommendations presented in the report should be reviewed and confirmed based on the proposed cut and fill and observation at the time of construction.

If deviations from the noted subsurface conditions are encountered during construction, they should be brought to the attention of the geotechnical engineer.

The information contained in this report and on the Test Pit Logs is not intended to provide the contractor with all the information needed for proper selection of equipment, means and methods, or for cost and schedule estimation purposes. The use of information contained in the report for bidding purposes should be done at the contractor's option and risk.

Final plans for the proposed streets should be reviewed by the project geotechnical engineer so that he may determine if changes in the recommendations are required.

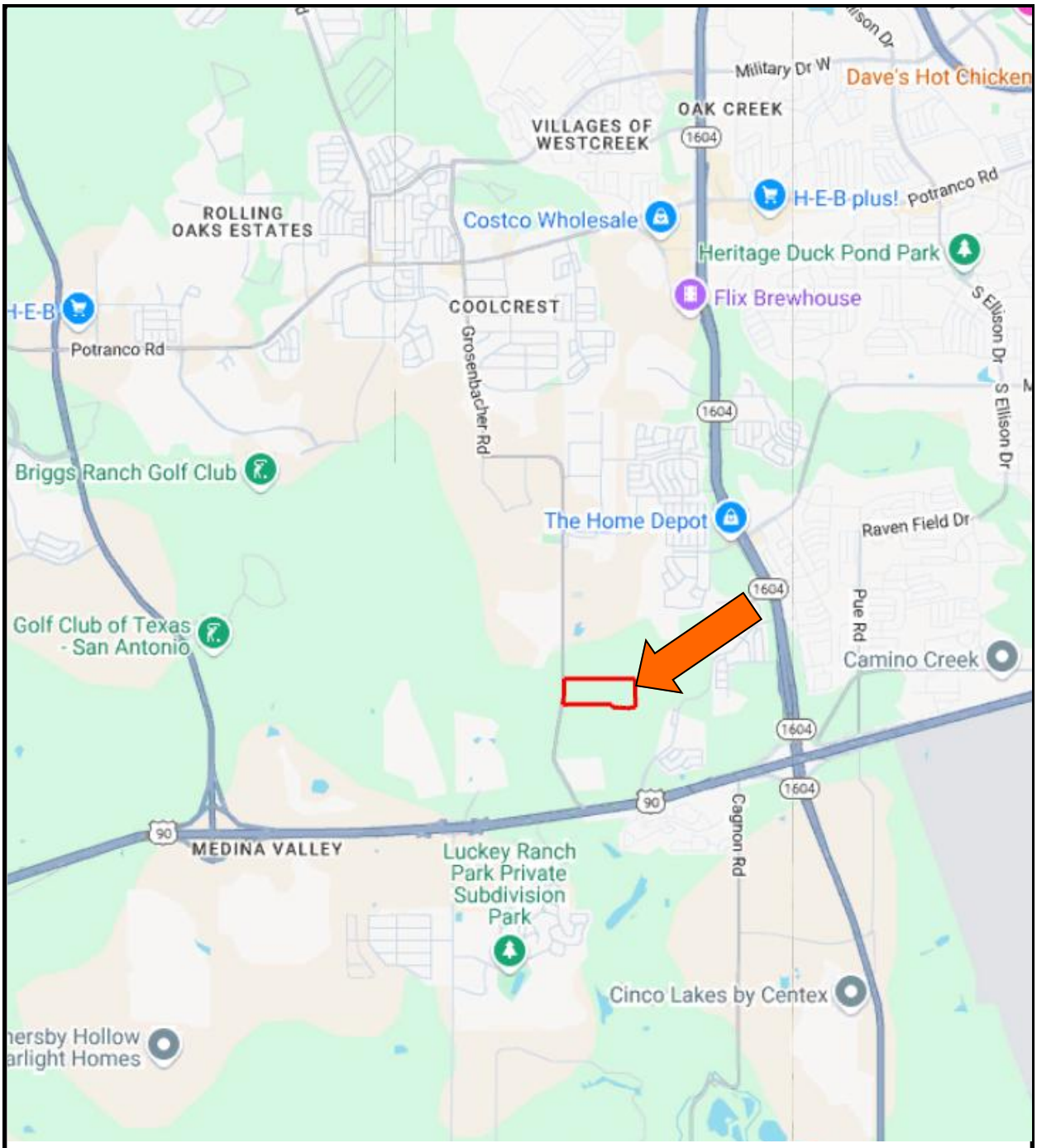
The project geotechnical engineer declares that the findings, recommendations, or professional advice contained herein have been made and this report prepared in accordance with generally accepted professional engineering practice in the fields of geotechnical engineering and engineering geology. The recommendations presented in this report should be reevaluated by InTEC if cut and fill operations are performed, or any changes are made to drainage conditions. No other warranties are implied or expressed.

This report has been prepared for the exclusive use of **KBHOME** for pavement thickness evaluation for the **proposed new streets at Terra Buona, Take III & Take IV in San Antonio, Texas.**

Illustration Section

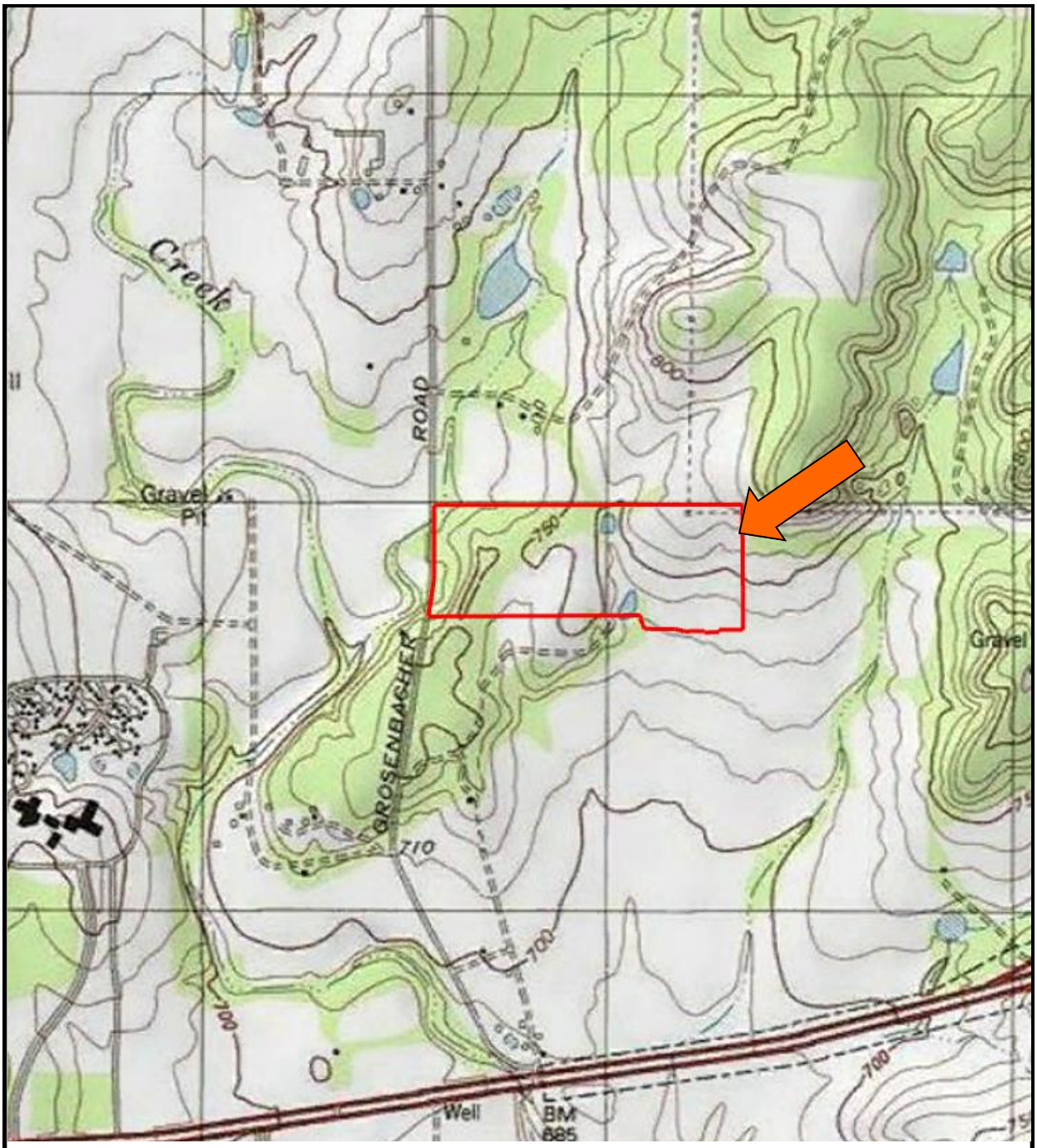
Description	Plate No.
Vicinity Map	Plate 1A
Aerial Map	Plate 1B
Topographic Map	Plate 1C
Geologic Map	Plate 1D
Soil Map	Plate 1E
Approximate Test Pit Locations	Plate 1F
Test Pit Photos	Plates 1G-1 thru 1G-3
Test Pit Logs	Plates 2—14
Keys to Classifications and Symbols	Plate 15
Calculations	Plates 16—30
Information on Geotechnical Report	Appendix

Subsurface Exploration and Pavement Analysis Proposed New Streets Terra Buona, Take III & IV San Antonio, Texas		
	InTEC Project Number: **S251104-P**	Date: 03/27/2025

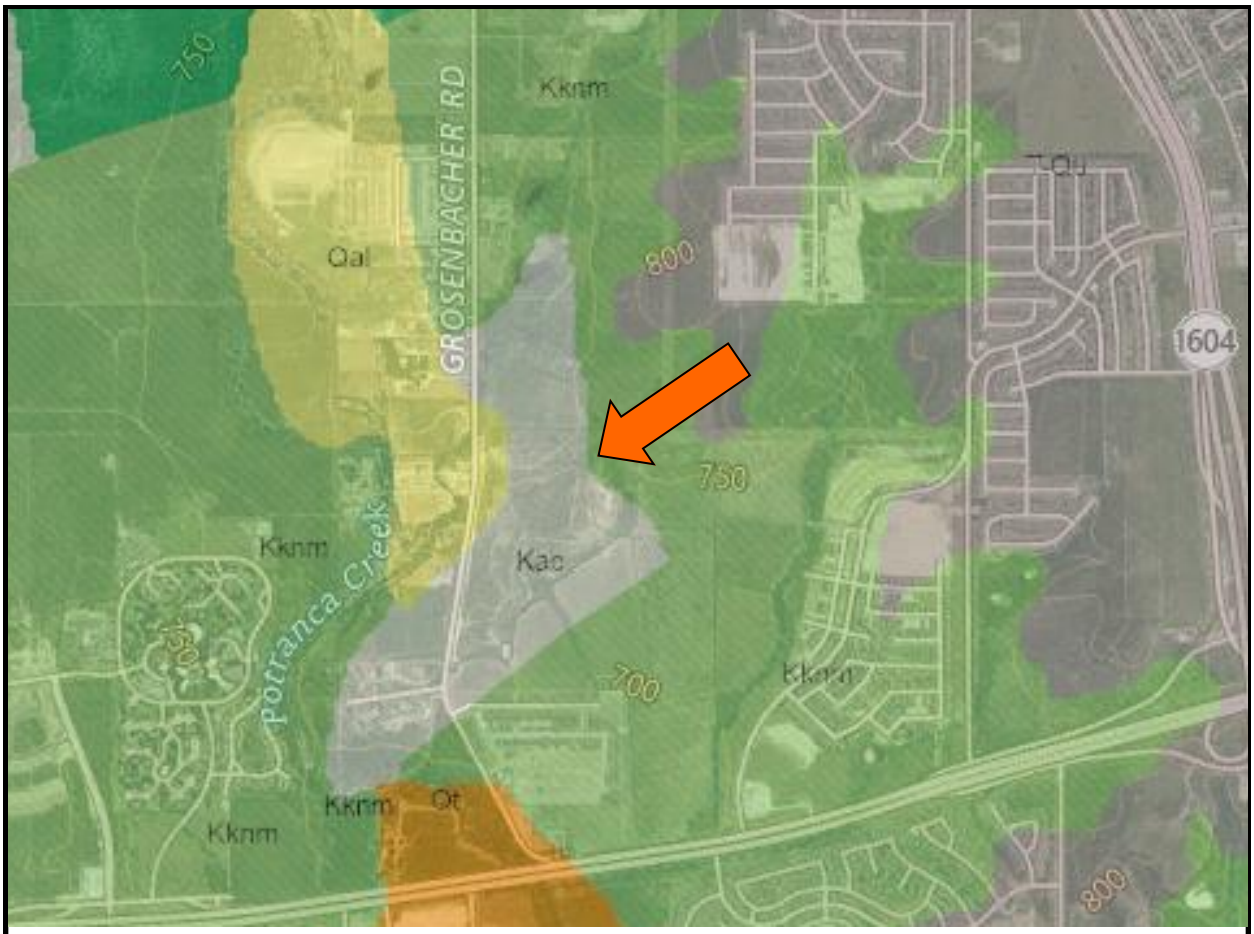


Subsurface Exploration and Pavement Analysis Proposed New Streets Terra Buona, Take III & IV San Antonio, Texas	**Vicinity Map**	
	InTEC Project Number: **S251104-P**	Date: 03/27/2025

Subsurface Exploration and Pavement Analysis Proposed New Streets Terra Buona, Take III & IV San Antonio, Texas	**Aerial Map—Approximate Location**	
	InTEC Project Number: **S251104-P**	Date: 03/27/2025



Subsurface Exploration and Pavement Analysis Proposed New Streets Terra Buona, Take III & IV San Antonio, Texas	**Topographic Map—Approximate Location**	
	InTEC Project Number: **S251104-P**	Date: 03/27/2025



Kknm—Navarro Group and Marlbrook Marl

Navarro Group and Marlbrook Marl ("upper Taylor marl") undivided, Kknm. Upper part—marl, clay, sandstone, and siltstone; marl and clay, glauconitic, contain concretions of limonite and siderite; sandstone, fine grained, and siltstone, yellow brown, contain concretions of hard bluish-gray siliceous limestone 2 to 10 feet in diameter; sandstone beds have little lateral continuity and become more abundant westward; thickness up to 580 feet. Lower part—clay, dominantly montmorillonitic, unctuous, greenish gray to brownish gray; weathers to a very thick, black, clayey soil; thickness 400± feet. Total thickness 980± feet

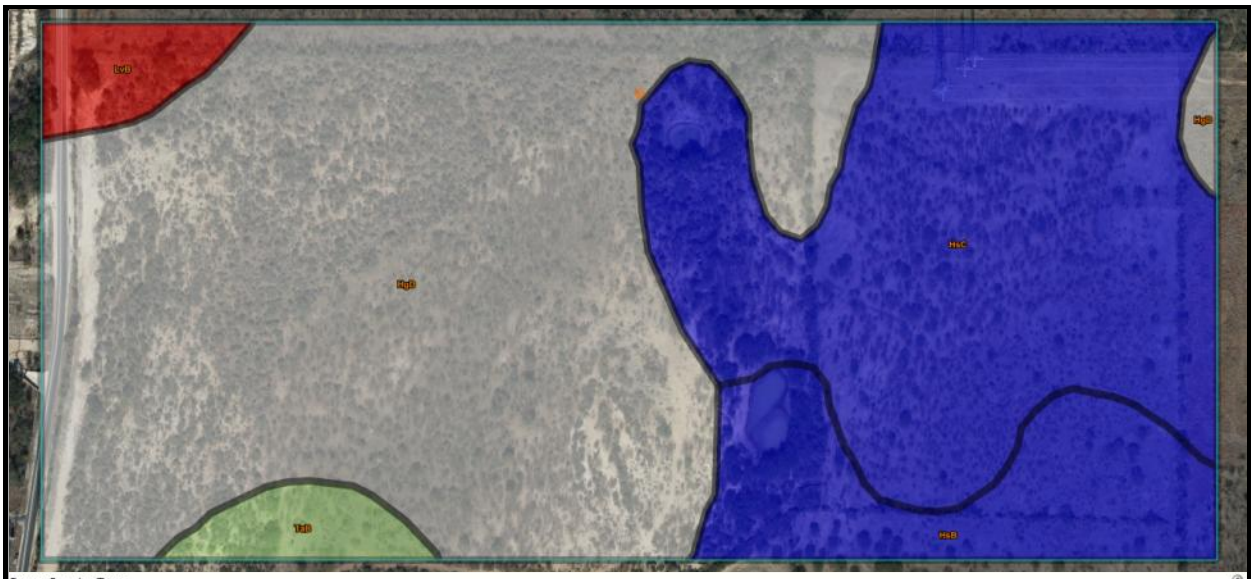
Kac—Anacacho Limestone

limestone and marl; limestone, light yellow to yellow brown and light gray, thick bedded, in part crossbedded, fossiliferous; alternates with marl, light gray to yellow; in part sandy, some volcanic rock fragments and weathered, rusty bentonite beds; marine megafossils abundant; thickness up to 500 feet, thins to a feather edge in western Bexar County

Qal—Alluvium

Floodplain deposits

Subsurface Exploration and Pavement Analysis Proposed New Streets Terra Buona, Take III & IV San Antonio, Texas	**Geologic Map—Approximate Location**	
	InTEC Project Number: **S251104-P**	Date: 03/27/2025



Bexar County, Texas

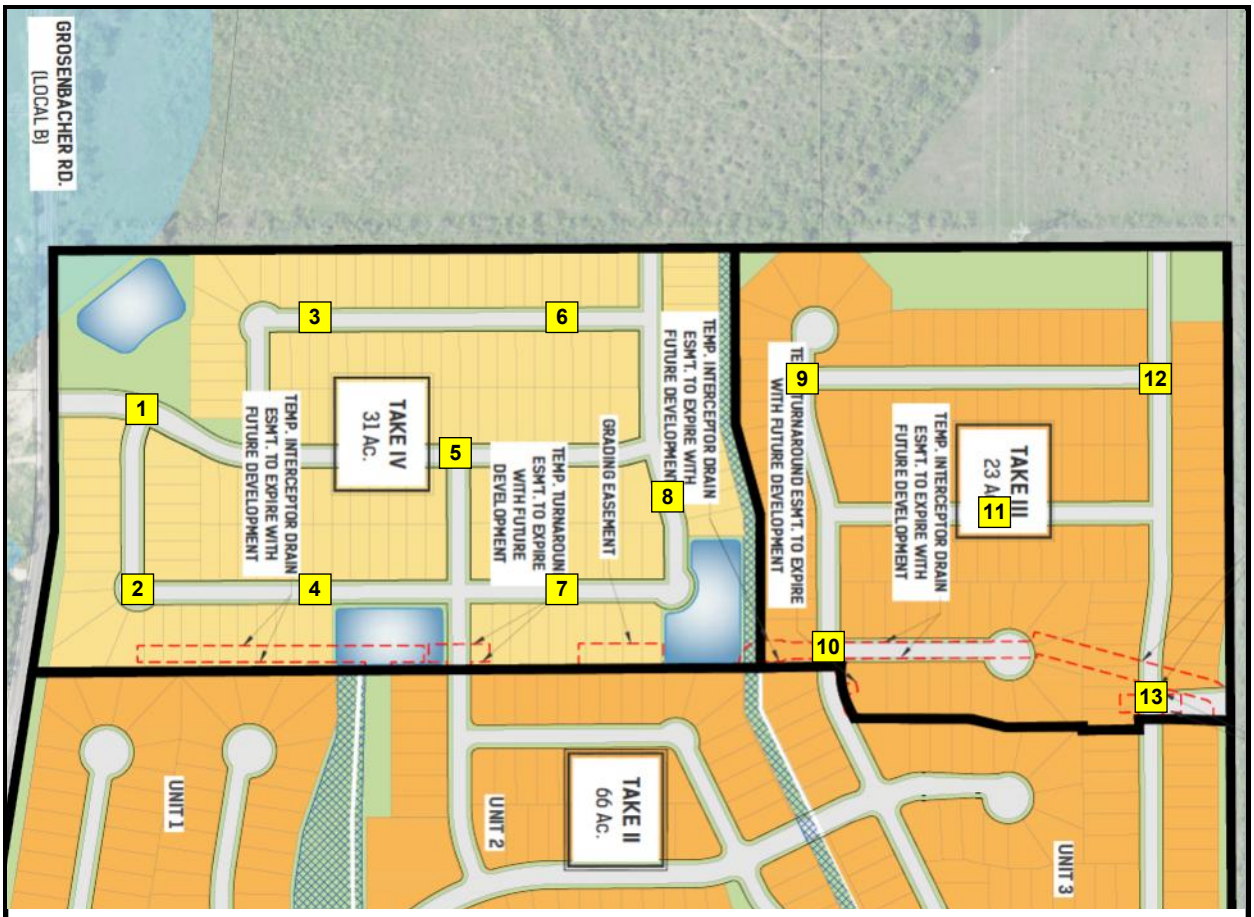
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			In				*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*
HgD—Rock outcrop-Olmos complex, 5 to 25 percent slopes														
Rock outcrop	80	D	0-80	Bedrock	—	—	—	—	—	—	—	—	—	—
Olmos	15	D	0-13	Very cobbly loam	SC, CL, GC	A-2-6, A-6	0- 0- 0	21-26- 35	61-72- 89	52-65- 86	44-58- 81	32-43- 62	32-35 -36	13-15-16
			13-14	Cemented material	—	—	—	—	—	—	—	—	—	—
			14-26	Cemented material	—	A-2-4, A-2-6, A-4	—	—	—	—	—	—	—	—
			26-80	Cemented material	—	A-2-4, A-2-6, A-4	—	—	—	—	—	—	—	—
HsB—Houston Black clay, 1 to 3 percent slopes														
Houston black	80	D	0-6	Clay	CH	A-7-6	0- 0- 0	0- 0- 0	96-98-100	92-96-100	81-92-100	71-81- 90	63-70 -76	34-44-49
			6-70	Clay, silty clay	CH	A-7-6	0- 0- 0	0- 0- 0	98-98-100	96-96-100	85-92-100	74-81- 90	58-70 -76	38-44-49
			70-80	Clay, silty clay	CH	A-7-6	0- 0- 0	0- 0- 0	94-96-100	86-92-100	74-88-100	65-78- 95	61-71 -75	37-45-50
HsC—Houston Black clay, 3 to 5 percent slopes														
Houston black	90	D	0-6	Clay	CH	A-7-6	0- 0- 0	0- 0- 0	96-98-100	92-96-100	81-92-100	71-81- 90	63-70 -76	38-44-49
			6-70	Clay, silty clay	CH	A-7-6	0- 0- 0	0- 0- 0	98-98-100	96-96-100	85-92-100	74-81- 90	63-70 -71	38-44-49
			70-80	Clay, silty clay	CH	A-7-6	0- 0- 0	0- 0- 0	94-96-100	86-92-100	74-88-100	65-78- 95	61-71 -75	37-45-50
LvB—Lewisville silty clay, 1 to 3 percent slopes														
Lewisville	85	C	0-15	Silty clay	CH	A-7-6	0- 0- 0	0- 0- 0	94-96-100	94-96-100	91-95-100	87-90-100	52-52 -59	28-29-34
			15-38	Silty clay, clay loam, silty clay loam	CH, CL	A-6, A-7-6	0- 0- 0	0- 0- 0	95-96-100	95-96-100	83-95-100	76-88-100	39-49 -57	18-26-32
			38-69	Silty clay, clay loam, silty clay loam	CH, CL	A-6, A-7-6	0- 0- 0	0- 0- 0	81-89-100	81-89-100	71-88-100	65-82-100	39-50 -59	18-27-34
TaB—Eckrant cobbly clay, 1 to 8 percent slopes														
Eckrant	85	D	0-4	Cobbly clay	CH, CL	A-7-6	0- 3- 15	28-34- 55	75-92-100	74-92-100	68-88-100	60-78- 93	45-60 -70	25-32-40
			4-11	Extremely cobbly silty clay, very cobbly silty clay, extremely cobbly clay, very cobbly clay, very stony clay	CH, CL, GC	A-2-7, A-7-6	0-14- 22	28-36- 67	33-72- 82	30-70- 81	27-67- 81	24-60- 77	45-60 -70	25-32-40
			11-80	Bedrock	—	—	—	—	—	—	—	—	—	—

Subsurface Exploration and Pavement Analysis
Proposed New Streets
Terra Buona, Take III & IV
San Antonio, Texas

Soil Map—Approximate Location

InTEC Project Number:
S251104-P

Date:
03/27/2025



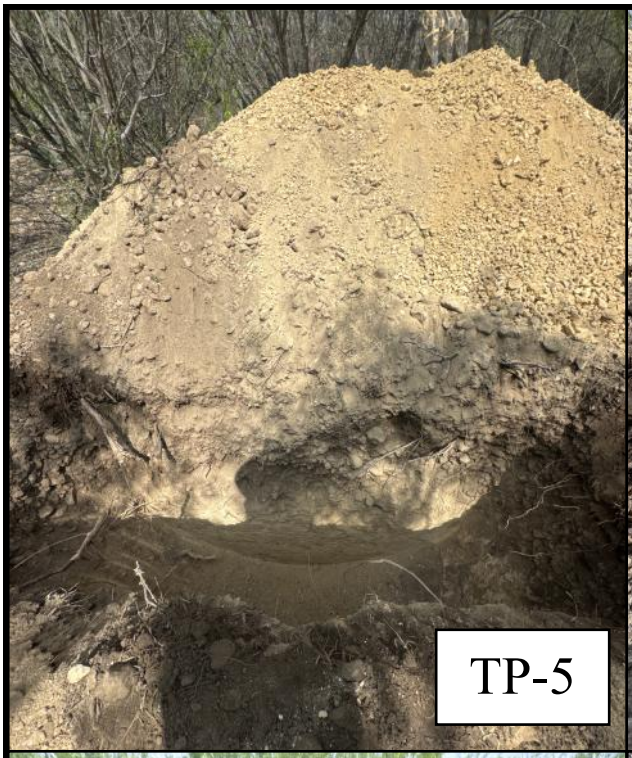
Subsurface Exploration and Pavement Analysis Proposed New Streets Terra Buona, Take III & IV San Antonio, Texas	**Approximate Test Pit Locations**	
	InTEC Project Number: **S251104-P**	Date: 03/27/2025

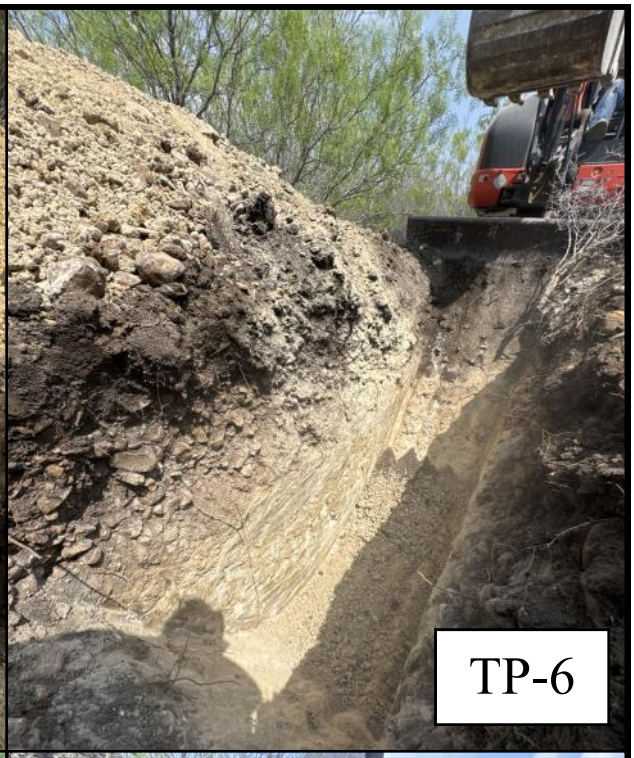
Subsurface Exploration and Pavement Analysis
Proposed New Streets
Terra Buona, Take III & IV
San Antonio, Texas

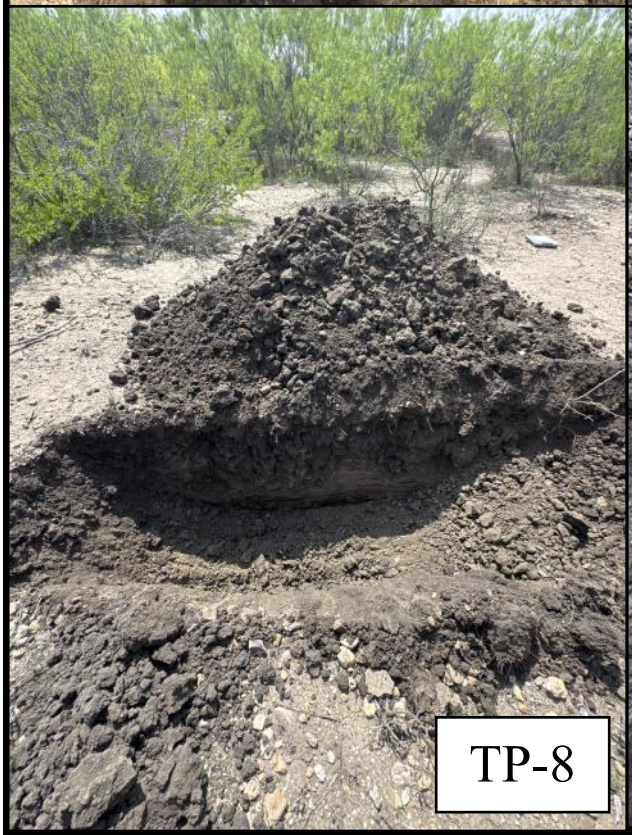
Test Pit Photos

InTEC Project Number:
S251104-P

Date:
03/27/2025





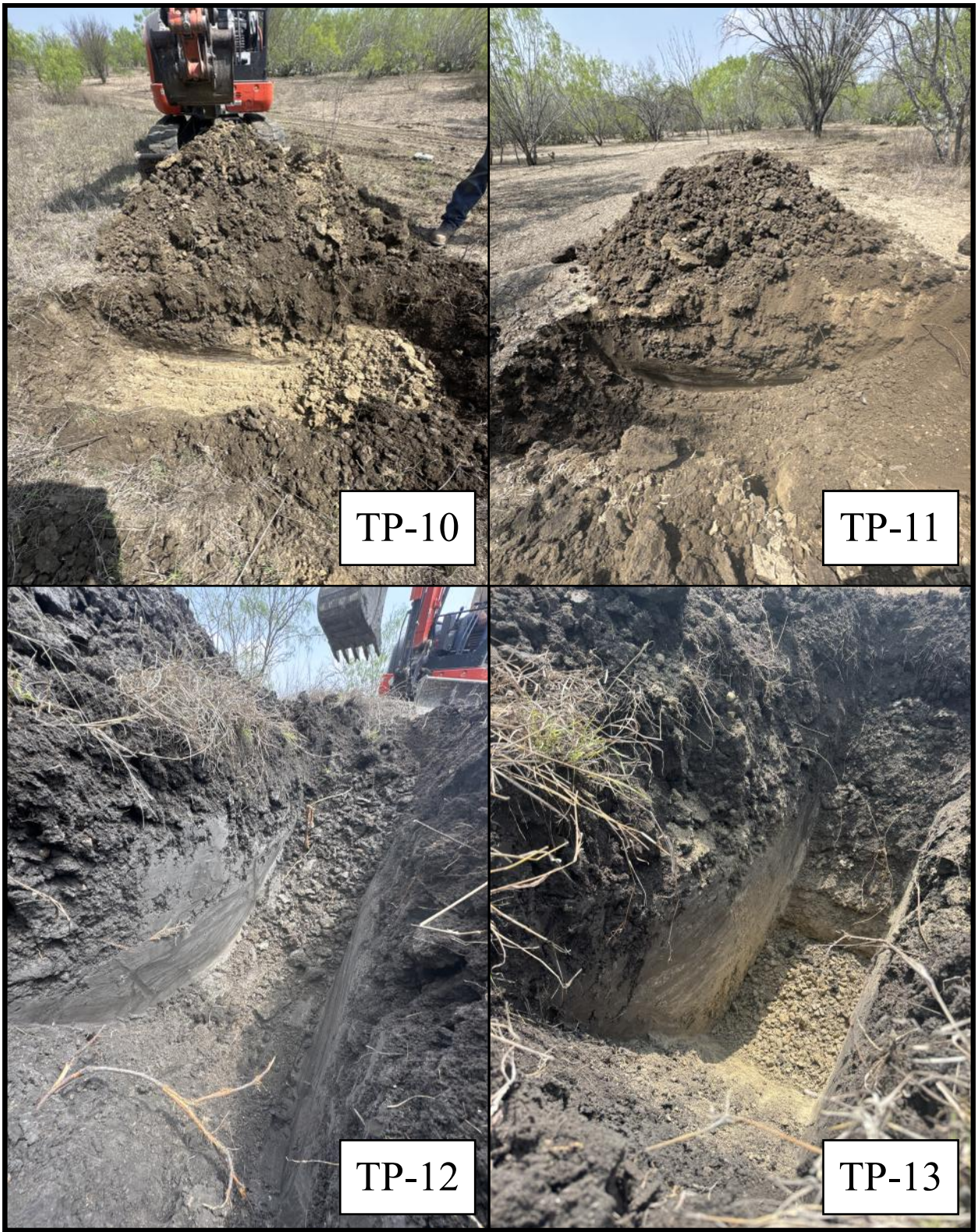


Subsurface Exploration and Pavement Analysis
Proposed New Streets
Terra Buona, Take III & IV
San Antonio, Texas

Test Pit Photos

InTEC Project Number:
S251104-P

Date:
03/27/2025



Subsurface Exploration and Pavement Analysis
Proposed New Streets
Terra Buona, Take III & IV
San Antonio, Texas

Test Pit Photos

InTEC Project Number:
S251104-P

Date:
03/27/2025

PROJECT: Terra Buona, Take III & Take IV **PROJECT NO: S251104**

LOCATION: San Antonio, Texas **DATE:** 03/31/2025

CLIENT: KBHOME

inTEC

TEST PIT NO. TP-1

DEPTH (feet)	SYMBOL	SAMPLES	SOIL DESCRIPTION	% MINUS 200 SIEVE	UNIT DRY WT IN PCF	S.S. BY P.P	BLOWS PER FOOT	SHEAR STRENGTH TSF	LIQUID LIMIT	PLASTICITY INDEX	Plastic Limit ⊢⊣ Liquid Limit Moisture Content % - ● 20 40 60 80
0			Brown Sandy Clay								
		TP	Tan Clay to Tan Calcareous Clay -with Silty Clay Seams						32	15	
		TP									
5		TP									
			Mini-Excavator Refusal TP = Test Pit Sample								
10											
15											
20											
25											
30											
35											

Notes:

Ground Water Observed: No

Completion Depth (ft): 6

S.S by P.P - Shear Strength in TSF by Hand Penetrometer

S.S. - Split Spoon Sample
S.T. - Shelby Tube Sample

HA - Hand Auger
AU - Auger Sample

Plate: 2

PROJECT: Terra Buona, Take III & Take IV **PROJECT NO: S251104**

LOCATION: San Antonio, Texas **DATE:** 03/31/2025

CLIENT: KBHOME

inTEC

TEST PIT NO. TP-2

DEPTH (feet)	SYMBOL	SAMPLES	SOIL DESCRIPTION	% MINUS 200 SIEVE	UNIT DRY WT IN PCF	S.S. BY P.P	BLOWS PER FOOT	SHEAR STRENGTH TSF	LIQUID LIMIT	PLASTICITY INDEX
0			Brown Sandy Clay							
		TP	Tan Clay to Tan Calcareous Clay -with Gravel -with Silty Clay Seams							
		TP								
5		TP								
			Mini-Excavator Refusal TP = Test Pit Sample							
10										
15										
20										
25										
30										
35										

Plastic Limit ⊢⊣ *Liquid Limit*

Moisture Content % - ● 20 40 60 80

Notes:

Ground Water Observed: No

Completion Depth (ft): 6

S.S by P.P - Shear Strength in TSF by Hand Penetrometer

S.S. - Split Spoon Sample
S.T. - Shelby Tube Sample

HA - Hand Auger
AU - Auger Sample

Plate: 3

PROJECT: Terra Buona, Take III & Take IV **PROJECT NO: S251104**

LOCATION: San Antonio, Texas **DATE:** 03/31/2025

CLIENT: KBHOME

inTEC

TEST PIT NO. TP-3

DEPTH (feet)	SYMBOL	SAMPLES	SOIL DESCRIPTION	% MINUS 200 SIEVE	UNIT DRY WT IN PCF	S.S. BY P.P	BLOWS PER FOOT	SHEAR STRENGTH TSF	LIQUID LIMIT	PLASTICITY INDEX
0		TP	Brown Clay -with Gravel							
		TP								
5		TP	Tan Calcareous Clay -with Caliche -with Marl Seams						36	19
		TP								
10			Mini-Excavator Refusal TP = Test Pit Sample							
15										
20										
25										
30										
35										

Plastic Limit ⊢⊣ Liquid Limit

Moisture Content % - ● 20 40 60 80

Notes:

Ground Water Observed: No

Completion Depth (ft): 8

S.S by P.P - Shear Strength in TSF by Hand Penetrometer

S.S. - Split Spoon Sample
S.T. - Shelby Tube Sample

HA - Hand Auger
AU - Auger Sample

Plate: 4

PROJECT: Terra Buona, Take III & Take IV **PROJECT NO: S251104**

LOCATION: San Antonio, Texas **DATE:** 03/31/2025

CLIENT: KBHOME

inTEC

TEST PIT NO. TP-4

DEPTH (feet)	SYMBOL	SAMPLES	SOIL DESCRIPTION	% MINUS 200 SIEVE	UNIT DRY WT IN PCF	S.S. BY P.P	BLOWS PER FOOT	SHEAR STRENGTH TSF	LIQUID LIMIT	PLASTICITY INDEX
0		TP	Dark Brown Clay -with Gravel							
		TP	Tan Calcareous Clay -with Caliche							
5		TP								
			Mini-Excavator Refusal TP = Test Pit Sample							
10										
15										
20										
25										
30										
35										

Plastic Limit ⊢⊣ *Liquid Limit*

Moisture Content % - ●

20 40 60 80

Notes:

Ground Water Observed: No

Completion Depth (ft): 6

S.S by P.P - Shear Strength in TSF by Hand Penetrometer

S.S. - Split Spoon Sample
S.T. - Shelby Tube Sample

HA - Hand Auger
AU - Auger Sample

Plate: 5

PROJECT: Terra Buona, Take III & Take IV **PROJECT NO: S251104**

LOCATION: San Antonio, Texas **DATE:** 03/31/2025

CLIENT: KBHOME

inTEC

TEST PIT NO. TP-5

DEPTH (feet)	SYMBOL	SAMPLES	SOIL DESCRIPTION	% MINUS 200 SIEVE	UNIT DRY WT IN PCF	S.S. BY P.P	BLOWS PER FOOT	SHEAR STRENGTH TSF	LIQUID LIMIT	PLASTICITY INDEX
0		TP	Dark Brown Clay -with Gravel							
		TP	Tan Calcareous Clay -with Caliche							
5		TP								
		TP							31	15
			Mini-Excavator Refusal TP = Test Pit Sample							
10										
15										
20										
25										
30										
35										

Plastic Limit ⊢⊣ *Liquid Limit*

Moisture Content % - ● 20 40 60 80

Notes:

Ground Water Observed: No

Completion Depth (ft): 8

S.S by P.P - Shear Strength in TSF by Hand Penetrometer

S.S. - Split Spoon Sample
S.T. - Shelby Tube Sample

HA - Hand Auger
AU - Auger Sample

Plate: 6

PROJECT: Terra Buona, Take III & Take IV **PROJECT NO: S251104**

LOCATION: San Antonio, Texas **DATE:** 03/31/2025

CLIENT: KBHOME

inTEC

TEST PIT NO. TP-6

DEPTH (feet)	SYMBOL	SAMPLES	SOIL DESCRIPTION	% MINUS 200 SIEVE	UNIT DRY WT IN PCF	S.S. BY P.P	BLOWS PER FOOT	SHEAR STRENGTH TSF	LIQUID LIMIT	PLASTICITY INDEX
0		TP	Dark Brown Clay to Brown Clay -with Gravel							
		TP							56	34
5		TP	Tan Calcareous Clay -with Caliche							
			Mini-Excavator Refusal TP = Test Pit Sample							
10										
15										
20										
25										
30										
35										

Plastic Limit ⊢⊣ *Liquid Limit*

Moisture Content % - ● 20 40 60 80

Notes:

Ground Water Observed: No

Completion Depth (ft): 6

S.S by P.P - Shear Strength in TSF by Hand Penetrometer

S.S. - Split Spoon Sample
S.T. - Shelby Tube Sample

HA - Hand Auger
AU - Auger Sample

Plate: 7

PROJECT: Terra Buona, Take III & Take IV **PROJECT NO: S251104**

LOCATION: San Antonio, Texas **DATE:** 03/31/2025

CLIENT: KBHOME

inTEC

TEST PIT NO. TP-7

DEPTH (feet)	SYMBOL	SAMPLES	SOIL DESCRIPTION	% MINUS 200 SIEVE	UNIT DRY WT IN PCF	S.S. BY P.P	BLOWS PER FOOT	SHEAR STRENGTH TSF	LIQUID LIMIT	PLASTICITY INDEX
0		TP	Dark Brown Clay							
		TP	Tan Calcareous Clay -with Caliche							
5		TP							31	13
			Mini-Excavator Refusal TP = Test Pit Sample							
10										
15										
20										
25										
30										
35										

Plastic Limit ⊢⊣ *Liquid Limit*

Moisture Content % - ● *20 40 60 80*

Notes:

Ground Water Observed: No

Completion Depth (ft): 6

S.S by P.P - Shear Strength in TSF by Hand Penetrometer

S.S. - Split Spoon Sample
S.T. - Shelby Tube Sample

HA - Hand Auger
AU - Auger Sample

Plate: 8

PROJECT: Terra Buona, Take III & Take IV **PROJECT NO: S251104**

LOCATION: San Antonio, Texas **DATE:** 03/31/2025

CLIENT: KBHOME

inTEC

TEST PIT NO. TP-8

DEPTH (feet)	SYMBOL	SAMPLES	SOIL DESCRIPTION	% MINUS 200 SIEVE	UNIT DRY WT IN PCF	S.S. BY P.P	BLOWS PER FOOT	SHEAR STRENGTH TSF	LIQUID LIMIT	PLASTICITY INDEX	Plastic Limit ⊢⊣ Liquid Limit Moisture Content % - ●
0		TP	Dark Brown Clay						52	33	20 40 60 80
		TP									
5			Tan Clay								
			Mini-Excavator Refusal TP = Test Pit Sample								
10											
15											
20											
25											
30											
35											

Notes:

Ground Water Observed: No

Completion Depth (ft): 5

S.S by P.P - Shear Strength in TSF by Hand Penetrometer

S.S. - Split Spoon Sample
S.T. - Shelby Tube Sample

HA - Hand Auger
AU - Auger Sample

Plate: 9

PROJECT: Terra Buona, Take III & Take IV **PROJECT NO: S251104**

LOCATION: San Antonio, Texas **DATE:** 03/31/2025

CLIENT: KBHOME

inTEC

TEST PIT NO. TP-9

DEPTH (feet)	SYMBOL	SAMPLES	SOIL DESCRIPTION	% MINUS 200 SIEVE	UNIT DRY WT IN PCF	S.S. BY P.P	BLOWS PER FOOT	SHEAR STRENGTH TSF	LIQUID LIMIT	PLASTICITY INDEX	Plastic Limit ⊢⊣ Liquid Limit Moisture Content % - ●
0											20 40 60 80
		TP	Dark Brown Clay						66	42	
		TP									
5			Tan Clay to Tan Calcareous Clay								
			Mini-Excavator Refusal TP = Test Pit Sample								
10											
15											
20											
25											
30											
35											

Notes:

Ground Water Observed: No

Completion Depth (ft): 5

S.S by P.P - Shear Strength in TSF by Hand Penetrometer

S.S. - Split Spoon Sample
S.T. - Shelby Tube Sample

HA - Hand Auger
AU - Auger Sample

Plate: 10

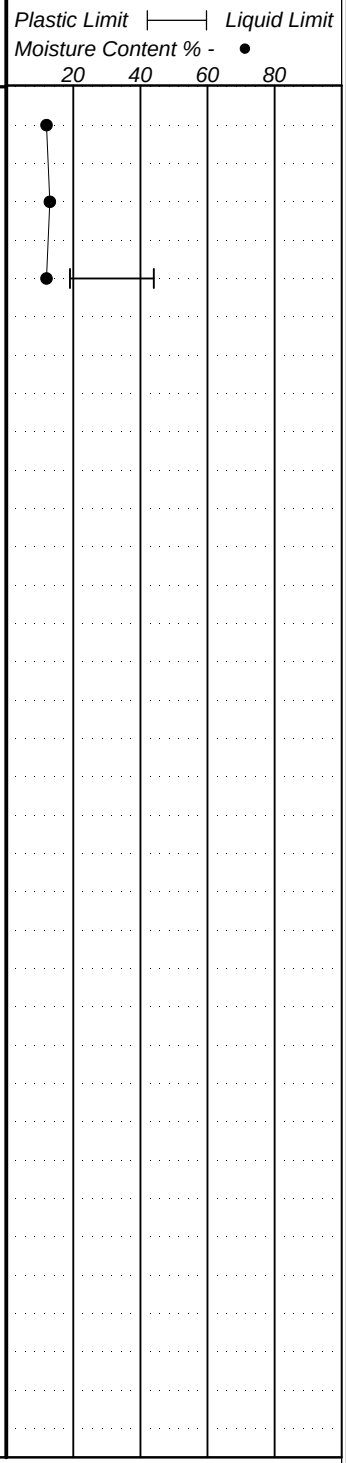
PROJECT: Terra Buona, Take III & Take IV **PROJECT NO: S251104**

LOCATION: San Antonio, Texas **DATE:** 03/31/2025

CLIENT: KBHOME

TEST PIT NO. TP-10

DEPTH (feet)	SYMBOL	SAMPLES	SOIL DESCRIPTION	% MINUS 200 SIEVE	UNIT DRY WT IN PCF	S.S. BY P.P	BLOWS PER FOOT	SHEAR STRENGTH TSF	LIQUID LIMIT	PLASTICITY INDEX
0		TP	Dark Brown Clay							
		TP	Tan Clay to Tan Calcareous Clay							
5		TP							44	25
			Mini-Excavator Refusal TP = Test Pit Sample							
10										
15										
20										
25										
30										
35										



Notes:

Ground Water Observed: No

Completion Depth (ft): 6

S.S by P.P - Shear Strength in TSF by Hand Penetrometer

S.S. - Split Spoon Sample
S.T. - Shelby Tube Sample

HA - Hand Auger
AU - Auger Sample

Plate: 11

PROJECT: Terra Buona, Take III & Take IV **PROJECT NO: S251104**

LOCATION: San Antonio, Texas **DATE:** 03/31/2025

CLIENT: KBHOME

inTEC

TEST PIT NO. TP-11

DEPTH (feet)	SYMBOL	SAMPLES	SOIL DESCRIPTION	% MINUS 200 SIEVE	UNIT DRY WT IN PCF	S.S. BY P.P	BLOWS PER FOOT	SHEAR STRENGTH TSF	LIQUID LIMIT	PLASTICITY INDEX	Plastic Limit ⊢⊣ Liquid Limit; Moisture Content % - ● (20 40 60 80)
0		TP	Dark Brown Clay								
		TP							56	36	
5		TP	Tan Clay								
			Mini-Excavator Refusal TP = Test Pit Sample								
10											
15											
20											
25											
30											
35											

Notes:

Ground Water Observed: No

Completion Depth (ft): 6

S.S by P.P - Shear Strength in TSF by Hand Penetrometer

S.S. - Split Spoon Sample
S.T. - Shelby Tube Sample

HA - Hand Auger
AU - Auger Sample

Plate: 12

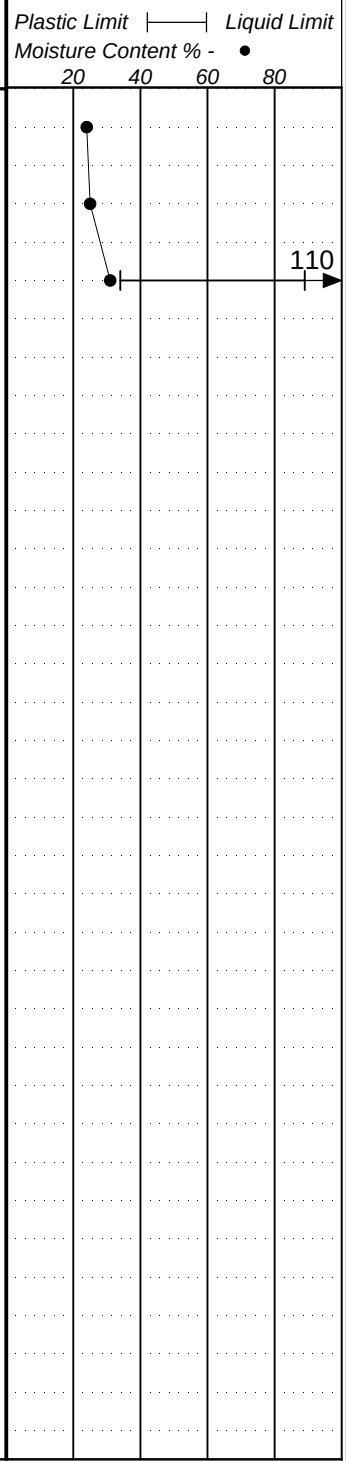
PROJECT: Terra Buona, Take III & Take IV **PROJECT NO: S251104**

LOCATION: San Antonio, Texas **DATE:** 03/31/2025

CLIENT: KBHOME

TEST PIT NO. TP-12

DEPTH (feet)	SYMBOL	SAMPLES	SOIL DESCRIPTION	% MINUS 200 SIEVE	UNIT DRY WT IN PCF	S.S. BY P.P	BLOWS PER FOOT	SHEAR STRENGTH TSF	LIQUID LIMIT	PLASTICITY INDEX
0			Dark Brown Clay							
		TP								
		TP								
5		TP							110	76
			Tan Clay							
			Mini-Excavator Refusal TP = Test Pit Sample							
10										
15										
20										
25										
30										
35										



Notes:

Ground Water Observed: No

Completion Depth (ft): 7

S.S by P.P - Shear Strength in TSF by Hand Penetrometer

S.S. - Split Spoon Sample
S.T. - Shelby Tube Sample

HA - Hand Auger
AU - Auger Sample

Plate: 13

PROJECT: Terra Buona, Take III & Take IV **PROJECT NO: S251104**

LOCATION: San Antonio, Texas **DATE:** 03/31/2025

CLIENT: KBHOME

inTEC

TEST PIT NO. TP-13

DEPTH (feet)	SYMBOL	SAMPLES	SOIL DESCRIPTION	% MINUS 200 SIEVE	UNIT DRY WT IN PCF	S.S. BY P.P	BLOWS PER FOOT	SHEAR STRENGTH TSF	LIQUID LIMIT	PLASTICITY INDEX
0		TP	Dark Brown Clay							
		TP								
5		TP							100	61
		TP	Tan and Gray Clay							
			Mini-Excavator Refusal TP = Test Pit Sample							
10										
15										
20										
25										
30										
35										

Plastic Limit ⊢⊣ *Liquid Limit*

Moisture Content % - ● *20 40 60 80*

Notes:

Ground Water Observed: No

Completion Depth (ft): 8

S.S by P.P - Shear Strength in TSF by Hand Penetrometer

S.S. - Split Spoon Sample
S.T. - Shelby Tube Sample

HA - Hand Auger
AU - Auger Sample

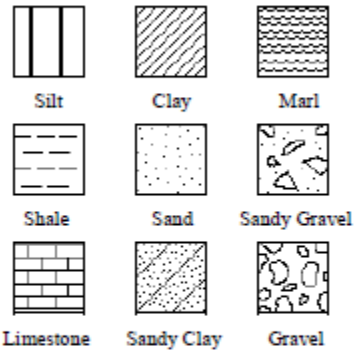
Plate: 14

KEY TO CLASSIFICATIONS AND SYMBOLS

Soil Fractions

Component	Size Range
Boulders	Greater than 12"
Cobbles	3" - 12"
Gravel	3" - #4 (4.76mm)
Coarse	3" - ¾"
Fine	¾" - #4
Sand	#4 - #200 (0.074mm)
Coarse	#4 - #10 (2.00mm)
Medium	#10 - #40 (0.42mm)
Fine	#40 - #200 (0.074mm)
Silt and Clay	Less than #200

Soil or Rock Types
(Shown in symbols column)
(Predominate Soil Types Shown Heavy)



TERMS DESCRIBING SOIL CONSISTENCY

Description (Cohesive Soils)	Unconfined Compression TSF	Blows/Ft. Std. Penetration Test	Description (Cohesionless Soils	Blows/Ft. Std. Penetration Tests
Very Soft	0.25	<2	Very Loose	0 – 4
Soft	0.25 – 0.50	2 – 4	Loose	4 – 10
Firm	0.50 – 1.00	4 – 8	Medium Dense	10 – 30
Stiff	1.00 – 2.00	8 – 15	Dense	30 – 50
Very Stiff	2.00 – 4.00	15 – 30	Very Dense	50
Hard	>4.00	>30		

SOIL STRUCTURE

Calcareous	Containing deposits of calcium carbonate; generally nodular.
Slickenside	Having inclined planes of weakness that are slick and glossy in appearance.
Laminated	Composed of thin layers of varying color and texture.
Fissured	Containing shrinkage cracks frequently filled with fine sand or silt. Usually more or less vertical.
Interbedded	Composed of alternate layers of different soil types.
Jointed	Consisting of hair cracks that fall apart as soon as the confining pressure is removed.
Varved	Consisting of alternate thin layers of sand, silt or clay formed by variations in sedimentations during the various seasons of the year, of often exhibiting contrasting colors when partially dried. Each layer is generally less than ½" in thickness.
Stratified	Composed of, or arranged in layers (usually 1 inch or more)
Well-graded	Having a wide range of grain sizes and substantial amount of all intermediate particle sizes.
Poorly or Gap-graded	Having a range of sizes with some intermediate sizes missing.
Uniformly-graded	Predominantly of one grain size.

Subsurface Exploration and Pavement Analysis
Proposed New Streets
Terra Buona, Take III & IV
San Antonio, Texas

InTEC Project Number: **S251104-P**

Date: 03/27/2025

Calculations

CBR = 2.0

Subsurface Exploration and Pavement Analysis Proposed New Streets Terra Buona, Take III & IV San Antonio, Texas		
	InTEC Project Number: **S251104-P**	Date: 04/12/2025

Asphalt Pavement
Design Analysis

Tensar
A Division of CMC

Design		Reference	
Project		Location	
Customer		Designer	Murali Subramaniam
Company	InTEC	Date	February 2, 2024

Results

Stabilized
151,300 ESALs

	Thickness	Coeff.	SN
HMA layer 1	3 in	0.420	1.260
Aggregate base (NX750)	6 in	0.300	1.800
Structural number (SN)			3.060

Unstabilized
111,200 ESALs

	Thickness	Coeff.	SN
HMA layer 1	2 in	0.440	0.880
Aggregate base	10 in	0.140	1.400
Subbase	8 in	0.080	0.640
Structural number (SN)			2.920

Parameters

Project Information

Target ESALs	Subgrade resilient modulus	Reliability	Standard deviation	Serviceability	
				Initial	Terminal
100,000	3,000 psi	70%	0.45	4.2	2

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Subsurface Exploration and Pavement Analysis Proposed New Streets Terra Buona, Take III & IV San Antonio, Texas	**Local Type A (without Bus Traffic)**	
	InTEC Project Number: **S251104-P**	Date: 04/12/2025

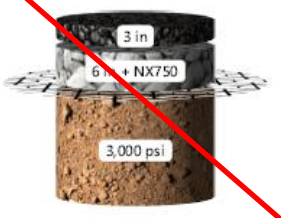
Asphalt Pavement
Design Analysis

Tensar. A Division of CMC

Design		Reference	
Project		Location	
Customer		Designer	Murali Subramaniam
Company	InTEC	Date	February 2, 2024

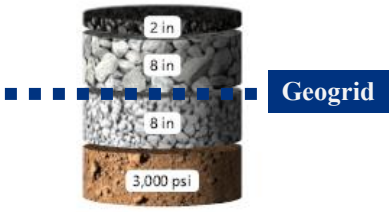
Results

Stabilized
151,300 ESALs



	Thickness	Coeff.	SN
HMA layer 1	3 in	0.420	1.260
Aggregate base (NX750)	6 in	0.300	1.800
Structural number (SN)			3.060

Unstabilized
101,600 ESALs



	Thickness	Coeff.	SN
HMA layer 1	2 in	0.440	0.880
Aggregate base	8 in	0.170	1.360
Subbase	8 in	0.080	0.640
Structural number (SN)			2.880

Parameters

Project Information

Target ESALs	Subgrade resilient modulus	Reliability	Standard deviation	Serviceability	
				Initial	Terminal
100,000	3,000 psi	70%	0.45	4.2	2

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Geogrid option calculated with adjusted structural coefficient value (0.17)

Subsurface Exploration and Pavement Analysis Proposed New Streets Terra Buona, Take III & IV San Antonio, Texas	**Local Type A (without Bus Traffic)**	
	InTEC Project Number: **S251104-P**	Date: 04/12/2025

Asphalt Pavement
Design Analysis

Tensar
A Division of CMC

Design		Reference	
Project		Location	
Customer		Designer	Murali Subramaniam
Company	InTEC	Date	February 2, 2024

Results

Stabilized
151,300 ESALs

Unstabilized
212,200 ESALs

Total HMA thickness should be within the same range on both pavement sections for accurate comparison: 2-3 in | 3-6 in | 6-14 in

	Thickness	Coeff.	SN
HMA layer 1	3 in	0.420	1.260
Aggregate base (NX750)	6 in	0.300	1.800
Structural number (SN)			3.060

	Thickness	Coeff.	SN
HMA layer 1	2 in	0.440	0.880
HMA layer 2	5 in	0.340	1.700
Subbase	8 in	0.080	0.640
Structural number (SN)			3.220

Parameters

Project Information

Target ESALs	Subgrade resilient modulus	Reliability	Standard deviation	Serviceability	
				Initial	Terminal
100,000	3,000 psi	70%	0.45	4.2	2

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Subsurface Exploration and Pavement Analysis Proposed New Streets Terra Buona, Take III & IV San Antonio, Texas	**Local Type A (without Bus Traffic)**	
	InTEC Project Number: **S251104-P**	Date: 04/12/2025

Tensar

SpectraPave4 PRO™
Pavement Optimization Design Analysis

Design Parameters for AASHTO (1993) Equation

Reliability (%)	= 70	Initial Serviceability	= 4.2
Standard Normal Deviate	= -.524	Terminal Serviceability	= 2.0
Standard Deviation	= 0.45	Change in Serviceability	= 2.2

Aggregate fill shall conform to following requirement:

D50 <= 27mm (Base course)

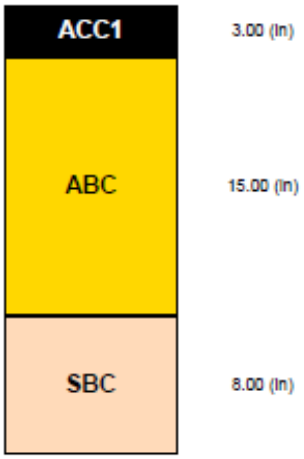
Unstabilized Section Material Properties

Layer	Description	Cost ($/ton)	Layer coefficient	Drainage factor
ACC1	Asphalt Wearing Course	70	0.440	N/A
ABC	Aggregate Base Course	20	0.140	1.0
SBC	Subbase Course	16	0.080	1.0

Stabilized Section Material Properties

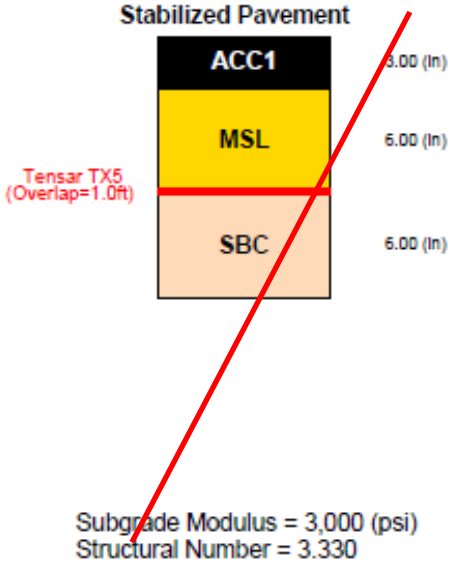
Layer	Description	Cost ($/ton)	Layer coefficient	Drainage factor
ACC1	Asphalt Wearing Course	70	0.420	N/A
MSL	Mechanically Stabilized Base Cour	20	0.265	1.0
SBC	Subbase Course	16	0.080	1.0

Unstabilized Pavement



Subgrade Modulus = 3,000 (psi)
Structural Number = 4.060
Calculated Traffic (ESALs) = 1,031,000

Stabilized Pavement



Subgrade Modulus = 3,000 (psi)
Structural Number = 3.330
Calculated Traffic (ESALs) = 266,000

LIMITATIONS OF THE REPORT

The designs, illustrations, information and other content included in this report are necessarily general and conceptual in nature, and do not constitute engineering advice or any design intended for actual construction. Specific design recommendations can be provided as the project develops.

Subsurface Exploration and Pavement Analysis Proposed New Streets Terra Buona, Take III & IV San Antonio, Texas	**Local Type A (with Bus Traffic)**	
	InTEC Project Number: **S251104-P**	Date: 04/12/2025

Tensar.

SpectraPave4 PRO™
Pavement Optimization Design Analysis

Design Parameters for AASHTO (1993) Equation

Reliability (%)	= 70	Initial Serviceability	= 4.2
Standard Normal Deviate	= -.524	Terminal Serviceability	= 2.0
Standard Deviation	= 0.45	Change in Serviceability	= 2.2

Aggregate fill shall conform to following requirement:

D50 <= 27mm (Base course)

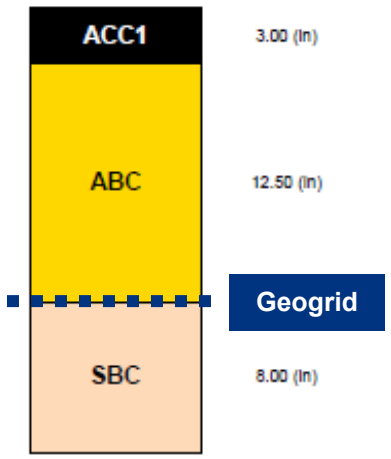
Unstabilized Section Material Properties

Layer	Description	Cost ($/ton)	Layer coefficient	Drainage factor
ACC1	Asphalt Wearing Course	70	0.440	N/A
ABC	Aggregate Base Course	20	0.170	1.0
SBC	Subbase Course	16	0.080	1.0

Stabilized Section Material Properties

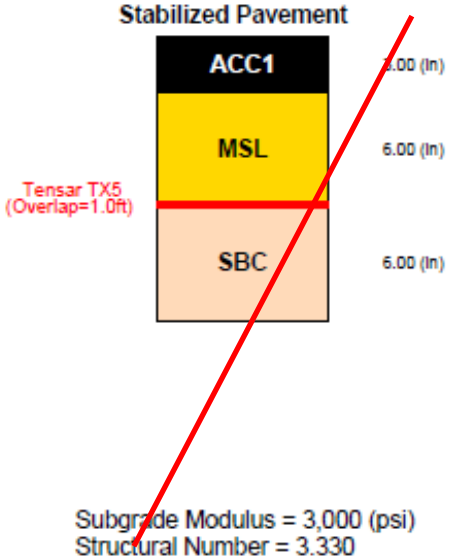
Layer	Description	Cost ($/ton)	Layer coefficient	Drainage factor
ACC1	Asphalt Wearing Course	70	0.420	N/A
MSL	Mechanically Stabilized Base Cour	20	0.265	1.0
SBC	Subbase Course	16	0.080	1.0

Unstabilized Pavement



Subgrade Modulus = 3,000 (psi)
Structural Number = 4.085
Calculated Traffic (ESALs) = 1,077,000

Stabilized Pavement



Subgrade Modulus = 3,000 (psi)
Structural Number = 3.330
Calculated Traffic (ESALs) = 266,000

Geogrid option calculated with adjusted structural coefficient value

LIMITATIONS OF THE REPORT

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Subsurface Exploration and Pavement Analysis Proposed New Streets Terra Buona, Take III & IV San Antonio, Texas	**Local Type A (with Bus Traffic)**	
	InTEC Project Number: **S251104-P**	Date: 04/12/2025

Tensar

SpectraPave4 PRO™
Pavement Optimization Design Analysis

Design Parameters for AASHTO (1993) Equation

Reliability (%)	= 70	Initial Serviceability	= 4.2
Standard Normal Deviate	= -.524	Terminal Serviceability	= 2.0
Standard Deviation	= 0.45	Change in Serviceability	= 2.2

Aggregate fill shall conform to following requirement:

D50 <= 27mm (Base course)

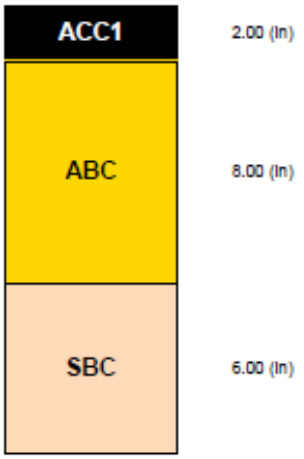
Unstabilized Section Material Properties

Layer	Description	Cost ($/ton)	Layer coefficient	Drainage factor
ACC1	Asphalt Wearing Course	70	0.440	N/A
ABC	Aggregate Base Course	20	0.340	1.0
SBC	Subbase Course	16	0.080	1.0

Stabilized Section Material Properties

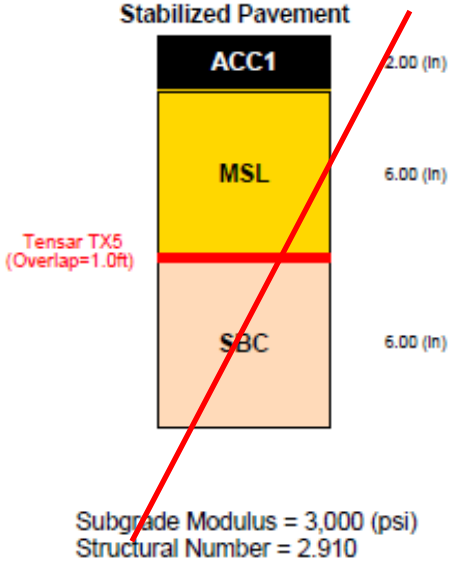
Layer	Description	Cost ($/ton)	Layer coefficient	Drainage factor
ACC1	Asphalt Wearing Course	70	0.420	N/A
MSL	Mechanically Stabilized Base Cour	20	0.265	1.0
SBC	Subbase Course	16	0.080	1.0

Unstabilized Pavement



Subgrade Modulus = 3,000 (psi)
Structural Number = 4.080
Calculated Traffic (ESALs) = 1,067,000

Stabilized Pavement



Subgrade Modulus = 3,000 (psi)
Structural Number = 2.910
Calculated Traffic (ESALs) = 109,000

LIMITATIONS OF THE REPORT

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Subsurface Exploration and Pavement Analysis Proposed New Streets Terra Buona, Take III & IV San Antonio, Texas	**Local Type A (with Bus Traffic)**	
	InTEC Project Number: **S251104-P**	Date: 04/12/2025

Tensar.

SpectraPave4 PRO™
Pavement Optimization Design Analysis

Design Parameters for AASHTO (1993) Equation

Reliability (%)	= 90	Initial Serviceability	= 4.2
Standard Normal Deviate	= -1.282	Terminal Serviceability	= 2.0
Standard Deviation	= 0.45	Change in Serviceability	= 2.2

Aggregate fill shall conform to following requirement:

D50 <= 27mm (Base course)

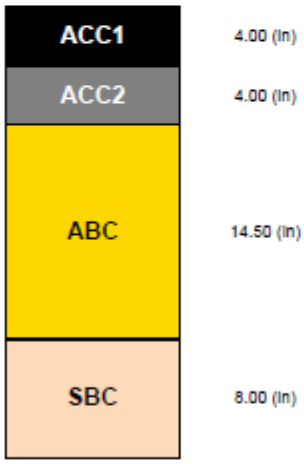
Unstabilized Section Material Properties

Layer	Description	Cost ($/ton)	Layer coefficient	Drainage factor
ACC1	Asphalt Wearing Course	70	0.440	N/A
ACC2	Dense-graded Asphalt Course	70	0.140	N/A
ABC	Aggregate Base Course	20	0.140	1.0
SBC	Subbase Course	16	0.080	1.0

Stabilized Section Material Properties

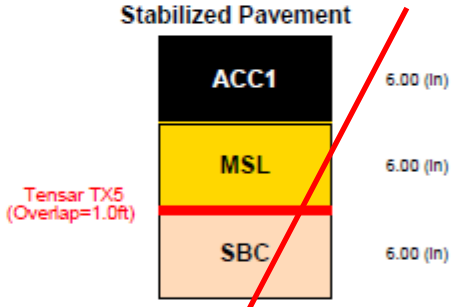
Layer	Description	Cost ($/ton)	Layer coefficient	Drainage factor
ACC1	Asphalt Wearing Course	70	0.420	N/A
MSL	Mechanically Stabilized Base Cour	20	0.265	1.0
SBC	Subbase Course	16	0.080	1.0

Unstabilized Pavement



Subgrade Modulus = 3,000 (psi)
Structural Number = 4.990
Calculated Traffic (ESALs) = 2,086,000

Stabilized Pavement



Subgrade Modulus = 3,000 (psi)
Structural Number = 4.590
Calculated Traffic (ESALs) = 1,129,000

LIMITATIONS OF THE REPORT

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Subsurface Exploration and Pavement Analysis Proposed New Streets Terra Buona, Take III & IV San Antonio, Texas	**Local Type B**	
	InTEC Project Number: **S251104-P**	Date: 04/12/2025

Tensar.

SpectraPave4 PRO™
Pavement Optimization Design Analysis

Design Parameters for AASHTO (1993) Equation

Reliability (%)	= 90	Initial Serviceability	= 4.2
Standard Normal Deviate	= -1.282	Terminal Serviceability	= 2.0
Standard Deviation	= 0.45	Change in Serviceability	= 2.2

Aggregate fill shall conform to following requirement:

D50 <= 27mm (Base course)

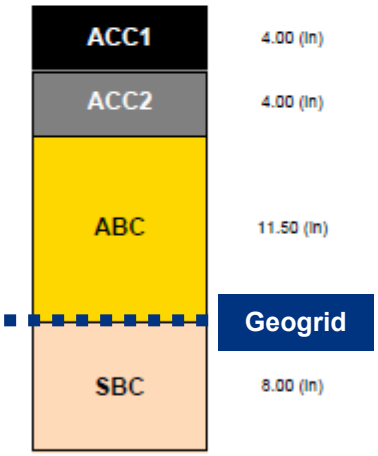
Unstabilized Section Material Properties

Layer	Description	Cost ($/ton)	Layer coefficient	Drainage factor
ACC1	Asphalt Wearing Course	70	0.440	N/A
ACC2	Dense-graded Asphalt Course	70	0.170	N/A
ABC	Aggregate Base Course	20	0.170	1.0
SBC	Subbase Course	16	0.080	1.0

Stabilized Section Material Properties

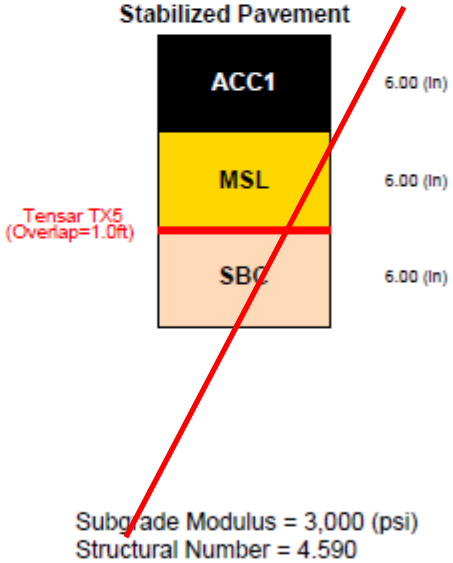
Layer	Description	Cost ($/ton)	Layer coefficient	Drainage factor
ACC1	Asphalt Wearing Course	70	0.420	N/A
MSL	Mechanically Stabilized Base Cour	20	0.265	1.0
SBC	Subbase Course	16	0.080	1.0

Unstabilized Pavement



Subgrade Modulus = 3,000 (psi)
Structural Number = 5.035
Calculated Traffic (ESALs) = 2,231,000

Stabilized Pavement



Subgrade Modulus = 3,000 (psi)
Structural Number = 4.590
Calculated Traffic (ESALs) = 1,129,000

Geogrid option calculated with adjusted structural coefficient value

LIMITATIONS OF THE REPORT

The designs, illustrations, information and other content included in this report are necessarily general and conceptual in nature, and do not constitute engineering advice or any design intended for actual construction. Specific design recommendations can be provided as the project develops.

Subsurface Exploration and Pavement Analysis Proposed New Streets Terra Buona, Take III & IV San Antonio, Texas	**Local Type B**	
	InTEC Project Number: **S251104-P**	Date: 04/12/2025

Tensar

SpectraPave4 PRO™
Pavement Optimization Design Analysis

Design Parameters for AASHTO (1993) Equation

Reliability (%)	= 90	Initial Serviceability	= 4.2
Standard Normal Deviate	= -1.282	Terminal Serviceability	= 2.0
Standard Deviation	= 0.45	Change in Serviceability	= 2.2

Aggregate fill shall conform to following requirement:

D50 <= 27mm (Base course)

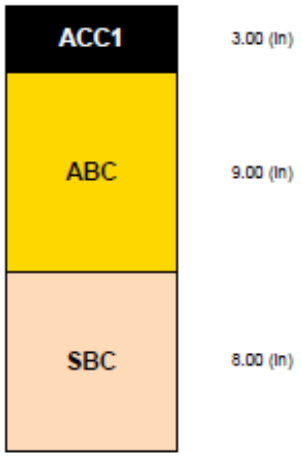
Unstabilized Section Material Properties

Layer	Description	Cost ($/ton)	Layer coefficient	Drainage factor
ACC1	Asphalt Wearing Course	70	0.440	N/A
ABC	Aggregate Base Course	20	0.340	1.0
SBC	Subbase Course	16	0.080	1.0

Stabilized Section Material Properties

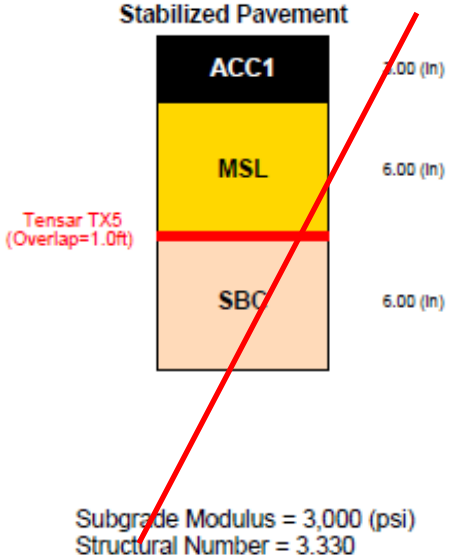
Layer	Description	Cost ($/ton)	Layer coefficient	Drainage factor
ACC1	Asphalt Wearing Course	70	0.420	N/A
MSL	Mechanically Stabilized Base Cour	20	0.265	1.0
SBC	Subbase Course	16	0.080	1.0

Unstabilized Pavement



Subgrade Modulus = 3,000 (psi)
Structural Number = 5.020
Calculated Traffic (ESALs) = 2,182,000

Stabilized Pavement



Subgrade Modulus = 3,000 (psi)
Structural Number = 3.330
Calculated Traffic (ESALs) = 121,000

LIMITATIONS OF THE REPORT

The designs, illustrations, information and other content included in this report are necessarily general and conceptual in nature, and do not constitute engineering advice or any design intended for actual construction. Specific design recommendations can be provided as the project develops.

Subsurface Exploration and Pavement Analysis Proposed New Streets Terra Buona, Take III & IV San Antonio, Texas	**Local Type B**	
	InTEC Project Number: **S251104-P**	Date: 04/12/2025

Tensar.

SpectraPave4 PRO™
Pavement Optimization Design Analysis

Design Parameters for AASHTO (1993) Equation

Reliability (%)	= 90	Initial Serviceability	= 4.2
Standard Normal Deviate	= -1.282	Terminal Serviceability	= 2.5
Standard Deviation	= 0.45	Change in Serviceability	= 1.7

Aggregate fill shall conform to following requirement:

D50 <= 27mm (Base course)

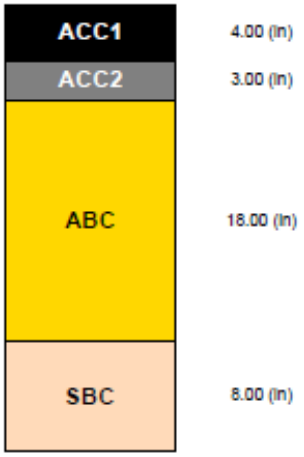
Unstabilized Section Material Properties

Layer	Description	Cost ($/ton)	Layer coefficient	Drainage factor
ACC1	Asphalt Wearing Course	70	0.440	N/A
ACC2	Dense-graded Asphalt Course	70	0.140	N/A
ABC	Aggregate Base Course	20	0.140	1.0
SBC	Subbase Course	16	0.060	1.0

Stabilized Section Material Properties

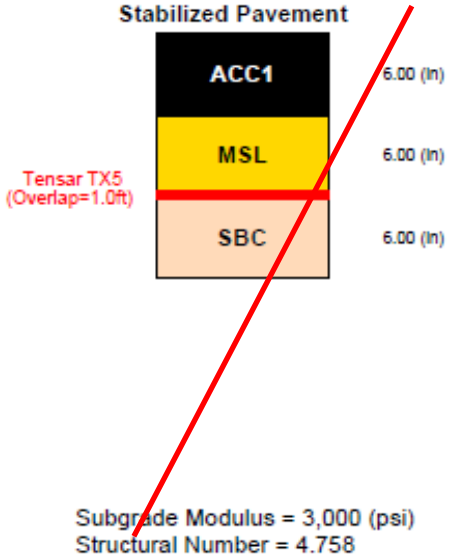
Layer	Description	Cost ($/ton)	Layer coefficient	Drainage factor
ACC1	Asphalt Wearing Course	70	0.440	N/A
MSL	Mechanically Stabilized Base Cour	20	0.273	1.0
SBC	Subbase Course	16	0.060	1.0

Unstabilized Pavement



Subgrade Modulus = 3,000 (psi)
Structural Number = 5.340
Calculated Traffic (ESALs) = 2,018,000

Stabilized Pavement



Subgrade Modulus = 3,000 (psi)
Structural Number = 4.758
Calculated Traffic (ESALs) = 897,000

LIMITATIONS OF THE REPORT

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Subsurface Exploration and Pavement Analysis Proposed New Streets Terra Buona, Take III & IV San Antonio, Texas	**Collector**	
	InTEC Project Number: **S251104-P**	Date: 04/12/2025

Tensar.

SpectraPave4 PRO™
Pavement Optimization Design Analysis

Design Parameters for AASHTO (1993) Equation

Reliability (%)	= 90	Initial Serviceability	= 4.2
Standard Normal Deviate	= -1.282	Terminal Serviceability	= 2.5
Standard Deviation	= 0.45	Change in Serviceability	= 1.7

Aggregate fill shall conform to following requirement:

D50 <= 27mm (Base course)

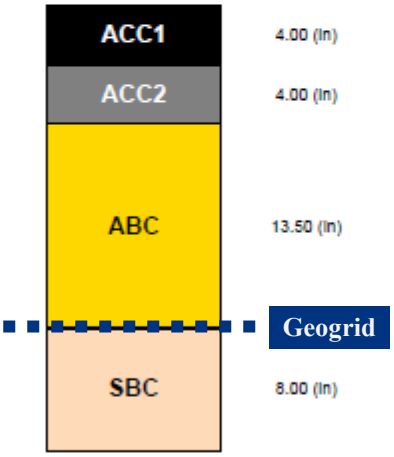
Unstabilized Section Material Properties

Layer	Description	Cost ($/ton)	Layer coefficient	Drainage factor
ACC1	Asphalt Wearing Course	70	0.440	N/A
ACC2	Dense-graded Asphalt Course	70	0.170	N/A
ABC	Aggregate Base Course	20	0.170	1.0
SBC	Subbase Course	16	0.080	1.0

Stabilized Section Material Properties

Layer	Description	Cost ($/ton)	Layer coefficient	Drainage factor
ACC1	Asphalt Wearing Course	70	0.440	N/A
MSL	Mechanically Stabilized Base Cour	20	0.308	1.0
None	Subbase Course	16	0.080	1.0

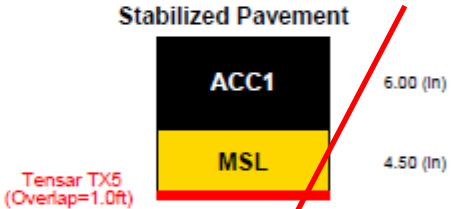
Unstabilized Pavement



Subgrade Modulus = 3,000 (psi)
Structural Number = 5.375
Calculated Traffic (ESALs) = 2,116,000

Geogrid option calculated with adjusted structural coefficient value (0.17)

Stabilized Pavement



Subgrade Modulus = 3,000 (psi)
Structural Number = 4.026
Calculated Traffic (ESALs) = 299,000

LIMITATIONS OF THE REPORT

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Subsurface Exploration and Pavement Analysis Proposed New Streets Terra Buona, Take III & IV San Antonio, Texas	**Collector**	
	InTEC Project Number: **S251104-P**	Date: 04/12/2025

Tensar

SpectraPave4 PRO™
Pavement Optimization Design Analysis

Design Parameters for AASHTO (1993) Equation

Reliability (%)	= 90	Initial Serviceability	= 4.2
Standard Normal Deviate	= -1.282	Terminal Serviceability	= 2.5
Standard Deviation	= 0.45	Change in Serviceability	= 1.7

Aggregate fill shall conform to following requirement:

D50 <= 27mm (Base course)

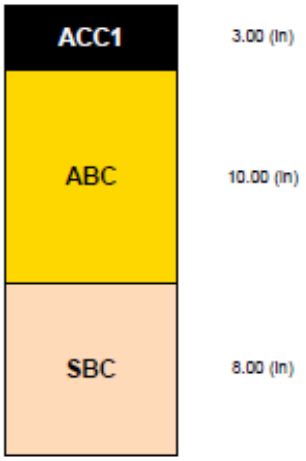
Unstabilized Section Material Properties

Layer	Description	Cost ($/ton)	Layer coefficient	Drainage factor
ACC1	Asphalt Wearing Course	70	0.440	N/A
ABC	Aggregate Base Course	20	0.340	1.0
SBC	Subbase Course	16	0.080	1.0

Stabilized Section Material Properties

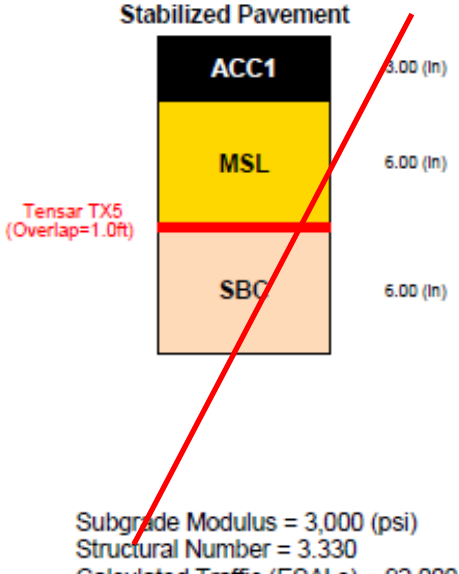
Layer	Description	Cost ($/ton)	Layer coefficient	Drainage factor
ACC1	Asphalt Wearing Course	70	0.420	N/A
MSL	Mechanically Stabilized Base Cour	20	0.265	1.0
SBC	Subbase Course	16	0.080	1.0

Unstabilized Pavement



Subgrade Modulus = 3,000 (psi)
Structural Number = 5.360
Calculated Traffic (ESALs) = 2,073,000

Stabilized Pavement



Subgrade Modulus = 3,000 (psi)
Structural Number = 3.330
Calculated Traffic (ESALs) = 92,000

LIMITATIONS OF THE REPORT

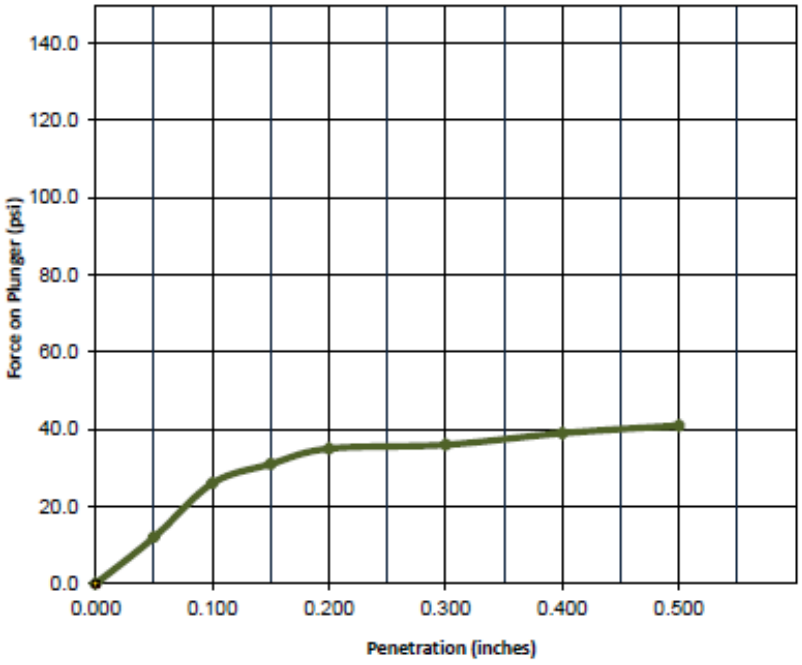
The designs, illustrations, information and other content included in this report are necessarily general and conceptual in nature, and do not constitute engineering advice or any design intended for actual construction. Specific design recommendations can be provided as the project develops.

Subsurface Exploration and Pavement Analysis Proposed New Streets Terra Buona, Take III & IV San Antonio, Texas	**Collector**	
	InTEC Project Number: **S251104-P**	Date: 04/12/2025

InTEC of San Antonio

ASTM D-1883 California Bearing Ratio Test Report

Load Penetration Curve



CBR Results

Results	A	B	C	D	Average
0.1 in Pen.	2.6				
0.2 in Pen.	2.3				
Moisture (%)	23.10				
Density (pcf)	96.20				
Final Moisture (%)	31.80				
Final Density (pcf)	84.60				

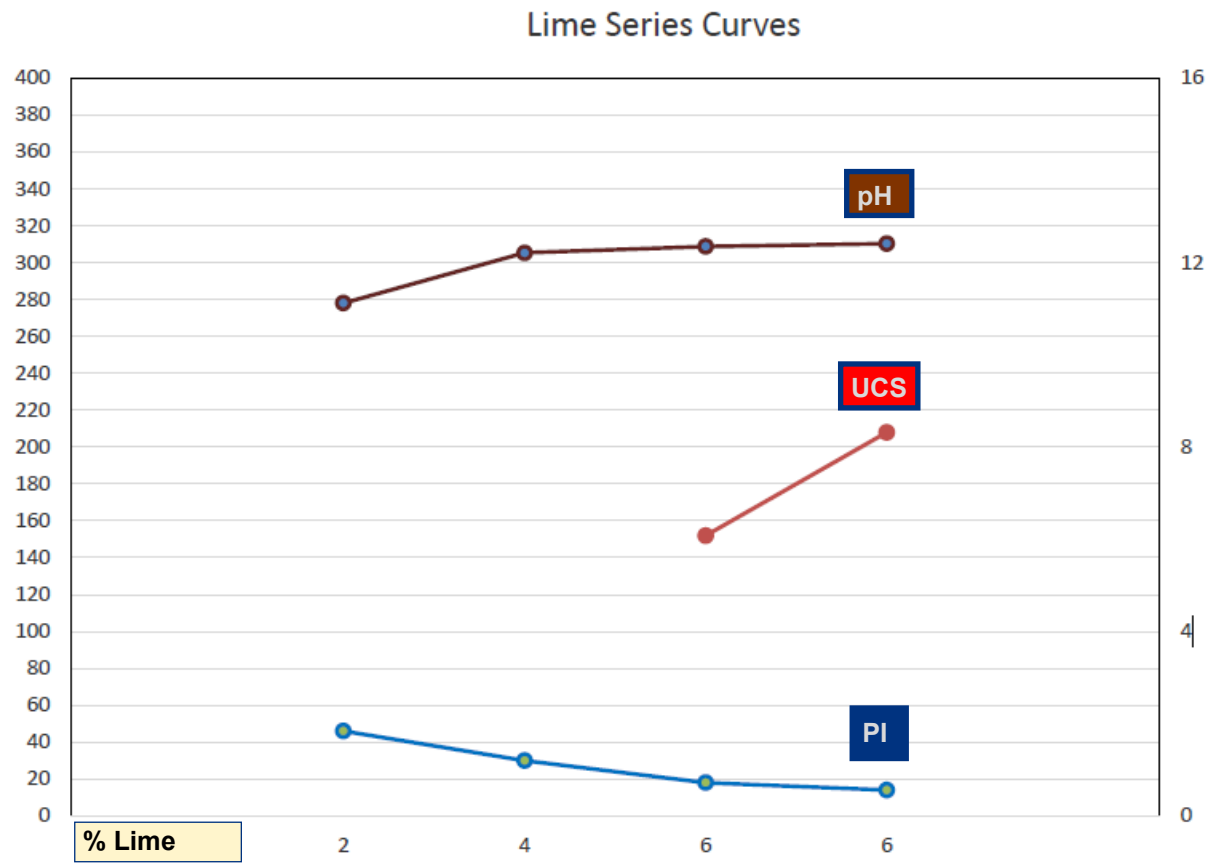
Project Number	S251104	Sample Location	
Project Name	Terra Buona, 3-4	Specimen A	Vicinity of TP-12
Date	4/26/2025		
Client	KBHome	Specimen C	
		Specimen D	
Job Ref.		Liquid Limit:	87.0
Sample Num.		Plastic Limit:	23.0
Remarks	Dark Brown Clay		

Subsurface Exploration and Pavement Analysis
Proposed New Streets
Terra Buona, Take III & IV
San Antonio, Texas

CBR Test Results

InTEC Project Number: **S251104-P**

Date: 04/12/2025



Subsurface Exploration and Pavement Analysis Proposed New Streets Terra Buona, Take III & IV San Antonio, Texas	**Lime Series**	
	InTEC Project Number: **S251104-P**	Date: 04/12/2025

Appendix

Subsurface Exploration and Pavement Analysis Proposed New Streets Terra Buona, Take III & IV San Antonio, Texas		
	InTEC Project Number: **S251104-P**	Date: 04/12/2025

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, you can benefit from a lowered exposure to problems associated with subsurface conditions at project sites and development of them that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

Geotechnical-Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. *Read and refer to the report in full.*

You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept*

responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are not final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals' plans and specifications; and
- be available whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for information purposes only.* To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer's services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration. Confront the risk of moisture infiltration*** by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

Telephone: 301/565-2733
e-mail: info@geoprofessional.org www.geoprofessional.org

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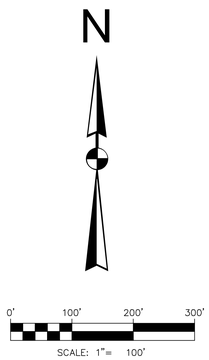
CPS PRELIMINARY DESIGN

M.W. CUDE ENGINEERS, L.L.C 4122 Pond Hill Road, Suite 101 San Antonio, Texas 78231 210.681.2951 (tel) 210.523.7112 (fax)



LAND USE AND DENSITY TABLE

UNIT	LAND USE	GROSS Ac.	FLOODPLAIN Ac.	NET Ac.	DU/Ac.	DWELLING UNIT COUNT	COMPLETION DATE
1	SINGLE FAMILY RESIDENTIAL	14.45	0.0	14.45	5.74	83	1ST QUARTER 2021
2	SINGLE FAMILY RESIDENTIAL	16.39	0.0	16.39	5.06	83	1ST QUARTER 2022
3	SINGLE FAMILY RESIDENTIAL	20.18	0.0	20.18	5.65	114	1ST QUARTER 2023
4	SINGLE FAMILY RESIDENTIAL	16.81	0.0	16.81	4.46	75	1ST QUARTER 2022
5	SINGLE FAMILY RESIDENTIAL	13.54	0.0	13.54	4.65	63	1ST QUARTER 2023
6	SINGLE FAMILY RESIDENTIAL	17.56	0.0	17.56	5.24	92	3RD QUARTER 2023
7	SINGLE FAMILY RESIDENTIAL	18.47	0.37	18.10	4.20	76	1ST QUARTER 2024
8	SINGLE FAMILY RESIDENTIAL	23.27	0.0	23.27	5.20	121	3RD QUARTER 2024
9	SINGLE FAMILY RESIDENTIAL	14.70	0.0	14.70	5.38	79	1ST QUARTER 2025
10	SINGLE FAMILY RESIDENTIAL	15.81	0.31	15.50	5.55	86	3RD QUARTER 2022
11	MULTI FAMILY RESIDENTIAL	18.96	3.69	15.27	25.00	382	3RD QUARTER 2025
12	SINGLE FAMILY (ZONED R-6)	10.01	8.48	1.53	7.00	11	1ST QUARTER 2026
TOTAL		200.16	12.85	187.31	6.75	1264	

PG NO.1

ALL ELECTRIC

Average Living Space	2400	Terra Buona Take 3 & 4			
# OF HOMES	TRANSFORMER KVA NAMEPLATE	TOTAL KVA		MAX DISTANCE 3/0	MAX DISTANCE 4/0
1	25	19		195	350
2	50	35		105	200
3	50	50		0	135
4	75	65		0	0
5	75	79		0	0
6	100	93		0	0
7	100	106		0	0
8	100	119	DO NOT USE	0	0
9	0	0		0	0
10	0	0		0	0
11	0	0		0	0
12	0	0		0	0

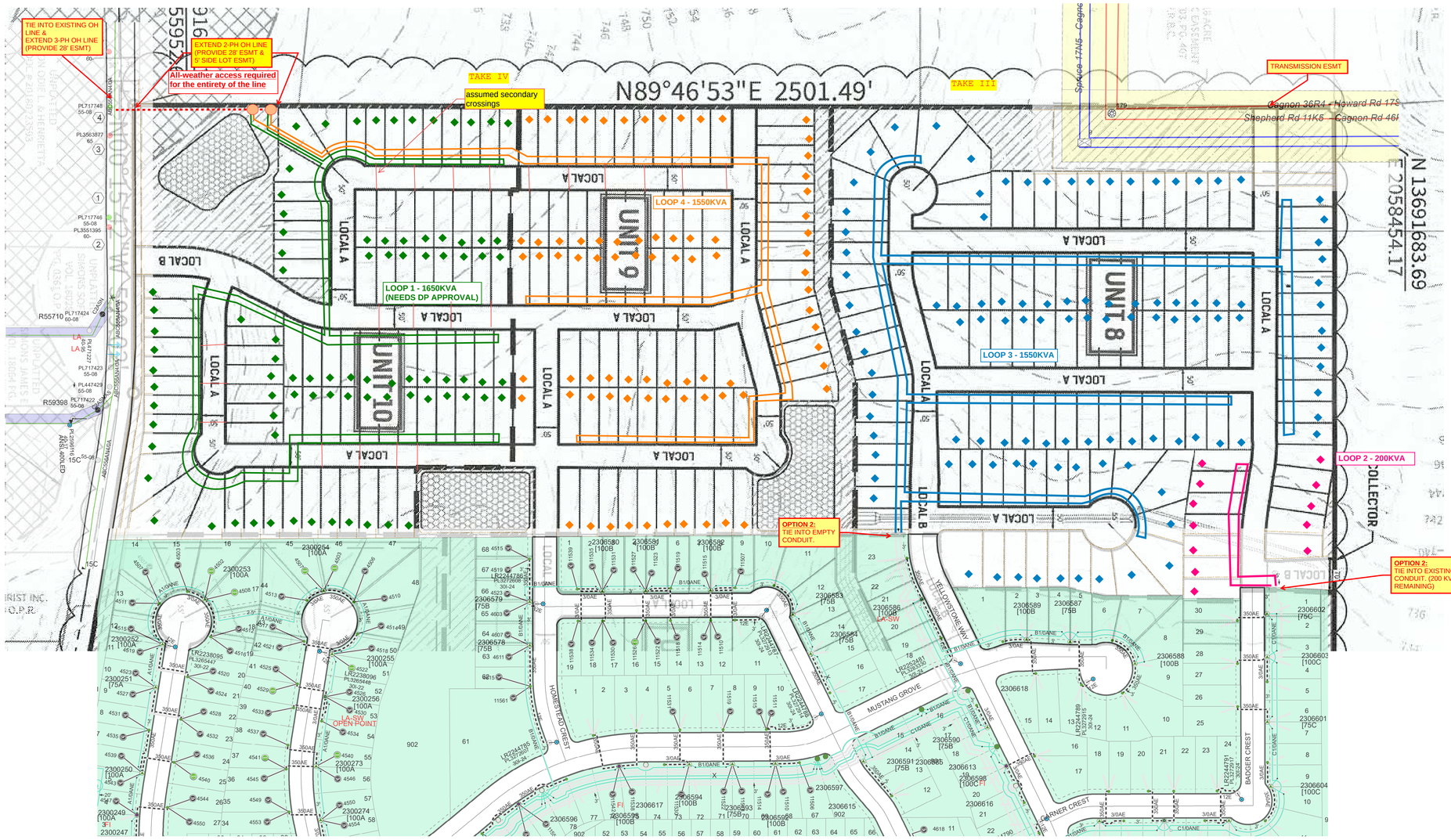
TERRA BUONA TAKE 3 & 4 OPTION 2
ELEC. MDP PRELIM
CREATED ON 05/05/25

LOOP 1 - 1,650KVA (NEEDS DP APPROVAL)
LOOP 2 - 1,000KVA
LOOP 3 - 1,550KVA
LOOP 4 - 200KVA
TOTAL = 2,750KVA

LEGEND:

- MDP LIMITS
- UNIT LIMITS
- EXISTING 100 YEAR FLOODPLAIN
- PROPOSED DETENTION POND
- OPEN SPACE
- ELEV. — EXISTING SURFACE CONTOUR
- CITY LIMITS

Ac.	= ACRES
C1	= CURVE NUMBER
C.B.	= COUNTY BLOCK
CONC.	= CONCRETE
C.V.E.	= CLEAR VISION EASEMENT
D.P.R.	= DEED AND PLAT RECORDS OF BEXAR COUNTY, TEXAS
DRN.	= DRAINAGE
E.G.T.CA.	= ELECTRIC, GAS, TELEPHONE AND CABLE TELEVISION



DIGITAL FILES

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