

Received

AUG 26 2019

PSI

AUG 30 2019

WILLIAMSON COUNTY, TEXAS

CHANGE ORDER NUMBER: 1

Received

AUG 22 2019

HNTB Corporation
Round Rock

1. CONTRACTOR: QA Construction
2. Change Order Work Limits: Sta. 0+83 to Sta. 2+37
3. Type of Change (on federal-aid non-exempt projects): Minor (Major/Minor)
4. Reasons: 3F (3 Max. - In order of importance - Primary first)

Project:	<u>1811-278</u>
Roadway:	<u>Forest North-Anderson Mill</u>
CSJ Number:	

5. Describe the work being revised:

3F: County Convenience. Additional work desired by the County. This Change Order adds drainage improvements on Tottenham Court at the County's request and provides the final balancing of unused items for the 8-inch water line relocation.

6. Work to be performed in accordance with Items: See attached
7. New or revised plan sheet(s) are attached and numbered: SF1, SF3, SF8, SF17, SF21, SF22, SD
8. New Special Provisions/Specifications to the contract are attached: No
9. New Special Provisions to Item N/A No. N/A, Special Specification Item N/A are attached.

Each signatory hereby warrants that each has the authority to execute this Change Order (CO).

The contractor must sign the Change Order and, by doing so, agrees to waive any and all claims for additional compensation due to any and all other expenses; additional changes for time, overhead and profit; or loss of compensation as a result of this change.

The following information must be provided

Time Ext. #: 1 Days added on this CO: 15

Amount added by this change order: \$1,513.40

THE CONTRACTOR Date 8/21/19

By [Signature]

Typed/Printed Name Dan Hernandez

Typed/Printed Title Project Manager

RECOMMENDED FOR EXECUTION:

[Signature] P.E. 8/19/22
Project Manager Date

N/A
Design Engineer Date

[Signature] 8/29/19
Program Manager Date

Design Engineer's Seal:

See attached plan sheets

County Commissioner Precinct 1 Date
|| APPROVED || REQUEST APPROVAL

County Commissioner Precinct 2 Date
|| APPROVED || REQUEST APPROVAL

County Commissioner Precinct 3 Date
|| APPROVED || REQUEST APPROVAL

County Commissioner Precinct 4 Date
☐ APPROVED ☐ REQUEST APPROVAL

County Judge Date
☐ APPROVED

WILLIAMSON COUNTY, TEXAS

CHANGE ORDER NUMBER: 1

Project # 1811-278

TABLE A: Force Account Work and Materials Placed into Stock

	LABOR	HOURLY	HOURLY RATE

TABLE B: Contract Items:

ITEM	DESCRIPTION	UNIT	UNIT PRICE	ORIGINAL + PREVIOUSLY REVISED		ADD or (DEDUCT)	NEW		OVERRUN/ UNDERRUN
				QUANTITY	ITEM COST		QUANTITY	ITEM COST	
100-6002	PREPARING ROW	STA	\$1,200.00	9.00	\$10,800.00		2.00	\$13,200.00	\$2,400.00
110-6002	EXCAVATION (CHANNEL)	CY	\$18.00	127.00	\$2,286.00		15.00	\$2,556.00	\$270.00
132-6003	EMBANKMENT (FINAL)(ORD COMP)(TY B)	CY	\$30.00	19.00	\$570.00		5.00	\$720.00	\$150.00
161-6030	COMPOST MANUFACTURED TOPSOIL (6")	SY	\$7.00	1298.00	\$9,086.00		88.00	\$9,702.00	\$616.00
164-6007	BROADCAST SEED (PERM) (URBAN) (CLAY)	SY	\$5.25	1298.00	\$6,814.50		88.00	\$7,276.50	\$462.00
164-6009	BROADCAST SEED (TEMP) (WARM) (CLAY)	SY	\$5.25	649.00	\$3,407.25		44.00	\$3,638.25	\$231.00
168-6001	VEGETATIVE WATERING	MG	\$22.00	197.00	\$4,334.00		2.20	\$4,382.40	\$48.40
169-6006	SOIL RETENTION BLANKETS (CL 2) (TY F)	SY	\$3.50	1298.00	\$4,543.00		88.00	\$4,851.00	\$308.00
400-6006	CUT & RESTORING PAV	SY	\$135.00	15.00	\$2,025.00		42.00	\$7,695.00	\$5,670.00
460-6001	CMP (GAL STL 12 IN)	LF	\$190.00	0.00	\$0.00		72.00	\$13,680.00	\$13,680.00
467-6317	SET (TY II) (12 IN) (CMP) (4:1) (P)	EA	\$1,900.00	0.00	\$0.00		1.00	\$1,900.00	\$1,900.00
474-6001	SLOT DRAIN (GAL STL) (12 IN)	LF	\$265.00	0.00	\$0.00		103.00	\$27,295.00	\$27,295.00
502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	\$3,800.00	2.00	\$7,600.00		0.50	\$9,500.00	\$1,900.00
506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	\$3.50	443.00	\$1,550.50		160.00	\$2,110.50	\$560.00
506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	\$1.50	443.00	\$664.50		160.00	\$904.50	\$240.00
531-6001	CONC SIDEWALKS (4")	SY	\$72.00	6.00	\$432.00		3.00	\$648.00	\$216.00
1004-6002	TREE PROTECTION	AC	\$2,000.00	0.30	\$600.00		1.00	\$2,600.00	\$2,000.00
510-AW8-DIA	PIPE, 8" DIA, DI CL 350 (ALL DEPTHS) WITH RESTRAINED JOINTS INCLUDES EXCAVATION AND BACKFILL	LF	\$95.00	402.00	\$38,190.00		(402.00)	\$0.00	(\$38,190.00)
510-JW 8" X 8"	WET CONNECTIONS, 8" DIA. X 8" DIA.	EA	\$1,500.00	1	\$1,500.00		(1.00)	\$0.00	(\$1,500.00)
510-KWW	DUCTILE IRON FITTINGS	TON	\$7,500.00	0.35	\$2,625.00		(0.35)	\$0.00	(\$2,625.00)
511S-A8	VALVES, GATE, 8" DIAMETER	EA	\$1,900.00	2	\$3,800.00		(2.00)	\$0.00	(\$3,800.00)
SP510-JW-AC-8"X6"	AC PIPE CONNECTIONS, 8" X 6"	EA	\$1,300.00	4	\$5,200.00		(4.00)	\$0.00	(\$5,200.00)
SP510-JW-AC-8"X8"	AC PIPE CONNECTIONS, 8" X 8"	EA	\$1,500.00	1	\$1,500.00		(1.00)	\$0.00	(\$1,500.00)
SP1900-W8DIA	REMOVING PIPE, 8" DIA. AC PIPE FOR REMOVAL AT STORM CROSSINGS, REQUIRED RESRIANED JOINTS TO EXISTING COUPLINGS AND OTHER AREAS SPECIFIED ON PLANS AND INCLUDING TRENCH AND PAVEMENT REPAIRS	LF	\$18.00	201	\$3,618.00		(201.00)	\$0.00	(\$3,618.00)
TOTALS					\$111,145.75			\$112,659.15	\$1,513.40

CHANGE ORDER REASON(S) CODE CHART

1. Design Error or Omission	1A. Incorrect PS&E 1B. Other
2. Differing Site Conditions (unforeseeable)	2A. Dispute resolution (expense caused by conditions and/or resulting delay) 2B. Unavailable material 2C. New development (conditions changing after PS&E completed) 2D. Environmental remediation 2E. Miscellaneous difference in site conditions (unforeseeable)(Item 9) 2F. Site conditions altered by an act of nature 2G. Unadjusted utility (unforeseeable) 2H. Unacquired Right-of-Way (unforeseeable) 2I. Additional safety needs (unforeseeable) 2J. Other
3. County Convenience	3A. Dispute resolution (not resulting from error in plans or differing site conditions) 3B. Public relations improvement 3C. Implementation of a Value Engineering finding 3D. Achievement of an early project completion 3E. Reduction of future maintenance 3F. Additional work desired by the County 3G. Compliance requirements of new laws and/or policies 3H. Cost savings opportunity discovered during construction 3I. Implementation of improved technology or better process 3J. Price adjustment on finished work (price reduced in exchange for acceptance) 3K. Addition of stock account or material supplied by state provision 3L. Revising safety work/measures desired by the County 3M. Other
4. Third Party Accommodation	4A. Failure of a third party to meet commitment 4B. Third party requested work 4C. Compliance requirements of new laws and/or policies (impacting third party) 4D. Other
5. Contractor Convenience	5A. Contractor exercises option to change the traffic control plan 5B. Contractor requested change in the sequence and/or method of work 5C. Payment for Partnering workshop 5D. Additional safety work/measures desired by the contractor 5E. Other
6. Untimely ROW/Utilities	6A. Right-of-Way not clear (third party responsibility for ROW) 6B. Right-of-Way not clear (County responsibility for ROW) 6C. Utilities not clear 6D. Other

Williamson County Road Bond Program

**Forest North-Anderson Mill
Williamson County Project No. 1811-278**

Change Order No. 1

Reason for Change

This Change Order adds drainage improvements on Tottenham Court at the County's request and also provides the final balancing of unused items for the 8-inch water line relocation. For the Tottenham Court improvements, the Contractor agreed to overrun the existing bid items. The additional work required three (3) new bid items. The drainage improvements consist of the installation of a slotted drain pipe, a pipe outfall and safety end treatment at the end of the pipe. There is some minor re-grading of the existing ditch line and all disturbed areas will be re-vegetated upon completion of the work.

The following summarizes the new Contract items required for this Change Order.

ITEM	DESCRIPTION	QTY	UNIT
460-6001	CMP (GAL STL 12 IN)	72	LF
467-6317	SET (TY II) (12 IN) (CMP) (4:1) (P)	1	EA
474-6001	SLOT DRAIN (GAL STL) (12 IN)	103	LF

This Change Order results in a net increase of \$1,513.40 to the Contract amount, for an adjusted Contract total of \$296,513.40. The original Contract amount was \$295,000.00. As a result of this and all Change Orders to-date, \$1,513.40 has been added to the Contract, resulting in a 0.51% net increase in the Contract cost. Fifteen (15) days will be added to the Contract as a result of this Change Order.

HNTB Corporation

James Klotz, P.E.

FOREST NORTH DRAINAGE IMPROVEMENTS
TOTAL OPINION OF PROBABLE COSTS

TxDOT Bid Item	Description	Unit	Estimated Quantity	Unit Cost	Total Cost
0100 6002	PREPARING ROW	STA	2	\$ 1,200.00	\$ 2,400.00
0110 6002	EXCAVATION (CHANNEL)	CY	15	\$ 18.00	\$ 270.00
0132 6003	EMBANKMENT (FINAL)(ORD COMP)(TY B)	CY	5	\$ 30.00	\$ 150.00
0160 WC02	COMPOST MANUFACTURED TOPSOIL (6")	SY	88	\$ 7.00	\$ 616.00
0164 WC05	BROADCAST SEED (PERM) (URBAN) (CLAY)	SY	88	\$ 5.25	\$ 462.00
0164 WC10	BROADCAST SEED (TEMP) (WARM) (CLAY)	SY	44	\$ 5.25	\$ 231.00
0168 WC01	VEGETATIVE WATERING	MG	2.2	\$ 22.00	\$ 48.40
0169 6006	SOIL RETENTION BLANKETS (CL 2) (TY F)	SY	88	\$ 3.50	\$ 308.00
0400 6006	CUT & RESTORING PAV	SY	42	\$ 135.00	\$ 5,670.00
0460 6001	CMP (GAL STL 12 IN)	LF	72	\$ 190.00	\$ 13,680.00
0467 6317	SET (TY II) (12 IN) (CMP) (4: 1) (P)	EA	1	\$ 1,900.00	\$ 1,900.00
0474 6001	SLOT DRAIN (GAL STL) (12 IN)	LF	103	\$ 265.00	\$ 27,295.00
0502 6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	0.5	\$ 3,800.00	\$ 1,900.00
0506 6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	160	\$ 3.50	\$ 560.00
0506 6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	160	\$ 1.50	\$ 240.00
0531 6001	CONC SIDEWALKS (4")	SY	3	\$ 72.00	\$ 216.00
1004 6002	TREE PROTECTION	AC	1	\$ 2,000.00	\$ 2,000.00
Project Total					\$ 57,946.40

Dawn Haggard

From: Ryan Rivera
Sent: Monday, July 08, 2019 3:49 PM
To: Ryan Helm
Cc: 62811_1811-278_ForestNorthAnderson; James Klotz; Clayton Weber; Eddie R. Church
Subject: RE: Forest North Improvement - Additional Work Pricing

Ryan,

Please proceed with the additional work that QA Services priced for the Forest North project at Tottenham Ct. Let us know roughly 1 week prior to your start so we can notify residents of upcoming work. We will begin the change order process to add these items to the contract with an additional 15 days to complete the work. Let me know if you have any questions.

Thanks,

Ryan

From: Ryan Helm <ryan@qacsi.com>
Sent: Monday, July 1, 2019 4:52 PM
To: Ryan Rivera <rrivera@HNTB.com>
Cc: 62811_1811-278_ForestNorthAnderson <62811_1811-278_ForestNorthAnderson@HNTB.com>
Subject: Fwd: Forest North Improvement - Additional Work Pricing

Please see below.

Thanks,

Jess Ryan Helm
QA Construction Services inc
C-956-455-7388

Sent from my iPhone

Begin forwarded message:

From: <jose@qacsi.com>
Date: July 1, 2019 at 2:41:41 PM CDT
To: "Ryan Helm" <ryan@qacsi.com>
Cc: "Javier Barajas" <jbarajas@landmarkces.com>
Subject: Forest North Improvement - Additional Work Pricing

Ryan,

See attached pricing for the additional work requested by the Project Manager. Let me know if you have any question.

Thanks,

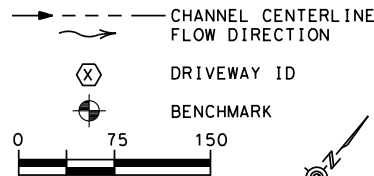
Jose Ruiz
Project Estimator
817-367-8383 Cell
jose@qacsi.com



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- LEGEND
- CITY OF AUSTIN LIMITS
 - EXISTING PROPERTIES
 - 13515 EXISTING ADDRESS
 - EXISTING R.O.W.
 - EXISTING EASEMENT
 - EXISTING EDGE OF PAVEMENT
 - OHE EXISTING OVERHEAD ELECTRIC
 - WL EXISTING WATERLINE
 - EXISTING RIGHT-OF-WAY
 - PROPOSED EASEMENT
 - PROPOSED TEMPORARY EASEMENT



NOTES:

- COORDINATES ARE BASED ON TEXAS STATE PLANE SYSTEM, CENTRAL ZONE, ADJUSTED TO THE SURFACE. TO TRANSFORM FROM SURFACE VALUES TO LAMBERT GRID VALUES USE A FACTOR OF 0.99988706.
- BENCHMARKS: (VERTICAL DATUM: NAD 83)
TBM "A": SQUARE CUT ON CURB.
ELEVATION: 889.07'
TBM "B": RAILROAD SPIKE SET IN POWER POLE
ELEVATION: 889.65'
TBM "D": SQUARE CUT ON SIDEWALK.
ELEVATION: 904.20
- PARCEL INFORMATION FOR THE PROJECT LAYOUT WAS OBTAINED FROM THE WILLIAMSON COUNTY APPRAISAL DISTRICT AND IS FOR REFERENCE ONLY.
- CIP SF1 DESCRIPTION:
STORM SEWER SF1:
INSTALL STORM SEWER ALONG SOUTH SIDE OF MEADOWHEATH DRIVE FROM STILLFOREST STREET TO HAVERSHAM COURT.
CULVERT C-31:
REMOVE EXISTING CULVERT.
CHANNEL SF1-3:
REGRADE CHANNEL ALONG SOUTH SIDE OF MEADOWHEATH DRIVE FROM BROADMEADE AVENUE TO STILLFOREST STREET.
- CIP SF2 DESCRIPTION:
CHANNEL SF2-1:
REGRADE CHANNEL ALONG WEST SIDE OF STILLFOREST STREET FROM CHATTERTON COURT TO MEADOWHEATH DRIVE.
CULVERT C-35:
REMOVE AND REPLACE EXISTING CULVERT.
CHANNEL SF1-3:
REGRADE CHANNEL ALONG WEST SIDE OF STILLFOREST STREET FROM TOTTENHAM COURT TO CHATTERTON COURT.
CULVERT C-36:
REMOVE AND REPLACE EXISTING CULVERT.
- ~~CIP SF3 DESCRIPTION:~~
- CIP SF4 DESCRIPTION:
CHANNEL SF4-1
REGRADE CHANNEL ALONG NORTH SIDE OF TOTTENHAM COURT FROM THE CUL-DE-SAC TO STILLFOREST STREET.
STORM SEWER SF4-1
INSTALL STORM SEWER ON NORTH SIDE OF TOTTENHAM TO CHANNEL.
- ALL PROPERTIES WITHIN THIS ZONE ARE SUBJECT TO THE FOLLOWING RESTRICTIONS IN ACCORDANCE WITH FOREST NORTH SUBDIVISION RESTRICTIONS:
-ALLOWED ONE-RIBBON DRIVEWAY
-NO FENCE, WALL OR HEDGE SHALL BE BUILT FORWARD OF THE BUILDING SETBACK LINE

REV. NO.	BY	DATE	REVISION DESCRIPTION
1	CG	8/24/16	CO 1 - REMOVE CIP SF3
2	VO	6/6/19	ADD SLOTTED DRAIN TO SF4



K FRIESE & ASSOCIATES, INC.
1120 S. CAPITAL OF TEXAS HWY, II-100, AUSTIN, TX 78746

WILLIAMSON COUNTY
FOREST NORTH DRAINAGE IMPROVEMENTS
STILLFOREST ZONE
PROJECT LAYOUT

**K·FRIESE
+ ASSOCIATES**
PUBLIC PROJECT ENGINEERING
1120 S. Capital of Texas Highway
CityView 2, Suite 100
Austin, Texas 78746
P - 512.338.1704
F - 512.338.1784
TBPE Firm #6535
www.kfriesecom



SCALE	1" = 150'
DATE	9/01/2017
SHEET NO.	5F1 OF 5F22

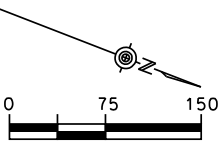
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Drainage Area ID	Drainage Area (ac)	C Value	Tc (min)	Intensity (25-YR) (in/hr)	Discharge (25-YR) (cfs)	Intensity (100-YR) (in/hr)	Discharge (100-YR) (cfs)
SF16	3.46	0.5	26.8	5.21	9.9	6.82	13.0
SF18	0.52	0.5	16.8	6.60	1.9	8.52	2.4
SF20	0.97	0.5	20.0	6.07	3.2	7.88	4.2
SF22	0.66	0.5	16.4	6.67	2.4	8.61	3.1
SF24	1.57	0.5	16.5	6.65	5.7	8.59	7.4
SF26	0.23	0.5	11.1	7.88	1.0	10.03	1.3
SF28	1.56	0.5	21.2	5.89	5.0	7.66	6.6
SF32	0.51	0.5	10.0	8.19	2.3	10.40	2.9
SF101	3.83	0.5	21.9	5.80	12.2	7.55	15.9
SF102	0.37	0.5	10.0	8.19	1.7	10.40	2.1
SF103	1.30	0.5	23.3	5.61	4.0	7.32	5.2
SF104	2.80	0.5	30.0	4.89	7.5	6.43	9.9
SF105	0.31	0.5	10.0	8.19	1.4	10.40	1.8

SEE NOTE 2

- LEGEND
- CITY OF AUSTIN LIMITS
 - DRAINAGE AREA
 - CHANNEL
 - TC FLOW PATH
 - FLOW DIRECTION
 - (X.XX) DRAINAGE AREA ID
 - [X.XX] INLET ID



- NOTE:
- HYDROLOGY FOR THE ONSITE DRAINAGE BASINS WAS DEVELOPED USING THE RATIONAL METHOD DESCRIBED IN THE TXDOT HYDRAULIC MANUAL, MAY 2014, SECTION 13.
C-VALUE: 0.50 FOR SF RESIDENTIAL
TC: KERBY-KIRPICH METHOD
 - FLOW FOR CIP SF4 CHANNEL WAS CALCULATED USING THE FLOW FOR DRAINAGE AREA SF24.

REV. NO.	BY	DATE	REVISION DESCRIPTION
1	CG	5/10/17	RFI 20 - REVISE CIP SF2
2	VO	6/6/19	ADD SLOTTED DRAIN TO SF4



K FRIESE & ASSOCIATES, INC.
1120 S. CAPITAL OF TEXAS HWY, II-100, AUSTIN, TX 78746

WILLIAMSON COUNTY
FOREST NORTH DRAINAGE IMPROVEMENTS
STILLFOREST ZONE
DRAINAGE AREA MAP

K FRIESE + ASSOCIATES
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1120 S. Capital of Texas Highway
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Austin, Texas 78746
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F - 512.338.1784
TBPE Firm #6535
www.kfriesecom

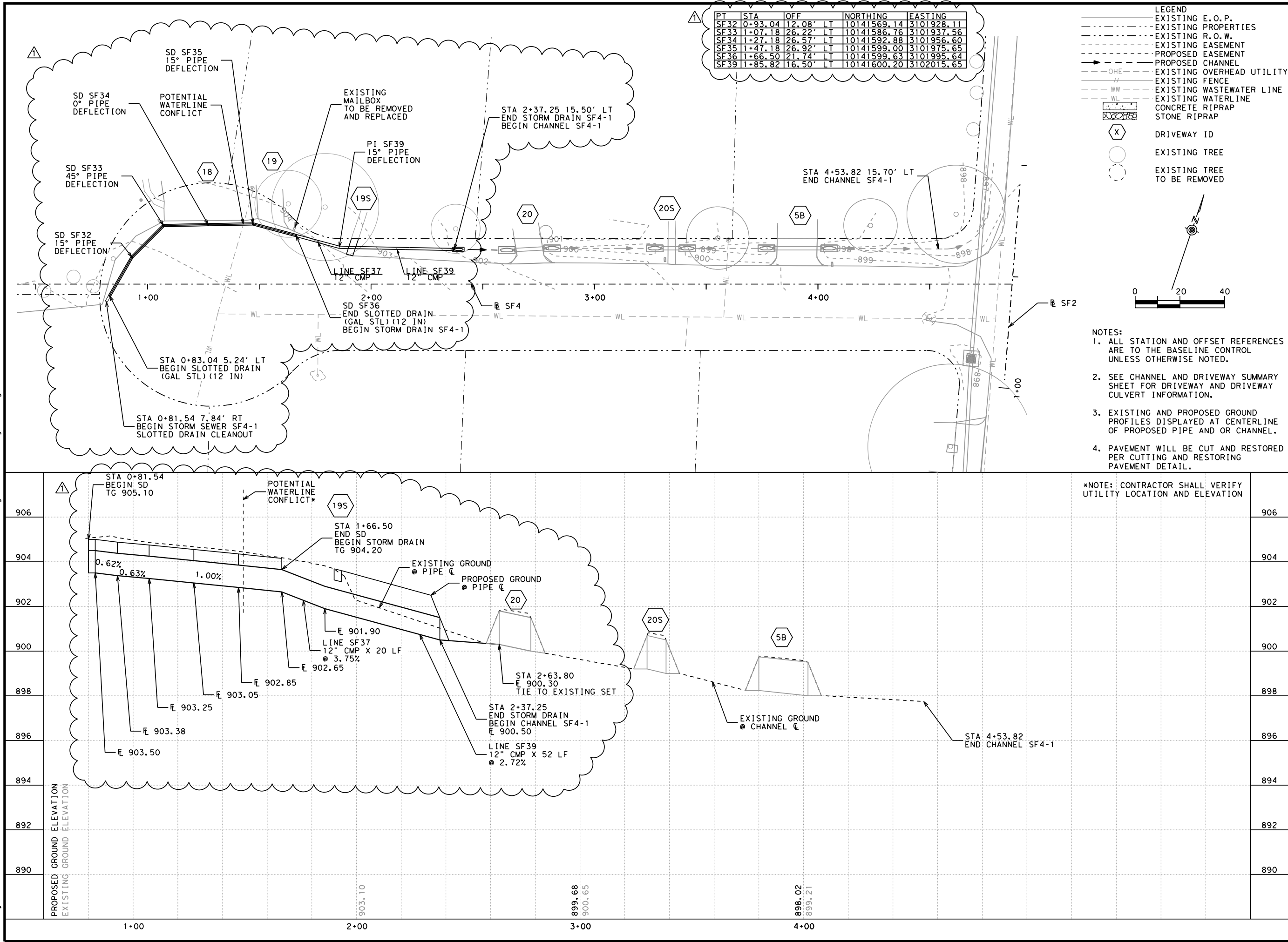


SCALE 1" = 150'
DATE 9/01/2017

SHEET NO.
SF3 OF SF22

SSN#OF#S

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- NOTES:
- ALL STATION AND OFFSET REFERENCES ARE TO THE BASELINE CONTROL UNLESS OTHERWISE NOTED.
 - SEE CHANNEL AND DRIVEWAY SUMMARY SHEET FOR DRIVEWAY AND DRIVEWAY CULVERT INFORMATION.
 - EXISTING AND PROPOSED GROUND PROFILES DISPLAYED AT CENTERLINE OF PROPOSED PIPE AND OR CHANNEL.
 - PAVEMENT WILL BE CUT AND RESTORED PER CUTTING AND RESTORING PAVEMENT DETAIL.

*NOTE: CONTRACTOR SHALL VERIFY UTILITY LOCATION AND ELEVATION

REV.	NO.	BY	DATE	REVISION DESCRIPTION
1	1	VO	6/5/19	ADD SLOTTED DRAIN TO SF4

VICTORIA M. ORTEGA
113096
6/6/2019

K FRIESE & ASSOCIATES, INC.
1120 S. CAPITAL OF TEXAS HWY, II-100, AUSTIN, TX 78746

WILLIAMSON COUNTY
FOREST NORTH DRAINAGE IMPROVEMENTS
CHANNEL SF4-1 PLAN AND PROFILE - START TO END

K-FRIESE + ASSOCIATES
PUBLIC PROJECT ENGINEERING
1120 S. Capital of Texas Highway
CityView 2, Suite 100
Austin, Texas 78746
P - 512.338.1704
F - 512.338.1784
TBPE Firm #6535
www.kfriesecom

WILLIAMSON COUNTY
1848

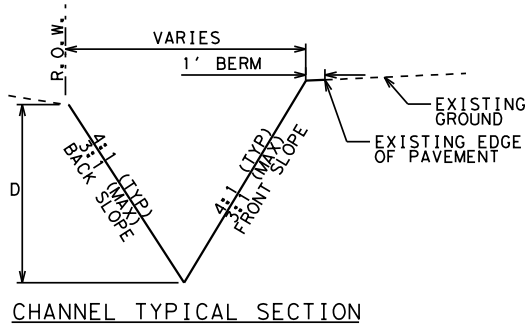
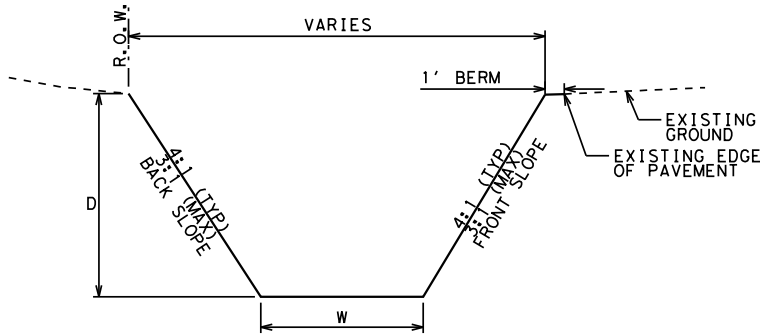
SCALE	H: 1" = 40' V: 1" = 4'
DATE	9/01/2017
SHEET NO. SF8 OF SF22	

SSN#OF#S

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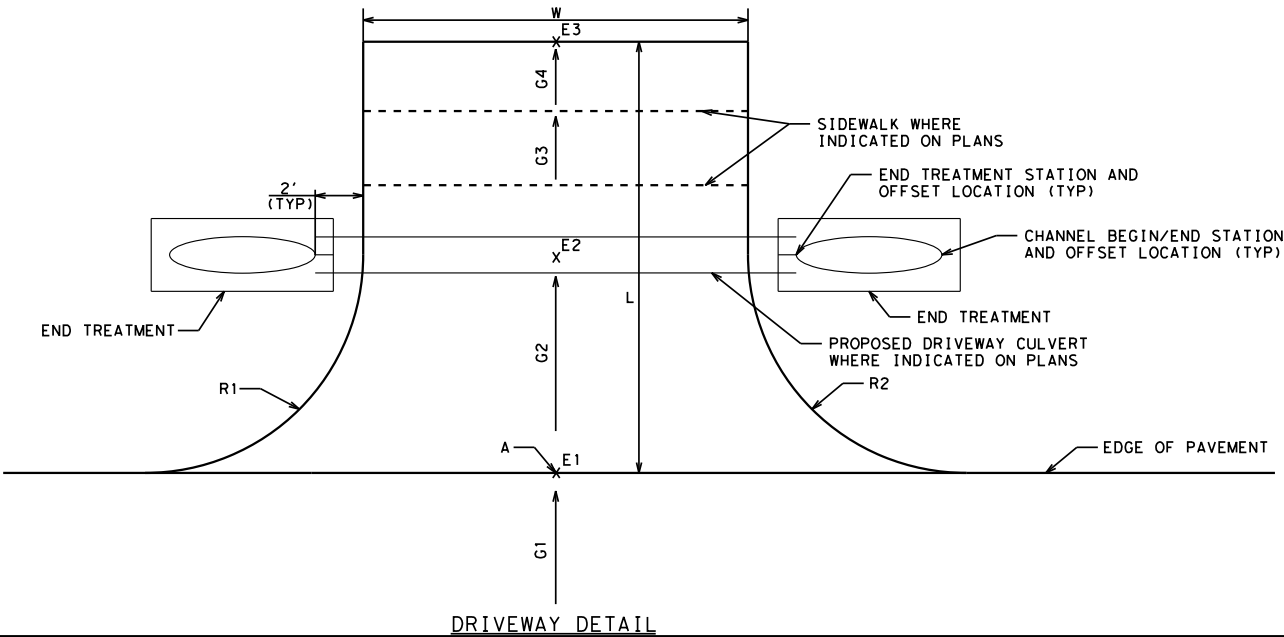
Channel Hydraulics Summary

CIP Project ID	Channel ID	Segment ID	Upstream			Downstream Station			Length (ft)	Longitudinal Slope (%)	Roughness Coefficient (n)	Bottom (W) (ft)	Depth (D) (ft)	Side Front (: :1)	Side Back (: :1)	Capacity (cfs)	Lining Material	Q ₂₅ (cfs)	V ₂₅ (fps)	d ₂₅ (ft)		
			Station (sta)	Offset (ft)	Flowline (ft)	Station (sta)	Offset (ft)	Flowline (ft)														
SF1	SF1-3	1	1+13.41	17.57	RT	888.91	1+83.80	17.00	RT	888.63	70.39	0.40	0.040	N/A	2.0	4.0	4.0	36.8	GRASS	7.0	1.52	1.07
		2	1+92.00	17.00	RT	888.50	3+17.10	17.00	RT	887.30	125.10	0.96	0.040	N/A	2.0	4.0	4.0	57.1	GRASS	7.0	2.11	0.92
		3	3+39.50	17.00	RT	886.72	4+31.00	17.60	RT	886.42	91.50	0.33	0.040	N/A	2.0	4.0	4.0	33.5	GRASS	7.0	1.41	1.11
		4	4+54.50	18.50	RT	886.14	5+17.25	19.80	RT	885.62	62.75	0.83	0.040	N/A	2.0	4.0	4.0	53.1	GRASS	7.0	2.00	0.94
		5	5+38.50	20.00	RT	885.43	5+85.25	19.00	RT	885.18	34.75	0.72	0.040	N/A	1.5	3.0	3.0	53.6	GRASS	7.0	4.78	0.70
		6	5+96.00	18.75	RT	885.08	6+35.70	21.20	RT	884.82	35.30	0.74	0.040	N/A	1.2	4.0	4.0	40.3	GRASS	7.0	4.52	0.62
SF2	SF2-1	1	5+72.83	13.22	LT	891.10	6+03.00	12.50	LT	890.60	30.17	2.00	0.040	N/A	0.5	10.0	10.0	4.7	GRASS	1.9	1.51	0.36
		2	6+42.23	11.65	LT	889.25	7+68.00	13.50	LT	886.80	125.77	1.95	0.040	N/A	1.0	5.0	8.0	21.1	GRASS	9.9	2.68	0.75
		3	8+63.40	14.43	LT	885.70	9+18.75	24.15	LT	884.82	58.94	1.50	0.040	N/A	1.2	5.0	4.0	20.6	GRASS	12.2	2.79	0.99
	SF2-3	1	1+78.23	14.11	LT	896.85	3+03.00	13.60	LT	896.35	124.77	0.40	0.040	N/A	0.7	10.0	10.0	6.4	GRASS	6.2	1.53	0.78
		2	3+61.66	13.98	LT	894.76	4+48.00	14.40	LT	893.90	86.34	1.00	0.040	N/A	0.6	4.0	5.0	2.7	GRASS	2.4	1.60	0.58
		3	4+89.83	14.78	LT	892.90	5+10.00	15.00	LT	892.50	20.17	2.00	0.040	N/A	0.8	6.0	4.0	9.0	GRASS	3.4	2.21	0.56
	SF2-5	1	10+70.18	14.95	LT	898.16	11+47.00	14.25	LT	897.85	76.70	0.40	0.040	N/A	0.9	6.0	6.7	6.0	GRASS	6.1	1.32	0.85
2		11+92.20	14.00	LT	897.78	1+10.00	15.65	LT	897.60	17.85	1.00	0.040	N/A	0.6	7.7	12.5	4.9	GRASS	1.0	1.06	0.30	
SF3	SF3-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
SF4	SF4-1	1	2+37.25	15.50	LT	900.50	2+63.80	15.20	LT	900.30	26.55	0.75	0.040	N/A	1.2	3.5	3.5	11.2	GRASS	8.5	2.08	1.08
		2	2+78.00	16.00	LT	900.00	3+30.00	16.00	LT	899.20	52.00	1.54	0.040	N/A	1.5	3.0	3.0	24.8	GRASS	8.5	2.81	1.00
		3	3+38.50	16.00	LT	899.00	3+80.00	16.00	LT	898.24	41.50	1.83	0.040	N/A	1.2	3.0	3.0	14.9	GRASS	8.5	2.99	0.97
		4	4+02.00	16.00	LT	898.00	4+53.82	15.70	LT	897.30	51.82	1.35	0.040	2	0.8	4.0	6.0	12.6	GRASS	8.5	2.37	0.67



Driveway Culvert Summary

CIP Project ID	Driveway ID	Station (A) (sta)	Length (L) (ft)	Width (W) (ft)	Radius (R ₁) (ft)	Radius (R ₂) (ft)	Roadway Grade (G ₁) (%)	Driveway Grade (G ₂) (%)	Sidewalk Grade (G ₃) (%)	Driveway Grade (G ₄) (%)	Elevation			Sidewalk Area (sy)	Driveway Area (sy)	Number of Barrels	RCP (CL III) (18 IN) (lf)	RCP (CL III) (24 IN) (lf)	Upstream				Downstream				Slope (ft/ft)	Roughness Coefficient (n)	Culvert Flows				
											(E ₁) (ft)	(E ₂) (ft)	(E ₃) (ft)						End Treatment (ea)	Station (sta)	Offset (ft)	Flowline (ft)	End Treatment (ea)	Station (sta)	Offset (ft)	Flowline (ft)			Q ₂₅ (cfs)	d ₂₅ (ft)	Capacity (cfs)		
SF1	1S	1+87.90	20	5	N/A	N/A	-2.09	-0.50	N/A	N/A	890.50	890.47	890.46	9		1	9		4:1 SET	1+83.80	17.00	RT	888.63	4:1 SET	1+92.00	17.00	RT	888.50	0.014	0.012	7.0	1.2	13.7
	2	3+28.30	17	17	5	5	-0.80	1.50	N/A	N/A	888.96	889.13	889.26		34	1	23		4:1 SET	3+17.10	17.00	RT	887.30	4:1 SET	3+39.50	17.00	RT	886.72	0.025	0.012	7.0	1.0	18.1
	3	4+42.75	16	19	5	5	-0.25	3.03	N/A	N/A	888.27	888.49	888.78		34	1	24		4:1 SET	4+31.00	17.60	RT	886.42	4:1 SET	4+54.50	18.50	RT	886.14	0.012	0.012	7.0	1.2	12.3
	4	5+27.88	13	17	5	5	-0.05	-2.15	N/A	2.90	887.71	887.53	887.65		27	1	22		4:1 SET	5+17.25	19.80	RT	885.62	4:1 SET	5+38.50	20.00	RT	885.43	0.009	0.012	7.0	1.3	10.6
	11S	5+90.63	14	5	N/A	N/A	-0.72	2.00	N/A	N/A	887.12	887.27	887.37	8		1	11		4:1 SET	5+85.25	19.00	RT	885.18	4:1 SET	5+96.00	18.75	RT	885.08	0.009	0.012	7.0	1.3	10.9
	12	7+59.79	17	20	5	5	-2.75	1.90	N/A	N/A	885.50	885.58	885.73		39					SEE STORM SEWER CALCULATIONS													
13	9+54.01	16	22	10	5	-0.35	0.65	N/A	N/A	884.24	884.30	884.37		42					SEE STORM SEWER CALCULATIONS														
SF2	5	2+66.53	14	10	10	10	-0.93	1.50	N/A	3.00	896.72	896.80	896.92		19					SEE STORM SEWER CALCULATIONS													
	6	1+76.80	14	10	5	5	-1.10	-0.95	N/A	1.30	896.44	896.40	896.47		16					SEE STORM SEWER CALCULATIONS													
	7	4+69.85	14	20	5	5	-0.65	4.50	N/A	N/A	894.52	894.90	895.16		31					SEE STORM SEWER CALCULATIONS													
	8	6+21.90	16	19	5	5	-1.40	-2.70	N/A	1.50	890.74	890.73	890.84		34					SEE STORM SEWER CALCULATIONS													
	9	8+13.85	15	8	5	5	-2.30	-1.85	N/A	0.30	887.97	887.82	887.84		15					SEE STORM SEWER CALCULATIONS													
	10	3+85.06	15	8	5	5	-2.65	0.28	N/A	2.10	887.50	887.52	887.64		15					SEE STORM SEWER CALCULATIONS													
SF3	11	4+09.16	15	23	5	5	-2.66	0.05	N/A	3.15	887.25	887.28	887.42		38					SEE STORM SEWER CALCULATIONS													
	14	11+71.20	13	23	5	5	-0.65	3.25	N/A	4.72	898.79	899.02	899.30		34					SEE STORM SEWER CALCULATIONS													
	15	1+00.00																															
	16	2+09.84																															
SF4	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-					-	-	-	-	-	-	-	-	-	-	-	-	-	
	8S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	18	1+25.88																															
	19	1+56.35																															
	19S	1+90.43	8	3	N/A	N/A	-3.48	-2.50	N/A	-2.50	903.74	903.55	903.35	3																			
	20	2+70.90	11	12	5	5	-3.48	-2.18	N/A	-1.70	901.75	901.61	901.52		17	1	15		4:1 SET	2+63.80	15.20	LT	900.30	4:1 SET	2+78.00	16.00	LT	900.00	0.020	0.012	8.5	1.2	42.0
20S	3+34.25	12	4	N/A	N/A	-1.90	-0.86	N/A	-0.05	900.81	900.75	900.73	6		1	9		4:1 SET	3+30.00	16.00	LT	899.20	4:1 SET	3+38.50	16.00	LT	899.00	0.022	0.012	8.5	1.2	17.0	
5B	3+91.00	12	18	5	5	-0.72	-2.72	N/A	-1.30	899.88	899.65	899.60		26	1	22		4:1 SET	3+80.00	16.00	LT	898.24	4:1 SET	4+02.00	16.00	LT	898.00	0.011	0.012	8.5	1.3	11.9	



REV. NO. 1
REV. BY VO
DATE 6/6/19
REVISION DESCRIPTION
ADD SLOTTED DRAIN TO SF4

VICTORIA M. ORTEGA
113096
LICENSED PROFESSIONAL ENGINEER
6/6/2019

K FRIESE & ASSOCIATES, INC.
1120 S. CAPITAL OF TEXAS HWY, II-100, AUSTIN, TX 78746

WILLIAMSON COUNTY
FOREST NORTH DRAINAGE IMPROVEMENTS
STILLFOREST ZONE
CHANNEL AND DRIVEWAY SUMMARY

K-FRIESE + ASSOCIATES
PUBLIC PROJECT ENGINEERING
1120 S. Capital of Texas Highway
CityView 2, Suite 100
Austin, Texas 78746
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www.kfriesee.com

WILLIAMSON COUNTY
1848

SCALE

DATE 9/01/2017

SHEET NO. SF17 OF SF22

SSN#OF#S

X:\Projects\0300 - Forest North Phase 2\DCN\Sheets\TottenhamCourt\0300*SF*TH*HYD06.dgn modified by Vortega on 6/6/2019 - 6:08:31 PM

Link ID	Upstream				Downstream				Number of Barrels	Size	Length (ft)	Link Slope (%)	Roughness Coefficient	Flows		Notes		
	Station	Offset	Flowline	HGL	Station	Offset	Flowline	HGL						Q ₂₅	Capacity			
	(sta)	(ft)	(ft)	(ft)	(sta)	(ft)	(ft)	(ft)						(cfs)	(cfs)			
SF28	11+49.00	14.25	LT	894.85	896.14	1+12.00	14.25	LT	894.60	896.01	1	18" RCP	61	0.42	0.012	5.1	7.9	1
SF25	1+12.00	15.65	LT	892.23	896.01	3+05.00	15.65	LT	891.65	895.51	1	18" RCP	190	0.31	0.012	5.8	6.8	1
SF23	3+05.00	13.60	LT	891.65	895.51	4+50.00	13.60	LT	890.52	892.80	1	18" RCP	141	0.80	0.012	13.1	11.0	1
SF21	4+50.00	14.40	LT	890.52	892.80	5+12.00	14.40	LT	890.05	891.65	1	18" RCP	59	0.80	0.012	15.1	11.0	1
SF19	5+12.00	15.00	LT	890.05	891.65	6+05.00	15.00	LT	887.60	888.81	1	18" RCP	91	2.72	0.012	18.1	20.2	1
SF17	6+05.00	12.50	LT	887.10	888.83	7+70.00	12.50	LT	883.30	884.34	1	24" RCP	163	2.35	0.012	19.7	40.4	1
SF15	7+70.00	13.50	LT	883.30	885.37	9+23.67	13.50	LT	880.20	881.58	1	24" RCP	153	2.04	0.012	28.2	37.7	1
SF101	6+38.20	21.20	RT	879.25	882.09	9+23.67	21.20	LT	879.20	882.05	1	36" RCP	11	0.50	0.012	12.7	54.9	1
SF101A	9+23.67	14.50	LT	879.20	882.05	7+41.45	14.50	RT	878.75	881.59	1	36" RCP	90	0.50	0.012	39.5	54.9	1
SF102	7+41.45	17.50	RT	878.75	881.59	9+33.00	17.50	RT	877.81	881.02	1	36" RCP	188	0.50	0.012	40.4	55.0	1
SF103	9+33.00	17.65	RT	877.81	881.02	10+29.50	17.65	RT	877.34	880.66	1	36" RCP	95	0.50	0.012	43.8	54.8	1
SF1J1	10+29.50	18.70	RT	877.34	880.66	10+40.50	18.70	RT	877.29	880.48	1	36" RCP	10	0.52	0.012	43.8	55.9	1
SF104	10+40.50	22.60	RT	877.29	880.48	10+47.40	22.60	LT	877.04	879.60	1	36" RCP	44	0.58	0.012	49.4	59.2	1
SF105	10+47.40	24.00	LT	877.04	879.60	10+65.00	24.00	LT	876.76	879.26	1	36" RCP	53	0.53	0.012	50.2	56.5	1
SF1J2	10+65.00	26.00	LT	876.76	879.26	10+76.53	26.00	LT	876.18	878.49	1	36" RCP	107	0.55	0.012	50.2	57.4	1, 2
SF32	0+83.04	5.24	RT	903.50	904.26	0+93.04	12.08	LT	903.38	904.24	1	12" CMP	21	0.63	0.024	0.5	1.6	
SF33	0+93.04	12.08	LT	903.38	904.24	1+07.18	26.22	LT	903.25	904.18	1	12" CMP	20	0.63	0.024	1.0	1.6	
SF34	1+07.18	26.22	LT	903.25	904.18	1+27.18	26.57	LT	903.05	904.04	1	12" CMP	21	1.00	0.024	1.5	2.1	
SF35	1+27.18	26.57	LT	903.05	904.04	1+47.18	26.92	LT	902.85	903.84	1	12" CMP	21	1.00	0.024	2.0	2.1	
SF36	1+47.18	26.92	LT	902.85	903.84	1+66.50	21.74	LT	902.65	903.33	1	12" CMP	21	1.00	0.024	2.5	2.1	
SF37	1+66.50	21.74	LT	902.65	903.33	1+85.82	16.50	LT	901.90	902.50	1	12" CMP	21	3.75	0.024	2.5	4.0	
SF39	1+85.82	16.50	LT	901.90	902.63	2+37.25	15.50	LT	900.50	901.17	1	12" CMP	52	2.72	0.024	2.5	3.4	

Inlet ID	Station (sta)	Chain	Offset (ft)		Description	Grate Perimeter (ft)	Grate Area (sf)	Clog Reduction Factor	Perimeter Reduction Factor	Inlet Elevation (ft)	Q ₂₅ (cfs)	Allowable Ponded (ft)	Ponded Elevation (ft)	Notes
SF16	7+70.00	SF2	13.50	LT	TY PSL(FG)(3-3)(3-3)	12.67	5.50	0.50	0.50	886.80	9.9	1.00	887.44	1
SF18	6+05.00	SF2	12.50	LT	TY PSL(FG)(3-3)(3-3)	12.67	5.50	0.50	0.50	890.60	1.9	0.40	890.81	1
SF20	5+12.00	SF2	15.00	LT	TY PSL(FG)(3-3)(3-3)	12.67	5.50	0.50	0.50	893.15	3.2	0.35	893.45	1, 4 – 893.84
SF22	4+50.00	SF2	14.40	LT	TY PSL(FG)(3-3)(3-3)	12.67	5.50	0.50	0.50	893.90	2.4	0.50	894.15	1
SF24	3+05.00	SF2	13.60	LT	TY PSL(FG)(3-3)(3-3)	12.67	5.50	0.50	0.50	896.35	5.7	0.50	896.79	1
SF26	1+12.00	SF2	15.65	LT	TY PSL(FG)(3-3)(3-3)	12.67	5.50	0.50	0.50	897.60	1.0	0.75	897.74	1, 4 – 898.72
SF28	11+49.00	SF2A	14.25	LT	TY PSL(FG)(3-3)(3-3)	12.67	5.50	0.50	0.50	897.85	5.0	0.90	898.26	1
SF101	6+38.20	SF1	21.20	RT	TY PSL(FG)(4-4)(4-4)	16.67	8.19	0.50	0.50	884.82	12.2	1.20	885.43	1, 4 – 887.20
SF102	7+41.45	SF1	17.50	RT	TY PSL(FG)(3-3)(3-3)	12.67	5.50	0.50	0.50	884.50	1.7	0.70	884.69	1
SF103	9+33.00	SF1	17.65	RT	TY PSL(FG)(3-3)(3-3)	12.67	5.50	0.50	0.50	883.17	4.0	1.00	883.51	1
SF104	10+40.50	SF1	22.60	RT	TY PSL(FG)(3-3)(3-3)	12.67	5.50	0.50	0.50	882.00	7.5	0.60	882.53	1, 4 – 883.61
SF105	10+47.40	SF1	24.00	LT	TY PSL(FG)(3-3)(3-3)	12.67	5.50	0.50	0.50	882.00	1.4	1.00	882.17	1
SF32	0+93.04	SF4	12.08	LT	20' SLOTTED DRAIN (12 IN)	n/a	n/a	n/a	n/a	905.08	0.5	0.25	905.25	
SF33	1+07.18	SF4	26.22	LT	20' SLOTTED DRAIN (12 IN)	n/a	n/a	n/a	n/a	904.85	0.5	0.25	905.02	
SF34	1+27.18	SF4	26.57	LT	20' SLOTTED DRAIN (12 IN)	n/a	n/a	n/a	n/a	904.67	0.5	0.25	904.83	
SF35	1+47.18	SF4	26.92	LT	20' SLOTTED DRAIN (12 IN)	n/a	n/a	n/a	n/a	904.46	0.5	0.25	904.63	
SF36	1+66.50	SF4	21.74	LT	20' SLOTTED DRAIN (12 IN)	n/a	n/a	n/a	n/a	904.18	0.5	0.25	904.35	

NOTES:

ANALYSIS PERFORMED USING GEOPAK DRAINAGE (2009 EDITION), WHICH PERFORMED HYDRAULIC COMPUTATIONS IN ACCORDANCE WITH FHWA HEC-22 GUIDELINES.

- EXISTING STORM SEWER.
- TAILWATER SET TO 10-YEAR WATER SURFACE ELEVATION FOR LAKE CREEK TRIBUTARY 2 OBTAINED FROM FEMA.
- ALL TY PSL INLETS SHALL INCLUDE A MINIMUM 1.5 FT CAST-IN-PLACE REINFORCED CONCRETE APRON PER DETAIL 'A' ON TYPE PSL DETAIL SHEET.
- THE HEADWATER ELEVATION, AS NOTED, FOR THE EXISTING CULVERT WAS USED AS THE ALLOWABLE PONDED ELEVATION AT CORRESPONDING INLET.

REV. NO.

1

REV. BY

V. Ortega

DATE

6/6/19

REVISION DESCRIPTION

ADD SLOTTED DRAIN TO SF4

STATE OF TEXAS

VICTORIA M. ORTEGA

113096

PROFESSIONAL ENGINEER

6/6/2019

K FRIESE & ASSOCIATES, INC.

1120 S. CAPITAL OF TEXAS HWY, II-100, AUSTIN, TX 78746

WILLIAMSON COUNTY

FOREST NORTH DRAINAGE IMPROVEMENTS

STILLFOREST ZONE

STORM SEWER HYDRAULIC CALCULATIONS

K•FRIESE

+ ASSOCIATES

PUBLIC PROJECT ENGINEERING

1120 S. Capital of Texas Highway

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WILLIAMSON

COUNTY

1848

SCALE

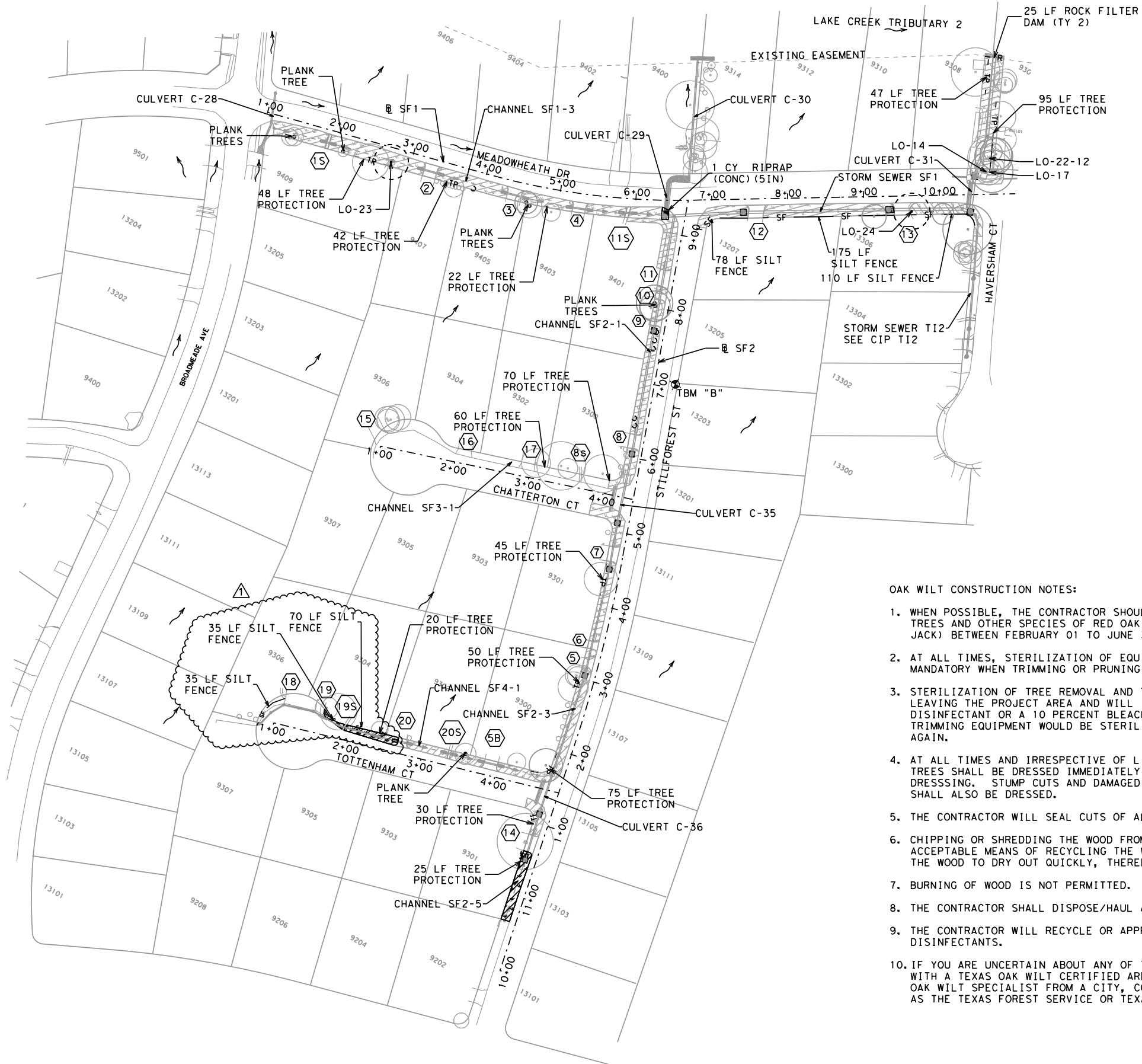
DATE

9/01/2017

SHEET NO.

SF21 OF SF22

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LEGEND		
---	EXISTING E.O.P.	
---	EXISTING PROPERTIES	
---	EXISTING R.O.W.	
---	EXISTING EASEMENT	
---	PROPOSED EASEMENT	
- SF	SILT FENCE	
- RB	ROCK FILTER DAM	
- TP	TREE PROTECTION	
[Pattern]	SOIL RETENTION BLANKET	
[Pattern]	CONCRETE RIPRAP	
[Pattern]	STONE RIPRAP	
[Pattern]	TOPSOIL AND SEEDING (4")	
[Symbol]	EXISTING TREE/LANDSCAPING	
[Symbol]	TREE/LANDSCAPING REMOVAL (XX-YY) (SPECIES-SIZE)	
[Symbol]	TREE PROTECTION - PLANK	

- NOTES:
1. PROVIDE TEMPORARY INLET PROTECTION FOR ALL EXISTING AND PROPOSED CURB INLETS AND AREA INLETS.
 2. VEGETATION REMOVAL SHALL BE CONTAINED TO THE CHANNEL BOTTOM. CONTRACTOR SHALL CONTACT ENGINEER PRIOR TO REMOVING TREES LARGER THAN 8-INCHES IN DIAMETER WHICH ARE NOT INDICATED FOR REMOVAL ON THE PLANS.
 3. ALL AREAS OUTSIDE THE EASEMENTS AND ROW ARE NO WORK AREAS.
 4. CONTRACTOR IS RESPONSIBLE FOR LOCATING A TEMPORARY SPOILS & STAGING AREA. SILT FENCE SHALL BE INSTALLED IMMEDIATELY DOWNSTREAM FOR THE TEMPORARY SPOILS AND STAGING AREAS.

OAK WILT CONSTRUCTION NOTES:

1. WHEN POSSIBLE, THE CONTRACTOR SHOULD AVOID TRIMMING OR PRUNING LIVE OAK TREES AND OTHER SPECIES OF RED OAK (SPANISH, SHUMARD, WATER, AND BLACK JACK) BETWEEN FEBRUARY 01 TO JUNE 30.
2. AT ALL TIMES, STERILIZATION OF EQUIPMENT AND PAINTING WOUNDS ARE MANDATORY WHEN TRIMMING OR PRUNING SUSCEPTIBLE SPECIES.
3. STERILIZATION OF TREE REMOVAL AND TRIMMING EQUIPMENT WILL OCCUR BEFORE LEAVING THE PROJECT AREA AND WILL INVOLVE USING EITHER AEROSOL DISINFECTANT OR A 10 PERCENT BLEACH-WATER SOLUTION. IN ADDITION, THE TRIMMING EQUIPMENT WOULD BE STERILIZED THOROUGHLY BEFORE IT IS USED AGAIN.
4. AT ALL TIMES AND IRRESPECTIVE OF LIMB SIZE, ALL CUTS AND WOUNDS TO OAK TREES SHALL BE DRESSED IMMEDIATELY USING A NON-PHYTOTOXIC TREE WOUND DRESSING. STUMP CUTS AND DAMAGED ROOTS (BOTH ABOVE AND BELOW GROUND) SHALL ALSO BE DRESSED.
5. THE CONTRACTOR WILL SEAL CUTS OF ALL OAK TREES AND HARD WOOD TREES.
6. CHIPPING OR SHREDDING THE WOOD FROM INFECTED TREES TO USE AS MULCH IS AN ACCEPTABLE MEANS OF RECYCLING THE WOOD. CHIPPING OR SHREDDING ALLOWS THE WOOD TO DRY OUT QUICKLY, THEREBY KILLING THE FUNGUS.
7. BURNING OF WOOD IS NOT PERMITTED.
8. THE CONTRACTOR SHALL DISPOSE/HAUL ALL TRIMMINGS AND LOGS DAILY.
9. THE CONTRACTOR WILL RECYCLE OR APPROPRIATELY DISPOSE OF ALL UNUSED DISINFECTANTS.
10. IF YOU ARE UNCERTAIN ABOUT ANY OF THIS INFORMATION, YOU SHOULD CONSULT WITH A TEXAS OAK WILT CERTIFIED ARBORIST, ISA CERTIFIED ARBORIST, OR AN OAK WILT SPECIALIST FROM A CITY, COUNTY OR STATE GOVERNMENT AGENCY SUCH AS THE TEXAS FOREST SERVICE OR TEXAS AGRILIFE EXTENSION SERVICE.

REV. NO.	BY	DATE	REVISION DESCRIPTION
1	VO	6/6/19	ADD SLOTTED DRAIN TO SF4

Victoria M. Ortega

6/6/2019

K FRIESE & ASSOCIATES, INC.
1120 S. CAPITAL OF TEXAS HWY, II-100, AUSTIN, TX 78746

WILLIAMSON COUNTY
FOREST NORTH DRAINAGE IMPROVEMENTS

STILLFOREST ZONE
EROSION AND SEDIMENTATION CONTROL

**K·FRIESE
+ ASSOCIATES**
PUBLIC PROJECT ENGINEERING

1120 S. Capital of Texas Highway
CityView 2, Suite 100
Austin, Texas 78746
P = 512.338.1704
F = 512.338.1784
TBPE Firm #6535
www.kfriesec.com

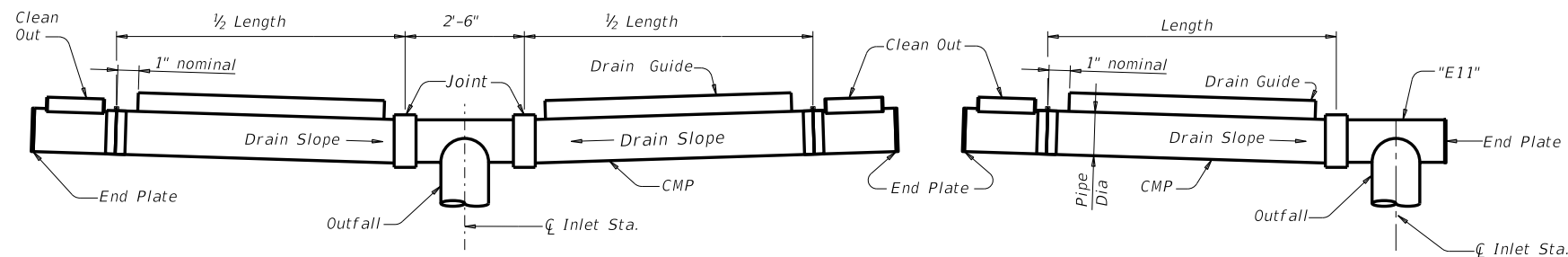
**WILLIAMSON
COUNTY**
1848

SCALE	1" = 150'
DATE	9/01/2017

SHEET NO.
SF22 OF SF22

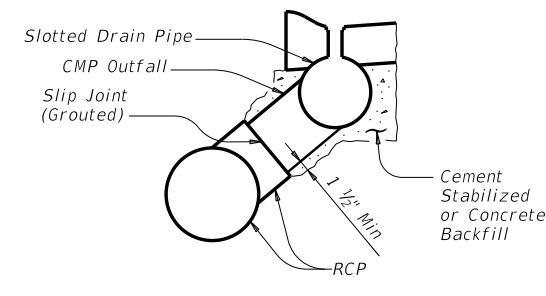
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DATE:
FILE:

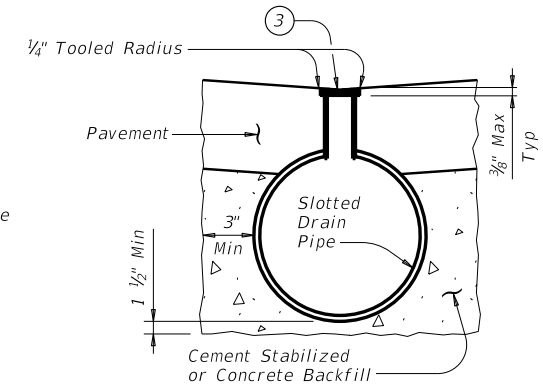


TYPICAL TYPE "T" DRAIN INSTALLATION

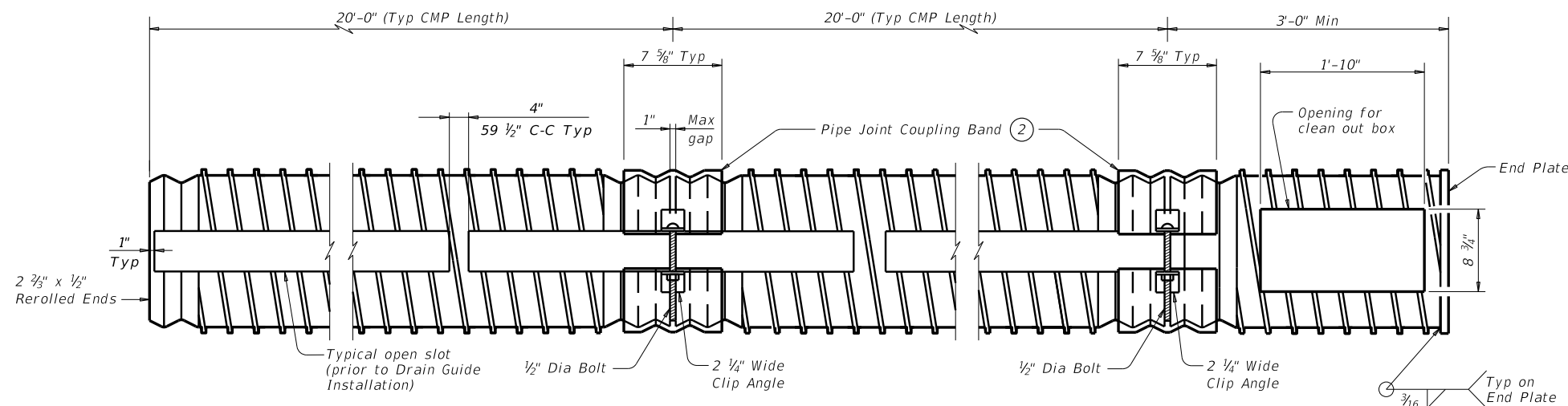
TYPICAL TYPE "L" DRAIN INSTALLATION



BACKFILL DETAIL AT OUTFALL

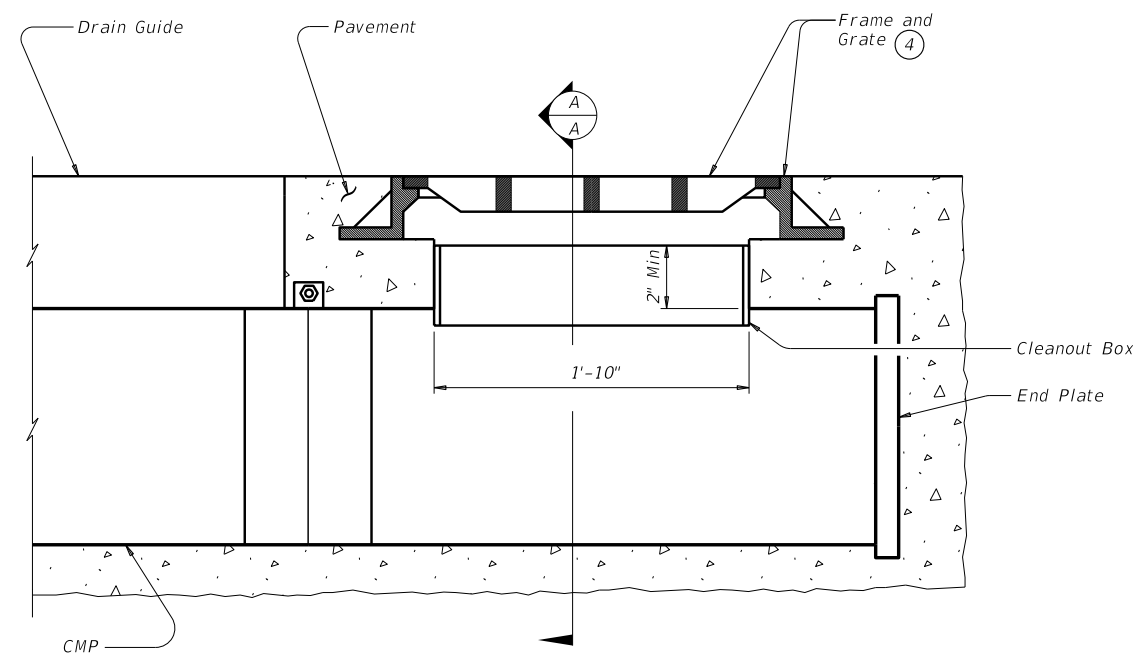


TYPICAL BACKFILL DETAIL

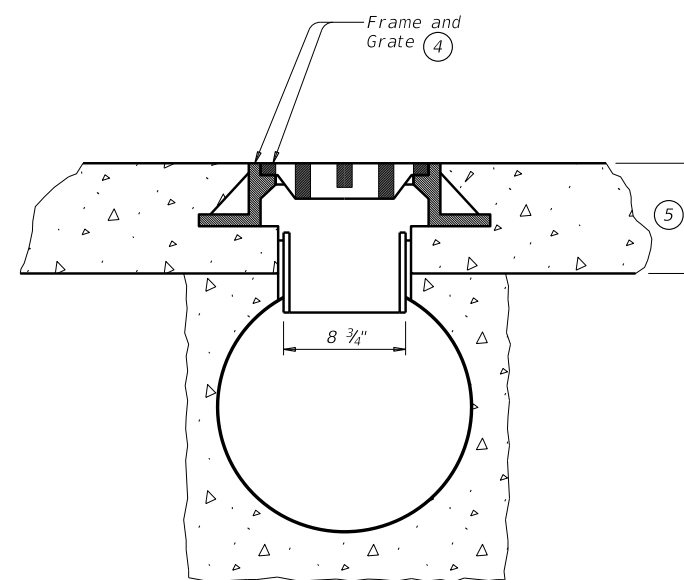


SLOTTED CORRUGATED METAL PIPE (CMP) DETAIL ①

Showing Type IR pipe



CLEAN OUT BOX ELEVATION



SECTION A-A

- ① Provide 16 gauge (Min) x 12" to 36" Dia Corrugated Metal Pipe (Type I ~ 2 3/8" x 1/2" corrugations or Type IR ~ 3/4" x 3/4" x 7 1/2" corrugations)
- ② Alternate methods of joining lengths of pipe, as recommended by the manufacturer, may be used with the approval of the Engineer.
- ③ Wood Strip (Nom 3/8" Max x 2 1/2"). Wood strip may be omitted if suitable protection is provided during pavement placement.
- ④ Install frame and grate flush with pavement and centered over clean out box.
- ⑤ See pavement details for slab thickness.

FABRICATION NOTES:

Provide circular corrugated steel pipe, galvanized or aluminized, in accordance with Item 460, "Corrugated Metal Pipe".
Provide drain guide assemblies conforming to Item 474, "Linear Drains".
Fabricate bearing bars, cross bar spacers, end plates, and clean out boxes from 3/16" plate, ASTM A36. Galvanize in accordance with Item 445, "Galvanizing".
Furnish slotted drain in 20'-0" lengths, when practical, to minimize number of joints.
Furnish pedestrian cap when specified in the plans.

INSTALLATION NOTES:

Backfill trenches for slotted drains and outfall pipe with low strength concrete (minimum 2 sacks or cement per cubic yard) or cement stabilized backfill as shown or directed by the Engineer.
Place suitable compressible material in the outfall connection slip joint, to retain grout during curing.
Provide heavy duty frame and grate from one of the following, or approved equal (clear opening 22" x 8 3/4" Min, 25 1/2" x 12 Max).
Neenah R-3471
EJ V-4274
USF 4621 frame and 6296 grate

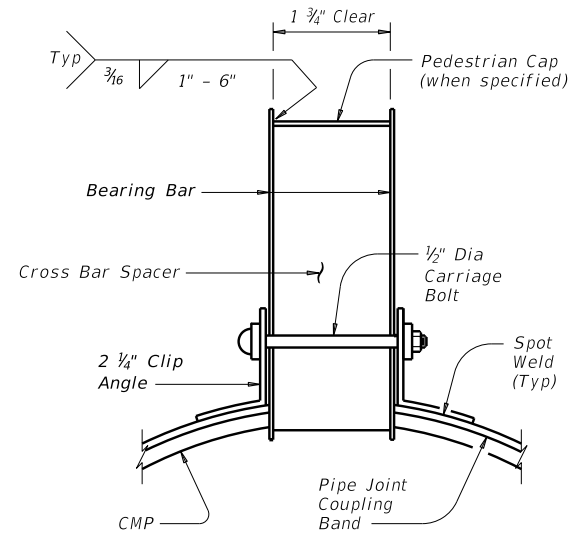
GENERAL NOTES:

Unless otherwise shown on the plans, the Contractor may furnish any of the designs as shown.
Frame and grate is subsidiary to Slotted Drain.

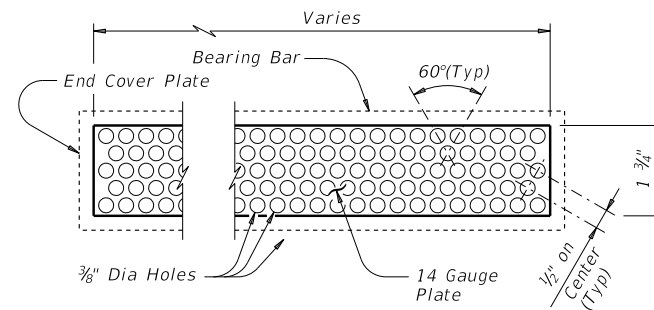
SHEET 1 OF 2

 Texas Department of Transportation				Bridge Division Standard	
ROADWAY LINEAR DRAIN (SLOTTED DRAIN)					
SD					
FILE: sdstds01.dgn		DN: TxDOT	CK: TxDOT	DW: DKC	CK: AES
©TxDOT May 2014		CONT	SECT	JOB	HIGHWAY
REVISIONS		DIST	COUNTY		SHEET NO.

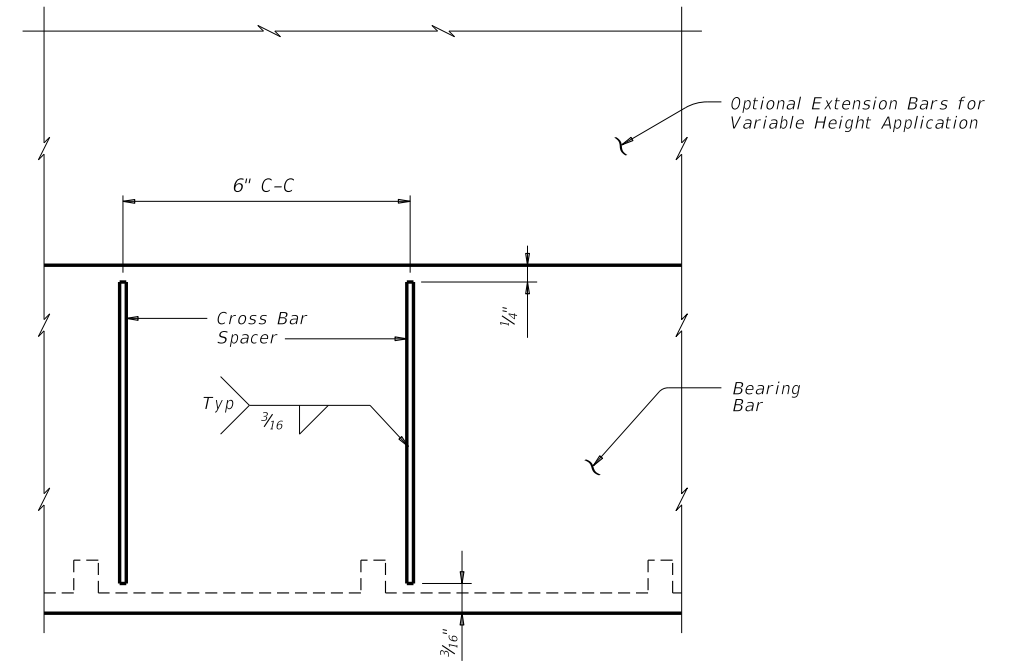
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**PIPE JOINT CONNECTION
TRANSVERSE SECTION**

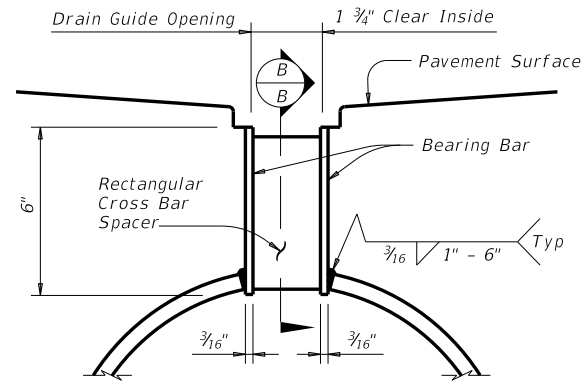


PEDESTRIAN CAP DETAIL

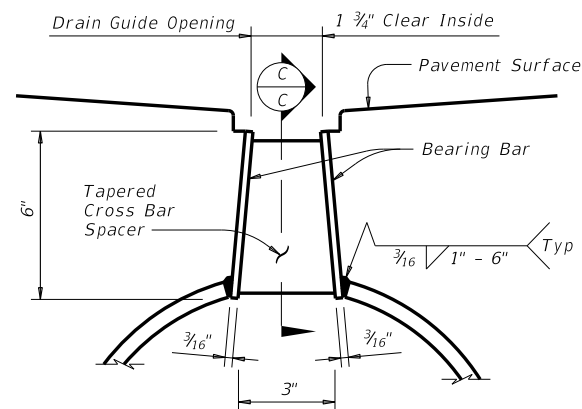


**SECTION B-B
(WITH RECTANGULAR SPACERS)**

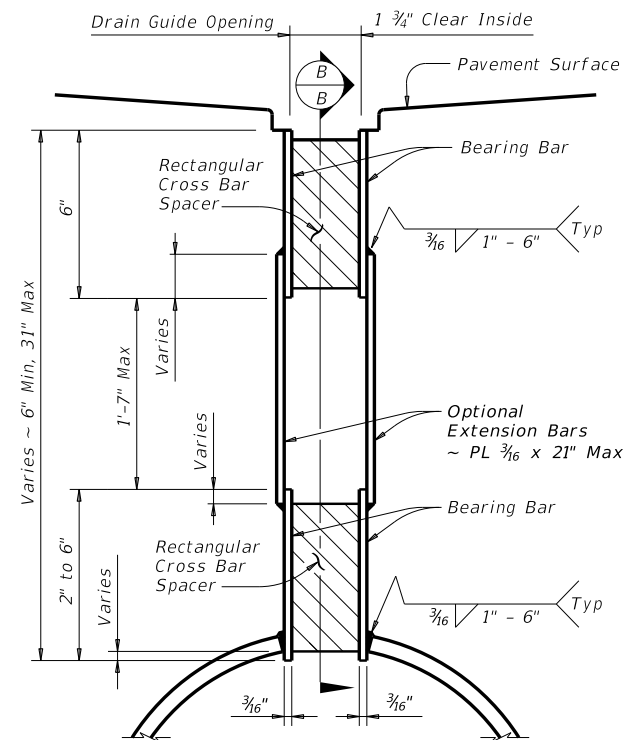
Showing Installation of Cross Bar Spacers in Longitudinal Section



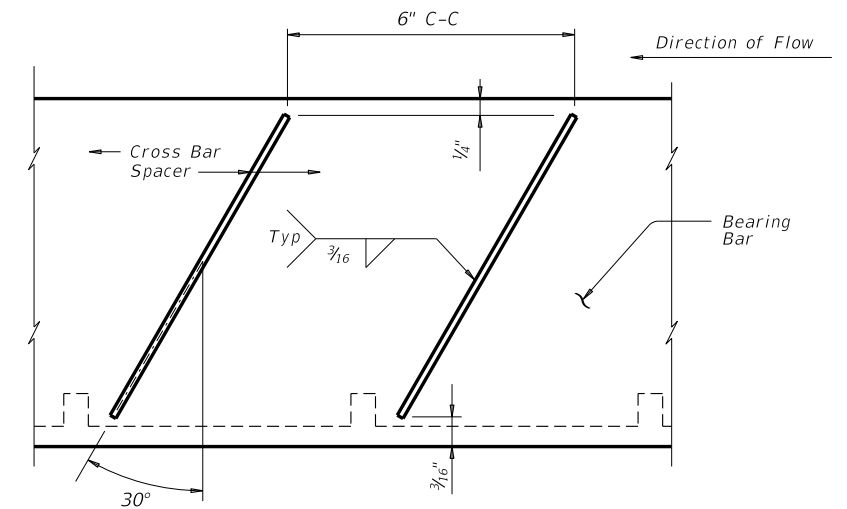
**STANDARD HEIGHT
Showing Rectangular Spacers**



**STANDARD HEIGHT
Showing Tapered Spacers**



**VARIABLE HEIGHT
Showing Rectangular Spacers
and Extension**



**SECTION C-C
(WITH TAPERED SPACERS)**

Showing Installation of Cross Bar Spacers in Longitudinal Section

TYPICAL SECTIONS THRU DRAIN GUIDE INSTALLATION

SHEET 2 OF 2

 Texas Department of Transportation				Bridge Division Standard	
ROADWAY LINEAR DRAIN (SLOTTED DRAIN)					
SD					
FILE: sdstds01.dgn	DN: TxDOT	CK: TxDOT	DW: DKC	CK: AES	
©TxDOT May 2014	CONT	SECT	JOB	HIGHWAY	
REVISIONS	DIST	COUNTY			SHEET NO.

DATE:
FILE:

REQUEST FOR INFORMATION FORM

RFI NO.: 2 DATE: 5/7/19
PROJECT: Forest North-Anderson Mill RESPONSE REQUESTED BY
DATE: 5/14/19
TO: Lance Parish, P.E. - CobbFendley

REFERENCE: Proposed waterline relocation

PROBLEM:

Can all proposed waterline relocation/installation be removed from the contract due to the current separation distances shown on the attachments? Photo #1 references Sheet C-103. Photo #2 references Sheet C-104. Photo #3 references Sheet C-102 at Station 1+42. Photo #4 references Sheet C-102 at Station 2+25.

RECOMMENDED SOLUTION:

Remove all proposed waterline relocation/installation from the contract due to the existing separation distances shown in the attachments.

Ryan Rivera
Originator

Supervisor

RESPONSE:

AWU agrees that the lines are determined to not be in conflict and so can be removed from the scope of the project.

Lance Parish, PE
Responder

5/9/2019
Date

Sign, Date & Return to HNTB **via e-mail**.

Mail original to: **NA** HNTB Corporation
101 E. Old Settlers Blvd. Suite 100
Round Rock, Texas 78664

Attachments to RFI:
Cc:

Ryan Rivera

From: Ryan Helm <ryan@qacsi.com>
Sent: Wednesday, May 1, 2019 9:48 AM
To: Ryan Rivera
Cc: 62811_1811-278_ForestNorthAnderson; Eddie R. Church; jose@qacsi.com; lecarrero@landmarkces.com; Clayton Weber; JBarajas@landmarkces.com
Subject: Spacing between Water and Storm

■ - WATERLINE (EXISTING)
■ - STORM (PROPOSED)

Good morning,

On pothole 1, Sherbourne and Roxborough:

Bottom of existing waterline - 933.90
Top of proposed Storm- 932.90
Difference - 1'

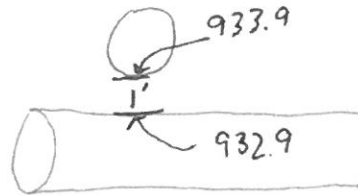


PHOTO #1

On Pothole 2, Alley behind pre school:

Bottom of existing waterline - 929.82
Top of proposed storm- 928.76
Difference- 1.06'

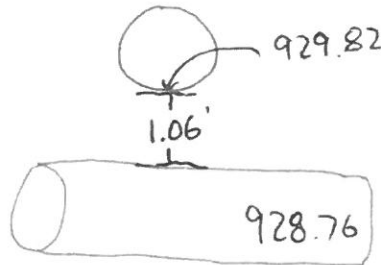


PHOTO #2

Thanks,

Jess Ryan Helm
QA Construction Services inc
Project Manager
C-956-455-7388

Sent from my iPhone

Ryan Rivera

From: Ryan Helm <ryan@qacsi.com>
Sent: Tuesday, April 30, 2019 8:04 AM
To: Ryan Rivera
Cc: 62811_1811-278_ForestNorthAnderson; Eddie R. Church; Luis E. Carrero; Jose Ruiz
Subject: Pre-Construction Elevations

Good morning Ryan,

Below are the existing elevations we found after potholing for the existing waterline and storm lines:

Benchmark used was listed on page 8 of drawings, as a bolt on fire hydrant flange with elevation = 932.07'.

Pothole 1: Waterline, Sherbourne and Roxborough

Trench: 18"x3.5'x4'
T.O.P: 934.60
B.O.P: 933.90

PHOTO #1

Pothole 2: Waterline, Middle of Alley behind Pre-school

Trench: 18"x3.5'x4'
T.O.P: 930.52
B.O.P: 929.82

PHOTO #2

Pothole 3: Waterline, Broadmeade and Roxboroough, between costumers driveways

Trench: 3'x4'x5'
T.O.P: 922.20
B.O.P: 921.50

PHOTO #3

Pothole 4: Waterline, Dentist office between fence and Asphalt

Trench: 5'x4'x4'
T.O.P: 922.15
B.O.P: 921.45

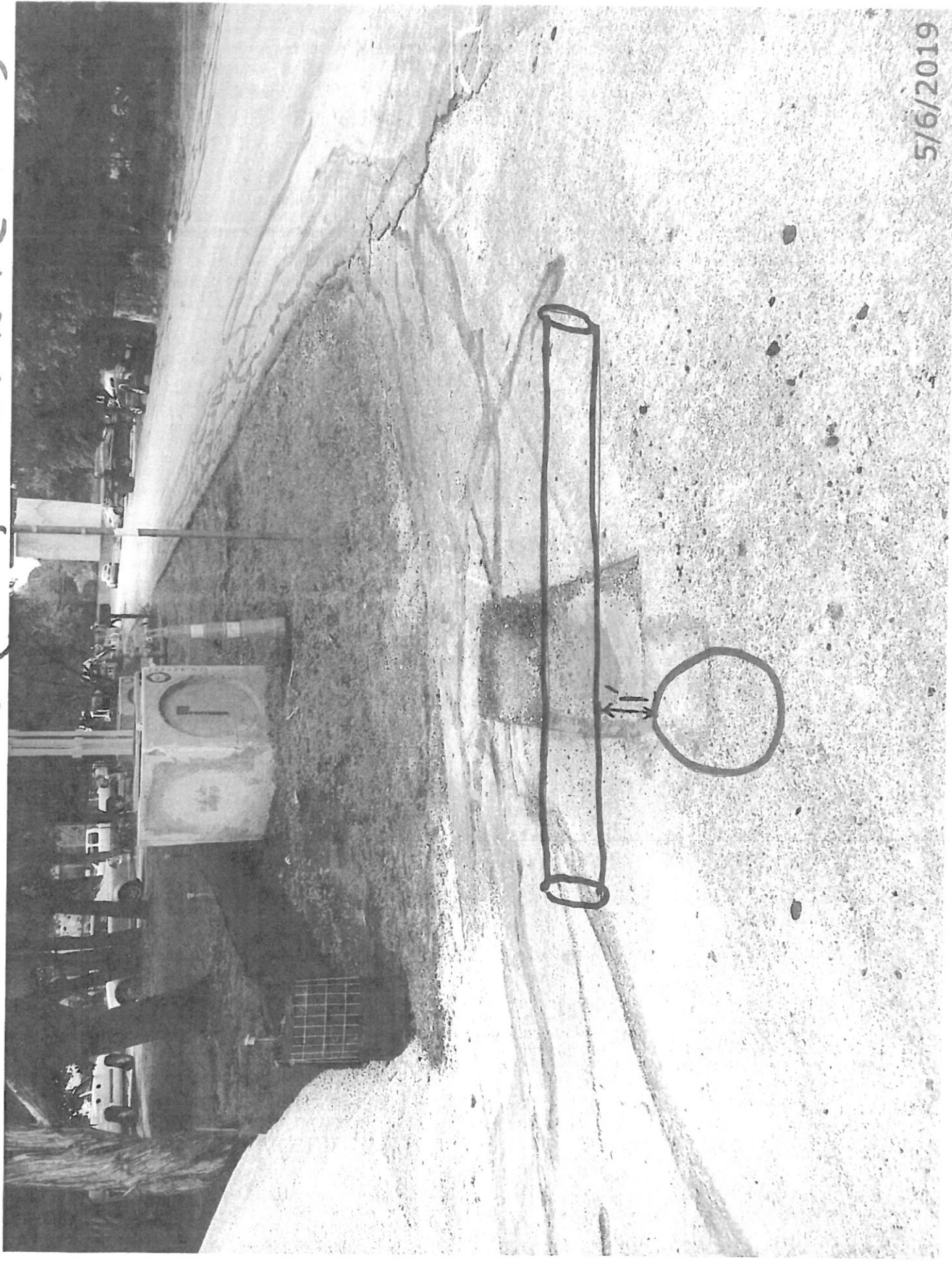
PHOTO #4

Thanks,

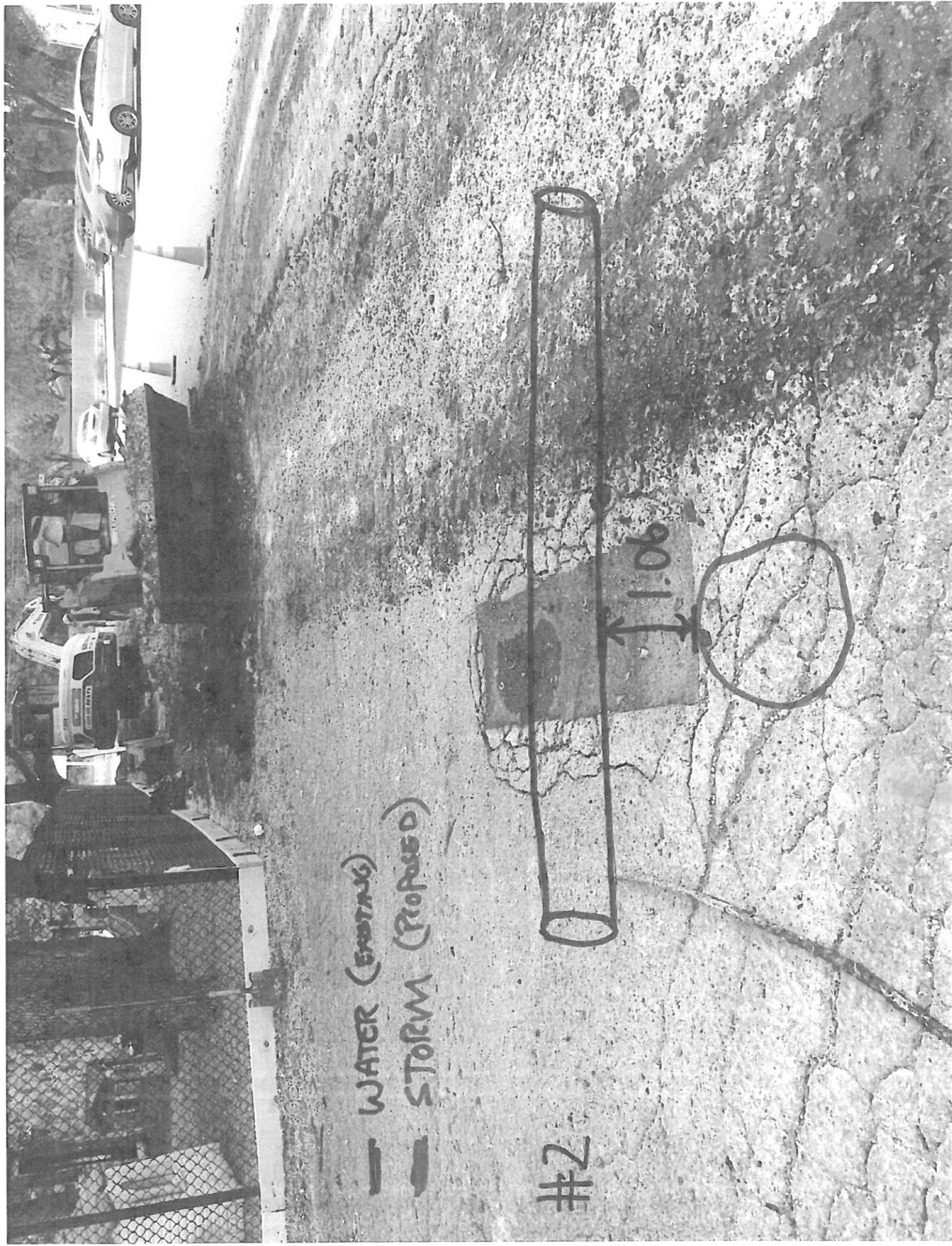
Jess Ryan Helm
QA Construction Services Inc
Project Manager
C-956-455-7388

#1

- WATER (EXISTING) — STORM (PROPOSED)



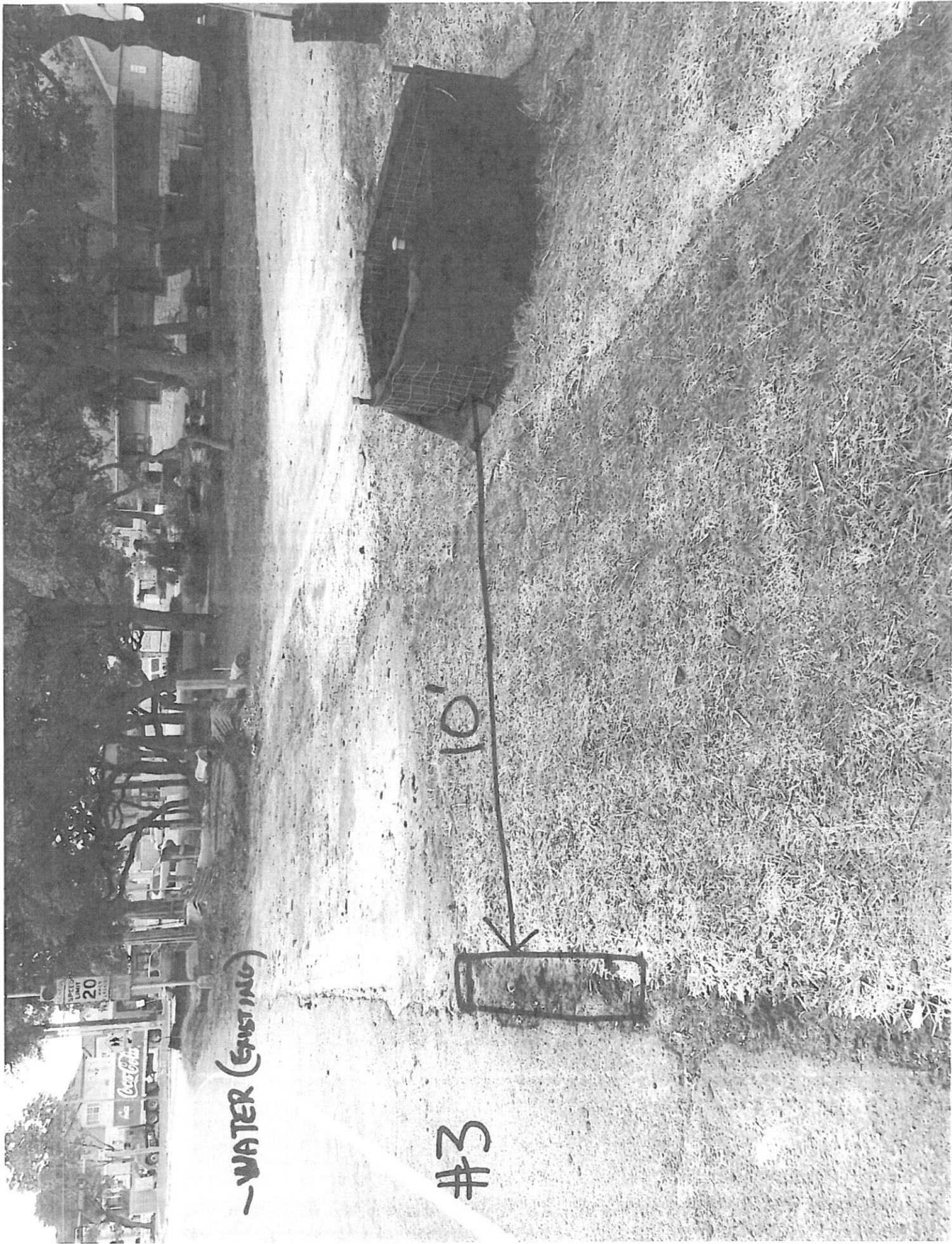
5/6/2019



— WATER (EXISTING)
— STORM (PROPOSED)

#2

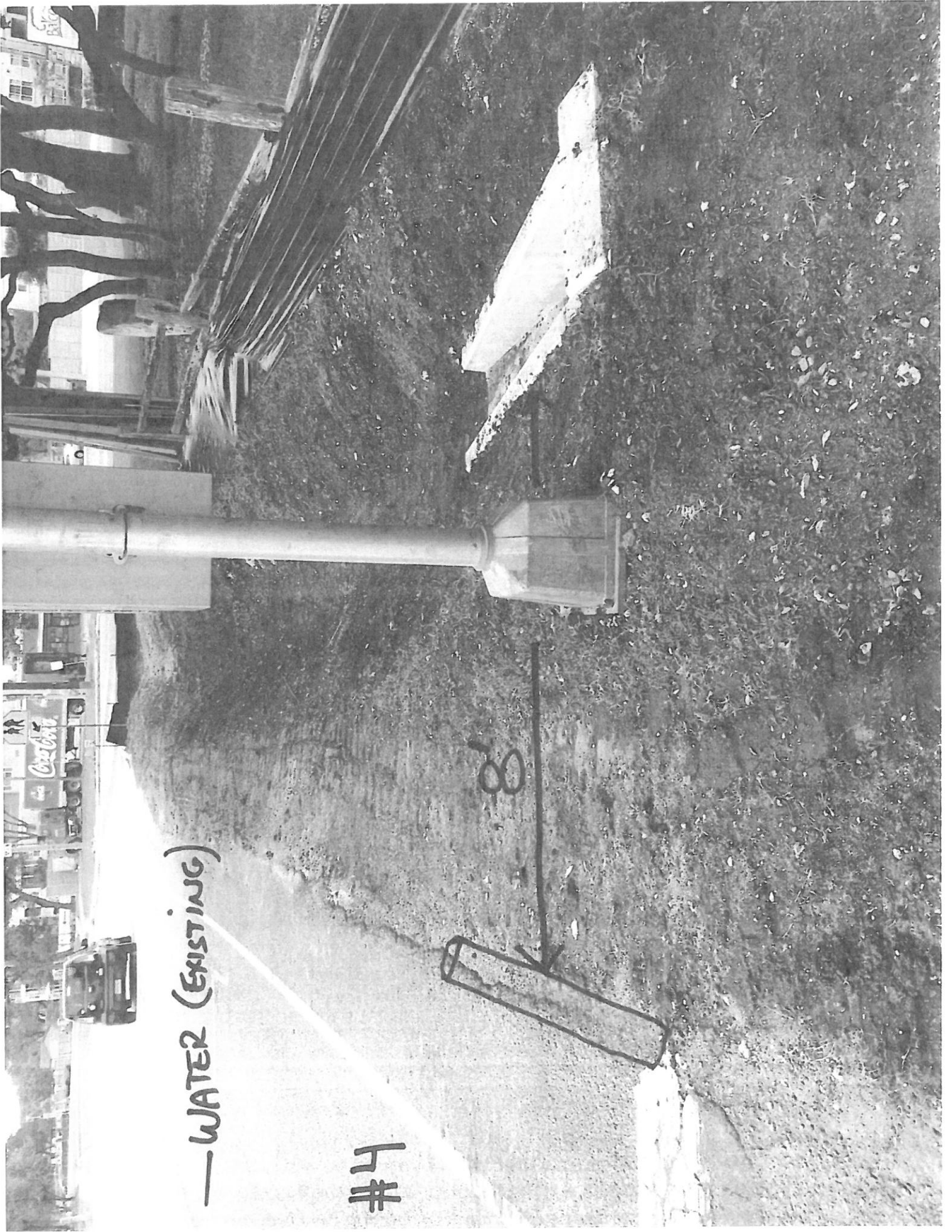
1.06



-WATER (EXISTING)

#3

10'



—WATER (EXISTING)

#4

8