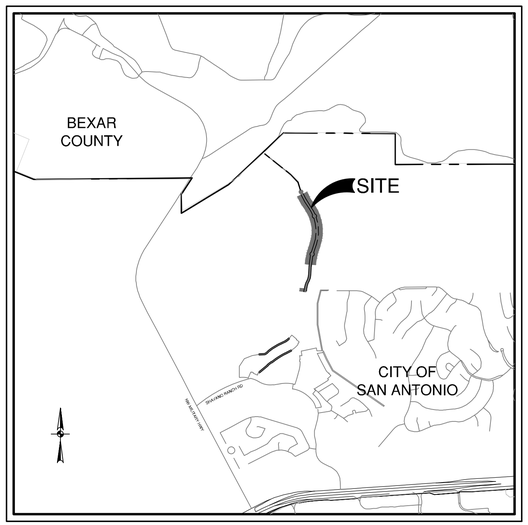
# SHAVANO HIGHLANDS UNIT 7

## SAN ANTONIO, TEXAS

# CIVIL CONSTRUCTION PLANS

SHEET INDEX


| Sheet Description | | Sheet No. |
|---|---|---|
| COVER SHEET | | C0.00 |
| MASTER DRAINAGE PLAN | | C1.00 |
| DRAIN A - PLAN & PROFILE | STA. 1+00.00 TO END | C1.01 |
| DRAIN B - PLAN & PROFILE | STA. 1+00.00 TO END | C1.02 |
| DRAIN C - PLAN & PROFILE | STA. 1+00.00 TO END | C1.03 |
| DRAINAGE DETAILS | | C1.10 |
| DRAINAGE DETAILS | | C1.11 |
| DRAINAGE DETAILS | | C1.12 |
| DRAINAGE DETAILS | | C1.13 |
| POWDER MILL - PLAN & PROFILE | STA: 1+00.00 TO 11+00.00 | C2.00 |
| POWDER MILL - PLAN & PROFILE | STA: 11+00.00 TO 22+00.00 | C2.01 |
| POWDER MILL - PLAN & PROFILE | STA: 22+00.00 TO END | C2.02 |
| STREET DETAILS | | C2.10 |
| STREET DETAILS | | C2.11 |
| STREET DETAILS | | C2.12 |
| OVERALL SIGNAGE PLAN | | C3.00 |
| SIGNAGE DETAILS | | C3.10 |
| SIGNAGE DETAILS | | C3.11 |
| SIGNAGE DETAILS | | C3.12 |
| OVERALL WATER DISTRIBUTION PLAN | | C4.00 |
| OVERALL WATER DISTRIBUTION PLAN | | C4.01 |
| OVERALL WATER DISTRIBUTION PLAN | | C4.02 |
| WATER DISTRIBUTION PLAN DETAILS | | C4.10 |
| WATER DISTRIBUTION PLAN NOTES | | C4.11 |
| OVERALL SANITARY SEWER PLAN | | C5.00 |
| OVERALL SANITARY SEWER PLAN | | C5.01 |
| OVERALL SANITARY SEWER PLAN | | C5.02 |
| OVERALL SANITARY SEWER PLAN | | C5.03 |
| SANITARY SEWER LINE A - PLAN & PROFILE | STA: 1+00.00 TO 10+00.00 | C5.04 |
| SANITARY SEWER LINE A - PLAN & PROFILE | STA: 10+00.00 TO 20+00.00 | C5.05 |
| SANITARY SEWER LINE A - PLAN & PROFILE | STA: 20+00.00 TO 30+00.00 | C5.06 |
| SANITARY SEWER LINE A - PLAN & PROFILE | STA: 30+00.00 TO 40+00.00 | C5.07 |
| SANITARY SEWER LINE A - PLAN & PROFILE | STA: 40+00.00 TO END | C5.08 |
| SANITARY SEWER DETAILS | | C5.10 |
| SANITARY SEWER NOTES | | C5.11 |
| OVERALL UTILITY PLAN | | C6.00 |
| OVERALL UTILITY PLAN | | C6.01 |
| OVERALL UTILITY PLAN | | C6.02 |
| OVERALL UTILITY PLAN | | C6.03 |
| OVERALL GRADING PLAN | | C7.00 |
| OVERALL GRADING PLAN | | C7.01 |
| OVERALL GRADING PLAN | | C7.02 |
| STORM WATER POLLUTION PREVENTION PLAN | | C8.00 |
| STORM WATER POLLUTION PREVENTION PLAN | | C8.01 |
| STORM WATER POLLUTION PREVENTION PLAN | | C8.02 |
| STORM WATER POLLUTION PREVENTION PLAN | | C8.03 |
| STORM WATER POLLUTION PREVENTION PLAN DETAILS | | C8.10 |


LOCATION MAP
NOT-TO-SCALE

PREPARED FOR:

SHAVANO ROGERS RANCH NORTH NO. 3, LTD.
11 LYNN BATTS LANE, SUITE 100
SAN ANTONIO, TEXAS 78218

NOVEMBER 2023

STATE OF TEXAS
CALEB M. CHANCE
98401
LICENSED
PROFESSIONAL ENGINEER
4/15/24


PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800


SEWER - EAST SEWERSHED (UPPER) -DOS RIOS/ LEON CREEK

DEVELOPER'S NAME: SHAVANO ROGERS RANCH NORTH NO. 3, LTD.
ADDRESS: 11 LYNN BATTS LANE, SUITE 100
CITY: SAN ANTONIO STATE: TEXAS ZIP: 78218
PHONE# (210) 828-6131 FAX#
SAWS BLOCK MAP# 140650 TOTAL EDU'S 46 TOTAL ACREAGE 18.90
TOTAL LINEAR FOOTAGE OF PIPE: 8" 4,546 LF PLAT NO. 23-11800083
NUMBER OF LOTS 46 SAWS JOB NO. 23-1533

WATER (SAWS PRESSURE ZONE 11)

DEVELOPER'S NAME: BITTERBLUE/ROGERS WATER INTERESTS, LTD.
ADDRESS: 11 LYNN BATTS LANE, SUITE 100
CITY: SAN ANTONIO STATE: TEXAS ZIP: 78218
PHONE# 210-826-6131 FAX#
SAWS BLOCK MAP# 08-2616 & 082616 TOTAL EDU'S 48 TOTAL ACREAGE 18.90
TOTAL LINEAR FOOTAGE OF PIPE: 8"-278 LF 12"-2,714 LF PLAT NO. 23-11800083
NUMBER OF LOTS 46 SAWS JOB NO. 23-1041

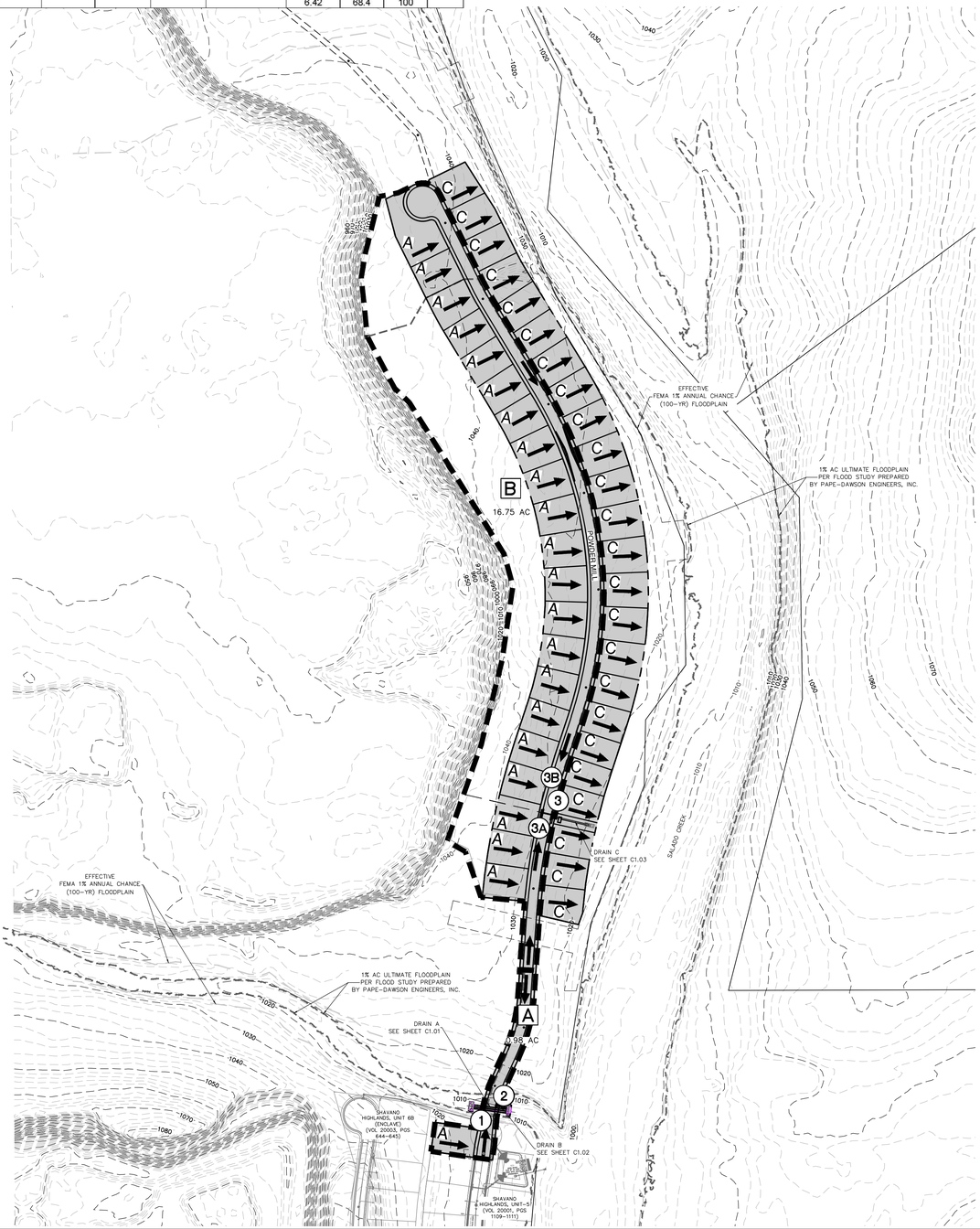
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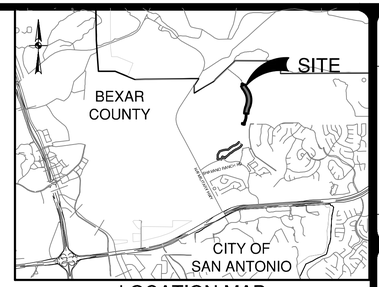
PLAT NO. 23-11800083 PD JOB NO. 8834-22 SHAVANO HIGHLANDS UNIT 7

Date: Apr 15, 2024, 3:22pm User ID: uwilkerso
File: P:\88\34\22\Design\Civil\C8834222.dwg


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| POINT | STRUCTURE | WATERSHED | TOTAL AREA (ACRES) | COMPOSITE C VALUE | OVERLAND FLOW LENGTH FEET | OVERLAND FLOW TRAVEL TIME MINUTES | SHALLOW LENGTH FEET | SHALLOW TRAVEL TIME MINUTES | CHANNEL FLOW (6 FPS) LENGTH FEET | CHANNEL FLOW (6 FPS) TRAVEL TIME MINUTES | TIME OF CONCENTRATION MINUTES | A14 INTENSITY (PA-2) IN/HR | FLOW Q CFS | FREQ YRS | POINT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 - 4' X 3' MBC | | | SEE STORM WATER MANAGEMENT PLAN FOR HYDROLOGIC CALCULATIONS | | | | | | | | 3.28 | - | 5 | 1 |
| | | | | | | | | | | | | 4.56 | - | 25 | |
| | | | | | | | | | | | | 5.68 | 147.0 | 100 | |
| 2 | 1 - 5' Curb Inlet | A | 0.98 | 0.72 | 100 | 1 | 341 | 4 | 0 | 0 | 5 | 7.94 | 5.6 | 5 | 2 |
| | | | | | | | | | | | | 11.14 | 7.9 | 25 | |
| | | | | | | | | | | | | 14.01 | 9.9 | 100 | |
| 3 | 2 - 20' Curb Inlets | B | 16.75 | 0.72 | 100 | 14 | 2048 | 16 | 0 | 0 | 30 | 3.72 | 44.9 | 5 | 3 |
| | | | | | | | | | | | | 5.16 | 62.2 | 25 | |
| | | | | | | | | | | | | 6.42 | 77.4 | 100 | |
| 3A | Street Capacity Check | B | 1.96 | 0.72 | 100 | 10 | 522 | 4 | 0 | 0 | 14 | 5.51 | 7.8 | 5 | 3A |
| | | | | | | | | | | | | 7.67 | 10.8 | 25 | |
| | | | | | | | | | | | | 9.64 | 13.6 | 100 | |
| 3B | Street Capacity Check | B | 14.79 | 0.72 | 100 | 14 | 2048 | 16 | 0 | 0 | 30 | 3.72 | 39.6 | 5 | 3B |
| | | | | | | | | | | | | 5.16 | 54.9 | 25 | |
| | | | | | | | | | | | | 6.42 | 68.4 | 100 | |




LOCATION MAP
NOT-TO-SCALE

0' 200' 400' 600'
SCALE: 1"= 200'

## MASTER DRAINAGE LEGEND

- PROJECT LIMITS
- EXISTING CONTOUR — 690 —
- 100 YR FLOODPLAIN
- RUNOFF FLOW PATH
- DRAINAGE AREA BOUNDARY
- FHA LOT GRADING TYPE — A,B,C
- PROPOSED DIRECTION OF FLOW
- DRAINAGE CALCULATION POINT — (11)
- DRAINAGE AREA — A

| NO. | REVISION | DATE |
|---|---|---|

STATE OF TEXAS
CALEB M. CHANCE
98401
LICENSED
PROFESSIONAL ENGINEER
4/15/24


PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

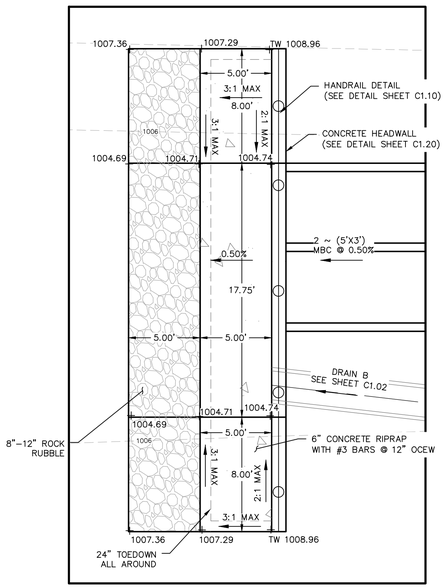

# SHAVANO HIGHLANDS UNIT 7
SAN ANTONIO, TEXAS

MASTER DRAINAGE PLAN

PLAT NO. 23-11800083
JOB NO. 8834-22
DATE NOVEMBER 2023
DESIGNER AW
CHECKED CC DRAWN RC
SHEET C1.00

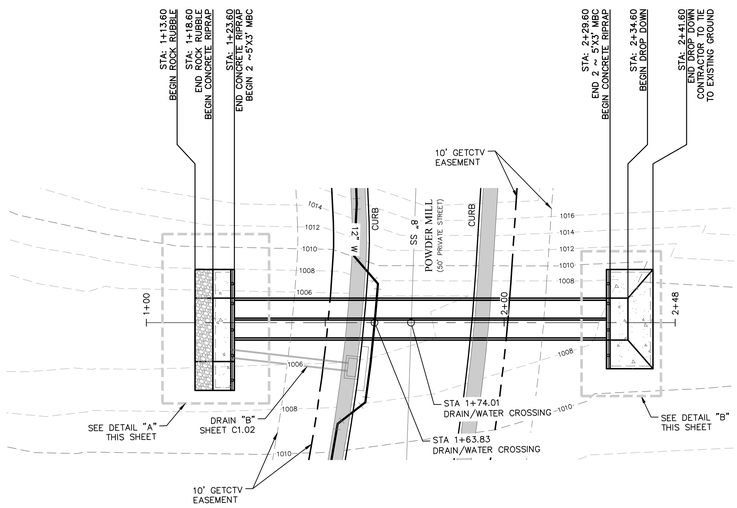
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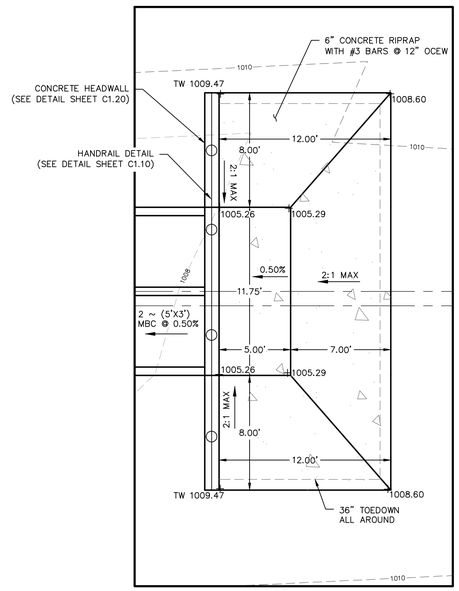

DETAIL "A"

SCALE: 1" = 5'



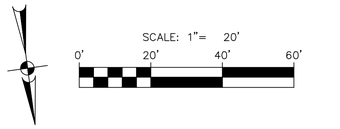

DRAIN "A"
STA. 1+00.00 TO END

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




DETAIL "B"

SCALE: 1" = 5'




## DRAINAGE LEGEND

- PROJECT LIMITS
- 100 YR FLOODPLAIN
- EXISTING CONTOUR — 690 —
- PROPOSED CONTOUR — 690 —
- PROPOSED WATER — W —
- PROPOSED SEWER — SS —
- PROPOSED STORM DRAIN
- EXISTING STORM DRAIN
- FLOW ARROW

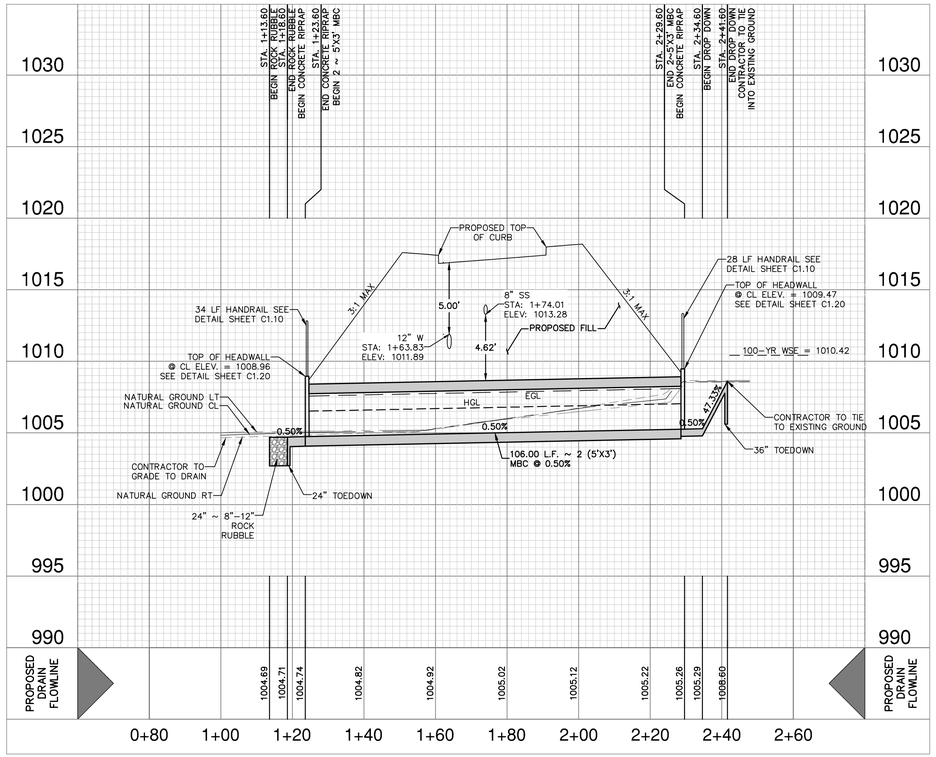
| NO. | REVISION | DATE |
|---|---|---|

STATE OF TEXAS
CALEB M. CHANCE
98401
LICENSED
PROFESSIONAL ENGINEER
3/20/24

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

| HYDRAULIC CALCULATIONS STORM DRAIN | |
|---|---|
| STA. 1+23.60 TO 2+29.60 | |
| Q100= | 147 CFS |
| Dn = | 1.78 FT |
| S = | 0.50% |
| V = | 8.26 FPS |
| n = | 0.013 |

V AFTER ROCK RUBBLE = 2.51 FPS




## DRAINAGE & GRADING NOTES:

1. THE CONTRACTOR WILL BE RESPONSIBLE FOR DETERMINING EXACT LOCATION OF ALL UTILITIES AND DRAINAGE STRUCTURES WHETHER SHOWN ON THE PLANS OR NOT. THE CONTRACTOR SHALL UNCOVER EXISTING UTILITIES PRIOR TO CONSTRUCTION TO VERIFY SIZE, GRADE, AND LOCATION. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY OF ANY DEVIATIONS FROM PLANS PRIOR TO BEGINNING CONSTRUCTION. ANY DAMAGE TO EXISTING UTILITIES, WHETHER SHOWN ON THE PLANS OR NOT, SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO REPAIR, AT HIS EXPENSE.
2. ALL CONCRETE FOR TXDOT DRAINAGE STRUCTURES SHALL MEET TXDOT SPECIFICATIONS. ALL OTHER CONCRETE SHALL BE CLASS "A" 3000 PSI CYLINDER STRENGTH IN 28 DAYS.
3. REFERENCE DRAINAGE DETAILS FOR PIPE TRENCH DETAILS, BOX CULVERT, HEADWALL, AND WINGWALL CONSTRUCTION DETAILS, AND BOX CULVERT BEDDING AND EXCAVATION LIMITS.
4. CONTRACTOR SHALL GROUT ALL CURB INLETS AND JUNCTION BOXES TO PROVIDE FOR POSITIVE DRAINAGE.

## 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 ANY AVAILABLE GEOTECHNICAL INFORMATION AND THE ANTICIPATED INSTALLATION SITES 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!!

CONTRACTOR SHALL BE REQUIRED TO LOCATE ALL PUBLIC OR PRIVATE UTILITIES INCLUDING BUT NOT LIMITING TO: WATER, SEWER, TELEPHONE AND FIBER OPTIC LINES, SITE LIGHTING ELECTRIC, SECONDARY ELECTRIC, PRIMARY ELECTRICAL DUCTBANKS, 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 CONTRACTOR'S SOLE EXPENSE WHETHER THE UTILITY IS SHOWN ON THESE PLANS OR NOT.

# SHAVANO HIGHLANDS UNIT 7

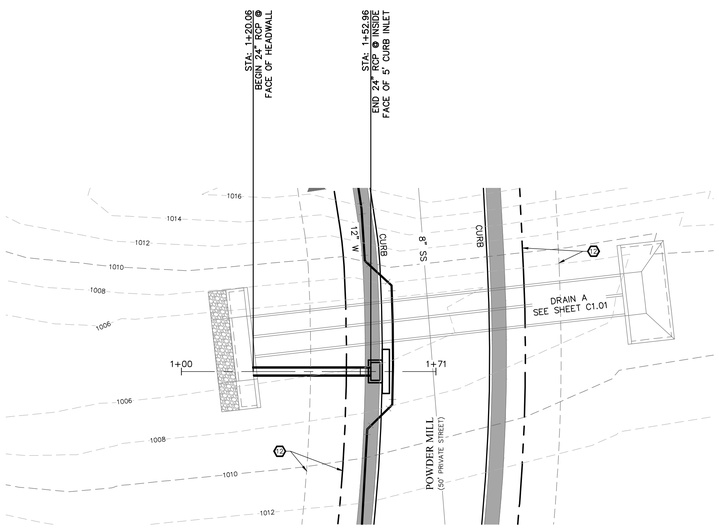
SAN ANTONIO, TEXAS

DRAIN A - PLAN & PROFILE
STA. 1+00.00 TO END

| | |
|---|---|
| PLAT NO. | 23-11800083 |
| JOB NO. | 8834-22 |
| DATE | NOVEMBER 2023 |
| DESIGNER | AW |
| CHECKED | CC |
| DRAWN | RC |
| SHEET | C1.01 |

Date: Mar 20, 2024, 2:36pm User ID: vallarreal
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SCALE: 1"= 20'

0' 20' 40' 60'

## DRAINAGE LEGEND

- PROJECT LIMITS
- 100 YR FLOODPLAIN
- EXISTING CONTOUR — 690 —
- PROPOSED CONTOUR — 690 —
- PROPOSED WATER — W —
- PROPOSED SEWER — SS —
- PROPOSED STORM DRAIN
- EXISTING STORM DRAIN
- FLOW ARROW

(10) 10' GAS, ELECTRIC, TELEPHONE AND CABLE TV EASEMENT (OFF-LOT)(0.354 TOTAL ACRES)

**HYDRAULIC CALCULATIONS 24" STORM DRAIN**

STA. 1+20.06 TO 1+52.96

Q25 = 7.9 CFS
Dn = 0.50
Sf = 0.01%
S = 10.0%
V = 14.9 FPS
n = 0.013
D = 2.00 ft

V AFTER ROCK RUBBLE = 2.51 FPS

**HYDRAULIC CALCULATIONS–DRAIN "B"**

TOTAL $Q_{25}$ = 7.9 CFS

$Q_{25}$ = 7.9 CFS

$Q_{25} = CL(H^{3/2})$ (WEIR FLOW)

$L = \frac{Q}{C(H^{3/2})} = \frac{7.9}{(3.087)\ (0.79^{3/2})} = 3.64$ FT

L = 3.64 FT USE 1 ~ 5 FT CURB INLET

CHECK WITH ORRIFICE FLOW

$Q_{25} = CA\sqrt{2gh}$ (ORIFICE FLOW EQN.)

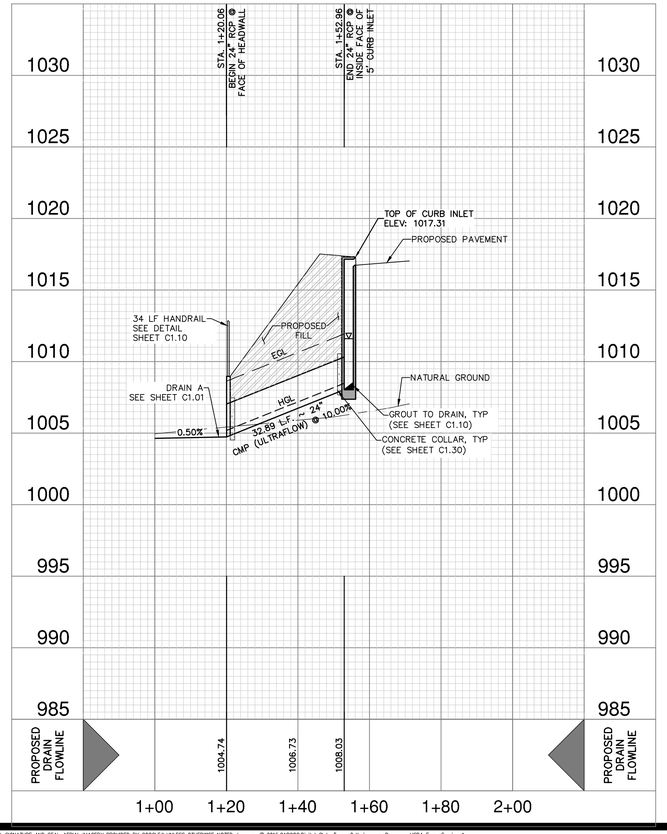
A = L(0.52), h = 0.57, g = 32.2, c = 0.70

$L = \frac{7.9}{(0.70)\ (0.52)\sqrt{2}\ (32.2)\ (0.57)}$

L = 3.58 FT OK

DRAIN "B"
STA. 1+00.00 TO END

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




## DRAINAGE & GRADING NOTES:

1. THE CONTRACTOR WILL BE RESPONSIBLE FOR DETERMINING EXACT LOCATION OF ALL UTILITIES AND DRAINAGE STRUCTURES WHETHER SHOWN ON THE PLANS OR NOT. THE CONTRACTOR SHALL UNCOVER EXISTING UTILITIES PRIOR TO CONSTRUCTION TO VERIFY SIZE, GRADE, AND LOCATION. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY OF ANY DEVIATIONS FROM PLANS PRIOR TO BEGINNING CONSTRUCTION. ANY DAMAGE TO EXISTING UTILITIES, WHETHER SHOWN ON THE PLANS OR NOT, SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO REPAIR, AT HIS EXPENSE.
2. ALL CONCRETE FOR TXDOT DRAINAGE STRUCTURES SHALL MEET TXDOT SPECIFICATIONS. ALL OTHER CONCRETE SHALL BE CLASS "A" 3000 PSI CYLINDER STRENGTH IN 28 DAYS.
3. REFERENCE DRAINAGE DETAILS FOR PIPE TRENCH DETAILS, BOX CULVERT, HEADWALL, AND WINGWALL CONSTRUCTION DETAILS, AND BOX CULVERT BEDDING AND EXCAVATION LIMITS.
4. CONTRACTOR SHALL GROUT ALL CURB INLETS AND JUNCTION BOXES TO PROVIDE FOR POSITIVE DRAINAGE.

## 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 ANY AVAILABLE GEOTECHNICAL INFORMATION AND THE ANTICIPATED INSTALLATION SITES 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!!

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| NO. | REVISION | DATE |
|---|---|---|
| | | |

STATE OF TEXAS
CALEB M. CHANCE
98401
LICENSED PROFESSIONAL ENGINEER
3/20/24


PAPE-DAWSON ENGINEERS
SAN ANTONIO I AUSTIN I HOUSTON I FORT WORTH I DALLAS
2000 NW LOOP 410 I SAN ANTONIO, TX 78213 I 210.375.9000
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028800


# SHAVANO HIGHLANDS UNIT 7
SAN ANTONIO, TEXAS

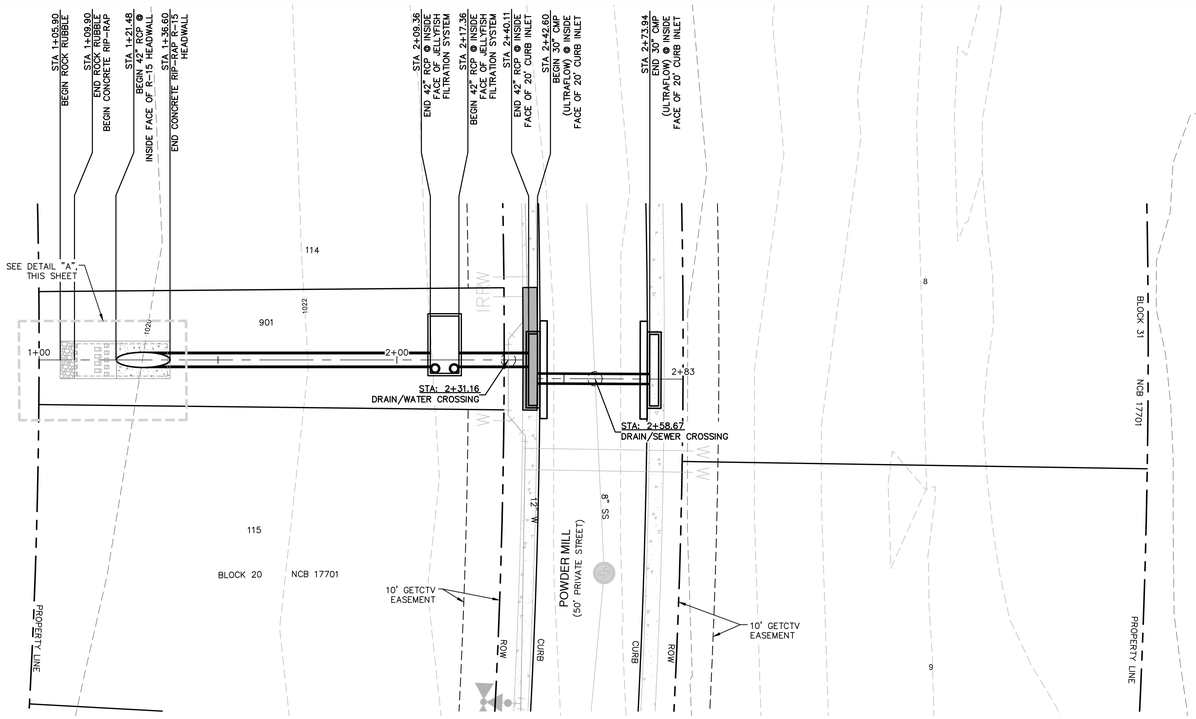
DRAIN B - PLAN & PROFILE
STA. 1+00.00 TO END

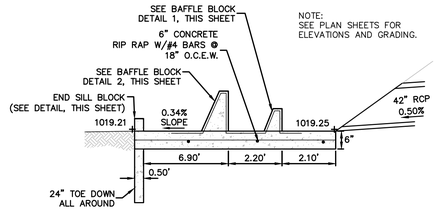
PLAT NO. 23-11800083
JOB NO. 8834-22
DATE NOVEMBER 2023
DESIGNER AW
CHECKED CC DRAWN RC
SHEET C1.02


Date: Mar 20, 2024, 2:36pm User ID: wilfarrel
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| HYDRAULIC CALCULATIONS 42" STORM DRAIN | HYDRAULIC CALCULATIONS 42" STORM DRAIN | HYDRAULIC CALCULATIONS 30" STORM DRAIN |
|---|---|---|
| STA. 1+21.48 TO 2+09.36 | STA. 2+17.36 TO 2+40.11 | STA. 2+42.60 TO 2+73.94 |
| Q25 = 62.2 CFS | Q25 = 62.2 CFS | Q25 = 31.1 CFS |
| Dn = 2.55 FT | Dn = 2.55 FT | Dn = 1.99 FT |
| Sf = 0.38% | Sf = 0.38% | Sf = 0.58% |
| S = 0.50% | S = 0.50% | S = 0.60% |
| V = 8.37 FPS | V = 8.37 FPS | V = 7.53 FPS |
| n = 0.013 | n = 0.013 | n = 0.013 |
| D = 3.50 ft | D = 3.50 ft | D = 2.50 ft |

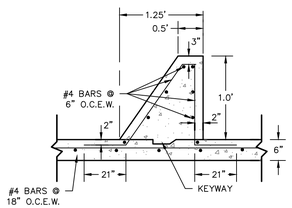



NOTE:
SEE PLAN SHEETS FOR ELEVATIONS AND GRADING.

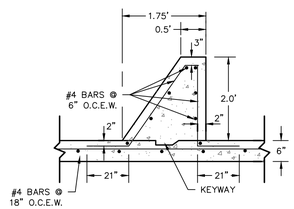
## BAFFLE BLOCKS DETAIL

NOT-TO-SCALE



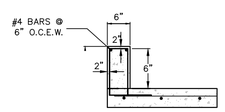

## BAFFLE BLOCK DETAIL 1

NOT-TO-SCALE




## BAFFLE BLOCK DETAIL 2

NOT-TO-SCALE

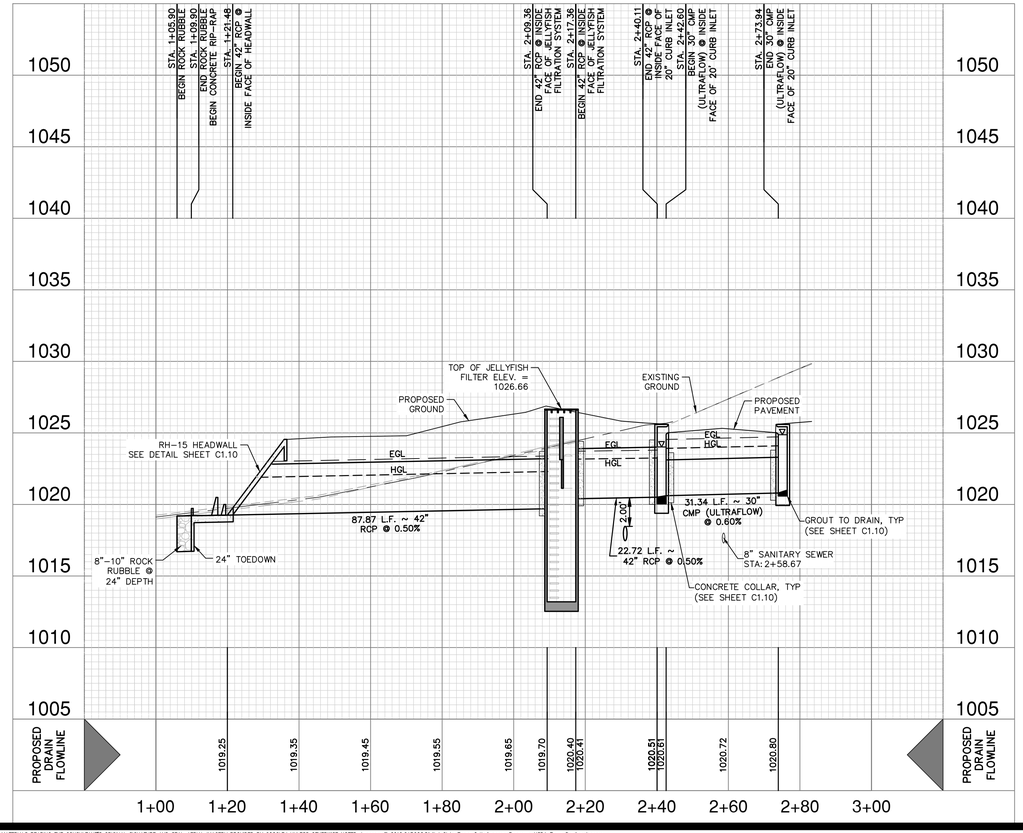



## END SILL BLOCK DETAIL

NOT-TO-SCALE

DRAIN "C"
STA. 1+00.00 TO END

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




SCALE: 1"= 20'
0' 20' 40' 60'

## DRAINAGE LEGEND

- PROJECT LIMITS
- 100 YR FLOODPLAIN
- EXISTING CONTOUR — 690 —
- PROPOSED CONTOUR — 690 —
- PROPOSED WATER — W —
- PROPOSED SEWER — SS —
- PROPOSED STORM DRAIN
- EXISTING STORM DRAIN
- FLOW ARROW

HYDRAULIC CALCULATIONS–DRAIN "C"
TOTAL $Q_{25}$ = 62.2 CFS (31.1 CFS EACH INLET)

$Q_{25}$ = 31.1 CFS

$Q_{25} = CA\sqrt{2gh}$ (ORIFICE FLOW EQN.)

A = L(0.52), h = 0.57, g = 32.2, c = 0.67

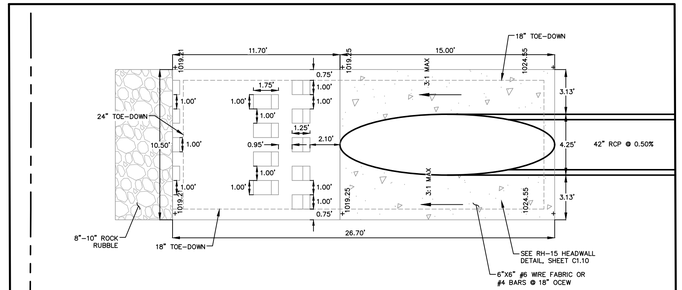
$$L = \frac{31.1\ CFS}{(0.67)\ (0.52)\sqrt{2}\ (32.2)\ (0.57)}$$

L = 14.73 FT USE 1 ~ 20 FT CURB INLET EACH SIDE

CHECK WITH WEIR FORMULA

$$h = \left(\frac{Q}{(CL)}\right)^{2/3} = \left(\frac{31.1}{(3.087)\ (20)}\right)^{2/3} = 0.63\ FT.$$

h = 0.63 < 0.79 OK




## DETAIL "A"

SCALE: 1" = 5'

## DRAINAGE & GRADING NOTES:

1. THE CONTRACTOR WILL BE RESPONSIBLE FOR DETERMINING EXACT LOCATION OF ALL UTILITIES AND DRAINAGE STRUCTURES WHETHER SHOWN ON THE PLANS OR NOT. THE CONTRACTOR SHALL UNCOVER EXISTING UTILITIES PRIOR TO CONSTRUCTION TO VERIFY SIZE, GRADE, AND LOCATION. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY OF ANY DEVIATIONS FROM PLANS PRIOR TO BEGINNING CONSTRUCTION. ANY DAMAGE TO EXISTING UTILITIES, WHETHER SHOWN ON THE PLANS OR NOT, SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO REPAIR, AT HIS EXPENSE.
2. ALL CONCRETE FOR TXDOT DRAINAGE STRUCTURES SHALL MEET TXDOT SPECIFICATIONS. ALL OTHER CONCRETE SHALL BE CLASS "A" 3000 PSI CYLINDER STRENGTH IN 28 DAYS.
3. REFERENCE DRAINAGE DETAILS FOR PIPE TRENCH DETAILS, BOX CULVERT, HEADWALL, AND WINGWALL CONSTRUCTION DETAILS, AND BOX CULVERT BEDDING AND EXCAVATION LIMITS.
4. CONTRACTOR SHALL GROUT ALL CURB INLETS AND JUNCTION BOXES TO PROVIDE FOR POSITIVE DRAINAGE.

## 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 ANY AVAILABLE GEOTECHNICAL INFORMATION AND THE ANTICIPATED INSTALLATION SITES 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!!

CONTRACTOR SHALL BE REQUIRED TO LOCATE ALL PUBLIC OR PRIVATE UTILITIES INCLUDING BUT NOT LIMITING TO: WATER, SEWER, TELEPHONE AND FIBER OPTIC LINES, SITE LIGHTING ELECTRIC, SECONDARY ELECTRIC, PRIMARY ELECTRICAL DUCTBANKS, 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 CONTRACTOR'S SOLE EXPENSE WHETHER THE UTILITY IS SHOWN ON THESE PLANS OR NOT.

| NO. | REVISION | DATE |
|---|---|---|
| | | |

STATE OF TEXAS
CALEB M. CHANCE
98401
LICENSED PROFESSIONAL ENGINEER
12/8/23


PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800


# SHAVANO HIGHLANDS UNIT 7

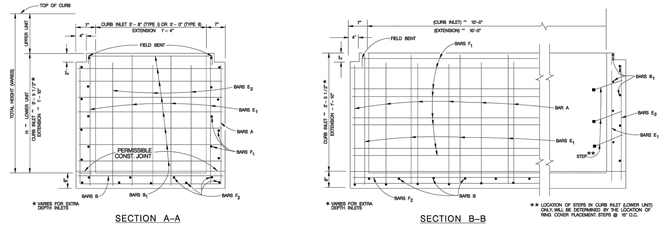
SAN ANTONIO, TEXAS

DRAIN C - PLAN & PROFILE
STA. 1+00.00 TO END

PLAT NO. 23-11800083
JOB NO. 8834-22
DATE NOVEMBER 2023
DESIGNER AW
CHECKED CC DRAWN RC
SHEET C1.03


Date: Dec 08, 2023, 11:56am User ID: vallarreal
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SECTION A–A




SECTION B–B

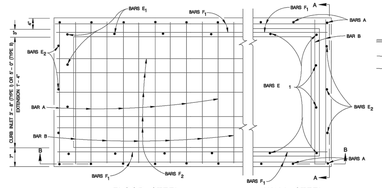
## REINFORCING STEEL

| LOWER UNIT 10'X 5'– 0" (TYPE I) | | | | |
|---|---|---|---|---|
| BAR | NO. | SIZE | SPAC. | LENGTH |
| A | 12 | #4 | 12" | VARIES |
| B | 11 | #4 | 12" | 6'-6" |
| $B_1$ | VARIES | #4 | 12" | 6'-6" |
| $E_1$ | 20 | #4 | 16"± | VARIES |
| $E_2$ | 6 | #4 | 16"± | VARIES |
| $F_1$ | VARIES | #4 | 12"± | 10'-10" |
| $F_2$ | 9 | #4 | — | 10'-10" |

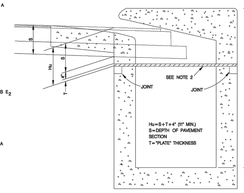
| LOWER UNIT 10'X 5'– 0" (TYPE II) | | | | |
|---|---|---|---|---|
| BAR | NO. | SIZE | SPAC. | LENGTH |
| A | 12 | #4 | 12" | VARIES |
| B | 11 | #4 | 12" | 6'-6" |
| $B_1$ | VARIES | #4 | 12" | 6'-6" |
| $F_1$ | 22 | #4 | 16"± | VARIES |
| $E_2$ | 8 | #4 | 16"± | VARIES |
| $F_1$ | VARIES | #4 | 12"± | 10'-10" |
| $F_2$ | 11 | #4 | — | 10'-10" |

## GENERAL NOTES

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



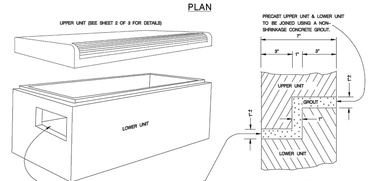

FLOOR STEEL WALL STEEL




PHASE CONSTRUCTION

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

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

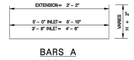



PLAN

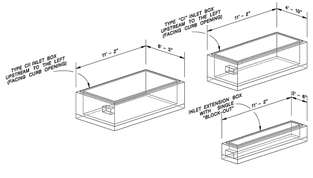



JOINT DETAIL

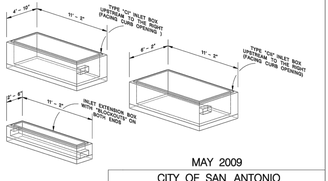
WHEN USING PRECAST UPPER UNIT, THIS SPACE IS FOR MAKING MINOR HORIZONTAL AND VERTICAL ADJUSTMENTS TO ACCOMODATE A FIT BETWEEN THE UPPER AND LOWER UNIT THAT ALLOWS FOR A MATCH LINE AND GRADE BETWEEN THE ROADWAY CURB AND THE UPPER UNIT OF THE INLET.




BARS A (LOWER UNIT)




CONCRETE INLET BOX CONFIGURATIONS (LOWER UNITS)



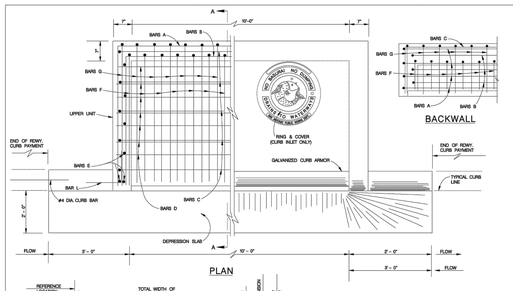

CONCRETE INLET BOX CONFIGURATIONS (UPPER UNITS)

MAY 2009

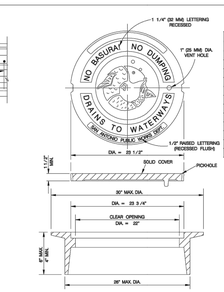
CITY OF SAN ANTONIO
CAPITAL IMPROVEMENTS MANAGEMENT SERVICES DEPARTMENT

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

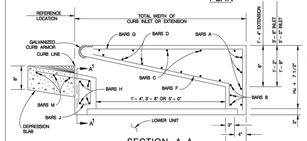
___% SUBMITTAL PROJECT NO.:_____ DATE:_____
DRAWN BY:V. VASQUEZ DSGN. BY:L.E. MALTOS, P.E. CHKD. BY:S.S. HOSSEINI, P.E. SHEET NO.:___OF



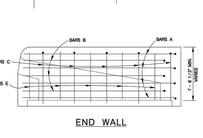

PLAN



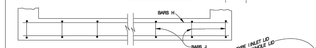

BACKWALL



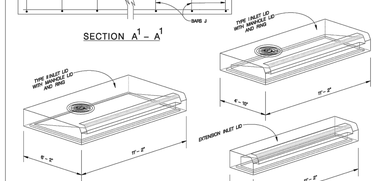

SECTION A–A



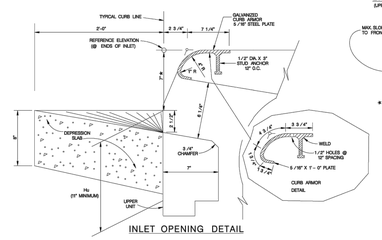

END WALL




SECTION A1 – A1




CONCRETE INLET LID CONFIGURATIONS (UPPER UNITS)




INLET OPENING DETAIL




MANHOLE LID & RING DETAIL (ITEM 409)

NOTES FOR MANHOLE LID AND RING

1. FOR LID DESIGN OUTSIDE OF CITY OF SAN ANTONIO, DELETE "SAN ANTONIO PUBLIC WORKS DEPT.".
2. CASTING NUMBER AND MANUFACTURER'S I.D. ON LID AND RING.
3. LOAD BEARING CAPABILITY OF 16-20 MINIMUM.
4. THE LOAD BEARING SURFACES SHALL BE MACHINE GROUND.
5. THE COMBINED WEIGHT OF THE MANHOLE RING AND COVER MUST BE AT LEAST 350 LBS.

SEE SHEET 1 OF 3 FOR GENERAL NOTES.

## REINFORCING STEEL (FOR Hu=11")

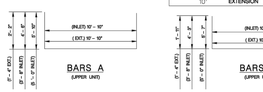
| UPPER UNIT 10' X 2'-6" (TYPE I) | | | | | |
|---|---|---|---|---|---|
| BAR | NO. | SIZE | SPAC. | LENGTH | WEIGHT |
| A | 6 | #4 | —— | 10'-10" | 65 |
| B | 3 | #4 | —— | 10'-10" | 33 |
| C | 5 | #4 | 11" | 10'-0" | 42 |
| D | 11 | #4 | 6" | 10'-10" | 80 |
| E | 16 | #4 | 11" | 1'-2" | 13 |
| F | 21 | #5 | 6" | 2'-6" | 147 |
| G | 22 | #6 | 6" | 5'-6" | 187 |
| H | 4 | #4 | —— | 10'-10" | 29 |
| J | 10 | #4 | —— | 2'-6" | 25 |
| L | 4 | #4 | —— | 2'-0" | 5 |
| M | 5 | #4 | —— | 14'-8" | 39 |
| TOTAL WEIGHT | | | | | 620 LBS. |

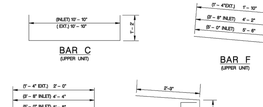
| UPPER UNIT 10' X 5'-0" (TYPE II) | | | | | |
|---|---|---|---|---|---|
| BAR | NO. | SIZE | SPAC. | LENGTH | WEIGHT |
| A | 4 | #4 | —— | 20'-6" | 60 |
| B | 3 | #4 | —— | 19'-10" | 43 |
| C | 7 | #4 | 11" | 19'-0" | 92 |
| D | 11 | #4 | 6" | 10'-10" | 80 |
| E | 16 | #4 | 11" | 1'-2" | 13 |
| F | 21 | #5 | 6" | 5'-6" | 179 |
| G | 22 | #6 | 6" | 7'-0" | 231 |
| H | 4 | #4 | —— | 10'-10" | 29 |
| J | 10 | #4 | —— | 2'-6" | 25 |
| L | 4 | #4 | —— | 2'-0" | 5 |
| M | 5 | #4 | —— | 14'-8" | 39 |
| TOTAL WEIGHT | | | | | 759 LBS. |

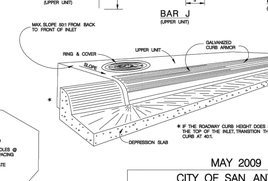
## CLASS "A" CONCRETE QUANTITIES (FOR Hu = 11")

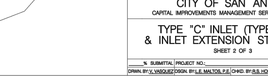
| DEPRESSION SLAB | C.Y. |
|---|---|
| 10' INLET | 0.7 |
| 10' EXTENSION | 0.7 |

| UPPER UNIT (ONLY) | C.Y. |
|---|---|
| 10' X 2'-6" CURB INLET | 1.9 |
| 10' X 5'-0" CURB INLET | 2.7 |
| 10' EXTENSION | 1.0 |



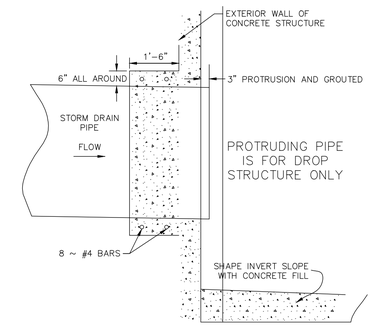



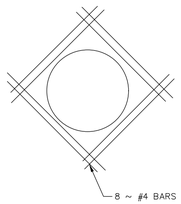

MAY 2009

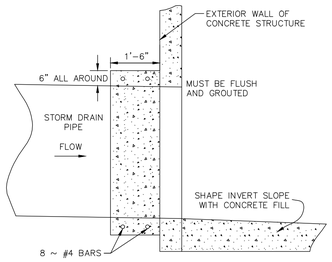
CITY OF SAN ANTONIO
CAPITAL IMPROVEMENTS MANAGEMENT SERVICES DEPARTMENT

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

___% SUBMITTAL PROJECT NO.:_____ DATE:_____
DRAWN BY:V. VASQUEZ DSGN. BY:L.E. MALTOS, P.E. CHKD. BY:S.S. HOSSEINI, P.E. SHEET NO.:___OF




PIPE FLUSH WITH INVERT

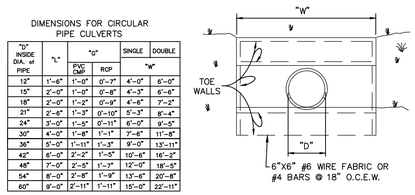
NOTES:
1. CONCRETE FOR STRUCTURE SHALL BE CLASS "A," 3,000 P.S.I. AT 28 DAYS.
2. ALL EXPOSED EDGES SHALL BE CHAMFERED 3/4".
3. REINFORCING STEEL SHALL BE NEW BILLET STEEL, INTERMEDIATE GRADE, ASTM. A-15. THE DEFORMATION SHALL CONFORM TO ASTM. A-305.
4. ALL DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS.
5. ALL BARS INTERCEPTING MANHOLE OPENING AND REINFORCED CONCRETE PIPE SHALL BE FIELD-CUT.
6. WHERE LAPPING OF BARS IS REQUIRED, A MINIMUM LAP OF 33 DIAMETERS SHALL BE USED.
7. INVERT OF JUNCTION BOX TO BE SHAPED WITH CONCRETE FILL (3,000 P.S.I. MIN.) TO EFFECT DRAINAGE TO OUTLET PIPE. COST SUBSIDIARY TO CLASS "A" CONCRETE (JUNCTION BOXES).

## CONCRETE COLLAR DETAIL

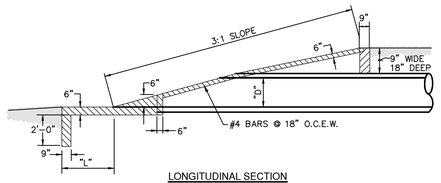
NOT-TO-SCALE
PROVIDE AT CONNECTION TO ALL STRUCTURES

DIMENSIONS FOR CIRCULAR PIPE CULVERTS

| "D" INSIDE DIA. of PIPE | "L" | "C" | | SINGLE | DOUBLE |
|---|---|---|---|---|---|
| | | PVC CMP | RCP | "W" | |
| 12" | 1'–6" | 1'–0" | 0'–7" | 4'–0" | 6'–0" |
| 15" | 2'–0" | 1'–0" | 0'–8" | 4'–3" | 6'–6" |
| 18" | 2'–0" | 1'–2" | 0'–9" | 4'–6" | 7'–2" |
| 21" | 2'–6" | 1'–3" | 0'–10" | 5'–3" | 8'–4" |
| 24" | 3'–0" | 1'–5" | 0'–11" | 6'–0" | 9'–5" |
| 30" | 4'–0" | 1'–8" | 1'–1" | 7'–6" | 11'–8" |
| 36" | 5'–0" | 1'–11" | 1'–3" | 9'–0" | 13'–11" |
| 42" | 6'–0" | 2'–2" | 1'–5" | 10'–6" | 16'–2" |
| 48" | 7'–0" | 2'–5" | 1'–7" | 12'–0" | 18'–5" |
| 54" | 8'–0" | 2'–8" | 1'–9" | 13'–6" | 20'–8" |
| 60" | 9'–0" | 2'–11" | 1'–11" | 15'–0" | 22'–11" |



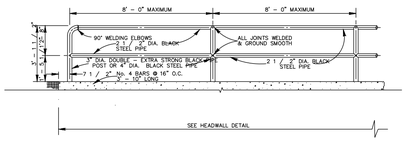

SINGLE CIRCULAR PIPE CULVERTS



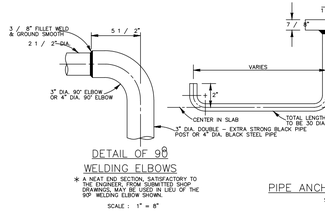

LONGITUDINAL SECTION

## RH-15 HEADWALL DETAIL

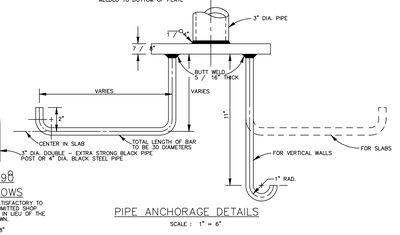
NOT-TO-SCALE




PIPE RAILING SECTION
SCALE : 1" = 4'




DETAIL OF 90° WELDING ELBOWS
* A NEAT END SECTION, SATISFACTORY TO THE ENGINEER, FROM SUBMITTED SHOP DRAWINGS, MAY BE USED IN LIEU OF THE 90° WELDING ELBOW SHOWN.
SCALE : 1" = 8"




PIPE ANCHORAGE DETAILS
SCALE : 1" = 4"

## HANDRAIL PIPE DETAIL – (DRAIN "A")

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

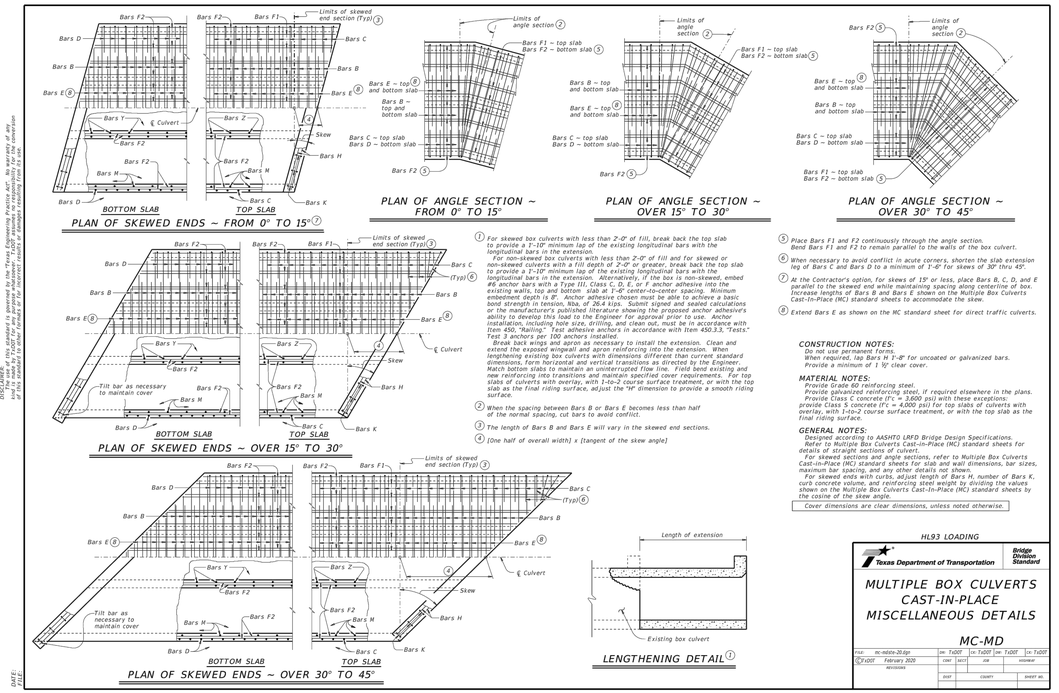
NO. REVISION DATE

STATE OF TEXAS
CALEB M. CHANCE
LICENSED
98401
PROFESSIONAL ENGINEER
3/9/23

SHAVANO HIGHLANDS UNIT 7
SAN ANTONIO, TEXAS
DRAINAGE DETAILS

PLAT NO. 23-11800083
JOB NO. 8834-22
DATE DECEMBER 2021
DESIGNER AW
CHECKED CC DRAWN RC
SHEET C1.10

Date: Mar 09, 2023, 4:35pm User ID: vvillarreal
File: P:\88\34\22\Design\Civil\DR07183422.dwg
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1. For skewed box culverts with less than 2'-0" of fill, break back the top slab to provide a 1'-10" minimum lap of the existing longitudinal bars with the longitudinal bars in the extension.
   For non-skewed box culverts with less than 2'-0" of fill and for skewed or non-skewed culverts with a fill depth of 2'-0" or greater, break back the top slab to provide a 1'-10" minimum lap of the existing longitudinal bars with the longitudinal bars in the extension. Alternatively, for the Fill Height Method, embed #6 anchor bars with a Type III, Class C, D, E, or F anchor adhesive into the existing walls, top and bottom slab at 1'-6" center-to-center spacing. Minimum embedment depth is 8". Anchor adhesive chosen must be able to achieve a basic bond strength in tension, $N_{ba}$, of 26.4 kips. Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing." Test adhesive anchors in accordance with Item 450.3.3, "Tests." Test 3 anchors per 100 anchors installed.
   Break back wings and apron as necessary to install the extension. Clean and extend the exposed wingwall and apron reinforcing into the extension. When lengthening existing box culverts with dimensions different than current standard dimensions, form horizontal and vertical transitions as directed by the Engineer. Match bottom slabs to maintain an uninterrupted flow line. Field bend existing and extension bars as necessary to maintain cover. When lengthening existing box top slabs of culverts with overlays, with 1-to-2 course surface treatment, or with the top slab as the final riding surface, adjust the "H" dimension to provide a smooth riding surface.
2. When the spacing between Bars B or Bars E becomes less than half of the normal spacing, cut bars to avoid conflict.
3. The length of Bars B and Bars E will vary in the skewed end sections.
4. [one half of overall width] x [tangent of the skew angle]
5. Place Bars F1 and F2 continuously through the angle section. Bend Bars F1 and F2 to remain parallel to the walls of the box culvert.
6. When necessary to avoid conflict in acute corners, shorten the slab extension leg of Bars C and Bars D to a minimum of 1'-8" for skews of 30° thru 45°.
7. At the Contractor's option, for skews of 15° or less, place Bars B, C, D, and E parallel to the skewed end while maintaining spacing along centerline of box. Increase lengths of Bars B and Bars E shown on the Multiple Box Culverts Cast-In-Place (MC) standard sheets to accommodate the skew.
8. Extend Bars E as shown on the MC standard sheet for direct traffic culverts.

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

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

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

Cover dimensions are clear dimensions, unless noted otherwise.

HL93 LOADING

Texas Department of Transportation — Bridge Division Standard

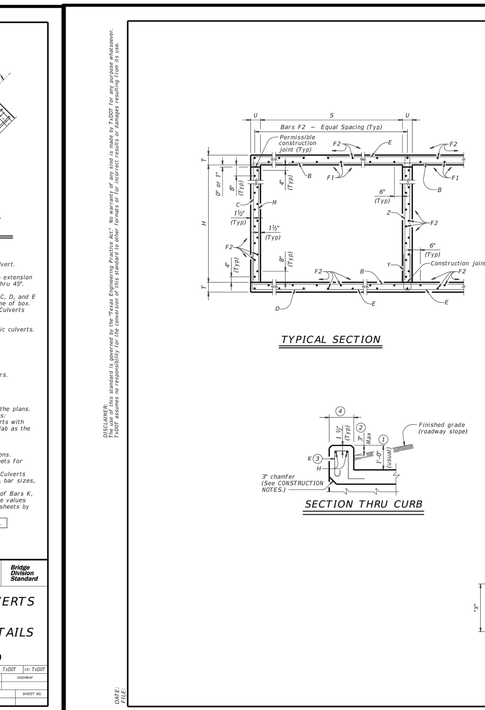
# MULTIPLE BOX CULVERTS CAST-IN-PLACE MISCELLANEOUS DETAILS

## MC-MD

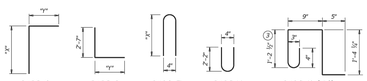
| FILE: mc-mdde-20.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
| ©TxDOT February 2020 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | | | | |
| | DIST | COUNTY | | SHEET NO. |

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DATE:
FILE:




| TABLE OF BAR DIMENSIONS | | |
|---|---|---|
| H | "A" | "Y" |
| 2'-0" | 2'-6 ½" | 3'-8 ½" |
| 3'-0" | 3'-6 ½" | 3'-8 ½" |
| 4'-0" | 4'-6 ½" | 3'-8 ½" |
| 5'-0" | 5'-6 ½" | 3'-8 ½" |




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

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

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

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

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

**MATERIAL NOTES:**
Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
Provide Class C concrete ($f'_c$ = 3,600 psi) for culvert barrel and curb.
Provide bar laps, where required, as follows:
- Uncoated or galvanized – #4 = 1'-8" Min
- Uncoated or galvanized – #5 = 2'-1" Min
- Uncoated or galvanized – #6 = 2'-6" Min

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

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

HL93 LOADING — SHEET 1 OF 2

Texas Department of Transportation — Bridge Division Standard

# MULTIPLE BOX CULVERTS CAST-IN-PLACE

## 5'-0" SPAN 2' TO 23' FILL

## MC-5-23

| FILE: CD-MCS23-20.dgn | DN: TBE | CK: BWP | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
| ©TxDOT February 2020 | CONT | SECT | JOB | HIGHWAY |
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FILE:

| TABLE OF DIMENSIONS AND REINFORCING STEEL (Wings for one structure end) | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dimensions | | | | | Variable Reinforcing | | | | Estimated Quantities per ft of wing (2-wings) | | Estimated Quantities per ft of Toewall (1-toewall) | | | | | | | | | | |
| Maximum Wingwall Height "Hw" | W | X | Y | Z | Bars J1 | | Bars J2 | | Reinf (Lb/Ft) | Conc (CY/Ft) | Reinf (Lb/Ft) | Conc (CY/Ft) | | | | | | | | | |
| | | | | | Size | Spa | Size | Spa | | | | | | | | | | | | | |
| 2'-6" | 2'-10" | 10" | 1'-0" | 7" | #4 | 1'-0" | #4 | 1'-0" | 48.64 | 0.406 | 6.85 | 0.071 | | | | | | | | | |
| 2'-9" | 2'-10" | 10" | 1'-0" | 7" | #4 | 1'-0" | #4 | 1'-0" | 49.31 | 0.424 | 6.85 | 0.071 | | | | | | | | | |
| 3'-0" | 2'-10" | 10" | 1'-0" | 7" | #4 | 1'-0" | #4 | 1'-0" | 49.98 | 0.444 | 6.85 | 0.071 | | | | | | | | | |
| 3'-3" | 2'-10" | 10" | 1'-0" | 7" | #4 | 1'-0" | #4 | 1'-0" | 53.32 | 0.462 | 6.85 | 0.071 | | | | | | | | | |
| 3'-6" | 2'-10" | 10" | 1'-0" | 7" | #4 | 1'-0" | #4 | 1'-0" | 53.98 | 0.480 | 6.85 | 0.071 | | | | | | | | | |
| 3'-9" | 3'-2" | 1'-2" | 1'-0" | 7" | #4 | 1'-0" | #4 | 1'-0" | 55.77 | 0.532 | 6.85 | 0.071 | | | | | | | | | |
| 4'-0" | 3'-2" | 1'-2" | 1'-0" | 7" | #4 | 1'-0" | #4 | 1'-0" | 59.77 | 0.568 | 6.85 | 0.071 | | | | | | | | | |
| 5'-0" | 3'-9" | 1'-7" | 1'-2" | 7" | #4 | 1'-0" | #4 | 1'-0" | 63.45 | 0.632 | 6.96 | 0.075 | | | | | | | | | |
| 5'-6" | 3'-9" | 1'-7" | 1'-2" | 7" | #4 | 1'-0" | #4 | 1'-0" | 67.46 | 0.668 | 6.96 | 0.075 | | | | | | | | | |
| 6'-0" | 4'-4" | 2'-0" | 1'-4" | 7" | #5 | 1'-0" | #5 | 1'-0" | 80.67 | 0.730 | 7.07 | 0.078 | | | | | | | | | |
| 6'-6" | 4'-4" | 2'-0" | 1'-4" | 7" | #5 | 1'-0" | #5 | 1'-0" | 85.05 | 0.768 | 7.07 | 0.078 | | | | | | | | | |
| 7'-0" | 5'-0" | 2'-3" | 1'-9" | 8" | #5 | 1'-0" | #5 | 1'-0" | 92.15 | 0.864 | 8.07 | 0.093 | | | | | | | | | |
| 7'-6" | 5'-0" | 2'-3" | 1'-9" | 8" | #5 | 1'-0" | #5 | 1'-0" | 96.54 | 0.902 | 8.07 | 0.093 | | | | | | | | | |
| 8'-0" | 5'-6" | 2'-8" | 1'-10" | 8" | #5 | 6" | #5 | 6" | 139.04 | 0.962 | 8.13 | 0.095 | | | | | | | | | |
| 8'-6" | 5'-6" | 2'-8" | 1'-10" | 8" | #5 | 6" | #5 | 6" | 144.47 | 1.000 | 8.13 | 0.095 | | | | | | | | | |
| 9'-6" | 6'-0" | 2'-10" | 2'-2" | 9" | #5 | 6" | #5 | 6" | 156.93 | 1.136 | 8.41 | 0.110 | | | | | | | | | |
| 10'-6" | 6'-5" | 3'-0" | 2'-5" | 9" | #6 | 6" | #5 | 6" | 196.27 | 1.234 | 8.57 | 0.117 | | | | | | | | | |
| 11'-6" | 7'-2" | 3'-6" | 2'-8" | 11" | #6 | 6" | #6 | 6" | 230.13 | 1.438 | 9.52 | 0.140 | | | | | | | | | |
| 12'-6" | 7'-8" | 3'-8" | 2'-11" | 1'-0" | #7 | 6" | #6 | 6" | 283.41 | 1.592 | 9.74 | 0.157 | | | | | | | | | |
| 13'-6" | 8'-2" | 4'-0" | 3'-2" | 1'-2" | #8 | 6" | #6 | 6" | 348.72 | 1.804 | 10.02 | 0.186 | | | | | | | | | |
| 14'-6" | 8'-10" | 4'-5" | 3'-5" | 1'-4" | #9 | 6" | #6 | 6" | 432.94 | 2.046 | 10.30 | 0.218 | | | | | | | | | |
| 15'-6" | 9'-6" | 4'-10" | 3'-8" | 1'-6" | #9 | 6" | #7 | 6" | 489.52 | 2.302 | 11.24 | 0.253 | | | | | | | | | |
| 16'-0" | 9'-11" | 5'-0" | 3'-11" | 1'-7" | #9 | 6" | #7 | 6" | 503.22 | 2.448 | 11.47 | 0.279 | | | | | | | | | |

| TABLE OF WINGWALL REINFORCING (2-wings) | | | |
|---|---|---|---|
| Bar | Size | No. | Spa |
| D1 | #6 | – | 1'-0" |
| D2 | #6 | – | 1'-0" |
| E1 | #4 | – | 1'-0" |
| F | #4 | – | 1'-0" |
| G | #6 | – | 8" |
| H1 | #4 | 4 | – |
| P | #4 | – | 1'-0" |
| V | #4 | – | 1'-0" |

| TABLE OF TOEWALL REINFORCING | | | |
|---|---|---|---|
| Bar | Size | No. | Spa |
| J3 | #4 | – | 1'-0" |
| M2 | #4 | – | 1'-0" |
| E2 | #4 | – | 1'-0" |




**WING DIMENSION FORMULAS:**
(All values are in feet.)

Hw = H + T + C
Lw = (Hw) (SL) + cosine (θ) for Type PW-1
= (Hw – 1') (SL) + cosine (θ) for Type PW-2 and Hw ≥ 4'
= (Hw – 0.5') (SL) + cosine (θ) for Type PW-2 and Hw < 4'

For cast-in-place culverts:
Ltw = ((N) (S) + (N + 1) (U)) + cosine (θ)

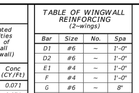
For precast culverts:
Ltw = ((N) (S) + (N – 1) (0.5')) + cosine (θ)
Total Wingwall Area (two wings – SF) =
= (2)(Hw)(Lw) for Type PW-1
= (2)(Hw)(Lw) – 6 SF for Type PW-2 and Hw ≥ 4'
= (2)(Hw)(Lw) – 1.5 SF for Type PW-2 and Hw < 4'

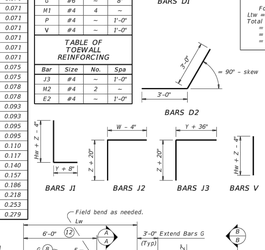
Hw = Height of wingwall
Lw = Length of wingwall
Ltw = Culvert toewall length
N = Number of culvert spans
SL = Channel slope ratio (horizontal: 1 vertical, usual value is 2:1)
θ = Culvert skew angle

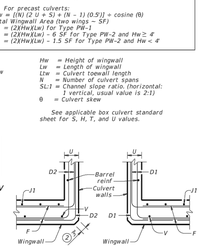
See applicable box culvert standard sheet for S, H, T, and U values.

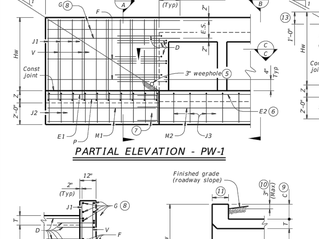
1. Skew = 0°
2. At discharge end, chamfer may be ¾" minimum.
3. For 15° skew – 1"
   For 30° skew – 2"
   For 45° skew – 3"
4. Quantities shown are for two Type PW-1 wings. Adjust concrete volume for Type PW-2 wings. To determine estimated quantities for two wings, multiply the tabulated values by Lw. Quantities shown do not include weight of Bars D.
5. Provide weepholes for Hw = 5'-0" and greater. Fill around weepholes with coarse gravel.
6. Extend Bars E2 1'-6" minimum into the wingwall footing.
7. Lap Bars H1 1'-0" minimum with Bars H2.
8. Place Bars G as shown, equally spaced at 8" maximum. Provide at least two pairs of Bars G per wing.
9. 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0", refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CH) standard sheet. Refer to the Box Culvert Rail Mounting Details (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.
10. For vehicle safety, the following requirements must be met:
    - For structures without bridge rail, construct curbs no more than 3" above finished grade.
    - For structures with bridge rail, construct curbs flush with finished grade.

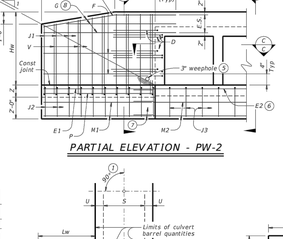
    Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
11. 1'-0" typical. 2'-3" when the Box Culvert Rail Mounting Details (RAC) standard sheet is referred to elsewhere in the plans.
12. 3'-0" for Hw < 4'.
13. 6" for Hw < 4'.

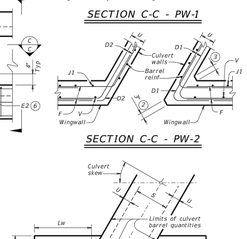



**DESIGNER NOTES:**
Type PW-1 can be used for all applications and must be used if railing is to be mounted to the wingwall.
Type PW-2 can only be used for applications without a railing mounted to the wingwall.

**MATERIAL NOTES:**
Provide Class C concrete ($f'_c$=3,600 psi).
Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.

**GENERAL NOTES:**
Designed in accordance with AASHTO LRFD Bridge Design Specifications.
Depth of toewalls for wingwalls and culverts may be reduced or eliminated when founded on solid rock, when directed by the Engineer.
See Box Culvert Supplement (BCS) standard sheet for wingwall type and additional dimensions and information.
Quantities for concrete and reinforcing steel resulting from the formulas given on this sheet are for the Contractor's information only.

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

Texas Department of Transportation — Bridge Division Standard

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

## PW

| FILE: pwsb601-20.dgn | DN: GAF | CK: CAE | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
| ©TxDOT February 2020 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | DIST | COUNTY | | SHEET NO. |

DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for errors that may appear in this standard or in any derivative thereof other than those prepared by employees of the Texas Department of Transportation. Use of this standard is at the sole risk of the user. Any use of this standard for incorrect results or damages resulting from its use.

DATE:
FILE:

| SECTION DIMENSIONS | | | | BILLS OF REINFORCING STEEL (For Box Length = 40 feet) | | | | | | | | | | | | | | | | | | | | | | | | | | | | QUANTITIES | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NUMBER OF SPANS | | | | Bars B | | | | Bars C & D | | | | | | Bars E | | | | Bars F1 ~ #4 | | | | Bars F2 ~ #4 | | | | Bars M ~ #4 | | | | Bars Y & Z ~ #4 | | | | | | Bars H 4 ~ #4 | | Bars K | | Per Foot of Barrel | | Curb | | Total | |
| | S | H | T | U | No. | Size | Spa | Length | Wt | No. | Size | Spa | Length | Wt | No. | Size | Spa | Length | Wt | No. | Size | Spa | Length | Wt | No. | Size | Spa | Length | Wt | No. | Size | Spa | Bars Y Length | Bars Y Wt | Bars Z Length | Bars Z Wt | Length | Wt | No. | Wt | Conc (CY) | Reinf (Lb) | Conc (CY) | Reinf (Lb) | Conc (CY) | Reinf (Lb) |
| 2 | 5'-0" | 2'-0" | 8" | 7" | 108 | #5 | 9" | 11'-6" | 1,295 | 108 | #5 | 9" | 6'-3" | 704 | 6'-4" | 713 | 108 | #5 | 9" | 5'-8" | 638 | 8 | 18" | 39'-9" | 212 | 38 | 18" | 39'-9" | 1,009 | 108 | 9" | 2'-0" | 144 | 54 | 9" | 4'-7" | 165 | 5'-3" | 362 | 11'-6" | 46 | 106 | 0.710 | 126.7 | 0.9 | 103 | 29.3 | 5,172 |
| 3 | 5'-0" | 2'-0" | 8" | 7" | 108 | #5 | 9" | 17'-1" | 1,924 | 108 | #5 | 9" | 6'-3" | 704 | 6'-4" | 713 | 108 | #5 | 9" | 10'-8" | 1,202 | 12 | 18" | 39'-9" | 319 | 54 | 18" | 39'-9" | 1,434 | 108 | 9" | 2'-0" | 144 | 108 | 9" | 4'-7" | 331 | 5'-3" | 379 | 17'-1" | 46 | 38 | 1.066 | 178.8 | 1.3 | 152 | 42.4 | 7,302 |
| 4 | 5'-0" | 2'-0" | 8" | 7" | 108 | #5 | 9" | 22'-8" | 2,553 | 108 | #5 | 9" | 6'-3" | 704 | 6'-4" | 713 | 108 | #5 | 9" | 15'-8" | 1,765 | 16 | 18" | 39'-9" | 425 | 70 | 18" | 39'-9" | 1,859 | 108 | 9" | 2'-0" | 144 | 162 | 9" | 4'-7" | 496 | 5'-3" | 568 | 22'-8" | 61 | 48 | 1.348 | 230.7 | 1.7 | 195 | 53.6 | 9,422 |
| 5 | 5'-0" | 2'-0" | 8" | 7" | 108 | #5 | 9" | 28'-3" | 3,182 | 108 | #5 | 9" | 6'-3" | 704 | 6'-4" | 713 | 108 | #5 | 9" | 20'-8" | 2,328 | 20 | 18" | 39'-9" | 531 | 86 | 18" | 39'-9" | 2,284 | 108 | 9" | 2'-0" | 144 | 216 | 9" | 4'-7" | 661 | 5'-3" | 758 | 28'-3" | 75 | 60 | 1.667 | 282.6 | 2.1 | 242 | 68.8 | 11,547 |
| 6 | 5'-0" | 2'-0" | 8" | 7" | 108 | #5 | 9" | 33'-10" | 3,811 | 108 | #5 | 9" | 6'-3" | 704 | 6'-4" | 713 | 108 | #5 | 9" | 25'-8" | 2,891 | 24 | 18" | 39'-9" | 637 | 102 | 18" | 39'-9" | 2,708 | 108 | 9" | 2'-0" | 144 | 270 | 9" | 4'-7" | 827 | 5'-3" | 947 | 33'-10" | 90 | 70 | 1.985 | 334.6 | 2.5 | 285 | 82.0 | 13,667 |
| 2 | 5'-0" | 3'-0" | 8" | 7" | 108 | #6 | 9" | 11'-6" | 1,865 | 108 | #5 | 9" | 7'-3" | 817 | 6'-4" | 713 | 108 | #5 | 9" | 5'-8" | 638 | 8 | 18" | 39'-9" | 212 | 44 | 18" | 39'-9" | 1,168 | 108 | 9" | 3'-0" | 216 | 54 | 9" | 4'-7" | 165 | 7'-3" | 362 | 11'-6" | 46 | 38 | 0.775 | 151.4 | 0.9 | 103 | 31.9 | 6,159 |
| 3 | 5'-0" | 3'-0" | 8" | 7" | 108 | #6 | 9" | 17'-1" | 2,771 | 108 | #5 | 9" | 7'-3" | 817 | 6'-4" | 713 | 108 | #5 | 9" | 10'-8" | 1,202 | 12 | 18" | 39'-9" | 319 | 62 | 18" | 39'-9" | 1,646 | 108 | 9" | 3'-0" | 216 | 108 | 9" | 4'-7" | 331 | 7'-3" | 523 | 17'-1" | 46 | 38 | 1.115 | 213.5 | 1.3 | 152 | 45.9 | 8,690 |
| 4 | 5'-0" | 3'-0" | 8" | 7" | 108 | #6 | 9" | 22'-8" | 3,677 | 108 | #5 | 9" | 7'-3" | 817 | 6'-4" | 713 | 108 | #5 | 9" | 15'-8" | 1,765 | 16 | 18" | 39'-9" | 425 | 80 | 18" | 39'-9" | 2,124 | 108 | 9" | 3'-0" | 216 | 162 | 9" | 4'-7" | 496 | 7'-3" | 785 | 22'-8" | 61 | 48 | 1.456 | 275.5 | 1.7 | 195 | 59.9 | 11,213 |
| 5 | 5'-0" | 3'-0" | 8" | 7" | 108 | #6 | 9" | 28'-3" | 4,583 | 108 | #5 | 9" | 7'-3" | 817 | 6'-4" | 713 | 108 | #5 | 9" | 20'-8" | 2,328 | 20 | 18" | 39'-9" | 531 | 98 | 18" | 39'-9" | 2,602 | 108 | 9" | 3'-0" | 216 | 216 | 9" | 4'-7" | 661 | 7'-3" | 1,046 | 28'-3" | 75 | 60 | 1.797 | 343.4 | 2.1 | 242 | 73.9 | 13,739 |
| 6 | 5'-0" | 3'-0" | 8" | 7" | 108 | #6 | 9" | 33'-10" | 5,488 | 108 | #5 | 9" | 7'-3" | 817 | 6'-4" | 713 | 108 | #5 | 9" | 25'-8" | 2,891 | 24 | 18" | 39'-9" | 637 | 116 | 18" | 39'-9" | 3,080 | 108 | 9" | 3'-0" | 216 | 270 | 9" | 4'-7" | 827 | 7'-3" | 1,308 | 33'-10" | 90 | 70 | 2.137 | 399.4 | 2.5 | 285 | 88.0 | 16,262 |
| 2 | 5'-0" | 4'-0" | 8" | 7" | 108 | #6 | 9" | 11'-6" | 1,865 | 108 | #5 | 9" | 8'-3" | 929 | 6'-4" | 713 | 108 | #5 | 9" | 5'-8" | 638 | 8 | 18" | 39'-9" | 212 | 44 | 18" | 39'-9" | 1,168 | 108 | 9" | 4'-0" | 289 | 54 | 9" | 4'-7" | 165 | 9"-3" | 334 | 11'-6" | 31 | 26 | 1.334 | 151.4 | 0.9 | 103 | 34.5 | 6,416 |
| 3 | 5'-0" | 4'-0" | 8" | 7" | 108 | #6 | 9" | 17'-1" | 2,771 | 108 | #5 | 9" | 8'-3" | 929 | 6'-4" | 713 | 108 | #5 | 9" | 10'-8" | 1,202 | 12 | 18" | 39'-9" | 319 | 62 | 18" | 39'-9" | 1,646 | 108 | 9" | 4'-0" | 289 | 108 | 9" | 4'-7" | 331 | 9"-3" | 667 | 17'-1" | 46 | 38 | 1.916 | 213.5 | 1.3 | 152 | 49.4 | 9,019 |
| 4 | 5'-0" | 4'-0" | 8" | 7" | 108 | #6 | 9" | 22'-8" | 3,677 | 108 | #5 | 9" | 8'-3" | 929 | 6'-4" | 713 | 108 | #5 | 9" | 15'-8" | 1,765 | 16 | 18" | 39'-9" | 425 | 80 | 18" | 39'-9" | 2,124 | 108 | 9" | 4'-0" | 289 | 162 | 9" | 4'-7" | 496 | 9"-3" | 1,001 | 22'-8" | 61 | 48 | 1.564 | 285.5 | 1.7 | 195 | 64.3 | 11,614 |
| 5 | 5'-0" | 4'-0" | 8" | 7" | 108 | #6 | 9" | 28'-3" | 4,583 | 108 | #5 | 9" | 8'-3" | 929 | 6'-4" | 713 | 108 | #5 | 9" | 20'-8" | 2,328 | 20 | 18" | 39'-9" | 531 | 98 | 18" | 39'-9" | 2,602 | 108 | 9" | 4'-0" | 289 | 216 | 9" | 4'-7" | 661 | 9"-3" | 1,335 | 28'-3" | 75 | 60 | 1.927 | 343.4 | 2.1 | 242 | 79.1 | 14,213 |
| 6 | 5'-0" | 4'-0" | 8" | 7" | 108 | #6 | 9" | 33'-10" | 5,488 | 108 | #5 | 9" | 8'-3" | 929 | 6'-4" | 713 | 108 | #5 | 9" | 25'-8" | 2,891 | 24 | 18" | 39'-9" | 637 | 116 | 18" | 39'-9" | 3,080 | 108 | 9" | 4'-0" | 289 | 270 | 9" | 4'-7" | 827 | 9"-3" | 1,668 | 33'-10" | 90 | 70 | 2.288 | 413.1 | 2.5 | 285 | 94.0 | 16,807 |
| 2 | 5'-0" | 5'-0" | 8" | 7" | 108 | #6 | 9" | 11'-6" | 1,865 | 108 | #5 | 9" | 9'-3" | 1,042 | 6'-4" | 713 | 108 | #5 | 9" | 5'-8" | 638 | 8 | 18" | 39'-9" | 212 | 50 | 18" | 39'-9" | 1,328 | 108 | 9" | 5'-0" | 361 | 54 | 9" | 4'-7" | 165 | 11"-3" | 406 | 11'-6" | 31 | 26 | 0.904 | 168.3 | 0.9 | 103 | 37.0 | 6,833 |
| 3 | 5'-0" | 5'-0" | 8" | 7" | 108 | #6 | 9" | 17'-1" | 2,771 | 108 | #5 | 9" | 9'-3" | 1,042 | 6'-4" | 713 | 108 | #5 | 9" | 10'-8" | 1,202 | 12 | 18" | 39'-9" | 319 | 70 | 18" | 39'-9" | 1,859 | 108 | 9" | 5'-0" | 361 | 108 | 9" | 4'-7" | 331 | 11"-3" | 812 | 17'-1" | 46 | 38 | 1.288 | 235.3 | 1.3 | 152 | 52.8 | 9,562 |
| 4 | 5'-0" | 5'-0" | 8" | 7" | 108 | #6 | 9" | 22'-8" | 3,677 | 108 | #5 | 9" | 9'-3" | 1,042 | 6'-4" | 713 | 108 | #5 | 9" | 15'-8" | 1,765 | 16 | 18" | 39'-9" | 425 | 90 | 18" | 39'-9" | 2,390 | 108 | 9" | 5'-0" | 361 | 162 | 9" | 4'-7" | 496 | 11"-3" | 1,217 | 22'-8" | 61 | 48 | 1.634 | 302.2 | 1.7 | 195 | 68.6 | 12,281 |
| 5 | 5'-0" | 5'-0" | 8" | 7" | 108 | #6 | 9" | 28'-3" | 4,583 | 108 | #5 | 9" | 9'-3" | 1,042 | 6'-4" | 713 | 108 | #5 | 9" | 20'-8" | 2,328 | 20 | 18" | 39'-9" | 531 | 110 | 18" | 39'-9" | 2,921 | 108 | 9" | 5'-0" | 361 | 216 | 9" | 4'-7" | 661 | 11"-3" | 1,623 | 28'-3" | 75 | 60 | 2.056 | 369.1 | 2.1 | 242 | 84.3 | 15,005 |
| 6 | 5'-0" | 5'-0" | 8" | 7" | 108 | #6 | 9" | 33'-10" | 5,488 | 108 | #5 | 9" | 9'-3" | 1,042 | 6'-4" | 713 | 108 | #5 | 9" | 25'-8" | 2,891 | 24 | 18" | 39'-9" | 637 | 130 | 18" | 39'-9" | 3,452 | 108 | 9" | 5'-0" | 361 | 270 | 9" | 4'-7" | 827 | 11"-3" | 2,029 | 33'-10" | 90 | 70 | 2.439 | 436.0 | 2.5 | 285 | 100.1 | 17,725 |

HL93 LOADING — SHEET 2 OF 2

Texas Department of Transportation — Bridge Division Standard

# MULTIPLE BOX CULVERTS CAST-IN-PLACE

## 5'-0" SPAN 2' TO 23' FILL

## MC-5-23

| FILE: CD-MCS23-20.dgn | DN: TBE | CK: BWP | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
| ©TxDOT February 2020 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | DIST | COUNTY | | SHEET NO. |

| NO. | REVISION | DATE |
|---|---|---|
| | | |

STATE OF TEXAS — CALEB M. CHANCE — 98401 — LICENSED PROFESSIONAL ENGINEER — 3/20/24

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

# SHAVANO HIGHLANDS UNIT 7

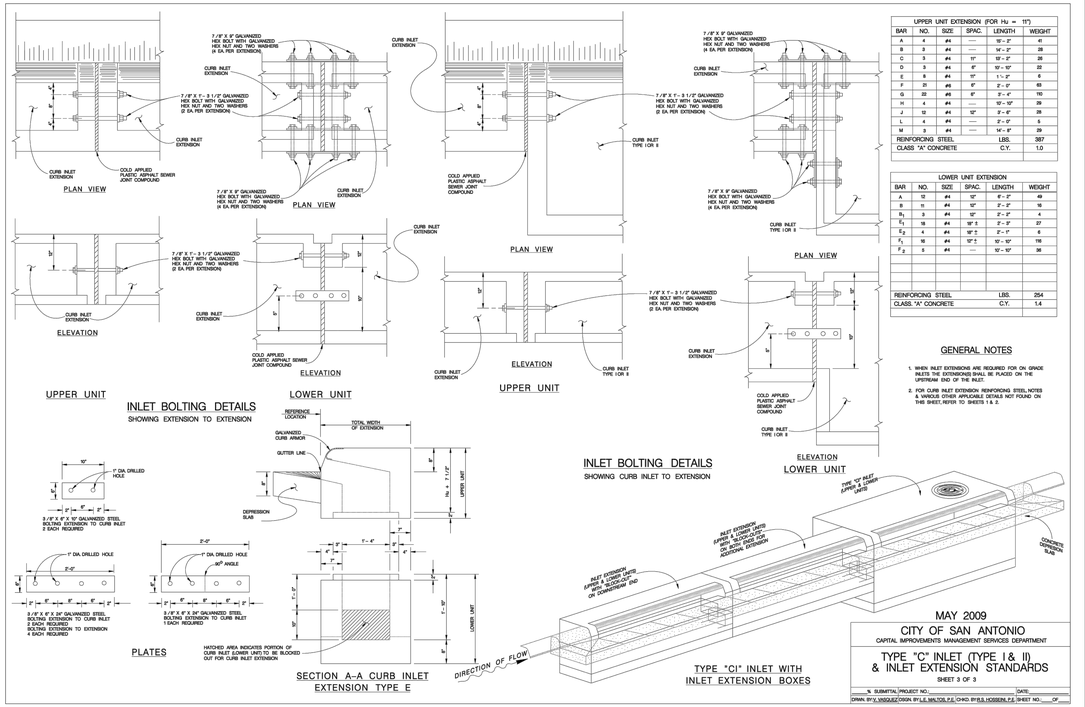
SAN ANTONIO, TEXAS

DRAINAGE DETAILS

PLAT NO. 23-11800083
JOB NO. 8834-22
DATE NOVEMBER 2023
DESIGNER AW
CHECKED CC DRAWN RC
SHEET C1.11

Date: Mar 20, 2024, 2:36pm User ID: vallorreol
File: P:\86\34\22\Design\Civil\DRG\183422.dwg

THIS DOCUMENT HAS BEEN PRODUCED FROM MATERIAL THAT WAS STORED AND/OR TRANSMITTED ELECTRONICALLY AND MAY HAVE BEEN INADVERTENTLY ALTERED. RELY ONLY ON FINAL HARDCOPY MATERIALS BEARING THE CONSULTANT'S ORIGINAL SIGNATURE A




| UPPER UNIT EXTENSION (FOR H₂ = 11") | | | | | |
|---|---|---|---|---|---|
| BAR | NO. | SIZE | SPAC. | LENGTH | WEIGHT |
| A | 4 | #4 | — | 10'-2" | 41 |
| B | 3 | #4 | — | 14'-2" | 28 |
| C | 3 | #4 | 11" | 13'-2" | 26 |
| D | 3 | #4 | 8" | 10'-10" | 22 |
| E | 8 | #4 | 11" | 1'-2" | 6 |
| F | 23 | #6 | 6" | 2'-5" | 83 |
| G | 22 | #6 | 6" | 3'-4" | 110 |
| H | 4 | #4 | — | 10'-10" | 29 |
| J | 13 | #4 | 12" | 2'-6" | 35 |
| L | 4 | #4 | — | 2'-5" | 5 |
| M | 3 | #4 | — | 14'-9" | 29 |
| REINFORCING STEEL | | | | LBS. | 397 |
| CLASS "A" CONCRETE | | | | C.Y. | 1.0 |

| LOWER UNIT EXTENSION | | | | | |
|---|---|---|---|---|---|
| BAR | NO. | SIZE | SPAC. | LENGTH | WEIGHT |
| A | 10 | #4 | 12" | 8'-2" | 46 |
| B | 5 | #4 | 12" | 8'-2" | 16 |
| $B_1$ | 3 | #4 | 12" | 2'-3" | 4 |
| $E_1$ | 16 | #4 | 10" ± | 2'-3" | 27 |
| $E_2$ | 4 | #4 | 10" ± | 2'-1" | 6 |
| $F_1$ | 16 | #4 | 10" ± | 10'-10" | 116 |
| $F_2$ | 3 | #4 | — | 10'-10" | 36 |
| REINFORCING STEEL | | | | LBS. | 254 |
| CLASS "A" CONCRETE | | | | C.Y. | 1.4 |

## GENERAL NOTES

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

MAY 2009

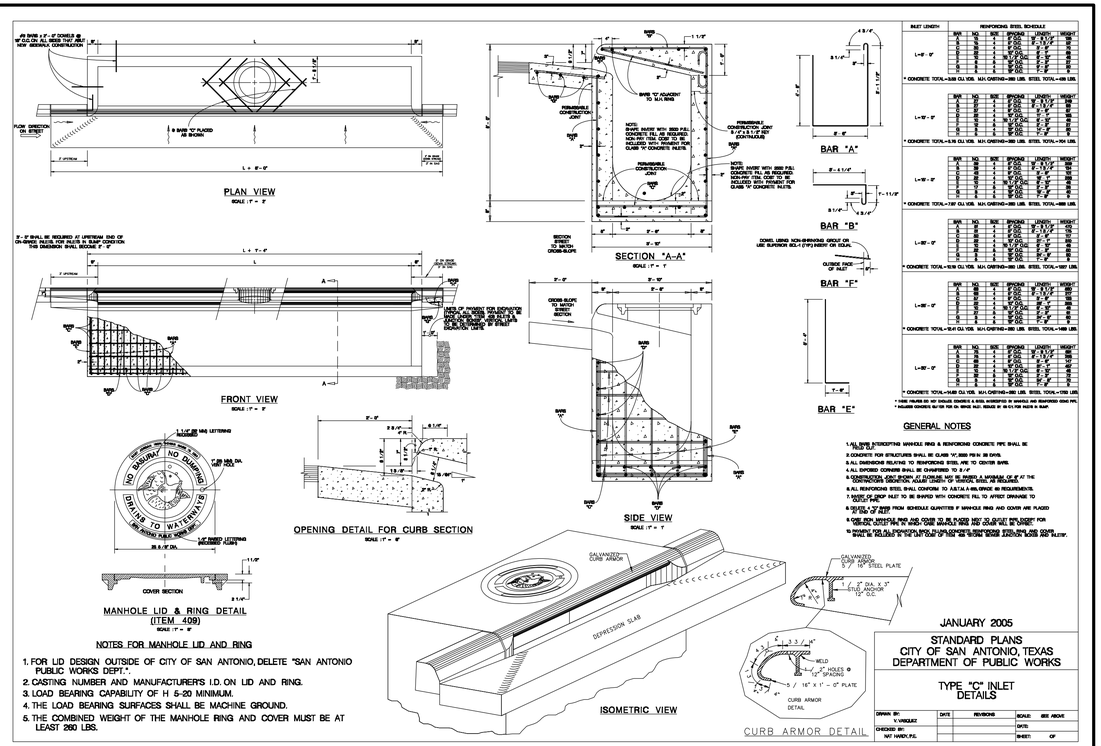
CITY OF SAN ANTONIO
CAPITAL IMPROVEMENTS MANAGEMENT SERVICES DEPARTMENT

TYPE "C" INLET (TYPE I & II)
& INLET EXTENSION STANDARDS

SHEET 3 OF 3

| # | SUBMITTAL | PROJECT NO. | DATE |
|---|---|---|---|

DRWN. BY: V. VASQUEZ | DESIGN BY: L. E. MILTOS, P.E. | CHKD. BY: R.S. HOSIERI, P.E. | SHEET NO. | OF




| INLET LENGTH | REINFORCING STEEL SCHEDULE | | | | | |
|---|---|---|---|---|---|---|
| | BAR | NO. | SIZE | SPACING | LENGTH | WEIGHT |
| L=8'-0" | A | 2 | #4 | 6" CTRS | 7'-10" | 21 |
| | B | 2 | #4 | 6" CTRS | 7'-10" | 21 |
| | C | 2 | #4 | 6" CTRS | 7'-10" | 21 |
| | D | 2 | #4 | 6" CTRS | 7'-10" | 21 |
| | E | 4 | #4 | VARIES | 2'-3" | 12 |
| | F | 4 | #4 | VARIES | 2'-3" | 12 |
| * CONCRETE TOTAL=3.68 CU. YDS. MH. CASTING=360 LBS. STEEL TOTAL=129 LBS. | | | | | | |
| L=10'-0" | A | 2 | #4 | 6" CTRS | 9'-10" | 26 |
| | B | 2 | #4 | 6" CTRS | 9'-10" | 26 |
| | C | 2 | #4 | 6" CTRS | 9'-10" | 26 |
| | D | 2 | #4 | 6" CTRS | 9'-10" | 26 |
| | E | 4 | #4 | VARIES | 2'-3" | 12 |
| | F | 4 | #4 | VARIES | 2'-3" | 12 |
| * CONCRETE TOTAL=4.76 CU. YDS. MH. CASTING=360 LBS. STEEL TOTAL=164 LBS. | | | | | | |
| L=10'-0" | A | 2 | #4 | 6" CTRS | 9'-10" | 26 |
| | B | 2 | #4 | 6" CTRS | 9'-10" | 26 |
| | C | 2 | #4 | 6" CTRS | 9'-10" | 26 |
| | D | 2 | #4 | 6" CTRS | 9'-10" | 26 |
| | E | 4 | #4 | VARIES | 2'-3" | 12 |
| | F | 4 | #4 | VARIES | 2'-3" | 12 |
| * CONCRETE TOTAL=7.97 CU. YDS. MH. CASTING=360 LBS. STEEL TOTAL=488 LBS. | | | | | | |
| L=10'-0" | A | 2 | #4 | 6" CTRS | 9'-10" | 26 |
| | B | 2 | #4 | 6" CTRS | 9'-10" | 26 |
| | C | 2 | #4 | 6" CTRS | 9'-10" | 26 |
| | D | 2 | #4 | 6" CTRS | 9'-10" | 26 |
| | E | 4 | #4 | VARIES | 2'-3" | 12 |
| | F | 4 | #4 | VARIES | 2'-3" | 12 |
| * CONCRETE TOTAL=8.18 CU. YDS. MH. CASTING=360 LBS. STEEL TOTAL=497 LBS. | | | | | | |
| L=10'-0" | A | 2 | #4 | 6" CTRS | 9'-10" | 26 |
| | B | 2 | #4 | 6" CTRS | 9'-10" | 26 |
| | C | 2 | #4 | 6" CTRS | 9'-10" | 26 |
| | D | 2 | #4 | 6" CTRS | 9'-10" | 26 |
| | E | 4 | #4 | VARIES | 2'-3" | 12 |
| | F | 4 | #4 | VARIES | 2'-3" | 12 |
| * CONCRETE TOTAL=10.41 CU. YDS. MH. CASTING=360 LBS. STEEL TOTAL=1489 LBS. | | | | | | |
| L=10'-0" | A | 2 | #4 | 6" CTRS | 9'-10" | 26 |
| | B | 2 | #4 | 6" CTRS | 9'-10" | 26 |
| | C | 2 | #4 | 6" CTRS | 9'-10" | 26 |
| | D | 2 | #4 | 6" CTRS | 9'-10" | 26 |
| | E | 4 | #4 | VARIES | 2'-3" | 12 |
| | F | 4 | #4 | VARIES | 2'-3" | 12 |
| * CONCRETE TOTAL=14.65 CU. YDS. MH. CASTING=360 LBS. STEEL TOTAL=1783 LBS. | | | | | | |

* THESE VALUES DO NOT INCLUDE CONCRETE & STEEL ASSOCIATED W/ MANHOLE AND DRAINPIPE RING PER, * INCLUDES CONCRETE BLK FOR TOE IN. BRACE BLKS. DEDUCT 9" IN CY PER INLETS IN SUMP.

## GENERAL NOTES

1. ALL BARS INTERCEPTING MANHOLE RING & REINFORCING CONCRETE PIPE SHALL BE TIED TO IT.
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 IN SIDEWALK NOT TO EXCEED A MAXIMUM OF 6'-0" AT THE DISCRETION OF THE ENGINEER OR AS SHOWN ON THE PLANS, WHICHEVER IS SMALLER.
6. ALL REINFORCING STEEL SHALL CONFORM TO A.S.T.M. A-615, GRADE 60 REQUIREMENTS.
7. WHERE AN INTAKE INLET TO BE SHAPED WITH CONCRETE FILL TO AFFECT DRAINAGE TO INTAKE OPENING.
8. INVERT & SLOPE TO BE FROM SCHEDULE QUANTITIES IF MANHOLE RING AND COVER ARE PLACED AT TIME OF POUR.
9. USE NON-SHRINK GROUT FOR ANY COVER TO BE PLACED NEXT TO CURVED OR FLARED TOP SECTIONS. GROUT SHALL BE PLACED ON THE OUTSIDE OF THE RING AND COVER.
10. MANHOLE RING AND CONCRETE RING TO HAVE MINIMUM CONCRETE BEARING AREA AND SHALL NOT BE WELDED TO THE TOP SECTION OF PIPE OR TAPERED CONCRETE SECTIONS WHERE USED.

JANUARY 2005

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

TYPE "C" INLET
DETAILS

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

## 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 H 5-20 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.

NO. | REVISION | DATE

STATE OF TEXAS
CALEB M. CHANCE
98401
LICENSED PROFESSIONAL ENGINEER
10/4/23

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

SHAVANO HIGHLANDS UNIT 7
SAN ANTONIO, TEXAS
DRAINAGE DETAILS

PLAT NO. 23-11800083
JOB NO. 8834-22
DATE DECEMBER 2021
DESIGNER AW
CHECKED CC DRAWN RC
SHEET C1.12

Date: Oct 04, 2023, 1:13pm User ID: uelloreol
File: P:\88\134122\Design\Civil\DRDT883422.dwg

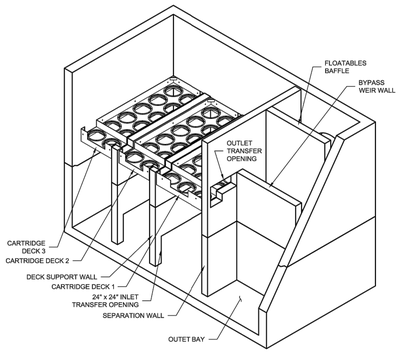
| Approved By | Date |
|---|---|
| MTH | 12/5/23 |
| Project No. | Rev. |
| 23-28973-001 | - |

KOONTZ BRYANT JOHNSON WILLIAMS
Formerly CBC Engineers

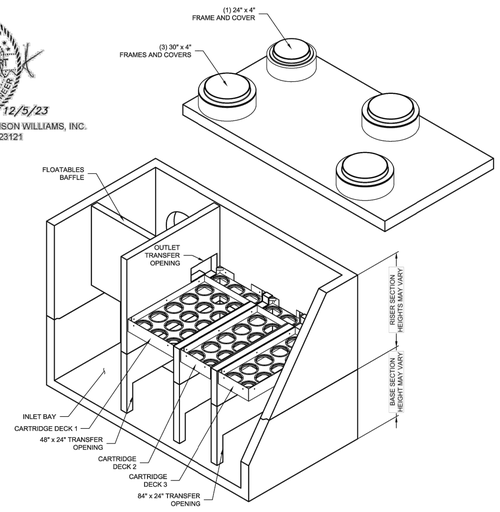
| Rev | Date | By | Description |
|---|---|---|---|
| | | | |

STATE OF TEXAS
MITCHELL T. HARDERT
104405
LICENSED
PROFESSIONAL ENGINEER
12/5/23

KOONTZ BRYANT JOHNSON WILLIAMS, INC.
TBPE FIRM NUMBER F-23121




**NW ISOMETRIC VIEW**




**SE ISOMETRIC VIEW**

ISOMETRIC VIEWS ARE REPRESENTATIONAL. SEE DETAILED CONTRACT DRAWING FOR SITE SPECIFIC DIMENSIONS

CONTECH
**CONTRACT**
DRAWING

| NO. | REVISION | BY | DATE |
|---|---|---|---|
| | | | |

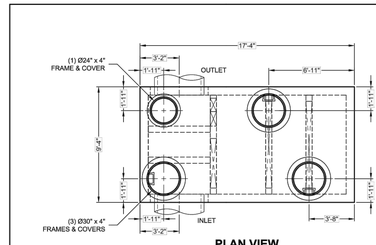
8' X 16' JELLYFISH™ - 764951-10
SHAVANO HIGHLANDS UNIT 7
SAN ANTONIO, TX
SITE DESIGNATION:

CONTECH ENGINEERED SOLUTIONS LLC
www.ContechES.com
800 Standard Parkway, Cedar Falls, IA 50613
800-338-1122 513-645-7000 513-645-7993 FAX

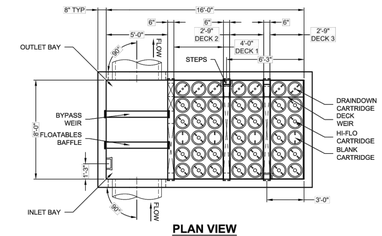
*Jellyfish Filter*

| | |
|---|---|
| DATE: | 11/28/2023 |
| DESIGNED: | RKD |
| DRAWING: | KOB |
| CHECKED: | RKD |
| APPROVED: | RKD |
| PROJECT No.: | 764951 |
| SEQUENCE No.: | 10 |
| SHEET: | 2 OF 2 |

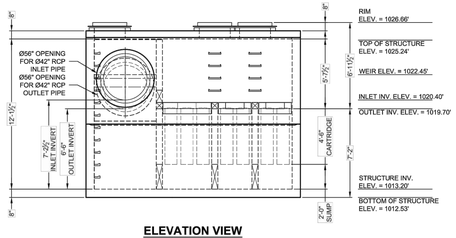

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**PLAN VIEW**




**PLAN VIEW**
(TOP SLAB NOT SHOWN FOR CLARITY)




**ELEVATION VIEW**

MATERIAL LIST - PROVIDED BY CONTECH

| COUNT | DESCRIPTION | INSTALLED BY |
|---|---|---|
| 31 | 54" HI-FLO CARTRIDGE (70 mm ORIFICE) | CONTECH |
| 7 | 54" DRAINDOWN CARTRIDGE (35 mm ORIFICE) | CONTECH |
| 4 | CARTRIDGE BLANK (NO ORIFICE) | CONTECH |
| 1 | JELLYFISH VAULT 18-CARTRIDGE DECK, STANDARD | CONTECH |
| 2 | JELLYFISH VAULT 12-CARTRIDGE DECK, STANDARD | CONTECH |
| 1 | JOINT SEALANT (BY PRECASTER) | CONTRACTOR |
| 3 | Ø30" X 4" FRAME & COVER, EJ #41600483 | CONTRACTOR |
| 1 | Ø24" X 4" FRAME & COVER, EJ #41600389 | CONTRACTOR |
| 4 PLCS. | GRADE RING/RISER | CONTRACTOR |
| 19 | STEPS | CONTECH |
| 1 | EPA LABEL | CONTECH |

SITE DESIGN DATA

| | |
|---|---|
| WATER QUALITY FLOW RATE | 6.08 CFS |
| PEAK FLOW RATE | 7.30 CFS |
| RETURN PERIOD OF PEAK FLOW | 100 YRS |

GENERAL NOTES:
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS REPRESENTATIVE, WWW.ContechES.COM
3. JELLYFISH WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
4. STRUCTURE SHALL MEET AASHTO HS-20, ASSUMING EARTH COVER OF 0' - 2', AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 LOAD RATING AND BE CAST WITH THE CONTECH LOGO.
5. STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-478 AND AASHTO LOAD FACTOR DESIGN METHOD.

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STRUCTURE
C. CONTRACTOR WILL INSTALL AND LEVEL THE STRUCTURE, SEALING THE JOINTS. LINE ENTRY AND EXIT POINTS (NON-SHRINK GROUT WITH APPROVED WATERSTOP OR FLEXIBLE BOOT)
D. WHEN ACTIVATED PRIOR TO SITE STABILIZATION, CONTRACTOR TO PROTECT CARTRIDGES FROM CONSTRUCTION-RELATED EROSION RUNOFF.
E. CARTRIDGE INSTALLATION, BY CONTECH, SHALL OCCUR ACCORDING TO THE PROVISIONS IN THE ACTIVATION CHECKLIST AND THE QUOTED SCOPE OF WORK. CONTACT CONTECH TO COORDINATE CARTRIDGE INSTALLATION WITH SITE STABILIZATION AT (800) 338-1122.

STRUCTURE WEIGHT
APPROXIMATE HEAVIEST PICK OF (5) PIECES = 53500 LBS.

CONTECH
**CONTRACT**
DRAWING

SLV
5635 / 492043
LAYOUT 7
CLASS B00


8' X 16' JELLYFISH™ - 764951-10
SHAVANO HIGHLANDS UNIT 7
SAN ANTONIO, TX
SITE DESIGNATION:

CONTECH ENGINEERED SOLUTIONS LLC
www.ContechES.com
800 Standard Parkway, Cedar Falls, IA 50613
800-338-1122 513-645-7000 513-645-7993 FAX

*Jellyfish Filter*


| | |
|---|---|
| DATE: | 11/28/2023 |
| DESIGNED: | RKD |
| DRAWING: | KOB |
| CHECKED: | RKD |
| APPROVED: | RKD |
| PROJECT No.: | 764951 |
| SEQUENCE No.: | 10 |
| SHEET: | 1 OF 2 |


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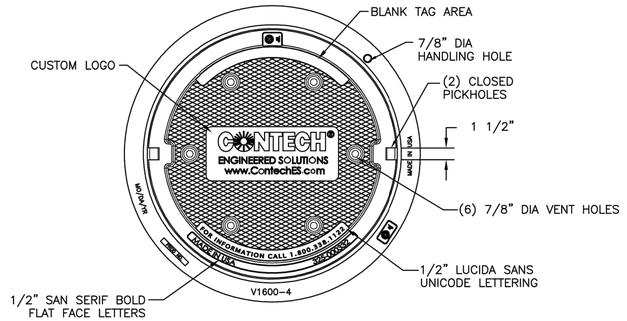

| NO. | REVISION | BY | DATE |
|---|---|---|---|
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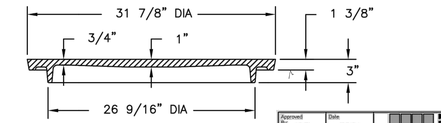
PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

STATE OF TEXAS
CALEB M. CHANCE
98401
LICENSED
PROFESSIONAL ENGINEER
12/8/23

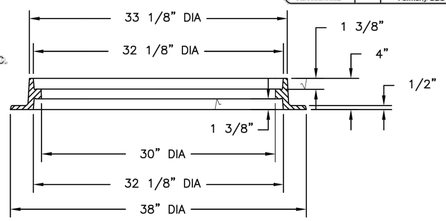
# 1810B4 V1600-4 Assembly

ej




**COVER SECTION**




**FRAME SECTION**

STATE OF TEXAS
MITCHELL T. HARDERT
104405
LICENSED
PROFESSIONAL ENGINEER
12/5/23

KOONTZ BRYANT JOHNSON WILLIAMS, INC.
TBPE FIRM NUMBER F-23121

**Product Number**
**41600483**
**Design Features**
-Materials
Cover
Gray Iron (CL35B)
Frame
Gray Iron (CL35B)

-Design Load
Heavy Duty
-Open Area
n/a
-Coating
Undipped
-√ Designates Machined Surface

**Certification**
-
- ASTM A48
-
-Country of Origin: USA

**Major Components**
00180783
41600410

**Drawing Revision**
05/09/2007 Designer: SMH
6/26/2017 Revised By: DAE

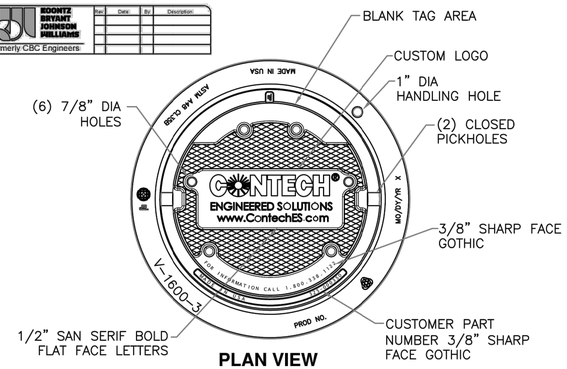
**Disclaimer**
Weights (lbs./kg) dimensions (inches/mm) and drawings provided for your guidance. We reserve the right to modify specifications without prior notice.


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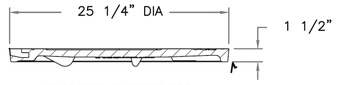

**Contact**
800 626 4653
ejco.com

# V1600-3 V1610-3 Assembly

ej



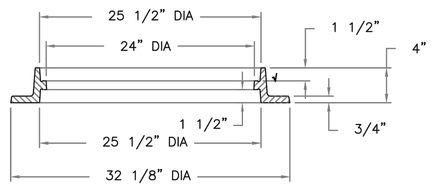

**PLAN VIEW**




**COVER SECTION**

STATE OF TEXAS
MITCHELL T. HARDERT
104405
LICENSED
PROFESSIONAL ENGINEER
12/5/23

KOONTZ BRYANT JOHNSON WILLIAMS, INC.
TBPE FIRM NUMBER F-23121




**RING SECTION**

**Product Number**
**41600389**
**Design Features**
-Materials
Frame
Gray Iron (CL35B)
Cover
Gray Iron (CL35B)

-Design Load
Heavy Duty
-Open Area
n/a
-Coating
Undipped
-√ Designates Machined Surface

**Certification**
-
- ASTM A48
-
-Country of Origin: USA

**Major Components**
41600310
41600374

**Drawing Revision**
05/02/2008 Designer: DEW
6/20/2017 Revised By: DAE

**Disclaimer**
Weights (lbs./kg) dimensions (inches/mm) and drawings provided for your guidance. We reserve the right to modify specifications without prior notice.


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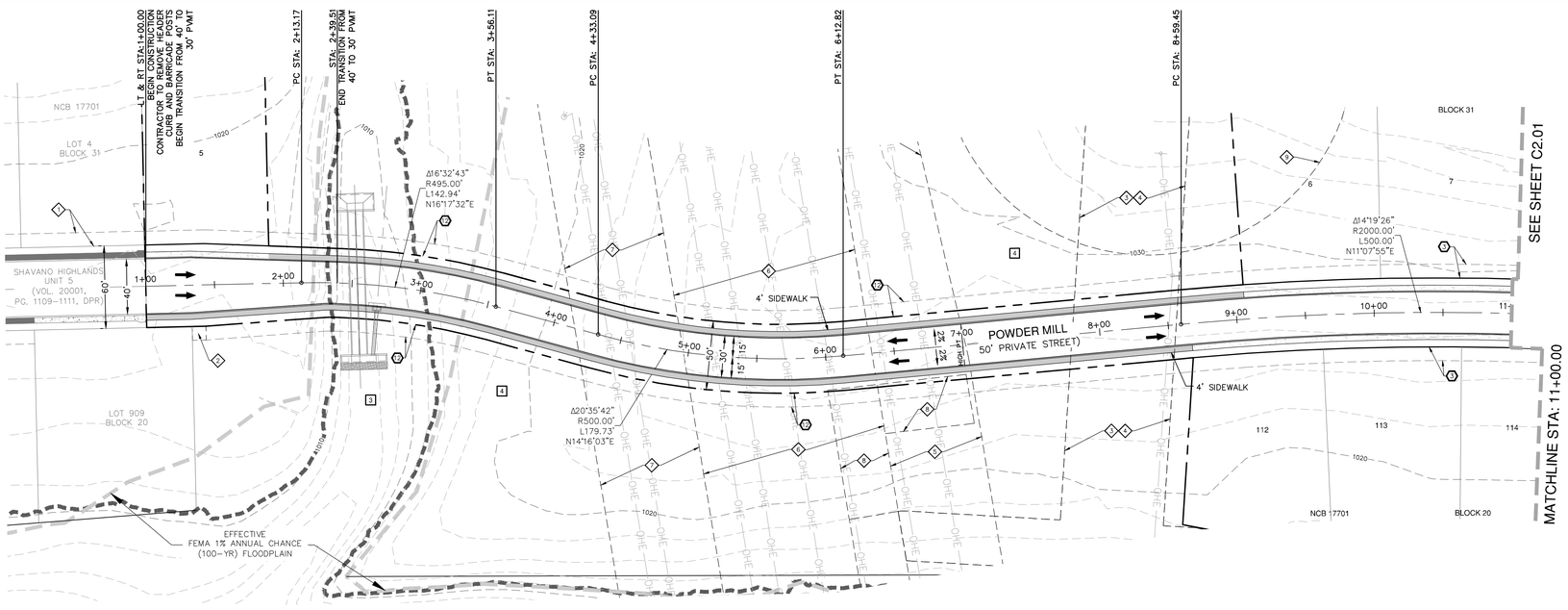

**Contact**
800 626 4653
ejco.com

SHAVANO HIGHLANDS UNIT 7
SAN ANTONIO, TEXAS
DRAINAGE DETAILS

| | |
|---|---|
| PLAT NO. | 23-11800083 |
| JOB NO. | 8834-22 |
| DATE | NOVEMBER 2023 |
| DESIGNER | AW |
| CHECKED | CC |
| DRAWN | RC |
| SHEET | C1.13 |

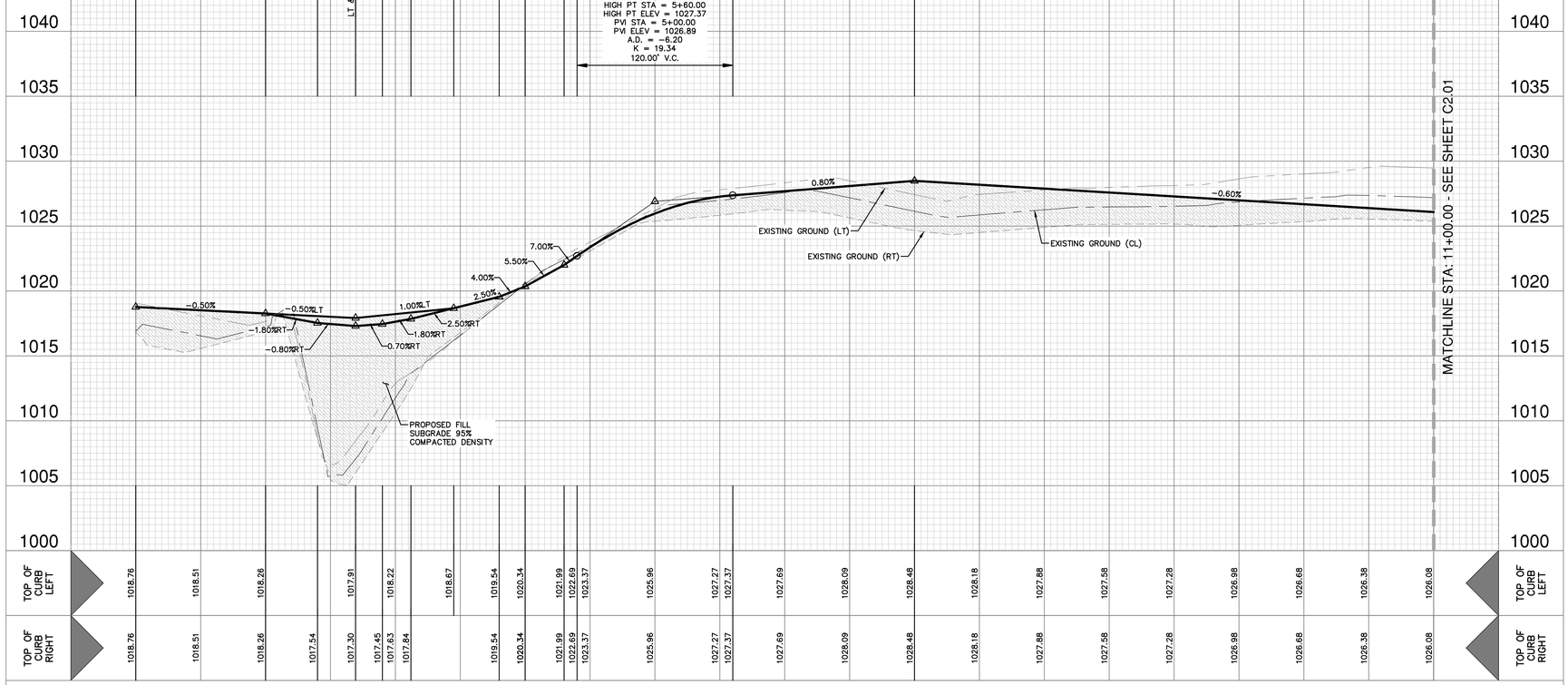

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POWDER MILL
STA. 1+00.00 TO 11+00.00

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




SCALE: 1"= 50'
0' 50' 100' 150'

## STREET LEGEND

| | |
|---|---|
| PROJECT LIMITS | |
| MAINTAIN GUTTER | |
| EXISTING CONTOUR | 970 |
| WHEELCHAIR RAMP | Ⓘ |
| CENTERLINE | CL |
| RADIUS POINT | RP |
| POINT OF CURVATURE | PC |
| POINT OF TANGENCY | PT |
| RETURN | RET |
| DRAINAGE FLOW ARROW | |
| TOP OF CURB SPOT ELEVATION | 857.30 |
| PAVEMENT ELEVATION | 857.00(P) × |
| WASHOUT CROWN SECTION | |
| SIDEWALK (HOMEOWNER'S RESPONSIBILITY) | |
| SIDEWALK (DEVELOPER'S RESPONSIBILITY) | |
| DRIVEWAY | |

## KEYED NOTES:

3. 10' GAS, ELECTRIC, TELEPHONE AND CABLE TV EASEMENT
Y1. PERMANENT VARIABLE WIDTH SANITARY SEWER EASEMENT (MIN. 16' WIDE) (OFF-LOT) (0.556 ACRE)
Y2. 10' GAS, ELECTRIC, TELEPHONE AND CABLE TV EASEMENT (OFF-LOT)(0.354 TOTAL ACRES)
Y4. VARIABLE WIDTH SANITARY SEWER EASEMENT (0.007 ACRE)
1. 10' GAS, ELECTRIC, TELEPHONE AND CABLE TV EASEMENT (VOL 20001, PG 1109-1111, DPR)
2. 10'x10' GAS, ELECTRIC, TELEPHONE AND CABLE TV EASEMENT (VOL 20001, PG 1109-1111, DPR)
5. ELECTRIC LINE RIGHT-OF-WAY AGREEMENT (VOL 16444, PG. 2154, OPR) (VOL 16464, PG. 76, OPR)
6. EASEMENT AGREEMENT VARIABLE WIDTH WATER, UTILITY, INGRESS AND TERMINATION OF ORIGINAL EASEMENT (VOL 16346, PG. 1335, OPR)
7. 65' INGRESS/EGRESS & ELECTRIC EASEMENT (VOL 1183, PG 280, OPR)
8. 135' ELECTRIC TRANSMISSION POWER EASEMENT (VOL 5655, PG 284, OPR)
9. 75' ELECTRIC EASEMENT (VOL 7191, PG 145, OPR)
10. VARIABLE WIDTH WATER & UTILITY EASEMENT (VOL. 11683, PGS. 2474-2491 OPR) (VOL. 11683, PGS. 2492-2507 OPR)
11. SECOND AMENDED AND RESTATED SANITARY CONTROL EASEMENT (DOC. NO. 20190259079, OPR)

3. UNPLATTED SALADO CREEK CONSERVATION ASSOCIATION INC (DOC# 20180095650 OPR)
4. REMAINING PORTION OF 440.2 ACRES BITTERBLUE/ROGERS WATER INTERESTS LTD (DOC #20120144729) (VOL 15613 PG 1714 DR)

## PRIVATE STREET NOTE:

THE LOT 999, BLOCK 27, NEW CITY BLOCK 17701, (**POWDER MILL**) ARE PRIVATE STREETS AND ARE ALSO DESIGNATED AS AN UNDERGROUND ELECTRIC, GAS, TELEPHONE, CABLE TV, DRAINAGE, WATER, PEDESTRIAN AND/OR SANITARY SEWER EASEMENT, THEREFORE, SUCH AREAS SHALL BE DEEMED TO HAVE BEEN DEDICATED TO THE PUBLIC FOR SUCH EASEMENTS AND PRIVATE STREETS.

## STREET NOTES:

1. CONTRACTOR SHALL MATCH EXISTING PAVEMENT AT TIE-IN. IF EXISTING PAVEMENT ELEVATION DIFFERS SIGNIFICANTLY, CONTRACTOR SHALL NOTIFY THE ENGINEER PRIOR TO CONTINUING WORK.
2. SIDEWALKS SHALL BE CONSTRUCTED 3-FT FROM THE BACK OF CURB FOR ALL LOCATIONS WHERE THE SIDEWALK IS SHOWN OFFSET. REFER TO STREET DETAIL SHEET FOR SIDEWALK AND RAMP DETAILS.
3. NO PERMANENT STRUCTURES HIGHER THAN 3 FEET, AND LOWER THAN 8 FEET ABOVE THE PAVEMENT, INCLUDING STRUCTURES, WALLS, FENCES, AND VEGETATION, SHALL BE CONSTRUCTED OR ALLOWED WITHIN THE CLEAR VISION EASEMENT. CONTRACTOR SHALL GRADE AREAS WITHIN CLEAR VISION EASEMENTS SUCH THAT THE ELEVATION WITHIN THE CLEAR VISION EASEMENT IS NOT HIGHER THAN 3 FEET ABOVE THE ADJACENT TOP OF PAVEMENT.
4. DRIVEWAYS SHOWN ON THIS PLAN ARE FOR THE SOLE PURPOSE OF INDICATING A POTENTIAL CONFLICT WITH CURB RAMP, DRAINAGE INFRASTRUCTURE, OR OTHER CONFLICT. DRIVEWAY LOCATION IS SUBJECT TO CHANGE BASED ON HOME SELECTION AND FINAL LOT DESIGN.
5. CHANGES IN THE SIDEWALK LOCATION FOR A MAXIMUM LINEAR DISTANCE OF TWO HUNDRED (200) FEET ARE PERMITTED TO BE APPROVED BY THE FIELD INSPECTOR WITHOUT AMENDING THE STREET PLAN OR UTILITY LAYOUT PER UDC SECTION 35-506 (Q)(6).
6. THE CONSTRUCTION OF SIDEWALKS ADJACENT TO ALL 900 SERIES LOTS WILL BE THE RESPONSIBILITY OF THE DEVELOPER AS SHOWN ON THE OVERALL SIGNAGE PLAN SIDEWALKS ARE NOT SHOWN ADJACENT TO ALL PRIVATE STREETS. REFER TO SHEET C3.00 FOR LOCATIONS OF SIDEWALK CONSTRUCTION.
7. FILL MATERIAL SHOULD BE NATIVE ON-SITE MATERIAL, FREE OF DELETERIOUS MATERIAL WITH A MINIMUM CBR VALUE OF 2.5 AND A PI MAXIMUM OF 20. THE GRAVEL SIZE SHOULD NOT EXCEED 3 INCHES IN DIAMETER. LIME APPLICATION RATE SHOULD BE RE-EVALUATED FOR THE FILL MATERIAL. THE MATERIAL SHOULD BE PLACED AS PER APPLICABLE CITY OR COUNTY GUIDELINES.

| NO. | REVISION | DATE |
|---|---|---|
| | | |

STATE OF TEXAS
98401
LICENSED
PROFESSIONAL ENGINEER
CALEB M. CHANCE
4/15/24

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

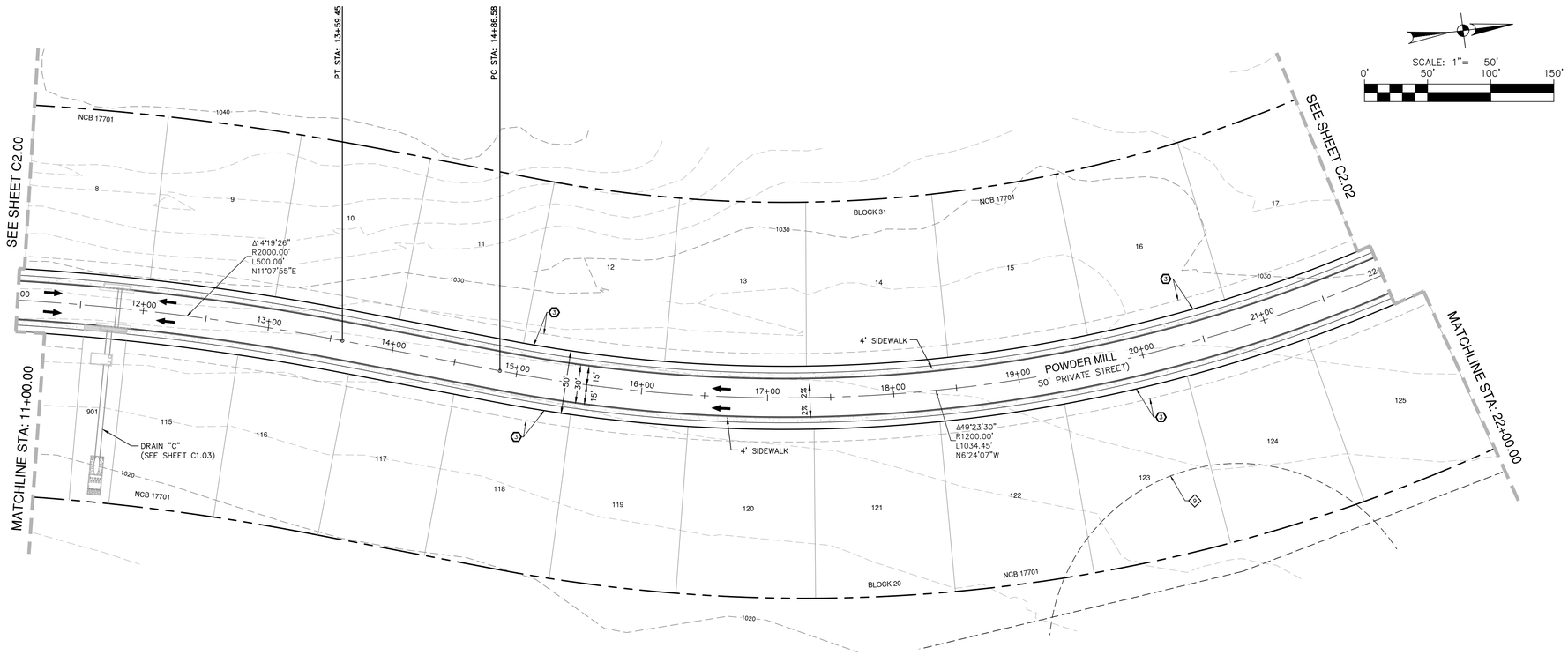
# SHAVANO HIGHLANDS UNIT 7
SAN ANTONIO, TEXAS

POWDER MILL - PLAN & PROFILE
STA: 1+00.00 TO 11+00.00

PLAT NO. 23-11800083
JOB NO. 8834-22
DATE NOVEMBER 2023
DESIGNER AW
CHECKED CC DRAWN RC
SHEET C2.00

Date: Apr 15, 2024, 5:19pm User ID: uvilarreal
File: P:\88\34\22\Design\Civil\ST883422 - POWDER MILL.dwg

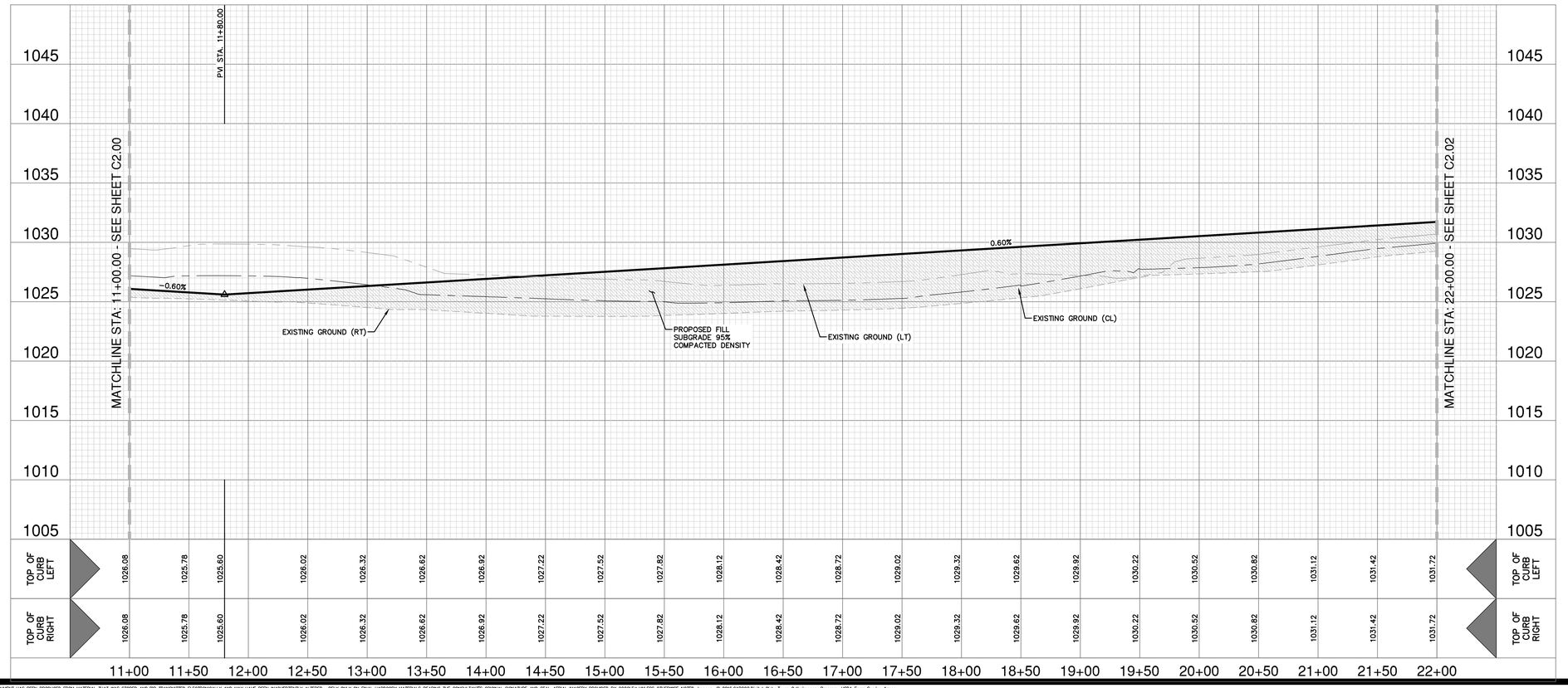
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SCALE: 1"= 50'
0' 50' 100' 150'

POWDER MILL
STA. 11+00.00 TO 21+00.00

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




## STREET LEGEND

| | |
|---|---|
| PROJECT LIMITS | |
| MAINTAIN GUTTER | |
| EXISTING CONTOUR | 970 |
| WHEELCHAIR RAMP | |
| CENTERLINE | CL |
| RADIUS POINT | RP |
| POINT OF CURVATURE | PC |
| POINT OF TANGENCY | PT |
| RETURN | RET |
| DRAINAGE FLOW ARROW | |
| TOP OF CURB SPOT ELEVATION | 857.30 |
| PAVEMENT ELEVATION | 857.00(P) × |
| WASHOUT CROWN SECTION | |
| SIDEWALK (HOMEOWNER'S RESPONSIBILITY) | |
| SIDEWALK (DEVELOPER'S RESPONSIBILITY) | |
| DRIVEWAY | |

## KEYED NOTES:

1. 10' GAS, ELECTRIC, TELEPHONE AND CABLE TV EASEMENT
2. PERMANENT VARIABLE WIDTH SANITARY SEWER EASEMENT (MIN. 16' WIDE) (OFF-LOT) (0.556 ACRE)
3. 10' GAS, ELECTRIC, TELEPHONE AND CABLE TV EASEMENT (OFF-LOT)(0.354 TOTAL ACRES)
4. VARIABLE WIDTH SANITARY SEWER EASEMENT (0.007 ACRE)
5. 10' GAS, ELECTRIC, TELEPHONE AND CABLE TV EASEMENT (VOL 20001, PG 1109-1111, DPR)
6. 10'x10' GAS, ELECTRIC, TELEPHONE AND CABLE TV EASEMENT (VOL 20001, PG 1109-1111, DPR)
7. ELECTRIC LINE RIGHT-OF-WAY AGREEMENT (VOL 16444, PG. 2154, OPR) (VOL 16464, PG. 76, OPR)
8. EASEMENT AGREEMENT VARIABLE WIDTH WATER, UTILITY, INGRESS AND TERMINATION OF ORIGINAL EASEMENT (VOL 16346, PG. 1335, OPR)
9. 65' INGRESS/EGRESS & ELECTRIC EASEMENT (VOL 1183, PG 280, OPR)
10. 135' ELECTRIC TRANSMISSION POWER EASEMENT (VOL 5655, PG 284, OPR)
11. 75' ELECTRIC EASEMENT (VOL 7191, PG 145, OPR)
12. VARIABLE WIDTH WATER & UTILITY EASEMENT (VOL. 11683, PGS. 2474-2491 OPR) (VOL. 11683, PGS. 2492-2507 OPR)
13. SECOND AMENDED AND RESTATED SANITARY CONTROL EASEMENT (DOC. NO. 20190259079, OPR)

## PRIVATE STREET NOTE:

THE LOT 999, BLOCK 27, NEW CITY BLOCK 17701, (**POWDER MILL**) ARE PRIVATE STREETS AND ARE ALSO DESIGNATED AS AN UNDERGROUND ELECTRIC, GAS, TELEPHONE, CABLE TV, DRAINAGE, WATER, PEDESTRIAN AND/OR SANITARY SEWER EASEMENT, THEREFORE, SUCH AREAS SHALL BE DEEMED TO HAVE BEEN DEDICATED TO THE PUBLIC FOR SUCH EASEMENTS AND PRIVATE STREETS.

## STREET NOTES:

1. CONTRACTOR SHALL MATCH EXISTING PAVEMENT AT TIE-IN. IF EXISTING PAVEMENT ELEVATION DIFFERS SIGNIFICANTLY, CONTRACTOR SHALL NOTIFY THE ENGINEER PRIOR TO CONTINUING WORK.
2. SIDEWALKS SHALL BE CONSTRUCTED 3-FT FROM THE BACK OF CURB FOR ALL LOCATIONS WHERE THE SIDEWALK IS SHOWN OFFSET. REFER TO STREET DETAIL SHEET FOR SIDEWALK AND RAMP DETAILS.
3. NO PERMANENT STRUCTURES HIGHER THAN 3 FEET, AND LOWER THAN 8 FEET ABOVE THE PAVEMENT, INCLUDING STRUCTURES, WALLS, FENCES, AND VEGETATION, SHALL BE CONSTRUCTED OR ALLOWED WITHIN THE CLEAR VISION EASEMENT. CONTRACTOR SHALL GRADE AREAS WITHIN CLEAR VISION EASEMENTS SUCH THAT THE ELEVATION WITHIN THE CLEAR VISION EASEMENT IS NOT HIGHER THAN 3 FEET ABOVE THE ADJACENT TOP OF PAVEMENT.
4. DRIVEWAYS SHOWN ON THIS PLAN ARE FOR THE SOLE PURPOSE OF INDICATING A POTENTIAL CONFLICT WITH CURB RAMP, DRAINAGE INFRASTRUCTURE, OR OTHER CONFLICT. DRIVEWAY LOCATION IS SUBJECT TO CHANGE BASED ON HOME SELECTION AND FINAL LOT DESIGN.
5. CHANGES IN THE SIDEWALK LOCATION FOR A MAXIMUM LINEAR DISTANCE OF TWO HUNDRED (200) FEET ARE PERMITTED TO BE APPROVED BY THE FIELD INSPECTOR WITHOUT AMENDING THE STREET PLAN OR UTILITY LAYOUT PER UDC SECTION 35-506 (Q)(6).
6. THE CONSTRUCTION OF SIDEWALKS ADJACENT TO ALL 900 SERIES LOTS WILL BE THE RESPONSIBILITY OF THE DEVELOPER AS SHOWN ON THE OVERALL SIGNAGE PLAN SIDEWALKS ARE NOT SHOWN ADJACENT TO ALL PRIVATE STREETS. REFER TO SHEET C3.00 FOR LOCATIONS OF SIDEWALK CONSTRUCTION.
7. FILL MATERIAL SHOULD BE NATIVE ON-SITE MATERIAL, FREE OF DELETERIOUS MATERIAL WITH A MINIMUM CBR VALUE OF 2.5 AND A PI MAXIMUM OF 20. THE GRAVEL SIZE SHOULD NOT EXCEED 3 INCHES IN DIAMETER. LIME APPLICATION RATE SHOULD BE RE-EVALUATED FOR THE FILL MATERIAL. THE MATERIAL SHOULD BE PLACED AS PER APPLICABLE CITY OR COUNTY GUIDELINES.

| NO. | REVISION | DATE |
|---|---|---|
| | | |


STATE OF TEXAS
CALEB M. CHANCE
98401
LICENSED
PROFESSIONAL ENGINEER
12/8/23

PAPE-DAWSON ENGINEERS
SAN ANTONIO I AUSTIN I HOUSTON I FORT WORTH I DALLAS
2000 NW LOOP 410 I SAN ANTONIO, TX 78213 I 210.375.9000
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028800

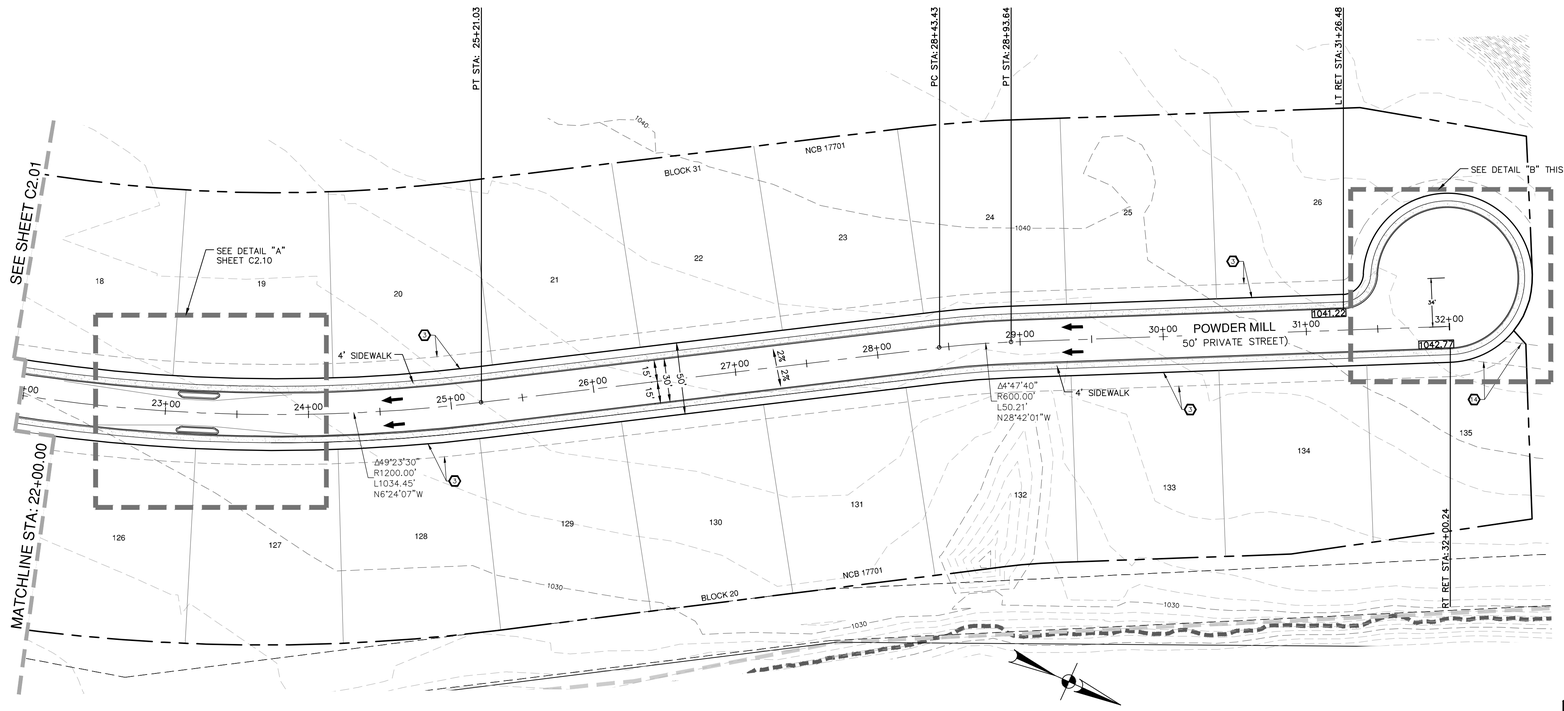

# SHAVANO HIGHLANDS UNIT 7
SAN ANTONIO, TEXAS

POWDER MILL - PLAN & PROFILE
STA: 11+00.00 TO 22+00.00

PLAT NO. 23-11800083
JOB NO. 8834-22
DATE NOVEMBER 2023
DESIGNER AW
CHECKED CC DRAWN RC
SHEET C2.01

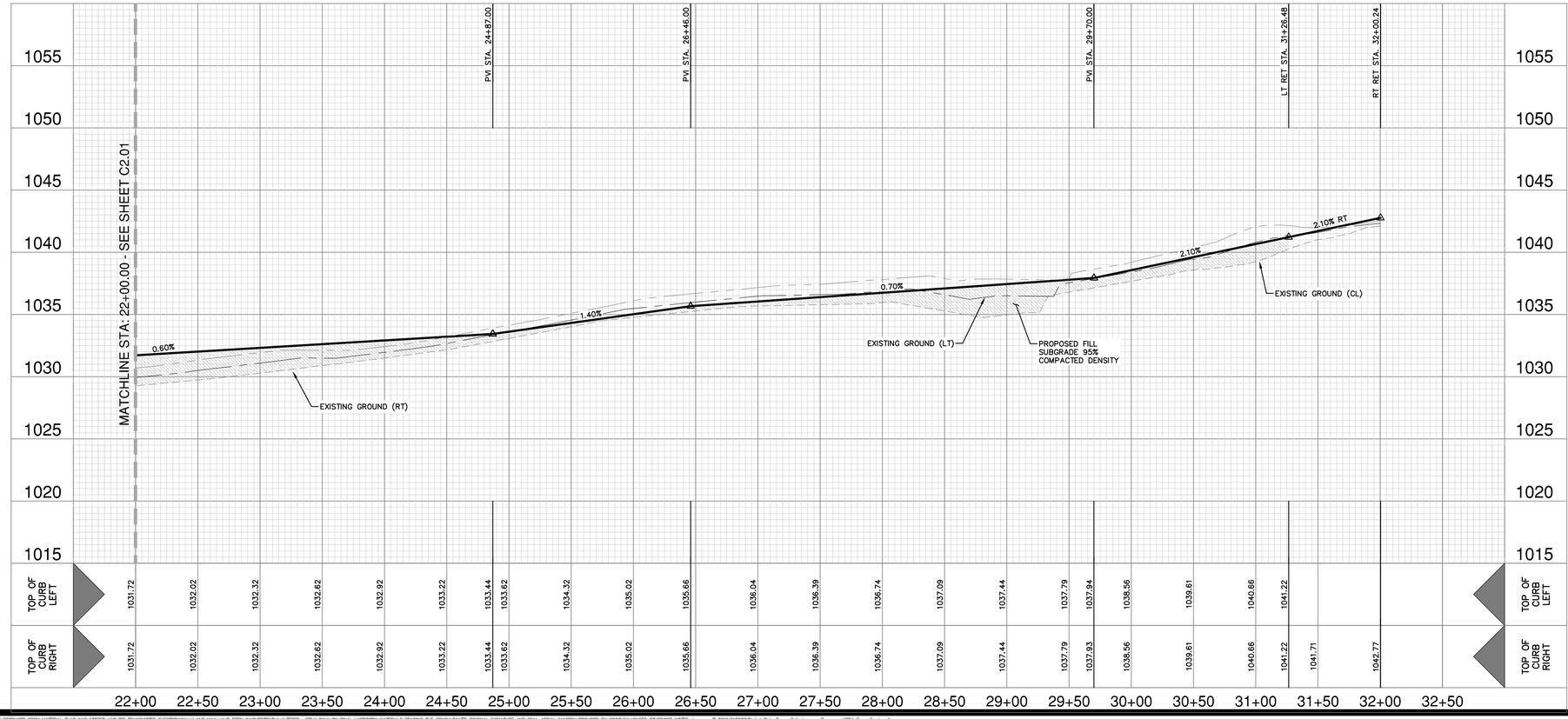

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POWDER MILL
STA. 21+00.00 TO END

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

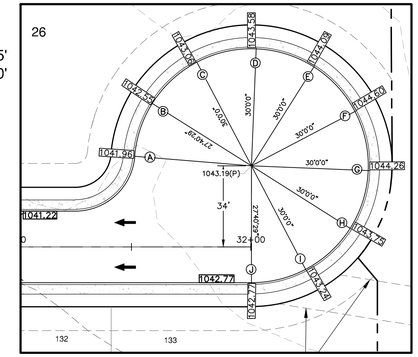



## STREET LEGEND

| | |
|---|---|
| PROJECT LIMITS | |
| MAINTAIN GUTTER | |
| EXISTING CONTOUR | 970 |
| WHEELCHAIR RAMP | |
| CENTERLINE | CL |
| RADIUS POINT | RP |
| POINT OF CURVATURE | PC |
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| DRAINAGE FLOW ARROW | |
| TOP OF CURB SPOT ELEVATION | 857.30 |
| PAVEMENT ELEVATION | 857.00(P) × |
| WASHOUT CROWN SECTION | |
| SIDEWALK (HOMEOWNER'S RESPONSIBILITY) | |
| SIDEWALK (DEVELOPER'S RESPONSIBILITY) | |
| DRIVEWAY | |

## KEYED NOTES:

3. 10' GAS, ELECTRIC, TELEPHONE AND CABLE TV EASEMENT
17. PERMANENT VARIABLE WIDTH SANITARY SEWER EASEMENT (MIN. 16' WIDE) (OFF-LOT) (0.556 ACRE)
19. 10' GAS, ELECTRIC, TELEPHONE AND CABLE TV EASEMENT (OFF-LOT)(0.354 TOTAL ACRES)
14. VARIABLE WIDTH SANITARY SEWER EASEMENT (0.007 ACRE)
1. 10' GAS, ELECTRIC, TELEPHONE AND CABLE TV EASEMENT (VOL 20001, PG 1109-1111, DPR)
2. 10'x10' GAS, ELECTRIC, TELEPHONE AND CABLE TV EASEMENT (VOL 20001, PG 1109-1111, DPR)
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6. 65' INGRESS/EGRESS & ELECTRIC EASEMENT (VOL 1183, PG 280, OPR)
8. 135' ELECTRIC TRANSMISSION POWER EASEMENT (VOL 5655, PG 284, OPR)
7. 75' ELECTRIC EASEMENT (VOL 7191, PG 145, OPR)
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10. SECOND AMENDED AND RESTATED SANITARY CONTROL EASEMENT (DOC. NO. 20190259079, OPR)




DETAIL "B"
SCALE: 1" = 30'

## PRIVATE STREET NOTE:

THE LOT 999, BLOCK 27, NEW CITY BLOCK 17701, (**POWDER MILL**) ARE PRIVATE STREETS AND ARE ALSO DESIGNATED AS AN UNDERGROUND ELECTRIC, GAS, TELEPHONE, CABLE TV, DRAINAGE, WATER, PEDESTRIAN AND/OR SANITARY SEWER EASEMENT, THEREFORE, SUCH AREAS SHALL BE DEEMED TO HAVE BEEN DEDICATED TO THE PUBLIC FOR SUCH EASEMENTS AND PRIVATE STREETS.

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| NO. | REVISION | DATE |
|---|---|---|
| | | |

STATE OF TEXAS
CALEB M. CHANCE
98401
LICENSED PROFESSIONAL ENGINEER
4/15/24

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

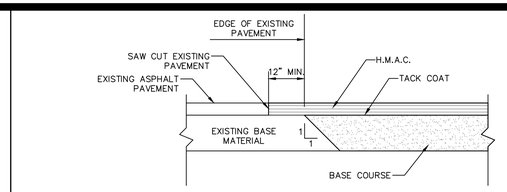
# SHAVANO HIGHLANDS UNIT 7
SAN ANTONIO, TEXAS

POWDER MILL - PLAN & PROFILE
STA: 22+00.00 TO END

PLAT NO. 23-11800083
JOB NO. 8834-22
DATE NOVEMBER 2023
DESIGNER AW
CHECKED CC DRAWN RC
SHEET C2.02

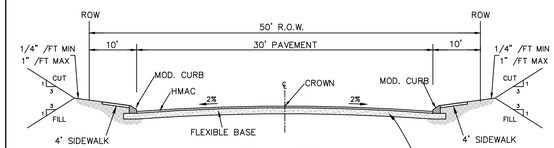
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| PAVEMENT SECTION DETAIL | | | | | | | |
|---|---|---|---|---|---|---|---|
| STREET NAME | STATION | TYPE "D" HMAC | CRUSHED LIMESTONE BASE | STABILIZED SUBGRADE | GEOGRID (TENSAR TRIAX TX5) | CBR | STRUCTURAL NUMBER |
| POWDER MILL | 1+00.00 TO END | 2.00" | 8.50" | * | NO | 5.0 | 2.07 |



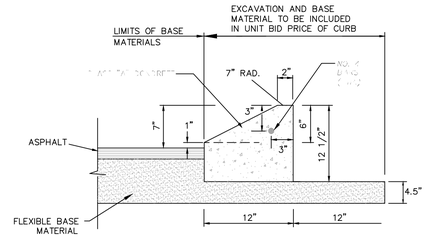

ASPHALT/ASPHALT JUNCTURE DETAIL

NOT-TO-SCALE



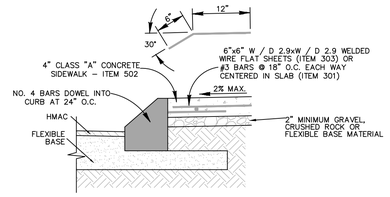

LOCAL TYPE "A"
TYPICAL STREET SECTION (50' R.O.W.)

NOT-TO-SCALE




MODIFIED 7" CURB DETAIL
(ROCK SUBGRADE)

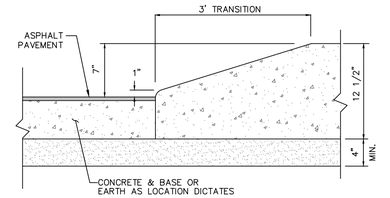
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SIDEWALK ABUTTING CURB SECTION

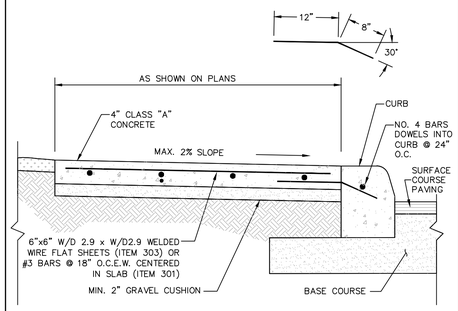
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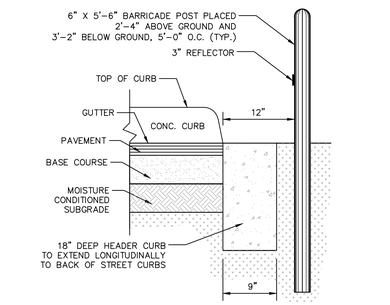

CURB TRANSITION DETAIL
(FROM PAVEMENT TO STANDARD CURB)

NOT-TO-SCALE



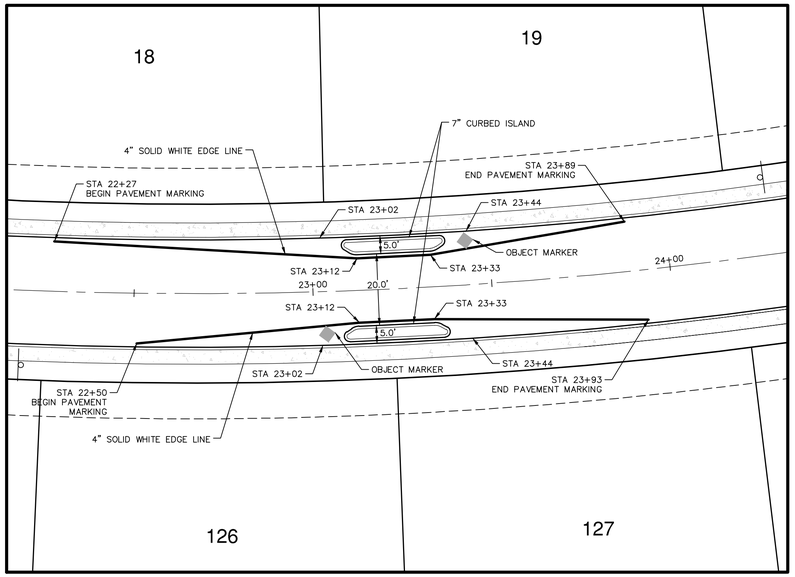

SIDEWALK DETAIL

NOT-TO-SCALE




HEADER CURB & BARRICADE POST DETAIL

NOT-TO-SCALE




DETAIL "A"

1" = 20'

## GENERAL NOTES:

1. CONTRACTOR SHALL REFERENCE THE PROJECT PAVEMENT DESIGN REPORT PREPARED BY **INTEC OF SAN ANTONIO** DATED **DECEMBER 27, 2021.**
2. CONTRACTOR SHALL RETAIN A GEOTECHNICAL ENGINEER TO VERIFY THE SUB GRADE CONDITION PRIOR TO PLACING ANY BASE MATERIAL. GEOTECHNICAL ENGINEER SHALL DETERMINE THE SUB GRADE CONDITION AND IF LIME STABILIZATION IS REQUIRED.
3. GEOTECHNICAL ENGINEER SHOULD VERIFY THE STREET SUBGRADE AT THE TIME OF CONSTRUCTION PRIOR TO PLACEMENT OF AGGREGATE BASE.
4. THE FLEXIBLE BASE COURSE SHOULD BE CRUSHED LIMESTONE CONFORMING TO TXDOT STANDARD SPECIFICATIONS, ITEM 247, TYPE A, GRADES 1 OR 2.
5. THE MOISTURE CONTENT OF THE FILL SHOULD BE MAINTAINED WITHIN THE RANGE OF OPTIMUM WATER CONTENT TO 3 PERCENTAGE POINTS ABOVE THE OPTIMUM WATER CONTENT UNTIL PERMANENTLY COVERED.
6. IN THE EVENT THAT THE CLAY FILL USED IS DIFFERENT THAN THE EXISTING SUBGRADE, THE RECOMMENDATIONS IN THE GEOTECHNICAL REPORT COULD BE INVALIDATED AND THE DESIGN ENGINEER MUST BE CONSULTED TO DETERMINE IF ADDITIONAL CBR TESTING AND THICKER PAVEMENT SECTIONS ARE REQUIRED.
7. WHERE PAVEMENT SUBGRADE IS LOCATED WITHIN 2-FEET OF THE EXISTING GROUND SURFACE (STRATUM 1 CLAYS), MOISTURE CONDITIONED SUBGRADE WILL BE REQUIRED. GEOTECHNICAL ENGINEER SHOULD VERIFY THE STREET SUBGRADE AT THE TIME OF CONSTRUCTION PRIOR TO PLACEMENT OF AGGREGATE BASE TO DETERMINE WHERE THE MOISTURE CONDITIONED SUBGRADE IS NEEDED. REFERENCE GEOTECHNICAL ENGINEERING REPORT FOR MORE INFORMATION.
8. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING ALL MATERIAL TESTING WITH THE PROJECT GEOTECHNICAL ENGINEER. TESTING SHALL BE PAID FOR BY THE OWNER.
9. FILL MATERIAL HOULD BE NATIVE ON-SITE MATERIAL, FREE OF DELETERIOUS MATERIAL WITH A MINIMUM CBR VALUE OF 2 AND A PI WITHIN RANGE OF 5 AND 20. THE GRAVEL SIZE SHOULD NOT EXCEED 3 INCHES IN DIAMETER. LIME OR CEMENT APPLICATION RATES SHOULD BE RE-EVALUATED FOR THE FILL MATERIAL. THE MATERIAL SHOULD BE PLACED AS PER APPLICABLE CITY OR COUNTY GUIDELINES. CONTRACTOR TO VERIFY EXACT SPECIFICATIONS WITH PROJECT GEOTECHNICAL ENGINEERING REPORT.
10. A BEXAR COUNTY PERMIT MUST BE OBTAINED BEFORE WORKING IN THE BEXAR COUNTY ROW. CONTRACTOR SHALL COORDINATE A TRAFFIC CONTROL PLAN FOR ALL WORK WITHIN THE ROW. ADDITIONAL WARNING SIGNS MAY BE RECOMMENDED BY THE ENGINEER ONCE THE ROADWAYS ARE CONSTRUCTED.

## STREET SUBGRADE NOTES:

1. IF THE STREET SUBGRADE PLASTICITY INDEX VALUE IS GREATER THAN 20, SUBGRADE STABILIZATION IS NEEDED AS PER CITY OF SAN ANTONIO REQUIREMENTS.
2. IF THE SUBGRADE PLASTICITY INDEX VALUE IS 20 OR LESS. SUBGRADE STABILIZATION IS NOT NEEDED. THE SUBGRADE SHOULD BE MOISTURE CONDITIONED (COMPACTED TO A MINIMUM OF 95 PERCENT OF THE MAXIMUM DRY DENSITY AT A MINIMUM MOISTURE CONTENT OF OPTIMUM PLUS 2 PERCENT (TEX114E)).
3. THE SUBGRADE SHOULD BE STABILIZED USING 6 PERCENT LIME TO A DEPTH OF 6 INCHES AS NOTED ABOVE.
4. THE SUBGRADE SOILS SHOULD BE TESTED FOR SOIL SULFATE CONTENT PRIOR TO STABILIZATION. IF THE SOIL SULFATE CONTENT IS HIGH, AN ALTERNATE PROCEDURE / RECOMMENDATION WILL BE NEEDED.
5. LIME APPLICATION RATE OF 27.5 LBS PER SQ YARD FOR 6 INCH DEPTH OF STABILIZATION IS RECOMMENDED.
6. APPROVED FILL MATERIAL SHOULD BE USED TO RAISE THE GRADE. THE FILL SHOULD BE FREE OF DELETERIOUS MATERIAL WITH A MINIMUM CBR VALUE OF 2.5. 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.
7. THE SUBGRADE SHOULD BE PROOF ROLLED TO IDENTIFY SOFT AREAS BEFORE STABILIZATION.

## LIME NOTES:

FOR LIME STABILIZATION CONSTRUCTION VERIFICATION THE FOLLOWING SHALL BE CONDUCTED ON THE FIELD:

1. AFTER INITIAL MIXING THE SOIL-LIME MIXTURE SHALL MELLOW FOR A PERIOD OF TWO TO THREE (2-3) DAYS. MAINTAIN MOISTURE DURING MELLOWING.
2. AFTER MELLOWING AND FINAL MIXING, THE PULVERIZATION SHALL BE CHECKED USING THE FOLLOWING CRITERIA (REMOVE NON-SLAKING AGGREGATES RETAINED ON THE $\frac{1}{2}$ INCH SIEVE FROM THE SAMPLE):
   - MINIMUM PASSING $1\frac{1}{2}$" SIEVE 100
   - MINIMUM PASSING $\frac{3}{4}$" SIEVE 85
   - MINIMUM PASSING NO. 4 SIEVE 60
3. SAMPLE SOIL-LIME MIXTURE FOR DETERMINATION OF MAXIMUM DRY DENSITY (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 IN THE BEXAR COUNTY FLEXIBLE PAVEMENT DESIGN CRITERIA GUIDE FOR MIXTURE DESIGN.
4. COMPACT AND CHECK FIELD DENSITY (MINIMUM OF 95% OF MDD REQUIRED).
5. CURE FOR AN ADDITIONAL 2 TO 5 DAYS (TOTAL MELLOWING AND CURING TIME SHOULD TOTAL AT LEAST 5 DAYS).
6. VERIFY DEPTH OF LIME STABILIZED LAYER TO DEPTH AS NOTED ON PLAN TO WITHIN +/- 1.0 INCH.

| NO. | REVISION | DATE |
|---|---|---|
| 1 | ADDED DETAIL | 06/19/23 |

STATE OF TEXAS
CALEB M. CHANCE
98401
LICENSED PROFESSIONAL ENGINEER
4/15/24


PAPE-DAWSON ENGINEERS
SAN ANTONIO I AUSTIN I HOUSTON I FORT WORTH I DALLAS
2000 NW LOOP 410 I SAN ANTONIO, TX 78213 I 210.375.9000
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028800


# SHAVANO HIGHLANDS UNIT 7
SAN ANTONIO, TEXAS

STREET DETAILS

PLAT NO. 23-11800083
JOB NO. 8834-22
DATE NOVEMBER 2023
DESIGNER AW
CHECKED CC DRAWN RC
SHEET C2.10

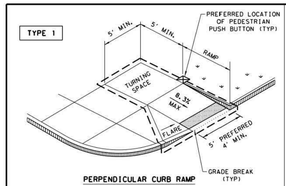

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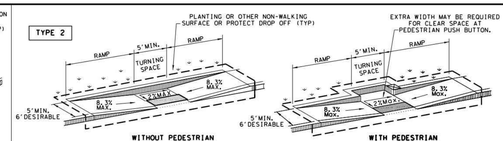
DATE:
FILE:

TYPE 1




PERPENDICULAR CURB RAMP

TYPE 2

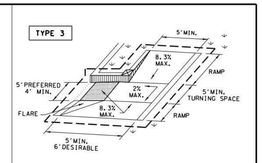



WITHOUT PEDESTRIAN PUSH BUTTON

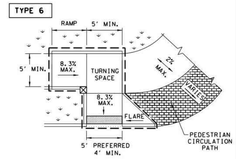
WITH PEDESTRIAN PUSH BUTTON

PARALLEL CURB RAMP

TYPE 3

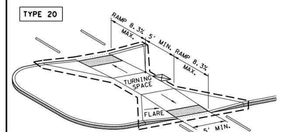



TYPE 6



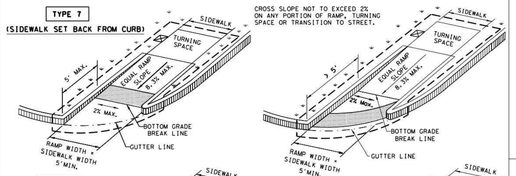

COMBINATION CURB RAMPS

TYPE 20

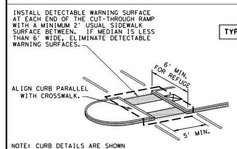



CURB RAMPS AT MEDIAN ISLANDS

TYPE 7
(SIDEWALK SET BACK FROM CURB)

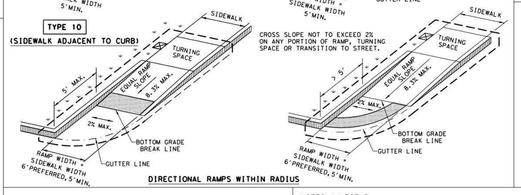



TYPE 21



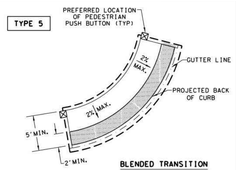

NOTE: CURB DETAILS ARE SHOWN ELSEWHERE IN THE PLANS.

TYPE 10
(SIDEWALK ADJACENT TO CURB)



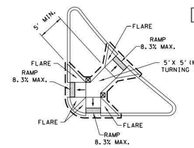

DIRECTIONAL RAMPS WITHIN RADIUS

TYPE 5

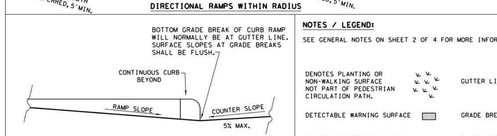



BLENDED TRANSITION
(FLUSH LANDING)

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: | DW: VP | CK: | CK: PK & JD |
|---|---|---|---|---|---|
| ©TxDOT: MARCH, 2002 | CONT | SECT | JOB | | HIGHWAY |
| REVISIONS | | | | | |
| REVISED 08-2013 | DIST | | COUNTY | | SHEET NO. |
| REVISED 11-2018 | | | | | |

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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.

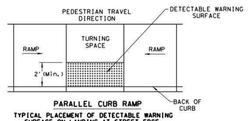
### DETECTABLE WARNING PAVERS (IF USED)

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

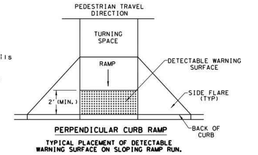
27. Provide clear ground space at operable parts, including pedestrian push buttons. Operable parts shall be placed within unobstructed reach range specified in PROWAG section R406.
28. Place traffic signal or illumination poles, ground boxes, controller boxes, signs, drainage facilities and other items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

### DETECTABLE WARNING SURFACE DETAILS



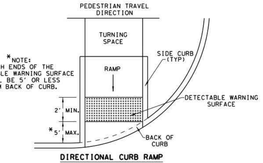

PARALLEL CURB RAMP

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



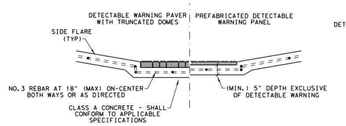

PERPENDICULAR CURB RAMP

TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.




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

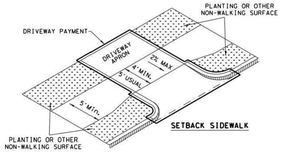
PED-18

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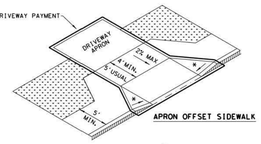
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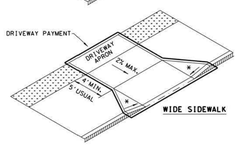
## SIDEWALK TREATMENT AT DRIVEWAYS



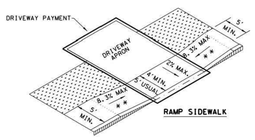

SETBACK SIDEWALK




APRON OFFSET SIDEWALK

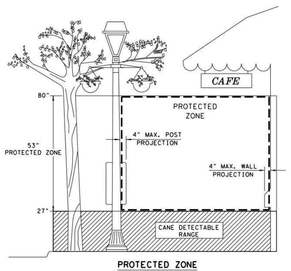



WIDE SIDEWALK



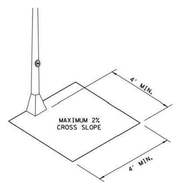

RAMP SIDEWALK

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.

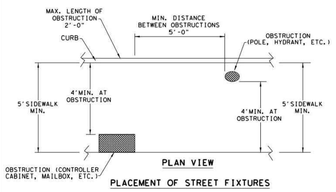



PROTECTED ZONE

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.




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.

DETECTION BARRIER FOR VERTICAL CLEARANCE < 80"

SHEET 3 OF 4

Texas Department of Transportation — Design Division Standard

PEDESTRIAN FACILITIES
CURB RAMPS

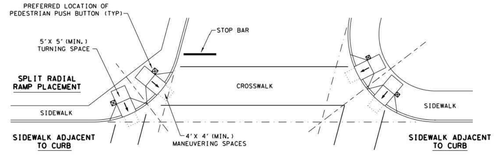
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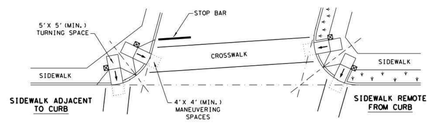
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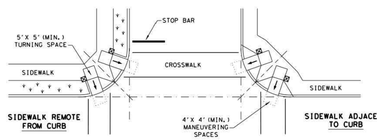
## TYPICAL CROSSING LAYOUTS
SEE SHEET 1 OF 4 FOR DETAILS AND DIMENSIONS



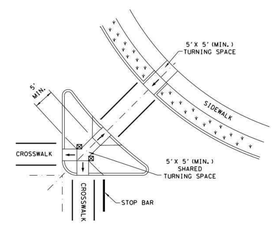

SKEWED INTERSECTION WITH "LARGE" RADIUS



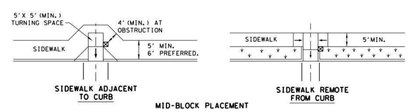

SKEWED INTERSECTION WITH "SMALL" RADIUS




NORMAL INTERSECTION WITH "SMALL" RADIUS




AT INTERSECTION
W/FREE RIGHT TURN & ISLAND




MID-BLOCK PLACEMENT
PERPENDICULAR RAMPS

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

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NO. | REVISION | DATE

STATE OF TEXAS
CALEB M. CHANCE
98401
LICENSED PROFESSIONAL ENGINEER
3/9/23

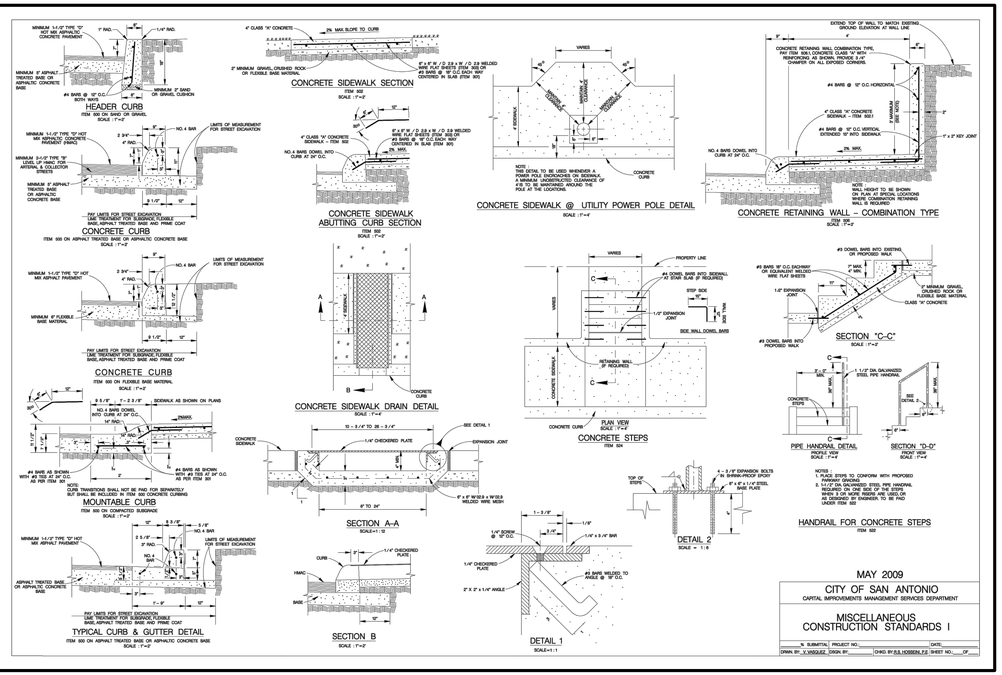
PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

SHAVANO HIGHLANDS UNIT 7
SAN ANTONIO, TEXAS
STREET DETAILS

PLAT NO. 23-11800083
JOB NO. 8834-22
DATE DECEMBER 2021
DESIGNER AW
CHECKED CC DRAWN RC
SHEET C2.11

Date: Mar 09, 2023, 4:36pm User ID: vvillarreal
File: P:\88\34\22\Design\Civil\STD\883422.dwg

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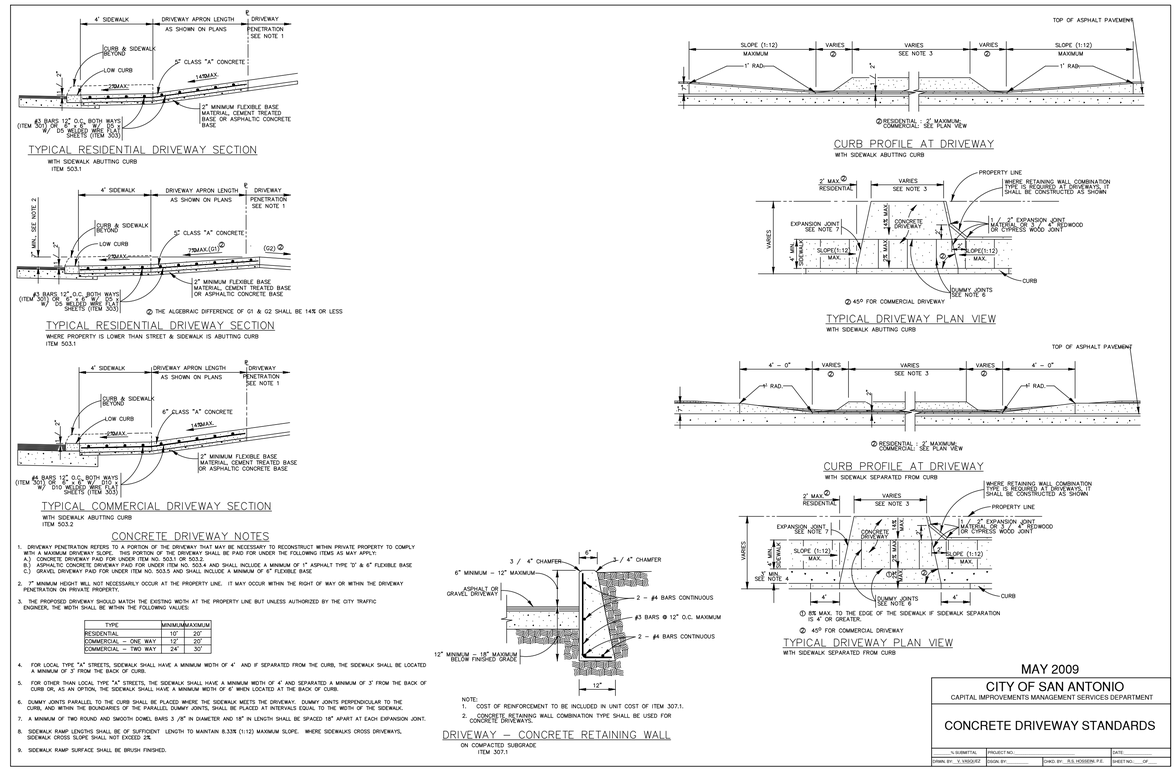

MAY 2009

CITY OF SAN ANTONIO
CAPITAL IMPROVEMENTS MANAGEMENT SERVICES DEPARTMENT

MISCELLANEOUS
CONSTRUCTION STANDARDS I

| % SUBMITTAL | PROJECT NO.: | DATE: |
|---|---|---|
| DRAWN BY: V. VASQUEZ | DESIGN BY: | CHKD. BY: R.S. HOSSEINI, P.E. |

SHEET NO.____OF____



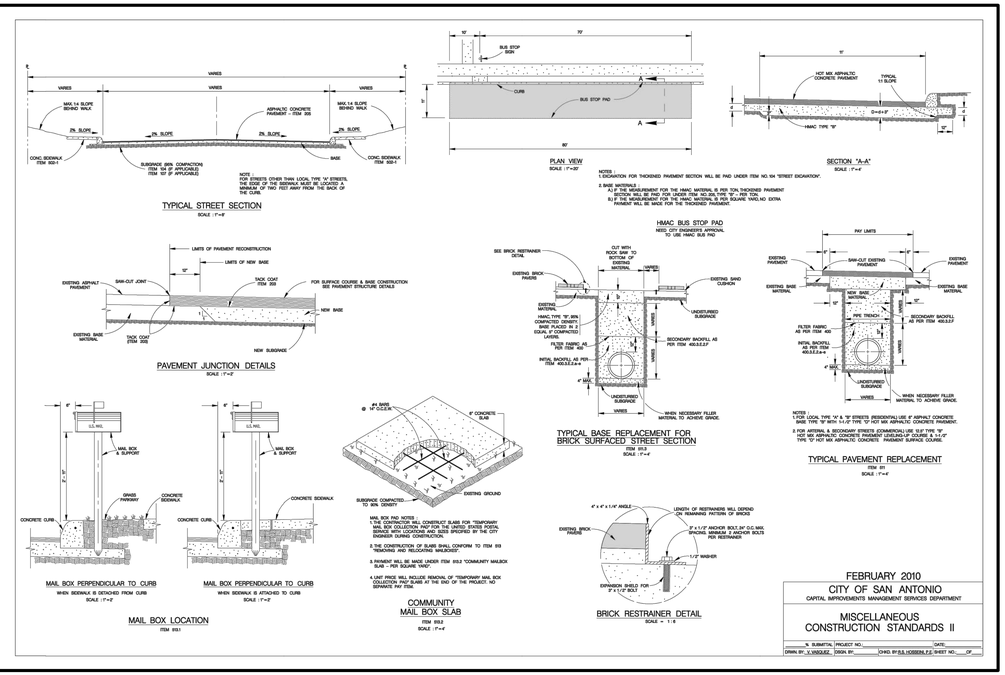

MAY 2009

CITY OF SAN ANTONIO
CAPITAL IMPROVEMENTS MANAGEMENT SERVICES DEPARTMENT

CONCRETE DRIVEWAY STANDARDS

| % SUBMITTAL | PROJECT NO.: | DATE: |
|---|---|---|
| DRAWN BY: | DESIGN BY: | CHKD. BY: R.S. HOSSEINI, P.E. |

SHEET NO.____OF____




FEBRUARY 2010

CITY OF SAN ANTONIO
CAPITAL IMPROVEMENTS MANAGEMENT SERVICES DEPARTMENT

MISCELLANEOUS
CONSTRUCTION STANDARDS II

| % SUBMITTAL | PROJECT NO.: | DATE: |
|---|---|---|
| DRAWN BY: V. VASQUEZ | DESIGN BY: | CHKD. BY: R.S. HOSSEINI, P.E. |

SHEET NO.____OF____

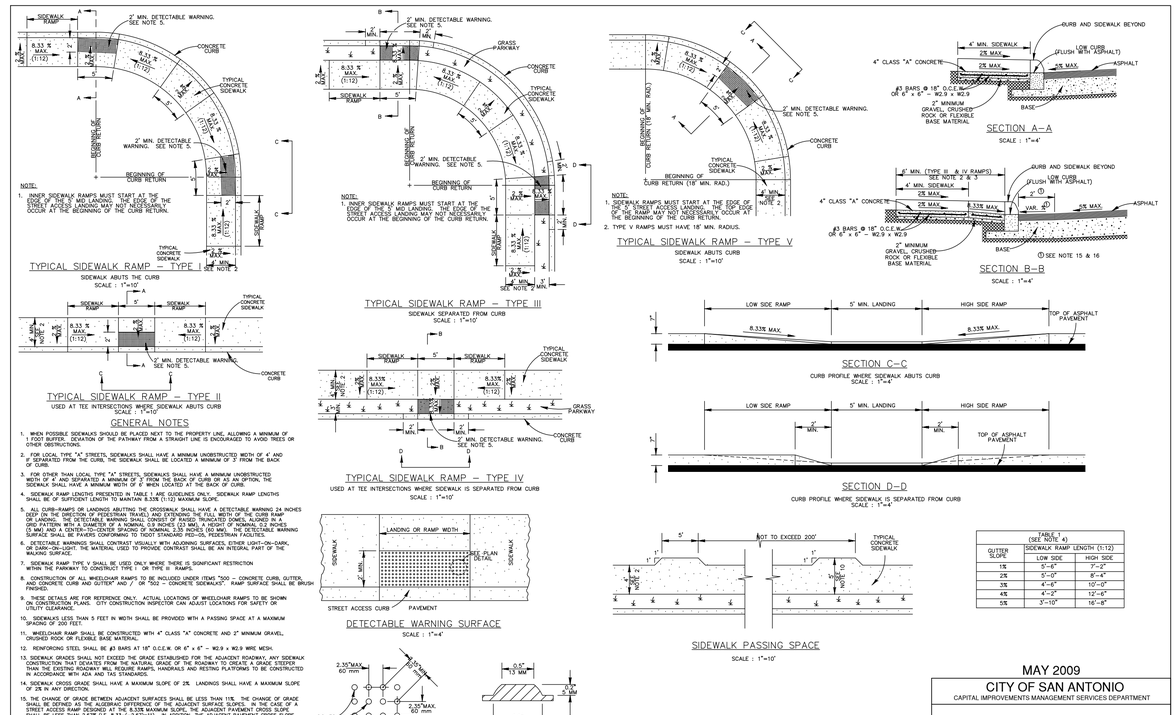



TABLE I
(SEE NOTE 4)

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

MAY 2009

CITY OF SAN ANTONIO
CAPITAL IMPROVEMENTS MANAGEMENT SERVICES DEPARTMENT

WHEELCHAIR RAMP STANDARDS

| PROJECT NO.: | | DATE: |
|---|---|---|
| DESIGN BY: | CHKD. BY: R.S. HOSSEINI, P.E. | SHEET NO.____OF____ |

NO. REVISION | DATE

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

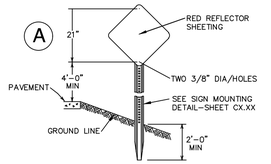
STATE OF TEXAS
CALEB M. CHANCE
98401
LICENSED
PROFESSIONAL ENGINEER
3/9/23

SHAVANO HIGHLANDS UNIT 7
SAN ANTONIO, TEXAS
STREET DETAILS

PLAT NO. 23-11800083
JOB NO. 8834-22
DATE DECEMBER 2021
DESIGNER AW
CHECKED CC DRAWN RC
SHEET C2.12

Date: Mar 09, 2023, 4:37pm User ID: rwilloreed
File: P:\88\34\22\Design\Civil\STD\883422.dwg

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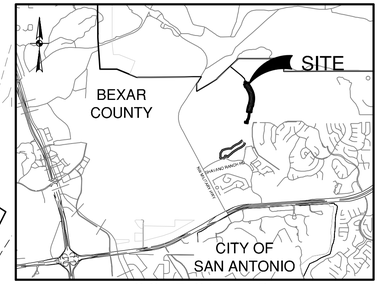



UNITS MOUNTED ON 0.080" THICK SHEET ALUMINUM CONFORMING WITH ASTM B-209 ALLOY 6061-T6.

TYPE 4 OM4-3
18" x 18"

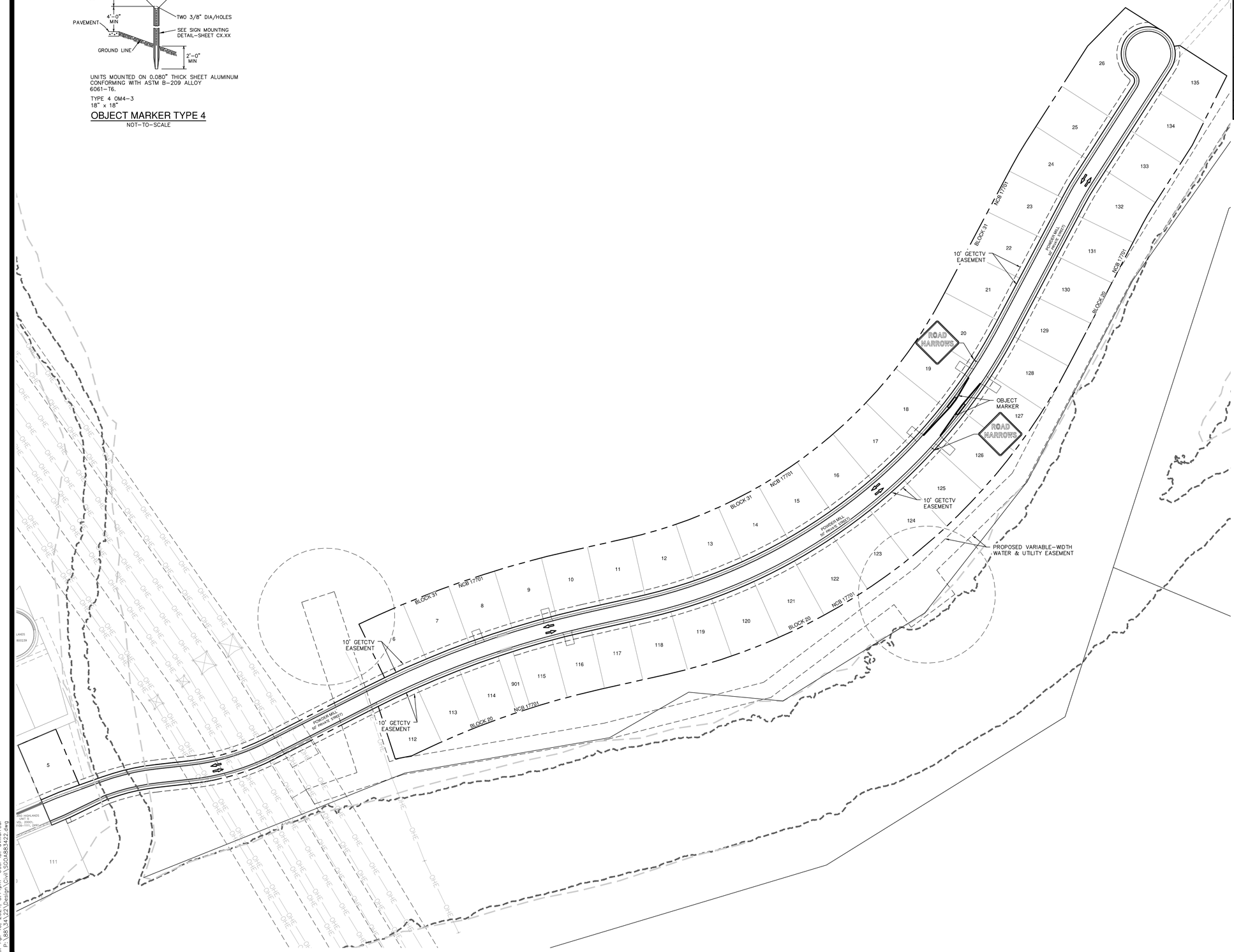
## OBJECT MARKER TYPE 4

NOT-TO-SCALE




## LOCATION MAP

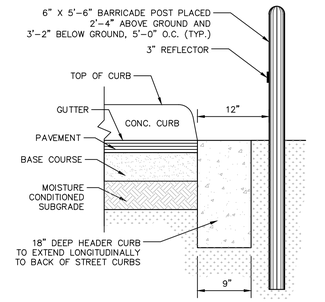
NOT-TO-SCALE




0' 100' 200' 300'

SCALE: 1"= 100'

| SYMBOL | ITEM NUMBER |
|---|---|
| UNIT BOUNDARY | |
| PROPOSED DRIVEWAY | |
| TRAFFIC FLOW ARROW | |
| SIDEWALK (HOMEBUILDER RESPONSIBILITY) | |
| SIDEWALK (SITEWORK CONTRACTOR RESPONSIBILITY) | |
| ROAD NARROWS W5-1 30"X30" | |




## HEADER CURB & BARRICADE POST DETAIL

NOT-TO-SCALE

## DRIVEWAY NOTE:

DRIVEWAYS SHOWN ON THIS PLAN ARE FOR THE SOLE PURPOSE OF INDICATING A POTENTIAL CONFLICT WITH CURB RAMP, DRAINAGE INFRASTRUCTURE, OR OTHER CONFLICT. DRIVEWAY LOCATION IS SUBJECT TO CHANGE BASED ON HOME SELECTION AND FINAL LOT DESIGN.

## 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 ANY AVAILABLE GEOTECHNICAL INFORMATION AND THE ANTICIPATED INSTALLATION SITES 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.

| NO. | REMISION | DATE |
|---|---|---|
| 1 | REVISED CURB SECTION | 06/20/23 |

STATE OF TEXAS
CALEB M. CHANCE
98401
LICENSED PROFESSIONAL ENGINEER
4/15/24

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

# SHAVANO HIGHLANDS UNIT 7

SAN ANTONIO, TEXAS

## OVERALL SIGNAGE PLAN

PLAT NO. 23-11800083
JOB NO. 8834-22
DATE NOVEMBER 2023
DESIGNER AW
CHECKED CC DRAWN RC
SHEET C3.00

Date: Apr 15, 2024, 5:14pm User ID: williamnel
File: P:\88\34\22\Design\Civil\SGOA883422.dwg

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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))
SRS = Schedule 80 Pipe (see SMD(SLIP-1) to (SLIP-3))

**Number of Posts (1 or 2)**

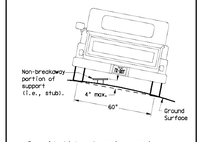
**Anchor Type**

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

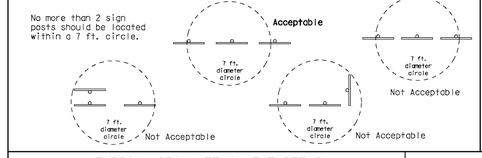
**Sign Mounting Designation**

P = Prefab. "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:
TEXT or ZEXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
BW = 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

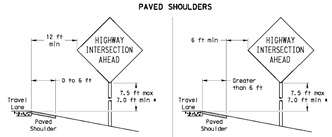



To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).




## SIGN LOCATION

**PAVED SHOULDERS**



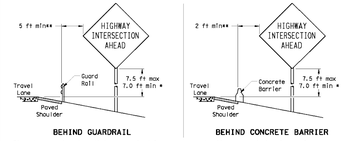

**LESS THAN 6 FT. WIDE**

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.

**BEHIND BARRIER**

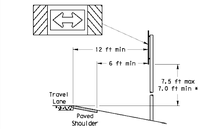



**BEHIND GUARDRAIL**

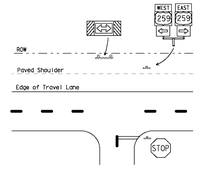
**BEHIND CONCRETE BARRIER**

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

**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.




* Signs shall be mounted using the following condition that results in the greatest sign elevation:

(1) a minimum of 7 ft a maximum of 7.5 feet above the edge of the travel lane or

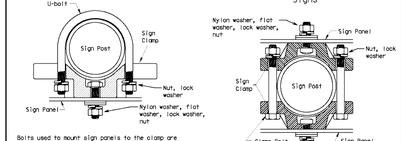
(2) a minimum of 7 ft a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

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



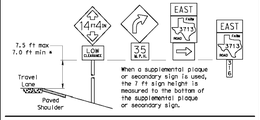

Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

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.

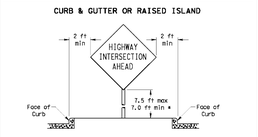
| Pipe Diameter | Approximate Bolt Length | |
|---|---|---|
| | Specific Clamp | Universal Clamp |
| 2" nominal | 3" | 3 or 3 1/2" |
| 2 1/2" nominal | 3 or 3 1/2" | 3 1/2 or 4" |
| 3" nominal | 3 1/2 or 4" | 4 1/2" |

**SIGNS WITH PLAQUES**

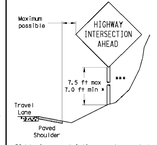



When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

**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*

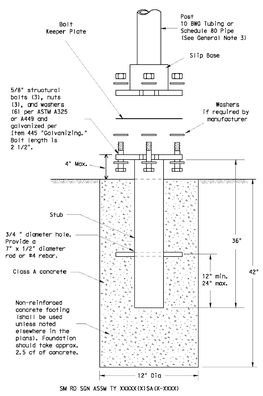
## SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

| © TxDOT July 2022 | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
| 9-08 REVISIONS | FED.RD. DIV.NO. | STATE | JOB | HIGHWAY |
| | 6 | | | |
| | "STATE" | DIST. | COUNTY | SHEET No. |

264

## 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. http://www.txdot.gov/business/producer_list.htm The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

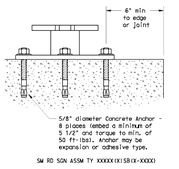
1. Slip base shall be permanently marked to indicate manufacturer, Method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
2. Material used as post with this system shall conform to the following specifications:
   10 BWG Tubing (2.875" outside diameter)
   0.134" nominal wall thickness
   Seamless or electric-resistance welded steel tubing or pipe
   Steel shall be HSLAS GF 55 per ASTM A1011 or ASTM A1008
   Other steels may be used if they meet the followings
   55,000 PSI minimum yield strength
   70,000 PSI minimum tensile strength
   20% minimum elongation in 2"
   Wall thickness (uncoated) shall be within the range of 0.122" to 0.136"
   Outside diameter (uncoated) shall be within the range of 2.867" to 2.883"
   Galvanization per ASTM A123 or ASTM A653 CS TYPE. For prepainted steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.
   Schedule 80 Pipe (2.875" outside diameter)
   0.276" nominal wall thickness
   Steel tubing per ASTM A500 Gr C
   Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the followings
   46,000 PSI minimum yield strength
   62,000 PSI minimum tensile strength
   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:
   http://www.txdot.gov/publications/traffic.htm
4. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

ASSEMBLY PROCEDURE

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

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

## CONCRETE ANCHOR




SM RD SGN ASSM TY XXXXX(1)XX(SB OR XXXX)

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

**Texas Department of Transportation**
*Traffic Operations Division*

## SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

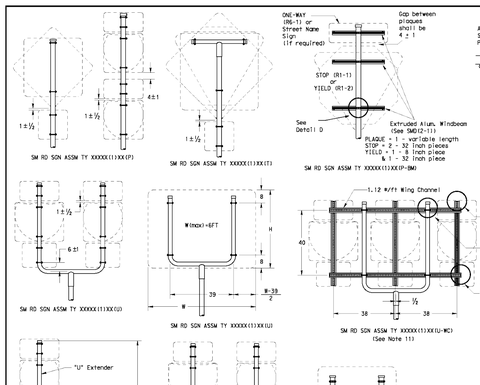
SMD(SLIP-1)-08

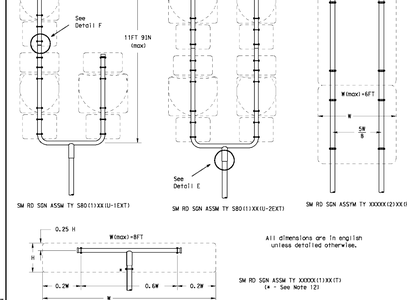
| © TxDOT July 2022 | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
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| 9-08 REVISIONS | FED.RD. DIV.NO. | STATE | JOB | HIGHWAY |
| | 6 | | | |
| | "STATE" | DIST. | COUNTY | SHEET No. |

263

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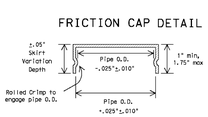
DATE/FILE:




All dimensions are in english unless detailed otherwise.

## FRICTION CAP DETAIL




Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes. The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp recesses 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.

**GENERAL NOTES:**

1. Sign supports must be spliced except where shown. Sign support posts shall not be spliced.
2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific mounting due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess plow, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., exposed support shall not be visible when the sign is viewed from the front). Sealing shall be applied to 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(CT) TY 10BWG(1)XX(CP-BW) |
| | 60-inch YIELD sign (R1-2) | TY 10BWG(1)XX(CT) TY 10BWG(1)XX(CP-BW) |
| | 48x16-inch ONE-WAY sign (R6-1) | TY 10BWG(1)XX(CT) TY 10BWG(1)XX(CP-BW) |
| | 36x48, 48x36, and 48x48-inch signs | TY 10BWG(1)XX(CT) |
| | 48x60-inch signs | TY SB0(1)XX(CT) |
| | 48x48-inch signs (diamond or square) | TY 10BWG(1)XX(CT) |
| | 48x60-inch signs | TY SB0(1)XX(CT) |
| Warning | 48-inch Advance School X-ing sign (S1-1) | TY 10BWG(1)XX(CT) |
| | 48-inch School X-ing sign (S2-1) | TY 10BWG(1)XX(CT) |
| | Large Arrow sign (W1-6 & W1-7) | TY 10BWG(1)XX(CT) |

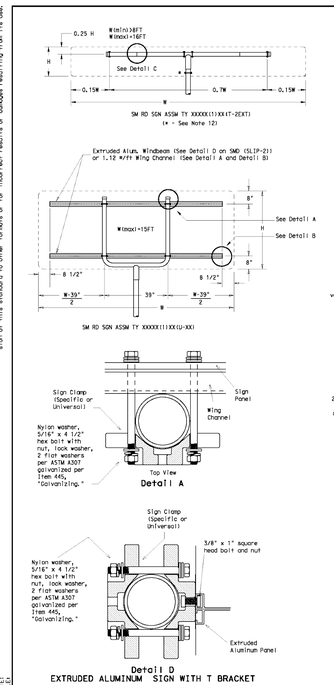
**Texas Department of Transportation**
*Traffic Operations Division*

## SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-2)-08

| © TxDOT July 2022 | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
| 9-08 REVISIONS | FED.RD. DIV.NO. | STATE | JOB | HIGHWAY |
| | 6 | | | |
| | "STATE" | DIST. | COUNTY | SHEET No. |

262




**GENERAL NOTES:**

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

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

**Texas Department of Transportation**
*Traffic Operations Division*

## SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-3)-08

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|---|---|---|---|---|
| 9-08 REVISIONS | FED.RD. DIV.NO. | STATE | JOB | HIGHWAY |
| | 6 | | | |
| | "STATE" | DIST. | COUNTY | SHEET No. |

262

Date: Mar 09, 2023, 4:37pm User ID: williamsd
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| NO. | REVISION | DATE |
|---|---|---|

STATE OF TEXAS
CALEB M. CHANCE
98401
LICENSED
PROFESSIONAL ENGINEER
3/9/23

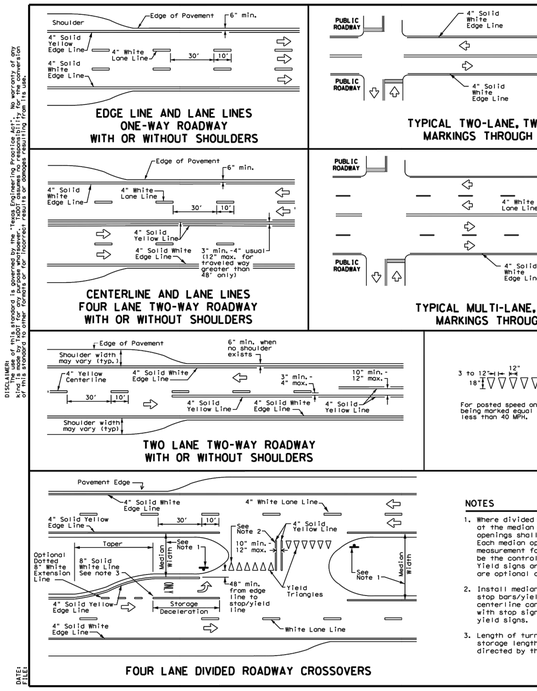
**PAPE-DAWSON ENGINEERS**
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

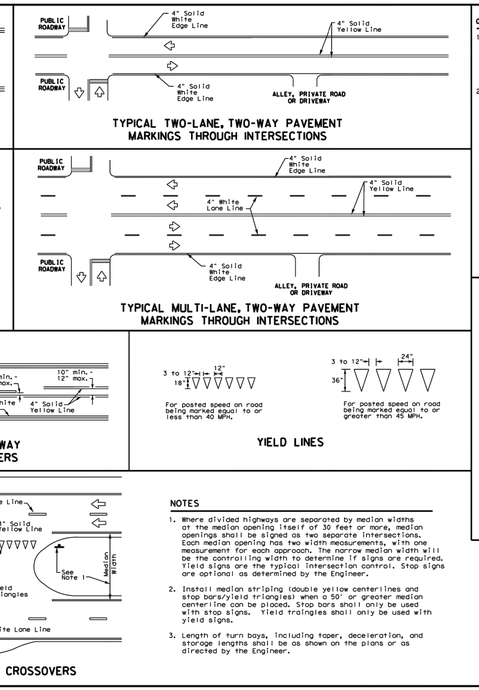
# SHAVANO HIGHLANDS UNIT 7
SAN ANTONIO, TEXAS

SIGNAGE DETAILS

PLAT NO. 23-11800083
JOB NO. 8834-22
DATE DECEMBER 2021
DESIGNER AW
CHECKED CC DRAWN RC
SHEET C3.10

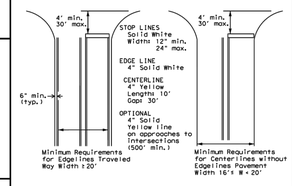
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**GENERAL NOTES**

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

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

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

**NOTES**

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

Texas Department of Transportation — Traffic Safety Division Standard

# TYPICAL STANDARD PAVEMENT MARKINGS

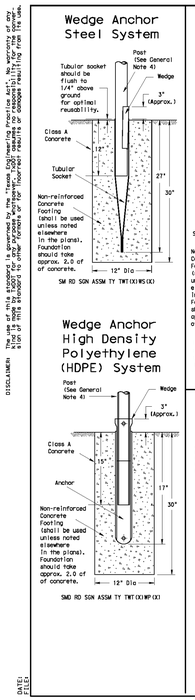
# PM(1)-20

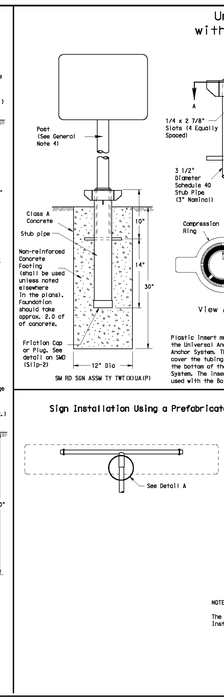
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| ©TxDOT | November 1978 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | | DIST | COUNTY | | SHEET NO. |
| 8-95 3-03 | | | | | |
| 5-00 2-12 | | | | | |
| 8-00 4-20 | | | | | |

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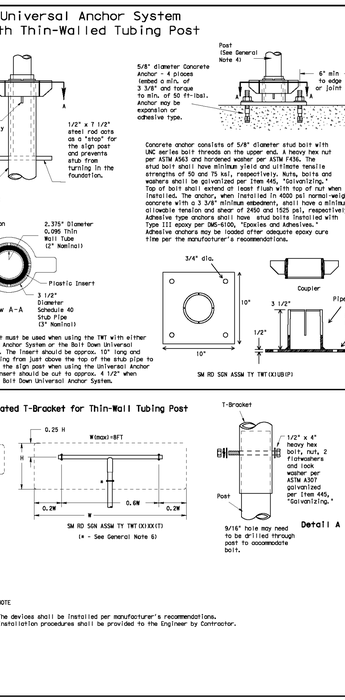
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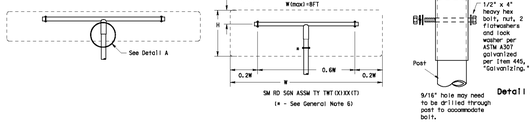



Plastic Insert must be used when using the TWT with either the Universal Anchor System or the Bolt Down Universal Anchor System. The Insert should be approx. 10" long and cover the tubing from just above the top of the stub pipe to the bottom of the sign post when using the Universal Anchor System. The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




**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 15 square feet of sign area.
2. The tubular socket, wedge and prefabricated T-bracket shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to the approval of the TxDOT Traffic Standards Engineer.
3. Except for posts (13 BWG tubing), clamps, nuts and bolts, all components shall be prequalified. A list of prequalified vendors may be obtained from the Material Producer List web page. The website address is: https://www.txdot.gov/business/producer-list.htm
4. Material used as post with this system shall conform to the following specifications:
   13 BWG Tubing (2.375" outside diameter) (TWT)
   0.095" nominal wall thickness
   Seamless or electric-resistance welded steel tubing
   Steel shall be HSLAS for 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 tunnelhold 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 pregalvanized steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.
5. Sign blanks shall be the sizes and shapes shown on the plans.
6. Additional sign clamp required on the "T-bracket" post for 24" high signs. Place clamp at least 3" above bottom of sign when possible.
7. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
8. See the Traffic Operations Division website for detailed drawings of sign clamps and Wedge Anchor System components. The website address is: http://www.txdot.gov/publications/traffic.htm

**WEDGE ANCHOR SYSTEM INSTALLATION PROCEDURE**

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

**UNIVERSAL ANCHOR SYSTEM INSTALLATION PROCEDURE**

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

Texas Department of Transportation
Traffic Operations Division

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

SMD(TWT)-08

| ©TxDOT July 2022 | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
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| 9-08 | | | | |
| | "ES" | | DistCTL | SHEET No. |

2 SEE

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

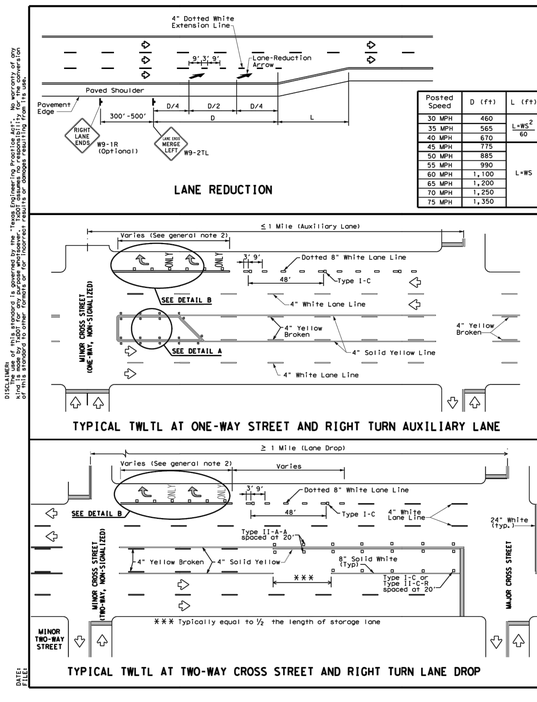
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STATE OF TEXAS
CALEB M. CHANCE
98401
LICENSED PROFESSIONAL ENGINEER
3/9/23

# SHAVANO HIGHLANDS UNIT 7
SAN ANTONIO, TEXAS

SIGNAGE DETAILS

PLAT NO. 23-11800083
JOB NO. 8834-22
DATE DECEMBER 2021
DESIGNER AW
CHECKED CC DRAWN RC
SHEET C3.11



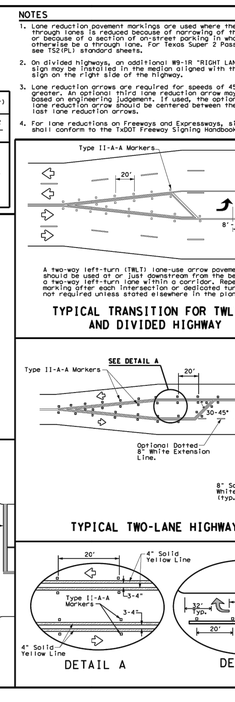

| Posted Speed | D (ft) | L (ft) |
|---|---|---|
| 30 MPH | 460 | L=WS²/60 |
| 35 MPH | 565 | |
| 40 MPH | 670 | |
| 45 MPH | 775 | L=WS |
| 50 MPH | 885 | |
| 55 MPH | 990 | |
| 60 MPH | 1,100 | |
| 65 MPH | 1,200 | |
| 70 MPH | 1,250 | |
| 75 MPH | 1,350 | |

**NOTES**

1. Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn bays for emphasis. Details for words and arrows are as shown in the Standard Highway Sign Designs for Texas.
2. When lane-use words and arrow markings are used, two sets of arrows should be used if the length of the bay is greater than 180 feet. When a single lane use arrow or word and arrow marking is used for a short turn lane, it should be located at or near the upstream end of the full-width turn lane.
3. Use raised pavement marker Type I-C with undivided highways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.
4. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

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

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







Texas Department of Transportation — Traffic Safety Division Standard

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

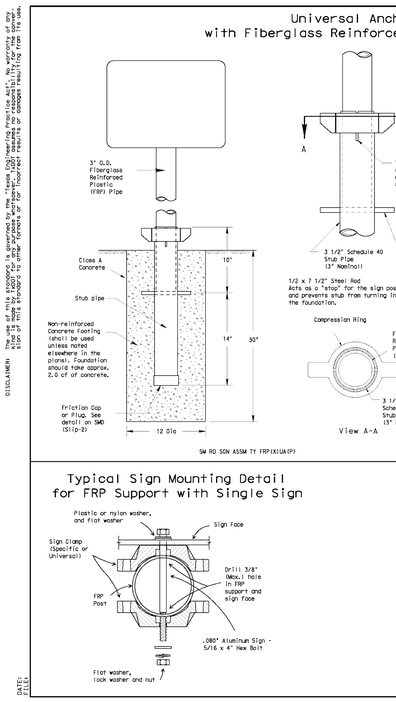
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| REVISIONS | | DIST | COUNTY | | SHEET NO. |
| 5-06 2-10 | | | | | |
| 5-08 2-12 | | | | | |
| 8-95 6-20 | | | | | |

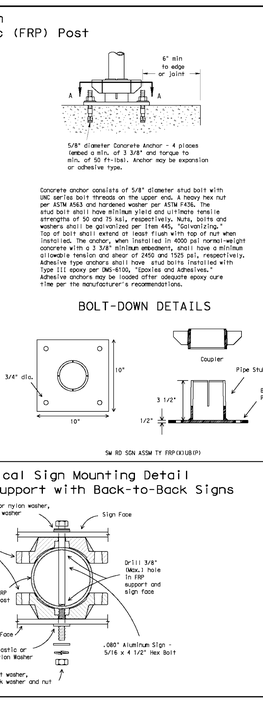
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Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. A heavy hex nut per ASTM A563 and hardened washer per ASTM F436. The stud bolt shall have minimum yield and ultimate tensile strengths of 50 and 75 ksi,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




**GENERAL NOTES:**

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

**FRP POST REQUIREMENTS**

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

**UNIVERSAL ANCHOR SYSTEM INSTALLATION PROCEDURES**

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

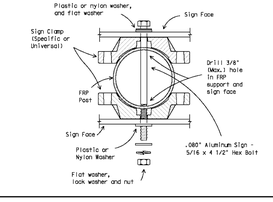
**BOLT DOWN SIGN SUPPORT**

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

**Typical Sign Mounting Detail for FRP Support with Single Sign**




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




Texas Department of Transportation
Traffic Operations Division

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

SMD(FRP)-08

| ©TxDOT July 2022 | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
| REVISIONS | DIST | COUNTY | | HIGHWAY |
| 9-08 | | | | |
| | "ES" | | DistCTL | SHEET No. |

2 SEE

Date: Mar 09, 2023, 4:37pm User ID: williamrod
File: P:\88\341\22\Design\Civil\SGD71883422.dwg
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## GENERAL NOTES

1.) THE EXISTING SIGNS LOCATED ON THE JOBSITE ARE THE PROPERTY OF THE CITY OF SAN ANTONIO. THROUGHOUT THE PERIOD OF THE CONTRACT, THE CONTRACTOR SHALL PROTECT THESE SIGNS SUCH THAT THEY ARE NOT DAMAGED IN THE COURSE OF CONSTRUCTION ACTIVITY. SUCH PROTECTION SHALL INCLUDE THE PERIOD AFTER SIGNS ARE REMOVED FROM INSTALLATION AND STORED BY THE CONTRACTOR OR DELIVERED TO TRAFFIC OPERATIONS. THE ASSISTANT TRAFFIC SUPERINTENDENT (207-7765) MUST BE NOTIFIED 48 HOURS IN ADVANCE PRIOR TO DELIVERY.

2.) AFTER SIGNS ARE REMOVED FROM INSTALLATION AND ARE BEING STORED BY THE CONTRACTOR, THE CONTRACTOR SHALL CONTACT THE TRAFFIC OPERATIONS SECTION OF THE PUBLIC WORKS DEPARTMENT (207-7765) AND ARRANGE FOR A CONVENIENT TIME TO DELIVER CITY SIGNS AND POLES.

3.) PRIOR TO THE START OF CONSTRUCTION, ALL EXISTING SIGNS WITHIN THE AREA OF CONSTRUCTION WILL BE INVENTORIED AND DOCUMENTED JOINTLY BY THE TRAFFIC ENGINEERING (207-7720) CONSTRUCTION INSPECTION AND THE CONTRACTOR. THIS DOCUMENT WILL BE JOINTLY SIGNED BY BOTH PARTIES REFLECTING THE SIGN TYPE, SIGN SIZE, SIGN CONDITION, SIGN LOCATION, REFLECTIVITY ADEQUACY, ETC. THE CONTRACTOR IS HELD ACCOUNTABLE FOR THESE SIGNS THROUGHOUT THE PROJECT AND AT THE PROJECTS COMPLETION.

4.) ALL GROUND MOUNTED SIGNS SHALL USE HIGH INTENSITY REFLECTIVE SHEETING.

5.) ALL OVERHEAD SIGNS SHALL USE DIAMOND GRADE REFLECTIVE SHEETING.

6.) ALL BLANKS TO BE ALUMINUM ALLOY NO. 5052-H38.

7.) "T" DENOTES THICKNESS OF SIGN BLANKS.

8.) ALL HOLES SHALL BE 3 /8" DIAMETER DRILLED OR PUNCHED AS SHOWN ON EACH BLANK DETAIL AND SHALL BE FREE OF BURRS AND /OR ROUGH EDGES.

9.) SIGN BLANK CORNERS TO BE ROUNDED AS SHOWN ON EACH DETAIL.

10.) ALL SIGN BLANK TO BE ETCHED, DEGREASED, AND HAVE AN ALODINE FINISH PRIOR TO APPLICATION OF LEGENDS.

11.) ALL DETAILS ARE NOT TO SCALE.

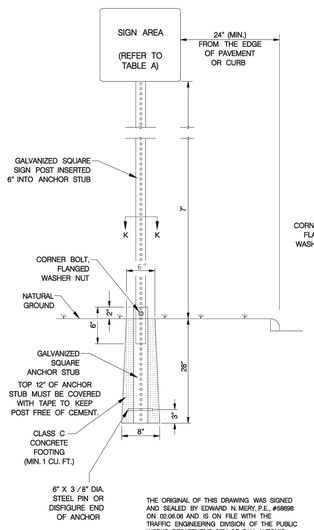
12.) ALL DIMENSIONS ARE IN INCHES.

13.) ALL SIGNS SHALL BE MANUFACTURED AND INSTALLED IN CONFORMANCE TO THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES AND STANDARD HIGHWAY SIGNS (FHWA) LATEST EDITION.

14.) REINSTALLATION OF PREVIOUSLY EXISTING SIGNS, WHERE REQUIRED BY THE CITY TRAFFIC ENGINEER, SHALL BE AT THE CONTRACTOR'S EXPENSE.

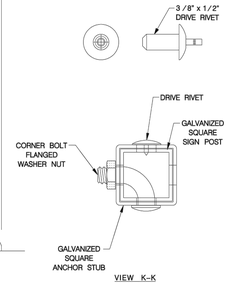
## TYPICAL GROUND SIGN INSTALLATION

TYPE "U" MOUNT
PERFORATED SQUARE METAL TUBING (DRIVEABLE)




| METAL TUBING | SIGN AREA | |
|---|---|---|
| | ≤ 10 SQ. FT. | > 10 SQ. FT. |
| GALVANIZED SQUARE SIGN POST (PERFORATED) | 1-3 /4" x 1-3 /4" (14 GAUGE) | 2" x 2" (12 GAUGE) |
| GALVANIZED SQUARE ANCHOR STUB (PERFORATED) | 2" X 2" (14 GAUGE) | 2-1 /4" x 2-1 /4" (14 GAUGE) |

TABLE A




VIEW K-K

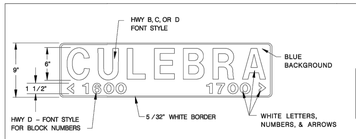
FEBRUARY 2006

CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

TRAFFIC SIGN STANDARDS
GENERAL NOTES AND GROUND SIGN MOUNTING
SHEET 1 OF 4

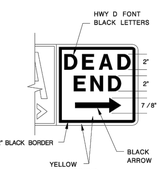
| % SUBMITTAL | PROJECT NO. | | DATE: |
|---|---|---|---|
| DRAWN BY: A.F.S. | DESIGN BY: E.N.M. | CHKD BY: J.D.F./E.N.M. | SHEET NO. | OF |

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9" D3 – STREET NAME SIGN




NEW 9" D3 W / DEAD END OR NO OUTLET SIGNAGE

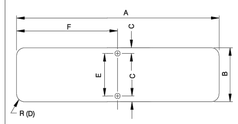
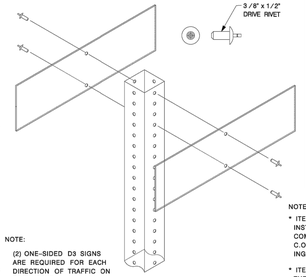



TABLE – D3 SIGNS

| A | B | C | D | E | F | T |
|---|---|---|---|---|---|---|
| 24" | 9" | 1 /2" | 3 /4" | 8" | 12" | 0.125" |
| 30" | 9" | 1 /2" | 3 /4" | 8" | 15" | 0.125" |
| 36" | 9" | 1 /2" | 3 /4" | 8" | 18" | 0.125" |
| 42" | 9" | 1 /2" | 3 /4" | 8" | 21" | 0.125" |
| 48" | 9" | 1 /2" | 3 /4" | 8" | 24" | 0.125" |
| 54" | 9" | 1 /2" | 3 /4" | 8" | 27" | 0.125" |

NOTE: A 30" LONG OR GREATER PLATE SHALL BE USED WHEN A "DEAD END" OR "NO OUTLET" SUPPLEMENT IS REQUIRED.

| | |
|---|---|
| HEIGHT | 9" (228 mm) |
| LENGTH | 24" (600 MM) MIN. 54 (1350 MM) MAX. 6" (150 MM) INCREMENTS OF LENGTH |
| THICKNESS | 0.125" (3MM) |
| SUBSTRATE | ALUMINUM ALLOY, 5052-H38 (ASTM B-209) GOLD CHROMATE FINISH |
| SIGN FACE MATERIALS | BLUE FILM OVER HIGH INTENSITY FP-85, SECTION 718 AND L-S-300C |
| LEGENDS AND SYMBOLS | SERIES D (USUAL) SERIES C OR B FOR MAXIMUM LENGTH SIGN BLANK, IF NECESSARY |
| COLOR | WHITE LEGEND ON BLUE BACKGROUND |
| LETTER TRACKING | 10% |




NOTE:
(2) ONE-SIDED D3 SIGNS ARE REQUIRED FOR EACH DIRECTION OF TRAFFIC ON EACH POLE.

D3 SIGN TO POLE INSTALLATION

TYPICAL GROUND MOUNTED SIGN PLACEMENT

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| STREET SIGN ASSEMBLY EXAMPLES | PAY ITEMS | | | |
|---|---|---|---|---|
| | ITEM | UNIT | DESCRIPTION | QUANTITY |
| STOP SIGN WITH 2 STREET NAMES | 531.3 | EA. | R1-1 STOP | 1 |
| | 531.57-P | EA. | 9-IN STREET NAME PLATE (4 PLATES) | 2 |
| YIELD SIGN WITH 1 STREET NAME | 531.4 | EA. | R1-2 YIELD | 1 |
| | 531.57-P | EA. | 9-IN STREET NAME PLATE (2 PLATES) | 1 |
| 2 STREET SIGNS | 531.57 | EA. | 9-IN STREET NAME SIGN (2 PLATES) | 1 |
| | 531.57-P | EA. | 9-IN STREET NAME PLATE (2 PLATES) | 1 |

NOTE:
* ITEM 531.57 "9-INCH STREET NAME" SIGN (1-EA.) INCLUDES THE INSTALLATION OF (2) ONE-SIDED D3 SIGNS. THIS SHALL BE FULL COMPENSATION FOR MATERIALS AND LABOR AS DESCRIBED IN C.O.S.A. STANDARD SPECIFICATIONS AND GROUND SIGN MOUNTING STANDARD DETAIL.

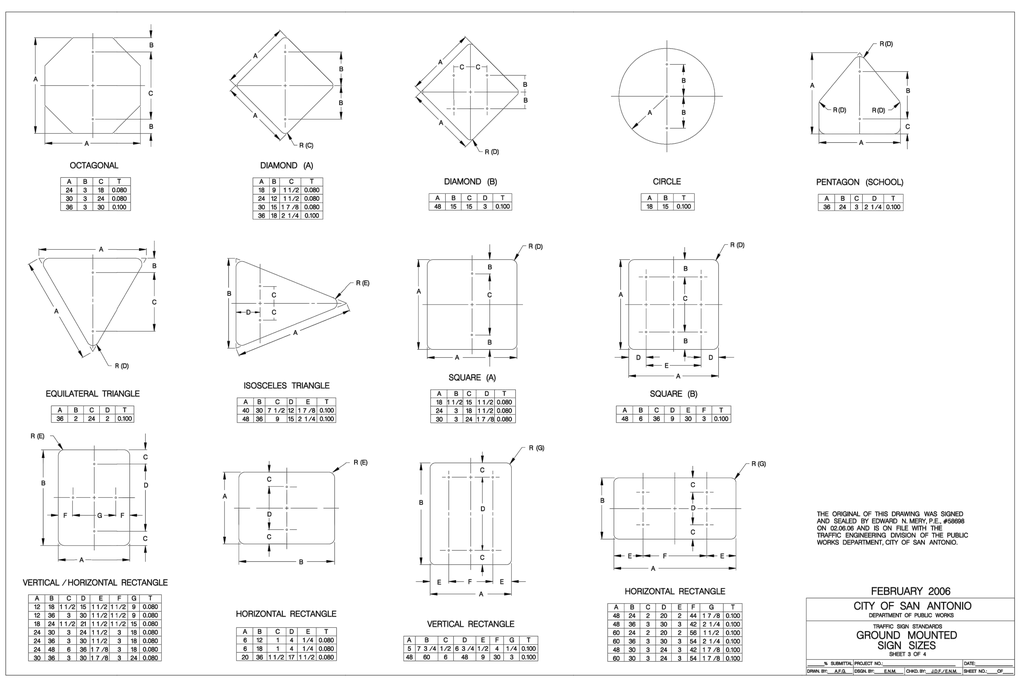
* ITEM 531.57-P "9-INCH STREET NAME PLATE" (1-EA.) INCLUDES THE INSTALLATION OF (2) ONE-SIDED D3 SIGNS ON TOP OF EXISTING SIGN (I.E., STOP SIGN OR YIELD SIGN), EXTRA LENGTH POLE AND APPURTENANCES REQUIRED TO MEET SPECIFICATIONS.

JULY 2010

CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

TRAFFIC SIGN STANDARDS
D3 STREET NAME SIGN AND SIGN MOUNTING
SHEET 2 OF 4

| % SUBMITTAL | PROJECT NO. | | DATE: |
|---|---|---|---|
| DRAWN BY: A.F.S. | DESIGN BY: E.N.M. | CHKD BY: J.D.F./E.N.M. | SHEET NO. | OF |




| A | B | C | D | T |
|---|---|---|---|---|
| 24 | 3 | 18 | | 0.080 |
| 30 | 3 | 24 | | 0.080 |
| 36 | 3 | 30 | | 0.100 |

| A | B | C | T |
|---|---|---|---|
| 18 | 9 | 1 1/2 | 0.080 |
| 24 | 12 | 1 1/2 | 0.080 |
| 30 | 15 | 1 7 /8 | 0.080 |
| 36 | 18 | 2 1/4 | 0.100 |

| A | B | C | D | T |
|---|---|---|---|---|
| 48 | 15 | 15 | 3 | 0.100 |

| A | B | T |
|---|---|---|
| 18 | 15 | 0.100 |

| A | B | C | D | T |
|---|---|---|---|---|
| 36 | 24 | 3 | 2 1/4 | 0.100 |

| A | B | C | D | E | T |
|---|---|---|---|---|---|
| 36 | 2 | 24 | 2 | | 0.100 |

| A | B | C | D | E | T |
|---|---|---|---|---|---|
| 40 | 30 | 7 1/2 | 32 | 1 7 /8 | 0.100 |
| 48 | 36 | 9 | 15 | 2 1/4 | 0.100 |

| A | B | C | D | T |
|---|---|---|---|---|
| 18 | 1 1/2 | 15 | 1 1/2 | 0.080 |
| 24 | 3 | 18 | 1 1/2 | 0.080 |
| 30 | 3 | 24 | 1 7 /8 | 0.080 |

| A | B | C | D | E | F | T |
|---|---|---|---|---|---|---|
| 48 | 6 | 36 | 9 | 30 | 3 | 0.100 |

| A | B | C | D | E | F | G | T |
|---|---|---|---|---|---|---|---|
| 12 | 18 | 1 1/2 | 15 | 1 1/2 | 1 1/2 | 9 | 0.080 |
| 12 | 36 | 3 | 30 | 1 1/2 | 1 1/2 | 9 | 0.080 |
| 18 | 24 | 1 1/2 | 21 | 1 1/2 | 1 1/2 | 15 | 0.080 |
| 24 | 30 | 3 | 24 | 1 1/2 | 3 | 18 | 0.080 |
| 24 | 36 | 3 | 30 | 1 1/2 | 3 | 18 | 0.080 |
| 24 | 48 | 6 | 36 | 1 7 /8 | 3 | 18 | 0.080 |
| 30 | 36 | 3 | 30 | 1 7 /8 | 3 | 24 | 0.080 |

| A | B | C | D | T |
|---|---|---|---|---|
| 6 | 12 | 1 | 4 | 1/4 0.080 |
| 6 | 18 | 1 | 4 | 1/4 0.080 |
| 20 | 36 | 1 1/2 | 17 | 1 1/2 0.080 |

| A | B | C | D | E | T |
|---|---|---|---|---|---|
| 5 | 7 3 /4 | 1 1/2 | 6 | 3 /4 | 1/2 0.100 |
| 48 | 60 | 6 | 48 | 9 | 30 3 0.100 |

| A | B | C | D | E | F | G | T |
|---|---|---|---|---|---|---|---|
| 48 | 24 | 2 | 20 | 2 | 44 | 1 7 /8 | 0.100 |
| 48 | 36 | 3 | 30 | 3 | 42 | 2 1/4 | 0.100 |
| 60 | 24 | 2 | 20 | 2 | 56 | 1 1/2 | 0.100 |
| 60 | 36 | 3 | 30 | 3 | 54 | 2 1/4 | 0.100 |
| 48 | 30 | 3 | 24 | 3 | 42 | 1 7 /8 | 0.100 |
| 60 | 30 | 3 | 24 | 3 | 54 | 1 7 /8 | 0.100 |

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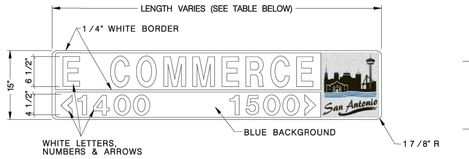
FEBRUARY 2006

CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

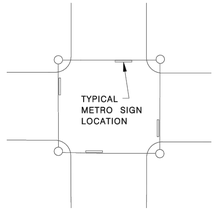
TRAFFIC SIGN STANDARDS
GROUND MOUNTED SIGN SIZES
SHEET 3 OF 4

| % SUBMITTAL | PROJECT NO. | | DATE: |
|---|---|---|---|
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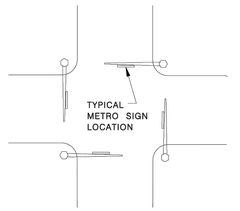
## TYPICAL METRO SIGN PLACEMENT




15" METRO – STREET NAME SIGNS

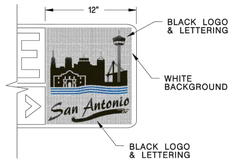


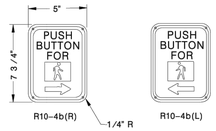

SPAN WIRE INSTALLATION




MAST ARM INSTALLATION

15" METRO w/CITY SKY LINE




PEDESTRIAN PUSHBUTTON SIGNS

| | |
|---|---|
| HEIGHT | 15" (381 MM) |
| LENGTH | 48" (1200 MM) MIN. 72" (1800 MM) MAX.** 1' (300 MM) 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 FP-85, SECTION 718 AND L-S-300C |
| LEGENDS AND SYMBOLS | SERIES D (USUAL) SERIES C OR B FOR MAXIMUM LENGTH SIGN BLANK, IF NECESSARY |
| COLOR | WHITE LEGEND ON BLUE BACKGROUND |
| LETTER TRACKING | 17% (USUAL) 10% (MIN.) |

** SIGN PLATE LONGER THAN 72" MUST BE APPROVED BY THE CITY TRAFFIC ENGINEER

* DIAMOND GRADE SHEETING 5052-H38 ALUMINUM SUBSTRATE




R10-10
*(30" X 36")




R3-5L
*(30" X 36")




R10-9
*(30" X 24")




R10-12
*(30" X 36")

LEFT TURN SIGNS

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FEBRUARY 2006

CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

TRAFFIC SIGN STANDARDS
METRO STREET NAME SIGN AND SIGN PLACEMENT
SHEET 4 OF 4

| % SUBMITTAL | PROJECT NO. | | DATE: |
|---|---|---|---|
| DRAWN BY: A.F.S. | DESIGN BY: E.N.M. | CHKD BY: J.D.F./E.N.M. | SHEET NO. | OF |

| NO. | REVISION | DATE |
|---|---|---|

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

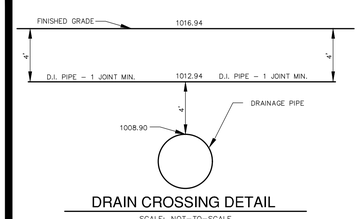
STATE OF TEXAS
CALEB M. CHANCE
98401
LICENSED PROFESSIONAL ENGINEER
3/9/23

SHAVANO HIGHLANDS UNIT 7
SAN ANTONIO, TEXAS
SIGNAGE DETAILS

PLAT NO. 23-11800083
JOB NO. 8834-22
DATE DECEMBER 2021
DESIGNER AW
CHECKED CC DRAWN RC
SHEET C3.12

Date: Mar 09, 2023, 4:38pm User ID: villarreal
File: P:\88\34\22\Design\Civil\SD78834222.dwg

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DRAIN CROSSING DETAIL

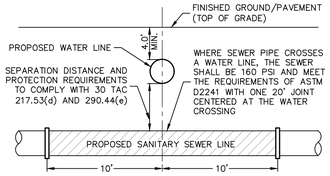
SCALE: NOT-TO-SCALE

## KEYED NOTES:

1. 1 – STANDARD FIRE HYDRANT
   1 – 12" X 6" ANCHOR TEE, M.J.
   6" D.I. PIPE, CUT AS REQ'D
   1 – 6" 1/4 ANCHOR BEND, M.J.
   1 – 6" GATE VALVE, M.J.
   1 – 6" VALVE BOX, COMPLETE
   (SEE SAWS DETAIL DD-834-01 SHEET 2 OF 2)
2. FOR CHLORINATION INJECTION:
   2 – 1" CORPORATION STOP, CC X IP
   2 – 1" COPPER TUBING, CUT AS REQ'D
   2 – 1" COMP. X 1½" COUPLING, CURB STOP
   2 – 1½" THD SOLID CAPS, THR

   1–2" BLOWOFF ASSEMBLY (TEMP)
   (SEE DETAIL SHEET C5.20)

   CONTRACTOR TO TIE INTO EXISTING 12" PVC WATER MAIN
   AFTER DISINFECTION AND ACCEPTANCE BY SAWS
   SAWS JOB NO. 21–1107
3. 10' GAS, ELECTRIC, TELEPHONE AND CABLE TV EASEMENT
11. VARIABLE WIDTH SANITARY SEWER EASEMENT (OFF–LOT) (0.556 ACRE)
12. 10' GAS, ELECTRIC, TELEPHONE AND CABLE TV EASEMENT (OFF–LOT)(0.354 TOTAL ACRES)
13. VARIABLE WIDTH SANITARY SEWER EASEMENT (0.007 ACRE)
4. 10' GAS, ELECTRIC, TELEPHONE AND CABLE TV EASEMENT (VOL 20001, PG 1109–1111, DPR)
5. 10'x10' GAS, ELECTRIC, TELEPHONE AND CABLE TV EASEMENT (VOL 20001, PG 1109–1111, DPR)
6. ELECTRIC LINE RIGHT–OF–WAY AGREEMENT (VOL 16444, PG. 2154, OPR) (VOL 16464, PG. 76, OPR)
7. EASEMENT AGREEMENT VARIABLE WIDTH WATER, UTILITY, INGRESS AND TERMINATION OF ORIGINAL EASEMENT (VOL 16346, PG. 1335, OPR)
8. 65' INGRESS/EGRESS & ELECTRIC EASEMENT (VOL 1183, PG 280, OPR)
9. 135' ELECTRIC TRANSMISSION POWER EASEMENT (VOL 5655, PG 284, OPR)
10. 75' ELECTRIC EASEMENT (VOL 7191, PG 145, OPR)
14. VARIABLE WIDTH WATER & UTILITY EASEMENT (VOL. 11683, PGS. 2474–2491 OPR) (VOL. 11683, PGS. 2492–2507 OPR)
15. SECOND AMENDED AND RESTATED SANITARY CONTROL EASEMENT (DOC. NO. 20190259079, OPR)




TYPICAL SANITARY SEWER/WATER CROSSING DETAIL

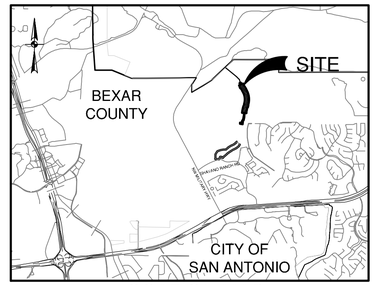
NOT–TO–SCALE

## FIRE FLOW NOTE:

IN AN EFFORT TO MEET THE CITY OF SAN ANTONIO'S FIRE FLOW REQUIREMENTS FOR THE PROPOSED RESIDENTIAL DEVELOPMENT, THE PUBLIC WATER MAIN SYSTEM HAS BEEN DESIGNED FOR A MINIMUM FIRE FLOW DEMAND OF 2250 GPM AT 25 PSI RESIDUAL PRESSURE. THE FIRE FLOW REQUIREMENTS FOR INDIVIDUAL STRUCTURES WILL BE REVIEWED DURING THE BUILDING PERMIT PROCESS IN ACCORDANCE WITH THE PROCEDURES SET FORTH BY THE CITY OF SAN ANTONIO DIRECTOR OF DEVELOPMENT SERVICES DEPARTMENT AND THE SAN ANTONIO FIRE DEPARTMENT FIRE MARSHAL.

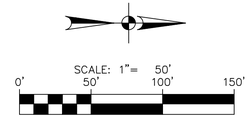
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LOCATION MAP

NOT–TO–SCALE




## WATER LEGEND

- PROJECT LIMITS
- EXISTING WATER
- EXISTING SEWER
- PROPOSED SEWER
- PROPOSED WATER
- PROPOSED 3/4" SINGLE SERVICE WITH 5/8" METER
- PROPOSED 1" DUAL SERVICE WITH 5/8" METER
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- JOINT RESTRAINT
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PRESSURE REDUCING VALVE TO BE INSTALLED ON CUSTOMER'S SIDE OF METER BY HOMEBUILDER.

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CONTRACTOR TO VERIFY THAT NO PORTION OF THE TRACT IS BELOW GROUND ELEVATION OF 1215 FEET WHERE THE STATIC PRESSURE WILL NORMALLY EXCEED 80 PSI. AT ALL SUCH LOCATIONS WHERE THE GROUND LEVEL IS BELOW 1215 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.
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## WATER (SAWS PRESSURE ZONE 11)

DEVELOPER'S NAME: BITTERBLUE/ROGERS WATER INTERESTS, LTD.
ADDRESS: 11 LYNN BATTS LANE, SUITE 100
CITY: SAN ANTONIO STATE: TEXAS ZIP: 78218
PHONE# 210–826–6131 FAX#
SAWS BLOCK MAP# 08–2616 & 08–2616 TOTAL EDU'S 48 TOTAL ACREAGE 18.90
TOTAL LINEAR FOOTAGE OF PIPE: 12"–2,714 LF, 8"–278 LF PLAT NO. 23–11800083
NUMBER OF LOTS 46 SAWS JOB NO. 23–1041



PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

STATE OF TEXAS
CALEB M. CHANCE
98401
LICENSED PROFESSIONAL ENGINEER
4/15/24

| NO. | REVISION | DATE |
|---|---|---|

# SHAVANO HIGHLANDS UNIT 7
SAN ANTONIO, TEXAS

OVERALL WATER DISTRIBUTION PLAN

PLAT NO. 23-11800083
JOB NO. 8834-22
DATE NOVEMBER 2023
DESIGNER AW
CHECKED CC DRAWN RC
SHEET C4.00

Date: Apr 15, 2024, 2:57pm User ID: williamreal
File: P:\88\34\22\Design\Civil\WTOA883422.dwg

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## KEYED NOTES:

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   1 – 12" X 6" ANCHOR TEE, M.J.
   6" D.I. PIPE, CUT AS REQ'D
   1 – 6" 1/4 ANCHOR BEND, M.J.
   1 – 6" GATE VALVE, M.J.
   1 – 6" VALVE BOX, COMPLETE
   (SEE SAWS DETAIL DD-834-01 SHEET 2 OF 2)

2. FOR CHLORINATION INJECTION:
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   2 – 1" COPPER TUBING, CUT AS REQ'D
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   2 – 1½" THD SOLID CAPS, THR

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3. 10' GAS, ELECTRIC, TELEPHONE AND CABLE TV EASEMENT

4. VARIABLE WIDTH SANITARY SEWER EASEMENT (OFF–LOT) (0.556 ACRE)

5. 10' GAS, ELECTRIC, TELEPHONE AND CABLE TV EASEMENT (OFF–LOT)(0.354 TOTAL ACRES)

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10. EASEMENT AGREEMENT VARIABLE WIDTH WATER, UTILITY, INGRESS AND TERMINATION OF ORIGINAL EASEMENT (VOL 16346, PG. 1335, OPR)

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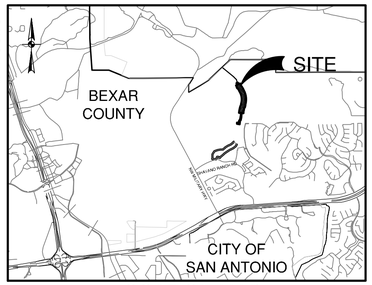
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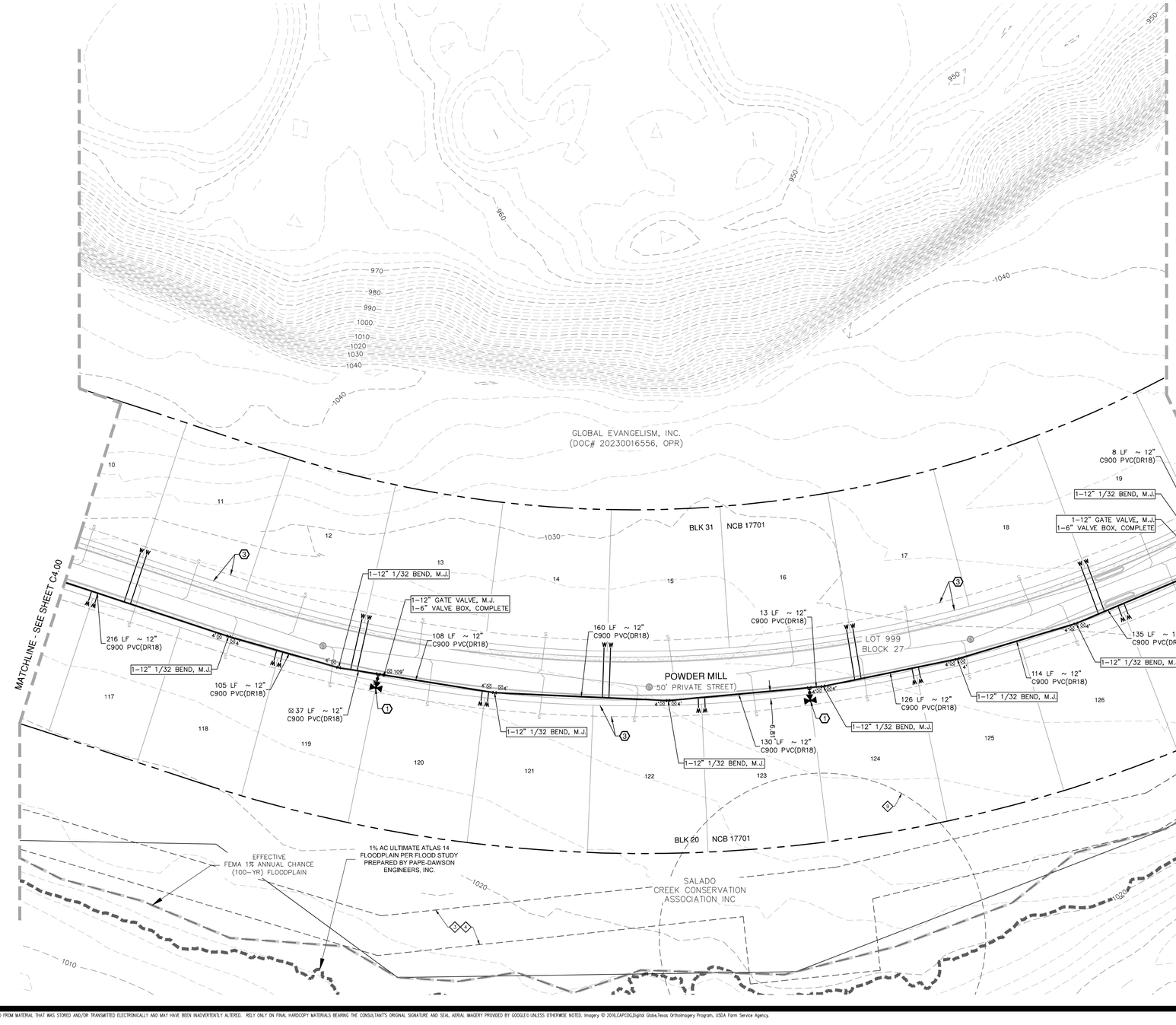
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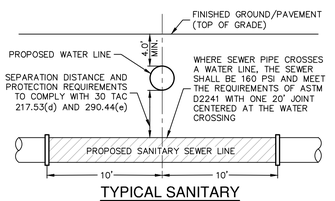
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CALEB M. CHANCE
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SAN ANTONIO, TEXAS

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PLAT NO. 23-11800083
JOB NO. 8834-22
DATE NOVEMBER 2023
DESIGNER AW
CHECKED CC DRAWN RC
SHEET C4.01


Date: Apr 15, 2024, 2:52pm User ID: villarreal
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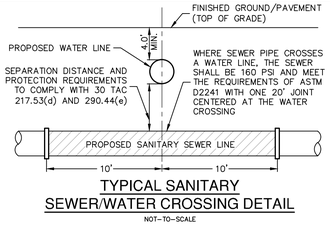
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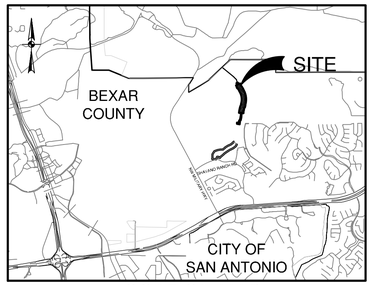
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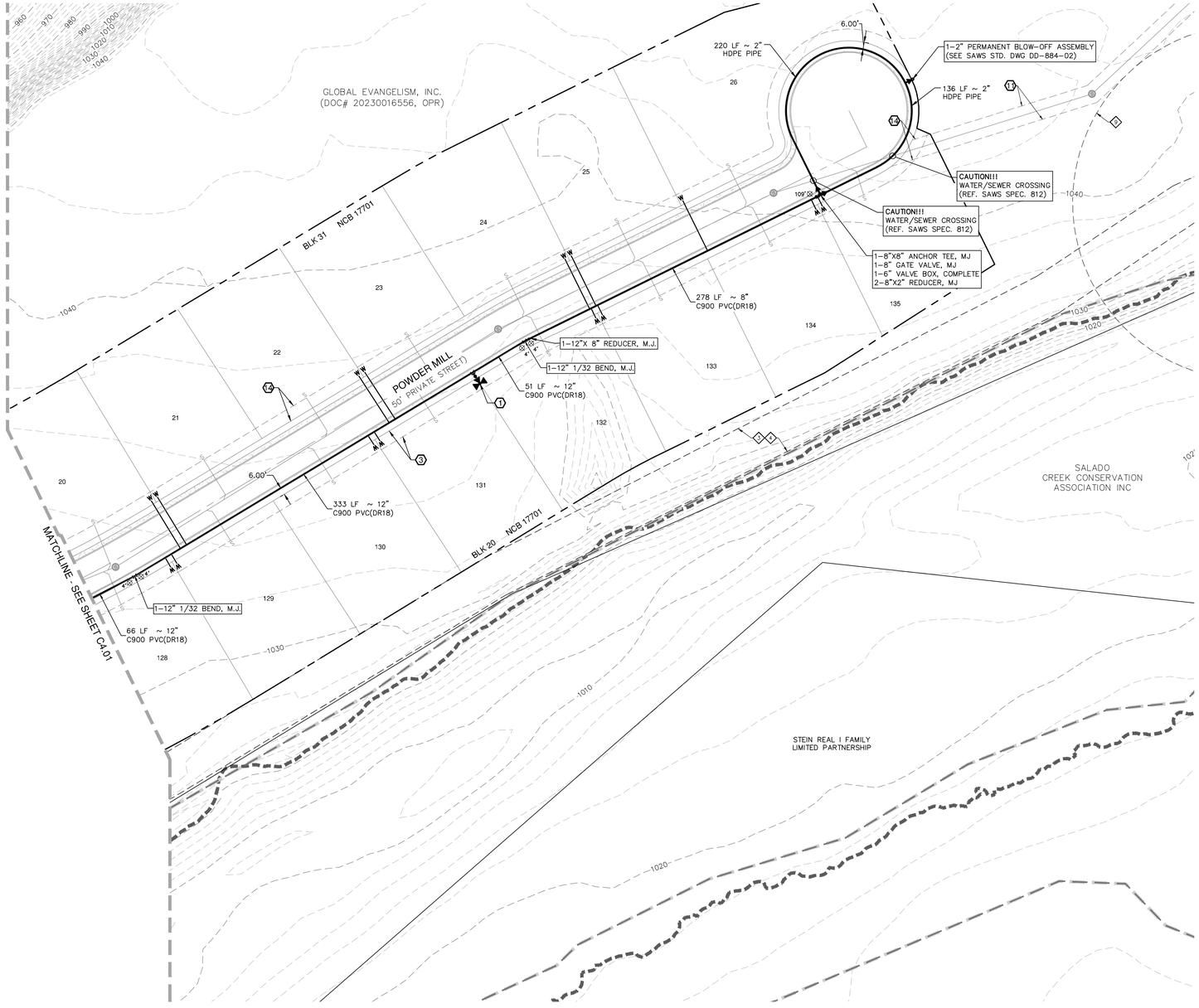



## LOCATION MAP

NOT–TO–SCALE

SCALE: 1"= 50'

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- PROJECT LIMITS
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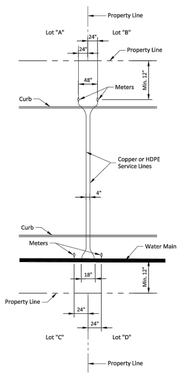
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SHEET C4.02

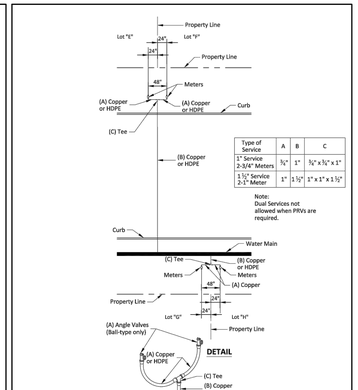
Date: Apr 15, 2024, 2:52pm User ID: williereal
File: P:\88\34\22\Design\Civil\WTOA883422.dwg

THIS DOCUMENT HAS BEEN PRODUCED FROM MATERIAL THAT WAS STORED AND/OR TRANSMITTED ELECTRONICALLY AND MAY HAVE BEEN INADVERTENTLY ALTERED. RELY ONLY ON FINAL HARDCOPY MATERIALS BEARING THE CONSULTANT'S ORIGINAL SIGNATURE AND SEAL. AERIAL IMAGERY PROVIDED BY GOOGLE© UNLESS OTHERWISE NOTED. Imagery © 2016,CAPCOG,Digital Globe,Texas OrthoImagery Program, USDA Farm Service Agency.




**SINGLE SERVICE LINE - SINGLE METER**

| PROPERTY OF | TYPICAL | APPROVED | REVISED |
|---|---|---|---|
| SAN ANTONIO WATER SYSTEM<br>SAN ANTONIO, TEXAS | NEW DEVELOPMENT SERVICE ARRANGEMENT | March 2008 | December 2018 |
| | DD-824-05 | | SHEET 1 OF 3 |



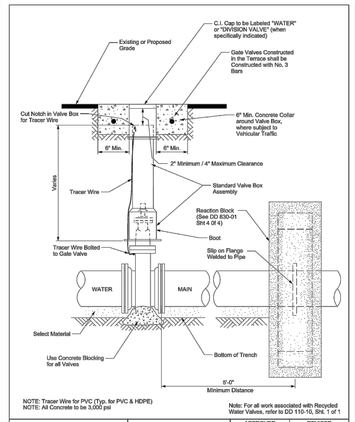

| Type of Service | A | B | C |
|---|---|---|---|
| 1" Service 2-3/4" Meters | ¾" | 1" | ¾" x ¾" x 1" |
| 1 ½" Service 2-1" Meter | 1" | 1 ½" | 1" x 1" x 1 ½" |

Note:
Dual Services not allowed when PRVs are required.

**DETAIL**

**SINGLE SERVICE LINE - DUAL METER**

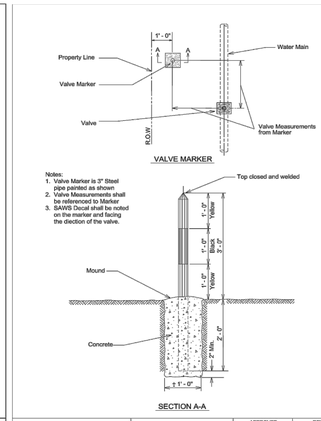
| PROPERTY OF | TYPICAL | APPROVED | REVISED |
|---|---|---|---|
| SAN ANTONIO WATER SYSTEM<br>SAN ANTONIO, TEXAS | SERVICE ARRANGEMENT | March 2008 | December 2018 |
| | DD-824-05 | | SHEET 2 OF 3 |




NOTE: Tracer Wire for PVC (Typ. for PVC & HDPE)
NOTE: All Concrete to be 3,000 psi

Note: For all work associated with Recycled Water Valves, refer to SDI 110-10, Bht. 1 of 1

| PROPERTY OF | INSTALLATION OF NON-GEARED GATE VALVE WITH VALVE BOX AND EXTENSION | APPROVED | REVISED |
|---|---|---|---|
| SAN ANTONIO WATER SYSTEM<br>SAN ANTONIO, TEXAS | | MARCH 2008 | AUG 2019 |
| | DD 828-01 | | SHEET 1 OF 1 |




**VALVE MARKER**

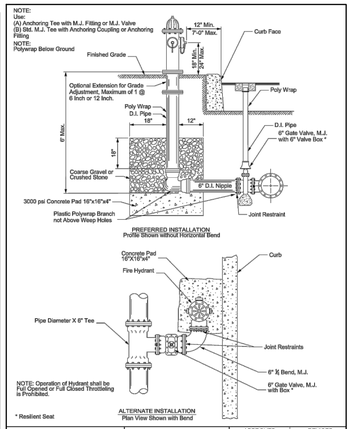
Notes:
1. Valve Marker is 3" Steel pipe painted as shown
2. Valve Measurements shall be referenced to Marker
3. SAWS Decal shall be noted on the marker and facing the direction of the valve.




**SECTION A-A**

| PROPERTY OF | VALVE MARKER | APPROVED | REVISED |
|---|---|---|---|
| SAN ANTONIO WATER SYSTEM<br>SAN ANTONIO, TEXAS | | MARCH 2008 | AUG 2019 |
| | DD-828-04 | | SHEET 1 OF 1 |

NOTE:
Use:
(A) Anchoring Tee with M.J. Fitting or M.J. Valve
(B) Std. M.J. Tee with Anchoring Coupling or Anchoring Fitting
NOTE:
Polywrap Below Ground




PREFERRED INSTALLATION
Profile Shown without Horizontal Bend

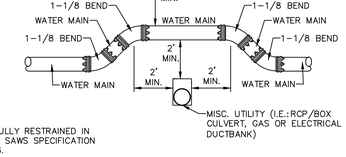



NOTE: Operation of Hydrant shall be Full Opened or Full Closed Throttleing is Prohibited.

* Resilient Seat

ALTERNATE INSTALLATION
Plan View Shown with Bend

| PROPERTY OF | FIRE HYDRANT INSTALLATION (JOINT RESTRAINT) | APPROVED | REVISED |
|---|---|---|---|
| SAN ANTONIO WATER SYSTEM<br>SAN ANTONIO, TEXAS | | MAY 2013 | AUG 2019 |
| | DD-834-01 | | SHEET 1 OF 5 |



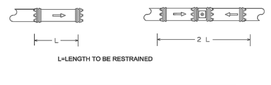

RESTRAINED LENGTH FOR TEES

| PIPE SIZE (inch) | BRANCH SIZE (inch) | LENGTH OF RUN (ft.) | RESTRAINED LENGTH IN FEET, WHEN TEST PRESSURE = 200 psi | RESTRAINED LENGTH IN FEET, WHEN TEST PRESSURE = 150 psi |
|---|---|---|---|---|
| 6 | 4 | 0 | 42 | 31 |
| 6 | 4 | 5 | 7 | 1 |
| 6 | 4 | 10 | 7 | 1 |
| 6 | 6 | 0 | 59 | 44 |
| 6 | 6 | 5 | 35 | 26 |
| 6 | 6 | 10 | 11 | 7 |
| 8 | 4 | 0 | 42 | 31 |
| 8 | 4 | 5 | 1 | 1 |
| 8 | 4 | 10 | 1 | 1 |
| 8 | 6 | 0 | 59 | 44 |
| 8 | 6 | 5 | 28 | 13 |
| 8 | 6 | 10 | 1 | 1 |
| 8 | 8 | 0 | 77 | 58 |
| 8 | 8 | 5 | 63 | 34 |
| 8 | 8 | 10 | 30 | 11 |
| 8 | 8 | 15 | 6 | 1 |

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

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

| PROPERTY OF | RESTRAINED LENGTHS FOR TEES | APPROVED | REVISED |
|---|---|---|---|
| SAN ANTONIO WATER SYSTEM<br>SAN ANTONIO, TEXAS | | March 2008 | AUG 2019 |
| | DD-839-04 | | SHEET 1 OF 2 |




L=LENGTH TO BE RESTRAINED

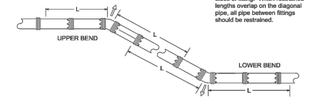
| PIPE SIZE (inch) | RESTRAINED LENGTH IN FEET, WHEN TEST PRESSURE = 200 psi | RESTRAINED LENGTH IN FEET, WHEN TEST PRESSURE = 150 psi |
|---|---|---|
| 6 | 59 | 44 |
| 8 | 77 | 58 |
| 10 | 93 | 69 |
| 12 | 109 | 82 |

RESTRAINED LENGTH DESIGN

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

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

| PROPERTY OF | RESTRAINED LENGTHS FOR DEAD ENDS / INLINE VALVES | APPROVED | REVISED |
|---|---|---|---|
| SAN ANTONIO WATER SYSTEM<br>SAN ANTONIO, TEXAS | | MARCH 2008 | AUG 2019 |
| | DD-839-05 | | SHEET 1 OF 1 |

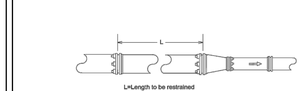



| PIPE SIZE (inch) | BEND ANGLE (deg.) | LOW SIDE DEPTH | UPPER BEND RESTRAINED LENGTH IN FEET TEST PRESSURE = 200 psi | LOWER BEND RESTRAINED LENGTH IN FEET TEST PRESSURE = 200psi | UPPER BEND RESTRAINED LENGTH IN FEET TEST PRESSURE = 150 psi | LOWER BEND RESTRAINED LENGTH IN FEET TEST PRESSURE = 150 psi |
|---|---|---|---|---|---|---|
| 6 | 45 | 5 | 24 | 8 | 18 | 6 |
| 6 | 22.5 | 5 | 12 | 4 | 9 | 3 |
| 6 | 11.25 | 5 | 6 | 2 | 4 | 1 |
| 6 | 45 | 10 | 24 | 5 | 18 | 4 |
| 6 | 22.5 | 10 | 12 | 2 | 9 | 2 |
| 6 | 11.25 | 10 | 6 | 1 | 4 | 1 |
| 8 | 45 | 5 | 32 | 11 | 24 | 8 |
| 8 | 22.5 | 5 | 15 | 5 | 11 | 4 |
| 8 | 11.25 | 5 | 8 | 3 | 6 | 2 |
| 8 | 45 | 10 | 32 | 7 | 24 | 5 |
| 8 | 22.5 | 10 | 15 | 3 | 11 | 2 |
| 8 | 11.25 | 10 | 8 | 2 | 6 | 1 |
| 12 | 45 | 5 | 45 | 16 | 34 | 12 |
| 12 | 22.5 | 5 | 22 | 7 | 16 | 6 |
| 12 | 11.25 | 5 | 11 | 4 | 8 | 3 |
| 12 | 45 | 10 | 45 | 10 | 34 | 7 |
| 12 | 22.5 | 10 | 22 | 5 | 16 | 3 |
| 12 | 11.25 | 10 | 11 | 2 | 8 | 2 |

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

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

| PROPERTY OF | RESTRAINED LENGTHS VERTICAL OFFSETS | APPROVED | REVISED |
|---|---|---|---|
| SAN ANTONIO WATER SYSTEM<br>SAN ANTONIO, TEXAS | | MARCH 2008 | AUG 2019 |
| | DD-839-06 | | SHEET 1 OF 1 |

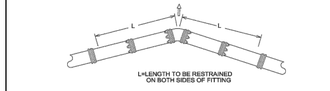



| PIPE SIZE (inch) | SMALL SIZE (inch) | RESTRAINED LENGTH IN FEET, WHEN TEST PRESSURE = 200 psi | RESTRAINED LENGTH IN FEET, WHEN TEST PRESSURE = 150 psi |
|---|---|---|---|
| 6 | 4 | 30 | 23 |
| 8 | 4 | 55 | 42 |
| 8 | 6 | 32 | 24 |
| 12 | 6 | 60 | 46 |
| 12 | 8 | 58 | 43 |

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

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

| PROPERTY OF | RESTRAINED LENGTHS FOR REDUCERS | APPROVED | REVISED |
|---|---|---|---|
| SAN ANTONIO WATER SYSTEM<br>SAN ANTONIO, TEXAS | | MARCH 2008 | AUG 2019 |
| | DD-839-07 | | SHEET 1 OF 1 |

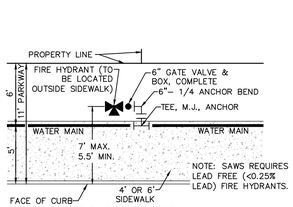



| PIPE SIZE (inch) | BEND ANGLE (deg.) | RESTRAINED LENGTH IN FEET, WHEN TEST PRESSURE = 200 psi | RESTRAINED LENGTH IN FEET, WHEN TEST PRESSURE = 150 psi |
|---|---|---|---|
| 6 | 90 | 23 | 17 |
| 6 | 45 | 9 | 7 |
| 6 | 22.5 | 5 | 3 |
| 6 | 11.25 | 2 | 2 |
| 8 | 90 | 30 | 22 |
| 8 | 45 | 12 | 7 |
| 8 | 22.5 | 6 | 4 |
| 8 | 11.25 | 3 | 2 |
| 12 | 90 | 43 | 32 |
| 12 | 45 | 18 | 13 |
| 12 | 22.5 | 8 | 6 |
| 12 | 11.25 | 4 | 3 |

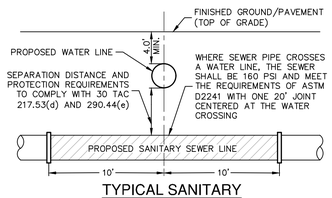
RESTRAINED LENGTH DESIGN
Restrained length calculations are for P.V.C pipe bedded in compacted granular material extending to the top of the pipe. The native soil material is assumed to be inorganic clay of high plasticity. Depth of bury is assumed to be 4 feet.

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

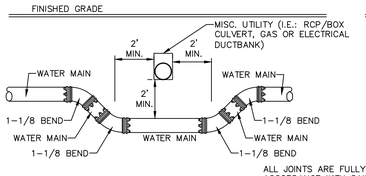
| PROPERTY OF | RESTRAINED LENGTHS FOR HORIZONTAL BENDS | APPROVED | REVISED |
|---|---|---|---|
| SAN ANTONIO WATER SYSTEM<br>SAN ANTONIO, TEXAS | | MARCH 2008 | AUG 2019 |
| | DD-839-08 | | SHEET 1 OF 1 |




FIRE HYDRANT INSTALLATION
NOT-TO-SCALE




TYPICAL SANITARY SEWER/WATER CROSSING DETAIL
NOT-TO-SCALE



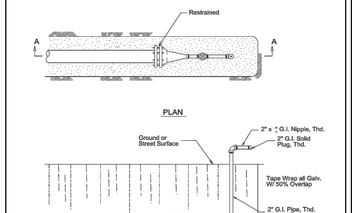




ALL JOINTS ARE FULLY RESTRAINED IN ACCORDANCE WITH SAWS SPECIFICATION TABLE DD-839-06.

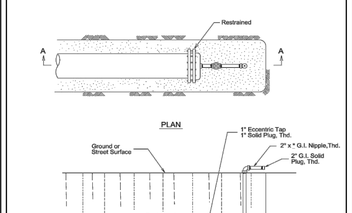
TYPICAL UTILITY/WATER CROSSING DETAIL
NOT-TO-SCALE

| PROPERTY OF | 2" TEMPORARY BLOW-OFF ASSEMBLY ON 6" & 8" MAINS | APPROVED | REVISED |
|---|---|---|---|
| SAN ANTONIO WATER SYSTEM<br>SAN ANTONIO, TEXAS | | March 2008 | AUG 2019 |
| | DD-844-01 | | SHEET 1 OF 4 |



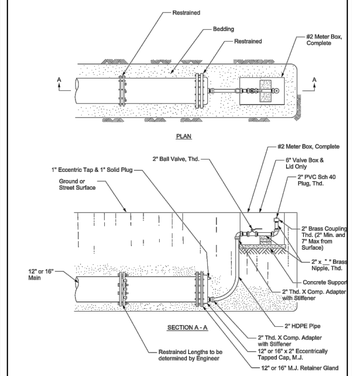

Cut as required to extend beyond excavation

| PROPERTY OF | 2" TEMPORARY BLOW-OFF ASSEMBLY ON 12" & 16" MAINS | APPROVED | REVISED |
|---|---|---|---|
| SAN ANTONIO WATER SYSTEM<br>SAN ANTONIO, TEXAS | | March 2008 | AUG 2019 |
| | DD-844-01 | | SHEET 2 OF 4 |



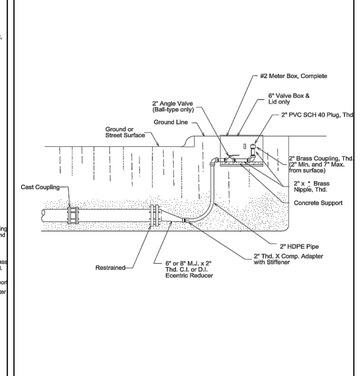

Cut as required to extend beyond excavation.

| PROPERTY OF | 2" TEMPORARY BLOW-OFF ASSEMBLY ON 12" & 16" MAINS | APPROVED | REVISED |
|---|---|---|---|
| SAN ANTONIO WATER SYSTEM<br>SAN ANTONIO, TEXAS | | March 2008 | AUG 2019 |
| | DD-844-01 | | SHEET 2 OF 4 |




* Length Varies

| PROPERTY OF | 2" PERMANENT BLOW-OFF ASSEMBLY ON 12" & 16" MAINS | APPROVED | REVISED |
|---|---|---|---|
| SAN ANTONIO WATER SYSTEM<br>SAN ANTONIO, TEXAS | | MARCH 2008 | AUG 2019 |
| | DD-844-02 | | SHEET 3 OF 5 |




* Cut to fit in meter box.

| PROPERTY OF | 2" PERMANENT BLOW-OFF ASSEMBLY ON 6" & 8" MAINS | APPROVED | REVISED |
|---|---|---|---|
| SAN ANTONIO WATER SYSTEM<br>SAN ANTONIO, TEXAS | | MARCH 2008 | AUG 2019 |
| | DD-844-02 | | SHEET 3 OF 5 |

WATER (SAWS PRESSURE ZONE 11)

DEVELOPER'S NAME: BITTERBLUE/ROGERS WATER INTERESTS, LTD.
ADDRESS: 11 LYNN BATTS LANE, SUITE 100
CITY: SAN ANTONIO STATE: TEXAS ZIP: 78218
PHONE# 210-826-6131 FAX#
SAWS BLOCK MAP# 08-2816 & 08-2616 TOTAL EDU'S 48 TOTAL ACREAGE 18.90
TOTAL LINEAR FOOTAGE OF PIPE: 12"-2,714 LF. 8"-278 LF PLAT NO. 23-11800083
NUMBER OF LOTS 46 SAWS JOB NO. 23-1041

NO. REVISION DATE

STATE OF TEXAS
CALEB M. CHANCE
98401
LICENSED PROFESSIONAL ENGINEER
4/15/24

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

# SHAVANO HIGHLANDS UNIT 7
SAN ANTONIO, TEXAS

WATER DISTRIBUTION PLAN DETAILS

PLAT NO. 23-11800083
JOB NO. 8834-22
DATE NOVEMBER 2023
DESIGNER AW
CHECKED CC DRAWN RC
SHEET C4.10

Date: Apr 15, 2024, 2:53pm User ID: williamsd
File: P:\88\34\22\Design\Civil\WTD788422.dwg

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# SAWS CONSTRUCTION NOTES

(LAST REVISED JULY 2017)

## SAWS 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
   (210) 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.

    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.

11. 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.

## SAWS WATER NOTES

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 ASBESTOS- CONTAINING 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 1215 FEET WHERE THE STATIC PRESSURE WILL NORMALLY EXCEED 80 PSI. AT ALL SUCH LOCATIONS WHERE THE GROUND LEVEL IS BELOW 1215 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.

## PROJECT WATER NOTES

1. MACHINE CHLORINATION BY THE S.A.W.S.

2. ALL 8", 12" AND 16" PIPE SHALL BE P.V.C. C-900 CLASS 235 DR 18.

3. ALL MAINS SHALL BE HYDROSTATICALLY TESTED BY THE CONTRACTOR, AS PROVIDED FOR IN THE SPECIAL CONDITIONS.

4. THE WATER LINES WILL BE SET FROM THE STREET HUBS BEFORE THIS CONTRACT BEGINS. STREET CUT SHEETS WILL BE SUPPLIED TO THE CONTRACTOR. THERE SHOULD BE NO ADDITIONAL STAKES REQUIRED, AND IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO INSPECT THE SITE AND VERIFY THAT ALL STAKES REQUIRED FOR HIS WORK ARE IN PLACE AT THE TIME THE CONSTRUCTION BEGINS. IF ANY STAKES ARE MISSING THE ENGINEER SHOULD BE NOTIFIED IMMEDIATELY. AFTER CONSTRUCTION BEGINS, ALL CONSTRUCTION STAKES, MARKS, ETC., SHALL BE CAREFULLY PRESERVED BY THE CONTRACTOR, AND IN CASE OF DESTRUCTION OR REMOVAL BY THE CONTRACTOR, HIS EMPLOYEE OR ANY OTHER MEANS, SUCH STAKES, MARKS, ETC., SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.

5. THE CONTRACTOR SHALL FURNISH THE ENGINEER WITH ALL THE FINAL MEASUREMENTS, TAPS AND LENGTH OF SERVICE CONNECTIONS.

6. THE LOT CORNERS WILL BE SET BY THE ENGINEER FOR INSTALLATION OF ALL WATER SERVICES. THESE LOT CORNERS SHALL BE CAREFULLY PRESERVED BY THE CONTRACTOR SO THE METER BOXES CAN BE SET IN PHASE II. ANY LOT CORNER DESTROYED OR REMOVED BY THE CONTRACTOR, HIS EMPLOYEES, OR BY ANY OTHER MEANS SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.

7. STREETS WILL HAVE BEEN EXCAVATED DOWN TO SUBGRADE AND THE PARKWAY WILL BE CUT DOWN TO TOP OF CURB BY THE STREET CONTRACTOR, PRIOR TO CONSTRUCTION OF THE WATER MAINS. IT WILL BE THE UTILITY CONTRACTOR'S RESPONSIBILITY TO PROVIDE A PAD FOR HIS EQUIPMENT.

8. WATER METER BOXES IF APPLICABLE SHALL BE INSTALLED NINE FEET FROM FACE OF CURB TO CENTER OF THE METER BOX.

9. ALL GARBAGE OR SPOIL MATERIAL FROM THIS WORK SHALL BE REMOVED FROM THE SITE BY THE CONTRACTOR, AT HIS EXPENSE.

10. FINAL CONNECTION TO THE EXISTING WATER MAIN SHALL NOT BE MADE UNTIL WATER MAIN HAS BEEN PRESSURE TESTED, CHLORINATED AND THE S.A.W.S. RELEASES THE MAIN FOR TIE-IN AND USE.

11. UNIT PRICE BID FOR "STANDARD FIRE HYDRANT ASSEMBLY" SHALL INCLUDE FIRE HYDRANT, 6-INCH GATE VALVE AND 6-INCH VALVE BOX COMPLETE, ANCHOR BEND, AND ALL 6-INCH DI PIPE REQUIRED (DI PIPE REQUIRED SHALL INCLUDE ALL PIPE FROM THE TEE ON THE MAIN LINE TO THE FIRE HYDRANT).

12. WHEN SEWER LINES ARE INSTALLED IN THE VICINITY OF WATER MAINS, SUCH INSTALLATION SHALL BE IN STRICT ACCORDANCE WITH THE TEXAS NATURAL RESOURCE CONSERVATION COMMISSION "RULES AND REGULATIONS FOR PUBLIC WATER SYSTEMS" (1988 OR ANY REVISIONS THERETO).

13. A CLEAR SPACE SHALL BE PROVIDED AROUND ALL FIRE HYDRANTS. THIS AREA SHOULD HAVE A MINIMUM DIAMETER OF 3.0' AND BE CLEAN OF VERTICAL OBSTRUCTIONS, VALVES, AND METER BOXES.

14. SAWS REQUIRES LEAD FREE (< 0.25%) FIRE HYDRANTS.

15. UNLESS OTHERWISE NOTED ALL SERVICES SHALL BE 3/4" WITH 5/8" METER.

WATER (SAWS PRESSURE ZONE 11)

DEVELOPER'S NAME: BITTERBLUE/ROGERS WATER INTERESTS, LTD.
ADDRESS: 11 LYNN BATTS LANE, SUITE 100
CITY: SAN ANTONIO STATE: TEXAS ZIP: 78218
PHONE# 210-826-6131 FAX#
SAWS BLOCK MAP# 082616 TOTAL EDU'S 48 TOTAL ACREAGE 18.90
TOTAL LINEAR FOOTAGE OF PIPE: 08-2616 & 8"-278 LF 12"-2,714 LF PLAT NO. 23-11800083
NUMBER OF LOTS 46 SAWS JOB NO. 23-1041

| NO. | REVISION | DATE |
|---|---|---|

STATE OF TEXAS
CALEB M. CHANCE
98401
LICENSED
PROFESSIONAL ENGINEER
4/15/24


PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800


# SHAVANO HIGHLANDS UNIT 7

SAN ANTONIO, TEXAS

WATER DISTRIBUTION PLAN NOTES

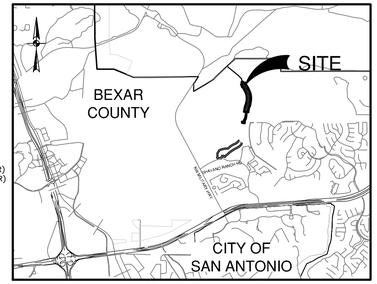
PLAT NO. 23-11800083
JOB NO. 8834-22
DATE NOVEMBER 2023
DESIGNER AW
CHECKED CC DRAWN RC
SHEET C4.11


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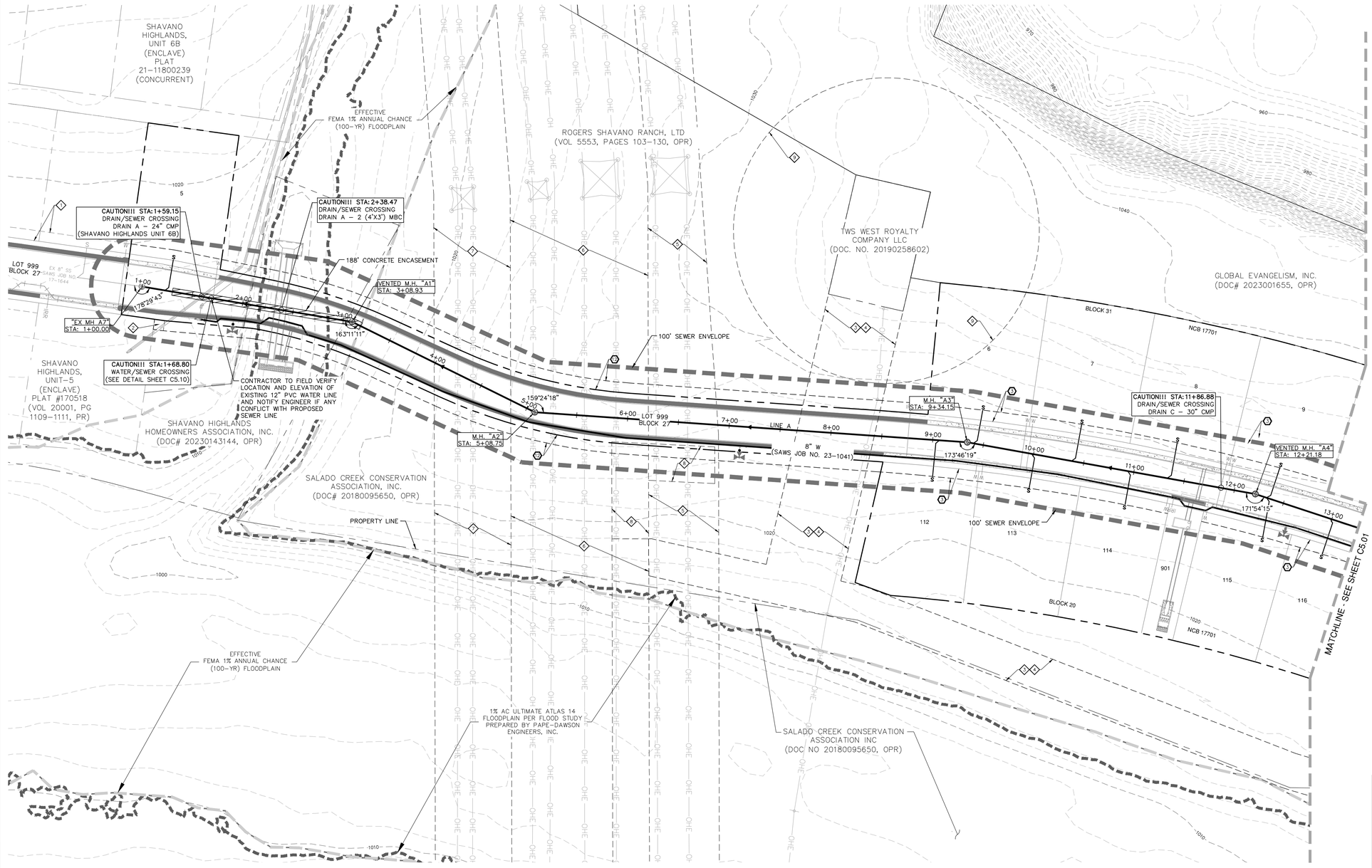
## KEYED NOTES:

3. 10' GAS, ELECTRIC, TELEPHONE AND CABLE TV EASEMENT
7. PERMANENT VARIABLE WIDTH SANITARY SEWER EASEMENT (MIN. 16' WIDE) (OFF-LOT) (0.556 ACRE)
10. 10' GAS, ELECTRIC, TELEPHONE AND CABLE TV EASEMENT (OFF-LOT)(0.354 TOTAL ACRES)
14. VARIABLE WIDTH SANITARY SEWER EASEMENT (0.007 ACRE)
1. 10' GAS, ELECTRIC, TELEPHONE AND CABLE TV EASEMENT (VOL 20001, PG 1109-1111, DPR)
2. 10'x10' GAS, ELECTRIC, TELEPHONE AND CABLE TV EASEMENT (VOL 20001, PG 1109-1111, DPR)
5. ELECTRIC LINE RIGHT-OF-WAY AGREEMENT (VOL 16444, PG. 2154, OPR) (VOL 16464, PG. 76, OPR)
4. EASEMENT AGREEMENT VARIABLE WIDTH WATER, UTILITY, INGRESS AND TERMINATION OF ORIGINAL EASEMENT (VOL 16346, PG. 1335, OPR)
6. 65' INGRESS/EGRESS & ELECTRIC EASEMENT (VOL 1183, PG 280, OPR)
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9. 75' ELECTRIC EASEMENT (VOL 7191, PG 145, DR)
11. VARIABLE WIDTH WATER & UTILITY EASEMENT (VOL. 11683, PGS. 2474-2491 OPR) (VOL. 11683, PGS. 2492-2507 OPR)
13. SECOND AMENDED AND RESTATED SANITARY CONTROL EASEMENT (DOC. NO. 20190259079, OPR)



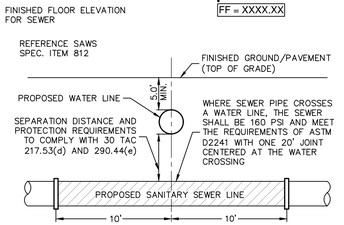

## LOCATION MAP
NOT-TO-SCALE

SCALE: 1"= 50'
0' 50' 100' 150'




## SEWER LEGEND

PROJECT LIMITS
EXISTING WATER
EXISTING SEWER
PROPOSED SEWER
PROPOSED WATER
PROPOSED SEWER LATERAL
FINISHED FLOOR ELEVATION FOR SEWER
FF = XXXX.XX




## TYPICAL SANITARY SEWER/WATER CROSSING DETAIL
NOT-TO-SCALE

## CAUTION!!

CONTRACTOR SHALL BE REQUIRED TO LOCATE ALL PUBLIC OR PRIVATE UTILITIES INCLUDING BUT NOT LIMITING TO: WATER, SEWER, TELEPHONE AND FIBER OPTIC LINES, SITE LIGHTING ELECTRIC, SECONDARY ELECTRIC, PRIMARY ELECTRICAL DUCTBANKS, 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 CONTRACTOR'S SOLE EXPENSE WHETHER THE UTILITY IS SHOWN ON THESE PLANS OR NOT.

## FINISHED FLOOR NOTES:

1. THE FINISHED FLOOR ELEVATIONS (FF) REPRESENT THE MINIMUM POSSIBLE FLOOR ELEVATION TO PROVIDE SANITARY SEWER SERVICE TO EACH LOT. ACTUAL FINISHED FLOOR ELEVATIONS FOR EACH LOT ARE TO BE DETERMINED BY THE BUILDER AND SHALL TAKE INTO CONSIDERATION AS-BUILT CONDITIONS FOR FOUND SEWER SERVICES AND ACTUAL LATERAL PLACEMENT. IT IS THE BUILDER'S SOLE RESPONSIBILITY TO DETERMINE ACTUAL FINISHED FLOOR ELEVATIONS FOR EACH LOT PRIOR TO THE START OF HOME FOUNDATION CONSTRUCTION TAKING INTO CONSIDERATION SITE DRAINAGE, STREET ACCESS AND SANITARY SEWER SERVICE ELEVATIONS.
2. THE MINIMUM SANITARY SEWER LATERAL GRADES WERE BASED UPON THE MINIMUM FINISHED FLOOR ELEVATIONS FOR THE LOTS LOCATED ON THE DOWNHILL SIDES OF THE PROPOSED ROADWAYS.

## PRIVATE STREET DESIGNATION :

LOT **999**, BLOCK **27**, CB OR NCB **17701**, **(POWDER MILL)** IS A PRIVATE STREET AND IS DESIGNATED AS AN UNDERGROUND AND AT-GRADE INFRASTRUCTURE AND SERVICE FACILITIES EASEMENT FOR GAS, ELECTRIC, STREET LIGHT, TELEPHONE CABLE TELEVISION, DRAINAGE, PEDESTRIAN, PUBLIC WATER, WASTEWATER, AND RECYCLED WATER MAINS.

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## SEWER - EAST SEWERSHED (UPPER) -DOS RIOS/ LEON CREEK

DEVELOPER'S NAME: SHAVANO ROGERS RANCH NORTH NO. 3, LTD.
ADDRESS: 11 LYNN BATTS LANE, SUITE 100
CITY: SAN ANTONIO STATE: TEXAS ZIP: 78218
PHONE# (210) 828-6131 FAX#
SAWS BLOCK MAP# 140650 TOTAL EDU'S 46 TOTAL ACREAGE 18.90
TOTAL LINEAR FOOTAGE OF PIPE: 8" 4,546 LF PLAT NO. 23-11800083
NUMBER OF LOTS 46 SAWS JOB NO. 23-1533

| NO. | REVISION | DATE |
|---|---|---|

STATE OF TEXAS
98401
LICENSED PROFESSIONAL ENGINEER
4/15/24


PAPE-DAWSON ENGINEERS
SAN ANTONIO I AUSTIN I HOUSTON I FORT WORTH I DALLAS
2000 NW LOOP 410 I SAN ANTONIO, TX 78213 I 210.375.9000
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028800


# SHAVANO HIGHLANDS UNIT 7
SAN ANTONIO, TEXAS

OVERALL SANITARY SEWER PLAN

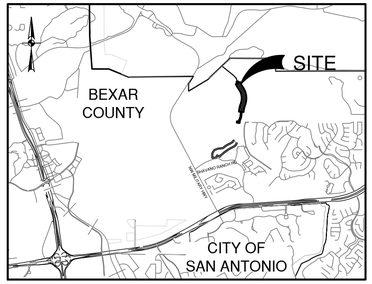
PLAT NO. 23-11800083
JOB NO. 8834-22
DATE NOVEMBER 2023
DESIGNER AW
CHECKED CC DRAWN RC
SHEET C5.00


Date: Apr 15, 2024, 5:14pm User ID: williercel
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## KEYED NOTES:

1. 10' GAS, ELECTRIC, TELEPHONE AND CABLE TV EASEMENT
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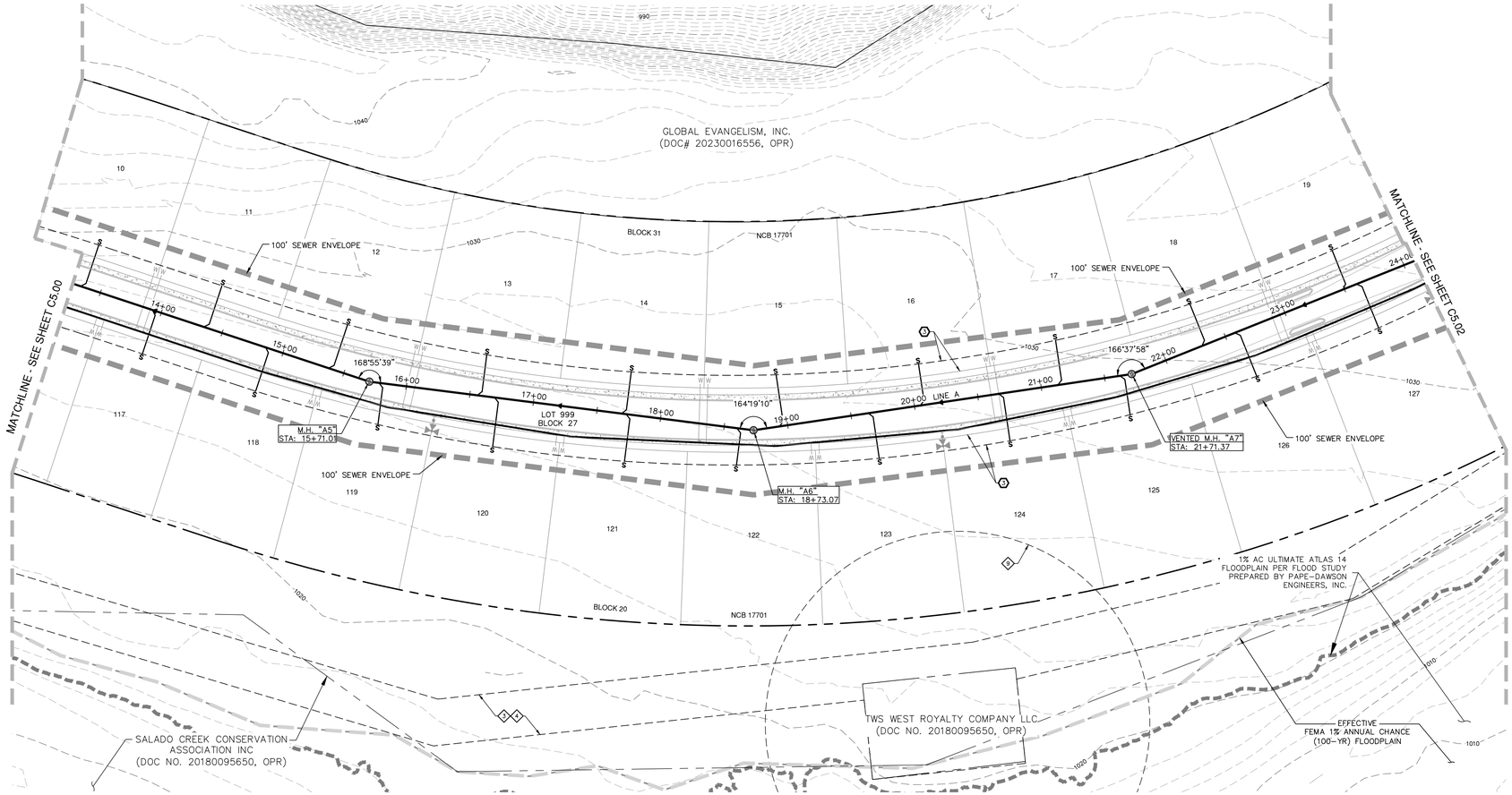



## LOCATION MAP

NOT-TO-SCALE

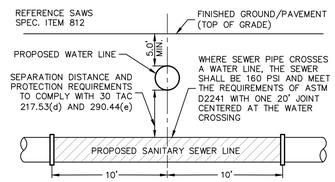
SCALE: 1"= 50'

0' 50' 100' 150'




## SEWER LEGEND

- PROJECT LIMITS
- EXISTING WATER (W)
- EXISTING SEWER (SS, MANHOLE)
- PROPOSED SEWER (S, MANHOLE)
- PROPOSED WATER (FIRE HYDRANT, W)
- PROPOSED SEWER LATERAL (S)
- FINISHED FLOOR ELEVATION FOR SEWER (FF = XXXX.XX)




## TYPICAL SANITARY SEWER/WATER CROSSING DETAIL

NOT-TO-SCALE

## CAUTION!!

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## SEWER - EAST SEWERSHED (UPPER) -DOS RIOS/ LEON CREEK

| | |
|---|---|
| DEVELOPER'S NAME: | SHAVANO ROGERS RANCH NORTH NO. 3, LTD. |
| ADDRESS: | 11 LYNN BATTS LANE, SUITE 100 |
| CITY: | SAN ANTONIO |
| STATE: | TEXAS |
| ZIP: | 78218 |
| PHONE# | (210) 828-6131 |
| FAX# | |
| SAWS BLOCK MAP# | 140650 |
| TOTAL EDU'S | 46 |
| TOTAL ACREAGE | 18.90 |
| TOTAL LINEAR FOOTAGE OF PIPE: | 8" 4,546 LF |
| PLAT NO. | 23-11800083 |
| NUMBER OF LOTS | 46 |
| SAWS JOB NO. | 23-1533 |

| NO. | REVISION | DATE |
|---|---|---|
| | | |

STATE OF TEXAS
CALEB M. CHANCE
98401
LICENSED
PROFESSIONAL ENGINEER
12/8/23


PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800


# SHAVANO HIGHLANDS UNIT 7

SAN ANTONIO, TEXAS

OVERALL SANITARY SEWER PLAN

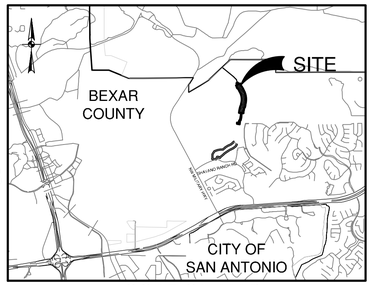
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|---|---|
| PLAT NO. | 23-11800083 |
| JOB NO. | 8834-22 |
| DATE | NOVEMBER 2023 |
| DESIGNER | AW |
| CHECKED | CC |
| DRAWN | RC |
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## KEYED NOTES:

3. 10' GAS, ELECTRIC, TELEPHONE AND CABLE TV EASEMENT
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Y3. VARIABLE WIDTH SANITARY SEWER EASEMENT (0.007 ACRE)
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2. 10'x10' GAS, ELECTRIC, TELEPHONE AND CABLE TV EASEMENT (VOL 20001, PG 1109-1111, DPR)
4. ELECTRIC LINE RIGHT-OF-WAY AGREEMENT (VOL 16444, PG. 2154, OPR) (VOL 16464, PG. 76, OPR)
5. EASEMENT AGREEMENT VARIABLE WIDTH WATER, UTILITY, INGRESS AND TERMINATION OF ORIGINAL EASEMENT (VOL 16346, PG. 1335, OPR)
6. 65' INGRESS/EGRESS & ELECTRIC EASEMENT (VOL 1183, PG 280, OPR)
7. 135' ELECTRIC TRANSMISSION POWER EASEMENT (VOL 5655, PG 284, OPR)
8. 75' ELECTRIC EASEMENT (VOL 7191, PG 145, DR)
9. VARIABLE WIDTH WATER & UTILITY EASEMENT (VOL. 11683, PGS. 2474-2491 OPR) (VOL. 11683, PGS. 2492-2507 OPR)
10. SECOND AMENDED AND RESTATED SANITARY CONTROL EASEMENT (DOC. NO. 20190259079, OPR)

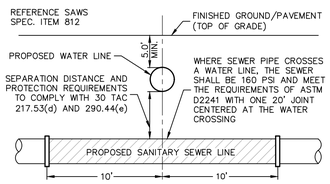



## LOCATION MAP
NOT-TO-SCALE

SCALE: 1"= 50'
0' 50' 100' 150'

## SEWER LEGEND

PROJECT LIMITS
EXISTING WATER (W)
EXISTING SEWER (SS, MANHOLE)
PROPOSED SEWER (S)
PROPOSED WATER (FIRE HYDRANT, W)
PROPOSED SEWER LATERAL (S)
FINISHED FLOOR ELEVATION FOR SEWER (FF = XXXX.XX)




## TYPICAL SANITARY SEWER/WATER CROSSING DETAIL
NOT-TO-SCALE

## CAUTION!!

CONTRACTOR SHALL BE REQUIRED TO LOCATE ALL PUBLIC OR PRIVATE UTILITIES INCLUDING BUT NOT LIMITING TO: WATER, SEWER, TELEPHONE AND FIBER OPTIC LINES, SITE LIGHTING ELECTRIC, SECONDARY ELECTRIC, PRIMARY ELECTRICAL DUCTBANKS, 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 CONTRACTOR'S SOLE EXPENSE WHETHER THE UTILITY IS SHOWN ON THESE PLANS OR NOT.

## FINISHED FLOOR NOTES:

1. THE FINISHED FLOOR ELEVATIONS (FF) REPRESENT THE MINIMUM POSSIBLE FLOOR ELEVATION TO PROVIDE SANITARY SEWER SERVICE TO EACH LOT. ACTUAL FINISHED FLOOR ELEVATIONS FOR EACH LOT ARE TO BE DETERMINED BY THE BUILDER AND SHALL TAKE INTO CONSIDERATION AS-BUILT CONDITIONS FOR FOUND SEWER SERVICES AND ACTUAL LATERAL PLACEMENT. IT IS THE BUILDER'S SOLE RESPONSIBILITY TO DETERMINE ACTUAL FINISHED FLOOR ELEVATIONS FOR EACH LOT PRIOR TO THE START OF HOME FOUNDATION CONSTRUCTION TAKING INTO CONSIDERATION SITE DRAINAGE, STREET ACCESS AND SANITARY SEWER SERVICE ELEVATIONS.
2. THE MINIMUM SANITARY SEWER LATERAL GRADES WERE BASED UPON THE MINIMUM FINISHED FLOOR ELEVATIONS FOR THE LOTS LOCATED ON THE DOWNHILL SIDES OF THE PROPOSED ROADWAYS.

## PRIVATE STREET DESIGNATION :

LOT **999**, BLOCK **27**, CB OR NCB **17701**, **(POWDER MILL)** IS A PRIVATE STREET AND IS DESIGNATED AS AN UNDERGROUND AND AT-GRADE INFRASTRUCTURE AND SERVICE FACILITIES EASEMENT FOR GAS, ELECTRIC, STREET LIGHT, TELEPHONE CABLE TELEVISION, DRAINAGE, PEDESTRIAN, PUBLIC WATER, WASTEWATER, AND RECYCLED WATER MAINS.

## 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 ANY AVAILABLE GEOTECHNICAL INFORMATION AND THE ANTICIPATED INSTALLATION SITES 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.

## SEWER - EAST SEWERSHED (UPPER) -DOS RIOS/ LEON CREEK

DEVELOPER'S NAME: SHAVANO ROGERS RANCH NORTH NO. 3, LTD.
ADDRESS: 11 LYNN BATTS LANE, SUITE 100
CITY: SAN ANTONIO STATE: TEXAS ZIP: 78218
PHONE# (210) 828-6131 FAX#
SAWS BLOCK MAP# 140650 TOTAL EDU'S: 46 TOTAL ACREAGE 18.90
TOTAL LINEAR FOOTAGE OF PIPE: 8" 4,546 LF PLAT NO. 23-11800083
NUMBER OF LOTS 46 SAWS JOB NO. 23-1533

| NO. | REVISION | DATE |
|---|---|---|
| | | |

STATE OF TEXAS
CALEB M. CHANCE
98401
LICENSED PROFESSIONAL ENGINEER
4/15/24


PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

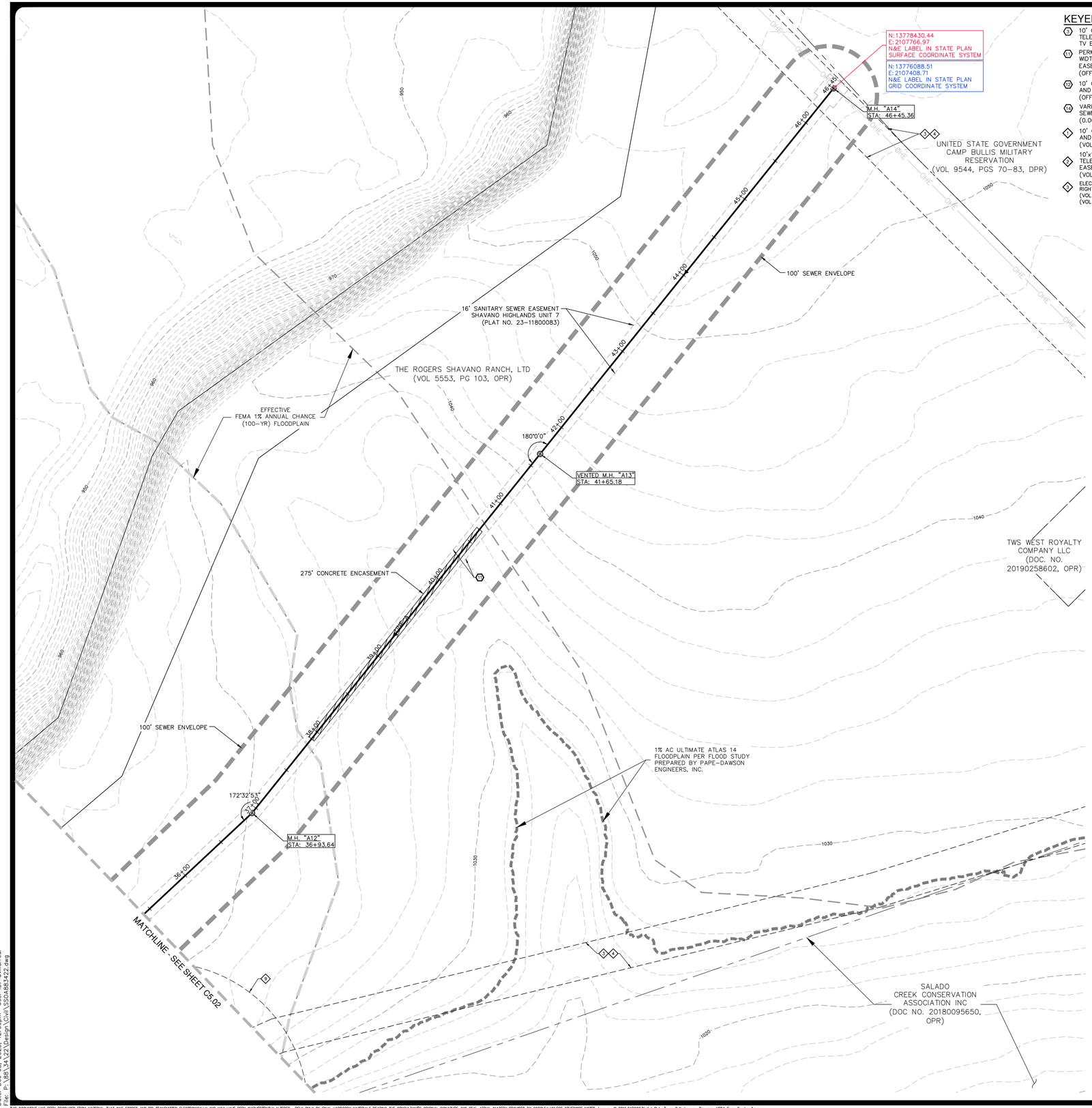

# SHAVANO HIGHLANDS UNIT 7
SAN ANTONIO, TEXAS

OVERALL SANITARY SEWER PLAN

PLAT NO. 23-11800083
JOB NO. 8834-22
DATE NOVEMBER 2023
DESIGNER AW
CHECKED CC DRAWN RC
SHEET C5.02

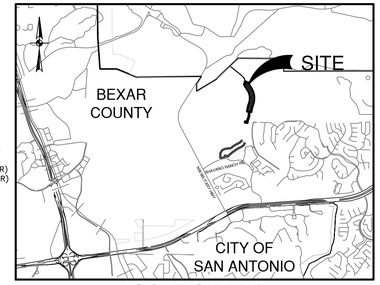
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## KEYED NOTES:

1. 10' GAS, ELECTRIC, TELEPHONE AND CABLE TV EASEMENT
2. PERMANENT VARIABLE WIDTH SANITARY SEWER EASEMENT (MIN. 16' WIDE) (OFF-LOT) (0.556 ACRE)
3. 10' GAS, ELECTRIC, TELEPHONE AND CABLE TV EASEMENT (OFF-LOT)(0.354 TOTAL ACRES)
4. VARIABLE WIDTH SANITARY SEWER EASEMENT (0.007 ACRE)
5. 10' GAS, ELECTRIC, TELEPHONE AND CABLE TV EASEMENT (VOL 20001, PG 1109-1111, DPR)
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13. SECOND AMENDED AND RESTATED SANITARY CONTROL EASEMENT (DOC. NO. 20190259079, OPR)




## LOCATION MAP

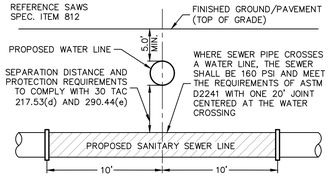
NOT-TO-SCALE

SCALE: 1"= 50'

0' 50' 100' 150'

## SEWER LEGEND

- PROJECT LIMITS
- EXISTING WATER (W)
- EXISTING SEWER (SS)
- PROPOSED SEWER (SS) MANHOLE (S)
- PROPOSED WATER (W) FIRE HYDRANT
- PROPOSED SEWER LATERAL
- FINISHED FLOOR ELEVATION FOR SEWER (FF = XXXX.XX)




## TYPICAL SANITARY SEWER/WATER CROSSING DETAIL

NOT-TO-SCALE

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LOT **999** BLOCK **27** CB OR NCB **17701** (**POWDER MILL**) IS A PRIVATE STREET AND IS DESIGNATED AS AN UNDERGROUND AND AT-GRADE INFRASTRUCTURE AND SERVICE FACILITIES EASEMENT FOR GAS, ELECTRIC, STREET LIGHT, TELEPHONE CABLE TELEVISION, DRAINAGE, PEDESTRIAN, PUBLIC WATER, WASTEWATER, AND RECYCLED WATER MAINS.

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## SEWER - EAST SEWERSHED (UPPER) -DOS RIOS/ LEON CREEK

| | |
|---|---|
| DEVELOPER'S NAME: | SHAVANO ROGERS RANCH NORTH NO. 3, LTD. |
| ADDRESS: | 11 LYNN BATTS LANE, SUITE 100 |
| CITY: SAN ANTONIO | STATE: TEXAS ZIP: 78218 |
| PHONE# (210) 828-6131 | FAX# |
| SAWS BLOCK MAP# 140650 | TOTAL EDU'S: 46 TOTAL ACREAGE 18.90 |
| TOTAL LINEAR FOOTAGE OF PIPE: | 8" 4,546 LF PLAT NO. 23-11800083 |
| NUMBER OF LOTS 46 | SAWS JOB NO. 23-1533 |

| NO. | REVISION | DATE |
|---|---|---|
| | | |

STATE OF TEXAS
CALEB M. CHANCE
98401
LICENSED
PROFESSIONAL ENGINEER
12/8/23

PAPE-DAWSON ENGINEERS
SAN ANTONIO I AUSTIN I HOUSTON I FORT WORTH I DALLAS
2000 NW LOOP 410 I SAN ANTONIO, TX 78213 I 210.375.9000
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028800

# SHAVANO HIGHLANDS UNIT 7

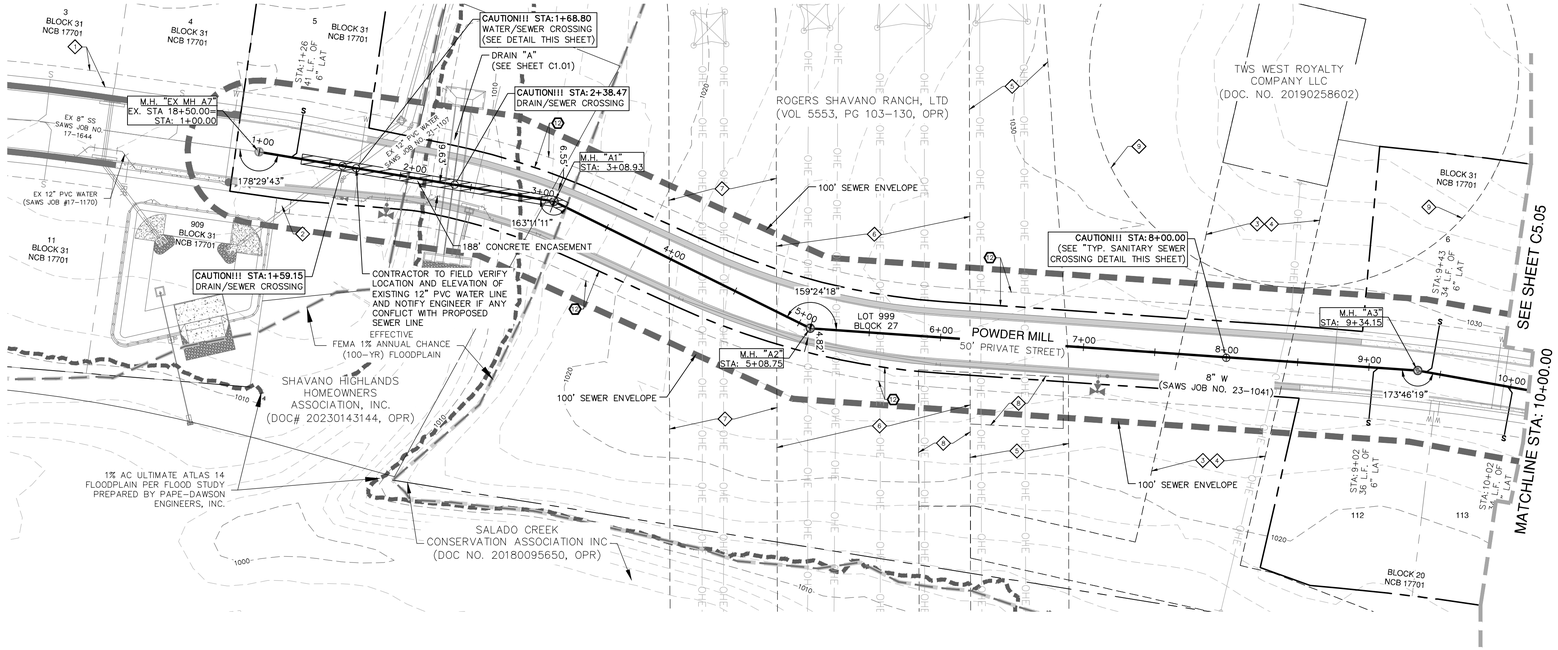
SAN ANTONIO, TEXAS

OVERALL SANITARY SEWER PLAN

| | |
|---|---|
| PLAT NO. | 23-11800083 |
| JOB NO. | 8834-22 |
| DATE | NOVEMBER 2023 |
| DESIGNER | AW |
| CHECKED | CC |
| DRAWN | RC |
| SHEET | C5.03 |

Date: Dec 08, 2023, 12:00pm User ID: wilterreal
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SCALE: 1"= 50'

0' 50' 100' 150'

## SEWER LEGEND

PROJECT LIMITS

EXISTING WATER

EXISTING SEWER

PROPOSED SEWER

PROPOSED WATER

PROPOSED SEWER LATERAL

FINISHED FLOOR ELEVATION FOR SEWER

MANHOLE

FIRE HYDRANT

FF = XXXX.XX

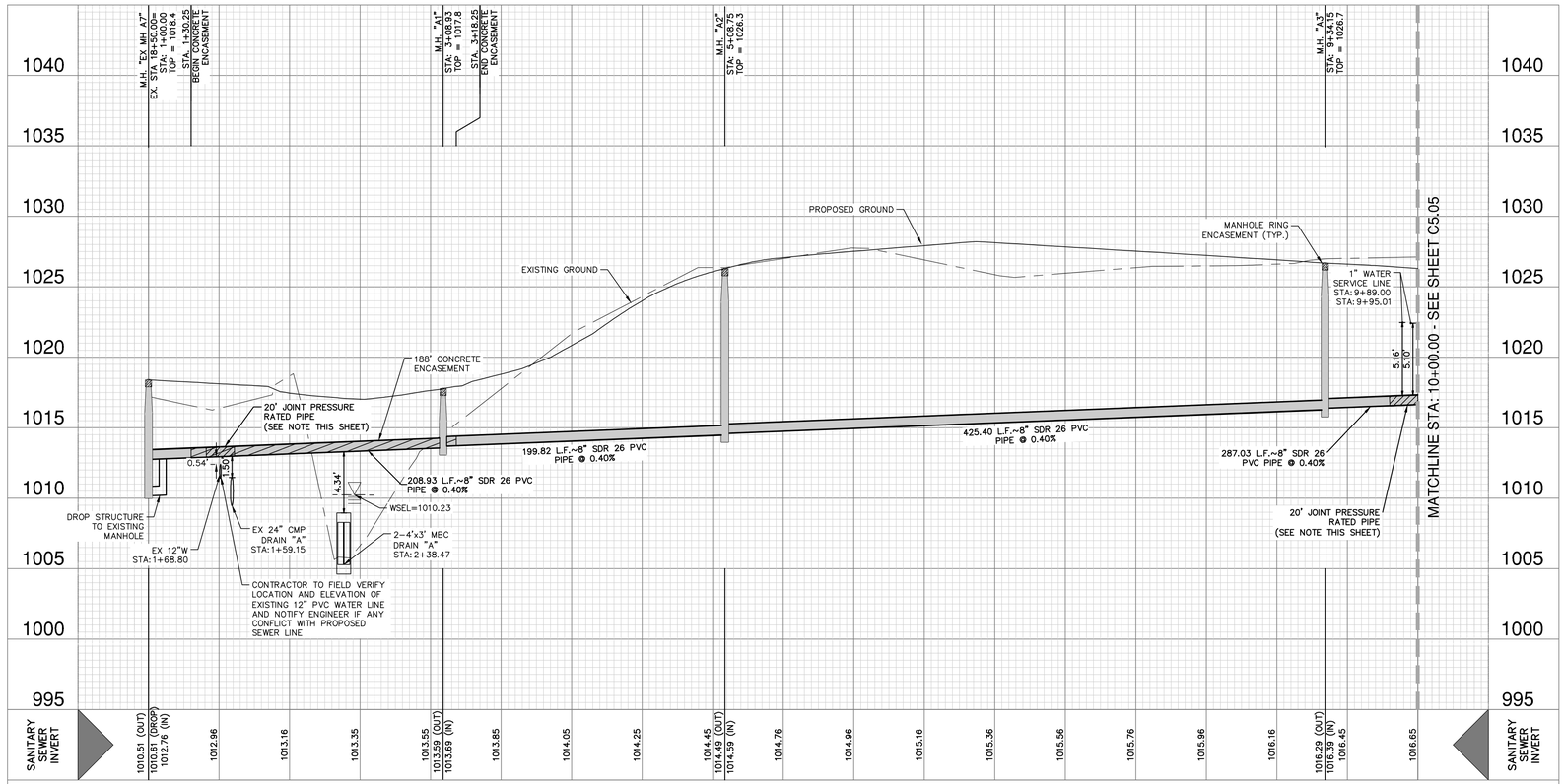
**NOTE:**
ALL WATER AND SEWER MAINS AND WATER SERVICES AND SEWER LATERALS SHALL BE INSTALLED BY THE CONTRACTOR AND BE APPROVED BY SAWS PRIOR TO STREET PAVING.

## KEYED NOTES:

1. 10' GAS, ELECTRIC, TELEPHONE AND CABLE TV EASEMENT
2. PERMANENT VARIABLE WIDTH SANITARY SEWER EASEMENT (MIN. 16' WIDE) (OFF-LOT) (0.556 ACRE)
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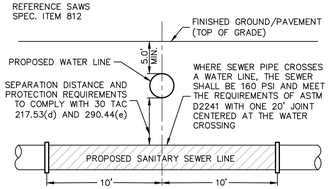
SANITARY SEWER LINE "A"
STA. 1+00.00 TO 10+00.00

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




## PRIVATE STREET DESIGNATION :

LOT **999**, BLOCK **27**, CB OR NCB **17701**, **(POWDER MILL)** IS A PRIVATE STREET AND IS DESIGNATED AS AN UNDERGROUND AND AT-GRADE INFRASTRUCTURE AND SERVICE FACILITIES EASEMENT FOR GAS, ELECTRIC, STREET LIGHT, TELEPHONE CABLE TELEVISION, DRAINAGE, PEDESTRIAN, PUBLIC WATER, WASTEWATER, AND RECYCLED WATER MAINS.




## TYPICAL SANITARY SEWER/WATER CROSSING DETAIL

NOT-TO-SCALE

## CAUTION!!

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SEWER - EAST SEWERSHED (UPPER) -DOS RIOS/
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| NO. | REVISION | DATE |
|---|---|---|

STATE OF TEXAS
CALEB M. CHANCE
98401
LICENSED
PROFESSIONAL ENGINEER
4/15/24

PAPE-DAWSON ENGINEERS
SAN ANTONIO I AUSTIN I HOUSTON I FORT WORTH I DALLAS
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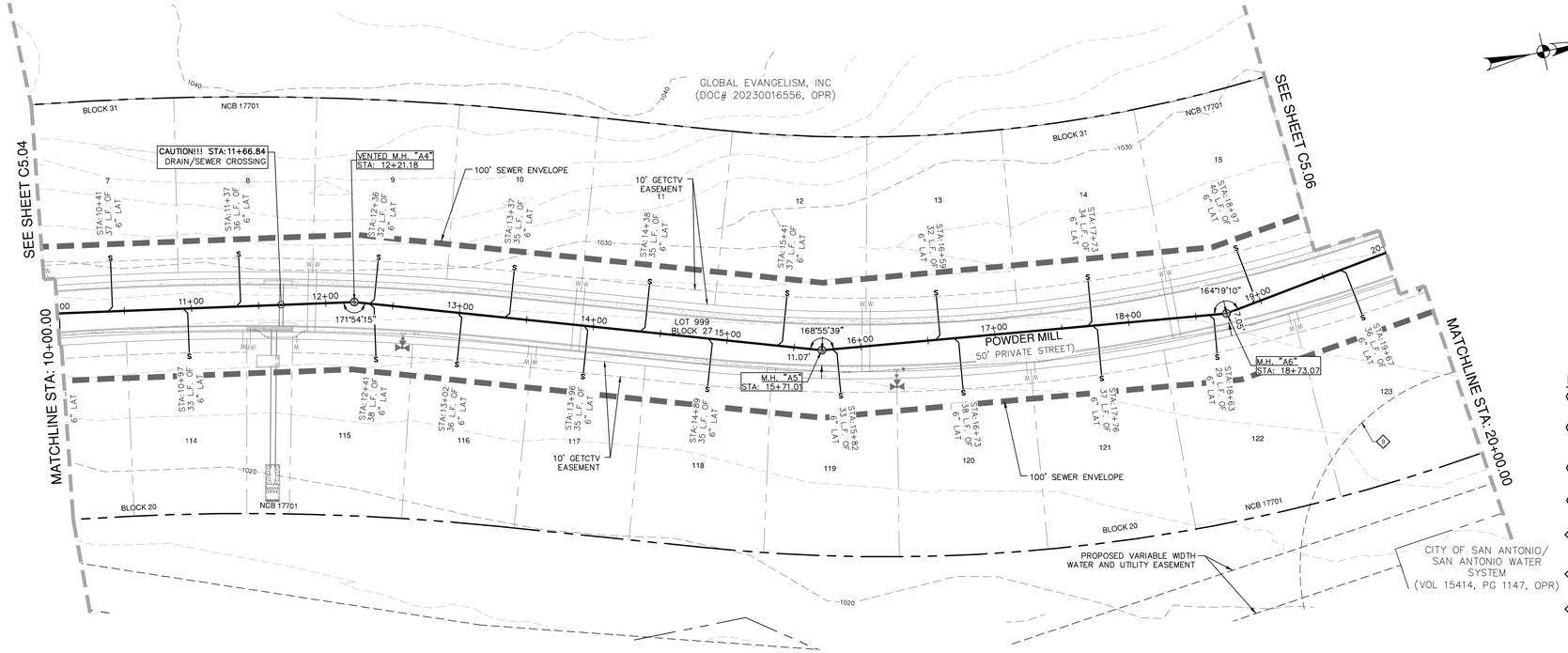
# SHAVANO HIGHLANDS UNIT 7
SAN ANTONIO, TEXAS

SANITARY SEWER LINE A - PLAN & PROFILE
STA: 1+00.00 TO 10+00.00

PLAT NO. 23-11800083
JOB NO. 8834-22
DATE NOVEMBER 2023
DESIGNER AW
CHECKED CC DRAWN RC
SHEET C5.04

Date: Apr 15, 2024, 5:14pm User ID: vvillarreal
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SCALE: 1"= 50'

0' 50' 100' 150'

## SEWER LEGEND

- PROJECT LIMITS
- EXISTING WATER
- EXISTING SEWER
- PROPOSED SEWER
- PROPOSED WATER
- PROPOSED SEWER LATERAL
- FINISHED FLOOR ELEVATION FOR SEWER

MANHOLE

FIRE HYDRANT

FF = XXXX.XX

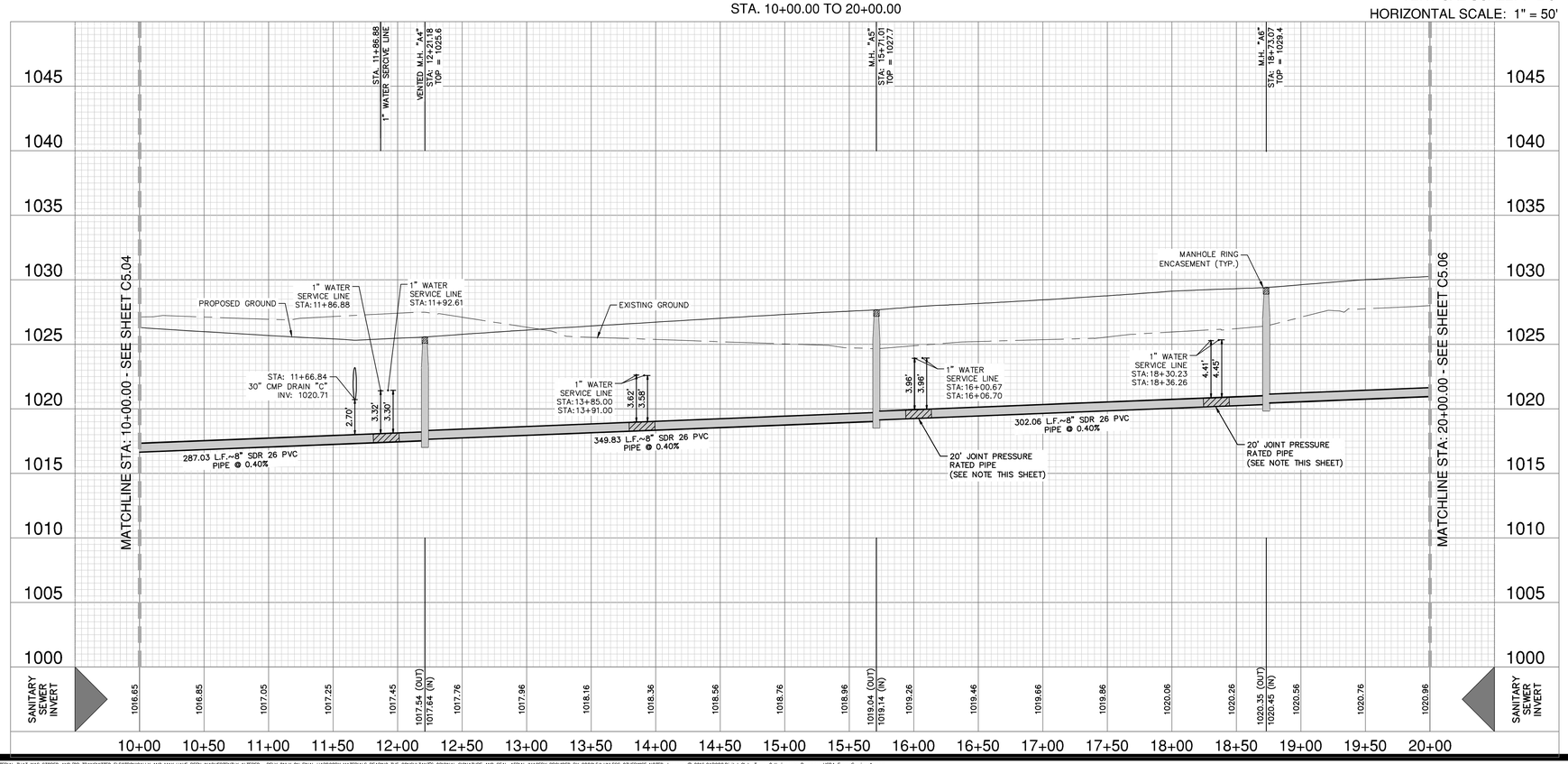
**NOTE:**
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## KEYED NOTES:

1. 10' GAS, ELECTRIC, TELEPHONE AND CABLE TV EASEMENT
2. PERMANENT VARIABLE WIDTH SANITARY SEWER EASEMENT (MIN. 16' WIDE) (OFF-LOT) (0.556 ACRE)
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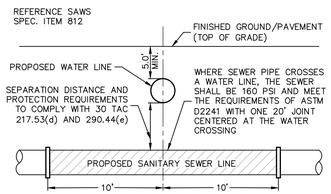
SANITARY SEWER LINE "A"
STA. 10+00.00 TO 20+00.00

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




## PRIVATE STREET DESIGNATION :

LOT **999**, BLOCK **27**, CB OR NCB **17701**, (**POWDER MILL**) IS A PRIVATE STREET AND IS DESIGNATED AS AN UNDERGROUND AND AT-GRADE INFRASTRUCTURE AND SERVICE FACILITIES EASEMENT FOR GAS, ELECTRIC, STREET LIGHT, TELEPHONE CABLE TELEVISION, DRAINAGE, PEDESTRIAN, PUBLIC WATER, WASTEWATER, AND RECYCLED WATER MAINS.




### TYPICAL SANITARY SEWER/WATER CROSSING DETAIL

NOT-TO-SCALE

## CAUTION!!

CONTRACTOR SHALL BE REQUIRED TO LOCATE ALL PUBLIC OR PRIVATE UTILITIES INCLUDING BUT NOT LIMITING TO: WATER, SEWER, TELEPHONE AND FIBER OPTIC LINES, SITE LIGHTING ELECTRIC, SECONDARY ELECTRIC, PRIMARY ELECTRICAL DUCTBANKS, 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 CONTRACTOR'S SOLE EXPENSE WHETHER THE UTILITY IS SHOWN ON THESE PLANS OR NOT.

## 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 ANY AVAILABLE GEOTECHNICAL INFORMATION AND THE ANTICIPATED INSTALLATION SITES 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.

SEWER - EAST SEWERSHED (UPPER) -DOS RIOS/ LEON CREEK

DEVELOPER'S NAME: SHAVANO ROGERS RANCH NORTH NO. 3, LTD.
ADDRESS: 11 LYNN BATTS LANE, SUITE 100
CITY: SAN ANTONIO STATE: TEXAS ZIP: 78218
PHONE# (210) 828-6131 FAX#
SAWS BLOCK MAP# 140650 TOTAL EDU'S 46 TOTAL ACREAGE 18.90
TOTAL LINEAR FOOTAGE OF PIPE: 8" 4,546 LF PLAT NO. 23-11800083
NUMBER OF LOTS 46 SAWS JOB NO. 23-1533

| NO. | REVISION | DATE |
|---|---|---|

STATE OF TEXAS
CALEB M. CHANCE
98401
LICENSED PROFESSIONAL ENGINEER
4/15/24

PAPE-DAWSON ENGINEERS
SAN ANTONIO I AUSTIN I HOUSTON I FORT WORTH I DALLAS
2000 NW LOOP 410 I SAN ANTONIO, TX 78213 I 210.375.9000
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028800

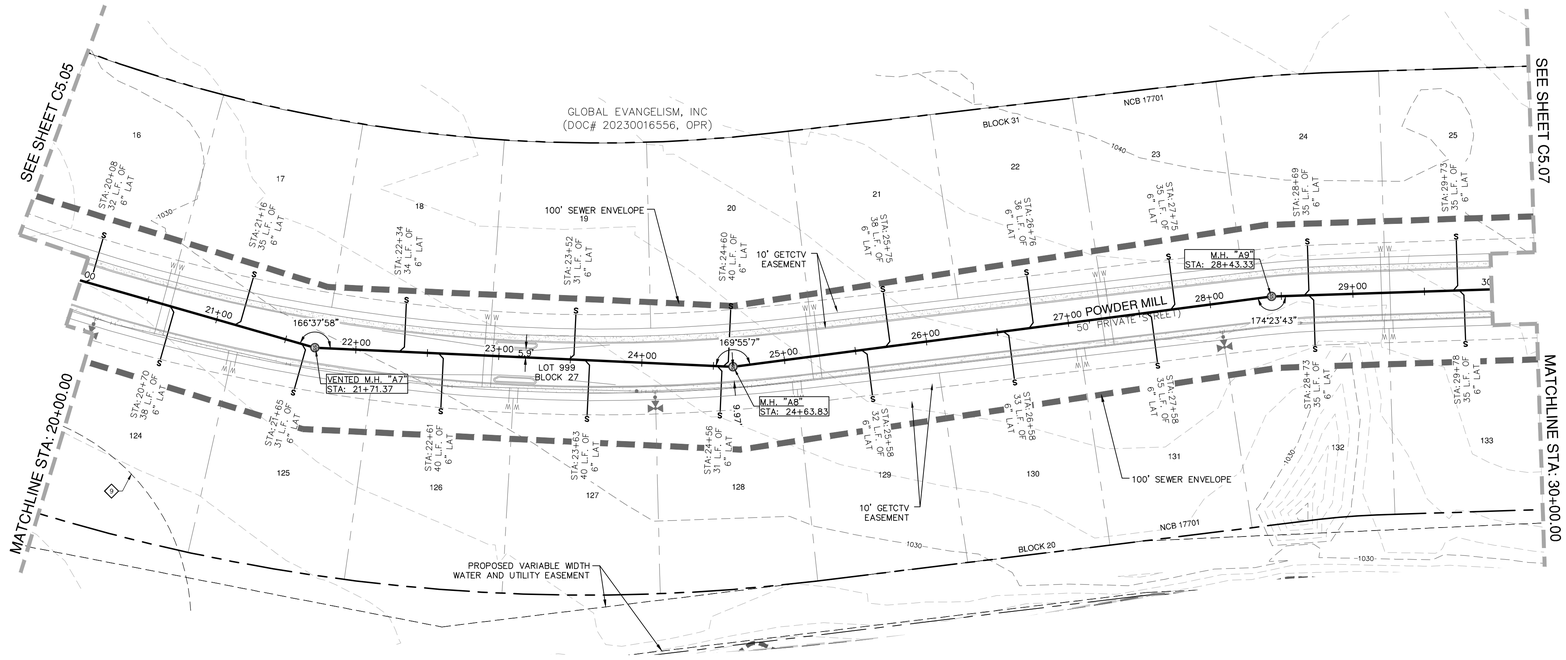
# SHAVANO HIGHLANDS UNIT 7
SAN ANTONIO, TEXAS

SANITARY SEWER LINE A - PLAN & PROFILE
STA: 10+00.00 TO 20+00.00

PLAT NO. 23-11800083
JOB NO. 8834-22
DATE NOVEMBER 2023
DESIGNER AW
CHECKED CC DRAWN RC
SHEET C5.05

Date: Apr 15, 2024, 5:15pm User ID: uvillarreal
File: P:\88\34\22\Design\Civil\SS883422 - LINE A.dwg

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SCALE: 1"= 50'

0' 50' 100' 150'

## SEWER LEGEND

- PROJECT LIMITS
- EXISTING WATER
- EXISTING SEWER
- PROPOSED SEWER
- MANHOLE
- PROPOSED WATER
- FIRE HYDRANT
- PROPOSED SEWER LATERAL
- FINISHED FLOOR ELEVATION FOR SEWER (FF = XXXX.XX)

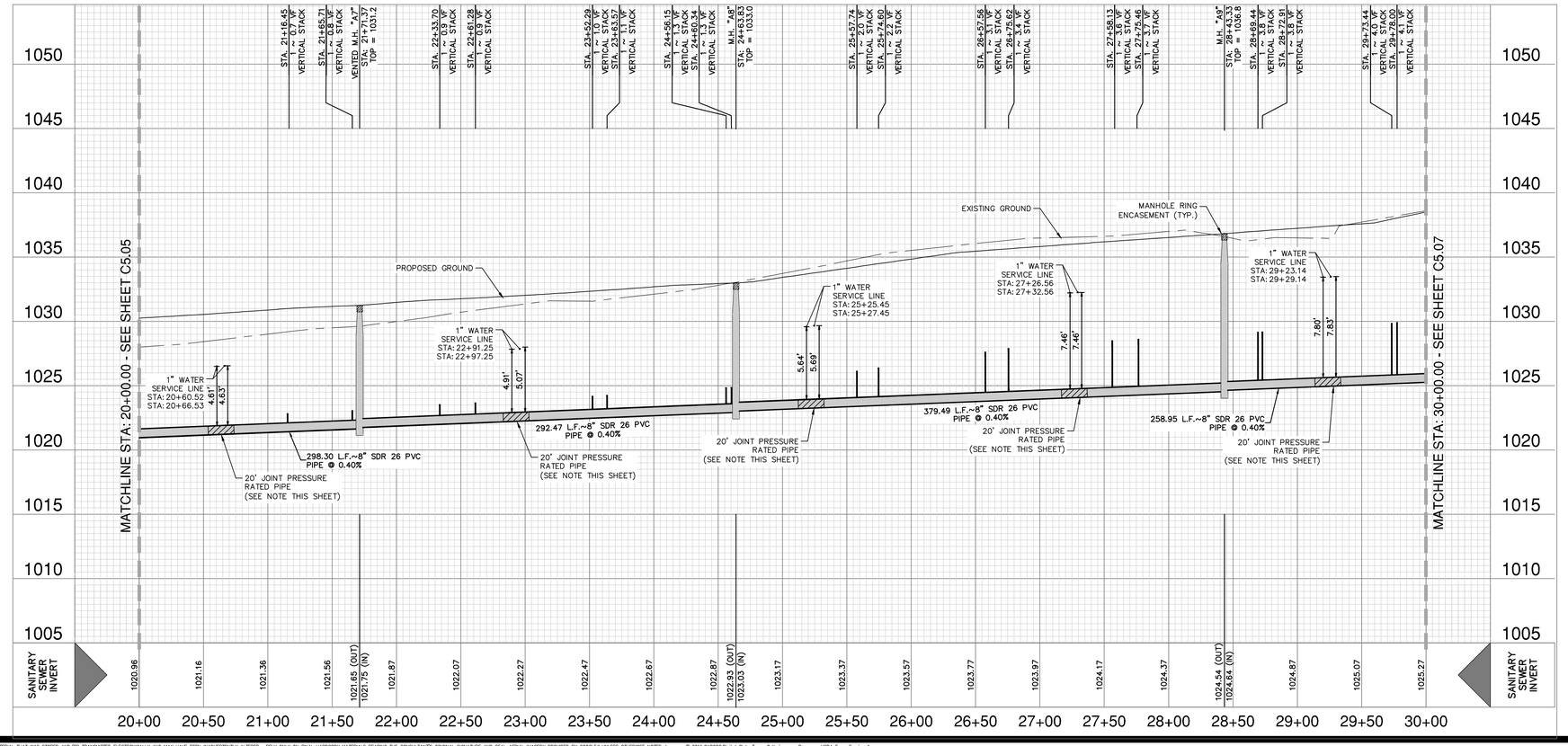
**NOTE:**
ALL WATER AND SEWER MAINS AND WATER SERVICES AND SEWER LATERALS SHALL BE INSTALLED BY THE CONTRACTOR AND BE APPROVED BY SAWS PRIOR TO STREET PAVING.

## KEYED NOTES:

1. 10' GAS, ELECTRIC, TELEPHONE AND CABLE TV EASEMENT
2. PERMANENT VARIABLE WIDTH SANITARY SEWER EASEMENT (MIN. 16' WIDE) (OFF-LOT) (0.556 ACRE)
3. 10' GAS, ELECTRIC, TELEPHONE AND CABLE TV EASEMENT (OFF-LOT)(0.354 TOTAL ACRES)
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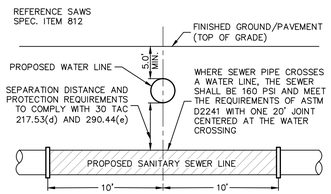
SANITARY SEWER LINE "A"
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TYPICAL SANITARY SEWER/WATER CROSSING DETAIL
NOT-TO-SCALE

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NUMBER OF LOTS 46 SAWS JOB NO. 23-1533

| NO. | REVISION | DATE |
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STATE OF TEXAS
CALEB M. CHANGE
98401
LICENSED PROFESSIONAL ENGINEER
4/15/24

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

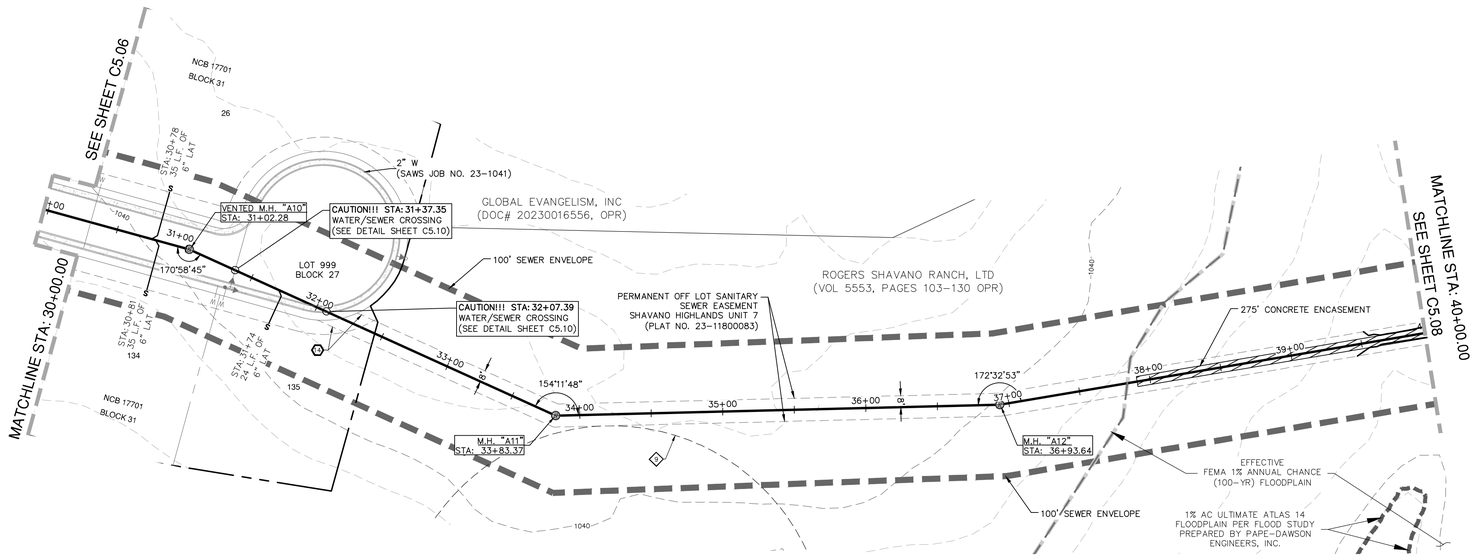
# SHAVANO HIGHLANDS UNIT 7
SAN ANTONIO, TEXAS

SANITARY SEWER LINE A - PLAN & PROFILE
STA: 20+00.00 TO 30+00.00

PLAT NO. 23-11800083
JOB NO. 8834-22
DATE NOVEMBER 2023
DESIGNER AW
CHECKED CC DRAWN RC
SHEET C5.06

Date: Apr 15, 2024, 5:15pm User ID: vvillarreal
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SCALE: 1"= 50'

0' 50' 100' 150'

## SEWER LEGEND

- PROJECT LIMITS
- EXISTING WATER
- EXISTING SEWER
- PROPOSED SEWER
- PROPOSED WATER
- PROPOSED SEWER LATERAL
- FINISHED FLOOR ELEVATION FOR SEWER (FF = XXXX.XX)

MANHOLE

FIRE HYDRANT

**NOTE:**

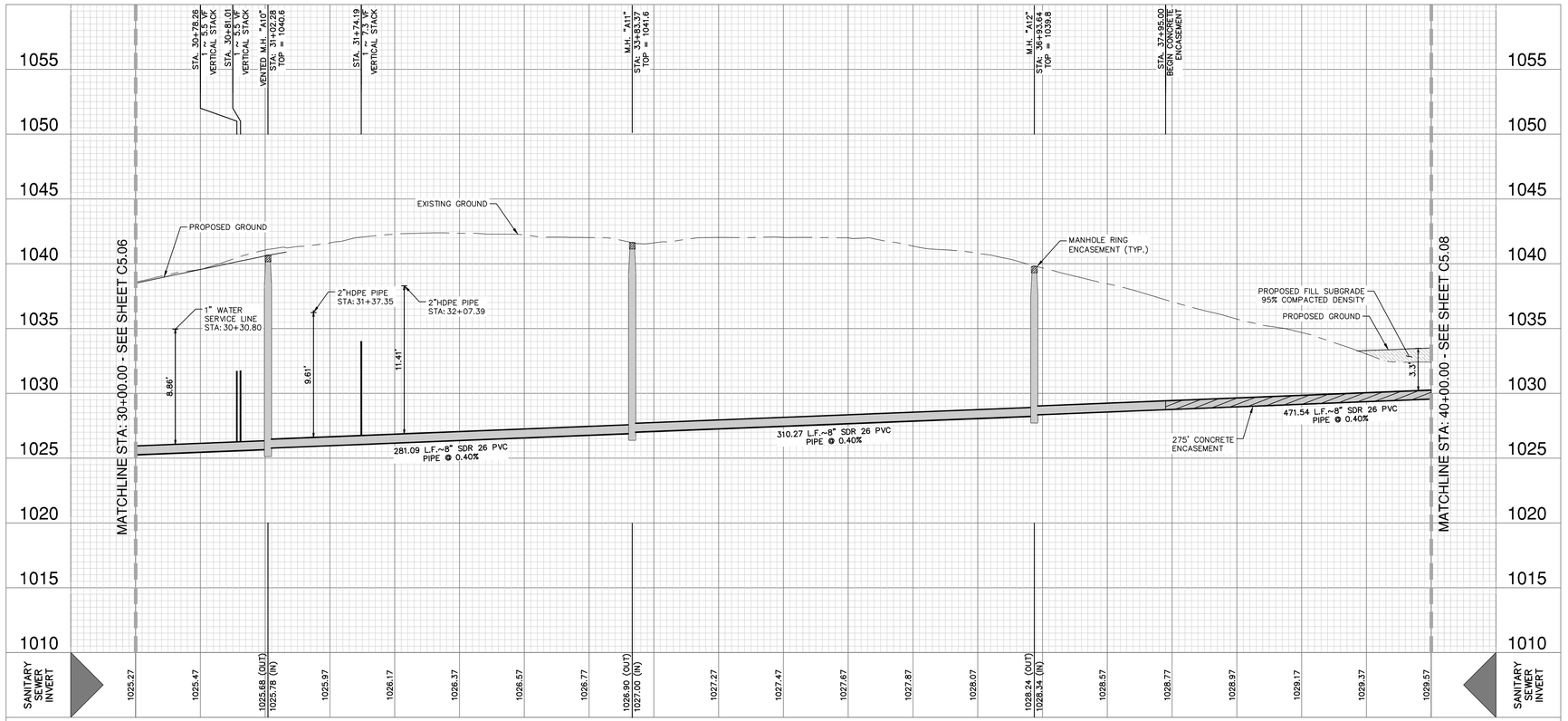
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## KEYED NOTES:

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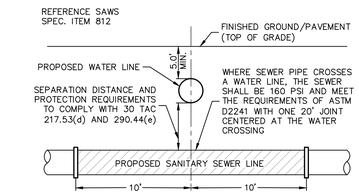
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### TYPICAL SANITARY SEWER/WATER CROSSING DETAIL

NOT-TO-SCALE

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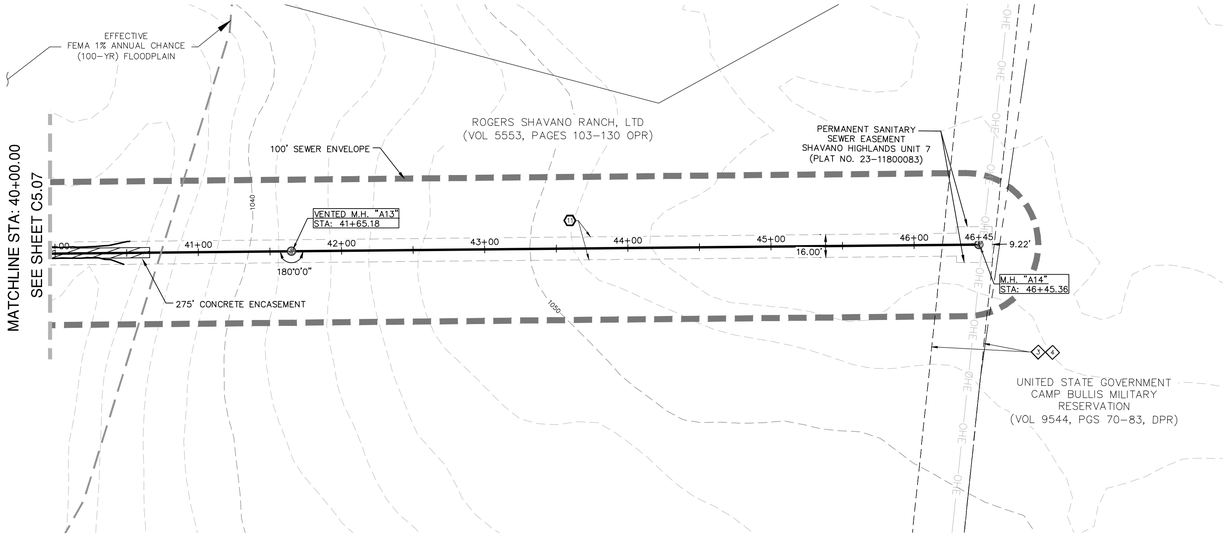
# SHAVANO HIGHLANDS UNIT 7

SAN ANTONIO, TEXAS

SANITARY SEWER LINE A - PLAN & PROFILE
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SCALE: 1"= 50'

0' 50' 100' 150'

## SEWER LEGEND

PROJECT LIMITS

EXISTING WATER

EXISTING SEWER

PROPOSED SEWER

MANHOLE

PROPOSED WATER

FIRE HYDRANT

PROPOSED SEWER LATERAL

FINISHED FLOOR ELEVATION FOR SEWER

FF = XXXX.XX

**NOTE:**

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## KEYED NOTES:

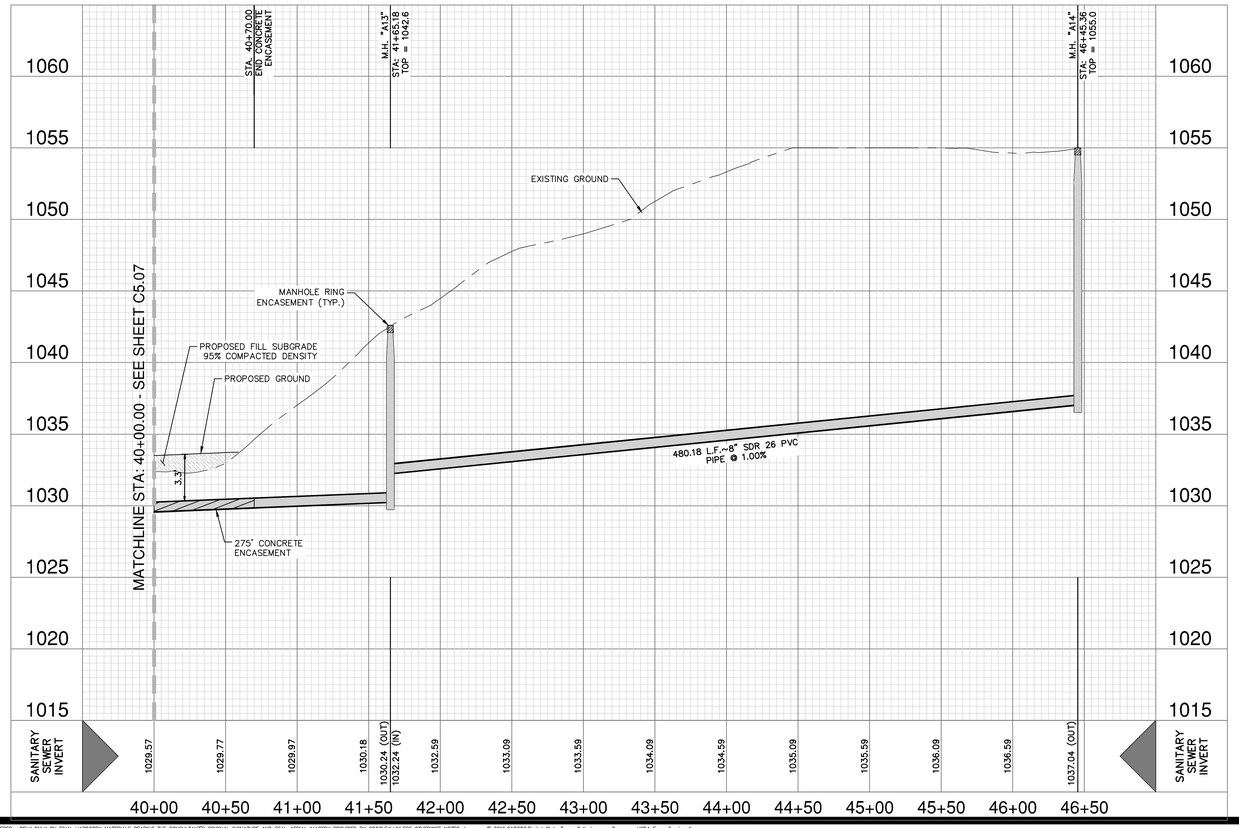
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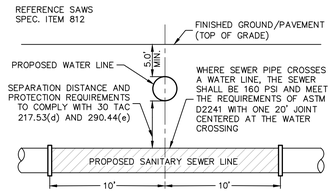
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STA. 40+00.00 TO END

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CONTRACTOR SHALL BE REQUIRED TO LOCATE ALL PUBLIC OR PRIVATE UTILITIES INCLUDING BUT NOT LIMITING TO: WATER, SEWER, TELEPHONE AND FIBER OPTIC LINES, SITE LIGHTING ELECTRIC, SECONDARY ELECTRIC, PRIMARY ELECTRICAL DUCTBANKS, 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 CONTRACTOR'S SOLE EXPENSE WHETHER THE UTILITY IS SHOWN ON THESE PLANS OR NOT.

## 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 ANY AVAILABLE GEOTECHNICAL INFORMATION AND THE ANTICIPATED INSTALLATION SITES 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.

SEWER - EAST SEWERSHED (UPPER) -DOS RIOS/ LEON CREEK

DEVELOPER'S NAME: SHAVANO ROGERS RANCH NORTH NO. 3, LTD.
ADDRESS: 11 LYNN BATTS LANE, SUITE 100
CITY: SAN ANTONIO STATE: TEXAS ZIP: 78218
PHONE# (210) 828-6131 FAX#
SAWS BLOCK MAP# 140650 TOTAL EDU'S 46 TOTAL ACREAGE 18.90
TOTAL LINEAR FOOTAGE OF PIPE: 8" 4,546 LF PLAT NO. 23-11800083
NUMBER OF LOTS 46 SAWS JOB NO. 23-1533

| NO. | REVISION | DATE |
|---|---|---|
| | | |

STATE OF TEXAS
CALEB M. CHANCE
98401
LICENSED PROFESSIONAL ENGINEER
1/31/24

PAPE-DAWSON ENGINEERS
SAN ANTONIO I AUSTIN I HOUSTON I FORT WORTH I DALLAS
2000 NW LOOP 410 I SAN ANTONIO, TX 78213 I 210.375.9000
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028800

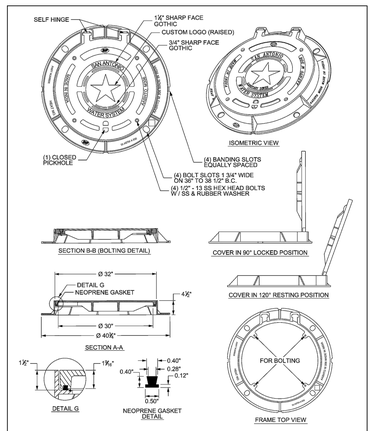
# SHAVANO HIGHLANDS UNIT 7

SAN ANTONIO, TEXAS

SANITARY SEWER LINE A - PLAN & PROFILE
STA: 40+00.00 TO END

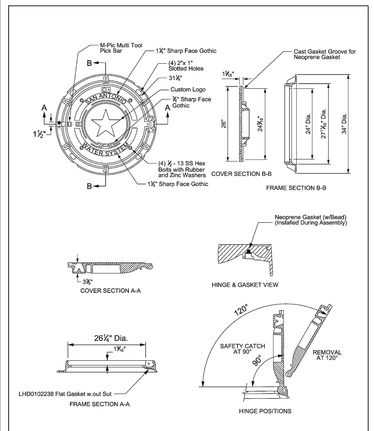
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JOB NO. 8834-22
DATE NOVEMBER 2023
DESIGNER AW
CHECKED CC DRAWN RC
SHEET C5.08

Date: Jan 31, 2024, 1:55pm User ID: vvillarreal
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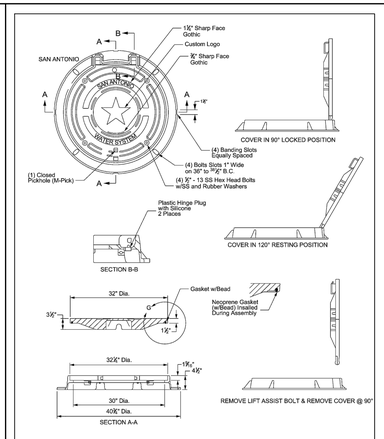

SIP Industries

| PROPERTY OF | | APPROVED | REVISED |
|---|---|---|---|
| SAN ANTONIO WATER SYSTEM<br>SAN ANTONIO, TEXAS | 30" MANHOLE RING AND COVER DETAIL | AUG 2019 | |
| | | DD 852-07 | SHEET 1 OF 5 |



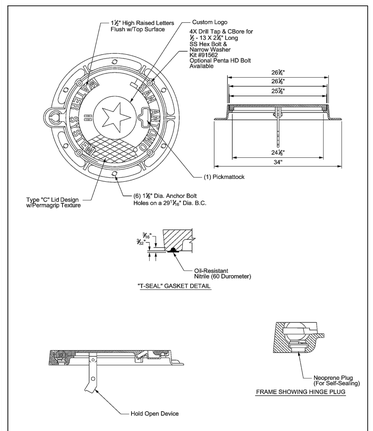

ERGO Assembly

| PROPERTY OF | | APPROVED | REVISED |
|---|---|---|---|
| SAN ANTONIO WATER SYSTEM<br>SAN ANTONIO, TEXAS | MANHOLE RING AND COVER DETAIL | MARCH 2008 | AUG 2019 |
| | | DD 852-07 | SHEET 2 OF 5 |



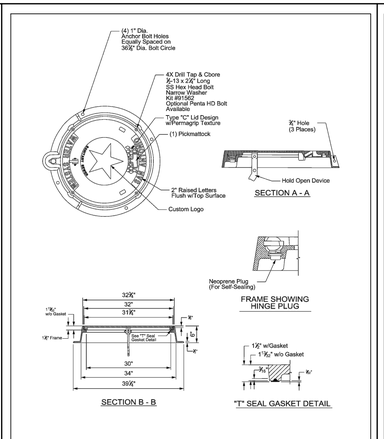

ERGO XL Assembly

| PROPERTY OF | | APPROVED | REVISED |
|---|---|---|---|
| SAN ANTONIO WATER SYSTEM<br>SAN ANTONIO, TEXAS | MANHOLE RING AND COVER DETAIL | MARCH 2008 | AUG 2019 |
| | | DD 852-07 | SHEET 3 OF 5 |



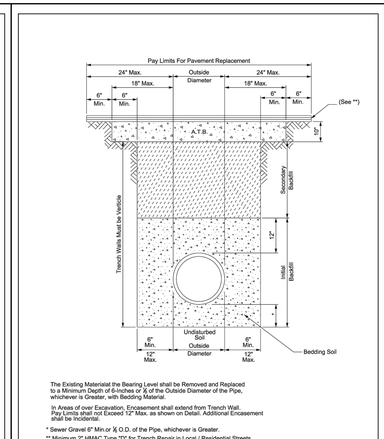

NEENAH FOUNDRY

| PROPERTY OF | | APPROVED | REVISED |
|---|---|---|---|
| SAN ANTONIO WATER SYSTEM<br>SAN ANTONIO, TEXAS | MANHOLE RING AND COVER DETAIL | MARCH 2008 | AUG 2019 |
| | | DD 852-07 | SHEET 4 OF 5 |




NEENAH FOUNDRY

| PROPERTY OF | | APPROVED | REVISED |
|---|---|---|---|
| SAN ANTONIO WATER SYSTEM<br>SAN ANTONIO, TEXAS | MANHOLE RING AND COVER DETAIL | MARCH 2008 | AUG 2019 |
| | | DD 852-07 | SHEET 5 OF 5 |

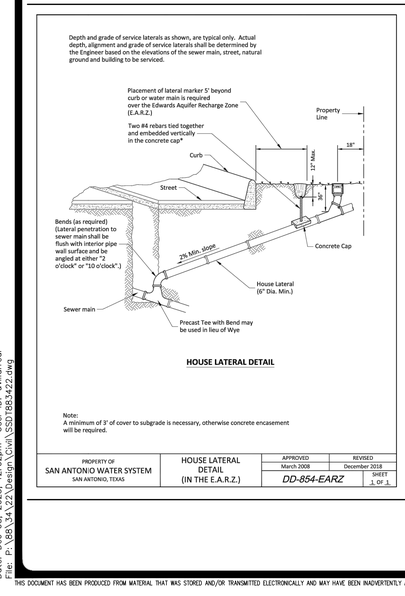



The Existing Materialat the Bearing Level shall be Removed and Replaced to a Minimum Depth of 6-inches or ¼ of the Outside Diameter of the Pipe, whichever is Greater, with Bedding Material.

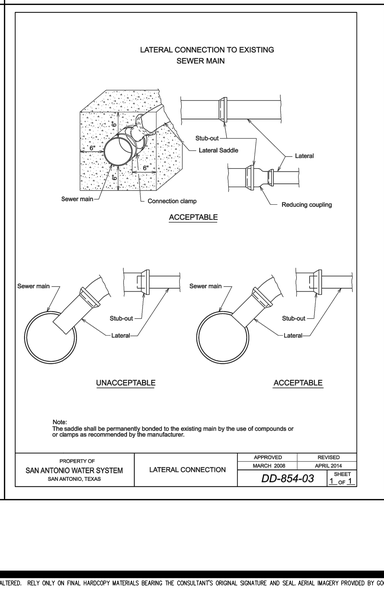
In Areas of over Excavation, Encasement shall extend from Trench Wall. Pay Limits shall not Exceed 12" Max. as shown on Detail: Additional Encasement shall be incidental.

* Sewer Gravel 6" Min.or ¼ O.D. of the Pipe, whichever is Greater.
** Minimum 2" HMAC Type "D" for Trench Repair in Local / Residential Streets.
** Minimum 3" HMAC Type "C" for Trench Repair in Colector / Arterial Streets.

| PROPERTY OF | | APPROVED | REVISED |
|---|---|---|---|
| SAN ANTONIO WATER SYSTEM<br>SAN ANTONIO, TEXAS | SANITARY SEWER PIPE LAID IN TRENCH | MARCH 2008 | DEC 2018 |
| | | DD-804-01 | SHEET 1 OF 1 |




| PROPERTY OF | | APPROVED | REVISED |
|---|---|---|---|
| SAN ANTONIO WATER SYSTEM<br>SAN ANTONIO, TEXAS | TRENCH COMPACTION DETAIL | MARCH 2018 | DEC 2018 |
| | | DD 804-02 | SHEET 1 OF 1 |




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

| PROPERTY OF | | APPROVED | REVISED |
|---|---|---|---|
| SAN ANTONIO WATER SYSTEM<br>SAN ANTONIO, TEXAS | GO, NO GO DEFLECTION TESTING MANDREL | March 2008 | APRIL 2014 |
| | | DD-848-01 | SHEET 1 OF 2 |

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

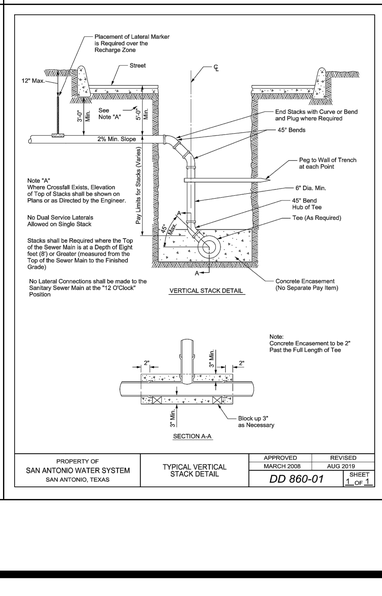
* Minimum Length

CHART

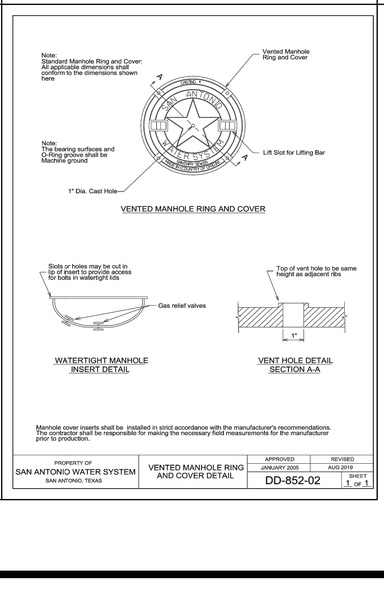
Notes:
PVC pipes and fittings 6" to 15" in diameter shall conform to ASTM D-3034-08.
PVC pipes and fittings 18" to 27" in diameter shall conform to ASTM F-679-08.

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

| PROPERTY OF | | APPROVED | REVISED |
|---|---|---|---|
| SAN ANTONIO WATER SYSTEM<br>SAN ANTONIO, TEXAS | GO, NO GO DEFLECTION TESTING MANDREL CHART | MARCH 2008 | APRIL 2014 |
| | | DD-848-01 | SHEET 2 OF 2 |

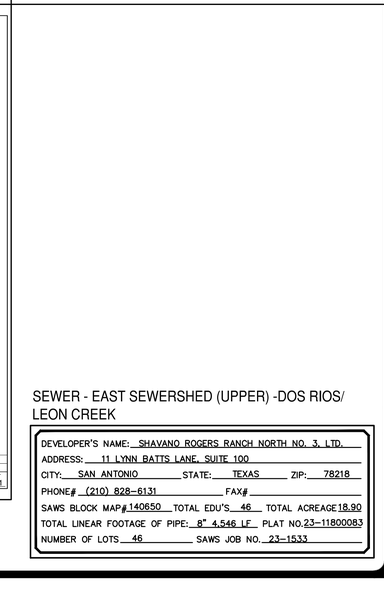



| PROPERTY OF | | APPROVED | REVISED |
|---|---|---|---|
| SAN ANTONIO WATER SYSTEM<br>SAN ANTONIO, TEXAS | STANDARD PRECAST MANHOLE | MAY 2013 | AUG 2019 |
| | | DD-852-01 | SHEET 1 OF 2 |




General Notes:
1. Material for Sanitary Sewer Pipe Must be the Same from Manhole to Manhole. Changes in Type of Pipe may be Made only at Manholes, or Special Structures, Except as Approved by the Project Engineer.
2. Adaptors and Concrete Collars shall be used as approved by the SAWS Project Engineer.
3. Watertight Manhole Rings and Covers shall be Trans-Tex A77 "O" Ring or Approved Equal.

| PROPERTY OF | | APPROVED | REVISED |
|---|---|---|---|
| SAN ANTONIO WATER SYSTEM<br>SAN ANTONIO, TEXAS | STANDARD MONOLITHIC MANHOLE | March 2008 | AUG 2019 |
| | | DD 852-01 | SHEET 2 OF 2 |




NOTE:
1. The Concrete Shall be 4000 PSI Minimum and Reinforced with No. 4 Bars as Shown.
2. The Concrete Shall Extend to Edge of Saw Cut Pavement.
3. Manhole Ring Encasement is Required on all Manholes.
4. Manhole Lid shall Open in the Direction of Traffic or Downstream in Parkway

| PROPERTY OF | | APPROVED | REVISED |
|---|---|---|---|
| SAN ANTONIO WATER SYSTEM<br>SAN ANTONIO, TEXAS | MANHOLE RING ENCASEMENT DETAIL | AUGUST 2009 | AUG 2019 |
| | | DD 852-03 | SHEET 1 OF 2 |




**HOUSE LATERAL DETAIL**

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

| PROPERTY OF | | APPROVED | REVISED |
|---|---|---|---|
| SAN ANTONIO WATER SYSTEM<br>SAN ANTONIO, TEXAS | HOUSE LATERAL DETAIL (IN THE E.A.R.Z.) | March 2008 | December 2018 |
| | | DD-854-EARZ | SHEET 1 OF 1 |




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

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




| PROPERTY OF | | APPROVED | REVISED |
|---|---|---|---|
| SAN ANTONIO WATER SYSTEM<br>SAN ANTONIO, TEXAS | TYPICAL CONCRETE DETAILS | MARCH 2008 | DEC 2018 |
| | | DD 858-02 | SHEET 1 OF 1 |




| PROPERTY OF | | APPROVED | REVISED |
|---|---|---|---|
| SAN ANTONIO WATER SYSTEM<br>SAN ANTONIO, TEXAS | TYPICAL VERTICAL STACK DETAIL | MARCH 2008 | AUG 2019 |
| | | DD 860-01 | SHEET 1 OF 1 |




Manhole cover inserts shall be installed in strict accordance with the manufacturer's recommendations. The contractor shall be responsible for making the necessary field measurements for the manufacturer prior to production.

| PROPERTY OF | | APPROVED | REVISED |
|---|---|---|---|
| SAN ANTONIO WATER SYSTEM<br>SAN ANTONIO, TEXAS | VENTED MANHOLE RING AND COVER DETAIL | JANUARY 2005 | AUG 2019 |
| | | DD-852-02 | SHEET 1 OF 1 |

SEWER - EAST SEWERSHED (UPPER) -DOS RIOS/ LEON CREEK

DEVELOPER'S NAME: SHAVANO ROGERS RANCH NORTH NO. 3, LTD.
ADDRESS: 11 LYNN BATTS LANE, SUITE 100
CITY: SAN ANTONIO STATE: TEXAS ZIP: 78218
PHONE# (210) 828-6131 FAX#
SAWS BLOCK MAP# 140650 TOTAL EDU'S 46 TOTAL ACREAGE 18.90
TOTAL LINEAR FOOTAGE OF PIPE: 8" 4,546 LF PLAT NO. 23-11800083
NUMBER OF LOTS 46 SAWS JOB NO. 23-1533

NO. REVISION DATE

STATE OF TEXAS
CALEB M. CHANCE
98401
LICENSED
PROFESSIONAL ENGINEER
12/8/23

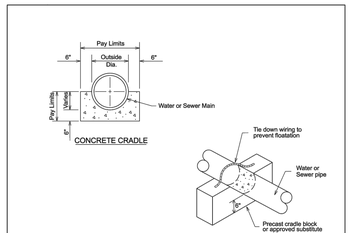
PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

SHAVANO HIGHLANDS UNIT 7
SAN ANTONIO, TEXAS
SANITARY SEWER DETAILS

PLAT NO. 23-11800083
JOB NO. 8834-22
DATE NOVEMBER 2023
DESIGNER AW
CHECKED CC DRAWN RC
SHEET C5.10

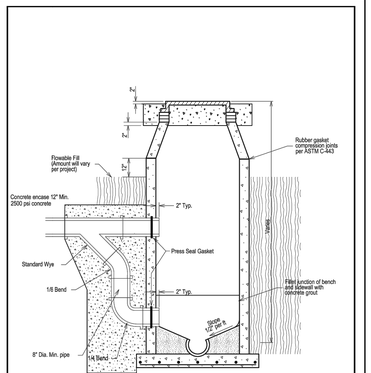
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Notes:
1) All concrete encasement shall be poured at a plane 6" above the pipe between excavated trench walls.
2) All pipe with less than 3' of cover to subgrade shall be concrete-encased.
3) All Force mains shall be provided with thrust blocks, where changes in direction occur, at Tees, Bends, Crosses, changes in size, stops, or as directed by SAWS.

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




Note:
Price for drop fittings and encasement to be included with the price of manhole.

| PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS | DROP MANHOLE DETAIL | APPROVED March 2008 | REVISED |
|---|---|---|---|
| | | DD-852-08 | SHEET 1 OF 1 |

# TCEQ - ORGANIZED SEWAGE COLLECTION SYSTEM GENERAL CONSTRUCTION NOTES

1. THIS ORGANIZED SEWAGE COLLECTION SYSTEM (SCS) MUST BE CONSTRUCTED IN ACCORDANCE WITH 30 TEXAS ADMINISTRATIVE CODE (TAC) §213.5(C), THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY'S (TCEQ) EDWARDS AQUIFER RULES AND ANY LOCAL GOVERNMENT STANDARD SPECIFICATIONS.

2. ALL CONTRACTORS CONDUCTING REGULATED ACTIVITIES ASSOCIATED WITH THIS PROPOSED REGULATED PROJECT MUST BE PROVIDED WITH COPIES OF THE SCS PLAN AND THE TCEQ LETTER INDICATING THE SPECIFIC CONDITIONS OF ITS APPROVAL. DURING THE COURSE OF THESE REGULATED ACTIVITIES, THE CONTRACTORS MUST BE REQUIRED TO KEEP ON-SITE COPIES OF THE PLAN AND THE APPROVAL LETTER.

3. A WRITTEN NOTICE OF CONSTRUCTION MUST BE SUBMITTED TO THE PRESIDING TCEQ REGIONAL OFFICE AT LEAST 48 HOURS PRIOR TO THE START OF ANY REGULATED ACTIVITIES. THIS NOTICE MUST INCLUDE:
   - THE NAME OF THE APPROVED PROJECT;
   - THE ACTIVITY START DATE; AND
   - THE CONTACT INFORMATION OF THE PRIME CONTRACTOR.

4. ANY MODIFICATION TO THE ACTIVITIES DESCRIBED IN THE REFERENCED SCS APPLICATION FOLLOWING THE DATE OF APPROVAL MAY REQUIRE THE SUBMITTAL OF AN SCS APPLICATION TO MODIFY THIS APPROVAL, INCLUDING THE PAYMENT OF APPROPRIATE FEES AND ALL INFORMATION NECESSARY FOR ITS REVIEW AND APPROVAL.

5. PRIOR TO BEGINNING ANY CONSTRUCTION ACTIVITY, ALL TEMPORARY EROSION AND SEDIMENTATION (E&S) CONTROL MEASURES MUST BE PROPERLY INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE MANUFACTURERS SPECIFICATIONS. THESE CONTROLS MUST REMAIN IN PLACE UNTIL THE DISTURBED AREAS HAVE BEEN PERMANENTLY STABILIZED.

6. IF ANY SENSITIVE FEATURES ARE DISCOVERED DURING THE WASTEWATER LINE TRENCHING ACTIVITIES, ALL REGULATED ACTIVITIES NEAR THE SENSITIVE FEATURE MUST BE SUSPENDED IMMEDIATELY. THE APPLICANT MUST IMMEDIATELY NOTIFY THE APPROPRIATE REGIONAL OFFICE OF THE TCEQ OF THE FEATURE DISCOVERED. A GEOLOGIST'S ASSESSMENT OF THE LOCATION AND EXTENT OF THE FEATURE DISCOVERED MUST BE REPORTED TO THE REGIONAL OFFICE IN WRITING AND THE APPLICANT MUST SUBMIT A PLAN FOR ENSURING THE STRUCTURAL INTEGRITY OF THE SEWER LINE OR FOR MODIFYING THE PROPOSED COLLECTION SYSTEM ALIGNMENT AROUND THE FEATURE. THE REGULATED ACTIVITIES NEAR THE SENSITIVE FEATURE MAY NOT PROCEED UNTIL THE EXECUTIVE DIRECTOR HAS REVIEWED AND APPROVED THE METHODS PROPOSED TO PROTECT THE SENSITIVE FEATURE AND THE EDWARDS AQUIFER FROM ANY POTENTIALLY ADVERSE IMPACTS TO WATER QUALITY WHILE MAINTAINING THE STRUCTURAL INTEGRITY OF THE LINE.

7. SEWER LINES LOCATED WITHIN OR CROSSING THE 5-YEAR FLOODPLAIN OF A DRAINAGE WAY WILL BE PROTECTED FROM INUNDATION AND STREAM VELOCITIES WHICH COULD CAUSE EROSION AND SCOURING OF BACKFILL. THE TRENCH MUST BE CAPPED WITH CONCRETE TO PREVENT SCOURING OF BACKFILL, OR THE SEWER LINES MUST BE ENCASED IN CONCRETE. ALL CONCRETE SHALL HAVE A MINIMUM THICKNESS OF 6 INCHES.

8. BLASTING PROCEDURES FOR PROTECTION OF EXISTING SEWER LINES AND OTHER UTILITIES WILL BE IN ACCORDANCE WITH THE NATIONAL FIRE PROTECTION ASSOCIATION CRITERIA. SAND IS NOT ALLOWED AS BEDDING OR BACKFILL IN TRENCHES THAT HAVE BEEN BLASTED. IF ANY EXISTING SEWER LINES ARE DAMAGED, THE LINES MUST BE REPAIRED AND RETESTED.

9. ALL MANHOLES CONSTRUCTED OR REHABILITATED ON THIS PROJECT MUST HAVE WATERTIGHT SIZE ON SIZE RESILIENT CONNECTORS ALLOWING FOR DIFFERENTIAL SETTLEMENT. IF MANHOLES ARE CONSTRUCTED WITHIN THE 100-YEAR FLOODPLAIN, THE COVER MUST HAVE A GASKET AND BE BOLTED TO THE RING. WHERE GASKETED MANHOLE COVERS ARE REQUIRED FOR MORE THAN THREE MANHOLES IN SEQUENCE OR FOR MORE THAN 1500 FEET, ALTERNATE MEANS OF VENTING WILL BE PROVIDED. BRICKS ARE NOT AN ACCEPTABLE CONSTRUCTION MATERIAL FOR ANY PORTION OF THE MANHOLE.

   THE DIAMETER OF THE MANHOLES MUST BE A MINIMUM OF FOUR FEET AND THE MANHOLE FOR ENTRY MUST HAVE A MINIMUM CLEAR OPENING DIAMETER OF 30 INCHES. THESE DIMENSIONS AND OTHER DETAILS SHOWING COMPLIANCE WITH THE COMMISSION'S RULES CONCERNING MANHOLES AND SEWER LINE/MANHOLE INVERTS DESCRIBED IN 30 TAC §217.55 ARE INCLUDED ON PLAN SHEET C5.10.

   IT IS SUGGESTED THAT ENTRANCE INTO MANHOLES IN EXCESS OF FOUR FEET DEEP BE ACCOMPLISHED BY MEANS OF A PORTABLE LADDER. THE INCLUSION OF STEPS IN A MANHOLE IS PROHIBITED.

10. WHERE WATER LINES AND NEW SEWER LINE ARE INSTALLED WITH A SEPARATION DISTANCE CLOSER THAN NINE FEET (I.E., WATER LINES CROSSING WASTEWATER LINES, WATER LINES PARALLELING WASTEWATER LINES, OR WATER LINES NEXT TO MANHOLES) THE INSTALLATION MUST MEET THE REQUIREMENTS OF 30 TAC §217.53(D) (PIPE DESIGN) AND 30 TAC §290.44(E) (WATER DISTRIBUTION).

11. WHERE SEWERS LINES DEVIATE FROM STRAIGHT ALIGNMENT AND UNIFORM GRADE ALL CURVATURE OF SEWER PIPE MUST BE ACHIEVED BY THE FOLLOWING PROCEDURE WHICH IS RECOMMENDED BY THE PIPE MANUFACTURER: N/A

    IF PIPE FLEXURE IS PROPOSED, THE FOLLOWING METHOD OF PREVENTING DEFLECTION OF THE JOINT MUST BE USED: N/A

    SPECIFIC CARE MUST BE TAKEN TO ENSURE THAT THE JOINT IS PLACED IN THE CENTER OF THE TRENCH AND PROPERLY BEDDED IN ACCORDANCE WITH 30 TAC §217.54.

12. NEW SEWAGE COLLECTION SYSTEM LINES MUST BE CONSTRUCTED WITH STUB OUTS FOR THE CONNECTION OF ANTICIPATED EXTENSIONS. THE LOCATION OF SUCH STUB OUTS MUST BE MARKED ON THE GROUND SUCH THAT THEIR LOCATION CAN BE EASILY DETERMINED AT THE TIME OF CONNECTION OF THE EXTENSIONS. SUCH STUB OUTS MUST BE MANUFACTURED WYES OR TEES THAT ARE COMPATIBLE IN SIZE AND MATERIAL WITH BOTH THE SEWER LINE AND THE EXTENSION. AT THE TIME OF ORIGINAL CONSTRUCTION, NEW STUB-OUTS MUST BE CONSTRUCTED SUFFICIENTLY TO EXTEND BEYOND THE END OF THE STREET PAVEMENT. ALL STUB-OUTS MUST BE SEALED WITH A MANUFACTURED CAP TO PREVENT LEAKAGE. EXTENSIONS THAT WERE NOT ANTICIPATED AT THE TIME OF ORIGINAL CONSTRUCTION OR THAT ARE TO BE CONNECTED TO AN EXISTING SEWER LINE NOT FURNISHED WITH STUB OUTS MUST BE CONNECTED USING A MANUFACTURED SADDLE AND IN ACCORDANCE WITH ACCEPTED PLUMBING TECHNIQUES.

    IF NO STUB-OUT IS PRESENT AN ALTERNATE METHOD OF JOINING LATERALS IS SHOWN IN THE DETAIL ON SHEET C5.10. (FOR POTENTIAL FUTURE LATERALS).

    THE PRIVATE SERVICE LATERAL STUB-OUTS MUST BE INSTALLED AS SHOWN ON THE PLAN AND PROFILE SHEETS ON PLAN SHEET C5.04 TO C5.08 AND MARKED AFTER BACKFILLING AS SHOWN IN THE DETAIL ON PLAN SHEET C5.10

13. TRENCHING, BEDDING AND BACKFILL MUST CONFORM WITH 30 TAC §217.54. THE BEDDING AND BACKFILL FOR FLEXIBLE PIPE MUST COMPLY WITH THE STANDARDS OF ASTM D-2321, CLASSES IA, IB, II OR III. RIGID PIPE BEDDING MUST COMPLY WITH THE REQUIREMENTS OF ASTM C 12 (ANSI A 106.2) CLASSES A, B OR C.

14. SEWER LINES MUST BE TESTED FROM MANHOLE TO MANHOLE. WHEN A NEW SEWER LINE IS CONNECTED TO AN EXISTING STUB OR CLEAN-OUT, IT MUST BE TESTED FROM EXISTING MANHOLE TO NEW MANHOLE. IF A STUB OR CLEAN-OUT IS USED AT THE END OF THE PROPOSED SEWER LINE, NO PRIVATE SERVICE ATTACHMENTS MAY BE CONNECTED BETWEEN THE LAST MANHOLE AND THE CLEANOUT UNLESS IT CAN BE CERTIFIED AS CONFORMING WITH THE PROVISIONS OF 30 TAC §213.5(C)(3)(E).

15. ALL SEWER LINES MUST BE TESTED IN ACCORDANCE WITH 30 TAC §217.57. THE ENGINEER MUST RETAIN COPIES OF ALL TEST RESULTS WHICH MUST BE MADE AVAILABLE TO THE EXECUTIVE DIRECTOR UPON REQUEST. THE ENGINEER MUST CERTIFY IN WRITING THAT ALL WASTEWATER LINES HAVE PASSED ALL REQUIRED TESTING TO THE APPROPRIATE REGIONAL OFFICE WITHIN 30 DAYS OF TEST COMPLETION AND PRIOR TO USE OF THE NEW COLLECTION SYSTEM. TESTING METHOD WILL BE:

(a) FOR A COLLECTION SYSTEM PIPE THAT WILL TRANSPORT WASTEWATER BY GRAVITY FLOW, THE DESIGN MUST SPECIFY AN INFILTRATION AND EXFILTRATION TEST OR A LOW-PRESSURE AIR TEST. A TEST MUST CONFORM TO THE FOLLOWING REQUIREMENTS:

(1) LOW PRESSURE AIR TEST.

(A) A LOW PRESSURE AIR TEST MUST FOLLOW THE PROCEDURES DESCRIBED IN AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) C-828, ASTM C-924, OR ASTM F-1417 OR OTHER PROCEDURE APPROVED BY THE EXECUTIVE DIRECTOR, EXCEPT AS TO TESTING TIMES AS REQUIRED IN TABLE C.3 INSUBPARAGRAPH (C) OF THIS PARAGRAPH OR EQUATION C.3 IN SUBPARAGRAPH (B)(II) OF THIS PARAGRAPH.

(B) FOR SECTIONS OF COLLECTION SYSTEM PIPE LESS THAN 36 INCH AVERAGE INSIDE DIAMETER, THE FOLLOWING PROCEDURE MUST APPLY, UNLESS A PIPE IS TO BE TESTED AS REQUIRED BY PARAGRAPH (2) OF THIS SUBSECTION.

(I) A PIPE MUST BE PRESSURIZED TO 3.5 POUNDS PER SQUARE INCH (PSI) GREATER THAN THE PRESSURE EXERTED BY GROUNDWATER ABOVE THE PIPE.

(II) ONCE THE PRESSURE IS STABILIZED, THE MINIMUM TIME ALLOWABLE FOR THE PRESSURE TO DROP FROM 3.5 PSI GAUGE TO 2.5 PSI GAUGE IS COMPUTED FROM THE FOLLOWING EQUATION:

EQUATION C.3

WHERE: T= (0.085 * D * K)/Q

T = TIME FOR PRESSURE TO DROP 1.0 POUND PER SQUARE INCH GAUGE IN SECONDS
K = 0.000419 X D X L, BUT NOT LESS THAN 1.0
D = AVERAGE INSIDE PIPE DIAMETER IN INCHES
L = LENGTH OF LINE OF SAME SIZE BEING TESTED, IN FEET
Q = RATE OF LOSS, 0.0015 CUBIC FEET PER MINUTE PER SQUARE FOOT INTERNAL SURFACE.

(C) SINCE A K VALUE OF LESS THAN 1.0 MAY NOT BE USED, THE MINIMUM TESTING TIME FOR EACH PIPE DIAMETER IS SHOWN IN THE FOLLOWING TABLE C.3:

| PIPE DIAMETER (INCHES) | MIN. TIME (SECONDS) | LENGTH FOR MIN. (FEET) | TIME, LONGER LENGTH (SECONDS) |
|---|---|---|---|
| 6 | 340 | 398 | 0.855(L) |
| 8 | 454 | 298 | 1.520(L) |
| 10 | 567 | 239 | 2.374(L) |
| 12 | 680 | 199 | 3.419(L) |
| 15 | 850 | 159 | 5.342(L) |
| 18 | 1020 | 133 | 7.693(L) |
| 21 | 1190 | 114 | 10.471(L) |
| 24 | 1360 | 100 | 13.676(L) |
| 27 | 1530 | 88 | 17.309(L) |
| 30 | 1700 | 80 | 21.369(L) |
| 33 | 1870 | 72 | 25.856(L) |

(D) AN OWNER MAY STOP A TEST IF NO PRESSURE LOSS HAS OCCURRED DURING THE FIRST 25% OF THE CALCULATED TESTING TIME.

(E) IF ANY PRESSURE LOSS OR LEAKAGE HAS OCCURRED DURING THE FIRST 25% OF A TESTING PERIOD, THEN THE TEST MUST CONTINUE FOR THE ENTIRE TEST DURATION AS OUTLINED ABOVE OR UNTIL FAILURE.

(F) WASTEWATER COLLECTION SYSTEM PIPES WITH A 27 INCH OR LARGER AVERAGE INSIDE DIAMETER MAY BE AIR TESTED AT EACH JOINT INSTEAD OF FOLLOWING THE PROCEDURE OUTLINED IN THIS SECTION.

(G) A TESTING PROCEDURE FOR PIPE WITH AN INSIDE DIAMETER GREATER THAN 33 INCHES MUST BE APPROVED BY THE EXECUTIVE DIRECTOR.

(2) INFILTRATION/EXFILTRATION TEST.

(A) THE TOTAL EXFILTRATION, AS DETERMINED BY A HYDROSTATIC HEAD TEST, MUST NOT EXCEED 50 GALLONS PER INCH OF DIAMETER PER MILE OF PIPE PER 24 HOURS AT A MINIMUM TEST HEAD OF 2.0 FEET ABOVE THE CROWN OF A PIPE AT AN UPSTREAM MANHOLE.

(B) AN OWNER SHALL USE AN INFILTRATION TEST IN LIEU OF AN EXFILTRATION TEST WHEN PIPES ARE INSTALLED BELOW THE GROUNDWATER LEVEL.

(C) THE TOTAL EXFILTRATION, AS DETERMINED BY A HYDROSTATIC HEAD TEST, MUST NOT EXCEED 50 GALLONS PER INCH DIAMETER PER MILE OF PIPE PER 24 HOURS AT A MINIMUM TEST HEAD OF TWO FEET ABOVE THE CROWN OF A PIPE AT AN UPSTREAM MANHOLE, OR AT LEAST TWO FEET ABOVE EXISTING GROUNDWATER LEVEL, WHICHEVER IS GREATER.

(D) FOR CONSTRUCTION WITHIN A 25-YEAR FLOOD PLAIN, THE INFILTRATION OR EXFILTRATION MUST NOT EXCEED 10 GALLONS PER INCH DIAMETER PER MILE OF PIPE PER 24 HOURS AT THE SAME MINIMUM TEST HEAD AS IN SUBPARAGRAPH (C) OF THIS PARAGRAPH.

(E) IF THE QUANTITY OF INFILTRATION OR EXFILTRATION EXCEEDS THE MAXIMUM QUANTITY SPECIFIED, AN OWNER SHALL UNDERTAKE REMEDIAL ACTION IN ORDER TO REDUCE THE INFILTRATION OR EXFILTRATION TO AN AMOUNT WITHIN THE LIMITS SPECIFIED. AN OWNER SHALL RETEST A PIPE FOLLOWING A REMEDIATION ACTION.

(b) IF A GRAVITY COLLECTION PIPE IS COMPOSED OF FLEXIBLE PIPE, DEFLECTION TESTING IS ALSO REQUIRED. THE FOLLOWING PROCEDURES MUST BE FOLLOWED:

(1) FOR A COLLECTION PIPE WITH INSIDE DIAMETER LESS THAN 27 INCHES, DEFLECTION MEASUREMENT REQUIRES A RIGID MANDREL.

(A) MANDREL SIZING.

(i) A RIGID MANDREL MUST HAVE AN OUTSIDE DIAMETER (OD) NOT LESS THAN 95% OF THE BASE INSIDE DIAMETER (ID) OR AVERAGE ID OF A PIPE, AS SPECIFIED IN THE APPROPRIATE STANDARD BY THE ASTMS, AMERICAN WATER WORKS ASSOCIATION, UNI-BELL, OR AMERICAN NATIONAL STANDARDS INSTITUTE, OR ANY RELATED APPENDIX.

(ii) IF A MANDREL SIZING DIAMETER IS NOT SPECIFIED IN THE APPROPRIATE STANDARD, THE MANDREL MUST HAVE AN OD EQUAL TO 95% OF THE ID OF A PIPE. IN THIS CASE, THE ID OF THE PIPE, FOR THE PURPOSE OF DETERMINING THE OD OF THE MANDREL, MUST EQUAL BE THE AVERAGE OUTSIDE DIAMETER MINUS TWO MINIMUM WALL THICKNESSES FOR OD CONTROLLED PIPE AND THE AVERAGE INSIDE DIAMETER FOR ID CONTROLLED PIPE.

(iii) ALL DIMENSIONS MUST MEET THE APPROPRIATE STANDARD.

(B) MANDREL DESIGN.

(i) A RIGID MANDREL MUST BE CONSTRUCTED OF A METAL OR A RIGID PLASTIC MATERIAL THAT CAN WITHSTAND 200 PSI WITHOUT BEING DEFORMED.

(ii) A MANDREL MUST HAVE NINE OR MORE ODD NUMBER OF RUNNERS OR LEGS.

(iii) A BARREL SECTION LENGTH MUST EQUAL AT LEAST 75% OF THE INSIDE DIAMETER OF A PIPE.

(iv) EACH SIZE MANDREL MUST USE A SEPARATE PROVING RING.

(C) METHOD OPTIONS.

(i) AN ADJUSTABLE OR FLEXIBLE MANDREL IS PROHIBITED.

(ii) A TEST MAY NOT USE TELEVISION INSPECTION AS A SUBSTITUTE FOR A DEFLECTION TEST.

(iii) IF REQUESTED, THE EXECUTIVE DIRECTOR MAY APPROVE THE USE OF A DEFLECTOMETER OR A MANDREL WITH REMOVABLE LEGS OR RUNNERS ON A CASE-BY-CASE BASIS.

(2) FOR A GRAVITY COLLECTION SYSTEM PIPE WITH AN INSIDE DIAMETER 27 INCHES AND GREATER, OTHER TEST METHODS MAY BE USED TO DETERMINE VERTICAL DEFLECTION. A DEFLECTION TEST METHOD MUST BE ACCURATE TO WITHIN PLUS OR MINUS 0.2% DEFLECTION.

(3) AN OWNER SHALL NOT CONDUCT A DEFLECTION TEST UNTIL AT LEAST 30 DAYS AFTER THE FINAL BACKFILL.

(4) GRAVITY COLLECTION SYSTEM PIPE DEFLECTION MUST NOT EXCEED FIVE PERCENT (5%).

(5) IF A PIPE SECTION FAILS A DEFLECTION TEST, AN OWNER SHALL CORRECT THE PROBLEM AND CONDUCT A SECOND TEST AFTER THE FINAL BACKFILL HAS BEEN IN PLACE AT LEAST 30 DAYS.

16. ALL MANHOLES MUST BE TESTED TO MEET OR EXCEED THE REQUIREMENTS OF 30 TAC §217.58.

(a) ALL MANHOLES MUST PASS A LEAKAGE TEST.

(b) AN OWNER SHALL TEST EACH MANHOLE (AFTER ASSEMBLY AND BACKFILLING) FOR LEAKAGE, SEPARATE AND INDEPENDENT OF THE COLLECTION SYSTEM PIPES, BY HYDROSTATIC EXFILTRATION TESTING, VACUUM TESTING, OR OTHER METHOD APPROVED BY THE EXECUTIVE DIRECTOR.

(1) HYDROSTATIC TESTING.

(A) THE MAXIMUM LEAKAGE FOR HYDROSTATIC TESTING OR ANY ALTERNATIVE TEST METHODS IS 0.025 GALLONS PER FOOT DIAMETER PER FOOT OF MANHOLE DEPTH PER HOUR.

(B) TO PERFORM A HYDROSTATIC EXFILTRATION TEST, AN OWNER SHALL SEAL ALL WASTEWATER PIPES COMING INTO A MANHOLE WITH AN INTERNAL PIPE PLUG, FILL THE MANHOLE WITH WATER, AND MAINTAIN THE TEST FOR AT LEAST ONE HOUR.

(C) A TEST FOR CONCRETE MANHOLES MAY USE A 24-HOUR WETTING PERIOD BEFORE TESTING TO ALLOW SATURATION OF THE CONCRETE.

(2) VACUUM TESTING.

(A) TO PERFORM A VACUUM TEST, AN OWNER SHALL PLUG ALL LIFT HOLES AND EXTERIOR JOINTS WITH A NON-SHRINK GROUT AND PLUG ALL PIPES ENTERING A MANHOLE.

(B) NO GROUT MUST BE PLACED IN HORIZONTAL JOINTS BEFORE TESTING.

(C) STUB-OUTS, MANHOLE BOOTS, AND PIPE PLUGS MUST BE SECURED TO PREVENT MOVEMENT WHILE A VACUUM IS DRAWN.

(D) AN OWNER SHALL USE A MINIMUM 60 INCH-LB TORQUE WRENCH TO TIGHTEN THE EXTERNAL CLAMPS THAT SECURE A TEST COVER TO THE TOP OF A MANHOLE.

(E) A TEST HEAD MUST BE PLACED AT THE INSIDE OF THE TOP OF A CONE SECTION, AND THE SEAL INFLATED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

(F) THERE MUST BE A VACUUM OF 10 INCHES OF MERCURY INSIDE A MANHOLE TO PERFORM A VALID TEST.

(G) A TEST DOES NOT BEGIN UNTIL AFTER THE VACUUM PUMP IS OFF.

(H) A MANHOLE PASSES THE TEST IF AFTER 2.0 MINUTES AND WITH ALL VALVES CLOSED, THE VACUUM IS AT LEAST 9.0 INCHES OF MERCURY.

17. ALL PRIVATE SERVICE LATERALS MUST BE INSPECTED AND CERTIFIED IN ACCORDANCE WITH 30 TAC §213.5(C)(3)(I). AFTER INSTALLATION OF AND, PRIOR TO COVERING AND CONNECTING A PRIVATE SERVICE LATERAL TO AN EXISTING ORGANIZED SEWAGE COLLECTION SYSTEM, A TEXAS LICENSED PROFESSIONAL ENGINEER, TEXAS REGISTERED SANITARIAN, OR APPROPRIATE CITY INSPECTOR MUST VISUALLY INSPECT THE PRIVATE SERVICE LATERAL AND THE CONNECTION TO THE SEWAGE COLLECTION SYSTEM, AND CERTIFY THAT IT IS CONSTRUCTED IN CONFORMITY WITH THE APPLICABLE PROVISIONS OF THIS SECTION. THE OWNER OF THE COLLECTION SYSTEM MUST MAINTAIN SUCH CERTIFICATIONS FOR FIVE YEARS AND FORWARD COPIES TO THE APPROPRIATE REGIONAL OFFICE UPON REQUEST. CONNECTIONS MAY ONLY BE MADE TO AN APPROVED SEWAGE COLLECTION SYSTEM.

**THESE GENERAL CONSTRUCTION NOTES MUST BE INCLUDED ON THE CONSTRUCTION PLANS PROVIDED TO THE CONTRACTOR AND ALL SUBCONTRACTORS.**

| | |
|---|---|
| AUSTIN REGIONAL OFFICE<br>12100 PARK 35 CIRCLE, BUILDING A<br>AUSTIN, TEXAS 78753-1808<br>PHONE (512) 339-2929<br>FAX (512) 339-3795 | SAN ANTONIO REGIONAL OFFICE<br>14250 JUDSON ROAD<br>SAN ANTONIO, TEXAS 78233-4480<br>PHONE (210) 490-3096<br>FAX (210) 545-4329 |

# SAWS CONSTRUCTION NOTES

(LAST REVISED JANUARY 2022)

## SAWS 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 (210) 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.

## SAWS 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.

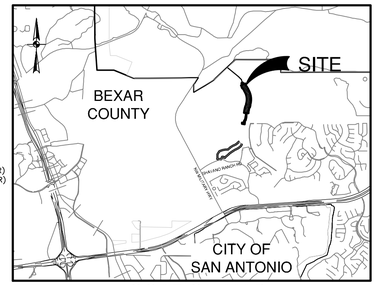
   SHOULD THE CONTRACTOR FAIL TO ADDRESS AN SSO IMMEDIATELY AND TO SAWS SATISFACTION, THEY WILL BE RESPONSIBLE FOR ALL COSTS INCURRED BY SAWS, INCLUDING ANY FINES FROM EPA, TCEQ AND/OR ANY OTHER FEDERAL, STATE OR LOCAL AGENCIES.

   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.

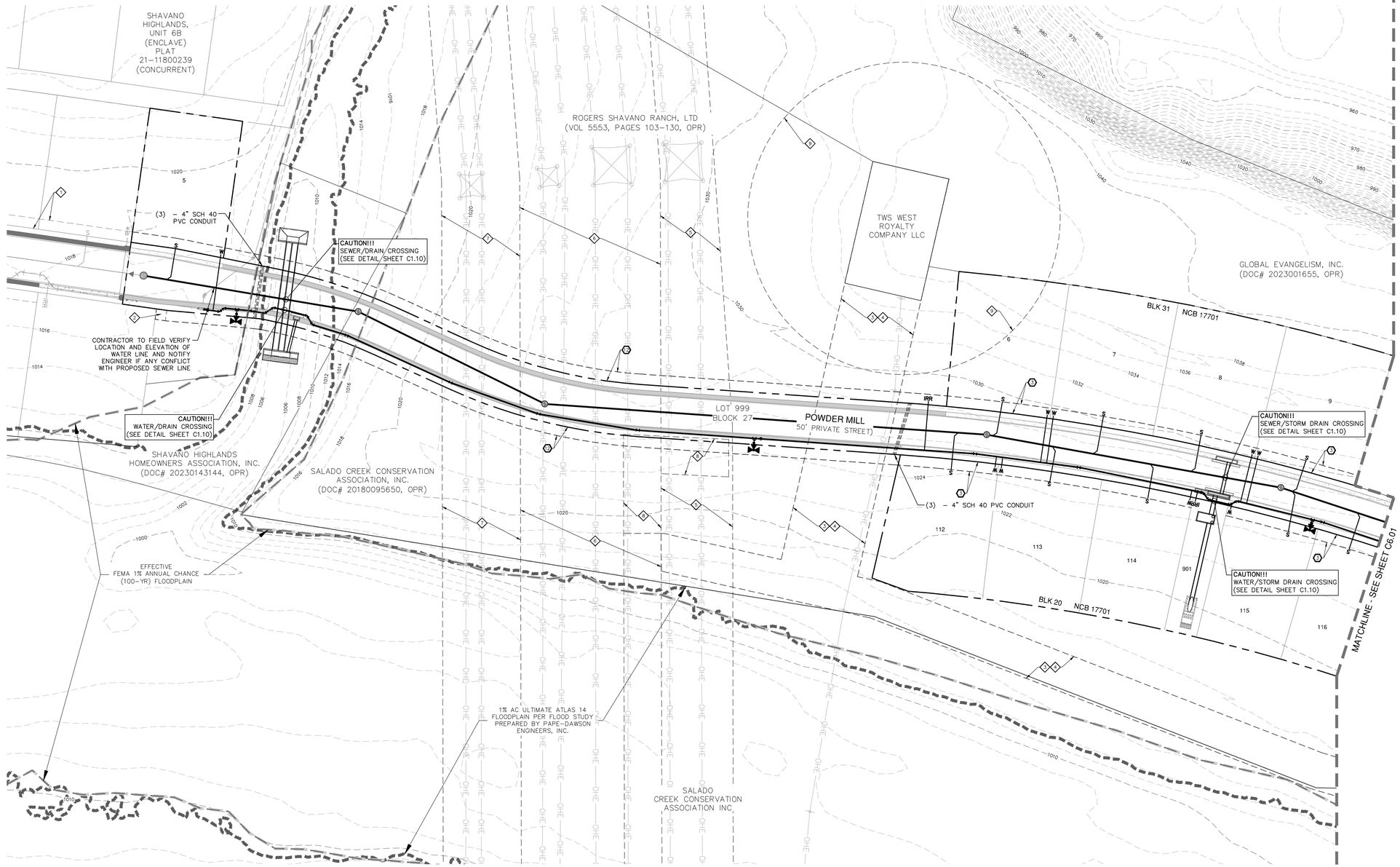
## KEYED NOTES:

3. 10' GAS, ELECTRIC, TELEPHONE AND CABLE TV EASEMENT
7. PERMANENT VARIABLE WIDTH SANITARY SEWER EASEMENT (MIN. 16' WIDE) (OFF-LOT) (0.556 ACRE)
10. 10' GAS, ELECTRIC, TELEPHONE AND CABLE TV EASEMENT (OFF-LOT)(0.354 TOTAL ACRES)
13. VARIABLE WIDTH SANITARY SEWER EASEMENT (0.007 ACRE)
1. 10' GAS, ELECTRIC, TELEPHONE AND CABLE TV EASEMENT (VOL 20001, PG 1109-1111, DPR)
2. 10'x10' GAS, ELECTRIC, TELEPHONE AND CABLE TV EASEMENT (VOL 20001, PG 1109-1111, DPR)
5. ELECTRIC LINE RIGHT-OF-WAY AGREEMENT (VOL 16444, PG. 2154, OPR) (VOL 16464, PG. 76, OPR)
4. EASEMENT AGREEMENT VARIABLE WIDTH WATER, UTILITY, INGRESS AND TERMINATION OF ORIGINAL EASEMENT (VOL 16346, PG. 1335, OPR)
6. 65' INGRESS/EGRESS & ELECTRIC EASEMENT (VOL 1183, PG 280, OPR)
8. 135' ELECTRIC TRANSMISSION POWER EASEMENT (VOL 5655, PG 284, OPR)
9. 75' ELECTRIC EASEMENT (VOL 7191, PG 145, OPR)
11. VARIABLE WIDTH WATER & UTILITY EASEMENT (VOL. 11683, PGS. 2474-2491 OPR) (VOL. 11683, PGS. 2492-2507 OPR)
12. SECOND AMENDED AND RESTATED SANITARY CONTROL EASEMENT (DOC. NO. 20190259079, OPR)




## LOCATION MAP
NOT-TO-SCALE

SCALE: 1"= 50'
0' 50' 100' 150'




## UTILITY LEGEND

| | |
|---|---|
| PROJECT LIMITS | |
| EXISTING WATER | W |
| EXISTING SEWER | SS, MANHOLE |
| PROPOSED SEWER | SS, MANHOLE |
| PROPOSED WATER | W, FIRE HYDRANT |
| PROPOSED WYE & LATERAL | W, S |
| SINGLE WATER SERVICE | W |
| DUAL WATER SERVICE | W, W |
| STREET LIGHTS | SL |
| GAS, ELECTRIC, TELEPHONE & CABLE TELEVISION EASEMENT | GETCTV |

## PRIVATE STREET DESIGNATION :

LOT **999**, BLOCK **27**, CB OR NCB **17701**, **(POWDER MILL)** IS A PRIVATE STREET AND IS DESIGNATED AS AN UNDERGROUND AND AT-GRADE INFRASTRUCTURE AND SERVICE FACILITIES EASEMENT FOR GAS, ELECTRIC, STREET LIGHT, TELEPHONE CABLE TELEVISION, DRAINAGE, PEDESTRIAN, PUBLIC WATER, WASTEWATER, AND RECYCLED WATER MAINS.

## CONDUIT NOTES:

1. CONTRACTOR SHALL INSTALL PERMANENT MARKERS IN PROPOSED CURB WHERE CONDUITS CROSS THE ROADWAY (BOTH SIDES).
2. CONDUITS SHALL BE PVC WITH MINIMUM BURY OF 36 INCHES BELOW PROPOSED FINISHED GRADE. SCHEDULE 80 TO BE USED FOR CPS CONDUITS, ALL OTHER CONDUITS ARE SCHEDULE 40.
3. ALL CONDUITS SHALL BE EXTENDED BEHIND CURBS OR PROPOSED SIDEWALKS A MINIMUM OF 3 FEET AND CAPPED FOR FUTURE USE.
4. ALL CONDUIT SLEEVES TO BE USED FOR ELECTRIC, GAS, OR TELECOMMUNICATION UTILITY CROSSINGS SHALL BE INSTALLED TO MEET OR EXCEED DESIGN REQUIREMENTS FOR THE UTILITY AGENCY WHICH THEY ARE SERVING, INCLUDING BUT NOT LIMITED TO THE DEPTH, TRENCH PLACEMENT, AND PROXIMITY TO OTHER UTILITIES. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR VERIFYING AND INSTALLING THE CONDUIT SLEEVES TO MEET THESE SPECIFICATIONS INCLUDING COORDINATING WITH THE UTILITY AGENCY FOR ANY REQUIRED INSPECTIONS

## 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 ANY AVAILABLE GEOTECHNICAL INFORMATION AND THE ANTICIPATED INSTALLATION SITES 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!!

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| NO. | REVISION | DATE |
|---|---|---|

STATE OF TEXAS
CALEB M. CHANCE
98401
LICENSED PROFESSIONAL ENGINEER
4/15/24

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

# SHAVANO HIGHLANDS UNIT 7
SAN ANTONIO, TEXAS

OVERALL UTILITY PLAN

PLAT NO. 23-11800083
JOB NO. 8834-22
DATE NOVEMBER 2023
DESIGNER AW
CHECKED CC DRAWN RC
SHEET C6.00

Date: Apr 15, 2024, 5:16pm User ID: unitarcrel
File: P:\88\34\22\Design\Civil\UT07A883422.dwg

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## KEYED NOTES:

(3) 10' GAS, ELECTRIC, TELEPHONE AND CABLE TV EASEMENT

(7) PERMANENT VARIABLE WIDTH SANITARY SEWER EASEMENT (MIN. 16' WIDE) (OFF-LOT) (0.556 ACRE)

(12) 10' GAS, ELECTRIC, TELEPHONE AND CABLE TV EASEMENT (OFF-LOT)(0.354 TOTAL ACRES)

(14) VARIABLE WIDTH SANITARY SEWER EASEMENT (0.007 ACRE)

(1) 10' GAS, ELECTRIC, TELEPHONE AND CABLE TV EASEMENT (VOL 20001, PG 1109-1111, DPR)

(2) 10'x10' GAS, ELECTRIC, TELEPHONE AND CABLE TV EASEMENT (VOL 20001, PG 1109-1111, DPR)

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(4) EASEMENT AGREEMENT VARIABLE WIDTH WATER, UTILITY, INGRESS AND TERMINATION OF ORIGINAL EASEMENT (VOL 16346, PG. 1335, OPR)

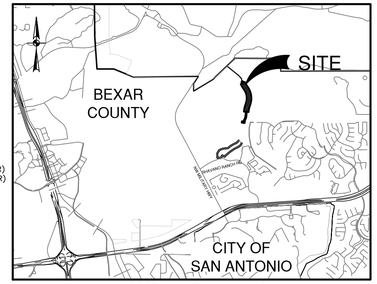
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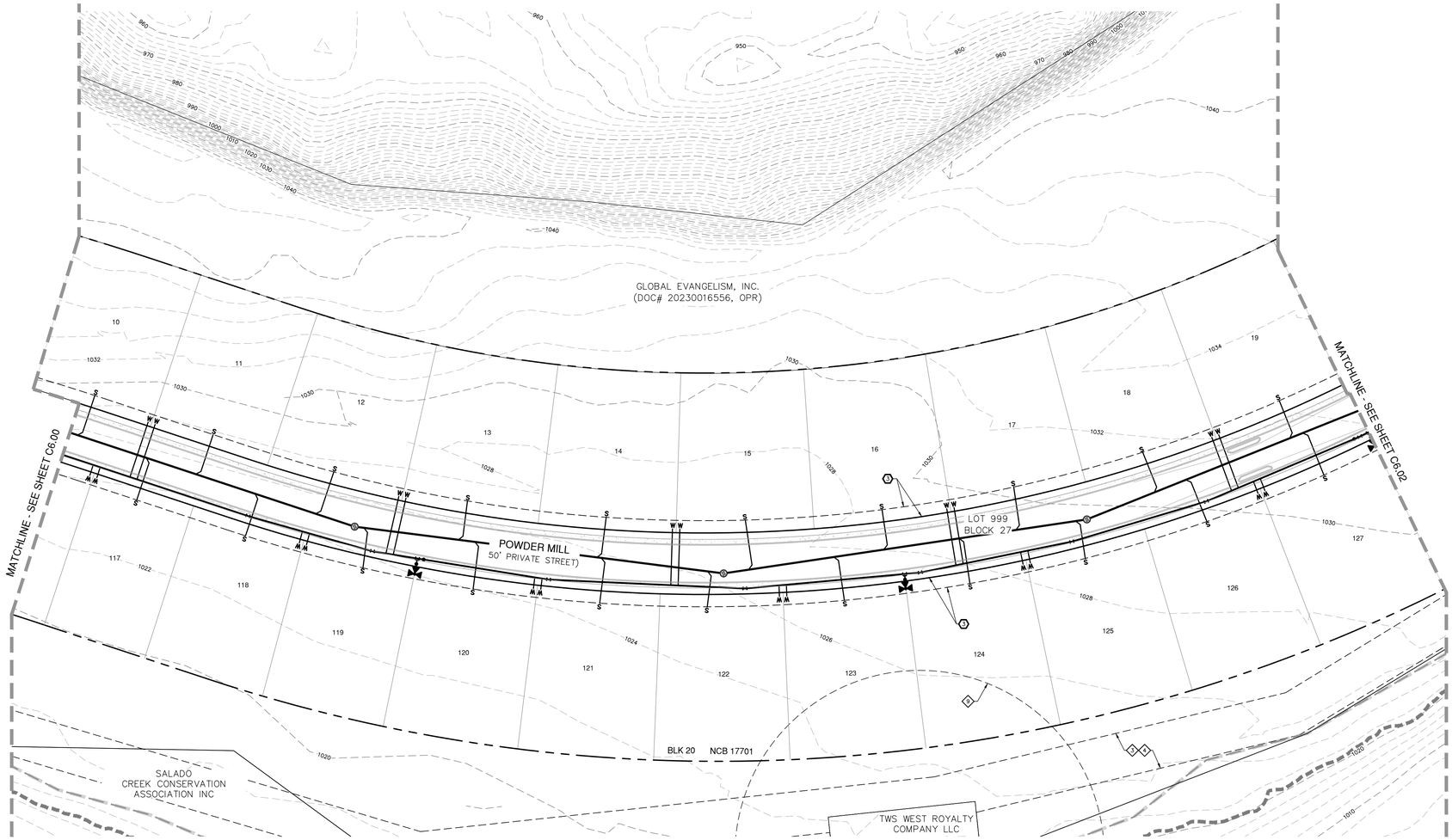



## LOCATION MAP

NOT-TO-SCALE

SCALE: 1"= 50'

0' 50' 100' 150'




## UTILITY LEGEND

| | |
|---|---|
| PROJECT LIMITS | |
| EXISTING WATER | W |
| EXISTING SEWER | SS |
| PROPOSED SEWER | SS MANHOLE |
| PROPOSED WATER | W FIRE HYDRANT |
| PROPOSED WYE & LATERAL | S |
| SINGLE WATER SERVICE | W |
| DUAL WATER SERVICE | W W |
| STREET LIGHTS | SL |
| GAS, ELECTRIC, TELEPHONE & CABLE TELEVISION EASEMENT | GETCTV |

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2. CONDUITS SHALL BE PVC WITH MINIMUM BURY OF 36 INCHES BELOW PROPOSED FINISHED GRADE. SCHEDULE 80 TO BE USED FOR CPS CONDUITS, ALL OTHER CONDUITS ARE SCHEDULE 40.
3. ALL CONDUITS SHALL BE EXTENDED BEHIND CURBS OR PROPOSED SIDEWALKS A MINIMUM OF 3 FEET AND CAPPED FOR FUTURE USE.
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CALEB M. CHANCE
98401
LICENSED
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12/8/23


PAPE-DAWSON ENGINEERS
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TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028800


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SAN ANTONIO, TEXAS

OVERALL UTILITY PLAN

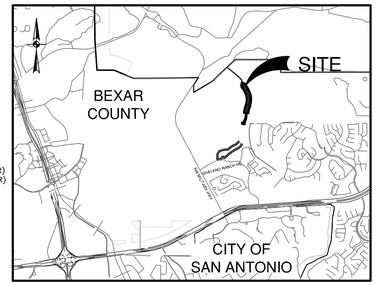
PLAT NO. 23-11800083
JOB NO. 8834-22
DATE NOVEMBER 2023
DESIGNER AW
CHECKED CC DRAWN RC
SHEET C6.01


Date: Dec 08, 2023, 12:03pm User ID: uvillarreal
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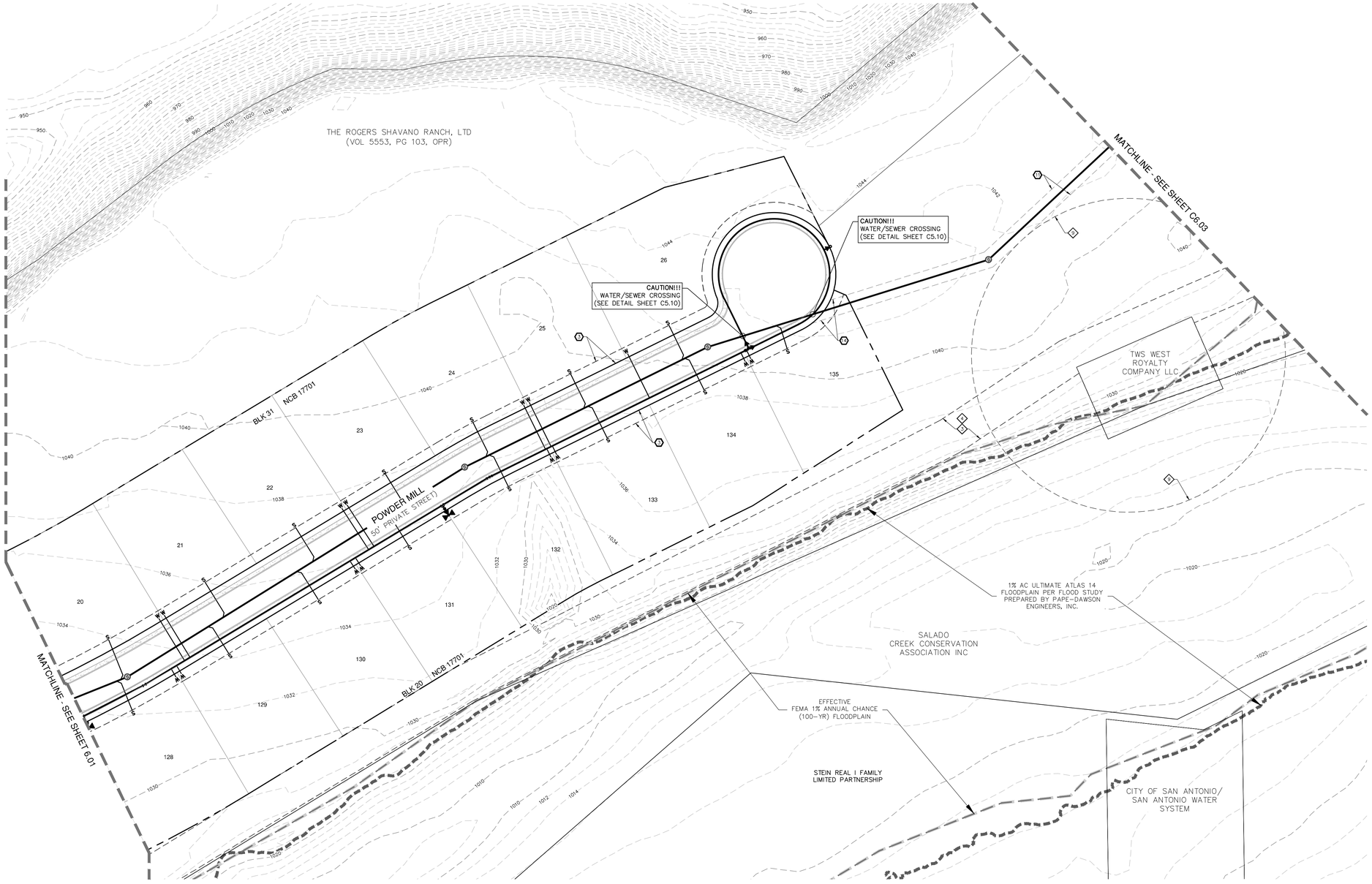
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## LOCATION MAP
NOT-TO-SCALE

SCALE: 1"= 50'

0' 50' 100' 150'




## UTILITY LEGEND

| | |
|---|---|
| PROJECT LIMITS | |
| EXISTING WATER | W |
| EXISTING SEWER | SS |
| PROPOSED SEWER | SS MANHOLE |
| PROPOSED WATER | W FIRE HYDRANT |
| PROPOSED WYE & LATERAL | S |
| SINGLE WATER SERVICE | W |
| DUAL WATER SERVICE | W W |
| STREET LIGHTS | SL |
| GAS, ELECTRIC, TELEPHONE & CABLE TELEVISION EASEMENT | GETCTV |

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STATE OF TEXAS
CALEB M. CHANCE
98401
LICENSED PROFESSIONAL ENGINEER
4/15/24


PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
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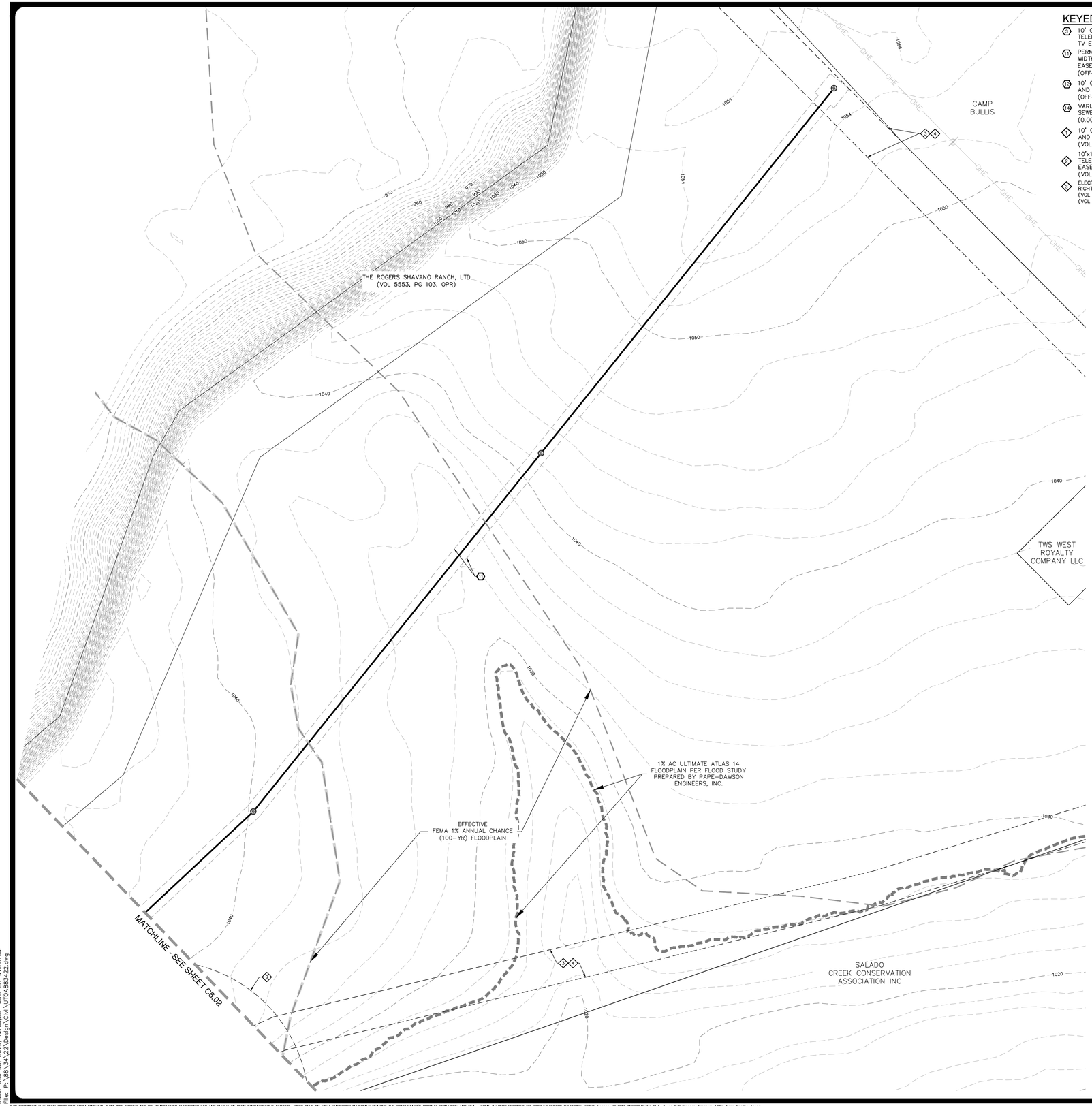

# SHAVANO HIGHLANDS UNIT 7
SAN ANTONIO, TEXAS

OVERALL UTILITY PLAN

PLAT NO. 23-11800083
JOB NO. 8834-22
DATE NOVEMBER 2023
DESIGNER AW
CHECKED CC DRAWN RC
SHEET C6.02

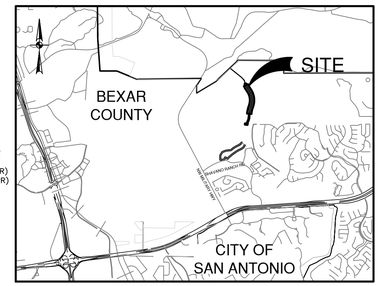
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## LOCATION MAP

NOT-TO-SCALE

SCALE: 1"= 50'

0' 50' 100' 150'

## UTILITY LEGEND

| | |
|---|---|
| PROJECT LIMITS | |
| EXISTING WATER | W |
| EXISTING SEWER | SS |
| PROPOSED SEWER | SS MANHOLE |
| PROPOSED WATER | W FIRE HYDRANT |
| PROPOSED WYE & LATERAL | S |
| SINGLE WATER SERVICE | W |
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| STREET LIGHTS | SL |
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12/8/23

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SAN ANTONIO, TEXAS

OVERALL UTILITY PLAN

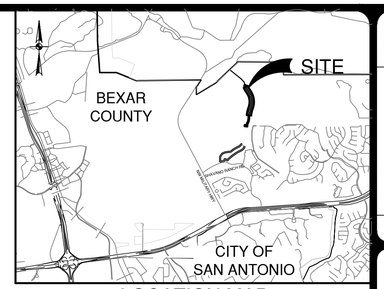
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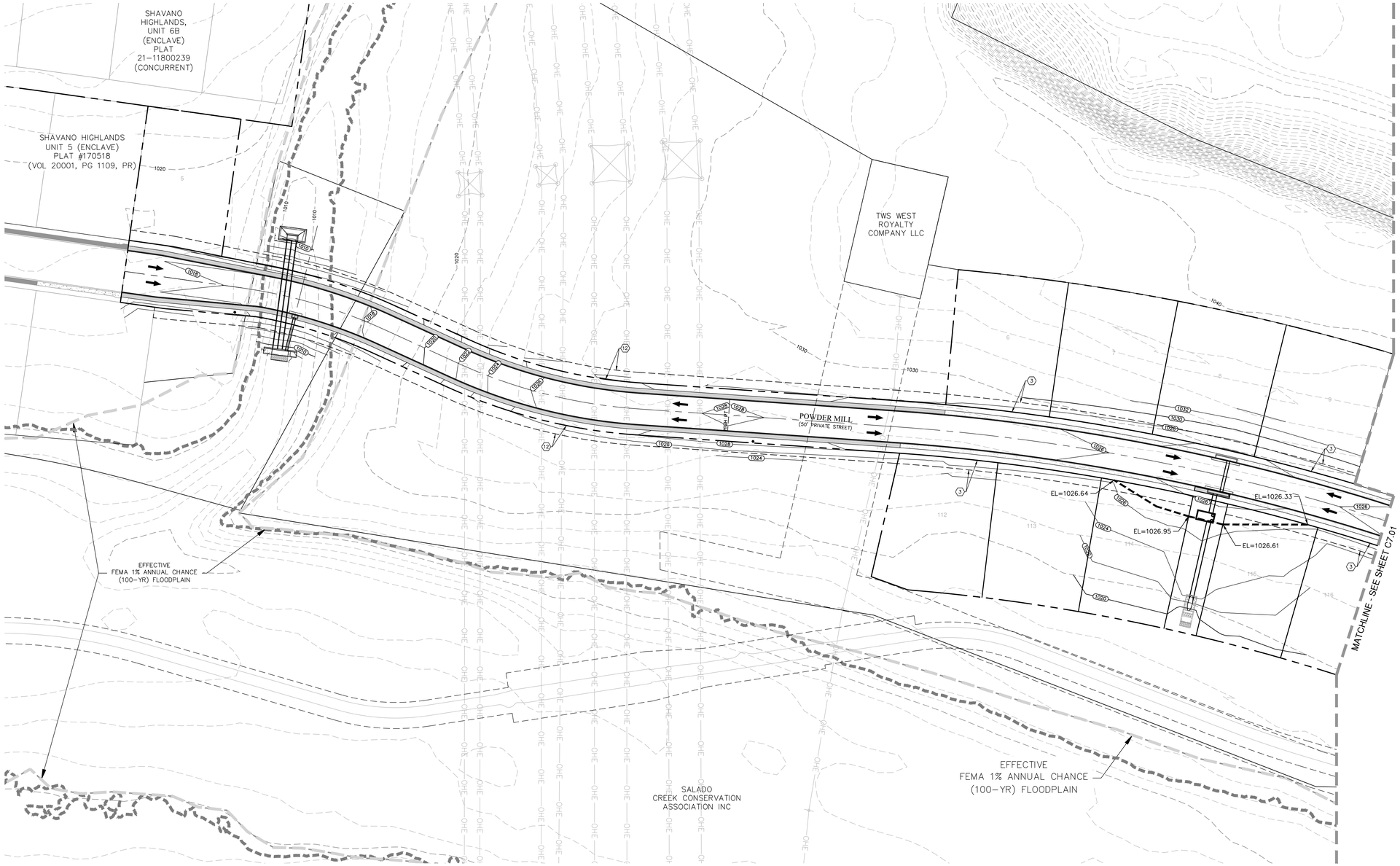
## KEYED NOTES:

1. 10' GAS, ELECTRIC, TELEPHONE AND CABLE TV EASEMENT
2. VARIABLE WIDTH SANITARY SEWER EASEMENT (OFF-LOT) (0.556 ACRE)
3. 10' GAS, ELECTRIC, TELEPHONE AND CABLE TV EASEMENT (OFF-LOT)(0.354 TOTAL ACRES)
4. VARIABLE WIDTH SANITARY SEWER EASEMENT (0.007 ACRE)




LOCATION MAP
NOT-TO-SCALE

SCALE: 1"= 50'
0' 50' 100' 150'




## GRADING LEGEND

- PROJECT LIMITS
- 100 YR FLOODPLAIN
- EXISTING CONTOUR — 976
- PROPOSED CONTOUR — 970
- FLOW ARROW (EXISTING)
- FLOW ARROW (PROPOSED)
- MINIMUM FINISHED FLOOR ELEVATION — FF = XXXX.XX
- TREES TO REMAIN
- HIGH POINT

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| | | |

STATE OF TEXAS
CALEB M. CHANCE
98401
LICENSED PROFESSIONAL ENGINEER
12/8/23


PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800


# SHAVANO HIGHLANDS UNIT 7
SAN ANTONIO, TEXAS

OVERALL GRADING PLAN

PLAT NO. 23-11800083
JOB NO. 8834-22
DATE NOVEMBER 2023
DESIGNER AW
CHECKED CC DRAWN RC
SHEET C7.00

Date: Dec 08, 2023, 12:04pm User ID: vwilborrel
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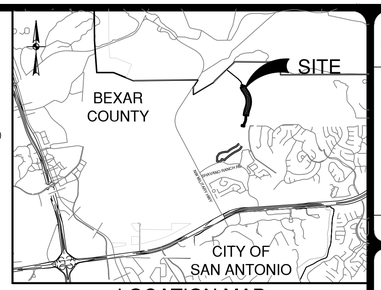
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(17) VARIABLE WIDTH SANITARY SEWER EASEMENT (OFF-LOT) (0.556 ACRE)

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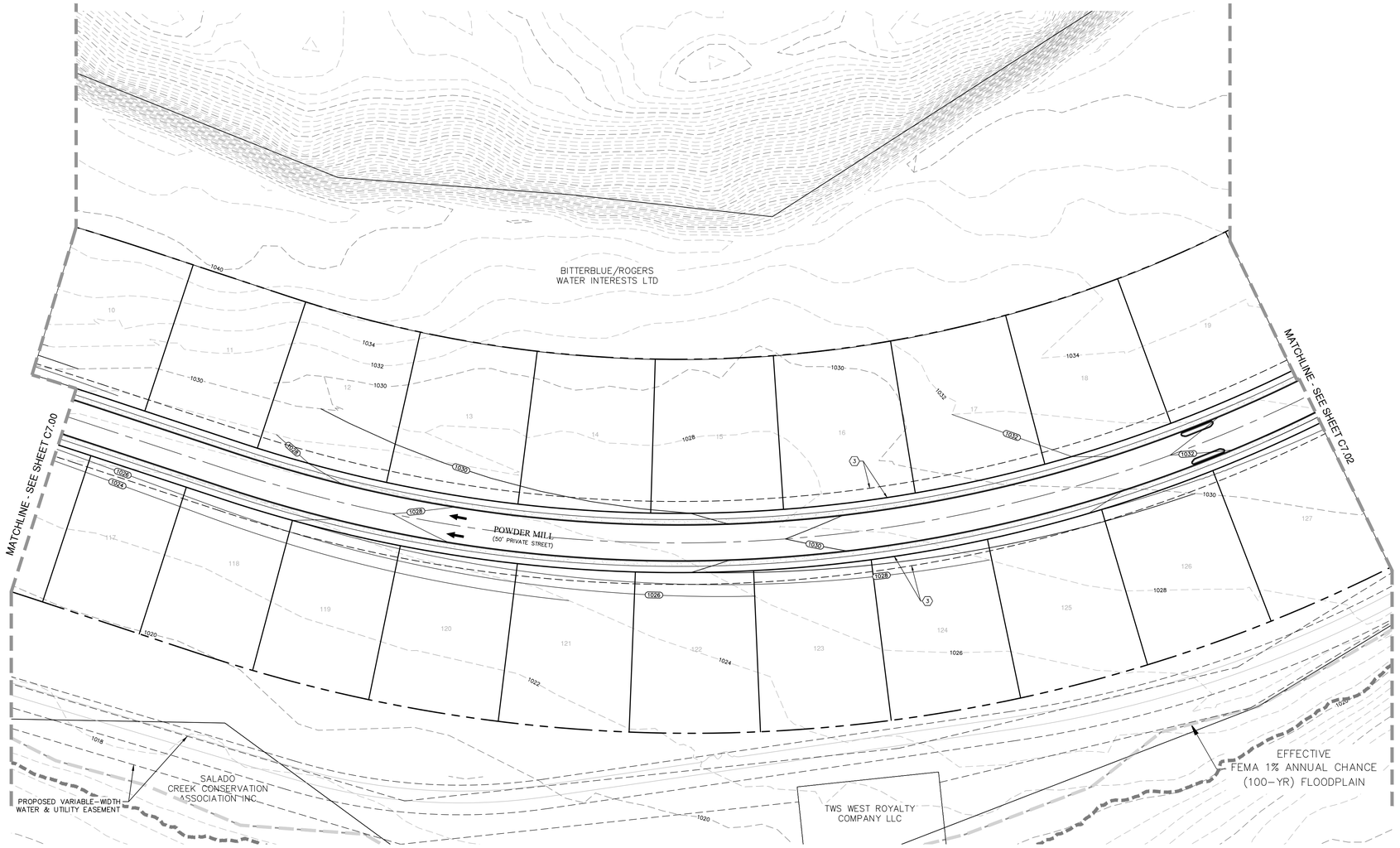



LOCATION MAP

NOT-TO-SCALE

SCALE: 1"= 50'

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## GRADING LEGEND

PROJECT LIMITS

100 YR FLOODPLAIN

EXISTING CONTOUR 976

PROPOSED CONTOUR 970

FLOW ARROW (EXISTING)

FLOW ARROW (PROPOSED)

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STATE OF TEXAS
CALEB M. CHANCE
98401
LICENSED
PROFESSIONAL ENGINEER
12/8/23


PAPE-DAWSON ENGINEERS
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# SHAVANO HIGHLANDS UNIT 7

SAN ANTONIO, TEXAS

OVERALL GRADING PLAN

PLAT NO. 23-11800083

JOB NO. 8834-22

DATE NOVEMBER 2023

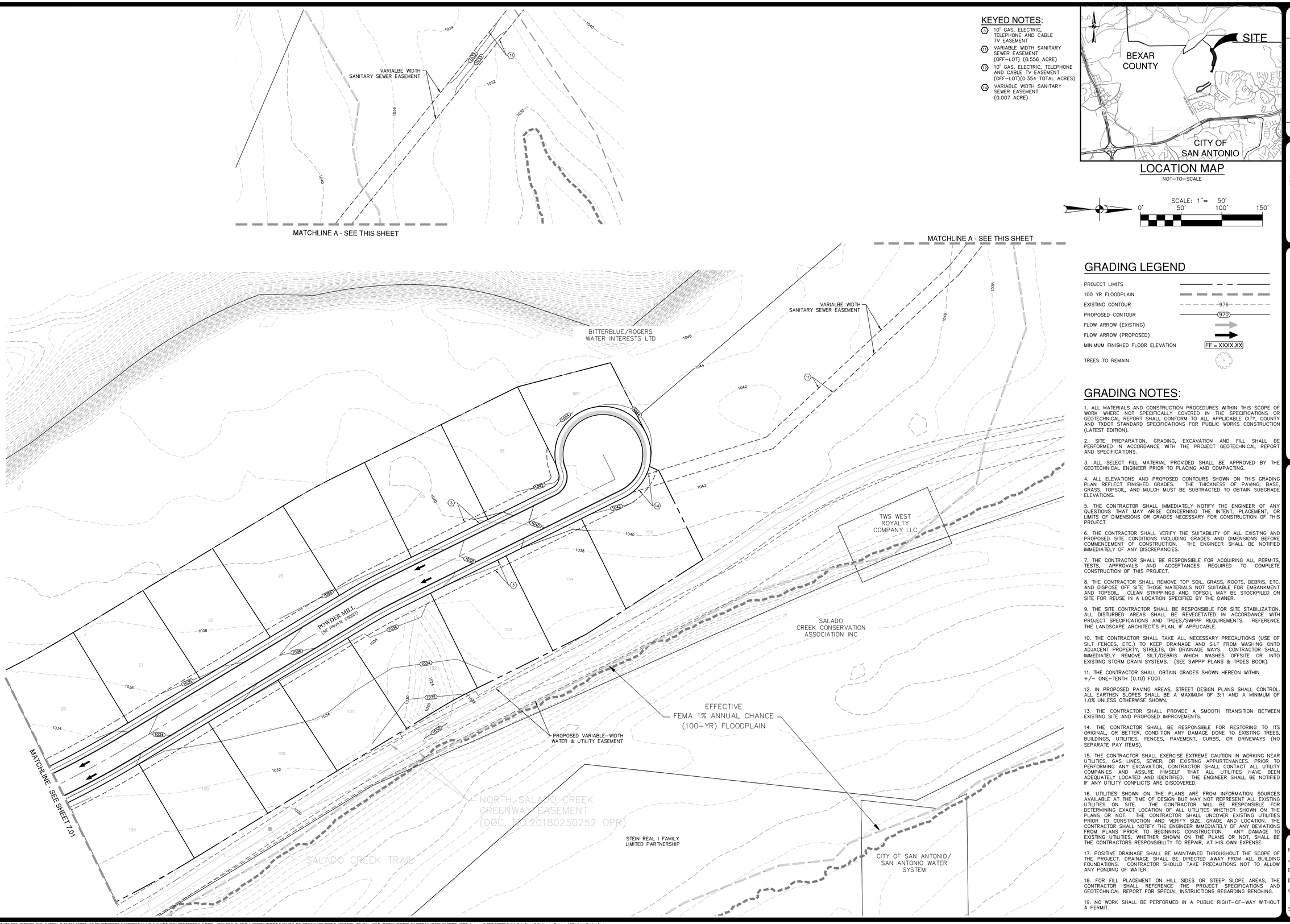
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LOCATION MAP

NOT-TO-SCALE

SCALE: 1"= 50'

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## GRADING LEGEND

PROJECT LIMITS

100 YR FLOODPLAIN

EXISTING CONTOUR 976

PROPOSED CONTOUR 970

FLOW ARROW (EXISTING)

FLOW ARROW (PROPOSED)

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TREES TO REMAIN

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SAN ANTONIO, TEXAS

OVERALL GRADING PLAN

PLAT NO. 23-11800083

JOB NO. 8834-22

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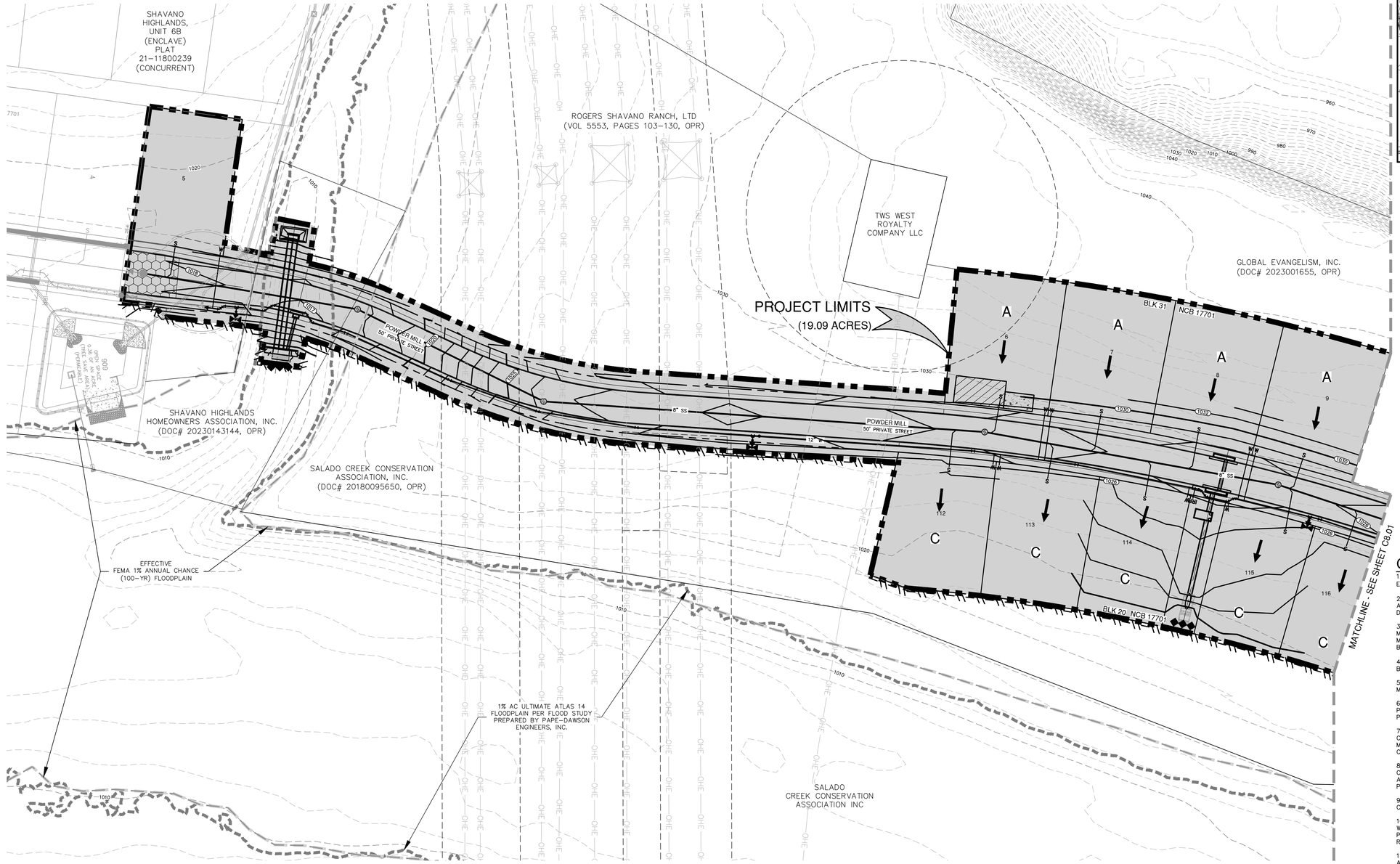
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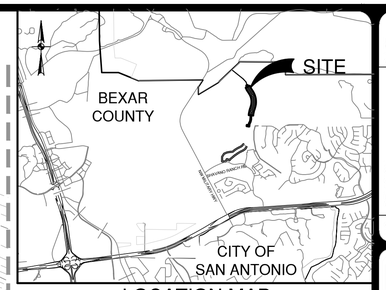
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## LOCATION MAP

NOT-TO-SCALE

SCALE: 1"= 50'

0' 50' 100' 150'

## SWPPP LEGEND

- PROJECT LIMITS
- EXISTING CONTOUR (976)
- PROPOSED CONTOUR (976)
- FLOW ARROW (EXISTING)
- FLOW ARROW (PROPOSED)
- SILT FENCE
- ROCK BERM
- GRAVEL FILTER BAGS
- GRATE INLET PROTECTION
- SEDIMENT CONTROL ROLLS
- LIMITS OF DISTURBED AREA
- STABILIZED CONSTRUCTION ENTRANCE/EXIT (FIELD LOCATE)
- CONSTRUCTION EQUIPMENT, VEHICLE & MATERIALS STORAGE AREA (FIELD LOCATE)
- CONCRETE TRUCK WASH-OUT PIT (FIELD LOCATE)

## GENERAL NOTES

1. DO NOT DISTURB VEGETATED AREAS (TREES, GRASS, WEEDS, BRUSH, ETC.) ANY MORE THAN NECESSARY FOR CONSTRUCTION.

2. CONSTRUCTION ENTRANCE/EXIT LOCATION, CONCRETE WASH-OUT PIT, AND CONSTRUCTION EQUIPMENT AND MATERIAL STORAGE YARD TO BE DETERMINED IN THE FIELD.

3. STORM WATER POLLUTION PREVENTION CONTROLS MAY NEED TO BE MODIFIED IN THE FIELD TO ACCOMPLISH THE DESIRED EFFECT. ALL MODIFICATIONS ARE TO BE NOTED ON THIS EXHIBIT AND SIGNED AND DATED BY THE RESPONSIBLE PARTY.

4. RESTRICT ENTRY/EXIT TO THE PROJECT SITE TO DESIGNATED LOCATIONS BY USE OF ADEQUATE FENCING, IF NECESSARY.

5. ALL STORM WATER POLLUTION PREVENTION CONTROLS ARE TO BE MAINTAINED AND IN WORKING CONDITIONS AT ALL TIMES.

6. FOR A COMPLETE LISTING OF TEMPORARY STORM WATER POLLUTION PREVENTION CONTROLS REFER TO THE TPDES STORM WATER POLLUTION PREVENTION PLAN.

7. STORM WATER POLLUTION PREVENTION STRUCTURES SHOULD BE CONSTRUCTED WITHIN THE SITE BOUNDARIES. SOME OF THESE FEATURES MAY BE SHOWN OUTSIDE THE SITE BOUNDARIES ON THIS PLAN FOR VISUAL CLARITY.

8. AS SOON AS PRACTICAL, ALL DISTURBED SOIL THAT WILL NOT BE COVERED BY IMPERVIOUS COVER SUCH AS PARKWAY AREAS, EASEMENT AREAS, EMBANKMENT SLOPES, ETC. WILL BE STABILIZED PER APPLICABLE PROJECT SPECIFICATIONS.

9. BEST MANAGEMENT PRACTICES MAY BE INSTALLED IN STAGES TO COINCIDE WITH THE DISTURBANCE OF UPGRADIENT AREAS.

10. BEST MANAGEMENT PRACTICES MAY BE REMOVED IN STAGES ONCE THE WATERSHED FOR THAT PORTION CONTROLLED BY THE BEST MANAGEMENT PRACTICES HAS BEEN STABILIZED IN ACCORDANCE WITH TPDES REQUIREMENTS.

11. UPON COMPLETION OF THE PROJECT, INCLUDING SITE STABILIZATION, AND BEFORE FINAL PAYMENT IS ISSUED, CONTRACTOR SHALL REMOVE ALL SEDIMENT AND EROSION CONTROL MEASURES, PAYING SPECIAL ATTENTION TO ROCK BERMS IN DRAINAGE FEATURES.

12. WHERE VEGETATED FILTER STRIPS ARE INDICATED, CONTRACTOR SHALL VERIFY THAT SUFFICIENT VEGETATION EXISTS, OTHERWISE CONTRACTOR SHALL PLACE SILT FENCING IN LIEU OF VEGETATED FILTER STRIP.

13. SHADED AREA ▭ DENOTES LIMITS OF DISTURBED AREAS. OTHER AREAS WITHIN THE PROJECT LIMITS, WITH THE EXCEPTION OF A CONSTRUCTION EQUIPMENT AND MATERIAL STORAGE YARD, ARE NOT A PART OF THIS TPDES STORM WATER POLLUTION PREVENTION PLAN (SWP3) AND WILL NOT BE DISTURBED BY CIVIL CONSTRUCTION ACTIVITIES. HOUSE CONSTRUCTION ACTIVITIES WILL REQUIRE A SEPARATE STORM WATER POLLUTION PREVENTION PLAN.

14. PRIOR TO BEGINNING CONSTRUCTION, CONTRACTOR SHALL COORDINATE PLACEMENT OF TEMPORARY BEST MANAGEMENT PRACTICES WITHIN TXDOT RIGHT-OF-WAY WITH TXDOT.

15. CPS ENERGY WILL FUNCTION AS A SECONDARY OPERATOR ON THIS PROJECT AND WILL BE INSTALLING ELECTRIC UTILITIES FOR ON-SITE CONSTRUCTION AND OFF-SITE FEED TO THE PROJECT.

16. A BEXAR COUNTY ROW PERMIT MUST BE OBTAINED BEFORE WORKING IN ANY BEXAR COUNTY ROW.

## SWP3 MODIFICATIONS

| DATE | SIGNATURE | DESCRIPTION |
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EXHIBIT 2

| NO. | REVISION | DATE |
|---|---|---|
| | | |

STATE OF TEXAS
CALEB M. CHANCE
98401
LICENSED
PROFESSIONAL ENGINEER
12/8/23

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

# SHAVANO HIGHLANDS UNIT 7

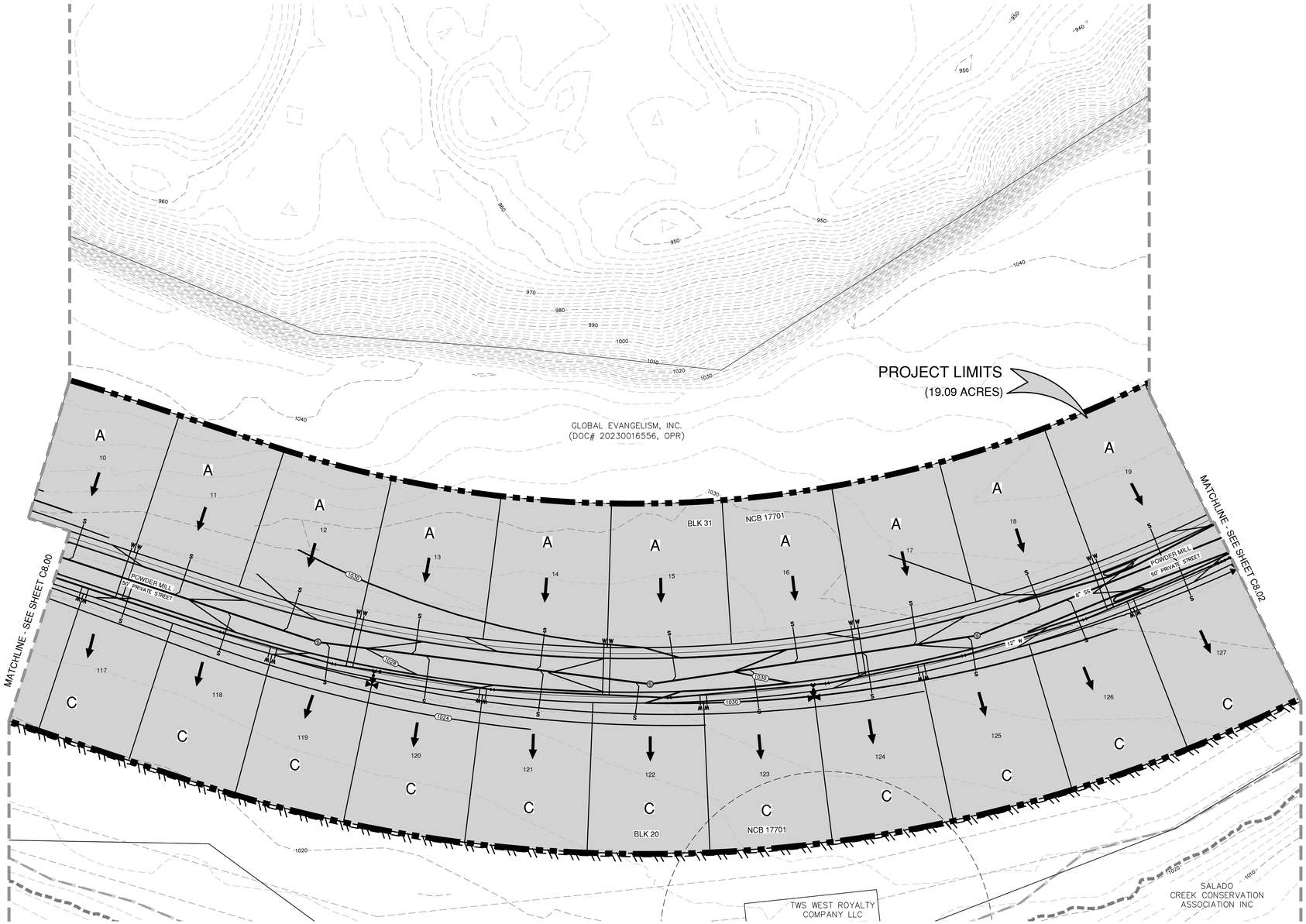
SAN ANTONIO, TEXAS

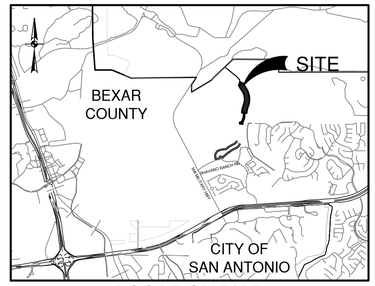
STORM WATER POLLUTION PREVENTION PLAN

PLAT NO. 23-11800083
JOB NO. 8834-22
DATE NOVEMBER 2023
DESIGNER AW
CHECKED CC DRAWN RC
SHEET C8.00

Date: Dec 08, 2023, 12:05pm User ID: valtorrel
File: P:\88\34\22\Design\Civil\SWPPP8834220.dwg

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LOCATION MAP

NOT-TO-SCALE

SCALE: 1"= 50'

0' 50' 100' 150'

## SWPPP LEGEND

- PROJECT LIMITS
- EXISTING CONTOUR (976)
- PROPOSED CONTOUR (976)
- FLOW ARROW (EXISTING)
- FLOW ARROW (PROPOSED)
- SILT FENCE
- ROCK BERM
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- GRATE INLET PROTECTION
- SEDIMENT CONTROL ROLLS
- LIMITS OF DISTURBED AREA
- STABILIZED CONSTRUCTION ENTRANCE/EXIT (FIELD LOCATE)
- CONSTRUCTION EQUIPMENT, VEHICLE & MATERIALS STORAGE AREA (FIELD LOCATE)
- CONCRETE TRUCK WASH-OUT PIT (FIELD LOCATE)

## GENERAL NOTES

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## SWP3 MODIFICATIONS

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EXHIBIT 2

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|---|---|---|
| | | |

STATE OF TEXAS
CALEB M. CHANCE
98401
LICENSED PROFESSIONAL ENGINEER
12/8/23

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

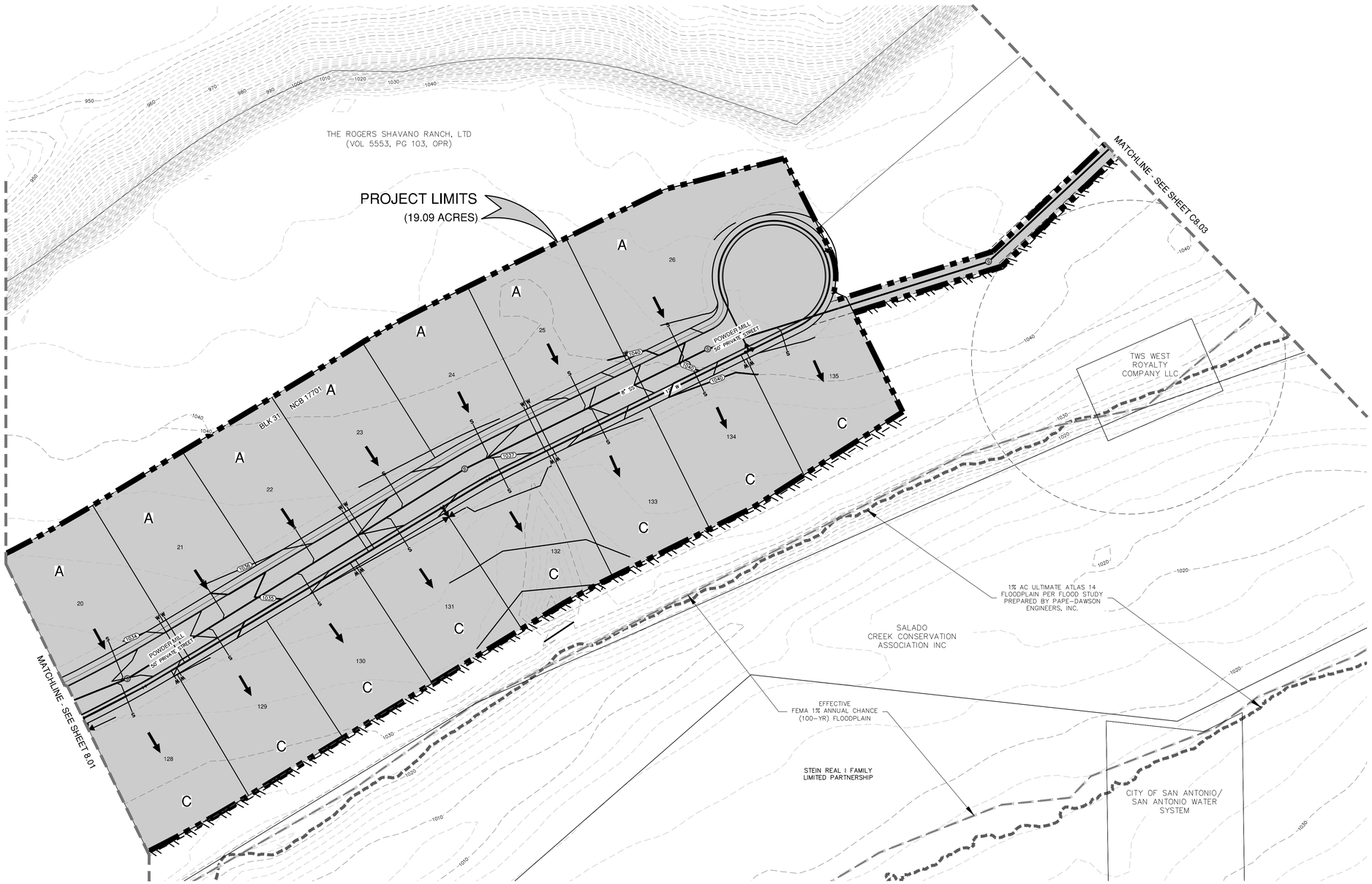
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SAN ANTONIO, TEXAS

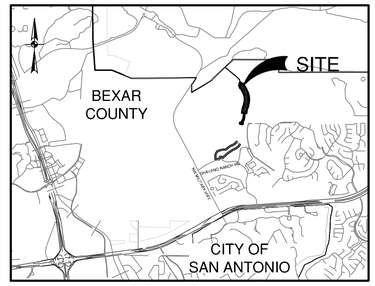
STORM WATER POLLUTION PREVENTION PLAN

PLAT NO. 23-11800083
JOB NO. 8834-22
DATE NOVEMBER 2023
DESIGNER AW
CHECKED CC DRAWN RC
SHEET C8.01

Date: Dec 08, 2023, 12:05pm User ID: vallarreal
File: P:\88\34\22\Design\Civil\SWPPB83422.dwg

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## LOCATION MAP

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EXHIBIT 2

## SWP3 MODIFICATIONS

| DATE | SIGNATURE | DESCRIPTION |
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| NO. | REVISION | DATE |
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STATE OF TEXAS
CALEB M. CHANCE
98401
LICENSED
PROFESSIONAL ENGINEER
4/15/24

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

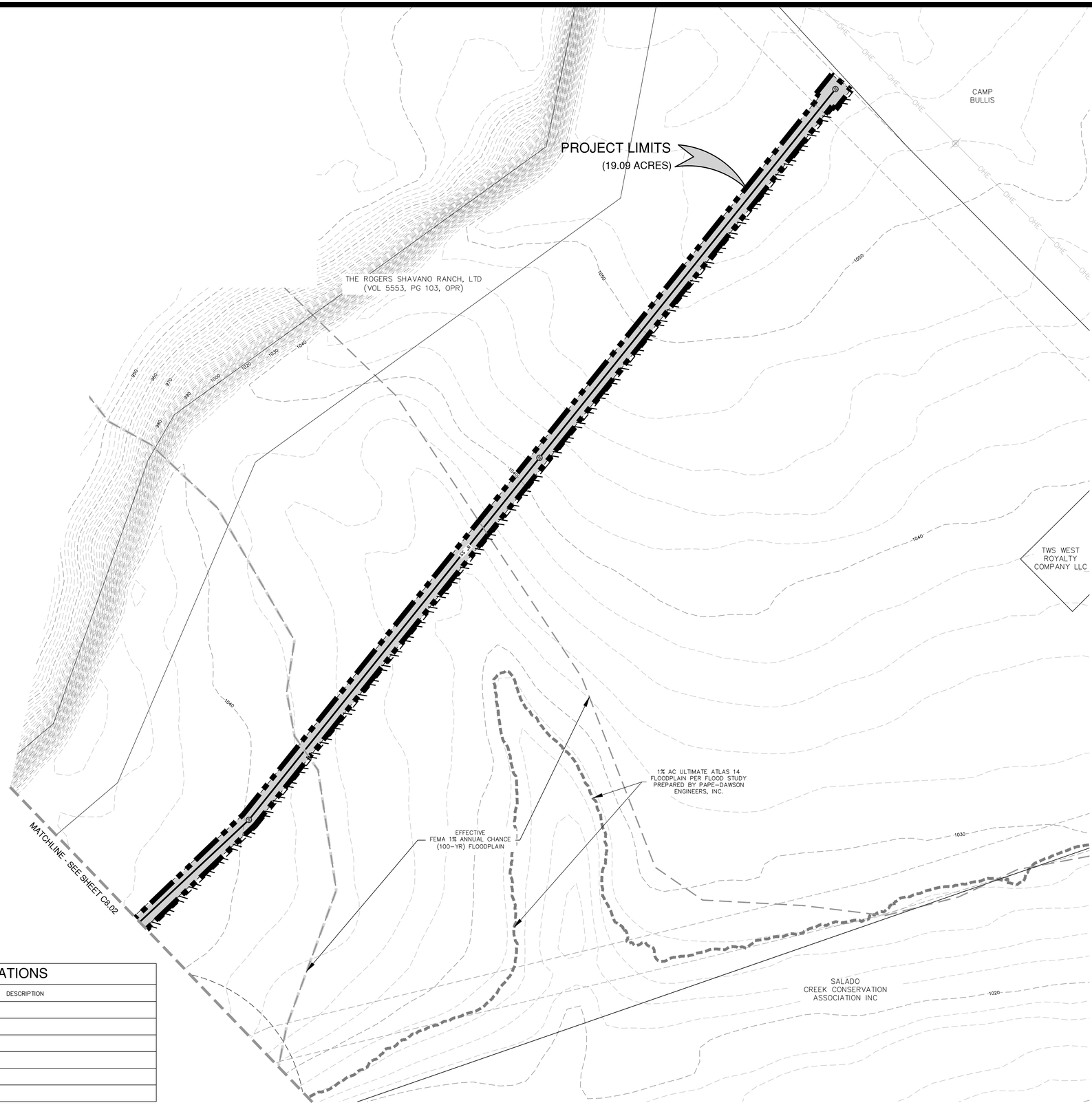
# SHAVANO HIGHLANDS UNIT 7
SAN ANTONIO, TEXAS

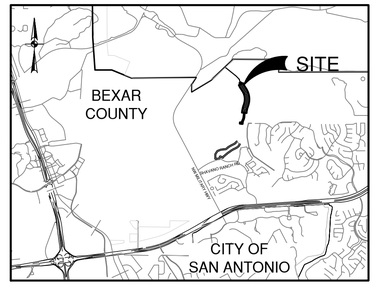
STORM WATER POLLUTION PREVENTION PLAN

PLAT NO. 23-11800083
JOB NO. 8834-22
DATE NOVEMBER 2023
DESIGNER AW
CHECKED CC DRAWN RC
SHEET C8.02

Date: Apr 15, 2024, 2:55pm User ID: willierael
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LOCATION MAP

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0' 50' 100' 150'

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EXHIBIT 2

## SWP3 MODIFICATIONS

| DATE | SIGNATURE | DESCRIPTION |
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| NO. | REVISION | DATE |
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STATE OF TEXAS
CALEB M. CHANCE
98401
LICENSED
PROFESSIONAL ENGINEER
12/8/23

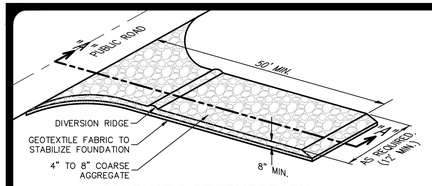
PAPE-DAWSON ENGINEERS
SAN ANTONIO I AUSTIN I HOUSTON I FORT WORTH I DALLAS
2000 NW LOOP 410 I SAN ANTONIO, TX 78213 I 210.375.9000
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028800

# SHAVANO HIGHLANDS UNIT 7
SAN ANTONIO, TEXAS

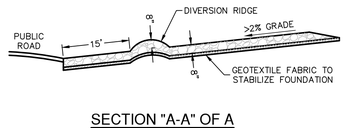
STORM WATER POLLUTION PREVENTION PLAN

PLAT NO. 23-11800083
JOB NO. 8834-22
DATE NOVEMBER 2023
DESIGNER AW
CHECKED CC DRAWN RC
SHEET C8.03

Date: Dec 08, 2023, 12:06pm User ID: wilarreal
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SCHEMATIC OF TEMPORARY CONSTRUCTION ENTRANCE/EXIT




SECTION "A-A" OF A CONSTRUCTION ENTRANCE/EXIT

## MATERIALS

1. THE AGGREGATE SHOULD CONSIST OF 4–INCH TO 8–INCH WASHED STONE OVER A STABLE FOUNDATION AS SPECIFIED IN THE PLAN.

2. THE AGGREGATE SHOULD BE PLACED WITH A MINIMUM THICKNESS OF 8–INCHES.

3. THE GEOTEXTILE FABRIC SHOULD BE DESIGNED SPECIFICALLY FOR USE AS A SOIL FILTRATION MEDIA WITH AN APPROXIMATE WEIGHT OF 6 OZ/YD$^2$, A MULLEN BURST RATING OF 140 LB/IN$^2$, AND AN EQUIVALENT OPENING SIZE GREATER THAN A NUMBER 50 SIEVE.

4. IF A WASHING FACILITY IS REQUIRED, A LEVEL AREA WITH A MINIMUM OF 4–INCH DIAMETER WASHED STONE OR COMMERCIAL ROCK SHOULD BE INCLUDED IN THE PLANS. DIVERT WASTEWATER TO A SEDIMENT TRAP OR BASIN.

## INSTALLATION

1. AVOID CURVES ON PUBLIC ROADS AND STEEP SLOPES. REMOVE VEGETATION AND OTHER OBJECTIONABLE MATERIAL FROM THE FOUNDATION AREA. GRADE CROWN FOUNDATION FOR POSITIVE DRAINAGE.

2. THE MINIMUM WIDTH OF THE ENTRANCE/EXIT SHOULD BE 12 FEET OR THE FULL WIDTH OF EXIT ROADWAY, WHICHEVER IS GREATER.

3. THE CONSTRUCTION ENTRANCE SHOULD BE AT LEAST 50 FEET LONG.

4. IF THE SLOPE TOWARD THE ROAD EXCEEDS 2%, CONSTRUCT A RIDGE, 6–INCHES TO 8–INCHES HIGH WITH 3:1 (H:V) SIDE SLOPES, ACROSS THE FOUNDATION APPROXIMATELY 15 FEET FROM THE ENTRANCE TO DIVERT RUNOFF AWAY FROM THE PUBLIC ROAD.

5. PLACE GEOTEXTILE FABRIC AND GRADE FOUNDATION TO IMPROVE STABILITY, ESPECIALLY WHERE WET CONDITIONS ARE ANTICIPATED.

6. PLACE STONE TO DIMENSIONS AND GRADE SHOWN ON PLANS. LEAVE SURFACE SMOOTH AND SLOPE FOR DRAINAGE.

7. DIVERT ALL SURFACE RUNOFF AND DRAINAGE FROM THE STONE PAD TO A SEDIMENT TRAP OR BASIN.

8. INSTALL PIPE UNDER PAD AS NEEDED TO MAINTAIN PROPER PUBLIC ROAD DRAINAGE.

## COMMON TROUBLE POINTS

1. INADEQUATE RUNOFF CONTROL–SEDIMENT WASHES ONTO PUBLIC ROAD.

2. STONE TOO SMALL OR GEOTEXTILE FABRIC ABSENT, RESULTS IN MUDDY CONDITION AS STONE IS PRESSED INTO SOIL.

3. PAD TOO SHORT FOR HEAVY CONSTRUCTION TRAFFIC–EXTEND PAD BEYOND THE MINIMUM 50–FOOT LENGTH AS NECESSARY.

4. PAD NOT FLARED SUFFICIENTLY AT ROAD SURFACE, RESULTS IN MUD BEING TRACKED ON TO ROAD AND POSSIBLE DAMAGE TO ROAD.

5. UNSTABLE FOUNDATION – USE GEOTEXTILE FABRIC UNDER PAD AND/OR IMPROVE FOUNDATION DRAINAGE.

## INSPECTION AND MAINTENANCE GUIDELINES

1. THE ENTRANCE SHOULD BE MAINTAINED IN A CONDITION, WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS–OF–WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.

2. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS–OF–WAY SHOULD BE REMOVED IMMEDIATELY BY CONTRACTOR.

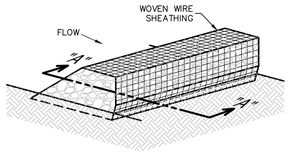
3. WHEN NECESSARY, WHEELS SHOULD BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHT–OF–WAY.

4. WHEN WASHING IS REQUIRED, IT SHOULD BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.

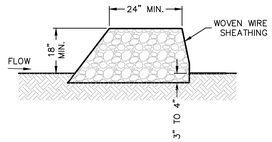
5. ALL SEDIMENT SHOULD BE PREVENTED FROM ENTERING ANY STORM DRAIN, DITCH OR WATER COURSE BY USING APPROVED METHODS.

# STABILIZED CONSTRUCTION ENTRANCE/EXIT DETAIL

NOT–TO–SCALE




ISOMETRIC PLAN VIEW




SECTION "A-A"

## ROCK BERMS

THE PURPOSE OF A ROCK BERM IS TO SERVE AS A CHECK DAM IN AREAS OF CONCENTRATED FLOW, TO INTERCEPT SEDIMENT–LADEN RUNOFF, DETAIN THE SEDIMENT AND RELEASE THE WATER IN SHEET FLOW. THE ROCK BERM SHOULD BE USED WHEN THE CONTRIBUTING DRAINAGE AREA IS LESS THAN 5 ACRES. ROCK BERMS ARE USED IN AREAS WHERE THE VOLUME OF RUNOFF IS TOO GREAT FOR A SILT FENCE TO CONTAIN. THEY ARE LESS EFFECTIVE FOR SEDIMENT REMOVAL THAN SILT FENCES, PARTICULARLY FOR FINE PARTICLES, BUT ARE ABLE TO WITHSTAND HIGHER FLOWS THAN A SILT FENCE. AS SUCH, ROCK BERMS ARE OFTEN USED IN AREAS OF CHANNEL FLOWS (DITCHES, GULLIES, ETC.). ROCK BERMS ARE MOST EFFECTIVE AT REDUCING BED LOAD IN CHANNELS AND SHOULD NOT BE SUBSTITUTED FOR OTHER EROSION AND SEDIMENT CONTROL MEASURES FARTHER UP THE WATERSHED.

## INSPECTION AND MAINTENANCE GUIDELINES

1. INSPECTION SHOULD BE MADE WEEKLY AND AFTER EACH RAINFALL BY THE RESPONSIBLE PARTY. FOR INSTALLATIONS IN STREAMBEDS, ADDITIONAL DAILY INSPECTIONS SHOULD BE MADE.

2. REMOVE SEDIMENT AND OTHER DEBRIS WHEN BUILDUP REACHES 6 INCHES AND DISPOSE OF THE ACCUMULATED SILT IN AN APPROVED MANNER THAT WILL NOT CAUSE ANY ADDITIONAL SILTATION.

3. REPAIR ANY LOOSE WIRE SHEATHING.

4. THE BERM SHOULD BE RESHAPED AS NEEDED DURING INSPECTION.

5. THE BERM SHOULD BE REPLACED WHEN THE STRUCTURE CEASES TO FUNCTION AS INTENDED DUE TO SILT ACCUMULATION AMONG THE ROCKS, WASHOUT, CONSTRUCTION TRAFFIC DAMAGE, ETC.

6. THE ROCK BERM SHOULD BE LEFT IN PLACE UNTIL ALL UPSTREAM AREAS ARE STABILIZED AND ACCUMULATED SILT REMOVED.

## MATERIALS

1. THE BERM STRUCTURE SHOULD BE SECURED WITH A WOVEN WIRE SHEATHING HAVING MAXIMUM OPENING OF 1 INCH AND A MINIMUM WIRE DIAMETER OF 20 GAUGE GALVANIZED AND SHOULD BE SECURED WITH SHOAT RINGS.

2. CLEAN, OPEN GRADED 3–INCH TO 5–INCH DIAMETER ROCK SHOULD BE USED, EXCEPT IN AREAS WHERE HIGH VELOCITIES OR LARGE VOLUMES OF FLOW ARE EXPECTED, WHERE 5–INCH TO 8–INCH DIAMETER ROCKS MAY BE USED.

## INSTALLATION

1. LAY OUT THE WOVEN WIRE SHEATHING PERPENDICULAR TO THE FLOW LINE. THE SHEATHING SHOULD BE 20 GAUGE WOVEN WIRE MESH WITH 1 INCH OPENINGS.

2. BERM SHOULD HAVE A TOP WIDTH OF 2 FEET MINIMUM WITH SIDE SLOPES BEING 2:1 (H:V) OR FLATTER.

3. PLACE THE ROCK ALONG THE SHEATHING AS SHOWN IN THE DIAGRAM TO A HEIGHT NOT LESS THAN 18".

4. WRAP THE WIRE SHEATHING AROUND THE ROCK AND SECURE WITH TIE WIRE SO THAT THE ENDS OF THE SHEATHING OVERLAP AT LEAST 2 INCHES, AND THE BERM RETAINS ITS SHAPE WHEN WALKED UPON.

5. BERM SHOULD BE BUILT ALONG THE CONTOUR AT ZERO PERCENT GRADE OR AS NEAR AS POSSIBLE.

6. THE ENDS OF THE BERM SHOULD BE TIED INTO EXISTING UPSLOPE GRADE AND THE BERM SHOULD BE BURIED IN A TRENCH APPROXIMATELY 3 TO 4 INCHES DEEP TO PREVENT FAILURE OF THE CONTROL.

## COMMON TROUBLE POINTS

1. INSUFFICIENT BERM HEIGHT OR LENGTH (RUNOFF QUICKLY ESCAPES OVER THE TOP OR AROUND THE SIDES OF BERM).

2. BERM NOT INSTALLED PERPENDICULAR TO FLOW LINE (RUNOFF ESCAPING AROUND ONE SIDE).

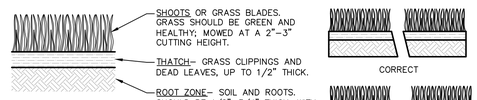
# ROCK BERM DETAIL

NOT–TO–SCALE



LAY SOD IN A STAGGERED PATTERN. BUTT THE STRIPS TIGHTLY AGAINST EACH OTHER. DO NOT LEAVE SPACES AND DO NOT OVERLAP. A SHARPENED MASON'S TROWEL IS A HANDY TOOL FOR TUCKING DOWN THE ENDS AND TRIMMING PIECES.

BUTTING – ANGLED ENDS CAUSED BY THE AUTOMATIC SOD CUTTER MUST BE MATCHED CORRECTLY.




## APPEARANCE OF GOOD SOD

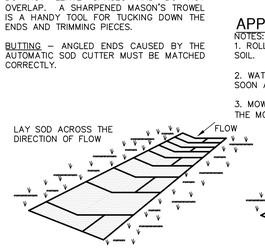
NOTES:
1. ROLL SOD IMMEDIATELY TO ACHIEVE FIRM CONTACT WITH THE SOIL.

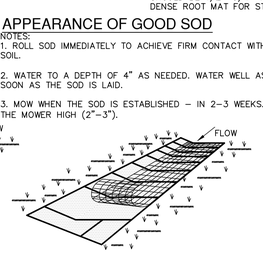
2. WATER TO A DEPTH OF 4" AS NEEDED. WATER WELL AS SOON AS THE SOD IS LAID.

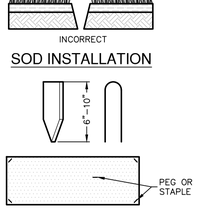
3. MOW WHEN THE SOD IS ESTABLISHED – IN 2–3 WEEKS. SET THE MOWER HIGH (2"–3").




## SOD INSTALLATION




USE PEGS OR STAPLES TO FASTEN SOD FIRMLY – AT THE ENDS OF STRIPS AND IN THE CENTER, OR EVERY 3–4 FEET IF THE STRIPS ARE LONG. WHEN READY TO MOW, DRIVE PEGS OR STAPLES FLUSH WITH THE GROUND.

## MATERIALS

1. SOD SHOULD BE MACHINE CUT AT A UNIFORM SOIL THICKNESS OF 3/4" INCH (± 1/4" INCH) AT THE TIME OF CUTTING. THIS THICKNESS SHOULD EXCLUDE SHOOT GROWTH AND THATCH.

2. PIECES OF SOD SHOULD BE CUT TO THE SUPPLIER'S STANDARD WIDTH AND LENGTH, WITH A MAXIMUM ALLOWABLE DEVIATION IN ANY DIMENSION OF 5%. TORN OR UNEVEN PADS SHOULD NOT BE ACCEPTABLE.

3. STANDARD SIZE SECTIONS OF SOD SHOULD BE STRONG ENOUGH TO SUPPORT THEIR OWN WEIGHT AND RETAIN THEIR SIZE AND SHAPE WHEN SUSPENDED FROM A FIRM GRASP ON ONE END OF THE SECTION.

4. SOD SHOULD BE HARVESTED, DELIVERED, AND INSTALLED WITHIN A PERIOD OF 36 HOURS.

## SITE PREPARATION

1. PRIOR TO SOIL PREPARATION, AREAS TO BE SODDED SHOULD BE BROUGHT TO FINAL GRADE IN ACCORDANCE WITH THE APPROVED PLAN.

2. THE SURFACE SHOULD BE CLEARED OF ALL TRASH, DEBRIS AND OF ALL ROOTS, BRUSH, WIRE, GRADE STAKES AND OTHER OBJECTS THAT WOULD INTERFERE WITH PLANTING, FERTILIZING OR MAINTENANCE OPERATIONS.

3. FERTILIZE ACCORDING TO SOIL TESTS. FERTILIZER NEEDS CAN BE DETERMINED BY A SOIL TESTING LABORATORY OR REGIONAL RECOMMENDATIONS CAN BE MADE BY COUNTY AGRICULTURAL EXTENSION AGENTS. FERTILIZER SHOULD BE WORKED INTO THE SOIL TO A DEPTH OF 3 INCHES WITH A DISC, SPRINGTOOTH HARROW OR OTHER SUITABLE EQUIPMENT. ON SLOPING LAND, THE FINAL HARROWING OR DISCING OPERATION SHOULD BE ON THE CONTOUR.

## INSTALLATION IN CHANNELS

1. SOD STRIPS IN WATERWAYS SHOULD BE LAID PERPENDICULAR TO THE DIRECTION OF FLOW. CARE SHOULD BE TAKEN TO BUTT ENDS OF STRIPS TIGHTLY (SEE FIGURE ABOVE).

2. AFTER ROLLING OR TAMPING, SOD SHOULD BE PEGGED OR STAPLED TO RESIST WASHOUT DURING THE ESTABLISHMENT PERIOD. MESH OR OTHER NETTING MAY BE PEGGED OVER THE SOD FOR EXTRA PROTECTION IN CRITICAL AREAS.

## GENERAL INSTALLATION (VA. DEPT. OF CONSERVATION, 1992)

1. SOD SHOULD NOT BE CUT OR LAID IN EXCESSIVELY WET OR DRY WEATHER. SOD ALSO SHOULD NOT BE LAID ON SOIL SURFACES THAT ARE FROZEN.

2. DURING PERIODS OF HIGH TEMPERATURE, THE SOIL SHOULD BE LIGHTLY IRRIGATED IMMEDIATELY PRIOR TO LAYING THE SOD, TO COOL THE SOIL AND REDUCE ROOT BURNING AND DIEBACK.

3. THE FIRST ROW OF SOD SHOULD BE LAID IN A STRAIGHT LINE WITH SUBSEQUENT ROWS PLACED PARALLEL TO AND BUTTING TIGHTLY AGAINST EACH OTHER. LATERAL JOINTS SHOULD BE STAGGERED TO PROMOTE MORE UNIFORM GROWTH AND STRENGTH. CARE SHOULD BE EXERCISED TO ENSURE THAT SOD IS NOT STRETCHED OR OVERLAPPED AND THAT ALL JOINTS ARE BUTTED TIGHT IN ORDER TO PREVENT VOIDS WHICH WOULD CAUSE DRYING OF THE ROOTS (SEE FIGURE ABOVE).

4. ON SLOPES 3:1 OR GREATER, OR WHEREVER EROSION MAY BE A PROBLEM, SOD SHOULD BE LAID WITH STAGGERED JOINTS AND SECURED BY STAPLING OR OTHER APPROVED METHODS. SOD SHOULD BE INSTALLED WITH THE LENGTH PERPENDICULAR TO THE SLOPE (ON CONTOUR).

5. AS SODDING OF CLEARLY DEFINED AREAS IS COMPLETED, SOD SHOULD BE ROLLED OR TAMPED TO PROVIDE FIRM CONTACT BETWEEN ROOTS AND SOIL.

6. AFTER ROLLING, SOD SHOULD BE IRRIGATED TO A DEPTH SUFFICIENT THAT THE UNDERSIDE OF THE SOD PAD AND THE SOIL 4 INCHES BELOW THE SOD IS THOROUGHLY WET.

7. UNTIL SUCH TIME A GOOD ROOT SYSTEM BECOMES DEVELOPED, IN THE ABSENCE OF ADEQUATE RAINFALL, WATERING SHOULD BE PERFORMED AS OFTEN AS NECESSARY TO MAINTAIN MOIST SOIL TO A DEPTH OF AT LEAST 4 INCHES.

8. THE FIRST MOWING SHOULD NOT BE ATTEMPTED UNTIL THE SOD IS FIRMLY ROOTED, USUALLY 2–3 WEEKS. NOT MORE THAN ONE THIRD OF THE GRASS LEAF SHOULD BE REMOVED AT ANY ONE CUTTING.

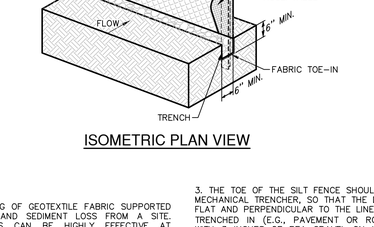
## INSPECTION AND MAINTENANCE GUIDELINES

1. SOD SHOULD BE INSPECTED WEEKLY AND AFTER EACH RAIN EVENT TO LOCATE AND REPAIR ANY DAMAGE.

2. DAMAGE FROM STORMS OR NORMAL CONSTRUCTION ACTIVITIES SUCH AS TIRE RUTS OR DISTURBANCE OF SWALE STABILIZATION SHOULD BE REPAIRED AS SOON AS PRACTICAL.

# SOD INSTALLATION DETAIL

NOT–TO–SCALE




ISOMETRIC PLAN VIEW

## SILT FENCE

A SILT FENCE IS A BARRIER CONSISTING OF GEOTEXTILE FABRIC SUPPORTED BY METAL POSTS TO PREVENT SOIL AND SEDIMENT LOSS FROM A SITE. WHEN PROPERLY USED, SILT FENCES CAN BE HIGHLY EFFECTIVE AT CONTROLLING SEDIMENT FROM DISTURBED AREAS. THEY CAUSE RUNOFF TO POND, ALLOWING HEAVIER SOLIDS TO SETTLE OUT. IF NOT PROPERLY INSTALLED, SILT FENCES ARE NOT LIKELY TO BE EFFECTIVE.

THE PURPOSE OF A SILT FENCE IS TO INTERCEPT AND DETAIN WATER–BORN SEDIMENT FROM UNPROTECTED AREAS OF A LIMITED EXTENT. SILT FENCE IS USED DURING THE PERIOD OF CONSTRUCTION NEAR THE PERIMETER OF A DISTURBED AREA TO INTERCEPT SEDIMENT WHILE ALLOWING WATER TO PERCOLATE THROUGH. THIS FENCE SHOULD REMAIN IN PLACE UNTIL THE DISTURBED AREA IS PERMANENTLY STABILIZED. SILT FENCE SHOULD NOT BE USED WHERE THERE IS A CONCENTRATION OF WATER IN A CHANNEL OR DRAINAGE WAY. IF CONCENTRATED FLOW OCCURS AFTER INSTALLATION, CORRECTIVE ACTION MUST BE TAKEN SUCH AS PLACING A ROCK BERM IN THE AREAS OF CONCENTRATED FLOW.

SILT FENCING WITHIN THE SITE MAY BE TEMPORARILY MOVED DURING THE DAY TO ALLOW CONSTRUCTION ACTIVITY PROVIDED IT IS REPLACED AND PROPERLY ANCHORED TO THE GROUND AT THE END OF THE DAY. SILT FENCES ON THE PERIMETER OF THE SITE OR AROUND DRAINAGE WAYS SHOULD NOT BE MOVED AT ANY TIME.

## MATERIALS

1. SILT FENCE MATERIAL SHOULD BE POLYPROPYLENE, POLYETHYLENE, OR POLYAMIDE WOVEN OR NONWOVEN FABRIC. THE FABRIC SHOULD BE 36 INCHES, WITH A MINIMUM UNIT WEIGHT OF 4.5 OZ/YD, MULLEN BURST STRENGTH EXCEEDING 190 LB/IN2, ULTRAVIOLET STABILITY EXCEEDING 70%, AND MINIMUM APPARENT OPENING SIZE OF U.S. SIEVE NUMBER 30.

2. FENCE POSTS SHOULD BE MADE OF HOT ROLLED STEEL, AT LEAST 4 FEET LONG WITH TEE OR Y–BAR CROSS SECTION, SURFACE PAINTED OR GALVANIZED, MINIMUM WEIGHT 1.25 LB/FT, AND BRINDELL HARDNESS EXCEEDING 140.

3. WOVEN WIRE BACKING TO SUPPORT THE FABRIC SHOULD BE GALVANIZED 2" X 4" WELDED WIRE, 12 GAUGE MINIMUM.

## INSTALLATION

1. STEEL POSTS, WHICH SUPPORT THE SILT FENCE, SHOULD BE INSTALLED ON A SLIGHT ANGLE TOWARD THE ANTICIPATED RUNOFF SOURCE. POSTS MUST BE EMBEDDED A MINIMUM OF 1–FOOT DEEP AND SPACED NOT MORE THAN 8 FEET ON CENTER. WHERE WATER CONCENTRATES, THE MAXIMUM SPACING SHOULD BE 6 FEET.

2. LAY OUT FENCING DOWN–SLOPE OF DISTURBED AREA, FOLLOWING THE CONTOUR AS CLOSELY AS POSSIBLE. THE FENCE SHOULD BE SITED SO THAT THE MAXIMUM DRAINAGE AREA IS ¼ ACRE/100 FEET OF FENCE.

3. THE TOE OF THE SILT FENCE SHOULD BE TRENCHED IN WITH A SPADE OR MECHANICAL TRENCHER, SO THAT THE DOWN–SLOPE FACE OF THE TRENCH IS FLAT AND PERPENDICULAR TO THE LINE OF FLOW. WHERE FENCE CANNOT BE TRENCHED IN (E.G., PAVEMENT OR ROCK OUTCROP), WEIGHT FABRIC FLAP WITH 3 INCHES OF PEA GRAVEL ON UPHILL SIDE TO PREVENT FLOW FROM SEEPING UNDER FENCE.

4. THE TRENCH MUST BE A MINIMUM OF 6 INCHES DEEP AND 6 INCHES WIDE TO ALLOW FOR THE SILT FENCE FABRIC TO BE LAID IN THE GROUND AND BACKFILLED WITH COMPACTED MATERIAL.

5. SILT FENCE SHOULD BE SECURELY FASTENED TO EACH STEEL SUPPORT POST OR TO WOVEN WIRE, WHICH IS IN TURN ATTACHED TO THE STEEL FENCE POST. THERE SHOULD BE A 3–FOOT OVERLAP, SECURELY FASTENED WHERE ENDS OF FABRIC MEET.

6. SILT FENCE SHOULD BE REMOVED WHEN THE SITE IS COMPLETELY STABILIZED SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.

## COMMON TROUBLE POINTS

1. FENCE NOT INSTALLED ALONG THE CONTOUR CAUSING WATER TO CONCENTRATE AND FLOW OVER THE FENCE.

2. FABRIC NOT SEATED SECURELY TO GROUND (RUNOFF PASSING UNDER FENCE).

3. FENCE NOT INSTALLED PERPENDICULAR TO FLOW LINE (RUNOFF ESCAPING AROUND SIDES).

4. FENCE TREATING TOO LARGE AN AREA, OR EXCESSIVE CHANNEL FLOW (RUNOFF OVERTOPS OR COLLAPSES FENCE).

## INSPECTION AND MAINTENANCE GUIDELINES

1. INSPECT ALL FENCING WEEKLY, AND AFTER RAINFALL.

2. REMOVE SEDIMENT WHEN BUILDUP REACHES 6 INCHES.

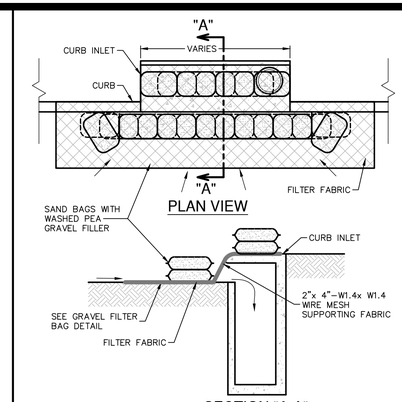
3. REPLACE TORN FABRIC OR INSTALL A SECOND LINE OF FENCING PARALLEL TO THE TORN SECTION.

4. REPLACE OR REPAIR SECTIONS CRUSHED OR COLLAPSED IN THE COURSE OF CONSTRUCTION ACTIVITY. IF A SECTION OF FENCE IS OBSTRUCTING VEHICULAR ACCESS, CONSIDER RELOCATING IT TO A SPOT WHERE IT WILL PROVIDE EQUAL PROTECTION, BUT WILL NOT OBSTRUCT VEHICLES. A TRIANGULAR FILTER DIKE MAY BE PREFERABLE TO A SILT FENCE AT COMMON VEHICLE ACCESS POINTS.

5. WHEN CONSTRUCTION IS COMPLETE, THE SEDIMENT SHOULD BE DISPOSED OF IN A MANNER THAT WILL NOT CAUSE ADDITIONAL SILTATION AND THE PRIOR LOCATION OF THE SILT FENCE SHOULD BE REVEGETATED. THE FENCE ITSELF SHOULD BE DISPOSED OF IN AN APPROVED LANDFILL.

# SILT FENCE DETAIL

NOT–TO–SCALE




PLAN VIEW

SECTION "A-A"

## GENERAL NOTES

1. CONTRACTOR TO INSTALL 2"x4"–W1.4xW1.4 WIRE MESH SUPPORTING FILTER FABRIC OVER THE INLET OPENING. FABRIC MUST BE SECURED TO WIRE BACKING WITH CLIPS OR WIRE TIES AT THIS LOCATION. SAND BAGS FILLED WITH WASHED PEA GRAVEL SHOULD BE PLACED ON TOP OF WIRE MESH ON TOP OF THE INLET AS SHOWN ON THIS DETAIL TO HOLD WIRE MESH IN PLACE. SANDBAGS FILLED WITH WASHED PEA GRAVEL SHOULD ALSO BE PLACED ALONG THE GUTTER AS SHOWN ON THIS DETAIL TO HOLD WIRE MESH IN PLACE. SAND BAGS TO BE STACKED TO FORM A CONTINUOUS BARRIER AROUND INLETS.

2. THE BAGS SHOULD BE TIGHTLY ABUTTED AGAINST EACH OTHER TO PREVENT RUNOFF FROM FLOWING BETWEEN THE BAGS.

## INSPECTION AND MAINTENANCE GUIDELINES

1. INSPECTION SHOULD BE MADE WEEKLY AND AFTER EACH RAINFALL. REPAIR OR REPLACEMENT SHOULD BE MADE PROMPTLY AS NEEDED BY THE CONTRACTOR.

2. 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.

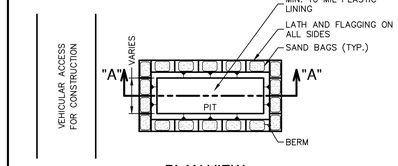
3. CHECK PLACEMENT OF DEVICE TO PREVENT GAPS BETWEEN DEVICE AND CURB.

4. INSPECT FILTER FABRIC AND PATCH OR REPLACE IF TORN OR MISSING.

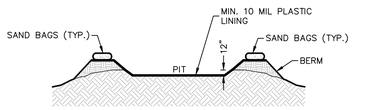
5. STRUCTURES SHOULD BE REMOVED AND THE AREA STABILIZED ONLY AFTER THE REMAINING DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.

# BAGGED GRAVEL CURB INLET PROTECTION DETAIL

NOT–TO–SCALE




PLAN VIEW




SECTION "A-A"

## GENERAL NOTES

1. DETAIL ABOVE ILLUSTRATES MINIMUM DIMENSIONS. PIT CAN BE INCREASED IN SIZE DEPENDING ON EXPECTED FREQUENCY OF USE.

2. WASHOUT PIT SHALL BE LOCATED IN AN AREA EASILY ACCESSIBLE TO CONSTRUCTION TRAFFIC.

3. WASHOUT PIT SHALL NOT BE LOCATED IN AREAS SUBJECT TO INUNDATION FROM STORM WATER RUNOFF.

4. LOCATE WASHOUT AREA AT LEAST 50 FEET FROM SENSITIVE FEATURES, STORM DRAINS, OPEN DITCHES OR WATER BODIES.

5. TEMPORARY CONCRETE WASHOUT FACILITY SHOULD BE CONSTRUCTED WITH SUFFICIENT QUANTITY AND VOLUME TO CONTAIN ALL LIQUID AND CONCRETE WASTE GENERATED BY WASHOUT OPERATIONS.

## MATERIALS

PLASTIC LINING MATERIAL SHOULD BE A MINIMUM OF 10 MIL IN POLYETHYLENE SHEETING AND SHOULD BE FREE OF HOLES, TEARS, OR OTHER DEFECTS THAT COMPROMISE THE IMPERMEABILITY OF THE MATERIAL.

## MAINTENANCE

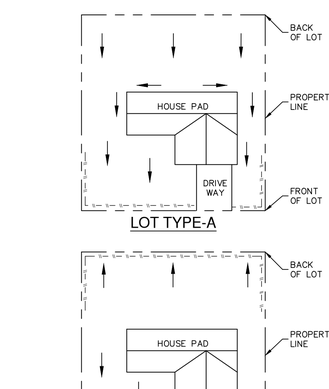
1. WHEN TEMPORARY CONCRETE WASHOUT FACILITIES ARE NO LONGER REQUIRED FOR THE WORK, THE HARDENED CONCRETE SHOULD BE REMOVED AND DISPOSED OF.

2. MATERIALS USED TO CONSTRUCT TEMPORARY CONCRETE WASHOUT FACILITIES SHOULD BE REMOVED FROM THE SITE OF THE WORK AND DISPOSED OF.

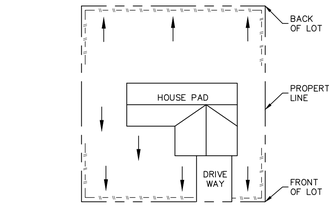
3. HOLES, DEPRESSIONS OR OTHER GROUND DISTURBANCES CAUSED BY THE REMOVAL OF THE TEMPORARY CONCRETE WASHOUT FACILITIES SHOULD BE BACKFILLED AND REPAIRED.

# CONCRETE TRUCK WASHOUT PIT DETAIL

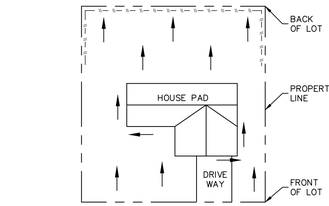
NOT–TO–SCALE




LOT TYPE-A




LOT TYPE-B



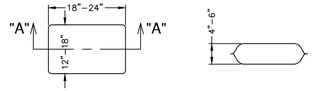

LOT TYPE-C

NOTE: SILT FENCE TO BE INSTALLED PER THESE DETAILS AND LOCATED ON THE DOWNGRADIENT SIDE OF EACH LOT LINE OR LIMITS OF CLEARING AS GENERALLY SHOWN ON THE OVERALL SITE PLAN.

LEGEND
SILT FENCE
DRAINAGE FLOW

# TYPICAL HOUSE LOT LAYOUTS

NOT–TO–SCALE




PLAN VIEW

SECTION "A-A"

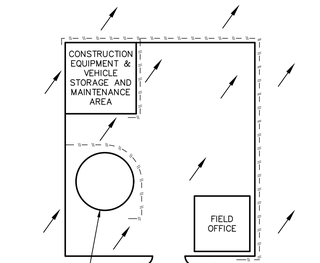
NOTES:
1. THE FILTER BAG MATERIAL SHALL BE MADE OF POLYPROPYLENE, POLYETHYLENE OR POLYAMIDE WOVEN FABRIC, MIN. UNIT WEIGHT OF 4 OUNCES/SY, HAVE A MULLEN BURST STRENGTH EXCEEDING 300 PSI AND ULTRAVIOLET STABILITY EXCEEDING 70%.

2. THE FILTER BAG SHALL BE FILLED WITH CLEAN, MEDIUM WASHED PEA GRAVEL TO COARSE GRAVEL (0.31 TO 0.75 INCH DIAMETER).

3. SAND SHALL NOT BE USED TO FILL THE FILTER BAGS.

# GRAVEL FILTER BAG DETAIL

NOT–TO–SCALE




LEGEND
SILT FENCE
FLOW ARROWS

# CONSTRUCTION STAGING AREA

NOT–TO–SCALE

THE ENGINEERING SEAL HAS BEEN AFFIXED TO THIS SHEET ONLY FOR THE PURPOSE OF DEMONSTRATING COMPLIANCE WITH THE TPDES–STORM WATER POLLUTION PREVENTION PLAN (SWP3) REGULATIONS.

THIS SHEET HAS BEEN PREPARED FOR PURPOSES OF THE SWP3 ONLY. ALL OTHER CIVIL ENGINEERING RELATED INFORMATION SHOULD BE ACQUIRED FROM THE APPROPRIATE SHEET IN THE CIVIL IMPROVEMENT PLANS.

EXHIBIT 3

| NO. | REVISION | DATE |
|---|---|---|
| | | |

STATE OF TEXAS
CALEB M. CHANCE
98401
LICENSED
PROFESSIONAL ENGINEER
3/9/23

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

# SHAVANO HIGHLANDS UNIT 7
SAN ANTONIO, TEXAS

STORM WATER POLLUTION PREVENTION PLAN DETAILS

PLAT NO. 23-11800083
JOB NO. 8834-22
DATE DECEMBER 2021
DESIGNER AW
CHECKED CC DRAWN RC
SHEET C8.10

Date: Mar 09, 2023, 4:47pm User ID: vvillarreal
File: P:\881_34\22\Design\Civil\SWD7883422.dwg

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