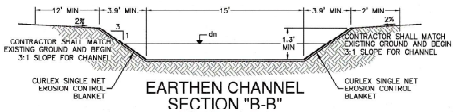
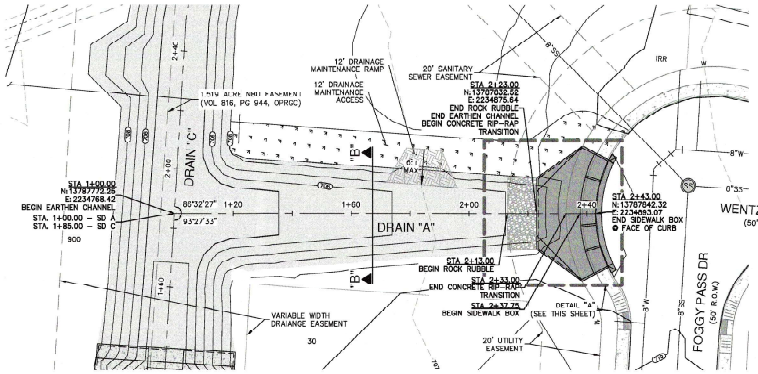
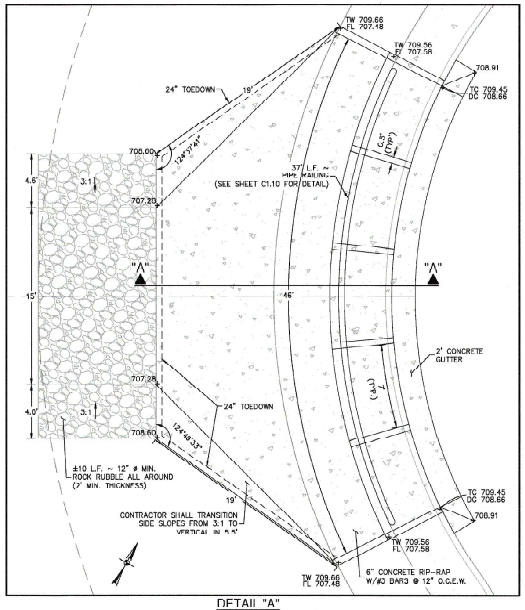



## EARTHEN CHANNEL SECTION "B-B"

(STA. 1+00.00 – STA. 2+23.00)
NOT-TO-SCALE




DETAIL "A"
1" = 9'

SCALE: 1" = 5'
0' 5' 10' 15'

## DRAINAGE LEGEND

| | |
|---|---|
| PROJECT LIMITS | |
| 100 YR FLOODPLAIN | |
| EXISTING CONTOUR | 690 |
| PROPOSED CONTOUR | 690 |
| EXISTING WATER | EXISTING FIRE HYDRANT W |
| EXISTING UNDERGROUND ELECTRIC | UGE |
| EXISTING GAS | G |
| PROPOSED SEWER | SS MANHOLE |
| PROPOSED WATER | FIRE HYDRANT W |
| PROPOSED STORM DRAIN | |
| EXISTING STORM DRAIN | |
| FLOW ARROW | |
| CURLEX SINGLE NET EROSION CONTROL BLANKETS | |
| DRAINAGE MAINTENANCE ACCESS | |

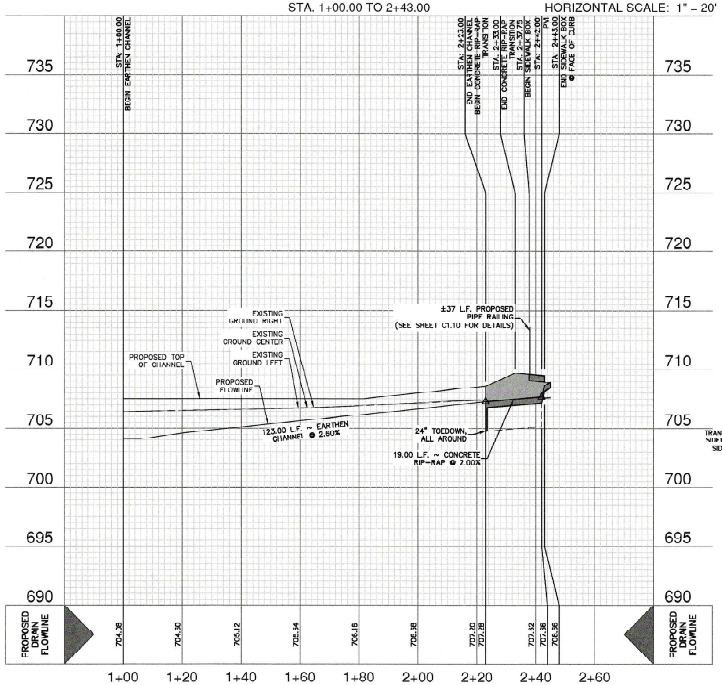
## HYDRAULIC CALCULATIONS EARTH CHANNEL

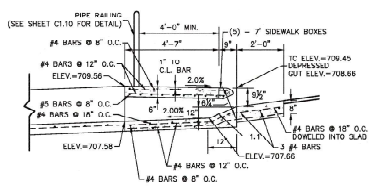
STA. 1+00.00 TO 2+23.00

| | | |
|---|---|---|
| $Q_{100}$ | = | 71 CFS |
| $D_W$ | = | 15 FT |
| n | = | 0.035 |
| S | = | 2.60% |
| $dn_{100}$ | = | 0.78 FT |
| $V_{100}$ | = | 5.27 FPS |
| dn25+Fbrd. | = | 1.78 FT |
| $Q_2$ | = | 33 CFS |
| $V_2$ | = | 4.03 FPS |
| $Q_{100}$ | = | 102 CFS |
| $dn_{100}$ | = | 0.96 FT |
| $V_{100}$ | = | 5.06 FPS |

DRAIN "A"
STA. 1+00.00 TO 2+43.00

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




## SECTION "A-A" SIDEWALK BOX DETAIL

NOT-TO-SCALE

### HYDRAULIC CALCULATIONS – 35' SIDEWALK BOX

TOTAL $Q_{25}$ = 71 CFS

$Q_{25}$ = 71 CFS

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

$A = L(0.52)$, $h = 0.54$, $g = 32.2$, $c = 0.70$

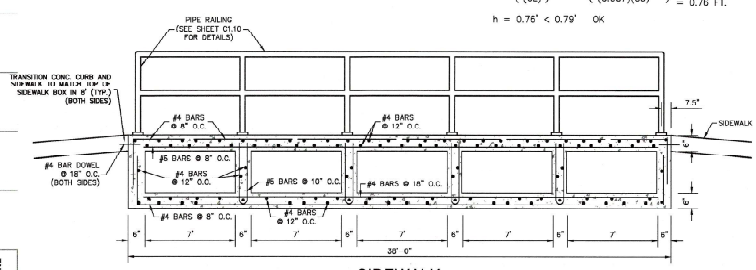
$$L = \frac{71\ CFS}{(0.7)\ (0.52)\sqrt{2\ (32.2)\ (0.54)}}$$

L = 33.08' USE 35' FT

CHECK WITH WEIR FORMULA

$$h = \left(\frac{Q}{(CL)}\right)^{2/3} = \left(\frac{71}{(3.087)(35)}\right)^{2/3} = 0.76\ FT.$$

h = 0.76' < 0.79' OK




## SIDEWALK BOX DETAIL

NOT-TO-SCALE

**WATER PONDING WIDTH**
SEE STORMWATER REPORT FOR STREET CAPACITY CALCULATIONS (10YR SPREAD WIDTH CONTAINED WITHIN CURB)

## 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 THESE DRAINAGE STRUCTURES SHALL MEET THESE 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.
5. EARTHEN CHANNELS WILL BE VEGETATED BY SEEDING OR SODDING. SIDE OF THE CHANNEL SURFACE MUST HAVE ESTABLISHED VEGETATION BEFORE COMAL COUNTY WILL ACCEPT.
6. CONTRACTOR SHALL MATCH TOP OF CHANNEL TO NATURAL GROUND AND MAINTAIN A MINIMUM CHANNEL DEPTH OF "D" AS SHOWN IN THE PROFILE.
7. ALL RCP SHALL BE AASHTO M170 CLASS III RCP.

## 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 EXCAVATION. SPECIFICALLY, CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR SAFETY CONSULTANT SHALL IMPLEMENT A TRENCH SAFETY PROGRAM IN ACCORDANCE WITH OSHA STANDARDS CONCERNING 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 "TEXAS 811" 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 |
|---|---|---|
| | | |

5-12-2022
TODD W. BLACKMON
65200
LICENSED
TEXAS


PAPE-DAWSON ENGINEERS
PROF. ENGINEERS | SURVEYING | MAPPING | NATURAL RESOURCES
10127 MORGAN AVE. STE 100 | NEW BRAUNFELS, TX 78132 | 830.625.9393
TBPE FIRM F-8324 | TBPLS FIRM 10028800

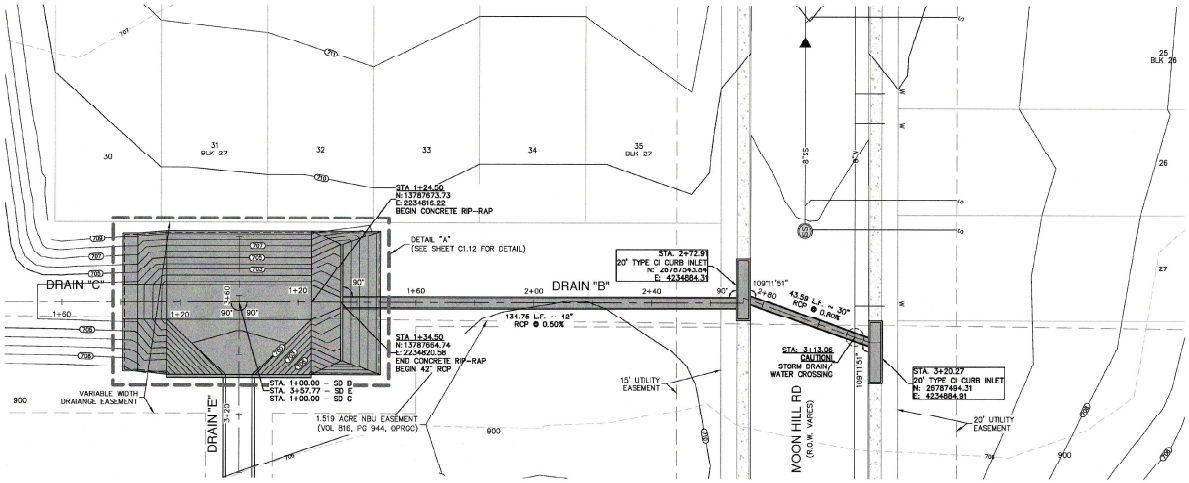

# STEELWOOD TRAIL UNIT 4

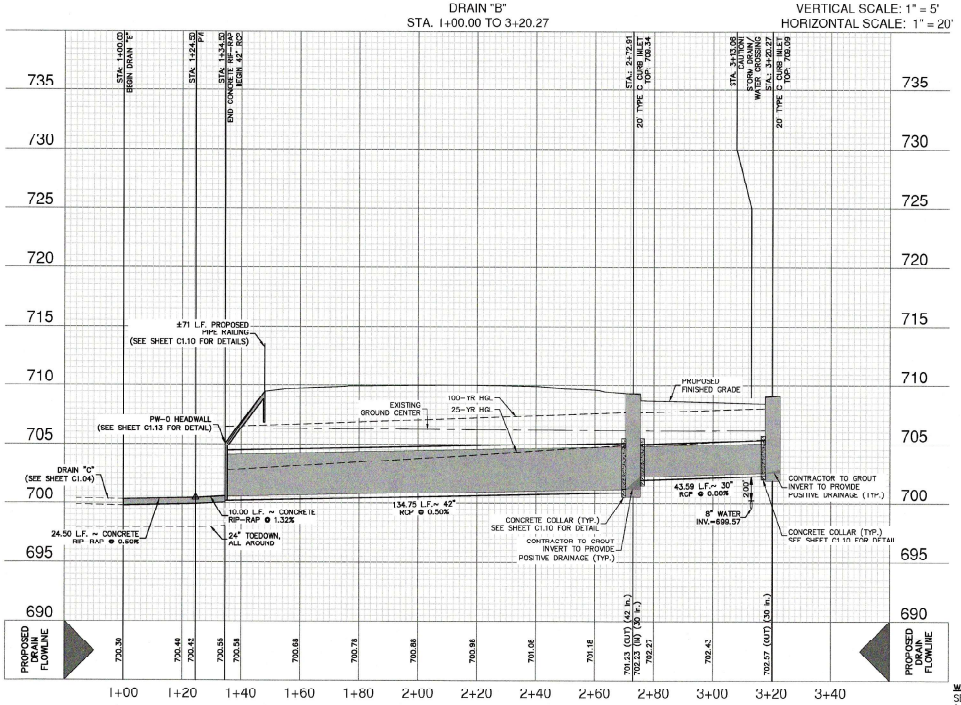
NEW BRAUNFELS, TEXAS

DRAIN A - PLAN & PROFILE
STA. 1+00.00 TO 2+43.00

PLAT NO.
JOB NO. 30034-07
DATE MAY 2022
DESIGNER HF
CHECKED HF DRAWN BH
SHEET C1.02

FOR PERMIT




**WATER BONDING WIDTH**

SEE STORMWATER REPORT FOR STREET CAPACITY CALCULATIONS (10YR SPREAD WIDTH CONTAINED WITHIN CURB)

SCALE: 1" = 20'

0' 20' 40' 60'

## DRAINAGE LEGEND

| | |
|---|---|
| PROJECT LIMITS | |
| 100 YR FLOODPLAIN | |
| EXISTING CONTOUR | 690 |
| PROPOSED CONTOUR | 690 |
| EXISTING WATER | EXISTING FIRE HYDRANT, W |
| EXISTING UNDERGROUND ELECTRIC | UCE |
| EXISTING GAS | G |
| EXISTING SEWER | SS, MANHOLE |
| PROPOSED SEWER | SS |
| PROPOSED WATER | FIRE HYDRANT, W |
| PROPOSED STORM DRAIN | |
| EXISTING STORM DRAIN | |
| FLOW ARROW | |
| CURLEX SINGLE NET EROSION CONTROL BLANKETS | |
| PROPOSED GAS | G |
| PROPOSED UNDERGROUND ELECTRIC | UCE |

| HYDRAULIC CALCULATIONS STORM DRAIN STA. 1+34.50 TO 2+72.91 | HYDRAULIC CALCULATIONS STORM DRAIN STA. 2+72.91 TO 3+20.27 |
|---|---|
| Q25 = 51 CFS | Q25 = 25.6 CFS |
| S = 0.50% | S = 0.80% |
| Sf = 0.26% | Sf = 0.39% |
| V25 = 8.02 FPS | V25 = 5.20 FPS |
| n = 0.013 | n = 0.013 |
| D = 3.5' | D = 2.5' |

**HYDRAULIC CALCULATIONS – 20' CURB INLET**

TOTAL $Q_{25}$ = 51 CFS

$Q_{25}$ = 25.5 CFS

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

A = L(0.52), h = 0.54, g = 32.2, c = 0.70

$$L = \frac{25.5\ \text{CFS}}{(0.7)\ (0.52)\sqrt{2\ (32.2)\ (0.54)}}$$

L = 11.85' USE 20' FT.

CHECK WITH WEIR FORMULA

$$h = \left(\frac{Q}{(CL)}\right)^{2/3} = \left(\frac{25.5}{(3.087)(20)}\right)^{2/3} = 0.55\ \text{FT.}$$

h = 0.55' < 0.79' OK

## 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.
5. EARTHEN CHANNELS WILL BE VEGETATED BY SEEDING OR SODDING; BOTH OF THE CHANNEL SURFACE MUST HAVE ESTABLISHED VEGETATION BEFORE COMAL COUNTY WILL ACCEPT.
6. CONTRACTOR SHALL MATCH TOP OF CHANNEL TO NATURAL GROUND AND MAINTAIN A MINIMUM CHANNEL DEPTH OF "D" AS SHOWN IN THE PROFILE.
7. ALL RCP SHALL BE AASHTO M170 CLASS III RCP.

## 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 DOCUMENTED 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 "TEXAS 811" 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 |
|---|---|---|
| | | |

8-12-2022

STATE OF TEXAS
TODD W. BLACKMON
89206
PROFESSIONAL ENGINEER

**PAPE-DAWSON ENGINEERS**

NEW BRAUNFELS | SAN ANTONIO | AUSTIN | HOUSTON | FT WORTH | DALLAS
NEW BRAUNFELS, 78130 | TBPELS FIRM # 10011801
TEXAS ENGINEERING FIRM #470 | TX TEXAS SURVEYING FIRM # 10028800

# STEELWOOD TRAIL UNIT 4

NEW BRAUNFELS, TEXAS

DRAIN 3 - PLAN & PROFILE
STA. 1+00.00 TO 3+20.27

PLAT NO.
JOB NO. 70034-07
DATE MAY 2022
DESIGNER HF
CHECKED HF DRAWN BH
SHEET C1.03

FOR PERMIT

Date: Aug 12, 2022, 1:53pm User ID: jmcy
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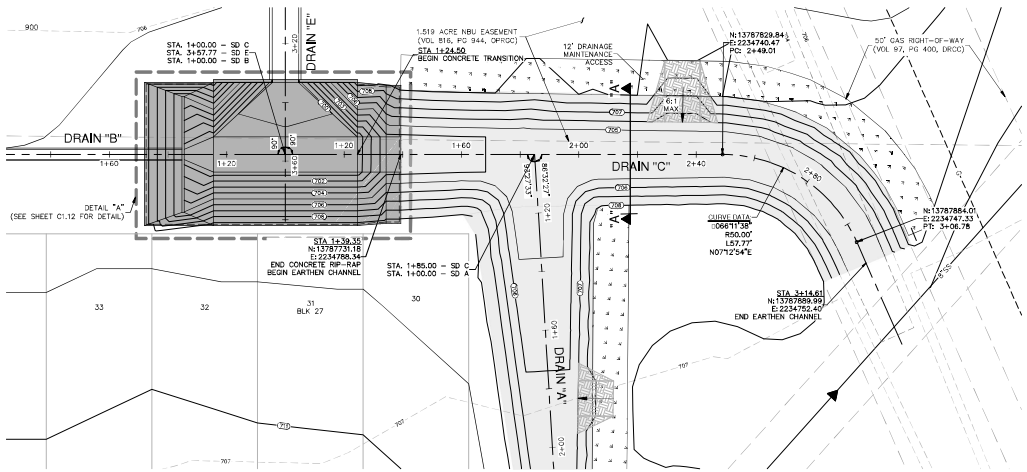
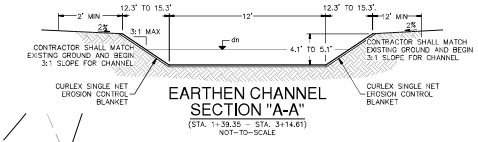



EARTHEN CHANNEL SECTION "A-A"
(STA. 1+39.35 – STA. 3+14.61)
NOT-TO-SCALE

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

## DRAINAGE LEGEND

- PROJECT LIMITS
- 100 YR FLOODPLAIN
- EXISTING CONTOUR — 690 —
- PROPOSED CONTOUR — 690 —
- EXISTING WATER — EXISTING FIRE HYDRANT — W —
- EXISTING UNDERGROUND ELECTRIC — UGE —
- EXISTING GAS — G —
- EXISTING SEWER — SS — MANHOLE
- PROPOSED SEWER — SS —
- PROPOSED WATER — FIRE HYDRANT — W —
- PROPOSED STORM DRAIN
- EXISTING STORM DRAIN
- FLOW ARROW
- CURLEX SINGLE NET EROSION CONTROL BLANKETS
- PROPOSED GAS — G —
- PROPOSED UNDERGROUND ELECTRIC — UGE —

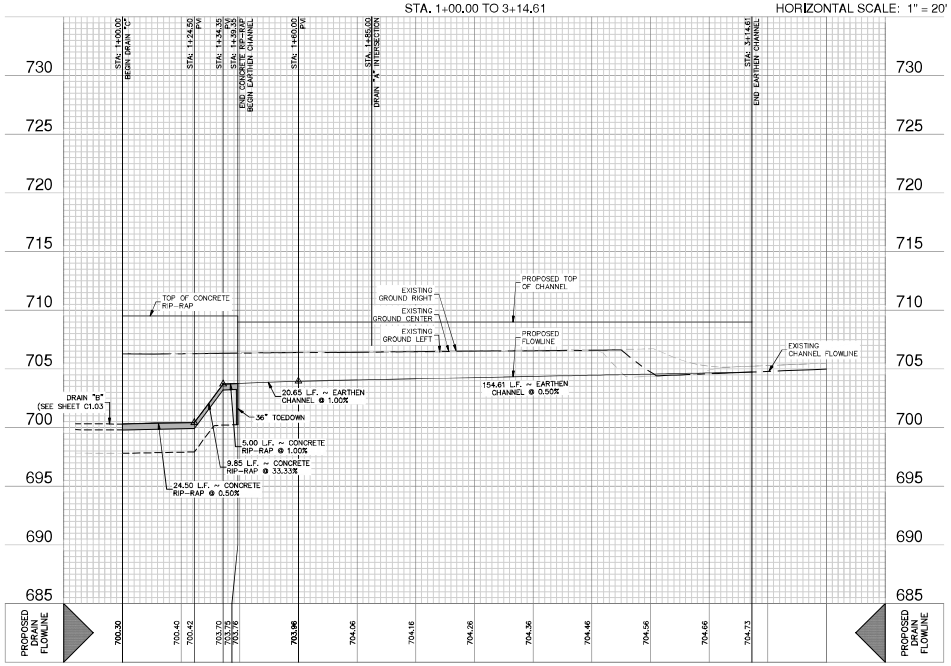
| HYDRAULIC CALCULATIONS EARTH CHANNEL STA. 1+39.35 TO 1+60.00 | |
|---|---|
| $Q_{25}$ = | 185 CFS |
| Bw = | 12 FT |
| n = | 0.035 |
| S = | 1.00% |
| $dn_{25}$ = | 1.94 FT |
| $V_{25}$ = | 5.37 FPS |
| dn25+Fbrd.= | 2.44 FT |
| $Q_2$ = | 87 CFS |
| $V_2$ = | 4.28 FPS |
| $Q_{100}$ = | 267 CFS |
| $dn_{100}$ = | 2.35 FT |
| $V_{100}$ = | 5.97 FPS |

| HYDRAULIC CALCULATIONS EARTH CHANNEL STA. 1+60.00 TO 1+85.00 | |
|---|---|
| $Q_{25}$ = | 185 CFS |
| Bw = | 12 FT |
| n = | 0.035 |
| S = | 0.50% |
| $dn_{25}$ = | 2.32 FT |
| $V_{25}$ = | 4.19 FPS |
| dn25+Fbrd.= | 2.82 FT |
| $Q_2$ = | 87 CFS |
| $V_2$ = | 3.36 FPS |
| $Q_{100}$ = | 267 CFS |
| $dn_{100}$ = | 2.81 FT |
| $V_{100}$ = | 4.65 FPS |

| HYDRAULIC CALCULATIONS EARTH CHANNEL STA. 1+85.00 TO 3+14.61 | |
|---|---|
| $Q_{25}$ = | 107 CFS |
| Bw = | 12 FT |
| n = | 0.035 |
| S = | 0.50% |
| $dn_{25}$ = | 1.74 FT |
| $V_{25}$ = | 3.55 FPS |
| dn25+Fbrd.= | 2.24 FT |
| $Q_2$ = | 50 CFS |
| $V_2$ = | 2.83 FPS |
| $Q_{100}$ = | 154 CFS |
| $dn_{100}$ = | 2.11 FT |
| $V_{100}$ = | 3.98 FPS |

DRAIN "C"
STA. 1+00.00 TO 3+14.61

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




**WATER PONDING WIDTH**
SEE STORMWATER REPORT FOR STREET CAPACITY CALCULATIONS (10YR SPREAD WIDTH CONTAINED WITHIN CURB)

## 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.
5. EARTHEN CHANNELS WILL BE VEGETATED BY SEEDING OR SODDING. 85% OF THE CHANNEL SURFACE MUST HAVE ESTABLISHED VEGETATION BEFORE COMAL COUNTY WILL ACCEPT.
6. CONTRACTOR SHALL MATCH TOP OF CHANNEL TO NATURAL GROUND AND MAINTAIN A MINIMUM CHANNEL DEPTH OF "D" AS SHOWN IN THE PROFILE.
7. ALL RCP SHALL BE AASHTO M170 CLASS III RCP.

## 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 "TEXAS 811" A MINIMUM OF 48 HOURS PRIOR TO THE START OF CONSTRUCTION. ANY DAMAGE TO EXISTING UTILITIES SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND THE REPAIR SHALL BE AT THE CONTRACTOR'S SOLE EXPENSE WHETHER THE UTILITY IS SHOWN ON THESE PLANS OR NOT.

FOR PERMIT

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

STATE OF TEXAS
TODD W. BLACKMON
89208
LICENSED
PROFESSIONAL ENGINEER
6-15-2022

PAPE-DAWSON ENGINEERS
NEW BRAUNFELS | SAN ANTONIO | AUSTIN | HOUSTON | FT WORTH | DALLAS
10172 INDEPENDENCE DR, STE 102 | NEW BRAUNFELS, TX 78132 | 830.625.5653
TEXAS ENGINEERING FIRM 14075 | TEXAS SURVEYING FIRM #10028800

# STEELWOOD TRAIL UNIT 4
NEW BRAUNFELS, TEXAS

DRAIN C - PLAN & PROFILE
STA. 1+00.00 TO 3+14.61

PLAT NO.
JOB NO. 30034-07
DATE MAY 2022
DESIGNER HF
CHECKED HF DRAWN BH
SHEET C1.04

Date: Jun 15, 2022, 11:43am User ID: tmartin
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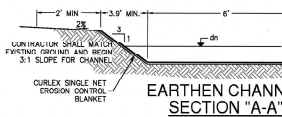
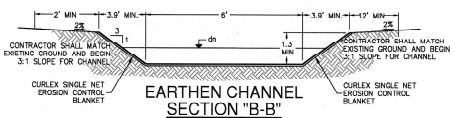
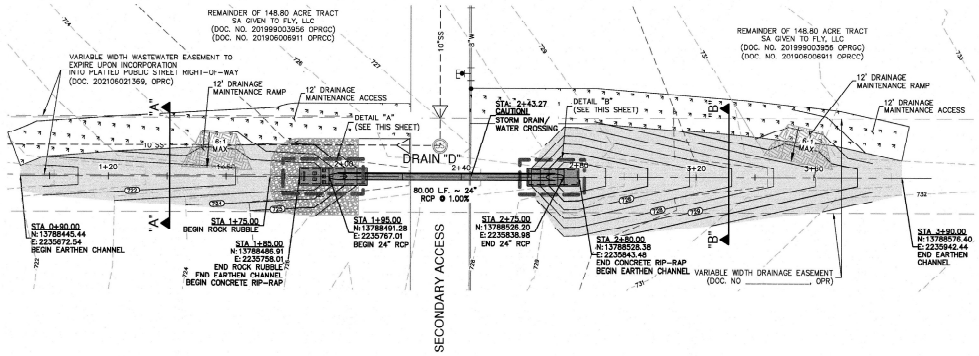
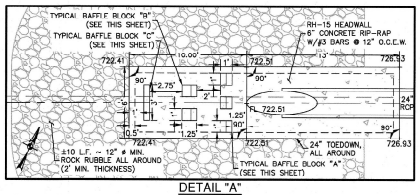



EARTHEN CHANNEL SECTION "A-A"
(STA. 1+00.00 – STA. 1+81.78)
NOT-TO-SCALE

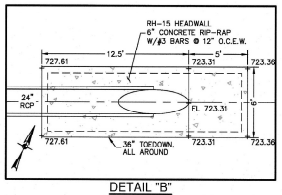



EARTHEN CHANNEL SECTION "B-B"
(STA. 2+79.72 – STA. 3+87.26)
NOT-TO-SCALE




DETAIL "A"
1" = 5'




DETAIL "B"
1" = 5'


## DRAINAGE LEGEND

- PROJECT LIMITS
- 100 YR FLOODPLAIN
- EXISTING CONTOUR — 690
- PROPOSED CONTOUR — 690
- EXISTING WATER — W
- EXISTING UNDERGROUND ELECTRIC — UCE
- EXISTING GAS — G
- EXISTING SEWER — SS
- PROPOSED SEWER — SS — MANHOLE
- PROPOSED WATER — W — FIRE HYDRANT
- PROPOSED STORM DRAIN
- EXISTING STORM DRAIN
- FLOW ARROW
- CURLEX SINGLE NET EROSION CONTROL BLANKETS
- PROPOSED GAS — G
- PROPOSED UNDERGROUND ELECTRIC — UGE

### HYDRAULIC CALCULATIONS STORM DRAIN "D"
STA. 1+95.00 TO 2+75.00

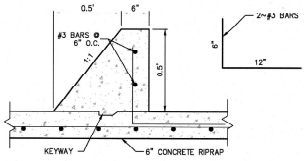
| | |
|---|---|
| Q25 | = 8 CFS |
| S | = 1.00% |
| Sf | = 0.13% |
| V25 | = 6.60 FPS |
| n | = 0.013 |
| D | = 2.0' |
| Q2 | = 3 CFS |
| V2 | = 5.02 FPS |

### HYDRAULIC CALCULATIONS EARTH CHANNEL
STA. 0+90.00 TO 1+85.00

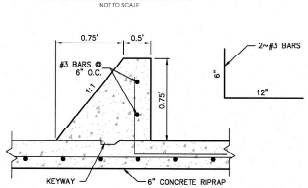
| | |
|---|---|
| Q25 = | 8 CFS |
| Bw = | 6 FT |
| n = | 0.035 |
| S = | 1.87% |
| dn25 = | 0.40 FT |
| V25 = | 2.80 FPS |
| dn25+Fbrd.= | 0.90 FT |
| Q2 = | 3 CFS |
| V2 = | 2.00 FPS |
| Q100 = | 12 CFS |
| dn100 = | 0.50 FT |
| V100 = | 3.20 FPS |

### HYDRAULIC CALCULATIONS EARTH CHANNEL
STA. 2+79.72 TO 3+87.26

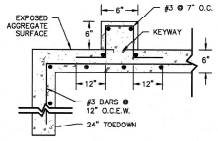
| | |
|---|---|
| Q25 = | 8 CFS |
| Bw = | 6 FT |
| n = | 0.035 |
| S = | 7.00% |
| dn25 = | 0.27 FT |
| V25 = | 4.33 FPS |
| dn25+Fbrd.= | 0.77 FT |
| Q2 = | 3 CFS |
| V2 = | 3.05 FPS |
| Q100 = | 12 CFS |
| dn100 = | 0.31 FT |
| V100 = | 4.98 FPS |




BAFFLE BLOCK "A" DETAIL
NOT TO SCALE




BAFFLE BLOCK "B" DETAIL
NOT TO SCALE




TYPICAL END SILL DETAIL "C"
SECTION
NOT TO SCALE

**WATER PONDING WIDTH**
SEE STORMWATER REPORT FOR STREET CAPACITY CALCULATIONS (10YR SPREAD WIDTH CONTAINED WITHIN CURB)

## DRAINAGE & GRADING NOTES:

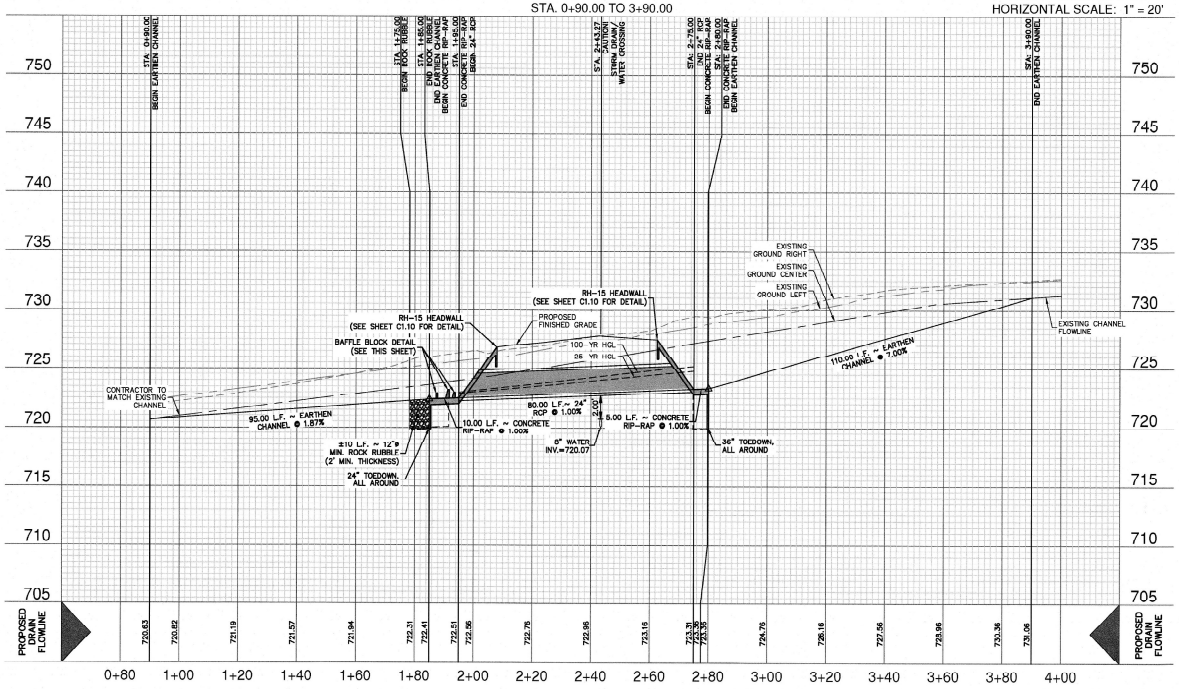
1. THE CONTRACTOR WILL BE RESPONSIBLE FOR DETERMINING EXACT LOCATION OF ALL UTILITIES AND DRAINAGE STRUCTURES WHETHER SHOWN ON THE PLANS OR NOT. THE CONTRACTOR SHALL UNCOVER EXISTING UTILITIES PRIOR TO CONSTRUCTION TO VERIFY SIZE, GRADE, AND LOCATION. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY 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.
5. EARTHEN CHANNELS WILL BE VEGETATED BY SEEDING OR SODDING. 85% OF THE CHANNEL SURFACE MUST HAVE ESTABLISHED VEGETATION BEFORE COMAL COUNTY WILL ACCEPT.
6. CONTRACTOR SHALL MATCH TOP OF CHANNEL TO NATURAL GROUND AND MAINTAIN A MINIMUM CHANNEL DEPTH OF "D" AS SHOWN IN THE PROFILE.
7. ALL RCP SHALL BE AASHTO M170 CLASS III RCP.

## 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 "TEXAS 811" 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 |
|---|---|---|
| | | |

8-17-2022
STATE OF TEXAS
TODD W. BLACKMON
09200
LICENSED
PROFESSIONAL ENGINEER

PAPE-DAWSON ENGINEERS
NEW BRAUNFELS | SAN ANTONIO | AUSTIN | HOUSTON | FT WORTH | DALLAS
1672 INDEPENDENCE DR, STE 103 | NEW BRAUNFELS, TX 78132 | 830.625.3333
TBPELS ENGINEERING FIRM #10601 | TBPELS SURVEYING FIRM #10028800

# STEELWOOD TRAIL UNIT 4
NEW BRAUNFELS, TEXAS

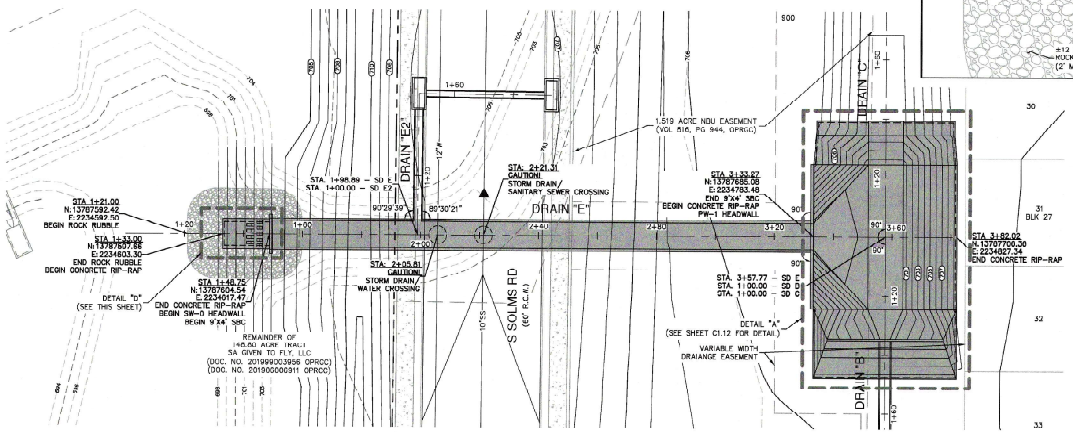
DRAIN D - PLAN & PROFILE
STA. 0+90.00 TO 3+90.00

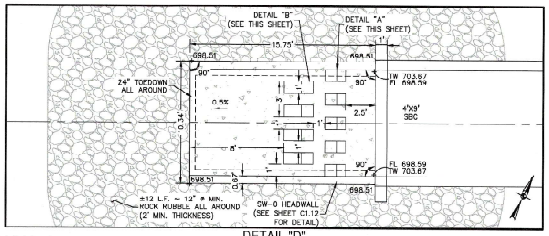
PLAT NO. _____
JOB NO. 30034-07
DATE MAY 2022
DESIGNER HF
CHECKED HF DRAWN BH
SHEET C1.05

FOR PERMIT



Date: Aug 22, 2022, 3:59pm User ID: tmartin
File: V:\CS\CAD\Design\CS30-30034-07.dwg




DETAIL "D"

SCALE: 1" = 20'

## DRAINAGE LEGEND

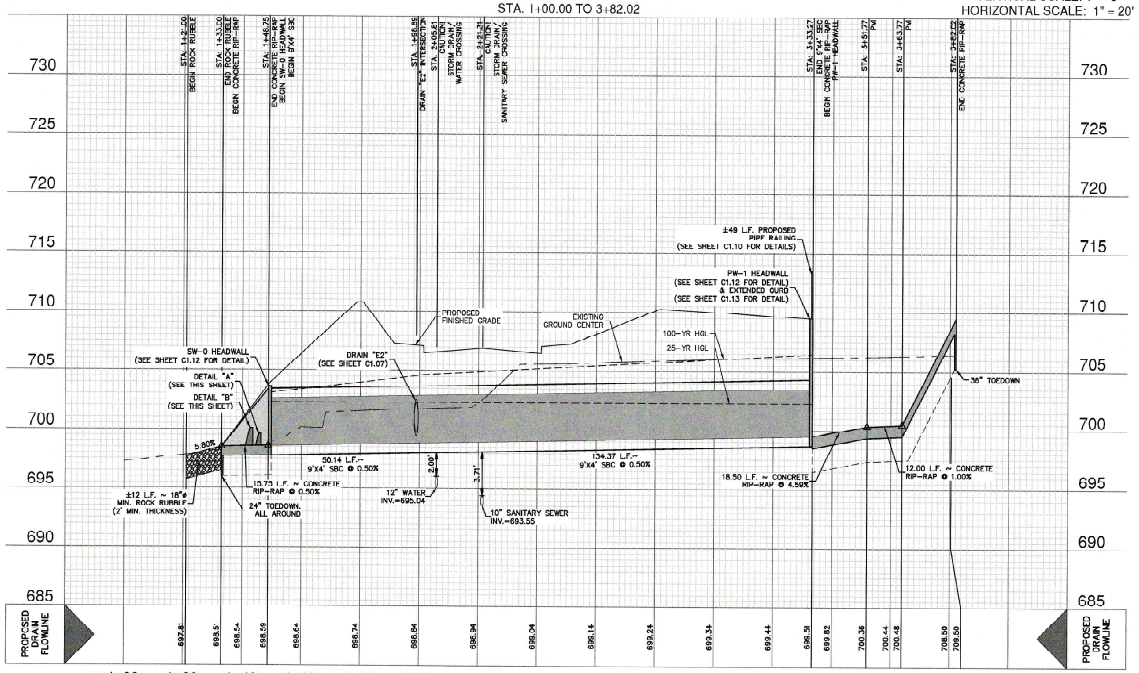
- PROJECT LIMITS
- 100 YR FLOODPLAIN
- EXISTING CONTOUR
- PROPOSED CONTOUR
- EXISTING WATER
- EXISTING UNDERGROUND ELECTRIC
- EXISTING GAS
- EXISTING SEWER
- PROPOSED SEWER
- PROPOSED WATER
- PROPOSED STORM DRAIN
- EXISTING STORM DRAIN
- FLOW ARROW
- QUIRLEX SINGLE NET EROSION CONTROL BLANKETS
- PROPOSED GAS
- PROPOSED UNDERGROUND ELECTRIC

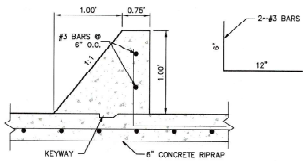
| HYDRAULIC CALCULATIONS STORM DRAIN "E" STA. 1+48.75 TO 1+98.89 | |
|---|---|
| Q25 | = 231 CFS |
| S | = 0.50% |
| Sf | = 0.20% |
| V25 | = 6.02 FPS |
| n | = 0.013 |
| D | = 4.0' |
| Q2 | = 111 CFS |
| V2 | = 5.65 FPS |

| HYDRAULIC CALCULATIONS STORM DRAIN "E" STA. 1+98.89 TO 3+33.27 | |
|---|---|
| Q25 | = 229 CFS |
| S | = 0.50% |
| Sf | = 0.20% |
| V25 | = 6.31 FPS |
| n | = 0.013 |
| D | = 4.0' |
| Q2 | = 108 CFS |
| V2 | = 7.15 FPS |

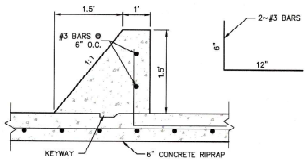
DRAIN "E"
STA. 1+00.00 TO 3+82.02

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




BAFFLE BLOCK "A" DETAIL
NOT TO SCALE




BAFFLE BLOCK "B" DETAIL
NOT TO SCALE

**WATER PONDING WIDTH**
SEE STORMWATER REPORT FOR STREET CAPACITY CALCULATIONS (10YR SPREAD WIDTH CONTAINED WITHIN CURB)

## 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 DEWATERING AND EXCAVATION LIMITS.
4. CONTRACTOR SHALL GROUT ALL CURB INLETS AND JUNCTION BOXES TO PROVIDE FOR POSITIVE DRAINAGE.
5. EARTHEN CHANNELS WILL BE VEGETATED BY SEEDING OR SODDING. 85% OF THE CHANNEL SURFACE MUST HAVE ESTABLISHED VEGETATION BEFORE COMAL COUNTY WILL ACCEPT.
6. CONTRACTOR SHALL MATCH TOP OF CHANNEL TO NATURAL GROUND AND MAINTAIN A MINIMUM CHANNEL DEPTH OF "D" AS SHOWN IN THE PROFILE.
7. ALL RCP SHALL BE AASHTO M170 CLASS III RCP.

## 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 APPROPRIATE 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 |
|---|---|---|
| | | |

8-12-2022
TODD W. BLACKMON
86208
LICENSED
PROFESSIONAL ENGINEER
STATE OF TEXAS

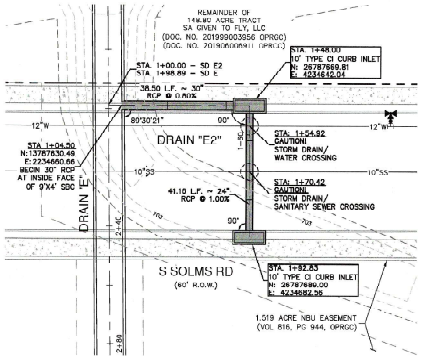
PAPE-DAWSON ENGINEERS
10801 MOPAC EXPY, BLDG. 1, STE. 100 AUSTIN, TX 78759
TEL: 512.454.8711 FAX: 512.338.1651
TBPELS FIRM REG. NO. F-8324 TBPLS FIRM REG. NO. 10028800

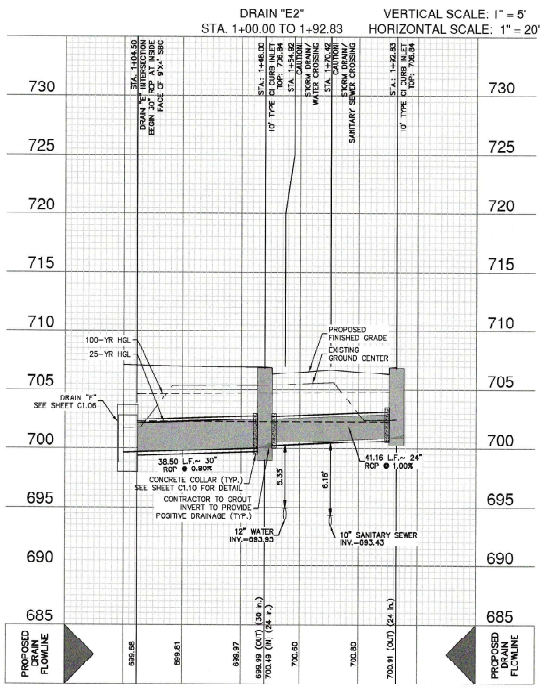
# STEELWOOD TRAIL UNIT 4
NEW BRAUNFELS, TEXAS

DRAIN E - PLAN & PROFILE
STA. 1+00.00 TO 3+82.02

PLAT NO.
JOB NO. 30031-07
DATE MAY 2022
DESIGNER HF
CHECKED HF DRAWN BH
SHEET C1.06

FOR PERMIT




**WATER PONDING WIDTH**

SEE STORMWATER REPORT FOR STREET CAPACITY CALCULATIONS (10YR SPREAD WIDTH CONTAINED WITHIN CURB)

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

## DRAINAGE LEGEND

| | |
|---|---|
| PROJECT LIMITS | |
| 100 YR FLOODPLAIN | |
| EXISTING CONTOUR | 690 |
| PROPOSED CONTOUR | 690 |
| EXISTING WATER | EXISTING FIRE HYDRANT W |
| EXISTING UNDERGROUND ELECTRIC | UGE |
| EXISTING GAS | G |
| EXISTING SEWER | SS |
| PROPOSED SEWER | SS CLEANOUT |
| PROPOSED WATER | FIRE HYDRANT W |
| PROPOSED STORM DRAIN | |
| EXISTING STORM DRAIN | |
| FLOW ARROW | |
| CURLEX SINGLE NET EROSION CONTROL BLANKETS | |
| PROPOSED GAS | G |
| PROPOSED UNDERGROUND ELECTRIC | UGE |

| HYDRAULIC CALCULATIONS STORM DRAIN STA. 1+04.50 TO 1+48.00 | HYDRAULIC CALCULATIONS STORM DRAIN STA. 1+48.00 TO 1+92.83 |
|---|---|
| Q25 = 6.0 CFS | Q25 = 3.0 CFS |
| S = 0.80% | S = 1.00% |
| Sf = 0.02% | Sf = 0.02% |
| V25 = 1.50 FPS | V25 = 3.30 FPS |
| n = 0.013 | n = 0.013 |
| D = 2.5' | D = 2.0' |

**HYDRAULIC CALCULATIONS – 10' CURB INLET**

TOTAL $Q_{25} = 6$ CFS

$Q_{25} = 3.0$ CFS

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

$A = L(0.52)$, $h = 0.54$, $g = 32.2$, $c = 0.70$

$$L = \frac{3.0 \text{ CFS}}{(0.7)\ (0.52)\sqrt{2}\ (32.2)\ (0.54)}$$

L = 1.40' USE 10' FT.

CHECK WITH weir FORMULA

$$h = \left(\frac{Q}{(CL)}\right)^{2/3} = \left(\frac{3.0}{(3.087)(10)}\right)^{2/3} = 0.21 \text{ FT.}$$

h = 0.21' < 0.79' OK

## 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.
5. EARTHEN CHANNELS WILL BE VEGETATED BY SEEDING OR SODDING. 85% OF THE CHANNEL SURFACE MUST HAVE ESTABLISHED VEGETATION BEFORE COMAL COUNTY WILL ACCEPT.
6. CONTRACTOR SHALL MATCH TOP OF CHANNEL TO NATURAL GROUND AND MAINTAIN A MINIMUM CHANNEL DEPTH OF "D" AS SHOWN IN THE PROFILE.
7. ALL RCP SHALL BE AASHTO M170 CLASS III RCP.

## 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 OUTDOORS, 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 "TEXAS 811" 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.

FOR PERMIT

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

8-12-2022
TODD W. BLACKMON
00200
LICENSED
PROFESSIONAL ENGINEER
STATE OF TEXAS

**PAPE-DAWSON ENGINEERS**
NEW BRAUNFELS | SAN ANTONIO | AUSTIN HOUSTON | FT NORTH | DALLAS
1672 INDEPENDENCE DR, STE 102 | NEW BRAUNFELS, TX 78132 | 830.625.8555
TEXAS ENGINEERING FIRM F-14781 | TEXAS SURVEYING FIRM # 10028800

# STEELWOOD TRAIL UNIT 4
NEW BRAUNFELS, TEXAS

DRAIN E2 - PLAN & PROFILE
STA. 1+00.00 TO 1+92.83

PLAT NO. _____
JOB NO. 30034-07
DATE MAY 2022
DESIGNER HF
CHECKED HF DRAWN DH
SHEET C1.07

Date: Aug 12, 2022, 11:37am User ID: hray
File: P:\30034007\Design\Civil\C1.07.dwg

American Excelsior Company®
Earth Science Division

Proud Participant in NTPEP and Proud Member of: NTPEP, Green Seal, IECA

Product Participant of: QDOR Technologies

## CURLEX® EROSION CONTROL BLANKETS
### INSTALLATION GUIDELINES

Before installing Curlex blankets, the seedbed shall be inspected by the Owner's Representative to ensure it has been properly prepared and fine graded to remove any trapping sills. It shall be free of obstructions, suchas tree roots, projections such as stones, and other foreign objects. The contractor shall proceed when satisfactory conditions are present. Afterthe area has been properly shaped, seeded, fertilized, and compacted, remove the Curlex protective cover. Next, locate the start of the roll,making sure the roll is facing toward the area to be covered, and then roll out the product. The product shall be rolled out flat, even, and smooth without stretching the material than anchored tothe subgrade.

**Slopes:** It is recommended the blankets be installed vertically on the slope; however, on short slopes it may be more practical to install horizontally across the width o' the application when agreed upon by the Engineer prior to installation. If more than one width is required, simply abut the edges of the verticallyinstalled blankets together and secure them with a common row of staples. Overlapping adjacent sides of Curlex blankets is not required wsen installed vertically on slopes. Curlex blankets shall be trenched at the head of the slope if the blanket cannot be extended three feet over the slope crest or if overland flow is anticipated from upslope areas.

**Channels:** Curlex blankets shall be centered to offset a seam in the middle of the waterway. They shall be installed in the same direction as the water flow. The adjoining blankets shall be installed away from the center of channel and overlapped. Curlex blanket installation should continue up the side slopes three feet above the anticipated high water elevation. Flanks exposed to runoff, or sheet flow, must be protected by a check slot or trenched. Curlex blankets shall be trenched at the start of thechannel. Curlex blankets shall be anchored using a staggered staple pattern at end of roll overlips and end of roll terminations.



850 Avenue H East | Arlington, Texas 76011
Phone -800-777-SOIL | Fax 817-385-3585 | www.Curlex.com

W0315R1116

American Excelsior Company®
Earth Science Division

Proud Participant in NTPEP and Proud Member of: NTPEP, Green Seal, IECA

Product Participant of: QDOR Technologies

## MATERIAL SPECIFICATIONS
## CURLEX® I

**Materials:**

Great Lakes Aspen (naturally seed free)
Polypropylene Netting
Stitching Thread
QuickGRASS® (green excelsior – optional)

**Typical Roll Sizes:**

| | | | |
|---|---|---|---|
| Width: | 4.0 ft (1.2 m) | 8.0 ft (2.4 m) | 16.0 ft (4.9 m) |
| Length: | 112.5 ft (34.29 m) | 112.5 ft (34.29 m) | 112.5 ft (34.29 m) |
| Area: | 50.0 yd$^2$ (41.8 m$^2$) | 100.0 yd$^2$ (83.6 m$^2$) | 200.0 yc$^2$ (167.2 m$^2$) |
| Weight: | 36.5 lb (16.6 kg) | 73.0 lb (33.1 kg) | 146.0 lb (66.2 kg) |

**Description:**

Curlex I erosion control blanket (ECB) is a natural, stitched excelsior blanket that provides a temporary organic cover to reduce erosion, protect seeds, enhance germination, and hasten re-vegetation. Curlex I is furnished in rolls with polyethylene wrapping to protect against the elements prior to installation, and may be oriented in Master-Paks of fifteen rolls banded together to minimize material handling requirements. Curlex I is also available as QuickGRASS (green pigment). Curlex I shall be manufactured in the U.S.A.

Curlex I has a design soil loss ratio (event-based RUSLE C factor) of .018 and is typically suitable for slopes up to 2H:1V. Curlex I is rated for channel flows up to 7.0 ft/s (2.1 m/s) and 1.75 lb/ft$^2$ (84 Pa) shear stress.

**Physical Properties:**

Fiber: Great Lakes Aspen (naturally seed free)
Curled, interlocking fibers with barbed edges
Fiber Size: 80% of fibers a minimum of 6 in (15.2 cm) long
0.058 in + 0.008 in wide x 0.018 in + 0.003 in thick
(0.97 mm ± 0.20 mm wide x 0.46 mm ± 0.08 mm thick)
Weight*: 0.73 lb/yd$^2$ (0.40 kg/m$^2$) ± 10% @ 22% Moisture
Thread Pattern: No more than 4.0 in (10.2 cm) transverse stitch spacing
Net Material: Polypropylene (green with ultraviolegradn and UV degrader additives or white with UV degrader additive)
Net Openings: 1.0 in wide x 2.0 in long (25.4 mm wide x 50.8 mm long)
Net Configuration: Top side only

* Weight is based on a dry fiber weight basis at time of manufacture. Baseline moisture content of Great Lakes Aspen excelsior is 22%.

MADE IN USA

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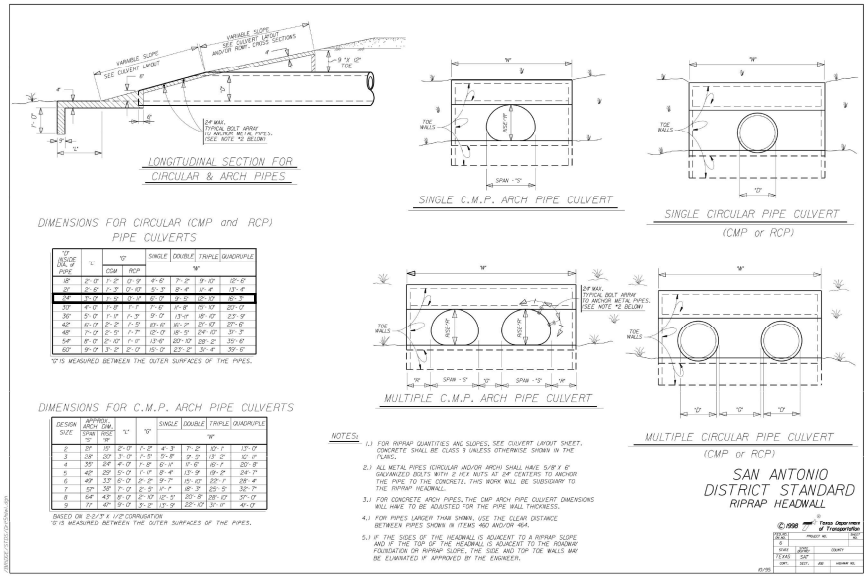



LONGITUDINAL SECTION FOR CIRCULAR & ARCH PIPES

SINGLE C.M.P. ARCH PIPE CULVERT

SINGLE CIRCULAR PIPE CULVERT
(CMP or RCP)

MULTIPLE C.M.P. ARCH PIPE CULVERT

MULTIPLE CIRCULAR PIPE CULVERT
(CMP or RCP)

DIMENSIONS FOR CIRCULAR (CMP and RCP) PIPE CULVERTS

| "D" DESIGN DIA. of PIPE | "L" | "D" CSM | "D" RCP | SINGLE | DOUBLE | TRIPLE | QUADRUPLE |
|---|---|---|---|---|---|---|---|
| | | | | "W" | | | |
| 18" | 2'-0" | 1'-2" | 1'-3" | 4'-6" | 7'-2" | 9'-10" | 12'-6" |
| 24" | 2'-6" | 1'-7" | 1'-9" | 5'-3" | 8'-4" | 11'-4" | 13'-4" |
| 30" | 3'-0" | 1'-11" | 2'-0" | 6'-0" | 9'-6" | 13'-0" | 16'-3" |
| 36" | 4'-0" | 1'-3" | 2'-3" | 7'-6" | 11'-8" | 15'-10" | 20'-0" |
| 42" | 4'-6" | 1'-7" | 2'-6" | 8'-9" | 13'-9" | 18'-9" | 23'-9" |
| 48" | 5'-0" | 1'-11" | 2'-9" | 9'-0" | 15'-6" | 21'-9" | 27'-6" |
| 54" | 6'-0" | 2'-3" | 3'-0" | 10'-6" | 17'-6" | 24'-6" | 31'-3" |
| 60" | 6'-6" | 2'-7" | 3'-3" | 11'-9" | 19'-6" | 27'-3" | 35'-0" |
| 66" | 7'-0" | 2'-11" | 3'-6" | 13'-0" | 21'-6" | 30'-0" | 38'-6" |
| 72" | 8'-0" | 3'-2" | 4'-0" | 15'-0" | 23'-6" | 32'-6" | 39'-6" |

"D" IS MEASURED BETWEEN THE OUTER SURFACES OF THE PIPES.

DIMENSIONS FOR C.M.P. ARCH PIPE CULVERTS

| DESIGN SIZE | APPROX. ARCH DIM. SPAN | APPROX. ARCH DIM. RISE | "L" | "D" | SINGLE | DOUBLE | TRIPLE | QUADRUPLE |
|---|---|---|---|---|---|---|---|---|
| | "S" | "R" | | | "W" | | | |
| 2 | 2'- | 1'- | 2'-0" | 1'-2" | 4'-3" | 7'-2" | 10'-1" | 13'-0" |
| 3 | 3'8" | 2'2" | 3'-0" | 1'-5" | 5'-8" | 9'-3" | 13'-3" | 16'-11" |
| 4 | 5'1" | 2'8" | 4'-0" | 1'-8" | 6'-11" | 11'-6" | 16'-1" | 20'-8" |
| 5 | 6'2" | 3'2" | 5'-0" | 1'-11" | 8'-4" | 13'-9" | 19'-2" | 24'-7" |
| 6 | 7'3" | 3'3" | 6'-0" | 2'-2" | 9'-7" | 16'-0" | 22'-1" | 28'-4" |
| 7 | 8'2" | 3'8" | 7'-0" | 2'-5" | 11'-1" | 18'-3" | 25'-5" | 32'-7" |
| 8 | 9'4" | 4'3" | 8'-0" | 2'-10" | 12'-3" | 20'-8" | 28'-10" | 37'-0" |
| 9 | 11' | 4'9" | 9'-0" | 3'-2" | 13'-9" | 22'-10" | 31'-11" | 41'-0" |

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

NOTES:

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

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

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

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

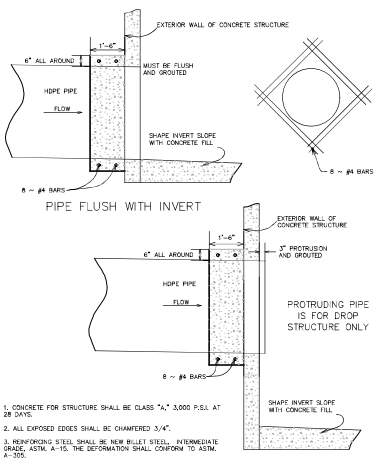
5.) IF THE SIDES OF THE HEADWALL IS ADJACENT TO A RIPRAP SLOPE AND IF THE TOP OF THE HEADWALL IS ADJACENT TO THE ROADWAY FOUNDATION OR RIPRAP SLOPE, THE SIDE AND TOP TOE WALLS MAY BE ELIMINATED IF APPROVED BY THE ENGINEER.

SAN ANTONIO
DISTRICT STANDARD
RIPRAP HEADWALL



| | | | |
|---|---|---|---|
| REVISIONS | PROJECT NO. | | SHEET NO. |
| 0 | | | |
| STATE | FEDERAL AID PROJECT NO. | COUNTY | |
| TEXAS | SHT. | | |
| DIST. | SECT. | JOB | HIGHWAY NO. |

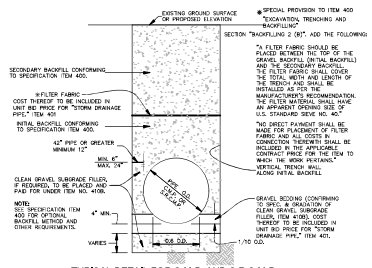
85/95



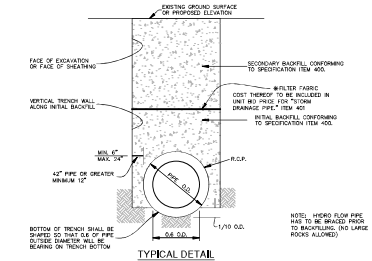

PIPE FLUSH WITH INVERT

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

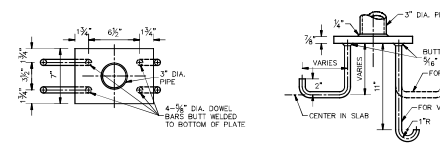



TYPICAL DETAIL FOR C.M.P. AND S.R.C.M.P.

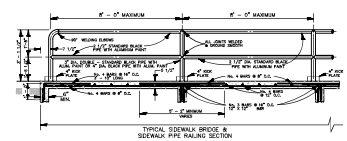


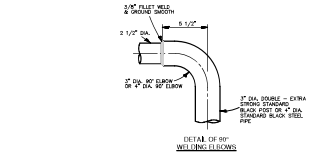

TYPICAL DETAIL

PIPE BEDDING AND BACKFILL DETAILS
NOT-TO-SCALE




PIPE ANCHORAGE DETAIL
NOT-TO-SCALE




DETAIL OF 90°
WELDING ELBOWS

PIPE RAILING DETAIL
NOT-TO-SCALE

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

STATE OF TEXAS
6-15-2022
TODD W. BLACKMON
89208
LICENSED
PROFESSIONAL ENGINEER

PAPE-DAWSON ENGINEERS
NEW BRAUNFELS | SAN ANTONIO | AUSTIN | HOUSTON | FT WORTH | DALLAS
10172 INDEPENDENCE DR, STE 102 | NEW BRAUNFELS, TX 78132 | 830.625.3623
TEXAS Engineering Firm F-10285 | TEXAS Surveying Firm F-10028800

# STEELWOOD TRAIL UNIT 4
## NEW BRAUNFELS, TEXAS
## DRAINAGE DETAILS

PLAT NO.
JOB NO. 30034-07
DATE MAY 2022
DESIGNER HF
CHECKED HF DRAWN BH
SHEET C1.10

FOR PERMIT

Date: Jun 15, 2022, 11:47am User ID: tonyflo
File: P:\30034\Acad\Design\Civil\30034-C1.dwg