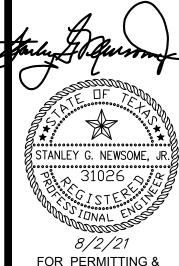


Edison Plaza
Beaumont, Texas 77701
TEL (409) 866-7196
FAX (409) 866-1745
J. ROB CLARK, A.I.A.
RONALD M. JONES, A.I.A.



8/2/21
FOR PERMITTING & CONSTRUCTION

ARCHITECT HAS REVIEWED THE CONSULTANT'S WORK AND COORDINATED IT WITH

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ISSUED FOR
SCHEMATIC DESIGN
DATE: X

DESIGN DEVELOPMENT

DATE: X

BIDS & CONSTRUCTION DATE: 08/02/2021

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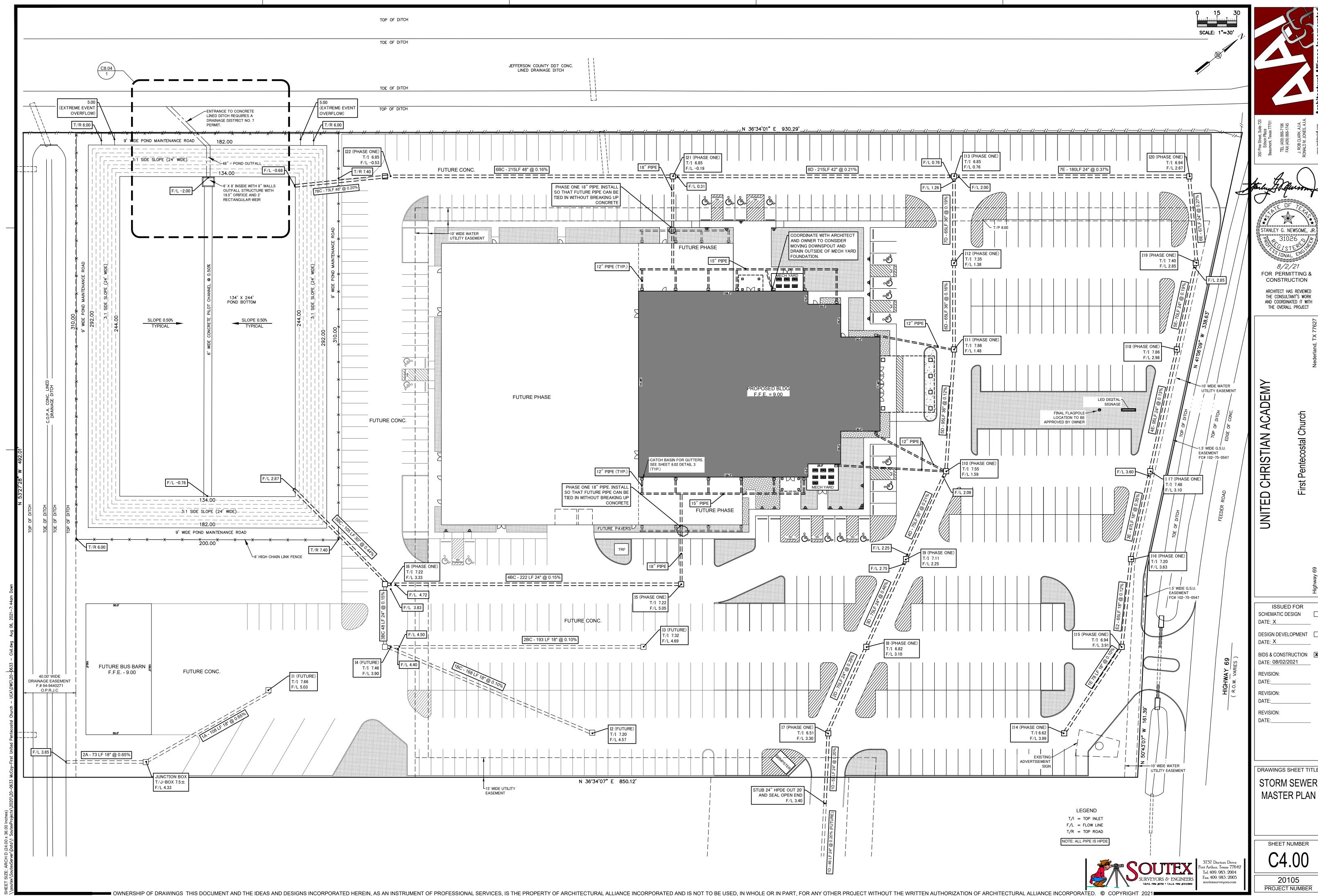
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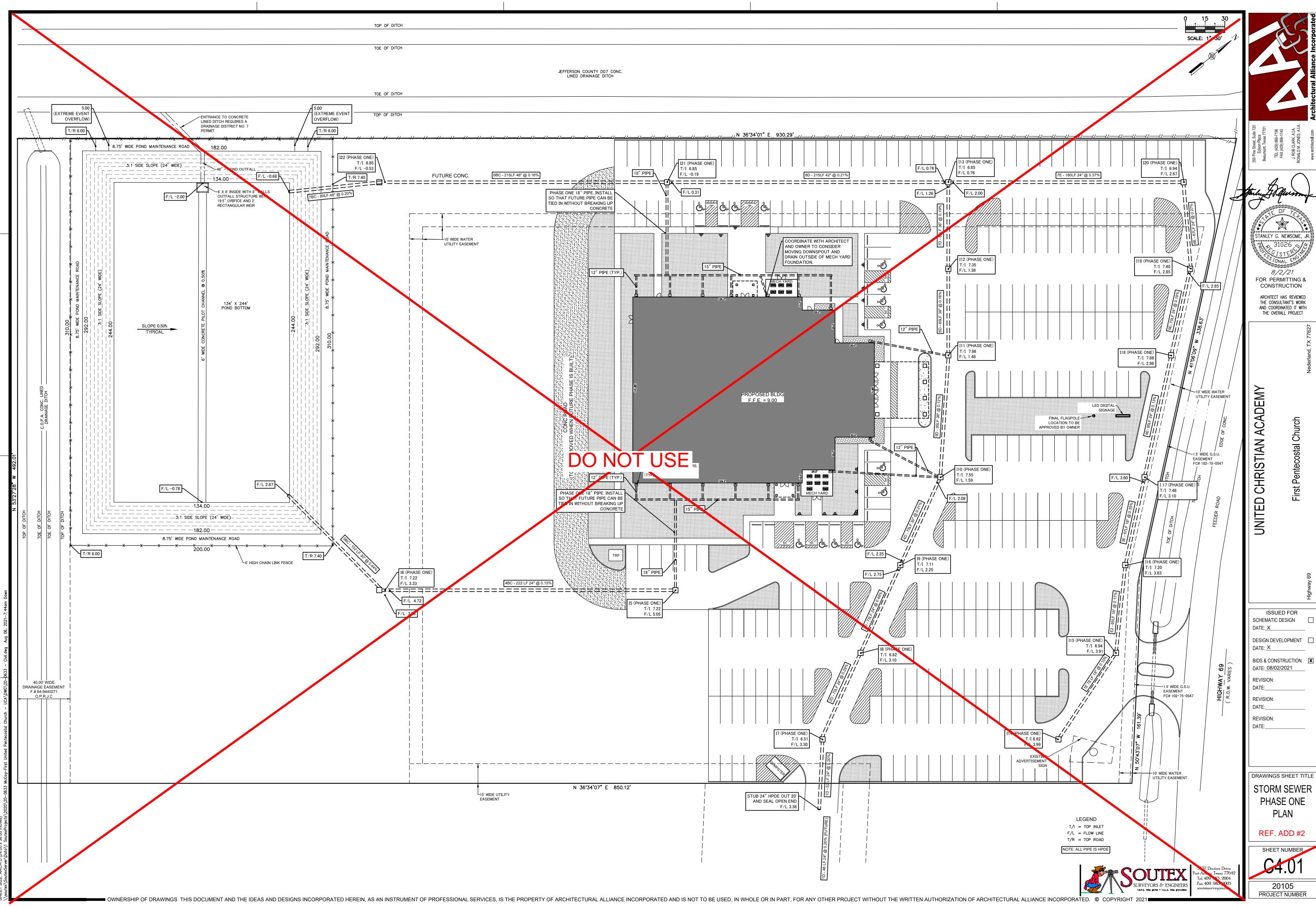
DRAWINGS SHEET TITLE

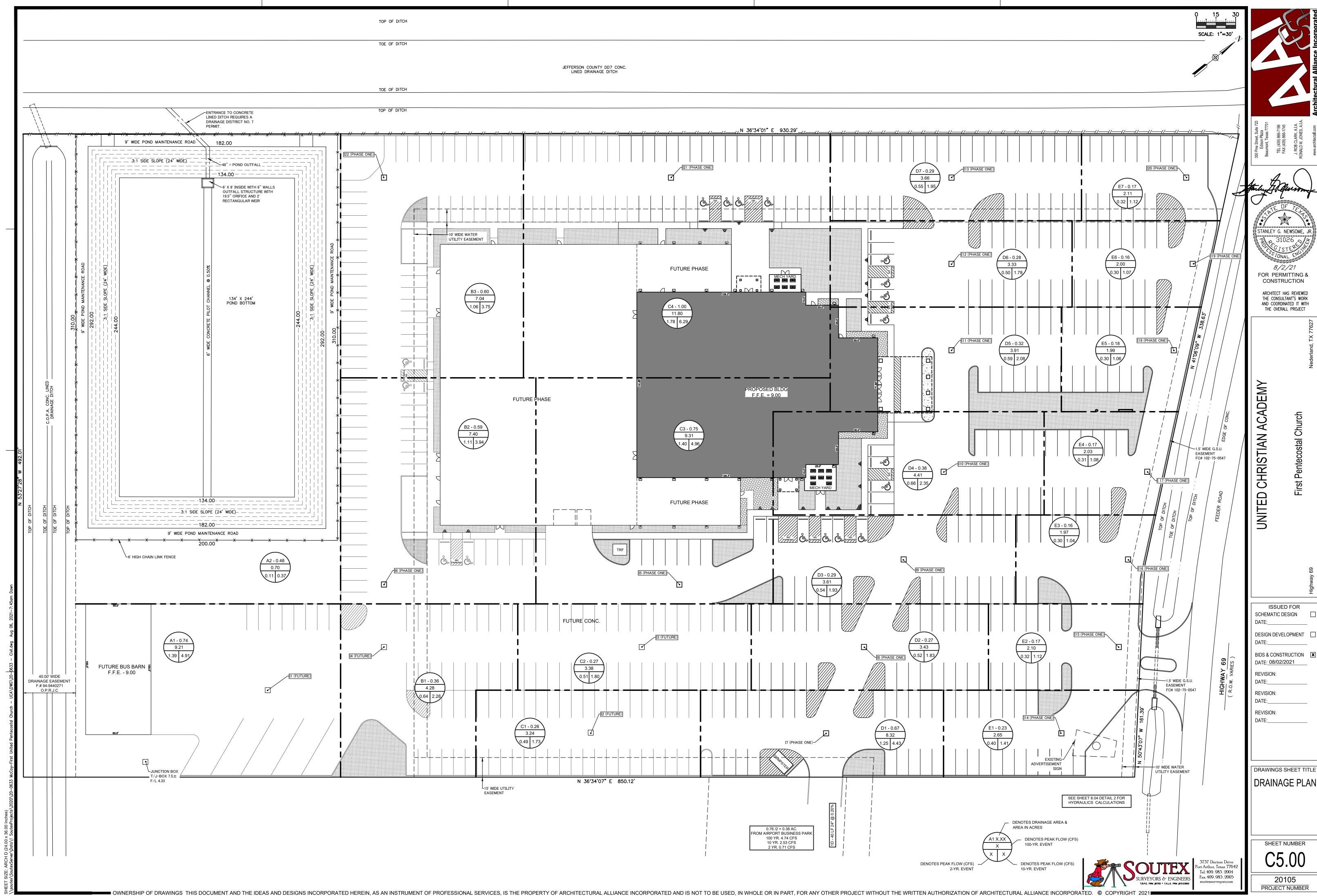
UTILITY PLAN

C3.00



MASTER PLAN







TBPE Firm No. F-5755 TBPLS Firm No. 10123800 LA EF.0005711 3737 Doctors Drive Port Arthur, Texas 77642 Office (409) 983.2004 Fax (409) 983.2005

July 1st, 2021

Mr. Garrett Boudoin Jefferson County Drainage District No. 7 P.O. Box 3244

Port Arthur, Texas 77643

RE: United Christian Academy Detention Pond

Dear Mr. Boudoin,

Please consider the development of the acreage at 10619 U.S. HWY 69, Port Arthur, Texas for the proposed United Christian Academy and the respective calculation for the required pond volume per Drainage District No. 7 (DD7) requirements.

Pre-Development Runoff Calculation

Pre-Development Runoff Coefficient

The total area is 10.71 acres. The City of Port Arthur ditch along west property line will not be considered in the drainage calculations as well as the Proposed Bus Barn area, which will drain into the City ditch.

City ditch area is $(592' \times 40')/43,560 = 0.54$ acres

Bus barn area is (240' X 130')/43,560 = 0.72 acres

Area to drain to the pond is 10.71 - (0.54 + 0.72) = 9.45 acres

Detention pond water surface area at 7' depth is (176' X 286')/43,560 = 1.16 acres Consider the 9.45 acres to have a runoff coefficient of C = 0.30. Use multiplier of 1.25 for the 100 year event.

=> Pre $C_{100}=0.375$

Pre-Development Time of Concentration

Pre-development time of concentration, tc: Path from N.E. corner of acreage to S.W. corner of acreage into Airport Ditch. Use SCS Uplands Method.

 $t_{path} = sqrt (492^2 + 694^2) = 850.71$

For overland flow, use 0.40 fps

 $t_c = 850.71/0.40 = 2,126.8$ seconds, or 35.45 minutes

Pre-Development Intensity:

Use $t_c = 34.45$ minutes to calculate I_{100} :

Intensity = $b/(T + d)^e$, where: e = 0.7416, b = 128.88, d = 15.31 $I_{100} = 128.88/(35.45 + 15.31)^{0.7416} = 7.00 \text{ in/hr}$

Pre-Development Peak Flow

Q = CIA

Pre $Q_{100} = (0.375)(7.00)(9.45) = 24.81$ cfs

Post Development Runoff Calculation

Post Development Runoff Coefficient

Total area = 9.45 acres

Grass area = 1.75 acres Use runoff coefficient of $C = 0.10 \times 1.25 = 0.13$

Concrete, Roof, and Pond area is 9.45 - 1.75 = 7.70 acres

Use runoff coefficient of $C = 0.85 \times 1.25 = 1.06$

Weighted C: $7.70/9.45 \times 1.06 = 0.86$ $1.75/9.45 \times 0.13 = 0.02$

 \Rightarrow Post $C_{100} = 0.88$ Post Development Time of Concentration

Post-development time of concentration, t_c: The path begins in the N.E. corner of the

acreage, 50' over grass to parking lot, 25' over concrete to inlet, then 1,200' in storm sewer to pond.

For travel over grass, use 0.20 fps.

50/0.20 = 250 seconds

For travel over concrete, use 0.40 fps. 25/0.40 = 62.5 seconds

For travel in storm sewer, use 0.20 fps.

Pond Report

1,200/2 = 600 seconds

 $t_c = 250 + 62.5 + 600 = 912.5$ seconds, or 15.2 minutes

Post Development Intensity:

Use $t_c = 15.25$ minutes to calculate I_{100} :

Intensity = $b/(T + d)^e$, where: e = 0.7416, b = 128.88, d = 15.31 $I_{100} = 128.88/(15.2 + 15.31)^{0.7416} = 10.22 \text{ in/hr}$

Post Development Peak Flow for All Lots Developed

Q = CIAPost $Q_{100} = (0.88)(10.22)(9.45) = 84.99 \text{ cfs}$

Pond Storage Requirement

 $7.70/9.45 \times 100\% = 81.5\%$ impervious area of the 9.45 acres

For Soil Groups B and 81.5% impervious, xs = 1.03 ft $V_R = A(xs) = 9.45(1.03) = 9.73$

B = 43,560(9.73) / 0.5(84.99) = 9,974

V = 0.5(9,974)(84.99-24.81) / 43,560 = 6.89 acre-ft, or 300,118 cu-ft

Storm Sewer Storage = 12,530 cu-ft

Pond Storage Required is 300,118 - 12,530 = 287,588 cu-ft

Proposed Pond Design

Airport Ditch F.L. = -3.0°

Existing Grade in Pond Area = 4.0' Set bottom of pond at elevation = -2.0

Set the side water depth at 7.0' with a 1.0' freeboard

Pond Bottom Dimensions: Width = 134', Length = 244'

Pond Volume = $\overline{288,609}$ cu-ft > the required storage of 287,588 cu-ft These calculations show that a pond with bottom dimensions of 134' X 244', a depth of

8.0', and a 3:1 side slope will contain a runoff volume of 288,609 cu-ft with 1.0' freeboard, which is sufficient to contain the post development runoff from the 100 year storm event.

Proposed Outfall Structure for Pond

Using the pre-development peak flow of 24.81 cfs as the design flow for the outfall structure, the pond with the dimensions and storage determined in the preceding section was modeled using Hydrology Studio. A 19.5" orifice along with a 2' rectangular weir for the proposed outfall structure were found to discharge a flow of 25.14 cfs at a pond water elevation of 7.00', which contains the runoff of the 100 year storm event. Please see the attached pond report to verify this statement.

Stanley G. Newsome, Jr., P.E., R.P.L.S. Soutex Surveyors & Engineers 3737 Doctors Drive

Port Arthur, Texas 77642

Office (409) 983.2004



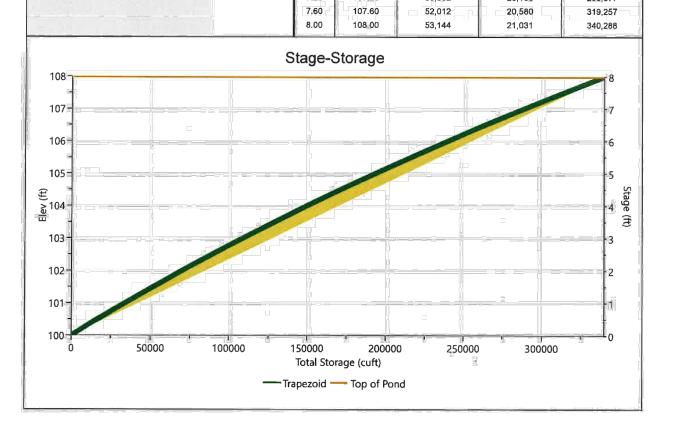
Pond Report

Hydrology Studio v 3.0:0.19 06-29-2021

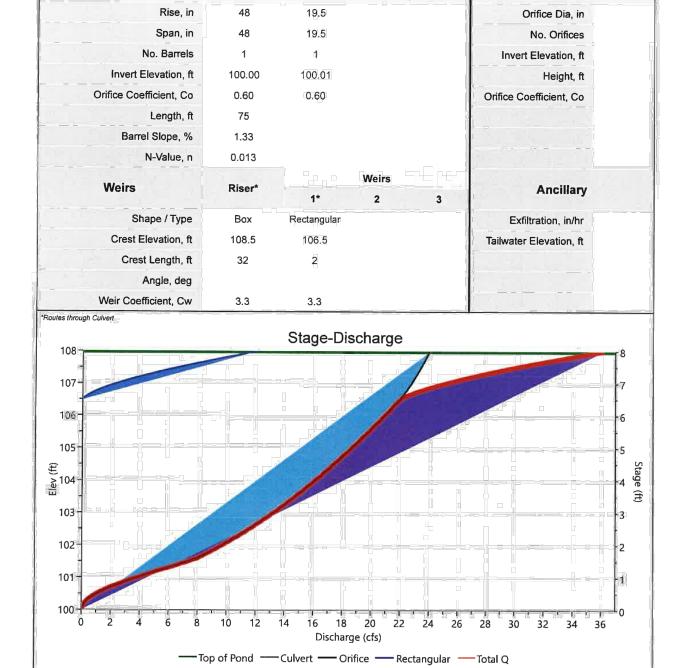
McCoy Pond

Stage-Storage

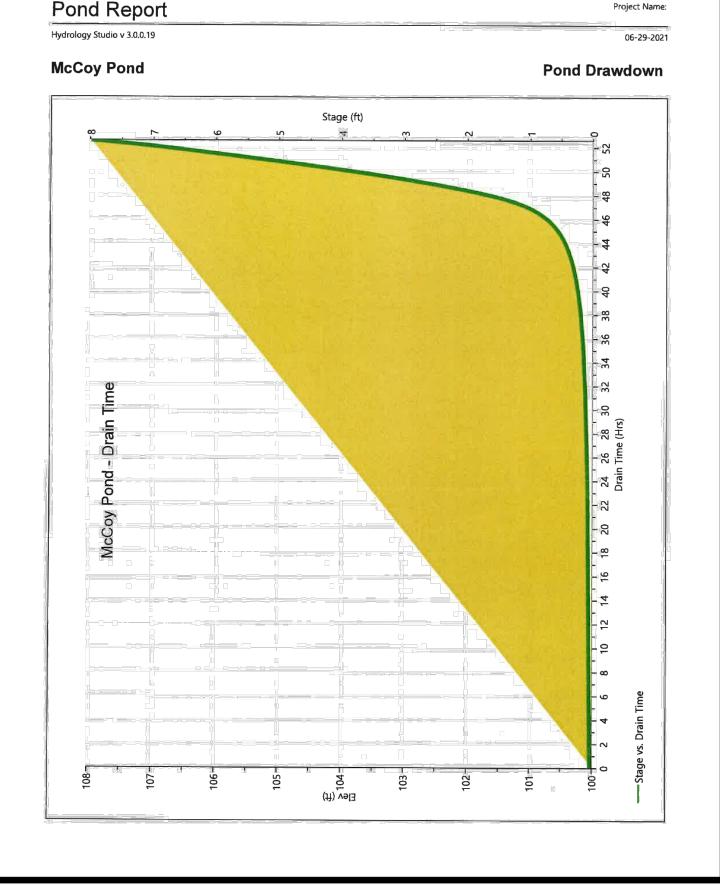
Trapezoid			Stage / Storage Table								
Description	Input	Stage (ft)	Elevation (ft)	Contour Area (sqft)	Incr. Storage (cuft)	Total Storage (cuft)					
Bottom Elevation, ft	100.00										
Bottom Length, ft	134.00	0.00	100.00	32,696 33,609	0.000 13,261	0.000 13,261					
Bottom Width, ft	244.00	0.80	100.80	34,533	13,628	26,889					
		1.20	101.20	35,469	14,000	40,889					
Side Slope, H:1	3.00	1,60	101.60	36,417	14,377	55,266					
Total Depth, ft	8.00	2.00	102.00	37,376	14,758	70,024					
Voids (%)	100.00	2.40	102.40	38,347	15,144	85,168					
	100.00	2.80	102.80	39,329	15,535	100,703					
		3.20	103,20	40,322	15,930	116,633					
		3.60	103.60	41,327		132,962					
		4.00	104,00	42,344	16,734	149,696					
		4.40	104.40	<u> </u>	17,143	166,839					
		4.80	104.80	44,412	17,556	184,395					
		5.20	105.20	45,463	17,975	202,370					
		5,60	105.60	46,526	18,397	220,767					
		6.00	106.00	47,600	18,825	239,592					
		6.40	106.40	48,686	19,257	258,849					
		6.80	106.80	49,783	19,693	278,542					
		7.20	107.20	50,892	20,135	298,677					

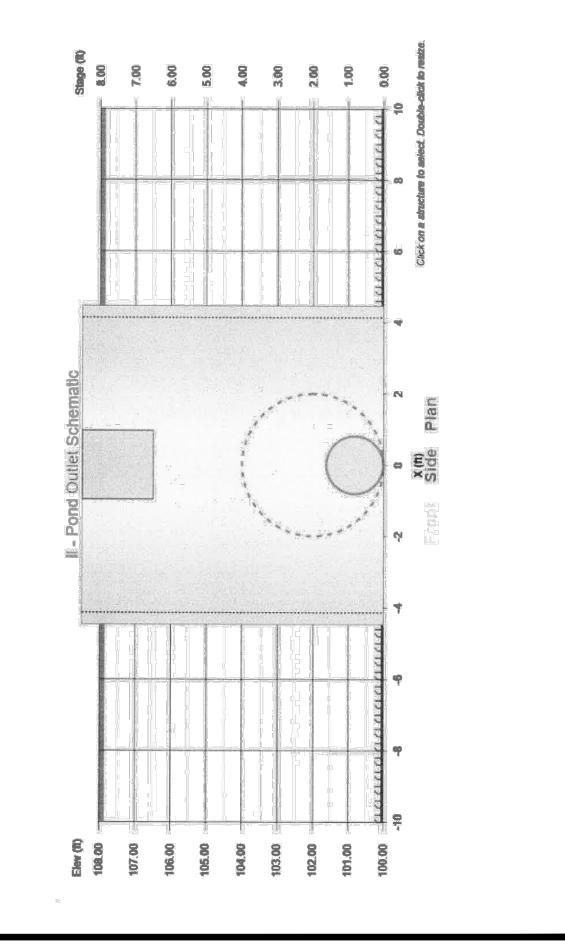


Pond Report Project Name: Hydrology Studio v 3.0.0.19 Stage-Discharge **Orifice Plate**



- 1	Elev. (ft)	Storage (cuft)	Culvert (cfs)		1									
- 1				1	2	3	Riser (cfs)	1	2	3	Pf Riser (cfs)	Exfil (cfs)	User (cfs)	Tota (cfs)
0.40	100.00	0.000	0.000	0:000			0.000	0.000						0.0
- 11	100.40	13,261	0.681 ic	0.681			0.000	0.000						0.6
0.80	100,80	26,889	2,533 ic	2.533			0.000	0.000						2.5
4	101.20	40,889	5.126 ic	5.126			0.000	0.000				,		5.13
- 4	101.60	55,266	7.972 ic	7,972			0,000	0,000		[1		7,9
	102.00	70,024	9.659 ic	9.659			0.000	0.000						9.6
	102,40	85,168	11.17 ic	11.17] }	0,000	0.000				1 3		11.1
	102.80	100,703	12.49 ic	12.49			0.000	0.000						12.4
	103.20	116,633	13,79 ic	13.79	<u> </u>		0,000	0.000						13.7
	103.60 104.00	132,962	14.97 ic	14,97			0.000	0.000			生 " 1			14.9
- 4	104.00	149,696 166,839	16.06 ic	16:06		ĺ	0.000	0.000			- 1	4		16.0
	104.40	184,395	18.13 ic	17.17 18.13			0.000	0,000		1 54	l- I			17.1
	105.20	202,370	19.12 ic	19.12			0.000	0.000			1			18,1
	105.60	220,767	20.01 ic	20.01		Ť	0.000	0.000		4	1			19.1
- II	106.00	239,592	20.88 ic	20.88			0.000	0.000						20.8
- 1	106.40	258,849	21,75 ic	21,75			0.000	0.000			l		: 1	21.7
6.80	106.80	278,542	23.59 ic	22,50			0.000	1.085						
7.20 1	107,20	298,677	26.92 ic	23.05	i i		0.000	3.865	H		1	` I		26.9
7.60	107.60	319,257	31.18 ic	23.56			0.000	7.614			1 - 1		l PA	31.1
8,00 1	108.00	340,288	36.17 ic	24.04			0.000	12.12					1	36.1
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SURVEYORS & ENGINEERS

STANLEY G. NEWSOME, JF 8/2/21 FOR PERMITTING & CONSTRUCTION ARCHITECT HAS REVIEWED THE CONSULTANT'S WORK AND COORDINATED IT WITH THE OVERALL PROJECT

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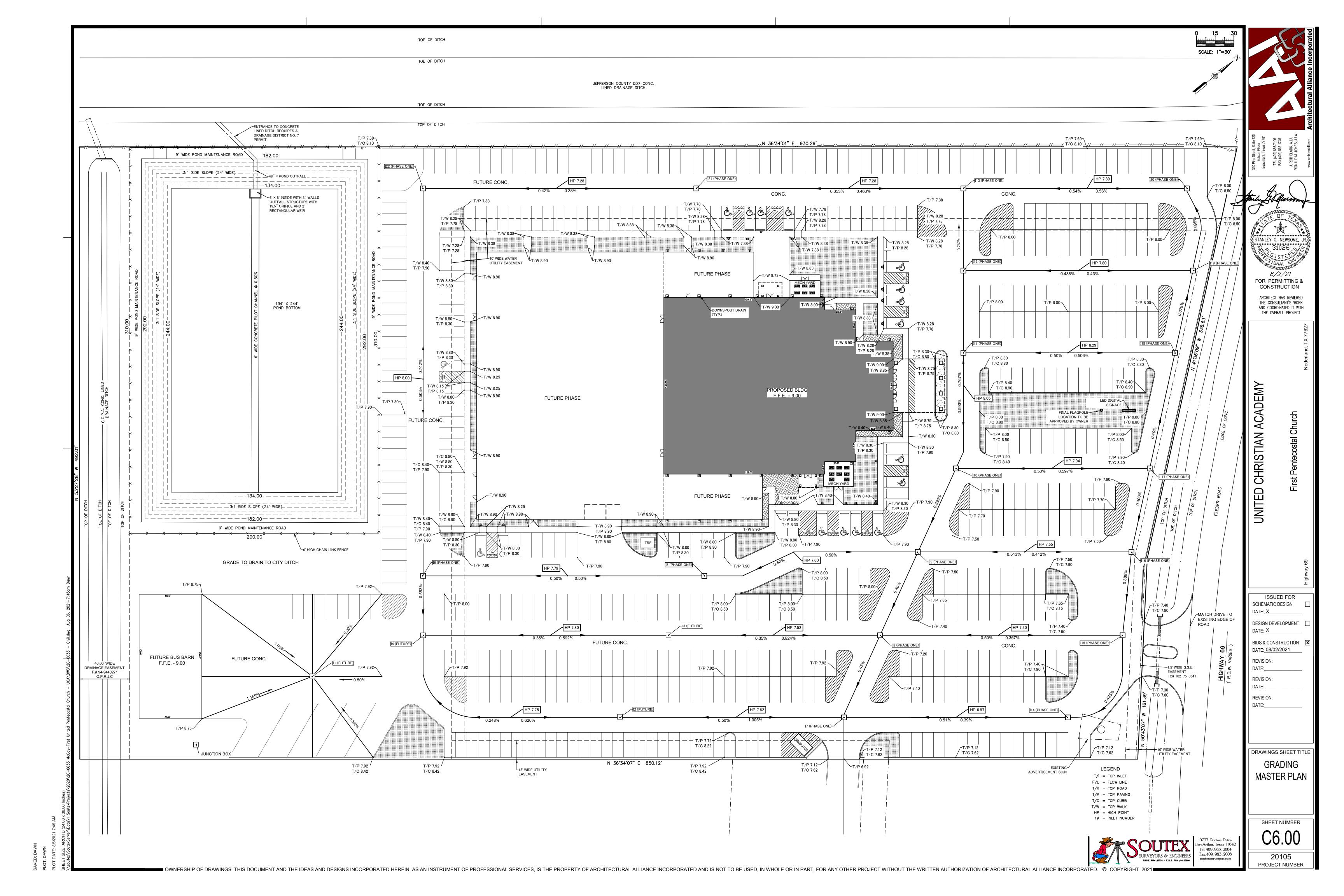
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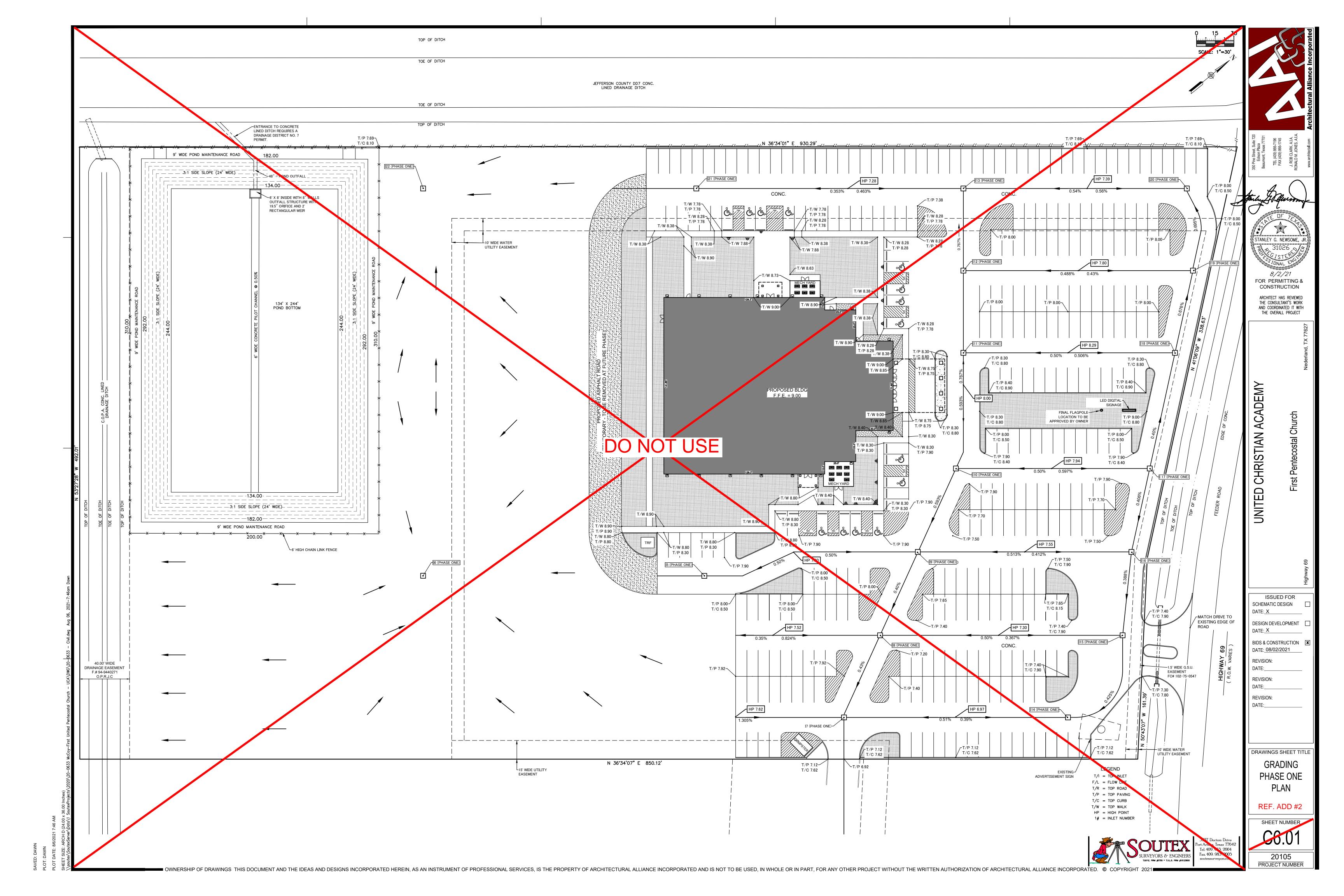
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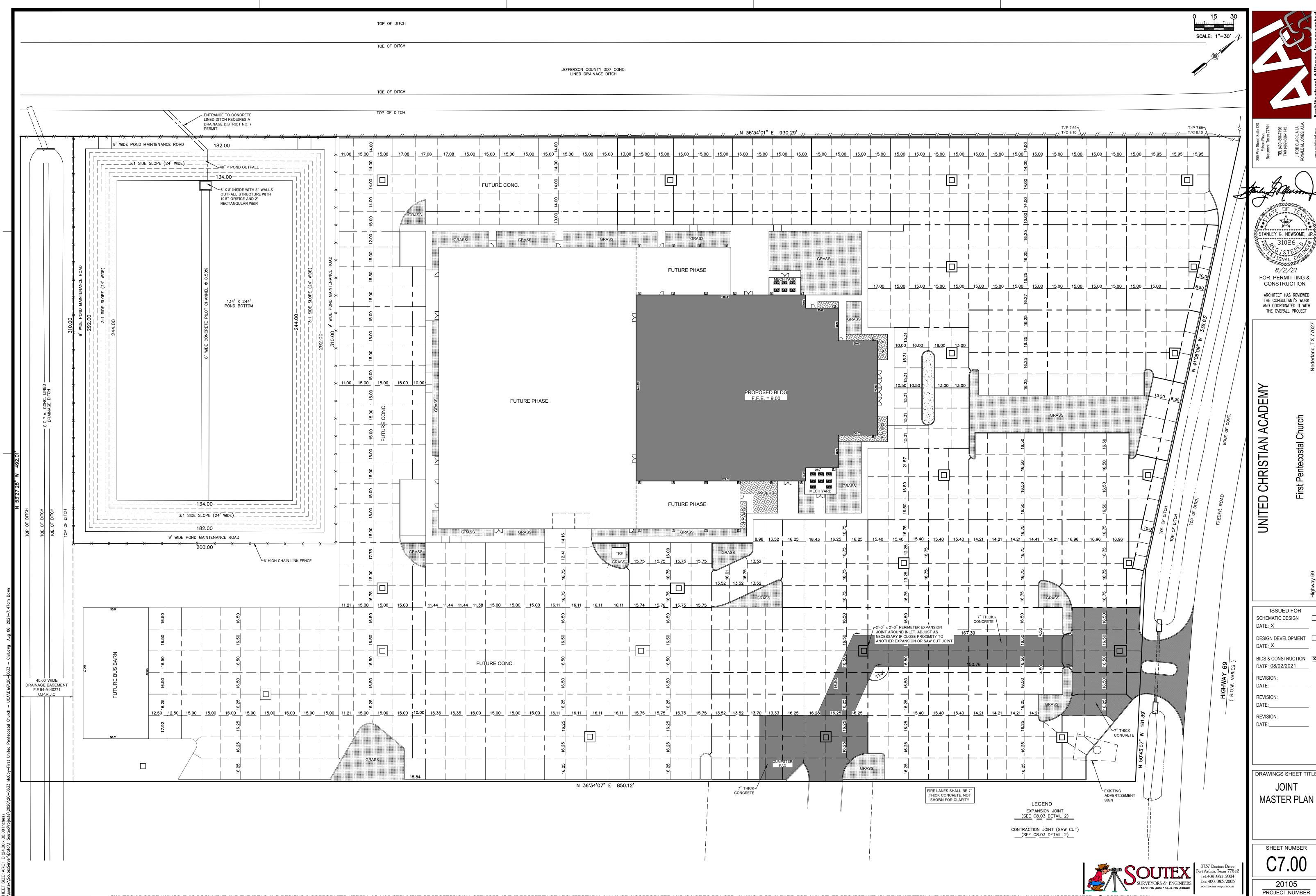
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DRAWINGS SHEET TITL DRAINAGE **CALCULATIONS**

SHEET NUMBER

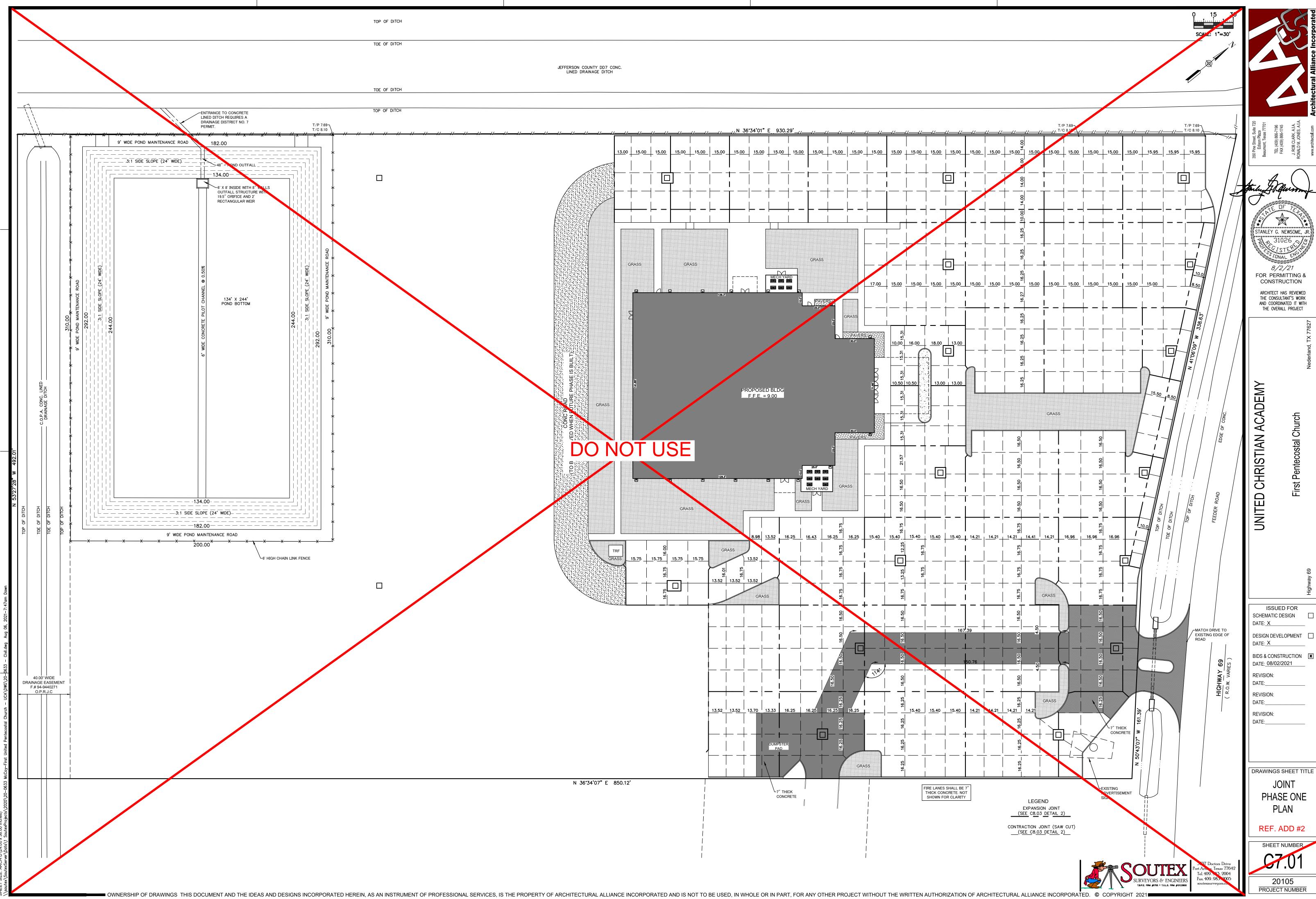




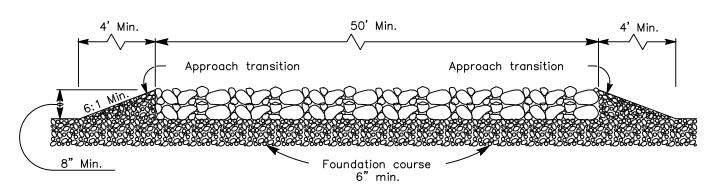


STANLEY G. NEWSOME, JR FOR PERMITTING &

ARCHITECT HAS REVIEWED THE CONSULTANT'S WORK AND COORDINATED IT WITH THE OVERALL PROJECT



PLAN



PROFILE

OVERLAP ENDS TIGHTLY 24" MINIMUM COMPLETELY SURROUND DRAINAGE ACCESS TO SECURE END OF LOG TO STAKE AS DIRECTED AREA DRAIN INLETS WITH EROSION CONTROL -18" TEMP. EROSION CONTROL LOG -DITCH FLOW OF LOG AS NEEDED TO HOLD IN PLACE (TYP)

LOGS PLACED AT AREA DRAIN INLETS

EROSION CONTROL LOG NOTES

- 1. LENGTHS OF EROSION CONTROL LOGS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS REQUIRED FOR THE PURPOSE INTENDED. MAXIMUM LENGTH
- OF LOGS SHALL BE 60' FOR 18" DIAMETER OR 30' FOR 12" DIAMETER LOGS. 2. UNLESS OTHERWISE DIRECTED, USE
- BIODEGRADABLE OR PHOTODEGRADABLE CONTAINMENT MESH ONLY WHERE LOG WILL REMAIN IN PLACE AS PART OF A VEGETATIVE SYSTEM. FOR TEMPORARY INSTALLATIONS,
- USE RECYCLABLE CONTAINMENT MESH. 3. STUFF LOGS WITH SUFFICIENT FILTER MATERIAL TO ACHIEVE DENSITY THAT WILL HOLD SHAPE
- WITHOUT EXCESSIVE DEFORMATION. 4. STAKES SHALL BE 2" X 2" WOOD OR #3 REBAR, 4' LONG, EMBEDDED SUCH THAT
- 2" PROTRUDES ABOVE LOG, OR AS DIRECTED. 5. DO NOT PLACE STAKES THROUGH CONTAINMENT

|4' min. steel or wood posts spaced at 6' to 8'.

Softwood posts shall be 3" min. dia. or nominal 2"x4".

| Hardwood posts shall have a min. cross section of $1.5" \times 1.5"$.

|Fasten fabric to top strand of welded wire mesh (W.W.M.)

| Attach the W.W.M. & fabric on end posts

Place 4" to 6" of fabric against the trench

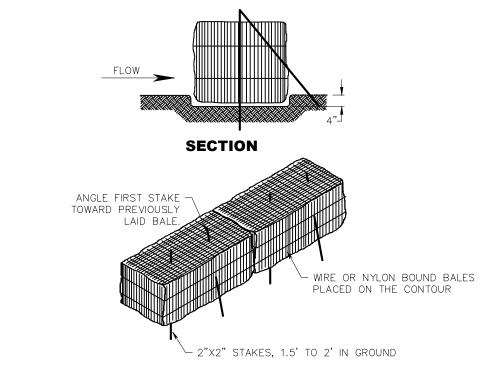
upstream direction. Minimum trench size

shall be 6" square. Backfill and hand tamp.

side and approx. 2" across trench bottom in

using 4 evenly spaced staples for wooden posts (or 4 T-Clips or sewn vertical pockets for steel posts).

by hog rings or cord at a max. spacing of 15".



2 TEMPORARY EROSION CONTROL LOGS NOT TO SCALE

Woven filter

Filter fabric

Backfill & hand tamp.

3' min. width

Connect the ends of

Galv. W.W.M. (12.5 Ga. min.) max. opening size shall be

successive reinforcement sheets or rolls a min. of

6 times with hog rings.

3 TEMPORARY HAY BALE BARRIER NOT TO SCALE

ROCK BERM

INSTALL AS NECESSARY TO PREVENT WASH OUT OF SILT FENCE.

NOTES:

1 CONSTRUCTION EXIT (TYPE 1)

NOT TO SCALE

- 1. USE ONLY OPEN GRADED ROCK (4 to 8") DIAMETER FOR STREAM FLOW CONDITIONS. USE OPEN GRADED ROCK (3 to 5") DIAMETER
- FOR OTHER CONDITIONS. 2. THE ROCK BERM SHALL BE SECURED WITH A WOVEN WIRE SHEATHING HAVING MAXIMUM (1") OPENING AND MINIMUM WIRE DIAMETER OF (20 GAUGE). ROCK BERMS IN CHANNEL APPLICATIONS SHALL BE ANCHORED FIRMLY INTO THE

CROSS SECTION 2

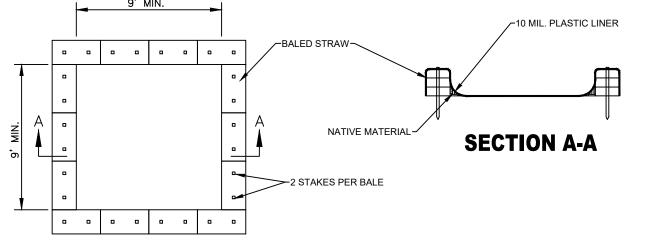
- A MINIMUM OF (6 ") WITH T-POSTS OR WITH (#5 OR #6)
- REBAR, WITH MAXIMUM SPACING APART OF (48") ON CENTER. 3. THE ROCK BERM SHALL BE INSPECTED WEEKLY OR AFTER EACH RAIN, AND THE STONE AND/OR FABRIC CORE-WOVEN SHEATHING SHALL BE REPLACED WHEN THE STRUCTURE CEASES TO FUNCTION AS INTENDED, DUE TO SILT ACCUMULATION AMONG THE ROCKS, WASHOUT, CONSTRUCTION TRAFFIC DAMAGE, ETC.

 4. WHEN SILT REACHES A DEPTH EQUAL TO ONE—THIRD THE HEIGHT OF THE BERM
- (6"), WHICHEVER IS LESS, THE SILT SHALL BE REMOVED AND DISPOSED OF ON AN APPROVED SITE AND IN A MANNER THAT WILL NOT CREATE A SILTATION
- 5. DAILY INSPECTION SHALL BE MADE ON SEVERE-SERVICE ROCK BERMS; SILT SHALL
- REMOVED WHEN ACCUMULATION REACHES (6").
 6. WHEN THE SITE IS COMPLETELY STABILIZED, THE BERM AND ACCUMULATED SILT SHALL BE REMOVED AND DISPOSED OF IN AN APPROVED MANNER. CONCRETE WASHOUT AREA
- MINIMUM AREA IS 10' x 10' WITH 2' DEPTH. PIT TO BE LINED WITH 10 MIL PLASTIC SHEETING.
- PROVIDE A SIGN NOTING THE CONCRETE WASHOUT AREA. 4. THE WASHOUT AREA TO BE CLEANED OUT WHEN 75% OF THE CAPACITY IS
- 5. WHEN AREA IS NO LONGER NEEDED THE MATERIAL IS TO BE REMOVED AND HAULED TO A CONCRETE CRUSHING FACILITY OR PERMITTED LANDFILL.

NOTES: 1. CONTRACTOR TO TAKE EXTRA CARE TO KEEP HWY. 69 ACCESS ROAD CLEAN AND FREE ANY MUD, DEBRIS, ETC. ON THESE ROADS CAUSED BY THIS CONSTRUCTION IS TO BE CLEANED UP AT ONCE. 2. EROSION CONTROL MEASURES TO BE MAINTAINED UNTIL VEGETATION ESTABLISHED @ 75%

SECTION A-A

5 TEMPORARY SEDIMENT CONTROL FENCE



BALE CONFIGURATION PLAN

CONCRETE WASHOUT NOTE: 1. ACTUAL LAYOUT TO BE DETERMINED IN THE FIELD. CONCRETE WASHOUT AREA SHALL BE INSTALLED PRIOR TO ANY CONCRETE PLACEMENT ON SITE.

- 2. STAKES SHALL BE A MINIMUM OF 48" IN LENGTH. STAKES SHALL BE EITHER 2" X 2" WOOD, 2.5 DIA. SCH. 40
- STARES SHALL BE A MINIMOM OF 46 IN LENGTH. STARES SHALL BE EITHER 2 X 2 WOOD, 2.5 DIA. SCH. 40 STEEL POSTS, OR STANDARD STEEL "I" OR "U" POSTS.

 3. SIGNS SHALL BE PLACED AT THE CONSTRUCTION ENTRANCE, AT THE WASHOUT AREA, AND ELSEWHERE AS NECESSARY TO CLEARLY INDICATED THE LOCATION OF THE CONCRETE WASHOUT AREA TO OPERATORS OF CONCRETE TRUCKS.

 4. TEMPORARY CONCRETE WASHOUT FACILITIES SHALL BE MAINTAINED TO PROVIDE ADEQUATE HOLDING CAPACITY WITH A MINIMUM FREEBOARD OF FOUR (4) INCHES.

 5. WASHOUT FACILITIES MUST BE CLEANED, OR NEW FACILITIES CONSTRUCTED AND READY FOR USE ONCE THE WASHOUT AREA IS 75% FILL!
- WASHOUT AREA IS 75% FULL.

3737 Doctors Drive Port Arthur, Texas 77642 6 CONCRETE WASHOUT DETAIL Tel. 409. 983. 2004 Fax. 409.983.2005 SURVEYORS & ENGINEERS

STANLEY G. NEWSOME, J 8/2/21 FOR PERMITTING & CONSTRUCTION

ARCHITECT HAS REVIEWED THE CONSULTANT'S WORK AND COORDINATED IT WITH THE OVERALL PROJECT

ACADEMY RISTIAN,

ISSUED FOR SCHEMATIC DESIGN DATE: X DESIGN DEVELOPMENT DATE: X BIDS & CONSTRUCTION X DATE: 08/02/2021

REVISION: DATE:_ REVISION: DATE:_

REVISION: DATE:_

> DRAWINGS SHEET TITL **DETAILS EROSION** CONTROL

> > SHEET NUMBER

20105 PROJECT NUMBER

4 ROCK BERM

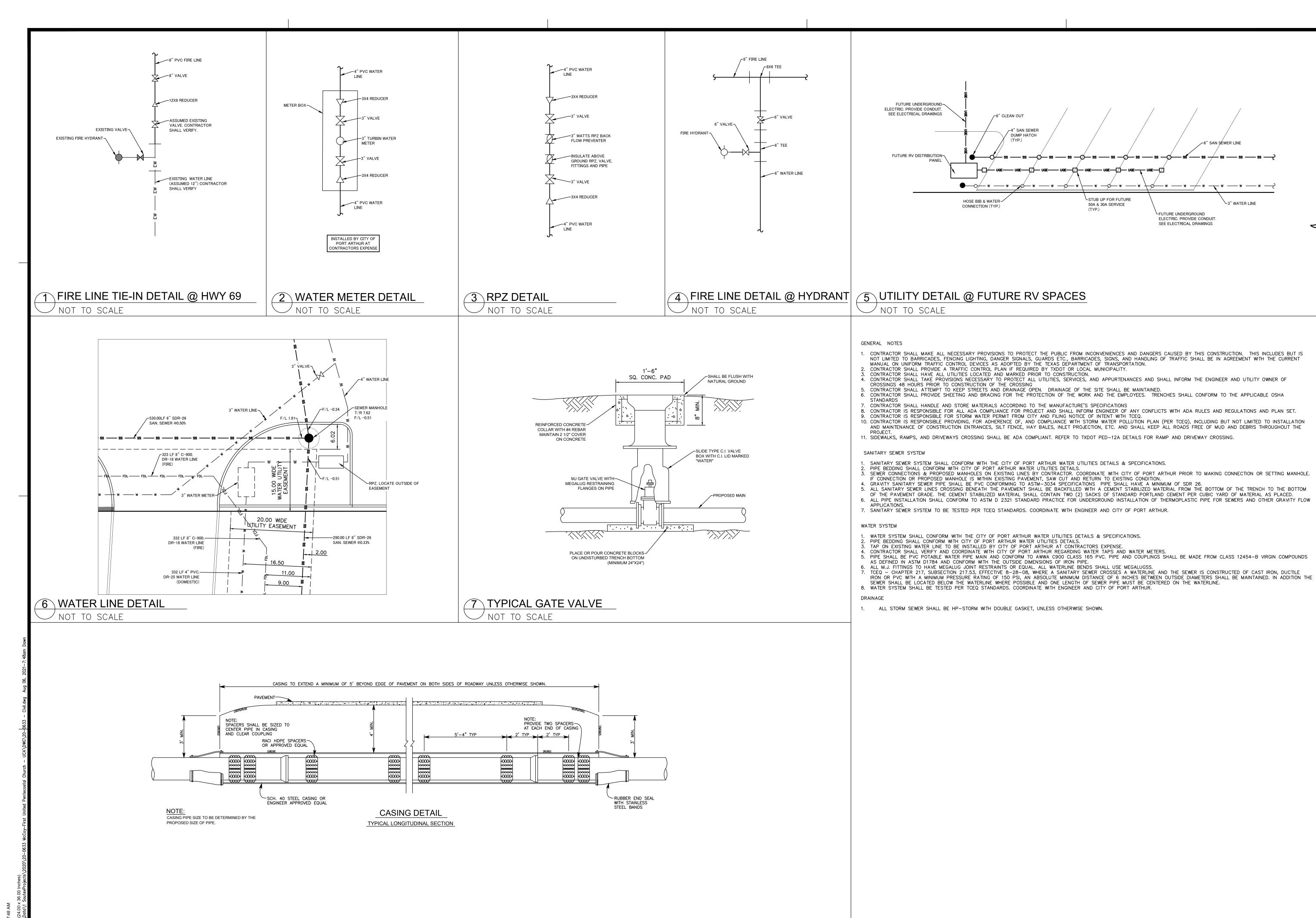
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NOT TO SCALE

/ NOT TO SCALE

Embed posts 18" min.

or anchor if in rock.



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SURVEYORS & ENGINEERS

8 SITE & UTILITY NOTES

Tel. 409. 983. 2004 Fax. 409.983.2005

20105 PROJECT NUMBER

SHEET NUMBER

STANLEY G. NEWSOME,

8/2/21

FOR PERMITTING & CONSTRUCTION

ARCHITECT HAS REVIEWED THE CONSULTANT'S WORK AND COORDINATED IT WITH THE OVERALL PROJECT

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DATE: 08/02/2021

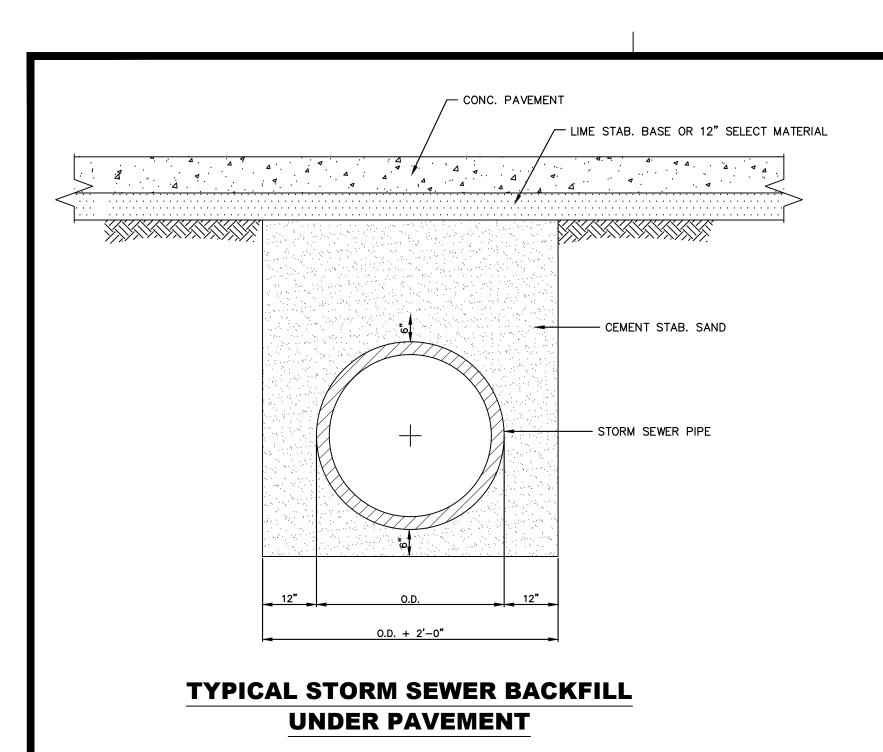
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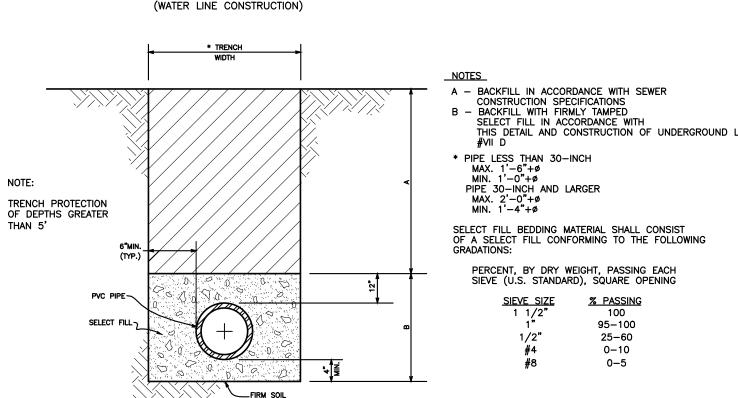
CLASS "A" BEDDING

(FOR USE WITH STORM SEWER PIPE)

TRENCH PROTECTION OF DEPTHS GREATER THAN 5' NOTES FOR CLASS "C" BEDDING

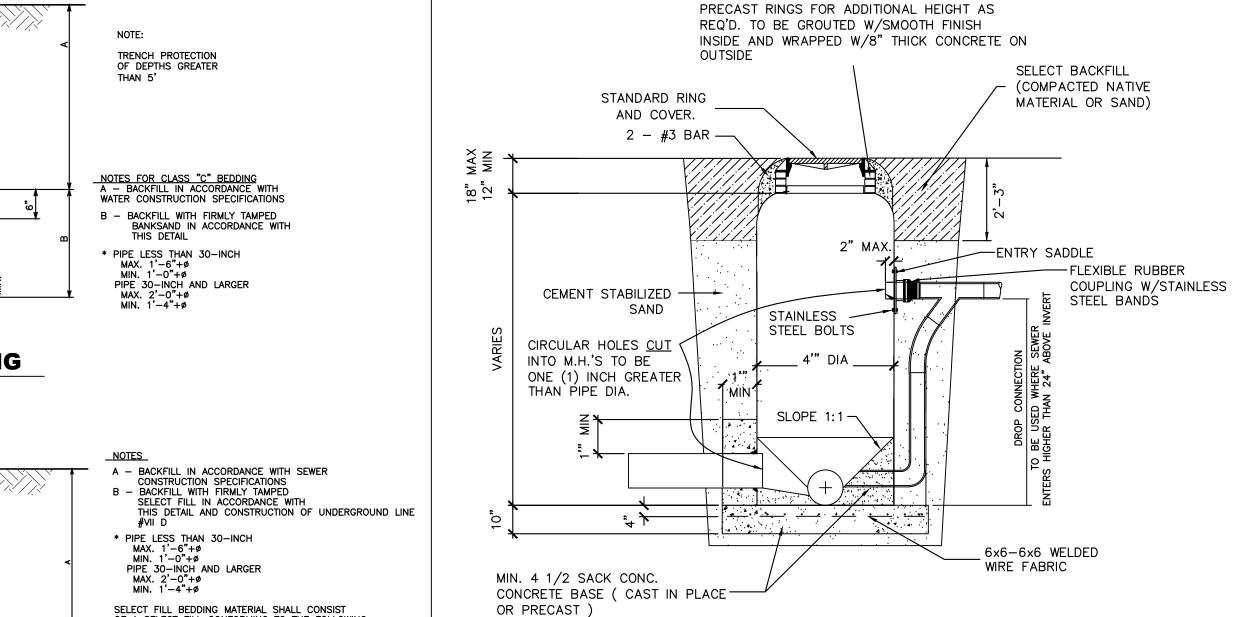
A - BACKFILL IN ACCORDANCE WITH WATER CONSTRUCTION SPECIFICATIONS B — BACKFILL WITH FIRMLY TAMPED BANKSAND IN ACCORDANCE WITH THIS DETAIL __BANKSAND-* PIPE LESS THAN 30-INCH MAX. 1'-6"+Ø MIN. 1'-0"+Ø PIPE 30-INCH AND LARGER MAX. 2'-0"+Ø MIN. 1'-4"+Ø FIRM SOIL AT GRADE

CLASS "C" BEDDING (WATER LINE CONSTRUCTION)



CLASS "B" BEDDING

(FOR USE WITH SAN SEWER PIPE)



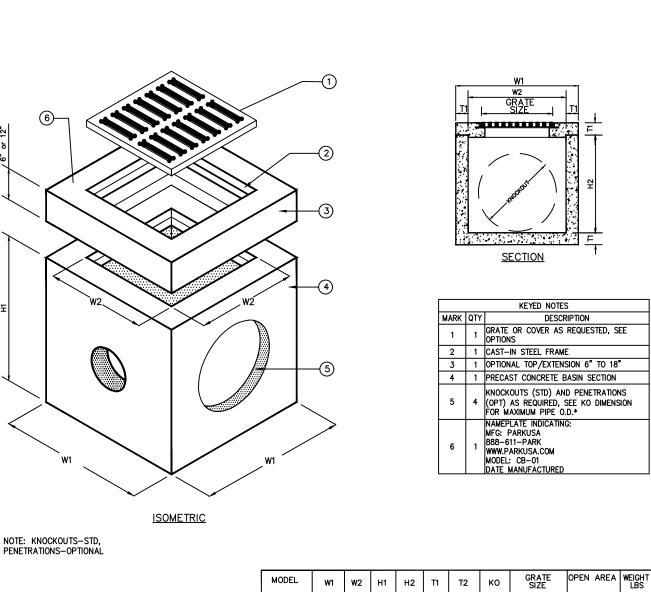
D3753-79 (STANDARD SPECIFICATION FOR GLASS FIBER-REINFORCED POLYESTER MANHOLES) ALL MANHOLES SUPPLIED WITH CONES SHALL BE

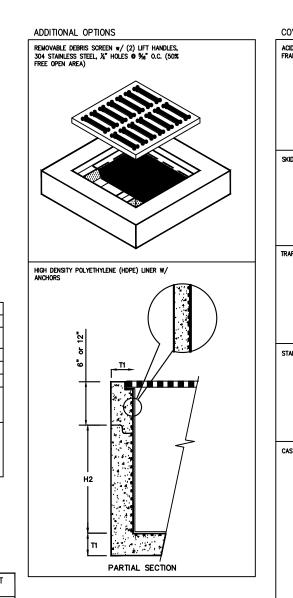
CERTIFIED TO COMPLY WITH ANSI/ASTM INSTALLATION SHALL BE COMPLY WITH MANUFACTURES RECOMMENDED INSTALLATION INSTRUCTIONS

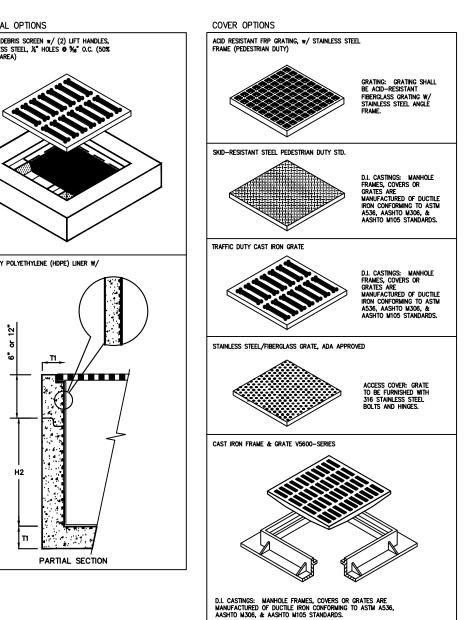
(SEWER 24" O.D. AND SMALLER) FIBERGLASS MANHOLE STIFFNESS - THICKNESS DEPTH 3'-6' 7'-12' 13'-20' 21'-25' NOMINAL .25 WALL .48 THICKNESS 1.26 3.02 STIFFNESS .72 F/AY PSI (4.96) (8.96) (13.86) (20.82)

PIPE BEDDING

NOT TO SCALE







<u>NOTE</u>

1. USE FOR ALL STORM SEWERS.

TO 90% PROCTOR DENSITY

NOTES FOR CLASS "A" BEDDING

A - CEMENT-STABILIZED SAND PLACED

2. USE CEMENT-STABILIZED SAND BACKFILL

IN AREAS "C" AND "D" WHEN CALLED

FOR IN PLANS OR TECHNICAL SPECS.

COMPACT CEMENT-STABILIZED SAND

BEFORE PIPE IS LAID UP TO FLOW

LINE OF PIPE OR MINIMUM DEPTH

B - CEMENT-STABILIZED SAND, THOROUGHLY

COMPACTED IN PLACE AFTER PIPE IS

SAND SHALL BE USED IN THIS ZONE

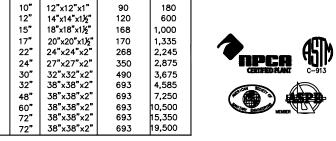
WHEN IT IS REQUIRED TO BE USED

D - 60/40 SELECT FILL PLACED NEXT DAY (OR LATER) AFTER PIPE IS LAID.

IN ZONE "D".

C - 60/40 SELECT FILL PLACED SAME DAY AS PIPE IS LAID. CEMENT STABILIZED







CLASS I/II CONCRETE WITH OF DESIGN STRENGTH OF 4500 PSI AT 28 DAYS. UNIT IS OF MONOLITHIC CONSTRUCTION AT FLOOR AND FIRST STAGE OF WALL WITH SECTIONAL RISER TO REQUIRED DEPTH.

10" 12"x12"x1" 12" 14"x14"x1½" 15" 18"x18"x1½"

GRADE 60 REINFORCED. STEEL REBAR CONFORMING TO ASTM A615 ON REQUIRED CENTERS OR EQUAL. REINFORCEMENT:

CAST IRON FRAMES AND GRATES ARE MANUFACTURED OF GREY CAST IRON CONFORMING TO ASTM A48-76 CLASS 30. C.I. CASTINGS:



NOT TO SCALE

2 FIBERGLASS MANHOLE

ISSUED FOR SCHEMATIC DESIGN DATE: X DESIGN DEVELOPMENT DATE: X

STANLEY G. NEWSOME, JF

8/2/21

FOR PERMITTING &

CONSTRUCTION

ARCHITECT HAS REVIEWED

THE CONSULTANT'S WORK

AND COORDINATED IT WITH

THE OVERALL PROJECT

ACADEMY

RISTIAN

BIDS & CONSTRUCTION X DATE: 08/02/2021 REVISION:

DATE:_ REVISION: DATE:_ REVISION:

DATE:_

DRAWINGS SHEET TITL **DETAILS** UTILITY

SHEET NUMBER

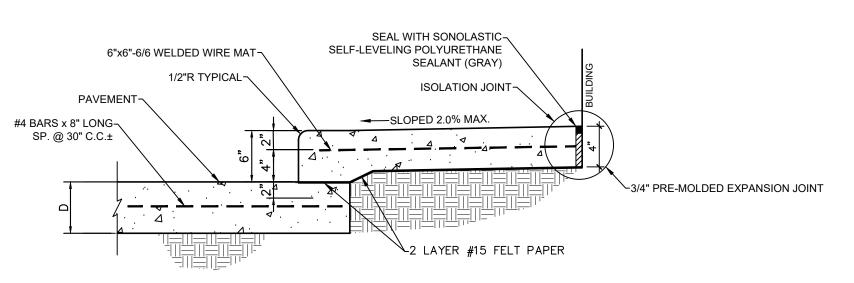
20105 PROJECT NUMBER

3 CATCH BASIN

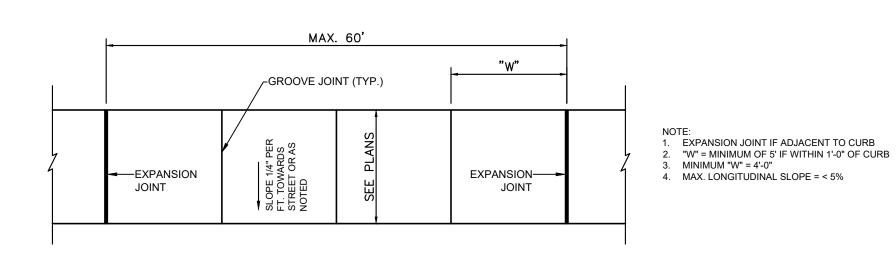
INLET PIPING FROM UPLINE BASINS

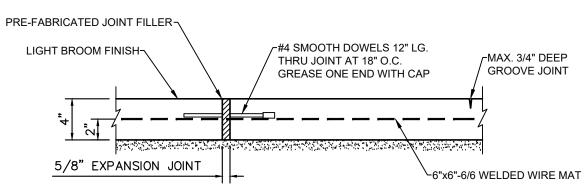
3737 Doctors Drive Port Arthur, Texas 77642 Tel. 409. 983. 2004 Fax. 409.983.2005 soutexsurveyors.com SURVEYORS & ENGINEERS

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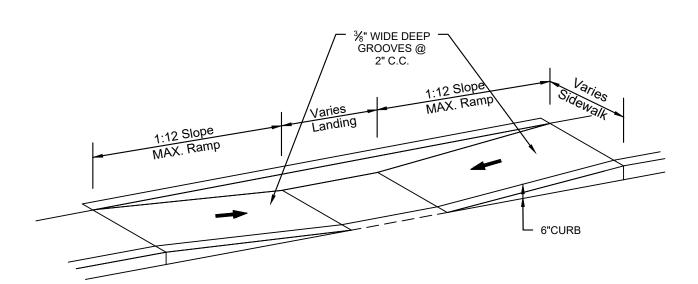


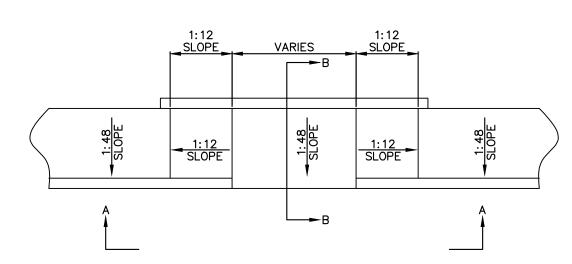
CURB TO SIDEWALK DETAIL



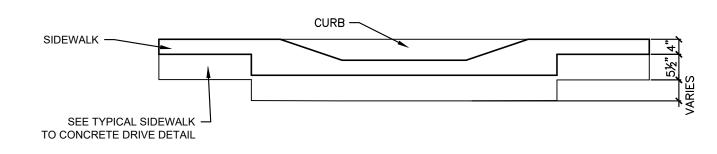


SIDEWALK DETAIL

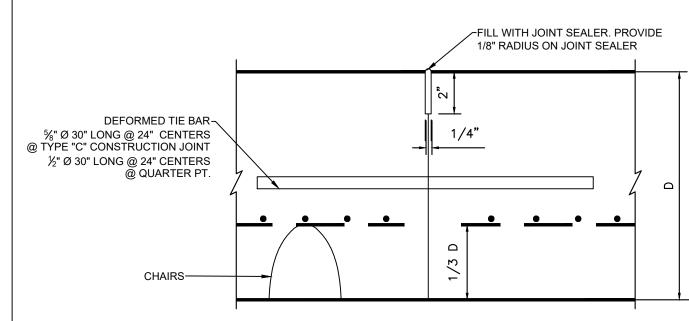




PARALLEL CURB RAMP

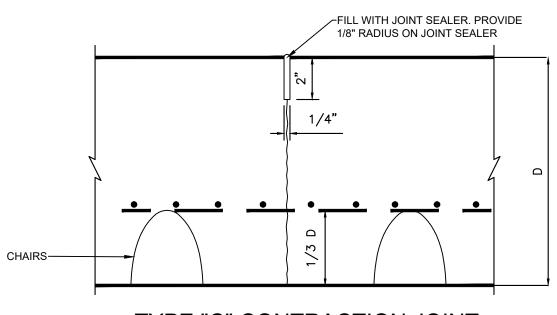


AA. PARALLEL CURB RAMP DETAIL



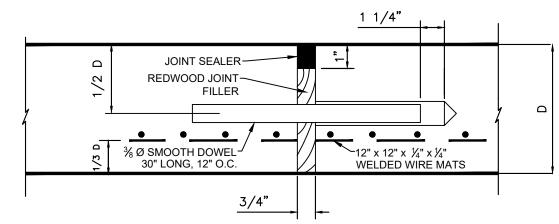
TYPE "E" CONSTRUCTION JOINT

NOTE: ONLY USE WITH AUTHORIZATION OF ENGINEER



TYPE "C" CONTRACTION JOINT

(SAW CUT)



TYPE "B" EXPANSION JOINT

2 JOINT DETAILS

NOT TO SCALE

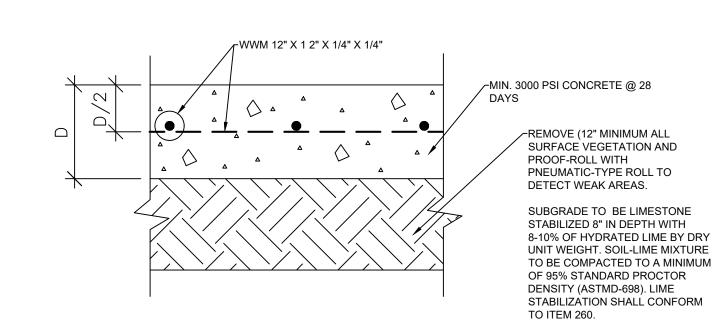
SILICON SEALANT.

2 NOTES

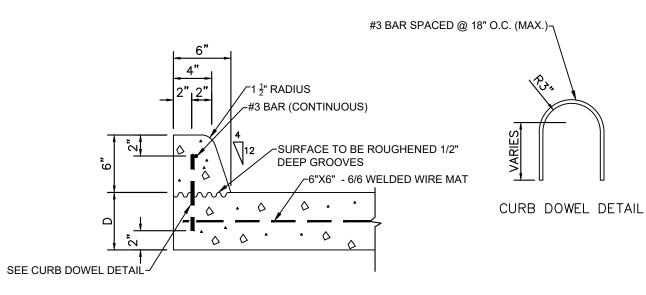
/ NOT TO SCALE

CONTRACTOR SHALL REVIEW SOILS REPORT PRIOR TO CONSTRUCTION.

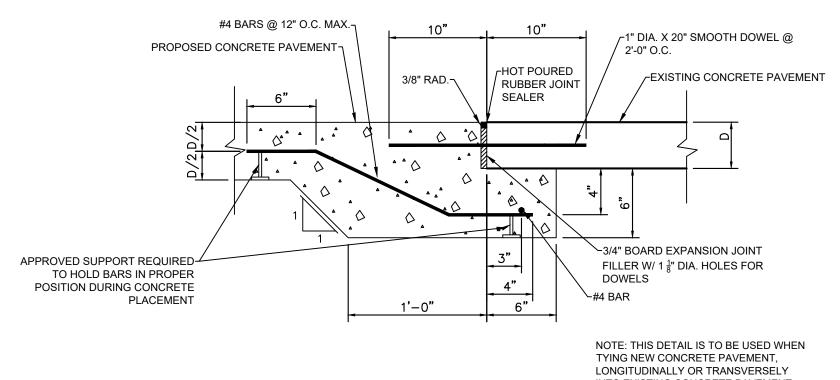
- ANY REQUIRED SELECT FILL TO BE PLACED IN 8" THICK LIFTS MAXIMUM. ALL CONCRETE TO BE 3000 PSI @ 28 DAY STRENGTH. 4. MAKE 3 TEST CYLINDERS EVERY 50 CY. BREAK AT 7 DAY, 14 DAY, AND 28
- DAY PLUS SPARE. 5. CURING COMPOUND TO BE USED AND FOLLOW MANUFACTURES
- DIRECTIONS.
- 6. BROOM FINISH FOR NON SLIP SURFACE.
- 7. THE CONTRACTOR IS RESPONSIBLE FOR ALL SUBGRADE AND CONCRETE LAB TESTING IN ACCORDANCE WITH CITY OF PORT ARTHUR STANDARDS AND SPECIFICATIONS.
- 8. PAVING MATS ARE RECOMMENDED (12' X 12" X 1/4"). CHAIRS WILL BE REQUIRED IN A QUANTITY TO INSURE THE MATS ARE IN THE MIDDLE OF
- THE PAVEMENT. 9. ENTRY DRIVE SHALL BE CONSTRUCTED TO CITY OF PORT ARTHUR/TXDOT STANDARDS AND SPECIFICATIONS. CONTRACTOR SHALL KEEP ENGINEER UP TO DATE OF ALL CONSTRUCTION AND SHALL CONTACT THE ENGINEER
- MIN. 24 HOURS IN ADVANCE OF CONCRETE POURS FOR INSPECTIONS. 10. EXPANSION JOINTS TO BE CLEAR HEART REDWOOD AND NOT TREATED
- 11. ALL JOINTS TO BE SEALED WITH CLASS 5 LOW MODULUS (SELF LEVELING)
- 12. THE AREA AT THE DUMPSTER OR WITH HEAVY TRUCK TRAFFIC TO BE 7" THICK. SEE SHEET C7.00 - JOINT MASTER PLAN & C7.01 - JOINT PHASE ONE



CONCRETE PAVEMENT DETAIL



STANDARD CURB FOR REINFORCED CONCRETE **PAVEMENT**



INTO EXISTING CONCRETE PAVEMENT. PAVEMENT TRANSITION

 $D = 5 \frac{1}{2}$ Concrete thickness (parking stalls) D = 7" CONCRETE THICKNESS (DRIVES, FIRE LANES & DUMPSTER)

(NEW CONCRETE TO EXIST. CONCRETE)

GEOTECHINICAL REPORT PREPARED BY SCIENCE ENGINEERING, LTD. REPORT NO. 16201, DATED AUG. 2016 IF DETAILS DIFFER FROM ENGINEERING REPORT CONTACT SOUTEX FOR CLARIFICATION.

2 PAVING DETAILS

NOT TO SCALE

Tel. 409.983.2004 Fax. 409.983.2005 soutexsurveyors.com SURVEYORS & ENGINEERS

STANLEY G. NEWSOME, J 8/2/21 FOR PERMITTING &

CONSTRUCTION ARCHITECT HAS REVIEWED THE CONSULTANT'S WORK AND COORDINATED IT WITH THE OVERALL PROJECT

ACADEMY

RISTIAN

CHR

UNITED

ISSUED FOR SCHEMATIC DESIGN DATE: X DESIGN DEVELOPMENT

DATE: X BIDS & CONSTRUCTION X DATE: 08/02/2021

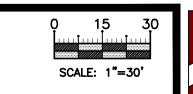
REVISION: DATE:___ REVISION: DATE:__

REVISION: DATE:

DRAWINGS SHEET TITL

DETAILS PAVING & **SIDEWALK**

SHEET NUMBER



STORM SEWER	LENGTH (FEET)	Q (CFS	DIAMETER (INCHES)	K	$S(\frac{Q}{K})^2$ $SLOPE^{***}$	$\frac{2}{A} = V$ VELOCITY (FDS)
1-A	108	9.21	18	114	0.0065	5.20
2-A	73	9.21	18	114	0.0065	5.20
1-BC	168	3.24	18	114	0.0008	1.83
2-BC	193	3.38	18	114	0.0009	1.91
3-BC	48	10.90	24	244	0.0020	3.47
4-BC	222	9.31	24	244	0.0015	2.96
5-BC	140	27.61	30	444	0.0039	5.62
6-BC	215	62.00	48	1556	0.0016	4.93
7-BC	85	69.04	48	1556	0.0020	5.49
1-D ***	40	4.47	24	244	0.0020	2.21
2-D	70	13.08	24	244	0.0029	4.17
3-D	75	16.51	24	244	0.0046	5.26
4-D	75	20.12	30	444	0.0021	4.09
5-D	95	24.53	36	722	0.0012	3.47
6-D	65	28.44	36	722	0.0016	4.02
7-D	65	31.77	36	722	0.0019	4.49
8-D	215	50.20	42	1090	0.0021	5.22
1-E	78	2.65	18	114	0.0005	1.50
2-E	65	4.75	18	114	0.0012	2.63
3-E	67	6.72	18	114	0.0035	5.74
4-E	95	8.75	24	244	0.0013	2.79
5-E	70	10.74	24	244	0.0019	3.41
6-E	67	12.74	24	244	0.0027	4.05
7-E	180	14.85	24	244	0.0037	4.73

STANLEY G. NEWSOME, JF 8/2/21

FOR PERMITTING & CONSTRUCTION ARCHITECT HAS REVIEWED THE CONSULTANT'S WORK AND COORDINATED IT WITH THE OVERALL PROJECT

CHRISTIAN ACADEMY

UNITED

ISSUED FOR SCHEMATIC DESIGN DESIGN DEVELOPMENT

DATE:_ BIDS & CONSTRUCTION X DATE: 08/02/2021 REVISION:

DATE:__ REVISION: DATE:__

REVISION: DATE:__

> DRAWINGS SHEET TITL **DETAILS**

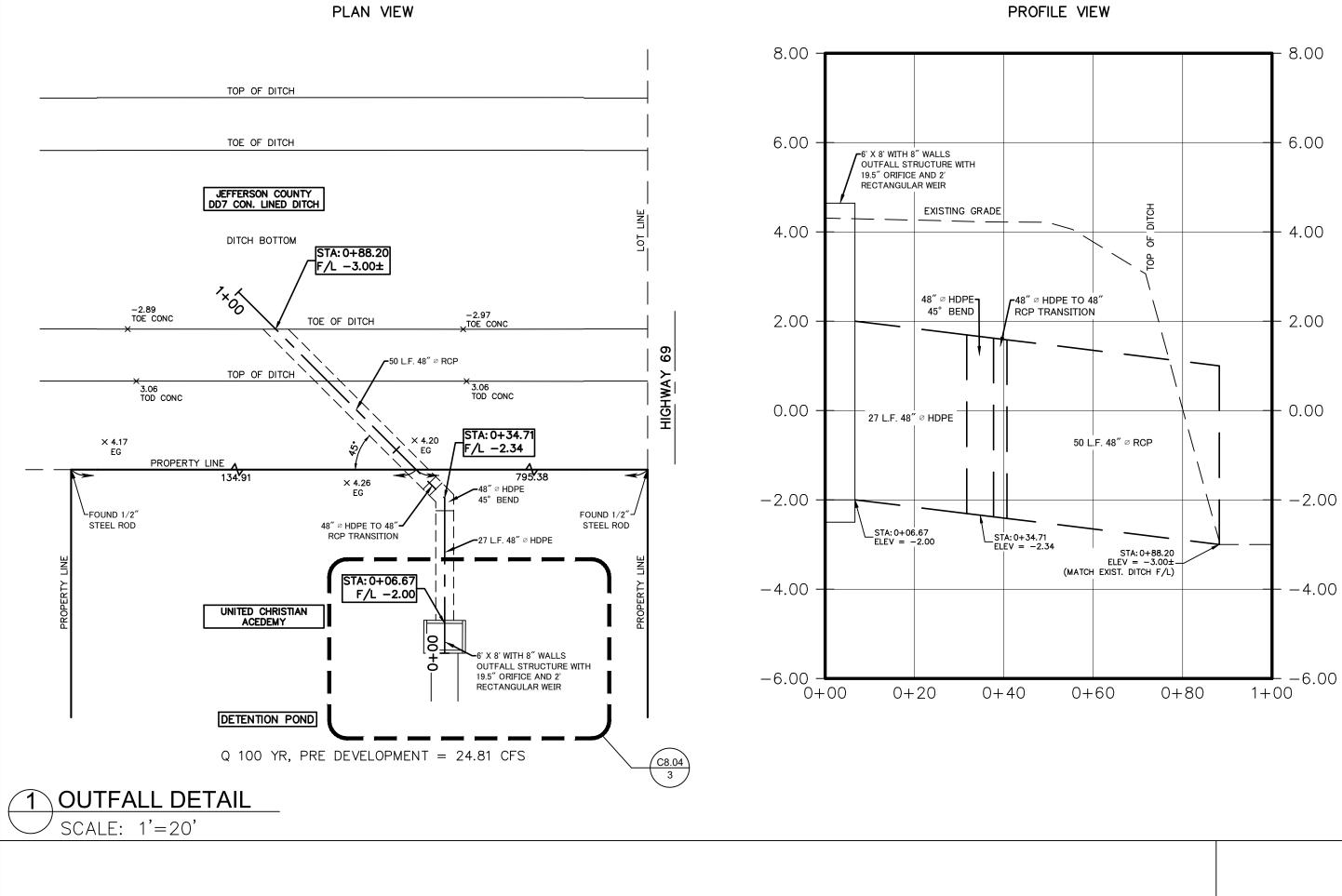
POND

SHEET NUMBER

20105
PROJECT NUMBER

6 PILOT CHANNEL DETAIL

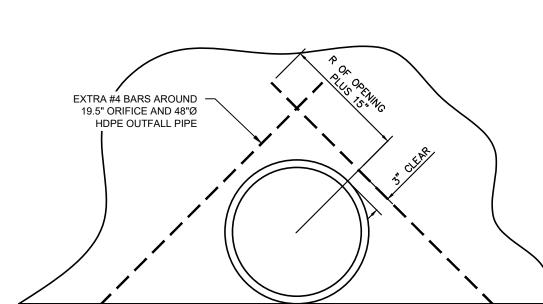




ELEV = 6.00 (5.50 @ EXTREME EVENT POND ON SHEET CX.XX FOR LOCATION) ELEV = -2.00 — 24'-0" (3:1 SLOPE) 9' WIDE ROADWAY POND BOTTOM

PILOT CHANNEL /- 48"Ø HDPE POND BOTTOM

3 OUTFALL STRUCTURE DETAIL
NOT TO SCALE



4 EXTRA ENFORCEMENT AROUND PIPE

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5 OUTFALL STRUCTURE SECTION

#4 BARS 12" C.C. EACH WAY

#4 BARS 12" C.C.EACH WAY, EACH FACE

SECTION A-A

* MINIMUM PIPE SIZE -= 18"

** MINIMUM SLOPE = 0.001

***FUTURE FLOW FROM AIRPORT BUSINESS PARK

2 HYDRAULICS CALCULATIONS

— #4 BARS 12" C.C. EACH WAY, EACH FACE

NOT TO SCALE

#4 BARS 12" C.C. EACH WAY -

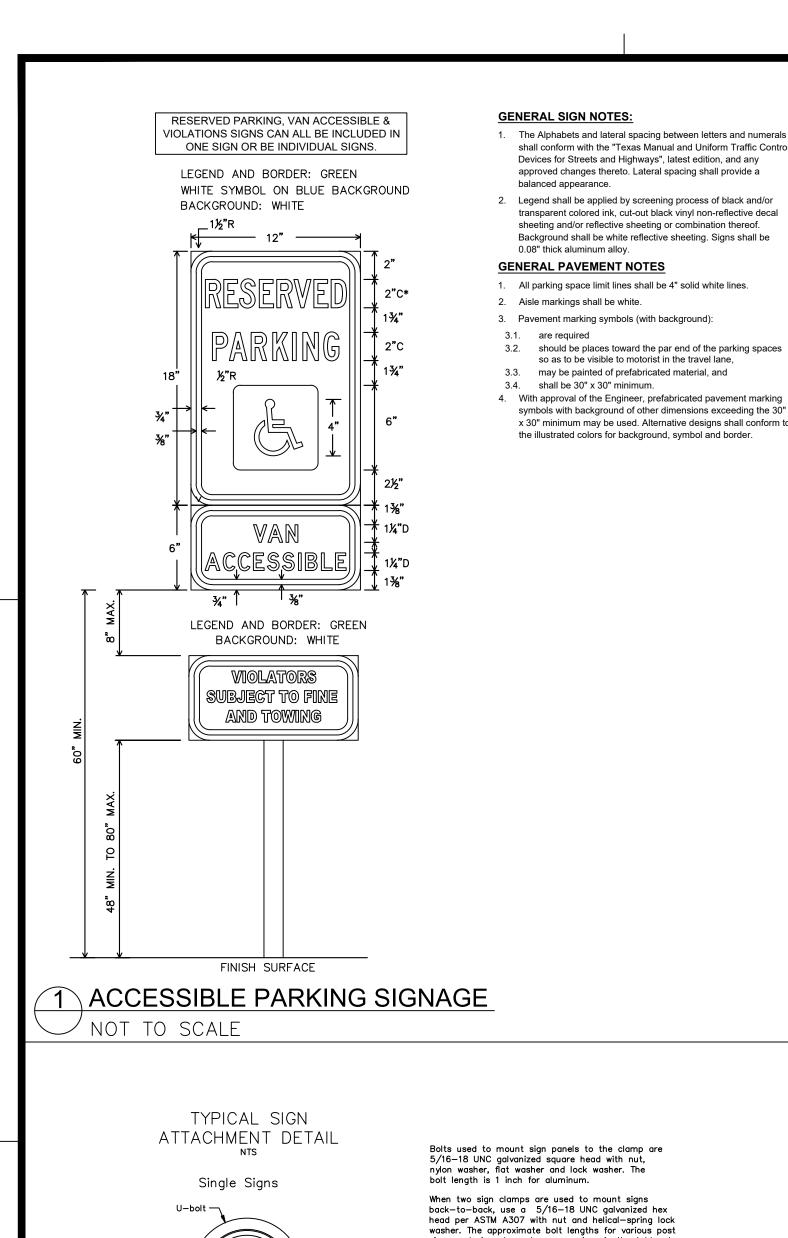
#4 BARS 24" C.C.

3'-0"

3'-0"

1'-4 1/2" 1'-4 1/2" 1'-4 1/2" 1'-4 1/2"

4 - #4 BARS 1'-10" C.C.
 CONTINUOUS



ACCESSIBLE PARKING SPACES & ACCESS transparent colored ink, cut-out black vinyl non-reflective decal AISLES SHALL NOT SLOPE GREATER THAN sheeting and/or reflective sheeting or combination thereof. 1:48 IN ANY DIRECTION Background shall be white reflective sheeting. Signs shall be BACK OF CURB . All parking space limit lines shall be 4" solid white lines. OR EDGE OF SIDEWALK 3.2. should be places toward the par end of the parking spaces 4. With approval of the Engineer, prefabricated pavement marking symbols with background of other dimensions exceeding the 30" x 30" minimum may be used. Alternative designs shall conform to the illustrated colors for background, symbol and border. 1' Typical *11' min *9' min OPTION ONE

OPTION

* NOTE: REFERENCE SITE PLAN FOR ACTUAL DIMENSIONS

Symbol Only symbol: blue or white TYPICAL ACCESSIBLE PARKING

SPACE DIMENSIONS

PARKING

TEXAS ACCESSIBILITY STANDARDS - CHAPTER 68 ADMINISTRATIVE

608.104 Accessible Parking Spaces

(a) A paved accessible parking space must include:

(1) the International Symbol of Accessibility painted conspicuously on the surface in a color that contrast the pavement.

(2) the words "NO PARKING" painted on any access aisle adjacent to the parking space. The words must be painted: in all capital letters;

with a letter height of at least 12" and a stroke width of at least 2"; and

centered within each access aisle adjacent to the parking space; and (3) A sign identifying the consequences of parking illegally in a paved accessible parking space.

at a minimum state "Violators Subject to Fine and Towing" in a letter height of at least 1";

be mounted on a pole, post, wall or freestanding board;

be no more than 8" below a sign required by Texas Accessibility Standards and be installed so that the bottom edge of the sign is no lower than 48" and no higher than

80" above ground level. (b) A parking space identification sign that complies with Texas Accessibility Standards, 502.6,

that includes the requirements in subsection (a)(3)(A) satisfies subsection (a)(3). TEXAS ACCESSIBILITY STANDARDS, CHAPTER 502 PARKING SPACES

502.1 General. Car and van parking spaces shall comply with 502. Where parking spaces are marked with lines, width measurements of parking spaces and access aisles shall be made from the Exception: Where parking spaces or access aisles are not adjacent to another parking space

or access aisle, measurements shall be permitted to include the full width of the line defining the parking space or access aisle. 502.2 Vehicle Spaces. Car parking spaces shall be 96" wide minimum and van parking spaces shall

be 132" wide minimum, shall be marked to define width, and shall have an adjacent access aisle complying with 502.3. Exception: Van parking spaces shall be permitted to be 96" wide minimum where the access

aisle is 96" wide minimum. 502.3 Access Aisle. Access aisles serving parking spaces shall comply with 502.3. Access aisles shall adjoin an accessible route. Two parking spaces shall be permitted to share a common access

502.3.1 Width. Access aisles serving car and can parking spaces shall be 60" wide.

502.3.2 Length. Access aisles shall extend the full length of the parking spaces they serve.

502.3.3 Marking. Access shall be marked so as to discourage parking in them. 502.3.4 Location. Access aisles shall not overlap the vehicular way. Access aisles shall be permitted

to be placed on either side of the parking space except for angled van parking spaces which shall have access aisles located on the passenger side of the parking spaces.

502.4 Floor or Ground Surfaces. Parking spaces and access aisles serving them shall comply with 302. Access aisles shall be at the same level as the parking spaces they serve. Changes in level are not permitted. Exception: Slopes not steeper that 1:48 shall be permitted.

502.5 Vertical Clearance. Parking spaces for vans and access aisles and vehicular routes serving them shall provide a vertical clearance of 98" minimum.

502.6 Identification. Parking space identification signs shall include the International Symbol of Accessibility complying with 703.7.2.1. Signs identifying van parking spaces shall contain the designation "van accessible". Signs shall be 60" minimum above the finish floor or ground surface measured to the bottom of the sign.

502.7 Relationship to Accessible Routes. Parking spaces and access aisles shall be designed so that cars and vans, when parked, cannot obstruct the required clear width of adjacent accessible



Line Type Indicated on Drawings

*INO PARKING - FIRE LANE

STRIPING: WHITE BLOCK LETTERS ON RED BACKGROUND

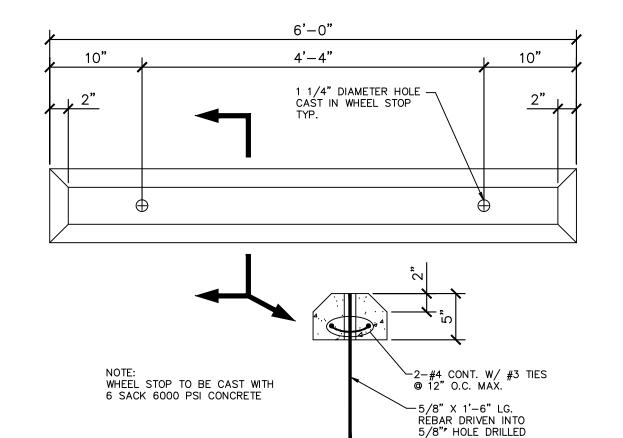
PAVEMENT STRIPING: COLOR SELECTED BY OWNER

& REPEAT MAX. 50' INTERVALS

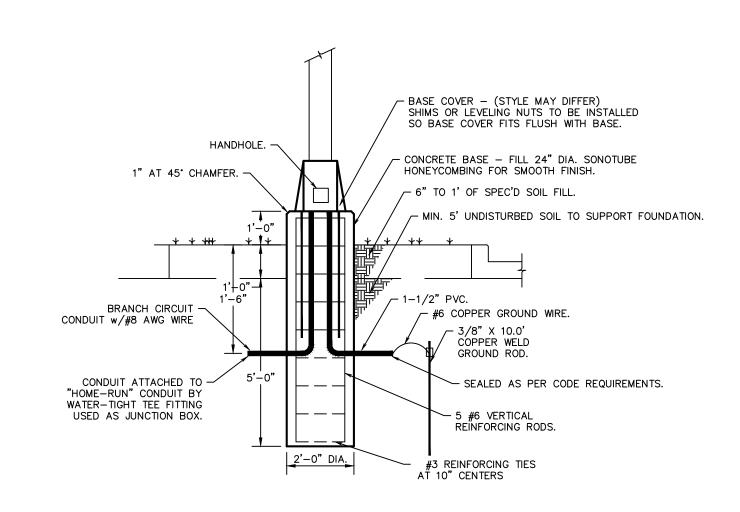
3 ACCESSIBLE PARKING NOTES



NOT TO SCALE







IN CONCRETE PAVING

1 LIGHT POLE FOUNDATION DETAIL





STANLEY G. NEWSOME, .

8/2/21

FOR PERMITTING &

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AND COORDINATED IT WITH

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ISSUED FOR SCHEMATIC DESIGN DATE: X DESIGN DEVELOPMENT DATE: X

BIDS & CONSTRUCTION X DATE: 08/02/2021

REVISION: DATE:_ REVISION:

DATE:_ REVISION: DATE:

DRAWINGS SHEET TITL **DETAILS**

PARKING / SITE

SHEET NUMBER

20105

4 SIGN INSTALLATION DETAILS

Wedge Anchor

Steel System

Tubular socket

ground for optimal

reusability.

Socket >

Concrete Footing (shall be used

unless noted

elsewhere in the plans).

should take approx. 2.0 cf

of concrete. — 12" Dia — —

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

Foundation

ANCHOR SYSTEM

1. The Wedge Anchor System and the Universal Anchor System with thin wall tubing post may

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 TxDot Traffic Standards Engineer.

3. Except for posts (13 BWG Tubing), clamps nuts and bolts, all components shall be

right. The bolt length may need to be adjusted

Sign clamps may be either the specific size clamp

Pipe Diameter | 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"

depending upon field conditions.

or the universal clamp.

4.1. 13" BWG Tubing (2.375" outside diameter) (TWT), 0.095" nominal wall thickness,

4.2.1. 55,000 PSI minimum yield strength 4.2.2. 70,000 PSI minimum yield strength

4.2.3. 18% minimum elongation in 2"

A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM 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

Anchor System components.

WEDGE ANCHOR SYSTEM INSTALLATION PROCEDURE

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 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. placements less than Place concrete into hole until it

Attach the sign to the sign post.

6. Insert the sign post into socket and align sign face with roadway/parking space. 7. Drive the wedge into the socket to secure post. This will leave approximately 3 inches of the wedge exposed.

be used to support up to 10 square feet of sign area.

prequalified.

GENERAL SIGN NOTES:

balanced appearance.

0.08" thick aluminum alloy.

3.1. are required

GENERAL PAVEMENT NOTES

3.4. shall be 30" x 30" minimum.

shall conform with the "Texas Manual and Uniform Traffic Control

Devices for Streets and Highways", latest edition, and any

approved changes thereto. Lateral spacing shall provide a

so as to be visible to motorist in the travel lane,

3.3. may be painted of prefabricated material, and

4. Material used as post with this system shall conform to the following specifications:

4.2. Seamless or electric-resistance welded steel tubing. Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008. Other steels may be used if they meet the following:

4.3. Wall thickness (uncoated shall be within the range of .083" to .099", Outside diameter (uncoated) shall be within the range of 2.369" to 2.381"
4.4. Galvanization per ASTM 123 or ASTM A653 G210. For precoated steel tubing (ASTM

8. See the Traffic Operations Division website for detailed drawings of sign clamps and Wedge

1. Dig foundation hole. Where solid rock is encountered at ground level, the foundation shall be a minimum depth of 18". When solid rock is encountered below ground level, the foundation shall extend in the solid rock a minimum depth of 18" or provide a minimum foundation depth of 30". If solid rock is encountered, the socket/stub may be reduced in length as required to a minimum length of 18". Any material removed from the socket/stub shall be from the bottom and the clearance Requirements given on SMD(GEN) must be followed. The inner surfaces of the socket/stub must remain free of concrete or other debris.

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 4. Plumb the socket. Allow a minimum 4 days for concrete to set, unless otherwise directed by

1. This Section pertains to the application of pavement markings in parking lots, along fire lanes and at fire hydrants.

. Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient surface temperature recommended by manufacturer. 3. Paint shall be Sherwin-Williams "set Fast" water based traffic marking paint or approved

4. Do not apply pavement-marking paint until colors have been approved by Owner.

6. Thoroughly clean pavement of all dirt, organic growth, oil, grease, or other materials that will prevent adhesion of the paint to the pavement surface.

5. Allow paving to age three days before starting pavement markings.

2" Stroke Width

Sweep and clean surface to eliminate loose material and dust. 8. Apply paint with mechanical equipment to produce pavement markings, of dimensions

indicated, with uniform, straight edges. Apply at manufacturer's recommended rates. 9. Apply paint wiht a wet film thickness of 0.015 inches with a uniform cross section. Minimum thickness of 0.010 inches measured in the dry condition. 10. Apply paint no sooner that 14 days after seal coat has been applied. (if applicable)

11. Apply paint in a single coat. 12. Apply paint as shown on Drawings.

13. Apply graphic symbols and lettering with paint-resistant, die-cut stencils. Apply paint so that it does not run beneath the stencil.

5 LANE MARKINGS

NOT TO SCALE

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600.01 - Description

Underground construction of water and sewer pipes includes all preparation of site, clearing, grubbing, excavation, street surface removal, boring, tunneling, dewatering, sheeting, bracing, laying and joining of pipe, bedding, backfilling, installation of fittings and manholes, testing, and cleaning up of the site. The work concludes furnishing of all materials, equipment, tools, labor and all other incidentals to complete the construction.

600.02 - Sequence of Work

The CONTRACTOR shall make adequate planning and preparation before excavation starts. CONTRACTOR shall notify the Manager of Water and Sewer Maintenance Division before beginning work. They shall pursue the job in an orderly fashion. The construction shall start with mains and proceed to laterals. All appurtenances shall be constructed as soon as the pipe line they serve is constructed to their location. The construction of appurtenances may be postponed upon approval of the ENGINEER and determination that the circumstances were beyond the control of the CONTRACTOR. A sufficient space as determined by the ENGINEER, shall be provided for proper installation at a later time.

600.03 - Site of Work

The OWNER will furnish the site, easements, or any right of way considered necessary by the engineer. If CONTRACTOR needs more working area, they shall make their own arrangements and indemnify the OWNER from any damages or claims.

600.04 - Protection of the Public

The contractor shall make any provisions necessary to protect the public from inconveniences and dangers caused by the construction. Storage and stringing of the material, equipment and excavation shall be done in a manner to cause minimum obstruction and inconvenience to the traffic and the property owners along or adjacent to the construction site. Fire Hydrants, water meters, water valves, gas valves, manholes, catch basins, and boxes for telephone, signal, and alarms shall not be obstructed or covered.

The CONTRACTOR shall make bridges or other provisions and arrangements approved by the ENGINEER to give access to the public across streams, highways, streets, sidewalks, and driveways. When required CONTRACTOR is to construct temporary bridges. Their responsibility for accidents shall include the roadway approaches and the structures of such crossings. The OWNER reserves the right to remedy any neglect by the contractor about the public conveniences and safety which may come to its attention. After twenty-four hours notice in writing to the CONTRACTOR, except in cases of emergency, when they shall have the right to remedy any neglect without notice, and, in either case, the cost of such work done by the OWNER shall be deducted from monies due or because of the CONTRACTOR.

600.05 - Handling of Traffic

The CONTRACTOR shall make provisions necessary to handle, direct, and divert the traffic. Notify Traffic and Transportation Department of the City of Port ARTHUR of any change in traffic flow at least forty-eight (48) hours in advance.

If diversion of traffic requires construction of a temporary roadway, the CONTRACTOR shall make all arrangements at their own cost and to the approval of the ENGINEER and the Traffic and Transportation Department. If a street needs closing, the department shall be informed forty-eight (48) hours before closing, and also after opening street to traffic. Adequate signs to divert the traffic shall be used as directed by the Traffic and Transportation Department.

The CONTRACTOR shall make every attempt to save traffic signs and also traffic boxes, cables and lights. If any of these appurtenances need to be removed or moved accidentally, the Traffic and Transportation Department shall be informed immediately.

600.06 - Barricades, Lights, and Guard (s)

Where the work is in or adjacent to any street, alley, or public place, the CONTRACTOR, at their own cost and expense, furnish and build such barricades, fences, lights and danger signals; shall provide such guard (s) and shall take such other precautionary measures for the protection of persons or property and of the work necessary. Barricades shall be recently painted in a color that will be visible at night. From sunset to sunrise the CONTRACTOR shall furnish and maintain adequate lights at each barricade. An enough barricades shall be built to keep vehicles from being driven on or into any work under construction. The CONTRACTOR shall furnish guard (s) in sufficient numbers to protect the work.

The CONTRACTOR shall be responsible for all damage to the work because of failure of barricades, signs, lights and guard (s) to protect it, and whenever evidence found of such damage, the ENGINEER may order the damage portion immediately removed and replaced by the CONTRACTOR at the CONTRACTOR'S cost and expense. The CONTRACTOR'S responsibility for the maintenance of barricades, signs and lights, and for providing guard (s), shall not cease until the project is accepted by the OWNER.

Barricades, signs, and handling of traffic shall be in agreement with the <u>Manual on Uniform Traffic Control Devices</u> as adopted by the Texas Highway Department, and as directed by the Traffic and Transportation Department of the City of Port ARTHUR, all in agreement with these specifications. A copy of the manual is available for review without charge at the Traffic and Transportation in City Hall.

600.07 - Protection of Utilities

The locations of utilities are not shown on the plans. The CONTRACTOR shall inspect the route of the construction during the bidding period to check the location of such utilities, and possibility of any conflict. Whenever existing utilities present obstructions to grade and alignment of pipes or appurtenances, the CONTRACTOR will notify the ENGINEER, who without delay, will determine whenever existing improvements are to be relocated or grade and alignment of pipe to be changed. When necessary to move services, poles, guy wires, pipe lines, or other obstructions, the CONTRACTOR will make necessary arrangements with owner-operator of utilities. The OWNER will not be liable for damages because of changes made by the owner operator of the utility which hinders progress of work, nor will the OWNER be liable for cost incurred in relocating utilities service poles, services and appurtenances.

The CONTRACTOR shall make any provision necessary to protect all utilities, services, and appurtenances. They shall locate and inform the owner-operator of a utility at least forty-eight (48) hours before progressing to such utility. It is the responsibility of the CONTRACTOR to provide and install all beam span supporting, bracing, shoring, and sheeting necessary to support all utilities crossed at their own expense.

600.08 - Protection of Private Property

The CONTRACTOR shall not enter upon private property for any purpose without having previously obtained permission from the OWNER. The CONTRACTOR shall be responsible for the preservation of, and shall use every precaution to prevent damage to all trees, shrubbery, plants, lawns, fences, culverts, bridges, pavement, driveways, sidewalks, buildings, and service lines in or adjacent to private property. If a private property owner has a complaint, the CONTRACTOR shall take immediate action to satisfy the property owner.

600.09 - Preparation of the Site and the Route

The CONTRACTOR shall make all preparation necessary before excavation starts. The construction site and or the route which the pipe will be laid in shall be cleared and grubbed before pipe laying. All trees, stumps, brush, roots, logs, rubbish and other objectionable material shall be removed and disposed of in a manner approved by the ENGINEER. Burning and or hauling of the material shall be executed in compliance with ordinances of the City of Port ARTHUR, County of Jefferson, or any other governmental body.

If work is proceeding through a utility easement, care shall be taken to clear all the proposed easement as specified above.

CONTRACTOR shall prepare the site furthermore by establishing drainage along the route if necessary, filling up holes, and generally leveling the site and or the route. The purpose is to keep the surface water away from the trench for pipe. It will also benefit the CONTRACTOR since soil conditions will improve and therefore the progress of the pipe laying.

600.10 - Protection of Street and Drainage

The CONTRACTOR shall make all attempts to keep streets and drainage open. Streets should be kept as clean as possible and mud scraped often as required and dust watered down if asked by the City. Drainage ditches shall be kept open and if filled by the CONTRACTOR, they shall be reopened before the crew leaves the site at the end of a working day.

If in the opinion of the ENGINEER the street needs to be closed, the CONTRACTOR shall inform the Traffic and Transportation Department and the residents being affected at least forty-eight (48) hours in advance. Attempts should be made to give temporary access to the residents of the blocking being affected. CONTRACTOR should attempt to minimize the duration of street closing by proper planning of the work and arranging for all the required material, equipment, and personnel. However, since the safety of the public is more important than the inconveniences imposed on, the CONTRACTOR should keep a closed street impassable to through traffic and not open it until it is safe for through traffic.

If sections of the original pavement or surface are removed by the CONTRACTOR, the trench shall be filled according to the provisions of "ITEM 600.19 and 20". Fill the top layer of the street with shale or limestone temporarily until the street is ready for surface replacement in agreement with "ITEM 600.20 and 21", until the street is ready for final replacement of the surface, CONTRACTOR should keep the street passable for the local residents.

The Street Department of the City of Port ARTHUR makes the final inspection of pavements, streets, shoulders, drainage ditches, and structures related to their department. CONTRACTOR shall correct any problem pointed out by

600.11 - Temporary Sewer and Drainage Connections

If existing sewers have to be taken up or removed, the CONTRACTOR at his cost and expense, provide and maintain temporary outlets and connections for all private or public drains and sewers. The CONTRACTOR shall also take care of all sewage and drainage which will be received from these drains and sewers; and for that purpose they shall provide and maintain, at their own expense, adequate pumping facilities and temporary outlets or diversions. The CONTRACTOR, at their own expense, shall construct such trough, pipe or other structures necessary, and at all times prepare to dispose of drainage and sewage received from these temporary connections until the permanent connections built and maintained under the contract, except where specified or ordered to be abandoned by the ENGINEER. All water or sewage shall be disposed of satisfactorily so that no nuisance is created and so that the work under construction will be adequately protected. Under no circumstances shall sewage be diverted to a drainage ditch, street, or natural ground.

600.12 - Control of Grade and Alignment

It is the responsibility of the CONTRACTOR to provide centerline stakes and cuts at each stake and to protect such stakes and control the alignment and grade. The CONTRACTOR may use any device such as level, transit or laser beam instrument to control the pipe laying. If the pipe alignment and grade is incorrect, it shall be taken out.

600.13 - Trench Excavation

The ground shall be excavated by the open trench method to the required depth, width, line and grade as given by the ENGINEER. The trench walls shall be vertical to a point not less then 12 inches above the top of the pipe. For all pipes the sides of the trench below the top of the pipe shall be less than 6" inches nor more than 8 inches from the side of the pipe for sizes 12 inches and less, and the pipe outside diameter plus 24 inches maximum trench width for pipe sizes 15 inches and larger. If the trench is excavated below the proper grade, it shall be refilled to grade with selected backfill material and thoroughly rammed without extra compensation, unless the extra excavation was ordered by the ENGINEER. In case of a cave-in and if the trench width is larger than the maximum allowed, selected backfill material shall be placed on sides of the pipe up to the undisturbed wall and compacted.

In sewer construction, the bottom of the trench shall be shaped to fit the bottom one-fourth (1/4) of the circumference of the pipe. In sewer and water construction, bell holes must be excavated before pipe placement.

600.14 - Locating Intersecting Pipes

The CONTRACTOR shall make attempts to locate intersecting lines ahead of pipe laying. They shall locate and excavate in advance service lines, sewers, and water lines which will be tied into the system under construction. Any pipe line or gas line, underground power lines, fiberoptic and telephone cables shall be located with proper

600.15 - Sheeting and Bracing

The CONTRACTOR shall provide sheeting and bracing necessary for the protection of the work and employees. In the event the soil conditions are such that the CONTRACTOR should desire to leave such sheeting in place, they shall secure the permission of the ENGINEER to do so. Any cost of such sheeting and bracing shall be included in the unit price of laying pipe.

600.16 - De-watering

Under no circumstances shall the surface water be allowed to flow in the trench. When ground water exists in the trench, the CONTRACTOR shall make attempts to drain it away from pipe laying area or pump it out of the trench. If quicksand or water sand conditions appear in the trench bottom, the CONTRACTOR shall undercut the trench and replace it with granular material at no extra cost to the OWNER, and with the ENGINEER'S approval. City reserves the right to require the CONTRACTOR to use adequate dewatering and sheeting and bracing if the CONTRACTOR was not installing the pipe properly in unstable soil.

600.17 - Pipe Handling

The CONTRACTOR shall unload, store, and replace pipe according to the specifications of the pipe manufacturer. Care shall be taken not to damage the pipe by impaction or point loading. If using PVC or Truss pipe the pipe shall be kept in the shipping bundle until the day that it will be installed.

600.18 - Pipe Placement

The pipe shall be laid straight to the exact alignment and grade as given by the ENGINEER. No variation from the given alignment and grade will be permitted except to avoid existing underground mains, and then only upon the written permission of the ENGINEER. It is important to locate such mains in advance for possible conflict.

All pipe shall be laid with the spigot end or tongue end downstream entering the bell or groove to full depth. Care shall be taken in placing pipe to prevent any bedding material being dragged into or left in the annular space for

The pipe shall be examined for defects, cut to correct lengths, and the interior surface and the bell and spigot thoroughly cleaned of all foreign material. The ENGINEER reserves the right to reject any joint of pipe which has not completely complied with the provisions of these specifications. Any unsatisfactory joint shall be replaced without cost to the OWNER.

600.19 - Jointing and Backfilling

Jointing and backfilling depends on the pipe material. Under each item for a given material, jointing and backfilling provisions are specified.

As soon as jointing is completed, backfilling shall start. The trench shall be absolutely backfield before the working day ends. Backfill material above the required 6 or 12 inch select backfill depends on the location of the line in relation to type of street or pavement.

(a) Portland Cement Concrete Pavement and Flexible Base Asphalt Surfaces with curb and gutter, the trench shall be filled to the bottom of the pavement with a dry mixture of clean sand and two (2) sacks of cement to the cu. yd., thoroughly tamped. This requirement shall apply to both trenches running along, Parallel and under the pavement and in trenches crossing the pavement.

(b) Flexible Base Asphalt Surfaces without Curb and Gutter in trench crossing flexible base surfaces with bituminous topping of any type or condition, the trench shall be filled to the bottom of the pavement surface with a dry mixture of clean sand and two (2) sacks of cement to the cu. yd. thoroughly tamped. This requirement shall apply in trenches crossing this type of pavement surface; however, in trench running under and parallel to this type of surface the requirement shall be the same as that specified for dirt streets in (c) below.

(c) Dirt Streets - The trench shall be backfilled with selected excavation of loose fine earth by either of two methods of backfill procedure, water tamping or power tamping. In using water tamping, the balance of the trench above the 6" height above the top of pipe shall be filled with the loose fine material in even layers not exceeding eighteen (18") inches in thickness of loose material and immediately flooded to complete saturation and left undisturbed for three (3) days.

The trench shall then be refilled and flooded again using poles to insure penetration of water to the full depth of the trench. This flooding shall continue until there is no further settlement. The top ten (10") inches of the trench shall be backfilled with limestone base. Power tamping will be permitted only where the trench and backfill material are dry enough to permit satisfactory compaction. Backfill shall be placed in the trench in layers not exceeding twelve (12") inches in thickness.

On completion of the tamping, all excavated material shall be substantially replaced in the trench deducting the space occupied by the pipe and bedding. Compaction in all levels from six (6") inches above the top of the pipe to grade shall be not less than 90% of the Maximum density value as determined by the "Standard Laboratory Method for Compaction and Density of Soil", "AASHO Designation T-99". The top ten (10") inches of the trench shall be backfilled with limestone base. The above procedure for dirt streets shall apply in trenches running in and parallel to and running across the normally maintained portion of the road or street right-of-way.

Whenever the trench is not in a street but in an easement or plant area which is not traveled, the backfill procedure shall be the same as for a dirt street, except that the top ten (10") inches of limestone base shall be

Whenever the trench is within a street right-of-way in which there is concrete or flexible base asphalt pavement but the trench is not in the paved portion of the right-of-way, the procedure shall be the same as for the dirt street, except that the limestone base in the top ten (10") inches of the trench shall be placed only in driveway crossings, roadway shoulders and other areas where there will be light traffic. Where limestone base is omitted the ground shall be restored to its original condition by the replacement of grass or any other improvement which existed before the construction

In general, pipe shall be placed in a trench free of clods of dirt and bedded with a bedding material or natural ground free of any large clods to damage the pipe or its position. The material around the pipe up to the spring line shall be packed to 90% density.

600.20 - Removal and Replacement of Street Surfaces

This work shall comprise the cutting and replacement of pavement where such is necessary for the installation of pipe lines or appurtenances under the contract. The work shall include the furnishing of all labor, materials, tools and equipment and doing all work of whatever nature including the hauling and disposal of surplus materials necessary for the removal and later replacement of pavement in agreement with the plans and specifications.

Whenever pipe line construction occurs in any street, regardless of type of pavement, the contractor will make every effort to provide ingress and egress to residents living along said streets.

No separate items for pavement for removal and replacement of concrete, asphaltic, shell or gravel, streets shall be listed. The cost of this work shall be included in the unit cost per foot of pipe line.

(a) Concrete Pavement: Concrete pavement shall include streets with a concrete slab, concrete base with topping, and asphaltic pavements with curb and gutter.

The CONTRACTOR shall not use equipment to cut trenches in existing pavements which will strike a heavier blow than is usual with a hand pavement breaker operated from an air compressor. The edges of the cut shall be trimmed to leave a vertical face of sound, unfractured, pavement.

The pavement shall be removed to a distance not less than twelve (12") inches back from a firm bank of the trench excavation.

All concrete for pavement replacement shall meet the requirements for concrete pavements as set out by the OWNER

All replacement pavement shall be finished in a neat and workmanlike manner and protected and cured as its

(b) Streets other than Concrete pavement: Street pavements other than concrete and asphaltic pavements with curb and gutter may be removed with the excavation to the extent of the excavation. After backfilling the trench as specified elsewhere herein, the CONTRACTOR shall replace the pavement to its original condition.

(c) Street surfacing: P. C. Concrete or asphaltic pavement, shall be replaced within 72 hours after completion of trench backfilling.

600.21 - Crossings of Driveways, Sidewalks, and Parking Areas

In backfilling the trenches which cross under driveways of any type (concrete, bituminous, shell and dirt), and under concrete sidewalks, the procedure shall be the same as that specified in Item 600.19 Paragraph (a) for concrete pavement which specifies a dry mixture of clean sand and two sack of cement to cubic yard thoroughly tamped.

The CONTRACTOR shall restore driveways and their culverts to their original condition as soon as possible. They shall inform citizens which will be affected by this work before start of work.

600.22 - Highway Crossings

Crossings of highways shall be done according to the requirements set forth by the Texas Highway Department as explained in the permit. City of Port ARTHUR will acquire the permit. It is the responsibility of the CONTRACTOR to familiarize himself with the requirements.

The CONTRACTOR shall notify the maintenance superintendent of the Texas Highway Department at least 48 hours before any work starts. Adequate signs, flares, barricades and flagmen shall be used according to the State Highway Standards. Highway shall be restored to its original condition.

600.24 - Drainage Ditch Crossings

Crossings of drainage ditches and canals shall be done according to the requirements set by the authority in charge of the ditch as explained in the permit. It is the responsibility of the CONTRACTOR to familiarize himself with

The CONTRACTOR shall notify the authority in charge before crossing ditch or canal at least 48 hours before any work starts. Adequate protection shall be taken to establish drainage back before the working day ends. The CONTRACTOR shall be responsible for any damages caused by the stoppage of drainage. CONTRACTOR shall restore the ditch or canal to its original shape and density as soon as possible.

600.25 - Pipe Line Crossings

the requirements.

It is the responsibility of the CONTRACTOR to locate all pipe lines to be crossed, contact the owner of the pipe line, and make arrangements for crossing such lines. It is best to locate such lines a few hundred feet ahead of pipe laying operation, in order to make revisions in grade or alignment, if they are necessary and approved by the ENGINEER.

600.26 - Excess Excavation

Excess excavation shall be hauled and placed on properties designated by the OWNER. If OWNER does not have any use for the excess dirt, the CONTRACTOR at his cost is to make arrangements to dispose of the excess excavation in a manner approved by the ENGINEER.

Those portions of excavated fine quality soil may be used in the trench above the 6 or 12 inch select backfill. Such portions may also be used on the construction site if they are spread properly as directed by the ENGINEER.

600.27 - Plugging Ends

Before leaving the work for the night, or at any time, the end of the pipe line shall be securely closed with a water tight plug at the entire cost and expense of the CONTRACTOR.

600.28 - Tunneling, Boring, and Casing

Requirements for tunneling, boring, and casing depends on the permit issuing agency involved. However, the Water Utilities Department of the City of Port ARTHUR should concur with the requirement set.

In general casings shall have a uniform invert to be accepted for maintenance by the City of Port ARTHUR. Furthermore, size of the casing shall be at least 6 inches larger than the outside diameter of the bell of the pipe.

Whenever a water line or sewer line is too shallow and pipe material is not adequate to withstand the traffic load at street crossings, casing or a rigid pipe such as ductile iron shall be used. An asphalt coated corrugated metal pipe may be used as a casing pipe under streets.

600.29 - Protective Coating

All bolts shall be stainless steel.

600.30 - Spacing of Sanitary Sewers and Water Lines

Spacing of Sanitary Sewers and Water Lines shall conform with TCEQ rules and Regulation.

If plans conflict with TCEQ rules and Regulations the CONTRACTOR shall notify the ENGINEER prior to construction.

600.31 - Testing and Acceptance

All water lines shall be flushed, sterilized and pressure tested according to the provisions of Section 809 before acceptance for maintenance by the Water Utilities Department of the City of Port ARTHUR.

600.32 - Clean up

The CONTRACTOR shall remove from site of work, and from public and private property, all temporary structures, rubbish, waste material including all excess excavated materials, and all trees removed. The completed clean up shall not be greater than 1,000 feet behind pipe laying operation, however, this distance shall be reduced in residential areas. Not more than one block can be disrupted for construction. Clean up and testing may be done at the same time but clean up shall not be delayed on the account of testing. Pipe laying operation will be suspended temporarily if completed clean up is farther behind than 1,000 feet.

600.33 - Agency Requirements to be Met

All water and sewer lines installed in City of Port ARTHUR shall meet the requirements of the Texas Commission on Environmental Quality (TCEQ).

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8/2/21 FOR PERMITTING & CONSTRUCTION

ARCHITECT HAS REVIEWED THE CONSULTANT'S WORK AND COORDINATED IT WITH THE OVERALL PROJECT

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REVISION:

DATE:

BIDS & CONSTRUCTION X

DRAWINGS SHEET TITLE
SPECIFICATIONS

SHEET NUMBER

20105
PROJECT NUMBER

SOUTEX
SURVEYORS & ENGINEERS
T.B.P.E. FIRM #0755 • T.XLLS. FIRM #10123800

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A. Comply with the latest edition of the following standards:

1.ASTM C270, Type M Mortar.

1.02 QUALITY ASSURANCE

2. ASTM D3753, Glass Fiber-Reinforced Polyester Manholes

1.03 SUBMITTALS

Submit the following information in accordance with the requirements of City of Port ARTHUR.

Submit record data of detailed drawings showing dimensions, materials, thicknesses of materials, manufacturer's installation instructions, accessories, fittings, hardware, anchorages, schedule of components, and other pertinent data.

B. Certificate of Adequacy of Design.

additions as set forth in these specifications.

2.00 PRODUCTS

2.01 MORTAR

Comply with Mortar for Unit Masonry, ASTM C270, for Type M mortar. The cement material used in the preparation of the mortar shall be Portland cement, Type I, normal, or Type II, moderate sulfate resistant.

2.02 CAST IRON FRAMES AND COVERS Frames and slotted covers shall be furnished and installed in accordance with the details on the Plans and

shall be with the approved City of Port ARTHUR Cover. A. Fiberglass manholes shall conform to all ASTM standards governing plastic laminations and the latest Glass Fiber-Reinforced Polyester Manholes, ASTM Designation D3753, with supplementary details or

B. The barrel and cone shall each be produced in a continuous manufacturing process which ensures continuous reinforcement and uniform strength and composition. The cone section, if produced separately, shall be affixed to the barrel section at the factory with a reinforced glass-resin joint resulting in a one-piece

unit. Field-made joints shall not be acceptable. C. The manhole shall be a circular cylinder with a minimum internal diameter of four feet. The cone of the manhole shall have a bearing surface wide enough to facilitate the placement of concrete adjustment rings.

The ring and cover shall not be placed directly on the manhole. D. Provide and install concrete grade rings to bring the cast iron frames to grade. Grade rings shall be 2 inches by 8 inches with an inside diameter of 32 inches.

E. Where PVC piping is connected to manholes, provide and install PVC sleeves with rubber gaskets and an abrasive silica outer coating. Sleeve shall be as manufactured by GPK products, Inc., of Fargo, North Dakota, or approved equivalent. Sleeve shall be firmly grouted into manhole opening in accordance with manufacturer's instructions.

F. Any manhole shall be rejected for failure to conform with any of the requirements of these specifications. Any manhole found to be defective or damaged resulting from improper handling or installation shall be removed and replaced at no additional expense to the OWNER. Patching shall not be acceptable. 2.04 MANHOLE INSERT

Manhole inserts shall be furnished and installed at each manhole and shall be a stainless steel Preco Sewer Guard ME C-4 watertight manhole insert or equivalent.

B. The manhole insert shall be stainless steel and each of its components, the valve bodies, the valve plugs, the valve springs, and the gasket shall be manufactured of plastic, stainless steel, or other corrosion

C. Each insert shall contain a gasket manufactured of Grade RE-41 black closed cell neoprene and meet the requirements of ASTM D-1056-73T. The gasket shall have a pressure sensitive adhesive on one side and be placed on the underside of the insert rim by the manufacturer.

Each insert shall have a gas relief valve and a vacuum relief valve each designed to release at a pressure differential equivalent to approximately ½ psi and approximately 2.25 psi, respectively. The valve body shall be manufactured of specially formulated plastic polymers and the valve plug shall be neoprene confined within a stainless steel spring

The manhole insert shall be manufactured and finished to fit upon the manhole frame rim upon which the manhole cover rests.

The manhole frame shall be cleaned of all dirt/debris before placing the insert upon the rim.

G. The insert lip with gasket shall be placed in contact with 360 degrees of manhole frame rim to retard water seepage between the insert and the manhole frame.

After the manhole insert has been installed on the manhole frame rim, note that the insert does not come in contact with the cover upon its removal or replacement (flipping).

After installation of the watertight manhole insert, the seal shall be water tested and shall not allow more than 1-gallon of inflow during a period of 24 hours.

3.00 EXECUTION

3.01 INSTALLATION

Manhole Base:

1.Inverts shall be built of concrete or half-sections of pipe (unless otherwise shown on the Plans) and shall be true and troweled to a smooth, hard finish. The invert depth shall be equal to one-half of the diameter of the largest pipe connected to the manhole, and shall be sloped at 1:1 between the inlet and outlet pipe flowlines. The top of the poured manhole invert outside of the flow channel shall be steeply-sloped to prevent solids deposition.

Concrete and reinforcing steel for the manhole base shall be placed in accordance with the

details on the Plans and the applicable provisions of these Specifications. Fiberglass manholes shall be installed in accordance with the manufacturer's recommendation and with supplementary details, addition or exception as directed by the OWNER and/or shown on the Plans. A minimum of 8 holes 5/8-inch in diameter shall be drilled around the periphery of the manholes, 2

4. All concrete used in the construction of fiberglass manhole bases shall have a minimum concrete alkalinity of 70 percent calcium carbonate equivalency in the final concrete product. Alkalinity shall be tested in accordance with methodology set forth in Concrete Pipe Handbook, published by the American Concrete Pipe Association, or equivalent industrial standards, with test results provided to the ENGINEER for record data.

Provide an adequate connection where the pipe connects to the manhole such that infiltration and exfiltration are prevented from occurring at the connection. When required, manhole adaptors shall be used. If the manhole base is concrete and cast-in-place around the pipe, an adapter gasket shall then be installed such that the gasket will serve as a watertight seal (water stop) between the pipe and concrete. If the manhole base has a pipe fabricated integrally with the manhole, then a manufacturer's recommended adaptor shall then be used to connect the pipe to the manhole pipe. If a "boot type" flexible connection is used, a minimum

of two stainless steel straps shall then be used to secure the flexible connector to the pipe. C. Frames and covers shall be furnished and installed as required and indicated on the Plans.

inches from the bottom for use in securing the manhole to the concrete base.

D. Use no more than 4 grade rings per manhole. Ring hold down bolts shall pass through rings into the top of the cone.

E. Where piping is connected to a manhole, CONTRACTOR shall provide a resilient connector in accordance with ASTM C-923 and the specifications and drawings. Where resilient connectors cannot be made at manhole connections, CONTRACTOR shall ensure that the pipe on each side of the manhole does not extend further than six (6) feet from the outside of the manhole wall or base, and the concrete cradle extends to within one (1) foot of the end of the pipe.

Where main sewer (lowest line) passes straight through manhole or degree of deflection of main sewer is less than 5 degrees, and no other line or stub-out is shown entering manhole below centerline of main sewer, lay sewer continuous through manhole. After manhole wall sections have been completed above top of sewer, break out and remove top half of barrel of sewer pipe that was previously laid through manhole. Use barrel of sewer pipe that was previously laid through manhole. Use concrete with 1-inch mortar topping and shape floor. Where main sewer (lowest line) alignment deflects greater than 5 degrees at manhole or where another sewer or stub-out enters at or below centerline of main sewer, terminate main sewer pipe laying in such a manner that ends of pipe are 2 inches inside of manhole wall.

SPECIFICATIONS FOR PVC GRAVITY SEWER PIPE AND FITTINGS

702.01 - General

The work includes all PVC (Poly Vinyl Chloride) Gravity Sewer pipe installed at locations and grade shown on plans and consisting of all excavation, backfilling, testing, and the furnishing of all materials, equipment, tools, labor, and incidentals for complete construction of the sewer line.

702.02 - Pipe and Fittings

All PVC (Poly Vinyl Chloride) sewer pipe and fittings installed under these specifications and intended as a gravity sewer line shall be manufactured to the dimensions and minimum design criteria as set forth in "Type PSM (Poly Vinyl Chloride) (PVC) Sewer Pipe and Fittings", ASTM Designation D-3034, except as herein stated. Pipe shall have a minimum SDR of 26.

Joints used in installing PVC sewer pipe shall be of the bell and spigot confined rubber gasket type with joining in agreement with the manufacturer's recommendations.

Pipe shall be installed in compliance with Item 600 of these specifications, manufacturer's specifications, and ASTM Standard D-2321-72 for "Underground Installation of Flexible Thermoplastic Sewer Pipe" or latest revision thereof.

Pipe shall be kept in the bundle as shipped from the plant until the day it is installed.

A deflection test may be required if deflection is apparent.

702.03 - Inspection and Testing

Upon request, the CONTRACTOR shall furnish the OWNER with a certified copy of test results showing that pipe supplier's material meets the requirements of this specification and those set forth in

The finished gravity sewer line shall pass all required test. If any section of line fails to pass the above test, the CONTRACTOR, at his own expense, shall locate and repair all defects and retest until the line passes the prescribed test.

SPECIFICATIONS FOR TESTING AND STERILIZATION OF COMPLETED LINE

809.01 - Procedure

Flushing, checking, chlorinating, sampling and testing of the completed line shall be done in the following sequence:

1.Flush line properly through valve or other opening at dead end. Area of opening should be no less than 1/4 area of pipe being flushed.

2. Chlorinate line. Pressure drop and flow should be away from point of chlorination and should be toward dead end (open) of line, not toward City connection. Chlorination shall be in agreement with AWWA Specification C651-99.

3. Make specified pressure test using City water through a direct connection to pump suction.

4. Make bacteriological test before and after pressure test.

Installation, disinfection, and testing shall meet the requirements of the "Rules and Regulations for Public Water Systems" adopted by the Texas Commission on Environmental Quality. If a line failure occurs where a joint or portion of a joint of pipe is replaced, that section of line should be isolated by closing adjacent line valves and the open line kept free of foreign matter. Make repairs and use HTH liberally, then flushed out at the nearest hydrant.

In extreme cases of failure, the CONTRACTOR may be required to repeat the entire chlorination procedure.

City personnel only may open and close existing valves.

809.02 - Pressure Testing

After pipe is laid and backfilled as specified, all newly laid pipe shall be subject to a hydrostatic pressure equal to 120% of the class of pipe unless otherwise noted on specification of pipe material, but shall not be less than 180 pounds per square inch. Water for testing shall be furnished by the City at the nearest convenient connection approved by the Superintendent of Water Utilities Department. The duration of each pressure test shall be two (2) hours.

809.03 - Pressure Test Procedure

The CONTRACTOR, after back-filling or partial back-filling all newly laid pipe, shall slowly fill the lines with water expelling all air. The CONTRACTOR shall use all available outlets to accomplish this, such as hydrants, air relief valves and taps when specified. Should additional taps be needed to vent air from high points in the line, the same shall be installed by and at the expense of the CONTRACTOR. The CONTRACTOR shall install certified gauges on the line tested at spacing not to exceed 2000 feet and at the end of the test section.

The water under pressure (10 to 50 psi), shall be allowed to stand for not less than 24 hours to allow for absorption before applying a pressure test.

During this period, the bulkheads, valves, and connections shall be examined for leaks.

A test pressure of not less than 180 psi shall be applied to valve or bulkhead sections by a hand pump or small power pump.

The CONTRACTOR shall furnish, install and operate at their own expense the necessary connections, pumps, meters and gauges in filling the line and making the test. The water necessary to maintain the test pressure shall be measured through a meter or other means satisfactory to the ENGINEER.

809.04 - Permissible Leakage

No pipe installation will be accepted until or unless the leakage in the foregoing test is less than the following values (based on nominal diameters, a 24-hour day, and 150 psi pressure):

(a) Ductile Iron Pipe: 24 gallons /(inch diameter--mile--day) for 18 foot length joints of pipe. evaluated on a basis of 150 psi.

(b) Reinforced Concrete Pressure Water Pipe, Steel Cylinder Type, Prestressed or Pretension:

35 gallons/(inch diameter--mile--day).

(c) Polyvinyl Chloride (PVC) C-900 Pipe: 24 gallons/(inch-- diameter--day).

(d) For other pressures the ratio of the square roots of pressures shall be used in determining

(e) The leakage shall be considered the amount of water entering the pipe line during the test, less the measured leakage through valves or bulkheads.

809.05 - Sterilization

When repairs made to existing mains or when new main extensions are provided, they must be disinfected by the CONTRACTOR using such amount of chlorine or chlorine compounds to fill the repaired or new mains and appurtenances with water containing 50 ppm chlorine. After the water containing this amount of chlorine which is greater than that normally present in drinking water has been in contact with the pipe and appurtenances at least 24 hours, the water shall be replaced with water to be transported normally and samples of water from the new or repaired main submitted to laboratories for bacteriological examination to be sure that the disinfection procedure was effective.

ITEM 810 SPECIFICATIONS FOR POLYVINYL CHLORIDE (PVC) PRESSURE WATER PIPE

810.01 - General

- (a) Pipe sizes 4 inches through 12 inches shall conform to American Water Works Association Standard C900-97 or the latest revision thereof, for pipe of class 150 with cast iron outside diameter.
- (b) Pipe sizes 14 inches through 24 inches shall conform to American Water Works Association Standard C905-97 or the latest revision thereof, for pipe of class 165 with cast iron outside diameter.
- (c) Unless contrary to these specifications, the CONTRACTOR shall handle, haul, and store pipe and other materials in
- agreement with the manufacturers recommendations. (d) All pipe must be acceptable, without penalty, to the Texas Fire Insurance Department for use in Water Works Distribution
- (e) Gasket shall be glued or held in place with a retainer ring.

810.02 - Manufacturer's Certificate

The manufacturer shall supply the City of Port ARTHUR an affidavit that the materials supplied for this contract comply with all applicable requirements of AWWA C900-97 or C905-97 standards.

- (a) All fittings for polyvinyl chloride pressure water pipe shall be gray iron or ductile iron design and manufactured in conformance with AWWA Standard Specifications C110/a21.10-98 revisions thereto.
- (b) Fittings shall be furnished with type of joint and end combinations and pressure class specified. Mechanical joint fittings shall be furnished complete with glands, gaskets and bolts. Flange joint fittings shall be in agreement with AWWA Standard Specification C111/A21.11-95.
- (c) All fittings shall be furnished with standard outside coatings consisting of coal tar or asphalt base bituminous materials. Fittings shall be cement mortar lined to standard thickness and sealed in conformity with AWWA Standard Specification C104/A21.4-95.

810.04 - Trench

- (a) Minimum width of trench shall be outside diameter of pipe plus twelve (12") inches. Maximum width of trench shall be outside diameter of pipe plus twenty-four (24") inches. Minimum depth of cover is three (3') feet over the top of the pipe. In places where lines crosses roadway ditches or drainage ditches in open excavation, the minimum cover shall be three (3') feet measured from top of pipe to flow of ditch unless shown otherwise on plans.
- (b) Preparation of trench bottom. The trench bottom should be constructed to provide a firm, stable, and uniform support for the full length of the pipe. Bell holes should be provided at each joint to permit proper assembly and pipe support. Any part of the trench bottom below grade should be backfilled to grade and should be compacted as required to provide firm pipe support.

810.05 - Laying of PVC Pipe

- (a) Laying of pipe. To prevent damage, proper implements, tools, and equipment shall be used for placement of pipe in the trench. Under no circumstances drop pipe or accessories into the trench. All foreign matter or dirt shall be removed from the pipe interior. Pipe joints should be assembled with care. When pipe laying is not in progress, open ends of installed pipe shall be closed to prevent entrance of trench water, dirt, foreign matter, or small animals into the line.
- (b) Pipe embedment. PVC pipe shall be installed with proper bedding providing uniform longitudinal support under the pipe. Backfill material shall be worked under the sides of the pipe to provide satisfactory haunching. Initial backfill material shall be placed to a minimum depth of 12 inches over the top of the pipe. All pipe embedment material shall be selected and placed carefully, avoiding stones (over 1/2 inch in size) and debris.
- (c) Final backfill. After placement and compaction of pipe embedment materials, the balance of backfill materials may be machine placed. The material should contain no large stones or rocks, or debris. Proper compaction procedures should be exercised to provide required densities.

810.06 - Concrete Blocking

Concrete having a compressive strength of not less than 1500 pounds per square inch shall be used as a cradle or blocking where shown on the plans or where directed by the ENGINEER. Bends, crosses with one opening plugged, and all tees shall be placed between solid ground and fitting to be anchored to the size and shape as shown on the plans or as directed by the ENGINEER. Gate valves shall be anchored as shown in plans.

810.07 - Service Connections

Make service connections in accordance with AWWA Manual M23 "PVC Pipe - Design and Installation" and the instructions from the Manufacturer. Use a brass service saddle (James Jones 975 "AWWA" Taper Thread (C.C.)" or equal) to connect 2" and smaller services to PVC pipe sizes 4" - 12". Use a ductile iron Tapped tee to connect 3" service connections. Coordinate with Port ARTHUR

SPECIFICATIONS FOR RESILIENT WEDGE GATE VALVES SIZES 4" THRU 36"

811.01 - General Description

Gate valves shall conform strictly to American Water Works Association Standard Specifications requirements for Resilient wedge Gate Valves for Ordinary Water Works Service C515-01, including changes and additions specifically stated in these specifications. Valves shall have an unobstructed waterway equal to or greater than the full nominal diameter of the

811.02 - Testing and Operating Procedures

All gate valve parts shall be designed to withstand safely and without permanent deformation both stresses resulting from an internal test pressure of 500 psi and combined stresses resulting from full internal pressure of 250 psi for valves sized up to and including 36 inches.

Further, the valve body and the internal parts of all valves shall be so constructed to develop full strength of the valve to the point of failure, in moving the valve gates in either direction across their seats from the point of opening to their full-closed position under full service pressure without rupture or permanent deformation of any other part.

The gate valve shall be subjected to a 500 psi hydrostatic seat and shell test which shall be applied between the gates. All joints and castings shall be completely water-tight. No casting shall show any suggestion of permanent distortion.

The resilient wedge mechanism shall provide zero leakage at the rated water working pressure when installed with the line flow in either direction.

811.03 - Valve Construction

- (a) Valves shall open left with fixed non-rising stem.
- (b) Operating nut is to be 2 inch square.
- (c) For Valve Sizes from 4" thru 24", the Stem shall be made of bronze (ASTM B-763, Alloy 867) with tensile strength of not less than 80,000 psi, a yield strength greater than 32,000 psi, and an elongation of not less than 15 percent. For Valve Sizes from 30" to 36", the Stem shall be made of bronze (ASTM B-862) with tensile strength of not less than 90,000 psi, a yield strength greater than 40,000 psi, and an elongation of not less than 18 percent.
- (d) All valves are manufactured with mechanical joints.
- (e) The body and bonnet shall be cast from a high-grade ductile iron which conforms to all requirements of ASTM 536-6545-12, or latest revision thereof.
- (f) All ferrous surfaces inside and outside shall have a fusion-bonded epoxy coating in accordance with AWWA C-550 or latest revision thereof.
- (g) The sealing mechanism shall consist of a cast iron gate having a vulcanized synthetic rubber coating. The valve (h) Packing shall be double "O" ring construction, with two above and one below the thrust collar except for 24" valves
- (i) The manufacturer shall supply certified reports stating the materials used in the gate valve conform to this specification and the latest AWWA C515-01 specification.

and larger were one above and one below the thrust collar are required. "O" rings set in a cartridge shall not be

SPECIFICATIONS FOR SOLID CONCRETE PAVING UNITS

900.01 - General

This specification covers the requirements for interlocking pavers manufactured for the construction of paved surfaces.

900.02 - Materials

Cementitious Materials shall conform to the following applicable ASTM specifications:

- 4.1.1 Portland Cements—Specification C 150.
- 4.1.2 Blended Cements—Specification C 595, Types IS or IP.
- 4.1.3 Hydrated Lime, Type S—Specification C 207. 4.1.4 Fly Ash—Specification C 618.
- 4.1.5 Ground Slag—Specification C 989. 4.1.6 Silica Fume—Specification C 1240.
- 4.2.1 Normal Weight—Specification C 33. 4.2.2 Lightweight—Specification C 331.
- 4.3 Chemical Admixtures shall conform to the following applicable ASTM specifications:
- 4.3.1 Air-entraining Admixtures—Specification C 260.
- 4.3.2 Water-reducing, Retarding, and Accelerating Admixtures—Specification C 494/C 494M.
- 4.3.3 Pigments for Integrally Colored Concrete—

Other Constituents—Integral water repellents, and other materials for which no ASTM standards exist, shall be previously established as suitable for use in concrete or shall be shown by test or experience not to be detrimental to the concrete.

4.2 Aggregates shall conform to the following ASTM specifications, except that grading requirements shall not necessarily apply:

900.03 - Physical Requirements

Units shall have an exposed face area #0.065 m2 (101 in.2), and their overall length divided by thickness shall be #4. The minimum thickness shall be 60 mm (2.36 in.).

Concrete units covered by this specification may be made from lightweight or normal weight aggregates or mixed lightweight and normal weight aggregates.

Compressive Strength—At the time of delivery to the work site, the average compressive strength of the test samples shall be not less than 55 MPa (8000 psi) with no individual unit less than 50 MPa (7200 psi) as required in 6.2. Absorption—The average absorption of the test samples shall not be greater than 5 % with no individual unit greater than 7 % as required in 6.2.

Resistance to Freezing and Thawing—The manufacturer shall satisfy the purchaser either by proven field performance or a laboratory freezing-and-thawing test that the paving units have adequate resistance to freezing and thawing. If a laboratory test is used, when tested in accordance with Test Methods C 67, specimens shall have no breakage and not greater than 1.0 % loss in dry mass of any individual unit when subjected to 50 cycles of freezing and thawing. This test method shall be conducted not more than 12 months prior to delivery of units. 5.6 Abrasion Resistance—When tested in accordance with Test Method C 418, specimens shall not have a greater volume loss than 15 cm3 /50 cm2 (0.92 in.3 /7.75 in.2). The average thickness loss shall not exceed 3 mm (0.118 in.). 5.7 Dimensional Tolerance—Length or width of units shall not differ by more than 61.6 mm (60.063 in.) from approved samples. Heights of units shall not differ more than 63.2 mm (60.125 in.) the specified standard dimension. All tests shall be performed as required in 6.2. Units shall meet dimensional tolerances prior to the application of architectural finishes.

900.04 - Sampling and Testing

The purchaser or his authorized representative shall be accorded proper facilities to inspect and sample the units at the place of manufacture from the lots ready for delivery.

Sample and test units in accordance with Test Methods C 140, except as required in 5.5. Units tested in compression shall be whole. If the testing machine does not have sufficient force to break a whole unit, then the unit shall be cut in half along the shortest axis and one half tested. Units with protruding, smaller ends shall have the ends saw cut and the remaining larger pieces tested. This specimen shall be symmetrical about two axes.

900.04 - Visual Inspection

All units shall be sound and free of defects that would interfere with the proper placing of the units or impair the strength or performance of the construction. Minor cracks incidental to the usual methods of manufacture or minor chipping resulting from customary methods of handling in shipment and delivery shall not be deemed grounds for

rejection.

In case the shipment fails to conform to the specified requirements, the manufacturer may sort it, and new specimens shall be selected by the purchaser from the retained lot and tested at the expense of the manufacturer. In case the second set of specimens fails to conform to the test requirements, the entire lot shall be rejected.

1000.01 - Material

The sod shall consist of live, growing St. Augustine grass, when shown on the Drawings, or other acceptable grass sod indicated on the Drawings secured from sources that are approved by the Engineer or designated representative. St. Augustine sod or other grass sod as shown on the Drawings shall have a healthy, virile root system of dense, thickly matted roots throughout the soil of the sod for a minimum thickness of 1 inch (25 millimeters). The thickness measure does not include grass. The sod shall be cut in rectangular pieces with its shortest side not less than 12 inches (300 mm). The Contractor shall not use sod from areas where the grass is thinned out nor where the grass roots have been dried out by exposure to the air and sun to such an extent as to damage its ability to grow when transplanted.

SPECIFICATIONS FOR SOD

The sod shall be substantially free from noxious weeds, Johnson grass or other grasses and shall not contain any matter deleterious to its growth or which might affect its subsistence or hardiness when transplanted. Unless the area has been closely pastured, it shall be closely mowed and raked to

remove all weeds and long standing stems. Sources from which sod is to be secured shall be approved by the Engineer or designated representative.

Care shall be taken at all times to retain the native soil of the roots of the sod during the process of excavating, hauling and planting. Sod material shall be kept moist from the time it is dug until it is planted. The sod existing at the source shall be watered to the extent required by the Engineer or designated

Fertilizer and the rate of application shall conform to the requirements of Standard Specification Item No. 606S, "Fertilizer".

of No. 11 gage (3 mm) wire that is bent to form a "U" approximately 1 inch (25 mm) in width.

Water shall be furnished by the Contractor and shall be clean and free of industrial wastes and other substances harmful to the growth of sod or to the

1000.01 - Planting Season

or ground staple for each piece of sod.

representative prior to excavating.

All planting shall be done between April and November except as specifically authorized in writing by the Engineer or designated representative. 1000.02 - Construction Methods

After the designated areas have been completed to the lines, grade and cross sections indicated on the Drawings, the surface shall be worked to a

shall be applied and tilled. Areas that become crusted shall be reworked to an acceptable condition before sodding. Sodding of the type specified shall conform to the requirements of this Specification Item. The Contractor shall give continuous care to the sodded area until the sod is accepted. The sod shall be placed on the prepared surface with the edges in close contact and alternate courses staggered. In ditches the sod shall be placed with the longer dimension perpendicular to the flow of water in the ditch. On slopes, starting at the bottom of the slope, the sod shall be placed with the

longer dimension parallel to the contours of the ground. The exposed edges of sod shall be buried flush with the adjacent soil. On slopes exceeding 3:1 or

where the sod may be displaced, the sod shall be pegged with not less than 4 stakes or ground staples per square yard (square meter) with at least 1 stake

depth of not less than 4 inches (100 mm) with a disc, tiller or other equipment approved by the Engineer or designated representative. Fertilizer nutrients

Pegs shall be of wood lath or similar material, pointed and driven with the flat side against the slope, 6 inches (150 mm) into the ground, leaving approximately ½ inch (12.5 mm) of the top above the ground. Ground staples shall not be less than 13 inches (330 mm) in length and shall be constructed

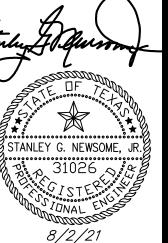
Immediately after the area is sodded, it shall be watered with a minimum of 5 gallons of water per square yard (22.5 liters per square meter) and at 10 day intervals as needed and as directed by the Engineer or designated representative. Subsequent to the initial application water shall be applied at a minimum rate of 3 gallons per square yard (13.5 liters per square meter), as required on the Drawings or as directed by the Engineer or designated representative until final acceptance by the City or until the grass uniformly reaches a height of 2 ½ inches (62.5 mm).

Availability of water from the Austin Water Utility will be limited as stated under the Water Conservation Standard, City of Austin Land Development Code Chapter 6-2, Article II, "Water Use Management Plan Established". The use of potable water will be restricted as stated in city of Austin Land Development code Sections 6-4-73, 6-4-54, 6-4-63, 6-4-64, 6-4-65, 6-4-81,

6-4-92, 15-9-37(D) and 15-9-101(B). Where applicable, the shoulders, slopes and ditches shall be smoothed after planting has been completed and shaped to conform to the desired cross sections shown on the Drawings. Any excess soil from planting operations shall be spread uniformly over adjacent areas or disposed of as directed by the Engineer or designated representative so that the completed surfaces will present a neat appearance. All sodded areas shall be rolled after the initial watering application, when sufficiently dry.







FOR PERMITTING & CONSTRUCTION ARCHITECT HAS REVIEWED THE CONSULTANT'S WORK AND COORDINATED IT WITH THE OVERALL PROJECT

CAD

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ISSUED FOR SCHEMATIC DESIGN DATE: X DESIGN DEVELOPMENT

BIDS & CONSTRUCTION X DATE: 08/02/2021 REVISION: DATE:__

DATE: X

REVISION:

REVISION:

DATE:__

DATE:__

DRAWINGS SHEET TITL **SPECIFICATIONS**

SHEET NUMBER