ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V - INFRASTRUCTURE

ROCKWALL
Economic Development Corporation

BOARD OF DIRECTORS

RICK JOHNSON, CHAIRMAN
MATT NEYLAND, VICE CHAIRMAN
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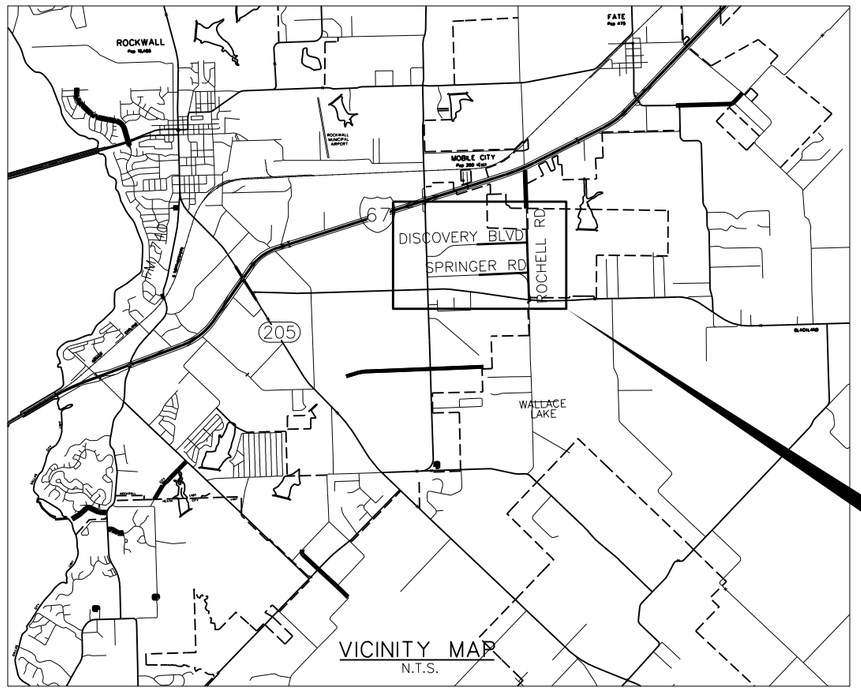

VICINITY MAP
N.T.S.

DISCOVERY AND SPRINGER DESIGN SPEED = 35MPH
ROCHELL DESIGN SPEED = 50MPH

OCTOBER 2021

RKW19711

FREESE AND NICHOLS
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Dallas, Texas 75204
Phone - (214) 217-2200
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Web - www.freese.com

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING
FIRM F-2144

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

THE SEAL THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO: 134095 ON 10/21/2021
ALTERATION ON A SEALED DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

SHEET INDEX

SHEET NO.	SEQ.	DESCRIPTION
GENERAL		
	1	COVER
GN-1 - GN-2	2-3	SHEET INDEX
GN-3 - GN-4	4-5	GENERAL NOTES
GN-5	6	PROJECT LAYOUT
GN-6	7	ALIGNMENT DATA
TYP-1 - TYP-2	8-9	TYPICAL SECTIONS
PLAT-1 - PLAT-3	10-10b	FINAL PLAT
RW-1 - RW-3	11-13	RIGHT-OF-WAY AND EASEMENT PLAN
TRAFFIC CONTROL		
TCP-1	14	CONSTRUCTION NARRATIVE
TCP-2	15	OVERALL TRAFFIC CONTROL PLAN
TCP-3	16	HIGHWAY 276 TRAFFIC CONTROL PLAN
BC(1-12)-21	17-28	BARRICADE AND CONSTRUCTION DETAILS
TCP(2-1)-18	29	TCP CONVENTIONAL ROAD SHOULDER WORK
TCP(2-2)-18	30	TCP ONE-LANE TWO-WAY TRAFFIC CONTROL
TCP(2-3)-18	31	TCP TRAFFIC SHIFTS ON TWO-LANE ROADS
TCP(2-5)-18	32	TCP LONG TERM LANE CLOSURES MULTILANE CONVENTIONAL RDS.
PAVING		
DM-1	33	SPRINGER RD DEMOLITION PLANS BEGIN TO STA 44+50
DM-2	34	SPRINGER RD DEMOLITION PLANS STA 44+50 TO END
DM-3	35	ROCHELL RD DEMOLITION PLANS BEGIN TO STA 27+00
DM-4	36	ROCHELL RD DEMOLITION PLANS STA 27+00 TO STA 45+00
DM-5	37	ROCHELL RD DEMOLITION PLANS STA 45+00 TO END
DM-6	38	PRATT DETENTION POND DEMOLITION PLAN
PV-1	39	DISCOVERY BLVD PLAN AND PROFILE BEGIN TO STA 32+50
PV-2	40	DISCOVERY BLVD PLAN AND PROFILE STA 32+50 TO STA 37+00
PV-3	41	DISCOVERY BLVD PLAN AND PROFILE STA 37+00 TO STA 41+50
PV-4	42	DISCOVERY BLVD PLAN AND PROFILE STA 41+50 TO STA 46+00
PV-5	43	DISCOVERY BLVD PLAN AND PROFILE STA 46+00 TO STA 50+50
PV-6	44	DISCOVERY BLVD PLAN AND PROFILE STA 50+50 TO END
PV-7	45	SPRINGER RD PLAN AND PROFILE BEGIN TO STA 31+00
PV-8	46	SPRINGER RD PLAN AND PROFILE STA 31+00 TO STA 35+50
PV-9	47	SPRINGER RD PLAN AND PROFILE STA 35+50 TO STA 40+00
PV-10	48	SPRINGER RD PLAN AND PROFILE STA 40+00 TO STA 44+50
PV-11	49	SPRINGER RD PLAN AND PROFILE STA 44+50 TO STA 49+00
PV-12	50	SPRINGER RD PLAN AND PROFILE STA 49+00 TO END
PV-13	51	ROCHELL RD PLAN AND PROFILE BEGIN TO STA 14+50
PV-14	52	ROCHELL RD PLAN AND PROFILE STA 14+50 TO STA 19+00
PV-15	53	ROCHELL RD PLAN AND PROFILE STA 19+00 TO STA 23+50
PV-16	54	ROCHELL RD PLAN AND PROFILE STA 23+50 TO STA 28+00
PV-17	55	ROCHELL RD PLAN AND PROFILE STA 28+00 TO STA 32+50
PV-18	56	ROCHELL RD PLAN AND PROFILE STA 32+50 TO STA 37+50
PV-19	57	ROCHELL RD PLAN AND PROFILE STA 37+50 TO STA 41+50
PV-20	58	ROCHELL RD PLAN AND PROFILE STA 41+50 TO STA 46+00
PV-21	59	ROCHELL RD PLAN AND PROFILE STA 46+00 TO STA 50+50
PV-22	60	ROCHELL RD PLAN AND PROFILE STA 50+50 TO END
GR-1 - GR-3	61-63	GRADING PLAN
PM-1	64	DISCOVERY PAVEMENT MARKING AND SIGNAGE BEGIN TO STA 37+00
PM-2	65	DISCOVERY PAVEMENT MARKING AND SIGNAGE STA 37+00 TO STA 46+00
PM-3	66	DISCOVERY PAVEMENT MARKING AND SIGNAGE STA 46+00 TO END
PM-4	67	SPRINGER PAVEMENT MARKING AND SIGNAGE BEGIN TO STA 36+00
PM-5	68	SPRINGER PAVEMENT MARKING AND SIGNAGE STA 36+00 TO STA 45+00
PM-6	69	SPRINGER PAVEMENT MARKING AND SIGNAGE STA 45+00 TO END
PM-7	70	ROCHELL PAVEMENT MARKING AND SIGNAGE BEGIN TO STA 19+00
PM-8	71	ROCHELL PAVEMENT MARKING AND SIGNAGE STA 19+00 TO STA 28+00
PM-9	72	ROCHELL PAVEMENT MARKING AND SIGNAGE STA 28+00 TO STA 37+00
PM-10	73	ROCHELL PAVEMENT MARKING AND SIGNAGE STA 37+00 TO STA 46+00
PM-11	74	ROCHELL PAVEMENT MARKING AND SIGNAGE STA 46+00 TO END
PVDT-1 - PVDT-8	75-82	PAVING DETAILS
GF(31)DAT-19	83	METAL BEAM GUARD FENCE DOWNSTREAM ANCHOR TERMINAL
GF(31)-19	84	METAL BEAM GUARD FENCE TL-3 MASH COMPLIANT
GF(31)TR TL3-19	85-86	METAL BEAM GUARD FENCE THRIE BEAM TRANSITION TL-3 MASH COMPLIANT
SGT(12S)31-18	87	MSKT END TERMINAL MASH - TL-3
RLSTD018-19	88-90	COMBINATION RAIL TYPE C221
SMD(GEN)-08	90A	SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS
SMD(TWT)-08	90B	SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS WEDGE & UNIVERSAL ANCHOR
LANDSCAPE		
LA-1	91	DISCOVERY BLVD PLANTING PLAN BEGIN TO STA 37+00
LA-2	92	DISCOVERY BLVD PLANTING PLAN STA 37+00 TO STA 46+00
LA-3	93	DISCOVERY BLVD PLANTING PLAN STA 46+00 TO END
LA-4	94	ROCHELL RD PLANTING PLAN
LADT-1	95	NOT USED
LADT-2	96	NOT USED
LADT-3	97	NOT USED
LADT-4	98	NOT USED
LADT-5	99	PLANTING DETAILS
LADT-6	100	PLANTING SCHEDULE
IR-1	101	NOT USED
IR-2	102	NOT USED
IR-3	103	NOT USED
IR-4	104	NOT USED
IR-5	105	NOT USED
IRDT-1 - IRDT-2	106-107	NOT USED
TC-1	108	OVERALL TREE CONSERVATION MAP
TC-2 - TC-6	109-113	TREE CONSERVATION PLAN
TC-7 - TC-9	114-116	TREE CONSERVATION PLAN TABLES
DETENTION POND		
DP-1	117	DETENTION POND SITE LAYOUT
DP-2	118	DETENTION POND SITE PLAN
DP-3	119	DETENTION POND SITE ALIGNMENT CONTROL TABLE
DP-4	120	DETENTION POND CALCULATIONS
DP-5	121	PROPOSED BERM PLAN AND PROFILE BEGIN TO STA 14+00
DP-6	122	PROPOSED BERM PLAN AND PROFILE STA 14+00 TO STA 18+00
DP-7	123	PROPOSED BERM PLAN AND PROFILE STA 18+00 TO END
DP-8	124	PROPOSED SPILLWAY PLAN AND PROFILE
DP-9	125	PROPOSED MAIN CHANNEL PLAN AND PROFILE BEGIN TO STA 12+50
DP-10	126	PROPOSED MAIN CHANNEL PLAN AND PROFILE STA 12+50 TO END
DP-11	127	PROPOSED POND CROSS SECTIONS
DP-12	128	PROPOSED SPILLWAY CROSS SECTIONS A-A, B-B, & C-C
DPDT-1	129	PROPOSED DROP STRUCTURE DETAILS
DPDT-2	130	MISCELLANEOUS DETENTION POND DETAILS
DPDT-3 - DPDT-4	131-132	PROPOSED FOREBAY DETAILS
DPDT-5	133	12.5 X 4.5 CIP BOX CULVERT
SW-0	134	CONCRETE WINGWALL WITH STRAIGHT WINGS DETAILS
STORM DRAIN		
DA-1	135	EXISTING DRAINAGE AREA MAP
DA-2	136	OVERALL DRAINAGE AREA MAP UNDEVELOPED CONDITIONS
DA-3	137	OVERALL DRAINAGE AREA MAP DEVELOPED CONDITIONS
DA-4	138	DISCOVERY BLVD DRAINAGE AREA MAP
DA-5	139	SPRINGER RD DRAINAGE AREA MAP
DA-6	140	ROCHELL RD DRAINAGE AREA MAP
DC-1	141	DRAINAGE AREA CALCULATIONS
IC-1	142	INLET CALCULATIONS
HC-1	143	HYDRAULIC CALCULATIONS CULVERTS
HC-2 - HC-3	144-145	HYDRAULIC CALCULATIONS STORM DRAIN
HC-4 - HC-5	146-147	HYDRAULIC CALCULATIONS LATERALS
RET-1	148	NORTH RETAINING WALL PLAN AND PROFILE
RET-2	149	SOUTH RETAINING WALL PLAN AND PROFILE
CULV-1	150	CULVERT 01 PLAN AND PROFILE
CULV-2	151	CULVERT 02 PLAN AND PROFILE
CULV-3	152	CULVERT 03 PLAN AND PROFILE
SD-1	153	STORM DRAIN LINE A1 BEGIN TO STA 14+50
SD-2	154	STORM DRAIN LINE A1 STA 14+50 TO STA 19+00
SD-3	155	STORM DRAIN LINE A1 STA 19+00 TO STA 23+50
SD-4	156	STORM DRAIN LINE A1 STA 23+50 TO STA 28+00
SD-5	157	STORM DRAIN LINE A1 STA 28+00 TO STA 32+50
SD-6	158	STORM DRAIN LINE A1 STA 32+50 TO STA 37+00
SD-7	159	STORM DRAIN LINE A1 STA 37+00 TO END
SD-8	160	STORM DRAIN LINE A2 BEGIN TO STA 14+50
SD-9	161	STORM DRAIN LINE A2 STA 14+50 TO END
SD-10	162	STORM DRAIN LINE A3 BEGIN TO STA 14+50
SD-11	163	STORM DRAIN LINE A3 STA 14+50 TO END
SD-12	164	STORM DRAIN LINE A4 BEGIN TO STA 14+50
SD-13	165	STORM DRAIN LINE A4 STA 14+50 TO END
SD-14	166	STORM DRAIN LINE B1 BEGIN TO STA 13+50
SD-15	167	STORM DRAIN LINE B1 STA 13+50 TO STA 18+00
SD-16	168	STORM DRAIN LINE B1 STA 18+00 TO END
SD-17	169	STORM DRAIN LINE C1 BEGIN TO STA 15+00
SD-18	170	STORM DRAIN LINE C1 STA 15+00 TO STA 19+50
SD-19	171	STORM DRAIN LINE C1 STA 19+50 TO END
SD-20	172	STORM DRAIN LINE C2 BEGIN TO STA 14+00
SD-21	173	STORM DRAIN LINE C2 STA 14+00 TO STA 18+50
SD-22	174	STORM DRAIN LINE C2 STA 18+50 TO STA 23+00
SD-23	175	STORM DRAIN LINE C2 STA 23+00 TO STA 27+50
SD-24	176	STORM DRAIN LINE C2 STA 27+50 TO END
SD-25	177	STORM DRAIN LINE C3 BEGIN TO END
SD-26	178	STORM DRAIN LINE C4 BEGIN TO END
SD-27	179	STORM DRAIN LINE C5 BEGIN TO END
SD-28	180	STORM DRAIN LINE D1 BEGIN TO END
LAT-1 - LAT-10	181-190	STORM DRAIN LATERAL PROFILES
SDDT-1 - SDDT-5	191-195	STORM DRAIN DETAILS
SDDT-6	196	HEADWALL DETAILS
MC-5-20	197-198	MULTIPLE BOX CULVERTS CAST-IN-PLACE 5'-0" SPAN
MC-7-10	199-200	MULTIPLE BOX CULVERTS CAST-IN-PLACE 7'-0" SPAN
MC-9-13	201-202	MULTIPLE BOX CULVERTS CAST-IN-PLACE 9'-0" SPAN
MC-MD	203	MULTIPLE BOX CULVERTS MISC
SCP-3 - SCP-9	204-210	SINGLE BOX CULVERTS PRECAST 5' - 9' SPAN
SCP-MD	211	SINGLE BOX CULVERT PRECAST
SCC-3 - SCC-9	212-221	SINGLE BOX CULVERT CAST-IN-PLACE 3'-9' SPAN
SCC-MD	222	SINGLE BOX CULVERT CAST-IN-PLACE
PW	223	PARALLEL CONCRETE WINGWALL
SET P-PD	224	SAFETY END TREATMENT FOR PIPE CULVERTS
SET B-PD	225-226	SAFETY END TREATMENT FOR BOX CULVERTS
MI-CBC(FW)	227-229	MANHOLE INLET CONNECT
JB-SPL(MOD)(FW)	230	SPECIAL JUNCTION BOX STRUCTURE
RWT(L)C	231	RETAINING WALLS
RW-2	232	RETAINING WALLS MISCELLANEOUS DETAILS
ECD	233	EXTENDED CURB DETAILS
ECD(MOD)	234	EXTENDED CURB DETAILS
EROSION CONTROL		
EC-1 - EC-3	235-237	EROSION CONTROL PLAN
ECDT-1 - ECDT-2	238-239	EROSION CONTROL DETAILS
UTILITIES		
UTIL-1	240	UTILITY LINES OVERALL LAYOUT
WLA-1	241	WATER LINE A BEGIN TO STA 5+00
WLA-2	242	WATER LINE A STA 5+00 TO STA 9+50
WLA-3	243	WATER LINE A STA 9+50 TO STA 14+00

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASED FOR REVIEW ON 10/7/2021
THIS DOCUMENT WAS ORIGINALLY ISSUED AND SEALED BY SARAH E. CAUDLE
REGISTERED PROFESSIONAL ENGINEER ON 10/7/2021
AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO. 134055
ALTERATIONS TO THIS DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

SHEET INDEX

NO.	ISSUES	BY	DATE
1	ADDENDUM #5	SEC	12/7/21

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MRF
DRAWN CHM
CHECKED SEC
REVISED
FILE NAME cv-trt-gn-index01.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale accordingly.
0 1"

SHEET GN-1
SEQ. 2

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Plot Scale: 10.000 '/ in. Project: Freese and Nichols, Inc. - True Type Fonts
Date: Feb. 20, 2024 - 03:35:14 PM

SHEET INDEX

SHEET NO.	SEQ.	DESCRIPTION
UTILITIES CONT.		
WLA-4	244	WATER LINE A STA 14+00 TO STA 18+50
WLA-5	245	WATER LINE A STA 18+50 TO STA 23+00
WLA-6	246	WATER LINE A STA 23+00 TO STA 26+50
WLA-7	247	WATER LINE A STA 26+50 TO END
WLB-1	248	WATER LINE B BEGIN TO STA 4+50
WLB-2	249	WATER LINE B STA 4+50 TO STA 9+00
WLB-3	250	WATER LINE B STA 9+00 TO STA 13+00
WLB-4	251	WATER LINE B STA 13+00 TO STA 17+00
WLB-5	252	WATER LINE B STA 17+00 TO STA 21+50
WLB-6	253	WATER LINE B STA 21+50 TO STA 25+50
WLB-7	254	WATER LINE B STA 25+50 TO END
WLC-1	255	WATER LINE C BEGIN TO STA 4+50
WLC-2	256	WATER LINE C STA 4+50 TO STA 9+00
WLC-3	257	WATER LINE C STA 9+00 TO STA 13+50
WLC-4	258	WATER LINE C STA 13+50 TO STA 18+00
WLC-5	259	WATER LINE C STA 18+00 TO STA 22+50
WLC-6	260	WATER LINE C STA 22+50 TO END
1 WBW-1	261	BLACKLAND WATER MAIN RE-ALIGNMENT BEGIN TO END
SSA-1	262	SANITARY SEWER LINE A BEGIN TO STA 16+00
SSA-2	263	SANITARY SEWER LINE A STA 16+00 TO STA 20+50
SSA-3	264	SANITARY SEWER LINE A STA 20+50 TO STA 24+00
SSA-4	265	SANITARY SEWER LINE A STA 24+00 TO STA 28+00
SSA-5	266	SANITARY SEWER LINE A STA 28+00 TO STA 32+50
SSA-6	267	SANITARY SEWER LINE A STA 32+50 TO STA 37+00
SSA-7	268	SANITARY SEWER LINE A STA 37+00 TO STA 41+50
SSA-8	269	SANITARY SEWER LINE A STA 41+50 TO STA 46+00
SSA-9	270	SANITARY SEWER LINE A STA 46+00 TO STA 50+50
SSA-10	271	SANITARY SEWER LINE A STA 50+50 TO STA 55+00
SSA-11	272	SANITARY SEWER LINE A STA 55+00 TO STA 59+50
SSA-12	273	SANITARY SEWER LINE A STA 59+50 TO STA 64+00
SSA-13	274	SANITARY SEWER LINE A STA 64+00 TO STA 68+50
SSA-14	275	SANITARY SEWER LINE A STA 68+50 TO STA 73+00
SSA-15	276	SANITARY SEWER LINE A STA 73+00 TO STA 77+50
SSA-16	277	SANITARY SEWER LINE A STA 77+50 TO END
SSB-1	278	SANITARY SEWER LINE B BEGIN TO STA 5+50
SSB-2	279	SANITARY SEWER LINE B STA 5+50 TO END
SSC-1	280	SANITARY SEWER LINE C BEGIN TO STA 5+50
SSC-2	281	SANITARY SEWER LINE C STA 5+50 TO END
UDT-1 - UDT-10	282-291	UTILITY DETAILS
ELECTRICAL		
EL-1	292	DISCOVERY BLVD ILLUMINATION PLAN BEGIN TO STA 46+00
EL-2	293	DISCOVERY BLVD ILLUMINATION PLAN STA 46+00 TO END
EL-3	294	SPRINGER RD ILLUMINATION PLAN BEGIN TO STA 44+50
EL-4	295	SPRINGER RD ILLUMINATION PLAN STA 44+50 TO END
EL-5	296	ROCHELL RD ILLUMINATION PLAN BEGIN TO STA 23+50
EL-6	297	ROCHELL RD ILLUMINATION PLAN STA 26+00 TO END
EL-7	298	MONUMENT ELECTRICAL PLANS
EL-8	299	RECTANGULAR LUMINAIRE DETAILS
ED(1-12)-14	300-311	ELECTRICAL DETAILS
ITS(37-38)-17	312-313	ITS GROUND BOX DETAILS
ITS(41)-16	314	ITS GROUND BOX POLYMER CONCRETE
CROSS SECTIONS		
XS-1 - XS-12	315-326	DISCOVERY BLVD CROSS SECTIONS
XS-13 - XS-21	327-335	SPRINGER RD CROSS SECTIONS
XS-22 - XS-33	336-347	ROCHELL RD CROSS SECTIONS

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RECORD DRAWINGS PREPARED ON:
8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASED FOR CONSTRUCTION
DOCUMENTS
FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASED THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
ALTERATION OF A SEALED DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

SHEET INDEX

NO.	ISSUES	BY	DATE
1	PRE-AWARD AMEND #1	SEC	4/12/2022

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MRF
DRAWN CHM
REVISED
CHECKED SEC
FILE NAME cv-trt-gn-index02.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
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SHEET GN-2
SEQ. 3

MicroStation V8 User: 90262 Office: On Site
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Date: Feb. 20, 2024 - 03:35:15 PM Projects - Freese and Nichols, Inc. - True Type Fonts

GENERAL ITEMS

1. All construction shall conform to the requirements set forth in the City of Rockwall's Engineering Department's "Standards of Design and Construction" and the "Standard Specifications for Public Works Construction" by the North Texas Central Council of Governments, 5th edition amended by the City of Rockwall. The CONTRACTOR shall reference the latest City of Rockwall standard details provided in the Rockwall Engineering Departments "Standards of Design and Construction" manual for details not provided in these plans. The CONTRACTOR shall possess one set of the NCTCOG Standard Specifications and Details and the City of Rockwall's "Standards of Design and Construction" manual on the project site at all times
2. Where any conflicting notes, details or specifications occur in the plans the City of Rockwall General Construction Notes, Standards, Details and Specifications shall govern unless detail or specification is more strict.
3. The City of Rockwall Engineering Departments "Standards of Design and Construction" can be found online at: http://www.rockwall.com/engr.asp
4. All communication between the City and the CONTRACTOR shall be through the Engineering Construction Inspector and City Engineer or designated representative only. It is the responsibility of the CONTRACTOR to contact the appropriate department for inspections that do not fall under this approved engineering plan set.
5. Prior to construction, CONTRACTOR shall have in their possession all necessary permits, plans, licenses, etc.
6. The CONTRACTOR shall have at least one original stamped and signed set of approved engineering plans and specifications on-site and in their possession at all times. A stop work order will be issued if items are not on-site. Copies of the approved plans will not be substituted for the required original "approved plans to be on-site".
7. All material submittals, concrete batch designs and shop drawings required for City review and approval shall be submitted by the CONTRACTOR to the City sufficiently in advance of scheduled construction to allow no less than 10 business days for review and response by the City.
8. All site dimensions are referenced to the face of curb or edge of pavement unless otherwise noted.
9. The City requires ten (10%) percent-two (2) year maintenance bond for paving, paving improvements, water systems, wastewater systems, storm sewer systems including detention systems, and associated fixtures and structures which are located within the right-of-ways or defined easements. The two (2) year maintenance bond is to state "from date of City acceptance" as the starting time.
10. A review of the site shall be conducted at twenty (20) months into the two (2) year maintenance period. The design engineer or their designated representative and the CONTRACTOR shall be present to walk the site with the City of Rockwall Engineering Inspection personnel.

EROSION CONTROL & VEGETATION

1. The CONTRACTOR or developer shall be responsible, as the entity exercising operational control, for all permitting as required by the Environmental Protection Agency (EPA) and the Texas Commission on Environmental Quality (TCEQ). This includes, but is not limited to, preparation of the Storm Water Pollution Prevention Plan (SWPPP), the Construction Site Notice (CSN), the Notice of Intent (NOI), the Notice of Termination (NOT) and any Notice of Change (NOC) and is required to pay all associated fees
2. Erosion control devices as shown on the erosion control plan for the project shall be installed prior to the start of land disturbing activities.
3. All erosion control devices are to be installed in accordance with the approved plans, specifications and Storm Water Pollution Prevention Plan (SWPPP) for the project. Erosion control devices shall be placed and in working order prior to start of construction. Changes are to be reviewed and approved by the design engineer and the City of Rockwall prior to implementation.
4. If the Erosion Control Plans and Storm Water Pollution Prevention Plan (SWPPP) as approved cannot appropriately control erosion and off-site sedimentation from the project, the erosion control plan and/or the SWPPP is required to be revised and any changes reported to the Texas Commission on Environmental Quality (TCEQ), when applicable.
5. All erosion control devices shall be inspected weekly by the CONTRACTOR and after all major rain events, or more frequently as dictated in the project Storm Water Pollution Prevention Plan (SWPPP). CONTRACTOR shall provide copies of inspection's reports to the engineering inspection after each inspection.
6. The CONTRACTOR shall not dispose of waste and any materials into streams, waterways or floodplains. The CONTRACTOR shall secure all excavation at the end of each day and dispose of all excess materials.
7. CONTRACTOR shall take all available precautions to control dust. CONTRACTOR shall control dust by sprinkling water or other means as approved by the City Engineer.
8. CONTRACTOR shall establish grass and maintain the seeded area, including watering, until a "Permanent Stand of Grass" is obtained at which time the project will be accepted by the City. A "Stand of Grass" (not winter rye or weeds) shall consist of 75% to 80% coverage of all disturbed areas and a minimum of one-inch (1") in height as determined by the City. No bare spots will be allowed. Re-seeding will be required in all washed areas and areas that don't grow.
9. All City right-of-ways shall be sodded if disturbed. No artificial grass is allowed in any City right-of-way and/or easements.
10. All adjacent streets/alleys shall be kept clean at all times
11. CONTRACTOR shall keep construction site clean at all times, immediately contain all debris and trash, all debris and trash shall be removed at the end of each work day, and all vegetation on the construction site 10-inches or taller in height must be cut immediately.
12. Suspension of all construction activities for the project will be enforced by the City if any erosion control requirements are not meet. Work may commence after deficiency has been rectified.
13. During construction of the project, all soil stockpiles and borrow areas shall be stabilized or protected with sediment trapping measures. The CONTRACTOR is responsible for the temporary protection and permanent stabilization of all soil stockpiles on-site as well as borrow areas and soil intentionally transported from the project site.
14. Where construction vehicles access routes intersect paved or public roads/alleys, construction entrances shall be installed to minimize the transport of sediment by vehicular tracking onto paved surfaces. Where sediment is transferred onto paved or public surfaces, the surface shall be immediately cleaned. Sediment shall be removed from the surface by shoveling or sweeping and transported to a sediment disposal area. Pavement washing shall be allowed only after sediment is removed in this manner.
15. All drainage inlets shall be protected from siltation, ineffective or unmaintained protection devices shall be immediately replaced and the inlet and storm system cleaned. Flushing is not an acceptable method of cleaning.
16. During all dewatering operations, water shall be pumped into an approved filtering device prior to discharge into a receiving outlet.

TRAFFIC CONTROL

1. All new Detouring or Traffic Control Plans are required to be submitted to the City for review and approval a minimum of 21 calendar days prior to planned day of implementation.
2. When the normal function of the roadway is suspended through closure of any portion of the right-of-way, temporary construction work zone traffic control devices shall be installed to effectively guide the motoring public through the area. Consideration for road user safety, worker safety, and the efficiency of road user flow is an integral element of every traffic control zone.
3. All traffic control plans shall be prepared and submitted to the Engineering Department in accordance with the standards identified in Part VI of the most recent edition of the TMUTCD. Lane closures will not occur on roadways without an approval from the Rockwall Engineering Department and an approved traffic control plan. Traffic control plans shall be required on all roadways as determined by the City Engineer or the designated representative.
4. All traffic control plans must be prepared, signed, and sealed by an individual that is licensed as a professional engineer in the State of Texas. All traffic control plans and copies of work zone certification must be submitted for review and approval a minimum of three (3) weeks prior to the anticipated temporary traffic control.
5. The CONTRACTOR executing the traffic control plan shall notify all affected property owners two (2) weeks prior to any the closures in writing and verbally.
6. Any deviation from an approved traffic control plan must be reviewed by the City Engineer or the designated representative. If an approved traffic control plan is not adhered to, the CONTRACTOR will first receive a verbal warning and be required to correct the problem immediately. If the deviation is not corrected, all construction work will be suspended, the lane closure will be removed, and the roadway opened to traffic.
7. All temporary traffic control devices shall be removed as soon as practical when they are no longer needed. When work is suspended for short periods of time at the end of the workday, all temporary traffic control devices that are no longer appropriate shall be removed or covered. The first violation of this provision will result in a verbal warning to the construction foreman. Subsequent violations will result in suspension of all work at the job site for a minimum of 48 hours. All contractors working on City funded projects will be charged one working day for each 24 hour closure.
8. Lane closures on any major or minor arterial will not be permitted between the hours of 6:00 am to 9:00 am and 3:30 pm to 7:00 pm. Where lane closures are needed in a school area, they will not be permitted during peak hours of 7:00 am – 9:00 am and 3:00 pm to 5:00 pm. Closures may be adjusted according to the actual start-finish times of the actual school with approval by the City Engineer. The first violation of this provision will result in a verbal warning to the construction foreman. Subsequent violations will result in suspension of all work at the job site for a minimum of 48 hours. All contractors working on City funded projects will be charged one working day for each 24 hour closure of a roadway whether they are working or not.
9. No traffic signs shall be taken down without permission from the City.
10. No street/roadway will be allowed to be fully closed.

UTILITY LINE LOCATES

1. It is the CONTRACTOR's responsibility to notify utility companies to arrange for utility locates at least 48 hours prior to beginning construction. The completeness and accuracy of the utility data shown on the plans is not guaranteed by the design engineer or the City. The CONTRACTOR is responsible for verifying the depth and location of existing underground utilities proper to excavating, trenching, or drilling and shall be required to take any precautionary measures to protect all lines shown and .or any other underground utilities not on record or not shown on the plans.
2. The CONTRACTOR shall be responsible for damages to utilities
3. CONTRACTOR shall adjust all City of Rockwall utilities to the final grades.
4. All utilities shall be placed underground.
5. CONTRACTOR shall be responsible for the protection of all existing main lines and service lines crossed or exposed by construction operations. Where existing mains or service lines are cut, broken or damaged, the CONTRACTOR shall immediately make repairs to or replace the entire service line with same type of original construction or better. The City of Rockwall can and will intervene to restore service if deemed necessary and charge the CONTRACTOR for labor, equipment, material and loss of water if repairs aren't made in a timely manner by the CONTRACTOR.
6. The City of Rockwall (City utilities) is not part of the Dig Tess or Texas one Call – 811 – line locate system. All City of Rockwall utility line locates are to be scheduled with the City of Rockwall Service Center. 972-771-7730. A 48-hour advance notice is required for all non-emergency line locates.
7. Underground utility lines shall be installed in accordance with the following standards in addition to other applicable criteria:
   a. No more than 500 linear feet of trench may be opened at one time.
   b. Material used for backfilling trenches shall be properly compacted to 95% standard density in order to minimize erosion, settlement, and promote stabilization that the geotechnical engineer recommends.
   c. Applicable safety regulations shall be complied with.
11. This plan details pipes up to 5 feet from the building. Refer to the building plans for building connections. CONTRACTOR shall supply and install pipe adapters as necessary.
12. All underground lines shall be installed, inspected, and approved prior to backfilling.
13. All concrete encasement shall have a minimum of 28 days compressive strength at 3,000 psi (min. 5.5 sack mix).

WATER LINE NOTES

1. The CONTRACTOR shall maintain existing water service at all times during construction.
2. Proposed water lines shall be AWWA C900-16 PVC Pipe (blue in color) for all sizes, DR 14 (PC 305) for pipeline sizes 12-inch and smaller, and DR 18 (PC 235) for 14-inch and larger water pipelines unless otherwise shown on water plan and profiles sheets. Proposed water lines shall be constructed with minimum cover of 4 feet for 6-inch through 8-inch, 5 feet for 12-inch through 18-inch and 6 feet for 20-inch and larger.
3. Proposed water line embedment shall be NCTCOG Class 'B-3' as amended by the City of Rockwall's engineering standards of design and construction manual.
4. CONTRACTOR shall coordinate the shutting down of all water lines with the City of Rockwall Engineering Inspector and Water Department. The City shall operate all water valves. Allow 5 business days from the date of notice to allow City personnel time to schedule a shut down. Two additional days are required for the CONTRACTOR to notify residents in writing of the shut down after the impacted area has been identified. Water shut downs impacting businesses during their normal operation hours is not allowed. CONTRACTOR is required to coordinate with the Rockwall Fire Department regarding any fire watch requirements as well as any costs incurred when the loss of fire protection to a structure occurs.
5. CONTRACTOR shall furnish and install gaskets on water lines between all dissimilar metals and at valves (both existing and proposed).
6. All fire hydrants and valves removed and salvaged shall be returned to the City of Rockwall Municipal Service Center.
7. Blue EMS pads shall be installed at every change in direction, valve, curb stop and service tap on the proposed water line and every 250'.
8. All water valve hardware and valve extensions, bolts, nuts and washers shall be 316 stainless steel.
9. All fire hydrants bolts, nuts and washers that are buried shall be 316 stainless steel.
10. Abandoned water lines to remain in place shall be cut and plugged and all void spaces within the abandoned line shall be filled with grout, flowable fill or an expandable permanent foam product. Valves to be abandoned in place shall have any extensions and the valve box removed and shall be capped in concrete.
11. All fire hydrants will have a minimum of 5 feet of clearance around the appurtenance including but not limited to parking spaces and landscaping.
12. All joints are to be megalug joints with thrust blocking.
13. Water and sewer mains shall be kept 10 feet apart (parallel) or when crossing 2 feet vertical clearance.
14. CONTRACTOR shall maintain a minimum of 4 feet of cover on all water lines.
15. All domestic and irrigation services are required to have a testable backflow device with a double check valve installed per the City of Rockwall regulations at the property line and shown on plans.

WASTEWATER LINE NOTES

1. The CONTRACTOR shall maintain existing wastewater service at all times during construction.
2. Wastewater line for 4-inch through 15-inch shall be Green PVC – SDR 35 (ASTM D3034) [less 10 ft cover] and SDR 26 (ASTM D3034) [10 ft or more cover]. For 18-inch and lager wastewater line shall be Green PVC – PS 46 (ASTM F679) [less 10 ft cover] and PS 115 (ASTM F679) [10 ft or more cover]. No services will be allowed on a sanitary sewer line deeper than 10 feet.
3. Proposed wastewater line embedment shall be NCTCOG Class 'H' as amended by the City of Rockwall's public works standard design and construction manual.
4. Green EMS pads shall be installed at every 250', manhole, clean out and service lateral on proposed wastewater lines.
5. CONTRACTOR shall CCTV all existing wastewater lines that are to be abandoned to ensure that all laterals are accounted for and transferred to proposed wastewater lines prior to abandonment.
6. All abandoned wastewater and force main lines shall be cut and plugged and all void spaces within the abandoned line shall be filled with grout, flowable fill or an expandable permanent foam product.
7. Existing manholes and cleanouts not specifically called to be relocated shall be adjusted to match final grades.
8. All wastewater pipes and public services shall be inspected by photographic means (television and DVD) prior to final acceptance and after franchise utilities are installed. The CONTRACTOR shall furnish a DVD to the Engineering Construction Inspector for review. Pipes shall be cleaned prior to TV inspection of the pipes. Any sags, open joints, cracked pipes, etc. shall be repaired or removed by the CONTRACTOR at the CONTRACTOR's expense. A television survey will be performed as part of the final testing in the twentieth (20^{th}) month of the maintenance period.
9. All manholes (public or private) shall be fitted with inflow prevention. The inflow prevention shall conform to the measures called out in standard detail R-5031.
10. All new or existing manholes being modified shall have corrosion protection being Raven Liner 405 epoxy coating, ConShield, or approved equal.. Consheild must have terracotta color dye mixed in the precast and cast-in-place concrete. Where connections to existing manholes are made the CONTRACTOR shall rehab manhole as necessary and install a 125 mil thick coating of Raven Liner 405 or approved equal.
11. All new or existing manholes that are to be placed in pavement shall be fitted with a sealed (gasketed) rim and cover to prevent inflow.
12. If an existing wastewater main or trunk line is called out to be replaced in place a wastewater bypassing pump plan shall be required and submitted to the Engineering Construction Inspector and City Engineer for approval prior to implementation. Bypass pump shall be fitted with an auto dialer and conform to the City's Noise Ordinance. Plan shall be to the City sufficiently in advance of scheduled construction to allow no less than 10 business days for review and response by the City.
13. CONTRACTOR shall maintain a minimum of 4 feet of cover on all wastewater lines.

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

THE SEAL THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS PREPARED BY JARAH E. LAUZ 8/20/2021
ALTERATION ON A SEALED DOCUMENT WITHOUT PROPER AUTHORITY AND/OR FAILURE TO ADD THE NOTATION "AS AMENDED" IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

GENERAL CONSTRUCTION NOTES
Sheet 1 of 2
October 2020

CITY OF ROCKWALL
ENGINEERING DEPARTMENT
385 S. Goliad
Rockwall, Texas 75087
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DEMOLITION, REMOVAL, DISPOSAL AND EXCAVATION NOTES

1. All pavements to be removed and replaced shall be saw cut to full depth along neat squared lines shown in the plans.
2. Proposed concrete pavement shall be constructed with longitudinal butt construction joints at all connections to existing concrete pavement.
3. All public concrete pavement to be removed and replaced shall be full panel replacement, 1-inch thicker and on top of 6-inch thick compacted flexbase.
4. No excess excavated material shall be deposited in low areas or along natural drainage ways without written permission from the affected property owner and the City of Rockwall. No excess excavation shall be deposited in the City Limits without a permit from the City of Rockwall. If the CONTRACTOR places excess materials in these areas without written permission, the CONTRACTOR will be responsible for all damages resulting from such fill and shall remove the material at their own cost.

PAVING AND GRADING

1. All detention systems are to be installed and verified for design compliance along with the associated storm sewer and outflow structures, prior to the start of any paving operations (including building foundations). Erosion protection shall be placed at the pond outflow structures, silt fence along the perimeter of the pond along with any of the associated erosion BMPs noted on the erosion control plan, and the sides and bottom of the detention system shall have either sod or anchored seeded curlex installed prior to any concrete placement.
2. All paving roadway, driveways, fire lanes, drive-isles, parking, dumpster pads, etc. sections shall have a minimum thickness, strength, reinforcement, joint type, joint spacing and subgrade treatment shall at a minimum conform to the City standards of Design and Construction and table below.

Street/Pavement Type	Minimum Thickness (inches)	Streng th 28-Day (psi)	Minimum Cement (sacks / CY)		Steel Reinforcement	
			Machine placed	Hand Placed	Bar #	Spacing (O.C.E.W.)
Arterial	10”	3,600	6.0	6.5	#4 bars	18”
Collector	8”	3,600	6.0	6.5	#4 bars	18”
Residential	6”	3,600	6.0	6.5	#3 bars	24”
Alley	7”-5”-7”	3,600	6.0	6.5	#3 bars	24”
Fire Lane	6”	3,600	6.0	6.5	#3 bars	24”
Driveways	6”	3,600	6.0	6.5	#3 bars	24”
Barrier Free Ramps	6”	3,600	N/A	6.5	#3 bars	24”
Sidewalks	4”	3,000	N/A	5.5	#3 bars	24”
Parking Lot/Drive Aisles	5”	3,000	5.0	5.5	#3 bars	24”
Dumpster Pads	7”	3,600	6.0	6.5	#3 bars	24”

3. Reinforcing steel shall be tied (100%). Reinforcing steel shall be set on plastic chairs. Bar laps shall be minimum 30 diameters. Sawed transverse dummy joints shall be spaced every 15 feet or 1.25 time longitudinal butt joint spacing whichever is less. Sawing shall occur within 5 to 12 hours after the pour, including sealing. Otherwise, the section shall be removed and longitudinal butt joint constructed.
4. No sand shall be allowed under any paving.
5. All concrete mix design shall be submitted to the City for review and approval prior to placement.
6. Fly ash may be used in concrete pavement locations provided that the maximum cement reduction does not exceed 20% by weight per C.Y. of concrete. The fly ash replacement shall be 1.25 lbs. per 1.0 lb. cement reduction.
7. All curb and gutter shall be integral (monolithic) with the pavement.
8. All fill shall be compacted by sheep's foot roller to a minimum 95% standard proctor. Maximum loose lift for compaction shall be 8 inches. All lifts shall be tested for density by an independent laboratory. All laboratory compaction reports shall be submitted to the City Engineering Construction Inspector once results are received. All reports will be required prior to final acceptance.
9. All concrete compression tests and soil compaction/density tests are required to be submitted to the City’s Engineering Inspector immediately upon results.
10. All proposed sidewalks shall include barrier free ramps at intersecting streets, alleys, etc. Barrier free ramps (truncated dome plate in Colonial or brick red color) shall meet current City and ADA requirements and be approved by the Texas Department of Licensing and Regulation (TDLR).
11. All public sidewalks shall be doweled into pavement where it abuts curbs and driveways. Expansion joint material shall be used at these locations.
12. All connection of proposed concrete pavement to existing concrete pavement shall include a longitudinal butt joint as the load transfer device. All longitudinal butt joints shall be clean, straight and smooth (not jagged in appearance)
13. Cracks formed in concrete pavement shall be repaired or removed by the CONTRACTOR at the City's discretion. CONTRACTOR shall replace existing concrete curbs, sidewalk, paving, a gutters as indicated on the plans and as necessary to connect to the existing infrastructure, including any damage caused by the CONTRACTOR.
14. All residential lots will require individual grading plans submitted during the building permit process that correspond with the engineered grading and drainage area plans.
15. Approval of this plan is not an authorization to grade adjacent properties when the plans or field conditions warrant off-site grading. Written permission must be obtained and signed from the affected property owner(s) and temporary construction easements may be required. The written permission shall be provided to the City as verification of approval by the adjacent property owner(s). Violation of this requirement will result in suspension of all work at the job site until issue has been rectified.
16. All cut or fill slopes of non-paved areas shall be a maximum of 4:1 and minimum of 1%.
17. CONTRACTOR agrees to repair any damage to property and the public right-of-way in accordance with the City Standards of Design and Construction.
18. CONTRACTOR shall protect all monuments, iron pins/rods, and property corners during construction.
19. CONTRACTOR shall ensure positive drainage so that runoff will drain by gravity flow to new or existing drainage inlets or sheet flow per these approved plans.

DRAINAGE / STORM SEWER NOTES

1. The CONTRACTOR shall maintain drainage at all times during construction. Ponding of water in streets, drives, trenches, etc. will not be allowed. Existing drainage ways shall not be blocked or removed unless explicitly stated in the plans or written approval is given by the City.
2. All structural concrete shall be 4200 psi compressive strength at 28 days minimum 7.0 sack mix, air entrained, unless noted otherwise. Fly ash shall not be allowed in any structural concrete.
3. Proposed storm sewer embedment shall be NCTCOG Class 'B' as amended by the City of Rockwall's Engineering Department Standards of Design and Construction Manual.
4. All public storm pipe shall be a minimum of 18-inch reinforced concrete pipe (RCP), Class III, unless otherwise noted.
5. All storm pipe entering structures shall be grouted to assure connection at the structure is watertight.
6. All storm structures shall have a smooth uniform poured mortar invert from invert in to invert out.
7. All storm sewer manholes in paved areas shall be flush with the paving grade, and shall have traffic bearing ring and covers.
8. All storm sewer pipes and laterals shall be inspected by photographic means (television and DVD) prior to final acceptance and after franchise utilities are installed. The CONTRACTOR shall furnish a DVD to the Engineering Construction Inspector for review. Pipes shall be cleaned prior to TV inspection of the pipes. Any sags, open joints, cracked pipes, etc. shall be repaired or removed by the CONTRACTOR at the CONTRACTOR’s expense. A television survey will be performed as part of the final testing in the twentieth (20^{th}) month of the maintenance period.

RETAINING WALLS

1. All retaining walls, regardless of height, will be reviewed and approved by the City Engineering Department
2. All retaining walls (including foundation stem walls), regardless of height, will be constructed of rock/stone/brick or rock/stone/brick faced. No smooth concrete walls are allowed. Wall materials shall be the same for all walls on the project.
3. All portions, including footings, tie-backs, and drainage backfill, of the wall shall be on-site and not encroach into any public easements or right-of-way. The entire wall shall be in one lot and shall not be installed along a lot line.
4. All walls 3 feet and taller will be designed and signed/sealed by a registered professional engineer in the State of Texas. The wall design engineer is required to inspect the wall construction and supply a signed/sealed letter of wall construction compliance to the City of Rockwall along with wall as-builts prior to City Engineering acceptance.
5. No walls are allowed in detention easements. A variance to allow retaining walls in a detention easement will require approval by the Planning and Zoning Commission with appeals being heard by the City Council.

FINAL ACCEPTANCE AND RECORD DRWINGS/AS-BUILTS

1. Final Acceptance shall occur when all the items on the Checklist for Final Acceptance have been completed and signed-off by the City. An example of the checklist for final acceptance has been included in the Appendix of the Standards of Design and Construction. Items on the checklist for final acceptance will vary per project and additional items not shown on the check list may be required.
2. After improvements have been constructed, the developer shall be responsible for providing to the City “As Built” or “Record Drawings”. The Design Engineer shall furnish all digital files of the project formatted in Auto Cad 14, or 2000 format or newer and Adobe Acrobat (.pdf) format with a CD-ROM disk or flash drive. The disk or drive shall include a full set of plans along with any landscaping, wall plans, and details sheets.
3. Submit 1-set of printed drawings of the “Record Drawings” containing copies of all sheets to the Engineering Construction Inspector for the project. The printed sheets will be reviewed by the inspector PRIOR to producing the “Record Drawing” digital files on disk or flash drive. This will allow any revisions to be addressed prior to producing the digital files.
4. Record Drawing Disk drawings shall have the Design Engineers seal, signature and must be stamped and dated as “Record Drawings” or “As Built Drawings” on all sheets.
5. The City of Rockwall will not accept any Record Drawing disk drawings which include a disclaimer. A disclaimer shall not directly or indirectly state or indicate that the design engineer or the design engineer’s surveyor/surveyors did not verify grades after construction, or that the Record Drawings were based solely on information provided by the construction contractor/contractors. Any Record Drawings which include like or similar disclaimer verbiage will not be accepted by the City of Rockwall.
6. Example of Acceptable Disclaimer: “To the best of our knowledge ABC Engineering, Inc., hereby states that this plan is As-Built. This information provided is based on surveying at the site and information provided by the contractor.”

PROTECTION OF EXISTING STRUCTURES AND UTILITIES:

1. Prior to the start of construction, communicate with the representatives of the local utility companies, including the oil, gas, telephone and communications companies, and local water and sewer utilities operating in the location of the proposed construction area. Seek the utility companies’ assistance in locating existing facilities to avoid conflicts during construction. The location, number, depth, and owner of utilities indicated are for information purposes only, and all utilities and structures may not be shown or may not be in the location shown.
2. Where construction endangers adjacent structures, utilities, embankments and/or roadways, light poles, pole base foundations, and associated electrical conduits and conductors, the Contractor shall, at his own expense, carefully support and protect such structures so that no damage occurs throughout the construction process. In case damage should occur, the Contractor shall be responsible for restoring the damaged structure to a condition acceptable to the Owner of that structure and shall bear all cost of such reparations
3. Repair or replace damaged street surfaces, driveways, sidewalks, curbs, gutters, fences, drainage structures, or other such facilities to the satisfaction of the Owner. Structures shall be returned to a condition equal to or better than the original condition and of same or better material and quality.
4. Excavation, trenching, backfilling and grading: prior to any excavation or trenching, notify the owner's representative, utility companies and owner's facilities department. Allow sufficient time for utilities to be located prior to excavation to avoid disruption of services. provide a minimum of 72 hours written notice to the owner prior to trenching or excavation. Do not proceed with trenching or excavation until authorized by the owner. utilities or services which are damaged, which are identified prior to excavation or tre

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

THE SEAL THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS PREPARED BY SARAH E. CAUDLE
ON 10/1/2021
ALTERATION OF A SEALED DOCUMENT WITHOUT PROPER AUTHORITY OF THE LICENSED PROFESSIONAL ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

GENERAL CONSTRUCTION NOTES
Sheet 2 of 2
October 2020

CITY OF ROCKWALL
ENGINEERING DEPARTMENT
385 S. Goliad
Rockwall, Texas 75087
P (972) 771-7746
F (972) 771-7748

CONTROL POINTS

CP	SURFACE NORTHING	SURFACE EASTING	GRID NORTHING	GRID EASTING	ELEVATION	DESCRIPTION
101	7019941.91	2610547.21	7018916.20	2610165.77	591.42	"X" CUT
102	7019776.19	2611080.33	7018750.50	2610698.82	581.98	"X" CUT
103	7020896.45	2611923.81	7019870.60	2611542.17	591.58	IRSC1/2
104	7020876.07	2611323.04	7019850.22	2610941.49	599.22	IRSC1/2
51	7018605.56	2613056.24	7017580.04	2612674.44	561.76	IRFC5/8
52	7019399.13	2613039.57	7018373.50	2612657.77	580.07	irfc5/8
53	7019896.51	2613013.15	7018870.80	2612631.35	584.85	IRFC5/8
54	7020526.42	2612982.79	7019500.62	2612601	578.52	IRSC5/8
55	7020931.16	2612580.76	7019905.30	2612199.02	580.02	IRSC5/8
56	7020935.95	2611990.96	7019910.09	2611609.31	590.21	IRFC5/8

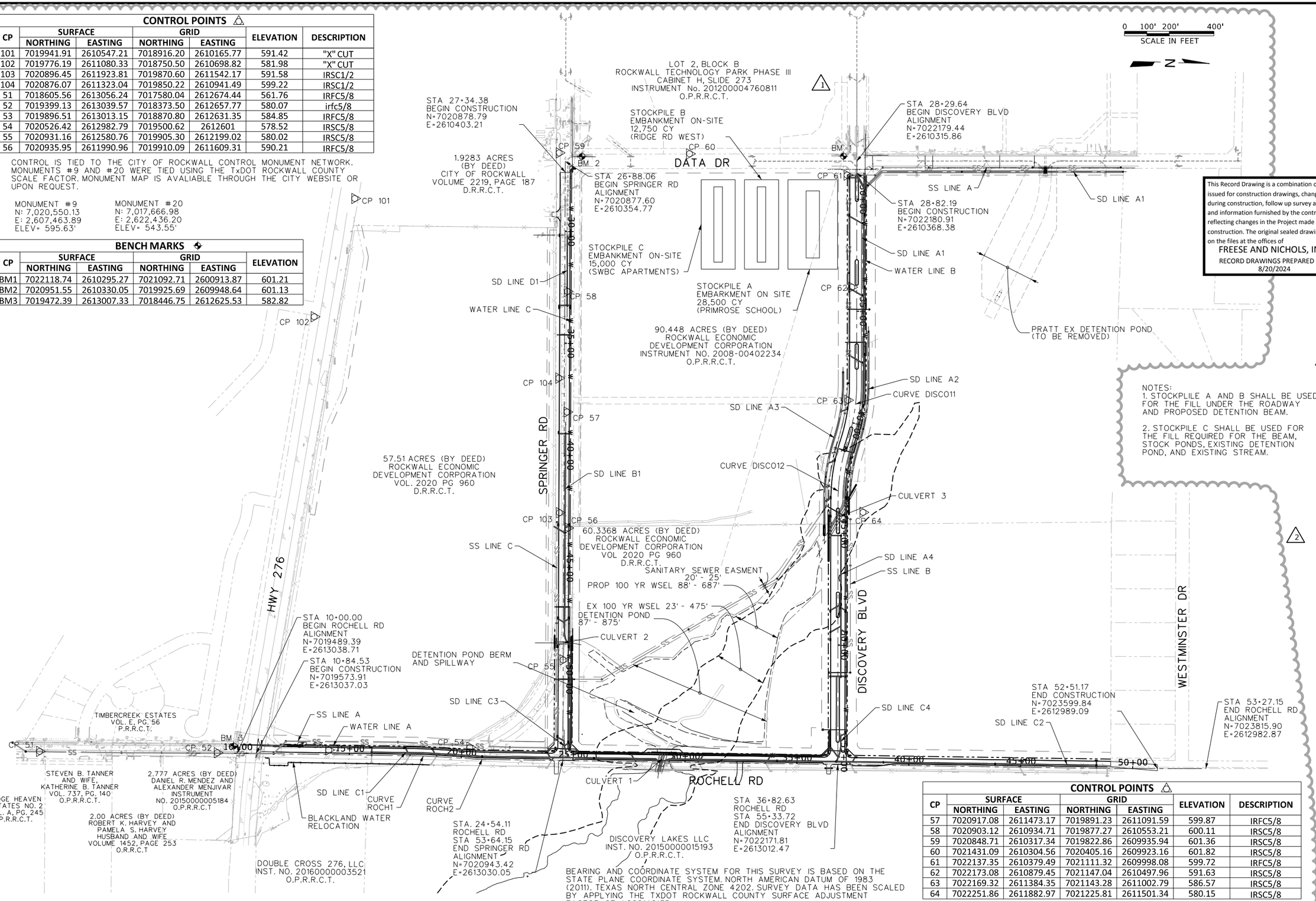
CONTROL IS TIED TO THE CITY OF ROCKWALL CONTROL MONUMENT NETWORK. MONUMENTS #9 AND #20 WERE TIED USING THE TxDOT ROCKWALL COUNTY SCALE FACTOR. MONUMENT MAP IS AVALIABLE THROUGH THE CITY WEBSITE OR UPON REQUEST.

MONUMENT #9
N: 7,020,550.13
E: 2,607,463.89
ELEV= 595.63'

MONUMENT #20
N: 7,017,666.98
E: 2,622,436.20
ELEV= 543.55'

BENCH MARKS

CP	SURFACE NORTHING	SURFACE EASTING	GRID NORTHING	GRID EASTING	ELEVATION
BM1	7022118.74	2610295.27	7021092.71	2600913.87	601.21
BM2	7020951.55	2610330.05	7019925.69	2609948.64	601.13
BM3	7019472.39	2613007.33	7018446.75	2612625.53	582.82



NOTES:
1. STOCKPLILE A AND B SHALL BE USED FOR THE FILL UNDER THE ROADWAY AND PROPOSED DETENTION BEAM.

2. STOCKPILE C SHALL BE USED FOR THE FILL REQUIRED FOR THE BEAM, STOCK PONDS, EXISTING DETENTION POND, AND EXISTING STREAM.

CONTROL POINTS

CP	SURFACE NORTHING	SURFACE EASTING	GRID NORTHING	GRID EASTING	ELEVATION	DESCRIPTION
57	7020917.08	2611473.17	7019891.23	2611091.59	599.87	IRFC5/8
58	7020903.12	2610934.71	7019877.27	2610553.21	600.11	IRSC5/8
59	7020848.71	2610317.34	7019822.86	2609935.94	601.36	IRSC5/8
60	7021431.09	2610304.56	7020405.16	2609923.16	601.82	IRSC5/8
61	7022137.35	2610379.49	7021111.32	2609998.08	599.72	IRFC5/8
62	7022173.08	2610879.45	7021147.04	2610497.96	591.63	IRSC5/8
63	7022169.32	2611384.35	7021143.28	2611002.79	586.57	IRSC5/8
64	7022251.86	2611882.97	7021225.81	2611501.34	580.15	IRSC5/8

BEARING AND COORDINATE SYSTEM FOR THIS SURVEY IS BASED ON THE STATE PLANE COORDINATE SYSTEM. NORTH AMERICAN DATUM OF 1983 (2011). TEXAS NORTH CENTRAL ZONE 4202. SURVEY DATA HAS BEEN SCALED BY APPLYING THE TXDOT ROCKWALL COUNTY SURFACE ADJUSTMENT FACTOR OF 1.00146135.

ELEVATIONS WERE ESTABLISHED BY THE ALLTERRA VRS NETWORK.

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

FREESE AND NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2250
Web - www.freese.com

RELEASE FOR REVIEW
THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
IT IS NOT TO BE USED FOR BIDDING OR CONSTRUCTION PURPOSES
NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
CIVIL
PROJECT LAYOUT

F&N JOB NO. RKW19271
DATE APRIL 2022
DESIGNED MF
DRAWN CHM
CHECKED ADH
FILE NAME cv-trt-pl-horiz01.sht

NO.	ISSUES	BY	DATE
1	PRE-AWARD AMEND #1	SEC	4/12/2022
2	ADDENDUM #2	SEC	11/17/21

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET GN-5
SEQ. 6

MicroStation V8 User: 90262 Office: On Site
Plotter: J:\jlf\Drawings\Roadway\cv-rtrt-horizon.sht
Plot Style: J:\jlf\Workspace\Styles\Monochrome.stb
Plot Scale: 400.080 '/ in.
Date: Feb. 19, 2024 - 03:35:31 PM
Model: Default
Xrefset: Freese and Nichols, Inc. - True Type Fonts

Office: On Site Date: Feb. 20, 2024 - 03:35:53 PM User: 90262 File: N:\jf\Drawings\Roadway\cv-trt-pl-horiz01.sht

SPRINGER RD

Beginning chain SPR01 description

Point SPR0100 N 7,020,877.5994 E 2,610,354.7679 Sta 26+88.06

Course from SPR0100 to SPR0101 N 88° 35' 26.32" E Dist 2,676.0877

Point SPR0101 N 7,020,943.4190 E 2,613,030.0460 Sta 53+64.15

Ending chain SPR01 description

DISCOVERY BLVD

Beginning chain DISC01 description

Point DISC0100 N 7,022,179.4412 E 2,610,315.8553 Sta 28+29.64

Course from DISC0100 to PC DISC011 N 88° 23' 40.50" E Dist 991.8725

Curve Data

Curve DISC011			
P.I. Station	39+56.12 N	7,022,211.0007 E	2,611,441.8883
Delta =	17° 59' 48.62" (RT)		
Degree =	6° 44' 26.45"		
Tangent =	134.6027		
Length =	266.9885		
Radius =	850.0000		
External =	10.5916		
Long Chord =	265.8923		
Mid. Ord. =	10.4612		
P.C. Station	38+21.51 N	7,022,207.2296 E	2,611,307.3384
P.T. Station	40+88.50 N	7,022,173.0161 E	2,611,571.0203
C.C.	N 7,021,357.5633 E	2,611,331.1522	
Back = N	88° 23' 40.50" E		
Ahead = S	73° 36' 30.88" E		
Chord Bear = S	82° 36' 25.19" E		

Curve Data

Curve DISC012			
P.I. Station	42+23.10 N	7,022,135.0315 E	2,611,700.1523
Delta =	17° 59' 48.62" (LT)		
Degree =	6° 44' 26.45"		
Tangent =	134.6027		
Length =	266.9885		
Radius =	850.0000		
External =	10.5916		
Long Chord =	265.8923		
Mid. Ord. =	10.4612		
P.C. Station	40+88.50 N	7,022,173.0161 E	2,611,571.0203
P.T. Station	43+55.49 N	7,022,138.8025 E	2,611,834.7022
C.C.	N 7,022,988.4689 E	2,611,810.8885	
Back = S	73° 36' 30.88" E		
Ahead = N	88° 23' 40.50" E		
Chord Bear = S	82° 36' 25.19" E		

Course from PT DISC012 to DISC0101 N 88° 23' 40.50" E Dist 150.0000

Point DISC0101 N 7,022,143.0049 E 2,611,984.6433 Sta 45+05.49

Course from DISC0101 to DISC0102 N 88° 23' 40.50" E Dist 1,028.2284

Point DISC0102 N 7,022,171.8119 E 2,613,012.4681 Sta 55+33.72

Ending chain DISC01 description

ROCHELL RD

Beginning chain ROCH description

Point ROCH01 N 7,019,489.3942 E 2,613,038.7052 Sta 10+00.00

Course from ROCH01 to ROCH02 N 1° 08' 09.91" W Dist 116.4182

Point ROCH02 N 7,019,605.7895 E 2,613,036.3970 Sta 11+16.42

Course from ROCH02 to ROCH03 N 0° 39' 59.88" W Dist 482.2267

Point ROCH03 N 7,020,087.9836 E 2,613,030.7864 Sta 15+98.64

Course from ROCH03 to PC ROCH1 N 0° 52' 59.05" W Dist 200.0000

Curve Data

Curve ROCH1			
P.I. Station	18+30.66 N	7,020,319.9746 E	2,613,027.2106
Delta =	2° 37' 13.08" (RT)		
Degree =	4° 05' 33.20"		
Tangent =	32.0186		
Length =	64.0260		
Radius =	1,400.0000		
External =	0.3661		
Long Chord =	64.0204		
Mid. Ord. =	0.3660		
P.C. Station	17+98.64 N	7,020,287.9598 E	2,613,027.7040
P.T. Station	18+62.67 N	7,020,351.9784 E	2,613,028.1812
C.C.	N 7,020,309.5364 E	2,614,427.5378	
Back = N	0° 52' 59.05" W		
Ahead = N	1° 44' 14.03" E		
Chord Bear = N	0° 25' 37.49" E		

Course from PT ROCH1 to PC ROCH2 N 1° 44' 14.03" E Dist 200.0000

Curve Data

Curve ROCH2			
P.I. Station	20+93.89 N	7,020,583.0961 E	2,613,035.1910
Delta =	2° 33' 19.03" (LT)		
Degree =	4° 05' 33.20"		
Tangent =	31.2239		
Length =	62.4374		
Radius =	1,400.0000		
External =	0.3481		
Long Chord =	62.4323		
Mid. Ord. =	0.3481		
P.C. Station	20+62.67 N	7,020,551.8865 E	2,613,034.2444
P.T. Station	21+25.11 N	7,020,614.3168 E	2,613,034.7452
C.C.	N 7,020,594.3286 E	2,611,634.8879	
Back = N	1° 44' 14.03" E		
Ahead = N	0° 49' 05.00" W		
Chord Bear = N	0° 27' 34.52" E		

Course from PT ROCH2 to ROCH04 N 0° 49' 05.00" W Dist 2,372.1631

Point ROCH04 N 7,022,986.2381 E 2,613,000.8771 Sta 44+97.27

Course from ROCH04 to ROCH05 N 0° 50' 55.46" W Dist 420.2405

Point ROCH05 N 7,023,406.4325 E 2,612,994.6522 Sta 49+17.51

Course from ROCH05 to ROCH06 N 1° 38' 11.22" W Dist 3.0079

Point ROCH06 N 7,023,409.4391 E 2,612,994.5663 Sta 49+20.52

Course from ROCH06 to ROCH07 N 1° 38' 41.06" W Dist 83.2419

Point ROCH07 N 7,023,492.6468 E 2,612,992.1771 Sta 50+03.76

Course from ROCH07 to ROCH08 N 1° 38' 55.69" W Dist 210.4870

Point ROCH08 N 7,023,703.0466 E 2,612,986.1207 Sta 52+14.25

Course from ROCH08 to ROCH09 N 1° 38' 52.96" W Dist 112.9045

Point ROCH09 N 7,023,815.9044 E 2,612,982.8736 Sta 53+27.15

Ending chain ROCH description

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FREESE AND NICHOLS, INC.

RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASED FOR REVIEW ONLY
THIS DOCUMENT WAS ORIGINALLY ISSUED AND SEALED BY SARAH E. CAUDLE, TEXAS NO. 134055, ON 10/21/2021. IT IS NOT TO BE USED FOR BIDDING OR CONSTRUCTION PURPOSES. ALTERATION OF A SEALED DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

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Fax: (214) 217-2201
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

ALIGNMENT DATA

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED AU
DRAWN SI
REVISED
CHECKED SEC
FILE NAME cv-trt-gn-align01.sht

NO.	ISSUES	BY	DATE

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

0 1"

SHEET GN-6

SEQ. 7

MicroStation V8 User: 90262 Office: On Site
Plotter: \\IP\HP800 PS3 Plot Config: Plot.cfg Model: Default
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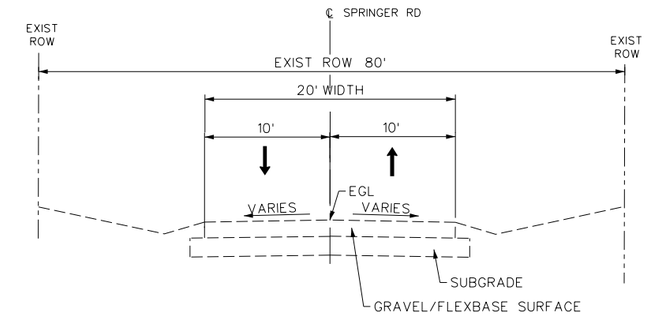
Date: Feb. 20, 2024 - 03:35:56 PM



1 EXISTING SPRINGER RD
N.T.S.
BEGIN TO END

LEGEND

1. SAWED LONGITUDINAL CONTRACTION, OR CONSTRUCTION JOINT
2. BLOCK SOD UNTIL:
   SPRINGER RD- 17.5' BEHIND BACK OF CURB
   DISCOVERY BLVD- 10.5' BEHIND BACK OF CURB
   ROCHELL RD WEST- 10.5' BEHIND BACK OF CURB
   ROCHELL RD EAST- 10.5' BEHIND BACK OF CURB
3. HYDROMULCH (OUTSIDE THE ROW LIMITS OR LIMITS ABOVE)
4. 10" REINFORCED CONCRETE PAVEMENT #4 BARS 18" C/C BOTH WAYS (3,600 PSI 6.0 SACK/CY HAND PLACED) (3,600 PSI6.5 SACK/CY MACHINE PLACED)
5. 9" REINFORCED CONCRETE PAVEMENT #4 BARS 18" C/C BOTH WAYS (3,600 PSI 6.0 SACK/CY HAND PLACED) (3,600 PSI6.5 SACK/CY MACHINE PLACED)
6. 8" LIME STABILIZED SUBGRADE (48LB/SY)
7. 4" CONCRETE SIDEWALK (3,000 PSI5.5 SACK/CY)
8. 6" INTEGRAL CURB (USE NTCOG DETAIL)

NOTES

1. ROADWAY FILL SHALL BE COMPACTED IN MAXIMUM 8-INCH LOOSE LIFTS TO AT LEAST 95 PERCENT OF STANDARD PROCTOR (ASTM D698) DENSITY BETWEEN OPTIMUM MOISTURE AND 4 PERCENT ABOVE OPTIMUM. THE FILL SHALL BE MATERIAL CONSISTING OF ON-SITE MATERIAL FROM REQUIRED CUT AREAS, EMBANKMENT FROM ON-SITE STOCKPILE, OR APPROVED IMPORTED FILL. CONTRACTOR SHALL ENSURE COMPACTION IS MAINTAINED ADJACENT TO EXISTING UTILITIES. THIS IS ALL CONSIDERED SUBSIDIARY TO THE EMBANKMENT PAY ITEMS.

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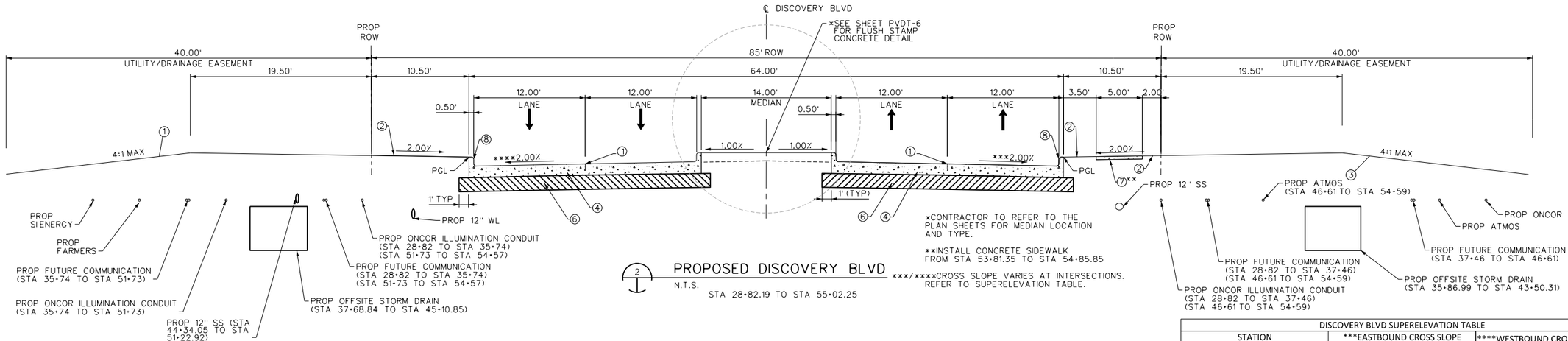
RECORD DRAWINGS PREPARED ON: 8/20/2024



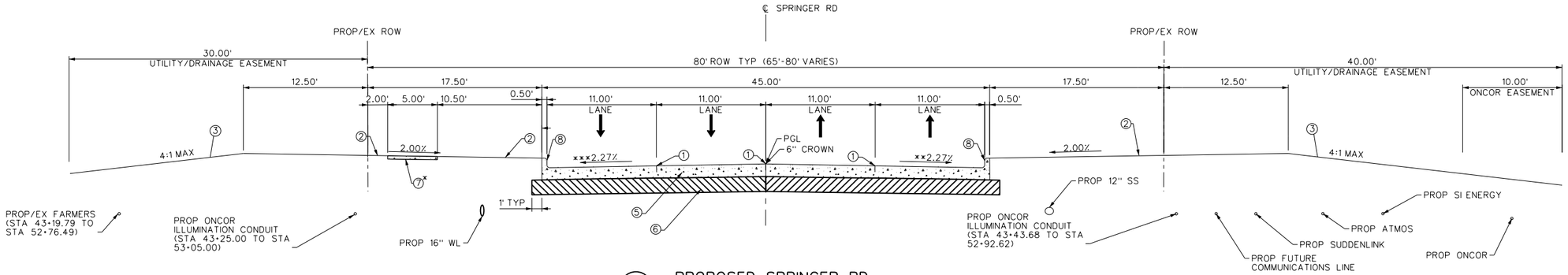
2 PROPOSED DISCOVERY BLVD
N.T.S.
STA 28+82.19 TO STA 55+02.25

×CONTRACTOR TO REFER TO THE PLAN SHEETS FOR MEDIAN LOCATION AND TYPE.

××INSTALL CONCRETE SIDEWALK FROM STA 53+81.35 TO STA 54+85.85

×××/××××CROSS SLOPE VARIES AT INTERSECTIONS. REFER TO SUPERELEVATION TABLE.

DISCOVERY BLVD SUPERELEVATION TABLE		
STATION	***EASTBOUND CROSS SLOPE	****WESTBOUND CROSS SLPOE
54+01.00	-2.00%	-2.00%
54+64.00	0.00%	-1.03%
54+86.00	0.70%	-0.70%



3 PROPOSED SPRINGER RD
N.T.S.
STA 27+40.26 TO STA 53+32.65

× INSTALL CONCRETE SIDEWALK FROM STA 48+09.74 TO STA 53+17.34

××/××× CROSS SLOPE VARIES AT INTERSECTIONS. REFER TO SUPER ELEVATION TABLE.

SPRINGER RD SUPERELEVATION TABLE		
STATION	** EASTBOUND CROSS SLOPE	***WESTBOUND COSS SLOPE
52+22.00	-2.27%	-2.27%
52+72.00	-1.85%	0.00%
53+16.00	-1.72%	1.72%

TEXAS REGISTERED ENGINEERING FIRM F-2144
FREESE AND NICHOLS, INC.

THE SEAL THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE TEXAS NO. 134055 ON 10/21/2021
ALTERATION OF A SEALED DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

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2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
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Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
CIVIL
TYPICAL SECTIONS

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MRF
DRAWN CHM
REVISED
CHECKED SEC
FILE NAME cv-trt-dt-typ01.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale
0 1"

SHEET TYP-1
SEQ. 8

MicroStation V8 User: 90262 Office: On Site
Plotter: HPDesignJet T1700dr PostScript Model: Default
Plot Scale: 12.000 '/ in. Project: Freese and Nichols, Inc. - True Type Fonts
Date: Feb. 20, 2024 - 03:35:57 PM

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

NOTES

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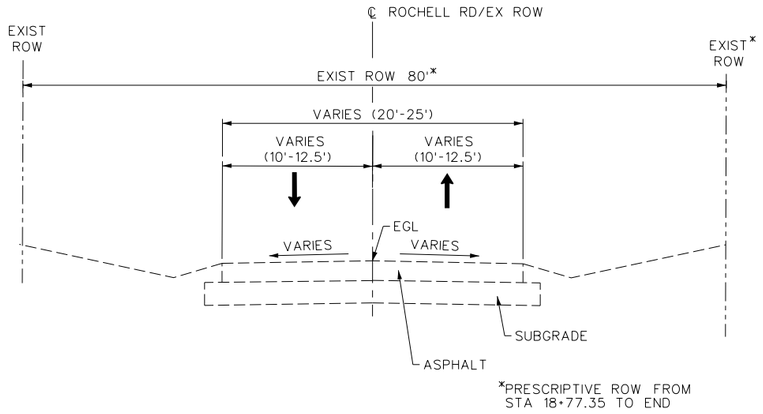
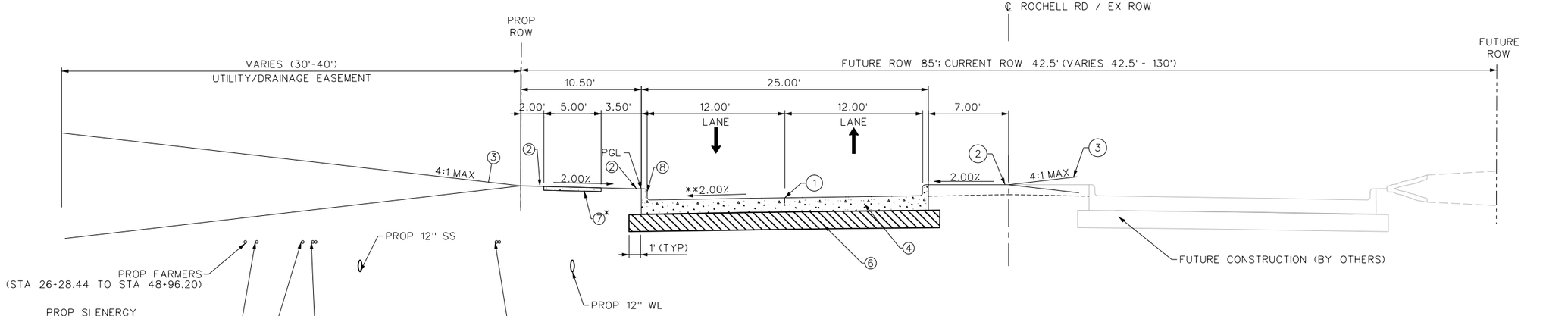


4 EXISTING ROCHELL RD
N.T.S.
BEGIN TO END

LEGEND

1. SAWED LONGITUDINAL CONTRACTION, OR CONSTRUCTION JOINT
2. BLOCK SOD UNTIL:
   SPRINGER RD- 17.5' BEHIND BACK OF CURB
   DISCOVERY BLVD- 10.5' BEHIND BACK OF CURB
   ROCHELL RD WEST- 10.5' BEHIND BACK OF CURB
   ROCHELL RD EAST- 10.5' BEHIND BACK OF CURB
3. HYDROMULCH (OUTSIDE THE ROW LIMITS OR LIMITS ABOVE)
4. 10" REINFORCED CONCRETE PAVEMENT #4 BARS 18" C/C BOTH WAYS
   (3,600 PSI 6.0 SACK/CY HAND PLACED)
   (3,600 PSI 6.5 SACK/CY MACHINE PLACED)
5. 9" REINFORCED CONCRETE PAVEMENT #4 BARS 18" C/C BOTH WAYS
   (3,600 PSI 6.0 SACK/CY HAND PLACED)
   (3,600 PSI 6.5 SACK/CY MACHINE PLACED)
6. 8" LIME STABILIZED SUBGRADE (48LB/SY)
7. 4" CONCRETE SIDEWALK (3,000 PSI 5.5 SACK/CY)
8. 6" INTEGRAL CURB (USE NTCOG DETAIL)

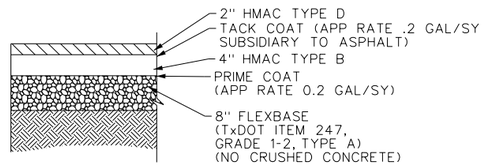


* INSTALL CONCRETE SIDEWALK FROM STA 24+91.16 TO STA 36+34.69 AND STA 12+22.79 TO STA 12+91.48.

** CROSS SLOPE VARIES AT INTERSECTIONS. REFER TO SUPERELEVATION TABLE.

5 PROPOSED ROCHELL RD
N.T.S.
STA 10+84.53 TO STA 49+01.57

**ROCHELL RD SUPERELEVATION TABLE	
STATION	CROSS SLOPE
10+83.89	-0.35%
11+78.00	-2.00%



5 ASPHALT PAVEMENT TRANSITION
N.T.S.
STA 49+01.57 TO STA 51+06.57

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASED FOR REVIEW ON 10/21/2021
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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
CIVIL
TYPICAL SECTIONS

NO.	ISSUES	BY	DATE

F&N JOB NO. RKV19711
DATE APRIL 2022
DESIGNED MRF
DRAWN CHM
REVISED
CHECKED SEC
FILE NAME cv-trt-dt-typ02.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale accordingly.

SHEET TYP-2
SEQ. 9

MicroStation V8 User: 90262 Office: On Site
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Plot Scale: 10.000 ' / in. Project: Freese and Nichols, Inc.- True Type Fonts
Date: Feb. 20, 2024 - 03:35:59 PM

20230000006632 1/4 PLAT 04/26/2023 10:17:23 AM

MATCH LINE SHEET 2

N 01°38'59" W 1,119.70'

10' WATER EASEMENT INST. NO. 20160000002288 O.P.R.R.C.T.

1/2" FIR W/ "WEIR & ASSOCIATES INC" CAP

5/8" FIR W/ "PACHECO KOCH" CAP

DISCOVERY BLVD. (85' Right-of-Way) (CAB. G, PG. 347 P.R.R.C.T.)

S 01°38'59" E 1,081.07'

S 46°38'58" E 37.83'

N 88°23'40" E 902.68'

S 88°23'40" W 929.40'

40' D.E. & U.E. (BY THIS PLAT)

Centerline

N 88°23'40" E 929.29'

S 88°23'40" W 912.70'

S 43°20'28" W 37.47'

1/2" FIR W/ "WEIR & ASSOCIATES INC" CAP

DRAINAGE & DETENTION EASEMENT INST. NO. 2012-464780 O.P.R.R.C.T.

DRAINAGE EASEMENT INST. NO. 2008-00406071 O.P.R.R.C.T.

65'

32.5'

Centerline

N 01°42'44" W 1,159.54'

S 01°42'43" E 1,160.55'

25' PEDESTRIAN, LANDSCAPE & UTILITY EASEMENT INST. NO. 2012-464780 O.P.R.R.C.T.

LOT 2 BLOCK B Rockwall Technology Park Phase III Cab. H, Pg. 273 (P.R.R.C.T.)

DATA DRIVE (65' Right-of-Way) (CAB. G, PG. 347 P.R.R.C.T.)

DRAINAGE EASEMENT INST. NO. 2008-00406067 O.P.R.R.C.T.

DRAINAGE EASEMENT INST. NO. 2008-00406069 O.P.R.R.C.T.

DRAINAGE EASEMENT INST. NO. 2008-00406066 O.P.R.R.C.T.

DRAINAGE & DETENTION EASEMENT INST. NO. 2012-464780 O.P.R.R.C.T.

S 46°34'32" E 30.83'

30' D.E. & U.E. (BY THIS PLAT)

N 88°26'27" E 222.77'

1/2" FIR W/ "WEIR & ASSOCIATES INC" CAP

S 88°26'27" W 235.14'

10' BLACKLAND WATER SUPPLY EASEMENT INST. NO. 2008-00402235 O.P.R.R.C.T. (To Be Abandoned)

N 88°36'34" E 1,788.05'

S 88°36'34" W 1,787.99'

1,333.56'

Centerline

N 88°36'34" E 1,787.64'

SPRINGER ROAD (80' Right-of-Way)

80'

40' D.E. & U.E. (BY THIS PLAT)

N 88°36'34" E 1,787.96'

N 00°56'16" W 40.02'

CITY OF ROCKWALL VOL. 2219, PG. 187 (D.R.R.C.T.)

BLACKLAND WATER CORP. VOL. 235, PG. 233 (D.R.R.C.T.)

281.32'

LOT 1 BLOCK 1 Highway 276 Self Storage Cab. F, Pg. 125 (P.R.R.C.T.)

N 00°56'16" W 892.33'

419.01'

Replat Highway 276 Self Storage Cab. F, Pg. 381 (P.R.R.C.T.)

LOTS BLOCK 1

192.00'

POINT OF BEGINNING N=7,018,928.86 E=2,610,285.52

S 00°56'16" E 13.33'

1/2" FIR W/ "R.S.C.I. RPLS 5934" CAP (C.M.)

145.56'

N 82°10'49" W 602.17'

608.64'

20' S.S.E. (BY THIS PLAT)

STATE OF TEXAS PARCEL 14 INST. NO. 20210000019941 (O.P.R.R.C.T.)

181.86'

391.03'

393.54'

S 75°41'14" W 146.40'

N 67°39'02" W 181.82'

STATE HIGHWAY NO. 276 (120' Right-of-Way) (VOL. 75, PG. 95 P.R.R.C.T.)

N 81°58'48" W 1,229.43'

835.89'

BLOCK A

BLOCK C

BLOCK D

HAWTHORNE TRAIL (50' Right-of-Way)

TIMBERCREEK DRIVE (60' Right-of-Way)

100' DRAINAGE R.O.W. DEDICATED TO THE CITY OF ROCKWALL CAB. E, PG. 55

Timber Creek Estates CAB. E, Pg. 55 (P.R.R.C.T.)

PINEBLUFF LANE (50' Right-of-Way)

ROCHELL ROAD (variable width Right-of-Way)

S 40°58'25" W 1,146.81'

COR-8 ALUMINUM DISK STAMPED: "CITY OF ROCKWALL SURVEY MONUMENT"

1/2" FIR

5/8" FIR

CONC. MON.

LOT 1 BLOCK C 56.5033 Acres 2,461,283 Sq. Ft. Min. F.F. Elev. = 579.00'

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION (REMAINDER OF CALLED 57.51 ACRES) INST. NO. 20200000000960 (O.P.R.R.C.T.)

J.A. RAMSEY SURVEY ABSTRACT NO. 186

LOT 1 BLOCK B 70.5969 Acres 3,075,201 Sq. Ft. Min. F.F. Elev. = 579.74'

J.B. JONES SURVEY ABSTRACT NO. 125

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION (CALLED 90.448 ACRES) VOL. 5528, PG. 194 (D.R.R.C.T.)

30' INGRESS & EGRESS EASEMENT VOL. 182, PG. 409 D.R.R.C.T. (To Be Abandoned)

20' D.E. & U.E. (BY THIS PLAT)

Deed Line

J.B. JONES SURVEY, ABSTRACT NO. 125
J.A. RAMSEY SURVEY, ABSTRACT NO. 186

Approximate Location of Survey Line

10' ONCOR EASEMENT (BY SEPARATE INSTRUMENT)

10' BLACKLAND WATER SUPPLY EASEMENT VOL. 76, PG. 40 D.R.R.C.T. (To Be Abandoned)

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION (CALLED 0.9524 ACRES) INST. NO. 20220000024507 O.P.R.R.C.T.

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION (CALLED 60.25 ACRES) INST. NO. 20200000000794 (O.P.R.R.C.T.)

DRAINAGE & DETENTION EASEMENT (BY THIS PLAT)

20' S.S.E. (BY THIS PLAT)

30' D.E. & U.E. (BY THIS PLAT)

80' RIGHT OF WAY DEDICATION (BY THIS PLAT)

42.5' RIGHT OF WAY DEDICATION (BY THIS PLAT)

RIGHT OF WAY DEDICATION (BY THIS PLAT) 0.2664 Acres 11,604 Sq. Ft.

LANDSCAPE EASEMENT (BY THIS PLAT)

85' RIGHT OF WAY DEDICATION (BY THIS PLAT)

RIGHT OF WAY DEDICATION (BY THIS PLAT) 8.4637 Acres 368,680 Sq. Ft.

25'X51' LANDSCAPE EASEMENT (BY THIS PLAT)

56'X76' LANDSCAPE EASEMENT (BY THIS PLAT)

ROBERT K. BRISCOE SURVEY ABSTRACT NO. 16

M.E. HAWKINS SURVEY ABSTRACT NO. 100

Approximate Location of Survey Line

DISCOVERY LAKES, LLC INST. NO. 20150000015193 (O.P.R.R.C.T.)

M.E. HAWKINS SURVEY ABSTRACT NO. 100

S 00°49'05" E 2,842.89'

S 00°49'05" E 1,084.86'

S 00°49'05" E 1,026.32'

S 00°49'05" E 825.10'

S 00°49'05" E 223.45'

S46°13'08"E 42.14'

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION (CALLED 1.101 ACRES) INST. NO. 20200000003632 (O.P.R.R.C.T.)

DOUBLE CROSS 276 , LLC INST. NO. 20160000003521 (O.P.R.R.C.T.)

S 01°10'12" E 168.31'

MISHO PROPERTIES LLC INST. NO. 20190000016704 (O.P.R.R.C.T.)

ROBERT K. HARVEY AND PAMELA S. HARVEY VOL. 1452, PG. 253 (D.R.R.C.T.)

50' S.S.E. (BY SEPARATE INSTRUMENT)

15'

1/2" FIR

1/2" FIR

N 90°00'00" W 37.98'

S 45°00'00" W 53.86'

N 83°41'15" W 41.43'

N 82°43'33" W 130.66'

44.24'

519.76'

S 88°37'59" W

507.26'

S 88°37'59" W

17.74'

S 43°23'45" W

17.74'

N 88°38'01" E 215.06'

N 88°38'01" E 502.14'

S 46°13'08" E 8.78'

S 01°24'34" E 104.34'

S 01°24'34" E 104.34'

N 29°44'59" W 116.48'

N 27°52'02" E 47.14'

N 34°48'39" E 156.27'

N 01°40'53" W 114.70'

N 01°40'53" W 114.70'

N 15°51'12" E 37.47'

N 42°47'57" W 40.09'

N 68°02'11" W 76.99'

N 15°56'47" W 98.80'

N 47°15'35" W 20.35'

S 37°13'35" E 894.56'

S 37°13'35" E 869.50'

S 48°46'06" E 53.72'

N 48°46'06" W 64.93'

N 48°46'06" W 186.57'

S 57°19'22" E 278.37'

N 57°19'22" W 314.17'

N 59°11'28" W 74.45'

N 44°23'19" W 140.33'

S 76°51'21" E 66.44'

S 80°07'53" E 150.42'

S 82°39'52" E 141.76'

N 89°49'17" E 191.11'

N88°23'40"E 300.69' 151.70'

93.64' 10'

S 45°09'27" E 200.90'

S 48°46'06" E 46.01'

N 88°20'55" E 90.78'

N 88°23'40" E 712.64'

N 88°23'40" E 982.36'

S 88°23'40" W 1,106.76'

N 88°23'40" E 1,105.17'

N 88°23'40" E 124.60'

S 00°49'05" E 1,151.02'

L1 L2 L3 L4 L5 L6 L7 L8 L9 L10

C1 C2 C3 C4 C5 C6 C7

△ =17°59'49" R =767.50' L =241.07' CB=S 82°36'25" E CD=240.09'

△ =17°59'49" R =932.50' L =292.90' CB=S 82°36'25" E CD=291.70'

△ =17°59'49" R =807.50' L =253.64' CB =S 82°36'25" E CD =252.60'

△ =17°59'49" R =892.50' L =280.34' CB=S 82°36'25" E CD=279.19'

△ =34°59'50" R =109.02' L =66.59' CB=N 10°55'36" E CD=65.56'

△ =02°33'19" R =1,317.50' L =58.76' CB=S 00°27'35" W CD=58.75'

△ =02°37'13" R =1,442.50' L =65.97' CB =S00°25'37"W CD =65.96'

△ =02°37'13" R =1,482.21' L =67.80' CB=S 00°25'37" W CD=67.79'

S 01°44'14" W 16.53'

S 01°44'14" W 200.00'

S 00°52'59" E 199.32'

S 00°52'59" E 199.32'

S 00°40'00" E 409.08'

S 00°40'00" E 438.90'

S 00°55'38" E 293.37'

SET MAG NAIL

1" FIR

1/2" FIR

40' D.E. & U.E. (BY THIS PLAT)

LEGEND

○	Monument Found	O.P.R.R.C.T.	Official Public Records Of Rockwall County Texas
O	1/2" Set Iron Rod (W/Red PJB SURVEYING Cap) Unless otherwise noted	D.R.R.C.T.	Deed Records Of Rockwall County Texas
□	Found 5/8" Iron Rod with Pink Cap Stamped "Texas Department of Transportation ROW Monument"	P.R.R.C.T.	Plat Records Of Rockwall County Texas
SX	Set "X" Cut	INST. NO.	Instrument Number
FIR	Found Iron Rod	VOL.	Volume
FIRC	Found Iron Rod with Cap	PG.	Page
FIP	Found Iron Pipe	R.O.W.	Right-of-Way
FPK	Found PK Nail	D.E.	Drainage Easement
FX	Found "X" Cut	U.E.	Utility Easement
MON	Concrete Monument	S.S.E.	Sanitary Sewer Easement
(C.M.)	Controlling Monument		
FND	Found		

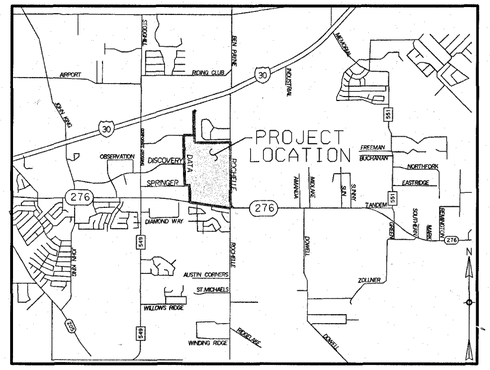
General Notes:

1. Bearings are referenced to the State Plane Coordinate System, Zone 4202, NAD 83.
2. Subject property lies within a Flood Hazard Area as depicted FEMA FIRM Panel Number 48397C0045L, dated September 26, 2008.
3. There are no proposed building improvements with this plat.
4. Water source shall be provided by the City of Rockwall.
5. Sewage disposal shall be provided by the City of Rockwall.
6. Property owner shall be responsible for maintenance, repairs and replacement of drainage and detention easements.

N

200 0 400

SCALE: 1" = 200'



LOCATION MAP
N. T. S.

CURVE TABLE

NO.	DELTA	RADIUS	LENGTH	CHORD BRG.	CHORD DIST.
C1	29°36'26"	613.69'	317.12'	N 76°35'13" W	313.60'
C2	10°21'34"	613.69'	110.96'	N 23°22'18" W	110.81'
C3	02°33'19"	1,357.50'	60.54'	S 00°27'35" W	60.54'
C4	00°32'22"	533.69'	5.02'	S 01°08'31" E	5.02'
C5	20°52'00"	613.69'	223.50'	S 11°14'49" E	222.27'
C6	17°59'49"	892.50'	280.34'	N 82°36'25" W	279.19'
C7	17°59'49"	807.50'	253.64'	N 82°36'25" W	252.60'

LINE TABLE

NO.	BEARING	DIST.
L1	N 88°38'01" E	303.43'
L2	N 46°34'32" W	41.45'
L3	N 43°20'28" E	42.39'
L4	N 01°40'53" W	85.27'
L5	N 46°53'14" W	42.25'

LINE TABLE

NO.	BEARING	DIST.
L6	S 00°49'05" E	36.25'
L7	S 01°44'14" W	183.47'
L8	S 43°23'45" W	42.43'
L9	S 46°13'13" E	42.14'
L10	S 43°23'40" W	42.73'

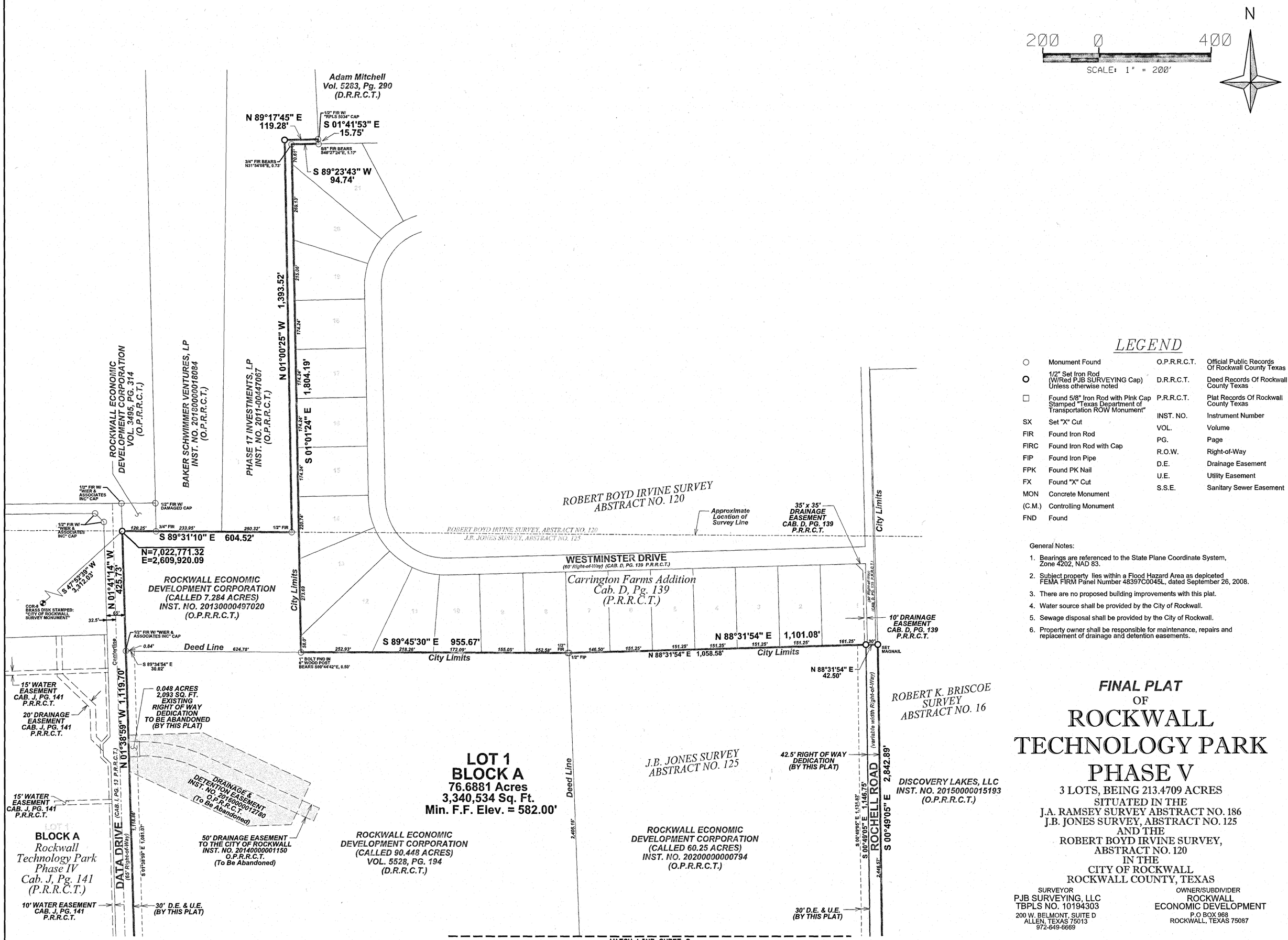
FINAL PLAT
OF
ROCKWALL TECHNOLOGY PARK PHASE V

3 LOTS, BEING 213.4709 ACRES
SITUATED IN THE
J.A. RAMSEY SURVEY ABSTRACT NO. 186
J.B. JONES SURVEY, ABSTRACT NO. 125
AND THE
ROBERT BOYD IRVINE SURVEY, ABSTRACT NO. 120
IN THE
CITY OF ROCKWALL
ROCKWALL COUNTY, TEXAS

SURVEYOR
PJB SURVEYING, LLC
TBPLS NO. 10194303
200 W. BELMONT, SUITE D
ALLEN, TEXAS 75013
972-649-6669

OWNER/SUBDIVIDER
ROCKWALL ECONOMIC DEVELOPMENT
P.O BOX 968
ROCKWALL, TEXAS 75087

CASE NO. P2021-062



LEGEND

○	Monument Found	O.P.R.R.C.T.	Official Public Records Of Rockwall County Texas
O	1/2" Set Iron Rod (W/Red PJB SURVEYING Cap) Unless otherwise noted	D.R.R.C.T.	Deed Records Of Rockwall County Texas
□	Found 5/8" Iron Rod with Pink Cap Stamped "Texas Department of Transportation ROW Monument"	P.R.R.C.T.	Plat Records Of Rockwall County Texas
SX	Set "X" Cut	INST. NO.	Instrument Number
FIR	Found Iron Rod	VOL.	Volume
FIRC	Found Iron Rod with Cap	PG.	Page
FIP	Found Iron Pipe	R.O.W.	Right-of-Way
FPK	Found PK Nail	D.E.	Drainage Easement
FX	Found "X" Cut	U.E.	Utility Easement
MON	Concrete Monument	S.S.E.	Sanitary Sewer Easement
(C.M.)	Controlling Monument		
FND	Found		

General Notes:

1. Bearings are referenced to the State Plane Coordinate System, Zone 4202, NAD 83.
2. Subject property lies within a Flood Hazard Area as depiceted FEMA FIRM Panel Number 48397C0045L, dated September 26, 2008.
3. There are no proposed building improvements with this plat.
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5. Sewage disposal shall be provided by the City of Rockwall.
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FINAL PLAT
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ROCKWALL TECHNOLOGY PARK PHASE V

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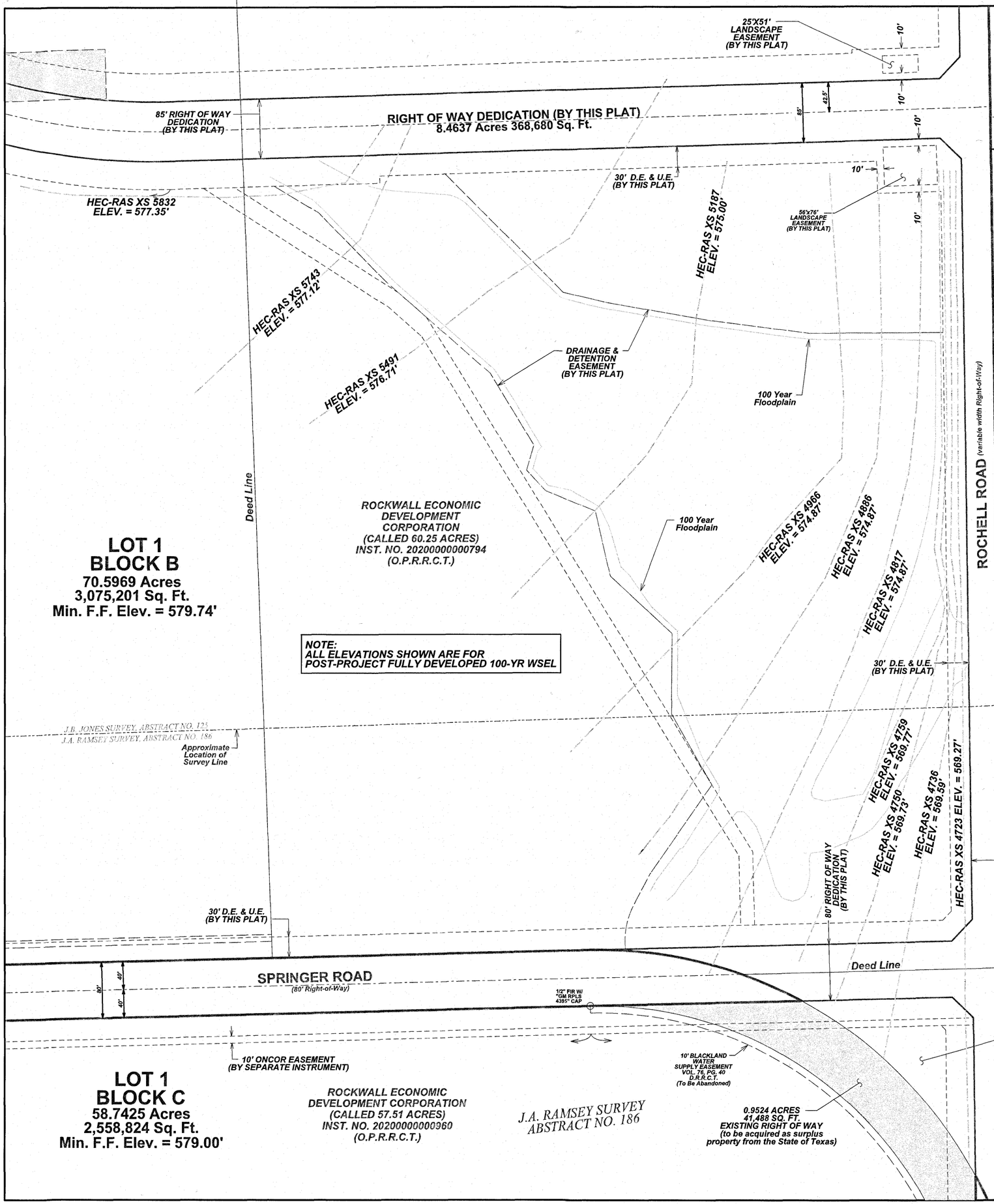

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(C.M.)	Controlling Monument	S.S.E.	Sanitary Sewer Easement
FND	Found		

General Notes:

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FINAL PLAT
OF
ROCKWALL TECHNOLOGY PARK PHASE V

3 LOTS, BEING 213.4709 ACRES
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J.A. RAMSEY SURVEY ABSTRACT NO. 186
J.B. JONES SURVEY, ABSTRACT NO. 125
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IN THE
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SURVEYOR
PJB SURVEYING, LLC
TBPLS NO. 10194303
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OWNER/SUBDIVIDER
ROCKWALL
ECONOMIC DEVELOPMENT
P.O BOX 968
ROCKWALL, TEXAS 75087

CASE NO. P2021-062

OWNER'S CERTIFICATION
(Public Dedication)

STATE OF TEXAS
COUNTY OF ROCKWALL

WHEREAS ROCKWALL ECONOMIC DEVELOPMENT CORPORATION, BEING THE OWNER OF A TRACT OF land inc the County of Rockwall, State of Texas, said tract being described as follows:

BEING a tract of land situated in the J.A. Ramsey Survey, Abstract Number 186, the J.B. Jones Survey, Abstract No. 125, and the Robert Boyd Irvine Survey, Abstract No. 120 in Rockwall County, Texas, being all of the remainder of a called 57.51 acre tract of land described in Special Warranty Deed to Rockwall Economic Development Corporation (REDC), as recorded in Instrument No. 20200000000960, of the Official Public Records of Rockwall County, Texas (O.P.R.R.C.T.), all of a called 1.101 acre tract of land described in General Warranty Deed to Rockwall Economic Development Corporation (REDC), as recorded in Instrument No. 20200000003632, O.P.R.R.C.T., all of a called 60.25 acre tract of land described in General Warranty Deed to Rockwall Economic Development Corporation (REDC), as recorded in Instrument No. 20200000000794, O.P.R.R.C.T., all of a called 7.284 acre tract of land described in deed to Rockwall Economic Development Corporation (REDC), as recorded in Instrument No. 20130000497020, .O.P.R.R.C.T., all of a called 90.448 acre tract of land described in Special Warranty Deed to Rockwall Economic Development Corporation (REDC), as recorded in Volume 5528, Page 194, of the Deed Records of Rockwall County, Texas (D.R.R.C.T.), and all of a called 0.9524 acre tract of land described in Deed Without Warranty, to Rockwall Economic Development Corporation (REDC), as recorded in Instrument No. 20220000024507, O.P.R.R.C.T., being more particularly described as follows:

BEGINNING at a 5/8-inch iron rod with pink cap stamped "TEXAS DEPARTMENT OF TRANSPORTATION ROW MONUMENT"found in the west line of said REDC 57.51 acre tract and the east line of Lot 3, Block 1, of the Replat of Highway 276 Self Storage, an addition to the City of Rockwall, Rockwall County, Texas, recorded in Cabinet F, Page 381, of the Plat Records of Rockwall County, Texas (P.R.R.C.T.), from which a found 1/2-inch iron rod with cap stamped "R.S.C.I. RPLS 5034" (controlling monument) bears South 00 degrees 56 minutes 16 seconds East, a distance of 13.33 feet at the southwest corner of said REDC 57.51 acre tract and the southeast corner of said Lot 3, Block 1, being in the existing northeasterly line of State Highway No. 276 (SH 276) (120 foot width right-of-way);

THENCE North 00 degrees 56 minutes 16 seconds West, with the west line of said REDC 57.51 acre tract and the east line of said Lot 3, Block 1, at a distance of 192.00 feet passing the northeast corner of said Lot 3, Block 1 and the easternmost southeast corner of Lot 1, Block 1 of Highway 276 Self Storage, an addition to the City of Rockwall, Rockwall County, Texas, recorded in Cabinet F, Page 125, P.R.R.C.T., continuing with the west line of said REDC 57.51 acre tract and the east line of said Lot 1, Block 1 at a distance of 624.35 feet passing the easternmost northeast corner of said Lot 1, Block 1 and the southeast corner of a tract of land conveyed by deed to the City of Rockwall, as recorded in Volume 2219, Page 187, D.R.R.C.T., continuing with the west line of said REDC 57.51 acre tract and the east line of said City of Rockwall tract, a total distance of 892.33 feet to a 1/2-inch iron rod with cap stamped "PJB SURVEYING" set at the northwest corner of said REDC 57.51 acre tract and the northeast corner of said City of Rockwall tract, being in the south line of Springer Road (80 foot right-of-way);

THENCE North 88 degrees 36 minutes 34 seconds East, with the north line of said REDC 57.51 acre tract and the south line of said Springer Road, a distance of 1,787.64 feet to a 1/2-inch iron rod with cap stamped "PJB SURVEYING" set at the at the northwest corner of said REDC 0.9524 acre tract;

THENCE North 88 degrees 38 minutes 01 second East, a distance of 303.43 feet to a 1/2-inch iron rod with cap stamped "PJB SURVEYING" set at the northeast corner of said REDC 0.9524 acre tract, being in the southwest line of said REDC 1.101 acre tract, being on a curve to the left, having a radius of 613.69 feet and a central angle of 29 degrees 36 minutes 26 seconds;

THENCE with the southwest line of said REDC 1.101 acre tract and the northeasterly line of said Springer Road, with said curve to the left, at an arc distance of 94.65 feet passing the northwest corner of said REDC 1.101 acre tract and a southwest corner of said REDC 60.25 acre tract, continuing with a southwesterly line of said REDC 60.25 acre tract and the northeasterly line of said Springer Road, a total arc distance of 317.12 feet (Chord Bearing North 76 degrees 35 minutes 13 seconds West - 313.60 feet) to a 1/2-inch iron rod with cap stamped "PJB SURVEYING" set at the point of tangency;

THENCE South 88 degrees 36 minutes 34 seconds West, with the south line of said REDC 60.25 acre tract and the north line of said Springer Road, at a distance of 454.43 feet passing the southwest corner of said REDC 60.25 acre tract and the southeast corner of said REDC 90.448 acre tract, continuing with the south line of said REDC 90.448 acre tract and the north line of said Springer Road, a total distance of 1,787.99 feet to a 1/2-inch iron rod with cap stamped "PJB SURVEYING" set;

THENCE South 88 degrees 26 minutes 27 seconds West, continuing with the south line of said REDC 90.448 acre tract and the north line of said Springer Road, a distance of 235.14 feet to a 1/2-inch iron rod with cap stamped "PJB SURVEYING" set;

THENCE North 46 degrees 34 minutes 32 seconds West, departing the south line of said REDC 90.448 acre tract and the north line of said Springer Road, a distance of 41.45 feet to a 1/2-inch iron rod with cap stamped "PJB SURVEYING" set in the east line of Data Drive (65 foot width right-of-way);

THENCE North 01 degree 42 minutes 44 seconds West, with the east line of said Data Drive, a distance of 1,159.54 feet to a 1/2-inch iron rod with cap stamped "PJB SURVEYING" set;

THENCE North 43 degrees 20 minutes 28 seconds East, continuing with the east line of said Data Drive, a distance of 42.39 feet to a 1/2-inch iron rod with cap stamped "PJB SURVEYING" set;

THENCE North 01 degree 40 minutes 53 seconds West, continuing with the east line of said Data Drive, a distance of 85.27 feet to a 1/2-inch iron rod with cap stamped "WEIR & ASSOCIATES INC found;

THENCE North 46 degrees 53 minutes 14 seconds West, continuing with the east line of said Data Drive, a distance of 42.25 feet a 1/2-inch iron rod with cap stamped "PJB SURVEYING" set;

THENCE North 01 degree 38 minutes 59 seconds West, continuing with the east line of said Data Drive, at a distance of 1,118.86 feet passing the north line of said REDC 90.448 acre tract and south line of said REDC 7.284 acre tract, continuing with the east line of said Data Drive, a total distance of 1,119.70 feet to a 1/2-inch iron rod with cap stamped "WEIR & ASSOCIATES INC" found;

THENCE North 01 degree 41 minutes 14 seconds West, continuing with the east line of said Data Drive, a distance of 425.73 feet to a 1/2-inch iron rod with cap stamped "PJB SURVEYING" set at the westernmost northwest corner of said REDC 7.284 acre tract and the southwest corner of the remainder of a called 52.76 acre tract described in deed to Rockwall Economic Development Corporation, recorded in Volume 3495, Page 314, O.P.R.R.C.T.;

THENCE South 89 degrees 31 minutes 10 seconds East, departing the east line of said Data Drive, with the north line of said REDC 7.284 acre tract and the south line of said 52.76 acre remainder tract, at a distance of 120.25 feet passing a 3/4-inch iron rod found at the southeast corner of said 52.76 acre remainder tract and the southwest corner of a tract of land described in deed to Baker Schwimmer Ventures, LP, as recorded in Instrument No. 20180000018084, O.P.R.R.C.T., at a distance of 354.20 feet passing the southeast corner of said Baker Schwimmer Ventures, LP and the southwest corner of a tract of land described in deed to Phase 17 Investments, LP, as recorded in Instrument No. 2011-00447067, O.P.R.R.C.T., continuing with a north line of said REDC 7.284 acre tract and the south line of said Phase 17 Investments, LP, a total distance of 604.52 feet to a 1/2-inch iron rod found at in interior corner of said REDC 7.284 acre tract and the southeast corner of said Phase 17 Investments, LP tract;

THENCE North 01 degree 00 minutes 25 seconds West, with the west line of said REDC 7.284 acre tract and the east line of said Phase 17 Investments, LP tract, a distance of 1,393.52 feet to a 1/2-inch iron rod with cap stamped "PJB SURVEYING" set at the northernmost northwest corner of said REDC 7.284 acre tract and an interior corner of said Phase 17 Investments, LP tract;

THENCE North 89 degrees 17 minutes 45 seconds East, with a north line of said REDC 7.284 acre tract and a south line of said Phase 17 Investments, LP tract, a distance of 119.28 feet to a 1/2-inch iron rod with cap stamped "RPLS 5034" found at the northeast corner of said REDC 7.284 acre tract and a southeast corner of said Phase 17 Investments, LP tract, being in the west line of a tract of land described in deed to Adam Mitchell, as recorded in Volume 5283, Page 290, D.R.R.C.T.;

THENCE South 01 degree 41 minutes 53 seconds East, with an east line of said REDC 7.284 acre tract and the west line of said Adam Mitchell tract, a distance of 15.75 feet to a southeast corner of said REDC 7.284 acre tract and the southwest corner of said Adam Mitchell tract, being in the north line of Carrington Farms Addition, an addition to the City of Fate, as recorded in Cabinet D, Page 139, P.R.R.C.T., from which a found 5/8-inch iron rod bears South 46 degrees 27 minutes 24 seconds East, a distance of 1.17 feet;

THENCE South 89 degrees 23 minutes 43 seconds West, with a south line of said REDC 7.284 acre tract and the north line of said Carrington Farms Addition, a distance of 94.74 feet to an interior corner of said REDC 7.284 acre tract and the northwest corner of said Carrington Farms Addition, from which a 3/4-inch iron rod bears North 31 degrees 54 minutes 08 seconds East, a distance of 0.73 feet;

THENCE South 01 degree 01 minute 24 seconds East, with the east line of said REDC 7.284 acre tract and the west line of said Carrington Farms Addition, a distance of 1,804.19 feet to the southeast corner of said REDC 7.284 acre tract and the southwest corner of said Carrington Farms Addition, being in the north line of said REDC 90.448 acre tract, from which a found 1-inch bolt in 6-inch wood post bears South 00 degrees 44 minutes 42 seconds East, a distance of 0.50 feet;

THENCE South 89 degrees 45 minutes 30 seconds East, with the north line of said REDC 90.448 acre tract and the south line of said Carrington Farms Addition, a distance of 955.67 feet to a 1/2-inch iron pipe found at the northeast corner of said REDC 90.448 acre tract and the northwest corner of said REDC 60.25 acre tract;

THENCE North 88 degrees 31 minutes 54 seconds East, with the north line of said REDC 60.25 acre tract and the south line of said Carrington Farms Addition, at a distance of 1,094.00 feet passing the southeast corner of said Carrington Farms Addition, continuing a total distance of 1,101.08 feet to a magnail set at the northeast corner of said REDC 60.25 acre tract, being in the west line of a tract of land described in deed to Discovery Lakes, LLC, as recorded in Instrument No. 20150000015193, O.P.R.R.C.T., being in the approximate center of Rochell Road;

THENCE South 00 degrees 49 minutes 05 seconds East, with the east line of said REDC 60.25 acre tract and the west line of said Discovery Lakes, LLC tract, with the approximate center of said Rochell Road, at a distance of 2,446.57 feet passing the southeast corner of said REDC 60.25 acre tract and the northeast corner of said REDC 1.101 acre tract, continuing a total distance of 2,842.89 feet to a magnail set at the southeast corner of said REDC 1.101 acre tract, being in the northerly line of said Springer Road, being on a curve to the left, having a radius of 613.69 feet and a central angle of 10 degrees 21 minutes 34 seconds;

THENCE with the southwest line of said REDC 1.101 acre tract and the northerly line of said Springer Road, with said curve to the left, an arc distance of 110.96 feet (Chord Bearing North 23 degrees 22 minutes 18 seconds West - 110.81 feet) to a 1/2-inch iron rod with cap stamped "PJB SURVEYING" set;

THENCE South 00 degrees 49 minutes 05 seconds East, departing the southwest line of said REDC 1.101 acre tract and the northerly line of said Springer Road, a distance of 36.25 feet to a 1/2-inch iron rod with cap stamped "PJB SURVEYING" set at the point of curvature of a curve to the right, having a radius of 1,357.50 feet and a central angle of 02 degrees 33 minutes 19 seconds;

THENCE with said curve to the right, an arc distance of 60.54 feet (Chord Bearing South 00 degrees 27 minutes 35 seconds West - 60.54 feet) to a magnail set at the point of tangency;

THENCE South 01 degree 44 minutes 14 seconds West, a distance of 183.47 feet to a 1/2-inch iron rod with cap stamped "PJB SURVEYING" set in the east line of said REDC 57.51 acre tract and the west line of Rochell Road (80 foot width right-of-way, being the point of curvature of a non-tangent curve to the right, having a radius of 533.69 feet and a central angle of 00 degrees 32 minutes 22 seconds;

THENCE with the east line of said REDC 57.51 acre tract and the west line of said Rochell Road, with said curve to the right, an arc distance of 5.02 feet (Chord Bearing South 01 degree 08 minutes 31 seconds East - 5.02 feet) to a 1/2-inch iron rod with cap stamped "PJB SURVEYING" set;

THENCE South 00 degrees 55 minutes 38 seconds East, continuing with the east line of said REDC 57.51 acre tract and the west line of said Rochell Road, a distance of 293.37 feet to a 1/2-inch iron rod found at the point of curvature of a non-tangent curve to the left, having a radius of 613.69 feet and a central angle of 20 degrees 52 minutes 00 seconds;

THENCE continuing with the east line of said REDC 57.51 acre tract and the west line of said Rochell Road, with said curve to the left, an arc distance of 223.50 feet (Chord Bearing South 11 degrees 14 minutes 49 seconds East - 222.27 feet to a 1/2-inch iron rod with cap stamped "PJB SURVEYING" set;

THENCE South 01 degree 10 minutes 12 seconds East, continuing with the east line of said a distance of 168.31 feet to a 5/8-inch iron rod with pink cap stamped "TEXAS DEPARTMENT OF TRANSPORTATION ROW MONUMENT" found in the existing northeasterly line of said SH 276;

THENCE North 90 degrees 00 minutes 00 seconds West, with the existing northeasterly line of said SH 276, a distance of 37.98 feet to a 5/8-inch iron rod with pink cap stamped "TEXAS DEPARTMENT OF TRANSPORTATION ROW MONUMENT" found;

THENCE South 45 degrees 00 minutes 00 seconds West, continuing with the existing northeasterly line of said SH 276, a distance of 53.86 feet to a 5/8-inch iron rod with pink cap stamped "TEXAS DEPARTMENT OF TRANSPORTATION ROW MONUMENT" found;

THENCE North 83 degrees 41 minutes 15 seconds West, continuing with the existing northeasterly line of said SH 276, a distance of 41.43 feet to a 5/8-inch iron rod with pink cap stamped "TEXAS DEPARTMENT OF TRANSPORTATION ROW MONUMENT" found;

THENCE North 82 degrees 43 minutes 33 seconds West, continuing with the existing northeasterly line of said SH 276, a distance of 130.66 feet to a 5/8-inch iron rod with pink cap stamped "TEXAS DEPARTMENT OF TRANSPORTATION ROW MONUMENT" found;

THENCE North 81 degrees 58 minutes 48 seconds West, continuing with the existing northeasterly line of said SH 276, a distance of 1,229.43 feet to a 5/8-inch iron rod with pink cap stamped "TEXAS DEPARTMENT OF TRANSPORTATION ROW MONUMENT" found;

THENCE North 67 degrees 39 minutes 02 seconds West, continuing with the existing northeasterly line of said SH 276, a distance of 181.82 feet to a 5/8-inch iron rod with pink cap stamped "TEXAS DEPARTMENT OF TRANSPORTATION ROW MONUMENT" found;

THENCE North 82 degrees 10 minutes 49 seconds West, continuing with the existing northeasterly line of said SH 276, a distance of 602.17 feet to a 5/8-inch iron rod with pink cap stamped "TEXAS DEPARTMENT OF TRANSPORTATION ROW MONUMENT" found;

THENCE South 75 degrees 41 minutes 14 seconds West, continuing with the existing northeasterly line of said SH 276, a distance of 146.40 feet to the POINT OF BEGINNING, containing 213.4709 acres of land.

NOW THEREFORE, KNOW ALL MEN BY THESE PRESENTS:

STATE OF TEXAS
COUNTY OF ROCKWALL

We, the undersigned owners of the land shown on this plat, and desiganted herein as ROCKWALL TECHNOLOGY PARK PHASE V, an Addition to the City of Rockwall, Texas, and whose name is subscribed hereto, hereby dedicate to the use of the public forever all streets, alleys, parks, water courses, drains, easements and public places thereon shown on the purpose and consideration therein expressed. We further certify that all other parties who have a mortgage or lien interest on the subdivision have been notified and signed this plat. We understand and do hereby reserve the easement strips shown on this plat for the purposes stated and for the mutual use and accommodation of all utilities desiring to use of using same. We also understand the following:

1. No buildings shall be constructed or placed upon, over, or across the utility easements described herein.
2. Any public utility shall have the right to remove and keep removed all or part of any buildings, fences, trees, shrubs, or other growths or improvements which in any way endanger or interfere with construction, maintenance or efficiency of their respective system on any of these easement strips; and any public utility shall at all times have the right of ingress to, from and upon the said easement strips for purpose of construction, reconstruction, inspecting, patrolling, maintaing, and either adding to or removing all or part of their respective system without the necessity of, at any time, procuring the permission of anyone.
3. The City of Rockwall will not be responsible for any claims of any nature resulting from or occasioned by the establishment of grade of streets in the subdivision.
4. The developer and subdivision engineer shall bear total responsibility for storm drain improvements.
5. The developer shall be responsible for the necessary facilities to provide drainage patterns and drainage controls such that properties within the drainage area are not adversely affected by storm drainage from the development.
6. No house dwelling unit, or other structure shall be constructed on any lot in this addition by the owner or any other person until the developer and/or owner has compiled with all requirements of the Subdivision Regulations of the City of Rockwall regarding improvements with respect to the entire block on the street or streets on which property abuts, including the actual installation of streets with the required base and paving, curb and gutter, water and sewer, draingage structures, storm structures, storm sewers, and alleys, all according to the specifications of the City of Rockwall; or

Until an escrow deposit, sufficient to pay for the cost of such improvements, as determined by the city's engineer and/or city administrator, computed on a private commercial rate basis, has been made with the city secretary, accompanied by an agreement signed by the developer and/or owner, authorizing the city to make such improvements at prevailing private commercial rates, or have the same made by a contractor and pay for the same out of the escrow deposit, should the developer and/or owner fail or refuse to install the required improvements within the time stated in such written agreement, but in no case shall the City be obligated to make such improvements itself. Such deposit may be used by the owner and/or developer as progress payments as the work progresses in making such improvements by making certified requisitions to the city secretary, supported by evidence of work done; or

Until the developer and/or owner files a corporate surety bond with the city secretary in a sum equal to the cost such improvements for the desiganted area, guaranteeing the installation thereof within the time stated in the bond, which time shall be fixed by the city council of the City of Rockwall.

We further acknowledge that the dedications and/or exaction's made herein are proportional to the impact of the Subdivision upon the public services required in order that the development will comport with the present and future growth needs of the City; We, our successors and assigns hereby waive any claim, damage, or cause of action that we, may have as a result of the dedication of exactions made herein.

Rockwall Economic Development Corporation

STATE OF TEXAS
COUNTY OF ROCKWALL

Before me, the undersigned authority, on this day personally appeared Rockwall Economic Development Corporation, known to me to be the person whose name is subscribed to the foregoing instrument and acknowledged to me that he executed the same for the purpose and consideration therein stated.

Given under my hand and seal of office, this 28th day of March 2023

Notary Public in and for the State of Texas

1-6-24
My Commissin Expires

JENNIFER L. HAMMONDS
Notary Public, State of Texas
ID # 13230083-8
My Comm. Exp. 01-06-2024

STANDARD CITY SIGNATURE BLOCK

Planning & Zoning Commission, Charirman — Date 4-25-2023

APPROVED:
I hereby certify that the above and foregoing plat of an addition to the City of Rockwall, Texas, was approved by the City Council of the City of Rockwall on the 6th day of December, 2021.

This approval shall be invalid unless the approved plat for such addition is recorded in the office of the County Clerk of Rockwall, County, Texas, within one hundred eighty (180) days from said date of final approval.

WITNESS OUT HANDS, this 26th day of April, 2023

Mayor, City of Rockwall

City Secretary of Rockwall

City Engineer

CITY OF ROCKWALL TEXAS

Filed and Recorded
Official Public Records
Jennifer Fogg, County Clerk
Rockwall County, Texas
04/26/2023 10:17:23 AM
$200.00
20230000006632

ROCKWALL COUNTY, TEXAS

SURVEYOR'S CERTIFICATE

NOW, THEREFORE KNOW ALL MEN BY THESE PRESENTS:

THAT I, Patrick J. Baldasaro, R.P.L.S. 5504, do hereby certify that I prepared this plat from an actual and accurate survey of the land, and that the corner monuments shown thereon were properly place under my personal supervision.

Patrick J. Baldasaro
Texas Registered Professional Land Surveyor No. 5504

STATE OF TEXAS
REGISTERED
PATRICK J. BALDASARO
5504
PROFESSIONAL
LAND SURVEYOR

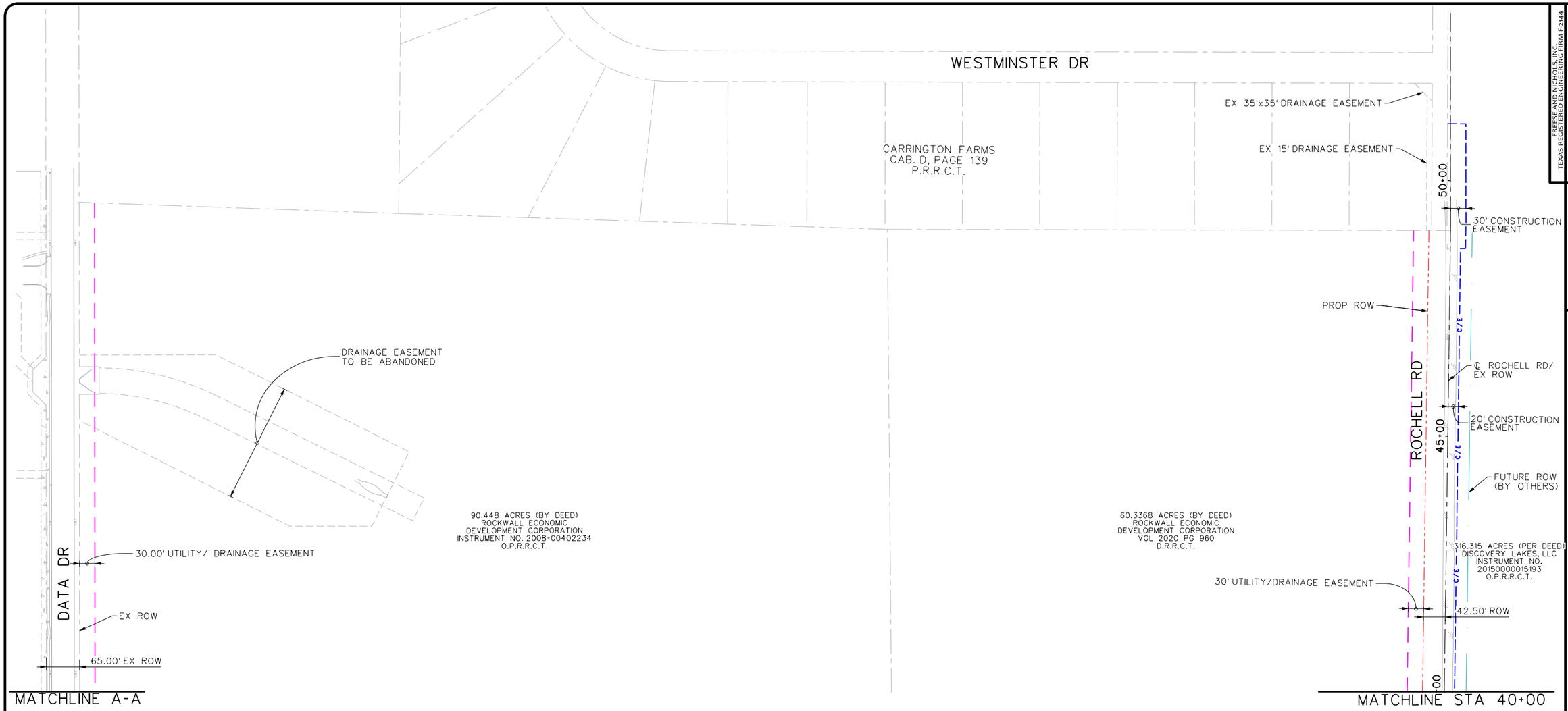
FINAL PLAT
OF
ROCKWALL TECHNOLOGY PARK PHASE V

3 LOTS, BEING 213.4709 ACRES
SITUATED IN THE
J.A. RAMSEY SURVEY ABSTRACT NO. 186
J.B. JONES SURVEY, ABSTRACT NO. 125
AND THE
ROBERT BOYD IRVINE SURVEY,
ABSTRACT NO. 120
IN THE
CITY OF ROCKWALL
ROCKWALL COUNTY, TEXAS

SURVEYOR
PJB SURVEYING, LLC
TBPLS NO. 10194303
200 W. BELMONT, SUITE D
ALLEN, TEXAS 75013
972-649-6669

OWNER/SUBDIVIDER
ROCKWALL
ECONOMIC DEVELOPMENT
P.O BOX 968
ROCKWALL, TEXAS 75087

CASE NO. P2021-062



FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASE THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
ALTERATION OF A SEALED DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2201
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

RIGHT-OF-WAY AND EASEMENT PLAN

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

LEGEND
- UTILITY/DRAINAGE EASEMENT
- PROP ROW
- EX ROW
- LANDSCAPE EASEMENT
- ROCHELL RD FUTURE ROW
- CONSTRUCTION EASEMENT

N
0 50' 100' 200'
SCALE IN FEET

NO.	ISSUES	BY	DATE

F&N JOB NO. RKV19711
DATE APRIL 2022
DESIGNED MRF
DRAWN CHM
REVISED
CHECKED SEC
FILE NAME cv-trt-pl-row01.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale
0 1"

SHEET RW-1
SEQ. 11

MicroStation V8 User: 90262 Office: On Site
Plotter: J:\Work Files\...\HP3D MonoPDF
Plot Scale: 200.000 ' / in.
Date: Feb. 20, 2024 - 03:36:02 PM
Model: Default
Project: Freese and Nichols, Inc.- True Type Fonts

MATCHLINE A-A

MATCHLINE STA 40+00

40' UTILITY/DRAINAGE EASEMENT

42.50'

85.00' ROW

42.50'

30+00

35+00

40+00

DRAINAGE EASEMENT TO BE ABANDONED

PROP ROW

40' UTILITY/DRAINAGE EASEMENT

40' UTILITY/DRAINAGE EASEMENT

PROP ROW

℄ DISCOVERY BLVD

HEC-RAS XS 5832

45+00

DISCOVERY BLVD

50+00

55+00

30'x30' ROW CORNER CLIP (TYP)

42.50' ROW

EX ROW

10' UTILITY/DRAINAGE EASEMENT

10' UTILITY/DRAINAGE EASEMENT

LANDSCAPE EASEMENT (50'x25')

15' CONSTRUCTION EASEMENT

℄ ROCHELL RD

50' CONSTRUCTION EASEMENT

25' SANITARY SEWER EASEMENT

30' INGRESS AND EGRESS EASEMENT TO BE ABANDONED

HEC-RAS XS 5143

HEC-RAS XS 5491

85.00' ROW

42.50'

42.50'

LANDSCAPE EASEMENT (76'x56')

10' UTILITY/DRAINAGE EASEMENT

10' UTILITY/DRAINAGE EASEMENT

35+00

ROCHELL RD

2

DRAINAGE EASEMENT VARIES (140' - 620')

20' UTILITY EASEMENT

90.448 ACRES (BY DEED)
ROCKWALL ECONOMIC
DEVELOPMENT CORPORATION
INSTRUMENT NO. 2008-00402234
O.P.R.R.C.T.

FUTURE ROW (BY OTHERS)

107' CONSTRUCTION EASEMENT

20' SANITARY SEWER EASEMENT

60.3368 ACRES (BY DEED)
ROCKWALL ECONOMIC
DEVELOPMENT CORPORATION
VOL 2020 PG 960
D.R.R.C.T.

42.50' PROP ROW

30' UTILITY/DRAINAGE EASEMENT

316.315 ACRES (PER DEED)
DISCOVERY LAKES, LLC
INSTRUMENT
NO. 20150000015193
O.P.R.R.C.T.

HEC-RAS XS 5187

PROP ROW

30+00

65' CONSTRUCTION EASEMENT

EX ROW

DATA DR

65.00' EX ROW

HEC-RAS XS 4966

HEC-RAS XS 4866

HEC-RAS XS 4817

125' CONSTRUCTION EASEMENT

DRAINAGE EASEMENT (340' - 375')

HEC-RAS XS 4750

EX ROW

EXISTING 10' BLACKLAND WATER EASEMENT TO BE ABANDONED

30' UTILITY/DRAINAGE EASEMENT

80' EX ROW

41.50' EX ROW

℄ SPRINGER RD

PROP 80' ROW

HEC-RAS XS 4759

65' CONSTRUCTION EASEMENT

30+00

35+00

40+00

45+00

SPRINGER RD

50+00

25+00

HEC-RAS XS 4736

HEC-RAS XS 4723

HEC-RAS XS 4421

HEC-RAS XS 4464

42.50' PROP ROW

50' CONSTRUCTION EASEMENT

CITY OF ROCKWALL
VOL 2219.PG.187
D.R.R.C.T.

40' UTILITY/DRAINAGE EASEMENT

10' ONCOR EASEMENT

38.50' EX ROW

60.3368 ACRES (BY DEED)
ROCKWALL ECONOMIC
DEVELOPMENT CORPORATION
VOL 2020 PG 960
D.R.R.C.T.

80.00' PROP ROW

EXISTING ROW TO BE ABANDONED

PROP ROW

EX ROW

40' UTILITY/DRAINAGE EASEMENT

00

MATCHLINE STA 20+00

LEGEND

- UTILITY/DRAINAGE EASEMENT
- PROP ROW
- EX ROW
- LANDSCAPE EASEMENT
- ROCHELL RD FUTURE ROW
- CONSTRUCTION EASEMENT

N

0 50' 100' 200'

SCALE IN FEET

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of

FREESE AND NICHOLS, INC.

RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

FREESE AND NICHOLS, INC.
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2249
Web - www.freese.com

RELEASE FOR REVIEW PURPOSES ONLY. THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE TEXAS NO. 134055 ON 10/21/2021. IT IS NOT TO BE USED OR RELIED ON WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

RIGHT-OF-WAY AND EASEMENT PLAN

NO.	ISSUES	BY	DATE
1	CO #1	SEC	XX/XX/XX
2	ADDENDUM #2	SEC	11/17/21

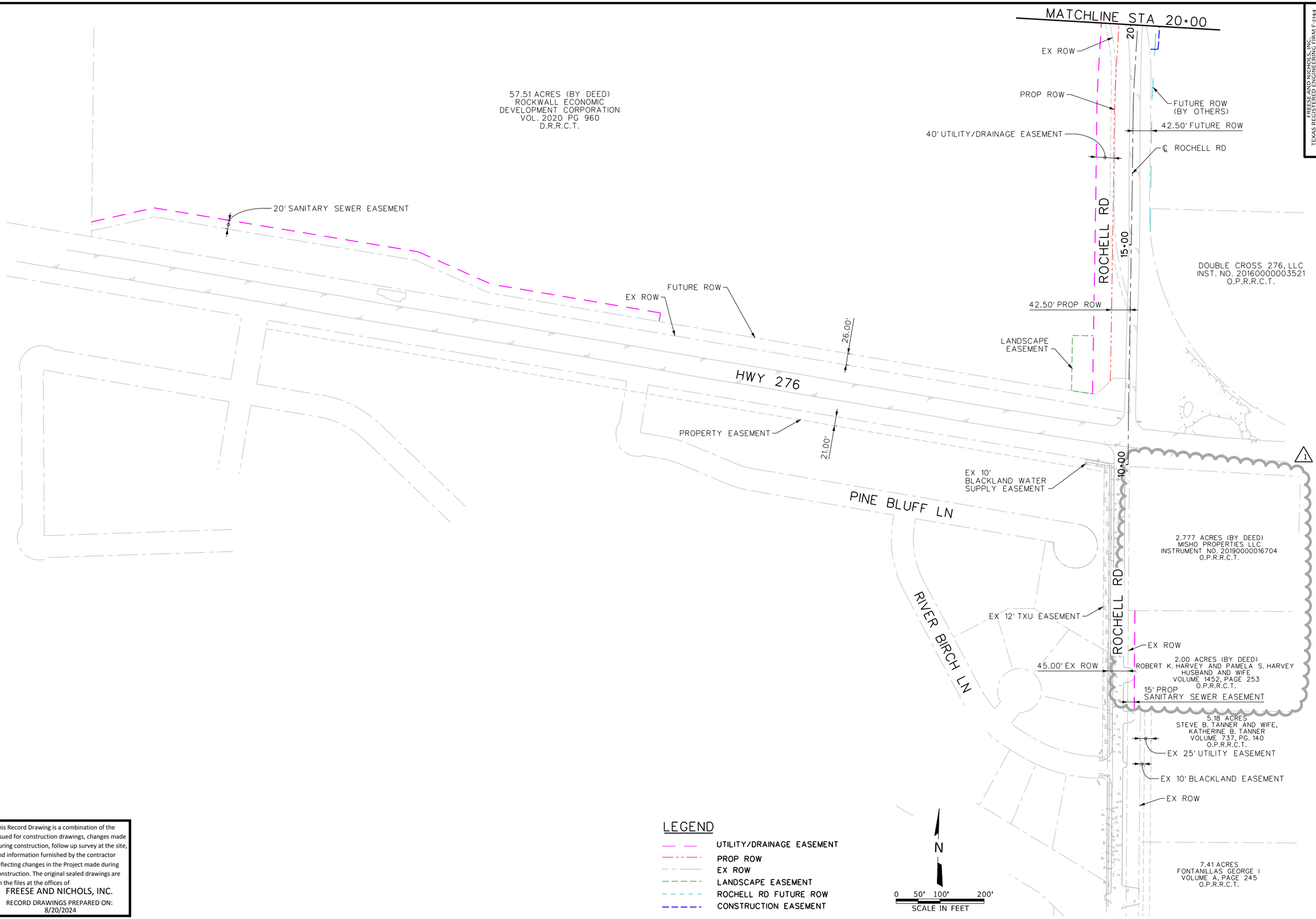
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

F&N JOB NO.	RKW19711
DATE	APRIL 2022
DESIGNED	MRF
DRAWN	CHM
REVISED	
CHECKED	SEC
FILE NAME	cv-trt-pl-row03.sht

SHEET RW-2

SEQ. 12

MicroStation V8 User: 90262 Office: On Site
N:\lf\Drawings\Roadway\cv-trt-pl-row03.sht
Plotter: \\FNIDC01\HP 7700 - Facility Maintenance
Plot Scale: 200.000 ' / in.
Date: Feb. 20, 2024 - 03:36:05 PM
Model: Default
Project: Freese and Nichols, Inc. - True Type Fonts



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FREESE AND NICHOLS, INC.

RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASE THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
ALTERATIONS TO RELEASED DOCUMENTS WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

RIGHT-OF-WAY AND EASEMENT PLAN

NO.	ISSUES	BY	DATE
1	PRE-AWARD AMEND #1	SEC	4/12/2022

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

FAN JOB NO.	RKW19711
DATE	APRIL 2022
DESIGNED	MRF
DRAWN	CHM
REVISED	
CHECKED	SEC
FILE NAME	cv-trt-pl-row04.sht

SHEET
RW-3

SEQ.
13

GENERAL EX FLOODPLAIN INFORMATION:

A CONDITIONAL LETTER OF MAP REVISION (CLOMR) DOCUMENT HAS BEEN SUBMITTED AND IS PENDING FINAL APPROVAL. UNTIL CLOMR APPROVAL IS RECEIVED BY THE OWNER AND THE PROJECT TEAM, NO FILL / EMBANKMENT CONSTRUCTION OR MODIFICATION ADVERSELY IMPACTING FLOOD STORAGE IN THE EXISTING FEMA 100-YEAR FLOODPLAIN WILL BE ALLOWED. THE EXISTING FEMA 100-YEAR FLOODPLAIN IMPACTS EXISTING SECTIONS OF DISCOVERY BLVD AND ROCHELL ROAD. APPROVAL OF THE CLOMR IS ESTIMATED TO BE RECEIVED MARCH 2022 TO JUNE 2022.

CONSTRUCTION SEQUENCE NOTES

1. ALL SANITARY SEWER AND WATER LINES SHALL BE CONSTRUCTED FIRST. PROPOSED UTILITIES LYING WITHIN THE EXISTING FEMA 100-YEAR FLOODPLAIN MUST BE CONSTRUCTED ONLY TO EXISTING GRADE. IN THESE LOCATIONS, THE MANHOLES AND/OR OTHER APPURTENANCES (IN AREAS WHERE FILL IS REQUIRED TO ESTABLISH PROPOSED GRADE FOR THE UTILITY SYSTEM) MUST BE CONSTRUCTED TO PROPOSED GRADE ONCE THE CLOMR IS APPROVED. THE CONTRACTOR TO USE TXDOT TCP(2-2)-18 WITH FLAGGER IF NEEDING ANY LANE CLOSER. ALL TRENCHES MUST BE COVERED WITH STEEL PLATE.

2. THE STORM DRAINAGE SYSTEM OUTSIDE THE LIMITS OF THE EXISTING FEMA 100-YEAR FLOODPLAIN OR THE SEGMENTS OF THE STORM DRAINAGE SYSTEM LYING WITHIN THE FEMA 100-YEAR FLOODPLAIN AND FALLING BELOW EXISTING GROUND MAY BE CONSTRUCTED IN CONJUNCTION WITH THE UTILITIES IN #1 ABOVE. ALL REMAINING STORM DRAINAGE SEGMENTS (IN AREAS WHERE FILL IS REQUIRED TO ESTABLISH PROPOSED GRADE FOR THE STORM DRAINAGE SYSTEM) MUST BE CONSTRUCTED ONCE THE CLOMR IS APPROVED. THE CONTRACTOR TO USE TXDOT TCP(2-2)-18 WITH FLAGGER IF NEEDING ANY LANE CLOSER. ALL TRENCHES MUST BE COVERED WITH STEEL PLATE.

3. ROADWAY SEQUENCE:

SPRINGER ROAD - CONTRACTOR MAY CONSTRUCT ALL OF SPRINGER ROAD PRIOR TO THE DETENTION POND BEING CONSTRUCTED AND OPERATIONAL. THIS INCLUDES STORM DRAINAGE, UTILITIES, AND ROADWAY (INCLUDING CONCRETE FOR THE PAVEMENT). CONTRACTOR MAY FULLY CLOSE SPRINGER RD DURING CONSTRUCTION. ACCESS WILL NEED TO BE MAINTAINED AT ALL TIMES TO THE ELEVATED WATER STORAGE TANK. CONTRACTOR WILL BE REQUIRED TO CONSTRUCT TEMPORARY DRIVE WITH GATE ACCESS AND EQUIPMENT WHILE THE EXISTING DRIVE IS RECONSTRUCTED . THIS SHALL BE COORDINATED WITH THE CONSTRUCTION INSPECTOR.

DISCOVERY BLVD - CONTRACTOR MAY CONSTRUCT PORTIONS OF THE ROADWAY PRIOR TO THE DETENTION POND BEING CONSTRUCTED AND OPERATIONAL. THIS INCLUDES UTILITIES, STORM DRAINAGE, AND FILL / EMBANKMENT FOR THE ROADWAY (NO PAVING). THE FILL / EMBANKMENT FOR THE ROADWAY MAY ONLY BE CONSTRUCTED OUTSIDE THE EXISTING FEMA 100-YR FLOODPLAIN PRIOR TO THE CLOMR BEING APPROVED. CONCRETE FOR THE ROADWAY CANNOT BE CONSTRUCTED UNTIL THE DETENTION POND IS IN PLACE AND OPERATIONAL.

ROCHELL ROAD (NORTH OF HWY 276)- ONE LANE EACH DIRECTION MUST REMAIN OPEN TO TRAFFIC OR MUST HAVE A 2-LANE, 20 FEET WIDE ALL-WEATHER DETOUR ROUTE FOR RESIDENTIAL TRAFFIC FROM THE CARRINGTON FARM NEIGHBORHOOD (WESTMINSTER DRIVE AND CARRINGTON DRIVE) TO REACH DATA DRIVE DURING CONSTRUCTION. ALL DETOURS SHALL GUIDE TRAFFIC TO HWY 276. THE "PREFERRED" DETOUR ROUTE TO HWY 276 IS ALONG ROCHELL RD TO EITHER THE TEMPORARY ACCESS ROAD OR DISCOVERY BLVD TO DATA DRIVE TO SPRINGER RD AND BACK TO ROCHELL RD. DETOUR OPTIONS AVAILABLE TO THE CONTRACTOR INCLUDE:

A. TEMPORARY ACCESS ROAD CONSTRUCTED ACROSS THE MOST NORTHERN PORTION OF REDC PROPERTY TO DETOUR TRAFFIC TO DATA DRIVE

B. UTILIZE EXISTING PAVEMENT (OR NEW PAVEMENT ON ROCHELL ROAD OR PORTIONS THEREOF) TO ACCESS DISCOVERY BLVD TO ROUTE TRAFFIC VIA DATA DR TO SPRINGER RD (SEE ABOVE DESCRIPTION FOR DISCOVERY BLVD AND SPRINGER RD FOR LIMITATIONS). IF THIS OPTION IS CHOSEN, THE DETENTION POND WILL HAVE TO BE IN PLACE TO ALLOW PERMANENT PAVING ON DISCOVERY BLVD OR CONTRACTOR WILL BE REQUIRED TO CONSTRUCT AN 11 WIDE, ALL-WEATHER DETOUR ROUTE ALONG DISCOVERY BLVD FOR RESIDENTIAL TRAFFIC FROM THE CARRINGTON FARM NEIGHBORHOOD TO REACH DATA DRIVE.

ROCHELL RD (SOUTH OF HWY 276)- ONE LANE EACH DIRECTION MUST REMAIN OPEN TO TRAFFIC USING FLAGGERS. ALL TRENCHES MUST BE COVERED WITH STEEL PLATES AT THE END OF THE DAY.THE CONTRACTOR MUST CONSTRUCT ALL CONCRETE USING HIGH EARLY RELEASE STRENGTH. ALL DRIVEWAYS MUST BE BUILT ONE HALF AT A TIME TO KEEP ACCESS FOR THE PROPERTY OWNER.

4. DUE TO THE AMOUNT OF FILL REQUIRED FOR THE CONSTRUCTION OF ROCHELL ROAD, IT IS RECOMMENDED TO BUILD FROM THE DISCOVERY ROAD INTERSECTION TO THE EXISTING SPRINGER ROAD INTERSECTION IN ONE PHASE. ALL UTILITIES MAY BE INSTALLED PRIOR TO THE ROAD BEING CONSTRUCTED: HOWEVER, ANY ITEM CONSIDERED FILL / EMBANKMENT WITHIN THE EXISTING FEMA 100-YEAR FLOODPLAIN CANNOT BE CONSTRUCTED UNTIL CLOMR APPROVAL (SEE #1 ABOVE). CONSTRUCTION ALLOWED ON ROCHELL ROAD, PRIOR TO COMPLETION AND OPERATION OF THE DETENTION POND INCLUDES STORM DRAINAGE, UTILITIES, AND ROADWAY (INCLUDING CONCRETE FOR THE PAVEMENT).

CONSTRUCTION SEQUENCE GENERAL NOTES

1.CONTRACTOR SHALL INSTALL A MINIMUM AMOUNT OF TEMPORARY ASPHALT PAVEMENT TO MAINTAIN 2-WAY TRAFFIC ON ROCHELL. THIS IS CONSIDERED SUBSIDIARY TO THE TRAFFIC CONTROL BID ITEMS.

2. CONTRACTOR TO SETUP CHANNELIZING DEVICES, SIGNS, AND BARRICADES PER BC (1-12)-21 ALONG WITH TXDOT TCP SHEETS.

3. CONTRACTOR MUST SUBMIT PROPOSED SIGNED AND SEALED TRAFFIC CONTROL PLAN AND DETOUR PLAN WITH BID DOCUMENTS FOR OWNER APPROVAL. ANY CHANGES TO THE PLAN DURING CONSTRUCTION MUST BE SUBMITTED FOR APPROVAL.

4. THE TRAFFIC CONTROL MUST BE DESIGNED FOR 30 MPH SPEED LIMIT.

5. PORTABLE CHANGEABLE MESSAGE SIGN, SIGNAGE, BARRICADES, CONCRETE BARRIERS, TEMPORARY WALLS, TEMPORARY ROADWAY, AND TEMPORARY PAVEMENT MARKINGS SHALL BE SUBSIDIARY TO TRAFFIC CONTROL BID ITEMS. THE CONTRACTOR SHALL NEED APPROVAL OF CITY ENGINEER FOR PLACEMENT OF MESSAGE BOARD. THE CONTRACTOR SHALL USE RAISED BUTTONS WHEN PLACING TEMPORARY MARKINGS

6. ALL LANE WIDTHS SHALL MAINTAIN A MINIMUM OF 11 FT.

7. NO FILL MAY BE INSTALLED WITHIN THE EXISTING FEMA 100-YEAR FLOODPLAIN UNTIL THE CLOMR IS APPROVED. THIS IS ESTIMATED TO BE APPROVED IN MARCH 2022 TO JUNE 2022.

8. DISCOVERY BLVD MAY NOT BE FULLY BUILT UNTIL THE NEW PROPOSED DETENTION POND IS IN PLACE. AN ALL-WEATHER SURFACE CAN BE INSTALLED AS AN INTERMEDIATE STEP.

9. THE CONTRACTOR SHALL INSTALL TEMPORARY FENCE DURING INTERIUM CONDITION WHEN FENCE IS REMOVED ON ADJACENT PROPOERTIES. TEMPORARY FENCE SHALL BE SUBMITTED TO ENGINEER FOR APPROVAL. ALL FENCES SHALL BE EQUAL IN HEIGHT AND DURABILITY OF EXISTING FENCE.

10. A MINIMUM OF TWO PORTABLE MESSAGE BOARDS SHALL BE PROVIDED AT EITHER END OF THE PROJECT FOR ALL DETOURS.

1

11. FRANCHISE UTILTIES SEQUENCE:
ONCOR/ SUDDENLINK- THE PROPOSED T-INTERSECTION AT SPRINGER AND ROCHELL RD SHALL BE CLEARED AND GRUBBED FIRST ALONG WITH ANY EXISTING FENCE REMOVED TO ALLOW FRANCHISE UTILTY CONTRACTOR TO RELOCATE THEIR EXISTING OVERHEAD LINES ALONG SPRINGER RD. A SCHEDULE SHOULD BE PROVIDED TO THE FRANCHISE UTITLITY OWNER WITHIN A WEEK OF NOTICE TO PROCEED. FARMERS- THE EXISTING POWER POLES IN CONFLICT WITH THE PROJECT WILL BE REMOVED PRIOR TO BEGINING CONSTRUCTION. ONCE THE GRADES AS ESTABLISH, THE UTILTIY PROVIDER CONTRACTOR WILL INSTALL THE NEW UNDERGROUND LINE.

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

FREESE AND NICHOLS, INC.
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2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2250
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

CONSTRUCTION NARRATIVE

NO.	ISSUES	BY	DATE
1	ADDENDUM #2	SEC	11/17/21

F&N JOB NO.	RKW19711
DATE	APRIL 2022
DESIGNED	MRF
DRAWN	CHM
REVISED	
CHECKED	SEC
FILE NAME	cv-trt-gn-tcpnarr.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

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SHEET
TCP-1
SEQ.
14

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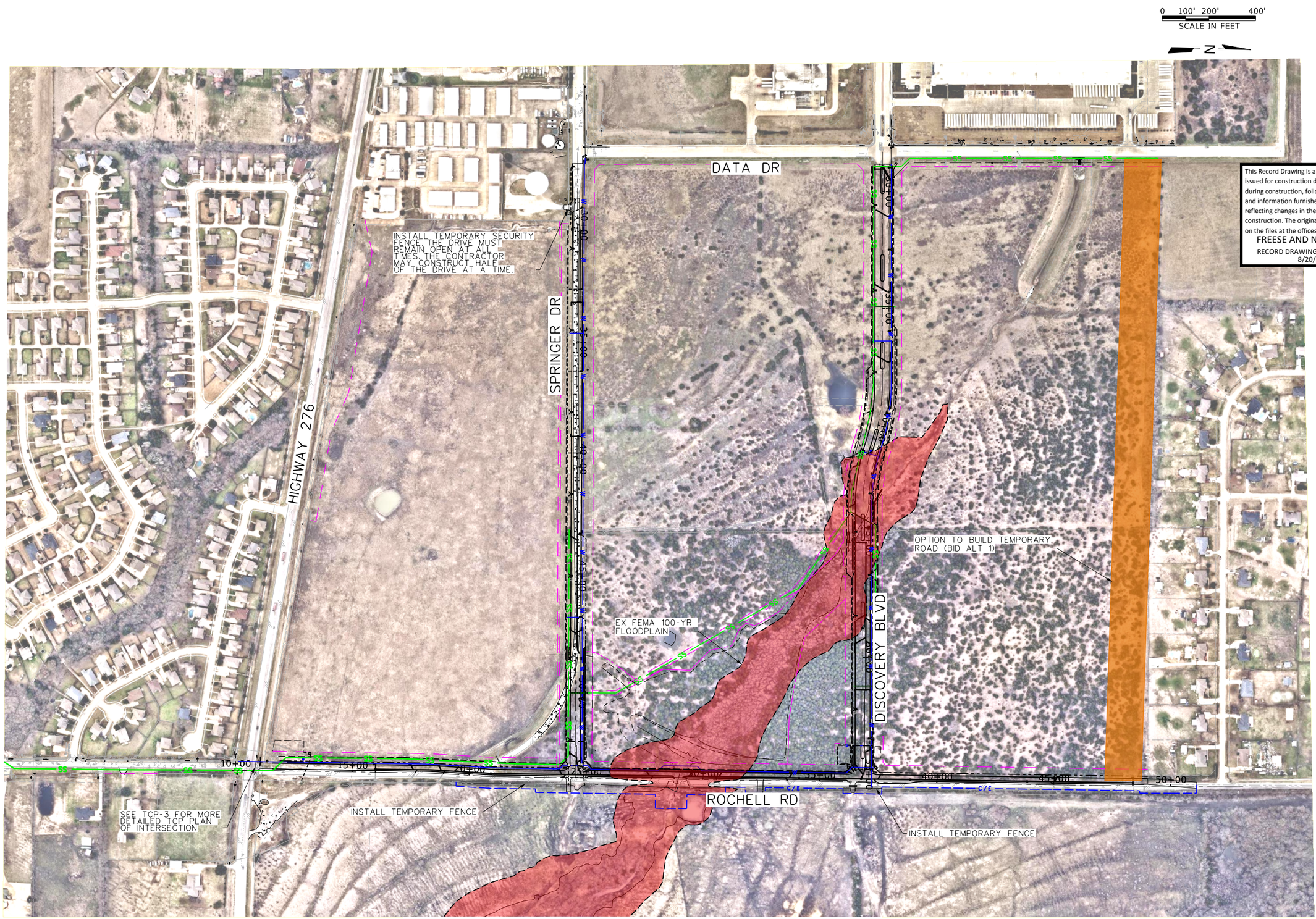

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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

OVERALL TRAFFIC CONTROL PLAN

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MF
DRAWN CHM
REVISED
CHECKED ADH
FILE NAME cv-trt-pl-overalltcp.sht

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0 1"

SHEET TCP-2

SEQ. 15

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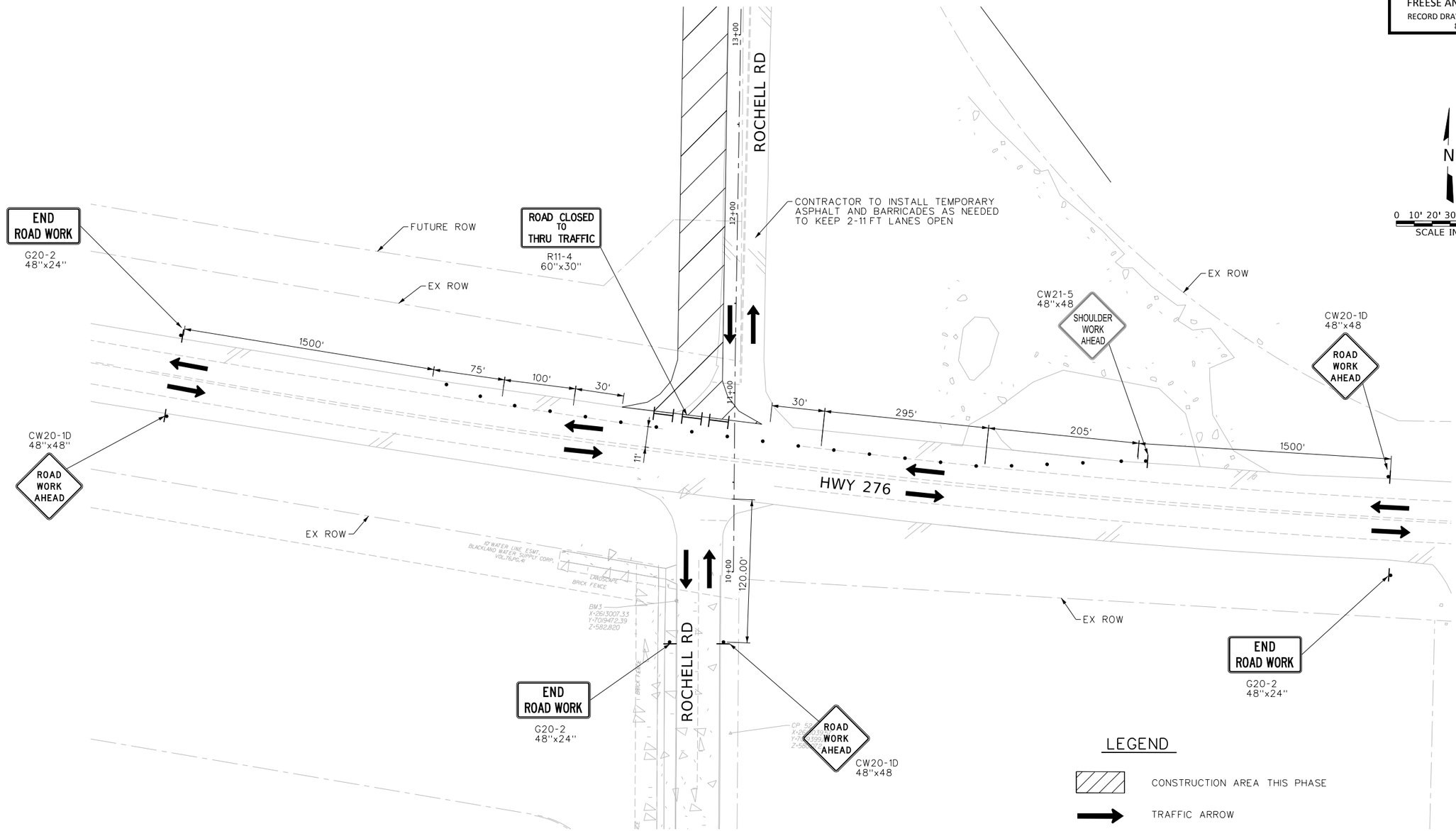
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024



LEGEND

- CONSTRUCTION AREA THIS PHASE
- TRAFFIC ARROW
- SIGN
- BARRELS
- TYPE III BARRICADES

NOTES:

1. CONTRACTOR SHALL SUBMIT PROPOSED DETOUR PLAN AND SIGNAGE TO ENGINEER FOR APPROVAL.
2. CONTRACTOR TO REFERENCE TXDOT DETAIL TCP(2-1)-18 FOR LAYOUT OF TRAFFIC CONTROL.

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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

ROCHELL RD
HIGHWAY 276 TRAFFIC CONTROL PLAN

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED SEC
DRAWN CHM
REVISED
CHECKED
FILE NAME cv-trt-pl-tcp07.sht

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SHEET TCP-3
SEQ. 16

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FILE:

BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

1. The Barricade and Construction Standard Sheets (BC sheets) are intended to show typical examples for placement of temporary traffic control devices, construction pavement markings, and typical work zone signs. The information contained in these sheets meet or exceed the requirements shown in the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).

2. The development and design of the Traffic Control Plan (TCP) is the responsibility of the Engineer.

3. The Contractor may propose changes to the TCP that are signed and sealed by a licensed professional engineer for approval. The Engineer may develop, sign and seal Contractor proposed changes.

4. The Contractor is responsible for installing and maintaining the traffic control devices as shown in the plans. The Contractor may not move or change the approximate location of any device without the approval of the Engineer.

5. Geometric design of lane shifts and detours should, when possible, meet the applicable design criteria contained in manuals such as the American Association of State Highway and Transportation Officials (AASHTO), "A Policy on Geometric Design of Highways and Streets," the TxDOT "Roadway Design Manual" or engineering judgment.

6. When projects abut, the Engineer(s) may omit the END ROAD WORK, TRAFFIC FINES DOUBLE, and other advance warning signs if the signing would be redundant and the work areas appear continuous to the motorists. If the adjacent project is completed first, the Contractor shall erect the necessary warning signs as shown on these sheets, the TCP sheets or as directed by the Engineer. The BEGIN ROAD WORK NEXT X MILES sign shall be revised to show appropriate work zone distance.

7. The Engineer may require duplicate warning signs on the median side of divided highways where median width will permit and traffic volumes justify the signing.

8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition. Sign details not shown in this manual shall be shown in the plans or the Engineer shall provide a detail to the Contractor before the sign is manufactured.

9. The temporary traffic control devices shown in the illustrations of the BC sheets are examples. As necessary, the Engineer will determine the most appropriate traffic control devices to be used.

10. Where highway construction or maintenance work is being undertaken, other than mobile operations as defined by the Texas Manual on Uniform Traffic Control Devices, CSJ limit signs are required. CSJ limit signs are shown on BC(2). The OBEY WARNING SIGNS STATE LAW sign, STAY ALERT TALK OR TEXT LATER and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the CSJ limits. For mobile operations, CSJ limit signs are not required.

11. Traffic control devices should be in place only while work is actually in progress or a definite need exists.

12. The Engineer has the final decision on the location of all traffic control devices.

13. Inactive equipment and work vehicles, including workers' private vehicles must be parked away from travel lanes. They should be as close to the right-of-way line as possible, or located behind a barrier or guardrail, or as approved by the Engineer.

WORKER SAFETY NOTES:

1. Workers on foot who are exposed to traffic or to construction equipment within the right-of-way shall wear high-visibility safety apparel meeting the requirements of ISEA "American National Standard for High-Visibility Apparel," or equivalent revisions, and labeled as ANSI 107-2004 standard performance for Class 2 or 3 risk exposure. Class 3 garments should be considered for high traffic volume work areas or night time work.

2. Except in emergency situations, flagger stations shall be illuminated when flagging is used at night.

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

1. Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources.

2. Work zone traffic control devices shall be compliant with the Manual for Assessing safety Hardware (MASH).

THE DOCUMENTS BELOW CAN BE FOUND ON-LINE AT http://www.txdot.gov
COMPLIANT WORK ZONE TRAFFIC CONTROL DEVICES LIST (CWZTCD)
DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS)
MATERIAL PRODUCER LIST (MPL)
ROADWAY DESIGN MANUAL - SEE "MANUALS (ONLINE MANUALS)"
STANDARD HIGHWAY SIGN DESIGNS FOR TEXAS (SHSD)
TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD)
TRAFFIC ENGINEERING STANDARD SHEETS

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS 4-03 7-13 9-07 8-14 5-10 5-21	DIST	COUNTY		SHEET NO. 17

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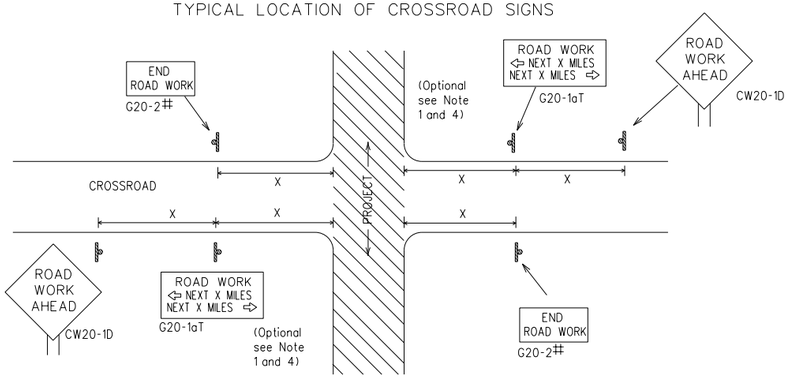
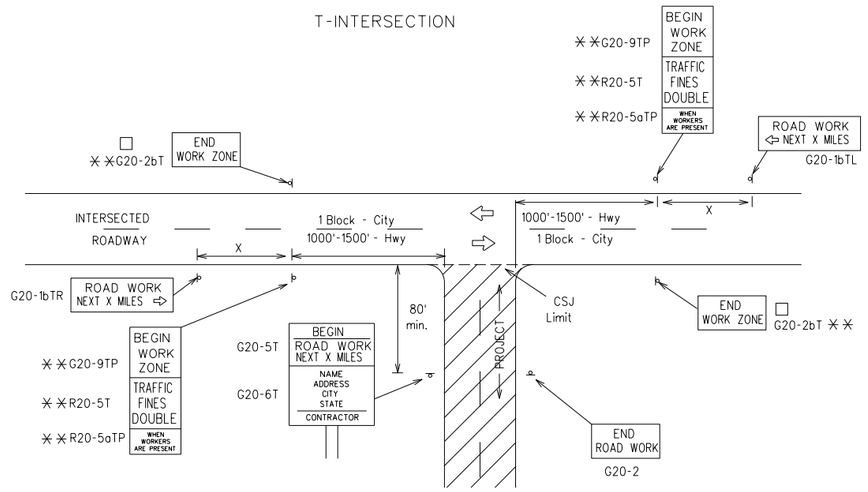
TYPICAL LOCATION OF CROSSROAD SIGNS



May be mounted on back of "ROAD WORK AHEAD"(CW20-1D) sign with approval of Engineer. (See note 2 below)

1. The typical minimum signing on a crossroad approach should be a "ROAD WORK AHEAD" (CW20-1D)sign and a (G20-2) "END ROAD WORK" sign, unless noted otherwise in plans.
2. The Engineer may use the reduced size 36" x 36" ROAD WORK AHEAD (CW20-1D) sign mounted back to back with the reduced size 36" x 18" "END ROAD WORK"(G20-2) sign on low volume crossroads (see Note 4 under "Typical Construction Warning Sign Size and Spacing"). See the "Standard Highway Sign Designs for Texas" manual for sign details. The Engineer may omit the advance warning signs on low volume crossroads. The Engineer will determine whether a road is low volume as per TMUTCD Part 5. This information shall be shown in the plans.
3. Based on existing field conditions, the Engineer/Inspector may require additional signs such as FLAGGER AHEAD, LOOSE GRAVEL, or other appropriate signs. When additional signs are required, these signs will be considered part of the minimum requirements. The Engineer/Inspector will determine the proper location and spacing of any sign not shown on the BC sheets, Traffic Control Plan sheets or the Work Zone Standard Sheets.
4. The "ROAD WORK NEXT X MILES"(G20-1aT)sign shall be required at high volume crossroads to advise motorists of the length of construction in either direction from the intersection. The Engineer will determine whether a roadway is considered high volume.
5. Additional traffic control devices may be shown elsewhere in the plans for higher volume crossroads.
6. When work occurs in the intersection area, appropriate traffic control devices, as shown elsewhere in the plans or as determined by the Engineer/Inspector, shall be in place.

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

1. The Engineer will determine the types and location of any additional traffic control devices, such as a flagger and accompanying signs, or other signs, that should be used when work is being performed at or near an intersection.
2. If construction closes the road at a T-intersection, the Contractor shall place the "CONTRACTOR NAME"(G20-6T) sign behind the Type 3 Barricades for the road closure (see BC(10) also). The "ROAD WORK NEXT X MILES" left arrow(G20-1bTL) and "ROAD WORK NEXT X MILES" right arrow (G20-1bTR)" signs shall be replaced by the detour signing called for in the plans.

TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING

1.5.6

SIZE

Sign Number or Series	Conventional Road	Expressway/ Freeway
CW20[4] CW21 CW22 CW23 CW25	48" x 48"	48" x 48"
CW1, CW2, CW7, CW8, CW9, CW11, CW14	36" x 36"	48" x 48"
CW3, CW4, CW5, CW6, CW8-3, CW10, CW12	48" x 48"	48" x 48"

SPACING

Posted Speed	Sign * Spacing "X"
MPH	Feet (Apprx.)
30	120
35	160
40	240
45	320
50	400
55	500[2]
60	600[2]
65	700[2]
70	800[2]
75	900[2]
80	1000[2]
*	*[3]

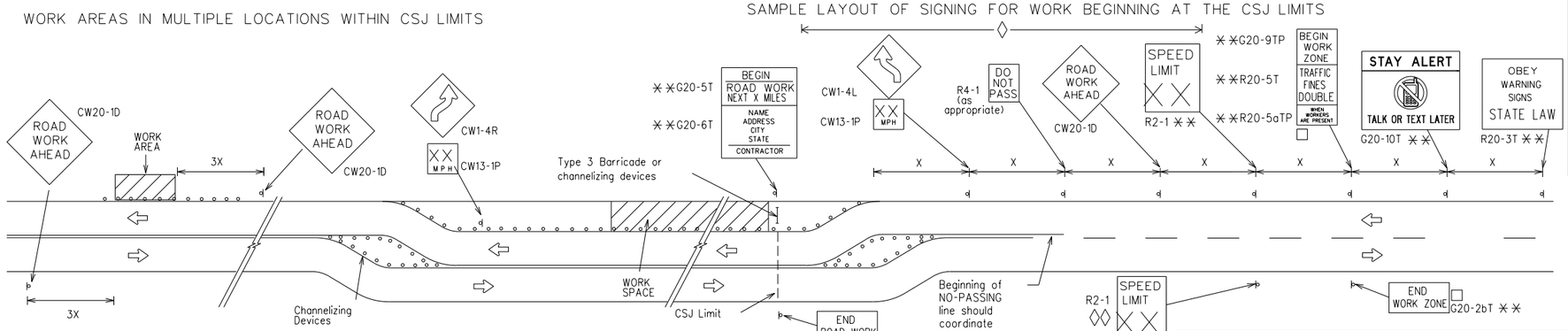
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

* Minimum distance from work area to first Advance Warning sign nearest the work area and/or distance between each additional sign.

GENERAL NOTES

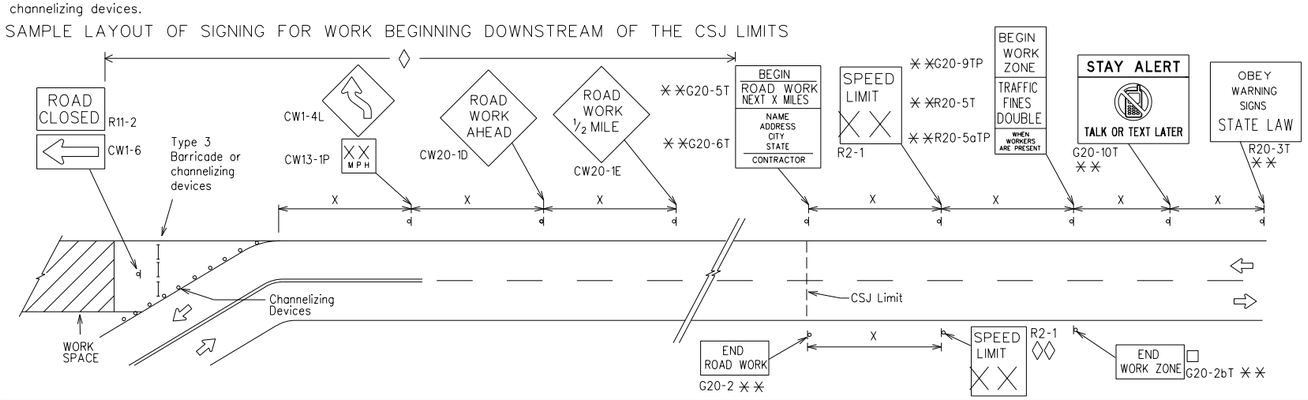
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may be used on low volume crossroads at the discretion of the Engineer as per TMUTCD Part 5. See Note 2 under "Typical Location of Crossroad Signs".
5. Only diamond shaped warning sign sizes are indicated.
6. See sign size listing in "TMUTCD", Sign Appendix or the "Standard Highway Sign Designs for Texas" manual for complete list of available sign design sizes.

WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD"(CW20-1D)signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing of signs and channelizing devices.

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING DOWNSTREAM OF THE CSJ LIMITS



NOTES

The Contractor shall determine the appropriate distance to be placed on the G20-1 series signs and "BEGIN ROAD WORK NEXT X MILES"(G20-5T)sign for each specific project. This distance shall replace the "X" and shall be rounded to the nearest whole mile with the approval of the Engineer. No decimals shall be used.

□ The "BEGIN WORK ZONE"(G20-9TP) and "END WORK ZONE" (G20-2bT) shall be used as shown on the sample layout when advance signs are required outside the CSJ Limits. They inform the motorist of entering or leaving a part of the work zone lying outside the CSJ Limits where traffic fines may double if workers are present.

XX CSJ limit signing is required for highway construction and maintenance work, with the exception of mobile operations.

◊ Area for placement of "ROAD WORK AHEAD" (CW20-1D)sign and other signs or devices as called for on the Traffic Control Plan.

◊◊ Contractor will install a regulatory speed limit sign at the end of the work zone.

LEGEND	
⊢⊣	Type 3 Barricade
○○○	Channelizing Devices
▬	Sign
X	See Typical Construction Warning Sign Size and Spacing chart or the TMUTCD for sign spacing requirements.

SHEET 2 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

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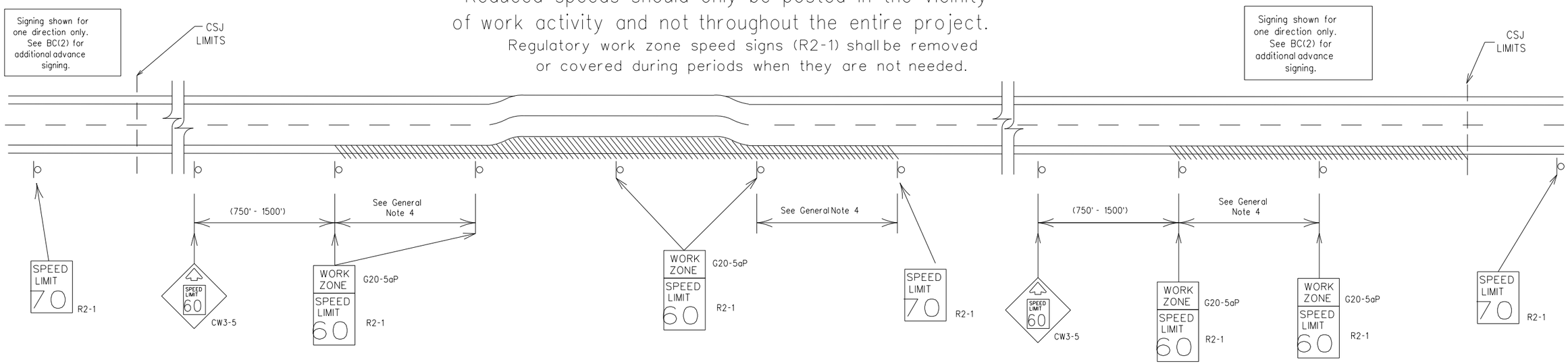
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

Work zone speed limits shall be regulatory, established in accordance with the "Procedures for Establishing Speed Zones," and approved by the Texas Transportation Commission, or by City Ordinance when within Incorporated City Limits.

Reduced speeds should only be posted in the vicinity of work activity and not throughout the entire project.
Regulatory work zone speed signs (R2-1) shall be removed or covered during periods when they are not needed.



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

This type of work zone speed limit should be included on the design of the traffic control plans when restricted geometrics with a lower design speed are present in the work zone and modification of the geometrics to a higher design speed is not feasible.

Long/Intermediate Term Work Zone Speed Limit signs, when approved as described above, should be posted and visible to the motorist when work activity is present. Work activity may also be defined as a change in the roadway that requires a reduced speed for motorists to safely negotiate the work area, including:

a) rough road or damaged pavement surface
b) substantial alteration of roadway geometrics (diversions)
c) construction detours
d) grade
e) width
f) other conditions readily apparent to the driver

As long as any of these conditions exist, the work zone speed limit signs should remain in place.

SHORT TERM WORK ZONE SPEED LIMITS

This type of work zone speed limit may be included on the design of the traffic control plans when workers or equipment are not behind concrete barrier, when work activity is within 10 feet of the traveled way or actually in the traveled way.

Short Term Work Zone Speed Limit signs should be posted and visible to the motorists only when work activity is present. When work activity is not present, signs shall be removed or covered.
(See Removing or Covering on BC(4)).

GENERAL NOTES

1. Regulatory work zone speed limits should be used only for sections of construction projects where speed control is of major importance.
2. Regulatory work zone speed limit signs shall be placed on supports at a 7 foot minimum mounting height.
3. Speed zone signs are illustrated for one direction of travel and are normally posted for each direction of travel.
4. Frequency of work zone speed limit signs should be:
   40 mph and greater 0.2 to 2 miles
   35 mph and less 0.2 to 1 mile
5. Regulatory speed limit signs shall have black legend and border on a white reflective background (See "Reflective Sheeting" on BC(4)).
6. Fabrication, erection and maintenance of the "ADVANCE SPEED LIMIT" (CW3-5) sign, "WORK ZONE" (G20-5aP) plaque and the "SPEED LIMIT" (R2-1) signs shall not be paid for directly, but shall be considered subsidiary to Item 502.
7. Turning signs from view, laying signs over or down will not be allowed, unless as otherwise noted under "REMOVING OR COVERING" on BC(4).
8. Techniques that may help reduce traffic speeds include but are not limited to:
   A. Law enforcement.
   B. Flagger stationed next to sign.
   C. Portable changeable message sign (PCMS).
   D. Low-power (drone) radar transmitter.
   E. Speed monitor trailers or signs.
9. Speeds shown on details above are for illustration only.
   Work Zone Speed Limits should only be posted as approved for each project.
10. For more specific guidance concerning the type of work, work zone conditions and factors impacting allowable regulatory construction speed zone reduction see TxDOT form #1204 in the TxDOT e-form system.

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Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

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97

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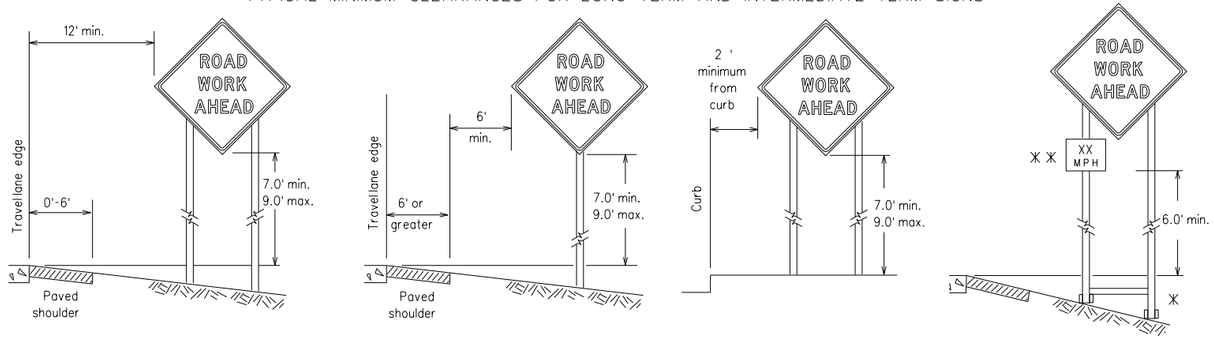
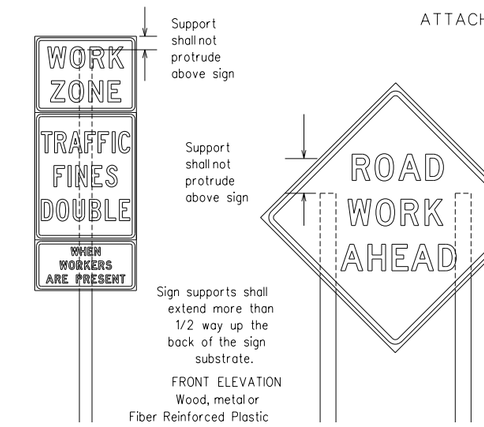
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



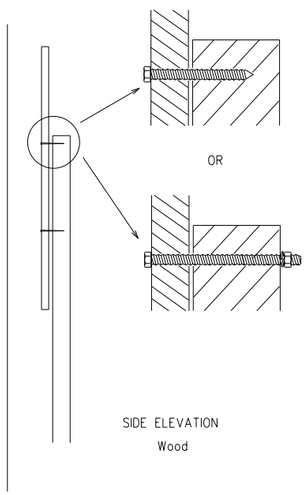
⁂ When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

⁂⁂ When plaques are placed on dual-leg supports, they should be attached to the upright nearest the travel lane. Supplemental plaques (advisory or distance) should not cover the surface of the parent sign.

ATTACHMENT FOR SIGN SUPPORTS



FRONT ELEVATION
Wood, metal or
Fiber Reinforced Plastic



SIDE ELEVATION
Wood

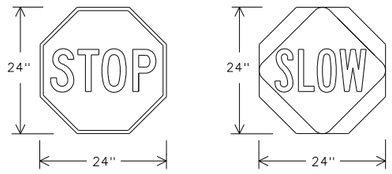
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

Nails shall NOT be allowed. Each sign shall be attached directly to the sign support. Multiple signs shall not be joined or spliced by any means. Wood supports shall not be extended or repaired by splicing or other means.

Splicing embedded perforated square metal tubing in order to extend post height will only be allowed when the splice is made using four bolts, two above and two below the spice point. Splice must be located entirely behind the sign substrate, not near the base of the support. Splice insert lengths should be at least 5 times nominal post size, centered on the splice and of at least the same gauge material.

STOP/SLOW PADDLES

1. STOP/SLOW paddles are the primary method to control traffic by flaggers. The STOP/SLOW paddle size should be 24" x 24".
2. STOP/SLOW paddles shall be retroreflectorized when used at night.
3. STOP/SLOW paddles may be attached to a staff with a minimum length of 6' to the bottom of the sign.
4. Any lights incorporated into the STOP or SLOW paddle faces shall only be as specifically described in Section 6E.03 Hand Signaling Devices in the TMUTCD.



Background - Red
Legend & Border - White

Background - Orange
Legend & Border - Black

SHEETING REQUIREMENTS (WHEN USED AT NIGHT)		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	ORANGE	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND & BORDER	WHITE	TYPE B OR C SHEETING
LEGEND & BORDER	BLACK	ACRYLIC NON-REFLECTIVE FILM

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

1. Permanent signs are used to give notice of traffic laws or regulations, call attention to conditions that are potentially hazardous to traffic operations, show route designations, destinations, directions, distances, services, points of interest, and other geographical, recreational, specific service (LOGO), or cultural information. Drivers proceeding through a work zone need the same, if not better route guidance as normally installed on a roadway without construction.
2. When permanent regulatory or warning signs conflict with work zone conditions, remove or cover the permanent signs until the permanent sign message matches the roadway condition. For details for covering large guide signs see the TS-CD standard.
3. When existing permanent signs are moved and relocated due to construction purposes, they shall be visible to motorists at all times.
4. If existing signs are to be relocated on their original supports, they shall be installed on crashworthy bases as shown on the SMD Standard sheets. The signs shall meet the required mounting heights shown on the BC Sheets or the SMD Standards. This work should be paid for under the appropriate pay item for relocating existing signs.
5. If permanent signs are to be removed and relocated using temporary supports, the Contractor shall use crashworthy supports as shown on the BC standard sheets, TLRS standard sheets or the CWZTCD list. The signs shall meet the required mounting heights shown on the BC, or the SMD standard sheets during construction. This work should be paid for under the appropriate pay item for relocating existing signs.
6. Any sign or traffic control device that is struck or damaged by the Contractor or his/her construction equipment shall be replaced as soon as possible by the Contractor to ensure proper guidance for the motorists. This will be subsidiary to Item 502.

GENERAL NOTES FOR WORK ZONE SIGNS

1. Contractor shall install and maintain signs in a straight and plumb condition and/or as directed by the Engineer.
2. Wooden sign posts shall be painted white.
3. Barricades shall NOT be used as sign supports.
4. All signs shall be installed in accordance with the plans or as directed by the Engineer. Signs shall be used to regulate, warn, and guide the traveling public safely through the work zone.
5. The Contractor may furnish either the sign design shown in the plans or in the "Standard Highway Sign Designs for Texas" (SHSD). The Engineer/Inspector may require the Contractor to furnish other work zone signs that are shown in the TMUTCD but may have been omitted from the plans. Any variation in the plans shall be documented by written agreement between the Engineer and the Contractor's Responsible Person. All changes must be documented in writing before being implemented. This can include documenting the changes in the Inspector's TxDOT diary and having both the Inspector and Contractor initial and date the agreed upon changes.
6. The Contractor shall furnish sign supports listed in the "Compliant Work Zone Traffic Control Device List" (CWZTCD) for small roadside signs. Supports for temporary large roadside signs shall meet the requirements detailed on the Temporary Large Roadside Signs (TLRS) standard sheets. The Contractor shall install the sign support in accordance with the manufacturer's recommendations. If there is a question regarding installation procedures, the Contractor shall furnish the Engineer a copy of the manufacturer's installation recommendations so the Engineer can verify the correct procedures are being followed.
7. The Contractor is responsible for installing signs on approved supports and replacing signs with damaged or cracked substrates and/or damaged or marred reflective sheeting as directed by the Engineer/Inspector.
8. Identification markings may be shown only on the back of the sign substrate. The maximum height of letters and/or company logos used for identification shall be 1 inch.
9. The Contractor shall replace damaged wood posts. New or damaged wood sign posts shall not be spliced.

DURATION OF WORK (as defined by the "Texas Manual on Uniform Traffic Control Devices" Part 6)

1. The types of sign supports, sign mounting height, the size of signs, and the type of sign substrates can vary based on the type of work being performed. The Engineer is responsible for selecting the appropriate size sign for the type of work being performed. The Contractor is responsible for ensuring the sign support, sign mounting height and substrate meets manufacturer's recommendations in regard to crashworthiness and duration of work requirements.
   a. Long-term stationary - work that occupies a location more than 3 days.
   b. Intermediate-term stationary - work that occupies a location more than one daylight period up to 3 days, or nighttime work lasting more than one hour.
   c. Short-term stationary - daytime work that occupies a location for more than 1 hour in a single daylight period.
   d. Short, duration - work that occupies a location up to 1 hour.
   e. Mobile - work that moves continuously or intermittently (stopping for up to approximately 15 minutes.)

SIGN MOUNTING HEIGHT

1. The bottom of Long-term/Intermediate-term signs shall be at least 7 feet, but not more than 9 feet, above the paved surface, except as shown for supplemental plaques mounted below other signs.
2. The bottom of Short-term/Short Duration signs shall be a minimum of 1 foot above the pavement surface but no more than 2 feet above the ground.
3. Long-term/Intermediate-term Signs may be used in lieu of Short-term/Short Duration signing.
4. Short-term/Short Duration signs shall be used only during daylight and shall be removed at the end of the workday or raised to appropriate Long-term/Intermediate sign height.
5. Regulatory signs shall be mounted at least 7 feet, but not more than 9 feet, above the paved surface regardless of work duration.

SIZE OF SIGNS

1. The Contractor shall furnish the sign sizes shown on BC (2) unless otherwise shown in the plans or as directed by the Engineer.

SIGN SUBSTRATES

1. The Contractor shall ensure the sign substrate is installed in accordance with the manufacturer's recommendations for the type of sign support that is being used. The CWZTCD lists each substrate that can be used on the different types and models of sign supports.
2. "Mesh" type materials are NOT an approved sign substrate, regardless of the tightness of the weave.
3. All wooden individual sign panels fabricated from 2 or more pieces shall have one or more plywood cleat, 1/2" thick by 6" wide, fastened to the back of the sign and extending fully across the sign. The cleat shall be attached to the back of the sign using wood screws that do not penetrate the face of the sign panel. The screws shall be placed on both sides of the splice and spaced at 6" centers. The Engineer may approve other methods of splicing the sign face.

REFLECTIVE SHEETING

1. All signs shall be retroreflective and constructed of sheeting meeting the color and retro-reflectivity requirements of DMS-8300 for rigid signs or DMS-8310 for roll-up signs. The web address for DMS specifications is shown on BC(1).
2. White sheeting, meeting the requirements of DMS-8300 Type A, shall be used for signs with a white background.
3. Orange sheeting, meeting the requirements of DMS-8300 Type B_{FL} or Type C_{FL}, shall be used for rigid signs with orange backgrounds.

SIGN LETTERS

1. All sign letters and numbers shall be clear, and open rounded type uppercase alphabet letters as approved by the Federal Highway Administration (FHWA) and as published in the "Standard Highway Sign Design for Texas" manual. Signs, letters and numbers shall be of first class workmanship in accordance with Department Standards and Specifications.

REMOVING OR COVERING

1. When sign messages may be confusing or do not apply, the signs shall be removed or completely covered.
2. Long-term stationary or intermediate stationary signs installed on square metal tubing may be turned away from traffic 90 degrees when the sign message is not applicable. This technique may not be used for signs installed in the median of divided highways or near any intersections where the sign may be seen from approaching traffic.
3. Signs installed on wooden skids shall not be turned at 90 degree angles to the roadway. These signs should be removed or completely covered when not required.
4. When signs are covered, the material used shall be opaque, such as heavy mil black plastic, or other materials which will cover the entire sign face and maintain their opaque properties under automobile headlights at night, without damaging the sign sheeting.
5. Burlap shall NOT be used to cover signs.
6. Duct tape or other adhesive material shall NOT be affixed to a sign face.
7. Signs and anchor stubs shall be removed and holes backfilled upon completion of work.

SIGN SUPPORT WEIGHTS

1. Where sign supports require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand should be used.
2. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
3. Rock, concrete, iron, steel or other solid objects shall not be permitted for use as sign support weights.
4. Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs.
5. Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber (such as tire inner tubes) shall NOT be used.
6. Rubber ballasts designed for channelizing devices should not be used for ballast on portable sign supports. Sign supports designed and manufactured with rubber bases may be used when shown on the CWZTCD list.
7. Sandbags shall only be placed along or laid over the base supports of the traffic control device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners. Sandbags shall be placed along the length of the skids to weigh down the sign support.
8. Sandbags shall NOT be placed under the skid and shall not be used to level sign supports placed on slopes.

FLAGS ON SIGNS

1. Flags may be used to draw attention to warning signs. When used, the flag shall be 16 inches square or larger and shall be orange or fluorescent red-orange in color. Flags shall not be allowed to cover any portion of the sign face.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

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98

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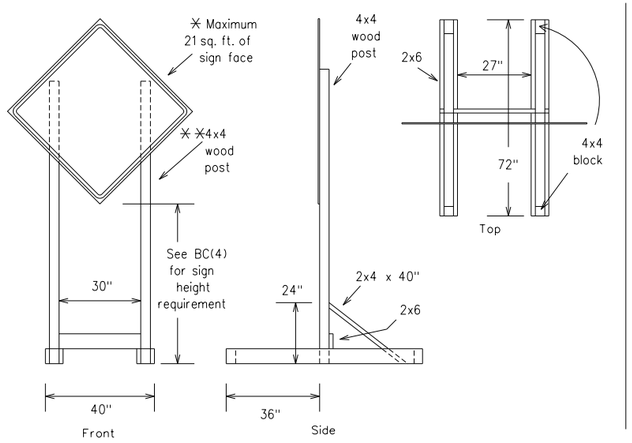
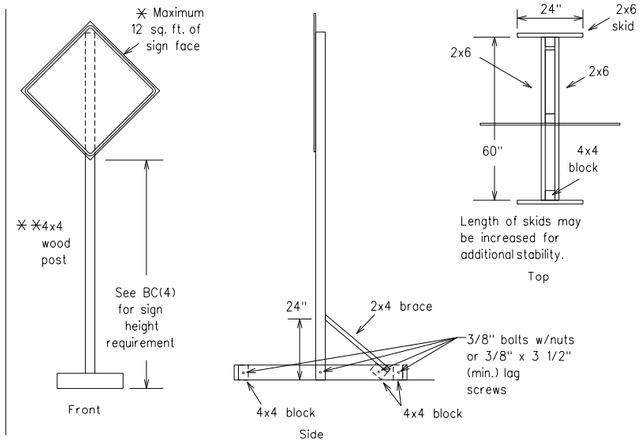
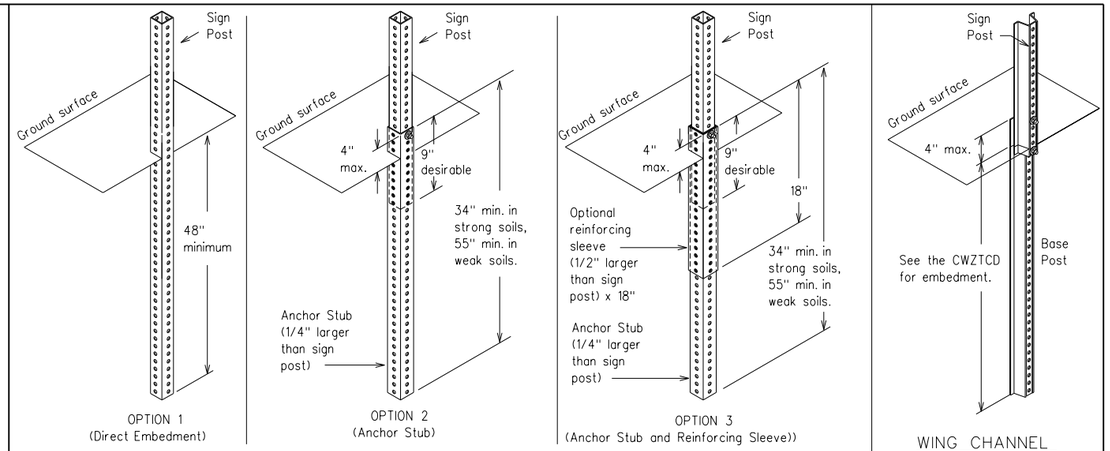




SKID MOUNTED WOOD SIGN SUPPORTS

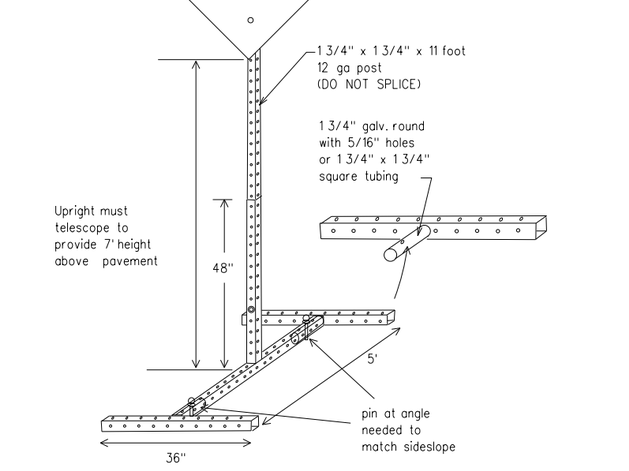
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

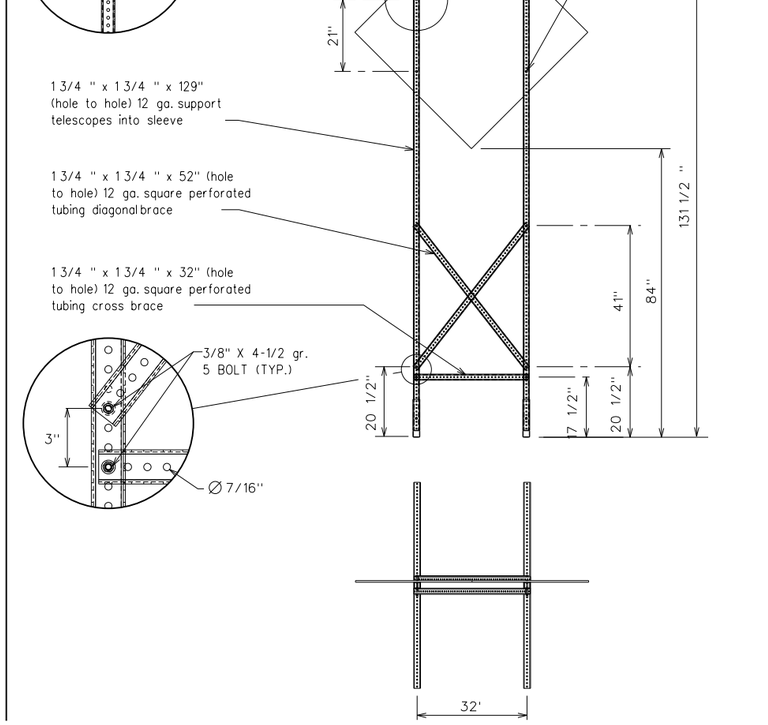


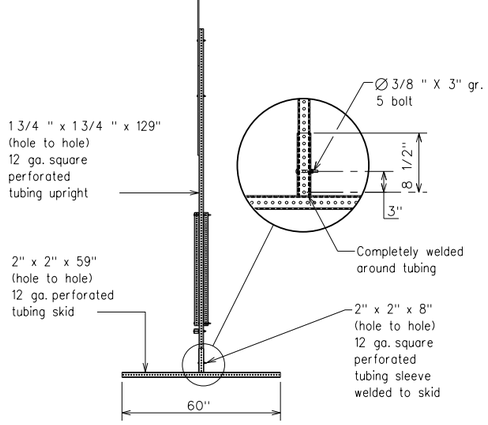
PERFORATED SQUARE METAL TUBING

GROUND MOUNTED SIGN SUPPORTS

Refer to the CWZTCD and the manufacturer's installation procedure for each type sign support.
The maximum sign square footage shall adhere to the manufacturer's recommendation.
Two post installations can be used for larger signs.







SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

WEDGE ANCHORS

Both steel and plastic Wedge Anchor Systems as shown on the SMD Standard Sheets may be used as temporary sign supports for signs up to 10 square feet of sign face. They may be set in concrete or in sturdy soils if approved by the Engineer. (See web address for "Traffic Engineering Standard Sheets" on BC(1)).

OTHER DESIGNS

MORE DETAILS OF APPROVED LONG/INTERMEDIATE AND SHORT TERM SUPPORTS CAN BE FOUND ON THE CWZTCD LIST. SEE BC(1) FOR WEBSITE LOCATION.

GENERAL NOTES

1. Nails may be used in the assembly of wooden sign supports, but 3/8" bolts with nuts or 3/8" x 3 1/2" lag screws must be used on every joint for final connection.
2. No more than 2 sign posts shall be placed within a 7 ft. circle, except for specific materials noted on the CWZTCD List.
3. When project is completed, all sign supports and foundations shall be removed from the project site. This will be considered subsidiary to Item 502.

* See BC(4) for definition of "Work Duration."

** Wood sign posts MUST be one piece. Splicing will NOT be allowed. Posts shall be painted white.

☐ See the CWZTCD for the type of sign substrate that can be used for each approved sign support.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

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WHEN NOT IN USE, REMOVE THE PCMS FROM THE RIGHT-OF-WAY OR PLACE THE PCMS BEHIND BARRIER OR GUARDRAIL WITH SIGN PANEL TURNED PARALLEL TO TRAFFIC

PORTABLE CHANGEABLE MESSAGE SIGNS

1. The Engineer/Inspector shall approve all messages used on portable changeable message signs (PCMS).
2. Messages on PCMS should contain no more than 8 words (about four to eight characters per word), not including simple words such as "TO," "FOR," "AT," etc.
3. Messages should consist of a single phase, or two phases that alternate. Three-phase messages are not allowed. Each phase of the message should convey a single thought, and must be understood by itself.
4. Use the word "EXIT" to refer to an exit ramp on a freeway; i.e., "EXIT CLOSED." Do not use the term "RAMP."
5. Always use the route or interstate designation (IH, US, SH, FM) along with the number when referring to a roadway.
6. When in use, the bottom of a stationary PCMS message panel should be a minimum 7 feet above the roadway, where possible.
7. The message term "WEEKEND" should be used only if the work is to start on Saturday morning and end by Sunday evening at midnight. Actual days and hours of work should be displayed on the PCMS if work is to begin on Friday evening and/or continue into Monday morning.
8. The Engineer/Inspector may select one of two options which are available for displaying a two-phase message on a PCMS. Each phase may be displayed for either four seconds each or for three seconds each.
9. Do not "flash" messages or words included in a message. The message should be steady burn or continuous while displayed.
10. Do not present redundant information on a two-phase message; i.e., keeping two lines of the message the same and changing the third line.
11. Do not use the word "Danger" in message.
12. Do not display the message "LANES SHIFT LEFT" or "LANES SHIFT RIGHT" on a PCMS. Drivers do not understand the message.
13. Do not display messages that scroll horizontally or vertically across the face of the sign.
14. The following table lists abbreviated words and two-word phrases that are acceptable for use on a PCMS. Both words in a phrase must be displayed together. Words or phrases not on this list should not be abbreviated, unless shown in the TMUTCD.
15. PCMS character height should be at least 18 inches for trailer mounted units. They should be visible from at least 1/2 (.5) mile and the text should be legible from at least 600 feet at night and 800 feet in daylight. Truck mounted units must have a character height of 10 inches and must be legible from at least 400 feet.
16. Each line of text should be centered on the message board rather than left or right justified.
17. If disabled, the PCMS should default to an illegible display that will not alarm motorists and will only be used to alert workers that the PCMS has malfunctioned. A pattern such as a series of horizontal solid bars is appropriate.

WORD OR PHRASE	ABBREVIATION
Access Road	ACCS RD
Alternate	ALT
Avenue	AVE
Best Route	BEST RTE
Boulevard	BLVD
Bridge	BRDG
Cannot	CANT
Center	CTR
Construction Ahead	CONST AHD
CROSSING	XING
Detour Route	DETOUR RTE
Do Not	DONT
East	E
Eastbound	(route) E
Emergency	EMER
Emergency Vehicle	EMER VEH
Entrance, Enter	ENT
Express Lane	EXP LN
Expressway	EXPWY
XXXX Feet	XXXX FT
Fog Ahead	FOG AHD
Freeway	FRWY, FWY
Freeway Blocked	FWY BLKD
Friday	FRI
Hazardous Driving	HAZ DRIVING
Hazardous Material	HAZMAT
High-Occupancy	HOV
Vehicle Highway	HWY
Hour(s)	HR, HRS
Information	INFO
It Is	ITS
Junction	JCT
Left	LFT
Left Lane	LFT LN
Lane Closed	LN CLOSED
Lower Level	LWR LEVEL
Maintenance	MAINT

WORD OR PHRASE	ABBREVIATION
Major	MAJ
Miles	MI
Miles Per Hour	MPH
Minor	MNR
Monday	MON
Normal	NORM
North	N
Northbound	(route) N
Parking	PKING
Road	RD
Right Lane	RT LN
Saturday	SAT
Service Road	SERV RD
Shoulder	SHLDR
Slippery	SLIP
South	S
Southbound	(route) S
Speed	SPD
Street	ST
Sunday	SUN
Telephone	PHONE
Temporary	TEMP
Thursday	THURS
To Downtown	TO DWNTN
Traffic	TRAF
Travelers	TRVLRS
Tuesday	TUES
Time Minutes	TIME MIN
Upper Level	UPR LEVEL
Vehicles (s)	VEH, VEHS
Warning	WARN
Wednesday	WED
Weight Limit	WT LIMIT
West	W
Westbound	(route) W
Wet Pavement	WET PVMT
Will Not	WONT

Roadway designation # IH-number, US-number, SH-number, FM-number

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

(The Engineer may approve other messages not specifically covered here.)

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

FREEWAY CLOSED X MILE	FRONTAGE ROAD CLOSED
ROAD CLOSED AT SH XXX	SHOULDER CLOSED XXX FT
ROAD CLSD AT FM XXXX	RIGHT LN CLOSED XXX FT
RIGHT X LANES CLOSED	RIGHT X LANES OPEN
CENTER LANE CLOSED	DAYTIME LANE CLOSURES
NIGHT LANE CLOSURES	I-XX SOUTH EXIT CLOSED
VARIOUS LANES CLOSED	EXIT XXX CLOSED X MILE
EXIT CLOSED	RIGHT LN TO BE CLOSED
MALL DRIVEWAY CLOSED	X LANES CLOSED TUE - FRI
XXXXXXXX BLVD CLOSED	

Other Condition List

ROADWORK XXX FT	ROAD REPAIRS XXXX FT
FLAGGER XXXX FT	LANE NARROWS XXXX FT
RIGHT LN NARROWS XXXX FT	TWO-WAY TRAFFIC XX MILE
MERGING TRAFFIC XXXX FT	CONST TRAFFIC XXX FT
LOOSE GRAVEL XXXX FT	UNEVEN LANES XXXX FT
DETOUR X MILE	ROUGH ROAD XXXX FT
ROADWORK PAST SH XXXX	ROADWORK NEXT FRI-SUN
BUMP XXXX FT	US XXX EXIT X MILES
TRAFFIC SIGNAL XXXX FT	LANES SHIFT *

* LANES SHIFT in Phase 1 must be used with STAY IN LANE in Phase 2.

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

MERGE RIGHT	FORM X LINES RIGHT
DETOUR NEXT X EXITS	USE XXXXX RD EXIT
USE EXIT XXX	USE EXIT I-XX NORTH
STAY ON US XXX SOUTH	USE I-XX E TO I-XX N
TRUCKS USE US XXX N	WATCH FOR TRUCKS
WATCH FOR TRUCKS	EXPECT DELAYS
EXPECT DELAYS	PREPARE TO STOP
REDUCE SPEED XXX FT	END SHOULDER USE
USE OTHER ROUTES	WATCH FOR WORKERS
STAY IN LANE *	

Location List

AT FM XXXX
BEFORE RAILROAD CROSSING
NEXT X MILES
PAST US XXX EXIT
XXXXXXX TO XXXXXXX
US XXX TO FM XXXX

Warning List

SPEED LIMIT XX MPH
MAXIMUM SPEED XX MPH
MINIMUM SPEED XX MPH
ADVISORY SPEED XX MPH
RIGHT LANE EXIT
USE CAUTION
DRIVE SAFELY
DRIVE WITH CARE

** Advance Notice List

TUE-FRI XX AM- X PM
APR XX-XX X PM-X AM
BEGINS MONDAY
BEGINS MAY XX
MAY X-X XX PM - XX AM
NEXT FRI-SUN
XX AM TO XX PM
NEXT TUE AUG XX
TONIGHT XX PM- XX AM

* LANES SHIFT in Phase 1 must be used with STAY IN LANE in Phase 2.

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

1. Only 1 or 2 phases are to be used on a PCMS.
2. The 1st phase (or both) should be selected from the "Road/Lane/Ramp Closure List" and the "Other Condition List".
3. A 2nd phase can be selected from the "Action to Take/Effect on Travel, Location, General Warning, or Advance Notice Phase Lists".
4. A Location Phase is necessary only if a distance or location is not included in the first phase selected.
5. If two PCMS are used in sequence, they must be separated by a minimum of 1000 ft. Each PCMS shall be limited to two phases, and should be understandable by themselves.
6. For advance notice, when the current date is within seven days of the actual work date, calendar days should be replaced with days of the week. Advance notification should typically be for no more than one week prior to the work.

WORDING ALTERNATIVES

1. The words RIGHT, LEFT and ALL can be interchanged as appropriate.
2. Roadway designations IH, US, SH, FM and LP can be interchanged as appropriate.
3. EAST, WEST, NORTH and SOUTH (or abbreviations E, W, N and S) can be interchanged as appropriate.
4. Highway names and numbers replaced as appropriate.
5. ROAD, HIGHWAY and FREEWAY can be interchanged as needed.
6. AHEAD may be used instead of distances if necessary.
7. FT and MI, MILE and MILES interchanged as appropriate.
8. AT, BEFORE and PAST interchanged as needed.
9. Distances or AHEAD can be eliminated from the message if a location phase is used.

PCMS SIGNS WITHIN THE R.O.W. SHALL BE BEHIND GUARDRAIL OR CONCRETE BARRIER OR SHALL HAVE A MINIMUM OF FOUR (4) PLASTIC DRUMS PLACED PERPENDICULAR TO TRAFFIC ON THE UPSTREAM SIDE OF THE PCMS, WHEN EXPOSED TO ONE DIRECTION OF TRAFFIC. WHEN EXPOSED TO TWO WAY TRAFFIC, THE FOUR DRUMS SHOULD BE PLACED WITH ONE DRUM AT EACH OF THE FOUR CORNERS OF THE UNIT.

FULL MATRIX PCMS SIGNS

1. When Full Matrix PCMS signs are used, the character height and legibility/visibility requirements shall be maintained as listed in Note 15 under "PORTABLE CHANGEABLE MESSAGE SIGNS" above.
2. When symbol signs, such as the "Flagger Symbol"(CW20-7) are represented graphically on the Full Matrix PCMS sign and, with the approval of the Engineer, it shall maintain the legibility/visibility requirement listed above.
3. When symbol signs are represented graphically on the Full Matrix PCMS, they shall only supplement the use of the static sign represented, and shall not substitute for, or replace that sign.
4. A full matrix PCMS may be used to simulate a flashing arrow board provided it meets the visibility, flash rate and dimming requirements on BC(7), for the same size arrow.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

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100

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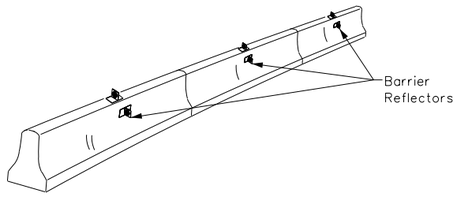
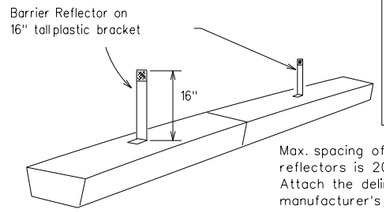
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost of the reflectors shall be considered subsidiary to Item 512.



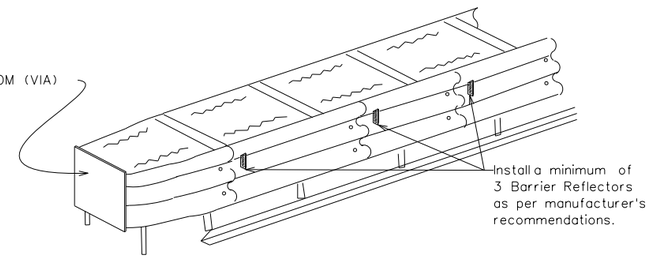
CONCRETE TRAFFIC BARRIER (CTB)

3. Where traffic is on one side of the CTB, two (2) Barrier Reflectors shall be mounted in approximately the midsection of each section of CTB. An alternate mounting location is uniformly spaced at one end of each CTB. This will allow for attachment of a barrier grapple without damaging the reflector. The Barrier Reflector mounted on the side of the CTB shall be located directly below the reflector mounted on top of the barrier, as shown in the detail above.
4. Where CTB separates two-way traffic, three barrier reflectors shall be mounted on each section of CTB. The reflector unit on top shall have two yellow reflective faces (Bi-Directional)while the reflectors on each side of the barrier shall have one yellow reflective face, as shown in the detail above.
5. When CTB separates traffic traveling in the same direction, no barrier reflectors will be required on top of the CTB.
6. Barrier Reflector units shall be yellow or white in color to match the edgeline being supplemented.
7. Maximum spacing of Barrier Reflectors is forty (40) feet.
8. Pavement markers or temporary flexible-reflective roadway marker tabs shall NOT be used as CTB delineation.
9. Attachment of Barrier Reflectors to CTB shall be per manufacturer's recommendations.
10. Missing or damaged Barrier Reflectors shall be replaced as directed by the Engineer.
11. Single slope barriers shall be delineated as shown on the above detail.



Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB)



DELINEATION OF END TREATMENTS

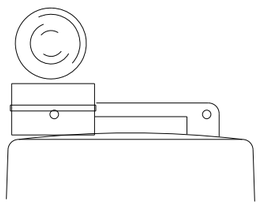
LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

LPCB is approved for use in work zone locations, where the posted speed is 45mph, or less. See Roadway Standard Sheet LPCB.

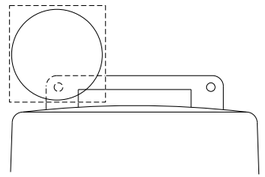
END TREATMENTS FOR CTB'S USED IN WORK ZONES

End treatments used on CTB's in work zones shall meet the apppropriate crashworthy standards as defined in the Manual for Assessing Safety Hardware (MASH). Refer to the CWZTCD List for approved end treatments and manufacturers.

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



Type C Warning Light or approved substitute mounted on a drum adjacent to the travel way.



Warning reflector may be round or square.Must have a yellow reflective surface area of at least 30 square inches

WARNING LIGHTS

1. Warning lights shall meet the requirements of the TMUTCD.
2. Warning lights shall NOT be installed on barricades.
3. Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "FL". The Type A Warning Lights shall not be used with signs manufactured with Type B or C $_{FL}$Sheeting meeting the requirements of Departmental Material Specification DMS-8300.
4. Type-C and Type D 360 degree Steady Burn Lights are intended to be used in a series for delineation to supplement other traffic control devices. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "SB".
5. The Engineer/Inspector or the plans shall specify the location and type of warning lights to be installed on the traffic control devices.
6. When required by the Engineer, the Contractor shall furnish a copy of the warning lights certification. The warning light manufacturer will certify the warning lights meet the requirements of the latest ITE Purchase Specifications for Flashing and Steady-Burn Warning Lights.
7. When used to delineate curves, Type-C and Type D Steady Burn Lights should only be placed on the outside of the curve, not the inside.
8. The location of warning lights and warning reflectors on drums shall be as shown elsewhere in the plans.

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

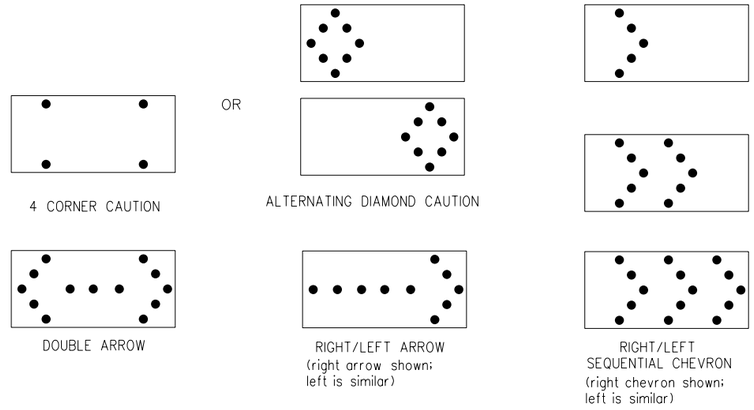
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing devices to form a merging taper may be used for delineation. If used, the successive flashing of the sequential warning lights should occur from the beginning of the taper to the end of the merging taper in order to identify the desired vehicle path. The rate of flashing for each light shall be 65 flashes per minute, plus or minus 10 flashes.
4. Type C and D steady-burn warning lights are intended to be used in a series to delineate the edge of the travel lane on detours, on lane changes, on lane closures, and on other similar conditions.
5. Type A, Type C and Type D warning lights shall be installed at locations as detailed on other sheets in the plans.
6. Warning lights shall not be installed on a drum that has a sign, chevron or vertical panel.
7. The maximum spacing for warning lights on drums should be identical to the channelizing device spacing.

WARNING REFLECTORS MOUNTED ON PLASTIC DRUMS AS A SUBSTITUTE FOR TYPE C (STEADY BURN) WARNING LIGHTS

1. A warning reflector or approved substitute may be mounted on a plastic drum as a substitute for a Type C, steady burn warning light at the discretion of the Contractor unless otherwise noted in the plans.
2. The warning reflector shall be yellow in color and shall be manufactured using a sign substrate approved for use with plastic drums listed on the CWZTCD.
3. The warning reflector shall have a minimum retroreflective surface area (one-side) of 30 square inches.
4. Round reflectors shall be fully reflectorized, including the area where attached to the drum.
5. Square substrates must have a minimum of 30 square inches of reflectorized sheeting. They do not have to be reflectorized where it attaches to the drum.
6. The side of the warning reflector facing approaching traffic shall have sheeting meeting the color and retroreflectivity requirements for DMS 8300-Type B or Type C.
7. When used near two-way traffic, both sides of the warning reflector shall be reflectorized.
8. The warning reflector should be mounted on the side of the handle nearest approaching traffic.
9. The maximum spacing for warning reflectors should be identical to the channelizing device spacing requirements.

Arrow Boards may be located behind channelizing devices in place for a shoulder taper or merging taper, otherwise they shall be delineated with four (4) channelizing devices placed perpendicular to traffic on the upstream side of traffic.

1. The Flashing Arrow Board should be used for all lane closures on multi-lane roadways, or slow moving maintenance or construction activities on the travel lanes.
2. Flashing Arrow Boards should not be used on two-lane, two-way roadways, detours, diversions or work on shoulders unless the "CAUTION" display (see detail below) is used.
3. The Engineer/Inspector shall choose all appropriate signs, barricades and/or other traffic control devices that should be used in conjunction with the Flashing Arrow Board.
4. The Flashing Arrow Board should be able to display the following symbols:



4 CORNER CAUTION

ALTERNATING DIAMOND CAUTION

DOUBLE ARROW

RIGHT/LEFT ARROW
(right arrow shown;
left is similar)

RIGHT/LEFT
SEQUENTIAL CHEVRON
(right chevron shown;
left is similar)

5. The "CAUTION" display consists of four corner lamps flashing simultaneously, or the Alternating Diamond Caution mode as shown.
6. The straight line caution display is NOT ALLOWED.
7. The Flashing Arrow Board shall be capable of minimum 50 percent dimming from rated lamp voltage. The flashing rate of the lamps shall not be less than 25 nor more than 40 flashes per minute.
8. Minimum lamp "on time" shall be approximately 50 percent for the flashing arrow and equal intervals of 25 percent for each sequential phase of the flashing chevron.
9. The sequential arrow display is NOT ALLOWED.
10. The flashing arrow display is the TxDOT standard; however, the sequential chevron display may be used during daylight operations.
11. The Flashing Arrow Board shall be mounted on a vehicle, trailer or other suitable support.
12. A Flashing Arrow Board SHALL NOT BE USED to laterally shift traffic.
13. A full matrix PCMS may be used to simulate a Flashing Arrow Board provided it meets visibility, flash rate and dimming requirements on this sheet for the same size arrow.
14. Minimum mounting height of trailer mounted Arrow Boards should be 7 feet from roadway to bottom of panel.

REQUIREMENTS			
TYPE	MINIMUM SIZE	MINIMUM NUMBER OF PANEL LAMPS	MINIMUM VISIBILITY DISTANCE
B	30 x 60	13	3/4 mile
C	48 x 96	15	1 mile

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

WHEN NOT IN USE, REMOVE THE ARROW BOARD FROM THE RIGHT-OF-WAY OR PLACE THE ARROW BOARD BEHIND CONCRETE TRAFFIC BARRIER OR GUARDRAIL.

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

1. Truck-mounted attenuators (TMA) used on TxDOT facilities must meet the requirements outlined in the Manual for Assessing Safety Hardware (MASH).
2. Refer to the CWZTCD for the requirements of Level 2 or Level 3 TMAs.
3. Refer to the CWZTCD for a list of approved TMAs.
4. TMAs are required on freeways unless otherwise noted in the plans.
5. A TMA should be used anytime that it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the work performance.
6. The only reason a TMA should not be required is when a work area is spread down the roadway and the work crew is an extended distance from the TMA.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION ARROW PANEL, REFLECTORS, WARNING LIGHTS & ATTENUATOR

BC(7)-21

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7-13 5-21				23

101

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GENERAL NOTES

1. For long term stationary work zones on freeways, drums shall be used as the primary channelizing device.
2. For intermediate term stationary work zones on freeways, drums should be used as the primary channelizing device but may be replaced in tangent sections by vertical panels, or 42" two-piece cones. In tangent sections, one-piece cones may be used with the approval of the Engineer but only if personnel are present on the project at all times to maintain the cones in proper position and location.
3. For short term stationary work zones on freeways, drums are the preferred channelizing device but may be replaced in tapers, transitions and tangent sections by vertical panels, two-piece cones or one-piece cones as approved by the Engineer.
4. Drums and all related items shall comply with the requirements of the current version of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
5. Drums, bases, and related materials shall exhibit good workmanship and shall be free from objectionable marks or defects that would adversely affect their appearance or serviceability.
6. The Contractor shall have a maximum of 24 hours to replace any plastic drums identified for replacement by the Engineer/Inspector. The replacement device must be an approved device.

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

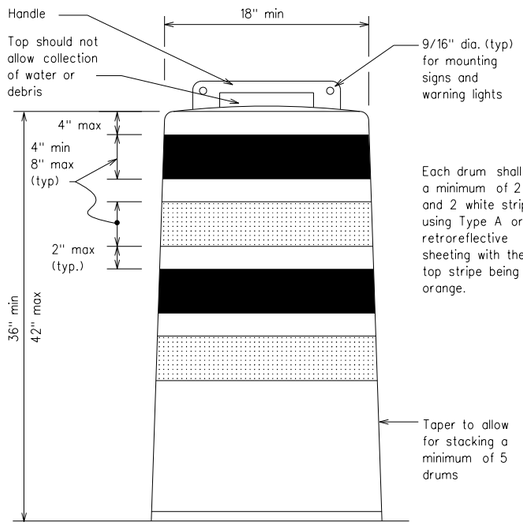
1. Plastic drums shall be a two-piece design: the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents accidental separation due to normal handling and/or air turbulence created by passing vehicles.
3. Plastic drums shall be constructed of lightweight flexible, and deformable materials. The Contractor shall NOT use metal drums or single piece plastic drums as channelization devices or sign supports.
4. Drums shall present a profile that is a minimum of 18 inches in width at the 36 inch height when viewed from any direction. The height of drum unit (body installed on base) shall be a minimum of 36 inches and a maximum of 42 inches.
5. The top of the drum shall have a built-in handle for easy pickup and shall be designed to drain water and not collect debris. The handle shall have a minimum of two widely spaced 9/16 inch diameter holes to allow attachment of a warning light, warning reflector unit or approved compliant sign.
6. The exterior of the drum body shall have a minimum of four alternating orange and white retroreflective circumferential stripes not less than 4 inches nor greater than 8 inches in width. Any non-reflectorized space between any two adjacent stripes shall not exceed 2 inches in width.
7. Bases shall have a maximum width of 36 inches, a maximum height of 4 inches, and a minimum of two footholds of sufficient size to allow base to be held down while separating the drum body from the base.
8. Plastic drums shall be constructed of ultra-violet stabilized, orange, high-density polyethylene (HDPE) or other approved material.
9. Drum body shall have a maximum unballasted weight of 11 lbs.
10. Drum and base shall be marked with manufacturer's name and model number.

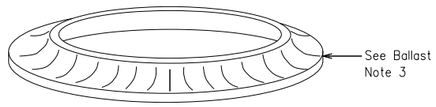
RETROREFLECTIVE SHEETING

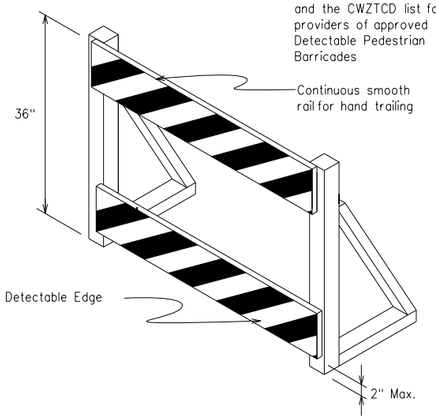
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall be suitable for use on and shall adhere to the drum surface such that, upon vehicular impact, the sheeting shall remain adhered in-place and exhibit no delaminating, cracking, or loss of retroreflectivity other than that loss due to abrasion of the sheeting surface.

BALLAST

1. Unballasted bases shall be large enough to hold up to 50 lbs. of sand. This base, when filled with the ballast material, should weigh between 35 lbs (minimum) and 50 lbs (maximum). The ballast may be sand in one to three sandbags separate from the base, sand in a sand-filled plastic base, or other ballasting devices as approved by the Engineer. Stacking of sandbags will be allowed, however height of sandbags above pavement surface may not exceed 12 inches.
2. Bases with built-in ballast shall weigh between 40 lbs. and 50 lbs. Built-in ballast can be constructed of an integral crumb rubber base or a solid rubber base.
3. Recycled truck tire sidewalls may be used for ballast on drums approved for this type of ballast on the CWZTCD list.
4. The ballast shall not be heavy objects, water, or any material that would become hazardous to motorists, pedestrians, or workers when the drum is struck by a vehicle.
5. When used in regions susceptible to freezing, drums shall have drainage holes in the bottoms so that water will not collect and freeze becoming a hazard when struck by a vehicle.
6. Ballast shall not be placed on top of drums.
7. Adhesives may be used to secure base of drums to pavement.

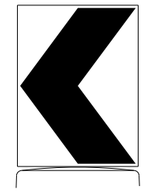




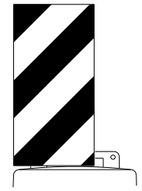


DETECTABLE PEDESTRIAN BARRICADES

1. When existing pedestrian facilities are disrupted, closed, or relocated in a TTC zone, the temporary facilities shall be detectable and include accessibility features consistent with the features present in the existing pedestrian facility. Refer to WZ(BTS-2) for Pedestrian Control requirements for Sidewalk Diversions, Sidewalk Detours and Crosswalk Closures.
2. Where pedestrians with visual disabilities normally use the closed sidewalk, a Detectable Pedestrian Barricade shall be placed across the full width of the closed sidewalk instead of a Type 3 Barricade.
3. Detectable pedestrian barricades similar to the one pictured above, longitudinal channelizing devices, some concrete barriers, and wood or chain link fencing with a continuous detectable edging can satisfactorily delineate a pedestrian path.
4. Tape, rope, or plastic chain strung between devices are not detectable, do not comply with the design standards in the "Americans with Disabilities Act Accessibility Guidelines (ADAAG)" and should not be used as a control for pedestrian movements.
5. Warning lights shall not be attached to detectable pedestrian barricades.
6. Detectable pedestrian barricades should use 8" nominal barricade rails as shown on BC(10) provided that the top rail provides a smooth continuous rail suitable for hand trailing with no splinters, burrs, or sharp edges.



18" x 24" Sign
(Maximum Sign Dimension)
Chevron CW1-8, Opposing Traffic Lane Divider, Driveway sign D70a, Keep Right R4 series or other signs as approved by Engineer



12" x 24"
Vertical Panel
mount with diagonals sloping down towards travel way

Plywood, Aluminum or Metal sign substrates shall NOT be used on plastic drums

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

1. Signs used on plastic drums shall be manufactured using substrates listed on the CWZTCD.
2. Chevrons and other work zone signs with an orange background shall be manufactured with Type B or Type C Orange$_{FL}$ sheeting meeting the color and retroreflectivity requirements of DMS-8300, "Sign Face Material," unless otherwise specified in the plans.
3. Vertical Panels shall be manufactured with orange and white sheeting meeting the requirements of DMS-8300 Type A or Type B. Diagonal stripes on Vertical Panels shall slope down toward the intended traveled lane.
4. Other sign messages (text or symbolic) may be used as approved by the Engineer. Sign dimensions shall not exceed 18 inches in width or 24 inches in height, except for the R9 series signs discussed in note 8 below.
5. Signs shall be installed using a 1/2 inch bolt (nominal) and nut, two washers, and one locking washer for each connection.
6. Mounting bolts and nuts shall be fully engaged and adequately torqued. Bolts should not extend more than 1/2 inch beyond nuts.
7. Chevrons may be placed on drums on the outside of curves, on merging tapers or on shifting tapers. When used in these locations, they may be placed on every drum or spaced not more than on every third drum. A minimum of three (3) should be used at each location called for in the plans.
8. R9-9, R9-10, R9-11 and R9-11a Sidewalk Closed signs which are 24 inches wide may be mounted on plastic drums, with approval of the Engineer.

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BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

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9-07 5-21				24
7-13				

102

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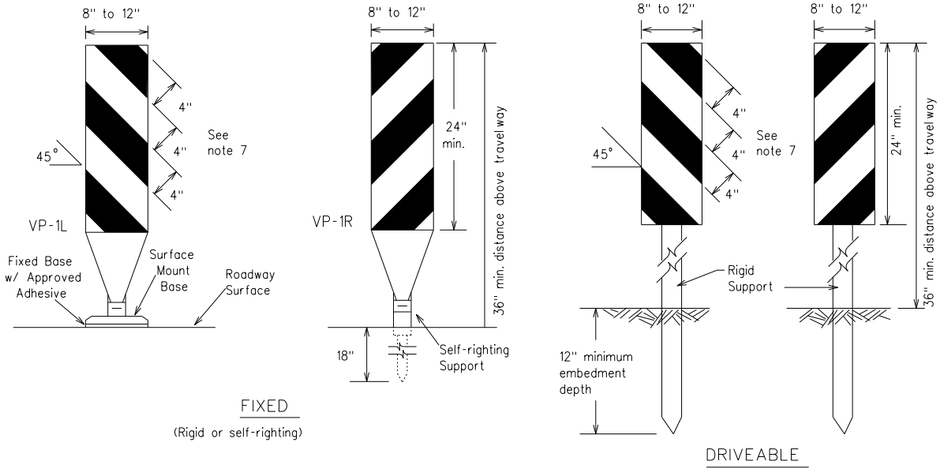
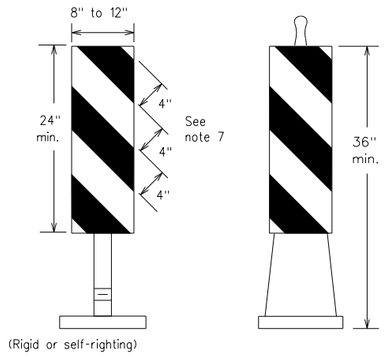


FIXED

(Rigid or self-righting)

DRIVEABLE

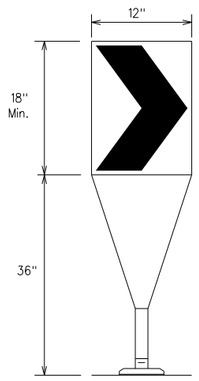


(Rigid or self-righting)

PORTABLE

VERTICAL PANELS (VPs)

1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is required. The Engineer/Inspector shall refer to the Roadway Design Manual for additional requirements on the use VP's for drop-offs.
3. VP's should be mounted back to back if used at the edge of cuts adjacent to two-way two lane roadways. Stripes are to be reflective orange and reflective white and should always slope downward toward the travel lane.
4. VP's used on expressways and freeways or other high speed roadways, may have more than 270 square inches of retroreflective area facing traffic.
5. Self-righting supports are available with portable base. See "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
6. Sheeting for the VP's shall be retroreflective Type A or Type B conforming to Departmental Material Specification DMS-8300, unless noted otherwise.
7. Where the height of reflective material on the vertical panel is 36 inches or greater, a panel stripe of 6 inches shall be used.



Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

1. The chevron shall be a vertical rectangle with a minimum size of 12 by 18 inches.
2. Chevrons are intended to give notice of a sharp change of alignment with the direction of travel and provide additional emphasis and guidance for vehicle operators with regard to changes in horizontal alignment of the roadway.
3. Chevrons, when used, shall be erected on the outside of a sharp curve or turn, or on the far side of an intersection. They shall be in line with and at right angles to approaching traffic. Spacing should be such that the motorist always has three in view, until the change in alignment eliminates its need.
4. To be effective, the chevron should be visible for at least 500 feet.
5. Chevrons shall be orange with a black nonreflective legend. Sheeting for the chevron shall be retroreflective Type B or Type C conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.
6. For Long Term Stationary use on tapers or transitions on freeways and divided highways, self-righting chevrons may be used to supplement plastic drums but not to replace plastic drums.

CHEVRONS

GENERAL NOTES

1. Work Zone channelizing devices illustrated on this sheet may be installed in close proximity to traffic and are suitable for use on high or low speed roadways. The Engineer/Inspector shall ensure that spacing and placement is uniform and in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
2. Channelizing devices shown on this sheet may have a driveable, fixed or portable base. The requirement for self-righting channelizing devices must be specified in the General Notes or other plan sheets.
3. Channelizing devices on self-righting supports should be used in work zone areas where channelizing devices are frequently impacted by errant vehicles or vehicle related wind gusts making alignment of the channelizing devices difficult to maintain. Locations of these devices shall be detailed elsewhere in the plans. These devices shall conform to the TMUTCD and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
4. The Contractor shall maintain devices in a clean condition and replace damaged, nonreflective, faded, or broken devices and bases as required by the Engineer/Inspector. The Contractor shall be required to maintain proper device spacing and alignment.
5. Portable bases shall be fabricated from virgin and/or recycled rubber. The portable bases shall weigh a minimum of 30 lbs.
6. Pavement surfaces shall be prepared in a manner that ensures proper bonding between the adhesives, the fixed mount bases and the pavement surface. Adhesives shall be prepared and applied according to the manufacturer's recommendations.
7. The installation and removal of channelizing devices shall not cause detrimental effects to the final pavement surfaces, including pavement surface discoloration or surface integrity. Driveable bases shall not be permitted on final pavement surfaces. The Engineer/Inspector shall approve all application and removal procedures of fixed bases.

LONGITUDINAL CHANNELIZING DEVICES (LCD)

1. LCDs are crashworthy, lightweight, deformable devices that are highly visible, have good target value and can be connected together. They are not designed to contain or redirect a vehicle on impact.
2. LCDs may be used instead of a line of cones or drums.
3. LCDs shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. LCDs should not be used to provide positive protection for obstacles, pedestrians or workers.
5. LCDs shall be supplemented with retroreflective delineation as required for temporary barriers on BC(7) when placed roughly parallel to the travel lanes.
6. LCDs used as barricades placed perpendicular to traffic should have at least one row of reflective sheeting meeting the requirements for barricade rails as shown on BC(10). Place reflective sheeting near the top of the LCD along the full length of the device.

WATER BALLASTED SYSTEMS USED AS BARRIERS

1. Water ballasted systems used as barriers shall not be used solely to channelize road users, but also to protect the work space per the appropriate Manual for Assessing Safety Hardware (MASH) crashworthiness requirements based on roadway speed and barrier application.
2. Water ballasted systems used to channelize vehicular traffic shall be supplemented with retroreflective delineation or channelizing devices to improve daytime/nighttime visibility. They may also be supplemented with pavement markings.
3. Water ballasted systems used as barriers shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. Water ballasted systems used as barriers should not be used for a merging taper except in low speed (less than 45 MPH) urban areas. When used on a taper in a low speed urban area, the taper shall be delineated and the taper length should be designed to optimize road user operations considering the available geometric conditions.
5. When water ballasted systems used as barriers have blunt ends exposed to traffic, they should be attenuated as per manufacturer recommendations or flared to a point outside the clear zone.

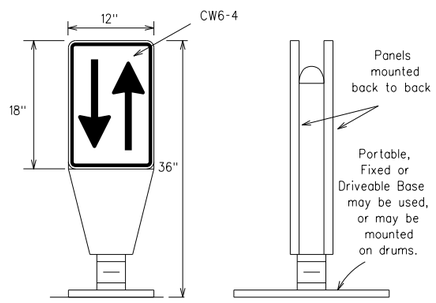
If used to channelize pedestrians, longitudinal channelizing devices or water ballasted systems must have a continuous detectable bottom for users of long canes and the top of the unit shall not be less than 32 inches in height.

HOLLOW OR WATER BALLASTED SYSTEMS USED AS LONGITUDINAL CHANNELIZING DEVICES OR BARRIERS

Posted Speed	Formula	Minimum Desirable Taper Lengths ✳✳			Suggested Maximum Spacing of Channelizing Devices	
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'
35		205'	225'	245'	35'	70'
40		265'	295'	320'	40'	80'
45	L=WS	450'	495'	540'	45'	90'
50		500'	550'	600'	50'	100'
55		550'	605'	660'	55'	110'
60		600'	660'	720'	60'	120'
65		650'	715'	780'	65'	130'
70		700'	770'	840'	70'	140'
75		750'	825'	900'	75'	150'
80		800'	880'	960'	80'	160'

✳✳ Taper lengths have been rounded off.
L=Length of Taper (FT.) W=Width of Offset (FT.)
S=Posted Speed (MPH)

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS



1. Opposing Traffic Lane Dividers (OTLD) are delineation devices designed to convert a normal one-way roadway section to two-way operation. OTLD's are used on temporary centerlines. The upward and downward arrows on the sign's face indicate the direction of traffic on either side of the divider. The base is secured to the pavement with an adhesive or rubber weight to minimize movement caused by a vehicle impact or wind gust.
2. The OTLD may be used in combination with 42" cones or VPs.
3. Spacing between the OTLD shall not exceed 500 feet. 42" cones or VPs placed between the OTLD's should not exceed 100 foot spacing.
4. The OTLD shall be orange with a black non-reflective legend. Sheeting for the OTLD shall be retroreflective Type B or Type C conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)

SHEET 9 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

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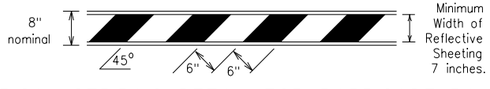
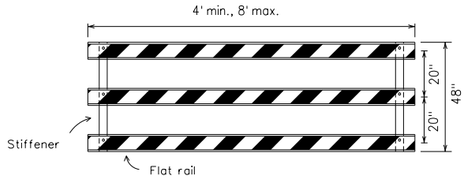
TYPE 3 BARRICADES

1. Refer to the Compliant Work Zone Traffic Control Devices List (CWZTCD) for details of the Type 3 Barricades and a list of all materials used in the construction of Type 3 Barricades.
2. Type 3 Barricades shall be used at each end of construction projects closed to all traffic.
3. Barricades extending across a roadway should have stripes that slope downward in the direction toward which traffic must turn in detouring. When both right and left turns are provided, the chevron striping may slope downward in both directions from the center of the barricade. Where no turns are provided at a closed road, striping should slope downward in both directions toward the center of roadway.
4. Striping of rails, for the right side of the roadway, should slope downward to the left. For the left side of the roadway, striping should slope downward to the right.
5. Identification markings may be shown only on the back of the barricade rails. The maximum height of letters and/or company logos used for identification shall be 1".
6. Barricades shall not be placed parallel to traffic unless an adequate clear zone is provided.
7. Warning lights shall NOT be installed on barricades.
8. Where barricades require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand is recommended. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight. Sand bags shall not be stacked in a manner that covers any portion of a barricade rails reflective sheeting. Rock, concrete, iron, steel or other solid objects will NOT be permitted. Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs. Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber (such as tire inner tubes) shall not be used for sandbags. Sandbags shall only be placed along or upon the base supports of the device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners.
9. Sheeting for barricades shall be retroreflective Type A or Type B conforming to Departmental Material Specification DMS-8300 unless otherwise noted.

Barricades shall NOT be used as a sign support.



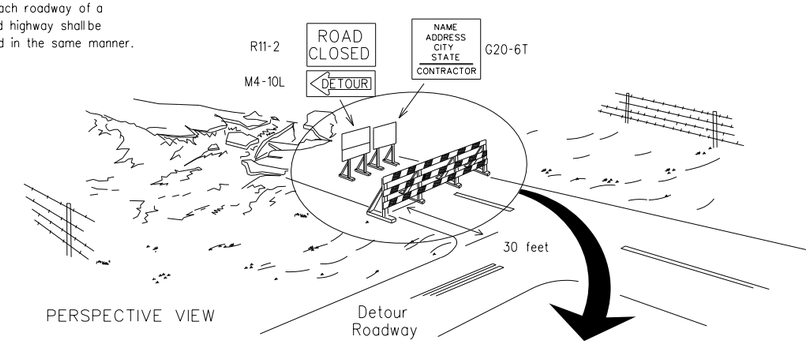
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



Stiffener may be inside or outside of support, but no more than 2 stiffeners shall be allowed on one barricade.

TYPICAL PANEL DETAIL
FOR SKID OR POST TYPE BARRICADES

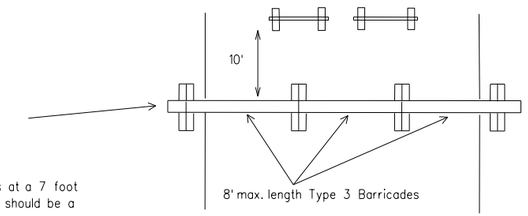
Each roadway of a divided highway shall be barricaded in the same manner.



PERSPECTIVE VIEW

The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.

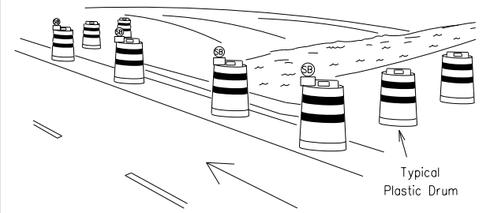
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

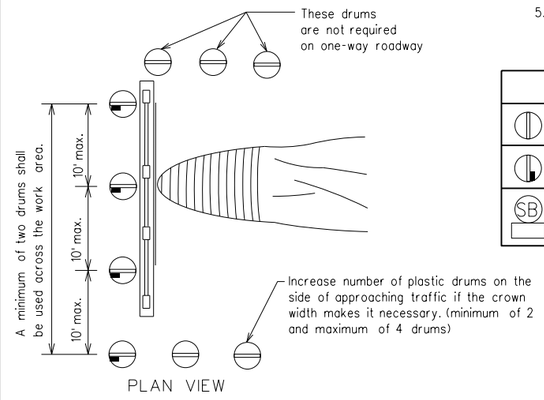
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

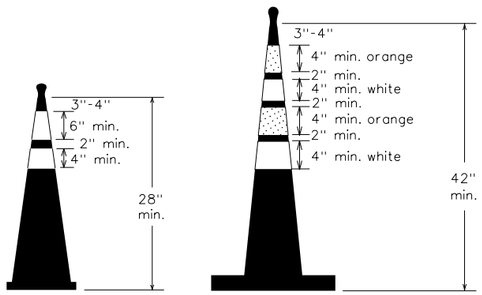
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder width is greater than 12 feet, steady-burn lights may be omitted if drums are used.
5. Drums must extend the length of the culvert widening.



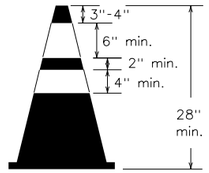
PLAN VIEW

LEGEND	
	Plastic drum
	Plastic drum with steady burn light or yellow warning reflector
SB	Steady burn warning light or yellow warning reflector

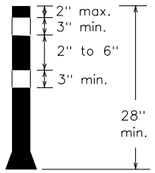
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones



One-Piece cones

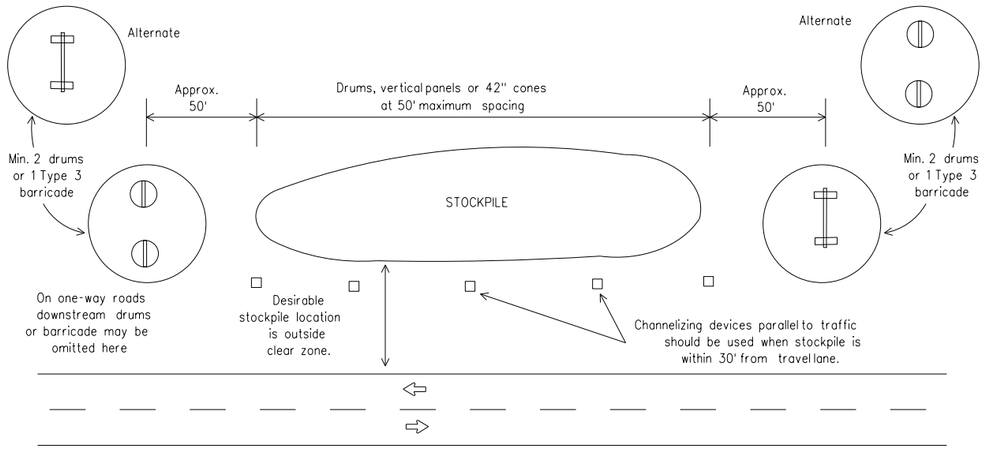


Tubular Marker

28" Cones shall have a minimum weight of 9 1/2 lbs.

42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

1. Traffic cones and tubular markers shall be predominantly orange, and meet the height and weight requirements shown above.
2. One-piece cones have the body and base of the cone molded in one consolidated unit. Two-piece cones have a cone shaped body and a separate rubber base, or ballast, that is added to keep the device upright and in place.
3. Two-piece cones may have a handle or loop extending up to 8" above the minimum height shown, in order to aid in retrieving the device.
4. Cones or tubular markers shall have white or white and orange reflective bands as shown above. The reflective bands shall have a smooth, sealed outer surface and meet the requirements of Departmental Material Specification DMS-8300 Type A or Type B.
5. 28" cones and tubular markers are generally suitable for short duration and short-term stationary work as defined on BC(4). These should not be used for intermediate-term or long-term stationary work unless personnel is on-site to maintain them in their proper upright position.
6. 42" two-piece cones, vertical panels or drums are suitable for all work zone durations.
7. Cones or tubular markers used on each project should be of the same size and shape.



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

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WORK ZONE PAVEMENT MARKINGS

GENERAL

1. The Contractor shall be responsible for maintaining work zone and existing pavement markings, in accordance with the standard specifications and special provisions, on all roadways open to traffic within the CSJ limits unless otherwise stated in the plans.
2. Color, patterns and dimensions shall be in conformance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
3. Additional supplemental pavement marking details may be found in the plans or specifications.
4. Pavement markings shall be installed in accordance with the TMUTCD and as shown on the plans.
5. When short term markings are required on the plans, short term markings shall conform with the TMUTCD, the plans and details as shown on the Standard Plan Sheet WZ(STPM).
6. When standard pavement markings are not in place and the roadway is opened to traffic, DO NOT PASS signs shall be erected to mark the beginning of the sections where passing is prohibited and PASS WITH CARE signs at the beginning of sections where passing is permitted.
7. All work zone pavement markings shall be installed in accordance with Item 662, "Work Zone Pavement Markings."

RAISED PAVEMENT MARKERS

1. Raised pavement markers are to be placed according to the patterns on BC(12).
2. All raised pavement markers used for work zone markings shall meet the requirements of Item 672, "RAISED PAVEMENT MARKERS" and Departmental Material Specification DMS-4200 or DMS-4300.

PREFABRICATED PAVEMENT MARKINGS

1. Removable prefabricated pavement markings shall meet the requirements of DMS-8241.
2. Non-removable prefabricated pavement markings (foil back) shall meet the requirements of DMS-8240.

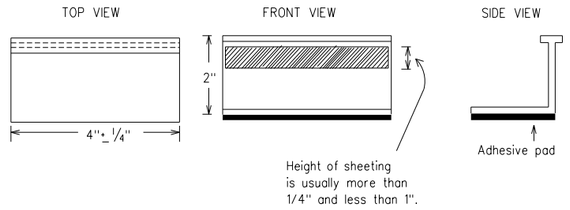
MAINTAINING WORK ZONE PAVEMENT MARKINGS

1. The Contractor will be responsible for maintaining work zone pavement markings within the work limits.
2. Work zone pavement markings shall be inspected in accordance with the frequency and reporting requirements of work zone traffic control device inspections as required by Form 599.
3. The markings should provide a visible reference for a minimum distance of 300 feet during normal daylight hours and 160 feet when illuminated by automobile low-beam headlights at night, unless sight distance is restricted by roadway geometrics.
4. Markings failing to meet this criteria within the first 30 days after placement shall be replaced at the expense of the Contractor as per Specification Item 662.

REMOVAL OF PAVEMENT MARKINGS

1. Pavement markings that are no longer applicable, could create confusion or direct a motorist toward or into the closed portion of the roadway shall be removed or obliterated before the roadway is opened to traffic.
2. The above shall not apply to detours in place for less than three days, where flaggers and/or sufficient channelizing devices are used in lieu of markings to outline the detour route.
3. Pavement markings shall be removed to the fullest extent possible, so as not to leave a discernable marking. This shall be by any method approved by TxDOT Specification Item 677 for "Eliminating Existing Pavement Markings and Markers".
4. The removal of pavement markings may require resurfacing or seal coating portions of the roadway as described in Item 677.
5. Subject to the approval of the Engineer, any method that proves to be successful on a particular type pavement may be used.
6. Blast cleaning may be used but will not be required unless specifically shown in the plans.
7. Over-painting of the markings SHALL NOT BE permitted.
8. Removal of raised pavement markers shall be as directed by the Engineer.
9. Removal of existing pavement markings and markers will be paid for directly in accordance with Item 677, "ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS," unless otherwise stated in the plans.
10. Black-out marking tape may be used to cover conflicting existing markings for periods less than two weeks when approved by the Engineer.

Temporary Flexible-Reflective Roadway Marker Tabs



STAPLES OR NAILS SHALL NOT BE USED TO SECURE TEMPORARY FLEXIBLE-REFLECTIVE ROADWAY MARKER TABS TO THE PAVEMENT SURFACE

1. Temporary flexible-reflective roadway marker tabs used as guidemarks shall meet the requirements of DMS-8242.
2. Tabs detailed on this sheet are to be inspected and accepted by the Engineer or designated representative. Sampling and testing is not normally required, however at the option of the Engineer, either "A" or "B" below may be imposed to assure quality before placement on the roadway.
   A. Select five (5) or more tabs at random from each lot or shipment and submit to the Construction Division, Materials and Pavement Section to determine specification compliance.
   B. Select five (5) tabs and perform the following test. Affix five (5) tabs at 24 inch intervals on an asphaltic pavement in a straight line. Using a medium size passenger vehicle or pickup, run over the markers with the front and rear tires at a speed of 35 to 40 miles per hour, four (4) times in each direction. No more than one (1) out of the five (5) reflective surfaces shall be lost or displaced as a result of this test.
3. Small design variances may be noted between tab manufacturers.
4. See Standard Sheet WZ(STPM) for tab placement on new pavements. See Standard Sheet TCP(7-1) for tab placement on seal coat work.

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

1. Raised pavement markers used as guidemarks shall be from the approved product list, and meet the requirements of DMS-4200.
2. All temporary construction raised pavement markers provided on a project shall be of the same manufacturer.
3. Adhesive for guidemarks shall be bituminous material hot applied or butyl rubber pad for all surfaces, or thermoplastic for concrete surfaces.

Guidemarks shall be designated as:
YELLOW - (two amber reflective surfaces with yellow body).
WHITE - (one silver reflective surface with white body).

DEPARTMENTAL MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
TRAFFIC BUTTONS	DMS-4300
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY REMOVABLE, PREFABRICATED PAVEMENT MARKINGS	DMS-8241
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS	DMS-8242

A list of prequalified reflective raised pavement markers, non-reflective traffic buttons, roadway marker tabs and other pavement markings can be found at the Material Producer List web address shown on BC(1).

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

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11-02 8-14				

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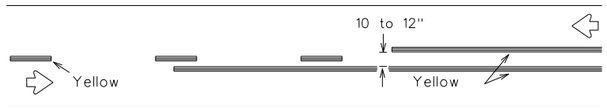
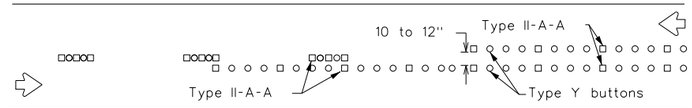
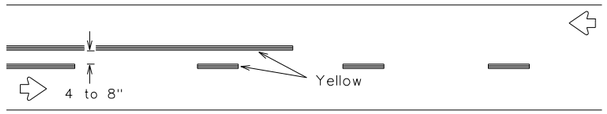
PAVEMENT MARKING PATTERNS



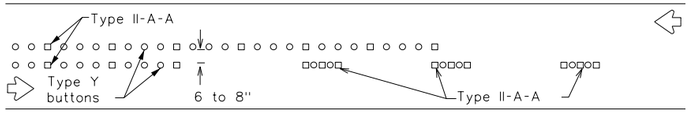
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



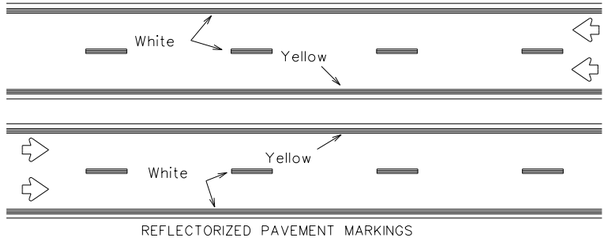
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



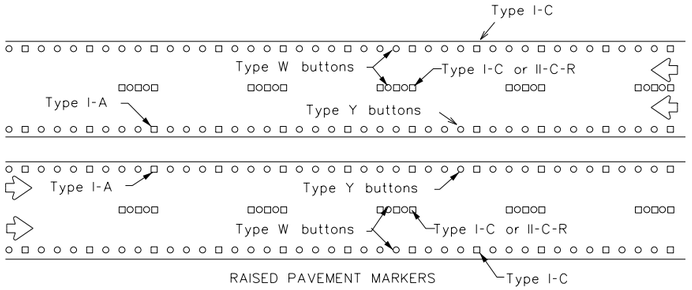
RAISED PAVEMENT MARKERS - PATTERN B

Pattern A is the TXDOT Standard, however Pattern B may be used if approved by the Engineer. Prefabricated markings may be substituted for reflectorized pavement markings.

CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO-LANE, TWO-WAY HIGHWAYS



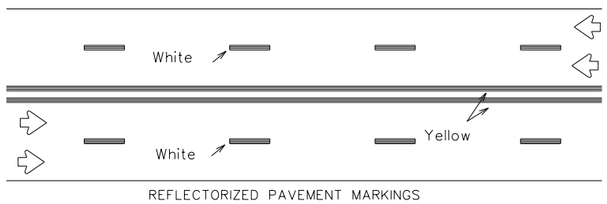
REFLECTORIZED PAVEMENT MARKINGS



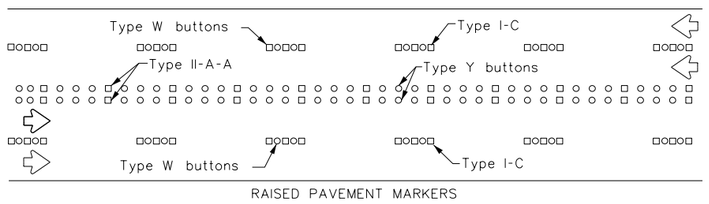
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



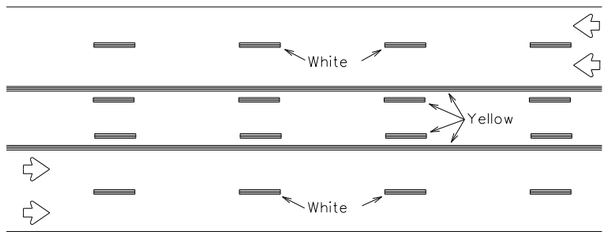
REFLECTORIZED PAVEMENT MARKINGS



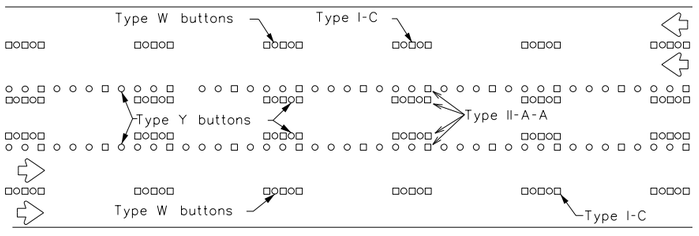
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

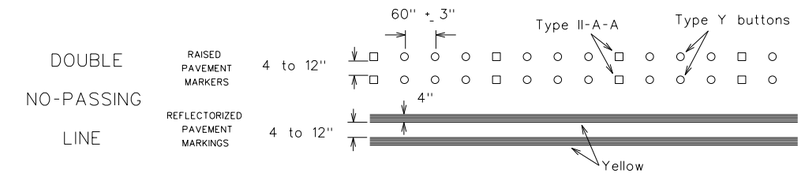
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

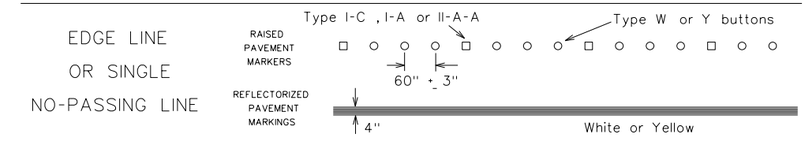
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

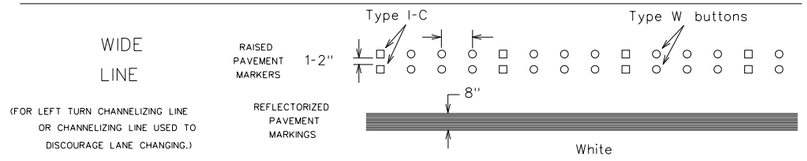


EDGE LINE OR SINGLE NO-PASSING LINE



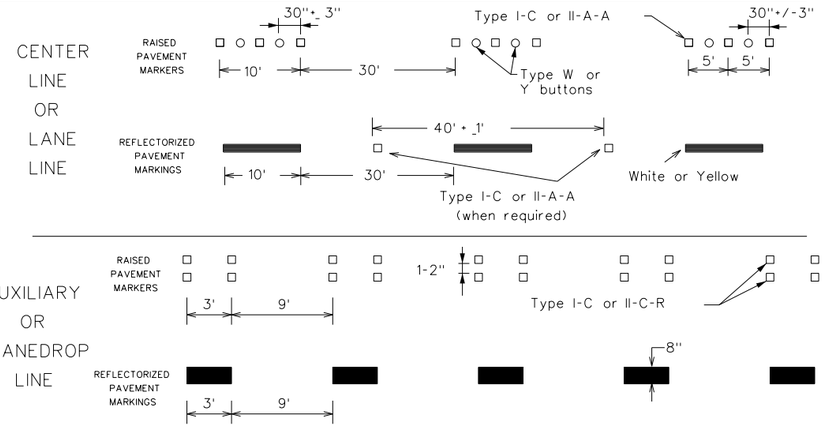
WIDE LINE

(FOR LEFT TURN CHANNELIZING LINE OR CHANNELIZING LINE USED TO DISCOURAGE LANE CHANGING.)



BROKEN LINES

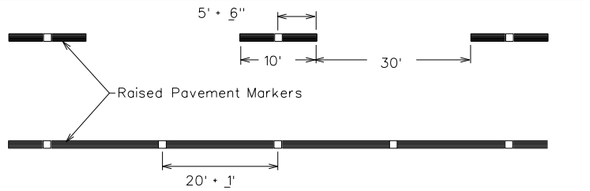
CENTER LINE OR LANE LINE



AUXILIARY OR LANEDROP LINE

REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

If raised pavement markers are used to supplement REMOVABLE markings, the markers shall be applied to the top of the tape at the approximate mid length of tape used for broken lines or at 20 foot spacing for solid lines. This allows an easier removal of raised pavement markers and tape.



Centerline only - not to be used on edge lines

Raised pavement markers used as standard pavement markings shall be from the approved products list and meet the requirements of Item 672 "RAISED PAVEMENT MARKERS."

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 1-97 9-07 5-21 2-98 7-13 11-02 8-14	DIST	COUNTY		SHEET NO. 28

106

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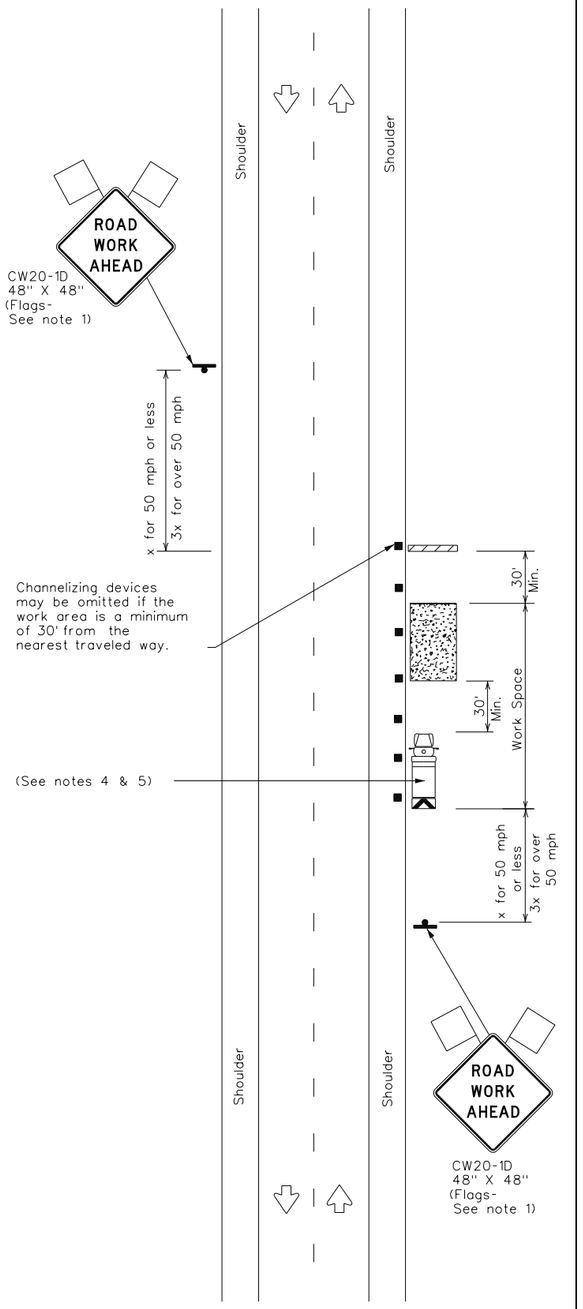
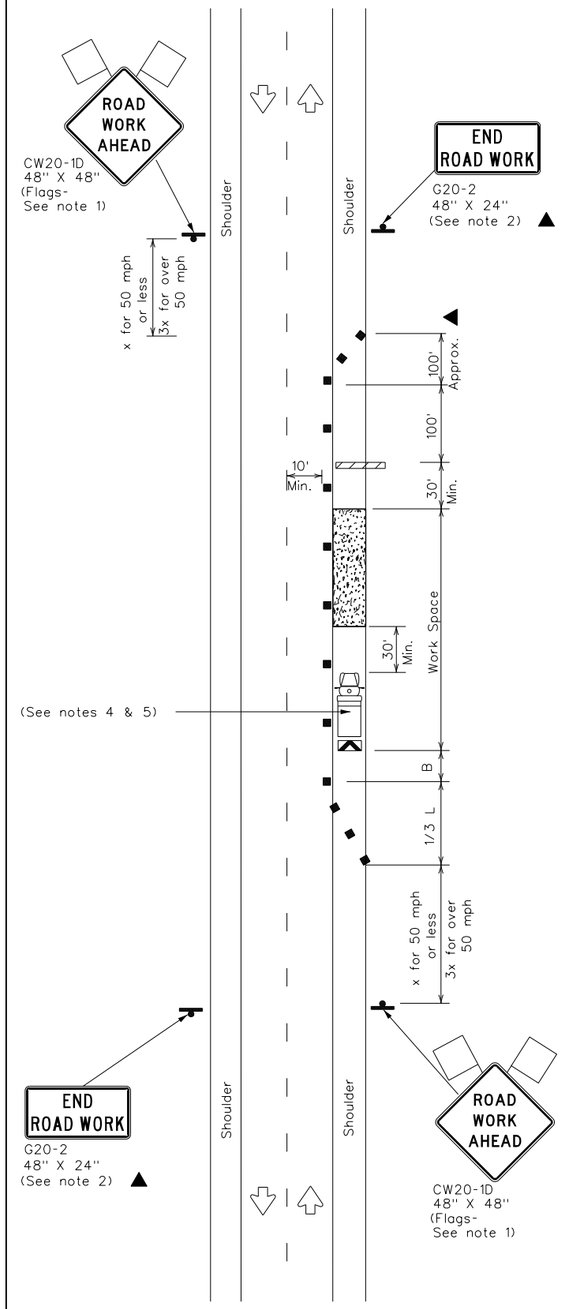
DATE:
FILE:



TCP (2-1a)

WORK SPACE NEAR SHOULDER

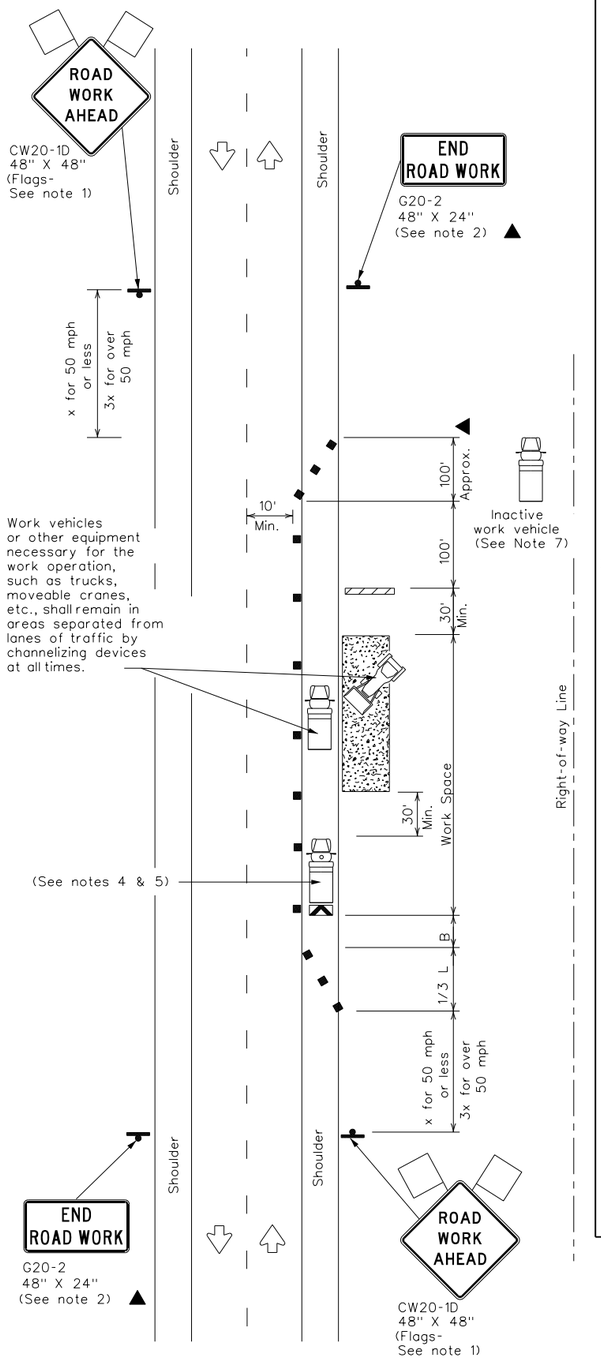
Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER

Conventional Roads



TCP (2-1c)

WORK VEHICLES ON SHOULDER

Conventional Roads

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

THE SEAL THAT APPEARS ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
IT MAY NOT BE USED WITHOUT PROPER AUTHORIZATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L=WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only

** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓	✓	✓

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated in the plans, or for routine maintenance work, when approved by the Engineer.
3. Stockpiled material should be placed a minimum of 30 feet from nearest traveled way.
4. Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
5. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.
6. See TCP(5-1) for shoulder work on divided highways, expressways and freeways.
7. Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
8. CW21-5 "SHOULDER WORK" signs may be used in place of CW20-1D "ROAD WORK AHEAD" signs for shoulder work on conventional roadways.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(2-1)-18

FILE: tcp2-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS				
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12				29
1-97 2-18				

161

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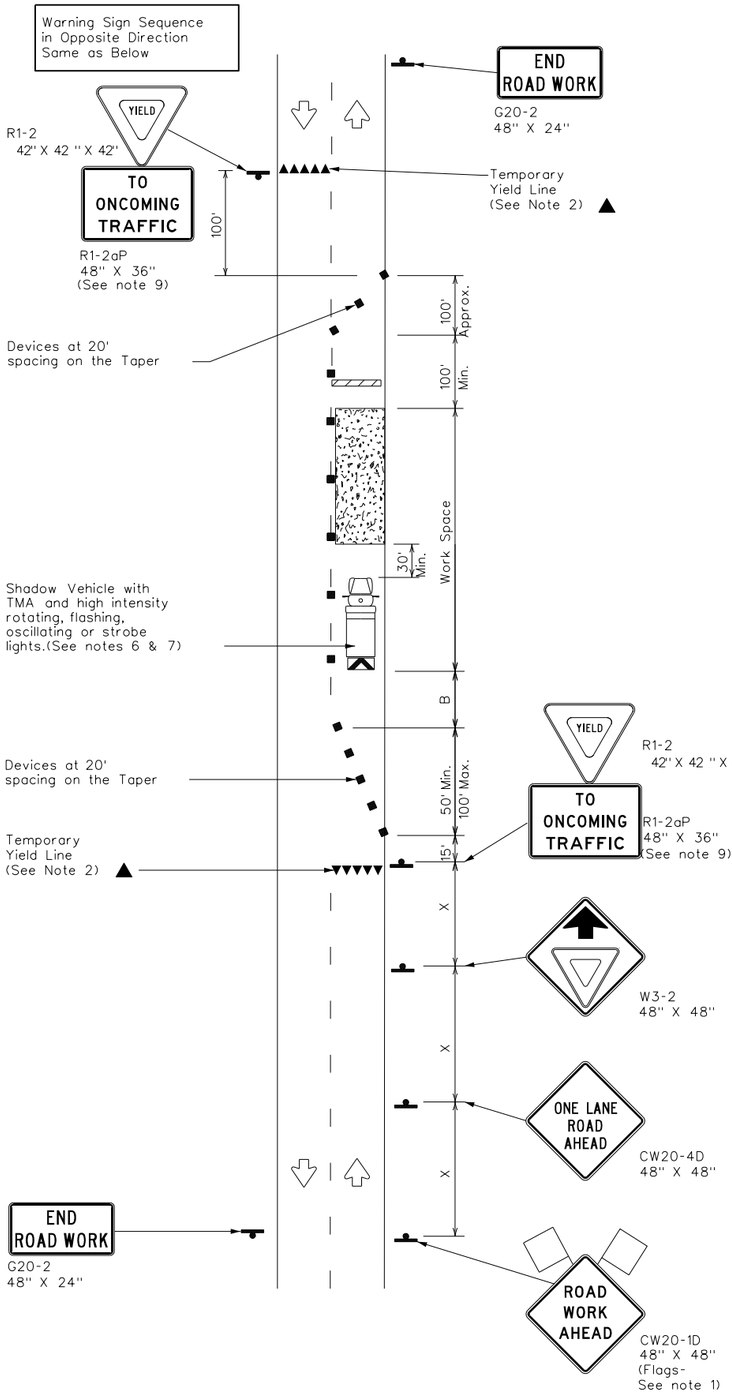
DATE:
FILE:



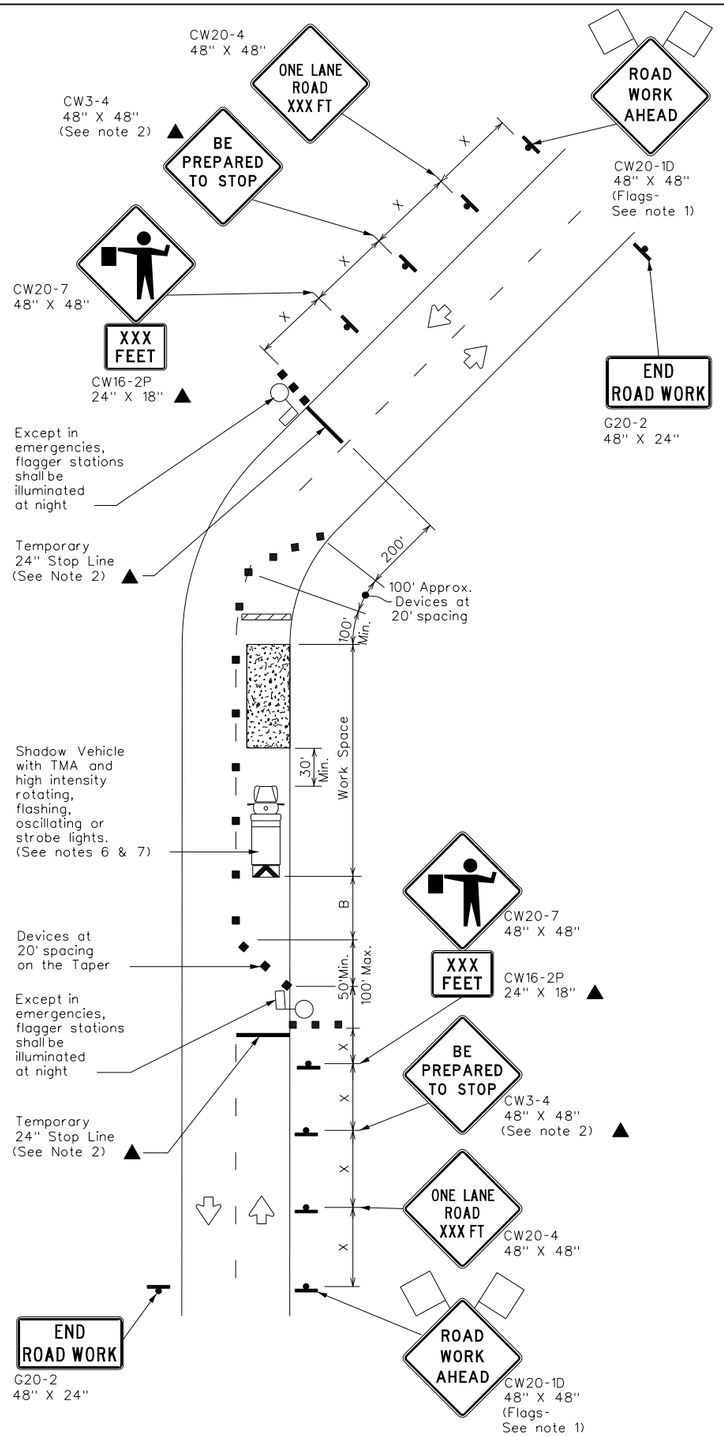
TCP (2-2a)

2-LANE ROADWAY WITHOUT PAVED SHOULDERS

ONE LANE TWO-WAY

CONTROL WITH YIELD SIGNS

(Less than 2000 ADT - See Note 9)



TCP (2-2b)

2-LANE ROADWAY WITHOUT PAVED SHOULDERS

ONE LANE TWO-WAY

CONTROL WITH FLAGGERS

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
IT MAY NOT BE ALTERED WHICH WILL VOID ALL RESPONSIBILITY FOR THE SEALED DOCUMENT. ALTERATION OF A SEALED DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

Posted Speed ✳	Formula	Minimum Desirable Taper Lengths ✳✳ 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L=WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

✳ Conventional Roads Only

✳✳ Taper lengths have been rounded off.

L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓	✓	

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4 "ONE LANE ROAD XXX FT" sign, but proper sign spacing shall be maintained.
4. Flaggers should use two-way radios or other methods of communication to control traffic.
5. Length of work space should be based on the ability of flaggers to communicate.
6. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
7. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-2a)

8. The R1-2 "YIELD" sign traffic control may be used on projects with approaches that have adequate sight distance. For projects in urban areas, work space should be no longer than one half city block. In rural areas, roadways with less than 2000 ADT, work space should be no longer than 400 feet.
9. The R1-2aP "YIELD TO ONCOMING TRAFFIC" sign shall be placed on a support at a 7 foot minimum mounting height.

TCP (2-2b)

10. Channelizing devices on the center line may be omitted when a pilot car is leading traffic and approved by the Engineer.
11. If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain stopping sight distance to the flagger and a queue of stopped vehicles. (See table above).
12. Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situtations.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN ONE-LANE TWO-WAY TRAFFIC CONTROL

TCP(2-2)-18

FILE: tcp2-2-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS				
8-95 3-03	DIST	COUNTY		SHEET NO.
1-97 2-12				30
4-98 2-18				

162

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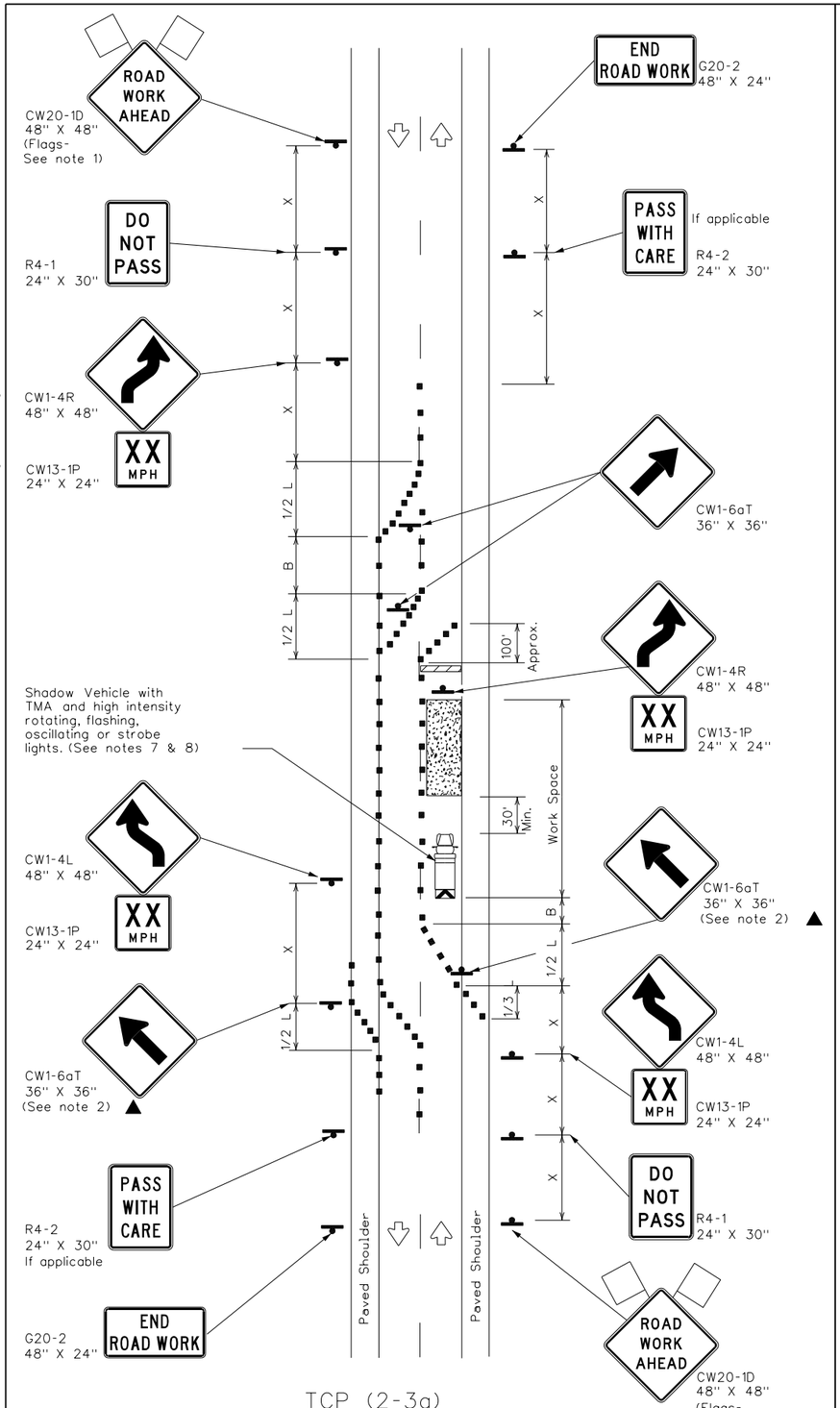
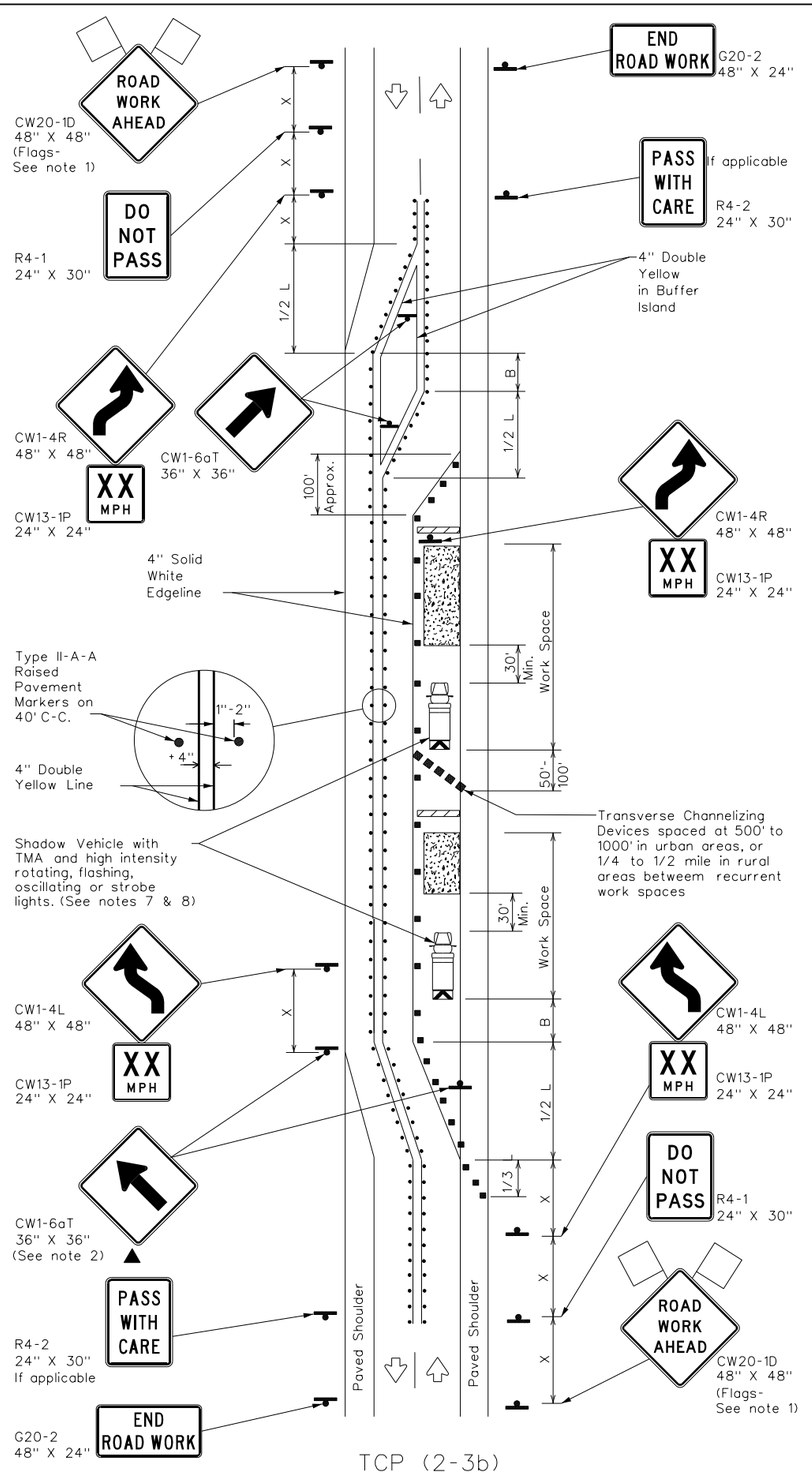
DATE:
FILE:



TCP (2-3a)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
ADEQUATE FIELD OF VIEW



TCP (2-3b)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
INADEQUATE FIELD OF VIEW

LEGEND

	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		Raised Pavement Markers Ty II-AA
	Sign		Traffic Flow
	Flag		Flagger

I HEREBY CERTIFY THAT ORIGINALS APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO. 136055 ON 10/21/2021
IT IS NOT TO BE USED FOR BIDDING PURPOSES WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER'S AN OFFICE UNDER THE TXDOT CONSULTANT CONTRACTING PRACTICE ACT.

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L=WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only

** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE

MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
				TCP(2-3b)ONLY
			✓	✓

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. When work space will be in place less than three days existing pavement markings may remain in place. Channelizing devices shall be used to separate traffic.
4. Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safely control traffic. Flagger should be positioned at end of traffic queue.
5. The R4-1 "DO NOT PASS," R4-2 " PASS WITH CARE" and construction regulatory speed zone signs may be installed within CW20-1D "ROAD WORK AHEAD" signs. Proper spacing of signs shall be maintained.
6. Conflicting pavement marking shall be removed for long term projects.
7. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted.
8. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-3a)

9. Conflicting pavement markings shall be removed for long-term projects. For shorter durations where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20' or 15' if posted speeds are 35 mph or slower, and for tangent sections, at 1/2(S) where S is the speed in mph. This tighter device spacing is intended for the area of the conflicting markings, not the entire work zone.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN TRAFFIC SHIFTS ON TWO-LANE ROADS

TCP(2-3)-18

FILE: tcp(2-3)-18.dgn	DN:	CK:	DW:	CK:
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REVISIONS 8-95 3-03 1-97 2-12 4-98 2-18	DIST	COUNTY		SHEET NO. 31

163

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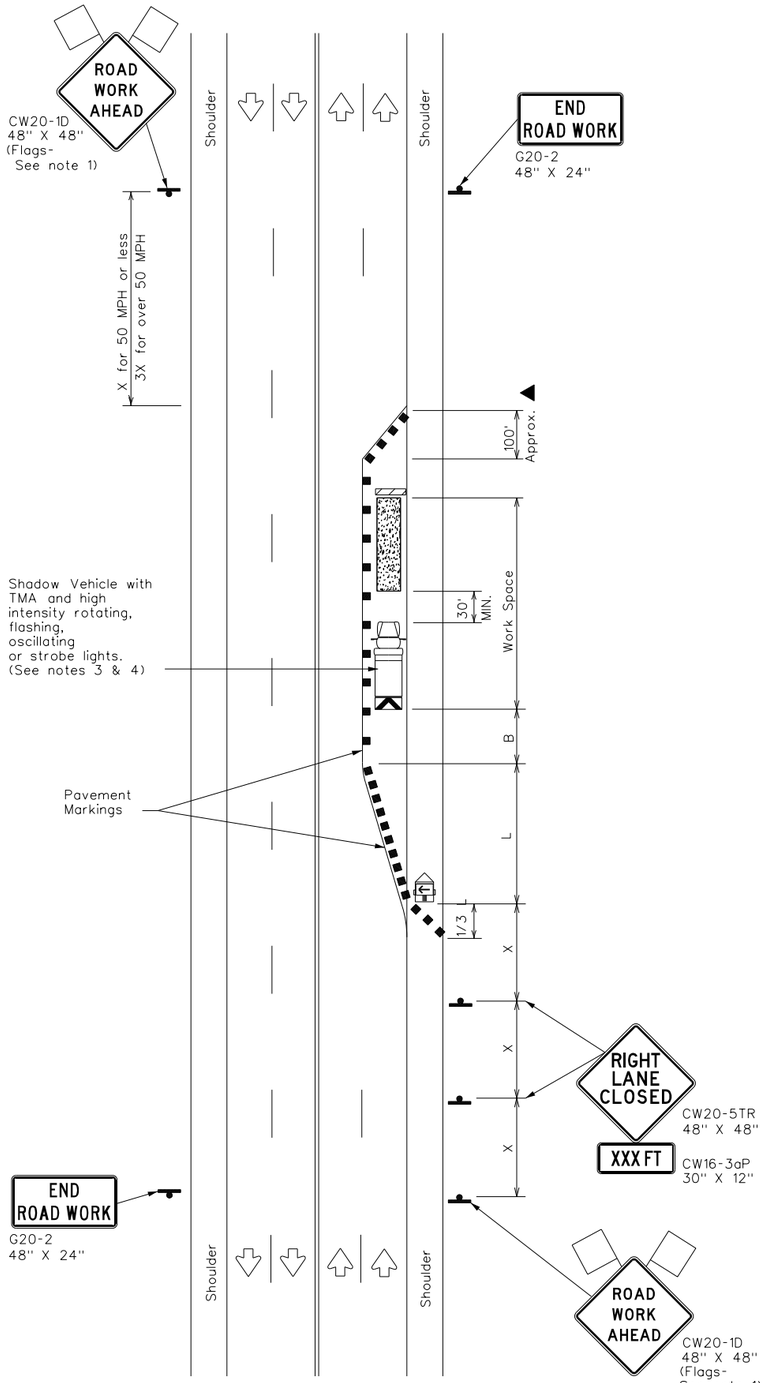
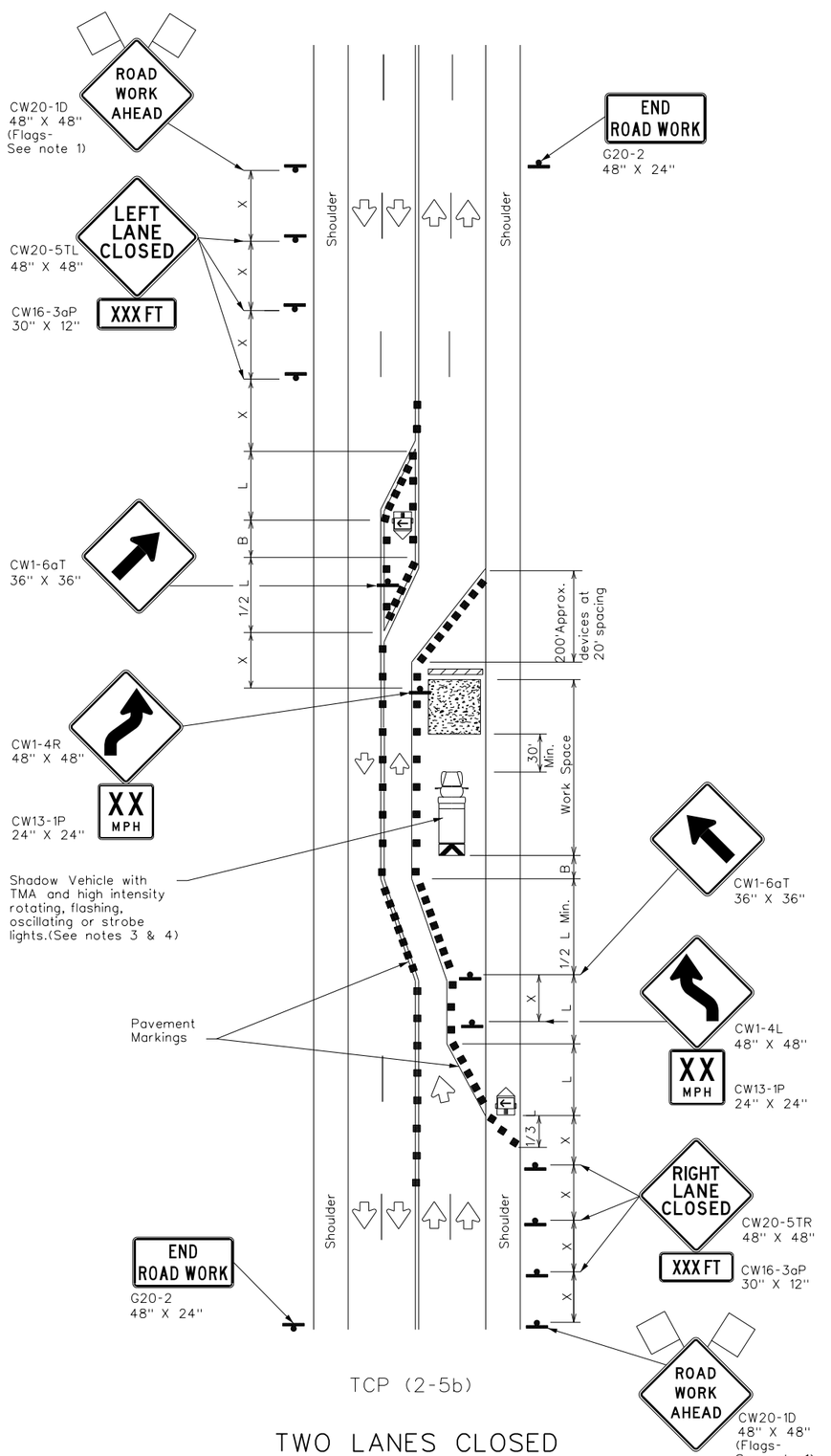
DATE:
FILE:



TCP (2-5a)

ONE LANE CLOSED



TCP (2-5b)

TWO LANES CLOSED

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

THESE STANDARDS ARE GOVERNED BY THE TEXAS ENGINEERING PRACTICE ACT. ANY MODIFICATION OF THESE STANDARDS, UNLESS AUTHORIZED BY SARAH E. CAUBLE TEXAS NO. 134095 ON 10/21/2021 IS PROHIBITED AND WILL RELIEVE TXDOT OF ALL RESPONSIBILITY FOR THE INFORMATION AND DATA CONTAINED HEREIN. ANY UNAUTHORIZED MODIFICATION OF THESE STANDARDS MAY CONSTITUTE AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

Posted Speed ✳	Formula	Minimum Desirable Taper Lengths ✳✳ 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L=WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

✳ Conventional Roads Only

✳✳ Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
			✓	✓

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew eposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substitutued for the Shadow Vehicle and TMA.
4. Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.
5. The downstream taper is optional. When used, it should be 100 feet approximately per lane, with channelizing devices spaced at 20 feet.

TCP (2-5a)

6. If this TCP is used for a left lane closure, CW20-5TL "LEFT LANE CLOSED" signs shall be used and channelizing devices shall be placed on the centerline to protect the work space from opposing traffic, with the arrow board placed in the closed lane near the end of the merging taper.

TCP (2-5b)

7. Conflicting pavement markings shall be removed for long-term projects.

Texas Department of Transportation

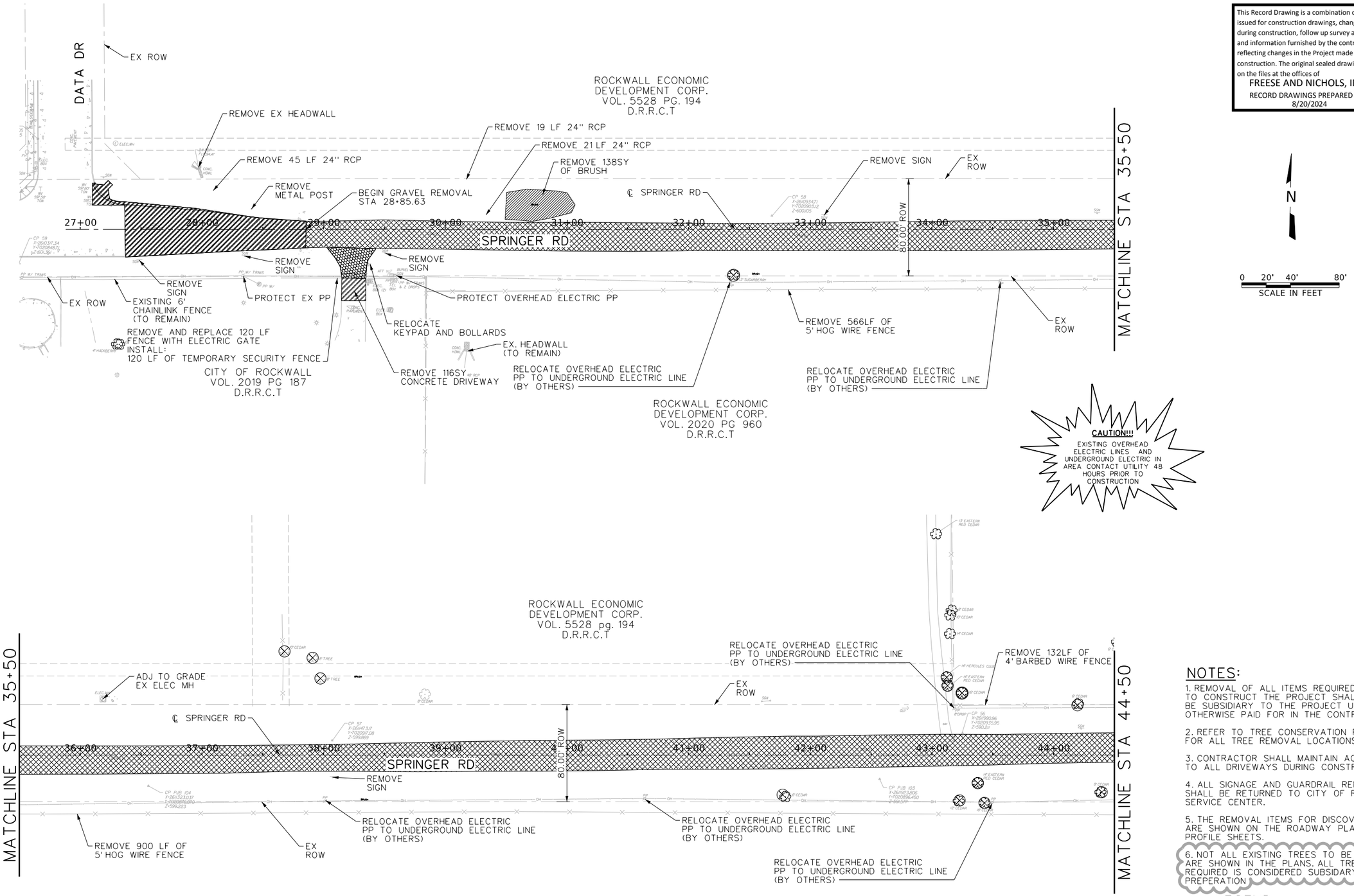
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LONG TERM LANE CLOSURES MULTILANE CONVENTIONAL RDS.

TCP(2-5)-18

FILE: tcp2-5-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 2-12				
1-97 3-03	DIST	COUNTY		SHEET NO.
4-98 2-18				32

165



This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of

FREESE AND NICHOLS, INC.

RECORD DRAWINGS PREPARED ON: 8/20/2024

N

0 20' 40' 80'

SCALE IN FEET

NOTES:

1. REMOVAL OF ALL ITEMS REQUIRED TO CONSTRUCT THE PROJECT SHALL BE SUBSIDIARY TO THE PROJECT UNLESS OTHERWISE PAID FOR IN THE CONTRACT.
2. REFER TO TREE CONSERVATION PLANS FOR ALL TREE REMOVAL LOCATIONS.
3. CONTRACTOR SHALL MAINTAIN ACCESS TO ALL DRIVEWAYS DURING CONSTRUCTION.
4. ALL SIGNAGE AND GUARDRAIL REMOVED SHALL BE RETURNED TO CITY OF ROCKWALL SERVICE CENTER.
5. THE REMOVAL ITEMS FOR DISCOVERY BLVD ARE SHOWN ON THE ROADWAY PLAN AND PROFILE SHEETS.
6. NOT ALL EXISTING TREES TO BE REMOVED ARE SHOWN IN THE PLANS. ALL TREE REMOVAL REQUIRED IS CONSIDERED SUBSIDARY TO SITE PREPERATION (1)

LEGEND

- GRAVEL REMOVAL
- CONCRETE PAVING AND BARRIER FREE RAMP REMOVAL
- ASPHALT REMOVAL
- BRUSH REMOVAL
- TREE REMOVAL (SEE NOTE 6) (1)

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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Dallas, Texas 75204
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Fax: (214) 217-2250
Web - www.freese.com

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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

SPRINGER RD DEMOLITION PLANS
BEGIN TO STA 44+50

NO.	ISSUES	BY	DATE
1	ADDENDUM #2	SEC	11/17/21

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

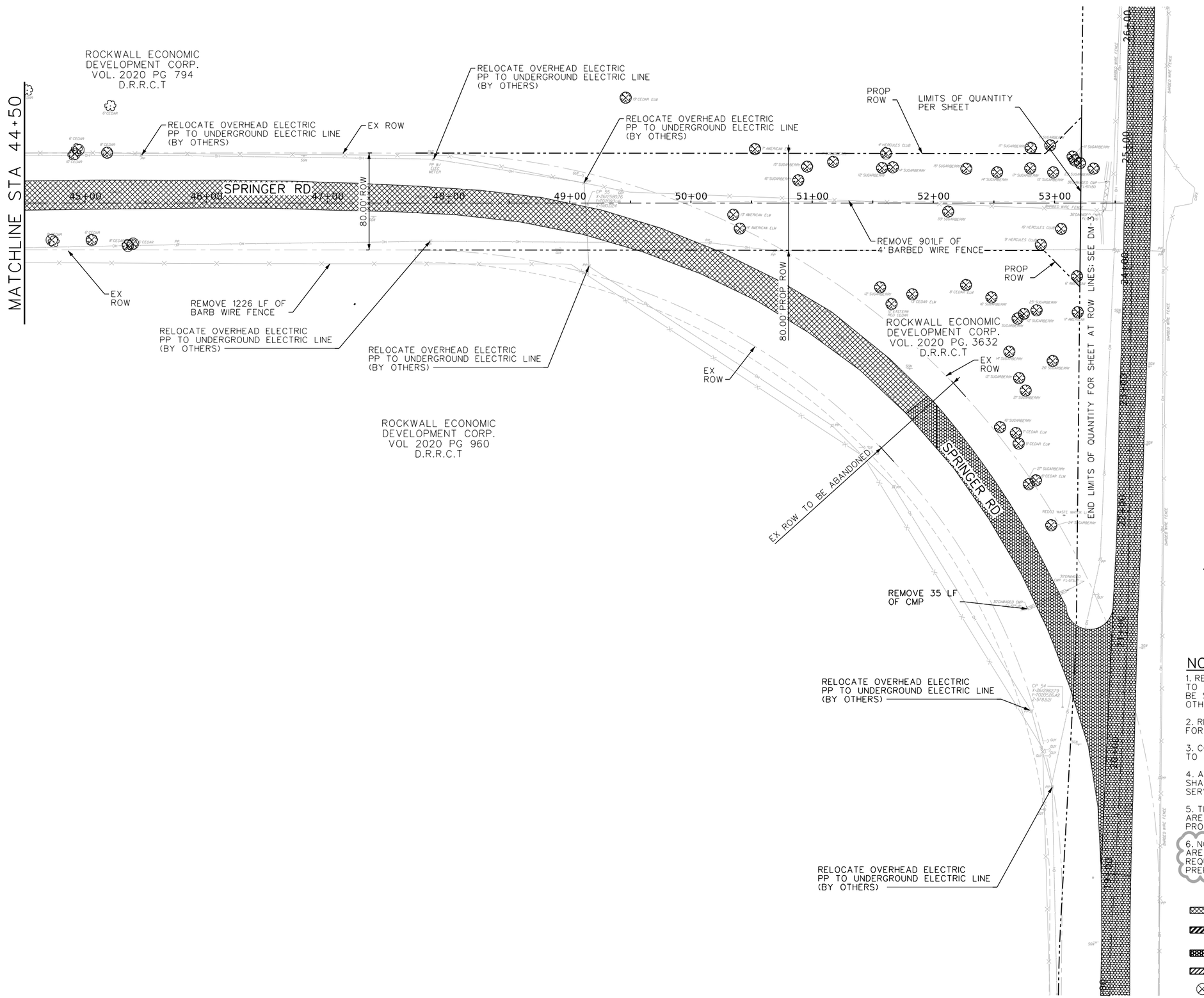
F&N JOB NO.	RKW19271
DATE	APRIL 2022
DESIGNED	MRF
DRAWN	CHM
REVISED	
CHECKED	SEC
FILE NAME	cv-trt-pl-demo-springer01.dgn

SHEET DM-1

SEQ. 33

MicroStation V8 User: 90262 Office: On Site
N:\IP\Drawings\Roadway\cv-trt-pl-demo-springer01.dgn
Plotter: //Wireless Network_HP9050 Microsoft PS
Plot Scale: 80.008 ? in. = 1 ft.
Date: Feb. 21, 2024 - 09:28:21 AM
Model: Default
Project: Freese and Nichols, Inc. - True Type Fonts

Office: On Site Date: Feb. 21, 2024 - 09:28:21 AM User: 90262 File: N:\IP\Drawings\Roadway\cv-trt-pl-demo-springer01.dgn



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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

CAUTION!!!
EXISTING OVERHEAD ELECTRIC LINES AND UNDERGROUND ELECTRIC IN AREA CONTACT UTILITY 48 HOURS PRIOR TO CONSTRUCTION

NOTES:

1. REMOVAL OF ALL ITEMS REQUIRED TO CONSTRUCT THE PROJECT SHALL BE SUBSIDIARY TO THE PROJECT UNLESS OTHERWISE PAID FOR IN THE CONTRACT.
2. REFER TO TREE CONSERVATION PLANS FOR ALL TREE REMOVAL LOCATIONS.
3. CONTRACTOR SHALL MAINTAIN ACCESS TO ALL DRIVEWAYS DURING CONSTRUCTION.
4. ALL SIGNAGE AND GUARDRAIL REMOVED SHALL BE RETURNED TO CITY OF ROCKWALL SERVICE CENTER.
5. THE REMOVAL ITEMS FOR DISCOVERY BLVD ARE SHOWN ON THE ROADWAY PLAN AND PROFILE SHEETS.
6. NOT ALL EXISTING TREES TO BE REMOVED ARE SHOWN IN THE PLANS. ALL TREE REMOVAL REQUIRED IS CONSIDERED SUBSIDARY TO SITE PREPERATION

LEGEND

- GRAVEL REMOVAL
- CONCRETE PAVING AND BARRIER FREE RAMP REMOVAL
- ASPHALT REMOVAL
- BRUSH REMOVAL
- TREE REMOVAL (SEE NOTE 6) 1

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
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Fax: (214) 217-2084
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

SPRINGER RD DEMOLITION PLANS STA 44+50 TO END

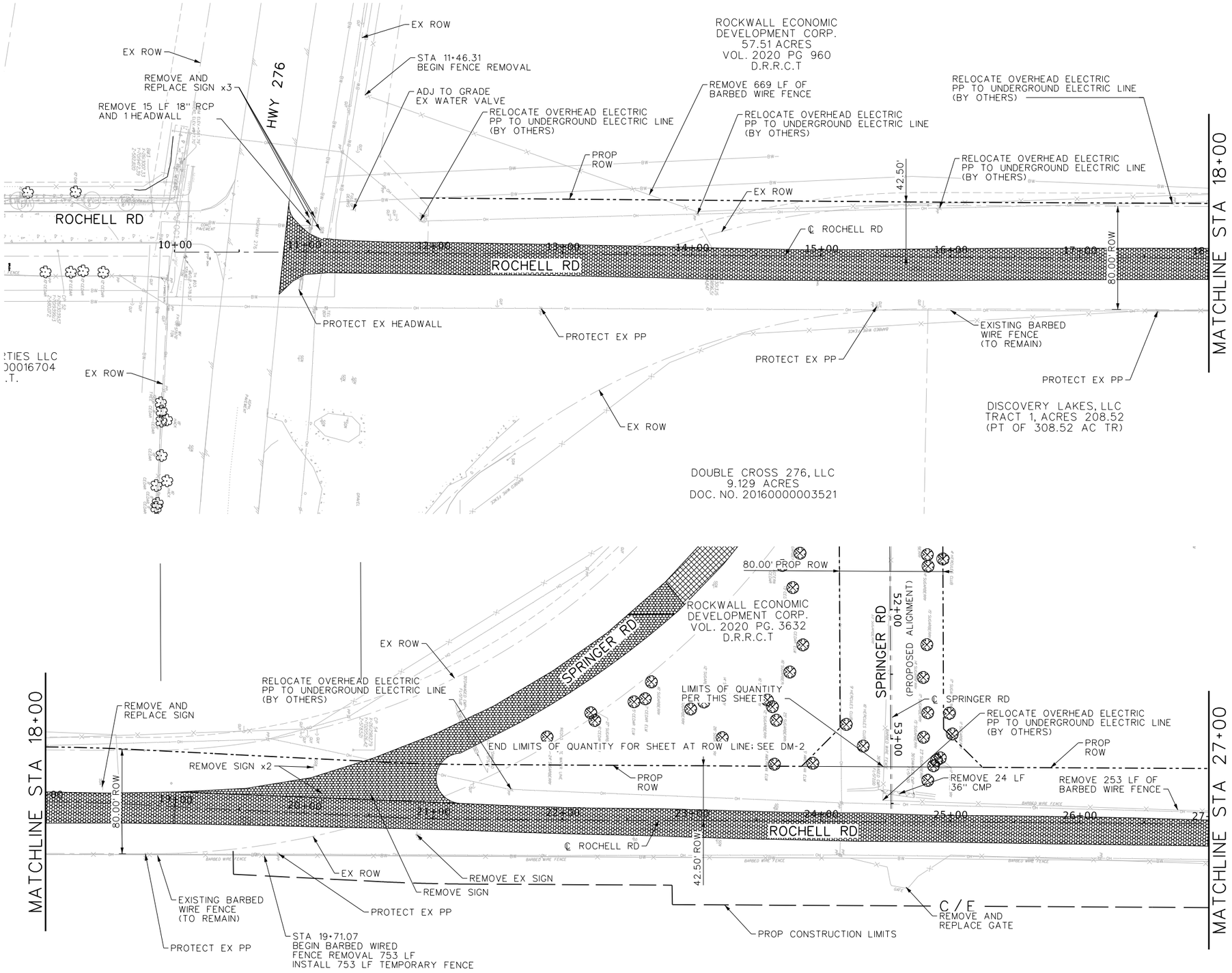
NO.	ISSUES	BY	DATE
1	ADDENDUM #2	SEC	11/17/21

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MRF
DRAWN CHM
REVISED
CHECKED SEC
FILE NAME cv-trt-pl-demo-springer02.dgn

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale 0 1"

SHEET DM-2
SEQ. 34

MicroStation V8 User: 90262 Office: On Site
Platter: J:\JIF\Drawings\Roadway\cv-trt-pl-demo-springer02.dgn
Plot Style: Roadway.tbl Plotter: HP DesignJet 4000ps PS
Plot Scale: 80.000 ' In. Model: Default
Date: Feb. 21, 2024 - 09:28:23 AM Project: Freese and Nichols, Inc. - True Type Fonts



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FREESE AND NICHOLS, INC.

RECORD DRAWINGS PREPARED ON: 8/20/2024

N

0 20' 40' 80'

SCALE IN FEET

CAUTION!!!
EXISTING OVERHEAD ELECTRIC LINES AND UNDERGROUND ELECTRIC IN AREA CONTACT UTILITY 48 HOURS PRIOR TO CONSTRUCTION

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LEGEND

- GRAVEL REMOVAL
- CONCRETE PAVING AND BARRIER FREE RAMP REMOVAL
- ASPHALT REMOVAL
- BRUSH REMOVAL
- ⊗ TREE REMOVAL (SEE NOTE 6) 1

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2201
Web - www.freese.com

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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

ROCHELL RD DEMOLITION PLANS BEGIN TO STA 27+00

NO.	ISSUES	BY	DATE
1	ADDENDUM #2	SEC	11/17/21

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

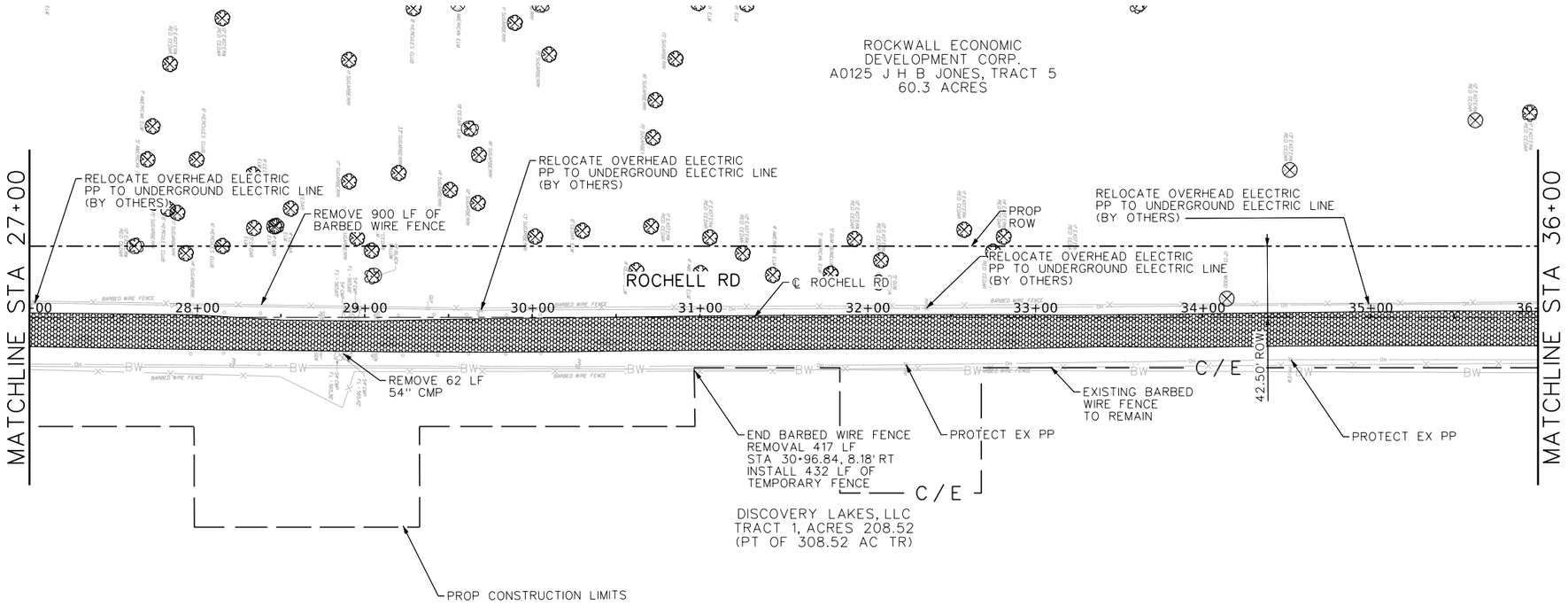
F&N JOB NO.	RKW19711
DATE	APRIL 2022
DESIGNED	MRF
DRAWN	CHM
REVISED	
CHECKED	SEC
FILE NAME	cv-trt-pl-demo-rochelle1.dgn

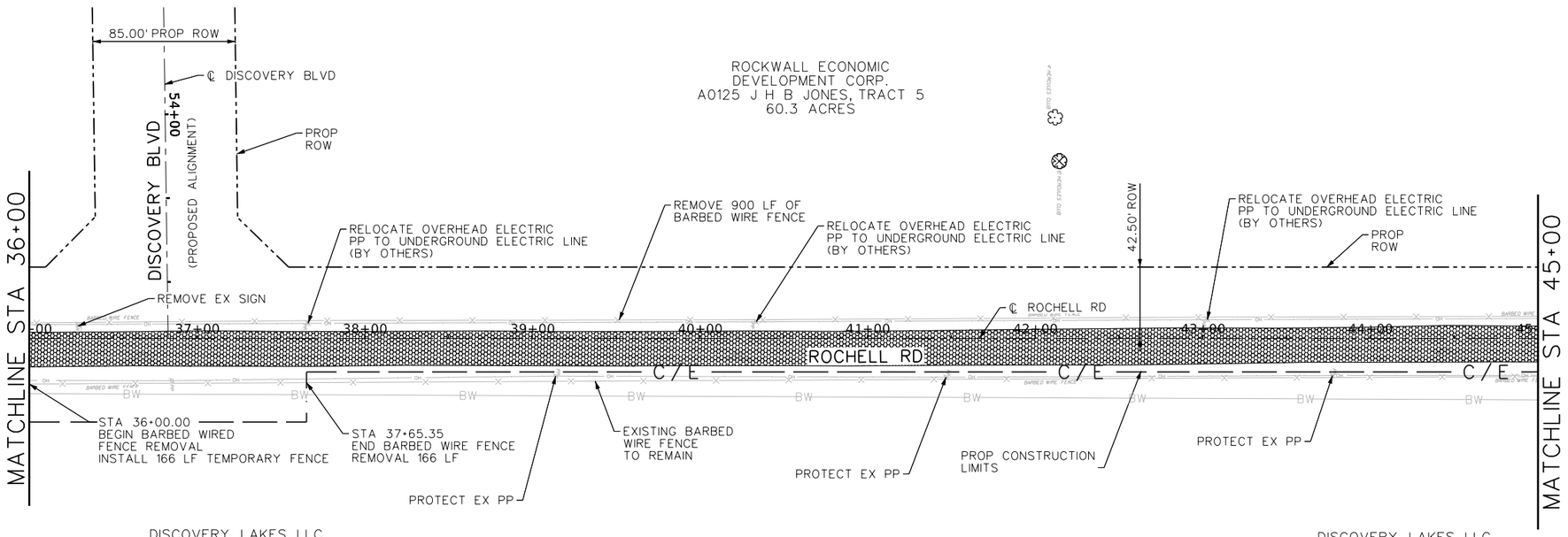
SHEET DM-3

SEQ. 35

MicroStation V8 User: 90262 Office: On Site
Plotter: \\IP\Drawings\Roadway\cv-trt-pl-demo-rochelle1.dgn
Plot Scale: 80.008 ' / in. Model: Default
Date: Feb. 21, 2024 - 09:29:22 AM Projects: Freese and Nichols, Inc.-True Type Fonts

Office: On Site Date: Feb. 21, 2024 - 09:29:22 AM User: 90262 File: N:\IP\Drawings\Roadway\cv-trt-pl-demo-rochelle1.dgn





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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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RELEASED FOR CONSTRUCTION
THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
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FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2299
Web - www.freese.com

N

0 20' 40' 80'
SCALE IN FEET

CAUTION!!!
EXISTING OVERHEAD ELECTRIC LINES AND UNDERGROUND ELECTRIC IN AREA CONTACT UTILITY 48 HOURS PRIOR TO CONSTRUCTION

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1

LEGEND

- GRAVEL REMOVAL
- CONCRETE PAVING AND BARRIER FREE RAMP REMOVAL
- ASPHALT REMOVAL
- BRUSH REMOVAL
- TREE REMOVAL (SEE NOTE 6) 1

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

ROCHELL RD DEMOLITION PLANS STA 27+00 TO STA 45+00

NO.	ISSUES	BY	DATE
1	ADDENDUM #2	SEC	11/17/21

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

F&N JOB NO.	RKW19711
DATE	APRIL 2022
DESIGNED	MRF
DRAWN	CHM
CHECKED	SEC
FILE NAME	cv-trt-pl-demo-rochelle2.dgn

SHEET
DM-4
SEQ.
36

MicroStation V8 User: 90262 Office: On Site
Platter: J:\IP\Drawings\Roadway\cv-trt-pl-demo-rochelle2.dgn
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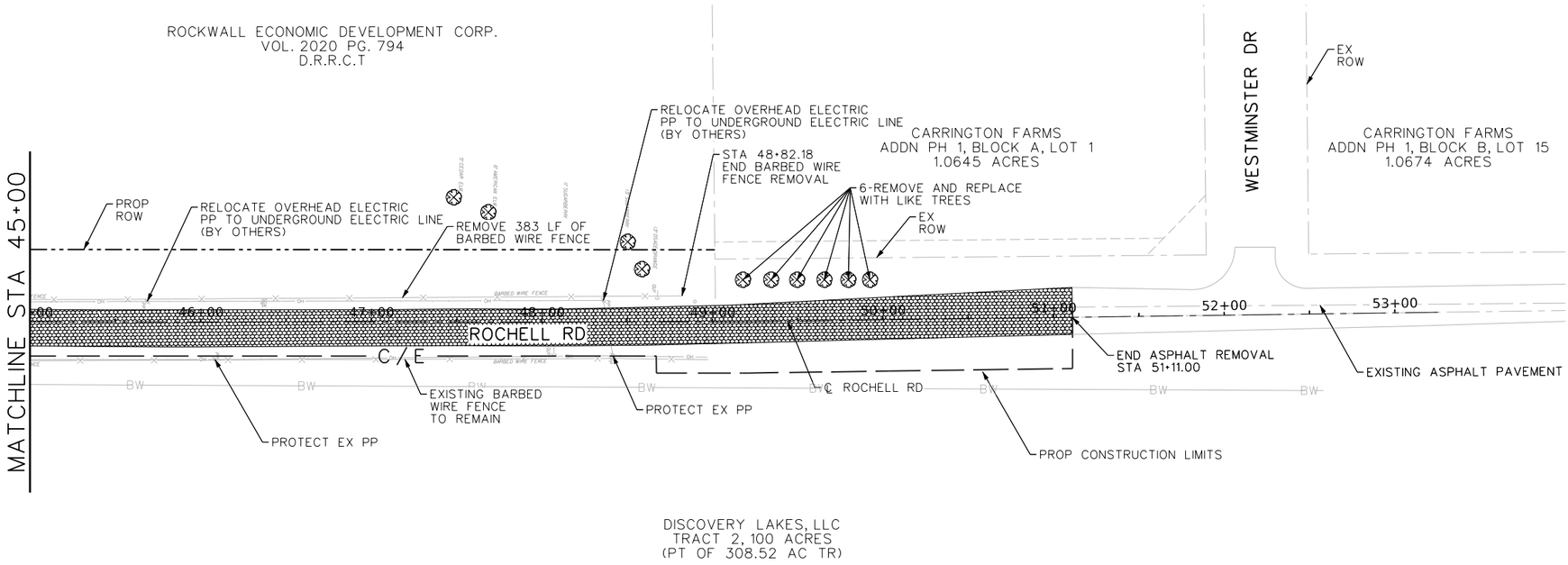
Date: Feb. 21, 2024 - 09:29:25 AM Project: Freese and Nichols, Inc. - True Type Fonts



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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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TEXAS NO. 134055 ON 10/21/2021
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FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2299
Web - www.freese.com

N

0 20' 40' 80'
SCALE IN FEET

CAUTION!!!
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LEGEND

- GRAVEL REMOVAL
- CONCRETE PAVING AND BARRIER FREE RAMP REMOVAL
- ASPHALT REMOVAL
- BRUSH REMOVAL
- ⊗ TREE REMOVAL (SEE NOTE 6) 1

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
CIVIL
ROCHELL RD DEMOLITION PLANS
STA 45+00 TO END

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MRF
DRAWN CHM
CHECKED SEC

NO.	ISSUES	BY	DATE
1	ADDENDUM #2	SEC	11/17/21

FILE NAME cv-trt-pl-demo-rochelle3.dgn

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale accordingly.
0 1"

SHEET DM-5
SEQ. 37

MicroStation V8 User: 90262 Office: On Site
Plotter: \\jlf\Drawings\Roadway\cv-trt-pl-demo-rochelle3.dgn
Plot Scale: 80.065 ' / In.
Date: Feb. 21, 2024 - 09:29:27 AM
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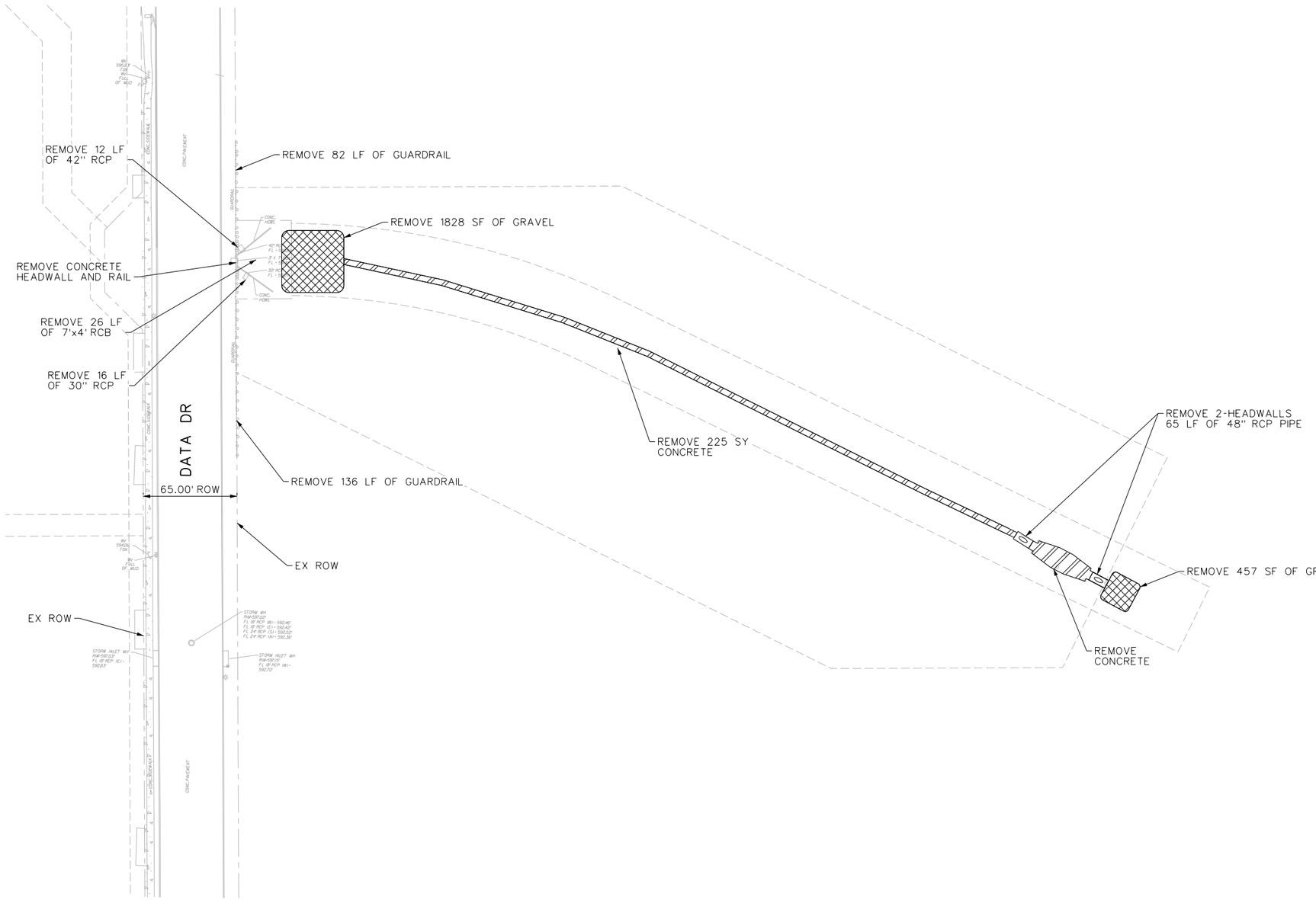
Xrefs: Freese and Nichols, Inc.-True Type Fonts



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RECORD DRAWINGS PREPARED ON:
8/20/2024

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LEGEND

- GRAVEL REMOVAL
- CONCRETE PAVING AND BARRIER FREE RAMP REMOVAL
- ASPHALT REMOVAL
- BRUSH REMOVAL
- TREE REMOVAL (SEE NOTE 6) 1

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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TEXAS NO. 134055 ON 10/21/2021
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FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2201
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

PRATT DETENTION POND DEMOLITION PLAN

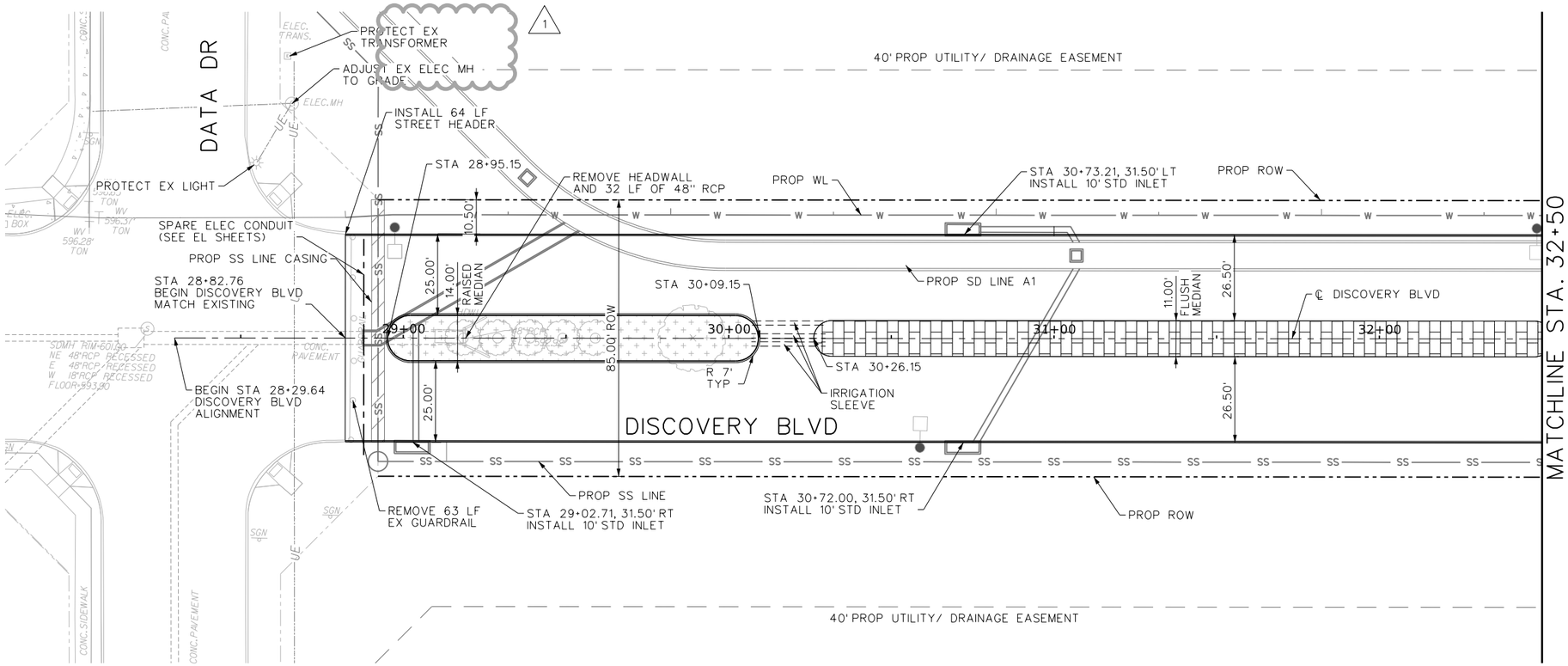
NO.	ISSUES	BY	DATE
1	ADDENDUM #2	SEC	11/17/21

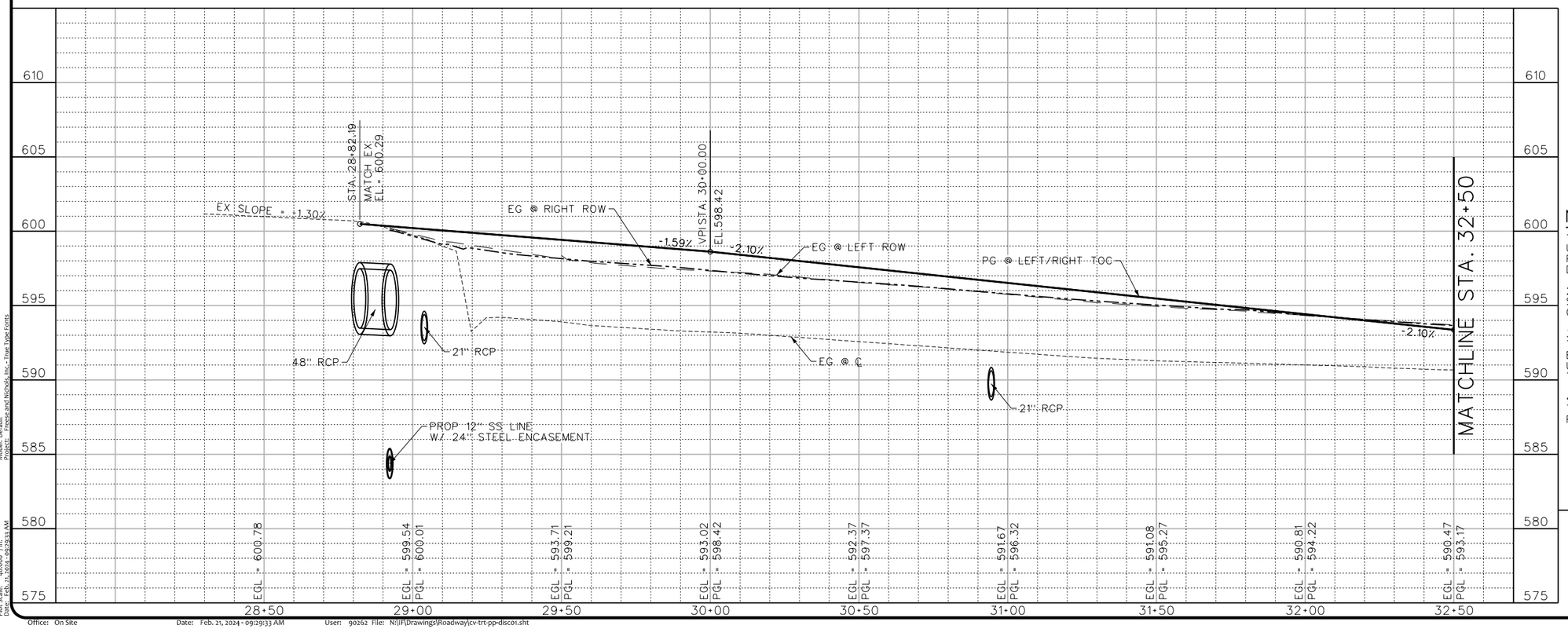
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale
0 1"

F&N JOB NO.	RKW19711
DATE	APRIL 2022
DESIGNED	MRF
DRAWN	CHM
REVISED	
CHECKED	SEC
FILE NAME	cv-trt-pl-demo-pond.dgn

SHEET
DM-6
SEQ.
38

MicroStation V8 User: 90262 Office: On Site
Plotter: \\PW001-Xerox 7760_Facility Area\Xerox 7760_Facility Area.pltr
Plot Scale: 80.008 ' / in.
Date: Feb. 21, 2024 - 09:29:28 AM
Model: Default
Project: Freese and Nichols, Inc. - True Type Fonts





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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

N

0 10' 20' 40'
HORIZONTAL SCALE
0 2' 4' 8'
VERTICAL SCALE

LEGEND

- ASPHALT PAVING (REFER TO TYP-2)
- COLORED AND CHEMICALLY STAINED CONCRETE PAVING (REFER TO PVDT-6)
- 4" SIDEWALK (REFER TO DETAIL R-2170)
- 8" CONCRETE PAVEMENT (3,600 PSI@ 6.5 SACK/CY) W/ #4 @ 18" OCEW
- ROCK RIPRAP (REFER TO DPDT-2)
- 6" THICK GRAVEL DRIVEWAY
- VG VALLEY GUTTER
- HP HIGH POINT

NOTES:

1. ALL DIMENSIONS ARE TO BACK OF CURB UNLESS OTHERWISE STATED IN THE PLANS. ALL INLET CALLOUTS ARE DIMENSIONED FROM THE FACE OF CURB.
2. REFER TO STORM DRAIN, SANITARY SEWER, AND WATER SHEETS FOR MORE CONSTRUCTION INFORMATION.
3. REMOVAL OF ALL ITEMS REQUIRED TO CONSTRUCT THE PROJECT SHALL BE SUBSIDIARY TO THE PROJECT UNLESS OTHERWISE PAID FOR IN THE CONTRACT.
4. REFER TO TREE CONSERVATION TC-1 THRU TC-6 FOR TREE REMOVAL AND PRESERVATION.

PROFILE LEGEND

EXISTING GRADE @ ℄	----------
PROPOSED GRADE @ LT AND RT TOC	————
EX GRADE @ LT ROW	— — —
EX GRADE @ RT ROW	– – – – –

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FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

FREESE NICHOLS
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Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

DISCOVERY BLVD PLAN & PROFILE BEGIN TO STA 32+50

NO.	ISSUES	BY	DATE
1	ADDENDUM #2	SEC	11/17/21

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

FAN JOB NO.	RKW19711
DATE	APRIL 2022
DESIGNED	MRF
DRAWN	CHM
CHECKED	SEC
FILE NAME	cv-trt-pp-disco1.sht

SHEET PV-1
SEQ. 39

MicroStation V8 User: 90262 Office: On Site
N:\IF\Drawings\Roadway\cv-trt-pp-disco1.sht
Model: Default
Project: Freese and Nichols, Inc. - True Type Fonts
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Plot Scale: 40.000 ' / in.
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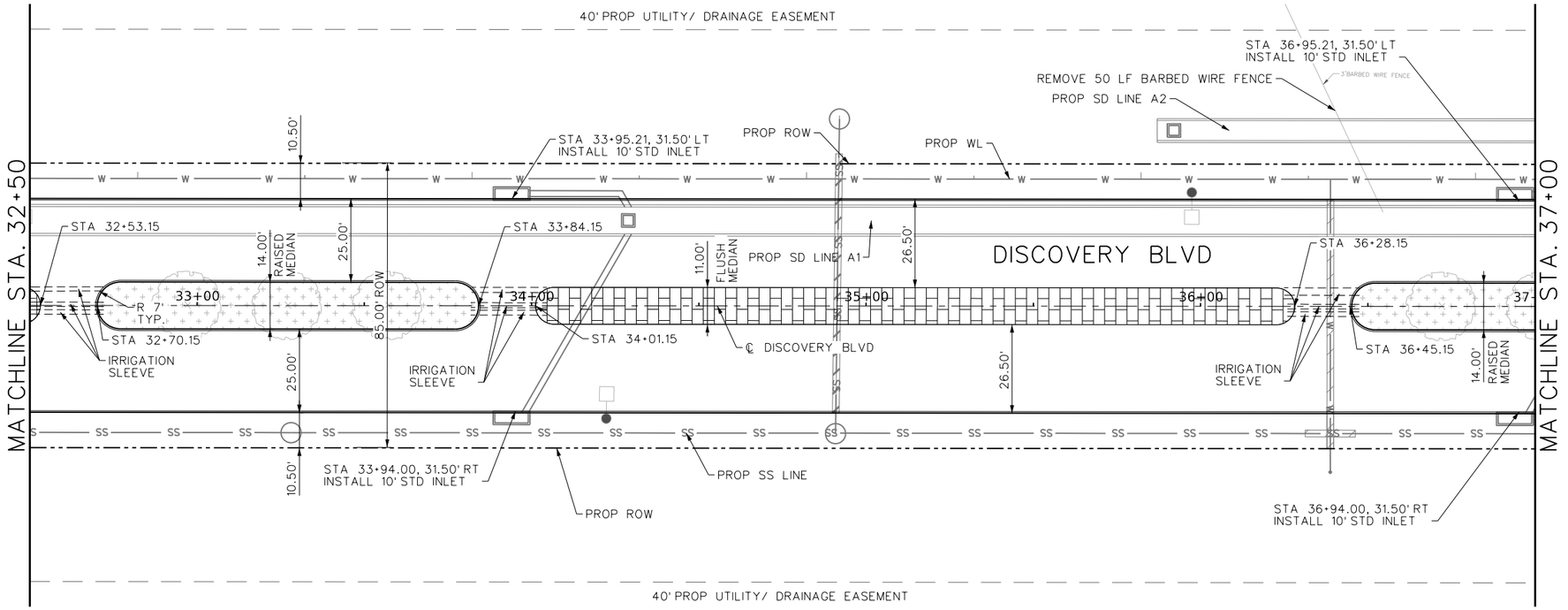

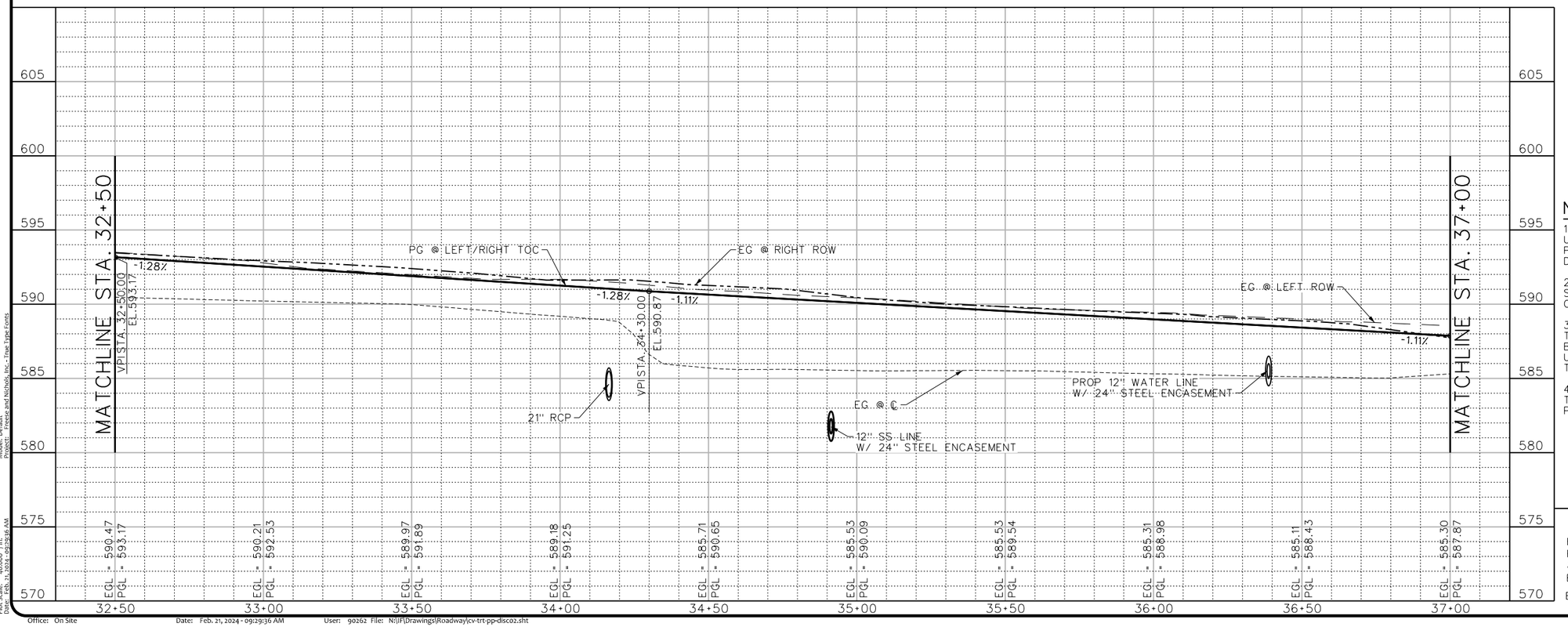

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RECORD DRAWINGS PREPARED ON: 8/20/2024

N

0 10' 20' 40'
HORIZONTAL SCALE
0 2' 4' 8'
VERTICAL SCALE

LEGEND

- ASPHALT PAVING (REFER TO TYP-2)
- COLORED AND CHEMICALLY STAINED CONCRETE PAVING (REFER TO PVDT-6)
- 4" SIDEWALK (REFER TO DETAIL R-2170)
- 8" CONCRETE PAVEMENT (3,600 PSI@ 6.5 SACK/CY) W/ #4 @ 18" OCEW
- ROCK RIPRAP (REFER TO DPDT-2)
- 6" THICK GRAVEL DRIVEWAY
- VG — VALLEY GUTTER
- HP — HIGH POINT

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PROFILE LEGEND

- EXISTING GRADE @ ℄
- PROPOSED GRADE @ LT AND RT TOC
- EX GRADE @ LT ROW
- EX GRADE @ RT ROW

TEXAS REGISTERED ENGINEERING FIRM F-2144
FREESE AND NICHOLS, INC.

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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

DISCOVERY BLVD PLAN & PROFILE STA 32+50 TO STA 37+00

F&N JOB NO.	RKW19711
DATE	APRIL 2022
DESIGNED	MRF
DRAWN	CHM
CHECKED	SEC
FILE NAME	cv-trt-pp-disc02.sht

NO.	ISSUES	BY	DATE

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET PV-2

SEQ. 40

MicroStation V8 User: 90262 Office: On Site
N:\lf\Drawings\Roadway\cv-trt-pp-disc02.sht
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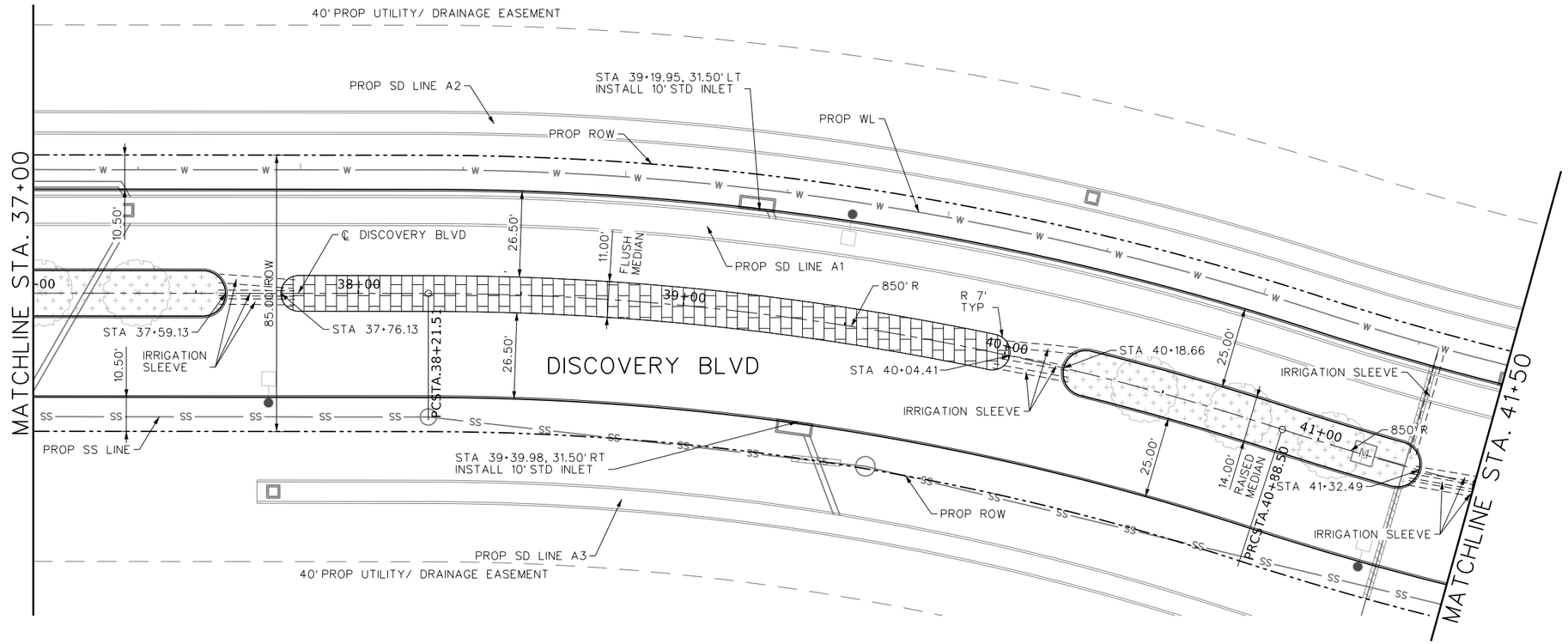
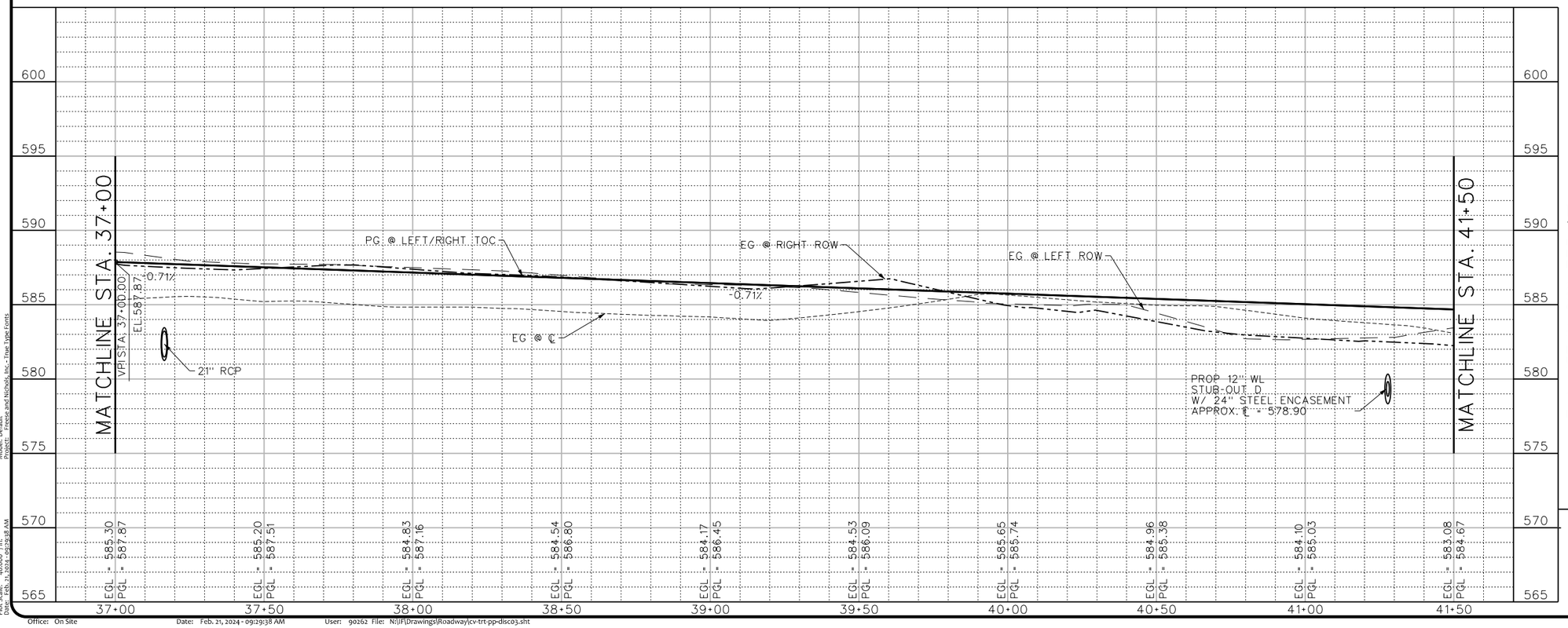
Plot Scale: 40.087 ' in.
Plot: Feb. 21, 2024 - 09:29:36 AM
Model: Default
Xrefs: Freese and Nichols, Inc. - True Type Fonts
Office: On Site Date: Feb. 21, 2024 - 09:29:36 AM User: 90262 File: N:\lf\Drawings\Roadway\cv-trt-pp-disc02.sht





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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

N

0 10' 20' 40'
HORIZONTAL SCALE
0 2' 4' 8'
VERTICAL SCALE

LEGEND

- ASPHALT PAVING (REFER TO TYP-2)
- COLORED AND CHEMICALLY STAINED CONCRETE PAVING (REFER TO PVDT-6)
- 4" SIDEWALK (REFER TO DETAIL R-2170)
- 8" CONCRETE PAVEMENT (3,600 PSI@ 6.5 SACK/CY) W/ #4 @ 18" OCEW
- ROCK RIPRAP (REFER TO DPDT-2)
- 6" THICK GRAVEL DRIVEWAY
- VG — VALLEY GUTTER
- HP — HIGH POINT

NOTES:

1. ALL DIMENSIONS ARE TO BACK OF CURB UNLESS OTHERWISE STATED IN THE PLANS. ALL INLET CALLOUTS ARE DIMENSIONED FROM THE FACE OF CURB.
2. REFER TO STORM DRAIN, SANITARY SEWER, AND WATER SHEETS FOR MORE CONSTRUCTION INFORMATION.
3. REMOVAL OF ALL ITEMS REQUIRED TO CONSTRUCT THE PROJECT SHALL BE SUBSIDIARY TO THE PROJECT UNLESS OTHERWISE PAID FOR IN THE CONTRACT.
4. REFER TO TREE CONSERVATION TC-1 THRU TC-6 FOR TREE REMOVAL AND PRESERVATION.

PROFILE LEGEND

- EXISTING GRADE @ ℄
- PROPOSED GRADE @ LT AND RT TOC
- EX GRADE @ LT ROW
- EX GRADE @ RT ROW

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASE THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
ALTERATION OF A SEALED DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2250
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

DISCOVERY BLVD PLAN & PROFILE STA 37+00 TO STA 41+50

NO.	ISSUES	BY	DATE

FAN JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MRF
DRAWN CHM
REVISED
CHECKED SEC
FILE NAME cv-trt-pp-disc03.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET PV-3
SEQ. 41

MicroStation V8 User: 90262 Office: On Site
Plotter: \\IP\HP5000PS17 on Ne01:
Plot Scale: 40.008 ' In.
Date: Feb. 21, 2024 - 09:29:38 AM
Model: Default
Xrefs: Freese and Nichols, Inc. - True Type Fonts

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

THE SEAL THAT SHOWN APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY JARAH E. CAUDLE
TEXAS NO. 134095 ON 10/21/2021
IT IS A VIOLATION OF LAW TO ALTER THIS ITEM WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE and NICHOLS
Dallas, Texas 75204
2711 North Haskell Avenue, Suite 3300
Phone - (214) 217-2200
Fax - (214) 217-2299
Web - www.freese.com

N

0 10' 20' 40'
HORIZONTAL SCALE

0 2' 4' 8'
VERTICAL SCALE

LEGEND

- ASPHALT PAVING (REFER TO TYP-2)
- COLORED AND CHEMICALLY STAINED CONCRETE PAVING (REFER TO PVDT-6)
- 4" SIDEWALK (REFER TO DETAIL R-2170)
- 8" CONCRETE PAVEMENT (3,600 PSI @ 6.5 SACK/CY) W/ #4 @ 18" OCEW
- ROCK RIPRAP (REFER TO DPDT-2)
- 6" THICK GRAVEL DRIVEWAY
- VG — VALLEY GUTTER
- HP — HIGH POINT

NOTES:

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4. REFER TO TREE CONSERVATION TC-1 THRU TC-6 FOR TREE REMOVAL AND PRESERVATION.

PROFILE LEGEND
- EXISTING GRADE @ ℄
- PROPOSED GRADE @ LT AND RT TOC
- EX GRADE @ LT ROW
- EX GRADE @ RT ROW

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
CIVIL
DISCOVERY BLVD PLAN & PROFILE STA 41+50 TO 46+00

NO.	ISSUES	BY	DATE

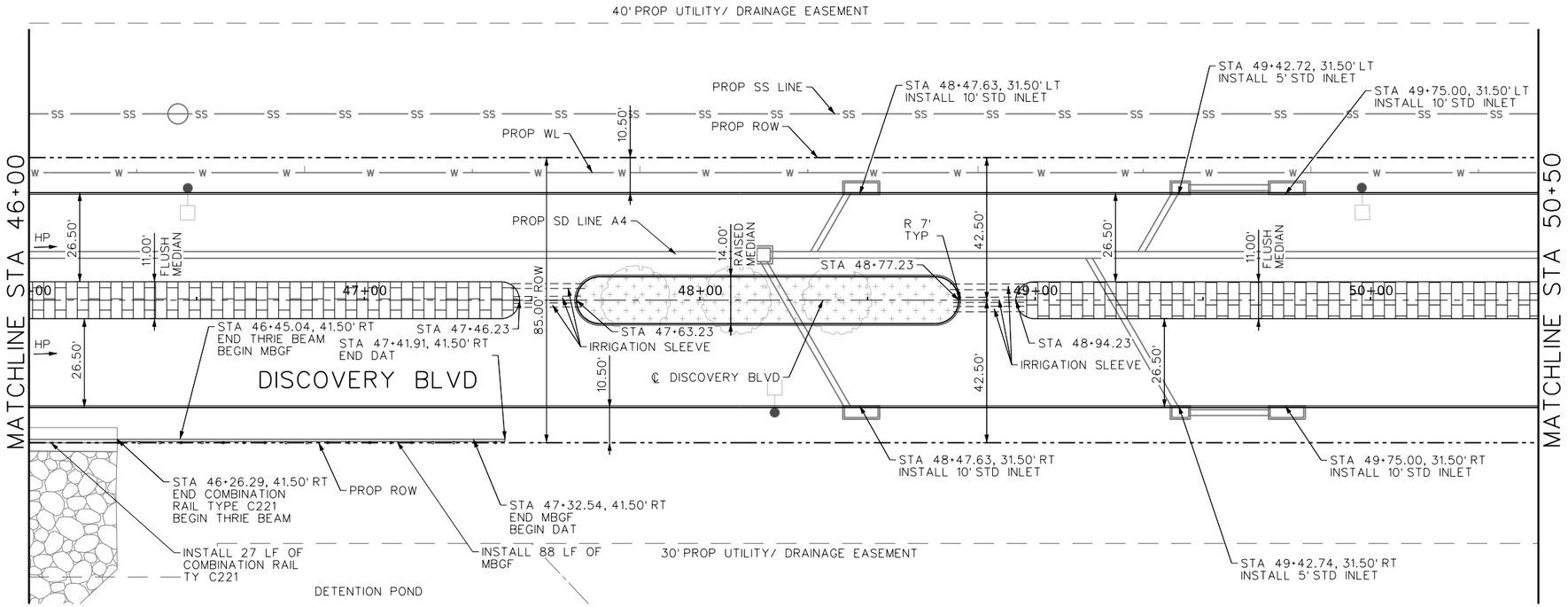
F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MRF
DRAWN CHM
REVISED
CHECKED SEC
FILE NAME cv-trt-pp-disc04.sht

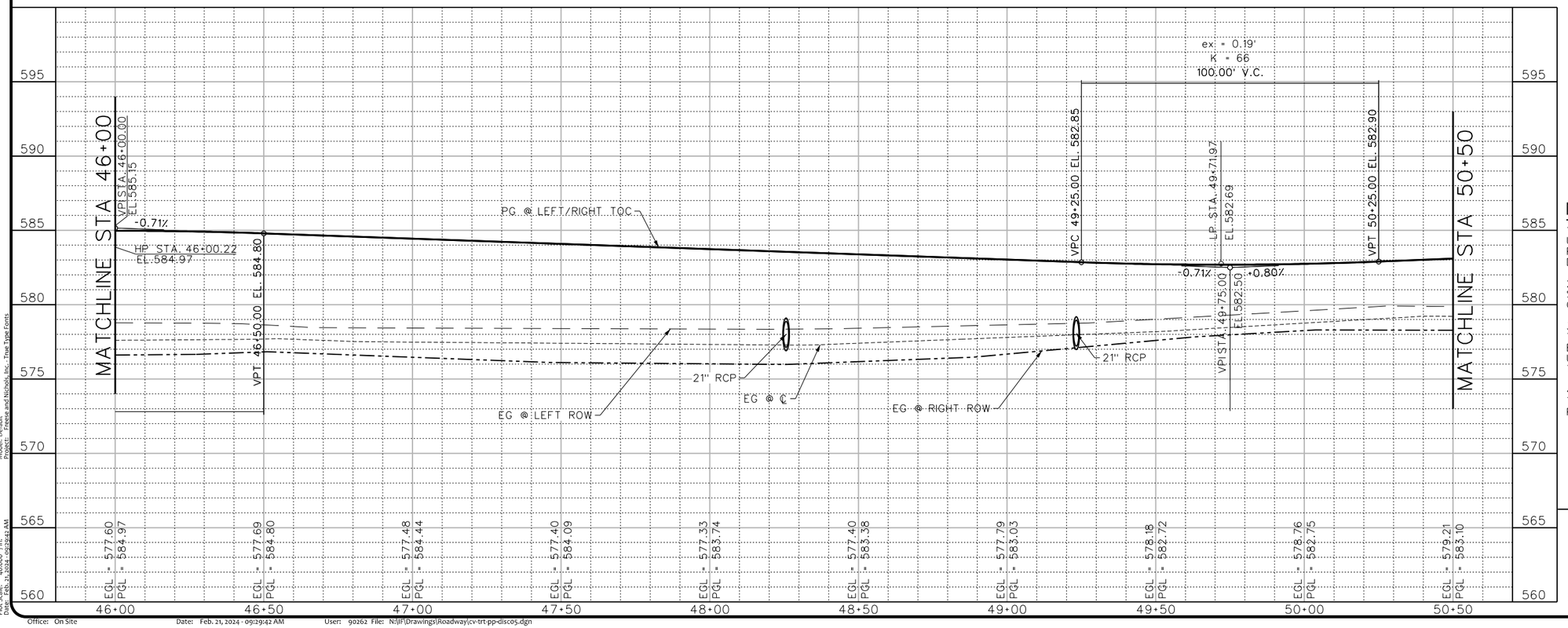
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET PV-4
SEQ. 42

Microstation V8 User: 90262. Office: On Site
Plot Style: N:\lf\Drawings\Roadway\cv-trt-pp-disc04.sht
Plotter: \\fnfort1\HP_Designjet_T1700_T1120_PS_Color_Plotter
Plot Scale: 40.0x8.0 ' / in.
Date: Feb. 21, 2024 - 09:29:40 AM
Model: Default
Project: Freese and Nichols Inc - True Type Fonts

Office: On Site Date: Feb. 21, 2024 - 09:29:40 AM User: 90262 File: N:\lf\Drawings\Roadway\cv-trt-pp-disc04.sht





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FREESE AND NICHOLS, INC.

RECORD DRAWINGS PREPARED ON: 8/20/2024

N

0 10' 20' 40'
HORIZONTAL SCALE

0 2' 4' 8'
VERTICAL SCALE

LEGEND

- ASPHALT PAVING (REFER TO TYP-2)
- COLORED AND CHEMICALLY STAINED CONCRETE PAVING (REFER TO PVDT-6)
- 4" SIDEWALK (REFER TO DETAIL R-2170)
- 8" CONCRETE PAVEMENT (3,600 PSI@ 6.5 SACK/CY) W/ #4 @ 18" OCEW
- ROCK RIPRAP (REFER TO DPDT-2)
- 6" THICK GRAVEL DRIVEWAY
- VG — VALLEY GUTTER
- HP — HIGH POINT

NOTES:

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PROFILE LEGEND

- EXISTING GRADE @ ℄ ----------
- PROPOSED GRADE @ LT AND RT TOC ——————
- EX GRADE @ LT ROW — — —
- EX GRADE @ RT ROW – – – – –

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

THE SEAL THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO.: 134095 ON 10/21/2021
IT IS A VIOLATION OF LAW TO ALTER THIS DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: 214.217.2200
Fax: 214.217.2201
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

DISCOVERY BLVD PLAN & PROFILE STA 46+00 TO STA 50+50

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MRE
DRAWN CHM
REVISED
CHECKED SEC
FILE NAME cv-trt-pp-disc05.dgn

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET PV-5

SEQ. 43

MicroStation V8 User: 90262 Office: On Site
Plotter: J:\Projects\Rockwall\Engineering\Roadway\cv-trt-pp-disc05.dgn
Plot Scale: 40.006 ' In.
Plot Date: Feb 21 2024 - 09:29:41 AM
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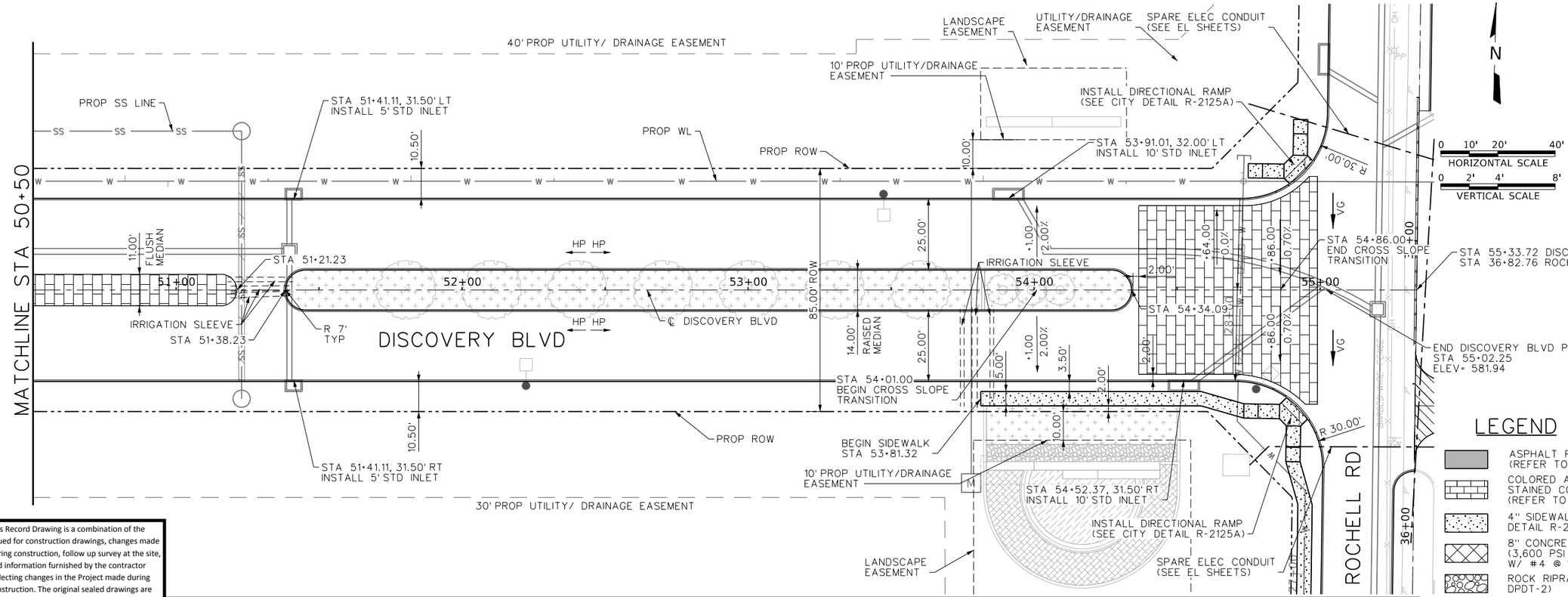
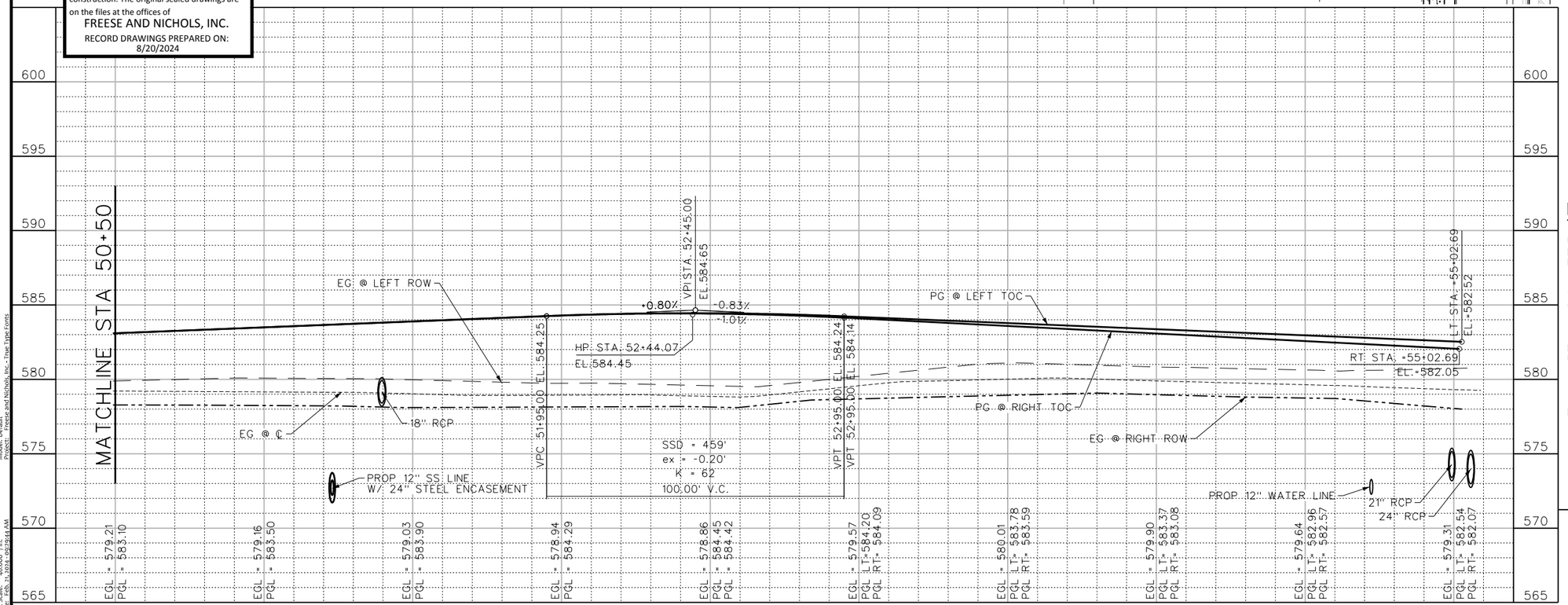
Project: Freese and Nichols, Inc. - True Type Fonts
Office: On Site
Date: Feb. 21, 2024 - 09:29:42 AM
User: 90262 File: N:\F\Drawings\Roadway\cv-trt-pp-disc05.dgn



LEGEND

- ASPHALT PAVING (REFER TO TYP-2)
- COLORED AND CHEMICALLY STAINED CONCRETE PAVING (REFER TO PVDT-6)
- 4" SIDEWALK (REFER TO DETAIL R-2170)
- 8" CONCRETE PAVEMENT (3,600 PSI@ 6.5 SACK/CY) W/ #4 @ 18" OCEW
- ROCK RIPRAP (REFER TO DPDT-2)
- 6" THICK GRAVEL DRIVEWAY
- VG — VALLEY GUTTER
- HP — HIGH POINT



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PROFILE LEGEND

- EXISTING GRADE @ ℄
- PROPOSED GRADE @ LT AND RT TOC
- EX GRADE @ LT ROW
- EX GRADE @ RT ROW

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASE THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE TEXAS NO. 134055 ON 10/21/2021 IT IS UNLAWFUL TO RELEASE THIS DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

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Phone: (214) 217-2200
Fax: (214) 217-2250
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

DISCOVERY BLVD PLAN & PROFILE STA 50+50 TO END

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MRF
DRAWN CHM
REVISED
CHECKED SEC
FILE NAME cv-trt-pp-disc06.dgn

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET PV-6
SEQ. 44

MicroStation V8 User: 90262 Office: On Site
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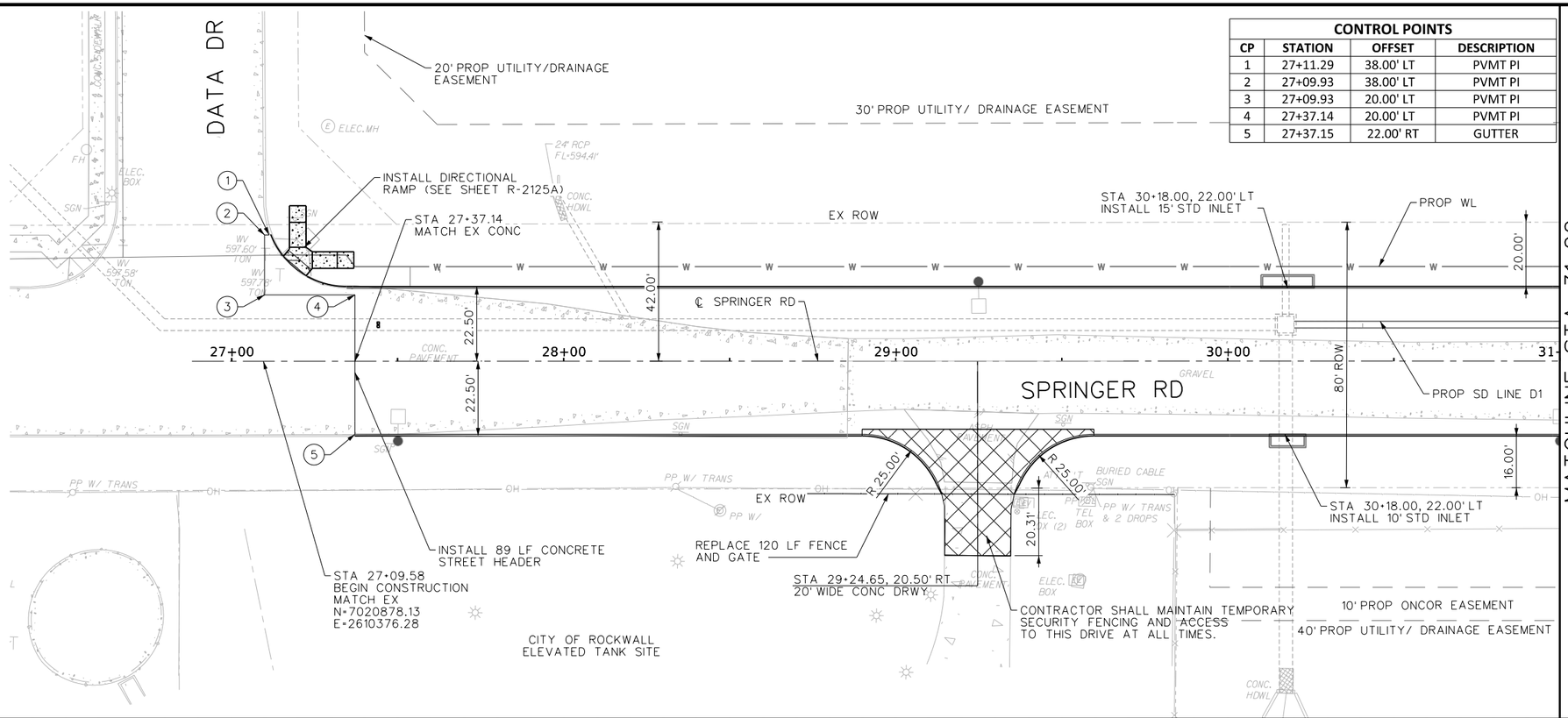
Model: Default
Plotter: \\FNDFS01\HP Designjet T1700dr PostScript
Plot Scale: 40.008 ' in.
Plot Date: Feb. 21, 2024 - 09:29:44 AM
Project: Freese and Nichols, Inc. - True Type Fonts

Office: On Site Date: Feb. 21, 2024 - 09:29:44 AM User: 90262 File: N:\lf\Drawings\Roadway\cv-trt-pp-disc06.dgn



CONTROL POINTS			
CP	STATION	OFFSET	DESCRIPTION
1	27+11.29	38.00' LT	PVMT PI
2	27+09.93	38.00' LT	PVMT PI
3	27+09.93	20.00' LT	PVMT PI
4	27+37.14	20.00' LT	PVMT PI
5	27+37.15	22.00' RT	GUTTER

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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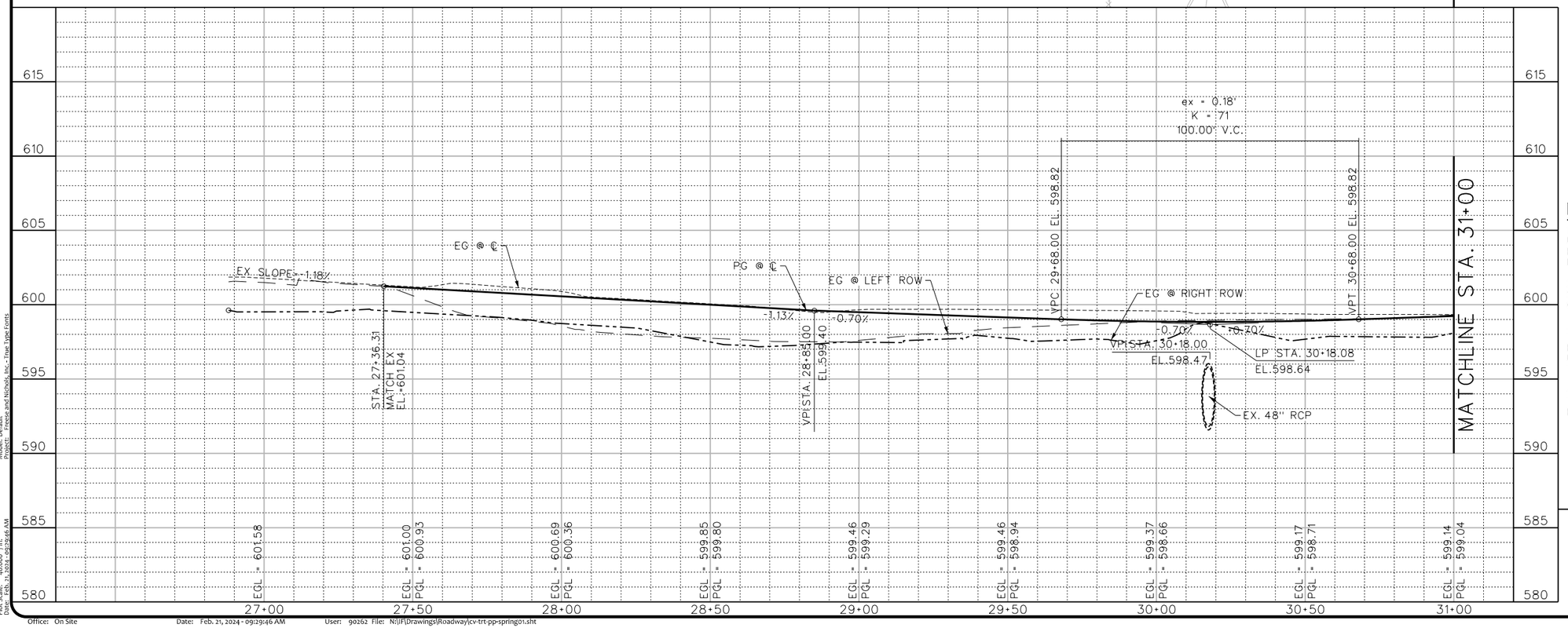
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2250
Web - www.freese.com

N

0 10' 20' 40'
HORIZONTAL SCALE
0 2' 4' 8'
VERTICAL SCALE

LEGEND

- ASPHALT PAVING (REFER TO TYP-2)
- COLORED AND CHEMICALLY STAINED CONCRETE PAVING (REFER TO PVDT-6)
- 4" SIDEWALK (REFER TO DETAIL R-2170)
- 8" CONCRETE PAVEMENT (3,600 PSI@ 6.5 SACK/CY) W/ #4 @ 18" OCEW
- ROCK RIPRAP (REFER TO DPDT-2)
- 6" THICK GRAVEL DRIVEWAY
- VG — VALLEY GUTTER
- HP — HIGH POINT



NOTES:

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PROFILE LEGEND
EXISTING GRADE @ ℄
PROPOSED GRADE @ ℄
EX GRADE @ LT ROW
EX GRADE @ RT ROW

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
CIVIL
SPRINGER RD PLAN & PROFILE
BEGIN TO STA 31+00

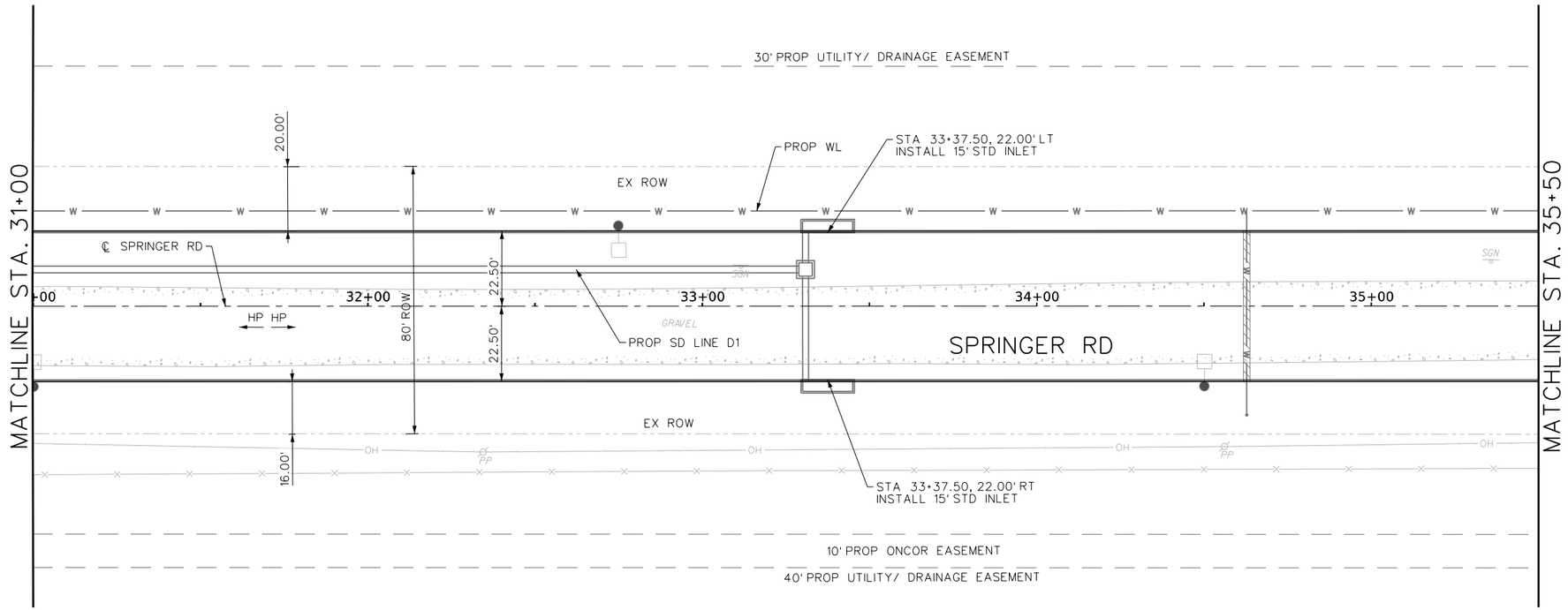
NO.	ISSUES	BY	DATE

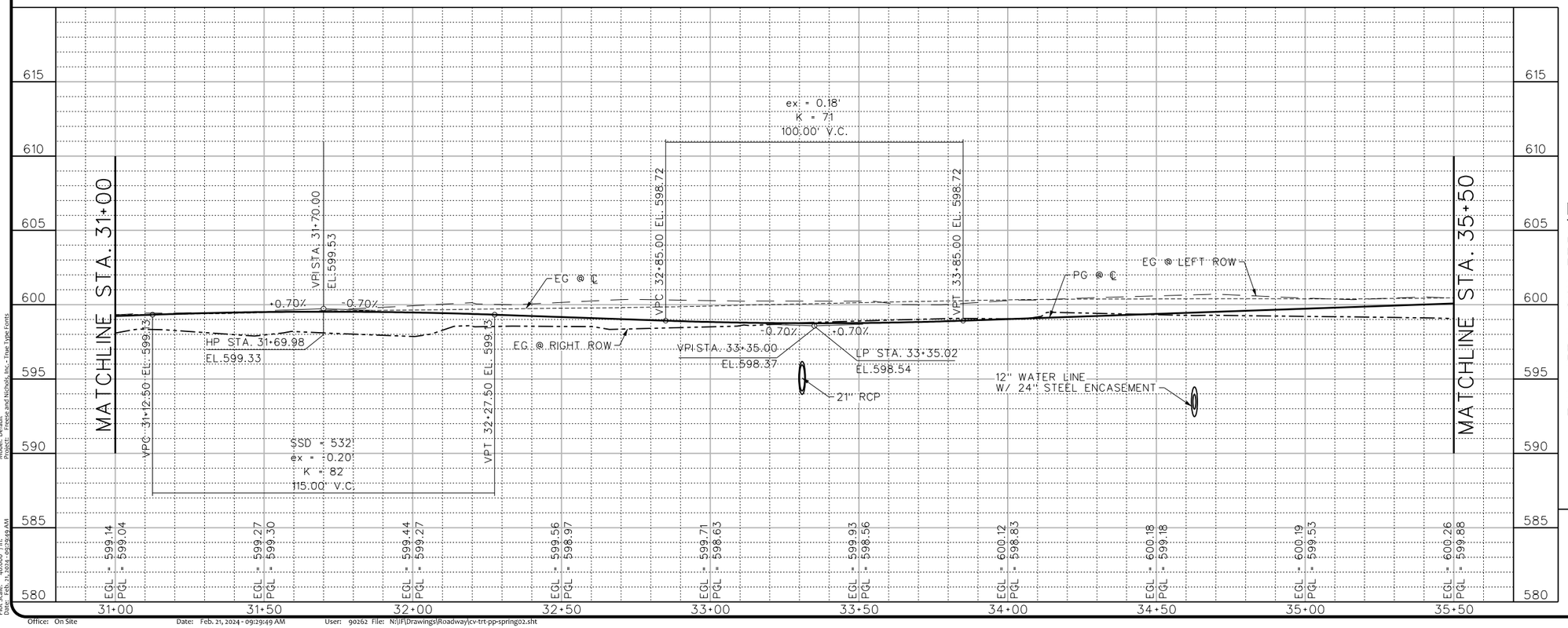
F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MRF
DRAWN CHM
CHECKED SEC
FILE NAME cv-trt-pp-springo1.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET PV-7
SEQ. 45

MicroStation V8 User: 90262 Office: On Site
N:\lf\Drawings\Roadway\cv-trt-pp-springo.sht
Model: Default
Plotter: \\FNIDC01\Xerox 7857 PostScript
Plot Scale: 40.008 ' in.
Plot Date: Feb. 21, 2024 - 09:29:46 AM
Projects - Freese and Nichols, Inc. - True Type Fonts





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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

N

0 10' 20' 40'
HORIZONTAL SCALE
0 2' 4' 8'
VERTICAL SCALE

LEGEND

- ASPHALT PAVING (REFER TO TYP-2)
- COLORED AND CHEMICALLY STAINED CONCRETE PAVING (REFER TO PVDT-6)
- 4" SIDEWALK (REFER TO DETAIL R-2170)
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- ROCK RIPRAP (REFER TO DPDT-2)
- 6" THICK GRAVEL DRIVEWAY
- VG — VALLEY GUTTER
- HP — HIGH POINT

NOTES:

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PROFILE LEGEND
EXISTING GRADE @ ℄
PROPOSED GRADE @ ℄
EX GRADE @ LT ROW
EX GRADE @ RT ROW

TEXAS REGISTERED ENGINEERING FIRM F-2144
FREESE AND NICHOLS, INC.

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RELEASED THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
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FREESE NICHOLS
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Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2299
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

SPRINGER RD PLAN & PROFILE STA 31+00 TO STA 35+50

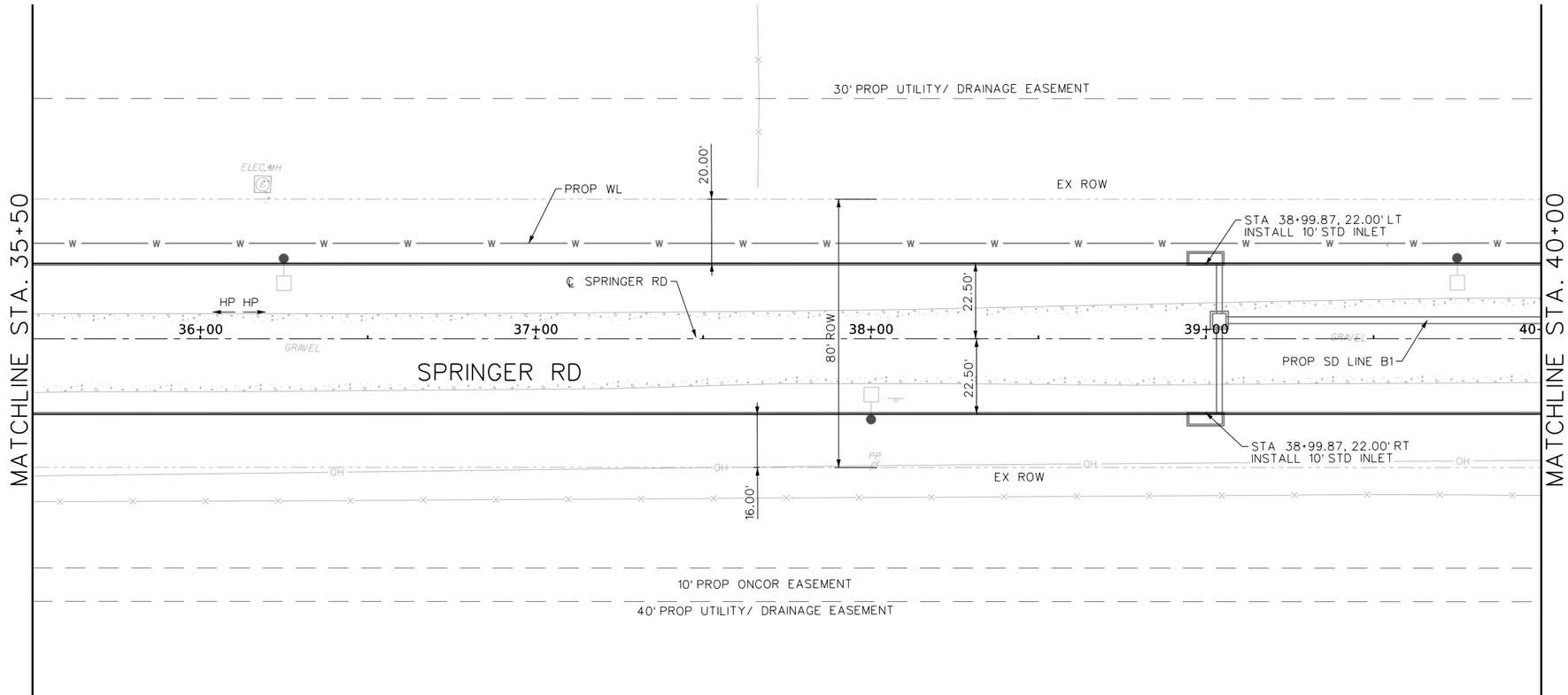
NO.	ISSUES	BY	DATE

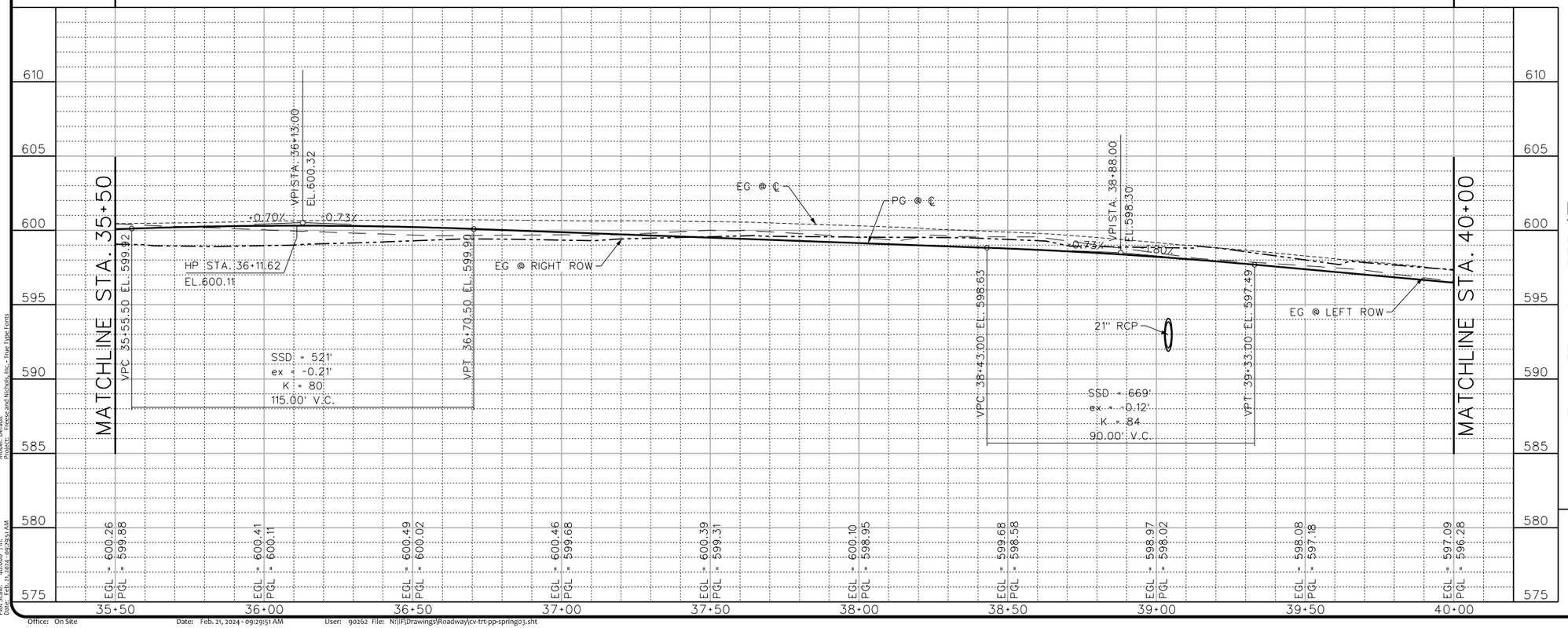
F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MRF
DRAWN CHM
REVISED
CHECKED SEC
FILE NAME cv-trt-pp-spring02.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET PV-8
SEQ. 46

MicroStation V8 User: 90262 Office: On Site
Plotter: J:\PLOTDRV\HP T1700 24" ColorPDF MonoPlot.pltg Model: Default
Plot Scale: 40.087 'in. Projects: Freese and Nichols Inc - True Type Fonts
Plot: Feb. 21, 2024 - 09:29:49 AM
Office: On Site Date: Feb. 21, 2024 - 09:29:49 AM User: 90262 File: N:\F\Drawings\Roadway\cv-trt-pp-spring02.sht





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FREESE AND NICHOLS, INC.

RECORD DRAWINGS PREPARED ON: 8/20/2024

N

0 10' 20' 40'
HORIZONTAL SCALE

0 2' 4' 8'
VERTICAL SCALE

LEGEND

- ASPHALT PAVING (REFER TO TYP-2)
- COLORED AND CHEMICALLY STAINED CONCRETE PAVING (REFER TO PVDT-6)
- 4" SIDEWALK (REFER TO DETAIL R-2170)
- 8" CONCRETE PAVEMENT (3,600 PSI@ 6.5 SACK/CY) W/ #4 @ 18" OCEW
- ROCK RIPRAP (REFER TO DPDT-2)
- 6" THICK GRAVEL DRIVEWAY
- VG — VALLEY GUTTER
- HP — HIGH POINT

NOTES:

1. ALL DIMENSIONS ARE TO BACK OF CURB UNLESS OTHERWISE STATED IN THE PLANS. ALL INLET CALLOUTS ARE DIMENSIONED FROM THE FACE OF CURB.
2. REFER TO STORM DRAIN, SANITARY SEWER, AND WATER SHEETS FOR MORE CONSTRUCTION INFORMATION.
3. REMOVAL OF ALL ITEMS REQUIRED TO CONSTRUCT THE PROJECT SHALL BE SUBSIDIARY TO THE PROJECT UNLESS OTHERWISE PAID FOR IN THE CONTRACT.
4. REFER TO TREE CONSERVATION TC-1 THRU TC-6 FOR TREE REMOVAL AND PRESERVATION.

PROFILE LEGEND

- EXISTING GRADE @ ℄
- PROPOSED GRADE @ ℄
- EX GRADE @ LT ROW
- EX GRADE @ RT ROW

TEXAS REGISTERED ENGINEERING FIRM F-2144
FREESE AND NICHOLS, INC.

RELEASED FOR THE PURPOSES OF INTERIM REVIEW UNDER THE AUTHORITY OF SARAH E. CAUDLE, TEXAS NO. 134055, ON 10/21/2021. IT IS NOT TO BE USED FOR BIDDING OR CONSTRUCTION PURPOSES.

THIS DOCUMENT WAS ORIGINALLY ISSUED AND SEALED BY SARAH E. CAUDLE, TEXAS NO. 134055, ON 10/21/2021. STORED ELECTRONICALLY ON FREESE AND NICHOLS, INC. NETWORK. NO PRINTED COPIES OF THIS DOCUMENT SHALL BE CONSIDERED VALID WITHOUT THE ORIGINAL SIGNATURE AND SEAL OF THE RESPONSIBLE ENGINEER. IT IS A VIOLATION OF THE TEXAS ENGINEERING PRACTICE ACT FOR ANY PERSON TO ALTER THIS DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER AND IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2211
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

SPRINGER RD PLAN & PROFILE STA 35+50 TO STA 40+00

NO.	ISSUES	BY	DATE

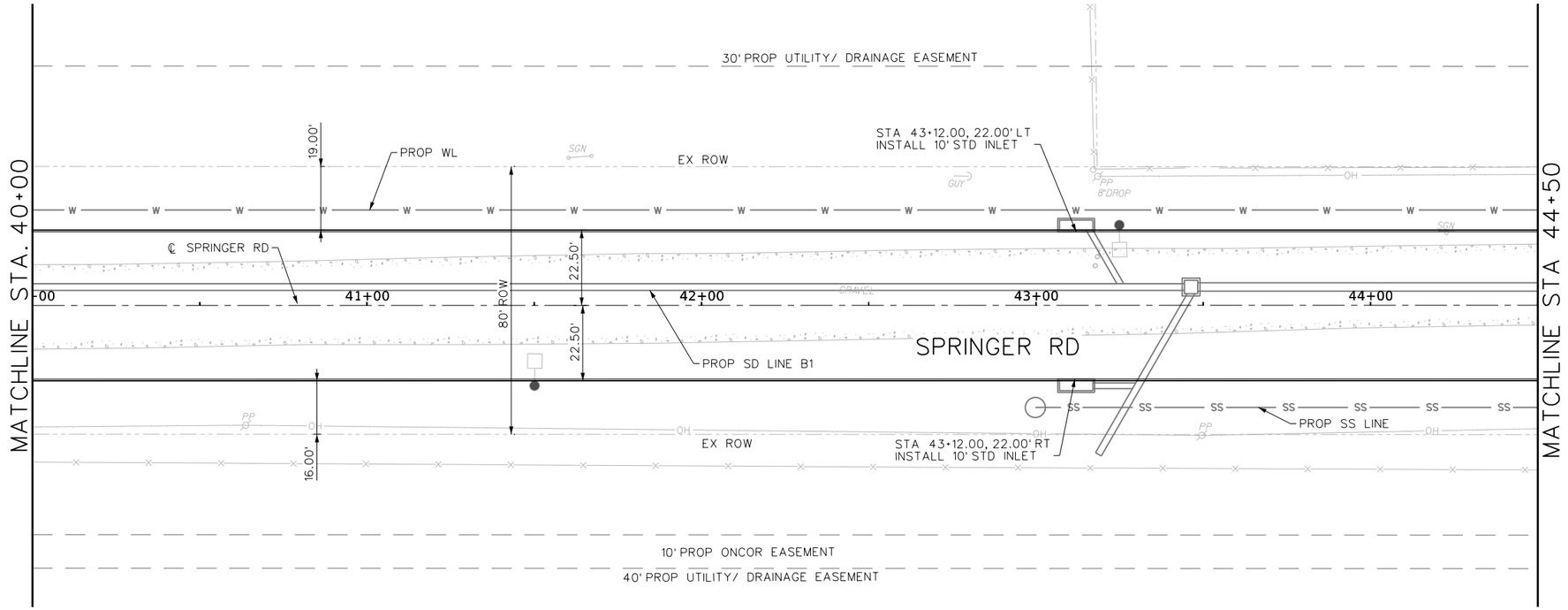
F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MRF
DRAWN CHM
REVISED
CHECKED SEC
FILE NAME cv-trt-pp-spring03.sht

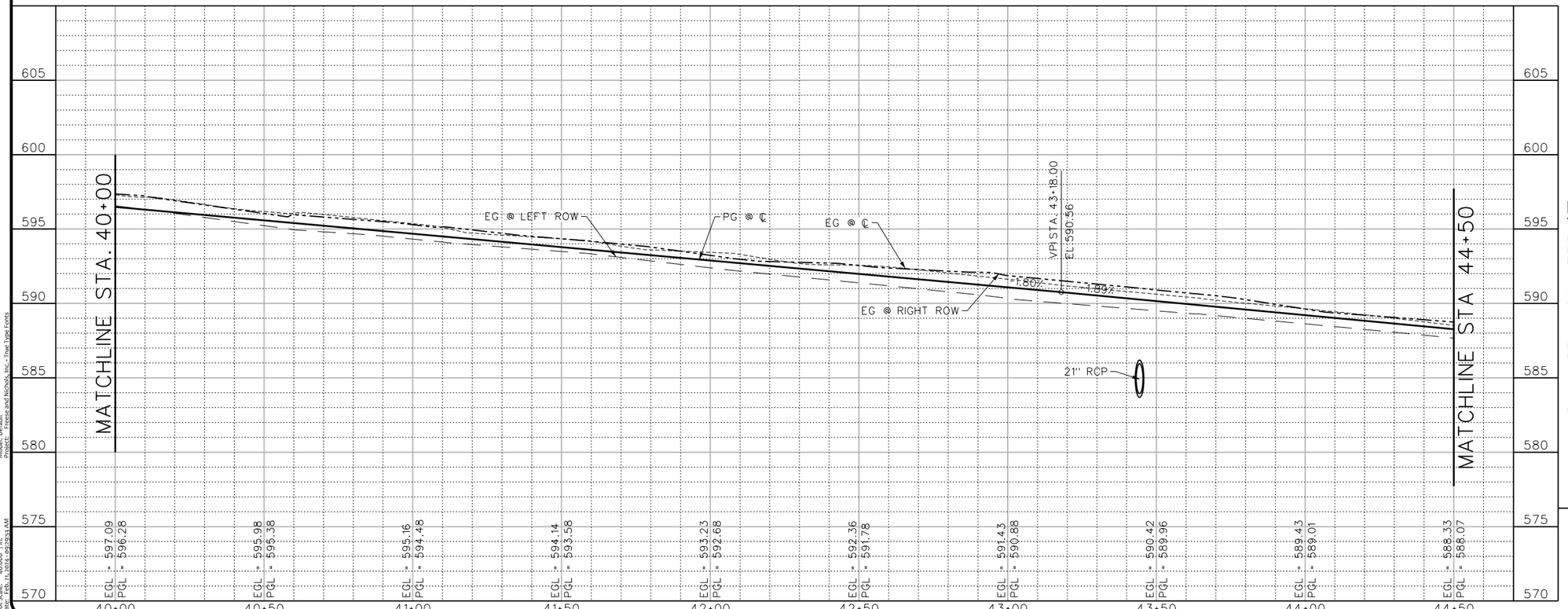
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET PV-9

SEQ. 47

MicroStation V8 User: 90262 Office: On Site
N:\lf\Drawings\Roadway\cv-trt-pp-spring03.sht
Model: Default
Projects: Freese and Nichols Inc. - True Type Fonts
Plotter: \\PLOT02-PLOT\HP Color LaserJet M651 PCL 6
Plot Scale: 40.087 ' in.
Date: Feb. 21, 2024 - 09:29:51 AM





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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

N

0 10' 20' 40'
HORIZONTAL SCALE

0 2' 4' 8'
VERTICAL SCALE

LEGEND

- ASPHALT PAVING (REFER TO TYP-2)
- COLORED AND CHEMICALLY STAINED CONCRETE PAVING (REFER TO PVDT-6)
- 4" SIDEWALK (REFER TO DETAIL R-2170)
- 8" CONCRETE PAVEMENT (3,600 PSI@ 6.5 SACK/CY) W/ #4 @ 18" OCEW
- ROCK RIPRAP (REFER TO DPDT-2)
- 6" THICK GRAVEL DRIVEWAY
- VG — VALLEY GUTTER
- HP — HIGH POINT

NOTES:

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4. REFER TO TREE CONSERVATION TC-1 THRU TC-6 FOR TREE REMOVAL AND PRESERVATION.

PROFILE LEGEND

- EXISTING GRADE @ ℄
- PROPOSED GRADE @ ℄
- EX GRADE @ LT ROW
- EX GRADE @ RT ROW

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASE THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
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FREESE NICHOLS
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Fax: (214) 217-2299
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

SPRINGER RD PLAN & PROFILE
STA 40+00 TO 44+50

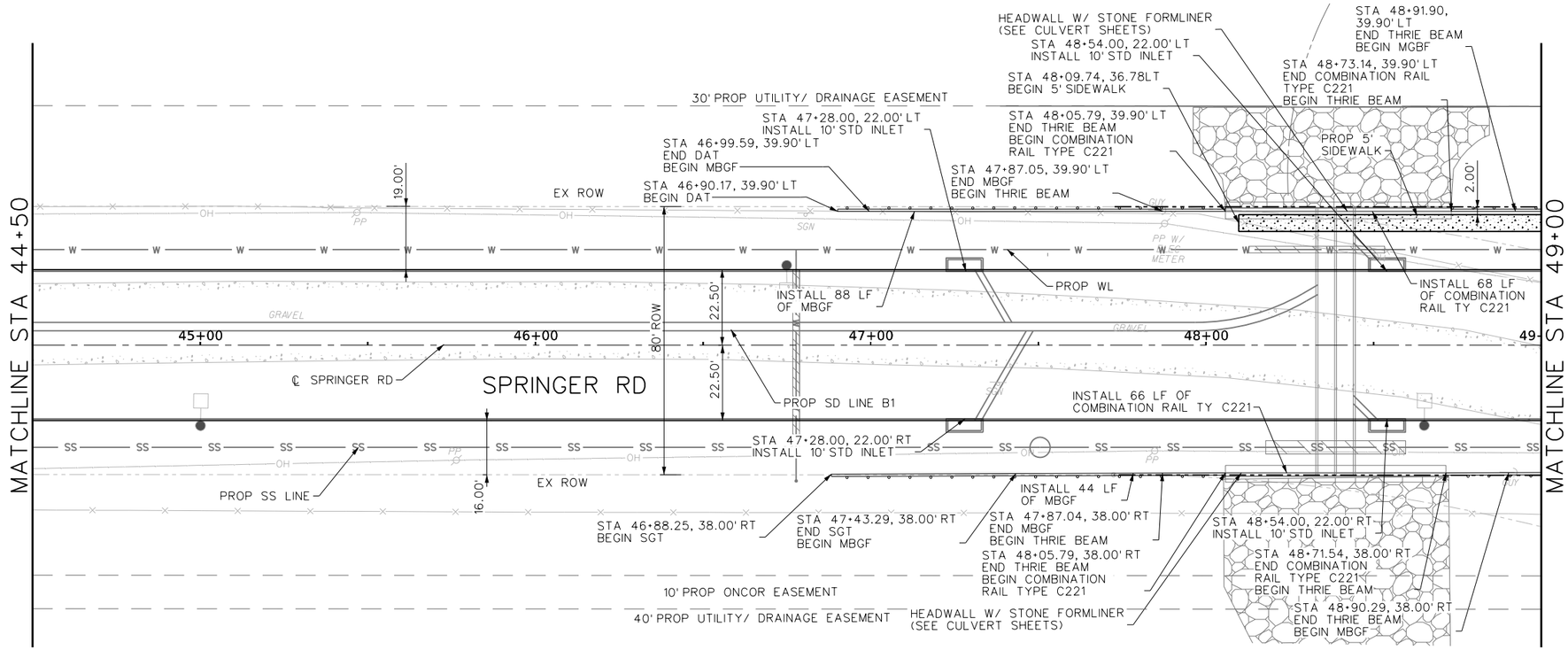
NO.	ISSUES	BY	DATE

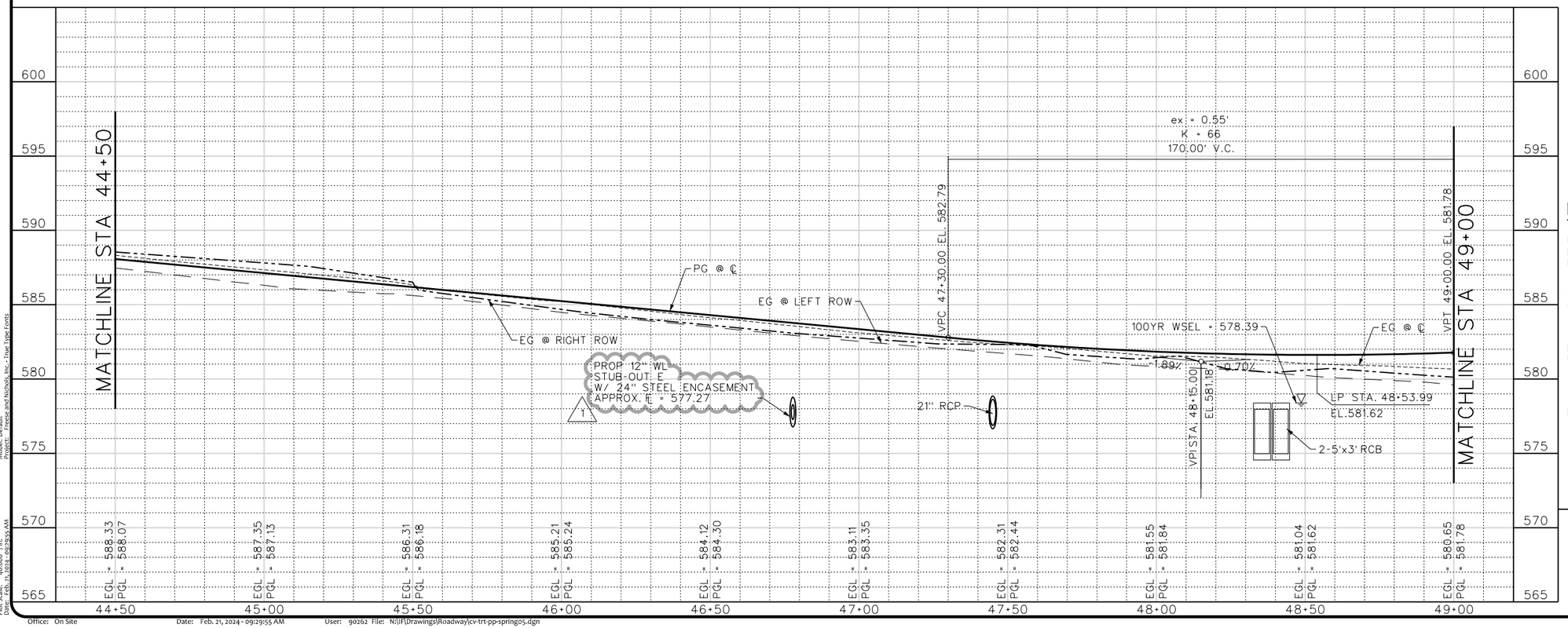
F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MRF
DRAWN CHM
REVISED
CHECKED SEC
FILE NAME cv-trt-pp-spring04.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale accordingly.

SHEET PV-10
SEQ. 48

MicroStation V8 User: 90262 Office: On Site
Plotter: \\JP\HOU01-P01-MFP-01 Model: Default
Plot Scale: 40.087 ' / in. Project: Freese and Nichols, Inc. - True Type Fonts
Date: Feb. 21, 2024 - 09:29:53 AM
Office: On Site Date: Feb. 21, 2024 - 09:29:53 AM User: 90262 File: N:\F\Drawings\Roadway\cv-trt-pp-spring04.sht





LEGEND

- ASPHALT PAVING (REFER TO TYP-2)
- COLORED AND CHEMICALLY STAINED CONCRETE PAVING (REFER TO PVDT-6)
- 4" SIDEWALK (REFER TO DETAIL R-2170)
- 8" CONCRETE PAVEMENT (3,600 PSI@ 6.5 SACK/CY) W/ #4 @ 18" OCEW
- ROCK RIPRAP (REFER TO DPDT-2)
- 6" THICK GRAVEL DRIVEWAY
- VG — VALLEY GUTTER
- HP — HIGH POINT

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PROFILE LEGEND

- EXISTING GRADE @ ℄
- PROPOSED GRADE @ ℄
- EX GRADE @ LT ROW
- EX GRADE @ RT ROW

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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0 10' 20' 40'
HORIZONTAL SCALE
0 2' 4' 8'
VERTICAL SCALE

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

SPRINGER RD PLAN & PROFILE STA 44+50 TO STA 49+00

NO.	ISSUES	BY	DATE
1	ADDENDUM #2	SEC	11/17/21

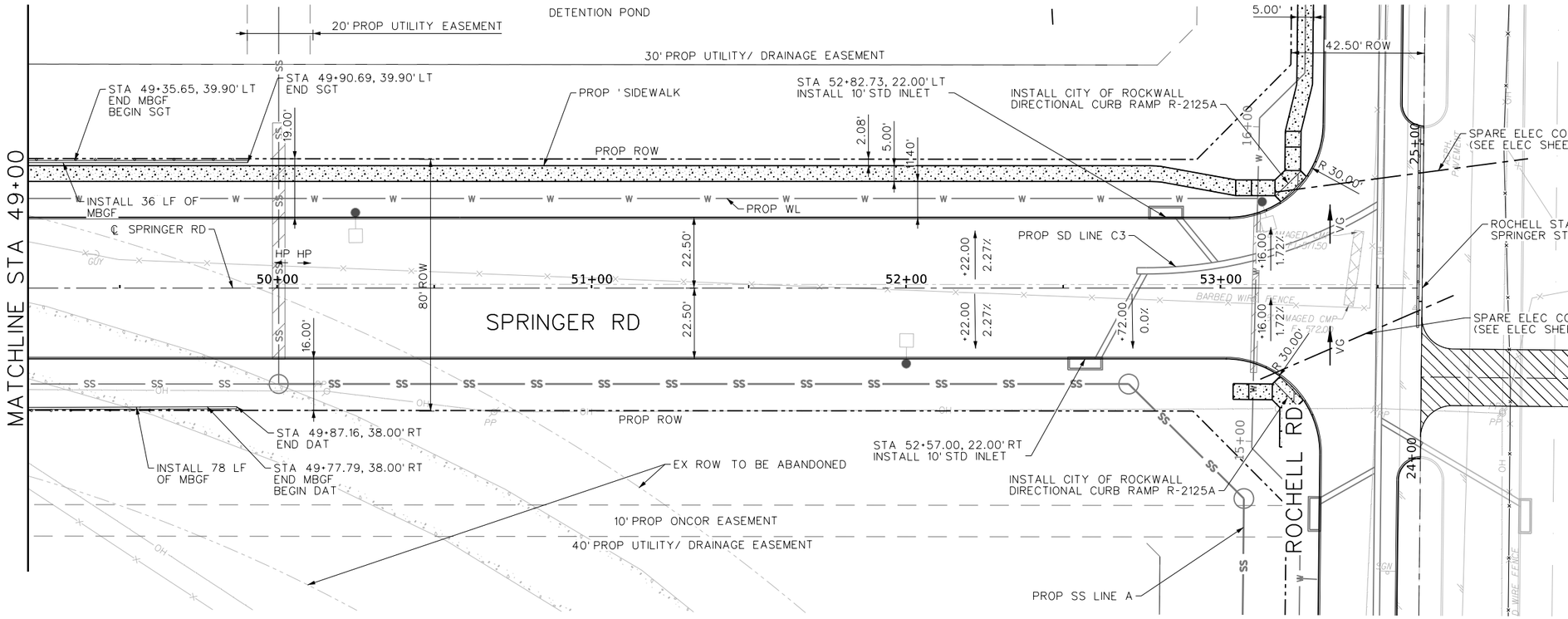
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

F&N JOB NO.	RKW19711
DATE	APRIL 2022
DESIGNED	MRF
DRAWN	CHM
REVISED	
CHECKED	SEC
FILE NAME	cv-trt-pp-springo5.dgn

SHEET PV-11
SEQ. 49

MicroStation V8 User: 90262 Office: On Site
Plotter: J:\IP\DOCS\Roadway\cv-trt-pp-springo5.dgn
Plot Scale: 40.087 ' in.
Plot Date: Feb. 21, 2024 - 09:29:55 AM
Model: Default
Projects: Freese and Nichols, Inc. - True Type Fonts

Office: On Site Date: Feb. 21, 2024 - 09:29:55 AM User: 90262 File: N:\IF\Drawings\Roadway\cv-trt-pp-springo5.dgn



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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

LEGEND

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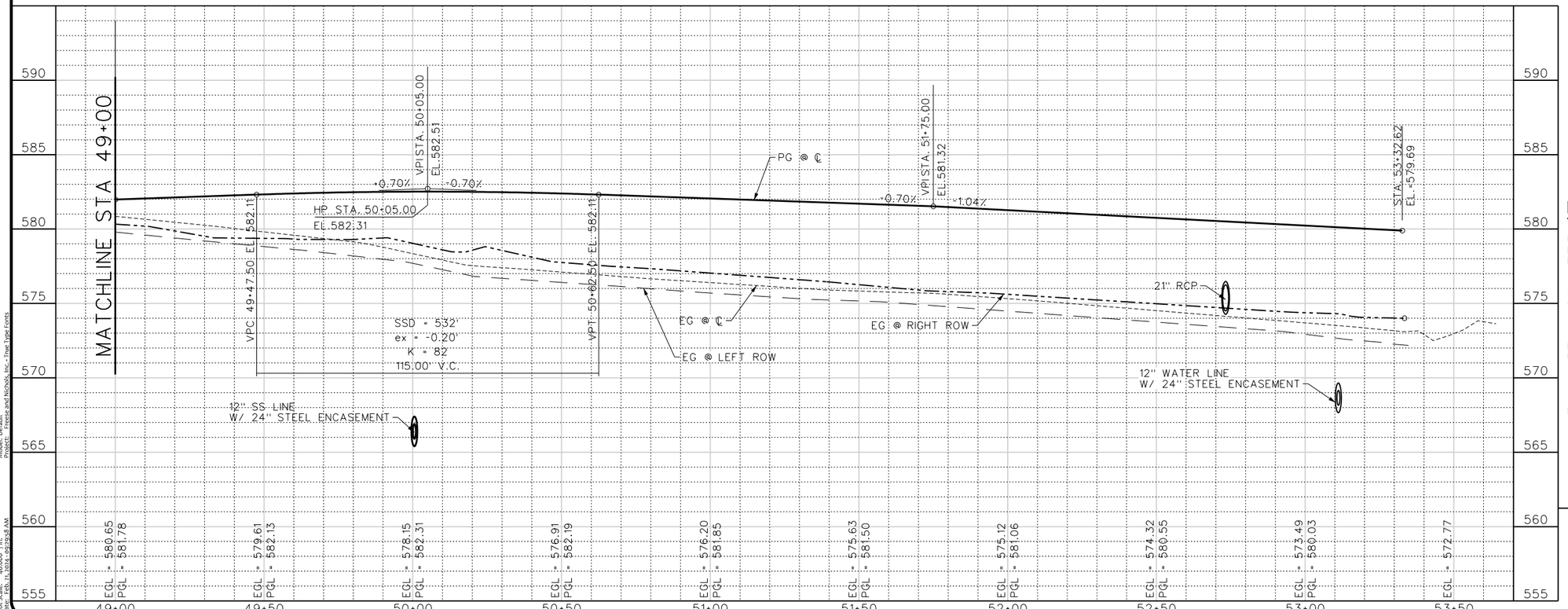
- COLORED AND CHEMICALLY STAINED CONCRETE PAVING (REFER TO PVDT-6)
- 4" SIDEWALK (REFER TO DETAIL R-2170)
- 8" CONCRETE PAVEMENT (3,600 PSI@ 6.5 SACK/CY) W/ #4 @ 18" OCEW
- ROCK RIPRAP (REFER TO DPDT-2)
- 6" THICK GRAVEL DRIVEWAY
- VG — VALLEY GUTTER
- HP — HIGH POINT



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PROFILE LEGEND

- EXISTING GRADE @ ℄
- PROPOSED GRADE @ ℄
- EX GRADE @ LT ROW
- EX GRADE @ RT ROW

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASE THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
IT IS UNLAWFUL TO RELEASE THIS DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2299
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

SPRINGER RD PLAN & PROFILE
STA 49+00 TO END

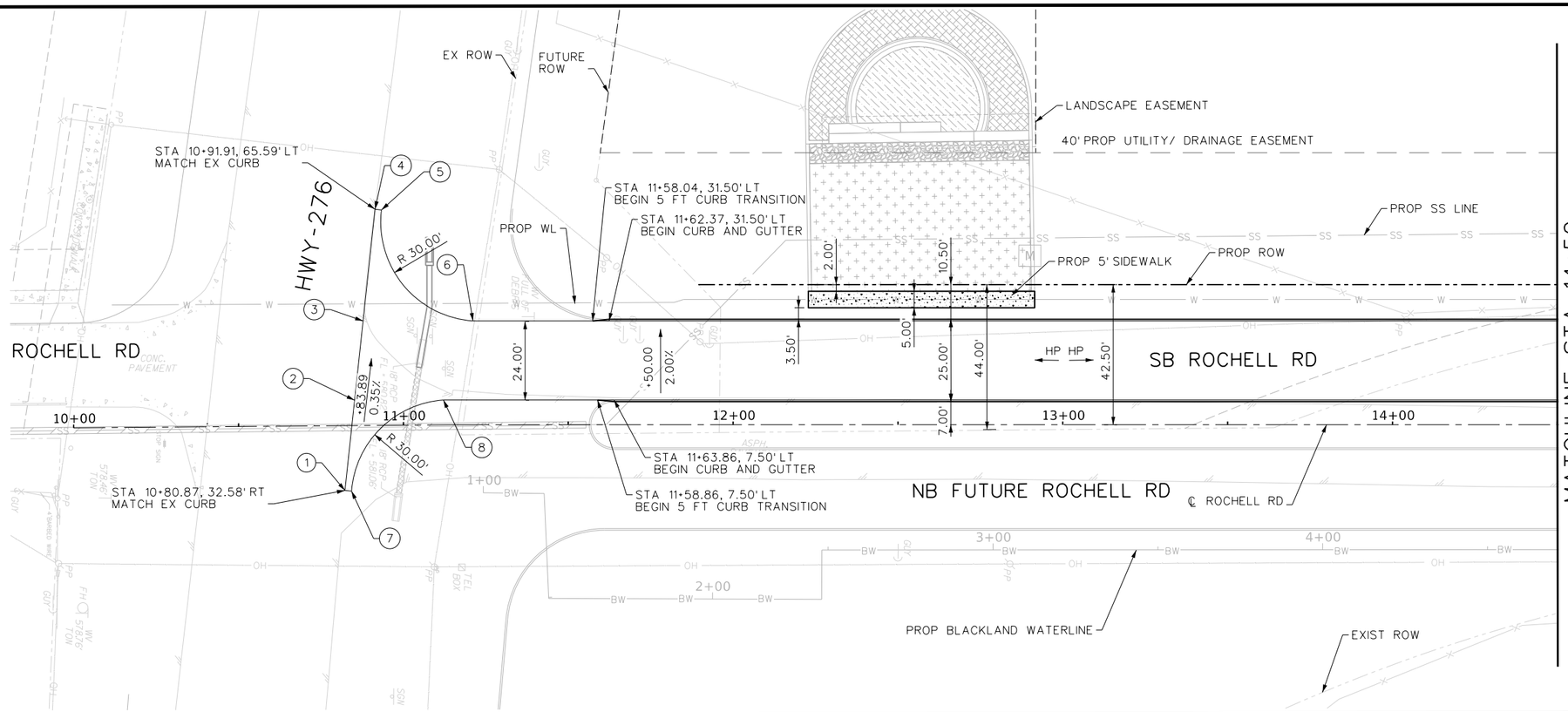
NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MRF
DRAWN CHM
REVISED
CHECKED SEC
FILE NAME cv-trt-pp-spring06.dgn

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET PV-12
SEQ. 50

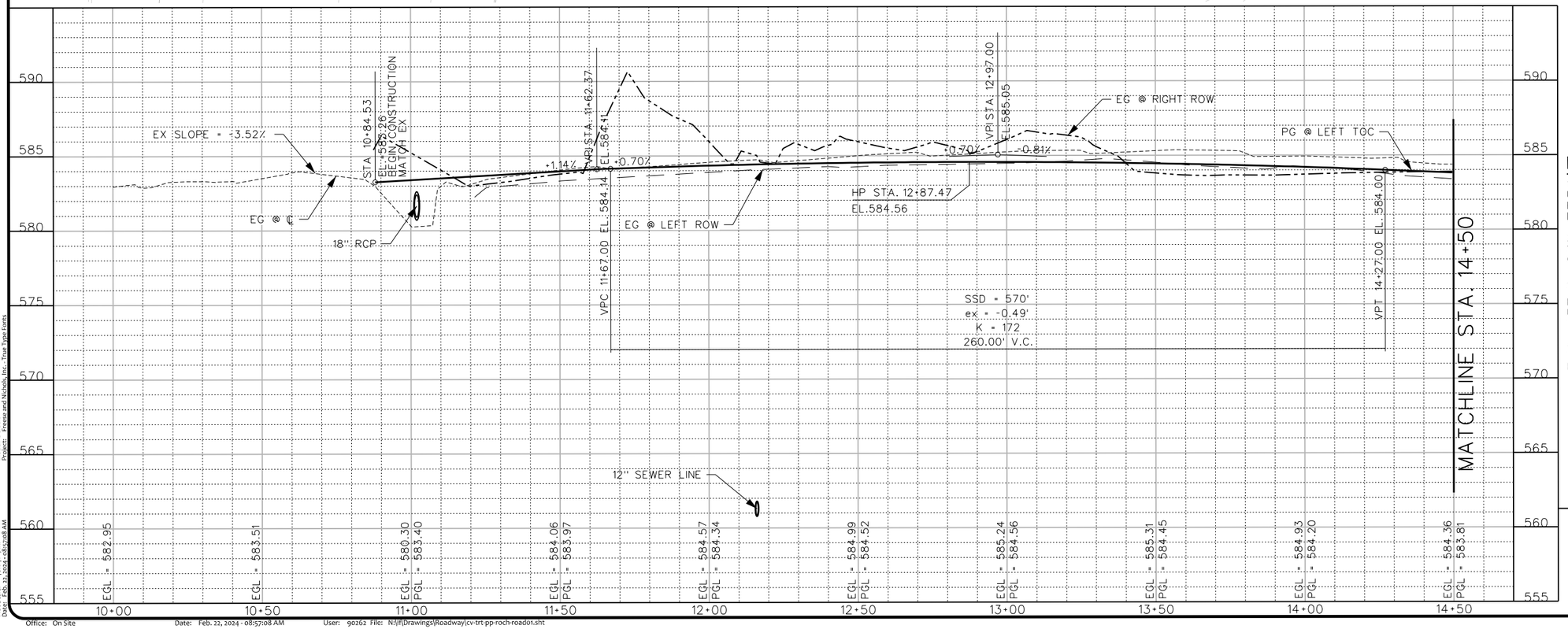
MicroStation V8 User: 90262 Office: On Site
Plotter: \\jlp0005\Xerox AltaLink C8130 PS
Plot Scale: 40.087 ' in.
Plot Date: Feb. 21, 2024 - 09:29:58 AM
Model: Default
Objects: Freese and Nichols, Inc. - True Type Fonts



CONTROL POINTS			
CP	STATION	OFFSET	DESCRIPTION
1	10+82.10	19.64' RT	MATCH EXISTING
2	10+85.25	7.75' LT	MATCH EXISTING
3	10+88.01	31.73' LT	MATCH EXISTING
4	10+91.91	65.59' LT	MATCH EXISTING
5	10+93.90	65.53' LT	30' R PC
6	11+21.12	31.50' LT	30' R PT
7	10+84.09	19.84' RT	30' R PC
8	11+12.21	7.50' LT	30' R PT

LEGEND

- ASPHALT PAVING (REFER TO TYP-2)
- COLORED AND CHEMICALLY STAINED CONCRETE PAVING (REFER TO PVDT-6)
- 4" SIDEWALK (REFER TO DETAIL R-2170)
- 8" CONCRETE PAVEMENT (3,600 PSI@ 6.5 SACK/CY) W/ #4 @ 18" OCEW
- ROCK RIPRAP (REFER TO DPDT-2)
- 6" THICK GRAVEL DRIVEWAY
- VG — VALLEY GUTTER
- HP — HIGH POINT



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FREESE AND NICHOLS, INC.

RECORD DRAWINGS PREPARED ON: 8/20/2024

PROFILE LEGEND

- EXISTING GRADE @ ℄ ----------
- PROPOSED GRADE @ LT AND RT TOC ——————
- EX GRADE @ LT ROW — — — ·
- EX GRADE @ RT ROW — — — — —

THESE PLANS WERE PREPARED UNDER THE SUPERVISION OF MATTHEW R. FERGUSON, P.E. TEXAS REGISTERED ENGINEERING FIRM F-2144

THIS SEAL THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE TEXAS NO.: 134695 ON 10/21/2021 IT IS UNLAWFUL TO ALTER THIS SEAL WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER'S AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Fax: (214) 217-2200
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

ROCHELL RD PLAN & PROFILE
BEGIN TO STA 14+50

NO.	ISSUES	BY	DATE

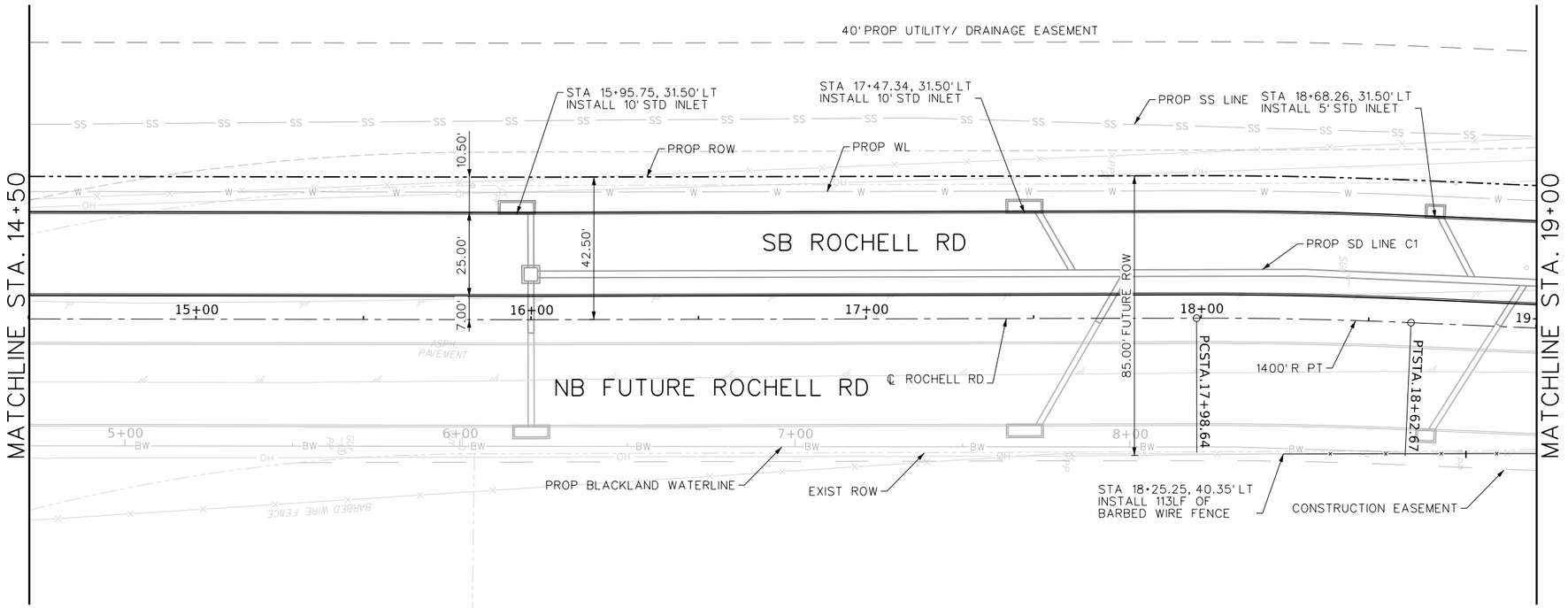
F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MRF
DRAWN CHM
REVISED
CHECKED SEC
FILE NAME cv-trt-pp-roch-road01.sht

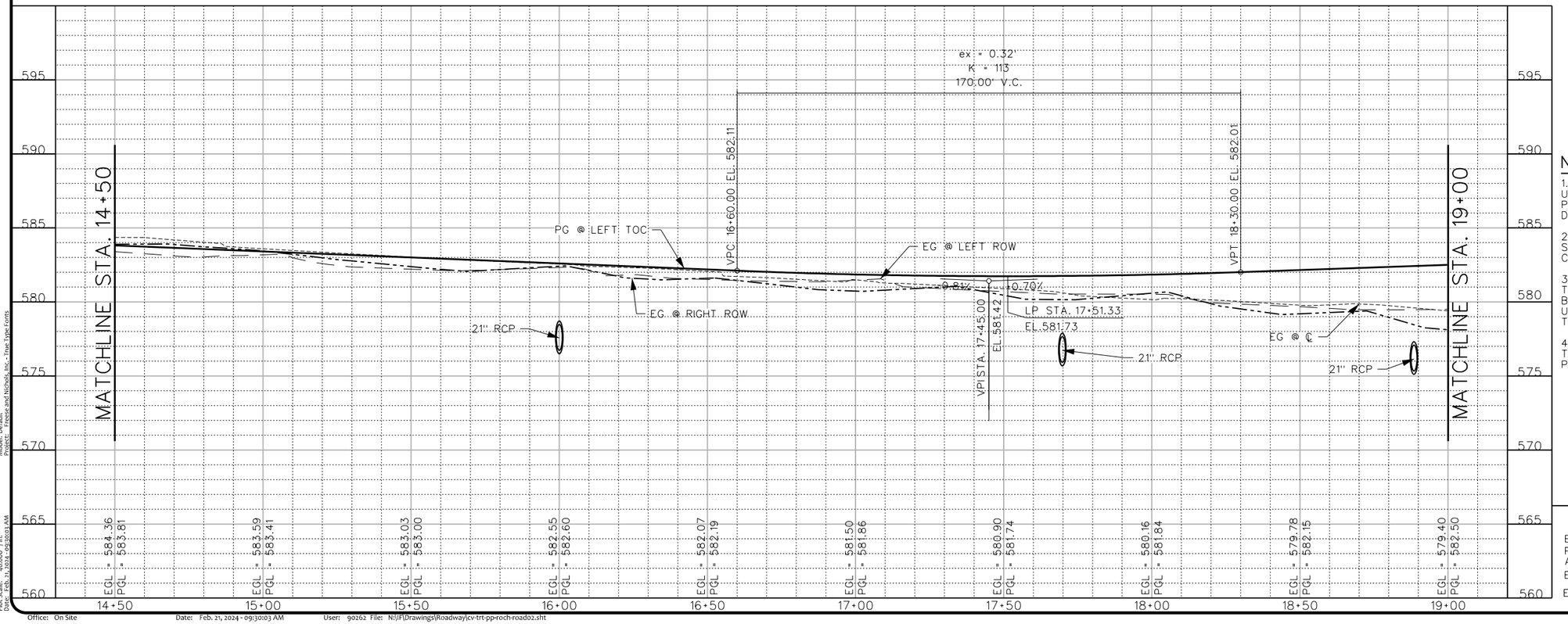
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET PV-13
SEQ. 51

MicroStation V8 User: 90262 Office: On Site
Plotter: //jfw-fnp01/HP_Z4Gen3_PCL6_Model-Default_Project: Freese and Nichols, Inc. - True Type Fonts
Plot Scale: 40.04' / in.
Date: Feb. 22, 2024 - 08:57:08 AM

Office: On Site Date: Feb. 22, 2024 - 08:57:08 AM User: 90262 File: N:\fl\Drawings\Roadway\cv-trt-pp-roch-road01.sht





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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASED FOR PERMITTING PURPOSES ONLY
RELEASED THAT ORIGINALLY POSTED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
IT IS NOT TO BE USED OR VIEWED OR MODIFIED WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

N

0 10' 20' 40'
HORIZONTAL SCALE
0 2' 4' 8'
VERTICAL SCALE

LEGEND

- ASPHALT PAVING (REFER TO TYP-2)
- COLORED AND CHEMICALLY STAINED CONCRETE PAVING (REFER TO PVDT-6)
- 4" SIDEWALK (REFER TO DETAIL R-2170)
- 8" CONCRETE PAVEMENT (3,600 PSI@ 6.5 SACK/CY) W/ #4 @ 18" OCEW
- ROCK RIPRAP (REFER TO DPDT-2)
- 6" THICK GRAVEL DRIVEWAY
- VG — VALLEY GUTTER
- HP — HIGH POINT

NOTES:

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PROFILE LEGEND

EXISTING GRADE @ ℄	----------
PROPOSED GRADE @ LT AND RT TOC	————
EX GRADE @ LT ROW	— — — ·
EX GRADE @ RT ROW	— — — — —

FREESE NICHOLS
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Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

ROCHELL RD PLAN & PROFILE
STA 14+50 TO STA 19+00

NO.	ISSUES	BY	DATE

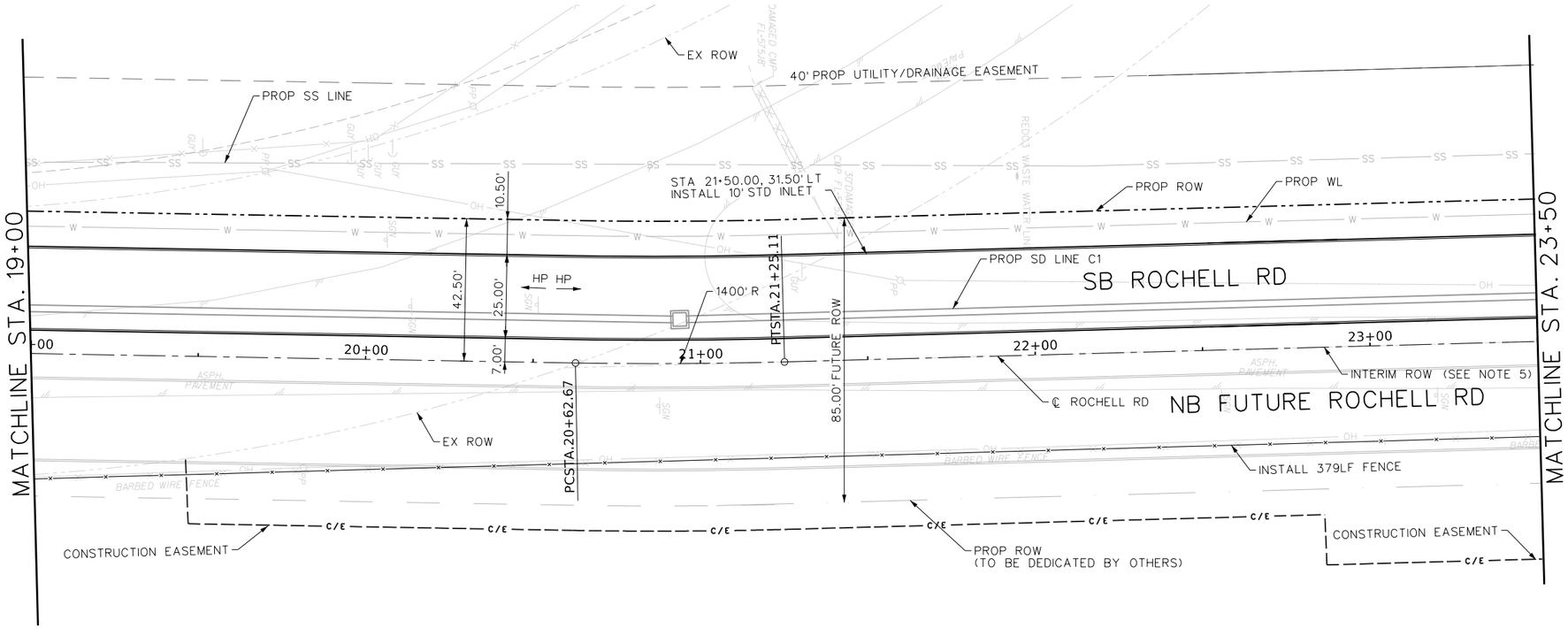
F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MRF
DRAWN CHM
REVISED
CHECKED SEC
FILE NAME cv-trt-pp-roch-road02.sht

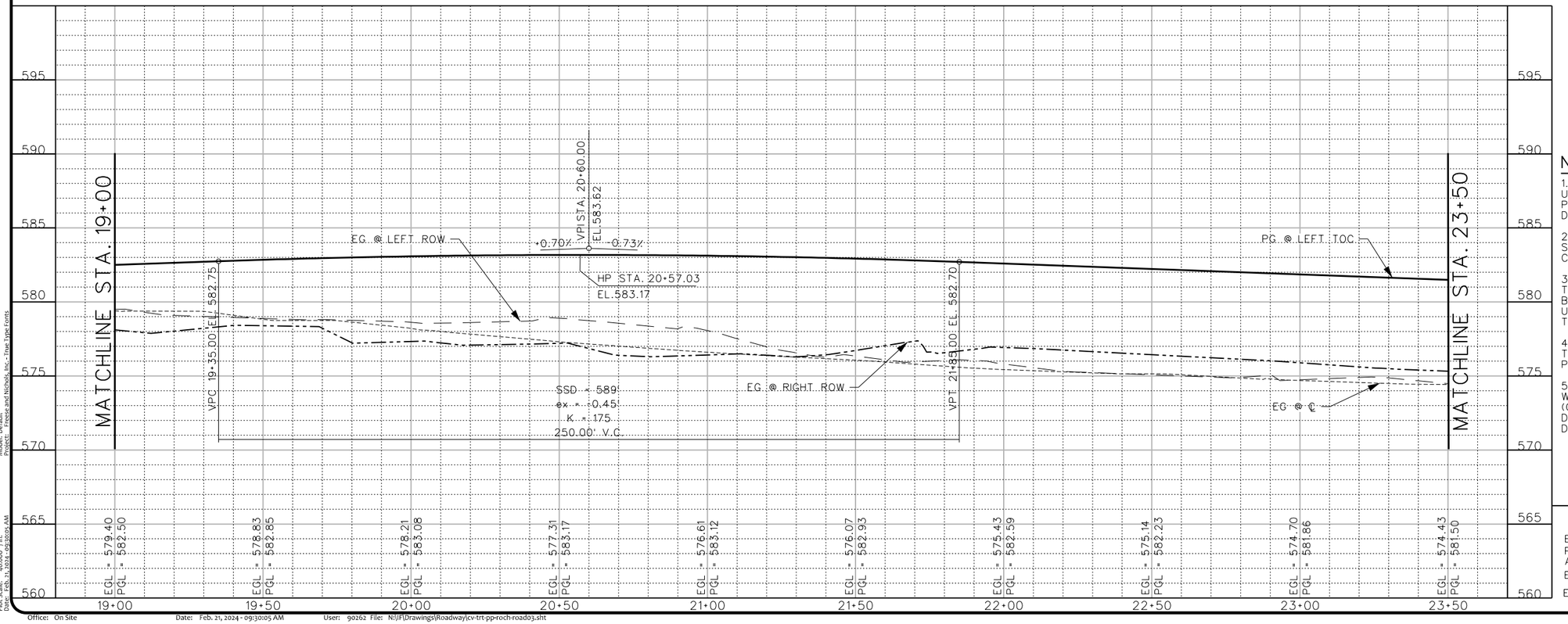
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET PV-14
SEQ. 52

MicroStation V8 User: 90262 Office: On Site
N:\lf\Drawings\Roadway\cv-trt-pp-roch-road02.sht
Plotter: J:\Workgroup\Plot Styles\PWP_MonoOptiX.tbl Model: Default
Plot Scale: 40.0087 'in. Project: Freese and Nichols, Inc.--True Type Fonts
Plot Date: Feb. 21, 2024 - 09:30:03 AM

Office: On Site Date: Feb. 21, 2024 - 09:30:03 AM User: 90262 File: N:\lf\Drawings\Roadway\cv-trt-pp-roch-road02.sht





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FREESE AND NICHOLS, INC.

RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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TEXAS NO. 134055 ON 10/21/2021
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N

0 10' 20' 40'
HORIZONTAL SCALE

0 2' 4' 8'
VERTICAL SCALE

LEGEND

- ASPHALT PAVING (REFER TO TYP-2)
- COLORED AND CHEMICALLY STAINED CONCRETE PAVING (REFER TO PVDT-6)
- 4" SIDEWALK (REFER TO DETAIL R-2170)
- 8" CONCRETE PAVEMENT (3,600 PSI@ 6.5 SACK/CY) W/ #4 @ 18" OCEW
- ROCK RIPRAP (REFER TO DPDT-2)
- 6" THICK GRAVEL DRIVEWAY
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4. REFER TO TREE CONSERVATION TC-1 THRU TC-6 FOR TREE REMOVAL AND PRESERVATION.
5. THE STREET RIGHT OF WAY TO THE WEST SIDE OF THE PROPERTY LINE (CENTERLINE OF ROCHELL RD) WAS DEDICATED BY ROCKWALL ECONOMIC DEVELOPMENT CORPORATION.

PROFILE LEGEND

- EXISTING GRADE @ ℄
- PROPOSED GRADE @ LT AND RT TOC
- EX GRADE @ LT ROW
- EX GRADE @ RT ROW

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2201
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

ROCHELL RD PLAN & PROFILE
STA 19+00 TO STA 23+50

NO.	ISSUES	BY	DATE

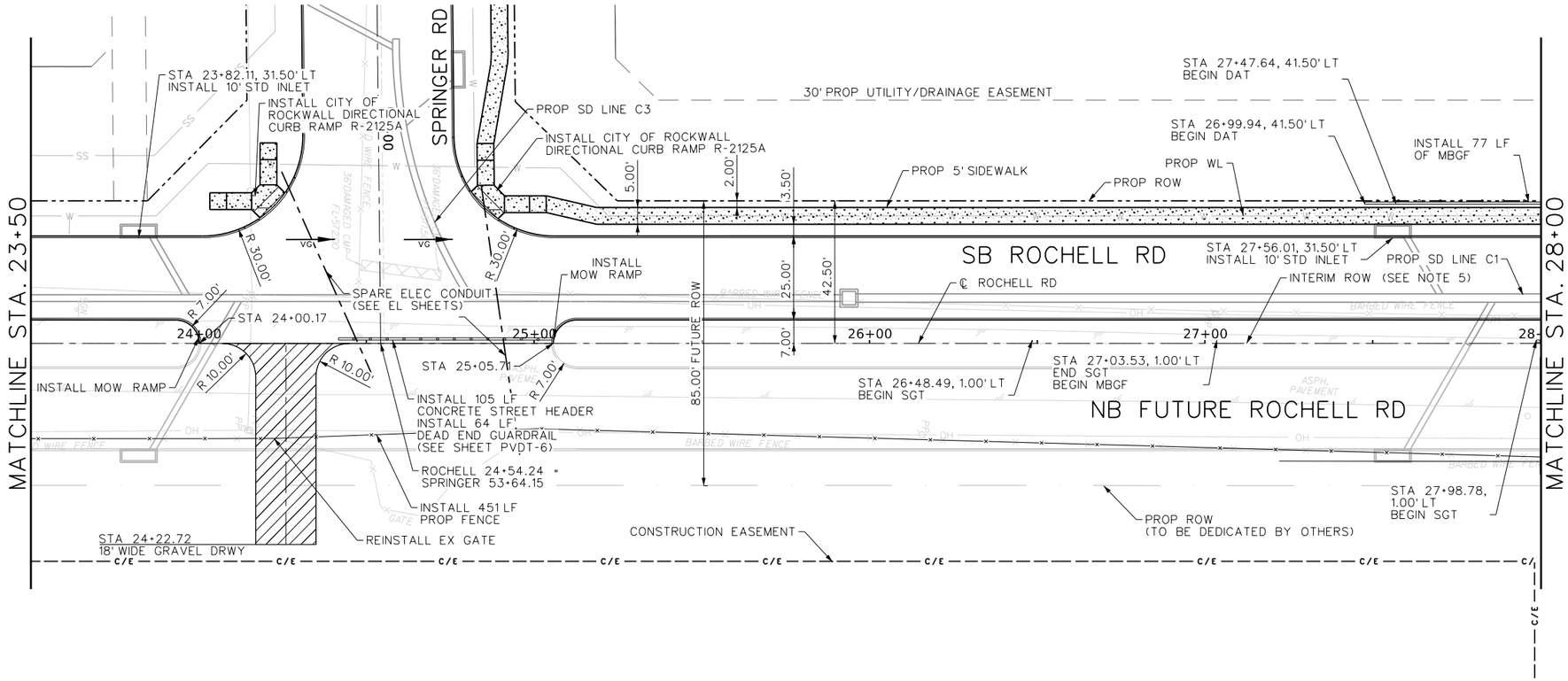
F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MRF
DRAWN CHM
REVISED
CHECKED SEC
FILE NAME cv-trt-pp-roch-road03.sht

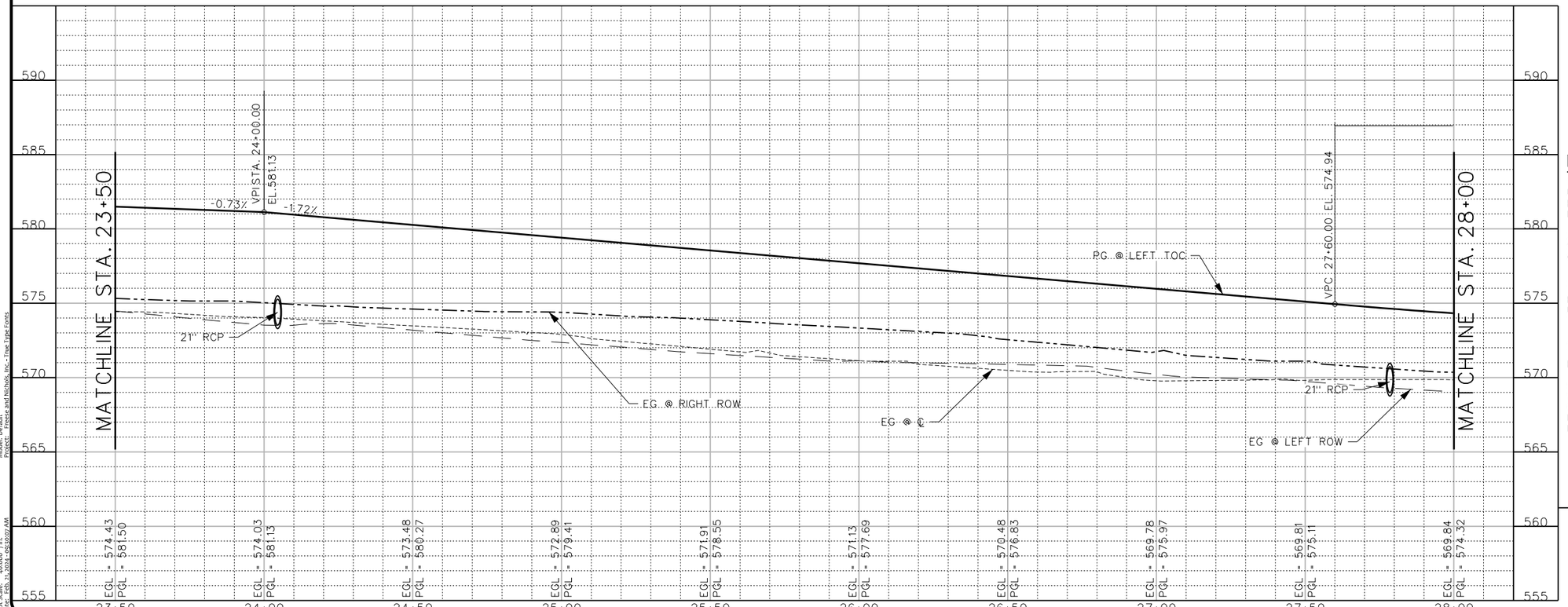
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET PV-15
SEQ. 53

MicroStation V8 User: 90262 Office: On Site
Plotter: \\jfl\Drawings\Roadway\cv-trt-pp-roch-road03.sht Model: Default
Plot Scale: 40.0087 In. = 1 Ft. Project: Freese and Nichols, Inc.- True Type Fonts
Date: Feb. 21, 2024 - 09:30:05 AM

Office: On Site Date: Feb. 21, 2024 - 09:30:05 AM User: 90262 File: N:\jfl\Drawings\Roadway\cv-trt-pp-roch-road03.sht





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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

N

0 10' 20' 40'
HORIZONTAL SCALE
0 2' 4' 8'
VERTICAL SCALE

LEGEND

- ASPHALT PAVING (REFER TO TYP-2)
- COLORED AND CHEMICALLY STAINED CONCRETE PAVING (REFER TO PVDT-6)
- 4" SIDEWALK (REFER TO DETAIL R-2170)
- 8" CONCRETE PAVEMENT (3,600 PSI@ 6.5 SACK/CY) W/ #4 @ 18" OCEW
- ROCK RIPRAP (REFER TO DPDT-2)
- 6" THICK GRAVEL DRIVEWAY
- VG — VALLEY GUTTER
- HP — HIGH POINT

NOTES:

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5. THE STREET RIGHT OF WAY TO THE WEST SIDE OF THE PROPERTY LINE (CENTERLINE OF ROCHELL RD) WAS DEDICATED BY ROCKWALL ECONOMIC DEVELOPMENT CORPORATION.

PROFILE LEGEND
- EXISTING GRADE @ ℄
- PROPOSED GRADE @ LT AND RT TOC
- EX GRADE @ LT ROW
- EX GRADE @ RT ROW

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASE THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
IT IS UNLAWFUL TO RELEASE THIS DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2211
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

ROCHELL RD PLAN & PROFILE STA 23+50 TO STA 28+00

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MRF
DRAWN CHM
REVISED
CHECKED SEC
FILE NAME cv-trt-pp-roch-road04.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET PV-16
SEQ. 54

MicroStation V8 User: 90262 Office: On Site
Plotter: \\JP\Drawings\Roadway\cv-trt-pp-roch-road04.sht
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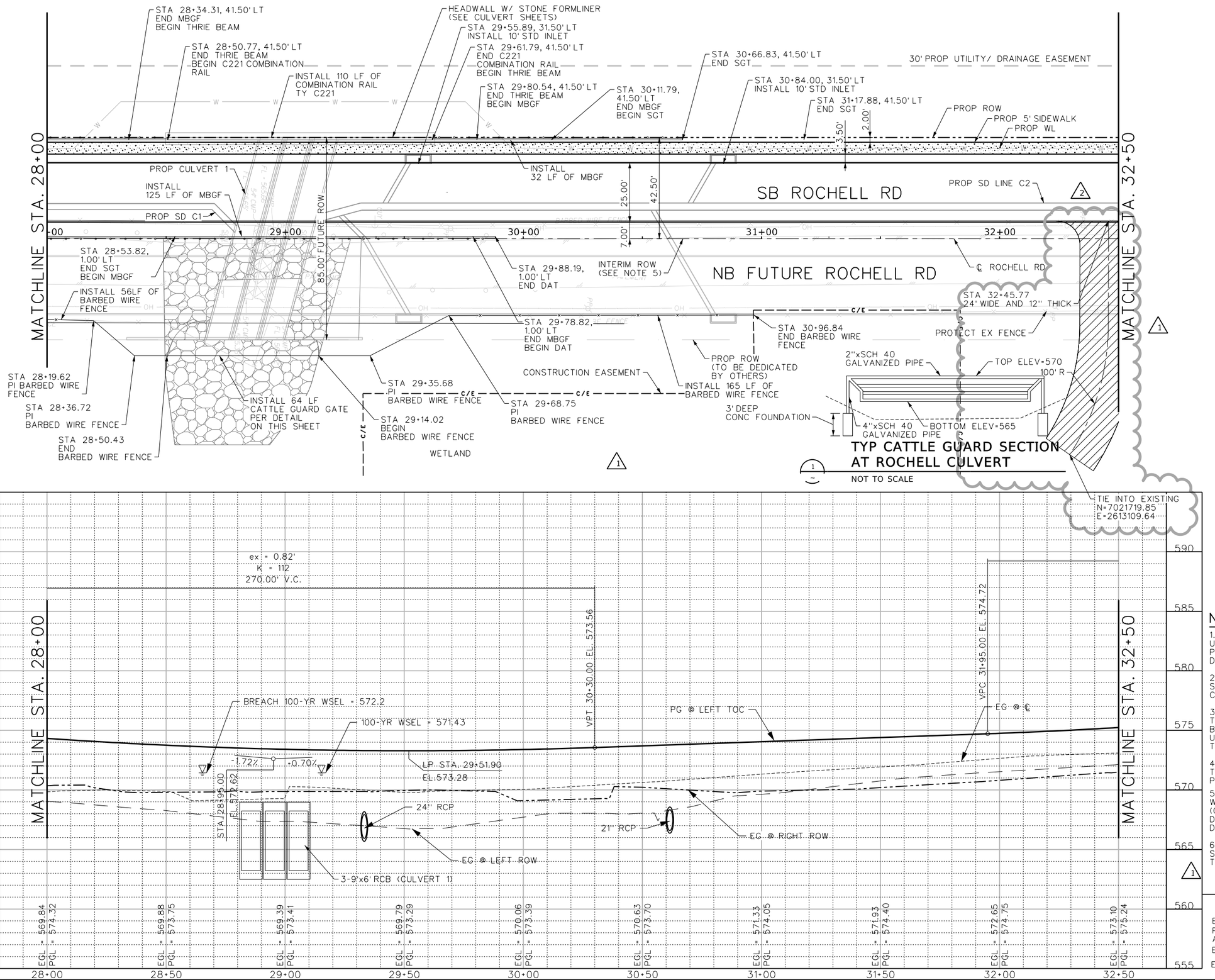
Plot Date: Feb. 21, 2024 - 09:30:07 AM
Model: Default
Project: Freese and Nichols, Inc. - True Type Fonts



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FREESE AND NICHOLS, INC.

RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASE THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE TEXAS NO. 134055 ON 10/21/2021 IT SHOULD NOT BE USED FOR ANY PURPOSE WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2250
Web - www.freese.com

N

0 10' 20' 40'
HORIZONTAL SCALE

0 2' 4' 8'
VERTICAL SCALE

LEGEND

- ASPHALT PAVING (REFER TO TYP-2)
- COLORED AND CHEMICALLY STAINED CONCRETE PAVING (REFER TO PVDT-6)
- 4" SIDEWALK (REFER TO DETAIL R-2170)
- 8" CONCRETE PAVEMENT (3,600 PSI@ 6.5 SACK/CY) W/ #4 @ 18" OCEW
- ROCK RIPRAP (REFER TO DPDT-2)
- 6" THICK GRAVEL DRIVEWAY
- VG — VALLEY GUTTER
- HP — HIGH POINT

NOTES:

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5. THE STREET RIGHT OF WAY TO THE WEST SIDE OF THE PROPERTY LINE (CENTERLINE OF ROCHELL RD) WAS DEDICATED BY ROCKWALL ECONOMIC DEVELOPMENT CORPORATION.
6. CONTRACTOR SHALL SUBMIT PROPOSED SHOP DRAWING FOR APPROVAL PRIOR TO PURCHASING AND INSTALLING GATE.

PROFILE LEGEND

- EXISTING GRADE @ ℄
- PROPOSED GRADE @ LT AND RT TOC
- EX GRADE @ LT ROW
- EX GRADE @ RT ROW

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

ROCHELL RD PLAN & PROFILE STA 28+00 TO STA 32+50

NO.	ISSUES	BY	DATE
2	ADDENDUM # 2	SEC	11/17/2021
1	CO #1	SEC	10/24/22

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MRF
DRAWN CHM
REVISED
CHECKED SEC
FILE NAME cv-trt-pp-roch-road05.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET PV-17
SEQ. 55

MicroStation V8 User: 90262 Office: On Site
Plotter: \\jlf\Drawings\Roadway\cv-trt-pp-roch-road05.sht
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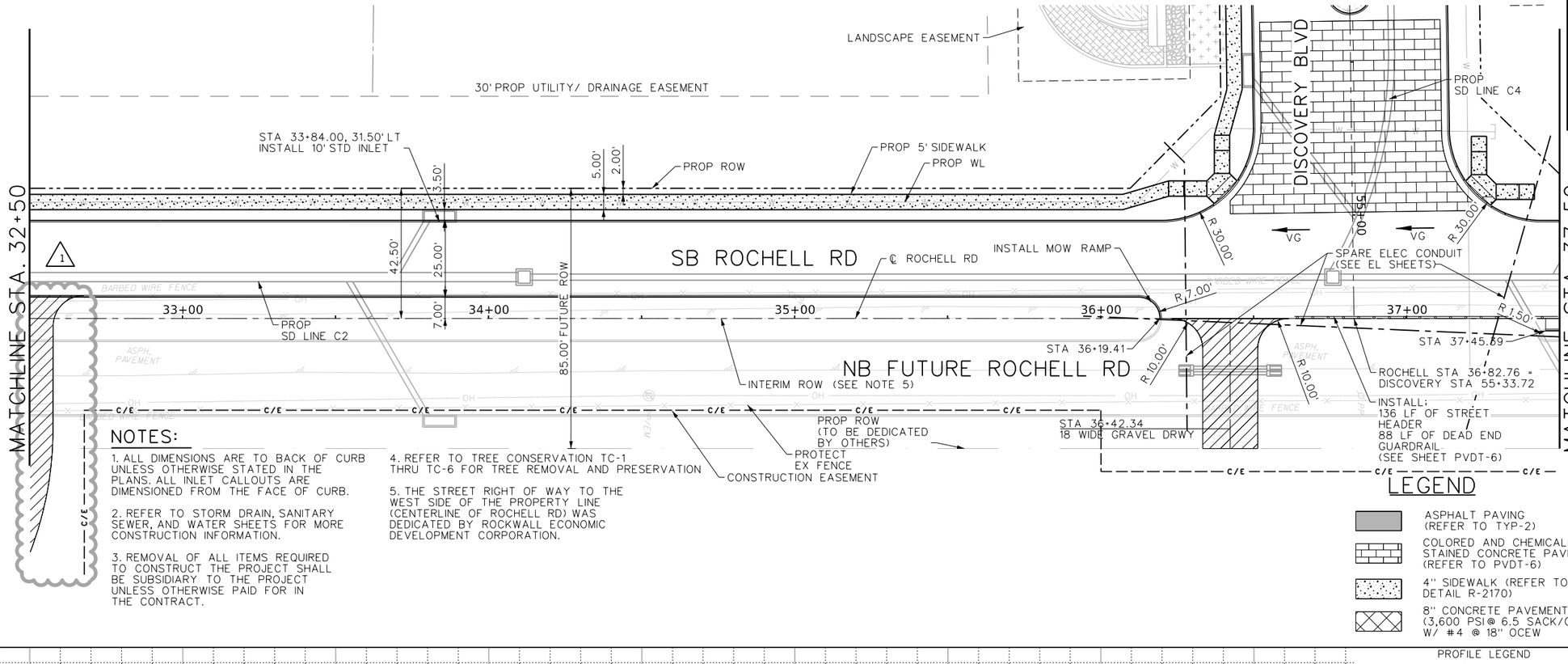
Plot Scale: 40.008 ' / in.
Date: Feb. 21, 2024 - 11:05:11 AM
Projects: Freese and Nichols, Inc. - True Type Fonts



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5. THE STREET RIGHT OF WAY TO THE WEST SIDE OF THE PROPERTY LINE (CENTERLINE OF ROCHELL RD) WAS DEDICATED BY ROCKWALL ECONOMIC DEVELOPMENT CORPORATION.

LEGEND

- ASPHALT PAVING (REFER TO TYP-2)
- COLORED AND CHEMICALLY STAINED CONCRETE PAVING (REFER TO PVDT-6)
- 4" SIDEWALK (REFER TO DETAIL R-2170)
- 8" CONCRETE PAVEMENT (3,600 PSI@ 6.5 SACK/CY) W/ #4 @ 18" OCEW
- 6" THICK GRAVEL DRIVEWAY
- VG — VALLEY GUTTER
- HP — HIGH POINT

HORIZONTAL SCALE 0 10' 20' 40'
VERTICAL SCALE 0 2' 4' 8'

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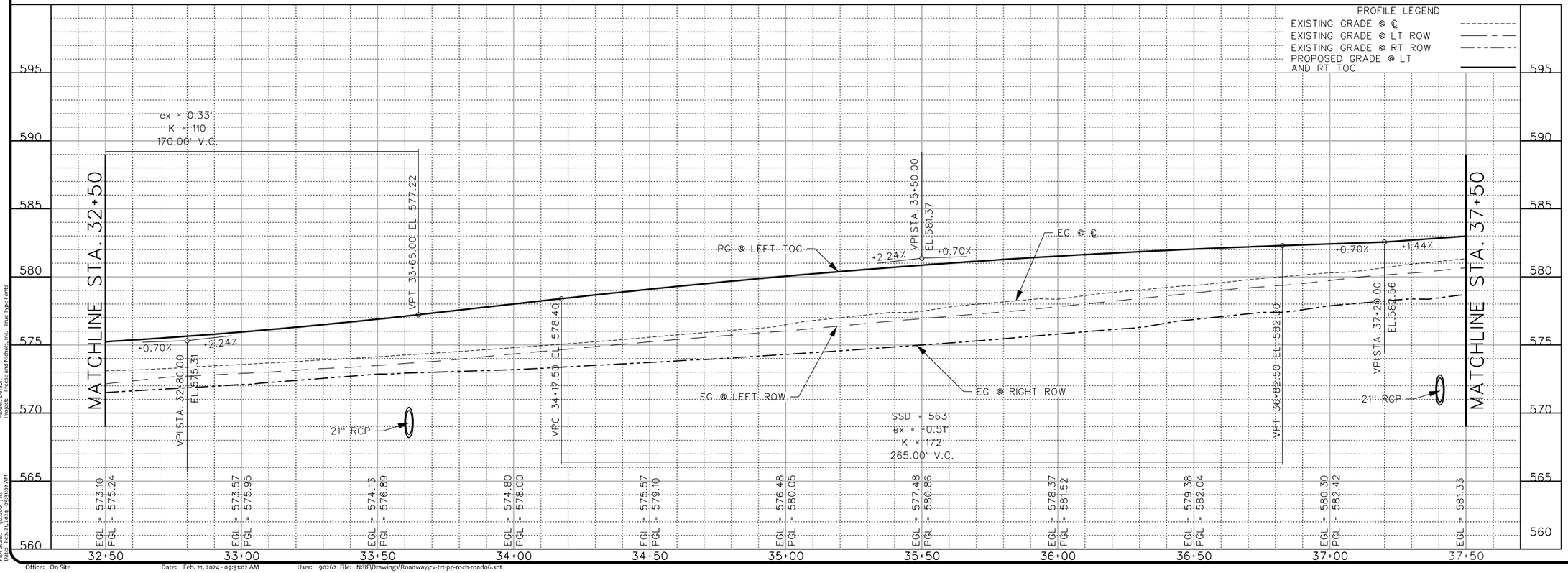
RECORD DRAWINGS PREPARED ON: 8/20/2024



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FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144
FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2201
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

ROCHELL RD PLAN & PROFILE STA 32+50 TO STA 37+50

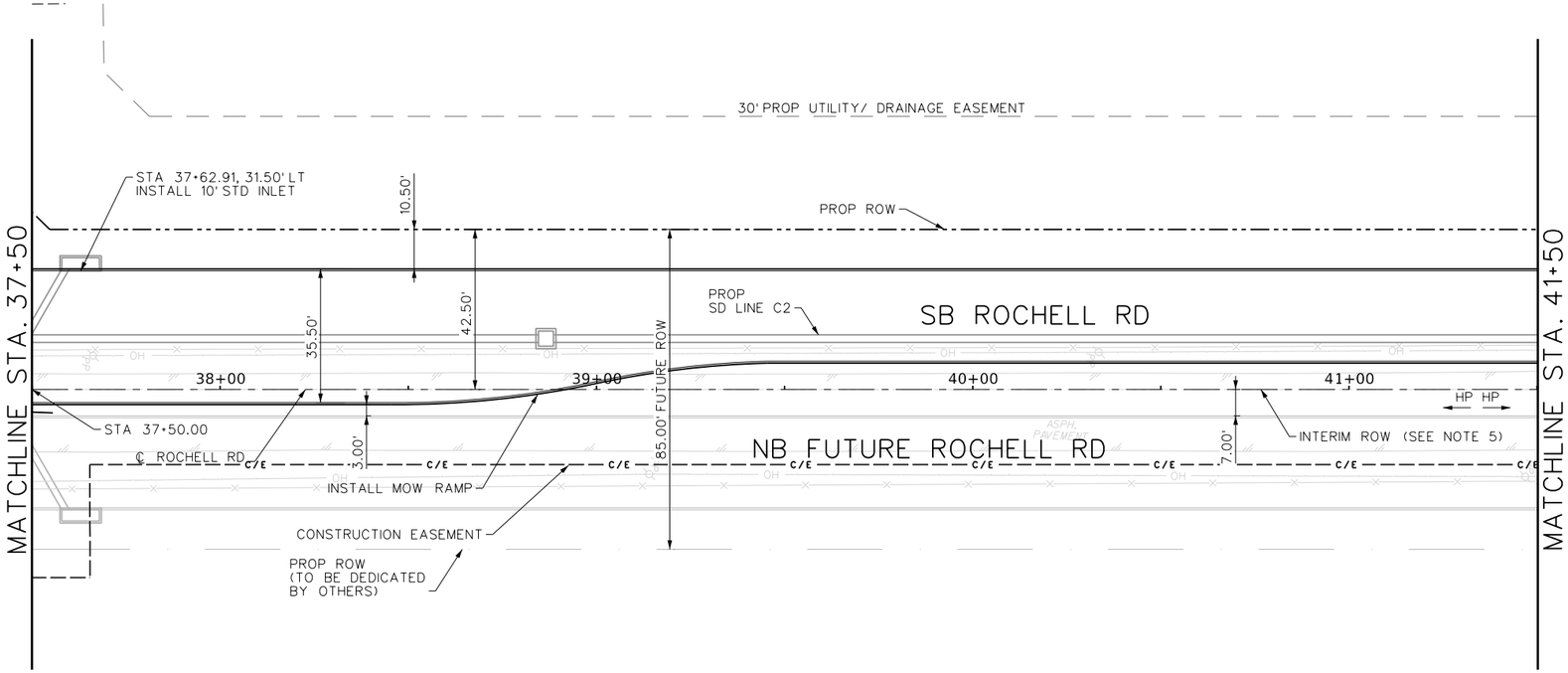
NO.	ISSUES	BY	DATE
1	CO #1	SEC	10/24/22

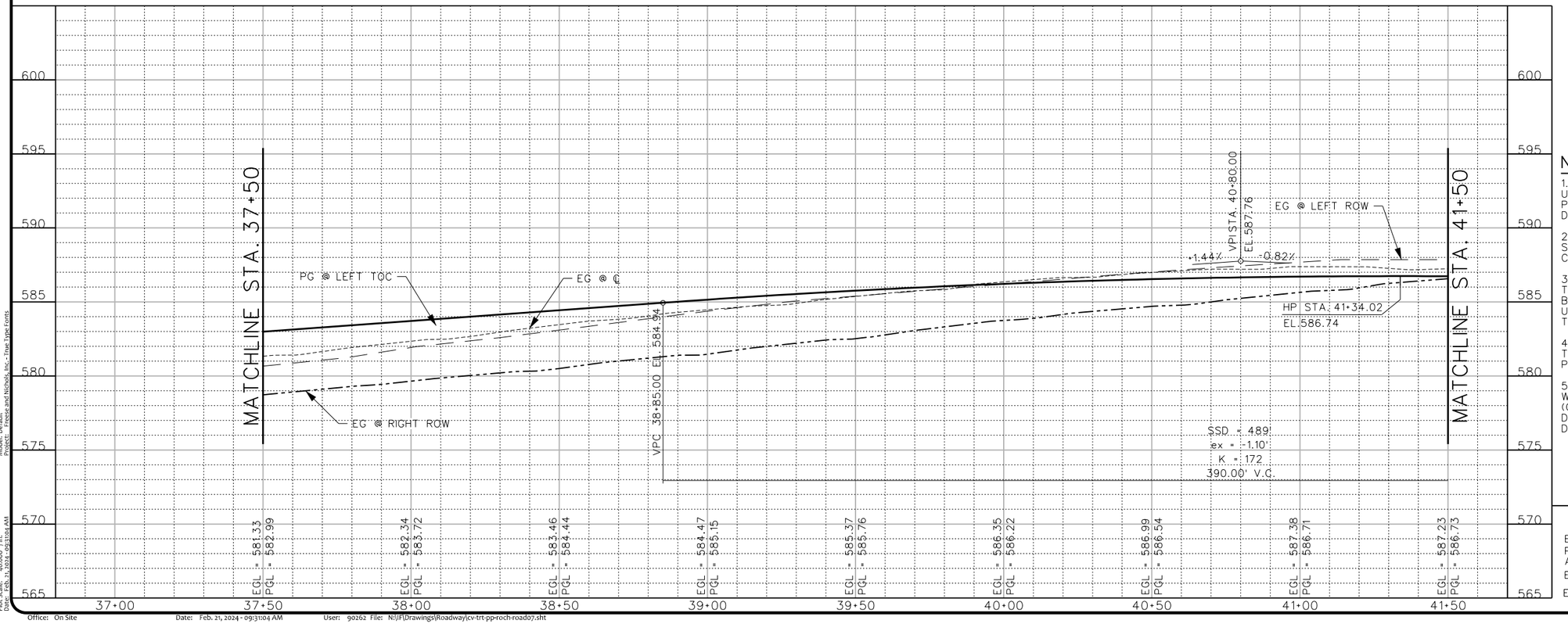
F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MRF
DRAWN CHM
REVISED
CHECKED SEC
FILE NAME cv-trt-pp-roch-road06.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET PV-18
SEQ. 56

MicroStation V8 User: 90262 Office: On Site
Plotter: \\JH\Drawings\Roadway\cv-trt-pp-roch-road06.sht
Plot Scale: 40.008 ' in.
Plot Date: Feb. 21, 2024 - 09:31:02 AM
Model: Default
Project: Freese and Nichols, Inc. - True Type Fonts





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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

N

0 10' 20' 40'
HORIZONTAL SCALE
0 2' 4' 8'
VERTICAL SCALE

LEGEND

- ASPHALT PAVING (REFER TO TYP-2)
- COLORED AND CHEMICALLY STAINED CONCRETE PAVING (REFER TO PVDT-6)
- 4" SIDEWALK (REFER TO DETAIL R-2170)
- 8" CONCRETE PAVEMENT (3,600 PSI@ 6.5 SACK/CY) W/ #4 @ 18" OCEW
- ROCK RIPRAP (REFER TO DPDT-2)
- 6" THICK GRAVEL DRIVEWAY
- VG — VALLEY GUTTER
- HP — HIGH POINT

NOTES:

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PROFILE LEGEND

- EXISTING GRADE @ ℄ ----------
- PROPOSED GRADE @ LT AND RT TOC ——————
- EX GRADE @ LT ROW — — —
- EX GRADE @ RT ROW — — — — —

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASED FOR REVIEW
THIS DOCUMENT WAS ORIGINALLY ISSUED AND SEALED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
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2711 North Haskell Avenue, Suite 3300
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Phone: (214) 217-2200
Fax: (214) 217-2201
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

ROCHELL RD PLAN & PROFILE STA 37+50 TO STA 41+50

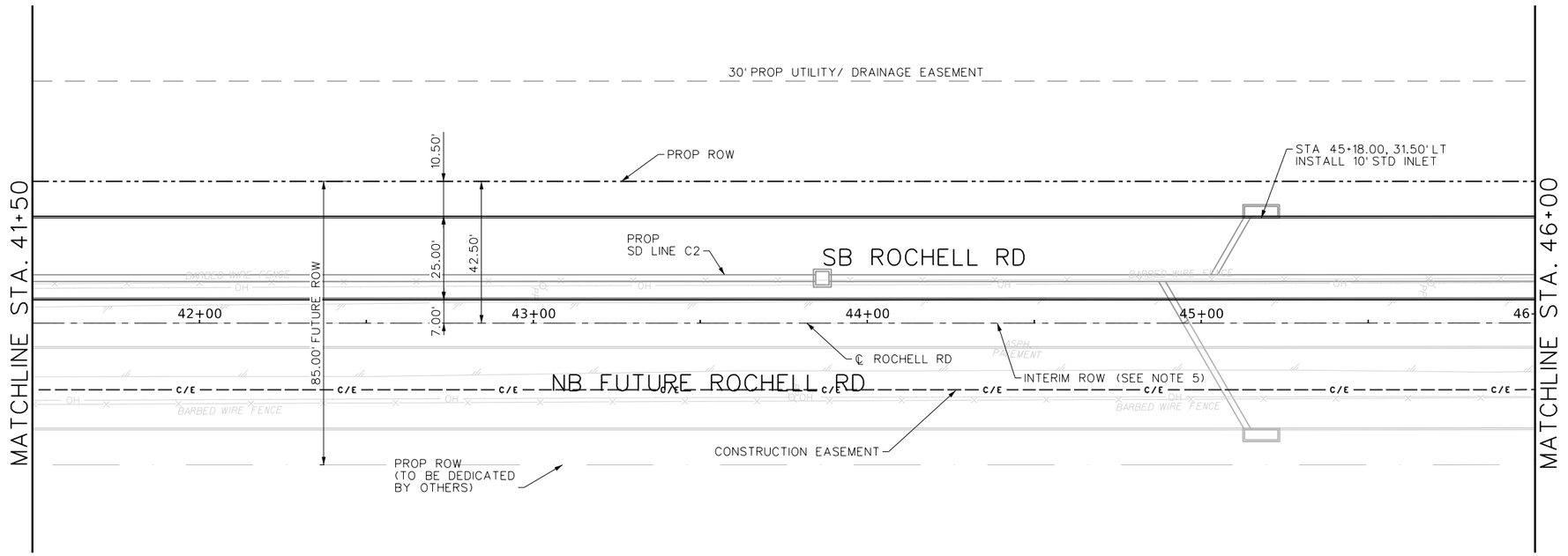
NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MRF
DRAWN CHM
REVISED
CHECKED SEC
FILE NAME cv-trt-pp-roch-road07.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET PV-19
SEQ. 57

MicroStation V8 User: 90262 Office: On Site
Plotter: \\ffl\Drawings\Roadway\cv-trt-pp-roch-road07.sht
Plot Scale: 40.0087 In. = 1 Ft. Model: Default
Date: Feb. 21, 2024 - 09:31:04 AM Project: Freese and Nichols, Inc. - True Type Fonts
Office: On Site Date: Feb. 21, 2024 - 09:31:04 AM User: 90262 File: N:\ffl\Drawings\Roadway\cv-trt-pp-roch-road07.sht



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RECORD DRAWINGS PREPARED ON:
8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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Dallas, Texas 75204
Phone - (214) 217-2200
Fax - (214) 217-2201
Web - www.freese.com

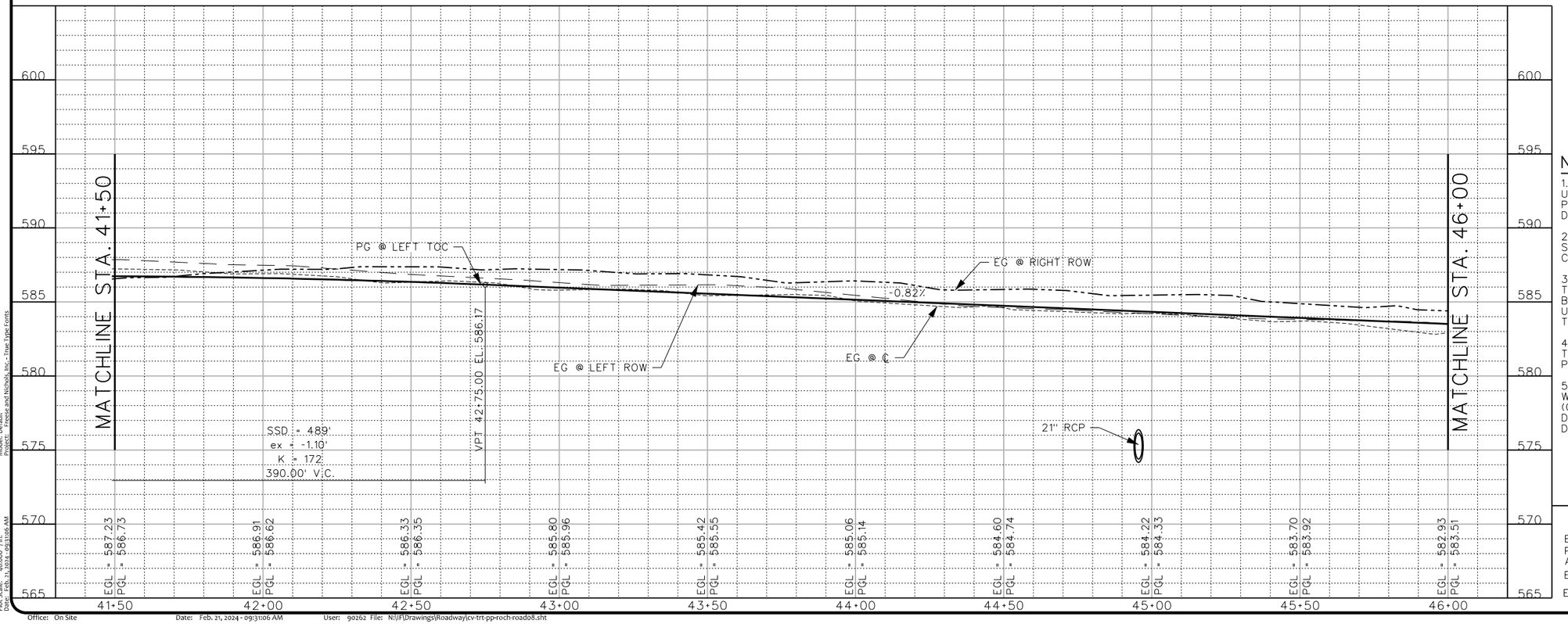
N

0 10' 20' 40'
HORIZONTAL SCALE

0 2' 4' 8'
VERTICAL SCALE

LEGEND

- ASPHALT PAVING (REFER TO TYP-2)
- COLORED AND CHEMICALLY STAINED CONCRETE PAVING (REFER TO PVDT-6)
- 4" SIDEWALK (REFER TO DETAIL R-2170)
- 8" CONCRETE PAVEMENT (3,600 PSI@ 6.5 SACK/CY) W/ #4 @ 18" OCEW
- ROCK RIPRAP (REFER TO DPDT-2)
- 6" THICK GRAVEL DRIVEWAY
- VG — VALLEY GUTTER
- HP — HIGH POINT



NOTES:

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5. THE STREET RIGHT OF WAY TO THE WEST SIDE OF THE PROPERTY LINE (CENTERLINE OF ROCHELL RD) WAS DEDICATED BY ROCKWALL ECONOMIC DEVELOPMENT CORPORATION.

PROFILE LEGEND

- EXISTING GRADE @ ℄ ----------
- PROPOSED GRADE @ LT AND RT TOC ——————
- EX GRADE @ LT ROW — — —
- EX GRADE @ RT ROW — — — — —

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

ROCHELL RD PLAN & PROFILE STA 41+50 TO STA 46+00

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MRF
DRAWN CHM
REVISED
CHECKED SEC
FILE NAME cv-trt-pp-roch-road08.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.

SHEET PV-20
SEQ. 58

MicroStation V8 User: 90262 Office: On Site
N:\lf\Drawings\Roadway\cv-trt-pp-roch-road08.sht
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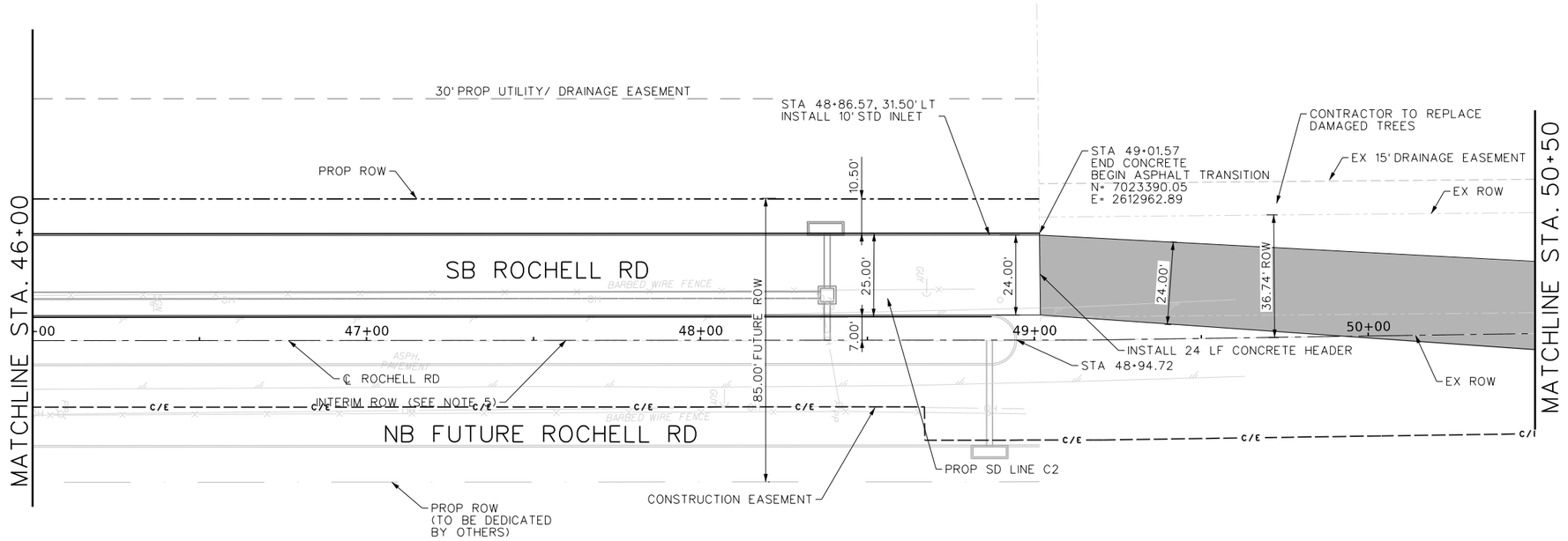
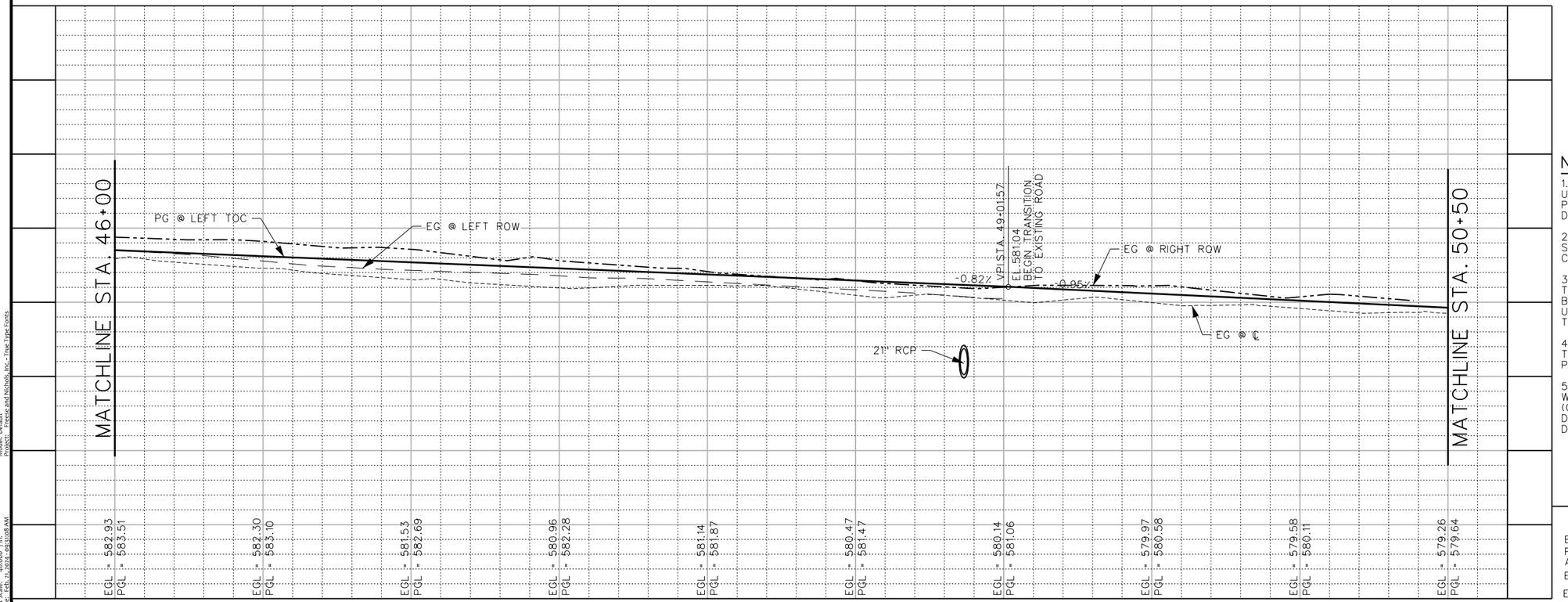
Plot Scale: 40.0087 'in. Project: Freese and Nichols, Inc.- True Type Fonts
Date: Feb. 21, 2024 - 09:31:06 AM
Office: On Site Date: Feb. 21, 2024 - 09:31:06 AM User: 90262 File: N:\lf\Drawings\Roadway\cv-trt-pp-roch-road08.sht





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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

LEGEND

- ASPHALT PAVING (REFER TO TYP-2)
- COLORED AND CHEMICALLY STAINED CONCRETE PAVING (REFER TO PVDT-6)
- 4" SIDEWALK (REFER TO DETAIL R-2170)
- 8" CONCRETE PAVEMENT (3,600 PSI@ 6.5 SACK/CY) W/ #4 @ 18" OCEW
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- 6" THICK GRAVEL DRIVEWAY
- VG — VALLEY GUTTER
- HP — HIGH POINT

NOTES:

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PROFILE LEGEND

- EXISTING GRADE @ ℄ ----------
- PROPOSED GRADE @ LT AND RT TOC ——————
- EX GRADE @ LT ROW — — —
- EX GRADE @ RT ROW — — — —

TEXAS REGISTERED ENGINEERING FIRM F-2144
FREESE AND NICHOLS, INC.

RELEASE FOR REVIEW
THIS DOCUMENT WAS PREPARED UNDER THE AUTHORITY OF SARAH E. CAUDLE TEXAS NO. 134055 ON 10/21/2021 IT IS NOT TO BE USED FOR BIDDING OR CONSTRUCTION WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

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Fax: (214) 217-2201
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

ROCHELL RD PLAN & PROFILE
STA 46+00 TO STA 50+50

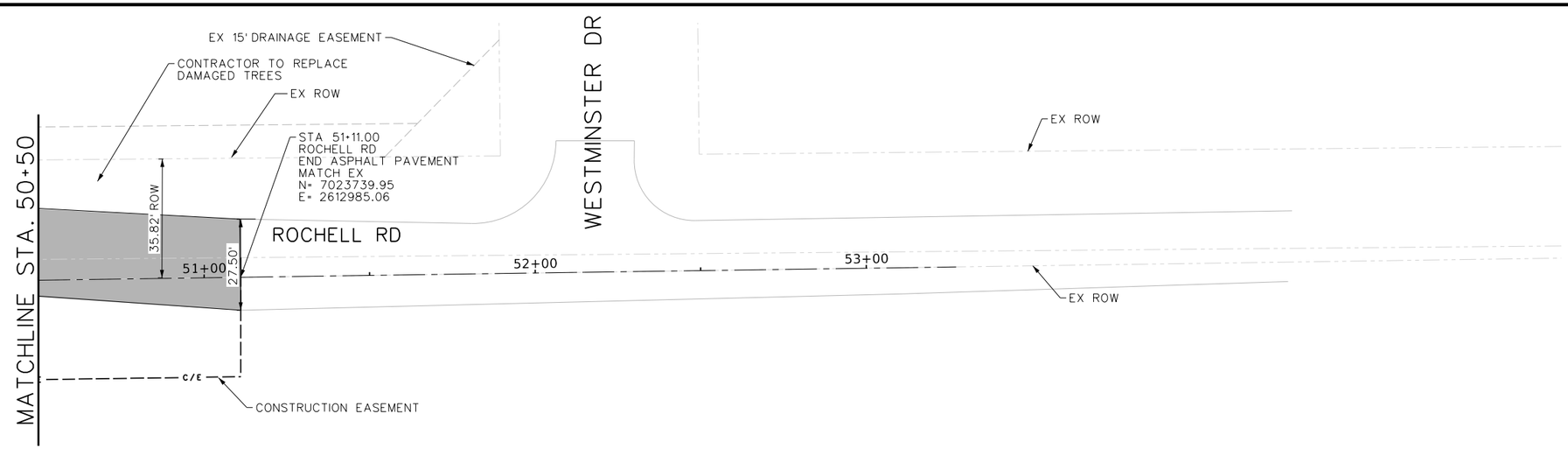
NO.	ISSUES	BY	DATE

F&N JOB NO. RKV19711
DATE APRIL 2022
DESIGNED MRF
DRAWN CHM
REVISED
CHECKED SEC
FILE NAME cv-trt-pp-roch-road09.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET PV-21
SEQ. 59

MicroStation V8 User: 90262 Office: On Site
N:\IF\Drawings\Roadway\cv-trt-pp-roch-road09.sht
Plotter: J:\Workspace\PWD\PWD.pltcfg Model: Default
Plot Scale: 40.0087 In. Project: Freese and Nichols, Inc.- True Type Fonts
Date: Feb. 21, 2024 - 09:31:08 AM



This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASE THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
ALTERATIONS TO THIS DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2201
Web - www.freese.com

N

0 10' 20' 40'
HORIZONTAL SCALE
0 2' 4' 8'
VERTICAL SCALE

LEGEND

- ASPHALT PAVING (REFER TO TYP-2)
- COLORED AND CHEMICALLY STAINED CONCRETE PAVING (REFER TO PVDT-6)
- 4" SIDEWALK (REFER TO DETAIL R-2170)
- 8" CONCRETE PAVEMENT (3,600 PSI@ 6.5 SACK/CY) W/ #4 @ 18" OCEW
- ROCK RIPRAP (REFER TO DPDT-2)
- 6" THICK GRAVEL DRIVEWAY
- VG — VALLEY GUTTER
- HP — HIGH POINT

NOTES:

1. ALL DIMENSIONS ARE TO BACK OF CURB UNLESS OTHERWISE STATED IN THE PLANS. ALL INLET CALLOUTS ARE DIMENSIONED FROM THE FACE OF CURB.
2. REFER TO STORM DRAIN, SANITARY SEWER, AND WATER SHEETS FOR MORE CONSTRUCTION INFORMATION.
3. REMOVAL OF ALL ITEMS REQUIRED TO CONSTRUCT THE PROJECT SHALL BE SUBSIDIARY TO THE PROJECT UNLESS OTHERWISE PAID FOR IN THE CONTRACT.
4. REFER TO TREE CONSERVATION TC-1 THRU TC-6 FOR TREE REMOVAL AND PRESERVATION.

PROFILE LEGEND

EXISTING GRADE @ ℄	----------
PROPOSED GRADE @ LT AND RT TOC	————
EX GRADE @ LT ROW	— — —
EX GRADE @ RT ROW	— — — — —

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

ROCHELL RD PLAN & PROFILE STA 50+50 TO END

NO.	ISSUES	BY	DATE

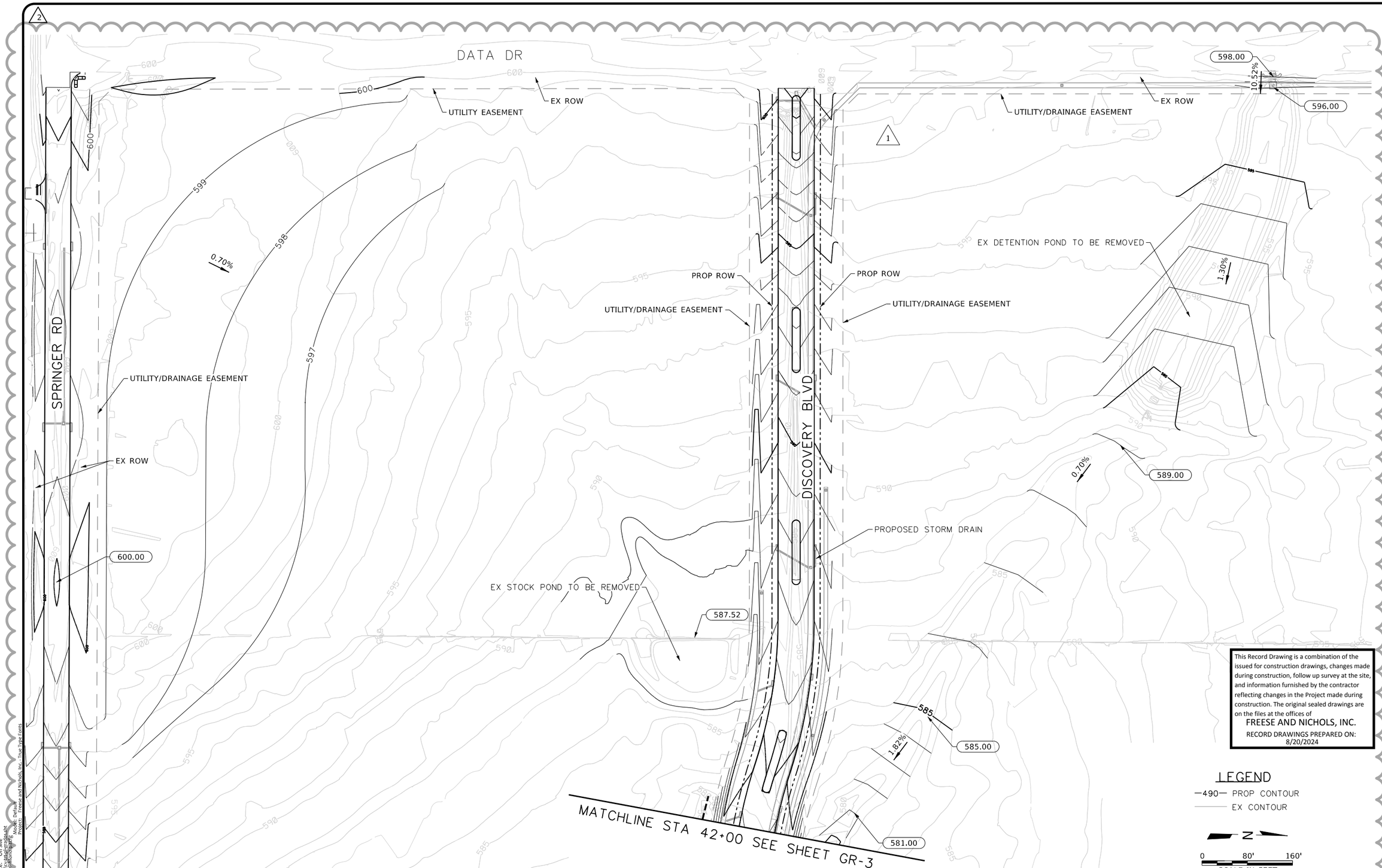
F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MRF
DRAWN CHM
REVISED
CHECKED SEC
FILE NAME cv-trt-pp-roch-road10.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET PV-22
SEQ. 60

MicroStation V8 User: 90262 Office: On Site
Plotter: \\jfpw0001\hp5100_ps4pcl4 Model: Default
Plot Scale: 40.087 ' / in. Plotted: Freese and Nichols, Inc. - True Type Fonts
Date: Feb. 21, 2024 - 09:31:10 AM

Office: On Site Date: Feb. 21, 2024 - 09:31:10 AM User: 90262 File: N:\F\Drawings\Roadway\cv-trt-pp-roch-road10.sht



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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

LEGEND
—490— PROP CONTOUR
EX CONTOUR

N
0 80' 160'
SCALE IN FEET

NOTES:

1. THE MAXIMUM SLOPE IS 4:1.
2. CONTRACTOR TO REFER TO DETENTION POND SHEETS FOR DETAILED GRADING INFORMATION.
3. ALL ROADWAY GRADES CAN BE FOUND ON THE ROADWAY PLAN AND PROFILE SHEETS.
4. ALL SIDE DITCHES SHALL HAVE 6 FT BOTTOM WIDTHS.

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASE FOR CONSTRUCTION
THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO. 134095 ON 10/21/2021
IT IS NOT TO BE USED FOR BIDDING PURPOSES
NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: 214.217.2200
Fax: 214.217.2201
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
CIVIL
GRADING PLAN

NO.	ISSUES	BY	DATE
2	ADDENDUM #5	SEC	12/7/21
1	ADDENDUM #2	SEC	11/17/21

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

F&N JOB NO.	RKW19711
DATE	APRIL 2022
DESIGNED	MRF
DRAWN	CHM
REVISED	
CHECKED	SEC
FILE NAME	cv-trt-plgrad01.sht

SHEET GR-1
SEQ. 61

MicroStation V8 User: 90262 Office: On Site
Plotted: Feb. 21, 2024 - 09:31:14 AM
Plot Scale: 1.000 '/ In.
Date: Feb. 21, 2024 - 09:31:14 AM
Model: Default
Project: Freese and Nichols Inc - True Type Fonts

Office: On Site Date: Feb. 21, 2024 - 09:31:14 AM User: 90262 File: N:\ff\Drawings\Roadway\cv-trt-pl-grad01.sht

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

MATCHLINE STA 42+00 SEE SHEET GR-1

583.00
2.33%
EX STOCK POND TO BE REMOVED
585.00

590.00
1.85%
EX ROW
585.00
1.85%
SPRINGER RD
EX ROW

DRAINAGE EASEMENT
SS EASEMENT
HEC-RAS XS 5187
HEC-RAS XS 4966
PROP ROW
UTILITY/DRAINAGE EASEMENT
580.15
4:1
575.92
PROP ROW
UTILITY/DRAINAGE EASEMENT
582.30
HEC-RAS XS 4866
HEC-RAS XS 4817
HEC-RAS XS 4759
HEC-RAS XS 4750
HEC-RAS XS 4736
563.45
586.00
584.00
579.16
0.60%
0.60%
PROP ROW
UTILITY/DRAINAGE EASEMENT
UTILITY/DRAINAGE EASEMENT
PROP ROW
HEC-RAS XS 4723
ROCHELL RD
EX ROW
582.83
HEC-RAS XS 4464
C/L
HEC-RAS XS 4421
573.00
563.00
562.80

MATCHLINE STA 31+50 SEE SHEET GR-3

HWY 276

N
0 80' 160'
SCALE IN FEET

NOTES:

1. THE MAXIMUM SLOPE IS 4:1.
2. CONTRACTOR TO REFER TO DETENTION POND SHEETS FOR DETAILED GRADING INFORMATION.
3. ALL ROADWAY GRADES CAN BE FOUND ON THE ROADWAY PLAN AND PROFILE SHEETS.
4. ALL SIDE DITCHES SHALL HAVE 6 FT BOTTOM WIDTHS.

LEGEND

—490— PROP CONTOUR
—490— EX CONTOUR

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

THIS SEAL THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO. 134095 ON 10/21/2021
ALTERATION OF A SEALED DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

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2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: 214.217.2200
Fax: 214.217.2201
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
CIVIL
GRADING PLAN

NO.	ISSUES	BY	DATE
1	ADDENDUM # 5	SEC	12/7/21
2	ADDENDUM # 3	SEC	11/30/202
3	ADDENDUM # 2	SEC	11/17/21

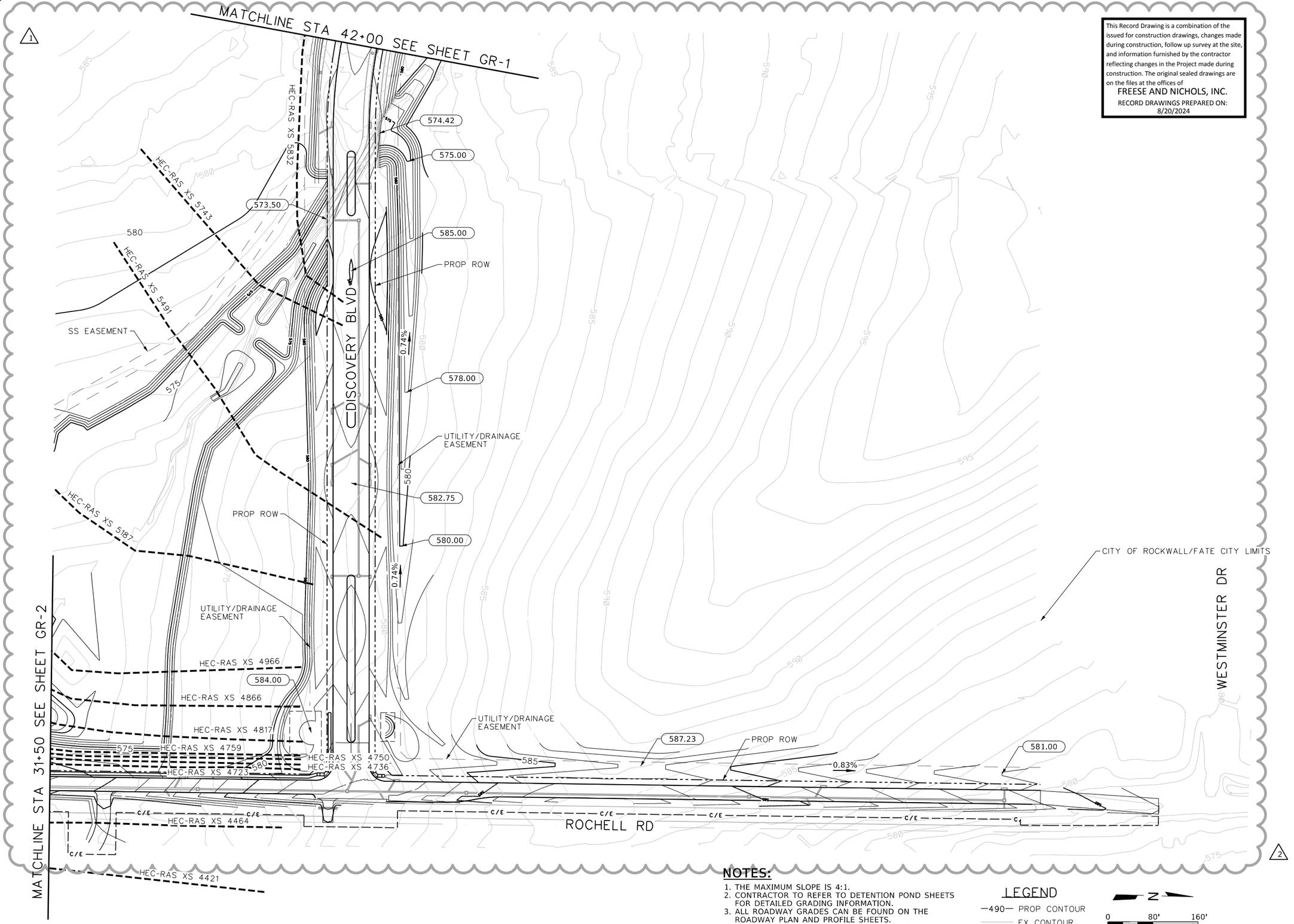
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale accordingly.

F&N JOB NO.	RKW19711
DATE	APRIL 2022
DESIGNED	MRF
DRAWN	CHM
REVISED	
CHECKED	SEC
FILE NAME	cv-trt-pl-grad02.sht

SHEET GR-2
SEQ. 62

MicroStation V8 User: 90262 Office: On Site
File: N:\IF\Drawings\Roadway\cv-trt-pl-grad02.sht
Plotter: \\IPNetPrint\HP_LaserJet M806 Mono(Plotter_1
Plot Scale: 1in = 80.1ft / 1in
Date: 2/21/2024 - 09:31:17 AM
Model: Default
Project: - Freese and Nichols Inc - True Type Fonts

Office: On Site Date: Feb. 21, 2024 - 09:31:17 AM User: 90262 File: N:\IF\Drawings\Roadway\cv-trt-pl-grad02.sht



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FREESE AND NICHOLS, INC.

RECORD DRAWINGS PREPARED ON: 8/20/2024

NOTES:

1. THE MAXIMUM SLOPE IS 4:1.
2. CONTRACTOR TO REFER TO DETENTION POND SHEETS FOR DETAILED GRADING INFORMATION.
3. ALL ROADWAY GRADES CAN BE FOUND ON THE ROADWAY PLAN AND PROFILE SHEETS.
4. ALL SIDE DITCHES SHALL HAVE 6 FT BOTTOM WIDTHS.

LEGEND

—490— PROP CONTOUR

EX CONTOUR

N

0 80' 160'

SCALE IN FEET

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2201
Web - www.freese.com

RELEASE FOR PERMIT ON 10/21/2021
AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO. 134095 ON 10/21/2021
IT IS A VIOLATION OF LAW TO USE THIS DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

GRADING PLAN

NO.	ISSUES	DATE	BY
1	ADDENDUM # 5	12/7/21	SEC
2	ADDENDUM # 3	11/30/2021	SEC

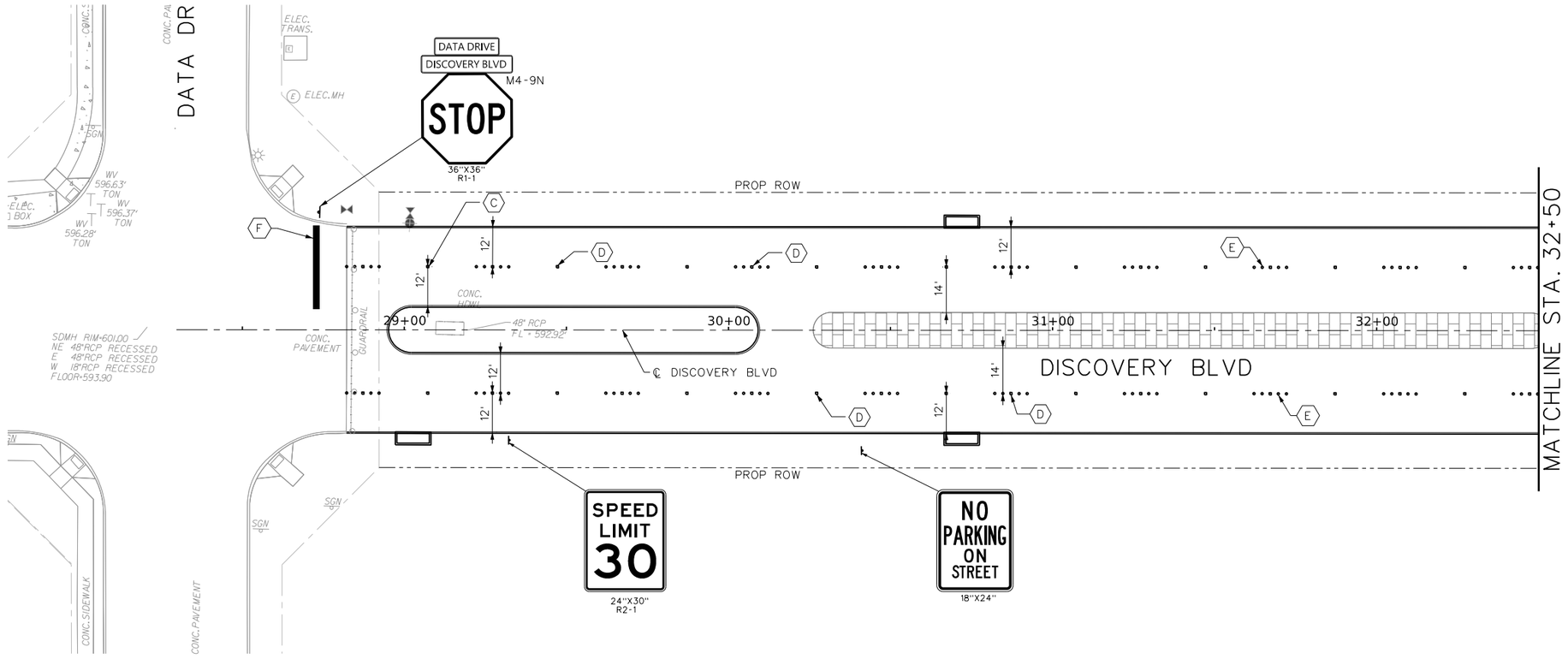
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

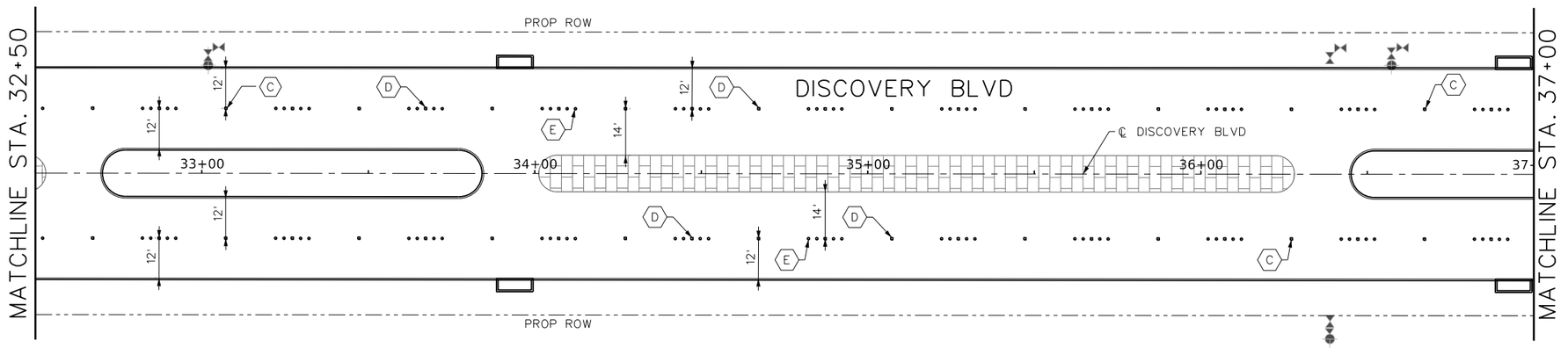
F&N JOB NO.	RKW19271
DATE	APRIL 2022
DESIGNED	MRF
DRAWN	CHM
REVISED	
CHECKED	SEC
FILE NAME	cv-trt-pl-grad03.sht

SHEET GR-3

SEQ. 63

MicroStation V8 User: 90262 Office: On Site
Platter: J:\IF\Drawings\Roadway\cv-trt-pl-grad03.sht
Plot Scale: 160.107 ' / in.
Date: Feb. 21, 2024 - 09:31:20 AM
Model: Default
Project: Freese and Nichols, Inc - True Type Fonts





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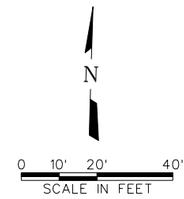
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024



LEGEND

- (A) TYPE II-AA RPM
- (B) TYPE Y RPM
- (C) TYPE II-B-B RPM
- (D) TYPE II-C-R RPM
- (E) TYPE W RPM
- (F) REFL PAV MRK (W) 24" (SLD)

NOTES:

1. REFER TO SHEETS PVDT-4 AND PVDT-5 FOR PAVEMENT MARKING DETAILS
2. ALL STRIPING SHALL BE TYPE 1 REFLECTIVE THERMOPLASTIC, UNLESS OTHERWISE NOTED.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR LAYING OUT ALL PAVEMENT MARKINGS. CHECKING OVERALL DISTANCES ON GROUND AND MAKING ANY ADJUSTMENTS IF NECESSARY PRIOR TO PLACEMENT OF ALL FINAL MARKINGS, WITH APPROVAL OF PROJECT ENGINEER.
4. ALL STREET PAVEMENT MARKINGS INCLUDING DIRECTIONAL ARROWS, WORDS, CROSSWALKS, AND STOP BARS SHALL BE REFLECTORIZED THERMOPLASTIC MATERIAL, UNLESS OTHERWISE NOTED.
5. CONTRACTOR SHALL PRE-MARK STRIPING LAYOUT FOR APPROVAL OF CITY'S STREETS DEPARTMENT AND TXDOT PRIOR TO PLACEMENT OF ANY FINAL PAVEMENT MARKING AND SIGNS.

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

THE SEAL THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
ALTERATION OF SEALED DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2211
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

DISCOVERY PAVEMENT MARKING & SIGNAGE BEGIN TO STA 37+00

NO.	ISSUES	BY	DATE

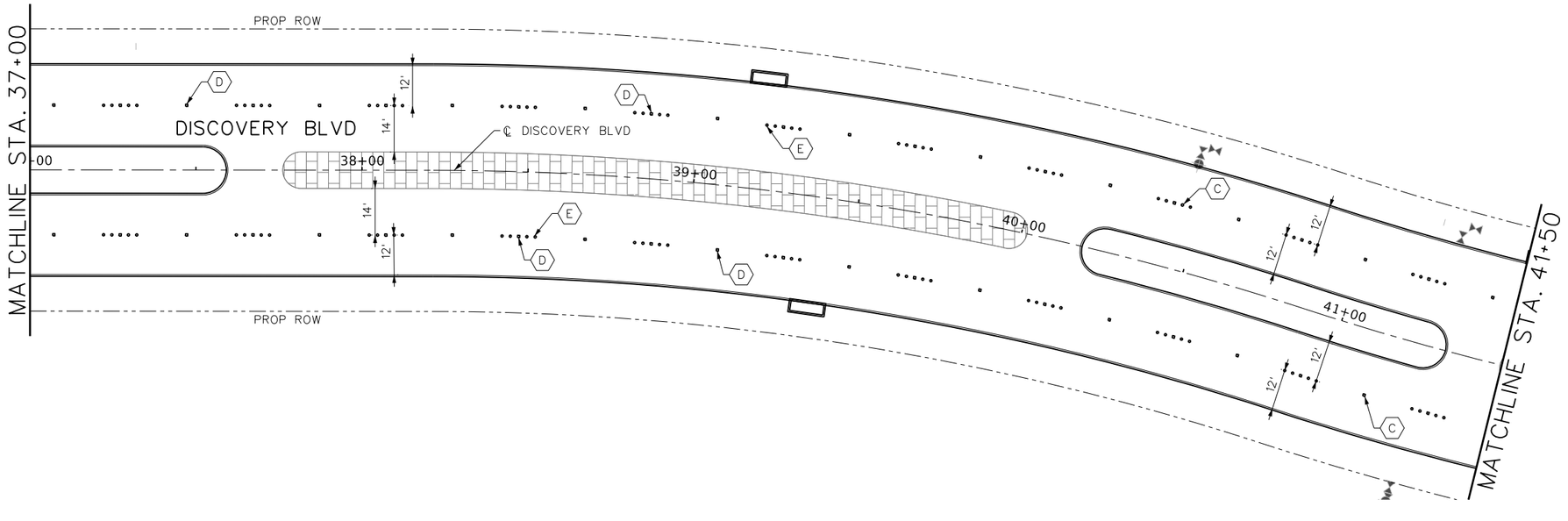
F&N JOB NO. RKW1971
DATE APRIL 2022
DESIGNED MRF
DRAWN CHM
REVISED
CHECKED SEC
FILE NAME cv-trt-pl-pavmrk01.sht

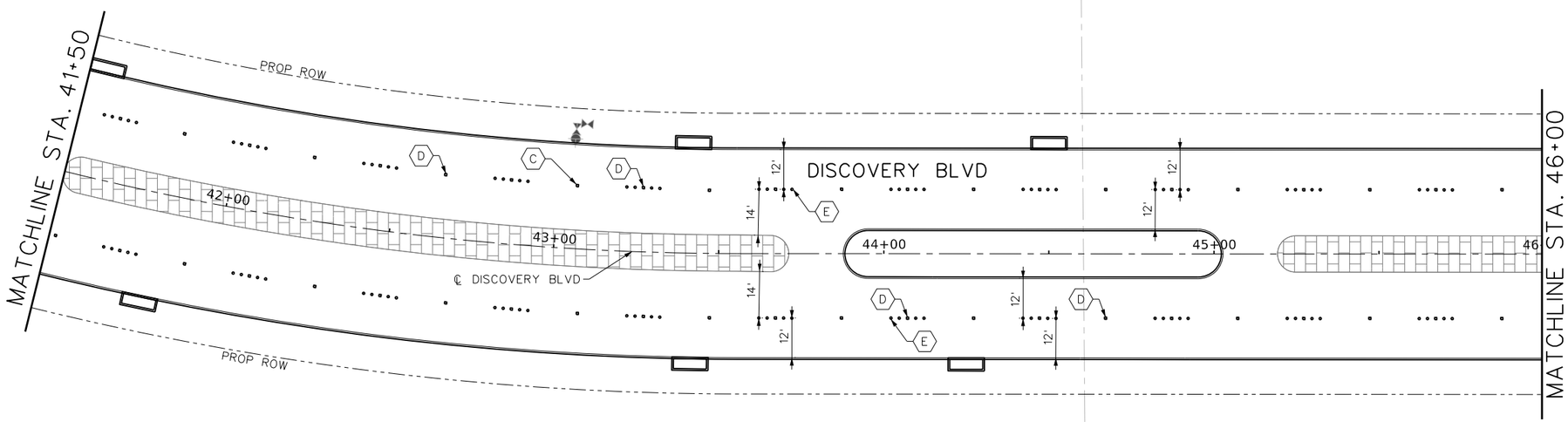
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale
0 1"

SHEET PM-1
SEQ. 64

MicroStation V8 User: 90262 Office: On Site
Platter: J:\FIF\Drawings\Roadway\cv-trt-pl-pavmrk01.sht
Plot Scale: 40.008 ' / In. Model: Default
Date: Feb. 21, 2024 - 09:31:23 AM Project: Freese and Nichols, Inc. - True Type Fonts

Office: On Site Date: Feb. 21, 2024 - 09:31:23 AM User: 90262 File: N:\JF\Drawings\Roadway\cv-trt-pl-pavmrk01.sht





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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

N

0 10' 20' 40'
SCALE IN FEET

LEGEND

- (A) TYPE II-AA RPM
- (B) TYPE Y RPM
- (C) TYPE II-B-B RPM
- (D) TYPE II-C-R RPM
- (E) TYPE W RPM
- (F) REFL PAV MRK (W) 24" (SLD)

NOTES:

1. REFER TO SHEETS PVDT-4 AND PVDT-5 FOR PAVEMENT MARKING DETAILS
2. ALL STRIPING SHALL BE TYPE 1 REFLECTIVE THERMOPLASTIC, UNLESS OTHERWISE NOTED.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR LAYING OUT ALL PAVEMENT MARKINGS. CHECKING OVERALL DISTANCES ON GROUND AND MAKING ANY ADJUSTMENTS IF NECESSARY PRIOR TO PLACEMENT OF ALL FINAL MARKINGS, WITH APPROVAL OF PROJECT ENGINEER.
4. ALL STREET PAVEMENT MARKINGS INCLUDING DIRECTIONAL ARROWS, WORDS, CROSSWALKS, AND STOP BARS SHALL BE REFLECTORIZED THERMOPLASTIC MATERIAL, UNLESS OTHERWISE NOTED.
5. CONTRACTOR SHALL PRE-MARK STRIPING LAYOUT FOR APPROVAL OF CITY'S STREETS DEPARTMENT AND TXDOT PRIOR TO PLACEMENT OF ANY FINAL PAVEMENT MARKING AND SIGNS.

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASED THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
ALTERATION OF THIS DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

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Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2299
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

DISCOVERY PAVEMENT MARKING & SIGNAGE STA 37+00 TO STA 46+00

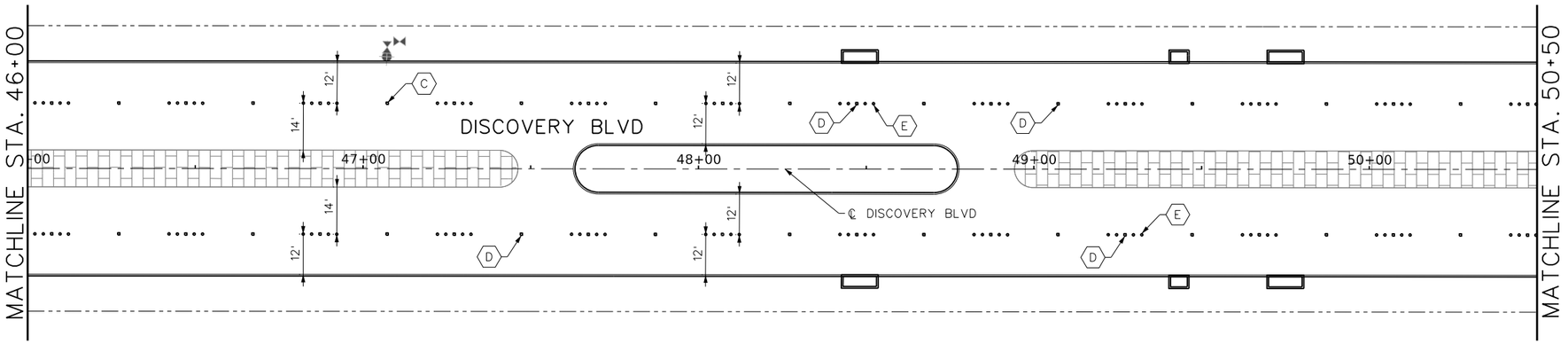
NO.	ISSUES	BY	DATE

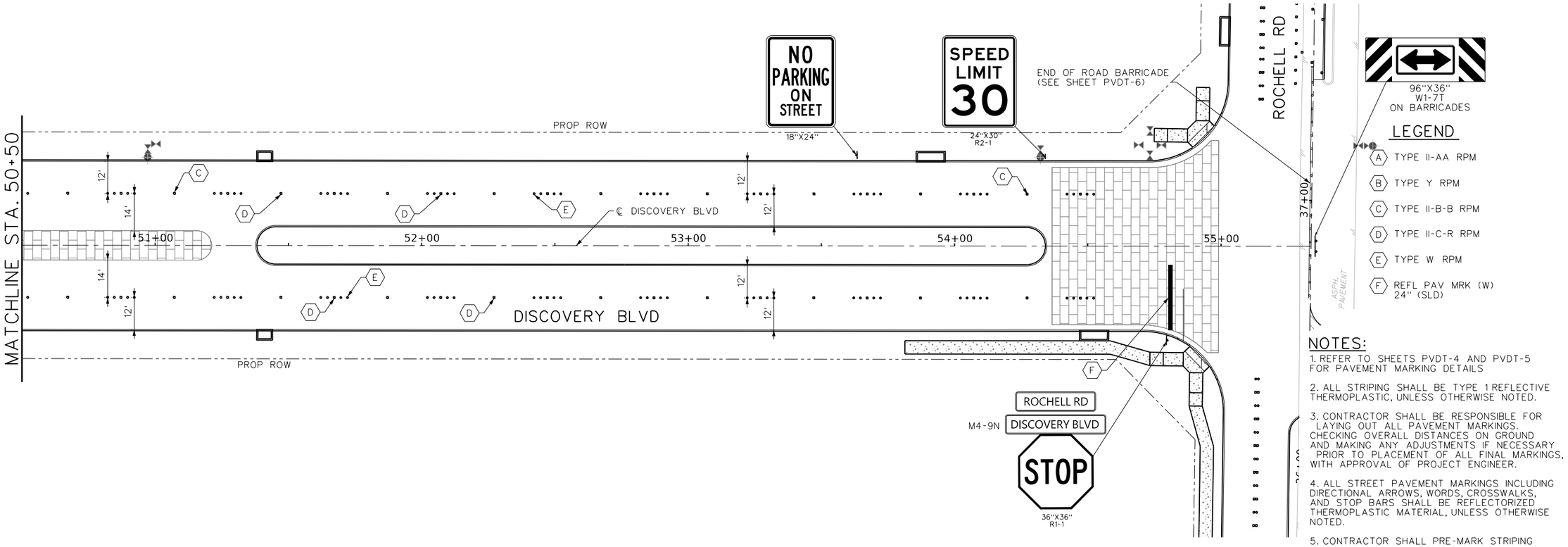
F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MRF
DRAWN CHM
REVISED
CHECKED SEC
FILE NAME cv-trt-pl-pavmrk02.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET PM-2
SEQ. 65

MicroStation V8 User: 90262 Office: On Site
Plotter: \\jfl\Drawings\Roadway\cv-trt-pl-pavmrk02.sht
Plot Scale: 40.008 ' / in.
Date: Feb. 21, 2024 - 09:31:25 AM
Model: Default
Projects: Freese and Nichols, Inc. - True Type Fonts





NOTES:

1. REFER TO SHEETS PVDT-4 AND PVDT-5 FOR PAVEMENT MARKING DETAILS
2. ALL STRIPING SHALL BE TYPE 1 REFLECTIVE THERMOPLASTIC, UNLESS OTHERWISE NOTED.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR LAYING OUT ALL PAVEMENT MARKINGS. CHECKING OVERALL DISTANCES ON GROUND AND MAKING ANY ADJUSTMENTS IF NECESSARY PRIOR TO PLACEMENT OF ALL FINAL MARKINGS, WITH APPROVAL OF PROJECT ENGINEER.
4. ALL STREET PAVEMENT MARKINGS INCLUDING DIRECTIONAL ARROWS, WORDS, CROSSWALKS, AND STOP BARS SHALL BE REFLECTORIZED THERMOPLASTIC MATERIAL, UNLESS OTHERWISE NOTED.
5. CONTRACTOR SHALL PRE-MARK STRIPING LAYOUT FOR APPROVAL OF CITY'S STREETS DEPARTMENT AND TXDOT PRIOR TO PLACEMENT OF ANY FINAL PAVEMENT MARKING AND SIGNS.

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

N

0 10' 20' 40'
SCALE IN FEET

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASE THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
RELEASE OF THIS DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

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Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2212
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
CIVIL
DISCOVERY PAVEMENT MARKING & SIGNAGE STA 46+00 TO END

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MRF
DRAWN CHM
REVISED
CHECKED SEC
FILE NAME cv-trt-pl-pavmrk03.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale accordingly.
0 1"

SHEET PM-3
SEQ. 66

MicroStation V8 User: 90262 Office: On Site
N:\IF\Drawings\Roadway\cv-trt-pl-pavmrk03.sht
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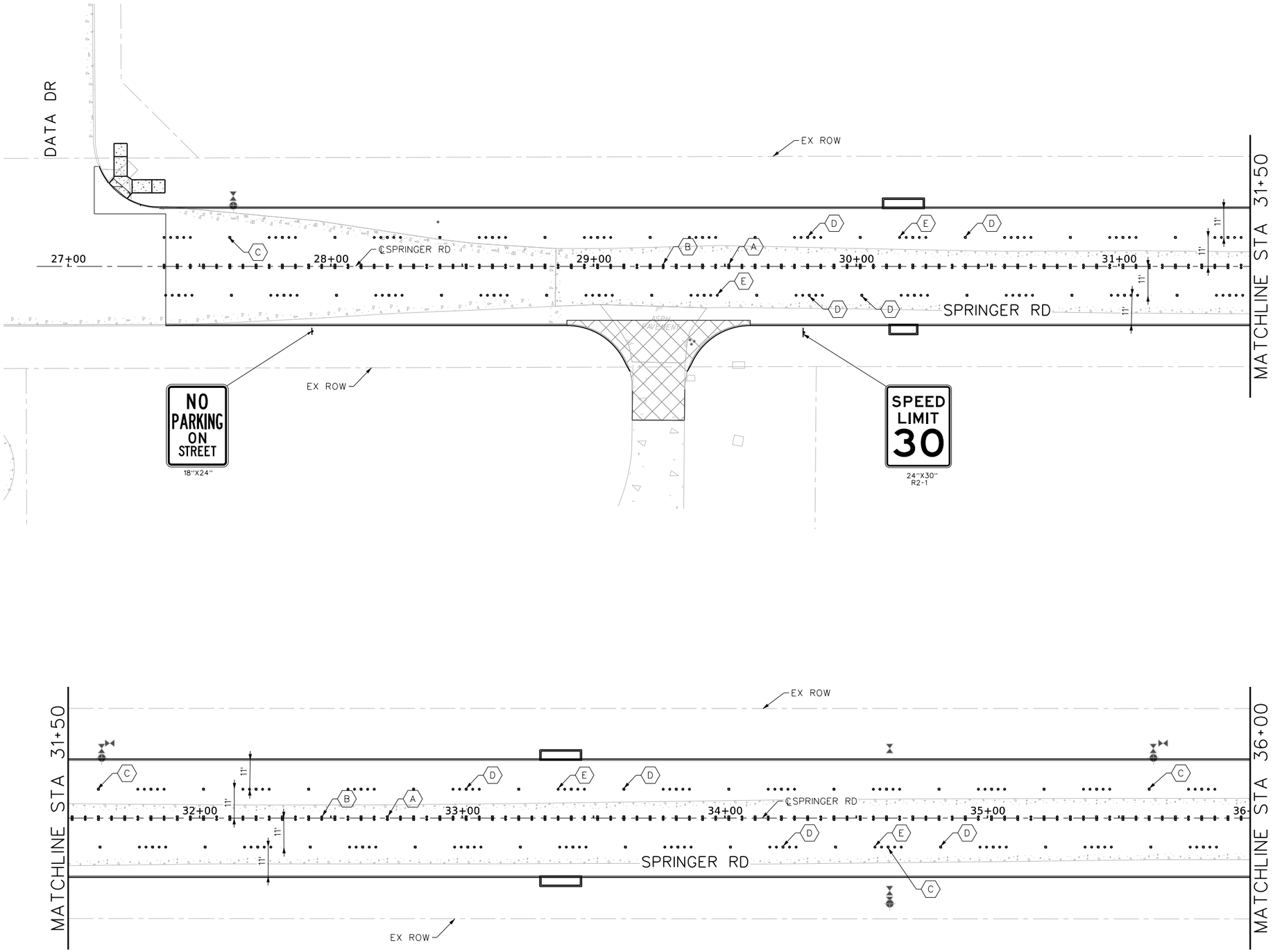
Plot Scale: 40.000 ' / in.
Date: Feb. 21, 2024 - 09:31:27 AM
Model: Default
Plotted: Freese and Nichols, Inc. - True Type Fonts



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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

N

0 10' 20' 40'
SCALE IN FEET

LEGEND

- (A) TYPE II-AA RPM
- (B) TYPE Y RPM
- (C) TYPE II-B-B RPM
- (D) TYPE II-C-R RPM
- (E) TYPE W RPM
- (F) REFL PAV MRK (W) 24" (SLD)

NOTES:

1. REFER TO SHEETS PVDT-4 AND PVDT-5 FOR PAVEMENT MARKING DETAILS

2. ALL STRIPING SHALL BE TYPE 1 REFLECTIVE THERMOPLASTIC, UNLESS OTHERWISE NOTED.

3. CONTRACTOR SHALL BE RESPONSIBLE FOR LAYING OUT ALL PAVEMENT MARKINGS. CHECKING OVERALL DISTANCES ON GROUND AND MAKING ANY ADJUSTMENTS IF NECESSARY PRIOR TO PLACEMENT OF ALL FINAL MARKINGS, WITH APPROVAL OF PROJECT ENGINEER.

4. ALL STREET PAVEMENT MARKINGS INCLUDING DIRECTIONAL ARROWS, WORDS, CROSSWALKS, AND STOP BARS SHALL BE REFLECTORIZED THERMOPLASTIC MATERIAL, UNLESS OTHERWISE NOTED.

5. CONTRACTOR SHALL PRE-MARK STRIPING LAYOUT FOR APPROVAL OF CITY'S STREETS DEPARTMENT AND TXDOT PRIOR TO PLACEMENT OF ANY FINAL PAVEMENT MARKING AND SIGNS.

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASE THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
IT IS UNLAWFUL TO USE OR RELEASE THIS DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2250
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

SPRINGER PAVEMENT MARKING & SIGNAGE BEGIN TO STA 36+00

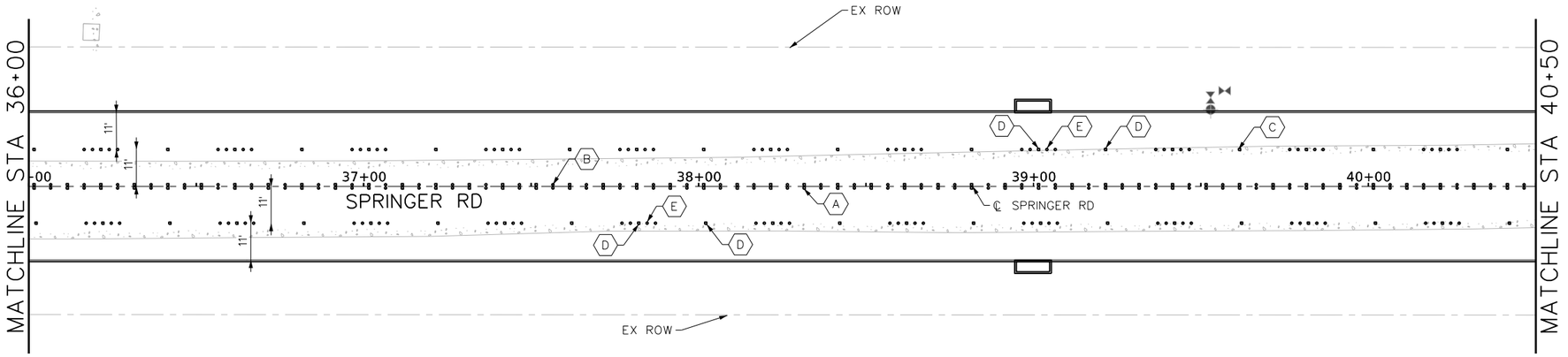
NO.	ISSUES	BY	DATE

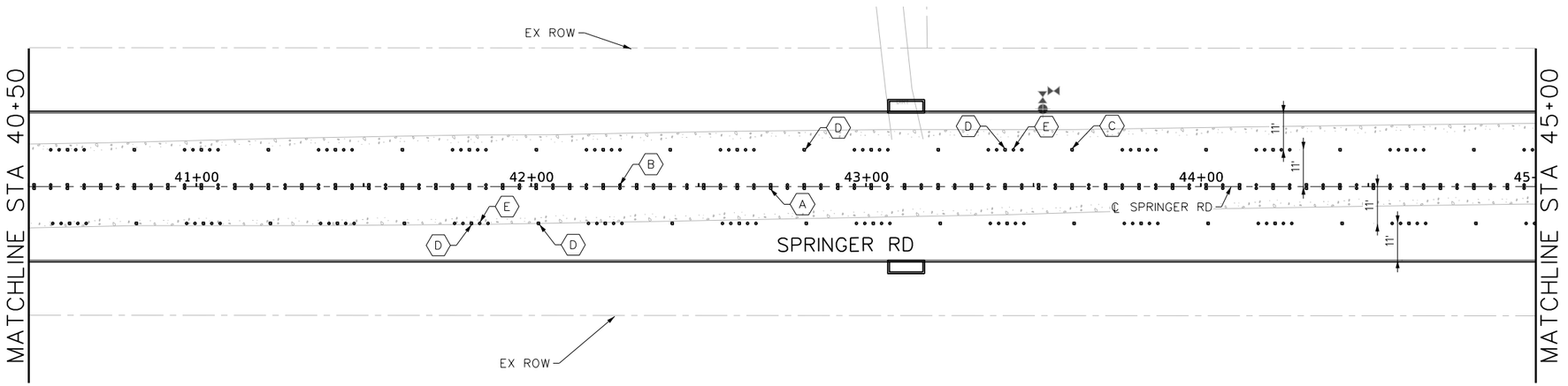
F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MRF
DRAWN CHM
REVISED
CHECKED SEC
FILE NAME cv-trt-pp-springpvmrk01.dgn

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET PM-4
SEQ. 67

MicroStation V8 User: 90262 Office: On Site
Plotter: \\FW0001-NSS01_FreeOfficeXerox7760.pltcfg Model: Default
Plot Scale: 40.008 ' / in. Project: Freese and Nichols, Inc.-True Type Fonts
Date: Feb. 21, 2024 - 09:31:30 AM





This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

N

0 10' 20' 40'
SCALE IN FEET

LEGEND

- (A) TYPE II-AA RPM
- (B) TYPE Y RPM
- (C) TYPE II-B-B RPM
- (D) TYPE II-C-R RPM
- (E) TYPE W RPM
- (F) REFL PAV MRK (W) 24" (SLD)

NOTES:

1. REFER TO SHEETS PVDT-4 AND PVDT-5 FOR PAVEMENT MARKING DETAILS
2. ALL STRIPING SHALL BE TYPE 1 REFLECTIVE THERMOPLASTIC, UNLESS OTHERWISE NOTED.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR LAYING OUT ALL PAVEMENT MARKINGS. CHECKING OVERALL DISTANCES ON GROUND AND MAKING ANY ADJUSTMENTS IF NECESSARY PRIOR TO PLACEMENT OF ALL FINAL MARKINGS, WITH APPROVAL OF PROJECT ENGINEER.
4. ALL STREET PAVEMENT MARKINGS INCLUDING DIRECTIONAL ARROWS, WORDS, CROSSWALKS, AND STOP BARS SHALL BE REFLECTORIZED THERMOPLASTIC MATERIAL, UNLESS OTHERWISE NOTED.
5. CONTRACTOR SHALL PRE-MARK STRIPING LAYOUT FOR APPROVAL OF CITY'S STREETS DEPARTMENT AND TXDOT PRIOR TO PLACEMENT OF ANY FINAL PAVEMENT MARKING AND SIGNS.

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASE THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
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FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2201
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

SPRINGER PAVEMENT MARKING & SIGNAGE STA 36+00 TO STA 45+00

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MRF
DRAWN CHM
REVISED
CHECKED SEC

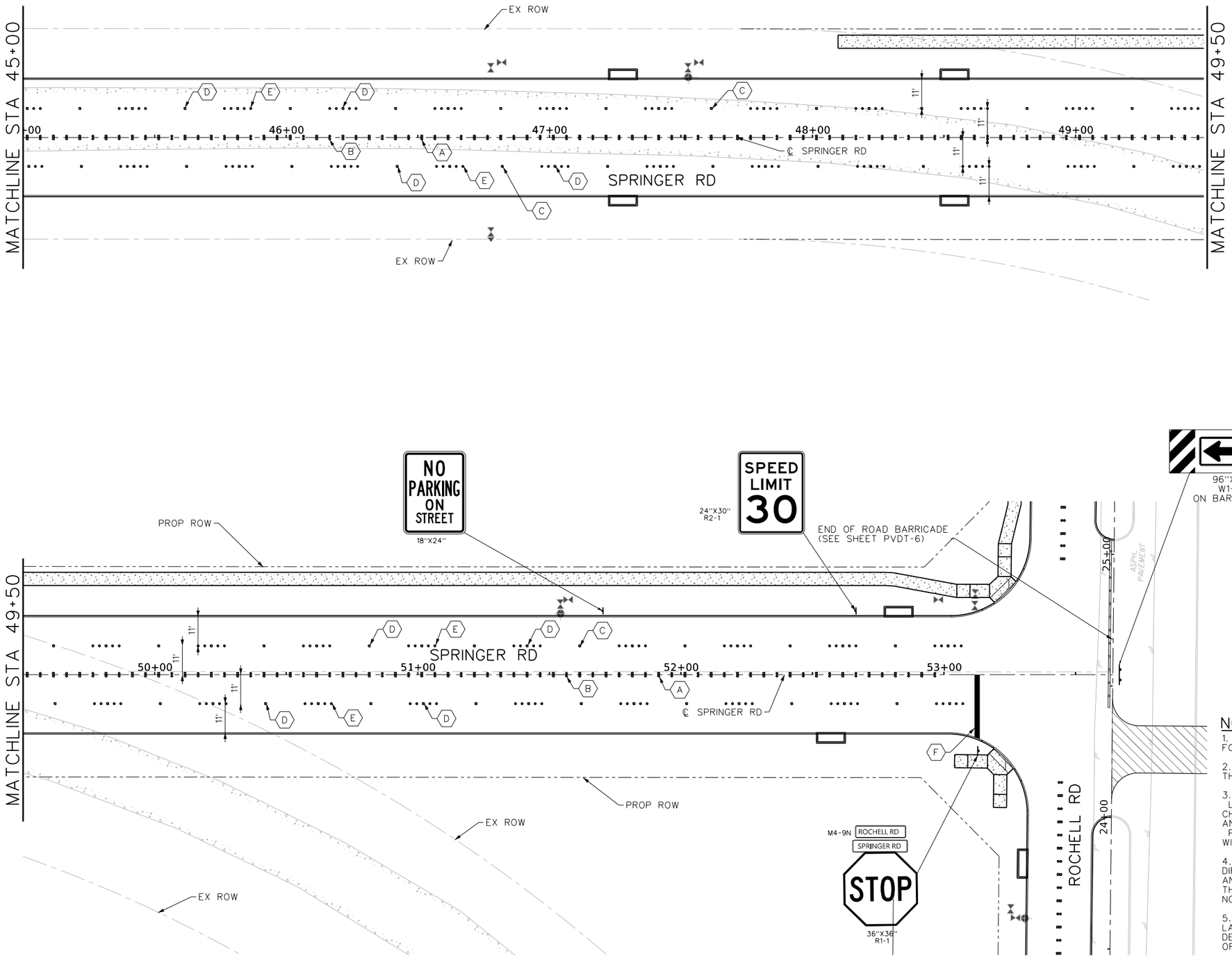
NO.	ISSUES	BY	DATE

FILE NAME cv-trt-pp-springpvmrk02.dgn

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET PM-5
SEQ. 68

MicroStation V8 User: 90262 Office: On Site
Plotter: \\FW0001-NSC01_FollyDR-Xerox.PRT
Plot Scale: 40.008 ' / in.
Date: Feb. 14, 2024 - 09:33:2 AM
Model: Default
Project: Freese and Nichols, Inc.-True Type Fonts



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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

N

0 10' 20' 40'
SCALE IN FEET

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASE THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
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FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2250
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
CIVIL
SPRINGER PAVEMENT MARKING & SIGNAGE STA 45+00 TO END

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19271
DATE APRIL 2022
DESIGNED MRF
DRAWN CHM
REVISED
CHECKED SEC
FILE NAME cv-trt-pp-springpvmrk03.dgn

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET PM-6
SEQ. 69

MicroStation V8 User: 90262 Office: On Site
Plotter: J:\Work\Active\Roadway\cv-trt-pp-springpvmrk03.dgn
Plot Scale: 40.008 ? in. = 1 in. Model: Default
Date: Feb. 21, 2024 - 09:31:34 AM Layout: Freese and Nichols, Inc.- True Type Fonts

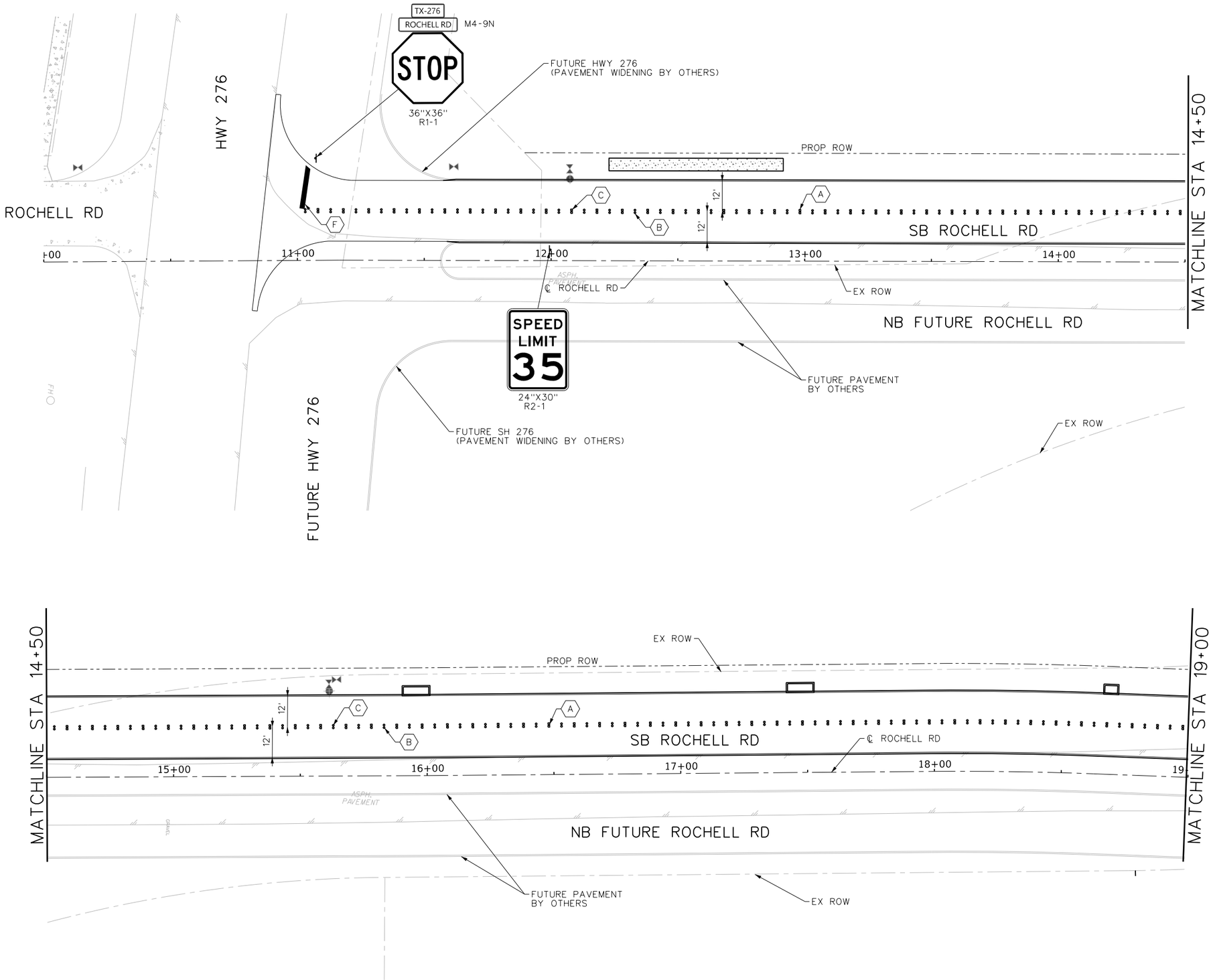
Office: On Site Date: Feb. 21, 2024 - 09:31:34 AM User: 90262 File: N:\I\P\Drawings\Roadway\cv-trt-pp-springpvmrk03.dgn

LEGEND

- (A) TYPE II-AA RPM
- (B) TYPE Y RPM
- (C) TYPE II-B-B RPM
- (D) TYPE II-C-R RPM
- (E) TYPE W RPM
- (F) REFL PAV MRK (W) 24" (SLD)

NOTES:

1. REFER TO SHEETS PVDT-4 AND PVDT-5 FOR PAVEMENT MARKING DETAILS
2. ALL STRIPING SHALL BE TYPE 1 REFLECTIVE THERMOPLASTIC, UNLESS OTHERWISE NOTED.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR LAYING OUT ALL PAVEMENT MARKINGS. CHECKING OVERALL DISTANCES ON GROUND AND MAKING ANY ADJUSTMENTS IF NECESSARY PRIOR TO PLACEMENT OF ALL FINAL MARKINGS, WITH APPROVAL OF PROJECT ENGINEER.
4. ALL STREET PAVEMENT MARKINGS INCLUDING DIRECTIONAL ARROWS, WORDS, CROSSWALKS, AND STOP BARS SHALL BE REFLECTORIZED THERMOPLASTIC MATERIAL, UNLESS OTHERWISE NOTED.
5. CONTRACTOR SHALL PRE-MARK STRIPING LAYOUT FOR APPROVAL OF CITY'S STREETS DEPARTMENT AND TXDOT PRIOR TO PLACEMENT OF ANY FINAL PAVEMENT MARKING AND SIGNS.



N

0 10' 20' 40'
SCALE IN FEET

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

LEGEND

- (A) TYPE II-AA RPM
- (B) TYPE Y RPM
- (C) TYPE II-B-B RPM
- (D) TYPE II-C-R RPM
- (E) TYPE W RPM
- (F) REFL PAV MRK (W) 24" (SLD)

NOTES:

1. REFER TO SHEETS PVDT-4 AND PVDT-5 FOR PAVEMENT MARKING DETAILS
2. ALL STRIPING SHALL BE TYPE 1 REFLECTIVE THERMOPLASTIC, UNLESS OTHERWISE NOTED.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR LAYING OUT ALL PAVEMENT MARKINGS. CHECKING OVERALL DISTANCES ON GROUND AND MAKING ANY ADJUSTMENTS IF NECESSARY PRIOR TO PLACEMENT OF ALL FINAL MARKINGS, WITH APPROVAL OF PROJECT ENGINEER.
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FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASE THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
RELEASED FOR REVIEW PURPOSES ONLY WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2201
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

ROCHELL PAVEMENT MARKING & SIGNAGE BEGIN TO STA 19+00

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MRF
DRAWN CHM
REVISED
CHECKED SEC
FILE NAME cv-trt-pl-roch-pavemark1.dgn

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET PM-7
SEQ. 70

MicroStation V8 User: 90262 Office: On Site
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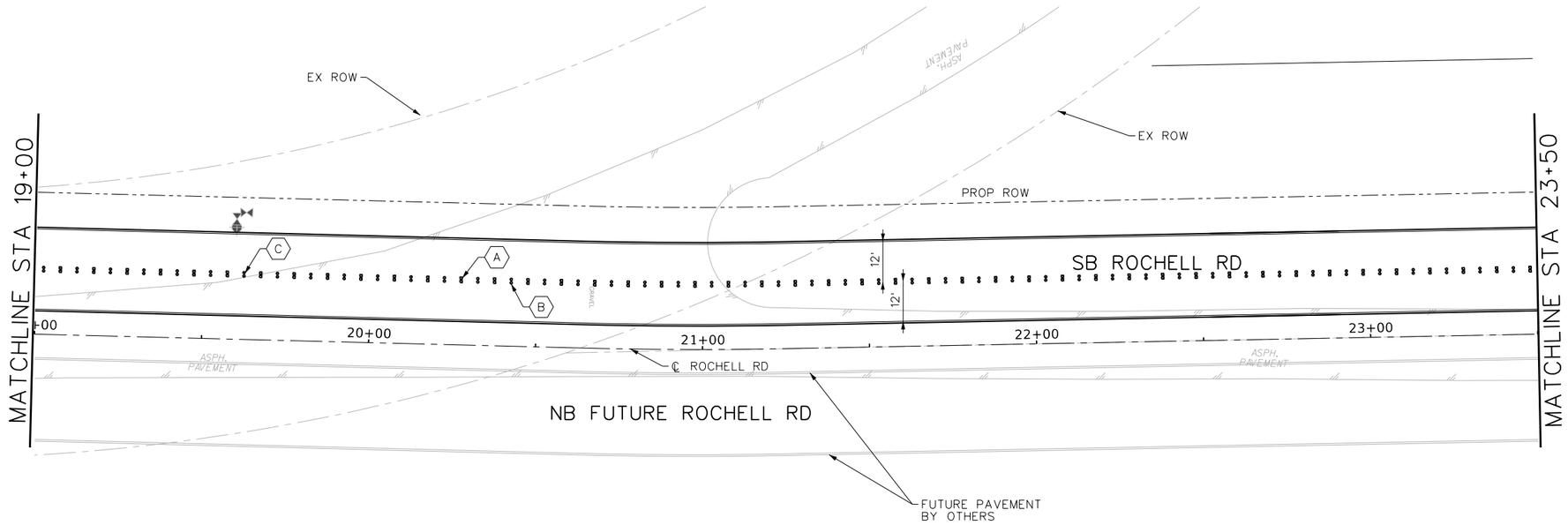
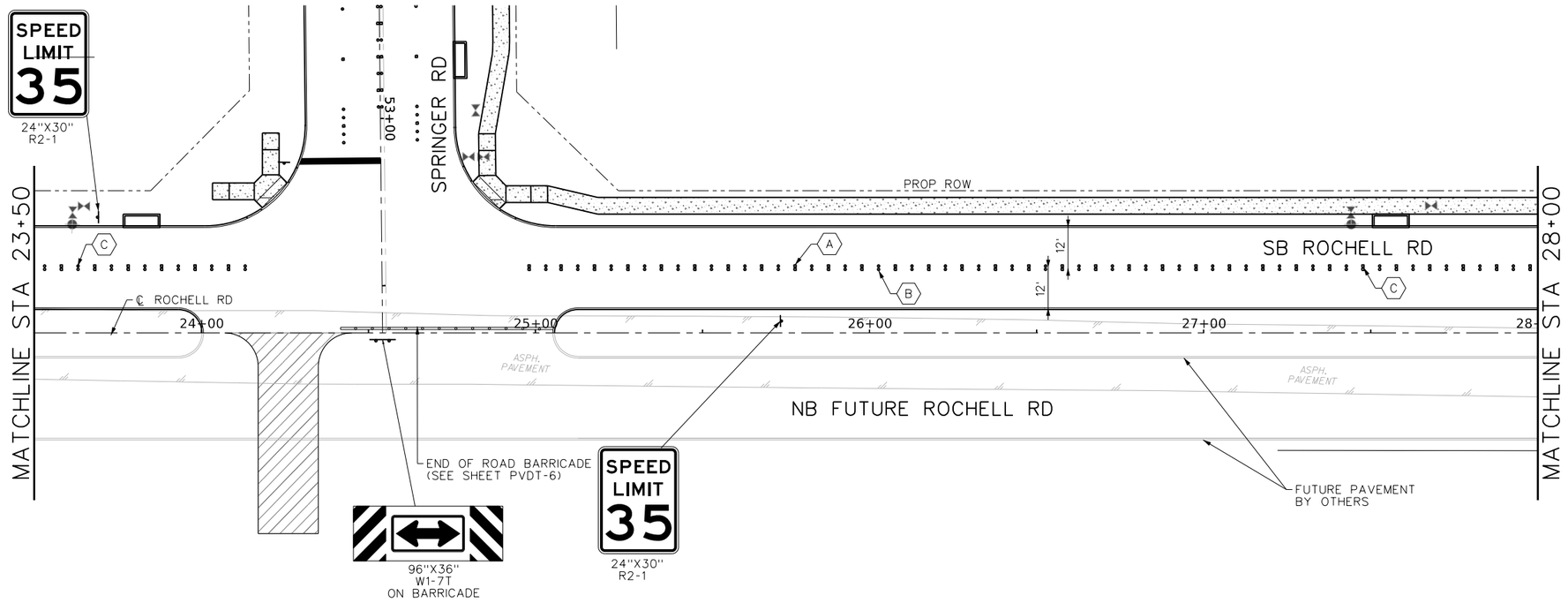
Plot Scale: 40.008 ? in.
Date: Feb. 21, 2024 - 09:31:37 AM
Model: Default
Projects: Freese and Nichols, Inc. - True Type Fonts





N

0 10' 20' 40'
SCALE IN FEET

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

LEGEND

- (A) TYPE II-AA RPM
- (B) TYPE Y RPM
- (C) TYPE II-B-B RPM
- (D) TYPE II-C-R RPM
- (E) TYPE W RPM
- (F) REFL PAV MRK (W) 24" (SLD)

NOTES:

1. REFER TO SHEETS PVDT-4 AND PVDT-5 FOR PAVEMENT MARKING DETAILS
2. ALL STRIPING SHALL BE TYPE 1 REFLECTIVE THERMOPLASTIC, UNLESS OTHERWISE NOTED.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR LAYING OUT ALL PAVEMENT MARKINGS. CHECKING OVERALL DISTANCES ON GROUND AND MAKING ANY ADJUSTMENTS IF NECESSARY PRIOR TO PLACEMENT OF ALL FINAL MARKINGS, WITH APPROVAL OF PROJECT ENGINEER.
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5. CONTRACTOR SHALL PRE-MARK STRIPING LAYOUT FOR APPROVAL OF CITY'S STREETS DEPARTMENT AND TXDOT PRIOR TO PLACEMENT OF ANY FINAL PAVEMENT MARKING AND SIGNS.

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASED FOR THE PURPOSES OF INTERIM REVIEW UNDER THE AUTHORITY OF SARAH E. CAUDLE, TEXAS NO. 134055, ON 10/21/2021. IT IS NOT TO BE USED FOR BIDDING OR CONSTRUCTION PURPOSES.

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2201
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

ROCHELL PAVEMENT MARKING & SIGNAGE STA 19+00 TO STA 28+00

NO.	ISSUES	BY	DATE

FAN JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MRF
DRAWN CHM
CHECKED SEC
REVISED
FILE NAME cv-trt-pl-roch-pavemark2.dgn

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale accordingly.
0 1"

SHEET PM-8
SEQ. 71

MicroStation V8 User: 90262 Office: On Site
Plotter: \\IP\KONICA MINOLTA C754e_PCL6 on Ne04:
Plot Scale: 40.0087 ' / in.
Date: Feb. 21, 2024 - 09:31:39 AM
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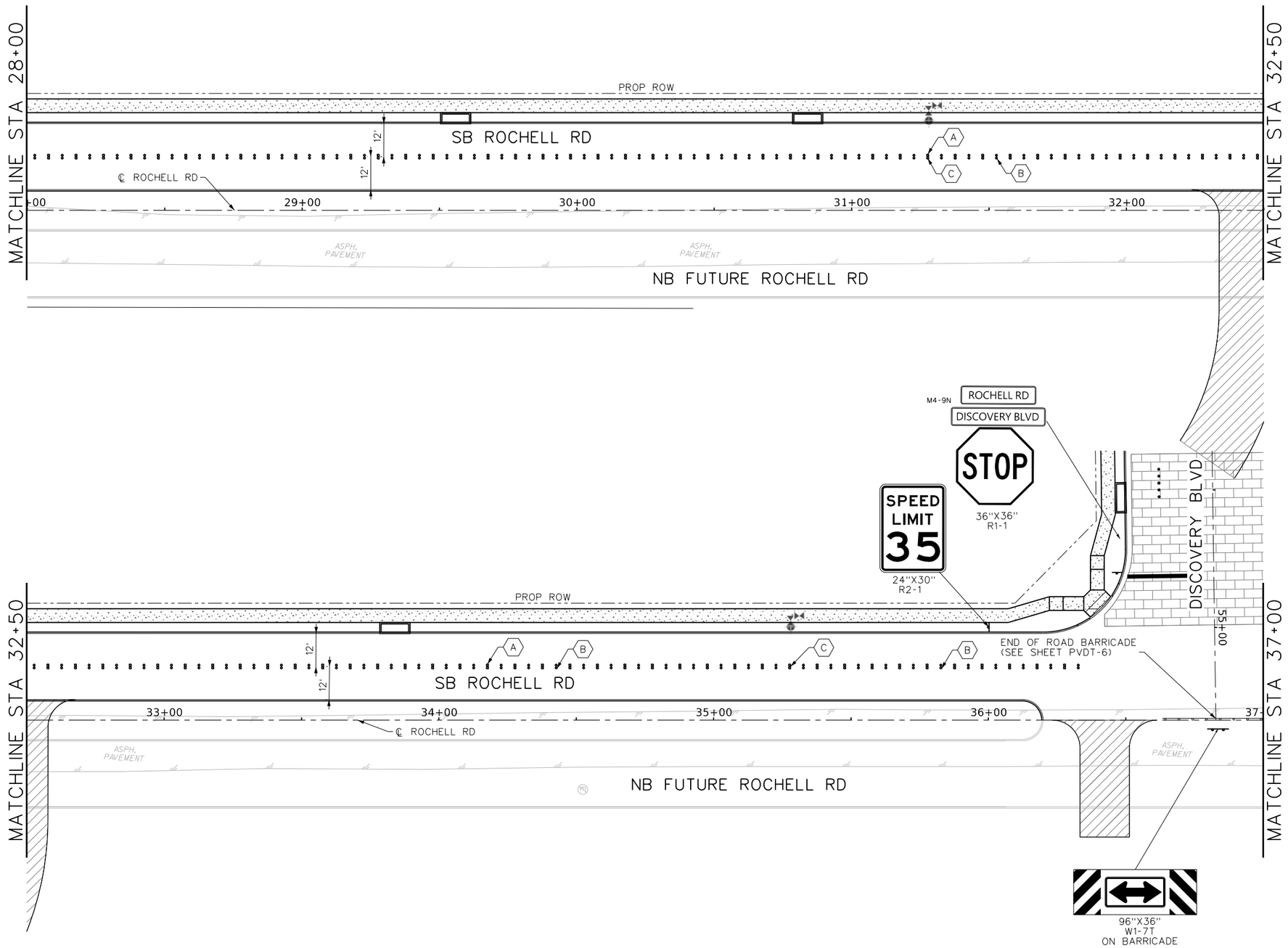
Model: Default
Projects: Freese and Nichols, Inc. - True Type Fonts



N

0 10' 20' 40'

SCALE IN FEET

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of

FREESE AND NICHOLS, INC.

RECORD DRAWINGS PREPARED ON: 8/20/2024

LEGEND

- (A) TYPE II-AA RPM
- (B) TYPE Y RPM
- (C) TYPE II-B-B RPM
- (D) TYPE II-C-R RPM
- (E) TYPE W RPM
- (F) REFL PAV MRK (W) 24" (SLD)

NOTES:

1. REFER TO SHEETS PMDT-1 AND PMDT-2 FOR PAVEMENT MARKING DETAILS

2. ALL STRIPING SHALL BE TYPE 1 REFLECTIVE THERMOPLASTIC, UNLESS OTHERWISE NOTED.

3. CONTRACTOR SHALL BE RESPONSIBLE FOR LAYING OUT ALL PAVEMENT MARKINGS. CHECKING OVERALL DISTANCES ON GROUND AND MAKING ANY ADJUSTMENTS IF NECESSARY PRIOR TO PLACEMENT OF ALL FINAL MARKINGS, WITH APPROVAL OF PROJECT ENGINEER.

4. ALL STREET PAVEMENT MARKINGS INCLUDING DIRECTIONAL ARROWS, WORDS, CROSSWALKS, AND STOP BARS SHALL BE REFLECTORIZED THERMOPLASTIC MATERIAL, UNLESS OTHERWISE NOTED.

5. CONTRACTOR SHALL PRE-MARK STRIPING LAYOUT FOR APPROVAL OF CITY'S STREETS DEPARTMENT AND TXDOT PRIOR TO PLACEMENT OF ANY FINAL PAVEMENT MARKING AND SIGNS.

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASE THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
ALTERATION OF THIS DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2201
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

ROCHELL PAVEMENT MARKING & SIGNAGE STA 28+00 TO STA 37+00

NO.	ISSUES	BY	DATE

FAN JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MRF
DRAWN CHM
REVISED
CHECKED SEC
FILE NAME cv-trt-pl-roch-pavemark3.dgn

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale accordingly.

SHEET PM-9

SEQ. 72

MicroStation V8 User: 90262 Office: On Site
N:\IF\Drawings\Roadway\cv-trt-pl-roch-pavemark3.dgn
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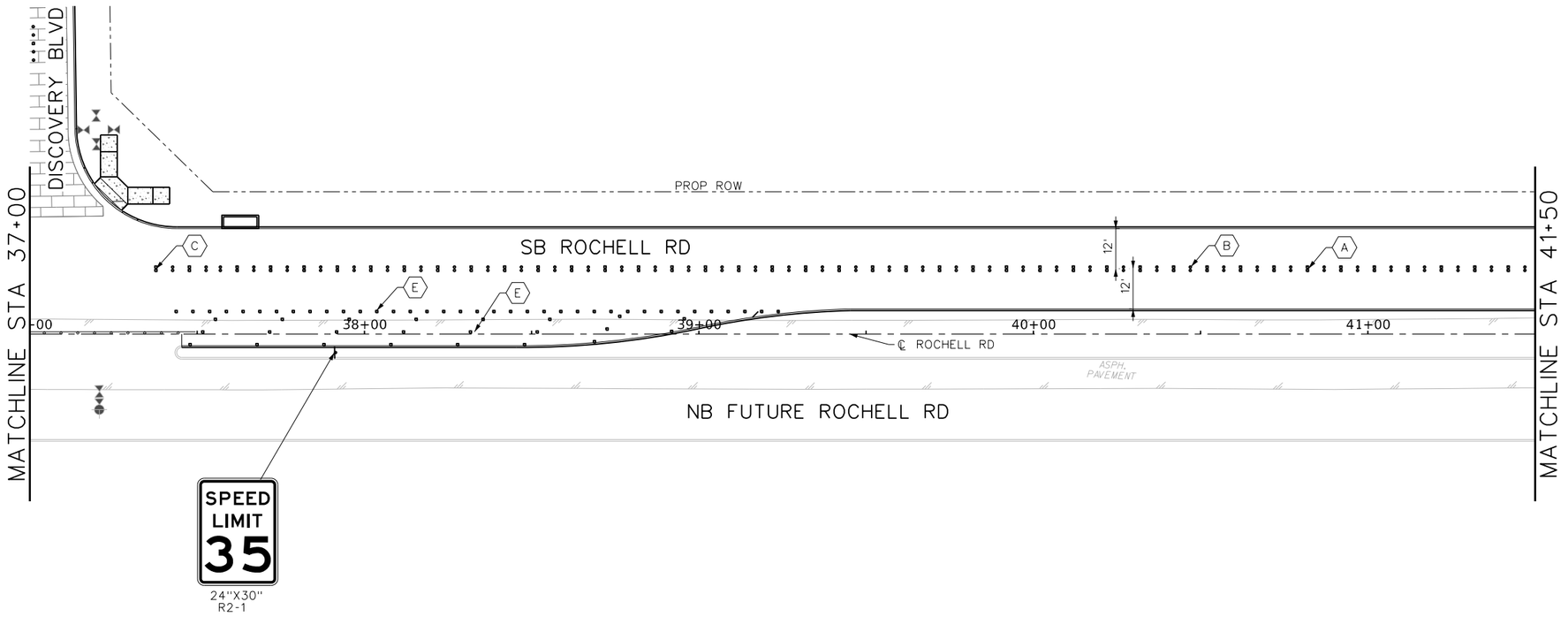
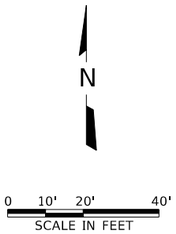
Date: Feb. 21, 2024 - 09:31:41 AM
Model: Default
Plotted: Freese and Nichols, Inc. - True Type Fonts





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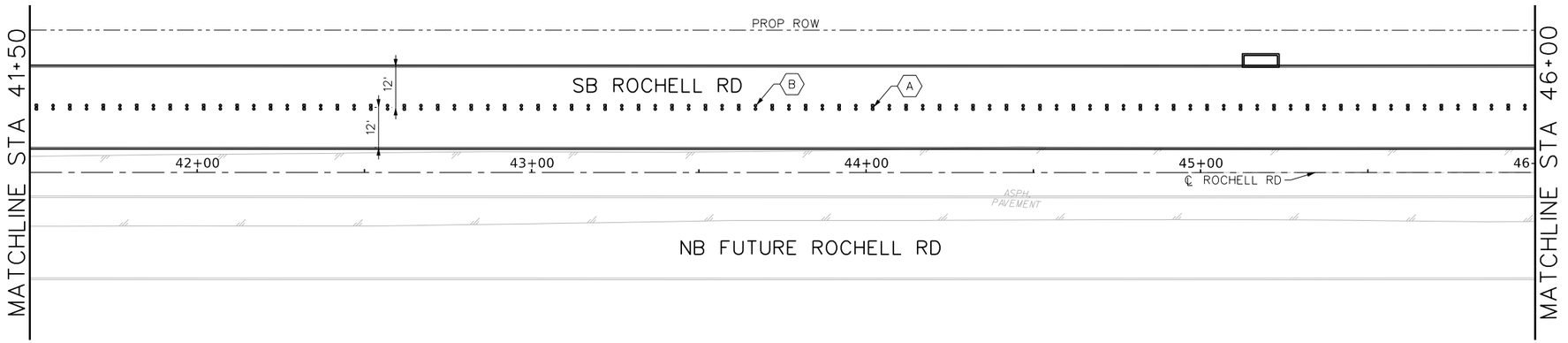
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024



LEGEND

- (A) TYPE II-AA RPM
- (B) TYPE Y RPM
- (C) TYPE II-B-B RPM
- (D) TYPE II-C-R RPM
- (E) TYPE W RPM
- (F) REFL PAV MRK (W) 24" (SLD)

NOTES:

1. REFER TO SHEETS PVDT-4 AND PVDT-5 FOR PAVEMENT MARKING DETAILS
2. ALL STRIPING SHALL BE TYPE 1 REFLECTIVE THERMOPLASTIC, UNLESS OTHERWISE NOTED.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR LAYING OUT ALL PAVEMENT MARKINGS. CHECKING OVERALL DISTANCES ON GROUND AND MAKING ANY ADJUSTMENTS IF NECESSARY PRIOR TO PLACEMENT OF ALL FINAL MARKINGS, WITH APPROVAL OF PROJECT ENGINEER.
4. ALL STREET PAVEMENT MARKINGS INCLUDING DIRECTIONAL ARROWS, WORDS, CROSSWALKS, AND STOP BARS SHALL BE REFLECTORIZED THERMOPLASTIC MATERIAL, UNLESS OTHERWISE NOTED.
5. CONTRACTOR SHALL PRE-MARK STRIPING LAYOUT FOR APPROVAL OF CITY'S STREETS DEPARTMENT AND TXDOT PRIOR TO PLACEMENT OF ANY FINAL PAVEMENT MARKING AND SIGNS.

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASE FOR REVIEW PURPOSES ONLY
THIS DOCUMENT WAS ORIGINALLY ISSUED AND SEALED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
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Fax: (214) 217-2201
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

ROCHELL PAVEMENT MARKING & SIGNAGE STA 37+00 TO STA 46+00

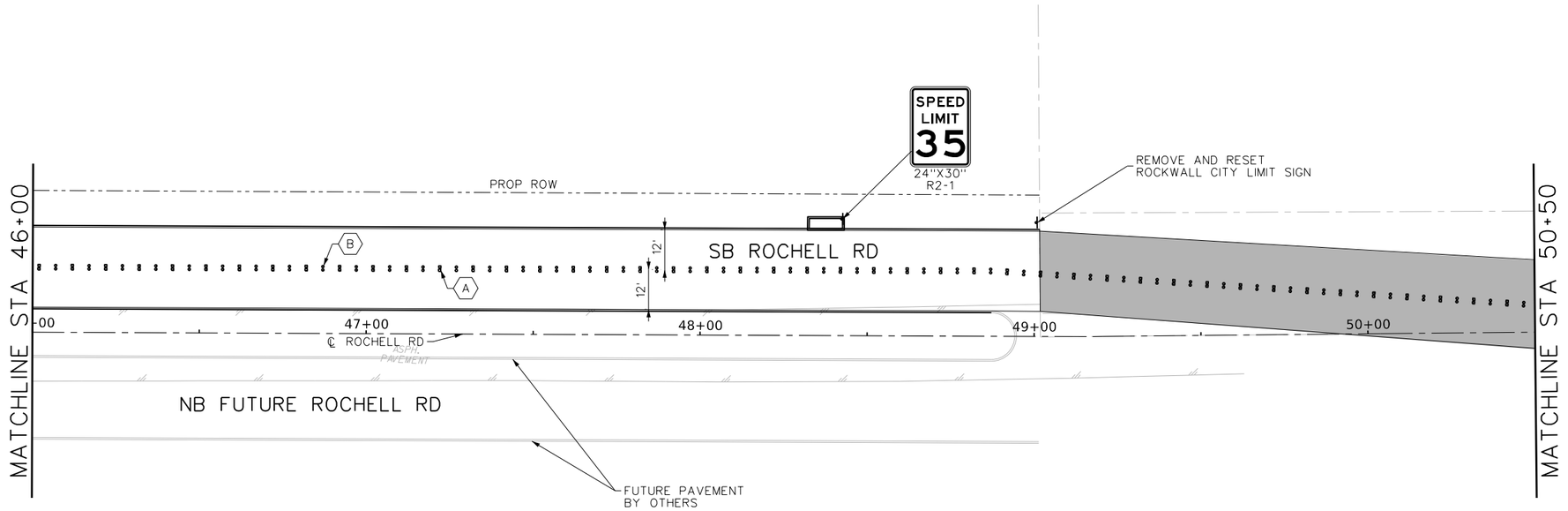
NO.	ISSUES	BY	DATE

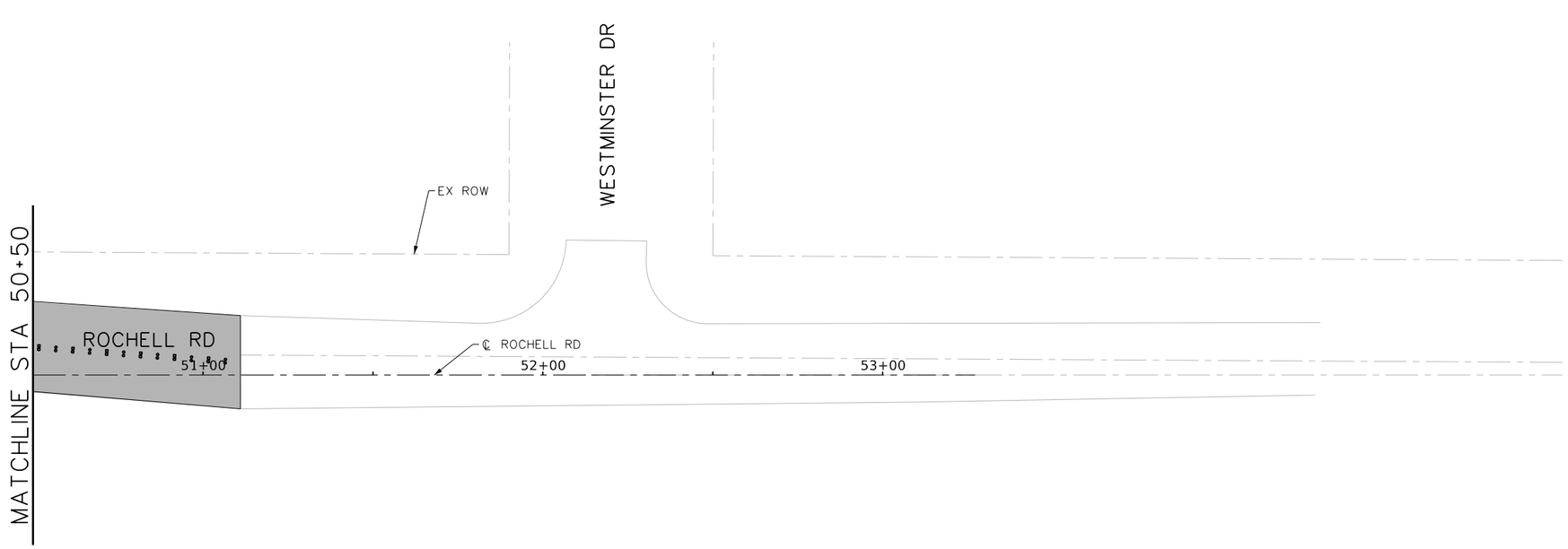
F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MRF
DRAWN CHM
REVISED
CHECKED SEC
FILE NAME cv-trt-pl-roch-pavemark4.dgn

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET PM-10
SEQ. 73

MicroStation V8 User: 90262 Office: On Site
Plotter: \\jfl\Drawings\Roadway\cv-trt-pl-roch-pavemark4.dgn
Plot Scale: 40.0687 ' In. Model: Default
Date: Feb. 21, 2024 - 09:31:42 AM Project: Freese and Nichols, Inc. - True Type Fonts





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FREESE AND NICHOLS, INC.

RECORD DRAWINGS PREPARED ON: 8/20/2024

LEGEND

- (A) TYPE II-AA RPM
- (B) TYPE Y RPM
- (C) TYPE II-B-B RPM
- (D) TYPE II-C-R RPM
- (E) TYPE W RPM
- (F) REFL PAV MRK (W) 24" (SLD)

NOTES:

1. REFER TO SHEETS PVDT-4 AND PVDT-5 FOR PAVEMENT MARKING DETAILS

2. ALL STRIPING SHALL BE TYPE 1 REFLECTIVE THERMOPLASTIC, UNLESS OTHERWISE NOTED.

3. CONTRACTOR SHALL BE RESPONSIBLE FOR LAYING OUT ALL PAVEMENT MARKINGS. CHECKING OVERALL DISTANCES ON GROUND AND MAKING ANY ADJUSTMENTS IF NECESSARY PRIOR TO PLACEMENT OF ALL FINAL MARKINGS, WITH APPROVAL OF PROJECT ENGINEER.

4. ALL STREET PAVEMENT MARKINGS INCLUDING DIRECTIONAL ARROWS, WORDS, CROSSWALKS, AND STOP BARS SHALL BE REFLECTORIZED THERMOPLASTIC MATERIAL, UNLESS OTHERWISE NOTED.

5. CONTRACTOR SHALL PRE-MARK STRIPING LAYOUT FOR APPROVAL OF CITY'S STREETS DEPARTMENT AND TXDOT PRIOR TO PLACEMENT OF ANY FINAL PAVEMENT MARKING AND SIGNS.

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

FREESE AND NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2201
Web - www.freese.com

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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

ROCHELL PAVEMENT MARKING & SIGNAGE STA 46+00 TO END

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MRF
DRAWN CHM
REVISED
CHECKED SEC

FILE NAME cv-trt-pl-roch-pavemark5.dgn

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale!

0 1"

SHEET PM-11

SEQ. 74

MicroStation V8 User: 90262 Office: On Site
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Date: Feb. 21, 2024 - 09:31:44 AM
Model: Default
Projects: Freese and Nichols, Inc. - True Type Fonts

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8/20/2024

FREESE AND NICHOLS, INC.
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2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone - (214) 217-2200
Fax - (214) 217-2201
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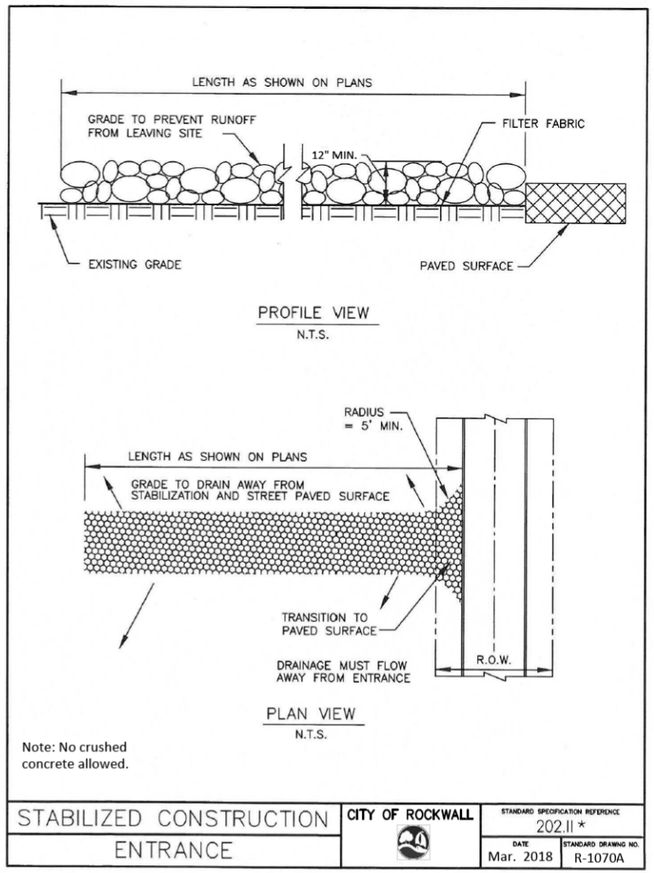


Note: No crushed concrete allowed.

STABILIZED CONSTRUCTION ENTRANCE	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 202.II *	
		DATE Mar. 2018	STANDARD DRAWING NO. R-1070A

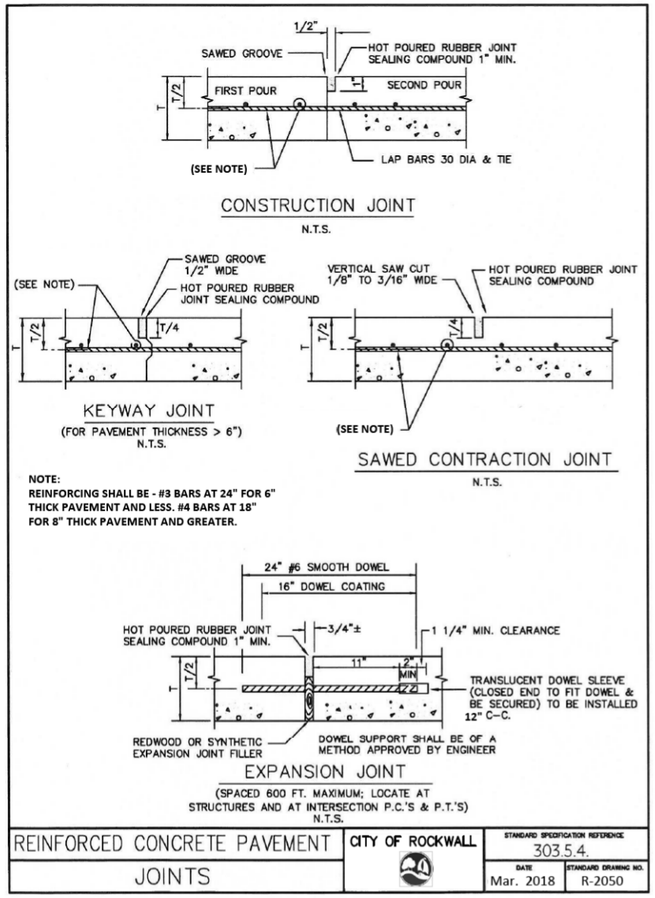
*Section II Standard Drawings as of October 2004. Reference number only has been updated for Fifth Edition Specifications. *Public Works Construction Standards North Central Texas, Fifth Edition.*

STABILIZED CONSTRUCTION ENTRANCE GENERAL NOTES:

1. STONE SHALL BE 4 TO 6 INCH DIAMETER COARSE AGGREGATE.
2. MINIMUM LENGTH SHALL BE 50 FEET AND WIDITH SHALL BE 20 FEET.
3. THE THICKNESS SHALL NOT BE LESS THAN 12 INCHES.
4. THE WIDTH SHALL BE NO LESS THAN THE FULL WIDTH OF ALL POINTS OF INGRESS OR EGRESS.
5. WHEN NECESSARY, VEHICLES SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO A PUBLIC ROADWAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE WITH DRAINAGE FLOWING AWAY FROM BOTH THE STREET AND THE STABILIZED ENTRANCE. ALL SEDIMENT SHALL BE PREVENTED FROM ENTERING ANY STORM DRAIN, DITCH OR WATERCOURSE USING APPROVED METHODS.
6. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PAVED SURFACES. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND. ALL SEDIMENT SPILLED, DROPPED, WASHED, OR TRACKED ONTO PAVED SURFACES MUST BE REMOVED IMMEDIATELY.
7. THE ENTRANCE MUST BE PROPERLY GRADED OR INCORPORATE A DRAINAGE SWALE TO PREVENT RUNOFF FROM LEAVING THE CONSTRUCTION SITE.
8. PREVENT SHORTCUTTING OF THE FULL LENGTH OF THE CONSTRUCTION ENTRANCE BY INSTALLING BARRIERS AS NECESSARY.
9. INSPECTION SHALL BE AS SPECIFIED IN THE SWPPP.
10. NO CRUSHED CONCRETE ALLOWED.

STABILIZED CONSTRUCTION ENTRANCE	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 202.II *	
		DATE Mar. 2018	STANDARD DRAWING NO. R-1070B

*Section II Standard Drawings as of October 2004. Reference number only has been updated for Fifth Edition Specifications. *Public Works Construction Standards North Central Texas, Fifth Edition.*



REINFORCED CONCRETE PAVEMENT JOINTS	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 303.5.4.	
		DATE Mar. 2018	STANDARD DRAWING NO. R-2050

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
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REVISED
CHECKED SEC
FILE NAME cv-trt-dt02.dgn

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale
0 1"

SHEET PVDT-1
SEQ. 75

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Date: Feb. 21, 2024 - 09:31:46 AM
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Projects: Freese and Nichols, Inc. - True Type Fonts

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RECORD DRAWINGS PREPARED ON:
8/20/2024

FREESE AND NICHOLS, INC.
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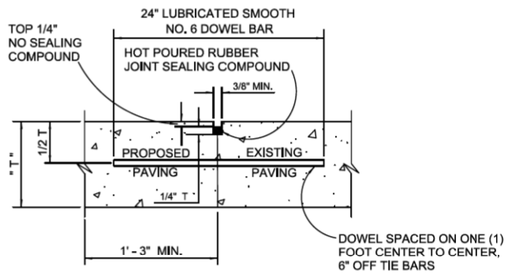
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2836
Web - www.freese.com

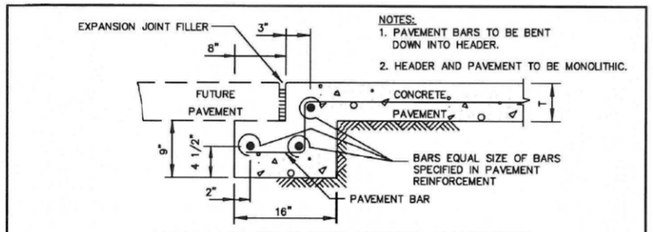


NOTES: T = PAVEMENT

1. LONGITUDINAL BUTT CONSTRUCTION MAY BE UTILIZED IN PLACE OF LONGITUDINAL HINGED (KEYWAY) JOINT AT CONTRACTORS OPTION.
2. DOWEL BARS SHALL BE DRILLED INTO PAVEMENT HORIZONTALLY BY USE OF A MECHANICAL RIG.
3. DRILLING BY HAND IS NOT ACCEPTABLE, PUSHING DOWEL BARS INTO GREEN CONCRETE NOT ACCEPTABLE.

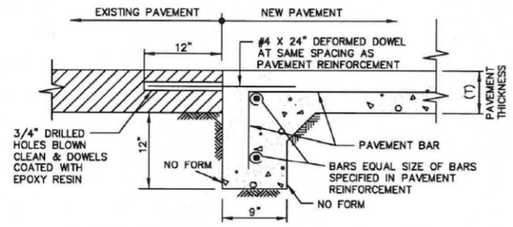
LONGITUDINAL BUTT JOINT
NOT TO SCALE

REINFORCED CONCRETE PAVEMENT	CITY OF ROCKWALL	
LONGITUDINAL BUTT JOINT		DATE: OCT. '17 / DRAWING NO.: R-2051

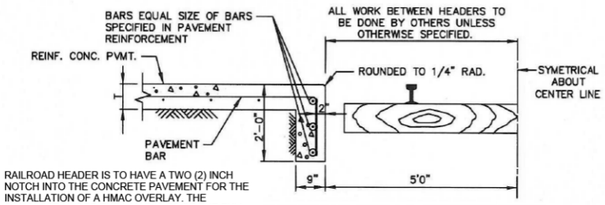


NOTES:
1. PAVEMENT BARS TO BE BENT DOWN INTO HEADER.
2. HEADER AND PAVEMENT TO BE MONOLITHIC.

STREET HEADER FOR FUTURE PAVEMENT
N.T.S.



STREET HEADER AT EXISTING PAVEMENT
N.T.S.



RAILROAD HEADER IS TO HAVE A TWO (2) INCH NOTCH INTO THE CONCRETE PAVEMENT FOR THE INSTALLATION OF A HMAC OVERLAY. THE CONCRETE UNDER THE HMAC IS TO BE THE FULL STREET THICKNESS. THE NOTCH SHOULD START AT THE END OF THE PAVEMETN AND GO TWENTY (20) FEET UP THE ROAD AWAY FROM THE CROSSING.

STREET HEADER AT RAILROAD
N.T.S.

REINFORCED CONCRETE PAVEMENT	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE: 305.4
STREET HEADERS		DATE: Mar. 2018 / STANDARD DRAWING NO.: R-2070

GENERAL NOTES:

1. REINFORCED CONCRETE PAVEMENT:
   A. ALL CURBS SHALL BE PLACED INTEGRAL WITH PAVEMENT UNLESS OTHERWISE APPROVED BY THE OWNER.
   B. CURBS SHALL MEET THE SAME COMPRESSIVE STRENGTH AS SPECIFIED FOR THE PAVEMENT.
   C. BAR LAPS SHALL BE 30 DIAMETERS.
   D. REINFORCING BARS SHALL BE SUPPORTED BY CHAIRS OR OTHER DEVICES APPROVED BY THE OWNER.
2. SUBGRADE: (UNLESS OTHERWISE SPECIFIED BY OWNER)
   A. SUBGRADE UNDER ALL PAVEMENTS SHALL BE STABILIZED TO A MINIMUM DEPTH OF SIX (6") INCHES WITH HYDRATEDLIME CEMENT. LABORATORY TESTS WILL BE PERFORMED TO DETERMINE THE AMOUNT OF LIME OR CEMENT TO USE.

PAVEMENT SYSTEMS	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE: 302,303
GENERAL NOTES		DATE: Mar. 2018 / STANDARD DRAWING NO.: R-2190

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
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FILE NAME cv-trt-dt03.dgn

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

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SEQ. 76

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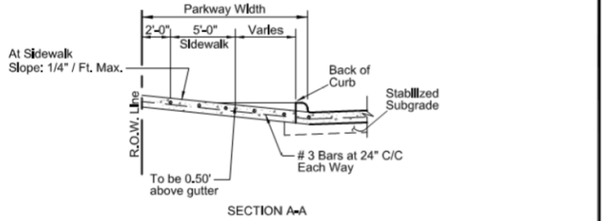
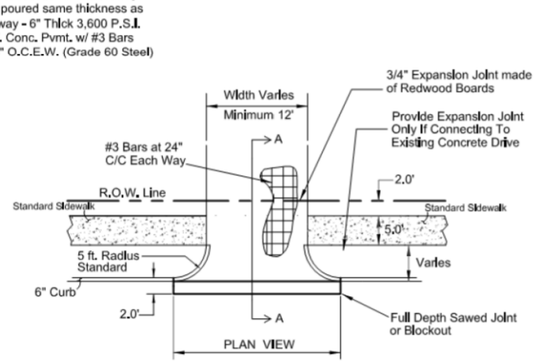


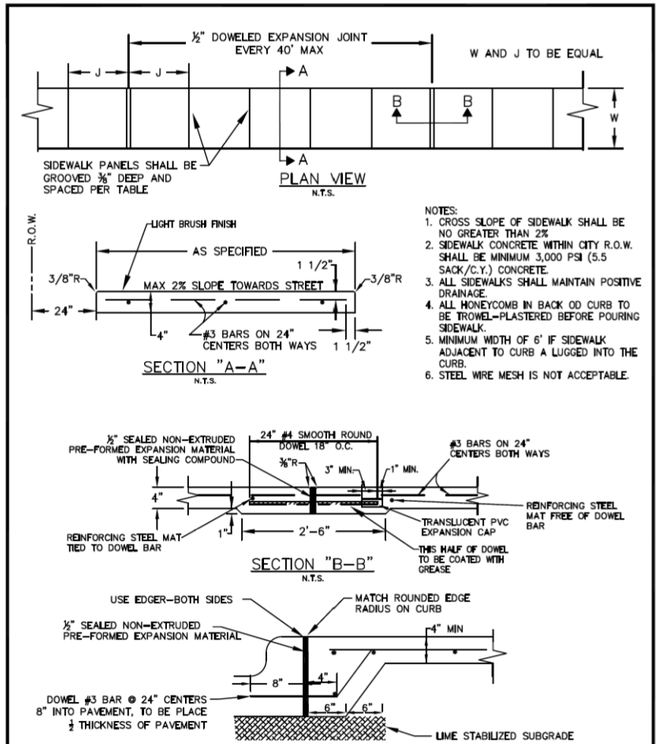
SECTION A-A

NOTE:
Sidewalk section thru driveway to be poured same thickness as driveway - 6" Thick 3,600 P.S.I. Reinf. Conc. Pvmt. w/ #3 Bars @ 24" O.C.E.W. (Grade 60 Steel)



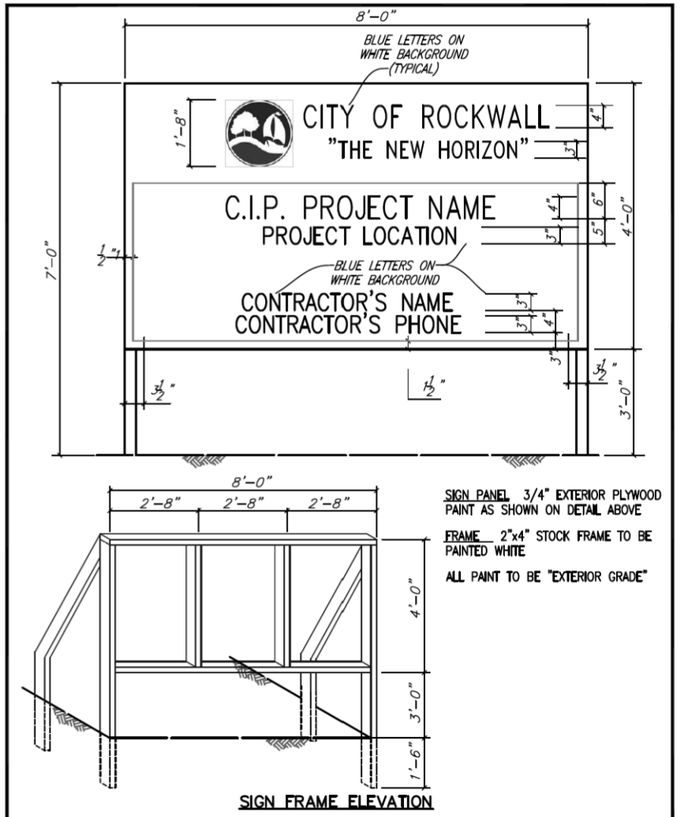
DRIVEWAY DETAILS
(Not to Scale)

DRIVEWAY DETAIL	CITY OF ROCKWALL		
RESIDENTIAL DRIVEWAY		DATE AUG '19	DRAWING NO. R-2150



JOINT LUG DETAIL FOR MEDIAN PAVEMENT
LEAD WALK CONNECTIONS OR SIDEWALK ADJACENT TO CURB
N.T.S.

REINFORCED CONCRETE SIDEWALKS	CITY OF ROCKWALL		
JOINTS AND SPACING		DATE AUG '19	DRAWING NO. R-2170



SIGN FRAME ELEVATION

SIGN PANEL 3/4" EXTERIOR PLYWOOD PAINT AS SHOWN ON DETAIL ABOVE

FRAME 2"x4" STOCK FRAME TO BE PAINTED WHITE

ALL PAINT TO BE "EXTERIOR GRADE"

MISCELLANEOUS DETAILS	CITY OF ROCKWALL		
CONSTRUCTION SIGN DETAIL		DATE AUG. '15	DRAWING NO. R-7010

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
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Phone: (214) 217-2200
Fax: (214) 217-2250
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
CIVIL
PAVING DETAILS

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CHECKED SEC
FILE NAME cv-trt-dt04.dgn

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale
0 1"

SHEET PVDT-3
SEQ. 77

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Project: Freese and Nichols, Inc. - True Type Fonts

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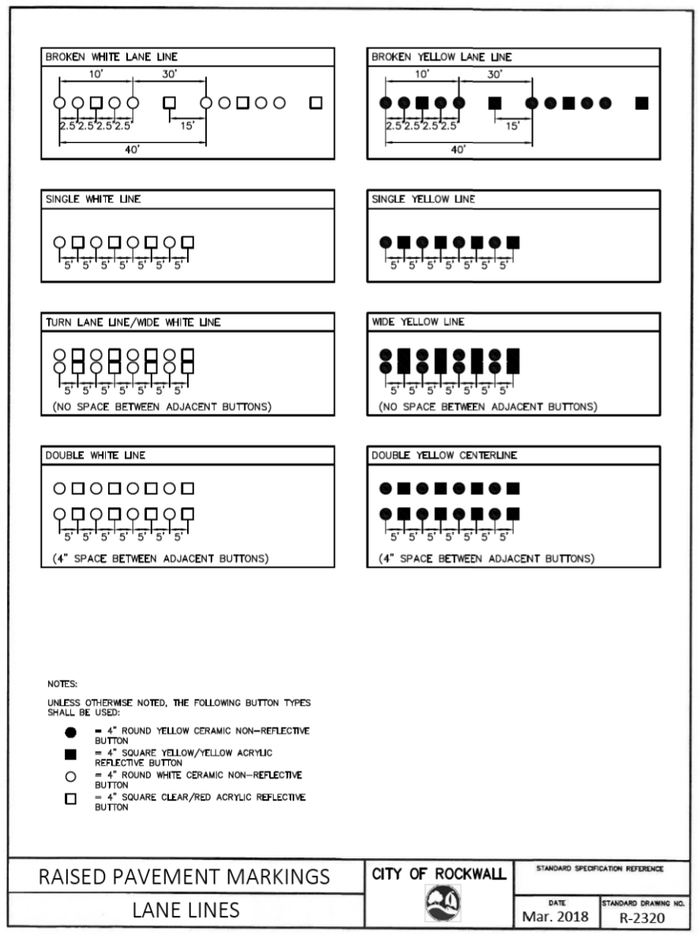
8/20/2024



NOTES:

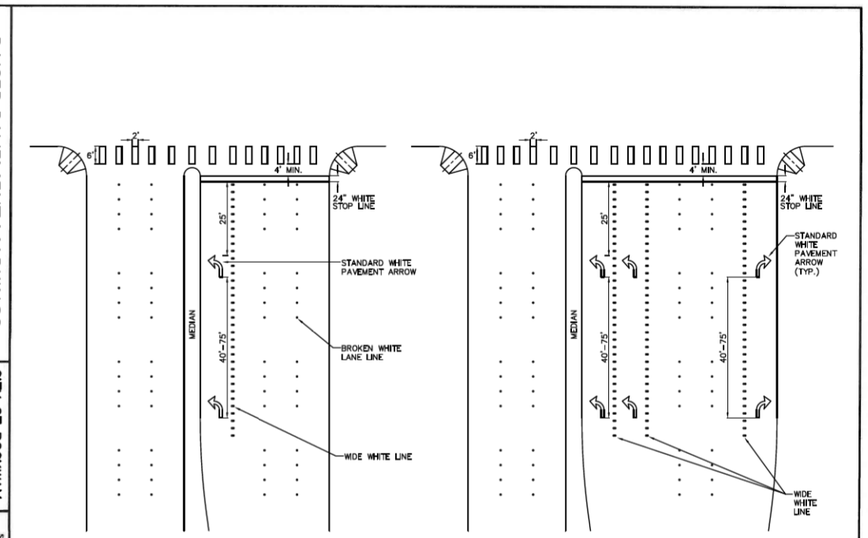
UNLESS OTHERWISE NOTED, THE FOLLOWING BUTTON TYPES SHALL BE USED:

- ● = 4" ROUND YELLOW CERAMIC NON-REFLECTIVE BUTTON
- ■ = 4" SQUARE YELLOW/YELLOW ACRYLIC REFLECTIVE BUTTON
- ○ = 4" ROUND WHITE CERAMIC NON-REFLECTIVE BUTTON
- □ = 4" SQUARE CLEAR/RED ACRYLIC REFLECTIVE BUTTON

RAISED PAVEMENT MARKINGS	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE
LANE LINES		DATE: Mar. 2018 / STANDARD DRAWING NO.: R-2320

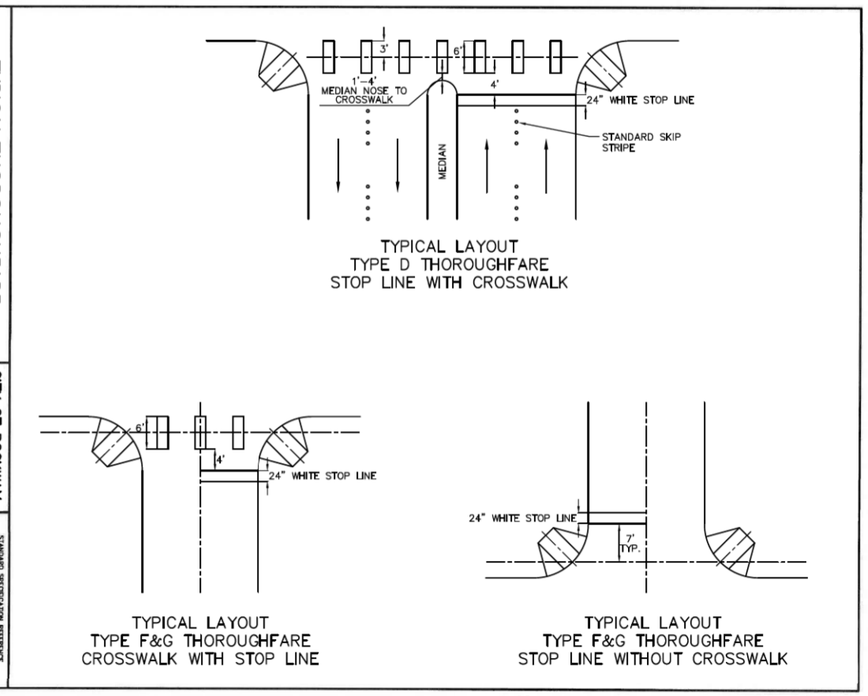
*Section II Standard Drawings as of October 2004. Reference number only has been updated for Fifth Edition Specifications. *Public Works Construction Standards North Central Texas, Fifth Edition.*

RAISED PAVEMENT MARKINGS	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE
INTERSECTION APPROACH		DATE: Mar. 2018 / STANDARD DRAWING NO.: R-2340



*Section II Standard Drawings as of October 2004. Reference number only has been updated for Fifth Edition Specifications. *Public Works Construction Standards North Central Texas, Fifth Edition.*

TYPICAL THOROUGHFARE LAYOUTS	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE
		DATE: Mar. 2018 / STANDARD DRAWING NO.: R-2360



FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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TEXAS NO. 134055 ON 10/21/2021
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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

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FILE NAME cv-trt-dt05.dgn

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SHEET
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SEQ.

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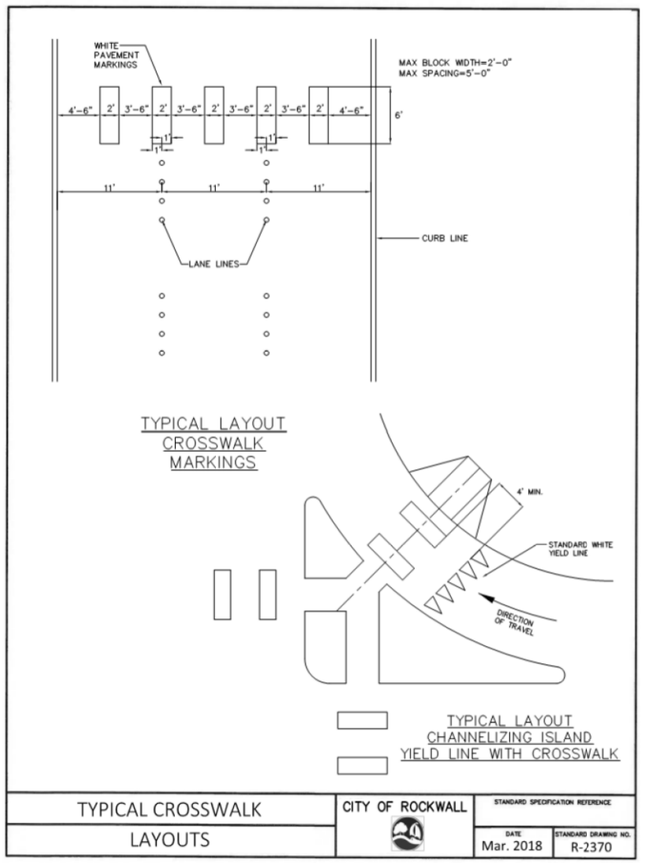
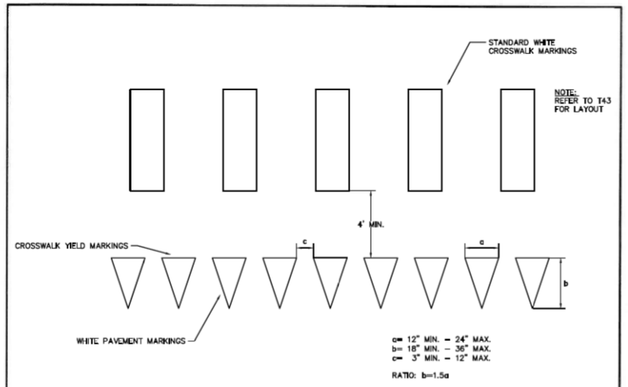


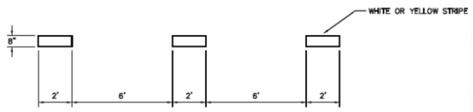
TYPICAL LAYOUT CROSSWALK MARKINGS

TYPICAL LAYOUT CHANNELIZING ISLAND YIELD LINE WITH CROSSWALK

TYPICAL CROSSWALK LAYOUTS	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE	
		DATE Mar. 2018	STANDARD DRAWING NO. R-2370



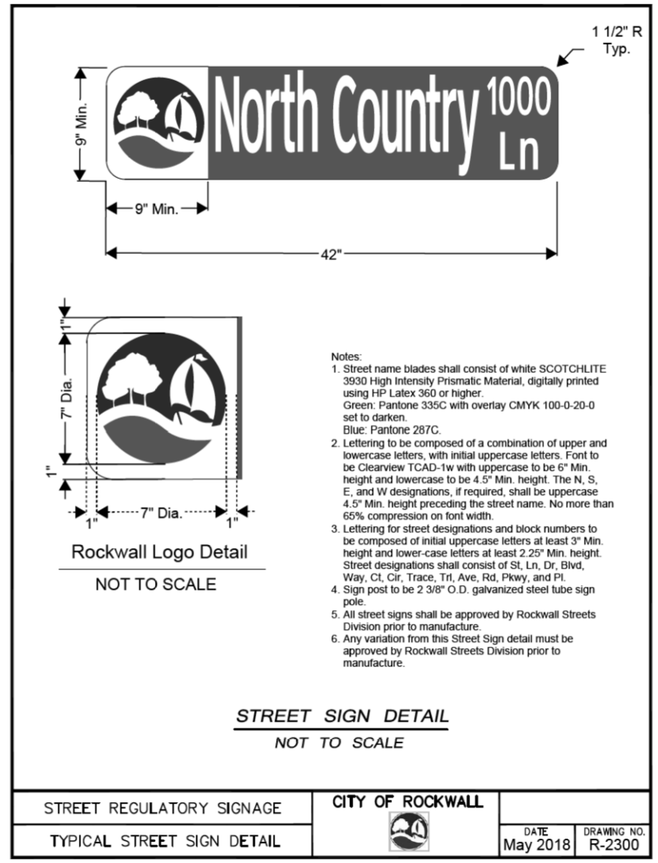
CROSSWALK MARKINGS



DASH LINE ("PUPPY TRACK") MARKINGS

TYPICAL CROSSWALK AND DASHED MARKINGS	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE	
		DATE Mar. 2018	STANDARD DRAWING NO. R-2380

*Section II Standard Drawings as of October 2004. Reference number only has been updated for Fifth Edition Specifications. *Public Works Construction Standards North Central Texas, Fifth Edition.*



Rockwall Logo Detail

NOT TO SCALE

Notes:
1. Street name blades shall consist of white SCOTCHLITE 3930 High Intensity Prismatic Material, digitally printed using HP Latex 360 or higher.
   Green: Pantone 335C with overlay CMYK 100-0-20-0 set to darken.
   Blue: Pantone 287C.
2. Lettering to be composed of a combination of upper and lowercase letters, with initial uppercase letters. Font to be Clearview TCAD-1w with uppercase to be 6" Min. height and lowercase to be 4.5" Min. height. The N, S, E, and W designations, if required, shall be uppercase 4.5" Min. height preceding the street name. No more than 65% compression on font width.
3. Lettering for street designations and block numbers to be composed of initial uppercase letters at least 3" Min. height and lower-case letters at least 2.25" Min. height. Street designations shall consist of St, Ln, Dr, Blvd, Way, Ct, Cir, Trace, Trl, Ave, Rd, Pkwy, and Pl.
4. Sign post to be 2 3/8" O.D. galvanized steel tube sign pole.
5. All street signs shall be approved by Rockwall Streets Division prior to manufacture.
6. Any variation from this Street Sign detail must be approved by Rockwall Streets Division prior to manufacture.

STREET SIGN DETAIL

NOT TO SCALE

STREET REGULATORY SIGNAGE	CITY OF ROCKWALL		
TYPICAL STREET SIGN DETAIL		DATE May 2018	DRAWING NO. R-2300

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
CIVIL
PAVING DETAILS

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MAU
DRAWN CHM
CHECKED ADH
cv-trt-dt06.dgn

NO.	ISSUES	BY	DATE	FILE NAME

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale accordingly
0 1"

SHEET PVDT-5
SEQ. 79

MicroStation V8 User: 90262 Office: On Site
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Plot Scale: 2.000 '/ in. Model: Default
Date: Feb. 21, 2024 - 09:32:11 AM Project: Freese and Nichols, Inc. - True Type Fonts

NOTES:

1. JOINT SPACING TO BE DETERMINED IN FIELD.

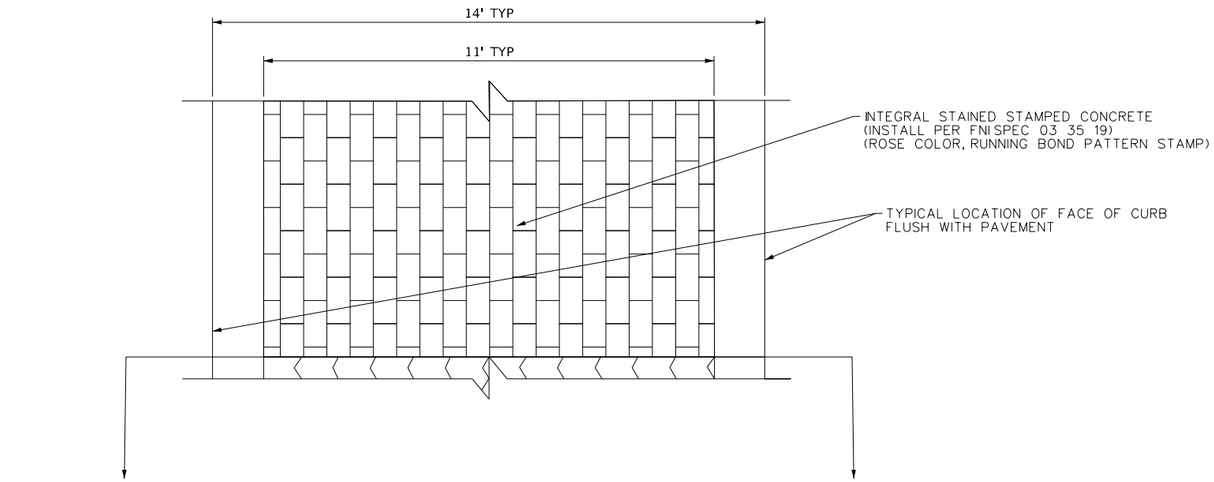
2. INTEGRAL STAMPED COLORED CONCRETE FOR THE MEDIAN SHALL BE:
ROSE COLOR
RUNNING BOND PATTERN STAMP

3. CONTRACTOR SHALL COORDINATE COLOR AND PATTERN OF STAMPED COLORED CONCRETE WITH THE OWNER AND ENGINEER. SUBMITTAL TO THE OWNER AND ENGINEER IS REQUIRED PRIOR TO ORDERING THE MATERIAL.

4. THE CONTRACTOR SHALL CONSTRUCT A 4'X4' MOCK-UP OF THE STAMPED COLORED CONCRETE AS SPECIFIED FOR APPROVAL PRIOR TO COMMENCING WORK.

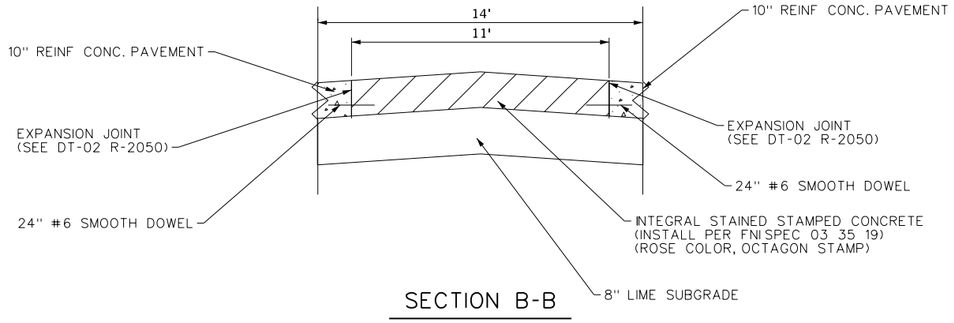
5. INTEGRAL STAINED STAMPED CONCRETE (ROSE COLOR, RUNNING BOND PATTERN STAMP) 3600 PSI WITH STEEL REINFORCEMENT TO BE NO. 4 (DEFORMED BARS ON 18" CENTER EACH WAY. THE CONCRETE COLOR SHALL BE MIXED WITH THE CONCRETE IN THE TRUCK. CONTRACTOR TO USE 6.0 SACKS IF PLACED WITH A MACHINE AND 6.5 SACKS IF PLACED WITH A HAND.

6. 1/2" EXPANDABLE JOINT MATERIAL ANY PLACE WHERE CONCRETE ABUTS CONCRETE.

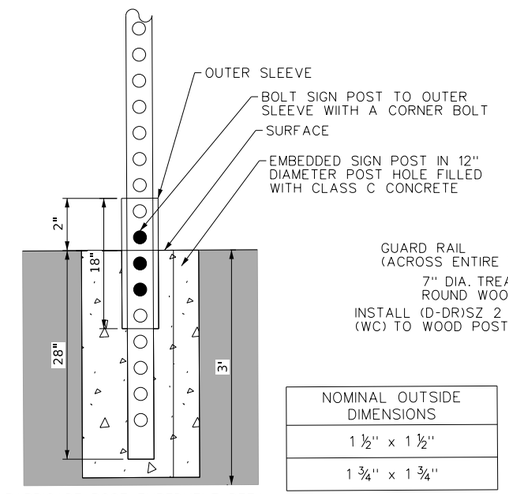


1 INTEGRAL STAINED STAMPED CONCRETE FLUSH WITH PAVEMENT

N.T.S.

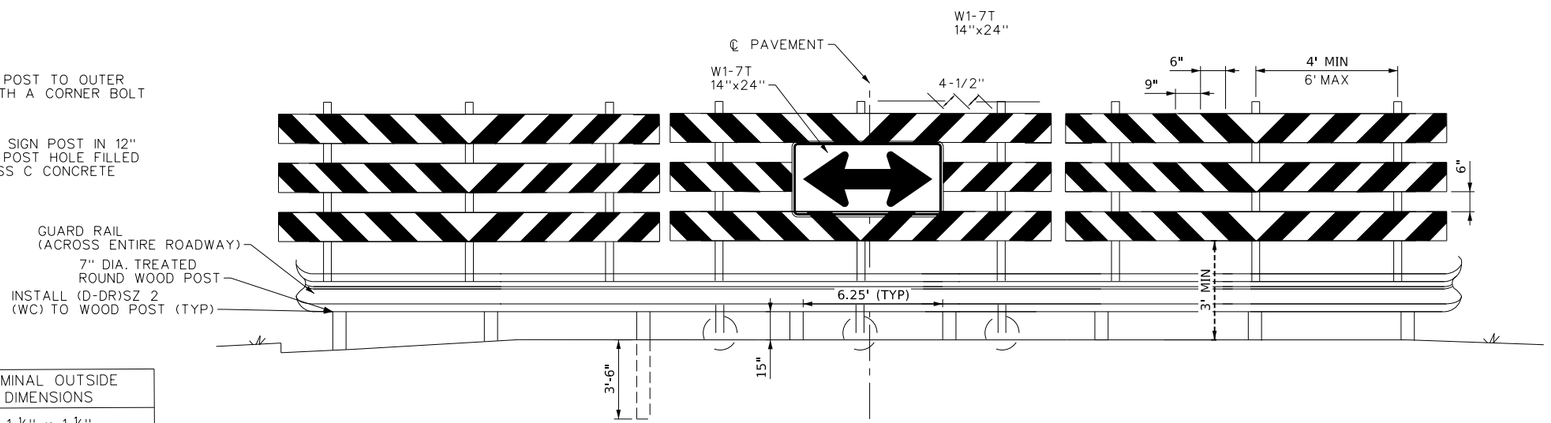


SECTION B-B



BARRICADE POST EMBEDMENT DETAIL

NOMINAL OUTSIDE DIMENSIONS
1 ½" x 1 ½"
1 ¾" x 1 ¾"



2 DEAD END GUARDRAIL

N.T.S.

GUARDRAIL NOTES:

1. REFER TO TxDOT DETAIL GF(31)-14 FOR METAL BEAM GUARD FENCE.

2. ALL POSTS AND ANCHORS SHALL CONFORM TO THE STANDARD SPECIFICATIONS FOR HOT ROLLED CARBON SHEET STEEL, STRUCTURAL QUALITY ASTM DESIGNATION A570-79.

3. ALL POSTS AND ANCHORS SHALL CARRY MINIMUM CERTIFIALE 60,000 PSI YIELD STRENGTH.

4. ALL TOP POSTS MUST BE CAPABLE OF FRACTURING AT THE POINT OF CONNECTION WITH A SINGLE ANCHOR, WHEN IMPACTED, IN SUCH A MANNER THAT THE PIECE INSIDE OF THE ANCHOR CAN BE REMOVED SO AS TO ALLOW TO RECIEVE A NEW TOP POST.

5. THE SHAPE OF ALL POSTS AND ANCHORS SHALL BE SQUARE AND STRAIGHT WITH SMOOTH TUBING WELDED IN ONE CORNER WITH A TOLERANCE THAT PERMITS TELESCOPING OF THE NEXT LARGER OR SMALL SIZE, IN 1/4" INCREMENTS.

6. ALL ANCHORS SHALL BE 12 GAUGE WITH HOLES THAT ARE FULLY PERFORATED 7/16" DIAMETER ON 1" CENTERS FOR AT LEAST THE TOP 4" OF THE ANCHOR WHIILE BEING TRULY ALIGNED IN THE CENTER OF THE SECTION.

7. ALL TOP POSTS SHALL BE 14 GAUGE WITH HOLES THAT ARE PRE PUNCHED ON 1" CENTERS FOR THE ENTIRE LENGTH OF THE POST AND TRULY ALIGNED IN THE CENTER OF SECTION.

8. STANDARD OUTSIDE CORNER RADII SHALL BE 5/32" PLUS OR MINUS 1/32".

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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TEXAS NO. 134055 ON 10/21/2021
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FREESE NICHOLS
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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
CIVIL

PAVING DETAILS

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F&N JOB NO. RKW19711
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SHEET
PVDT-6
SEQ.
80

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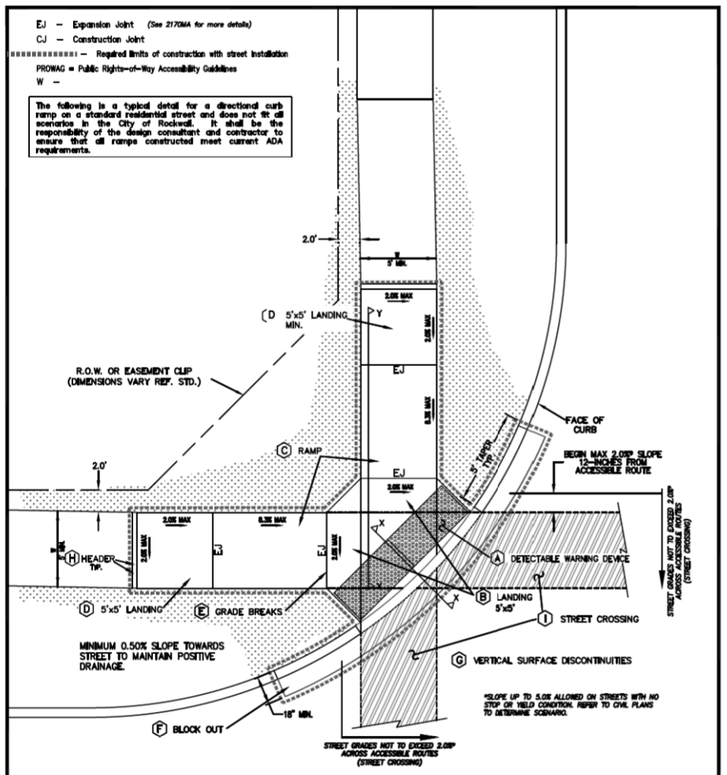
Plot Scale: 2.000 '/ in. Project: Freese and Nichols, Inc.-True Type Fonts
Date: Feb. 21, 2024 - 09:32:15 AM

EJ – Expansion Joint (See 2170MA for more details)
CJ – Construction Joint
– Required limits of construction with street installation
PROWAG = Public Rights-of-Way Accessibility Guidelines
W –

The following is a typical detail for a directional curb ramp on a standard residential street and does not fit all scenarios in the City of Rockwall. It shall be the responsibility of the design consultant and contractor to ensure that all ramps constructed meet current ADA requirements.



NOTES: All newly constructed sidewalks, curb ramps and crosswalks installed within City of Rockwall public rights-of-way shall be considered a pedestrian access route and shall conform to the most current "Draft" Guidelines for Public Rights-of-Way created by the United States Access Board.

1. SEE DETAIL R-2125B FOR RAMP FEATURE DESCRIPTIONS
2. SEE DETAIL R-2125C FOR SECTIONS X-X AND Y-Y
3. SEE DETAIL R-2125D FOR ADDITIONAL NOTES

DIRECTIONAL CURB RAMP	CITY OF ROCKWALL	DATE	DRAWING NO.
		MAR. '17	R-2125A

(A) Detectable Warning Devices (DWD) shall be pre-manufactured cast-in-place truncated dome plates installed to the manufacturer's specifications, and shall meet all ADA requirements. No Brick Pavers allowed. Color to be approved by the City. DWD shall be 24 inches in length for the full width of the street connection starting at the back of curb. A maximum 2-inch border shall be allowed on the sides of the DWD for proper installation.

(B) Also known as "Clear Space" per ADA PROWAG, the City requires a minimum landing space of 5-foot by 5-foot at the bottom of every ramp. This landing space shall have a cross slope in both directions that does not exceed 2.0%. and shall be wholly outside the parallel vehicular travel path.

(C) The ramp component of the directional curb ramp shall have a continuous longitudinal slope more than 5% and less than 8.3%. The ramp shall also have a cross slope of no more than 2.0%. Length of ramp can vary, but shall not exceed 15 feet to achieve desired elevation change.

(D) Also known as "Turning Space" per ADA PROWAG, a minimum landing space of 5-foot by 5-foot shall be at the top of every ramp. This landing (turning) space shall have a cross slope in both directions that does not exceed 2.0%. Landing must match width of sidewalk and length shall be the same distance ("Squared" Landing).

(E) All curb ramps shall have grade breaks at the top and bottom that are perpendicular to the direction of the ramp run. Where the ends of the bottom grade break are less than or equal to 5 feet, the DWD shall be placed within the ramp at the bottom grade break. Where either end of the bottom grade break is greater than 5 feet, the DWD shall be placed behind the back of the curb.

(F) Paving contractor shall leave block out with a keyway joint installed, minimum of 18 inches measured from back of curb. Block out shall be poured monolithically with Curb Ramp. Concrete shall tie to street paving with a keyway joint per NCTCOG detail 2050. No curb shall be constructed where a DWD is provided. The curb on either side shall have a typical 5 foot taper to transition from the standard 6-inch curb height to be flush with ramp.

(G) All work associated with accessible routes shall be installed flush with all features to minimize vertical surface discontinuities. Each segment along accessible route shall be flush with no more (zero tolerance) than a ¼-inch grade separation (elevation difference), or ½-inch grade separation if beveled (bevel slope shall not be steeper than 50%).

(H) A sidewalk header shall be constructed at ends of all work performed.

(I) Street crossings shall adhere to same guidelines as other accessible routes within public right-of-way, and shall be for the full width of the in-line accessible route. Cross slope shall not exceed 2%*. New street construction shall incorporate all ADA design requirements. It shall be the responsibility of the Design Professional and Contractor to ensure all street crossings meet the requirements of PROWAG. Street alterations on existing streets to bring to compliance shall be at the City Engineer's discretion.

(J) All curbs constructed as part of an ADA Ramp shall match City curb standards.

** See PROWAG special design considerations when street crossing has no stop or yield condition.*

DIRECTIONAL CURB RAMP	CITY OF ROCKWALL	DATE	DRAWING NO.
		MAR. '17	R-2125B

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TEXAS NO. 134055 ON 10/21/2021
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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
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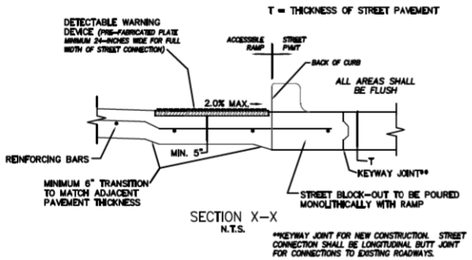
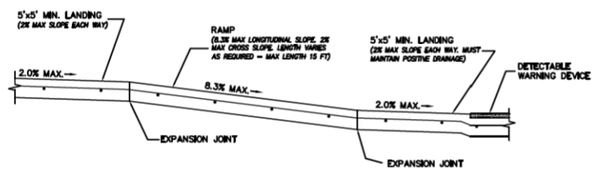


SECTION X–X
N.T.S.

**KEYWAY JOINT FOR NEW CONSTRUCTION. STREET CONNECTION SHALL BE LONGITUDINAL BUTT JOINT FOR CONNECTIONS TO EXISTING ROADWAYS.



SECTION Y–Y
N.T.S.

NOTE: ALL SIDEWALK CURB RAMPS WILL BE 3,600 PSI (6.5 SACK/CY) CONCRETE.

DIRECTIONAL CURB RAMP	CITY OF ROCKWALL	DATE	DRAWING NO.
		MAR. '17	R–2125C

PEDESTRIAN ACCESSIBILITY (WITHIN PUBLIC R.O.W.)

All newly constructed sidewalks, curb ramps and crosswalks installed within City of Rockwall public rights–of–way shall be considered a pedestrian access route and shall conform to the most current Guidelines for Public Rights–of–Way created by the United States Access Board.

CURB RAMPS

1. All slopes shown are MAXIMUM ALLOWABLE. Lesser slopes that will still drain properly should be used. Adjust curb ramp length or grade of approach sidewalks as directed.
2. Landings shall be 5'x 5' minimum with a maximum 2% slope in the transverse and longitudinal directions..
3. Clear space at the bottom of curb ramps shall be a minimum of 5'x 5' wholly contained within the crosswalk and wholly outside the parallel vehicular travel path.
4. Maximum allowable cross slope on sidewalk and curb ramp surfaces is 2%.
5. Additional information on curb ramp location, design, light reflective value and texture may be found in the most current edition of the Texas Accessibility Standards (TAS) and 16 TAC 68.102. Federal guidelines shall supersede any conflicts.
6. Crosswalk dimensions, crosswalk markings and stop bar locations shall be as shown elsewhere in the plans. At intersections where crosswalk markings are not required, curb ramps and accessible routes shall align with theoretical crosswalks unless otherwise directed.
7. Handrails are not required on curb ramps.
8. Provide a flush transition where the curb ramps connect to the street.
9. Accessible routes are considered "ramps" when longitudinal slopes are between 5% and 8.3% (maximum allowable). Sidewalks under 5% longitudinal slope are deemed accessible routes and must follow all applicable guidelines.

DETECTABLE WARNING DEVICE

10. Curb ramps must contain a detectable warning surface that consists of raised truncated domes complying with Section 705 of the TAS. The surface must contrast visually with adjoining surfaces. Furnish and install an approved cast–in–place dark red detectable warning surface material adjacent to uncolored concrete, unless specified elsewhere in the plans.
11. Detectable Warning Materials shall be truncated dome plates in the color approved by the City. Install products in accordance with manufacturer's specifications.
12. Detectable warning surfaces must be slip resistant and not allow water to accumulate.
13. Detectable warning surfaces shall be a minimum of 24" in depth in the direction of pedestrian travel, and extend the full width of the curb ramp or landing where the pedestrian access route enters the street.
14. Detectable warning surfaces shall be located so that the edge nearest the curb line is at the back of curb. When placed on the ramp, align the rows of domes to be perpendicular to the grade break between the ramp run and the street. Where detectable warning surfaces are provided on a surface with a slope that is less than 5 percent, dome orientation is less critical. Detectable warning surfaces may be curved along the corner radius.

SIDEWALKS

15. Provide clear ground space at operable parts, including pedestrian push buttons. Operable parts shall be placed within one or more reach ranges specified in TAS 308.
16. Place traffic signal or illumination poles, ground boxes, controller boxes, signs, drainage facilities and other items so as not to obstruct the pedestrian access route or clear ground space.
17. Street grades and cross slopes shall be as shown elsewhere in the plans.
18. Changes in level greater than 1/4 inch are not permitted (1/2 inch with bevel).
19. The least possible grade should be used to maximize accessibility. The running slope of sidewalks and crosswalks within the public right of way may follow the grade of the parallel roadway. Where a continuous grade greater than 5% must be provided, handrails may be desirable to improve accessibility. Handrails may also be needed to protect pedestrians from potentially hazardous conditions. If provided, handrails shall comply with TAS 505.
20. Handrail extensions shall not protrude into the usable landing area or into intersecting pedestrian routes.

DIRECTIONAL CURB RAMP	CITY OF ROCKWALL	DATE	DRAWING NO.
		MAR. '17	R–2125D

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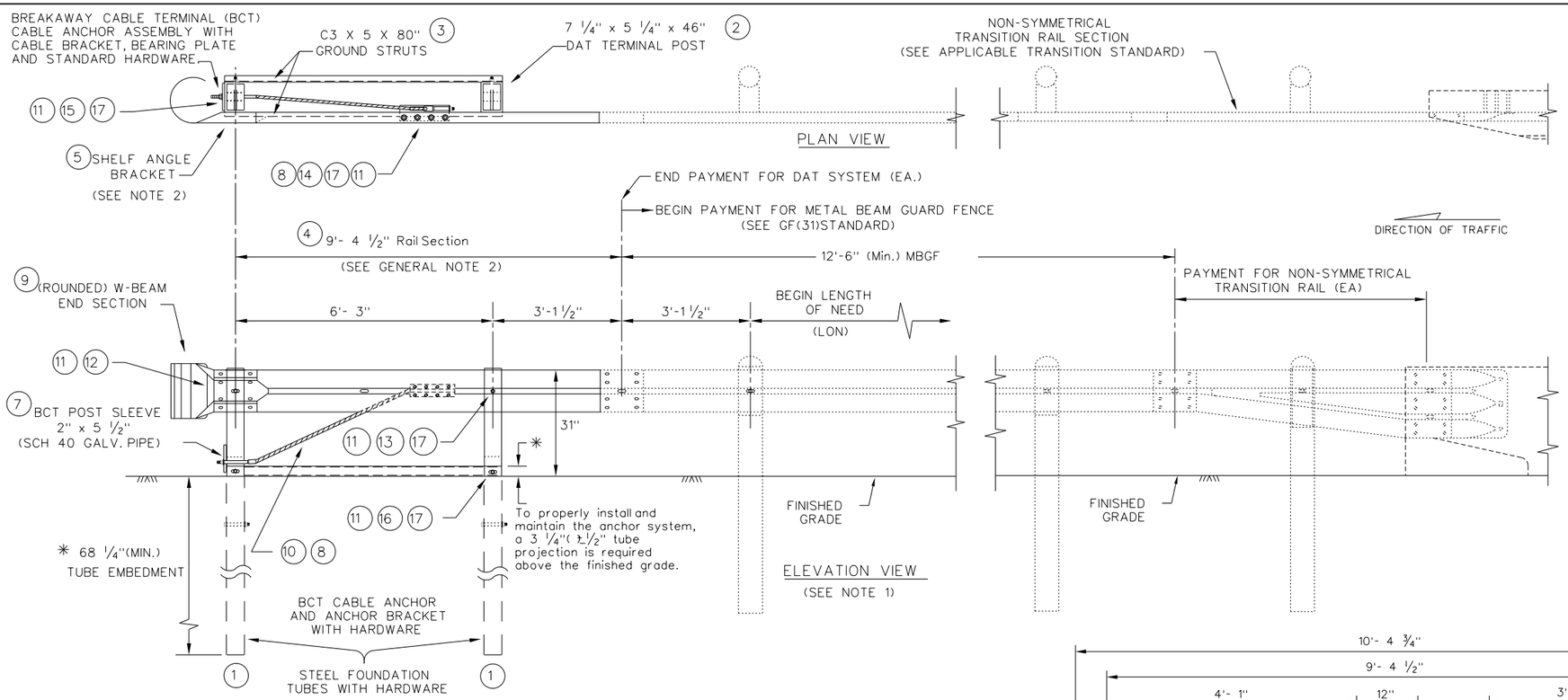


DOWNSTREAM ANCHOR TERMINAL (DAT)

NOTE: ONLY FOR DOWNSTREAM USE, WHEN LOCATED OUTSIDE THE HORIZONTAL CLEARANCE AREA OF OPPOSING TRAFFIC.

GENERAL NOTES

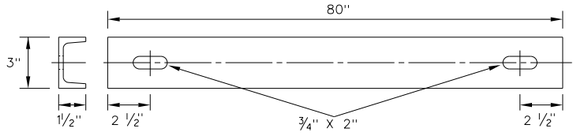
1. THE DETAIL SHOWN IS THE MINIMUM LENGTH OF NEED (LON) FOR A DOWNSTREAM ANCHOR TERMINAL (DAT) CONNECTED TO A CONCRETE RAIL.
2. THE RAIL SECTION AT THE END POST IS SUPPORTED BY THE SHELF ANGLE BRACKET. THE RAIL ELEMENT IS NOT ATTACHED TO THE END POST.
3. THE FOUNDATION TUBES SHALL NOT PROJECT MORE THAN 3 3/4" ABOVE THE FINISHED GRADE.
4. ALL HARDWARE FOR DAT SHALL BE ASTM A307 UNLESS OTHERWISE SHOWN.
5. REFER TO GF(31) SHEET FOR TERMINAL CONNECTION DETAILS.

MOW STRIP INSTALLATION

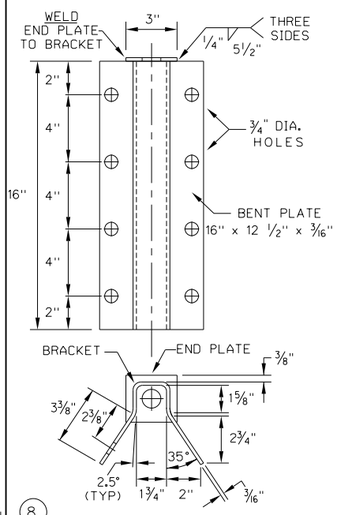
IF A MOW STRIP IS REQUIRED WITH THE DAT INSTALLATION THE LEAVE-OUT AREA AROUND THE STEEL FOUNDATION TUBES AND THE TWO CHANNEL STRUTS MAY BE OMITTED. THIS WILL REQUIRE A FULL POUR AT THE FOUNDATION TUBES.

#	(DAT) PARTS LIST	QTY
(1)	STEEL FOUNDATION TUBE	2
(2)	DAT TERMINAL POST	2
(3)	CHANNEL STRUT	2
(4)	TERMINAL RAIL ELEMENT	1
(5)	SHELF ANGLE BRACKET	1
(6)	BCT BEARING PLATE	1
(7)	BCT POST SLEEVE	1
(8)	GUARDRAIL ANCHOR BRACKET	1
(9)	(ROUNDED)W-BEAM END SECTION	1
(10)	BCT CABLE ANCHOR	1
(11)	RECESSED NUT, GUARDRAIL	20
(12)	1 1/4" BUTTON HEAD BOLT	4
(13)	10" BUTTON HEAD BOLT	2
(14)	5/8" X 2" HEX HEAD BOLT	8
(15)	5/8" X 8" HEX HEAD BOLT	4
(16)	5/8" X 10" HEX HEAD BOLT	2
(17)	5/8" FLAT WASHER	18

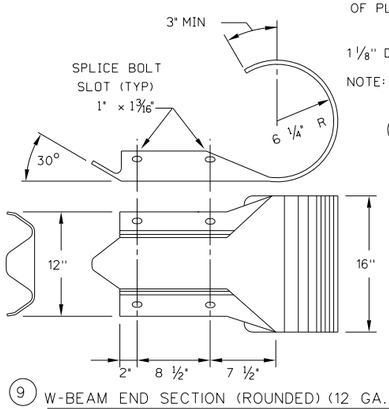
(4) TERMINAL RAIL ELEMENT FOR DAT



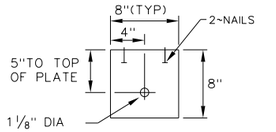
(3) CHANNEL STRUT
C3 X 5 X 80", GRADE A36



(8) GUARDRAIL ANCHOR BRACKET

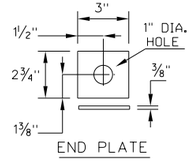


(9) W-BEAM END SECTION (ROUNDED) (12 GA.)

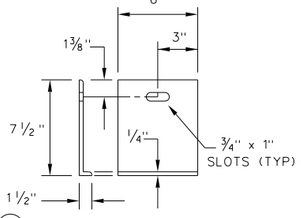


NOTE: DRIVE NAILS AND BEND OVER TO PREVENT PLATE ROTATION

(6) BEARING PLATE
8"x 8"x 5/8" P L



END PLATE



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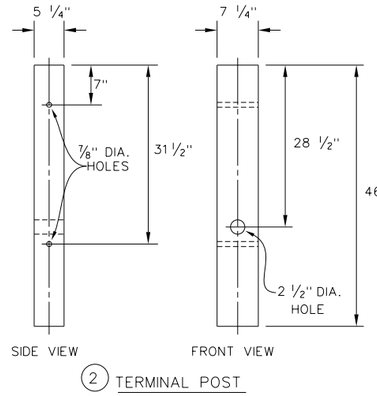
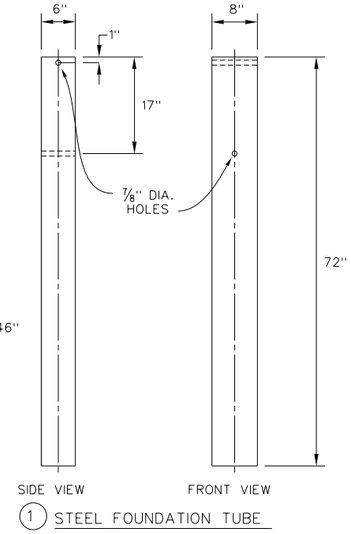


(2) TERMINAL POST
7 1/4"x 5 1/4"x 46" WOOD POST



(1) STEEL FOUNDATION TUBE
6"x 8"x 1/8" x 72" STEEL TUBE

Texas Department of Transportation

Design Division Standard

METAL BEAM GUARD FENCE
(DOWNSTREAM ANCHOR TERMINAL)
TL-3 MASH COMPLIANT

GF(31)DAT-19

FILE: gf31dat19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
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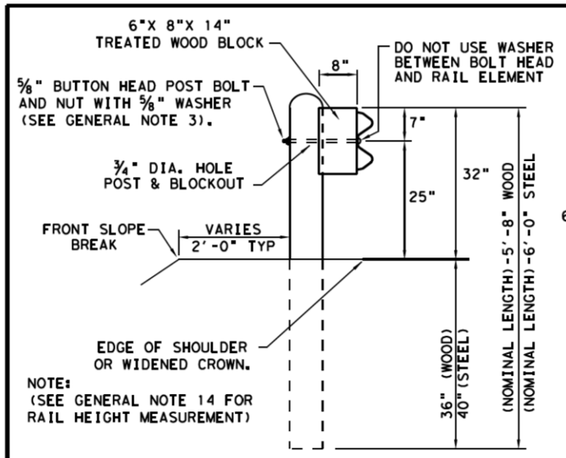
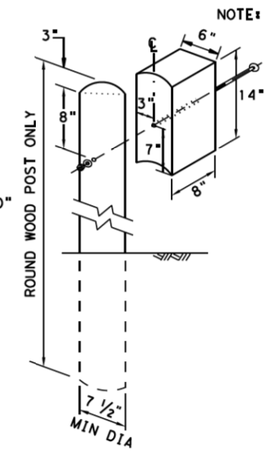
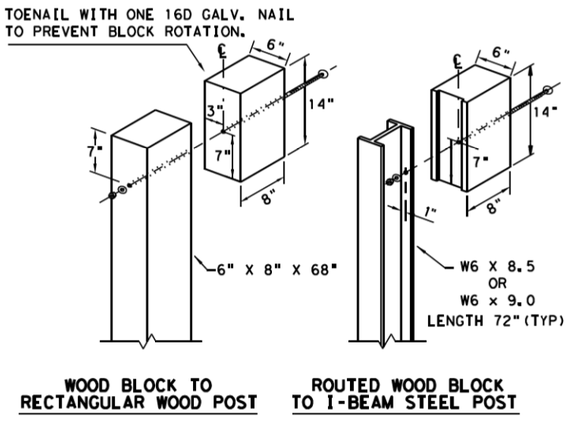


TYPICAL POST PLACEMENT



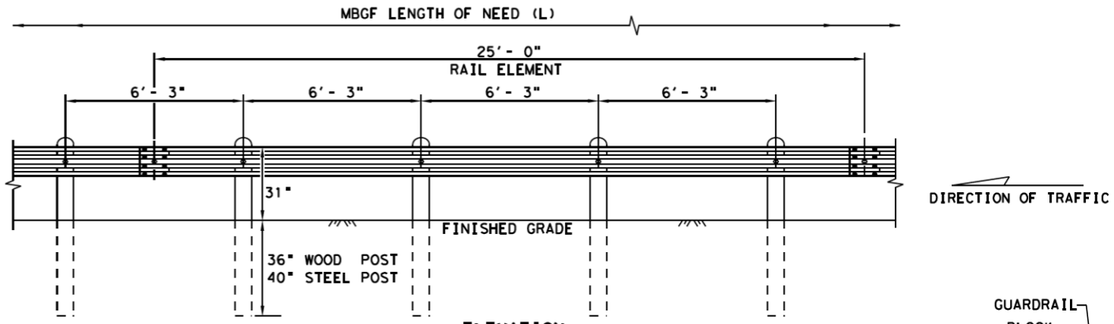
WOOD BLOCK TO ROUND WOOD POST



WOOD BLOCK TO RECTANGULAR WOOD POST

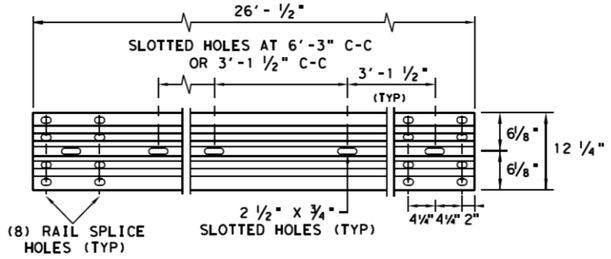
ROUTED WOOD BLOCK TO I-BEAM STEEL POST

NOTE: ** "WOOD" INDICATES DIMENSIONS FOR BOTH ROUND AND RECTANGULAR WOOD POST SYSTEMS.



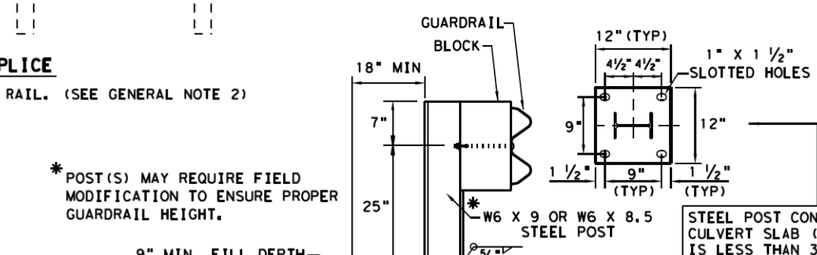
ELEVATION MID-SPAN RAIL SPLICE

SHOWING A 25'- 0" SECTION OF W-BEAM RAIL. (SEE GENERAL NOTE 2)



ELEVATION 25'- 0" (NOM.) W-BEAM SECTION

NOTES: SEE GENERAL NOTE 2 FOR ALLOWABLE RAIL TYPES.
SEE RAIL SPLICE DETAIL FOR REQUIRED HARDWARE.



LOW FILL CULVERT POST

STEEL POST CONNECTION TO CULVERT SLAB (USE WHEN THERE IS LESS THAN 36" COVER OVER CULVERT SLAB).

NOTE: TRANSISTIONS TO BRIDGE RAILS OR TRAFFIC BARRIERS.
SEE GF(31)TL3 TR STANDARD FOR HIGH-SPEED TL-3 TRANSITIONS.
SEE GF(31)TL2 TR STANDARD FOR LOW-SPEED TL-2 TRANSITIONS.

NOTE: TWO INSTALLATION OPTIONS.

1. BOLT-THROUGH OPTION: REQUIRES A 6" MIN. SLAB THICKNESS. 7/8" DIA (ASTM A449) HEAVY HEX BOLTS WITH TWO HARDENED WASHER EACH AND HEAVY HEX NUTS.
   NOTE: BOLT LENGTH = SLAB PLUS 2 1/4" MIN.

2. EPOXY ANCHOR OPTION: THIS OPTION MAY ONLY BE USED IF THE CULVERT SLAB IS 9" MIN. THICK. THREADED ANCHOR RODS MUST BE 7/8" DIA. ASTM A449 OR A193 GRADE B7 WITH HEAVY HEX NUT, AND ONE HARDENED WASHER EACH. EMBED ANCHOR RODS 6" WITH HILTI HIT RE 500 EPOXY ADHESIVE. OTHER TYPE III CLASS C EPOXY ADHESIVES MEETING THE REQUIREMENTS OF DMS-6100, "EPOXIES AND ADHESIVES", MAY BE USED IF IT CAN BE DEMONSTRATED THAT THEY MEET OR EXCEED THE STRENGTH OF HILTI HIT RE 500 WITH THE SAME EMBEDMENT DEPTH AND THREADED ROD DIA. FOLLOW THE MANUFACTURER'S REQUIREMENTS FOR INSTALLING EPOXIED THREADED RODS. EXTEND RODS 1/4" MIN. BEYOND NUT.

NOTE: CULVERTS OF 25 FT. OR LESS, SEE GF(31)LS STANDARD FOR "LONG SPAN" OPTION.

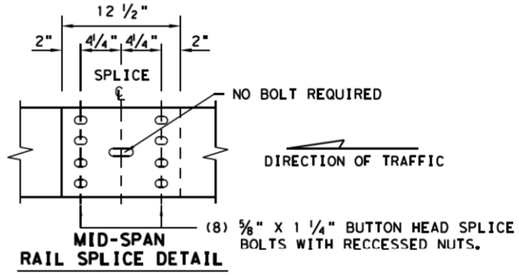
NOTE:
FOUR TYPES OF BUTTON-HEAD GUARD RAIL BOLTS COME WITH A RECCESSED NUT.

SPLICE BOLT LENGTH — VARIES
FBB01 = 1 1/4"
FBB02 = 2"
5/8"

POST & BLOCK LENGTH
FBB03 = 10"
FBB04 = 18"

BUTTON HEAD BOLT

NOTE: SEE GENERAL NOTE 3 FOR SPLICE & POST BOLT DETAILS.



MID-SPAN RAIL SPLICE DETAIL

NOTE: GF(31), MID-SPAN RAIL SPLICES ARE REQUIRED WITH 6'-3" POST SPACINGS.

GENERAL NOTES

1. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF MBGF SHALL BE SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."
2. RAIL ELEMENTS SHALL MEET THE REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED IN THE PLANS. THE CONTRACTOR MAY FURNISH RAIL ELEMENTS OF 25'- 0", OR 12'- 6" (NOM.) LENGTHS. RAIL ELEMENTS MAY HAVE SLOTTED HOLES AT 3'-1 1/2" C-C OR 6'-3" C-C. A SPECIAL LENGTH OF RAIL MAY BE MANUFACTURED TO ACCOMMODATE THE DOWNSTREAM ANCHOR TERMINAL (DAT) AND THE TRANSITION SECTIONS OF GUARDRAIL.
3. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND 5/8" WASHER (FWC16a) AND NOT MORE THAN 1" BEYOND IT. TRIM REMAINING BOLT LENGTH TO MEET REQUIRED LENGTH.
4. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING." FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
5. CROWN SHALL BE WIDENED TO ACCOMMODATE THE METAL BEAM GUARD FENCE.
6. THE LATERAL APPROACH TO THE GUARD FENCE, SHALL HAVE A MAXIMUM SLOPE OF 1V:10H.
7. IF SHOWN ELSEWHERE IN THE PLANS OR AS DIRECTED BY THE ENGINEER, THE GUARD FENCE MAY BE FLARED AT A RATE OF 25:1 OR FLATTER.
8. UNLESS OTHERWISE SHOWN IN THE PLANS, GUARD FENCE PLACED IN THE VICINITY OF CURBS SHALL BE POSITIONED SO THAT THE FACE OF CURB IS LOCATED DIRECTLY BELOW OR BEHIND THE FACE OF THE RAIL. RAIL PLACED OVER CURBS SHALL BE INSTALLED SO THAT THE POST BOLT IS LOCATED APPROXIMATELY 25 INCHES ABOVE THE GUTTER PAN OR EDGE OF SHOULDER.
9. APPLICATIONS IN SOLID ROCK ARE ONLY ALLOWED WITH STEEL POSTS. IF SOLID ROCK IS ENCOUNTERED WITHIN 0 TO 18" OF THE FINISHED GRADE, DRILL A 24" DIA. HOLE, 24" INTO THE ROCK. IF SOLID ROCK IS ENCOUNTERED BELOW 18", DRILL A 12" DIA. HOLE, 12" INTO THE ROCK OR TO THE STANDARD EMBEDMENT DEPTH, WHICHEVER MAYBE LESS. ANY EXCESS POST LENGTH, AFTER MEETING THESE DEPTHS, MAY BE FIELD CUT TO ENSURE PROPER GUARDRAIL MOUNTING HEIGHT. BACKFILL WITH COARSE AGGREGATE MATERIAL.
10. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
11. SPECIAL FABRICATION WILL BE REQUIRED AT INSTALLATION LOCATIONS HAVING A CURVATURE OF LESS THAN 150 FT. RADIUS.
12. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210, "COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. THE CONSTRUCTION DIVISION, TXDOT MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210 ONLY PRODUCERS ON THE MPL MAY FURNISH COMPOSITE MATERIAL BLOCKS.
13. FOR THE LOW FILL CULVERT OPTION, POSTS LOCATED PARTIALLY OR WHOLLY BETWEEN PRECAST BOX CULVERT UNITS, THE USE OF A CAST-IN-PLACE CONCRETE CLOSURE BETWEEN BOXES IS REQUIRED. THE LENGTH OF THE CAST-IN-PLACE CONCRETE CLOSURE SHALL ACCOMMODATE THE PLACEMENT OF THE LOW FILL CULVERT OPTION. SEE CONCRETE CLOSURE DETAILS ON BRIDGE STANDARD SCP-MD.
14. GUARDRAIL HEIGHT MEASUREMENT: WHEN THE GUARDRAIL IS LOCATED ABOVE PAVEMENT, MEASURE THE HEIGHT FROM THE PAVEMENT TO THE TOP OF THE W-BEAM RAIL. WHEN THE GUARDRAIL IS LOCATED UP TO 2 FT. OFF OF THE EDGE OF PAVEMENT OR FOR A PAVEMENT OVERLAY, USE A 10-FOOT STRAIGHTEDGE TO EXTEND THE PAVEMENT/SHOULDER SLOPE TO THE BACK OF RAIL, MEASURE FROM THE BOTTOM OF STRAIGHTEDGE TO THE TOP OF RAIL. FOR GUARDRAIL LOCATED DOWN A 10:1 SLOPE, MEASURE FROM THE NOMINAL TERRAIN.

Texas Department of Transportation — Design Division Standard

METAL BEAM GUARD FENCE
TL-3 MASH COMPLIANT
GF(31)-19

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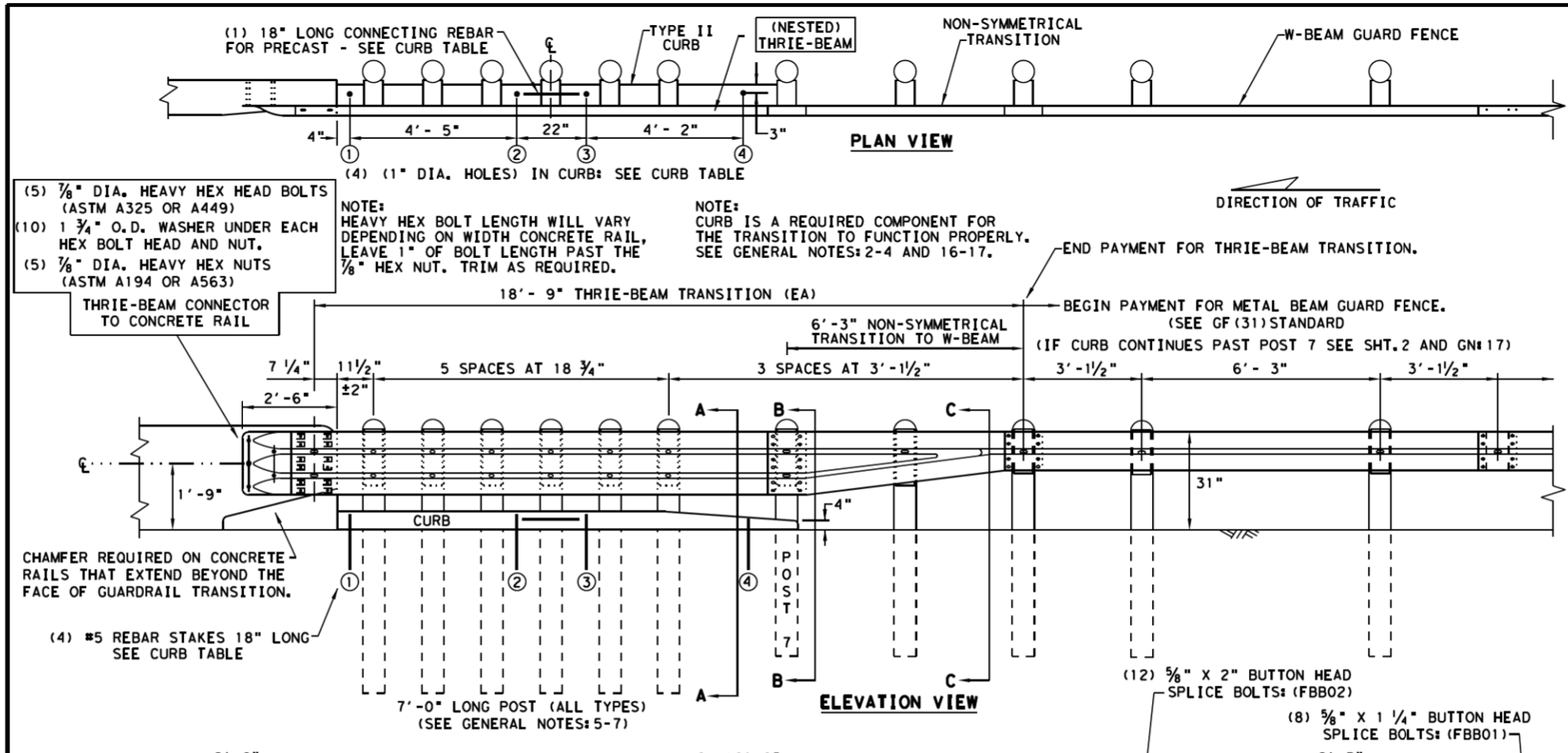


GENERAL NOTES

1. CONTACT THE DESIGN DIVISION FOR DRAINAGE CUT OUT OPTIONS NEEDED WITHIN THE CURB SECTION OF THE THRIE-BEAM TRANSITION. (512) 416-2678
2. CONCRETE CURB MAY BE CAST-IN-PLACE OR PRECAST AS SHOWN ON THIS SHEET. WHEN USED IN CONJUNCTION WITH THE THRIE-BEAM TRANSITIONS, CURB SHALL BE TYPE II (5- 3/4") HEIGHT; SEE CURRENT CCCG STANDARD SHEET FOR FURTHER DETAILS. IF OTHER CURB HEIGHTS ARE SHOWN IN THE PLANS IN CONJUNCTION WITH THE TRANSITION, THE CURB HEIGHT MAY BE FROM 4" TO 8" WITH A RELATIVELY VERTICAL FACE. CONCRETE CURB SHALL BE CONTINUOUS TO THE SEVENTH POST UNLESS OTHERWISE SHOWN IN THE PLANS. SEE GENERAL NOTE: 17 FOR CIRCUMSTANCES WHERE CURB CONTINUES PAST POST 7.
3. CONCRETE CURB TYPE II SUBSIDIARY TO "METAL BEAM GUARD FENCE TRANSITION". IF NO ADDITIONAL CURB IS INDICATED BEYOND THE TRANSITION, THEN ANY CURB HEIGHT GREATER THAN 4" WILL BE TAPERED DOWN BEGINNING AT THE LAST 7 FT. POST TO A MAXIMUM HEIGHT OF 4" AT POST 7. IF SHOWN ELSEWHERE IN THE PLANS, ADDITIONAL CURB UNDERNEATH GUARDRAIL WILL BE PAID FOR BY THE LINEAR FOOT.
4. UNLESS OTHERWISE SHOWN IN THE PLANS, TRANSITIONS SHALL BE PLACED WITH THE BLOCKOUT FACE IN FRONT OF OR DIRECTLY ABOVE THE CURB FACE. SEE SECTION A-A.
5. FOR ROUND WOOD POST SYSTEMS, ALL ROUND WOOD POSTS SHALL BE 7 1/2" DIA. MINIMUM THROUGHOUT THE THRIE-BEAM TRANSITION.
6. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. REFER TO GF(31) STANDARD SHEET.
7. THE POST LENGTH SHALL BE MARKED ON ALL 7'- 0" LONG POSTS BY THE MANUFACTURER. THE MARK SHALL BE LOCATED WITHIN THE TOP 1 FT. REGION OF THE POST, AT LEAST 5/8" IN HEIGHT, AND VISIBLE AFTER INSTALLATION. WOODEN POSTS SHALL BE MARKED WITH A BRAND, AND STEEL POSTS WITH A STENCIL BEFORE GALVANIZING.
8. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
9. RAIL ELEMENTS SHALL MEET THE REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED ON THE PLANS. THE THRIE-BEAM TERMINAL CONNECTOR AND THE THRIE-BEAM TRANSITION TO W-BEAM SHALL BE OF THE SAME MATERIAL, BUT SHALL NOT BE LESS THAN 10 GAUGE. CONTRACTOR SHALL VERIFY THAT THE LOCATIONS OF BOLT HOLES MATCH THOSE IN THE THRIE-BEAM TERMINAL CONNECTOR PRIOR TO ORDERING MATERIALS.
10. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND 5/8" WASHER (FWC16a) AND NOT MORE THAN 1" BEYOND IT. TRIM REMAINING BOLT LENGTH TO MEET REQUIRED LENGTH.
11. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
12. CROWN SHALL BE WIDENED TO ACCOMMODATE TRANSITIONS.
13. WHERE SOLID ROCK IS ENCOUNTERED, CONTACT THE DESIGN DIVISION FOR ADDITIONAL GUIDANCE. (512) 416-2678
14. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210, "COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. TXDOT'S CONSTRUCTION DIVISION MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210. ONLY PRODUCERS ON THE MPL CAN FURNISH COMPOSITE MATERIAL BLOCKS.
15. REFER TO GF(31) STANDARD SHEET & BRIDGE RAILING DETAILS FOR ADDITIONAL DETAILS.
16. THE INSTALLATION OF THE TYPE II CURB IS CRITICAL FOR THE PERFORMANCE OF THE THRIE-BEAM TRANSITION SYSTEM. THE CURB PREVENTS (VEHICLE WHEEL SNAGGING) AT THE CONCRETE RAIL AND IS REQUIRED TO MEET MASH CRASH TEST CRITERIA.
17. IF CURB EXTENDS BEYOND POST 7, 25' OF NESTED W-BEAM GUARDRAIL SHALL BE INSTALLED BEYOND THE PAY LIMITS OF THRIE-BEAM TRANSITION SECTION, (SEE SHT.2). PAYMENT FOR THIS 25' SECTION WILL BE BY LINEAR FOOT, PAY ITEM "0540 6XXX MTL W-BEAM GD FEN (NESTED) (TIM POST)" OR "540 6XXX MTL W-BEAM GD FEN (NESTED) (STEEL POST)" AS APPLICABLE FOR POST TYPE. SEE SHT.2 FOR ADDITIONAL INFORMATION.

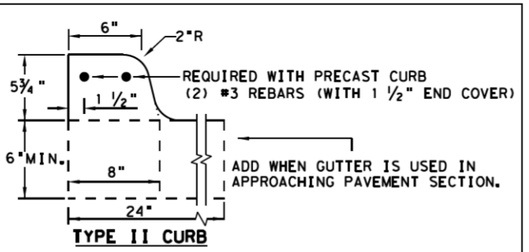
THRIE-BEAM TERMINAL - CURB TABLE

PRECAST CURB FULL LENGTH EQUALS 12'- 2"
THE PRECAST CURB MAY BE FORMED INTO TWO SECTIONS.

CURB (1) LENGTH 5'- 8"
CURB (2) LENGTH 6'- 6"
TAPER CURB (2) TO A HEIGHT OF 4" AT POST 7

CONNECTING PRECAST CURB SECTIONS (1) & (2):
FORM OR CORE (1" DIA. HOLE 9" LONG) INTO EACH CURB END.
USE (1) #5 GR.60 REBAR 18" LONG TO CONNECT BOTH CURBS.

SECURING PRECAST OR CAST-IN-PLACE TO FINISHED GRADE:
FORM OR CORE FOUR (1" DIA. HOLES), SEE BOTH VIEWS FOR HOLE LOCATIONS. DRIVE (4) #5 GR.60 REBAR STAKES 18" LONG INTO THE GROUND AND 1/2" BELOW TOP OF CURB. FILL HOLES WITH APPROVED GROUT MIXTURE.



TYPE II CURB

NOTE: OPTIONS FOR TYPE II CURB:
1. PRECAST
2. CAST-IN-PLACE

* NOTES: NOT NEEDED FOR CAST-IN-PLACE.
SEE TYPE II CURB DETAIL FOR REBAR AND COVER REQUIREMENTS.
PERCUSSION DRILLING IS NOT PERMITTED WITH:
TYPE II CURB, BRIDGE RAIL OR CONCRETE TRAFFIC RAIL.

TYPE II CURB DETAILS

HIGH-SPEED TRANSITION

Texas Department of Transportation — Design Division Standard

METAL BEAM GUARD FENCE THRIE-BEAM TRANSITION TL-3 MASH COMPLIANT

GF(31)TR TL3-19

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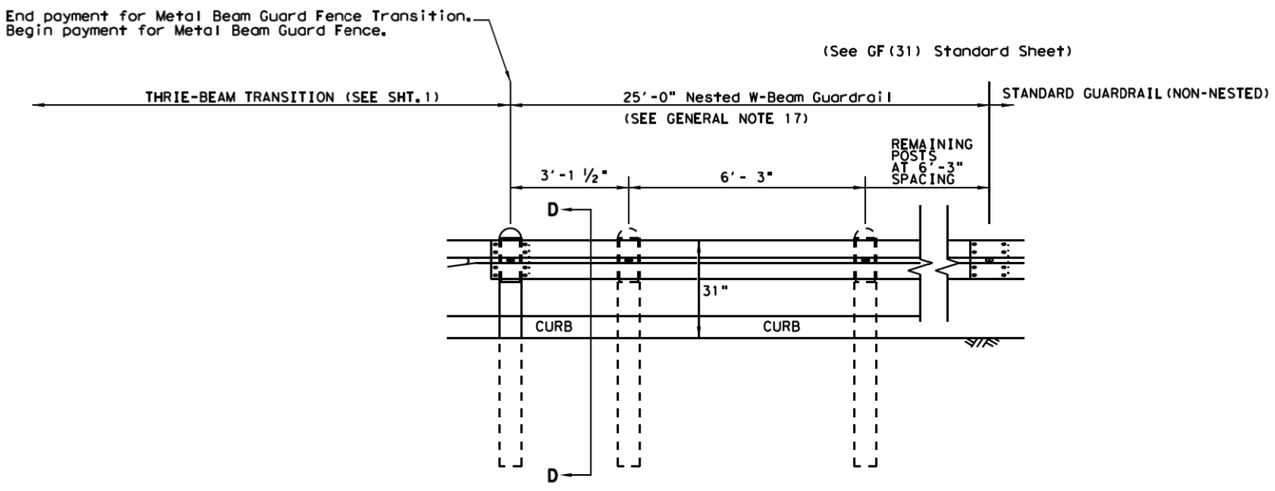
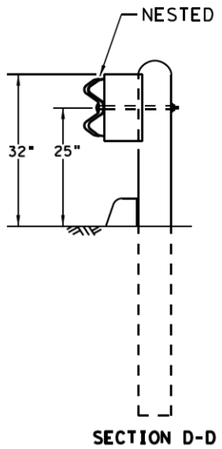
REQUIRED ALTERNATIVE FOR CONTINUOUS CURB EXTENDING PAST POST 7 (SEE SHT. 1 GENERAL NOTE 17)





SECTION D-D

HIGH-SPEED TRANSITION

SHEET 2 OF 2

Texas Department of Transportation | Design Division Standard

METAL BEAM GUARD FENCE THRIE-BEAM TRANSITION TL-3 MASH COMPLIANT

GF(31)TR TL3-19

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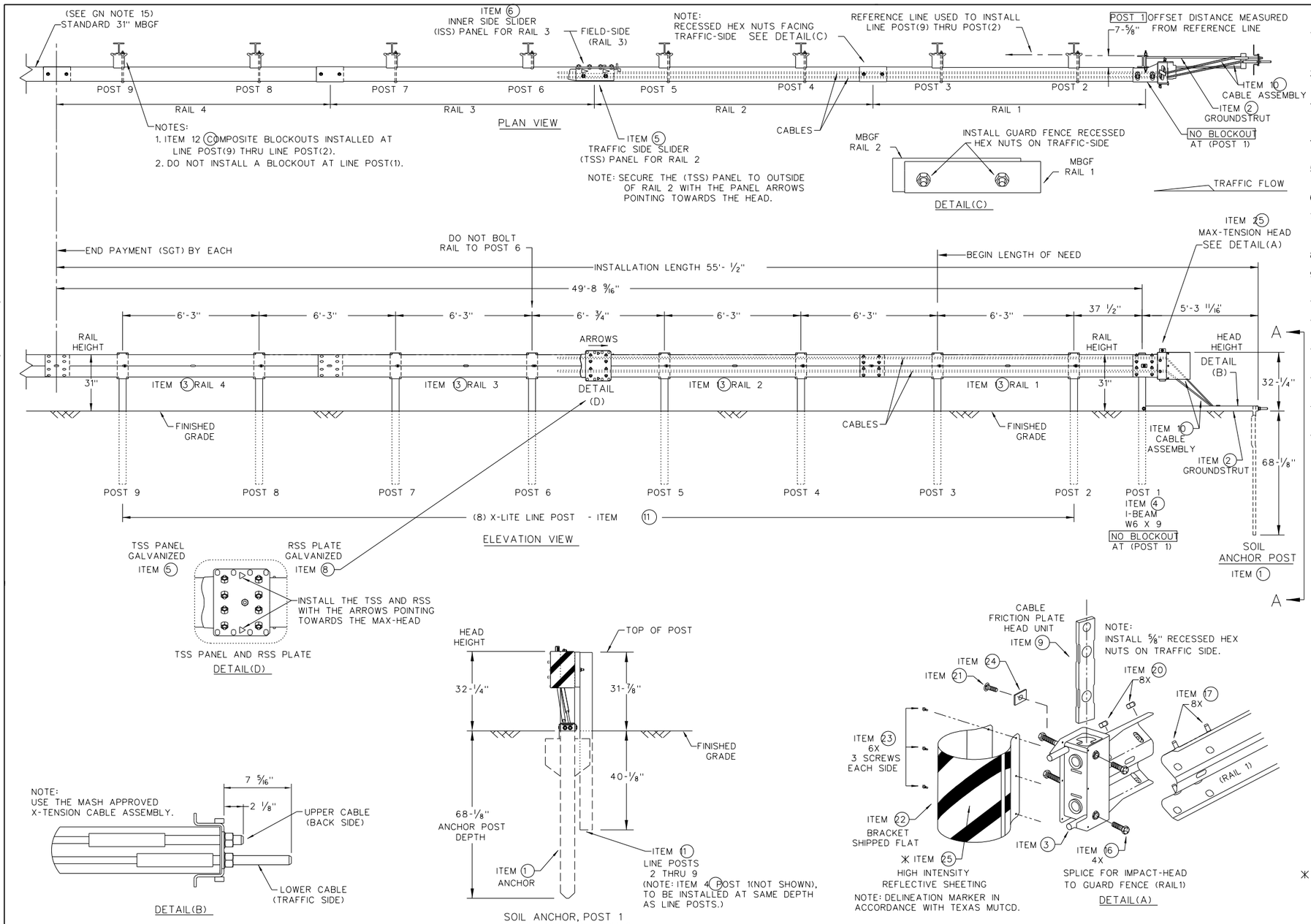

GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: LINDSAY TRANSPORTATION SOLUTIONS (LTS) - BARRIER SYSTEMS, INC. AT (707) 374-6800
2. FOR INSTALLATION, REPAIR, & MAINTENANCE REFER TO THE: MAX-TENSION INSTALLATION INSTRUCTION MANUAL. P/N MANMAX REV D (ECN 3516).
3. APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" ON THE FRONT FACE OF THE DEVICE PER MANUFACTURE'S RECOMMENDATIONS. OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.
4. FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
5. ALL STEEL COMPONENTS ARE GALVANIZED PER ASTM A123 OR EQUIVALENT UNLESS OTHERWISE STATED.
6. SYSTEM SHOWN USING STEEL WIDE FLANGE POST WITH COMPOSITE BLOCKOUTS.
7. COMPOSITE MATERIAL BLOCKOUT THAT MEETS THE REQUIREMENTS OF DMS-7210, MAY BE SUBSTITUTED FOR BLOCKOUTS SIMILAR DIMENSIONS. SEE CONSTRUCTION DIVISION MATERIAL PRODUCER LIST(MPL)FOR CERTIFIED PRODUCERS.
8. REFER TO INSTALLATION MANUAL FOR SPECIFIC PANEL LAPPING GUIDANCE.
9. IF SOLID ROCK IS ENCOUNTERED SEE THE MANUFACTURER'S INSTALLATION MANUAL FOR INSTALLATION GUIDANCE.
10. POSTS SHALL NOT BE SET IN CONCRETE.
11. A DRIVING CAP WITH A TIMBER OR PLASTIC INSERT SHALL BE USED WHEN DRIVING POST TO PREVENT DAMAGE TO THE GALVANIZING ON TOP OF THE POST.
12. MAX-TENSION SYSTEM SHALL NEVER BE INSTALLED WITHIN A CURVED SECTION OF GUARDRAIL.
13. IF A DELINEATION MARKER IS REQUIRED, MARKER SHALL BE IN ACCORDANCE WITH TEXAS MUTCD.
14. THE SYSTEM IS SHOWN WITH 12'-6" MBGF PANELS, 25'-0" MBGF PANELS ARE ALSO ALLOWED.
15. A MINIMUM OF 12'-6" OF 12GA. MBGF IS REQUIRED IMMEDIATELY DOWNSTREAM OF THE MAX-TENSION SYSTEM.

ITEM #	PART NUMBER	DESCRIPTION	QTY
1	BSI-1610060-00	SOIL ANCHOR - GALVANIZED	1
2	BSI-1610061-00	GROUND STRUT - GALVANIZED	1
3	BSI-1610062-00	MAX-TENSION IMPACT HEAD	1
4	BSI-1610063-00	W6x9 I-BEAM POST 6FT.-GALVANIZED	1
5	BSI-1610064-00	TSS PANEL - TRAFFIC SIDE SLIDER	1
6	BSI-1610065-00	ISS PANEL - INNER SIDE SLIDER	1
7	BSI-1610066-00	TOOTH - GEOMET	1
8	BSI-1610067-00	RSS PLATE - REAR SIDE SLIDER	1
9	B061058	CABLE FRICTION PLATE - HEAD UNIT	1
10	BSI-1610069-00	CABLE ASSEMBLY - MASH X-TENSION	2
11	BSI-1012078-00	X-LITE LINE POST-GALVANIZED	8
12	B090534	8" W-BEAM COMPOSITE-BLOCKOUT XT110	8
13	BSI-4004386	12'-6" W-BEAM GUARD FENCE PANELS 12GA.	4
14	BSI-1102027-00	X-LITE SQUARE WASHER	1
15	BSI-2001886	5/8" X 7" THREAD BOLT HH (GR.5)GEOMET	1
16	BSI-2001885	3/4" X 3" ALL-THREAD BOLT HH (GR.5)GEOMET	4
17	4001115	5/8" X 1 1/4" GUARD FENCE BOLTS (GR.2)MGAL	48
18	2001840	5/8" X 10" GUARD FENCE BOLTS MGAL	8
19	2001636	5/8" WASHER F436 STRUCTURAL MGAL	2
20	4001116	5/8" RECESSED GUARD FENCE NUT (GR.2)MGAL	59
21	BSI-2001888	5/8" X 2" ALL THREAD BOLT (GR.5)GEOMET	1
22	BSI-1701063-00	DELINEATION MOUNTING (BRACKET)	1
23	BSI-2001887	1/4" X 3/4" SCREW SD HH 410SS	7
24	4002051	GUARDRAIL WASHER RECT AASHTO FWR03	1
* 25	SEE NOTE BELOW	HIGH INTENSITY REFLECTIVE SHEETING	1
** 26	4002337	8" W-BEAM TIMBER-BLOCKOUT, PDB01B	8
** 27	BSI-4004431	25' W-BEAM GUARDRAIL PANEL,8-SPACE,12GA.	2
28	MANMAX Rev-(D)	MAX-TENSION INSTALLATION INSTRUCTIONS	1

* TO BE PROVIDED BY DISTRIBUTOR OR CONTRACTOR.

** ALTERNATIVE ITEMS NOT SHOWN.
ITEM(26) 8" WOOD-BLOCKOUTS
ITEM(27) 25'GUARD FENCE PANELS

NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE MAX-TENSION END TERMINAL, IT IS NOT INTENDED TO REPLACE THE PRODUCT DESCRIPTION ASSEMBLY MANUAL.

Texas Department of Transportation

Design Division Standard

MAX-TENSION END TERMINAL
MASH - TL-3
SGT(11S)31-18

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REVISIONS				
	DIST	COUNTY		SHEET NO.
				87

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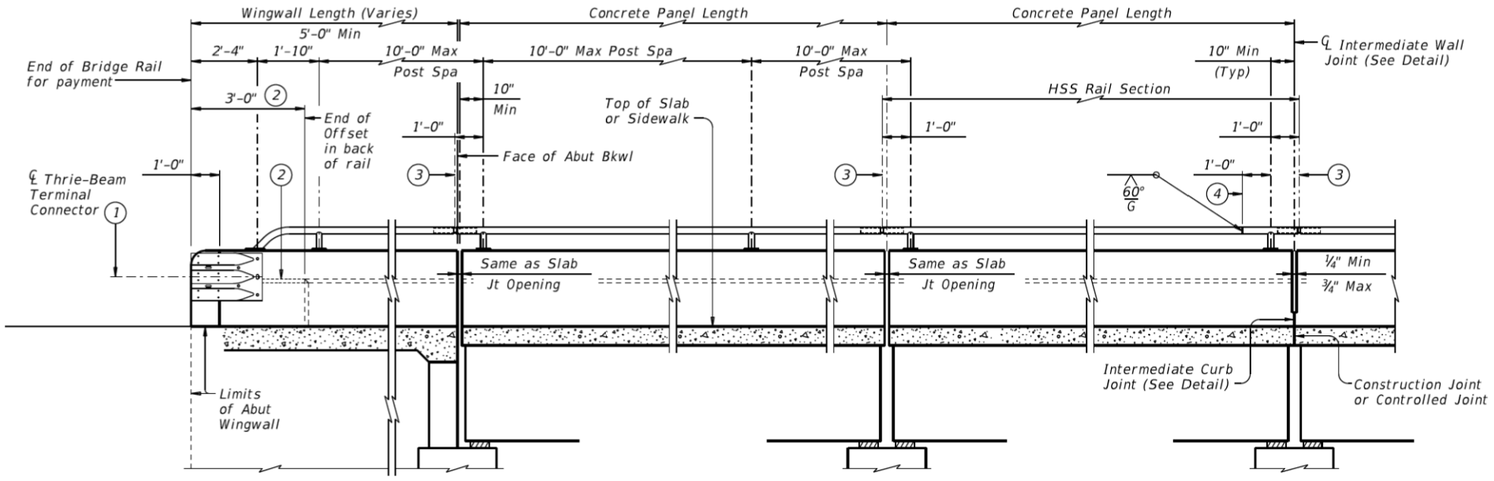
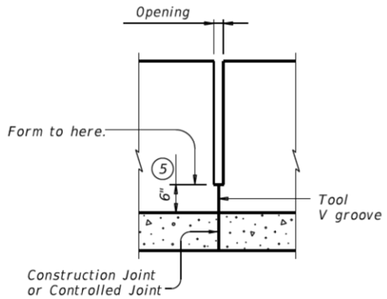


AT ABUTMENTS | AT BENTS WITH SLAB EXP JOINTS | AT BENTS WITHOUT SLAB EXP JOINTS

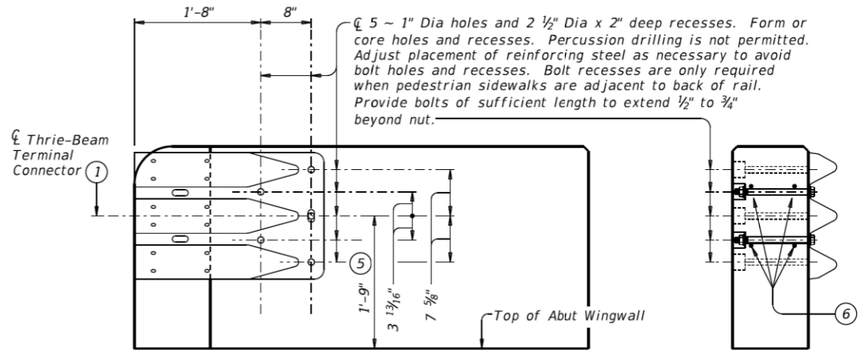
ROADWAY ELEVATION OF RAIL



INTERMEDIATE WALL JOINT DETAIL

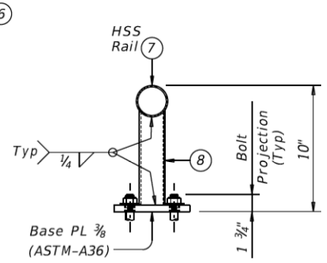
Provide at all interior bents without slab expansion joints.

1. Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence". Attach Metal Beam Guard Fence Transitions to the bridge rail and extend along the embankment unless otherwise shown in the plans.
2. Back of rail offset may, with Engineer's approval, be continued to the end of the railing.
3. ℄ Exp Joint or Splice Joint as required.
4. One shop splice per HSS rail section is permitted with minimum 85 percent penetration. The weld may be square groove, or single vee groove. Grind smooth.
5. Increase 2" for structures with overlay.
6. Place 4 additional Bars R(#4) 3'-8" in length inside Bars S(#4) and centered 2'-0" from end of rail when Terminal Connections are required. Field bend as needed.
7. HSS 2.875 x 0.203
8. HSS 2.375 x 0.154
9. ⅜" Dia Hole in bottom of HSS rail (Minimum 1 hole between posts ~ Typ)

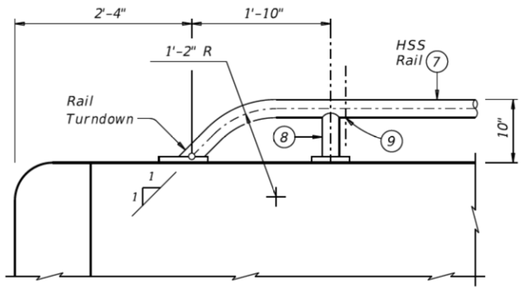


ELEVATION | SECTION

TERMINAL CONNECTION DETAILS

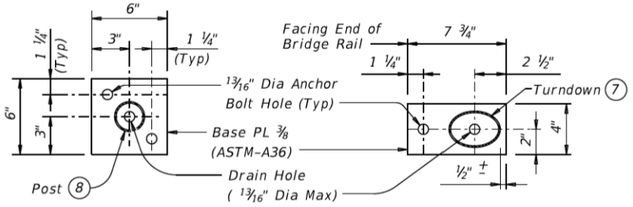


TRANSVERSE SECTION



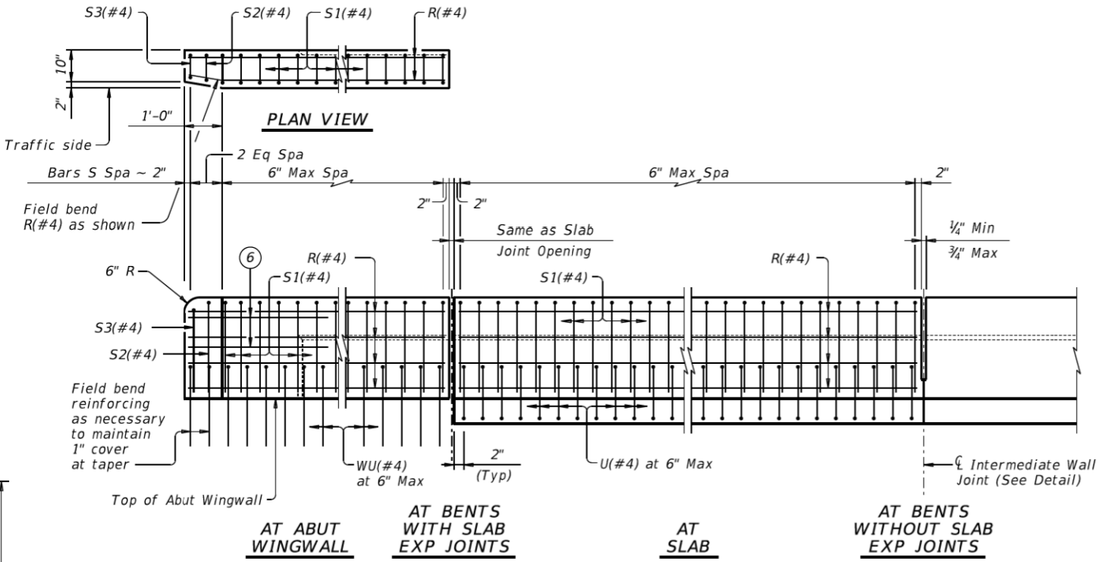
Note that at least two anchor points (as shown) are required for the Bridge Rail on the Abutment Wingwall. Longer Wingwalls may require more than two Rail anchorages.

HSS RAIL TERMINAL DETAIL



POST BASE PLATE PLAN | RAIL TURNDOWN BASE PLATE PLAN

HSS RAIL DETAILS



AT ABUT WINGWALL | AT BENTS WITH SLAB EXP JOINTS | AT SLAB | AT BENTS WITHOUT SLAB EXP JOINTS

ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT

(Showing without raised sidewalk)

SHEET 1 OF 3

Texas Department of Transportation

Bridge Division Standard

COMBINATION RAIL

TYPE C221

FILE: rlstd018-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
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REVISIONS				
	DIST	COUNTY		SHEET NO.
				88

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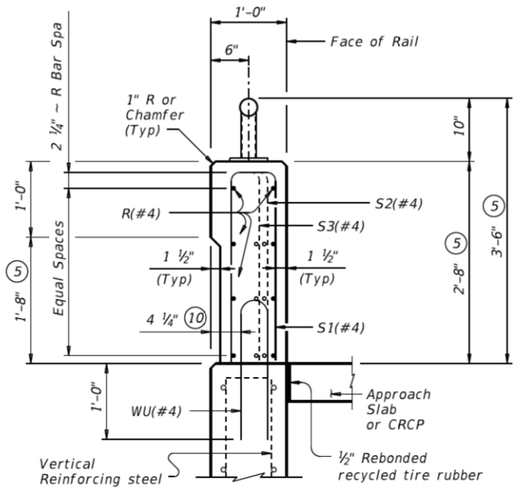
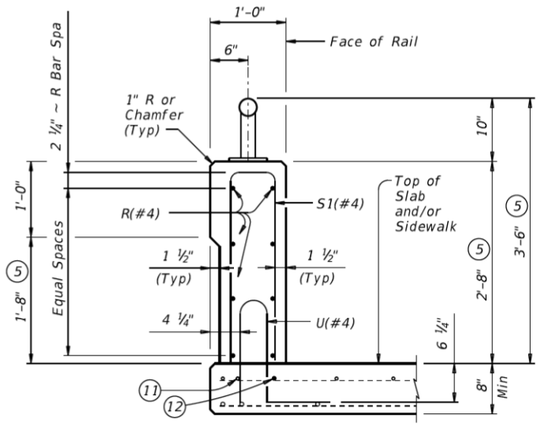
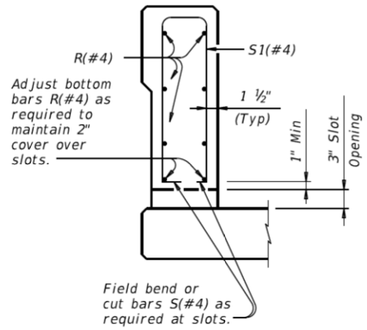


ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS

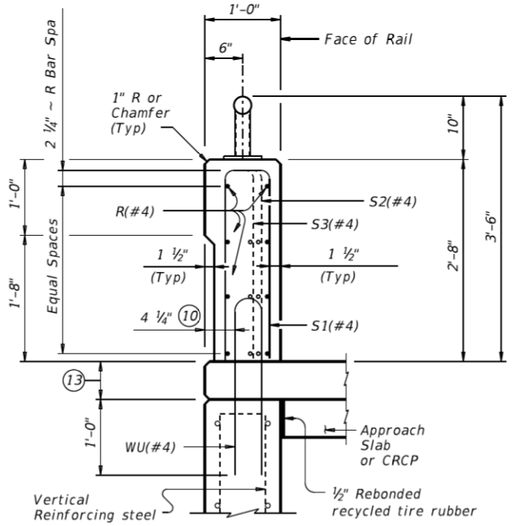


ON BRIDGE SLAB

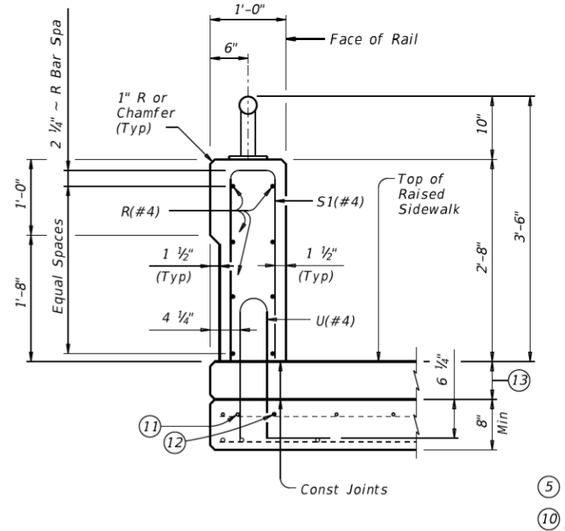
SECTIONS THRU RAIL WITHOUT RAISED SIDEWALK



SECTION THRU OPTIONAL SIDE SLOT DRAIN

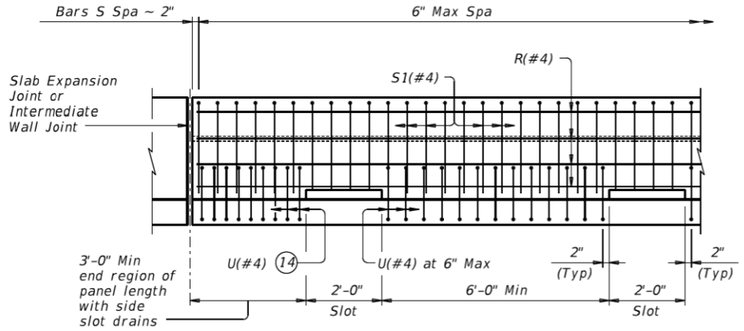


ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS



ON BRIDGE SLAB

SECTIONS THRU RAIL WITH RAISED SIDEWALK



OPTIONAL SIDE SLOT DRAIN DETAIL

Note: Side Slot Drains may be used where shown elsewhere on the plans or as directed by the Engineer. Drains should not be placed over railroad tracks, lower roadways, or sidewalks. When this rail is used as a separator between a roadway surface and a sidewalk surface, side drain slots will not be permitted.

(5) Increase 2" for structures with overlay.

(10) 5 ¼" when vertical reinforcing has closer clear cover over horizontal reinforcing in abutment wingwalls or retaining walls on traffic side of wall.

(11) As an aid in supporting reinforcement, additional longitudinal bars may be used in the slab with the approval of the Engineer. Such bars must be furnished at the Contractors expense.

(12) Top longitudinal slab bar may be adjusted laterally 3" plus or minus to tie reinforcing.

(13) Raised Sidewalk

(14) Space U(#4) bars at 4" Max when end region of panel length is less than 6'-0" to side slot drain. Space U(#4) bars at 6" Max when end region of panel length is 6'-0" and greater to side slot drain.

Texas Department of Transportation

Bridge Division Standard

COMBINATION RAIL

TYPE C221

FILE: rlstd018-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
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				89

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DATE:
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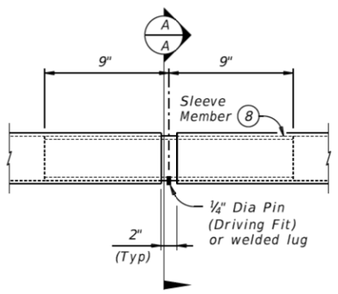
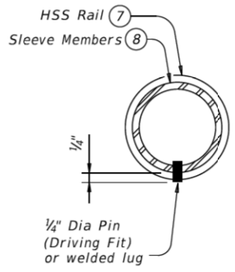
RAIL DATA FOR HORIZONTAL CURVES

	RADIUS TO FACE OF RAIL	MAX CHORD LENGTH	CONSTRUCT OR FABRICATE
HSS Rail	Over 2800'	29'-0"	Straight rail panels
	Over 1400' thru 2800'	14'-6"	To required radius or to chords shown
	Over 700' thru 1400'	7'-3"	
	Thru 700'	Zero	To required radius

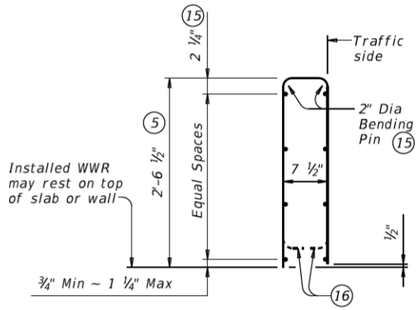


AT SPLICE OR EXP JTS



SECTION A-A

PIPE SPLICE DETAILS



OPTIONAL WELDED WIRE REINFORCEMENT (WWR)

DESCRIPTION	LONGITUDINAL WIRES	VERTICAL WIRES
Minimum (Cumulative Total) Wire Area	1.067 Sq In.	0.267 Sq In. per Ft
	No. of Wires	Spacing
Minimum	8	4"
Maximum	10	8"
Maximum Wire Size Differential	The smaller wire must have an area of 40% or more of the larger wire.	

CONSTRUCTION NOTES:

This railing may be constructed by the slipform process when approved by the Engineer, with equipment approved by the Engineer and when adhesive anchor bolts are used. Slipforming parapet is not allowed if anchor bolts are cast with parapet wall. Provide sensor control for both line and grade. Tack welding to provide bracing for slipform operations is acceptable. Welding may be performed at a minimum spacing of 3 ft between the cage and the anchorage. It is permissible to weld to bars U, WU and S at any location on the cage. If increased bracing is needed, provide additional anchorage devices and weld in the upper two thirds of the cage. Paint welded areas on epoxy coated and/or galvanized reinforcing with an organic zinc rich paint in accordance with Item 445 "Galvanizing".

If rail is slipformed, apply an heavy epoxy bead 1" behind toe of traffic side of rail to concrete deck just prior to slip forming. Provide a ⅜" width x ¼" tall heavy epoxy bead with Type III, Class C or a Type V epoxy.

Test adhesive anchors in accordance with Item 450.3.3, "Tests". Test 3 anchors per 100 anchors installed. Perform corrective measures to provide adequate capacity if any of the tests do not meet the required test load. Repair damage from testing as directed.

At the Contractor's option anchor bolts may be cast with the parapet. See "Material Notes".

Face of rail, parapet must be plumb unless otherwise approved by the Engineer. HSS rail posts must be square to the top of parapet. Use epoxy mortar under post base plates if gaps larger than 1/16" exist.

Round or chamfer exposed edges of HSS rail and HSS rail posts to approximately 1/16" by grinding.

HSS rail sections must not include less than two posts, and no more than four (except at Abutments).

Chamfer all parapet exposed corners.

MATERIAL NOTES:

Provide Class "C" concrete. Povide Class "C" (HPC) if required elsewhere.

Provide Grade 60 reinforcing steel.

Epoxy coat or galvanize all reinforcing steel if slab bars are epoxy coated or galvanized.

Provide ASTM A1085 or A500 Gr B or A53 Gr B for all HSS.

Galvanize all metal components of steel rail system. Apply additional coatings when shown elsewhere on the plans. When plans require paint over gavanizing, follow the requirements for painting galvanized steel in Item 445, "Galvanizing" and when field painting, Item 446, "Field Cleaning and Painting Steel". Sleeve members and anchor bolts must receive galvanization prior to installation and only field paint after installation unless directed otherwise by Engineer.

Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for Bars U and WU unless noted otherwise. Deformed WWR (ASTM 1064) may be substituted for Bars R and S, as shown. Combinations of reinforcing steel and WWR or configurations of WWR other that shown are permitted if conditions in the table are satisfied. Provide the same laps as required for reinforcing bars.

Anchor bolts must be ⅝" Dia ASTM A307 Gr A fully threaded rods with one hex nut and one hardened steel washer (ASTM F436) each. Nuts must conform to ASTM A563 requirements. Embed fully threaded rods into parapet wall with a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 3". Anchor adhesive chosen must be able to achieve a nominal bond strength in tension of a single anchor, Na, of 5 kips (edge distance must be accounted for). Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing".

Optional cast-in-place anchor bolts must be ⅝" Dia ASTM A307 Gr A bolts (or threaded rods with one tack welded hex nut each) with one hex nut and one hardened steel washer (ASTM F436) at each bolt. Nuts must conform to ASTM A563 requirements.

Provide bar laps, where required, as follows: Uncoated or galvanized ~ #4 = 1'-7"
Epoxy coated ~ #4 = 2'-5"

GENERAL NOTES:

This rail has been evaluated and accepted to be of equal strength to railings with like geometry, which have been crash tested to meet MASH TL-3 criteria. This rail can be used for speeds of 50 mph and greater when a TL-3 rated guard fence transition is used. When a TL-2 rated guard fence transition is used, this rail can only be used for speeds of 45 mph and less.

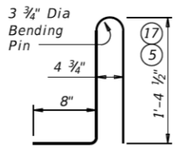
Do not use this railing on bridges with expansion joints providing more than 5" movement.

Rail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.

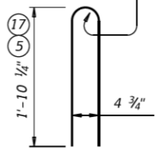
Submit erection drawings showing panel lengths, rail post spacing, and anchor bolt setting to the Engineer for approval.

Average weight of railing with no overlay: 380 plf (total)
370 plf (Conc)
10 plf (Steel)

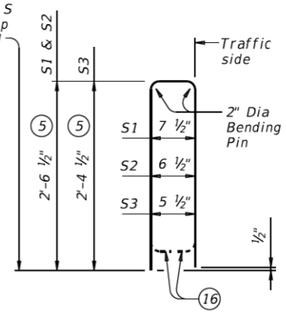
Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.



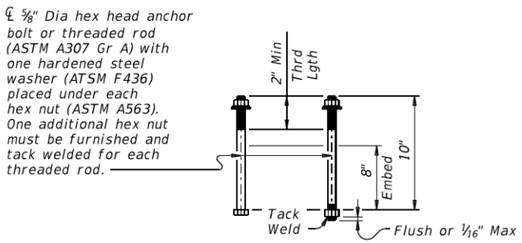
BARS U (#4)



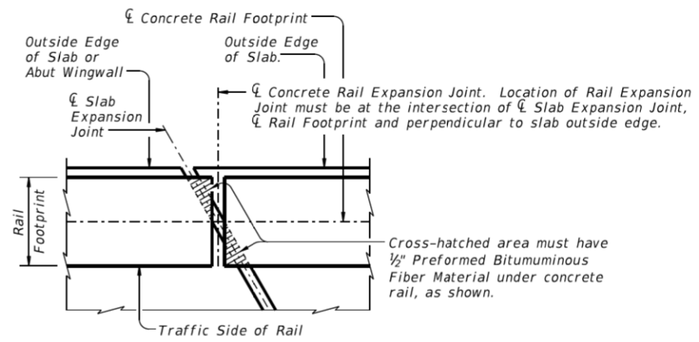
BARS WU (#4)



BARS S (#4)



CAST-IN-PLACE ANCHOR BOLT OPTIONS (18)



PLAN OF RAIL AT EXPANSION JOINTS

Example showing Slab Expansion Joints without breakbacks.

(5) Increase 2" for structures with overlay.
(7) HSS 2.875 x 0.203
(8) HSS 2.375 x 0.154
(15) No longitudinal wires may be in top center of cage.
(16) Bend or cut as required to clear drain slots.
(17) For raised sidewalks, add sidewalk height to total bar height. Use sidewalk height at rail's location.
(18) See "Material Notes" for anchor bolt information.

Texas Department of Transportation | Bridge Division Standard

COMBINATION RAIL

TYPE C221

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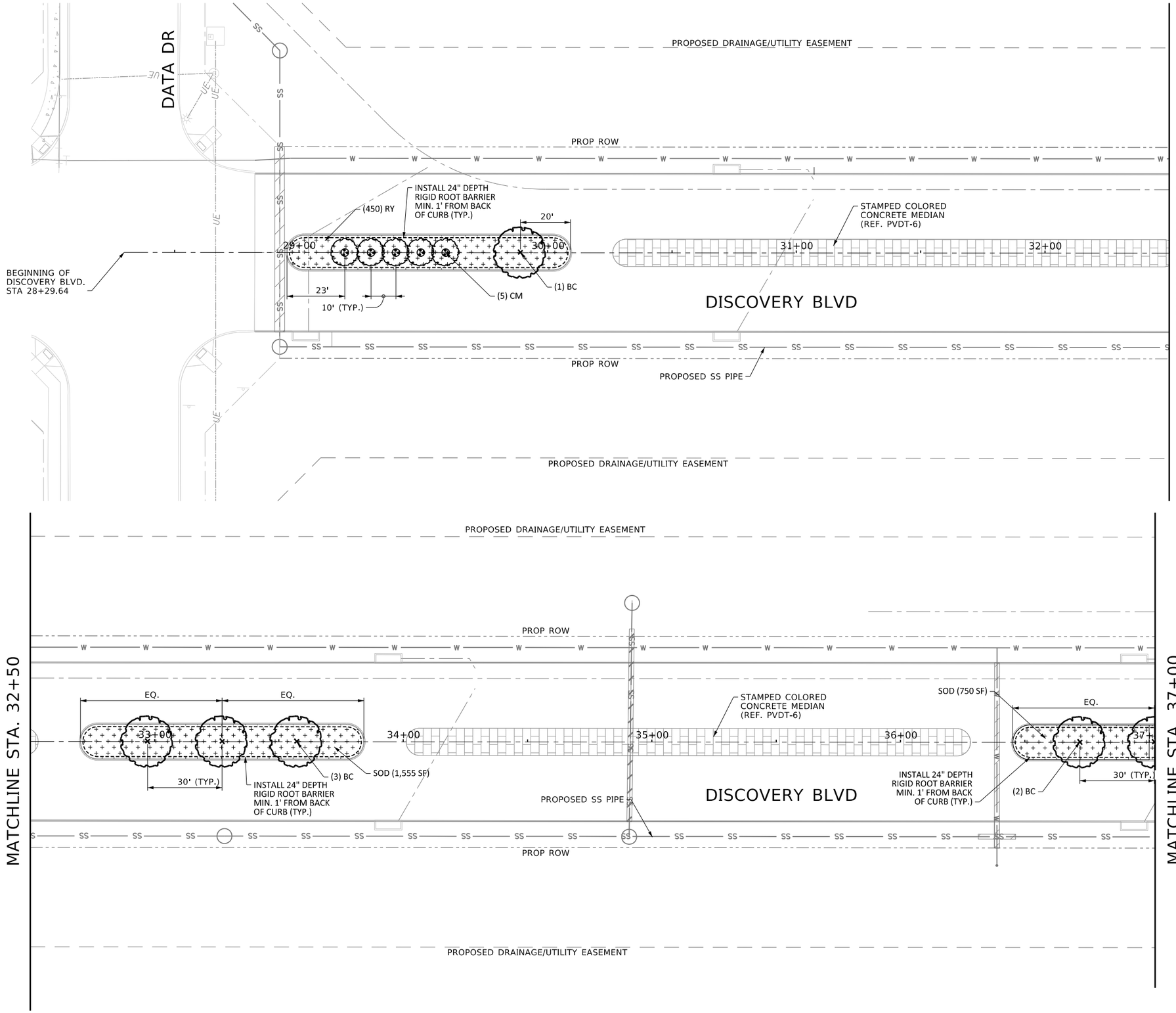
				90



LEGEND

- SOD TURF GRASS
- GROUNDCOVER A - 4" POT (SPACED @12" O.C.)
- GROUNDCOVER B - 4" POT (SPACED @12" O.C.)
- ORNAMENTAL SHRUBS - 3 GAL (SPACED @24" O.C.)
- ORNAMENTAL SHRUBS - 3 GAL (SPACED @24" O.C.)
- 4"-6" RIVER COBBLE
- 4" CAL. STREET TREE
- 2" CAL. ORNAMENTAL TREE (7' TALL MINIMUM)

NOTES:

1) NOTIFY LANDSCAPE ARCHITECT OF ANY DISCREPANCY BETWEEN PROPOSED LANDSCAPE PLANTING AND FIELD CONDITIONS PRIOR TO PLANTING.
2) REFER TO SHEET LADT-5, LADT-6 FOR LANDSCAPE PLANTING DETAILS, PLANT SPECIES, SIZES, AND DESCRIPTIONS.
3) CONTRACTOR SHALL VERIFY ALL EASEMENT LINES AND VISIBILITY LINES IN THE FIELD PRIOR TO CONSTRUCTION.
4) CONTRACTOR SHALL VERIFY THE LOCATIONS OF ALL UTILITIES IN THE FIELD PRIOR TO PLANTING EXCAVATION.
5) STAKE AND MARK ALL TREE LAYOUTS FOR LANDSCAPE ARCHITECT'S APPROVAL PRIOR TO CONSTRUCTION.
6) ALL DIMENSIONS ARE TO BACK OF CURB, CENTER OF TREE, AND EDGE OF SHRUB SPECIES UNLESS NOTED OTHERWISE.
7) ALL STREET TREES PLANTED IN MEDIAN ARE TO BE CENTERED IN THE MEDIAN.
8) ROOT BARRIER TO BE INTERLOCKING RIGID ROOT BARRIER MODEL UB24-2 BY DEEPROOT, OR EQUIVILENT APPROVED BY LANDSCAPE ARCHITECT.
9) ROOT BARRIER TO BE INSTALLED 1' BEYOND BACK OF CURB OR EDGE OR ROAD BASE.

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2250
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

LANDSCAPE ARCHITECTURE

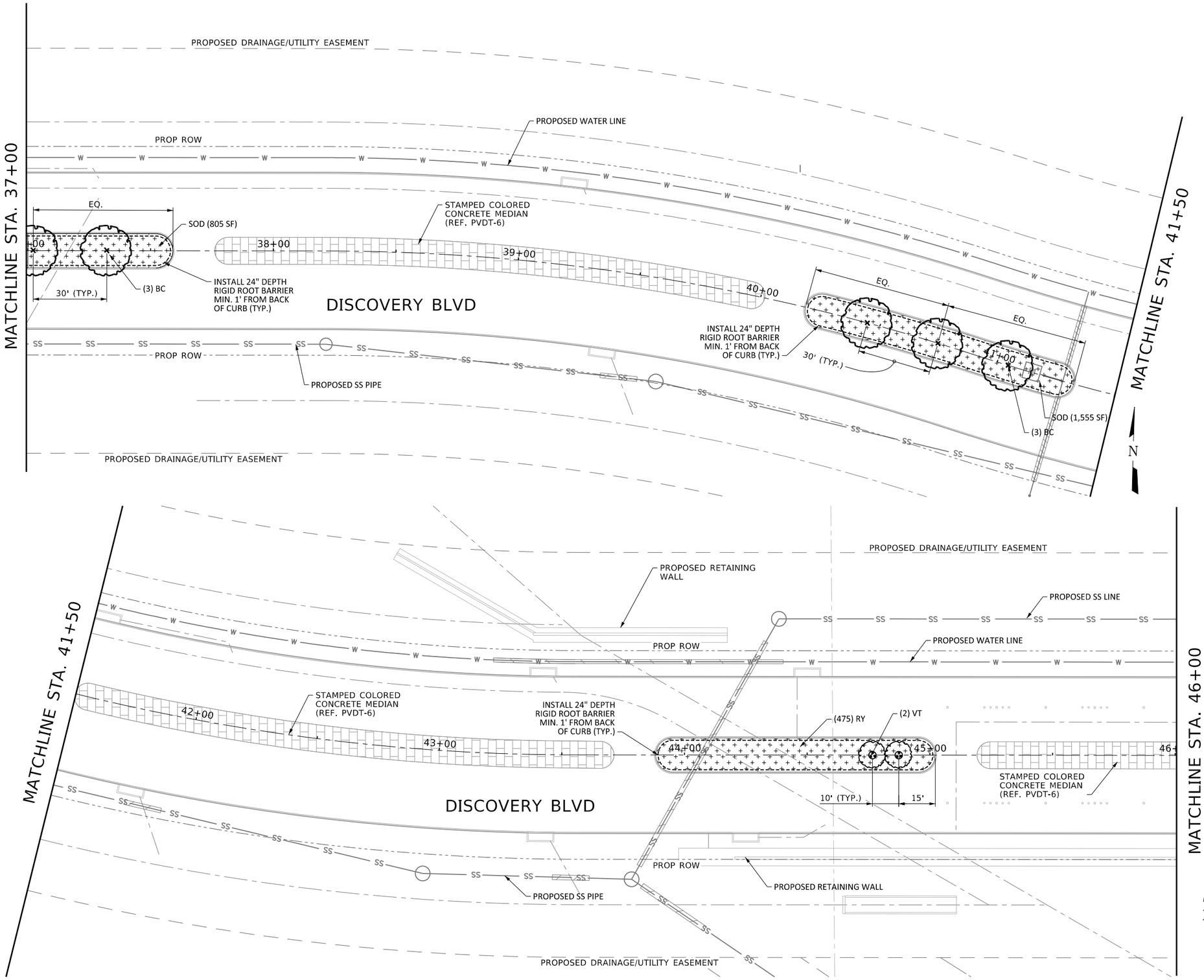
DISCOVERY BLVD PLANTING PLAN
BEGIN TO STA 37+00

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19771
DATE APRIL 2022
DESIGNED MLM
DRAWN MLM
REVISED
CHECKED ADH
FILE NAME la-trt-pl-disc01.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET LA-1
SEQ. 91



LEGEND

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- ORNAMENTAL SHRUBS - 3 GAL (SPACED @24" O.C.)
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- 4"-6" RIVER COBBLE
- 4" CAL. STREET TREE
- 2" CAL. ORNAMENTAL TREE (7' TALL MINIMUM)

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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ON 10/21/2021
TEXAS NO. 3028
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Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

LANDSCAPE ARCHITECTURE

DISCOVERY BLVD PLANTING PLAN STA 37+00 TO STA 46+00

NO.	ISSUES	BY	DATE

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DATE APRIL 2022
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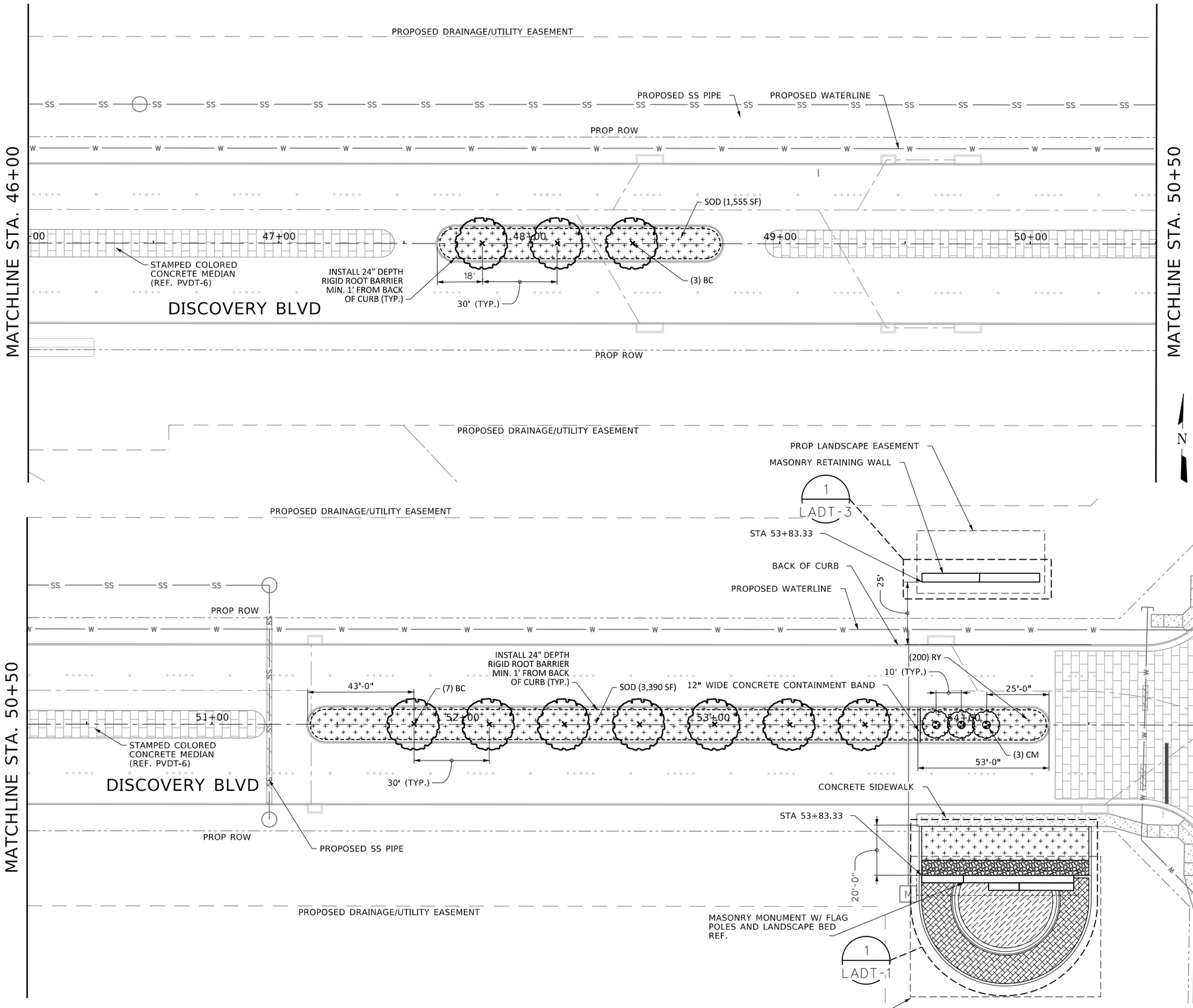
CHECKED ADH
FILE NAME la-trt-pl-disc02.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale
0 1"

SHEET LA-2
SEQ. 92



LEGEND

- SOD TURF GRASS
- GROUNDCOVER A - 4" POT (SPACED @12" O.C.)
- GROUNDCOVER B - 4" POT (SPACED @12" O.C.)
- ORNAMENTAL SHRUBS - 3 GAL (SPACED @24" O.C.)
- ORNAMENTAL SHRUBS - 3 GAL (SPACED @24" O.C.)
- 4"-6" RIVER COBBLE
- 4" CAL. STREET TREE
- 2" CAL. ORNAMENTAL TREE (7' TALL MINIMUM)

NOTES:

1) NOTIFY LANDSCAPE ARCHITECT OF ANY DISCREPANCY BETWEEN PROPOSED LANDSCAPE PLANTING AND FIELD CONDITIONS PRIOR TO PLANTING.
2) REFER TO SHEET LADT-5, LADT-6 FOR LANDSCAPE PLANTING DETAILS, PLANT SPECIES, SIZES, AND DESCRIPTIONS.
3) CONTRACTOR SHALL VERIFY ALL EASEMENT LINES AND VISIBILITY LINES IN THE FIELD PRIOR TO CONSTRUCTION.
4) CONTRACTOR SHALL VERIFY THE LOCATIONS OF ALL UTILITIES IN THE FIELD PRIOR TO PLANTING EXCAVATION.
5) STAKE AND MARK ALL TREE LAYOUTS FOR LANDSCAPE ARCHITECT'S APPROVAL PRIOR TO CONSTRUCTION.
6) ALL DIMENSIONS ARE TO BACK OF CURB, CENTER OF TREE, AND EDGE OF SHRUB SPECIES UNLESS NOTED OTHERWISE.
7) ALL STREET TREES PLANTED IN MEDIAN ARE TO BE CENTERED IN THE MEDIAN.
8) ROOT BARRIER TO BE INTERLOCKING RIGID ROOT BARRIER MODEL UB24-2 BY DEEPROOT, OR EQUIVILENT APPROVED BY LANDSCAPE ARCHITECT.
9) ROOT BARRIER TO BE INSTALLED 1' BEYOND BACK OF CURB OR EDGE OR ROAD BASE.

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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THIS DRAWING WAS PREPARED UNDER THE AUTHORITY OF MATTHEW L. MILANO ON 10/21/2021
TEXAS NO. 3028
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FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2299
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

LANDSCAPE ARCHITECTURE

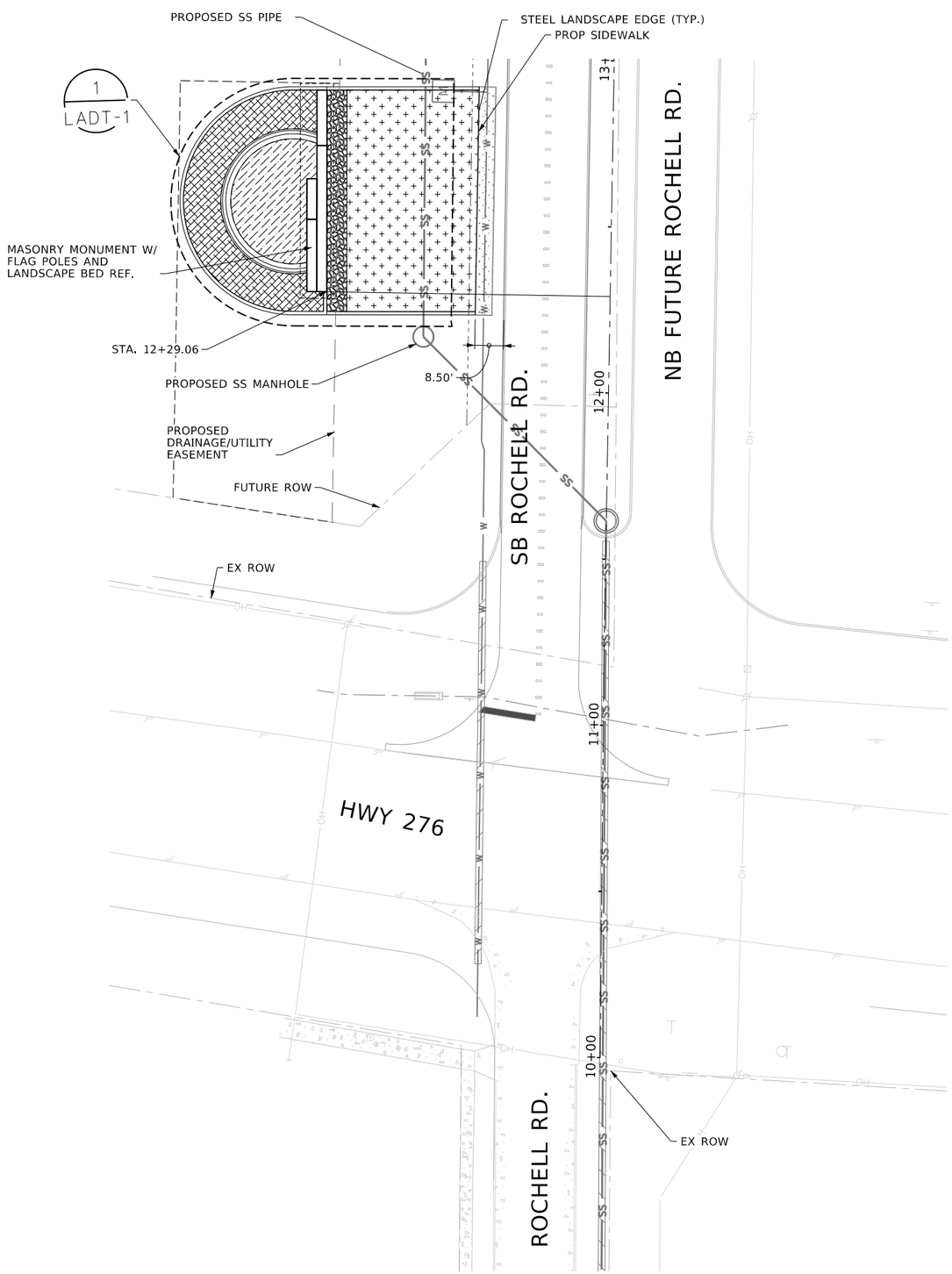
DISCOVERY BLVD PLANTING PLAN STA 46+00 TO END

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MLM
DRAWN MLM
REVISED
CHECKED ADH
FILE NAME la-trt-pl-disc03.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale accordingly. 0 1"

SHEET LA-3
SEQ. 93



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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

LEGEND

- SOD TURF GRASS
- GROUNDCOVER A - 4" POT (SPACED @12" O.C.)
- GROUNDCOVER B - 4" POT (SPACED @12" O.C.)
- ORNAMENTAL SHRUBS - 3 GAL (SPACED @24" O.C.)
- ORNAMENTAL SHRUBS - 3 GAL (SPACED @24" O.C.)
- 4"-6" RIVER COBBLE
- 4" CAL. STREET TREE
- 2" CAL. ORNAMENTAL TREE (7' TALL MINIMUM)

NOTES:

1) NOTIFY LANDSCAPE ARCHITECT OF ANY DISCREPANCY BETWEEN PROPOSED LANDSCAPE PLANTING AND FIELD CONDITIONS PRIOR TO PLANTING.
2) REFER TO SHEET LADT-5, LADT-6 FOR LANDSCAPE PLANTING DETAILS, PLANT SPECIES, SIZES, AND DESCRIPTIONS.
3) CONTRACTOR SHALL VERIFY ALL EASEMENT LINES AND VISIBILITY LINES IN THE FIELD PRIOR TO CONSTRUCTION.
4) CONTRACTOR SHALL VERIFY THE LOCATIONS OF ALL UTILITIES IN THE FIELD PRIOR TO PLANTING EXCAVATION.
5) STAKE AND MARK ALL TREE LAYOUTS FOR LANDSCAPE ARCHITECT'S APPROVAL PRIOR TO CONSTRUCTION.
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7) ALL STREET TREES PLANTED IN MEDIAN ARE TO BE CENTERED IN THE MEDIAN.
8) ROOT BARRIER TO BE INTERLOCKING RIGID ROOT BARRIER MODEL UB24-2 BY DEEPROOT, OR EQUIVILENT APPROVED BY LANDSCAPE ARCHITECT.
9) ROOT BARRIER TO BE INSTALLED 1' BEYOND BACK OF CURB OR EDGE OR ROAD BASE.

0 10' 20' 40'
SCALE IN FEET

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144
FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2201
Web - www.freese.com

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ON 10/21/2021
TEXAS NO. 3028
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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

LANDSCAPE ARCHITECTURE

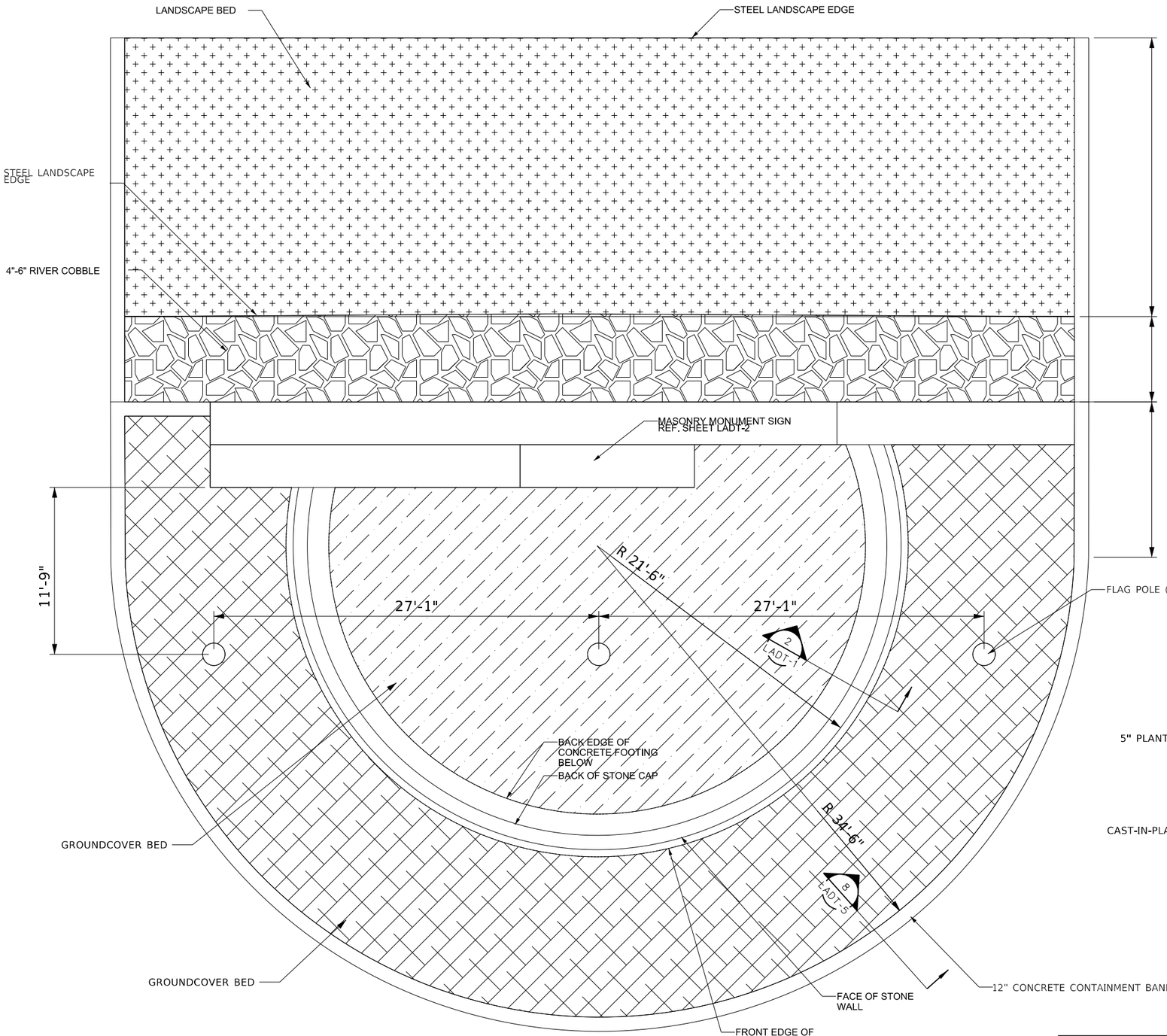
ROCHELL RD PLANTING PLAN

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MLM
DRAWN MLM
REVISED
CHECKED ADH
FILE NAME la-trt-pl-disc04.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale. 0 1"

SHEET LA-4
SEQ. 94



1 LADT-1 MONUMENT PLANTER ENLARGEMENT PLAN

NOT TO SCALE

LEGEND

- TIFFWAY 419 BERMUDA - SOD TURF GRASS
- GREY COTONEASTER - 4" POT (SPACED @12" O.C.)
- ASIAN JASMINE - 4" POT (SPACED @12" O.C.)
- RED YUCCA - 3 GAL (SPACED @24" O.C.)
- LITTLE BLUESTEM - 3 GAL (SPACED @24" O.C.)
- 4"-6" RIVER COBBLE

NOTES:

1. CAST-IN-PLACE CONCRETE SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 3500 PSI, IN ACCORDANCE WITH ACI 301, AND REINFORCING STEEL SHALL BE IN ACCORDANCE WITH ASTM A615, GRADE 60, DEFORMED. ALL REINFORCING SHALL BE FABRICATED AND INSTALLED IN ACCORDANCE WITH ACI 315.

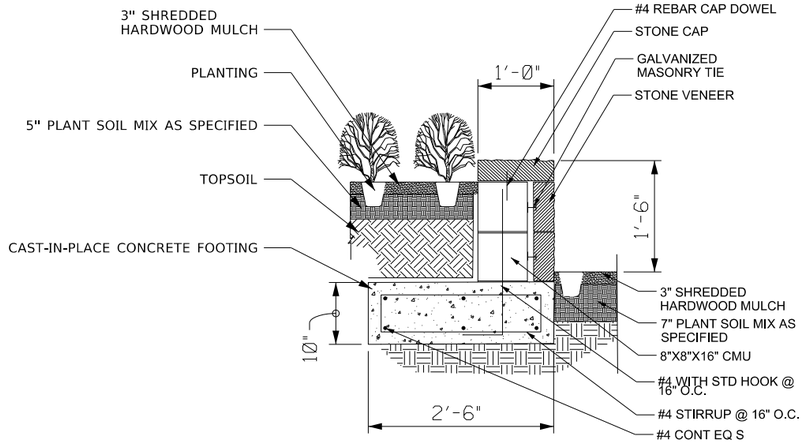
2. CMU SHALL BE NOMINAL SIZE 8" x 8" x 16"

3. ALL WALL STONE SHALL BE BEIGE - CREAM RANGE COLOR, 4" THICKNESS FOR FACE VENEER AND CAP. VENEER PATTERN TO BE RANDOM ASHLAR. CONTRACTOR SHALL SUBMIT STONE SAMPLES TO LANDSCAPE ARCHITECT FOR APPROVAL PRIOR TO CONSTRUCTION.

3. ALL EXPOSED JOINTS IN STONE AND CMU SHALL BE 3/8 INCH WIDTH. ALL JOINT DIMENSIONS SHOWN ARE TO CENTERLINE OF JOINT.

4. ALL MORTAR IN CAST STONE SHALL BE TYPE S; COLOR OF MORTAR SHALL BE BEIGE - CREAM RANGE. CONTRACTOR SHALL SUBMIT COLOR SAMPLES TO LANDSCAPE ARCHITECT FOR APPROVAL PRIOR TO CONSTRUCTION.

5. RIVER COBBLE TO BE 4"-6" AGGREGATE SIZE RANGE. COLOR TO BE A MIX BLEND. CONTRACTOR SHALL SUBMIT PRODUCT SAMPLES TO LANDSCAPE ARCHITECT FOR APPROVAL PRIOR TO CONSTRUCTION.



2 LADT-1 PLANTER WALL SECTION

NOT TO SCALE

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FREESE AND NICHOLS, INC.

RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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ON 10/21/2021
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FREESE NICHOLS
2nd GENERATION
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2250
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

LANDSCAPE ARCHITECTURE

MONUMENT ENLARGEMENT PLAN

NO.	ISSUES	DATE	BY

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MLM
DRAWN MLM
REVISED
CHECKED JHH
FILE NAME la-trt-dt-mdetails01.dgn

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

0 1"

SHEET LADT-1

SEQ. 95

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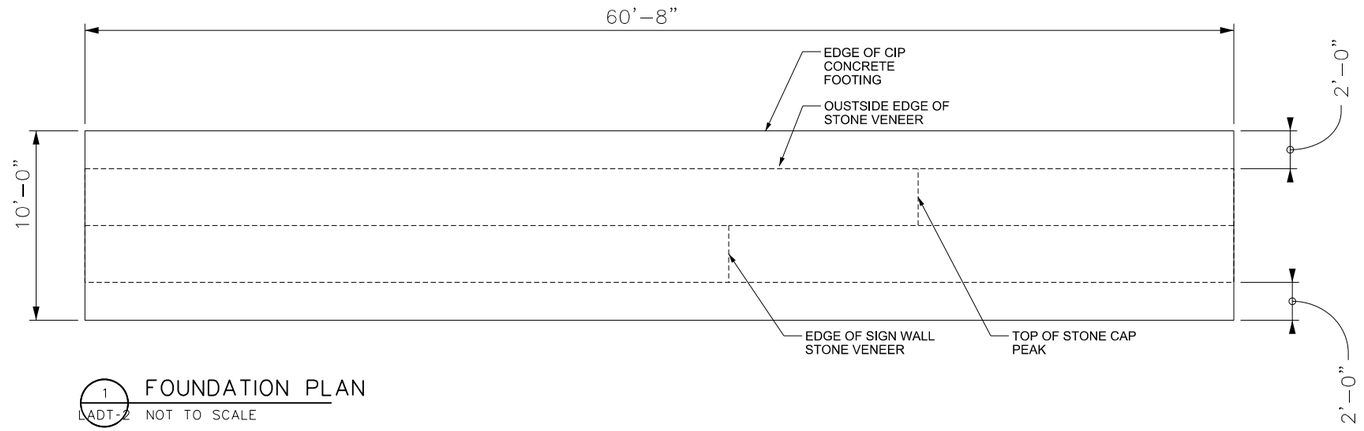
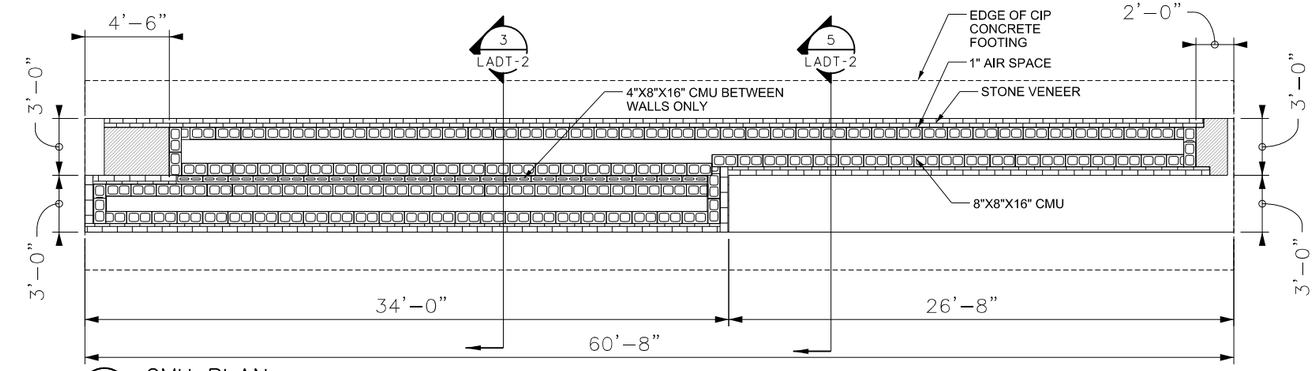
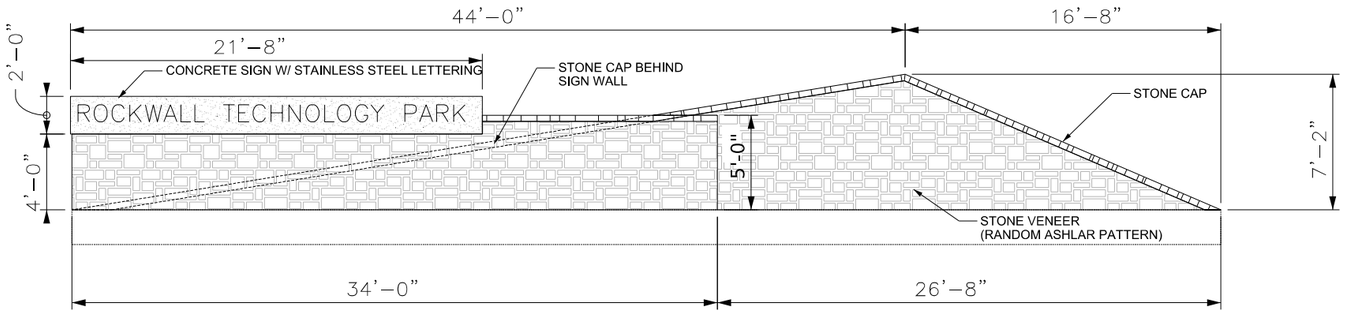


1 LADT-2 FOUNDATION PLAN
NOT TO SCALE



2 LADT-2 CMU PLAN
NOT TO SCALE



4 LADT-2 FRONT ELEVATION
NOT TO SCALE

NOTES:

1. CAST-IN-PLACE CONCRETE SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 3500 PSI, IN ACCORDANCE WITH ACI 301, AND REINFORCING STEEL SHALL BE IN ACCORDANCE WITH ASTM A615, GRADE 60, DEFORMED. ALL REINFORCING SHALL BE FABRICATED AND INSTALLED IN ACCORDANCE WITH ACI 315.

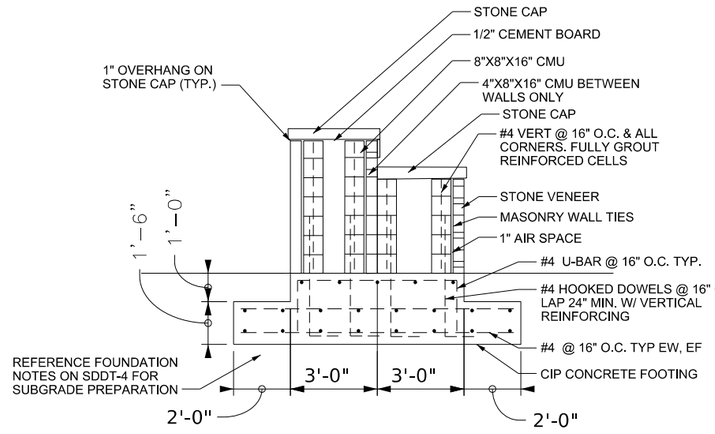
2. CMU SHALL BE NOMINAL SIZE 8" x 8" x 16"

3. ALL WALL STONE SHALL BE BEIGE - CREAM RANGE COLOR. 4" THICKNESS FOR FACE VENEER AND CAP. VENEER PATTERN TO BE RANDOM ASHLAR. CONTRACTOR SHALL SUBMIT STONE SAMPLES TO LANDSCAPE ARCHITECT FOR APPROVAL PRIOR TO CONSTRUCTION.

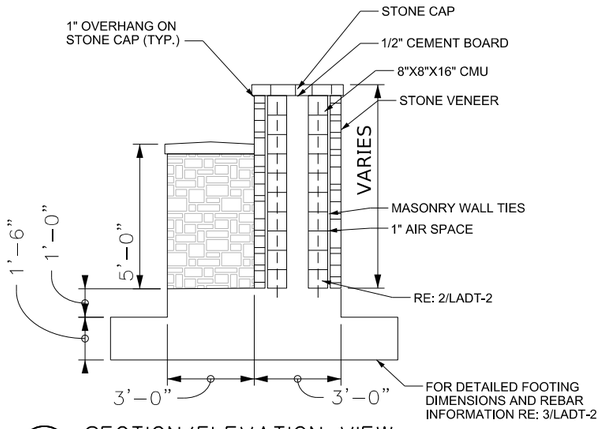
3. ALL EXPOSED JOINTS IN STONE AND CMU SHALL BE 3/8 INCH WIDTH. ALL JOINT DIMENSIONS SHOWN ARE TO CENTERLINE OF JOINT.

4. ALL MORTAR IN CAST STONE SHALL BE TYPE S; COLOR OF MORTAR SHALL BE BEIGE - CREAM RANGE. CONTRACTOR SHALL SUBMIT COLOR SAMPLES TO LANDSCAPE ARCHITECT FOR APPROVAL PRIOR TO CONSTRUCTION.

5. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS OF STAINLESS STEEL LETTERING AND FASTENING METHODS TO LANDSCAPE ARCHITECT FOR REVIEW PRIOR TO CONSTRUCTION.



3 LADT-2 SECTION VIEW
NOT TO SCALE



5 LADT-2 SECTION/ELEVATION VIEW
NOT TO SCALE

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RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2201
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

LANDSCAPE ARCHITECTURE

MONUMENT DETAILS

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MLM
DRAWN MLM
REVISED
CHECKED HH
FILE NAME la-trt-dt-mdetails02.dgn

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale
0 1"

SHEET LADT-2
SEQ. 96

MicroStation V8 User: 90262 Office: On Site
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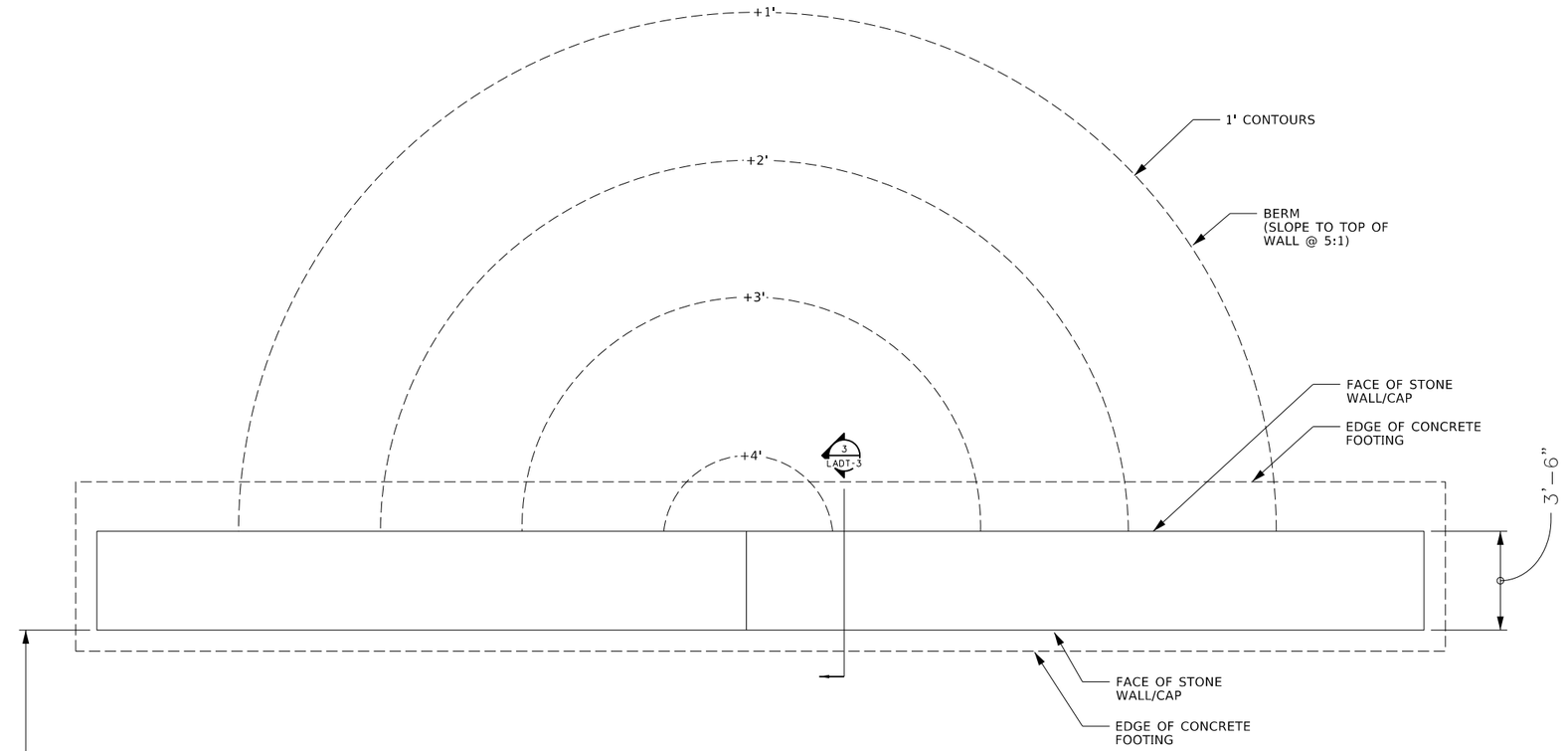
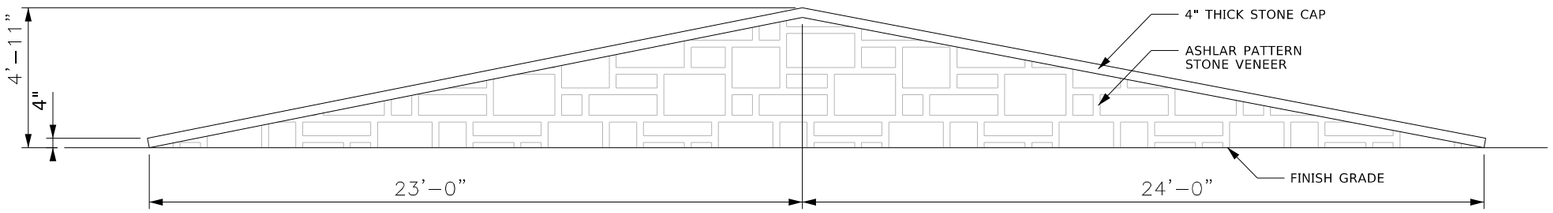


1 LADT-3 MONUMENT RETAINING WALL PLAN VIEW

NOT TO SCALE



2 LADT-3 MONUMENT RETAINING WALL ELEVATION VEIW

NOT TO SCALE

NOTES:

1. CAST-IN-PLACE CONCRETE SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 3500 PSI, IN ACCORDANCE WITH ACI 301, AND REINFORCING STEEL SHALL BE IN ACCORDANCE WITH ASTM A615, GRADE 60, DEFORMED. ALL REINFORCING SHALL BE FABRICATED AND INSTALLED IN ACCORDANCE WITH ACI 315.
2. CMU SHALL BE NOMINAL SIZE 8" x 8" x 16"
3. ALL WALL STONE SHALL BE BEIGE - CREAM RANGE COLOR. 4" THICKNESS FOR FACE VENEER AND CAP. VENEER PATTERN TO BE RANDOM ASHLAR. CONTRACTOR SHALL SUBMIT STONE SAMPLES TO LANDSCAPE ARCHITECT FOR APPROVAL PRIOR TO CONSTRUCTION.
4. ALL EXPOSED JOINTS IN STONE AND CMU SHALL BE 3/8 INCH WIDTH. ALL JOINT DIMENSIONS SHOWN ARE TO CENTERLINE OF JOINT.
5. ALL MORTAR IN CAST STONE SHALL BE TYPE S; COLOR OF MORTAR SHALL BE BEIGE - CREAM RANGE. CONTRACTOR SHALL SUBMIT COLOR SAMPLES TO LANDSCAPE ARCHITECT FOR APPROVAL PRIOR TO CONSTRUCTION.

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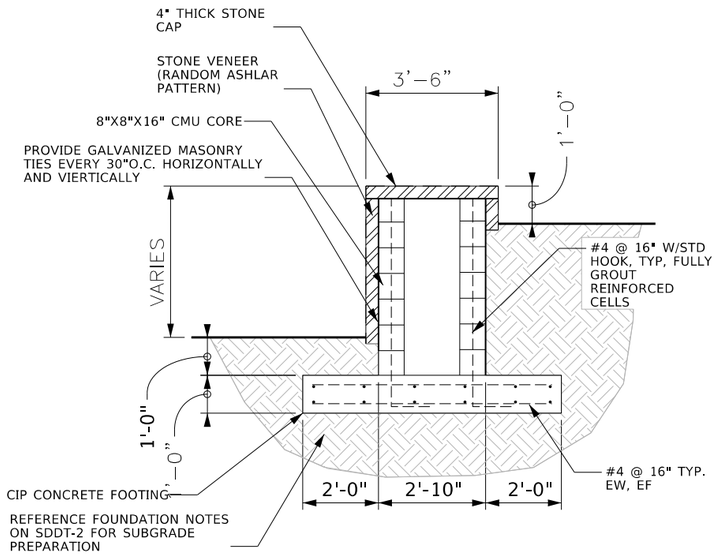
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024



3 LADT-3 MONUMENT WALL SECTION DETAIL

NOT TO SCALE

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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TEXAS NO. 3028
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Phone - (214) 217-2200
Fax - (214) 217-2201
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

LANDSCAPE ARCHITECTURE

MONUMENT WALL DETAILS

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19271
DATE APRIL 2022
DESIGNED MLM
DRAWN MLM
REVISED
CHECKED HH
FILE NAME la-trt-dt-mdetails03.dgn

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET
LADT-3

SEQ.
97

MicroStation V8 User: 90262 Office: On Site
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Date: Feb. 21, 2024 - 11:42:46 AM
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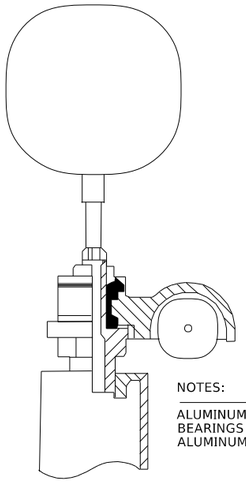


NOTES:

ALUMINUM BODY STAINLESS STEEL BALL BEARINGS ALUMINUM SHEAVE CAST ALUMINUM SPINDLE

1 LADT-4 FLAGPOLE TRUCK DETAIL

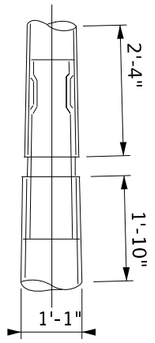
NOT TO SCALE

NOTES:

1. ALL SHAFTS WITH OVERALL LENGTH OF MORE THAN 38'-6" ARE SHIPPED IN TWO SECTIONS.

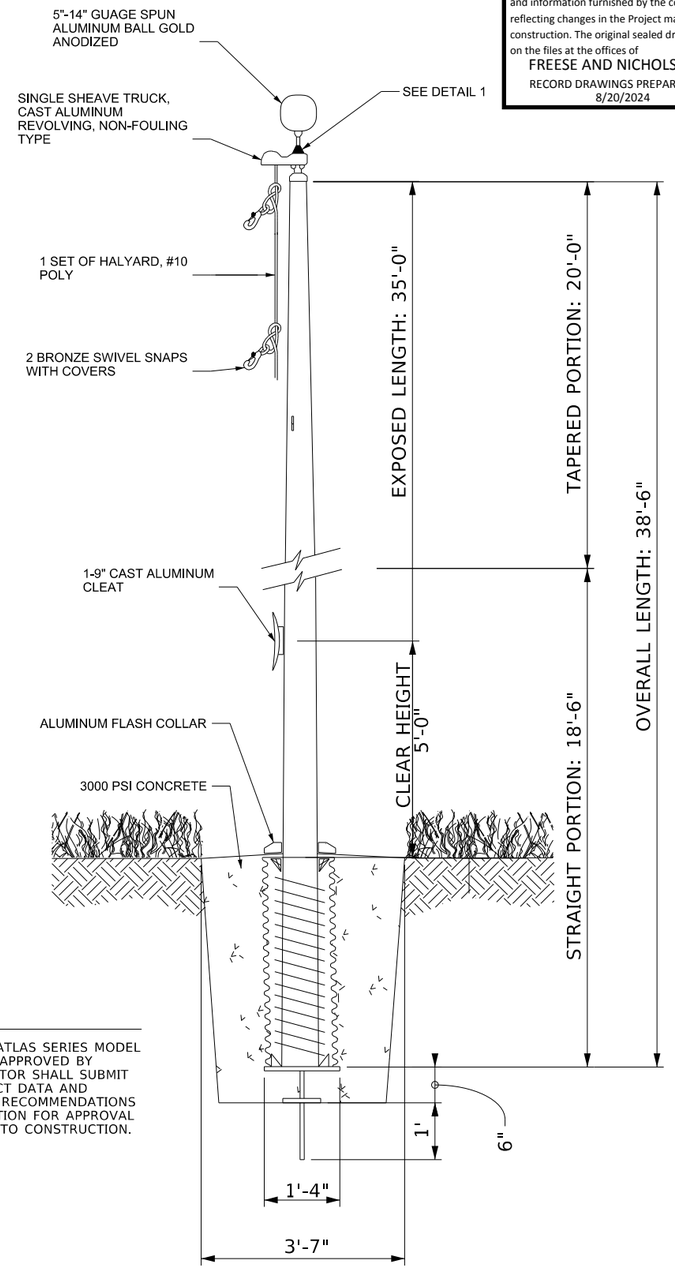
2. EACH SECTION MATCHED MARKED FOR FIELD ASSEMBLY, EXPOSED PORTION OF JAM SLEEVE MUST BE WELL LUBRICATED PRIOR TO ASSEMBLY.

3. 1-1/2" MAXIMUN SHOP CAP ALLOWED FOR FIELD FITTING (RAM FOR TIGHT JOINT.



2 LADT-4 FLAGPOLE SHAFT DETAIL

NOT TO SCALE



NOTES:

1. FLAGPOLE TO BE ATLAS SERIES MODEL ECA35 OR EQUAL APPROVED BY OWNER. CONTRACTOR SHALL SUBMIT FLAGPOLE PRODUCT DATA AND MANUFACTURER'S RECOMMENDATIONS FOR THE FOUNDATION FOR APPROVAL BY OWNER PRIOR TO CONSTRUCTION.

3 LADT-4 FLAGPOLE ELEVATION VIEW - MODEL ECA35

NOT TO SCALE

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RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASED FOR REVIEW ON 10/21/2021 AUTHORIZED BY MATTHEW L. MILANO TEXAS NO. 3028 IT IS A VIOLATION OF LAW TO RELEASE THIS DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

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Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

LANDSCAPE ARCHITECTURE

MONUMENT/FLAGPOLE DETAILS

NO.	ISSUES	BY	DATE

FRN JOB NO. RKW19711
DATE APRIL 2022
DESIGNED ML.M
DRAWN ML.M
REVISED
CHECKED HH
FILE NAME la-trt-dt-mdetails04.dgn

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale accordingly.

SHEET LADT-4

SEQ. 98

MicroStation V8 User: 90262 Office: On Site
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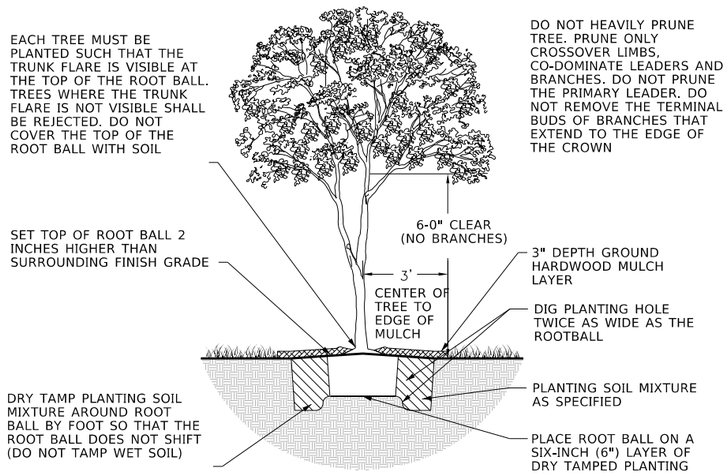
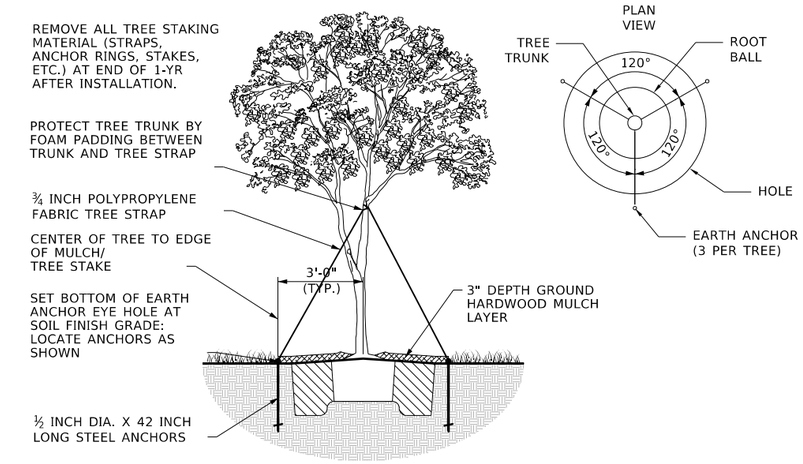
Plot Scale: 0.5 '= 1'in.
Date: Feb. 21, 2024 - 11:42:37 AM
Model: Sheet
Project: Freese and Nichols, Inc. - True Type Fonts



1 LADT-5 STREET TREE PLANTING DETAIL

NOT TO SCALE



2 LADT-5 STREET TREE STAKING DETAIL

NOT TO SCALE

NOTES:
1) TREE STRAPS FABRIC STRAPS, DARK GREEN COLOR:
GEMPLER MODEL AT5G
OR
WEBBING LANDSCAPE SUPPLIES MODEL WEB500
OR
EQUIVALENT, IF APPROVED BY ENGINEER.
SUBMIT STRAP PRODUCT DATA AND SAMPLE TO ENGINEER FOR APPROVAL PRIOR TO INSTALLATION.

2) DIAMETER X 30 INCH LONG W/ 1" DIAMETER EYE HOLE AT TOP, AND 4 INCH DIAMETER BLADE AT BOTTOM:
AMERICAN EARTH ANCHORS MODEL HELIX 30-4
OR
GEMPLER MODEL MTE30B
OR
EQUIVALENT, IF APPROVED BY ENGINEER.
SUBMIT EARTH ANCHOR PRODUCT DATA AND SAMPLE TO ENGINEER FOR APPROVAL PRIOR TO INSTALLATION.

3) FOR STREET TREES STEEL EARTH ANCHORS SHALL BE 1#2" DIAMETER X 42 INCH LONG W/ 1" DIAMETER EYE HOLE AT TOP, AND 4 INCH DIAMETER BLADE AT BOTTOM:
AMERICAN EARTH ANCHORS MODEL HELIX 42-4
OR
GEMPLER MODEL MTE42B
OR
EQUIVALENT, IF APPROVED BY ENGINEER.
SUBMIT EARTH ANCHOR PRODUCT DATA AND SAMPLE TO ENGINEER FOR APPROVAL PRIOR TO INSTALLATION.

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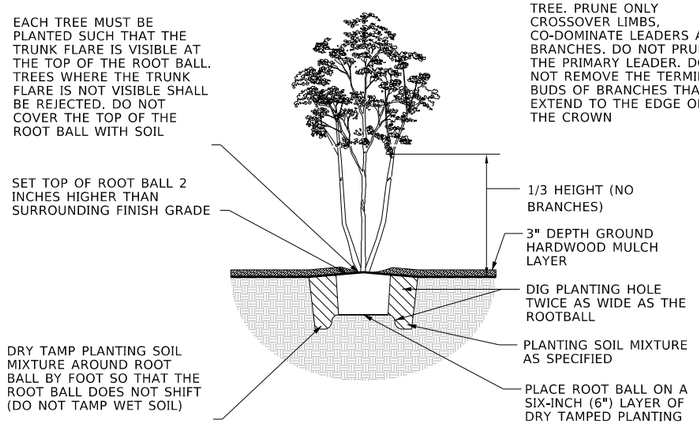
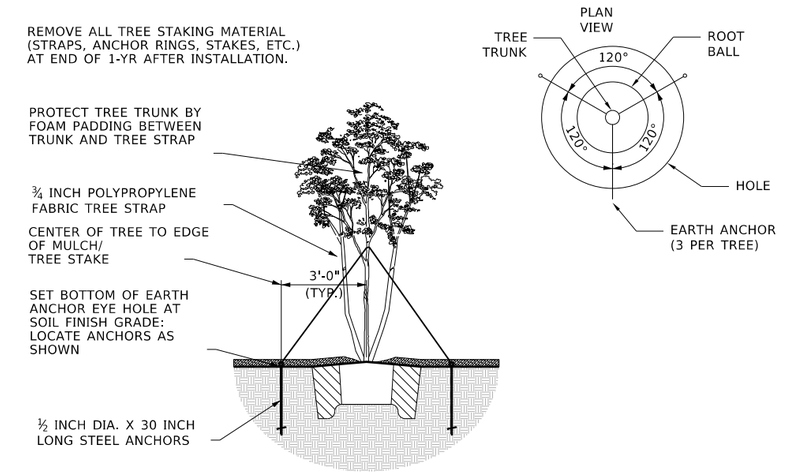
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024



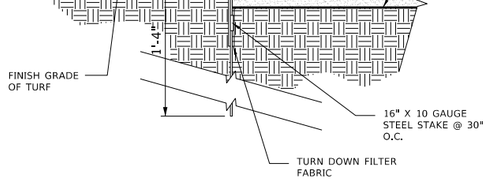
3 LADT-5 ORNAMENTAL TREE PLANTING DETAIL

NOT TO SCALE



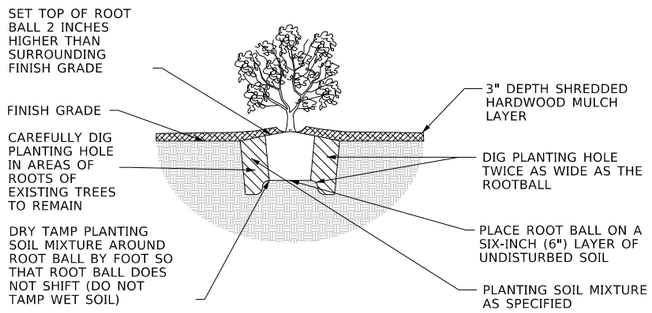
4 LADT-5 ORNAMENTAL TREE STAKING DETAIL

NOT TO SCALE



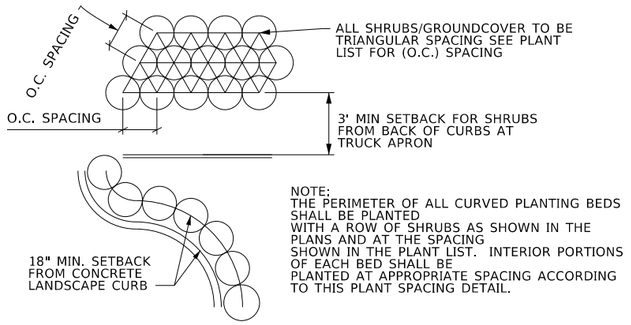
5 LADT-5 STEEL EDGE DETAIL

NOT TO SCALE



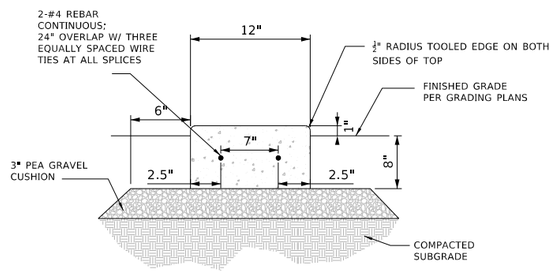
6 LADT-5 SHRUB/ORNAMENTAL GRASS PLANTING DETAIL

NOT TO SCALE



7 LADT-5 SHRUB SPACING DETAIL

NOT TO SCALE



8 LADT-5 12" CONCRETE LANDSCAPE EDGE DETAIL

NOT TO SCALE

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASE THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY MATTHEW L. MILANO
TEXAS NO. 3028
ON 10/21/2021
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FREESE NICHOLS
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Dallas, Texas 75204
Phone: (214) 217-2200
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Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

LANDSCAPE ARCHITECTURE

PLANTING DETAILS

F&N JOB NO.	RKW19271		
DATE	APRIL 2022		
DESIGNED	M.L.M		
DRAWN	M.L.M		
REVISED	M.L.M		
CHECKED	HH		
FILE NAME	la-trt-dt-pdetails02.sht		
NO.	BY	DATE	ISSUES

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET LADT-5

SEQ. 99

PLANT LIST

ABBREV.	SYMBOL	QUANTITY	SIZE	COMMON NAME	BOTANICAL NAME	CONDITION	COMMENTS			
LARGE SHADE TREES										
BC		20	#95 CLASS MINIMUM	BALD CYPRESS	TAXODIUM DISTICHUM	CONTAINER	MINIMUM TRUNK DIAMETER 4 INCHES @ 4' ABOVE GRADE; MINIMUM SPREAD SIX FEET; MINIMUM HEIGHT TWELVE FEET; FULL DENSE CANOPY; STRONG CENTRAL TRUNK; NO CODOMINANT STEMS; MATCH SELECTIONS FOR UNIFORM HEIGHT AND SPREAD.			
ORNAMENTAL TREES										
CM		8	#30 CLASS MINIMUM	NATCHEZ CRAPE MYRTLE 'SINGLE TRUNK'	LAGERSTROEMIA INDICA 'NATCHEZ'	CONTAINER	STRONG CENTRAL TRUNK; MINIMUM TRUNK DIAMETER 2 INCHES; MINIMUM SPREAD FOUR FEET; MINIMUM HEIGHT SEVEN FEET; FULL DENSE CANOPY; MATCH SELECTIONS FOR UNIFORM HEIGHT AND SPREAD			
VT		2	#30 CLASS MINIMUM	VITEX	VITEX 'AGNUS CASTUS'	CONTAINER	THREE TO SEVEN TRUNKS; EACH TRUNK DIAMETER 2 INCHES; MINIMUM SPREAD FOUR FEET; MINIMUM HEIGHT SEVEN FEET; FULL DENSE CANOPY; MATCH SELECTIONS FOR UNIFORM HEIGHT AND SPREAD			
SHRUBS/ORNAMENTAL GRASSES							MINIMUM SPREAD	MINIMUM HEIGHT	SPACING	
LB		1016	#3 CLASS MINIMUM	LITTLE BLUESTEM	SCHIZACHYRIUM SCOPARIUM	CONTAINER	15 INCHES	15 INCHES	24" O.C.	FULL DENSE AND MATCH SELECTIONS FOR UNIFORM HEIGHT AND SPREAD
RY		1145	#3 CLASS MINIMUM	RED YUCCA	HESPERALOE PARVIFLORA	CONTAINER	18 INCHES	18 INCHES		
GROUNDCOVERS										
LB		1740	4" POT MINIMUM	GREY COTONEASTER	ROSEMARINUS OFFICINALUS 'PROSTRATUS'	CONTAINER	TRIANGULAR SPACING @ 12" O.C.			FULL DENSE AND MATCH SELECTIONS FOR UNIFORM HEIGHT AND SPREAD
MG		2660	4" POT MINIMUM	ASIAN JASMINE	TRACHELOSPERMUM ASIATICUM	CONTAINER	TRIANGULAR SPACING @ 12" O.C.			
TURF GRASS										
		9700 SF	SOLID SOD	TIFFWAY 419 BERMUDA	CYNODON DACTYLON 'TIFFWAY 419'					

NOTES:
ALL SIZES SHOWN FOR ALL PLANTS (SUCH AS CALIPER, CONTAINER SIZE, SPREAD, HEIGHT, ETC.) ARE MINIMUM REQUIRED SIZES. A CONTAINER SIZE LARGER THAN THE MINIMUM SIZECONTAINER INDICATED IN THE PLANT LIST MAY BE NECESSARY TO PROVIDE THE MINIMUM HEIGHT INDICATED.

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RECORD DRAWINGS PREPARED ON:
8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

LANDSCAPE ARCHITECTURE

PLANTING SCHEDULE

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MLM
DRAWN MLM
REVISED
CHECKED HH
FILE NAME la-trt-dt-pdetails01.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1"

SHEET LADT-6
SEQ. 100

MicroStation V8 User: 90262 Office: On Site
File: N:\LA\Drawings\la-trt-dt-pdetails01.sht
Plotter: \\Plot01\Xerox VersaLink C7000 PS Model: Default
Plot Scale: 2.0000 ft / in Project: Freese and Nichols, Inc. - True Type Fonts
Date: Feb. 21, 2024 - 09:40:29 AM

System One						
Sprays	DESIRED HEAD PRESSURE (psi):				30	
ZONE#	S8					
Loss #/	Length	Flow	Diameter	Loss/100'	Individual Loss	Cumulative Loss
Type						
Lateral 1	12	0.63	0.75	0.07	0.01	0.01
Lateral 2	12	1.89	0.75	0.24	0.03	0.04
Lateral 3	12	3.15	0.75	0.88	0.11	0.14
Lateral 4	12	4.41	0.75	1.33	0.16	0.30
Lateral 5	12	5.67	0.75	1.86	0.22	0.53
Lateral 6	6	6.93	0.75	2.47	0.15	0.67
Lateral 7	10	13.23	1.25	0.83	0.08	0.76
Lateral 8	3	26.5	1.5	1.54	0.05	0.80
Head Allowance					2.00	2.80
Valve		26.5	1.5		2.00	4.80
Main 1	1225	26.5	2	0.62	7.60	12.40
Backflow		26.5	1.5		8.00	20.40
Meter		26.5	1.5		1.60	22.00
		Grand Total Loss			22.00	22.00
		Assumed Starting psi:			60	
		Total Losses:			22.00	
		Actual Head Pressure:			38.00	
		Designed Pressure:			52.00	
		Difference of Start and Actual:			8.00	

System Two						
Sprays	DESIRED HEAD PRESSURE (psi):				30	
ZONE#	S4					
Loss #/	Length	Flow	Diameter	Loss/100'	Individual Loss	Cumulative Loss
Type						
Lateral 1	6	0.37	0.75	0.07	0.00	0.00
Lateral 2	6	0.74	0.75	0.07	0.00	0.01
Lateral 3	10	1.24	0.75	0.24	0.02	0.03
Lateral 4	10	2.24	0.75	0.52	0.05	0.08
Lateral 5	10	3.24	0.75	0.88	0.09	0.17
Lateral 6	10	4.24	0.75	1.33	0.13	0.31
Lateral 7	10	5.24	0.75	1.86	0.19	0.49
Lateral 8	10	6.24	0.75	2.47	0.25	0.74
Lateral 9	10	7.24	1	0.94	0.09	0.83
Lateral 10	10	8.24	1	1.17	0.12	0.95
Lateral 11	10	9.24	1	1.42	0.14	1.09
Lateral 12	5	10.24	1	1.98	0.10	1.19
Lateral 13	5	11.74	1.25	0.63	0.03	1.22
Lateral 14	12	19.7	1.25	1.61	0.19	1.42
Head Allowance					2.00	3.42
Valve		19.7	1.5		2.00	5.42
Main 1	65	19.7	1.5	1.14	0.74	6.16
Backflow		19.7	1.5		8.00	14.16
Meter		19.7	1.5		0.80	14.96
		Grand Total Loss			14.96	14.96
		Assumed Starting psi:			55	
		Total Losses:			14.96	
		Actual Head Pressure:			40.04	
		Designed Pressure:			44.96	
		Difference of Start and Actual:			10.04	

DESIGN PRESSURE NOTES:
TEN DAYS PRIOR TO START OF CONSTRUCTION, IRRIGATION CONTRACTOR SHALL VERIFY AVAILABLE WATER PRESSURE AND FLOW AT FROM PUBLIC SYSTEM.

THE SITE HAS TWO IRRIGATION METERS.

THE IRRIGATION SYSTEM FOR SYSTEM ONE IS DESIGNED TO OPERATE WITH A PRESSURE OF 52.00 POUNDS PER SQUARE INCH.

THE IRRIGATION SYSTEM FOR SYSTEM TWO IS DESIGNED TO OPERATE WITH A PRESSURE OF 44.96 POUNDS PER SQUARE INCH.

NOTE:
1. ENTIRE SYSTEM SHALL BE INSTALLED PER TCEQ STANDARDS, MANUFACTURER'S SPECIFICATIONS AND ALL CITY CODES.

2. THIS DESIGN IS DIAGRAMMATIC, ALL PIPING, VALVES, AND OTHER EQUIPMENT SHOWN WITHIN PAVED AREAS OR OUT OF PROPERTY BOUNDARIES ARE FOR DESIGN CLARIFICATION ONLY, AND SHALL BE INSTALLED IN PLANTING AREAS WITHIN THE PROPERTY LINES OR LIMITS INDICATED ON PLAN. THE IRRIGATION CONTRACTOR SHALL VERIFY THE LOCATIONS OF ALL ABOVE GROUND IRRIGATION EQUIPMENT WITH THE OWNER'S AUTHORIZED REPRESENTATIVE PRIOR TO INSTALLATION, OR IRRIGATION CONTRACTOR MAY BE REQUIRED TO MOVE SUCH ITEMS AT HIS OWN COST.

3. VARIOUS AREAS ON PLAN ARE SHOWING SINGLE HEAD COVERAGE. IF OWNER SHOULD ELECT FOR FULL COVERAGE, CONTRACTOR TO PROCURE THE PROPER PERMITS AND BID ALTERNATE FOR THESE ADDITIONAL SPRAY HEADS, ZONES, AND CONTROLLER EXPANSION FOR THE SYSTEM.

4. IRRIGATION CONTRACTOR IS TO COORDINATE LOCATION AND PLACEMENT OF ALL IRRIGATION ITEMS WITH THE GENERAL CONTRACTOR. CONTRACTOR IS TO USE EXTREME CAUTION IN TRENCHING TO AVOID EXISTING AND PROPOSED UTILITIES. CONTRACTOR TO LOCATE ALL UTILITIES PRIOR TO IRRIGATION INSTALLATION.

5. IRRIGATION SPRAY NOZZLES TO BE ADJUSTED TO AVOID PAVEMENT, BUILDING, WALLS, FENCES, UTILITIES, EQUIPMENT, SIGNAGE, AND CALL BOX

6. REFERENCE LANDSCAPE PLAN FOR LOCATION OF GRAVEL, STEEL EDGING AND ALL PROPOSED PLANT MATERIAL.

7. IN TURF AREAS (BOTH SOD AND HYDROMULCH AREAS) OUTSIDE OF IRRIGATION PERMANENT COVERAGE, CONTRACTOR TO PROVIDE TEMPORARY IRRIGATION UNTIL ESTABLISHED, TYP

8. CONTRACTOR TO TAKE ALL NECESSARY MEASURES TO PREVENT WATER HAMMER AND SYSTEM COLLAPSE BY DISCHARGING AIR DURING STARTUP AND ALLOWING AIR TO ENTER DURING SHUTDOWN. INSTALL THRUST BLOCKS AND AIR/VACUUM RELIEF VALVES AS NECESSARY TO PROTECT MAINLINE SYSTEM. FOR 3 INCH AND LARGER MAINLINE, INSTALL JOINT RESTRAINTS AT TURNS. INSTALL PER MANUFACTURE'S RECOMMENDATIONS.

9. ALL MAINLINE PIPING 3 INCHES AND LARGER SHALL BE BELL AND GASKETED CLASS 200 PVC PIPE, SDR 21. INSTALL PER MANUFACTURERS RECOMMENDATIONS, CONTACT MANUFACTURE OR DISTRIBUTOR FOR PRODUCT DEMONSTRATION.

10. GROUP VALVES IN FIELD AS NECESSARY FOR MAINLINE SIZING. CENTER FEED LATERALS WHEN POSSIBLE.

IRRIGATION LEGEND			
SYMBOL	DESCRIPTION	MANUFACTURER	MODEL NO.
10a	SPRAYS TURF- PRO ADJ. NOZ	HUNTER	PROS-04-PRS30
10b	SPRAY SHRUBS-PRO ADJ. NOZ	HUNTER	PROS-12-PRS30
	MULTI-STREAM BUBBLERS	HUNTER	PROS-06-PRS30 W/ MSBN50H NOZZLES
	REMOTE CONTROL VALVE	DIG	300DC-100 AND 305DC-150
	1.5" DOUBLE CHECK ASSEMBLY	FEBCO	850 SERIES
	QUICK COUPLER	HUNTER	HQ-3-RC
R	WEATHER SENSOR	HUNTER AND DIG	MINI CLIK W/ DIG-SKIT 8821-4 SENSOR

IRRIGATION LEGEND	
SYMBOL	DESCRIPTION
	1.5" IRRIGATION METER
A	SYSTEM ONE- DIG LEIT X12 CONTROLLER SYSTEM TWO- DIG LEIT LEIT 4004 CONTROLLER
	ISOLATION VALVE
	LATERAL PIPING REFER TO PLAN CLASS 200 PVC
	MAINLINE PIPING REFER TO PLAN SCH. 40 PVC, SIZED AS SHOWN (INSTALL THRUST BLOCKS AND AIR/VACUUM RELIEF VALVES AS NECESSARY TO PROTECT MAINLINE SYSTEM)
=======	IRRIGATION SLEEVE, SCH. 40 PVC, MIN. TWICE SIZE OF PIPE TO BE INSERTED, ONE SLEEVE PER PIPE CONTROL WIRING SLEEVE, 2" SCH. 40 PVC
D1 / 1" / 8.8	VALVE STATION # (WHERE D = DRIP TUBING, S = SPRAY, R = ROTOR, T = TREE DRIP) VALVE SIZE GPM

SLEEVING NOTES

1. PIPING AND CONTROL WIRES SHALL BE INSTALLED IN SEPARATE SLEEVES UNDER PAVING, REFERENCE DRAWINGS FOR SLEEVE SIZE AND LOCATION.
2. SLEEVES SHALL BE FURNISHED AND INSTALLED BY GENERAL CONTRACTOR.
3. INSTALLATION OF SLEEVES SHALL BE TWENTY - FOUR (24") BELOW TOP OF PAVEMENT OR FINISHED GRADE.
4. SLEEVES SHALL EXTEND ONE (1) FOOT BEYOND EDGE OF ALL PAVEMENT AND STAKED FOR LOCATION.
5. ALL SLEEVES SHALL BE SCHEDULE 40 PVC PIPE, CAPPED ON BOTH ENDS AND SIZED AT LEAST TWO TIMES LARGER THAN THE DIAMETER OF THE PIPE INSIDE THE SLEEVE.
6. SLEEVE LOCATIONS SHALL BE MARKED ONTO THE CURB WITH A SAWCUT OF TWO PARALLEL LINES THAT ARE TWO (2") INCHES LONG AND ONE (1") APART.
7. CONTRACTOR IS RESPONSIBLE FOR THE INSTALLATION OF SLEEVES AND SHALL ALSO BE RESPONSIBLE FOR LOCATING ANY SLEEVE THAT CANNOT BE FOUND DURING THE INSTALLATION OF THE SYSTEM.
8. CONTRACTOR SHALL FURNISH OWNER AND IRRIGATION CONTRACTOR WITH AN 'AS-BUILT' DRAWING SHOWING ALL SLEEVE LOCATIONS.

IRRIGATION GENERAL NOTES

1. THE IRRIGATION CONTRACTOR SHALL COORDINATE INSTALLATION OF THE IRRIGATION SYSTEM WITH THE LANDSCAPE CONTRACTOR SO THAT ALL PLANT MATERIAL WILL BE WATERED IN ACCORDANCE WITH THE INTENT OF THE PLANS AND SPECIFICATIONS.
2. THE CONTRACTOR SHALL BE RESPONSIBLE TO NOTIFY THE IRRIGATION DESIGNER OF SITE CONDITIONS OR ASSUME FULL RESPONSIBILITY FOR ANY AND ALL ON SITE REVISIONS NECESSARY.
3. CONTRACTOR TO VERIFY DESIGN AND ITS INTENT TO PROVIDE FULL COVERAGE TO ALL NEW PLANTING MATERIAL.
4. NOTIFY IRRIGATION DESIGNER OF ANY LAYOUT DISCREPANCIES PRIOR TO BIDDING.
5. LOCATE ALL UTILITIES AND SITE LIGHTING CONDUITS BEFORE IRRIGATION INSTALLATION BEGINS.
6. IRRIGATION CONTRACTOR TO PROCURE ALL PERMITS, LICENSES AND GIVE ALL NECESSARY NOTICES THROUGHOUT THE DURATION OF THE PROJECT.
7. THE CONTRACTOR SHALL BE A REGISTERED LICENSED IRRIGATOR IN GOOD STANDING WITH THE STATE OF TEXAS BOARDS AND REGULATORS.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL PLANT MATERIAL UPON ACCEPTANCE AND THROUGH THE WARRANTY PERIOD FOR DAMAGE DUE TO IRRIGATION SYSTEM FAILURE.
9. ALL ASPECTS OF THE IRRIGATION INSTALLATION SHALL CONFORM WITH THE PROPER GOVERNING AUTHORITIES, CODES AND ORDINANCES.
10. SLEEVES SHALL BE FURNISHED AND INSTALLED BY GENERAL CONTRACTOR. SLEEVE MATERIAL SHALL BE SCHEDULE 40, SIZE AS INDICATED ON PLAN. REFER TO SLEEVING NOTES.
11. ALL MAIN LINE AND LATERAL LINE PIPING IN PLANTING AND LAWN AREAS SHALL HAVE A MINIMUM OF 12 INCHES OF COVER. ALL PIPING UNDER PAVING SHALL HAVE A MINIMUM OF 18 INCHES OF COVER. CONTRACTOR TO VERIFY LOCAL FREEZE DEPTHS AND ADJUST DEPTH OF COVER ACCORDINGLY.
12. ZONE VALVES SHALL NOT BE LOCATED WITHIN THREE (3') FEET OF ANY DRIVEWAY, TRAFFIC AISLE, ISLAND ETC. WHERE THEY WILL BE DAMAGED BY VEHICLES DRIVING OVER CURBS.
13. ALL NOZZLES IN PARKING LOT ISLANDS AND PLANTING BEDS SHALL BE LOW ANGLE NOZZLES TO MINIMIZE OVER SPRAY ON PAVEMENT SURFACES.
14. AUTOMATIC CONTROLLER SHALL BE INSTALLED AT LOCATION SHOWN. POWER (120V) SHALL BE LOCATED IN A JUNCTION BOX WITHIN FIVE (5') FEET OF CONTROLLER, LOCATION BY OTHER TRADES. RAIN AND FREEZE SENSORS SHALL BE INSTALLED WITH EACH CONTROLLER.
15. ELECTRICAL SPLICES SHOULD BE LOCATED AT EACH VALVE AND CONTROLLER ONLY.
16. PROVIDE A 3/4" BLOW DOWN DRAIN TEE TO ALLOW WATER TO BE BLOWN FROM THE IRRIGATION LINES/SYSTEM.
17. DISTURBED AREAS IN NEED OF TURF ESTABLISHMENT MAY EXIST BEYOND COVERAGE LIMITS OF THE PERMANENT IRRIGATION SYSTEM. IN THESE AREAS, CONTRACTOR TO DETERMINE A TEMPORARY MEANS TO ESTABLISH NECESSARY TURF. CONTRACTOR IS ENCOURAGED TO BEGIN TURF ESTABLISHMENT IMMEDIATELY UPON FINAL GRADE IN ACCORDANCE WITH AND TO SATISFY SWPPP.
18. PROVIDE WITH OWNER A COPY OF ALL INSTALLED EQUIPMENT AND LINES (AS BUILT PLANS.)
19. PLACE COPY OF ZONE MAP WITH ALL ZONE VALVE LOCATIONS SHOWN AND APPROVED IRRIGATION PLAN IN PROTECTIVE JACKET IN MAIN CONTROL PANEL.
20. IRRIGATION IN TEXAS IS REGULATED BY:
THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ)
MC-178 / PO BOX 13087
AUSTIN, TEXAS 78711-3087
WWW.TECQ.STATE.TX.US.

IRRIGATION PROJECT NOTES

1. THE LOCATION OF MAINLINE AND VALVES ON THIS PLAN MAY BE SHOWN IN PAVED AREAS FOR DESIGN CLARITY ONLY. IRRIGATION ELEMENTS HAVE BEEN SHOWN ON THIS PLAN AS ACCURATELY AS POSSIBLE WITHOUT THE FORFEIT OF DESIGN CLARITY AND INTENT. ALL PIPES AND VALVES SHALL BE INSTALLED WITHIN **PERVIOUS** AREAS. ALL PIPE AND WIRES THAT CROSS UNDER PAVING SHALL BE INSTALLED IN SEPARATE SLEEVES AS SPECIFIED.
2. ALL SPRINKLER EQUIPMENT NUMBERS REFERENCE THE HUNTER EQUIPMENT CATALOG UNLESS OTHERWISE INDICATED.
3. TEN DAYS PRIOR TO START OF CONSTRUCTION, IRRIGATION CONTRACTOR SHALL VERIFY STATIC WATER PRESSURE. THE SITE HAS TWO IRRIGATION METERS. THE IRRIGATION SYSTEM FOR SYSTEM ONE IS DESIGNED TO OPERATE WITH A PRESSURE OF 52.00 POUNDS PER SQUARE INCH. THE IRRIGATION SYSTEM FOR SYSTEM TWO IS DESIGNED TO OPERATE WITH A PRESSURE OF 44.96 POUNDS PER SQUARE INCH. SHOULD THE DESIGN PRESSURE FOR THE SYSTEM BE HIGHER THAN THE EXISTING PRESSURE, THE IRRIGATION CONTRACTOR SHALL NOTIFY THE IRRIGATION DESIGNER IMMEDIATELY.
4. IRRIGATION CONTRACTOR SHALL COORDINATE THE LOCATION OF THE CONTROLLER AND SENSORS WITH THE GENERAL CONTRACTOR AND OWNER. A 110 VOLT ELECTRICAL SERVICE TO POWER THE IRRIGATION CONTROLLER SHALL BE PROVIDED BY THE GENERAL CONTRACTOR AT THE LOCATION SHOWN ON THIS PLAN.
5. WATER SERVICE TAP, METER AND LEAD FOR THE IRRIGATION SYSTEM SHALL BE PROVIDED AND INSTALLED BY THE GENERAL CONTRACTOR. SERVICE LINE AND METER SHALL BE SIZED AS NOTED ON THIS PLAN.
6. TYPE AND INSTALLATION OF THE WATER METER AND BACK FLOW PREVENTION DEVICE SHALL BE DETERMINED BY THE GOVERNING AUTHORITY. AN ISOLATION VALVE SHALL BE PROVIDED BETWEEN THE WATER METER AND BACK FLOW DEVICE.
7. ALL CALCULATIONS FOR THIS IRRIGATION SYSTEM ARE BASED ON PRODUCTS AND EQUIPMENT INFORMATION PROVIDED BY HUNTER. INSTALLATION OF THESE PRODUCTS SHALL NOT EXCEED MANUFACTURERS RECOMMENDATIONS.
8. REFERENCE HUNTER GUIDELINES AND SPECIFICATIONS PRIOR TO INSTALLATION. CONFIRM REQUIREMENTS FOR CONTROLLER, WATERPROOF CONNECTIONS, GROUNDING, SURGE PROTECTORS, DECODERS, VALUES, AND WIRING PRIOR TO INSTALLATION. HUNTER TECHNICAL SERVICES (760) 591-7383. WWW.HUNTERINDUSTRIES.COM
9. REFERENCE DIG CORPORATION GUIDELINES AND SPECIFICATIONS PRIOR TO INSTALLATION. CONFIRM REQUIREMENTS FOR CONTROLLER, WATERPROOF CONNECTIONS, GROUNDING, SURGE PROTECTORS, DECODERS, VALUES, AND WIRING PRIOR TO INSTALLATION. CONTACT (800) 322-9146 OR (760) 727-0914. WWW.DIGCORP.COM/PROFESSIONAL-RESOURCES/
10. SPRAY HEADS LOCATED IN TURF AREAS SHALL BE HUNTER PROS-04-PRS30 SPRAY BODIES WITH PRO ADJUSTABLE NOZZLES, FIXED ARC NOZZLES, AND STRIP PATTERN NOZZLES RATE AND AS INDICATED ON THE PLAN.
11. SPRAY HEADS LOCATED IN SHRUB AREAS SHALL BE HUNTER PROS-12-PRS30 SPRAY BODIES WITH PRO ADJUSTABLE NOZZLES, FIXED ARC NOZZLES, AND STRIP PATTERN NOZZLES RATE AND AS INDICATED ON THE PLAN.
12. IRRIGATION REMOTE CONTROL VALVES SHALL BE 1" AND/OR 1.5" DIG 300DC-100 AND 305DC-150 AS INDICATED. PRIOR TO ALL REMOTE CONTROL VALVES, INSTALL A NOMINALLY SIZED BALL VALVE WITHIN THE SAME BOX. USE DC LATCHING SOLENOIDS.
13. SIZE OF VALVES ARE AS SHOWN ON PLAN. VALVES SHALL BE INSTALLED IN APPROVED BOXES WITH COVERS LARGE ENOUGH TO PERMIT MANUAL OPERATION, REMOVAL OF SOLENOID AND / OR VALVE COVER WITHOUT ANY EARTH EXCAVATION. OWNERS MAY ELECT LOCKING BOXES ON A PROJECT BY PROJECT BASIS.
14. QUICK COUPLING VALVES SHALL BE HUNTER INSTALLED PER DETAIL SHOWN. SWING JOINTS SHALL BE CONSTRUCTED USING ¾" SCHEDULE 80 ELBOWS. CONTRACTOR SHALL SUPPLY OWNER WITH HQ-3-RC COUPLERS (QUANTITY PER PLAN) WITH (2) HK-33 KEYS AND TWO (2) HS-0 HOSE SWIVELS AS PART OF THIS CONTRACT.
15. IRRIGATION SYSTEM AUTOMATIC CONTROLLER SHALL BE DIG LEIT X12 CONTROLLER AND DIG LEIT 4004, WITH RAIN AND FREEZE SENSORS. INSTALL PER MANUFACTURERS RECOMMENDATIONS. CONFIRM WIRING, GROUNDING AND SURGE PROTECTION REQUIREMENTS BEFORE INSTALLING.
16. TREE BUBBLERS SHALL USE HUNTER PROS-06-PRS30 BODIES WITH HUNTER MULTI-STREAM BUBBLERS MODEL MSBN-50H NOZZLES.
17. ALL VALVE CONTROL WIRE SHALL BE SIZED PER MANUFACTURER GUIDELINES BY THE CONTRACTOR ACCORDING TO THE ACTUAL FIELD DISTANCE, ALL CONNECTIONS SHALL BE WATER-PROOF, KEPT TO A MINIMUM, AND LOCATED IN AN APPROVED BOX.

SUGGESTED LATERAL PIPE SIZE, CLASS 200 PVC	
FLOW RANGE GPM	PIPE SIZE
0 - 8 GPM	3/4"
8 - 12 GPM	1"
12 - 22 GPM	1-1/4 "
22 - 28 GPM	1-1/2"
28 + GPM	2"

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Phone - 214.217.2200
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

IRRIGATION

IRRIGATION GENERAL NOTES

NO.	ISSUE	BY	DATE
1	UPDATED IRRIGATION, CONVERT DRIP IRRIGATION TO SPRAY	AWR	7-24-23

F&N JOB NO. RKW19711
DATE FEB 2024
DESIGNED AWR
DRAWN AWR
REVISED AWR
CHECKED AWR

FILE NAME 23119_Irrigation Series-record drawings.dwg

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SHEET IR-1
SEQ. 101

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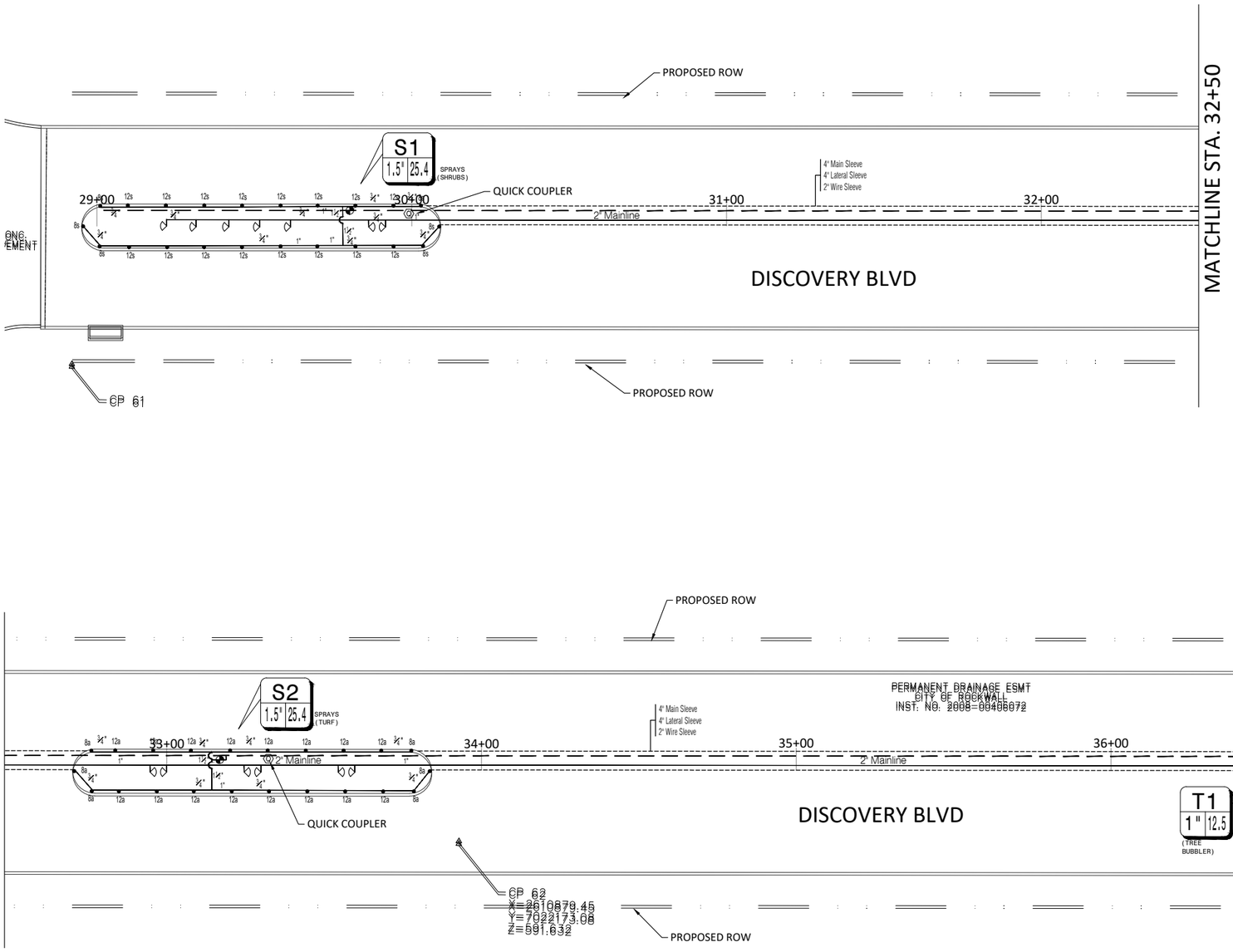

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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

IRRIGATION

DISCOVERY BLVD. IRRIGATION PLAN
BEGIN TO STA. 37+00

NO.	ISSUE	BY	DATE
1	UPDATED IRRIGATION, CONVERT DRIP IRRIGATION TO SPRAY	AWR	7-24-23

F&N JOB NO. RKW19711
DATE FEB 2024
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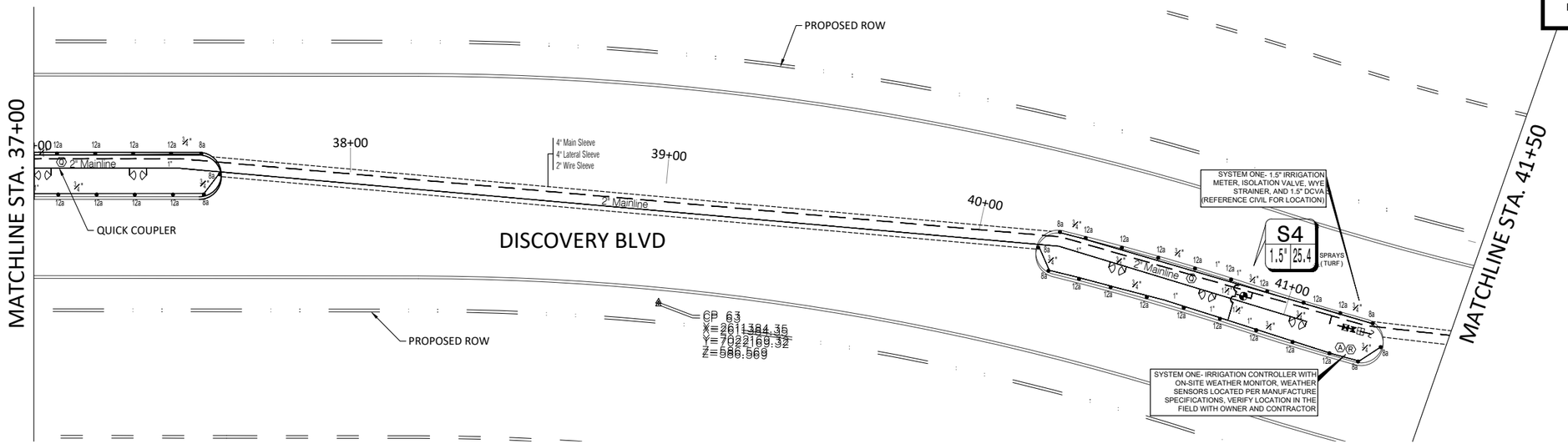
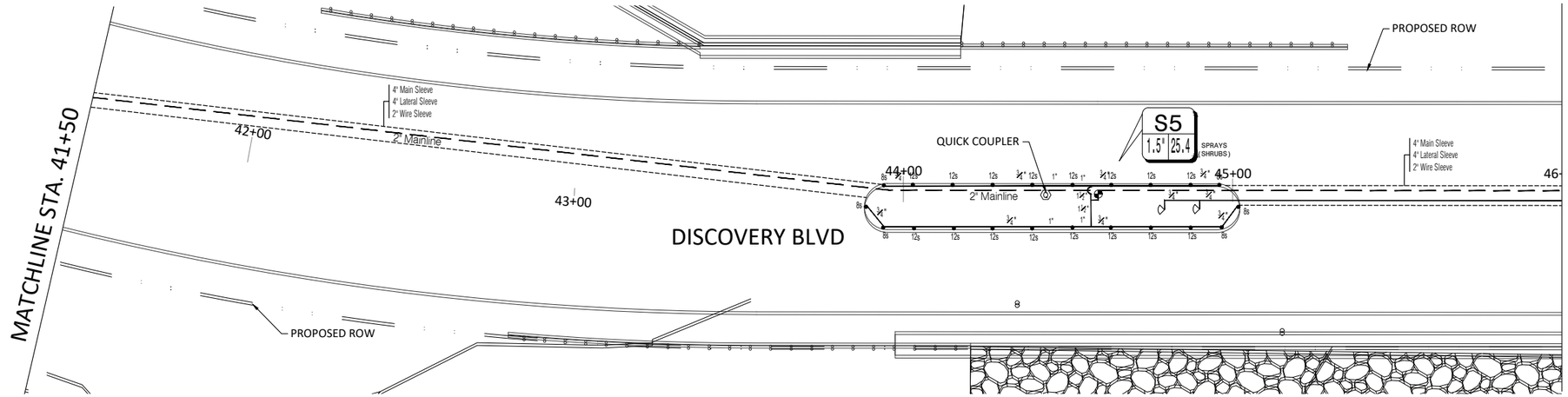
RECORD DRAWINGS PREPARED ON:
8/20/2024





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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
IRRIGATION
DISCOVERY BLVD. IRRIGATION PLAN
STA. 37+00 TO STA. 46+00

NO.	ISSUE	BY	DATE
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F&N JOB NO. RKW19711
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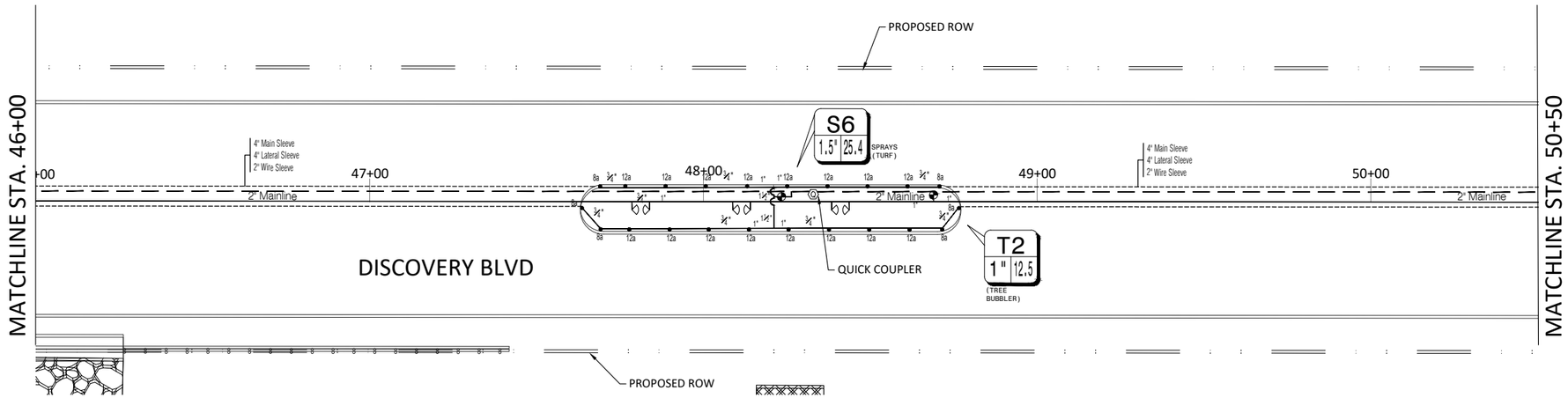

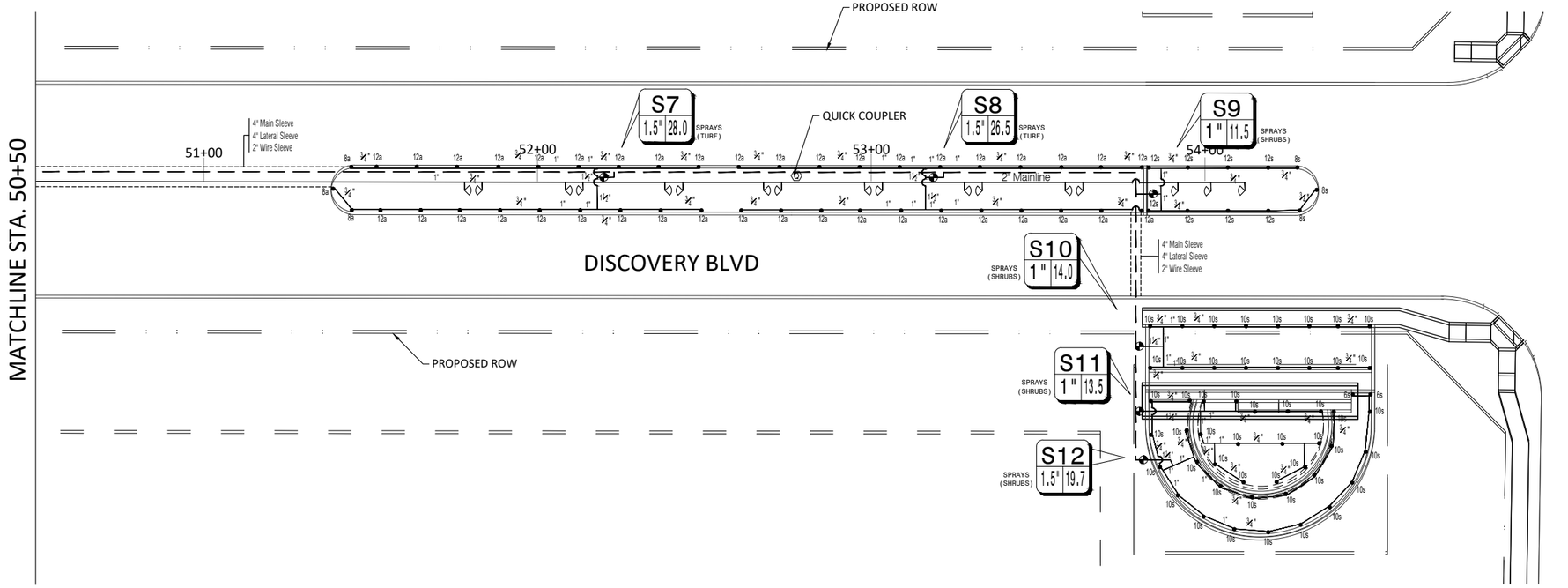

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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
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IRRIGATION
DISCOVERY BLVD. IRRIGATION PLAN
STA. 46+00 TO END

NO.	ISSUE	BY	DATE
1	UPDATED IRRIGATION, CONVERT DRIP IRRIGATION TO SPRAY	AWR	7-24-23

F&N JOB NO. RKW19711
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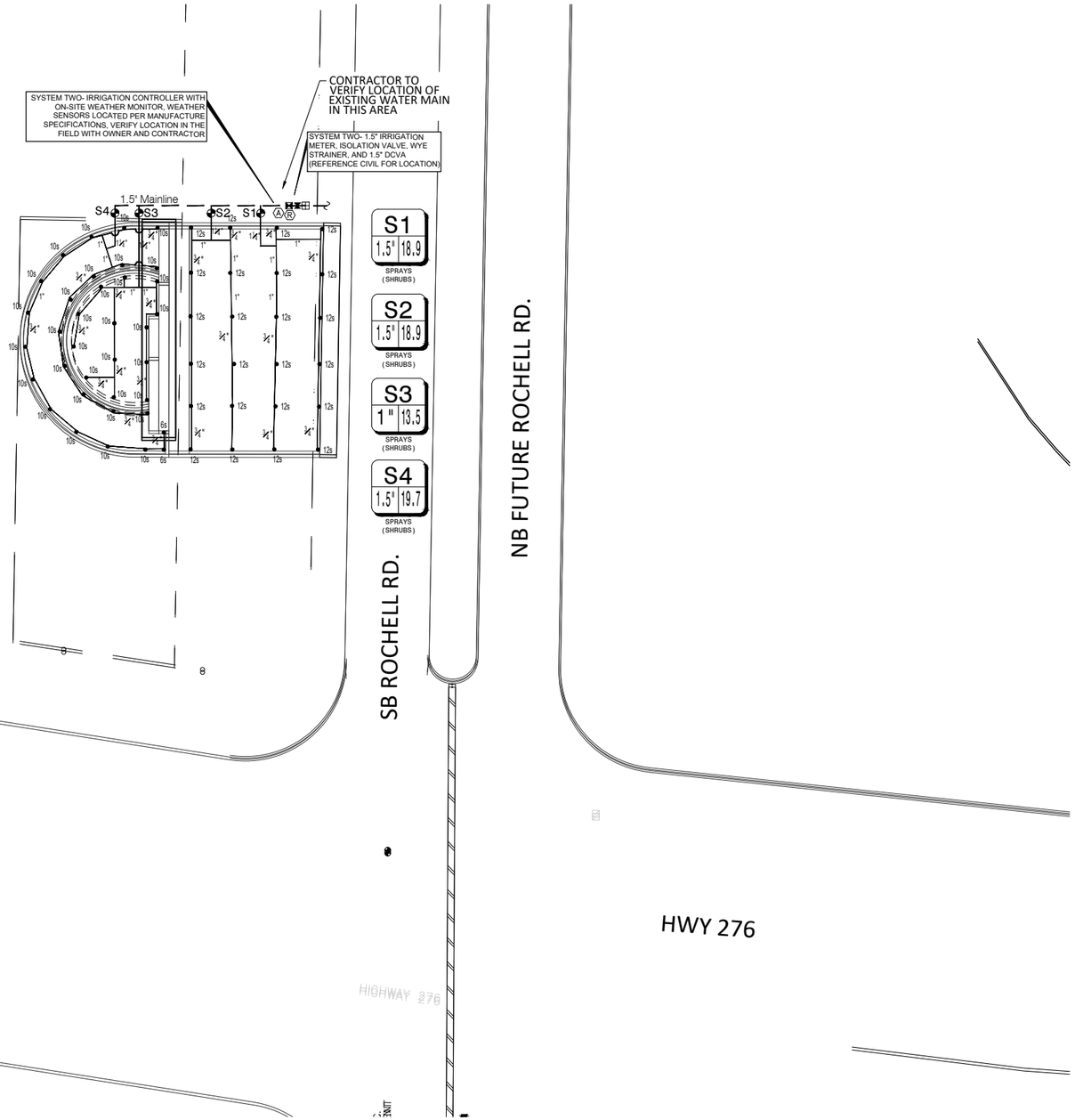

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RTP PHASE V INFRASTRUCTURE

IRRIGATION

ROCHELL RD. IRRIGATION PLAN
BEGIN TO STA. 13+00

NO.	ISSUE	BY	DATE
1	UPDATED IRRIGATION, CONVERT DRIP IRRIGATION TO SPRAY	AWR	7-24-23

B&N JOB NO. RKW19711
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SEQ. 105

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SECTION 32 8423 - UNDERGROUND IRRIGATION SLEEVES AND UTILITY CONDUITS

PART 1 - GENERAL

1.1 DESCRIPTION

A. PROVIDE UNDERGROUND IRRIGATION SLEEVES AS INDICATED ON THE DRAWINGS.

1.2 RELATED WORK

A. SECTION 32 8424 - IRRIGATION SYSTEM.

1.3 REFERENCE STANDARDS

A. AMERICAN STANDARD FOR TESTING AND MATERIALS (ASTM) - LATEST EDITION.

PART 2 - MATERIALS

2.1 GENERAL

A. POLYVINYL CHLORIDE PIPE (PVC) - SCHEDULE 40 SHALL BE USED FOR ALL SLEEVING PURPOSES.

B. PVC PIPES SHALL BE MARKED WITH SDR NUMBER, ASTM STANDARD NUMBER, AND THE NSF SEAL.

C. SOLVENT SHALL BE USED AS RECOMMENDED BY MANUFACTURER TO MAKE SOLVENT WELDED JOINTS. PIPE AND FITTINGS SHOULD BE CLEANED BEFORE APPLYING SOLVENT.

PART 3 - EXECUTION

3.1 INSTALLATION

A. A MINIMUM OF TWENTY FOUR (24) INCHES COVER SHALL BE PROVIDED OVER THE TOP OF SLEEVE FROM FINISH GRADE.

B. SLEEVES SHALL BE EXTENDED ONE (1) FOOT PAST THE EDGE OF PAVEMENT OF WALLS. INSTALL A NINETY DEGREE ELBOW ON EACH SLEEVE AND ADD ADDITIONAL LENGTH TO EXTEND ABOVE FINISH GRADE BY TWELVE (12) INCHES. CAP PIPE ENDS.

3.2 BACKFILL

A. BACKFILL SHALL BE PLACED OVER SLEEVES IN SIX (6) INCH LIFTS. SOIL SHALL BE TAMPED INTO PLACE, TAKING CARE TO NOT DAMAGE SLEEVE.

B. REPAIR ANY DAMAGE FROM IMPROPER COMPACTION.

END OF SECTION

SECTION 32 8424 - IRRIGATION SYSTEM

PART 1 - GENERAL

1.1 DESCRIPTION

A. PROVIDE A COMPLETE IRRIGATION SYSTEM INSTALLATION AS DETAILED AND SPECIFIED. THIS SHALL INCLUDE FURNISHING ALL LABOR, MATERIAL, EQUIPMENT AND SERVICES NECESSARY TO PROVIDE COMPLETE INSTALLATION. WORK INCLUDES:

a. TRENCHING

b. BACKFILL

c. AUTOMATIC CONTROLLED SYSTEM

d. AS BUILT DRAWINGS

B. SLEEVING AS SHOWN SHALL BE FURNISHED BY THE GENERAL CONTRACTOR.

C. METER AND POWER SHALL BE PROVIDED BY THE GENERAL CONTRACTOR.

1.2 RELATED WORK

C. REFERENCE IRRIGATION PLANS FOR CONTROLLER, HEAD AND ALL VALVE LOCATIONS.

D. REFERENCE LANDSCAPE PLANS, NOTES, DETAILS FOR ADDITIONAL REQUIREMENTS.

E. SECTION 32 9300 - LANDSCAPE

F. SECTION 32-8423 - UNDERGROUND IRRIGATION SLEEVE AND UTILITY CONDUITS

1.3 REFERENCE STANDARDS

A. AMERICAN STANDARD FOR TESTING AND MATERIALS (ASTM) - LATEST EDITION.

1.4 QUALITY ASSURANCE AND REQUIREMENTS

A. PERMITS AND FEES: THE CONTRACTOR SHALL OBTAIN AND PAY FOR ANY PERMITS NECESSARY AND ALL OBSERVATIONS AS REQUIRED.

B. MANUFACTURER'S DIRECTIONS: MANUFACTURER'S DIRECTIONS AND DETAILED DRAWINGS SHALL BE FOLLOWED IN ALL CASES WHERE THE MANUFACTURERS OF ARTICLES USED IN THIS CONTRACT FURNISH DIRECTIONS COVERING POINTS NOT SHOWN IN THE DRAWINGS AND SPECIFICATIONS.

C. ORDINANCES, CODES, AND REGULATIONS: ALL LOCAL, MUNICIPAL AND STATE LAWS, AND RULES AND REGULATIONS GOVERNING OR RELATING TO ANY PORTION OF THIS WORK ARE HEREBY INCORPORATED INTO AND MADE A PART OF THESE SPECIFICATIONS, AND THEIR PROVISIONS SHALL BE CARRIED OUT BY THE CONTRACTOR. ANYTHING CONTAINED IN THESE SPECIFICATIONS SHALL NOT BE CONSTRUED TO CONFLICT WITH ANY OF THE ABOVE RULES AND REGULATIONS AND REQUIREMENTS OF THE SAME.

D. HOWEVER, WHEN THESE SPECIFICATIONS AND DRAWINGS CALL FOR OR DESCRIBE MATERIALS, WORKMANSHIP, OR CONSTRUCTION OF A BETTER QUALITY, HIGHER STANDARD OR LARGER SIZE THAN IS REQUIRED BY THE ABOVE RULES AND REGULATIONS, THESE SPECIFICATIONS AND DRAWINGS SHALL TAKE PRECEDENCE.

1.5 SCHEDULE OF MATERIALS

A. MATERIALS LIST:

a. ALL EQUIPMENT MANUFACTURERS AND MODEL NUMBERS SHALL BE AS NOTED ON THE PLANS.

b. THE CONTRACTOR SHALL FURNISH THE ARTICLES, EQUIPMENT, MATERIALS, OR PROCESSES SPECIFIED BY NAME IN THE DRAWINGS AND SPECIFICATIONS. NO SUBSTITUTION WILL BE ALLOWED WITHOUT PRIOR WRITTEN APPROVAL OF THE LANDSCAPE ARCHITECT.

c. A COMPLETE MATERIAL LIST OF EQUIPMENT SHALL BE SUBMITTED BEFORE PERFORMING ANY WORK. SUBMITTAL SHOULD INCLUDE ALL MANUFACTURERS' SPECIFICATIONS AND LITERATURE FOR APPROVAL BY THE LANDSCAPE ARCHITECT PRIOR TO INSTALLATION.

d. EQUIPMENT OR MATERIALS INSTALLED OR FURNISHED WITHOUT PRIOR APPROVAL OF THE LANDSCAPE ARCHITECT MAY BE REJECTED.

e. APPROVAL OF ANY ITEM, ALTERNATE OR SUBSTITUTE INDICATES ONLY THAT THE PRODUCT OR PRODUCTS APPARENTLY MEET THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS ON THE BASIS OF THE INFORMATION OR SAMPLES SUBMITTED.

f. MANUFACTURER'S WARRANTIES SHALL NOT RELIEVE THE CONTRACTOR OF HIS LIABILITY UNDER THE GUARANTEE. SUCH WARRANTIES SHALL ONLY SUPPLEMENT THE GUARANTEE.

1.4 RECORD AND AS BUILT DRAWINGS/SUBMITTALS

A. CONTRACTOR SHALL PROVIDE AND KEEP UP TO DATE AND COMPLETE "AS-BUILT" RECORD SET OF PRINTS.

B. CONTRACTOR SHOULD USE ALL SYMBOLS AND NOTATIONS CONSISTENT WITH THE ORIGINAL DRAWINGS.

C. IN "AS-BUILT" DRAWINGS, CONTRACTOR SHALL LOCATE:

a. CONNECTION TO EXISTING WATER LINES

b. CONNECTION TO ELECTRICAL POWER

c. GATE VALVES

d. ROUTING OF SPRINKLER PRESSURE LINES

e. SPRINKLER CONTROL VALVES

f. QUICK COUPLING VALVES

g. OTHER RELATED EQUIPMENT

D. SUBMIT COMPLETED TRACINGS PRIOR TO FINAL ACCEPTANCE. DATE AND SIGN ALL DRAWINGS.

E. EQUIPMENT TO BE FURNISHED:

a. SUPPLY AS PART OF THIS CONTRACT THE FOLLOWING TOOLS:

i. QUICK COUPLING KEYS, THREE (3) WITH BOILER DRAINS ATTACHED USING BRASS REDUCER.

ii. THREE (3) KEYS FOR EACH AUTOMATIC CONTROLLER

b. THE ABOVE MENTIONED EQUIPMENT SHALL BE TURNED OVER TO THE OWNER AT THE CONCLUSION OF THE PROJECT.

F. THE IRRIGATION CONTRACTOR SHOULD DEMONSTRATE THAT THE FINAL INSTALLED SYSTEM WILL OPERATE ACCORDING TO THE INTENT OF THE DESIGNED AND SPECIFIED SYSTEM. IRRIGATION CONTRACTOR SHALL GUARANTEE 100% COVERAGE TO ALL AREAS TO BE IRRIGATION.

1.5 MAINTENANCE AND GUARANTEE

A. MAINTENANCE AND WORKMANSHIP SHALL BE GUARANTEED FULLY FOR ONE (1) YEAR AFTER FINAL ACCEPTANCE.

B. PROVIDE MAINTENANCE OF SYSTEM, CLEANING AND ADJUSTMENT OF THE HEADS, FOR ONE (1) YEAR AFTER COMPLETION OF INSTALLATION.

C. GUARANTEE IS LIMITED TO REPAIR AND REPLACEMENT OF DEFECTIVE MATERIALS AND WORKMANSHIP, INCLUDING THE REPAIR OF BACKFILL SETTLEMENT.

1.6 TESTING

A. PERFORM TESTING REQUIRED WITH OTHER TRADES INCLUDING EARTHWORK, PAVING, PLUMBING, ETC. TO AVOID CUTTING, PATCHING OR BORING.

B. WATER PRESSURE SHOULD BE FOUND PRIOR TO STARTING CONSTRUCTION. DETERMINE/CONFIRM THAT STATIC WATER PRESSURE IS MORE THAN THE WATER PRESSURE NEEDED FOR THE SYSTEM TO FUNCTION PROPERTY. IF STATIC PRESSURE IS LESS THAN THE DESIGN PRESSURE NEEDED, DO NOT START WORK UNTIL THE LANDSCAPE ARCHITECT IS NOTIFIED.

1.7 COORDINATION

A. COORDINATE INSTALLATION OF ALL PRODUCTS, INCLUDING EARTHWORK, PAVING AND PLUMBING.

B. COORDINATE TO ENSURE THAT ELECTRICAL POWER SOURCE IS IN PLACE.

C. COORDINATE INSTALLATION WITH WORK SPECIFIED IN OTHER SECTIONS.

D. COORDINATE WITH THE LANDSCAPE CONTRACTOR TO ENSURE PLANT MATERIAL IS UNIFORMLY WATERED IN ACCORDANCE WITH INTENT SHOWN ON DRAWINGS.

PART 2 - PRODUCTS

2.1 MATERIALS

B. REFER TO CONSTRUCTION DRAWINGS AND NOTES.

C. SPRINKLER HEADS IN LAWN AREAS AS SPECIFIED ON PLAN

D. PVC PIPE: CLASS 200 SPR 21

E. COPPER TUBING (FOR CITY CONNECTIONS): TYPE "M"

F. 24V WIRE - SIZE 14, TYPE UF

G. ELECTRIC VALVES TO BE ALL PLASTIC CONSTRUCTION AS INDICATED ON PLANS.

H. REFER TO DRAWING FOR BACKFLOW PREVENTION LOCATION - COORDINATE EXACT LOCATION WITH THE GENERAL CONTRACTOR.

PART 3 - EXECUTION

3.1 INSPECTION:

A. SITE CONDITIONS:

a. ALL SCALED DIMENSIONS ARE APPROXIMATE. THE CONTRACTOR SHALL CHECK AND VERIFY ALL SIZE DIMENSIONS.

b. EXERCISE EXTREME CARE IN EXCAVATING AND WORKING NEAR UTILITIES. CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGES TO UTILITIES WHICH ARE CAUSED BY ANY OF HIS OPERATIONS OR NEGLECT.

c. COORDINATE INSTALLATION OF IRRIGATION MATERIALS, INCLUDING PIPE, SO THERE SHALL BE NO INTERFERENCE WITH UTILITIES OR OTHER CONSTRUCTION DIFFICULTY IN PLANTING TREES, SHRUBS, AND GROUNDCOVERS. COORDINATE WORK WITH OTHER SITE CONTRACTORS.

3.2 PREPARATION

A. PHYSICAL LAYOUT:

a. PIPING AND HEAD LAYOUT AS SHOWN ON PLANS IS SCHEMATIC ONLY. ALL PIPES TO BE INSTALLED DIRECTLY BEHIND CURBS, WALKS AND WALLS WHEREVER POSSIBLE.

b. PRIOR TO INSTALLATION CONTRACTOR SHALL STAKE OUT ALL PRESSURE SUPPLY LINES, ROUTING AND LOCATION OF SPRINKLER HEADS.

c. ALL LAYOUTS SHALL BE APPROVED BY THE LANDSCAPE ARCHITECT OR OWNER'S REPRESENTATIVE PRIOR TO INSTALLATION.

B. WATER SUPPLY:

a. IRRIGATION SYSTEM SHALL BE CONNECTED TO WATER SUPPLY POINTS OF CONNECTION AS INDICATED ON THE DRAWINGS.

b. CONNECTIONS SHOULD BE MADE AT APPROXIMATE LOCATIONS AS SHOWN ON DRAWINGS. CONTRACTOR SHALL VERIFY IN FIELD AND BE RESPONSIBLE FOR MINOR CHANGES CAUSED BY ACTUAL SITE CONDITIONS.

3.3 INSTALLATION

A. TRENCHING

a. DIG TRENCHES STRAIGHT 6" WIDE WITH NEAR VERTICAL SIDE AND SUPPORT PIPE CONTINUOUSLY ON BOTTOM OF TRENCH. REMOVE LUMBER, RUBBISH, LARGE ROCKS ETC. FROM TRENCHES. LAY PIPE TO AN EVEN GRADE - WITH A FIRM, UNIFORM BEARING FOR ENTIRE LENGTH OF PIPE.

b. REMOVE FOREIGN MATTER OR DIRT FROM INSIDE OF PIPE BEFORE WELDING AND KEEP PIPING CLEAN BY ANY MEANS POSSIBLE DURING AND AFTER LAYING OF PIPE.

c. PROVIDE A MINIMUM OF EIGHTEEN (18) INCHES OF COVER FOR ALL PRESSURE SUPPLY LINES.

d. PROVIDE A MINIMUM OF TWELVE (12) INCHES OF COVER FOR ALL NON-PRESSURE LINES.

e. PROVIDE A MINIMUM COVER OF EIGHTEEN (18) INCHES FOR ALL CONTROL WIRING.

f. NO MACHINE TRENCHING, UNLESS APPROVED BY THE LANDSCAPE ARCHITECT, SHALL BE DONE WITHIN DRIP LINE OF EXISTING TREES. TRENCHING SHOULD BE DONE BY HAND, TUNNELING OR BORING OR OTHER METHODS APPROVED BY THE LANDSCAPE ARCHITECT. IT SHOULD BE UNDERSTOOD THAT PIPING LAYOUT IS DIAGRAMMATIC AND PIPING SHALL BE ROUTED AROUND TREES AND SHRUBS IN SUCH A MANNER TO AVOID DAMAGE TO PLANTS.

B. BACKFILL

a. TRENCHES SHALL NOT BE BACKFILLED UNTIL ALL REQUIRED TESTS ARE PERFORMED. TRENCHES SHALL BE CAREFULLY BACKFILLED WITH THE EXCAVATED MATERIALS APPROVED FOR BACKFILLING, CONSISTING OF EARTH, LOAM, SANDY CLAY, SAND OR OTHER APPROVED MATERIALS, FREE FROM LARGE CLODS, STONES OR STICKS.

b. IF SETTLEMENT OCCURS AND SUBSEQUENT ADJUSTMENTS IN PIPE, VALVES, SPRINKLER HEADS, LAWN OR PLANTING OR OTHER CONSTRUCTION ARE NECESSARY, THE CONTRACTOR SHALL MAKE ALL REQUIRED ADJUSTMENTS WITHOUT THE COST TO THE OWNER.

C. TRENCHING AND BACKFILL UNDER PAVING:

a. ALL IRRIGATION MAIN LINE AND LATERAL LINES OR WIRING LOCATED UNDER AREAS WHERE PAVING, ASPHALTIC PAVING, OR CONCRETE SHALL BE INSTALLED IN SCHEDULE 40 PVC SLEEVES OF ADEQUATE SIZE. SEE SECTION 32 8423.

D. ASSEMBLIES

a. INSTALL ALL ASSEMBLIES SPECIFIED HEREIN IN ACCORDANCE WITH RESPECTIVE DETAILS. IN ABSENCE OF DETAIL DRAWINGS OR SPECIFICATIONS, PERFORM SUCH WORK IN ACCORDANCE WITH BEST STANDARD PRACTICES OR MANUFACTURER'S RECOMMENDATIONS AS APPROVED BY THE LANDSCAPE ARCHITECT.

b. MAKE SOLVENT WELDED JOINTS USING ONLY THE SOLVENT RECOMMENDED BY THE MANUFACTURER. PIPES AND FITTINGS SHOULD BE CLEANED OF ALL DIRT AND DUST AND MOISTENED BEFORE APPLYING SOLVENT.

c. ON PVC TO METAL CONNECTIONS, THE CONTRACTOR SHALL WORK METAL CONNECTIONS FIRST. USE NON HARDENING PIPE DOPE OR TEFLON TAPE ON THREADED PVC ADAPTERS INTO WHICH PIPE MAY BE WELDED. LIGHT WRENCH PRESSURE IS ALL THAT IS REQUIRED, USE THREADED PVC ADAPTERS INTO WHICH THE PIPE MAY BE WELDED.

E. LINE CLEARANCE: ALL LINES SHALL HAVE A MINIMUM CLEARANCE OF SIX (6) INCHES FROM EACH OTHER AND FROM OTHER TRADES. PARALLEL LINES SHALL NOT BE DIRECTLY INSTALLED ONE OVER THE OTHER.

F. WIRING: SUPPLY WIRE FROM THE AUTOMATIC CONTROLLER TO ALL THE VALVES. A SEPARATE WIRE IS REQUIRED TO EACH ELECTRIC VALVE. A COMMON NEUTRAL WIRE IS ALSO REQUIRED FROM EACH CONTROL TO EACH OF THE VALVES. BUNDLE MULTIPLE WIRES AND TAPE THEM TOGETHER AT TEN FOOT INTERVALS. EXPANSION COILS OF TEN INCHES SHALL BE INSTALLED APPROXIMATELY EVERY 100 FEET. MAKE ALL SPLICES WATERPROOF.

G. AUTOMATIC CONTROLLER: INSTALL AS PER MANUFACTURER'S SPECIFICATIONS AND INSTRUCTIONS. REMOVE CONTROL VALVES SHALL BE CONNECTED TO CONTROLLER IN NUMERICAL SEQUENCE AS SHOWN ON THE DRAWINGS. EACH REMOVE CONTROL VALVE SHALL BE WIRED TO ONE STATION OF THE CONTROLLER.

H. REMOTE CONTROL VALVES:

a. INSTALL WHERE SHOWN ON DRAWINGS AND DETAILS. VALVES SHALL BE SIZED ACCORDING TO THE DRAWINGS.

b. INSTALL IN A LEVEL POSITION IN ACCORDANCE TO MANUFACTURER'S SPECIFICATIONS.

c. WHEN GROUPED TOGETHER, ALLOW AT LEAST TWELVE (12) INCHES BETWEEN VALVES. INSTALL EACH REMOTE CONTROL VALVE IN A SEPARATE VALVE BOX. EACH VALVE NUMBER AND ITS CONTROLLER LETTER SHALL BE STENCILED INSIDE VALVE BOX TOP WITH EXTERIOR PAINT.

I. FLUSHING OF SYSTEM:

a. AFTER ALL NEW SPRINKLER PIPE LINES AND RISERS ARE IN PLACE AND CONNECTED, ALL NECESSARY WORK HAS BEEN COMPLETED, AND PRIOR TO INSTALLATION OF SPRINKLER HEADS, THE CONTROL VALVES SHALL BE OPENED AND A FULL HEAD OF WATER USED TO FLUSH OUT THE SYSTEM.

b. SPRINKLER HEADS SHALL BE INSTALLED ONLY AFTER FLUSHING OF THE SYSTEM HAS BEEN ACCOMPLISHED.

J. SPRINKLER HEADS:

a. INSTALL HEADS AS DESIGNED ON THE DRAWINGS. MAKE APPROPRIATE ADJUSTMENTS TO HEAD LAYOUT TO ACCOMMODATE FOR ACTUAL FIELD CONDITIONS.

b. SPACING OF HEADS SHALL NOT EXCEED THE MAXIMUM INDICATED ON THE DRAWINGS. IN NO CASE SHALL THE SPACING EXCEED THE MAXIMUM RECOMMENDED BY THE MANUFACTURER.

c. ALL SPRINKLERS TO ATTACH TO LATERAL LINES WITH FLEXIBLE CONNECTORS. REFERENCE DETAILS ON DRAWINGS.

3.4 TESTING

A. THE CONTRACTOR SHALL TEST SPRINKLER MAIN FOR TWELVE TO FOURTEEN HOURS UNDER NORMAL PRESSURE. IF LEAKS ARE PRESENT, REPLACE JOINT OR JOINS AND REPEAT TEST.

B. A COMPLETE TEST SHALL BE MADE PRIOR TO BACKFILLING. BACKFILLING MATERIALS MAY BE PLACED IN TRENCHES IN LIFTS TO ENSURE STABILITY OF THE LINE UNDER THE PRESSURE OF BACKFILL. IN EACH CASE, LEAVE FITTINGS AND COUPLINGS OPEN TO VISUALLY INSPECT FOR FULL PERIOD OF TEST.

C. WHEN SYSTEM IS COMPLETE, A COVERAGE TEST SHALL BE PERFORMED IN THE PRESENCE OF THE LANDSCAPE ARCHITECT OR OWNER'S REPRESENTATIVE. IT SHALL BE DETERMINED IF THE WATER COVERAGE FOR ALL PLANTING AREAS IS COMPLETE AND ADEQUATE. FURNISH ALL MATERIALS AND PERFORM ALL WORK REQUIRED TO CORRECT ANY INADEQUACIES OF COVERAGE.

D. UPON COMPLETION OF EACH PHASE OF WORK, THE ENTIRE SYSTEM SHOULD BE TESTED AND ADJUSTED TO MEET SITE REQUIREMENTS.

END OF SECTION

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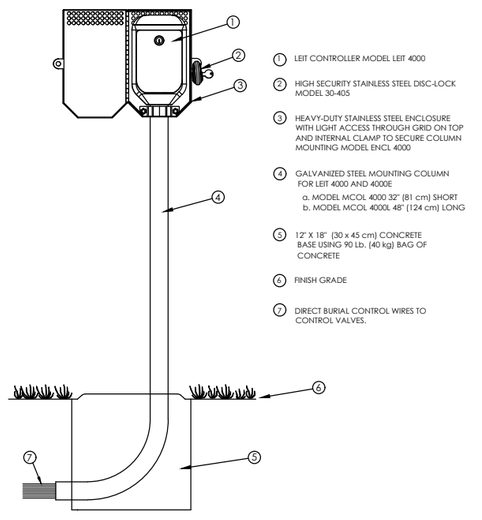
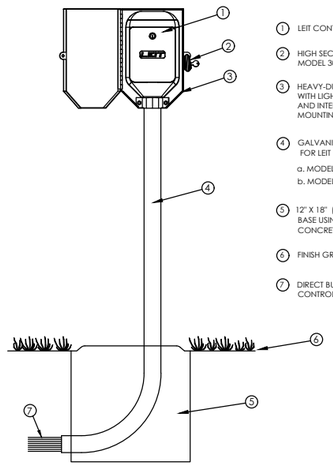
FREESE AND NICHOLS, INC.

RECORD DRAWINGS PREPARED ON: 8/20/2024



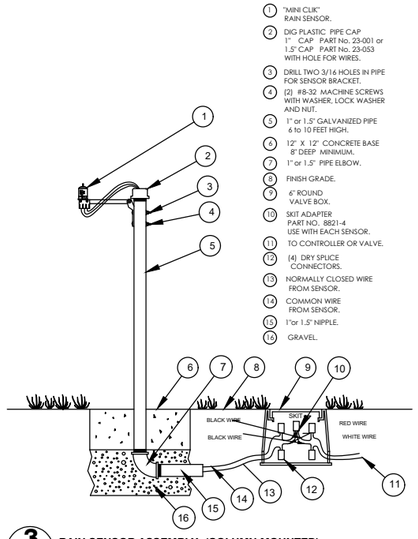
1. LEIT CONTROLLER MODEL LEIT 4000
2. HIGH SECURITY STAINLESS STEEL DISC-LOCK MODEL 30-405
3. HEAVY-DUTY STAINLESS STEEL ENCLOSURE WITH LIGHT ACCESS THROUGH GRID ON TOP AND INTERNAL CLAMP TO SECURE COLUMN MOUNTING MODEL ENCL 4000
4. GALVANIZED STEEL MOUNTING COLUMN FOR LEIT 4000 AND 4000E
   a. MODEL MCOL 4000 32" (81 cm) SHORT
   b. MODEL MCOL 4000L 48" (124 cm) LONG
5. 12" X 18" (30 x 45 cm) CONCRETE BASE USING 90 Lb. (40 kg) BAG OF CONCRETE
6. FINISH GRADE
7. DIRECT BURIAL CONTROL WIRES TO CONTROL VALVES.

1 LEIT 4000 AND 4000E WITH LIGHT ACCESSIBLE STAINLESS STEEL ENCLOSURE
N.T.S.



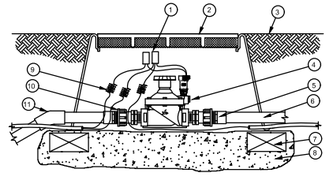
1. LEIT CONTROLLER MODEL X AND XRC
2. HIGH SECURITY STAINLESS STEEL DISC-LOCK MODEL 30-405
3. HEAVY-DUTY STAINLESS STEEL ENCLOSURE WITH LIGHT ACCESS THROUGH GRID ON TOP AND INTERNAL CLAMP TO SECURE COLUMN MOUNTING MODEL ENCL X
4. GALVANIZED STEEL MOUNTING COLUMN FOR LEIT X AND XRC
   a. MODEL MCOLX 35" (89 cm) SHORT
   b. MODEL MCOLXL 51" (129 cm) LONG
5. 12" X 18" (30 x 45 cm) CONCRETE BASE USING 90 Lb. (40 kg) BAG OF CONCRETE
6. FINISH GRADE
7. DIRECT BURIAL CONTROL WIRES TO CONTROL VALVES.

2 LEIT X AND XRC WITH LIGHT ACCESSIBLE STAINLESS STEEL ENCLOSURE
N.T.S.



1. "MINI CLIK" RAIN SENSOR.
2. DIG PLASTIC PIPE CAP 1" CAP PART No. 23-001 or 1.5" CAP PART No. 23-053 WITH HOLE FOR WIRES.
3. DRILL TWO 3/16 HOLES IN PIPE FOR SENSOR BRACKET.
4. (2) #8-32 MACHINE SCREWS WITH WASHER, LOCK WASHER AND NUT.
5. 1" or 1.5" GALVANIZED PIPE 6 to 10 FEET HIGH.
6. 12" X 12" CONCRETE BASE 8" DEEP MINIMUM.
7. 1" or 1.5" PIPE ELBOW.
8. FINISH GRADE.
9. 6" ROUND VALVE BOX.
10. SKIT ADAPTER PART NO.: 8821-4 USE WITH EACH SENSOR.
11. TO CONTROLLER OR VALVE.
12. (4) DRY SPLICE CONNECTORS.
13. NORMALLY CLOSED WIRE FROM SENSOR.
14. COMMON WIRE FROM SENSOR.
15. 1"or 1.5" NIPPLE.
16. GRAVEL.

3 RAIN SENSOR ASSEMBLY (COLUMN MOUNTED)
N.T.S.



4 REMOTE CONTROL VALVE FOR LEIT CONTROLLER
N.T.S.

811
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FREESE NICHOLS
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Web – www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

IRRIGATION

IRRIGATION SPECIFICATIONS AND DETAILS

NO.	ISSUE	BY	DATE
1	UPDATED IRRIGATION, CONVERT DRIP IRRIGATION TO SPRAY	AWR	7-24-23

F&N JOB NO.	RKW19711
DATE	FEB 2024
DESIGNED	AWR
DRAWN	AWR
REVISED	AWR
CHECKED	AWR
FILE NAME	23119_Irrigation Series–record drawings.dwg

Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.

VERIFY SCALE 0 1

SHEET IRDT-1

SEQ. 106

ACAD Rel: 24.0s (LMS Tech)
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Plot Date: 2/26/2024 10:49 AM Plot By: ### Filename: S:\awr\jobs\2023\23119_Discovery Boulevard Irrigation, Rockwall\AutoCAD\sheets\23119_Irrigation Series–record drawings.dwg

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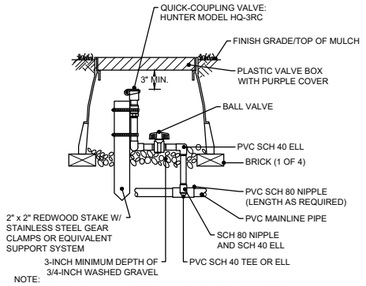
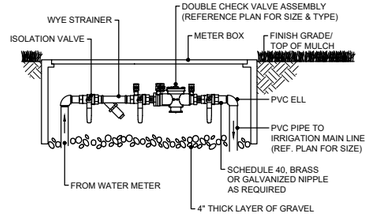
RECORD DRAWINGS PREPARED ON: 8/20/2024



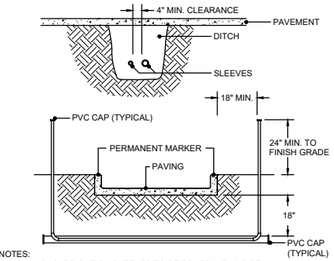
NOTE:
1. FURNISH NOMINALLY SIZED BALL VALVE WITHIN SAME BOX AND PRIOR TO MAINLINE TEE.
2. FURNISH FITTINGS AND PIPING NOMINALLY SIZED IDENTICAL TO NOMINAL QUICK COUPLING VALVE INLET SIZE.

1 QUICK COUPLING VALVE
N.T.S.



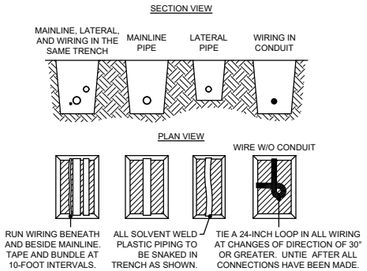
NOTE:
1. INSTALL BACKFLOW PREVENTER AS REQUIRED BY LOCAL CODES AND HEALTH DEPARTMENT. VERIFY LOCAL REQUIREMENTS PRIOR TO INSTALLATION. PRIOR TO BACKFLOW PREVENTER, INSTALL A NOMINALLY SIZED ISOLATION VALVE.

2 DOUBLE CHECK ASSEMBLY
N.T.S.



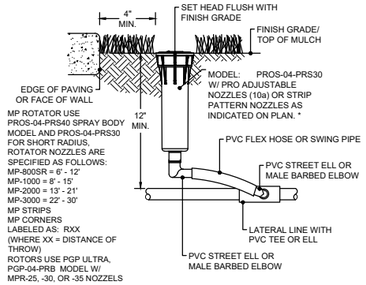
NOTES:
1. ALL PVC IRRIGATION SLEEVES TO BE SCHEDULE 40 PIPE.
2. ALL JOINTS TO BE SOLVENT WELDED AND WATERTIGHT.
3. WHERE THERE IS MORE THAN ONE SLEEVE, EXTEND THE SMALLER SLEEVE TO 24-INCHES MINIMUM ABOVE FINISH GRADE.
4. MECHANICALLY TAMP TO 95% PROCTOR.
5. SLEEVE LOCATIONS SHALL BE MARKED ONTO THE TOP OF CURB WITH A SAWCUT OF TWO PARALLEL LINES THAT ARE 2" LONG AND 1" APART.

3 IRRIGATION PVC SLEEVES
N.T.S.



NOTES:
1. SLEEVE BELOW ALL HARDSCAPE ELEMENTS WITH SCH 40 PVC TWICE THE DIAMETER OF THE PIPE OR WIRE BUNDLE WITHIN.
2. FOR PIPE AND WIRE BURIAL DEPTHS, SEE SPECIFICATIONS. MINIMUM - 12"
3. BACKFILL AND COMPACT TRENCHES TO ORIGINAL GRADE.

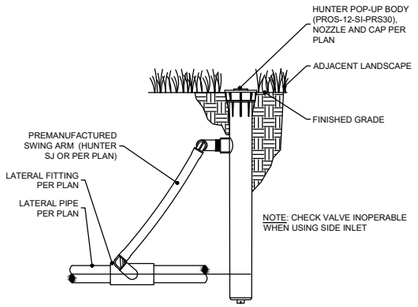
4 PIPE AND WIRING TRENCHING
N.T.S.



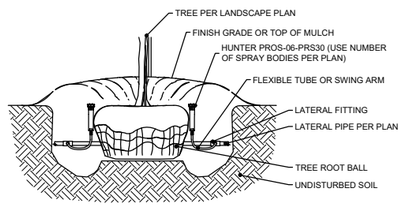
MP ROTATOR USE PROS-04-PRS40 SPRAY BODY MODEL AND PROS-04-PRS30 FOR SHORT RADIUS.
ROTATOR NOZZLES ARE SPECIFIED AS FOLLOWS:
MP-8005R = 6' - 12'
MP-1000 = 8' - 15'
MP-2000 = 13' - 21'
MP-3000 = 22' - 30'
MP STRIPS
MP CORNERS
LABELED AS: RXX
(WHERE XX = DISTANCE OF THROW)
ROTORS USE PGP ULTRA, PGP-04-PRB MODEL W/ MPR-25, -30, OR -35 NOZZELS
LABELED AS: XXR

NOTE:
1. MAY NOT BE USED IN LANDSCAPE AREAS LESS THAN FORTY-EIGHT INCHES (48") IN LENGTH OR WIDTH.

5 POP-UP SPRAY BODY OR POP-UP ROTOR
N.T.S.

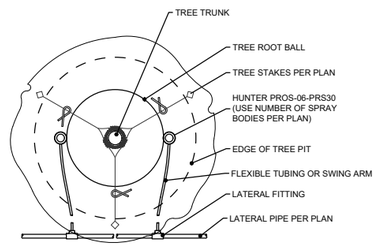


6 POP-UP SPRAY BODY SHRUBS
N.T.S.



NOTE:
1. PLACE POP-UP BUBBLER DIRECTLY AT THE EDGE OF THE ROOT BALL. ENSURE THAT THE STREAM BUBBLERS SPRAYS DIRECTLY ONTO THE ROOT BALL TO WET THOROUGHLY.
2. SPACE REQUIRED NUMBER OF SPRAY BODIES EQUIDISTANT AROUND EDGE OF ROOT BALL.
2. USE NUMBER OF SPRAY BODIES PER PLAN.

7 TREE BUBBLER ASSEMBLY WITH HUNTER PROS-06-PRS30
N.T.S.



NOTE:
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2. SPACE REQUIRED NUMBER OF SPRAY BODIES EQUIDISTANT AROUND EDGE OF ROOT BALL.
2. USE NUMBER OF SPRAY BODIES PER PLAN.

8 TREE BUBBLER ASSEMBLY WITH HUNTER PROS-06-PRS30
N.T.S.

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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

IRRIGATION

IRRIGATION SPECIFICATIONS AND DETAILS

NO.	ISSUE	BY	DATE
1	UPDATED IRRIGATION, CONVERT DRIP IRRIGATION TO SPRAY	AWR	7-24-23

F&N JOB NO. RKW19711

	DATE
DESIGNED	FEB 2024
DRAWN	AWR
REVISED	AWR
CHECKED	AWR

FILE NAME: 23119_Irrigation Series-record drawings.dwg

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SHEET IRDT-2

SEQ. 107

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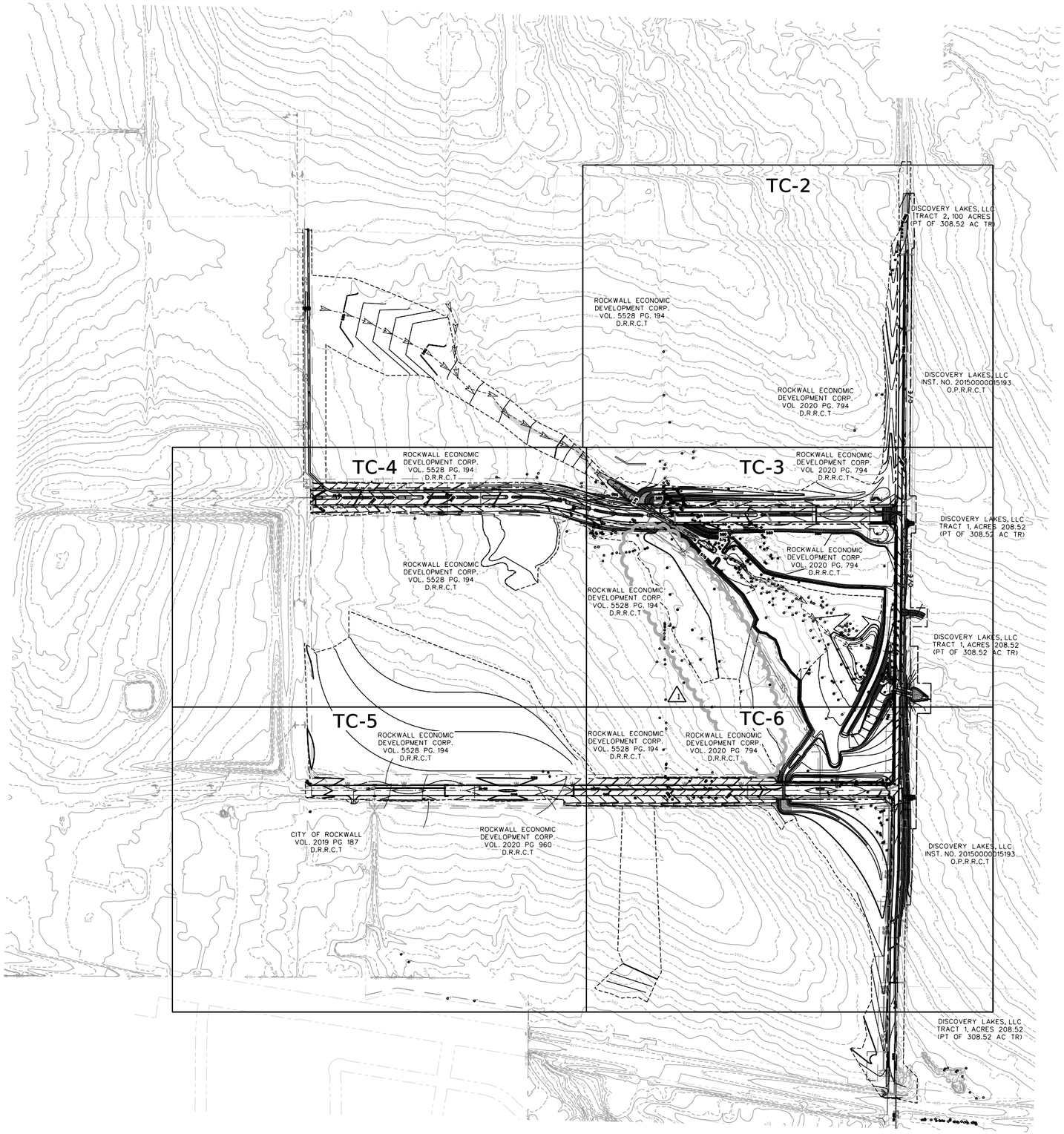

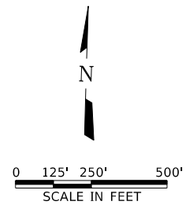

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

THE SEAL THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
IT IS A VIOLATION OF LAW TO ALTER THIS DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE NICHOLS
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Fax: (214) 217-2201
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

OVERALL TREE CONSERVATION MAP

NO.	ISSUES	BY	DATE
1	ADDENDUM # 3	SEC	11/30/2023

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1"

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MW
DRAWN MW
REVISED
CHECKED
FILE NAME cv-trt-pl-tcmap01.sht

SHEET TC-1
SEQ. 108

MicroStation V8 User: 90262 Office: On Site
Plotter: J:\Work Order Folder\Environmental\cv-trt-pl-tcmap01.sht
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Date: Feb. 21, 2024 - 09:40:41 AM Project: Freese and Nichols, Inc. - True Type Fonts

Office: On Site Date: Feb. 21, 2024 - 09:40:41 AM User: 90262 File: N:\|F\Drawings\Environmental\cv-trt-pl-tcmap01.sht

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RECORD DRAWINGS PREPARED ON:
8/20/2024

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TEXAS REGISTERED ENGINEERING FIRM F-2144

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2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2299
Web - www.freese.com

DISCOVERY LAKES, LLC
TRACT 2, 100 ACRES
(PT OF 308.52 AC TR)

ROCKWALL ECONOMIC
DEVELOPMENT CORP.
VOL. 5528 PG. 194
D.R.R.C.T

ROCKWALL ECONOMIC
DEVELOPMENT CORP.
VOL 2020 PG. 794
D.R.R.C.T

DISCOVERY LAKES, LLC
INST. NO. 20150000015193
O.P.R.R.C.T

SD LINE C2

ROCHELL RD

MATCHLINE A-A

N

0 20' 40' 60' 120'
SCALE IN FEET

LEGEND:

- CONSTRUCTION LIMITS
- TREE
- TREE REMOVAL

NOTES:
1. ALL TREES THAT FALL WITHIN THE CONSTRUCTION LIMITS ARE CONSIDERED TO BE REMOVED AND MITIGATED FOR.
2. ALL TREES OUTSIDE THE CONSTRUCTION LIMITS SHALL BE PROTECTED PER DETAIL ON TC-9.

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

TREE CONSERVATION PLAN

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MW
DRAWN MW
REVISED
CHECKED ADH
FILE NAME cv-trt-pl-treecon01.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale!
0 1

SHEET
TC-2
SEQ.
109

MicroStation V8 User: 90262 Office: On Site
N:\IF\Drawings\Environmental\cv-trt-pl-treecon01.sht
Plotter: pltPlotDrv.rsc Model: Default
Plot Scale: 120.000 '/ in. Plotter: Adobe PDF Printer Plotted: Freese and Nichols, Inc. - True Type Fonts
Date: Feb. 21, 2024 - 09:40:59 AM

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

MATCHLINE A-A

MATCHLINE B-B

MATCHLINE C-C

ROCKWALL ECONOMIC DEVELOPMENT CORP. VOL 2020 PG. 794 D.R.R.C.T

ROCKWALL ECONOMIC DEVELOPMENT CORP. VOL. 5528 PG. 194 D.R.R.C.T

DISCOVERY LAKES, LLC TRACT 1, ACRES 208.52 (PT OF 308.52 AC TR)

DISCOVERY BLVD

ROCHELL RD

CULVERT 1

CULVERT 3

SD LINE A1

SD LINE A2

SD LINE A3

SD LINE A4

SD LINE C1

SD LINE C2

SS LINE A

SS LINE B

WL LINE B

LEGEND:

- CONSTRUCTION LIMITS
- TREE
- TREE REMOVAL

NOTES:
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N

0 20' 40' 60' 120'
SCALE IN FEET

1

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2250
Web - www.freese.com

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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

TREE CONSERVATION PLAN

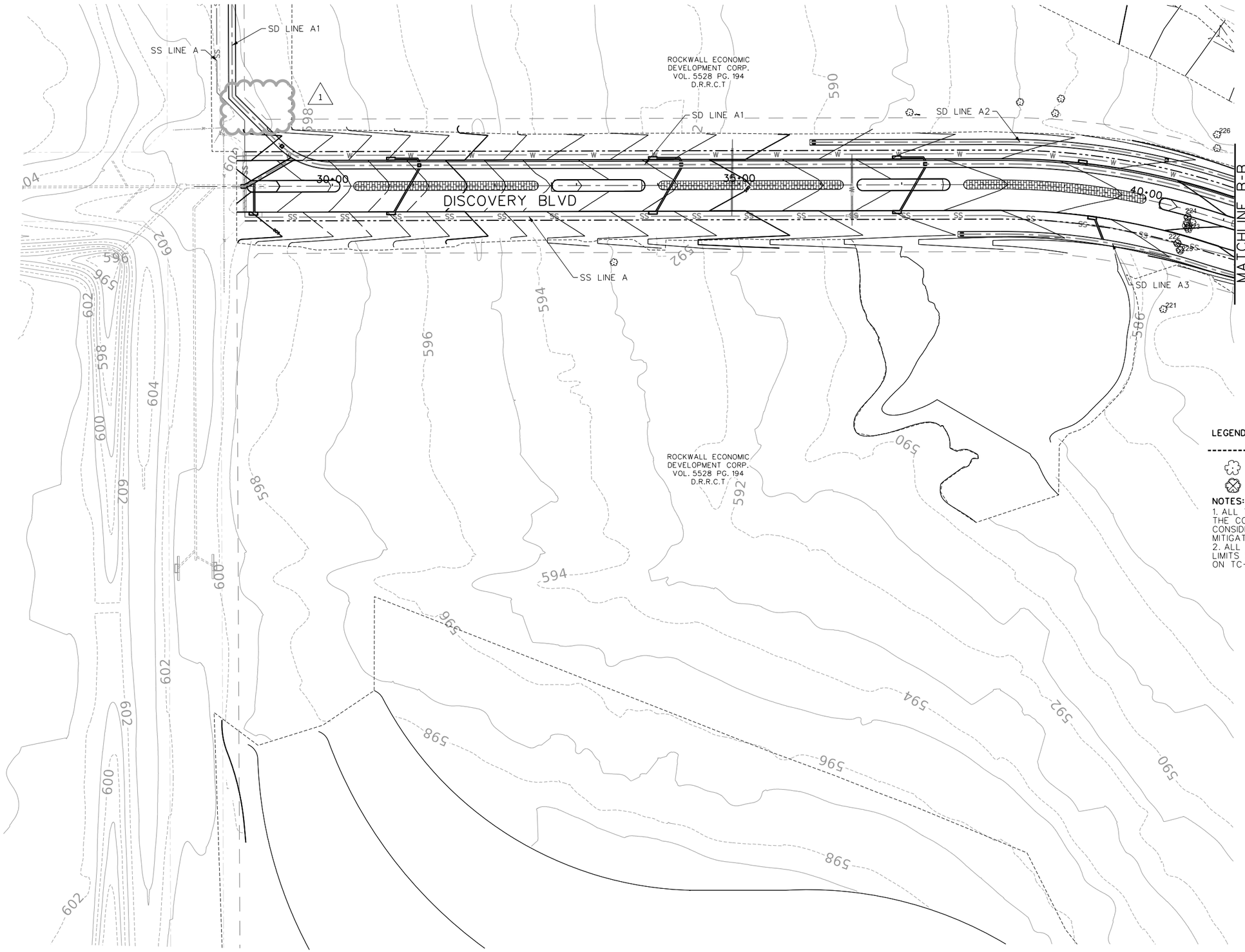
NO.	ISSUES	BY	DATE
1	ADDENDUM #3	SEC	11/30/2021

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

FAN JOB NO.	RKW19711
DATE	APRIL 2022
DESIGNED	MW
DRAWN	MW
CHECKED	ADH
REVISED	
FILE NAME	cv-trt-pl-treecon02.sht

SHEET
TC-3
SEQ.
110

MicroStation V8 User: 90262 Office: On Site
Platter: N:\IF\Drawings\Environmental\cv-trt-pl-treecon02.sht
Plot Style: Freese Nichols.stb Plotter: HP DesignJet T1700dr PostScript
Plot Scale: 120.000 ' / In. Model: Default
Date: Feb. 21, 2024 - 09:41:14 AM Project: Freese and Nichols Inc. - True Type Fonts



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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

N

0 20' 40' 60' 120'
SCALE IN FEET

LEGEND:

CONSTRUCTION LIMITS
TREE
TREE REMOVAL

NOTES:
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FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

FREESE AND NICHOLS
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Dallas, Texas 75204
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RTP PHASE V INFRASTRUCTURE

CIVIL

TREE CONSERVATION PLAN

NO.	ISSUES	BY	DATE
1	ADDENDUM 1	SEC	10/29/21

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

F&N JOB NO. RKV19711
DATE APRIL 2022
DESIGNED MW
DRAWN MW
CHECKED ADH
FILE NAME cv-trt-pl-treecon03.sht

SHEET TC-4
SEQ. 111

MicroStation V8 User: 90262 Office: On Site
Plotter: J:\Plotter\HP Designjet T1700 Monochrome.PC3 Model: Default
Plot Scale: 120.000 ' / in. Project: Freese and Nichols, Inc.--True Type Fonts
Date: Feb. 21, 2024 - 09:41:32 AM
N:\IF\Drawings\Environmental\cv-trt-pl-treecon03.sht

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RECORD DRAWINGS PREPARED ON:
8/20/2024

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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
CIVIL
TREE CONSERVATION PLAN

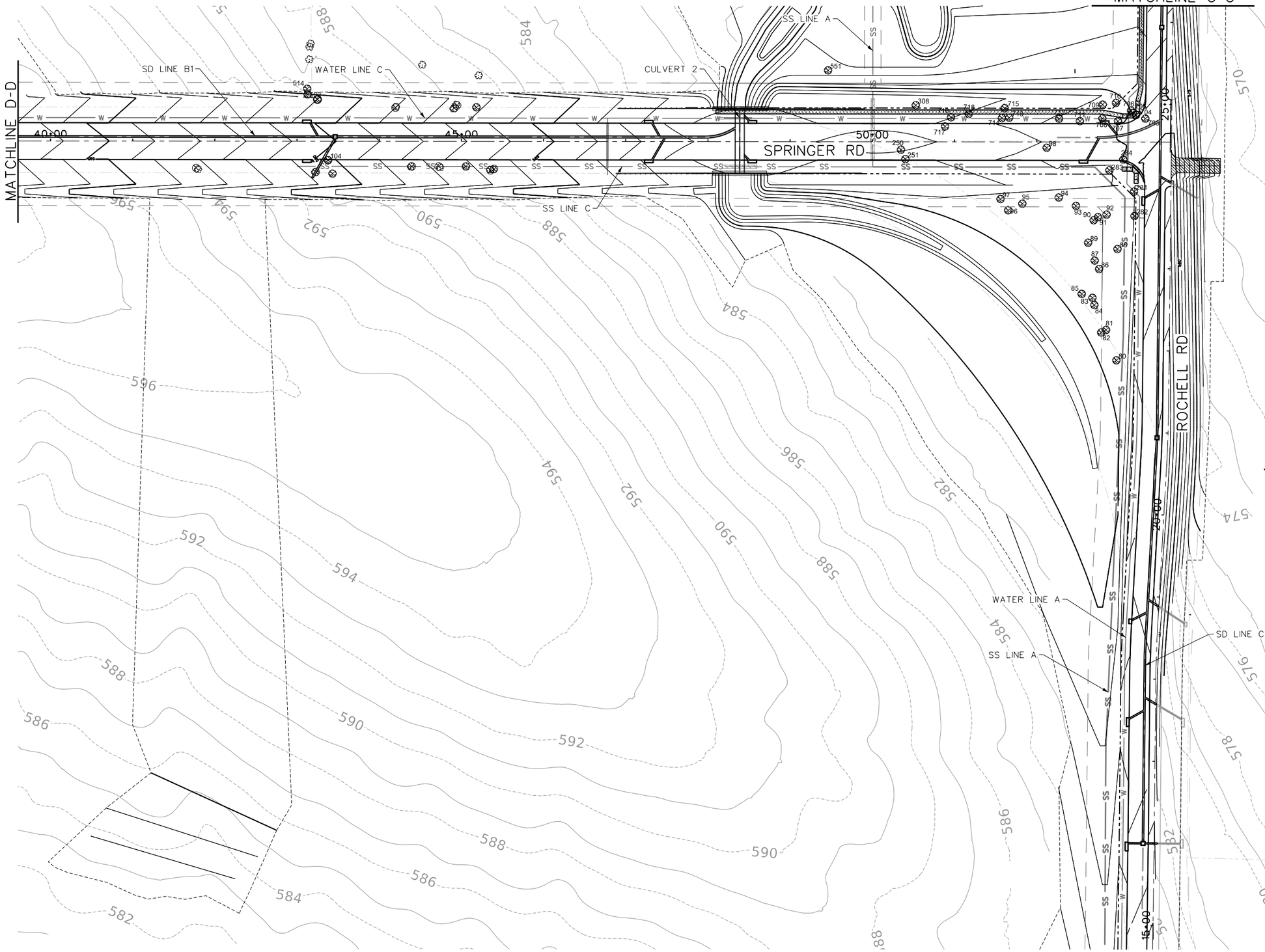
NO.	ISSUES	BY	DATE

FNI JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MW
DRAWN MW
REVISED
CHECKED ADH
FILE NAME cv-trt-pl-treecon04.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET TC-5
SEQ. 112

MicroStation V8 User: 90262 Office: On Site
Plotter: \\JPW01-PL-HP07 HP DesignJet T1700dr PS
Plot Scale: 120.000 '/ IN.
Date: Feb. 21, 2024 - 09:41:46 AM
Model: Default
Project: Freese and Nichols, Inc. - True Type Fonts



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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

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TEXAS REGISTERED ENGINEERING FIRM F-2144

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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

TREE CONSERVATION PLAN

NO.	ISSUES	BY	DATE

F&N JOB NO. RKV19711
DATE APRIL 2022
DESIGNED MW
DRAWN MW
REVISED
CHECKED ADH
FILE NAME cv-trt-pl-treecon05.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET TC-6
SEQ. 113

MicroStation V8 User: 90262 Office: On Site
N:\lf\Drawings\Environmental\cv-trt-pl-treecon05.sht
Plotter: J:\Plotter\Xerox 7970.pltr Model: Default
Plot Scale: 120.000 '/ in. Project: Freese and Nichols, Inc.--True Type Fonts
Date: Feb. 21, 2024 - 09:42:00 AM

Tree Number	Species	Diameter at Breast Height (Inches)	Canopy Cover (Feet)	General Condition	Northing	Easting	Remove Y / N	Healthy Removed (Inches)	Mitigation Required (Inches)
1	Black Willow	14.1	16	Healthy	7021392.84	2612999.18	Y	14.1	0.0
2	Cedar Elm	14.5	18	Healthy	7021392.69	2612983.82	Y	14.5	14.5
3	Hackberry	11.4	12	Healthy	7021383.87	2612976.42	Y	11.4	5.7
4	Hackberry	13.6	16	Healthy	7021438.96	2612947.02	Y	13.6	6.8
5	Hackberry	12.3	14	Healthy	7021455.58	2612954.60	Y	12.3	6.2
6	Hackberry	13.4	17	Healthy	7021490.14	2612974.08	Y	13.4	6.7
7	Cedar Elm	5.9	8	Healthy	7021518.24	2612970.22	Y	5.9	5.9
8	Hackberry	15.3	18	Healthy	7021559.52	2612914.12	Y	15.3	7.7
9	Hackberry	15.9	18	Healthy	7021560.62	2612891.78	Y	15.9	8.0
10	Hackberry	15.5	18	Healthy	7021572.35	2612866.93	Y	15.5	7.8
11	Cedar Elm	4.8	7	Healthy	7021585.37	2612833.55	Y	4.8	4.8
12	Cedar Elm	8.3	12	Healthy	7021614.42	2612833.73	Y	8.3	8.3
13	Cedar Elm	18.2	20	Healthy	7021615.19	2612799.27	Y	18.2	18.2
14	American Elm	23.7	21	Healthy	7021647.97	2612810.95	N	0.0	0.0
15	Cedar Elm	9.9	12	Healthy	7021679.60	2612782.44	N	0.0	0.0
16	Cedar Elm	19.3	24	Healthy	7021667.94	2612768.03	N	0.0	0.0
17	American Elm	6.5	12	Healthy	7021680.00	2612767.70	N	0.0	0.0
18	Cedar Elm	4.3	9	Healthy	7021664.37	2612747.92	N	0.0	0.0
19	Hackberry	11.0	15	Healthy	7021670.25	2612758.88	N	0.0	0.0
20	Cedar Elm	8.9	14	Healthy	7021648.39	2612760.76	N	0.0	0.0
21	Cedar Elm	21.7	24	Healthy	7021639.62	2612746.75	N	0.0	0.0
22	Cedar Elm	12.2	15	Healthy	7021626.11	2612748.75	Y	12.2	12.2
23	Cedar Elm	5.0	9	Healthy	7021654.03	2612778.17	N	0.0	0.0
24	Cedar Elm	6.6	12	Healthy	7021658.19	2612795.61	N	0.0	0.0
25	Cedar Elm	5.8	9	Healthy	7021645.83	2612778.03	N	0.0	0.0
26	Cedar Elm	5.4	9	Healthy	7021630.58	2612774.74	N	0.0	0.0
27	Cedar Elm	4.0	7	Healthy	7021631.17	2612738.86	Y	4.0	4.0
28	Cedar Elm	6.2	11	Healthy	7021628.70	2612737.49	Y	6.2	6.2
29	Hackberry	11.8	17	Healthy	7021639.45	2612741.86	N	0.0	0.0
30	Cedar Elm	4.6	9	Healthy	7021667.78	2612736.16	N	0.0	0.0
31	Hackberry	12.2	16	Healthy	7021724.84	2612696.35	N	0.0	0.0
32	Hackberry	11.4	16	Healthy	7021725.11	2612677.74	N	0.0	0.0
33	Cedar Elm	9.6	15	Healthy	7021749.13	2612657.65	N	0.0	0.0
34	Hackberry	12.8	18	Healthy	7021757.48	2612650.29	N	0.0	0.0
35	Cedar Elm	7.5	14	Healthy	7021759.21	2612675.81	N	0.0	0.0
36	Cedar Elm	6.2	10	Healthy	7021774.62	2612657.47	N	0.0	0.0
37	Cedar Elm	5.1	12	Healthy	7021792.46	2612650.20	N	0.0	0.0
38	Hackberry	23.1	17	Healthy	7021765.96	2612617.43	N	0.0	0.0
39	Hackberry	11.2	14	Healthy	7021770.12	2612606.04	N	0.0	0.0
40	Cedar Elm	4.9	7	Healthy	7021791.46	2612593.88	N	0.0	0.0
41	Cedar Elm	4.2	6	Healthy	7021786.37	2612558.06	N	0.0	0.0
42	Hackberry	12.1	18	Healthy	7021784.77	2612539.75	N	0.0	0.0
43	Cedar Elm	18.1	18	Healthy	7021772.73	2612523.05	N	0.0	0.0
44	Cedar Elm	8.0	13	Healthy	7021781.35	2612483.73	N	0.0	0.0
45	Hackberry	12.5	15	Healthy	7021805.45	2612482.39	N	0.0	0.0
46	Cedar Elm	4.3	8	Healthy	7021827.52	2612459.05	N	0.0	0.0
47	Cedar Elm	5.0	8	Healthy	7021815.89	2612449.65	N	0.0	0.0
48	Hackberry	15.5	17	Healthy	7021811.01	2612418.16	N	0.0	0.0
49	Hackberry	13.4	18	Healthy	7021808.75	2612408.44	N	0.0	0.0
50	Cedar Elm	27.1	25	Healthy	7021827.42	2612387.69	N	0.0	0.0
51	Cedar Elm	6.3	8	Healthy	7021864.15	2612361.19	N	0.0	0.0
52	American Elm	10.3	15	Healthy	7021855.94	2612340.45	N	0.0	0.0
53	Cedar Elm	4.5	8	Damaged	7021855.76	2612337.10	Y	0.0	0.0
54	Cedar Elm	6.6	9	Healthy	7021835.98	2612357.37	N	0.0	0.0
55	Eastern Red Cedar	14.0	12	Healthy	7021830.71	2612337.44	Y	14.0	7.0
56	Cedar Elm	9.2	14	Healthy	7021872.15	2612334.85	N	0.0	0.0
57	Common Persimmon	8.8	11	Healthy	7021882.94	2612292.54	Y	8.8	8.8
58	Eastern Red Cedar	11.0	10	Healthy	7021873.07	2612293.45	Y	11.0	5.5
59	Cedar Elm	6.0	8	Healthy	7021894.96	2612277.90	Y	6.0	6.0
60	Cedar Elm	5.7	8	Healthy	7021908.05	2612283.66	Y	5.7	5.7
61	Hackberry	11.7	17	Healthy	7021916.98	2612281.95	Y	11.7	5.9
62	Cedar Elm	6.8	8	Healthy	7021927.90	2612289.94	Y	6.8	6.8
63	Cedar Elm	4.8	8	Healthy	7021913.18	2612270.42	Y	4.8	4.8
64	Cedar Elm	4.2	7	Healthy	7021916.59	2612264.15	Y	4.2	4.2
65	Cedar Elm	4.2	7	Healthy	7021944.72	2612262.93	Y	4.2	4.2
66	Cedar Elm	5.5	8	Healthy	7021952.01	2612244.04	Y	5.5	5.5
67	Cedar Elm	23.7	18	Healthy	7021954.01	2612220.12	Y	23.7	23.7
68	Cedar Elm	10.0	14	Healthy	7021993.89	2612161.77	Y	10.0	10.0
69	Cedar Elm	8.0	11	Healthy	7021993.93	2612147.12	Y	8.0	8.0
70	Cedar Elm	4.5	7	Healthy	7021990.37	2612151.16	Y	4.5	4.5
71	Cedar Elm	15.5	18	Healthy	7022027.88	2612144.71	Y	15.5	15.5
72	Cedar Elm	10.5	13	Healthy	7022018.08	2612151.61	Y	10.5	10.5
73	Cedar Elm	7.0	10	Healthy	7022006.62	2612164.52	Y	7.0	7.0
74	Cedar Elm	14.5	17	Healthy	7022017.26	2612171.54	Y	14.5	14.5
75	Cedar Elm	7.3	9	Healthy	7022023.23	2612188.68	Y	7.3	7.3
76	Cedar Elm	16.1	18	Healthy	7022006.51	2612191.18	N	0.0	0.0
77	Cedar Elm	9.1	12	Healthy	7022014.28	2612204.59	Y	9.1	9.1
78	Cedar Elm	13.0	18	Healthy	7021999.00	2612195.15	Y	13.0	13.0
79	Bois d'Arc	13.9	10	Healthy	7021804.06	2612382.72	N	0.0	0.0
80	Hackberry	24.3	18	Healthy	7020676.07	2612969.78	Y	24.3	12.2
81	Cedar Elm	6.0	9	Damaged	7020712.75	2612956.25	Y	0.0	0.0
82	Hackberry	26.9	16	Healthy	7020709.47	2612950.39	Y	26.9	53.8
83	Cedar Elm	6.8	9	Healthy	7020751.40	2612938.72	Y	6.8	6.8
84	Cedar Elm	4.8	8	Healthy	7020742.75	2612941.23	Y	4.8	4.8
85	Hackberry	16.0	18	Healthy	7020755.86	2612925.40	Y	16.0	8.0
86	Hackberry	21.4	25	Healthy	7020786.62	2612945.92	Y	21.4	10.7
87	Hackberry	12.2	16	Healthy	7020796.79	2612940.32	Y	12.2	6.1
88	Hackberry	26.0	28	Healthy	7020811.55	2612967.64	Y	26.0	52.0
89	Hackberry	14.0	11	Healthy	7020818.35	2612931.72	Y	14.0	7.0
90	Hackberry	16.2	18	Healthy	7020845.84	2612937.80	Y	16.2	8.1
91	Hackberry	12.1	14	Healthy	7020849.83	2612942.89	Y	12.1	6.1
92	Hackberry	24.5	25	Healthy	7020853.05	2612953.31	Y	24.5	12.3
93	Hackberry	16.3	19	Healthy	7020862.79	2612915.82	Y	16.3	8.2
94	Cedar Elm	7.6	108	Healthy	7020872.46	2612894.62	Y	7.6	7.6
95	Cedar Elm	13.2	15	Healthy	7020863.74	2612850.49	Y	13.2	13.2
96	Eastern Red Cedar	11.6	12	Healthy	7020855.30	2612833.54	Y	11.6	5.8
97	Hackberry	11.6	14	Healthy	7020868.81	2612823.79	Y	11.6	5.8
98	Hackberry	33.2	19	Healthy	7020932.65	2612878.42	Y	33.2	66.4
99	Hackberry	13.0	17	Healthy	7020853.44	2610904.47	Y	13.0	6.5
100	Cottonwood	11.1	14	Healthy	7020160.31	2610820.75	N	0.0	0.0
101	Green Ash	5.0	7	Healthy	7020127.07	2610855.31	N	0.0	0.0
102	Black Willow	28.6	15	Healthy	7019969.62	2611032.16	N	0.0	0.0
103	American Elm	10.2	14	Healthy	7019961.69	2611151.66	N	0.0	0.0
104	Eastern Red Cedar	14.3	22	Healthy	7020895.09	2612004.53	Y	14.3	7.2
105	Hackberry	11.0	14	Healthy	7022106.77	2611958.31	Y	11.0	5.5
106	Hackberry	11.2	15	Healthy	7022093.84	2612011.85	Y	11.2	5.6
107	Hackberry	22.0	25	Healthy	7022043.04	2612065.73	Y	22.0	11.0
108	Hackberry	15.4	19	Healthy	7022026.24	2612051.19	Y	15.4	7.7
109	Hercules-club	6.0	8	Healthy	7022034.69	2612082.18	Y	6.0	6.0
110	Hackberry	12.4	15	Healthy	7022043.93	2612143.94	Y	12.4	6.2
111	Cedar Elm	4.1	7	Healthy	7022057.62	2612146.66	Y	4.1	4.1
112	Cedar Elm	6.9	9	Healthy	7022059.61	2612130.06	Y	6.9	6.9
113	Cedar Elm	12.5	15	Healthy	7022062.35	2612117.06	Y	12.5	12.5
114	Hackberry	12.0	15	Healthy	7022074.95	2612185.09	Y	12.0	6.0
115	Cedar Elm	12.3	15	Healthy	7022070.40	2612193.62	Y	12.3	12.3
116	Hackberry	14.8	16	Healthy	7022079.45	2612198.52	Y	14.8	7.4
117	Cedar Elm	4.6	7	Healthy	7022099.07	2612184.53	Y	4.6	4.6
118	Cedar Elm	4.6	8	Healthy	7022107.32	2612206.24	Y	4.6	4.6
119	Hackberry	14.3	19	Healthy	7022107.19	2612216.38	Y	14.3	7.2
120	Cedar Elm	5.4	7	Healthy	7022096.68	2612232.84	Y	5.4	5.4
121	Cedar Elm	12.0	17	Healthy	7022065.01	2612217.35	Y	12.0	12.0
122	Cedar Elm	5.9	9	Healthy	7022064.19	2612212.75	Y	5.9	5.9
123	Cedar Elm	4.6	7	Damaged	7022059.57	2612210.04	Y	0.0	0.0
124	Cedar Elm	12.3	15	Healthy	7022056.64	2612209.82	Y	12.3	12.3
125	Cedar Elm	7.3	10	Healthy	7022049.05	2612204.85	Y	7.3	7.3
126	Cedar Elm	9.9	14	Healthy	7022041.26	2612210.06	Y	9.9	9.9
127	Cedar Elm	4.2	8	Healthy	7022034.96	2612211.75	Y	4.2	4.2
128	Cedar Elm	6.0	11	Healthy	7022038.30	2612231.01	Y	6.0	6.0
129	Cedar Elm	5.6	9	Healthy	7022062.72	2612237.62	Y	5.6	5.6
130	Cedar Elm	6.9	10	Healthy	7022064.16	2612236.81	Y	6.9	6.9
131	Hackberry	13.5	16	Healthy	7022076.23	2612244.42	Y	13.5	6.8
132	Hackberry	11.2	15	Healthy	7022113.69	2612267.42	Y	11.2	5.6
133	Cedar Elm	6.7	9	Healthy	7022109.71	2612289.04	Y	6.7	6.7
134	Cedar Elm	14.1	19	Healthy	7022106.57	2612320.78	Y	14.1	14.1
135	Cedar Elm	4.3	8	Healthy	7022106.27	2612347.89	Y	4.3	4.3
136	Cedar Elm	6.5	9	Healthy	7022102.67	2612353.91	Y	6.5	6.5
137	Cedar Elm	13.6	16	Healthy	7022079.03	2612365.58	Y	13.6	13.6
138	Cedar Elm	6.4	9	Healthy	7022080.95	2612374.11	Y	6.4	6.4
139	Cedar Elm	5.1	9	Healthy	7022080.26	2612377.01	Y	5.1	5.1
140	Cedar Elm	5.0	9	Healthy	7022063.73	2612380.68	Y	5.0	5.0
141	Cedar Elm	5.2	9	Healthy	7022056.05	2612387.87	Y	5.2	5.2
142	Cedar Elm	4.0	7	Healthy	7022054.12	2612391.16	Y	4.0	4.0
143	Cedar Elm	8.6	11	Damaged	7022028.06	2612390.04	Y	0.0	0.0
144	Cedar Elm	8.2	12	Healthy	7022006.17	2612405.16	Y	8.2	8.2
145	Cedar Elm	11.0	17	Healthy	7022001.66	2612391.46	Y	11.0	11.0
146	Cedar Elm	11.1	18	Healthy	7022010.85	2612374.21	Y	11.1	11.1
148	Hackberry	16.5	12	Healthy	7022139.44	2611976.76	Y	16.5	8.3
149	Hackberry	13.7	12	Damaged	7022148.17	2611976.43	Y	0.0	0.0
150	Hackberry	14.4	16	Healthy	7022176.14	2611932.37	Y	14.4	7.2

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASE FOR PERMITTING, BIDDING OR CONSTRUCTION

THIS DOCUMENT WAS ORIGINALLY ISSUED AND SEALED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
IT SHOULD NOT BE USED FOR ANY PURPOSE WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

TREE CONSERVATION PLAN TABLES

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MW
DRAWN MW
REVISED
CHECKED ADH
FILE NAME cv-trt-pl-treecontables.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET TC-7

SEQ. 114

MicroStation V8 User: 90262 Office: On Site
Platters: J:\RKW\Drawings\Environmental\cv-trt-pl-treecontables.sht
Plot Style: Rockwall Water - Freese and Nichols.ctb Model: Default
Plot Scale: 120.000 ' / in. Project: Freese and Nichols, Inc. - True Type Fonts
Date: Feb. 21, 2024 - 09:42:03 AM

Tree Number	Species	Diameter at Breast Height (Inches)	Canopy Cover (Feet)	General Condition	Northing	Easting	Remove Y / N	Healthy Removed (Inches)	Mitigation Required (Inches)
151	Hackberry	13.0	10	Healthy	7022194.75	2611935.78	Y	13.0	6.5
152	Hackberry	11.5	15	Healthy	7022196.74	2611940.84	Y	11.5	5.8
153	Hackberry	18.0	15	Healthy	7022159.68	2611980.46	Y	18.0	9.0
154	Hackberry	11.5	8	Damaged	7022221.65	2611952.82	Y	0.0	0.0
155	Hackberry	18.0	16	Healthy	7022227.03	2611968.03	Y	18.0	9.0
156	Hackberry	12.5	14	Damaged	7022234.19	2611951.98	Y	0.0	0.0
157	Hackberry	19.0	16	Healthy	7022241.70	2611933.95	Y	19.0	9.5
158	Hackberry	14.5	15	Healthy	7022293.43	2611950.01	N	0.0	0.0
159	Eastern Red Cedar	11.5	18	Healthy	7022306.25	2611941.45	N	0.0	0.0
160	Eastern Red Cedar	12.0	18	Healthy	7022260.12	2612005.28	Y	12.0	6.0
161	Hercules-club	6.3	7	Healthy	7022232.80	2612013.75	Y	6.3	6.3
162	Hercules-club	6.8	10	Healthy	7022232.68	2612021.08	Y	6.8	6.8
163	Hercules-club	5.5	8	Healthy	7022200.77	2612025.22	Y	5.5	5.5
164	American Elm	12.2	20	Healthy	7022193.54	2612026.61	Y	12.2	12.2
165	American Elm	14.4	20	Healthy	7022176.48	2612012.15	Y	14.4	14.4
166	American Elm	15.0	25	Healthy	7022169.28	2612016.59	Y	15.0	15.0
167	Eastern Red Cedar	11.0	18	Healthy	7022153.27	2612066.63	Y	11.0	5.5
168	Eastern Red Cedar	12.8	18	Healthy	7022180.81	2612060.22	Y	12.8	6.4
169	American Elm	12.5	15	Healthy	7022124.05	2612069.12	Y	12.5	12.5
170	Eastern Red Cedar	13.2	20	Healthy	7022119.80	2612080.50	Y	13.2	6.6
171	American Elm	5.5	9	Healthy	7022117.34	2612103.02	Y	5.5	5.5
172	Bois d'Arc	12.1	20	Healthy	7022102.70	2612096.85	Y	12.1	0.0
173	American Elm	7.0	12	Healthy	7022103.01	2612120.85	Y	7.0	7.0
174	American Elm	6.4	9	Healthy	7022109.04	2612137.61	Y	6.4	6.4
175	American Elm	5.0	8	Healthy	7022108.14	2612143.36	Y	5.0	5.0
176	American Elm	4.1	7	Healthy	7022102.01	2612158.84	Y	4.1	4.1
177	American Elm	4.6	6	Healthy	7022116.00	2612157.42	Y	4.6	4.6
178	Cedar Elm	5.2	8	Healthy	7022068.27	2612216.70	Y	5.2	5.2
179	Cedar Elm	9.5	16	Healthy	7021967.72	2612323.84	Y	9.5	9.5
180	Hackberry	11.8	18	Healthy	7021933.89	2612330.32	Y	11.8	5.9
181	American Elm	4.1	6	Healthy	7021943.50	2612321.45	Y	4.1	4.1
182	American Elm	4.3	7	Healthy	7021954.01	2612326.43	Y	4.3	4.3
183	American Elm	7.5	10	Healthy	7021952.93	2612320.16	Y	7.5	7.5
184	American Elm	4.4	6	Healthy	7021946.50	2612313.76	Y	4.4	4.4
185	American Elm	4.8	8	Healthy	7021971.83	2612319.00	Y	4.8	4.8
186	American Elm	6.8	12	Healthy	7021980.61	2612301.43	Y	6.8	6.8
187	American Elm	9.5	10	Healthy	7021993.23	2612295.75	Y	9.5	9.5
188	Hackberry	13.0	16	Damaged	7022013.10	2612287.53	Y	0.0	0.0
189	American Elm	10.7	16	Healthy	7022045.13	2612283.43	Y	10.7	10.7
190	Hackberry	11.0	10	Damaged	7022019.50	2612281.14	Y	0.0	0.0
191	American Elm	5.7	8	Healthy	7022012.12	2612258.25	Y	5.7	5.7
192	American Elm	6.5	8	Healthy	7021997.92	2612255.32	Y	6.5	6.5
193	American Elm	7.0	10	Healthy	7022007.66	2612249.00	Y	7.0	7.0
194	American Elm	6.7	10	Healthy	7022008.02	2612248.33	Y	6.7	6.7
195	Cedar Elm	5.1	5	Healthy	7022002.87	2612238.70	Y	5.1	5.1
196	Cedar Elm	8.5	10	Healthy	7021999.46	2612227.36	Y	8.5	8.5
197	Hackberry	11.5	14	Healthy	7022050.73	2612253.30	Y	11.5	5.8
198	Cottonwood	21.4	16	Healthy	7021869.88	2612342.35	N	0.0	0.0
199	Hackberry	14.4	9	Damaged	7021887.31	2612380.83	N	0.0	0.0
200	Cedar Elm	12.2	16	Healthy	7021900.07	2612408.68	Y	12.2	12.2
201	American Elm	15.3	24	Healthy	7021938.60	2612402.14	Y	15.3	15.3
202	Cedar Elm	7.0	9	Healthy	7021943.51	2612394.64	Y	7.0	7.0
203	American Elm	4.8	7	Healthy	7021960.59	2612427.77	Y	4.8	4.8
204	Cedar Elm	6.3	10	Healthy	7021970.56	2612419.69	Y	6.3	6.3
205	Cedar Elm	5.2	9	Healthy	7021974.10	2612422.12	Y	5.2	5.2
206	Eastern Red Cedar	12.8	16	Healthy	7021962.54	2612453.10	Y	12.8	6.4
207	Green Ash	5.4	10	Healthy	7021867.38	2612414.54	N	0.0	0.0
208	Eastern Red Cedar	15.8	18	Healthy	7021873.33	2612433.56	Y	15.8	7.9
209	Cedar Elm	13.5	20	Healthy	7021848.84	2612429.84	N	0.0	0.0
210	Cedar Elm	5.2	7	Healthy	7021847.54	2612439.76	N	0.0	0.0
211	Cedar Elm	4.3	6	Healthy	7021842.81	2612457.22	N	0.0	0.0
212	American Elm	15.3	10	Healthy	7021835.19	2612478.45	N	0.0	0.0
213	Eastern Red Cedar	11.3	15	Healthy	7021858.88	2612549.18	Y	11.3	5.7
214	Hackberry	11.5	16	Healthy	7021721.40	2612540.97	N	0.0	0.0
215	Hackberry	13.0	20	Healthy	7021765.59	2612420.15	N	0.0	0.0
216	Eastern Red Cedar	11.0	16	Healthy	7021819.13	2612173.92	Y	11.0	5.5
217	Hackberry	11.0	16	Healthy	7022093.47	2611949.11	Y	11.0	5.5
218	Hackberry	16.0	16	Healthy	7022114.79	2611948.38	Y	16.0	8.0
219	Bois d'Arc	14.5	22	Healthy	7022135.39	2611922.11	Y	14.5	0.0
220	Hackberry	14.0	18	Healthy	7022063.99	2611626.71	Y	14.0	7.0
221	Honey-locust	11.1	14	Healthy	7022058.93	2611511.27	N	0.0	0.0
222	Hackberry	21.5	18	Damaged	7022140.51	2611526.54	Y	0.0	0.0
223	Hackberry	29.5	30	Damaged	7022166.26	2611537.71	Y	0.0	0.0
224	Hackberry	27.2	30	Damaged	7022172.85	2611538.41	Y	0.0	0.0
225	Hackberry	24.1	20	Healthy	7022132.68	2611529.74	Y	24.1	12.1

Tree Number	Species	Diameter at Breast Height (Inches)	Canopy Cover (Feet)	General Condition	Northing	Easting	Remove Y / N	Healthy Removed (Inches)	Mitigation Required (Inches)
226	Hackberry	22.9	18	Damaged	7022275.28	2611571.80	N	0.0	0.0
227	Black Willow	24.6	18	Healthy	7022274.74	2611663.53	Y	24.6	0.0
228	Hackberry	23.8	18	Healthy	7022055.38	2611618.22	Y	23.8	11.9
229	Hackberry	18.0	25	Healthy	7022040.77	2611630.17	Y	18.0	9.0
230	Hackberry	11.3	14	Healthy	7022051.37	2611644.97	Y	11.3	5.7
231	Bois d'Arc	46.7	30	Healthy	7022088.24	2611659.82	Y	46.7	0.0
232	Hackberry	17.2	20	Healthy	7022056.52	2611660.65	Y	17.2	8.6
233	Hackberry	20.3	22	Healthy	7022059.01	2611668.07	Y	20.3	10.1
234	Black Willow	22.2	18	Healthy	7022086.83	2611705.19	Y	22.2	0.0
235	Bois d'Arc	13.3	14	Healthy	7022068.38	2611718.30	Y	13.3	0.0
236	Hackberry	20.3	18	Healthy	7022066.38	2611717.14	Y	20.3	10.2
237	Hercules-club	5.2	9	Healthy	7022075.60	2611751.18	Y	5.2	5.2
238	Hackberry	15.9	20	Healthy	7022236.78	2611917.92	Y	15.9	8.0
239	Eastern Red Cedar	11.5	15	Healthy	7022348.52	2611936.77	N	0.0	0.0
240	Eastern Red Cedar	11.9	18	Healthy	7022366.17	2611941.50	N	0.0	0.0
241	Eastern Red Cedar	11.2	16	Healthy	7022418.41	2612015.45	N	0.0	0.0
242	Eastern Red Cedar	11.4	12	Healthy	7022426.69	2612065.73	N	0.0	0.0
243	Eastern Red Cedar	11.1	15	Healthy	7022398.83	2612065.55	N	0.0	0.0
244	Eastern Red Cedar	11.7	16	Healthy	7022098.10	2612375.85	Y	11.7	5.9
245	Hercules-club	4.8	9	Healthy	7021740.99	2612706.10	N	0.0	0.0
246	Hackberry	12.8	10	Damaged	7021720.38	2612760.31	N	0.0	0.0
247	Hackberry	11.8	12	Damaged	7021492.34	2612835.75	Y	0.0	0.0
248	Hackberry	15.1	16	Healthy	7021496.79	2612865.46	Y	15.1	7.6
249	Cedar Elm	19.3	22	Healthy	7021450.87	2612910.42	Y	19.3	19.3
250	American Elm	12.5	10	Healthy	7020925.69	2612701.19	Y	12.5	12.5
251	American Elm	4.4	9	Healthy	7020914.40	2612706.82	Y	4.4	4.4
252	Eastern Red Cedar	11.1	12	Healthy	7021559.14	2612967.00	Y	11.1	5.6
253	Eastern Red Cedar	12.4	15	Healthy	7021614.01	2612982.33	Y	12.4	6.2
254	American Elm	4.4	8	Healthy	7021632.18	2612995.01	Y	4.4	4.4
255	American Elm	5.5	9	Healthy	7021666.50	2612993.92	Y	5.5	5.5
256	Gum Bumelia	5.0	8	Healthy	7021666.74	2612993.71	Y	5.0	5.0
257	Eastern Red Cedar	11.8	13	Healthy	7021680.60	2612972.84	Y	11.8	5.9
258	Eastern Red Cedar	11.5	12	Healthy	7021696.54	2612985.27	Y	11.5	5.8
259	Gum Bumelia	4.9	5	Damaged	7021695.30	2612998.52	Y	0.0	0.0
260	Eastern Red Cedar	11.2	12	Healthy	7021745.96	2612966.39	Y	11.2	5.6
261	Eastern Red Cedar	13.9	18	Healthy	7021769.54	2612970.15	Y	13.9	7.0
262	Eastern Red Cedar	11.4	15	Healthy	7021763.31	2612979.19	Y	11.4	5.7
263	Eastern Red Cedar	11.2	18	Healthy	7021812.51	2612983.92	Y	11.2	5.6
264	Eastern Red Cedar	11.4	14	Healthy	7021847.04	2612831.33	Y	11.4	5.7
265	Eastern Red Cedar	12.2	16	Healthy	7022049.98	2612896.74	Y	12.2	6.1
266	Eastern Red Cedar	11.1	10	Healthy	7022082.16	2612892.38	Y	11.1	5.6
267	Hercules-club	6.2	10	Healthy	7022701.85	2612899.18	Y	6.2	6.2
268	Hercules-club	4.1	9	Healthy	7022698.82	2612873.07	N	0.0	0.0
269	Bois d'Arc	12.9	16	Healthy	7023347.22	2612964.60	Y	12.9	0.0
270	Hackberry	12.5	14	Healthy	7023338.58	2612948.72	Y	12.5	6.3
271	Hackberry	11.4	12	Healthy	7023301.96	2612942.63	Y	11.4	5.7
272	American Elm	5.9	6	Healthy	7023256.60	2612932.62	Y	5.9	5.9
273	Cedar Elm	4.7	8	Healthy	7023236.24	2612924.17	Y	4.7	4.7
274	Eastern Red Cedar	16.1	18	Healthy	7022868.71	2611922.43	N	0.0	0.0
275	Eastern Red Cedar	12.6	18	Healthy	7022674.33	2611928.29	N	0.0	0.0
276	Eastern Red Cedar	11.0	10	Healthy	7022265.96	2612226.57	Y	11.0	5.5
277	Eastern Red Cedar	12.3	18	Healthy	7022196.44	2612703.51	Y	12.3	6.2
278	Eastern Red Cedar	14.3	16	Healthy	7022192.29	2612773.61	Y	14.3	7.2
279	Cottonwood	12.2	10	Damaged	7021903.22	2613005.18	Y	0.0	0.0
280	Gum Bumelia	4.7	7	Healthy	7023373.32	2610327.28	Y	4.7	4.7
281	American Elm	6.0	7	Healthy	7020881.96	2612985.99	Y	6.0	6.0
282	American Elm	11.3	12	Healthy	7020852.27	2612987.30	Y	11.3	11.3
283	Hercules-club	9.4	10	Damaged	7020907.21	2612955.47	Y	0.0	0.0
284	Hercules-club	16.3	14	Healthy	7020920.66	2612971.95	Y	16.3	16.3
285	Hackberry	14.3	8	Damaged	7021281.83	2612987.05	Y	0.0	0.0
286	Hackberry	11.1	10	Healthy	7021276.50	2612962.99	Y	11.1	5.6
287	Hercules-club	6.3	8	Healthy	7021270.64	2612960.46	Y	6.3	6.3
288	Hackberry	15.0	12	Healthy	7021262.12	2612957.15	Y	15.0	7.5
289	Eastern Red Cedar	12.1	15	Healthy	7021252.26	2612982.96	Y	12.1	6.1
290	Hercules-club	6.3	10	Healthy	7021287.48	2612931.09	Y	6.3	6.3
291	American Elm	5.0	8	Healthy	7021258.13	2612931.29	Y	5.0	5.0
292	American Elm	6.8	9	Healthy	7021260.95	2612911.61	Y	6.8	6.8
293	Eastern Red Cedar	13.2	18	Healthy	7021270.76	2612874.35	Y	13.2	6.6
294	Eastern Red Cedar	11.5	13	Healthy	7021301.62	2612846.57	Y	11.5	5.8
295	Eastern Red Cedar	11.2	15	Healthy	7021295.46	2612811.76	Y	11.2	5.6
296	Eastern Red Cedar	11.7	16	Healthy	7021339.76	2612737.54	Y	11.7	5.9
297	Eastern Red Cedar	11.1	14	Healthy	7021366.64	2612716.96	Y	11.1	5.6
298	Eastern Red Cedar	11.6	18	Healthy	7021420.52	2612748.03	Y	11.6	5.8
299	Eastern Red Cedar	11.2	15	Healthy	7021416.54	2612714.72	Y	11.2	5.6
300	Eastern Red Cedar	11.2	20	Healthy	7021436.67	2612663.36	Y	11.2	5.6

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

THE SEAL THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
ALTERATIONS TO SEALED DOCUMENTS MADE WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

TREE CONSERVATION PLAN TABLES

F&N JOB NO.	RKW19711
DATE	APRIL 2022
DESIGNED	MW
DRAWN	MW
CHECKED	ADH

NO.	ISSUES	BY	DATE
	REVISED		

FILE NAME: cv-trt-pl-treecontables02.sht

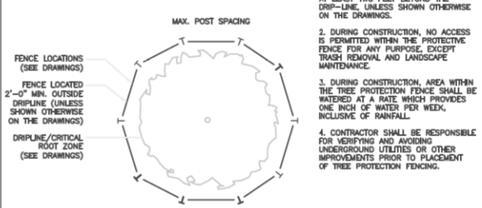
VERIFY SCALE
Bar is one inch on original drawing.
If not one inch on this sheet, adjust scale
0 1"

SHEET
TC-8

SEQ.
115

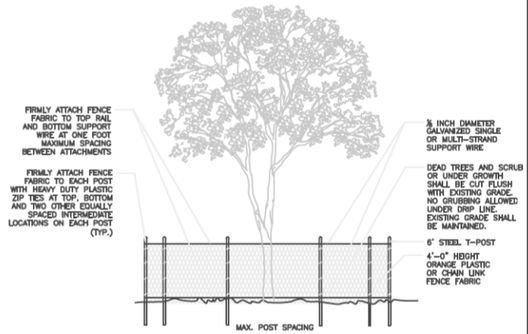
MicroStation V8 User: 90262 Office: On Site
Plotter: J:\P\0090\Misc\Plotter Profiles\Plotter Profile.pltcfg Model: Default
Plot Scale: 120.000 '/ In. Project: Freese and Nichols, Inc. - Trees Type Fonts
Date: Feb. 21, 2024 - 09:42:07 AM

Tree Number	Species	Diameter at Breast Height (Inches)	Canopy Cover (Feet)	General Condition	Northing	Easting	Remove Y / N	Healthy Removed (Inches)	Mitigation Required (Inches)
301	American Elm	4.3	6	Healthy	7021599.21	2612645.97	N	0.0	0.0
302	Hackberry	17.1	18	Healthy	7021683.99	2612669.07	N	0.0	0.0
303	Eastern Red Cedar	11.3	12	Healthy	7022139.64	2612273.06	Y	11.3	5.7
304	Hackberry	11.0	12	Healthy	7022022.98	2612176.19	Y	11.0	5.5
305	Eastern Red Cedar	11.3	14	Healthy	7021900.23	2612204.47	Y	11.3	5.7
306	Eastern Red Cedar	11.0	16	Healthy	7021596.86	2612124.07	Y	11.0	11.0
307	Eastern Red Cedar	11.0	16	Healthy	7021504.04	2612119.78	Y	11.0	11.0
308	American Elm	7.3	10	Healthy	7020980.30	2612717.78	Y	7.3	7.3
500	Eastern Red Cedar	12.3	16	Healthy	7021177.74	2611963.16	N	0.0	0.0
501	Eastern Red Cedar	13.3	15	Healthy	7021098.88	2611965.26	N	0.0	0.0
502	Eastern Red Cedar	13.9	16	Healthy	7020974.53	2611977.75	Y	13.9	7.0
503	Eastern Red Cedar	11.1	12	Healthy	7021399.10	2612048.43	N	0.0	0.0
504	Eastern Red Cedar	12.6	18	Healthy	7021483.37	2612073.84	N	0.0	0.0
505	Eastern Red Cedar	11.3	21	Healthy	7021497.36	2612037.20	N	0.0	0.0
506	Cedar Elm	5.1	6	Healthy	7021535.78	2611995.03	N	0.0	0.0
507	Eastern Red Cedar	11.0	16	Healthy	7021643.09	2611996.10	Y	11.0	11.0
508	Gum Bumelia	4.7	4	Healthy	7021650.26	2611978.51	N	0.0	0.0
509	Eastern Red Cedar	11.8	18	Healthy	7021789.56	2611977.44	Y	11.8	11.8
510	Eastern Red Cedar	11.3	18	Healthy	7021907.94	2611961.68	Y	11.3	11.3
511	Cedar Elm	4.3	6	Healthy	7022035.25	2611979.51	Y	4.3	4.3
512	Eastern Red Cedar	13.3	16	Healthy	7021497.64	2612204.28	Y	13.3	13.3
513	Eastern Red Cedar	11.2	12	Healthy	7021463.89	2612195.40	Y	11.2	11.2
514	Hercules-club	4.2	9	Healthy	7020981.38	2611976.89	N	0.0	0.0
515	Eastern Red Cedar	11.2	17	Healthy	7021293.68	2612176.11	N	0.0	0.0
516	Eastern Red Cedar	12.9	15	Healthy	7021366.10	2612303.43	N	0.0	0.0
517	Cedar Elm	7.3	8	Healthy	7021398.99	2612431.49	Y	7.3	7.3
518	Cedar Elm	4.0	6	Healthy	7021697.15	2612406.96	N	0.0	0.0
519	Hackberry	14.3	10	Healthy	7021754.03	2612436.12	N	0.0	0.0
520	Hackberry	19.9	16	Healthy	7021782.36	2612435.46	N	0.0	0.0
521	Hackberry	12.7	12	Healthy	7021744.58	2612508.51	N	0.0	0.0
522	American Elm	10.1	15	Healthy	7021746.05	2612511.71	N	0.0	0.0
523	Hackberry	15.3	14	Healthy	7021720.69	2612486.06	N	0.0	0.0
524	American Elm	10.8	13	Healthy	7021712.15	2612524.92	N	0.0	0.0
525	Hackberry	27.9	18	Healthy	7021711.78	2612576.13	N	0.0	0.0
526	Hackberry	11.8	14	Healthy	7021687.39	2612572.54	N	0.0	0.0
527	American Elm	8.4	15	Healthy	7021687.04	2612617.40	N	0.0	0.0
528	Hackberry	11.0	12	Healthy	7021698.36	2612648.51	N	0.0	0.0
529	Hackberry	16.0	16	Healthy	7021644.96	2612606.85	N	0.0	0.0
530	Cedar Elm	4.9	7	Healthy	7021612.93	2612618.30	N	0.0	0.0
531	Hackberry	11.3	12	Healthy	7021563.58	2612675.12	N	0.0	0.0
532	Hackberry	25.6	22	Healthy	7021584.99	2612686.66	Y	25.6	51.2
533	Hackberry	26.4	19	Healthy	7021563.02	2612728.13	Y	26.4	52.8
534	Hercules-club	5.3	7	Healthy	7021497.28	2612746.63	Y	5.3	5.3
535	Eastern Red Cedar	12.4	16	Healthy	7021482.69	2612775.80	Y	12.4	6.2
536	American Elm	5.6	9	Healthy	7021503.36	2612812.24	Y	5.6	5.6
537	Hackberry	12.4	8	Damaged	7021456.38	2612810.65	Y	0.0	0.0
538	American Elm	5.1	12	Healthy	7021443.07	2612832.17	Y	5.1	5.1
539	Eastern Red Cedar	12.0	18	Healthy	7021434.12	2612802.05	Y	12.0	6.0
540	Cedar Elm	4.5	8	Healthy	7021434.76	2612808.53	Y	4.5	4.5
541	Hercules-club	7.6	12	Healthy	7021415.59	2612839.01	Y	7.6	7.6
542	Hackberry	11.3	15	Healthy	7021377.48	2612870.39	Y	11.3	5.7
543	Hackberry	33.4	20	Healthy	7021408.10	2612937.36	Y	33.4	66.8
544	Hackberry	17.3	18	Healthy	7021378.55	2612942.82	Y	17.3	8.6
545	Cedar Elm	14.1	14	Healthy	7021344.05	2612959.52	Y	14.1	14.1
546	Cedar Elm	4.3	6	Healthy	7021335.60	2612969.95	Y	4.3	4.3
547	Cedar Elm	5.2	8	Healthy	7021322.24	2612971.40	Y	5.2	5.2
548	Cedar Elm	4.0	7	Healthy	7021334.31	2612970.23	Y	4.0	4.0
549	Hercules-club	5.9	8	Healthy	7021303.75	2612982.38	Y	5.9	5.9
550	Cedar Elm	4.2	6	Healthy	7021321.38	2612939.47	Y	4.2	4.2
551	Cedar Elm	19.3	18	Healthy	7021020.03	2612610.03	Y	19.3	19.3
552	Cedar Elm	4.8	6	Healthy	7021180.36	2612804.11	Y	4.8	4.8
553	Cedar Elm	9.6	11	Healthy	7021203.14	2612835.42	Y	9.6	9.6
554	Eastern Red Cedar	11.3	18	Healthy	7021254.72	2612685.67	Y	11.3	5.7
555	Eastern Red Cedar	11.2	15	Healthy	7021577.38	2612360.22	Y	11.2	5.6
556	Eastern Red Cedar	11.9	12	Healthy	7022380.89	2611918.11	N	0.0	0.0
557	Cedar Elm	4.0	5	Healthy	7022555.01	2611956.57	N	0.0	0.0
558	Hackberry	11.2	14	Healthy	7021476.13	2612846.86	Y	11.2	5.6
559	Hackberry	16.4	12	Healthy	7021455.81	2612925.87	Y	16.4	8.2
700	Eastern Red Cedar	11.2	14	Healthy	7021501.22	2612595.27	N	0.0	0.0
701	Eastern Red Cedar	11.4	12	Healthy	7021455.80	2612605.71	Y	11.4	5.7
702	Eastern Red Cedar	11.2	12	Healthy	7021274.78	2612756.22	Y	11.2	5.6
703	Hackberry	22.6	14	Damaged	7020971.10	2612997.35	Y	0.0	0.0
704	Hackberry	11.3	14	Healthy	7020975.29	2612986.17	Y	11.3	5.7
705	Hackberry	11.0	12	Healthy	7020977.58	2612981.73	Y	11.0	5.5
706	Hackberry	11.5	10	Healthy	7020980.50	2612979.89	Y	11.5	5.8
707	Hackberry	15.2	15	Healthy	7020967.18	2612964.23	Y	15.2	7.6
708	Hackberry	17.2	24	Healthy	7020970.03	2612945.23	Y	17.2	8.6
709	Hackberry	16.9	15	Healthy	7020986.52	2612945.64	Y	16.9	8.5
710	Hackberry	11.0	10	Healthy	7020989.38	2612961.26	Y	11.0	5.5
711	Hackberry	14.4	18	Healthy	7020966.06	2612917.97	Y	14.4	7.2
712	Hackberry	14.6	12	Healthy	7020968.34	2612892.56	Y	14.6	7.3
713	Hackberry	13.5	12	Healthy	7020968.08	2612831.84	Y	13.5	6.8
714	Hackberry	11.6	10	Healthy	7020967.31	2612822.97	Y	11.6	5.8
715	Hercules-club	4.2	9	Healthy	7020979.75	2612826.04	Y	4.2	4.2
716	Hackberry	15.3	12	Healthy	7020966.80	2612761.10	Y	15.3	7.7
717	Hackberry	15.6	12	Healthy	7020955.42	2612754.11	Y	15.6	7.8
718	Hackberry	11.2	12	Healthy	7020971.32	2612782.46	Y	11.2	5.6
719	Cedar Elm	4.4	5	Healthy	7021550.71	2612993.43	Y	4.4	4.4
720	Eastern Red Cedar	11.0	10	Healthy	7021594.35	2612973.15	Y	11.0	5.5
721	American Elm	4.2	5	Healthy	7021589.00	2612994.46	Y	4.2	4.2
722	Eastern Red Cedar	13.2	10	Healthy	7021939.74	2612927.96	Y	13.2	6.6
723	Hercules-club	4.0	5	Healthy	7022057.05	2612804.26	Y	4.0	4.0
724	Hercules-club	7.3	6	Healthy	7022538.98	2612780.98	N	0.0	0.0
725	American Elm	4.6	5	Healthy	7022070.52	2611990.90	Y	4.6	4.6
726	Hackberry	11.3	12	Healthy	7022030.29	2612025.29	Y	11.3	5.7
727	Hackberry	12.7	10	Healthy	7022006.71	2612109.18	Y	12.7	6.4
728	American Elm	6.8	10	Healthy	7021955.54	2612128.27	Y	6.8	6.8
729	Hackberry	12.4	12	Damaged	7022013.24	2612083.77	Y	0.0	0.0
730	Hackberry	11.2	12	Healthy	7022008.40	2612080.73	Y	11.2	5.6
731	Eastern Red Cedar	11.0	12	Healthy	7021634.88	2612080.67	Y	11.0	11.0
732	Eastern Red Cedar	11.1	12	Healthy	7021723.44	2612012.63	Y	11.1	11.1
						Total Tree Mitigation		3082.9	2224.1



NOTES:
1. TREE PROTECTION FENCE SHALL BE ERECTED AROUND EACH PROTECTED TREE OR GROUP OF PROTECTED TREES AT LEAST TWO FEET BEYOND THE DRIP-LINE, UNLESS SHOWN OTHERWISE ON THE DRAWINGS.
2. DURING CONSTRUCTION, NO ACCESS IS PERMITTED WITHIN THE PROTECTIVE FENCE FOR ANY PURPOSE, EXCEPT TRASH REMOVAL AND LANDSCAPE MAINTENANCE.
3. DURING CONSTRUCTION, AREA WITHIN THE TREE PROTECTION FENCE SHALL BE WATERED AT A RATE WHICH PROVIDES ONE INCH OF WATER PER WEEK, INCLUSIVE OF RAINFALL.
4. CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING AND AVOIDING UNDERGROUND UTILITIES OR OTHER IMPROVEMENTS PRIOR TO PLACEMENT OF TREE PROTECTION FENCING.

X TREE PROTECTION FENCE DETAIL – PLAN VIEW
NOT TO SCALE



X TREE PROTECTION DETAIL
1/2"=1'-0"

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

TEXAS REGISTERED ENGINEERING FIRM F-2144
FREESE AND NICHOLS, INC.

RELEASE THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE TEXAS NO. 134055 ON 10/21/2021
ALTERATIONS TO THIS DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2299
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
CIVIL
TREE CONSERVATION PLAN TABLES

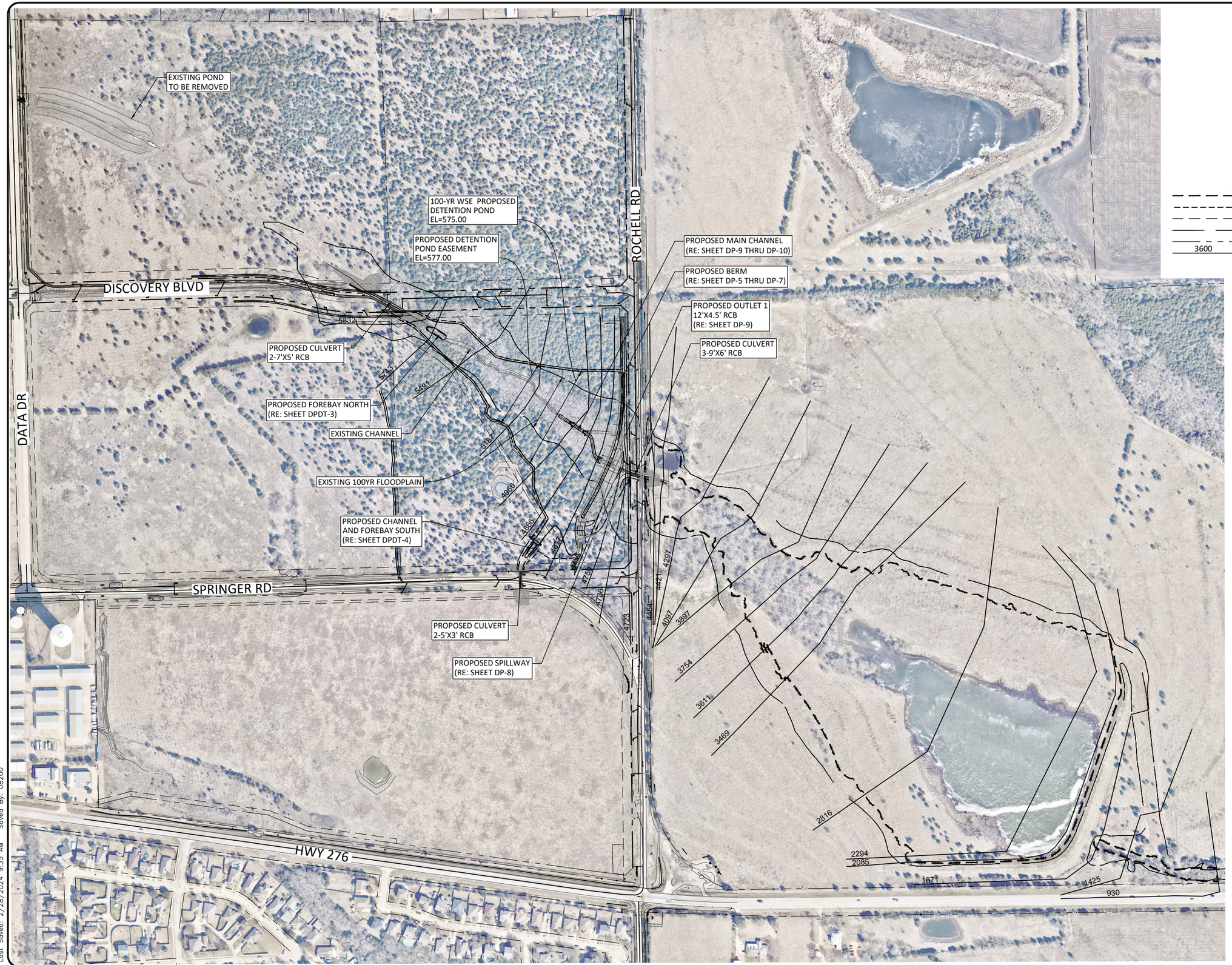
NO.	ISSUES	BY	DATE
1	ADDENDUM # 3	SEC	11/30/2021

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MW
DRAWN MW
CHECKED ADH
REVISED
FILE NAME cv-trt-pl-treecontables03.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET TC-9
SEQ. 116

MicroStation V8 User: 90262 Office: On Site
Plotter: \\JP\DGN\Wide_HP6Pt Plotting.plt Model: Default
Plot Scale: 120.000 '= 1" Project: Freese and Nichols, Inc. - Tree Type Fonts
Date: Feb. 21, 2024 - 09:42:11 AM
Office: On Site Date: Feb. 21, 2024 - 09:42:11 AM User: 90262 File: N:\F\Drawings\Environmental\cv-trt-pl-treecontables03.sht



This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

Freese and Nichols, Inc.
Texas Registered Engineering Firm F-2144

LEGEND

- 100-YR WATER SURFACE ELEVATION
- PROPOSED DETENTION POND EASEMENT
- PROPOSED DRAINAGE EASEMENT
- EXISTING 100YR FLOODPLAIN
- EX PROPERTY LINE
- 3600 HEC-RAS CROSS SECTIONS

NOTES:

1. ADDITIONAL INFORMATION ON THE HEC-RAS CROSS SECTIONS CAN BE FOUND IN THE DOWNSTREAM ASSESSMENT THAT ACCOMPANIES THIS PLAN SET.

N

0 200' 400'
SCALE IN FEET

FREESE AND NICHOLS
2711 North Haskell Ave, Suite 3300
Dallas, Texas 75204
Phone – (214) 217-2200
Web – www.freese.com

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY JAMES T. OTTO, P.E. TEXAS NO. 137931 ON 10/21/2020
IT IS NOT TO BE USED FOR BIDDING OR CONSTRUCTION PURPOSES. ALTERATION OF THIS ENGINEER'S SEAL WITHOUT NOTIFICATION OF THE ENGINEER IS AN OFFENSE UNDER SECTION 1001.002 OF THE TEXAS OCCUPATIONS CODE.

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
EDC PHASE V INFRASTRUCTURE

CIVIL

DETENTION POND
SITE LAYOUT

NO.	ISSUE	BY	DATE

F&N JOB NO. RKW19711
DATE 10/2021
DESIGNED CES
DRAWN CAD
REVISED GG
CHECKED JTO
FILE NAME CV-ALL-PL-HC01.dwg

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1"

SHEET DP-1
SEQ. 117

ACAD Rel: 24.2s (LMS Tech)
Filename: N:\SW\Drawings\CV-ALL-PL-HC01.dwg
Last Saved: 2/28/2024 9:35 AM Saved By: 08200

Plot Date: 2/28/2024 10:09 AM Plot By: 08200 Filename: N:\SW\Drawings\CV-ALL-PL-HC01.dwg

LEGEND

- 100-YR WATER SURFACE ELEV.
- PROPOSED DETENTION POND EASEMENT
- EXISTING 100 YR FLOODPLAIN
- EXISTING PROPERTY LINE
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- PROPOSED RIPRAP
- PROPOSED CONCRETE
- POINT NUMBER
- ALIGNMENT CURVE NUMBER
- ALIGNMENT LINE NUMBER

SPRINGER RD

DISCOVERY BLVD

ROCHELL RD

STA 13+30
EP CHANNEL SOUTH

PROPOSED
FOREBAY SOUTH
(RE: SHEET DPDT-4)

STA 14+50
EP SPILLWAY

STA 10+00
BP BERM

PROPOSED
SPILLWAY
EL=573.25

STA 10+00
BP SPILLWAY

STA 10+00
BP SWALE A

PROPOSED
FOREBAY NORTH
(RE: SHEET DPDT-3)

PROPOSED
DETENTION
POND EASEMENT
EL=577.00

PROPOSED DETENTION
POND EASEMENT

100-YR WSE
PROPOSED
DETENTION
POND
EL=575.00

EXISTING
CHANNEL

EX 100YR
FLOODPLAIN

STA 14+54.76
EP SWALE A
TIE INTO EX CHANNEL

PROPOSED
MAIN CHANNEL

STA 7+00
BP CHANNEL SOUTH

PROPOSED
DROP STRUCTURE #1

PROPOSED
DROP STRUCTURE #2

PROPOSED
OUTFALL 1
12'X4.5' RCB

STA 19+23.37
END BERM
N=7021833.76
E=2612947.85

PROPOSED WATER

C/C
DP11

B/B
DP11

A/A
DP11

0 50' 100'
SCALE IN FEET

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

Freese and Nichols, Inc.
Texas Registered Engineering Firm F-2144

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY CARL E. SORENSEN, P.E. TEXAS NO. 83923 ON 10/21/2020
IT IS A VIOLATION OF THE ENGINEERING PRACTICE ACT FOR ANY PERSON TO ALTER THIS DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IN AN ELECTRONIC FORMAT AS PER TEXAS ENGINEERING PRACTICE ACT.

NOTES:

1. RE: SHEET DP-3 FOR ALIGNMENT COORDINATE CONTROL TABLES.
2. DEVELOPER MAY NOT DEVELOP BELOW ELEVATION 577.
3. SEE SHEET TC-1 FOR TREE CONSERVATION PLAN AND FOR TREES THAT ARE TO REMAIN IN PLACE. CONTRACTOR WILL BE REQUIRED TO ISOLATE TREES TO BE SAVED AND DELINEATE AREAS WITH ORANGE CONSTRUCTION FENCING WHERE GRADING AND/OR DEPOSIT OF FILL IS TO BE PROHIBITED OR MINIMIZED.

FREESE AND NICHOLS
2711 North Haskell Ave, Suite 3300
Dallas, Texas 75204
Phone – (214) 217–2200
Web – www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

EDC PHASE V INFRASTRUCTURE

CIVIL

DETENTION POND SITE PLAN

NO.	ISSUE	BY	DATE
1	ADDENDUM #3	CES	11/30/2021

F&N JOB NO. RKW19711
DATE 10/2021
DESIGNED CES
DRAWN CAD
CHECKED JTO
FILE NAME CV-ALL-PL-SPO1.dwg

VERIFY SCALE 1" 0
Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.

SHEET DP-2
SEQ. 118

AC4D Rel: 24.2s (LWS Tech)
Filename: N:\SW Drawings\CV-ALL-PL-SPO1.dwg
Last Saved: 2/28/2024 10:02 AM Saved By: 08200

Plot Date: 2/28/2024 10:05 AM Plot By: 08200 Filename: N:\SW Drawings\CV-ALL-PL-SPO1.dwg

PROPOSED BERM						
NUMBER	BEGIN STATION	END STATION	DELTA	RADIUS	LENGTH	LINE/CHORD DIRECTION
L4	STA 10+00.00 N=7020953.94 E=2612739.73	STA 10+37.97 N=7020991.89 E=2612738.79			37.97'	N01° 24' 33.68"W
C5	STA 10+37.97 N=7020991.89 E=2612738.79	STA 10+67.63 N=7021020.05 E=2612746.64	33.99'	50.00'	29.66'	N15° 35' 05.79"E
L5	STA 10+67.63 N=7021020.05 E=2612746.64	STA 10+78.95 N=7021029.59 E=2612752.74			11.33'	N32° 34' 45.27"E
C1	STA 10+78.95 N=7021029.59 E=2612752.74	STA 11+47.92 N=7021095.51 E=2612767.75	39.51'	100.00'	68.96'	N12° 49' 21.34"E
L1	STA 11+47.92 N=7021095.51 E=2612767.75	STA 11+81.51 N=7021128.86 E=2612763.69			33.59'	N06° 56' 02.60"W
C2	STA 11+81.51 N=7021128.86 E=2612763.69	STA 12+76.10 N=7021220.13 E=2612781.65	36.13'	150.00'	94.59'	N11° 07' 51.85"E
L2	STA 12+76.10 N=7021220.13 E=2612781.65	STA 13+63.41 N=7021296.35 E=2612824.24			87.31'	N29° 11' 46.30"E
C3	STA 13+63.41 N=7021296.35 E=2612824.24	STA 14+05.01 N=7021333.48 E=2612842.99	4.81'	496.00'	41.61'	N26° 47' 35.40"E
L3	STA 14+05.01 N=7021333.48 E=2612842.99	STA 15+07.66 N=7021426.97 E=2612885.38			102.65'	N24° 23' 24.50"E
C4	STA 15+07.66 N=7021426.97 E=2612885.38	STA 18+05.64 N=7021716.03 E=2612947.85	24.39'	700.00'	297.98'	N12° 11' 42.25"E

PROPOSED SPILLWAY						
NUMBER	BEGIN STATION	END STATION	DELTA	RADIUS	LENGTH	LINE/CHORD DIRECTION
L6	STA 10+00.00 N=7021387.28 E=2613008.75	STA 10+27.44 N=7021394.02 E=2612982.14			27.44'	N75° 47' 14.14"W
C6	STA 10+27.44 N=7021394.02 E=2612982.14	STA 10+83.17 N=7021371.76 E=2612935.89	79.82'	40.00'	55.73'	S64° 18' 04.27"W
L7	STA 10+83.17 N=7021371.76 E=2612935.89	STA 12+82.45 N=7021190.26 E=2612853.60			199.28'	S24° 23' 22.68"W
C7	STA 12+82.45 N=7021190.26 E=2612853.60	STA 13+72.02 N=7021146.32 E=2612781.61	68.43'	75.00'	89.57'	S58° 36' 10.63"W
L8	STA 13+72.02 N=7021146.32 E=2612781.61	STA 14+50.00 N=7021150.15 E=2612703.73			77.98'	N87° 11' 01.42"W

PROPOSED CHANNEL SOUTH						
NUMBER	BEGIN STATION	END STATION	DELTA	RADIUS	LENGTH	LINE/CHORD DIRECTION
L13	STA 7+00.00 N=7021459.23 E=2612843.47	STA 10+36.08 N=7021189.35 E=2612643.19			336.08'	S36° 34' 43.52"W
L14	STA 10+36.08 N=7021189.35 E=2612643.19	STA 12+43.78 N=7021022.56 E=2612519.41			207.70'	S36° 34' 43.52"W
C11	STA 12+43.78 N=7021022.56 E=2612519.41	STA 12+96.82 N=7020972.91 E=2612503.68	37.99'	80.00'	53.04'	S17° 35' 04.92"W
L15	STA 12+96.82 N=7020972.91 E=2612503.68	STA 13+30.00 N=7020939.75 E=2612504.50			33.17'	S01° 24' 33.68"E

PROPOSED MAIN CHANNEL						
NUMBER	BEGIN STATION	END STATION	DELTA	RADIUS	LENGTH	LINE/CHORD DIRECTION
L10	STA 10+00.00 N=7021387.28 E=2613008.75	STA 10+21.69 N=7021392.59 E=2612987.71			21.69'	N75° 49' 05.00"W
C9	STA 10+21.69 N=7021392.59 E=2612987.71	STA 10+39.99 N=7021398.67 E=2612970.48	10.48'	100.00'	18.30'	N70° 34' 35.70"W
L11	STA 10+39.99 N=7021398.67 E=2612970.48	STA 11+75.13 N=7021455.06 E=2612847.68			135.14'	N65° 20' 06.41"W
C8	STA 11+75.13 N=7021455.06 E=2612847.68	STA 12+13.82 N=7021484.52 E=2612824.97	55.42'	40.00'	38.69'	N37° 37' 32.29"W
L9	STA 12+13.82 N=7021484.52 E=2612824.97	STA 12+71.21 N=7021541.06 E=2612815.08			57.39'	N09° 54' 58.18"W
C10	STA 12+71.21 N=7021541.06 E=2612815.08	STA 12+99.64 N=7021564.20 E=2612799.94	46.54'	35.00'	28.43'	N33° 11' 12.90"W
L12	STA 12+99.64 N=7021564.20 E=2612799.94	STA 14+69.49 N=7021658.06 E=2612658.37			169.86'	N56° 27' 27.63"W

575 CONTOUR						
NUMBER	BEGIN STATION	END STATION	DELTA	RADIUS	LENGTH	LINE/CHORD DIRECTION
L58	STA 10+00.00 N=7020972.34 E=2612496.84	STA 10+00.41 N=7020972.75 E=2612496.83			0.41'	N01° 24' 33.68"W
C30	STA 10+00.41 N=7020972.75 E=2612496.83	STA 10+55.30 N=7021025.42 E=2612510.03	29.32'	107.27'	54.90'	N14° 03' 59.33"E
L57	STA 10+55.30 N=7021025.42 E=2612510.03	STA 10+62.54 N=7021031.78 E=2612513.46			7.23'	N28° 19' 43.52"E
L56	STA 10+62.54 N=7021031.78 E=2612513.46	STA 11+02.79 N=7021067.21 E=2612532.56			40.25'	N28° 19' 43.52"E
C29	STA 11+02.79 N=7021067.21 E=2612532.56	STA 11+05.52 N=7021069.52 E=2612534.03	8.25'	19.00'	2.74'	N32° 27' 13.52"E
L55	STA 11+05.52 N=7021069.52 E=2612534.03	STA 11+61.91 N=7021114.59 E=2612567.90			56.38'	N36° 55' 34.53"E
L54	STA 11+61.91 N=7021114.59 E=2612567.90	STA 11+65.94 N=7021115.62 E=2612571.81			4.04'	N75° 14' 28.94"E
L53	STA 11+65.94 N=7021115.62 E=2612571.81	STA 12+61.40 N=7021195.64 E=2612623.86			95.45'	N33° 02' 34.45"E
C28	STA 12+61.40 N=7021195.64 E=2612623.86	STA 12+67.96 N=7021201.84 E=2612624.97	56.16'	6.69'	6.56'	N10° 11' 45.84"E
L52	STA 12+67.96 N=7021201.84 E=2612624.97	STA 13+20.71 N=7021247.64 E=2612598.80			52.75'	N29° 44' 58.68"W
L51	STA 13+20.71 N=7021247.64 E=2612598.80	STA 14+14.26 N=7021334.42 E=2612563.88			93.55'	N21° 54' 54.16"W
L50	STA 14+14.26 N=7021334.42 E=2612563.88	STA 15+04.96 N=7021425.13 E=2612564.39			90.71'	N00° 19' 25.47"E
L49	STA 15+04.96 N=7021425.13 E=2612564.39	STA 15+56.95 N=7021460.41 E=2612526.21			51.99'	N47° 15' 34.78"W
L16	STA ??? N=7021841.07 E=2612871.61	STA ??? N=7021838.09 E=2612933.85			62.31'	S87° 16' 01.32"E
L48	STA 15+56.95 N=7021460.41 E=2612526.21	STA 16+12.50 N=7021505.95 E=2612494.40			55.55'	N34° 56' 15.89"W
L47	STA 16+12.50 N=7021505.95 E=2612494.40	STA 16+27.86 N=7021516.49 E=2612483.23			15.35'	N46° 40' 44.54"W
L46	STA 16+27.86 N=7021516.49 E=2612483.23	STA 16+87.88 N=7021574.08 E=2612466.31			60.03'	N16° 21' 53.68"W
L45	STA 16+87.88 N=7021574.08 E=2612466.31	STA 17+19.24 N=7021602.21 E=2612452.46			31.36'	N26° 13' 29.65"W
L44	STA 17+19.24 N=7021602.21 E=2612452.46	STA 17+48.94 N=7021617.21 E=2612426.83			29.70'	N59° 39' 44.90"W
L43	STA 17+48.94 N=7021617.21 E=2612426.83	STA 17+68.46 N=7021630.23 E=2612412.27			19.53'	N48° 12' 02.89"W
L42	STA 17+68.46 N=7021630.23 E=2612412.27	STA 18+00.24 N=7021636.34 E=2612381.09			31.78'	N78° 54' 22.60"W

575 CONTOUR						
NUMBER	BEGIN STATION	END STATION	DELTA	RADIUS	LENGTH	LINE/CHORD DIRECTION
L41	STA 18+00.24 N=7021636.34 E=2612381.09	STA 18+29.68 N=7021657.94 E=2612361.08			29.44'	N42° 47' 57.32"W
L40	STA 18+29.68 N=7021657.94 E=2612361.08	STA 18+52.88 N=7021680.25 E=2612367.42			23.19'	N15° 51' 12.27"E
L39	STA 18+52.88 N=7021680.25 E=2612367.42	STA 18+62.37 N=7021686.99 E=2612374.10			9.49'	N44° 45' 45.63"E
C13	STA ??? N=7021877.26 E=2612485.06	STA ??? N=7021843.26 E=2612732.90	0.25'	56876.34'	250.17'	S82° 11' 18.52"E
L38	STA 18+62.37 N=7021686.99 E=2612374.10	STA 19+42.69 N=7021756.17 E=2612333.28			80.32'	N30° 32' 44.03"W
C14	STA ??? N=7021892.04 E=2612414.12	STA ??? N=7021877.26 E=2612485.06	8.24'	504.00'	72.52'	S78° 13' 41.57"E
C26	STA 21+68.07 N=7021917.20 E=2612177.44	STA 21+75.16 N=7021923.83 E=2612176.70	68.99'	5.89'	7.09'	N06° 23' 53.58"W
L32	STA 21+75.16 N=7021923.83 E=2612176.70	STA 22+02.97 N=7021946.41 E=2612192.93			27.81'	N35° 42' 37.93"E
C25	STA 22+02.97 N=7021946.41 E=2612192.93	STA 22+12.43 N=7021954.80 E=2612191.53	90.34'	6.00'	9.46'	N09° 27' 40.87"W
L31	STA 22+12.43 N=7021954.80 E=2612191.53	STA 22+14.41 N=7021955.95 E=2612189.91			1.98'	N54° 37' 59.68"W
C24	STA 22+14.41 N=7021955.95 E=2612189.91	STA 22+23.80 N=7021954.55 E=2612181.56	89.73'	6.00'	9.40'	S80° 30' 14.15"W
L30	STA 22+23.80 N=7021954.55 E=2612181.56	STA 22+44.38 N=7021937.83 E=2612169.58			20.57'	S35° 38' 27.97"W
C23	STA 22+44.38 N=7021937.83 E=2612169.58	STA 22+59.55 N=7021935.94 E=2612156.66	107.25'	8.11'	15.18'	S81° 39' 28.55"W
L29	STA 22+59.55 N=7021935.94 E=2612156.66	STA 24+01.21 N=7022037.29 E=2612057.69			141.66'	N44° 19' 08.00"W
L28	STA 24+01.21 N=7022037.29 E=2612057.69	STA 24+04.69 N=7022039.78 E=2612055.26			3.48'	N44° 18' 06.88"W
C22	STA 24+04.69 N=7022039.78 E=2612055.26	STA 24+25.37 N=7022051.72 E=2612038.51	20.43'	58.00'	20.68'	N54° 30' 59.97"W
L27	STA 24+25.37 N=7022051.72 E=2612038.51	STA 24+33.71 N=7022055.28 E=2612030.97			8.34'	N64° 43' 53.05"W
L26	STA 24+33.71 N=7022055.28 E=2612030.97	STA 24+71.64 N=7022089.87 E=2612046.55			37.93'	N24° 15' 29.23"E
L25	STA 24+71.64 N=7022089.87 E=2612046.55	STA 25+14.12 N=7022069.66 E=2612083.93			42.48'	S61° 36' 19.50"E
C21	STA 25+14.12 N=7022069.66 E=2612083.93	STA 25+79.73 N=7022046.65 E=2612144.98	20.82'	180.57'	65.61'	S69° 20' 42.27"E
L24	STA 25+79.73 N=7022046.65 E=2612144.98	STA 26+63.21 N=7022040.53 E=2612228.24			83.48'	S85° 47' 56.95"E

575 CONTOUR						
NUMBER	BEGIN STATION	END STATION	DELTA	RADIUS	LENGTH	LINE/CHORD DIRECTION
C20	STA 26+63.21 N=7022040.53 E=2612228.24	STA 26+80.17 N=7022027.89 E=2612234.15	121.44'	8.00'	16.96'	S25° 04' 44.49"E
L17	STA ??? N=7021840.94 E=2612765.07	STA ??? N=7021841.07 E=2612871.61			106.53'	N89° 56' 00.88"E
C12	STA ??? N=7021843.26 E=2612732.90	STA ??? N=7021840.94 E=2612765.07	3.70'	498.99'	32.26'	S85° 53' 08.96"E
L23	STA 26+80.17 N=7022027.89 E=2612234.15	STA 27+26.41 N=7021990.31 E=2612207.20			46.24'	S35° 38' 27.97"W
C19	STA 27+26.41 N=7021990.31 E=2612207.20	STA 27+35.87 N=7021981.92 E=2612208.61	90.27'	6.00'	9.45'	S09° 29' 45.85"E
L22	STA 27+35.87 N=7021981.92 E=2612208.61	STA 27+37.76 N=7021980.83 E=2612210.15			1.89'	S54° 37' 59.68"E
C18	STA 27+37.76 N=7021980.83 E=2612210.15	STA 27+47.16 N=7021982.22 E=2612218.50	89.74'	6.00'	9.40'	N80° 29' 46.54"E
L21	STA 27+47.16 N=7021982.22 E=2612218.50	STA 27+76.45 N=7022006.03 E=2612235.56			29.29'	N35° 37' 32.76"E
C17	STA 27+76.45 N=7022006.03 E=2612235.56	STA 28+23.00 N=7022009.89 E=2612276.46	97.97'	27.22'	46.54'	N84° 36' 33.16"E
L20	STA 28+23.00 N=7022009.89 E=2612276.46	STA 28+69.90 N=7021977.55 E=2612310.44			46.91'	S46° 24' 26.44"E

CONTROL POINTS				
PNT	NORTHING	EASTING	ELEVATION	DESCRIPTION
1	7021460.18	2612806.98	568.00	PG
2	7021424.93	2612842.09	569.00	PG
3	7021666.25	2612889.81	569.00	PG
4	7021679.32	2612889.73	570.00	PG
5	7021682.62	2612864.61	571.00	PG
6	7021681.93	2612916.98	571.00	PG

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RECORD DRAWINGS PREPARED ON: 8/20/2024

Freese and Nichols, Inc.
Texas Registered Engineering Firm F-2144

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FREESE NICHOLS
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Dallas, Texas 75204
Phone – 972.335.3214 – 2200
Web – www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
EDC PHASE V INFRASTRUCTURE
CIVIL
DETENTION POND
SITE ALIGNMENT CONTROL TABLES

NO.	ISSUE	BY	DATE

PAN JOB NO. RKW19711
DATE 10/2021
DESIGNED CES
DRAWN CAD
REVISED GG
CHECKED JTO
FILE NAME CV-ALL-PL-SP01.dwg

Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
VERIFY SCALE 0 1

SHEET DP-3
SEQ. 119

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Last Saved: 2/28/2024 10:02 AM Saved By: 08200

Plot Date: 2/28/2024 10:10 AM Plot By: 08200 Filename: N:\SW\Drawings\CV-ALL-PL-SP01.dwg

Storm Event	Rainfall Volume (in)	Peak Inflow (cfs)	Peak Discharge (cfs)	Storage (ac-ft)	Peak Elevation (ft)	Junction jD	
						Pre-Project Peak Discharge (cfs)	Post-Project Peak Discharge (cfs)
5-YR	5.03	867	520	9.9	573.2	591	539
10-YR	6.12	1045	619	13.3	573.8	738	640
25-YR	7.21	1224	746	16.4	574.3	883	772
100-YR	9.29	1561	1018	21.6	575.0	1159	1052

Elevation (ft)	Area (ac)
566	0.002
567	0.270
568	0.350
569	0.570
570	0.720
571	1.510
572	2.830
573	4.950
574	6.480
575	7.450
576	8.580
577	12.510

Elevation (ft)	Discharge (cfs)
566.00	0.00
567.00	30.91
568.00	86.45
569.00	160.83
570.00	248.57
571.00	340.91
572.00	427.20
573.00	503.57
573.25	521.38
574.00	660.60
575.00	1005.89
576.00	1533.87
577.00	2260.60

Post Project Hydrology Calculations Summary

Input Parameters					Results			
Basin Name	Area (sq. miles)	Area (acres)	Curve Number*	Lag Time (min.)	5-yr Peak Flow (cfs)	10-yr Peak Flow (cfs)	25-yr Peak Flow (cfs)	100-yr Peak Flow (cfs)
A	0.03778	24.18	95.4	7.3	103	124	146	186
B	0.01799	11.51	96.8	6.9	50	61	71	90
C1	0.01793	11.48	94.8	7.0	49	59	70	89
C2	0.03166	20.26	96.6	8.1	85	103	120	153
C3	0.04829	30.90	96.3	8.0	130	157	183	234
C4	0.00728	4.66	96.8	2.6	23	28	32	41
C5	0.03825	24.48	96.8	8.3	102	123	144	184
D1	0.02804	17.94	96.8	8.9	74	89	104	132
D2	0.06485	41.50	95.6	8.0	173	209	245	313
D3	0.01575	10.08	96.8	3.3	49	59	69	88
E	0.03330	21.31	96.8	7.8	91	109	128	163

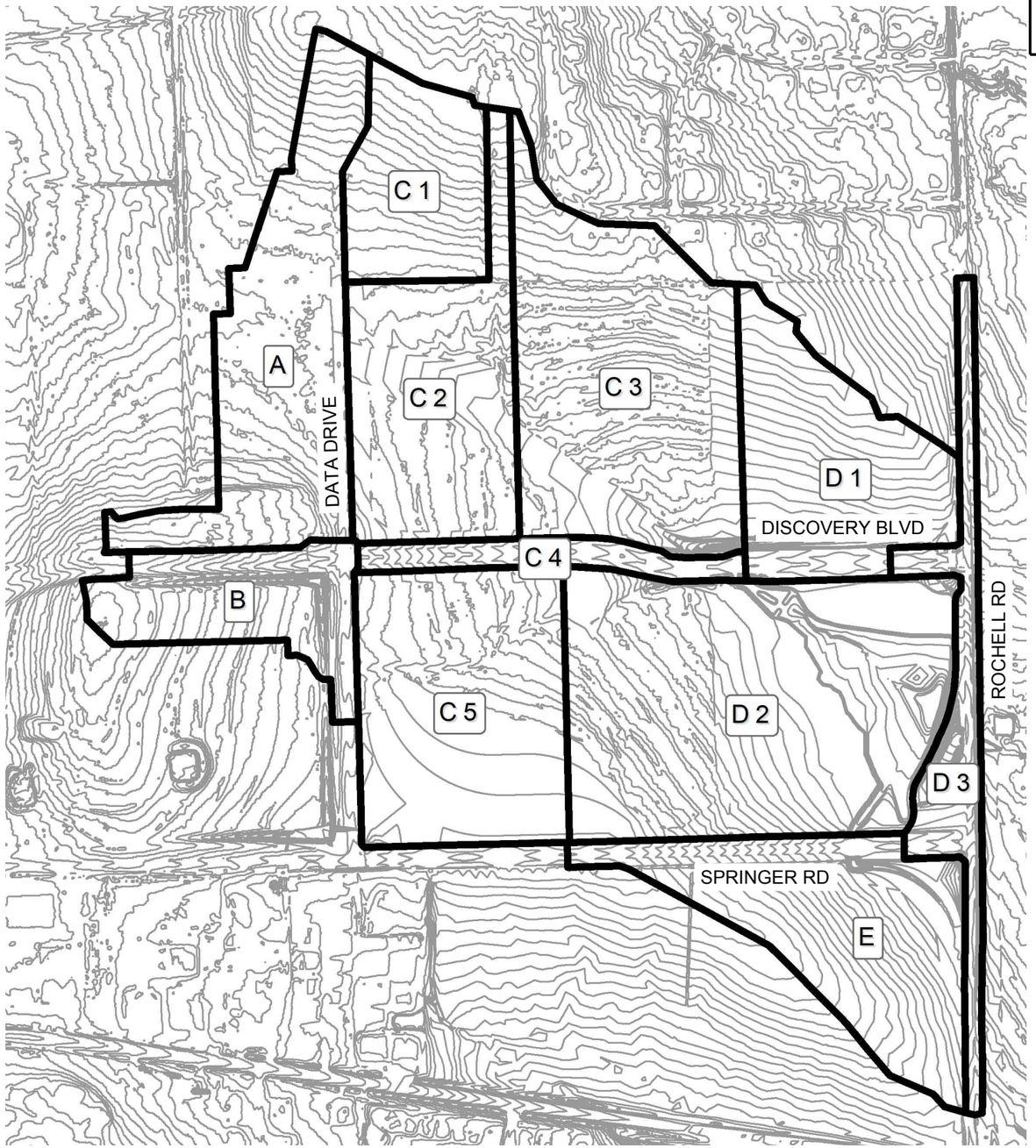
Note: * Curve numbers are based on AMC III conditions per City of Rockwall standards
All basins are developed in post-project conditions, with the exception of portions of basins a, c1, and c3. see figures 3 and 8 in the downstream assessment for the detained area map.

NOTES:

1. ADDITIONAL INFORMATION ON THE HYDROLOGIC AND HYDRAULIC EFFECTS OF THE IMPLEMENTATION OF THIS DETENTION POND ON THE SURROUNDING AREA CAN BE FOUND IN THE DOWNSTREAM ASSESSMENT (SUBMITTED SEPARATELY).
2. THE ROCKWALL TECHNOLOGY PARK DETENTION POND BREACH ANALYSIS WAS SUBMITTED SEPARATELY THAT LOOKS AT THE EFFECTS ON THE SURROUNDING AREA IF THERE WERE TO BE A BREAK IN THE PROPOSED BERM.
3. A CLOMR WILL BE SUBMITTED TO FEMA REFLECTING THESE PROPOSED CHANGES TO A ZONE A FLOODPLAIN.

N

0 100' 200'
SCALE IN FEET



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Freese and Nichols, Inc.
Texas Registered Engineering Firm F-2144

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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
EDC PHASE V INFRASTRUCTURE
CIVIL
DETENTION POND CALCULATIONS

NO.	ISSUE	BY	DATE

FAN JOB NO. RKW19711
DATE 10/2021
DESIGNED CES
DRAWN CAD
REVISED GG
CHECKED JTO
FILE NAME CV-ALL-PL-SP01.dwg

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1

SHEET DP-4
SEQ. 120

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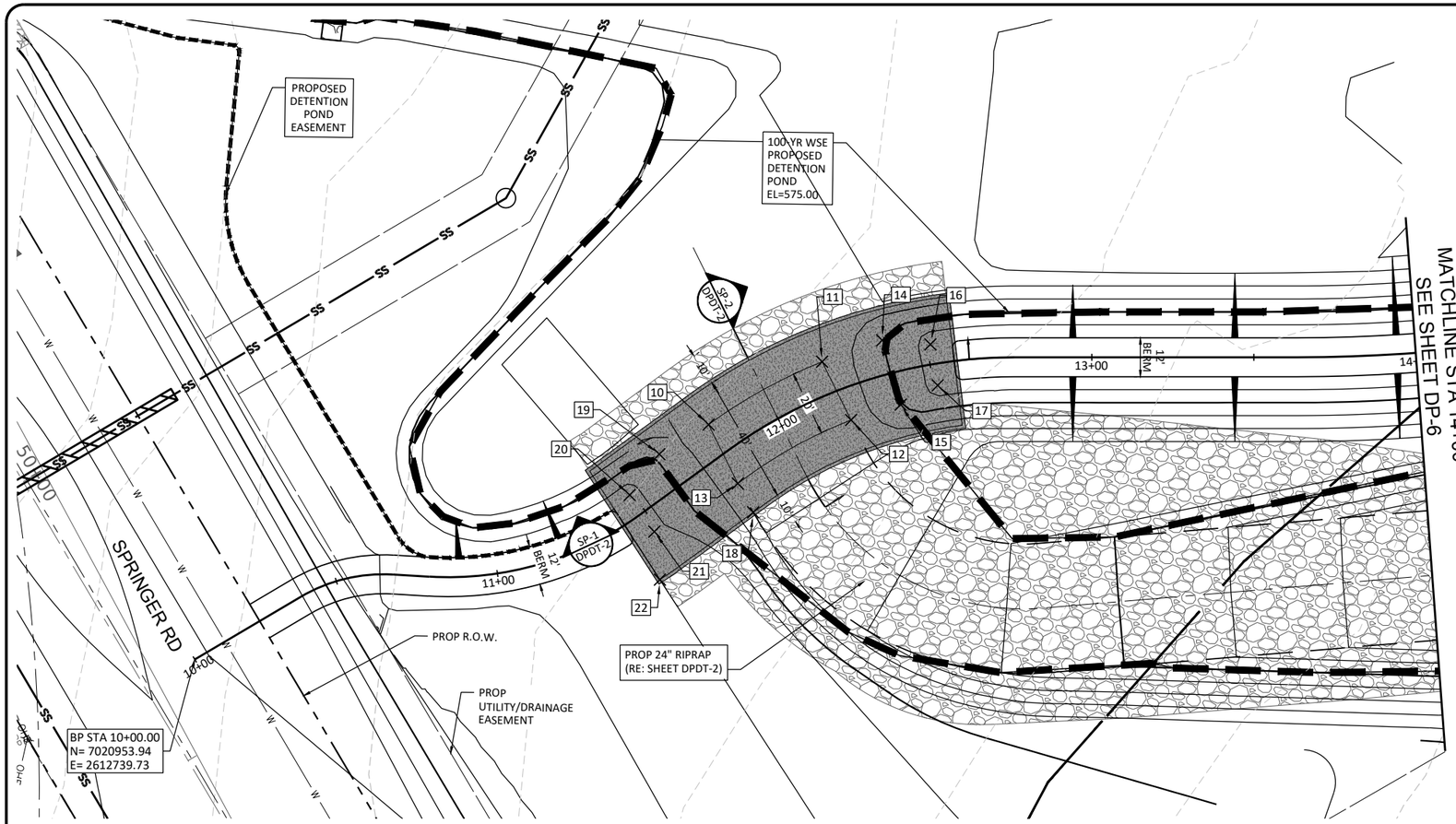

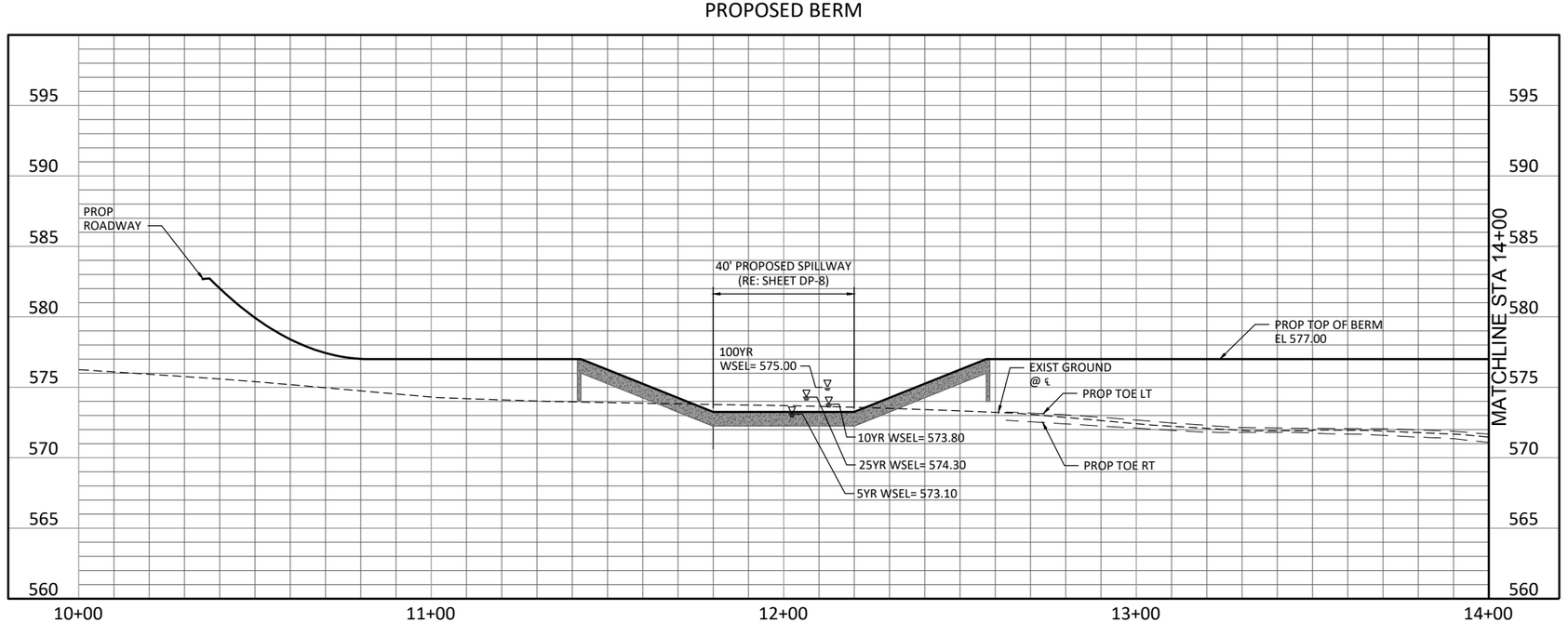

CAUTION!!!
EXISTING GAS LINES AND OVERHEAD ELECTRIC LINES IN AREA CONTACT UTILITY 48 HOURS PRIOR TO CONSTRUCTION

LEGEND

- 100-YR WATER SURFACE ELEV.
- PROPOSED DETENTION POND EASEMENT
- EXISTING 100 YR FLOODPLAIN
- EXISTING PROPERTY LINE
- UTILITY EASEMENT
- PROPOSED RIPRAP
- PROPOSED CONCRETE

NOTES:

1. ONCE THE SPECIFIED SLOPES AND DIMENSIONS OF THE BERM HAVE BEEN ACHIEVED, THE BERM SHALL BE COVERED WITH SOD FOLLOWING NCTCOG SS 32 92 00. ALL OTHER DISTURBED AREAS WITHIN THE DETENTION POND LIMITS WILL BE COVERED WITH HYDRAULIC MULCH FOLLOWING NCTCOG SPEC 204.6.4.4.
2. THE 5-YEAR WATER SURFACE ELEVATION PASSES THROUGH OUTLET 1 AND DOES NOT OVERTOP THE SPILLWAY.

PROPOSED SPILLWAY POINT TABLE

PNT	NORTHING	EASTING	ELEVATION	DESCRIPTION
10	7021127.67	2612753.76	573.25	DESIGN POINT
11	7021167.71	2612753.94	573.25	DESIGN POINT
12	7021166.72	2612773.99	573.34	DESIGN POINT
13	7021126.67	2612774.03	573.44	DESIGN POINT
14	7021187.10	2612757.21	574.80	DESIGN POINT
15	7021182.40	2612777.32	574.90	DESIGN POINT
16	7021199.50	2612765.56	576.35	DESIGN POINT
17	7021195.27	2612777.69	576.29	DESIGN POINT
18	7021126.48	2612784.13	573.20	DESIGN POINT
19	7021109.96	2612754.35	574.74	DESIGN POINT
20	7021095.81	2612760.86	576.20	DESIGN POINT
21	7021096.93	2612774.47	576.36	DESIGN POINT
22	7021091.22	2612788.23	577.00	DESIGN POINT

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0 20' 40'
SCALE IN FEET HORIZONTAL

0 5' 10'
SCALE IN FEET VERTICAL

Freese and Nichols, Inc.
Texas Registered Engineering Firm F-2144

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FREESE NICHOLS
2711 North Haskell Ave, Suite 3300
Dallas, Texas 75204
Phone – 214.217.2200
Web – www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

EDC PHASE V INFRASTRUCTURE

CIVIL

PROPOSED BERM PLAN AND PROFILE
BEGIN TO STA 14+00

NO.	ISSUE	BY	DATE

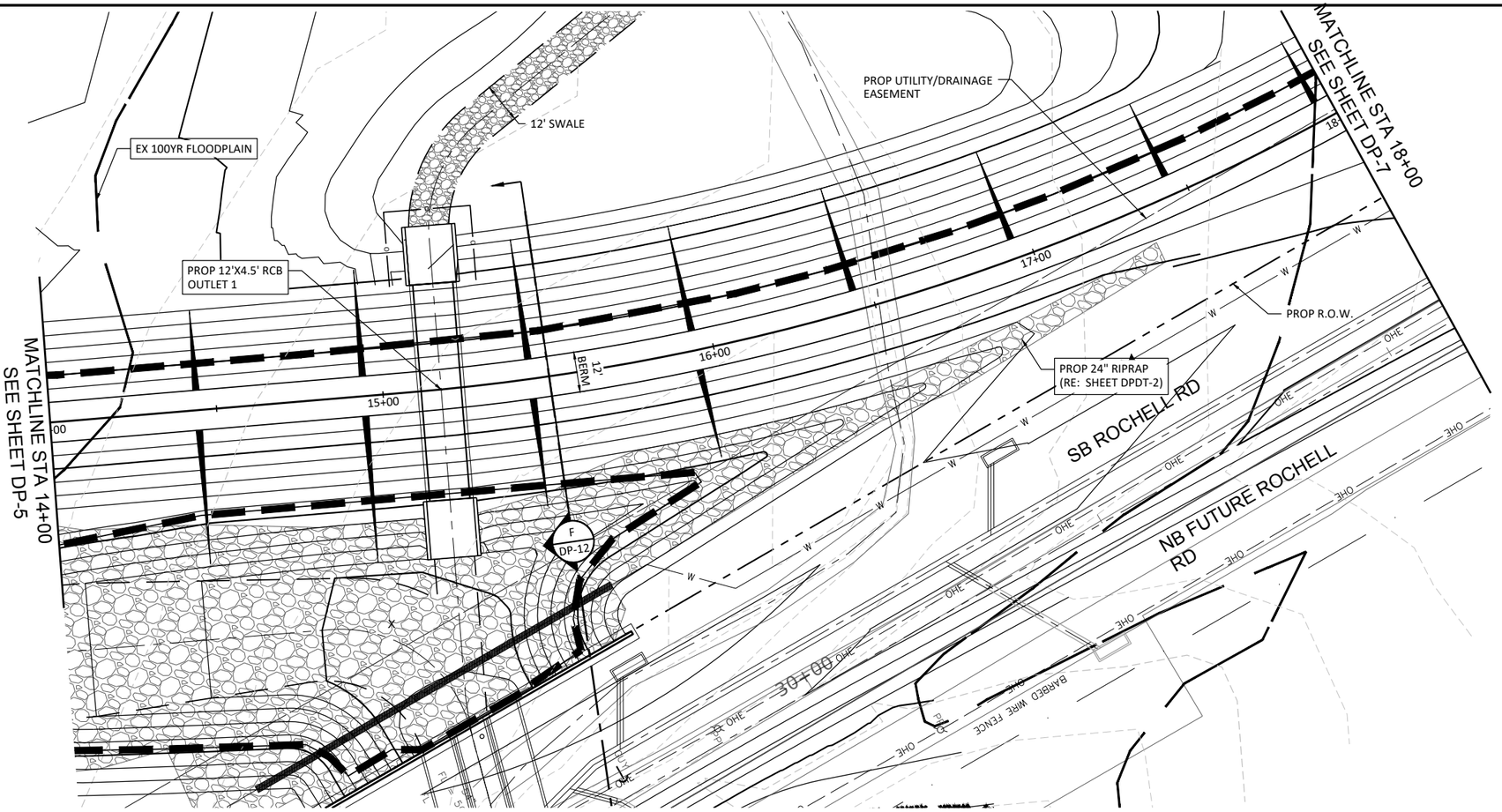
F&N JOB NO. RKW19711
DATE 10/2021
DESIGNED CES
DRAWN CAD
REVISED GG
CHECKED JTO
FILE NAME CV-ALL-PP-BERM01.dwg

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1

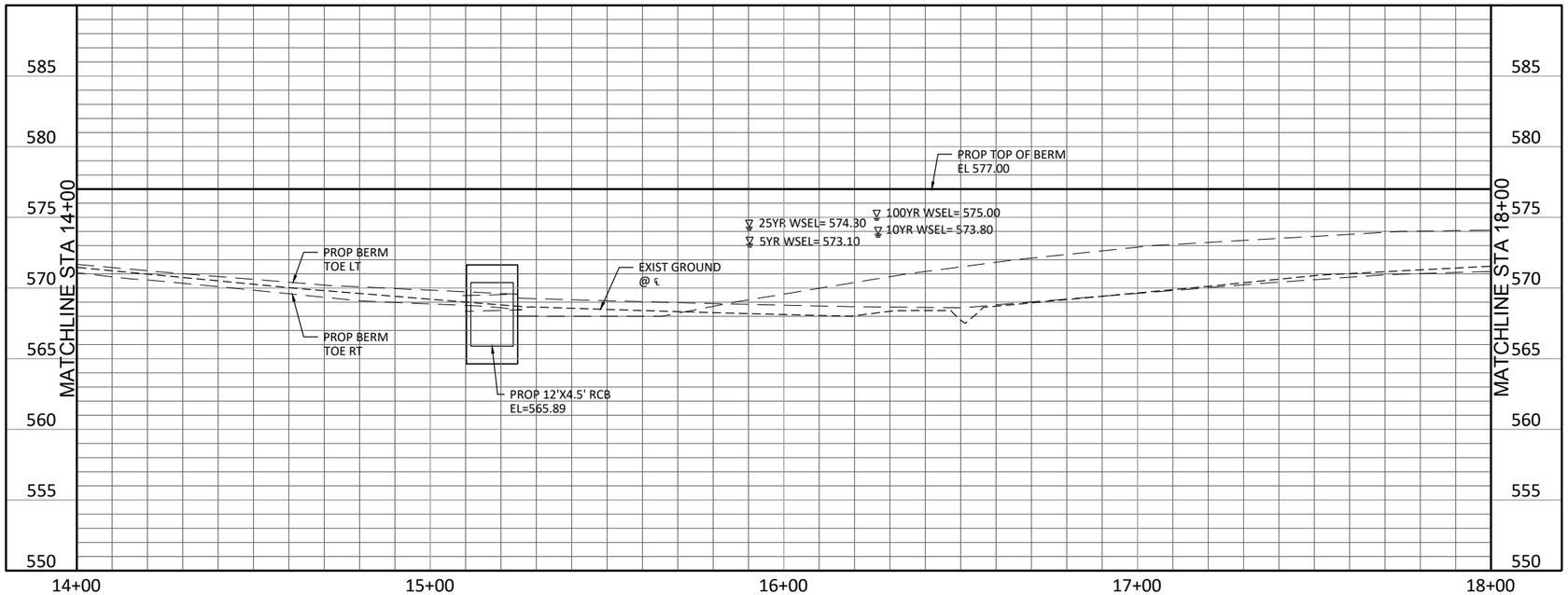
SHEET DP-5
SEQ. 121

ACAD Rel: 24.2s (LMS Tech)
Filename: N:\SW\Drawings\CV-ALL-PP-BERM01.dwg
Last Saved: 2/28/2024 9:48 AM Saved By: 08200

Plot Date: 2/28/2024 10:10 AM Plot By: 08200 Filename: N:\SW\Drawings\CV-ALL-PP-BERM01.dwg



PROPOSED BERM



CAUTION!!!
EXISTING GAS LINES AND OVERHEAD ELECTRIC LINES IN AREA CONTACT UTILITY 48 HOURS PRIOR TO CONSTRUCTION

LEGEND

- 100-YR WATER SURFACE ELEV.
- PROPOSED DETENTION POND EASEMENT
- EXISTING 100 YR FLOODPLAIN
- EXISTING PROPERTY LINE
- UTILITY EASEMENT
- PROPOSED RIPRAP

NOTES:

1. ONCE THE SPECIFIED SLOPES AND DIMENSIONS OF THE BERM HAVE BEEN ACHIEVED, THE BERM SHALL BE COVERED WITH SOD FOLLOWING NCTCOG SS 32 92 00. ALL OTHER DISTURBED AREAS WITHIN THE DETENTION POND LIMITS WILL BE COVERED WITH HYDRAULIC MULCH FOLLOWING NCTCOG SPEC 204.6.4.4.
2. THE 5-YEAR WATER SURFACE ELEVATION PASSES THROUGH OUTLET 1 AND DOES NOT OVERTOP THE SPILLWAY.

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

0 20' 40'
SCALE IN FEET
HORIZONTAL

0 5' 10'
SCALE IN FEET
VERTICAL

Freese and Nichols, Inc.
Texas Registered Engineering Firm F-2144

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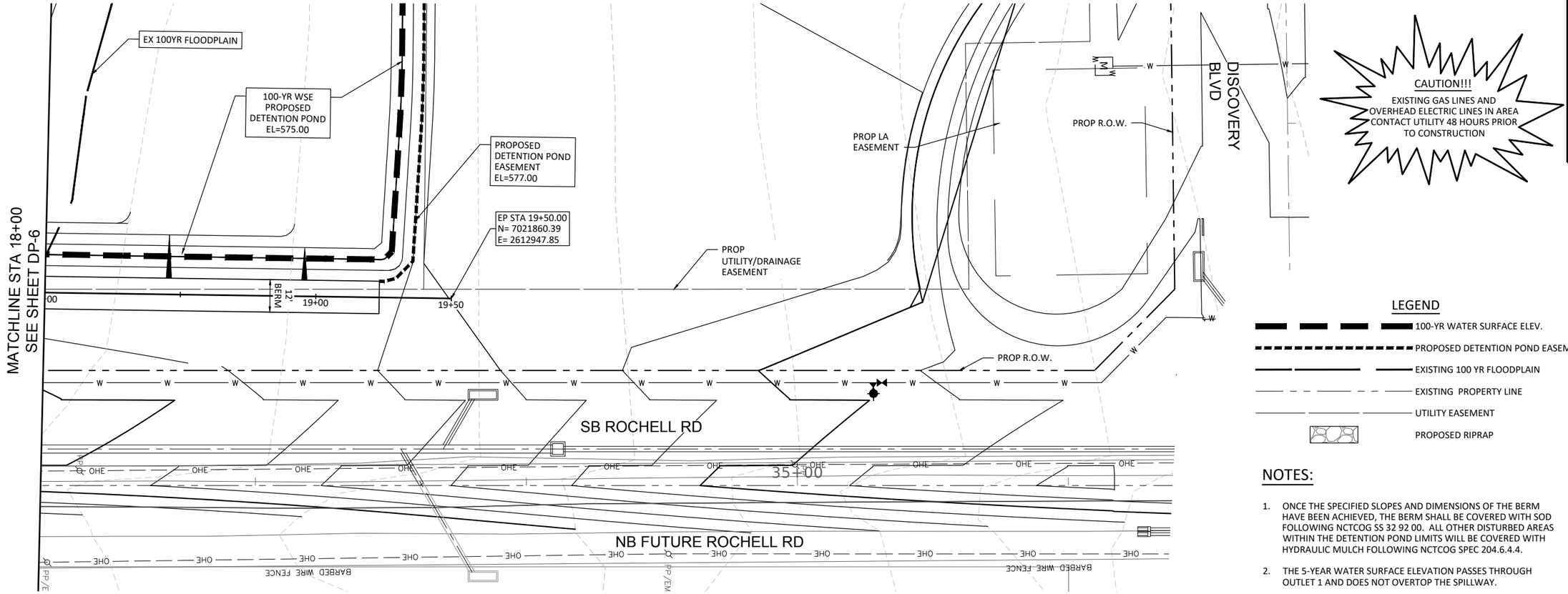

CAUTION!!!
EXISTING GAS LINES AND
OVERHEAD ELECTRIC LINES IN AREA
CONTACT UTILITY 48 HOURS PRIOR
TO CONSTRUCTION

LEGEND

- 100-YR WATER SURFACE ELEV.
- PROPOSED DETENTION POND EASEMENT
- EXISTING 100 YR FLOODPLAIN
- EXISTING PROPERTY LINE
- UTILITY EASEMENT
- PROPOSED RIPRAP

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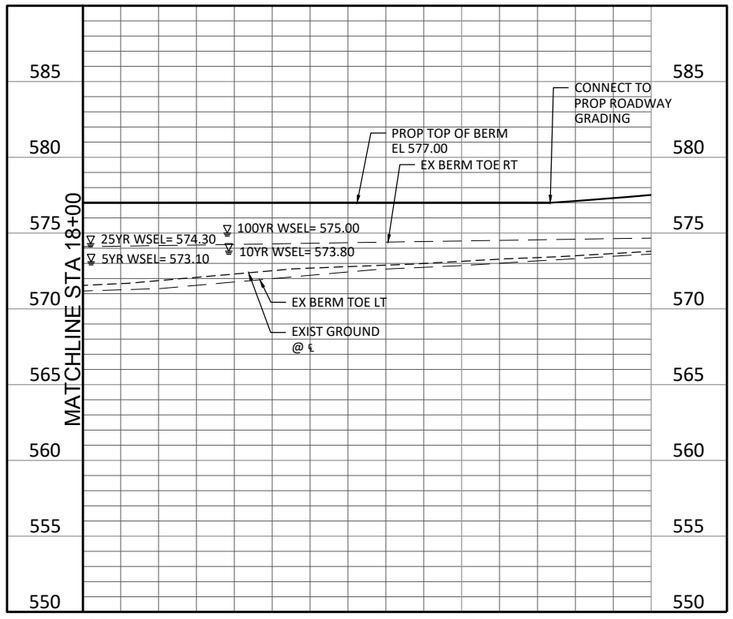
2. THE 5-YEAR WATER SURFACE ELEVATION PASSES THROUGH OUTLET 1 AND DOES NOT OVERTOP THE SPILLWAY.

PROPOSED BERM



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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

N

0 20' 40'
SCALE IN FEET
HORIZONTAL

0 5' 10'
SCALE IN FEET
VERTICAL

Freese and Nichols, Inc.
Texas Registered Engineering Firm F-2144

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OPERATIONS OF THE TEXAS ENGINEERING PRACTICE ACT

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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

EDC PHASE V INFRASTRUCTURE

CIVIL

PROPOSED BERM PLAN AND PROFILE STA 18+00 TO END

F&N JOB NO.	RKW19711
DATE	10/2021
DESIGNED	CES
DRAWN	CAD
REVISED	GG
CHECKED	JTO

NO.	ISSUE	BY	DATE

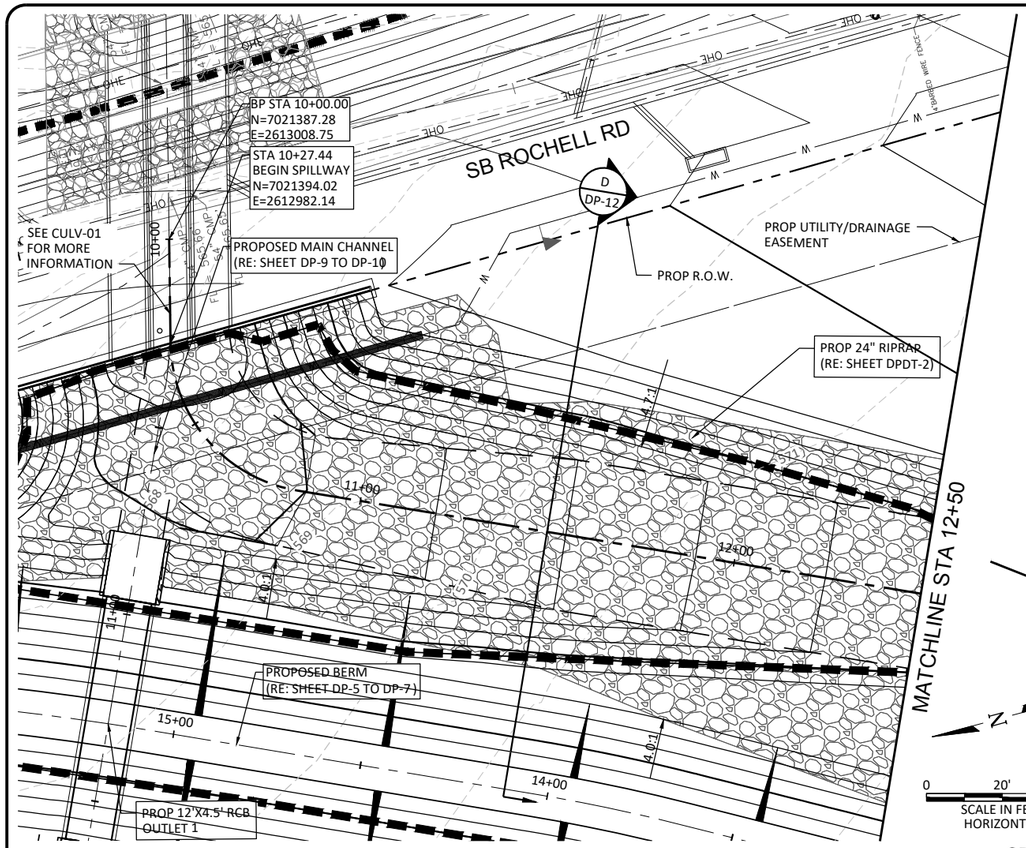
FILE NAME CV-ALL-PP-BERM01.dwg

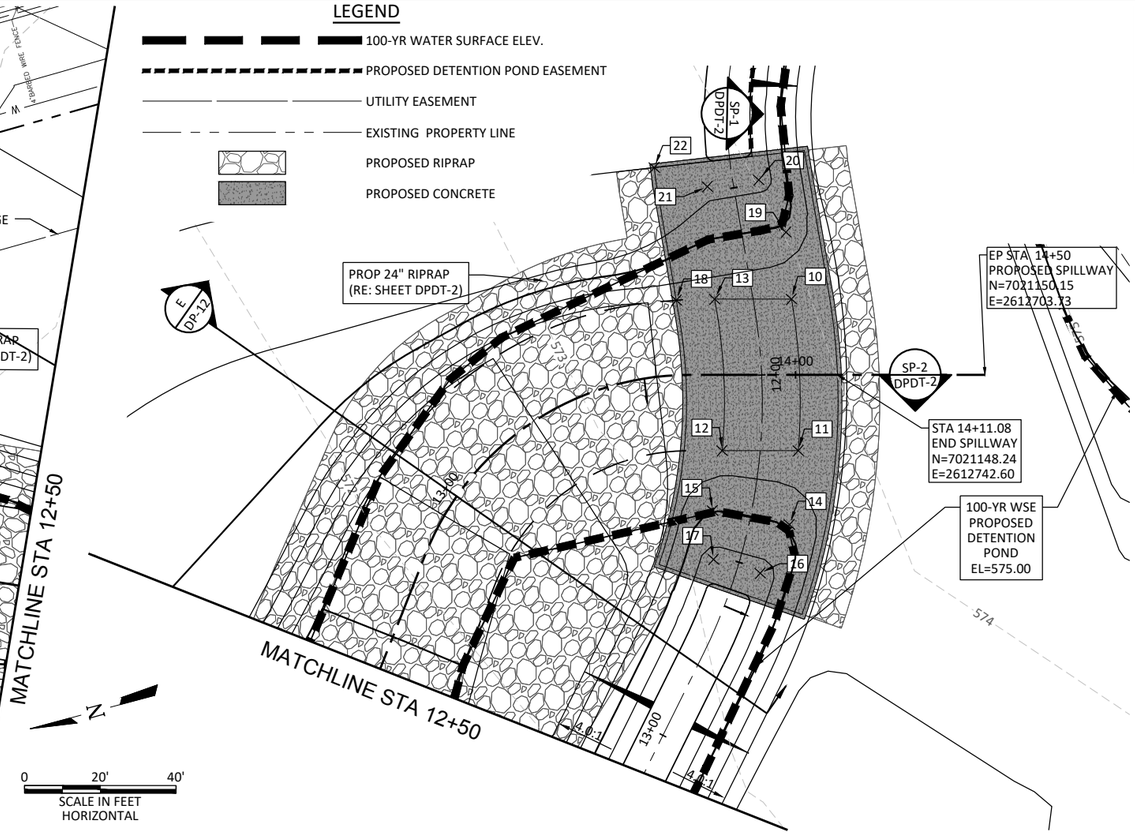
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1

SHEET DP-7
SEQ. 123

ACAD Rel: 24.2s (LMS Tech)
Filename: N:\SW\Drawings\CV-ALL-PP-BERM01.dwg
Last Saved: 2/28/2024 9:48 AM Saved By: 08200

Plot Date: 2/28/2024 10:10 AM Plot By: 08200 Filename: N:\SW\Drawings\CV-ALL-PP-BERM01.dwg





NOTES:

1. DESIGN POINT TABLE SHOWN ON SHEET DP-5.
2. GENERAL RIP RAP PLACEMENT IS FROM THE BOTTOM CHANNEL ELEVATION TO 4 FEET ABOVE THE BOTTOM CHANNEL ELEVATION.
3. THE 5-YEAR WATER SURFACE ELEVATION PASSES THROUGH OUTLET 1 AND DOES NOT OVERTOP THE SPILLWAY.

SCALE IN FEET HORIZONTAL

SCALE IN FEET VERTICAL

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

Freese and Nichols, Inc.
Texas Registered Engineering Firm F-2144

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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

EDC PHASE V INFRASTRUCTURE

CIVIL

PROPOSED SPILLWAY PLAN AND PROFILE

NO.	ISSUE	BY	DATE

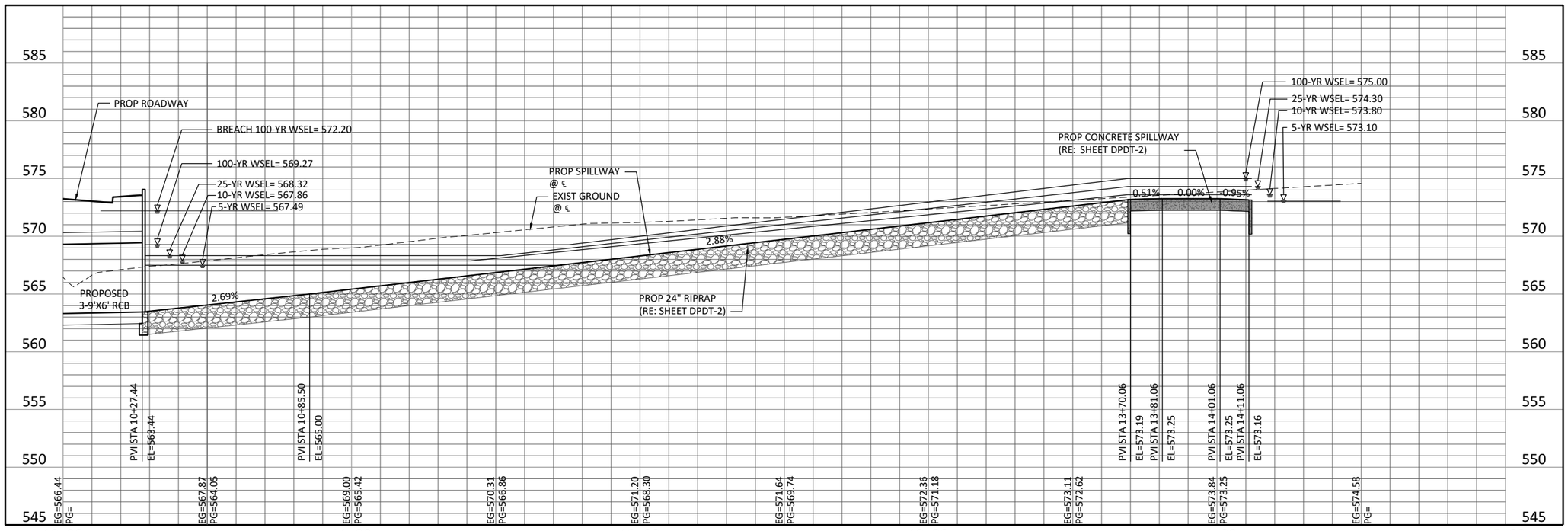
FAN JOB NO.	RKW19711
DATE	10/2021
DESIGNED	CES
DRAWN	CAD
REVISED	GG
CHECKED	JTO
FILE NAME	CV-ALL-PP-SPILLWAY01.dwg

Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.

VERIFY SCALE 1 0

SHEET DP-8

SEQ. 124



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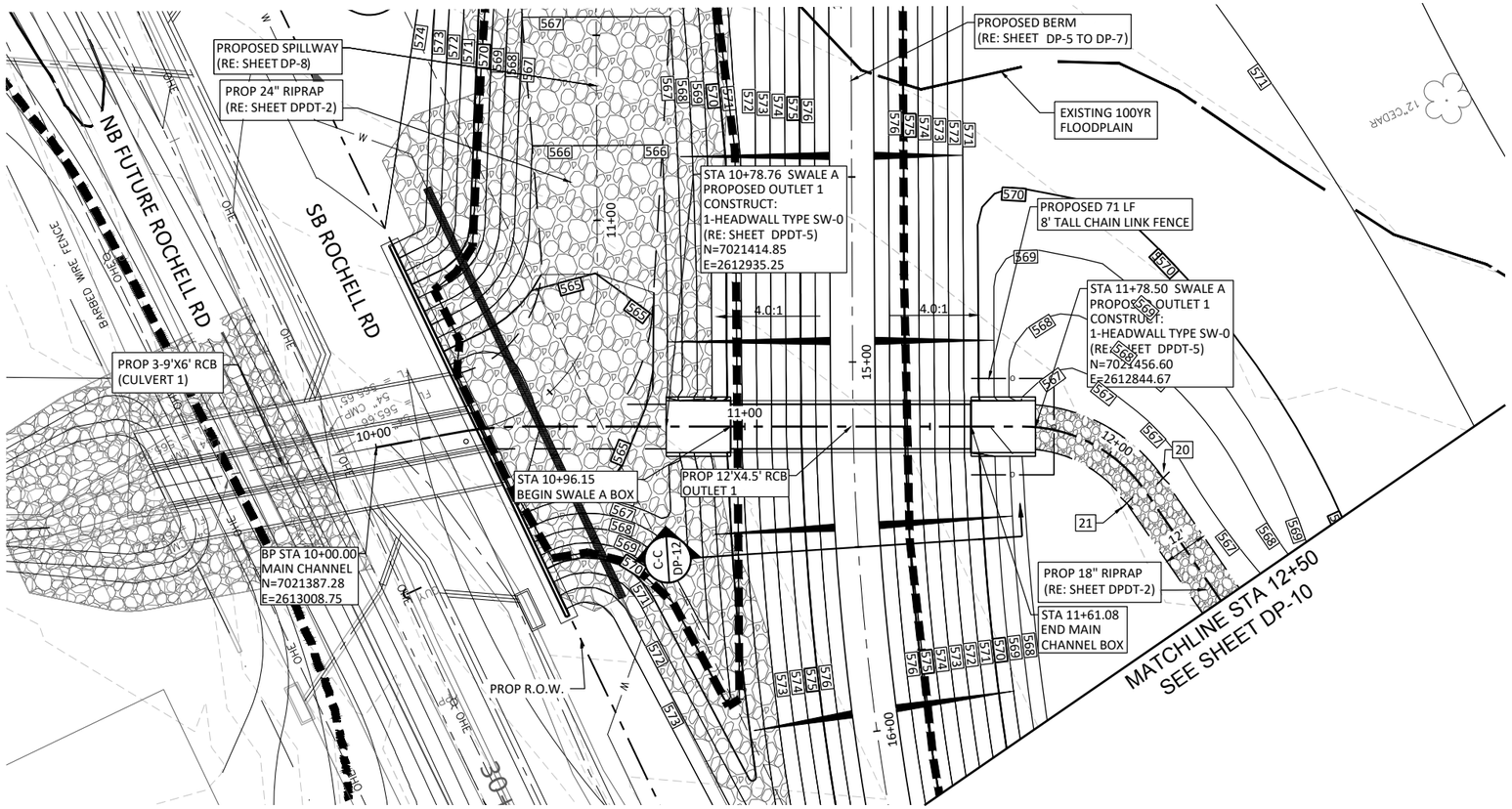
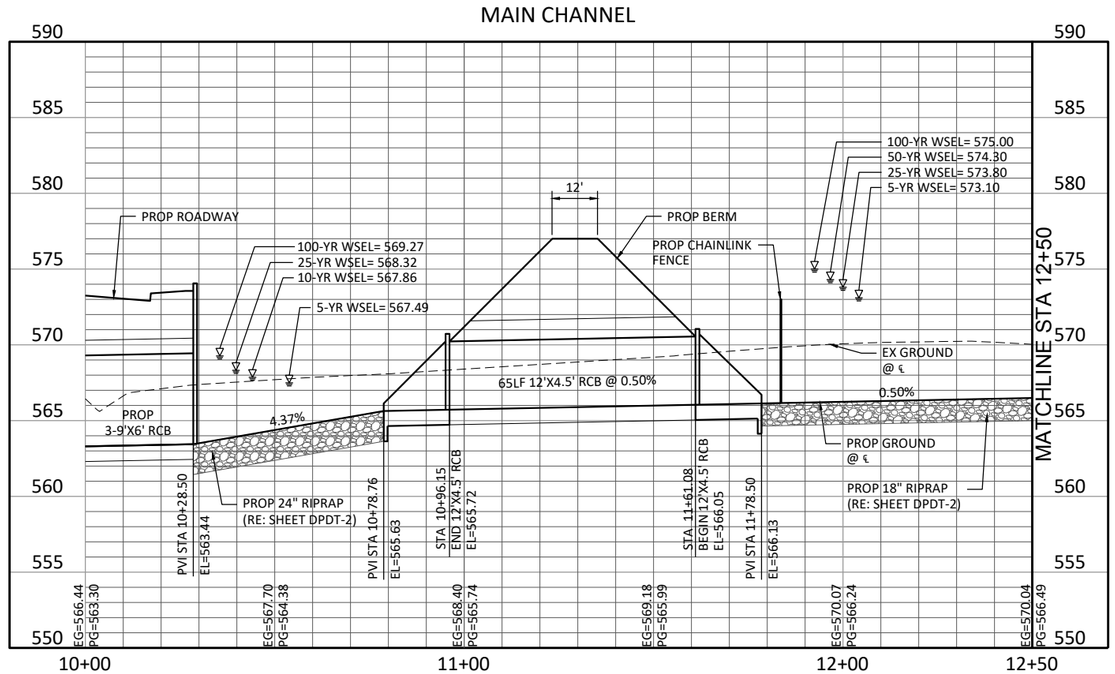
Last Saved: 12/1/2021 11:43 AM Saved By: 03752

Plot Date: 2/28/2024 10:11 AM Plot By: 08200 Filename: N:\SW\Drawings\CV-ALL-PP-SPILLWAY01.dwg





CAUTION!!!
EXISTING GAS LINES AND OVERHEAD ELECTRIC LINES IN AREA CONTACT UTILITY 48 HOURS PRIOR TO CONSTRUCTION

PROPOSED MAIN CHANNEL POINT TABLE				
PNT	NORTHING	EASTING	ELEVATION	DESCRIPTION
20	7021483.49	2612819.06	566.43	DESIGN POINTS
21	7021485.56	2612830.88	566.43	DESIGN POINTS

LEGEND

- 100-YR WATER SURFACE ELEV.
- PROPOSED DETENTION POND EASEMENT
- EXISTING 100 YR FLOODPLAIN
- EXISTING PROPERTY LINE
- PROPOSED RIPRAP

NOTES:

1. CHAINLINK FENCE SHALL HAVE A HEIGHT OF 7 FEET ABOVE GROUND AND WILL TAPER INTO THE BERM. THE FENCE SHALL MAINTAIN A MINIMUM ELEVATION OF 573.10 AT ALL LOCATIONS.

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

N

0 20' 40'
SCALE IN FEET
HORIZONTAL

0 5' 10'
SCALE IN FEET
VERTICAL

Freese and Nichols, Inc.
Texas Registered Engineering Firm F-2144

RELEASED FOR REVIEW ONLY
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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
EDC PHASE V INFRASTRUCTURE
CIVIL
PROPOSED MAIN CHANNEL PLAN AND PROFILE
BEGIN TO STA 12+50

NO.	ISSUE	BY	DATE

J&N JOB NO.	RKW19711
DATE	10/2021
DESIGNED	CES
DRAWN	CAD
REVISED	GG
CHECKED	JTO
FILE NAME	CV-ALL-PP-SWALE01.dwg

Bar is one inch on original drawing, if not one inch on this sheet, adjust scale.
VERIFY SCALE 0 1

SHEET DP-9
SEQ. 125

ACAD Rel: 24.2s (LMS Tech)
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Last Saved: 12/1/2021 11:38 AM Saved By: 03752
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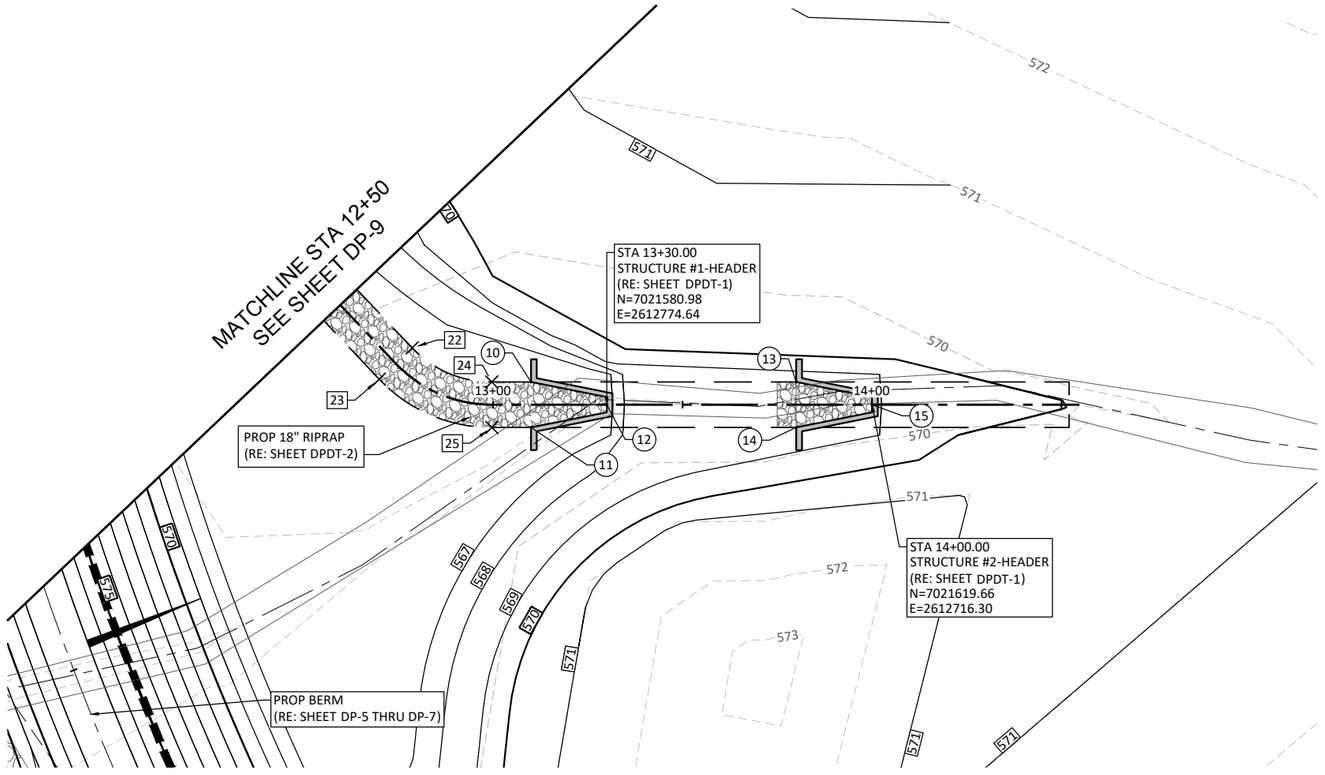


DROP STRUCTURE CONTROL POINTS

PNT	NORTHING	EASTING	ELEVATION	DESCRIPTION
10	7021564.93	2612787.99	567.79	CORNER
11	7021574.93	2612794.62	567.79	CORNER
12	7021580.98	2612774.64	568.08	CENTER
13	7021603.61	2612729.65	567.83	CORNER
14	7021613.61	2612736.28	567.83	CORNER
15	7021619.66	2612716.30	569.73	CENTER

CAUTION!!!
EXISTING GAS LINES AND OVERHEAD ELECTRIC LINES IN AREA CONTACT UTILITY 48 HOURS PRIOR TO CONSTRUCTION

LEGEND

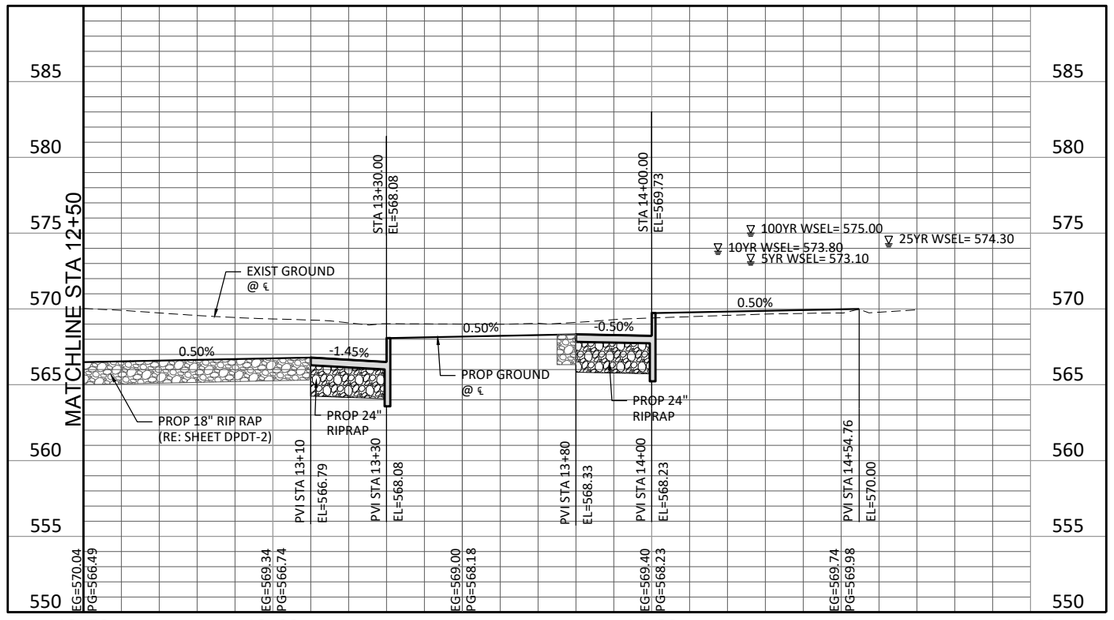
PROPOSED RIPRAP

PROPOSED NATURAL STONE

This Record Drawing is a combination of the sealed engineering contracts for this project, modified by information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on file at the offices of
FREESE AND NICHOLS, INC.

RECORD DRAWINGS PREPARED ON:
02/21/2024

MAIN CHANNEL



PROPOSED MAIN CHANNEL POINT TABLE

PNT	NORTHING	EASTING	ELEVATION	DESCRIPTION
22	7021540.11	2612809.16	566.72	DESIGN POINTS
23	7021542.16	2612820.98	566.72	DESIGN POINTS
24	7021559.20	2612796.64	566.86	DESIGN POINTS
25	7021569.21	2612803.25	566.86	DESIGN POINTS

SCALE IN FEET HORIZONTAL
0 20' 40'

SCALE IN FEET VERTICAL
0 5' 10'

1

Freese and Nichols, Inc.
Texas Registered Engineering Firm F-2144

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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
EDC PHASE V INFRASTRUCTURE
CIVIL
PROPOSED MAIN CHANNEL PLAN AND PROFILE
STA 12+50 TO END

NO.	ISSUE	BY	DATE
1	ADDENDUM #3	CES	11/30/2024
	VERIFY SCALE Bar is one inch on original drawing, if not one inch on this sheet, adjust scale.		

R&M JOB NO.	RKW19711
DATE	10/2021
DESIGNED	CES
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REVISED	GG
CHECKED	JTO
FILE NAME	CV-ALL-PP-SWALE01.dwg

SHEET DP-10
SEQ. 126

ACAD Rel: 24.2s (LMS Tech)
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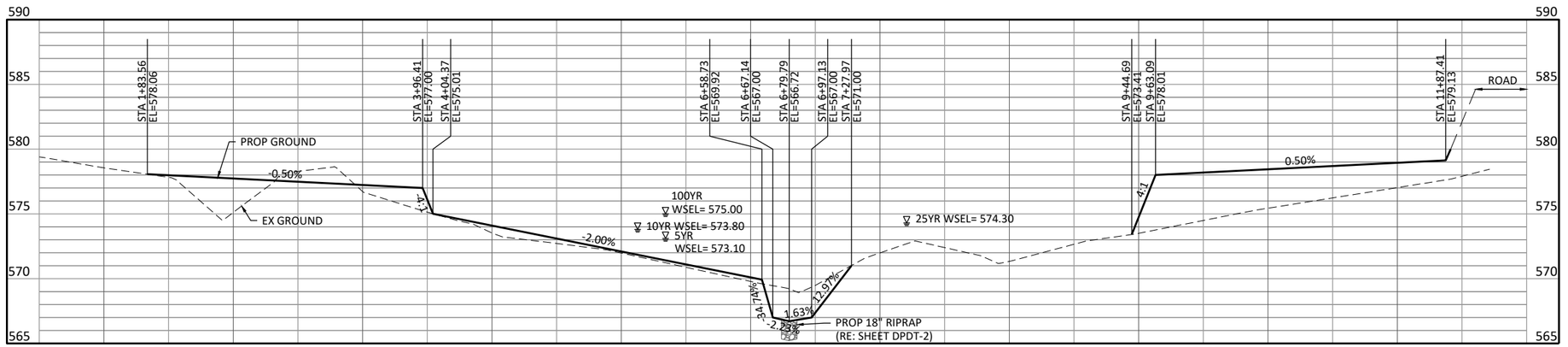
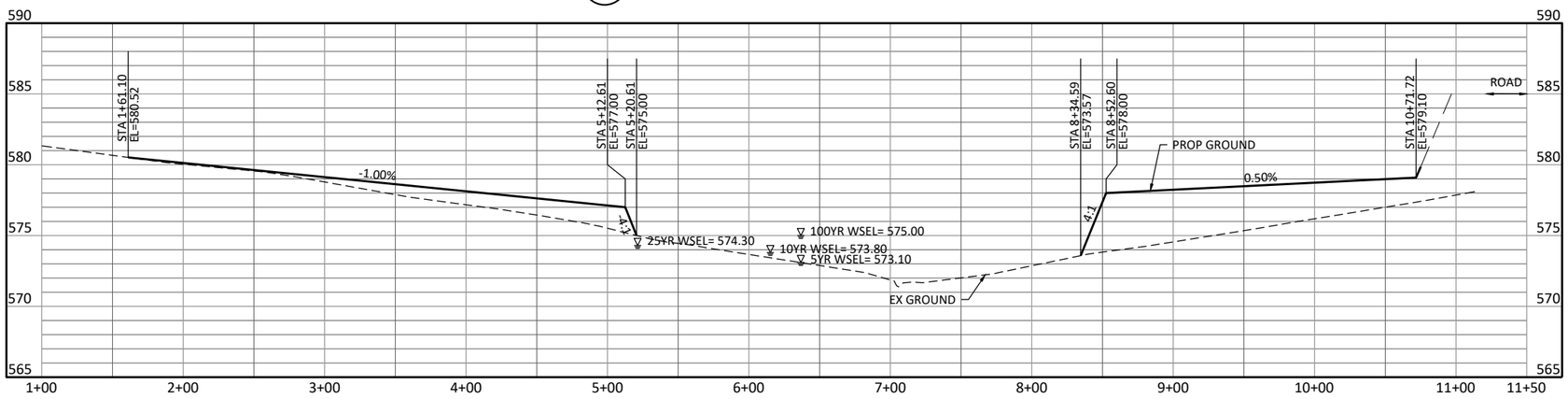


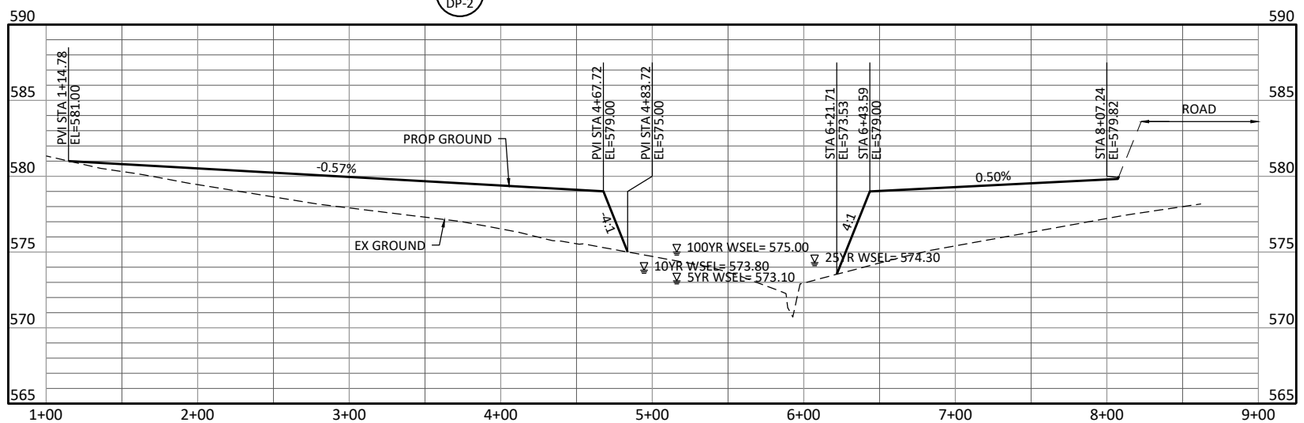
A-A
DP-2

POND CROSS SECTION A-A



B-B
DP-2

POND CROSS SECTION B-B



C-C
DP-2

POND CROSS SECTION C-C

1

0 50' 100'
SCALE IN FEET
HORIZONTAL

0 10' 20'
SCALE IN FEET
VERTICAL

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RECORD DRAWINGS PREPARED ON:
8/20/2024

Freese and Nichols, Inc.
Texas Registered Engineering Firm F-2144

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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

EDC PHASE V INFRASTRUCTURE

CIVIL

PROPOSED POND CROSS SECTIONS

NO.	ISSUE	BY	DATE
1	ADDENDUM #3	CES	11/30/2021

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1

F&N JOB NO.	RKW19711
DATE	10/2021
DESIGNED	CES
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REVISED	GG
CHECKED	JTO
FILE NAME	CV-ALL-PL-XSEC01.dwg

SHEET
DP-11
SEQ.
127

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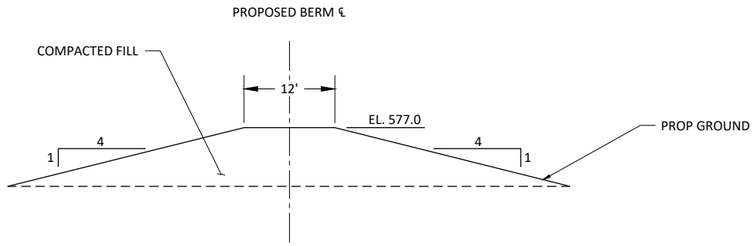
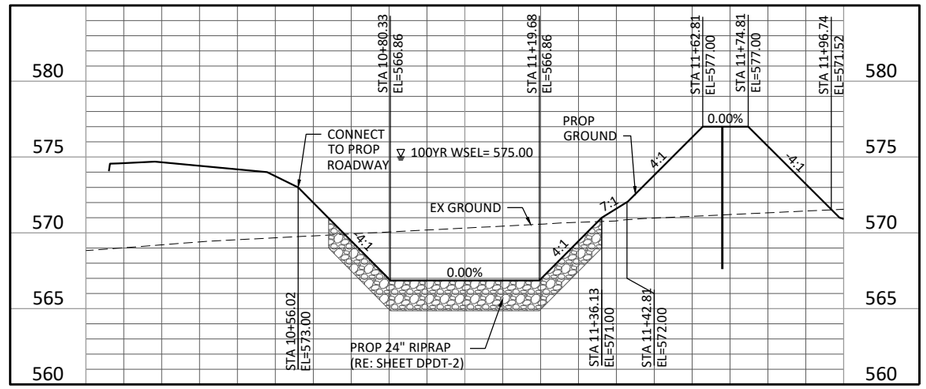


1 TYPICAL BERM CROSS SECTION

1"=10'

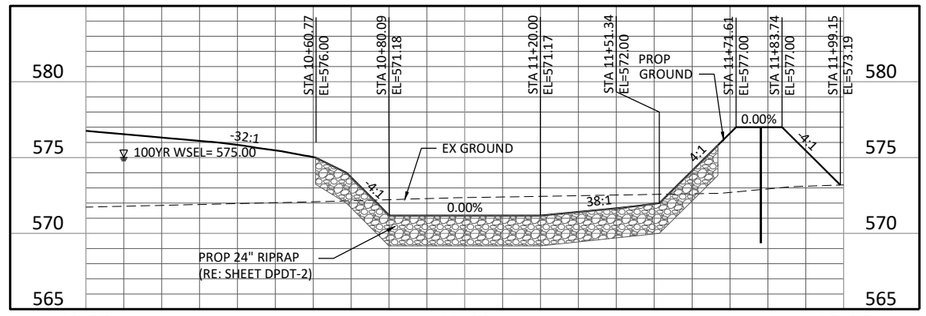
BERM NOTES:

1. SOIL REQUIREMENTS
   a. SOILS COMPRISING THE EMBANKMENT SHALL CONSIST OF CLAYS AND SANDY CLAYS CLASSIFIED AS CH AND CL MATERIALS WITH A LIQUID LIMIT GREATER THAN OR EQUAL TO 30, A PLASTICITY INDEX GREATER THAN OR EQUAL TO 15, AND MORE THAN 50 PERCENT PASSING THE NO. 200 SIEVE, WHICH ARE FREE OF ORGANIC MATTER. THE MAXIMUM PARTICLE SIZE SHALL BE 3 INCHES.
   b. SUITABLE SOILS SHALL BE TESTED FOR DISPERSIVE BEHAVIOR AT A RATE OF ONE CRUMB TEST(ASTM D6572) EVERY 5,000 SQUARE YARDS OF PLACED MATERIAL. ACCEPTABLE MATERIAL SHALL CLASSIFY AS GRADE 1 USING THE CRUMB TEST, WITH NO MORE THAT 10 PERCENT OF THE TEST RESULTS CLASSIFYING AS GRADE 2.
2. SUBGRADE PREPARATION AND BACKFILL REQUIREMENTS
   a. CLEAR, GRUB, AND REMOVE SURFICIAL VEGETATION, WASTE, AND LOOSE SOILS AT LEAST 10 FEET OUTSIDE THE PLAN LIMITS OF THE AREA TO BE OCCUPIED BY THE EMBANKMENT BY FELLING, CUTTING UP, AND DISPOSING OF TREES AND OTHER VEGETATION, TOGETHER WITH THE DOWN TIMBER, SNAGS, BRUSH, RUBBISH, FENCES, AND DEBRIS OCCURRING WITHIN THE AREA TO BE CLEARED. TREES AND BRUSH OUTSIDE THE LIMITS OF THE INDICATED AREAS TO BE CLEARED, BUT WITHIN THE IMMEDIATE VICINITY OF THE WORK THAT INTERFERE WITH OR RETARD THE PROGRESS OF CONSTRUCTION OPERATIONS, MAY BE REMOVED UPON RECEIPT OF THE APPROVAL OF THE ENGINEER.
   b. AFTER FILLING DEPRESSIONS AND IMMEDIATELY PRIOR TO PLACEMENT OF THE EMBANKMENT SOILS, THOROUGHLY LOOSEN THE FOUNDATION BY SCARIFYING, PLOWING, DISCING, OR HARROWING TO A MINIMUM DEPTH OF 6 INCHES AND WET TO WITHIN THE REQUIRED MOISTURE CONTENT. REMOVE ANY ROOTS OR OTHER DEBRIS TURNED UP IN THE PROCESS OF LOOSENING AND COMPACT THE ENTIRE SURFACE OF THE EMBANKMENT FOUNDATION AREA BY A MINIMUM OF EIGHT COMPLETE PASSES OF THE APPROPRIATE COMPACTOR.
   c. UPON COMPLETION OF FOUNDATION PREPARATION, CONTINUE EARTHWORK OPERATIONS FOR THE EMBANKMENT BY PLACING FILL IN LOOSE, HORIZONTAL LIFTS NOT EXCEEDING 8 TO 9 INCHES. PLACE AND COMPACT THE EMBANKMENT SOILS IN UNIFORM, CONTINUOUS LIFTS. FILL PLACED ALONG SLOPES SHALL BE BENCHED TO ENSURE HORIZONTAL LIFTS.
   d. EMBANKMENT SOILS SHOULD BE COMPACTED TO A MINIMUM IN-PLACE DENSITY OF 98 PERCENT OF THE MAXIMUM DENSITY AS DETERMINED BY ASTM D698. THE MOISTURE RANGE SHALL BE AT OPTIMUM MOISTURE TO PLUS 3 PERCENT OF THE OPTIMUM MOISTURE AS DETERMINED BY ASTM D698.
3. FIELD QUALITY CONTROL
   a. IN-PLACE DENSITY TESTS SHALL BE CONDUCTED AT A AN AGREED UPON RATE, GENERALLY BETWEEN THREE AND TEN TESTS PER LIFT DEPENDING ON THE GENERAL RATE OF PRODUCTION AND THE TYPICAL AREA OF THE LIFTS. IN GENERAL, ONE TEST PER 1,000 CUBIC YARDS SHOULD BE USED AS A GUIDELINE, WITH FEWER TESTS USED FOR LARGER AREAS AND IF RESULTS ARE GENERALLY CONSISTENT. THIS FREQUENCY CAN BE INCREASED BY THE ENGINEER IF MATERIALS OR PROPERTIES VARY SIGNIFICANTLY.
   b. AT LEAST ONE MOISTURE-DENSITY DETERMINATION, ONE ATTERBERG LIMITS DETERMINATION, AND ONE PARTICLE SIZE GRADATION TEST SHALL BE PERFORMED FOR EACH MATERIAL TYPE THAT IS PLACED AND COMPACTED. ADDITIONAL TESTS SHALL BE PERFORMED AT THE START OF AND DURING THE COURSE OF CONSTRUCTION FOR ANY SIGNIFICANT CHANGE IN MATERIAL TYPE, COLOR, CONSISTENCY, OR OTHER CHARACTERISTICS THAT MAY BE INDICATIVE OF A CHANGE IN MATERIAL PROPERTIES.



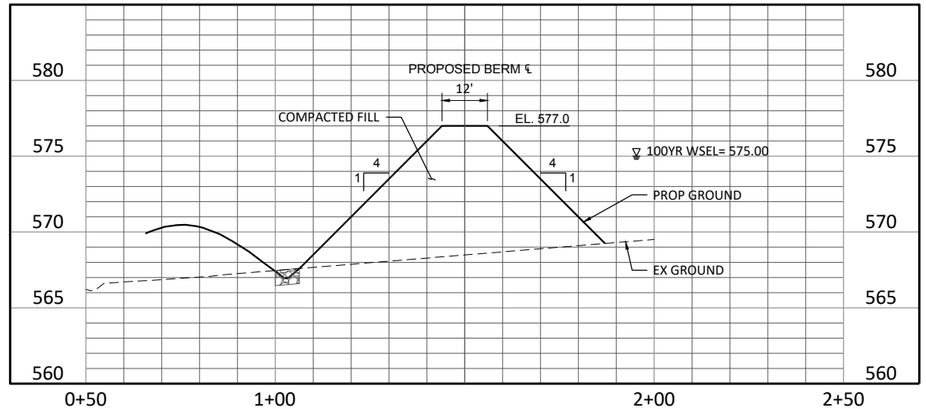
D DP-8 SPILLWAY CROSS SECTION A-A

NTS



E DP-8 SPILLWAY CROSS SECTION B-B

NTS



F DP-6 BERM CROSS SECTION C-C

NTS

1

0 20' 40'
SCALE IN FEET HORIZONTAL

0 5' 10'
SCALE IN FEET VERTICAL

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RECORD DRAWINGS PREPARED ON: 8/20/2024

Freese and Nichols, Inc.
Texas Registered Engineering Firm F-2144

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FREESE NICHOLS
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Dallas, Texas 75204
Phone – (214) 217-2200
Web – www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
EDC PHASE V INFRASTRUCTURE
CIVIL
PROPOSED SPILLWAY CROSS SECTIONS A-A, B-B, & C-C

NO.	ISSUE	BY	DATE
1	ADDENDUM #3	CES	11/30/2023

Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
VERIFY SCALE 0 1"

F&N JOB NO. RKW19711
DATE 10/2021
DESIGNED CES
DRAWN CAD
CHECKED JTO
FILE NAME CV-ALL-PP-SPILLWAY01.dwg

SHEET DP-12
SEQ. 128

ACAD Rel: 24.2s (LMS Tech)
Filename: N:\SW\Drawings\CV-ALL-PP-SPILLWAY01.dwg
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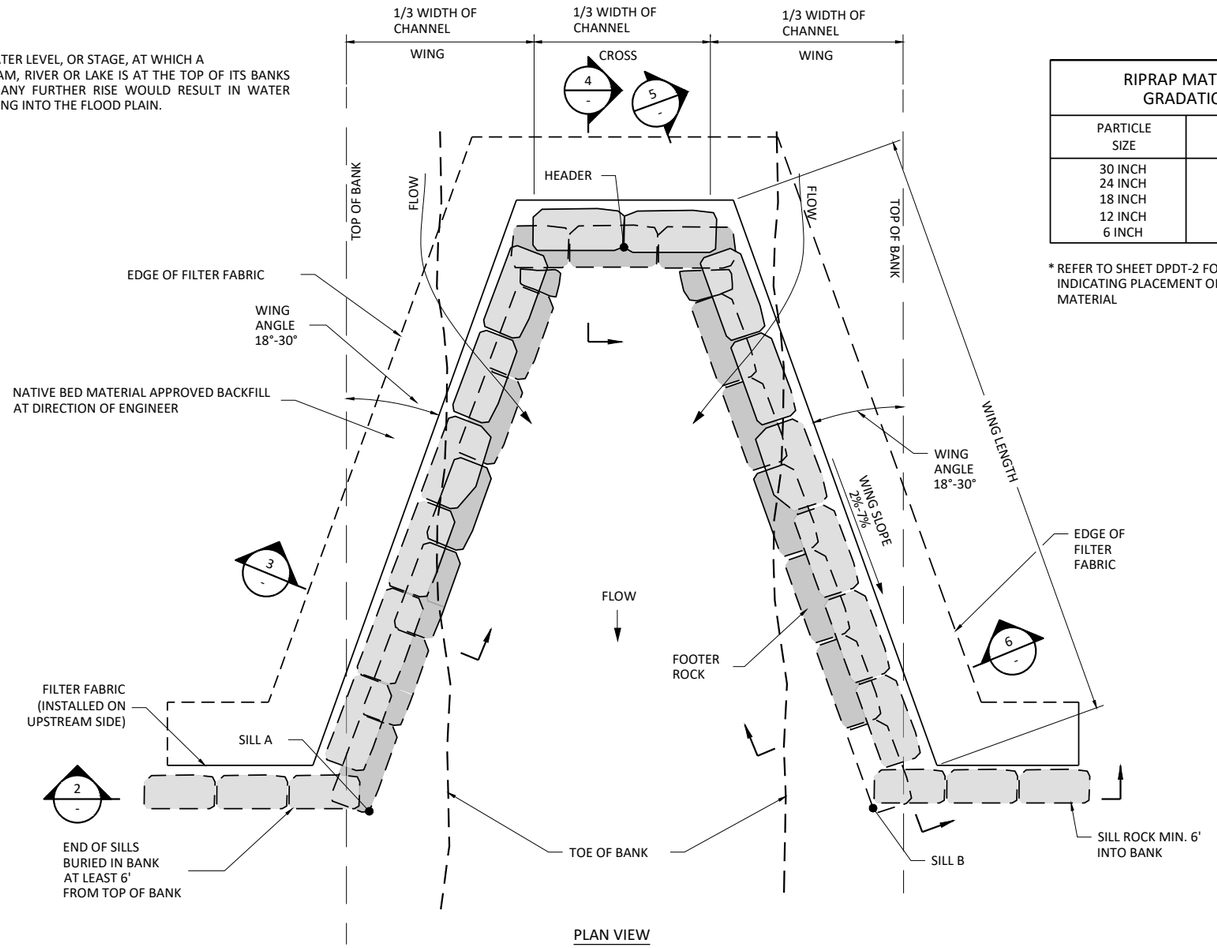
Plot Date: 2/28/2024 10:12 AM Plot By: 08200 Filename: N:\SW\Drawings\CV-ALL-PP-SPILLWAY01.dwg

BANKFULL: THE WATER LEVEL, OR STAGE, AT WHICH A STREAM, RIVER OR LAKE IS AT THE TOP OF ITS BANKS AND ANY FURTHER RISE WOULD RESULT IN WATER MOVING INTO THE FLOOD PLAIN.



PLAN VIEW

NOTES:

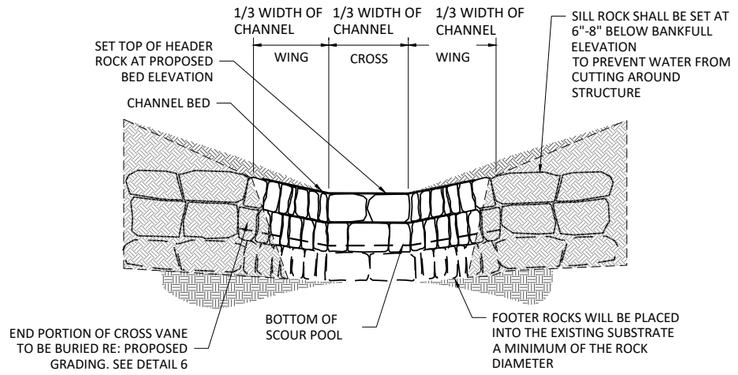
1. HEADER, FOOTER, AND SILL ROCKS TO BE STACKABLES
2. VANE ARMS BACKFILLED WITH APPROVED BACKFILL AT DIRECTION OF ENGINEER.
3. EXTEND CUTOFF SILL TO VALLEY TO CREATE FLOODPLAIN BLOCK

1 SINGLE DROP ROCK CROSS OR ROCK CROSS VANE

NOT TO SCALE

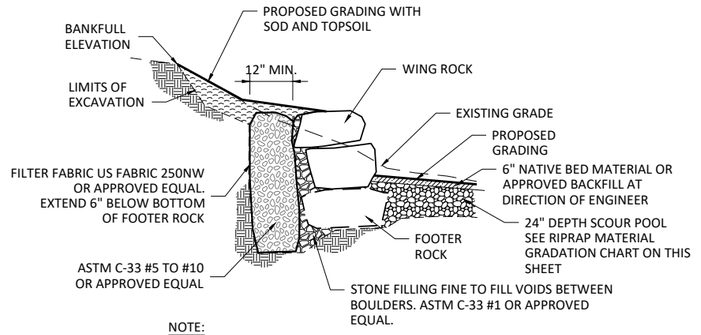
RIPRAP MATERIAL GRADATION *	
PARTICLE SIZE	PERCENT PASSING
30 INCH	100
24 INCH	75-100
18 INCH	55-75
12 INCH	35-50
6 INCH	15-30

* REFER TO SHEET DPDT-2 FOR NOTES INDICATING PLACEMENT OF RIPRAP MATERIAL



2 UPSTREAM VIEW

NOT TO SCALE

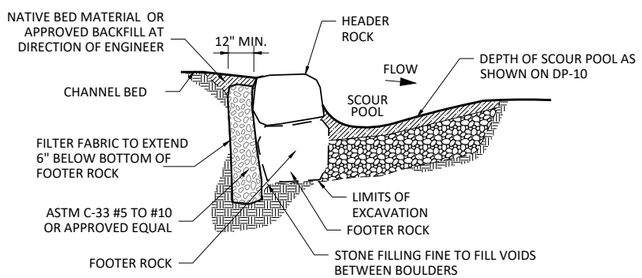


NOTE:

NEAT LINE EXCAVATION. ADDITIONAL MATERIAL SHALL BE AT CONTRACTORS EXPENSE.

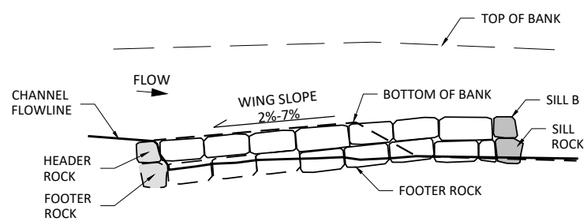
3 SECTION VIEW

NOT TO SCALE



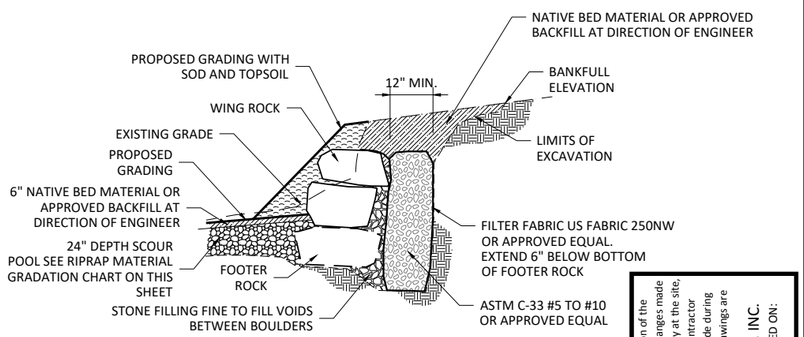
4 PROFILE VIEW

NOT TO SCALE



5 SECTION VIEW

NOT TO SCALE



NOTE:

NEAT LINE EXCAVATION. ADDITIONAL MATERIAL SHALL BE AT CONTRACTORS EXPENSE.

6 SECTION VIEW

NOT TO SCALE

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Freese and Nichols, Inc.
Texas Registered Engineering Firm F-2144

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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

EDC PHASE V INFRASTRUCTURE

CIVIL

PROPOSED DROP STRUCTURE DETAILS

NO.	ISSUE	DATE	BY

P&N JOB NO.	RKW19711
DATE	10/2021
DESIGNED	CES
DRAWN	CAD
REVISED	GG
CHECKED	JTO
FILE NAME	CV-DT-DET01.dwg

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale. 0 1

SHEET DPDT-1

SEQ. 129

ACAD Rel: 24.2s (LMS Tech)
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Last Saved: 12/1/2021 11:59 AM Saved By: 03752

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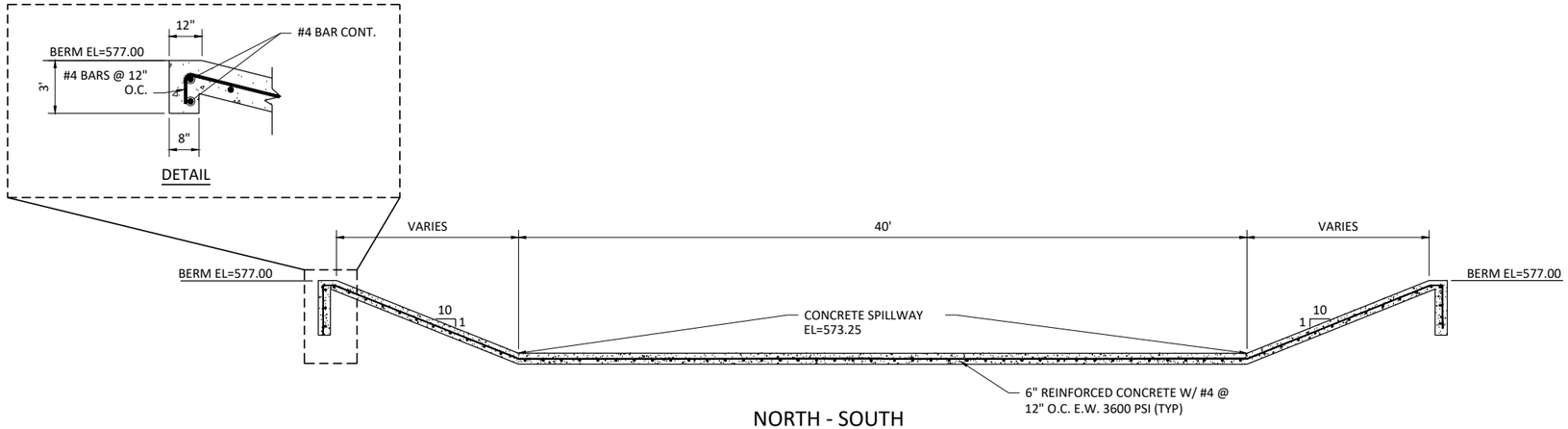
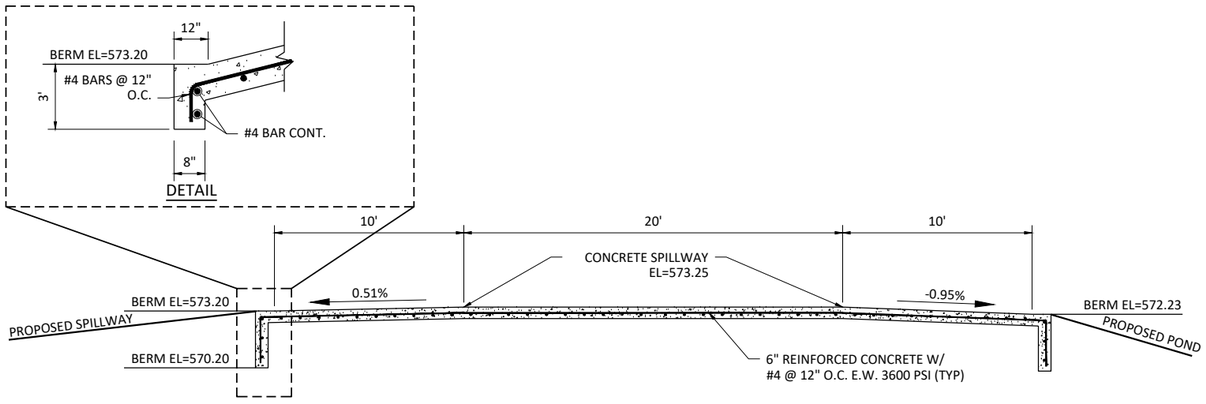


SP-1
DP-5

NORTH - SOUTH CONCRETE SPILLWAY DETAIL

NOT TO SCALE



SP-2
DP-5

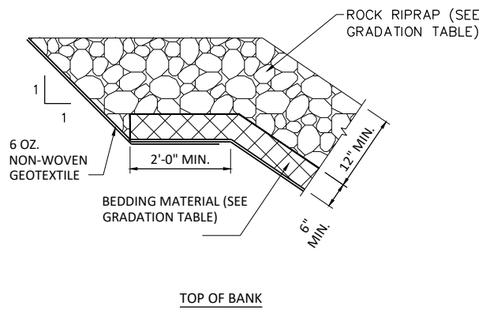
EAST - WEST CONCRETE SPILLWAY DETAIL

NOT TO SCALE

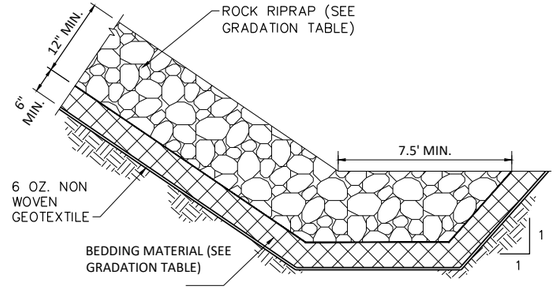
RIPRAP GRADATIONS		RIPRAP GRADATIONS		RIPRAP GRADATIONS		BEDDING GRADATION	
24" THICKNESS OF RIPRAP		18" THICKNESS OF RIPRAP		12" THICKNESS OF RIPRAP		6" THICKNESS OF BEDDING	
SIEVE SIZE SQUARE MESH	PERCENT PASSING	SIEVE SIZE SQUARE MESH	PERCENT PASSING	SIEVE SIZE SQUARE MESH	PERCENT PASSING	SIEVE SIZE SQUARE MESH	PERCENT PASSING
30 INCH	100	21 INCH	100	15 INCH	100	3 INCH	100
24 INCH	65-100	18 INCH	65-100	12 INCH	70-100	1-1/2 INCH	55-100
18 INCH	45-75	12 INCH	35-65	8 INCH	45-75	3/4 INCH	25-60
12 INCH	25-50	8 INCH	15-40	6 INCH	30-55	3/8 INCH	5-30
8 INCH	10-30	6 INCH	5-25	3 INCH	10-30	No. 4	0-10
6 INCH	0-15	4 INCH	0-15	1-1/2 INCH	0-10		

NOTE: THE BEDDING MATERIAL AND GEOTEXTILE IS CONSIDERED SUBSIDIARY TO ROCK RIPRAP.

1



TOP OF BANK



BOTTOM OF BANK

3

ROCK RIPRAP DETAIL

NOT TO SCALE

NOTES:

1. THE ENTIRE PERIMETER OF THE SPILLWAY SHOULD HAVE A 3' TIE DOWN.
2. SUBGRADE MATERIAL UNDER THE SPILLWAY SHOULD MATCH THE EMBANKMENT MATERIAL FOR THE BERM. SEE BERM NOTES ON SHEET DP-12.

Freese and Nichols, Inc.
Texas Registered Engineering Firm F-2144

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

FREESE NICHOLS
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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

EDC PHASE V INFRASTRUCTURE

CIVIL

MISCELLANEOUS DETENTION POND DETAILS

NO.	ISSUE	BY	DATE
1	ADDENDUM #3	CES	1/30/2021

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1

F&N JOB NO.	RKW19711
DATE	10/2021
DESIGNED	CES
DRAWN	CAD
REVISED	GG
CHECKED	JTO
FILE NAME	CV-DT-DET01.dwg

SHEET
DPDT-2
SEQ.
130

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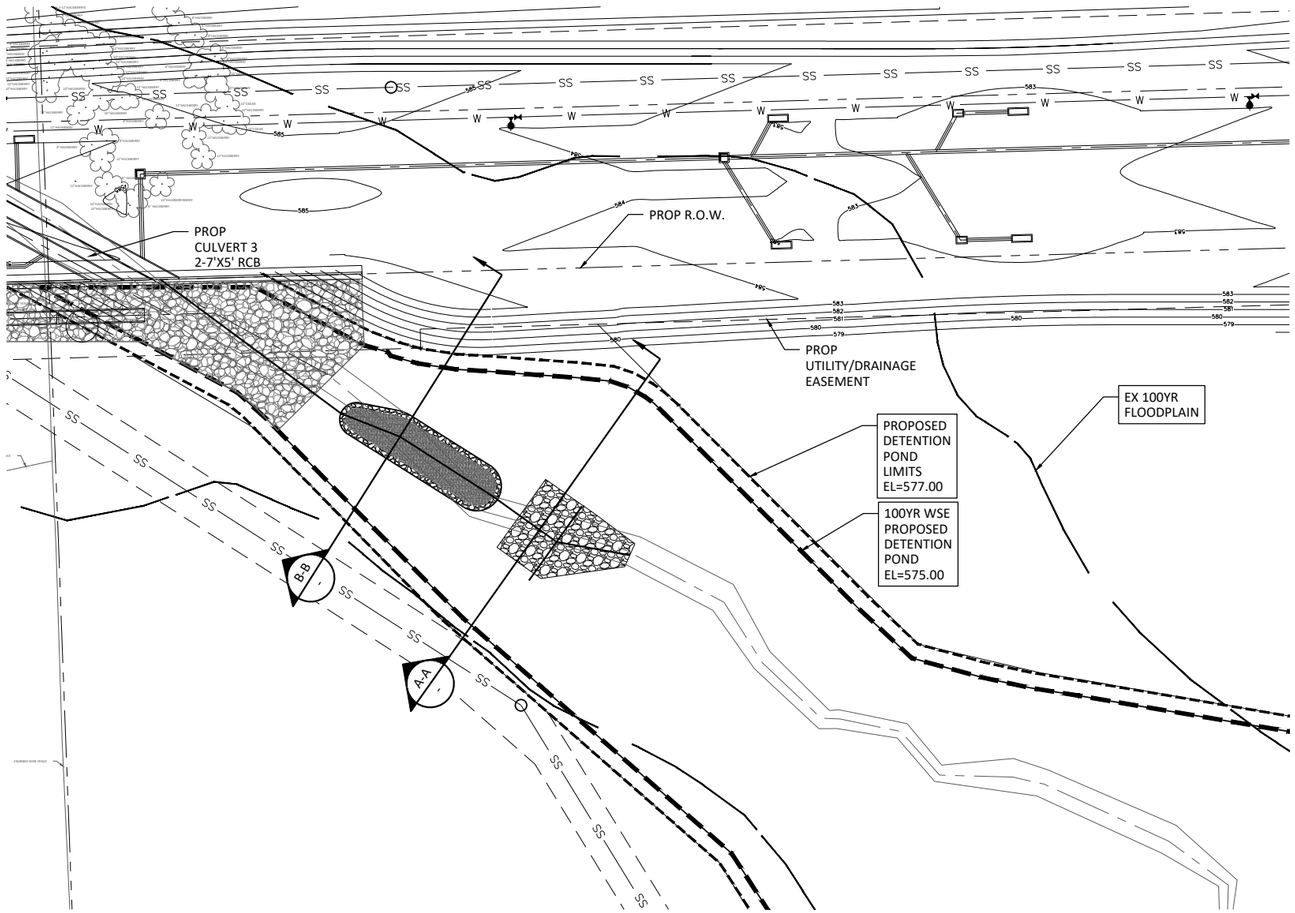

LEGEND

- 100-YR WATER SURFACE ELEV.
- PROPOSED DETENTION POND LIMITS
- EXISTING 100 YR FLOODPLAIN
- EXISTING PROPERTY LINE
- PROPOSED RIPRAP
- PROPOSED CONCRETE
- PROPOSED GROUND
- PROPOSED SOD

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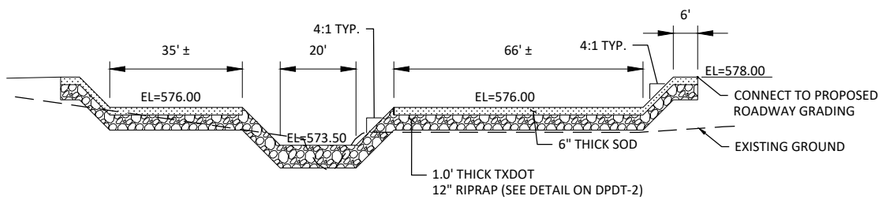
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

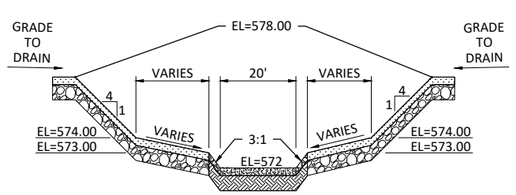
NOTES:

1. THE SEDIMENT FOREBAYS WERE DESIGNED BASED ON A YEARLY MAINTENANCE FREQUENCY. IF THE FOREBAYS ARE NOT MAINTAINED ON A REGULAR BASIS, THE FUNCTION OF THE FOREBAY, CULVERT, AND DETENTION POND WILL DETERIORATE.

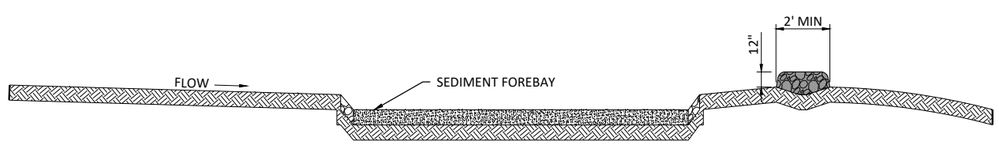
PROPOSED FOREBAY POINT TABLE



1 FOREBAY SECTION A-A
NTS



2 FOREBAY SECTION B-B
NTS



3 TYPICAL FOREBAY PROFILE
NTS

N

0 20' 40' 80'
SCALE IN FEET

Freese and Nichols, Inc.
Texas Registered Engineering Firm F-2144

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FREESE NICHOLS
2711 North Haskell Ave, Suite 3300
Dallas, Texas 75204
Phone – 214.217.2200
Web – www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
EDC PHASE V INFRASTRUCTURE
CIVIL
PROPOSED FOREBAY DETAILS

NO.	ISSUE	BY	DATE

FNI JOB NO.	RKW19711
DATE	10/2021
DESIGNED	CES
DRAWN	CAD
REVISED	GG
CHECKED	JTO
FILE NAME	CV-DT-DET01.dwg

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0 1"

SHEET DPDT-3
SEQ. 131

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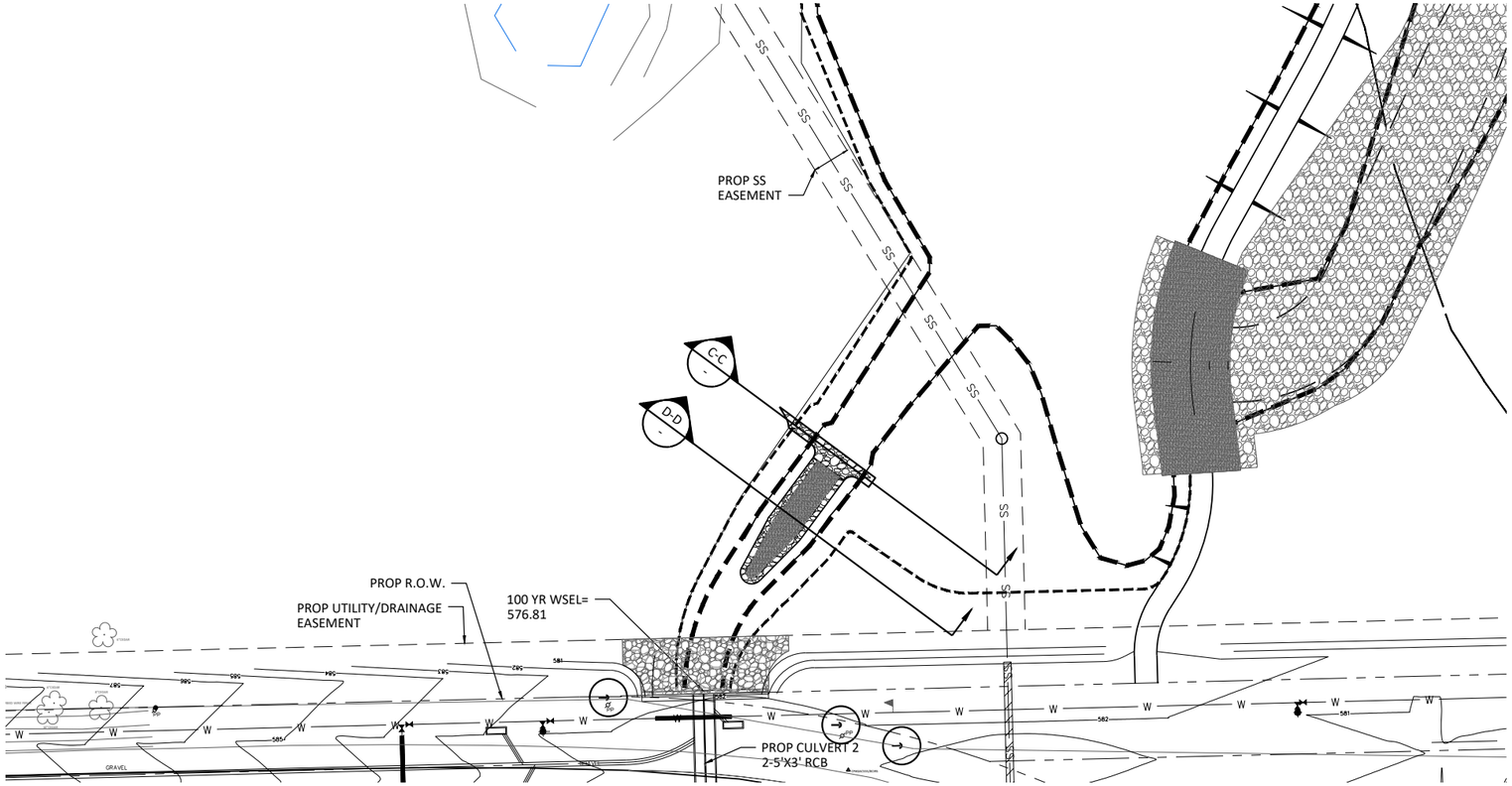


LEGEND

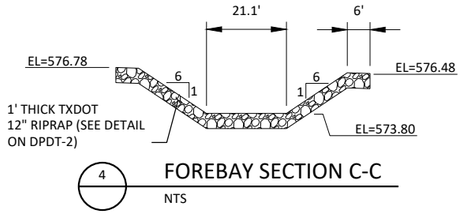
- 100-YR WATER SURFACE ELEV.
- PROPOSED DETENTION POND LIMITS
- EXISTING 100 YR FLOODPLAIN
- EXISTING PROPERTY LINE
- PROPOSED RIPRAP
- PROPOSED CONCRETE
- PROPOSED GROUND
- PROPOSED SOD

NOTES:

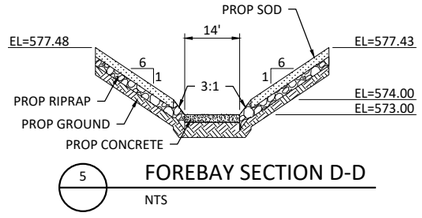
1. THE SEDIMENT FOREBAYS WERE DESIGNED BASED ON A YEARLY MAINTENANCE FREQUENCY. IF THE FOREBAYS ARE NOT MAINTAINED ON A REGULAR BASIS, THE FUNCTION OF THE FOREBAY, CULVERT, AND DETENTION POND WILL DETERIORATE.

N

0 20' 40' 80'
SCALE IN FEET



4 FOREBAY SECTION C-C
NTS



5 FOREBAY SECTION D-D
NTS

PROPOSED FOREBAY POINT TABLE

Basin	Target Sediment Size (mm)	R Fraction of Target Sediment Removed	Peak Flow Rate, Q (m/sec)	A (m2) Surface Area at Normal Water Depth	Wnwl (m) Minimum Width or Length of Sediment Pond
North	1.0	0.9	16.5 (584.6 cft/sec)	2,435 (0.602 acre-ft)	33.1 (108.6 ft)
South	1.0	0.9	2.59 (91.3 cft/sec)	381 (0.094 acre-ft)	9.2 (30.3 ft)

Basin	Condition	Land Use	Weighted CN	Drainage Area (acres)	Total Sediment Load (tons/year)	Total Sediment Volume (cf/year)	Selected Sediment Storage Volume (cf)
North	Existing	Urban	92.7	304.8	29	563	
	Ultimate	Urban	97.7	327.3	59.8	1,160	1,160
South	Existing	Urban	92.7	21.3	2	39	
	Ultimate	Urban	97.7	21.3	3.9	75.5	75.5

Basin	Low Weir Elevation (ft)	High Weir Elevation (ft)	Weir Width (ft)	Peak Pond Elevation 100-Year Return Interval Under Ultimate Conditions (ft)
North	573.5	574	128	576
South	N/A	573.8	21.6	575.5

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

Freese and Nichols, Inc.
Texas Registered Engineering Firm F-2144

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Web – www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

EDC PHASE V INFRASTRUCTURE

CIVIL

PROPOSED FOREBAY DETAILS

JOB/JOB NO.	RKW19711
DATE	10/2021
DESIGNED	CES
DRAWN	CAD
REVISED	GG
CHECKED	JTO
FILE NAME	CV-DT-DET01.dwg

NO.	ISSUE	BY	DATE

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VERIFY SCALE 0 1

SHEET DPDT-4
SEQ. 132

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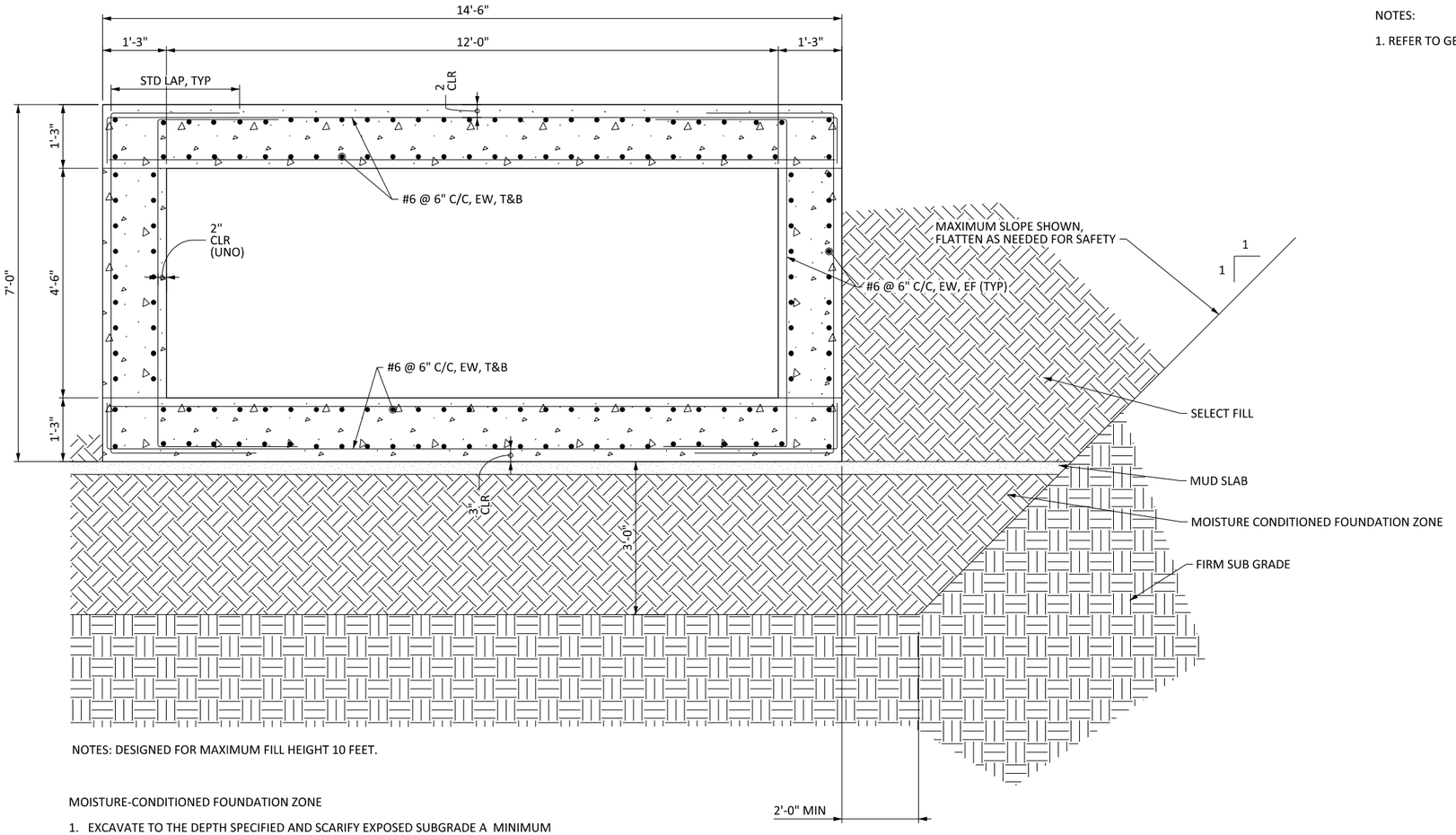

NOTES: DESIGNED FOR MAXIMUM FILL HEIGHT 10 FEET.

MOISTURE-CONDITIONED FOUNDATION ZONE

1. EXCAVATE TO THE DEPTH SPECIFIED AND SCARIFY EXPOSED SUBGRADE A MINIMUM OF 6 INCHES.
2. PLACE AND COMPACT ONSITE SOILS IN MAXIMUM LOOSE, HORIZONTAL LIFTS NOT EXCEEDING 8 TO 9 INCHES (4 INCHES WITH HAND DIRECTED COMPACTION EQUIPMENT).
3. COMPACT TO AT LEAST 98% STANDARD PROCTOR DENSITY (ASTM D698) AT A MOISTURE CONTENT FROM OPTIMUM TO +4% OF OPTIMUM.
4. PROTECT AND MAINTAIN MOISTURE CONTENT DURING PLACEMENT AND COMPACTION. REWORK LIFTS FAILING TO MEET THE SPECIFICATIONS.
5. PLACE MUD SLAB WITHIN 4 HOURS OF FINAL COMPACTION.

1 RCB SECTION
3/4"= 1'-0"

NOTES:

1. REFER TO GENERAL NOTES ON SHEET SDDT-6.

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

1 1/2" = 1'-0"
0 1' 2'

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASE THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY AMY L. RAINES TEXAS NO. 83515 ON 10/21/2021 IT IS UNLAWFUL TO RELEASE THIS DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
STRUCTURAL
12 x 4.5 CIP BOX CULVERT

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED ALR
DRAWN MDB
CHECKED -
REVISED -

NO.	ISSUES	BY	DATE

FILE NAME ST-RKW-DT-CULV.dgn

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale
0 1"

SHEET DPDT-5
SEQ. 133

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DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE:
FILE:

TABLE OF DIMENSIONS AND REINFORCING STEEL
(Wings for one structure end)

Dimensions					Variable Reinforcing				Estimated Quantities per ft of wing length (2~wings) (3)	
					Bars J1		Bars J2			
Maximum Wingwall Height Hw	W	X	Y	Z	Size	Spa	Size	Spa	Reinf (Lb/Ft)	Conc (CY/Ft)
2'-6"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	33.73	0.248
3'-0"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	37.07	0.261
3'-6"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	37.74	0.273
4'-0"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	38.41	0.285
4'-6"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	41.75	0.330
5'-0"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	45.09	0.343
5'-6"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	45.75	0.355
6'-0"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	46.42	0.367
7'-0"	3'-8"	1'-9"	1'-3"	7"	#4	1'-0"	#4	1'-0"	52.77	0.414
8'-0"	4'-2"	2'-0"	1'-6"	8"	#5	1'-0"	#4	1'-0"	60.19	0.486
9'-0"	4'-8"	2'-3"	1'-9"	8"	#4	6"	#4	6"	81.49	0.535
10'-0"	5'-2"	2'-6"	2'-0"	8"	#5	6"	#4	6"	97.25	0.584
11'-0"	5'-8"	2'-9"	2'-3"	8"	#6	6"	#5	6"	133.65	0.634
12'-0"	6'-2"	3'-0"	2'-6"	9"	#7	6"	#5	6"	162.29	0.721
13'-0"	6'-8"	3'-3"	2'-9"	11"	#7	6"	#5	6"	178.80	0.856
14'-0"	7'-2"	3'-6"	3'-0"	1'-0"	#8	6"	#5	6"	216.78	0.959
15'-0"	7'-8"	4'-0"	3'-0"	1'-1"	#9	6"	#6	6"	283.06	1.068
16'-0"	8'-2"	4'-6"	3'-0"	1'-3"	#9	6"	#6	6"	297.02	1.234

TABLE OF WINGWALL REINFORCING
(2~wings)

Bar	Size	No.	Spa
D	#5	~	1'-0"
E	#4	~	1'-0"
F	#4	~	1'-0"
G	#6	4	~
M	#4	4	~
P	#4	~	1'-0"
R	#5	6	~
V	#4	~	1'-0"

TABLE OF ESTIMATED CULVERT TOEWALL QUANTITIES

Bar	Size	No.	Spa
L	#4	~	1'-6"
Q	#4	1	~
Reinf (Lb/Ft)			2.45
Conc (CY/Ft)			0.037

WING DIMENSION FORMULAS:

(All values are in feet.)

Hw = H + T + C - 0.250'
Lw = (Hw - 0.333') (SL)

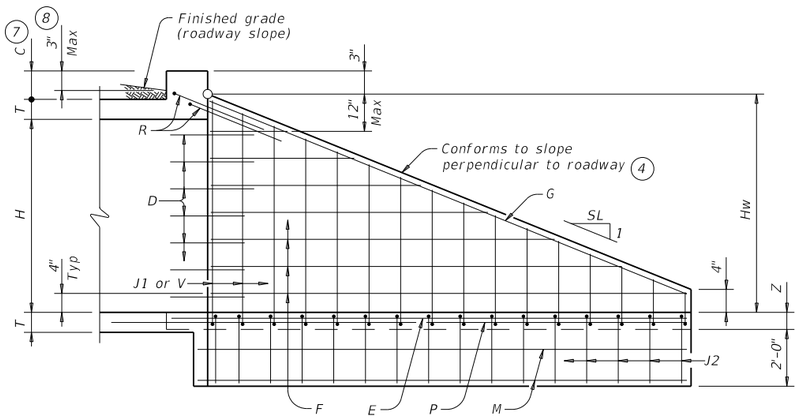
For cast-in-place culverts:
Ltw = (N) (S) + (N + 1) (U)

For precast culverts:
Ltw = (N) (2U + S) + (N - 1) (0.5')

Total Wingwall Area (two wings ~ SF) = (Hw + 0.333') (Lw)

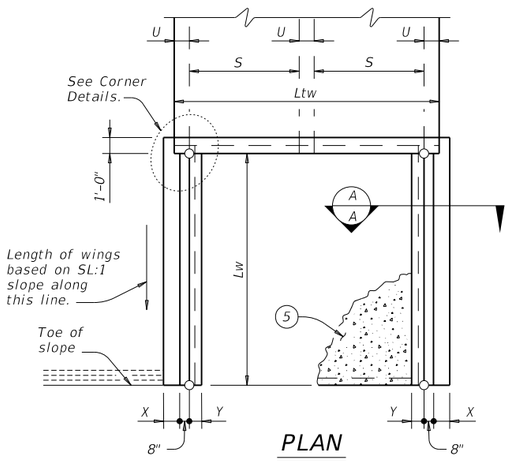
Hw = Height of wingwall
SL:1 = Side slope ratio (horizontal:1 vertical)
Lw = Length of wingwall
Ltw = Culvert toewall length
N = Number of culvert spans

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



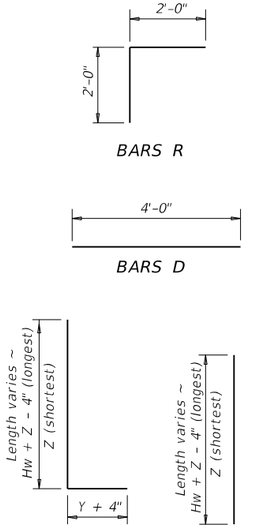
INSIDE ELEVATION

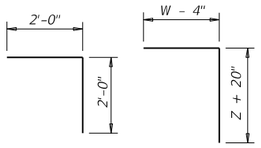
(Showing reinforcing. Culvert and culvert toewall reinforcing not shown for clarity.)

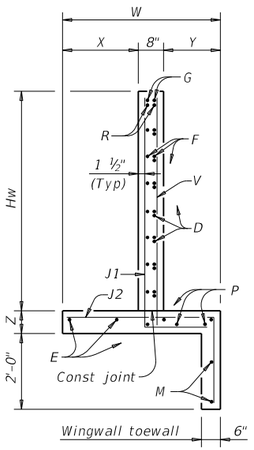


PLAN

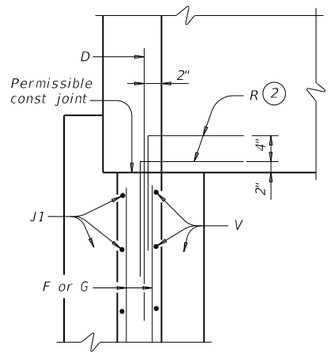
(Showing dimensions.)



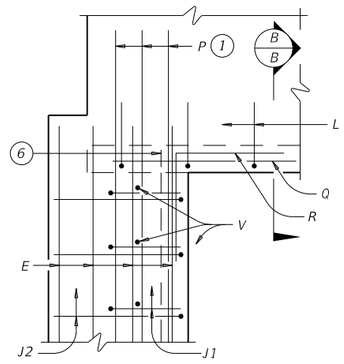




SECTION A-A

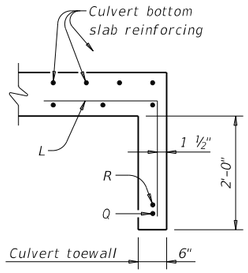


WINGWALL



FOOTING AND TOEWALL

CORNER DETAILS



SECTION B-B (5)

(1) Extend Bars P 3'-0" minimum into bottom slab of box culvert.

(2) Adjust as necessary to maintain 1 1#2" clear cover and 4" minimum between bars.

(3) Quantities shown are based on an average wing height for two wings (one structure end). To determine total quantities for two wings, multiply the tabulated values by Lw.

(4) Recommended values of side slope are: 2:1, 3:1, 4:1, and 6:1.

(5) When shown elsewhere on the plans, construct 5" deep concrete riprap. Payment for riprap is as required by Item 432, "Riprap". Unless otherwise shown on the plans or directed by the Engineer, provide a 6" wide by 1'-6" deep reinforced concrete toewall along all edges of the riprap adjacent to natural ground; reinforce the toewall by extending typical riprap reinforcing into the toewall; and extend construction joints or grooved joints oriented in the direction of flow across the full distance of the riprap at intervals of approximately 20'. When such riprap is provided, the culvert toewall shown in SECTION B-B will not be required.

(6) At Contractor's option, culvert toewall may be ended flush with wingwall toewall. Adjust reinforcing as needed.

(7) 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0, refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Box Culvert Rail Mounting Details (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.

(8) For vehicle safety, the following requirements must be met:
- For structures without bridge rail, construct curbs no more than 3" above finished grade.
- For structures with bridge rail, construct curbs flush with finished grade.

Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

MATERIAL NOTES:

Provide Class C concrete (f'c = 4,200 psi, 7.0 sack/CY).
Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
In riprap concrete, synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing unless noted otherwise.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
When structure is founded on solid rock, depth of toewalls for culverts and wingwalls may be reduced or eliminated as directed by the Engineer.
See Box Culvert Supplement (BCS) standard sheet for additional dimensions and information.
The quantities for concrete and reinforcing steel resulting from the formulas given on this sheet are for Contractor's information only.

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

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

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TEXAS NO: 137876 ON 10/20/2021
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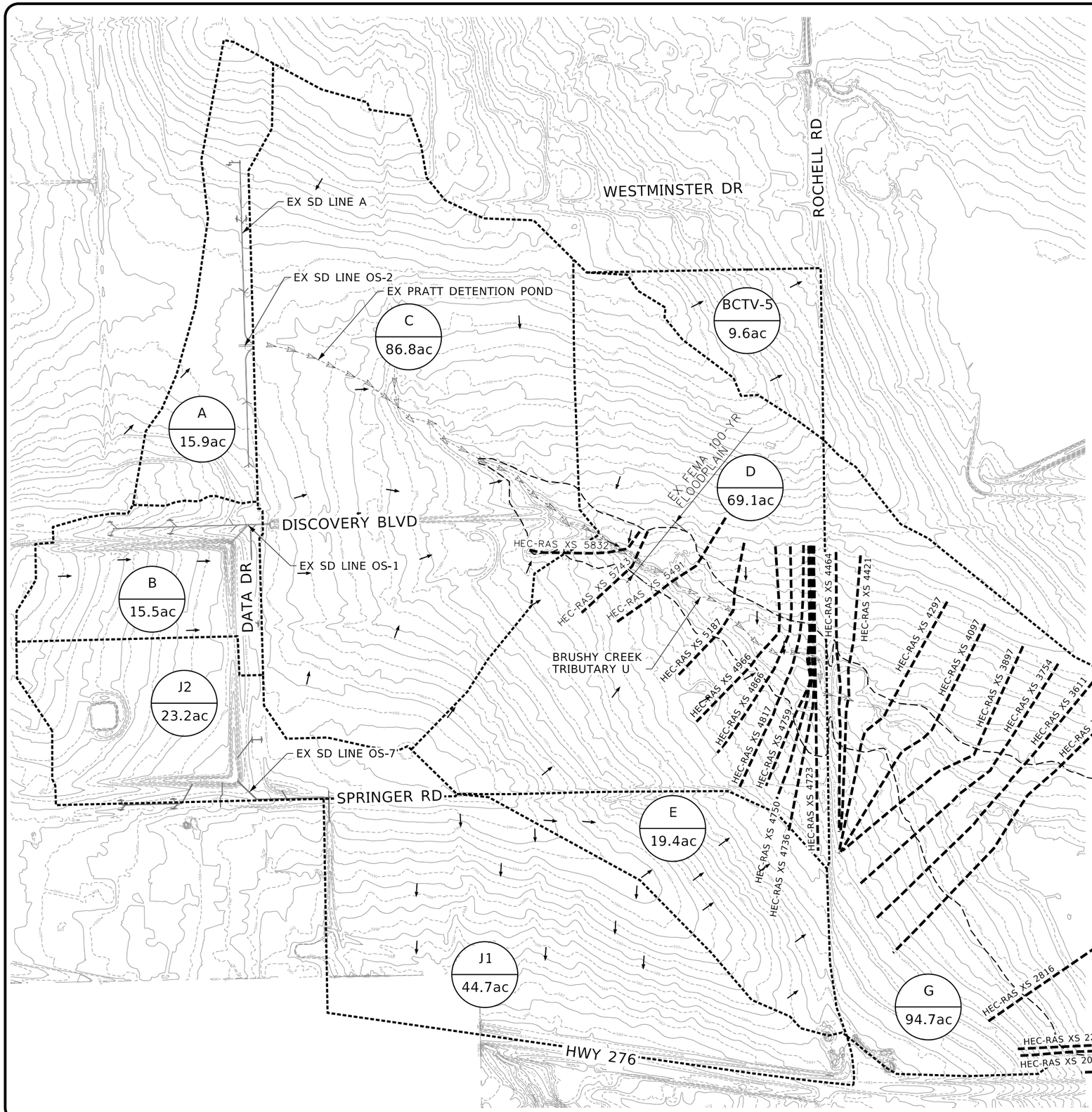
Texas Department of Transportation

Bridge Division Standard

CONCRETE WINGWALLS WITH STRAIGHT WINGS FOR 0° SKEW BOX CULVERTS

SW-O

FILE: sw-0std-20.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020 REVISIONS	CONT	SECT	JOB	HIGHWAY
	DIST	COUNTY		SHEET NO.
				134



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RECORD DRAWINGS PREPARED ON: 8/20/2024

N

0 125' 250' 500'
SCALE IN FEET

Pre Project Hydrology Calculations Summary

Input Parameters					Results			
Basin Name	Area (sq. miles)	Area (acres)	Curve Number*	Lag Time (min.)	5-yr Peak Flow (cfs)	10-yr Peak Flow (cfs)	25-yr Peak Flow (cfs)	100-yr Peak Flow
A	0.02490	15.94	91.1	9.8	59	73	86	111
B	0.02425	15.52	91.3	10.2	57	70	83	107
C	0.13566	86.82	90.5	14.6	277	340	403	522
D	0.10798	69.10	89.1	17.4	200	247	294	382
E	0.03032	19.41	90.4	14.4	62	76	91	117
G	0.14804	94.75	91.5	14.4	309	378	447	577
J1	0.06991	44.74	90.6	8.5	172	211	250	323
J2	0.03624	23.19	90.7	11.7	81	99	117	152
BCTV-5	0.01501	9.61	88.7	9.5	35	43	51	66

Note: * Curve numbers are based on AMC III conditions per City of Rockwall standards

LEGEND

- X / X.XXac — DRAINAGE AREA DESIGNATION / AREA (ACRES)
- DRAINAGE BOUNDARY
- FLOW DIRECTION
- CREEK CENTERLINE
- FEMA EFFECTIVE FLOODPLAIN

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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TEXAS NO. 134055 ON 10/21/2021
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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

EXISTING DRAINAGE AREA MAP

NO.	ISSUES	BY	DATE

FAN JOB NO. RKW19271
DATE APRIL 2022
DESIGNED MLW
DRAWN MLW
REVISED
CHECKED SEC
FILE NAME cv-trt-pl-EXdamap01.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale!
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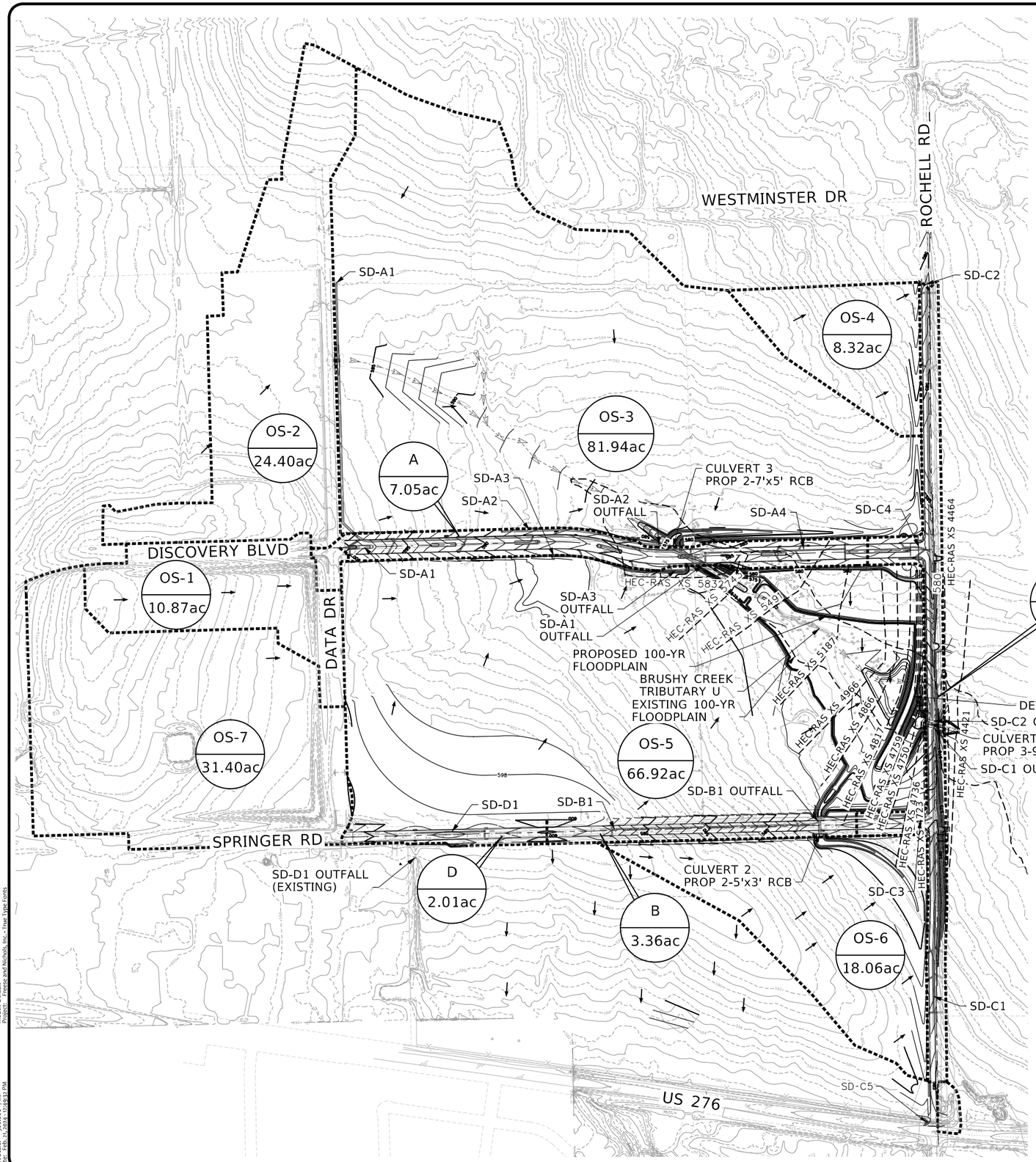
SHEET DA-1
SEQ. 135



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FREESE AND NICHOLS, INC.

RECORD DRAWINGS PREPARED ON: 8/20/2024

NOTES:

1. OS-1 OUTFALLS TO SD-A1 AT MANHOLE A1-5 AT DATA AND DISCOVERY.
2. OS-2 OUTFALLS TO SD-A1 AT MANHOLE A1-7 NORTH OF DATA AND DISCOVERY.
3. OS-3 OUTFALLS TO CULVERT 3 VIA PROPOSED ROAD SIDE DITCHES AND NATURAL TERRAIN.
4. OS-4 OUTFALLS TO EXISTING ROADSIDE DITCH NORTH OF PROJECT LIMITS VIA PROPOSED ROAD SIDE DITCH.
5. OS-5 OUTFALLS TO PROPOSED DRAINAGE POND VIA PROPOSED ROAD SIDE DITCHES AND NATURAL TERRAIN.
6. OS-6 OUTFALLS TO CULVERT 2 VIA PROPOSED ROAD SIDE DITCHES AND NATURAL TERRAIN.
7. OS-1, OS-2, OS-3, OS-5, OS-6, A, B AND C ARE DETAINED FOR IN PROPOSED DETENTION POND.
8. THE PROPOSED DETENTION POND IS DESIGNED TO OVER-DETAIN FOR PROPOSED LINE C (BOTH FUTURE AND PROPOSED ROADWAY).

N

0 125' 250' 500'
SCALE IN FEET

LEGEND

- A / X.XXac — DRAINAGE AREA DESIGNATION; AREA (ACRES)
- DRAINAGE BOUNDARY
- FLOW DIRECTION
- CREEK CENTERLINE

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASED FOR THE PURPOSES OF INTERIM REVIEW UNDER THE AUTHORITY OF SARAH E. CAUDLE, TEXAS NO. 134055, ON 10/21/2021. IT IS NOT TO BE USED FOR BIDDING, PERMIT OR CONSTRUCTION PURPOSES WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

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Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

OVERALL DRAINAGE AREA MAP UNDEVELOPED CONDITIONS

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW1971H
DATE APRIL 2022
DESIGNED MLW
DRAWN MLW
REVISED
CHECKED SEC
FILE NAME cv-trt-pl-damap01.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

0" 1"

SHEET DA-2

SEQ. 136

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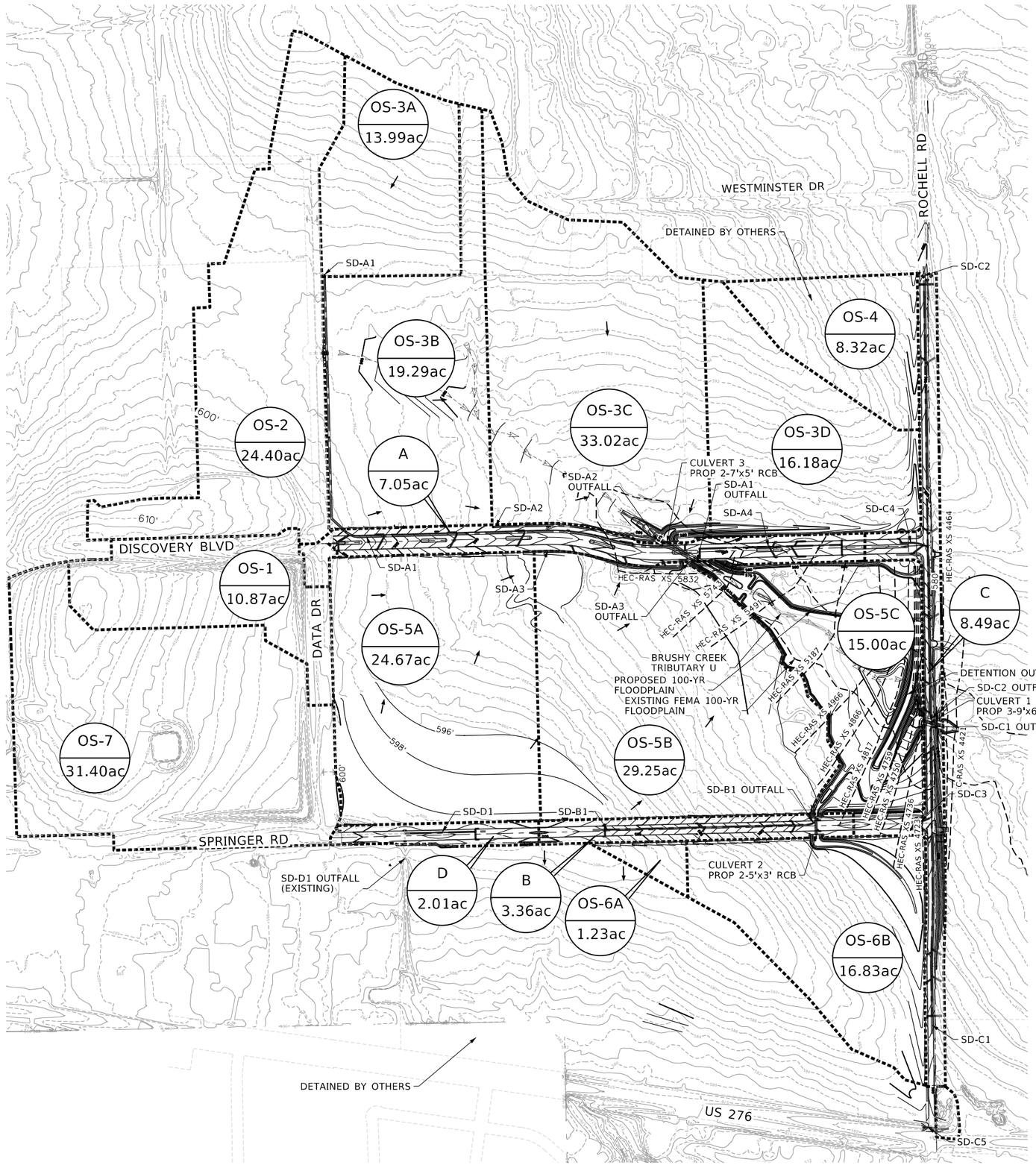

N

0 125' 250' 500'

SCALE IN FEET

NOTES:

1. OS-1 OUTFALLS TO SD-A1 AT MANHOLE A1-5 AT DATA AND DISCOVERY.
2. OS-2 OUTFALLS TO SD-A1 AT MANHOLE A1-7 NORTH OF DATA AND DISCOVERY.
3. OS-3A ACCOUNTED FOR IN SD-A1 AT MANHOLE A1-8.
4. OS-3B ACCOUNTED FOR IN SD-A2 AT MANHOLE A2-2.
5. OS-3C OUTFALLS TO CULVERT 3 VIA PROPOSED ROAD SIDE DITCHES. WHEN DEVELOPED, THE DEVELOPER SHALL REMOVE THE DITCH AND PIPE THEIR SYSTEM TO CULVERT 3 VIA THE DRAINAGE EASEMENT.
6. OS-3D OUTFALLS TO CULVERT 3 VIA PROPOSED ROAD SIDE DITCHES.WHEN DEVELOPED, THE DEVELOPER SHALL REMOVE THE DITCH AND PIPE THEIR SYSTEM TO CULVERT 3 VIA THE DRAINAGE EASEMENT.
7. OS-4 OUTFALLS TO EXISTING ROAD SIDE DITCH NORTH OF PROJECT LIMITS VIA PROPOSED ROAD SIDE DITCH. THIS AREA SHALL BE DETAINED BY OTHERS.
8. OS-5A ACCOUNTED FOR IN SD-A3 AT MANHOLE A3-2.
9. OS-5B OUTFALLS TO PROPOSED DRAINAGE POND VIA NATURAL TERRAIN. WHEN DEVELOPED, THE DEVELOPER SHALL PIPE THEIR SYSTEM TO THE DETENTION POND. THE 100-YR WSEL OF THE POND IS 575 FT.
10. OS-5C OUTFALLS TO PROPOSED DRAINAGE POND VIA ROAD SIDE DITCHES VIA NATURAL TERRAIN. WHEN DEVELOPED, THE DEVELOPER SHALL PIPE THEIR SYSTEM TO THE DETENTION POND. THE 100-YR WSEL OF THE POND IS 575 FT.
11. OS-6A ACCOUNTED FOR IN SD-B1 AT MANHOLE B1-2 VIA A 24" STUBOUT.
12. OS-6B OUTFALLS TO CULVERT 2 VIA PROPOSED ROAD SIDE DITCHES. WHEN DEVELOPED, THE DEVELOPER SHALL REMOVE THE DITCH AND PIPE THEIR SYSTEM TO CULVERT 2 VIA THE DRAINAGE EASEMENT.
13. OS-1, OS-2, OS-3, OS-5, OS-6, A AND B ARE DETAINED FOR IN PROPOSED DETENTION POND.
14. THE PROPOSED DETENTION POND IS DESIGNED TO OVER-DETAIN FOR PROPOSED LINE C (BOTH FUTURE AND PROPOSED).

LEGEND

- A / X.XXac — DRAINAGE AREA DESIGNATION / AREA (ACRES)
- DRAINAGE BOUNDARY
- FLOW DIRECTION
- CREEK CENTERLINE

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RECORD DRAWINGS PREPARED ON: 8/20/2020

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TEXAS REGISTERED ENGINEERING FIRM F-2144

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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

OVERALL DRAINAGE AREA MAP DEVELOPED CONDITIONS

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MW
DRAWN MW
REVISED
CHECKED MRA
FILE NAME cv-trt-pl-damapotA.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET DA-3

SEQ. 137

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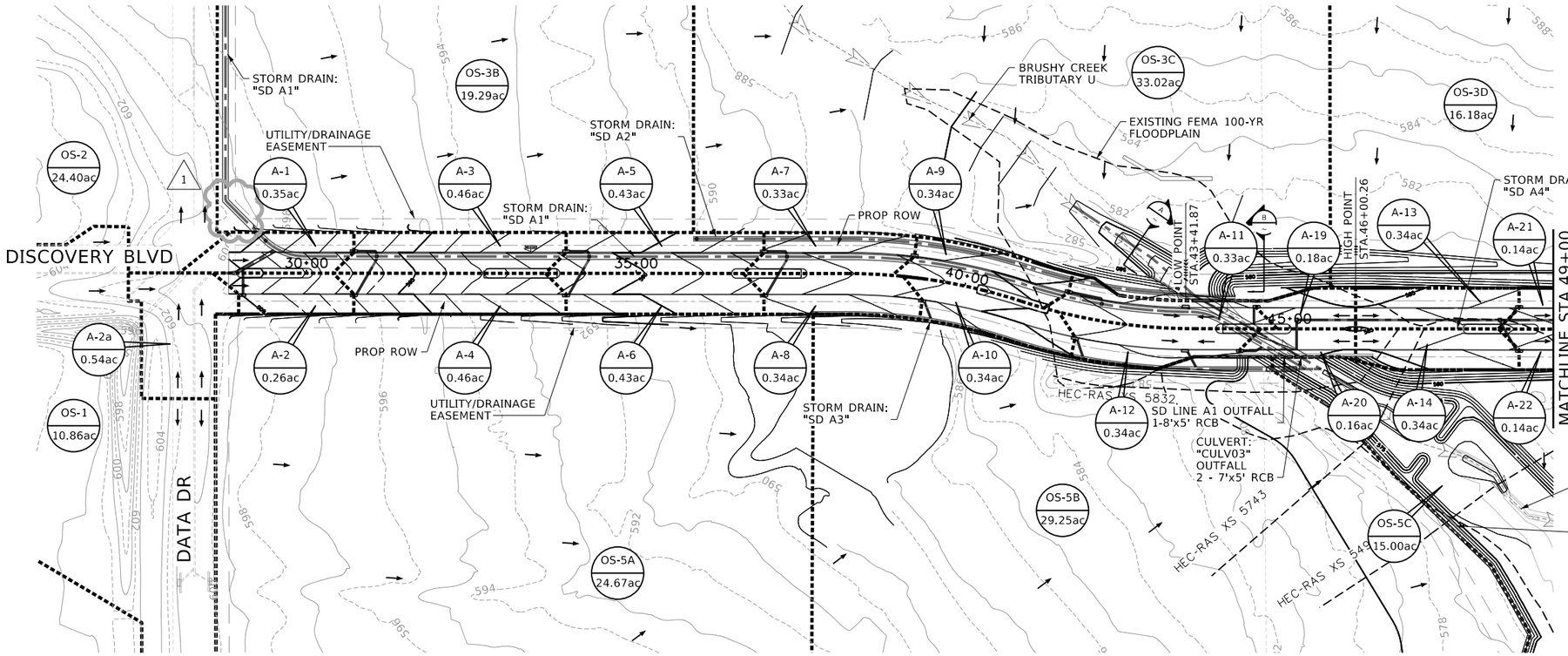

NOTE:

1. THE AREA LABLES OUTSIDE THE PAVEMENT ARE SHOWING DEVELOPED CONDITIONS DRAINAGE AREA.

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Fax: (214) 217-2250
Web - www.freese.com

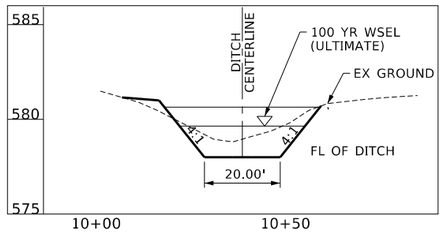
RELEASE THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE TEXAS NO. 134055 ON 10/21/2021 FREESE AND NICHOLS, INC. ASSUMES NO RESPONSIBILITY FOR ANY ALTERATIONS MADE TO THIS DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

DISCOVERY BLVD DRAINAGE AREA MAP

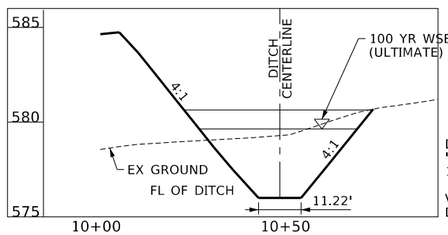


DITCH SLOPE = 3.33%
'n' VALUE = 0.045
100 YR (ULT)
Q=392.92 CFS
V=10.18 FPS
DEPTH=1.50'

A

DITCH SECTION A

NOT TO SCALE

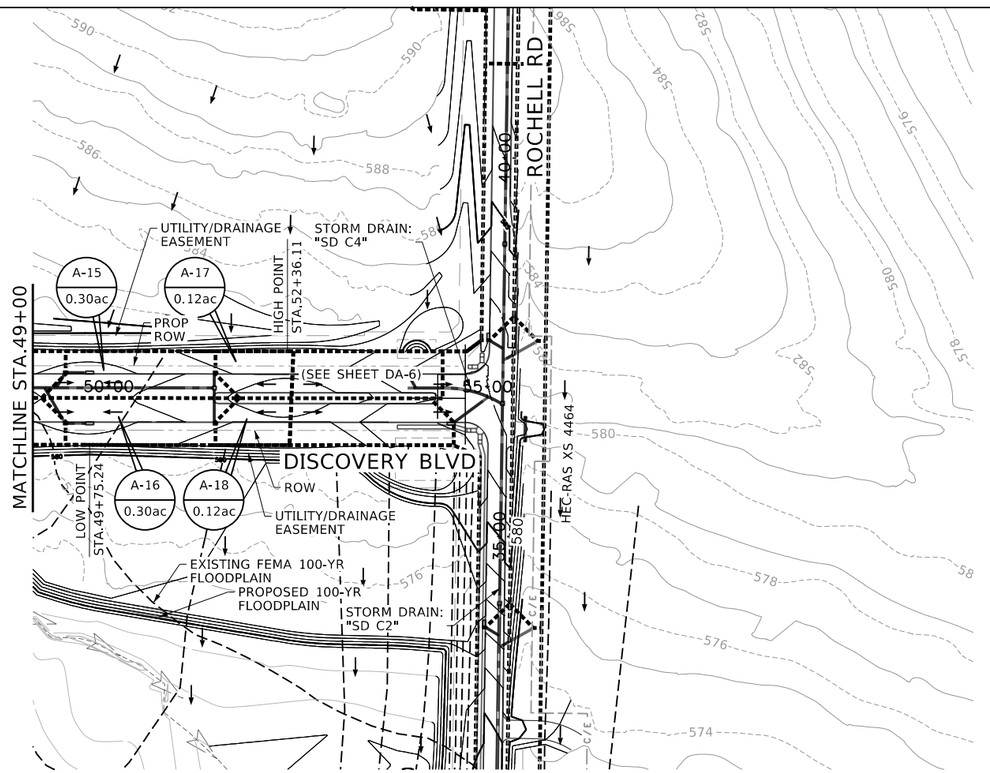


DITCH SLOPE = 0.74%
'n' VALUE = 0.045
100 YR (ULT)
Q=124.08 CFS
V=3.44 FPS
DEPTH=3.50'

B

DITCH SECTION B

NOT TO SCALE



LEGEND

- DRAINAGE AREA DESIGNATION (X / X.XXac)
- AREA (ACRES)
- EXIST STORM DRAIN
- DRAINAGE BOUNDARY
- FLOW DIRECTION
- CREEK CENTERLINE

NO.	ISSUES	BY	DATE
1	ADDENDUM #2	SEC	11/17/21

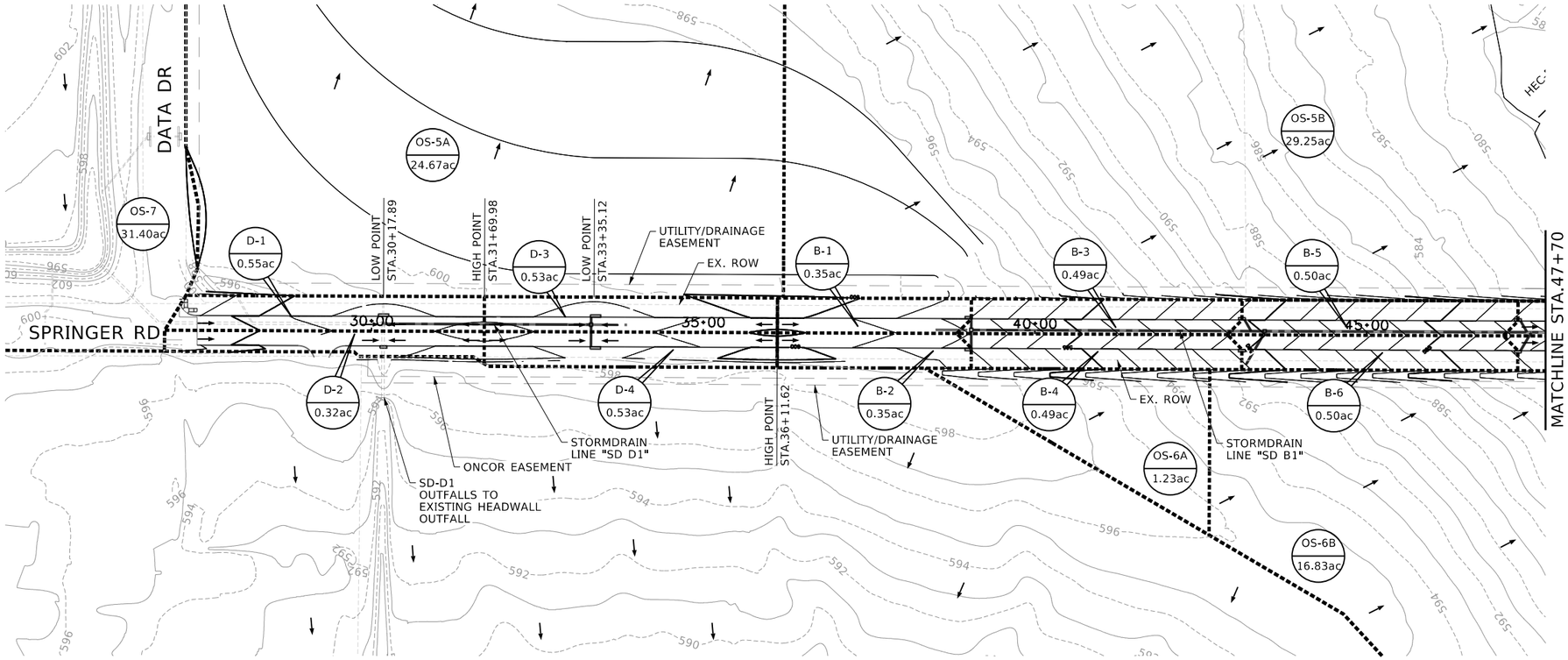
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.

F&N JOB NO.	RKW19711
DATE	APRIL 2022
DESIGNED	MW
DRAWN	MW
REVISED	
CHECKED	MRA
FILE NAME	cv-trt-pl-damap02.sht

SHEET DA-4

SEQ. 138

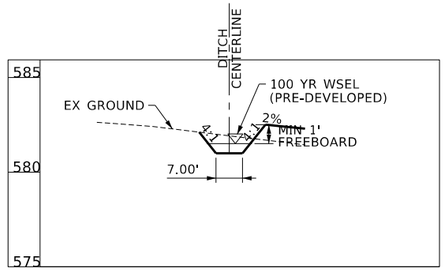
MicroStation V8 User: 90262 Office: On Site
N:\IF\Drawings\Drainage\cv-trt-pl-damap02.sht
Model: Default
Projects - Freese and Nichols, Inc. - True Type Fonts
Plotter: \\PW007W-PLT01_HP DesignJet T1700ps
Plot Scale: 200.000 ' / in.
Date: Feb. 21, 2024 - 12:50:09 PM



NOTE:
1 THE AREA LABELES OUTSIDE THE PAVEMENT ARE SHOWING DEVELOPED CONDITIONS DRAINAGE AREA.

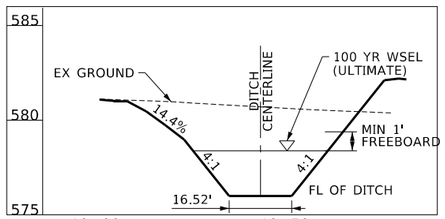
N

0 50' 100' 200'
SCALE IN FEET



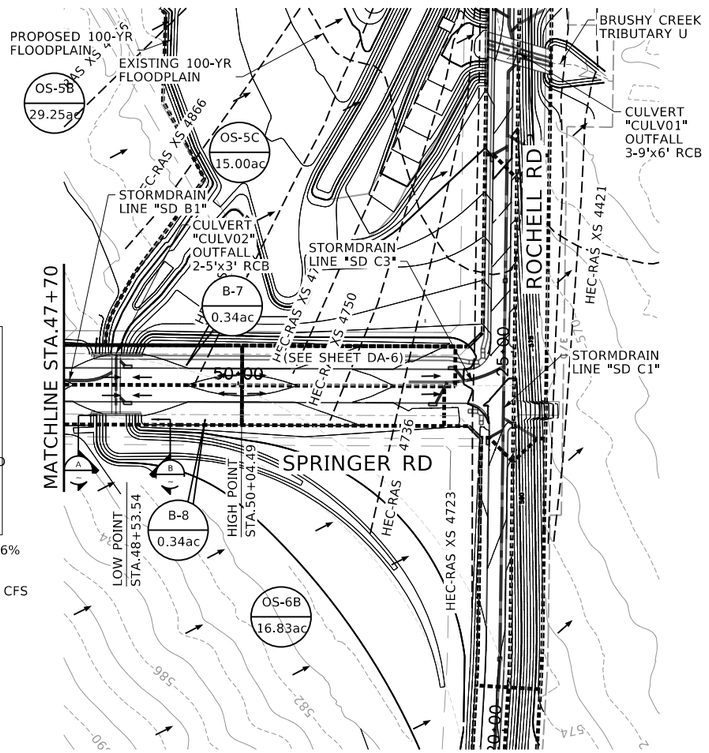
DITCH SLOPE=1.85%
'n' VALUE=.045
100 YR (PRE-DEVELOPED)
Q= 16 CFS
V= 2.76 FPS
DEPTH= 0.62'

A DITCH SECTION A
NOT TO SCALE



DITCH SLOPE=0.6%
'n' VALUE=.045
100 YR (ULT)
Q= 121.28 CFS
V= 3.05 FPS
DEPTH= 2.5'

B DITCH SECTION B
NOT TO SCALE



N

0 50' 100' 200'
SCALE IN FEET

LEGEND

- DRAINAGE AREA DESIGNATION (X / X.XXac)
- AREA (ACRES)
- EXIST STORM DRAIN
- DRAINAGE BOUNDARY
- FLOW DIRECTION
- CREEK CENTERLINE

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASED THAT ORIGINALLY EXPOSED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
ALTERATION OF A SEALED DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2299
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
CIVIL
SPRINGER RD
DRAINAGE AREA MAP

NO.	ISSUES	BY	DATE

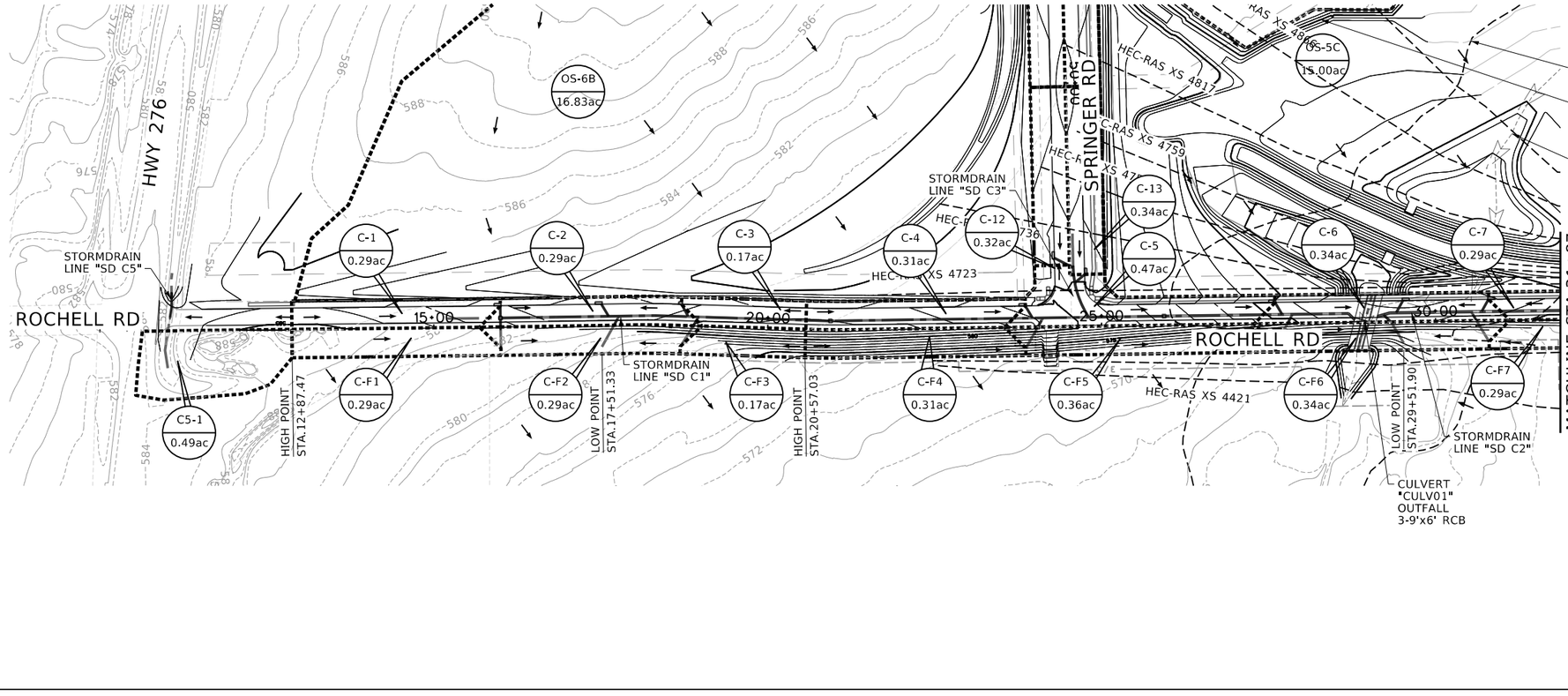
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

F&N JOB NO.	RKW19711
DATE	APRIL 2022
DESIGNED	MW
DRAWN	MW
REVISED	
CHECKED	MRA
FILE NAME	cv-trt-pl-damap03.sht

SHEET
DA-5
SEQ.
139

MicroStation V8 User: 90262 Office: On Site
Plotter: \\jlf\Drawings\Drainage\cv-trt-pl-damap03.sht
Plot Scale: 200.000 ' / in.
Date: Feb. 21, 2024 - 12:50:19 PM
Model: Default
Project: Freese and Nichols, Inc. - True Type Fonts

Office: On Site Date: Feb. 21, 2024 - 12:50:19 PM User: 90262 File: N:\JF\Drawings\Drainage\cv-trt-pl-damap03.sht

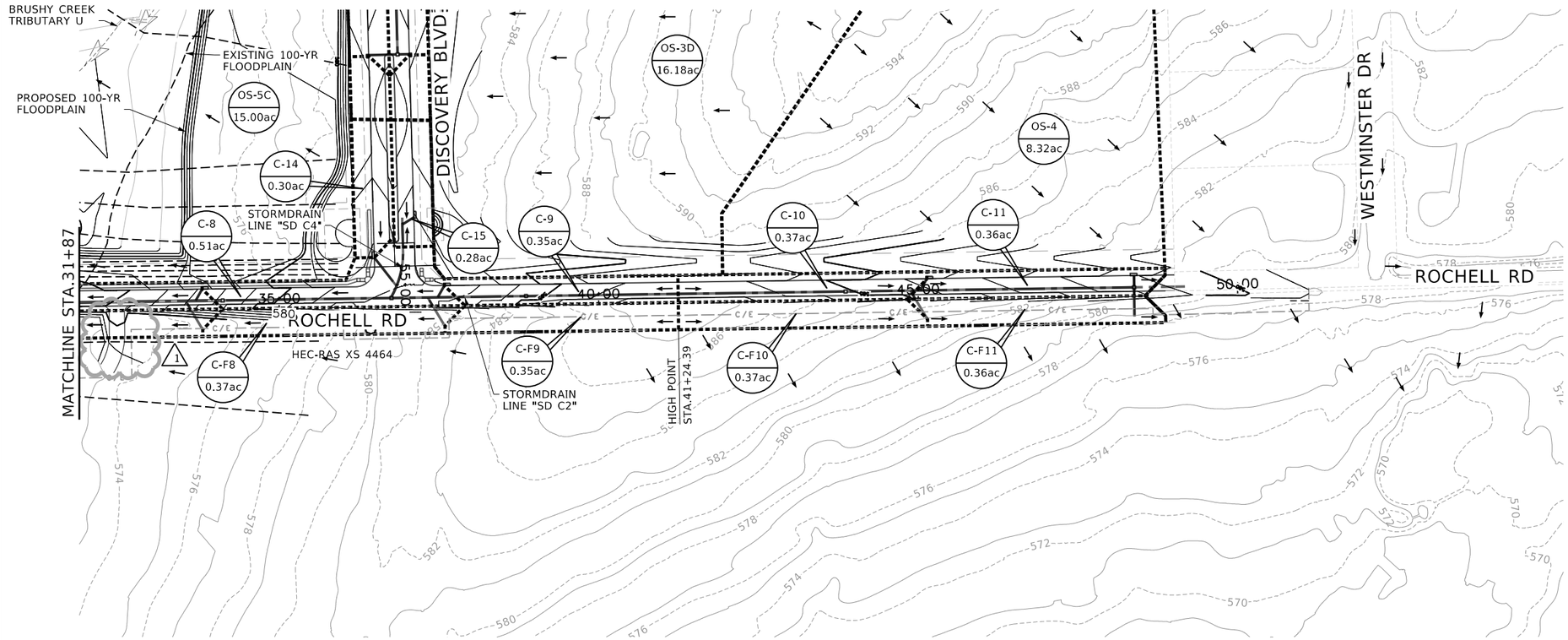


NOTE:

1. THE AREA LABELED OUTSIDE THE PAVEMENT ARE SHOWING DEVELOPED CONDITIONS DRAINAGE AREA

N

0 50' 100' 200'
SCALE IN FEET



N

0 50' 100' 200'
SCALE IN FEET

LEGEND

- DRAINAGE AREA DESIGNATION (X / X.XXac)
- AREA (ACRES)
- EXIST STORM DRAIN
- DRAINAGE BOUNDARY
- FLOW DIRECTION
- CREEK CENTERLINE

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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FREESE NICHOLS
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Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

ROCHELL RD DRAINAGE AREA MAP

NO.	ISSUES	BY	DATE
1	CO #1	SEC	XX/XX/XXX

F&N JOB NO. RKW1971
DATE APRIL 2022
DESIGNED MW
DRAWN MW
CHECKED MRA
REVISED
FILE NAME cv-trt-pl-damap04.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale accordingly. 0 1"

SHEET DA-6
SEQ. 140

MicroStation V8 User: 90262 Office: On Site
Platter: J:\RKW\Drawings\Drainage\cv-trt-pl-damap04.sht
Plot Style: J:\RKW\Utility Files\pltcfg\Mono.plt Model: Default
Plot Scale: 200.000 ' / in. Project: Freese and Nichols, Inc. - True Type Fonts
Date: Feb. 21, 2024 - 12:50:27 PM

DRAINAGE AREA COMPUTATIONS								
AREAS DRAINED								
AREA ID	TOTAL DRAINAGE AREA	WEIGHTED RUNOFF COEFF. "C"	C*A	TIME OF CONC-ENTRATION "Tc"	DESIGN STORM FREQUENCY	INTENSITY "I"	STORM RUNOFF "Q"	DRAINS TO / REMARKS
	(ACRES)		(ACRES)	(MIN)	(YRS)	(IN/HR)	(CFS)	
A-1	0.35	0.90	0.31	10.00	100-yr	9.80	3.05	INLET "A1" *
A-2a	0.54	0.90	0.49	10.00	100-yr	9.80	4.79	INLET "A2a"*
A-2	0.26	0.90	0.23	10.00	100-yr	9.80	2.28	INLET "A2" *
A-3	0.46	0.90	0.41	10.00	100-yr	9.80	4.04	INLET "A3" *
A-4	0.46	0.90	0.41	10.00	100-yr	9.80	4.04	INLET "A4" *
A-5	0.43	0.90	0.38	10.00	100-yr	9.80	3.77	INLET "A5" *
A-6	0.43	0.90	0.38	10.00	100-yr	9.80	3.77	INLET "A6" *
A-7	0.33	0.90	0.29	10.00	100-yr	9.80	2.88	INLET "A7" *
A-8	0.34	0.90	0.31	10.00	100-yr	9.80	3.01	INLET "A8" *
A-9	0.34	0.90	0.31	10.00	100-yr	9.80	3.02	INLET "A9" *
A-10	0.34	0.90	0.31	10.00	100-yr	9.80	3.01	INLET "A10" *
A-11	0.33	0.90	0.30	10.00	100-yr	9.80	2.91	INLET "A11" *
A-12	0.34	0.90	0.30	10.00	100-yr	9.80	2.97	INLET "A12" *
A-19	0.18	0.90	0.16	10.00	100-yr	9.80	1.58	INLET "A19" *
A-20	0.16	0.90	0.14	10.00	100-yr	9.80	1.42	INLET "A20" *
A-13	0.34	0.90	0.31	10.00	100-yr	9.80	3.01	INLET "A13" *
A-14	0.34	0.90	0.31	10.00	100-yr	9.80	3.00	INLET "A14" *
A-15	0.30	0.90	0.27	10.00	100-yr	9.80	2.69	INLET "A15" *
A-16	0.30	0.90	0.27	10.00	100-yr	9.80	2.69	INLET "A16" *
A-17	0.12	0.90	0.11	10.00	100-yr	9.80	1.09	INLET "A17" *
A-18	0.12	0.90	0.11	10.00	100-yr	9.80	1.09	INLET "A18" *
A-21	0.14	0.90	0.12	10.00	100-yr	9.80	1.19	INLET "A21" *
A-22	0.14	0.90	0.12	10.00	100-yr	9.80	1.19	INLET "A22" *
B-1	0.35	0.90	0.31	10.00	100-yr	9.80	3.06	INLET "B1" *
B-2	0.35	0.90	0.31	10.00	100-yr	9.80	3.06	INLET "B2" *
B-3	0.49	0.90	0.44	10.00	100-yr	9.80	4.34	INLET "B3" *
B-4	0.49	0.90	0.44	10.00	100-yr	9.80	4.34	INLET "B4" *
B-5	0.50	0.90	0.45	10.00	100-yr	9.80	4.42	INLET "B5" *
B-6	0.50	0.90	0.45	10.00	100-yr	9.80	4.42	INLET "B6" *
B-7	0.34	0.90	0.31	10.00	100-yr	9.80	2.99	INLET "B7" *
B-8	0.34	0.90	0.31	10.00	100-yr	9.80	2.99	INLET "B8" *
C5-1	0.49	0.90	0.44	10.00	100-yr	9.80	4.32	DEVELOPED - CROSSING CULVERT "SD-C5"
C-1	0.29	0.90	0.26	10.00	100-yr	9.80	2.59	INLET "C1"*
C-2	0.29	0.90	0.26	10.00	100-yr	9.80	2.53	INLET "C2"*
C-3	0.17	0.90	0.15	10.00	100-yr	9.80	1.51	INLET "C3"*
C-4	0.31	0.90	0.28	10.00	100-yr	9.80	2.72	INLET "C4"*
C-5	0.47	0.90	0.43	10.00	100-yr	9.80	4.18	INLET "C5"*
C-6	0.34	0.90	0.30	10.00	100-yr	9.80	2.95	INLET "C6"*
C-7	0.29	0.90	0.26	10.00	100-yr	9.80	2.58	INLET "C7"*
C-8	0.51	0.90	0.46	10.00	100-yr	9.80	4.52	INLET "C8" *
C-9	0.35	0.90	0.31	10.00	100-yr	9.80	3.05	INLET "C9" *
C-10	0.37	0.90	0.33	10.00	100-yr	9.80	3.24	INLET "C10"*
C-11	0.36	0.90	0.33	10.00	100-yr	9.80	3.21	INLET "C11"*
C-12	0.32	0.90	0.29	10.00	100-yr	9.80	2.84	INLET "C12"*
C-13	0.34	0.90	0.31	10.00	100-yr	9.80	2.99	INLET "C13"*
C-14	0.30	0.90	0.27	10.00	100-yr	9.80	2.61	INLET "C14"*
C-15	0.28	0.90	0.25	10.00	100-yr	9.80	2.49	INLET "C15"*
D-1	0.55	0.90	0.50	10.00	100-yr	9.80	4.87	INLET "D1"*
D-2	0.32	0.90	0.29	10.00	100-yr	9.80	2.82	INLET "D2"*
D-3	0.53	0.90	0.48	10.00	100-yr	9.80	4.69	INLET "D3"*
D-4	0.53	0.90	0.48	10.00	100-yr	9.80	4.69	INLET "D4"*

*THIS AREA IS DETAINED WITHIN THE PROPOSED DETENTION POND.

FUTURE DRAINAGE AREA FOR ROCHELL RD (SEE SHEET DA-6):

DRAINAGE AREA COMPUTATIONS								
AREAS DRAINED								
AREA ID	TOTAL DRAINAGE AREA	WEIGHTED RUNOFF COEFF. "C"	C*A	TIME OF CONC-ENTRATION "Tc"	DESIGN STORM FREQUENCY	INTENSITY "I"	STORM RUNOFF "Q"	DRAINS TO / REMARKS
	(ACRES)		(ACRES)	(MIN)	(YRS)	(IN/HR)	(CFS)	
C-F1	0.29	0.90	0.26	10.00	100-yr	9.80	2.59	FUTURE - INLET "CF1"
C-F2	0.29	0.90	0.26	10.00	100-yr	9.80	2.52	FUTURE - INLET "CF2"
C-F3	0.17	0.90	0.15	10.00	100-yr	9.80	1.51	FUTURE - INLET "CF3"
C-F4	0.31	0.90	0.28	10.00	100-yr	9.80	2.74	FUTURE - INLET "CF4"
C-F5	0.36	0.90	0.33	10.00	100-yr	9.80	3.22	FUTURE - INLET "CF5"
C-F6	0.34	0.90	0.30	10.00	100-yr	9.80	2.95	FUTURE - INLET "CF6"
C-F7	0.29	0.90	0.26	10.00	100-yr	9.80	2.58	FUTURE - INLET "CF7"
C-F8	0.37	0.90	0.33	10.00	100-yr	9.80	3.26	FUTURE - INLET "CF8"
C-F9	0.35	0.90	0.31	10.00	100-yr	9.80	3.04	FUTURE - INLET "CF9"
C-F10	0.37	0.90	0.33	10.00	100-yr	9.80	3.24	FUTURE - INLET "CF10"
C-F11	0.36	0.90	0.33	10.00	100-yr	9.80	3.21	FUTURE - INLET "CF11"

PROPOSED PRE-DEVELOPED CONDITIONS (SEE SHEET DA-2):

DRAINAGE AREA COMPUTATIONS								
AREAS DRAINED								
AREA ID	TOTAL DRAINAGE AREA	WEIGHTED RUNOFF COEFF. "C"	C*A	TIME OF CONC-ENTRATION "Tc"	DESIGN STORM FREQUENCY	INTENSITY "I"	STORM RUNOFF "Q"	DRAINS TO / REMARKS
	(ACRES)		(ACRES)	(MIN)	(YRS)	(IN/HR)	(CFS)	
OS-1	10.86	0.42***	4.55	10.00	100-yr	9.80	44.56	EX, STORMDRAIN + DETENTION POND - ID#01*
OS-2	24.40	0.90	21.96	10.00	100-yr	9.80	215.21	EX. STORMDRAIN + CULVERT - ID#02*
OS-3	81.85	0.35	28.65	10.00	100-yr	9.80	280.75	UNDEVELOPED - CULVERT "CULV03"*
OS-4	8.32	0.35	2.91	10.00	100-yr	9.80	28.52	EX. DITCH NORTH ALONG ROCHELLE RD.
OS-5	68.92	0.35	24.12	10.00	100-yr	9.80	236.39	UNDEVELOPED - PROP. DRAINAGE POND *
OS-6	18.06	0.35	6.32	10.00	100-yr	9.80	61.95	UNDEVELOPED - CULVERT "CULV02"*
OS-7	31.40	0.21***	6.63	10.00	100-yr	9.80	65.00	EXISTING - INTERSECTS WITH "SD-D"

PROPOSED DEVELOPED CONDITIONS (SEE SHEET DA-3)**:

DRAINAGE AREA COMPUTATIONS								
AREAS DRAINED								
AREA ID	TOTAL DRAINAGE AREA	WEIGHTED RUNOFF COEFF. "C"	C*A	TIME OF CONC-ENTRATION "Tc"	DESIGN STORM FREQUENCY	INTENSITY "I"	STORM RUNOFF "Q"	DRAINS TO / REMARKS
	(ACRES)		(ACRES)	(MIN)	(YRS)	(IN/HR)	(CFS)	
OS-3A	13.99	0.90	12.59	10.00	100-yr	9.80	123.39	DEVELOPED - STORMDRAIN "SD-A1" - ID#03*
OS-3B	19.29	0.90	17.36	10.00	100-yr	9.80	170.14	DEVELOPED - STORMDRAIN "SD-A3" - ID#04*
OS-3C	33.02	0.90	29.72	10.00	100-yr	9.80	291.24	DEVELOPED - CULVERT "CULV03"*
OS-3D	16.18	0.90	14.56	10.00	100-yr	9.80	142.73	DEVELOPED - CULVERT "CULV03"*
OS-5A	24.67	0.90	22.20	10.00	100-yr	9.80	217.59	DEVELOPED - STORMDRAIN "SD-A4" - ID#05*
OS-5B	29.25	0.90	26.33	10.00	100-yr	9.80	257.99	DEVELOPED - PROP. DRAINAGE POND*
OS-5C	15.00	0.90	13.50	10.00	100-yr	9.80	132.30	DEVELOPED - PROP. DRAINAGE POND*
OS-6A	1.23	0.90	1.11	10.00	100-yr	9.80	10.85	DEVELOPED - STORMDRAIN "SD-B1" - ID#06*
OS-6B	16.83	0.90	15.15	10.00	100-yr	9.80	148.44	DEVELOPED - CULVERT "CULV02"*

* THIS AREA IS DETAINED WITHIN THE PROPOSED DETENTION POND.

** DRAINAGE AREAS OS-1, OS-2, OS-4 AND OS-7 REMAIN THE SAME FOR THE DEVELOPED CONDITIONS.

*** C-VALUES FOR OS-7 AND OS-1 HAVE BEEN ADJUSTED TO REFLECT THE REFLECT THE AS-BUILT Q VALUES SHOWN ON THE BIMBO BAKERY PLANS FOR BOTH DETENTION PONDS ON THE PROPERTY.

NOTES:
1. INTENSIFY VALUES ARE BASED ON CITY OF ROCKWALL 2019 DESIGN MANUAL

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2250
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

DRAINAGE AREA CALCULATIONS

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MLW
DRAWN MLW
REVISED
CHECKED XXX
FILE NAME cv-trt-pl-drainage_calc.sht

NO. ISSUES | BY | DATE

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale accordingly. 0 1"

SHEET DC-1

SEQ. 141

MicroStation V8 User: 90262 Office:On Site
N:\IF\Drawings\Drainage\cv-trt-pl-drainage_calc.sht
Plotter: J:\Plotdrv_V8_11\PDF_File\PDF-Mono.pltcfg Model: Default
Plot Scale: 2.0000 '/ In. Project: Freese and Nichols, Inc. - True Type Fonts
Date: Feb. 21, 2024 - 12:50:40 PM

INLETS TO BE CONSTRUCTED:

NOTES:
1. ALL INLETS ARE DESIGN BASED ON 100 YEAR STORM.

INLET DESIGN CALCULATIONS TABLE

INLET ID	LOCATION			STORM	AREA RUNOFF						UPSTREAM BYPASS	TOTAL GUTTER FLOW	GUTTER FLOW																					REMARKS
	ALIGNMENT	STATION	OFFSET	DESIGN FREQ.	C	AREA ID	TIME OF CONCENTRATION	INTENSITY	AREA	RUNOFF			THOROUGHFARE TYPE	ON-GRADE / SAG	MANNING'S	LONG SLOPE	CROWN TYPE	CROSS-SLOPE	DEPRESSION		PONDING WIDTH / SPREAD		DEPTH OF GUTTER FLOW		MAX. ALLOW FLOW BASED ON MAX. SPREAD	DEPRESSED GUTTER SECTION		SECTION BEYOND DEPRESSION		CONVEYANCE		RATIO OF DEPRESSION FLOW TO TOTAL FLOW	EQUIVALENT CROSSSLOPE	INLET LENGTH		INLET CAPACITY	CARRYOVER TO INLET ID	FLOW	C*A	
											C*A	Qa			n	S		Sx	a	W	T_{ALLOW}	T_{ACTUAL}	Y_{ALLOW}	Y_{ACTUAL}	$Q_{ALLOW\ GUTTER}$	Aw	Pw	Ao	Po	Kw	Ko	Eo	Se	$L_{REQ'D}$	L_{ACTUAL}	Qc		Q_{BYPASS}		
				(YR)			(MIN)	(IN/HR)	(ACRES)	(CFS)		(CFS)				(FT/FT)		(FT/FT)	(FT)	(FT)	(FT)	(FT)	(FT)	(FT)	(CFS)	(SF)	(FT)	(SF)	(FT)	(CFS)	(CFS)		(FT/FT)	(FT)	(FT)	(CFS)		(CFS)		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
A1	Discovery Blvd	30+56.00	32.00 RT	100-yr	0.90	A-1	10.00	9.80	0.35	3.05	0.00	3.05	M4D	On Grade	0.0175	0.0210	Straight	0.020	0.50	2	12	9.83	0.24	0.20	5.16	0.85	2.07	0.61	7.83	40.12	9.54	0.81	0.22	8.41	10	4.61	A3	0.00	0.00	"Lat-A1"
A2a	Discovery Blvd	30+00.13	32.00 LT	100-yr	0.90	A-2a	10.00	9.80	0.55	4.82	0.00	4.82	M4D	On Grade	0.0175	0.0160	Straight	0.020	0.50	2	12	12.28	0.24	0.25	4.50	0.95	2.07	1.06	10.28	48.07	19.68	0.71	0.20	10.07	10	4.73	A2	0.00	0.00	"Lat-A2a"
A2	Discovery Blvd	30+72.00	32.00 LT	100-yr	0.90	A-2	10.00	9.80	0.26	2.28	0.00	2.28	M4D	On Grade	0.0175	0.0210	Straight	0.020	0.50	2	12	8.82	0.24	0.18	5.16	0.81	2.07	0.47	6.82	36.99	6.60	0.85	0.23	7.25	10	4.92	A4	0.00	0.00	"Lat-A2"
A3	Discovery Blvd	33+78.00	32.00 RT	100-yr	0.90	A-3	10.00	9.80	0.46	4.04	0.00	4.04	M4D	On Grade	0.0175	0.0128	Straight	0.020	0.50	2	12	11.99	0.24	0.24	4.03	0.94	2.07	1.00	9.99	47.09	18.23	0.72	0.20	8.67	10	5.67	A5	0.00	0.00	"Lat-A3"
A4	Discovery Blvd	33+94.00	32.00 LT	100-yr	0.90	A-4	10.00	9.80	0.46	4.04	0.00	4.04	M4D	On Grade	0.0175	0.0128	Straight	0.020	0.50	2	12	11.99	0.24	0.24	4.03	0.94	2.07	1.00	9.99	47.10	18.24	0.72	0.20	8.68	10	5.67	A6	0.00	0.00	"Lat-A4"
A5	Discovery Blvd	36+78.00	32.00 RT	100-yr	0.90	A-5	10.00	9.80	0.43	3.77	0.00	3.77	M4D	On Grade	0.0175	0.0111	Straight	0.020	0.50	2	12	11.99	0.24	0.24	3.75	0.94	2.07	1.00	9.99	47.10	18.25	0.72	0.20	8.07	10	6.27	A7	0.00	0.00	"Lat-A5"
A6	Discovery Blvd	36+94.00	32.00 RT	100-yr	0.90	A-6	10.00	9.80	0.43	3.77	0.00	3.77	M4D	On Grade	0.0175	0.0111	Straight	0.020	0.50	2	12	11.99	0.24	0.24	3.75	0.94	2.07	1.00	9.99	47.10	18.25	0.72	0.20	8.07	10	6.27	A8	0.00	0.00	"Lat-A6"
A7	Discovery Blvd	39+14.00	32.00 LT	100-yr	0.90	A-7	10.00	9.80	0.33	2.88	0.00	2.88	M4D	On Grade	0.0175	0.0071	Straight	0.020	0.50	2	12	11.78	0.24	0.24	3.00	0.93	2.07	0.96	9.78	46.41	17.26	0.73	0.20	6.26	10	8.76	A9	0.00	0.00	"Lat-A7"
A8	Discovery Blvd	39+39.00	32.00 RT	100-yr	0.90	A-8	10.00	9.80	0.34	3.01	0.00	3.01	M4D	On Grade	0.0175	0.0071	Straight	0.020	0.50	2	12	11.99	0.24	0.24	3.00	0.94	2.07	1.00	9.99	47.10	18.25	0.72	0.20	6.43	10	8.63	A10	0.00	0.00	"Lat-A8"
A9	Discovery Blvd	41+50.00	32.00 LT	100-yr	0.90	A-9	10.00	9.80	0.34	3.02	0.00	3.02	M4D	On Grade	0.0175	0.0071	Straight	0.020	0.50	2	12	12.00	0.24	0.24	3.00	0.94	2.07	1.00	10.00	47.13	18.29	0.72	0.20	6.43	10	8.63	A11	0.00	0.00	"Lat-A9"
A10	Discovery Blvd	41+80.00	32.00 RT	100-yr	0.90	A-10	10.00	9.80	0.34	3.01	0.00	3.01	M4D	On Grade	0.0175	0.0071	Straight	0.020	0.50	2	12	11.99	0.24	0.24	3.00	0.94	2.07	1.00	9.99	47.08	18.22	0.72	0.20	6.42	10	8.63	A12	0.00	0.00	"Lat-A10"
A11	Discovery Blvd	43+41.87	32.00 LT	100-yr	0.90	A-11	10.00	9.80	0.33	2.91	0.00	2.91	M4D	Sag	0.0175	0.0071	Straight	0.020	0.50	2	12	11.84	0.24	0.24	3.00	0.93	2.07	0.97	9.84	46.59	17.52	0.73	0.20	7.38	10	3.60		0.00	0.00	"Lat-A11"
A12	Discovery Blvd	43+41.87	32.00 RT	100-yr	0.90	A-12	10.00	9.80	0.34	2.97	0.00	2.97	M4D	Sag	0.0175	0.0071	Straight	0.020	0.50	2	12	11.93	0.24	0.24	3.00	0.94	2.07	0.99	9.93	46.91	17.97	0.72	0.20	7.49	10	3.65		0.00	0.00	"Lat-A12"
A19	Discovery Blvd	44+50.00	32.00 LT	100-yr	0.90	A-19	10.00	9.80	0.18	1.58	0.00	1.58	M4D	On Grade	0.0175	0.0071	Straight	0.020	0.50	2	12	9.41	0.24	0.19	3.00	0.84	2.07	0.55	7.41	38.80	8.23	0.83	0.23	4.55	5	1.97	A11	0.00	0.00	"Lat-A19"
A20	Discovery Blvd	44+25.00	32.00 RT	100-yr	0.90	A-20	10.00	9.80	0.16	1.42	0.00	1.42	M4D	On Grade	0.0175	0.0071	Straight	0.020	0.50	2	12	9.05	0.24	0.18	3.00	0.82	2.07	0.50	7.05	37.68	7.19	0.84	0.23	4.31	5	2.02	A12	0.00	0.00	"Lat-A20"
A13	Discovery Blvd	48+48.13	32.00 LT	100-yr	0.90	A-13	10.00	9.80	0.34	3.01	0.00	3.01	M4D	On Grade	0.0175	0.0071	Straight	0.020	0.50	2	12	11.99	0.24	0.24	3.00	0.94	2.07	1.00	9.99	47.10	18.24	0.72	0.20	6.42	10	8.63	A21	0.00	0.00	"Lat-A13"
A14	Discovery Blvd	48+54.13	32.00 RT	100-yr	0.90	A-14	10.00	9.80	0.34	3.00	0.00	3.00	M4D	On Grade	0.0175	0.0071	Straight	0.020	0.50	2	12	11.97	0.24	0.24	3.00	0.94	2.07	0.99	9.97	47.04	18.16	0.72	0.20	6.41	10	8.64	A22	0.00	0.00	"Lat-A14"
A21	Discovery Blvd	48+48.13	32.00 LT	100-yr	0.90	A-21	10.00	9.80	0.14	1.19	0.00	1.19	M4D	On Grade	0.0175	0.0070	Straight	0.020	0.50	2	12	8.50	0.24	0.17	2.98	0.80	2.07	0.42	6.50	36.02	5.80	0.86	0.24	3.94	5	2.11	A15	0.00	0.00	"Lat-A21"
A22	Discovery Blvd	48+54.13	32.00 RT	100-yr	0.90	A-22	10.00	9.80	0.14	1.19	0.00	1.19	M4D	On Grade	0.0175	0.0070	Straight	0.020	0.50	2	12	8.50	0.24	0.17	2.98	0.80	2.07	0.42	6.50	36.02	5.80	0.86	0.24	3.94	5	2.11	A16	0.00	0.00	"Lat-A22"
A15	Discovery Blvd	49+75.00	32.00 RT	100-yr	0.90	A-15	10.00	9.80	0.30	2.69	0.00	2.69	M4D	Sag	0.0175	0.0070	Straight	0.020	0.50	2	12	11.52	0.24	0.23	2.98	0.92	2.07	0.91	9.52	45.54	16.04	0.74	0.20	6.96	10	3.46		0.00	0.00	"Lat-A15"
A16	Discovery Blvd	49+75.00	32.00 RT	100-yr	0.90	A-16	10.00	9.80	0.30	2.69	0.00	2.69	M4D	Sag	0.0175	0.0070	Straight	0.020	0.50	2	12	11.52	0.24	0.23	2.98	0.92	2.07	0.91	9.52	45.54	16.04	0.74	0.20	6.96	10	3.46		0.00	0.00	"Lat-A16"
A17	Discovery Blvd	50+50.00	32.00 LT	100-yr	0.90	A-17	10.00	9.80	0.12	1.09	0.00	1.09	M4D	On Grade	0.0175	0.0070	Straight	0.020	0.50	2	12	8.21	0.24	0.16	2.98	0.79	2.07	0.39	6.21	35.17	5.14	0.87	0.24	3.76	5	2.14	A15	0.00	0.00	"Lat-A17"
A18	Discovery Blvd	50+50.00	32.00 RT	100-yr	0.90	A-18	10.00	9.80	0.12	1.09	0.00	1.09	M4D	On Grade	0.0175	0.0070	Straight	0.020	0.50	2	12	8.21	0.24	0.16	2.98	0.79	2.07	0.39	6.21	35.17	5.14	0.87	0.24	3.76	5	2.14	A16	0.00	0.00	"Lat-A18"
B1	Springer Ln	39+04.00	22.50 LT	100-yr	0.90	B-1	10.00	9.80	0.35	3.06	0.00	3.06	M4U	On Grade	0.0175	0.0073	Straight	0.023	0.50	2	22	11.09	0.50	0.25	18.91	0.96	2.07	0.94	9.09	48.61	17.49	0.74	0.21	6.40	10	8.85	B3	0.00	0.00	"Lat-B1"
B2	Springer Ln	39+04.00	22.50 RT	100-yr	0.90	B-2	10.00	9.80	0.35	3.06	0.00	3.06	M4U	On Grade	0.0175	0.0073	Straight	0.023	0.50	2	22	11.09	0.50	0.25	18.91	0.96	2.07	0.94	9.09	48.61	17.49	0.74	0.21	6.40	10	8.85	B4	0.00	0.00	"Lat-B2"
B3	Springer Ln	43+12.00	22.50 LT	100-yr	0.90	B-3	10.00	9.80	0.49	4.34	0.00	4.34	M4U	On Grade	0.0175	0.0180	Straight	0.023	0.50	2	22	10.67	0.50	0.24	29.69	0.94	2.07	0.85	8.67	47.02	15.44	0.75	0.21	9.60	10	4.79	B5	0.00	0.00	"Lat-B3"
B4	Springer Ln	43+12.00	22.50 RT	100-yr	0.90	B-4	10.00	9.80	0.49	4.34	0.00	4.34	M4U	On Grade	0.0175	0.0180	Straight	0.023	0.50	2	22	10.67	0.50	0.24	29.69	0.94	2.07	0.85	8.67	47.02	15.44	0.75	0.21	9.60	10	4.79	B6	0.00	0.00	"Lat-B4"
B5	Springer Ln	47+28.00	22.50 LT	100-yr	0.90	B-5	10.00	9.80	0.50	4.42	0.00	4.42	M4U	On Grade	0.0175	0.0189	Straight	0.023	0.50	2	22	10.65	0.50	0.24	30.42	0.94	2.07	0.85	8.65	46.95	15.34	0.75	0.21	9.81	10	4.63	B7	0.00	0.00	"Lat-B5"
B6	Springer Ln	47+28.00	22.50 RT	100-yr	0.90	B-6	10.00	9.80	0.50	4.42	0.00	4.42	M4U	On Grade	0.0175	0.0189	Straight	0.023	0.50	2	22	10.65	0.50	0.24	30.42	0.94	2.07	0.85	8.65	46.95	15.34	0.75	0.21	9.81	10	4.63	B8	0.00	0.00	"Lat-B6"
B7	Springer Ln	48+54.00	22.50 LT	100-yr	0.90	B-7	10.00	9.80	0.34	2.99	0.00	2.99	M4U	Sag	0.0175	0.0070	Straight	0.023	0.50	2	22	11.08	0.50	0.25	18.52	0.96	2.07	0.94	9.08	48.59	17.46	0.74	0.21	6.71	10	3.94		0.00	0.00	"Lat-B7"
B8	Springer Ln	48+54.00	22.50 RT	100-yr	0.90	B-8	10.00	9.80	0.34	2.99	0.00	2.99	M4U	Sag	0.0175	0.0070	Straight	0.023	0.50	2	22	11.08	0.50	0.25	18.52	0.96	2.07	0.94	9.08	48.59	17.46	0.74	0.21	6.71	10	3.94		0.00	0.00	"Lat-B8"
C1	Rochelle Rd	15+95.75	32.00 LT	100-yr	0.90	C-1	10.00	9.80	0.29	2.59	0.00	2.59	M4D	On Grade	0.0175	0.0081	Straight	0.020	0.50	2	12	11.05	0.24	0.22	3.20	0.90	2.07	0.82	9.05	44.01	14.03	0.76	0.21	6.10	10	8.39	C2	0.00	0.00	"Lat-C1"
C2	Rochelle Rd	17+47.34	32.00 LT	100-yr	0.90	C-2	10.00	9.80	0.29	2.53	0.00	2.53	M4D	Sag	0.0175	0.0070	Straight	0.020	0.50	2	12	11.27	0.24	0.23	2.98	0.91	2.07	0.86	9.27	44.71	14.93	0.75	0.21	6.69	10	3.35		0.00	0.00	"Lat-C2"
C3	Rochelle Rd	18+66.01	32.00 LT	100-yr	0.90	C-3	10.00	9.80	0.17	1.51	0.00	1.51	M4D	On Grade	0.0175	0.0070	Straight	0.020	0.50	2	12	9.28	0.24	0.19	2.98	0.83	2.07	0.53	7.28	38.39	7.84	0.83	0.23	4.43	5	2.01	C2	0.00	0.00	"Lat-C3"
C4	Rochelle Rd	23+82.11	32.00 LT	100-yr	0.90	C-4	10.00	9.80	0.31	2.72	0.00	2.72	M4D	On Grade	0.0175	0.0073	Straight	0.020	0.50	2	12	11.49	0.24	0.23	3.04	0.92	2.07	0.90	9.49	45.43	15.90	0.74	0.21	6.12	5	1.68	C5	0.13	0.01	"Lat-C4"
C5	Rochelle Rd	27+56.01	32.00 LT	100-yr	0.90	C-5	10.00	9.80	0.47	4.18	0.01	4.31	M4D	On Grade	0.0175	0.0172	Straight	0.020	0.50	2	12	11.62	0.24	0.23	4.67	0.92	2.07	0.92	9.62	45.86	16.49	0.74	0.20	9.63	10	4.71	C6	0.00	0.00	"Lat-C5"
C6	Rochelle Rd	29+55.89	32.00 LT	100-yr	0.90	C-6	10.00	9.80	0.34	2.95	0.00	2.95	M4D	Sag	0.0175	0.0070	Straight	0.020	0.50	2	12	11.94	0.24	0.24	2.98	0.94	2.07	0.99	9.94	46.92	17.99	0.72	0.20	7.41	10	3.65		0.00	0.00	"Lat-C6"
C7	Rochelle Rd	30+84.00	32.00 LT	100-yr	0.90	C-7	10.00	9.80	0.29	2.58	0.00	2.60	M4D	On Grade	0.0175	0.0070	Straight	0.020	0.50	2	12	11.38	0.24	0.23	2.98	0.92	2.07	0.88	9.38	45.08	15.43	0.74	0.21	5.91	10	9.10	C6	0.00	0.00	"Lat-C7"
C8	Rochelle Rd	33+84.00	32.00 LT	100-yr	0.90	C-8	10.00	9.80	0.51	4.52	0.00	4.52	M4D	On Grade	0.0175	0.0224	Straight	0.020	0.50	2	12	11.26	0.24	0.23	5.33	0.91	2.07	0.86	9.26	44.67	14.88	0.75	0.21	10.53	10	4.00	C7	0.02	0.00	"Lat-C8"
C9	Rochelle Rd	37+62.91	32.00 LT	100-yr	0.90	C-9	10.00	9.80	0.35	3.05	0.00	3.05	M4D	On Grade	0.0175	0.0144	Straight	0.020	0.50	2	12	10.55	0.24	0.21	4.27	0.88	2.07	0.73	8.55	42.38	12.04	0.78	0.21	7.66	10	5.76	C8	0.00	0.00	"Lat-C9"
C10	Rochelle Rd	45+18.00	32.00 LT	100-yr	0.90	C-10	10.00	9.80	0.37	3.24	0.00	3.24	M4D	On Grade	0.0175	0.0082	Straight	0.020	0.50	2	12	12.00	0.24	0.24	3.22	0.94	2.07	1.00	10.00	47.13	18.29	0.72	0.20	6.92	10	7.78	C11	0.00	0.00	"Lat-C10"
C11	Rochelle Rd	48+86.57	32.00 LT	100-yr	0.90	C-11	10.00	9.80	0.36	3.21	0.00	3.21	M4D	On Grade	0.0175	0.0082	Straight	0.020	0.50	2	12	11.95	0.24	0.24	3.22	0.94	2.07	0.99	9.95	46.98	18.07	0.72	0.20	6.89	10	7.81		0.00	0.00	"Lat-C11"
C12	Springer Ln	52+62.50	32.00 LT	100-yr	0.90	C-12	10.00	9.80	0.32	2.84	0.00	2.84	M4U	Sag	0.0175	0.0070	Straight	0.010	0.50	2	22	18.13	0.50	0.18	4.72	0.84	2.07	1.30	16.13	39.35	20.63	0.66	0.17	12.38	10	2.42		0.00	0.00	"Lat-C11"
C13	Springer Ln	52+82.73	32.00 LT	100-yr	0.90	C-13	10.00	9.80	0.34	2.99	0.00	2.99	M4U	On Grade	0.0175	0.0070	Straight	0.020	0.50	2	22	12.00	0.50	0.24	14.99	0.94	2.07	1.00	10.00	47.12	18.27	0.72	0.20	6.38	10	8.72	C5	0.00	0.00	"Lat-C12"
C14	Discovery Blvd	54+52.37	22.50 RT	100-yr	0.90	C-14	10.00	9.80	0.30	2.61	0.00	2.61	M4D	On Grade	0.0175	0.0101	Straight	0.016	0.50	2	12	11.99	0.24	0.20	2.59	0.86	2.07	0.82	9.99	40.87	13.24	0.76	0.21	6.62	10	6.96	C8	0.00	0.00	"Lat-C13"
C15	Discovery Blvd	53+91.01	22.50 LT	100-yr	0.90	C-15	10.00	9.80	0.28	2.49	0.00	2.49	M4D	Sag	0.0175	0.0083	Straight	0.020	0.50	2	12	10.84	0.24	0.22	3.24	0.89	2.07	0.78	8.84	43.32	13.17	0.77	0.21	7.12	10	3.16		0.00	0.00	"Lat-C14"
D1	Springer Ln	30+18.00	22.50 LT	100-yr	0.90	D-1	10.00	9.80	0.55	4.87	0.00	4.87	M4U	Sag	0.0175	0.0200	Straight	0.023	0.50	2	22	10.92	0.50	0.25	31.30	0.95	2.07	0.90	8.92	48.00	16.68	0.74	0.21	13.54	15	5.28		0.00	0.00	"Lat-D1"
D2	Springer Ln	30+18.00	22.50 RT	100-yr	0.90	D-2	10.00	9.80	0.32	2.82	0.00	2.82	M4U	Sag	0.0175	0.0200	Straight	0.023	0.50	2	22	8.90	0.50	0.20	31.30	0.86	2.07	0.54	6.90	40.53	8.41	0.83	0.23	9.90	10	2.84		0.00	0.00	"Lat-D2"
D3	Springer Ln	33+37.50	22.50 LT	100-yr	0.90	D-3	10.00	9.80	0.53	4.69	0.00	4.69	M4U	Sag	0.0175	0.0200	Straight	0.023	0.50	2	22	10.77	0.50	0.24	31.30	0.94	2.07	0.87	8.77	47.42	15.94	0.75	0.21	13.27	15	5.17		0.00	0.00	"Lat-D3"
D4	Springer Ln	33+37.50	22.50 RT	100-yr	0.90	D-4	10.00	9.80	0.53	4.69	0.00	4.69	M4U	Sag	0.0175	0.0200	Straight	0.023	0.50	2	22	10.77	0.50	0.24	31.30	0.94	2.07	0.87	8.77	47.42	15.94	0.75	0.21	13.27	15	5.17		0.00	0.00	"Lat-D4"

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

FUTURE INLETS:

INLET DESIGN CALCULATIONS TABLE

INLET ID	LOCATION			STORM	AREA RUNOFF						UPSTREAM BYPASS	TOTAL GUTTER FLOW	GUTTER FLOW																					REMARKS
	ALIGNMENT	STATION	OFFSET	DESIGN FREQ.	C	AREA ID	TIME OF CONCENTRATION	INTENSITY	AREA	RUNOFF			THOROUGHFARE TYPE	ON-GRADE / SAG	MANNING'S	LONG SLOPE	CROWN TYPE	CROSS-SLOPE	DEPRESSION		PONDING WIDTH / SPREAD		DEPTH OF GUTTER FLOW		MAX. ALLOW FLOW BASED ON MAX. SPREAD	DEPRESSED GUTTER SECTION		SECTION BEYOND DEPRESSION		CONVEYANCE		RATIO OF DEPRESSION FLOW TO TOTAL FLOW	EQUIVALENT CROSSSLOPE	INLET LENGTH		INLET CAPACITY	CARRYOVER TO INLET ID	FLOW	C*A	
							Tc	I	A	Q	C*A	Qa			n	S		Sx	a	W	T_{ALLOW}	T_{ACTUAL}	Y_{ALLOW}	Y_{ACTUAL}	$Q_{ALLOW\ GUTTER}$	Aw	Pw	Ao	Po	Kw	Ko	Eo	Se	$L_{REQ'D}$	L_{ACTUAL}	Qc		Q_{BYPASS}		
				(YR)			(MIN)	(IN/HR)	(ACRES)	(CFS)		(CFS)				(FT/FT)		(FT/FT)	(FT)	(FT)	(FT)	(FT)	(FT)	(FT)	(CFS)	(SF)	(FT)	(SF)	(FT)	(CFS)	(CFS)		(FT/FT)	(FT)	(FT)	(CFS)		(CFS)		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
CF1	Rochelle Rd	15+95.75	31.50 LT	100-yr	0.90	C-F1	10.00	9.80	0.29	2.59	0.00	2.59	M4D	On Grade	0.0175	0.0081	Straight	0.020	0.50	2	12	11.06	0.24	0.22	3.20	0.90	2.07	0.82	9.06	44.02	14.04	0.76	0.21	6.11	5	1.61	CF2	0.12	0.01	"Lat-CF1"
CF2	Rochelle Rd	17+47.34	31.50 LT	100-yr	0.90	C-F2	10.00	9.80	0.29	2.52	0.01	2.64	M4D	Sag	0.0175	0.0070	Straight	0.020	0.50	2	12	11.44	0.24	0.23	2.98	0.92	2.07	0.89	9.44	45.26	15.67	0.74	0.21	6.87	10	3.42		0.00	0.00	"Lat-CF2"
CF3	Rochelle Rd	18+66.01	31.50 LT	100-yr	0.90	C-F3	10.00	9.80	0.17	1.51	0.00	1.51	M4D	On Grade	0.0175	0.0070	Straight	0.020	0.50	2	12	9.28	0.24	0.19	2.98	0.83	2.07	0.53	7.28	38.39	7.84	0.83	0.23	4.43	5	2.01	CF2	0.00	0.00	"Lat-CF3"
CF4	Rochelle Rd	23+82.11	31.50 LT	100-yr	0.90	C-F4	10.00	9.80	0.31	2.74	0.00	2.74	M4D	On Grade	0.0175	0.0073	Straight	0.020	0.50	2	12	11.51	0.24	0.23	3.04	0.92	2.07	0.90	9.51	45.51	16.01	0.74	0.20	6.14	10	8.75	CF5	0.00	0.00	"Lat-CF4"
CF5	Rochelle Rd	27+56.01	31.50 LT	100-yr	0.90	C-F5	10.00	9.80	0.36	3.22	0.00	3.22	M4D	On Grade	0.0175	0.0172	Straight	0.020	0.50	2	12	10.41	0.24	0.21	4.67	0.88	2.07	0.71	8.41	41.95	11.54	0.78	0.22	8.23	10	5.12	CF6	0.00	0.00	"Lat-CF5"
CF6	Rochelle Rd	29+55.89	31.50 LT	100-yr	0.90	C-F6	10.00	9.80	0.34	2.95	0.00	2.95	M4D	Sag	0.0175	0.0070	Straight	0.020	0.50	2	12	11.94	0.24	0.24	2.98	0.94	2.07	0.99	9.94	46.92	17.99	0.72	0.20	7.41	10	3.65		0.00	0.00	"Lat-CF6"
CF7	Rochelle Rd	30+84.00	31.50 LT	100-yr	0.90	C-F7	10.00	9.80	0.29	2.58	0.00

CULVERT CALCULATIONS:

	Input Data							100yr Results							
Culvert ID	Size	100-yr Q (cfs)	Length (ft)	Culvert Slope(%)	US Invert (ft)	DS Invert (ft)	Assumed Top of Road (ft)	US WSEL (ft)	DS WSEL (ft)	Culv. Outlet Velocity (ft/s)	Freeboard (ft)	Q Capacity cfs	Assumed Tailwater Condition	Comments	100-YR Tailwater Velocity
1	3-9'x6' RCBs	1631	88	0.50	563.44	563.00	573.34	571.43	N/A	12.7	1.91	1679.13	Normal depth of natural cross	These values are from a simplified HY-8 model, using undetained flows.	
1*	3-9'x6' RCBs	1054	88	0.50	563.44	563.00	573.34	569.27	567.96	8.5	4.07	1679.13	See HEC-RAS model.	* Values in this row reflect the inclusion of the proposed detention pond. These values were obtained from a HEC-RAS model, using detained flows. Tailwater velocity reported here as the worst case scenario.	4.74 (HEC-RAS XS 4464)
2	2-5'x3' RCBs	163	80	0.50	575.17	574.77	580.17	578.39	576.81	8.0	1.78	201.30	Graded 12' trapezoidal channel to outfall at the regional pond.		3.94 (HY-8)
3	2-7'x5' RCBs	517	170	0.50	574.35	573.50	582.53	579.93	577.74	7.9	2.60	630.56			4.74 (HEC-RAS XS 5832)

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
CIVIL
HYDRAULIC CALCULATIONS
CULVERTS

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW1971
DATE APRIL 2022
DESIGNED MLW
DRAWN MLW
REVISED XXX
CHECKED MRA
FILE NAME cv-trt-pl-hyd_calc.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale
0 1"

SHEET HC-1
SEQ. 143

MicroStation V8 User:90262 Office:On Site
N:\lf\Drawings\Drainage\cv-trt-pl-hyd_calc.sht
Platter: J:\Plot\v_V8_11\PDF_File\PDF-Mono.pltcfg
Plot Scale: 2.0000 '/ in. Model: Default
Date: Feb. 21, 2024 - 12:50:45 PM Project:Freese and Nichols, Inc. - True Type Fonts

HYDRAULIC CALCULATIONS:

STORM DRAIN LINE A1:

LINE A1

SYSTEM ID	COLLECTION POINT STATION U/S	COLLECTION POINT STATION D/S	LENGTH	# OF BARRELS	PIPE SIZE	BOX SPAN	BOX RISE	TYPE	AREA	WETTED PERIMETER PW	HYDRAULIC RADIUS	MANNING'S n	FLOWLINE ELEVATION U/S	FLOWLINE ELEVATION D/S	SLOPE	INLET ID	AREA	RUNOFF COEFF. C	INCREMENTAL C*A	ACCUMULATED C*A	UPSTREAM TC	DESIGN STORM FREQ.	INTENSITY I	Q RUNOFF Q	CONDUIT CAPACITY QC	PARTIAL FLOW	VELOCITY V	TIME IN CONDUIT	FRICTION SLOPE Sf	FRICTION HEADLOSS	HGL U/S	HGL D/S	HEADLOSS V1 2/2g	HEADLOSS V2 2/2g	HEADLOSS JCT. TYPE	HEADLOSS COEFF. KJ	HEADLOSS HL	DESIGN HGL	TOP OF CURB ELEV.	HGL DEPTH BELOW T/C
			(FT)		(IN)	(FT)	(FT)		(FT2)	(FT)	(FT)				(FT/FT)		(ACRES)				(MIN)	(YR)	(IN/HR)	(CFS)	(CFS)	(YES/NO)	(FT/S)	(MIN)	(FT/FT)	(FT)			(FT)	(FT)			(FT)				(FT)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
SD-A1	10+16.44	13+62.85	346.41	1	-	6	4	RCB	24.00	20.000	1.54	0.013	591.00	589.27	0.005	OS-3A	13.99	0.90	12.59	12.59	10.00	100-yr	9.80	123.39	219.52	NO	5.14	1.12	0.00158	0.55	595.57	595.02	0.410	0.410	MH (D1=D2)(0°)	0.05	0.02	595.59	597.97	2.38
SD-A1	13+62.85	17+35.73	372.88	1	-	8	5	RCB	40.00	26.000	1.54	0.013	589.27	587.78	0.004	OS-2	24.40	0.90	21.96	34.55	11.12	100-yr	9.62	332.39	386.22	YES	8.31	0.75	0.00296	1.10	594.05	592.95	0.410	1.072	MH (90° LAT)	0.25	0.97	595.02	598.60	3.58
SD-A1	17+35.73	20+94.69	358.96	1	-	8	5	RCB	40.00	26.000	1.54	0.013	587.78	586.34	0.004	-	0.00	0.00	0.00	34.55	11.87	100-yr	9.50	328.26	386.98	NO	8.21	0.73	0.00289	1.04	592.90	591.86	1.072	1.046	MH (D1=D2)(0°)	0.05	0.05	592.95	597.66	4.71
SD-A1	20+94.69	21+75.00	80.31	1	-	8	5	RCB	40.00	26.000	1.54	0.013	586.34	586.02	0.004	-	0.00	0.00	0.00	34.55	12.60	100-yr	9.38	324.23	385.67	NO	8.11	0.17	0.00282	0.23	591.48	591.26	1.046	1.020	BEND (Pipe)(45°)	0.37	0.38	591.86	600.18	8.32
SD-A1	21+75.00	22+00.37	25.37	1	-	8	5	RCB	40.00	26.000	1.54	0.013	586.02	585.66	0.014	-	0.00	0.00	0.00	34.55	12.76	100-yr	9.36	323.31	727.81	NO	8.08	0.05	0.00280	0.07	591.26	591.19	1.020	1.014	-	0.00	0.00	591.26	599.03	7.77
SD-A1	22+00.37	23+55.64	155.27	1	-	8	5	RCB	40.00	26.000	1.54	0.013	585.66	583.44	0.014	A2A/OS-1	11.41	0.44	5.04	39.59	12.82	100-yr	9.35	370.13	730.57	YES	9.25	0.28	0.00367	0.57	590.21	589.64	1.014	1.330	MH (60° LAT)	0.35	0.97	591.19	599.18	7.99
SD-A1	23+55.64	26+58.14	302.5	1	-	8	5	RCB	40.00	26.000	1.54	0.013	583.44	579.12	0.014	A1/A2	0.60	0.90	0.54	40.13	13.10	100-yr	9.30	373.43	730.14	NO	9.34	0.54	0.00374	1.13	588.75	587.62	1.330	1.353	WYE (Pipe)(60°)	0.35	0.89	589.64	596.17	6.53
SD-A1	26+58.14	26+77.64	19.5	1	-	8	5	RCB	40.00	26.000	1.54	0.013	579.12	579.02	0.005	-	0.00	0.00	0.00	40.13	13.64	100-yr	9.22	369.96	437.53	NO	9.25	0.04	0.00367	0.07	587.62	587.55	1.353	1.328	-	0.00	0.00	587.62	593.23	5.61
SD-A1	26+77.64	29+77.64	300	1	-	8	5	RCB	40.00	26.000	1.54	0.013	579.02	577.52	0.005	A3/A4	0.92	0.90	0.82	40.96	13.67	100-yr	9.21	377.33	432.03	NO	9.43	0.53	0.00381	1.14	586.63	585.49	1.328	1.382	MH (60° LAT)	0.35	0.92	587.55	590.88	3.33
SD-A1	29+77.64	31+76.01	198.37	1	-	8	5	RCB	40.00	26.000	1.54	0.013	577.52	576.53	0.005	A5/A6	0.85	0.90	0.77	41.73	14.20	100-yr	9.13	380.87	431.63	NO	9.52	0.35	0.00389	0.77	584.57	583.80	1.382	1.408	MH (60° LAT)	0.35	0.92	585.49	587.66	2.17
SD-A1	31+76.01	34+63.17	287.16	1	-	8	5	RCB	40.00	26.000	1.54	0.013	576.53	575.09	0.005	A7	0.33	0.90	0.29	42.02	14.55	100-yr	9.07	381.22	432.66	NO	9.53	0.50	0.00389	1.12	582.88	581.76	1.408	1.410	WYE (Pipe)(60°)	0.35	0.92	583.80	586.28	2.48
SD-A1	34+63.17	35+96.55	133.38	1	-	8	5	RCB	40.00	26.000	1.54	0.013	575.09	574.43	0.005	A9	0.34	0.90	0.31	42.33	15.05	100-yr	8.99	380.65	429.79	NO	9.52	0.23	0.00388	0.52	581.08	580.57	1.410	1.406	MH (D1=D2)(60°)	0.48	0.67	581.76	584.25	2.49
SD-A1	35+96.55	37+21.48	124.93	1	-	8	5	RCB	40.00	26.000	1.54	0.013	574.43	573.80	0.005	A11	0.33	0.90	0.30	42.63	15.29	100-yr	8.96	381.93	433.87	NO	9.55	0.22	0.00391	0.49	579.64	579.16	1.406	1.416	WYE (Pipe)(60°)	0.35	0.92	580.57	583.49	2.92
SD-A1	37+21.48	37+57.88	36.4	1	-	8	5	RCB	40.00	26.000	1.54	0.013	573.80	573.62	0.005	A20	0.16	0.90	0.14	42.77	15.50	100-yr	8.93	381.92	429.65	YES	9.56	0.06	0.00495	0.18	578.23	578.05	1.416	1.420	WYE (Pipe)(60°)	0.35	0.92	579.16	584.00	4.84

NOTES:
1. SD-A1 STARTING HGL IS FROM DOWNSTREAM HGL AT CULVERT 03.
2. PARTIAL FLOW VELOCITIES, FRICTION SLOPE, AND HGL IS SHOWN WHEN INDICATED IN COLUMN 27.

STORM DRAIN LINE A2:

LINE A2

SYSTEM ID	COLLECTION POINT STATION U/S	COLLECTION POINT STATION D/S	LENGTH	# OF BARRELS	PIPE SIZE	BOX SPAN	BOX RISE	TYPE	AREA	WETTED PERIMETER PW	HYDRAULIC RADIUS	MANNING'S n	FLOWLINE ELEVATION U/S	FLOWLINE ELEVATION D/S	SLOPE	INLET ID	AREA	RUNOFF COEFF. C	INCREMENTAL C*A	ACCUMULATED C*A	UPSTREAM TC	DESIGN STORM FREQ.	INTENSITY I	Q RUNOFF Q	CONDUIT CAPACITY QC	PARTIAL FLOW	VELOCITY V	TIME IN CONDUIT	FRICTION SLOPE Sf	FRICTION HEADLOSS	HGL U/S	HGL D/S	HEADLOSS V1 2/2g	HEADLOSS V2 2/2g	HEADLOSS JCT. TYPE	HEADLOSS COEFF. KJ	HEADLOSS HL	DESIGN HGL	TOP OF CURB ELEV.	HGL DEPTH BELOW T/C
			(FT)		(IN)	(FT)	(FT)		(FT2)	(FT)	(FT)				(FT/FT)		(ACRES)				(MIN)	(YR)	(IN/HR)	(CFS)	(CFS)	(YES/NO)	(FT/S)	(MIN)	(FT/FT)	(FT)			(FT)	(FT)			(FT)				(FT)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
SD-A2	10+20.00	10+25.00	5	1	-	6	3	RCB	18.00	18.000	1.00	0.013	578.29	578.26	0.006	OS-3B	19.29	0.90	17.36	17.36	10.00	100-yr	9.80	170.14	159.81	NO	9.45	0.01	0.00680	0.03	585.09	585.06	1.387	1.387	-	0.00	0.00	585.09	589.13	4.04
SD-A2	10+25.00	14+60.40	435.4	1	-	6	3	RCB	18.00	18.000	1.00	0.013	578.26	576.09	0.005	-	0.00	0.00	0.00	17.36	10.01	100-yr	9.80	170.11	145.65	NO	9.45	0.77	0.00680	2.96	584.99	582.03	1.387	1.387	MH (D1=D2)(0°)	0.05	0.07	585.06	589.07	4.01
SD-A2	14+60.40	17+67.14	306.74	1	-	6	3	RCB	18.00	18.000	1.00	0.013	576.09	574.55	0.005	-	0.00	0.00	0.00	17.36	10.78	100-yr	9.68	167.98	146.18	NO	9.33	0.55	0.00663	2.03	581.96	579.93	1.387	1.352	MH (D1=D2)(0°)	0.05	0.07	582.03	585.63	3.60

NOTES:
1. SD-A2 STARTING HGL IS FROM UPSTREAM HGL AT CULVERT 03.
2. PARTIAL FLOW VELOCITIES, FRICTION SLOPE, AND HGL IS SHOWN WHEN INDICATED IN COLUMN 27.

STORM DRAIN LINE A3:

LINE A3

SYSTEM ID	COLLECTION POINT STATION U/S	COLLECTION POINT STATION D/S	LENGTH	# OF BARRELS	PIPE SIZE	BOX SPAN	BOX RISE	TYPE	AREA	WETTED PERIMETER PW	HYDRAULIC RADIUS	MANNING'S n	FLOWLINE ELEVATION U/S	FLOWLINE ELEVATION D/S	SLOPE	INLET ID	AREA	RUNOFF COEFF. C	INCREMENTAL C*A	ACCUMULATED C*A	UPSTREAM TC	DESIGN STORM FREQ.	INTENSITY I	Q RUNOFF Q	CONDUIT CAPACITY QC	PARTIAL FLOW	VELOCITY V	TIME IN CONDUIT	FRICTION SLOPE Sf	FRICTION HEADLOSS	HGL U/S	HGL D/S	HEADLOSS V1 2/2g	HEADLOSS V2 2/2g	HEADLOSS JCT. TYPE	HEADLOSS COEFF. KJ	HEADLOSS HL	DESIGN HGL	TOP OF CURB ELEV.	HGL DEPTH BELOW T/C
			(FT)		(IN)	(FT)	(FT)		(FT2)	(FT)	(FT)				(FT/FT)		(ACRES)				(MIN)	(YR)	(IN/HR)	(CFS)	(CFS)	(YES/NO)	(FT/S)	(MIN)	(FT/FT)	(FT)			(FT)	(FT)			(FT)				(FT)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
SD-A3	10+20.00	10+25.00	5	1	-	6	4	RCB	24.00	20.000	1.20	0.013	576.96	576.94	0.004	OS-5A	24.67	0.90	22.20	22.20	10.00	100-yr	9.80	217.59	196.46	NO	9.07	0.01	0.00491	0.02	583.94	583.92	1.276	1.276	-	0.00	0.00	583.94	587.38	3.44
SD-A3	10+25.00	11+98.65	173.65	1	-	6	4	RCB	24.00	20.000	1.20	0.013	576.94	576.07	0.005	-	0.00	0.00	0.00	22.20	10.01	100-yr	9.80	217.56	219.87	NO	9.06	0.32	0.00491	0.85	583.86	583.00	1.276	1.276	MH (D1=D2)(0°)	0.05	0.06	583.92	587.35	3.43
SD-A3	11+98.65	14+36.19	237.54	1	-	6	4	RCB	24.00	20.000	1.20	0.013	576.07	574.88	0.005	A8	0.34	0.90	0.31	22.51	10.33	100-yr	9.75	219.42	219.86	NO	9.14	0.43	0.00499	1.19	582.15	580.97	1.276	1.298	WYE (Pipe)(60°)	0.35	0.85	583.00	586.04	3.04
SD-A3	14+36.19	15+00.08	63.89	1	-	6	4	RCB	24.00	20.000	1.20	0.013	574.88	574.56	0.005	A10	0.34	0.90	0.31	22.82	10.76	100-yr	9.68	220.83	219.84	NO	9.20	0.12	0.00505	0.32	580.11	579.78	1.298	1.315	WYE (Pipe)(60°)	0.35	0.86	580.97	584.34	3.37
SD-A3	15+00.08	16+09.57	109.49	1	-	6	4	RCB	24.00	20.000	1.20	0.013	574.56	574.02	0.005	-	0.00	0.00	0.00	22.82	10.88	100-yr	9.66	220.41	218.15	NO	9.18	0.20	0.00503	0.55	579.72	579.17	1.315	1.310	MH (D1=D2)(0°)	0.05	0.07	579.78	583.92	4.14
SD-A3	16+09.57	17+16.68	107.11	1	-	6	4	RCB	24.00	20.000	1.20	0.013	574.02	573.48	0.005	A12	0.34	0.90	0.30	23.12	11.08	100-yr	9.63	222.60	220.56	NO	9.28	0.19	0.00514	0.55	578.29	577.74	1.310	1.336	WYE (Pipe)(60°)	0.35	0.88	579.17	583.51	4.34

NOTES:
1. SD-A3 STARTING HGL IS FROM DOWNSTREAM HGL AT CULVERT 03.
2. PARTIAL FLOW VELOCITIES, FRICTION SLOPE, AND HGL IS SHOWN WHEN INDICATED IN COLUMN 27.

STORM DRAIN LINE A4:

LINE A4

SYSTEM ID	COLLECTION POINT STATION U/S	COLLECTION POINT STATION D/S	LENGTH	# OF BARRELS	PIPE SIZE	BOX SPAN	BOX RISE	TYPE	AREA	WETTED PERIMETER PW	HYDRAULIC RADIUS	MANNING'S n	FLOWLINE ELEVATION U/S	FLOWLINE ELEVATION D/S	SLOPE	INLET ID	AREA	RUNOFF COEFF. C	INCREMENTAL C*A	ACCUMULATED C*A	UPSTREAM TC	DESIGN STORM FREQ.	INTENSITY I	Q RUNOFF Q	CONDUIT CAPACITY QC	PARTIAL FLOW	VELOCITY V	TIME IN CONDUIT	FRICTION SLOPE Sf	FRICTION HEADLOSS	HGL U/S	HGL D/S	HEADLOSS V1 2/2g	HEADLOSS V2 2/2g	HEADLOSS JCT. TYPE	HEADLOSS COEFF. KJ	HEADLOSS HL	DESIGN HGL	TOP OF CURB ELEV.	HGL DEPTH BELOW T/C
			(FT)		(IN)	(FT)	(FT)		(FT2)	(FT)	(FT)				(FT/FT)		(ACRES)				(MIN)	(YR)	(IN/HR)	(CFS)	(CFS)	(YES/NO)	(FT/S)	(MIN)	(FT/FT)	(FT)			(FT)	(FT)			(FT)				(FT)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
SD-A4	16+73.58	14+65.04	208.54	1	24	-	-	RCP	3.14	6.283	0.50	0.013	578.09	577.05	0.005	A17/A18	0.25	0.90	0.22	0.22	10.00	100-yr	9.80	2.18	16.02	NO	0.69	5.01	0.00009	0.02	580.44	580.42	0.007	0.007	MH (90° LAT)	0.25	0.01	580.44	583.81	3.37
SD-A4	14+65.04	14+49.45	15.59	1	24	-	-	RCP	3.14	6.283	0.50	0.013	577.05	576.97	0.005	A21/A15	0.44	0.90	0.40	0.62	15.01	100-yr	9.00	5.57	16.25	NO	1.77	0.15	0.00060	0.01	580.37	580.36	0.007	0.049	WYE (Pipe)(60°)	0.35	0.05	580.42	582.81	2.39
SD-A4	14+49.45	13+67.43	82.02	1	24	-	-	RCP	3.14	6.283	0.50	0.013	576.97	576.56	0.005	A22/A16	0.44	0.90	0.40	1.01	15.15	100-yr	8.98	9.11	16.04	NO	2.90	0.47	0.00161	0.13	580.25	580.12	0.049	0.131	WYE (Pipe)(60°)	0.35	0.11	580.36	582.92	2.56
SD-A4	13+67.43	13+52.99	14.44	1	24	-	-	RCP	3.14	6.283	0.50	0.013	576.56	576.48	0.006	A13	0.34	0.90	0.31	1.32	15.63	100-yr	8.91	11.78	16.88	NO	3.75	0.06	0.00270	0.04	579.94	579.90	0.131	0.218	WYE (Pipe)(60°)	0.35	0.17	580.12	583.50	3.38
SD-A4	13+52.99	10+44.67	308.32	1	24	-	-	RCP	3.14	6.283	0.50	0.013	576.48	574.94	0.005	A14	0.34	0.90	0.31	1.63	15.69	100-yr	8.90	14.49	16.03	NO	4.61	1.11	0.00408	1.26	579.65	578.39	0.218	0.330	MH (60° LAT)	0.35	0.25	579.90	583.60	3.70
SD-A4	10+44.67	10+00.00	44.67	1	24	-	-	RCP	3.14	6.283	0.50	0.013	574.94	574.72	0.005	-	0.00	0.00	0.00	1.63	16.80	100-yr	8.75	14.24	15.92	NO	4.53	0.16	0.00394	0.18	578.22	578.04	0.330	0.319	MH (D1=D2)(90°)	0.55	0.18	578.39	584.51	6.12

NOTES:
1. SD-A4 STARTING HGL IS FROM HY-8 MODEL OF CULVERT 03.
2. PARTIAL FLOW VELOCITIES, FRICTION SLOPE, AND HGL IS SHOWN WHEN INDICATED IN COLUMN 27.

STORM DRAIN LINE B1:

LINE B1

SYSTEM ID	COLLECTION POINT STATION U/S	COLLECTION POINT STATION D/S	LENGTH	# OF BARRELS	PIPE SIZE	BOX SPAN	BOX RISE	TYPE	AREA	WETTED PERIMETER PW	HYDRAULIC RADIUS	MANNING'S n	FLOWLINE ELEVATION U/S	FLOWLINE ELEVATION D/S	SLOPE	INLET ID	AREA	RUNOFF COEFF. C	INCREMENTAL C*A	ACCUMULATED C*A	UPSTREAM TC	DESIGN STORM FREQ.	INTENSITY I	Q RUNOFF Q	CONDUIT CAPACITY QC	PARTIAL FLOW	VELOCITY V	TIME IN CONDUIT	FRICTION SLOPE Sf	FRICTION HEADLOSS	HGL U/S	HGL D/S	HEADLOSS V1 2/2g	HEADLOSS V2 2/2g	HEADLOSS JCT. TYPE	HEADLOSS COEFF. KJ	HEADLOSS HL	DESIGN HGL	TOP OF CURB ELEV.	HGL DEPTH BELOW T/C
			(FT)		(IN)	(FT)	(FT)		(FT2)	(FT)	(FT)				(FT/FT)		(ACRES)				(MIN)	(YR)	(IN/HR)	(CFS)	(CFS)	(YES/NO)	(FT/S)	(MIN)	(FT/FT)	(FT)			(FT)	(FT)			(FT)				(FT)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
SD-B1	10+54.00	14+75.80	421.8	1	24	-	-	RCP	3.14	6.283	0.50	0.013	591.66	584.07	0.018	B1/B2	0.69	0.90	0.62	0.62	10.00	100-yr	9.80	6.12	30.43	YES	1.48	4.74	0.01799	7.59	592.24	584.65	0.034	0.034	MH (90° LAT)	0.25	0.03	592.27	597.95	5.68
SD-B1	14+75.80	14+96.35	20.55	1	24	-	-	RCP	3.14	6.283	0.50	0.013	584.07	583.70	0.018	B3	0.49	0.90	0.44	1.07	14.74	100-yr	9.04	9.65	30.44	YES	2.68	0.13	0.01800	0.37	584.82	584.45	0.034	0.112	WYE (Pipe)(60°)	0.35	0.10	584.92	590.40	5.48
SD-B1	14+96.35	18+91.80	395.45	1	30	-	-	RCP	4.91	7.854	0.63	0.013	583.70	576.58	0.018	B4/OS-6A	1.72	0.90	1.55	2.62	14.87	100-yr	9.02	23.60	55.19	YES	4.57	1.44	0.01800	7.12	584.81	579.73	0.112	0.324	MH (60° LAT)	0.35	0.28	585.10	590.01	4.91
SD-B1	18+91.80	18+98.16	6.36	1	30	-	-	RCP	4.91	7.854	0.63	0.013	576.58	576.46	0.019	B5	0.50	0.90	0.45	3.07	16.31	100-yr	8.82	27.04	56.49	NO	5.51	0.02	0.00432	0.03	579.37	579.34	0.324	0.471	WYE (Pipe)(60°)	0.35	0.36	579.73	582.57	2.84
SD-B1	18+98.16	19+85.54	87.38	1	30	-	-	RCP	4.91	7.854	0.63	0.013	576.46	574.89	0.018	B6	0.50	0.90	0.45	3.52	16.33	100-yr	8.81	31.01	55.13	NO	6.32	0.23	0.00569	0.50	578.89	578.39	0.471	0.620	WYE (Pipe)(60°)	0.35	0.45	579.34	582.46	3.12

NOTES:
1. SD-B1 STARTING HGL IS FROM UPSTREAM HGL AT CULVERT 02.
2. PARTIAL FLOW VELOCITIES, FRICTION SLOPE, AND HGL IS SHOWN WHEN INDICATED IN COLUMN 27.

This Record Drawing is a combination of the issued for construction drawings, changes made during construction based on the marked-up prints, drawings, and other data furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of FREESE AND NICHOLS, INC.
RECORD DRAWING AS PREPARED ON: 8/23/2022

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

HYDRAULIC CALCULATIONS
STORM DRAIN

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MLW
DRAWN MLW
REVISED
CHECKED MRA
FILE NAME cv-trt-pl-hydraulic_calc.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale
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SHEET HC-2

SEQ. 144

MicroStation V8 User: 90262 Office: On Site
Plotter: HP DesignJet 750C+ Model: Default
Plot Scale: 2.000 ' / In. Projects: Freese and Nichols, Inc. - True Type Fonts
Date: Feb. 21, 2024 - 12:50:49 PM

HYDRAULIC CALCULATIONS: (CONTINUED)

STORM DRAIN LINE C1:

LINE C1

SYSTEM ID	COLLECTION POINT STATION U/S	COLLECTION POINT STATION D/S	LENGTH	# OF BARRELS	PIPE SIZE	BOX SPAN	BOX RISE	TYPE	AREA	WETTED PERIMETER PW	HYDRAULIC RADIUS	MANNING'S n	FLOWLINE ELEVATION U/S	FLOWLINE ELEVATION D/S	SLOPE	INLET ID	AREA	RUNOFF COEFF. C	INCRE-MENTAL C*A	ACCUM-ULATED C*A	UP-STREAM TC	DESIGN STORM FREQ.	INTENSITY I	RUNOFF Q	CONDUIT CAPACITY QC	PARTIAL FLOW	VELOCITY V	TIME IN CONDUIT	FRICTION SLOPE Sf	FRICTION HEAD-LOSS	HGL U/S	HGL D/S	HEADLOSS CALCULATIONS V1 2/2g	V2 2/2g	JCT. TYPE	COEFF. KJ	HEAD-LOSS HL	DESIGN HGL	TOP OF CURB ELEV.	HGL DEPTH BELOW T/C
			(FT)		(IN)	(FT)	(FT)		(FT2)	(FT)	(FT)				(FT/FT)		(ACRES)				(MIN)	(YR)	(IN/HR)	(CFS)	(CFS)	(YES/NO)	(FT/S)	(MIN)	(FT/FT)	(FT)			(FT)	(FT)			(FT)			(FT)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
SD-C1	10+80.07	12+42.08	162.01	1	24	-	-	RCP	3.14	6.283	0.50	0.013	576.24	575.42	0.005	C1/CF1	0.59	0.90	0.53	0.53	10.00	100-yr	9.80	5.18	16.14	NO	1.65	1.64	0.00052	0.08	578.84	578.75	0.042	0.042	MH (90° LAT)	0.25	0.03	578.87	582.60	3.73
SD-C1	12+42.08	12+57.67	15.59	1	24	-	-	RCP	3.14	6.283	0.50	0.013	575.42	575.35	0.004	C2	0.29	0.90	0.26	0.79	11.64	100-yr	9.54	7.51	15.20	NO	2.39	0.11	0.00109	0.02	578.68	578.66	0.042	0.089	WYE (Pipe)(60°)	0.35	0.07	578.75	581.74	2.99
SD-C1	12+57.67	13+61.38	103.71	1	24	-	-	RCP	3.14	6.283	0.50	0.013	575.35	574.82	0.005	CF2	0.29	0.90	0.26	1.04	11.75	100-yr	9.52	9.94	16.22	NO	3.16	0.55	0.00192	0.20	578.54	578.34	0.089	0.155	WYE (Pipe)(60°)	0.35	0.12	578.66	581.74	3.08
SD-C1	13+61.38	13+76.97	15.59	1	24	-	-	RCP	3.14	6.283	0.50	0.013	574.82	574.74	0.005	C3	0.17	0.90	0.15	1.20	12.29	100-yr	9.43	11.30	16.25	NO	3.60	0.07	0.00248	0.04	578.19	578.15	0.155	0.201	WYE (Pipe)(60°)	0.35	0.15	578.34	582.30	3.96
SD-C1	13+76.97	15+74.29	197.32	1	24	-	-	RCP	3.14	6.283	0.50	0.013	574.74	573.75	0.005	CF3	0.17	0.90	0.15	1.35	12.37	100-yr	9.42	12.73	16.07	NO	4.05	0.81	0.00315	0.62	577.97	577.35	0.201	0.255	WYE (Pipe)(60°)	0.35	0.18	578.15	582.30	4.15
SD-C1	15+74.29	18+76.89	302.6	1	24	-	-	RCP	3.14	6.283	0.50	0.013	573.75	572.24	0.005	-	0.00	0.00	0.00	1.35	13.18	100-yr	9.29	12.56	16.02	NO	4.00	1.26	0.00306	0.93	577.33	576.41	0.255	0.248	MH (D1=D2)(0°)	0.05	0.01	577.35	583.14	5.79
SD-C1	18+76.89	18+92.48	15.59	1	24	-	-	RCP	3.14	6.283	0.50	0.013	572.24	572.16	0.005	C4	0.31	0.90	0.28	1.63	14.44	100-yr	9.09	14.81	16.25	NO	4.71	0.06	0.00426	0.07	576.15	576.08	0.248	0.345	WYE (Pipe)(60°)	0.35	0.26	576.41	581.23	4.82
SD-C1	18+92.48	19+61.05	68.57	1	24	-	-	RCP	3.14	6.283	0.50	0.013	572.16	571.82	0.005	CF4	0.31	0.90	0.28	1.91	14.49	100-yr	9.08	17.34	15.97	NO	5.52	0.21	0.00584	0.40	575.73	575.33	0.345	0.473	WYE (Pipe)(60°)	0.35	0.35	576.08	580.34	4.26
SD-C1	19+61.05	20+74.00	112.95	1	24	-	-	RCP	3.14	6.283	0.50	0.013	571.82	571.26	0.005	C12/C13	0.66	0.90	0.60	2.50	14.70	100-yr	9.05	22.66	15.97	NO	7.21	0.26	0.00998	1.13	574.69	573.56	0.473	0.808	WYE (Pipe)(60°)	0.35	0.64	575.33	579.60	4.27
SD-C1	20+74.00	22+50.79	176.79	1	30	-	-	RCP	4.91	7.854	0.63	0.013	571.26	568.61	0.015	-	0.00	0.00	0.00	2.50	14.96	100-yr	9.01	22.55	50.35	YES	4.41	0.67	0.01499	2.65	573.54	570.89	0.808	0.302	MH (D1=D2)(0°)	0.05	0.02	573.56	577.78	4.22
SD-C1	22+50.79	22+66.37	15.58	1	30	-	-	RCP	4.91	7.854	0.63	0.013	568.61	568.37	0.015	C5	0.47	0.90	0.43	2.93	15.63	100-yr	8.91	26.12	51.05	YES	5.30	0.05	0.01540	0.24	570.56	570.32	0.302	0.436	WYE (Pipe)(60°)	0.35	0.33	570.89	574.94	4.05
SD-C1	22+66.37	23+49.88	83.51	1	30	-	-	RCP	4.91	7.854	0.63	0.013	568.37	567.12	0.015	CF5	0.36	0.90	0.33	3.26	15.68	100-yr	8.90	29.02	50.32	YES	5.91	0.24	0.00498	0.42	569.93	569.52	0.436	0.543	WYE (Pipe)(60°)	0.35	0.39	570.32	574.49	4.17
SD-C1	23+49.88	23+63.43	13.55	1	30	-	-	RCP	4.91	7.854	0.63	0.013	567.12	566.42	0.052	-	0.00	0.00	0.00	3.26	15.91	100-yr	8.87	28.91	93.48	YES	5.89	0.04	0.00494	0.07	569.29	569.22	0.543	0.539	BEND (Pipe)(60°)	0.43	0.23	569.52	573.59	4.07

NOTES:
1. SD-C1 STARTING HGL IS FROM DOWNSTREAM HGL AT CULVERT 01.
2. PARTIAL FLOW VELOCITIES, FRICTION SLOPE, AND HGL IS SHOWN WHEN INDICATED IN COLUMN 27.

STORM DRAIN LINE C2:

LINE C2

SYSTEM ID	COLLECTION POINT STATION U/S	COLLECTION POINT STATION D/S	LENGTH	# OF BARRELS	PIPE SIZE	BOX SPAN	BOX RISE	TYPE	AREA	WETTED PERIMETER PW	HYDRAULIC RADIUS	MANNING'S n	FLOWLINE ELEVATION U/S	FLOWLINE ELEVATION D/S	SLOPE	INLET ID	AREA	RUNOFF COEFF. C	INCRE-MENTAL C*A	ACCUM-ULATED C*A	UP-STREAM TC	DESIGN STORM FREQ.	INTENSITY I	RUNOFF Q	CONDUIT CAPACITY QC	PARTIAL FLOW	VELOCITY V	TIME IN CONDUIT	FRICTION SLOPE Sf	FRICTION HEAD-LOSS	HGL U/S	HGL D/S	HEADLOSS CALCULATIONS V1 2/2g	V2 2/2g	JCT. TYPE	COEFF. KJ	HEAD-LOSS HL	DESIGN HGL	TOP OF CURB ELEV.	HGL DEPTH BELOW T/C
			(FT)		(IN)	(FT)	(FT)		(FT2)	(FT)	(FT)				(FT/FT)		(ACRES)				(MIN)	(YR)	(IN/HR)	(CFS)	(CFS)	(YES/NO)	(FT/S)	(MIN)	(FT/FT)	(FT)			(FT)	(FT)			(FT)			(FT)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
SD-C2	29+74.61	25+91.36	383.25	1	24	-	-	RCP	3.14	6.283	0.50	0.013	574.56	572.65	0.005	C11/CF11	0.73	0.90	0.65	0.65	10.00	100-yr	9.80	6.42	16.01	NO	2.04	3.13	0.00080	0.31	578.59	578.29	0.065	0.065	MH (90° LAT)	0.25	0.05	578.64	581.17	2.53
SD-C2	25+91.36	25+75.77	15.59	1	24	-	-	RCP	3.14	6.283	0.50	0.013	572.65	572.57	0.005	C10	0.37	0.90	0.33	0.99	13.13	100-yr	9.30	9.17	16.25	NO	2.92	0.09	0.00163	0.03	578.18	578.15	0.065	0.132	WYE (Pipe)(60°)	0.35	0.11	578.29	584.21	5.92
SD-C2	25+75.77	24+74.61	101.16	1	24	-	-	RCP	3.14	6.283	0.50	0.013	572.57	572.06	0.005	CF10	0.37	0.90	0.33	1.32	13.22	100-yr	9.29	12.22	16.11	NO	3.89	0.43	0.00290	0.29	577.96	577.67	0.132	0.235	WYE (Pipe)(60°)	0.35	0.19	578.15	584.42	6.27
SD-C2	24+74.61	19+74.61	500	1	24	-	-	RCP	3.14	6.283	0.50	0.013	572.06	569.56	0.005	-	0.00	0.00	0.00	1.32	13.65	100-yr	9.22	12.13	16.04	NO	3.86	2.16	0.00286	1.43	577.66	576.23	0.235	0.232	MH (D1=D2)(0°)	0.05	0.01	577.67	585.25	7.58
SD-C2	19+74.61	18+36.29	138.32	1	24	-	-	RCP	3.14	6.283	0.50	0.013	569.56	568.87	0.005	-	0.00	0.00	0.00	1.32	15.81	100-yr	8.89	11.70	16.02	NO	3.72	0.62	0.00266	0.37	576.22	575.85	0.232	0.215	MH (D1=D2)(0°)	0.05	0.01	576.23	584.97	8.74
SD-C2	18+36.29	18+20.70	15.59	1	24	-	-	RCP	3.14	6.283	0.50	0.013	568.87	568.79	0.005	C9	0.35	0.90	0.31	1.63	16.43	100-yr	8.80	14.32	16.25	NO	4.56	0.06	0.00399	0.06	575.60	575.54	0.215	0.323	WYE (Pipe)(60°)	0.35	0.25	575.85	583.12	7.27
SD-C2	18+20.70	17+63.92	56.78	1	24	-	-	RCP	3.14	6.283	0.50	0.013	568.79	568.50	0.005	CF9	0.35	0.90	0.31	1.94	16.48	100-yr	8.79	17.04	16.21	NO	5.42	0.17	0.00564	0.32	575.19	574.87	0.323	0.457	WYE (Pipe)(60°)	0.35	0.34	575.54	582.71	7.17
SD-C2	17+63.92	14+99.68	264.24	1	24	-	-	RCP	3.14	6.283	0.50	0.013	568.50	567.19	0.005	C14/C15	0.66	0.90	0.60	2.53	16.66	100-yr	8.77	22.21	15.97	NO	7.07	0.62	0.00959	2.53	574.26	571.72	0.457	0.776	MH (60° LAT)	0.35	0.62	574.87	582.25	7.38
SD-C2	14+99.68	14+57.37	42.31	1	36	-	-	RCP	7.07	9.425	0.75	0.013	567.19	566.98	0.005	-	0.00	0.00	0.00	2.53	17.28	100-yr	8.68	21.99	47.12	NO	3.11	0.23	0.00108	0.05	571.68	571.63	0.776	0.150	ENLARGE (D2/D1=1.2)	0.31	0.05	571.72	578.28	6.56
SD-C2	14+57.37	14+41.78	15.59	1	36	-	-	RCP	7.07	9.425	0.75	0.013	566.98	566.90	0.005	C8	0.51	0.90	0.46	2.99	17.51	100-yr	8.65	25.90	47.91	NO	3.66	0.07	0.00150	0.02	571.48	571.45	0.150	0.208	WYE (Pipe)(60°)	0.35	0.16	571.63	577.70	6.07
SD-C2	14+41.78	11+57.37	284.41	1	36	-	-	RCP	7.07	9.425	0.75	0.013	566.90	565.48	0.005	CF8	0.37	0.90	0.33	3.33	17.58	100-yr	8.64	28.74	47.26	NO	4.07	1.17	0.00185	0.53	571.27	570.74	0.208	0.257	WYE (Pipe)(60°)	0.35	0.18	571.45	576.95	5.50
SD-C2	11+57.37	11+41.78	15.59	1	36	-	-	RCP	7.07	9.425	0.75	0.013	565.48	565.40	0.005	C7	0.29	0.90	0.26	3.59	18.74	100-yr	8.48	30.43	47.91	NO	4.31	0.06	0.00207	0.03	570.55	570.51	0.257	0.288	WYE (Pipe)(60°)	0.35	0.20	570.74	573.91	3.17
SD-C2	11+41.78	10+29.27	112.51	1	36	-	-	RCP	7.07	9.425	0.75	0.013	565.40	564.84	0.005	CF7	0.29	0.90	0.26	3.85	18.80	100-yr	8.47	32.63	47.18	NO	4.62	0.41	0.00238	0.27	570.28	570.02	0.288	0.331	WYE (Pipe)(60°)	0.35	0.23	570.51	573.73	3.22
SD-C2	10+29.27	10+20.00	9.27	1	36	-	-	RCP	7.07	9.425	0.75	0.013	564.84	564.79	0.005	C6	0.34	0.90	0.30	4.16	19.21	100-yr	8.41	34.95	49.12	NO	4.94	0.03	0.00273	0.03	569.75	569.73	0.331	0.380	WYE (Pipe)(60°)	0.35	0.26	570.02	573.30	3.28
SD-C2	10+20.00	10+10.00	10	1	36	-	-	RCP	7.07	9.425	0.75	0.013	564.79	564.74	0.005	-	0.00	0.00	0.00	4.16	19.24	100-yr	8.41	34.93	47.29	NO	4.94	0.03	0.00273	0.03	569.63	569.60	0.380	0.379	BEND (Pipe)(30°)	0.25	0.09	569.73	573.31	3.58
SD-C2	10+10.00	10+00.00	10	1	36	-	-	RCP	7.07	9.425	0.75	0.013	564.74	564.69	0.005	CF6	0.34	0.90	0.30	4.46	19.28	100-yr	8.40	37.44	47.29	NO	5.30	0.03	0.00313	0.03	569.30	569.27	0.379	0.436	WYE (Pipe)(60°)	0.35	0.30	569.60	573.34	3.74

NOTES:
1. SD-C2 STARTING HGL IS FROM DOWNSTREAM HGL AT CULVERT 01.
2. PARTIAL FLOW VELOCITIES, FRICTION SLOPE, AND HGL IS SHOWN WHEN INDICATED IN COLUMN 27.

STORM DRAIN LINE C3:

LINE C3

SYSTEM ID	COLLECTION POINT STATION U/S	COLLECTION POINT STATION D/S	LENGTH	# OF BARRELS	PIPE SIZE	BOX SPAN	BOX RISE	TYPE	AREA	WETTED PERIMETER PW	HYDRAULIC RADIUS	MANNING'S n	FLOWLINE ELEVATION U/S	FLOWLINE ELEVATION D/S	SLOPE	INLET ID	AREA	RUNOFF COEFF. C	INCRE-MENTAL C*A	ACCUM-ULATED C*A	UP-STREAM TC	DESIGN STORM FREQ.	INTENSITY I	RUNOFF Q	CONDUIT CAPACITY QC	PARTIAL FLOW	VELOCITY V	TIME IN CONDUIT	FRICTION SLOPE Sf	FRICTION HEAD-LOSS	HGL U/S	HGL D/S	HEADLOSS CALCULATIONS V1 2/2g	V2 2/2g	JCT. TYPE	COEFF. KJ	HEAD-LOSS HL	DESIGN HGL	TOP OF CURB ELEV.	HGL DEPTH BELOW T/C
			(FT)		(IN)	(FT)	(FT)		(FT2)	(FT)	(FT)				(FT/FT)		(ACRES)				(MIN)	(YR)	(IN/HR)	(CFS)	(CFS)	(YES/NO)	(FT/S)	(MIN)	(FT/FT)	(FT)			(FT)	(FT)			(FT)			(FT)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
SD-C3	10+51.24	10+74.11	22.87	1	24	-	-	RCP	3.14	6.283	0.50	0.013	573.79	573.22	0.025	C12	0.32	0.90	0.29	0.29	10.00	100-yr	9.80	2.84	35.81	YES	0.90	0.42	0.00016	0.00	575.42	575.41	0.013	0.013	WYE (Pipe)(60°)	0.35	0.01	575.43	580.31	4.88
SD-C3	10+74.11	11+29.92	55.81	1	24	-	-	RCP	3.14	6.283	0.50	0.013	573.22	571.82	0.025	C13	0.34	0.90	0.31	0.60	10.42	100-yr	9.73	5.79	35.93	NO	1.84	0.50	0.00065	0.04	575.37	575.33	0.013	0.053	WYE (Pipe)(60°)	0.35	0.05	575.41	580.15	4.74

NOTES:
1. SD-C3 STARTING HGL IS FROM UPSTREAM HGL AT SD-C1.
2. PARTIAL FLOW VELOCITIES, FRICTION SLOPE, AND HGL IS SHOWN WHEN INDICATED IN COLUMN 27.

STORM DRAIN LINE C4 AND C5:

LINE C4 AND C5

SYSTEM ID	COLLECTION POINT STATION U/S	COLLECTION POINT STATION D/S	LENGTH	# OF BARRELS	PIPE SIZE	BOX SPAN	BOX RISE	TYPE	AREA	WETTED PERIMETER PW	HYDRAULIC RADIUS	MANNING'S n	FLOWLINE ELEVATION U/S	FLOWLINE ELEVATION D/S	SLOPE	INLET ID	AREA	RUNOFF COEFF. C	INCRE-MENTAL C*A	ACCUM-ULATED C*A	UP-STREAM TC	DESIGN STORM FREQ.	INTENSITY I	RUNOFF Q	CONDUIT CAPACITY QC	PARTIAL FLOW	VELOCITY V	TIME IN CONDUIT	FRICTION SLOPE Sf	FRICTION HEAD-LOSS	HGL U/S	HGL D/S	HEADLOSS CALCULATIONS V1 2/2g	V2 2/2g	JCT. TYPE	COEFF. KJ	HEAD-LOSS HL	DESIGN HGL	TOP OF CURB ELEV.	HGL DEPTH BELOW T/C
			(FT)		(IN)	(FT)	(FT)		(FT2)	(FT)	(FT)				(FT/FT)		(ACRES)				(MIN)	(YR)	(IN/HR)	(CFS)	(CFS)	(YES/NO)	(FT/S)	(MIN)	(FT/FT)	(FT)			(FT)	(FT)			(FT)			(FT)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
SD-C4	10+10.68	11+08.34	97.66	1	24	-	-	RCP	3.14	6.283	0.50	0.013	576.34	573.12	0.033	C15	0.28	0.90	0.25	0.25	10.00	100-yr	9.80	2.49	41.19	YES	0.42	3.90	0.03297	3.22	576.65	574.92	0.003	0.003	WYE (Pipe)(60°)	0.35	0.00	576.65	583.32	6.67
SD-C4	11+08.34	11+26.85	18.51	1	24	-	-	RCP	3.14	6.283	0.50	0.013	573.12	572.51	0.033	C14	0.30	0.90	0.27	0.52	13.90	100-yr	9.18	4.77	41.18	NO	1.52	0.20	0.00044	0.01	574.88	574.87	0.003	0.036	WYE (Pipe)(60°)	0.35	0.03	574.92	581.82	6.90
SD-C5	10+69.18	10+50.82	18.36	1	18	-	-	RCP	1.77	4.712	0.38	0.013	580.78	580.65	0.007	C5-1	0.49	0.90	0.44	0.44	10.00	100-yr	9.80	4.32	8.98	YES	2.39	0.13	0.00727	0.13	581.49	581.36	0.089	0.089	-	0.00	0.00	581.49	583.92	2.43
SD-C5	10+50.82	10+29.51	21.31	1	18	-	-	RCP	1.77	4.712	0.38	0.013	580.65	580.49	0.007	-	0.00	0.00	0.00	0.44	10.13	100-yr	9.78	4.31	8.89	YES	2.40	0.15	0.00712	0.15	581.37	581.21	0.089	0.089	BEND (Pipe)(30°)	0.25	0.02	581.39	583.57	2.18

NOTES:
1. SD-C4 STARTING HGL IS FROM UPSTREAM HGL AT SD-C2.
2. PARTIAL FLOW VELOCITIES, FRICTION SLOPE, AND HGL IS SHOWN WHEN INDICATED IN COLUMN 27.

STORM DRAIN LINE D1:

LINE D1

SYSTEM ID	COLLECTION POINT STATION U/S	COLLECTION POINT STATION D/S	LENGTH	# OF BARRELS	PIPE SIZE	BOX SPAN	BOX RISE	TYPE	AREA	WETTED PERIMETER P_w	HYDRAULIC RADIUS	MANNING'S n	FLOWLINE ELEVATION U/S	FLOWLINE ELEVATION D/S	SLOPE	INLET ID	AREA	RUNOFF COEFF. C	INCRE-MENTAL C*A	ACCUM-ULATED C*A	UP-STREAM T_c	DESIGN STORM FREQ.	INTENSITY I	RUNOFF Q	CONDUIT CAPACITY Q_c	PARTIAL FLOW	VELOCITY V	TIME IN CONDUIT	FRICTION SLOPE S_o	FRICTION HEAD-LOSS	HGL U/S	HGL D/S	HEADLOSS CALCULATIONS $V_i^2/2g$	$V_o^2/2g$	JCT. TYPE	COEFF. K	HEAD-LOSS H	DESIGN HGL	TOP OF CURB ELEV.	HGL DEPTH BELOW T/C
			(FT)		(IN)	(FT)	(FT)		(FT')	(FT)	(FT)				(FT/FT)		(ACRES)				(MIN)	(YR)	(IN/HR)	(CFS)	(CFS)	(YES/NO)	(FT/S)	(MIN)	(FT/FT)	(FT)			(FT)	(FT)			(FT)			(FT)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
SD-D1	13+13.41	10+00.00	313.41	1	24	-	-	RCP	3.14	6.283	0.50	0.013	593.62	592.67	0.003	D3/D4	0.85	0.90	0.77	0.77	10.00	100-yr	9.80	7.51	12.49	YES	2.48	2.11	0.00303	0.95	594.71	594.73	0.095	0.095	MH (90° LAT)	0.25	0.07	594.78	598.54	3.76
SD-D1	10+00.00	09+66.50	33.5	1	48	-	-	RCP	12.57	12.566	1.00	0.013	592.67	592.37	0.009	D1/OS-7	31.95	0.22	7.13	7.90	12.11	100-yr	9.46	74.72	136.30	YES	5.95	0.09	0.00896	0.30	594.73	594.43	0.095	0.549	MH (90° LAT)	0.25	0.53	595.26	598.63	3.37
SD-D1	09+66.50	08+88.95	77.55	1	48	-	-	RCP	12.57	12.566	1.00	0.013	592.37	591.68	0.009	D2	0.32	0.90	0.29	8.18	12.20	100-yr	9.45	77.32	135.86	YES	6.15	0.21	0.00890	0.69	594.49	593.80	0.549	0.588	MH (D1=D2)(0°)	0.05	0.03	594.52	598.63	4.11

NOTES:
1. SD-D1 STARTING HGL IS FROM AS-BUILT PLANS LINE "R" (WIER & ASSOCIATES, INC.).
2. PARTIAL FLOW VELOCITIES, FRICTION SLOPE, AND HGL IS SHOWN WHEN INDICATED IN COLUMN 27.

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/25/2021

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASE FOR CONSTRUCTION
RELEASED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
RELEASED FOR INTERIM REVIEW ONLY AND NOT TO BE USED WITHOUT PROPER AUTHORIZATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

HYDRAULIC CALCULATIONS
STORM DRAIN

F&N JOB NO. RKW19711

NO.	ISSUES	BY	DATE

	DATE	BY
DESIGNED	APRIL 2022	MLW
DRAWN		MLW
CHECKED		MRA
REVISED		

FILE NAME cv-trt-pl-hydraulic_calc.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET HC-3

SEQ. 145

MicroStation V8 User: 90262 Office: On Site
Plotter: \\UFI\Drawings\Drainage\cv-trt-pl-hydraulic_calc.sht
Plot Style: J:\Projects\Rockwall\RTP Phase V\Dwg\Plot Styles\Half Scale.tbl
Plot Scale: 2.000000 ' in. = 1.000000 ' in.
Date: Feb. 21, 2024 - 12:50:52 PM
Model: Default
Project: Freese and Nichols, Inc. - True Type Fonts

HYDRAULIC CALCULATIONS: (CONTINUED)

"A" LATERALS:

Form 3.3: STORM SEWER CALCULATIONS TABLE

SYSTEM ID (LATERAL)	COLLECTION POINT STATION U/S	COLLECTION POINT STATION D/S	LENGTH	# OF BARRELS	PIPE SIZE	BOX SPAN	BOX RISE	TYPE	AREA	WETTED PERIMETER PW	HYDRAULIC RADIUS	MANNING'S n	FLOWLINE ELEVATION U/S	FLOWLINE ELEVATION D/S	SLOPE	INLET ID	AREA	RUNOFF COEFF. C	INCREMENTAL C*A	ACCUMULATED C*A	UP-STREAM TC	DESIGN STORM FREQ.	INTENSITY I	RUNOFF Q	CONDUIT CAPACITY QC	PARTIAL FLOW	VELOCITY V	TIME IN CONDUIT T	FRICTION SLOPE Sf	FRICTION HEAD-LOSS	HGL U/S	HGL D/S	HEADLOSS V1 2/2g	HEADLOSS V2 2/2g	HEADLOSS JCT. TYPE	HEADLOSS COEFF. KJ	HEADLOSS HL	DESIGN HGL	TOP OF CURB ELEV.	HGL DEPTH BELOW T/C
			(FT)		(IN)	(FT)	(FT)		(FT2)	(FT)	(FT)				(FT/FT)		(ACRES)				(MIN)	(YR)	(IN/HR)	(CFS)	(CFS)	(YES/NO)	(FT/S)	(MIN)	(FT/FT)	(FT)			(FT)	(FT)				(FT)		(FT)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
LATERAL A1																																								
LAT-A1	10+32.19	10+04.62	27.57	1	21	-	-	RCP	2.41	5.498	0.44	0.013	591.32	586.94	0.159	A1	0.35	0.90	0.31	0.31	10.00	100-yr	9.80	3.05	63.33	YES	0.61	0.75	0.1589	4.38	591.56	589.65	0.006	0.006	INLET (Beg. of Line)	1.25	0.01	591.56	596.82	5.26
LAT-A1	10+04.62	10+00.00	4.62	1	21	-	-	RCP	2.41	5.498	0.44	0.013	586.94	586.21	0.158	-	0.00	0.00	0.00	0.31	10.75	100-yr	9.68	3.01	63.15	NO	1.25	0.06	0.0004	0.00	589.64	589.64	0.006	0.024	BEND (Pipe)(30°)	0.25	0.01	589.65	596.22	6.57
LATERAL A2A																																								
LAT-A2A	10+38.58	10+00.00	38.58	1	21	-	-	RCP	2.41	5.498	0.44	0.013	595.45	591.83	0.094	A2a	0.55	0.90	0.49	0.49	10.00	100-yr	9.80	4.82	48.67	YES	1.23	0.52	0.0938	3.62	595.80	592.74	0.024	0.024	INLET (Beg. of Line)	1.25	0.03	595.83	599.95	4.12
LATERAL A2																																								
LAT-A2	10+61.78	10+00.00	61.78	1	21	-	-	RCP	2.41	5.498	0.44	0.013	592.32	586.21	0.099	A2	0.26	0.90	0.23	0.23	10.00	100-yr	9.80	2.28	49.96	YES	0.46	2.24	0.0989	6.11	592.56	589.64	0.003	0.003	INLET (Beg. of Line)	1.25	0.00	592.56	596.82	4.26
LATERAL A3																																								
LAT-A3	10+32.19	10+04.62	27.57	1	21	-	-	RCP	2.41	5.498	0.44	0.013	586.78	582.51	0.155	A3	0.46	0.90	0.41	0.41	10.00	100-yr	9.80	4.04	62.53	YES	0.90	0.51	0.0006	0.02	587.58	587.57	0.013	0.013	INLET (Beg. of Line)	1.25	0.02	587.60	591.28	3.68
LAT-A3	10+04.62	10+00.00	4.62	1	21	-	-	RCP	2.41	5.498	0.44	0.013	582.51	581.79	0.156	-	0.00	0.00	0.00	0.41	10.51	100-yr	9.72	4.01	62.72	NO	1.67	0.05	0.0006	0.00	587.55	587.55	0.013	0.043	BEND (Pipe)(30°)	0.25	0.01	587.57	590.91	3.34
LATERAL A4																																								
LAT-A4	10+61.78	10+00.00	61.78	1	21	-	-	RCP	2.41	5.498	0.44	0.013	586.78	581.79	0.081	A4	0.46	0.90	0.41	0.41	10.00	100-yr	9.80	4.04	45.15	YES	1.68	0.61	0.0006	0.04	587.55	587.55	0.044	0.044	INLET (Beg. of Line)	1.25	0.05	587.61	591.28	3.67
LATERAL A5																																								
LAT-A5	10+32.19	10+04.62	27.57	1	21	-	-	RCP	2.41	5.498	0.44	0.013	583.39	580.74	0.096	A5	0.43	0.90	0.38	0.38	10.00	100-yr	9.80	3.77	49.26	NO	1.57	0.29	0.0006	0.02	585.52	585.50	0.038	0.038	INLET (Beg. of Line)	1.25	0.05	585.57	587.89	2.32
LAT-A5	10+04.62	10+00.00	4.62	1	21	-	-	RCP	2.41	5.498	0.44	0.013	580.74	580.29	0.097	-	0.00	0.00	0.00	0.38	10.29	100-yr	9.75	3.75	49.58	NO	1.56	0.05	0.0006	0.00	585.49	585.49	0.038	0.038	BEND (Pipe)(30°)	0.25	0.01	585.50	587.68	2.18
LATERAL A6																																								
LAT-A6	10+61.78	10+00.00	61.78	1	21	-	-	RCP	2.41	5.498	0.44	0.013	583.39	580.29	0.050	A6	0.43	0.90	0.38	0.38	10.00	100-yr	9.80	3.77	35.59	NO	1.57	0.66	0.0006	0.03	585.53	585.49	0.038	0.038	INLET (Beg. of Line)	1.25	0.05	585.57	587.89	2.32
LATERAL A7																																								
LAT-A7	10+02.84	10+00.00	2.84	1	21	-	-	RCP	2.41	5.498	0.44	0.013	579.79	579.30	0.173	A7	0.33	0.90	0.29	0.29	10.00	100-yr	9.80	2.88	65.99	NO	1.20	0.04	0.0003	0.00	583.80	583.80	0.022	0.022	INLET (Beg. of Line)	1.25	0.03	583.82	586.29	2.47
LATERAL A8																																								
LAT-A8	10+26.44	10+00.00	26.44	1	21	-	-	RCP	2.41	5.498	0.44	0.013	581.64	577.84	0.144	A8	0.34	0.90	0.31	0.31	10.00	100-yr	9.80	3.01	60.23	YES	1.25	0.35	0.0004	0.01	583.01	583.00	0.024	0.024	INLET (Beg. of Line)	1.25	0.03	583.04	586.14	3.10
LATERAL A9																																								
LAT-A9	10+49.84	10+04.60	45.24	1	21	-	-	RCP	2.41	5.498	0.44	0.013	580.10	578.07	0.045	A9	0.34	0.90	0.31	0.31	10.00	100-yr	9.80	3.02	33.65	YES	1.25	0.60	0.0004	0.02	581.78	581.77	0.024	0.024	INLET (Beg. of Line)	1.25	0.03	581.81	584.60	2.79
LAT-A9	10+04.60	10+00.00	4.6	1	21	-	-	RCP	2.41	5.498	0.44	0.013	578.07	577.86	0.046	-	0.00	0.00	0.00	0.31	10.60	100-yr	9.70	2.99	33.95	NO	1.24	0.06	0.0004	0.00	581.76	581.76	0.024	0.024	BEND (Pipe)(30°)	0.25	0.01	581.77	584.26	2.49
LATERAL A10																																								
LAT-A10	10+26.45	10+00.00	26.45	1	21	-	-	RCP	2.41	5.498	0.44	0.013	579.43	576.65	0.105	A10	0.34	0.90	0.31	0.31	10.00	100-yr	9.80	3.01	51.51	YES	1.25	0.35	0.0004	0.01	580.98	580.97	0.024	0.024	INLET (Beg. of Line)	1.25	0.03	581.01	584.43	3.42
LATERAL A11																																								
LAT-A11	10+02.90	10+00.00	2.9	1	21	-	-	RCP	2.41	5.498	0.44	0.013	577.55	577.20	0.121	A11	0.33	0.90	0.30	0.30	10.00	100-yr	9.80	2.91	55.19	NO	1.21	0.04	0.0003	0.00	580.57	580.57	0.023	0.023	INLET (Beg. of Line)	1.25	0.03	580.60	583.55	2.95
LATERAL A12																																								
LAT-A12	10+26.39	10+00.00	26.39	1	21	-	-	RCP	2.41	5.498	0.44	0.013	578.49	575.79	0.102	A12	0.34	0.90	0.30	0.30	10.00	100-yr	9.80	2.97	50.82	YES	1.24	0.36	0.0004	0.01	579.18	579.17	0.024	0.024	INLET (Beg. of Line)	1.25	0.03	579.21	583.49	4.28
LATERAL A13																																								
LAT-A13	10+21.36	10+00.00	21.36	1	21	-	-	RCP	2.41	5.498	0.44	0.013	578.93	576.56	0.111	A13	0.34	0.90	0.31	0.31	10.00	100-yr	9.80	3.01	52.92	YES	1.25	0.28	0.0004	0.01	580.12	580.12	0.024	0.024	INLET (Beg. of Line)	1.25	0.03	580.15	583.43	3.28
LATERAL A14																																								
LAT-A14	10+50.23	10+00.00	50.23	1	21	-	-	RCP	2.41	5.498	0.44	0.013	578.92	576.48	0.049	A14	0.34	0.90	0.31	0.31	10.00	100-yr	9.80	3.00	35.02	YES	1.25	0.67	0.0004	0.02	579.92	579.90	0.024	0.024	INLET (Beg. of Line)	1.25	0.03	579.95	583.42	3.47
LATERAL A15 AND A21																																								
LAT-A15	10+50.48	10+23.09	27.39	1	21	-	-	RCP	2.41	5.498	0.44	0.013	578.22	577.59	0.023	A15	0.30	0.90	0.27	0.27	10.00	100-yr	9.80	2.69	24.10	NO	1.12	0.41	0.0003	0.01	580.47	580.46	0.019	0.019	INLET (Beg. of Line)	1.25	0.02	580.50	582.72	2.22
LAT-A15	10+23.09	10+00.00	23.09	1	21	-	-	RCP	2.41	5.498	0.44	0.013	577.59	577.05	0.023	A21	0.14	0.90	0.12	0.40	10.41	100-yr	9.73	3.85	24.30	NO	1.60	0.24	0.0006	0.01	580.43	580.42	0.019	0.040	MH (60° LAT)	0.35	0.03	580.46	582.76	2.30
LATERAL A16 AND A22																																								
LAT-A16	10+81.65	10+54.27	27.38	1	21	-	-	RCP	2.41	5.498	0.44	0.013	578.22	577.81	0.015	A16	0.30	0.90	0.27	0.27	10.00	100-yr	9.80	2.69	19.44	NO	1.12	0.41	0.0003	0.01	580.43	580.43	0.019	0.019	INLET (Beg. of Line)	1.25	0.02	580.46	582.72	2.26
LAT-A16	10+54.27	10+00.00	54.27	1	21	-	-	RCP	2.41	5.498	0.44	0.013	577.81	576.97	0.015	A22	0.14	0.90	0.12	0.40	10.41	100-yr	9.73	3.85	19.77	NO	1.60	0.56	0.0006	0.03	580.39	580.36	0.019	0.040	MH (60° LAT)	0.35	0.03	580.43	582.76	2.33
LATERAL A17																																								
LAT-A17	10+16.50	10+00.00	16.5	1	21	-	-	RCP	2.41	5.498	0.44	0.013	579.31	578.09	0.074	A17	0.12	0.90	0.11	0.11	10.00	100-yr	9.80	1.09	43.20	YES	0.45	0.61	0.0000	0.00	580.44	580.44	0.003	0.003	INLET (Beg. of Line)	1.25	0.00	580.45	583.81	3.36
LATERAL A18																																								
LAT-A18	10+43.50	10+00.00	43.5	1	21	-	-	RCP	2.41	5.498	0.44	0.013	579.31	578.09	0.028	A18	0.12	0.90	0.11	0.11	10.00	100-yr	9.80	1.09	26.61	YES	0.45	1.60	0.0000	0.00	580.44	580.44	0.003	0.003	INLET (Beg. of Line)	1.25	0.00	580.45	583.81	3.36
LATERAL A19																																								
LAT-A19	10+25.74	10+00.00	25.74	1	21	-	-	RCP	2.41	5.498	0.44	0.013	579.61	576.69	0.113	A19	0.18	0.90	0.16	0.16	10.00	100-yr	9.80	1.58	53.51	YES	0.66	0.65	0.0001	0.00	579.93	579.93	0.007	0.007	INLET (Beg. of Line)	1.25	0.01	579.94	584.11	4.17
LATERAL A20																																								
LAT-A20	10+30.01	10+11.46	18.55	1	21	-	-	RCP	2.41	5.498	0.44	0.013	578.44	577.29	0.062	A20	0.16	0.90	0.14	0.14	10.00	100-yr	9.80	1.42	39.56	YES	0.59	0.52	0.0001	0.00	579.16	579.16	0.005	0.005	INLET (Beg. of Line)	1.25	0.01	579.17	583.94	4.77
LAT-A20	10+11.46	10+00.00	11.46	1	21	-	-	RCP	2.41	5.498	0.44	0.013	577.29	576.57	0.063	-	0.00	0.00	0.00	0.14	10.52	100-yr	9.72	1.41	39.82	NO	0.59	0.33	0.0001	0.00	579.16	579.16	0.005	0.005	BEND (Pipe)(30°)	0.25	0.00	579.16	584.07	4.91
LATERAL OS1																																								
LAT-OS1	10+84.53	10+68.48	16.05	1	48	-	-	RCP	12.57	12.566	1.00	0.013	593.34	593.18	0.010	OS-1	10.86	0.42	4.55	4.55	10.00	100-yr	9.80	44.56	143.81	YES	3.08	0.09	0.0100	0.16	594.82	594.66	0.147	0.147	-	0.00	0.00	594.82	600.42	5.60
LAT-OS1	10+68.48	10+55.32	13.16	1	48	-	-	RCP	12.57	12.566	1.00	0.013	593.18	591.83	0.103	-	0.00	0.00	0.00	4.55	10.09	100-yr	9.79	44.50	461.31	YES	2.15	0.10	0.1026	1.35	593.96	592.74	0.147	0.071	BEND (Pipe)(30°)	0.25	0.02	593.98	600.13	6.15
LAT-OS1	10+55.32	10+00.00	55.32	1	48	-	-	RCP	12.57	12.566	1.00	0.013	591.83	586.16	0.102	A2a	0.55	0.90	0.49	5.04	10.19	100-yr	9.77	49.23	461.11	YES	2.48	0.37	0.1025	5.67	592.67	591.19	0.071	0.096	WYE (Pipe)(60°)	0.35	0.07	592.74	599.95	7.21
LATERAL OS2																																								
LAT-OS2	10+10.87	10+04.00	6.87	1	-	7	4	RCB	28.00	22.000	1.27	0.013	590.38	590.35	0.005	OS-2	24.40	0.90	21.96	21.96	10.00	100-yr	9.80	215.21	269.02	NO	7.69	0.01	0.0033	0.02	595.04	595.02	0.917	0.917	MH (D1=D2)(0°)	0.05	0.05	595.09	601.85	6.76

NOTES:
1. PARTIAL FLOW VELOCITIES, FRICTION SLOPE, AND HGL IS SHOWN WHEN INDICATED IN COLUMN 27.

"B" LATERALS:

Form 3.3: STORM SEWER CALCULATIONS TABLE

SYSTEM ID (LATERAL)	COLLECTION POINT STATION U/S	COLLECTION POINT STATION D/S	LENGTH	# OF BARRELS	PIPE SIZE	BOX SPAN	BOX RISE	TYPE	AREA	WETTED PERIMETER PW	HYDRAULIC RADIUS	MANNING'S n	FLOWLINE ELEVATION U/S	FLOWLINE ELEVATION D/S	SLOPE	INLET ID	AREA	RUNOFF COEFF. C	INCREMENTAL C*A	ACCUMULATED C*A	UP-STREAM TC	DESIGN STORM FREQ.	INTENSITY I	RUNOFF Q	CONDUIT CAPACITY QC	PARTIAL FLOW	VELOCITY V	TIME IN CONDUIT T	FRICTION SLOPE Sf	FRICTION HEAD-LOSS	HGL U/S	HGL D/S	HEADLOSS V1 2/2g	HEADLOSS V2 2/2g	HEADLOSS JCT. TYPE	HEADLOSS COEFF. KJ	HEADLOSS HL	DESIGN HGL	TOP OF CURB ELEV.	HGL DEPTH BELOW T/C
			(FT)		(IN)	(FT)	(FT)		(FT2)	(FT)	(FT)				(FT/FT)		(ACRES)				(MIN)	(YR)	(IN/HR)	(CFS)	(CFS)	(YES/NO)	(FT/S)	(MIN)	(FT/FT)	(FT)			(FT)	(FT)				(FT)		(FT)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
LATERAL B1																																								
LAT-B1	10+15.00	10+00.00	15	1	21	-	-	RCP	2.41	5.498	0.44	0.013	595.04	591.66	0.225	B1	0.35	0.90	0.31	0.31	10.00	100-yr	9.80	3.06	75.42	YES	0.59	0.43	0.2253	3.38	595.26	592.27	0.005	0.005	INLET (Beg. of Line)	1.25	0.01	595.27	597.95	2.68
LATERAL B2																																								
LAT-B2	10+26.00	10+00.00	26	1	21	-	-	RCP	2.41	5.498	0.44	0.013	593.45	591.66	0.069	B2	0.35	0.90	0.31	0.31	10.00	100-yr	9.80	3.06	41.69	YES	0.71	0.61	0.0688	1.79	593.75	592.27	0.008	0.008	INLET (Beg. of Line)	1.25	0.01	593.76	597.95	4.19
LATERAL B3																																								
LAT-B3	10+19.63	10+00.00	19.63	1	21	-	-	RCP	2.41	5.498	0.44	0.013	586.16	584.07	0.106	B3	0.49	0.90	0.44	0.44	10.00	100-yr	9.80	4.34	51.84	YES	1.06	0.31	0.1065	2.09	586.48	584.92	0.017	0.017	INLET (Beg. of Line)	1.25	0.02	586.51	597.95	11.44
LATERAL OS6																																								
LAT-OS6	10+55.38	10+31.75	23.63	1	24	-	-	RCP	3.14	6.283	0.50	0.013	584.25	584.02	0.010	OS-6A	1.23	0.90	1.11	1.11	10.00	100-yr	9.80	10.85	22.38	YES	3.39	0.12	0.0097	0.23	585.21	584.98	0.179	0.179	-	0.00	0.00	585.21	590.34	5.13
LAT-OS6	10+31.75	10+00.00	31.75	1	24	-	-	RCP	3.14	6.283	0.50	0.013	584.02	583.70	0.010	B4	0.49	0.90	0.44	1.55	10.12	100-yr	9.78	15.16	22.77	YES	5.13	0.10	0.0101	0.32	585.19	585.10	0.179	0.409	WYE (Pipe)(60°)	0.35	0.35	585.54	590.34	4.80
LATERAL B4																																								
LAT-B4	10+13.47	10+00.00	13.47	1	21	-	-	RCP	2.41	5.498	0.44	0.013	586.16	584.02	0.159	B4	0.49	0.90	0.44	0.44	10.00	100-yr	9.80	4.34	63.33	YES	0.99	0.23	0.1589	2.14	586.45	585.54	0.015	0.015	INLET (Beg. of Line)	1.25	0.02	586.47	590.60	4.13
LATERAL B5																																								
LAT-B5	10+19.63	10+00.00	19.63	1	21	-	-	RCP	2.41	5.498	0.44	0.013	578.31	576.58	0.088	B5	0.50	0.90	0.45	0.45	10.00	100-yr	9.80	4.42	47.17	YES	1.11	0.29	0.0881	1.73	579.73	579.73	0.019	0.019	INLET (Beg. of Line)	1.25	0.02	579.75	582.81	3.06
LATERAL B6																																								
LAT-B6	10+32.33	10+00.00	32.33	1	21	-	-	RCP	2.41	5.498	0.44	0.013	578.31	576.46	0.057	B6	0.50	0.90	0.45	0.45	10.00	100-yr	9.80	4.42	38.01	YES	1.20	0.45	0.0572	1.85	579.34	579.34	0.022	0.022	INLET (Beg. of Line)	1.25	0.03	579.37	582.81	3.44
LATERAL B7																																								
LAT-B07	10+08.61	10+00.00	8.614	1	21	-	-	RCP	2.41	5.498	0.44	0.013	575.67	574.80	0.101	B7	0.34	0.90	0.31	0.31	10.00	100-yr	9.80	2.99	50.49	NO	1.24	0.12	0.0004	0.00	578.39	578.39	0.024	0.024	INLET (Beg. of Line)	1.25	0.03	578.42	581.67	3.25
LATERAL B8																																								
LAT-B08	10+08.61	10+00.00	8.614	1	21	-	-	RCP	2.41	5.498	0.44	0.013	576.11	575.04	0.124	B8	0.34	0.90	0.31	0.31	10.00	100-yr	9.80	2.99	56.00	NO	1.24	0.12	0.0004	0.00	578.39	578.39	0.024	0.024	INLET (Beg. of Line)	1.25	0.03	578.42	581.61	3.19

NOTES:
1. PARTIAL FLOW VELOCITIES, FRICTION SLOPE, AND HGL IS SHOWN WHEN INDICATED IN COLUMN 27.

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

THE SEAL THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
IT IS A VIOLATION OF LAW TO USE THIS DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

TEXAS REGISTERED ENGINEERING FIRM F-2144
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Dallas, Texas 75204
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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
CIVIL
HYDRAULIC CALCULATIONS
LATERALS

FAN JOB NO.	RKW19711
DATE	APRIL 2022
DESIGNED	MLW
DRAWN	MLW
REVISED	
CHECKED	MRA
FILE NAME	c:\...\pt-hydraulic_calc_laterals.sht

NO.	ISSUES	BY	DATE

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale. 0 1"

SHEET HC-4
SEQ. 146

"C" LATERALS:

Form 3.3: STORM SEWER CALCULATIONS TABLE

SYSTEM ID (LATERAL)	CONDUIT PROPERTIES: COLLECTION POINT STATION U/S	D/S	LENGTH	# OF BARRELS	PIPE SIZE	BOX SPAN	BOX RISE	TYPE	AREA	WETTED PERIMETER PW	HYDRAULIC RADIUS	MANNING'S n	FLOWLINE ELEVATION U/S	D/S	SLOPE	INCREMENTAL DRAINAGE AREA: INLET ID	AREA	RUNOFF COEFF. C	INCREMENTAL C*A	ACCUMULATED C*A	UP-STREAM TC	DESIGN STORM FREQ.	INTENSITY I	RUNOFF Q	CONDUIT CAPACITY QC	PARTIAL FLOW	VELOCITY V	TIME IN CONDUIT	FRICTION SLOPE Sf	FRICTION HEAD-LOSS	HGL U/S	HGL D/S	HEADLOSS CALCULATIONS: V1 2/2g	V2 2/2g	JCT. TYPE	COEFF. KJ	HEAD-LOSS HL	DESIGN HGL	TOP OF CURB ELEV.	HGL DEPTH BELOW T/C
			(FT)		(IN)	(FT)	(FT)		(FT2)	(FT)	(FT)		(MIN)		(FT/FT)		(ACRES)					(YR)	(IN/HR)	(CFS)	(CFS)	(YES/NO)	(FT/S)	(MIN)	(FT/FT)	(FT)												
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
LATERAL C1																																								
LAT-C1	10+16.50	10+00.00	16.5	1	21	-	-	RCP	2.41	5.498	0.44	0.013	578.10	576.24	0.113	C1	0.29	0.90	0.26	0.26	10.00	100-yr	9.80	2.59	53.34	YES	1.08	0.26	0.0003	0.00	578.87	578.87	0.018	0.018	INLET (Beg. of Line)	1.25	0.02	578.89	582.60	3.71
LATERAL C2																																								
LAT-C2	10+21.36	10+00.00	21.36	1	21	-	-	RCP	2.41	5.498	0.44	0.013	577.24	575.42	0.085	C2	0.29	0.90	0.26	0.26	10.00	100-yr	9.80	2.53	46.38	YES	1.05	0.34	0.0003	0.01	578.76	578.75	0.017	0.017	INLET (Beg. of Line)	1.25	0.02	578.78	581.74	2.96
LATERAL C3																																								
LAT-C3	10+21.36	10+00.00	21.36	1	21	-	-	RCP	2.41	5.498	0.44	0.013	577.79	574.82	0.139	C3	0.17	0.90	0.15	0.15	10.00	100-yr	9.80	1.51	59.24	YES	0.63	0.57	0.0001	0.00	578.34	578.34	0.006	0.006	INLET (Beg. of Line)	1.25	0.01	578.35	582.29	3.94
LATERAL C4																																								
LAT-C4	10+21.36	10+00.00	21.36	1	21	-	-	RCP	2.41	5.498	0.44	0.013	576.73	572.24	0.210	C4	0.31	0.90	0.28	0.28	10.00	100-yr	9.80	2.72	72.84	YES	0.51	0.70	0.2102	4.49	576.41	576.41	0.004	0.004	INLET (Beg. of Line)	1.25	0.01	576.41	581.23	4.82
LATERAL C5																																								
LAT-C5	10+21.36	10+00.00	21.36	1	21	-	-	RCP	2.41	5.498	0.44	0.013	570.44	568.61	0.086	C5	0.47	0.90	0.43	0.43	10.00	100-yr	9.80	4.18	46.50	YES	1.04	0.34	0.0857	1.83	570.89	570.89	0.017	0.017	INLET (Beg. of Line)	1.25	0.02	570.92	574.94	4.02
FUTURE LATERAL CF1																																								
LAT-CF1	10+43.50	10+00.00	43.5	1	21	-	-	RCP	2.41	5.498	0.44	0.013	578.09	576.24	0.043	CF1	0.29	0.90	0.26	0.26	10.00	100-yr	9.80	2.59	32.76	YES	0.62	1.17	0.0425	1.85	578.87	578.87	0.006	0.006	INLET (Beg. of Line)	1.25	0.01	578.88	582.59	3.71
FUTURE LATERAL CF2																																								
LAT-CF2	10+52.54	10+00.00	52.54	1	21	-	-	RCP	2.41	5.498	0.44	0.013	577.24	575.35	0.036	CF2	0.29	0.90	0.26	0.26	10.00	100-yr	9.80	2.52	30.13	YES	0.61	1.43	0.0360	1.89	578.66	578.66	0.006	0.006	INLET (Beg. of Line)	1.25	0.01	578.67	581.74	3.07
FUTURE LATERAL CF3																																								
LAT-CF3	10+52.54	10+00.00	52.54	1	21	-	-	RCP	2.41	5.498	0.44	0.013	576.74	574.74	0.038	CF3	0.17	0.90	0.15	0.15	10.00	100-yr	9.80	1.51	31.00	YES	0.63	1.40	0.0001	0.00	578.16	578.15	0.006	0.006	INLET (Beg. of Line)	1.25	0.01	578.17	581.24	3.07
FUTURE LATERAL CF4																																								
LAT-CF4	10+52.49	10+00.00	52.49	1	21	-	-	RCP	2.41	5.498	0.44	0.013	576.73	572.16	0.087	CF4	0.31	0.90	0.28	0.28	10.00	100-yr	9.80	2.74	46.88	YES	0.59	1.49	0.0871	4.57	576.99	576.08	0.005	0.005	INLET (Beg. of Line)	1.25	0.01	577.00	581.23	4.23
FUTURE LATERAL CF5																																								
LAT-CF5	10+52.54	10+00.00	52.54	1	21	-	-	RCP	2.41	5.498	0.44	0.013	570.44	568.37	0.039	CF5	0.36	0.90	0.33	0.33	10.00	100-yr	9.80	3.22	31.54	YES	0.83	1.05	0.0394	2.07	570.80	570.32	0.011	0.011	INLET (Beg. of Line)	1.25	0.01	570.81	574.94	4.13
LATERAL C6																																								
LAT-C6	10+21.36	10+00.00	21.36	1	21	-	-	RCP	2.41	5.498	0.44	0.013	566.79	564.84	0.091	C6	0.34	0.90	0.30	0.30	10.00	100-yr	9.80	2.95	48.00	NO	1.23	0.29	0.0003	0.01	570.02	570.02	0.023	0.023	INLET (Beg. of Line)	1.25	0.03	570.05	573.29	3.24
LATERAL C7																																								
LAT-C7	10+21.36	10+00.00	21.36	1	21	-	-	RCP	2.41	5.498	0.44	0.013	567.41	565.48	0.090	C7	0.29	0.90	0.26	0.26	10.00	100-yr	9.80	2.58	47.76	NO	1.07	0.33	0.0003	0.01	570.75	570.74	0.018	0.018	INLET (Beg. of Line)	1.25	0.02	570.77	573.91	3.14
LATERAL C8																																								
LAT-C8	10+21.36	10+00.00	21.36	1	21	-	-	RCP	2.41	5.498	0.44	0.013	569.55	566.98	0.120	C8	0.51	0.90	0.46	0.46	10.00	100-yr	9.80	4.52	55.11	NO	1.88	0.19	0.0008	0.02	571.65	571.63	0.055	0.055	INLET (Beg. of Line)	1.25	0.07	571.72	577.55	5.83
LATERAL C9																																								
LAT-C9	10+21.36	10+00.00	21.36	1	21	-	-	RCP	2.41	5.498	0.44	0.013	572.62	568.87	0.176	C9	0.35	0.90	0.31	0.31	10.00	100-yr	9.80	3.05	66.57	NO	1.27	0.28	0.0004	0.01	575.86	575.85	0.025	0.025	INLET (Beg. of Line)	1.25	0.03	575.89	583.12	7.23
LATERAL C10																																								
LAT-C10	10+21.36	10+00.00	21.36	1	21	-	-	RCP	2.41	5.498	0.44	0.013	575.71	572.65	0.143	C10	0.37	0.90	0.33	0.33	10.00	100-yr	9.80	3.24	60.13	NO	1.35	0.26	0.0004	0.01	578.29	578.29	0.028	0.028	INLET (Beg. of Line)	1.25	0.04	578.33	584.21	5.88
LATERAL C11																																								
LAT-C11	10+16.50	10+00.00	16.5	1	21	-	-	RCP	2.41	5.498	0.44	0.013	576.17	574.56	0.098	C11	0.36	0.90	0.33	0.33	10.00	100-yr	9.80	3.21	49.63	NO	1.33	0.21	0.0004	0.01	578.65	578.64	0.028	0.028	INLET (Beg. of Line)	1.25	0.03	578.68	581.17	2.49
FUTURE LATERAL CF6																																								
LAT-CF6	10+52.52	10+16.18	36.34	1	24	-	-	RCP	3.14	6.283	0.50	0.013	568.79	565.99	0.077	CF6	0.34	0.90	0.30	0.30	10.00	100-yr	9.80	2.95	62.96	YES	0.94	0.64	0.0002	0.01	569.62	569.61	0.014	0.014	INLET (Beg. of Line)	1.25	0.02	569.63	574.29	4.66
LAT-CF6	10+16.18	10+00.00	16.18	1	24	-	-	RCP	3.14	6.283	0.50	0.013	565.99	564.74	0.077	-	0.00	0.00	0.00	0.30	10.64	100-yr	9.70	2.92	63.05	NO	0.93	0.29	0.0002	0.00	569.61	569.60	0.014	0.013	BEND (Pipe)(30°)	0.25	0.00	569.61	573.79	4.18
FUTURE LATERAL CF7																																								
LAT-CF7	10+52.54	10+00.00	52.54	1	21	-	-	RCP	2.41	5.498	0.44	0.013	569.41	565.40	0.076	CF7	0.29	0.90	0.26	0.26	10.00	100-yr	9.80	2.58	43.89	YES	1.07	0.82	0.0003	0.01	570.53	570.51	0.018	0.018	INLET (Beg. of Line)	1.25	0.02	570.55	573.91	3.36
FUTURE LATERAL CF8																																								
LAT-CF8	10+52.54	10+00.00	52.54	1	21	-	-	RCP	2.41	5.498	0.44	0.013	572.05	566.90	0.098	CF8	0.37	0.90	0.33	0.33	10.00	100-yr	9.80	3.26	49.74	YES	0.73	1.20	0.0980	5.15	572.33	571.45	0.008	0.008	INLET (Beg. of Line)	1.25	0.01	572.34	577.55	5.21
FUTURE LATERAL CF9																																								
LAT-CF9	10+52.54	10+00.00	52.54	1	21	-	-	RCP	2.41	5.498	0.44	0.013	575.62	568.79	0.130	CF9	0.35	0.90	0.31	0.31	10.00	100-yr	9.80	3.04	57.28	YES	0.64	1.37	0.1300	6.83	575.87	575.54	0.006	0.006	INLET (Beg. of Line)	1.25	0.01	575.88	583.12	7.24
FUTURE LATERAL CF10																																								
LAT-CF10	10+52.54	10+00.00	52.54	1	21	-	-	RCP	2.41	5.498	0.44	0.013	578.71	572.57	0.117	CF10	0.37	0.90	0.33	0.33	10.00	100-yr	9.80	3.24	54.31	YES	0.71	1.23	0.1169	6.14	578.98	578.15	0.008	0.008	INLET (Beg. of Line)	1.25	0.01	578.99	584.21	5.22
FUTURE LATERAL CF11																																								
LAT-CF11	10+43.50	10+00.00	43.5	1	21	-	-	RCP	2.41	5.498	0.44	0.013	576.67	574.56	0.049	CF11	0.36	0.90	0.33	0.33	10.00	100-yr	9.80	3.21	34.99	NO	1.33	0.54	0.0004	0.02	578.66	578.64	0.028	0.028	INLET (Beg. of Line)	1.25	0.03	578.69	581.67	2.98
LATERAL C12																																								
LAT-C12	10+31.88	10+00.00	31.88	1	21	-	-	RCP	2.41	5.498	0.44	0.013	576.38	573.79	0.081	C12	0.32	0.90	0.29	0.29	10.00	100-yr	9.80	2.84	45.28	YES	0.62	0.85	0.0812	2.59	576.65	575.43	0.006	0.006	INLET (Beg. of Line)	1.25	0.01	576.66	580.88	4.22
LATERAL C13																																								
LAT-C13	10+19.60	10+00.00	19.6	1	21	-	-	RCP	2.41	5.498	0.44	0.013	575.27	573.22	0.105	C13	0.34	0.90	0.31	0.31	10.00	100-yr	9.80	2.99	51.38	YES	0.64	0.51	0.1046	2.05	575.53	575.41	0.006	0.006	INLET (Beg. of Line)	1.25	0.01	575.54	580.27	4.73
LATERAL C14																																								
LAT-C14	10+56.94	10+00.00	56.94	1	21	-	-	RCP	2.41	5.498	0.44	0.013	578.44	573.12	0.093	C14	0.30	0.90	0.27	0.27	10.00	100-yr	9.80	2.61	48.56	YES	0.55	1.73	0.0934	5.32	578.69	574.92	0.005	0.005	INLET (Beg. of Line)	1.25	0.01	578.70	582.94	4.24
LATERAL C15																																								
LAT-C15	10+21.36	10+00.00	21.36	1	21	-	-	RCP	2.41	5.498	0.44	0.013	578.41	576.34	0.097	C15	0.28	0.90	0.25	0.25	10.00	100-yr	9.80	2.49	49.46	YES	0.51	0.69	0.0969	2.07	578.66	576.65	0.004	0.004	INLET (Beg. of Line)	1.25	0.01	578.66	583.41	4.75

NOTES:
1. PARTIAL FLOW VELOCITIES, FRICTION SLOPE, AND HGL IS SHOWN WHEN INDICATED IN COLUMN 27.

"D" LATERALS:

Form 3.3: STORM SEWER CALCULATIONS TABLE

SYSTEM ID (LATERAL)	CONDUIT PROPERTIES: COLLECTION POINT STATION U/S	D/S	LENGTH	# OF BARRELS	PIPE SIZE	BOX SPAN	BOX RISE	TYPE	AREA	WETTED PERIMETER PW	HYDRAULIC RADIUS	MANNING'S n	FLOWLINE ELEVATION U/S	D/S	SLOPE	INCREMENTAL DRAINAGE AREA: INLET ID	AREA	RUNOFF COEFF. C	INCREMENTAL C*A	ACCUMULATED C*A	UP-STREAM TC	DESIGN STORM FREQ.	INTENSITY I	RUNOFF Q	CONDUIT CAPACITY QC	PARTIAL FLOW	VELOCITY V	TIME IN CONDUIT	FRICTION SLOPE Sf	FRICTION HEAD-LOSS	HGL U/S	HGL D/S	HEADLOSS CALCULATIONS: V1 2/2g	V2 2/2g	JCT. TYPE	COEFF. KJ	HEAD-LOSS HL	DESIGN HGL	TOP OF CURB ELEV.	HGL DEPTH BELOW T/C
			(FT)		(IN)	(FT)	(FT)		(FT2)	(FT)	(FT)		(MIN)		(FT/FT)		(ACRES)					(YR)	(IN/HR)	(CFS)	(CFS)	(YES/NO)	(FT/S)	(MIN)	(FT/FT)	(FT)												
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
LATERAL D1																																								
LAT-D1	10+11.50	10+00.00	11.5	1	24	-	-	RCP	3.14	6.283	0.50	0.013	592.73	592.67	0.005	D1	0.55	0.90	0.50	0.50	10.00	100-yr	9.80	4.87	16.38	NO	1.55	0.12	0.0005	0.01	595.26	595.26	0.037	0.037	INLET (Beg. of Line)	1.25	0.05	595.31	598.63	3.32
LATERAL D3																																								
LAT-D3	10+09.50	10+00.00	9.5	1	21	-	-	RCP	2.41	5.498	0.44	0.013	594.04	593.62	0.044	D3	0.53	0.90	0.48	0.48	10.00	100-yr	9.80	4.69	33.41	YES	1.34	0.12	0.0442	0.42	594.78	594.78	0.028	0.028	INLET (Beg. of Line)	1.25	0.03	594.82	598.54	3.72
LATERAL D4																																								
LAT-D4	10+31.50	10+00.00	31.5	1	21	-	-	RCP	2.41	5.498	0.44	0.013	595.04	593.62	0.045	D4	0.53	0.90	0.48	0.48	10.00	100-yr	9.80	4.69	33.73	YES	1.34	0.39	0.0451	1.42	595.46	594.78	0.028	0.028	INLET (Beg. of Line)	1.25	0.03	595.49	598.54	3.05

NOTES:
1. PARTIAL FLOW VELOCITIES, FRICTION SLOPE, AND HGL IS SHOWN WHEN INDICATED IN COLUMN 27.

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

TEXAS REGISTERED ENGINEERING FIRM F-2144
FREESE AND NICHOLS, INC.

RELEASE FOR PRELIMINARY REVIEW ONLY. NOT INTENDED OR SUITABLE FOR BIDDING, PERMITTING, CONSTRUCTION OR IMPLEMENTATION PURPOSES. PREPARED BY SARAH E. CAUDLE, TEXAS NO. 134055, ON 10/21/2021. IT IS UNLAWFUL TO USE OR REPRODUCE THIS DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE NICHOLS
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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
CIVIL
HYDRAULIC CALCULATIONS
LATERALS

FAN JOB NO.	RKW19711
DATE	APRIL 2022
DESIGNED	MLW
DRAWN	MLW
REVISED	
CHECKED	MRA

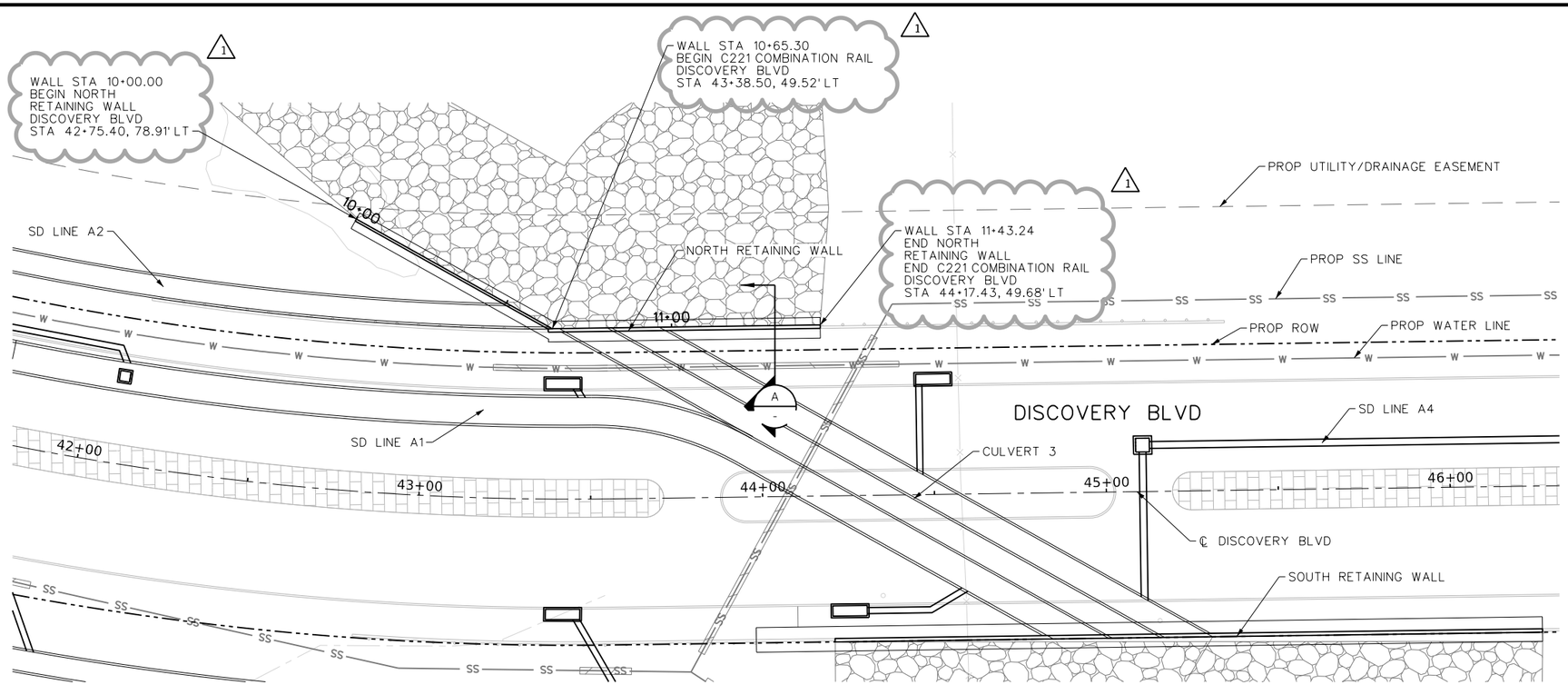
FILE NAME: t:\...\pl-hydraulic_calc_laterals.sht

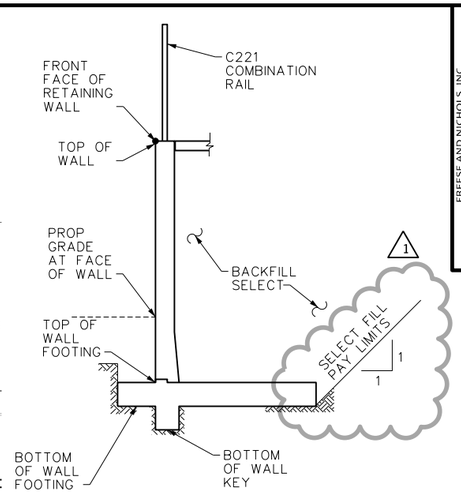
NO.	ISSUES	BY	DATE

VERIFY SCALE: Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.

SHEET
HC-5

SEQ.
147





A ~ TYPICAL SECTION
NOT TO SCALE

NOTES:

1. "EJ" INDICATES EXPANSION JOINT. "CJ" INDICATES CONSTRUCTION JOINT. REFER TO RW-2 "RETAINING WALL MISCELLANEOUS DETAILS" FOR WALL JOINT DETAILS.

2. UNLESS NOTED OTHERWISE, WALLS SHALL BE PER RW 1(L)C. REFER TO SDDT-6 FOR RETAINING WALL GENERAL NOTES.

3. REFER TO GR-3 FOR GRADING AROUND CULVERT.

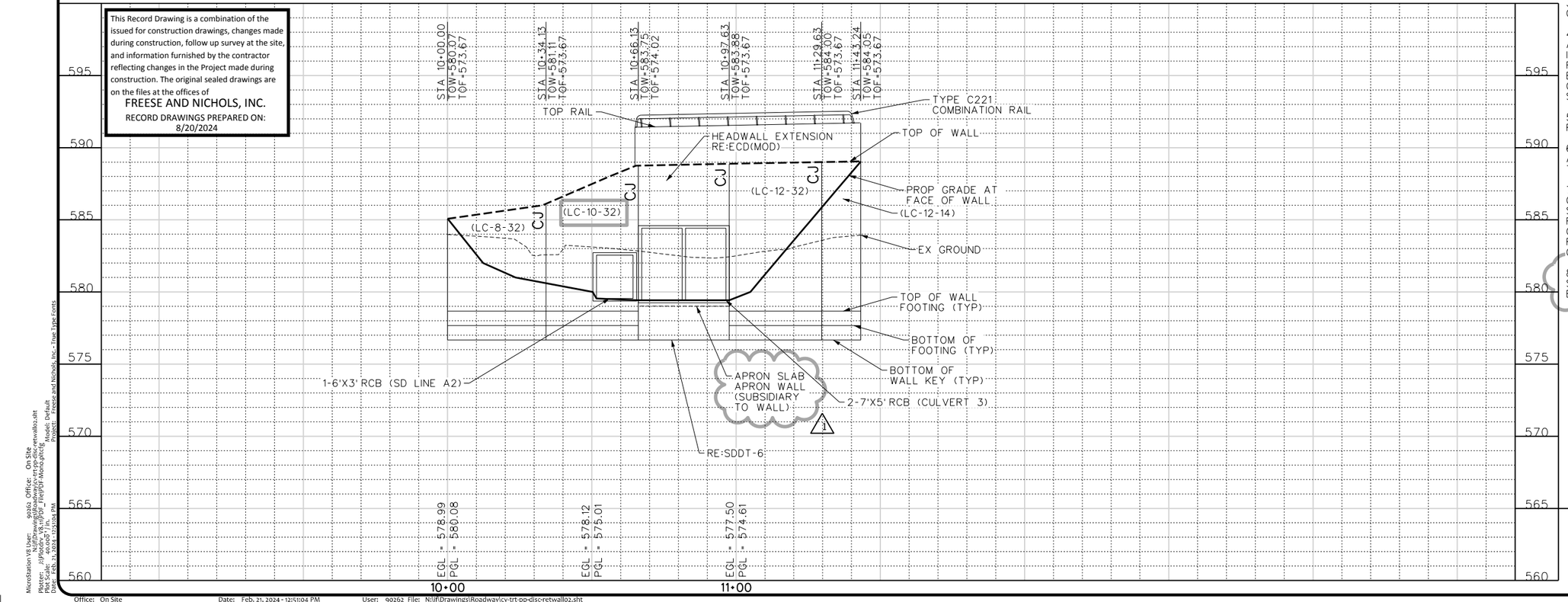
4. PROVIDE FORMLINER ON FACE OF WALL AND BOTH SIDES OF COMBINATION RAIL, INCREASE THICKNESS OF WALL BY FORMLINER THICKNESS. FORMLINER SHALL BE ASHLAR STONE RANDOM PATTERN. CONTRACTOR SHALL SUBMIT FORMLINER SAMPLE TO CITY FOR APPROVAL

5. BASELINE STATION FOR WALL IS OFF FACE OF WALL.

6. CONTRACTOR SHALL VERIFY LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO THE BEGINNING OF CONSTRUCTION.

7. AT CONTRACTORS OPTION, CAST-IN-PLACE RCB MAY BE USED. STATIONING AND ELEVATIONS SHOWN ARE FOR PRECAST OPTION. IF CAST-IN-PLACE OPTIONS IS CHOSEN, ADJUST AS NEEDED. REFER TO SCP-9 OR MC-9-13 FOR CULVERT DETAILS.

8. PROPOSED QTY IS BASED OFF SF FROM TOP OF WALL TO BOTTOM OF FOOTING.



PROFILE LEGEND

EXISTING GROUND ----------
PG AT FACE OF WALL ——————
TOP OF WALL – – – – –

N

0 10' 20' 40'
HORIZONTAL SCALE

0 2' 4' 8'
VERTICAL SCALE

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

THE SEAL THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY AMY L. RAINES
TEXAS NO. 83515 ON 10/21/2021
IT IS A VIOLATION OF LAW TO ALTER THIS DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
CIVIL
NORTH RETAINING WALL PLAN AND PROFILE

NO.	ISSUES	BY	DATE
1	ADDENDUM # 3	ALR	11/30/2021

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED ZF
DRAWN BA
CHECKED
FILE NAME cv-trt-pp-disc-retwall02.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET RET-1
SEQ. 148

MicroStation V8 User: 90262 Office: On Site
Plotter: J:\Proj\Drawings\Roadway\cv-trt-pp-disc-retwall02.sht
Plot Scale: 40.0067 ' / in. Model: Default
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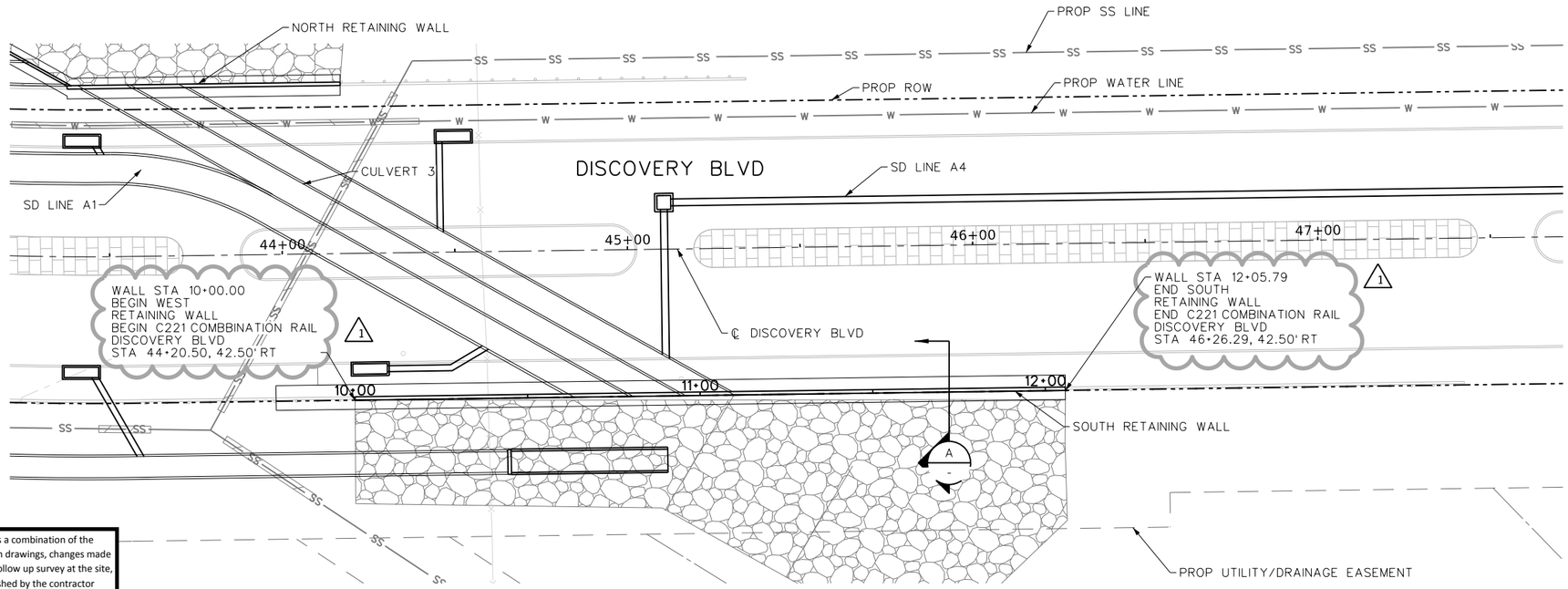
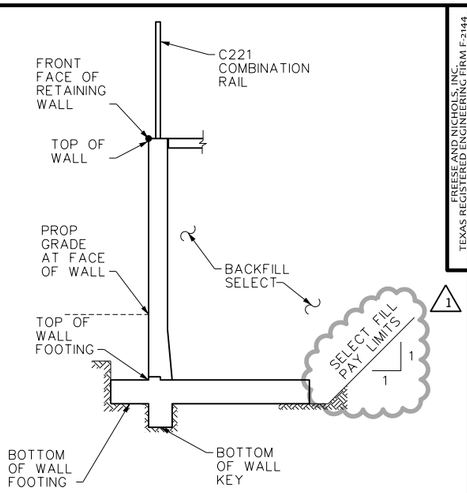
Office: On Site Date: Feb. 21, 2024 - 12:51:04 PM User: 90262 File: N:\jf\Drawings\Roadway\cv-trt-pp-disc-retwall02.sht





TYPICAL SECTION
NOT TO SCALE

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

NOTES:

1. "EJ" INDICATES EXPANSION JOINT. "CJ" INDICATES CONSTRUCTION JOINT. REFER TO RW-2 "RETAINING WALL MISCELLANEOUS DETAILS" FOR WALL JOINT DETAILS.

2. UNLESS NOTED OTHERWISE, WALLS SHALL BE PER RW 1(L)C. REFER TO SDDT-6 FOR RETAINING WALL GENERAL NOTES.

3. REFER TO GR-3 FOR GRADING AROUND CULVERT.

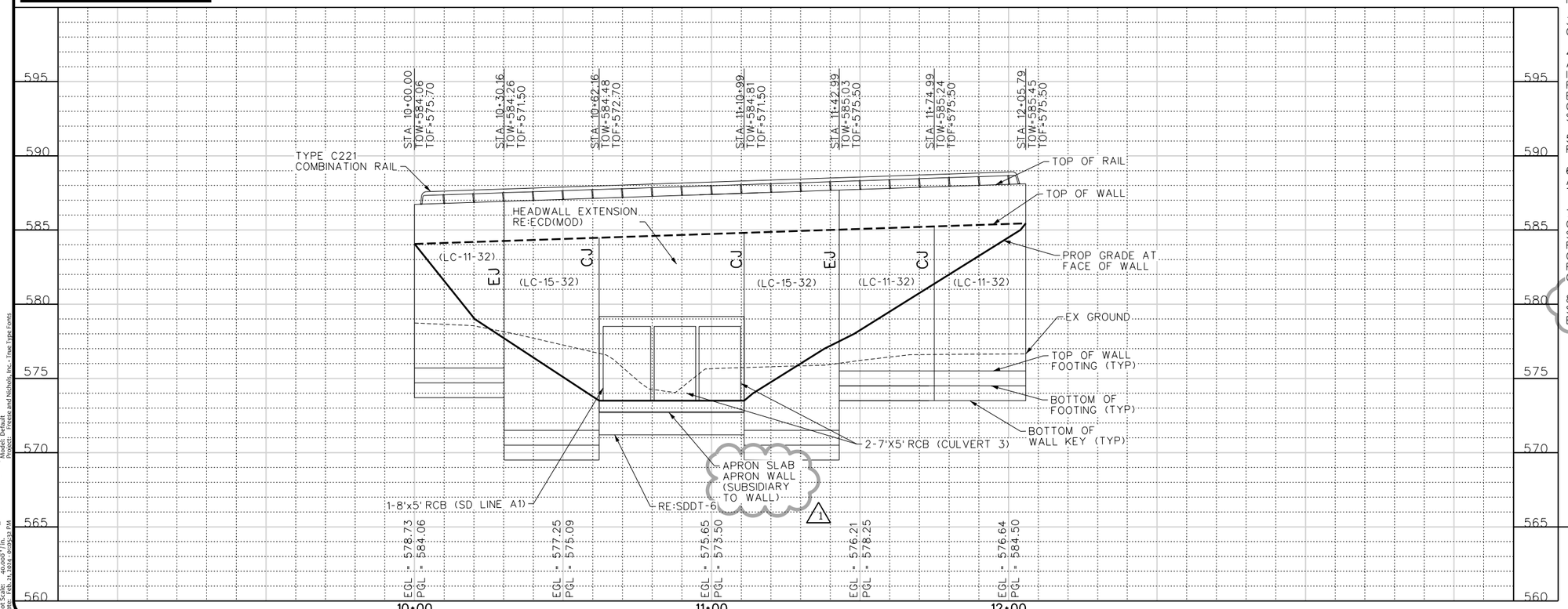
4. PROVIDE FORMLINER ON FACE OF WALL AND BOTH SIDES OF COMBINATION RAIL, INCREASE THICKNESS OF WALL BY FORMLINER THICKNESS. FORMLINER SHALL BE ASHLAR STONE RANDOM PATTERN. CONTRACTOR SHALL SUBMIT FORMLINER SAMPLE TO CITY FOR APPROVAL

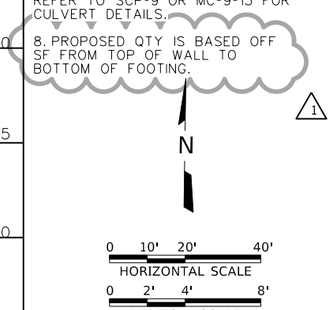
5. BASELINE STATION FOR WALL IS OFF FACE OF WALL.

6. CONTRACTOR SHALL VERIFY LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO THE BEGINNING OF CONSTRUCTION.

7. AT CONTRACTORS OPTION, CAST-IN-PLACE RCB MAY BE USED. STATIONING AND ELEVATIONS SHOWN ARE FOR PRECAST OPTION. IF CAST-IN-PLACE OPTIONS IS CHOSEN, ADJUST AS NEEDED. REFER TO SCP-9 OR MC-9-13 FOR CULVERT DETAILS.

8. PROPOSED QTY IS BASED OFF SF FROM TOP OF WALL TO BOTTOM OF FOOTING.





PROFILE LEGEND
EXISTING GROUND ----------
PG AT FACE OF WALL ————————
TOP OF WALL – – – – –

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

THE SEAL THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY AMY L. RAINES
TEXAS NO. 83515 ON 10/21/2021
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FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2250
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
CIVIL
SOUTH RETAINING WALL
PLAN AND PROFILE

NO.	ISSUES	BY	DATE
1	ADDENDUM # 3	ALR	11/30/2024

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED ZF
DRAWN BA
REVISED
CHECKED
FILE NAME cv-trt-pp-disc-retwall01.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET RET-2
SEQ. 149

MicroStation V8 User: 90262 Office: On Site
Plotter: \\jfl\Drawings\Roadway\cv-trt-pp-disc-retwall01.sht
Plot Scale: 40.008 ' / in.
Plot Date: Feb. 21, 2024 - 01:05:32 PM
Model: Default
Models: Freese and Nichols, Inc. - True Type Fonts

Office: On Site Date: Feb. 21, 2024 - 01:05:32 PM User: 90262 File: N:\jfl\Drawings\Roadway\cv-trt-pp-disc-retwall01.sht

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2250
Web - www.freese.com

RELEASE THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

CULVERT 01
PLAN & PROFILE

NO.	ISSUES	BY	DATE
1	ADDENDUM #2	SEC	11/17/21

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

F&N JOB NO.	RKW19711
DATE	APRIL 2022
DESIGNED	MW
DRAWN	ZLG
REVISED	
CHECKED	MRA
FILE NAME	cv-trt-pp-culv01.sht

SHEET
CULV-1
SEQ.
150

MicroStation V8 User: 90262 Office: On Site
Plotter: \\PW\Plotter_HP_Designjet_T1700_24in_PS
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Date: Feb. 21, 2024 - 12:51:20 PM
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Project: Freese and Nichols, Inc. - True Type Fonts
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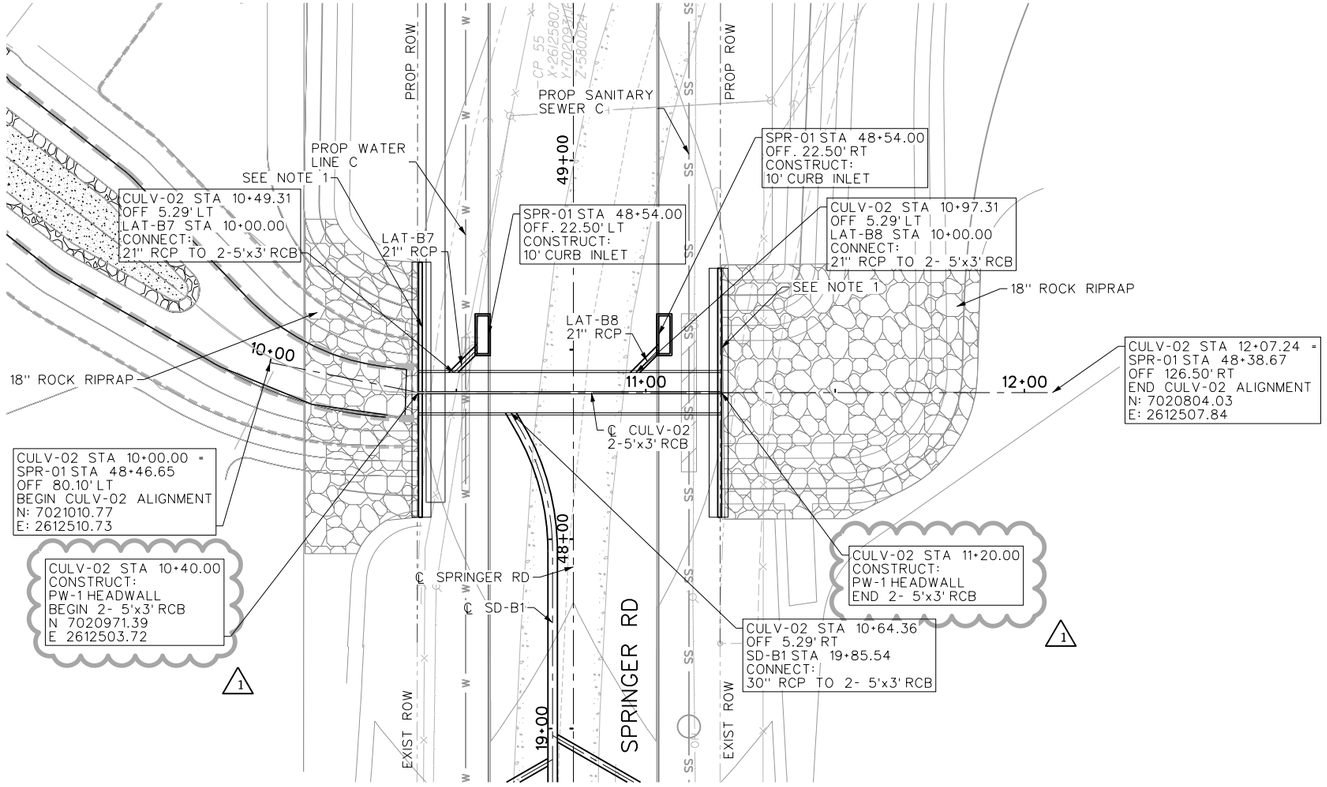

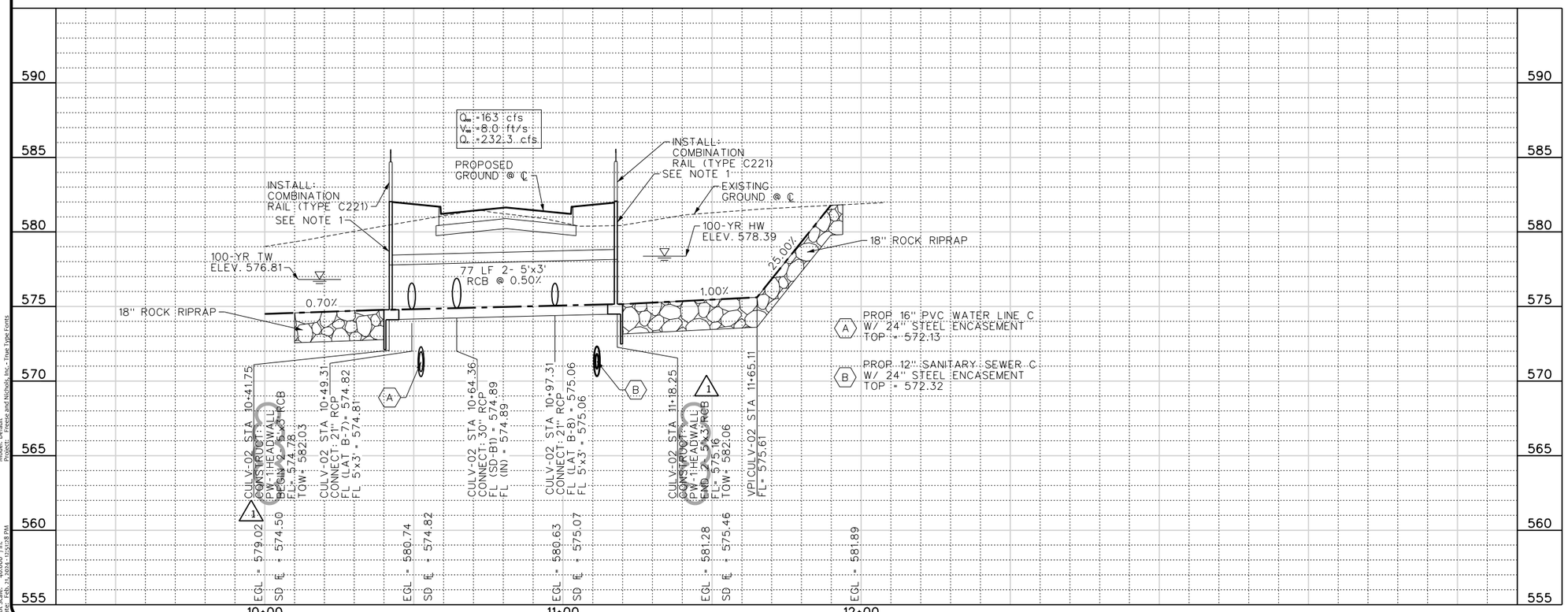

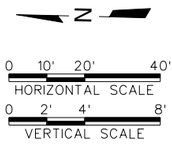

LEGEND

RIPRAP (SEE DPDT-2)

NOTES:

1. PROVIDE FORMLINER ON FACE OF WALL AND BOTH SIDES OF COMBINATION RAIL, INCREASE THICKNESS OF WALL BY FORMLINER THICKNESS. FORMLINER SHALL BE ASHLAR STONE RANDOM PATTERN. CONTRACTOR SHALL SUBMIT FORMLINER SAMPLE TO ENGINEER FOR APPROVAL.

2. REFER TO HC-1 FOR CULVERT CALCULATIONS.

3. AT ALL HEADWALLS AND RETAINING WALLS, THE CONTRACTOR MUST FOLLOW NOTE #2 UNDER "FOUNDATIONS" LOCATED ON SHEET SDDT-6 FOR THE ENTIRE LENGTH OF THE HEADWALL AND/OR WALL. ALL WORK IS CONSIDERED SUBSIDIARY TO WALL OR HEADWALL.

4. ALL HEADWALLS AND/OR WALLS SHALL HAVE SELECT FILL BEHIND THE WALL. SELECT FILL SHALL CONSIST OF MATERIALS WHICH ARE CLASSIFIED AS SP, SM, SC, CL, OR DUAL CLASSIFICATION THEREOF, WHICH HAVE A LIQUID LIMIT LESS THAN OR EQUAL TO 35 AND A PLASTICITY INDEX OF A MINIMUM OF 7 AND A MAXIMUM OF 15, WHICH ARE FREE OF ORGANIC MATERIALS. THE SELECT FILL IS CONSIDERED TO BE PART OF BID ITEM "EMBANKMENT"

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASE FOR REVIEW PURPOSES ONLY
THIS DOCUMENT WAS ORIGINALLY ISSUED AND SEALED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
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FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2250
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

CULVERT 02 PLAN & PROFILE

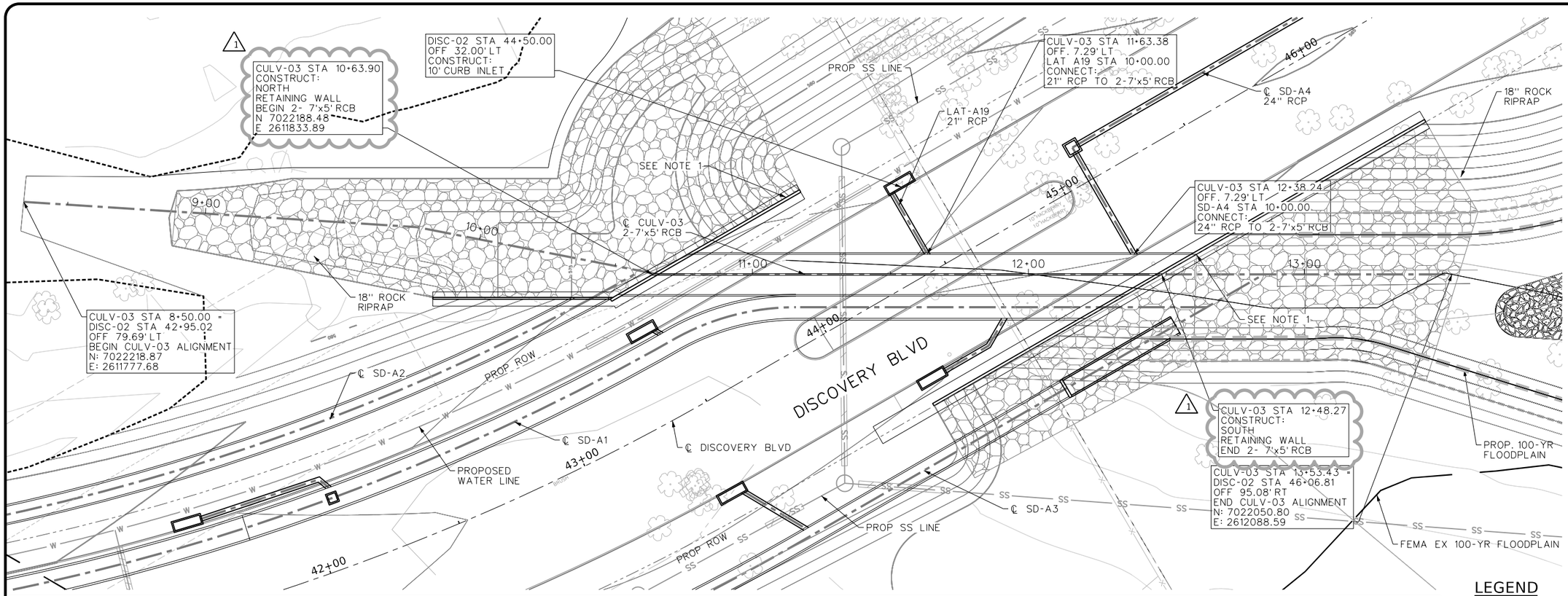
NO.	ISSUES	BY	DATE
1	ADDENDUM #3	SEC	11/30/202

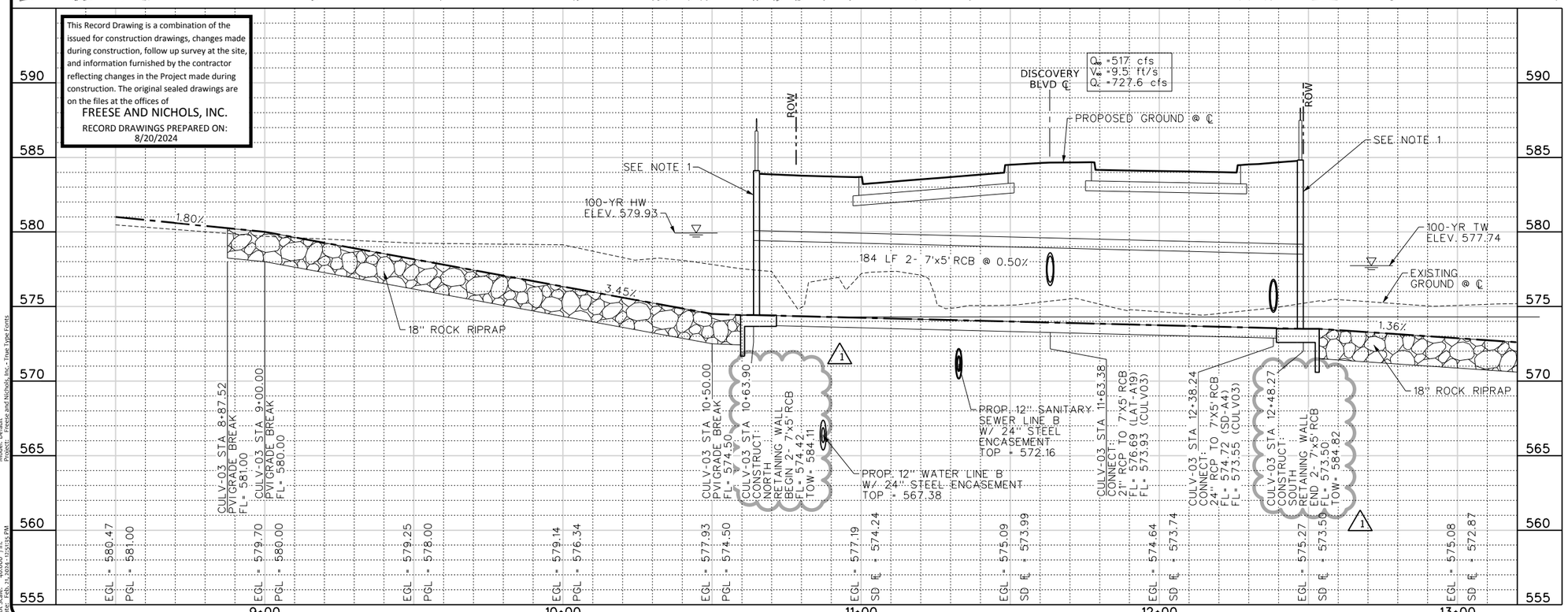
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

F&N JOB NO.	RKW19711
DATE	APRIL 2022
DESIGNED	MW
DRAWN	ZLG
CHECKED	MRA
REVISED	
FILE NAME	cv-trt-pp-culv02.sht

SHEET
CULV-2
SEQ.
151

MicroStation V8 User: 90262 Office: On Site
Plotter: J:\IP\Drawings\Drainage\cv-trt-pp-culv02.sht Model: Default
Plot Scale: 40.087 i'n. Projects: Freese and Nichols, Inc. - True Type Fonts
Date: Feb. 21, 2024 - 12:51:28 PM
Office: On Site Date: Feb. 21, 2024 - 12:51:28 PM User: 90262 File: N:\IF\Drawings\Drainage\cv-trt-pp-culv02.sht





LEGEND

RIPRAP (SEE DPDT-2)

NOTES:

1. PROVIDE FORMLINER ON FACE OF WALL AND BOTH SIDES OF COMBINATION RAIL, INCREASE THICKNESS OF WALL BY FORMLINER THICKNESS. FORMLINER SHALL BE ASHLAR STONE RANDOM PATTERN. CONTRACTOR SHALL SUBMIT FORMLINER SAMPLE TO ENGINEER FOR APPROVAL.

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N

0 10' 20' 40'
HORIZONTAL SCALE
0 2' 4' 8'
VERTICAL SCALE

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASE FOR PERMIT PURPOSES ONLY
THIS DOCUMENT WAS ORIGINALLY ISSUED AND SEALED BY SARAH E. CAUDLE
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IT IS NOT TO BE USED OR VIEWED OR MODIFIED WITHOUT PROPER AUTHORIZATION FROM THE RESPONSIBLE ENGINEER.
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FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2250
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

CULVERT 03
PLAN & PROFILE

NO.	ISSUES	BY	DATE
1	ADDENDUM # 3	SEC	11/30/2024

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MW
DRAWN ZLG
REVISED
CHECKED MRA
FILE NAME cv-trt-pp-culv03.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET
CULV-3
SEQ.
152

MicroStation V8 User: 90262 Office: On Site
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Plot Scale: 40.008 ' / in.
Plot Date: Feb. 21, 2024 - 12:51:35 PM
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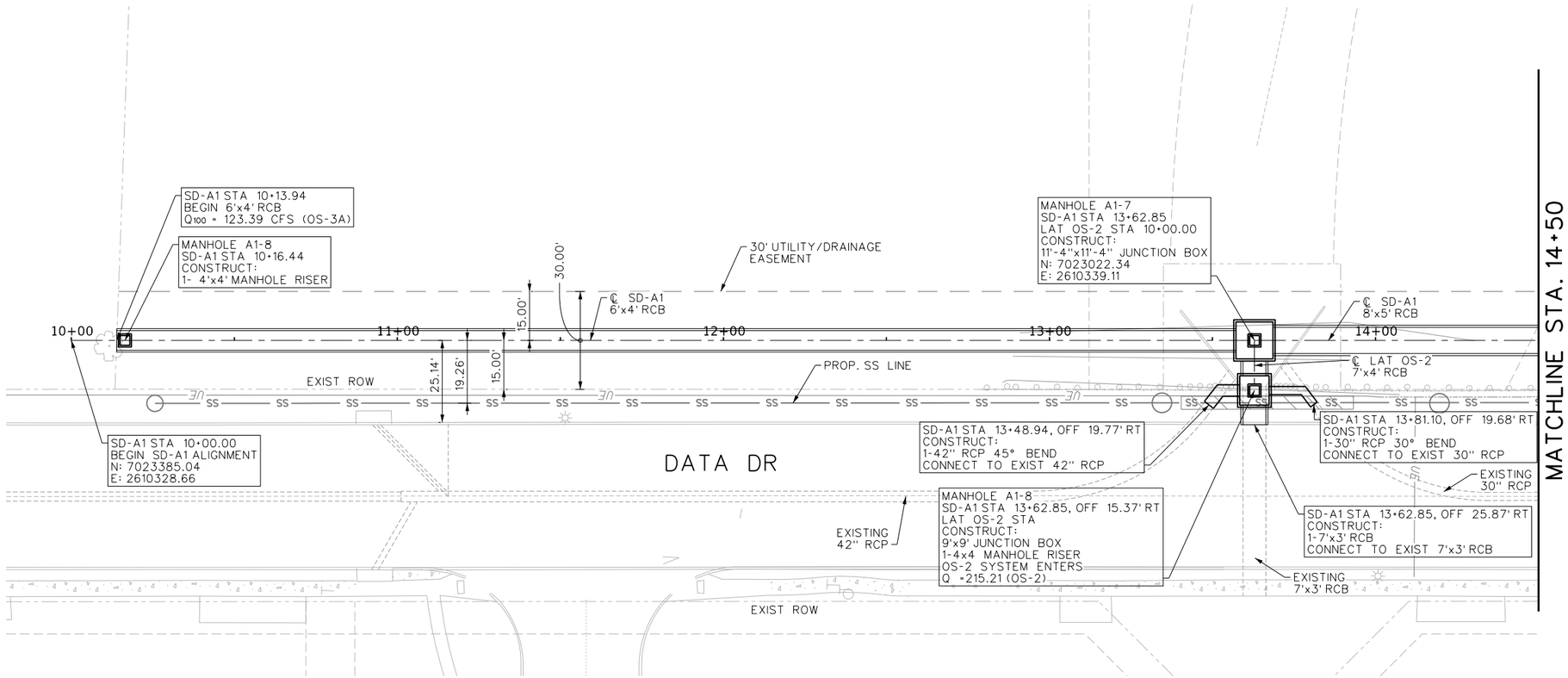
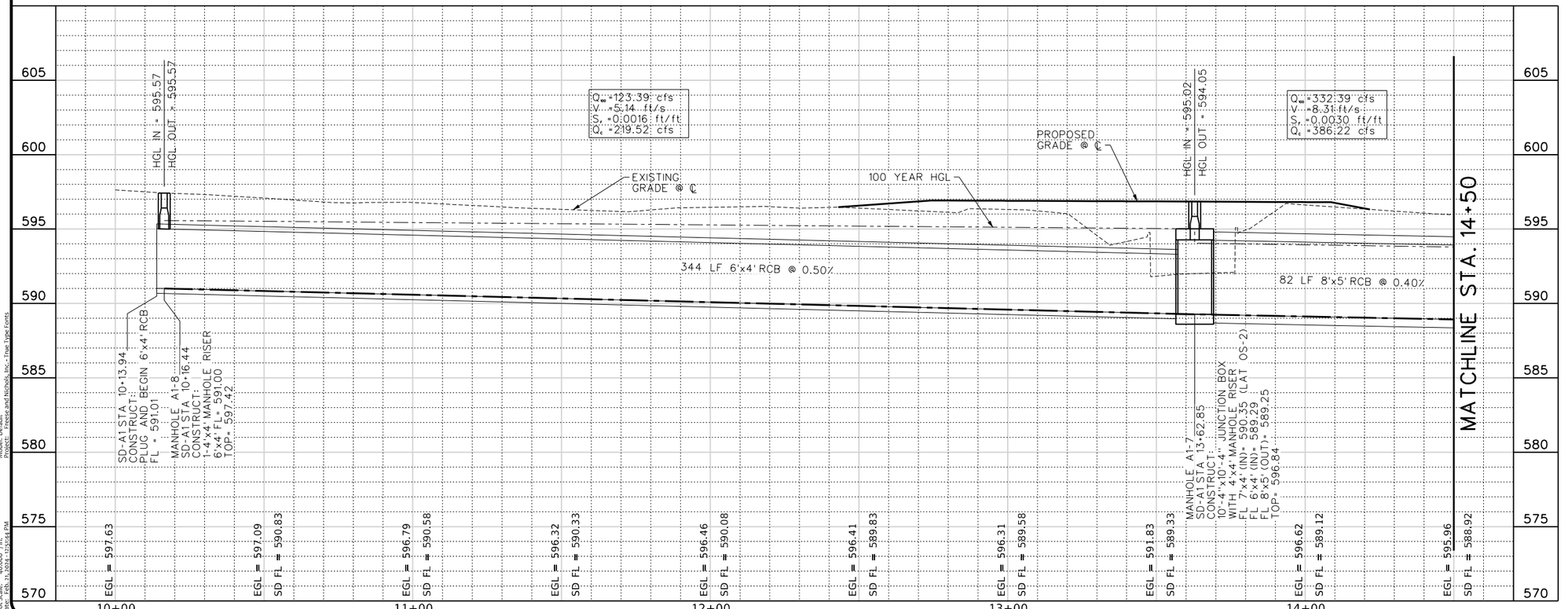
Models: Freese and Nichols, Inc. True Type Fonts

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024





N

0 10' 20' 40'
HORIZONTAL SCALE

0 2' 4' 8'
VERTICAL SCALE

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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Fax: (214) 217-2250
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

STORM DRAIN LINE A1
BEGIN TO STA 14+50

NO.	ISSUES	BY	DATE

F&N JOB NO.	RKW19711
DATE	APRIL 2022
DESIGNED	MW
DRAWN	ZLG
REVISED	
CHECKED	MRA
FILE NAME	cv-trt-pp-sdA1-1.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET
SD-1

SEQ.
153

MicroStation V8 User: 90262 Office: On Site
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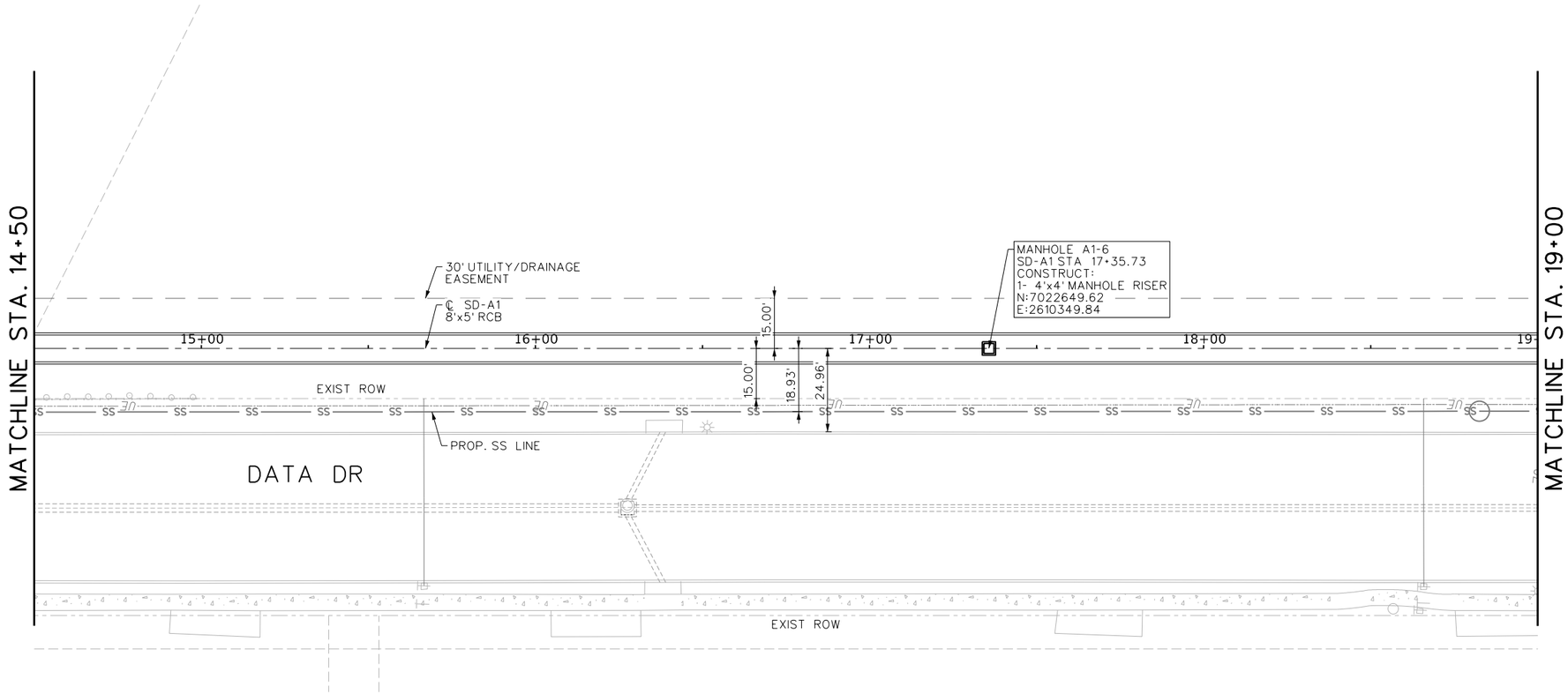
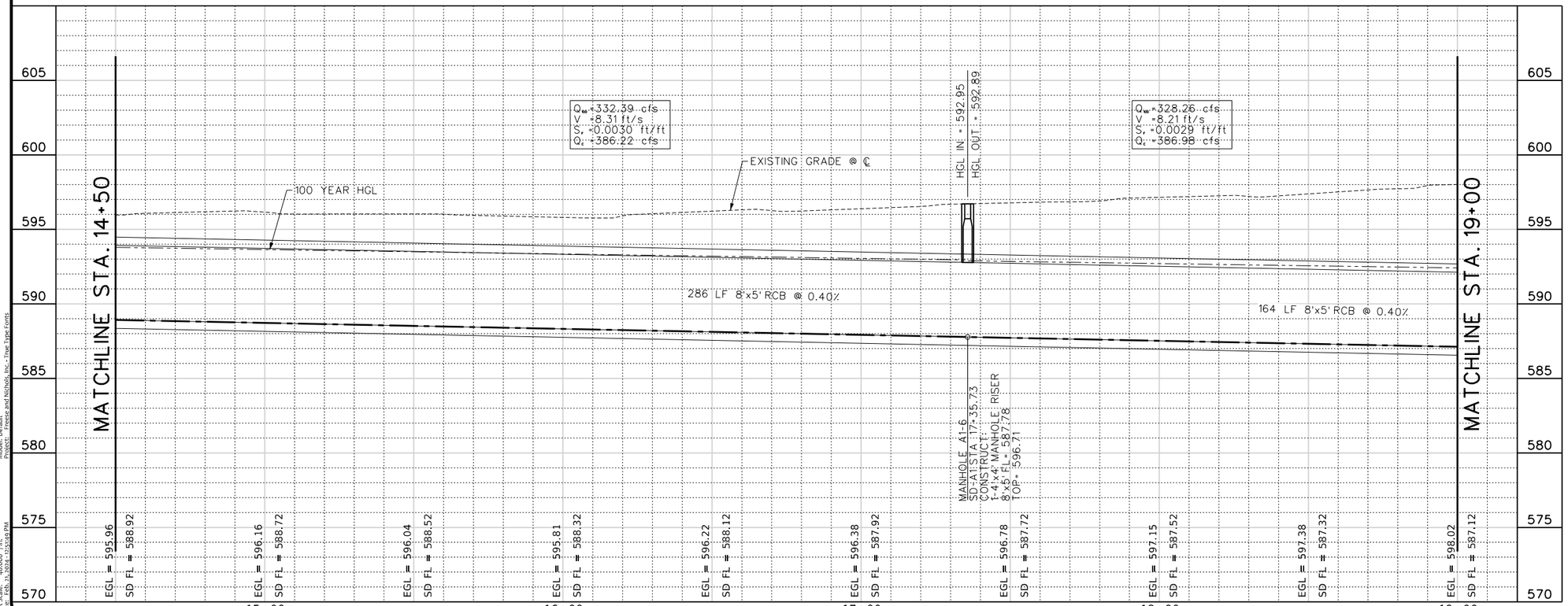
Date: Feb. 21, 2024 - 12:51:44 PM

Office: On Site Date: Feb. 21, 2024 - 12:51:44 PM User: 90262 File: N:\F\Drawings\Drainage\cv-trt-pp-sdA1-1.sht

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024





N

0 10' 20' 40'
HORIZONTAL SCALE

0 2' 4' 8'
VERTICAL SCALE

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASED FOR CONSTRUCTION
AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
RELEASED FOR CONSTRUCTION WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2299
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

STORM DRAIN LINE A1
STA 14+50 TO STA 19+00

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MW
DRAWN ZLG
REVISED
CHECKED MRA
FILE NAME cv-trt-pp-sdA1-2.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET SD-2
SEQ. 154

MicroStation V8 User: 90262 Office: On Site
Plotter: \\IP\Drawings\Drainage\cv-trt-pp-sdA1-2.sht
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Plot: Feb. 21, 2024 - 12:51:49 PM
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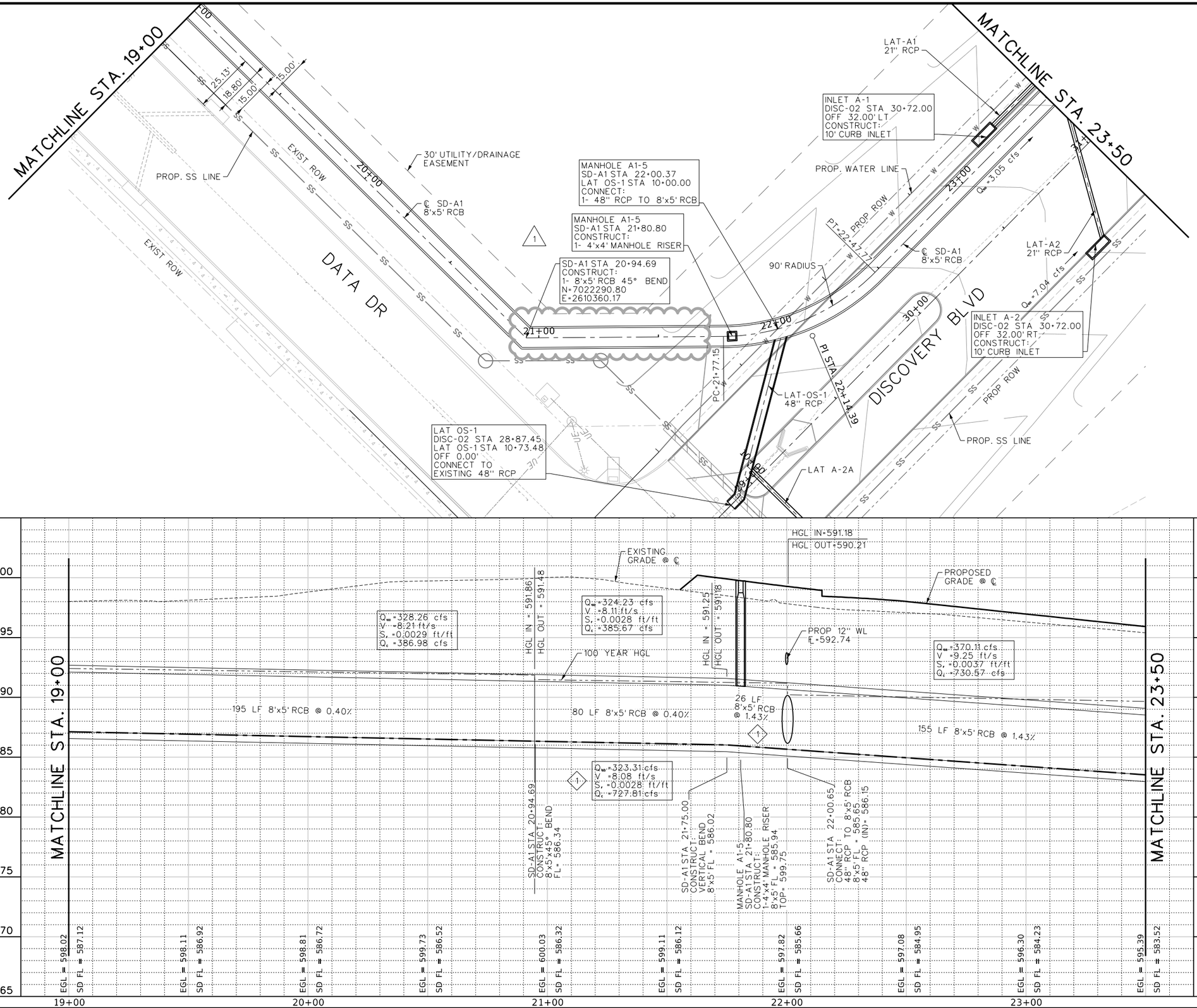

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FREESE AND NICHOLS, INC.

RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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TEXAS NO. 134055 ON 10/21/2021
IT IS A VIOLATION OF LAW TO ALTER THIS DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

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Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2201
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

STORM DRAIN LINE A1
STA 19+00 TO STA 23+50

NO.	ISSUES	BY	DATE
1	ADDENDUM #2	SEC	11/17/21

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.

F&N JOB NO.	RKW1971N
DATE	APRIL 2022
DESIGNED	MW
DRAWN	ZLG
REVISED	
CHECKED	MRA
FILE NAME	cv-trt-pp-sdA1-3.sht

SHEET SD-3

SEQ. 155

MicroStation V8 User: 90262 Office: On Site
N:\IF\Drawings\Drainage\cv-trt-pp-sdA1-3.sht
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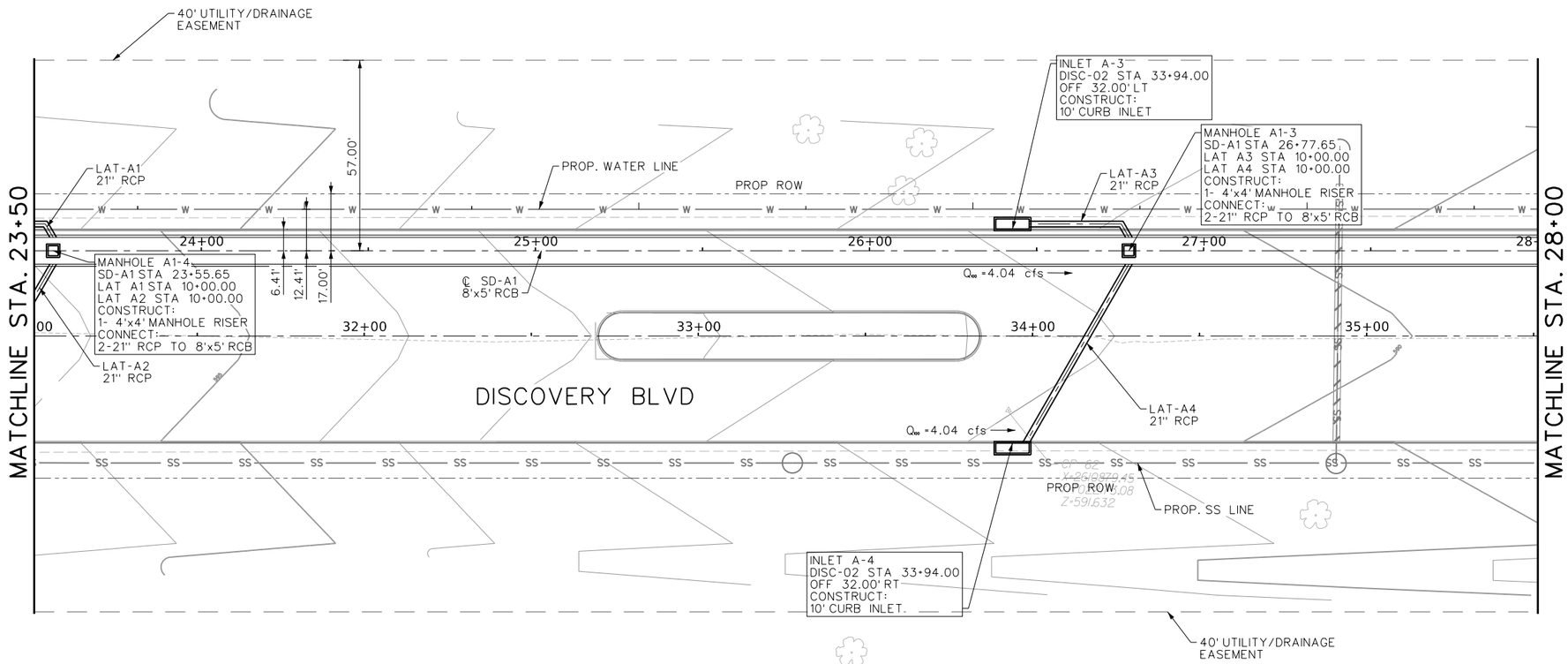
Plot Scale: 40.000 ' / in. Points: Freese and Nichols, Inc. - True Type Fonts
Date: Feb. 21, 2024 - 12:51:53 PM

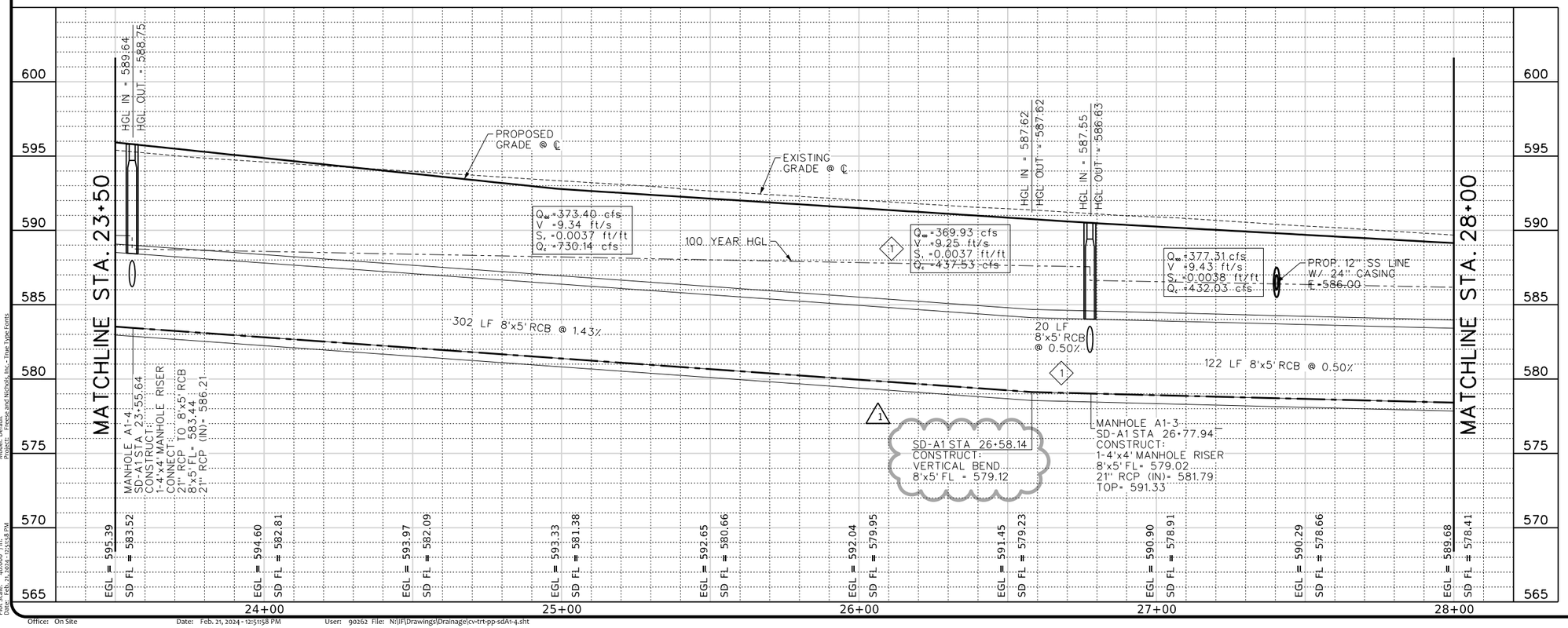
This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASE FOR CONSTRUCTION
RELEASED FOR THE PURPOSES OF INTERIM REVIEW ONLY
PRELIMINARY, NOT FOR CONSTRUCTION OR PERMIT PURPOSES
THIS DOCUMENT WAS ORIGINALLY ISSUED AND SEALED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
IT IS NOT TO BE USED FOR ANY PURPOSE WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2836
Web - www.freese.com





N

0 10' 20' 40'
HORIZONTAL SCALE

0 2' 4' 8'
VERTICAL SCALE

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

STORM DRAIN LINE A1
STA 23+50 TO STA 28+00

NO.	ISSUES	BY	DATE
1	ADDENDUM # 3	SEC	11/30/2022

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MW
DRAWN ZLG
REVISED
CHECKED MRA
FILE NAME cv-trt-pp-sdA1-4.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET SD-4
SEQ. 156

MicroStation V8 User: 90262 Office: On Site
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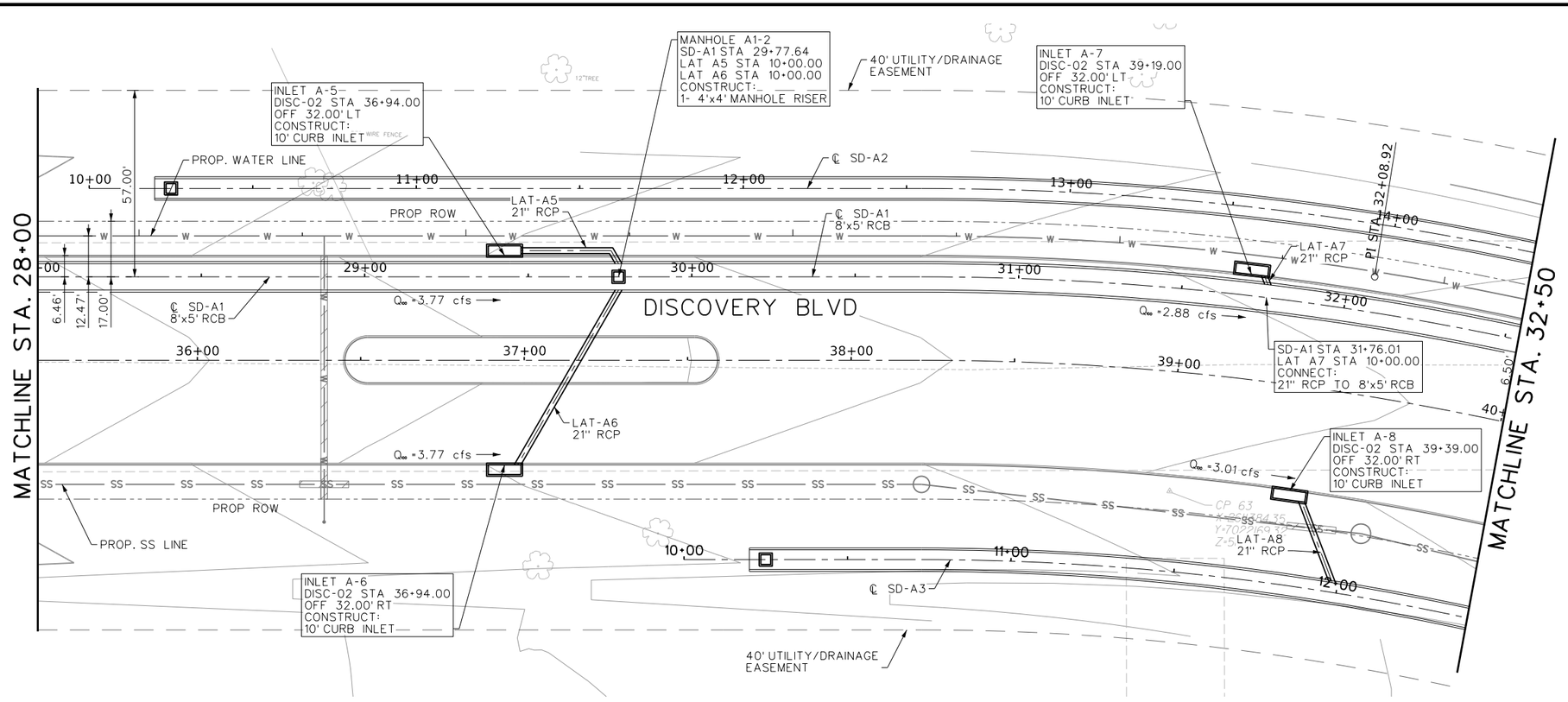
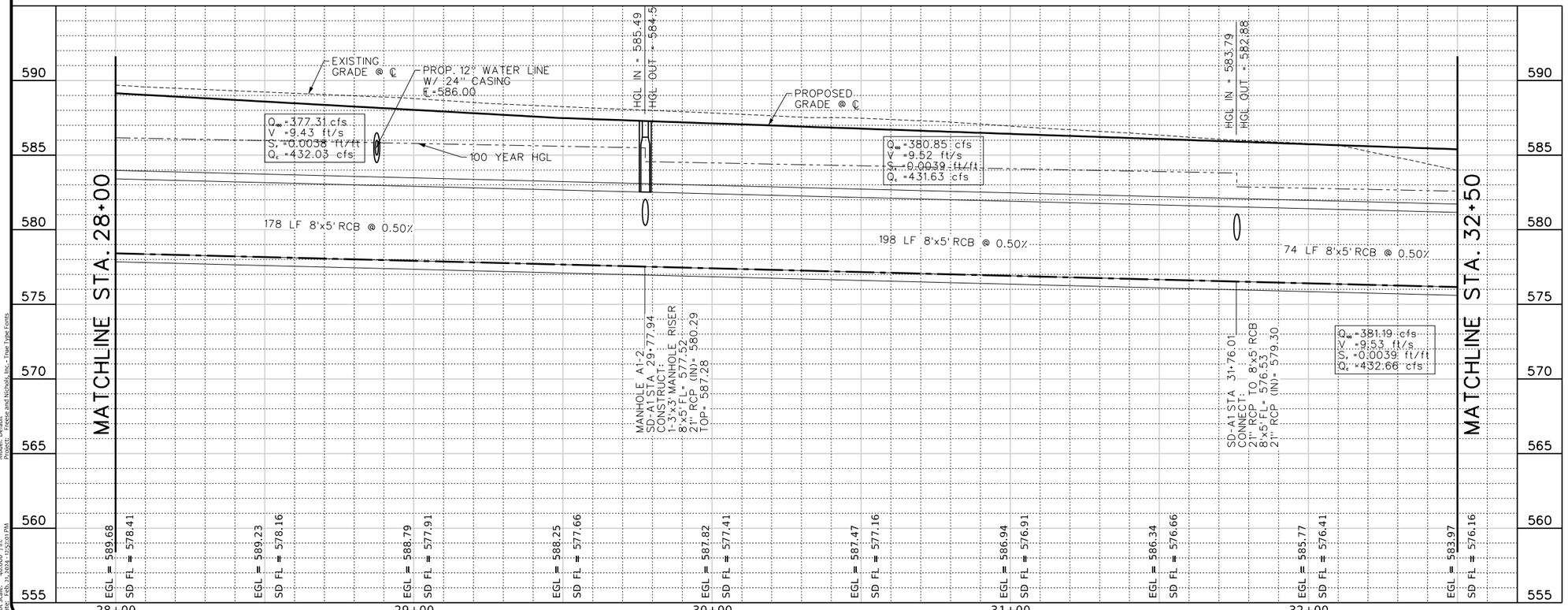
Plot Date: Feb. 21, 2024 - 12:51:58 PM
Model: Default
Project: Freese and Nichols, Inc. - True Type Fonts





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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2201
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

STORM DRAIN LINE A1
STA 28+00 TO STA 32+50

0 10' 20' 40'
HORIZONTAL SCALE
0 2' 4' 8'
VERTICAL SCALE

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MW
DRAWN ZLG
REVISED
CHECKED MRA
FILE NAME cv-trt-pp-sdA1-5.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET SD-5
SEQ. 157

MicroStation V8 User: 90262 Office: On Site
Plotter: \\IP\Ricoh MP C4503 PCL6 on Ne01
Plot Scale: 40.008 ' / in.
Plot Date: Feb. 21, 2024 - 12:52:01 PM
Model: Default
Project: Freese and Nichols, Inc. - True Type Fonts

Office: On Site Date: Feb. 21, 2024 - 12:52:01 PM User: 90262 File: N:\IF\Drawings\Drainage\cv-trt-pp-sdA1-5.sht

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RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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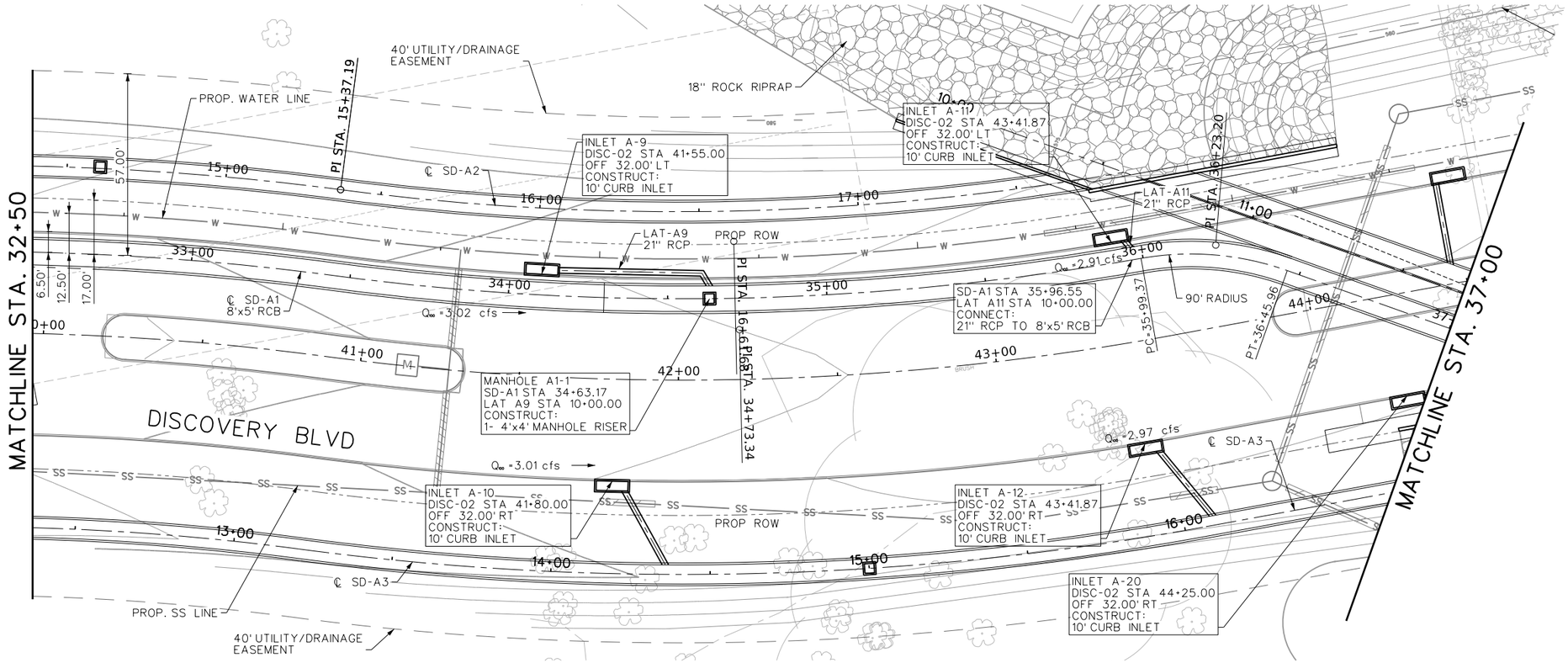
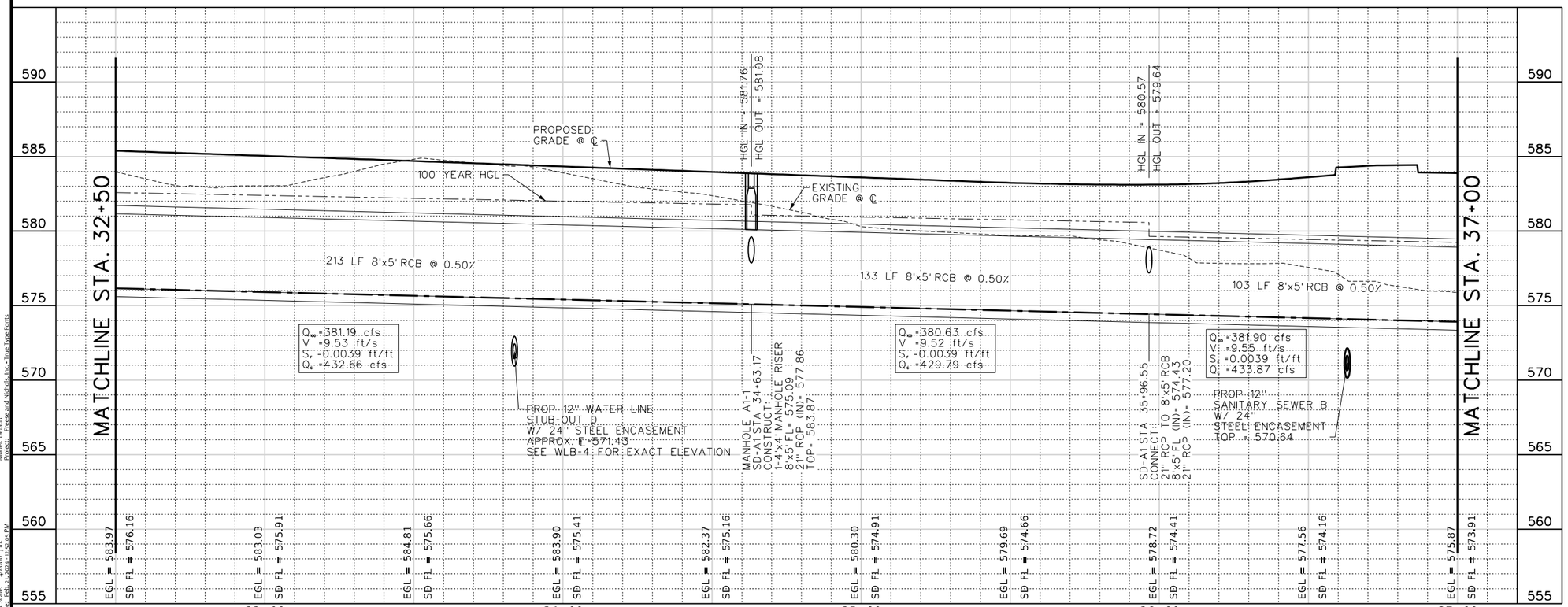
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2299
Web - www.freese.com

LEGEND

RIPRAP (SEE DPDT-2)





0 10' 20' 40'
HORIZONTAL SCALE
0 2' 4' 8'
VERTICAL SCALE

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
CIVIL
STORM DRAIN LINE A1
STA 32+50 TO STA 37+00

NO.	ISSUES	BY	DATE

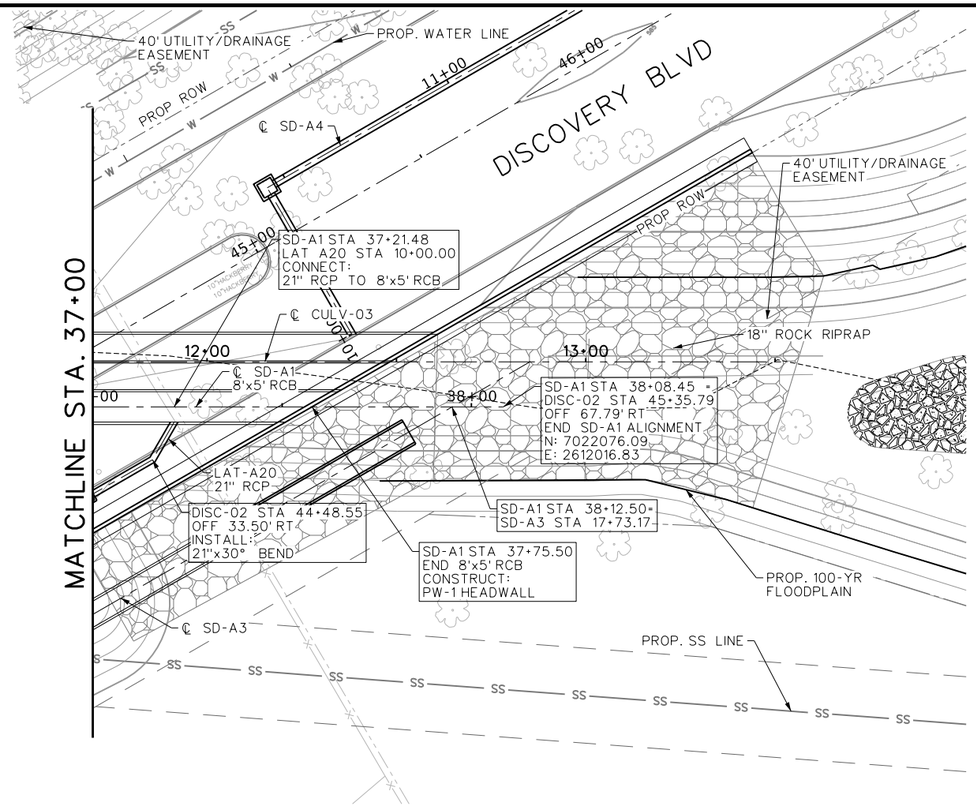
F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MW
DRAWN ZLG
REVISED
CHECKED MRA
FILE NAME cv-trt-pp-sdA1-6.sht

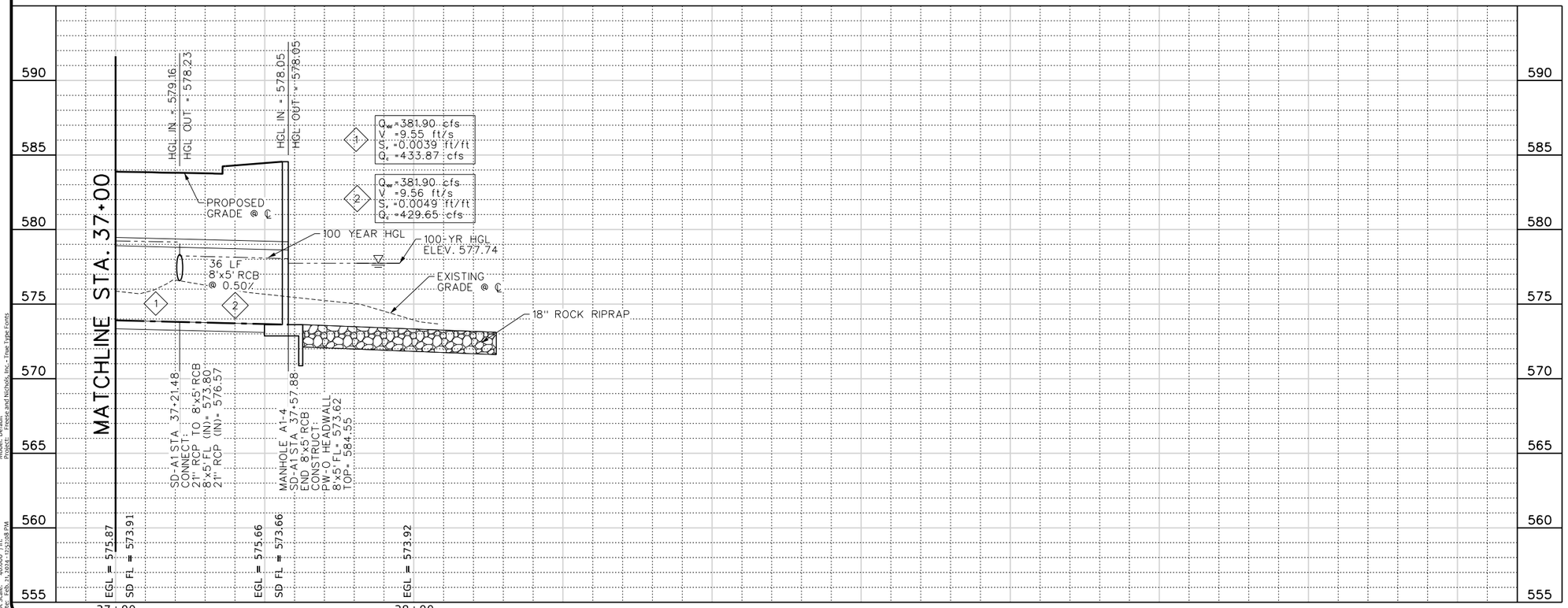
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET SD-6
SEQ. 158

MicroStation V8 User: 90262 Office: On Site
Plotter: \\IP\Drawing\Drainage\cv-trt-pp-sdA1-6.sht
Plot Scale: 40.008 ' / in.
Date: Feb. 21, 2024 - 12:52:05 PM
Model: Default
Project: Freese and Nichols, Inc. - True Type Fonts

Office: On Site Date: Feb. 21, 2024 - 12:52:05 PM User: 90262 File: N:\IF\Drawings\Drainage\cv-trt-pp-sdA1-6.sht





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RECORD DRAWINGS PREPARED ON:
8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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LEGEND

RIPRAP (SEE DPDT-2)

N

0 10' 20' 40'
HORIZONTAL SCALE
0 2' 4' 8'
VERTICAL SCALE

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2250
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

STORM DRAIN LINE A1
STA 37+00 TO END

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MW
DRAWN ZLG
REVISED
CHECKED MRA
FILE NAME cv-trt-pp-sdA1-7.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET SD-7
SEQ. 159

MicroStation V8 User: 90262 Office: On Site
Plotter: \\IP\HP500PS_PostScript Model Configuration
Plot Scale: 40.087 i'in.
Date: Feb. 21, 2024 - 12:52:08 PM

Model: Default
Xrefs: Freese and Nichols, Inc. - True Type Fonts

Office: On Site Date: Feb. 21, 2024 - 12:52:08 PM User: 90262 File: N:\IF\Drawings\Drainage\cv-trt-pp-sdA1-7.sht

SD-A2 STA 10+00.00 =
DISC-02 STA 35+66.97
OFF 52.50' LT
BEGIN SD-A2 ALIGNMENT
N: 7022252.58
E: 2611051.43

SD-A2 STA 10+20.00
BEGIN 6'x3' RCB
Q_{des} = 170.14cfs (OS-3B)

MANHOLE-A2-2
SD-A2 STA 10+25.00
CONSTRUCT:
1- 4'x4' MANHOLE RISER

40' UTILITY/DRAINAGE EASEMENT

3'BARBED WIRE FENCE

PROP WATER LINE

℄ SD-A2
6'x3' RCB

PC-12-54.54

902.5' RADIUS

30.00'
20.50'
14.50'
10.00'

PROP ROW

℄ SD-A1

DISCOVERY BLVD

℄ DISCOVERY BLVD

MATCHLINE STA. 14+50

PROP. SS LINE

PROP ROW

℄ SD-A3

CP 63
X=2625434.35
Y=7022169.32
Z=586.569

40' UTILITY/DRAINAGE EASEMENT

10+00 11+00 12+00 13+00 14+00 8+00 29+00 30+00 31+00 32+00 36+00 37+00 38+00 39+00 40+00

0 10' 20' 40'
HORIZONTAL SCALE
0 2' 4' 8'
VERTICAL SCALE

HGL IN = 585.06
HGL OUT = 584.99

PROPOSED GRADE @ ℄

EXISTING GRADE @ ℄

100 YEAR HGL

1 5' LF 6'x3' RCB @ 0.50%

1 Q_{des} = 170.14 cfs
V = 9.45 ft/s
S = 0.0068 ft/ft
Q_c = 159.81 cfs

425 LF 6'x3' RCB @ 0.50%

SD-A2 STA 10+20.00
PLUG
BEGIN 6'x3' RCB
FL = 578.29

MANHOLE A2-2
SD-A2 STA 10+25.00
CONSTRUCT:
1-4'x4' MANHOLE RISER
6'x3' FL (IN)(OUT) = 578.26
TOP = 589.54

Q_{des} = 170.11 cfs
V = 9.45 ft/s
S = 0.0068 ft/ft
Q_c = 145.65 cfs

MATCHLINE STA. 14+50

	10+00	11+00	12+00	13+00	14+00
EGL =	589.69	589.26	588.63	587.98	587.45
SD ℄ =	578.14	577.89	577.64	577.39	577.14
EGL =	587.15	586.73	586.23	585.48	584.72
SD ℄ =	577.14	576.89	576.64	576.39	576.14

590 585 580 575 570 565 560 555

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RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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TEXAS NO. 134055 ON 10/21/2021
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Phone: (214) 217-2200
Fax: (214) 217-2201
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

STORM DRAIN LINE A2
BEGIN TO STA 14+50

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MW
DRAWN ZLG
CHECKED MRA
REVISED
FILE NAME cv-trt-pp-sdA2-1.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET SD-8
SEQ. 160

MicroStation V8 User: 90262 Office: On Site
Plotter: \\IP\HP5000PS_PLOT Model: Default
Plot Scale: 40.087 i'in. Project: Freese and Nichols, Inc. - True Type Fonts
Date: Feb. 21, 2024 - 12:52:16 PM

Office: On Site Date: Feb. 21, 2024 - 12:52:16 PM User: 90262 File: N:\F\Drawings\Drainage\cv-trt-pp-sdA2-1.sht

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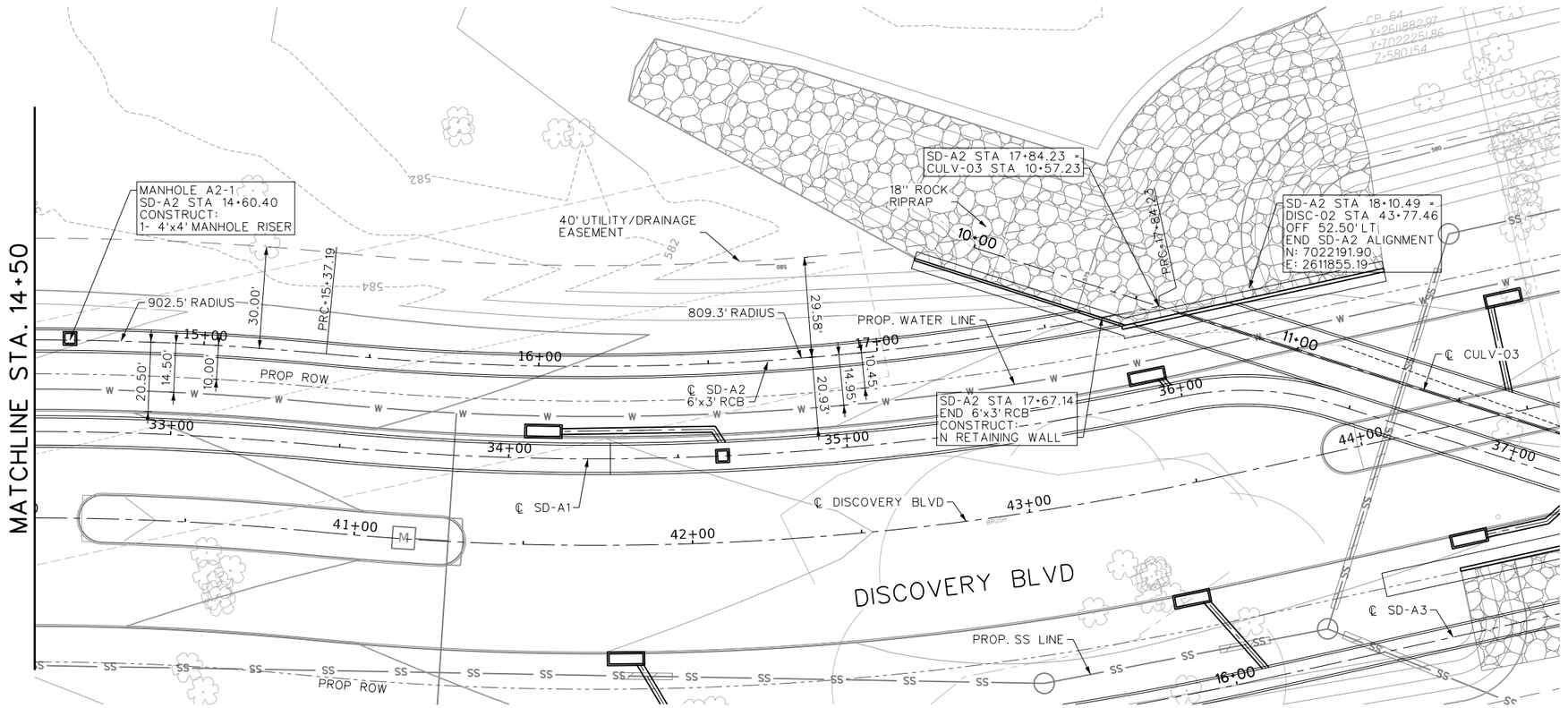
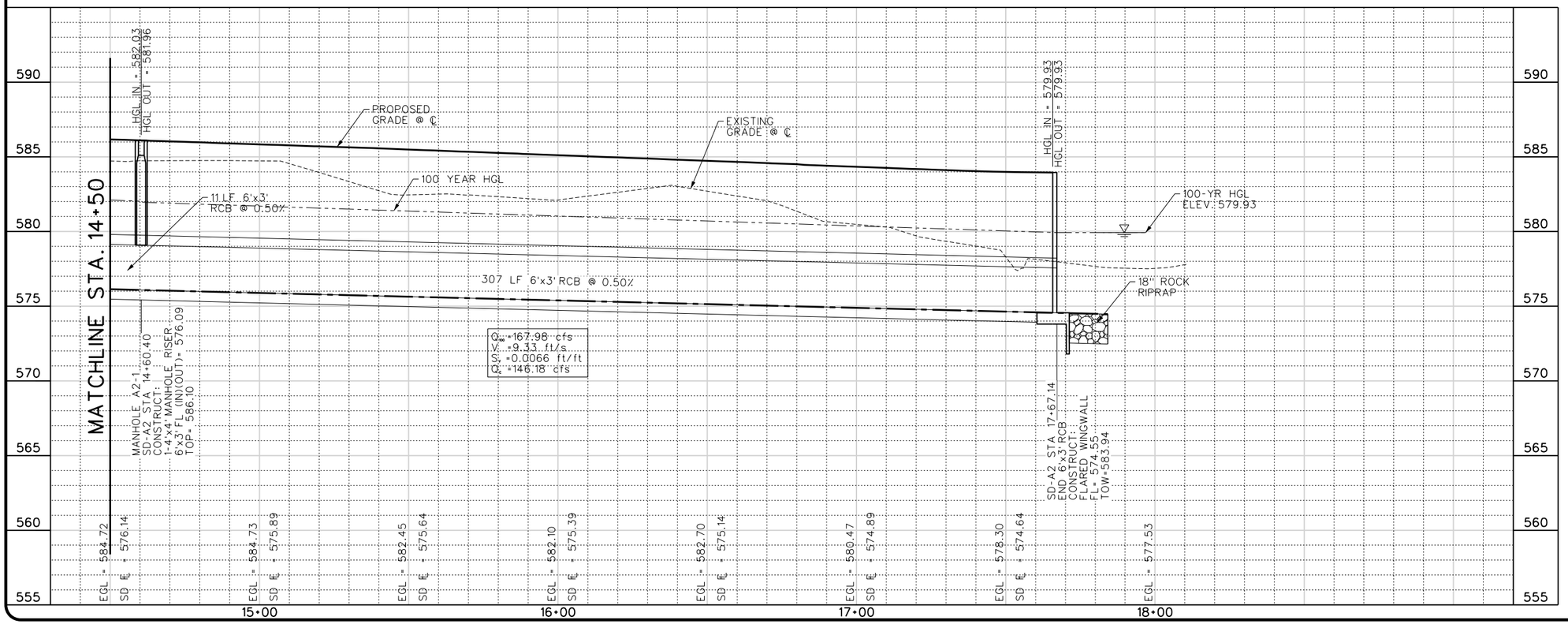
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2250
Web - www.freese.com

LEGEND

RIPRAP (SEE DPDT-2)





0 10' 20' 40'
HORIZONTAL SCALE
0 2' 4' 8'
VERTICAL SCALE

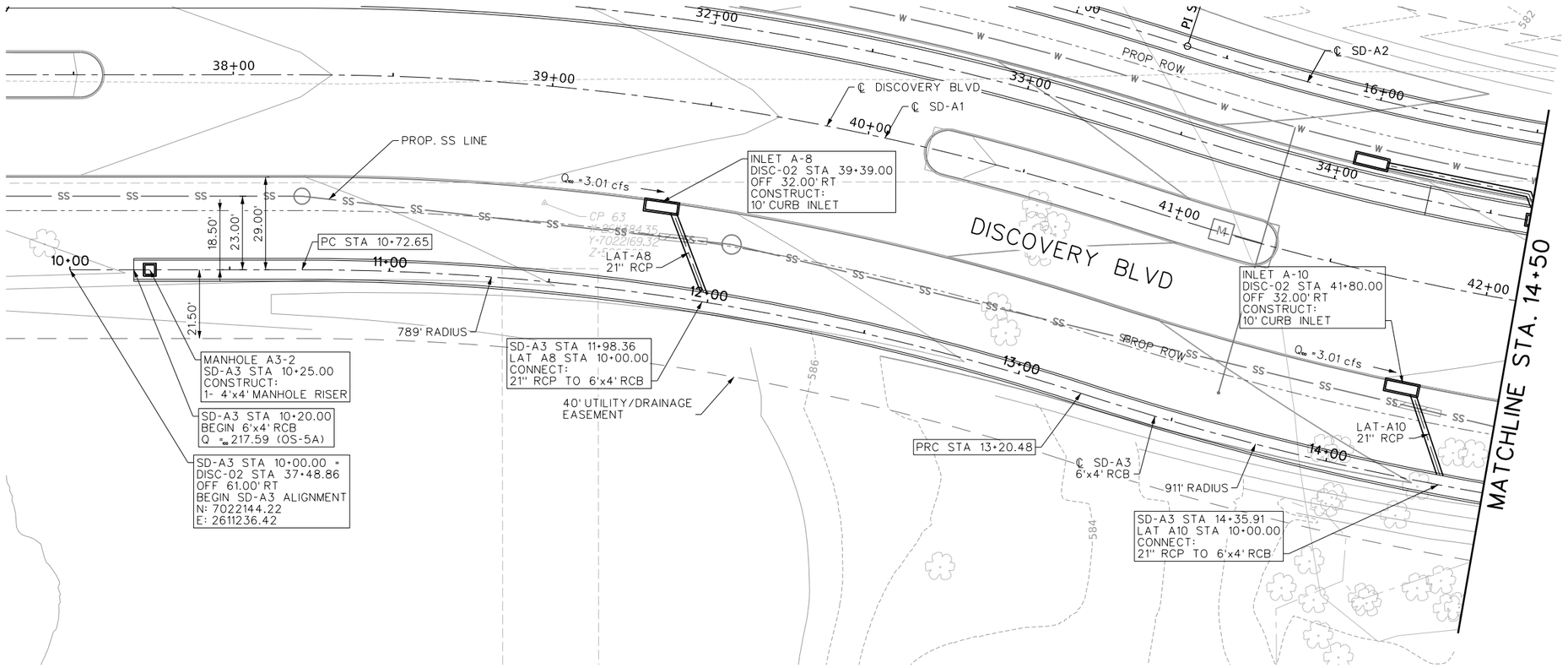
ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
CIVIL
STORM DRAIN LINE A2
STA 14+50 TO END

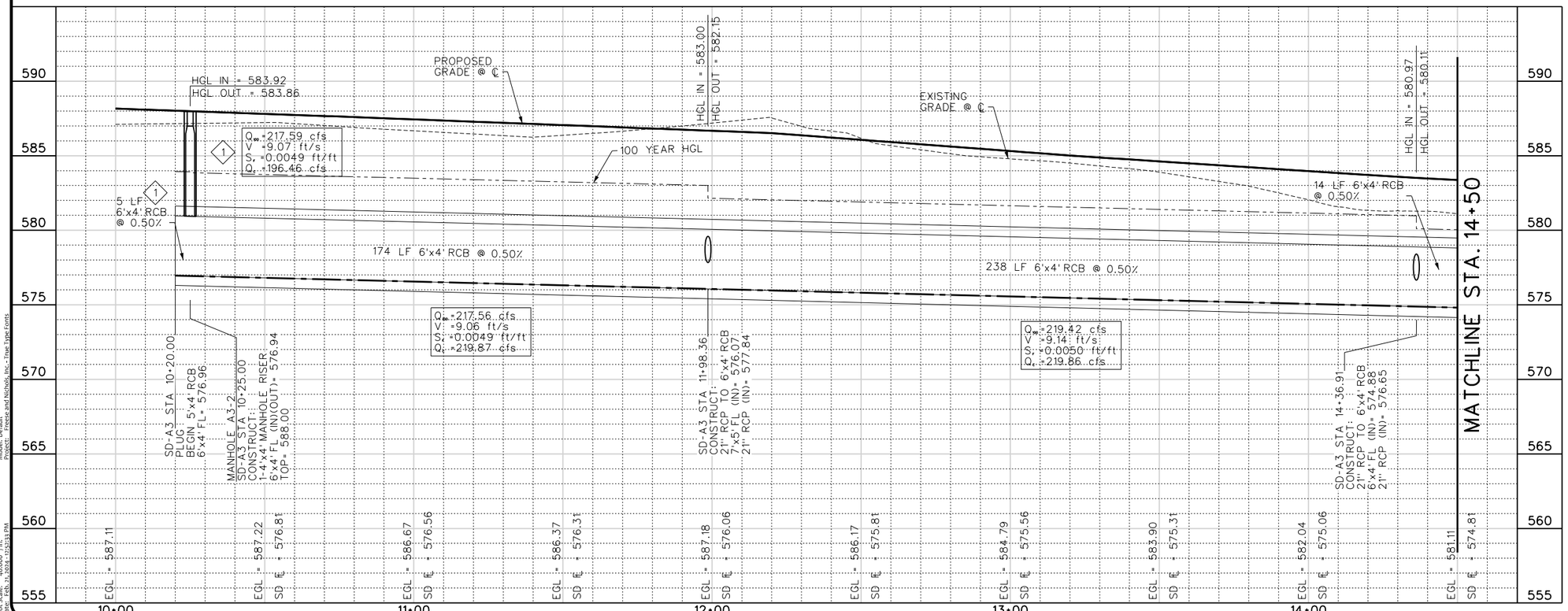
NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MW
DRAWN ZLG
REVISED
CHECKED MRA
FILE NAME cv-trt-pp-sdA2-2.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET SD-9
SEQ. 161





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RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASED FOR CONSTRUCTION
DATE: 10/21/2021
BY: SARAH E. CAUDLE
TEXAS NO. 134055
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2711 North Haskell Avenue, Suite 3300
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Phone: (214) 217-2200
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Web - www.freese.com

0 10' 20' 40'
HORIZONTAL SCALE
0 2' 4' 8'
VERTICAL SCALE

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
CIVIL
STORM DRAIN LINE A3
BEGIN TO STA 14+50

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MW
DRAWN ZLG
REVISED
CHECKED MRA
FILE NAME cv-trt-pp-sdA3-1.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET SD-10
SEQ. 162

MicroStation V8 User: 90262 Office: On Site
Plotter: \\jfpw001\HP5100_PS (HP DesignJet 5100ps PS)
Plot Scale: 40.087 ' / in.
Plot: Feb. 21, 2024 - 12:53:33 PM
Model: Default
Sheets: Freese and Nichols, Inc. - True Type Fonts
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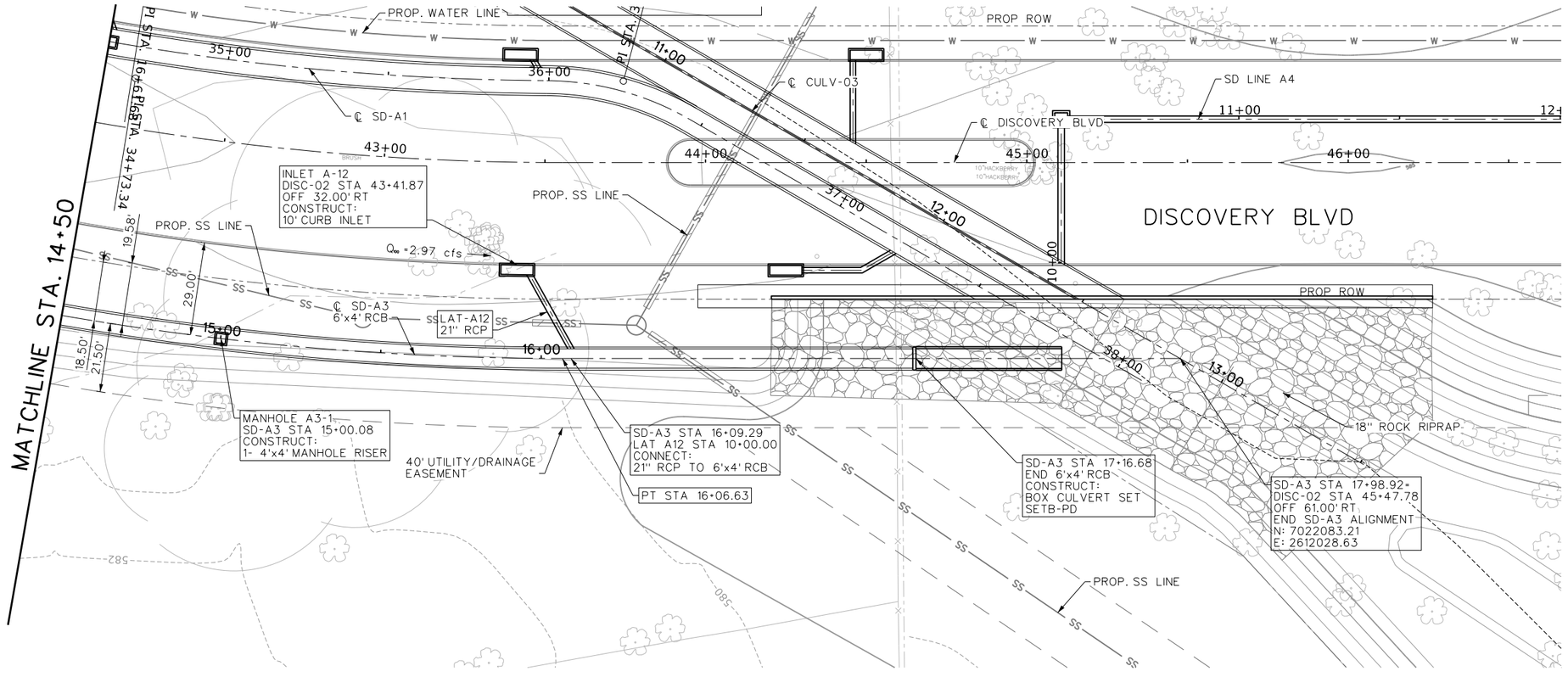

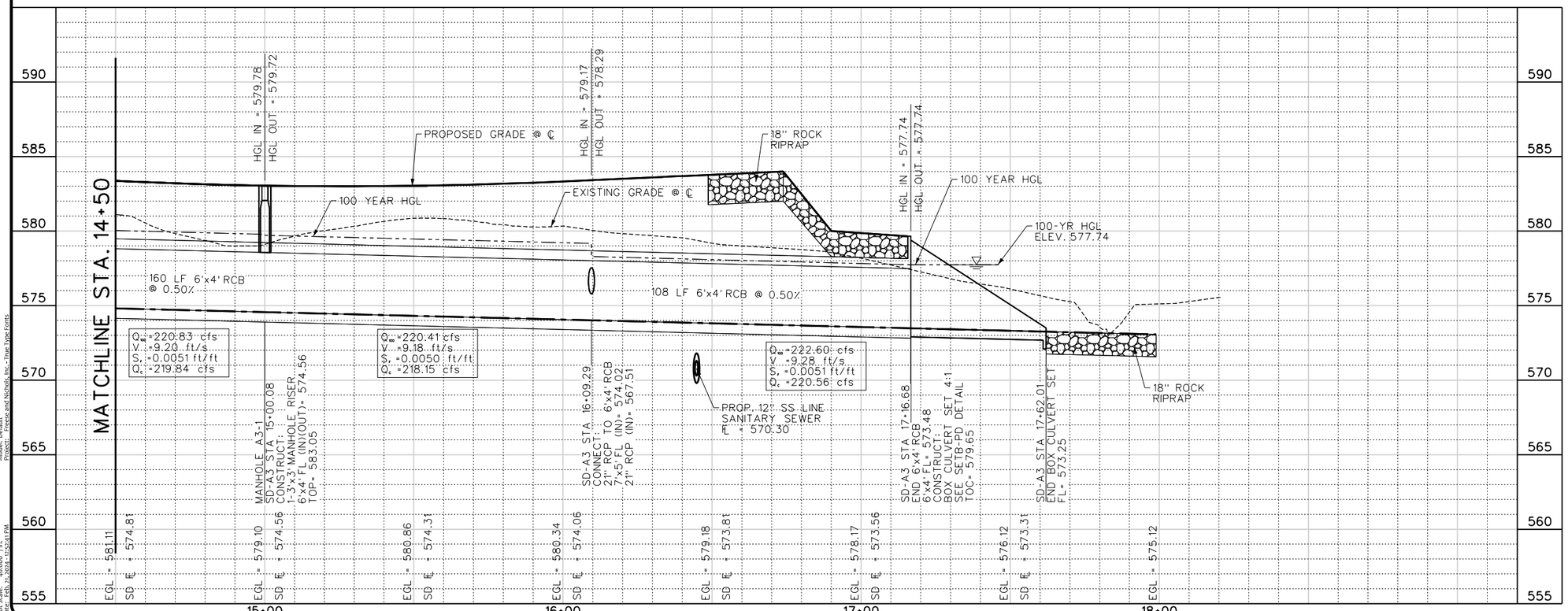

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

LEGEND

RIPRAP (SEE DPDT-2)

N

0 10' 20' 40'
HORIZONTAL SCALE
0 2' 4' 8'
VERTICAL SCALE

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2836
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

STORM DRAIN LINE A3
STA 14+50 TO END

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MW
DRAWN ZLG
REVISED
CHECKED MRA
FILE NAME cv-trt-pp-sdA3-2.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale accordingly.

SHEET SD-11
SEQ. 163

MicroStation V8 User: 90262 Office: On Site
N:\IF\Drawings\Drainage\cv-trt-pp-sdA3-2.sht
Plotter: \\FNI-DFW-PW01\HP Color LaserJet M651 PCL6
Plot Scale: 40.008 '/ In.
Date: Feb. 21, 2024 - 12:52:41 PM
Model: Default
Project: Freese and Nichols, Inc. - True Type Fonts

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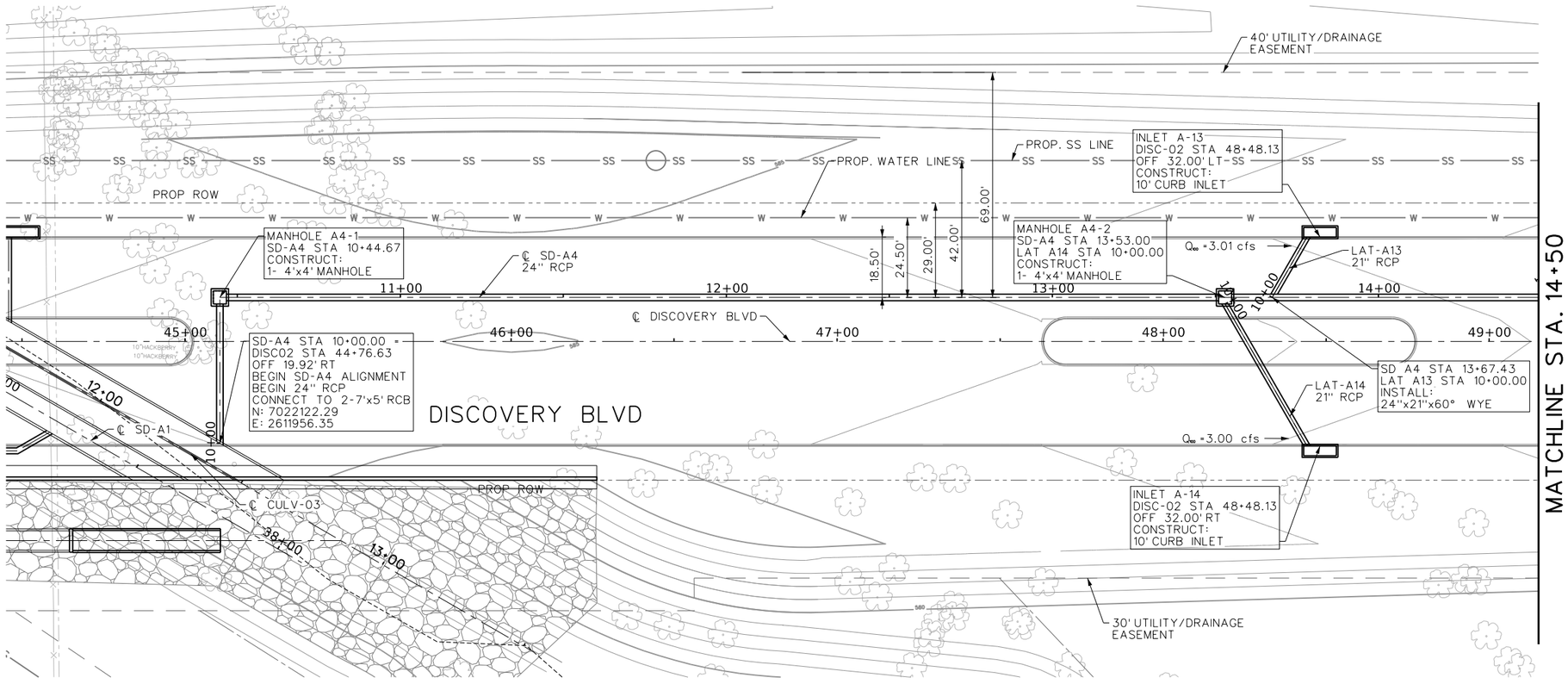
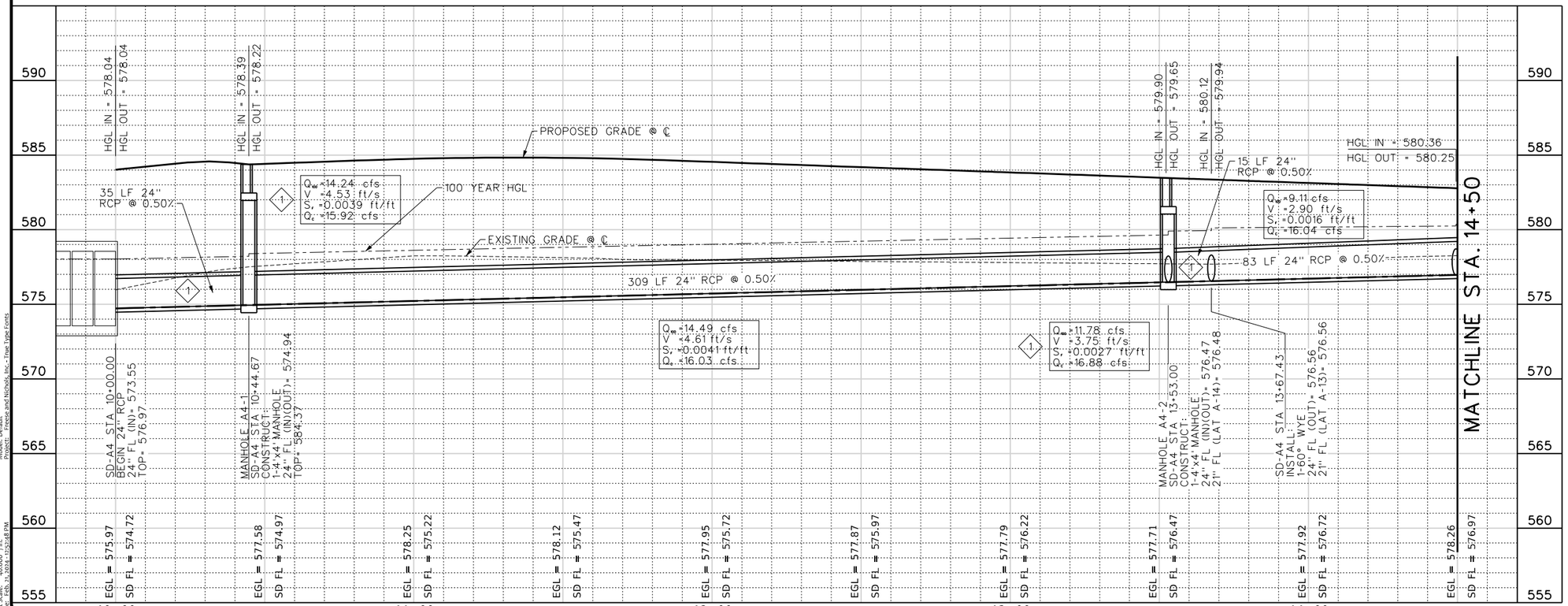
RECORD DRAWINGS PREPARED ON:
8/20/2024



N

0 10' 20' 40'
HORIZONTAL SCALE

0 2' 4' 8'
VERTICAL SCALE



THIS SEAL THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
IT IS A VIOLATION OF LAW TO ALTER THIS DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

STORM DRAIN LINE A4
BEGIN TO STA 14+50

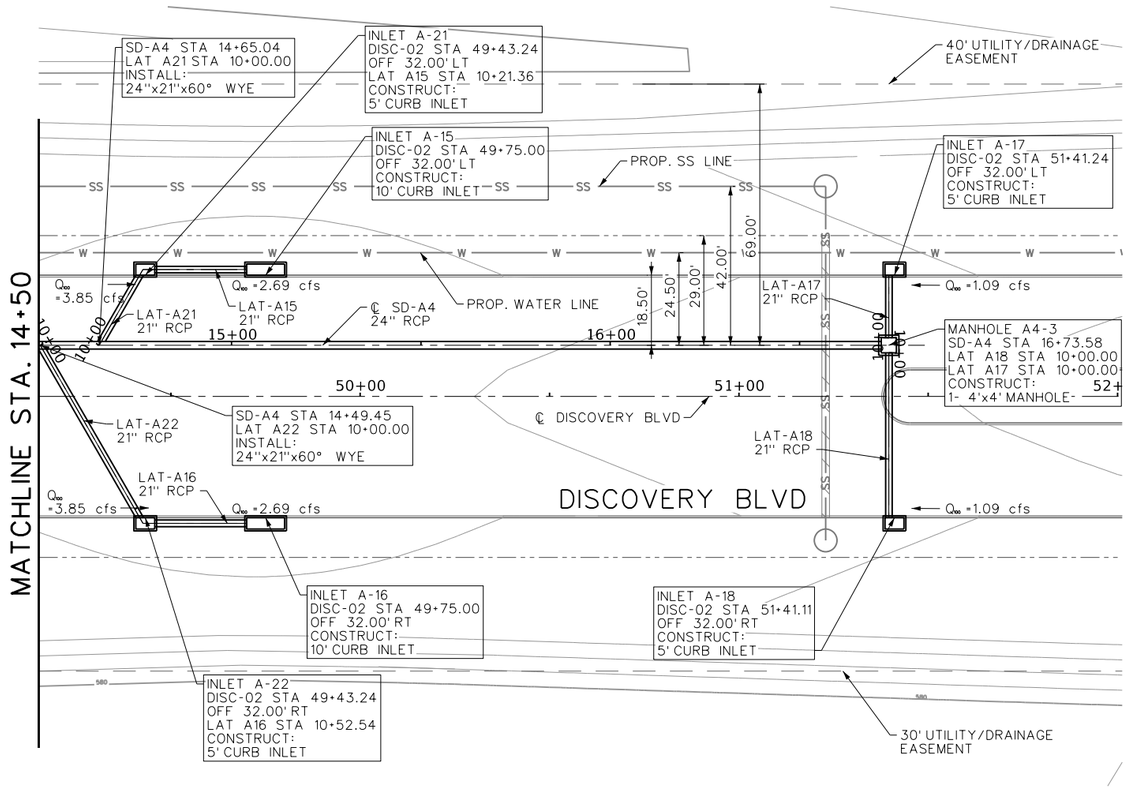
NO.	ISSUES	BY	DATE

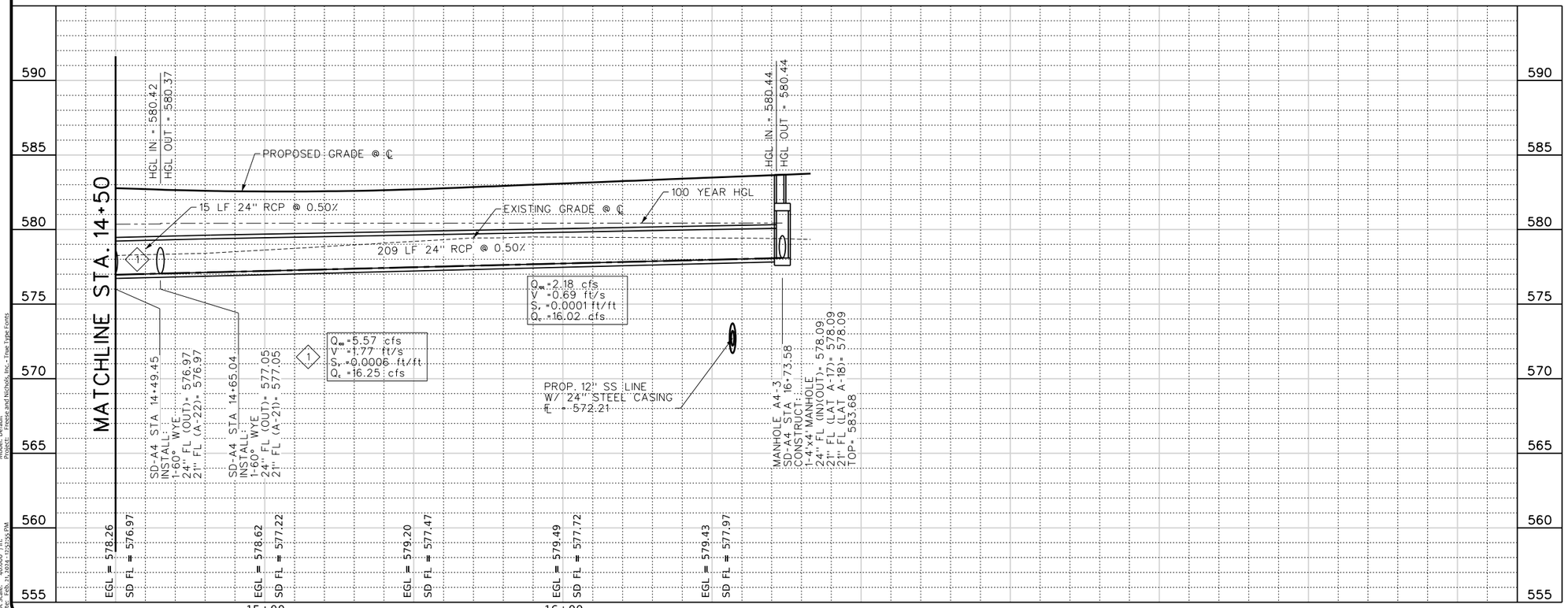
F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MW
DRAWN ZLG
CHECKED MRA
REVISED
FILE NAME cv-trt-pp-sdA4-1.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale accordingly.
0 1"

SHEET SD-12
SEQ. 164

MicroStation V8 User: 90262 Office: On Site
N:\IF\Drawings\Drainage\cv-trt-pp-sdA4-1.sht
Plotter: J3PM0001.pltcfg (HP DesignJet 4500 PS3) Model: Default
Plot Scale: 40.0087 i'in. Project: Freese and Nichols, Inc. - True Type Fonts
Date: Feb. 21, 2024 - 12:52:48 PM
Office: On Site Date: Feb. 21, 2024 - 12:52:48 PM User: 90262 File: N:\IF\Drawings\Drainage\cv-trt-pp-sdA4-1.sht





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FREESE AND NICHOLS, INC.

RECORD DRAWINGS PREPARED ON: 8/20/2024

N

0 10' 20' 40'
HORIZONTAL SCALE

0 2' 4' 8'
VERTICAL SCALE

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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Fax: (214) 217-2250
Web - www.freese.com

RELEASE THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

STORM DRAIN LINE A4
STA 14+50 TO END

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MW
DRAWN ZLG
CHECKED MRA
REVISED
FILE NAME cv-trt-pp-sdA4-2.sht

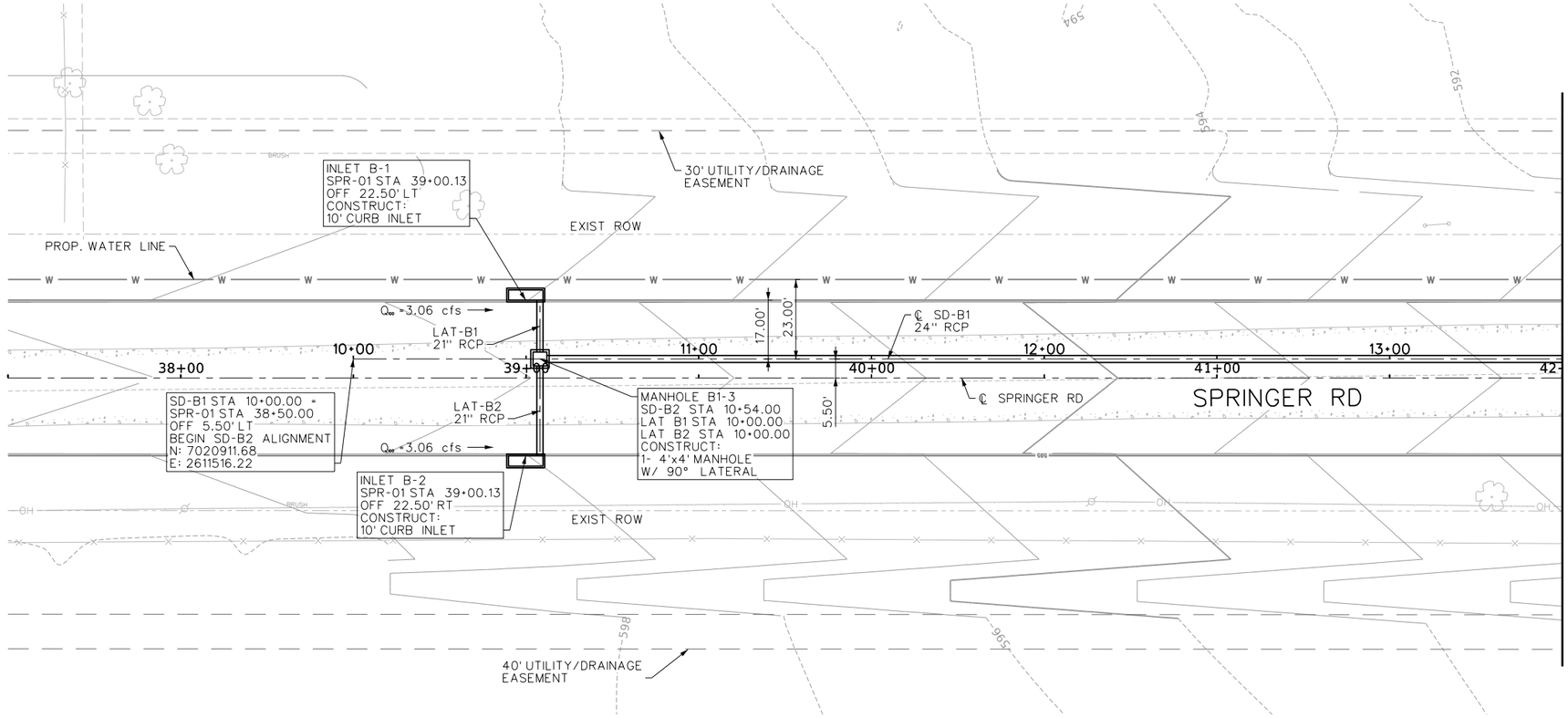
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale accordingly.

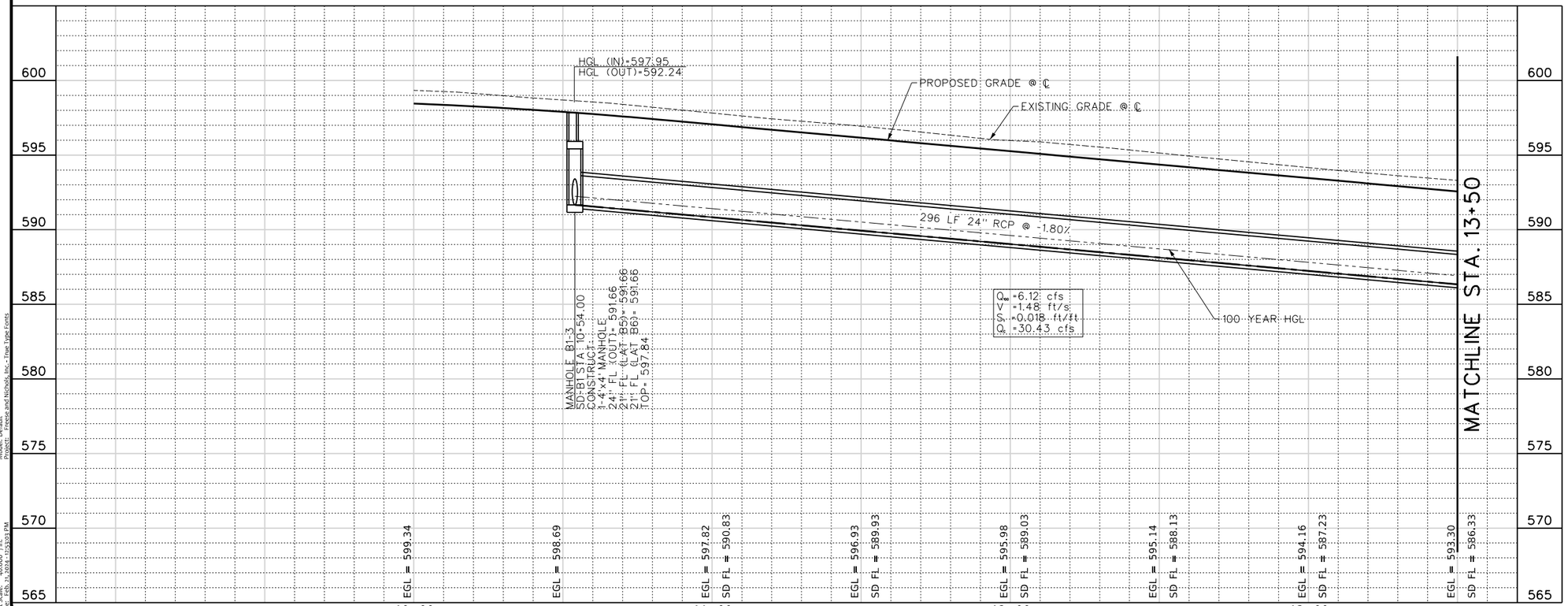
SHEET SD-13

SEQ. 165

MicroStation V8 User: 90262 Office: On Site
N:\IF\Drawings\Drainage\cv-trt-pp-sdA4-2.sht
Plotter: \\PW0001-PLOT01_HP DesignJet T1700dr PS
Plot Scale: 40.008 ' / in.
Date: Feb. 21, 2024 - 12:52:55 PM
Model: Default
Levels: * Freese and Nichols, Inc. - True Type Fonts

Office: On Site
Date: Feb. 21, 2024 - 12:52:55 PM
User: 90262 File: N:\IF\Drawings\Drainage\cv-trt-pp-sdA4-2.sht





This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of

FREESE AND NICHOLS, INC.

RECORD DRAWINGS PREPARED ON: 8/20/2024

N

0 10' 20' 40'
HORIZONTAL SCALE

0 2' 4' 8'
VERTICAL SCALE

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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TEXAS NO. 134055 ON 10/21/2021
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2711 North Haskell Avenue, Suite 3300
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Fax: (214) 217-2299
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

STORM DRAIN LINE B1
BEGIN TO STA. 13+50

NO.	ISSUES	BY	DATE

F&N JOB NO.	RKW19711
DATE	APRIL 2022
DESIGNED	MW
DRAWN	ZLG
REVISED	
CHECKED	MRA
FILE NAME	cv-trt-pp-sdB2-1.sht

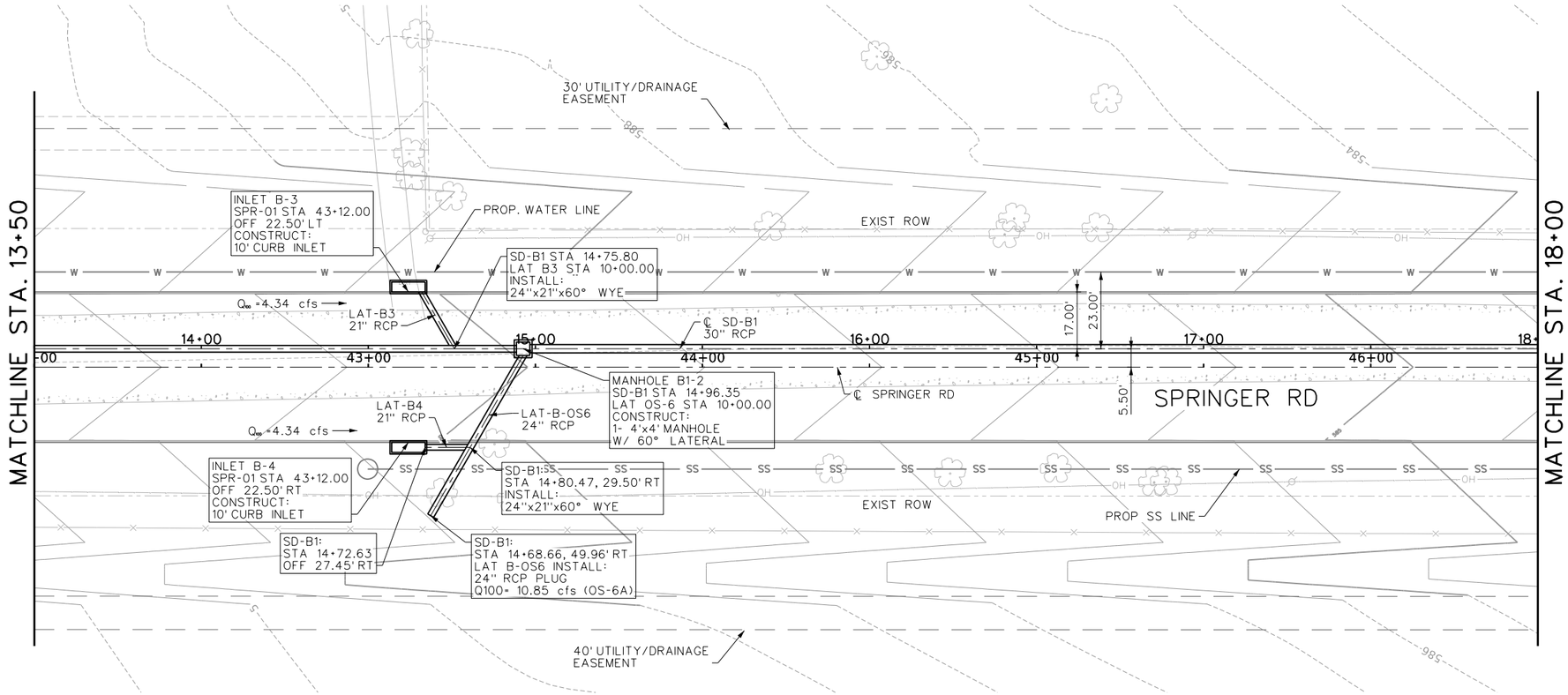
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

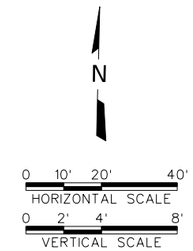
0 1"

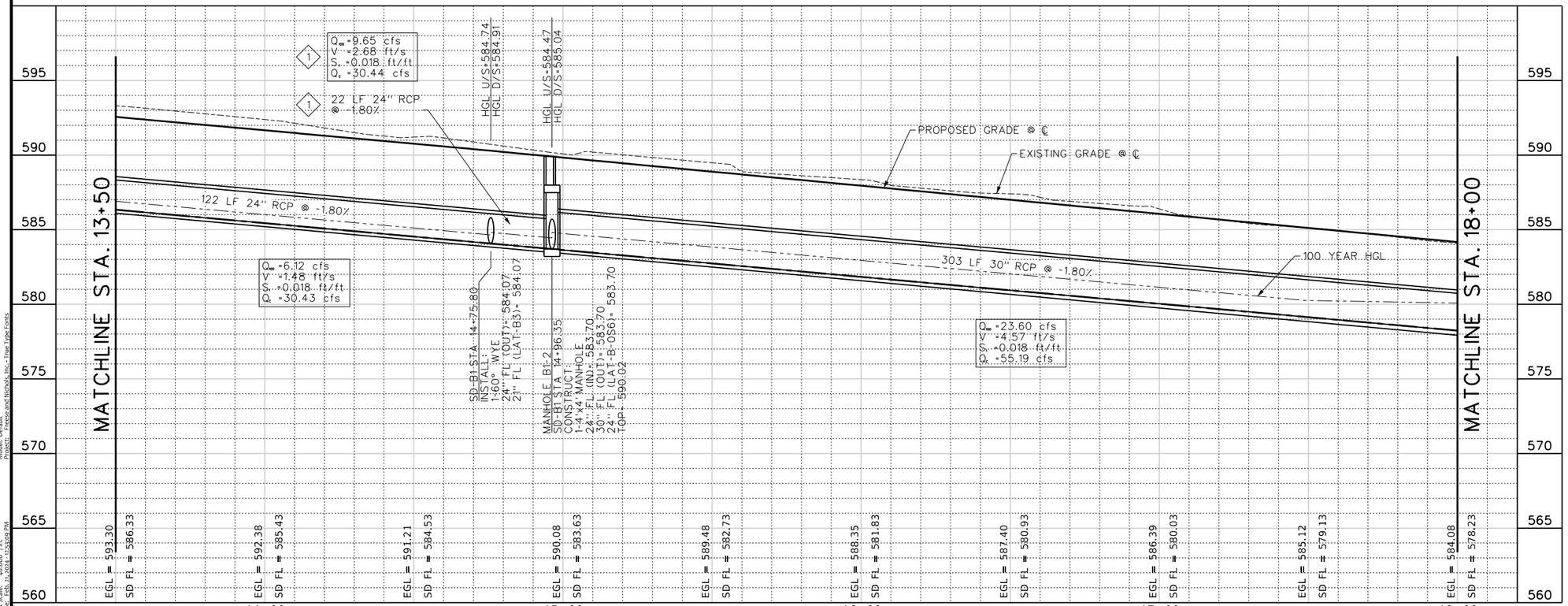
SHEET
SD-14

SEQ.
166

MicroStation V8 User: 90262 Office: On Site
N:\IF\Drawings\Drainage\cv-trt-pp-sdB2-1.sht
Plotter: \\IPM0001\HP5100_PS on IPM0001:
Plot Scale: 40.0087 ' / in.
Plot: Feb. 21, 2024 - 12:53:03 PM
Model: Default
Xrefs: Freese and Nichols, Inc. True Type Fonts







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FREESE AND NICHOLS, INC.

RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

STORM DRAIN LINE B1
STA 13+50 TO STA 18+00

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MW
DRAWN ZLG
REVISED
CHECKED MRA
FILE NAME cv-trt-pp-sdB2-2.sht

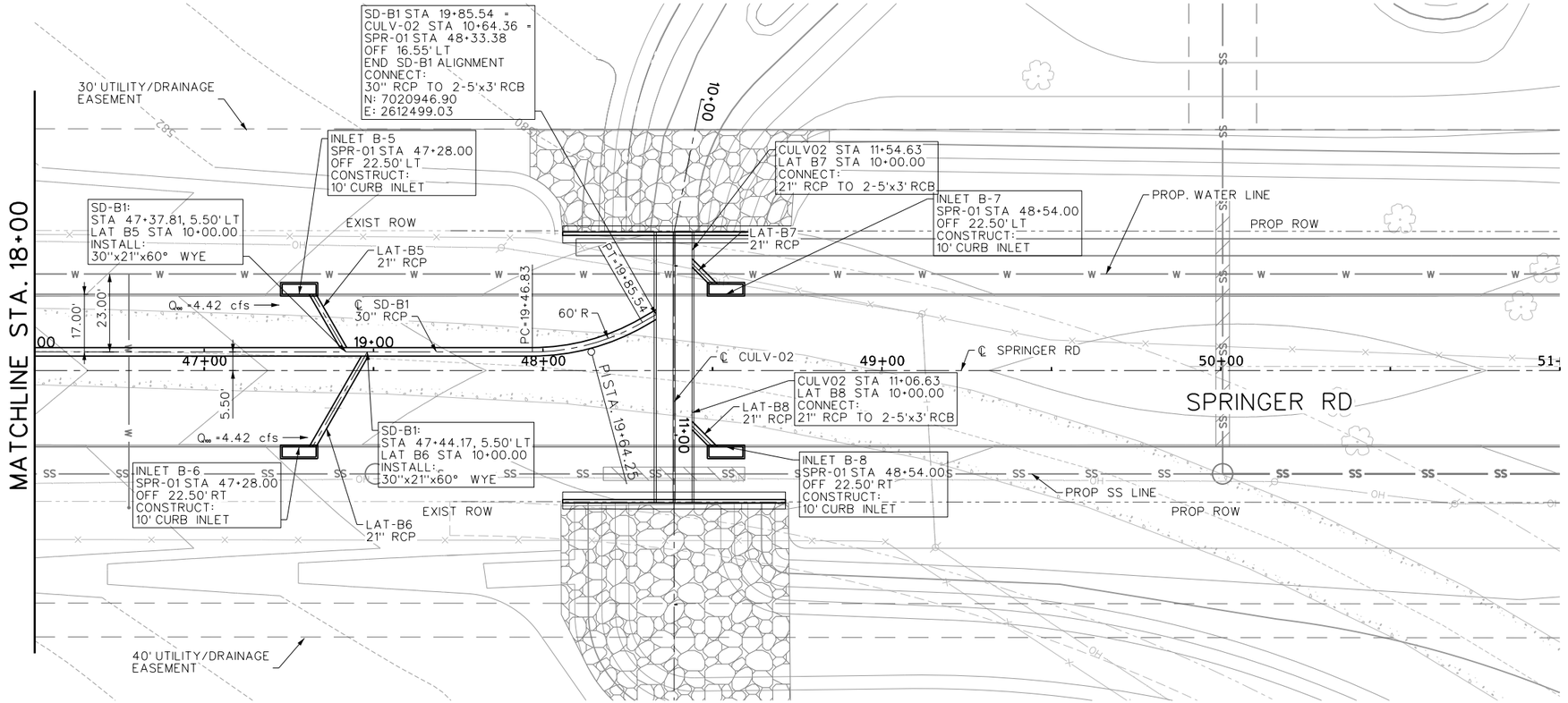
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

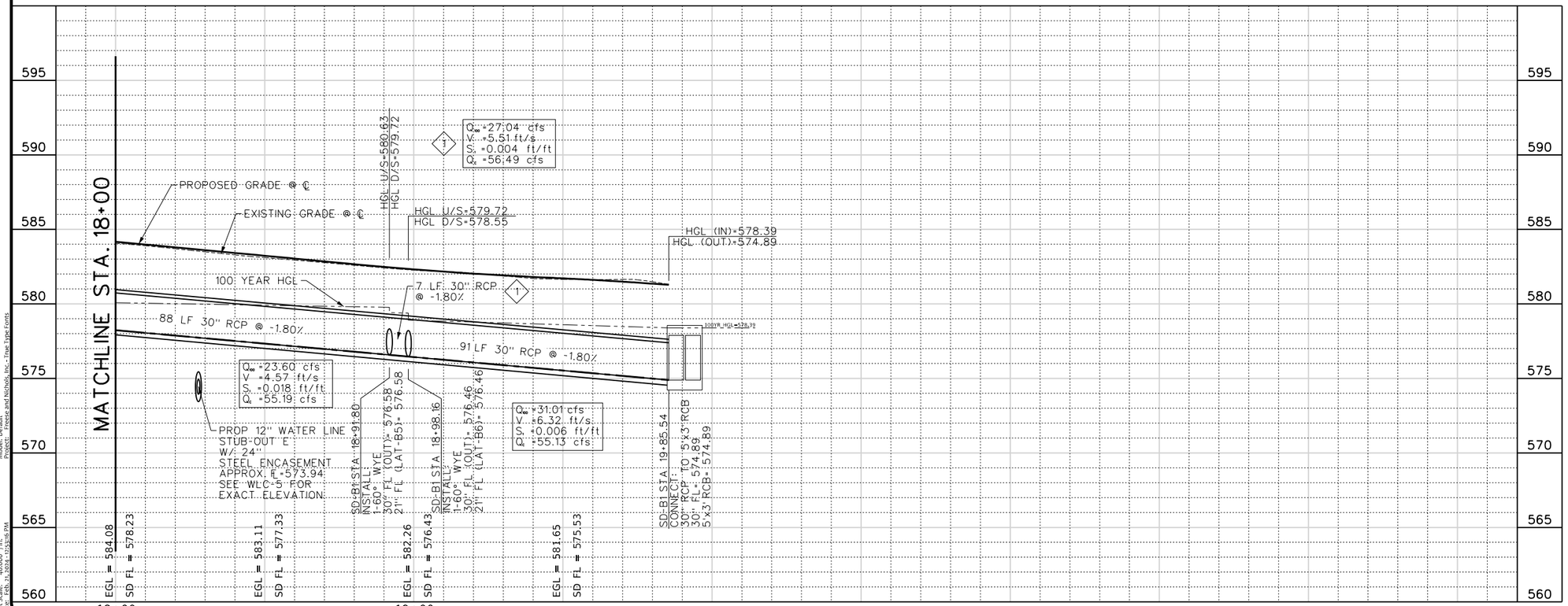
SHEET SD-15

SEQ. 167

MicroStation V8 User: 90262 Office: On Site
Plotter: \\IP\Drawing\Drainage\cv-trt-pp-sdB2-2.sht
Plot Scale: 40.008 ' / in.
Plot Date: Feb. 21, 2024 - 12:53:09 PM
Model: Default
Project: Freese and Nichols, Inc. - True Type Fonts

Office: On Site Date: Feb. 21, 2024 - 12:53:09 PM User: 90262 File: N:\IF\Drawings\Drainage\cv-trt-pp-sdB2-2.sht





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FREESE AND NICHOLS, INC.

RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

STORM DRAIN LINE B1
STA 18+00 TO END

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MW
DRAWN ZLG
CHECKED MRA
REVISED
FILE NAME cv-trt-pp-sdB2-3.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET SD-16

SEQ. 168

MicroStation V8 User: 90262 Office: On Site
Plotter: \\IP\Drawing\Drainage\cv-trt-pp-sdB2-3.sht
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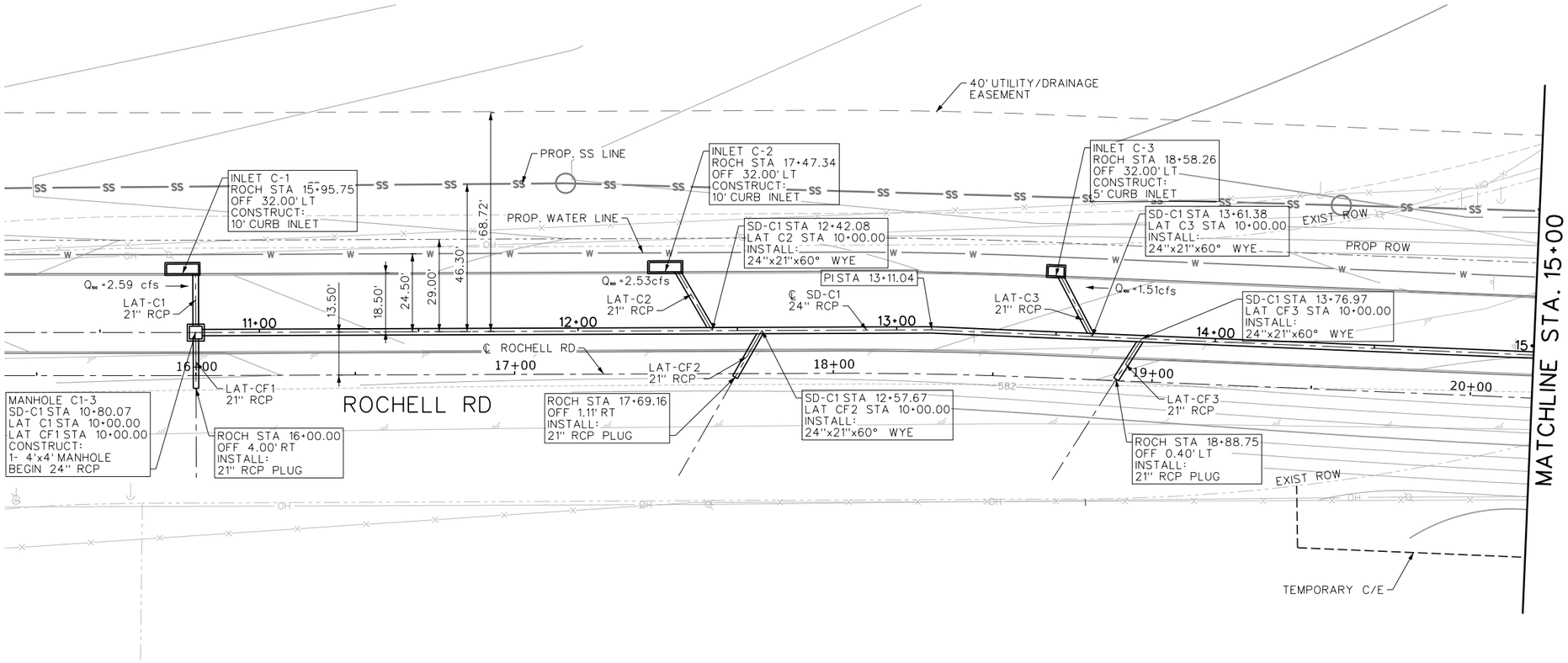
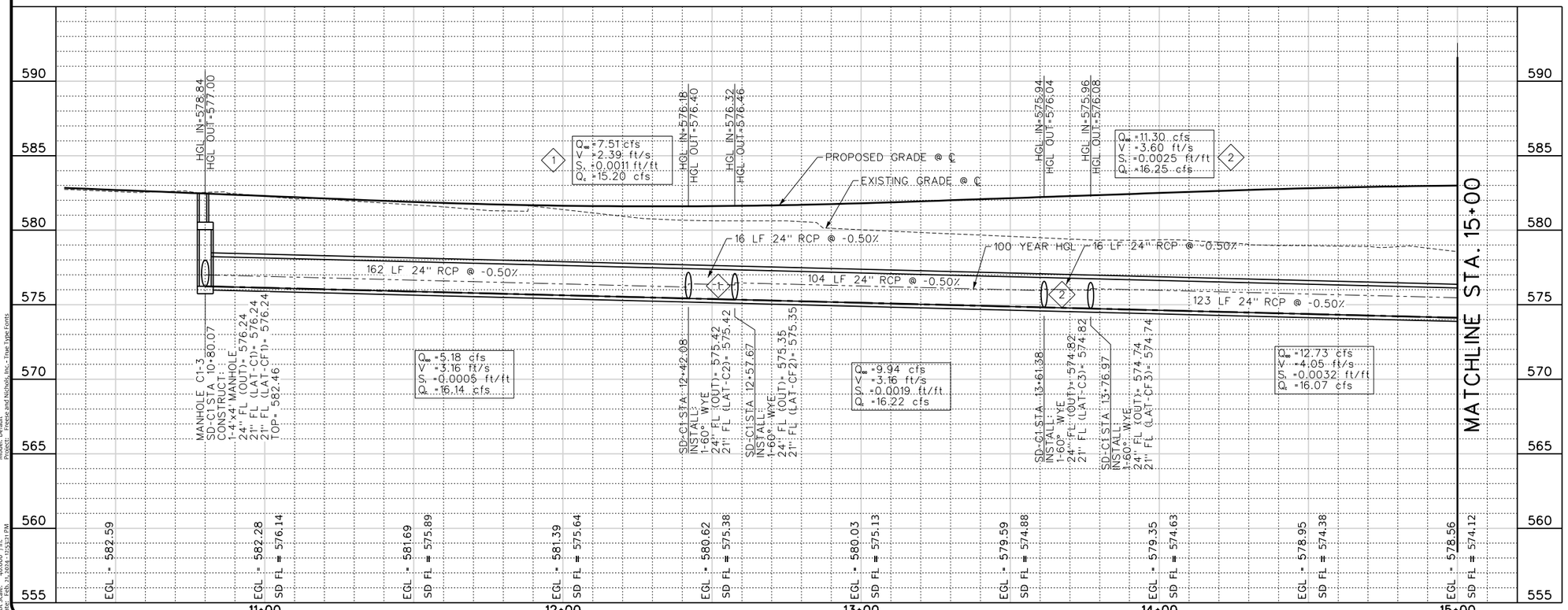
Date: Feb. 21, 2024 - 12:53:16 PM
Model: Default
Project: Freese and Nichols, Inc. - True Type Fonts





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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

STORM DRAIN LINE C1
BEGIN TO STA 15+00

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MW
DRAWN ZLG
REVISED
CHECKED MRA
FILE NAME cv-trt-pp-sdC1-1.sht

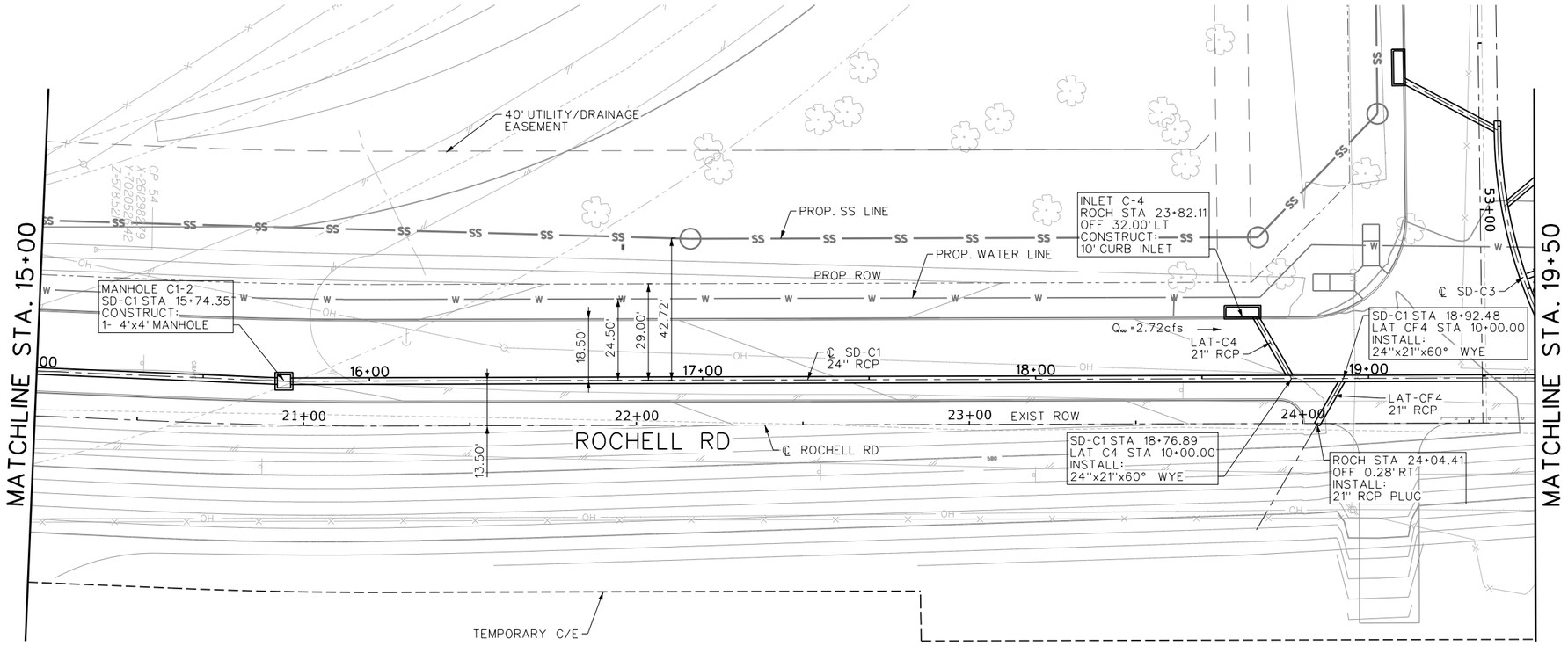
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale accordingly.
0 1"

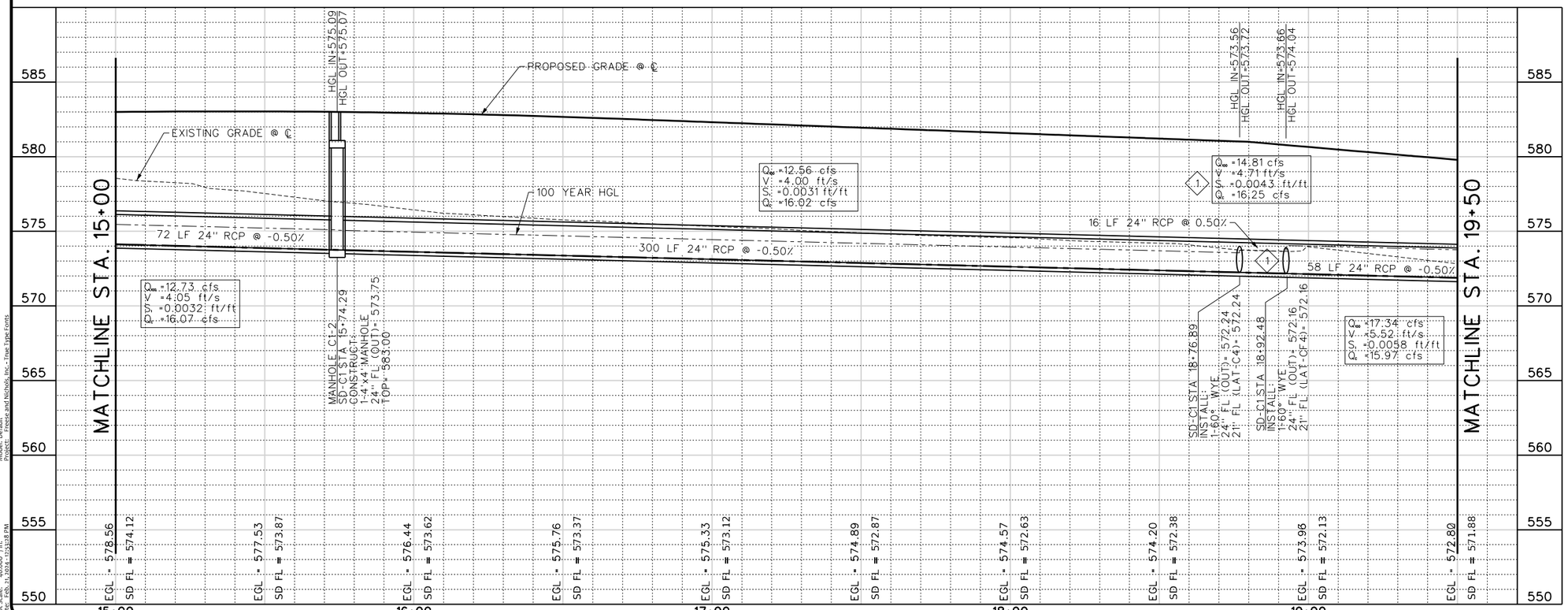
SHEET SD-17
SEQ. 169

MicroStation V8 User: 90262 Office: On Site
Plotter: \\IP\Xerox AltaLink C8130 PCL6
Plot Scale: 40.008 ' / In.
Plot: Feb. 21, 2024 - 12:53:21 PM
Model: Default
Sheets: Freese and Nichols, Inc. True Type Fonts

Office: On Site Date: Feb. 21, 2024 - 12:53:21 PM User: 90262 File: N:\IF\Drawings\Drainage\cv-trt-pp-sdC1-1.sht

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024





N
0 10' 20' 40'
HORIZONTAL SCALE
0 2' 4' 8'
VERTICAL SCALE

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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Fax: (214) 217-2250
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
CIVIL
STORM DRAIN LINE C1
STA 15+00 TO STA 19+50

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MW
DRAWN ZLG
REVISED
CHECKED MRA
FILE NAME cv-trt-pp-sdC1-2.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET SD-18
SEQ. 170

MicroStation V8 User: 90262 Office: On Site
Plotter: \\IP\HP DesignJet T1700dr PS Model: Default
Plot Scale: 40.008 ' / in. Project: Freese and Nichols, Inc. - True Type Fonts
Date: Feb. 21, 2024 - 12:53:28 PM

Office: On Site Date: Feb. 21, 2024 - 12:53:28 PM User: 90262 File: N:\IF\Drawings\Drainage\cv-trt-pp-sdC1-2.sht

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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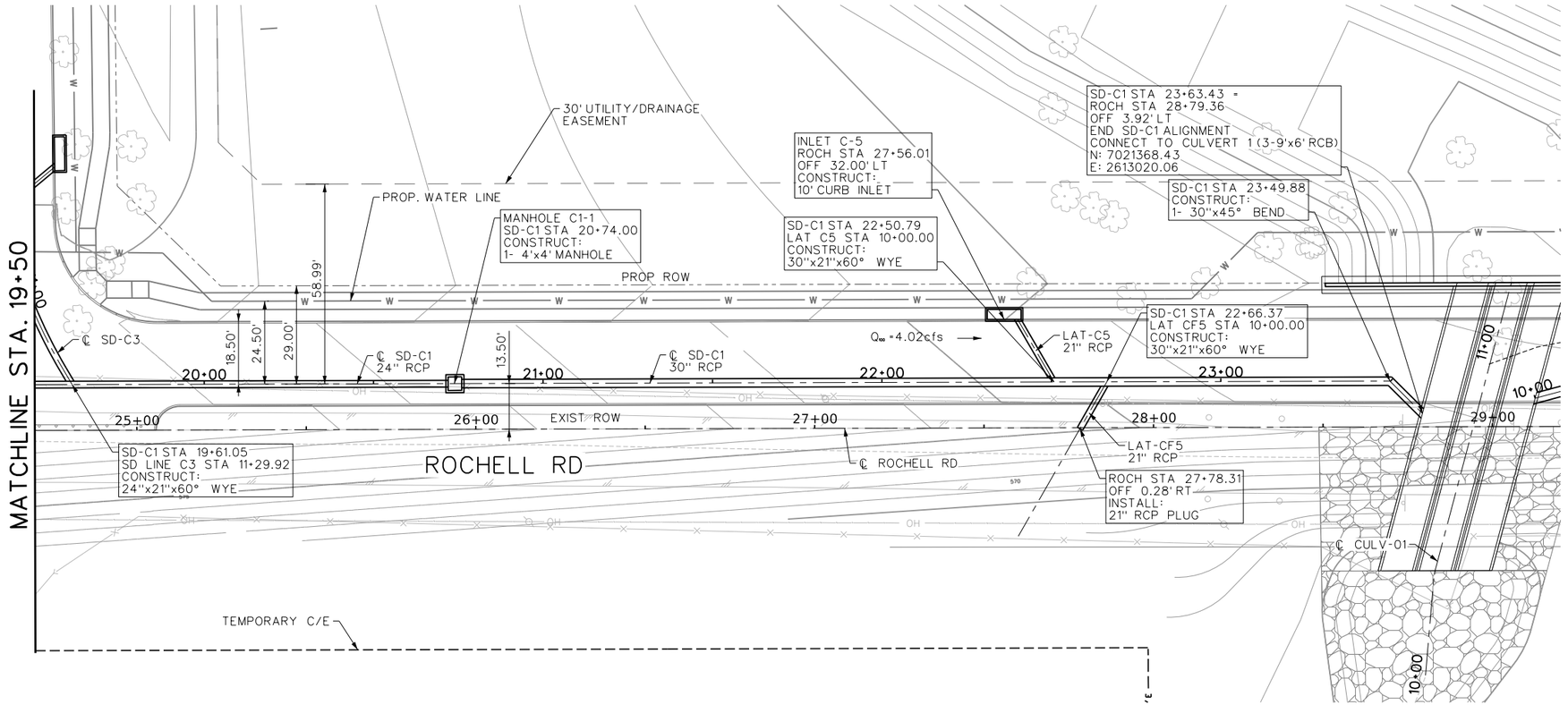
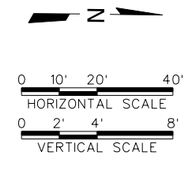
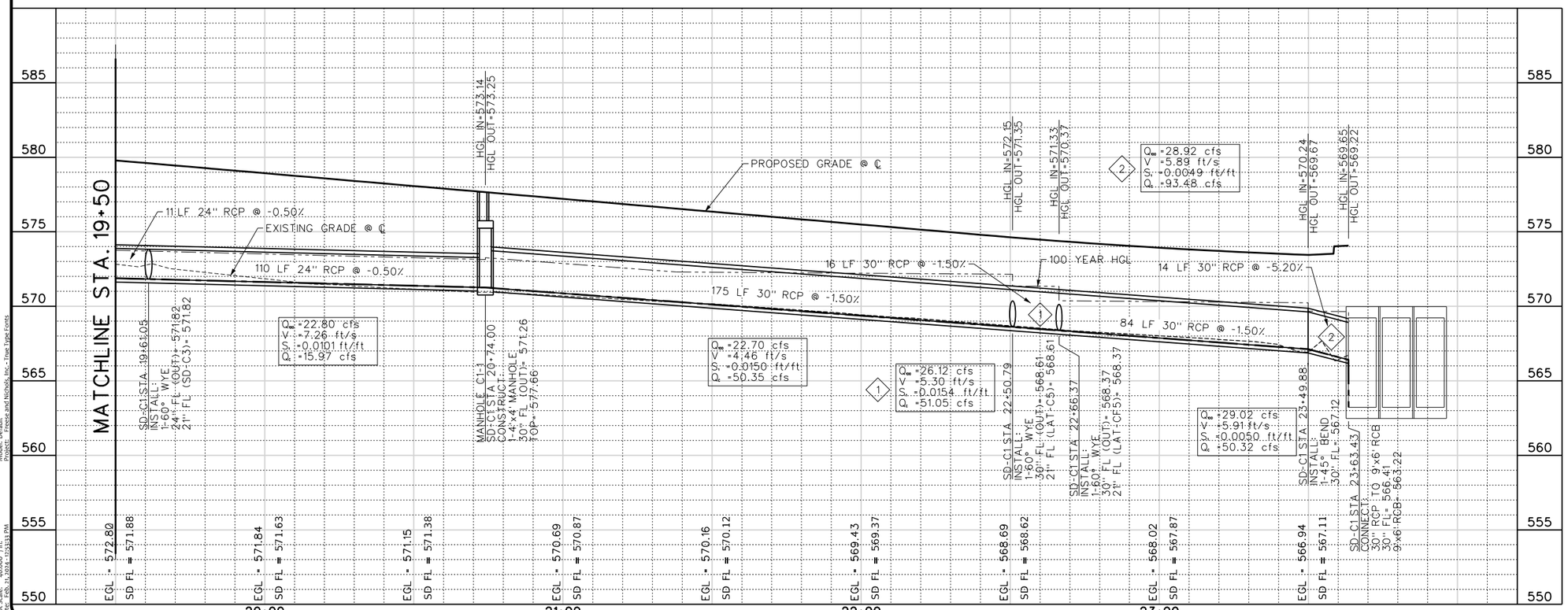






ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
CIVIL
STORM DRAIN LINE C1
STA 19+50 TO END

NO.	ISSUES	BY	DATE

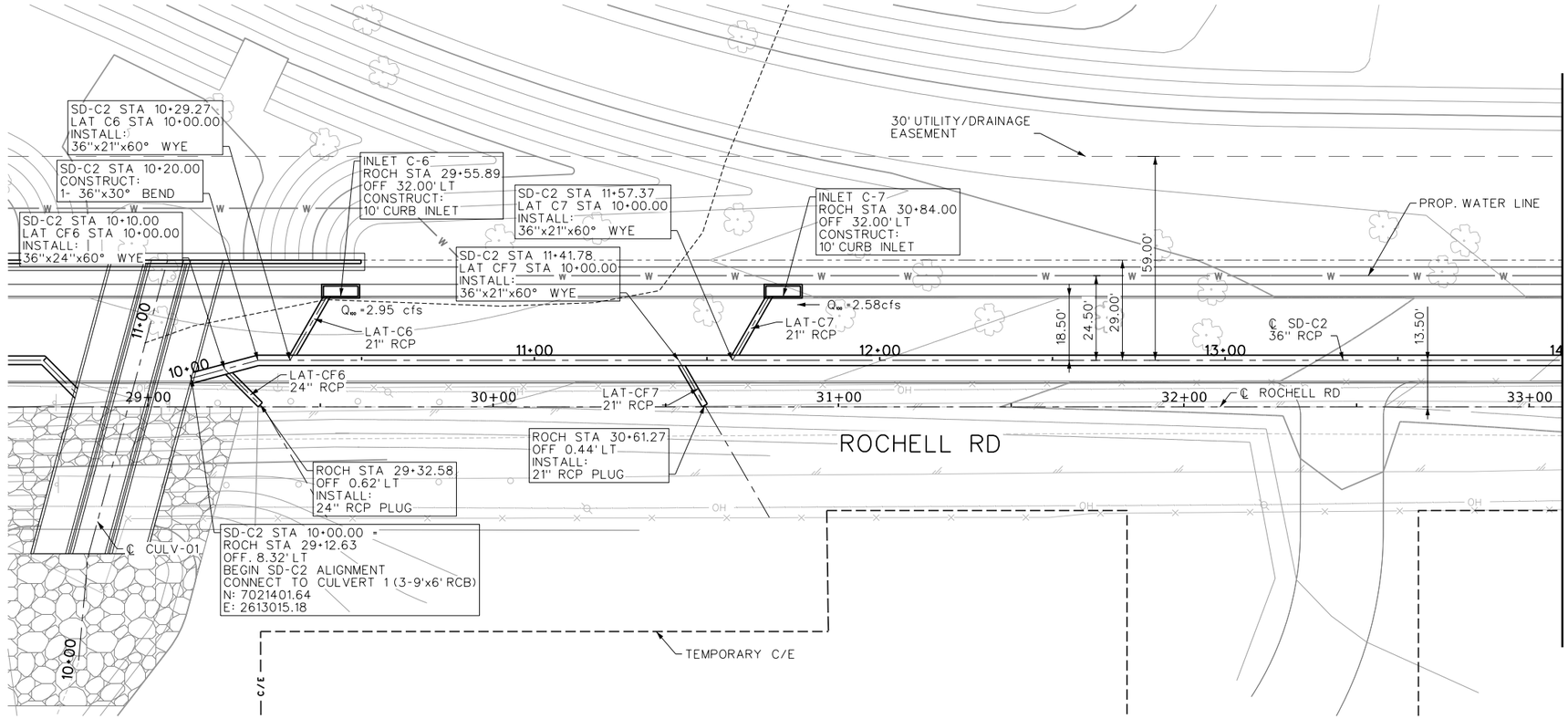
F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MW
DRAWN ZLG
REVISED
CHECKED MRA
FILE NAME cv-trt-pp-sdC1-3.sht

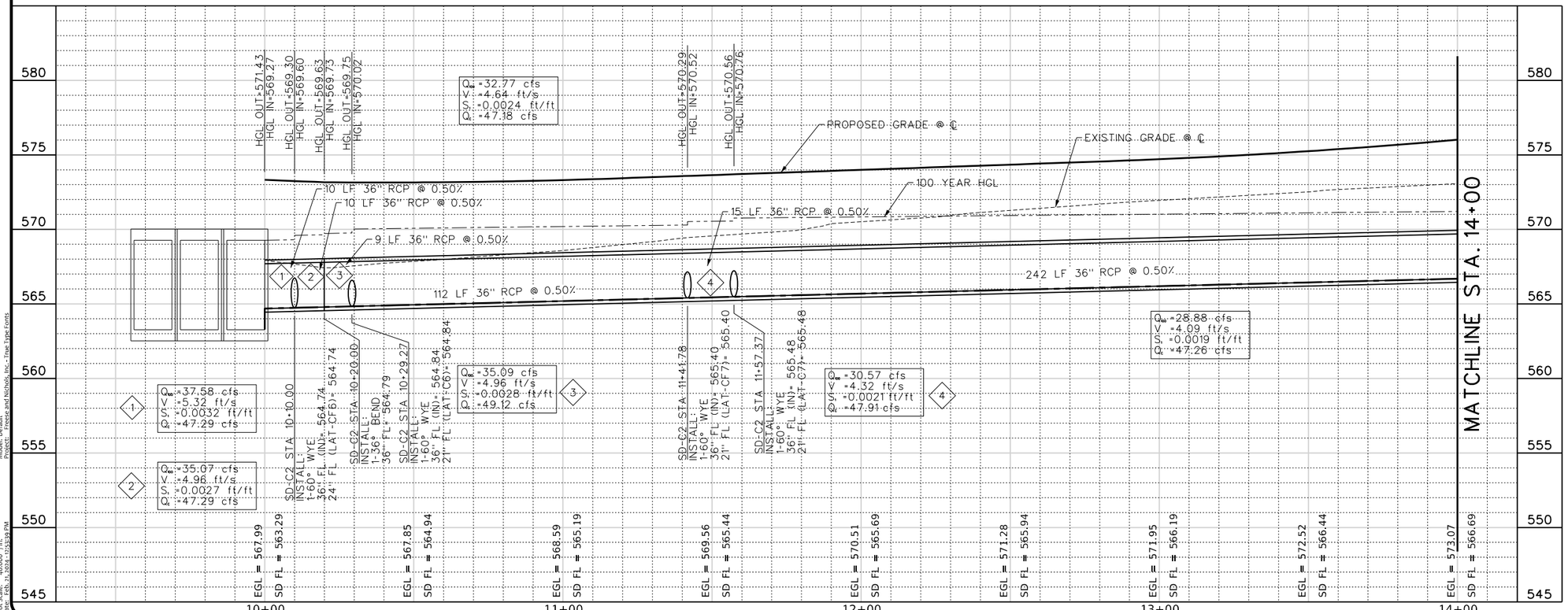
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET SD-19
SEQ. 171

MicroStation V8 User: 90262 Office: On Site
Plotter: \\FW1\Drawings\Drainage\cv-trt-pp-sdC1-3.sht
Plot Scale: 40.008 '/ In.
Plot Date: Feb. 21, 2024 - 12:53:33 PM
Model: Default
Project: Freese and Nichols, Inc. - True Type Fonts

Office: On Site Date: Feb. 21, 2024 - 12:53:33 PM User: 90262 File: N:\IF\Drawings\Drainage\cv-trt-pp-sdC1-3.sht





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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2250
Web - www.freese.com

N
0 10' 20' 40'
HORIZONTAL SCALE
0 2' 4' 8'
VERTICAL SCALE

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
CIVIL
STORM DRAIN LINE C2
BEGIN TO STA 14+00

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MW
DRAWN ZLG
CHECKED MRA
REVISED
FILE NAME cv-trt-pp-sdC2-1.sht

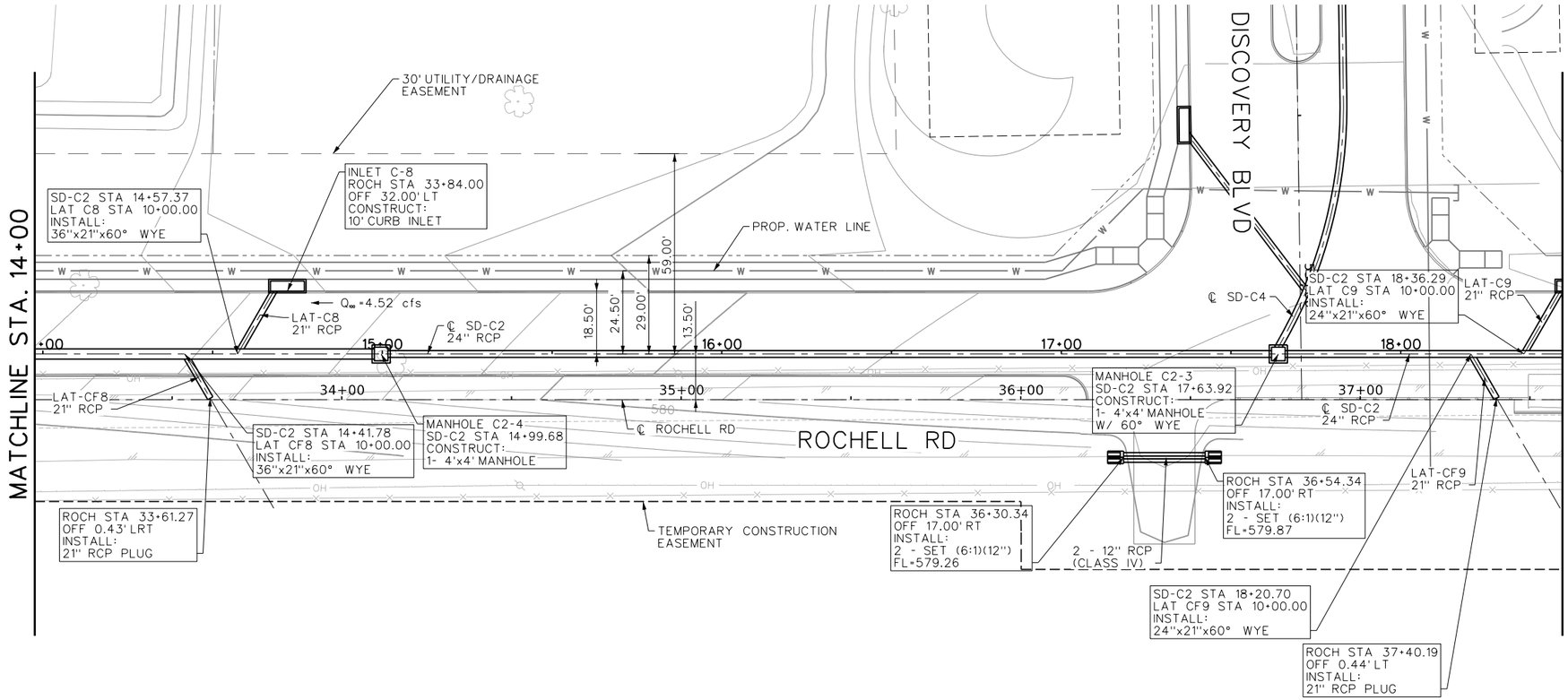
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale accordingly.
0 1"

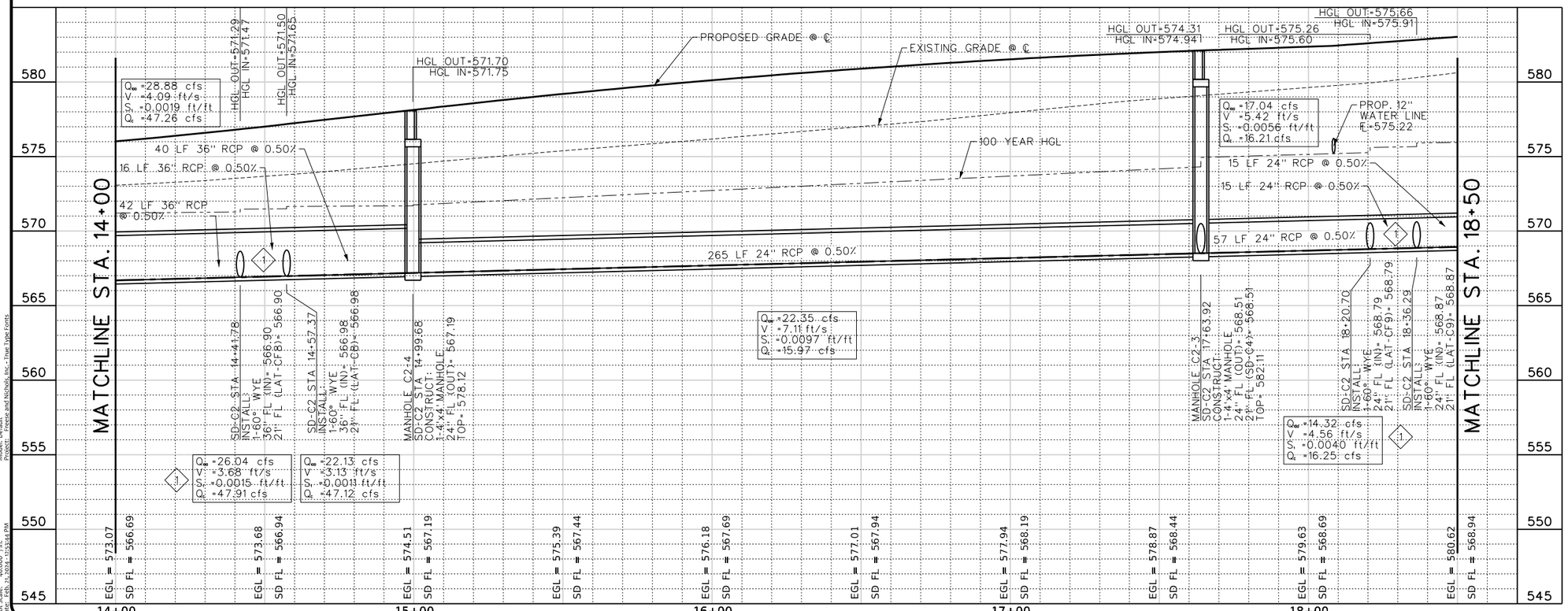
SHEET SD-20
SEQ. 172

MicroStation V8 User: 90262 Office: On Site
Plotter: \\IP\HP500PS_Plotter_Map3F Model: Default
Plot Scale: 40.087 ' / in. Project: Freese and Nichols, Inc. True Type Fonts
Plot: Feb. 21, 2024 - 12:53:39 PM

Office: On Site Date: Feb. 21, 2024 - 12:53:39 PM User: 90262 File: N:\IF\Drawings\Drainage\cv-trt-pp-sdC2-1.sht

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024





N
0 10' 20' 40'
HORIZONTAL SCALE
0 2' 4' 8'
VERTICAL SCALE

TEXAS REGISTERED ENGINEERING FIRM F-2144
FREESE AND NICHOLS, INC.

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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
CIVIL
STORM DRAIN LINE C2
STA 14+00 TO STA 18+50

NO.	ISSUES	BY	DATE

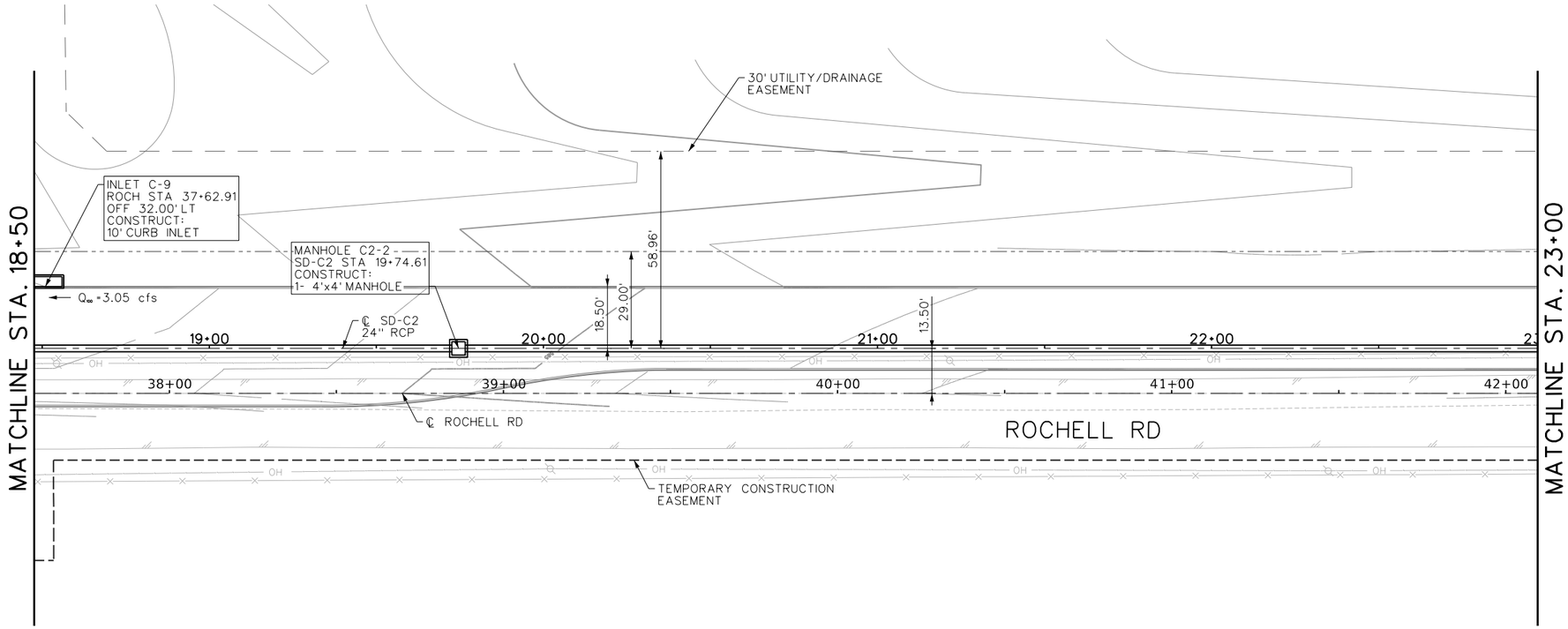
F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MW
DRAWN ZLG
REVISED
CHECKED MRA
FILE NAME cv-trt-pp-sdC2-2.sht

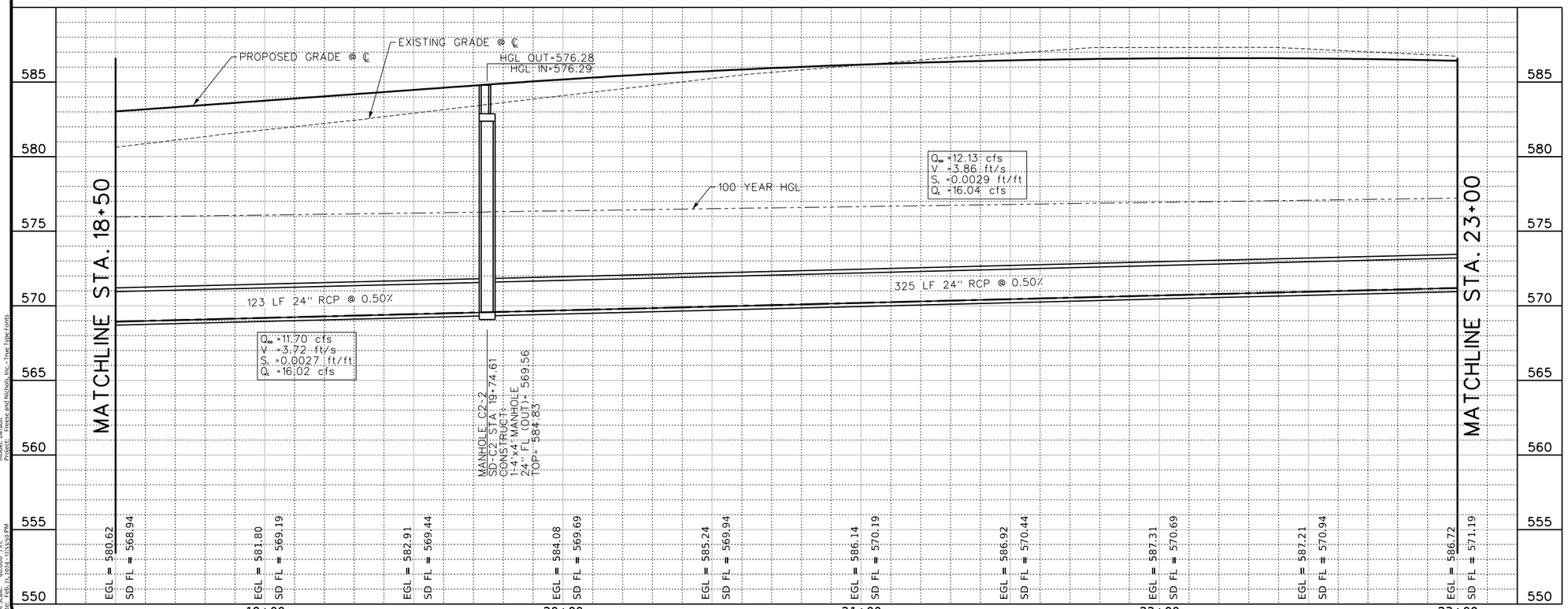
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET SD-21
SEQ. 173

MicroStation V8 User: 90262 Office: On Site
Plotter: \\JP\Drawings\Drainage\cv-trt-pp-sdC2-2.sht
Plot Scale: 40.008 '/ In.
Plot Date: Feb. 21, 2024 - 12:53:44 PM
Model: Default
Project: Freese and Nichols, Inc. - True Type Fonts

Office: On Site Date: Feb. 21, 2024 - 12:53:44 PM User: 90262 File: N:\IF\Drawings\Drainage\cv-trt-pp-sdC2-2.sht





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RECORD DRAWINGS PREPARED ON:
8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

THE SEAL THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
IT IS A VIOLATION OF LAW TO USE THIS DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone - (214) 217-2200
Fax - (214) 217-2201
Web - www.freese.com

N

0 10' 20' 40'
HORIZONTAL SCALE

0 2' 4' 8'
VERTICAL SCALE

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

STORM DRAIN LINE C2
STA 18+50 TO STA 23+00

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MW
DRAWN ZLG
REVISED
CHECKED MRA
FILE NAME cv-trt-pp-sdC2-3.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET SD-22
SEQ. 174

MicroStation V8 User: 90262 Office: On Site
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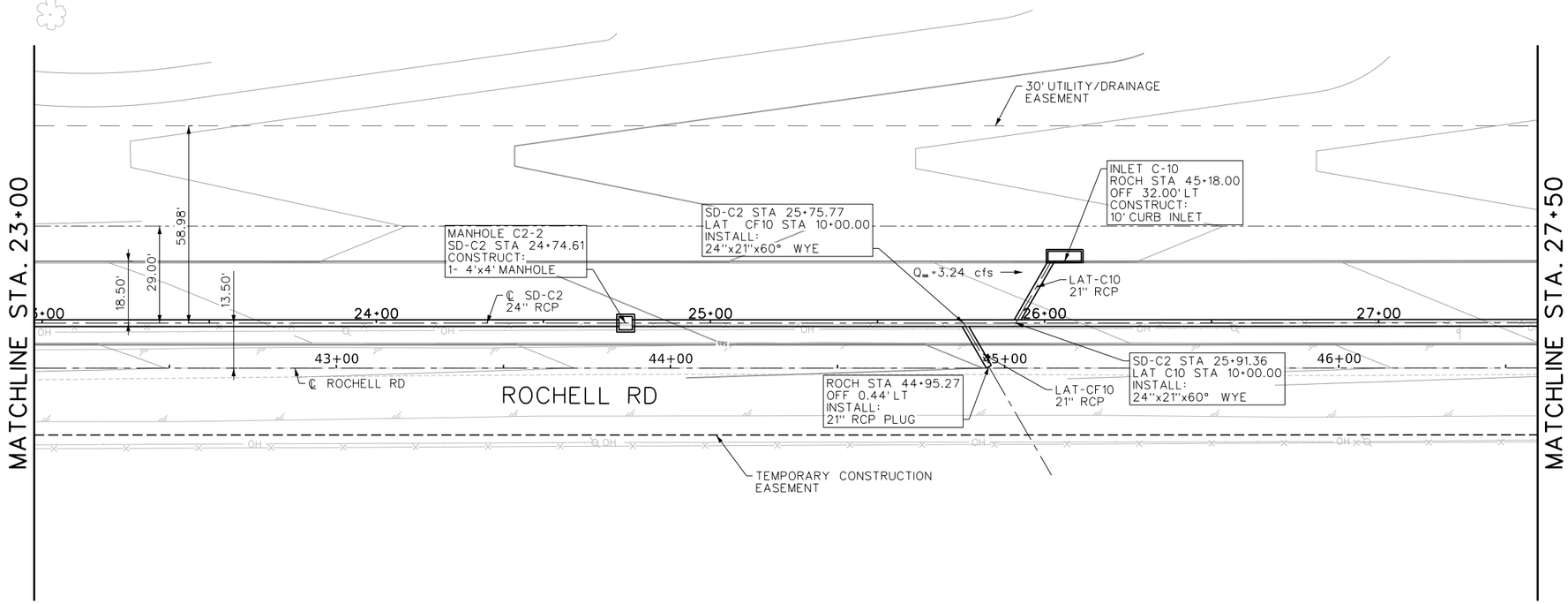
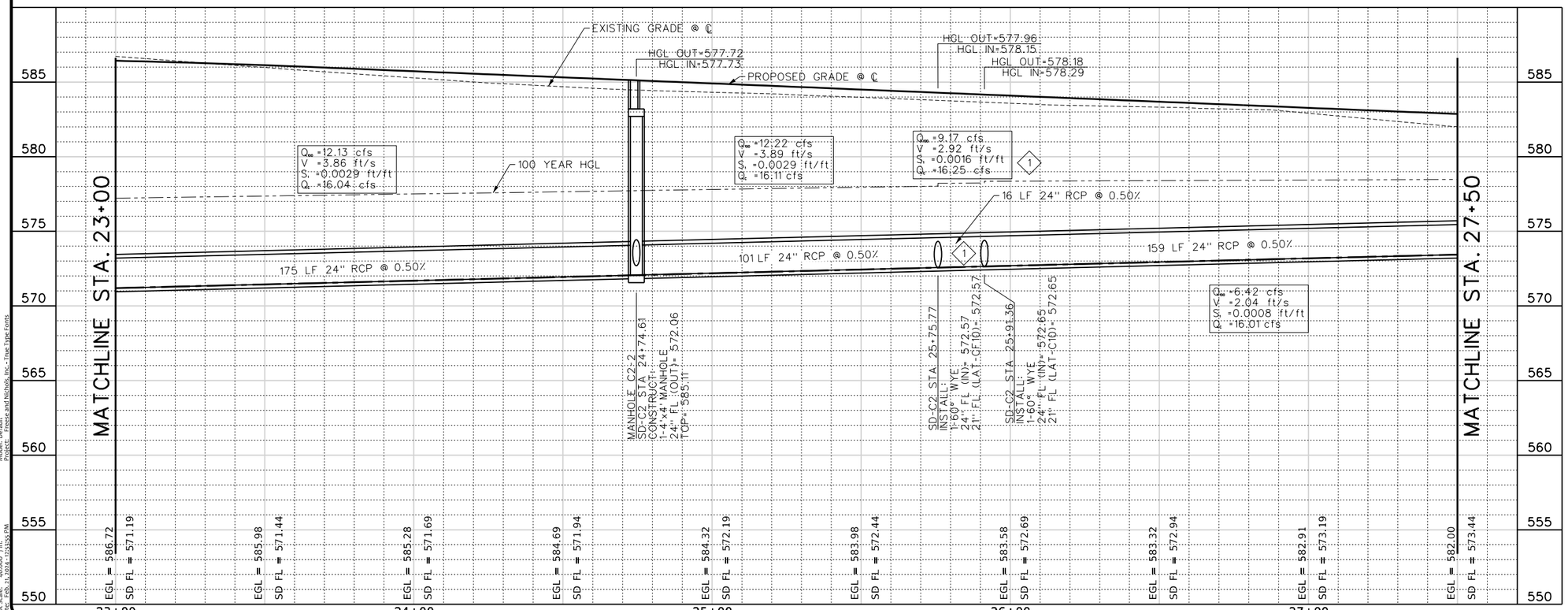
Plot Scale: 40.008 ' / in. Project: Freese and Nichols, Inc. - True Type Fonts
Date: Feb. 21, 2024 - 12:53:50 PM





This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

N

0 10' 20' 40'
HORIZONTAL SCALE
0 2' 4' 8'
VERTICAL SCALE

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2250
Web - www.freese.com

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AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

STORM DRAIN LINE C2
STA 23+00 TO STA 27+50

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MW
DRAWN ZLG
REVISED
CHECKED MRA
FILE NAME cv-trt-pp-sdC2-4.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale accordingly.
0 1"

SHEET SD-23
SEQ. 175

MicroStation V8 User: 90262 Office: On Site
Plotter: J:\IP\Drawings\Drainage\cv-trt-pp-sdC2-4.sht
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Date: Feb. 21, 2024 - 12:53:55 PM
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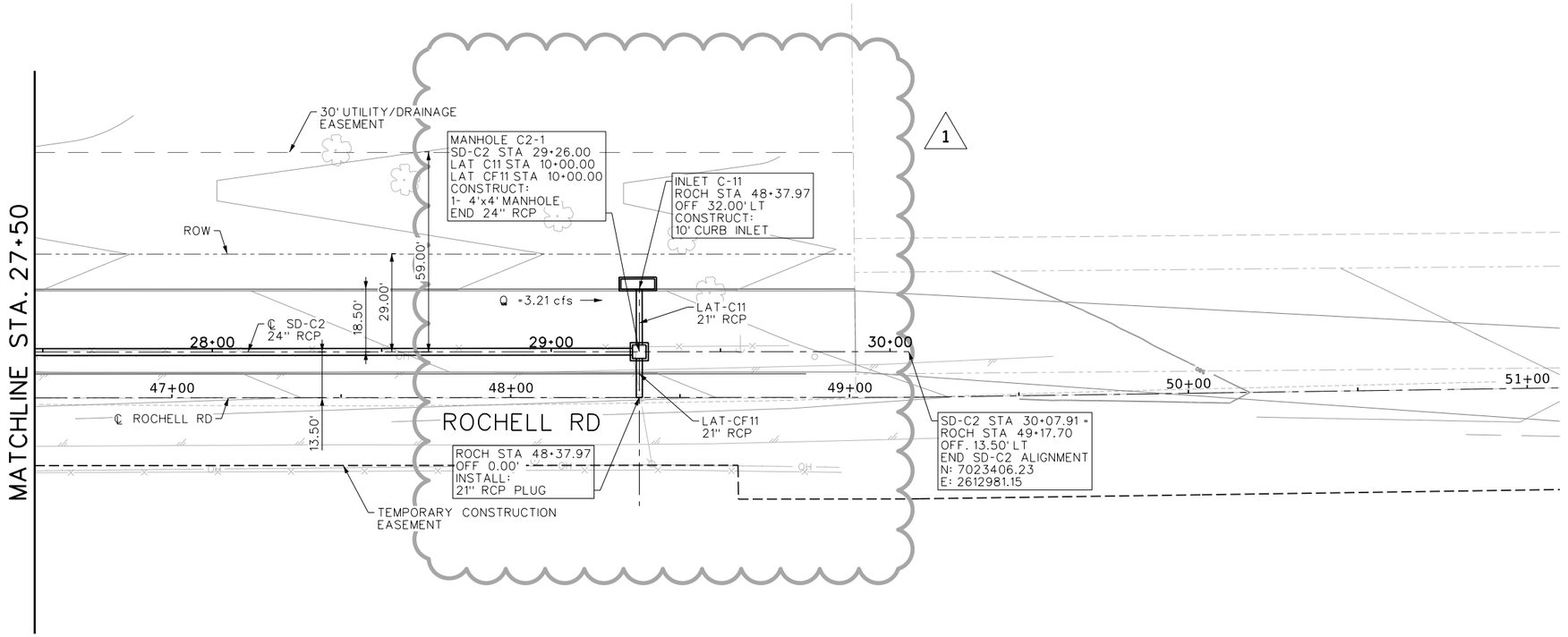
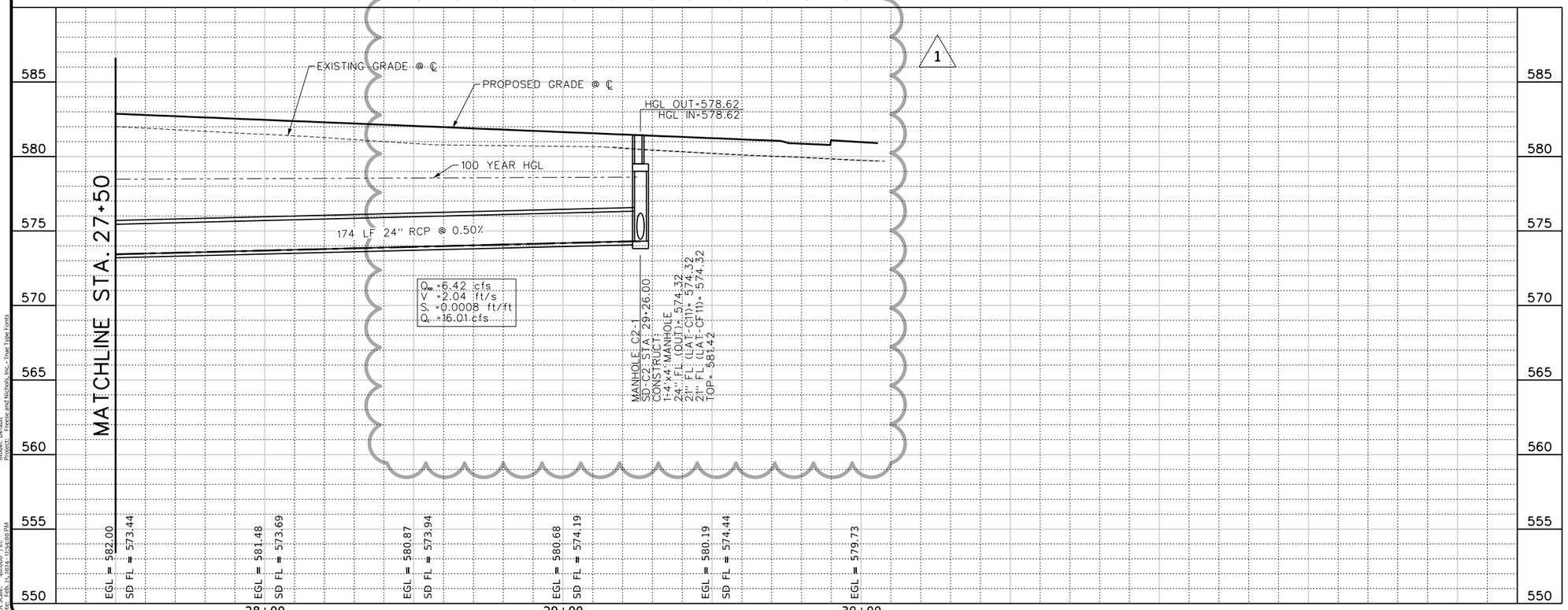
Xrefs: Freese and Nichols Inc - True Type Fonts





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RECORD DRAWINGS PREPARED ON: 8/20/2024

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TEXAS NO. 134095 ON 10/21/2021
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FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

THE SEAL THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS REGISTERED BY ALAN E. PETERSON
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Web - www.freese.com

N

0 10' 20' 40'
HORIZONTAL SCALE
0 2' 4' 8'
VERTICAL SCALE

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
CIVIL
STORM DRAIN LINE C2
STA 27+50 TO END

NO.	ISSUES	BY	DATE
1	REVISE SD-C2 AND LATERALS	ZF	07/21/23

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.

F&N JOB NO.	RKW19711
DATE	APRIL 2022
DESIGNED	MW
DRAWN	ZLG
REVISED	
CHECKED	MRA
FILE NAME	cv-trt-pp-sdC2-5.sht

SHEET
SD-24
SEQ.
176

MicroStation V8 User: 90262 Office: On Site
Plotter: \\IP\Konica Minolta C759 PCL
Plot Scale: 40.087 ' / in.
Plot Date: Feb. 21, 2024 - 12:54:00 PM
Model: Default
Xrefs: Freese and Nichols, Inc. - True Type Fonts
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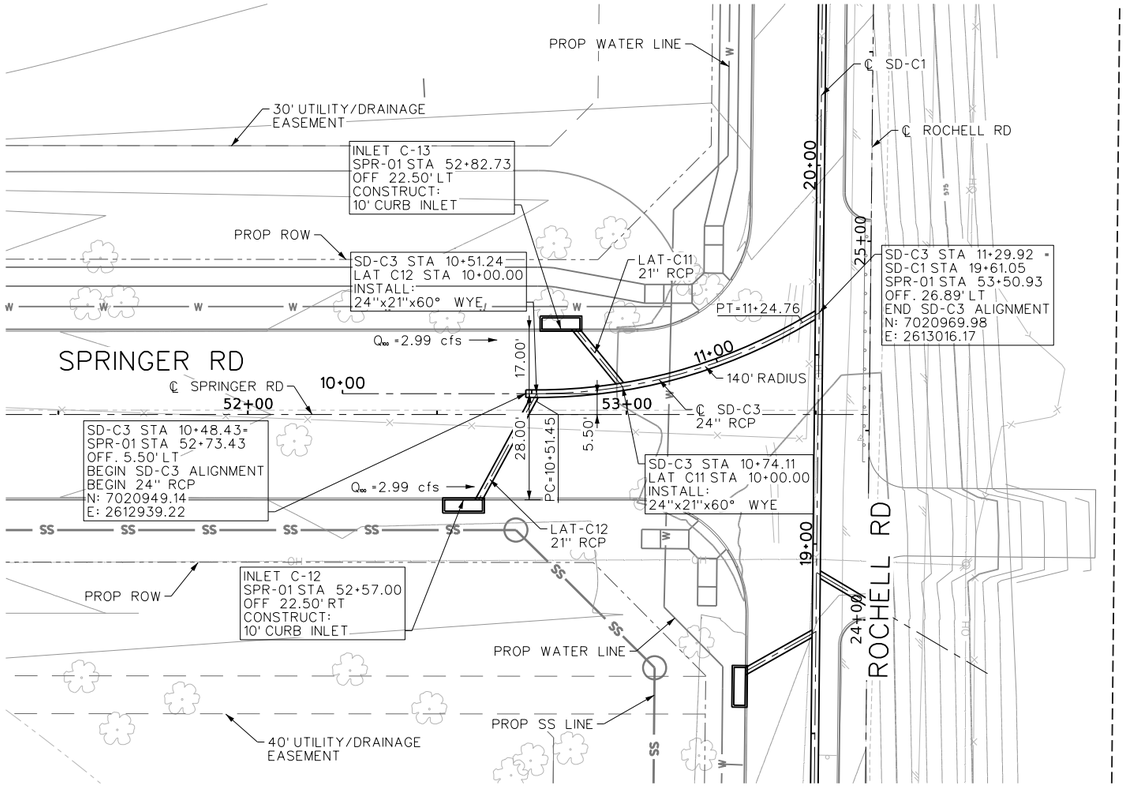
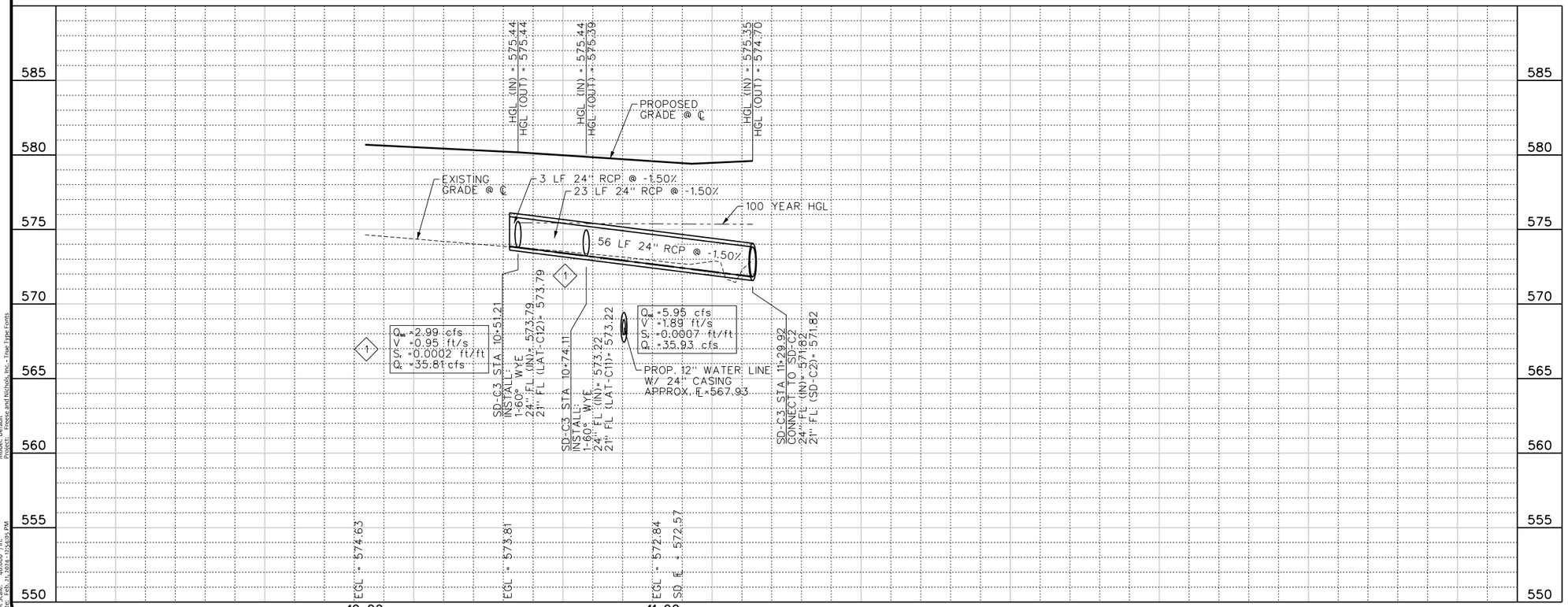
Date: Feb. 21, 2024 - 12:54:00 PM
User: 90262 File: N:\IF\Drawings\Drainage\cv-trt-pp-sdC2-5.sht





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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

N

0 10' 20' 40'
HORIZONTAL SCALE
0 2' 4' 8'
VERTICAL SCALE

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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TEXAS NO. 134055 ON 10/21/2021
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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

STORM DRAIN LINE C3
BEGIN TO END

NO.	ISSUES	BY	DATE

F&N JOB NO. RKV19711
DATE APRIL 2022
DESIGNED MW
DRAWN ZLG
REVISED
CHECKED MRA
FILE NAME cv-trt-pp-sdC3-1.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET SD-25
SEQ. 177

MicroStation V8 User: 90262 Office: On Site
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Plot Scale: 40.0067 '/ in. Project: Freese and Nichols, Inc. - True Type Fonts
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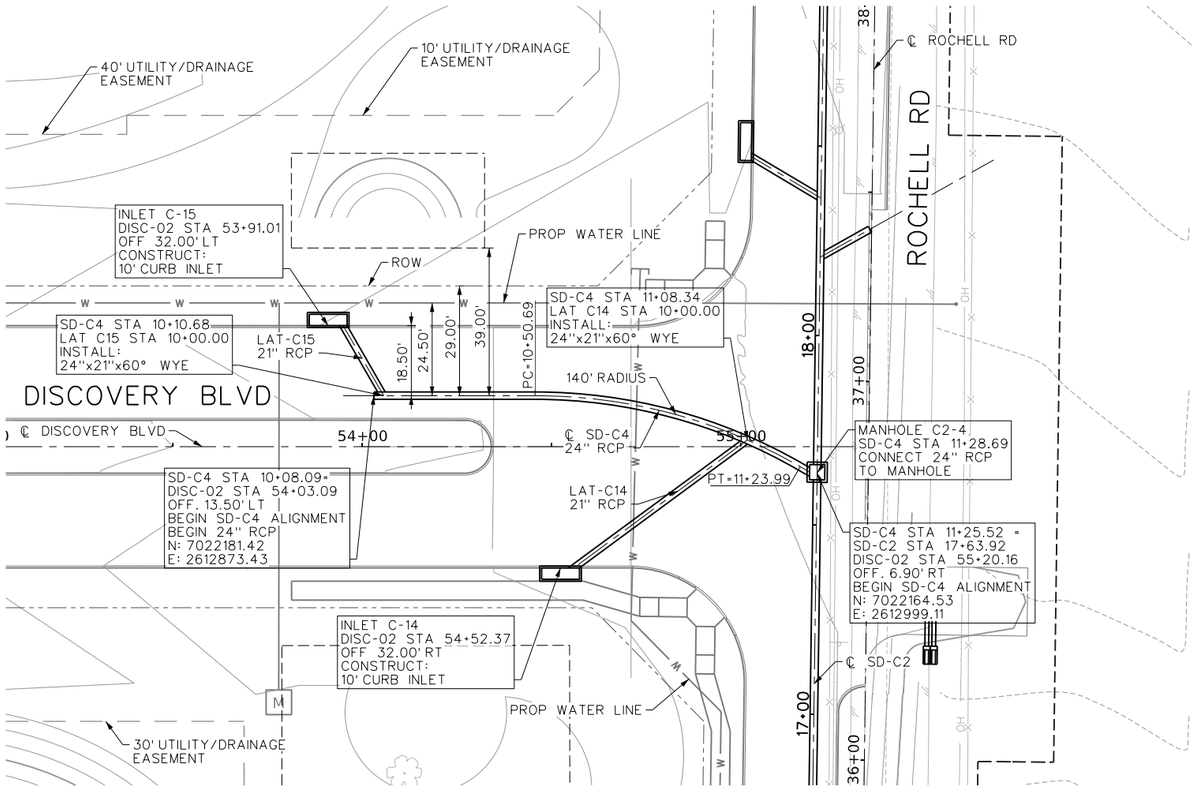

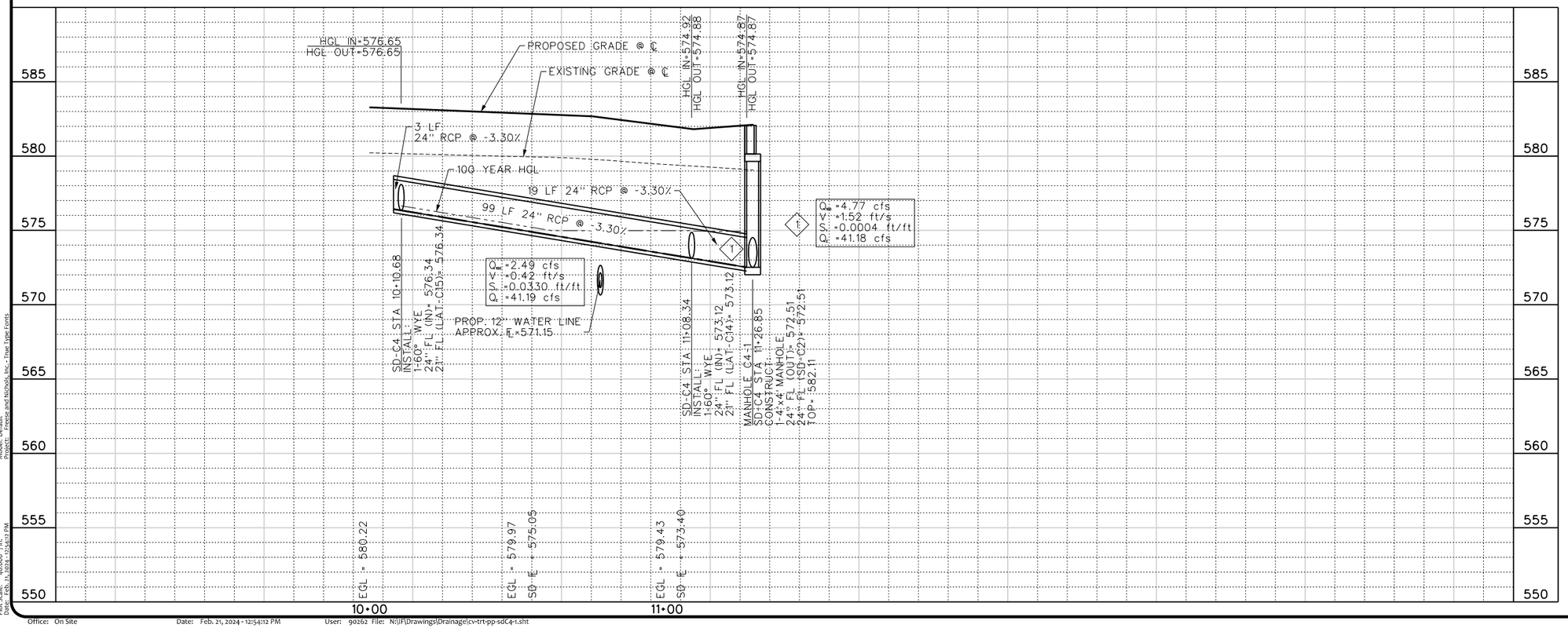

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

N

0 10' 20' 40'
HORIZONTAL SCALE
0 2' 4' 8'
VERTICAL SCALE

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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Fax: (214) 217-2201
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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

STORM DRAIN LINE C4
BEGIN TO END

NO.	ISSUES	BY	DATE

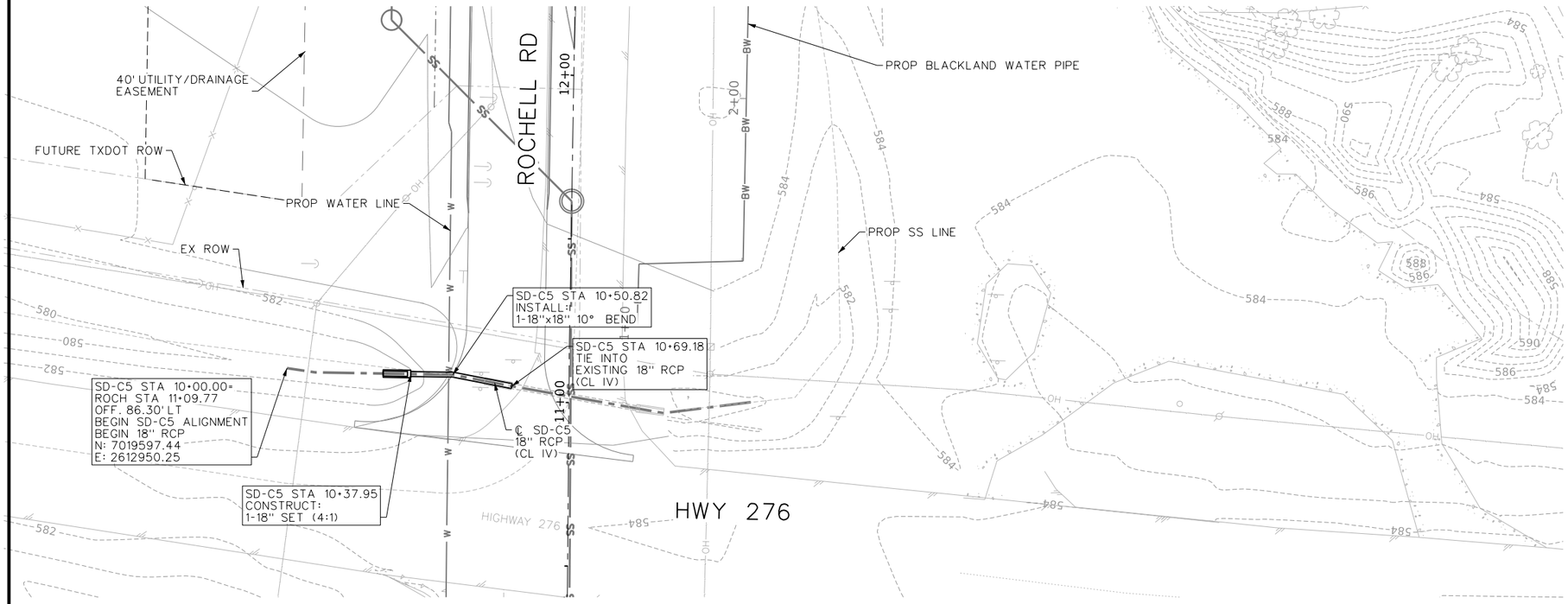
F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MW
DRAWN ZLG
REVISED
CHECKED MRA
FILE NAME cv-trt-pp-sdC4-1.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET
SD-26
SEQ.
178

MicroStation V8 User: 90262 Office: On Site
Plotter: I:\IF\Drawings\Drainage\cv-trt-pp-sdC4-1.sht
Plot Scale: 40.0067 ' In.
Date: Feb. 21, 2024 - 12:54:12 PM
Model: Default
Project: Freese and Nichols, Inc. - True Type Fonts

Office: On Site Date: Feb. 21, 2024 - 12:54:12 PM User: 90262 File: N:\IF\Drawings\Drainage\cv-trt-pp-sdC4-1.sht



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FREESE AND NICHOLS, INC.

RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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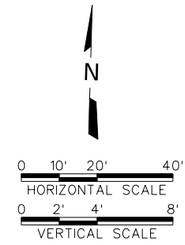

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Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2299
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

STORM DRAIN LINE C5
BEGIN TO END

NO.	ISSUES	BY	DATE

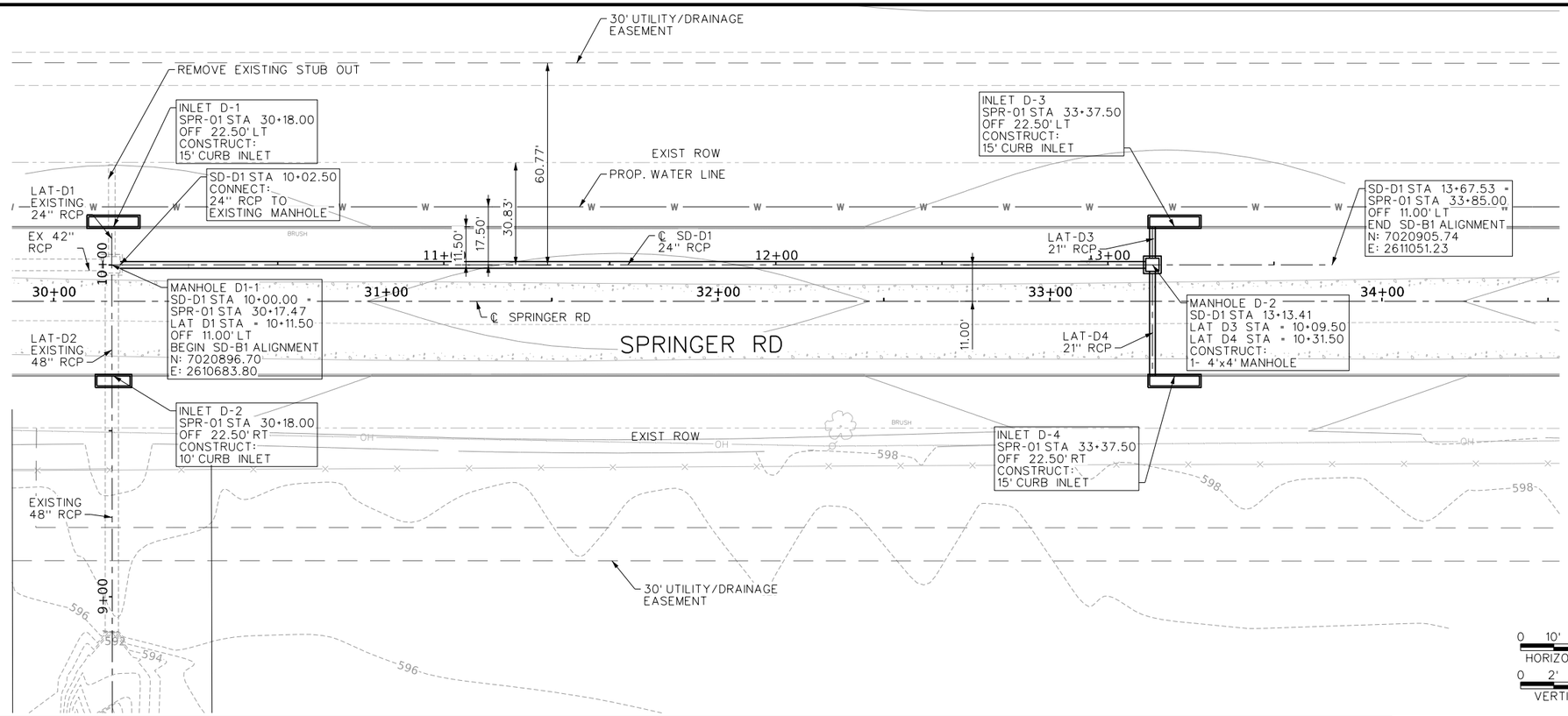
F&N JOB NO. RKV19711
DATE APRIL 2022
DESIGNED MW
DRAWN ZLG
REVISED
CHECKED MRA
FILE NAME cv-trt-pp-sdC5-1.sht

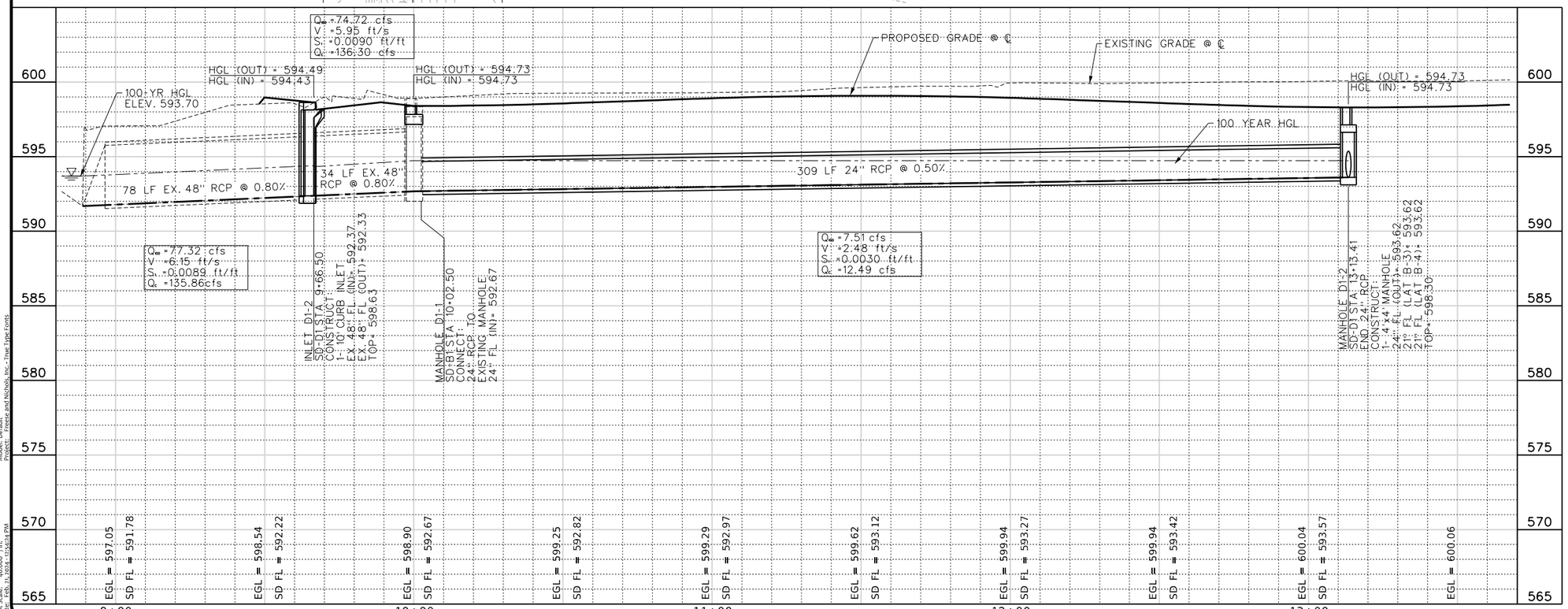
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET SD-27

SEQ. 179

MicroStation V8 User: 90262 Office: On Site
Plotter: \\jfnfs\Drawings\Drainage\cv-trt-pp-sdC5-1.sht
Plot Scale: 40.0067 'in.
Date: Feb. 21, 2024 - 12:54:16 PM
Model: Default
Project: Freese and Nichols, Inc. - True Type Fonts





FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

STORM DRAIN LINE D1
BEGIN TO END

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MW
DRAWN ZLG
REVISED
CHECKED MRA
FILE NAME cv-trt-pp-sdB1-1.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET SD-28
SEQ. 180

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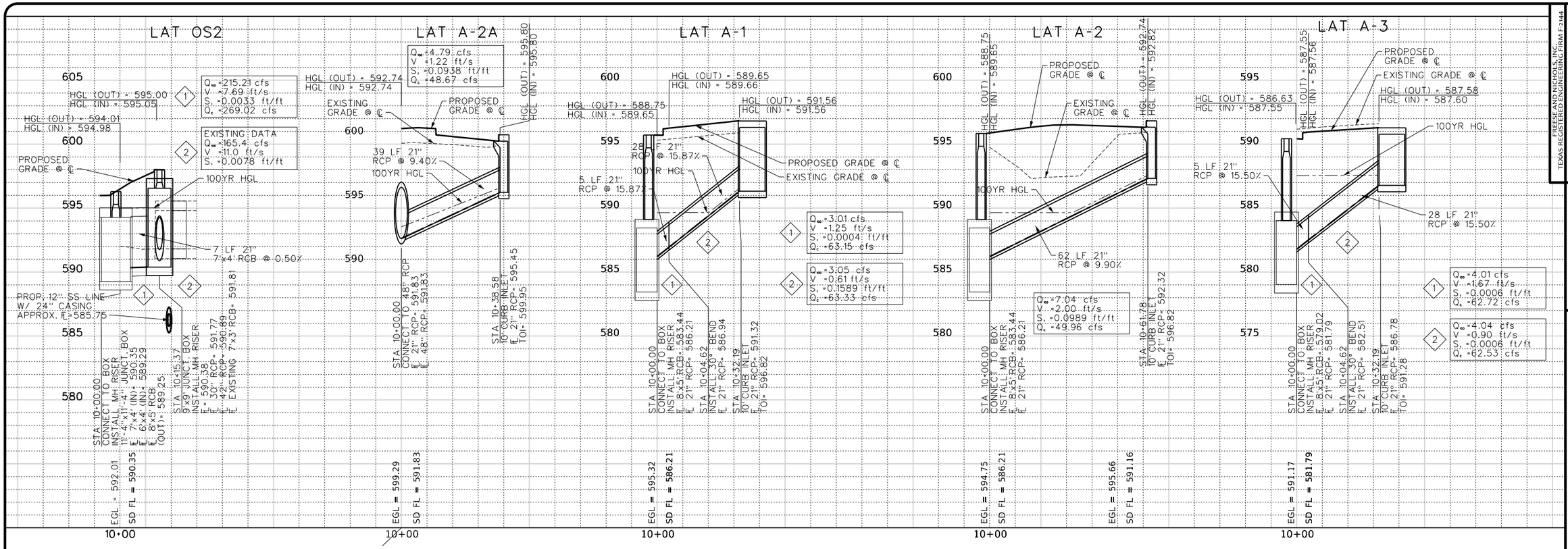
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

MicroStation V8 User: 90262 Office: On Site
Plotter: \\JP\Drawings\Drainage\cv-trt-pp-sdB1-1.sht
Plot Scale: 40.008 '/ In.
Plot Date: Feb. 21, 2024 - 12:54:24 PM
Model: Default
Project: Freese and Nichols, Inc. - True Type Fonts
Office: On Site
Date: Feb. 21, 2024 - 12:54:24 PM
User: 90262 File: N:\IF\Drawings\Drainage\cv-trt-pp-sdB1-1.sht



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FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2250
Web: www.freese.com

CITY OF ROCKWALL, TEXAS

EDC PHASE V INFRASTRUCTURE

CIVIL

STORM DRAIN LATERAL PROFILES
LATERAL LINES A-1 TO A-6

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW1971
DATE NOV 2020
DESIGNED MW
DRAWN ZLG
REVISED
CHECKED MRA
FILE NAME cv-trt-pr-lat01.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

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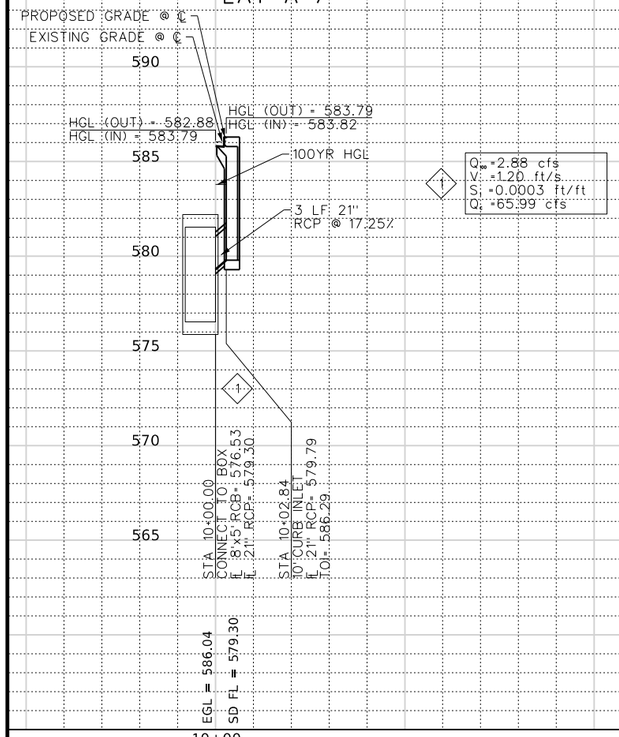
RECORD DRAWINGS PREPARED ON: 8/20/2024

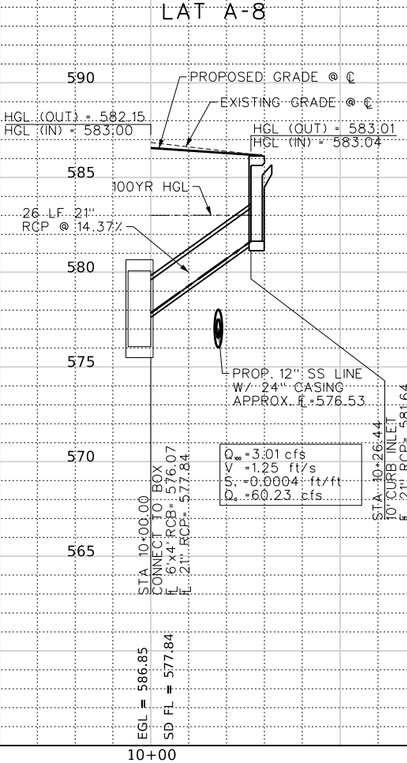
SHEET LAT-1

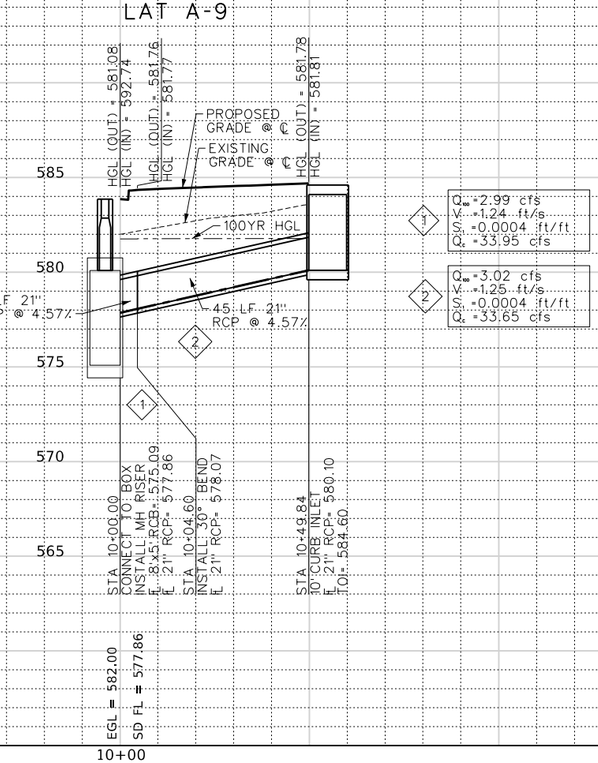
SEQ. 181

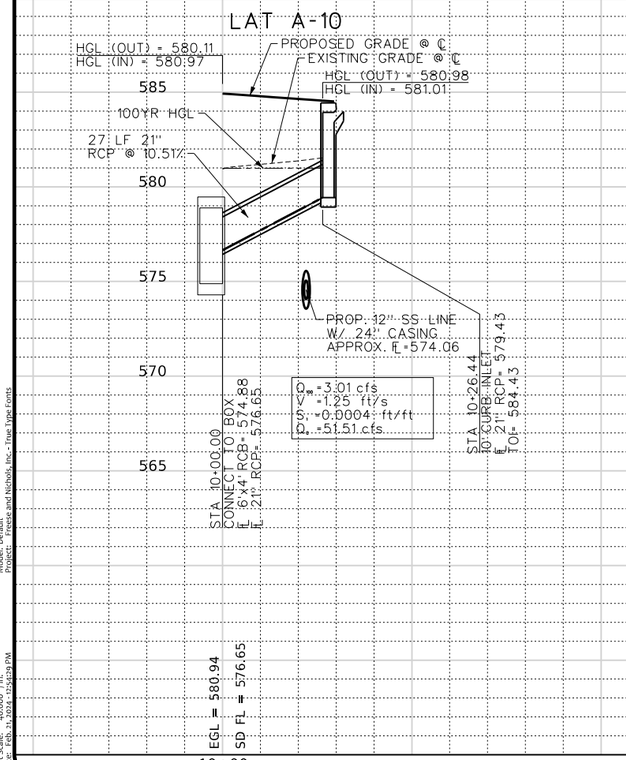
MicroStation V8 User: 90262 Office: On Site
Plotter: N:\IF\Drawings\Drainage\cv-trt-pr-lat01.sht
Plot Scale: 40.0067 ' In.
Date: Feb. 3, 2024 - 12:54:27 PM
Model: Default
Plotted: Freese and Nichols, Inc. - Trial Type Fonts

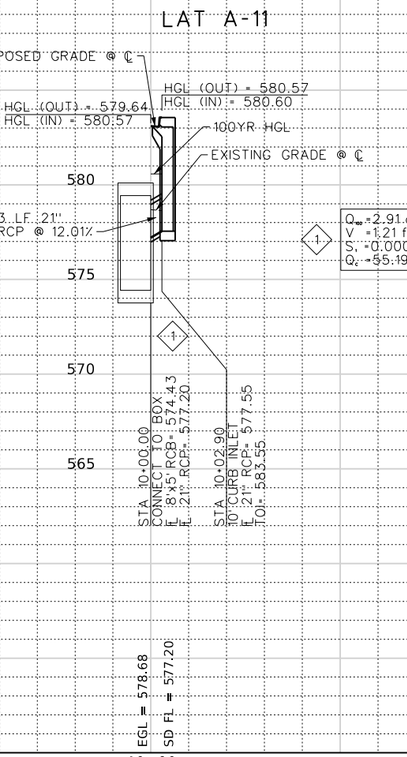
Office: On Site Date: Feb. 21, 2024 - 12:54:27 PM User: 90262 File: N:\IF\Drawings\Drainage\cv-trt-pr-lat01.sht

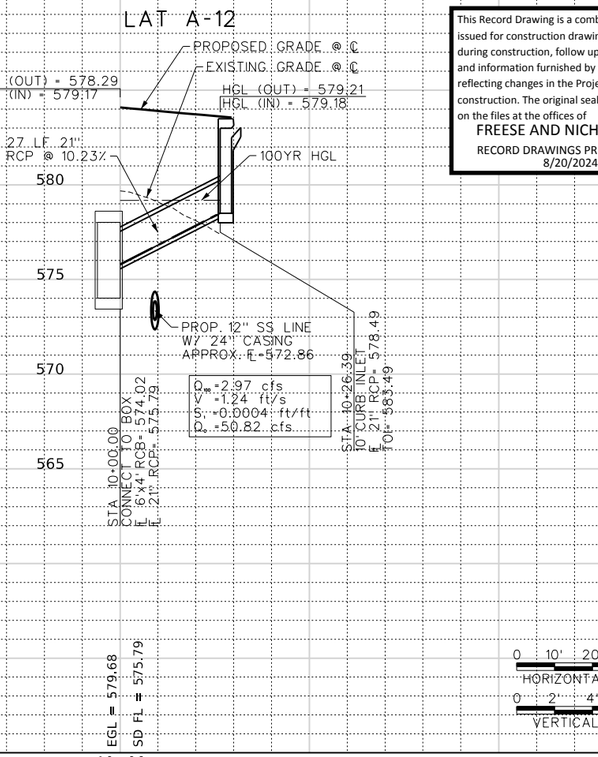












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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

0 10' 20' 40'
HORIZONTAL SCALE
0 2" 4" 8"
VERTICAL SCALE

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TEXAS NO. 134095 ON 10/21/2021
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FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2299
Web - www.freese.com

CITY OF ROCKWALL, TEXAS
EDC PHASE V INFRASTRUCTURE
CIVIL
STORM DRAIN LATERAL PROFILES
LATERAL LINES A-7 TO A-12

NO.	ISSUES	BY	DATE

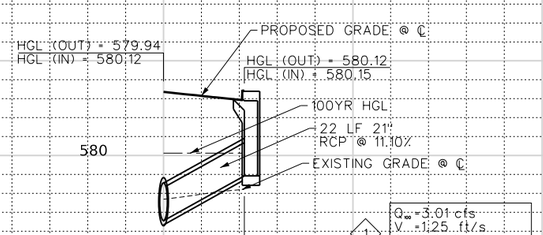
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

FRN JOB NO.	RKW19711
DATE	NOV 2020
DESIGNED	MW
DRAWN	ZLG
REVISED	
CHECKED	MRA
FILE NAME	cv-trt-pr-lat02.sht

SHEET
LAT-2
SEQ.
182

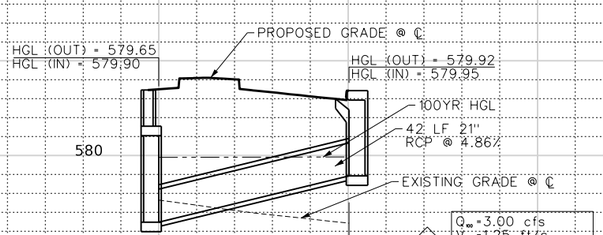
MicroStation V8 User: 90262 Office: On Site
Plotter: \\jfl\Drawings\Drainage\cv-trt-pr-lat02.sht Model: Default
Plot Scale: 40.0067 'in. Project: Precise and Nichols, Inc. - True Type Fonts
Plot Date: Feb. 21, 2024 - 12:54:29 PM

LAT A-13



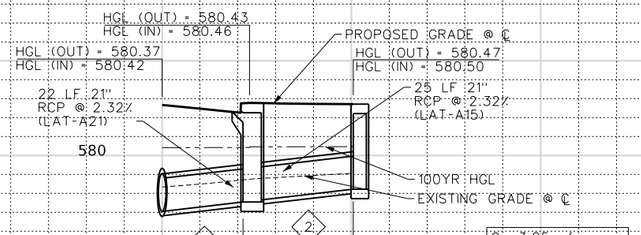
Q_{∞} = 3.01 cfs
V_{∞} = 1.25 ft/s
S_{∞} = 0.0004 ft/ft
Q_c = 52.92 cfs

LAT A-14



Q_{∞} = 3.00 cfs
V_{∞} = 1.25 ft/s
S_{∞} = 0.0004 ft/ft
Q_c = 35.02 cfs

LAT A-15/A21



1: Q_{∞} = 3.85 cfs, V_{∞} = 1.60 ft/s, S_{∞} = 0.0006 ft/ft, Q_c = 24.30 cfs

2: Q_{∞} = 2.69 cfs, V_{∞} = 1.12 ft/s, S_{∞} = 0.0003 ft/ft, Q_c = 24.10 cfs

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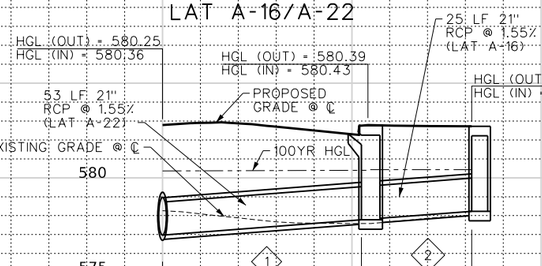
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

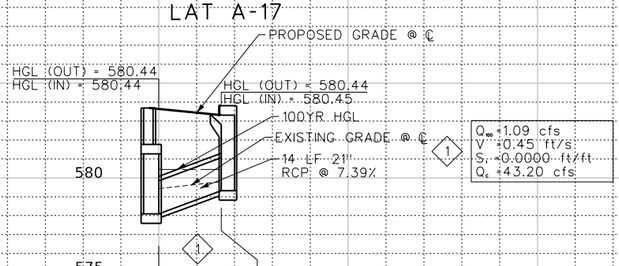
LAT A-16/A-22



1: Q_{∞} = 3.85 cfs, V_{∞} = 1.60 ft/s, S_{∞} = 0.0006 ft/ft, Q_c = 19.77 cfs

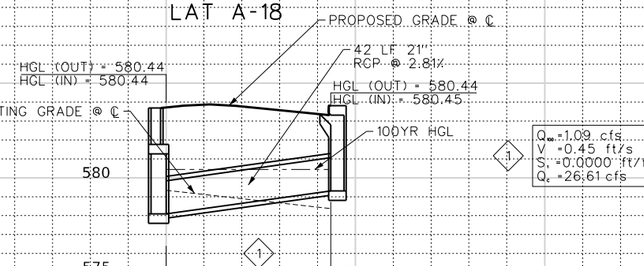
2: Q_{∞} = 2.69 cfs, V_{∞} = 1.12 ft/s, S_{∞} = 0.0003 ft/ft, Q_c = 19.44 cfs

LAT A-17



Q_{∞} = 1.09 cfs
V_{∞} = 0.45 ft/s
S_{∞} = 0.0000 ft/ft
Q_c = 43.20 cfs

LAT A-18



Q_{∞} = 1.09 cfs
V_{∞} = 0.45 ft/s
S_{∞} = 0.0000 ft/ft
Q_c = 26.61 cfs

0 10' 20' 40'
HORIZONTAL SCALE
0 2" 4" 8"
VERTICAL SCALE

THIS SEAL THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO. 134095 ON 10/21/2021
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FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2299
Web - www.freese.com

CITY OF ROCKWALL, TEXAS

EDC PHASE V INFRASTRUCTURE

CIVIL

STORM DRAIN LATERAL PROFILES LATERAL LINES A-13 TO A-18

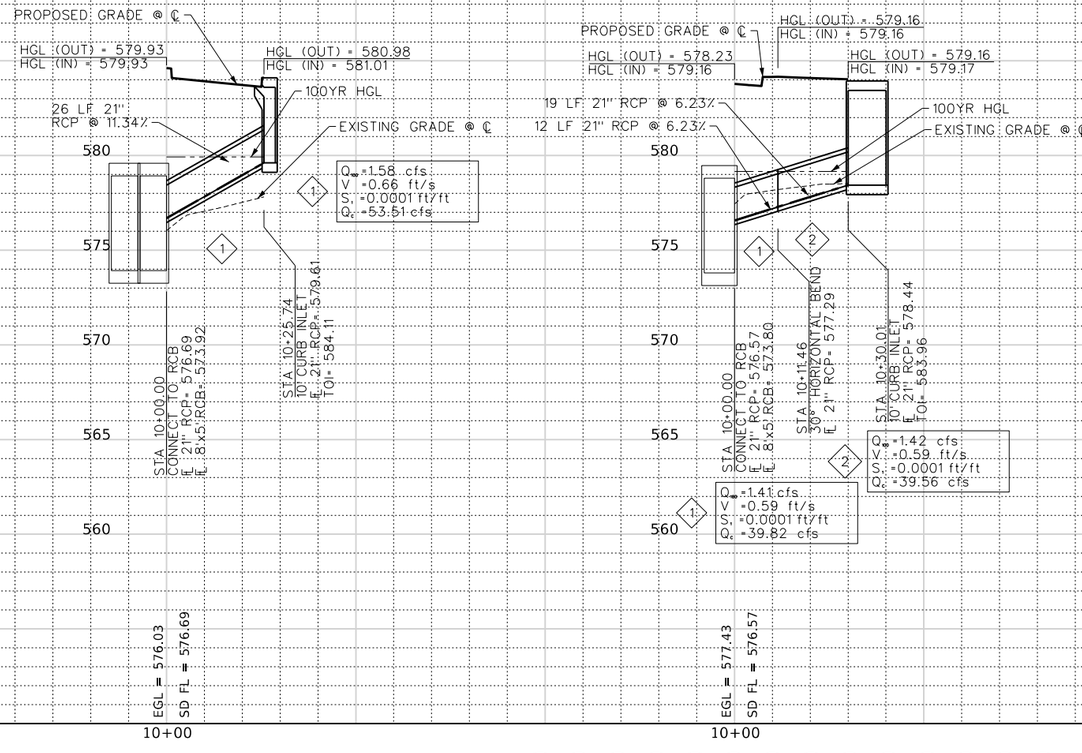
NO.	ISSUES	BY	DATE

FRN JOB NO.	RKW19711
DATE	NOV 2020
DESIGNED	MW
DRAWN	ZLG
REVISED	
CHECKED	MRA
FILE NAME	cv-trt-pr-lato3.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET
LAT-3
SEQ.
183

MicroStation V8 User: 90262 Office: On Site
Platter: J:\Rockwall\Drainage\cv-trt-pr-lato3.sht
Plot Scale: 40.0087 'in.
Plot Date: Feb. 3, 2024 - 12:53:31 PM
Model: Default
Project: Freese and Nichols, Inc. - True Type Fonts
Office: On Site Date: Feb. 21, 2024 - 12:54:31 PM User: 90262 File: N:\JF\Drawings\Drainage\cv-trt-pr-lato3.sht



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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

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FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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CITY OF ROCKWALL, TEXAS

EDC PHASE V INFRASTRUCTURE

CIVIL

STORM DRAIN LATERAL PROFILES
LATERAL LINES A-19 TO B-5

NO.	ISSUES	BY	DATE
1	RFI-019	ZGF	10/4/2023

F&N JOB NO.	RKW19171
DATE	NOV 2020
DESIGNED	MW
DRAWN	ZLG
REVISED	
CHECKED	MRA
FILE NAME	cv-trt-pr-lat04.sht

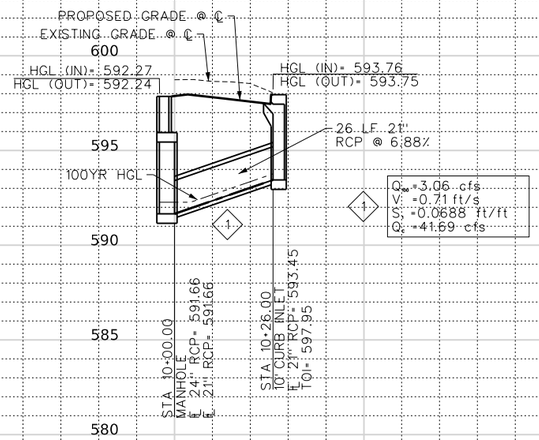
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET
LAT-4
SEQ.
184

MicroStation V8 User: 90262 Office: On Site
Platter: N:\lf\Drawings\Drainage\cv-trt-pr-lat04.sht
Plot Scale: 40.0067 ' / in.
Plot Date: Feb. 21, 2024 - 12:54:33 PM
Model: Default
Project: Freese and Nichols, Inc. - True Type Fonts

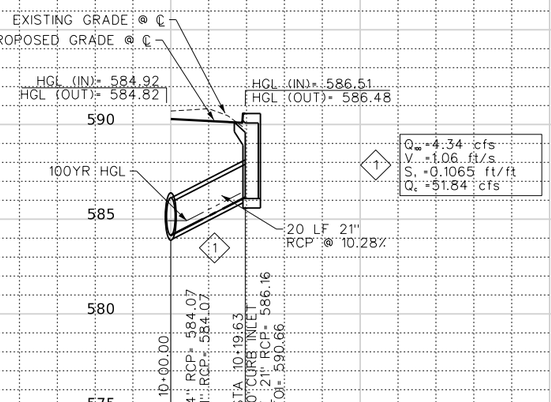
Office: On Site Date: Feb. 21, 2024 - 12:54:33 PM User: 90262 File: N:\lf\Drawings\Drainage\cv-trt-pr-lat04.sht

LAT B-2



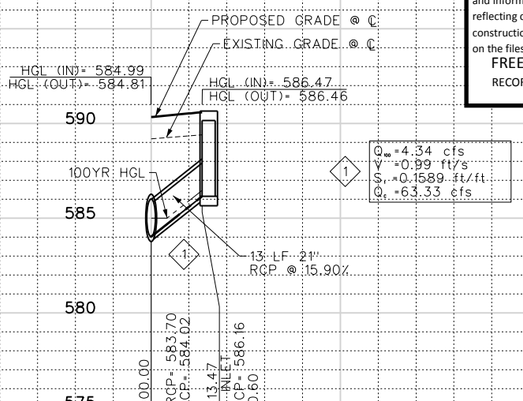
1 Q_∞ = 3.06 cfs
V = 0.71 ft/s
S_f = 0.0688 ft/ft
Q_c = 41.69 cfs

LAT B-3



1 Q_∞ = 4.34 cfs
V = 1.06 ft/s
S_f = 0.1065 ft/ft
Q_c = 51.84 cfs

LAT B-4



1 Q_∞ = 4.34 cfs
V = 0.99 ft/s
S_f = 0.1589 ft/ft
Q_c = 63.33 cfs

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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TEXAS NO. 134095 ON 10/31/2021
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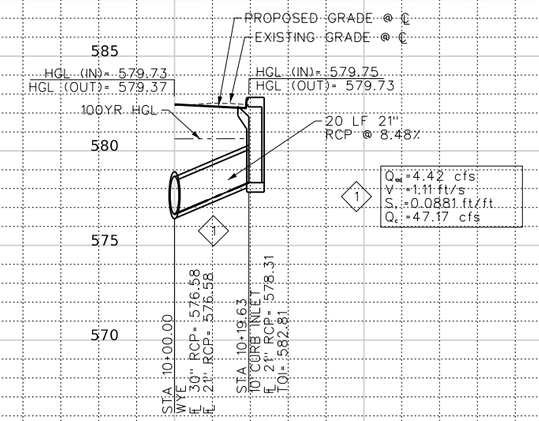
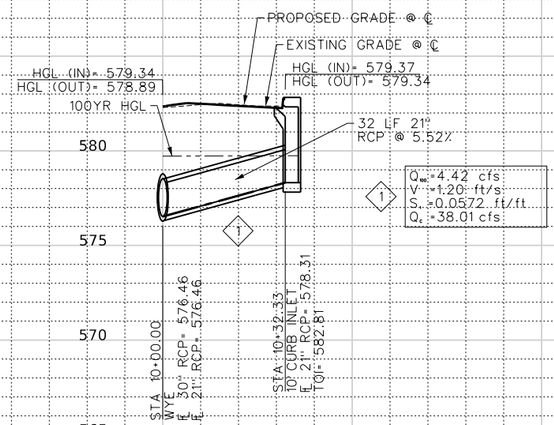
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2299
Web - www.freese.com

LAT B-5



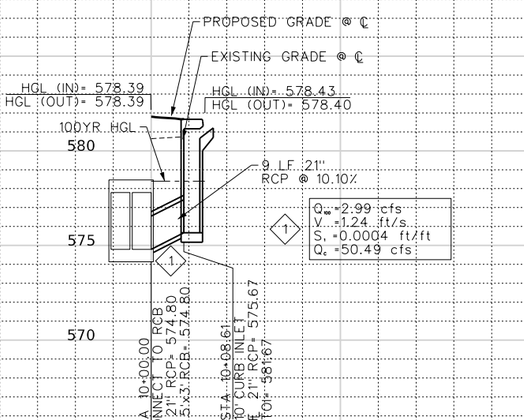
1 Q_∞ = 4.42 cfs
V = 1.11 ft/s
S_f = 0.0881 ft/ft
Q_c = 47.17 cfs

LAT B-6



1 Q_∞ = 4.42 cfs
V = 1.20 ft/s
S_f = 0.0572 ft/ft
Q_c = 38.01 cfs

LAT B-7



1 Q_∞ = 2.99 cfs
V = 1.24 ft/s
S_f = 0.0004 ft/ft
Q_c = 50.49 cfs

CITY OF ROCKWALL, TEXAS

EDC PHASE V INFRASTRUCTURE

CIVIL

STORM DRAIN LATERAL PROFILES
LATERAL LINES B-6 TO B-11

F&N JOB NO. RKW19711
DATE NOV 2020
DESIGNED MW
DRAWN ZLG
REVISED
CHECKED MRA
FILE NAME cv-trt-pr-lat05.sht

NO.	ISSUES	BY	DATE

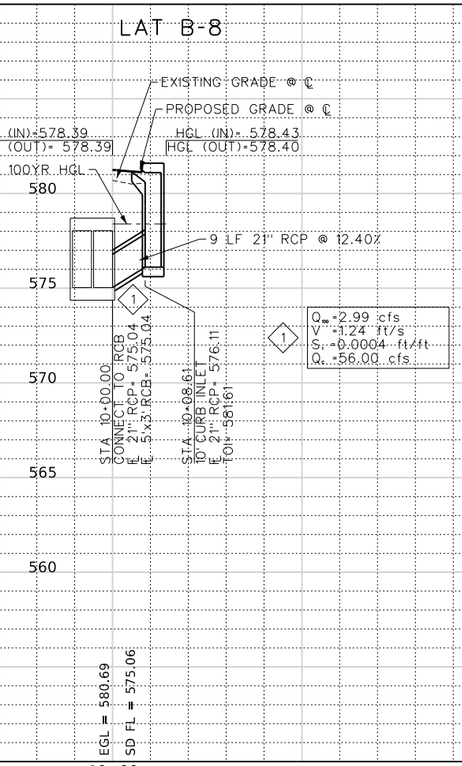
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

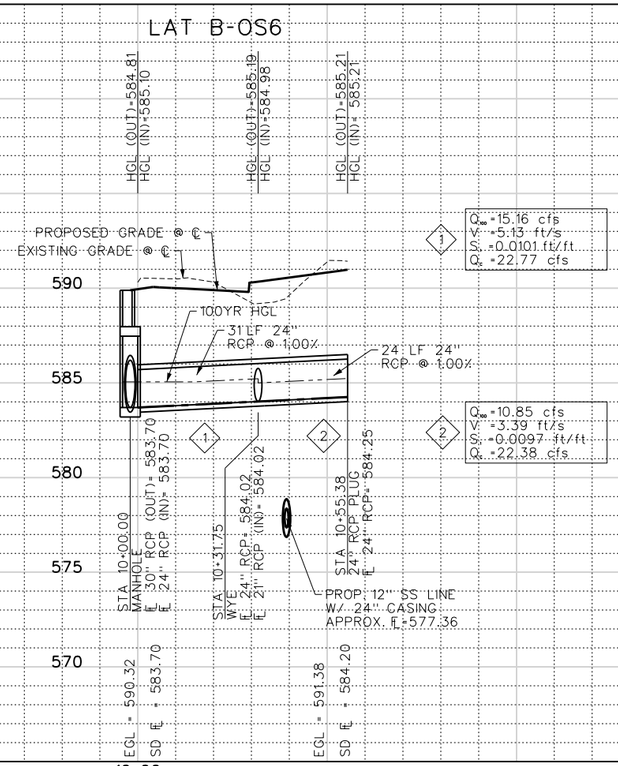
0 10' 20' 40'
HORIZONTAL SCALE
0 2" 4" 8"
VERTICAL SCALE

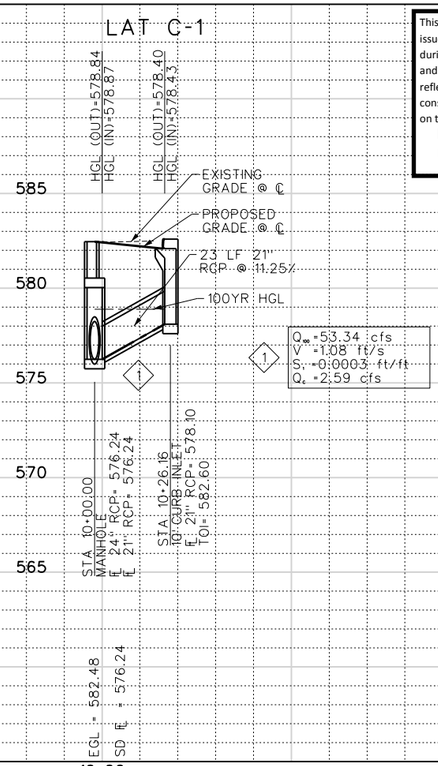
SHEET
LAT-5

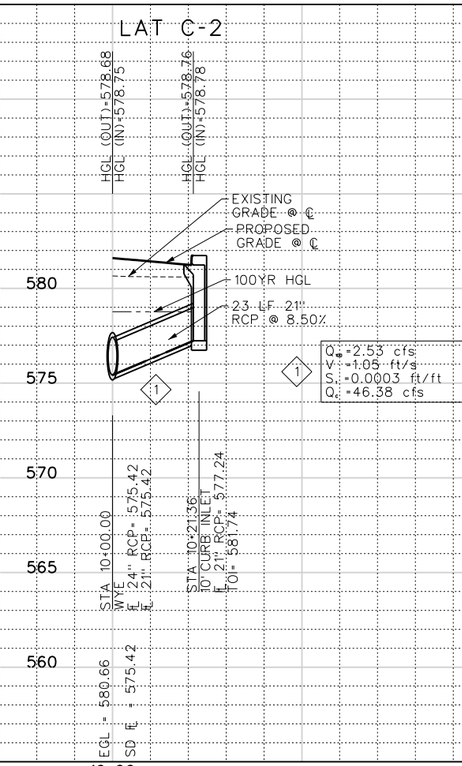
SEQ.
185

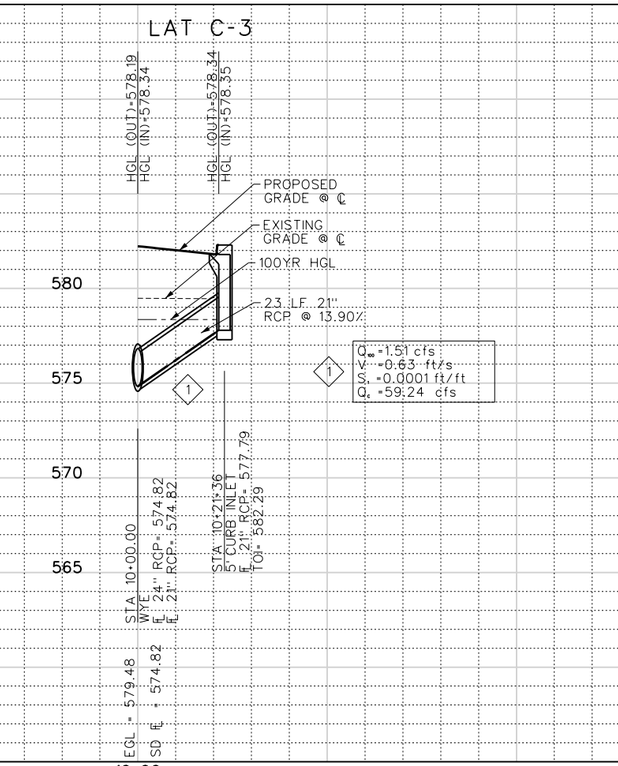
MicroStation V8 User: 90262 Office: On Site
Platter: I:\IF\Drawings\Drainage\cv-trt-pr-lat05.sht
Model: Default
Plot Scale: 40.0067 ' / in.
Date: Feb. 21, 2024 - 12:54:34 PM
Project: Freese and Nichols, Inc. - True Type Fonts

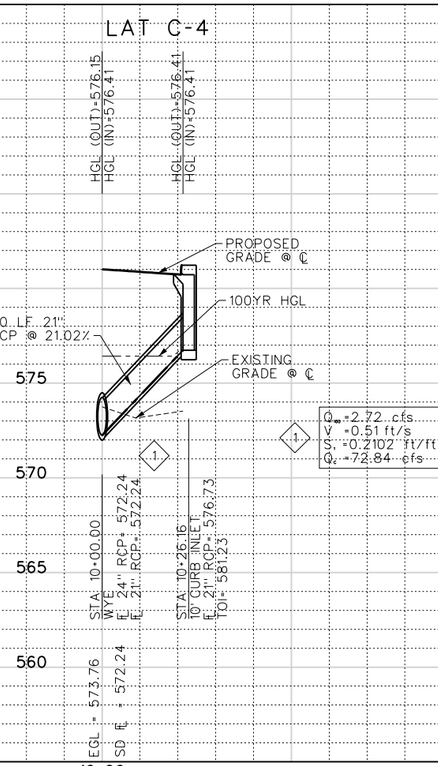












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FREESE AND NICHOLS, INC.

RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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TEXAS NO. 134095 ON 10/31/2021
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FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2299
Web - www.freese.com

CITY OF ROCKWALL, TEXAS

EDC PHASE V INFRASTRUCTURE

CIVIL

STORM DRAIN LATERAL PROFILES
LATERAL LINES B-12 TO C-4

NO.	ISSUES	BY	DATE

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

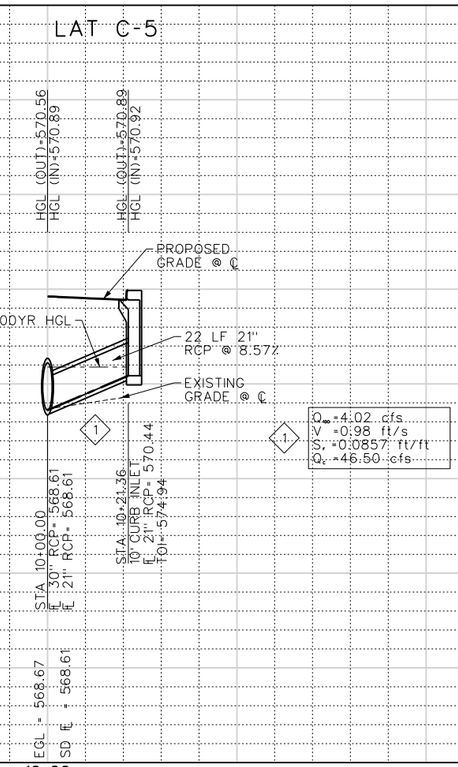
F&N JOB NO.	RKW19711
DATE	NOV 2020
DESIGNED	MW
DRAWN	ZLG
REVISED	
CHECKED	MRA
FILE NAME	cv-trt-pr-lat06.sht

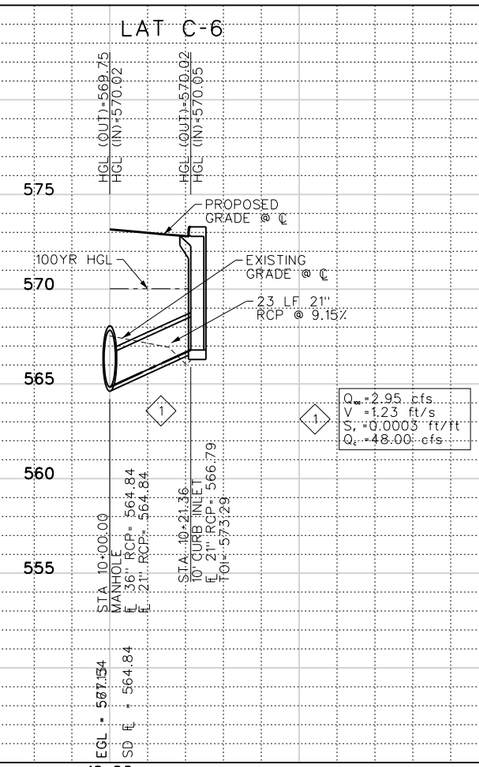
SHEET
LAT-6

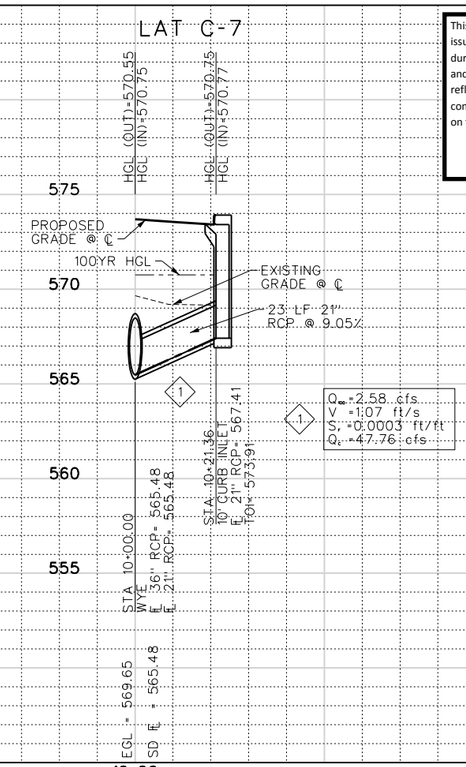
SEQ.
186

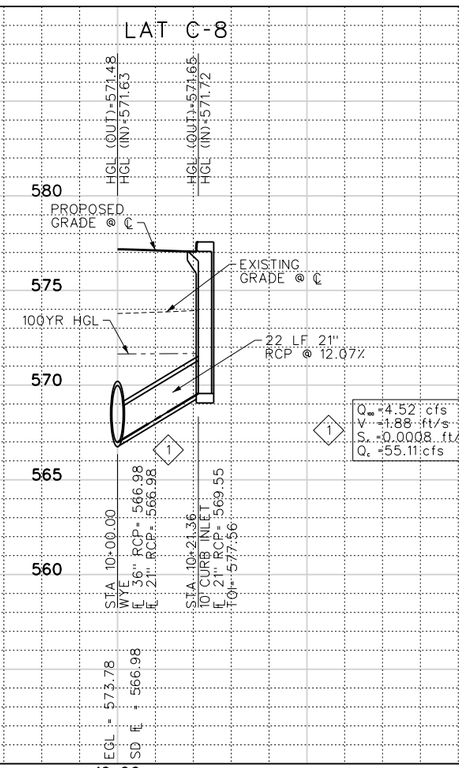
MicroStation V8 User: 90262 Office: On Site
Platter: J:\Work\Projects\RKW19711 - EDC Phase V\Drawings\Drainage\cv-trt-pr-lat06.sht
Plot Scale: 40.0087 'in.
Date: Feb. 3, 2024 - 12:53:57 PM
Model: Default
Levels: Freese and Nichols, Inc. - True Type Fonts

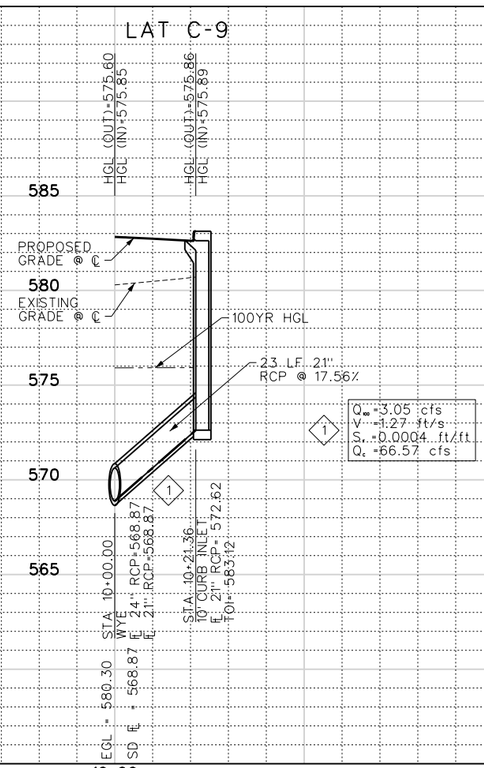
Office: On Site Date: Feb. 21, 2024 - 12:54:35 PM User: 90262 File: N:\JF\Drawings\Drainage\cv-trt-pr-lat06.sht

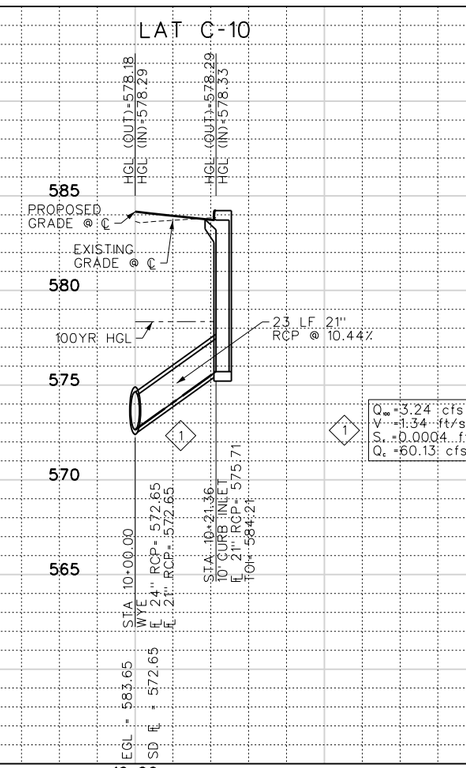












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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

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TEXAS NO.: 134095 ON: 10/31/2021
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FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2250
Web - www.freese.com

CITY OF ROCKWALL, TEXAS

EDC PHASE V INFRASTRUCTURE

CIVIL

STORM DRAIN LATERAL PROFILES
LATERALS C-5 TO C-10

NO.	ISSUES	BY	DATE

FB/N JOB NO. RKW1971T
DATE NOV 2020
DESIGNED MW
DRAWN ZLG
REVISED
CHECKED MRA
FILE NAME cv-trt-pr-lat07.sht

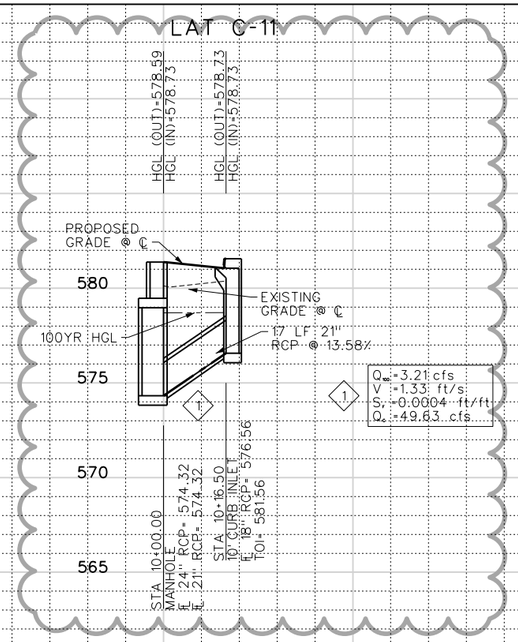
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

0 10' 20' 40'
HORIZONTAL SCALE
0 2" 4" 8"
VERTICAL SCALE

SHEET
LAT-7
SEQ.
187

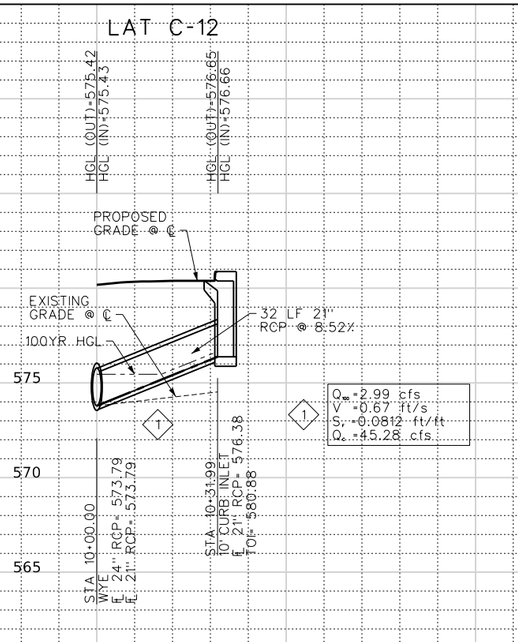
MicroStation V8 User: 90262 Office: On Site
Platter: N:\lf\Drawings\Drainage\cv-trt-pr-lat07.sht
Plot Scale: 40.0067 ' / in.
Date: Feb. 21, 2024 - 12:54:37 PM
Model: Default
Project: Freese and Nichols, Inc. - True Type Fonts

LAT C-11



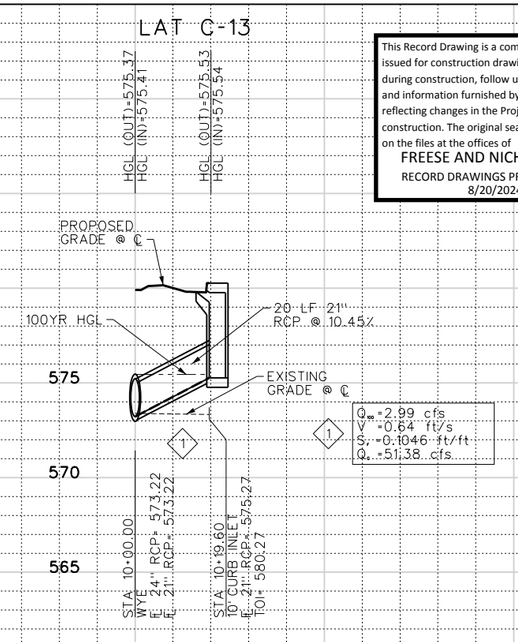
1 Q_{∞}=3.21 cfs
V =1.33 ft/s
S$_o$=0.0004 ft/ft
Q_o=49.63 cfs

LAT C-12



1 Q_{∞}=2.99 cfs
V =0.67 ft/s
S$_o$=0.0812 ft/ft
Q_o=45.28 cfs

LAT C-13



1 Q_{∞}=2.99 cfs
V =0.64 ft/s
S$_o$=0.1046 ft/ft
Q_o=51.38 cfs

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

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TEXAS NO. 69798 ON 10/21/2021
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TEXAS NO. 69798 ON 7/21/2023
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FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2299
Web - www.freese.com

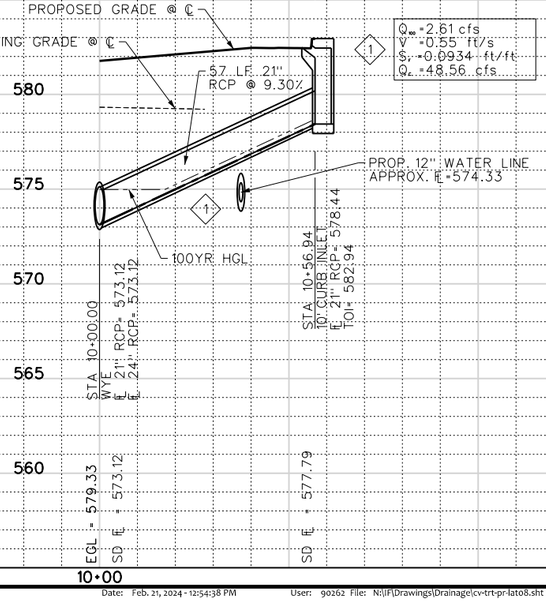
CITY OF ROCKWALL, TEXAS

EDC PHASE V INFRASTRUCTURE

CIVIL

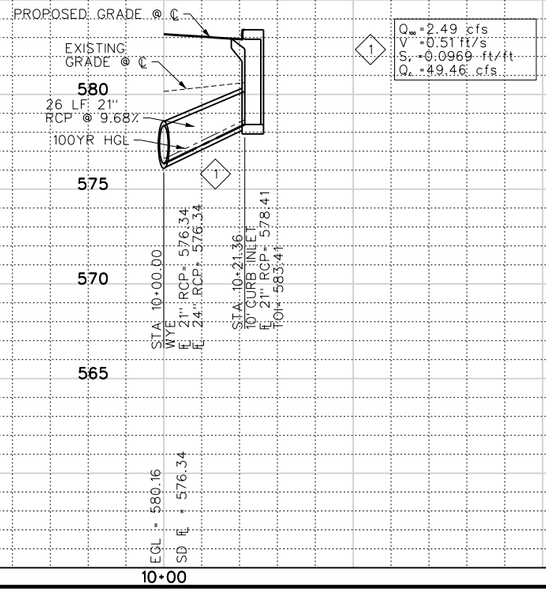
STORM DRAIN LATERAL PROFILES
LATERAL LINES C-11 TO C-14

LAT C-14



1 Q_{∞}=2.61 cfs
V =0.55 ft/s
S$_o$=0.0934 ft/ft
Q_o=48.56 cfs

LAT C-15



1 Q_{∞}=2.49 cfs
V =0.51 ft/s
S$_o$=0.0969 ft/ft
Q_o=49.46 cfs

0 10' 20' 40'
HORIZONTAL SCALE
0 2" 4" 8"
VERTICAL SCALE

NO.	ISSUES	BY	DATE
1	REVISE SD-C2 AND LATERALS	ZF	07/21/23

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

F&N JOB NO. RKW1971T
DATE NOV 2020
DESIGNED MW
DRAWN ZLG
REVISED
CHECKED MRA
FILE NAME cv-trt-pr-lat08.sht

SHEET
LAT-8
SEQ.
188

MicroStation V8 User: 90262 Office: On Site
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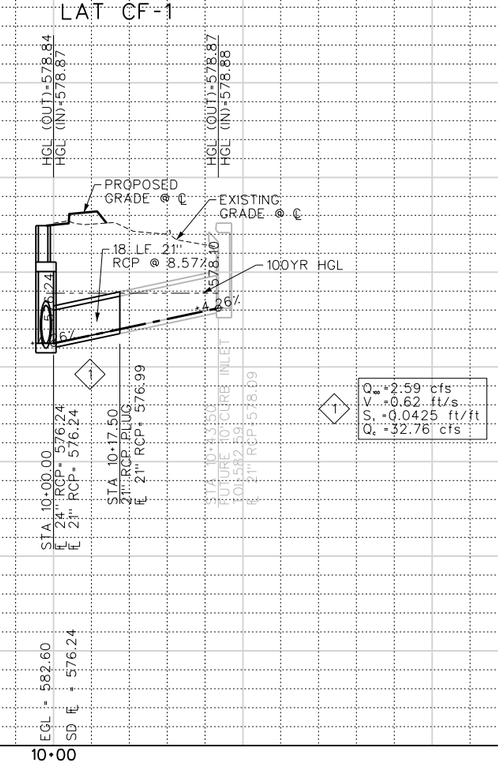
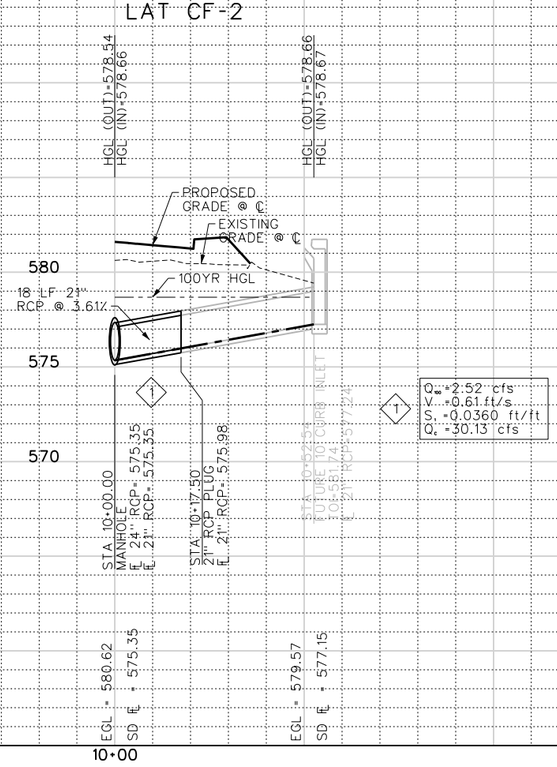
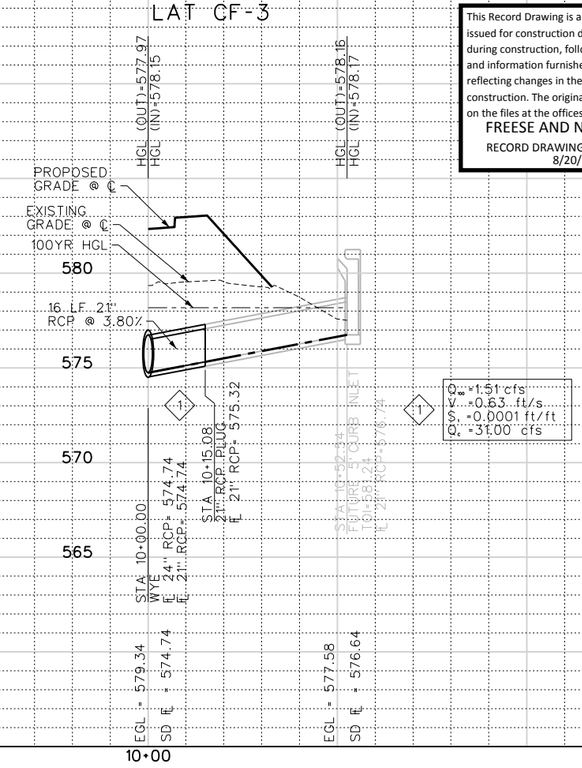
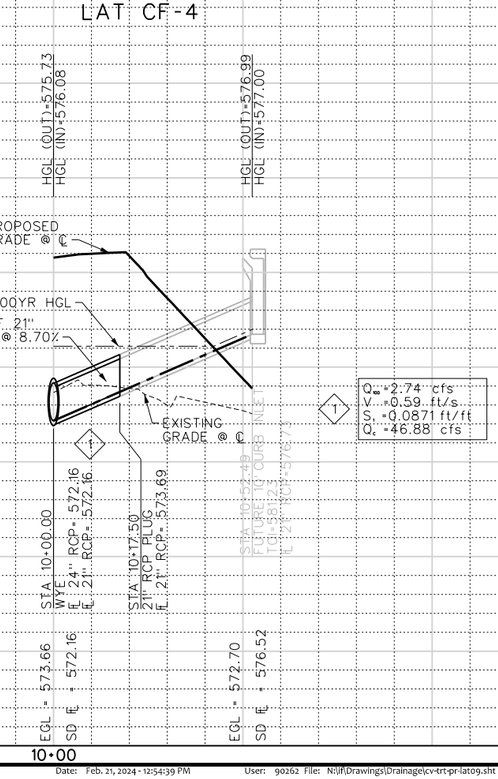
Plot Scale: 40.0087 'in.
Date: Feb. 21, 2024 - 12:54:38 PM
Model: Default
Project: Freese and Nichols, Inc. - True Type Fonts

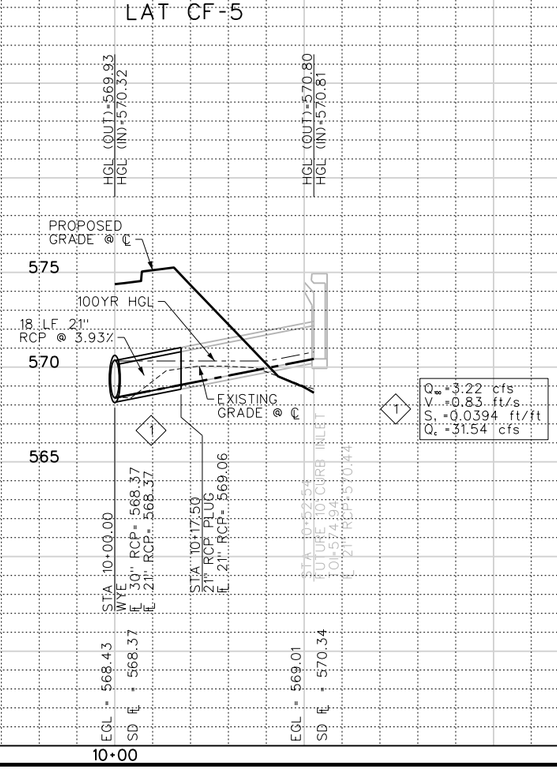
Office: On Site Date: Feb. 21, 2024 - 12:54:38 PM User: 90262 File: N:\lf\Drawings\Drainage\cv-trt-pr-lat08.sht

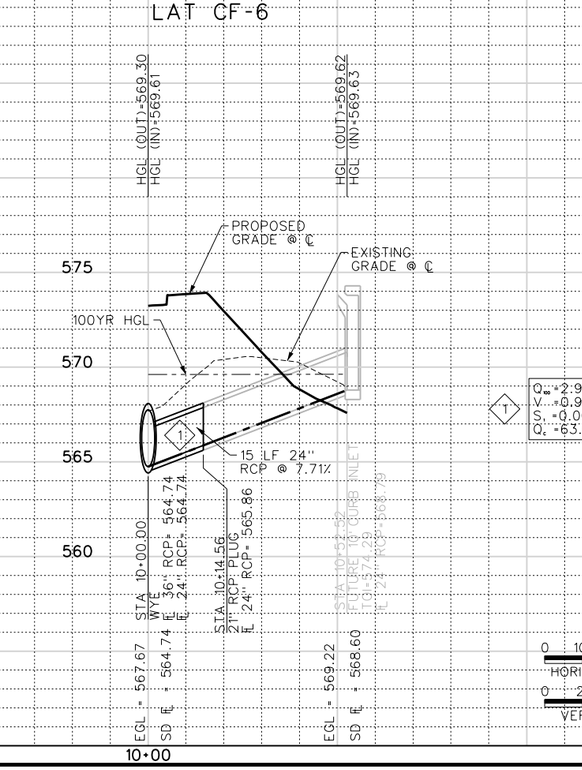












This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of

FREESE AND NICHOLS, INC.

RECORD DRAWINGS PREPARED ON: 8/20/2024

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Web - www.freese.com

CITY OF ROCKWALL, TEXAS

EDC PHASE V INFRASTRUCTURE

CIVIL

STORM DRAIN LATERAL PROFILES LATERAL LINES CF- TO CF-6

NO.	ISSUES	BY	DATE

F&N JOB NO.	RKW19711
DATE	NOV 2020
DESIGNED	MW
DRAWN	ZLG
REVISED	
CHECKED	MRA
FILE NAME	cv-trt-pr-lat09.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

0 10' 20' 40'
HORIZONTAL SCALE
0 2' 4' 8'
VERTICAL SCALE

SHEET LAT-9

SEQ. 189

MicroStation V8 User: 90262 Office: On Site
Plotter: N:\lf\Drawings\Drainage\cv-trt-pr-lat09.sht Model: Default
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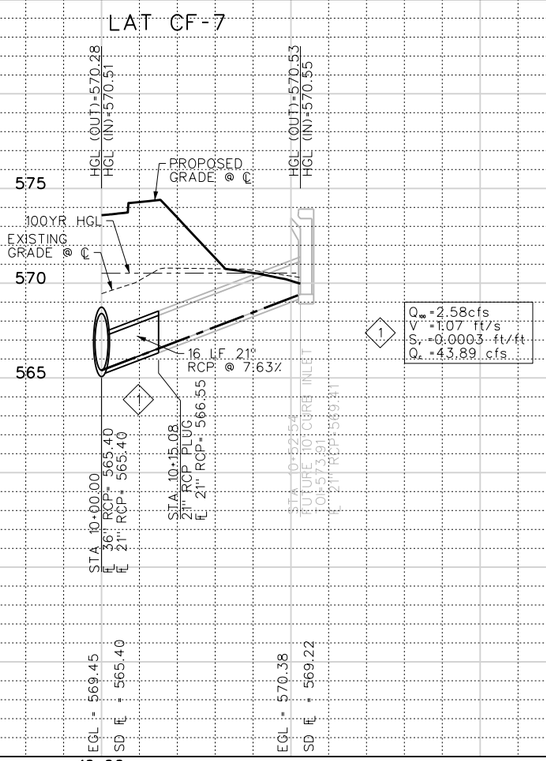
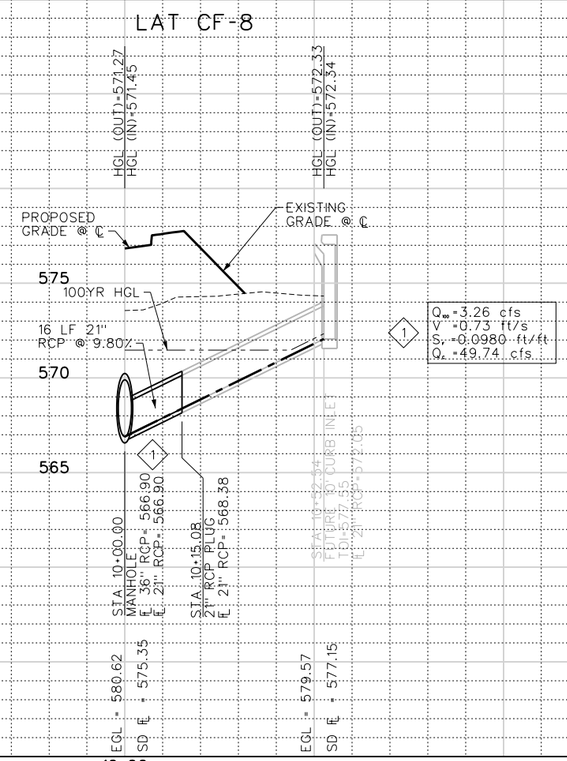
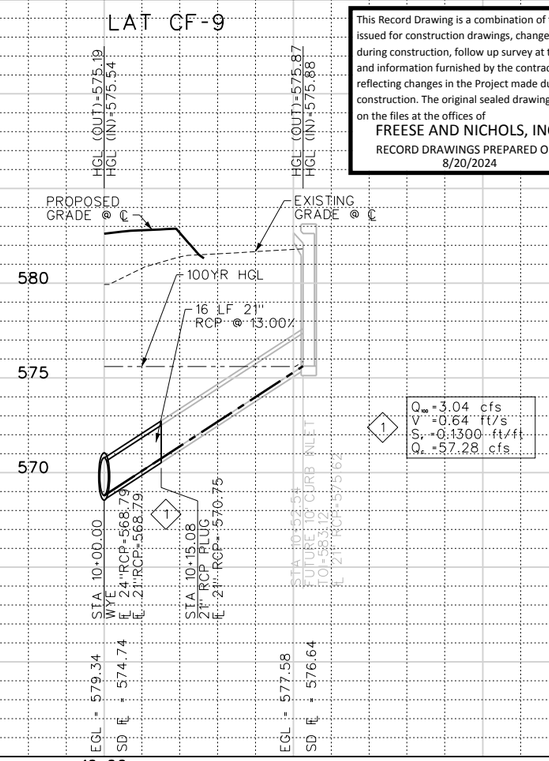
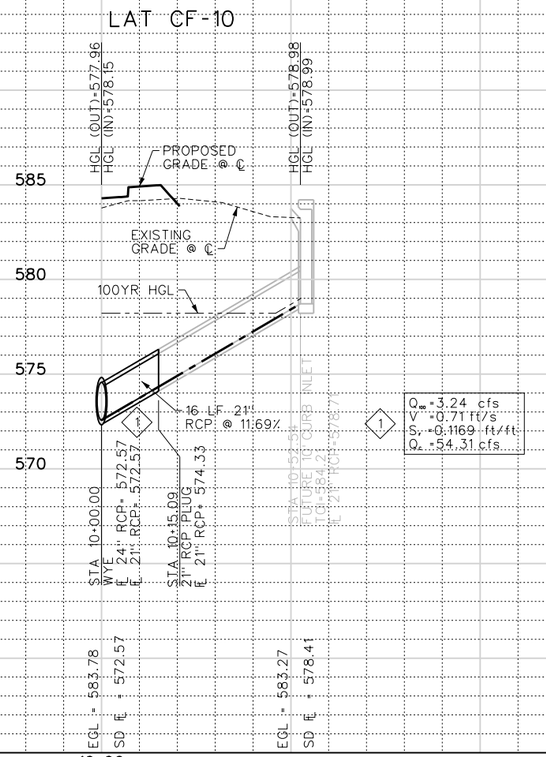
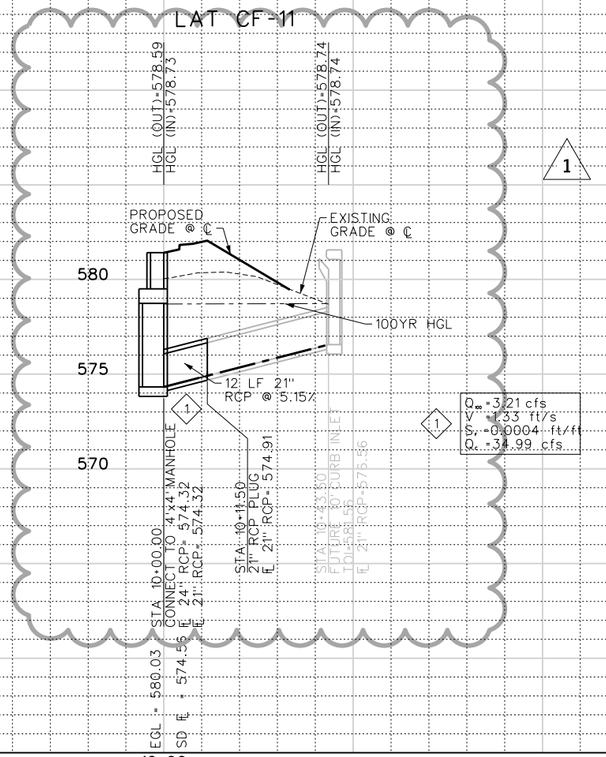
Date: Feb. 21, 2024 - 12:54:39 PM











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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

THE SEAL THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS REMOVED ON 8/20/2024 BY MARK R. ADAMS
TEXAS NO. 134095 ON 10/21/2021
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TEXAS NO. 69798 ON 7/21/2023
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FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2299
Web: www.freese.com

CITY OF ROCKWALL, TEXAS

EDC PHASE V INFRASTRUCTURE

CIVIL

STORM DRAIN LATERAL PROFILES LATERAL LINES C-7 TO C-11

NO.	ISSUES	BY	DATE
1	REVISE SD-C2 AND LATERALS	ZF	07/21/23

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

0 10' 20' 40'
HORIZONTAL SCALE
0 2" 4" 8"
VERTICAL SCALE

F&N JOB NO. RKW19711
DATE NOV 2020
DESIGNED MW
DRAWN ZLG
CHECKED MRA
FILE NAME cv-trt-pr-lat10.sht

SHEET LAT-10
SEQ. 190

MicroStation V8 User: 90262 Office: On Site
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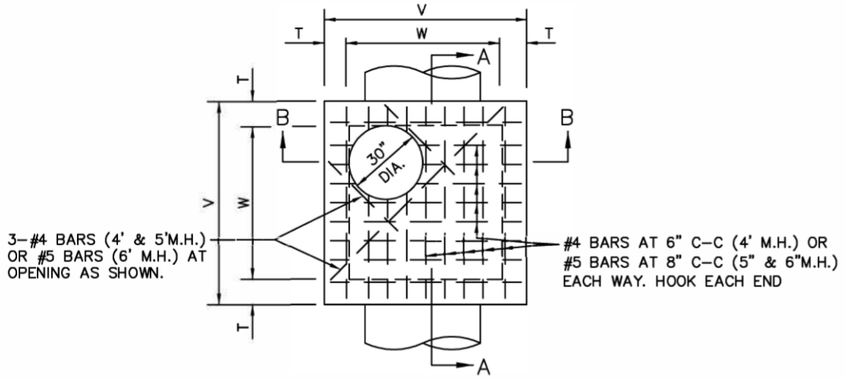
Date: Feb. 21, 2024 - 12:54:41 PM

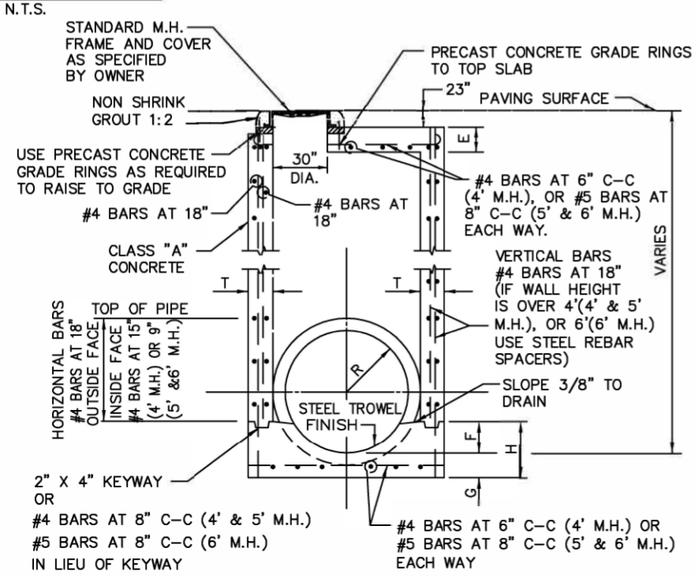


PLAN
N.T.S.

M.H. SIZE(W)	V	T	E	F	G	H
4'	5'–4"	8"	6"	9"	6"	1'–3"
5'	6'–4"	8"	6"	12"	8"	1'–8"
6'	7'–6"	9"	9"	16"	10"	2'–2"

TABLE OF DIMENSIONS
N.T.S.

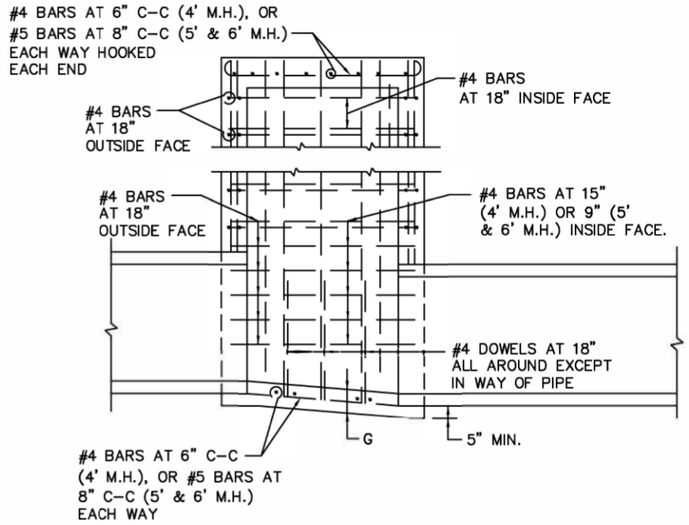
ALL CONCRETE STRUCTURES SHALL BE CLASS F (4200psi, MIN. 7.0 SACK CEMENT). NO FLY ASH IS ALLOWED IN CONCRETE STRUCTURES.



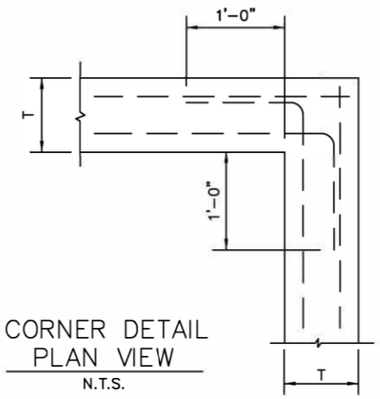
SECTION B–B
N.T.S.

STORM WATER MANHOLE	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 502.1.4.1*	
4', 5', OR 6' SQUARE		DATE Mar. 2018	STANDARD DRAWING NO. R-6010A

*Section II Standard Drawings as of October 2004. Reference number only has been updated for Fifth Edition Specifications. *Public Works Construction Standards North Central Texas, Fifth Edition.*



SECTION A–A
N.T.S.



CORNER DETAIL
PLAN VIEW
N.T.S.

NOTES:

1. SLOPE INVERT OF MANHOLE AS INDICATED ON PLAN–PROFILE SHEET.
2. LAYERS OF REINFORCING STEEL NEAREST THE INTERIOR AND EXTERIOR SURFACE SHALL HAVE A COVER OF 2" TO THE CENTER OF BARS, UNLESS OTHERWISE NOTED.
3. ALL CONCRETE STRUCTURES SHALL BE CLASS F (4200psi, MIN. 7.0 SACK CEMENT).
4. NO FLY ASH IS ALLOWED IN CONCRETE STRUCTURES.

STORM WATER MANHOLE	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 502.1.4.1*	
4', 5', OR 6' SQUARE		DATE Mar. 2018	STANDARD DRAWING NO. R-6010B

*Section II Standard Drawings as of October 2004. Reference number only has been updated for Fifth Edition Specifications. *Public Works Construction Standards North Central Texas, Fifth Edition.*

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
CIVIL
STORM DRAIN DETAILS

NO.	ISSUES	BY	DATE

FRN JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MW
DRAWN ZLG
REVISED
CHECKED MRA
FILE NAME Detail01.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale accordingly.
0 1"

SHEET SDDT-1
SEQ. 191

MicroStation V8 User: 90262 Office: On Site
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Project: Freese and Nichols, Inc. - True Type Fonts

Office: On Site Date: Feb. 21, 2024 - 12:54:42 PM User: 90262 File: N:\IF\Drawings\Drainage\Detail01.sht

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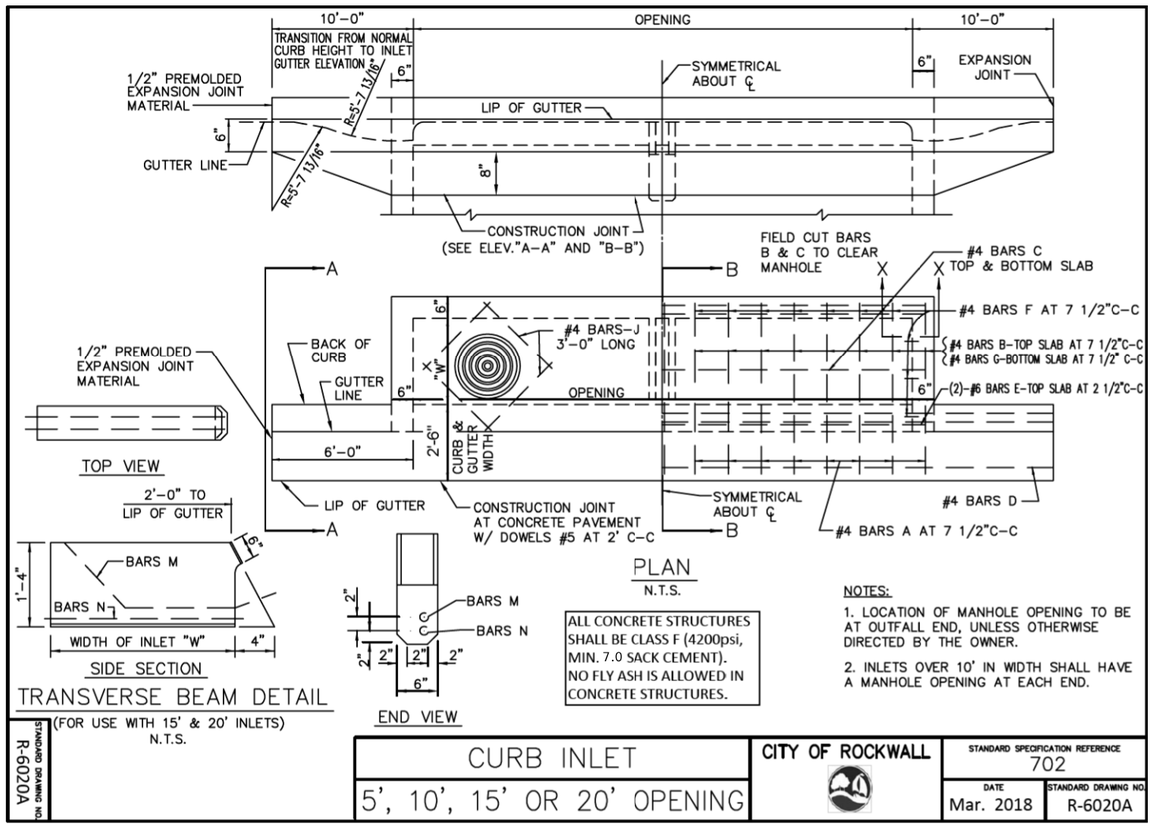
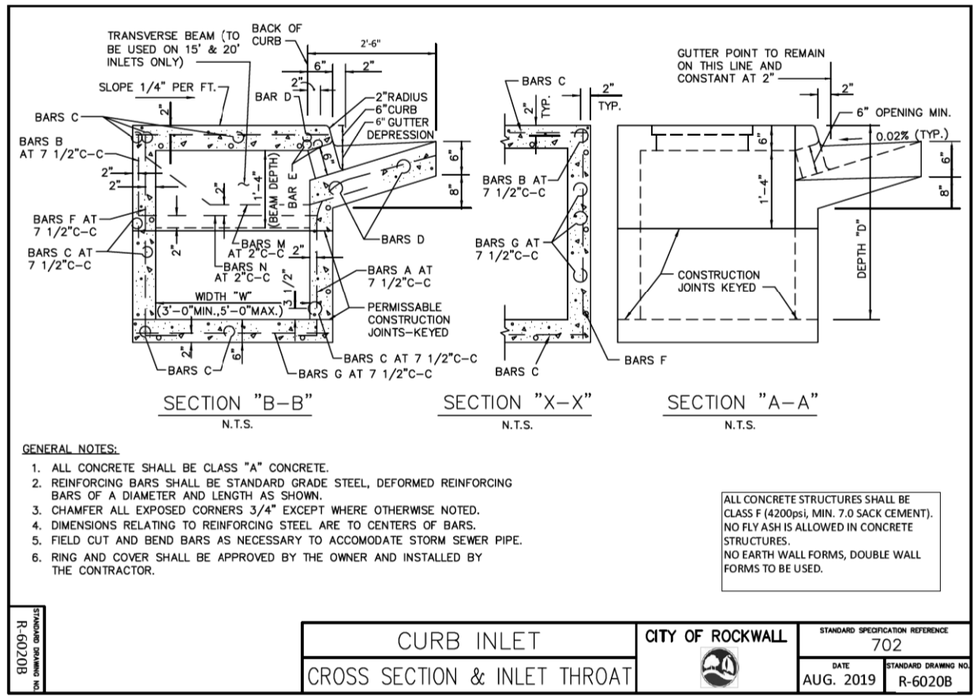
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024





TEXAS REGISTERED ENGINEERING FIRM F-2144
FREESE AND NICHOLS, INC.

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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
CIVIL
STORM DRAIN DETAILS

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MW
DRAWN ZLG
REVISED
CHECKED MRA
FILE NAME Detail02.sht

NO.	ISSUES	BY	DATE

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale
0 1"

SHEET SDDT-2
SEQ. 192

MicroStation V8 User: 90262 Office: On Site
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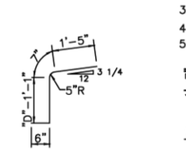
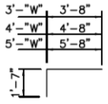
Projects: Freese and Nichols, Inc. - True Type Fonts



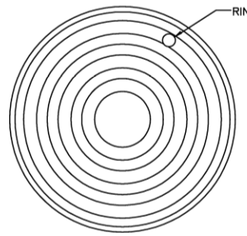
#4 BARS A
N.T.S.



#4 BARS B
N.T.S.

BARS C | LGTH.OPEN.+0'-8"
BARS D | LGTH.OPEN.+11'-8"

#4 BARS C & D
N.T.S.



"W"+0'-8"

#4 BARS G
N.T.S.

#4 BARS F
N.T.S.

LENGTH OF OPENING + 0'-8"

#4 BARS E
N.T.S.

ALL CONCRETE STRUCTURES SHALL BE CLASS F (4200psi, MIN. 7.0 SACK CEMENT). NO FLY ASH IS ALLOWED IN CONCRETE STRUCTURES. INLET LID TO BE LOCKING.

3'-0"

#4 BARS J
N.T.S.

#3 BARS M
N.T.S.

"W"+0'-8"

#5 BARS N
N.T.S.

CAST IRON
FRAME AND COVER
N.T.S

SEE STANDARD DRAWINGS 6020C

CURB INLET	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 702	
REBAR & M.H. FRAME & COVER		DATE Mar. 2018	STANDARD DRAWING NO. R-6020C

BILL OF REINFORCING STEEL

DEPTH "D"	ALL WIDTHS AND LENGTHS	OPENING LENGTH "L" = 5ft										OPENING LENGTH "L" = 10ft						OPENING LENGTH "L" = 15 ft								OPENING LENGTH "L" = 20 ft							
		Widths "W" 3ft			4ft		5ft					Widths "W" 3ft			4ft		5ft		Widths "W" 3ft			4ft		5ft				Widths "W" 3ft			4ft		5ft	
	BARS	BARS	BARS	BARS	BARS	BARS	BARS	BARS	BARS	BARS	BARS	BARS	BARS	BARS	BARS	BARS	BARS	BARS	BARS	BARS	BARS	BARS	BARS	BARS	BARS	BARS	BARS	BARS	BARS	BARS	BARS	BARS	BARS
	C	D	E	J	F	F	F	A	B	G	F	F	F	A	B	G	F	F	F	A	B	G	M	N	F	F	F	A	B	G	M	N
3'-6"	17	3	2	4	20	24	28	10	10	20	28	32	36	18	18	28	36	40	44	26	26	36	2	2	44	48	52	34	34	44	2	2
3'-9"	18	"	"	"	"	"	"	"	"	20	"	"	"	"	"	28	"	"	"	"	"	36	"	"	"	"	"	"	"	"	44	"	"
4'-0"	19	"	"	"	"	"	"	"	"	24	"	"	"	"	"	32	"	"	"	"	"	40	"	"	"	"	"	"	"	"	48	"	"
4'-3"	19	"	"	"	"	"	"	"	"	24	"	"	"	"	"	32	"	"	"	"	"	40	"	"	"	"	"	"	"	"	48	"	"
4'-6"	21	"	"	"	"	"	"	"	"	26	"	"	"	"	"	34	"	"	"	"	"	42	"	"	"	"	"	"	"	"	50	"	"
4'-9"	21	"	"	"	"	"	"	"	"	26	"	"	"	"	"	34	"	"	"	"	"	42	"	"	"	"	"	"	"	"	50	"	"
5'-0"	21	"	"	"	"	"	"	"	"	26	"	"	"	"	"	34	"	"	"	"	"	42	"	"	"	"	"	"	"	"	50	"	"
5'-3"	23	"	"	"	"	"	"	"	"	28	"	"	"	"	"	36	"	"	"	"	"	44	"	"	"	"	"	"	"	"	52	"	"
5'-6"	23	"	"	"	"	"	"	"	"	28	"	"	"	"	"	36	"	"	"	"	"	44	"	"	"	"	"	"	"	"	52	"	"
5'-9"	25	"	"	"	"	"	"	"	"	30	"	"	"	"	"	38	"	"	"	"	"	46	"	"	"	"	"	"	"	"	54	"	"
6'-0"	25	"	"	"	"	"	"	"	"	30	"	"	"	"	"	38	"	"	"	"	"	46	"	"	"	"	"	"	"	"	54	"	"
6'-3"	26	"	"	"	"	"	"	"	"	30	"	"	"	"	"	38	"	"	"	"	"	46	"	"	"	"	"	"	"	"	54	"	"
6'-6"	27	"	"	"	"	"	"	"	"	32	"	"	"	"	"	40	"	"	"	"	"	48	"	"	"	"	"	"	"	"	56	"	"
6'-9"	27	"	"	"	"	"	"	"	"	32	"	"	"	"	"	40	"	"	"	"	"	48	"	"	"	"	"	"	"	"	56	"	"
7'-0"	29	"	"	"	"	"	"	"	"	34	"	"	"	"	"	42	"	"	"	"	"	50	"	"	"	"	"	"	"	"	58	"	"
7'-3"	29	"	"	"	"	"	"	"	"	34	"	"	"	"	"	42	"	"	"	"	"	50	"	"	"	"	"	"	"	"	58	"	"
7'-6"	30	"	"	"	"	"	"	"	"	34	"	"	"	"	"	42	"	"	"	"	"	50	"	"	"	"	"	"	"	"	58	"	"
7'-9"	31	"	"	"	"	"	"	"	"	36	"	"	"	"	"	44	"	"	"	"	"	52	"	"	"	"	"	"	"	"	60	"	"
8'-0"	31	"	"	"	"	"	"	"	"	36	"	"	"	"	"	44	"	"	"	"	"	52	"	"	"	"	"	"	"	"	60	"	"
8'-3"	32	"	"	"	"	"	"	"	"	36	"	"	"	"	"	44	"	"	"	"	"	52	"	"	"	"	"	"	"	"	60	"	"
8'-6"	33	"	"	"	"	"	"	"	"	38	"	"	"	"	"	46	"	"	"	"	"	54	"	"	"	"	"	"	"	"	62	"	"
8'-9"	34	"	"	"	"	"	"	"	"	38	"	"	"	"	"	46	"	"	"	"	"	54	"	"	"	"	"	"	"	"	62	"	"
9'-0"	35	"	"	"	"	"	"	"	"	40	"	"	"	"	"	48	"	"	"	"	"	56	"	"	"	"	"	"	"	"	64	"	"
9'-3"	36	"	"	"	"	"	"	"	"	40	"	"	"	"	"	48	"	"	"	"	"	56	"	"	"	"	"	"	"	"	64	"	"
9'-6"	37	"	"	"	"	"	"	"	"	42	"	"	"	"	"	50	"	"	"	"	"	58	"	"	"	"	"	"	"	"	66	"	"
10'-0"	38	"	"	"	"	"	"	"	"	42	"	"	"	"	"	50	"	"	"	"	"	58	"	"	"	"	"	"	"	"	66	"	"

ALL CONCRETE STRUCTURES SHALL BE CLASS F (4200psi, MIN. 7.0 SACK CEMENT). NO FLY ASH IS ALLOWED IN CONCRETE STRUCTURES.

NOTE:
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SEE STANDARD DRAWINGS R-6020D

CURB INLET	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 702	
BILL OF REINFORCING STEEL		DATE Mar. 2018	STANDARD DRAWING NO. R-6020D

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

THE SEAL THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
ALTERATIONS TO SEALED DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE NICHOLS
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Dallas, Texas 75204
Phone - (214) 217-2200
Fax - (214) 217-2201
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
CIVIL
STORM DRAIN DETAILS

FRAN JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MW
DRAWN KLH
REVISED
CHECKED MRA
FILE NAME Detail02.sht

NO. | ISSUES | BY | DATE

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale
0 1

SHEET SDDT-3
SEQ. 193

MicroStation V8 User: 90262 Office: On Site
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Platter: 11"x17" Printer: HP Officejet Pro X476dw MFP
Plot Scale: 2.000 '/ In.
Date: Feb. 21, 2024 - 12:54:51 PM
Model: Default
Plotted: Freese and Nichols, Inc. - Time Type Fonts

SUMMARY OF QUANTITIES FOR CURB INLETS

DEPTH "D"	5'–0" OPENING						10'–0" OPENING						15'–0" OPENING						20'–0" OPENING					
	WIDTH 3'–0"		WIDTH 4'–0"		WIDTH 5'–0"		WIDTH 3'–0"		WIDTH 4'–0"		WIDTH 5'–0"		WIDTH 3'–0"		WIDTH 4'–0"		WIDTH 5'–0"		WIDTH 3'–0"		WIDTH 4'–0"		WIDTH 5'–0"	
	CONC C.Y.	STEEL LBS.	CONC C.Y.	STEEL LBS.	CONC C.Y.	STEEL LBS.	CONC C.Y.	STEEL LBS.	CONC C.Y.	STEEL LBS.	CONC C.Y.	STEEL LBS.	CONC C.Y.	STEEL LBS.	CONC C.Y.	STEEL LBS.	CONC C.Y.	STEEL LBS.	CONC C.Y.	STEEL LBS.	CONC C.Y.	STEEL LBS.	CONC C.Y.	STEEL LBS.
3'–6"	2.62	306	2.95	332	3.28	373	4.12	479	4.64	521	5.20	564	5.69	667	6.40	721	7.10	775	7.20	846	8.11	909	9.03	976
3'–9"	2.70	309	3.04	341	3.39	373	4.25	494	4.78	536	5.34	579	5.87	687	6.58	741	7.30	796	7.42	874	8.34	937	9.27	1010
4'–0"	2.78	328	3.14	364	3.49	399	4.38	518	4.92	565	5.49	610	6.05	718	6.77	776	7.49	835	7.64	909	8.58	976	9.51	1046
4'–3"	2.87	334	3.23	370	3.59	406	4.51	526	5.06	573	5.64	619	6.22	729	6.95	787	7.69	847	7.87	922	8.81	990	9.75	1061
4'–6"	2.95	356	3.32	394	3.69	431	4.64	558	5.20	607	5.79	656	6.40	770	7.14	830	7.88	891	8.09	973	9.04	1043	9.99	1115
4'–9"	3.03	361	3.41	410	3.79	438	4.77	566	5.34	616	5.94	665	6.57	780	7.32	841	8.07	903	8.31	986	9.27	1056	10.23	1129
5'–0"	3.12	367	3.51	416	3.90	445	4.90	574	5.47	624	6.09	674	6.75	791	7.51	853	8.27	915	8.53	999	9.50	1070	10.47	1144
5'–3"	3.20	383	3.60	424	4.00	465	5.03	600	5.61	652	6.23	704	6.93	827	7.69	890	8.46	955	8.76	1044	9.73	1118	10.71	1194
5'–6"	3.28	389	3.69	430	4.10	472	5.16	608	5.75	661	6.38	713	7.11	837	7.88	901	8.66	967	8.98	1057	9.97	1131	10.95	1208
5'–9"	3.37	405	3.78	451	4.20	495	5.29	635	5.89	690	6.53	744	7.28	874	8.07	940	8.85	1007	9.20	1102	10.20	1178	11.19	1258
6'–0"	3.45	415	3.88	460	4.30	504	5.42	646	6.03	702	6.68	757	7.45	888	8.25	954	9.05	1022	9.42	1119	10.43	1196	11.43	1276
6'–3"	3.53	425	3.97	470	4.41	515	5.55	661	6.17	718	6.83	773	7.63	908	8.44	975	9.24	1044	9.64	1147	10.66	1223	11.67	1305
6'–6"	3.62	437	4.06	486	4.51	532	5.68	681	6.31	739	6.97	797	7.81	935	8.62	1005	9.43	1057	9.87	1178	10.89	1258	11.92	1340
6'–9"	3.70	441	4.15	490	4.61	537	5.81	688	6.45	747	7.12	806	7.98	945	8.81	1015	9.63	1066	10.09	1191	11.12	1272	12.15	1355
7'–0"	3.78	460	4.25	510	4.71	560	5.94	716	6.59	777	7.27	837	8.16	981	8.99	1053	9.82	1126	10.31	1237	11.35	1319	12.40	1404
7'–3"	3.86	465	4.34	516	4.81	567	6.07	724	6.72	785	7.42	846	8.33	992	9.18	1065	10.02	1138	10.53	1249	11.59	1333	12.64	1418
7'–6"	3.95	477	4.43	529	4.91	570	6.20	742	6.86	804	7.57	866	8.51	1016	9.36	1089	10.21	1163	10.75	1290	11.82	1365	12.88	1451
7'–9"	4.03	491	4.53	544	5.02	597	6.33	762	7.00	826	7.71	890	8.67	1040	9.55	1116	10.41	1193	10.98	1313	12.05	1399	13.12	1498
8'–0"	4.12	496	4.62	550	5.12	604	6.46	770	7.14	834	7.86	899	8.86	1051	9.73	1129	10.60	1205	11.20	1325	12.28	1412	13.36	1510
8'–3"	4.20	504	4.71	559	5.22	613	6.59	784	7.28	849	8.01	915	9.04	1069	9.92	1149	10.80	1228	11.42	1353	12.51	1440	13.60	1529
8'–6"	4.28	519	4.80	576	5.32	632	6.71	804	7.42	871	8.16	938	9.21	1107	10.10	1176	10.99	1257	11.64	1385	12.74	1474	13.84	1565
8'–9"	4.37	528	4.90	586	5.42	643	6.84	819	7.56	886	8.31	954	9.39	1119	10.29	1199	11.18	1280	11.87	1410	12.97	1500	14.08	1592
9'–0"	4.45	545	4.99	605	5.53	664	6.97	842	7.70	912	8.46	982	9.56	1148	10.47	1231	11.38	1313	12.09	1447	13.21	1539	14.32	1631
9'–3"	4.53	554	5.08	614	5.63	674	7.10	858	7.84	929	8.60	999	9.74	1169	10.66	1252	11.57	1335	12.31	1474	13.44	1563	14.56	1660
9'–6"	4.62	568	5.17	630	5.73	692	7.23	878	7.97	950	8.75	1022	9.92	1195	10.84	1280	11.77	1365	12.53	1505	13.67	1600	14.80	1696
10'–0"	4.78	582	5.36	645	5.93	708	7.49	900	8.11	974	9.05	1048	10.27	1227	11.21	1312	12.16	1399	12.98	1546	14.13	1642	15.29	1739

NOTE:
FOR CONVENIENCE, DEPTHS OF INLETS SHOWN IN ABOVE TABLES ARE IN INCREMENTS OF 3 INCHES BUT ANY DEPTHS OTHER THAN THOSE SHOWN ABOVE MAY BE USED WHEREVER DEEMED NECESSARY. QUANTITIES FOR OTHER DEPTHS FALLING WITHIN THE LIMITS OF THE TABLE MAY BE FOUND BY INTERPOLATION.

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NO FLY ASH IS ALLOWED IN CONCRETE STRUCTURES.

R-6020E
TCM DRAWING SUPERSEDES

CURB INLET
SUMMARY OF QUANTITIES

CITY OF ROCKWALL

STANDARD SPECIFICATION REFERENCE: 702
DATE: Mar. 2018
STANDARD DRAWING NO.: R-6020E

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

THE SEAL THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
ALTERATION OF A SEALED DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone - (214) 217-2200
Fax - (214) 217-2201
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
CIVIL
STORM DRAIN DETAILS

NO.	ISSUES	BY	DATE

FRN JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MW
DRAWN KLH
REVISED
CHECKED MRA
FILE NAME Detail02.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET SDDT-4
SEQ. 194

MicroStation V8 User: 90262 Office: On Site
Platter: J:\PW\Projects\19711_RKW\SHEETS\Working\dwg
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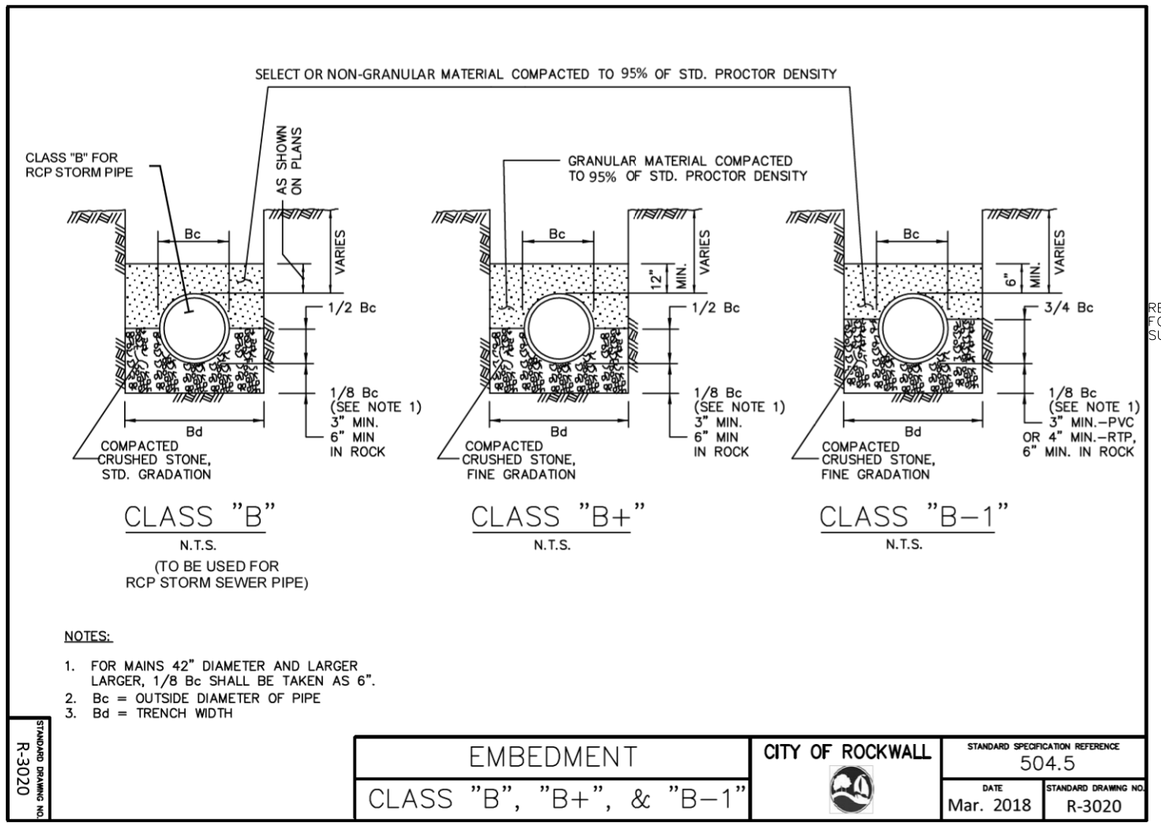
Date: Feb. 21, 2024 - 12:54:54 PM Project: Freese and Nichols, Inc. - True Type Fonts



CLASS "B"
N.T.S.
(TO BE USED FOR RCP STORM SEWER PIPE)

CLASS "B+"
N.T.S.

CLASS "B–1"
N.T.S.

NOTES:

1. FOR MAINS 42" DIAMETER AND LARGER LARGER, 1/8 Bc SHALL BE TAKEN AS 6".
2. Bc = OUTSIDE DIAMETER OF PIPE
3. Bd = TRENCH WIDTH

STANDARD DRAWING NO. R-3020

EMBEDMENT
CLASS "B", "B+", & "B–1"

CITY OF ROCKWALL

STANDARD SPECIFICATION REFERENCE 504.5

DATE Mar. 2018

STANDARD DRAWING NO. R-3020

REFER TO STANDARD MI-CBC (FTW) FOR CONNECTION TO RCB AND SUPPORT SLAB DETAILS

CITY OF ROCKWALL STORM WATER 4'x4' MANHOLE (REFER TO R6010A)

PROPOSED REINFORCED CONCRETE BOX

PROPOSED 4x4 MANHOLE RISERS
N.T.S.

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
CIVIL
STORM DRAIN DETAILS

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MW
DRAWN ZLG
REVISED
CHECKED MRA
FILE NAME Detailo2_1.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale accordingly
0 1"

SHEET SDDT-5
SEQ. 195

MicroStation V8 User: 90262 Office: On Site
Platters: N:\jlf\Drawings\Drainage\Detailo2_1.sht
Plot Scale: 2.00007 ft. / in. Plotter: HP Officejet Pro X576dw MFP
Date: Feb. 21, 2024 - 12:55:06 PM Model: Default
Project: Freese and Nichols, Inc. - True Type Fonts

GENERAL NOTES

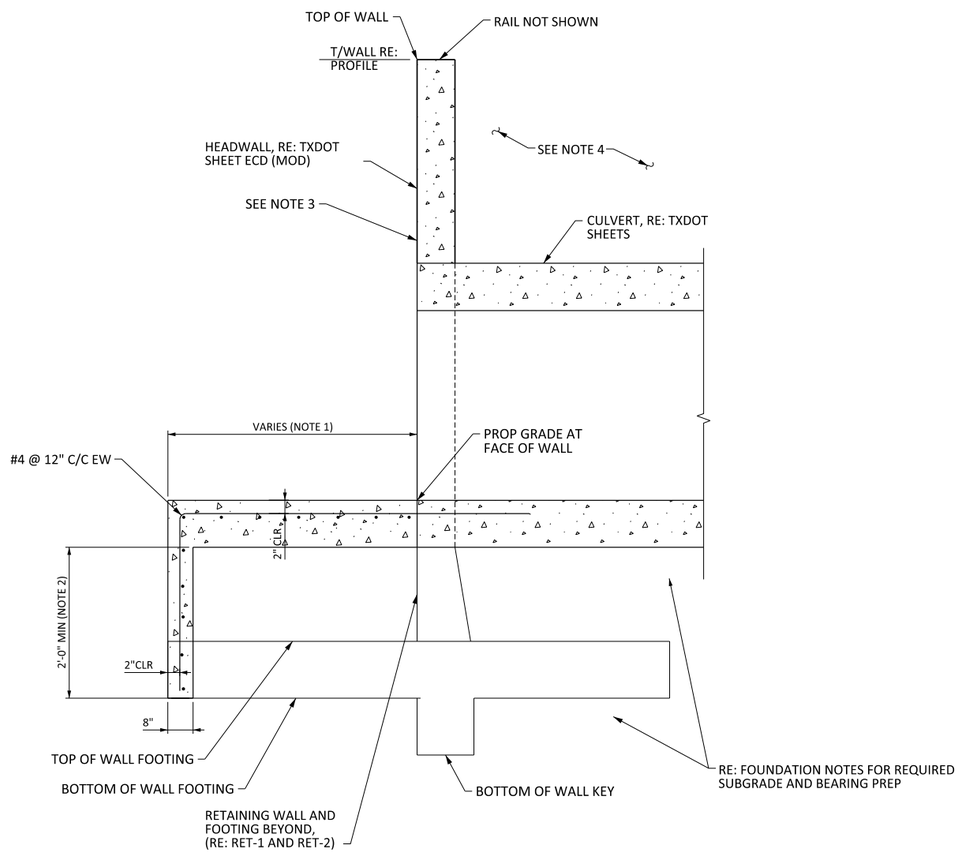
1. CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE INTERNATIONAL BUILDING CODE, 2015 EDITION INCLUDING LOCAL SUPPLEMENTS, EXCEPT WHERE APPLICABLE CODES OR THE CONTRACT DOCUMENTS ARE MORE RESTRICTIVE.
2. REMOVE ALL ABANDONED FOUNDATIONS, UTILITIES, PIPELINES, ETC. THAT INTERFERE WITH NEW CONSTRUCTION.
3. FIELD VERIFY ALL EXISTING CONDITIONS, INCLUDING LOCATION AND DIMENSIONS OF ALL EXISTING CONSTRUCTION AND UTILITIES. NOTIFY ENGINEER IF THERE IS A CONFLICT BETWEEN THE CONTRACT DOCUMENTS AND EXISTING CONDITIONS BEFORE PROCEEDING WITH WORK. PROVIDE EXCAVATION SHORING TO PROTECT AND SUPPORT FOUNDATION SOILS UNDER EXISTING STRUCTURES.
4. THE STRUCTURE IS DESIGNED FOR STABILITY IN THE FINAL CONDITION ONLY. PROVIDE TEMPORARY BRACING AND SHORING AS REQUIRED FOR STABILITY DURING CONSTRUCTION.
5. PLANS, SECTIONS, AND DETAILS ARE NOT TO BE SCALED FOR DETERMINATION OF QUANTITIES, LENGTHS, OR FIT OF MATERIALS.
6. SEE OTHER DISCIPLINE DRAWINGS FOR SIZE AND LOCATION OF ALL OPENINGS, DEPRESSIONS, OFFSETS, SLEEVES, CURBS, PADS, INSERTS, ETC. NOT SHOWN ON STRUCTURAL DRAWINGS.

CONCRETE

1. CONCRETE CONSTRUCTION SHALL CONFORM TO THE LATEST EDITIONS OF ACI 301 AND ACI 318.
2. ALL DETAILING, FABRICATION AND ERECTION OF REINFORCING BARS, UNLESS NOTED OTHERWISE, SHALL BE IN ACCORDANCE WITH THE MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES (ACI SP66), LATEST EDITION.
3. CONCRETE SHALL BE TYPE C CONCRETE PER TXDOT ITEM 421 AND HAVE A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 4,200 PSI (7.0 SACK/CY).
4. ALL REINFORCING SHALL BE IN ACCORDANCE WITH ASTM A615, GRADE 60, DEFORMED.
5. CONCRETE CLEAR COVER OVER REINFORCING SHALL BE AS LISTED BELOW, UNLESS OTHERWISE NOTED.
   A. CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH: 3"
   B. ALL OTHER: 2"
   C. SEE DRAWINGS FOR EXCEPTIONS
6. ALL EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED 3/4" INSIDE FORMS OR TOOLED TO 3/4" RADIUS ON SLABS UNLESS OTHERWISE NOTED.
7. IN CASES WHERE REINFORCING BARS CANNOT BE EXTENDED AS FAR AS REQUIRED DUE TO THE LIMITED EXTENT OF THE ADJACENT CONCRETE STRUCTURE, THE BARS SHALL EXTEND AS FAR AS POSSIBLE AND END IN STANDARD HOOKS.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN OF ALL FORMING, TEMPORARY BRACING AND SHORING.
9. UNLESS NOTED OTHERWISE, HOOKS SHOWN ON DRAWINGS SHALL BE ASSUMED TO BE STANDARD HOOKS PER ACI 318.
10. UNLESS INDICATED OTHERWISE, LAP SPLICES IN BEAMS AND WALLS SHALL BE STAGGERED.
11. ALL REINFORCING SHALL BE CONTINUOUS. CONTINUOUS BARS SHALL LAP 48 BAR DIAMETERS OF SMALLER BAR LAPPED, UNLESS NOTED OTHERWISE. ALL REBAR EMBEDMENT LENGTHS SHALL BE 36 BAR DIAMETERS, UNLESS NOTED OTHERWISE.

FOUNDATION

1. FOUNDATIONS DESIGN IS BASED ON THE RECOMMENDATIONS IN THE GEOTECHNICAL MEMORANDUM, PREPARED BY FREESE AND NICHOLS. INC. FOR THE ROCKWALL TECHNOLOGY PARK PHASE 3, PROJECT NUMBER RKW19711, DATED OCTOBER 29, 2020. A COPY OF THIS MEMORANDUM IS AVAILABLE FOR INSPECTION AT THE ENGINEERS OFFICE.
2. EXCAVATION AND SUBGRADE PREPARATION
   A. REMOVE THE SURFICIAL VEGETATION, WASTE AND LOOSE SOILS TO A MINIMUM DEPTH OF 12 INCHES.
   B. EXCAVATE THE SITE TO 3 FEET BELOW THE PROPOSED FINISHED SUBGRADE.
   C. SOFT YIELDING, AND/OR PUMPING OF SUBGRADE MATERIALS SHALL BE REMOVED OR REWORKED, PROVIDE A 3 INCH THICK LEAN CONCRETE MUD SLAB WITHIN 4 HOURS OF EXPOSURE.
   D. FILL THE SITE TO PROPOSED BEARING ELEVATION WITH CRUSHED STONE CONFORMING TO TXDOT ITEM 247, GRADE 1-2, TYPE A OR D, COMPACTED IN MAXIMUM 8-INCH LOOSE LIFTS TO AT LEAST 95 PERCENT OF STANDARD PROCTOR (ASTM D698) DENSITY WITH A MOISTURE CONTENT WITHIN 2 PERCENTAGE POINTS OF THE OPTIMUM MOISTURE CONTENT.
   E. ALL BACKFILL AGAINST STRUCTURES SHALL BE SELECT FILL. SELECT FILL SHALL BE MODIFIED FNI CLASS 4 EARTH FILL, LL LESS THAN 35, PLASTICITY INDEX BETWEEN 7 AND 15, MAXIMUM 2" AGGREGATE AND #200 LESS THAN 70 PERCENT WITH NO ORGANICS.
   F. BACKFILL SHALL BE PLACED IN MAXIMUM 8" LOOSE LIFTS FOR HEAVY EQUIPMENT AND 4" LOOSE LIFTS FOR HAND -DIRECTED EQUIPMENT. WITHIN 5 FEET OF THE WALLS, ONLY HAND OPERATED COMPACTION EQUIPMENT MAY BE USED. COMPACT TO A MINIMUM OF 95 PERCENT OF THE MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D698 (STANDARD PROCTOR), AND AT A MOISTURE CONTENT WITHIN -1 TO +3 PERCENT OF THE OPTIMUM MOISTURE CONTENT AS DETERMINED BY ASTM D698. IN- PLACE FILED DENSITY TESTS SHALL BE CONDUCTED AT A RATE OF THREE TESTS FOR EVERY LIFT.
   G. THE SUBGRADE MOISTURE CONTENT AND DENSITY SHALL BE MAINTAINED DURING CONSTRUCTION.
3. ALL BELOW GRADE FOUNDATION ELEMENTS ARE DESIGNED WITH FORMED SIDES UNLESS NOTED OTHERWISE. IF THE CONTRACTOR ELECTS TO USE EARTH FORMED SIDES, THE EXPOSED SURFACE AND 6 INCHES BELOW GRADE SHALL BE FORMED TO THE DESIGN DIMENSION. ALL CONCRETE EXPOSED TO VIEW IN THE FINAL CONDITION SHALL BE FORMED.
4. DESIGN BEARING PRESSURE (NET) IS 1,800 PSF FOR FOUNDATIONS BEARING ON PREPARED SUBGRADE OF CRUSHED STONE. SUITABLE BEARING MATERIALS SHALL BE VERIFIED BY A LICENSED PROFESSIONAL GEOTECHNICAL ENGINEER.



NOTES:
1. MATCH LENGTH OF TOE OF WALLS ON EACH SIDE. VARY LINEARLY BETWEEN DIFFERING LENGTHS.
2. MATCH DEPTH OF FOOTING OF WALLS ON EACH SIDE. VARY LINEARLY BETWEEN DIFFERING DEPTHS.
3. PROVIDE FORMLINER ON FACE OF WALL AND BOTH SIDES OF COMBINATION RAIL, INCREASE THICKNESS OF WALL BY FORMLINER THICKNESS. FORMLINER SHALL BE ASHLAR STONE RANDOM PATTERN. CONTRACTOR SHALL SUBMIT FORMLINER SAMPLE TO CITY FOR APPROVAL.
4. SELECT FILL SHALL CONSIST OF MATERIALS WHICH ARE CLASSIFIED AS SP, SM, SC, CL, OR DUAL CLASSIFICATION THEREOF, WHICH HAVE A LIQUID LIMIT LESS THAN OR EQUAL TO 35 AND A PLASTICITY INDEX OF A MINIMUM OF 7 AND A MAXIMUM OF 15, WHICH ARE FREE OF ORGANIC MATERIALS.

HEADWALL AT CULVERT 01

NOT TO SCALE

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASE THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY AMY L. RAINES
TEXAS NO. 83515 ON 10/21/2021
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FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone - (214) 217-2200
Fax - (214) 217-2201
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
STRUCTURAL
HEADWALL DETAILS

NO.	ISSUES	BY	DATE

FNI JOB NO. RKW19711
DATE APRIL 2022
DESIGNED ALR
DRAWN MDB
REVISED -
CHECKED -
FILE NAME ST-RKW-GN-NOTE.dgn

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET SDDT-6
SEQ. 196

MicroStation V8 User: 90262 Office: On Site
N:\ST\ST-RKW-GN-NOTE.dgn
Platter: 11"x17" Tabloid (ANSI B) Half Portrait Nano.pltcfg
Plot Scale: 01 1" = 1"
Date: Feb. 21, 2024 - 12:55:19 PM
Model: Sheet
Project: Freese and Nichols, Inc - True Type Fonts
Office: On Site Date: Feb. 21, 2024 - 12:55:19 PM User: 90262 File: N:\ST\ST-RKW-GN-NOTE.dgn

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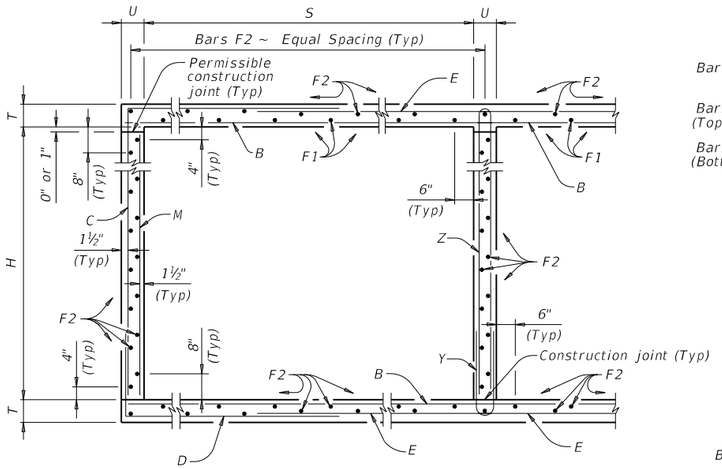
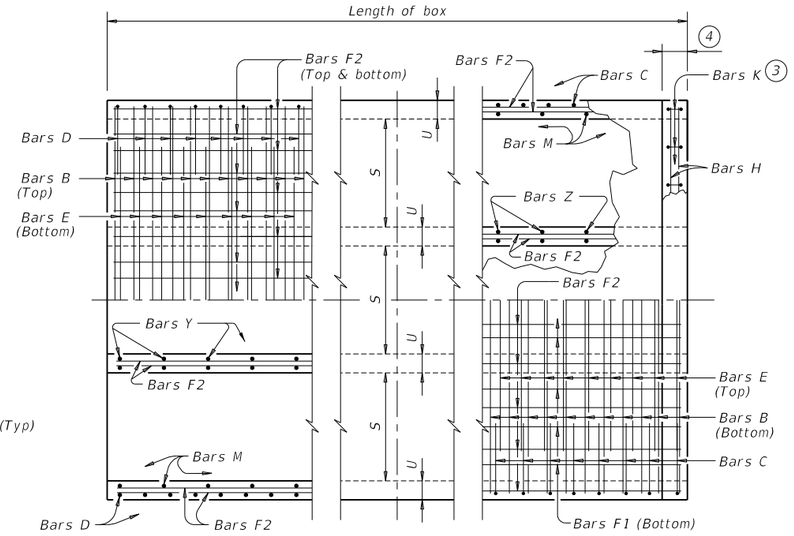
DATE:
FILE:



TYPICAL SECTION



BOTTOM SLAB TOP SLAB

PART PLANS

1. 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0", refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Rail Anchorage Curb (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.

2. For vehicle safety, the following requirements must be met:
   - For structures without bridge rail, construct curbs no more than 3" above finished grade.
   - For structures with bridge rail, construct curbs flush with finished grade.

   Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

3. For curbs less than 1'-0" high, tilt Bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, Bars K may be omitted.

4. 1'-0" typical. 2'-3" when the Rail Anchorage Curb (RAC) standard sheet is referred to elsewhere in the plans.

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

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

CONSTRUCTION NOTES:

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

MATERIAL NOTES:

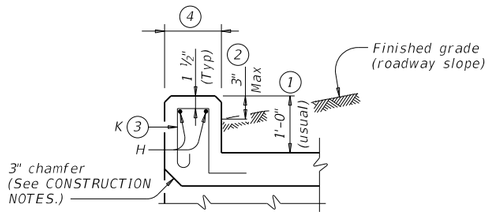
Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
Provide Class C concrete (f'c = 4,200 psi, 7.0 sack/CY) for culvert barrel and curb, with the following exceptions: provide Class S concrete (f'c = 4,200 psi, 7.0 sack/CY) for top slabs of:
- culverts with overlay,
- culverts with 1-to-2 course surface treatment, or
- culverts with the top slab as the final riding surface.

Provide bar laps, where required, as follows:
- Uncoated or galvanized ~ #4 = 1'-8" Min
- Uncoated or galvanized ~ #5 = 2'-1" Min
- Uncoated or galvanized ~ #6 = 2'-6" Min

GENERAL NOTES:

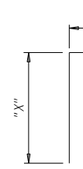
Designed according to AASHTO LRFD Bridge Design Specifications for the range of fill heights shown.
See the Multiple Box Culverts Cast-In-Place Miscellaneous Detail (MC-MD) standard sheet for details pertaining to skewed ends, angle sections, and lengthening.

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

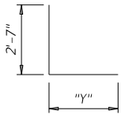


SECTION THRU CURB

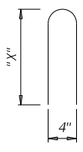
TABLE OF BAR DIMENSIONS		
H	"X"	"Y"
2'-0"	2'-6 ½"	3'-8 ½"
3'-0"	3'-6 ½"	3'-8 ½"
4'-0"	4'-6 ½"	3'-8 ½"
5'-0"	5'-6 ½"	3'-8 ½"



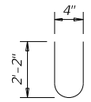
BARS C



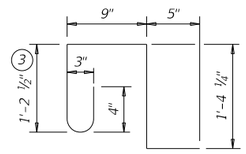
BARS D



BARS Z



BARS Y



BARS K (#4)
(Spa = 1'-0" Max)
(Length = 4'-2")

THE SEAL THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO: 134095 ON 10/21/2021
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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

HL93 LOADING SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

MULTIPLE BOX CULVERTS CAST-IN-PLACE 5'-0" SPAN 0' TO 20' FILL

MC-5-20

FILE: mc520ste-20.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
				197

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DATE:
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NUMBER OF SPANS	SECTION DIMENSIONS				BILLS OF REINFORCING STEEL (For Box Length = 40 feet)																																QUANTITIES					
					Bars B					Bars C & D							Bars E					Bars F1 ~ #4				Bars F2 ~ #4				Bars M ~ #4				Bars Y & Z ~ #4								Bars H 4 ~ #4		Bars K		Per Foot of Barrel		Curb		Total	
	S	H	T	U	No.	Size	Spa	Length	Wt	No.	Size	Spa	Bars C Length	Bars C Wt	Bars D Length	Bars D Wt	No.	Size	Spa	Length	Wt	No.	Spa	Length	Wt	No.	Spa	Length	Wt	No.	Spa	Length	Wt	No.	Spa	Bars Y Length	Bars Y Wt	Bars Z Length	Bars Z Wt	Length	Wt	No.	Wt	Conc (CY)	Renf (Lb)	Conc (CY)	Renf (Lb)	Conc (CY)	Renf (Lb)
2	5' – 0"	2' – 0"	8"	7"	108	#5	9"	11' – 6"	1,295	108	#5	9"	6' – 3"	704	6' – 4"	713	108	#5	9"	8' – 8"	976	8	18"	39' – 9"	212	38	18"	39' – 9"	1,009	108	9"	2' – 0"	144	54	9"	4' – 7"	165	5' – 3"	189	11' – 6"	31	26	72	0.710	135.2	0.9	103	29.3	5,510
3	5' – 0"	2' – 0"	8"	7"	108	#5	9"	17' – 1"	1,924	108	#5	9"	6' – 3"	704	6' – 4"	713	108	#5	9"	14' – 3"	1,605	12	18"	39' – 9"	319	54	18"	39' – 9"	1,434	108	9"	2' – 0"	144	108	9"	4' – 7"	331	5' – 3"	379	17' – 1"	46	38	106	1.029	188.8	1.3	152	42.4	7,705
4	5' – 0"	2' – 0"	8"	7"	108	#5	9"	22' – 8"	2,553	108	#5	9"	6' – 3"	704	6' – 4"	713	108	#5	9"	19' – 10"	2,234	16	18"	39' – 9"	425	70	18"	39' – 9"	1,859	108	9"	2' – 0"	144	162	9"	4' – 7"	496	5' – 3"	568	22' – 8"	61	48	134	1.348	242.4	1.7	195	55.6	9,891
5	5' – 0"	2' – 0"	8"	7"	108	#5	9"	28' – 3"	3,182	108	#5	9"	6' – 3"	704	6' – 4"	713	108	#5	9"	25' – 5"	2,863	20	18"	39' – 9"	531	86	18"	39' – 9"	2,284	108	9"	2' – 0"	144	216	9"	4' – 7"	661	5' – 3"	758	28' – 3"	75	60	167	1.667	296.0	2.1	242	68.8	12,082
6	5' – 0"	2' – 0"	8"	7"	108	#5	9"	33' – 10"	3,811	108	#5	9"	6' – 3"	704	6' – 4"	713	108	#5	9"	31' – 0"	3,492	24	18"	39' – 9"	637	102	18"	39' – 9"	2,708	108	9"	2' – 0"	144	270	9"	4' – 7"	827	5' – 3"	947	33' – 10"	90	70	195	1.986	349.6	2.5	285	82.0	14,268
2	5' – 0"	3' – 0"	8"	7"	108	#6	9"	11' – 6"	1,865	108	#5	9"	7' – 3"	817	6' – 4"	713	108	#5	9"	8' – 8"	976	8	18"	39' – 9"	212	44	18"	39' – 9"	1,168	108	9"	3' – 0"	216	54	9"	4' – 7"	165	7' – 3"	262	11' – 6"	31	26	72	0.775	159.9	0.9	103	31.9	6,497
3	5' – 0"	3' – 0"	8"	7"	108	#6	9"	17' – 1"	2,771	108	#5	9"	7' – 3"	817	6' – 4"	713	108	#5	9"	14' – 3"	1,605	12	18"	39' – 9"	319	62	18"	39' – 9"	1,646	108	9"	3' – 0"	216	108	9"	4' – 7"	331	7' – 3"	523	17' – 1"	46	38	106	1.115	223.5	1.3	152	45.9	9,093
4	5' – 0"	3' – 0"	8"	7"	108	#6	9"	22' – 8"	3,677	108	#5	9"	7' – 3"	817	6' – 4"	713	108	#5	9"	19' – 10"	2,234	16	18"	39' – 9"	425	80	18"	39' – 9"	2,124	108	9"	3' – 0"	216	162	9"	4' – 7"	496	7' – 3"	785	22' – 8"	61	48	134	1.456	287.2	1.7	195	59.9	11,682
5	5' – 0"	3' – 0"	8"	7"	108	#6	9"	28' – 3"	4,583	108	#5	9"	7' – 3"	817	6' – 4"	713	108	#5	9"	25' – 5"	2,863	20	18"	39' – 9"	531	98	18"	39' – 9"	2,602	108	9"	3' – 0"	216	216	9"	4' – 7"	661	7' – 3"	1,046	28' – 3"	75	60	167	1.796	350.8	2.1	242	73.9	14,274
6	5' – 0"	3' – 0"	8"	7"	108	#6	9"	33' – 10"	5,488	108	#5	9"	7' – 3"	817	6' – 4"	713	108	#5	9"	31' – 0"	3,492	24	18"	39' – 9"	637	116	18"	39' – 9"	3,080	108	9"	3' – 0"	216	270	9"	4' – 7"	827	7' – 3"	1,308	33' – 10"	90	70	195	2.137	414.5	2.5	285	88.0	16,863
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6	5' – 0"	4' – 0"	8"	7"	108	#6	9"	33' – 10"	5,488	108	#5	9"	8' – 3"	929	6' – 4"	713	108	#5	9"	31' – 0"	3,492	24	18"	39' – 9"	637	116	18"	39' – 9"	3,080	108	9"	4' – 0"	289	270	9"	4' – 7"	827	9' – 3"	1,668	33' – 10"	90	70	195	2.288	428.1	2.5	285	94.0	17,408
2	5' – 0"	5' – 0"	8"	7"	108	#6	9"	11' – 6"	1,865	108	#5	9"	9' – 3"	1,042	6' – 4"	713	108	#5	9"	8' – 8"	976	8	18"	39' – 9"	212	50	18"	39' – 9"	1,328	108	9"	5' – 0"	361	54	9"	4' – 7"	165	11' – 3"	406	11' – 6"	31	26	72	0.904	176.7	0.9	103	37.0	7,171
3	5' – 0"	5' – 0"	8"	7"	108	#6	9"	17' – 1"	2,771	108	#5	9"	9' – 3"	1,042	6' – 4"	713	108	#5	9"	14' – 3"	1,605	12	18"	39' – 9"	319	70	18"	39' – 9"	1,859	108	9"	5' – 0"	361	108	9"	4' – 7"	331	11' – 3"	812	17' – 1"	46	38	106	1.288	245.3	1.3	152	52.8	9,965
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6	5' – 0"	5' – 0"	8"	7"	108	#6	9"	33' – 10"	5,488	108	#5	9"	9' – 3"	1,042	6' – 4"	713	108	#5	9"	31' – 0"	3,492	24	18"	39' – 9"	637	130	18"	39' – 9"	3,452	108	9"	5' – 0"	361	270	9"	4' – 7"	827	11' – 3"	2,029	33' – 10"	90	70	195	2.439	451.0	2.5	285	100.1	18,326

HL93 LOADING SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

MULTIPLE BOX CULVERTS CAST-IN-PLACE

5'-0" SPAN

0' TO 20' FILL

MC-5-20

FILE: mc520ste-20.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
				198

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DATE:
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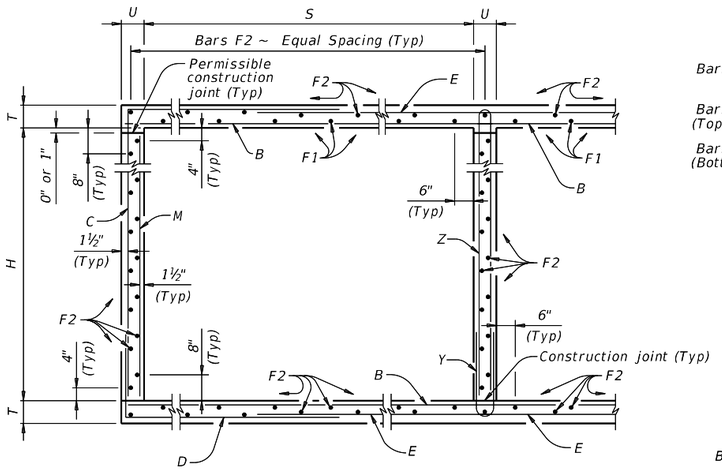
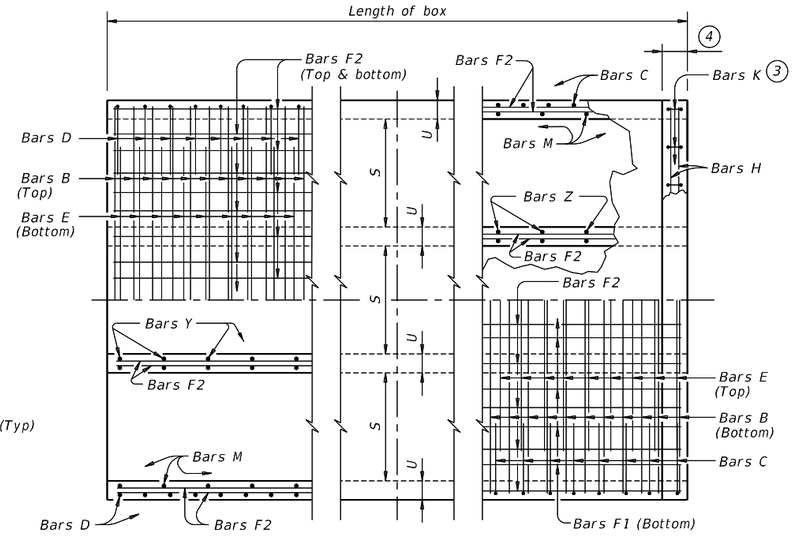


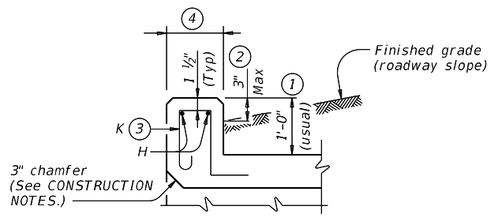
TYPICAL SECTION



BOTTOM SLAB

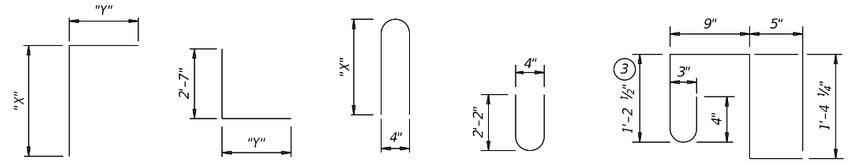
TOP SLAB

PART PLANS



SECTION THRU CURB

TABLE OF BAR DIMENSIONS		
H	"X"	"Y"
3'-0"	3'-6 ½"	4'-5"
4'-0"	4'-6 ½"	4'-5"
5'-0"	5'-6 ½"	4'-5"
6'-0"	6'-6 ½"	4'-5"
7'-0"	7'-6 ½"	4'-5"



BARS C | BARS D | BARS Z | BARS Y | BARS K (#4) (Spa = 1'-0" Max) (Length = 4'-2")

1. 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0", refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Rail Anchorage Curb (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.

2. For vehicle safety, the following requirements must be met:
   - For structures without bridge rail, construct curbs no more than 3" above finished grade.
   - For structures with bridge rail, construct curbs flush with finished grade.

   Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

3. For curbs less than 1'-0" high, tilt Bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, Bars K may be omitted.

4. 1'-0" typical. 2'-3" when the Rail Anchorage Curb (RAC) standard sheet is referred to elsewhere in the plans.

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

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

CONSTRUCTION NOTES:

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

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
Provide Class C concrete (f'c = 4,200 psi, 7.0 sack/CY) for culvert barrel and curb, with the following exceptions: provide Class S concrete (f'c = 4,200 psi, 7.0 sack/CY) for top slabs of:
- culverts with overlay,
- culverts with 1-to-2 course surface treatment, or
- culverts with the top slab as the final riding surface.

Provide bar laps, where required, as follows:
- Uncoated or galvanized ~ #4 = 1'-8" Min
- Uncoated or galvanized ~ #5 = 2'-1" Min
- Uncoated or galvanized ~ #6 = 2'-6" Min

GENERAL NOTES:

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

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

HL93 LOADING

SHEET 1 OF 2

THE SEAL THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO: 134095 ON 10/21/2021
ALTERATION ON A SEALED DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

Texas Department of Transportation

Bridge Division Standard

MULTIPLE BOX CULVERTS CAST-IN-PLACE 7'-0" SPAN 0' TO 10' FILL

MC-7-10

FILE: mc710ste-20.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
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REVISIONS				
	DIST	COUNTY		SHEET NO.
				199

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DATE:
FILE:

NUMBER OF SPANS	SECTION DIMENSIONS				BILLS OF REINFORCING STEEL (For Box Length = 40 feet)																																QUANTITIES					
					Bars B					Bars C & D							Bars E					Bars F1 ~ #4				Bars F2 ~ #4				Bars M ~ #4				Bars Y & Z ~ #4								Bars H 4 ~ #4		Bars K		Per Foot of Barrel		Curb		Total	
	S	H	T	U	No.	Size	Spa	Length	Wt	No.	Size	Spa	Bars C Length	Bars C Wt	Bars D Length	Bars D Wt	No.	Size	Spa	Length	Wt	No.	Spa	Length	Wt	No.	Spa	Length	Wt	No.	Spa	Length	Wt	No.	Spa	Bars Y Length	Bars Y Wt	Bars Z Length	Bars Z Wt	Length	Wt	No.	Wt	Conc (CY)	Renf (Lb)	Conc (CY)	Renf (Lb)	Conc (CY)	Renf (Lb)
2	7' – 0"	3' – 0"	8"	7"	108	#6	9"	15' – 6"	2,514	162	#5	6"	7' – 11"	1,338	7' – 0"	1,183	108	#6	9"	11' – 5"	1,852	10	18"	39' – 9"	266	54	18"	39' – 9"	1,434	108	9"	3' – 0"	216	54	9"	4' – 7"	165	7' – 3"	262	15' – 6"	41	34	95	0.972	230.8	1.2	136	40.0	9,366
3	7' – 0"	3' – 0"	8"	7"	108	#6	9"	23' – 1"	3,744	162	#5	6"	7' – 11"	1,338	7' – 0"	1,183	108	#6	9"	19' – 0"	3,082	15	18"	39' – 9"	398	77	18"	39' – 9"	2,045	108	9"	3' – 0"	216	108	9"	4' – 7"	331	7' – 3"	523	23' – 1"	62	50	139	1.412	321.5	1.7	201	58.2	13,061
4	7' – 0"	3' – 0"	8"	7"	108	#6	9"	30' – 8"	4,975	162	#5	6"	7' – 11"	1,338	7' – 0"	1,183	108	#6	9"	26' – 7"	4,312	20	18"	39' – 9"	531	100	18"	39' – 9"	2,655	108	9"	3' – 0"	216	162	9"	4' – 7"	496	7' – 3"	785	30' – 8"	82	64	178	1.851	412.3	2.3	260	76.3	16,751
5	7' – 0"	3' – 0"	8"	7"	108	#6	9"	38' – 3"	6,205	162	#5	6"	7' – 11"	1,338	7' – 0"	1,183	108	#6	9"	34' – 2"	5,542	25	18"	39' – 9"	664	123	18"	39' – 9"	3,266	108	9"	3' – 0"	216	216	9"	4' – 7"	661	7' – 3"	1,046	38' – 3"	102	80	223	2.290	503.0	2.8	325	94.4	20,446
6	7' – 0"	3' – 0"	8"	7"	108	#6	9"	45' – 10"	7,435	162	#5	6"	7' – 11"	1,338	7' – 0"	1,183	108	#6	9"	41' – 9"	6,773	30	18"	39' – 9"	797	146	18"	39' – 9"	3,877	108	9"	3' – 0"	216	270	9"	4' – 7"	827	7' – 3"	1,308	45' – 10"	122	94	262	2.729	593.9	3.4	384	112.6	24,138
2	7' – 0"	4' – 0"	8"	7"	108	#6	9"	15' – 6"	2,514	162	#5	6"	8' – 11"	1,507	7' – 0"	1,183	108	#6	9"	11' – 5"	1,852	10	18"	39' – 9"	266	54	18"	39' – 9"	1,434	108	9"	4' – 0"	289	54	9"	4' – 7"	165	9' – 3"	334	15' – 6"	41	34	95	1.037	238.6	1.2	136	42.6	9,680
3	7' – 0"	4' – 0"	8"	7"	108	#6	9"	23' – 1"	3,744	162	#5	6"	8' – 11"	1,507	7' – 0"	1,183	108	#6	9"	19' – 0"	3,082	15	18"	39' – 9"	398	77	18"	39' – 9"	2,045	108	9"	4' – 0"	289	108	9"	4' – 7"	331	9' – 3"	667	23' – 1"	62	50	139	1.498	331.2	1.7	201	61.6	13,447
4	7' – 0"	4' – 0"	8"	7"	108	#6	9"	30' – 8"	4,975	162	#5	6"	8' – 11"	1,507	7' – 0"	1,183	108	#6	9"	26' – 7"	4,312	20	18"	39' – 9"	531	100	18"	39' – 9"	2,655	108	9"	4' – 0"	289	162	9"	4' – 7"	496	9' – 3"	1,001	30' – 8"	82	64	178	1.959	423.7	2.3	260	80.6	17,209
5	7' – 0"	4' – 0"	8"	7"	108	#6	9"	38' – 3"	6,205	162	#5	6"	8' – 11"	1,507	7' – 0"	1,183	108	#6	9"	34' – 2"	5,542	25	18"	39' – 9"	664	123	18"	39' – 9"	3,266	108	9"	4' – 0"	289	216	9"	4' – 7"	661	9' – 3"	1,335	38' – 3"	102	80	223	2.420	516.3	2.8	325	99.6	20,977
6	7' – 0"	4' – 0"	8"	7"	108	#6	9"	45' – 10"	7,435	162	#5	6"	8' – 11"	1,507	7' – 0"	1,183	108	#6	9"	41' – 9"	6,773	30	18"	39' – 9"	797	146	18"	39' – 9"	3,877	108	9"	4' – 0"	289	270	9"	4' – 7"	827	9' – 3"	1,668	45' – 10"	122	94	262	2.881	608.9	3.4	384	118.6	24,740
2	7' – 0"	5' – 0"	8"	7"	108	#6	9"	15' – 6"	2,514	162	#5	6"	9' – 11"	1,676	7' – 0"	1,183	108	#6	9"	11' – 5"	1,852	10	18"	39' – 9"	266	60	18"	39' – 9"	1,593	108	9"	5' – 0"	361	54	9"	4' – 7"	165	11' – 3"	406	15' – 6"	41	34	95	1.102	250.4	1.2	136	45.2	10,152
3	7' – 0"	5' – 0"	8"	7"	108	#6	9"	23' – 1"	3,744	162	#5	6"	9' – 11"	1,676	7' – 0"	1,183	108	#6	9"	19' – 0"	3,082	15	18"	39' – 9"	398	85	18"	39' – 9"	2,257	108	9"	5' – 0"	361	108	9"	4' – 7"	331	11' – 3"	812	23' – 1"	62	50	139	1.584	346.1	1.7	201	65.1	14,045
4	7' – 0"	5' – 0"	8"	7"	108	#6	9"	30' – 8"	4,975	162	#5	6"	9' – 11"	1,676	7' – 0"	1,183	108	#6	9"	26' – 7"	4,312	20	18"	39' – 9"	531	110	18"	39' – 9"	2,921	108	9"	5' – 0"	361	162	9"	4' – 7"	496	11' – 3"	1,217	30' – 8"	82	64	178	2.067	441.8	2.3	260	85.0	17,932
5	7' – 0"	5' – 0"	8"	7"	108	#6	9"	38' – 3"	6,205	162	#5	6"	9' – 11"	1,676	7' – 0"	1,183	108	#6	9"	34' – 2"	5,542	25	18"	39' – 9"	664	135	18"	39' – 9"	3,585	108	9"	5' – 0"	361	216	9"	4' – 7"	661	11' – 3"	1,623	38' – 3"	102	80	223	2.549	537.5	2.8	325	104.8	21,825
6	7' – 0"	5' – 0"	8"	7"	108	#6	9"	45' – 10"	7,435	162	#5	6"	9' – 11"	1,676	7' – 0"	1,183	108	#6	9"	41' – 9"	6,773	30	18"	39' – 9"	797	160	18"	39' – 9"	4,248	108	9"	5' – 0"	361	270	9"	4' – 7"	827	11' – 3"	2,029	45' – 10"	122	94	262	3.032	633.2	3.4	384	124.7	25,713
2	7' – 0"	6' – 0"	8"	7"	108	#6	9"	15' – 6"	2,514	162	#5	6"	10' – 11"	1,845	7' – 0"	1,183	108	#6	9"	11' – 5"	1,852	10	18"	39' – 9"	266	66	18"	39' – 9"	1,752	108	9"	6' – 0"	433	54	9"	4' – 7"	165	13' – 3"	478	15' – 6"	41	34	95	1.167	262.2	1.2	136	47.8	10,624
3	7' – 0"	6' – 0"	8"	7"	108	#6	9"	23' – 1"	3,744	162	#5	6"	10' – 11"	1,845	7' – 0"	1,183	108	#6	9"	19' – 0"	3,082	15	18"	39' – 9"	398	93	18"	39' – 9"	2,469	108	9"	6' – 0"	433	108	9"	4' – 7"	331	13' – 3"	956	23' – 1"	62	50	139	1.671	361.0	1.7	201	68.6	14,642
4	7' – 0"	6' – 0"	8"	7"	108	#6	9"	30' – 8"	4,975	162	#5	6"	10' – 11"	1,845	7' – 0"	1,183	108	#6	9"	26' – 7"	4,312	20	18"	39' – 9"	531	120	18"	39' – 9"	3,186	108	9"	6' – 0"	433	162	9"	4' – 7"	496	13' – 3"	1,434	30' – 8"	82	64	178	2.175	459.9	2.3	260	89.3	18,655
5	7' – 0"	6' – 0"	8"	7"	108	#6	9"	38' – 3"	6,205	162	#5	6"	10' – 11"	1,845	7' – 0"	1,183	108	#6	9"	34' – 2"	5,542	25	18"	39' – 9"	664	147	18"	39' – 9"	3,903	108	9"	6' – 0"	433	216	9"	4' – 7"	661	13' – 3"	1,912	38' – 3"	102	80	223	2.679	558.7	2.8	325	110.0	22,673
6	7' – 0"	6' – 0"	8"	7"	108	#6	9"	45' – 10"	7,435	162	#5	6"	10' – 11"	1,845	7' – 0"	1,183	108	#6	9"	41' – 9"	6,773	30	18"	39' – 9"	797	174	18"	39' – 9"	4,620	108	9"	6' – 0"	433	270	9"	4' – 7"	827	13' – 3"	2,390	45' – 10"	122	94	262	3.183	657.6	3.4	384	130.7	26,687
2	7' – 0"	7' – 0"	8"	7"	108	#6	9"	15' – 6"	2,514	162	#5	6"	11' – 11"	2,014	7' – 0"	1,183	108	#6	9"	11' – 5"	1,852	10	18"	39' – 9"	266	66	18"	39' – 9"	1,752	108	9"	7' – 0"	505	54	9"	4' – 7"	165	15' – 3"	550	15' – 6"	41	34	95	1.231	270.0	1.2	136	50.4	10,937
3	7' – 0"	7' – 0"	8"	7"	108	#6	9"	23' – 1"	3,744	162	#5	6"	11' – 11"	2,014	7' – 0"	1,183	108	#6	9"	19' – 0"	3,082	15	18"	39' – 9"	398	93	18"	39' – 9"	2,469	108	9"	7' – 0"	505	108	9"	4' – 7"	331	15' – 3"	1,100	23' – 1"	62	50	139	1.757	370.7	1.7	201	72.0	15,027
4	7' – 0"	7' – 0"	8"	7"	108	#6	9"	30' – 8"	4,975	162	#5	6"	11' – 11"	2,014	7' – 0"	1,183	108	#6	9"	26' – 7"	4,312	20	18"	39' – 9"	531	120	18"	39' – 9"	3,186	108	9"	7' – 0"	505	162	9"	4' – 7"	496	15' – 3"	1,650	30' – 8"	82	64	178	2.283	471.3	2.3	260	93.6	19,112
5	7' – 0"	7' – 0"	8"	7"	108	#6	9"	38' – 3"	6,205	162	#5	6"	11' – 11"	2,014	7' – 0"	1,183	108	#6	9"	34' – 2"	5,542	25	18"	39' – 9"	664	147	18"	39' – 9"	3,903	108	9"	7' – 0"	505	216	9"	4' – 7"	661	15' – 3"	2,200	38' – 3"	102	80	223	2.809	571.9	2.8	325	115.2	23,202
6	7' – 0"	7' – 0"	8"	7"	108	#6	9"	45' – 10"	7,435	162	#5	6"	11' – 11"	2,014	7' – 0"	1,183	108	#6	9"	41' – 9"	6,773	30	18"	39' – 9"	797	174	18"	39' – 9"	4,620	108	9"	7' – 0"	505	270	9"	4' – 7"	827	15' – 3"	2,750	45' – 10"	122	94	262	3.334	672.6	3.4	384	136.8	27,288

HL93 LOADING SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

MULTIPLE BOX CULVERTS CAST-IN-PLACE

7'-0" SPAN

0' TO 10' FILL

MC-7-10

FILE: mc710ste-20.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
				200

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DATE:
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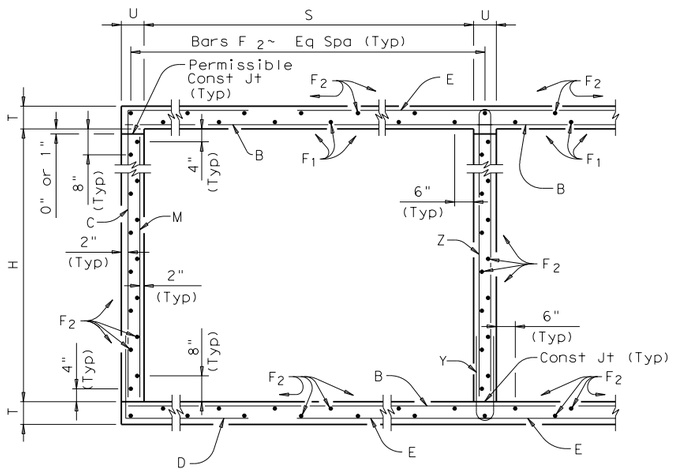
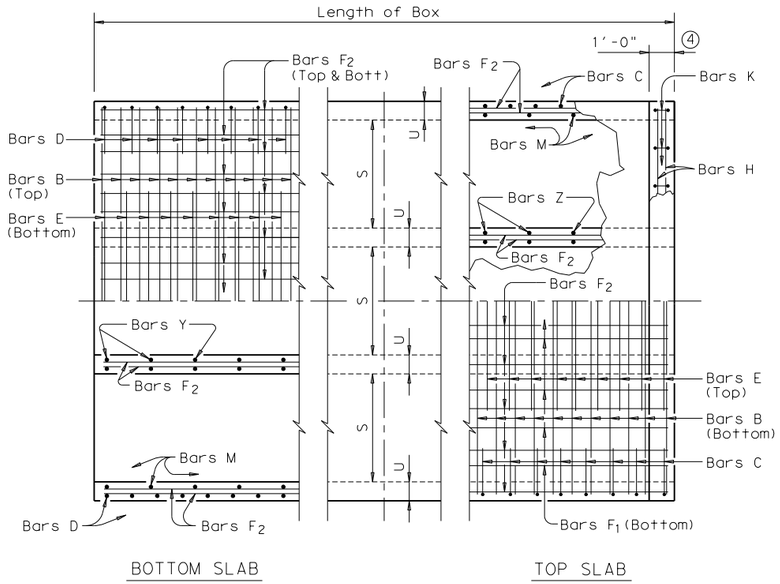


TYPICAL SECTION



BOTTOM SLAB

TOP SLAB

PART PLANS

① 0" min to 5'-0" max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail, bicycle rail or curbs taller than 1'-0", refer to ECD standard. For structures with T6 bridge rail, refer to T6-CM standard. For structures with traffic rail, other than T6, refer to RAC standard.

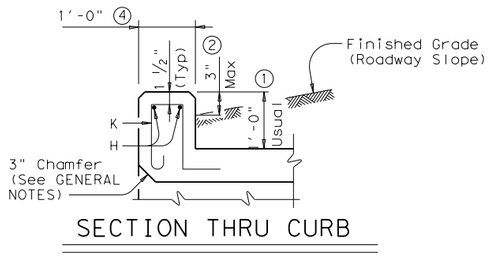
② For vehicle safety, the following requirements must be met:
- For structures without bridge rail, curbs shall project no more than 3" above finished grade.
- For structures with bridge rail, curbs shall be flush with finished grade.
Curb heights shall be reduced, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

③ For curbs less than 1'-0" high, tilt bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, bars K may be omitted.

④ 1'-0" typical. 2'-0" when RAC standard is referred to elsewhere in the plans.

Deformed welded wire reinforcement (WWR) meeting the requirements of ASTM A1064 may be used to replace conventional reinforcement shown at the Contractor's option. The area of required reinforcement may be reduced by the ratio of 60 ksi / 70 ksi. Spacing of WWR is limited to 4" Min and 18" Max. When required, provide lap splices in the WWR of the same length required for the equivalent bar size, rounded up for wire sizes between conventional bar sizes.

Example Conversion: Replacement of No. 6 Gr 60 at 6" Spacing with WWR.
WWR required = (0.44 sq in/ 0.5') x (60 ksi/70 ksi) = 0.754 sq in/ft.
If D30.6 wire is used to meet the 0.754 sq in/ft requirement in this example, the required spacing = (0.306 sq in/ 0.754 sq in/ft) x 12 in/ft = 4.87" Max spacing.
Required lap length for the provided D30.6 wire is 2'-2" (Lap required for uncoated No. 5 bars, as shown in Item 440).

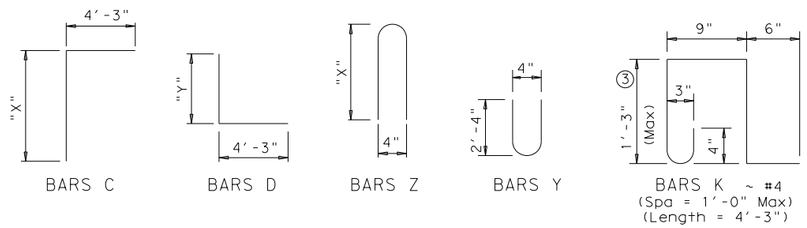


SECTION THRU CURB

H	Bar Dimensions	
	"X"	"Y"
5'-0"	5'-7"	2'- 4"
6'-0"	6'-7"	2'- 4"
7'-0"	7'-7"	2'- 9"
8'-0"	8'-7"	2'- 9"
9'-0"	9'-7"	2'- 9"

GENERAL NOTES:

Designed according to AASHTO LRFD Specifications.
Designed to the maximum fill height shown.
All reinforcing steel shall be Grade 60.
All concrete shall be Class "C" with a minimum compressive strength of 4,200 psi, 7.0 sack/CY.
The use of permanent forms is not allowed.
The bottom edge of the top slab shall be chamfered 3" at the entrance.
Reinforcing bars shall be adjusted to provide a minimum of 1 ¼" clear cover.
Construction joints shown at the flow line may be raised a maximum of 6" at the Contractor's option. If this option is used, Bars M may be cut off or raised, Bars C and D may be reversed, and Bars Y and Z may be reversed.
See standard MC-MD for skewed ends, angle sections and lengthening details.



HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

MULTIPLE BOX CULVERTS CAST-IN-PLACE 9'-0" SPAN 2' TO 13' FILL

MC-9-13

THE SEAL THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO: 134095 ON 10/21/2021.
ALTERATION ON A SEALED DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of

FREESE AND NICHOLS, INC.

RECORD DRAWINGS PREPARED ON: 8/20/2024

FILE: mc913ste.dgn	DN: GAF	CK: LMW	DW: BWH/TxDOT	CK: GAF
©TxDOT February 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS				
10-12: Added WWR; Bars Y & Z	DIST	COUNTY		SHEET NO.
				201

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DATE:
FILE:

BILLS OF REINFORCING STEEL (For Box Length = 40 feet)

NUMBER OF SPANS	SECTION DIMENSIONS				Bars B					Bars C & D							Bars E					Bars F_1~#4				Bars F_2~#4 at 1'-6" Max			Bars M~#4 at 1'-6" Max			Bars Y & Z~#4 at 1'-6" Max				Bars H 4~#4		Bars K		QUANTITIES Per foot of Barrel		Curb		Total	
													Bar C		Bar D																															
	S	H	T	U	No.	Size	Spa	Length	Wt	No.	Size	Spa	Length	Wt	Length	Wt	No.	Size	Spa	Length	Wt	No.	Spa	Length	Wt	No.	Length	Wt	No.	Length	Wt	No.	Bar Y Length	Bar Y Wt	Bar Z Length	Bar Z Wt	Length	Weight	No.	Weight	Conc (CY)	Reinf (Lb)	Conc (CY)	Reinf (Lb)	Conc (CY)	Reinf (Lb)
2	9'-0"	5'-0"	9"	8"	194	#5	5"	19'- 9"	3,996	194	#4	5"	9'-10"	1,274	6'- 7"	853	194	#6	5"	8'-10"	2,574	14	18"	39'-9"	372	68	39'-9"	1,806	56	5'- 0"	187	28	4'-10"	90	11'- 4"	212	19'- 9"	53	42	119	1.481	284.1	1.5	172	60.7	11,536
3	9'-0"	5'-0"	9"	8"	194	#5	5"	29'- 5"	5,952	194	#4	5"	9'-10"	1,274	6'- 7"	853	194	#6	5"	18'- 6"	5,391	21	18"	39'-9"	558	97	39'-9"	2,576	56	5'- 0"	187	56	4'-10"	181	11'- 4"	424	29'- 5"	79	62	176	2.142	434.9	2.2	255	87.9	17,651
4	9'-0"	5'-0"	9"	8"	194	#5	5"	39'- 1"	7,908	194	#4	5"	9'-10"	1,274	6'- 7"	853	194	#6	5"	28'- 2"	8,207	28	18"	39'-9"	743	126	39'-9"	3,346	56	5'- 0"	187	84	4'-10"	271	11'- 4"	636	39'- 1"	104	80	227	2.802	585.6	2.9	331	115.0	23,756
5	9'-0"	5'-0"	9"	8"	194	#5	5"	48'- 9"	9,864	194	#4	5"	9'-10"	1,274	6'- 7"	853	194	#6	5"	37'-10"	11,024	35	18"	39'-9"	929	155	39'-9"	4,116	56	5'- 0"	187	112	4'-10"	362	11'- 4"	848	48'- 9"	130	100	284	3.463	736.4	3.6	414	142.1	29,871
6	9'-0"	5'-0"	9"	8"	194	#5	5"	58'- 5"	11,820	194	#4	5"	9'-10"	1,274	6'- 7"	853	194	#6	5"	47'- 6"	13,841	42	18"	39'-9"	1,115	184	39'-9"	4,886	56	5'- 0"	187	140	4'-10"	452	11'- 4"	1,060	58'- 5"	156	120	341	4.123	887.2	4.3	497	169.2	35,985
2	9'-0"	6'-0"	9"	8"	194	#5	5"	19'- 9"	3,996	194	#4	5"	10'-10"	1,404	6'- 7"	853	194	#6	5"	8'-10"	2,574	14	18"	39'-9"	372	74	39'-9"	1,965	56	6'- 0"	224	28	4'-10"	90	13'- 4"	249	19'- 9"	53	42	119	1.556	293.2	1.5	172	63.7	11,899
3	9'-0"	6'-0"	9"	8"	194	#5	5"	29'- 5"	5,952	194	#4	5"	10'-10"	1,404	6'- 7"	853	194	#6	5"	18'- 6"	5,391	21	18"	39'-9"	558	105	39'-9"	2,788	56	6'- 0"	224	56	4'-10"	181	13'- 4"	499	29'- 5"	79	62	176	2.241	446.3	2.2	255	91.8	18,105
4	9'-0"	6'-0"	9"	8"	194	#5	5"	39'- 1"	7,908	194	#4	5"	10'-10"	1,404	6'- 7"	853	194	#6	5"	28'- 2"	8,207	28	18"	39'-9"	743	136	39'-9"	3,611	56	6'- 0"	224	84	4'-10"	271	13'- 4"	748	39'- 1"	104	80	227	2.926	599.2	2.9	331	119.9	24,300
5	9'-0"	6'-0"	9"	8"	194	#5	5"	48'- 9"	9,864	194	#4	5"	10'-10"	1,404	6'- 7"	853	194	#6	5"	37'-10"	11,024	35	18"	39'-9"	929	167	39'-9"	4,434	56	6'- 0"	224	112	4'-10"	362	13'- 4"	998	48'- 9"	130	100	284	3.611	752.3	3.6	414	148.0	30,506
6	9'-0"	6'-0"	9"	8"	194	#5	5"	58'- 5"	11,820	194	#4	5"	10'-10"	1,404	6'- 7"	853	194	#6	5"	47'- 6"	13,841	42	18"	39'-9"	1,115	198	39'-9"	5,257	56	6'- 0"	224	140	4'-10"	452	13'- 4"	1,247	58'- 5"	156	120	341	4.296	905.3	4.3	497	176.1	36,710
2	9'-0"	7'-0"	9"	8"	194	#5	5"	19'- 9"	3,996	162	#5	6"	11'-10"	1,999	7'- 0"	1,183	194	#6	5"	8'-10"	2,574	14	18"	39'-9"	372	74	39'-9"	1,965	56	7'- 0"	262	28	4'-10"	90	15'- 4"	287	19'- 9"	53	42	119	1.630	318.2	1.5	172	66.7	12,900
3	9'-0"	7'-0"	9"	8"	194	#5	5"	29'- 5"	5,952	162	#5	6"	11'-10"	1,999	7'- 0"	1,183	194	#6	5"	18'- 6"	5,391	21	18"	39'-9"	558	105	39'-9"	2,788	56	7'- 0"	262	56	4'-10"	181	15'- 4"	574	29'- 5"	79	62	176	2.340	472.2	2.2	255	95.8	19,143
4	9'-0"	7'-0"	9"	8"	194	#5	5"	39'- 1"	7,908	162	#5	6"	11'-10"	1,999	7'- 0"	1,183	194	#6	5"	28'- 2"	8,207	28	18"	39'-9"	743	136	39'-9"	3,611	56	7'- 0"	262	84	4'-10"	271	15'- 4"	860	39'- 1"	104	80	227	3.049	626.1	2.9	331	124.9	25,375
5	9'-0"	7'-0"	9"	8"	194	#5	5"	48'- 9"	9,864	162	#5	6"	11'-10"	1,999	7'- 0"	1,183	194	#6	5"	37'-10"	11,024	35	18"	39'-9"	929	167	39'-9"	4,434	56	7'- 0"	262	112	4'-10"	362	15'- 4"	1,147	48'- 9"	130	100	284	3.759	780.1	3.6	414	154.0	31,618
6	9'-0"	7'-0"	9"	8"	194	#5	5"	58'- 5"	11,820	162	#5	6"	11'-10"	1,999	7'- 0"	1,183	194	#6	5"	47'- 6"	13,841	42	18"	39'-9"	1,115	198	39'-9"	5,257	56	7'- 0"	262	140	4'-10"	452	15'- 4"	1,434	58'- 5"	156	120	341	4.469	934.1	4.3	497	183.1	37,860
2	9'-0"	8'-0"	9"	8"	194	#5	5"	19'- 9"	3,996	162	#5	6"	12'-10"	2,168	7'- 0"	1,183	194	#6	5"	8'-10"	2,574	14	18"	39'-9"	372	80	39'-9"	2,124	56	8'- 0"	299	28	4'-10"	90	17'- 4"	324	19'- 9"	53	42	119	1.704	328.3	1.5	172	69.7	13,302
3	9'-0"	8'-0"	9"	8"	194	#5	5"	29'- 5"	5,952	162	#5	6"	12'-10"	2,168	7'- 0"	1,183	194	#6	5"	18'- 6"	5,391	21	18"	39'-9"	558	113	39'-9"	3,000	56	8'- 0"	299	56	4'-10"	181	17'- 4"	648	29'- 5"	79	62	176	2.438	484.5	2.2	255	99.7	19,635
4	9'-0"	8'-0"	9"	8"	194	#5	5"	39'- 1"	7,908	162	#5	6"	12'-10"	2,168	7'- 0"	1,183	194	#6	5"	28'- 2"	8,207	28	18"	39'-9"	743	146	39'-9"	3,877	56	8'- 0"	299	84	4'-10"	271	17'- 4"	973	39'- 1"	104	80	227	3.173	640.7	2.9	331	129.8	25,960
5	9'-0"	8'-0"	9"	8"	194	#5	5"	48'- 9"	9,864	162	#5	6"	12'-10"	2,168	7'- 0"	1,183	194	#6	5"	37'-10"	11,024	35	18"	39'-9"	929	179	39'-9"	4,753	56	8'- 0"	299	112	4'-10"	362	17'- 4"	1,297	48'- 9"	130	100	284	3.907	797.0	3.6	414	159.9	32,293
6	9'-0"	8'-0"	9"	8"	194	#5	5"	58'- 5"	11,820	162	#5	6"	12'-10"	2,168	7'- 0"	1,183	194	#6	5"	47'- 6"	13,841	42	18"	39'-9"	1,115	212	39'-9"	5,629	56	8'- 0"	299	140	4'-10"	452	17'- 4"	1,621	58'- 5"	156	120	341	4.642	953.2	4.3	497	190.0	38,625
2	9'-0"	9'-0"	9"	8"	194	#5	5"	19'- 9"	3,996	194	#5	5"	13'-10"	2,799	7'- 0"	1,416	194	#6	5"	8'-10"	2,574	14	18"	39'-9"	372	86	39'-9"	2,284	56	9'- 0"	337	28	4'-10"	90	19'- 4"	362	19'- 9"	53	42	119	1.778	355.8	1.5	172	72.6	14,402
3	9'-0"	9'-0"	9"	8"	194	#5	5"	29'- 5"	5,952	194	#5	5"	13'-10"	2,799	7'- 0"	1,416	194	#6	5"	18'- 6"	5,391	21	18"	39'-9"	558	121	39'-9"	3,213	56	9'- 0"	337	56	4'-10"	181	19'- 4"	723	29'- 5"	79	62	176	2.537	514.3	2.2	255	103.7	20,825
4	9'-0"	9'-0"	9"	8"	194	#5	5"	39'- 1"	7,908	194	#5	5"	13'-10"	2,799	7'- 0"	1,416	194	#6	5"	28'- 2"	8,207	28	18"	39'-9"	743	156	39'-9"	4,142	56	9'- 0"	337	84	4'-10"	271	19'- 4"	1,085	39'- 1"	104	80	227	3.296	672.7	2.9	331	134.7	27,239
5	9'-0"	9'-0"	9"	8"	194	#5	5"	48'- 9"	9,864	194	#5	5"	13'-10"	2,799	7'- 0"	1,416	194	#6	5"	37'-10"	11,024	35	18"	39'-9"	929	191	39'-9"	5,072	56	9'- 0"	337	112	4'-10"	362	19'- 4"	1,446	48'- 9"	130	100	284	4.056	831.2	3.6	414	165.8	33,663
6	9'-0"	9'-0"	9"	8"	194	#5	5"	58'- 5"	11,820	194	#5	5"	13'-10"	2,799	7'- 0"	1,416	194	#6	5"	47'- 6"	13,841	42	18"	39'-9"	1,115	226	39'-9"	6,001	56	9'- 0"	337	140	4'-10"	452	19'- 4"	1,808	58'- 5"	156	120	341	4.815	989.7	4.3	497	196.9	40,086

Deformed welded wire reinforcement (WWR) meeting the requirements of ASTM A1064 may be used to replace conventional reinforcement shown at the Contractor's option. The area of required reinforcement may be reduced by the ratio of 60 ksi / 70 ksi. Spacing of WWR is limited to 4" Min and 18" Max. When required, provide lap splices in the WWR of the same length required for the equivalent bar size, rounded up for wire sizes between conventional bar sizes.

Example Conversion: Replacement of No. 6 Gr 60 at 6" Spacing with WWR.
WWR required = (0.44 sq in/ 0.5') x (60 ksi/70 ksi) = 0.754 sq in/ft.
If D30.6 wire is used to meet the 0.754 sq in/ft requirement in this example, the required spacing = (0.306 sq in/ 0.754 sq in/ft) x 12 in/ft = 4.87" Max spacing.
Required lap length for the provided D30.6 wire is 2'-2" (Lap required for uncoated No. 5 bars, as shown in Item 440).

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

MULTIPLE BOX CULVERTS CAST-IN-PLACE 9'-0" SPAN 2' TO 13' FILL

MC-9-13

FILE: mc913ste.dgn	DN: GAF	CK: LMW	DW: BWH/TxDOT	CK: GAF
©TxDOT February 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS				
10-12: Added WWR; Bars Y & Z	DIST	COUNTY		SHEET NO.
				202

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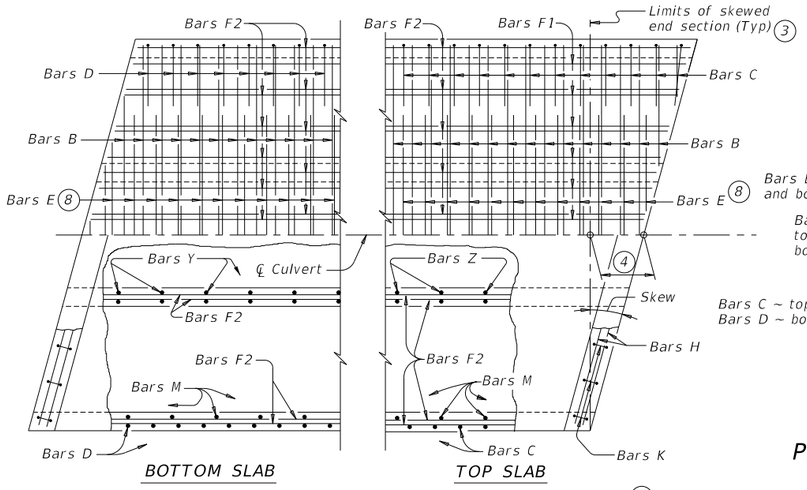
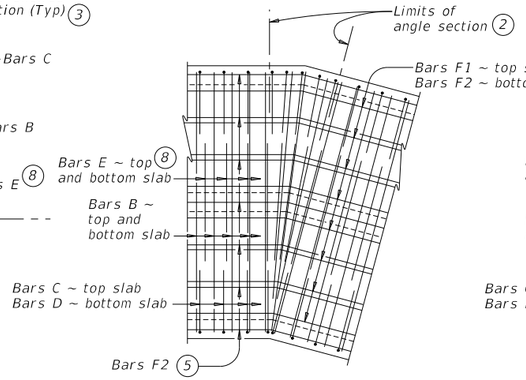
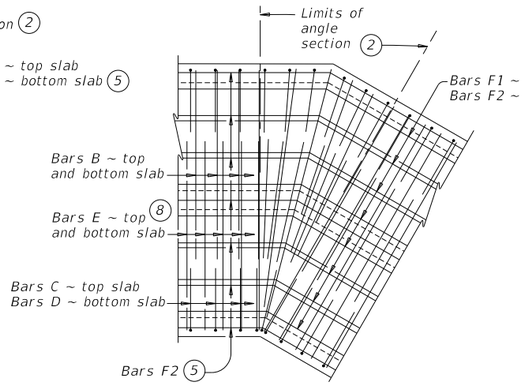


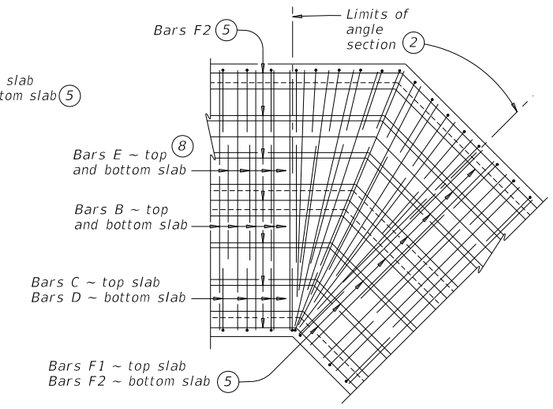
PLAN OF SKEWED ENDS ~ FROM 0° TO 15° 7



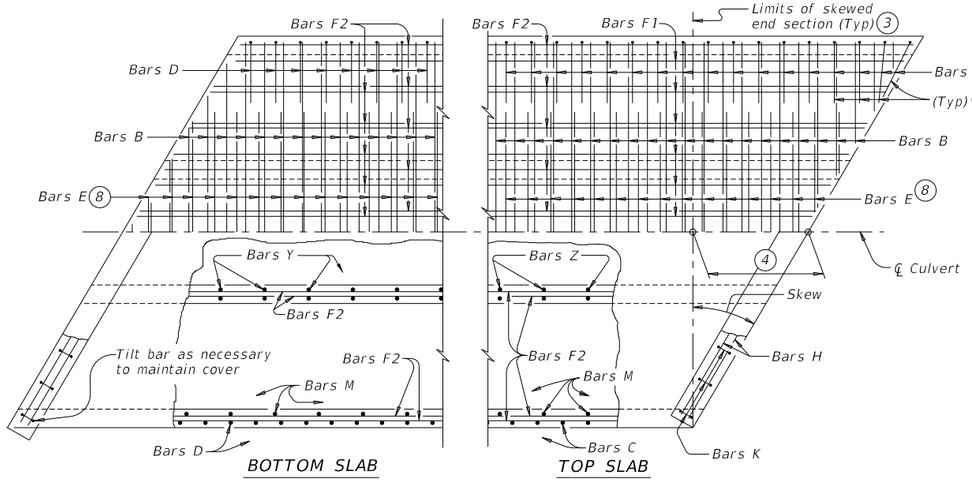
PLAN OF ANGLE SECTION ~ FROM 0° TO 15°



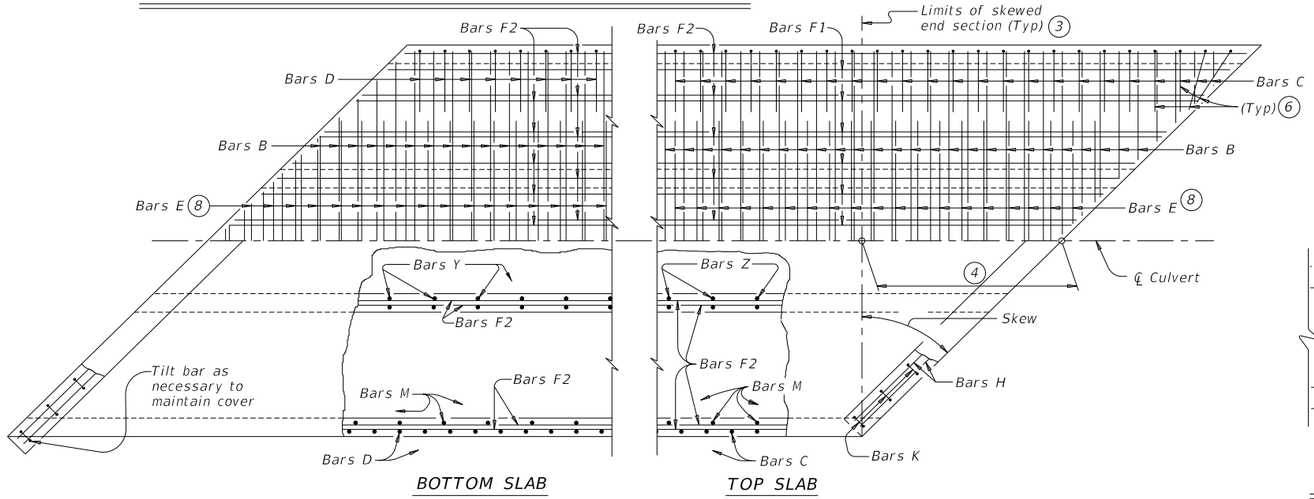
PLAN OF ANGLE SECTION ~ OVER 15° TO 30°



PLAN OF ANGLE SECTION ~ OVER 30° TO 45°

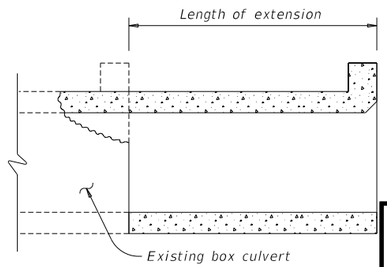


PLAN OF SKEWED ENDS ~ OVER 15° TO 30°



PLAN OF SKEWED ENDS ~ OVER 30° TO 45°

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



LENGTHENING DETAIL 1

CONSTRUCTION NOTES:

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

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel, if required elsewhere in the plans.
Provide Class C concrete (f'c = 4,200 psi, 7.0 sack/CY) with these exceptions: provide Class S concrete (f'c = 4,200 psi, 7.0 sack/CY) for top slabs of culverts with overlay, with 1-to-2 course surface treatment, or with the top slab as the final riding surface.

GENERAL NOTES:

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

Cover dimensions are clear dimensions, unless noted otherwise.

HL93 LOADING

THE SEAL THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO: 134095 ON 10/21/2021
ALTERATION ON A SEALED DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

Texas Department of Transportation

Bridge Division Standard

MULTIPLE BOX CULVERTS CAST-IN-PLACE MISCELLANEOUS DETAILS

MC-MD

FILE: mc-mdste-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
				203

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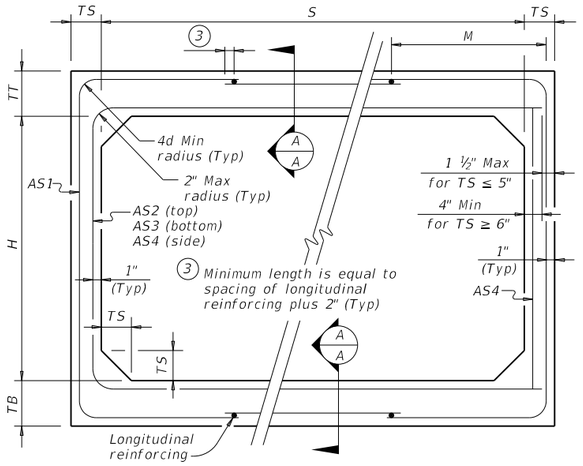
DATE:
FILE:

BOX DATA

SECTION DIMENSIONS					Fill Height	M (Min)	REINFORCING (sq. in. / ft.) (2)							(1) Lift Weight
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)	(ft.)	(in.)	AS1	AS2	AS3	AS4	AS5	AS7	AS8	(tons)
3	2	7	6	4	< 2	–	0.17	0.25	0.16	0.10	0.17	0.17	0.14	3.3
3	2	4	4	4	2 < 3	31	0.13	0.19	0.18	0.10	–	–	–	2.4
3	2	4	4	4	3 – 5	31	0.10	0.11	0.12	0.10	–	–	–	2.4
3	2	4	4	4	10	31	0.10	0.10	0.10	0.10	–	–	–	2.4
3	2	4	4	4	15	31	0.10	0.13	0.13	0.10	–	–	–	2.4
3	2	4	4	4	20	31	0.11	0.17	0.17	0.10	–	–	–	2.4
3	2	4	4	4	25	31	0.14	0.21	0.21	0.10	–	–	–	2.4
3	2	4	4	4	30	31	0.17	0.25	0.25	0.10	–	–	–	2.4
3	2	4	4	4	35	31	0.20	0.29	0.30	0.10	–	–	–	2.4
3	3	7	6	4	< 2	–	0.17	0.27	0.17	0.10	0.17	0.17	0.14	3.7
3	3	4	4	4	2 < 3	31	0.10	0.22	0.21	0.10	–	–	–	2.8
3	3	4	4	4	3 – 5	31	0.10	0.14	0.14	0.10	–	–	–	2.8
3	3	4	4	4	10	31	0.10	0.11	0.11	0.10	–	–	–	2.8
3	3	4	4	4	15	31	0.10	0.14	0.15	0.10	–	–	–	2.8
3	3	4	4	4	20	31	0.10	0.18	0.19	0.10	–	–	–	2.8
3	3	4	4	4	25	31	0.10	0.23	0.23	0.10	–	–	–	2.8
3	3	4	4	4	30	31	0.12	0.27	0.28	0.10	–	–	–	2.8
3	3	4	4	4	35	31	0.14	0.32	0.32	0.10	–	–	–	2.8

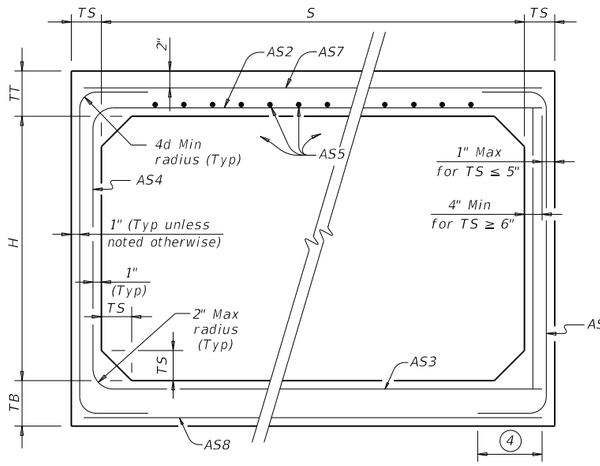
(1) For box length = 8'-0"

(2) AS1 thru AS4, AS7 and AS8 are minimum required areas of reinforcement per linear foot of box length. AS5 is minimum required area of reinforcement per linear foot of box width.



CORNER OPTION "A" CORNER OPTION "B"

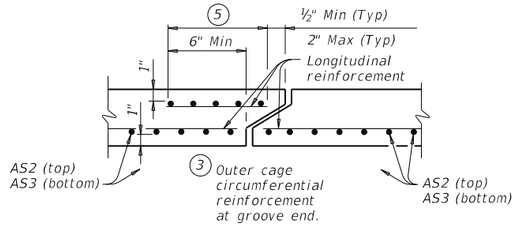
FILL HEIGHT 2 FT AND GREATER



CORNER OPTION "A" CORNER OPTION "B"

FILL HEIGHT LESS THAN 2 FT

(4) Length is equal to spacing of longitudinal reinforcing plus 2". (10" Min) (Typ)



SECTION A-A

(Showing top and bottom slab joint reinforcement.)

MATERIAL NOTES:

Provide 0.03 sq. in./ft. minimum longitudinal reinforcement at each face in slabs and walls. This minimum requirement may be met by the transverse wires when wire mesh reinforcement is used.

Provide Class H concrete (f'c = 5,000 psi, 7.0 sack/CY).

GENERAL NOTES:

Designs shown conform to ASTM C1577. Refer to ASTM C1577 for information or details not shown.

See Box Culverts Precast Miscellaneous Details (SCP-MD) standard sheet for details and notes not shown.

In lieu of furnishing the designs shown on this sheet, the contractor may furnish an alternate design that is equal to or exceeds the box design for the design fill height in the table. Submit shop plans for alternate designs in accordance with Item "Precast Concrete Structural Members (Fabrication)".

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS PRECAST

3'-0" SPAN

SCP-3

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This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of

FREESE AND NICHOLS, INC.

RECORD DRAWINGS PREPARED ON: 8/20/2024

FILE: scp03sts-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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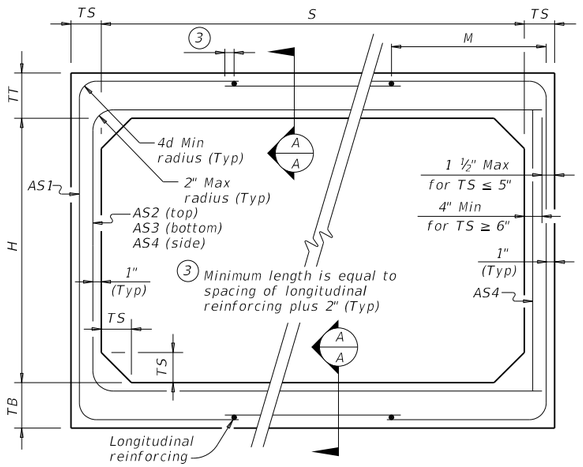
BOX DATA

SECTION DIMENSIONS					Fill Height	M (Min)	REINFORCING (sq. in. / ft.) ②							① Lift Weight
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)	(ft.)	(in.)	AS1	AS2	AS3	AS4	AS5	AS7	AS8	(tons)
4	2	7.5	6	5	< 2	–	0.18	0.27	0.15	0.12	0.18	0.18	0.14	4.5
4	2	5	5	5	2 < 3	38	0.18	0.19	0.17	0.12	–	–	–	3.6
4	2	5	5	5	3 – 5	38	0.13	0.13	0.13	0.12	–	–	–	3.6
4	2	5	5	5	10	38	0.12	0.12	0.12	0.12	–	–	–	3.6
4	2	5	5	5	15	38	0.14	0.16	0.16	0.12	–	–	–	3.6
4	2	5	5	5	20	38	0.18	0.20	0.21	0.12	–	–	–	3.6
4	2	5	5	5	25	38	0.23	0.25	0.25	0.12	–	–	–	3.6
4	2	5	5	5	30	38	0.28	0.30	0.30	0.12	–	–	–	3.6
4	3	7.5	6	5	< 2	–	0.18	0.31	0.18	0.12	0.18	0.18	0.14	5.0
4	3	5	5	5	2 < 3	38	0.15	0.23	0.20	0.12	–	–	–	4.1
4	3	5	5	5	3 – 5	38	0.12	0.16	0.16	0.12	–	–	–	4.1
4	3	5	5	5	10	38	0.12	0.14	0.14	0.12	–	–	–	4.1
4	3	5	5	5	15	38	0.12	0.18	0.18	0.12	–	–	–	4.1
4	3	5	5	5	20	38	0.14	0.23	0.24	0.12	–	–	–	4.1
4	3	5	5	5	25	38	0.17	0.29	0.29	0.12	–	–	–	4.1
4	3	5	5	5	30	38	0.21	0.35	0.35	0.12	–	–	–	4.1
4	4	7.5	6	5	< 2	–	0.18	0.33	0.20	0.12	0.18	0.18	0.14	5.5
4	4	5	5	5	2 < 3	38	0.12	0.26	0.23	0.12	–	–	–	4.6
4	4	5	5	5	3 – 5	38	0.12	0.18	0.18	0.12	–	–	–	4.6
4	4	5	5	5	10	38	0.12	0.15	0.15	0.12	–	–	–	4.6
4	4	5	5	5	15	38	0.12	0.19	0.20	0.12	–	–	–	4.6
4	4	5	5	5	20	38	0.12	0.25	0.25	0.12	–	–	–	4.6
4	4	5	5	5	25	38	0.14	0.31	0.31	0.12	–	–	–	4.6
4	4	5	5	5	30	38	0.17	0.37	0.37	0.12	–	–	–	4.6

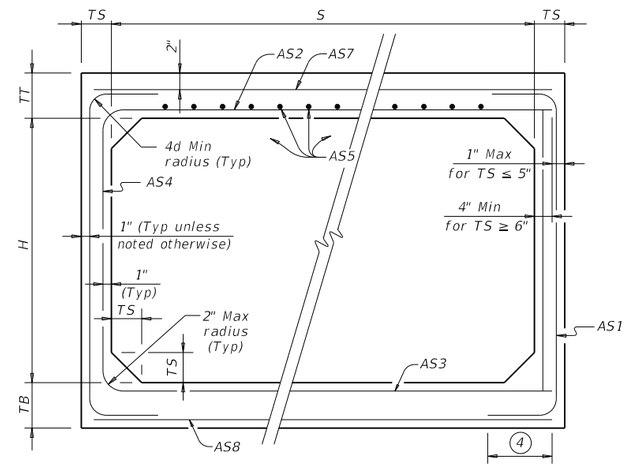
① For box length = 8'-0"

② AS1 thru AS4, AS7 and AS8 are minimum required areas of reinforcement per linear foot of box length. AS5 is minimum required area of reinforcement per linear foot of box width.



CORNER OPTION "A" CORNER OPTION "B"

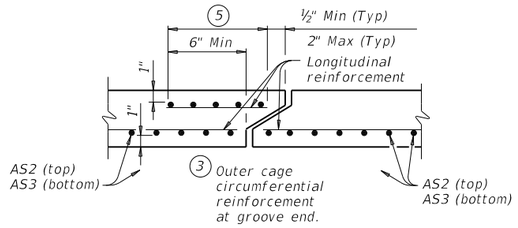
FILL HEIGHT 2 FT AND GREATER



CORNER OPTION "A" CORNER OPTION "B"

FILL HEIGHT LESS THAN 2 FT

④ Length is equal to spacing of longitudinal reinforcing plus 2". (10" Min) (Typ)



SECTION A-A

(Showing top and bottom slab joint reinforcement.)

MATERIAL NOTES:

Provide 0.03 sq. in./ft. minimum longitudinal reinforcement at each face in slabs and walls. This minimum requirement may be met by the transverse wires when wire mesh reinforcement is used.

Provide Class H concrete (f'c = 5,000 psi, 7.0 sack/CY).

GENERAL NOTES:

Designs shown conform to ASTM C1577. Refer to ASTM C1577 for information or details not shown.

See Box Culverts Precast Miscellaneous Details (SCP-MD) standard sheet for details and notes not shown.

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HL93 LOADING

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TEXAS NO: 134095 ON 10/21/2021
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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

Texas Department of Transportation — Bridge Division Standard

SINGLE BOX CULVERTS PRECAST
4'-0" SPAN

SCP-4

FILE: scp04sts-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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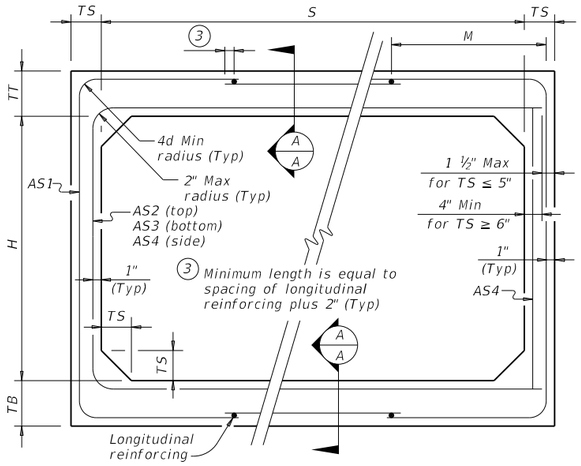
BOX DATA

SECTION DIMENSIONS					Fill Height	M (Min)	REINFORCING (sq. in. / ft.) (2)							(1) Lift Weight
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)	(ft.)	(in.)	AS1	AS2	AS3	AS4	AS5	AS7	AS8	(tons)
5	2	8	7	6	< 2	–	0.19	0.27	0.18	0.14	0.19	0.19	0.17	6.0
5	2	6	6	6	2 < 3	44	0.22	0.20	0.16	0.14	–	–	–	5.1
5	2	6	6	6	3 – 5	44	0.16	0.14	0.14	0.14	–	–	–	5.1
5	2	6	6	6	10	36	0.15	0.14	0.14	0.14	–	–	–	5.1
5	2	6	6	6	15	36	0.20	0.18	0.18	0.14	–	–	–	5.1
5	2	6	6	6	20	36	0.26	0.23	0.24	0.14	–	–	–	5.1
5	2	6	6	6	25	36	0.33	0.29	0.29	0.14	–	–	–	5.1
5	2	6	6	6	30	36	0.39	0.34	0.35	0.14	–	–	–	5.1
5	3	8	7	6	< 2	–	0.19	0.31	0.21	0.14	0.19	0.19	0.17	6.6
5	3	6	6	6	2 < 3	45	0.18	0.24	0.19	0.14	–	–	–	5.7
5	3	6	6	6	3 – 5	36	0.14	0.17	0.16	0.14	–	–	–	5.7
5	3	6	6	6	10	36	0.14	0.16	0.17	0.14	–	–	–	5.7
5	3	6	6	6	15	35	0.16	0.21	0.22	0.14	–	–	–	5.7
5	3	6	6	6	20	35	0.21	0.27	0.28	0.14	–	–	–	5.7
5	3	6	6	6	25	35	0.26	0.34	0.34	0.14	–	–	–	5.7
5	3	6	6	6	30	35	0.31	0.41	0.41	0.14	–	–	–	5.7
5	4	8	7	6	< 2	–	0.19	0.33	0.24	0.14	0.19	0.19	0.17	7.2
5	4	6	6	6	2 < 3	45	0.16	0.27	0.22	0.14	–	–	–	6.3
5	4	6	6	6	3 – 5	45	0.14	0.19	0.18	0.14	–	–	–	6.3
5	4	6	6	6	10	36	0.14	0.18	0.18	0.14	–	–	–	6.3
5	4	6	6	6	15	35	0.14	0.23	0.24	0.14	–	–	–	6.3
5	4	6	6	6	20	35	0.17	0.30	0.31	0.14	–	–	–	6.3
5	4	6	6	6	25	35	0.21	0.37	0.38	0.14	–	–	–	6.3
5	4	6	6	6	30	35	0.25	0.44	0.45	0.14	–	–	–	6.3
5	5	8	7	6	< 2	–	0.19	0.35	0.26	0.14	0.19	0.19	0.17	7.8
5	5	6	6	6	2 < 3	45	0.14	0.29	0.24	0.14	–	–	–	6.9
5	5	6	6	6	3 – 5	45	0.14	0.21	0.20	0.14	–	–	–	6.9
5	5	6	6	6	10	45	0.14	0.19	0.20	0.14	–	–	–	6.9
5	5	6	6	6	15	36	0.14	0.24	0.25	0.14	–	–	–	6.9
5	5	6	6	6	20	35	0.15	0.31	0.32	0.14	–	–	–	6.9
5	5	6	6	6	25	35	0.18	0.38	0.39	0.14	–	–	–	6.9
5	5	6	6	6	30	35	0.21	0.46	0.47	0.14	–	–	–	6.9

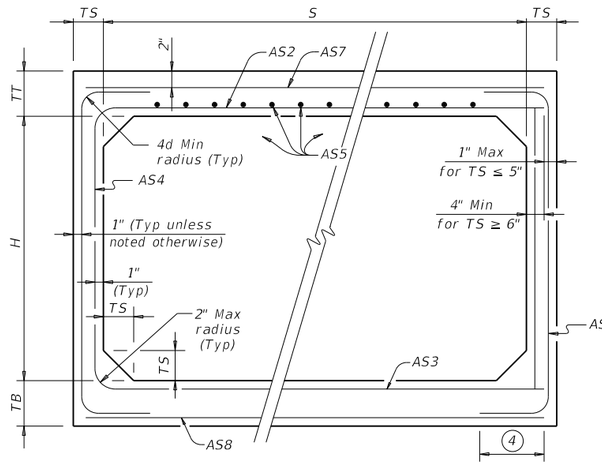
(1) For box length = 8'-0"

(2) AS1 thru AS4, AS7 and AS8 are minimum required areas of reinforcement per linear foot of box length. AS5 is minimum required area of reinforcement per linear foot of box width.



CORNER OPTION "A" CORNER OPTION "B"

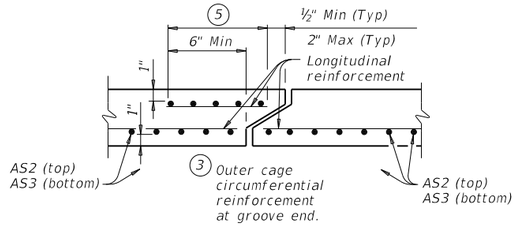
FILL HEIGHT 2 FT AND GREATER



CORNER OPTION "A" CORNER OPTION "B"

FILL HEIGHT LESS THAN 2 FT

(4) Length is equal to spacing of longitudinal reinforcing plus 2". (10" Min) (Typ)



SECTION A-A

(Showing top and bottom slab joint reinforcement.)

MATERIAL NOTES:

Provide 0.03 sq. in./ft. minimum longitudinal reinforcement at each face in slabs and walls. This minimum requirement may be met by the transverse wires when wire mesh reinforcement is used.

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GENERAL NOTES:

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HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS PRECAST

5'-0" SPAN

SCP-5

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RECORD DRAWINGS PREPARED ON: 8/20/2024

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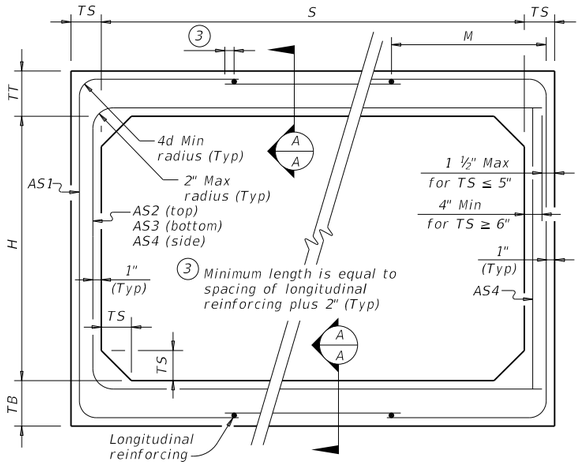
BOX DATA

SECTION DIMENSIONS					Fill Height	M (Min)	REINFORCING (sq. in. / ft.) (2)							(1) Lift Weight
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)	(ft.)	(in.)	AS1	AS2	AS3	AS4	AS5	AS7	AS8	(tons)
6	2	8	7	7	< 2	–	0.23	0.27	0.19	0.17	0.19	0.19	0.17	7.2
6	2	7	7	7	2 < 3	43	0.25	0.21	0.17	0.17	–	–	–	6.8
6	2	7	7	7	3 – 5	43	0.20	0.17	0.17	0.17	–	–	–	6.8
6	2	7	7	7	10	39	0.20	0.17	0.17	0.17	–	–	–	6.8
6	2	7	7	7	15	39	0.26	0.20	0.20	0.17	–	–	–	6.8
6	2	7	7	7	20	39	0.34	0.26	0.26	0.17	–	–	–	6.8
6	2	7	7	7	25	39	0.43	0.32	0.32	0.17	–	–	–	6.8
6	2	7	7	7	30	39	0.52	0.38	0.39	0.17	–	–	–	6.8
6	3	8	7	7	< 2	–	0.20	0.31	0.22	0.17	0.19	0.19	0.17	7.9
6	3	7	7	7	2 < 3	43	0.21	0.24	0.19	0.17	–	–	–	7.5
6	3	7	7	7	3 – 5	39	0.17	0.18	0.17	0.17	–	–	–	7.5
6	3	7	7	7	10	39	0.17	0.18	0.19	0.17	–	–	–	7.5
6	3	7	7	7	15	38	0.22	0.24	0.24	0.17	–	–	–	7.5
6	3	7	7	7	20	38	0.28	0.31	0.31	0.17	–	–	–	7.5
6	3	7	7	7	25	38	0.35	0.38	0.39	0.17	–	–	–	7.5
6	3	7	7	7	30	38	0.42	0.46	0.46	0.17	–	–	–	7.5
6	4	8	7	7	< 2	–	0.19	0.34	0.25	0.17	0.19	0.19	0.17	8.6
6	4	7	7	7	2 < 3	43	0.19	0.27	0.21	0.17	–	–	–	8.2
6	4	7	7	7	3 – 5	39	0.17	0.21	0.19	0.17	–	–	–	8.2
6	4	7	7	7	10	39	0.17	0.20	0.21	0.17	–	–	–	8.2
6	4	7	7	7	15	38	0.18	0.27	0.27	0.17	–	–	–	8.2
6	4	7	7	7	20	38	0.24	0.34	0.35	0.17	–	–	–	8.2
6	4	7	7	7	25	38	0.29	0.43	0.42	0.17	–	–	–	8.2
6	4	7	7	7	30	38	0.35	0.51	0.52	0.17	–	–	–	8.2
6	5	8	7	7	< 2	–	0.19	0.37	0.28	0.17	0.19	0.19	0.17	9.3
6	5	7	7	7	2 < 3	43	0.17	0.30	0.24	0.17	–	–	–	8.9
6	5	7	7	7	3 – 5	43	0.17	0.23	0.21	0.17	–	–	–	8.9
6	5	7	7	7	10	39	0.17	0.22	0.23	0.17	–	–	–	8.9
6	5	7	7	7	15	38	0.17	0.28	0.29	0.17	–	–	–	8.9
6	5	7	7	7	20	38	0.20	0.37	0.38	0.17	–	–	–	8.9
6	5	7	7	7	25	38	0.25	0.45	0.46	0.17	–	–	–	8.9
6	5	7	7	7	30	38	0.30	0.54	0.55	0.17	–	–	–	8.9
6	6	8	7	7	< 2	–	0.19	0.38	0.30	0.17	0.19	0.19	0.17	10
6	6	7	7	7	2 < 3	52	0.17	0.32	0.26	0.17	–	–	–	9.6
6	6	7	7	7	3 – 5	52	0.17	0.24	0.22	0.17	–	–	–	9.6
6	6	7	7	7	10	43	0.17	0.23	0.24	0.17	–	–	–	9.6
6	6	7	7	7	15	39	0.17	0.29	0.31	0.17	–	–	–	9.6
6	6	7	7	7	20	39	0.18	0.38	0.39	0.17	–	–	–	9.6
6	6	7	7	7	25	38	0.23	0.46	0.48	0.17	–	–	–	9.6
6	6	7	7	7	30	38	0.27	0.55	0.57	0.17	–	–	–	9.6

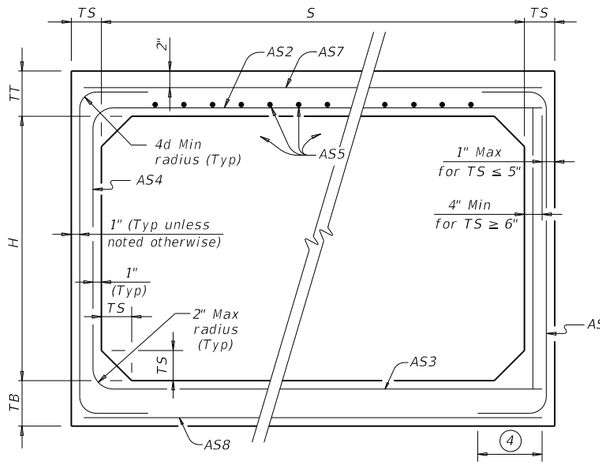
(1) For box length = 8'-0"

(2) AS1 thru AS4, AS7 and AS8 are minimum required areas of reinforcement per linear foot of box length. AS5 is minimum required area of reinforcement per linear foot of box width.



CORNER OPTION "A" CORNER OPTION "B"

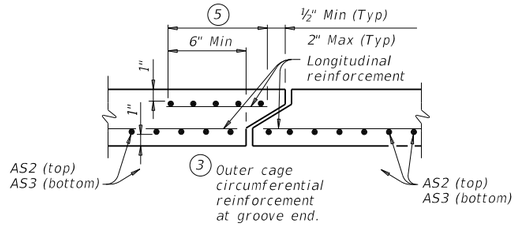
FILL HEIGHT 2 FT AND GREATER



CORNER OPTION "A" CORNER OPTION "B"

FILL HEIGHT LESS THAN 2 FT

(4) Length is equal to spacing of longitudinal reinforcing plus 2". (10" Min) (Typ)



SECTION A-A

(Showing top and bottom slab joint reinforcement.)

MATERIAL NOTES:

Provide 0.03 sq. in./ft. minimum longitudinal reinforcement at each face in slabs and walls. This minimum requirement may be met by the transverse wires when wire mesh reinforcement is used.

Provide Class H concrete (f'c = 5,000 psi, 7.0 sack/CY).

GENERAL NOTES:

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HL93 LOADING

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RECORD DRAWINGS PREPARED ON: 8/20/2024

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS PRECAST
6'-0" SPAN

SCP-6

FILE: scp06sts-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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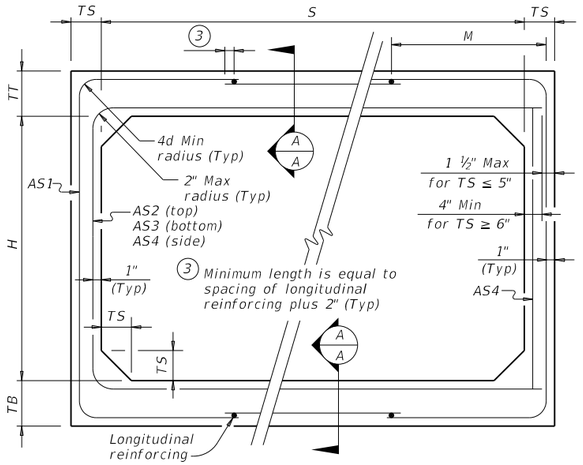
BOX DATA

SECTION DIMENSIONS					Fill Height	M (Min)	REINFORCING (sq. in. / ft.) (2)							(1) Lift Weight
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)	(ft.)	(in.)	AS1	AS2	AS3	AS4	AS5	AS7	AS8	(tons)
7	3	8	8	8	< 2	–	0.23	0.31	0.22	0.19	0.19	0.19	0.19	9.6
7	3	8	8	8	2 < 3	47	0.27	0.25	0.24	0.19	–	–	–	9.6
7	3	8	8	8	3 – 5	43	0.19	0.19	0.19	0.19	–	–	–	9.6
7	3	8	8	8	10	43	0.21	0.20	0.21	0.19	–	–	–	9.6
7	3	8	8	8	15	43	0.28	0.26	0.27	0.19	–	–	–	9.6
7	3	8	8	8	20	43	0.36	0.34	0.35	0.19	–	–	–	9.6
7	3	8	8	8	25	43	0.45	0.42	0.43	0.19	–	–	–	9.6
7	3	8	8	8	30	43	0.54	0.50	0.51	0.19	–	–	–	9.6
7	4	8	8	8	< 2	–	0.21	0.34	0.25	0.19	0.19	0.19	0.19	10.4
7	4	8	8	8	2 < 3	43	0.23	0.28	0.28	0.19	–	–	–	10.4
7	4	8	8	8	3 – 5	43	0.19	0.22	0.19	0.19	–	–	–	10.4
7	4	8	8	8	10	43	0.19	0.23	0.23	0.19	–	–	–	10.4
7	4	8	8	8	15	41	0.24	0.30	0.30	0.19	–	–	–	10.4
7	4	8	8	8	20	41	0.31	0.38	0.39	0.19	–	–	–	10.4
7	4	8	8	8	25	41	0.38	0.47	0.48	0.19	–	–	–	10.4
7	4	8	8	8	30	41	0.46	0.57	0.57	0.19	–	–	–	10.4
7	5	8	8	8	< 2	–	0.19	0.36	0.27	0.19	0.19	0.19	0.19	11.2
7	5	8	8	8	2 < 3	47	0.21	0.31	0.31	0.19	–	–	–	11.2
7	5	8	8	8	3 – 5	43	0.19	0.24	0.21	0.19	–	–	–	11.2
7	5	8	8	8	10	43	0.19	0.25	0.26	0.19	–	–	–	11.2
7	5	8	8	8	15	41	0.21	0.32	0.33	0.19	–	–	–	11.2
7	5	8	8	8	20	41	0.27	0.41	0.42	0.19	–	–	–	11.2
7	5	8	8	8	25	41	0.33	0.51	0.52	0.19	–	–	–	11.2
7	5	8	8	8	30	41	0.40	0.61	0.62	0.19	–	–	–	11.2
7	6	8	8	8	< 2	–	0.19	0.38	0.30	0.19	0.19	0.19	0.19	12.0
7	6	8	8	8	2 < 3	59	0.19	0.33	0.34	0.19	–	–	–	12.0
7	6	8	8	8	3 – 5	47	0.19	0.25	0.23	0.19	–	–	–	12.0
7	6	8	8	8	10	43	0.19	0.26	0.27	0.19	–	–	–	12.0
7	6	8	8	8	15	41	0.19	0.34	0.35	0.19	–	–	–	12.0
7	6	8	8	8	20	41	0.24	0.43	0.45	0.19	–	–	–	12.0
7	6	8	8	8	25	41	0.29	0.53	0.55	0.19	–	–	–	12.0
7	6	8	8	8	30	41	0.35	0.64	0.65	0.19	–	–	–	12.0
7	7	8	8	8	< 2	–	0.19	0.40	0.33	0.19	0.19	0.19	0.19	12.8
7	7	8	8	8	2 < 3	59	0.19	0.36	0.37	0.19	–	–	–	12.8
7	7	8	8	8	3 – 5	59	0.19	0.27	0.25	0.19	–	–	–	12.8
7	7	8	8	8	10	47	0.19	0.27	0.29	0.19	–	–	–	12.8
7	7	8	8	8	15	43	0.19	0.35	0.37	0.19	–	–	–	12.8
7	7	8	8	8	20	43	0.22	0.44	0.46	0.19	–	–	–	12.8
7	7	8	8	8	25	43	0.27	0.54	0.57	0.19	–	–	–	12.8
7	7	8	8	8	30	41	0.32	0.65	0.67	0.19	–	–	–	12.8

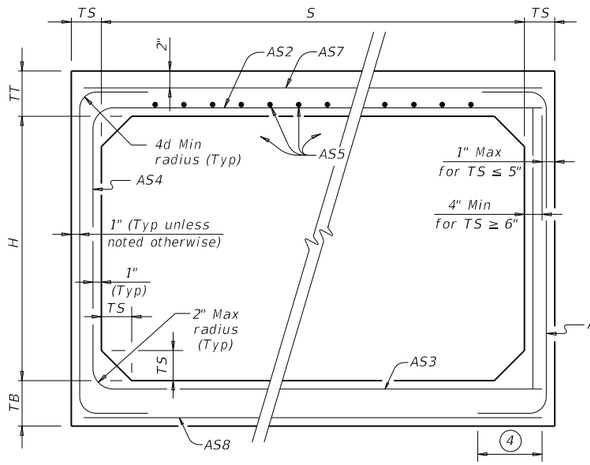
(1) For box length = 8'-0"

(2) AS1 thru AS4, AS7 and AS8 are minimum required areas of reinforcement per linear foot of box length. AS5 is minimum required area of reinforcement per linear foot of box width.



CORNER OPTION "A" CORNER OPTION "B"

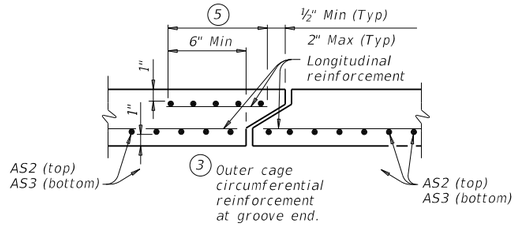
FILL HEIGHT 2 FT AND GREATER



CORNER OPTION "A" CORNER OPTION "B"

FILL HEIGHT LESS THAN 2 FT

(4) Length is equal to spacing of longitudinal reinforcing plus 2". (10" Min) (Typ)



SECTION A-A

(Showing top and bottom slab joint reinforcement.)

MATERIAL NOTES:

Provide 0.03 sq. in./ft. minimum longitudinal reinforcement at each face in slabs and walls. This minimum requirement may be met by the transverse wires when wire mesh reinforcement is used.

Provide Class H concrete (f'_c = 5,000 psi, 7.0 sack/CY).

GENERAL NOTES:

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RECORD DRAWINGS PREPARED ON: 8/20/2024

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS PRECAST
7'-0" SPAN

SCP-7

FILE: scp07sts-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS				
	DIST	COUNTY		SHEET NO.
				208

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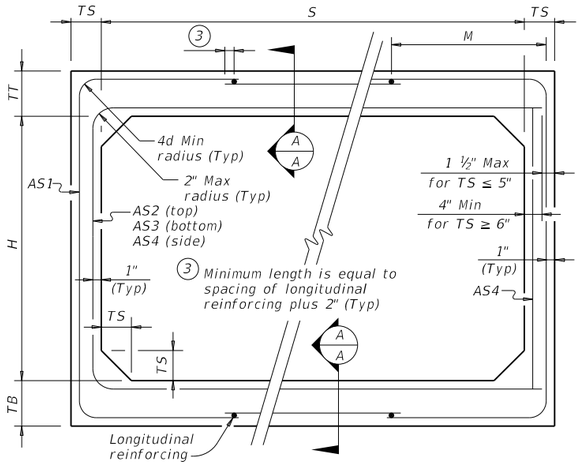
BOX DATA

SECTION DIMENSIONS					Fill Height	M (Min)	REINFORCING (sq. in. / ft.) (2)							(1) Lift Weight
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)	(ft.)	(in.)	AS1	AS2	AS3	AS4	AS5	AS7	AS8	(tons)
8	3	8	8	8	< 2	–	0.31	0.35	0.25	0.19	0.19	0.19	0.19	10.4
8	3	8	8	8	2 < 3	55	0.35	0.29	0.28	0.19	–	–	–	10.4
8	3	8	8	8	3 – 5	50	0.28	0.23	0.24	0.19	–	–	–	10.4
8	3	8	8	8	10	45	0.29	0.25	0.26	0.19	–	–	–	10.4
8	3	8	8	8	15	45	0.39	0.33	0.34	0.19	–	–	–	10.4
8	3	8	8	8	20	45	0.51	0.43	0.44	0.19	–	–	–	10.4
8	3	8	8	8	25	45	0.63	0.53	0.54	0.19	–	–	–	10.4
8	4	8	8	8	< 2	–	0.27	0.38	0.29	0.19	0.19	0.19	0.19	11.2
8	4	8	8	8	2 < 3	50	0.31	0.34	0.32	0.19	–	–	–	11.2
8	4	8	8	8	3 – 5	50	0.25	0.27	0.27	0.19	–	–	–	11.2
8	4	8	8	8	10	45	0.26	0.28	0.29	0.19	–	–	–	11.2
8	4	8	8	8	15	41	0.34	0.37	0.38	0.19	–	–	–	11.2
8	4	8	8	8	20	41	0.44	0.48	0.49	0.19	–	–	–	11.2
8	5	8	8	8	< 2	–	0.24	0.40	0.32	0.19	0.19	0.19	0.19	12.0
8	5	8	8	8	2 < 3	50	0.28	0.37	0.35	0.19	–	–	–	12.0
8	5	8	8	8	3 – 5	45	0.23	0.29	0.30	0.19	–	–	–	12.0
8	5	8	8	8	10	45	0.23	0.31	0.32	0.19	–	–	–	12.0
8	5	8	8	8	15	41	0.30	0.41	0.42	0.19	–	–	–	12.0
8	5	8	8	8	20	41	0.39	0.52	0.54	0.19	–	–	–	12.0
8	6	8	8	8	< 2	–	0.22	0.42	0.35	0.19	0.19	0.19	0.19	12.8
8	6	8	8	8	2 < 3	50	0.25	0.40	0.38	0.19	–	–	–	12.8
8	6	8	8	8	3 – 5	50	0.21	0.32	0.33	0.19	–	–	–	12.8
8	6	8	8	8	10	45	0.22	0.33	0.34	0.19	–	–	–	12.8
8	6	8	8	8	15	41	0.28	0.43	0.45	0.19	–	–	–	12.8
8	6	8	8	8	20	41	0.36	0.55	0.57	0.19	–	–	–	12.8
8	7	8	8	8	< 2	–	0.20	0.44	0.37	0.19	0.19	0.19	0.19	13.6
8	7	8	8	8	2 < 3	55	0.23	0.43	0.41	0.19	–	–	–	13.6
8	7	8	8	8	3 – 5	55	0.19	0.34	0.35	0.19	–	–	–	13.6
8	7	8	8	8	10	50	0.20	0.34	0.36	0.19	–	–	–	13.6
8	7	8	8	8	15	41	0.26	0.45	0.47	0.19	–	–	–	13.6
8	7	8	8	8	20	41	0.33	0.57	0.60	0.19	–	–	–	13.6
8	8	8	8	8	< 2	–	0.20	0.45	0.40	0.19	0.19	0.19	0.19	14.4
8	8	8	8	8	2 < 3	65	0.21	0.45	0.44	0.19	–	–	–	14.4
8	8	8	8	8	3 – 5	65	0.19	0.36	0.38	0.19	–	–	–	14.4
8	8	8	8	8	10	55	0.19	0.35	0.38	0.19	–	–	–	14.4
8	8	8	8	8	15	45	0.24	0.46	0.49	0.19	–	–	–	14.4
8	8	8	8	8	20	45	0.31	0.59	0.62	0.19	–	–	–	14.4

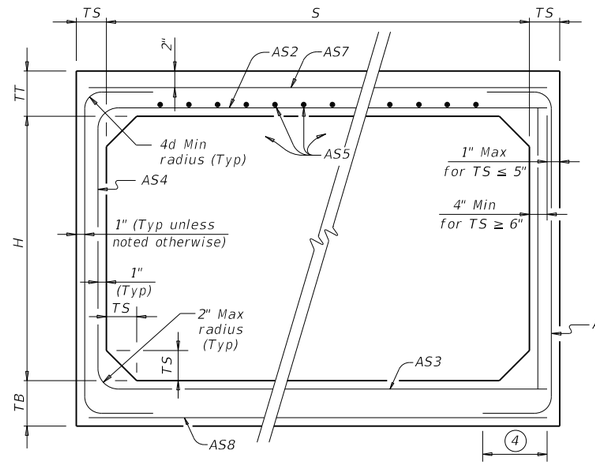
(1) For box length = 8'-0"

(2) AS1 thru AS4, AS7 and AS8 are minimum required areas of reinforcement per linear foot of box length. AS5 is minimum required area of reinforcement per linear foot of box width.



CORNER OPTION "A" CORNER OPTION "B"

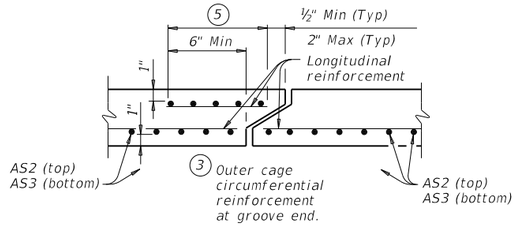
FILL HEIGHT 2 FT AND GREATER



CORNER OPTION "A" CORNER OPTION "B"

FILL HEIGHT LESS THAN 2 FT

(4) Length is equal to spacing of longitudinal reinforcing plus 2". (10" Min) (Typ)



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RECORD DRAWINGS PREPARED ON: 8/20/2024

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS PRECAST

8'-0" SPAN

SCP-8

FILE: scp08sts-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS				
	DIST	COUNTY		SHEET NO.
				209

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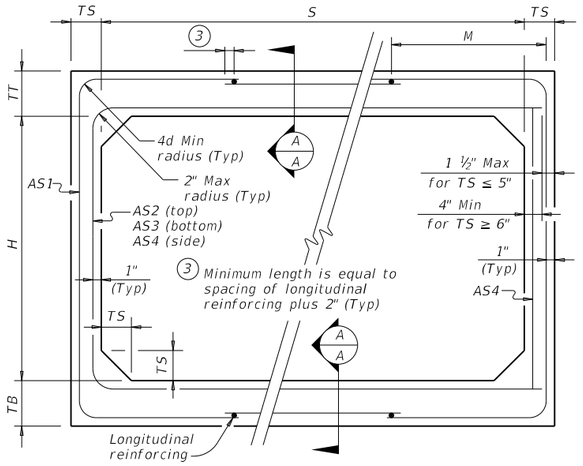
BOX DATA

SECTION DIMENSIONS					Fill Height	M (Min)	REINFORCING (sq. in. / ft.) (2)							(1) Lift Weight
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)	(ft.)	(in.)	AS1	AS2	AS3	AS4	AS5	AS7	AS8	(tons)
9	4	9	9	9	< 2	–	0.30	0.36	0.28	0.22	0.22	0.22	0.22	13.7
9	4	9	9	9	2 < 3	54	0.35	0.34	0.31	0.22	–	–	–	13.7
9	4	9	9	9	3 – 5	50	0.28	0.27	0.27	0.22	–	–	–	13.7
9	4	9	9	9	10	49	0.31	0.30	0.31	0.22	–	–	–	13.7
9	4	9	9	9	15	49	0.40	0.40	0.41	0.22	–	–	–	13.7
9	4	9	9	9	20	44	0.52	0.51	0.52	0.22	–	–	–	13.7
9	4	9	9	9	25	44	0.65	0.64	0.65	0.22	–	–	–	13.7
9	5	9	9	9	< 2	–	0.28	0.38	0.31	0.22	0.22	0.22	0.22	14.6
9	5	9	9	9	2 < 3	54	0.32	0.38	0.34	0.22	–	–	–	14.6
9	5	9	9	9	3 – 5	49	0.25	0.30	0.30	0.22	–	–	–	14.6
9	5	9	9	9	10	49	0.28	0.33	0.34	0.22	–	–	–	14.6
9	5	9	9	9	15	44	0.36	0.43	0.45	0.22	–	–	–	14.6
9	5	9	9	9	20	44	0.47	0.56	0.57	0.22	–	–	–	14.6
9	5	9	9	9	25	44	0.58	0.69	0.71	0.22	–	–	–	14.6
9	6	9	9	9	< 2	–	0.25	0.40	0.34	0.22	0.22	0.22	0.22	15.5
9	6	9	9	9	2 < 3	54	0.29	0.41	0.38	0.22	–	–	–	15.5
9	6	9	9	9	3 – 5	49	0.23	0.33	0.33	0.22	–	–	–	15.5
9	6	9	9	9	10	49	0.26	0.35	0.37	0.22	–	–	–	15.5
9	6	9	9	9	15	44	0.33	0.46	0.48	0.22	–	–	–	15.5
9	6	9	9	9	20	44	0.42	0.60	0.61	0.22	–	–	–	15.5
9	6	9	9	9	25	44	0.52	0.74	0.75	0.22	–	–	–	15.5
9	7	9	9	9	< 2	–	0.23	0.42	0.36	0.22	0.22	0.22	0.22	16.4
9	7	9	9	9	2 < 3	59	0.26	0.44	0.41	0.22	–	–	–	16.4
9	7	9	9	9	3 – 5	54	0.22	0.35	0.35	0.22	–	–	–	16.4
9	7	9	9	9	10	49	0.24	0.37	0.39	0.22	–	–	–	16.4
9	7	9	9	9	15	44	0.31	0.48	0.51	0.22	–	–	–	16.4
9	7	9	9	9	20	44	0.39	0.62	0.65	0.22	–	–	–	16.4
9	8	9	9	9	< 2	–	0.22	0.43	0.39	0.22	0.22	0.22	0.22	17.3
9	8	9	9	9	2 < 3	59	0.24	0.46	0.43	0.22	–	–	–	17.3
9	8	9	9	9	3 – 5	59	0.22	0.37	0.38	0.22	–	–	–	17.3
9	8	9	9	9	10	54	0.22	0.39	0.41	0.22	–	–	–	17.3
9	8	9	9	9	15	44	0.29	0.50	0.53	0.22	–	–	–	17.3
9	8	9	9	9	20	44	0.36	0.64	0.67	0.22	–	–	–	17.3
9	9	9	9	9	< 2	–	0.22	0.44	0.42	0.22	0.22	0.22	0.22	18.2
9	9	9	9	9	2 < 3	72	0.23	0.49	0.46	0.22	–	–	–	18.2
9	9	9	9	9	3 – 5	72	0.22	0.39	0.40	0.22	–	–	–	18.2
9	9	9	9	9	10	59	0.22	0.40	0.43	0.22	–	–	–	18.2
9	9	9	9	9	15	49	0.27	0.51	0.55	0.22	–	–	–	18.2
9	9	9	9	9	20	49	0.34	0.66	0.69	0.22	–	–	–	18.2

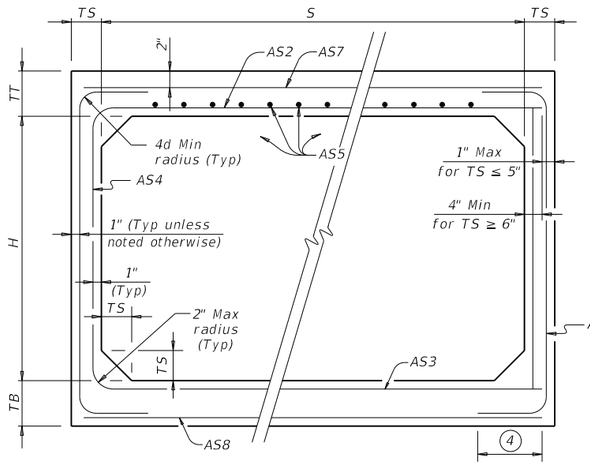
(1) For box length = 8'-0"

(2) AS1 thru AS4, AS7 and AS8 are minimum required areas of reinforcement per linear foot of box length. AS5 is minimum required area of reinforcement per linear foot of box width.



CORNER OPTION "A" CORNER OPTION "B"

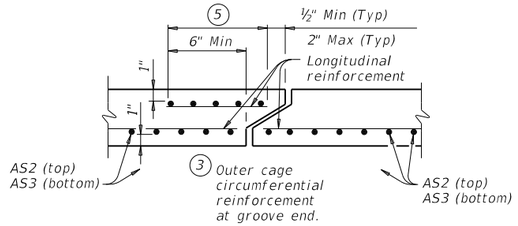
FILL HEIGHT 2 FT AND GREATER



CORNER OPTION "A" CORNER OPTION "B"

FILL HEIGHT LESS THAN 2 FT

(4) Length is equal to spacing of longitudinal reinforcing plus 2". (10" Min) (Typ)



SECTION A-A

(Showing top and bottom slab joint reinforcement.)

MATERIAL NOTES:

Provide 0.03 sq. in./ft. minimum longitudinal reinforcement at each face in slabs and walls. This minimum requirement may be met by the transverse wires when wire mesh reinforcement is used.

Provide Class H concrete (f'c = 5,000 psi, 7.0 sack/CY).

GENERAL NOTES:

Designs shown conform to ASTM C1577. Refer to ASTM C1577 for information or details not shown.

See Box Culverts Precast Miscellaneous Details (SCP-MD) standard sheet for details and notes not shown.

In lieu of furnishing the designs shown on this sheet, the contractor may furnish an alternate design that is equal to or exceeds the box design for the design fill height in the table. Submit shop plans for alternate designs in accordance with Item "Precast Concrete Structural Members (Fabrication)".

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RECORD DRAWINGS PREPARED ON: 8/20/2024

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS PRECAST

9'-0" SPAN

SCP-9

FILE: scp09sts-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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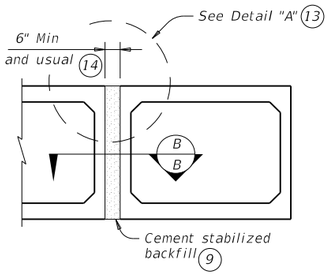
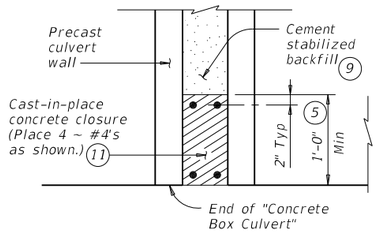
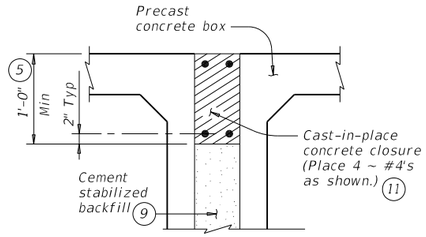
DATE: SEC 11/17/21
FILE: ⚠ ADDENDUM #2



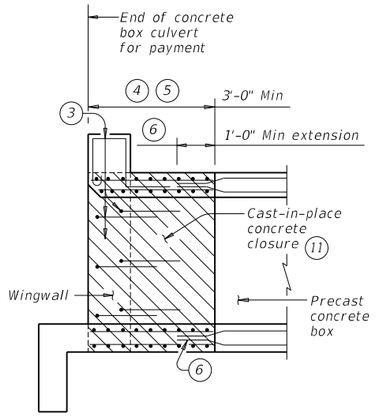
MULTIPLE UNIT PLACEMENT



SECTION B-B

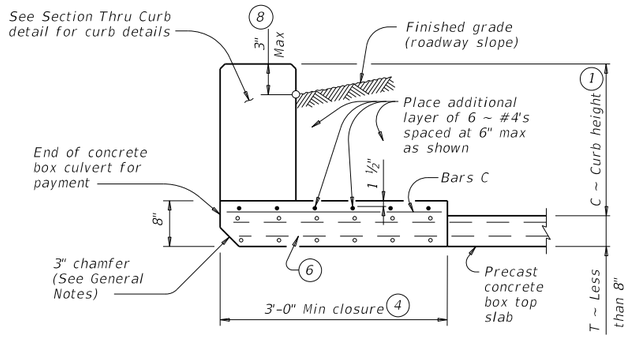


DETAIL "A" (13)

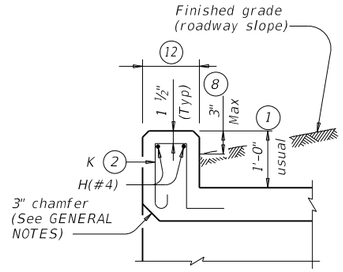


WINGWALL CONNECTION

(Also applies to safety end treatment.)

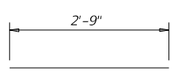


SECTION THRU TOP SLABS LESS THAN 8"

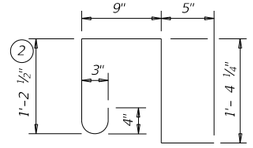


SECTION THRU CURB

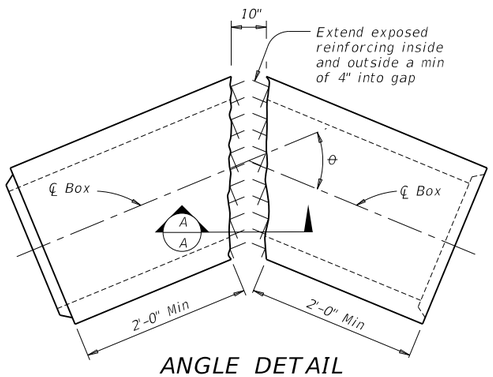
QUANTITIES PER FOOT OF CURB (10)	
Reinforcing Steel	4.12 Lb
Concrete	0.037 CY



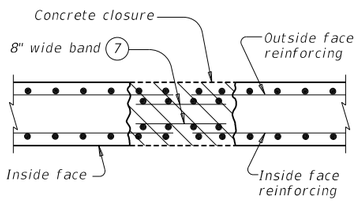
BARS C (#4)
(Spa = 1'–0" Max)



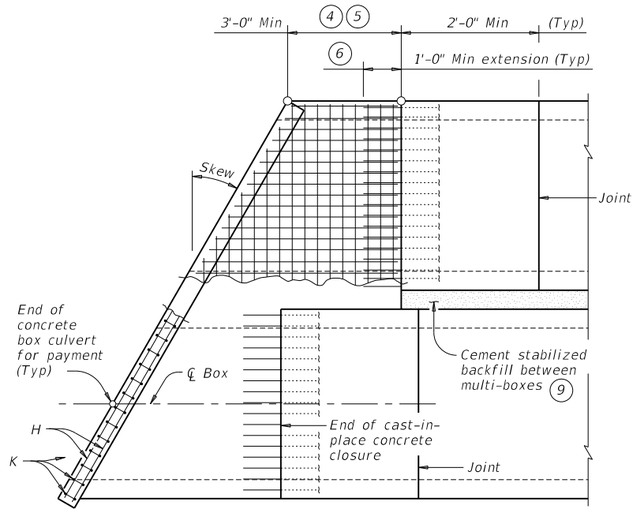
BARS K (#4)
(Spa = 1'–0" Max)
(Length = 4'–2")



ANGLE DETAIL



SECTION A-A



PLAN OF SKEWED ENDS

(Showing multi-box placement.)

1. *0" Min to 5'–0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail, bicycle rail, or curbs taller than 1'–0, refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631–CM) standard sheet. Refer to the Box Culvert Rail Mounting Details (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.*
2. *For curbs less than 1'–0" high, tilt Bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, Bars K may be omitted.*
3. *Extend curb, wingwall, or safety end treatment reinforcing into concrete closure. Bend or trim, as necessary, any reinforcing that does not fit into closure area.*
4. *Provide a 3'–0" Min cast–in–place concrete closure. Break back boxes in the field or cast boxes short. Provide bands of reinforcing in the closure that are the same size and spacing as in the precast box section. Provide #4 longitudinal reinforcement spaced at 12 inches Max within the closure. Except where shown otherwise, construct the cast–in–place closure flush with the inside and outside faces of the precast box section.*
5. *For multiple unit placements, adjust the length of the closure for the interior walls as necessary. Provide a 3'–0" Min cast–in–place closure in the top slab, bottom slab, and exterior wall. See Section B–B detail when interior walls are cast full length.*
6. *Extend precast box reinforcing a minimum of 1'–0" into concrete closure (Typ).*
7. *Place bands of reinforcing matching the inside and outside face reinforcing in the gaps of the top and bottom slabs. Place a band matching the outside face reinforcing of the wall in the gaps of the walls (placed in the outside face only). Tack weld the bands to the exposed reinforcing at each point of contact.*
8. *For vehicle safety, the following requirements must be met:*
   - *For structures without bridge rail, construct curbs no more than 3" above finished grade.*
   - *For structures with bridge rail, construct curbs flush with finished grade.*

   Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
9. *Cement stabilized backfill between boxes is considered part of the box culvert for payment.*
10. *All curb concrete and reinforcing is considered part of the box culvert for payment.*
11. *Any additional concrete and reinforcing required for the closures will be considered subsidiary to the box culvert for payment.*
12. *1'–0" typical. 2'–3" when the Box Culvert Rail Mounting Details (RAC) standard sheet is referred to elsewhere in the plans.*
13. *For multiple unit placement with overlay, with 1 to 2 course surface treatment, or with the top slab as the final riding surface, provide wall closure as shown in Detail "A".*
14. *This dimension may be increased with approval of the Engineer to allow the precast boxes to be tunneled or jacked in accordance with Item 476, "Jacking, Boring, or Tunneling Pipe or Box". No payment will be made for any additional material in the gap between adjacent boxes.*

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
Provide ASTM A1064 welded wire reinforcement. (1)
Provide Class C concrete (f'c = 4,200 psi, 7.0 sacks/CY) for the closures.
Provide cement stabilized backfill meeting the requirements of Item 400, "Excavation and Backfill for Structures."
Any additional concrete required for the closures will be considered subsidiary to the box culvert.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
Refer to the Single Box Culverts Precast (SCP) standard sheets for details and notes not shown.
Chamfer the bottom edge of the top slab closure 3 inches at culvert closure ends.

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

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

BOX CULVERTS PRECAST MISCELLANEOUS DETAILS

SCP-MD

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RECORD DRAWINGS PREPARED ON: 8/20/2024

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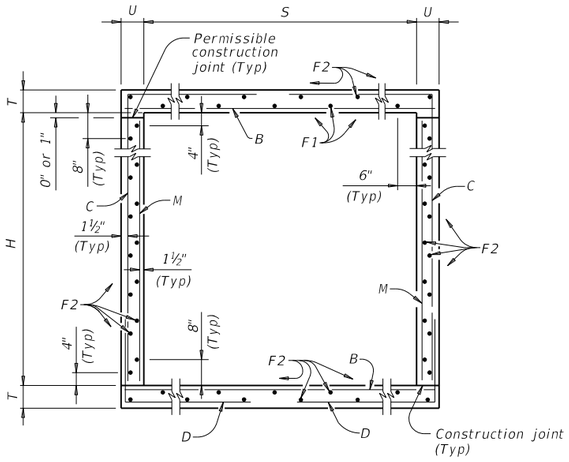
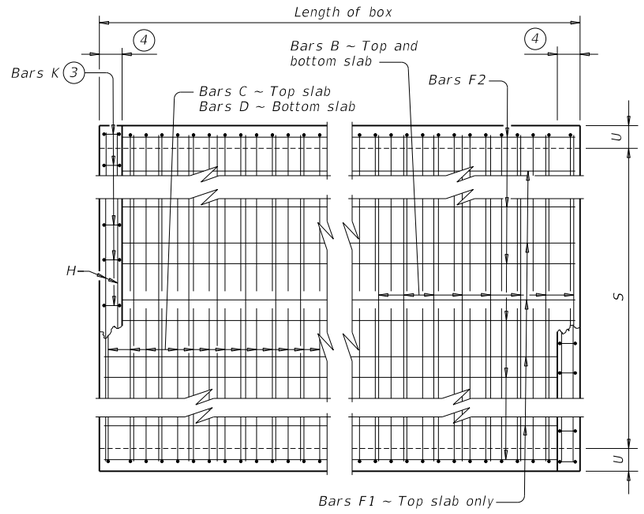
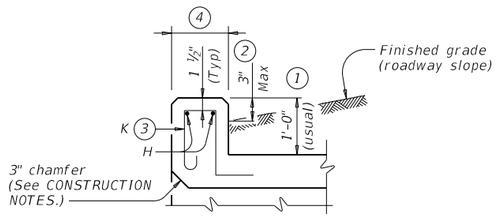


TYPICAL SECTION



PLAN OF REINF STEEL



SECTION THRU CURB

1 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0", refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Rail Anchorage Curb (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.

2 For vehicle safety, the following requirements must be met:
- For structures without bridge rail, construct curbs no more than 3" above finished grade.
- For structures with bridge rail, construct curbs flush with finished grade.

Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

3 For curbs less than 1'-0" high, tilt Bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, Bars K may be omitted.

4 1'-0" typical. 2'-3" when the Rail Anchorage Curb (RAC) standard sheet is referred to elsewhere in the plans.

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

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

CONSTRUCTION NOTES:

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

MATERIAL NOTES:

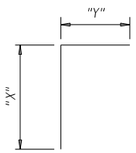
Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
Provide Class C concrete (f'c = 4,200 psi, 7.0 sack/CY) for culvert barrel and curb, with the following exceptions: provide Class S concrete (f'c = 4,200 psi, 7.0 sack/CY) for top slabs of:
- culverts with overlay,
- culverts with 1-to-2 course surface treatment, or
- culverts with the top slab as the final riding surface.

Provide bar laps, where required, as follows:
- Uncoated or galvanized ~ #4 = 1'-8" Min
- Uncoated or galvanized ~ #5 = 2'-1" Min

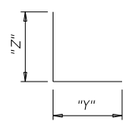
GENERAL NOTES:

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

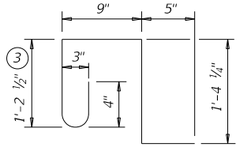
Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.



BARS C



BARS D



BARS K (#4)
(Spa = 1'-0" Max)
(Length = 4'-2")

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RECORD DRAWINGS PREPARED ON: 8/20/2024

HL93 LOADING SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS CAST-IN-PLACE
0' TO 30' FILL

SCC-3 & 4

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SECTION DIMENSIONS				(5) FILL HEIGHT	BILLS OF REINFORCING STEEL (For Box Length = 40 feet)																														QUANTITIES					
					Bars B					Bars C							Bars D							Bars M ~ #4				Bars F1 ~ #4 at 18" Spa			Bars F2 ~ #4 at 18" Spa			Bars H 4 ~ #4		Bars K		Per Foot of Barrel		Curb		Total	
S	H	T	U		No.	Size	Spa	Length	Weight	No.	Size	Spa	Length	Weight	" X "	" Y "	No.	Size	Spa	Length	Weight	" Y "	" Z "	No.	Spa	Length	Weight	No.	Length	Wt	No.	Length	Weight	Length	Wt	No.	Wt	Conc (CY)	Reinf (Lb)	Conc (CY)	Reinf (Lb)	Conc (CY)	Reinf (Lb)
3' – 0"	2' – 0"	8"	7"	30'	108	#5	9"	3' – 11"	441	108	#4	9"	5' – 5"	391	2' – 7"	2' – 10"	108	#4	9"	5' – 1"	367	2' – 10"	2' – 3"	108	9"	2' – 0"	144	3	39' – 9"	80	19	39' – 9"	505	3' – 11"	10	10	28	0.292	48.2	0.3	38	12.0	1,966
3' – 0"	3' – 0"	8"	7"	30'	108	#5	9"	3' – 11"	441	108	#4	9"	6' – 5"	463	3' – 7"	2' – 10"	108	#4	9"	5' – 1"	367	2' – 10"	2' – 3"	108	9"	3' – 0"	216	3	39' – 9"	80	23	39' – 9"	611	3' – 11"	10	10	28	0.335	54.5	0.3	38	13.7	2,216
4' – 0"	2' – 0"	8"	7"	30'	108	#5	9"	4' – 11"	554	162	#4	6"	5' – 9"	622	2' – 7"	3' – 2"	162	#4	6"	5' – 5"	586	3' – 2"	2' – 3"	108	9"	2' – 0"	144	3	39' – 9"	80	21	39' – 9"	558	4' – 11"	13	12	33	0.342	63.6	0.4	46	14.1	2,590
4' – 0"	3' – 0"	8"	7"	30'	108	#5	9"	4' – 11"	554	162	#4	6"	6' – 9"	730	3' – 7"	3' – 2"	162	#4	6"	5' – 5"	586	3' – 2"	2' – 3"	108	9"	3' – 0"	216	3	39' – 9"	80	25	39' – 9"	664	4' – 11"	13	12	33	0.385	70.8	0.4	46	15.8	2,876
4' – 0"	4' – 0"	8"	7"	30'	108	#5	9"	4' – 11"	554	162	#4	6"	7' – 9"	839	4' – 7"	3' – 2"	162	#4	6"	5' – 5"	586	3' – 2"	2' – 3"	108	9"	4' – 0"	289	3	39' – 9"	80	25	39' – 9"	664	4' – 11"	13	12	33	0.428	75.3	0.4	46	17.5	3,058

(5) For direct traffic culverts (fill height ≤ 2 ft.), identify the required box size and select the option with the minimum fill height.

HL93 LOADING SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS CAST-IN-PLACE
0' TO 30' FILL

SCC-3 & 4

FILE: scc34ste-20.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
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	DIST	COUNTY		SHEET NO.
				213

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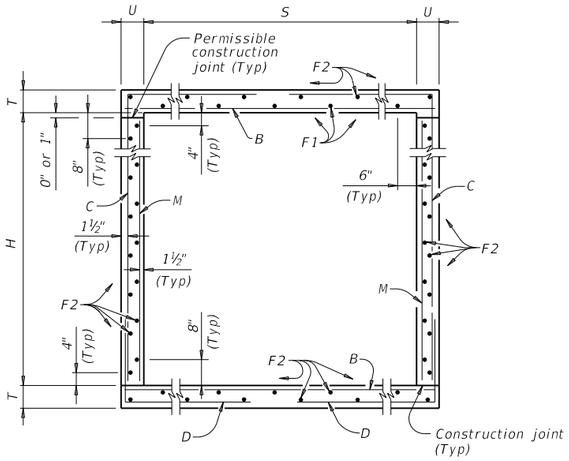
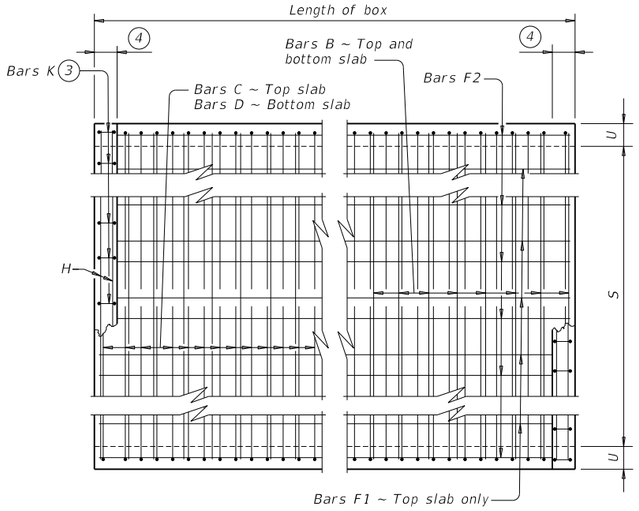
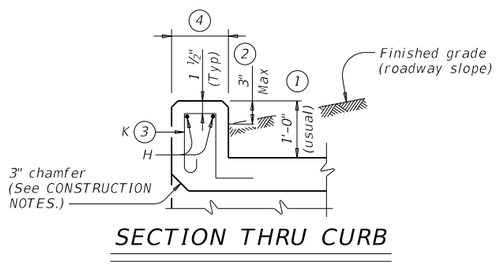


TYPICAL SECTION



PLAN OF REINF STEEL



SECTION THRU CURB

1 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0", refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Rail Anchorage Curb (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.

2 For vehicle safety, the following requirements must be met:
- For structures without bridge rail, construct curbs no more than 3" above finished grade.
- For structures with bridge rail, construct curbs flush with finished grade.

Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

3 For curbs less than 1'-0" high, tilt Bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, Bars K may be omitted.

4 1'-0" typical. 2'-3" when the Rail Anchorage Curb (RAC) standard sheet is referred to elsewhere in the plans.

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

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

CONSTRUCTION NOTES:

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

MATERIAL NOTES:

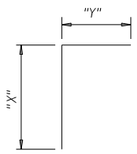
Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
Provide Class C concrete (f'c = 4,200 psi, 7.0 sack/CY) for culvert barrel and curb, with the following exceptions: provide Class S concrete (f'c = 4,200 psi, 7.0 sack/CY) for top slabs of:
- culverts with overlay,
- culverts with 1-to-2 course surface treatment, or
- culverts with the top slab as the final riding surface.

Provide bar laps, where required, as follows:
- Uncoated or galvanized ~ #4 = 1'-8" Min
- Uncoated or galvanized ~ #5 = 2'-1" Min
- Uncoated or galvanized ~ #6 = 2'-6" Min

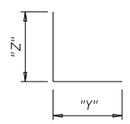
GENERAL NOTES:

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

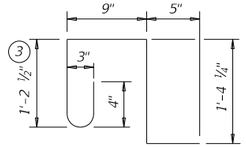
Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.



BARS C



BARS D



BARS K (#4)
(Spa = 1'-0" Max)
(Length = 4'-2")

THE SEAL THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO: 134095 ON 10/21/2021
ALTERATION ON A SEALED DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

HL93 LOADING SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS CAST-IN-PLACE
0' TO 30' FILL

SCC-5 & 6

FILE: scc56ste-20.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
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SECTION DIMENSIONS				FILL HEIGHT (5)	BILLS OF REINFORCING STEEL (For Box Length = 40 feet)																												QUANTITIES					
					Bars B					Bars C							Bars D							Bars M ~ #4				Bars F1 ~ #4 at 18" Spa			Bars F2 ~ #4 at 18" Spa			Bars H 4 ~ #4		Bars K		Per Foot of Barrel		Curb		Total	
S	H	T	U		No.	Size	Spa	Length	Weight	No.	Size	Spa	Length	Weight	" X "	" Y "	No.	Size	Spa	Length	Weight	" Y "	" Z "	No.	Spa	Length	Weight	No.	Length	Wt	No.	Length	Weight	Length	Wt	No.	Wt	Conc (CY)	Reinf (Lb)	Conc (CY)	Reinf (Lb)	Conc (CY)	Reinf (Lb)
5' – 0"	2' – 0"	8"	7"	26'	108	#6	9"	5' – 11"	960	108	#5	9"	6' – 4"	713	2' – 7"	3' – 9"	108	#5	9"	6' – 5"	723	3' – 9"	2' – 8"	108	9"	2' – 0"	144	4	39' – 9"	106	22	39' – 9"	584	5' – 11"	16	14	39	0.391	80.8	0.5	55	16.1	3,285
5' – 0"	2' – 0"	9"	7"	30'	108	#6	9"	5' – 11"	960	108	#5	9"	6' – 5"	723	2' – 8"	3' – 9"	108	#5	9"	6' – 6"	732	3' – 9"	2' – 9"	108	9"	2' – 0"	144	4	39' – 9"	106	22	39' – 9"	584	5' – 11"	16	14	39	0.429	81.2	0.5	55	17.6	3,304
5' – 0"	3' – 0"	8"	7"	26'	108	#6	9"	5' – 11"	960	108	#5	9"	7' – 4"	826	3' – 7"	3' – 9"	108	#5	9"	6' – 5"	723	3' – 9"	2' – 8"	108	9"	3' – 0"	216	4	39' – 9"	106	26	39' – 9"	690	5' – 11"	16	14	39	0.434	88.0	0.5	55	17.8	3,576
5' – 0"	3' – 0"	9"	7"	30'	108	#6	9"	5' – 11"	960	108	#5	9"	7' – 5"	835	3' – 8"	3' – 9"	108	#5	9"	6' – 6"	732	3' – 9"	2' – 9"	108	9"	3' – 0"	216	4	39' – 9"	106	26	39' – 9"	690	5' – 11"	16	14	39	0.472	88.5	0.5	55	19.3	3,594
5' – 0"	4' – 0"	8"	7"	26'	108	#6	9"	5' – 11"	960	108	#5	9"	8' – 4"	939	4' – 7"	3' – 9"	108	#5	9"	6' – 5"	723	3' – 9"	2' – 8"	108	9"	4' – 0"	289	4	39' – 9"	106	26	39' – 9"	690	5' – 11"	16	14	39	0.477	92.7	0.5	55	19.5	3,762
5' – 0"	4' – 0"	9"	7"	30'	108	#6	9"	5' – 11"	960	108	#5	9"	8' – 5"	948	4' – 8"	3' – 9"	108	#5	9"	6' – 6"	732	3' – 9"	2' – 9"	108	9"	4' – 0"	289	4	39' – 9"	106	26	39' – 9"	690	5' – 11"	16	14	39	0.515	93.1	0.5	55	21.1	3,780
5' – 0"	5' – 0"	8"	7"	26'	108	#6	9"	5' – 11"	960	108	#5	9"	9' – 4"	1,051	5' – 7"	3' – 9"	108	#5	9"	6' – 5"	723	3' – 9"	2' – 8"	108	9"	5' – 0"	361	4	39' – 9"	106	30	39' – 9"	797	5' – 11"	16	14	39	0.521	100.0	0.5	55	21.3	4,053
5' – 0"	5' – 0"	9"	7"	30'	108	#6	9"	5' – 11"	960	108	#5	9"	9' – 5"	1,061	5' – 8"	3' – 9"	108	#5	9"	6' – 6"	732	3' – 9"	2' – 9"	108	9"	5' – 0"	361	4	39' – 9"	106	30	39' – 9"	797	5' – 11"	16	14	39	0.559	100.4	0.5	55	22.8	4,072
6' – 0"	2' – 0"	8"	7"	20'	108	#6	9"	6' – 11"	1,122	108	#5	9"	6' – 8"	751	2' – 7"	4' – 1"	108	#5	9"	6' – 9"	760	4' – 1"	2' – 8"	108	9"	2' – 0"	144	5	39' – 9"	133	25	39' – 9"	664	6' – 11"	18	16	45	0.440	89.4	0.5	63	18.1	3,637
6' – 0"	2' – 0"	9"	7"	26'	108	#6	9"	6' – 11"	1,122	162	#5	6"	6' – 9"	1,141	2' – 8"	4' – 1"	162	#5	6"	6' – 10"	1,155	4' – 1"	2' – 9"	108	9"	2' – 0"	144	5	39' – 9"	133	25	39' – 9"	664	6' – 11"	18	16	45	0.485	109.0	0.5	63	19.9	4,422
6' – 0"	2' – 0"	10"	8"	30'	108	#6	9"	7' – 1"	1,149	162	#5	6"	6' – 11"	1,169	2' – 9"	4' – 2"	162	#5	6"	7' – 0"	1,183	4' – 2"	2' – 10"	82	12"	2' – 0"	110	5	39' – 9"	133	25	39' – 9"	664	7' – 1"	19	18	50	0.551	110.2	0.5	69	22.6	4,477
6' – 0"	3' – 0"	8"	7"	20'	108	#6	9"	6' – 11"	1,122	108	#5	9"	7' – 8"	864	3' – 7"	4' – 1"	108	#5	9"	6' – 9"	760	4' – 1"	2' – 8"	108	9"	3' – 0"	216	5	39' – 9"	133	29	39' – 9"	770	6' – 11"	18	16	45	0.484	96.6	0.5	63	19.9	3,928
6' – 0"	3' – 0"	9"	7"	26'	108	#6	9"	6' – 11"	1,122	162	#5	6"	7' – 9"	1,309	3' – 8"	4' – 1"	162	#5	6"	6' – 10"	1,155	4' – 1"	2' – 9"	108	9"	3' – 0"	216	5	39' – 9"	133	29	39' – 9"	770	6' – 11"	18	16	45	0.528	117.6	0.5	63	21.6	4,768
6' – 0"	3' – 0"	10"	8"	30'	108	#6	9"	7' – 1"	1,149	162	#5	6"	7' – 11"	1,338	3' – 9"	4' – 2"	162	#5	6"	7' – 0"	1,183	4' – 2"	2' – 10"	82	12"	3' – 0"	164	5	39' – 9"	133	29	39' – 9"	770	7' – 1"	19	18	50	0.601	118.4	0.5	69	24.6	4,806
6' – 0"	4' – 0"	8"	7"	20'	108	#6	9"	6' – 11"	1,122	108	#5	9"	8' – 8"	976	4' – 7"	4' – 1"	108	#5	9"	6' – 9"	760	4' – 1"	2' – 8"	108	9"	4' – 0"	289	5	39' – 9"	133	29	39' – 9"	770	6' – 11"	18	16	45	0.527	101.3	0.5	63	21.6	4,113
6' – 0"	4' – 0"	9"	7"	26'	108	#6	9"	6' – 11"	1,122	162	#5	6"	8' – 9"	1,478	4' – 8"	4' – 1"	162	#5	6"	6' – 10"	1,155	4' – 1"	2' – 9"	108	9"	4' – 0"	289	5	39' – 9"	133	29	39' – 9"	770	6' – 11"	18	16	45	0.571	123.7	0.5	63	23.4	5,010
6' – 0"	4' – 0"	10"	8"	30'	108	#6	9"	7' – 1"	1,149	162	#5	6"	8' – 11"	1,507	4' – 9"	4' – 2"	162	#5	6"	7' – 0"	1,183	4' – 2"	2' – 10"	82	12"	4' – 0"	219	5	39' – 9"	133	29	39' – 9"	770	7' – 1"	19	18	50	0.650	124.0	0.5	69	26.5	5,030
6' – 0"	5' – 0"	8"	7"	20'	108	#6	9"	6' – 11"	1,122	108	#5	9"	9' – 8"	1,089	5' – 7"	4' – 1"	108	#5	9"	6' – 9"	760	4' – 1"	2' – 8"	108	9"	5' – 0"	361	5	39' – 9"	133	33	39' – 9"	876	6' – 11"	18	16	45	0.570	108.5	0.5	63	23.3	4,404
6' – 0"	5' – 0"	9"	7"	26'	108	#6	9"	6' – 11"	1,122	162	#5	6"	9' – 9"	1,647	5' – 8"	4' – 1"	162	#5	6"	6' – 10"	1,155	4' – 1"	2' – 9"	108	9"	5' – 0"	361	5	39' – 9"	133	33	39' – 9"	876	6' – 11"	18	16	45	0.614	132.4	0.5	63	25.1	5,357
6' – 0"	5' – 0"	10"	8"	30'	108	#6	9"	7' – 1"	1,149	162	#5	6"	9' – 11"	1,676	5' – 9"	4' – 2"	162	#5	6"	7' – 0"	1,183	4' – 2"	2' – 10"	82	12"	5' – 0"	274	5	39' – 9"	133	33	39' – 9"	876	7' – 1"	19	18	50	0.700	132.3	0.5	69	28.5	5,360
6' – 0"	6' – 0"	8"	7"	20'	108	#6	9"	6' – 11"	1,122	108	#5	9"	10' – 8"	1,202	6' – 7"	4' – 1"	108	#5	9"	6' – 9"	760	4' – 1"	2' – 8"	108	9"	6' – 0"	433	5	39' – 9"	133	37	39' – 9"	982	6' – 11"	18	16	45	0.613	115.8	0.5	63	25.0	4,695
6' – 0"	6' – 0"	9"	7"	26'	108	#6	9"	6' – 11"	1,122	162	#5	6"	10' – 9"	1,816	6' – 8"	4' – 1"	162	#5	6"	6' – 10"	1,155	4' – 1"	2' – 9"	108	9"	6' – 0"	433	5	39' – 9"	133	37	39' – 9"	982	6' – 11"	18	16	45	0.657	141.0	0.5	63	26.8	5,704
6' – 0"	6' – 0"	10"	8"	30'	108	#6	9"	7' – 1"	1,149	162	#5	6"	10' – 11"	1,845	6' – 9"	4' – 2"	162	#5	6"	7' – 0"	1,183	4' – 2"	2' – 10"	82	12"	6' – 0"	329	5	39' – 9"	133	37	39' – 9"	982	7' – 1"	19	18	50	0.749	140.5	0.5	69	30.5	5,690

(5) For direct traffic culverts (fill height ≤ 2 ft.), identify the required box size and select the option with the minimum fill height.

HL93 LOADING SHEET 2 OF 2

Texas Department of Transportation | Bridge Division Standard

SINGLE BOX CULVERTS CAST-IN-PLACE
0' TO 30' FILL

SCC-5 & 6

FILE: scc56ste-20.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
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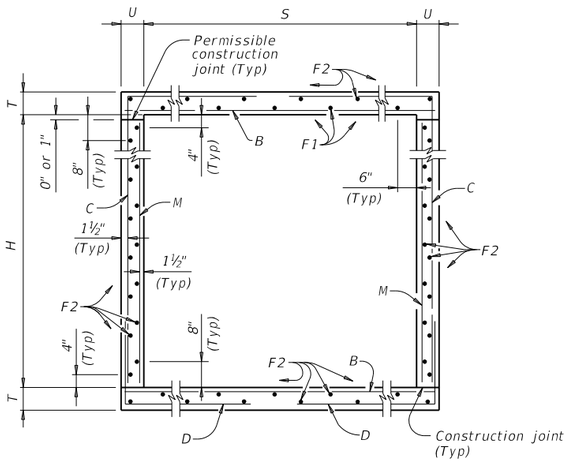
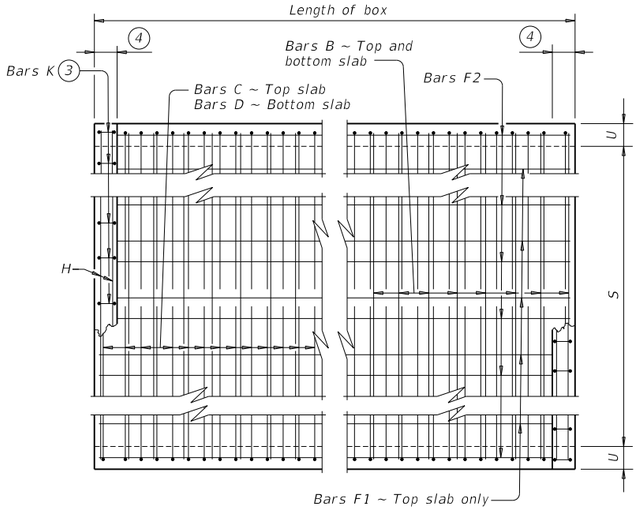
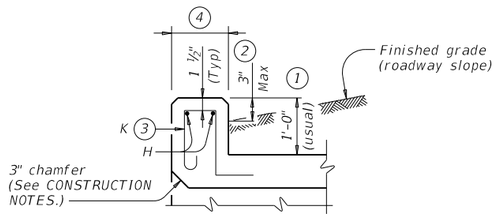


TYPICAL SECTION



PLAN OF REINF STEEL



SECTION THRU CURB

1 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0", refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Rail Anchorage Curb (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.

2 For vehicle safety, the following requirements must be met:
- For structures without bridge rail, construct curbs no more than 3" above finished grade.
- For structures with bridge rail, construct curbs flush with finished grade.

Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

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

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

CONSTRUCTION NOTES:

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

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
Provide Class C concrete (f'c = 4,200 psi, 7.0 sack/CY) for culvert barrel and curb, with the following exceptions: provide Class S concrete (f'c = 4,200 psi, 7.0 sack/CY) for top slabs of:
- culverts with overlay,
- culverts with 1-to-2 course surface treatment, or
- culverts with the top slab as the final riding surface.

Provide bar laps, where required, as follows:
- Uncoated or galvanized ~ #4 = 1'-8" Min
- Uncoated or galvanized ~ #5 = 2'-1" Min
- Uncoated or galvanized ~ #6 = 2'-6" Min

GENERAL NOTES:

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

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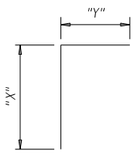
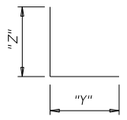
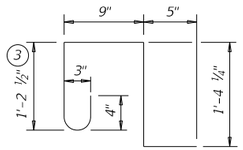


BARS C



BARS D



BARS K (#4)
(Spa = 1'-0" Max)
(Length = 4'-2")

HL93 LOADING

SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS CAST-IN-PLACE
0' TO 30' FILL

SCC-7

FILE: scc07ste-20.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
				216

THE SEAL THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

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DATE:
FILE:

SECTION DIMENSIONS				(5) FILL HEIGHT	BILLS OF REINFORCING STEEL (For Box Length = 40 feet)																												QUANTITIES					
					Bars B					Bars C							Bars D							Bars M ~ #4				Bars F1 ~ #4 at 18" Spa			Bars F2 ~ #4 at 18" Spa			Bars H 4 ~ #4		Bars K		Per Foot of Barrel		Curb		Total	
S	H	T	U		No.	Size	Spa	Length	Weight	No.	Size	Spa	Length	Weight	" X "	" Y "	No.	Size	Spa	Length	Weight	" Y "	" Z "	No.	Spa	Length	Weight	No.	Length	Wt	No.	Length	Weight	Length	Wt	No.	Wt	Conc (CY)	Reinf (Lb)	Conc (CY)	Reinf (Lb)	Conc (CY)	Reinf (Lb)
7' – 0"	3' – 0"	8"	7"	16'	108	#6	9"	7' – 11"	1,284	162	#5	6"	8' – 0"	1,352	3' – 7"	4' – 5"	162	#5	6"	7' – 1"	1,197	4' – 5"	2' – 8"	108	9"	3' – 0"	216	5	39' – 9"	133	31	39' – 9"	823	7' – 11"	21	18	50	0.533	125.1	0.6	71	21.9	5,076
7' – 0"	3' – 0"	9"	7"	20'	108	#6	9"	7' – 11"	1,284	162	#5	6"	8' – 1"	1,366	3' – 8"	4' – 5"	162	#5	6"	7' – 2"	1,211	4' – 5"	2' – 9"	108	9"	3' – 0"	216	5	39' – 9"	133	31	39' – 9"	823	7' – 11"	21	18	50	0.583	125.8	0.6	71	23.9	5,104
7' – 0"	3' – 0"	10"	8"	23'	108	#6	9"	8' – 1"	1,311	162	#5	6"	8' – 3"	1,394	3' – 9"	4' – 6"	162	#5	6"	7' – 4"	1,239	4' – 6"	2' – 10"	82	12"	3' – 0"	164	5	39' – 9"	133	31	39' – 9"	823	8' – 1"	22	20	56	0.663	126.6	0.6	78	27.1	5,142
7' – 0"	3' – 0"	11"	8"	30'	108	#6	9"	8' – 1"	1,311	162	#5	6"	8' – 4"	1,408	3' – 10"	4' – 6"	162	#5	6"	7' – 5"	1,253	4' – 6"	2' – 11"	82	12"	3' – 0"	164	5	39' – 9"	133	31	39' – 9"	823	8' – 1"	22	20	56	0.714	127.3	0.6	78	29.2	5,170
7' – 0"	4' – 0"	8"	7"	16'	108	#6	9"	7' – 11"	1,284	162	#5	6"	9' – 0"	1,521	4' – 7"	4' – 5"	162	#5	6"	7' – 1"	1,197	4' – 5"	2' – 8"	108	9"	4' – 0"	289	5	39' – 9"	133	31	39' – 9"	823	7' – 11"	21	18	50	0.576	131.2	0.6	71	23.6	5,318
7' – 0"	4' – 0"	9"	7"	20'	108	#6	9"	7' – 11"	1,284	162	#5	6"	9' – 1"	1,535	4' – 8"	4' – 5"	162	#5	6"	7' – 2"	1,211	4' – 5"	2' – 9"	108	9"	4' – 0"	289	5	39' – 9"	133	31	39' – 9"	823	7' – 11"	21	18	50	0.627	131.9	0.6	71	25.7	5,346
7' – 0"	4' – 0"	10"	8"	23'	108	#6	9"	8' – 1"	1,311	162	#5	6"	9' – 3"	1,563	4' – 9"	4' – 6"	162	#5	6"	7' – 4"	1,239	4' – 6"	2' – 10"	82	12"	4' – 0"	219	5	39' – 9"	133	31	39' – 9"	823	8' – 1"	22	20	56	0.712	132.2	0.6	78	29.1	5,366
7' – 0"	4' – 0"	11"	8"	30'	162	#6	6"	8' – 1"	1,967	162	#5	6"	9' – 4"	1,577	4' – 10"	4' – 6"	162	#5	6"	7' – 5"	1,253	4' – 6"	2' – 11"	82	12"	4' – 0"	219	5	39' – 9"	133	31	39' – 9"	823	8' – 1"	22	20	56	0.763	149.3	0.6	78	31.1	6,050
7' – 0"	5' – 0"	8"	7"	16'	108	#6	9"	7' – 11"	1,284	162	#5	6"	10' – 0"	1,690	5' – 7"	4' – 5"	162	#5	6"	7' – 1"	1,197	4' – 5"	2' – 8"	108	9"	5' – 0"	361	5	39' – 9"	133	35	39' – 9"	929	7' – 11"	21	18	50	0.619	139.9	0.6	71	25.4	5,665
7' – 0"	5' – 0"	9"	7"	20'	108	#6	9"	7' – 11"	1,284	162	#5	6"	10' – 1"	1,704	5' – 8"	4' – 5"	162	#5	6"	7' – 2"	1,211	4' – 5"	2' – 9"	108	9"	5' – 0"	361	5	39' – 9"	133	35	39' – 9"	929	7' – 11"	21	18	50	0.670	140.6	0.6	71	27.4	5,693
7' – 0"	5' – 0"	10"	8"	23'	108	#6	9"	8' – 1"	1,311	162	#5	6"	10' – 3"	1,732	5' – 9"	4' – 6"	162	#5	6"	7' – 4"	1,239	4' – 6"	2' – 10"	82	12"	5' – 0"	274	5	39' – 9"	133	35	39' – 9"	929	8' – 1"	22	20	56	0.761	140.5	0.6	78	31.1	5,696
7' – 0"	5' – 0"	11"	8"	30'	162	#6	6"	8' – 1"	1,967	162	#5	6"	10' – 4"	1,746	5' – 10"	4' – 6"	162	#5	6"	7' – 5"	1,253	4' – 6"	2' – 11"	82	12"	5' – 0"	274	5	39' – 9"	133	35	39' – 9"	929	8' – 1"	22	20	56	0.813	157.6	0.6	78	33.1	6,380
7' – 0"	6' – 0"	8"	7"	16'	108	#6	9"	7' – 11"	1,284	162	#5	6"	11' – 0"	1,859	6' – 7"	4' – 5"	162	#5	6"	7' – 1"	1,197	4' – 5"	2' – 8"	108	9"	6' – 0"	433	5	39' – 9"	133	39	39' – 9"	1,036	7' – 11"	21	18	50	0.663	148.6	0.6	71	27.1	6,013
7' – 0"	6' – 0"	9"	7"	20'	108	#6	9"	7' – 11"	1,284	162	#5	6"	11' – 1"	1,873	6' – 8"	4' – 5"	162	#5	6"	7' – 2"	1,211	4' – 5"	2' – 9"	108	9"	6' – 0"	433	5	39' – 9"	133	39	39' – 9"	1,036	7' – 11"	21	18	50	0.713	149.3	0.6	71	29.1	6,041
7' – 0"	6' – 0"	10"	8"	23'	108	#6	9"	8' – 1"	1,311	162	#5	6"	11' – 3"	1,901	6' – 9"	4' – 6"	162	#5	6"	7' – 4"	1,239	4' – 6"	2' – 10"	82	12"	6' – 0"	329	5	39' – 9"	133	39	39' – 9"	1,036	8' – 1"	22	20	56	0.811	148.7	0.6	78	33.1	6,027
7' – 0"	6' – 0"	11"	8"	30'	162	#6	6"	8' – 1"	1,967	162	#5	6"	11' – 4"	1,915	6' – 10"	4' – 6"	162	#5	6"	7' – 5"	1,253	4' – 6"	2' – 11"	82	12"	6' – 0"	329	5	39' – 9"	133	39	39' – 9"	1,036	8' – 1"	22	20	56	0.862	165.8	0.6	78	35.1	6,711
7' – 0"	7' – 0"	8"	7"	16'	108	#6	9"	7' – 11"	1,284	162	#5	6"	12' – 0"	2,028	7' – 7"	4' – 5"	162	#5	6"	7' – 1"	1,197	4' – 5"	2' – 8"	108	9"	7' – 0"	505	5	39' – 9"	133	39	39' – 9"	1,036	7' – 11"	21	18	50	0.706	154.6	0.6	71	28.8	6,254
7' – 0"	7' – 0"	9"	7"	20'	108	#6	9"	7' – 11"	1,284	162	#5	6"	12' – 1"	2,042	7' – 8"	4' – 5"	162	#5	6"	7' – 2"	1,211	4' – 5"	2' – 9"	108	9"	7' – 0"	505	5	39' – 9"	133	39	39' – 9"	1,036	7' – 11"	21	18	50	0.756	155.3	0.6	71	30.8	6,282
7' – 0"	7' – 0"	10"	8"	23'	108	#6	9"	8' – 1"	1,311	162	#5	6"	12' – 3"	2,070	7' – 9"	4' – 6"	162	#5	6"	7' – 4"	1,239	4' – 6"	2' – 10"	108	9"	7' – 0"	505	5	39' – 9"	133	39	39' – 9"	1,036	8' – 1"	22	20	56	0.860	157.4	0.6	78	35.0	6,372
7' – 0"	7' – 0"	11"	8"	30'	162	#6	6"	8' – 1"	1,967	162	#5	6"	12' – 4"	2,084	7' – 10"	4' – 6"	162	#5	6"	7' – 5"	1,253	4' – 6"	2' – 11"	108	9"	7' – 0"	505	5	39' – 9"	133	39	39' – 9"	1,036	8' – 1"	22	20	56	0.912	174.5	0.6	78	37.1	7,056

(5) For direct traffic culverts (fill height ≤ 2 ft.), identify the required box size and select the option with the minimum fill height.

HL93 LOADING SHEET 2 OF 2

Texas Department of Transportation | Bridge Division Standard

SINGLE BOX CULVERTS CAST-IN-PLACE
0' TO 30' FILL

SCC-7

FILE: scc07ste-20.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
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REVISIONS				
	DIST	COUNTY		SHEET NO.
				217

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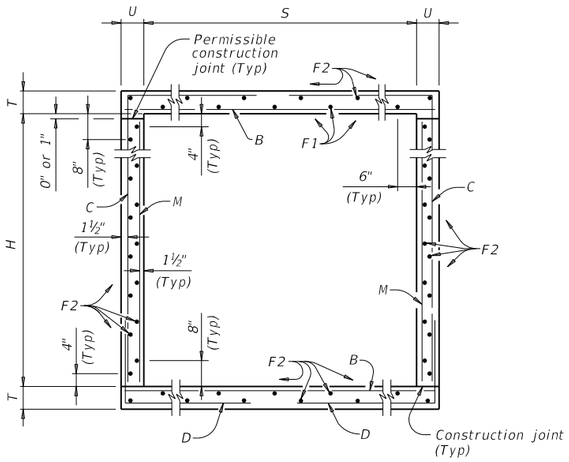
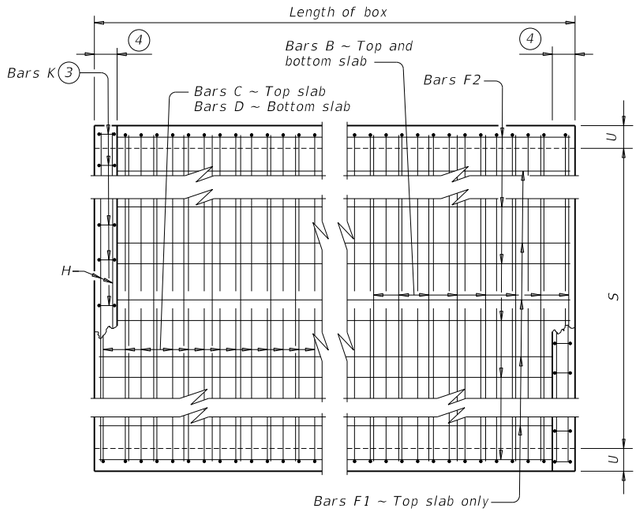
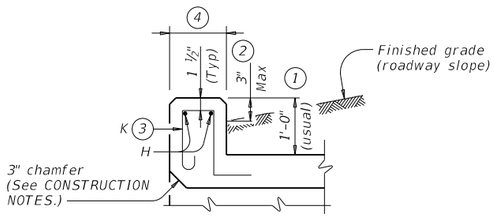


TYPICAL SECTION



PLAN OF REINF STEEL



SECTION THRU CURB

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MATERIAL NOTES:

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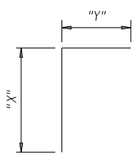
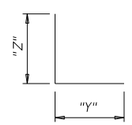
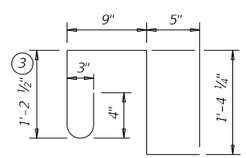


BARS C



BARS D



BARS K (#4)
(Spa = 1'-0" Max)
(Length = 4'-2")

HL93 LOADING

SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS CAST-IN-PLACE
0' TO 30' FILL

SCC-8

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

FILE: scc08ste-20.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
				218

SECTION DIMENSIONS				FILL HEIGHT (5)	BILLS OF REINFORCING STEEL (For Box Length = 40 feet)																													QUANTITIES					
					Bars B					Bars C							Bars D							Bars M ~ #4				Bars F1 ~ #4 at 18" Spa			Bars F2 ~ #4 at 18" Spa			Bars H 4 ~ #4		Bars K		Per Foot of Barrel		Curb		Total	
S	H	T	U		No.	Size	Spa	Length	Weight	No.	Size	Spa	Length	Weight	" X "	" Y "	No.	Size	Spa	Length	Weight	" Y "	" Z "	No.	Spa	Length	Weight	No.	Length	Wt	No.	Length	Weight	Length	Wt	No.	Wt	Conc (CY)	Reinf (Lb)	Conc (CY)	Reinf (Lb)	Conc (CY)	Reinf (Lb)
8' – 0"	3' – 0"	8"	7"	13'	162	#6	6"	8' – 11"	2,170	108	#6	9"	8' – 9"	1,419	3' – 7"	5' – 2"	108	#6	9"	8' – 3"	1,338	5' – 2"	3' – 1"	108	9"	3' – 0"	216	6	39' – 9"	159	32	39' – 9"	850	8' – 11"	24	20	56	0.582	153.8	0.7	80	24.0	6,232
8' – 0"	3' – 0"	8"	7"	16'	162	#6	6"	8' – 11"	2,170	108	#6	9"	8' – 9"	1,419	3' – 7"	5' – 2"	108	#6	9"	8' – 3"	1,338	5' – 2"	3' – 1"	108	9"	3' – 0"	216	6	39' – 9"	159	32	39' – 9"	850	8' – 11"	24	20	56	0.582	153.8	0.7	80	24.0	6,232
8' – 0"	3' – 0"	10"	8"	20'	162	#6	6"	9' – 1"	2,210	108	#6	9"	8' – 11"	1,446	3' – 9"	5' – 2"	108	#6	9"	8' – 5"	1,365	5' – 2"	3' – 3"	82	12"	3' – 0"	164	6	39' – 9"	159	32	39' – 9"	850	9' – 1"	24	22	61	0.724	154.9	0.7	85	29.6	6,279
8' – 0"	3' – 0"	11"	8"	23'	162	#6	6"	9' – 1"	2,210	108	#6	9"	9' – 0"	1,460	3' – 10"	5' – 2"	108	#6	9"	8' – 6"	1,379	5' – 2"	3' – 4"	82	12"	3' – 0"	164	6	39' – 9"	159	32	39' – 9"	850	9' – 1"	24	22	61	0.782	155.6	0.7	85	32.0	6,307
8' – 0"	3' – 0"	13"	9"	30'	162	#6	6"	9' – 3"	2,251	108	#6	9"	9' – 3"	1,500	4' – 0"	5' – 3"	108	#6	9"	8' – 9"	1,419	5' – 3"	3' – 6"	108	9"	3' – 0"	216	6	39' – 9"	159	32	39' – 9"	850	9' – 3"	25	22	61	0.929	159.9	0.7	86	37.9	6,481
8' – 0"	4' – 0"	8"	7"	13'	162	#6	6"	8' – 11"	2,170	108	#6	9"	9' – 9"	1,582	4' – 7"	5' – 2"	108	#6	9"	8' – 3"	1,338	5' – 2"	3' – 1"	108	9"	4' – 0"	289	6	39' – 9"	159	32	39' – 9"	850	8' – 11"	24	20	56	0.626	159.7	0.7	80	25.7	6,468
8' – 0"	4' – 0"	8"	7"	16'	162	#6	6"	8' – 11"	2,170	108	#6	9"	9' – 9"	1,582	4' – 7"	5' – 2"	108	#6	9"	8' – 3"	1,338	5' – 2"	3' – 1"	108	9"	4' – 0"	289	6	39' – 9"	159	32	39' – 9"	850	8' – 11"	24	20	56	0.626	159.7	0.7	80	25.7	6,468
8' – 0"	4' – 0"	10"	8"	20'	162	#6	6"	9' – 1"	2,210	108	#6	9"	9' – 11"	1,609	4' – 9"	5' – 2"	108	#6	9"	8' – 5"	1,365	5' – 2"	3' – 3"	82	12"	4' – 0"	219	6	39' – 9"	159	32	39' – 9"	850	9' – 1"	24	22	61	0.774	160.3	0.7	85	31.6	6,497
8' – 0"	4' – 0"	11"	8"	23'	162	#6	6"	9' – 1"	2,210	108	#6	9"	10' – 0"	1,622	4' – 10"	5' – 2"	108	#6	9"	8' – 6"	1,379	5' – 2"	3' – 4"	82	12"	4' – 0"	219	6	39' – 9"	159	32	39' – 9"	850	9' – 1"	24	22	61	0.831	161.0	0.7	85	33.9	6,524
8' – 0"	4' – 0"	13"	9"	30'	162	#6	6"	9' – 3"	2,251	108	#6	9"	10' – 3"	1,663	5' – 0"	5' – 3"	108	#6	9"	8' – 9"	1,419	5' – 3"	3' – 6"	108	9"	4' – 0"	289	6	39' – 9"	159	32	39' – 9"	850	9' – 3"	25	22	61	0.985	165.8	0.7	86	40.1	6,717
8' – 0"	5' – 0"	8"	7"	13'	162	#6	6"	8' – 11"	2,170	108	#6	9"	10' – 9"	1,744	5' – 7"	5' – 2"	108	#6	9"	8' – 3"	1,338	5' – 2"	3' – 1"	108	9"	5' – 0"	361	6	39' – 9"	159	36	39' – 9"	956	8' – 11"	24	20	56	0.669	168.2	0.7	80	27.4	6,808
8' – 0"	5' – 0"	8"	7"	16'	162	#6	6"	8' – 11"	2,170	108	#6	9"	10' – 9"	1,744	5' – 7"	5' – 2"	108	#6	9"	8' – 3"	1,338	5' – 2"	3' – 1"	108	9"	5' – 0"	361	6	39' – 9"	159	36	39' – 9"	956	8' – 11"	24	20	56	0.669	168.2	0.7	80	27.4	6,808
8' – 0"	5' – 0"	10"	8"	20'	162	#6	6"	9' – 1"	2,210	108	#6	9"	10' – 11"	1,771	5' – 9"	5' – 2"	108	#6	9"	8' – 5"	1,365	5' – 2"	3' – 3"	82	12"	5' – 0"	274	6	39' – 9"	159	36	39' – 9"	956	9' – 1"	24	22	61	0.823	168.4	0.7	85	33.6	6,820
8' – 0"	5' – 0"	11"	8"	23'	162	#6	6"	9' – 1"	2,210	108	#6	9"	11' – 0"	1,784	5' – 10"	5' – 2"	108	#6	9"	8' – 6"	1,379	5' – 2"	3' – 4"	82	12"	5' – 0"	274	6	39' – 9"	159	36	39' – 9"	956	9' – 1"	24	22	61	0.881	169.1	0.7	85	35.9	6,847
8' – 0"	5' – 0"	13"	9"	30'	162	#6	6"	9' – 3"	2,251	108	#6	9"	11' – 3"	1,825	6' – 0"	5' – 3"	108	#6	9"	8' – 9"	1,419	5' – 3"	3' – 6"	108	9"	5' – 0"	361	6	39' – 9"	159	36	39' – 9"	956	9' – 3"	25	22	61	1.040	174.3	0.7	86	42.3	7,057
8' – 0"	6' – 0"	8"	7"	13'	162	#6	6"	8' – 11"	2,170	108	#6	9"	11' – 9"	1,906	6' – 7"	5' – 2"	108	#6	9"	8' – 3"	1,338	5' – 2"	3' – 1"	108	9"	6' – 0"	433	6	39' – 9"	159	40	39' – 9"	1,062	8' – 11"	24	20	56	0.712	176.7	0.7	80	29.2	7,148
8' – 0"	6' – 0"	8"	7"	16'	162	#6	6"	8' – 11"	2,170	108	#6	9"	11' – 9"	1,906	6' – 7"	5' – 2"	108	#6	9"	8' – 3"	1,338	5' – 2"	3' – 1"	108	9"	6' – 0"	433	6	39' – 9"	159	40	39' – 9"	1,062	8' – 11"	24	20	56	0.712	176.7	0.7	80	29.2	7,148
8' – 0"	6' – 0"	10"	8"	20'	162	#6	6"	9' – 1"	2,210	108	#6	9"	11' – 11"	1,933	6' – 9"	5' – 2"	108	#6	9"	8' – 5"	1,365	5' – 2"	3' – 3"	82	12"	6' – 0"	329	6	39' – 9"	159	40	39' – 9"	1,062	9' – 1"	24	22	61	0.872	176.5	0.7	85	35.6	7,143
8' – 0"	6' – 0"	11"	8"	23'	162	#6	6"	9' – 1"	2,210	108	#6	9"	12' – 0"	1,947	6' – 10"	5' – 2"	108	#6	9"	8' – 6"	1,379	5' – 2"	3' – 4"	82	12"	6' – 0"	329	6	39' – 9"	159	40	39' – 9"	1,062	9' – 1"	24	22	61	0.930	177.2	0.7	85	37.9	7,171
8' – 0"	6' – 0"	13"	9"	30'	162	#6	6"	9' – 3"	2,251	108	#6	9"	12' – 3"	1,987	7' – 0"	5' – 3"	108	#6	9"	8' – 9"	1,419	5' – 3"	3' – 6"	108	9"	6' – 0"	433	6	39' – 9"	159	40	39' – 9"	1,062	9' – 3"	25	22	61	1.096	182.8	0.7	86	44.5	7,397
8' – 0"	7' – 0"	8"	7"	13'	162	#6	6"	8' – 11"	2,170	108	#6	9"	12' – 9"	2,068	7' – 7"	5' – 2"	108	#6	9"	8' – 3"	1,338	5' – 2"	3' – 1"	108	9"	7' – 0"	505	6	39' – 9"	159	40	39' – 9"	1,062	8' – 11"	24	20	56	0.755	182.6	0.7	80	30.9	7,382
8' – 0"	7' – 0"	8"	7"	16'	162	#6	6"	8' – 11"	2,170	162	#6	6"	12' – 9"	3,102	7' – 7"	5' – 2"	162	#6	6"	8' – 3"	2,007	5' – 2"	3' – 1"	108	9"	7' – 0"	505	6	39' – 9"	159	40	39' – 9"	1,062	8' – 11"	24	20	56	0.755	225.1	0.7	80	30.9	9,085
8' – 0"	7' – 0"	10"	8"	20'	162	#6	6"	9' – 1"	2,210	162	#6	6"	12' – 11"	3,143	7' – 9"	5' – 2"	162	#6	6"	8' – 5"	2,048	5' – 2"	3' – 3"	82	12"	7' – 0"	383	6	39' – 9"	159	40	39' – 9"	1,062	9' – 1"	24	22	61	0.922	225.1	0.7	85	37.6	9,090
8' – 0"	7' – 0"	11"	8"	23'	162	#6	6"	9' – 1"	2,210	162	#6	6"	13' – 0"	3,163	7' – 10"	5' – 2"	162	#6	6"	8' – 6"	2,068	5' – 2"	3' – 4"	82	12"	7' – 0"	383	6	39' – 9"	159	40	39' – 9"	1,062	9' – 1"	24	22	61	0.979	226.1	0.7	85	39.8	9,130
8' – 0"	7' – 0"	13"	9"	30'	162	#6	6"	9' – 3"	2,251	162	#6	6"	13' – 3"	3,224	8' – 0"	5' – 3"	162	#6	6"	8' – 9"	2,129	5' – 3"	3' – 6"	108	9"	7' – 0"	505	6	39' – 9"	159	40	39' – 9"	1,062	9' – 3"	25	22	61	1.151	233.3	0.7	86	46.7	9,416
8' – 0"	8' – 0"	8"	7"	13'	162	#6	6"	8' – 11"	2,170	108	#6	9"	13' – 9"	2,230	8' – 7"	5' – 2"	108	#6	9"	8' – 3"	1,338	5' – 2"	3' – 1"	108	9"	8' – 0"	577	6	39' – 9"	159	44	39' – 9"	1,168	8' – 11"	24	20	56	0.798	191.1	0.7	80	32.6	7,722
8' – 0"	8' – 0"	8"	7"	16'	162	#6	6"	8' – 11"	2,170	108	#6	9"	13' – 9"	2,230	8' – 7"	5' – 2"	162	#6	6"	8' – 3"	2,007	5' – 2"	3' – 1"	108	9"	8' – 0"	577	6	39' – 9"	159	44	39' – 9"	1,168	8' – 11"	24	20	56	0.798	207.8	0.7	80	32.6	8,391
8' – 0"	8' – 0"	10"	8"	20'	162	#6	6"	9' – 1"	2,210	108	#6	9"	13' – 11"	2,258	8' – 9"	5' – 2"	162	#6	6"	8' – 5"	2,048	5' – 2"	3' – 3"	108	9"	8' – 0"	577	6	39' – 9"	159	44	39' – 9"	1,168	9' – 1"	24	22	61	0.971	210.5	0.7	85	39.5	8,505
8' – 0"	8' – 0"	11"	8"	23'	162	#6	6"	9' – 1"	2,210	108	#6	9"	14' – 0"	2,271	8' – 10"	5' – 2"	162	#6	6"	8' – 6"	2,068	5' – 2"	3' – 4"	162	6"	8' – 0"	866	6	39' – 9"	159	44	39' – 9"	1,168	9' – 1"	24	22	61	1.029	218.6	0.7	85	41.8	8,827
8' – 0"	8' – 0"	13"	9"	30'	162	#6	6"	9' – 3"	2,251	108	#6	9"	14' – 3"	2,312	9' – 0"	5' – 3"	162	#6	6"	8' – 9"	2,129	5' – 3"	3' – 6"	162	6"	8' – 0"	866	6	39' – 9"	159	44	39' – 9"	1,168	9' – 3"	25	22	61	1.207	222.1	0.7	86	49.0	8,971

(5) For direct traffic culverts (fill height ≤ 2 ft.), identify the required box size and select the option with the minimum fill height.

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DATE:
FILE:

HL93 LOADING SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS CAST-IN-PLACE
0' TO 30' FILL

SCC-8

FILE: scc08ste-20.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
				219

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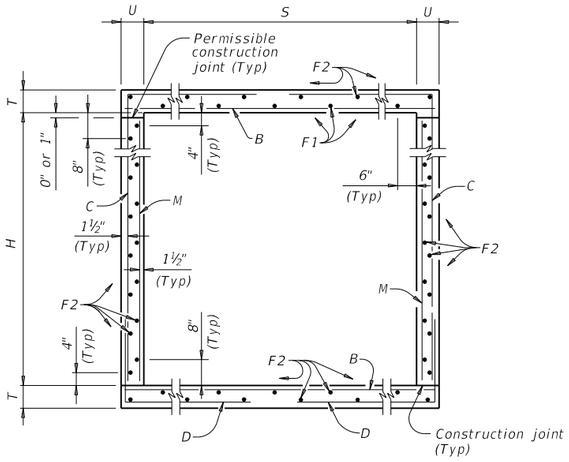
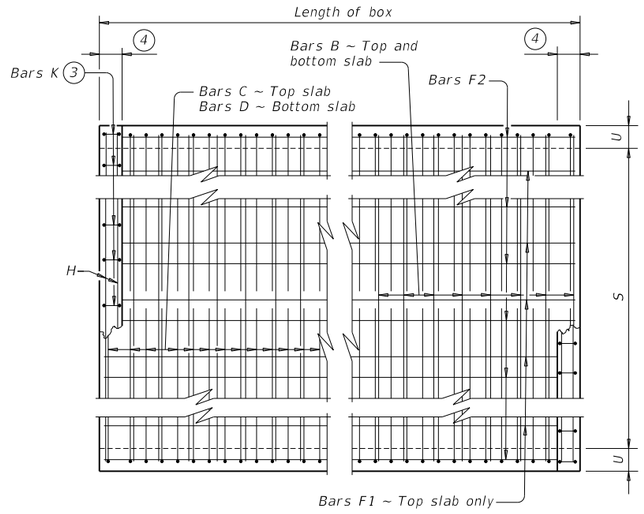
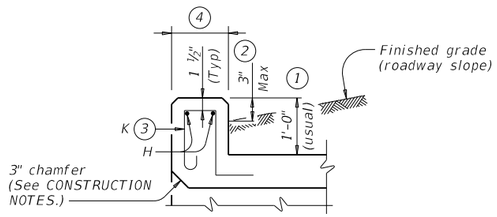


TYPICAL SECTION



PLAN OF REINF STEEL



SECTION THRU CURB

(1) 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0", refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Rail Anchorage Curb (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.

(2) For vehicle safety, the following requirements must be met:
- For structures without bridge rail, construct curbs no more than 3" above finished grade.
- For structures with bridge rail, construct curbs flush with finished grade.

Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

(3) For curbs less than 1'-0" high, tilt Bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, Bars K may be omitted.

(4) 1'-0" typical. 2'-3" when the Rail Anchorage Curb (RAC) standard sheet is referred to elsewhere in the plans.

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

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

CONSTRUCTION NOTES:

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

MATERIAL NOTES:

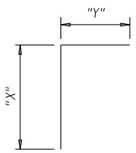
Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
Provide Class C concrete (f'c = 4,200 psi, 7.0 sack/CY) for culvert barrel and curb, with the following exceptions: provide Class S concrete (f'c = 4,200 psi, 7.0 sack/CY) for top slabs of:
- culverts with overlay,
- culverts with 1-to-2 course surface treatment, or
- culverts with the top slab as the final riding surface.

Provide bar laps, where required, as follows:
- Uncoated or galvanized ~ #4 = 1'-8" Min
- Uncoated or galvanized ~ #5 = 2'-1" Min
- Uncoated or galvanized ~ #6 = 2'-6" Min

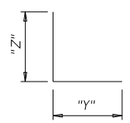
GENERAL NOTES:

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

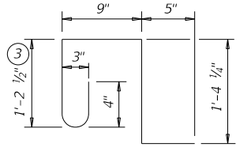
Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing bar dimensions shown are out-to-out of bar.



BARS C



BARS D



BARS K (#4)
(Spa = 1'-0" Max)
(Length = 4'-2")

THE SEAL THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO: 134095 ON 10/21/2021
ALTERATION ON A SEALED DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

HL93 LOADING SHEET 1 OF 2

Texas Department of Transportation | Bridge Division Standard

SINGLE BOX CULVERTS CAST-IN-PLACE
0' TO 30' FILL

SCC-9

FILE: scc09ste-20.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	DIST	COUNTY		SHEET NO.
				220

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DATE:
FILE:

SECTION DIMENSIONS				FILL HEIGHT (5)	BILLS OF REINFORCING STEEL (For Box Length = 40 feet)																														QUANTITIES					
					Bars B					Bars C							Bars D							Bars M ~ #4				Bars F1 ~ #4 at 18" Spa			Bars F2 ~ #4 at 18" Spa			Bars H 4 ~ #4		Bars K		Per Foot of Barrel		Curb		Total	
S	H	T	U		No.	Size	Spa	Length	Weight	No.	Size	Spa	Length	Weight	" X "	" Y "	No.	Size	Spa	Length	Weight	" Y "	" Z "	No.	Spa	Length	Weight	No.	Length	Wt	No.	Length	Weight	Length	Wt	No.	Wt	Conc (CY)	Reinf (Lb)	Conc (CY)	Reinf (Lb)	Conc (CY)	Reinf (Lb)
9' – 0"	4' – 0"	8"	7"	10'	162	#6	6"	9' – 11"	2,413	108	#6	9"	10' – 1"	1,636	4' – 7"	5' – 6"	108	#6	9"	8' – 7"	1,392	5' – 6"	3' – 1"	108	9"	4' – 0"	289	7	39' – 9"	186	35	39' – 9"	929	9' – 11"	26	22	61	0.675	171.1	0.8	87	27.8	6,932
9' – 0"	4' – 0"	8"	7"	13'	162	#6	6"	9' – 11"	2,413	162	#6	6"	10' – 1"	2,454	4' – 7"	5' – 6"	162	#6	6"	8' – 7"	2,089	5' – 6"	3' – 1"	108	9"	4' – 0"	289	7	39' – 9"	186	35	39' – 9"	929	9' – 11"	26	22	61	0.675	209.0	0.8	87	27.8	8,447
9' – 0"	4' – 0"	9"	8"	16'	162	#6	6"	10' – 1"	2,454	162	#6	6"	10' – 3"	2,494	4' – 8"	5' – 7"	162	#6	6"	8' – 9"	2,129	5' – 7"	3' – 2"	82	12"	4' – 0"	219	7	39' – 9"	186	35	39' – 9"	929	10' – 1"	27	24	67	0.772	210.3	0.8	94	31.6	8,505
9' – 0"	4' – 0"	11"	8"	20'	162	#6	6"	10' – 1"	2,454	162	#6	6"	10' – 5"	2,535	4' – 10"	5' – 7"	162	#6	6"	8' – 11"	2,170	5' – 7"	3' – 4"	82	12"	4' – 0"	219	7	39' – 9"	186	35	39' – 9"	929	10' – 1"	27	24	67	0.899	212.3	0.8	94	36.7	8,587
9' – 0"	4' – 0"	12"	9"	23'	162	#6	6"	10' – 3"	2,494	162	#6	6"	11' – 6"	2,798	5' – 11"	5' – 7"	162	#6	6"	9' – 0"	2,190	5' – 7"	3' – 5"	108	9"	4' – 0"	289	7	39' – 9"	186	35	39' – 9"	929	10' – 3"	27	24	67	1.000	222.2	0.8	94	40.8	8,980
9' – 0"	4' – 0"	13"	10"	26'	162	#6	6"	10' – 5"	2,535	162	#6	6"	10' – 8"	2,595	5' – 0"	5' – 8"	162	#6	6"	9' – 2"	2,230	5' – 8"	3' – 6"	108	9"	4' – 0"	289	7	39' – 9"	186	35	39' – 9"	929	10' – 5"	28	24	67	1.103	219.1	0.8	95	44.9	8,859
9' – 0"	4' – 0"	14"	11"	30'	162	#6	6"	10' – 7"	2,575	162	#6	6"	10' – 10"	2,636	5' – 1"	5' – 9"	162	#6	6"	9' – 4"	2,271	5' – 9"	3' – 7"	108	9"	4' – 0"	289	7	39' – 9"	186	35	39' – 9"	929	10' – 7"	28	24	67	1.208	222.2	0.8	95	49.1	8,981
9' – 0"	5' – 0"	8"	7"	10'	162	#6	6"	9' – 11"	2,413	108	#6	9"	11' – 1"	1,798	5' – 7"	5' – 6"	108	#6	9"	8' – 7"	1,392	5' – 6"	3' – 1"	108	9"	5' – 0"	361	7	39' – 9"	186	39	39' – 9"	1,036	9' – 11"	26	22	61	0.718	179.7	0.8	87	29.5	7,273
9' – 0"	5' – 0"	8"	7"	13'	162	#6	6"	9' – 11"	2,413	162	#6	6"	11' – 1"	2,697	5' – 7"	5' – 6"	162	#6	6"	8' – 7"	2,089	5' – 6"	3' – 1"	108	9"	5' – 0"	361	7	39' – 9"	186	39	39' – 9"	1,036	9' – 11"	26	22	61	0.718	219.6	0.8	87	29.5	8,869
9' – 0"	5' – 0"	9"	8"	16'	162	#6	6"	10' – 1"	2,454	162	#6	6"	11' – 3"	2,737	5' – 8"	5' – 7"	162	#6	6"	8' – 9"	2,129	5' – 7"	3' – 2"	82	12"	5' – 0"	274	7	39' – 9"	186	39	39' – 9"	1,036	10' – 1"	27	24	67	0.821	220.4	0.8	94	33.6	8,910
9' – 0"	5' – 0"	11"	8"	20'	162	#6	6"	10' – 1"	2,454	162	#6	6"	11' – 5"	2,778	5' – 10"	5' – 7"	162	#6	6"	8' – 11"	2,170	5' – 7"	3' – 4"	82	12"	5' – 0"	274	7	39' – 9"	186	39	39' – 9"	1,036	10' – 1"	27	24	67	0.949	222.5	0.8	94	38.7	8,992
9' – 0"	5' – 0"	12"	9"	23'	162	#6	6"	10' – 3"	2,494	162	#6	6"	12' – 6"	3,042	6' – 11"	5' – 7"	162	#6	6"	9' – 0"	2,190	5' – 7"	3' – 5"	108	9"	5' – 0"	361	7	39' – 9"	186	39	39' – 9"	1,036	10' – 3"	27	24	67	1.056	232.7	0.8	94	43.0	9,403
9' – 0"	5' – 0"	13"	10"	26'	162	#6	6"	10' – 5"	2,535	162	#6	6"	11' – 8"	2,839	6' – 0"	5' – 8"	162	#6	6"	9' – 2"	2,230	5' – 8"	3' – 6"	108	9"	5' – 0"	361	7	39' – 9"	186	39	39' – 9"	1,036	10' – 5"	28	24	67	1.165	229.7	0.8	95	47.4	9,282
9' – 0"	5' – 0"	14"	11"	30'	162	#6	6"	10' – 7"	2,575	162	#6	6"	13' – 1"	3,183	6' – 1"	7' – 0"	162	#6	6"	10' – 7"	2,575	7' – 0"	3' – 7"	108	9"	5' – 0"	361	7	39' – 9"	186	39	39' – 9"	1,036	10' – 7"	28	24	67	1.276	247.9	0.8	95	51.8	10,011
9' – 0"	6' – 0"	8"	7"	10'	162	#6	6"	9' – 11"	2,413	108	#6	9"	12' – 1"	1,960	6' – 7"	5' – 6"	108	#6	9"	8' – 7"	1,392	5' – 6"	3' – 1"	108	9"	6' – 0"	433	7	39' – 9"	186	43	39' – 9"	1,142	9' – 11"	26	22	61	0.761	188.2	0.8	87	31.2	7,613
9' – 0"	6' – 0"	8"	7"	13'	162	#6	6"	9' – 11"	2,413	162	#6	6"	12' – 1"	2,940	6' – 7"	5' – 6"	162	#6	6"	8' – 7"	2,089	5' – 6"	3' – 1"	108	9"	6' – 0"	433	7	39' – 9"	186	43	39' – 9"	1,142	9' – 11"	26	22	61	0.761	230.1	0.8	87	31.2	9,290
9' – 0"	6' – 0"	9"	8"	16'	162	#6	6"	10' – 1"	2,454	162	#6	6"	12' – 3"	2,981	6' – 8"	5' – 7"	162	#6	6"	8' – 9"	2,129	5' – 7"	3' – 2"	82	12"	6' – 0"	329	7	39' – 9"	186	43	39' – 9"	1,142	10' – 1"	27	24	67	0.870	230.5	0.8	94	35.6	9,315
9' – 0"	6' – 0"	11"	8"	20'	162	#6	6"	10' – 1"	2,454	162	#6	6"	12' – 5"	3,021	6' – 10"	5' – 7"	162	#6	6"	8' – 11"	2,170	5' – 7"	3' – 4"	82	12"	6' – 0"	329	7	39' – 9"	186	43	39' – 9"	1,142	10' – 1"	27	24	67	0.998	232.6	0.8	94	40.7	9,396
9' – 0"	6' – 0"	12"	9"	23'	162	#6	6"	10' – 3"	2,494	162	#6	6"	13' – 6"	3,285	7' – 11"	5' – 7"	162	#6	6"	9' – 0"	2,190	5' – 7"	3' – 5"	108	9"	6' – 0"	433	7	39' – 9"	186	43	39' – 9"	1,142	10' – 3"	27	24	67	1.111	243.3	0.8	94	45.2	9,824
9' – 0"	6' – 0"	13"	10"	26'	162	#6	6"	10' – 5"	2,535	162	#6	6"	12' – 8"	3,082	7' – 0"	5' – 8"	162	#6	6"	9' – 2"	2,230	5' – 8"	3' – 6"	108	9"	6' – 0"	433	7	39' – 9"	186	43	39' – 9"	1,142	10' – 5"	28	24	67	1.226	240.2	0.8	95	49.8	9,703
9' – 0"	6' – 0"	14"	11"	30'	162	#6	6"	10' – 7"	2,575	162	#6	6"	14' – 1"	3,427	7' – 1"	7' – 0"	162	#6	6"	10' – 7"	2,575	7' – 0"	3' – 7"	108	9"	6' – 0"	433	7	39' – 9"	186	43	39' – 9"	1,142	10' – 7"	28	24	67	1.344	258.5	0.8	95	54.6	10,433
9' – 0"	7' – 0"	8"	7"	10'	162	#6	6"	9' – 11"	2,413	108	#6	9"	13' – 1"	2,122	7' – 7"	5' – 6"	108	#6	9"	8' – 7"	1,392	5' – 6"	3' – 1"	108	9"	7' – 0"	505	7	39' – 9"	186	43	39' – 9"	1,142	9' – 11"	26	22	61	0.805	194.0	0.8	87	33.0	7,847
9' – 0"	7' – 0"	8"	7"	13'	162	#6	6"	9' – 11"	2,413	162	#6	6"	13' – 1"	3,183	7' – 7"	5' – 6"	162	#6	6"	8' – 7"	2,089	5' – 6"	3' – 1"	108	9"	7' – 0"	505	7	39' – 9"	186	43	39' – 9"	1,142	9' – 11"	26	22	61	0.805	238.0	0.8	87	33.0	9,605
9' – 0"	7' – 0"	9"	8"	16'	162	#6	6"	10' – 1"	2,454	162	#6	6"	13' – 3"	3,224	7' – 8"	5' – 7"	162	#6	6"	8' – 9"	2,129	5' – 7"	3' – 2"	82	12"	7' – 0"	383	7	39' – 9"	186	43	39' – 9"	1,142	10' – 1"	27	24	67	0.920	238.0	0.8	94	37.6	9,612
9' – 0"	7' – 0"	11"	8"	20'	162	#6	6"	10' – 1"	2,454	162	#6	6"	13' – 5"	3,265	7' – 10"	5' – 7"	162	#6	6"	8' – 11"	2,170	5' – 7"	3' – 4"	82	12"	7' – 0"	383	7	39' – 9"	186	43	39' – 9"	1,142	10' – 1"	27	24	67	1.047	240.0	0.8	94	42.6	9,694
9' – 0"	7' – 0"	12"	9"	23'	162	#6	6"	10' – 3"	2,494	162	#6	6"	14' – 6"	3,528	8' – 11"	5' – 7"	162	#6	6"	9' – 0"	2,190	5' – 7"	3' – 5"	108	9"	7' – 0"	505	7	39' – 9"	186	43	39' – 9"	1,142	10' – 3"	27	24	67	1.167	251.1	0.8	94	47.5	10,139
9' – 0"	7' – 0"	13"	10"	26'	162	#6	6"	10' – 5"	2,535	162	#6	6"	13' – 8"	3,325	8' – 0"	5' – 8"	162	#6	6"	9' – 2"	2,230	5' – 8"	3' – 6"	108	9"	7' – 0"	505	7	39' – 9"	186	43	39' – 9"	1,142	10' – 5"	28	24	67	1.288	248.1	0.8	95	52.3	10,018
9' – 0"	7' – 0"	14"	11"	30'	162	#6	6"	10' – 7"	2,575	162	#6	6"	15' – 1"	3,670	8' – 1"	7' – 0"	162	#6	6"	10' – 7"	2,575	7' – 0"	3' – 7"	108	9"	7' – 0"	505	7	39' – 9"	186	43	39' – 9"	1,142	10' – 7"	28	24	67	1.412	266.3	0.8	95	57.3	10,748
9' – 0"	8' – 0"	8"	7"	10'	162	#6	6"	9' – 11"	2,413	108	#6	9"	14' – 1"	2,285	8' – 7"	5' – 6"	108	#6	9"	8' – 7"	1,392	5' – 6"	3' – 1"	108	9"	8' – 0"	577	7	39' – 9"	186	47	39' – 9"	1,248	9' – 11"	26	22	61	0.848	202.5	0.8	87	34.7	8,188
9' – 0"	8' – 0"	8"	7"	13'	162	#6	6"	9' – 11"	2,413	162	#6	6"	14' – 1"	3,427	8' – 7"	5' – 6"	162	#6	6"	8' – 7"	2,089	5' – 6"	3' – 1"	108	9"	8' – 0"	577	7	39' – 9"	186	47	39' – 9"	1,248	9' – 11"	26	22	61	0.848	248.5	0.8	87	34.7	10,027
9' – 0"	8' – 0"	9"	8"	16'	162	#6	6"	10' – 1"	2,454	162	#6	6"	14' – 3"	3,467	8' – 8"	5' – 7"	162	#6	6"	8' – 9"	2,129	5' – 7"	3' – 2"	108	9"	8' – 0"	577	7	39' – 9"	186	47	39' – 9"	1,248	10' – 1"	27	24	67	0.969	251.5	0.8	94	39.5	10,155
9' – 0"	8' – 0"	11"	8"	20'	162	#6	6"	10' – 1"	2,454	162	#6	6"	14' – 5"	3,508	8' – 10"	5' – 7"	162	#6	6"	8' – 11"	2,170	5' – 7"	3' – 4"	108	9"	8' – 0"	577	7	39' – 9"	186	47	39' – 9"	1,248	10' – 1"	27	24	67	1.097	253.6	0.8	94	44.6	10,237
9' – 0"	8' – 0"	12"	9"	23'	162	#6	6"	10' – 3"	2,494	162	#6	6"	15' – 6"	3,772	9' – 11"	5' – 7"	162	#6	6"	9' – 0"	2,190	5' – 7"	3' – 5"	108	9"	8' – 0"	577	7	39' – 9"	186	47	39' – 9"	1,248	10' – 3"	27	24	67	1.222	261.7	0.8	94	49.7	10,561
9' – 0"	8' – 0"	13"	10"	26'	162	#6	6"	10' – 5"	2,535	162	#6	6"	14' – 8"	3,569	9' – 0"	5' – 8"	162	#6	6"	9' – 2"	2,230	5' – 8"	3' – 6"	108	9"	8' – 0"	577	7	39' – 9"	186	47	39' – 9"	1,248	10' – 5"	28	24	67	1.350	258.6	0.8	95	54.8	10,440
9' – 0"	8' – 0"	14"	11"	30'	162	#6	6"	10' – 7"	2,575	162	#6	6"	14' – 10"	3,609	9' – 1"	5' – 9"	162	#6	6"	9' – 4"	2,271	5' – 9"	3' – 7"	108	9"	8' – 0"	577	7	39' – 9"	186	47	39' – 9"	1,248	10' – 7"	28	24	67	1.479	261.7	0.8	95	60.0	10,561
9' – 0"	9' – 0"	8"	7"	10'	162	#6	6"	9' – 11"	2,413	108	#6	9"	15' – 1"	2,447	9' – 7"	5' – 6"	108	#6	9"	8' – 7"	1,392	5' – 6"	3' – 1"	162	6"	9' – 0"	974	7	39' – 9"	186	51	39' – 9"	1,354	9' – 11"	26	22	61	0.891	219.2	0.8	87	36.4	8,853
9' – 0"	9' – 0"	8"	7"	13'	162	#6	6"	9' – 11"	2,413	162	#6	6"	15' – 1"	3,670	9' – 7"	5' – 6"	162	#6	6"	8' – 7"	2,089	5' – 6"	3' – 1"	162	6"	9' – 0"	974	7	39' – 9"	186	51	39' – 9"	1,354	9' – 11"	26	22	61	0.891	267.2	0.8	87	36.4	10,773
9' – 0"	9' – 0"	9"	8"	16'	162	#6	6"	10' – 1"	2,454	162	#6	6"	15' – 3"	3,711	9' – 8"	5' – 7"	162	#6	6"	8' – 9"	2,129	5' – 7"	3' – 2"	162	6"	9' – 0"	974	7	39' – 9"	186	51	39' – 9"	1,354	10' – 1"	27	24	67	1.019	270.2	0.8	94	41.5	10,902
9' – 0"	9' – 0"	11"	8"	20'	162	#6	6"	10' – 1"	2,454	162	#6	6"	15' – 5"	3,751	9' – 10"	5' – 7"	162	#6	6"	8' – 11"	2,170	5' – 7"	3' – 4"	162	6"	9' – 0"	974	7	39' – 9"	186	51	39' – 9"	1,354	10' – 1"	27	24	67	1.146	272.2	0.8	94	46.6	10,983
9' – 0"	9' – 0"	12"	9"	23'	162	#6	6"	10' – 3"	2,494	162	#6	6"	16' – 6"	4,015	10' – 11"	5' – 7"	162	#6	6"	9' – 0"	2,190	5' – 7"	3' – 5"	162	6"	9' – 0"	974	7	39' – 9"	186	51	39' – 9"	1,354	10' – 3"	27	24	67	1.278	280.3	0.8	94	51.9	11,307
9' – 0"	9' – 0"	13"	10"	26'	162	#6	6"	10' – 5"	2,535	162	#6	6"	15' – 8"	3,812	10' – 0"	5' – 8"	162	#6	6"	9' – 2"	2,230	5' – 8"	3' – 6"	162	6"	9' – 0"	974	7	39' – 9"	186	51	39' – 9"	1,354	10' – 5"	28	24	67	1.412	277.3	0.8	95	57.3	11,186
9' – 0"	9' – 0"	14"	11"	30'	162	#6	6"	10' – 7"	2,575	162	#6	6"	17' – 1"	4,157	10' – 1"	7' – 0"	162	#6	6"	10' – 7"	2,575	7' – 0"	3' – 7"	162	6"	9' – 0"	974	7	39' – 9"	186	51	39' – 9"	1,354	10' – 7"	28	24	67	1.547	295.5	0.8	95	62.7	11,916

(5) For direct traffic culverts (fill height ≤ 2 ft.), identify the required box size and select the option with the minimum fill height.

HL93 LOADING

SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS CAST-IN-PLACE
0' TO 30' FILL

SCC-9

FILE: scc09ste-20.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
				221

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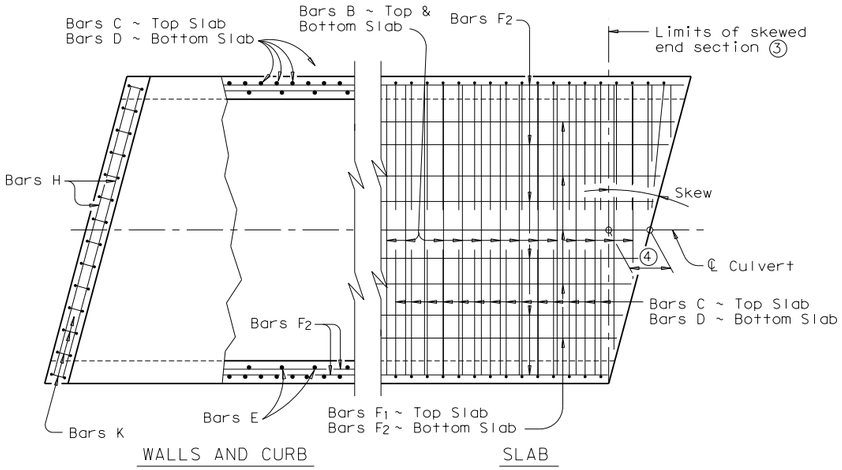
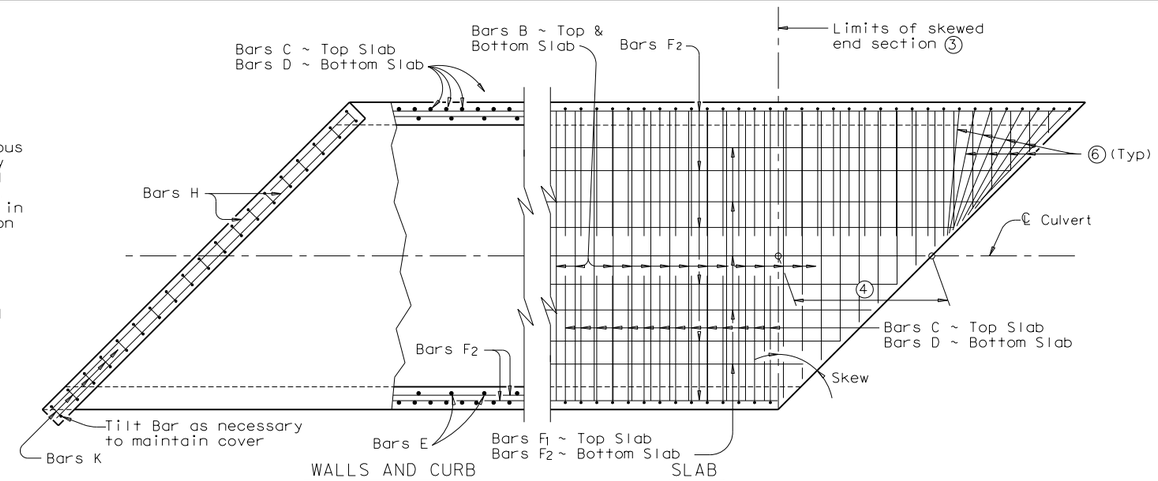
DATE:
FILE:

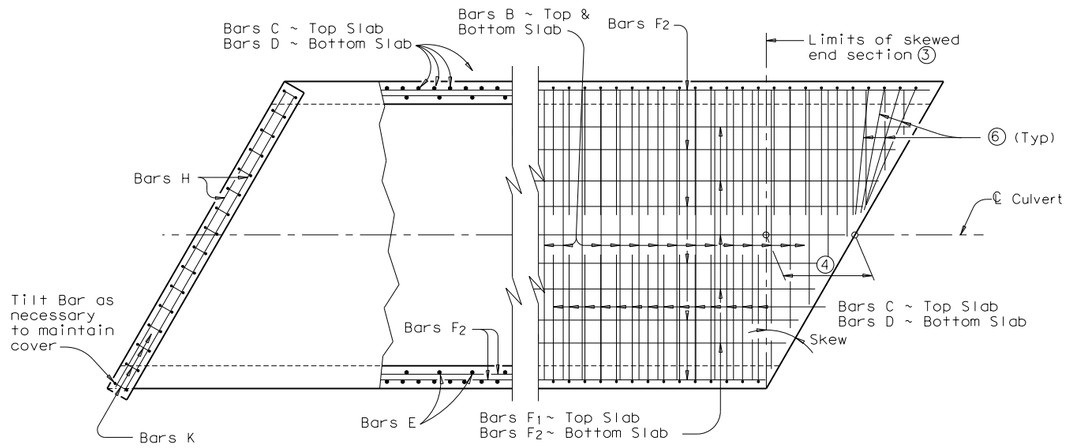


PLAN OF SKEWED ENDS ~ FROM 0° TO 15°⑦

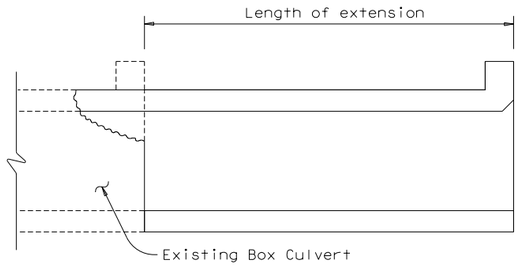
② When the spacing between Bars B becomes less than half of the normal spacing, bars shall be cut to avoid fouling
③ The length of Bars B and E will vary in the skewed end sections
④ ℄One half of overall width℄ x ℄Tan of the skew angle℄
⑤ Bars F_1 and F_2 shall be continuous through the angle section. They shall be bent to remain parallel to the walls of the Box Culvert.
⑥ When necessary to avoid fouling in acute corners, the slab extension leg of Bars C and Bars D may be shortened to a minimum of 1′-6" for skews of 30° and 45°.
⑦ For skews of 15° or less, the contractor has the option of placing Bars B, C and D parallel to the skewed end while maintaining spacing along centerline box. Lengths of Bars B shown on the standards shall be increased to accommodate the skew.



PLAN OF SKEWED ENDS ~ OVER 30° TO 45°



PLAN OF SKEWED ENDS ~ OVER 15° TO 30°

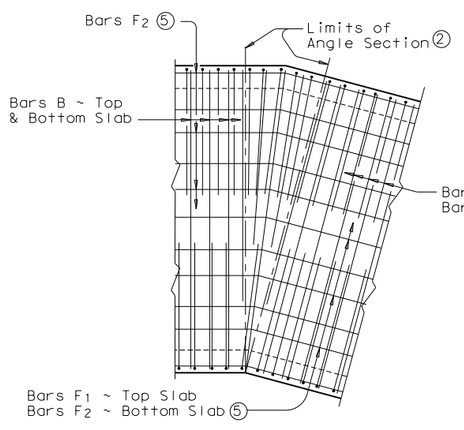


LENGTHENING DETAIL ①

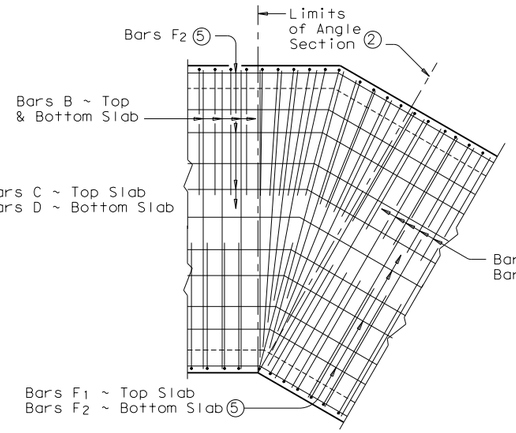
① For box culverts with less than 2′-0" of fill, the top slab shall be broken back to provide a minimum 1′-10" lap of the existing longitudinal bars with the longitudinal bars in the extension. If the depth of fill is 2′-0" or greater, the top slab shall be broken back to provide a 1′-0" minimum embedment of existing longitudinal reinforcing into the extension. Alternatively, if the fill height is greater than 2′-0", the existing curb may be left in place and 2′-0" long #6 bars shall be drilled and grouted 1′-0" into the existing top slab at 1′-6" center to center spacing. Wings and apron shall be broken back as necessary to install the extension. Exposed wingwall and apron reinforcing may be removed or cleaned and included in the extension. When lengthening existing box culverts with dimensions different than current standard dimensions, horizontal and vertical transitions shall be formed as directed by the Engineer. Bottom slabs shall match to maintain an uninterrupted flow line. Existing and new reinforcing shall be field bent into transition maintaining specified cover requirements.

GENERAL NOTES:
Designed according to AASHTO LRFD Specifications.
All reinforcing steel shall be Grade 60.
All concrete shall be Class "C" with these exceptions: use Class "S" for top slabs of culverts with overlay, with 1-to-2 course surface treatment, or with the top slab as the final riding surface.
Class "C" concrete shall have a minimum compressive strength of 4,200 psi, 7.0 sack/CY. Class "S" concrete shall have a minimum compressive strength of 4,200 psi, 7.0 sacks/CY.
The use of permanent forms is not allowed.
Refer to Single Box Culverts Cast-in-Place standard for details of straight sections of culvert. For skewed sections and angle sections refer to Single Box Culverts Cast-in-Place standard for slab and wall dimensions, bar sizes, maximum bar spacing, and any other details not shown. For Skewed ends with curbs, adjust length of Bars H, number of Bars K, curb concrete volume and reinforcing steel weight by dividing the values shown on the culvert standards by the cosine of the skew angle.
Laps for Bars H, when required, shall be 1′-9" for uncoated bars and 2′-7" for epoxy coated.

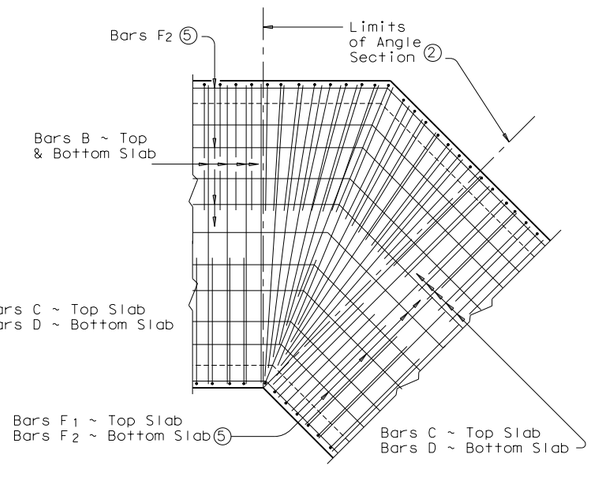
HL93 LOADING



PLAN OF ANGLE SECTION ~ FROM 0° TO 15°



PLAN OF ANGLE SECTION ~ OVER 15° TO 30°



PLAN OF ANGLE SECTION ~ OVER 30° TO 45°

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TEXAS NO: 134095 ON 10/21/2021
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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS CAST-IN-PLACE MISCELLANEOUS DETAILS

SCC-MD

FILE: sccmdste.dgn	DN: GAF	CK: LMW	DW: BWH/TxDOT	CK: GAF
©TxDOT February 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
				222

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DATE:
FILE:

TABLE OF DIMENSIONS & REINFORCING STEEL
(Wings for One Structure End)

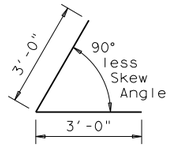
Dimensions					Variable Reinforcing				Estimated ④ Quantities per ft of wing (2~Wings)		Estimated Quantities per ft of Toewall (1~Toewall)	
					Bars J1		Bars J2					
Maximum Wingwall Height Hw	W	X	Y	Z	Size	Spa	Size	Spa	Reinf (Lb/Ft)	Conc (CY/Ft)	Reinf (Lb/Ft)	Conc (CY/Ft)
2'-6"	2'-10"	10"	1'- 0"	7"	#4	1'-0"	#4	1'-0"	48.64	0.406	6.85	0.071
2'-9"	2'-10"	10"	1'- 0"	7"	#4	1'-0"	#4	1'-0"	49.31	0.424	6.85	0.071
3'-0"	2'-10"	10"	1'- 0"	7"	#4	1'-0"	#4	1'-0"	49.98	0.444	6.85	0.071
3'-3"	2'-10"	10"	1'- 0"	7"	#4	1'-0"	#4	1'-0"	53.32	0.462	6.85	0.071
3'-6"	2'-10"	10"	1'- 0"	7"	#4	1'-0"	#4	1'-0"	53.98	0.480	6.85	0.071
4'-0"	3'- 2"	1'- 2"	1'- 0"	7"	#4	1'-0"	#4	1'-0"	55.77	0.532	6.85	0.071
4'-6"	3'- 2"	1'- 2"	1'- 0"	7"	#4	1'-0"	#4	1'-0"	59.77	0.568	6.85	0.071
5'-0"	3'- 9"	1'- 7"	1'- 2"	7"	#4	1'-0"	#4	1'-0"	63.45	0.632	6.96	0.075
5'-6"	3'- 9"	1'- 7"	1'- 2"	7"	#4	1'-0"	#4	1'-0"	67.46	0.668	6.96	0.075
6'-0"	4'- 4"	2'- 0"	1'- 4"	7"	#5	1'-0"	#5	1'-0"	80.67	0.730	7.07	0.078
6'-6"	4'- 4"	2'- 0"	1'- 4"	7"	#5	1'-0"	#5	1'-0"	85.05	0.768	7.07	0.078
7'-0"	5'- 0"	2'- 3"	1'- 9"	8"	#5	1'-0"	#5	1'-0"	92.15	0.864	8.07	0.093
7'-6"	5'- 0"	2'- 3"	1'- 9"	8"	#5	1'-0"	#5	1'-0"	96.54	0.902	8.07	0.093
8'-0"	5'- 6"	2'- 8"	1'-10"	8"	#5	6"	#5	6"	139.04	0.962	8.13	0.095
8'-6"	5'- 6"	2'- 8"	1'-10"	8"	#5	6"	#5	6"	144.47	1.000	8.13	0.095
9'-6"	6'- 0"	2'-10"	2'- 2"	9"	#5	6"	#5	6"	156.93	1.136	8.41	0.110
10'-6"	6'- 5"	3'- 0"	2'- 5"	9"	#6	6"	#5	6"	196.27	1.234	8.57	0.117
11'-6"	7'- 2"	3'- 6"	2'- 8"	11"	#6	6"	#6	6"	230.13	1.438	9.52	0.140
12'-6"	7'- 8"	3'- 9"	2'-11"	1'- 0"	#7	6"	#6	6"	283.41	1.592	9.74	0.157
13'-6"	8'- 2"	4'- 0"	3'- 2"	1'- 2"	#8	6"	#6	6"	348.72	1.804	10.02	0.186
14'-6"	8'-10"	4'- 5"	3'- 5"	1'- 4"	#9	6"	#6	6"	432.94	2.046	10.30	0.218
15'-6"	9'- 6"	4'-10"	3'- 8"	1'- 6"	#9	6"	#7	6"	489.52	2.302	11.24	0.253
16'-0"	9'-11"	5'- 0"	3'-11"	1'- 7"	#9	6"	#7	6"	505.72	2.448	11.47	0.279

TABLE OF WINGWALL REINFORCING (2~Wings)

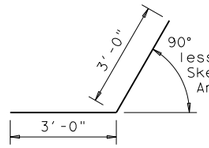
Bar	Size	No.	Spa
D1	#6	~	1'-0"
D2	#6	~	1'-0"
E1	#4	~	1'-0"
F	#4	~	1'-0"
G	#6	~	8"
M1	#4	4	~
P	#4	~	1'-0"
V	#4	~	1'-0"

TABLE OF TOEWALL REINFORCING

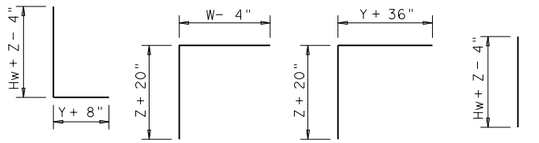
Bar	Size	No	Spa
J3	#4	~	1'-0"
M2	#4	2	~
E2	#4	~	1'-0"



BARS D1



BARS D2



BARS J1 BARS J2 BARS J3 BARS V

WING DIMENSION CALCULATIONS:

Formulas: (All values are in Feet)

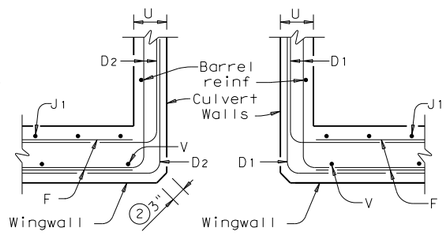
Hw = H + T + C
Lw = (Hw) (SL) ÷ Cosine θ for Ty PW-1
= (Hw - 1') (SL) ÷ Cosine θ for Ty PW-2 and Hw ≥ 4'
= (Hw - 0.5') (SL) ÷ Cosine θ for Ty PW-2 and Hw < 4'

For Cast-in-place culverts:
Ltw = ℄(N) (S) + (N + 1) (U)℄ ÷ Cosine θ

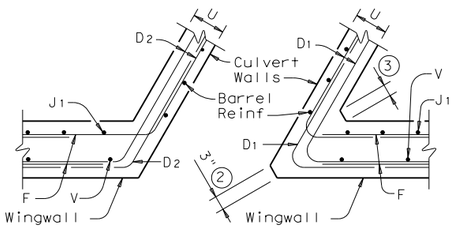
For Precast culverts:
Ltw = ℄(N) (2 U + S) + (N - 1) (0.5')℄ ÷ Cosine θ
Total Wingwall Area (Two Wings ~ SF)
= (2)(Hw)(Lw) for Ty PW-1
= (2)(Hw)(Lw) - 6 SF for Ty PW-2 and Hw ≥ 4'
= (2)(Hw)(Lw) - 1.5 SF for Ty PW-2 and Hw < 4'

Hw = Height of Wingwall
Lw = Length of Wingwall
Ltw = Culvert Toewall Length
N = Number of Culvert Spans
SL:1 = Channel Slope ratio. (Horizontal: 1 Vertical, Usual value is 2:1)
θ = Culvert Skew

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



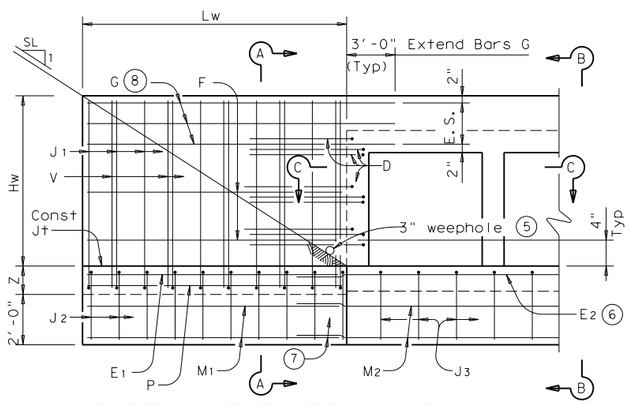
SECTION C-C



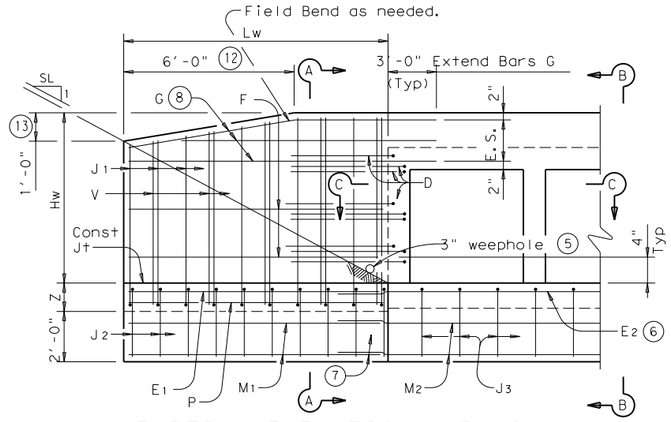
SECTION C-C

1. Skew Angle = 0°
2. At discharge end, chamfer may be ¾".
3. For 15° Skew ~ 1"
   For 30° Skew ~ 2"
   For 45° Skew ~ 3"
4. Quantities shown are for two Type PW-1 wings. Adjust concrete volume for Type PW-2 wings. To determine estimated quantities for two wings, multiply the tabulated values by Lw. Quantities shown do not include weight of Bars D.
5. Provide weepholes for Hw = 5'-0" and greater. Fill around weepholes with coarse gravel.
6. Extend Bars E2 1'-6" minimum into the wingwall footing.
7. Lap Bars M1 1'-6" minimum with Bars M2.
8. Bars G equally spaced at 8" maximum, place as shown. Provide at least two pair Bars G per wing.
9. 0" min to 5'-0" max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail, bicycle rail or curbs taller than 1'-0", refer to ECD standard. For structures with T6 bridge rail, refer to T6-CM standard. For structures with traffic rail, other than T6, refer to RAC standard.
10. For vehicle safety, the following requirements must be met:
    - For structures without bridge rail, curbs cannot project more than 3" above finished grade.
    - For structures with bridge rail, build curbs flush with finished grade.

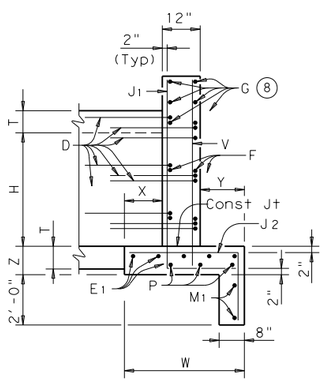
    Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
11. 1'-0" typical. 2'-0" typical when RAC standard is referenced elsewhere in the plans.
12. 3'-0" for Hw < 4'.
13. 6" for Hw < 4'.



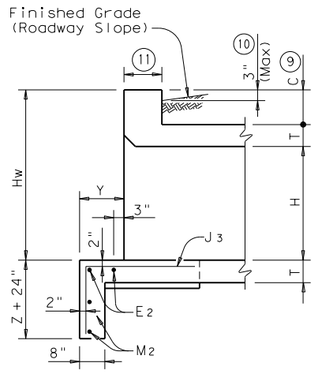
PARTIAL ELEVATION - PW-1



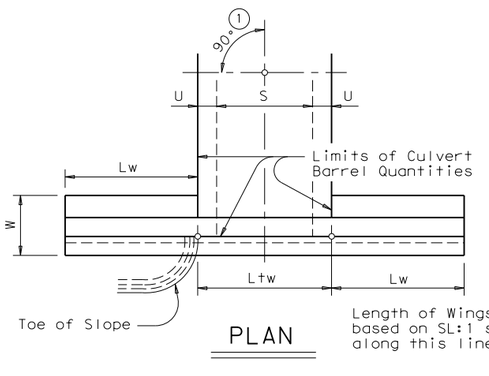
PARTIAL ELEVATION - PW-2



SECTION A-A
(Showing Wing Reinf)

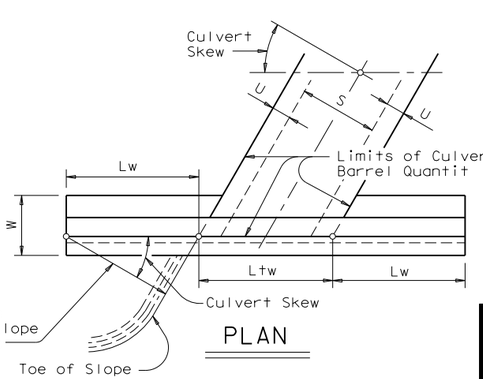


SECTION B-B
(Showing Wing Reinf)



PLAN

DETAILS FOR
NON-SKEWED BOX CULVERTS



PLAN

DETAILS FOR
SKEWED BOX CULVERTS
(Showing 30° Skew)

THE SEAL THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

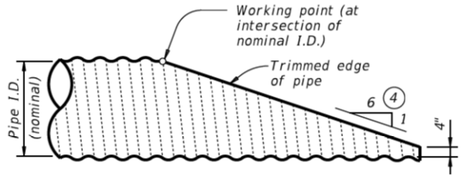
Texas Department of Transportation

Bridge Division Standard

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

PW

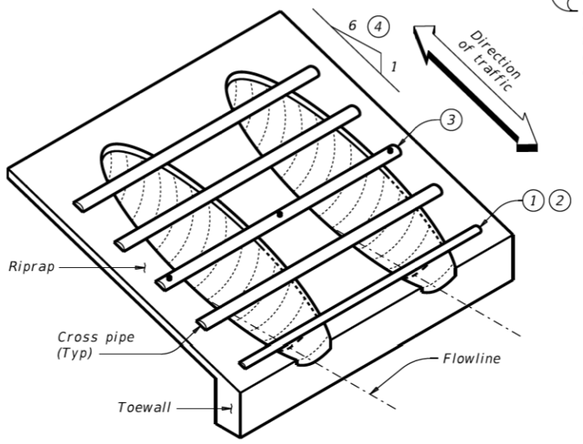
FILE: pwstde01.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: GAF
©TxDOT February 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS				
11-10: Reinforcing Quantities. 01-12: PW-1 & PW-2.	DIST	COUNTY		SHEET NO.
				223



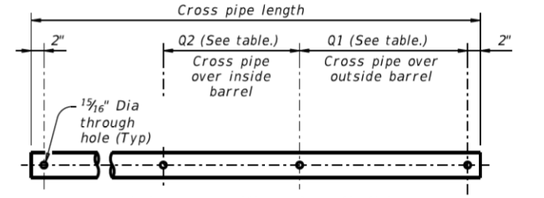
NOTE: All cross pipes, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

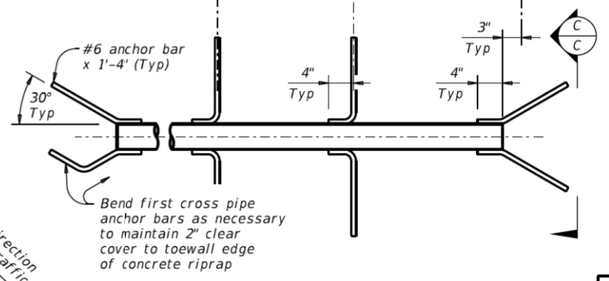
(Showing corrugated metal pipe (CMP) culvert Details at reinforced concrete pipe (RCP) culvert are similar.)



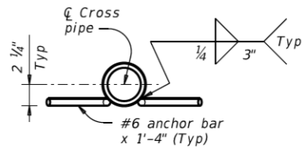
ISOMETRIC VIEW OF TYPICAL INSTALLATION



PIPE WITH BOLTED ANCHOR

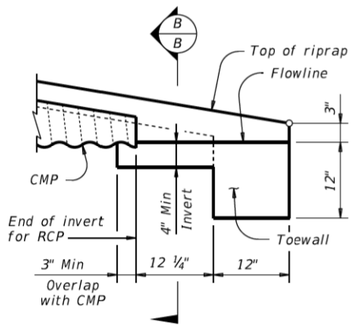


PIPE WITH ANCHOR BARS



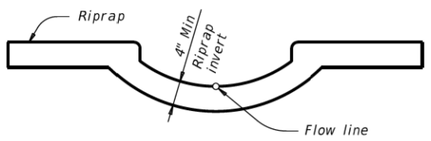
SECTION C-C

CROSS PIPE DETAILS



DETAIL "A"

(Showing invert with corrugated metal pipe (CMP) culvert. Reinforced concrete pipe (RCP) culvert details are similar. Cross pipes not shown for clarity.)



SECTION B-B

(Cross pipes not shown for clarity.)

CROSS PIPE LENGTHS, REQUIRED PIPE SIZES, AND RIPRAP QUANTITIES (2)

Nominal Culvert I.D.	Conc Riprap (CY) (6)	Pipe Culvert Spa ~ G	Single Barrel ~ Q1	Multi-Barrel ~ Q1	Q2	Conditions for Use of Cross Pipes	Cross Pipe Sizes
12"	0.6	0' – 9"	N/A	2' – 1"	1' – 9"	3 or more pipe culverts	3" Std (3.500" O.D.)
15"	0.7	0' – 11"	N/A	2' – 5"	2' – 2"		
18"	0.8	1' – 2"	N/A	2' – 10"	2' – 8"		
21"	0.9	1' – 4"	N/A	3' – 2"	3' – 1"		
24"	0.9	1' – 7"	N/A	3' – 6"	3' – 7"		
27"	1.0	1' – 8"	N/A	3' – 10"	3' – 11"	3 or more pipe culverts	3 ½" Std (4.000" O.D.)
30"	1.1	1' – 10"	N/A	4' – 2"	4' – 4"	2 or more pipe culverts	
33"	1.2	1' – 11"	4' – 2"	4' – 5"	4' – 8"	All pipe culverts	
36"	1.3	2' – 1"	4' – 5"	4' – 9"	5' – 1"	All pipe culverts	4" Std (4.500" O.D.)
42"	1.5	2' – 4"	4' – 11"	5' – 5"	5' – 10"		
48"	1.7	2' – 7"	5' – 5"	6' – 0"	6' – 7"	All pipe culverts	5" Std (5.563" O.D.)
54"	2.0	3' – 0"	5' – 11"	6' – 9"	7' – 6"		
60"	2.2	3' – 3"	6' – 5"	7' – 4"	8' – 3"		
66"	2.4	3' – 3"	6' – 11"	7' – 10"	8' – 9"		
72"	2.7	3' – 4"	7' – 5"	8' – 5"	9' – 4"		

(1) The proper installation of the first cross pipe is critical for vehicle safety. Place the top of the first cross pipe no more than 6" above the flow line.

(2) Provide cross pipes, except the first bottom pipe, of the size shown in the table. Provide a 3 1#2" standard pipe (4" O.D.) for the first bottom pipe.

(3) Install the third cross pipe from the bottom of the culvert using a bolted connection. Ensure that riprap concrete does not flow into the cross pipe so as to permit disassembly of the bolted connection to allow cleanout access. At the Contractor's option, install all other cross pipes using the bolted connection details.

(4) Match cross slope as shown elsewhere in the plans. Cross slope of 6:1 or flatter is required for vehicle safety.

(5) Riprap placed beyond the limits shown will be paid for as concrete riprap in accordance with Item 432, "Riprap".

(6) Quantities shown are for one end of one reinforced concrete pipe (RCP) culvert. For multiple pipe culverts or for corrugated metal pipe (CMP) culverts, quantities will need to be adjusted. Riprap quantities are for contractor's information only.

MATERIAL NOTES:

Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.

Provide cross pipes that meet the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 (Gr B), or API 5LX52.

Provide ASTM A307 bolts and nuts.

Galvanize all steel components, except concrete reinforcing, after fabrication. Repair galvanizing damaged during transport or construction in accordance with the specifications.

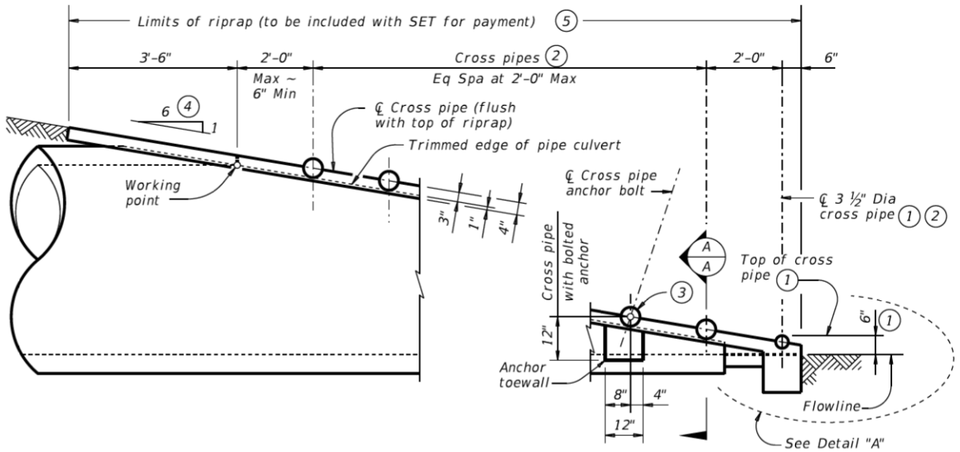
GENERAL NOTES:

Cross pipes are designed for a traversing load of 10,000 pounds at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside Parallel-Drainage Structures", Texas Transportation Institute, March 1981.

Safety end treatments (SET) shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the cross pipes.

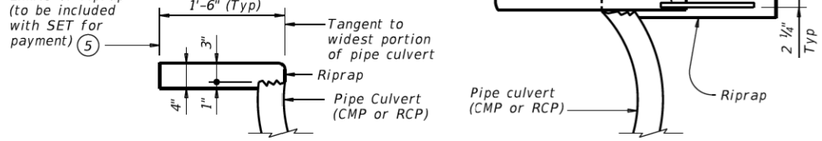
Construct concrete riprap and all necessary inverts in accordance with the requirements of Item 432, "Riprap".

Payment for riprap and toewall is included in the Price Bid for each Safety End Treatment.

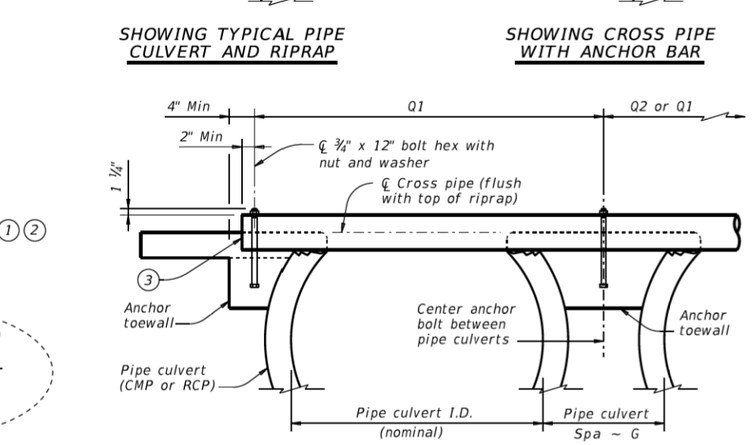


SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

(Showing reinforced concrete pipe (RCP) culvert. Details at corrugated metal pipe (CMP) culvert are similar.)



SHOWING CROSS PIPE WITH ANCHOR BAR



SHOWING TYPICAL PIPE CULVERT AND RIPRAP

SHOWING CROSS PIPE WITH BOLTED ANCHOR

SECTION A-A

Texas Department of Transportation

Bridge Division Standard

SAFETY END TREATMENT

FOR 12" DIA TO 72" DIA PIPE CULVERTS TYPE II ~ PARALLEL DRAINAGE

SETP-PD

FILE: setppdse-20.dgn	DN: GAF	CK: CAT	DW: JRP	CK: GAF
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	DIST	COUNTY		SHEET NO. 224

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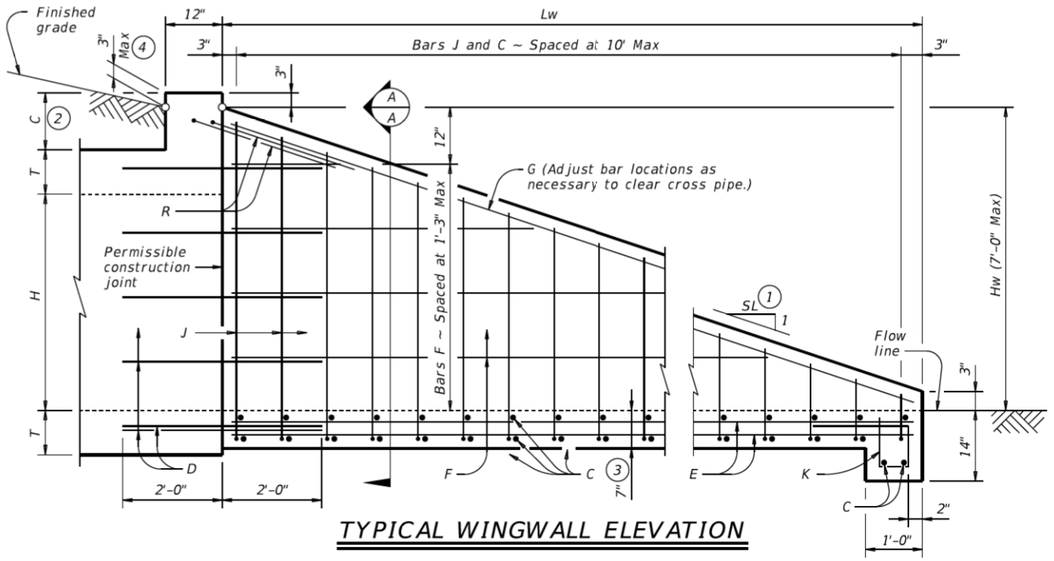
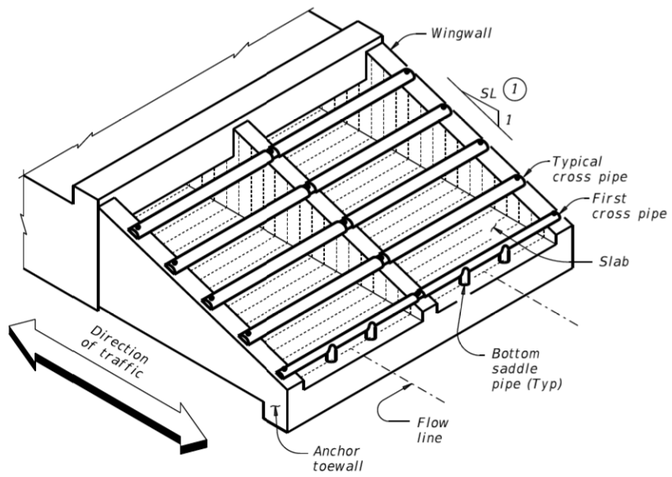


TYPICAL WINGWALL ELEVATION

(Cross pipes not shown for clarity.)



ISOMETRIC VIEW OF TYPICAL INSTALLATION

(Showing bolted anchor option.)

WING DIMENSION CALCULATIONS:

$Hw = H + T + C - 0.250'$

$Lw = (Hw - 0.333') (SL)$

For cast-in-place culverts:

$Atw = (N) (S) + (N + 1) (U)$

For precast culverts:

$Atw = (N) (2U + S) + (N - 1) (0.500')$

Total Wingwall Area (SF)
$= (0.5) (Hw + 0.333') (Lw) (N - 1)$

Total Concrete Volume (CY)
$= [(\text{Wingwall Area}) (0.583') +$
$(Lw) (Atw) (0.583') +$
$(Atw) (1.167') (1.167' - 0.583')] \div (27)$

PIPE RUNNER DIMENSION CALCULATIONS:

Pipe Runner Length (feet)
$= (Lw) (K1) = (1.917')$

Total Reinforcing (Lb)
$= (1.55) (Lw) (Atw) +$
$(4.43) (Atw) +$
$(K2) (Hw) (N + 1) (\sqrt{Lw})$

C = Height of curb above top of top slab (feet)
Hw = Height of wingwall (feet)
K = Constant value for use in formulas

Slope SL:1	K1	K2
3:1 ~	1.054 ~	7.45
4:1 ~	1.031 ~	8.49
6:1 ~	1.014 ~	10.30

Atw = Anchor toewall length (feet)
Lw = Length of wingwall (feet)
N = Number of culvert barrels
SL:1 = Side slope ratio (horizontal : 1 vertical)

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

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.

Provide galvanized reinforcing steel if required elsewhere in the plans.

Adjust reinforcing as necessary to provide a minimum clear cover of 1½".

Provide Class "C" concrete (f'c =(4,200 psi, 7.0 sack/CY))

Provide pipe runners, cross bars, and anchor pipes meeting the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 Gr B, or API 5LX52.

Provide ASTM A307 bolts.

Galvanize all steel components, except the concrete reinforcing, unless required elsewhere in the plans, after fabrication.

Repair galvanizing damaged during transport or construction in accordance with Item 445, "Galvanizing."

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

The safety end treatments shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the cross pipes.

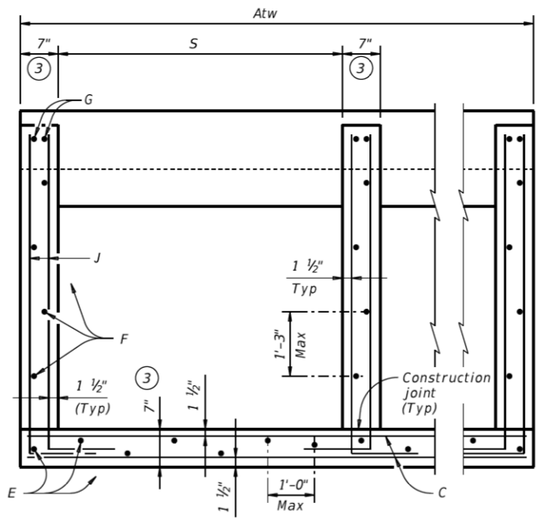
Cross pipes are designed for a traversing load of 10,000 pounds at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside Parallel-Drainage Structures", Texas Transportation Institute, March 1981.

The quantities for concrete, reinforcing steel, and cross pipes resulting from the formulas given herein are for Contractor's information only.

See the Box Culvert Supplement (BCS) standard sheet for additional dimensions and information.

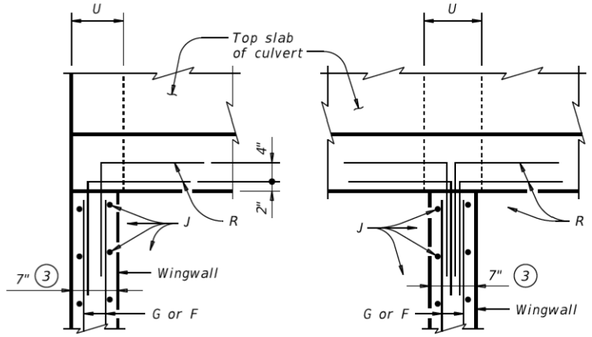
Alternate design drawings bearing the seal of a professional engineer will be acceptable for precast construction of the safety end treatments.

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



SECTION A-A

(Showing typical wingwall and wing slab reinforcing. Pipe runners not shown for clarity.)

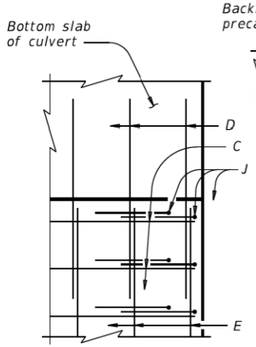


AT TOP OF EXTERIOR WINGWALL

(Cast-in-place culvert)

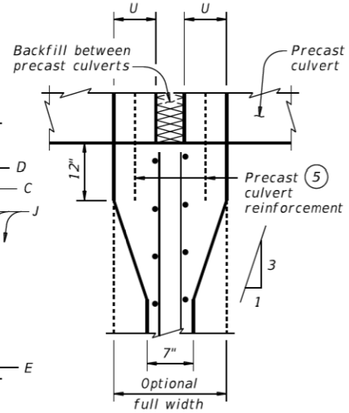
AT TOP OF INTERIOR WINGWALL

(Cast-in-place culvert)



AT OUTSIDE OF BOTTOM SLAB

(Cast-in-place culvert)



AT INTERIOR WINGWALL

(Precast culvert)

PLAN VIEWS OF CORNER DETAILS

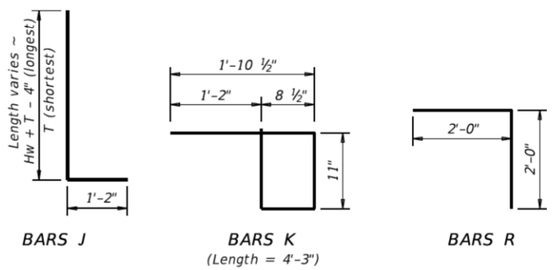


TABLE OF REINFORCING BAR SIZES AND SPACING		
Bar	Size	Spacing
C	#4	10" Max
D	#4	Match F and E
E	#4	1'- 0" Max
F	#4	1'- 3" Max
G	#6	As shown
J	#4	10" Max
K	#4	1'- 0" Max
R	#4	As shown

(1) Provide 6:1 or flatter slope.

(2) 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures without railing and curbs taller than 1'-0", refer to Extended Curb Details the Extended Curb Details (ECD) standard sheet.

(3) Wingwall and slab thicknesses may be the same as the adjacent culvert wall and slab thicknesses (7" Minimum). If thicknesses greater than the minimum (7") are used, no changes will be made in quantities and no additional compensation will be allowed.

(4) For vehicle safety, reduce height, if necessary, to provide a maximum 3" projection above finished grade. No changes will be made in quantities and no additional compensation will be allowed for this work.

(5) For culverts with C = 0", the precast culvert reinforcing may extend 1'-0" minimum into wingwall. Wingwall bars D and R may be omitted. Otherwise, refer to the Wingwall Connection detail on the Box Culvert Precast Miscellaneous Details (SCP-MD) standard sheet.

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TEXAS NO: 134095 ON 10/21/2021
ALTERATION ON A SEALED DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of

FREESE AND NICHOLS, INC.

RECORD DRAWINGS PREPARED ON: 8/20/2024

SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

SAFETY END TREATMENT

FOR BOX CULVERTS (MAXIMUM Hw = 7'-0") TYPE I ~ PARALLEL DRAINAGE

SETB-PD

FILE: setbpdse-20.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
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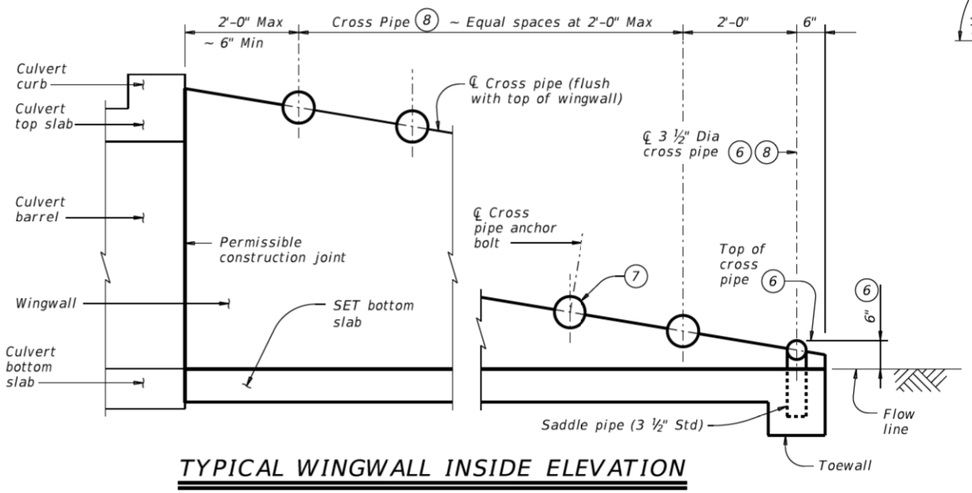
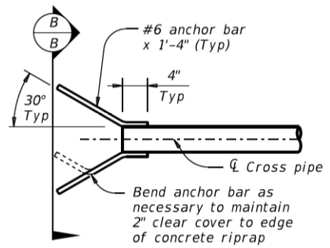
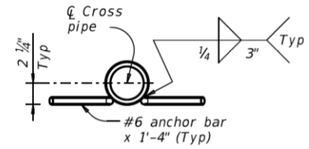


TYPICAL WINGWALL INSIDE ELEVATION

(Showing installation of cross pipes.)

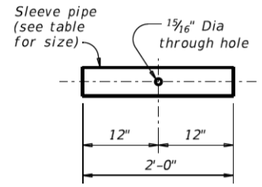


PART PLAN



SECTION B-B

OPTIONAL ANCHOR BAR DETAILS



SLEEVE PIPE DETAILS (9)

REQUIRED PIPE SIZES (8)		
Culvert Span Sizes	Cross Pipe Size	Sleeve Pipe Size (9)
First Pipe	3 ½" STD	2 ½" STD
30" to 42"	4" STD	3" STD
48" to 72"	5" STD	4" STD
78" to 120"	6" STD	5" STD

STANDARD PIPE SIZES		
Pipe Size	Pipe O.D.	Pipe I.D.
2 ½" STD	2.875"	2.469"
3" STD	3.500"	3.068"
3 ½" STD	4.000"	3.548"
4" STD	4.500"	4.026"
5" STD	5.563"	5.047"
6" STD	6.625"	6.065"

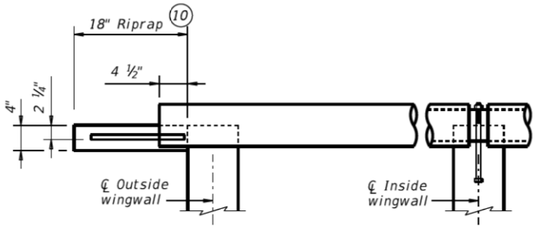
(6) The proper installation of the first cross pipe is critical for vechicle saftey. Place the top of the first cross pipe at no more than 6" above the flow line.

(7) Always install the third cross pipe from the bottom of the culvert using a bolted connection. Take care to ensure that concrete does not flow into this cross pipe so as to permit disassembly of the bolted connection to allow cleanout access.

(8) Provide cross pipes and sleeve pipes (if required) as shown in the Required Pipe Sizes table. Provide 3 1#2" saddle pipes for the 3 1#2" first cross pipe.

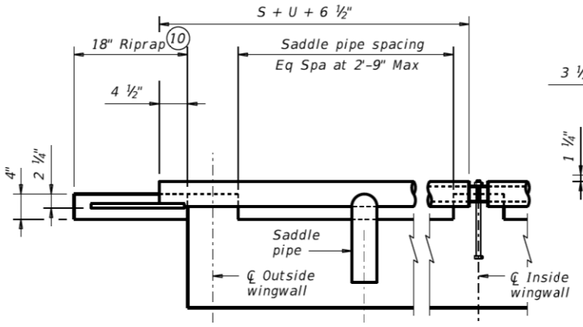
(9) At Contractor's option, make the cross pipe continuous across the inside wingwalls. If this option is selected, omit the sleeve pipe and make a 15#16" diameter throughhole in the cross pipe to accept the anchor bolt at the centerline of each interior wingwall.

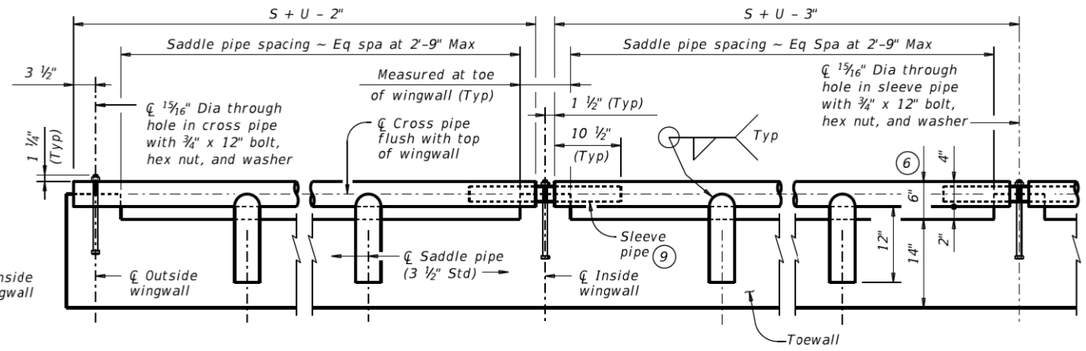
(10) Provide riprap when using the Optional Anchor Bar details. Riprap is included in the bid price for Safety End Treatment. Provide riprap in accordance with Item 432, "Riprap".



SECTION THROUGH INSTALLATION OF TYPICAL FULL CROSS PIPE

(Anchor details and dimensions are similar to those shown below in Section Through Installation of 3 ½" First Cross Pipe detail.)





SECTION THROUGH INSTALLATION OF 3 ½" FIRST CROSS PIPE

OUTSIDE CULVERT BARREL WITH OPTIONAL ANCHOR BARS & RIPRAP

OUTSIDE CULVERT BARREL WITH BOLTED ANCHOR

INSIDE CULVERT BARREL

CROSS PIPE INSTALLATION DETAILS

SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

SAFETY END TREATMENT

FOR BOX CULVERTS
(MAXIMUM Hw = 7'-0")
TYPE I ~ PARALLEL DRAINAGE

SETB-PD

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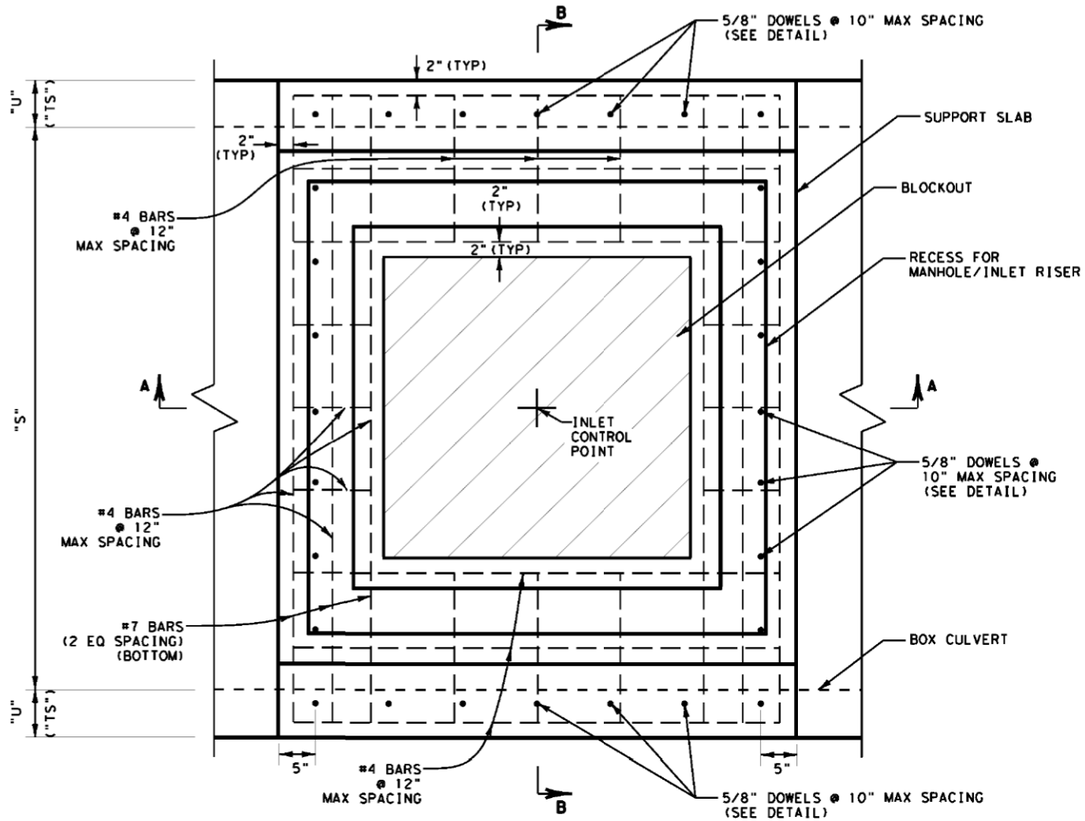
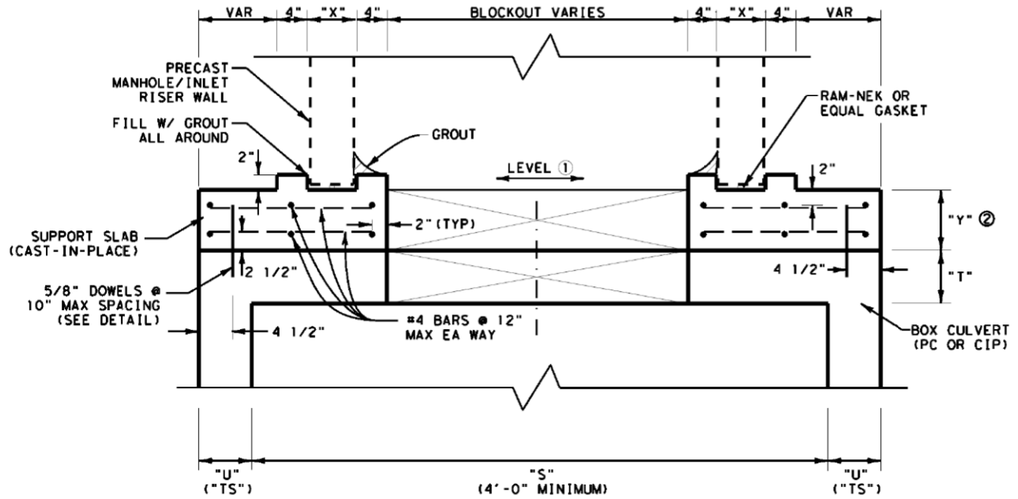


PLAN VIEW
N.T.S.



SECTION B-B
N.T.S.

NOTE:

"S" REFERS TO BOX CULVERT SPAN (4' MINIMUM)

"T" REFERS TO BOX CULVERT TOP SLAB THICKNESS

"U" AND "TS" REFERS TO BOX CULVERT WALL THICKNESS

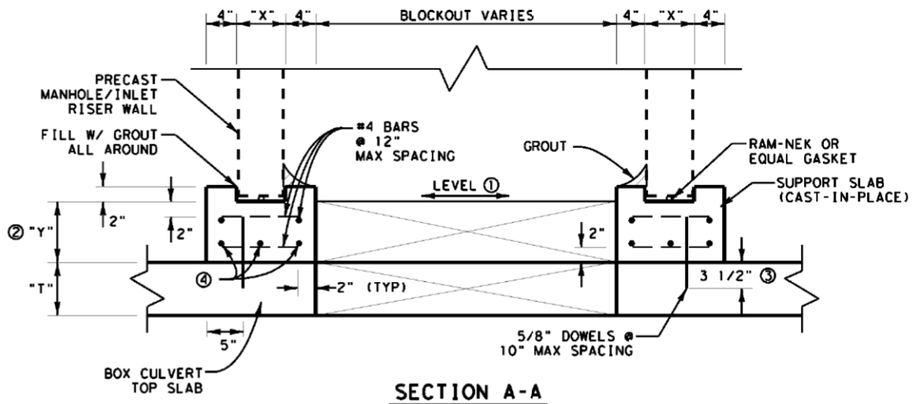
"X" = RISER WALL THICKNESS + 1/2"

① GRADE SUPPORT SLAB AND RECESS TO BE LEVEL, TO ENSURE THAT MANHOLE/INLET RISER IS PLUMB AND VERTICAL.

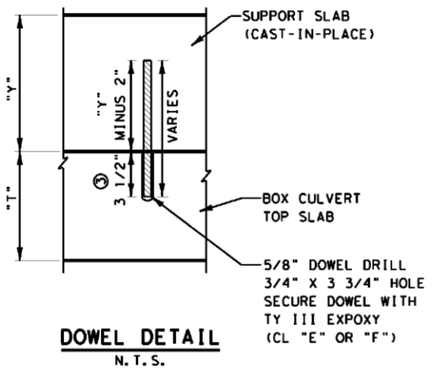
② FOR "S" </= 8', "Y" = 8" MIN
FOR 8' < "S" </= 10', "Y" = 10" MIN
FOR "S" > 10', "Y" = 12" MIN

③ FOR "T" LESS THAN 6", REDUCE TO 3".

④ 3 - #7 BARS @ EQUAL SPACING.



SECTION A-A
N.T.S.



DOWEL DETAIL
N.T.S.

GENERAL NOTES

1. SUPPORT SLAB TO BE CAST-IN-PLACE.
2. USE CLASS "C" CONCRETE FOR ALL SUPPORT SLABS.
3. USE GRADE 60 STEEL FOR ALL REINFORCING.
4. SEE CULVERT AND DRAINAGE LAYOUTS FOR LOCATION, TYPE, SIZE AND ORIENTAION OF INLET AND MANHOLE STRUCTURES.
5. CUT OR FORM BLOCKOUT IN TOP SLAB OF BOX CULVERT AS DIRECTED. CUT REINFORCING STEEL FLUSH WITH WALLS OF BLOCKOUT AND GROUT SMOOTH.
6. ADJUST LENGTHS OF REINFORCING BARS AS DIRECTED, TO ACCOMMODATE CULVERT SKEW.
7. SEE CULVERT STANDARDS FOR DIMENSIONS OF BOX CULVERTS.
8. MANHOLE AND INLET CONNECTIONS TO BOX CULVERTS WILL NOT BE PAID FOR DIRECTLY, BUT WILL BE SUBSIDIARY TO ITEM 462 AND ITEM 465.

PRECAST MANHOLE & INLET RISER CONNECTION

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Texas Department of Transportation

Fort Worth District Standard

MANHOLE/INLET CONNECTION TO BOX CULVERT MI-CBC (FTW)

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DATE	REVISIONS	6		227
05/2019		STATE	STATE DIST. NO.	COUNTY
		TEXAS	FTW	
		CONT.	SECT.	JOB	HIGHWAY NO.

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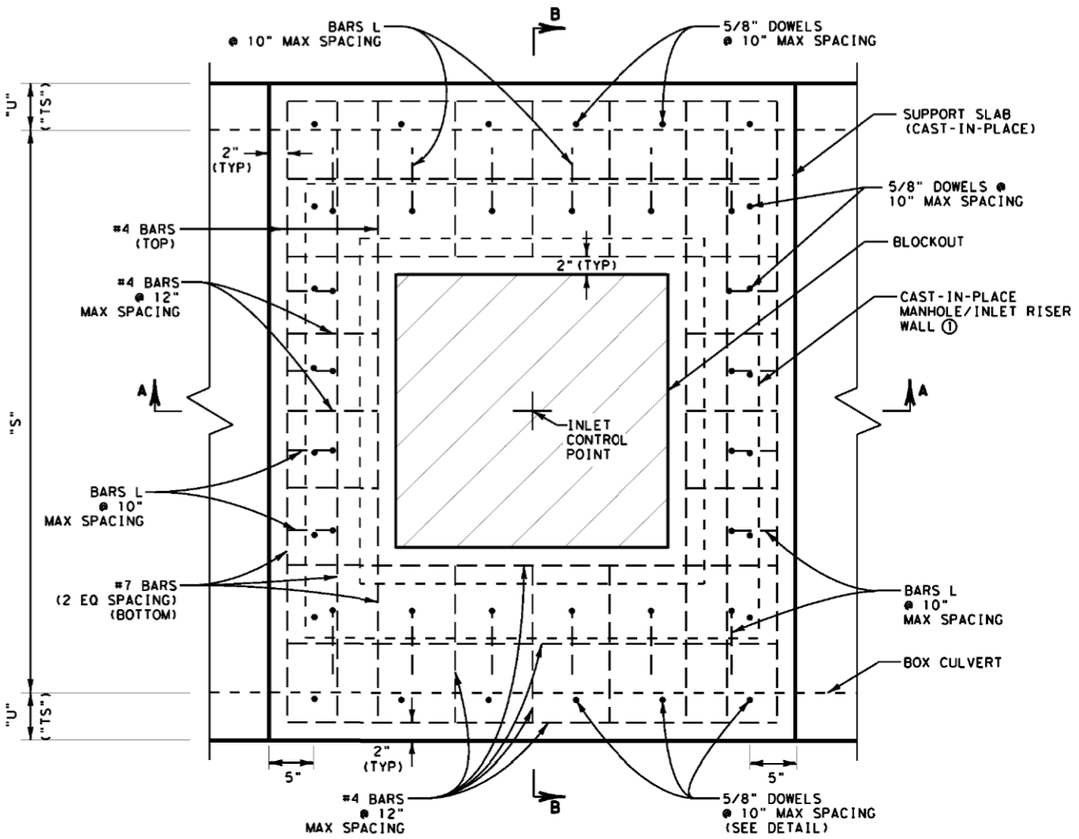
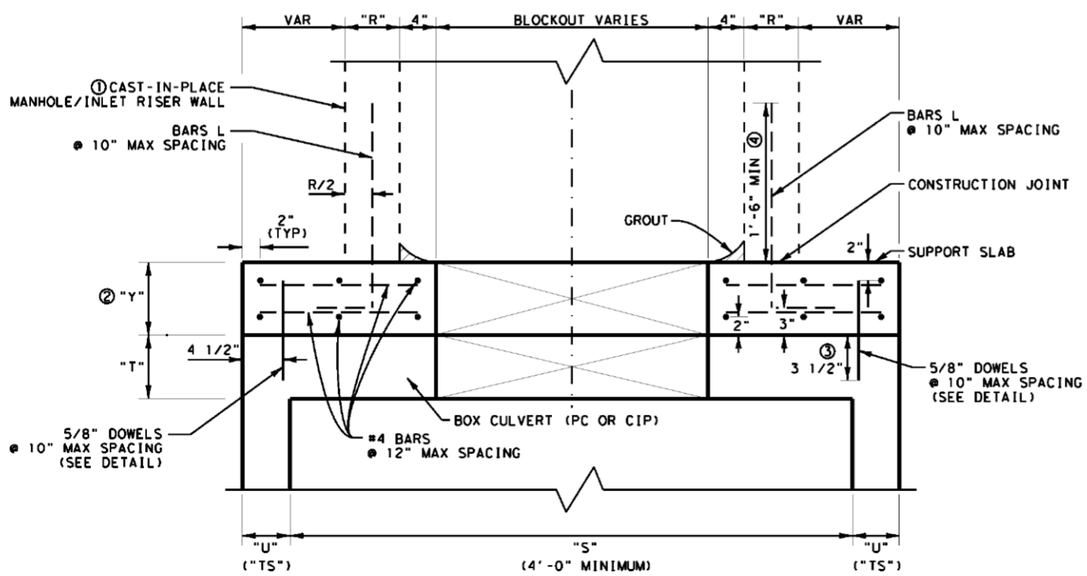


PLAN VIEW
N.T.S.



SECTION B-B
N.T.S.

NOTE:

"R" = RISER WALL THICKNESS

"S" REFERS TO BOX CULVERT SPAN (4' MINIMUM)

"T" REFERS TO BOX CULVERT TOP SLAB THICKNESS

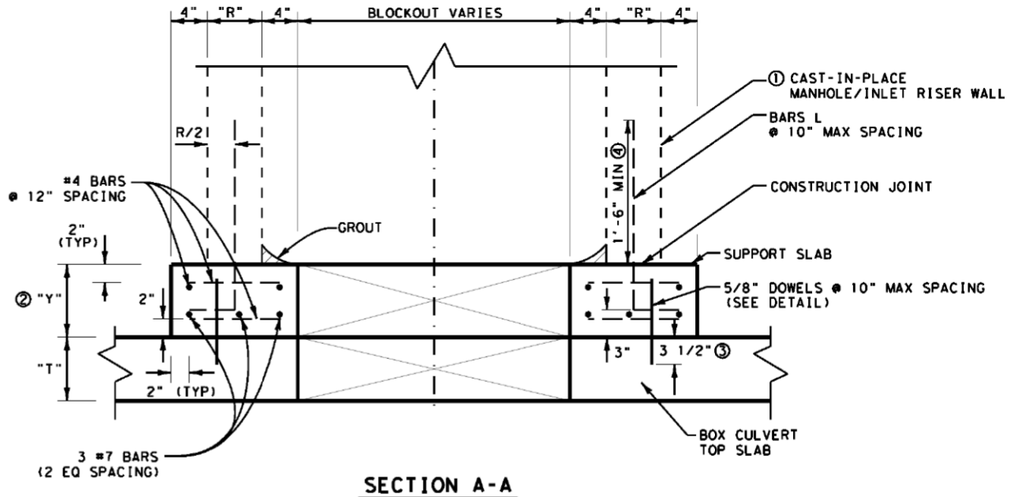
"U" AND "TS" REFERS TO BOX CULVERT WALL THICKNESS

① RISER WALL TO BE PLUMB AND VERTICAL.

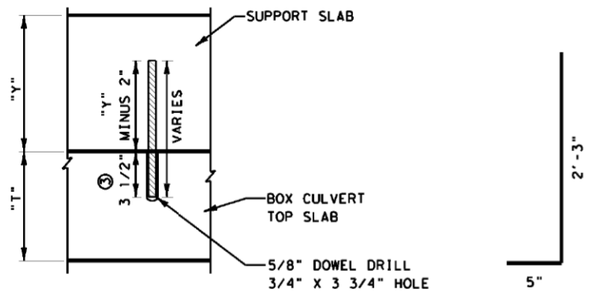
② FOR "S" </= 8', "Y" = 8" MIN
FOR 8' < "S" </= 10', "Y" = 10" MIN
FOR "S" > 10', "Y" = 12" MIN

③ FOR "T" LESS THAN 6", REDUCE TO 3".

④ FOR STRUCTURE HEIGHT LESS THAN 1'-6", ADJUST AS DIRECTED.



SECTION A-A
N.T.S.



DOWEL DETAIL
N.T.S.

GENERAL NOTES

1. SUPPORT SLAB TO BE CAST-IN-PLACE.
2. USE CLASS "C" CONCRETE FOR ALL SUPPORT SLABS.
3. USE GRADE 60 STEEL FOR ALL REINFORCING.
4. SEE CULVERT AND DRAINAGE LAYOUTS FOR LOCATION, TYPE, SIZE AND ORIENTAION OF INLET AND MANHOLE STRUCTURES.
5. CUT OR FORM BLOCKOUT IN TOP SLAB OF BOX CULVERT AS DIRECTED. CUT REINFORCING STEEL FLUSH WITH WALLS OF BLOCKOUT AND GROUT SMOOTH.
6. ADJUST LENGTHS OF REINFORCING BARS AS DIRECTED, TO ACCOMMODATE CULVERT SKEW.
7. SEE CULVERT STANDARDS FOR DIMENSIONS OF BOX CULVERTS.
8. MANHOLE AND INLET CONNECTIONS TO BOX CULVERTS WILL NOT BE PAID FOR DIRECTLY, BUT WILL BE SUBSIDIARY TO ITEM 462 AND ITEM 465.

CAST-IN-PLACE MANHOLE/INLET RISER CONNECTION

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Texas Department of Transportation

Fort Worth District Standard

MANHOLE/INLET CONNECTION TO BOX CULVERT MI-CBC (FTW)

ORIGINAL DRAWING: 05/2019	micbc-ftw.dgn	FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
DATE	REVISIONS	6		228
05/2019		STATE	STATE DIST.NO.	COUNTY
		TEXAS	FTW	
		CONT.	SECT.	JOB	HIGHWAY NO.

http://www.dot.state.tx.us/ftw/specinfo/standard.htm
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micbc-ftw.dgn

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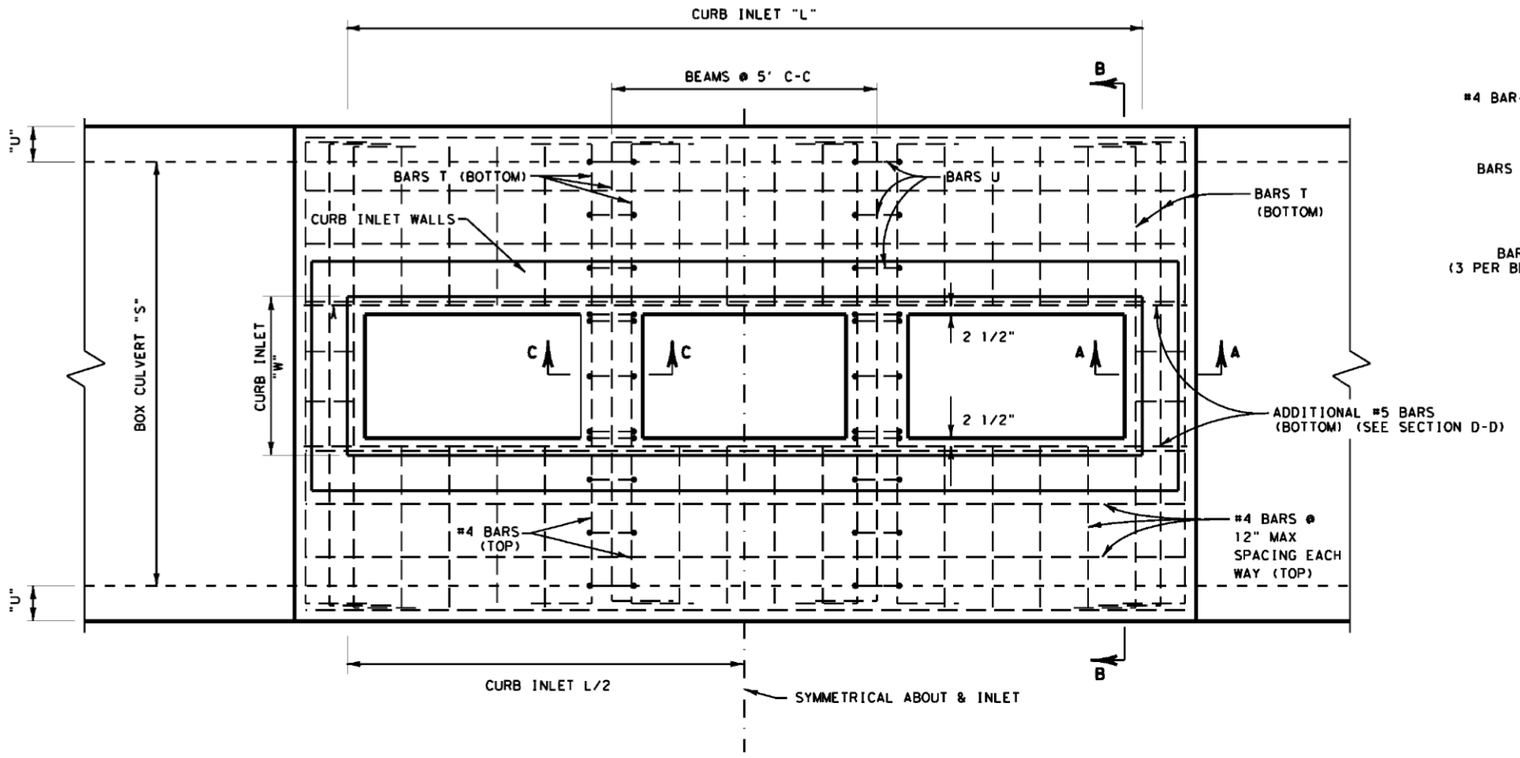
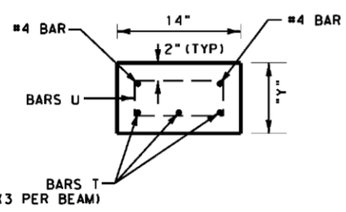
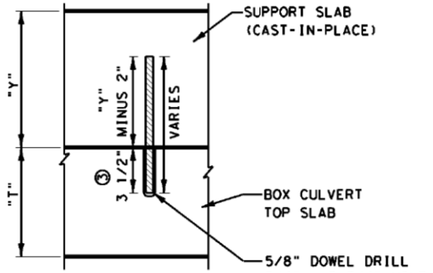


PLAN VIEW
N.T.S.



SECTION C-C
N.T.S.



DOWEL DETAIL
N.T.S.

NOTE:

"R" REFERS TO INLET WALL THICKNESS

"S" REFERS TO BOX CULVERT SPAN (4' MINIMUM)

"T" REFERS TO BOX CULVERT TOP SLAB THICKNESS

"U" AND "TS" REFER TO BOX CULVERT WALL THICKNESS

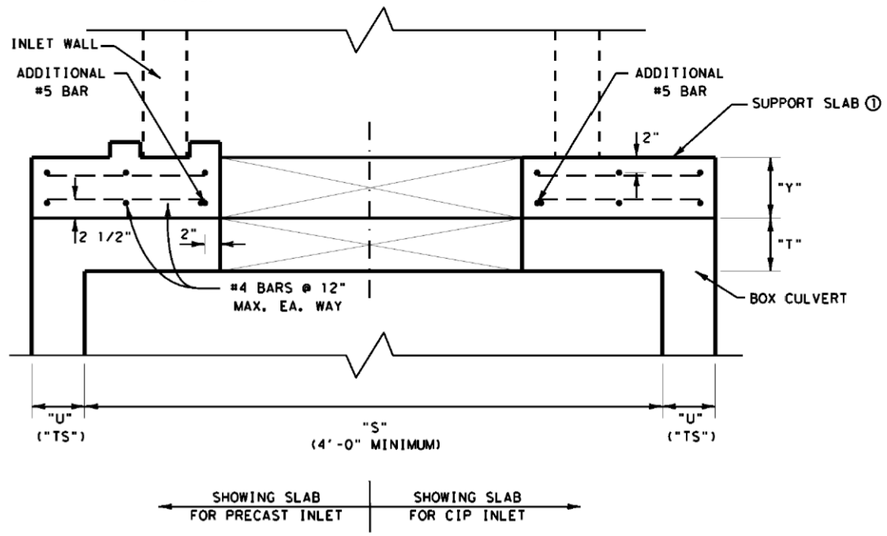
① GRADE SUPPORT SLAB AND RECESS TO BE LEVEL, TO ENSURE THAT INLET WALL IS PLUMB AND VERTICAL.

② FOR "S" </= 8', "Y" = 8" MIN
FOR 8' < "S" < 10', "Y" = 10" MIN
FOR "S" > 10', "Y" = 12" MIN

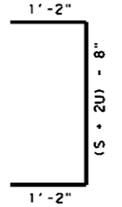
③ FOR "T" LESS THAN 6", REDUCE TO 3".

④ BARS P LENGTH = PIPE O.D. +9"; PLACE AS SHOWN.

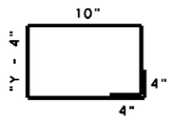
SECTION A-A
N.T.S.
(SHOWING C.I.P. CONNECTION)
(SEE SHEET 1 OF 4 FOR PRECAST CONNECTION)



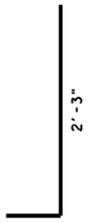
SECTION B-B
N.T.S.
(SEE SHEETS 1 & 2 FOR ADDITIONAL INFORMATION RELATED TO PRECAST OR CAST-IN-PLACE CONNECTIONS)



#7 BARS T
AS SHOWN



#3 BARS U
@ 12" MAX SPACING
PAIR OF BARS AT
CORNERS OF BLOCKOUTS



#4 BARS L

GENERAL NOTES

1. SUPPORT SLAB TO BE CAST-IN-PLACE.
2. USE CLASS "C" CONCRETE FOR ALL SUPPORT SLABS.
3. USE GRADE 60 STEEL FOR ALL REINFORCING.
4. SEE CULVERT AND DRAINAGE LAYOUTS FOR LOCATION, TYPE, SIZE AND ORIENTAION OF INLET AND MANHOLE STRUCTURES.
5. CUT OR FORM BLOCKOUT IN TOP SLAB OF BOX CULVERT AS DIRECTED. CUT REINFORCING STEEL FLUSH WITH WALLS OF BLOCKOUT AND GROUT SMOOTH.
6. ADJUST LENGTHS OF REINFORCING BARS AS DIRECTED, TO ACCOMMODATE CULVERT SKEW.
7. SEE CULVERT STANDARDS FOR DIMENSIONS OF BOX CULVERTS.
8. MANHOLE AND INLET CONNECTIONS TO BOX CULVERTS WILL NOT BE PAID FOR DIRECTLY, BUT WILL BE SUBSIDIARY TO ITEM 462 AND ITEM 465.
9. USE BASE STRUCTURE AND RISER WITH BOX CULVERTS WHERE SPAN IS LESS THAN 4'.

SUPPORT SLAB INTERMEDIATE BEAMS
FOR USE WITH CURB INLETS WHEN "L" > 5'

Texas Department of Transportation | Fort Worth District Standard

MANHOLE/INLET CONNECTION TO BOX CULVERT
MI-CBC (FTW)

ORIGINAL DRAWING: 05/2019	micbc-ftw.dgn	FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
DATE	REVISIONS	6		229
05/2019		STATE	STATE DIST.NO.	COUNTY
		TEXAS	FTW	
		CONT.	SECT.	JOB / HIGHWAY NO.

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https://www.dot.state.tx.us/ftw/specinfo/standard.htm
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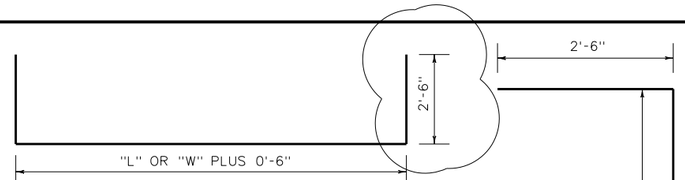
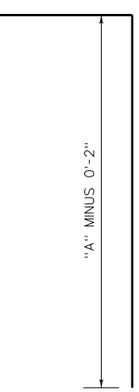
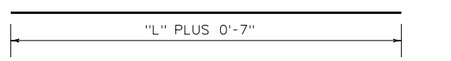


BARS A & BARS A2

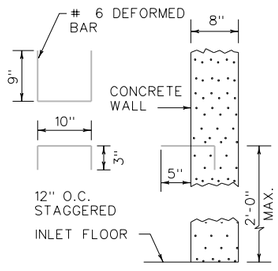
BARS D2



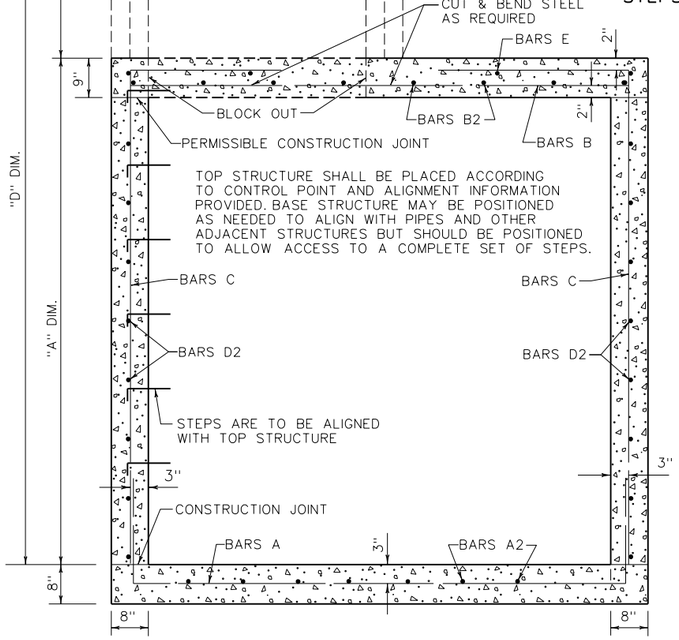
BARS C



BARS D



STEPS



TYPICAL SECTION - LENGTH VIEW

WIDTH VIEW SIMILAR

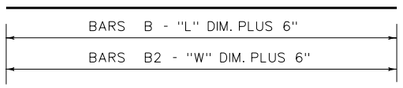
LEVELS DISPLAYED

1	2	3	5	7

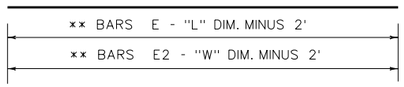
TABLE OF QUANTITIES WITH NO DEDUCTIONS FOR PIPES OR INLET OPENINGS

BILL OF REINFORCING STEEL

STRUCTURE NUMBER	HEIGHT OF STR. "A"	LENGTH OF STR. "L"	WIDTH OF STR. "W"	STEPS # 6 12" ±		BARS A NO. 7 @ 12" ±		BARS A2 NO. 7 @ 12" ±		BARS B NO. 7 @ 12" ±		BARS B2 NO. 7 @ 12" ±		BARS C NO. 7 @ 6" ±		BARS D NO. 7 @ 12" ±		BARS D2 NO. 7 @ 12" ±		BARS E NO. 7		BARS E2 NO. 7		REINF. STEEL LB.	CLASS A CONC. C.Y.
				No.	LENGTH	No.	LENGTH	No.	LENGTH	No.	LENGTH	No.	LENGTH	No.	LENGTH	No.	LENGTH	No.	LENGTH	No.	LENGTH	No.	LENGTH		
JB-01	8'-0"	9'-0"	9'-0"	8	2'-10"	10	13'-6"	10	13'-6"	10	9'-6"	10	9'-6"	40	10'-4"	20	9'-7"	20	11'-3"	2	8'-10"	2	8'-10"	2755	14.96
JB-02	8'-4"	11'-4"	11'-4"	8	2'-10"	13	16'-10"	13	16'-10"	13	11'-10"	13	11'-10"	44	10'-8"	20	12'-1"	20	13'-1"	2	9'-4"	2	9'-4"	3668	16.07



BARS B & B2



BARS E & E2

** 4'-10" MIN.

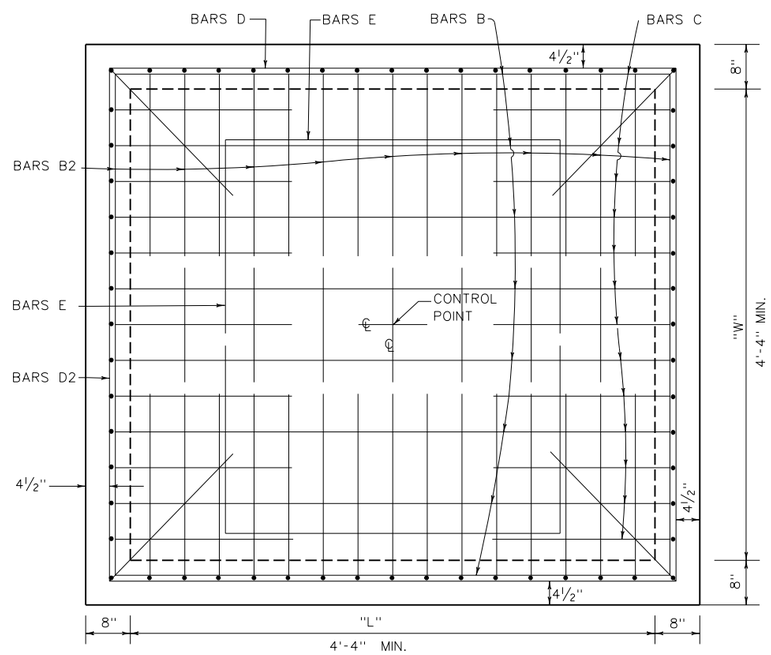
PIPE DIA.	CONC. REDUCTION ONE PIPE C.Y.
15	0.05
18	0.07
21	0.10
24	0.12
27	0.15
30	0.18
33	0.22
36	0.26
39	0.30
42	0.35
45	0.40
48	0.45
54	0.57
60	0.70
66	0.84
72	1.00
78	1.16

NOTE:

FOR 48" RCP OPENING DEDUCT 0.47 C.Y. CONCRETE.
FOR 6' X 4' RCB OPENING DEDUCT 0.87 C.Y. CONCRETE.
FOR 7' X 5' RCB OPENING DEDUCT 1.19 C.Y. CONCRETE.

GENERAL NOTES:

1. ALL CONCRETE SHALL BE CLASS "A".
2. DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS.
3. FIELD CUT AND BEND BARS AS REQUIRED TO ACCOMMODATE PIPES AND INLET EXTENSIONS.
4. CONSTRUCTION JOINT AT FLOWLINE MAY BE RAISED A MAXIMUM OF 6" AT OPTION OF THE CONTRACTOR. ADJUST LENGTH OF VERTICAL STEEL AS REQUIRED WITH A 20 DIAMETER LAP.
5. WHERE IT IS CONSIDERED NECESSARY, BARS CUT OUT TO PROVIDE OPENINGS FOR PIPE MAY BE BENT AND USED TO PROVIDE A BETTER TIE FOR EXTENSIONS AND PIPE AS DIRECTED BY THE ENGINEER.
6. WHEN STRUCTURE IS COMBINED WITH UPPER STRUCTURE, THE STRUCTURE LOCATION SHOWN IN THE PLANS REFERS TO THE CONTROL POINT OF THE UPPER STRUCTURE. WHEN STRUCTURE IS NOT COMBINED WITH UPPER STUCTURE, THE LOCATION SHOWN IN THE PLANS REFERS TO THE CONTROL POINT SHOWN ON THIS SHEET.
7. WHEN USED WITH INLET OR MANHOLE, MEASURE AND PAY FOR JUNCTION BOX AND INLET OR MANHOLE SEPARATELY.



PLAN - TOP SLAB

(BLOCK OUT NOT SHOWN)

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

THE SEAL THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY AMY L. RAINES
TEXAS NO: 83515 ON 10/21/2021
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P.E. _____ DATE _____

REVISIONS:
10/09-Added note to pay for inlet or manhole seperately

Texas Department of Transportation
FORT WORTH DISTRICT
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SPECIAL JUNCTION BOX STRUCTURE
JB-SPL (MOD) (FW)

ORIG. DRAW. DATE: 8/02	DESIGN:	FED.REG.	STATE	PROJ NO.			HIGHWAY
	CHECKED:	6	TEXAS				
	DRAWN:	DISTRICT	COUNTY	CONTROL	SECTION	JOB	SHEET
	CHECKED:	FTW					230

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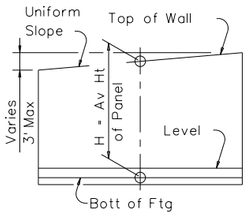
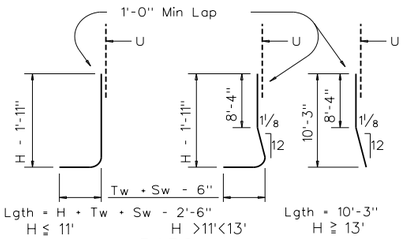
DATE:
FILE:

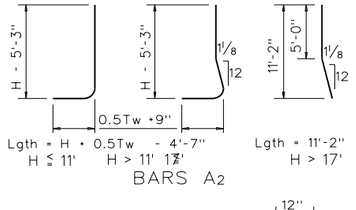


H DEFINITION

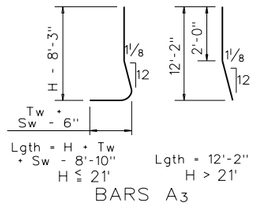
Wall Height "H"	PROPERTIES							REINFORCING STEEL FOR ONE 32' PANEL (DESIGN C)																												QUANTITY FOR ONE 32' PANEL		Wall Height "H"
	WALL DIMENSIONS						Max Soil Press	A_1 ~ 26 #5 at 15" c-c		A_2 ~ 25 #6 at 15" c-c		A_3 ~ 25 #7 at 15" c-c		A_4 ~ 26 #8 at 15" c-c		A_5 ~ 25 #9 at 15" c-c		A_6 ~ 25 #11 at 15" c-c		A_7 ~ 26 #11 at 15" c-c		B ~ 26 #5 at 15" c-c		C					D (#5) at 12" c-c		Dowel F at 12" c-c		H (#5) at 12" c-c		T (#5) at 12" c-c		U ~ 26 #5 at 15" c-c				
(Ft)	Fw	Tw	Sw	Hw	Ft	Kw	T/SF	Lgth	Wt	Lgth	Wt	Lgth	Wt	Lgth	Wt	Lgth	Wt	Lgth	Wt	Lgth	Wt	Lgth	Wt	Size	No	Spa	Lgth	Wt	No	Wt	No	Wt	No	Wt	No	Wt	Lgth	Wt	CONC (CY)	REINF (LB)	(Ft)
2	3'-6"	1'-9"	1'-0"	9"	1'-0"	9"	0.14																	#4	26	15"	2'-3"	39	4	131	4	32	2	66	3	99	3'-4"	90	6.0	458	2
3	4'-3"	2'-2"	1'-0"	1'-1"	1'-0"	9"	0.17																	#4	26	15"	2'-8"	46	6	197	5	40	3	99	3	99	5'-4"	145	8.1	626	3
4	5'-0"	2'-6"	1'-0"	1'-6"	1'-0"	9"	0.20	5'-0"	136													3'-6"	95	#4	26	15"	3'-0"	52	8	263	6	48	3	99	3	99	7'-4"	199	10.1	991	4
5	5'-8"	2'-10"	1'-0"	1'-10"	1'-0"	9"	0.24	6'-4"	172													4'-6"	122	#4	26	15"	3'-4"	58	10	329	7	56	3	99	4	131	8'-4"	226	12.1	1193	5
6	6'-4"	3'-2"	1'-0"	2'-2"	1'-0"	9"	0.28	7'-8"	208													5'-6"	149	#4	26	15"	3'-8"	64	12	394	8	64	3	99	4	131	8'-4"	226	14.1	1336	6
7	7'-0"	3'-6"	1'-0"	2'-6"	1'-0"	9"	0.32	9'-0"	244	4'-2"	156											6'-6"	176	#4	38	10"	4'-0"	102	14	460	9	72	4	131	4	131	8'-4"	226	16.1	1698	7
8	7'-9"	3'-10"	1'-0"	2'-11"	1'-0"	9"	0.35	10'-4"	280	5'-4"	200											7'-6"	203	#6	38	10"	4'-4"	247	16	526	10	80	4	131	5	164	8'-4"	226	18.1	2056	8
9	8'-6"	4'-3"	1'-0"	3'-3"	1'-0"	9"	0.37	11'-9"	319	6'-7"	247											8'-6"	231	#6	38	10"	4'-9"	271	18	591	11	88	4	131	5	164	8'-4"	226	20.2	2268	9
10	9'-2"	4'-7"	1'-0"	3'-7"	1'-0"	9"	0.41	13'-1"	355	7'-8"	288	6'-9"	345									9'-6"	258	#7	38	10"	5'-1"	395	20	657	12	96	5	164	6	197	8'-4"	226	22.2	2981	10
11	9'-10"	4'-11"	1'-0"	3'-11"	1'-0"	1'-0"	0.44	14'-5"	391	8'-11"	335	8'-1"	413									10'-6"	285	#8	38	10"	5'-5"	550	22	723	13	104	5	164	6	197	8'-4"	226	24.7	3382	11
12	10'-6"	5'-3"	1'-1 1/8"	4'-1 7/8"	1'-0"	1'-0"	0.45	15'-10"	429	10'-1"	379	9'-6"	485									11'-6"	312	#9	38	10"	5'-9"	743	24	789	14	112	6	197	6	197	8'-4"	226	26.7	3868	12
13	11'-2"	5'-7"	1'-2"	4'-5"	1'-3"	1'-3"	0.54	10'-3"	278	11'-2"	419	10'-11"	558	8'-5"	584							12'-6"	339	#9	38	10"	6'-1"	786	26	854	15	120	6	197	7	230	8'-4"	226	32.5	4591	13
14	11' -10"	5'-11"	1'-3 1/8"	4'-7 7/8"	1'-3"	1'-3"	0.57	10'-3"	278	12'-5"	466	12'-4"	630	9'-10"	683							13'-6"	366	#9	38	10"	6'-5"	829	28	920	16	128	7	230	7	230	8'-4"	226	34.9	4986	14
15	12'-6"	6'-3"	1'-4"	4'-11"	1'-6"	1'-3"	0.63	10'-3"	278	13'-7"	510	13'-9"	703	11'-2"	775							14'-6"	393	#9	38	10"	6'-9"	872	28	920	16	128	7	230	8	263	8'-4"	226	40.8	5298	15
16	13'-3"	6'-7"	1'-5"	5'-3"	1'-6"	1'-6"	0.66	10'-3"	278	14'-9"	554	15'-2"	775	12'-8"	879							15'-6"	420	#9	38	10"	7'-2"	926	30	986	17	136	7	230	8	263	8'-4"	226	44.5	5672	16
17	13' -10"	6' -11"	1'-6 1/4"	5'-4 3/4"	1'-6"	1'-6"	0.70	10'-3"	278	15'-11"	598	16'-7"	847	14'-1	978							16'-6"	447	#10	38	10"	7'-5"	1213	32	1051	18	144	8	263	8	263	8'-4"	226	47.3	6308	17
18	14'-6"	7'-3"	1'-7"	5'-8"	1'-9"	1'-6"	0.76	10'-3"	278	11'-2"	419	18'-0"	920	15'-5"	1070	9'-7"	815					17'-6"	475	#10	38	10"	7'-9"	1267	34	1117	19	152	8	263	9	296	8'-4"	226	54.2	7298	18
19	15'-2"	7'-7"	1'-8 1/8"	5'-10 7/8"	1'-9"	1'-6"	0.79	10'-3"	278	11'-2"	419	19'-5"	992	16'-11"	1174	10'-11"	928					18'-6"	502	#10	38	10"	8'-1"	1322	36	1183	20	160	8	263	9	296	8'-4"	226	57.5	7743	19
20	16'-0"	8'-0"	1'-9 1/4"	6'-2 3/4"	1'-9"	1'-6"	0.80	10'-3"	278	11'-2"	419	20'-11"	1069	18'-5"	1278	12'-4"	1048					19'-6"	529	#8	76	5"	8'-6"	1725	38	1248	21	168	9	296	10	329	8'-4"	226	61.3	8613	20
21	16'-6"	8'-3"	1'-10 1/8"	6'-4 7/8"	2'-0"	1'-6"	0.88	10'-3"	278	11'-2"	419	22'-3"	1137	19'-9"	1371	13'-7"	1155					20'-6"	556	#8	76	5"	8'-9"	1776	40	1314	22	176	9	296	10	329	8'-4"	226	68.8	9033	21
22	17'-3"	8'-7"	1'-11 1/4"	6'-8 3/4"	2'-0"	1'-6"	0.91	10'-3"	278	11'-2"	419	12'-2"	622	21'-2"	1469	15'-0"	1275	6'-1"	808			21'-6"	583	#8	76	5"	9'-2"	1860	42	1380	23	184	9	296	10	329	8'-4"	226	72.8	9729	22
23	18'-0"	9'-0"	2'-0 1/8"	6'-11 7/8"	2'-3"	1'-6"	0.95	10'-3"	278	11'-2"	419	12'-2"	622	22'-8"	1574	16'-4"	1388	7'-1"	941			22'-6"	610	#8	76	5"	9'-6"	1928	44	1446	24	192	10	329	11	361	8'-4"	226	81.7	10314	23
24	18'-6"	9'-4"	2'-1 1/4"	7'-0 3/4"	2'-3"	1'-6"	0.99	10'-3"	278	11'-2"	419	12'-2"	622	24'-1"	1672	17'-8"	1502	8'-1"	1074			23'-6"	637	#9	76	5"	9'-10"	2541	46	1511	25	200	10	329	11	361	8'-4"	226	85.4	11372	24
25	19'-3"	9'-7"	2'-2 3/8"	7'-5 5/8"	2'-3"	1'-9"	1.03	10'-3"	278	11'-2"	419	12'-2"	622	25'-5"	1764	19'-0"	1615	9'-1"	1206			24'-6"	664	#9	76	5"	10'-1"	2606	48	1577	26	208	10	329	12	394	8'-4"	226	91.0	11909	25
26	20'-0"	10'-0"	2'-3 1/2"	7'-8 1/2"	2'-3"	1'-9"	1.05	10'-3"	278	11'-2"	419	12'-2"	622	27'-0"	1874	20'-5"	1735	10'-1"	1339			25'-6"	692	#9	76	5"	10'-5"	2692	50	1643	27	217	11	361	12	394	8'-4"	226	95.6	12491	26
27	20'-6"	10'-4"	2'-4 5/8"	7'-9 3/8"	2'-3"	1'-9"	1.09	10'-3"	278	11'-2"	419	12'-2"	622	14'-4"	995	21'-9"	1849	11'-1"	1472	17'-0"	2348	26'-6"	719	#10	76	5"	10'-9"	3516	52	1708	28	225	11	361	12	394	8'-4"	226	99.7	15132	27
28	21'-3"	10'-7"	2'-5 3/4"	8'-2 1/4"	2'-3"	1'-9"	1.13	10'-3"	278	11'-2"	419	12'-2"	622	14'-4"	995	23'-0"	1955	12'-1"	1605	18'-4"	2533	27'-6"	746	#10	76	5"	11'-2"	3652	54	1774	29	233	11	361	13	427	8'-4"	226	104.6	15825	28
29	22'-0"	11'-0"	2'-6 1/2"	8'-5 1/2"	2'-6"	1'-9"	1.17	10'-3"	278	11'-2"	419	12'-2"	622	14'-4"	995	24'-5"	2075	13'-1"	1738	19'-10"	2740	28'-6"	773	#10	76	5"	11'-6"	3761	54	1774	29	233	12	394	13	427	8'-4"	226	115.3	16454	29



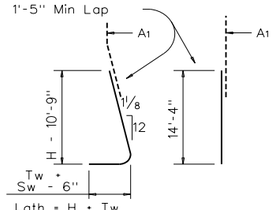
BARS A_1



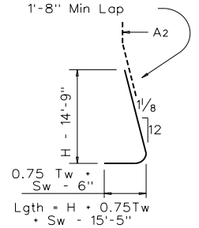
BARS A_2



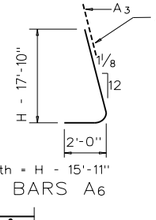
BARS A_3



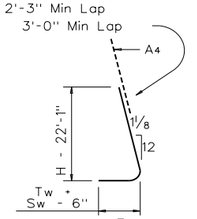
BARS A_4



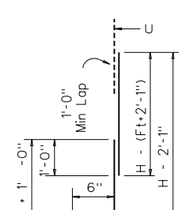
BARS A_5



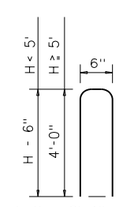
BARS A_6



BARS A_7

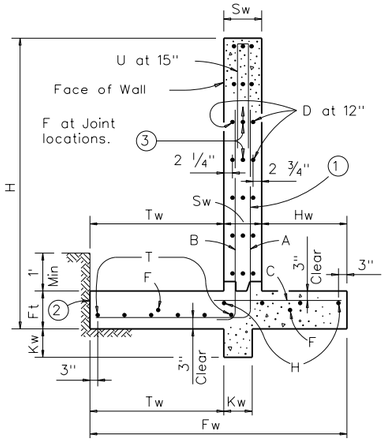


BARS B



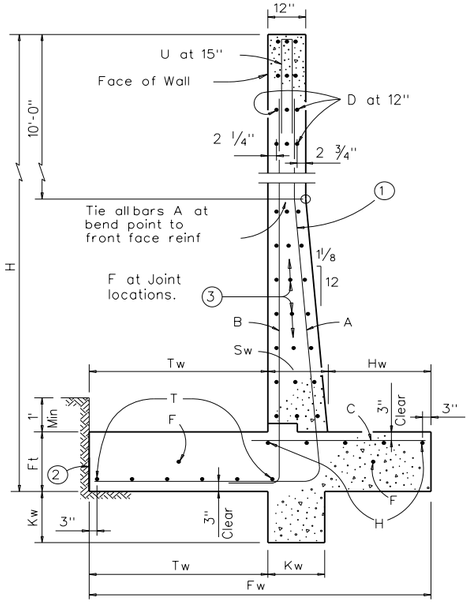
BARS U

1. Place vertical bars inside of horizontal bars (Typ both faces).
2. Place footing toe against undisturbed soil.
3. See standard RW 2 for size.

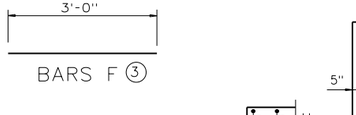


H ≤ 11'

SECTIONS

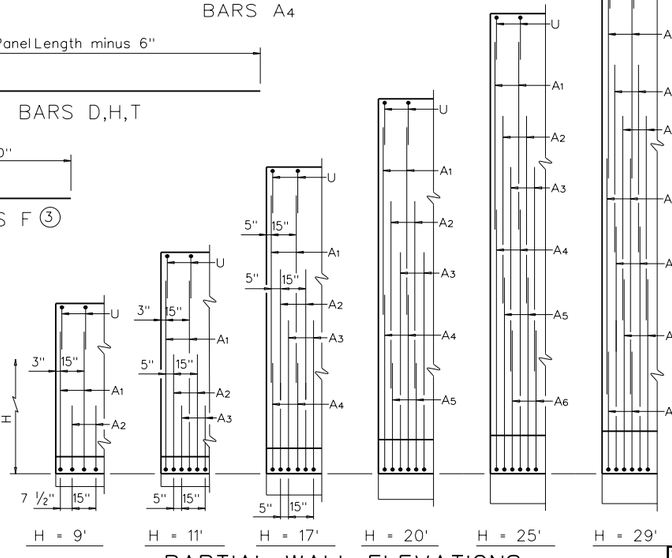


H > 11'



BARS D,H,T

BARS F ③



PARTIAL WALL ELEVATIONS
(Showing vertical reinforcing pattern in back face)

GENERAL NOTES:
All concrete to be Class "C" (4,200 psi, 7.0 sack/CY).
All reinforcing steel to be Grade 60.
For notes and details not shown on this sheet see sheet RW2.
Quantities are based on "H" being average height of panel.
Retaining Walls are designed to be coded as follows on Retaining Wall Layout Sheets.

HC - 21 - 28
LA - 28 - 32
- Panel Length ~ 32' is standard; 28' requires special quantities
- Average Height "H" of panel
- Design - A = no surcharge or slope above wall; B = slopes up to 4:1; C = traffic surcharge and/or slopes up to 2.5:1
- Footing pressure design ~ L = low, H = high

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RECORD DRAWINGS PREPARED ON: 8/20/2024

THE SEAL THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY AMY L. RAINES
TEXAS NO: 83515 ON 10/21/2021
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Texas Department of Transportation

Bridge Division Standard

RETAINING WALLS

RW 1(L)C

FILE: rwstde07.dgn	DN: TxDOT	CK: TxDOT	DW: GHO	CK: MPM
©TxDOT March 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
				231

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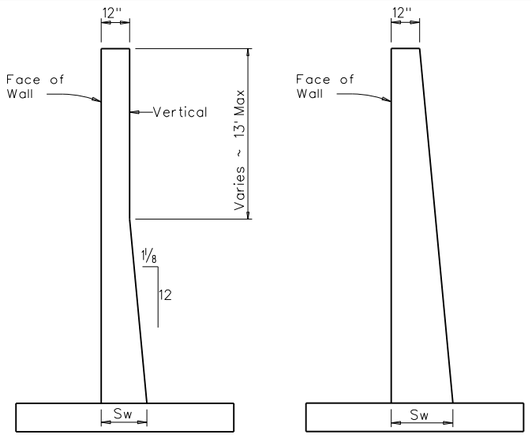
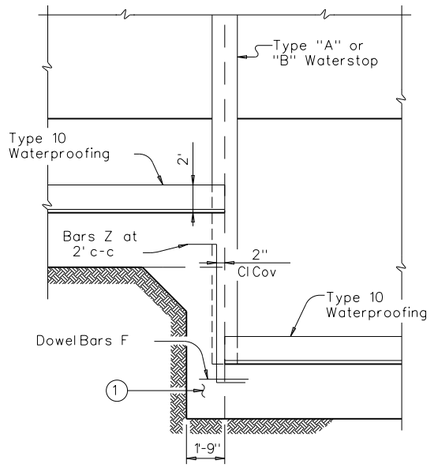


AS DETAILED ALL HEIGHTS
(Basis for payment)

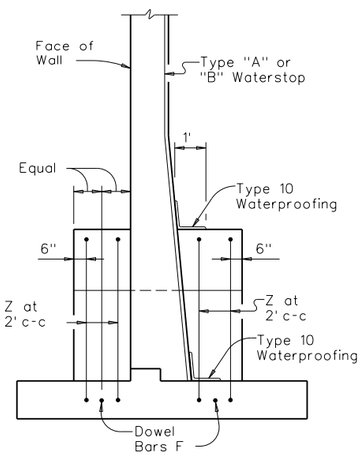
FRONT FACE VERTICAL BACK FACE SLOPED

ALTERNATE STEM SLOPE DETAILS

Walls with slopes other than those shown may be used after approval by the Engineer. Sw shall not be less than shown in Table on Sheet 1. No payment will be made for excess concrete due to changing of slope of wall stem.



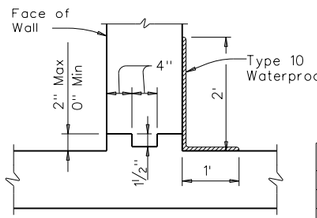
PARTIAL ELEVATION



PARTIAL SECTION

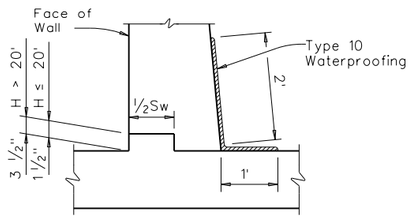
SHOWING WATERSTOP AT FOOTING JOINT

(1) Unreinforced Class "C" Concrete when difference in top of footing elevations is less than 6'. Omit when Dowel Bars F can be placed between adjacent footings with 4" cover top and bottom.



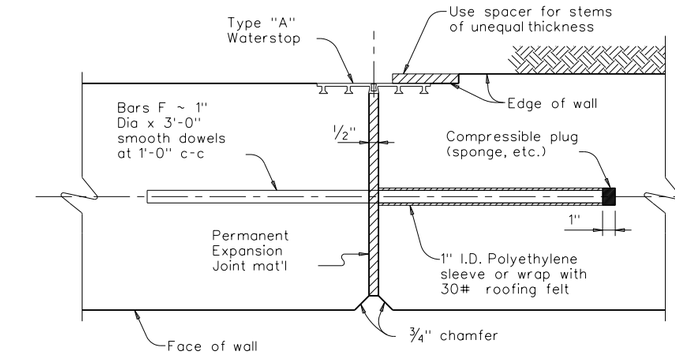
H ≤ "X"

DESIGN	"X"
A	14'
B	12'
C	11'

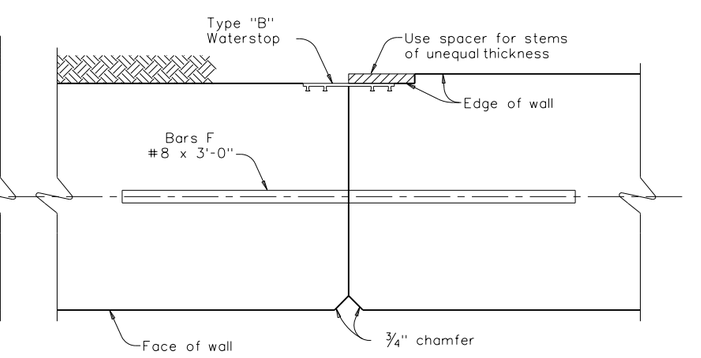


H > "X"

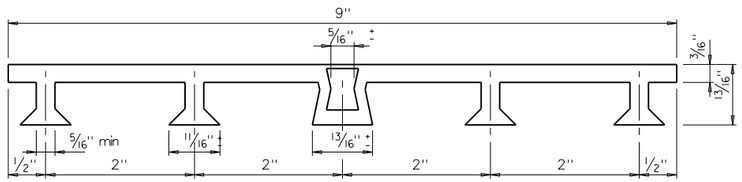
JOINT AND WATERSTOP DETAILS



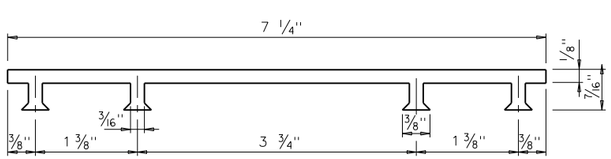
EXPANSION JOINT



CONSTRUCTION JOINT

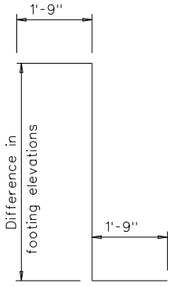


PVC WATERSTOP TYPE "A"



PVC WATERSTOP TYPE "B"

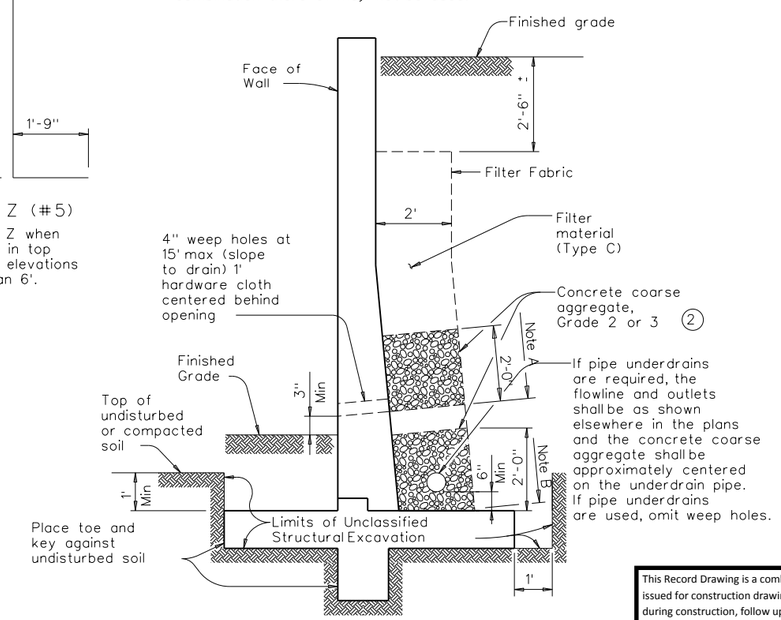
Note: Dimensions and shapes may vary slightly depending on manufacturer.



BARS Z (#5)

Omit Bars Z when difference in top of footing elevations is less than 6'.

(2) Crushed blast furnace slag, recycled crushed hydraulic cement concrete or combination there of may not be used.



DRAINAGE DETAILS AND EXCAVATION DIAGRAM

Note A: Stop coarse aggregate at this level when weep holes are used.

Note B: Use coarse aggregate to here with filter material above when underdrains are used.

GENERAL NOTES:

Walls are designed assuming unit weight of soil = 120 pcf, and coefficient of horizontal earth pressure = 0.33.

Walls are designed to provide a minimum factor of safety against sliding of 1.5. The undisturbed or compacted soil depth in front of walls, from bottom of Key up, shall not be less than Kw + Ft + 1'.

Retaining walls are detailed to be placed on grades up thru 10% with footing level, with no changes in reinforcing steel. Steeper grades can be accommodated by shortening Bars A and B and increasing length of legs of Bars U by the same amount. No change in Quantities will be involved

Retaining walls may be placed on Horizontal Curves by adjusting lengths of footing Bars T and H. Minor revisions of Concrete Quantities may be required.

Designed in accordance with current AASHTO Standard and Interim Specifications.

All concrete to be Class "C" (4,200 psi, 7.0 sac/CY).

All reinforcing steel to be Grade 60.

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of

FREESE AND NICHOLS, INC.

RECORD DRAWINGS PREPARED ON: 8/20/2024

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TEXAS NO: 83515 ON 10/21/2021
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Texas Department of Transportation

Bridge Division Standard

RETAINING WALL MISCELLANEOUS DETAILS

RW 2

FILE: rwstde11.dgn	DN: TxDOT	CK: TxDOT	DW: JGD	CK: MJG
©TxDOT March 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS				
04-11: Added Note 2.	DIST	COUNTY		SHEET NO.
				232

DATE:
FILE:

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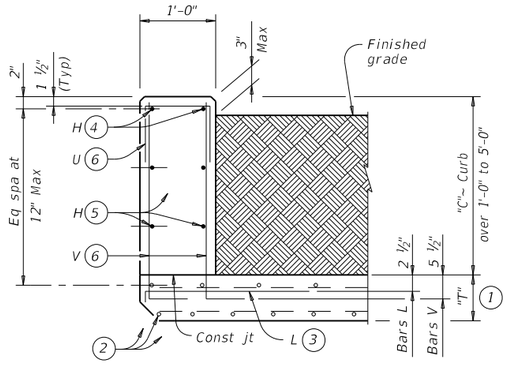
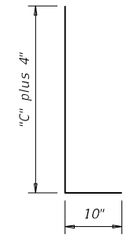
DATE:
FILE:

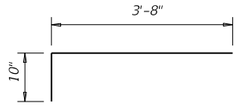


TYPICAL SECTION

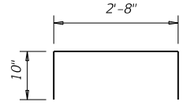
Used for curbs over 1'-0" to 5'-0"



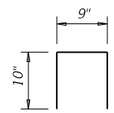
BARS V (#5) (6)
Spaced at 12" Max



BARS L (#5) (3)
Spaced at 12" Max



OPTIONAL BARS L (#5) (3) (7)
Spaced at 12" Max



BARS U (#4) (6)
Spaced at 12" Max

(1) "T" is equal to the culvert top slab thickness. For precast boxes with slabs less than 8" thick, see SCP-MD standard for additional details.

(2) Adjust normal culvert slab bars as necessary to clear obstructions.

(3) Place bars L as shown. Tilt hook as necessary to maintain cover.

(4) Place normal culvert curb bars H(#4) as shown. Adjust as necessary to clear obstructions.

(5) Additional bars H(#4) as required to maintain 12" Max spacing.

(6) Replace normal culvert curb bars K with one bar U and two bars V as shown spaced at 12" Max. Adjust length of bars V as necessary to maintain clear cover.

(7) Optional bars L are to be used only for precast box culverts with 3'-0" closure pour.

(8) Quantities shown are for Contractor's information only. Quantities are per linear foot of curb length. The value in table can be interpolated for intermediate values of curb height, "C". Quantity includes bars K (when applicable).

TABLE OF ESTIMATED CURB QUANTITIES (8)

Curb Height "C"	Conc (CY/LF)	Reinf Steel (Lb/LF)
1'-0"	0.037	10.4
1'-6"	0.056	14.5
2'-0"	0.074	15.6
2'-6"	0.093	18.0
3'-0"	0.111	19.0
3'-6"	0.130	21.3
4'-0"	0.148	22.4
4'-6"	0.167	24.8
5'-0"	0.185	25.9

CONSTRUCTION NOTES:

Adjust reinforcing steel as necessary to provide 1 ¼" cover.

For vehicle safety, top of the curb must not project more than 3" above the finished grade.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.

Provide galvanized reinforcing steel if required elsewhere in the plans.

Provide Class "C" concrete (f'_c = 4,200 psi, 7.0 sack/CY) minimum for curbs.

Provide bar laps, where required, as follows:

· Uncoated or galvanized – #4 = 1'-8" Min

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

These extended curb details have sufficient strength to allow for future retrofit of Type T631 or T631LS railing. These details are suitable for use with PR11, PR22 and PR3 type rails. These details are not suitable for the mounting of other rail types. For new construction using T631 or T631LS railing, use the T631-CM standard.

This Curb is considered as part of the Box Culvert for payment.

Cover dimensions are clear dimensions, unless noted otherwise.

Reinforcing bar dimensions shown are out-to-out of bar.

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Texas Department of Transportation

Bridge Division Standard

EXTENDED CURB DETAILS

FOR BOX CULVERTS WITH CURBS OVER 1'-0" TO 5'-0" TALL

ECD

FILE: ecdstde1-20.dgn	DN: GAF	CK: TxDOT	DW: TxDOT	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
				233

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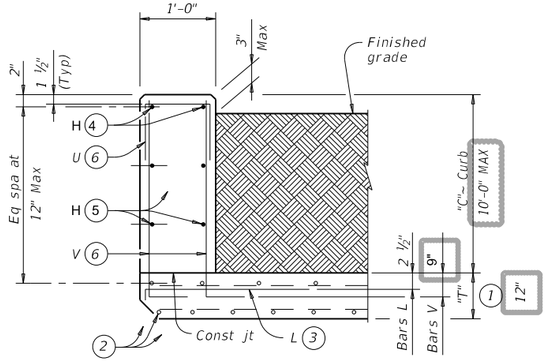
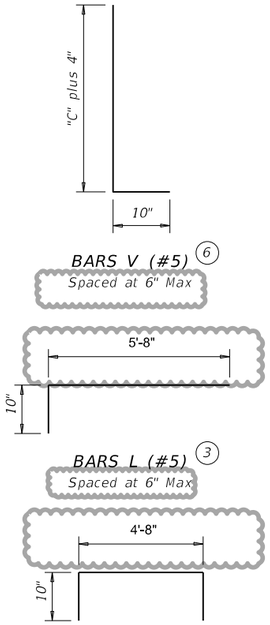
DATE:
FILE:



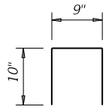
TYPICAL SECTION

Used for curbs up to 10'-0"



OPTIONAL BARS L (#5) 3 7

Spaced at 6" Max



BARS U (#4) 6

Spaced at 6" Max

1. "T" is equal to the larger of 12" or culvert top slab thickness. For precast boxes, see SCP-MD standard for additional details. Increase closure section from 3'-0" to 5'-0" for ECD (MOD)
2. Adjust normal culvert slab bars as necessary to clear obstructions.
3. Place bars L as shown. Tilt hook as necessary to maintain cover.
4. Place normal culvert curb bars H(#4) as shown. Adjust as necessary to clear obstructions.
5. Additional bars H(#4) as required to maintain 12" Max spacing.
6. Replace normal culvert curb bars K with one bar U and two bars V as shown spaced at 6" Max. Adjust length of bars V as necessary to maintain clear cover.
7. Optional bars L are to be used only for precast box culverts with 5'-0" closure pour.
8. Quantities shown are for Contractor's information only. Quantities are per linear foot of curb length. The value in table can be interpolated for intermediate values of curb height, "C". Quantity includes bars K (when applicable).

TABLE OF ESTIMATED CURB QUANTITIES 8

Curb Height "C"	Conc (CY/LF)	Reinf Steel (Lb/LF)
1'-0"	0.037	10.4
1'-6"	0.056	14.5
2'-0"	0.074	15.6
2'-6"	0.093	18.0
3'-0"	0.111	19.0
3'-6"	0.130	21.3
4'-0"	0.148	22.4
4'-6"	0.167	24.8
5'-0"	0.185	25.9

CONSTRUCTION NOTES:

Adjust reinforcing steel as necessary to provide 1 ¼" cover.

For vehicle safety, top of the curb must not project more than 3" above the finished grade.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.

Provide Class "C" concrete (f'_c = 4,200 psi, 7.0 sack/CY) minimum for curbs.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

These extended curb details have sufficient strength to allow for future retrofit of Type T631 or T631LS railing. These details are suitable for use with PR11, PR22 and PR3 type rails. These details are not suitable for the mounting of other rail types. For new construction using T631 or T631LS railing, use the T631-CM standard.

This Curb is considered as part of the Box Culvert for payment.

Cover dimensions are clear dimensions, unless noted otherwise.

Reinforcing bar dimensions shown are out-to-out of bar.

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Texas Department of Transportation

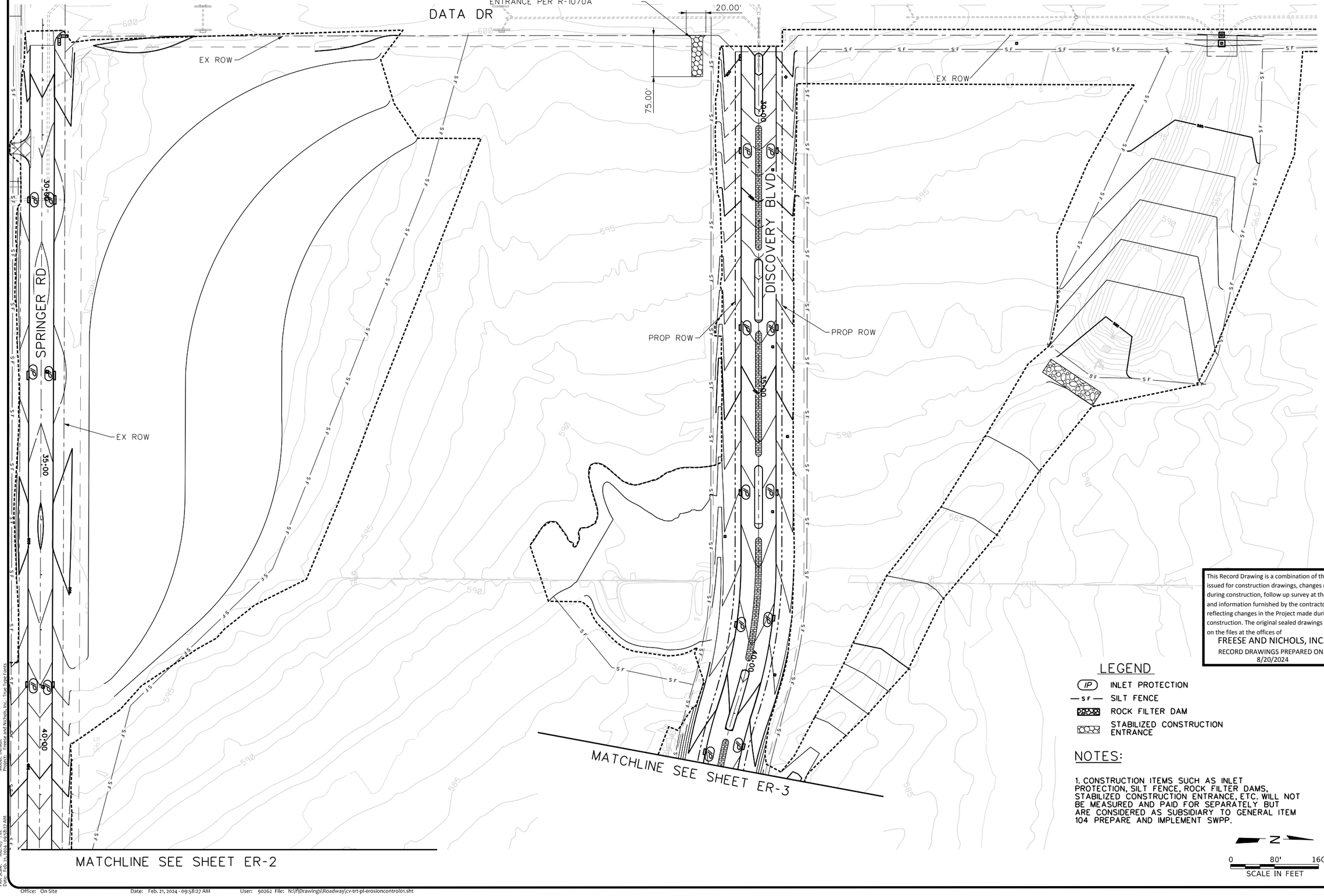
Bridge Division Standard

EXTENDED CURB DETAILS

FOR BOX CULVERTS WITH CURBS UP TO 10'-0" TALL

ECD (MOD)

FILE: ecdstde1-20.dgn	DN: GAF	CK: TxDOT	DW: TxDOT	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
				234



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RECORD DRAWINGS PREPARED ON: 8/20/2024

LEGEND

- IP — INLET PROTECTION
- SF — SILT FENCE
- ROCK FILTER DAM
- STABILIZED CONSTRUCTION ENTRANCE

NOTES:

1. CONSTRUCTION ITEMS SUCH AS INLET PROTECTION, SILT FENCE, ROCK FILTER DAMS, STABILIZED CONSTRUCTION ENTRANCE, ETC. WILL NOT BE MEASURED AND PAID FOR SEPARATELY BUT ARE CONSIDERED AS SUBSIDIARY TO GENERAL ITEM 104 PREPARE AND IMPLEMENT SWPP.

N

0 80' 160'

SCALE IN FEET

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASE FOR PERMIT
THIS DOCUMENT WAS ORIGINALLY PREPARED ON 10/21/2021
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Fax: (214) 217-2201
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

EROSION CONTROL PLAN

NO.	ISSUES	BY	DATE

F&N JOB NO. RKV19711
DATE APRIL 2022
DESIGNED MAU
DRAWN CHM
REVISED
CHECKED ADH
FILE NAME cv-trt-pl-erosioncontrol01.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET EC-1

SEQ. 235

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Office: On Site Date: Feb. 21, 2024 - 09:58:27 AM User: 90262 File: N:\fj\Drawings\Roadway\cv-trt-pl-erosioncontrol01.sht

MATCHLINE SEE SHEET ER-1

MATCHLINE A-A

MATCHLINE A-A

HWY 276

SPRINGER RD

ROCHELL RD

EX ROW

PROP ROW

10+00

15+00

20+00

25+00

30+00

75.00'

20.00'

INSTALL STABILIZED CONSTRUCTION ENTRANCE PER R-1070A

MATCHLINE SEE SHEET ER-3

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RECORD DRAWINGS PREPARED ON: 8/20/2024

LEGEND

- (IP) INLET PROTECTION
- —SF— SILT FENCE
- ROCK FILTER DAM
- STABILIZED CONSTRUCTION ENTRANCE

NOTES:

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N

0 80' 160'

SCALE IN FEET

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

EROSION CONTROL PLAN

NO.	ISSUES	BY	DATE

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FILE NAME cv-trt-pl-erosioncontrol02.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

0 1"

SHEET EC-2

SEQ. 236

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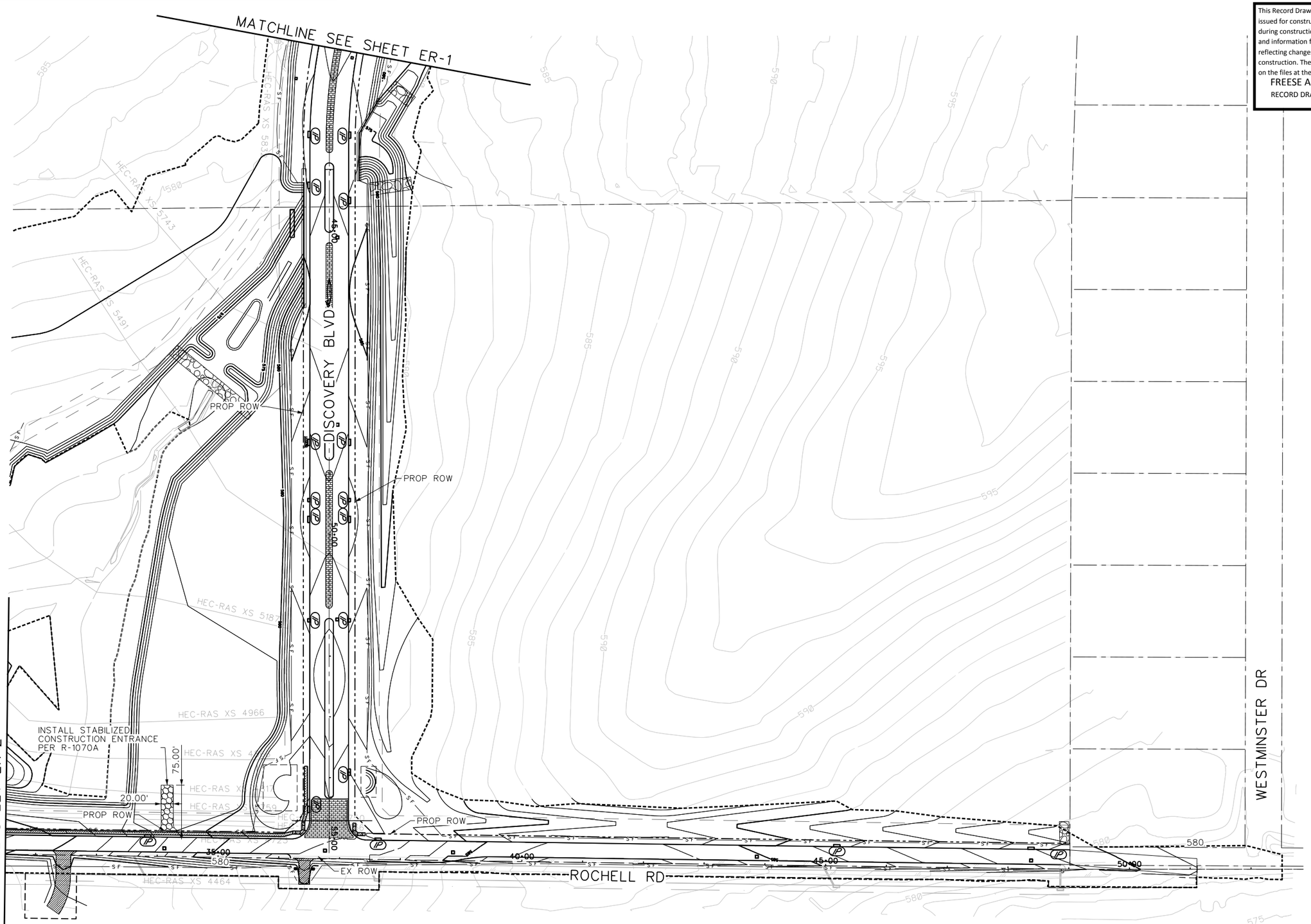

NOTES:

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LEGEND

- (IP) INLET PROTECTION
- —sf— SILT FENCE
- ROCK FILTER DAM
- STABILIZED CONSTRUCTION ENTRANCE

N

0 80' 160'

SCALE IN FEET

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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

EROSION CONTROL PLAN

NO.	ISSUES	DATE	BY

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F&N JOB NO.	RKW19711
DATE	APRIL 2022
DESIGNED	MAJ
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REVISED	
CHECKED	ADH
FILE NAME	cv-trt-pl-erosioncontrol03.sht

SHEET EC-3

SEQ. 237

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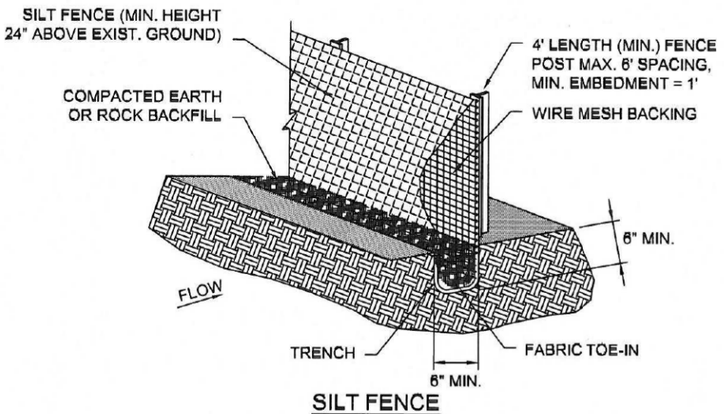
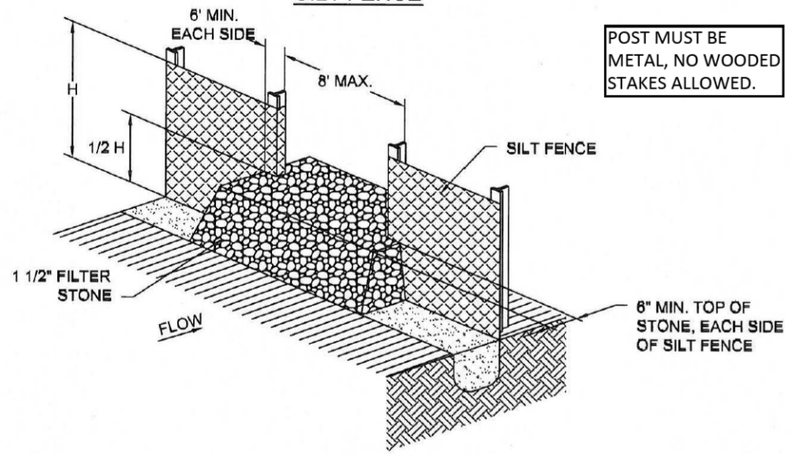


SILT FENCE



POST MUST BE METAL, NO WOODED STAKES ALLOWED.

STONE OVERFLOW STRUCTURE

SILT FENCE	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 202.5 *	
		DATE Mar. 2018	STANDARD DRAWING NO. R-1020A

*Section II Standard Drawings as of October 2004. Reference number only has been updated for Fifth Edition Specifications. *Public Works Construction Standards North Central Texas, Fifth Edition.*

SILT FENCE GENERAL NOTES:

1. POSTS WHICH SUPPORT THE SILT FENCE SHALL BE INSTALLED ON A SLIGHT ANGLE TOWARD THE ANTICIPATED RUNOFF SOURCE. POST MUST BE EMBEDDED A MINIMUM OF ONE FOOT.

2. THE TOE OF THE SILT FENCE SHALL BE TRENCHED IN WITH A SPADE OR MECHANICAL TRENCHER, SO THAT THE DOWNSLOPE FACE OF THE TRENCH IS FLAT AND PERPENDICULAR TO THE LINE OF FLOW. WHERE FENCE CANNOT BE TRENCHED IN (e.g. PAVEMENT), WEIGHT FABRIC FLAP WITH ROCK ON UPHILL SIDE TO PREVENT FLOW FROM SEEPING UNDER FENCE.

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

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

5. INSPECTION SHALL BE AS SPECIFIED IN THE SWPPP. REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED.

6. SILT FENCE SHALL BE REMOVED WHEN FINAL STABILIZATION IS ACHIEVED OR ANOTHER EROSION OR SEDIMENT CONTROL DEVICE IS EMPLOYED.

7. ACCUMULATED SILT SHALL BE REMOVED WHEN IT REACHES A DEPTH OF HALF THE HEIGHT OF THE FENCE. THE SILT SHALL BE DISPOSED OF AT AN APPROVED SITE AND IN SUCH A MANNER AS TO NOT CONTRIBUTE TO ADDITIONAL SILTATION.

8. FILTER STONE SHALL BE WRAPPED IN FILTER FABRIC AND BURIED SIX (6") INCHES MINIMUM.

SILT FENCE	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 202.5 *	
		DATE Mar. 2018	STANDARD DRAWING NO. R-1020B

*Section II Standard Drawings as of October 2004. Reference number only has been updated for Fifth Edition Specifications. *Public Works Construction Standards North Central Texas, Fifth Edition.*

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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
CIVIL
EROSION CONTROL DETAILS

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MAU
DRAWN CHM
CHECKED ADH
FILE NAME cv-trt-dt08.dgn

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SEQ. 238

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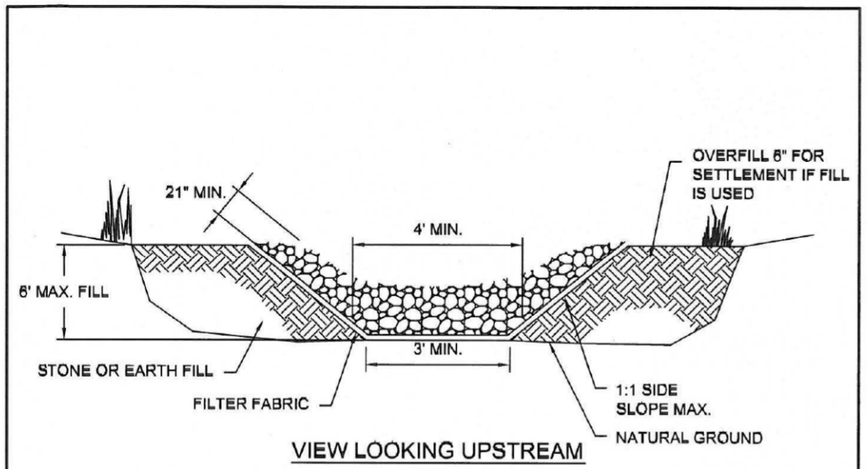
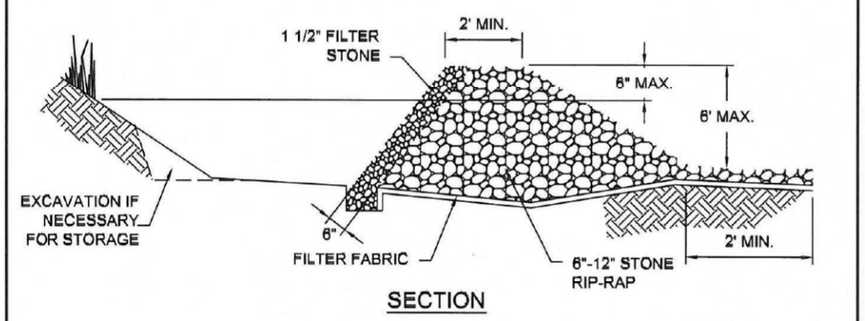


VIEW LOOKING UPSTREAM



SECTION

NOTE: FILTER STONE SHALL BE WRAPPED IN APPROPRIATE SIZED WIRE MESH TO CONTAIN STONE.

STONE OUTLET SEDIMENT TRAP	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 202.12 *	
		DATE Mar. 2018	STANDARD DRAWING NO. R-1090

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Fax - (214) 217-2201
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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
CIVIL
EROSION CONTROL DETAILS

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SEQ. 239

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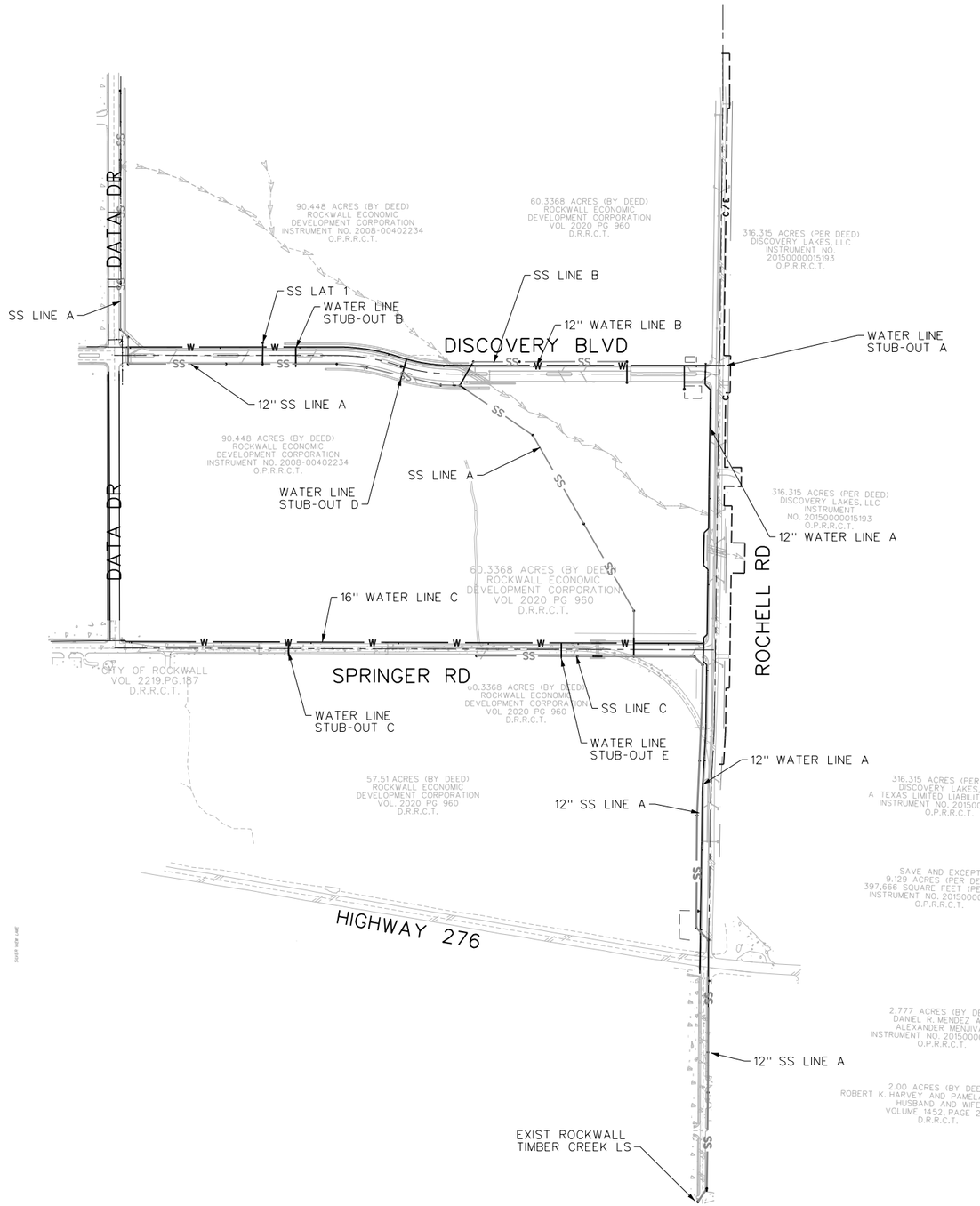

N

0 300' 600'

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Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

UTILITY LINES
OVERALL LAYOUT

NO.	ISSUES	BY	DATE

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F&N JOB NO.	RKW19711
DATE	APRIL 2022
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DRAWN	JP
REVISED	-
CHECKED	MH
FILE NAME	CV-PL-UTIL_LAYOUT01.dgn

SHEET
UTIL - 1

SEQ.
240

MicroStation V8 User: 90262 Office: On Site
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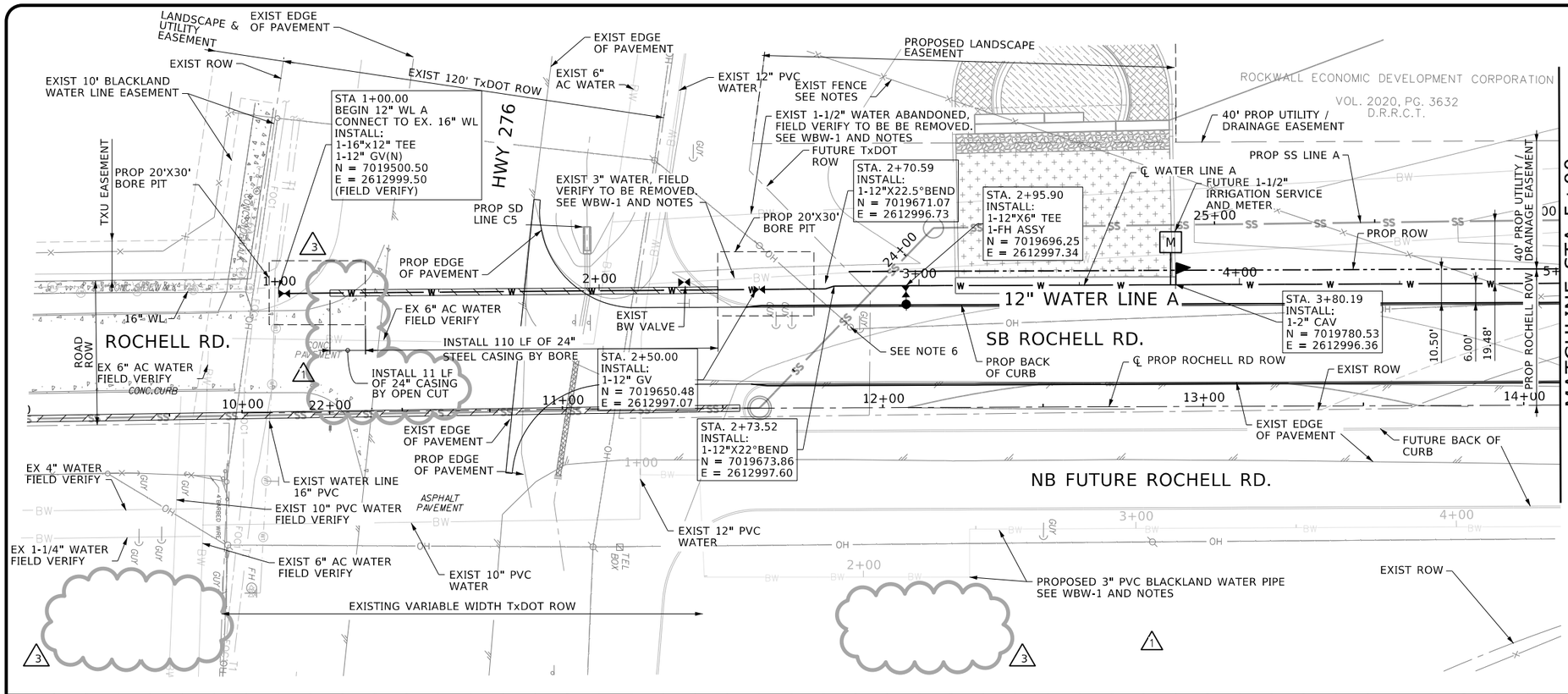
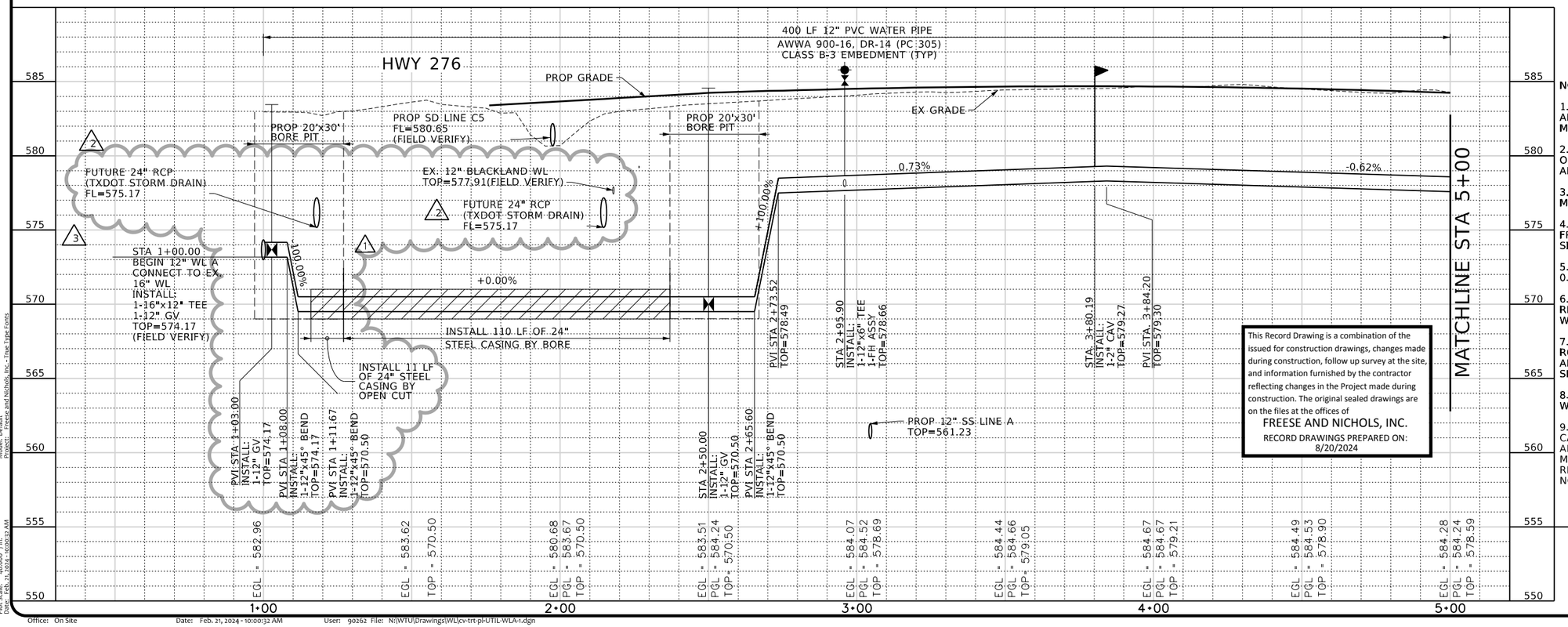




LEGEND

- ISOLATION VALVE (GV/BFV)
- 6" FH ASSEMBLY W/ 6" GV
- COMBINATION AIR-VACUUM VALVE (CAV) TYPE 1
- FIRE HYDRANT
- W — PROP WATERLINE
- SS — PROP SANITARY SEWER
- BW — BLACKLAND WATERLINE

CAUTION!!!
EXISTING UNDERGROUND UTILITIES IN AREA CONTACT UTILITY 48 HOURS PRIOR TO CONSTRUCTION

N

0 10' 20' 40'
HORIZONTAL SCALE
0 2' 4' 8'
VERTICAL SCALE

NOTES:

1. CONTRACTOR SHALL VERIFY LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO MANUFACTURING OF PRODUCTS.
2. CONTRACTOR TO FIELD VERIFY LOCATION OF EXISTING WATERLINE PRIOR TO EXCAVATION AND MAINTAIN SERVICE AT ALL TIMES.
3. DEFLECTED JOINTS TO BE AT 75% OF PIPE MANUFACTURER RECOMMENDATIONS.
4. ALL FIRE HYDRANTS SHALL BE PLACED 3FT FROM BACK OF FUTURE CURB TO AVOID FUTURE SIDEWALK CONSTRUCTION.
5. STEEL CASING SHALL HAVE THICKNESS OF 0.25 INCHES.
6. POWER POLES AND OHE ARE TO BE RELOCATED PRIOR TO WATER AND WASTEWATER PIPELINE CONSTRUCTION.
7. CONTRACTOR TO REFERENCE PROPOSED ROADWAY, STORMWATER, LANDSCAPE ARCHITECTURE AND OTHER IMPROVEMENT SHEETS FOR ADDITIONAL INFORMATION.
8. BARB WIRE FENCE SHALL BE REMOVED WHERE NECESSARY AND NOT REPLACED.
9. REFERENCE SHEET WBW-1 FOR MODIFICATIONS TO EXISTING BLACKLAND WATER ALIGNMENT. BLACKLAND WATER PIPE MODIFICATIONS TO BE COMPLETED BEFORE REMOVAL OF BLACKLAND WATER PIPES NOTED ON THIS SHEET.

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

PROFILE LEGEND

- PROFILE GRADE LINE
- EXISTING GROUND @ ℄

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144
RELEASE THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY MICHAEL R. HAGEN TEXAS NO. 111955 ON 10/21/2021 IT IS UNLAWFUL TO USE, REPRODUCE OR MODIFY WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.
FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2299
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
CIVIL
WATER LINE A
BEGIN TO STA 5+00

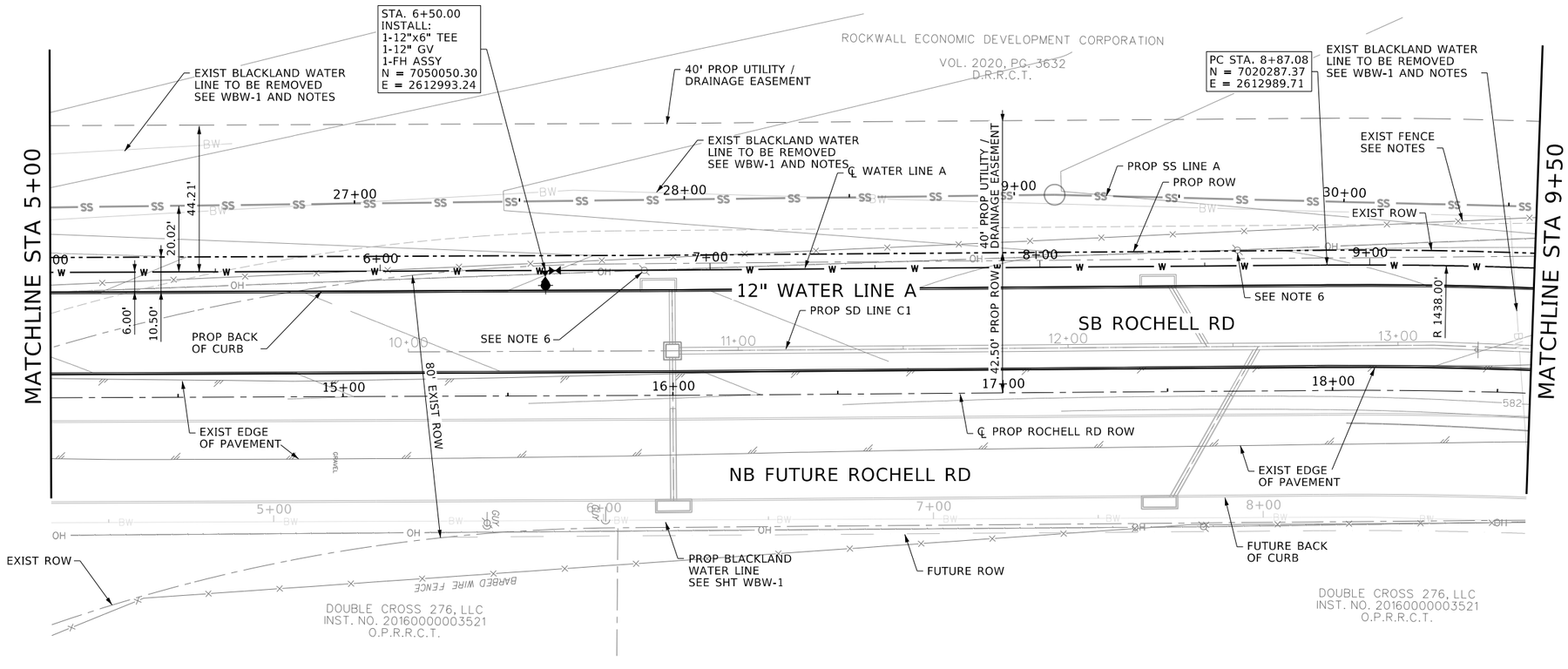
NO.	ISSUES	BY	DATE
1	CO #1	MH	6/24/22
2	ADDENDUM #5	MH	12/7/21
3	ADDENDUM #2	MH	11/17/21

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED CEL
DRAWN SI
REVISED
CHECKED MH
FILE NAME cv-trt-pl-UTIL-WLA-1.dgn

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale accordingly.

SHEET WLA-1
SEQ. 241

MicroStation V8 User: 90262 Office: On Site
Plotter: HP DesignJet T1700dr PS Model: Default
Plot Scale: 40.008 ' / in. Project: Freese and Nichols, Inc. - True Type Fonts
Plot Date: Feb. 21, 2024 - 10:00:32 AM
Office: On Site Date: Feb. 21, 2024 - 10:00:32 AM User: 90262 File: N:\WTU\Drawings\WL\cv-trt-pl-UTIL-WLA-1.dgn

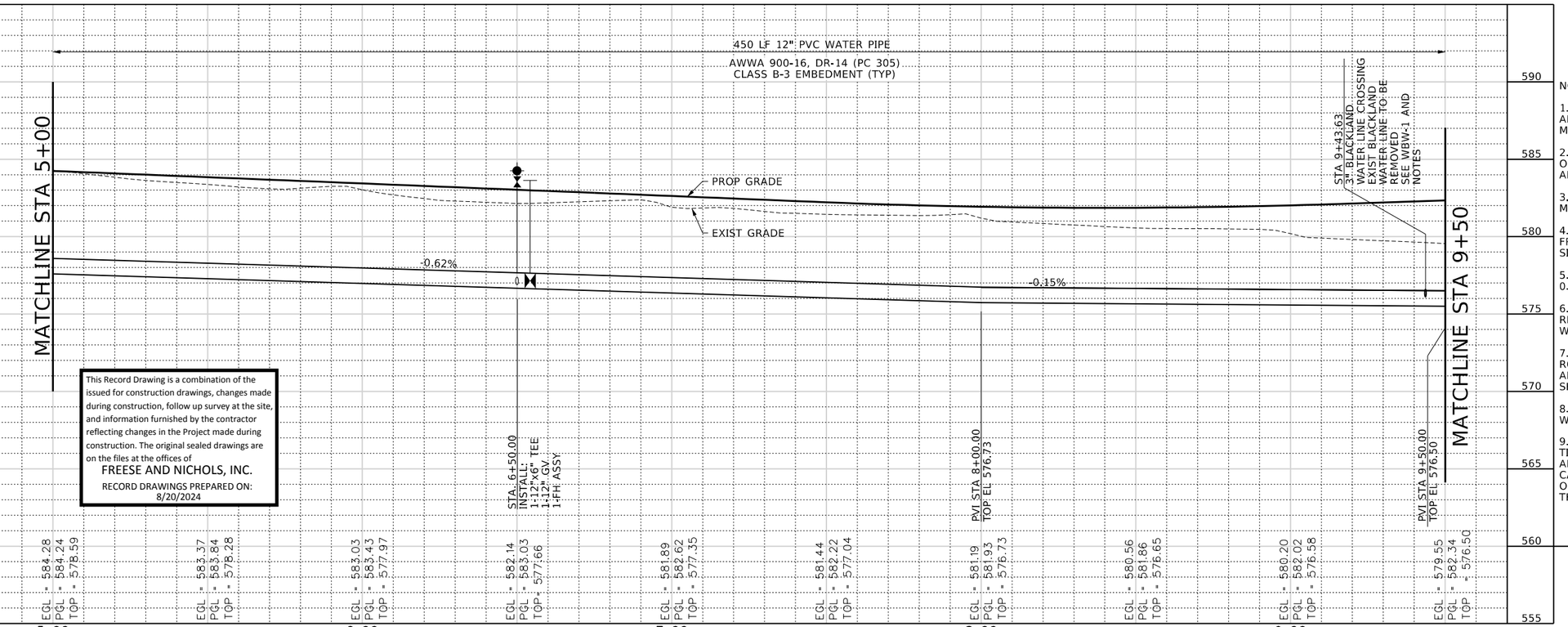


LEGEND

- ISOLATION VALVE (GV/BFV)
- 6" FH ASSEMBLY W/ 6" GV
- COMBINATION AIR-VACUUM VALVE (CAV) TYPE 1
- FIRE HYDRANT
- — W — PROP WATERLINE
- — SS — PROP SANITARY SEWER
- — BW — BLACKLAND WATERLINE

CAUTION!!!
EXISTING UNDERGROUND UTILITIES IN AREA CONTACT UTILITY 48 HOURS PRIOR TO CONSTRUCTION

N



0 10' 20' 40'
HORIZONTAL SCALE
0 2' 4' 8'
VERTICAL SCALE

NOTES:

1. CONTRACTOR SHALL VERIFY LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO MANUFACTURING OF PRODUCTS.
2. CONTRACTOR TO FIELD VERIFY LOCATION OF EXISTING WATERLINE PRIOR TO EXCAVATION AND MAINTAIN SERVICE AT ALL TIMES.
3. DEFLECTED JOINTS TO BE AT 75% OF PIPE MANUFACTURER RECOMMENDATIONS.
4. ALL FIRE HYDRANTS SHALL BE PLACED 3FT FROM BACK OF FUTURE CURB TO AVOID FUTURE SIDEWALK CONSTRUCTION.
5. STEEL CASING SHALL HAVE THICKNESS OF 0.25 INCHES.
6. POWER POLES AND OHE ARE TO BE RELOCATED PRIOR TO WATER AND WASTEWATER PIPELINE CONSTRUCTION.
7. CONTRACTOR TO REFERENCE PROPOSED ROADWAY, STORMWATER, LANDSCAPE ARCHITECTURE AND OTHER IMPROVEMENT SHEETS FOR ADDITIONAL INFORMATION.
8. BARB WIRE FENCE SHALL BE REMOVED WHERE NECESSARY AND NOT REPLACED.
9. REFERENCE SHEET WBW-1 FOR MODIFICATIONS TO EXISTING BLACKLAND WATER ALIGNMENT. BLACKLAND WATER PIPE MODIFICATIONS TO BE COMPLETED BEFORE REMOVAL OF BLACKLAND WATER PIPES NOTED ON THIS SHEET.

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

PROFILE LEGEND

- PROFILE GRADE LINE
- EXISTING GROUND @ ℄

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASED FOR THE PURPOSES OF REVIEW UNDER THE AUTHORITY OF MICHAEL R. HAGEN, TEXAS NO. 111955, ON 10/21/2021. IT IS NOT TO BE USED FOR BIDDING OR CONSTRUCTION PURPOSES. PERSONS USING THIS DOCUMENT WITHOUT PROPER AUTHORIZATION SHALL BE SOLELY RESPONSIBLE FOR ANY AND ALL DAMAGES RESULTING FROM SUCH UNAUTHORIZED USE. NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE NICHOLS
2nd GENERATION
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2250
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

WATER LINE A
STA 5+00 TO STA 9+50

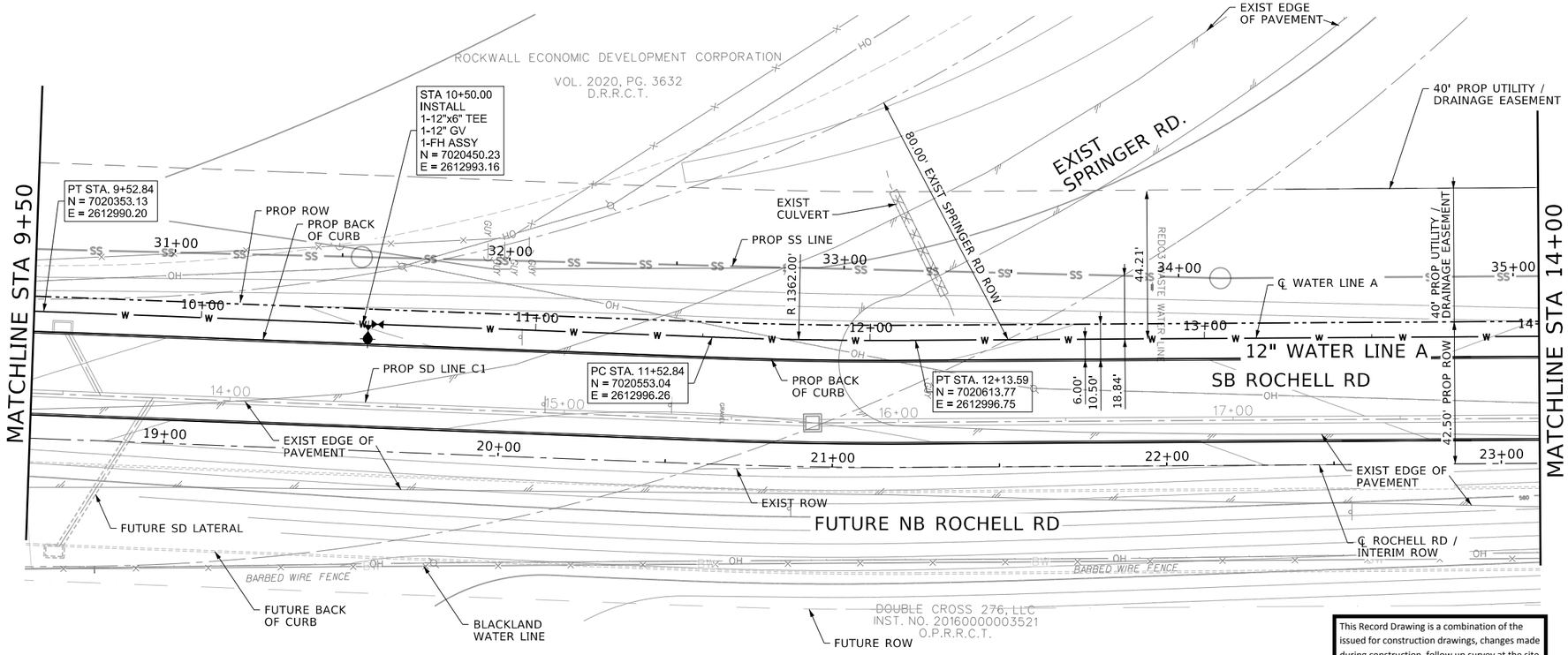
NO.	ISSUES	BY	DATE

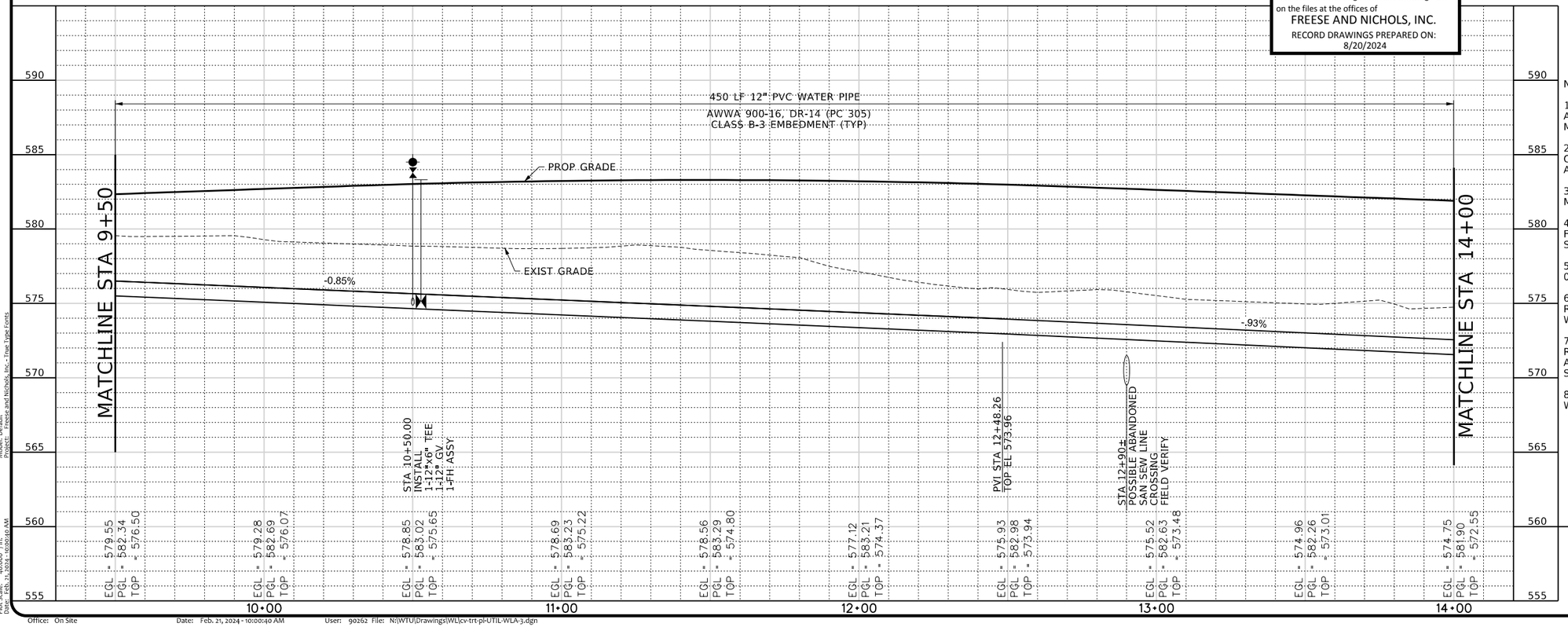
F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED CEL
DRAWN SI
REVISED
CHECKED MH
FILE NAME cv-trt-pl-UTIL-WLA-2.dgn

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale accordingly.
0 1"

SHEET WLA-2
SEQ. 242

MicroStation V8 User: 90262 Office: On Site
Plotter: \\PW01\Drawings\WL\cv-trt-pl-UTIL-WLA-2.dgn
Plot Scale: 40.0087 ' / in.
Date: Feb. 21, 2024 - 10:00:38 AM
Model: Default
Projects: Freese and Nichols, Inc. - True Type Fonts





LEGEND

- ISOLATION VALVE (GV/BFV)
- 6" FH ASSEMBLY W/ 6" GV
- COMBINATION AIR-VACUUM VALVE (CAV) TYPE 1
- FIRE HYDRANT
- PROP WATERLINE
- PROP SANITARY SEWER
- BLACKLAND WATERLINE

CAUTION!!!
EXISTING UNDERGROUND UTILITIES IN AREA CONTACT UTILITY 48 HOURS PRIOR TO CONSTRUCTION

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

N
0 10' 20' 40'
HORIZONTAL SCALE
0 2' 4' 8'
VERTICAL SCALE

NOTES:

1. CONTRACTOR SHALL VERIFY LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO MANUFACTURING OF PRODUCTS.
2. CONTRACTOR TO FIELD VERIFY LOCATION OF EXISTING WATERLINE PRIOR TO EXCAVATION AND MAINTAIN SERVICE AT ALL TIMES.
3. DEFLECTED JOINTS TO BE AT 75% OF PIPE MANUFACTURER RECOMMENDATIONS.
4. ALL FIRE HYDRANTS SHALL BE PLACED 3FT FROM BACK OF FUTURE CURB TO AVOID FUTURE SIDEWALK CONSTRUCTION.
5. STEEL CASING SHALL HAVE THICKNESS OF 0.25 INCHES.
6. POWER POLES AND OHE ARE TO BE RELOCATED PRIOR TO WATER AND WASTEWATER PIPELINE CONSTRUCTION.
7. CONTRACTOR TO REFERENCE PROPOSED ROADWAY, STORMWATER, LANDSCAPE ARCHITECTURE AND OTHER IMPROVEMENT SHEETS FOR ADDITIONAL INFORMATION.
8. BARB WIRE FENCE SHALL BE REMOVED WHERE NECESSARY AND NOT REPLACED.

PROFILE LEGEND

- PROFILE GRADE LINE
- EXISTING GROUND @ ℄

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASED FOR THE PURPOSE OF REVIEW UNDER THE AUTHORITY OF MICHAEL R. HAGEN, TEXAS NO. 119555 ON 10/21/2021. IT IS NOT TO BE USED FOR BIDDING OR CONSTRUCTION PURPOSES. THIS DOCUMENT WAS PREPARED UNDER 22 TAC 137.33. ANY UNAUTHORIZED USE OF THE DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2250
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

WATER LINE A
STA 9+50 TO STA 14+00

F&N JOB NO.	RKW19711		
DATE	APRIL 2022		
DESIGNED	CEL		
DRAWN	SI		
REVISED			
CHECKED	MH		
FILE NAME	cv-trt-pl-UTIL-WLA-3.dgn		

NO.	ISSUES	BY	DATE

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET
WLA-3

SEQ.
243

MicroStation V8 User: 90262 Office: On Site
N:\WTU\Drawings\WL\cv-trt-pl-UTIL-WLA-3.dgn
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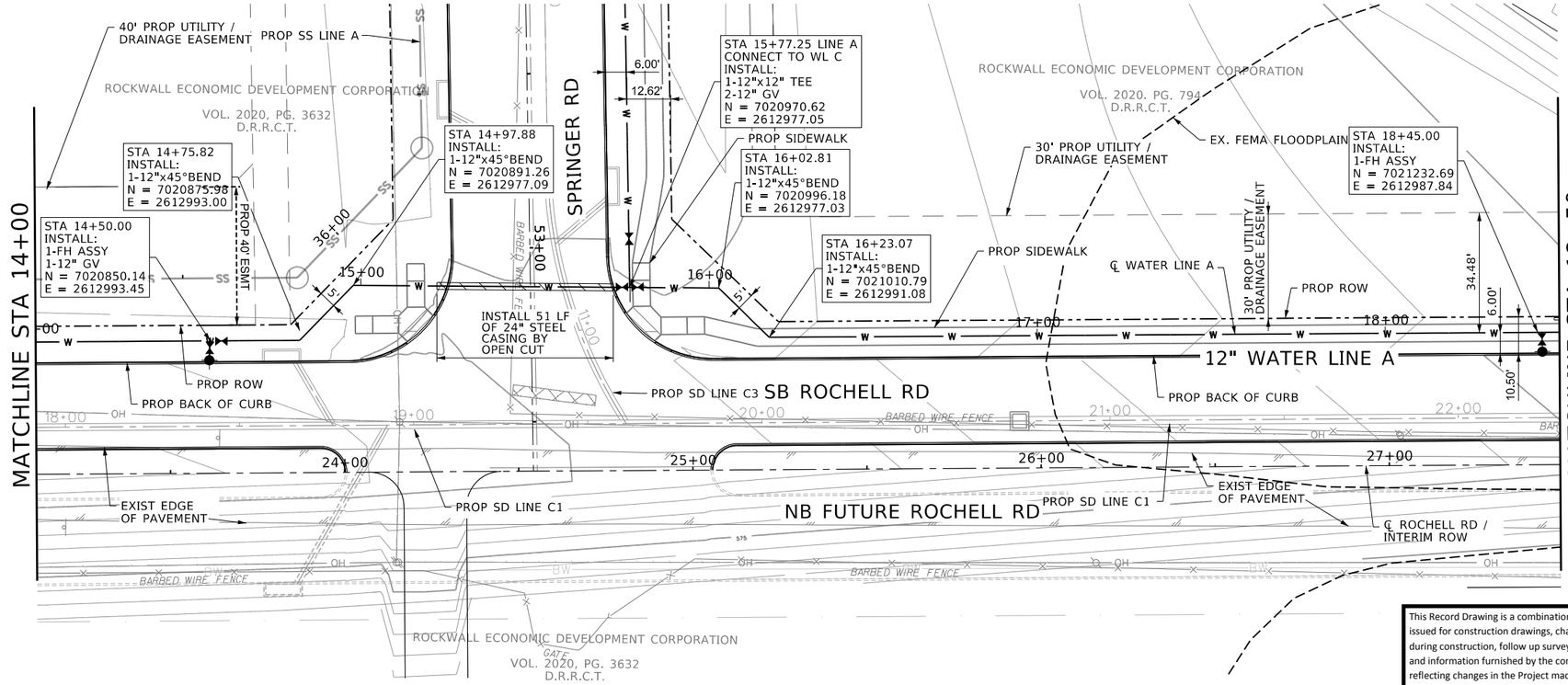
Date: Feb. 21, 2024 - 10:00:10 AM



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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

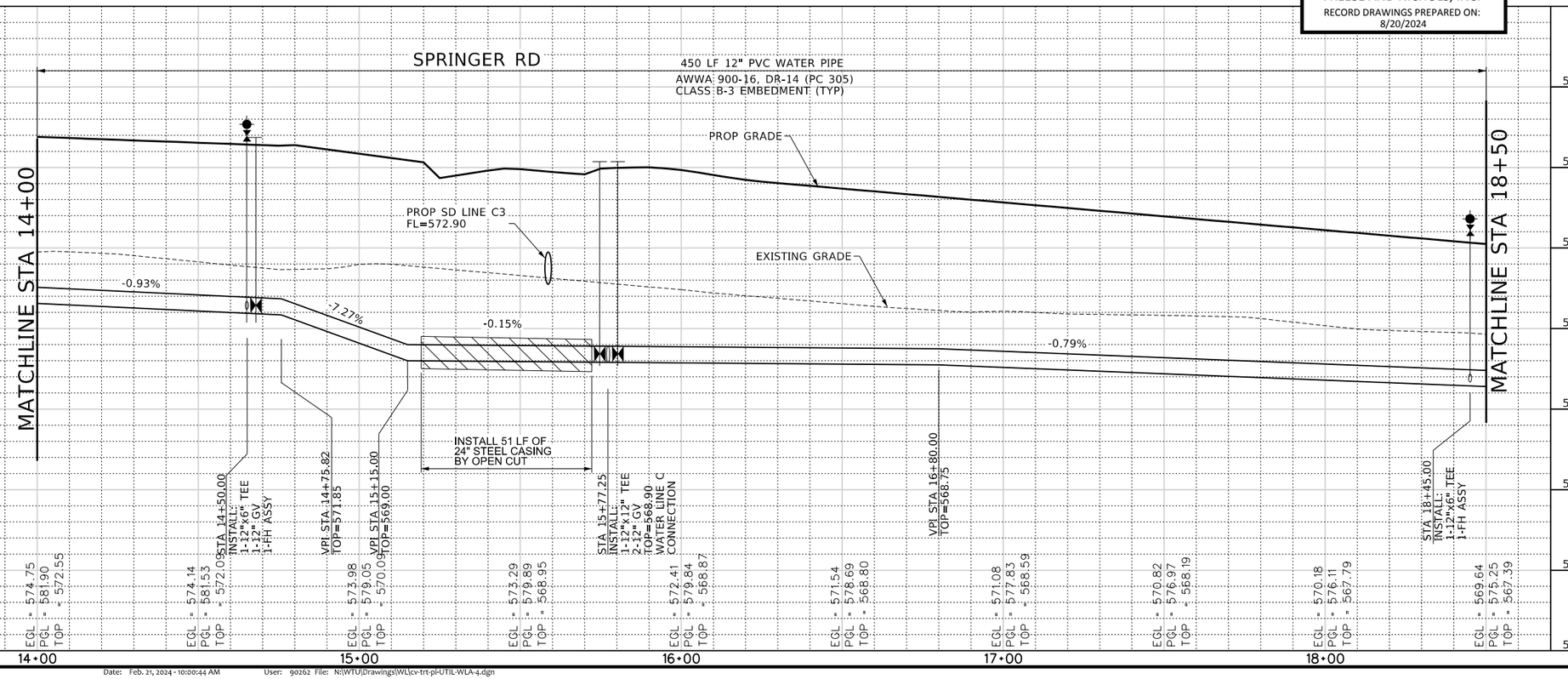
LEGEND

- ISOLATION VALVE (GV/BFV)
- 6" FH ASSEMBLY W/ 6" GV
- COMBINATION AIR-VACUUM VALVE (CAV) TYPE 1
- FIRE HYDRANT
- —W— PROP WATERLINE
- —SS— PROP SANITARY SEWER
- —BW— BLACKLAND WATERLINE

CAUTION!!!
EXISTING UNDERGROUND UTILITIES IN AREA CONTACT UTILITY 48 HOURS PRIOR TO CONSTRUCTION

N

0 10' 20' 40'
HORIZONTAL SCALE
0 2' 4' 8'
VERTICAL SCALE



PROFILE LEGEND

- PROFILE GRADE LINE
- EXISTING GROUND @ ℄

NOTES:

1. CONTRACTOR SHALL VERIFY LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO MANUFACTURING OF PRODUCTS.
2. CONTRACTOR TO FIELD VERIFY LOCATION OF EXISTING WATERLINE PRIOR TO EXCAVATION AND MAINTAIN SERVICE AT ALL TIMES.
3. DEFLECTED JOINTS TO BE AT 75% OF PIPE MANUFACTURER RECOMMENDATIONS.
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5. STEEL CASING SHALL HAVE THICKNESS OF 0.25 INCHES.
6. POWER POLES AND OHE ARE TO BE RELOCATED PRIOR TO WATER AND WASTEWATER PIPELINE CONSTRUCTION.
7. CONTRACTOR TO REFERENCE PROPOSED ROADWAY, STORMWATER, LANDSCAPE ARCHITECTURE AND OTHER IMPROVEMENT SHEETS FOR ADDITIONAL INFORMATION.
8. BARB WIRE FENCE SHALL BE REMOVED WHERE NECESSARY AND NOT REPLACED.

0 10' 20' 40'
HORIZONTAL SCALE
0 2' 4' 8'
VERTICAL SCALE

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASED FOR THE PURPOSES OF INTERIM REVIEW UNDER THE AUTHORITY OF MICHAEL R. HAGEN TEXAS NO. 111955 ON 10/21/2021 IT IS NOT TO BE USED FOR BIDDING OR CONSTRUCTION PURPOSES. NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

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Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2250
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

WATER LINE A
STA 14+00 TO STA 18+50

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED CEL
DRAWN SI
REVISED
CHECKED MH
FILE NAME cv-trt-pl-UTIL-WLA-4.dgn

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET WLA-4
SEQ. 244

MicroStation V8 User: 90262 Office: On Site
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Plotter: \\Shared\Xerox AltaLink C8070 Monochrome PS
Plot Scale: 40.0087 In. = 1 Ft.
Date: Feb. 21, 2024 - 10:00:44 AM
Model: Default
Project: Freese and Nichols, Inc. - True Type Fonts
Office: On Site
Date: Feb. 21, 2024 - 10:00:44 AM
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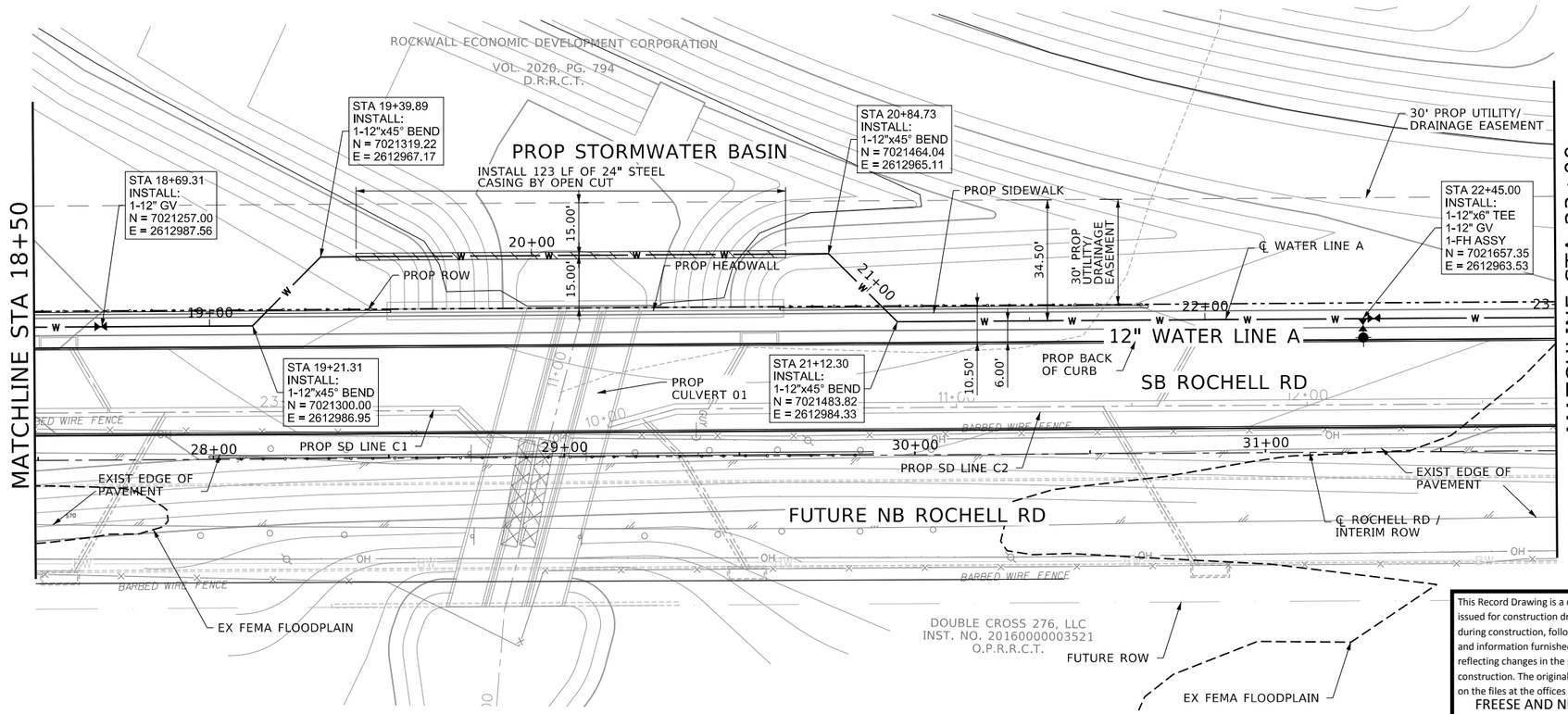

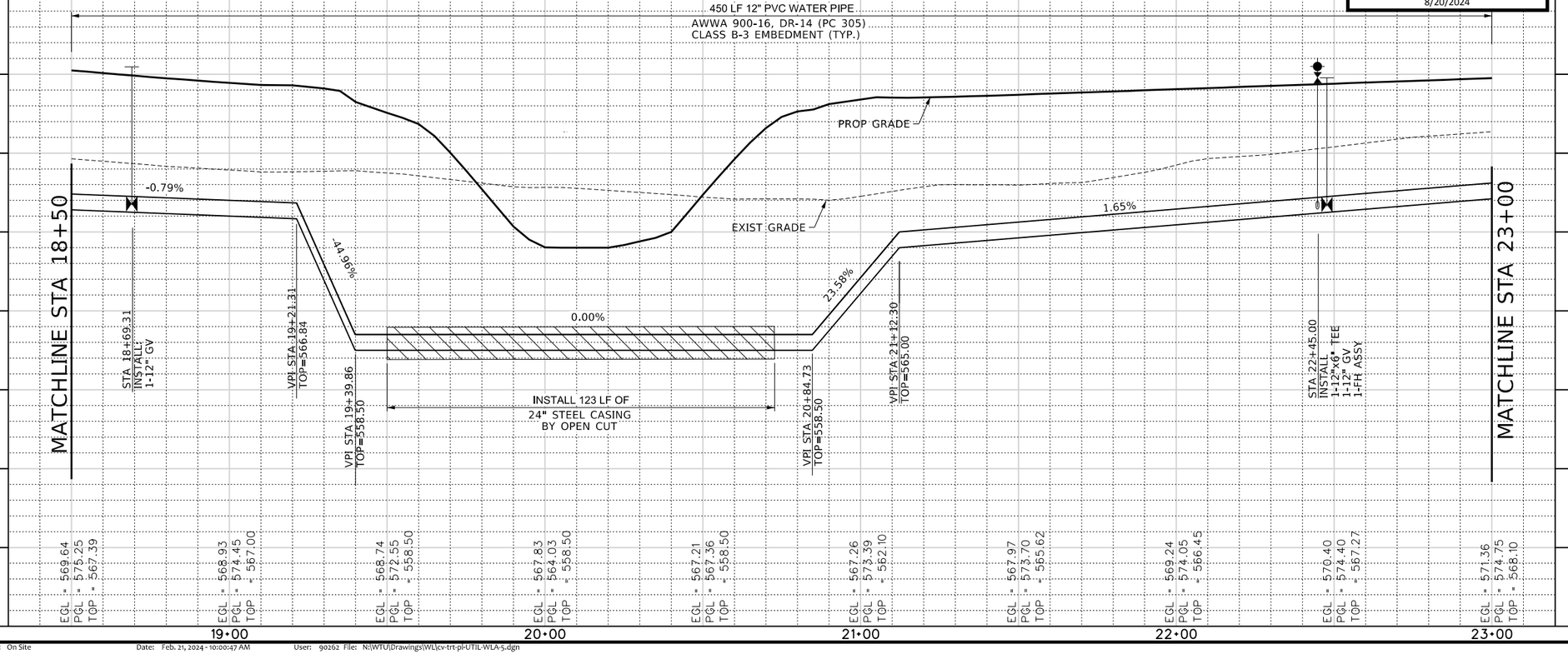

LEGEND

- ISOLATION VALVE (GV/BFV)
- 6" FH ASSEMBLY W/ 6" GV
- COMBINATION AIR-VACUUM VALVE (CAV) TYPE 1
- FIRE HYDRANT
- W — PROP WATERLINE
- SS — PROP SANITARY SEWER
- BW — BLACKLAND WATERLINE

CAUTION!!!
EXISTING UNDERGROUND UTILITIES IN AREA CONTACT UTILITY 48 HOURS PRIOR TO CONSTRUCTION

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

N
HORIZONTAL SCALE 0 10' 20' 40'
VERTICAL SCALE 0 2' 4' 8'

NOTES:

1. CONTRACTOR SHALL VERIFY LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO MANUFACTURING OF PRODUCTS.
2. CONTRACTOR TO FIELD VERIFY LOCATION OF EXISTING WATERLINE PRIOR TO EXCAVATION AND MAINTAIN SERVICE AT ALL TIMES.
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5. STEEL CASING SHALL HAVE THICKNESS OF 0.25 INCHES.
6. POWER POLES AND OHE ARE TO BE RELOCATED PRIOR TO WATER AND WASTEWATER PIPELINE CONSTRUCTION.
7. CONTRACTOR TO REFERENCE PROPOSED ROADWAY, STORMWATER, LANDSCAPE ARCHITECTURE AND OTHER IMPROVEMENT SHEETS FOR ADDITIONAL INFORMATION.
8. BARB WIRE FENCE SHALL BE REMOVED WHERE NECESSARY AND NOT REPLACED.

PROFILE LEGEND

- PROFILE GRADE LINE
- EXISTING GROUND @ ℄

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASED FOR THE PURPOSE OF REVIEW UNDER THE AUTHORITY OF MICHAEL R. HAGEN TEXAS NO. 111955 ON 10/21/2021. IT IS NOT TO BE USED FOR BIDDING OR CONSTRUCTION PURPOSES. ALTERATION OF A SEALED DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

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Phone: (214) 217-2200
Fax: (214) 217-2299
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

WATER LINE A
STA 18+50 TO STA 23+00

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED CEL
DRAWN SJ
REVISED
CHECKED MH
FILE NAME cv-trt-pl-UTIL-WLA-5.dgn

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale accordingly. 0 1"

SHEET WLA-5
SEQ. 245

MicroStation V8 User: 90262 Office: On Site
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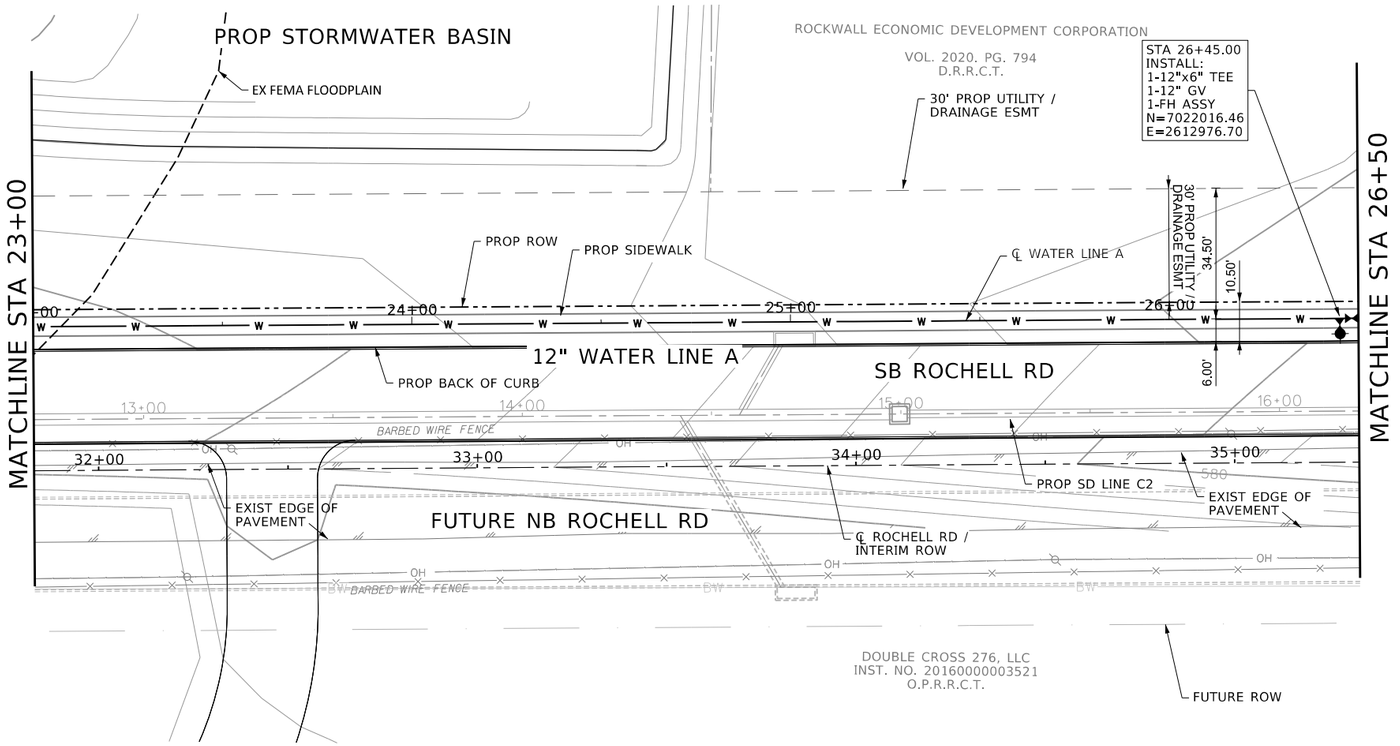
Plotter: HP DesignJet T1700dr PS ePrint (by HP-RicohPrinting)
Plot Scale: 40.000 ' / in.
Date: Feb. 21, 2024 - 10:00:47 AM
Model: Default
Project: Freese and Nichols, Inc. - True Type Fonts



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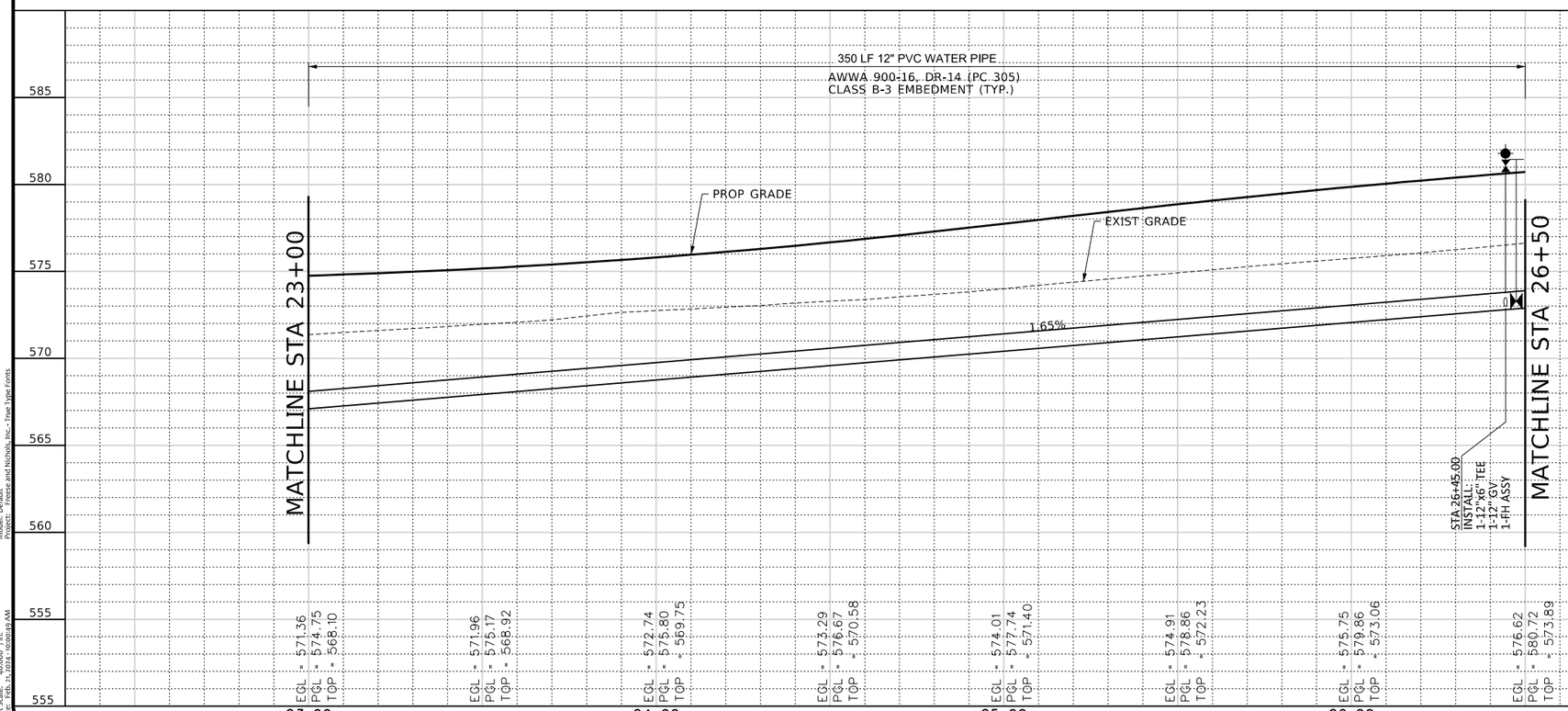
FREESE AND NICHOLS, INC.

RECORD DRAWINGS PREPARED ON: 8/20/2024

LEGEND

- ISOLATION VALVE (GV/BFV)
- 6" FH ASSEMBLY W/ 6" GV
- COMBINATION AIR-VACUUM VALVE (CAV) TYPE 1
- FIRE HYDRANT
- W — PROP WATERLINE
- SS — PROP SANITARY SEWER
- BW — BLACKLAND WATERLINE

CAUTION!!!
EXISTING UNDERGROUND UTILITIES IN AREA CONTACT UTILITY 48 HOURS PRIOR TO CONSTRUCTION



N

0 10' 20' 40'
HORIZONTAL SCALE

0 2' 4' 8'
VERTICAL SCALE

NOTES:

1. CONTRACTOR SHALL VERIFY LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO MANUFACTURING OF PRODUCTS.
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PROFILE LEGEND

- PROFILE GRADE LINE
- EXISTING GROUND @ ℄

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

WATER LINE A
STA 23+00 TO STA 26+50

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MH
DRAWN JP
REVISED -
CHECKED CCB
FILE NAME cv-trt-pl-UTIL-WLA-6.dgn

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET WLA-6

SEQ. 246

MicroStation V8 User: 90262 Office: On Site
N:\WTU\Drawings\WL\cv-trt-pl-UTIL-WLA-6.dgn
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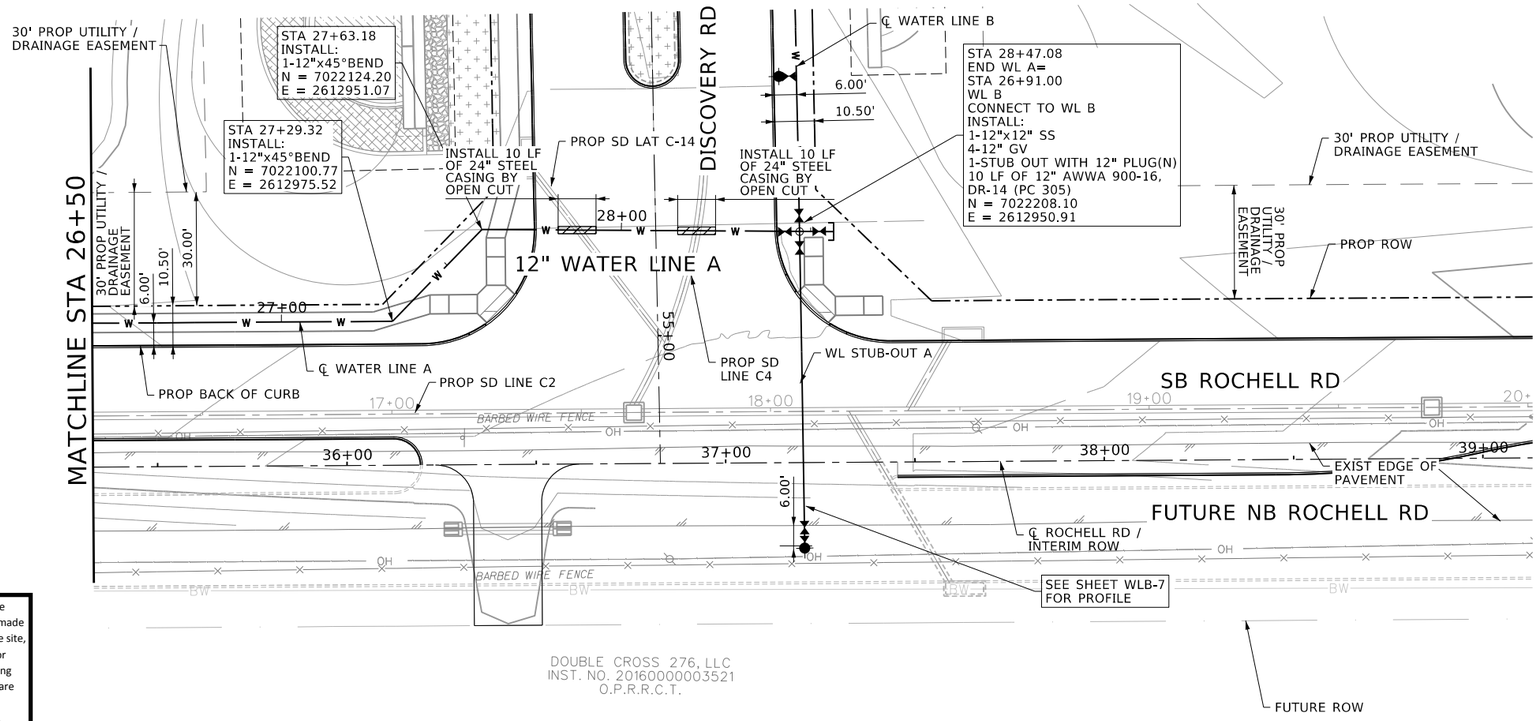
Date: Feb. 21, 2024 - 10:00:49 AM



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FREESE AND NICHOLS, INC.

RECORD DRAWINGS PREPARED ON: 8/20/2024

LEGEND

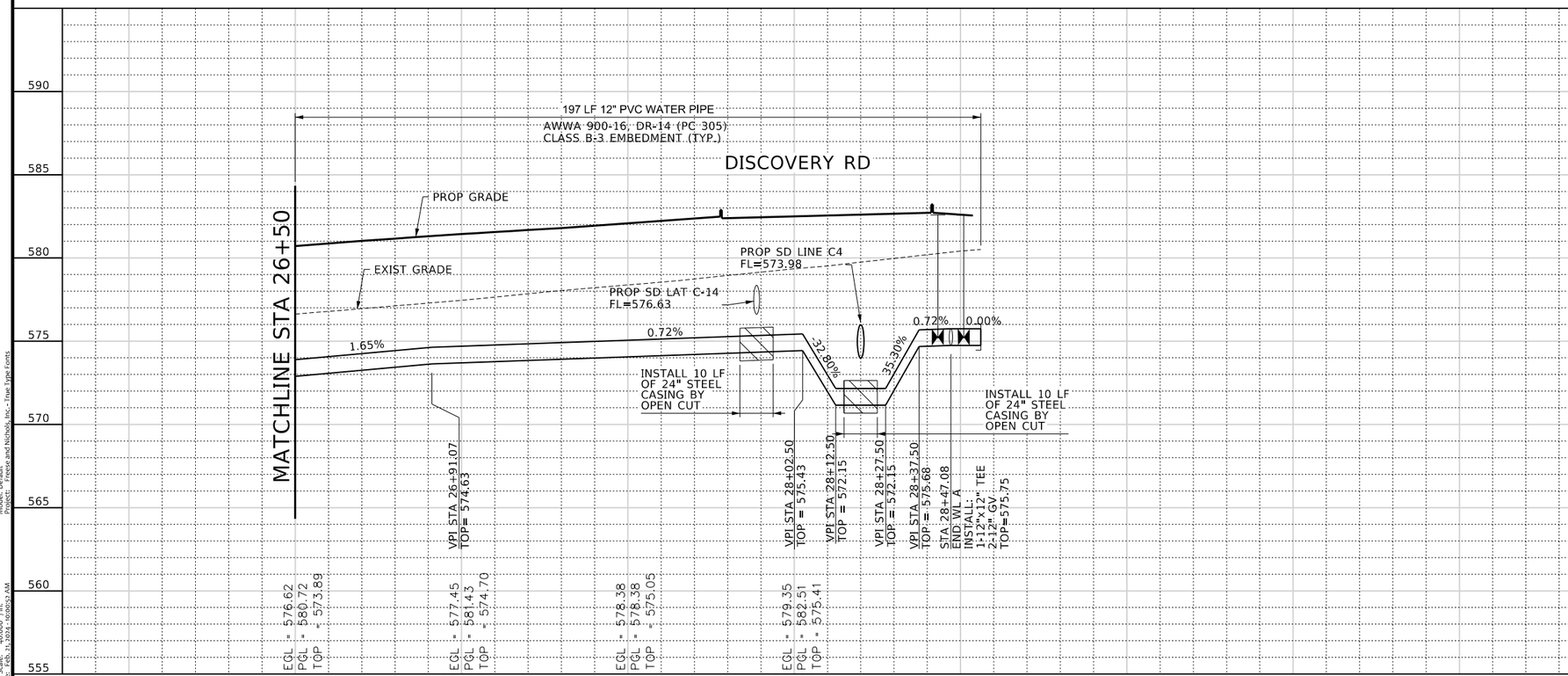
- ISOLATION VALVE (GV/BFV)
- 6" FH ASSEMBLY W/ 6" GV
- COMBINATION AIR-VACUUM VALVE (CAV) TYPE 1
- FIRE HYDRANT
- —W— PROP WATERLINE
- —SS— PROP SANITARY SEWER
- —BW— BLACKLAND WATERLINE

CAUTION!!!
EXISTING UNDERGROUND UTILITIES IN AREA CONTACT UTILITY 48 HOURS PRIOR TO CONSTRUCTION

N

0 10' 20' 40'
HORIZONTAL SCALE

0 2' 4' 8'
VERTICAL SCALE



PROFILE LEGEND

- PROFILE GRADE LINE
- EXISTING GROUND @ ℄

NOTES:

1. CONTRACTOR SHALL VERIFY LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO MANUFACTURING OF PRODUCTS.
2. CONTRACTOR TO FIELD VERIFY LOCATION OF EXISTING WATERLINE PRIOR TO EXCAVATION AND MAINTAIN SERVICE AT ALL TIMES.
3. DEFLECTED JOINTS TO BE AT 75% OF PIPE MANUFACTURER RECOMMENDATIONS.
4. ALL FIRE HYDRANTS SHALL BE PLACED 3FT FROM BACK OF FUTURE CURB TO AVOID FUTURE SIDEWALK CONSTRUCTION.
5. STEEL CASING SHALL HAVE THICKNESS OF 0.25 INCHES.
6. POWER POLES AND OHE ARE TO BE RELOCATED PRIOR TO WATER AND WASTEWATER PIPELINE CONSTRUCTION.
7. CONTRACTOR TO REFERENCE PROPOSED ROADWAY, STORMWATER, LANDSCAPE ARCHITECTURE AND OTHER IMPROVEMENT SHEETS FOR ADDITIONAL INFORMATION.
8. BARB WIRE FENCE SHALL BE REMOVED WHERE NECESSARY AND NOT REPLACED.

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

FREESE, NICHOLS AND WASHBURN, INC. DOES NOT CONSENT TO ANY USE OF THIS DOCUMENT THAT WAS NOT AUTHORIZED BY MICHAEL R. HAGEN TEXAS NO. 111955 ON 10/21/2021 AND SPECIFICALLY FOR THE PROJECT STATED HEREIN. ANY USE WITHOUT PROPER AUTHORIZATION OR THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2201
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

WATER LINE A
STA 26+50 TO END

NO.	ISSUES	BY	DATE

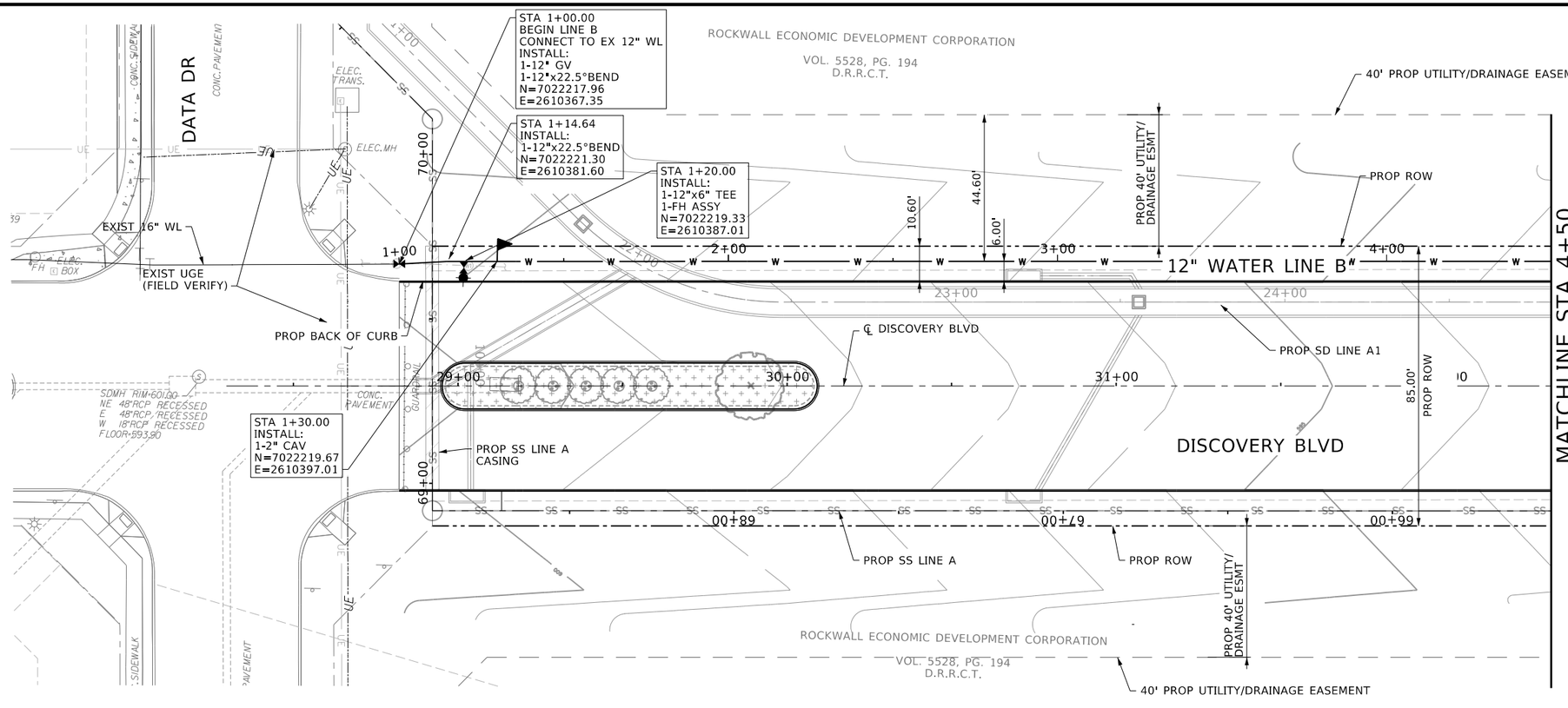
FILE NAME: cv-trt-pl-UTIL-WLA-7.dgn
CHECKED: MH
REVISED:
DRAWN: EB
DESIGNED: CEL
DATE: APRIL 2022
F&N JOB NO: RKW19171

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale!

SHEET
WLA-7

SEQ.
247

MicroStation V8 User: 90262 Office: On Site
N:\WTU\Drawings\WL\cv-trt-pl-UTIL-WLA-7.dgn
Plotter: pltPlotXerox6204_24x36.pltcfg Model: Default
Plot Scale: 40.000 ' / in. Plotted: Freese and Nichols, Inc. - True Type Fonts
Date: Feb. 21, 2024 - 10:00:52 AM



LEGEND

- ISOLATION VALVE (GV/BFV)
- 6" FH ASSEMBLY W/ 6" GV
- COMBINATION AIR-VACUUM VALVE (CAV) TYPE 1
- FIRE HYDRANT
- —W— PROP WATERLINE
- —SS— PROP SANITARY SEWER
- —BW— BLACKLAND WATERLINE

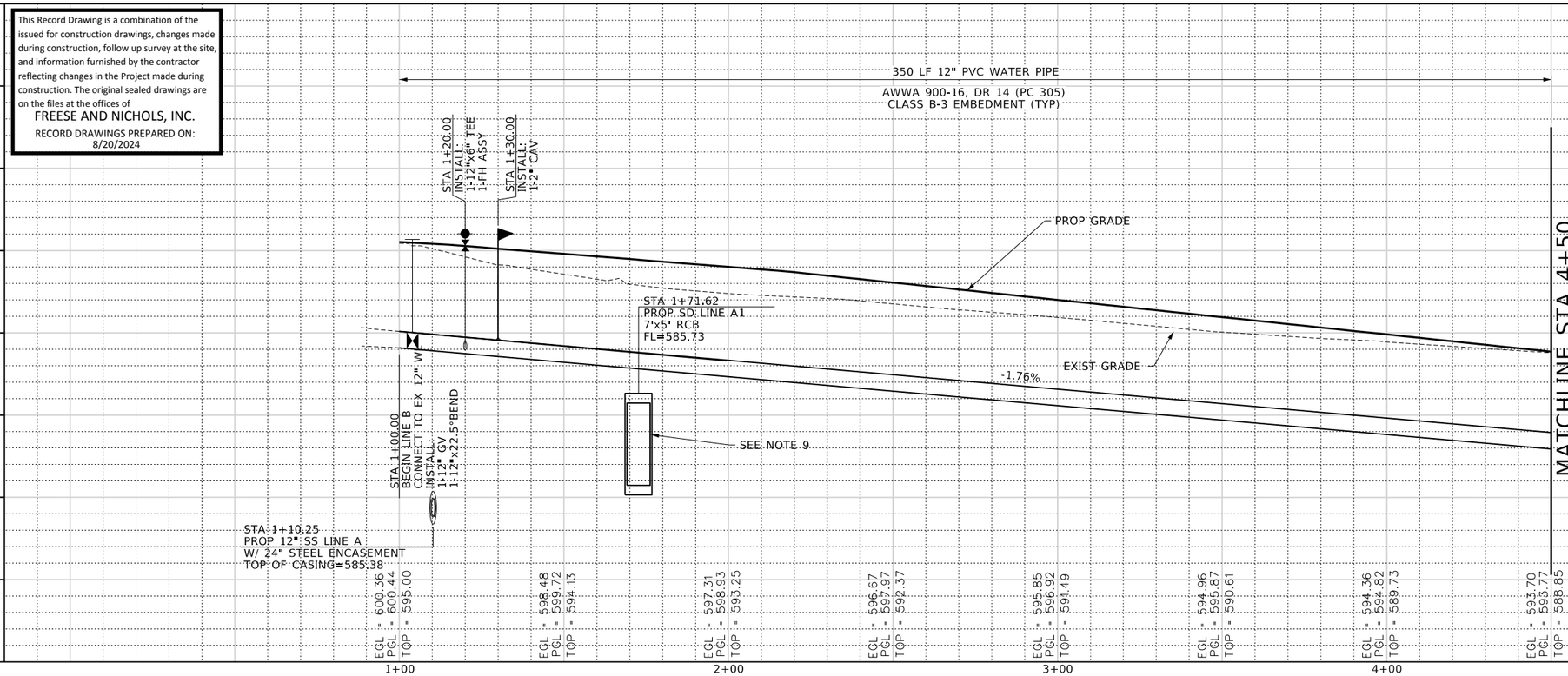
CAUTION!!!
EXISTING UNDERGROUND UTILITIES IN AREA CONTACT UTILITY 48 HOURS PRIOR TO CONSTRUCTION

N

0 10' 20' 40'
HORIZONTAL SCALE

0 2' 4' 8'
VERTICAL SCALE

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024



NOTES:

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2. CONTRACTOR TO FIELD VERIFY LOCATION OF EXISTING WATERLINE PRIOR TO EXCAVATION AND MAINTAIN SERVICE AT ALL TIMES.
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9. CONSTRUCTION OF SD-LINE A TO OCCUR TO INSTALLATION OF WL-B.

PROFILE LEGEND

- PROFILE GRADE LINE
- EXISTING GROUND @ ℄

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASED FOR REVIEW ONLY. NOT INTENDED OR SUITABLE FOR BIDDING, PERMITTING, CONSTRUCTION, OR RECORDING PURPOSES. IT IS NOT AUTHORIZED FOR USE BY OTHERS. IT IS ONLY VALID IF PRINTED BY THE ENGINEER OF RECORD. IT SHALL NOT BE ALTERED WITHOUT THE WRITTEN AUTHORIZATION OF THE ENGINEER OF RECORD.

RELEASED FOR CONSTRUCTION
DOCUMENTS
AUTHORIZED BY MICHAEL R. HAGEN
TEXAS NO. 119555 ON 10/21/2021
IT IS A VIOLATION OF STATE LAW TO ALTER THIS DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone - (214) 217-2200
Fax - (214) 217-2201
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

WATER LINE B
BEGIN TO STA 4+50

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED CEL
DRAWN SJ
REVISED
CHECKED MH
FILE NAME cv-trt-pl-UTIL-WLB-1.dgn

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale accordingly.

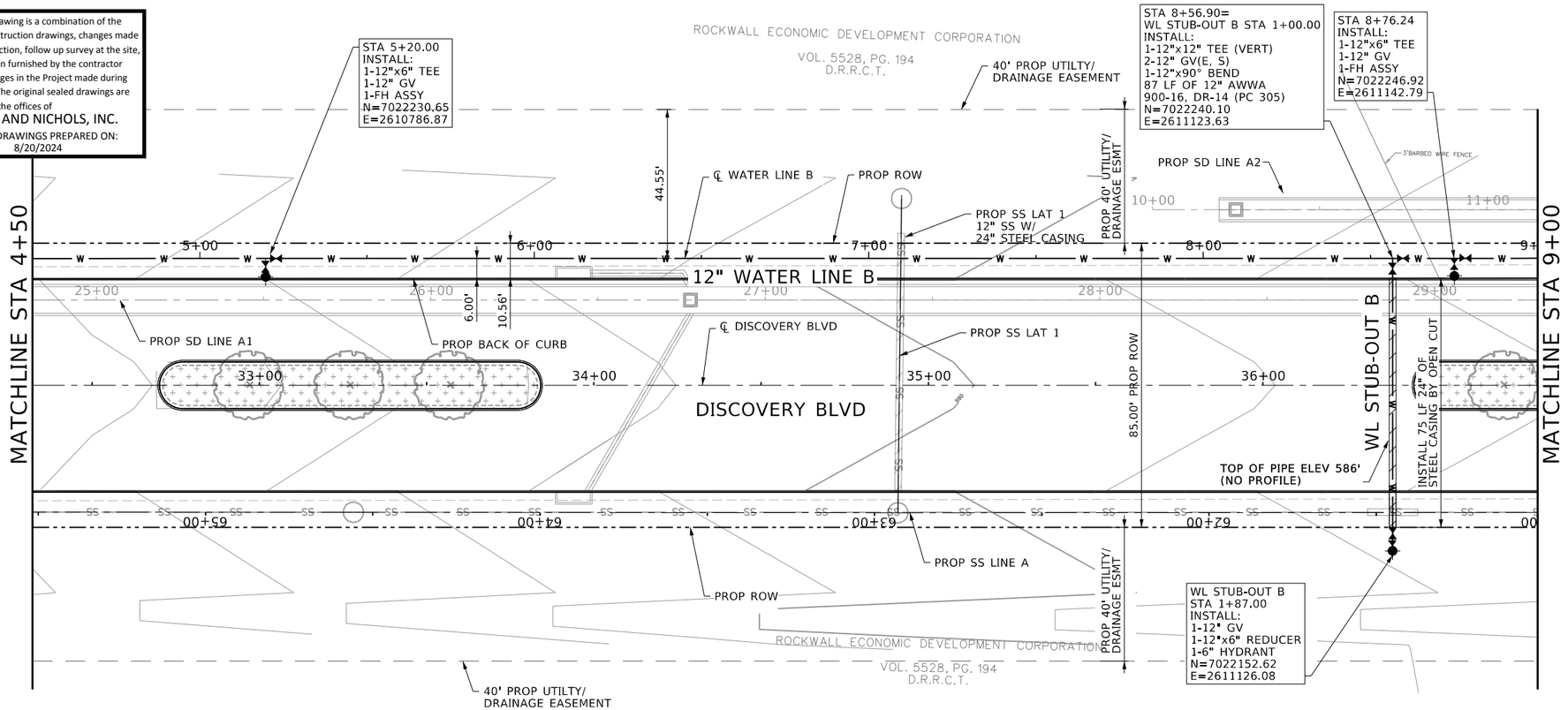
SHEET WLB-1
SEQ. 248

MicroStation V8 User: 90262 Office: On Site
Plotter: \\PLOT01\Xerox_7545PS_MainOffice Model: Default
Plot Scale: 40.087 ' / in. Projects: Freese and Nichols, Inc. - True Type Fonts
Plot Date: Feb. 21, 2024 - 10:01:13 AM

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of

FREESE AND NICHOLS, INC.

RECORD DRAWINGS PREPARED ON: 8/20/2024



LEGEND

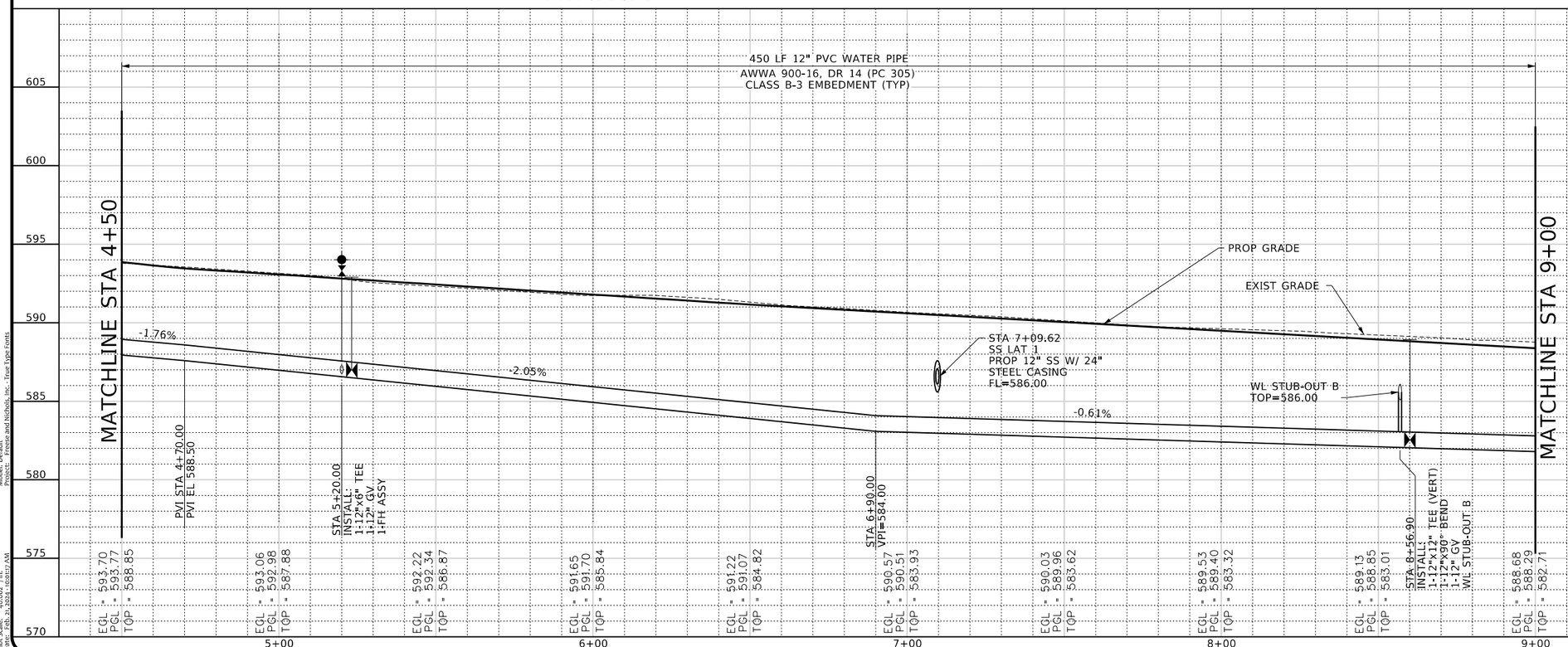
- ISOLATION VALVE (GV/BFV)
- 6" FH ASSEMBLY W/ 6" GV
- COMBINATION AIR-VACUUM VALVE (CAV) TYPE 1
- FIRE HYDRANT
- —W— PROP WATERLINE
- —SS— PROP SANITARY SEWER
- —BW— BLACKLAND WATERLINE

CAUTION!!!
EXISTING UNDERGROUND UTILITIES IN AREA CONTACT UTILITY 48 HOURS PRIOR TO CONSTRUCTION

N

0 10' 20' 40'
HORIZONTAL SCALE

0 2' 4' 8'
VERTICAL SCALE



PROFILE LEGEND

- PROFILE GRADE LINE
- EXISTING GROUND @ ℄

NOTES:

1. CONTRACTOR SHALL VERIFY LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO MANUFACTURING OF PRODUCTS.
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8. BARB WIRE FENCE SHALL BE REMOVED WHERE NECESSARY AND NOT REPLACED.
9. CONSTRUCTION OF SD-LINE A TO OCCUR TO INSTALLATION OF WL-B.

TEXAS REGISTERED ENGINEERING FIRM F-2144

FREESE AND NICHOLS, INC.

RELEASE FOR ORIGINAL UNDER THE AUTHORITY OF MICHAEL R. HAGEN, TEXAS NO. 119555, ON 10/21/2021. IT IS NOT TO BE USED FOR BIDDING PURPOSES. ALTERATIONS TO THIS DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2250
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

WATER LINE B
STA 4+50 TO STA 9+00

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW1971
DATE APRIL 2022
DESIGNED CEL
DRAWN SI
REVISED
CHECKED MH
FILE NAME cv-trt-pl-UTIL-WLB-2.dgn

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET WLB-2

SEQ. 249

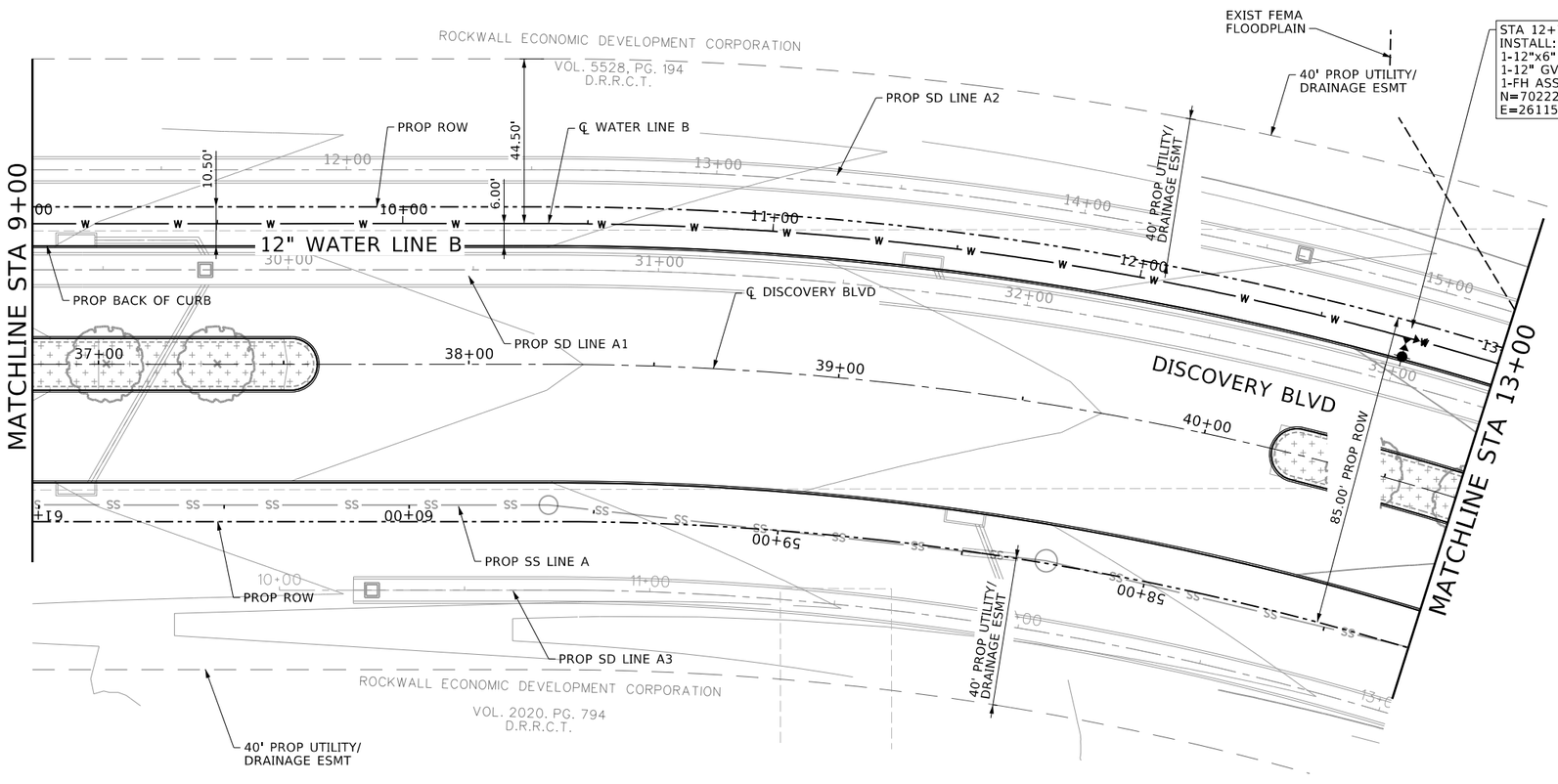
MicroStation V8 User: 90262 Office: On Site
N:\WFU\Drawings\WL\cv-trt-pl-UTIL-WLB-2.dgn
Model: Default
Plotted: Feb. 21, 2024 - 10:01:17 AM by Hagen, Michael R
Plotter: \\Plotter-1\Xerox VersaLink C7020 PS
Plot Scale: 40.00 ' / in.
Date: Feb. 21, 2024 - 10:01:17 AM
Xrefs: Freese and Nichols, Inc - True Type Fonts

Office: On Site Date: Feb. 21, 2024 - 10:01:17 AM User: 90262 File: N:\WFU\Drawings\WL\cv-trt-pl-UTIL-WLB-2.dgn

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of

FREESE AND NICHOLS, INC.

RECORD DRAWINGS PREPARED ON: 8/20/2024



LEGEND

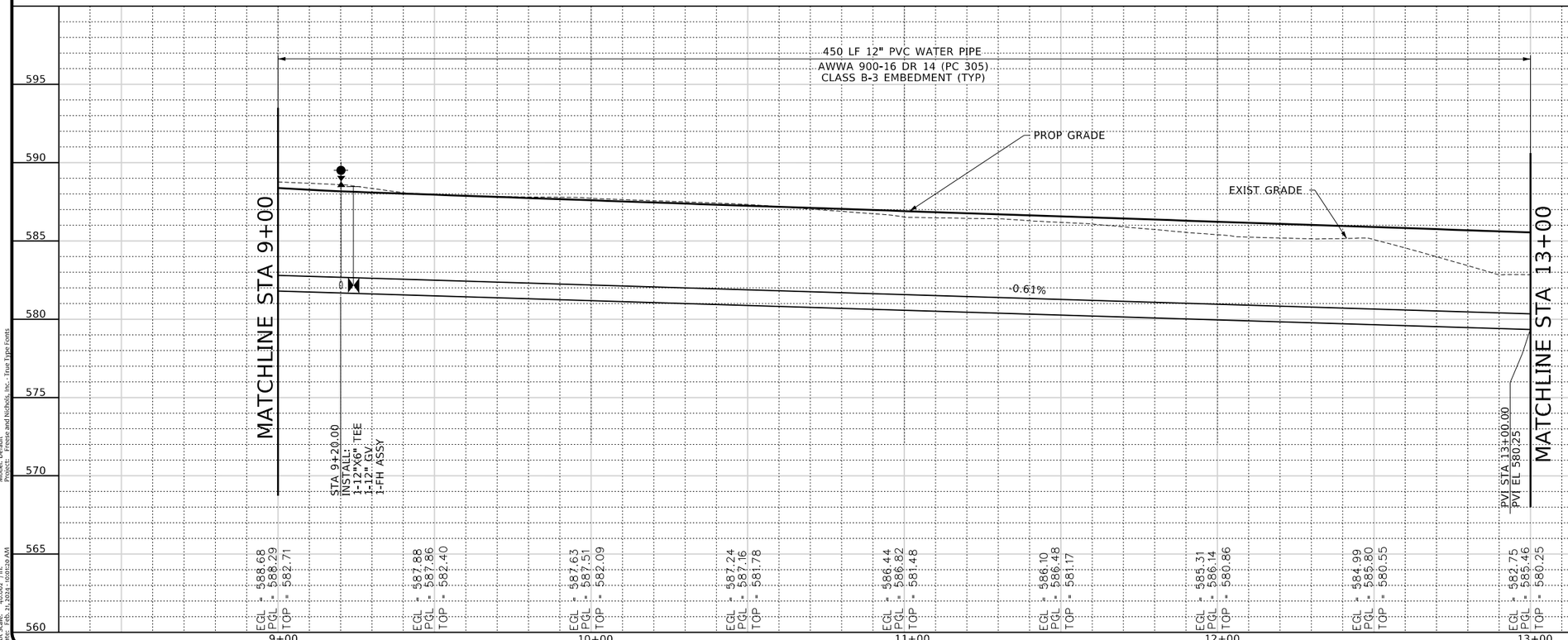
- ISOLATION VALVE (GV/BFV)
- 6" FH ASSEMBLY W/ 6" GV
- COMBINATION AIR-VACUUM VALVE (CAV) TYPE 1
- FIRE HYDRANT
- —W— PROP WATERLINE
- —SS— PROP SANITARY SEWER
- —BW— BLACKLAND WATERLINE

CAUTION!!!
EXISTING UNDERGROUND UTILITIES IN AREA CONTACT UTILITY 48 HOURS PRIOR TO CONSTRUCTION

N

0 10' 20' 40'
HORIZONTAL SCALE

0 2' 4' 8'
VERTICAL SCALE



PROFILE LEGEND

- PROFILE GRADE LINE
- EXISTING GROUND @ ℄

NOTES:

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9. CONSTRUCTION OF SD-LINE A TO OCCUR TO INSTALLATION OF WL-B.

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2201
Web - www.freese.com

RELEASE THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY MICHAEL R. HAGEN TEXAS NO. 113955 ON 10/21/2021 ALTERATION OF A SEALED DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

WATER LINE B
STA 9+00 TO STA 13+00

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED CEL
DRAWN SJ
REVISED
CHECKED MH
FILE NAME cv-trt-pl-UTIL-WLB-3.dgn

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale accordingly.

SHEET WLB-3

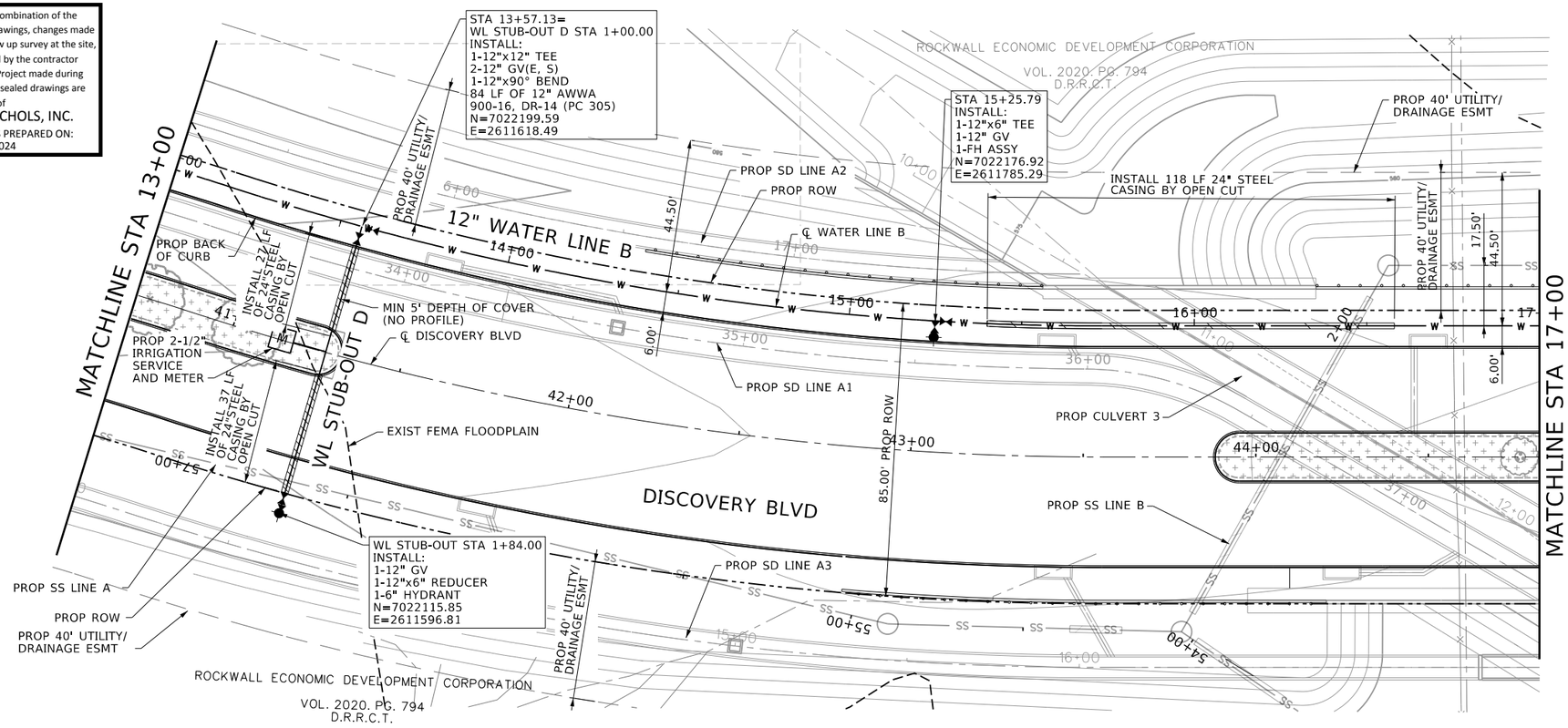
SEQ. 250

MicroStation V8 User: 90262 Office: On Site
Plotter: \\PLOT01\Xerox_7545P Model: Default
Plot Scale: 40.007 ' / in. Plotted: Feb. 21, 2024 - 10:01:20 AM
Data: Feb. 21, 2024 - 10:01:20 AM Projects: Freese and Nichols, Inc. - True Type Fonts
N:\WTU\Drawings\WL\cv-trt-pl-UTIL-WLB-3.dgn

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of

FREESE AND NICHOLS, INC.

RECORD DRAWINGS PREPARED ON: 8/20/2024



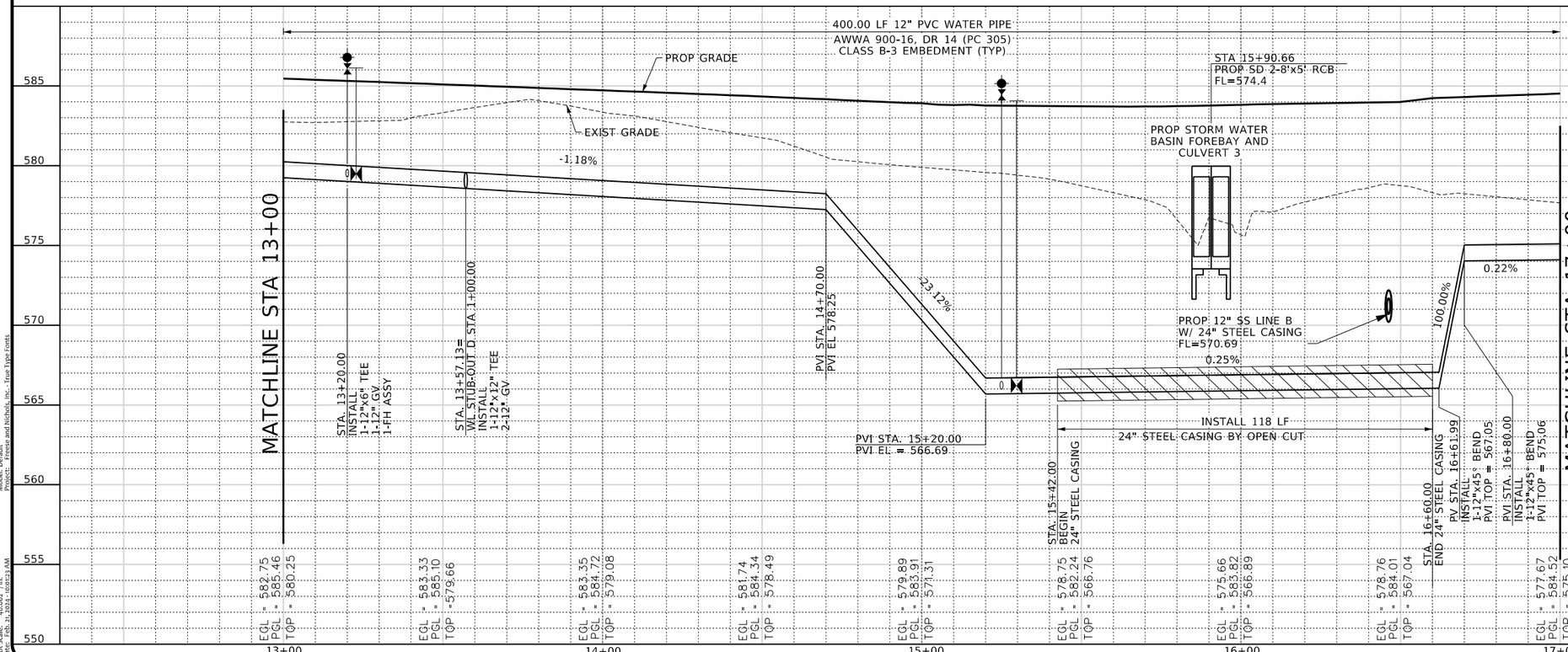
LEGEND

- ISOLATION VALVE (GV/BFV)
- 6" FH ASSEMBLY W/ 6" GV
- COMBINATION AIR-VACUUM VALVE (CAV) TYPE 1
- FIRE HYDRANT
- —W— PROP WATERLINE
- —SS— PROP SANITARY SEWER
- —BW— BLACKLAND WATERLINE

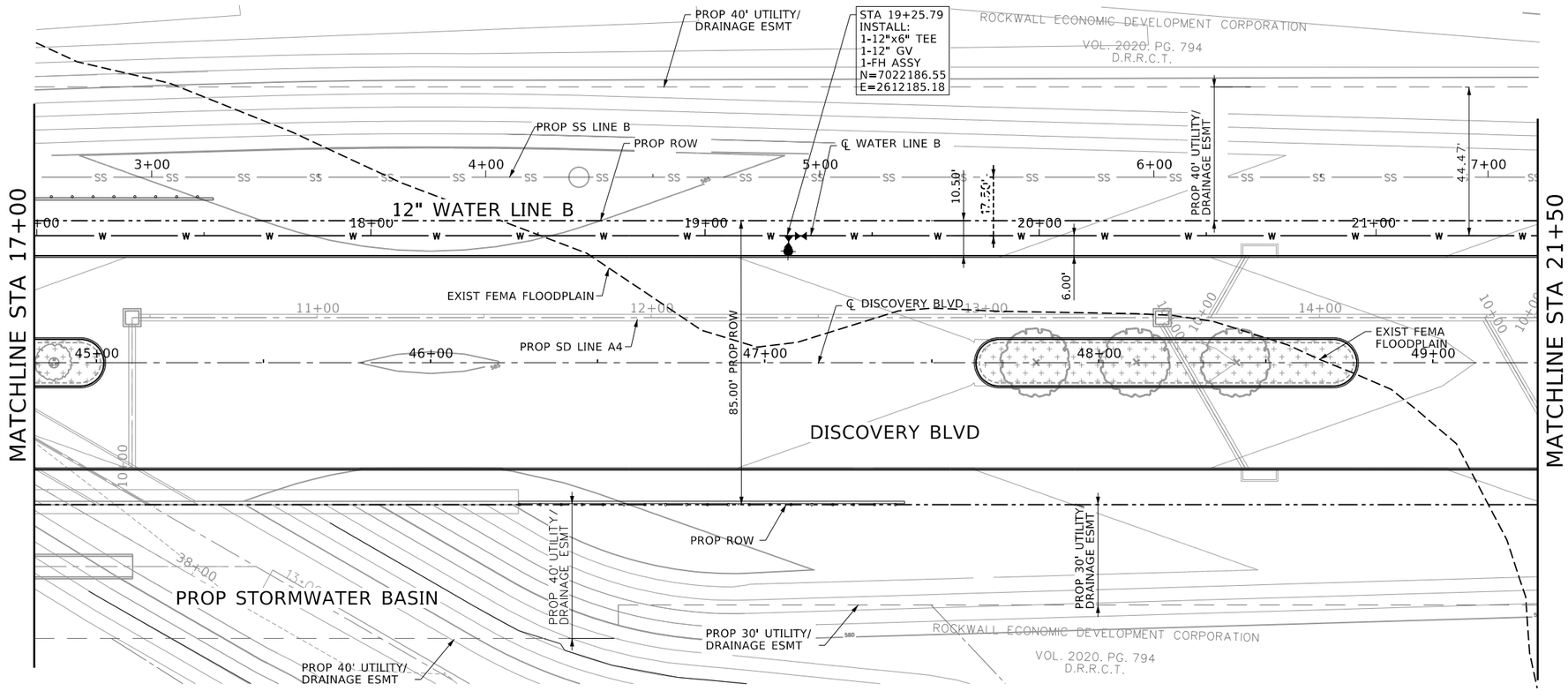
CAUTION!!!
EXISTING UNDERGROUND UTILITIES IN AREA CONTACT UTILITY 48 HOURS PRIOR TO CONSTRUCTION

N

0 10' 20' 40'
HORIZONTAL SCALE
0 2' 4' 8'
VERTICAL SCALE



| | | |



LEGEND

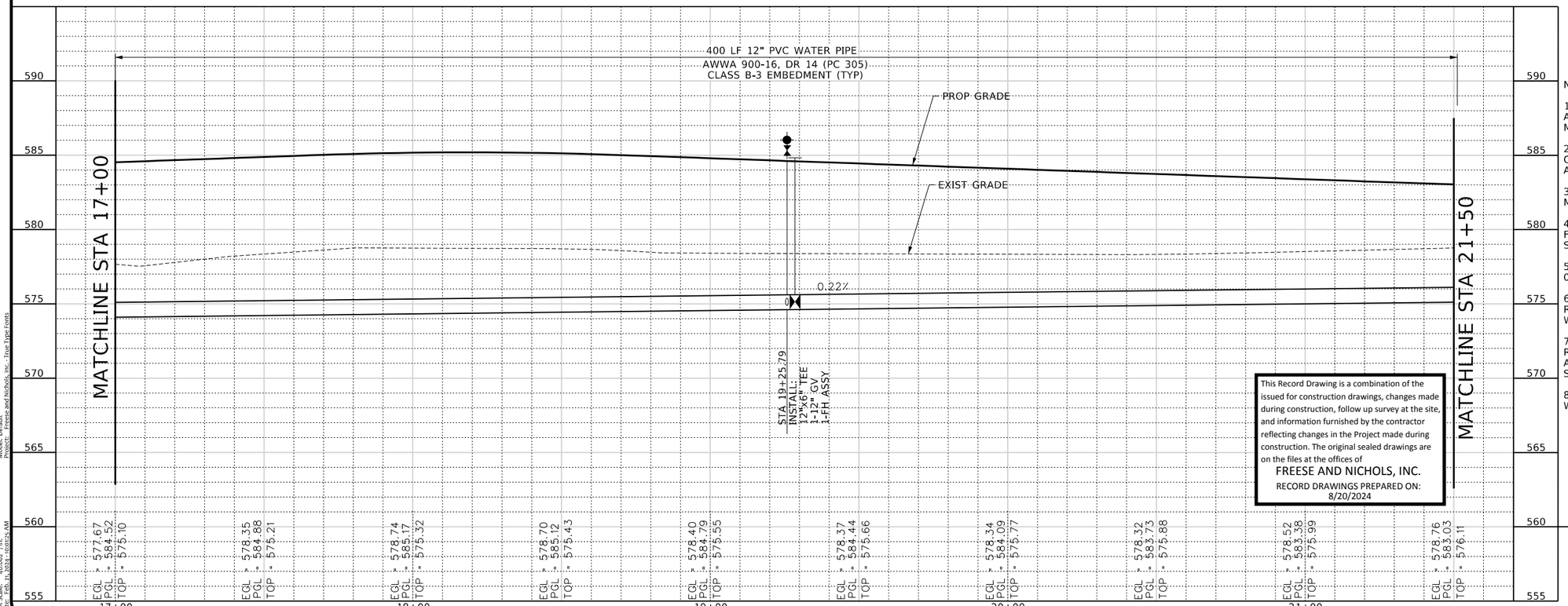
- ISOLATION VALVE (GV/BFV)
- 6" FH ASSEMBLY W/ 6" GV
- COMBINATION AIR-VACUUM VALVE (CAV) TYPE 1
- FIRE HYDRANT
- PROP WATERLINE
- PROP SANITARY SEWER
- BLACKLAND WATERLINE

CAUTION!!!
EXISTING UNDERGROUND UTILITIES IN AREA CONTACT UTILITY 48 HOURS PRIOR TO CONSTRUCTION

N

0 10' 20' 40'
HORIZONTAL SCALE

0 2' 4' 8'
VERTICAL SCALE



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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

NOTES:

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8. BARB WIRE FENCE SHALL BE REMOVED WHERE NECESSARY AND NOT REPLACED.

PROFILE LEGEND

- PROFILE GRADE LINE
- EXISTING GROUND @ ℄

I HEREBY CERTIFY THAT ORIGINALLY DEPOSITED ON THIS DOCUMENT WAS AUTHORIZED BY MICHAEL R. HAGEN TEXAS NO. 113955 ON 10/21/2021
IT IS NOT TO BE USED FOR ANY PURPOSE OR ON ANY PROJECT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144
FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2201
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

WATER LINE B
STA 17+00 TO STA 21+50

F&N JOB NO.	RKW19711		
DATE	APRIL 2022		
DESIGNED	CEL		
DRAWN	SI		
REVISED			
CHECKED	MH		
FILE NAME	cv-trt-pl-UTIL-WLB-5.dgn		

NO.	ISSUES	BY	DATE

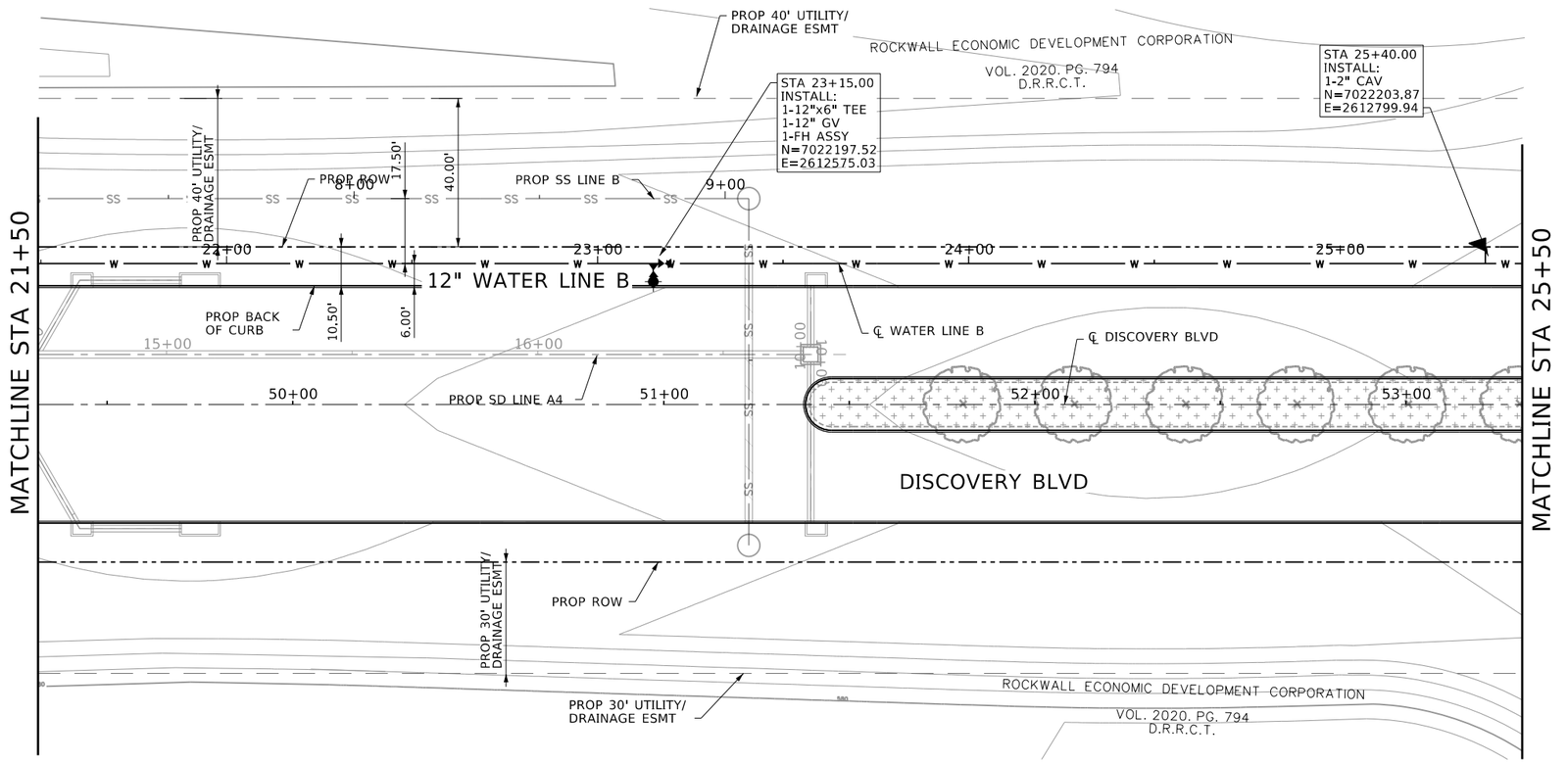
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

0 1"

SHEET WLB-5

SEQ. 252

MicroStation V8 User: 90262 Office: On Site
Platters: N:\WTU\Drawings\WL\cv-trt-pl-UTIL-WLB-5.dgn
Plot Scale: 40.0x0.7 in. = 1.0000 ft. Plot Date: Feb. 21, 2024 - 10:01:25 AM
Model: Default
Process: Freese and Nichols, Inc. - True Type Fonts
Office: On Site Date: Feb. 21, 2024 - 10:01:25 AM User: 90262 File: N:\WTU\Drawings\WL\cv-trt-pl-UTIL-WLB-5.dgn



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FREESE AND NICHOLS, INC.

RECORD DRAWINGS PREPARED ON: 8/20/2024

LEGEND

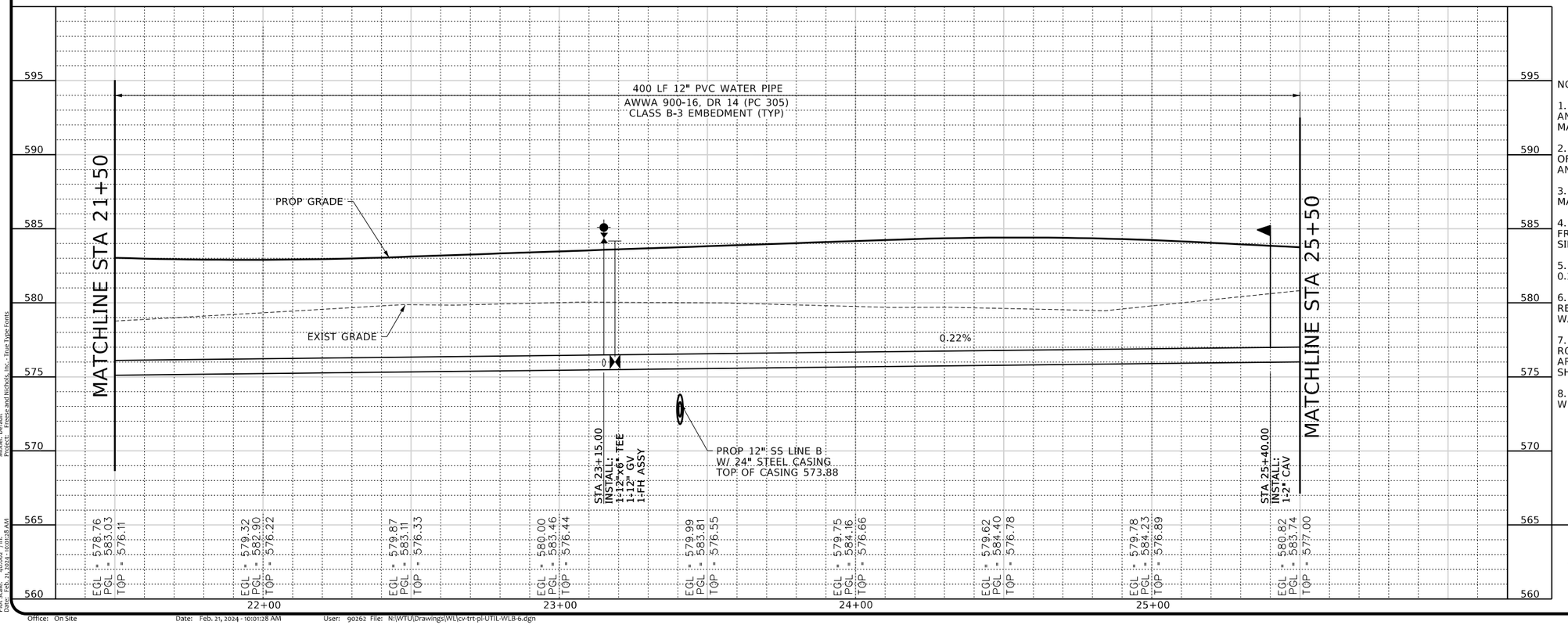
- ISOLATION VALVE (GV/BFV)
- 6" FH ASSEMBLY W/ 6" GV
- COMBINATION AIR-VACUUM VALVE (CAV) TYPE 1
- FIRE HYDRANT
- W — PROP WATERLINE
- SS — PROP SANITARY SEWER
- BW — BLACKLAND WATERLINE

CAUTION!!!
EXISTING UNDERGROUND UTILITIES IN AREA CONTACT UTILITY 48 HOURS PRIOR TO CONSTRUCTION

N

0 10' 20' 40'
HORIZONTAL SCALE

0 2' 4' 8'
VERTICAL SCALE



NOTES:

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PROFILE LEGEND

- PROFILE GRADE LINE
- EXISTING GROUND @ ℄

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2211
Web - www.freese.com

RELEASED FOR THE PURPOSES OF INTERIM REVIEW UNDER THE AUTHORITY OF MICHAEL R. HAGEN TEXAS NO. 119055 ON 10/21/2021 IT IS NOT TO BE USED FOR BIDDING OR PERMIT PURPOSES. ALTERATION OF THIS DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

WATER LINE B
STA 21+50 TO STA 25+50

NO.	ISSUES	BY	DATE

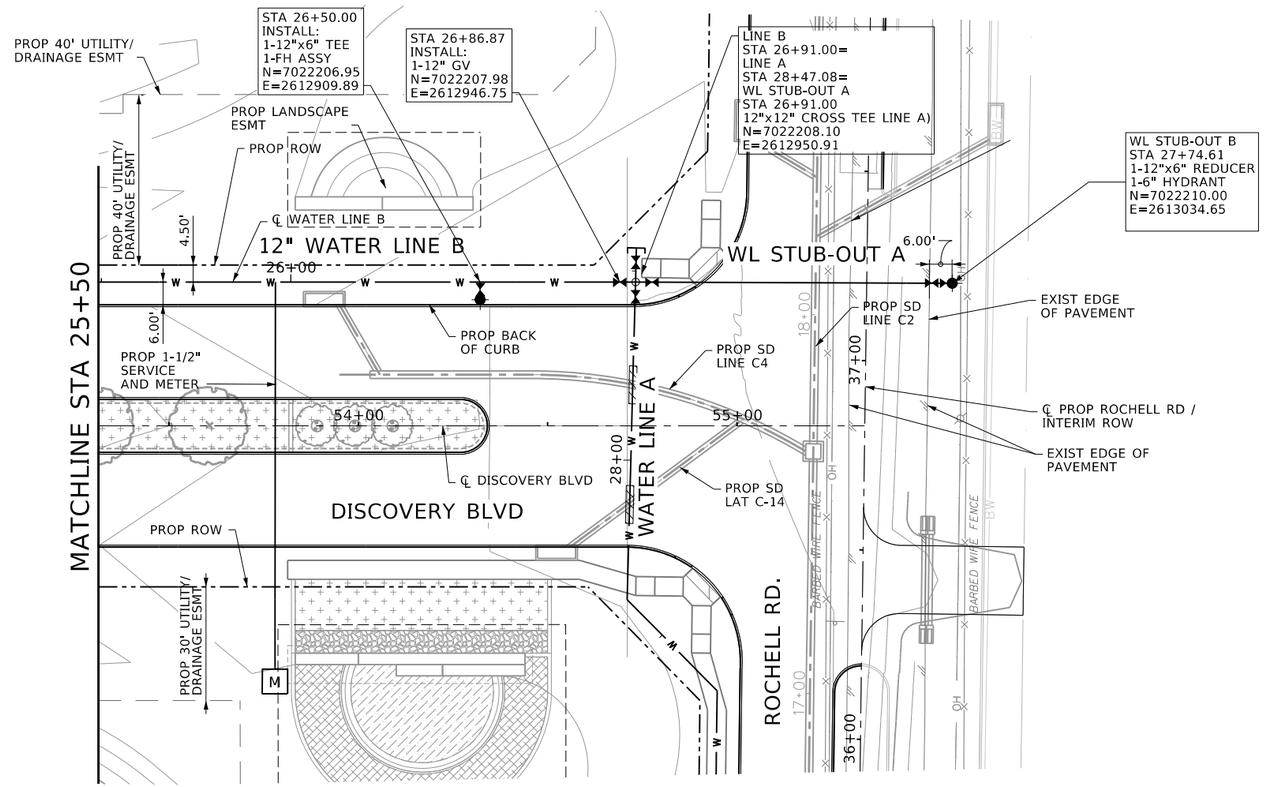
F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED CEL
DRAWN SL
REVISED
CHECKED MH
FILE NAME cv-trt-pl-UTIL-WLB-6.dgn

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale accordingly.

SHEET WLB-6

SEQ. 253

MicroStation V8 User: 90262 Office: On Site
Plotter: \\PLOT01\Xerox 7855 PS Plot By: Mike Hagen
Plot Scale: 40.00 ' / in.
Plot Date: Feb. 21, 2024 - 10:01:28 AM
Model: Default
Xrefs: Freese and Nichols, Inc. True Type Fonts
Office: On Site
Date: Feb. 21, 2024 - 10:01:28 AM
User: 90262 File: N:\WTU\Drawings\WL\cv-trt-pl-UTIL-WLB-6.dgn



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FREESE AND NICHOLS, INC.

RECORD DRAWINGS PREPARED ON: 8/20/2024

LEGEND

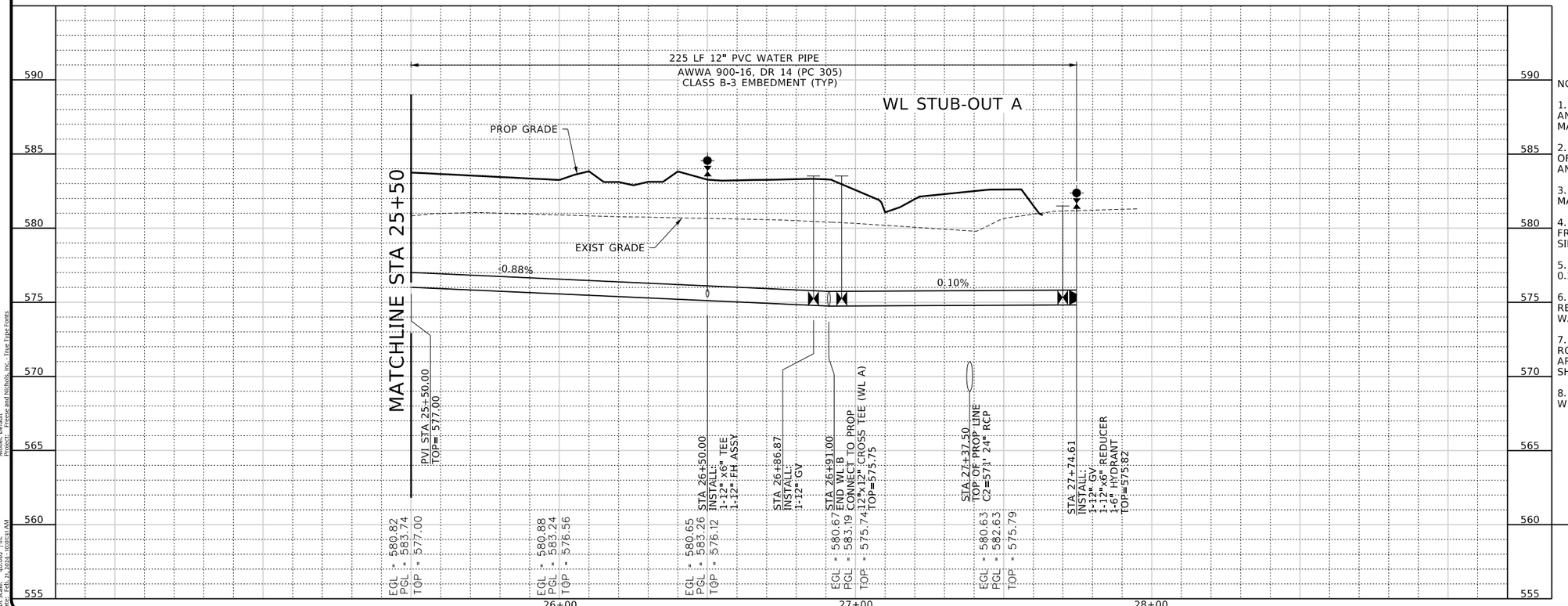
- ISOLATION VALVE (GV/BFV)
- 6" FH ASSEMBLY W/ 6" GV
- COMBINATION AIR-VACUUM VALVE (CAV) TYPE 1
- FIRE HYDRANT
- W — PROP WATERLINE
- SS — PROP SANITARY SEWER
- BW — BLACKLAND WATERLINE

CAUTION!!!
EXISTING UNDERGROUND UTILITIES IN AREA CONTACT UTILITY 48 HOURS PRIOR TO CONSTRUCTION

N

0 10' 20' 40'
HORIZONTAL SCALE

0 2' 4' 8'
VERTICAL SCALE



NOTES:

1. CONTRACTOR SHALL VERIFY LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO MANUFACTURING OF PRODUCTS.
2. CONTRACTOR TO FIELD VERIFY LOCATION OF EXISTING WATERLINE PRIOR TO EXCAVATION AND MAINTAIN SERVICE AT ALL TIMES.
3. DEFLECTED JOINTS TO BE AT 75% OF PIPE MANUFACTURER RECOMMENDATIONS.
4. ALL FIRE HYDRANTS SHALL BE PLACED 3FT FROM BACK OF FUTURE CURB TO AVOID FUTURE SIDEWALK CONSTRUCTION.
5. STEEL CASING SHALL HAVE THICKNESS OF 0.25 INCHES.
6. POWER POLES AND OHE ARE TO BE RELOCATED PRIOR TO WATER AND WASTEWATER PIPELINE CONSTRUCTION.
7. CONTRACTOR TO REFERENCE PROPOSED ROADWAY, STORMWATER, LANDSCAPE ARCHITECTURE AND OTHER IMPROVEMENT SHEETS FOR ADDITIONAL INFORMATION.
8. BARB WIRE FENCE SHALL BE REMOVED WHERE NECESSARY AND NOT REPLACED.

PROFILE LEGEND

- PROFILE GRADE LINE
- EXISTING GROUND @ ℄

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2211
Web - www.freese.com

RELEASE FOR REVIEW
THIS DOCUMENT WAS PREPARED UNDER THE AUTHORITY OF MICHAEL R. HAGEN, TEXAS NO. 119555, ON 10/21/2021. IT IS NOT TO BE USED FOR BIDDING, PERMITTING, OR CONSTRUCTION PURPOSES.

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

WATER LINE B
STA 25+50 TO END

NO.	ISSUES	BY	DATE

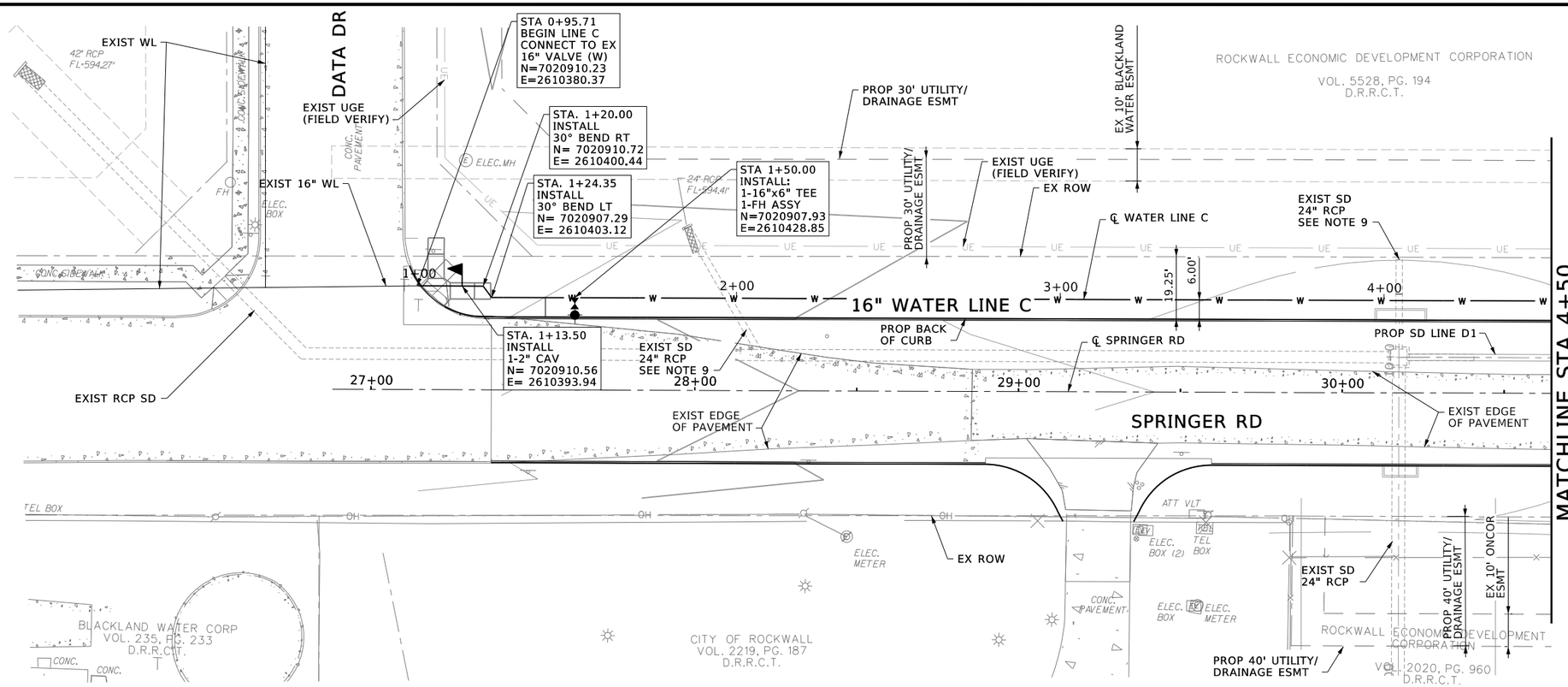
F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED CEL
DRAWN SJ
REVISED
CHECKED MH
FILE NAME cv-trt-pl-UTIL-WLB-7.dgn

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET WLB-7

SEQ. 254

MicroStation V8 User: 90262 Office: On Site
Plotter: \\PLOT01\Xerox_EX8254_Plot01 Model: Default
Plot Scale: 40.087 ' / in. Project: Freese and Nichols, Inc. True Type Fonts
Date: Feb. 21, 2024 - 10:01:31 AM
Office: On Site Date: Feb. 21, 2024 - 10:01:31 AM User: 90262 File: N:\WTU\Drawings\WL\cv-trt-pl-UTIL-WLB-7.dgn



LEGEND

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- COMBINATION AIR-VACUUM VALVE (CAV) TYPE 1
- FIRE HYDRANT
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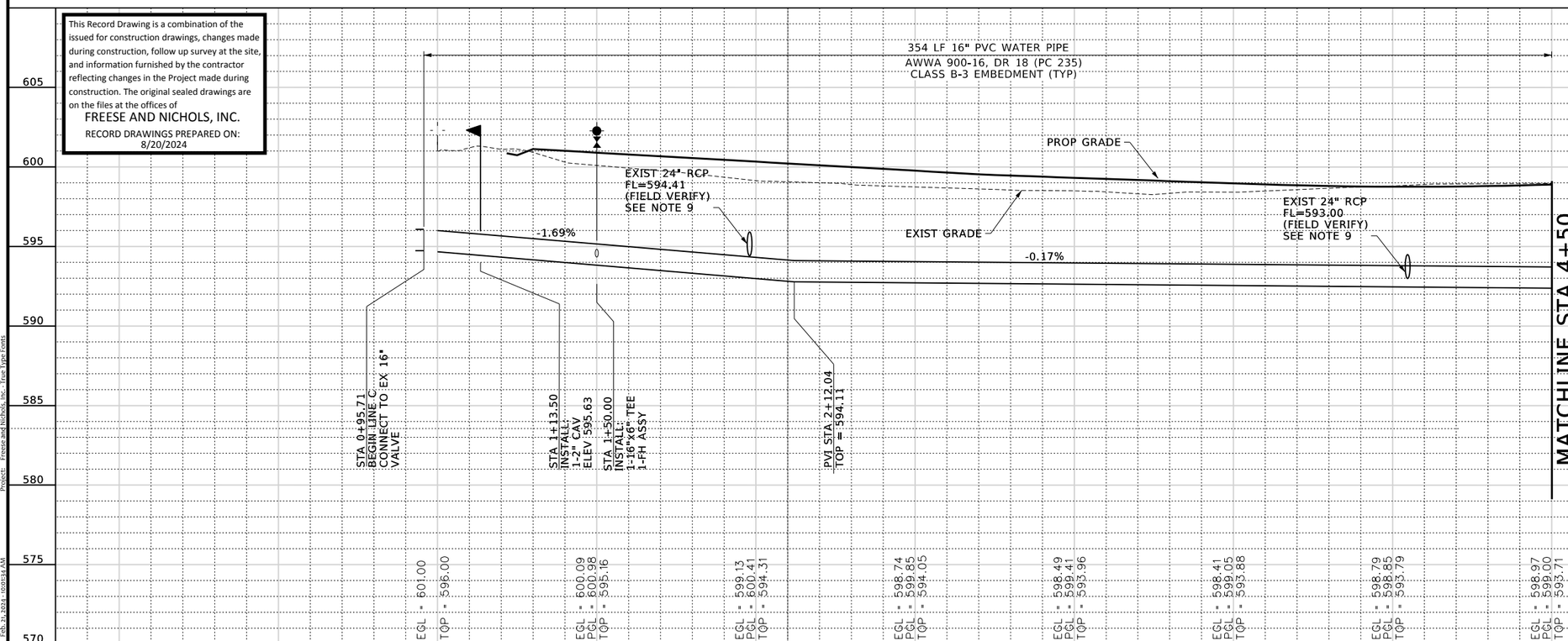
- —SS— PROP SANITARY SEWER
- —BW— BLACKLAND WATERLINE

CAUTION!!!
EXISTING UNDERGROUND UTILITIES IN AREA CONTACT UTILITY 48 HOURS PRIOR TO CONSTRUCTION

N

0 10' 20' 40'
HORIZONTAL SCALE

0 2' 4' 8'
VERTICAL SCALE



PROFILE LEGEND

- PROFILE GRADE LINE
- EXISTING GROUND @ ℄

NOTES:

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8. BARB WIRE FENCE SHALL BE REMOVED WHERE NECESSARY AND NOT REPLACED.
9. EXISTING STORM PIPE TO BE REMOVED PRIOR TO CONSTRUCTION OF WL-C.

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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Fax: (214) 217-2211
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

WATER LINE C
BEGIN TO STA 4+50

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED CEL
DRAWN SI
REVISED
CHECKED MH
FILE NAME cv-trt-pl-UTIL-WLC-1.dgn

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale accordingly.

SHEET WLC-1

SEQ. 255

MicroStation V8 User: 90262 Office: On Site
Plotter: \\PMOTX01\Xerox_AltaLink_C8070 Model: Default
Plot Scale: 40.002 ' / in. Project: Freese and Nichols, Inc. - True Type Fonts
Date: Feb. 21, 2024 - 10:01:34 AM

Office: On Site Date: Feb. 21, 2024 - 10:01:34 AM User: 90262 File: N:\WTU\Drawings\WL\cv-trt-pl-UTIL-WLC-1.dgn

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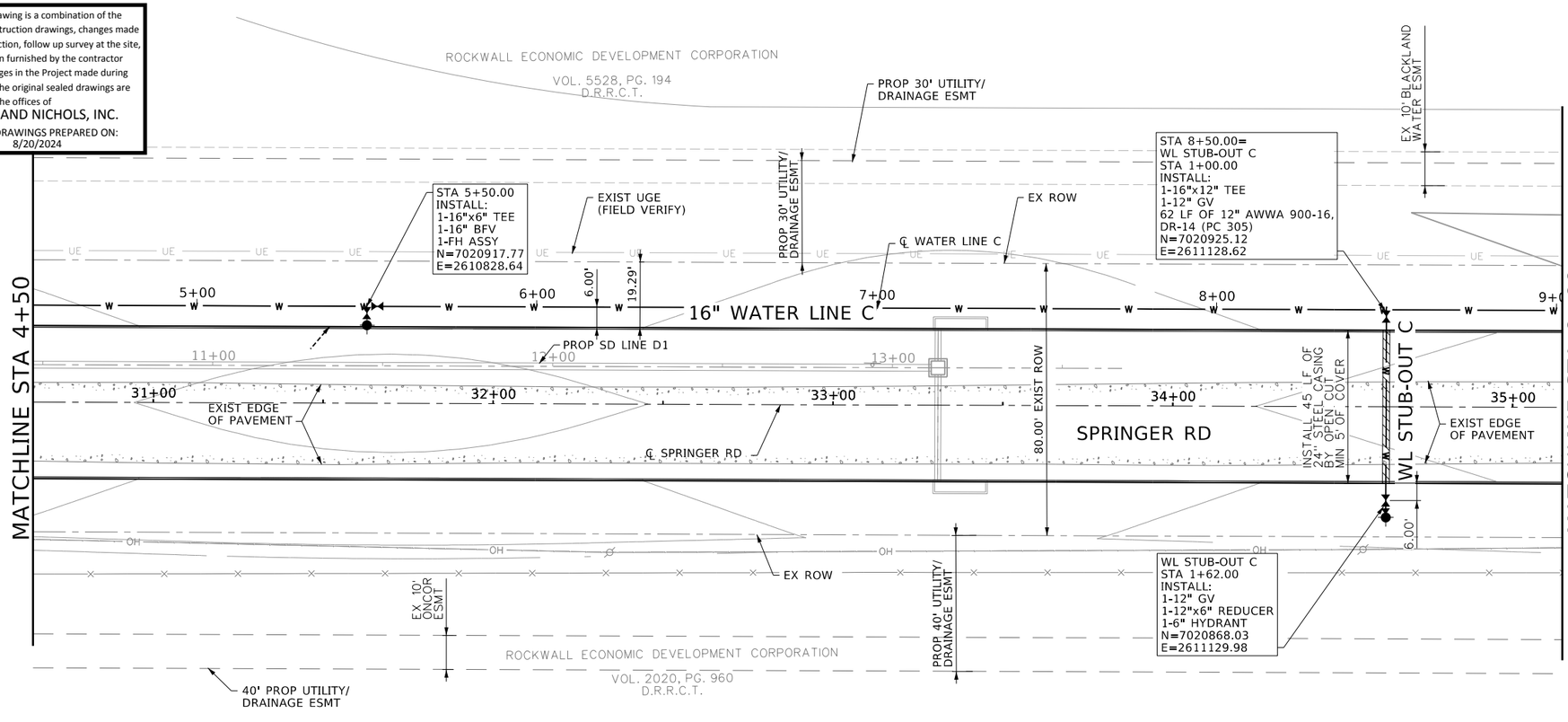
FREESE AND NICHOLS, INC.

RECORD DRAWINGS PREPARED ON: 8/20/2024



LEGEND

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- FIRE HYDRANT
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- —SS— PROP SANITARY SEWER
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CAUTION!!!
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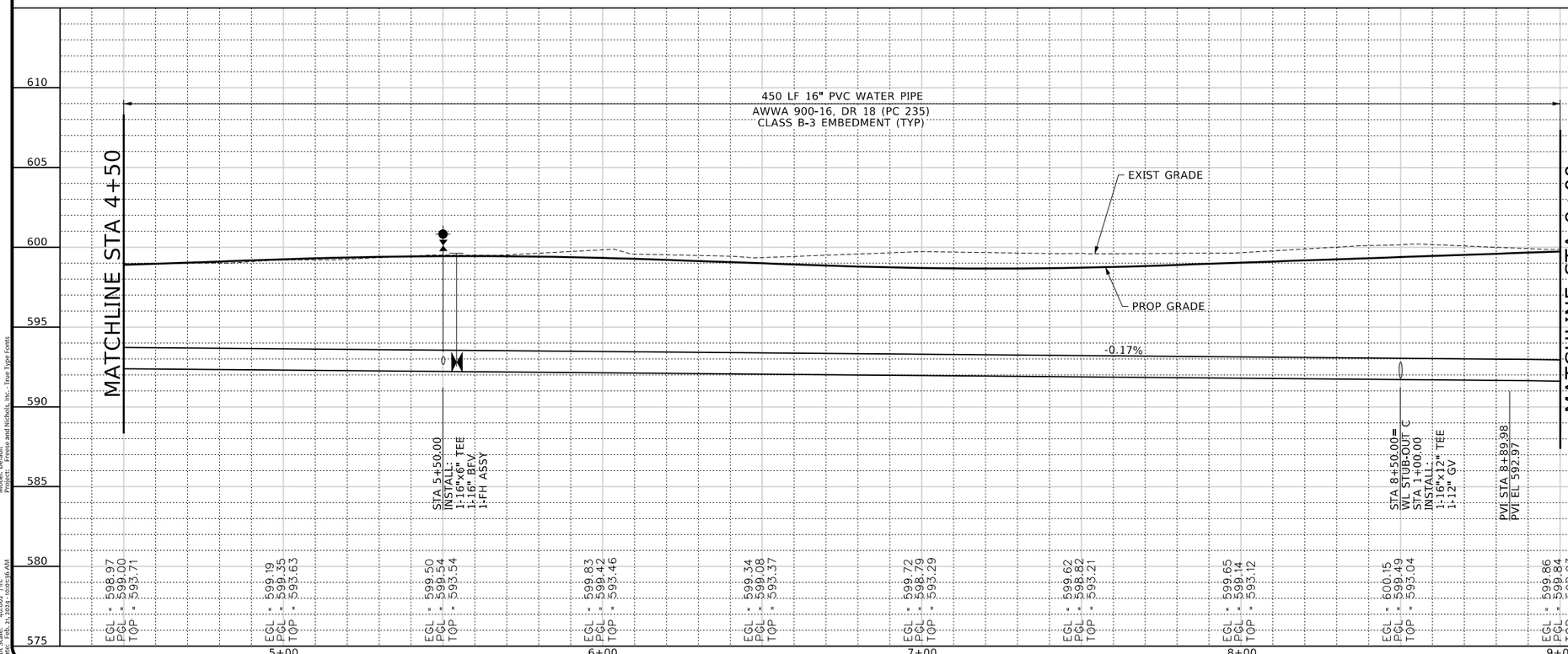
N

0 10' 20' 40'
HORIZONTAL SCALE

0 2' 4' 8'
VERTICAL SCALE



PROFILE LEGEND

- PROFILE GRADE LINE
- EXISTING GROUND @ ℄

NOTES:

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FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

I HEREBY STATE THAT ORIGINALLY SEALED ON THIS DOCUMENT WAS AUTHORIZED BY MICHAEL R. HAGEN
TEXAS NO. 119555 ON 10/21/2021
IT IS UNLAWFUL FOR ANY PERSON TO USE THIS DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

WATER LINE C
STA 4+50 TO STA 9+00

NO.	ISSUES	BY	DATE

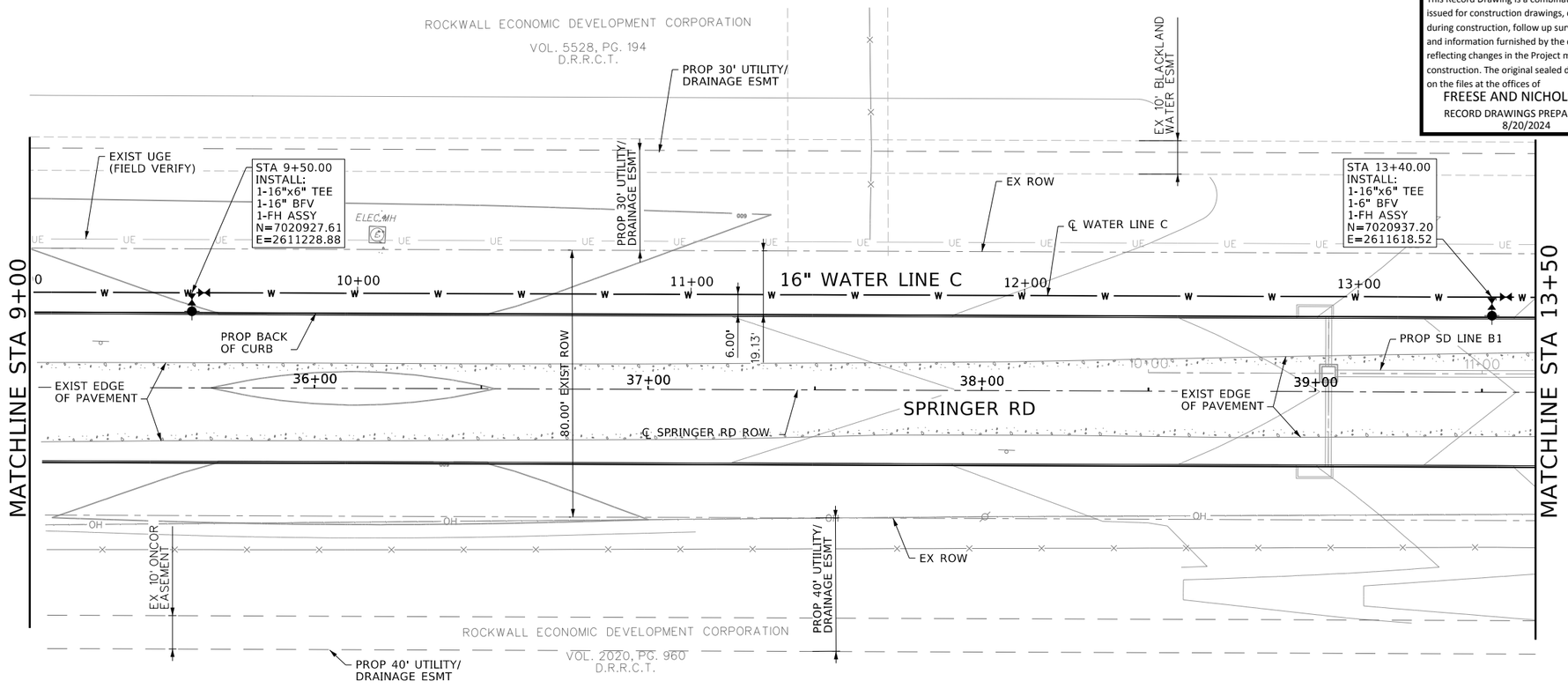
F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED CEL
DRAWN SI
REVISED
CHECKED MH
FILE NAME cv-trt-pl-UTIL-WLC-2.dgn

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale accordingly.

SHEET WLC-2

SEQ. 256

MicroStation V8 User: 90262 Office: On Site
Plotter: \\PLOTTER\Xerox_AltaLink_C8130_PCL6 Model: Default
Plot Scale: 40.002 ' / in. Projects: Freese and Nichols, Inc. - True Type Fonts
Date: Feb. 21, 2024 - 10:01:36 AM
Office: On Site Date: Feb. 21, 2024 - 10:01:36 AM User: 90262 File: N:\WTU\Drawings\WL\cv-trt-pl-UTIL-WLC-2.dgn



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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

LEGEND

- ISOLATION VALVE (GV/BFV)
- 6" FH ASSEMBLY W/ 6" GV
- COMBINATION AIR-VACUUM VALVE (CAV) TYPE 1
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- W — PROP WATERLINE
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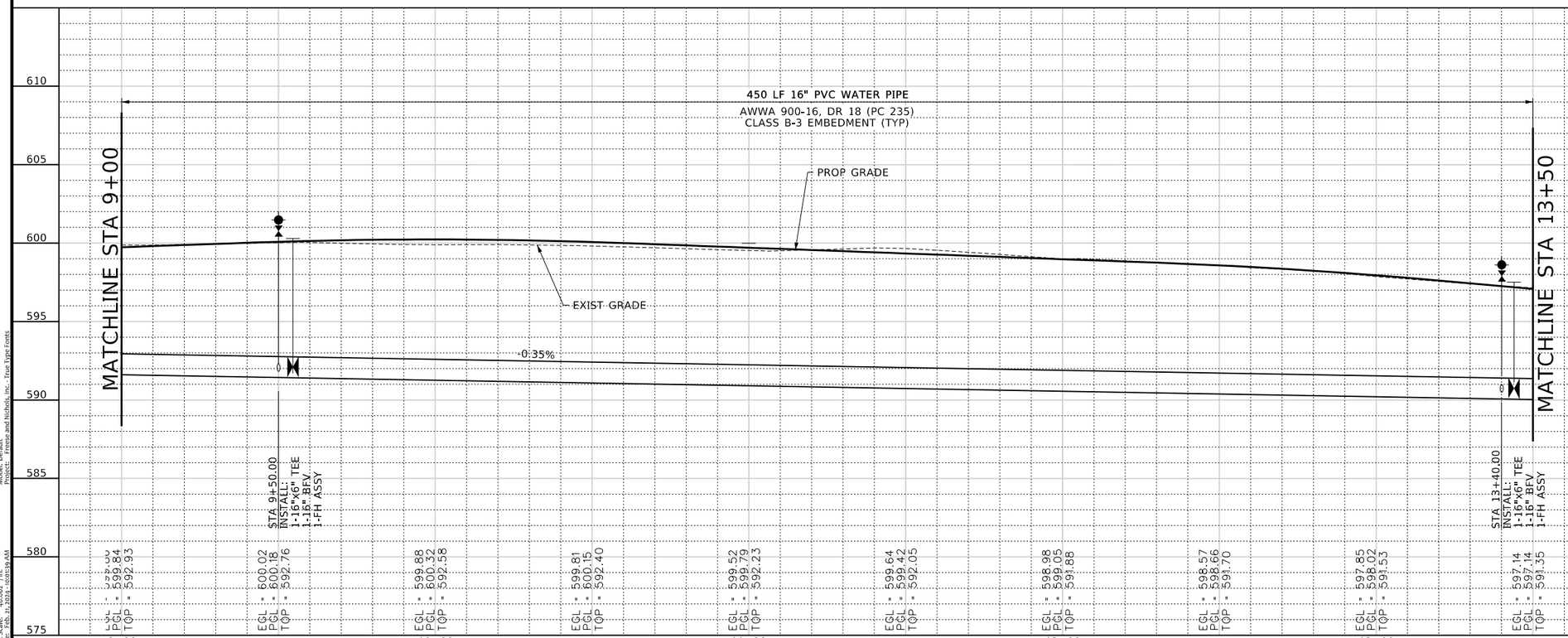
CAUTION!!!
EXISTING UNDERGROUND UTILITIES IN AREA CONTACT UTILITY 48 HOURS PRIOR TO CONSTRUCTION

N

0 10' 20' 40'
HORIZONTAL SCALE

0 2' 4' 8'
VERTICAL SCALE



PROFILE LEGEND

- PROFILE GRADE LINE
- EXISTING GROUND @ ℄

NOTES:

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FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2211
Web - www.freese.com

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TEXAS NO. 113955 ON 10/21/2021
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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

WATER LINE C
STA 9+00 TO STA 13+50

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED CEL
DRAWN SI
REVISED
CHECKED MH
FILE NAME cv-trt-pl-UTIL-WLC-3.dgn

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET WLC-3
SEQ. 257

MicroStation V8 User: 90262 Office: On Site
Plotter: \\FNHOU01\Plotter_HP_DesignJet_T1700_PostScript
Plot Scale: 40.027 ' / in.
Plot Date: Feb. 21, 2024 - 10:01:39 AM
Model: Default
Models: Freese and Nichols, Inc. - True Type Fonts

Office: On Site Date: Feb. 21, 2024 - 10:01:39 AM User: 90262 File: N:\WTU\Drawings\WL\cv-trt-pl-UTIL-WLC-3.dgn

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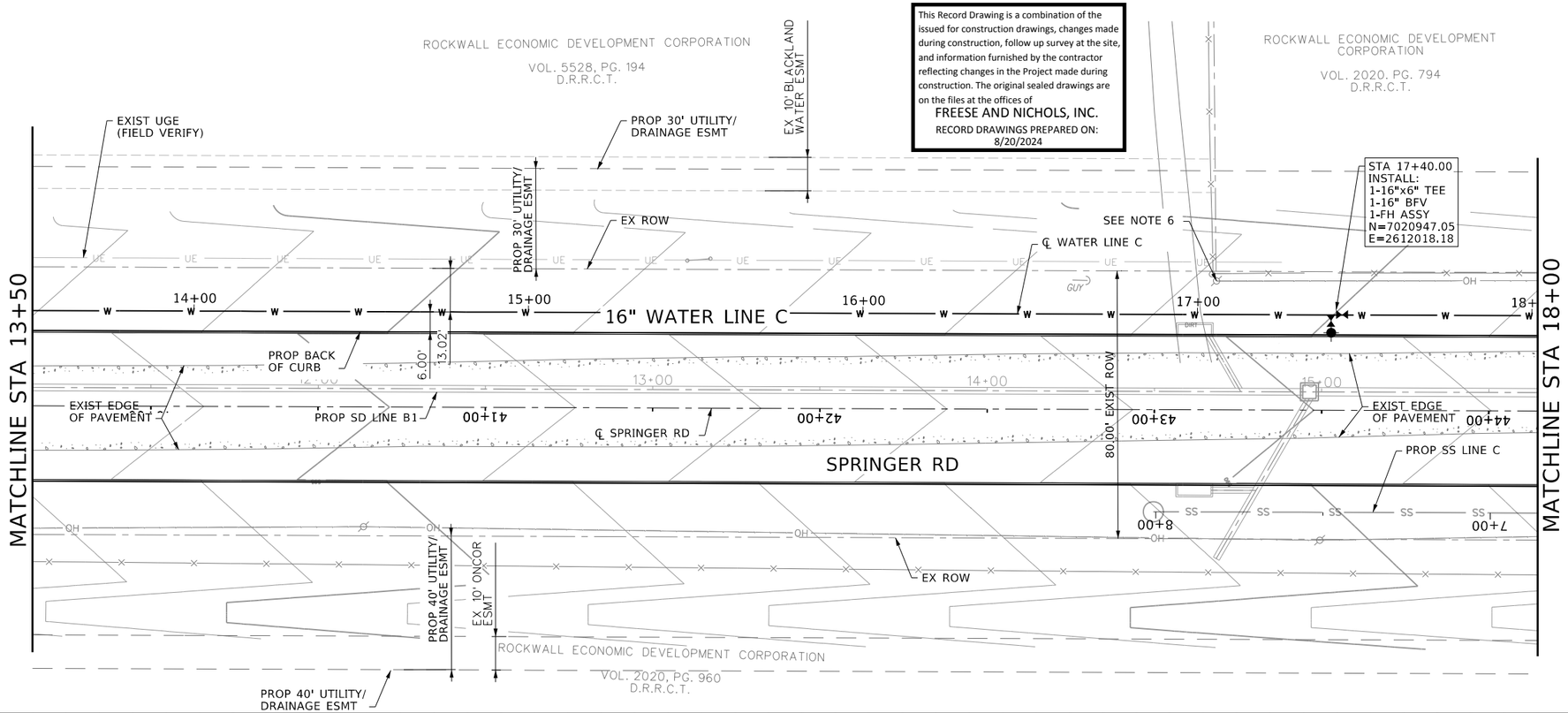
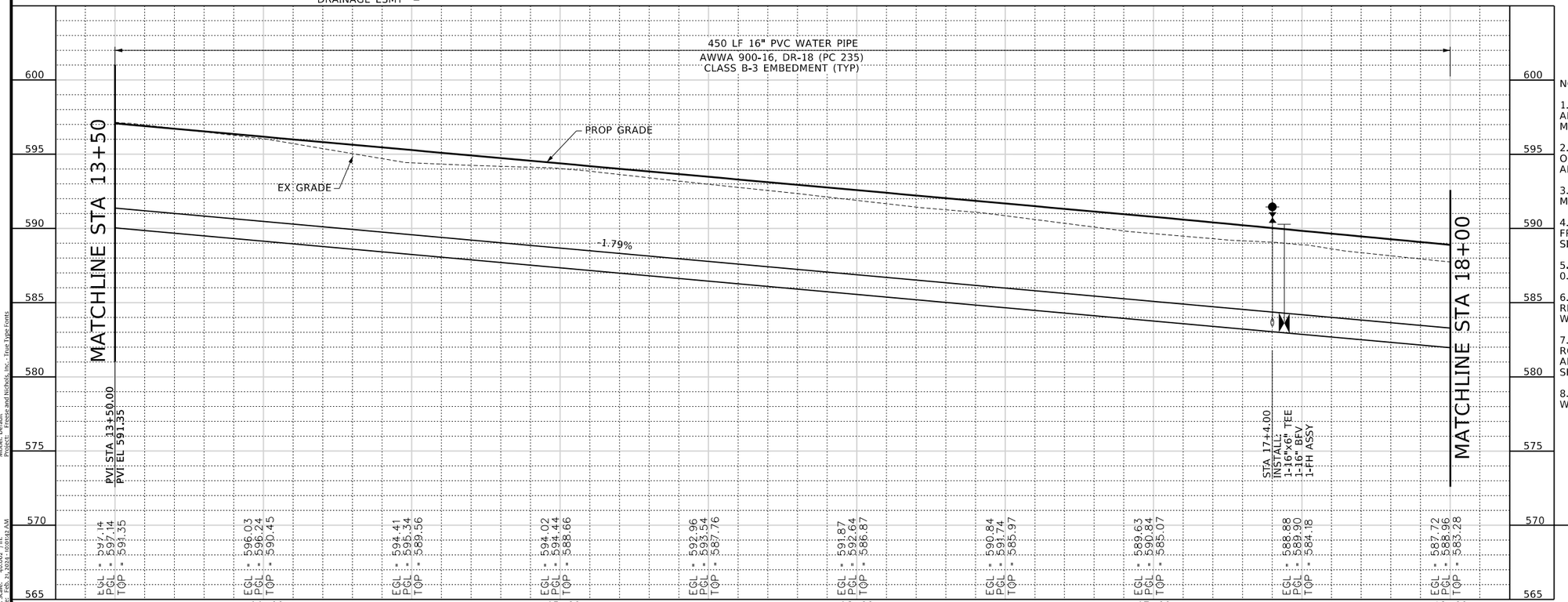
RECORD DRAWINGS PREPARED ON: 8/20/2024





LEGEND

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- —SS— PROP SANITARY SEWER
- —BW— BLACKLAND WATERLINE

CAUTION!!!
EXISTING UNDERGROUND UTILITIES IN AREA CONTACT UTILITY 48 HOURS PRIOR TO CONSTRUCTION

N

0 10' 20' 40'
HORIZONTAL SCALE

0 2' 4' 8'
VERTICAL SCALE

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PROFILE LEGEND

- PROFILE GRADE LINE
- EXISTING GROUND @ ℄

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASED FOR REVIEW ONLY. NOT INTENDED OR SUITABLE FOR BIDDING, PERMITTING OR CONSTRUCTION PURPOSES. IT WAS PREPARED BY OR UNDER THE SUPERVISION OF MICHAEL R. HAGEN, TEXAS NO. 119555, ON 10/21/2021. RELEASED FOR THE PURPOSES STATED HEREON BY MICHAEL R. HAGEN, TEXAS NO. 119555, ON 10/21/2021. IT IS NOT TO BE USED FOR ANY PURPOSE OTHER THAN THOSE STATED WITHIN A SPECIFIC, DATED AND SIGNED PROJECT OR PURPOSE DESCRIPTION. ITS USE FOR ANY OTHER PURPOSE IS AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO FREESE AND NICHOLS, INC. THIS DOCUMENT WAS ORIGINALLY ISSUED ON 10/21/2021 AND SHOULD NOT BE RELIED UPON IF FOUND TO BE IN ELECTRONIC FORM OR ANY PRINTED COPY MADE FROM AN ELECTRONIC FORM AFTER THAT DATE. ANY MODIFICATION OF THE DOCUMENT BY ANYONE OTHER THAN THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

WATER LINE C
STA 13+50 TO STA 18+00

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED CEL
DRAWN SI
REVISED
CHECKED MH
FILE NAME cv-trt-pl-UTIL-WLC-4.dgn

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale accordingly.

SHEET WLC-4
SEQ. 258

MicroStation V8 User: 90262 Office: On Site
Plotter: \\PLOTTER\Xerox 7855/75PS_PostScript_Mono.ppd
Plot Scale: 40.002 ' / in.
Date: Feb. 21, 2024 - 10:01:42 AM
Model: Default
Models: Freese and Nichols, Inc. - True Type Fonts
Office: On Site
Date: Feb. 21, 2024 - 10:01:42 AM
User: 90262 File: N:\WTU\Drawings\WL\cv-trt-pl-UTIL-WLC-4.dgn

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FREESE AND NICHOLS, INC.

RECORD DRAWINGS PREPARED ON: 8/20/2024

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
VOL. 2020, PG. 794
D.R.R.C.T.

STA 20+63.64=
WL STUB-OUT E
INSTALL:
1-16"x12" TEE
1-16" BFV (E)
1-12: GV (S)
69 LF OF 12" AWWA 900-16
DR-14 (PC 305)
N=7020955.03
E=2612343.18

STA 21+40.00
INSTALL:
1-16"x6" TEE
1-16" BFV
1-FH ASSY
N=7020956.85
E=2612418.16

INSTALL 40 LF OF 24" STEEL CASING BY OPEN CUT

PROP 30' UTILITY/ DRAINAGE ESMT

SEE NOTE 6

MATCHLINE STA 18+00

℄ WATER LINE C

EX ROW

18.89'

12.89'

6.00'

80.00' EXIST ROW

EXIST EDGE OF PAVEMENT

16" WATER LINE C

WL STUB-OUT E

INSTALL 45° LF OF 24" STEEL CASING BY OPEN CUT

PROP SD LINE B1

SPRINGER RD

℄ SPRINGER RD

MIN DEPTH OF COVER 5' (NO PROFILE)

PROP SS LINE C

PROP CULVERT 2

EXIST EDGE OF PAVEMENT

80.00' EXIST ROW

MATCHLINE STA 22+50

EX 10' ONCOR ESMT

PROP 40' UTILITY/ DRAINAGE ESMT

EX ROW

STA 1+69.00
INSTALL:
1-12" GV
1-12"x6" REDUCER
1-6" HYDRANT
N=7020886.05
E=2612344.88

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
VOL. 2020, PG. 960
D.R.R.C.T.

PROP 40' UTILITY/ DRAINAGE ESMT

450 LF 16" PVC WATER PIPE
AWWA 900-16, DR 18 (PC 235)
CLASS B-3 EMBEDMENT (TYP)

STA 22+34.45
PROP SD 18" RCP
FL=576.14

STA 22+24.18
PROP SD 2-5'x3' RCB
FL=574.90

-1.79%

-13.77%

0.00%

CULVERT 2

STA 20+63.64=
WL STUB-OUT E
1+00.00
INSTALL:
1-16"x12" TEE
1-12" GV

STA 21+40.00
INSTALL:
1-16"x6" TEE
1-16" BFV
1-FH ASSY

PVI STA 21+50.00
TOP=577.00

PVI STA 21+89.00
TOP=571.63

STA 22+00.00
BEGIN CASING

STA 22+40.49
END CASING

INSTALL 40 LF
24" STEEL CASING
BY OPEN CUT

EGL = 587.74 / PGL = 583.96 / TOP = 583.28
EGL = 586.68 / PGL = 583.01 / TOP = 582.38
EGL = 585.56 / PGL = 582.07 / TOP = 581.48
EGL = 585.55 / PGL = 586.13 / TOP = 580.59
EGL = 584.52 / PGL = 585.18 / TOP = 579.69
EGL = 583.52 / PGL = 584.24 / TOP = 578.79
EGL = 582.61 / PGL = 583.30 / TOP = 577.90
EGL = 581.80 / PGL = 582.44 / TOP = 577.00
EGL = 581.15 / PGL = 581.42 / TOP = 571.63
EGL = 580.43 / PGL = 580.95 / TOP = 571.63

18+00 19+00 20+00 21+00 22+00

LEGEND

- ISOLATION VALVE (GV/BFV)
- 6" FH ASSEMBLY W/ 6" GV
- COMBINATION AIR-VACUUM VALVE (CAV) TYPE 1
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CAUTION!!!
EXISTING UNDERGROUND UTILITIES IN AREA CONTACT UTILITY 48 HOURS PRIOR TO CONSTRUCTION

N

0 10' 20' 40'
HORIZONTAL SCALE
0 2' 4' 8'
VERTICAL SCALE

NOTES:

1. CONTRACTOR SHALL VERIFY LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO MANUFACTURING OF PRODUCTS.
2. CONTRACTOR TO FIELD VERIFY LOCATION OF EXISTING WATERLINE PRIOR TO EXCAVATION AND MAINTAIN SERVICE AT ALL TIMES.
3. DEFLECTED JOINTS TO BE AT 75% OF PIPE MANUFACTURER RECOMMENDATIONS.
4. ALL FIRE HYDRANTS SHALL BE PLACED 3FT FROM BACK OF FUTURE CURB TO AVOID FUTURE SIDEWALK CONSTRUCTION.
5. STEEL CASING SHALL HAVE THICKNESS OF 0.25 INCHES.
6. POWER POLES AND OHE ARE TO BE RELOCATED PRIOR TO WATER AND WASTEWATER PIPELINE CONSTRUCTION.
7. CONTRACTOR TO REFERENCE PROPOSED ROADWAY, STORMWATER, LANDSCAPE ARCHITECTURE AND OTHER IMPROVEMENT SHEETS FOR ADDITIONAL INFORMATION.
8. BARB WIRE FENCE SHALL BE REMOVED WHERE NECESSARY AND NOT REPLACED.

PROFILE LEGEND

- PROFILE GRADE LINE
- EXISTING GROUND @ ℄

I HEREBY CERTIFY THAT THIS DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM AUTHORIZED TO PRACTICE THE PROFESSION OF ENGINEERING IN THE STATE OF TEXAS.

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASE FOR REVIEW PURPOSES ONLY
PRINTED NAME: MICHAEL R. HAGEN
DATE: 10/21/2021
REGISTERED PROFESSIONAL ENGINEER
STATE OF TEXAS

THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW UNDER THE AUTHORITY OF MICHAEL R. HAGEN, TEXAS NO. 119555 ON 10/21/2021. IT IS NOT TO BE USED FOR BIDDING OR CONSTRUCTION PURPOSES. ALTERATION OF A SEALED DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2211
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
CIVIL
WATER LINE C
STA 18+00 TO STA 22+50

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED CEL
DRAWN SI
REVISED
CHECKED MH
FILE NAME cv-trt-pl-UTIL-WLC-5.dgn

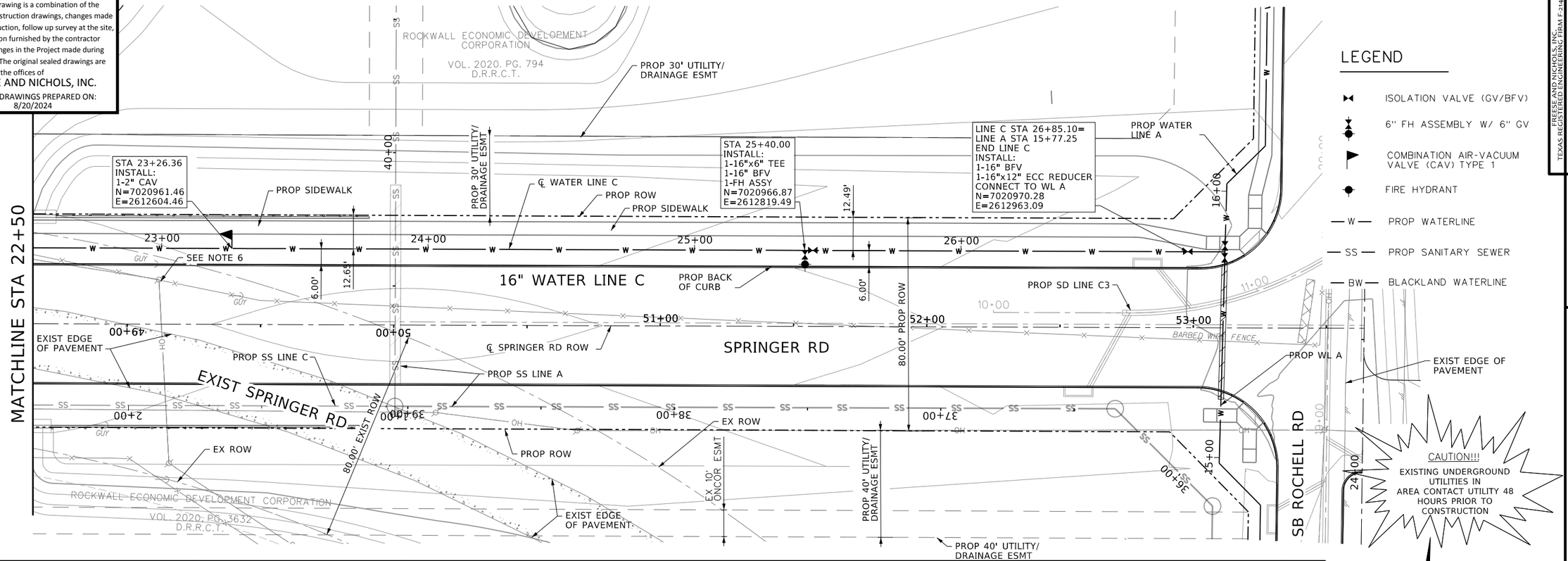
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET WLC-5
SEQ. 259

MicroStation V8 User: 90262 Office: On Site
Plotter: \\FNHOU\Drawings\WL\cv-trt-pl-UTIL-WLC-5.dgn Model: Default
Plot Style: FNHOU.ctb Projects: Freese and Nichols, Inc. - True Type Fonts
Plot Scale: 40.027 ' / in.
Date: Feb. 21, 2024 - 10:01:45 AM

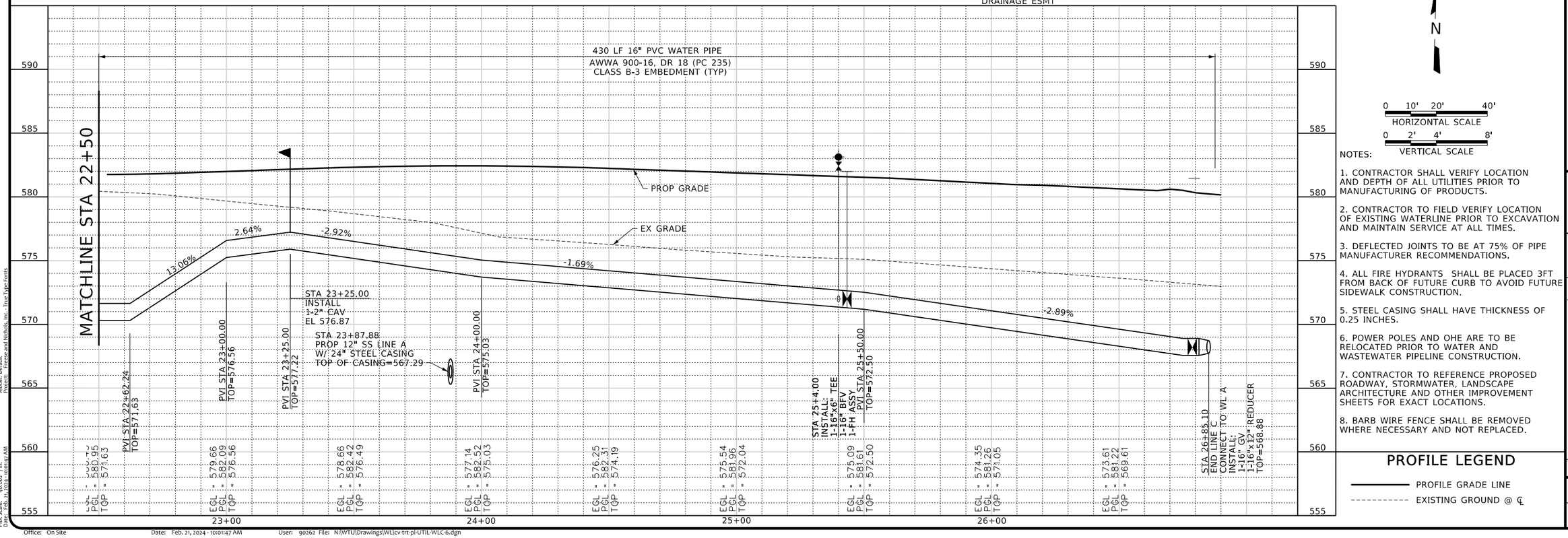
Office: On Site Date: Feb. 21, 2024 - 10:01:45 AM User: 90262 File: N:\WTU\Drawings\WL\cv-trt-pl-UTIL-WLC-5.dgn

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024



LEGEND

- ISOLATION VALVE (GV/BFV)
- 6" FH ASSEMBLY W/ 6" GV
- COMBINATION AIR-VACUUM VALVE (CAV) TYPE 1
- FIRE HYDRANT
- W — PROP WATERLINE
- SS — PROP SANITARY SEWER
- BW — BLACKLAND WATERLINE



0 10' 20' 40'
HORIZONTAL SCALE
0 2' 4' 8'
VERTICAL SCALE

NOTES:

1. CONTRACTOR SHALL VERIFY LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO MANUFACTURING OF PRODUCTS.
2. CONTRACTOR TO FIELD VERIFY LOCATION OF EXISTING WATERLINE PRIOR TO EXCAVATION AND MAINTAIN SERVICE AT ALL TIMES.
3. DEFLECTED JOINTS TO BE AT 75% OF PIPE MANUFACTURER RECOMMENDATIONS.
4. ALL FIRE HYDRANTS SHALL BE PLACED 3FT FROM BACK OF FUTURE CURB TO AVOID FUTURE SIDEWALK CONSTRUCTION.
5. STEEL CASING SHALL HAVE THICKNESS OF 0.25 INCHES.
6. POWER POLES AND OHE ARE TO BE RELOCATED PRIOR TO WATER AND WASTEWATER PIPELINE CONSTRUCTION.
7. CONTRACTOR TO REFERENCE PROPOSED ROADWAY, STORMWATER, LANDSCAPE ARCHITECTURE AND OTHER IMPROVEMENT SHEETS FOR EXACT LOCATIONS.
8. BARB WIRE FENCE SHALL BE REMOVED WHERE NECESSARY AND NOT REPLACED.

PROFILE LEGEND

- PROFILE GRADE LINE
- EXISTING GROUND @ ℄

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASE FOR REVIEW
THIS DOCUMENT WAS ORIGINALLY ISSUED AND SEALED BY MICHAEL R. HAGEN
TEXAS NO. 119555 ON 10/21/2021
IT SHALL NOT BE USED FOR BIDDING OR CONSTRUCTION PURPOSES

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2299
Web: www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

WATER LINE C
STA 22+50 TO END

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED CEL
DRAWN SI
REVISED
CHECKED MH
FILE NAME cv-trt-pl-UTIL-WLC-6.dgn

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale accordingly.

SHEET WLC-6
SEQ. 260

MicroStation V8 User: 90262 Office: On Site
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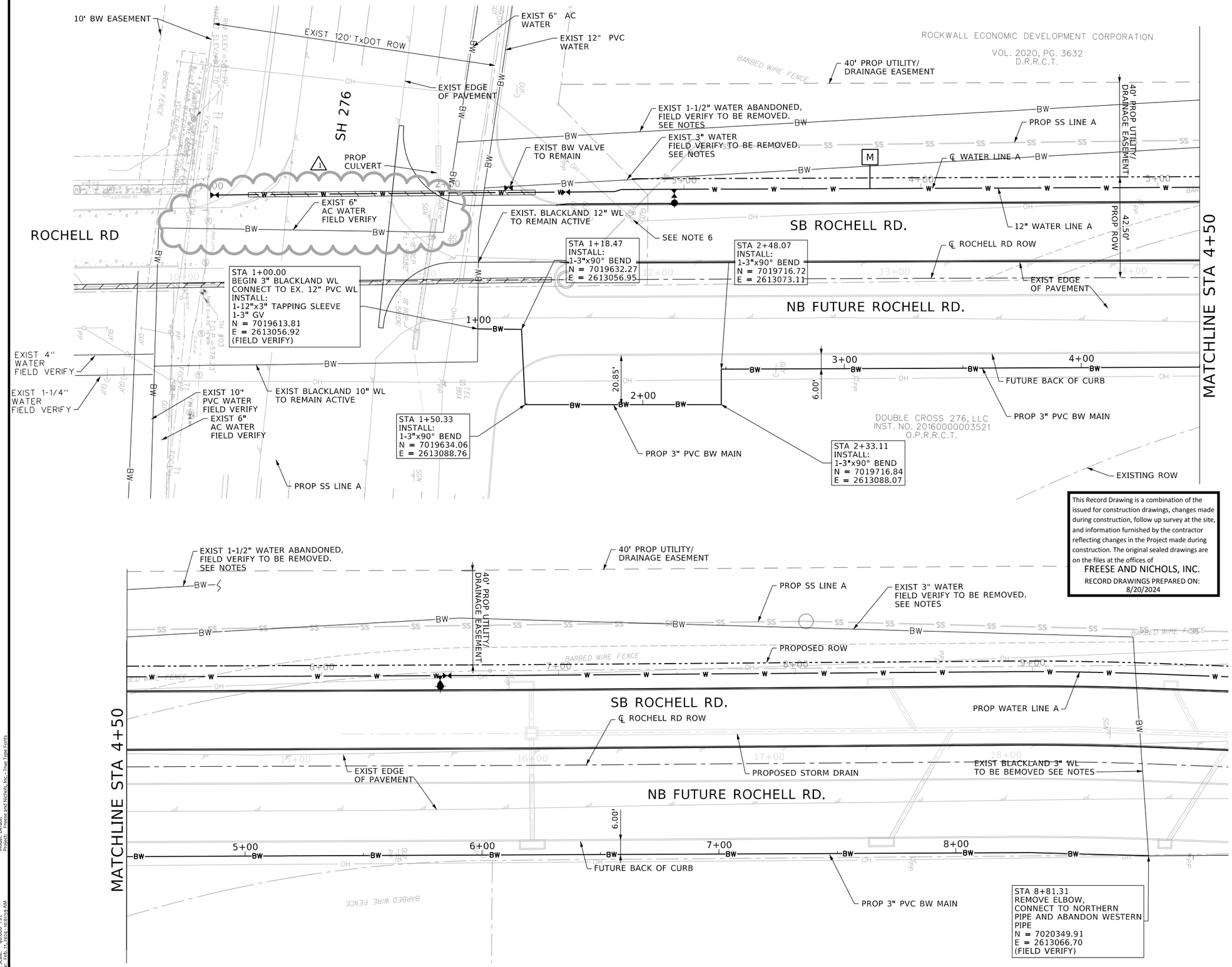
Date: Feb. 21, 2024 - 10:01:47 AM
Office: On Site Date: Feb. 21, 2024 - 10:01:47 AM User: 90262 File: N:\WTU\Drawings\WL\cv-trt-pl-UTIL-WLC-6.dgn



LEGEND

- ISOLATION VALVE (GV/BFV)
- 6" FH ASSEMBLY W/ 6" GV
- COMBINATION AIR-VACUUM VALVE (CAV) TYPE 1
- FIRE HYDRANT
- —W— PROP WATERLINE
- —SS— PROP SANITARY SEWER
- —BW— BLACKLAND WATERLINE

CAUTION!!!
EXISTING GAS LINES AND OVERHEAD ELECTRIC LINES IN AREA CONTACT UTILITY 48 HOURS PRIOR TO CONSTRUCTION

N

0 10' 20' 40'
HORIZONTAL SCALE
0 2' 4' 8'
VERTICAL SCALE

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

NOTES:

1. CONTRACTOR SHALL VERIFY LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO MANUFACTURING OF PRODUCTS.

2. CONTRACTOR TO FIELD VERIFY LOCATION OF EXISTING WATERLINE PRIOR TO EXCAVATION AND MAINTAIN SERVICE AT ALL TIMES.

3. DEFLECTED JOINTS TO BE AT 75% OF PIPE MANUFACTURER RECOMMENDATIONS.

4. ALL FIRE HYDRANTS SHALL BE PLACED 3FT FROM BACK OF FUTURE CURB TO AVOID FUTURE SIDEWALK CONSTRUCTION.

5. STEEL CASING SHALL HAVE THICKNESS OF 0.25 INCHES.

6. POWER POLES AND OHE ARE TO BE RELOCATED PRIOR TO WATER AND WASTEWATER PIPELINE CONSTRUCTION.

7. CONTRACTOR TO REFERENCE PROPOSED ROADWAY, STORMWATER, LANDSCAPE ARCHITECTURE AND OTHER IMPROVEMENT SHEETS FOR ADDITIONAL INFORMATION.

8. BARB WIRE FENCE SHALL BE REMOVED WHERE NECESSARY AND NOT REPLACED.

9 CONTRACTOR TO COORDINATE RE-ALIGNMENT OF BLACKLAND WATER PIPES WITH BLACKLAND W.S.C.

10. BLACKLAND WATER PIPE MODIFICATIONS TO BE COMPLETED BEFORE REMOVAL OF BLACKLAND WATER PIPES NOTED ON THIS SHEET.

11. EXISTING BLACKLAND WATER VALVE TO BE CLOSED AND CAPPED PRIOR TO REMOVAL OF BLACKLAND WATER PIPES.

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

THE SEAL THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY MICHAEL R. HAGEN
TEXAS NO. 119055 ON 10/21/2021
ALTERATION OF THIS DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE NICHOLS
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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

BLACKLAND & WATER MAIN RE-ALIGNMENT
BEGIN TO END

NO.	ISSUES	BY	DATE
1	ADDENDUM #2	MH	11/17/21

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.

F&N JOB NO.	RKW19711		
DATE	APRIL 2022	FILE NAME	01-UTIL-BLACKLAND WL_01.dgn
DESIGNED	CEL	CHECKED	MH
DRAWN	SI	REVISED	

SHEET
WBW-1

SEQ.
261

MicroStation V8 User: 90262 Office: On Site
N:\WTU\Drawings\WL\cv-trt-pl-UTIL-BLACKLAND WL_01.dgn
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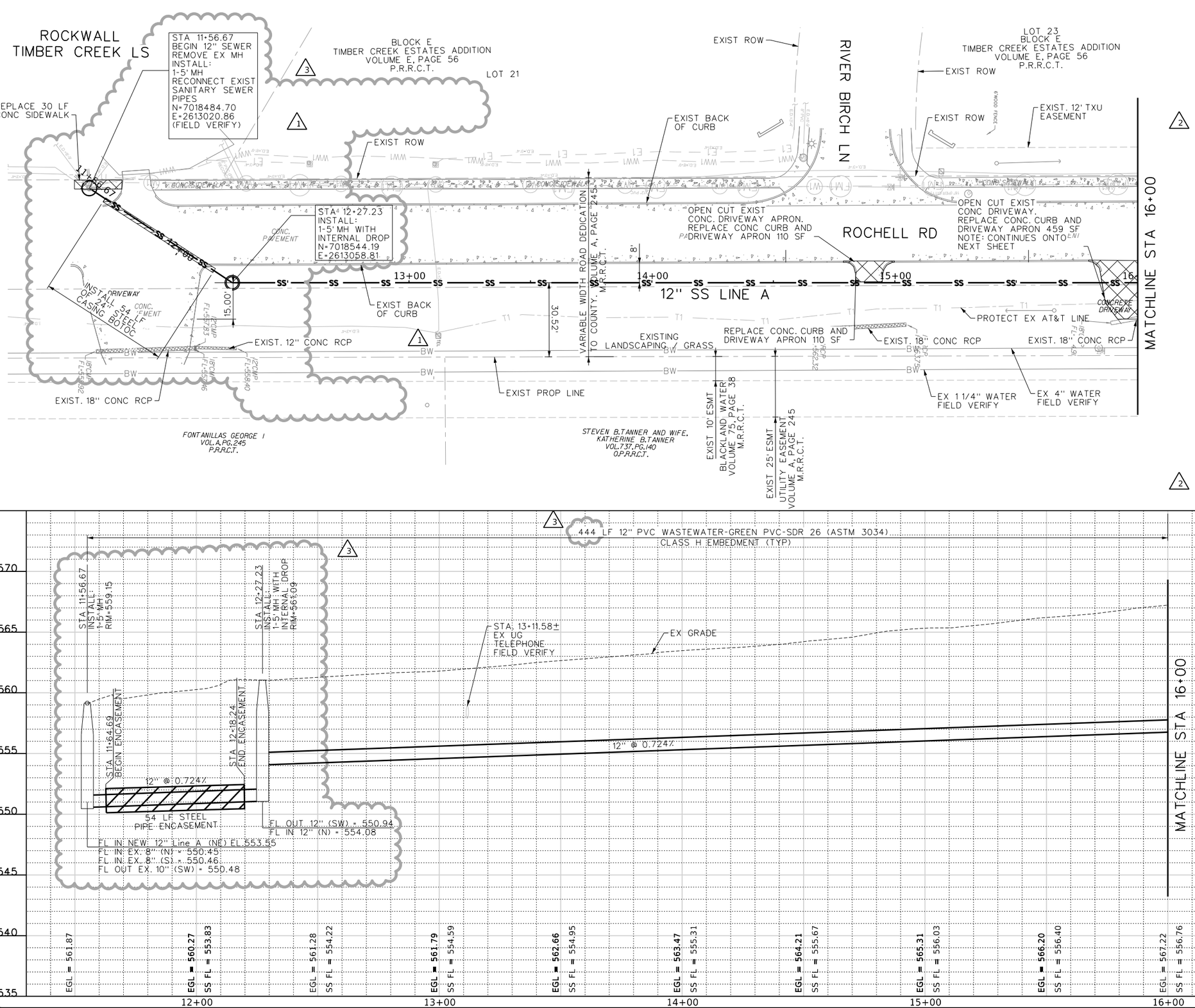
Plot Scale: 40.008 '/ in.
Date: Feb. 21, 2024 - 10:01:59 AM
Model: Default
Project: Freese and Nichols, Inc. - True Type Fonts



LEGEND

- —W— PROP WATERLINE
- —SS— PROP SANITARY SEWER
- —BW— BLACKLAND WATERLINE
- CONCRETE REPAIR

NOTES:
1. CONTRACTOR SHALL VERIFY LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO MANUFACTURING OF PRODUCTS.

2. EXISTING POWER POLES SOUTH OF HWY 276 ARE TO BE PROTECTED AND SUPPORTED DURING CONSTRUCTION ACTIVITIES. EXISTING POWER POLE LOCATED NORTH OF HWY 276 WILL BE RELOCATED BEFORE UTILITY CONSTRUCTION BEGINS AS DETERMINED BY THE CITY OF ROCKWALL.

3. STEEL CASING SHALL HAVE THICKNESS OF 0.25 INCHES.

4. CONTRACTOR TO REFERENCE PROPOSED ROADWAY, STORMWATER, LANDSCAPE ARCHITECTURE AND OTHER IMPROVEMENT SHEETS FOR ADDITIONAL INFORMATION.

5. MANHOLES LOCATED WITHIN FEMA FLOODPLAIN SHALL HAVE WATERTIGHT MANHOLE FRAMES AND COVERS INSTALLED TO PREVENT INFLOW.

6. CONTRACTOR IS TO MAINTAIN ACCESS FOR EXISTING ROADWAYS AND DRIVEWAYS TO ROCHELL RD.

CAUTION!!!
EXISTING UNDERGROUND UTILITIES IN AREA CONTACT UTILITY 48 HOURS PRIOR TO CONSTRUCTION

0 10' 20' 40'
HORIZONTAL SCALE
0 2' 4' 8'
VERTICAL SCALE

N

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

PROFILE LEGEND

- PROFILE GRADE LINE
- EXISTING GROUND @ ℄

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASED FOR THE PURPOSES OF INTERIM REVIEW UNDER THE AUTHORITY OF MICHAEL R. HAGEN TEXAS NO. 111955 ON 10/21/2021. IT WAS NOT INTENDED OR REPRESENTED FOR RECORDING OR BIDDING PURPOSES WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

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Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

SANITARY SEWER LINE A
BEGIN TO STA 16+00

NO.	ISSUES	BY	DATE
0	FO #1	MRH	9/27/2022
1	PRE-AWARD AMEND #1	MRH	4/12/2022
2	ADDENDUM #3	MH	11/30/2022

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

F&N JOB NO.	RKW19711
DATE	APRIL 2022
DESIGNED	CEL
DRAWN	SI
REVISED	
CHECKED	MH
FILE NAME	CV-UTL-PP-SSA01.sht

SHEET
SSA-1
SEQ.
262

MicroStation V8 User: 90262 Office: On Site
Plotter: \\PW01\Drawings\SS LINES\CV-UTL-PP-SSA01.sht
Plot Scale: 40.00 ' / In.
Date: Feb. 21, 2024 - 10:02:23 AM
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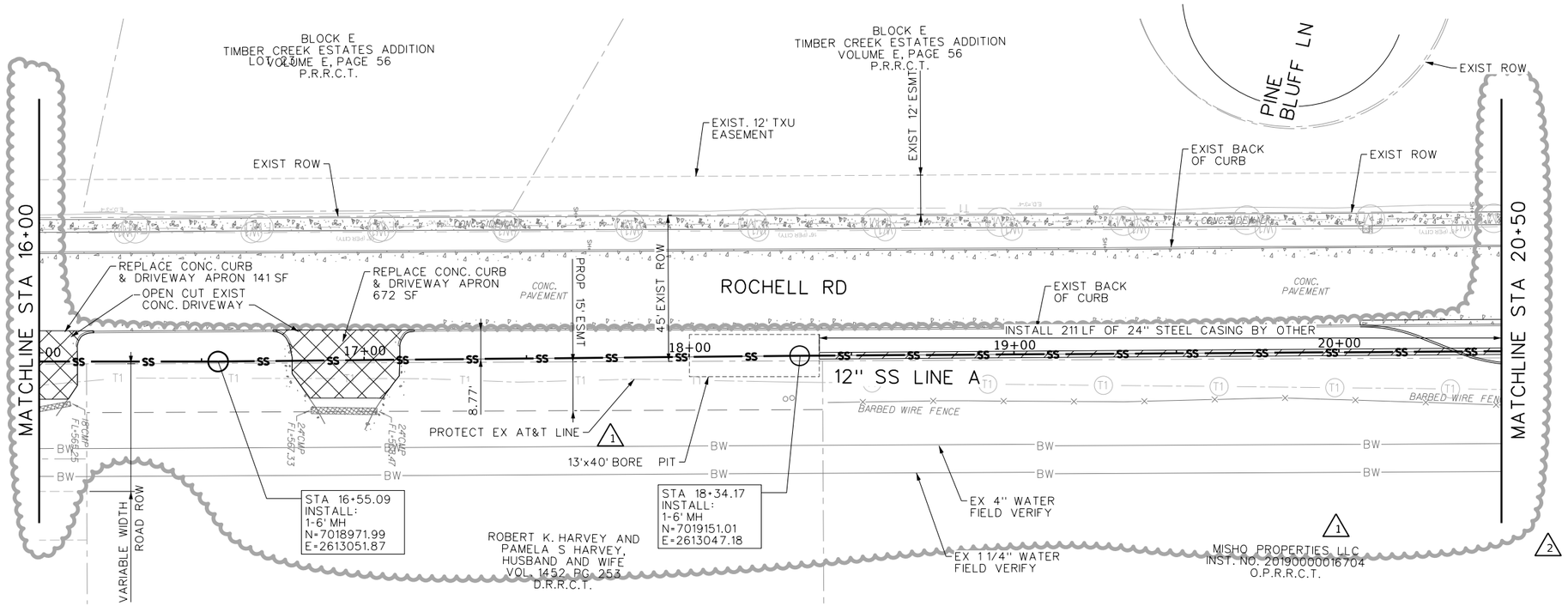
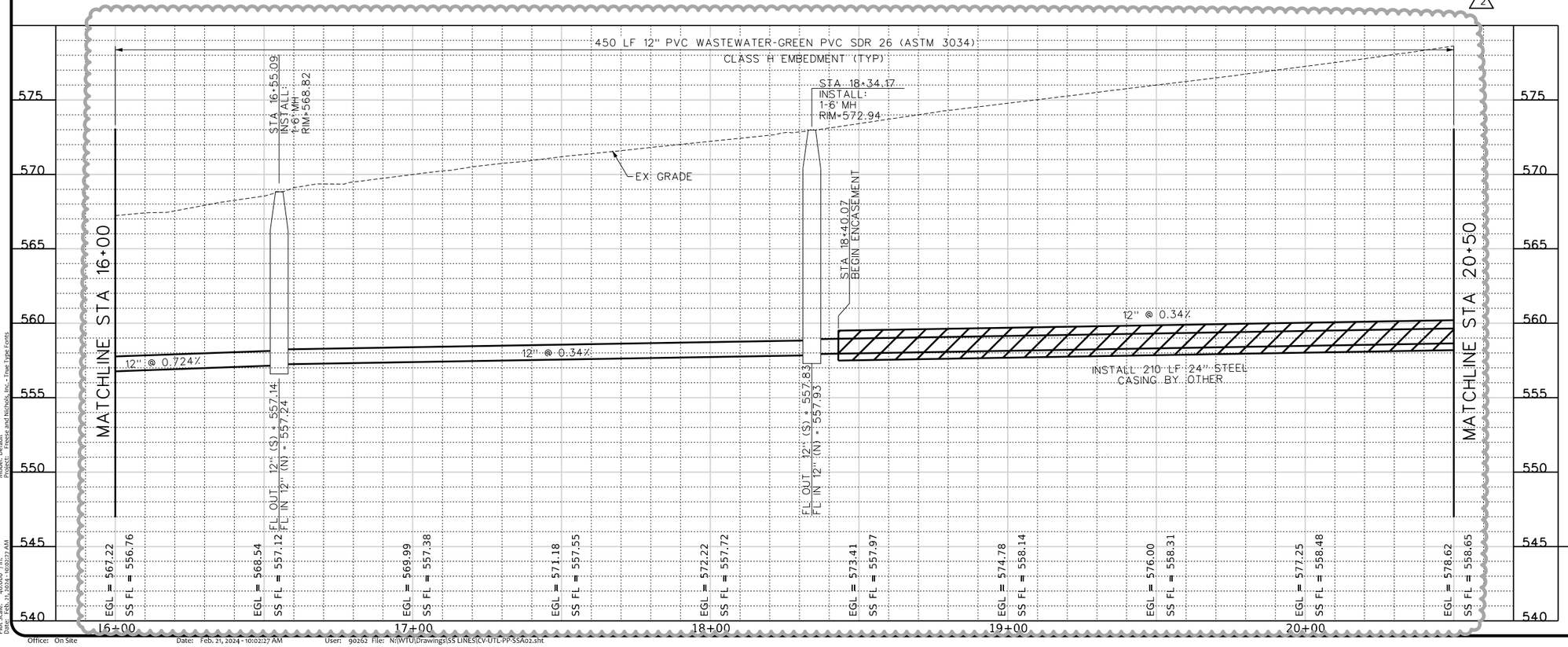
Project: Freese and Nichols, Inc. - True Type Fonts





PROFILE LEGEND

PROFILE GRADE LINE

EXISTING GROUND @ ℄

LEGEND

— W — PROP WATERLINE

— SS — PROP SANITARY SEWER

— BW — BLACKLAND WATERLINE

CONCRETE REPAIR

NOTES:
1. CONTRACTOR SHALL VERIFY LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO MANUFACTURING OF PRODUCTS.

2. EXISTING POWER POLES SOUTH OF HWY 276 ARE TO BE PROTECTED AND SUPPORTED DURING CONSTRUCTION ACTIVITIES. EXISTING POWER POLE LOCATED NORTH OF HWY 276 WILL BE RELOCATED BEFORE UTILITY CONSTRUCTION BEGINS AS DETERMINED BY THE CITY OF ROCKWALL.

3. STEEL CASING SHALL HAVE THICKNESS OF 0.25 INCHES.

4. CONTRACTOR TO REFERENCE PROPOSED ROADWAY, STORMWATER, LANDSCAPE ARCHITECTURE AND OTHER IMPROVEMENT SHEETS FOR ADDITIONAL INFORMATION.

5. MANHOLES LOCATED WITHIN FEMA FLOODPLAIN SHALL HAVE WATERTIGHT MANHOLE FRAMES AND COVERS INSTALLED TO PREVENT INFLOW.

6. CONTRACTOR IS TO MAINTAIN ACCESS FOR EXISTING ROADWAYS AND DRIVEWAYS TO ROCHELL RD.

CAUTION!!!
EXISTING UNDERGROUND UTILITIES IN AREA CONTACT UTILITY 48 HOURS PRIOR TO CONSTRUCTION

0 10' 20' 40'
HORIZONTAL SCALE

0 2' 4' 8'
VERTICAL SCALE

N

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASE FOR ORIGINAL DOCUMENT THIS DOCUMENT WAS AUTHORIZED BY MICHAEL R. HAGEN TEXAS NO. 111955 ON 10/21/2021 IT IS NOT TO BE USED FOR BIDDING PURPOSES WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

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Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

SANITARY SEWER LINE A STA 16+00 TO STA 20+50

NO.	ISSUES	BY	DATE
2	PRE-AWARD AMEND #1	MRH	4/12/2022
1	AMMENDMENT #3	MH	11/30/2021

FNI JOB NO. RKW19711
DATE APRIL 2022
DESIGNED CEL
DRAWN SI
REVISED
CHECKED MH
FILE NAME CV-UTL-PP-SSA02.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET SSA-2
SEQ. 263

MicroStation V8 User: 90262 Office: On Site
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Model: Default
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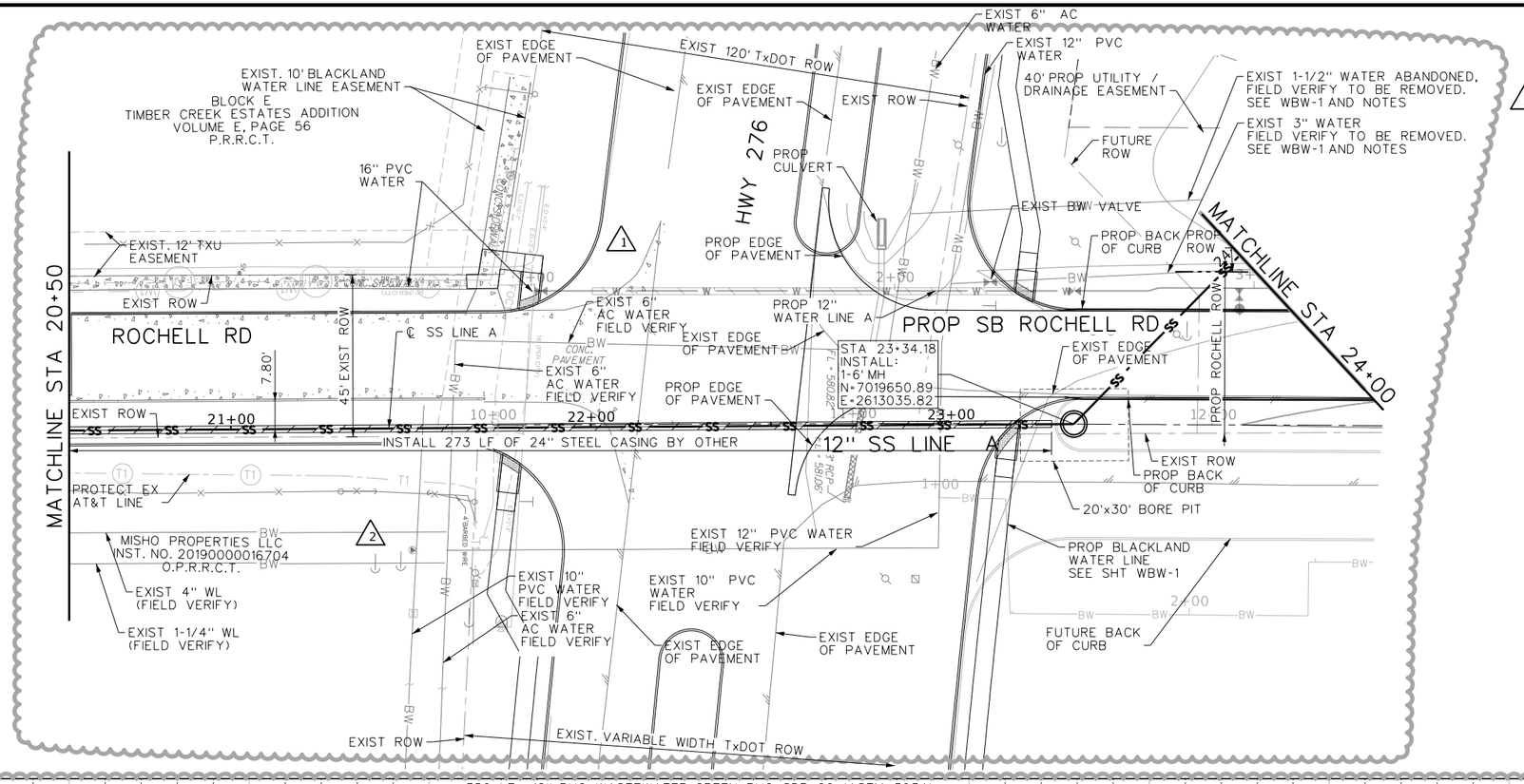
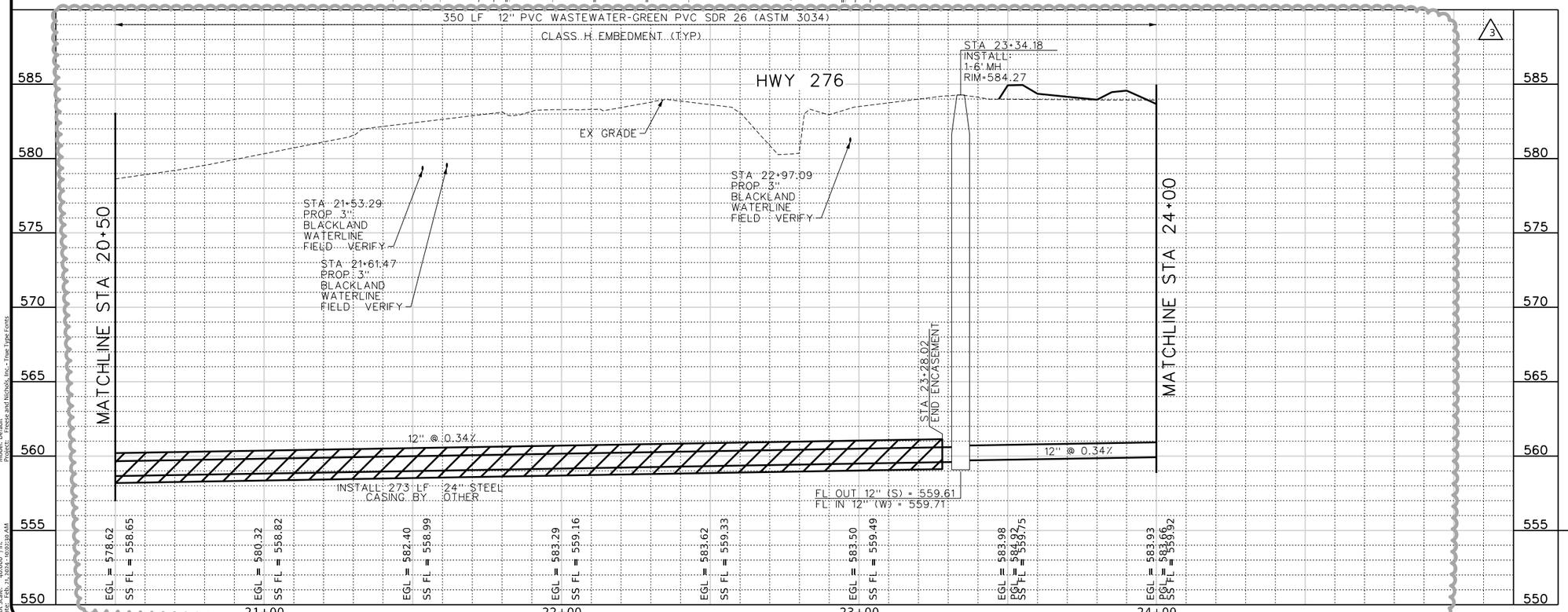
Plot Scale: 40.000 ' / in.
Date: Feb. 21, 2024 - 10:02:27 AM
Project: Freese and Nichols, Inc. - True Type Fonts





LEGEND

- — W — PROP WATERLINE
- — SS — PROP SANITARY SEWER
- — BW — BLACKLAND WATERLINE
- CONCRETE REPAIR

NOTES:

1. CONTRACTOR SHALL VERIFY LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO MANUFACTURING OF PRODUCTS.
2. EXISTING POWER POLES SOUTH OF HWY 276 ARE TO BE PROTECTED AND SUPPORTED DURING CONSTRUCTION ACTIVITIES. EXISTING POWER POLE LOCATED NORTH OF HWY 276 WILL BE RELOCATED BEFORE UTILITY CONSTRUCTION BEGINS AS DETERMINED BY THE CITY OF ROCKWALL.
3. STEEL CASING SHALL HAVE THICKNESS OF 0.25 INCHES.
4. CONTRACTOR TO REFERENCE PROPOSED ROADWAY, STORMWATER, LANDSCAPE ARCHITECTURE AND OTHER IMPROVEMENT SHEETS FOR ADDITIONAL INFORMATION.
5. MANHOLES LOCATED WITHIN FEMA FLOODPLAIN SHALL HAVE WATERTIGHT MANHOLE FRAMES AND COVERS INSTALLED TO PREVENT INFLOW.
6. REFERENCE SHEET WB-1 FOR MODIFICATIONS TO EXISTING BLACKLAND WATER ALIGNMENT. BLACKLAND WATER PIPE MODIFICATIONS TO BE COMPLETED BEFORE REMOVAL OF BLACKLAND WATER PIPES NOTED ON THIS SHEET.

CAUTION!!!
EXISTING UNDERGROUND UTILITIES IN AREA CONTACT UTILITY 48 HOURS PRIOR TO CONSTRUCTION

0 10' 20' 40'
HORIZONTAL SCALE
0 2' 4' 8'
VERTICAL SCALE

N

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

PROFILE LEGEND

- PROFILE GRADE LINE
- EXISTING GROUND @ ℄

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASE FOR REVIEW
THIS DOCUMENT WAS AUTHORIZED BY MICHAEL R. HAGEN
TEXAS NO. 111955 ON 10/21/2021
IT IS NOT TO BE USED FOR BIDDING PURPOSES

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2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2250
Web: www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

SANITARY SEWER LINE A
STA 20+50 TO STA 24+00

1

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED CEL
DRAWN SI
REVISED
CHECKED MH
FILE NAME CV-UTL-PP-SSA03.sht

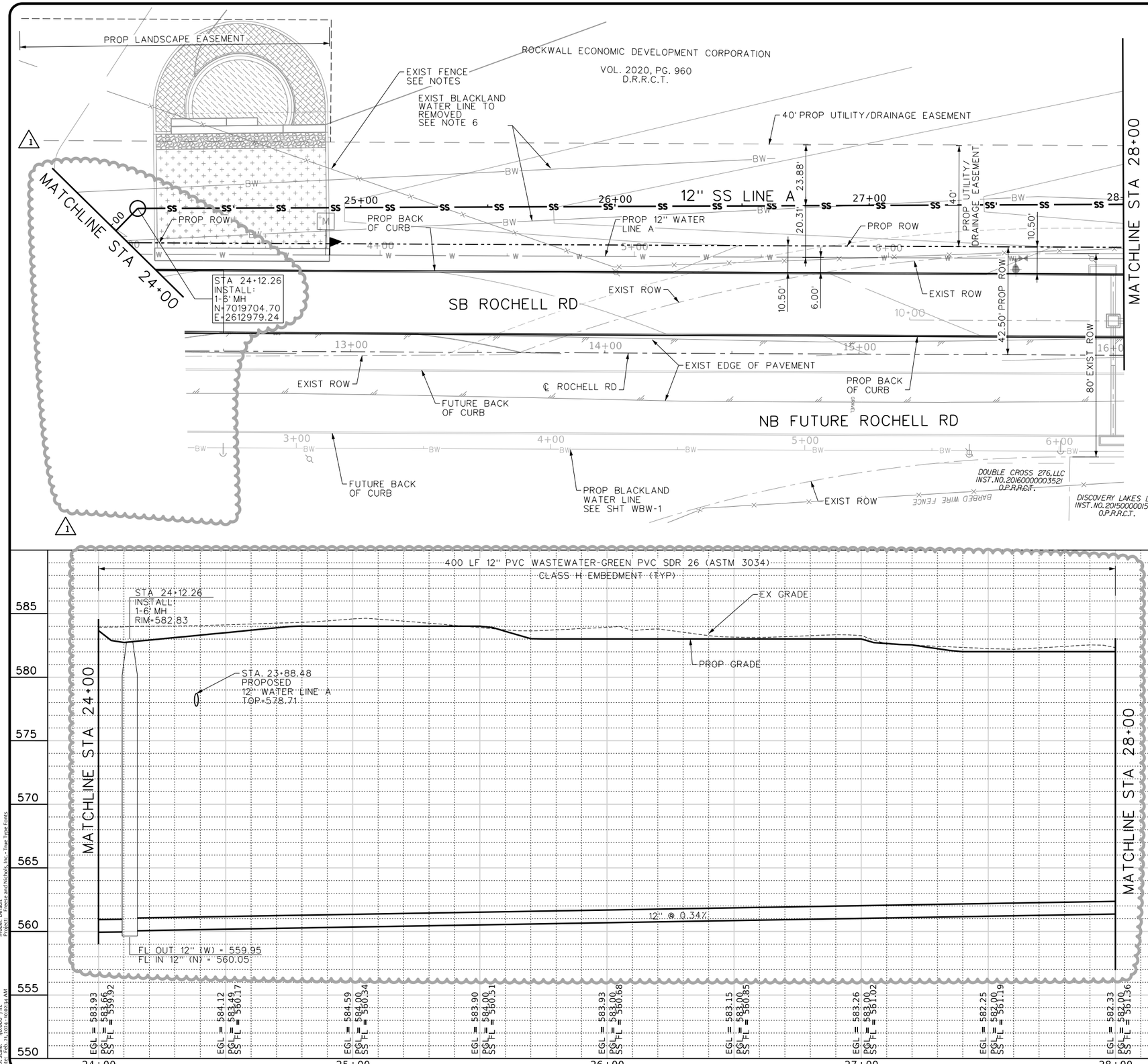
NO.	ISSUES	BY	DATE
1	PRE-AWARD AMEND #1	MRH	4/12/2022
2	ADDENDUM # 3	MH	11/30/21
3	ADDENDUM # 2	MH	11/17/21

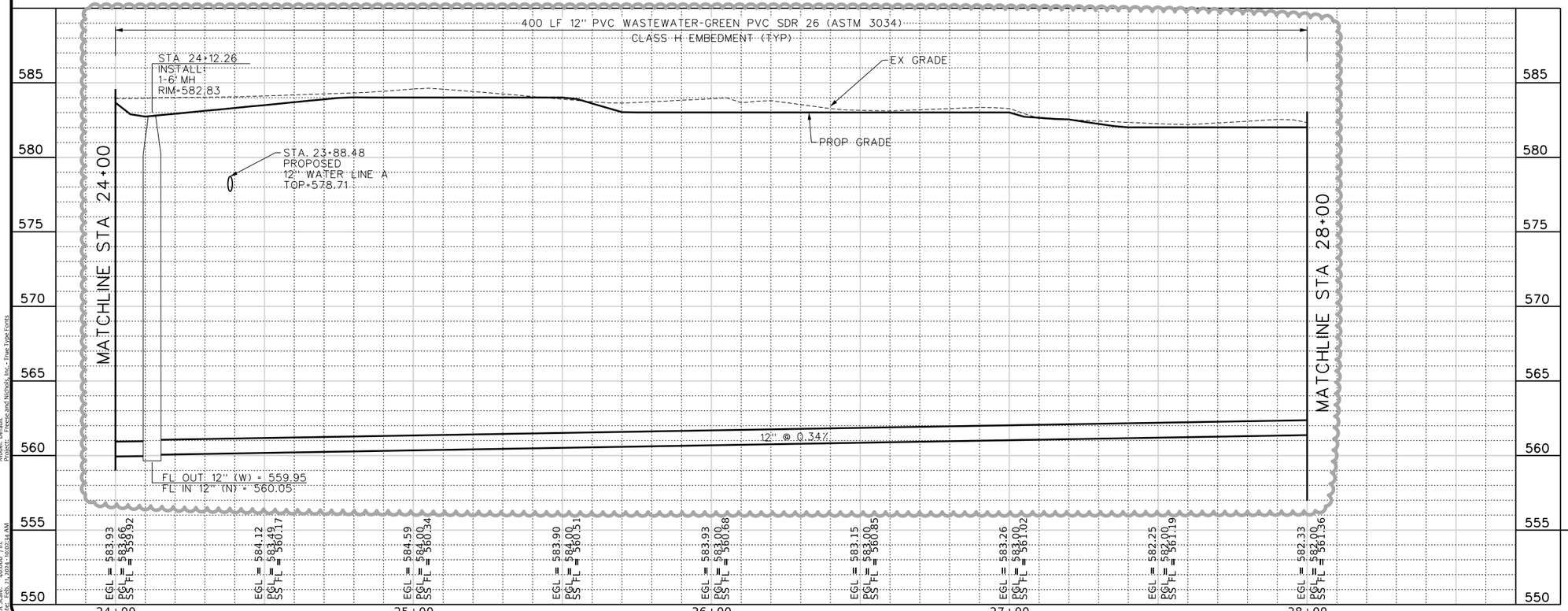
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET SSA-3

SEQ. 264

MicroStation V8 User: 90262 Office: On Site
Plotter: J:\PROJECTS\RKW19711 - RTP PHASE V\Working\plots\ Model: Default
Plot Scale: 40.006" / 1in. Project: Freese and Nichols, Inc. - True Type Fonts
Date: Feb. 21, 2024 - 10:03:19 AM
Office: On Site Date: Feb. 21, 2024 - 10:02:30 AM User: 90262 File: N:\WTU\Drawings\SS LINES\CV-UTL-PP-SSA03.sht





LEGEND

- W — PROP WATERLINE
- SS — PROP SANITARY SEWER
- BW — BLACKLAND WATERLINE
- CONCRETE REPAIR

NOTES:
1. CONTRACTOR SHALL VERIFY LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO MANUFACTURING OF PRODUCTS.

2. EXISTING POWER POLES SOUTH OF HWY 276 ARE TO BE PROTECTED AND SUPPORTED DURING CONSTRUCTION ACTIVITIES. EXISTING POWER POLE LOCATED NORTH OF HWY 276 WILL BE RELOCATED BEFORE UTILITY CONSTRUCTION BEGINS AS DETERMINED BY THE CITY OF ROCKWALL.

3. STEEL CASING SHALL HAVE THICKNESS OF 0.25 INCHES.

4. CONTRACTOR TO REFERENCE PROPOSED ROADWAY, STORMWATER, LANDSCAPE ARCHITECTURE AND OTHER IMPROVEMENT SHEETS FOR ADDITIONAL INFORMATION.

5. MANHOLES LOCATED WITHIN FEMA FLOODPLAIN SHALL HAVE WATERTIGHT MANHOLE FRAMES AND COVERS INSTALLED TO PREVENT INFLOW.

6. REFERENCE SHEET WB-1 FOR MODIFICATIONS TO EXISTING BLACKLAND WATER ALIGNMENT. BLACKLAND WATER PIPE MODIFICATIONS TO BE COMPLETED BEFORE REMOVAL OF BLACKLAND WATER PIPES NOTED ON THIS SHEET.

CAUTION!!!
EXISTING UNDERGROUND UTILITIES IN AREA CONTACT UTILITY 48 HOURS PRIOR TO CONSTRUCTION

0 10' 20' 40'
HORIZONTAL SCALE
0 2' 4' 8'
VERTICAL SCALE

N

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

PROFILE LEGEND

- PROFILE GRADE LINE
- EXISTING GROUND @ ℄

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASE THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY MICHAEL R. HAGEN TEXAS NO. 111955 ON 10/21/2021 RELEASED FOR REVIEW PURPOSES ONLY AND NOT INTENDED FOR CONSTRUCTION, BIDDING OR PERMIT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2299
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

SANITARY SEWER LINE A STA 24+00 TO STA 28+00

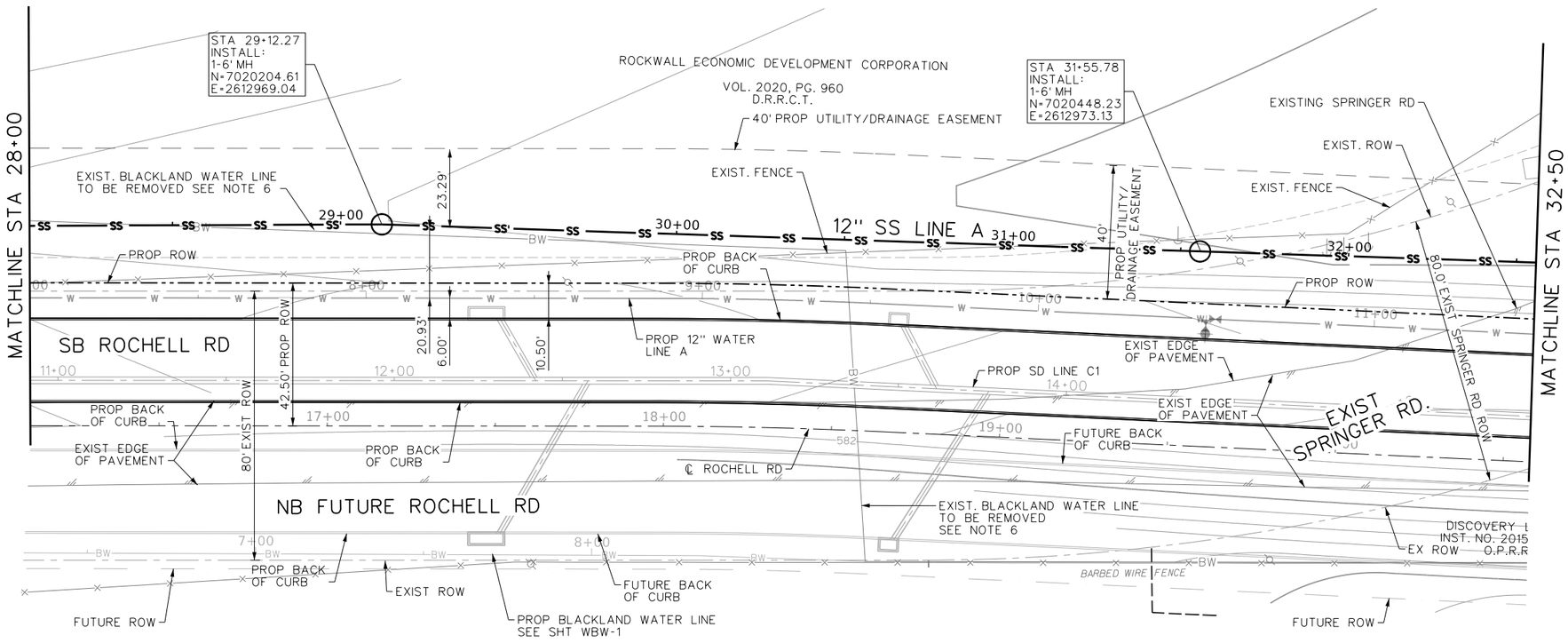
NO.	ISSUES	BY	DATE
1	PRE-AWARD AMEND #1	MRH	4/12/2022

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED CEL
DRAWN SI
REVISED
CHECKED MH
FILE NAME CV-UTL-PP-SSA04.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET SSA-4
SEQ. 265

MicroStation V8 User: 90262 Office: On Site
Plotter: \\FNWFS01\HP DesignJet T1700dr PostScript
Plot Scale: 40.008 ' / in.
Date: Feb. 21, 2024 - 10:03:14 AM
Model: Default
Project: Freese and Nichols, Inc. - True Type Fonts
Office: On Site Date: Feb. 21, 2024 - 10:02:34 AM User: 90262 File: N:\WTU\Drawings\SS LINES\CV-UTL-PP-SSA04.sht

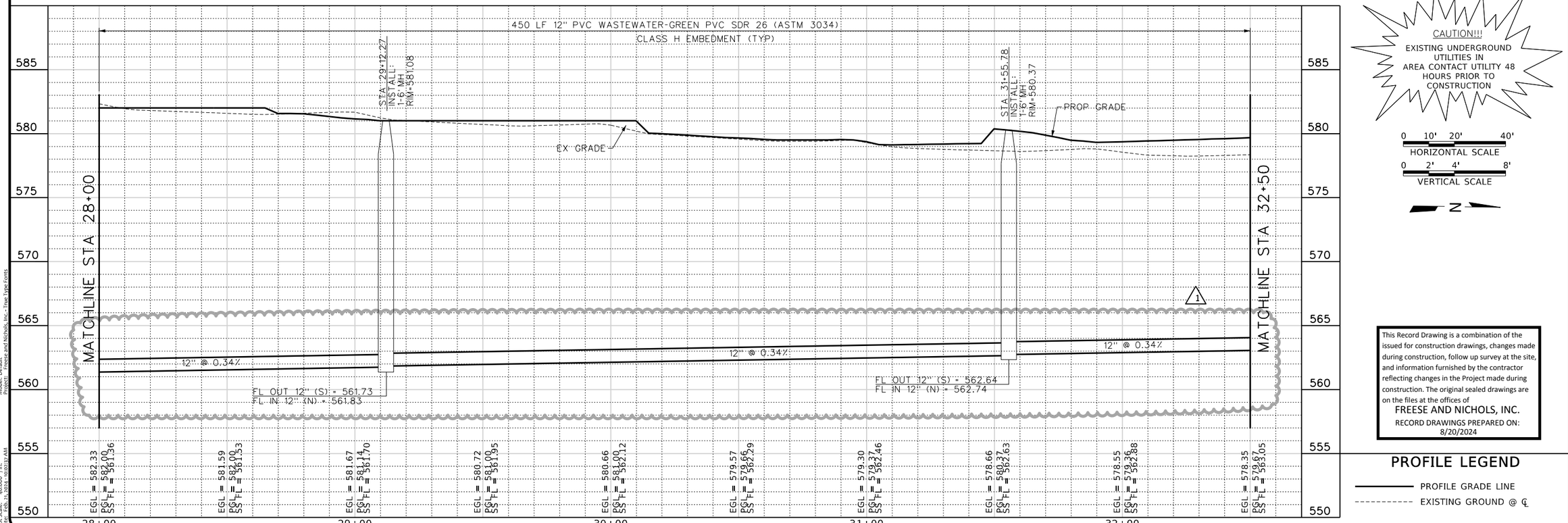


LEGEND

- — W — PROP WATERLINE
- — SS — PROP SANITARY SEWER
- — BW — BLACKLAND WATERLINE
- CONCRETE REPAIR

NOTES:

1. CONTRACTOR SHALL VERIFY LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO MANUFACTURING OF PRODUCTS.
2. EXISTING POWER POLES SOUTH OF HWY 276 ARE TO BE PROTECTED AND SUPPORTED DURING CONSTRUCTION ACTIVITIES. EXISTING POWER POLE LOCATED NORTH OF HWY 276 WILL BE RELOCATED BEFORE UTILITY CONSTRUCTION BEGINS AS DETERMINED BY THE CITY OF ROCKWALL.
3. STEEL CASING SHALL HAVE THICKNESS OF 0.25 INCHES.
4. CONTRACTOR TO REFERENCE PROPOSED ROADWAY, STORMWATER, LANDSCAPE ARCHITECTURE AND OTHER IMPROVEMENT SHEETS FOR ADDITIONAL INFORMATION.
5. MANHOLES LOCATED WITHIN FEMA FLOODPLAIN SHALL HAVE WATERTIGHT MANHOLE FRAMES AND COVERS INSTALLED TO PREVENT INFLOW.
6. REFERENCE SHEET WB-1 FOR MODIFICATIONS TO EXISTING BLACKLAND WATER ALIGNMENT. BLACKLAND WATER PIPE MODIFICATIONS TO BE COMPLETED BEFORE REMOVAL OF BLACKLAND WATER PIPES NOTED ON THIS SHEET.



CAUTION!!!
EXISTING UNDERGROUND UTILITIES IN AREA CONTACT UTILITY 48 HOURS PRIOR TO CONSTRUCTION

0 10' 20' 40'
HORIZONTAL SCALE
0 2' 4' 8'
VERTICAL SCALE

N

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

PROFILE LEGEND

- PROFILE GRADE LINE
- EXISTING GROUND @ ℄

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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TEXAS NO. 111955 ON 10/21/2021
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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

SANITARY SEWER LINE A STA 28+00 TO STA 32+50

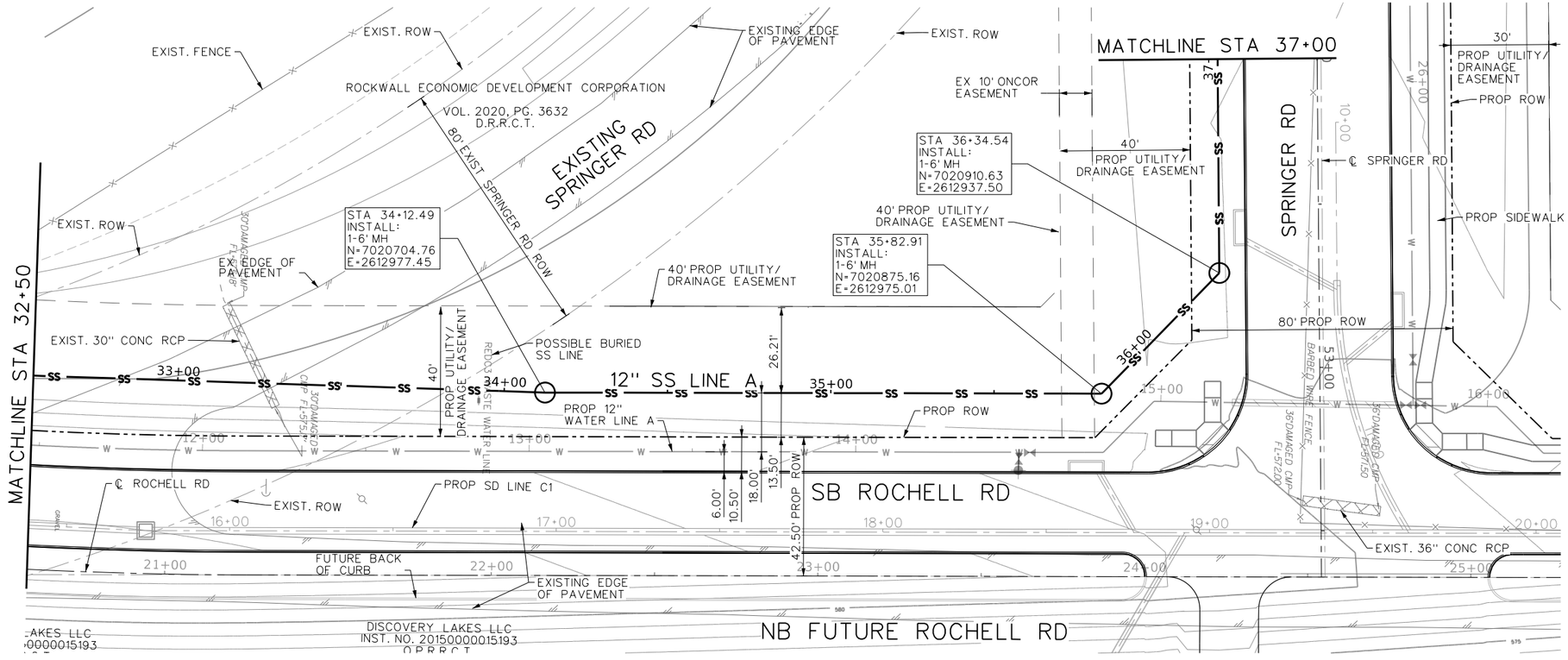
NO.	ISSUES	BY	DATE	FILE NAME
1	PRE-AWARD AMEND #1	MRH	4/12/2022	CV-UTL-PP-SSA05.sht

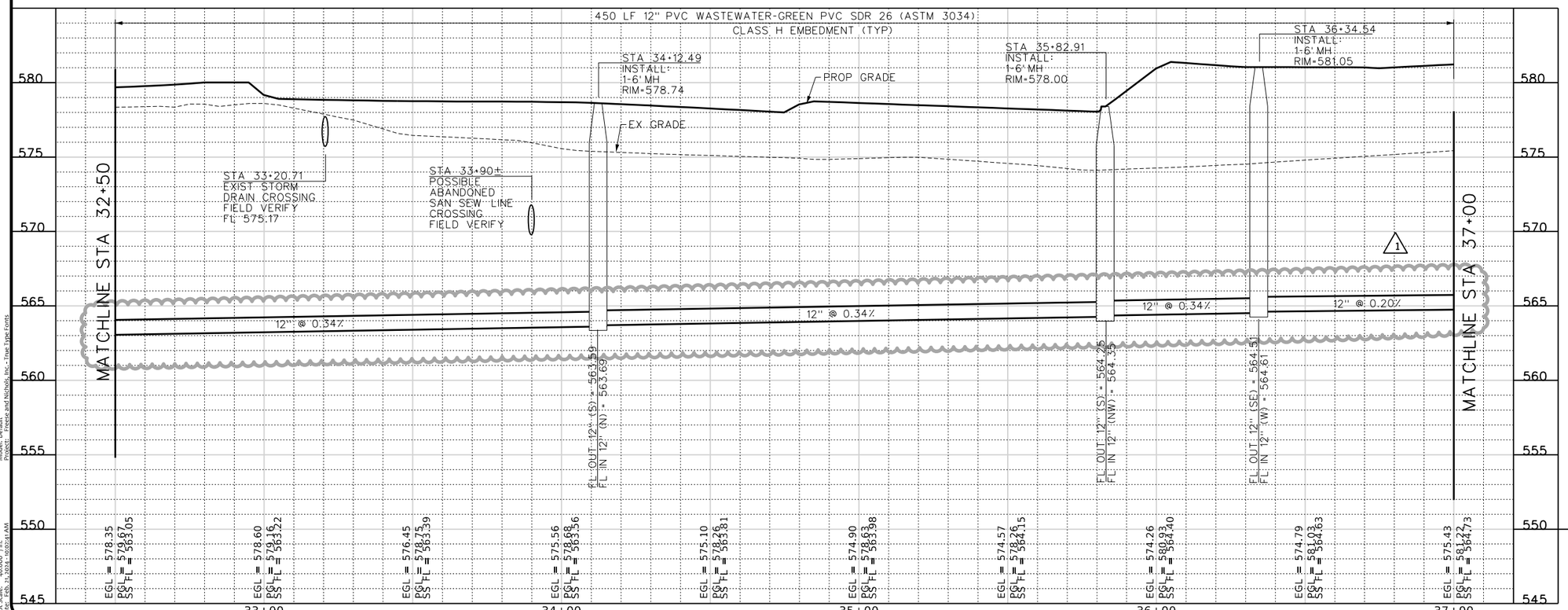
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED CEL
DRAWN SI
REVISED
CHECKED MH

SHEET SSA-5
SEQ. 266

MicroStation V8 User: 90262 Office: On Site
Plotter: HP9000C2760_24.pltCfg Model: Default
Plot Scale: 40.008 ' / in. Project: Freese and Nichols, Inc. - True Type Fonts
Date: Feb. 21, 2024 - 10:02:37 AM
Office: On Site Date: Feb. 21, 2024 - 10:02:37 AM User: 90262 File: N:\WTU\Drawings\SS LINES\CV-UTL-PP-SSA05.sht





LEGEND

- — W — PROP WATERLINE
- — SS — PROP SANITARY SEWER
- — BW — BLACKLAND WATERLINE
- CONCRETE REPAIR

NOTES:
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3. STEEL CASING SHALL HAVE THICKNESS OF 0.25 INCHES.

4. CONTRACTOR TO REFERENCE PROPOSED ROADWAY, STORMWATER, LANDSCAPE ARCHITECTURE AND OTHER IMPROVEMENT SHEETS FOR ADDITIONAL INFORMATION.

5. MANHOLES LOCATED WITHIN FEMA FLOODPLAIN SHALL HAVE WATERTIGHT MANHOLE FRAMES AND COVERS INSTALLED TO PREVENT INFLOW.

CAUTION!!!
EXISTING UNDERGROUND UTILITIES IN AREA CONTACT UTILITY 48 HOURS PRIOR TO CONSTRUCTION

0 10' 20' 40'
HORIZONTAL SCALE
0 2' 4' 8'
VERTICAL SCALE

N

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

PROFILE LEGEND

- PROFILE GRADE LINE
- EXISTING GROUND @ ℄

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
CIVIL
SANITARY SEWER LINE A
STA 32+50 TO STA 37+00

NO.	ISSUES	BY	DATE
1	PRE-AWARD AMEND #1	MRH	4/12/2022

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED CEL
DRAWN SI
REVISED
CHECKED MH
FILE NAME CV-UTL-PP-SSA06.sht

SHEET SSA-6
SEQ. 267

MicroStation V8 User: 90262 Office: On Site
Plotter: \\Wtfs01\Plotters\Xerox AltaLink C8130 PS.pdf Model: Default
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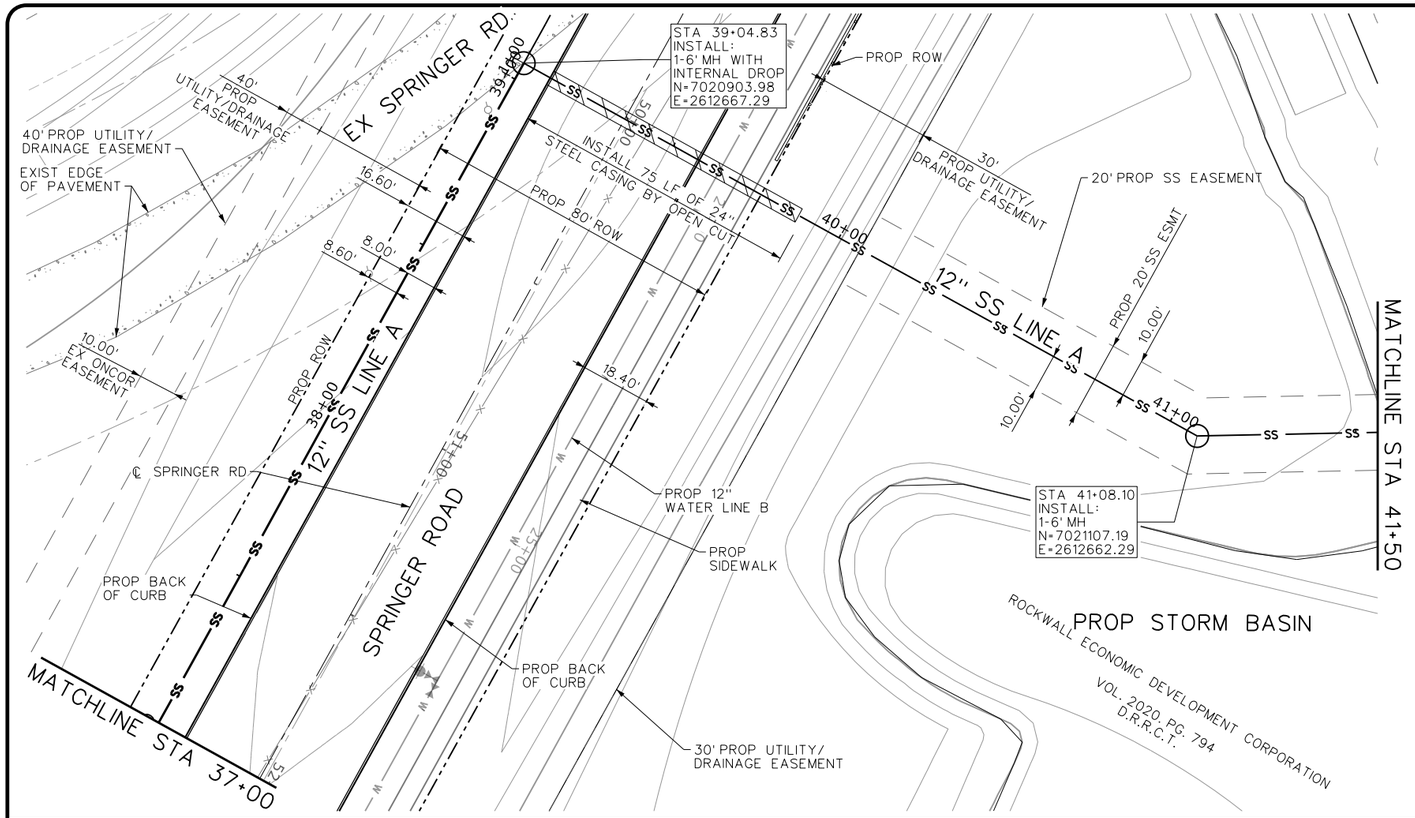

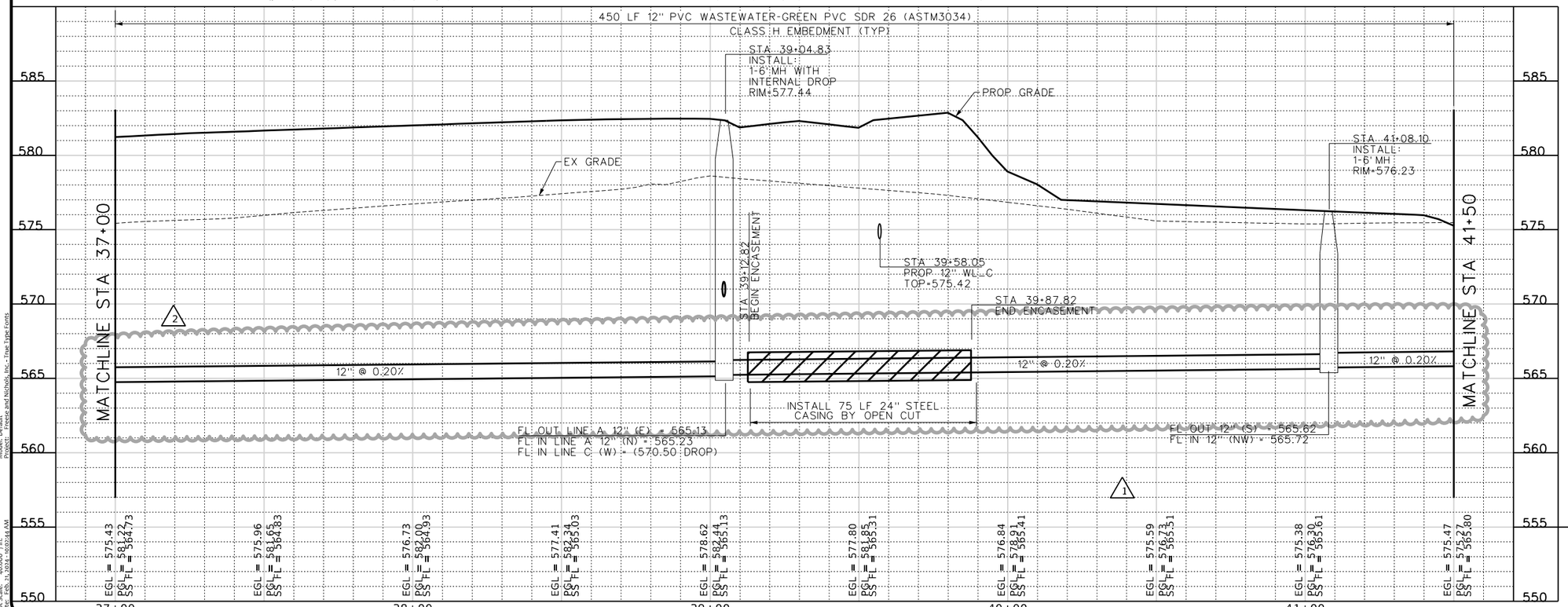

LEGEND

— W — PROP WATERLINE

— SS — PROP SANITARY SEWER

EXIST BLACKLAND WATERLINE

— BW — BLACKLAND WATERLINE

CONCRETE REPAIR

NOTES:
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0 2' 4' 8'
VERTICAL SCALE

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

PROFILE LEGEND

PROFILE GRADE LINE

EXISTING GROUND @ ℄

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

FREESE AND NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2250
Web - www.freese.com

RELEASE FOR PERMIT
THIS DOCUMENT WAS AUTHORIZED BY MICHAEL R. HAGEN
TEXAS NO. 111955 ON 10/21/2021
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NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

SANITARY SEWER LINE A STA 37+00 TO STA 41+50

NO.	ISSUES	BY	DATE
1	PRE-AWARD AMEND #1	MRH	4/12/2022
2	ADDENDUM #3	MRH	11/30/2022

FRN JOB NO. RKW19711
DATE APRIL 2022
DESIGNED CEL
DRAWN SI
REVISED
CHECKED MH
FILE NAME CV-UTL-PP-SSA07.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale accordingly.
0 1"

SHEET SSA-7
SEQ. 268

MicroStation V8 User: 90262 Office: On Site
Plotter: J:\PW\000\Plotter\HP DesignJet T1700dr PostScript.pltcfg Model: Default
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Date: Feb. 21, 2024 - 10:02:44 AM
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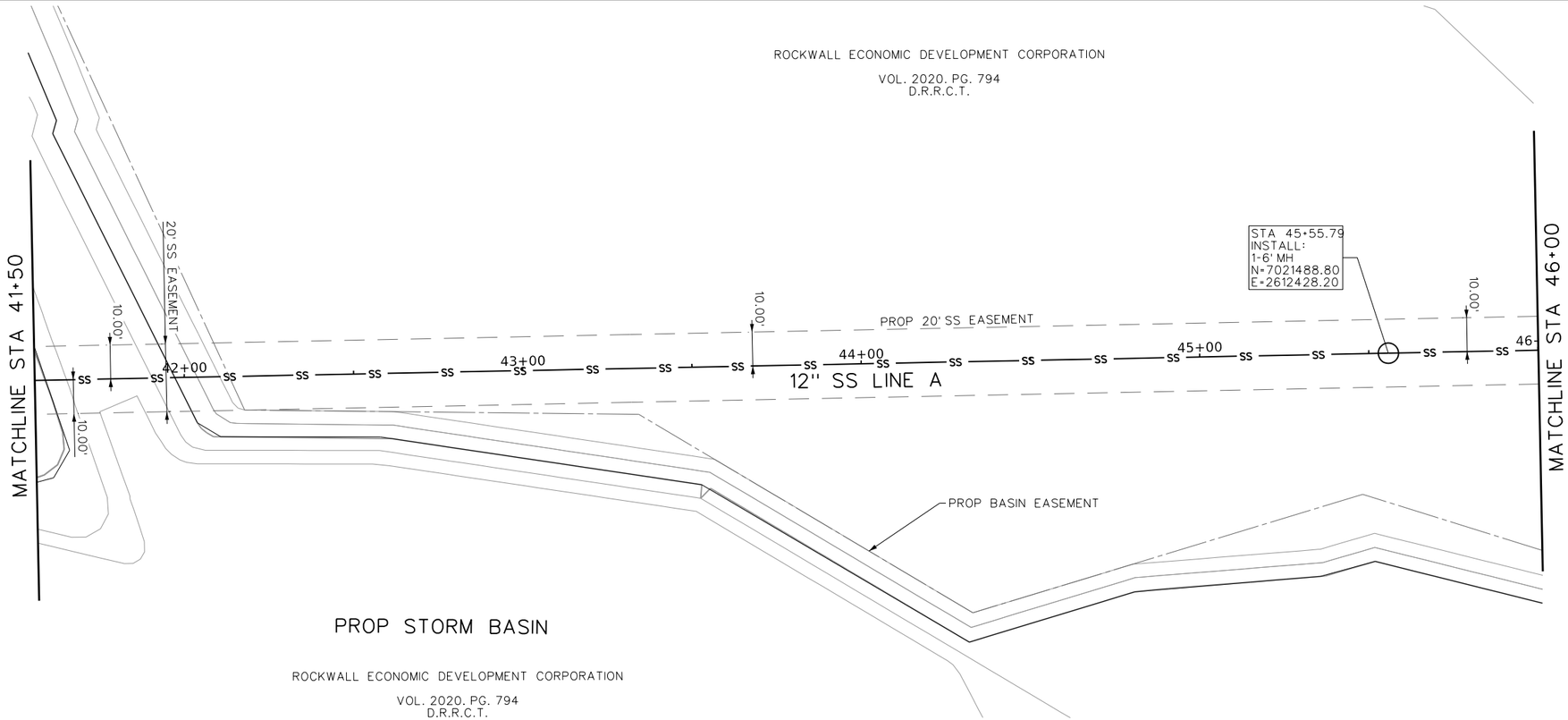

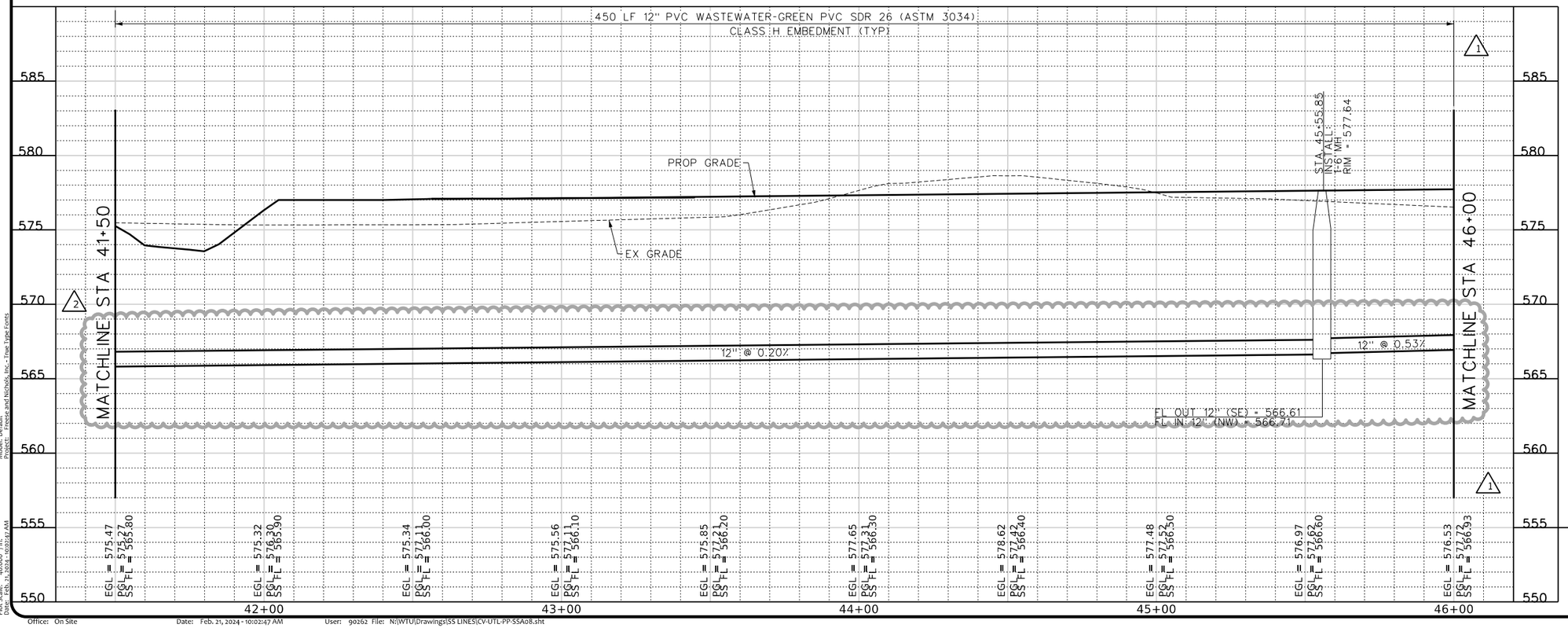

LEGEND

- — W — PROP WATERLINE
- — SS — PROP SANITARY SEWER
- — BW — BLACKLAND WATERLINE
- CONCRETE REPAIR

NOTES:
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0 10' 20' 40'
HORIZONTAL SCALE
0 2' 4' 8'
VERTICAL SCALE

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

PROFILE LEGEND

- PROFILE GRADE LINE
- EXISTING GROUND @ ℄

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASE FOR REVIEW
THIS DOCUMENT WAS ORIGINALLY ISSUED ON 10/21/2021 AND SHOULD NOT BE USED FOR ANY PURPOSE WITHOUT PROPER AUTHORIZATION FROM THE ENGINEER. IT IS UNLAWFUL FOR ANY PERSON TO ALTER THIS DOCUMENT WITHOUT PROPER AUTHORIZATION AND WITHOUT NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.
PRELIMINARY
NOT FOR CONSTRUCTION
PURPOSES
PERMIT
BIDDING
RECORD DRAWING
AS-BUILT

FREESE NICHOLS
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Phone: (214) 217-2200
Fax: (214) 217-2299
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

SANITARY SEWER LINE A STA 41+50 TO STA 46+00

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED CEL
DRAWN SI
CHECKED MH
FILE NAME CV-UTL-PP-SSA08.sht

NO.	ISSUES	BY	DATE
1	PRE-AWARD AMEND #1	MRH	4/12/2022
2	ADDENDUM #3	MRH	11/30/2022

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET SSA-8
SEQ. 269

MicroStation V8 User: 90262 Office: On Site
Platter: J:\JOBS\RKW19711\Drawings\SS LINES\CV-UTL-PP-SSA08.sht
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Date: Feb. 21, 2024 - 10:02:47 AM
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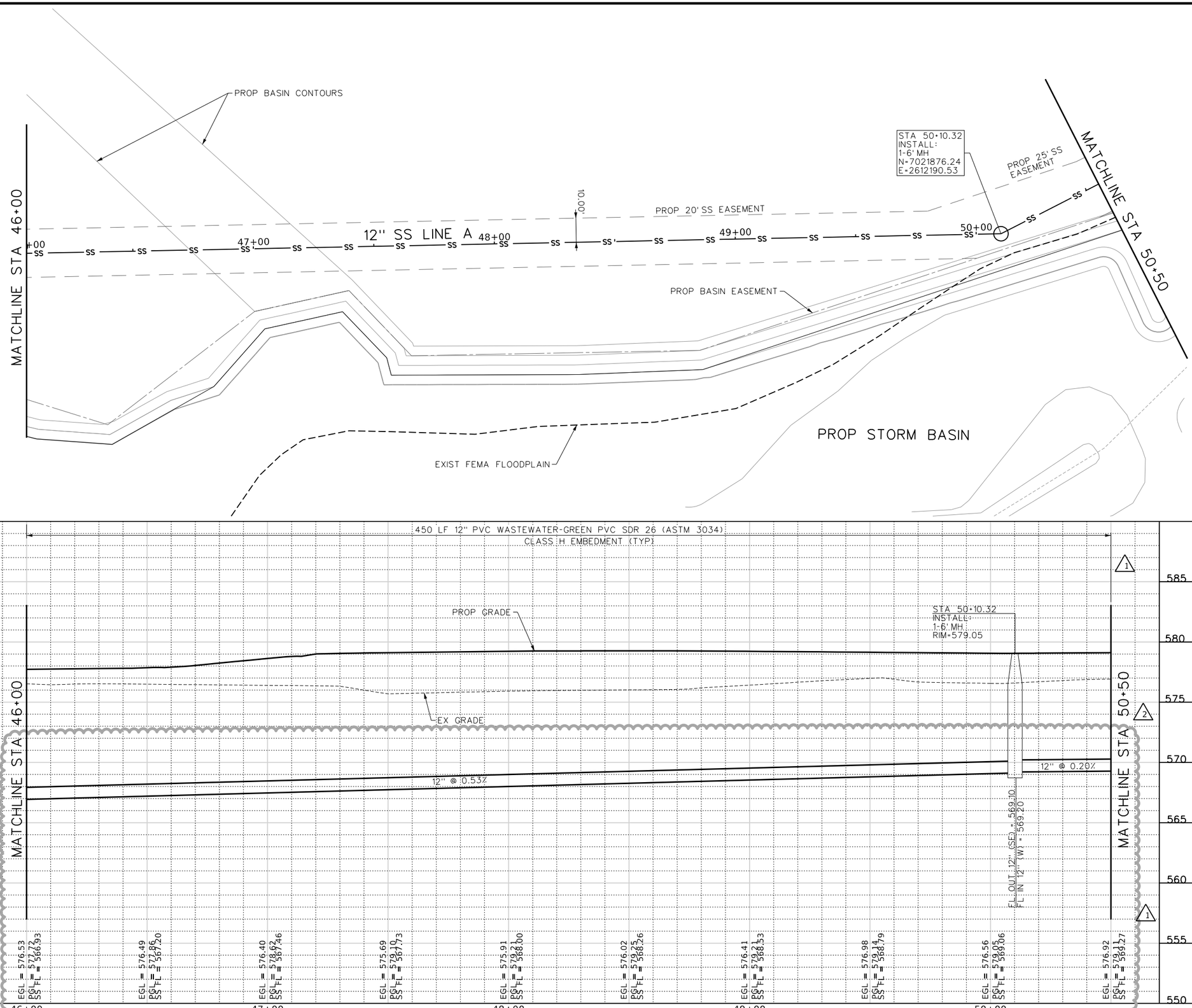
Layer: Default Display: Display Manager



LEGEND

- — W — PROP WATERLINE
- — SS — PROP SANITARY SEWER
- — BW — BLACKLAND WATERLINE
- CONCRETE REPAIR

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RECORD DRAWINGS PREPARED ON:
8/20/2024

PROFILE LEGEND

- PROFILE GRADE LINE
- EXISTING GROUND @ ℄

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

SANITARY SEWER LINE A
STA 46+00 TO STA 50+50

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED CEL
DRAWN SI
REVISED
CHECKED MH
FILE NAME CV-UTL-PP-SSA09.sht

NO.	ISSUES	BY	DATE
1	PRE-AWARD AMEND #1	MRH	4/12/2022
2	ADDENDUM #3	MRH	7/30/2022

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.

SHEET SSA-9
SEQ. 270

MicroStation V8 User: 90262 Office: On Site
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Printer: HP DesignJet T2500 eMFP Monochrome PS
Plot Scale: 40.005' / In.
Plot Date: Feb. 21, 2024 - 10:02:50 AM
Model: Default
Projects - Freese and Nichols, Inc., True Type Fonts

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
VOL.2020.PG.794
D.R.R.C.T.

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
VOL.5528.PG.194
D.R.R.C.T.

EXIST FEMA FLOODPLAIN

STA 54+89.23
INSTALL:
1-6' MH
N=7022088.71
E=2611773.93

STA 54+04.05
SS LINE B STA. 1+00.00
INSTALL:
1-6' MH WITH
INTERNAL DROP
N=7022580.36
E=2612956.94

MATCHLINE STA 50+50

MATCHLINE STA 55+00

25' PROP SS EASEMENT

10.00'

25.00'

12" SS LINE A

PROP SD LINE A3

40' PROP UTILITY/ DRAINAGE EASEMENT

INSTALL 15' LF 24" STEEL CASING BY OPEN CUT

INSTALL 31 LF 24" STEEL CASING BY OPEN CUT

℄ DISCOVERY BLVD

PROP BASIN EASEMENT

PROP ROW

PROP 12" SS LINE B

PROP 85' ROW

PROP SD LINE A1

PROP 8'x5' RCB STORM DRAIN

PROP BACK OF CURB

PROP WATER LINE B

PROP CUVERT 3 HEADWALL

PROP CULVERT 3

PROP STORM BASIN

DISCOVERY BLVD.

12" SS LINE B

PROP 40' ESMT UTILITY/ DRAINAGE EASEMENT

LEGEND

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- — SS — PROP SANITARY SEWER
- — BW — BLACKLAND WATERLINE
- CONCRETE REPAIR

NOTES:
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450 LF 12" PVC WASTEWATER-GREEN PVC SDR 26 (ASTM 3034)
CLASS H EMBEDMENT (TYP)

STA 54+04.05
INSTALL:
1-6' MH WITH
INTERNAL DROP
RIM=583.92

STA 54+89.23
INSTALL:
1-6' MH
RIM=584.00

PROP GRADE

EX GRADE

STA 53+67.38
BEGIN ENCASEMENT

STA 53+98.38
END ENCASEMENT

STA 54+15.59
BEGIN ENCASEMENT

STA 54+23.09
PROP 21" RCP (LAT A12)
FL 576.68

STA 54+30.59
END ENCASEMENT

12" @ 0.20%

15.00'

INSTALL 15 LF 24" STEEL CASING BY OPEN CUT

31'

INSTALL 31 LF 24" STEEL CASING BY OPEN CUT

STA 53+78.55
PROP SD LINE A3
5'x4' RCB
FL 573.92

OUT LINE A FL (SE) = 569.97
IN LINE A FL (W) = 572.45 (DROP)
IN LINE B FL (NW) = 570.55

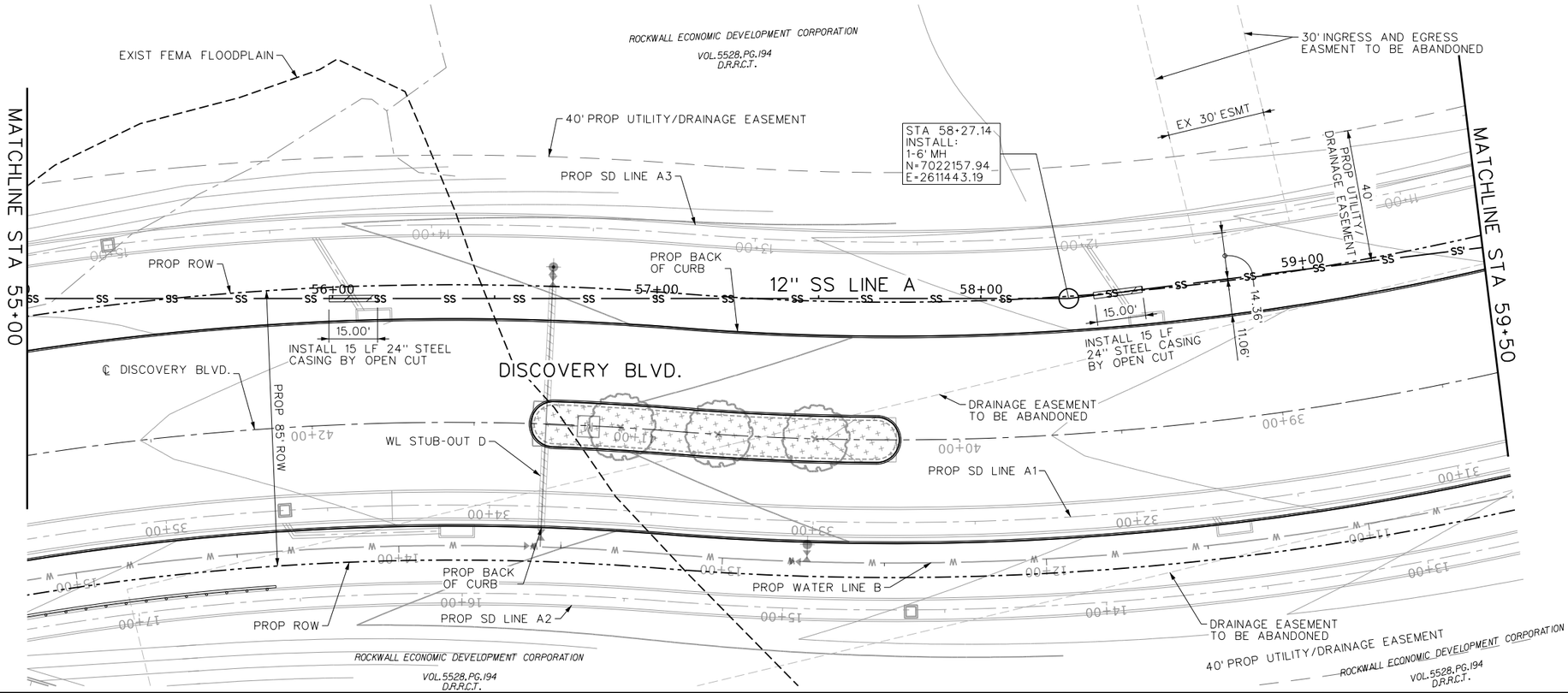
12" @ 0.86%

FL OUT 12" (E) = 572.61
FL IN 12" (W) = 572.71

MATCHLINE STA 50+50

MATCHLINE STA 55+00

| | | |



LEGEND

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- — SS — PROP SANITARY SEWER
- — BW — BLACKLAND WATERLINE
- CONCRETE REPAIR

NOTES:

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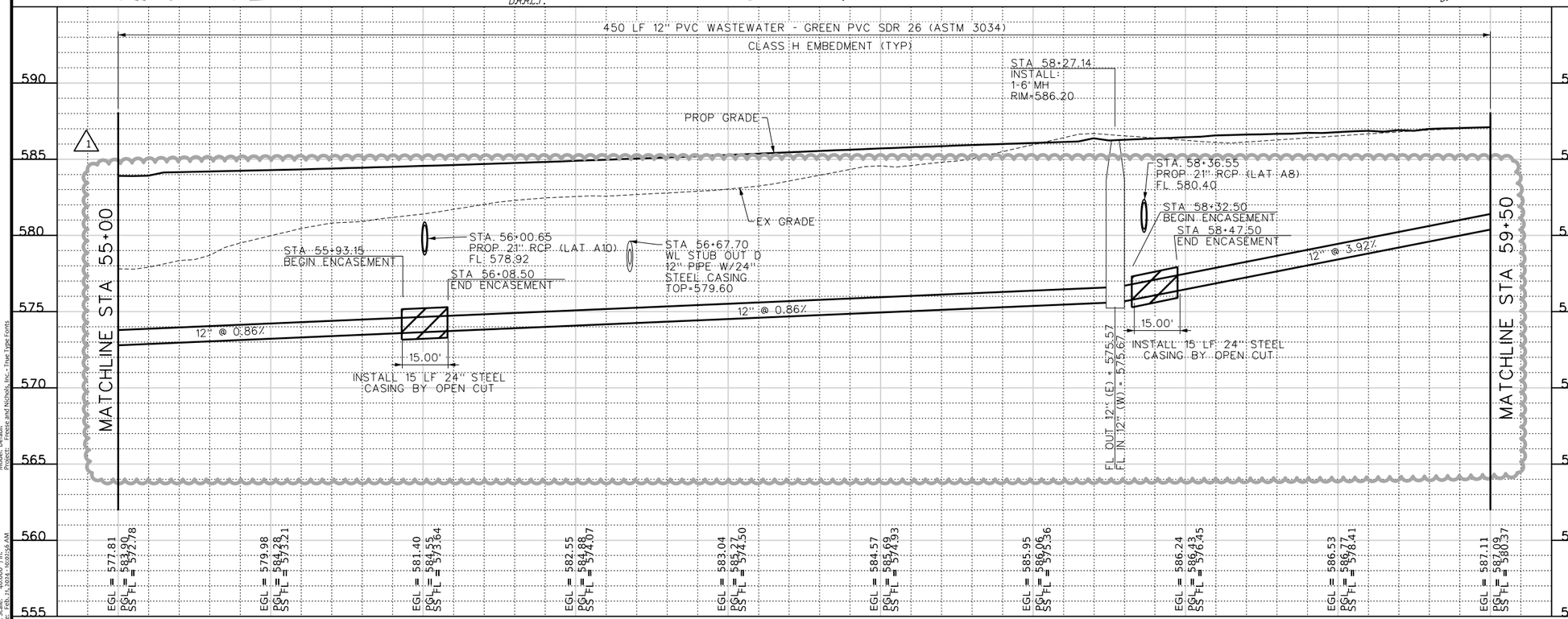
2. EXISTING POWER POLES SOUTH OF HWY 276 ARE TO BE PROTECTED AND SUPPORTED DURING CONSTRUCTION ACTIVITIES. EXISTING POWER POLE LOCATED NORTH OF HWY 276 WILL BE RELOCATED BEFORE UTILITY CONSTRUCTION BEGINS AS DETERMINED BY THE CITY OF ROCKWALL.
3. STEEL CASING SHALL HAVE THICKNESS OF 0.25 INCHES.
4. CONTRACTOR TO REFERENCE PROPOSED ROADWAY, STORMWATER, LANDSCAPE ARCHITECTURE AND OTHER IMPROVEMENT SHEETS FOR ADDITIONAL INFORMATION.
5. MANHOLES LOCATED WITHIN FEMA FLOODPLAIN SHALL HAVE WATERTIGHT MANHOLE FRAMES AND COVERS INSTALLED TO PREVENT INFLOW.



CAUTION!!!
EXISTING UNDERGROUND UTILITIES IN AREA CONTACT UTILITY 48 HOURS PRIOR TO CONSTRUCTION

0 10' 20' 40'
HORIZONTAL SCALE

0 2' 4' 8'
VERTICAL SCALE

N

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2020

PROFILE LEGEND

- PROFILE GRADE LINE
- EXISTING GROUND @ ℄

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASE FOR PERMIT
THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW UNDER THE AUTHORITY OF MICHAEL R. HAGEN TEXAS NO. 111955 ON 10/21/2021 IT IS NOT TO BE USED FOR BIDDING OR CONSTRUCTION PURPOSES.

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2250
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

SANITARY SEWER LINE A
STA 55+00 TO STA 59+50

NO.	ISSUES	BY	DATE	FILE NAME
1	PRE-AWARD AMEND #1	MRH	4/12/2022	CV-UTL-PP-SSA11.sht

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED CEL
DRAWN SI
REVISED
CHECKED MH

SHEET
SSA-11
SEQ.
272

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

MicroStation V8 User: 90262 Office: On Site
Plotter: \\PW001\Drawings\SS LINES\CV-UTL-PP-SSA11.sht
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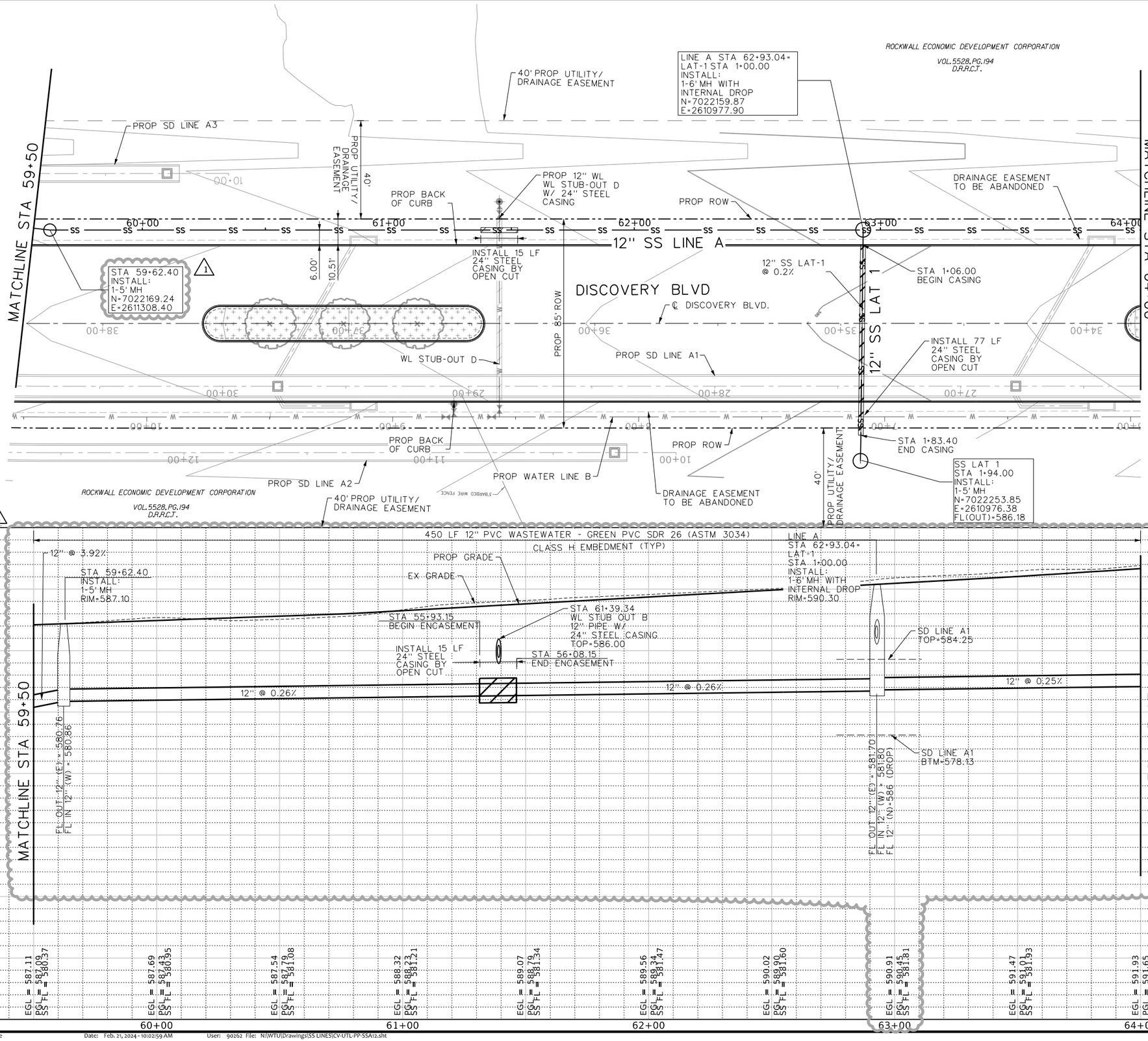
Plot Date: Feb. 21, 2024 - 10:02:56 AM Project: Freese and Nichols, Inc. - True Type Fonts



LEGEND

- — W — PROP WATERLINE
- — SS — PROP SANITARY SEWER
- — BW — BLACKLAND WATERLINE
- CONCRETE REPAIR

NOTES:
1. CONTRACTOR SHALL VERIFY LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO MANUFACTURING OF PRODUCTS.

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CAUTION!!!
EXISTING UNDERGROUND UTILITIES IN AREA CONTACT UTILITY 48 HOURS PRIOR TO CONSTRUCTION

0 10' 20' 40'
HORIZONTAL SCALE
0 2' 4' 8'
VERTICAL SCALE

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

PROFILE LEGEND

- PROFILE GRADE LINE
- EXISTING GROUND @ ℄

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASED FOR THE PURPOSES OF REVIEW UNDER THE AUTHORITY OF MICHAEL R. HAGEN TEXAS NO. 119555 ON 10/21/2021 IT IS NOT TO BE USED FOR BIDDING OR CONSTRUCTION PURPOSES. THIS DOCUMENT WAS PREPARED UNDER 22 TAC 137.33 WRITTEN AUTHORIZATION OR ADOPTION OF THIS DOCUMENT BY ANY PERSON OTHER THAN THE AUTHOR FOR ANY PURPOSE WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE NICHOLS
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Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2299
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

SANITARY SEWER LINE A STA 59+50 TO STA 64+00

NO.	ISSUES	BY	DATE
1	PRE-AWARD AMEND #1	MRH	4/12/2022

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED CEL
DRAWN SI
REVISED
CHECKED MH
FILE NAME CV-UTL-PP-SSA12.sht

SHEET SSA-12
SEQ. 273

MicroStation V8 User: 90262 Office: On Site
Plotter: HP DesignJet T1700dr PS Model: Default
Plot Scale: 40.000 ' / in. Project: Freese and Nichols, Inc. - Time Type Fonts
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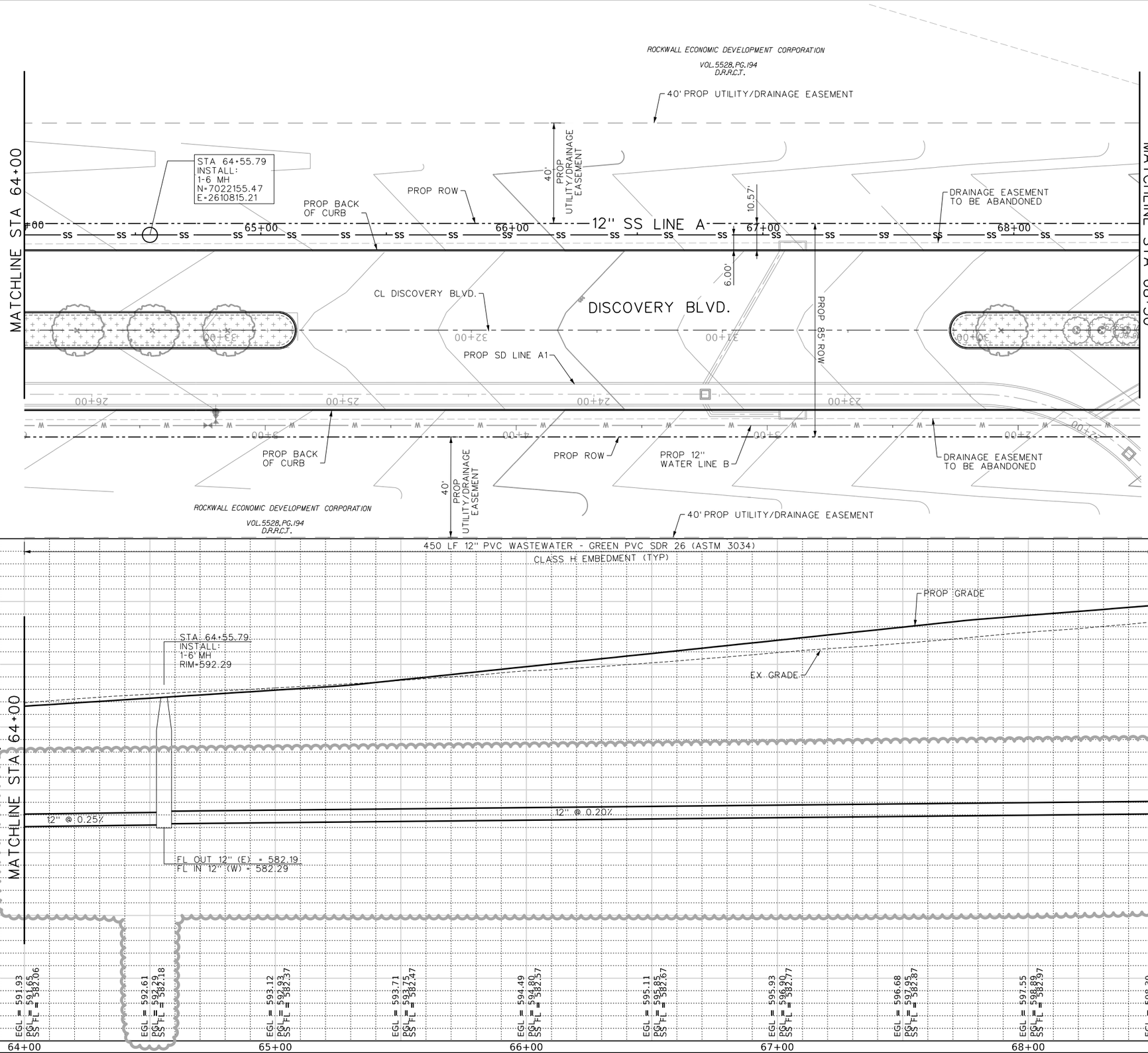

LEGEND

- — W — PROP WATERLINE
- — SS — PROP SANITARY SEWER
- — BW — BLACKLAND WATERLINE
- CONCRETE REPAIR

NOTES:

1. CONTRACTOR SHALL VERIFY LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO MANUFACTURING OF PRODUCTS.
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CAUTION!!!
EXISTING UNDERGROUND UTILITIES IN AREA CONTACT UTILITY 48 HOURS PRIOR TO CONSTRUCTION

0 10' 20' 40'
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0 2' 4' 8'
VERTICAL SCALE

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RECORD DRAWINGS PREPARED ON: 8/20/2024

PROFILE LEGEND

- PROFILE GRADE LINE
- EXISTING GROUND @ ℄

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASED FOR REVIEW ON 10/21/2021
AUTHORIZED BY MICHAEL R. HAGEN
TEXAS NO. 119055 ON 10/21/2021
IT IS A VIOLATION OF LAW TO USE THIS DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE NICHOLS
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Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2250
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

SANITARY SEWER LINE A STA 64+00 TO STA 68+50

NO.	ISSUES	BY	DATE
1	PRE - AWARD AMEND # 1	MRH	4/12/2022

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED CEL
DRAWN SI
REVISED
CHECKED MH
FILE NAME CV-UTL-PP-SSA13.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET SSA-13
SEQ. 274

MicroStation V8 User: 90262 Office: On Site
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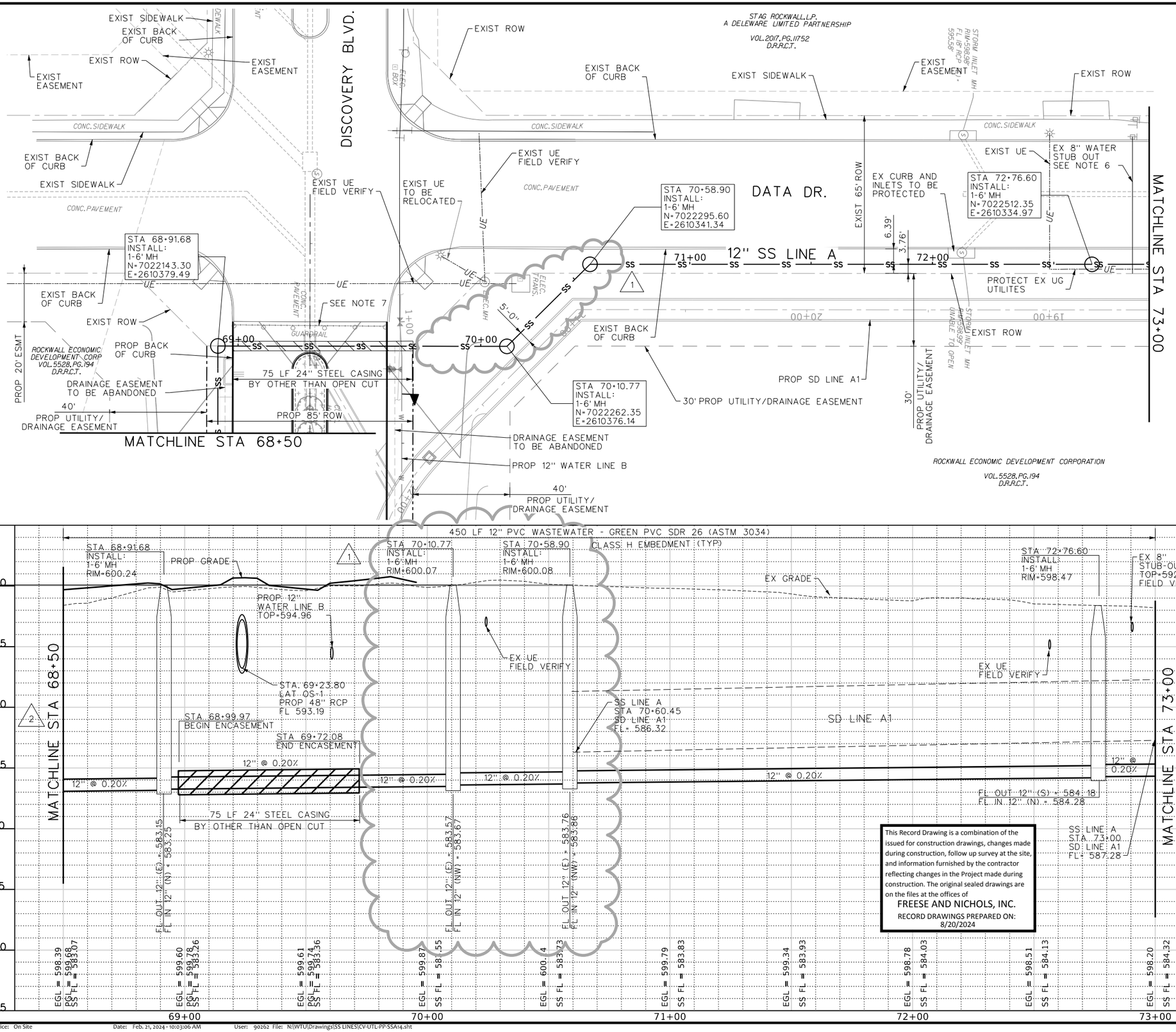

LEGEND

- — W — PROP WATERLINE
- — SS — PROP SANITARY SEWER
- — BW — BLACKLAND WATERLINE
- CONCRETE REPAIR

NOTES:

1. CONTRACTOR SHALL VERIFY LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO MANUFACTURING OF PRODUCTS.
2. EXISTING POWER POLES SOUTH OF HWY 276 ARE TO BE PROTECTED AND SUPPORTED DURING CONSTRUCTION ACTIVITIES. EXISTING POWER POLE LOCATED NORTH OF HWY 276 WILL BE RELOCATED BEFORE UTILITY CONSTRUCTION BEGINS AS DETERMINED BY THE CITY OF ROCKWALL.
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5. MANHOLES LOCATED WITHIN FEMA FLOODPLAIN SHALL HAVE WATERTIGHT MANHOLE FRAMES AND COVERS INSTALLED TO PREVENT INFLOW.
6. EXISTING WATER STUB-OUTS TO BE PROTECTED DURING CONSTRUCTION. UPON INSTALLATION OF SANITARY SEWER PIPE, STUB OUT IS TO BE EXTENDED TO 8 FEET OF THE SANITARY SEWER CENTERLINE.
7. EXISTING GUARDRAIL TO BE REMOVED AS PART OF DISCOVERY BLVD CONSTRUCTION.

CAUTION!!!
EXISTING UNDERGROUND UTILITIES IN AREA CONTACT UTILITY 48 HOURS PRIOR TO CONSTRUCTION

0 10' 20' 40'
HORIZONTAL SCALE
0 2' 4' 8'
VERTICAL SCALE

8. WHERE CONSTRUCTION ENDANGERS ADJACENT STRUCTURES, UTILITIES, EMBANKMENTS AND/OR ROADWAYS, LIGHT POLES, POLE BASE FOUNDATIONS, AND ASSOCIATED ELECTRICAL CONDUITS AND CONDUCTORS, THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, CAREFULLY SUPPORT AND PROTECT SUCH STRUCTURES SO THAT NO DAMAGE OCCURS THROUGHOUT THE CONSTRUCTION PROCESS. IN CASE DAMAGE SHOULD OCCUR, THE CONTRACTOR SHALL BE RESPONSIBLE FOR RESTORING THE DAMAGED STRUCTURE TO A CONDITION ACCETABLE TO THE OWNER OF THAT STRUCTURE AND SHALL BEAR ALL COST OF SUCH REPARATIONS.

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

PROFILE LEGEND

- PROFILE GRADE LINE
- EXISTING GROUND @ ℄

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASED FOR THE PURPOSES OF INTERIM REVIEW ONLY
THIS DOCUMENT WAS AUTHORIZED BY MICHAEL R. HAGEN
TEXAS NO. 111955 ON 10/21/2021
IT IS NOT TO BE USED FOR BIDDING OR CONSTRUCTION PURPOSES
ALTERATION OF THIS DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

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Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2299
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

SANITARY SEWER LINE A STA 68+50 TO STA 73+00

NO.	ISSUES	BY	DATE	FILE NAME
1	RFI-15	JS	07/21/23	CV-UTL-PP-SSA14.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED CEL
DRAWN SI
REVISED
CHECKED MH

SHEET SSA-14
SEQ. 275

MicroStation V8 User: 90262 Office: On Site
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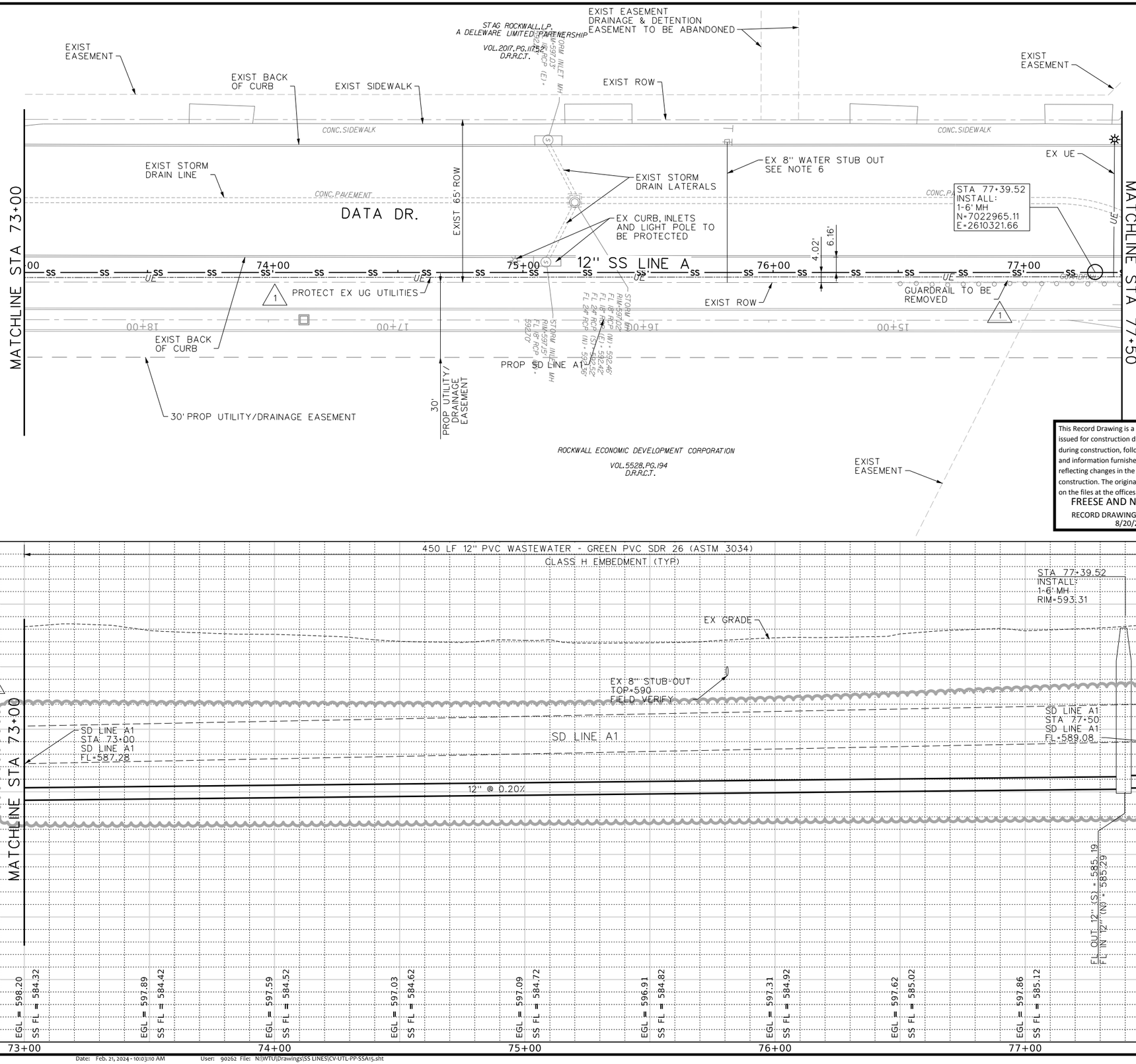
Date: Feb. 21, 2024 - 10:03:06 AM
Project: Freese and Nichols, Inc. - True Type Fonts



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FREESE AND NICHOLS, INC.

RECORD DRAWINGS PREPARED ON: 8/20/2024

LEGEND

- —W— PROP WATERLINE
- —SS— PROP SANITARY SEWER
- —BW— BLACKLAND WATERLINE
- CONCRETE REPAIR

NOTES:

1. CONTRACTOR SHALL VERIFY LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO MANUFACTURING OF PRODUCTS.
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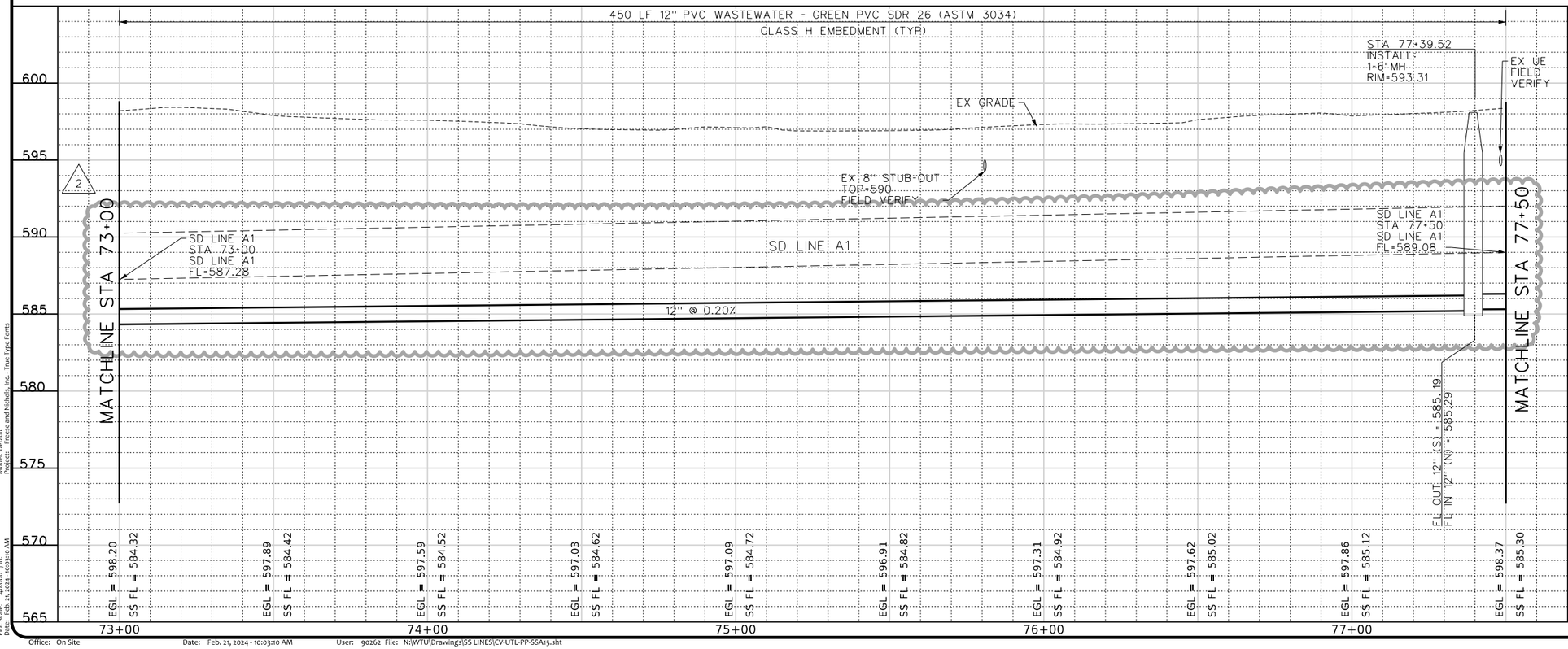
6. EXISTING WATER STUB-OUTS TO BE PROTECTED DURING CONSTRUCTION. UPON INSTALLATION OF SANITARY SEWER PIPE, STUB OUT IS TO BE EXTENDED TO 8 FEET OF THE SANITARY SEWER CENTERLINE.



CAUTION!!!
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0 10' 20' 40'
HORIZONTAL SCALE

0 2' 4' 8'
VERTICAL SCALE

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PROFILE LEGEND

- PROFILE GRADE LINE
- EXISTING GROUND @ ℄

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASE: THIS DOCUMENT IS RELEASED ON THIS DOCUMENT WAS AUTHORIZED BY MICHAEL R. HAGEN TEXAS NO. 111955 ON 10/21/2021 FOR INTERIM REVIEW PURPOSES. IT IS NOT TO BE USED WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE NICHOLS
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Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2201
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

SANITARY SEWER LINE A STA 73+00 TO STA 77+50

F&N JOB NO. RKW19711

NO.	ISSUES	BY	DATE
1	PRE-AWARD AMEND #1	MRH	4/12/2022
2	ADDENDUM #2	MH	11/17/21

DATE APRIL 2022 | DESIGNED CEL | DRAWN SI | REVISED | CHECKED MH | FILE NAME CV-UTL-PP-SSA15.sht

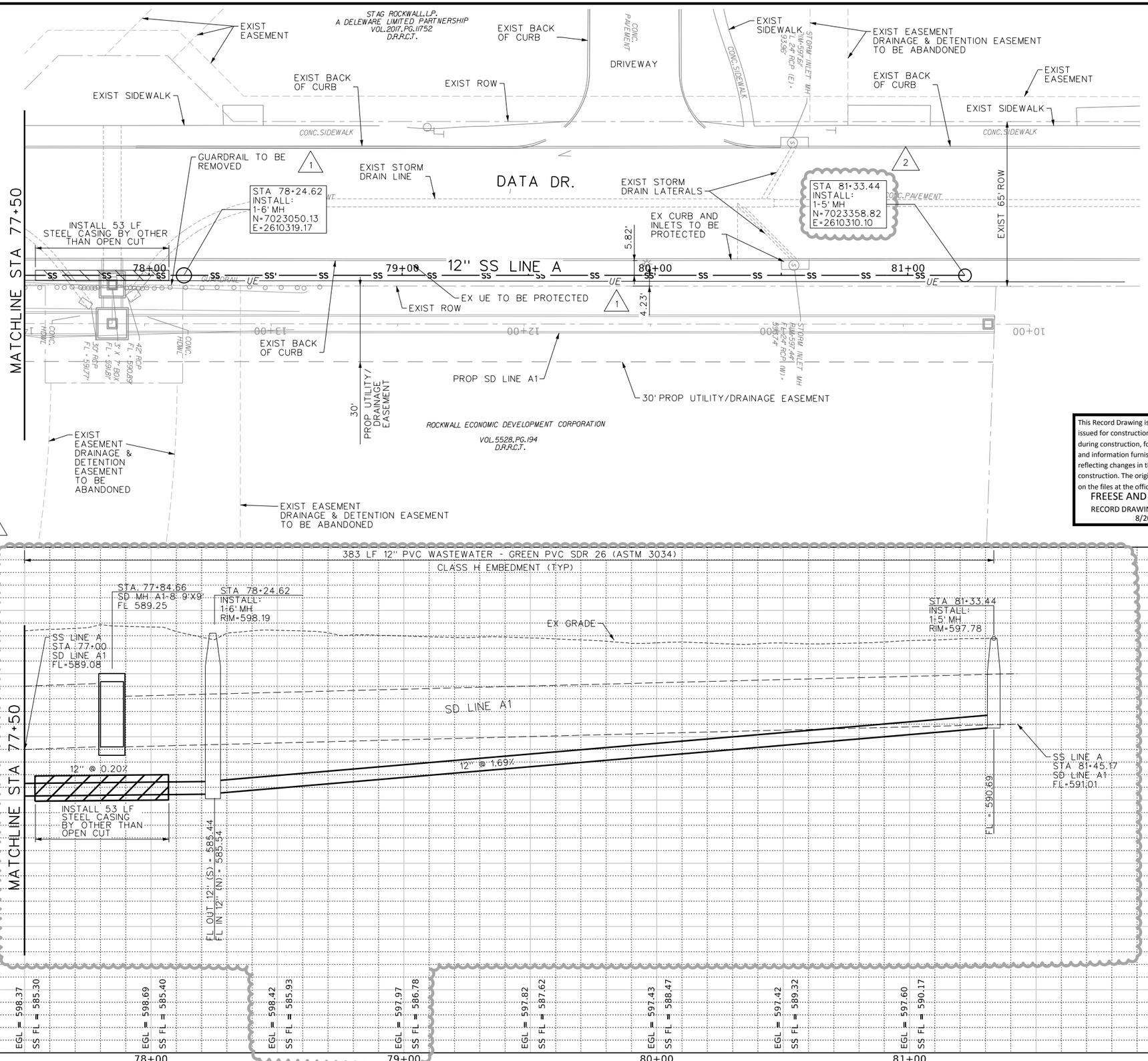
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

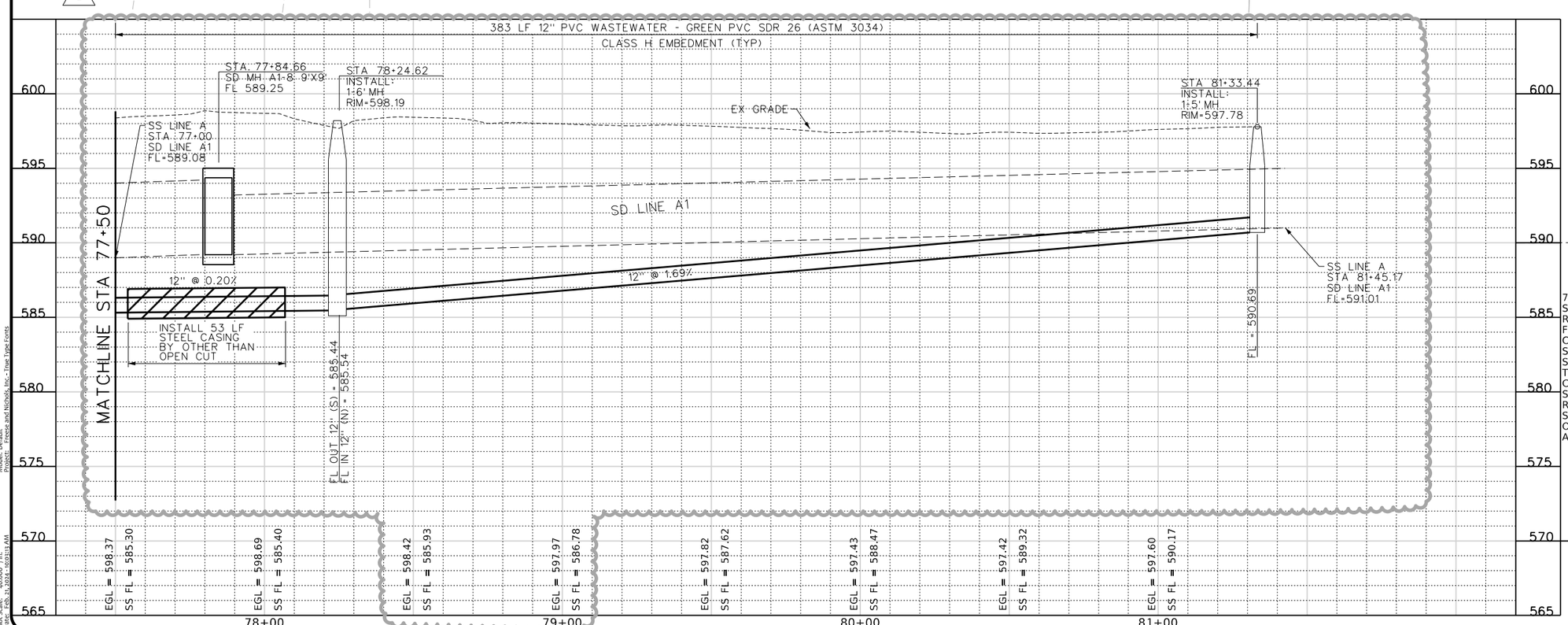
SHEET SSA-15

SEQ. 276

MicroStation V8 User: 90262 Office: On Site
Plotter: HP Designjet T1700dr PS (24.00in Roll) Plot Scale: 40.000 ' / in. Plot Date: Feb. 21, 2024 - 10:03:10 AM
Model: Default Project: Freese and Nichols, Inc.-True Type Fonts

Office: On Site Date: Feb. 21, 2024 - 10:03:10 AM User: 90262 File: N:\WTU\Drawings\SS LINES\CV-UTL-PP-SSA15.sht





LEGEND

- — W — PROP WATERLINE
- — SS — PROP SANITARY SEWER
- — BW — BLACKLAND WATERLINE
- CONCRETE REPAIR

NOTES:

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RECORD DRAWINGS PREPARED ON: 8/20/2024

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0 2' 4' 8'
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PROFILE LEGEND

- PROFILE GRADE LINE
- EXISTING GROUND @ ℄

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASED FOR REVIEW ONLY. NOT INTENDED OR SUITABLE FOR BIDDING, PERMITTING, CONSTRUCTION, OR RECORDING PURPOSES. PREPARED BY MICHAEL R. HAGEN, TEXAS NO. 119055, ON 10/21/2021. IT IS A VIOLATION OF LAW FOR ANY PERSON TO MODIFY THIS DOCUMENT WITHOUT PROPER AUTHORIZATION AND NOTIFICATION OF THE RESPONSIBLE ENGINEER. IT IS ALSO A VIOLATION OF LAW FOR ANY PERSON TO MODIFY THIS DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

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Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

SANITARY SEWER LINE A STA 77+50 TO END

NO.	ISSUES	BY	DATE
2	PRE-AWARD AMEND #1	MRH	4/12/2022
1	ADDENDUM #2	MH	11/17/21

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED CEL
DRAWN SI
REVISED
CHECKED MH
FILE NAME CV-UTL-PP-SSA16.sht

SHEET SSA-16
SEQ. 277

MicroStation V8 User: 90262 Office: On Site
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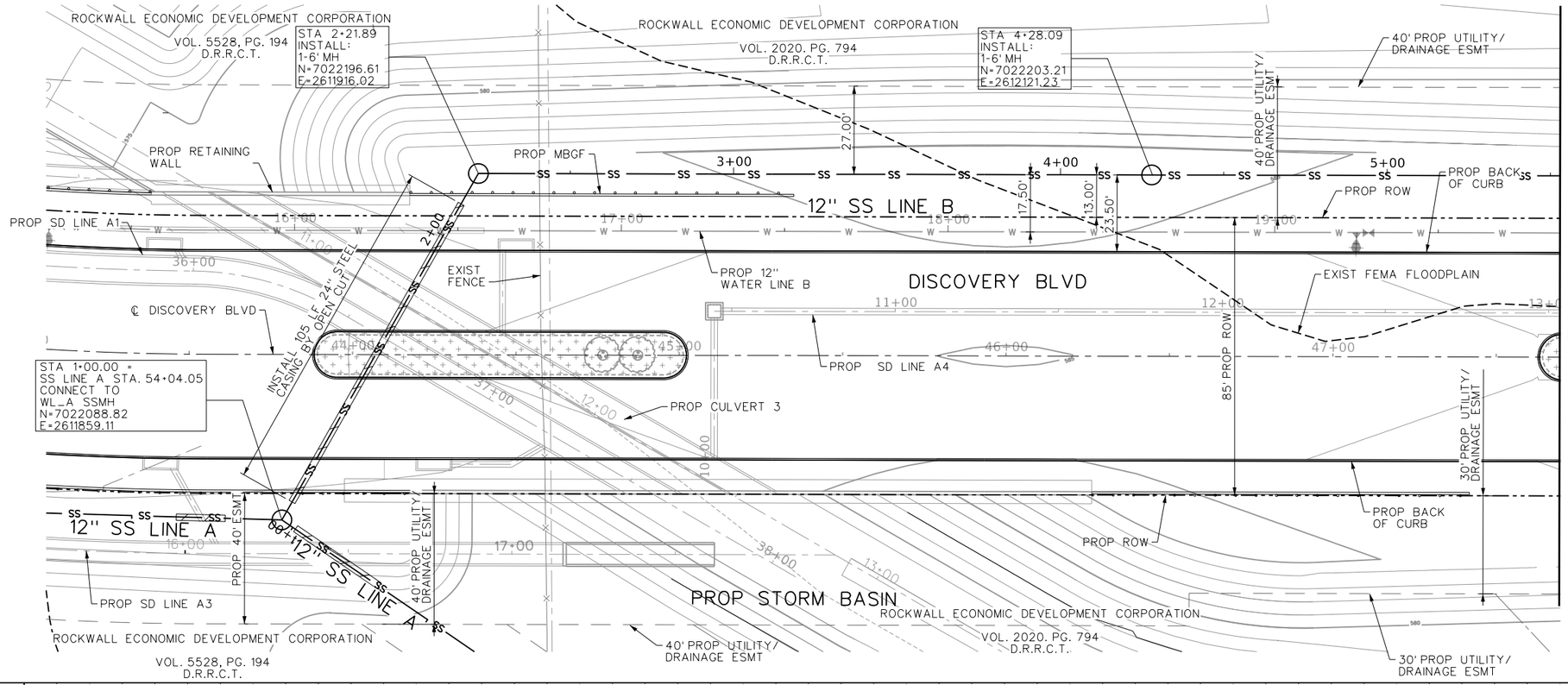

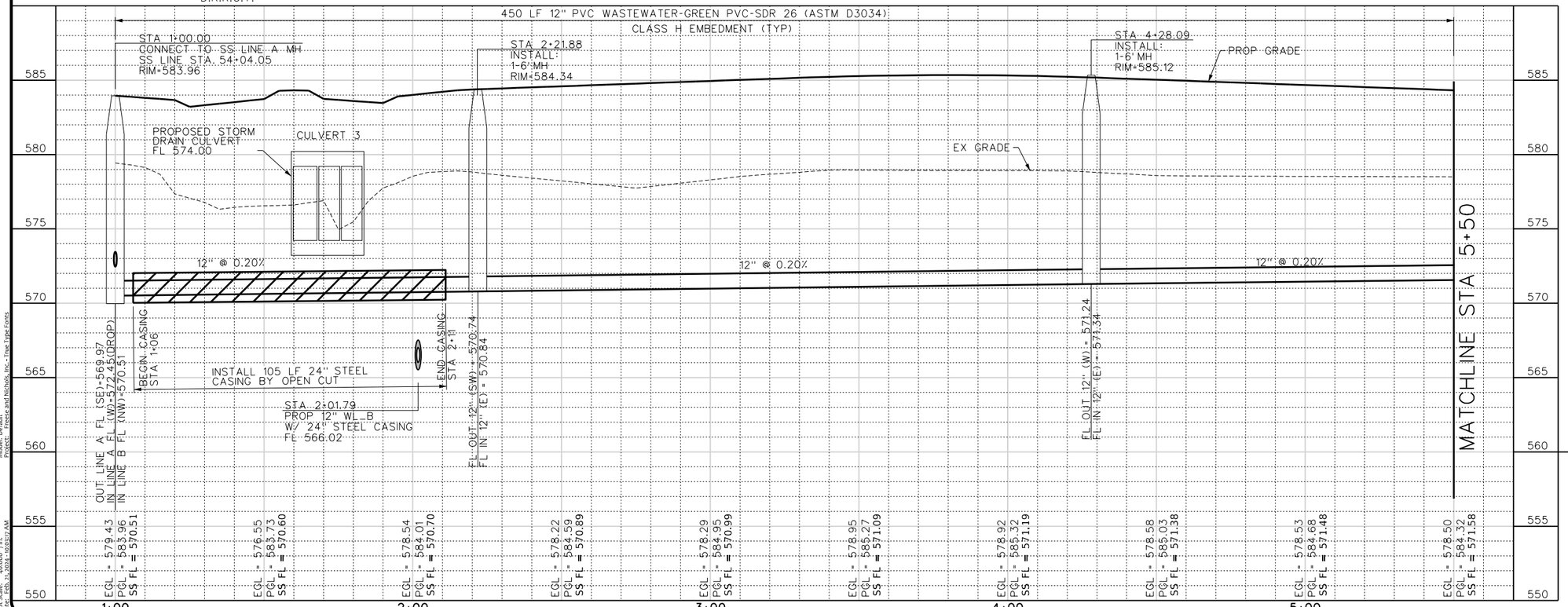

LEGEND

- — W — PROP WATERLINE
- — SS — PROP SANITARY SEWER
- — BW — BLACKLAND WATERLINE
- CONCRETE REPAIR

NOTES:
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3. STEEL CASING SHALL HAVE THICKNESS OF 0.25 INCHES.

4. CONTRACTOR TO REFERENCE PROPOSED ROADWAY, STORMWATER, LANDSCAPE ARCHITECTURE AND OTHER IMPROVEMENT SHEETS FOR ADDITIONAL INFORMATION.

5. MANHOLES LOCATED WITHIN FEMA FLOODPLAIN SHALL HAVE WATERTIGHT MANHOLE FRAMES AND COVERS INSTALLED TO PREVENT INFLOW.

CAUTION!!!
EXISTING UNDERGROUND UTILITIES IN AREA CONTACT UTILITY 48 HOURS PRIOR TO CONSTRUCTION

0 10' 20' 40'
HORIZONTAL SCALE
0 2' 4' 8'
VERTICAL SCALE

N

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

PROFILE LEGEND

- PROFILE GRADE LINE
- EXISTING GROUND @ ℄

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASED FOR REVIEW ONLY
THIS DOCUMENT WAS AUTHORIZED BY MICHAEL R. HAGEN
TEXAS NO. 119555 ON 10/21/2021
IT SHALL NOT BE USED FOR BIDDING PURPOSES

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2299
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

SANITARY SEWER LINE B
BEGIN TO STA 5+50

NO.	ISSUES	BY	DATE

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale!
0 1"

FAN JOB NO.	RKW19271
DATE	APRIL 2022
DESIGNED	CEL
DRAWN	SI
REVISED	XXX
CHECKED	MH
FILE NAME	cv-trt-pl-UTIL-SSB-1.sht

SHEET
SSB-1
SEQ.
278

MicroStation V8 User: 90262 Office: On Site
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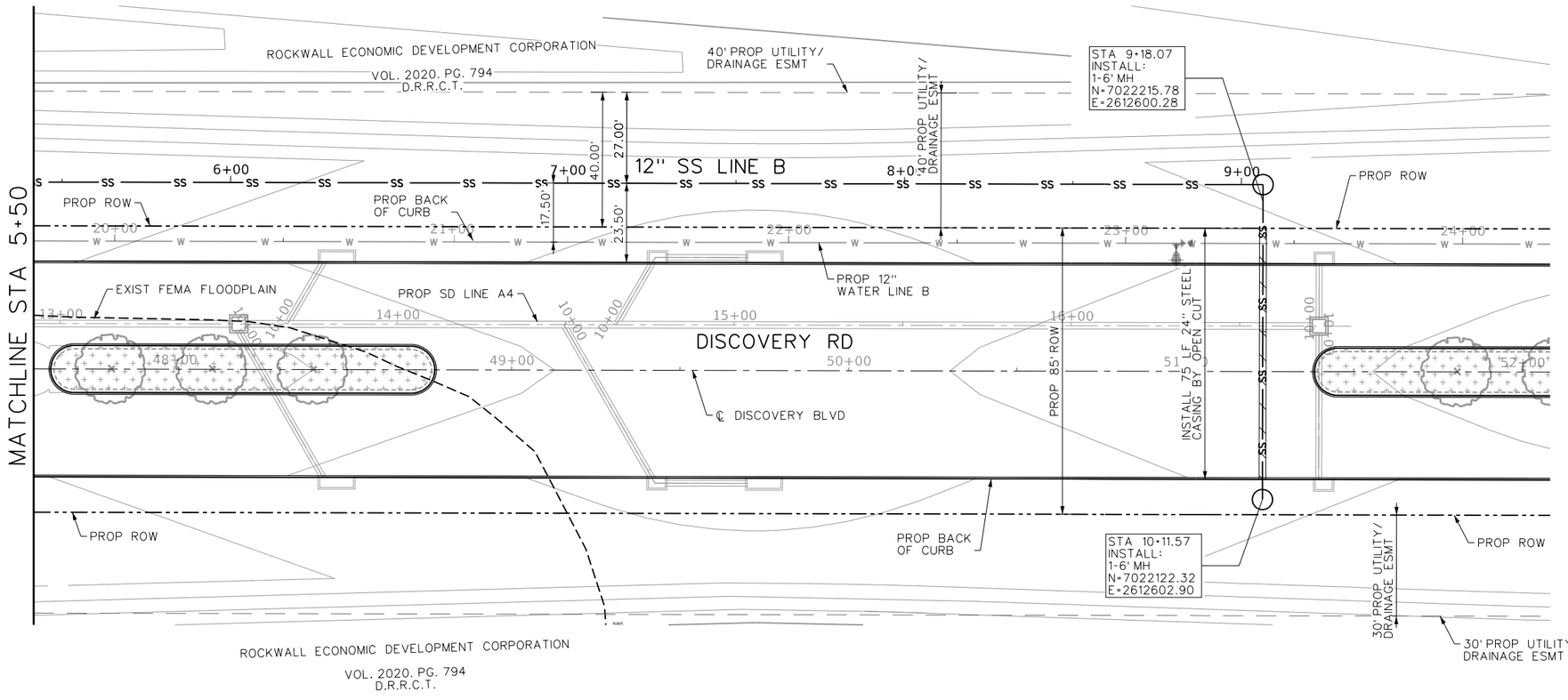

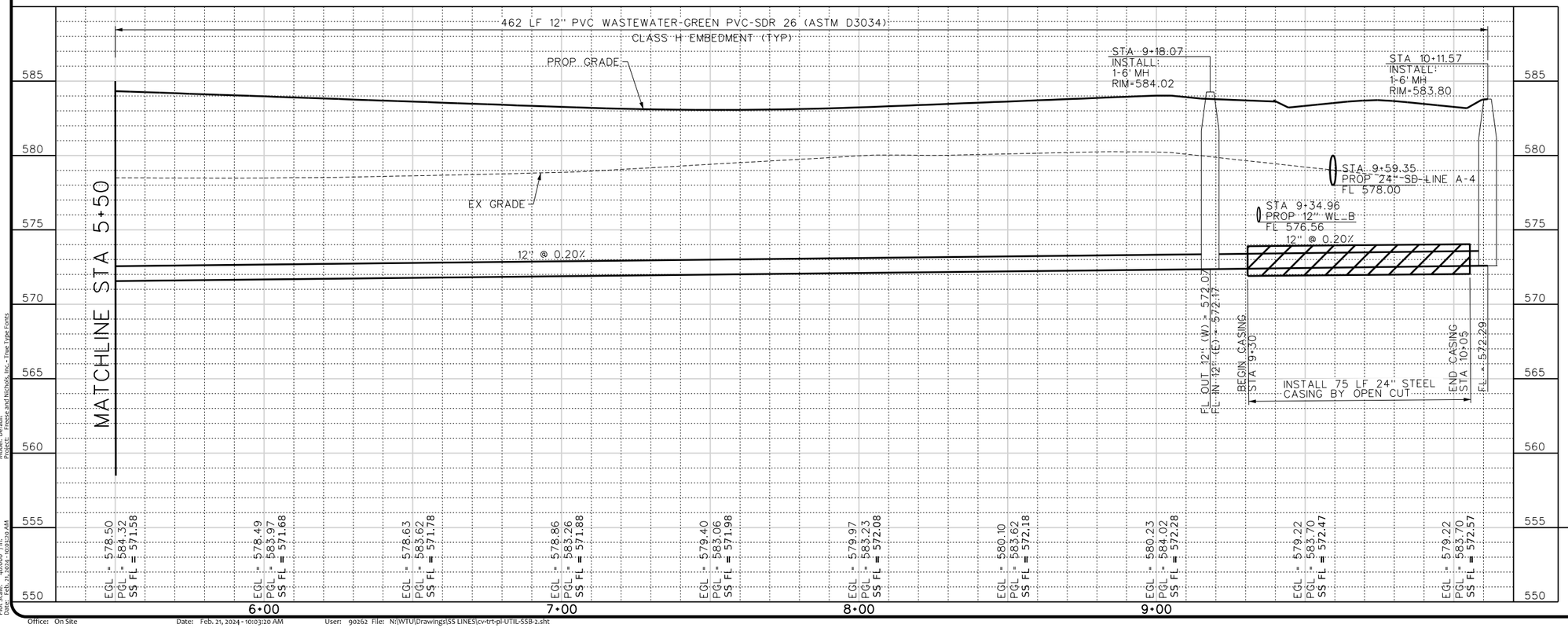

LEGEND

- — W — PROP WATERLINE
- — SS — PROP SANITARY SEWER
- — BW — BLACKLAND WATERLINE
- CONCRETE REPAIR

NOTES:
1. CONTRACTOR SHALL VERIFY LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO MANUFACTURING OF PRODUCTS.

2. EXISTING POWER POLES SOUTH OF HWY 276 ARE TO BE PROTECTED AND SUPPORTED DURING CONSTRUCTION ACTIVITIES. EXISTING POWER POLE LOCATED NORTH OF HWY 276 WILL BE RELOCATED BEFORE UTILITY CONSTRUCTION BEGINS AS DETERMINED BY THE CITY OF ROCKWALL.

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0 10' 20' 40'
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0 2' 4' 8'
VERTICAL SCALE

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

PROFILE LEGEND

- PROFILE GRADE LINE
- EXISTING GROUND @ ℄

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

FREESE AND NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2299
Web - www.freese.com

RELEASE THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY MICHAEL R. HAGEN
TEXAS NO. 111955 ON 10/21/2021
IT IS NOT TO BE USED OR VIEWED OR RELIED UPON WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

SANITARY SEWER LINE B STA 5+50 TO END

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED CEL
DRAWN SI
REVISED XXX
CHECKED MH
FILE NAME cv-trt-pl-UTIL-SSB-2.sht

NO.	ISSUES	BY	DATE

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET SSB-2
SEQ. 279

MicroStation V8 User: 90262 Office: On Site
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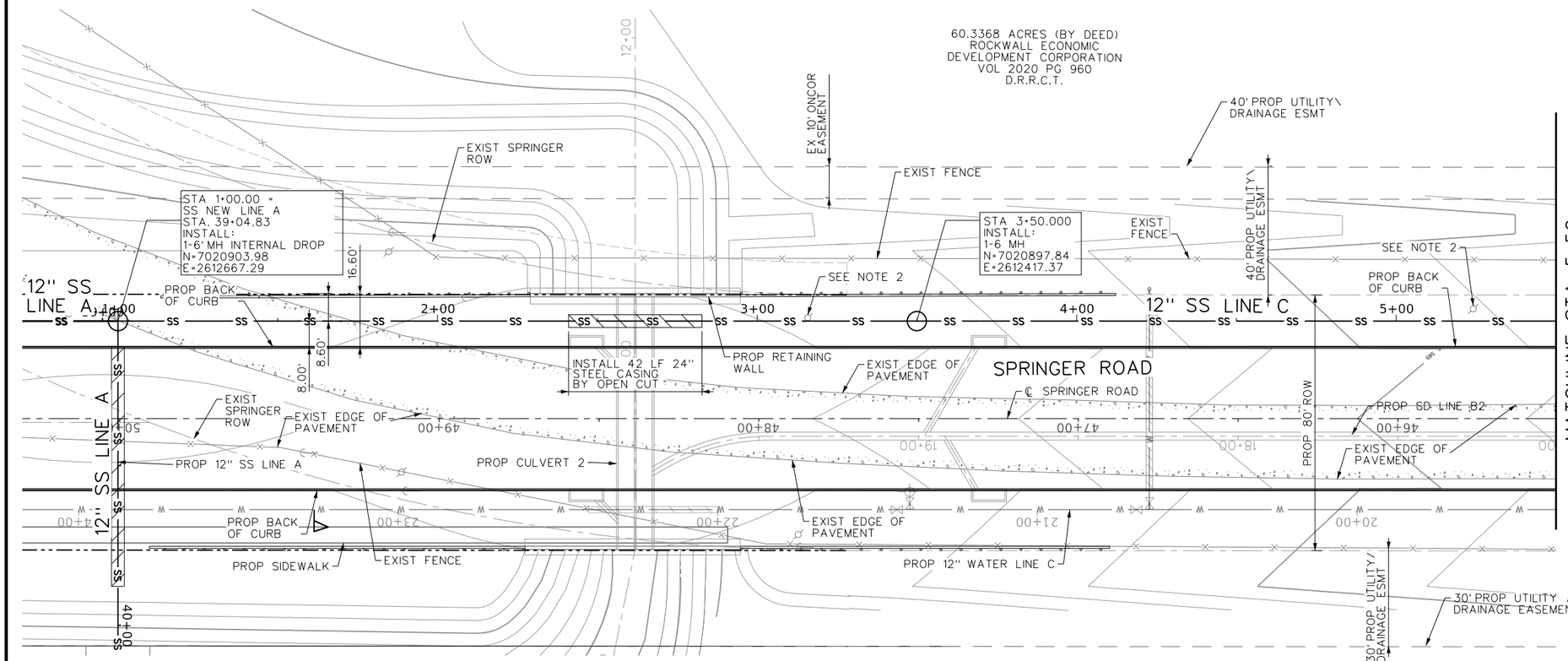

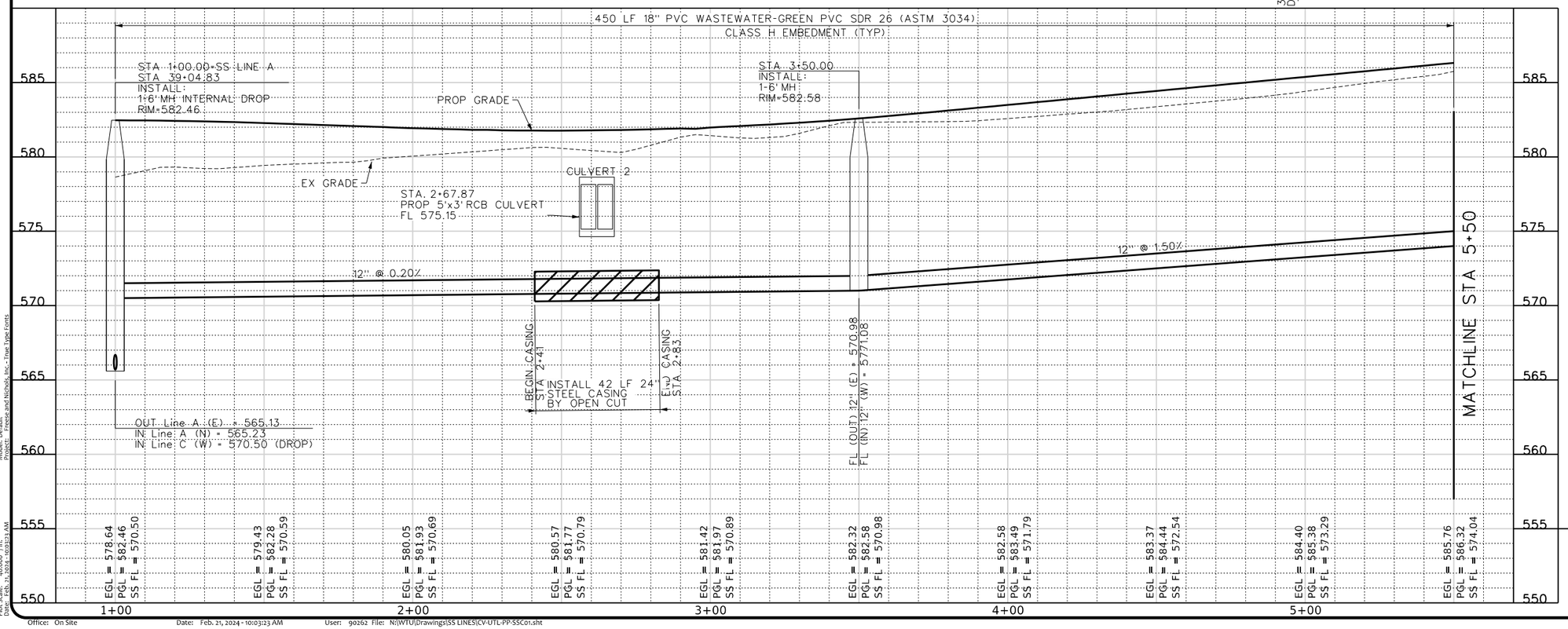

LEGEND

- PROP WATERLINE
- PROP SANITARY SEWER
- BW — BLACKLAND WATERLINE
- CONCRETE REPAIR

NOTES:
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PROFILE LEGEND

- PROFILE GRADE LINE
- EXISTING GROUND @ ℄

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASED FOR THE PURPOSES OF REVIEW UNDER THE AUTHORITY OF MICHAEL R. HAGEN TEXAS NO. 119555 ON 10/21/2021 IT IS NOT TO BE USED FOR BIDDING OR CONSTRUCTION PURPOSES. ALTERATION OF THIS DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2299
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

SANITARY SEWER LINE C
BEGIN TO STA 5+50

F&N JOB NO.	RKW19711
DATE	APRIL 2022
DESIGNED	CEL
DRAWN	SI
REVISED	XXX
CHECKED	MH
FILE NAME	CV-UTL-PP-SSC01.sht

NO.	ISSUES	BY	DATE

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET SSC-1
SEQ. 280

MicroStation V8 User: 90262 Office: On Site
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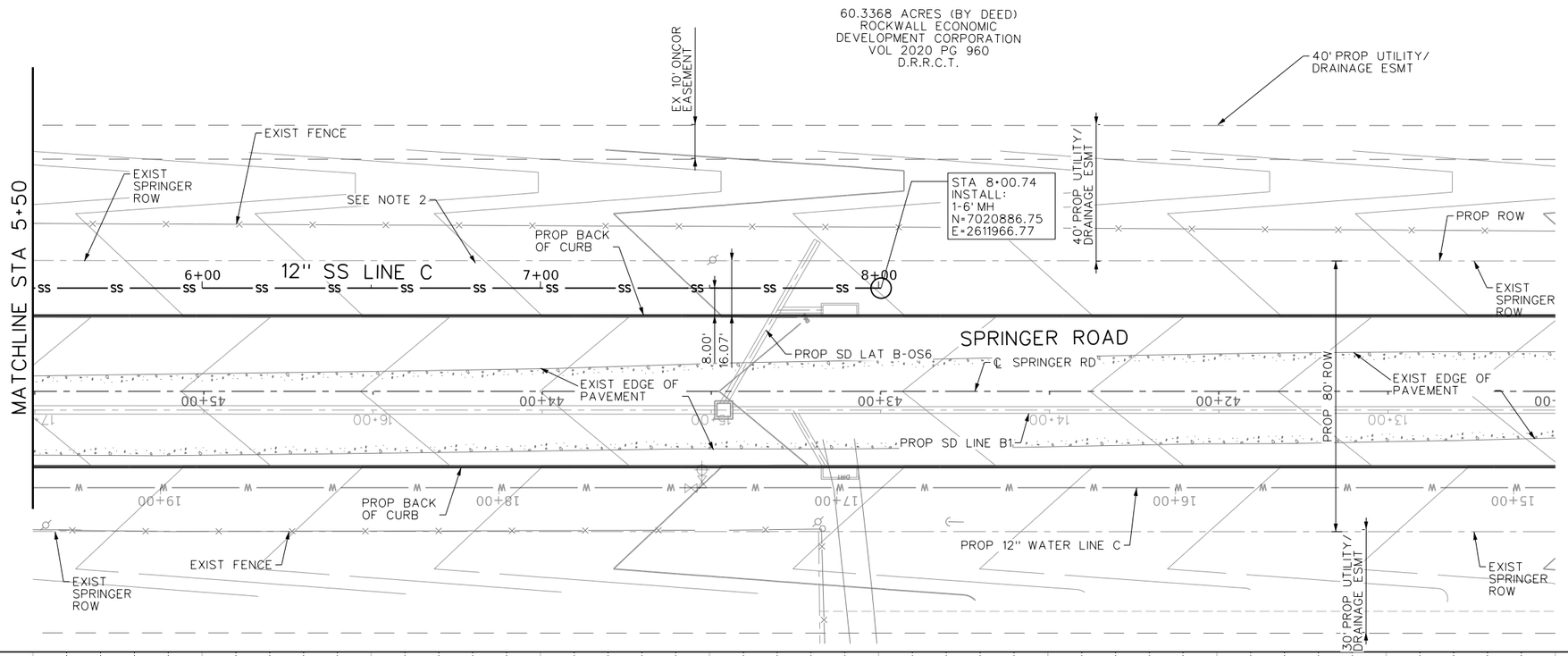

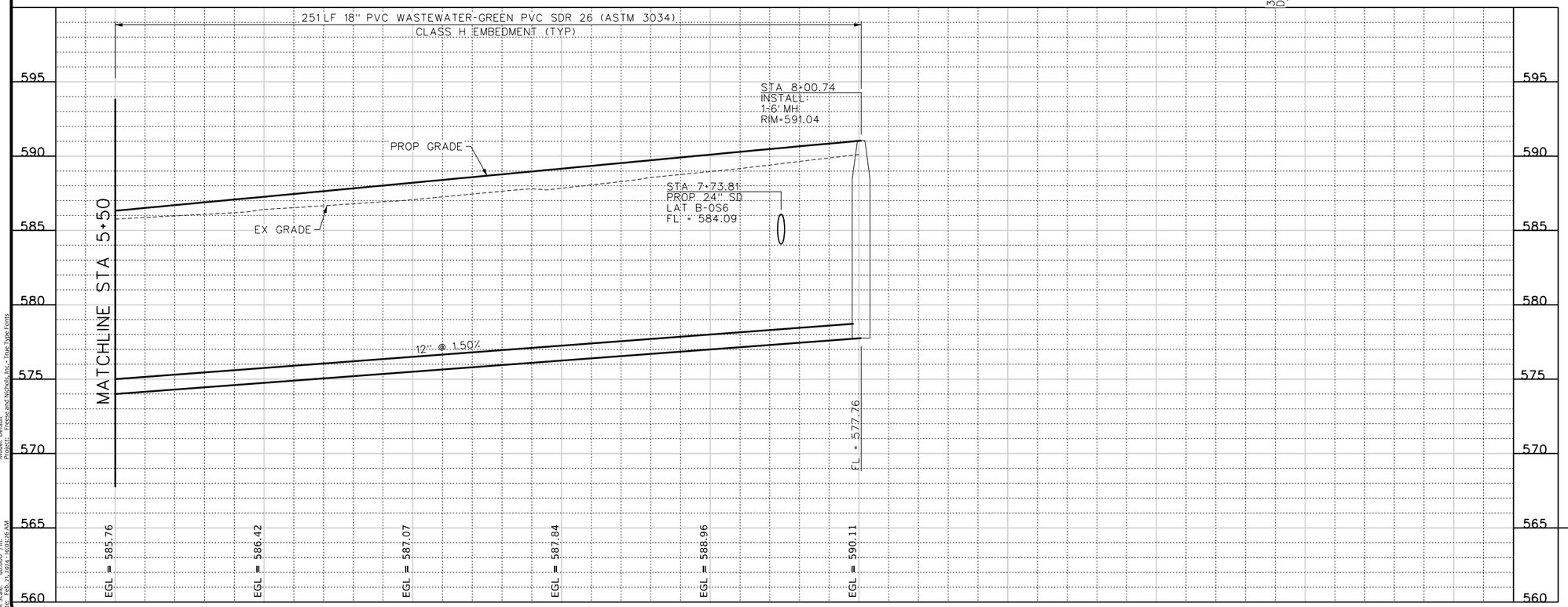

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- BW — BLACKLAND WATERLINE
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6. REFERENCE SHEET WB-1 FOR MODIFICATIONS TO EXISTING BLACKLAND WATER ALIGNMENT. BLACKLAND WATER PIPE MODIFICATIONS TO BE COMPLETED BEFORE REMOVAL OF BLACKLAND WATER PIPES NOTED ON THIS SHEET.

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0 10' 20' 40'
HORIZONTAL SCALE
0 2' 4' 8'
VERTICAL SCALE

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RECORD DRAWINGS PREPARED ON:
8/20/2024

PROFILE LEGEND

- PROFILE GRADE LINE
- EXISTING GROUND @ ℄

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASE FOR ORIGINAL DOCUMENT THIS DOCUMENT WAS AUTHORIZED BY MICHAEL R. HAGEN TEXAS NO. 111955 ON 10/21/2021 IT IS NOT TO BE USED FOR BIDDING PURPOSES WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2299
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

SANITARY SEWER LINE C STA. 5+50 TO END

F&N JOB NO.	RKW19711
DATE	APRIL 2022
DESIGNED	CEL
DRAWN	SI
REVISED	
CHECKED	MH
FILE NAME	CV-UTL-PP-SSC02.sht

NO.	ISSUES	BY	DATE

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale
0 1"

SHEET
SSC-2
SEQ.
281

MicroStation V8 User: 90262 Office: On Site
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Date: Feb. 21, 2024 - 10:03:26 AM Projects: Freese and Nichols, Inc. - True Type Fonts

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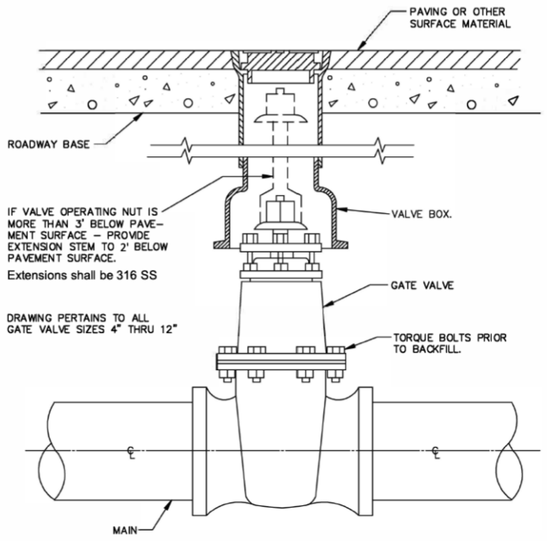
FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

THE SEAL THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY BARBARA E. BARRETT
TEXAS NO. 134955 ON 10/21/2021
IT IS A VIOLATION OF STATE LAW TO USE WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2201
Web - www.freese.com

NOTE:
IN UNPAVED AREAS, INSTALL 2' x 2' x 6" CONCRETE VALVE PAD FLUSH WITH THE TOP OF VALVE BOX. REINFORCE WITH #3 BARS ON 6" CENTERS BOTH WAYS.

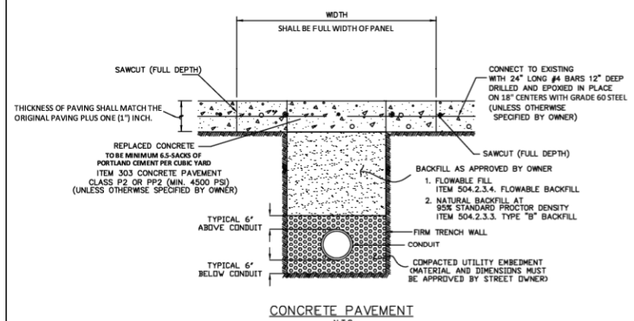


GATE VALVE BOX AND EXTENSION STEM
N.T.S.

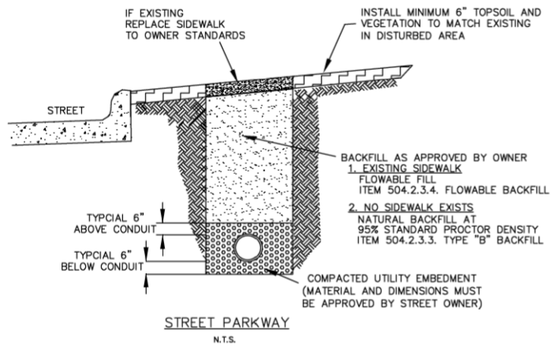
GATE VALVE 4" TO 12" BOX & EXTENSION STEM	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 502.6.6*	
		DATE AUG. '19	STANDARD DRAWING NO. R-4050

*Section II Standard Drawings as of October 2004. Reference number only has been updated for Fifth Edition Specifications. *Public Works Construction Standards North Central Texas, Fifth Edition.*

GENERAL NOTE: CHECK WITH STREET OWNER FOR SPECIFIC REQUIREMENTS NOT CONTAINED HEREIN



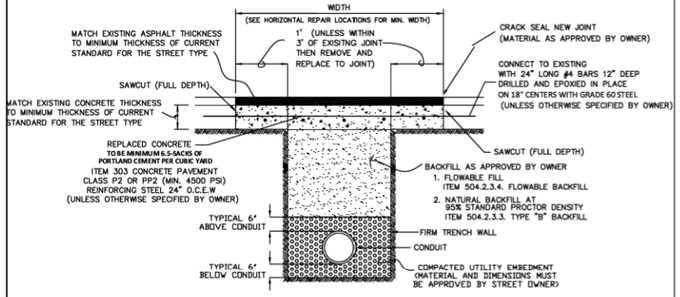
CONCRETE PAVEMENT
N.T.S.



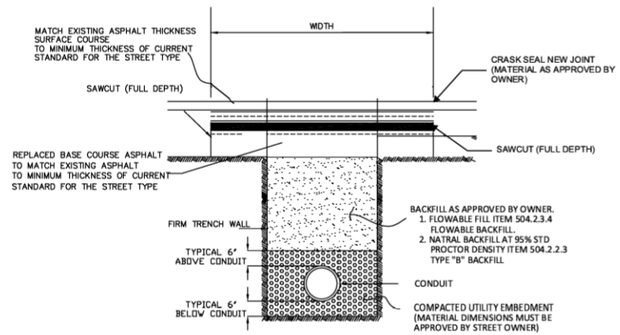
STREET PARKWAY
N.T.S.

PAVEMENT CUT AND REPAIR CONCRETE AND PARKWAY	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 402	
		DATE Mar. 2018	STANDARD DRAWING NO. R-3070A

GENERAL NOTE: CHECK WITH STREET OWNER FOR SPECIFIC REQUIREMENTS NOT CONTAINED HEREIN



CONCRETE PAVEMENT WITH ASPHALT OVERLAY
N.T.S.



FULL DEPTH ASPHALT PAVEMENT
N.T.S.

PAVEMENT CUT AND REPAIR ASPHALT	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 402	
		DATE Mar. 2018	STANDARD DRAWING NO. R-3070B

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
CIVIL
UTILITY DETAILS

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED
DRAWN
REVISED
CHECKED
FILE NAME cv-trt-util_dt01.dgn

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale accordingly.
0 1"

SHEET UDT-1
SEQ. 282

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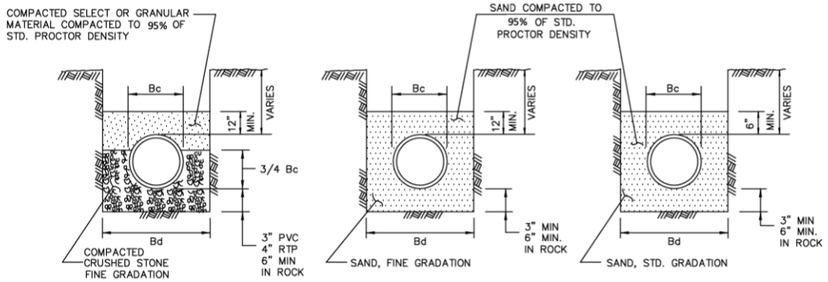


CLASS "B-2"
N.T.S.

CLASS "B-3"
N.T.S.

(TO BE USED FOR PVC WATER PIPE AND PVC WASTE WATER FORCE MAIN PIPE)

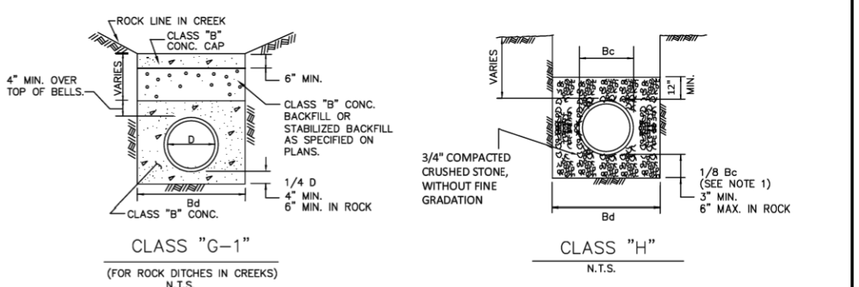
CLASS "B-4"
N.T.S.

NOTES:

1. Bc = OUTSIDE DIAMETER OF PIPE
2. Bd = TRENCH WIDTH
3. NO GRANULAR MATERIAL ABOVE ROCK OR STONE EMBEDMENT

STANDARD DRAWING NO. 3030

EMBEDMENT	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 504.5
CLASS "B-2","B-3", & "B-4"		DATE AUG. '19 / STANDARD DRAWING NO. R-3030



CLASS "G-1"
(FOR ROCK DITCHES IN CREEKS)
N.T.S.

CLASS "H"
N.T.S.

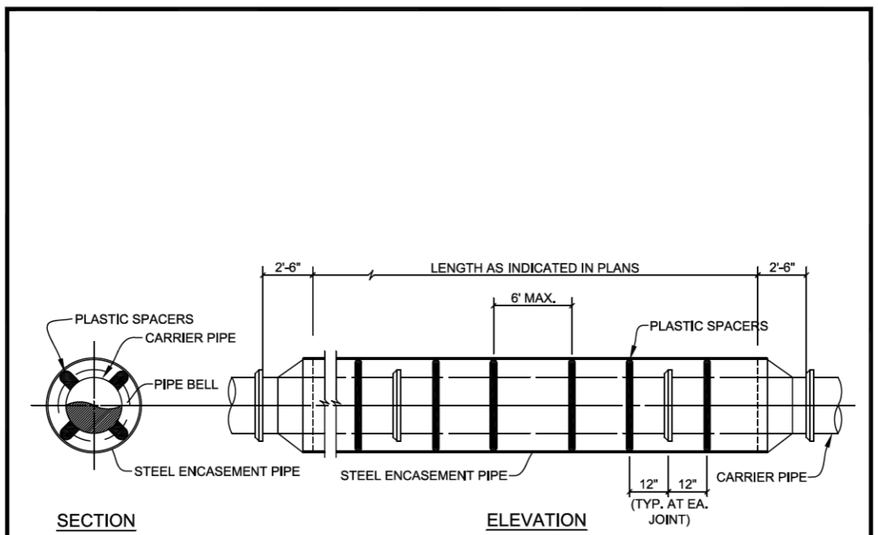
(TO BE USED FOR PVC WASTEWATER PIPE)

NOTES:

1. FOR MAINS 42" DIAMETER AND LARGER, 1/8 Bc SHALL BE TAKEN AS 6".
2. Bd = TRENCH WIDTH
3. Bc = OUTSIDE DIAMETER OF PIPE
4. D = INSIDE DIAMETER OF PIPE

STANDARD DRAWING NO. R-3060

EMBEDMENT	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 504.5
CLASS "G-1" & "H"		DATE AUG. '19 / STANDARD DRAWING NO. R-3060



SECTION

ELEVATION

ENCASED ROAD BORE

NO SCALE

NOTES:

1) ALL BORES BY CONTRACTOR SHALL BE DRY BORES.
2) PREFABRICATED PLASTIC SPACERS SHALL BE RACI NORTH AMERICA OR APPROVED EQUAL. FOR THE SPECIFIC APPLICATION AS RECOMMENDED BY THE MANUFACTURER.
3) CONTRACTOR SHALL PROVIDE SUPPORT UNDER CARRIER PIPE TO HAVE A MIN. 1" CLEARANCE BETWEEN PIPE BELL AND ENCASEMENT PIPE.
4) ENDS OF ENCASEMENT PIPE SHALL HAVE END SEALS INSTALLED PER MANUFACTURER'S REQUIREMENTS. END SEALS SHALL BE CCI MODEL ESW WRAP-AROUND BY CCI PIPELINE SYSTEMS OR APPROVED EQUAL.
5) THE DESIGN ENGINEER SHALL DESIGN THE MINIMUM THICKNESS OF THE ENCASEMENT PIPE. DESIGN WILL NEED TO INCLUDE DEAD LOADING BASED ON THE HEIGHT OF COVER AND HS-20 LOADINGS FOR ROADWAY CROSSINGS AND E-80 LOADINGS FOR RAILROAD CROSSINGS.
6) STEEL ENCASEMENT PIPE SHALL CONFORM TO AWWA C-200. PIPE SHALL BE FABRICATED IN ACCORDANCE WITH ASTM A-570 FROM STEEL PLATES HAVING MINIMUM YIELD STRENGTH 36,000 PSI.
7) STEEL ENCASEMENT PIPE SHALL BE PAINTED INSIDE AND OUTSIDE WITH TWO COATS OF TNEMEC, HB TNEMECOL, SERIES 46+465 COAL TAR, OR CITY APPROVED EQUIVALENT PRIOR TO DELIVERY TO THE JOB SITE. MINIMUM COATING INSIDE AND OUTSIDE SHALL BE 12+MILS DRY FILM THICKNESS (DFT) PER EACH COAT.
8) ENCASEMENT PIPE SHALL BE FEILD WELDED IN ACCORDANCE WITH AWWA C-206. WELDED JOINTS SHALL BE WIRE BRUSHED AND PAINTED WITH ONE COAT OF TNEMEC, OMNITHANE SERIES 530, 2.5-MILS DRY FILM THICKNESS 9DFT) OR CITY APPROVED EQUIVALENT.

UNDERGROUND CONDUIT	CITY OF ROCKWALL	
STEEL ENCASED BORE		DATE OCT. '17 / DRAWING NO. R-3090

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RECORD DRAWINGS PREPARED ON:
8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

THE SEAL THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY BRENNEL BARRETT
TEXAS NO. 134955 ON 10/21/2021
ITEMS OR REVISIONS MADE TO THIS DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone - (214) 217-2200
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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
CIVIL
UTILITY DETAILS

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED
DRAWN
REVISED
CHECKED
FILE NAME cv-trt-util_dt02.dgn

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET UDT-2
SEQ. 283

MicroStation V8 User: 90262 Office: On Site
Plotter: \\IP\KONICA MINOLTA C754e_PCL6 on Ne04:
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Date: Feb. 21, 2024 - 10:03:48 AM
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N:\IF\Drawings\Miscellaneous\cv-trt-util_dt02.dgn

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RECORD DRAWINGS PREPARED ON:
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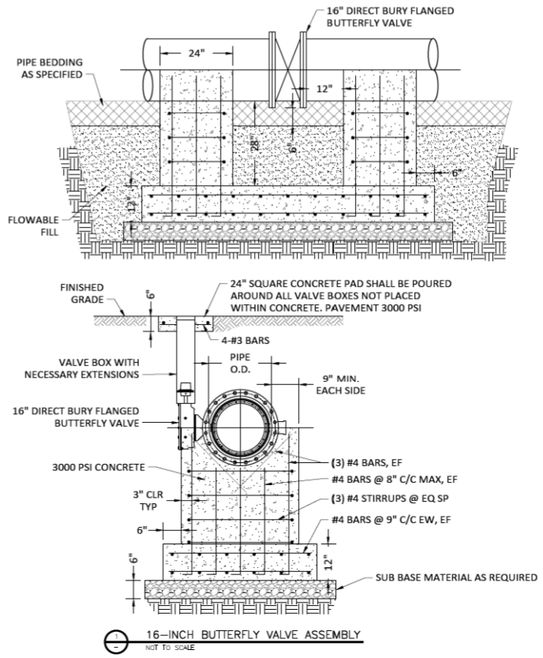

1 16-INCH BUTTERFLY VALVE ASSEMBLY
NOT TO SCALE

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone - (214) 217-2200
Fax - (214) 217-2201
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

UTILITY DETAILS

NO.	ISSUES	BY	DATE
1	ADDENDUM #2	MH	11/17/21

F&N JOB NO. RKW19711
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SHEET
UDT-3
SEQ.
284

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MicroStation V8 User: 90262 Office: On Site
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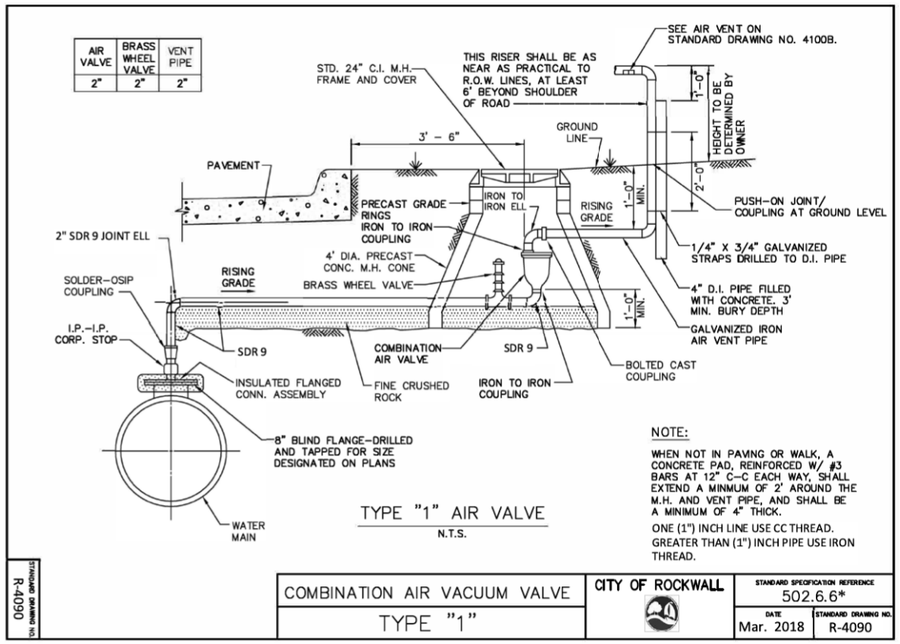
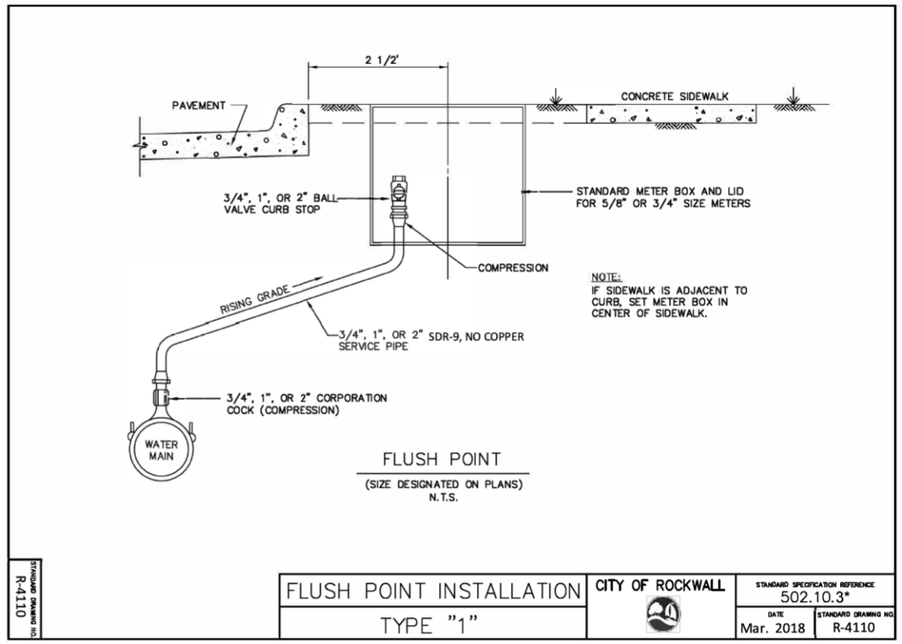


TYPE "1" AIR VALVE
N.T.S.

STANDARD DRAWING NO. R-4090

COMBINATION AIR VACUUM VALVE TYPE "1"	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 502.6.6*
		DATE Mar. 2018 / STANDARD DRAWING NO. R-4090

*Section II Standard Drawings as of October 2004. Reference number only has been updated for Fifth Edition Specifications. *Public Works Construction Standards North Central Texas, Fifth Edition.*



FLUSH POINT
(SIZE DESIGNATED ON PLANS)
N.T.S.

STANDARD DRAWING NO. R-4110

FLUSH POINT INSTALLATION TYPE "1"	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 502.10.3*
		DATE Mar. 2018 / STANDARD DRAWING NO. R-4110

*Section II Standard Drawings as of October 2004. Reference number only has been updated for Fifth Edition Specifications. *Public Works Construction Standards North Central Texas, Fifth Edition.*

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
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NO. ISSUES | BY | DATE

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SEQ. 285

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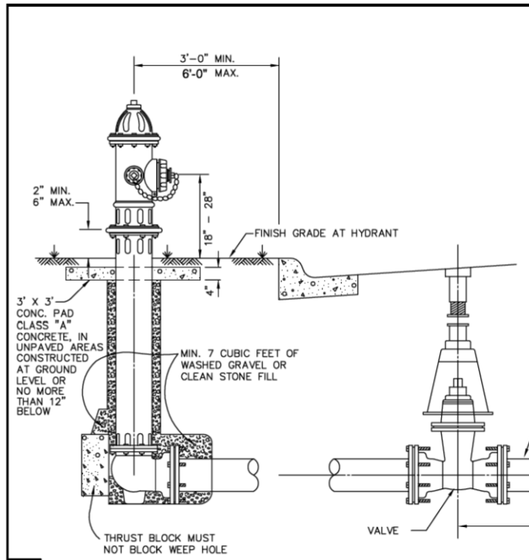


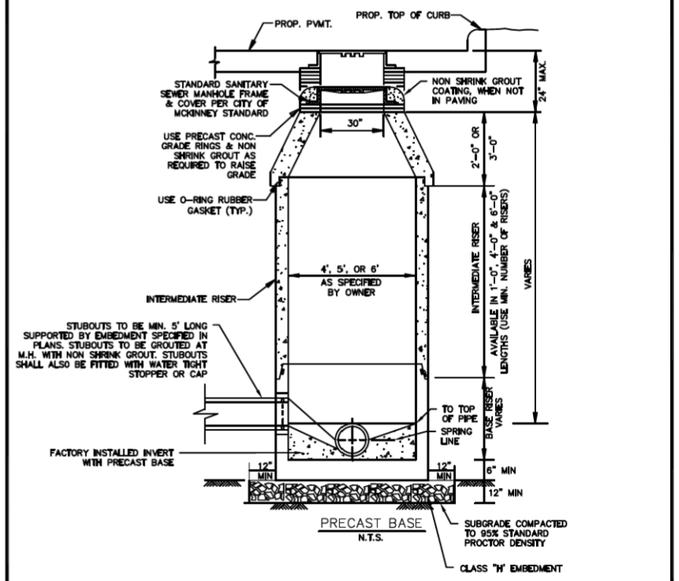
NOTES:

1. IN GENERAL, ALL FIRE HYDRANTS SHALL CONFORM TO AWWA STANDARD SPECIFICATIONS FOR FIRE HYDRANTS FOR ORDINARY WATER WORKS SERVICE, C-502. FIRE HYDRANTS SHALL HAVE A 5 1/4" MIN. VALVE OPENING AND A BARREL APPROXIMATELY 7" INSIDE DIAMETER. ALL HYDRANTS SHALL BE EQUIPPED WITH A BREAKAWAY FLANGE.
2. ALL JOINTS TO BE RESTRAINED JOINTS. MEGA-LUG OR APPROAVED EQUAL.
3. TYPICAL VALVE: ACTUAL VALVE LOCATION WILL DEPEND ON LOCATION OF WATER MAIN.
4. F.H. NO CLOSER THAN 18" TO EXISTING OR PROPOSED SIDEWALKS. (USUAL)
5. STANDARD BURY DEPTH 4' FEET
6. SET FIRE HYDRANT ON THE LOT LINE EXTENDED WHEN POSSIBLE.
7. F.H. SHALL BE LOCATED MINIMUM 1 FT. OUTSIDE OF THE AREA BETWEEN THE P.C.'S OF THE CORNER TURNING RADII AT INTERSECTIONS. (SEE PLAN VIEW)
8. PLACEMENT OF F.H. SHALL BE WHERE PUMPER NOZZLE IS PERPENDICULAR TO AND FACING THE NEAREST CURB.

R-4120	FIRE HYDRANT INSTALLATION	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 502.3
			DATE Aug. 2019
			STANDARD DRAWING NO. R-4120

NOTES:

1. FIRST MAIN LINE JOINT TO BE A MIN. OF 5' LONG.
2. IF FALSE M.H. ARE REQUIRED, THEY SHALL BE CONSTRUCTED, INSTALLED AND REMOVED PER STD. DWG. NO. 5100.
3. M.H.'S LOCATED OUTSIDE OF PAVING SHALL BE CONSTRUCTED WITH A CONCRETE MOW STRIP PER STD. DWG. NO. R-7005.
4. REFER TO STD. DWG. NO. R-5031 FOR INFLOW PROTECTION AT MANHOLE GRADE RINGS, MANHOLE JOINTS AND ON OUTSIDE OF STRUCTURE.
5. REFER TO STD. DWG. NO. R-5032 FOR CORROSION PROTECTION.
6. CONCRETE SHALL BE 4,200 PSI (7.0 SACK/CY) 28 DAY STRENGTH.
7. REINFORCING SHALL MEET OR EXCEED ASTM C478 REQUIREMENTS.
8. INSTALL GREEN EMS DISK AT ALL MANHOLES.
9. LIP TO BE PRECAST.



WASTEWATER MANHOLE PRECAST	CITY OF ROCKWALL	DATE AUG '19	DRAWING NO. R-5020

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FREESE AND NICHOLS, INC.
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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

UTILITY DETAILS

NO.	ISSUES	BY	DATE

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DATE APRIL 2022
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SEQ. 286

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Platter: J:\IF\Drawings\Miscellaneous\cv-trt-util_dt05.dgn
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Projects: Freese and Nichols, Inc. - True Type Fonts

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RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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2711 North Haskell Avenue, Suite 3300
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Phone: (214) 217-2200
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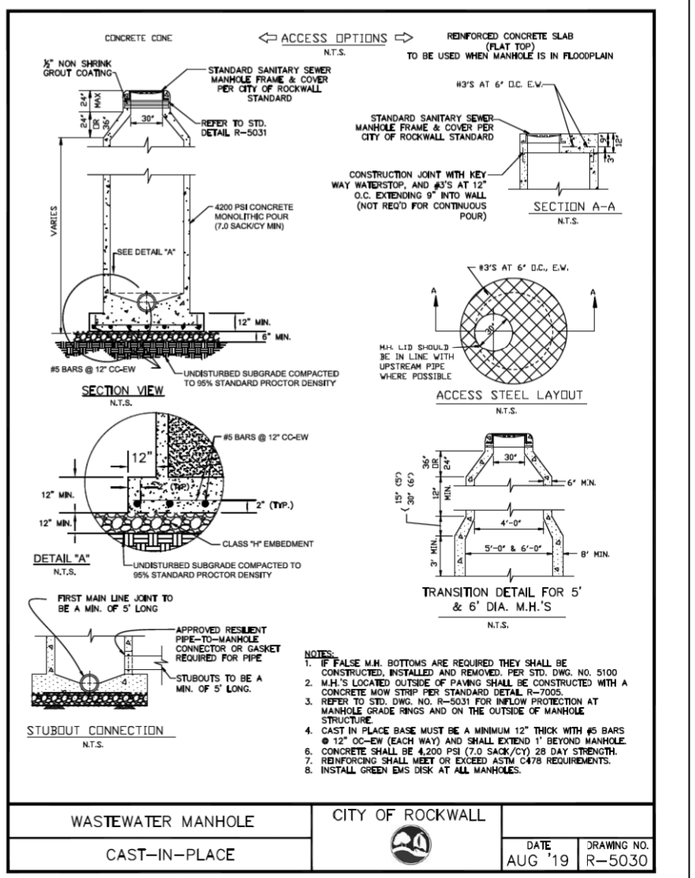
ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

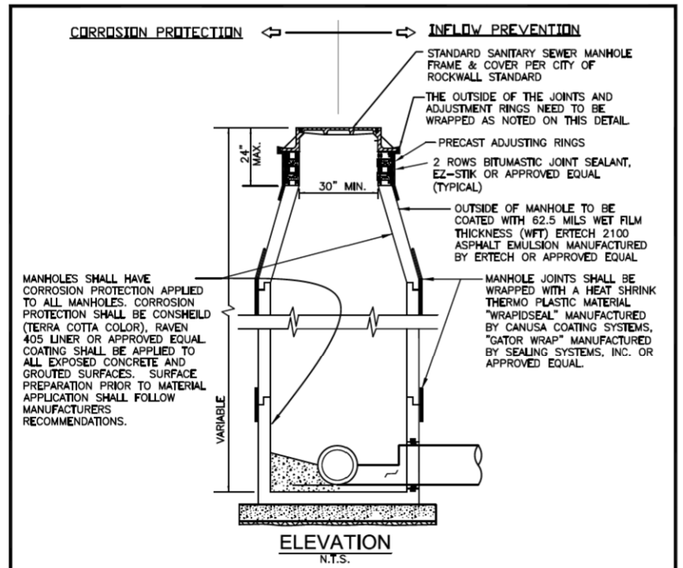
CIVIL

UTILITY DETAILS



NOTES:
1. IF FALSE M.H. BOTTOMS ARE REQUIRED THEY SHALL BE CONSTRUCTED, INSTALLED AND REMOVED. PER STD. DWG. NO. 5100
2. M.H.'S LOCATED OUTSIDE OF PAVING SHALL BE CONSTRUCTED WITH A CONCRETE MOW STRIP PER STANDARD DETAIL R-7005.
3. REFER TO STD. DWG. NO. R-5031 FOR INFLOW PROTECTION AT MANHOLE GRADE RINGS AND ON THE OUTSIDE OF MANHOLE STRUCTURE.
4. CAST IN PLACE BASE MUST BE A MINIMUM 12" THICK WITH #5 BARS @ 12" OC-EW (EACH WAY) AND SHALL EXTEND 1' BEYOND MANHOLE.
6. CONCRETE SHALL BE 4,200 PSI (7.0 SACK/CY) 28 DAY STRENGTH.
7. REINFORCING SHALL MEET OR EXCEED ASTM C478 REQUIREMENTS.
8. INSTALL GREEN EMS DISK AT ALL MANHOLES.

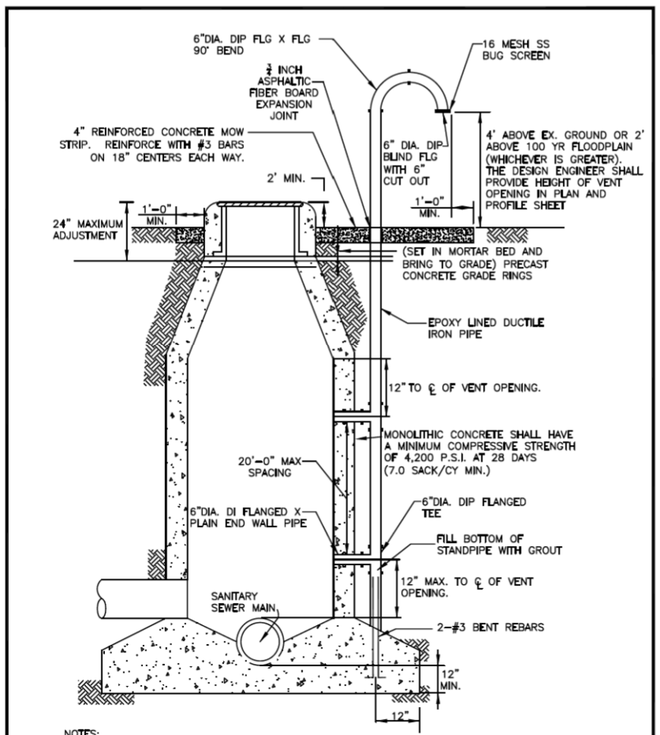
WASTEWATER MANHOLE	CITY OF ROCKWALL		
CAST-IN-PLACE		DATE AUG '19	DRAWING NO. R-5030



INFLOW PREVENTION NOTES:
1. REQUIRED ON ALL SANITARY SEWER MANHOLES AND LIFT STATION WET WELLS AND VALVE VAULTS.

CORROSION PREVENTION NOTES:
1. TO CORROSION PROTECTIVE COATING PROCESS, PRESSURE WASH AND CLEAN STRUCTURE. FILL BUG HOLES, JOINTS, HONEYCOMBS AND AROUND PIPE PENETRATIONS WITH A CEMENTITOUS REPAIR MATERIAL (CRM) AS NEEDED. USE STRONG SEAL MS2C MANUFACTURED BY THE STRONG COMPANY, INC. OR APPROVED EQUAL. THEN APPLY A MINIMUM OF 125 MILS (⅛ INCH) THICKNESS OF A POLYURETHANE COATING MATERIAL (EXISTING MANHOLES REQUIRE A MINIMUM OF 250 MILS THICKNESS OF POLYURETANE COATING MATERIAL). FOR THE POLYURETHANE COATING MATERIAL USE RAVEN 405 LINER OR APPROVED EQUAL.
2. ADDITIONAL CLEANING, PREPARATION, AND REPAIR METHODS MAY BE REQUIRED FOR EXISTING MANHOLES DEPENDING ON CONDITION ASSESSMENT OF THE MANHOLE. CONTACT ENGINEERING DIVISION FOR ADDITIONAL SPECIFICATIONS.
3. SPARK TESTING IS REQUIRED FOR COATINGS. COST FOR TESTING IS SUBSIDIARY TO OTHER BID ITEMS. CITY INSPECTOR TO BE PRESENT FOR SPARK TESTING. CONTRACTOR TO PROVIDE WRITTEN SPARK TEST RESULTS TO CITY.
4. EXISTING BRICK MANHOLES SHALL BE REPLACED.
5. REQUIRED ON ALL WASTEWATER MANHOLES AND LIFT STATION WET WELLS.

WASTEWATER MANHOLE	CITY OF ROCKWALL		
INFLOW PREVENTION & CORROSION PROTECTION		DATE AUG '19	DRAWING NO. R-5031



NOTES:
1. REFER TO STANDARD DETAIL R-5030 FOR MANHOLE. CONCRETE SHALL BE MONOLITHIC POUR.
2. REFER TO STD. DWG. NO. R-5031 FOR INFLOW PROTECTION AT MANHOLE GRADE RINGS, MANHOLE JOINTS, AND ON OUTSIDE OF STRUCTURE.

SHEET 1 OF 2

WASTEWATER MANHOLE	CITY OF ROCKWALL		
VENTED		DATE AUG '19	DRAWING NO. R-5060

NO.	ISSUES	BY	DATE

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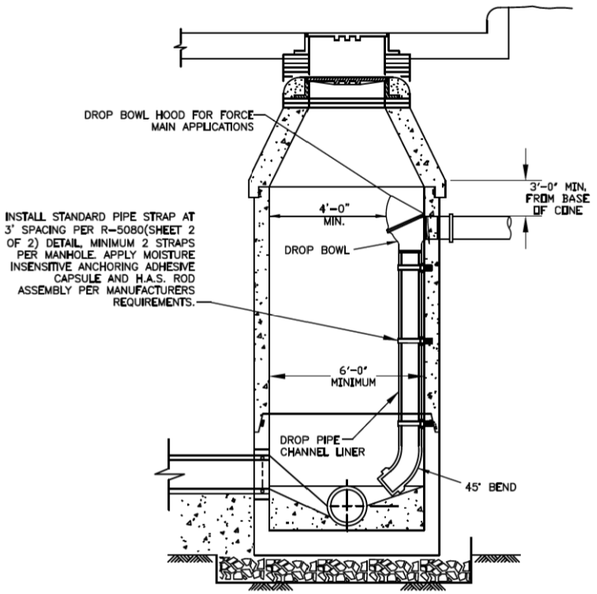


ELEVATION
N.T.S.

NOTE:
1. DROP BOWL, DROP PIPE CHANNEL LINER AND STAINLESS STEEL PIPE CLAMPS AS MANUFACTURED BY RELINER/DURAN INC. OR APPROVED EQUAL.

SHEET 1 OF 2

WASTEWATER MANHOLE	CITY OF ROCKWALL	DATE	DRAWING NO.
DROP CONNECTIONS		AUG '19	R-5080

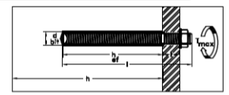
HVA ADHESIVE CAPSULE ANCHOR
A. DRILL HOLES WITH ANSI B212.15 MATCHED TOLERANCE CARBIDE TIPPED DRILL BITS WITH DRILL IN ROTO-HAMMER MODE OR USE A MATCHED TOLERANCE DIAMOND CORE DRILL BIT OF DIAMETER SPECIFIED BY HILTI.
B. DRILLED HOLE SPECIFICATIONS (DIAMETER & DEPTH) SHALL COMPLY WITH HILTI SPECIFICATION OR ICC ESR 1582.
C. ALLOWABLE LOADS MAY BE INCREASED BY 33-1/3% FOR SHORT-TERM WIND OR SEISMIC LOAD RESISTANCE IAW ICC ESR 1582 UNLESS NOT PERMITTED BY THE APPLICABLE BUILDING CODE.
D. WHEN CONDUCTED, PROOF TEST ANCHORS IN THE FIELD TO 150-200% OF HILTI PUBLISHED ALLOWABLE TENSION LOAD UNLESS NOTED OTHERWISE IN A PROOF TEST LOAD TABLE. TORQUE TESTING IS NOT PERMITTED.
E. ANCHORS SHALL BE TIGHTENED WITH A CALIBRATED TORQUE WRENCH. USE OF AN IMPACT WRENCH IS NOT PERMITTED.
F. CONTACT HILTI TECHNICAL SUPPORT AT 1-800-879-8000 FOR INSTALLATION INSTRUCTIONS IN SUBMERGED WATER CONDITIONS.
G. CONTACT HILTI TECHNICAL SUPPORT AT 1-800-879-8000 FOR ADDITIONAL ASSISTANCE WITH HVA ADHESIVE ANCHOR INSTALLATIONS.
H. INSTALLATION INSTRUCTIONS:
H.1. FOR HVA ADHESIVE CAPSULES WITH H.A.S. THREADED RODS:
1. DRILL ANCHOR HOLE WITH A CARBIDE BIT (SEE NOTE 1 ABOVE), TO SPECIFIED EMBEDMENT DEPTH.
2. CLEAN HOLE WITH COMPRESSED AIR OR BLOW OUT PUMP. INSERT NOZZLE TO BOTTOM OF HOLE.
3. IF USING MATCHED TOLERANCE CORE BIT, REMOVE STANDING WATER FROM HOLE.
4. INSERT APPROPRIATE HVU CAPSULE INTO HOLE WITH POINTED END FIRST. CAPSULE LENGTH IS LONGER THAN STANDARD EMBEDMENT AND WILL PROTRUDE FROM HOLE. DO NOT CUT OFF ANY PART OF THE HVU CAPSULE.
5. THREAD NUT ONTO ROD.
6. PLACE A WASHER ON FIRST NUT AND THREAD BLACK SETTING NUT DOWN ON WASHER.
7. TIGHTEN NUTS TOGETHER SO THAT BLACK SETTING WASHER IS AT TOP OF ROD.
8. INSERT SQUARE DRIVE SHAFT INTO HAMMER DRILL AND ATTACH PROPER IMPACT SOCKET.
9. WITH HAMMER DRILL ON ROTARY HAMMER, ENGAGE TOP NUT OF HAS ROD ASSEMBLY AND ROTOHAMMER ROD THROUGH CAPSULE(S) INTO THE HOLE. STOP DRILL ROTATION IMMEDIATELY UPON REACHING BOTTOM OF HOLE.
10. DO NOT DISTURB OR LOAD ANCHOR BEFORE CURING TIME ELAPSES.

HVA INSTALLATION SPECIFICATION TABLE FOR H.A.S. RODS

DETAILS	HAS Rod Size	In.	3/8	1/2	5/8	3/4	7/8	1	1-1/4
d_{bit} : nominal bit diameter		In.	15/32	9/16	11/16	7/8	1	1-1/8	1-3/8
h_{nom} = std. depth of embed. = capsule length		In.	3-1/2	4-1/4	5	6-5/8	6-5/8	8-1/4	12
t : max. thickness fastened		In.	1	1-1/2	1-3/4	2	3-1/4	3-1/2	3-3/4
t_{max} : max. tightening torque	All HDI Rods	ft-lb	18	30	75	150	175	235	400
h : minimum base material thickness	$h_{of\ wh\ nom}$	In.	5-1/4	6-3/8	7-1/2	10	10	12-3/8	18
	$h_{ef\ h\ nom}$	In.	$1,0h_{ef}$ 2	$1,0h_{ef}$ 2	$1,0h_{ef}$ 2	$1,0h_{ef}$ 2	$1,0h_{ef}$ 2	$1,0h_{ef}$ 2 1/4	$1,0h_{ef}$ 3
Recommended HDI Rotary Hammer Drill			TE-5,15, 18M,25	TE-18M,25,55,76		TE-55, 76		TE-76	

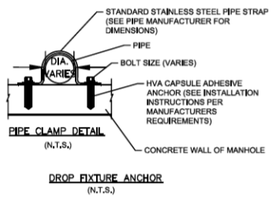
For SI: 1 inch = 25.4mm, 1ft-lb = 1.4 Nm
Curing Time Table (Approximate)

Approx. Curing Time	Base Material Temperature
20 Minutes	ABOVE 68° F/20° C
30 Minutes	50° F/10° C
1 Hour	32° F/0° C
5 Hour	23° F/-5° C



HILTI HVA ADHESIVE CAPSULE ANCHOR
OR APPROVED EQUAL

INSTALLATION INSTRUCTIONS:
1. SET THE DRILL DEPTH GAUGE AND DRILL A HOLE TO THE REQUIRED HOLE DEPTH. IMPORTANT: CLEAN OUT DUST AND DEBRIS. USE COMPRESSED AIR OR VACUUM AT BOTTOM OF THE HOLE. WHEN USING THE HILTI MATCHED TOLERANCE DIAMOND CORE BIT, IMMEDIATELY REMOVE STANDING WATER.
2. INSERT APPROPRIATE DIAMETER HVU ADHESIVE CAPSULE INTO PRE-DRILLED HOLE IN BASE MATERIAL. NOTE: THE BEST METHOD FOR SETTING MULTIPLE CAPSULES IS TO CRUSH THE FIRST CAPSULE(S) INTO THE HOLE AND THEN INSERT THE NEXT CAPSULE. DO NOT CUT OFF CAPSULES PARTIALLY PROTRUDING FROM THE HOLE.
3. CAPSULE LENGTH IS LONGER THAN STANDARD EMBED, DEPTH AND WILL PROTRUDE FROM THE HOLE.
4. THREAD A H.A.S. NUT ON THE H.A.S. ROD. PLACE A WASHER ON TOP OF THE FIRST NUT AND THEN THREAD A BLACK SETTING NUT DOWN ON TOP OF THE WASHER. TIGHTEN THE TWO NUTS TOGETHER "LOCKING" THE WASHER BETWEEN THEM. THE TOP NUT SHOULD BE FLUSH WITH THE TOP OF THE ROD.
5. INSERT A SQUARE DRIVE SHAFT INTO THE HAMMER DRILL AND ATTACH THE PROPER IMPACT SOCKET. AT THE ROTARY HAMMER DRILL SETTING, ENGAGE THE TOP NUT OF THE HAS ROD ASSEMBLY WITH THE SOCKET AND DRIVE THE ROD DOWN THROUGH THE CAPSULE(S). STOP DRILL ROTATION IMMEDIATELY UPON REACHING BOTTOM OF HOLE.
6. DO NOT DISTURB OR LOAD THE SET ANCHOR BEFORE THE SPECIFIED CURING TIME ELPASES.



PIPE CLAMP DETAIL
(N.T.S.)

DROP FIXTURE ANCHOR
(N.T.S.)

SHEET 2 OF 2

WASTEWATER MANHOLE	CITY OF ROCKWALL	DATE	DRAWING NO.
DROP CONNECTIONS		AUG '19	R-5080

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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
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SEQ. 288

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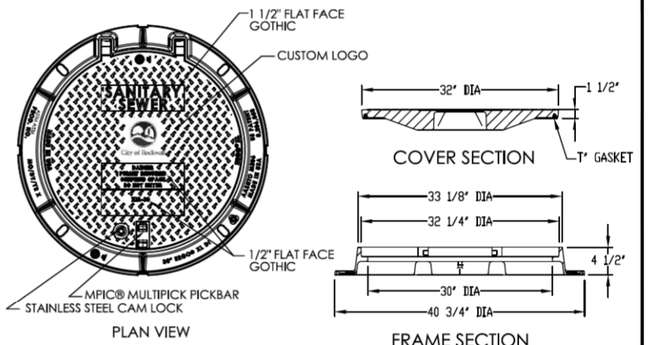
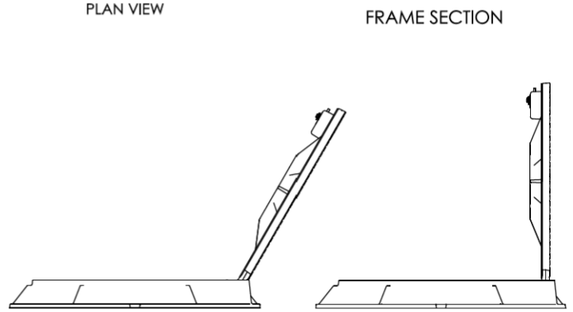
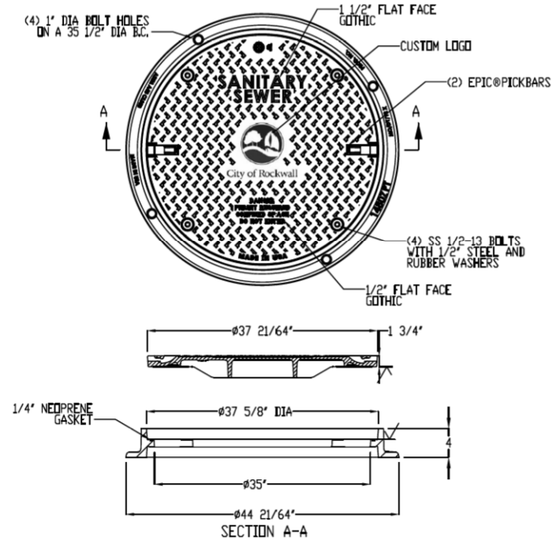




WASTEWATER MANHOLE	CITY OF ROCKWALL	DATE	DRAWING NO.
HINGED RIM AND COVER		AUG '19	R-5101



WASTEWATER MANHOLE	CITY OF ROCKWALL	DATE	DRAWING NO.
BOLT AND GASKET RIM AND COVER		AUG '19	R-5102

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

THE SEAL THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY AMBAMEL BAMBEH
TEXAS NO. 134955 ON 10/21/2021
ALTERATION OF SEALED DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2201
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
CIVIL
UTILITY DETAILS

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED
DRAWN
REVISED
CHECKED
FILE NAME cv-trt-util_dt08.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale
0 1"

SHEET UDT-8
SEQ. 289

MicroStation V8 User: 90262 Office: On Site
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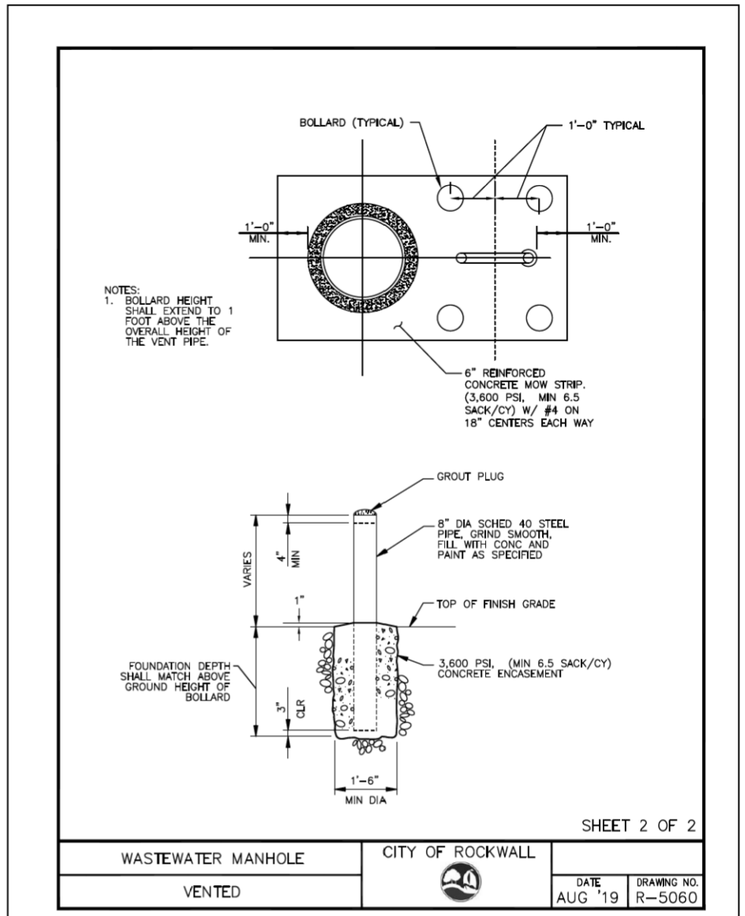

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

THE SEAL THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY AMICHAEL D AMBER!!
TEXAS NO. 134955 ON 10/21/2021
ALTERATION OF THIS DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

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2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone - (214) 217-2200
Fax - (214) 217-2201
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
CIVIL
UTILITY DETAILS

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED
DRAWN
REVISED
CHECKED
FILE NAME cv-trt-util_dt09.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

SHEET UDT-9
SEQ. 290

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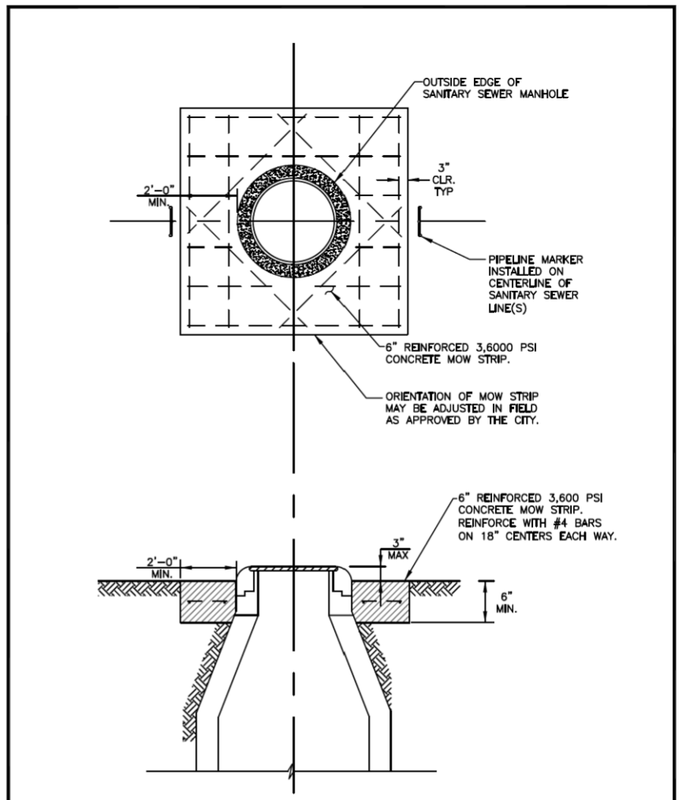

MANHOLE AND VALVE VAULT	CITY OF ROCKWALL		
MOW STRIP		DATE AUG '19	DRAWING NO. R-5180

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
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RECORD DRAWINGS PREPARED ON:
8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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TEXAS NO. 134955 ON 10/21/2021
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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
CIVIL
UTILITY DETAILS

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED
DRAWN
REVISED
CHECKED
FILE NAME cv-trt-util_dt10.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1"

SHEET UDT-10
SEQ. 291

MicroStation V8 User: 90262 Office: On Site
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Date: Feb. 21, 2024 - 10:04:18 AM
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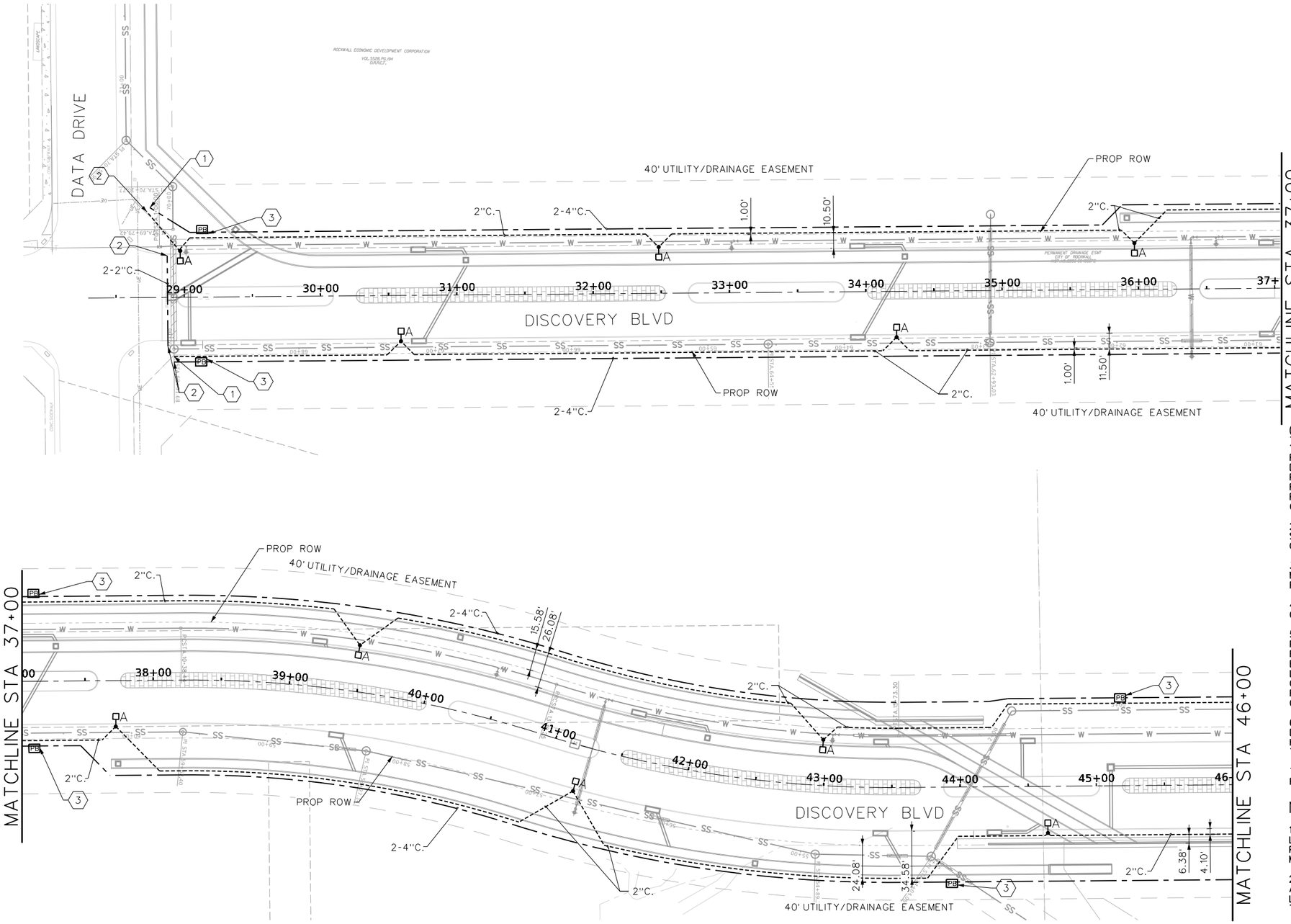

N

0 20' 40' 80'
SCALE IN FEET

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

GENERAL NOTES:

1. COORDINATE ELECTRIC UTILITY SERVICE REQUIREMENTS WITH ONCOR ELECTRIC DELIVERY PRIOR TO STARTING CONSTRUCTION. PROVIDE TRENCHING, CONDUITS, SWEEPS, FOUNDATION, AND OTHER EQUIPTMENT AS REQUIRED BY UTILITY, CONTACT JAMES JACKSON (972-860-6647)

2. CONDUIT ROUTING IS SHOWN SCHEMATICALLY, COORDINATE ROUTING OF CONDUIT WITH ALL UNDERGROUND UTILITIES.

3. ALL CONDUIT SHALL BE INSTALLED AT A MINIMUM OF 24" BELOW THE PROPOSED FINISH GRADE.

4. PROVIDE NYLON PULL STRING IN ALL SPARE OR OTHERWISE EMPTY CONDUIT.

5. LIGHT POLE, FIXTURE, AND CIRCUIT CONDUCTORS PROVIDED BY ONCOR, CONTRACTOR TO PROVIDE FOUNDATION AND CONDUIT, COORDINATE ELECTRIC UTILITY LIGHTING CIRCUIT SOURCE LOCATION WITH ONCOR REPRESENTATIVE. COORDINATE LIGHT POLE FOUNDATION REQUIREMENT AND ANCHOR BOLT PATTERN WITH ONCOR REPRESENTATIVE.

6. REFER TO ONCOR SECTION 213 STREET LIGHTING DETAILS FOR RECTANGULAR LUMINAIR POLES AND HARDWARE. (213-120) REFER TO SHEET EL-8. POLES TO BE 30 FT MOUNTING HEIGHT.

7. ALL LIGHT POLE FOUNDATIONS (CENTER OF FOUNDATION) SHALL BE 2.5 FT FROM BACK OF CURB.

NOTES BY SYMBOL "⬡"

1.EXTEND CONDUIT A MINIMUM OF 5' PAST THE LIGHT POLE FOUNDATION FOR FUTURE USE. PROVIDE UNDERGROUND LOCATING BALL MARKER AT THE CONDUIT TERMINATION

2.TERMINATE AND CAP CONDUIT IN AN ACCESSIBLE LOCATION. PROVIDE UNDERGROUND LOCATING BALL MARKER AT THE CONDUIT TERMINATION FOR FUTURE USE.

3.PROVIDE TXDOT ITS TYPE I GROUND BOX FOR FUTURE FIBER USE. GROUND BOX TO BE 36" DEPTH MINIMUM.

LEGEND:

---------- UNDERGROUND 2" CONDUIT OR DUCT BANK FOR STREET LIGHTING

—— - — 2-4" C. UNDERGROUND CONDUIT OR DUCT BANK FOR FUTURE FIBER

PB PULL BOX

A POLE MOUNTED LIGHT FIXTURE "A" - FIXTURE TYPE

ELECTRICAL SERVICE BOX

LIGHT FIXTURE SCHEDULE

TYPE	MANUFACTURER	CATALOG NO.	VOLT.	DESCRIPTION	INPUT WATTS
A	FIXTURE: BY ONCOR POLE: BY ONCOR	FIXTURE: BY ONCOR POLE: BY ONCOR	MVOLT	FIXTURE: BY ONCOR POLE: BY ONCOR	TBD
F	LITHONIA	DSXF3-LED-T-P1-40K-NSP-MVOLT-FV-WG-DBLXD	MVOLT	FLAGPOLE FLOOD LIGHT WITH 4000K COLOR TEMP, NARROW SPOT DISTRIBUTION (3'X3'), MULTIVOLT DRIVER, FULL VISOR, WIRE GUARD, AND BLACK FINISH.	107W
M	LITHONIA	OFL1 LED - P2 - 40K - MVOLT - DDBXD	MVOLT	POST MOUNT LED FLOOD LIGHT WITH 4000K COLOR TEMP, 4,400 LUMEN OUTPUT MINIMUM, MULTIVOLT INPUT DRIVER, WITH DARK BRONZE FINISH.	45W

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASE THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY DANIEL W. KOSS
TEXAS NO. 110037 ON 10/21/2021
IT IS UNLAWFUL TO USE OR REPRODUCE THIS DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2250
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

ELECTRICAL

DISCOVERY BLVD ILLUMINATION PLAN
BEGIN TO STA 46+00

NO.	ISSUES	DATE	BY

F&N JOB NO. RKW19771
DATE APRIL 2022
DESIGNED MLM
DRAWN MLM
REVISED
CHECKED HH
FILE NAME cv-trt-pl-illumination01_disc.dgn

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.

SHEET EL-1
SEQ. 292

MicroStation V8 User: 90262 Office: On Site
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Plot Scale: 80.000 ' / in.
Date: Feb. 21, 2024 - 10:06:06 AM
Model: Default
Projects: Freese and Nichols, Inc. - True Type Fonts

GENERAL NOTES:

1. COORDINATE ELECTRIC UTILITY SERVICE REQUIREMENTS WITH ONCOR ELECTRIC DELIVERY PRIOR TO STARTING CONSTRUCTION. PROVIDE TRENCHING, CONDUITS, SWEEPS, FOUNDATION, AND OTHER EQUIPTMENT AS REQUIRED BY UTILITY, CONTACT JAMES JACKSON (972-860-6647)

2. CONDUIT ROUTING IS SHOWN SCHEMATICALLY, COORDINATE ROUTING OF CONDUIT WITH ALL UNDERGROUND UTILITIES.

3. ALL CONDUIT SHALL BE INSTALLED AT A MINIMUM OF 24" BELOW THE PROPOSED FINISH GRADE.

4. PROVIDE NYLON PULL STRING IN ALL SPARE OR OTHERWISE EMPTY CONDUIT.

5. LIGHT POLE, FIXTURE, AND CIRCUIT CONDUCTORS PROVIDED BY ONCOR, CONTRACTOR TO PROVIDE FOUNDATION AND CONDUIT, COORDINATE ELECTRIC UTILITY LIGHTING CIRCUIT SOURCE LOCATION WITH ONCOR REPRESENTATIVE. COORDINATE LIGHT POLE FOUNDATION REQUIREMENT AND ANCHOR BOLT PATTERN WITH ONCOR REPRESENTATIVE.

6. REFER TO ONCOR SECTION 213 STREET LIGHTING DETAILS FOR RECTANGULAR LUMINAIR POLES AND HARDWARE. (213-120) REFER TO SHEET EL-8. POLES TO BE 30 FT MOUNTING HEIGHT.

7. ALL LIGHT POLE FOUNDATIONS (CENTER OF FOUNDATION) SHALL BE 2.5 FT FROM BACK OF CURB.

NOTES BY SYMBOL "⬡"

1. ELECTRICAL SERVICE "ES1". REFER TO ELECTRICAL SERVICE SCHEDULE.

2. FIXTURE TYPE "M" TO BE PEDESTAL MOUNTED. REFER TO DETAIL "2/EL-7". AIM FIXTURE AT THE MONUMENT VERTICAL SURFACE SUCH THAT THE LIGHTING IS AS EVEN AS POSSIBLE. THE FLOOD LIGHT CIRCUITS ARE TO BE SWITCHED BY THE PHOTOCELL AT THE ELECTRICAL SERVICE ENCLOSURE.

3. COORDINATE UTILITY SERVICE SOURCE LOCATION WITH UTILITY REPRESENTATIVE.

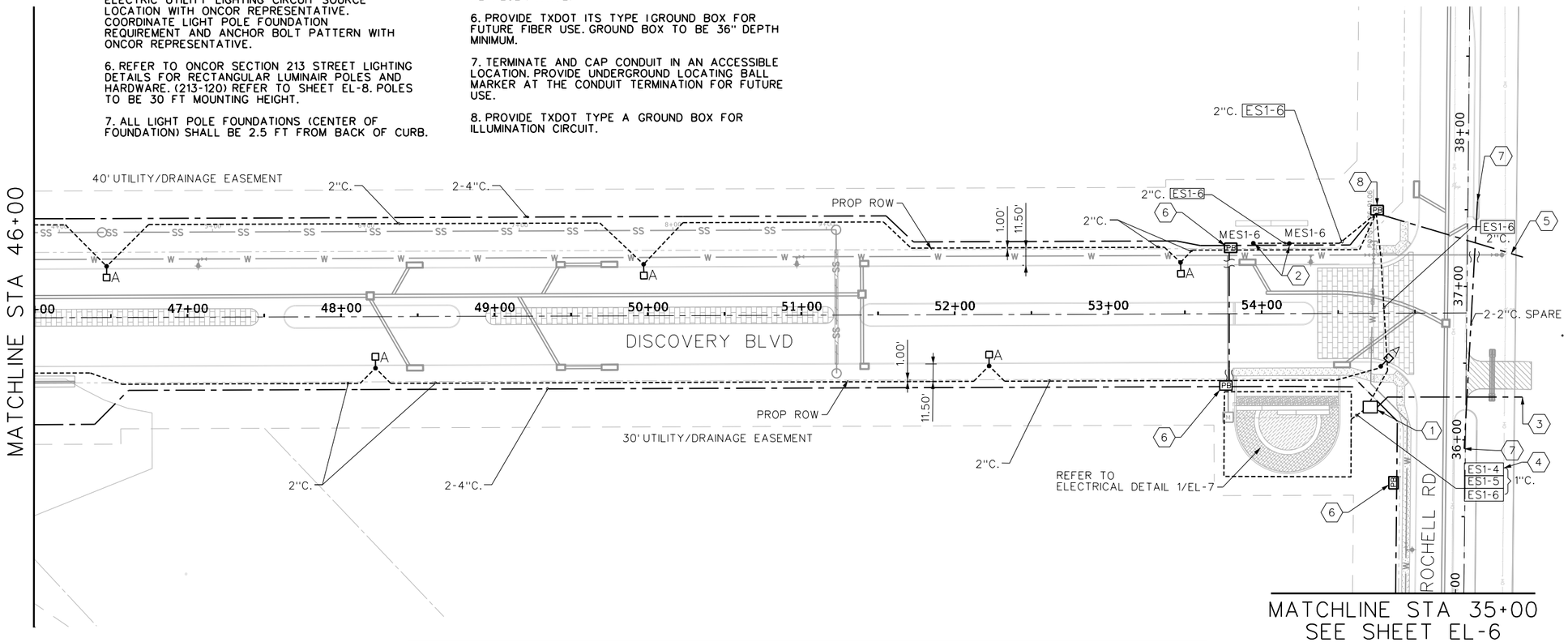
4. ROUTE CIRCUIT "ES1-4" TO IRRIGATION CONTROLLER. REFER TO IRRIGATION SHEET FOR LOCATION AT MONUMENT.

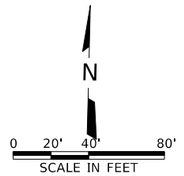
5. TERMINATE SPARE CONDUIT ON EAST SIDE OF ROCHELL RD WITHIN EASEMENT. PROVIDE UTILITY LOCATOR BALL AT CONDUIT TERMINATION. COORDINATE TERMINATION LOCATION WITH ONCOR REPRESENTATIVE.

6. PROVIDE TXDOT ITS TYPE IGROUND BOX FOR FUTURE FIBER USE. GROUND BOX TO BE 36" DEPTH MINIMUM.

7. TERMINATE AND CAP CONDUIT IN AN ACCESSIBLE LOCATION. PROVIDE UNDERGROUND LOCATING BALL MARKER AT THE CONDUIT TERMINATION FOR FUTURE USE.

8. PROVIDE TXDOT TYPE A GROUND BOX FOR ILLUMINATION CIRCUIT.





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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

Elec. Service No.	Sheet No.	Electrical Service Description (see ED (4) & (5) - 03)	Service Conduit Size	Service Conductors No./Size	Safety Switch Amps	Main Ckt. Bkr. Pole/Amp	Two-Pole Contactor Amps	Panelbd/ Loadcenter Amp Rating	Circuit No.	Branch Ckt. Bkr. Pole/Amps	Branch Circuit Amps	KVA Load
ES1	EL-2	ELC SRV TY D 120/240 060 (NS)AL(E)PS(U)	1 1/4"	3/#6	N/A	2P/60	30	100	1. SPARE	2P/15	5	0.6
									2. SPARE	2P/15	5	0.6
									3. SPARE	2P/15	5	0.6
									4. IRRIGATION CONTROLLER	1P/15	2	0.2
									5. FLAG FLOOD LIGHTS	1P/15	10	1.2
									6. MONUMENT FLOOD LIGHTS & RECEP	1P/15	6	0.7
ES2	EL-5	ELC SRV TY D 120/240 060 (NS)AL(E)PS(U)	1 1/4"	3/#6	N/A	2P/60	30	100	1. SPARE	2P/15	5	0.6
									2. SPARE	2P/15	5	0.6
									3. SPARE	2P/15	5	0.6
									4. IRRIGATION CONTROLLER	1P/15	2	0.2
									5. FLAG FLOOD LIGHTS	1P/15	9	1.1
									6. MONUMENT FLOOD LIGHTS & RECEP	1P/15	6	0.7

LEGEND:

- UNDERGROUND 2" CONDUIT OR DUCT BANK FOR STREET LIGHTING
- 2-4" C. UNDERGROUND CONDUIT OR DUCT BANK FOR FUTURE FIBER
- PB — PULL BOX
- A — POLE MOUNTED LIGHT FIXTURE "A" - FIXTURE TYPE
- ELECTRICAL SERVICE BOX

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

FREESE AND NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2201
Web - www.freese.com

RELEASED FOR THE PURPOSE OF INTERIM REVIEW UNDER THE AUTHORITY OF DANIEL W. KOSS TEXAS NO. 110037 ON 10/21/2021 IT IS NOT TO BE USED FOR BIDDING OR CONSTRUCTION PURPOSES. ALTERATION OF THIS DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

ELECTRICAL

DISCOVERY BLVD ILLUMINATION PLAN
STA 46+00 TO END

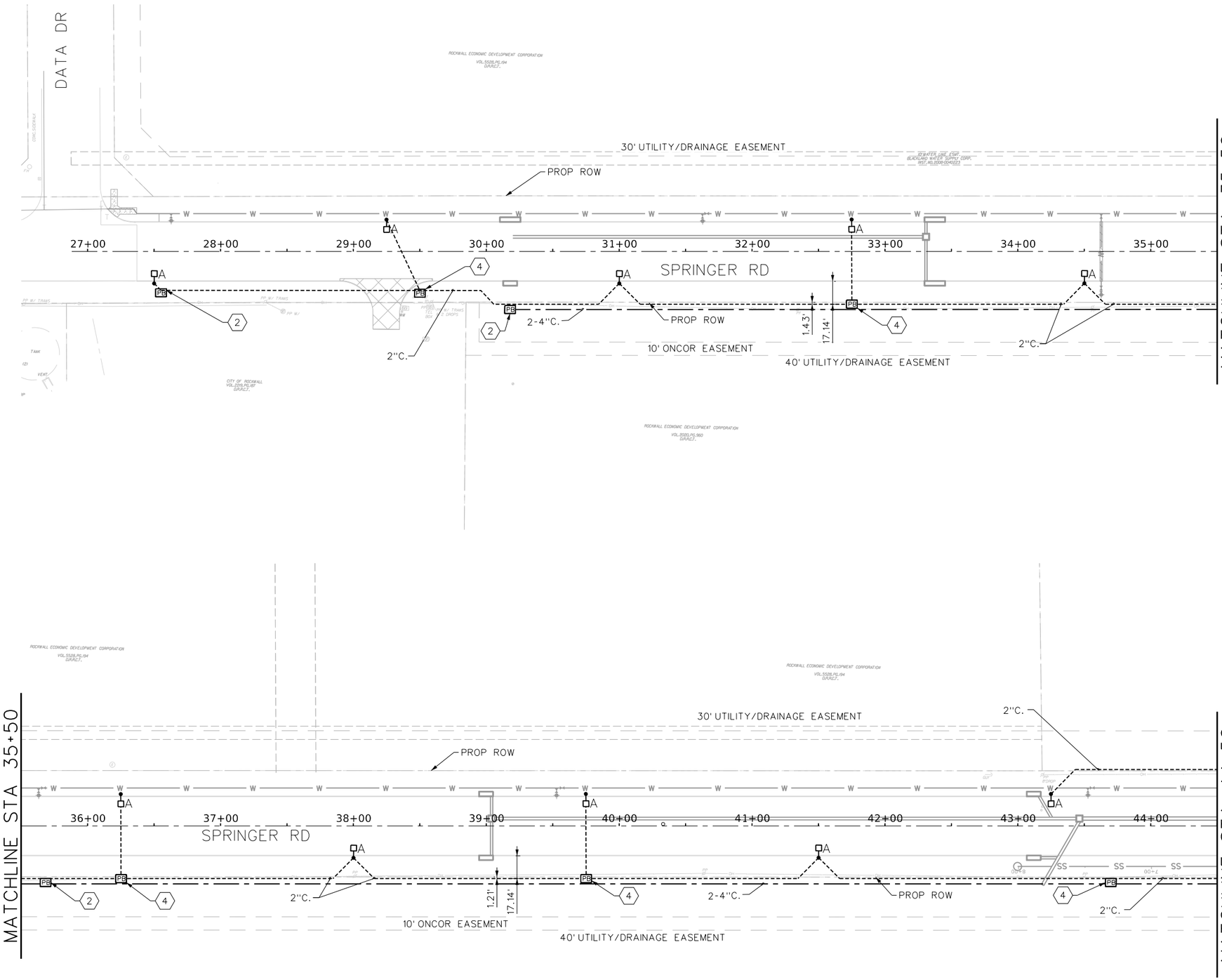
NO.	ISSUES	BY	DATE

F&N JOB NO. RKV19711
DATE APRIL 2022
DESIGNED ML,M
DRAWN ML,M
REVISED
CHECKED HH
FILE NAME cv-trt-pl-illumination02_disc.dgn

SHEET EL-2
SEQ. 293

MicroStation V8 User: 90262 Office: On Site
Plotter: N:\ELEC\drawings\cv-trt-pl-illumination02_disc.dgn
Plot Scale: 80.008 ' In. Model: Default
Date: Feb. 21, 2024 - 10:06:09 AM Project: Freese and Nichols, Inc.--True Type Fonts

Office: On Site Date: Feb. 21, 2024 - 10:06:09 AM User: 90262 File: N:\ELEC\drawings\cv-trt-pl-illumination02_disc.dgn



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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

N

0 20' 40' 80'
SCALE IN FEET

GENERAL NOTES:

1. COORDINATE ELECTRIC UTILITY SERVICE REQUIREMENTS WITH ONCOR ELECTRIC DELIVERY PRIOR TO STARTING CONSTRUCTION. PROVIDE TRENCHING, CONDUITS, SWEEPS, FOUNDATION, AND OTHER EQUIPTMENT AS REQUIRED BY UTILITY, CONTACT JAMES JACKSON (972-860-6647)

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4. PROVIDE NYLON PULL STRING IN ALL SPARE OR OTHERWISE EMPTY CONDUIT.

5. LIGHT POLE, FIXTURE, AND CIRCUIT CONDUCTORS PROVIDED BY ONCOR, CONTRACTOR TO PROVIDE FOUNDATION AND CONDUIT, COORDINATE ELECTRIC UTILITY LIGHTING CIRCUIT SOURCE LOCATION WITH ONCOR REPRESENTATIVE. COORDINATE LIGHT POLE FOUNDATION REQUIREMENT AND ANCHOR BOLT PATTERN WITH ONCOR REPRESENTATIVE.

6. REFER TO ONCOR SECTION 213 STREET LIGHTING DETAILS FOR RECTANGULAR LUMINAIR POLES AND HARDWARE. (213-120) REFER TO SHEET EL-8. POLES TO BE 30 FT MOUNTING HEIGHT.

7. ALL LIGHT POLE FOUNDATIONS (CENTER OF FOUNDATION) SHALL BE 2.5 FT FROM BACK OF CURB.

NOTES BY SYMBOL "⬡"

1. EXTEND CONDUIT A MINIMUM OF 5' PAST THE LIGHT POLE FOUNDATION FOR FUTURE USE. TERMINATE AND CAP CONDUIT IN AN ACCESSIBLE LOCATION. PROVIDE UNDERGROUND LOCATING BALL MARKERAT THE CONDUIT TERMINATION FOR FUTURE USE.

2. PROVIDE TXDOT ITS TYPE 1GROUND BOX FOR FUTURE FIBER USE. GROUND BOX TO BE 36" DEPTH MINIMUM.

3. TERMINATE AND CAP CONDUIT IN AN ACCESSIBLE LOCATION. PROVIDE UNDERGROUND LOCATING BALL MARKER AT THE CONDUIT TERMINATION FOR FUTURE USE.

4. PROVIDE TXDOT TYPE A GROUND BOX FOR ILLUMINATION CIRCUIT.

LEGEND:

- ---------- UNDERGROUND 2" CONDUIT OR DUCT BANK FOR STREET LIGHTING
- —— - — UNDERGROUND 2-4" C. CONDUIT OR DUCT BANK FOR FUTURE FIBER
- PB PULL BOX
- A POLE MOUNTED LIGHT FIXTURE "A" - FIXTURE TYPE
- ELECTRICAL SERVICE BOX

TEXAS REGISTERED ENGINEERING FIRM F-2144

THE SEAL THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY DANIEL W. KOSS
TEXAS NO. 110037 ON 10/21/2021
IT IS A VIOLATION OF STATE LAW TO USE THIS DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

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Phone: (214) 217-2200
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Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

ELECTRICAL

SPRINGER RD ILLUMINATION PLAN BEGINNING STA 35+50 TO STA 44+50

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MLM
DRAWN MLM
REVISED
CHECKED HH
FILE NAME rtr-pl-illumination03-spring.dgn

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1"

SHEET EL-3
SEQ. 294

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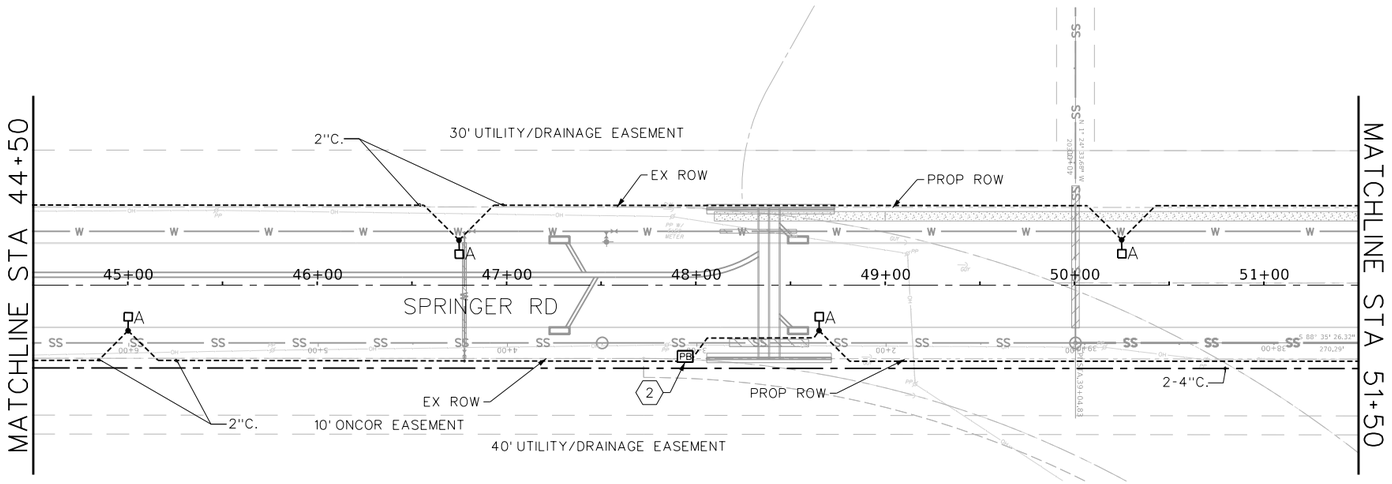
Date: Feb. 21, 2024 - 10:06:11 AM Project: Freese and Nichols, Inc. - True Type Fonts



ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
VOL.20205,PG.960
D.R.R.C.T.

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8/20/2024

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TEXAS NO. 110037 ON 10/21/2021
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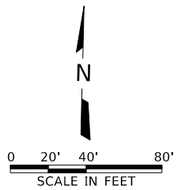


GENERAL NOTES:

1. COORDINATE ELECTRIC UTILITY SERVICE REQUIREMENTS WITH ONCOR ELECTRIC DELIVERY PRIOR TO STARTING CONSTRUCTION. PROVIDE TRENCHING, CONDUITS, SWEEPS, FOUNDATION, AND OTHER EQUIPTMENT AS REQUIRED BY UTILITY, CONTACT JAMES JACKSON (972-860-6647)

2. CONDUIT ROUTING IS SHOWN SCHEMATICALLY, COORDINATE ROUTING OF CONDUIT WITH ALL UNDERGROUND UTILITIES.

3. ALL CONDUIT SHALL BE INSTALLED AT A MINIMUM OF 24" BELOW THE PROPOSED FINISH GRADE.

4. PROVIDE NYLON PULL STRING IN ALL SPARE OR OTHERWISE EMPTY CONDUIT.

5. LIGHT POLE, FIXTURE, AND CIRCUIT CONDUCTORS PROVIDED BY ONCOR, CONTRACTOR TO PROVIDE FOUNDATION AND CONDUIT, COORDINATE ELECTRIC UTILITY LIGHTING CIRCUIT SOURCE LOCATION WITH ONCOR REPRESENTATIVE. COORDINATE LIGHT POLE FOUNDATION REQUIREMENT AND ANCHOR BOLT PATTERN WITH ONCOR REPRESENTATIVE.

6. REFER TO ONCOR SECTION 213 STREET LIGHTING DETAILS FOR RECTANGULAR LUMINAIR POLES AND HARDWARE. (213-120) REFER TO SHEET EL-8. POLES TO BE 30 FT MOUNTING HEIGHT.

7. ALL LIGHT POLE FOUNDATIONS (CENTER OF FOUNDATION) SHALL BE 2.5 FT FROM BACK OF CURB.

NOTES BY SYMBOL "⬡"

1. PROVIDE TXDOT ITS TYPE I GROUND BOX FOR FUTURE FIBER USE. GROUND BOX TO BE 36" DEPTH MINIMUM.

2. PROVIDE TXDOT TYPE A GROUND BOX FOR ILLUMINATION CIRCUIT.

LEGEND:

---------- UNDERGROUND 2" CONDUIT OR DUCT BANK FOR STREET LIGHTING

——— - — 2-4" C. UNDERGROUND CONDUIT OR DUCT BANK FOR FUTURE FIBER

PB PULL BOX

A POLE MOUNTED LIGHT FIXTURE "A" - FIXTURE TYPE

ELECTRICAL SERVICE BOX

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2201
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

ELECTRICAL

SPRINGER RD ILLUMINATION PLAN
STA 44+50 TO END

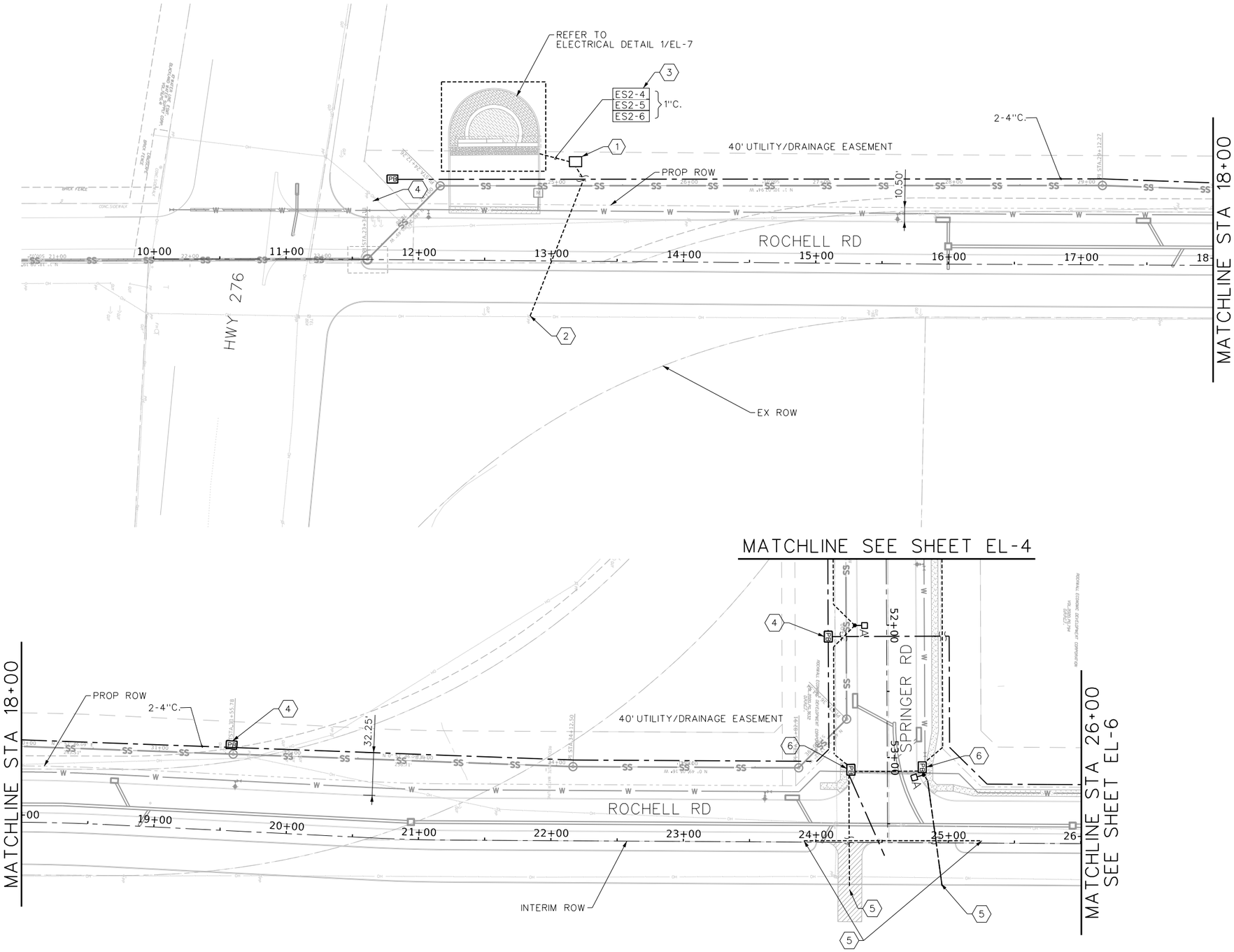
NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MLM
DRAWN MLM
REVISED
CHECKED HH
FILE NAME cv-trt-pl-illumination04_spring.dgn

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1"

SHEET EL-4
SEQ. 295

MicroStation V8 User: 90262 Office: On Site
Plotter: J:\PLOTS\Xerox_VersaPress_Color.pltcfg Model: Default
Plot Scale: 80.0087 '/ in. Project: Freese and Nichols, Inc. - True Type Fonts
Date: Feb. 21, 2024 - 10:06:13 AM



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FREESE AND NICHOLS, INC.

RECORD DRAWINGS PREPARED ON: 8/20/2024

N

0 20' 40' 80'

SCALE IN FEET

GENERAL NOTES:

1. COORDINATE ELECTRIC UTILITY SERVICE REQUIREMENTS WITH ONCOR ELECTRIC DELIVERY PRIOR TO STARTING CONSTRUCTION. PROVIDE TRENCHING, CONDUITS, SWEEPS, FOUNDATION, AND OTHER EQUIPTMENT AS REQUIRED BY UTILITY, CONTACT JAMES JACKSON (972-860-6647)

2. CONDUIT ROUTING IS SHOWN SCHEMATICALLY, COORDINATE ROUTING OF CONDUIT WITH ALL UNDERGROUND UTILITIES.

3. ALL CONDUIT SHALL BE INSTALLED AT A MINIMUM OF 24" BELOW THE PROPOSED FINISH GRADE.

4. PROVIDE NYLON PULL STRING IN ALL SPARE OR OTHERWISE EMPTY CONDUIT.

5. LIGHT POLE, FIXTURE, AND CIRCUIT CONDUCTORS PROVIDED BY ONCOR, CONTRACTOR TO PROVIDE FOUNDATION AND CONDUIT, COORDINATE ELECTRIC UTILITY LIGHTING CIRCUIT SOURCE LOCATION WITH ONCOR REPRESENTATIVE. COORDINATE LIGHT POLE FOUNDATION REQUIREMENT AND ANCHOR BOLT PATTERN WITH ONCOR REPRESENTATIVE.

6. REFER TO ONCOR SECTION 213 STREET LIGHTING DETAILS FOR RECTANGULAR LUMINAIR POLES AND HARDWARE. (213-120) REFER TO SHEET EL-8. POLES TO BE 30 FT MOUNTING HEIGHT.

7. ALL LIGHT POLE FOUNDATIONS (CENTER OF FOUNDATION) SHALL BE 2.5 FT FROM BACK OF CURB.

NOTES BY SYMBOL "⬡"

1. ELECTRICAL SERVICE "ES2". REFER TO ELECTRICAL SERVICE SCHEDULE. FIXTURE TYPE "M" TO BE PEDESTAL MOUNTED. REFER TO DETAIL "2/EL-7". AIM FIXTURE AT THE MONUMENT VERTICAL SURFACE SUCH THAT THE LIGHTING IS AS EVEN AS POSSIBLE. THE FLOOD LIGHT CIRCUITS ARE TO BE SWITCHED BY THE PHOTOCELL AT THE ELECTRICAL SERVICE ENCLOSURE.

2. COORDINATE UTILITY SERVICE SOURCE LOCATION WITH UTILITY REPRESENTATION.

3. ROUTE CIRCUIT "ES2-4" TO IRRIGATION CONTROLLER. REFER TO IRRIGATION SHEET FOR LOCATION AT MONUMENT.

4. PROVIDE TXDOT ITS TYPE 1GROUND BOX FOR FUTURE FIBER USE. GROUND BOX TO BE 36" DEPTH MINIMUM.

5. TERMINATE AND CAP CONDUIT IN AN ACCESSIBLE LOCATION. PROVIDE UNDERGROUND LOCATING BALL MARKER AT THE CONDUIT TERMINATION FOR FUTURE USE.

6. PROVIDE TXDOT TYPE A GROUND BOX FOR ILLUMINATION CIRCUIT.

LEGEND:

----------	UNDERGROUND 2" CONDUIT OR DUCT BANK FOR STREET LIGHTING
—— - —	2-4" C. UNDERGROUND CONDUIT OR DUCT BANK FOR FUTURE FIBER
PB	PULL BOX
A	POLE MOUNTED LIGHT FIXTURE "A" - FIXTURE TYPE
☐	ELECTRICAL SERVICE BOX

I HEREBY CERTIFY THAT THIS DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM AUTHORIZED TO RELEASE THIS DOCUMENT UNDER THE LAWS OF THE STATE OF TEXAS.

DANIEL W. KOSS
103737
LICENSED PROFESSIONAL ENGINEER
10/21/2021

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2250
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

ELECTRICAL

ROCHELL RD ILLUMINATION PLAN
BEGIN TO STA 26+00

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MLM
DRAWN MLM
REVISED
CHECKED HH
FILE NAME cv-trt-pl-illumination05_roch.dgn

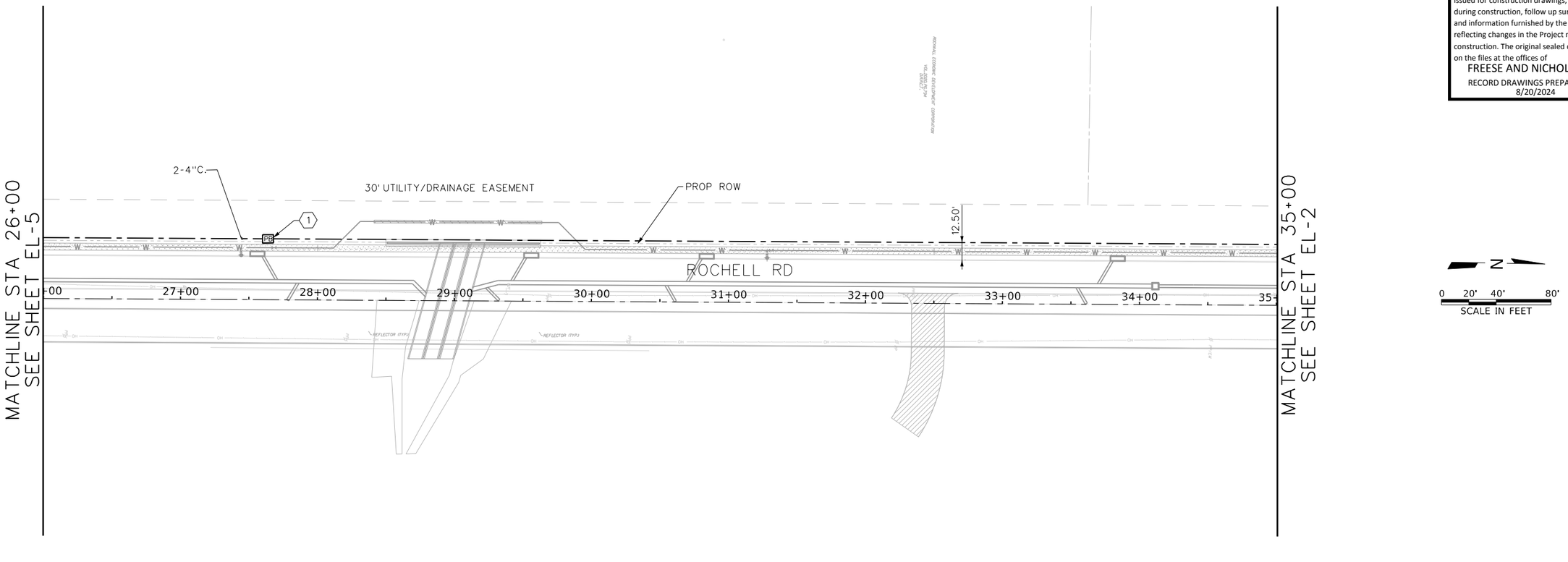
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.

SHEET EL-5

SEQ. 296

MicroStation V8 User: 90262 Office: On Site
Plotter: N:\ELEC\drawings\cv-trt-pl-illumination05_roch.dgn
Plot Scale: 80.008 ' / in. Model: Default
Date: Feb. 21, 2024 - 10:06:14 AM Project: Freese and Nichols, Inc. - True Type Fonts

Office: On Site Date: Feb. 21, 2024 - 10:06:14 AM User: 90262 File: N:\ELEC\drawings\cv-trt-pl-illumination05_roch.dgn



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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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TEXAS NO. 110037 ON 10/21/2021
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FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2836
Web - www.freese.com

N

0 20' 40' 80'
SCALE IN FEET

GENERAL NOTES:

1. COORDINATE ELECTRIC UTILITY SERVICE REQUIREMENTS WITH ONCOR ELECTRIC DELIVERY PRIOR TO STARTING CONSTRUCTION. PROVIDE TRENCHING, CONDUITS, SWEEPS, FOUNDATION, AND OTHER EQUIPTMENT AS REQUIRED BY UTILITY, CONTACT JAMES JACKSON (972-860-6647)

2. CONDUIT ROUTING IS SHOWN SCHEMATICALLY, COORDINATE ROUTING OF CONDUIT WITH ALL UNDERGROUND UTILITIES.

3. ALL CONDUIT SHALL BE INSTALLED AT A MINIMUM OF 24" BELOW THE PROPOSED FINISH GRADE.

4. PROVIDE NYLON PULL STRING IN ALL SPARE OR OTHERWISE EMPTY CONDUIT.

NOTES BY SYMBOL "⬡"

1. PROVIDE TXDOT ITS TYPE 1 GROUND BOX FOR FUTURE FIBER USE. GROUND BOX TO BE 36" DEPTH MINIMUM.

LEGEND:

---------- UNDERGROUND 2" CONDUIT OR DUCT BANK FOR STREET LIGHTING

——— - — 2-4" C. UNDERGROUND CONDUIT OR DUCT BANK FOR FUTURE FIBER

PB PULL BOX

A POLE MOUNTED LIGHT FIXTURE "A" - FIXTURE TYPE

ELECTRICAL SERVICE BOX

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

ROCHELL RD ILLUMINATION PLANS STA 26+00 TO END

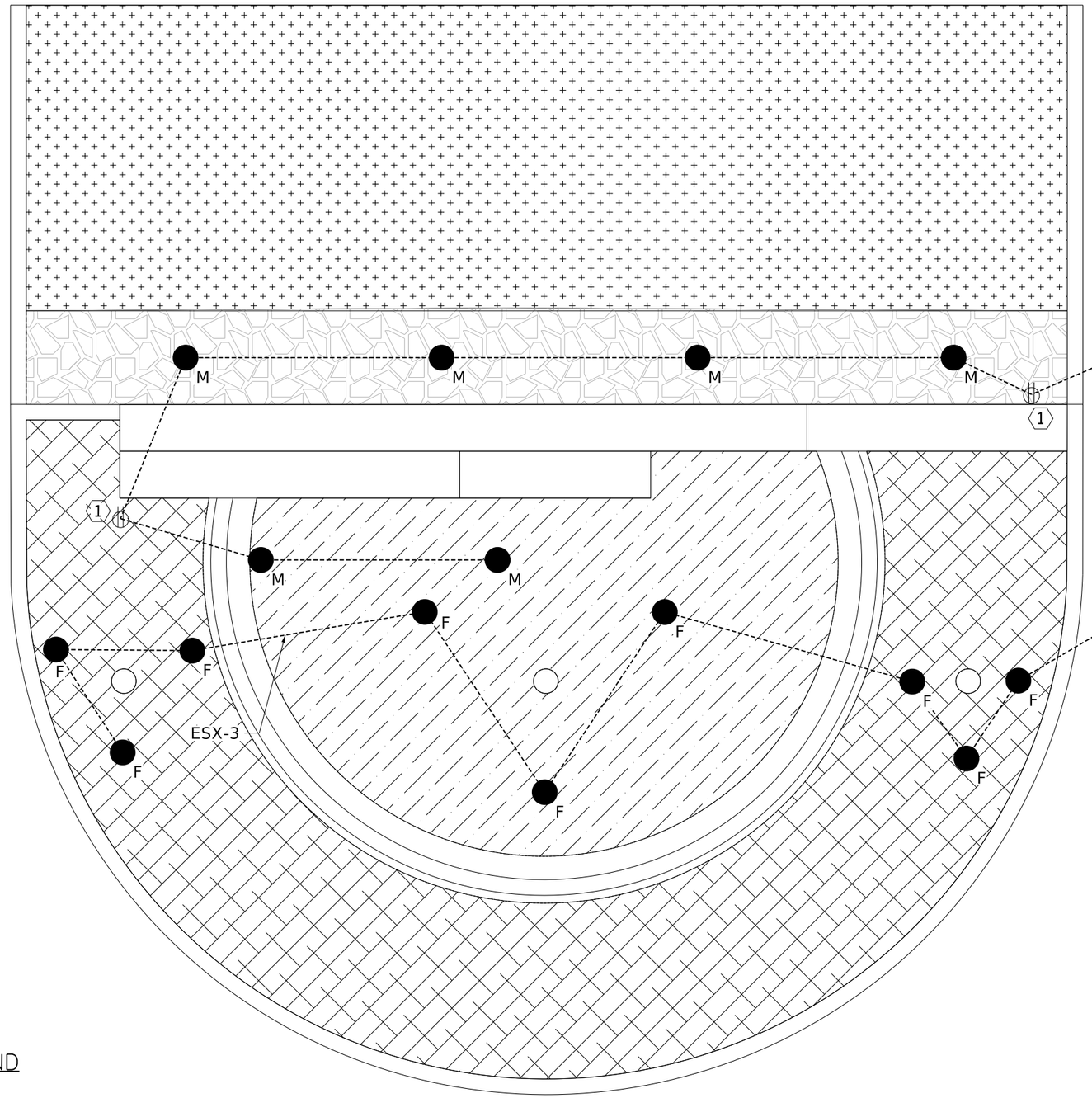
NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED MLM
DRAWN MLM
REVISED XXX
CHECKED HH
FILE NAME trt-pl-illumination06_roch.dgn

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1"

SHEET EL-6
SEQ. 297

MicroStation V8 User: 90262 Office: On Site
N:\ELEC\drawings\cv-trt-pl-illumination06_roch.dgn
Plotter: JJPlotter - Xerox WorkCentre 7120 PS
Plot Scale: 80.0087 i in.
Date: Feb. 21, 2024 - 10:06:16 AM
Model: Default
Project: Freese and Nichols, Inc. - True Type Fonts



NOTES:

1. ALL LIGHTING AND RECEPTACLE CONDUCTORS AND CONDUIT SHALL BE #10 IN 1" CONDUIT UNLESS OTHERWISE NOTED.

2. FIXTURES TYPE "F" AND TYPE "M" TO BE MOUNTED WITH CONCRETE FOUNDATION. REFER TO SHEET EL-2 FOR LIGHT FIXTURE SCEDULE. REFER TO DETAIL 2, THIS SHEET FOR FOUNDATION DETAIL.

3. ALL MONUMENT CIRCUITS FOR LIGHTING AND CONVIENENCE RECEPTACLES MUST BE SWITCHED BY THE PHOTOCELL LOCATED AT THE ELECTRICAL SERVICE ENCLOSURE.

4. AFTER INSTALLATION AIM FIXTURES TYPE "M" AT THE MONUMENT SIGNAGE AND FIXTURES TYPE "F" AT THE FLAG LOCATION AT THE TOP OF THEIR RESPECTIVE POLES TO ACHIEVE MAXIMUM UNIFORM COVERAGE.

5. CIRCUITING LABELED AS "ESX" REFERS THE ELECTRICAL SERVICE ASSOCIATED WITH THE MONUMENT SIGN, EITHER "ES1" OR "ES2".

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

NOTES BY SYMBOL "⬡"

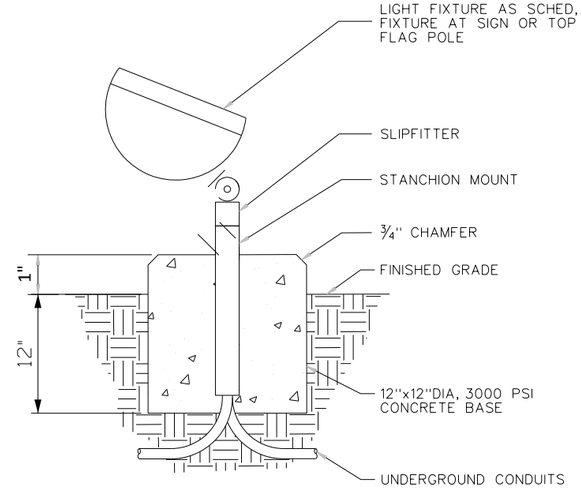
1. PROVIDE ONE DUPEX RECEPTACLE IN LEGRAND WIREMOLD OUTDOOR GROUND BOX XB814C520 ENCLOSURE. COORDINATE COVER FINISH/COLOR WITH OWNERS REPRESENTATIVE. RECEPTICLES MUST BE GFI.

2. CONTINUED ON REFERENCING SHEET

LEGEND

F — GROUND FLOOD LIGHT (DETAIL 2 ON SHEET)

1 MONUMENT ELECTRICAL PLAN
1/4"=1'0"



2 GROUND FLOODLIGHT
NOT TO SCALE

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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TEXAS NO. 110037 ON 10/21/2021
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FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone - (214) 217-2200
Fax - (214) 217-2299
Web - www.freese.com

CITY OF ROCKWALL, TEXAS
EDC PHASE 3 INFRASTRUCTURE
ELECTRICAL
MONUMENT ELECTRICAL PLAN

F&N JOB NO.	ROK19711
DATE	MAY 2020
DESIGNED	MLM
DRAWN	MLM
REVISED	
CHECKED	HH
FILE NAME	la-trt-dt-mdetails01.dgn

NO.	ISSUES	BY	DATE

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.

SHEET EL-7
SEQ. 298

MicroStation V8 User: 90262 Office: On Site
Plotter: J:\Plotters\Xerox_AltaLink_B8145.pltcfg Model: Sheet
Plot Scale: 0.2 "=1"in. Projects: Freese and Nichols, Inc. - True Type Fonts
Date: Feb. 21, 2024 - 01:54:16 PM

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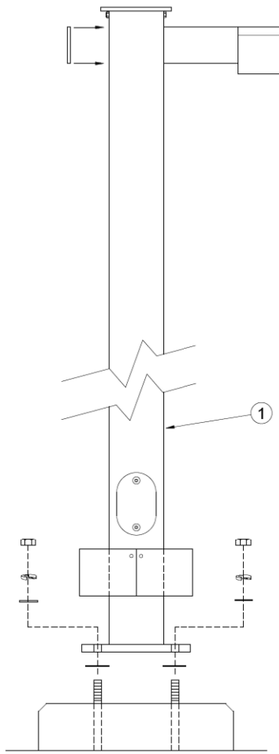
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

Rectangular Luminaire Poles and Hardware

213 - 120
02 - 18



Notes:

A. All mounting hardware is included with each pole CU
B. Mounting hardware should only be ordered as needed.

Item	Qty	Description	TSN/Ref	CU
2		Square Pole, 25 ft. Bronze Steel, Anchor Base	317523	SLPS25
2		Square Pole, 30 ft. Bronze Steel, Anchor Base	313830	SLPS30
2		Square Pole, 40 ft. Bronze Steel, Anchor Base	317524	SLPS40

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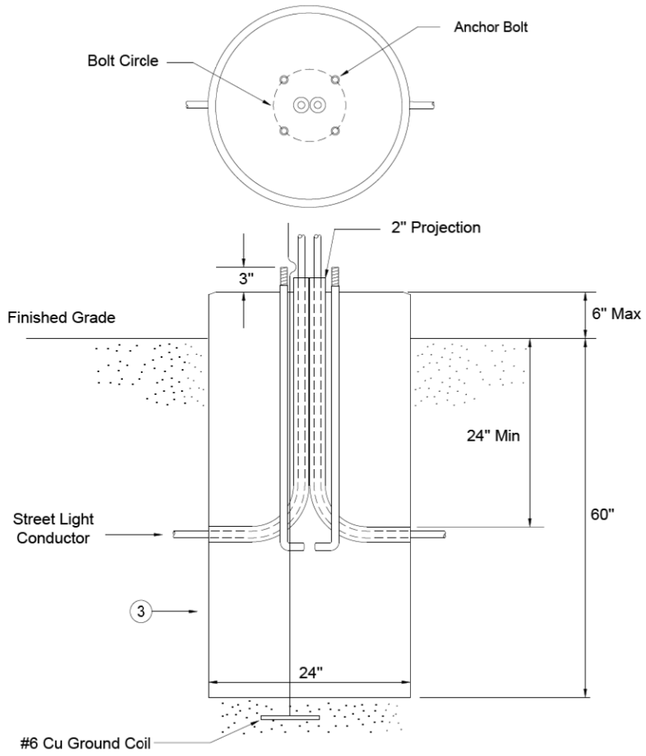
ONCOR

Rectangular Luminaire Foundations

213 - 120
02 - 18



Item	Qty	Description	TSN/Ref	CU
1		Precast Foundation, 14" Bolt Circle, 1" Anchor Bolts	398698	SLFPSQ25/30
1		Precast Foundation, 14" Bolt Circle, 1 1/4" Anchor Bolts	398700	SLFP40

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FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
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Phone: (214) 217-2200
Fax: (214) 217-2201
Web - www.freese.com

CITY OF ROCKWALL, TEXAS

EDC PHASE 3 INFRASTRUCTURE

ELECTRICAL

RECTANGULAR LUMINAIRE DETAILS

F&N JOB NO.	ROK19711
DATE	MAY 2020
DESIGNED	ML.M
DRAWN	ML.M
REVISED	
CHECKED	HH
FILE NAME	la-trt-dt-oncordetails01.dgn

NO.	ISSUES	BY	DATE

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale!
0 1"

SHEET EL-8

SEQ. 299

MicroStation V8 User: 90262 Office: On Site
N:\ELEC\drawings\la-trt-dt-oncordetails01.dgn
Plotters: pjPlotter, Xerox Phaser 7760DP, HewPrt Monochrome
Plot Scale: 0.2 '= 1' in.
Date: Feb. 21, 2024 - 01:54:37 PM
Models: Sheet
Projects: Freese and Nichols, Inc. - True Type Fonts

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GENERAL NOTES FOR ALL ELECTRICAL WORK

1. The location of all conduits, junction boxes, ground boxes, and electrical services is diagrammatic and may be shifted to accommodate field conditions.

2. Provide new and unused materials. Ensure that all materials and installations comply with the applicable articles of the National Electrical Code (NEC), TxDOT standards and specifications, National Electrical Manufacturers Association (NEMA), and are listed by Underwriters Laboratories (UL) or a Nationally Recognized Testing Lab (NRTL). NRTLs such as Canadian Standard Association (CSA), Intertek Testing Services NA Inc., or FM Approvals LLC can be considered equivalent to UL. Where reference is made to NEMA listed devices, International Electrotechnical Commission (IEC) listed devices will not be considered an acceptable equal to a NEMA listed device. Acceptable devices may have both a NEMA and IEC listing. Faulty fabrication or poor workmanship in any material, equipment, or installation is justification for rejection. Replace or reinstall rejected material or equipment at no additional cost to the Department.

3. Miscellaneous nuts, bolts and hardware, except for high strength bolts, may be stainless steel when plans specify galvanized, provided the bolt size is ½ in. or less in diameter.

4. Provide the following test equipment as required by the Engineer to confirm compliance with the contract and the NEC: voltmeter, ammeter, megohm meter (1000 volt DC), ground resistance tester, torque wrenches, and torque screwdrivers. Ensure all equipment has been properly calibrated within the last year. Provide calibration certification to the Engineer upon request. Operate test equipment during inspection as requested by the Engineer.

5. Install grounding as shown on the plans and in accordance with the NEC. Ensure all metallic conduits; metal poles; luminaires; and metal enclosures are bonded to the equipment grounding conductor. Provide stranded bare copper or green insulated grounding conductors. Ground rods, connectors, and bonding jumpers are subsidiary to the various bid items.

6. When required by the Engineer, notify the Department in writing of materials from the Material Producers List (MPL) intended for use on each project. Prequalified materials are listed on the MPL on TxDOT's website under "Roadway Illumination and Electrical Supplies." No substitutions will be allowed for materials on this list.

CONDUIT

A. MATERIALS

1. Provide conduit, junction boxes, fittings, and hardware as per TxDOT Departmental Material Specification (DMS) 11030 "Conduit" and Item 618 "Conduit" of TxDOT's "Standard Specifications For Construction And Maintenance Of Highways, Streets, And Bridges," latest edition. Provide conduits listed under Item 618 on the MPL under "Roadway Illumination and Electrical Supplies." Provide conduit types according to the descriptive code or as shown on the plans. Do not substitute other types of conduits for those shown. Provide liquidtight flexible metal conduit (LFMC) when flexible conduit is called for on galvanized steel rigid metallic conduit (RMC) systems. Provide liquidtight flexible nonmetallic conduit (LFNC) when flexible conduit is called for on polyvinyl chloride (PVC) systems.

2. Provide galvanized steel RMC for all exposed conduits, unless otherwise shown on the plans. Properly bond all metal conduits.

3. Unless otherwise shown on the plans, provide junction boxes with a minimum size as shown in the following table, which applies to the greatest number of conductors entering the box through one conduit with no more than four conduits per box. When a mixture of conductor sizes is present, count the conductors as if all are of the larger size. For situations not applicable to the table, size junction boxes in accordance with NEC.

AWG	3 CONDUCTORS	5 CONDUCTORS	7 CONDUCTORS
#1	10" x 10" x 4"	12" x 12" x 4"	16" x 16" x 4"
#2	8" x 8" x 4"	10" x 10" x 4"	12" x 12" x 4"
#4	8" x 8" x 4"	10" x 10" x 4"	10" x 10" x 4"
#6	8" x 8" x 4"	8" x 8" x 4"	10" x 10" x 4"
#8	8" x 8" x 4"	8" x 8" x 4"	8" x 8" x 4"

4. Junction boxes with an internal volume of less than 100 cu. in. and supported by entering raceways must have threaded entries or hubs identified for the intended purpose and supported by connection of two or more rigid metal conduits. Secure conduit within 3 ft. of the enclosure or within 18 in. of the enclosure if all conduit entries are on the same side. Mechanically secure all junction boxes with an internal volume greater than 100 cu. inches.

5. Provide hot dipped galvanized cast iron or sand cast aluminum outlet boxes for junction boxes containing only 10 AWG or 12 AWG conductors. Do not use die cast aluminum boxes. Size outlet boxes according to the NEC.

6. Do not use intermediate metal conduit (IMC) or electrical metallic tubing (EMT) unless specifically required by the plan sheets. When EMT is called for, provide junction boxes made from galvanized steel sheeting, listed and approved for outdoor use, unless otherwise noted on the plans. Size all galvanized steel junction boxes in accordance with the NEC. Provide junction boxes for IMC conduit systems that meet the same requirements for junction boxes used with RMC systems.

7. Provide PVC junction boxes intended for outdoor use on PVC conduit systems, unless otherwise noted on the plans.

8. Provide PVC elbows in PVC conduit systems, unless otherwise shown on the plans. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the PVC conduit system. When galvanized steel RMC elbows are specifically called for in the plans and any portion of the RMC elbow is buried less than 18 in., ground the RMC elbow by means of a grounding bushing on a rigid metal extension. Grounding of the rigid metal elbow is not required if the entire RMC elbow is encased in a minimum of 2 in. of concrete. PVC extensions are allowed on these concrete encased rigid metal elbows. RMC or PVC elbows are subsidiary to various bid items.

9. When required, provide High-Density Polyethylene (HDPE) conduit with factory installed internal conductors according to Item 622 "Duct Cable." At the Contractor's request and with approval by the Engineer, substitute HDPE conduit with no conductors for bored schedule 40 or schedule 80 PVC conduit bid under Item 618. Ensure bored HDPE substituted for PVC is schedule 40 and of the same size PVC called for in the plans. Ensure the substituted HDPE meets the requirements of Item 622, except that the conduit is supplied without factory-installed conductors. Make the transition of the HDPE conduit to PVC (or RMC elbow when required) at the bore pit. Provide conduit of the size and schedule as shown on the plans. Do not extend substituted conduit into ground boxes or foundations. Provide PVC or galvanized steel RMC elbows as called for at all ground boxes and foundations.

10. Use two-hole straps when supporting 2 in. and larger conduits. On electrical service poles, properly sized stainless steel or hot dipped galvanized one-hole standoff straps are allowed on the service riser conduit.

B. CONSTRUCTION METHODS

1. Provide and install expansion joint conduit fittings on all structure-mounted conduits at the structure's expansion joints to allow for movement of the conduit. In addition, provide and install expansion joint fittings on all continuous runs of galvanized steel RMC conduit externally exposed on structures such as bridges at maximum intervals of 150 ft. When requested by the project Engineer, supply manufacturer's specification sheet for expansion joint conduit fittings. Repair or replace expansion joint fittings that do not allow for movement at no additional cost to the Department. Provide the method of determining the amount of expansion to the Engineer upon request. Do not use LFMC or LFNC as a substitute for the required expansion conduit fittings.

2. Space all conduit supports at maximum intervals of 5 ft. Install conduit spacers when attaching metal conduit to surface of concrete structures. See "Conduit Mounting Options" on ED(2). Install conduit support within 3 ft. of all enclosures and conduit terminations.

3. Do not attach conduit supports directly to pre-stressed concrete beams except as shown specifically in the plans or as approved by the Engineer.

4. Unless otherwise shown on the plans, jack or bore conduit placed beneath existing roadways, driveways, sidewalks, or after the base or surfacing operation has begun. Backfill and compact the bore pits below the conduit per Item 476 "Jacking, Boring, or Tunneling Pipe or Box" prior to installing conduit or duct cable to prevent bending of the connections.

5. When placing conduit in the sub-grade of new roadways, backfill all trenches with excavated material unless otherwise noted on the plans. When placing conduit in the sub-base of new roadways, backfill all trenches with cement-stabilized base as per requirements of Items 110 "Excavation", 400 "Excavation and Backfill for Structures", 401 "Flowable Backfill", 402 "Trench Excavation Protection", and 403 "Temporary Special Shoring."

6. Provide and place warning tape approximately 10 in. above all trenched conduit as per Item 618.

7. During construction, temporarily cap or plug open ends of all conduit and raceways immediately after installation to prevent entry of dirt, debris and animals. Temporary caps constructed of durable duct tape are allowed. Tightly fix the tape to the conduit opening. Clean out the conduit and prove it clear in accordance with Item 618 prior to installing any conductors.

8. Ensure conduit entry into the top of any enclosure is waterproof by installing conduit sealing hubs or using boxes with threaded bosses. This includes surface mounted safety switches, meter cans, service enclosures, auxiliary enclosures and junction boxes. Grounding bushings on water tight sealing hubs are not required.

9. Fit the ends of all PVC conduit terminations with bushings or bell end fittings. Provide and install a grounding type bushing on all metal conduit terminations.

10. Install a bonding jumper from each grounding bushing to the nearest ground rod, grounding lug, or equipment grounding conductor. Ensure all bonding jumpers are the same size as the equipment grounding conductor. Bonding of conduit used as a casing under roadways for duct cable is not required, if the duct extends the full length through the casing.

11. At all electrical services, install a 6 AWG solid copper grounding electrode conductor.

12. Place conduits entering ground boxes so that the conduit openings are between 3 in. and 6 in. from the bottom of the box. See the ground box detail on sheet ED(4).

13. Seal ends of all conduits with duct seal, expandable foam, or by other methods approved by the Engineer. Seal conduit immediately after completion of conductor installation and pull tests. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a conduit sealant.

14. File smooth the cut ends of all mounting strut and conduit. Before installing, paint the field cut ends of all mounting strut and RMC (threaded or non-threaded) with zinc rich paint (94% or more zinc content) to alleviate overspray. Use zinc rich paint to touch up galvanized material as allowed under Item 445 "Galvanizing." Do not paint non-galvanized material with a zinc rich paint as an alternative for materials required to be galvanized.

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS CONDUITS & NOTES

ED(1)-14

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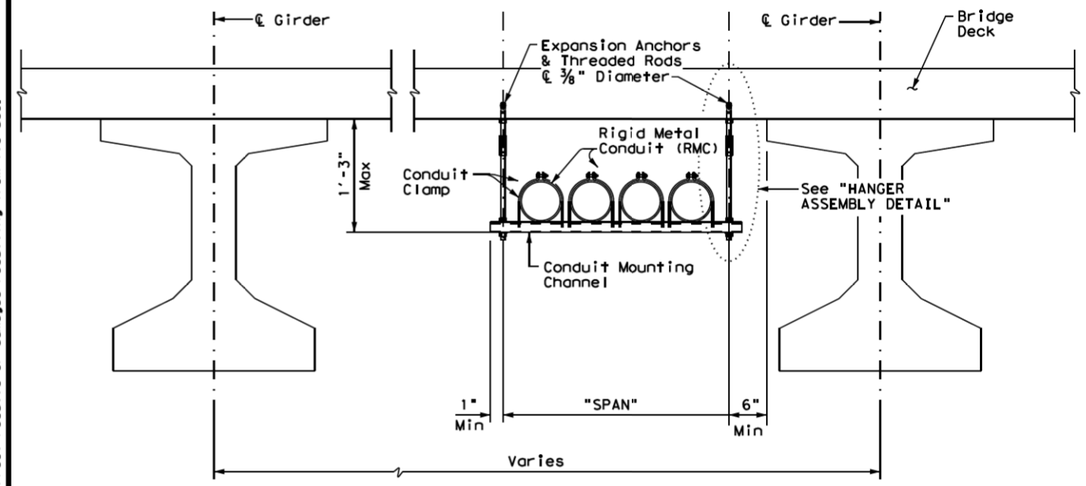
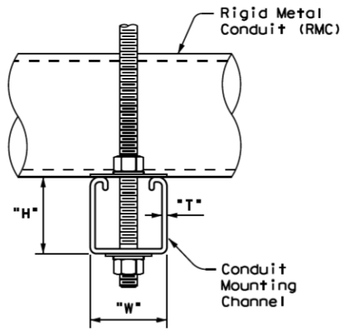
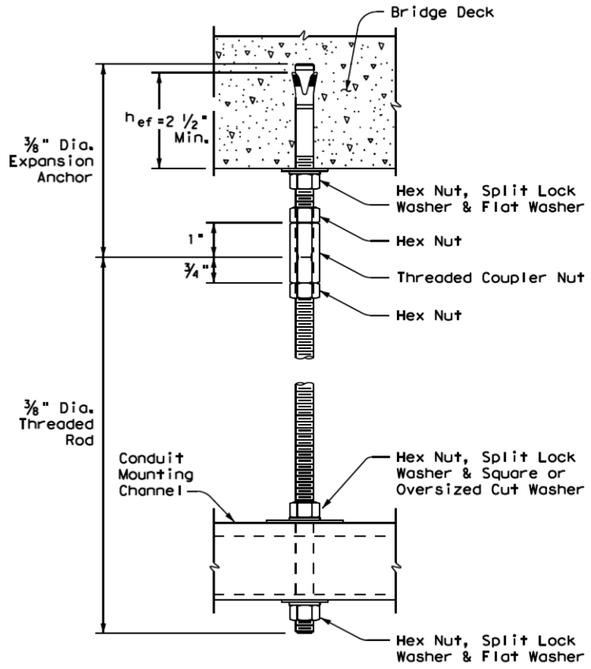


CONDUIT HANGING DETAIL

CONDUIT MOUNTING CHANNEL		
"SPAN"	"W" x "H"	"T"
less than 2'	1 5/8" x 1 3/8"	12 Ga.
2'-0" to 2'-6"	1 5/8" x 1 5/8"	12 Ga.
>2'-6" to 3'-0"	1 5/8" x 2 7/16"	12 Ga.

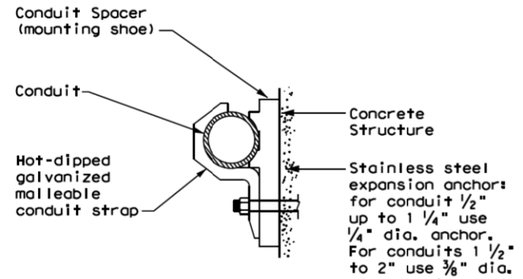
Channels with round or short slotted hole patterns are allowed, if the load carrying capacity is not reduced by more than 15%.

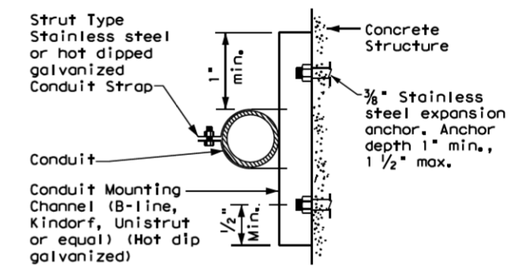




HANGER ASSEMBLY DETAIL

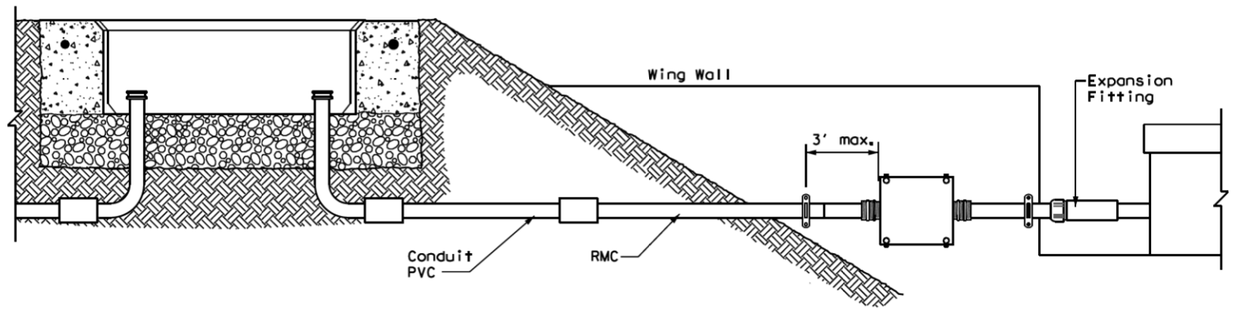
ELECTRIC CONDUIT TO BRIDGE DECK ATTACHMENT





CONDUIT MOUNTING OPTIONS

Attachment to concrete surfaces
See ED(1)B.2



TYPICAL CONDUIT ENTRY TO BRIDGE STRUCTURE DETAIL

EXPANSION ANCHOR NOTES FOR BRIDGE DECK ATTACHMENT

1. Use torque controlled mechanical expansion anchors that are approved for use in cracked concrete by the International Code Council, Evaluation Service (ICC-ES). The chosen anchor product shall have a designated ICC-ES Evaluation Report number, and its approval status shall be maintained on the ICC-ES website under Division 031600 for Concrete Anchors.
2. Unless otherwise approved by the Engineer: do not use adhesive anchors; do not use expansion anchors that are not included in the ICC-ES approval list; and do not use expansion anchors that are only approved for use in uncracked concrete.
3. Use anchors manufactured with stainless steel expansion wedges. Anchors manufactured with carbon steel expansion wedges are not allowed. Anchor bodies can be either zinc-plated carbon steel or stainless steel. For application in marine environment, both the anchor body and expansion wedge shall be stainless steel.
4. Install anchors as shown on the plans and in accordance with the anchor manufacturer's published installation instructions. Arrange a field demonstration test to evaluate the procedures and tools. The test shall be witnessed and approved by the Engineer prior to furnishing anchors on the structure.
5. Prior to hole drilling, use rebar locator to ensure clearing of existing deck strands or reinforcement. Install anchors to ensure a minimum effective embedment depth, (h_{ef}), as shown. Increase (h_{ef})as needed to ensure sufficient thread length for proper torqueing and tightening of anchors.
6. Use anchors of minimum 1600 Lbs tensile capacity (minimum of steel, concrete breakout, and concrete pullout strengths as determined by ACI 318 Appendix D) at the required minimum embedment depth (h_{ef}). No lateral loads shall be introduced after conduit installation.

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS CONDUIT SUPPORTS

ED(2)-14

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ELECTRICAL CONDUCTORS

A. MATERIAL INFORMATION

1. Provide Type XHHW insulated conductors in accordance with Departmental Material Specification (DMS)11040 "Conductors" and Item 620 "Electrical Conductors." Provide conductors as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies" Item 620. Color code insulated conductors in conformance with the NEC. Identify grounded (neutral) conductors with white insulation. Identify grounding conductors (ground wires) with green insulation or bare conductors. Identify ungrounded (hot) conductors with any color insulation except green, white, or gray. Keep color scheme consistent throughout the wiring system. Identify conductors 6 American Wire Gauge (AWG) and smaller by continuous color jacket. Identify electrical conductors 4 AWG and larger by continuous color jacket or by colored tape. When identifying conductors with colored tape, mark at least 6 in. of the conductor's insulation with half laps of tape.
2. Provide a solid copper 6 AWG grounding electrode conductor to bond the electrical service equipment to the concrete encased grounding electrode or the ground rod at the service location. Connect the grounding electrode conductor to the ground rod with a UL listed connector in accordance with DMS 11040. Connect the grounding electrode conductor to the concrete encased grounding electrode as shown in the plans.
3. Where two or more circuits are present in one conduit or enclosure, permanently identify the conductors of each branch circuit by attaching a non-metallic tag around both circuit conductors at each accessible location. Provide tags with two straps, large enough to indicate circuit number, letter, or other identification as shown in the plans. Print circuit identification on the tag with a permanent marker.
4. Use listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors for splicing as specified in DMS 11040. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Provide UL listed gel-filled insulating splice covers. Splicing materials, insulating materials, breakaway disconnects, splice covers, and fuse holders are subsidiary to various bid items.

B. CONSTRUCTION METHODS

1. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the conduit system. After installing conductors in conduit, perform conductor pull test. If a conductor cannot be freely pulled, make any needed alterations or repairs at no additional cost to the department. Perform insulation resistance tests in accordance with Item 620. Coordinate with the Engineer to witness the tests.
2. Leave 2 ft. minimum, 3 ft. maximum length for each conductor up to the splice in ground boxes. Leave 3 ft. minimum, 4 ft. maximum length of conductor in ground boxes when pulled through with no splice. Leave 1 ft. minimum, 1.5 ft. maximum length of conductor at enclosures, weatherheads and pole bases.
3. Make splices only in junction boxes, ground boxes, pole bases, or electrical enclosures and use only listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors. Insulate splices with heavy wall heat shrink tubing or gel-filled insulating splice covers to provide a watertight splice. Overlap conductor insulation with heat shrink tubing a minimum of 2 in. past both sides of the splice. Where heat shrink tubing may not shrink sufficiently to provide a watertight seal around the individual conductors, prior to heating the tubing, increase the diameter of the conductor insulation using hot melt adhesive tape to provide a watertight seal between the individual conductors and the heat shrink tubing. Ensure the tape extends past the heat shrink tubing. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Heat shrink tubing that appears to have been burned, or overheated, is considered defective and must be replaced.
4. Size and install gel-filled insulating splice covers according to manufacturer's specifications when used in place of heat shrink tubing.
5. Wire nuts with factory applied waterproof sealant may be used for 8 AWG or smaller conductors in above ground junction boxes, but not in pole bases or ground boxes. Install wire nuts in an upright position to prevent the accumulation of water.
6. Support conductors in illumination poles with a J-hook at the top of the pole.
7. When terminating conductors, remove the insulation and jacketing material without nicking the individual strands of the conductor. Conductors with nicked individual conductor strands or removed strands will be considered damaged.
8. Replace conductors and cables that are damaged beyond repair or that fail an insulation resistance test at no additional cost to the department.
9. Do not repair damaged conductors with duct tape, electrical tape, or wire nuts. Use only approved splicing methods.
10. Do not terminate more than one conductor under a single connector, unless the connector is rated for multiple conductors. Do not exceed the pressure connector's listing for maximum number and size of conductors allowed.
11. Install breakaway connectors on conductors bid under Item 620 whenever those conductors pass through a breakaway support device. Follow manufacturer's instructions when terminating conductors to breakaway connectors. Properly torque threaded connections. Proper terminations are critical to the safe operation of breakaway devices. Trim waterproofing boots on breakaway connectors to fit snugly around the conductor to ensure waterproof connection. Only one conductor may enter a single opening in a boot. Provide waterproof boots with the correct number of openings. Leave unused openings factory sealed. Use prequalified breakaway connectors as shown on the MPL.
12. Provide and install a separate stranded equipment grounding conductor (EGC) in all conduits that contain circuit wiring of 50 volts or more. Unless shown elsewhere, size the EGC to be the same size as the largest current carrying conductor contained in the conduit. Ensure all EGCs are bonded together at every accessible location. For traffic signal installations, provide a minimum size 8 AWG EGC. The EGC is paid for under Item 620.

C. TEMPORARY WIRING

1. Install temporary conductors and electrical equipment in accordance with the NEC article "Temporary Installations" and Department standard sheets.
2. Provide a ground fault circuit interrupter (GFCI) for power outlets for portable electrical equipment, power tools, ice machines, ice storage bins and refrigerators located outdoors at grade. GFCI may be any one of the following: molded cord and plug set, receptacle, or circuit breaker type.
3. Use listed wire nuts with factory applied sealant for temporary wiring where approved.
4. Enclose conductor splices within a listed enclosure or ground box, or ensure the splices are more than 10 ft. above grade vertically and more than 5 ft. horizontally from any metal structure. Where installing temporary conductors in areas subject to vehicle traffic or mobile construction equipment, ensure the vertical clearance to ground is at least 18 ft. when measured at the lowest point. Ground messenger wires that support power conductors in conformance with the NEC.
5. Protect and when necessary repair any existing electrical conduits uncovered during the construction process in a timely manner and in conformance with the NEC.

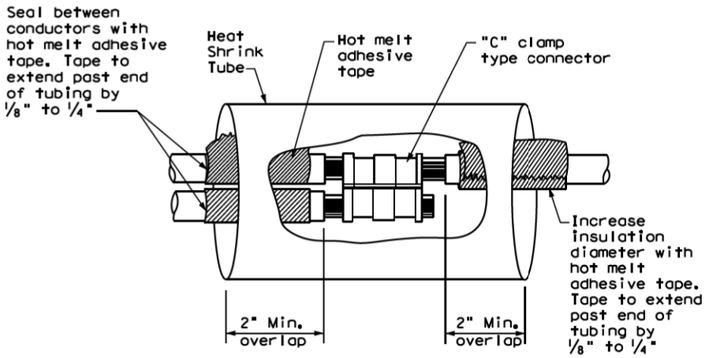
GROUND RODS & GROUNDING ELECTRODES

A. MATERIAL INFORMATION

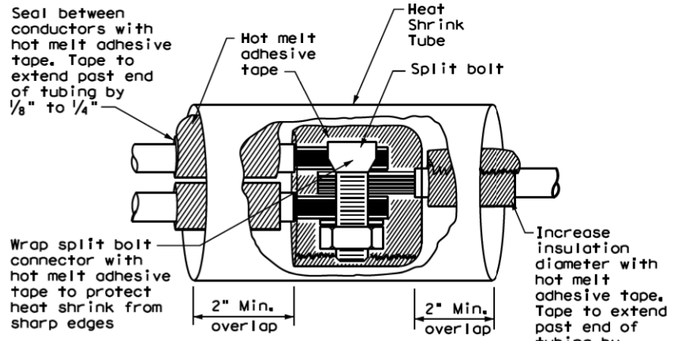
1. Provide and install a grounding electrode at electrical services. Provide ground rods according to DMS 11040 and the plans. Larger diameter or longer length rods may be called for in some specific locations, see the individual plans sheets. Concrete encased grounding electrodes may be called for in specific locations including electrical service, see individual plan sheets.

B. CONSTRUCTION METHODS

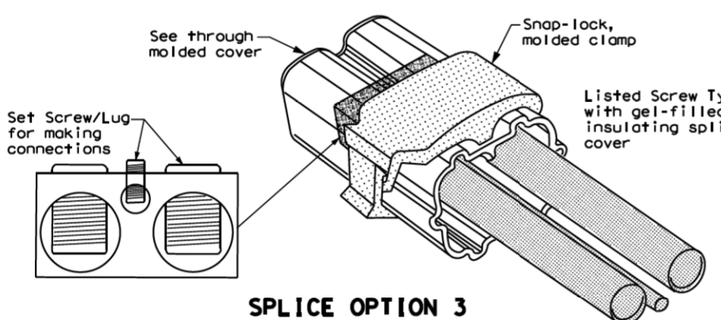
1. Furnish auxiliary ground rods for lightning protection and install in soil, concrete, or both, as called for in the plans. For ground rods installed in concrete, ensure the connection of the conductor to the ground rod is readily accessible for inspection or repairs. For ground rods installed in soil, ensure that the upper end is between 2 to 4 in. below finished grade.
2. Do not place ground rods in the same drilled hole as a timber pole.
3. Install ground rods so the imprinted part number is at the upper end of the rod.
4. Remove all non-conductive coatings such as concrete splatter from the rod at the clamp location.
5. Route all conductors as short and straight as possible for connection to lightning protection ground rods. When a bend is required, ensure a minimum radius bend of four inches for these conductors.
6. Unless otherwise called for in the plans, protect grounding electrode conductors with non-metallic conduit. When protecting grounding electrode conductors with metal conduit, provide and install a grounding type bushing and properly sized bonding jumper on each end of the metal conduit.
7. Written authorization is required before installing a ground rod in a horizontal trench for rocky soil or a solid rock bottom.



SPLICE OPTION 1
Compression Type



SPLICE OPTION 2
Split Bolt Type



SPLICE OPTION 3
Listed Screw Type

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS CONDUCTORS

ED(3)-14

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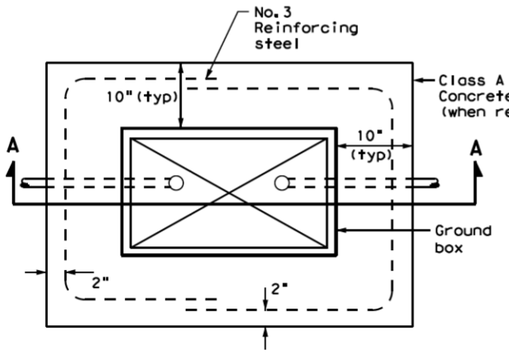
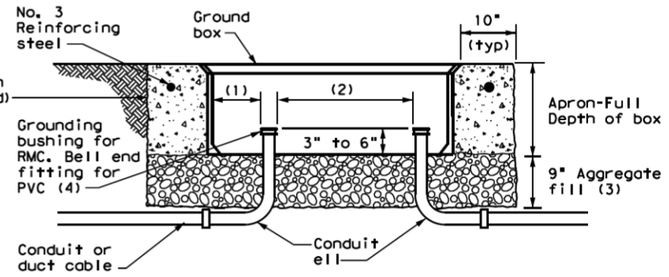


PLAN VIEW



SECTION A - A

APRON FOR GROUND BOX

(1) Uniformly space ends of conduits within the ground box. Position ends of conduits so that ground box walls do not interfere with the installation of grounding bushings or bell end fittings.

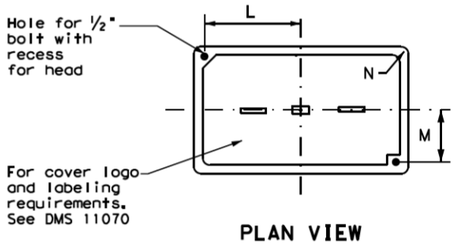
(2) Maintain sufficient space between conduits to allow for proper installation of bushing.

(3) Place aggregate under the box, not in the box. Aggregate should not encroach on the interior volume of the box.

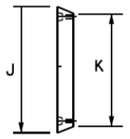
(4) Install a grounding bushing on the upper end of all RMC terminating in a ground box. Ground RMC elbows when any part of the elbow is less than 18 in. below the bottom of the ground box. Install a PVC bushing or bell end fitting on the upper end of all PVC conduits terminating in a ground box.

GROUND BOX DIMENSIONS	
TYPE	OUTSIDE DIMENSIONS (INCHES) (Width x Length X Depth)
A	12 X 23 X 11
B	12 X 23 X 22
C	16 X 29 X 11
D	16 X 29 X 22
E	12 X 23 X 17

GROUND BOX COVER DIMENSIONS								
TYPE	DIMENSIONS (INCHES)							
	H	I	J	K	L	M	N	P
A, B & E	23 1/4	23	13 3/4	13 1/2	9 7/8	5 1/8	1 3/8	2
C & D	30 1/2	30 1/4	17 1/2	17 1/4	13 1/4	6 3/4	1 3/8	2



PLAN VIEW



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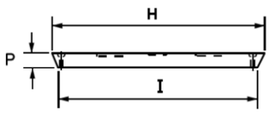

SIDE

GROUND BOX COVER

GROUND BOXES

A. MATERIALS

1. Provide polymer concrete ground boxes measuring 16x30x24 in. (WxLxD) or smaller in accordance with Departmental Material Specification (DMS) 11070 "Ground Boxes" and Item 624 "Ground Boxes."

2. Provide Type A, B, C, D, and E ground boxes as shown in the plans, and as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Item 624.

3. Ensure ground box cover is correctly labeled in accordance with DMS 11070.

4. Provide larger ground boxes in accordance with Item 624 and as shown in the plans.

B. CONSTRUCTION METHODS

1. Remove all gravel and dirt from conduit. Cap all conduits prior to placing aggregate and setting ground box. Provide Grade 3 or 4 coarse aggregate as shown on Table 2 of Item 302 "Aggregates for Surface Treatments." Ensure aggregate bed is in place and at least 9 inches deep, prior to setting the ground box. Install ground box on top of aggregate.

2. Cast ground box aprons in place. Reinforcing steel may be field bent. Ensure the depth of concrete for the apron extends from finished grade to the top of the aggregate bed under the box. Ground box aprons, including concrete and reinforcing steel, are subsidiary to ground boxes when called for by descriptive code.

3. Keep bolt holes in the box clear of dirt. Bolt covers down when not working in ground boxes.

4. Install all conduits and ells in a neat and workmanlike manner. Uniformly space conduits so grounding bushings and bell end fittings can easily be installed.

5. Temporarily seal all conduits in the ground box until conductors are installed.

6. Permanently seal conduits immediately after the completion of conductor installation and pull tests. Permanently seal the ends of all conduits with duct seal, expandable foam, or other method as approved. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a sealant.

7. When a ground rod is present in a ground box, bond all equipment grounding conductors together and to the ground rod with listed connectors.

8. When a type B or D ground box is stacked to meet volume requirements, it is allowable to cut an appropriately sized hole for conduit entry in the side wall at least 18 inches below grade.

9. If an existing ground box in the contract has a metal cover, bond the cover to the equipment grounding conductor with a 3 ft. long stranded bonding jumper the same size as the grounding conductor. The bonding jumper is subsidiary to various bid items. Verify existing ground boxes with metal covers are shown on the plans, with notes fully describing the work required.

10. If other ground boxes with metal covers are within the project limits but are not part of the contract, the Engineer may direct the Contractor to bond the metal covers, identifying the specific boxes in writing. This work will be paid for separately.

11. Bond metal ground box covers to the grounding conductor with a tank ground type lug.

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS
GROUND BOXES

ED(4)-14

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ELECTRICAL SERVICES NOTES

1. Provide new materials. Ensure installation and materials comply with the applicable provisions of the National Electrical Code (NEC) and National Electrical Manufacturers Association (NEMA) standards. Ensure material is Underwriters Laboratories (UL) listed. Provide and install electrical service conduits, conductors, disconnects, contactors, circuit breaker panels, and branch circuit breakers as shown on the Electrical Service Data chart in the plans. Faulty fabrication or poor workmanship in material, equipment, or installation is justification for rejection. Where manufacturers provide warranties and guarantees as a customary trade practice, furnish these to the State.

2. Provide electrical services in accordance with Electrical Details standard sheets, Departmental Material Specification (DMS) 11080 "Electrical Services," DMS 11081 "Electrical Services-Type A," DMS 11082 "Electrical Services-Type C," DMS 11083 "Electrical Services-Type D," DMS 11084 "Electrical Services-Type T," DMS 11085 "Electrical Services-Pedestal (PS)", and Item 628 "Electrical Services" of the Standard Specifications. Provide electrical service types A, C, and D, as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Item 628. Provide other service types as detailed on the plans.

3. Provide all work, materials, services, and any incidentals needed to install a complete electrical service as specified in the plans.

4. Coordinate with the Engineer and the utility provider for metering and compliance with utility requirements. Primary line extensions, connection charges, meter charges, and other charges by the utility company to provide power to the location are paid for in accordance with Item 628. Get approval for the costs associated with these charges prior to engaging the utility company to do the work. Consult with the utility provider to determine costs and requirements, and coordinate the work as approved.

5. The enclosure manufacturer will provide Master Lock Type 2 with brass tumblers keyed #2195 for all custom electrical enclosures. Installing Contractor is to provide Master Lock #2195 Type 2 with brass tumblers for "off the shelf" enclosures. Master Lock #2195 keys and locks become property of the State. Unless otherwise approved, do not energize electrical service equipment until locks are installed.

6. Enclosures with external disconnects that de-energize all equipment inside the enclosure do not need a dead front trim. Protect incoming line terminations from incidental contact as required by the NEC.

7. When galvanized is specified for nuts, screws, bolts or miscellaneous hardware, stainless steel may be used.

8. Provide wiring and electrical components rated for 75°C. Provide red, black, and white colored XHHW service entrance conductors of minimum size 6 American Wire Gauge (AWG). Identify size 6 AWG conductors by continuous color jacket. Identify electrical conductors sized 4 AWG and larger by continuous color jacket or by colored tape. Mark at least 6 inches of the conductor's insulation with half laps of colored tape, when identifying conductors. Ensure each service entrance conductor exits through a separately bushed non-metallic opening in the weatherhead. The lengths of the conductors outside the weatherhead are to be 12 inches minimum, 18 inches maximum, or as required by utility.

9. All electrical service conduit and conductors attached to the electrical service including the riser or the elbow below ground are subsidiary to the electrical service. For an underground utility feed, all service conduit and conductors after the elbow, including service conduit and conductors for the utility pole riser when furnished by the Contractor, will be paid for separately.

10. Provide rigid metal conduit (RMC) for all conduits on service, except for the ½ in. PVC conduit containing the electrical service grounding electrode conductor. Size the service entrance conduit as shown in the plans. Ensure conduit for branch circuit entry to enclosure is the same size as that shown on the layout sheets for branch circuit conduit. Extend all rigid metal conduits a minimum of 6 inches underground and then couple to the type and schedule of the conduit shown on the layout for that particular branch circuit. Install a grounding bushing on the RMC where it terminates in the service enclosure.

11. Use of liquidtight flexible metal conduit (LFMC) is allowed between the meter and service enclosure when they are mounted 90 to 180 degrees to each other. Size the LFMC the same size as service entrance conduit. LFMC must not exceed 3 feet in length. Strap LFMC within 1 foot of each end. LFMC less than 12 inches in length need not be strapped. Each end of LFMC must have a grounding bushing or be terminated with a grounding fitting. The LFMC must contain a grounded (neutral) conductor. Ensure any bend in LFMC never exceeds 180 degrees. A pull test is required on all installed conductors, with at least six inches of free conductor movement demonstrated to the satisfaction of the Engineer.

12. Ensure all mounting hardware and installation details of services conform to utility company specifications.

13. For all electrical service enclosures listed under Item 628 on the MPL, the UL 508 enclosure manufacturers will prepare and submit a schematic drawing unique to each service. Before shipment to the job site, place the applicable laminated schematic drawings and the laminated plan sheet showing the electrical service data chart used to build the enclosure in the enclosure's data pocket. The installing contractor will copy and laminate the actual project plan sheets detailing all equipment and branch circuits supplied by that service. The laminated plan sheets are to be placed in the service enclosure's document pocket. Reduce 11 in. x 17 in. plan sheets to 8 ½ in. x 11 in. before laminating. If the installation differs from the plan sheets, the installing contractor is to redline plan sheets before laminating.

14. When providing an "Off The Shelf" Type D or Type T service, provide laminated plan sheets detailing equipment and branch circuits supplied by that service. Reduce 11 in. x 17 in. plan sheets to 8 ½ in. x 11 in before laminating. Deliver these drawings before completion of the work to the Engineer, instead of placing in enclosure that has no door pocket.

15. Do not install conduit in the back wall of a service enclosure where it would penetrate the equipment mounting panel inside the enclosure. Provide grounding bushings on all metal conduits, and terminate bonding jumpers to grounding bus. Grounding bushings are not required when the end of the metal conduit is fitted with a conduit sealing hub or threaded boss, such as a meter base hub.

SERVICE ASSEMBLY ENCLOSURE

1. Provide threaded hub for all conduit entries into the top of enclosure.

2. Type galvanized steel (GS) enclosures may be used for Type C panelboards and for Type D and T services that do not use an enclosure mounted photocell or lighting contactor. Provide GS enclosures in accordance with DMS 11080, 11082, 11083, and 11084.

3. Provide aluminum (AL) and stainless steel (SS) enclosures for Types A, C, and D in accordance with DMS 11080, 11081, 11082, 11083, and 11084. Do not paint stainless steel.

4. Provide pedestal service (PS) enclosures in accordance with ED(9) and DMS 11080 and 11085. Do not provide GS pedestal services. If GS is shown in the PS descriptive code, provide an AL enclosure.

MAIN DISCONNECT & BRANCH CIRCUIT BREAKERS

1. Field drill flange-mounted remote operator handle if needed, to ensure handle is lockable in both the "On" and "Off" positions.

2. When the utility company provides a transformer larger than 50 KVA, verify that the available fault current is less than the circuit breaker's ampere interrupting capacity (AIC) rating and provide documentation from the electric utility provider to the Engineer.

PHOTOELECTRIC CONTROL

1. Provide photocell as listed on the MPL. Move, adjust, or shield the photocell from stray or ambient night time light to ensure proper operation. Mount photocell facing north when practical. Mount top of pole photocells as shown on Top Mounted Photocell Detail.

*ELECTRICAL SERVICE DATA

Elec. Service ID	Plan Sheet Number	Electrical Service Description	Service Conduit **Size	Service Conductors No./Size	Safety Switch Amps	Main Ckt. Bkr. Pole/Amps	Two-Pole Contractor Amps	Panelbd/ Loadcenter Amp Rating	Branch Circuit ID	Branch Ckt. Bkr. Pole/Amps	Branch Circuit Amps	KVA Load
SB 183	289	ELC SRV TY A 240/480 100(SS)AL(E)SF(U)	2"	3/#2	100	2P/100	100	N/A	Lighting NB	2P/40	26	28.1
									Lighting SB	2P/40	25	
									Underpass	1P/20	15	
NB Access	30	ELC SRV TY D 120/240 060(NS)SS(E)TS(O)	1 ¼"	3/#6	N/A	2P/60		100	Sig. Controller	1P/30	23	5.3
							30		Luminaires	2P/20	9	
									CCTV	1P/20	3	
2nd & Main	58	ELC SRV TY T 120/240 000(NS)GS(N)SP(O)	1 ¼"	3/#6	N/A	N/A	N/A	70	Flashing Beacon 1	1P/20	4	1.0
									Flashing Beacon 2	1P/20	4	

* Example only, not for construction. All new electrical services must have electrical service data chart specific to that service as shown in the plans.

** Verify service conduit size with utility. Size may change due to utility meter requirements. Ensure conduit size meets the National ELectrical Code.

EXPLANATION OF ELECTRICAL SERVICE DESCRIPTIVE CODE

ELEC SERV TY X XXX/XXX XXX (XX) XX (X) XX (X)

Schematic Type

Service Voltage V / V

Disconnect Amp Rating
000 indicates main lug only/
Typically Type T

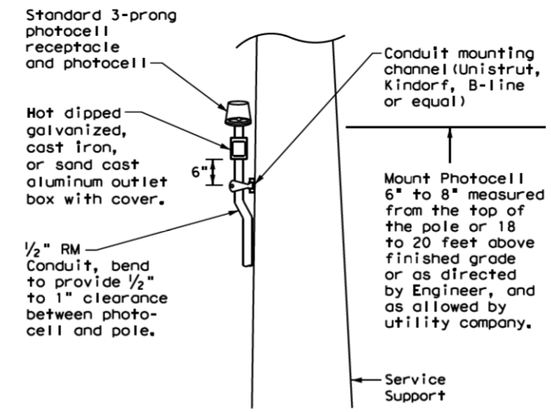
(SS)= Safety Switch Ahead of Meter-Check with Utility
(NS)= No safety Switch Ahead of Meter-Check with Utility

Enclosure Type
GS= Galvanized steel("off the shelf")
SS= Stainless steel(Custom Enclosure)See MPL
AL= Aluminum (Custom Enclosure)See MPL

Photocell Mounting Location
(E)= Inside Service/Enclosure Mounted
(T)= Top of pole
(L)= Luminaire mounted
(N)= None/No Photocell or Lighting Contactor Required

Service Support Type
GC= Granite concrete
OC= Other concrete
TP= Timber pole
SP= Steel pole
SF= Steel frame
OT= Pole by others or paid for separately
EX= Existing pole
TS= Service on traffic signal pole
PS= Pedestal Service

O= Overhead Service Feed from Utility
U= Underground Service Feed from Utility



TOP MOUNTED PHOTOCELL

Install conduit strap maximum 3 feet from box. 5 foot maximum spacing between straps supporting conduit.

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE NOTES & DATA

ED(5)-14

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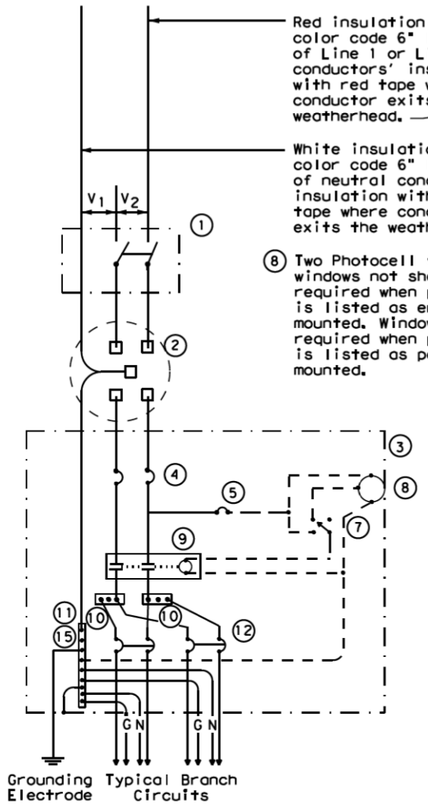
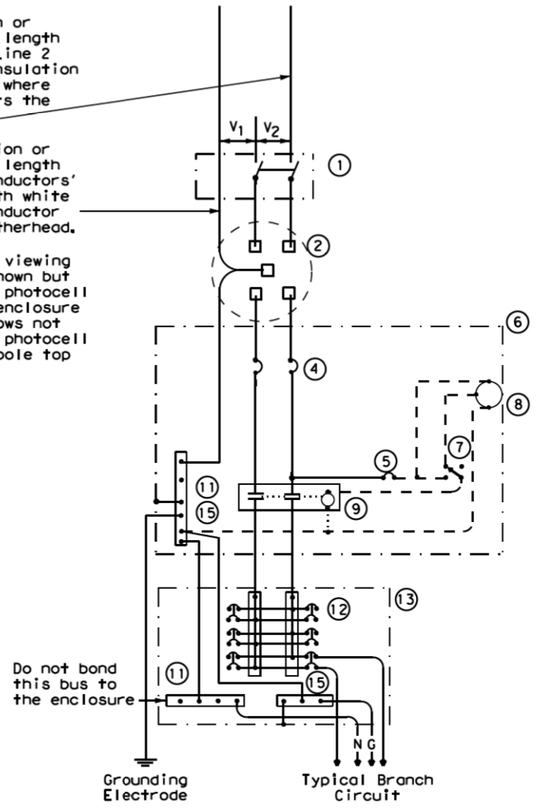
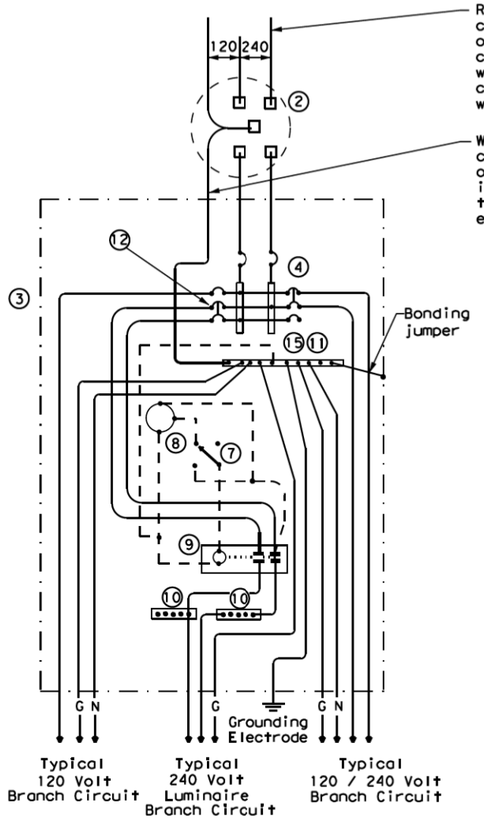


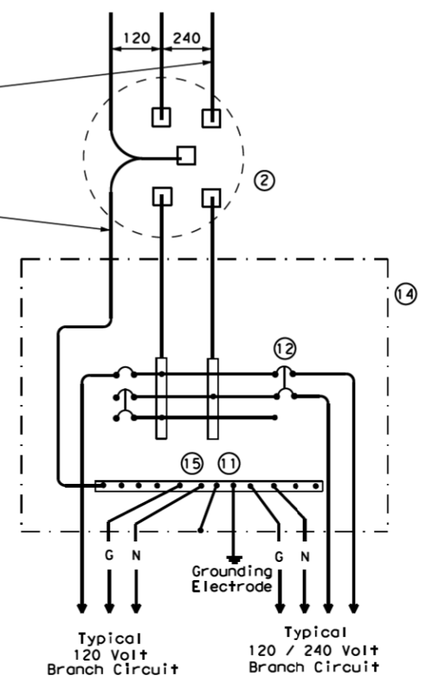
SCHEMATIC TYPE A
THREE WIRE



SCHEMATIC TYPE C
THREE WIRE



SCHEMATIC TYPE D - CUSTOM
120/240 VOLTS - THREE WIRE



SCHEMATIC TYPE T
120/240 VOLTS - THREE WIRE

Galvanized steel-"Buy Off The Shelf" only. When required install photocell top of the pole or on luminaire only, no lighting contractor will be installed.

WIRING LEGEND	
———	Power Wiring
- - - -	Control Wiring
—N—	Neutral Conductor
—G—	Equipment grounding conductor-always required

SCHEMATIC LEGEND	
1	Safety Switch (when required)
2	Meter (when required-verify with electric utility provider)
3	Service Assembly Enclosure
4	Main Disconnect Breaker (See Electrical Service Data)
5	Circuit Breaker, 15 Amp (Control Circuit)
6	Auxiliary Enclosure
7	Control Station ("H-O-A" Switch)
8	Photo Electric Control (enclosure-mounted shown)
9	Lighting Contactor
10	Power Distribution Terminal Blocks
11	Neutral Bus
12	Branch Circuit Breaker (See Electrical Service Data)
13	Separate Circuit Breaker Panelboard
14	Load Center
15	Ground Bus

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE ENCLOSURE AND NOTES

ED(6)-14

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SUPPORT TYPE STEEL POLE (SP) AND STEEL FRAME (SF)

1. Provide steel pole and steel frame supports as per TxDOT Departmental Material Specification (DMS)11080 "Electrical Services." Mount all equipment and conduit on 12 gauge galvanized steel or stainless steel channel strut, 1 ½ in. or 1 5/8 in. wide by 1 in. up to 3 ¾ in. deep Unistrut, Kindorf, B-line or equal. Bolt or weld all channel and hardware to vertical members as approved. Do not stack channel. File smooth and paint field cut ends of all channel with zinc-rich paint before installing.

2. Provide poles for overhead service with an eyebolt or similar fitting for attachment of the service drop to the pole in conformance with the electric utility provider's specifications.

3. Provide and install galvanized ¾ in. x 18 in. x 4 in. (dia. x length x hook length) anchor bolts for underground service supports. Provide and install galvanized ¾ in. x 56 in. x 4 in. anchor bolts for overhead service supports. Ensure anchor bolts have 3 in of thread, with 3 ¼ in. to 3 ½ in. of the exposed anchor bolt projecting above finished foundation. Provide and install leveling nuts for all anchor bolts.

4. Bond one of the anchor bolts to the rebar cage with 6 AWG bare stranded copper conductor. Use listed mechanical connectors rated for embedment in concrete. See Inset B.

5. Furnish and install rigid metallic ells in all steel pole and steel frame foundations for all conduits entering the service from underground.

6. Use class C concrete for foundations. Ensure reinforcing steel is Grade 60 with 3" of unobstructed concrete cover.

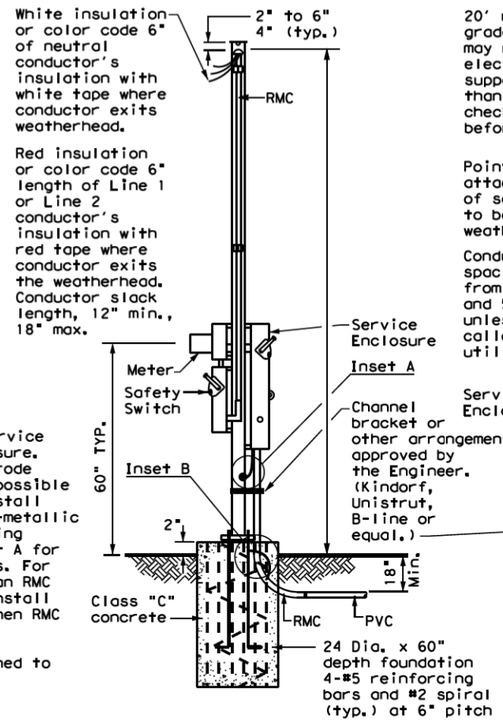
7. Drill and tap steel poles and frames for ½ in. X 13 UNC tank ground fitting. For steel pole service supports, provide and install tank ground fitting 4 in. to 6 in. below electrical service enclosure. Provide properly sized hole through the bottom of the enclosure for the service grounding electrode conductor. Ensure electrical service grounding electrode conductor is as short and straight as possible from the enclosure to the tank ground fitting. For steel frame service supports, provide and install tank ground fitting on steel frame post. Install service grounding electrode conductor in a non-metallic conduit or tubing from the enclosure to the steel frame post. Connect electrical service grounding electrode conductor to the tank ground fitting. See steel frame and steel pole details and Inset A for more information. Size service entrance conduit and branch circuit conduit as shown in the plans. For underground conduit runs from the electrical service, extend RMC from the service enclosure to an RMC elbow, and then connect the schedule type and size of conduit shown in the plans. Provide and install grounding bushings where RMC terminates in the enclosure. Grounding bushings are not required when RMC is fitted into a sealing hub or threaded boss.

8. If Steel pole or frame is painted, bond each separate painted piece with a bonding jumper attached to a tapped hole.

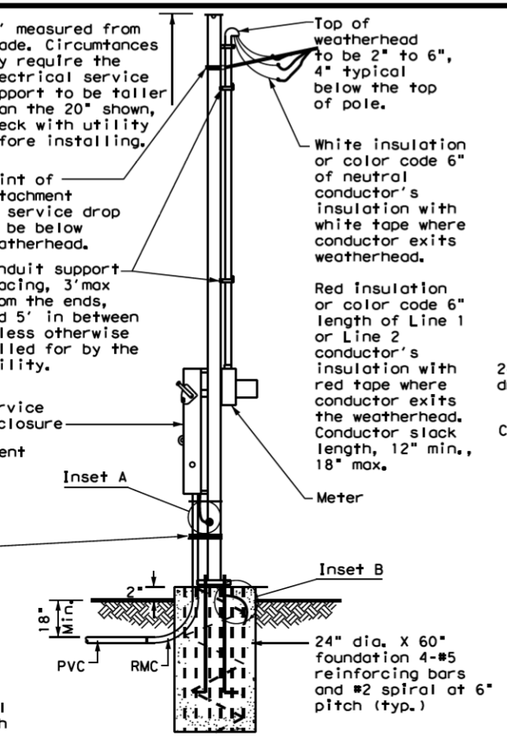
9. Provide ¼" - 20 machine screws for bonding. Do not use sheet metal screws. Remove all non-conductive material at contact points. Terminate bonding jumpers with listed devices. Install minimum size 6 AWG stranded copper bonding jumpers. Make up all threaded bonding connections wrench tight.

10. Avoid contact of the service drop and service entrance conductors with the metal pole to prevent abrasion of the insulated conductors.

11. Shop drawings are not required for service support structure unless specifically stated elsewhere or directed by the Engineer.

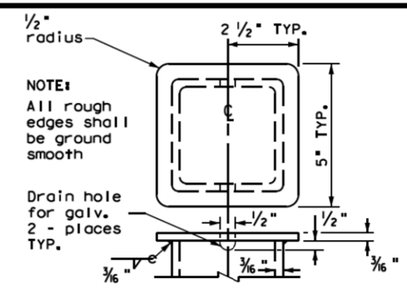


WITH SAFETY SWITCH

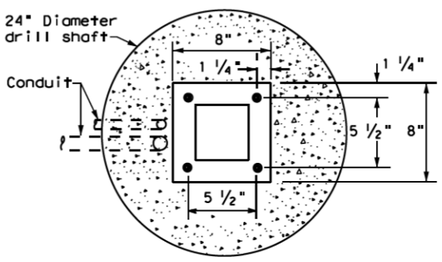


WITHOUT SAFETY SWITCH

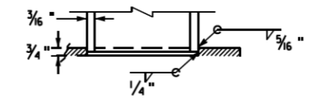
SERVICE SUPPORT TYPE SP (O) - OVERHEAD SERVICE



POLE TOP PLATE

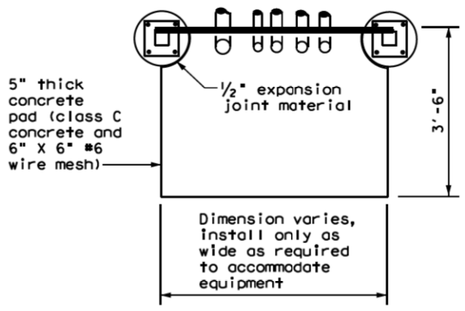


BASE PLATE DETAIL



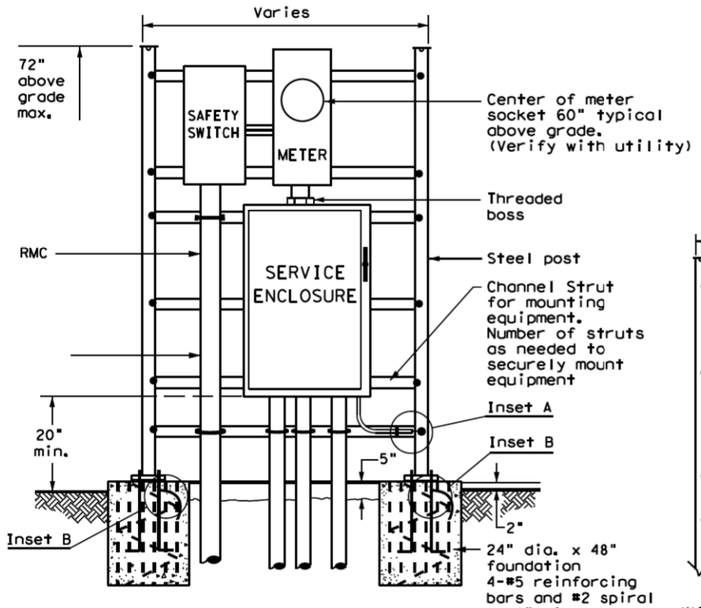
BOTTOM OF POLE

SERVICE SUPPORT TYPE SF & SP



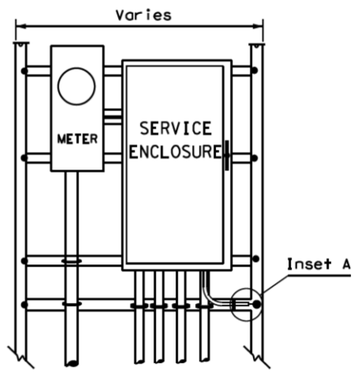
TOP VIEW

SERVICE SUPPORT TY SF (O) & SF (U)



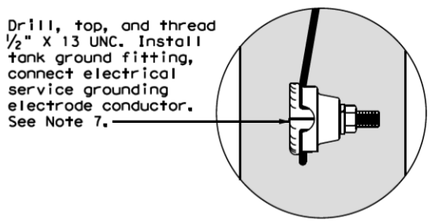
WITH SAFETY SWITCH

FRONT VIEW



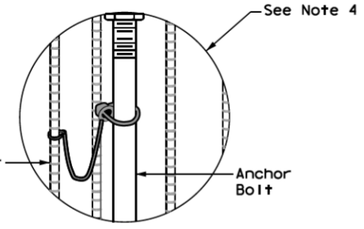
WITHOUT SAFETY SWITCH

SERVICE SUPPORT TYPE SF(U) - UNDERGROUND SERVICE

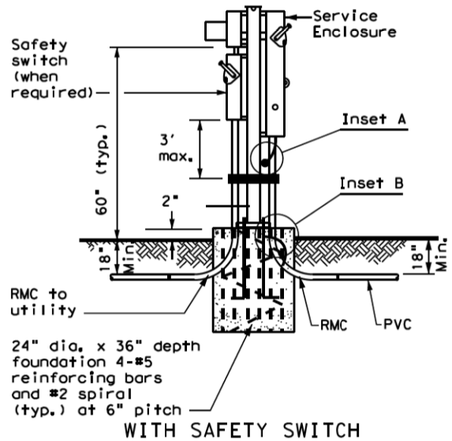


FRONT VIEW

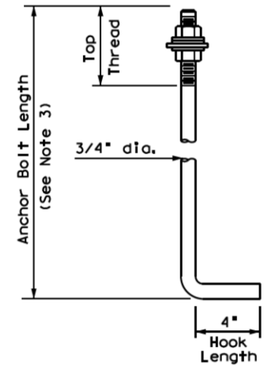
INSET A



INSET B



WITH SAFETY SWITCH



HOOKED ANCHOR DETAIL

SERVICE SUPPORT TYPE SP(U) - UNDERGROUND SERVICE

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE SUPPORT TYPES SF & SP

ED(7)-14

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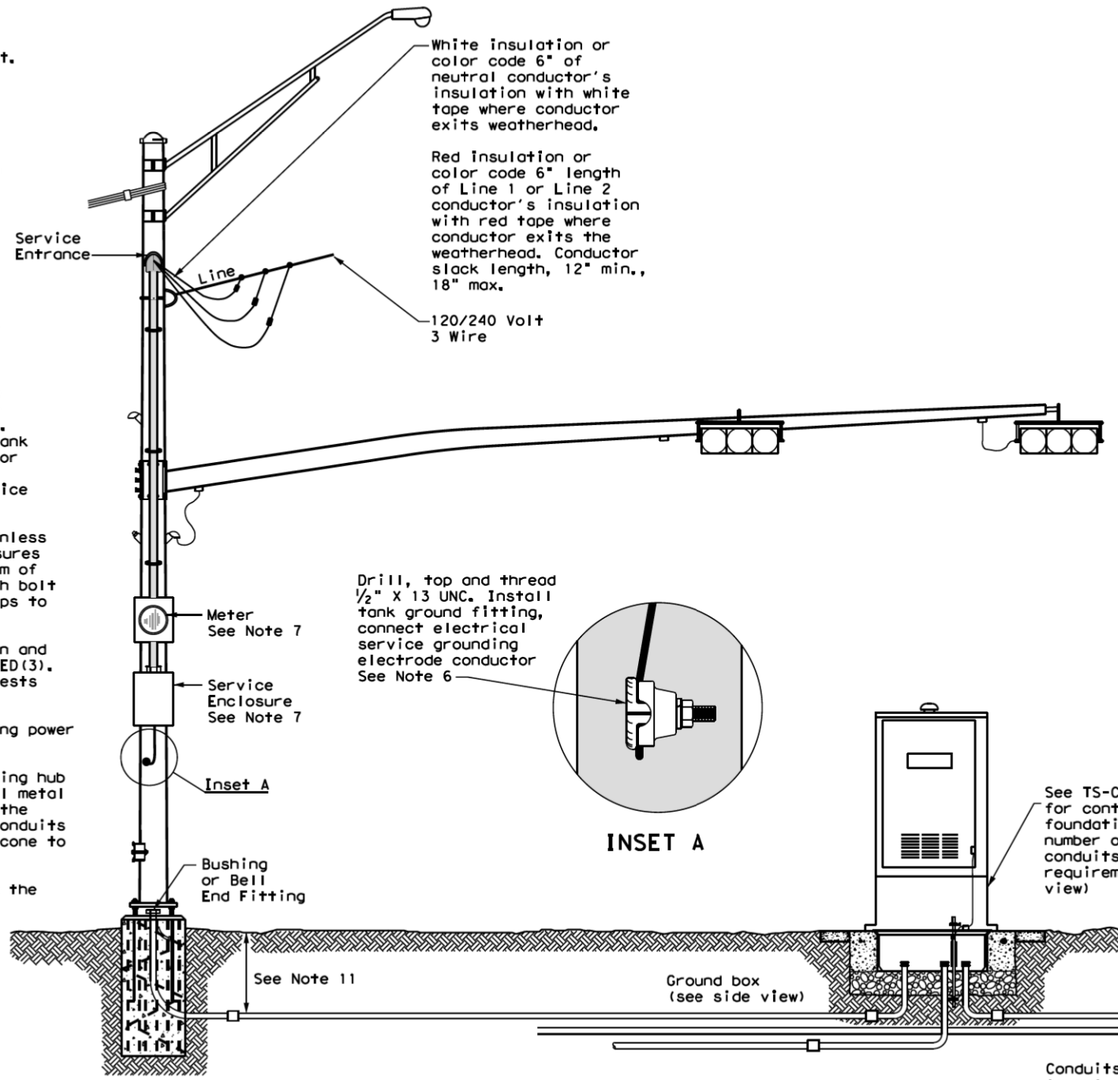
TRAFFIC SIGNAL NOTES

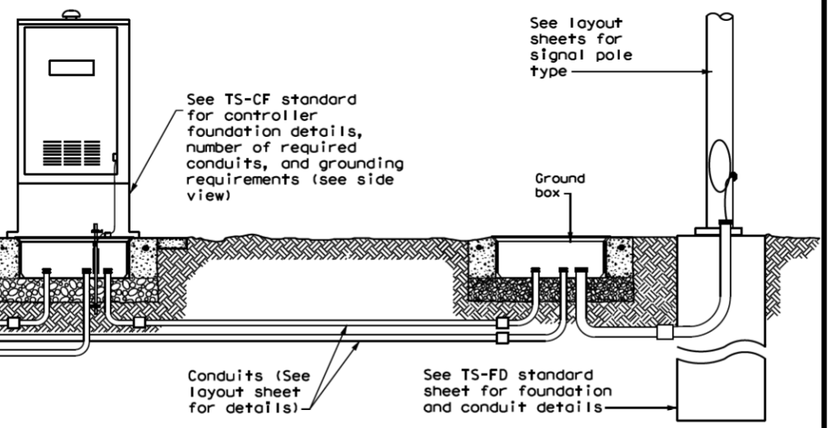
1. Do not pass luminaire conductors through the signal controller cabinet.
2. Include an equipment grounding conductor in all conduits throughout the electrical system. Bond all exposed metal parts to the grounding conductor.
3. Provide roadway luminaires, when required, in accordance with the material and construction sections of Item 610, "Roadway Illumination Assemblies," except for performance testing of luminaires. Test installed roadway luminaires for proper operation as a part of the associated traffic signal system test.
4. If internally illuminated street name signs are approved for use, ground the fixture to the pole with a 12 AWG green XHHW conductor.
5. Bond anchor bolts to rebar cage in two locations using #3 bars or 6 AWG stranded copper conductors. Use listed mechanical connectors rated for embedment in concrete. See TXDOT standard TS-FD for further details.
6. Drill and tap signal poles for ½ in. X 13 UNC tank ground fitting. Provide and install tank ground fitting 4 in. to 6 in. directly below electrical service enclosure. Provide properly sized hole through the bottom of the enclosure for the service grounding electrode conductor. Connect the electrical service grounding electrode conductor to the tank ground fitting. Ensure electrical service grounding electrode conductor is as short and straight as possible from the enclosure to the tank ground fitting. See Inset A detail for further information. Size service entrance conduit and branch circuit conduit as shown in the plans.
7. Mount electrical service enclosure and meter to signal pole with stainless steel bands. Ensure bands are a minimum width of ¾ in. Secure enclosures to bands using two-bolt brackets. Install brackets near top and bottom of each enclosure. Install properly sized stainless steel washers on each bolt in the enclosure. Band or drill and tap properly sized stand-off straps to signal pole for attaching conduit.
8. Conduct pull tests and insulation resistance tests on all illumination and power conductors as required in Item 620 "Electrical Conductors" and ED(3). To prevent electronics damage, do not conduct insulation resistance tests on traffic signal cables after termination.
9. Lock all enclosures and bolt down all ground box covers before applying power to the signal installation.
10. Terminate conduits entering the top of enclosures with a conduit-sealing hub or threaded boss such as meter hub. Install a grounding bushing on all metal conduits not connected to conduit-sealing hub or threaded boss. Bond the grounding bushing to the ground bus with a bonding jumper. Seal all conduits entering enclosures with duct seal or expanding foam. Do not use silicone to seal conduit ends.
11. For all conduits, ensure the burial depth is a minimum of 18". Ensure the minimum burial depth for conduit placed under a roadway is 24".



SIGNAL POLE WITH SERVICE

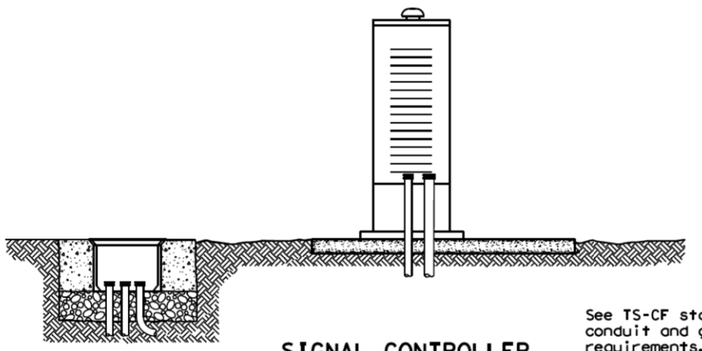
Type T electrical service mounted on signal pole shown as an example. See electrical details, layout sheets, and electrical service data chart for additional details.

INSET A



SIGNAL CONTROLLER FRONT VIEW

SIGNAL POLE



SIGNAL CONTROLLER SIDE VIEW

See TS-CF standard for conduit and grounding requirements. See layout sheets for ground box locations and any additional conduits that are required.

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS TYPICAL TRAFFIC SIGNAL SYSTEM DETAILS

ED(8)-14

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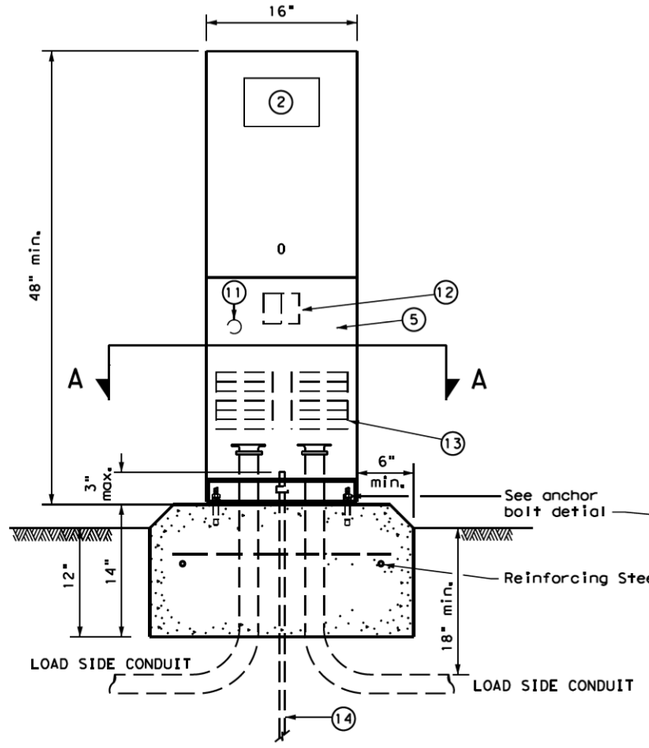
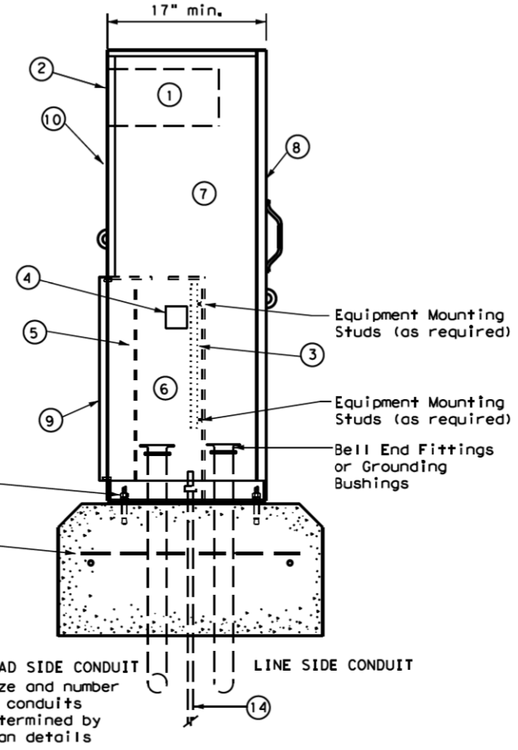
PEDESTAL SERVICE NOTES

1. Manufacture pedestal electrical services in accordance with Departmental Material Specifications (DMS)11080 "Electrical Services", 11085 "Electrical Services-Pedestal (PS)" and Item 628 "Electrical Services. "Provide pedestal electrical services as listed on the Material Producers list (MPL) on the Department's web site under "Roadway Illumination and Electrical Supplies," Item 628. Ensure all mounting hardware and installation details of services meet utility company specifications. Contact the local utility company for approval of pedestal details prior to installing the electrical pedestal service. Submit any changes required by the utility company prior to manufacturing the pedestal enclosure.
2. When a meter socket is required, provide a socket with a minimum 100 amp rating that complies with local utility requirements.
3. Provide Class A or C concrete for pedestal service foundations in accordance with Item 420, "Concrete Substructures," except that concrete will not be paid for directly but is considered subsidiary to Item 628.
4. Provide #4 reinforcing steel for foundations in accordance with Item 440, "Reinforcement for Concrete."
5. Install ½ in. X 2 1/16 in. minimum length concrete single expansion type anchors for mounting pedestal enclosure to foundation. Anchor location to match mounting holes in each corner of enclosure. Secure each of the four corners of the pedestal enclosure to the anchors in the foundation with a ½ in. galvanized or stainless steel machine thread bolt, a properly sized locknut and a flat washer.
6. Finish top of concrete foundation in a neat and workmanlike manner. If leveling washers are used, ensure no more than ⅛ in. gap at any corner. Do not exceed a maximum dip or rise in the foundation of ⅛ in. per foot. When properly installed, ensure the top of the service enclosure is level front to back and side to side within ¼ in. Repair rocking or movement of the service enclosure at no additional cost to the department.
7. Do not use liquidtight flexible metal conduit (LFMC) on pedestal type services.
8. Ensure all elbows in the foundation are sized as per utility provider's conduit requirements for underground conduit and feeders. PVC extensions may be installed provided the ends of the rigid metal conduits are more than 2 in. below the top of the concrete foundation. Where extension conduits are metal, grounding bushings must be installed with a bonding jumper properly terminated.

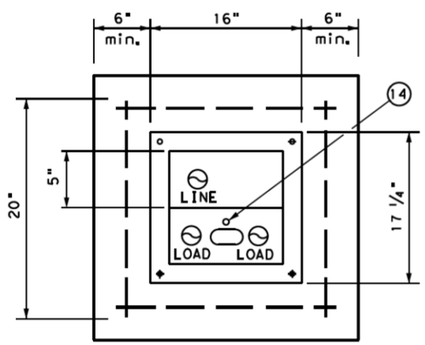


FRONT VIEW

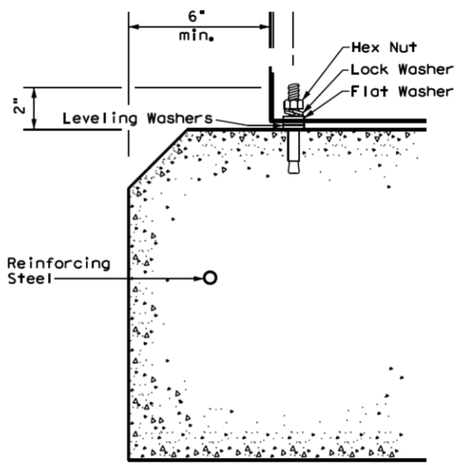


SIDE VIEW

TYPE C shown, TYPE A similar except that TYPE A shall have individual circuit breakers (CB) mounted on an equipment mounting panel. CB Handles shall protrude through hinged deadfront trim.



SECTION A-A



ANCHOR BOLT DETAIL

LEGEND	
1	Meter Socket, (when required)
2	Meter Socket Window, (when required)
3	Equipment Mounting Panel
4	Photo Electric Control Window, (When required)
5	Hinged Deadfront Trim
6	Load Side Conduit Trim
7	Line Side Conduit Area
8	Utility Access Door, with handle
9	Pedestal Door
10	Hinged Meter Access
11	Control Station (H-O-A Switch)
12	Main Disconnect
13	Branch Circuit Breakers
14	Copper Clad Ground Rod - 5/8" X 10'

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS
ELECTRICAL SERVICE SUPPORT
PEDESTAL SERVICE TYPE PS

ED(9)-14

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TIMBER POLE (TP) SERVICE SUPPORT NOTES

1. Ensure electrical service support is a class 5 treated timber pole as per Item 627 "Treated Timber Poles." Embed timber pole to depth required in Item 627.
2. Conduit and electrical conductors attached to the electrical service pole and underground within 12 in. of service pole are not paid for directly but are subsidiary to the electrial service.
3. Install pole-top mounted photocell (T) on north side of pole, or in service enclosure (E) as required. See Electrical Service Data chart in plan set.
4. Gain pole as required to provide flat surface for each channel. Gain timber pole to 5/8 in. max. depth and 1 7/8 in. max. height. Gain pole in a neat and workmanlike manner.
5. Mount meter and service equipment on stainless steel or galvanized channel (Unistrut, Kindorf, or equal). Provide channel sized 1 in. to 3 3/4 in. maximum depth, and 1 1/2 in. to 1 5/8 in. maximum width. File smooth the cut ends of galvanized channel and paint with zinc rich paint before installing on pole. Secure each channel section to timber pole with two galvanized or SS lag bolts, 1/4 in. minimum diameter by 1 1/2 in. minimum length. Use a galvanized or SS flat washer on each lag bolt. Do not stack channel.
6. When excess length must be trimmed from poles, trim from the top end only.

(1) Class 5 pole, height as required

(2) Service drop from utility company (attached below weatherhead)

(3) Service conduit (RMC) and service entrance conductors - One Red, One Black, One White (See Electrical Service Data)

(4) Safety switch (when required)

(5) Meter (when required)

(6) Service enclosure

(7) 6 AWG bare grounding electrode conductor in 1/2 in. PVC to ground rod - extend 1/2 in. PVC 6 in. underground.

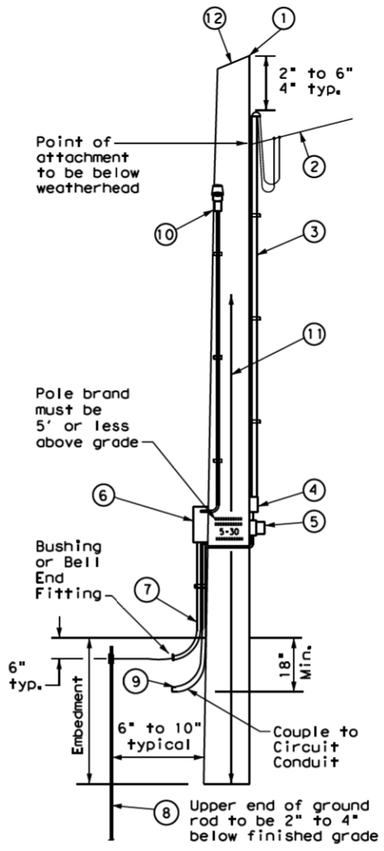
(8) 5/8 in. x 8 ft. Copper clad ground rod - drive ground rod to a depth of 2 in. to 4 in. below grade.

(9) RMC same size as branch circuit conduit.

(10) See pole-top mounted photocell detail on ED(5).

(11) When required by the serving utility provide bare 6 AWG copper conductor. Run wire from pole top to butt wrap or copper butt plate. Protect conductor with non-conductive material to a height of 8 ft. above finished grade.

(12) When required by utility, cut top of pole at an angle to enhance rain run off.

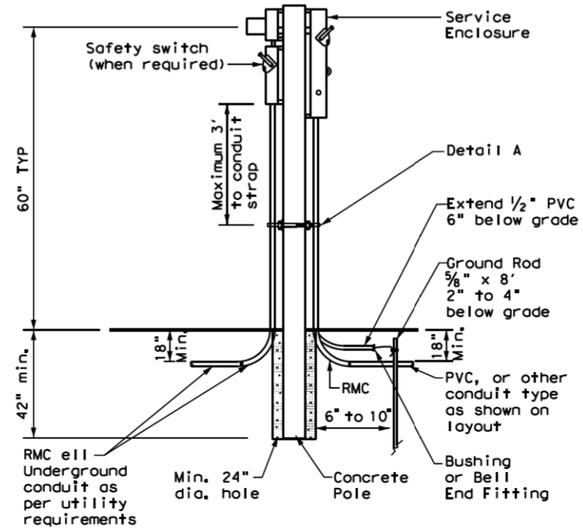


SERVICE SUPPORT TYPE TP (O)

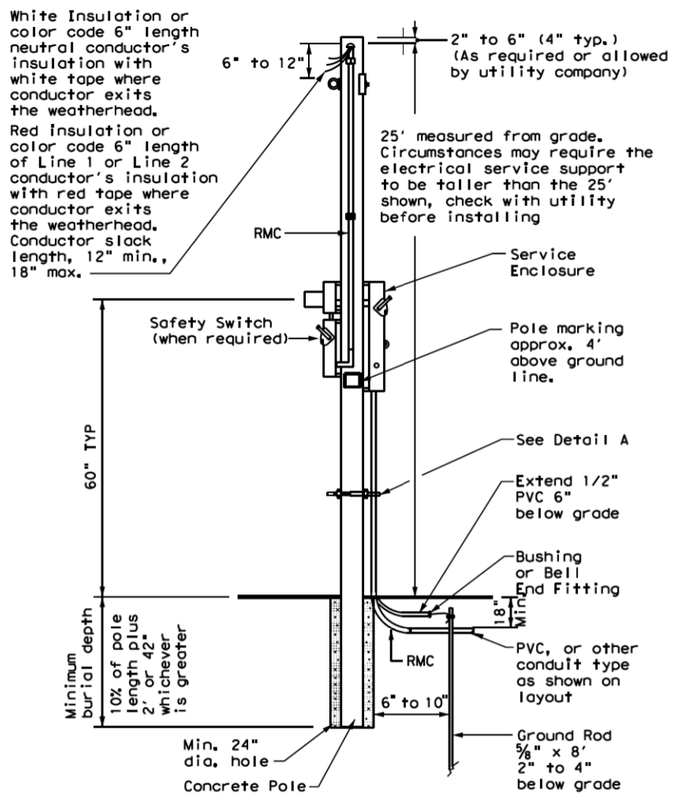
GRANITE CONCRETE (GC) & OTHER CONCRETE (OC) NOTES

Ensure electrical service support structures bid as type Granite Concrete (GC) or Other Concrete (OC) meet the following requirements.

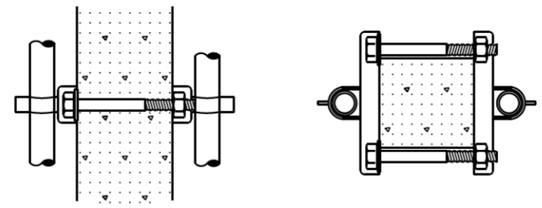
1. Provide GC and OC poles that meet the requirements of DMS 11080 "Electrical Services."
2. Provide prestressed concrete poles suitable for direct embedment into the ground without special foundations.
3. Verify poles are marked as required on DMS 11080. Location of marking should be approximately 4' above final grade. Use the two-point pickup locations when handling pole in horizontal position, and one-point pickup location for use in raising the pole to a vertical position. These marks are small but conspicuous.
4. Embed poles 42 in. or 10% of the length plus 2 ft., whichever is greater.
5. Ensure all installation details of services are in accordance with utility company specifications.
6. Install a one point rack or eye bolt bracket 6 inches to 12 inches below the weatherhead as an overhead service drop anchoring point for the electric utility.
7. Furnish and install galvanized or stainless steel channel strut 1 1/2 in. or 1 5/8 in. wide by 1 in. up to 3 3/4 in. deep (Unistrut, Kindorf, B-line or equal). Attach channel strut with stainless steel concrete anchors (max. 1" depth), square U-bolts or back to back channel strut with long bolts, or other secure mounting as approved by the Engineer. Ensure bolts are galvanized in accordance with ASTM A153. Do not stack channel struts.
8. Backfill the holes thoroughly by tamping in 6 in. lifts. After tamping to grade, place additional backfill material in a 6 inch high cone around the pole to allow for settling. Use material equal in composition and density to the surrounding area. Backfilling will not be paid for directly but is subsidiary to various bid items.



CONCRETE SERVICE SUPPORT
Underground (U)



CONCRETE SERVICE SUPPORT
Overhead (O)



DETAIL A

See Note 7. Before installing channel that has been cut, file sharp edges and paint with zinc-rich paint. Ensure there is no paint splatter on the pole.

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE SUPPORT TYPES GC, OC, & TP

ED(10)-14

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DUCT CABLE & HDPE CONDUIT NOTES

1. Provide duct cable in accordance with Departmental Material Specification (DMS) 11060 "Duct Cable" and Item 622 "Duct Cable." Provide duct cable as listed on the Material Producer List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies" Item 622.

2. Provide High-Density Polyethylene (HDPE) conduit in accordance with DMS 11060 and Item 618, "Conduit." Provide HDPE as listed on the MPL on the Department web site under "Roadway Illumination and Electrical Supplies," Item 618.

3. Supply duct cable with a minimum 2 in. diameter, unless otherwise shown in the plans. Provide duct cable and HDPE conduit as shown by descriptive code or on the plans. Bend duct cable and HDPE conduit as recommended by the manufacturer, with a minimum bending radius of 26 in. for 2 in. duct. Follow manufacturers' recommendations when handling duct cable and HDPE conduit reels and during installation of duct cable and HDPE conduit.

4. Do not splice conductors within duct cable or HDPE conduit. Couple duct cable and HDPE entering a ground box or foundation to a PVC elbow. When galvanized steel RMC elbows are called for in the plans and any portion of the RMC elbow is buried less than 18" from possible contact, ground the RMC elbow.

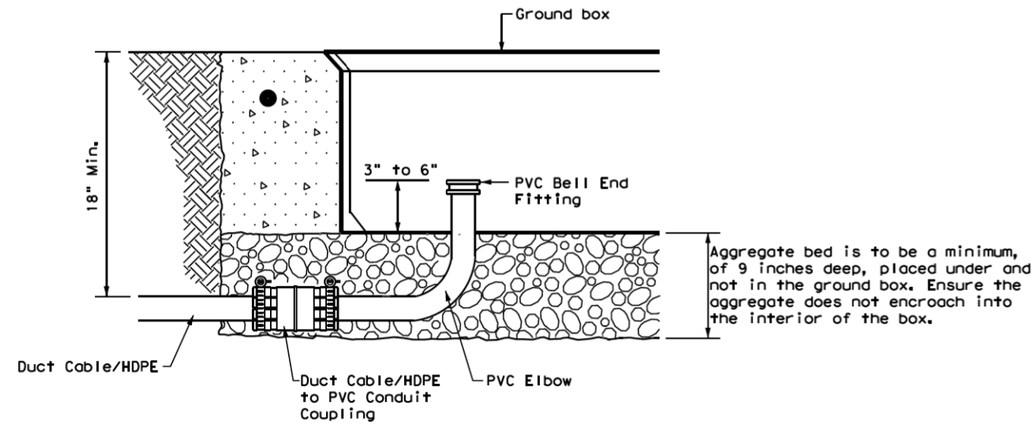
5. Furnish and install duct cable with factory installed conductors, sized as shown in the plans and as required by the National Electrical Code (NEC). The NEC contains specific requirements for duct cable in Article, "Nonmetallic Underground Conduit with Conductors: Type NUCC."

6. When conduit casing is called for in the plans, extend duct cable or HDPE conduit through the conduit casing in one continuous length without connection to the casing.

7. Seal the ends of duct cable or HDPE conduit with duct seal, expandable foam, or other approved method after completing the pull tests required by Item 622.

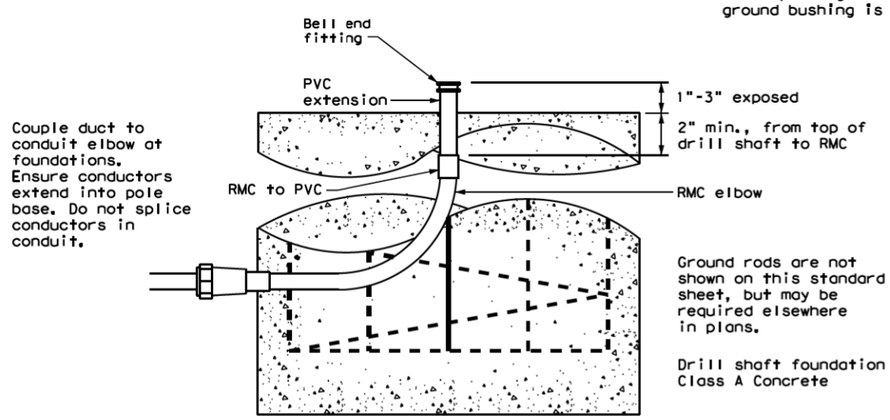
8. Provide minimum cover of 24 in. under roadways, 18 in. in other locations, or as shown on the plans.

9. Furnish and install listed fittings to couple duct cable or HDPE conduit to other types of conduit. Duct cable and HDPE conduit may be field-threaded and spliced with PVC or RMC threaded couplings; connected with listed tie-wrap fittings; connected using listed coupling made of HDPE with stainless steel external banding clamps and locking rings; connected with approved electrofusion conduit couplings; or connected using an approved chemical fusion method using an epoxy or adhesive specifically designed for HDPE couplings and connectors all installed in accordance with their manufacturer's instructions. Do not use PVC glue on HDPE. Do not use water pipe fittings, or connect conduit with heat shrink tubing.

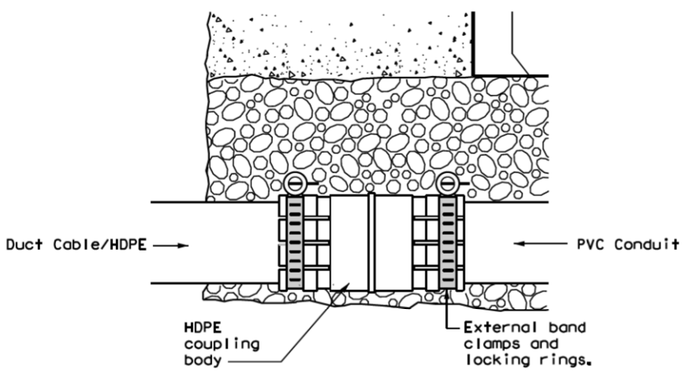


DUCT CABLE/HDPE AT GROUND BOX

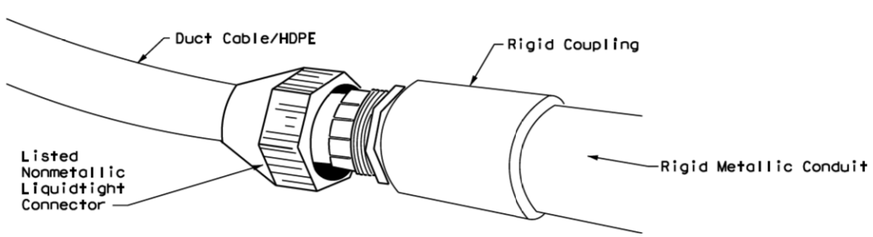
When the upper end of an RMC Ell does not enter the ground box, it may be extended with a SCH-40 PVC conduit nipple and bell end, provided there is a minimum of 18" of cover over all parts of the elbow. If not, a rigid extension and ground bushing is required.



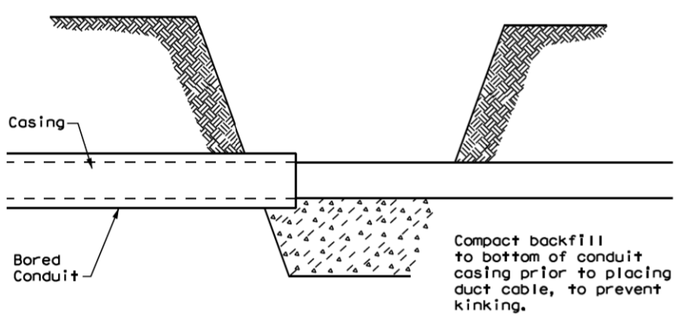
DUCT CABLE / HDPE AT FOUNDATION



DUCT CABLE/HDPE TO PVC



DUCT CABLE/HDPE TO RMC



BORE PIT DETAIL

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS DUCT CABLE/ HDPE CONDUIT

ED(11)-14

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BATTERY BOX GROUND BOXES NOTES

A. MATERIALS

1. Provide polymer concrete or fiberglass reinforced plastic (FRP) battery box ground box and cover in accordance with Departmental Material Specification (DMS) 11071 "Battery Box Ground Boxes." Battery box will accommodate up to 4 batteries, each measuring 8 in. x 13.5 in. x 10 in. (W x L x D). Label battery box ground box cover in accordance with DMS 11071.

2. Supply a marine grade batteries with covers. Secure the marine grade batteries with covers to the stainless steel rack in the bottom of the ground box with tie down straps.

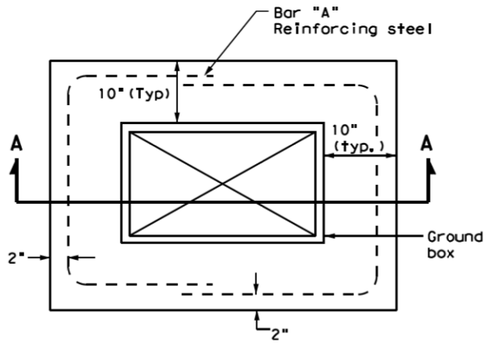
B. CONSTRUCTION METHODS

1. Ensure conduit entry will not interfere with placement of the batteries in the battery box ground box.

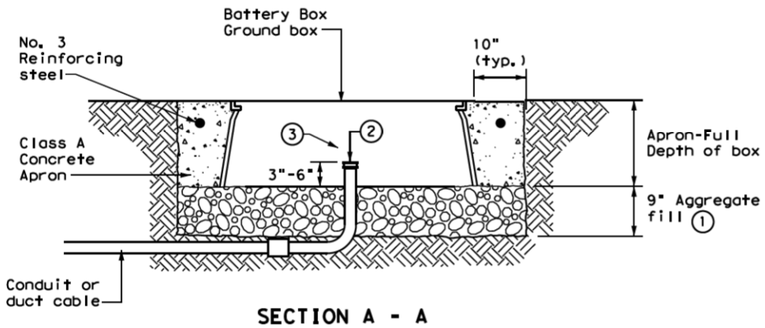
2. Remove all gravel and dirt from conduit. Cap all conduits prior to placing aggregate and setting battery box ground box. Provide Grade 3 or 4 coarse aggregate as shown on Table 2 of Item 302 "Aggregates for Surface Treatments." Ensure the aggregate bed is in place and is a minimum of 9 in. deep prior to setting the box. Install battery box ground box on top of aggregate.

3. Cast battery box aprons in place. Reinforcing steel may be field bent. Ensure the depth of concrete for the apron extends from finished grade to the top of the aggregate bed under the box. Battery box ground box aprons, including concrete and reinforcing steel, are subsidiary to battery box ground boxes when called for by descriptive code.

4. Bolt covers down when not working in battery box ground boxes. Keep bolt holes in the box clear of dirt.



PLAN VIEW



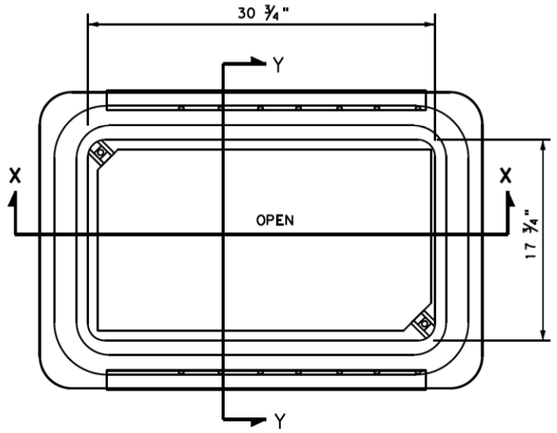
SECTION A - A

APRON FOR BATTERY BOX GROUND BOXES

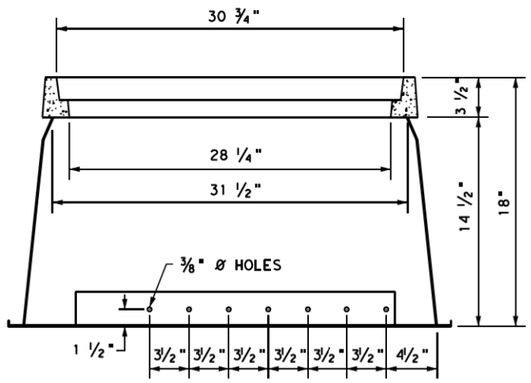
(1) Place aggregate under the box and not in the box. Aggregate should not encroach on the interior volume of the box.

(2) Install bushing or bell end fitting on the upper end of all ells.

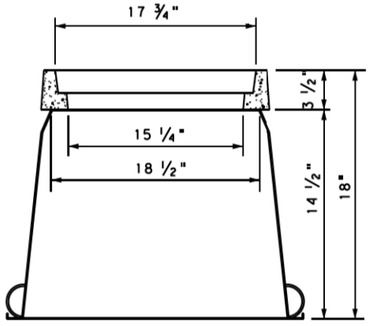
(3) Install all conduits in a neat and workmanlike manner.



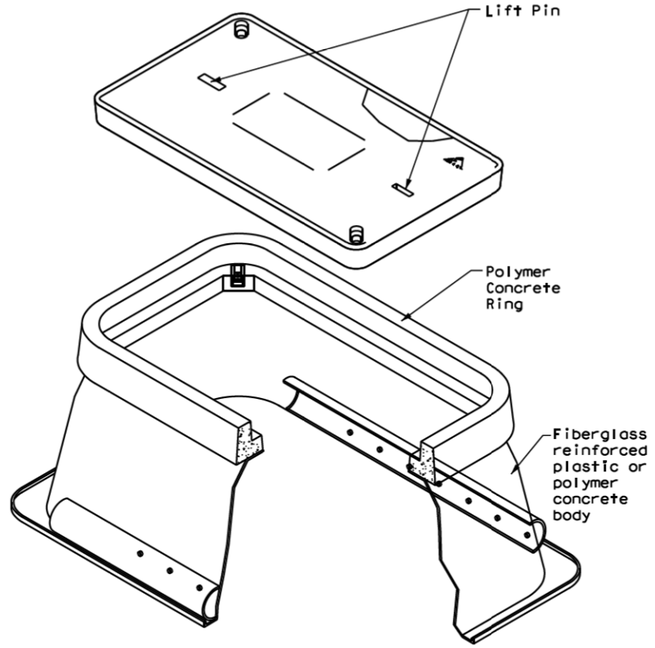
BATTERY BOX TOP VIEW



SECTION X-X



SECTION Y-Y



Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS
BATTERY BOX
GROUND BOXES

ED(12)-14

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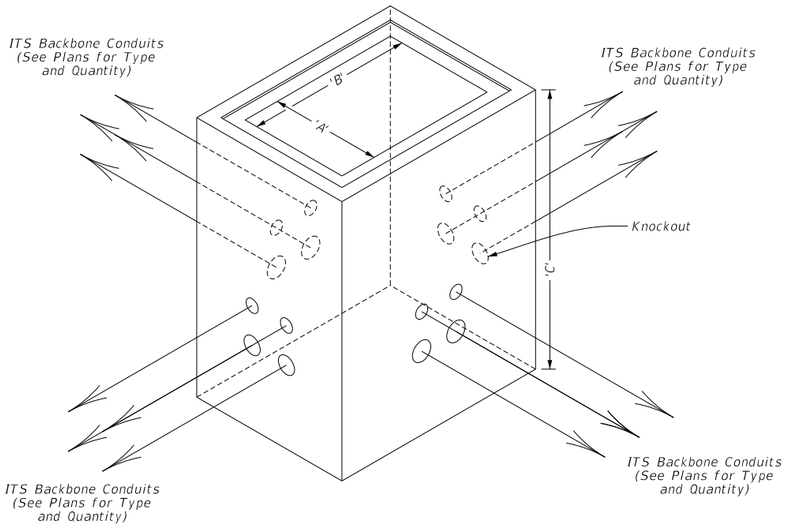
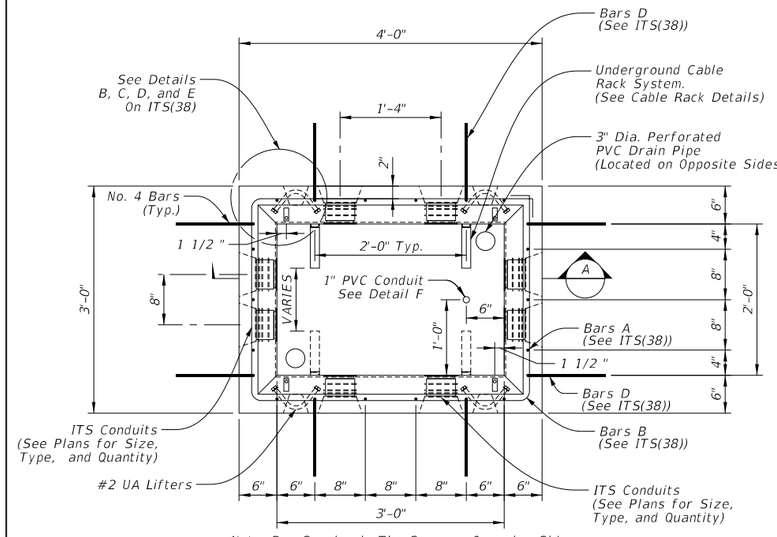


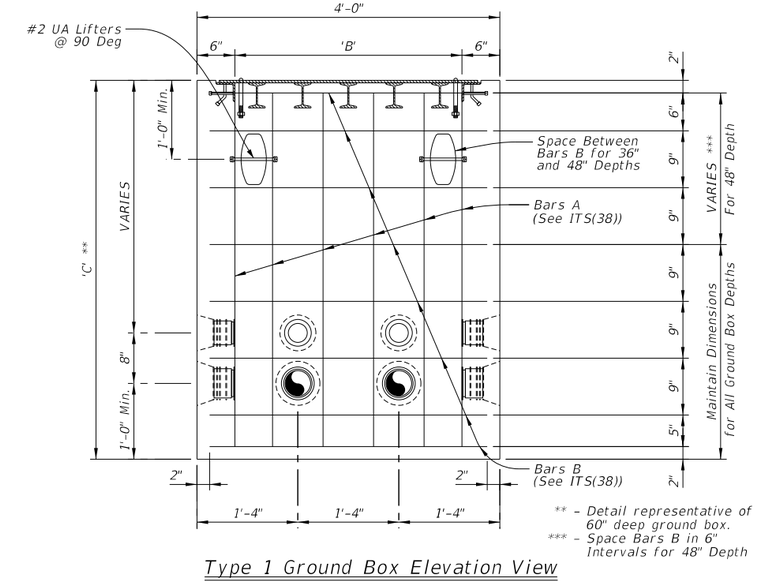
See Ground Box Schedule for A, B, and C Dimensions

Type 1 Ground Box Isometric View



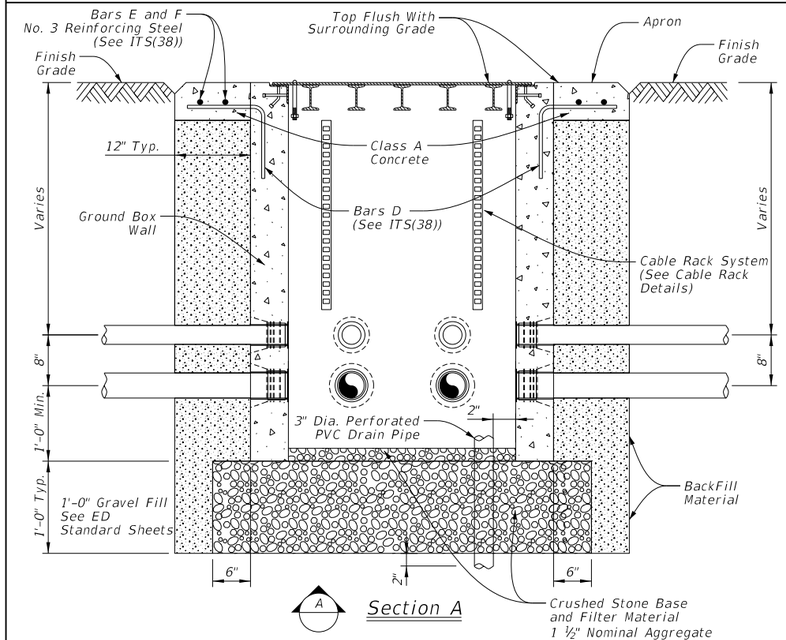
Note: Bar Spacing is The Same on Opposing Sides.

Type 1 Ground Box Plan View

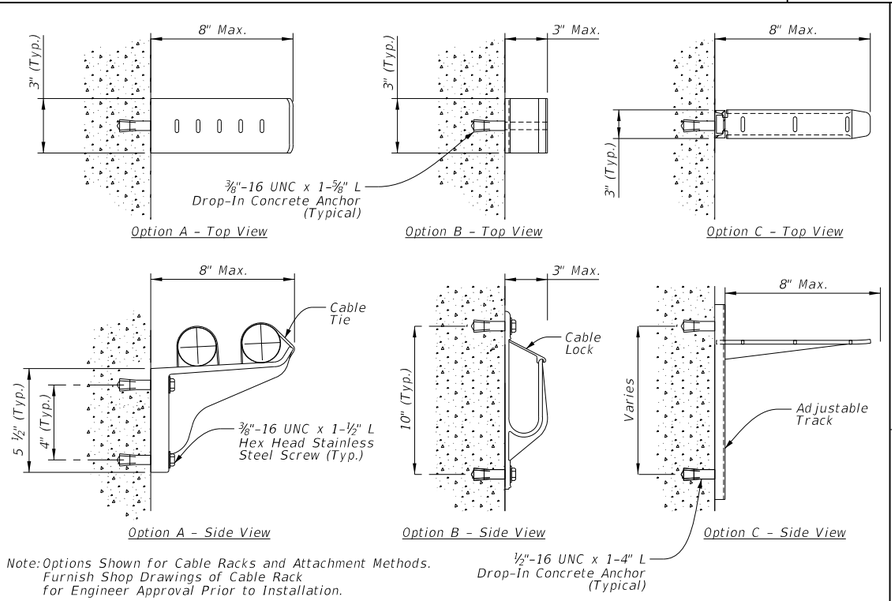


** – Detail representative of 60" deep ground box.
*** – Space Bars B in 6" Intervals for 48" Depth

Type 1 Ground Box Elevation View

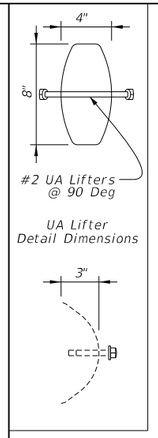


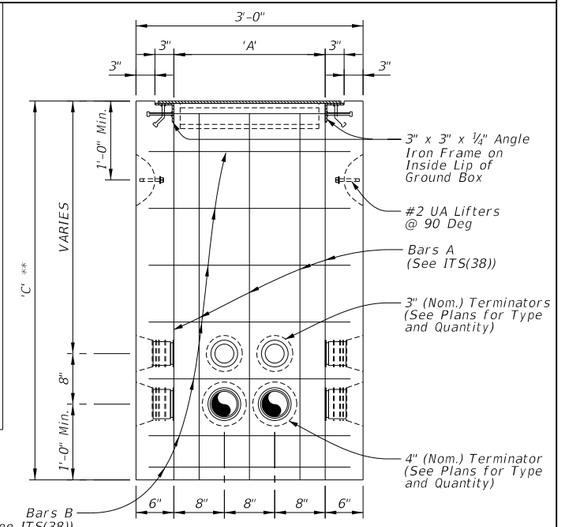
Section A



Note: Options Shown for Cable Racks and Attachment Methods. Furnish Shop Drawings of Cable Rack for Engineer Approval Prior to Installation.

Type 1 Cable Rack Details





Type 1 Ground Box Side View

** – Detail representative of 60" deep ground box.

General Notes:

1. Conduit entry points shown represent the standard configuration for backbone conduit as detailed on ITS(27). Additional conduits may be required as shown on the plans.
2. Provide Class A concrete for Type "1" ground boxes.
3. Provide terminators for the PVC conduit cast in the walls and placed symmetrically about the centerline of the box at the depths shown, unless otherwise noted, for the number of conduits identified on the plans to enter the box.
4. Provide terminators appropriately sized for the conduits indicated on the plans. Provide terminators with an air tight and water tight connection.
5. Closed bottom Type "1" ground boxes are acceptable in lieu of open bottom boxes. Provide two 3" Dia. perforated PVC drain pipes on opposite corners to optimize water drainage. Provide 12-inch base of crushed stone which extends 6 inches in all directions from the perimeter of the box for closed bottom boxes. Crushed stone will be subsidiary to Special Specification, "ITS Ground Box."
6. Install all open bottom Type "1" ground boxes on a 12-inch base of crushed stone which extends 6 inches in all directions from the perimeter of the box. Crushed stone will be subsidiary to Special Specification, "ITS Ground Box."
7. Cap and seal terminators that do not have conduits attached.
8. When additional conduit entry points are needed to accommodate existing conduit, core drill conduit knockouts in the field of the appropriate number and size of conduit at each location, as directed by the Engineer.
9. Provide a bell fitting on the end of each conduit to ensure a flush fit inside the ground box.
10. Concrete grout around the knockout (inside and out) and around the conduit and bell fitting to ensure a neat watertight fit after the conduit and bell fitting have been placed in a knockout. Ensure all openings in the ground box are sealed prior to grouting operations.
11. Install a nylon string and plug all unused conduits with tug-plugs sized for the particular conduits. Provide split innerduct plugs in conduits or innerducts with cables to seal the innerduct around the cables to prevent water and dirt from entering.
12. Provide steel (ASTM A-153), glass reinforced nylon, or equivalent cable rack assemblies designed to support the amount of cable storage slack identified in the plans. Locate cable rack system on one side only (longer length side) to allow access to the inside of the ground box. Cable racks may be installed at the factory or in the field. When mounting cable racks in the field, seal all penetrations to the concrete side wall to prevent moisture penetration. Ground metallic cable rack systems to grounding system inside ground box in accordance with the National Electrical Code.

Ground Box Schedule

Ground Box Type	'A' Width Inside (Inches)	'B' Length Inside (Inches)	'C' Depth Inside (Inches)
Type 1	24	36	36, 48, 60

Sheet Details
Not to Scale

SHEET 1 OF 2

Texas Department of Transportation

Traffic Operations Division Standard

ITS GROUND BOX DETAILS TYPE "1" WITH STEEL COVER

ITS(37)-16

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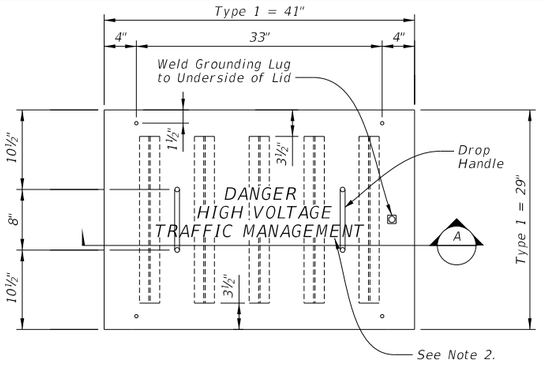
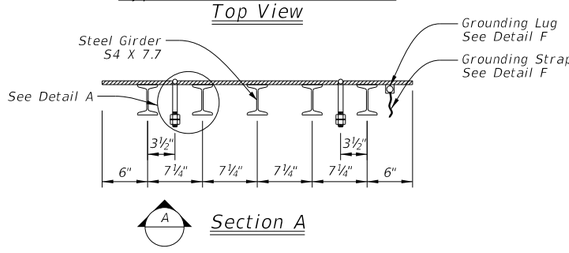
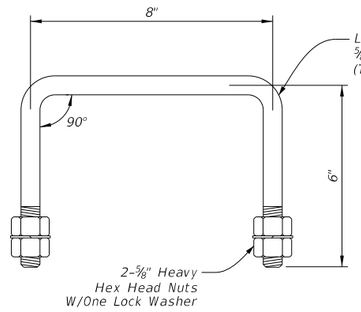


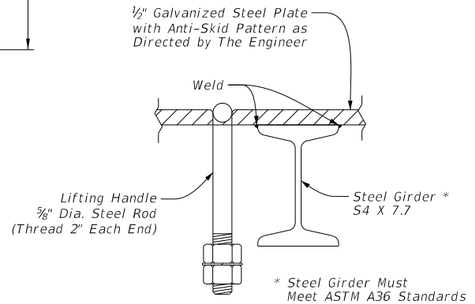
Type 1 Steel Cover Details
Top View



Section A



Drop Handle Detail



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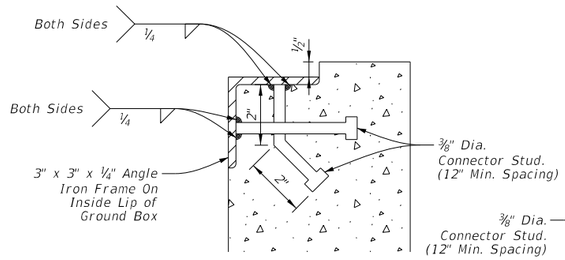

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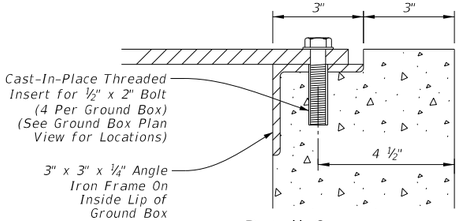
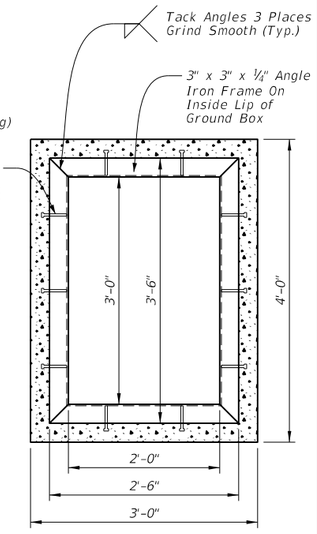


Detail C
Lid Attachment Detail



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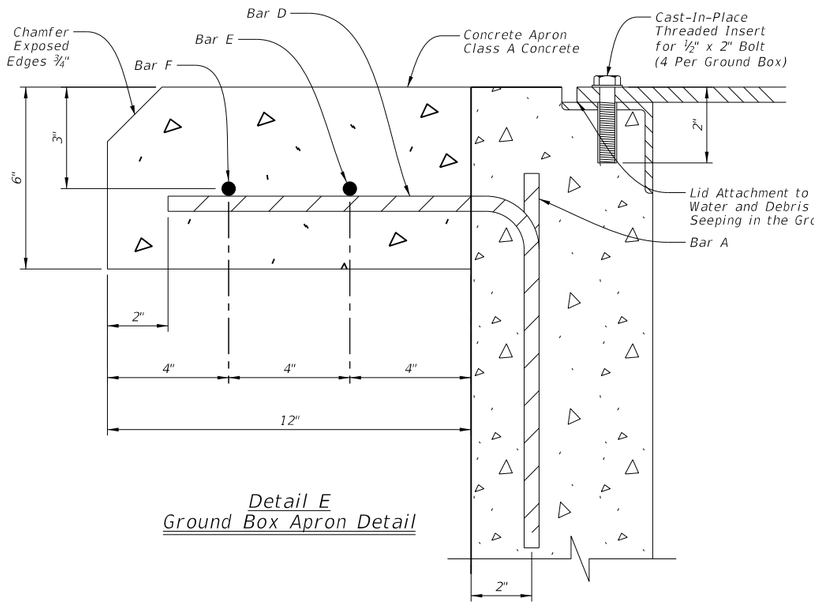
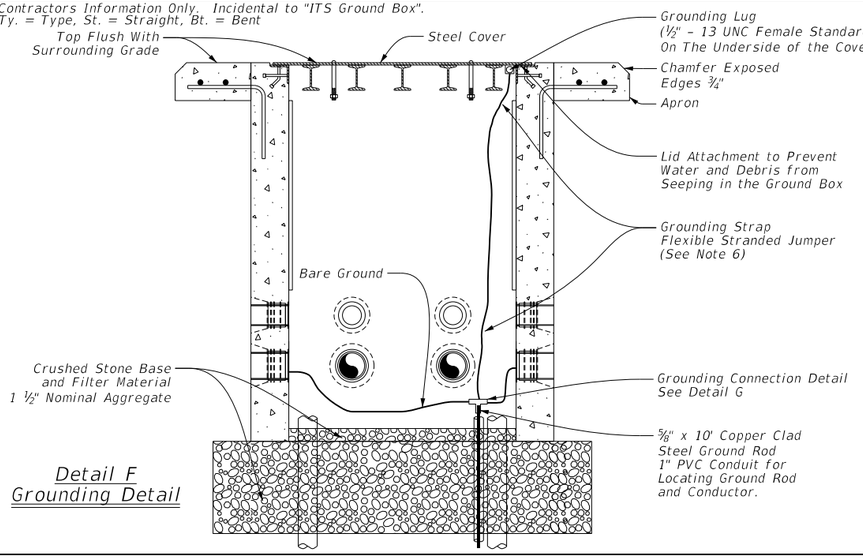


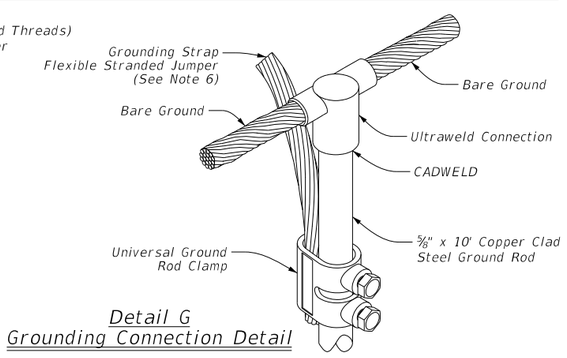
Detail E
Ground Box Apron Detail

Ground Box Type 1	BAR A					BAR B					BAR D					BAR E					BAR F					TOTALS	
	No.	Size	Ty.	Length	Weight	No.	Size	Ty.	Length	Weight	No.	Size	Ty.	Length	Weight	No.	Size	Ty.	Length	Weight	No.	Size	Ty.	Length	Weight	Steel * LBS.	Conc. * CY
36" Depth	22	#4	St.	2'-8"	39.3	5	#4	Bt.	13'-2"	44.1	8	#4	Bt.	2'-0"	10.7	1	#3	Bt.	17'-2"	6.5	1	#3	Bt.	19'-10"	7.5	108.1	.67
48" Depth	22	#4	St.	3'-8"	54.0	7	#4	Bt.	13'-2"	61.8	8	#4	Bt.	2'-0"	10.7	1	#3	Bt.	17'-2"	6.5	1	#3	Bt.	19'-10"	7.5	140.5	.89
60" Depth	22	#4	St.	4'-8"	68.8	8	#4	Bt.	13'-2"	70.6	8	#4	Bt.	2'-0"	10.7	1	#3	Bt.	17'-2"	6.5	1	#3	Bt.	19'-10"	7.5	164.1	1.11

* - For Contractors Information Only. Incidental to "ITS Ground Box".
Legend: Ty. = Type, St. = Straight, Bt. = Bent



Detail F
Grounding Detail



Detail G
Grounding Connection Detail

Note - All grounding connections to be CADWELD or approved equal. This work will not be paid for directly, but is considered incidental to ITS ground box.

General Notes:

1. See ITS(37) for additional Type "1" ground box details.
2. Hot-dip galvanized steel covers after all welds are made.
3. Label top of cover with the words "DANGER HIGH VOLTAGE TRAFFIC MANAGEMENT" using template-guided, hand-welded lettering at a height of 2 inches to ensure neatness.
4. Provide all Type "1" ground boxes with a securable, tamper-proof cover equipped with a bolting system that positively secures the cover in place.
5. Ground steel covers in accordance with the National Electrical Code.
6. Ground covers to the grounding cable using a split-bolt kearney clamp, and a minimum 8-foot long flexible stranded jumper the same size as the grounding conductor. Terminate to metal ground box cover with a tank ground type lug as approved and directed by the Engineer.
7. Provide Type "1" ground box and cover designed for heavy duty loading in accordance with AASHTO H20 loading when located where the box may experience deliberate, continuous vehicular traffic, such as near the shoulder or an auxiliary lane, or immediately adjacent to the unprotected edge of pavement.
8. Provide a Type "1" ground box and cover tested by a laboratory independent of the manufacturer certifying loading requirements are met. Provide certification of such tests to the Engineer for approval.
9. Provide a steel or cast iron cover in accordance with Item 471, Article 471.2, "Frames, Grates, Rings, and Covers." Provide covers with the number of drop handles shown. Provide Class "A" concrete for ground box construction and aprons.
10. Fabricate cover so to fits properly on the ground box, and no undue noise results when traffic contacts the cover.

Sheet Details
Not to Scale

Texas Department of Transportation

Traffic Operations Division Standard

ITS GROUND BOX DETAILS TYPE "1" WITH STEEL COVER

ITS(38)-17

FILE: its(38)-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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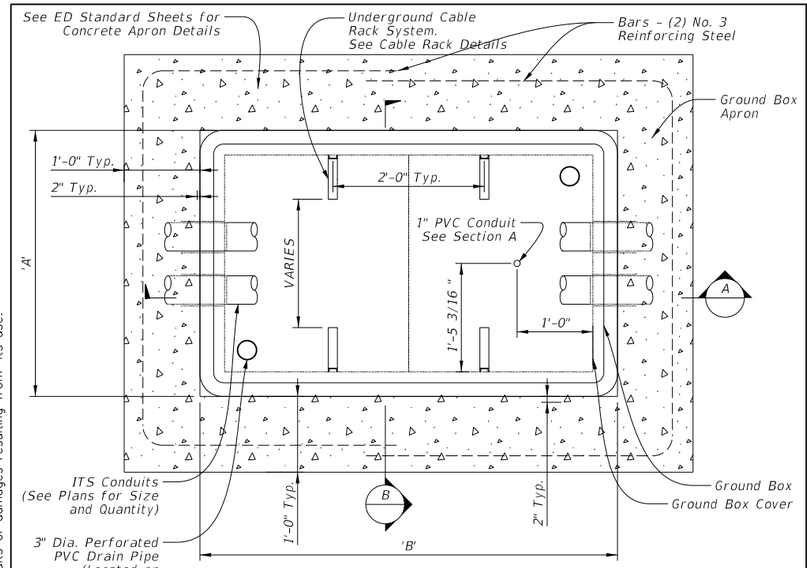
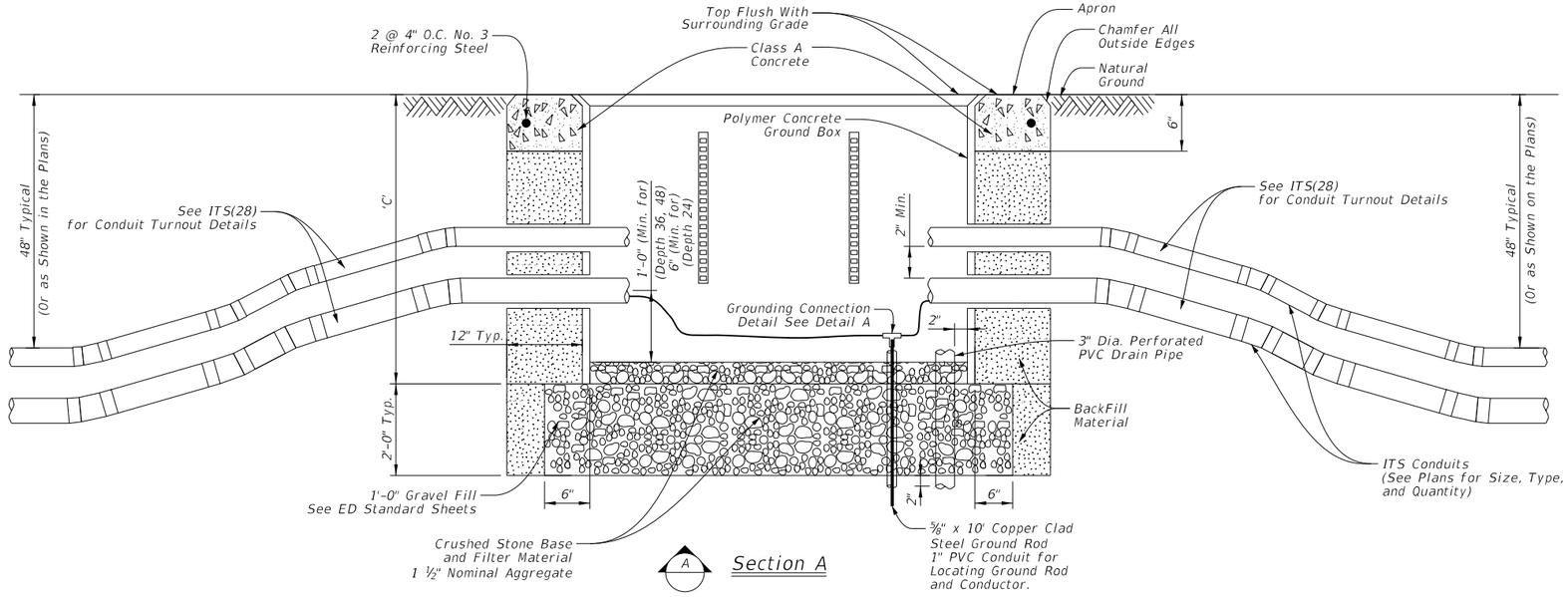


Top View Polymer Concrete Ground Box



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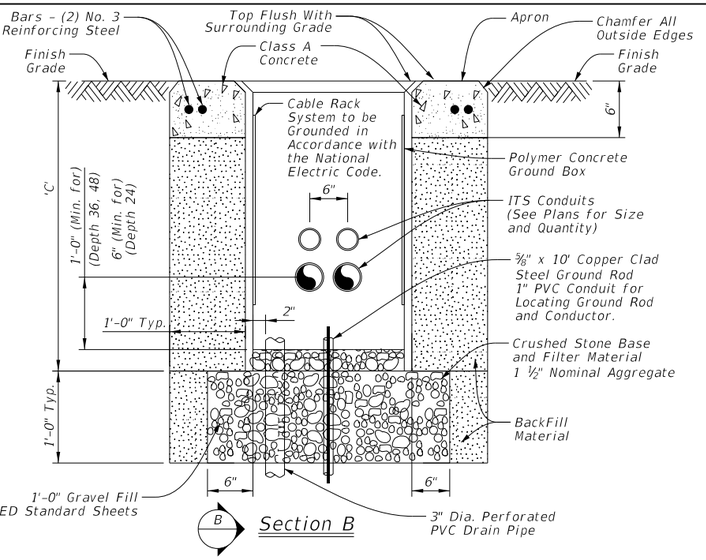


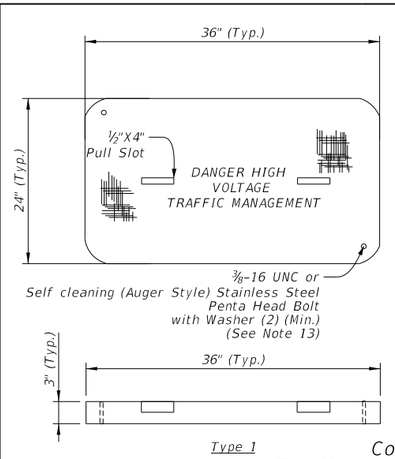
Section B

Ground Box Schedule

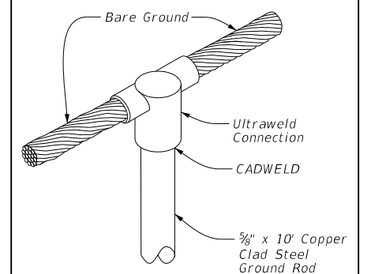
Ground Box Type	'A' * Width (Outside) (Inches)	'B' * Length (Outside) (Inches)	'C' Depth (Outside) (Inches)	Size #3 Bars (Apron)	
				Length	Weight
Type 1	26	38	24, 36, 48	24'-0"	9.12
Type 2	40	63	24, 36, 48	32'-8"	12.45

* – Tolerance of +/– 1.5"

Side View
Typical Ground Box



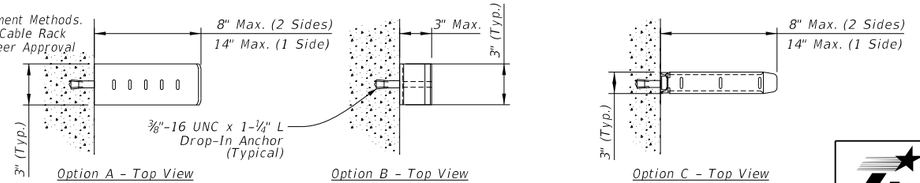
Cover
Top View and Side View



Note – All grounding connections to be CADWELD or approved equal. This work will not be paid for directly, but is considered incidental to ITS ground box.

Detail A
Grounding Connection Detail

Note:
Options Shown for Cable Racks and Attachment Methods. Furnish Shop Drawings of Cable Rack and Cable Rack Grounding System (If Applicable) for Engineer Approval Prior to Installation.



Cable Rack Details

Sheet Details
Not to Scale

General Notes:

1. Conduit shown is for example only. Additional conduits may be required as shown on the plans.
2. Provide polymer concrete ground box and cover.
3. Provide Type "2" ground boxes when splice enclosure is required, as shown on the plans.
4. Terminate conduits through the side of the ground box.
5. Provide terminators for conduits cast in the walls and placed symmetrically about the centerline of the box at the depths shown, unless otherwise noted, for the number of conduits identified on the plans to enter the box.
6. Provide terminators appropriately sized for the conduits indicated on the plans. Provide terminators with an air tight and water tight connection.
7. Provide ground box with open bottom. Provide two 3" Dia. perforated PVC drain pipes on opposite corners and extend 2" below bottom of gravel bed to optimize water drainage.
8. Install ground box on a 12-inch base of crushed stone which extends 6 inches in all directions from the perimeter of the box. Crushed stone will be subsidiary to special specification, "ITS Ground Box."
9. When additional conduit entry points are needed to accommodate existing conduit, core drill conduit knockouts in the field of the appropriate number and size of conduit at each location, as directed by the Engineer.
10. Provide a bell fitting on the end of each conduit to ensure a flush fit inside the ground box.
11. Concrete grout around the knockout (inside and out) and around the conduit and bell fitting to ensure a neat watertight fit after the conduit and bell fitting have been placed in a knockout. Ensure all openings in the ground box are sealed prior to grouting operations.
12. Label top of cover with the words "DANGER HIGH VOLTAGE TRAFFIC MANAGEMENT."
13. Equip all covers with a bolting system that will positively secure the cover in place.
14. Backfill in accordance with Item 400, "Excavation and Backfill for Structures."
15. Provide p
16. Provide steel (ASTM A-153), glass reinforced nylon, or equivalent cable rack assemblies designed to support the amount of cable storage slack and splice enclosures identified in the plans. Locate cable rack system on any side but allow for sufficient access to the inside of the ground box. Cable racks may be installed at the factory or in the field. When mounting cable racks in the field, seal all penetrations to the side wall to prevent moisture penetration. Ground metallic cable rack systems to grounding system inside ground box in accordance with the National Electrical Code.

Texas Department of Transportation

Traffic Operations Division Standard

ITS GROUND BOX POLYMER CONCRETE

ITS(41)-16

FILE: its(41)-16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS				
	DIST	COUNTY		SHEET NO.
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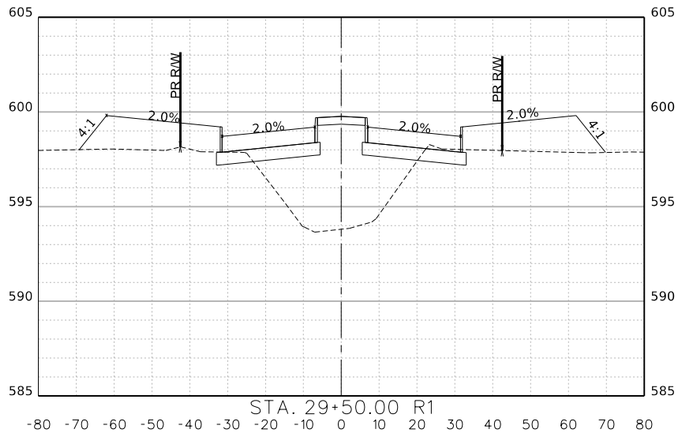

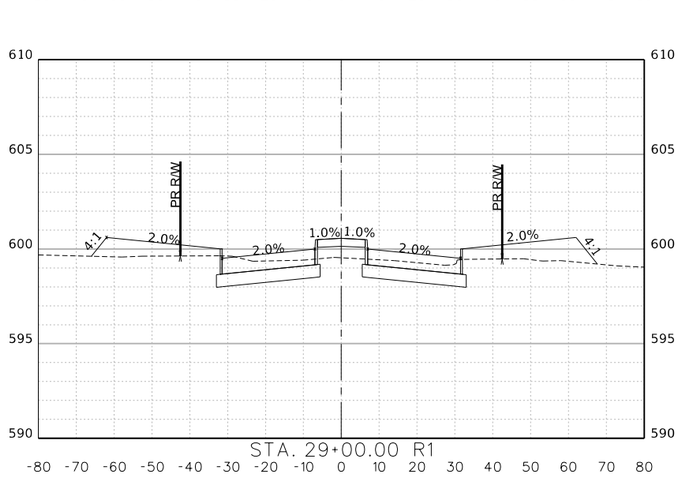

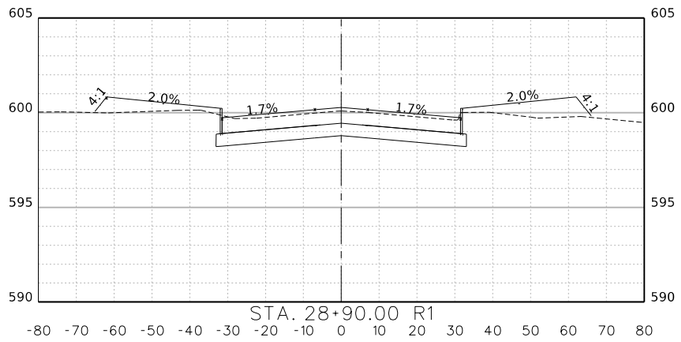

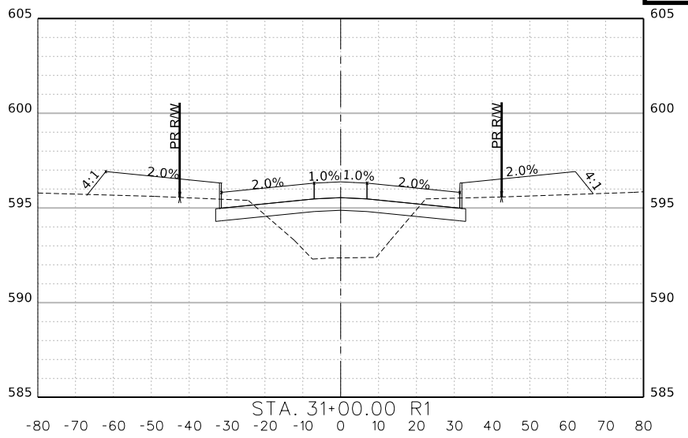

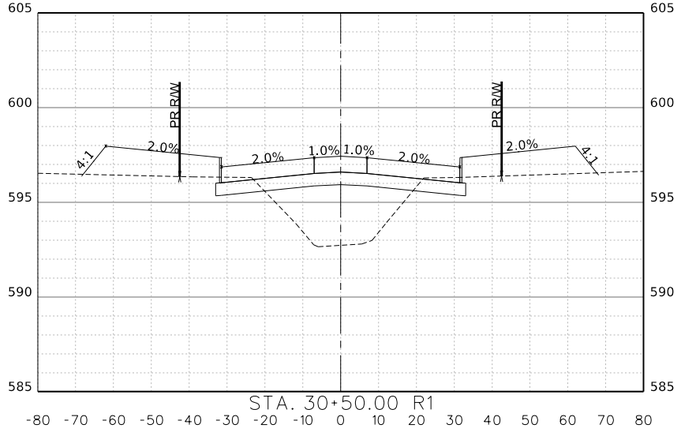

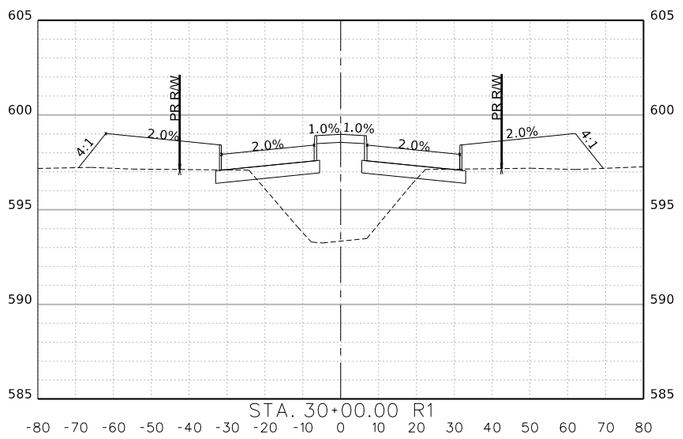

STA.28+90.00 R1 TO STA.31+00.00 R1

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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

DISCOVERY BLVD CROSS SECTIONS STA 28+90.00 TO STA 31+00.00

NO.	ISSUES	BY	DATE

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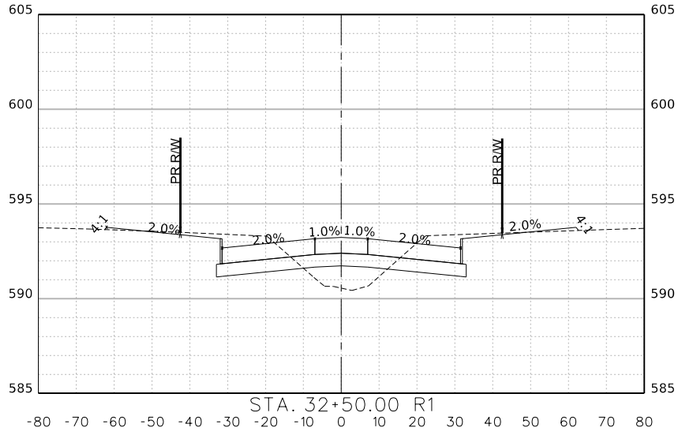

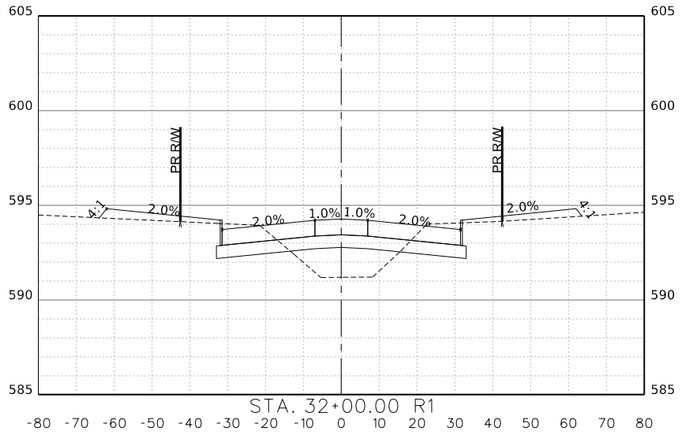

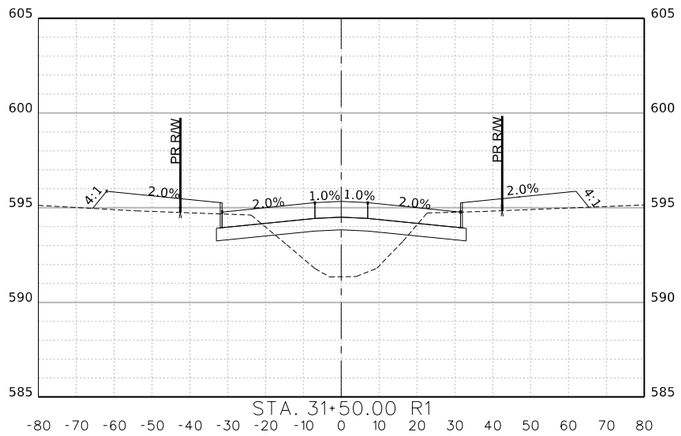

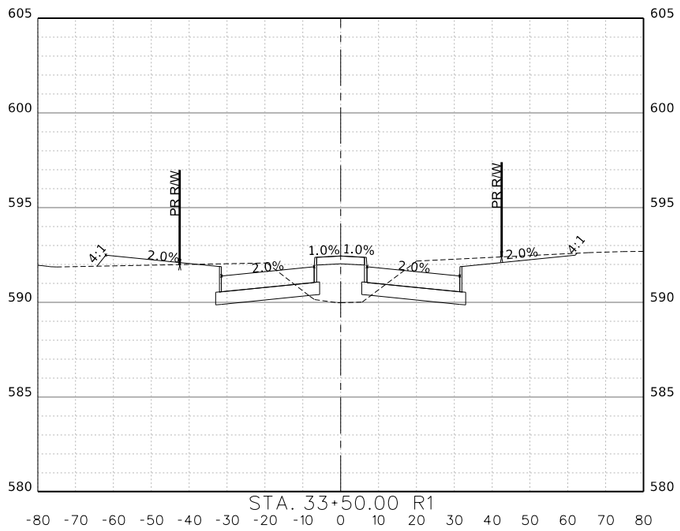

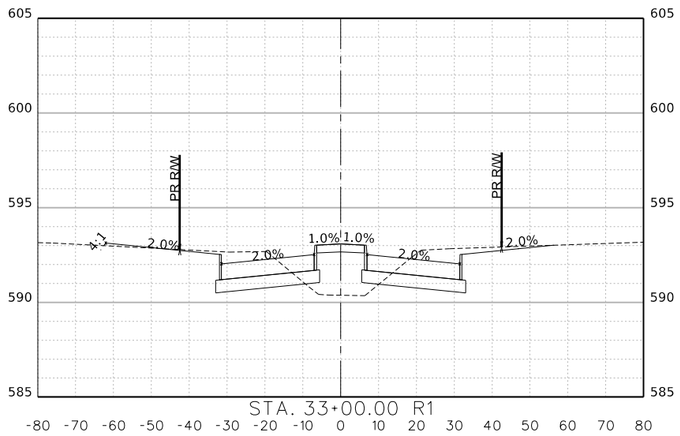

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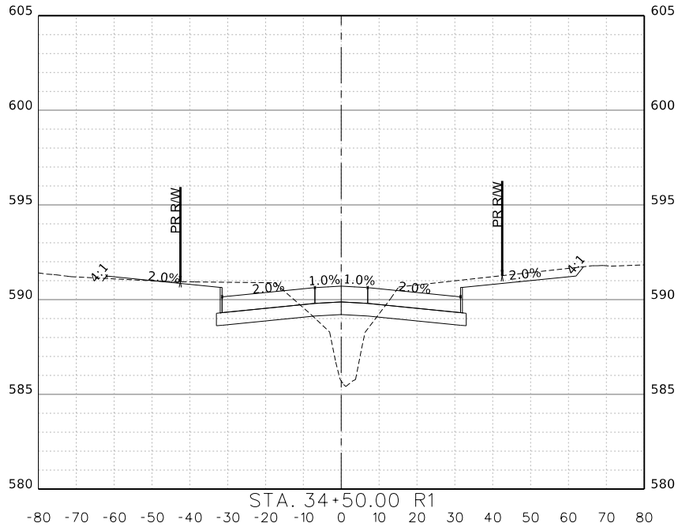

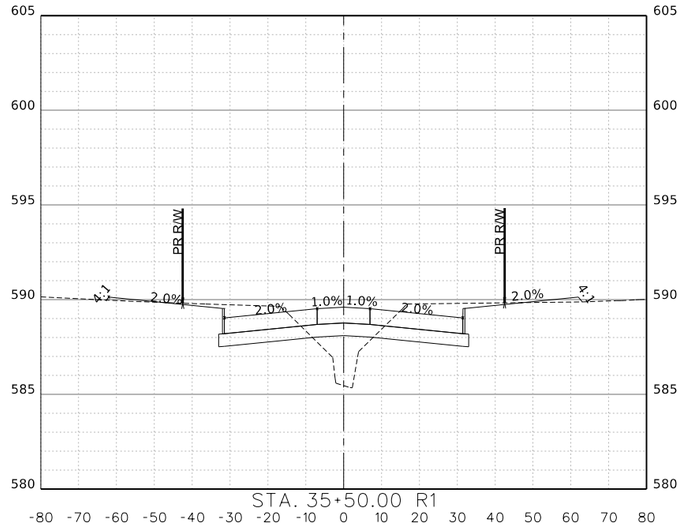

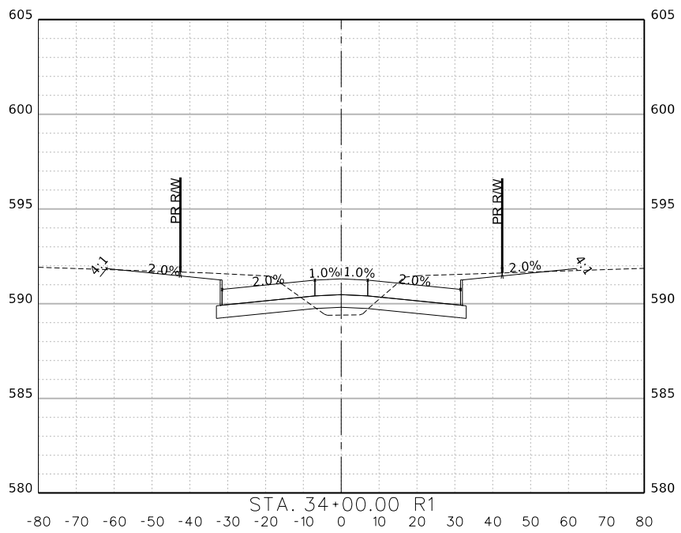

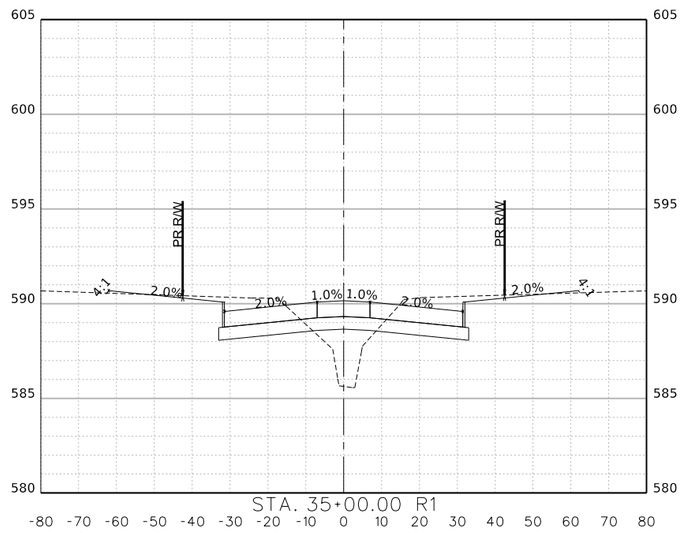

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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

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STA 34+00.00 TO STA 35+50.00

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REVISED
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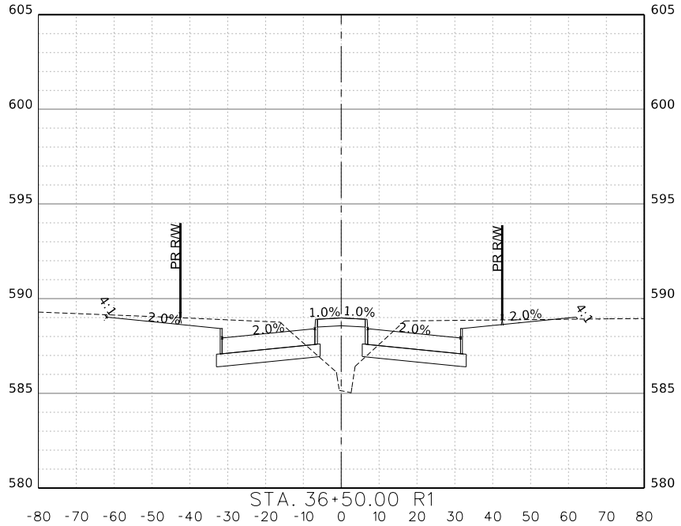

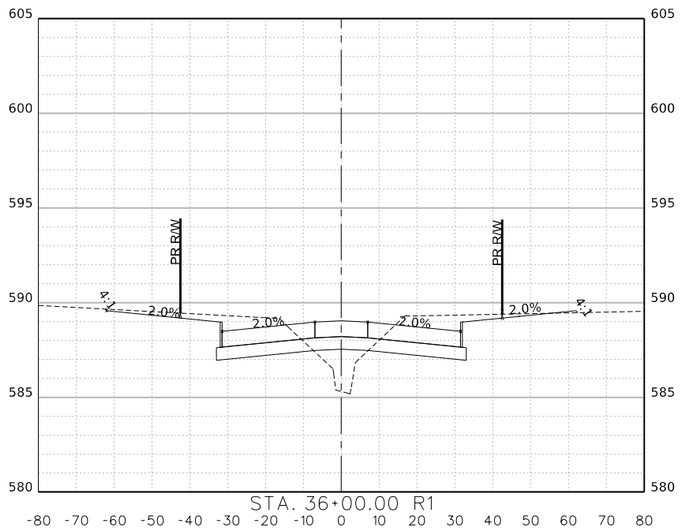

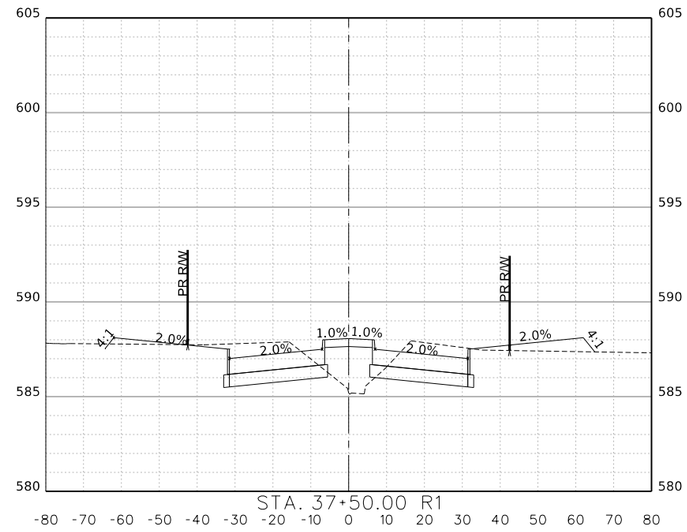

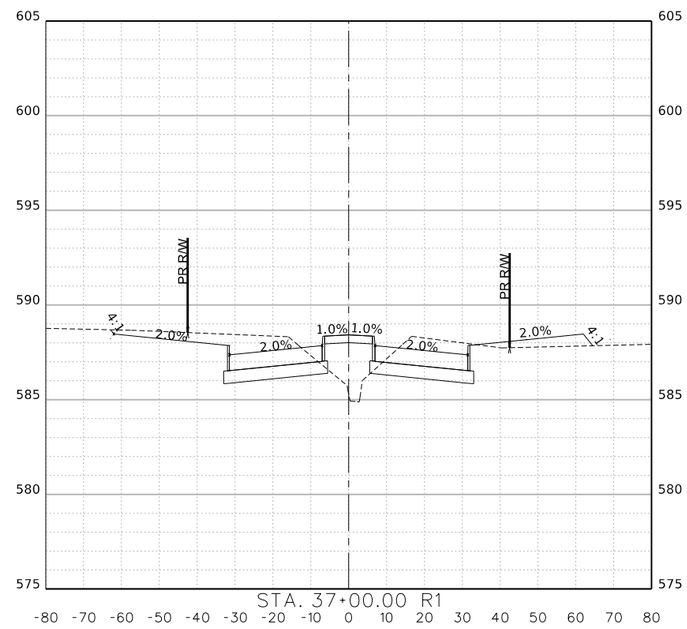

STA.36+00.00 R1 TO STA.37+50.00 R1

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASED FOR REVIEW ONLY
THIS DOCUMENT WAS PREPARED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
IT IS NOT TO BE USED FOR BIDDING OR CONSTRUCTION PURPOSES

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

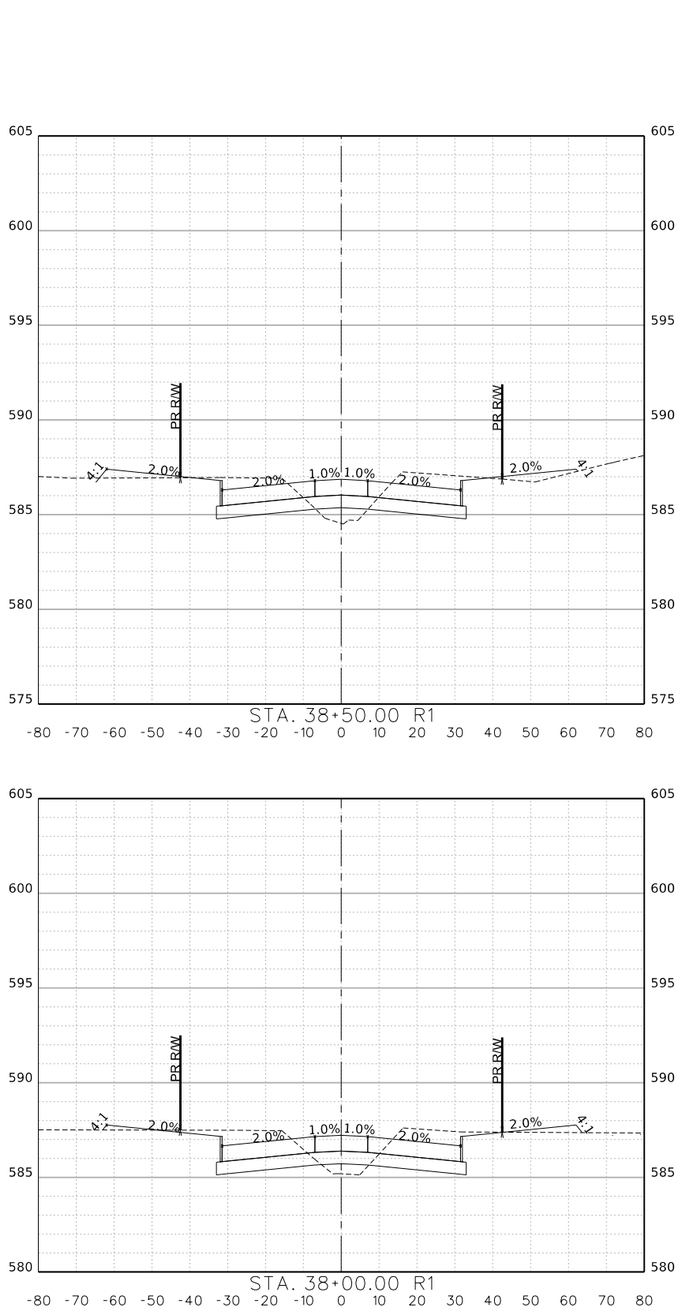
DISCOVERY BLVD CROSS SECTIONS STA 36+00.00 TO STA 37+50.00

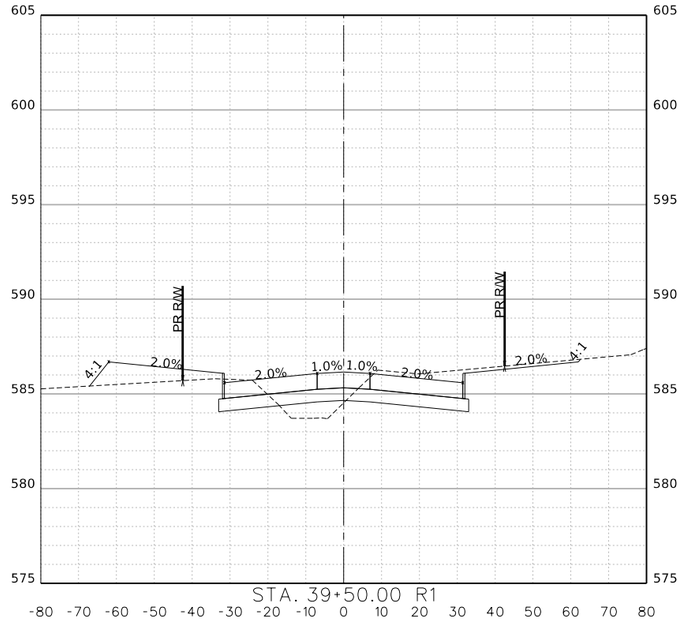
NO.	ISSUES	BY	DATE

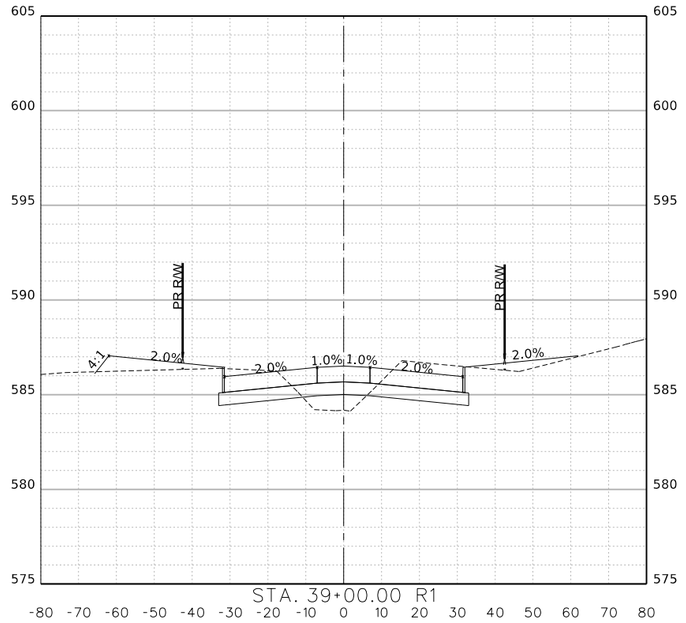
F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED CHM
DRAWN KLH
REVISED
CHECKED SEC
FILE NAME cv-trt-discovery-xs.dgn

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale!
0 1"

SHEET XS-4
SEQ. 318







STA.38+00.00 R1 TO STA.39+50.00 R1

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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TEXAS NO. 134055 ON 10/21/2021
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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

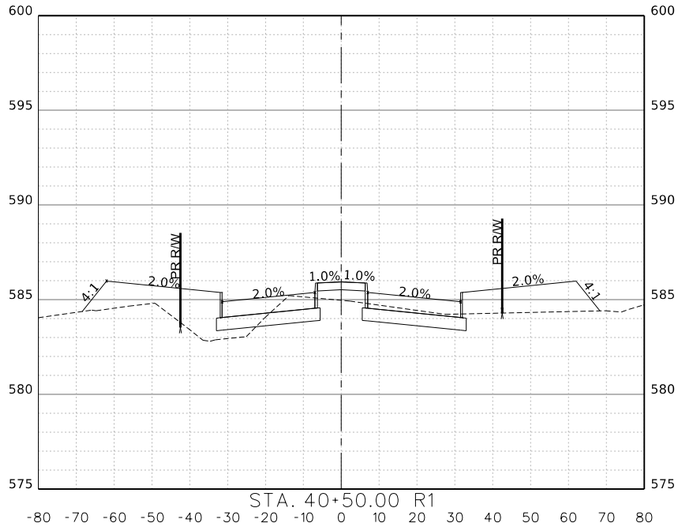
DISCOVERY BLVD CROSS SECTIONS STA 38+00.00 TO STA 39+50.00

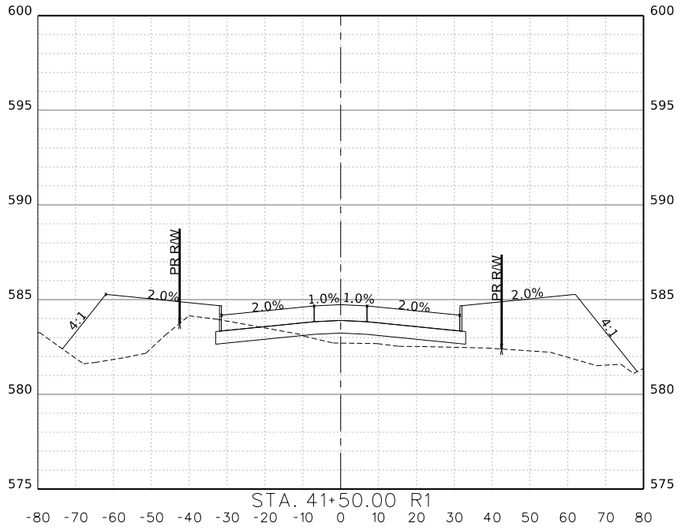
F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED CHM
DRAWN KLH
REVISED
CHECKED SEC
FILE NAME cv-trt-discovery-xs.dgn

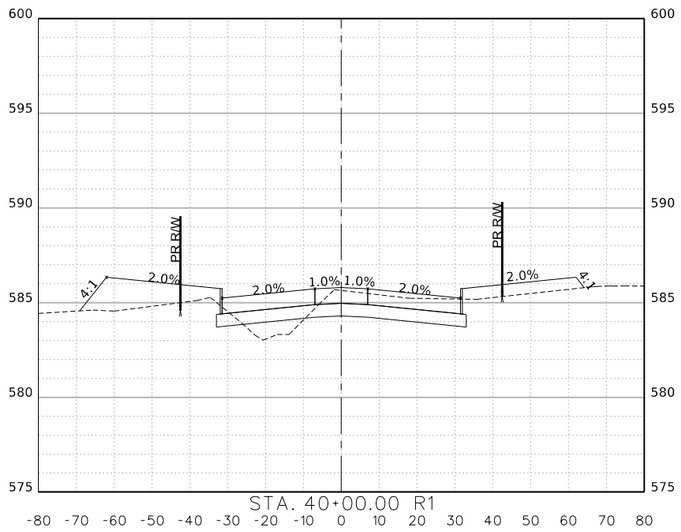
NO.	ISSUES	BY	DATE

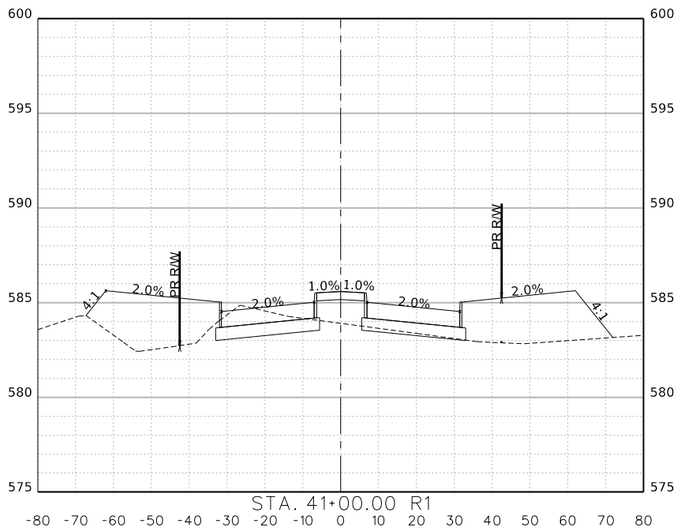
VERIFY SCALE
Bar is one inch on original drawing.
If not one inch on this sheet, adjust scale.
0 1"

SHEET XS-5
SEQ. 319









STA.40+00.00 R1 TO STA.41+50.00 R1

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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RELEASED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
ALTERATION OF A SEALED DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

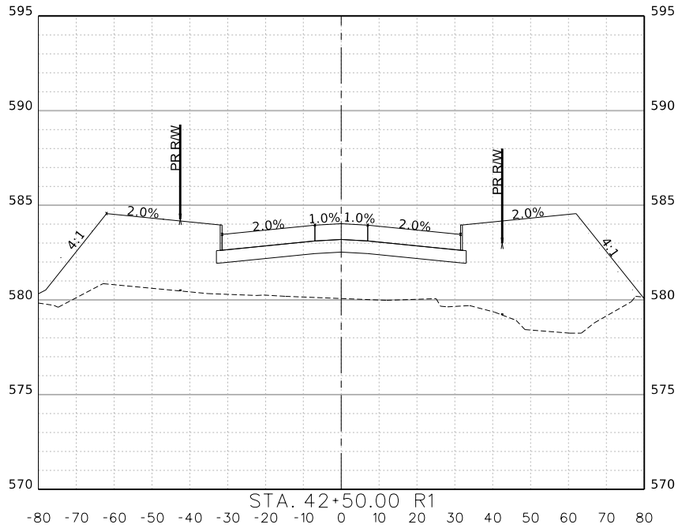
DISCOVERY BLVD CROSS SECTIONS STA 40+00.00 TO STA 41+50.00

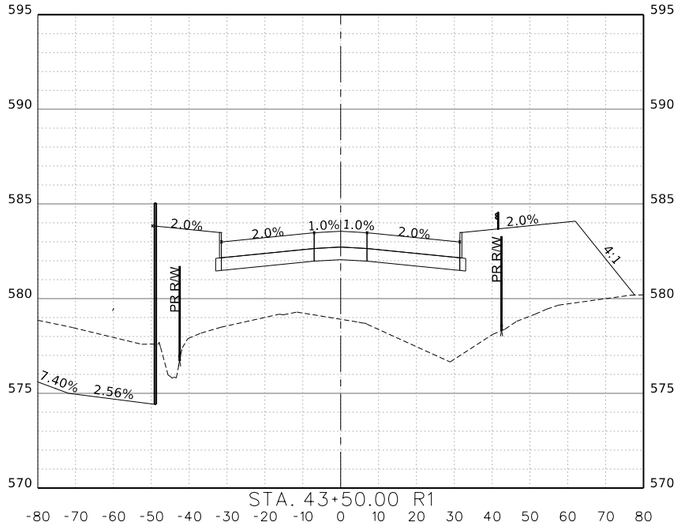
NO.	ISSUES	BY	DATE

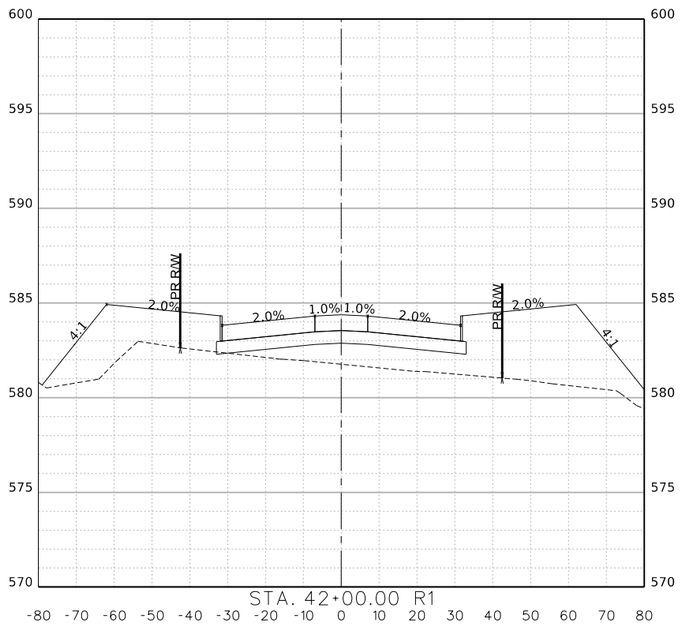
F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED CHM
DRAWN KLH
REVISED
CHECKED SEC
FILE NAME cv-trt-discovery-xs.dgn

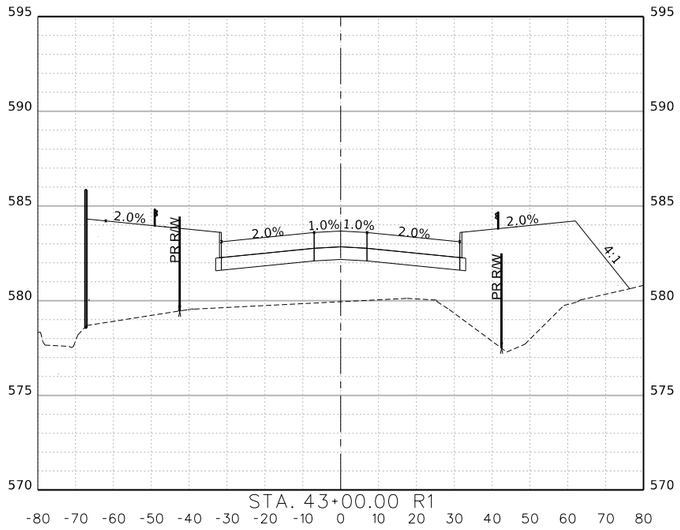
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale
0 1"

SHEET XS-6
SEQ. 320









STA.42+00.00 R1 TO STA.43+50.00 R1

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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TEXAS NO. 134055 ON 10/21/2021
ALTERATIONS TO ELECTRONIC DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE NICHOLS
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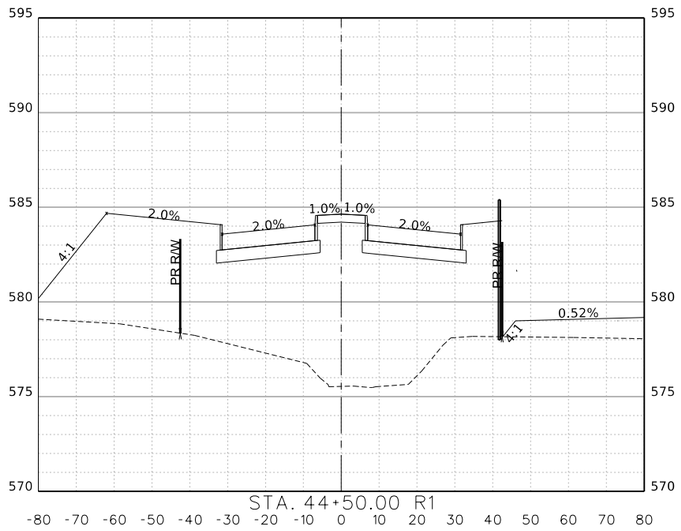
ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
CIVIL
DISCOVERY BLVD CROSS SECTIONS
STA 42+00.00 TO STA 43+50.00

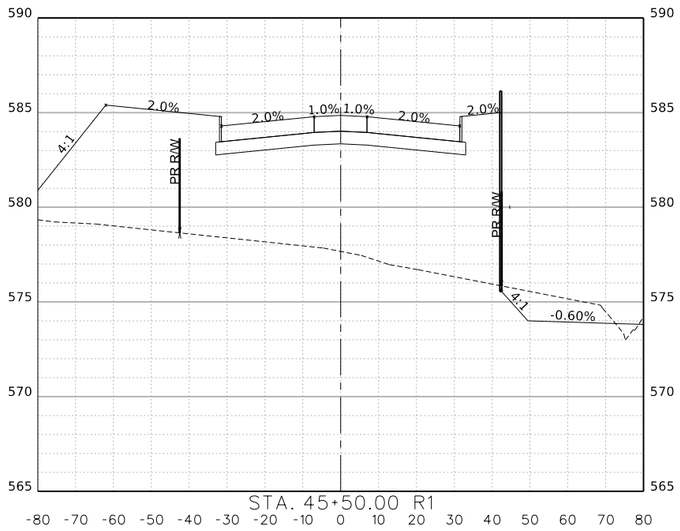
NO.	ISSUES	BY	DATE

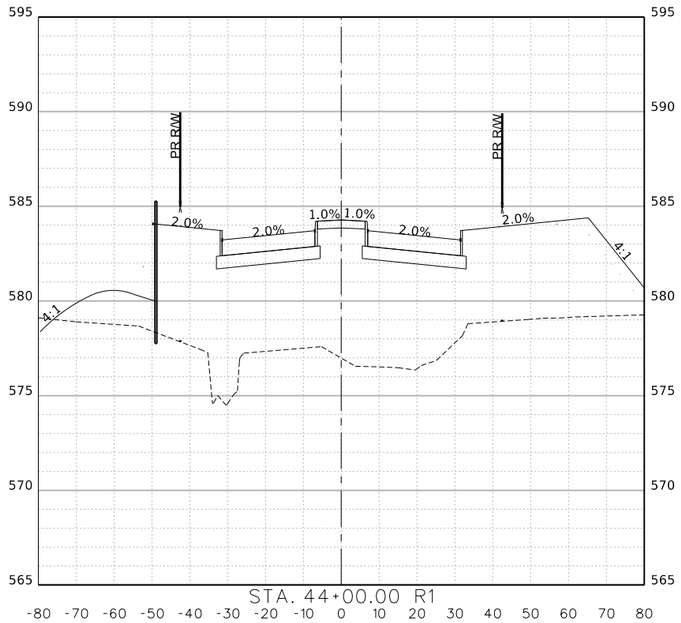
F&N JOB NO. RKW1971
DATE APRIL 2022
DESIGNED CHM
DRAWN KLH
REVISED
CHECKED SEC
FILE NAME cv-trt-discovery-xs.dgn

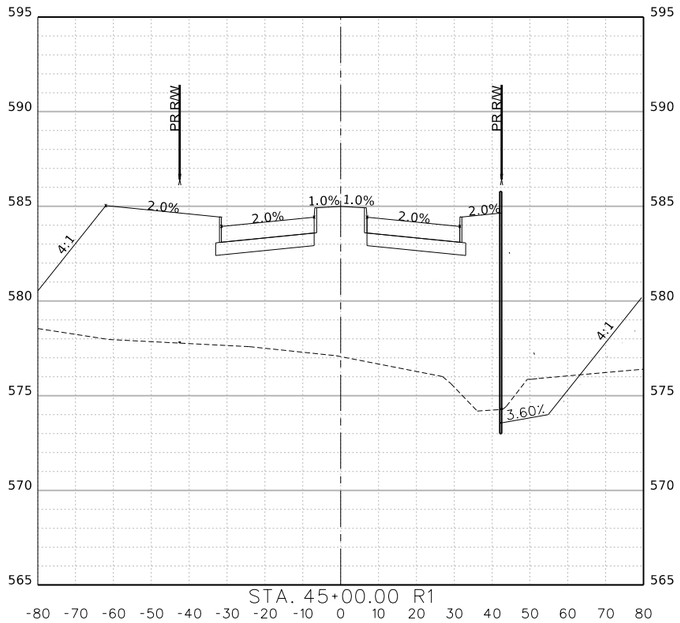
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale
0 1"

SHEET XS-7
SEQ. 321









STA.44+00.00 R1 TO STA.45+50.00 R1

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

THE SEAL THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

DISCOVERY BLVD CROSS SECTIONS STA 44+00.00 TO STA 45+50.00

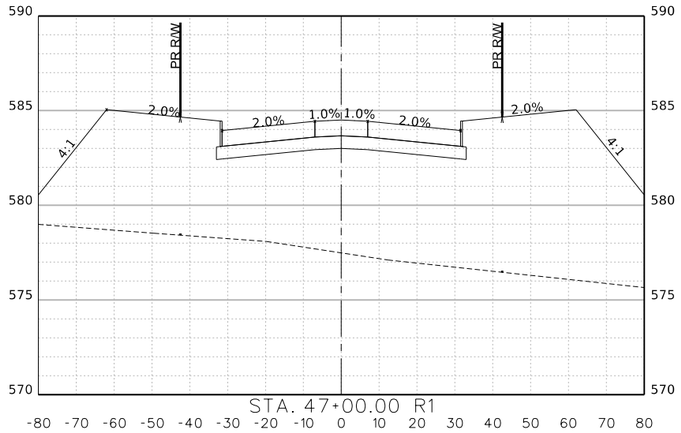
F&N JOB NO.	RKW19711
DATE	APRIL 2022
DESIGNED	CHM
DRAWN	KLH
REVISED	
CHECKED	SEC
FILE NAME	cv-trt-discovery-xs.dgn

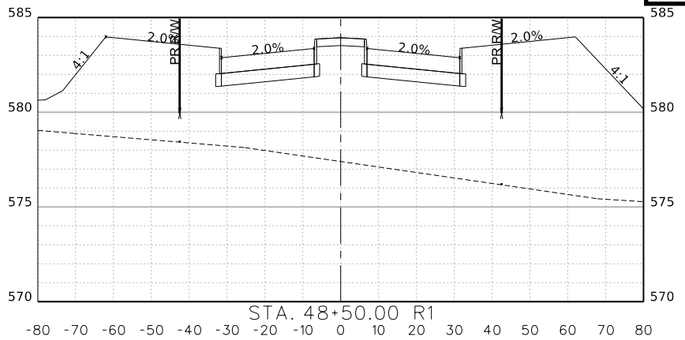
NO.	ISSUES	BY	DATE

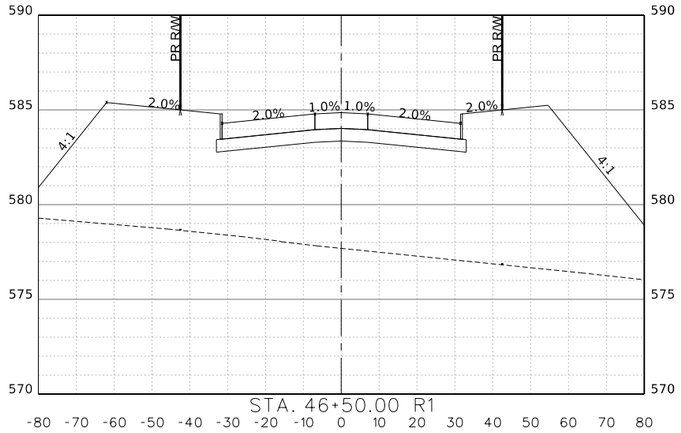
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale. 0 1"

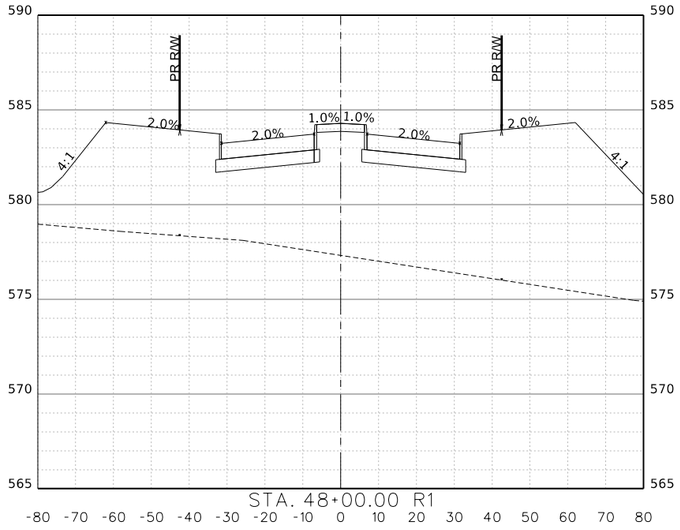
SHEET XS-8

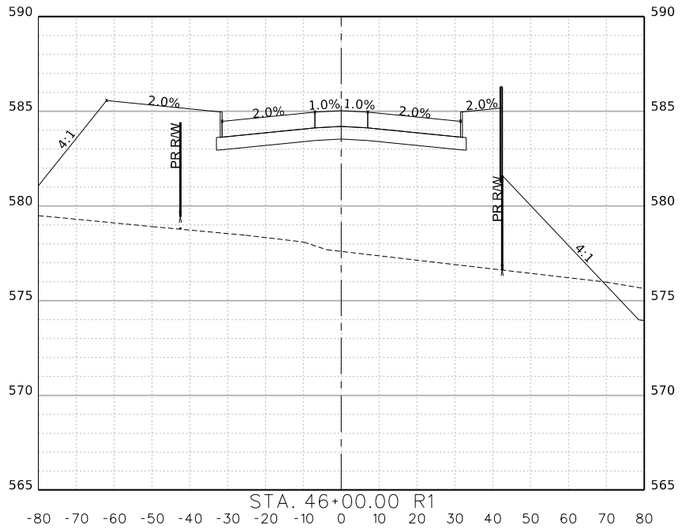
SEQ. 322

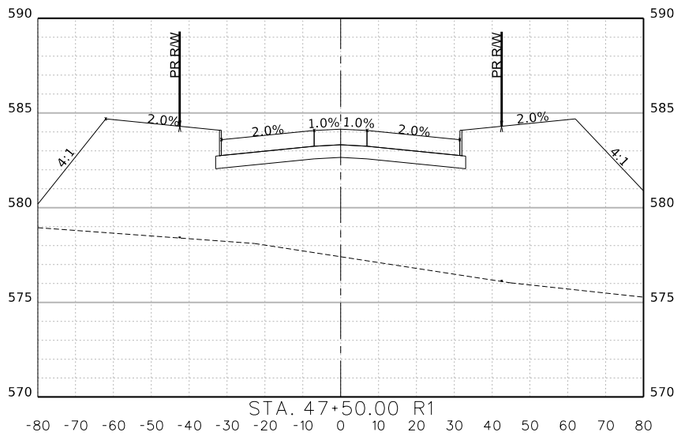












STA.46+00.00 R1 TO STA.48+50.00 R1

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

THE SEAL THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
ALTERATION OF A SEALED DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

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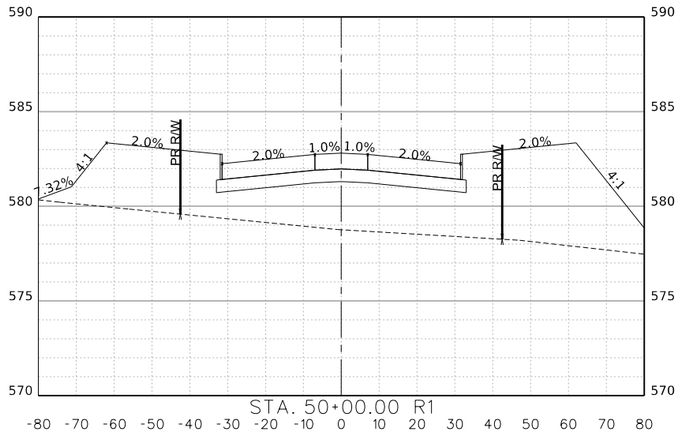
ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
CIVIL
DISCOVERY BLVD CROSS SECTIONS
STA 46+00.00 TO STA 48+50.00

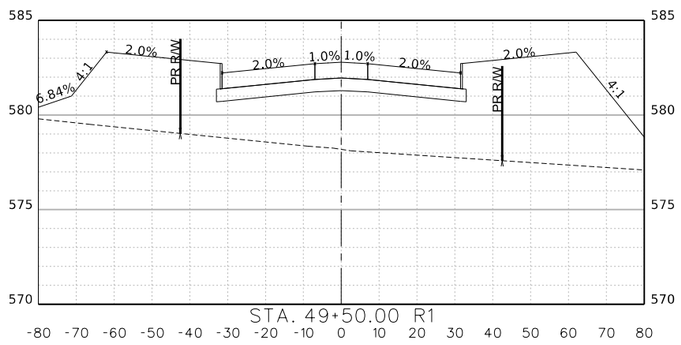
NO.	ISSUES	BY	DATE

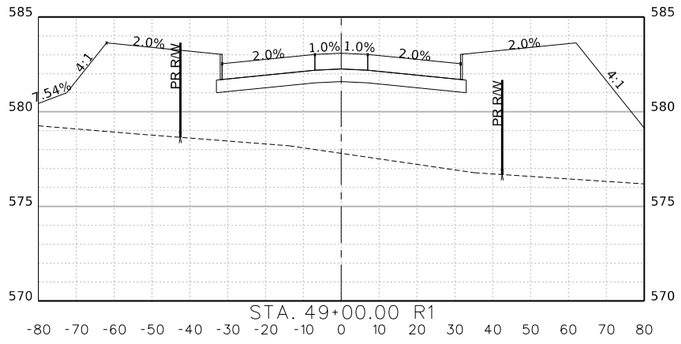
FAN JOB NO. RKW19711
DATE APRIL 2022
DESIGNED CHM
DRAWN KLH
REVISED
CHECKED SEC
FILE NAME cv-trt-discovery-xs.dgn

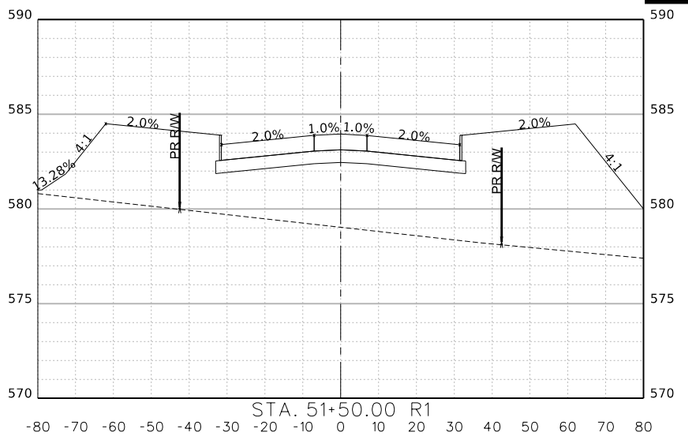
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale
0 1"

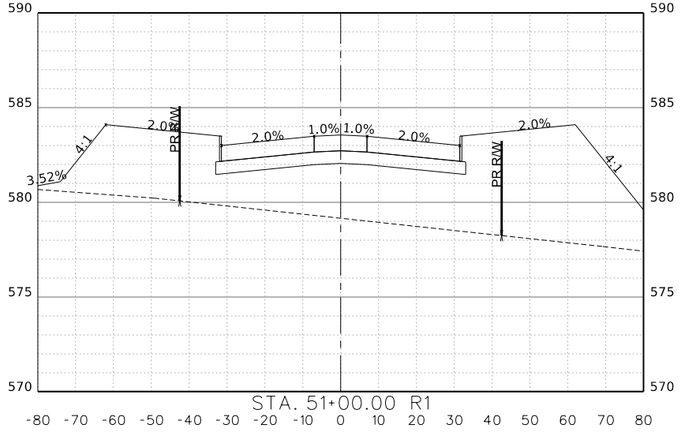
SHEET XS-9
SEQ. 323

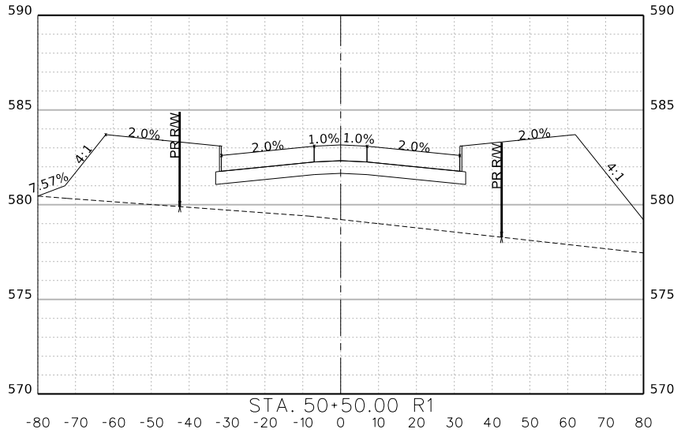












STA.49+00.00 R1 TO STA.51+50.00 R1

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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RELEASED BY SARAH E. CAUDLE, TEXAS NO. 134055, ON 10/21/2021

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2250
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
CIVIL
DISCOVERY BLVD CROSS SECTIONS STA 49+00.00 TO STA 51+50.00

FNI JOB NO.	RKW19711
DATE	APRIL 2022
DESIGNED	CHM
DRAWN	KLH
REVISED	
CHECKED	SEC
FILE NAME	cv-trt-discovery-xs.dgn

NO. | ISSUES | BY | DATE

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale
0 1"

SHEET XS-10
SEQ. 324

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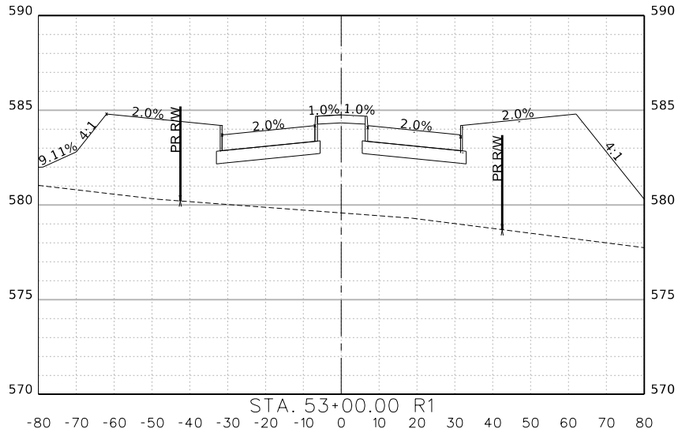
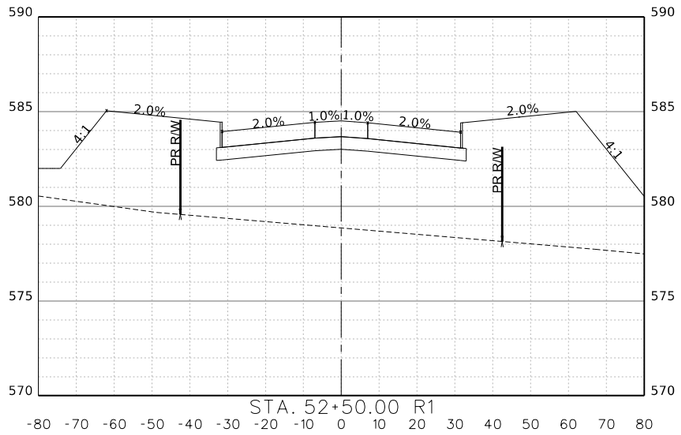
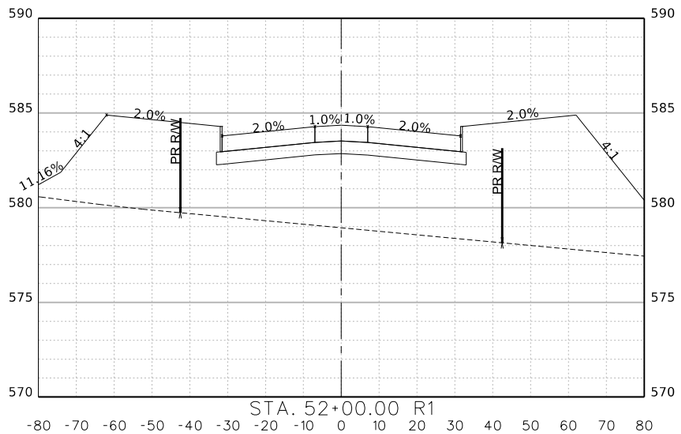
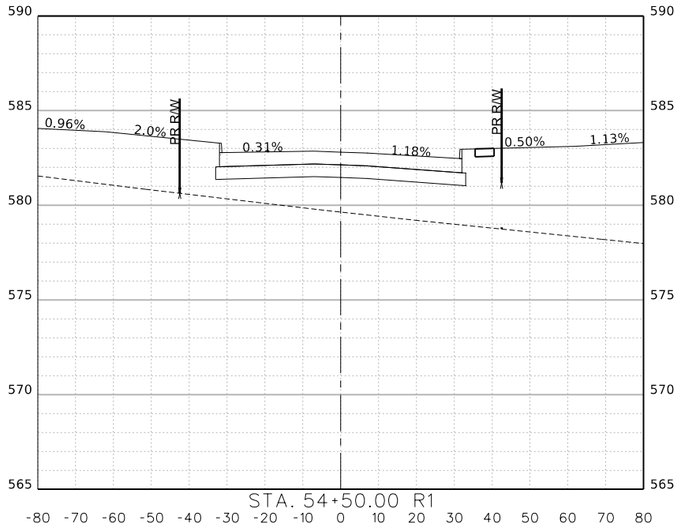
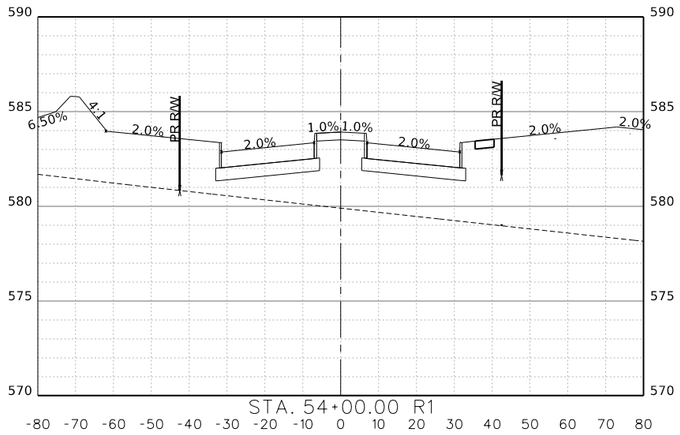
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

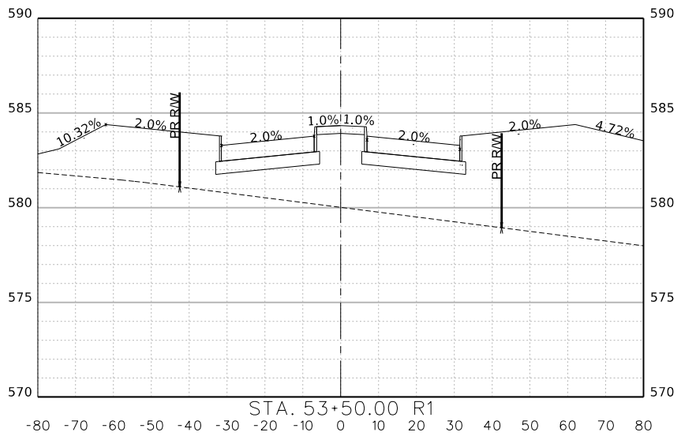












STA.52+00.00 R1 TO STA.54+50.00 R1

TEXAS REGISTERED ENGINEERING FIRM F-2144
FREESE AND NICHOLS, INC.

RELEASE FOR REVIEW PURPOSES ONLY
PE SEAL THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
ALTERATION OF THIS DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone - (214) 217-2200
Fax - (214) 217-2201
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

DISCOVERY BLVD CROSS SECTIONS STA 52+00.00 TO STA 54+50.00

NO.	ISSUES	BY	DATE

FRN JOB NO. RKW19711
DATE APRIL 2022
DESIGNED CHM
DRAWN KLH
REVISED
CHECKED SEC
FILE NAME cv-trt-discovery-xs.dgn

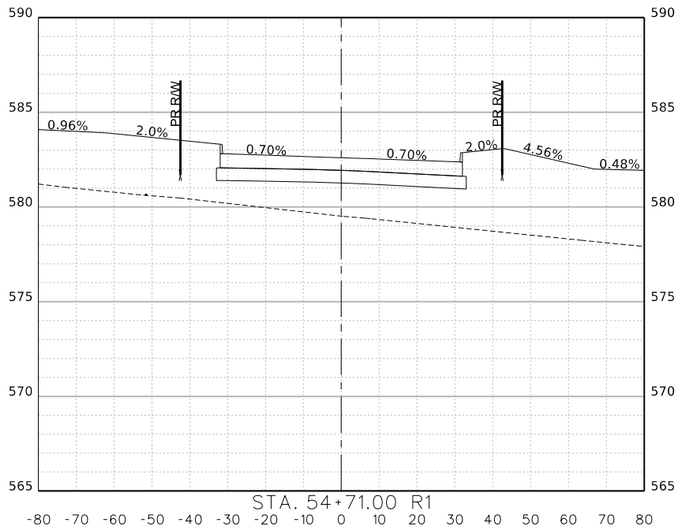
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale
0 1"

SHEET XS-11
SEQ. 325

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of

FREESE AND NICHOLS, INC.

RECORD DRAWINGS PREPARED ON: 8/20/2024



STA.54+71.00 R1 TO STA.54+71.00 R1

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2201
Web - www.freese.com

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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

DISCOVERY BLVD CROSS SECTIONS STA 54+71.00

FAN JOB NO.	RKW19711
DATE	APRIL 2022
DESIGNED	CHM
DRAWN	KLH
REVISED	
CHECKED	SEC
FILE NAME	cv-trt-discovery-xs.dgn

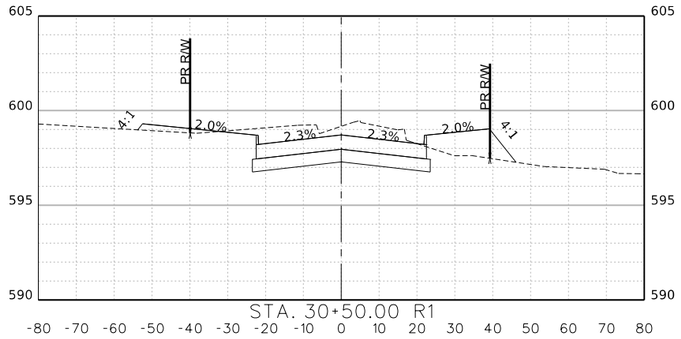
NO. | ISSUES | BY | DATE

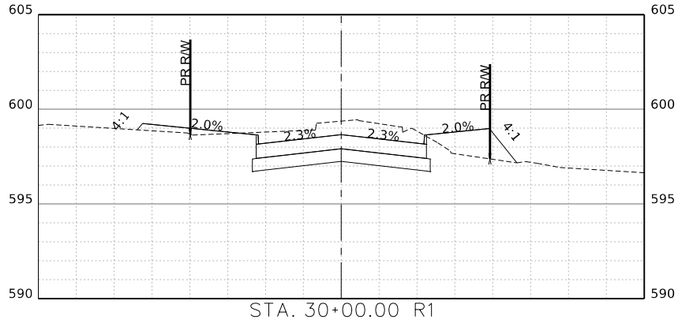
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

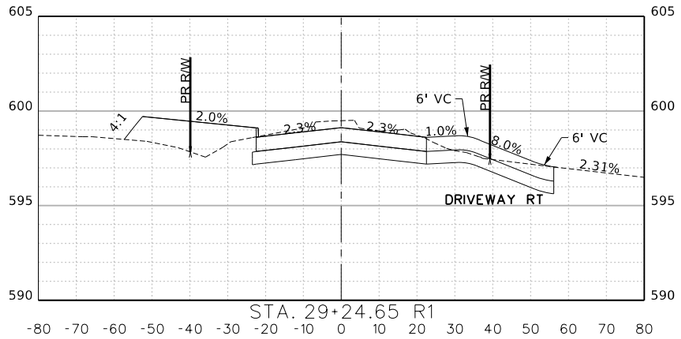
0 1"

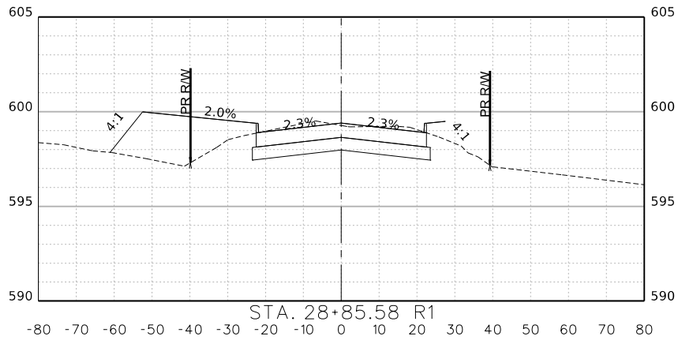
SHEET XS-12

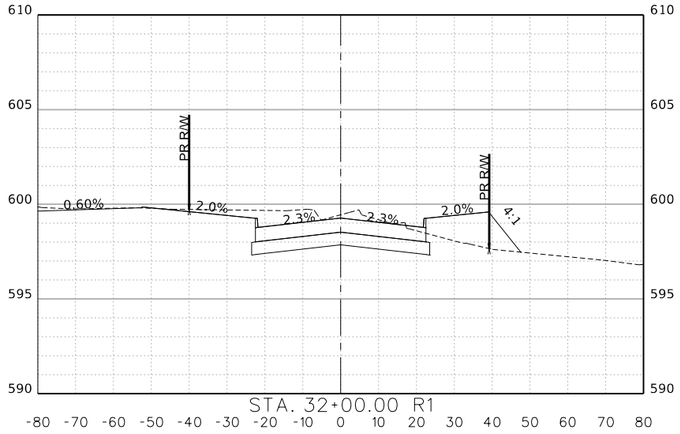
SEQ. 326

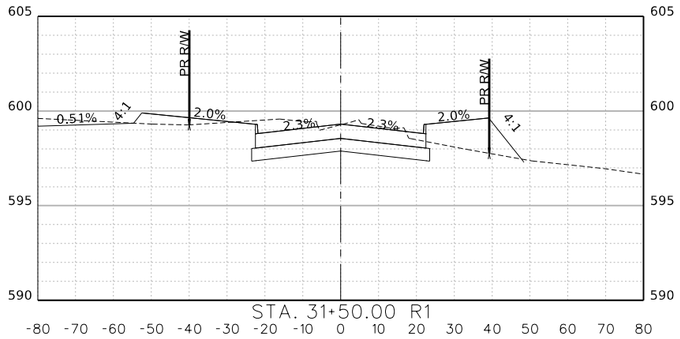


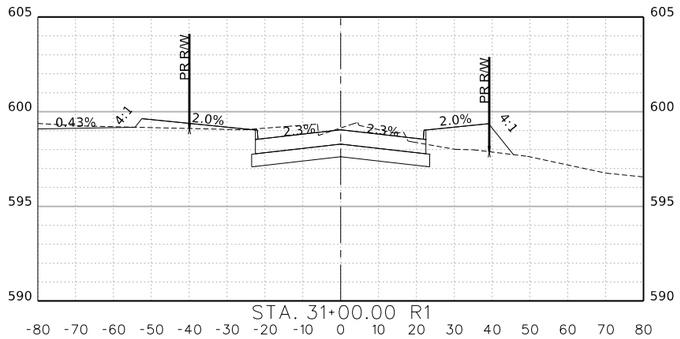












STA.28+85.58 R1 TO STA.32+00.00 R1

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASED FOR REVIEW ONLY
THIS DOCUMENT WAS ORIGINALLY ISSUED AND SEALED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
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RELEASED FOR CONSTRUCTION
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THIS DOCUMENT WAS ORIGINALLY ISSUED AND SEALED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

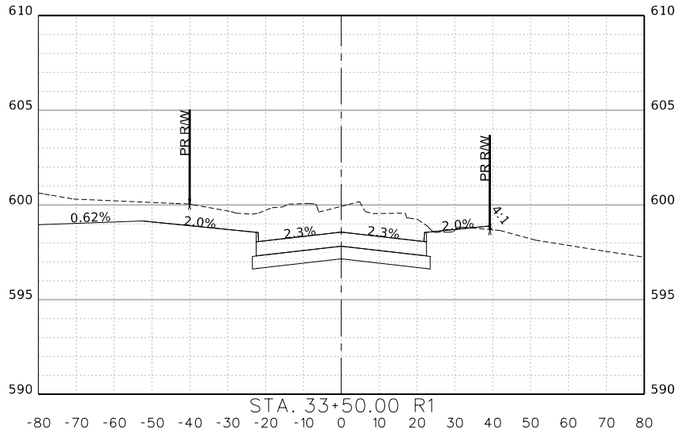
SPRINGER RD CROSS SECTIONS
STA 28+85.58 TO STA 32+00.00

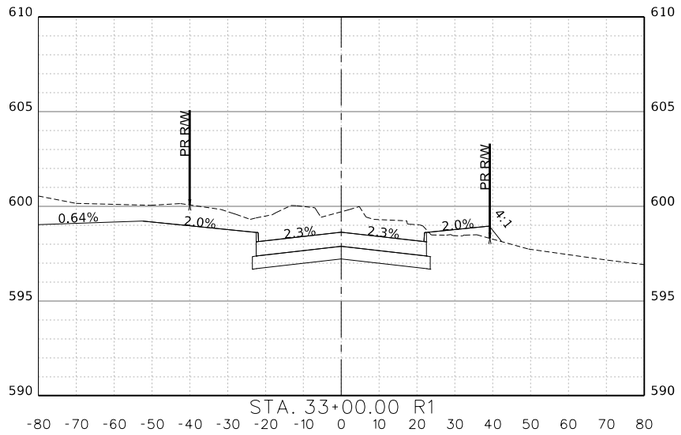
F&N JOB NO.	RKW19711
DATE	APRIL 2022
DESIGNED	CHM
DRAWN	KLH
REVISED	
CHECKED	SEC
FILE NAME	cv-trt-springer-xs.dgn

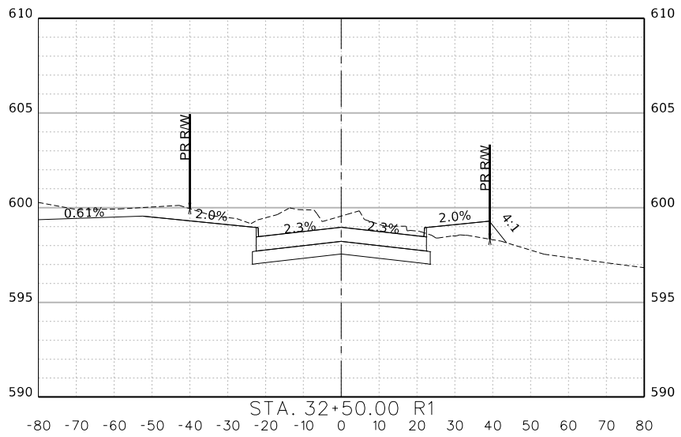
NO.	ISSUES	BY	DATE

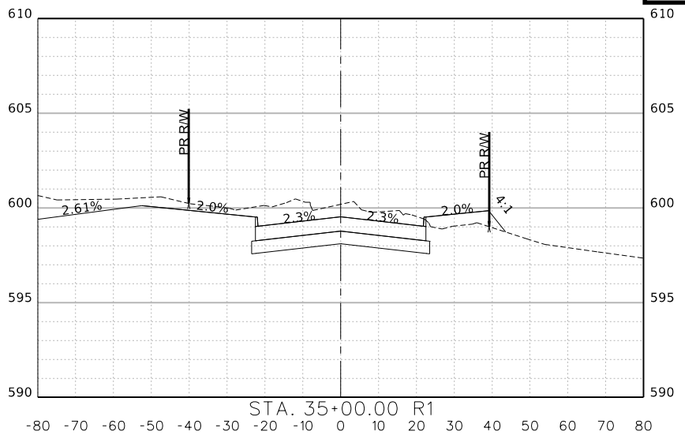
VERIFY SCALE
Bar is one inch on original drawing.
If not one inch on this sheet, adjust scale.
0 1"

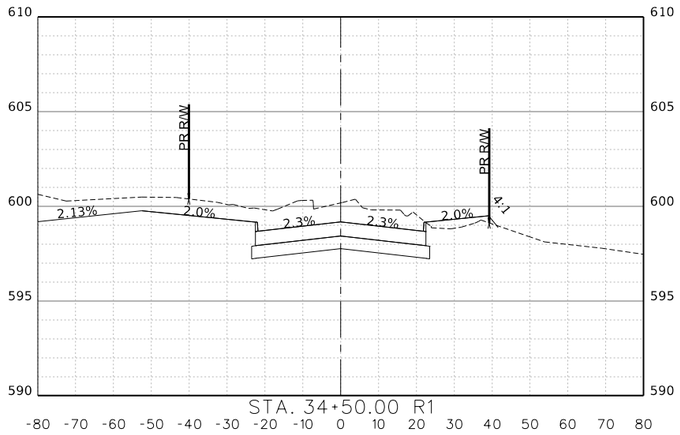
SHEET
XS-13
SEQ.
327

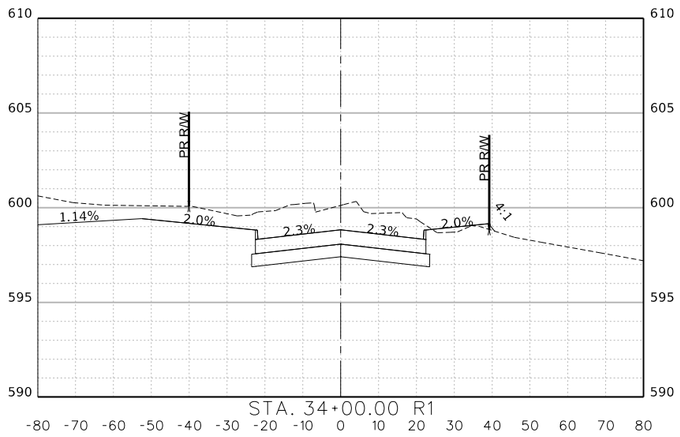












STA.32+50.00 R1 TO STA.35+00.00 R1

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FREESE AND NICHOLS, INC.

RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASED FOR CONSTRUCTION
DOCUMENTS
THIS DOCUMENT WAS ORIGINALLY ISSUED AND SEALED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
IT SHALL NOT BE USED FOR BIDDING OR CONSTRUCTION PURPOSES WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
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Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

SPRINGER RD CROSS SECTIONS STA 32+50.00 TO STA 35+00.00

NO.	ISSUES	BY	DATE

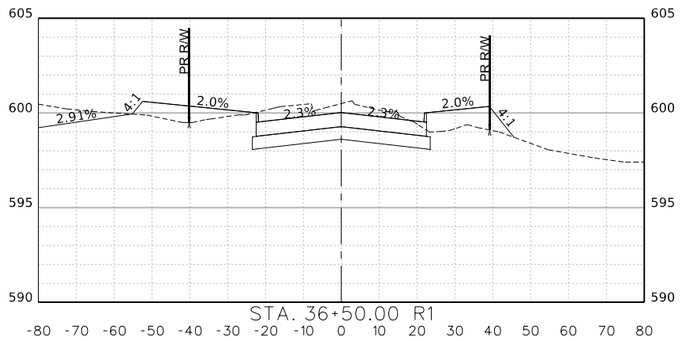
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

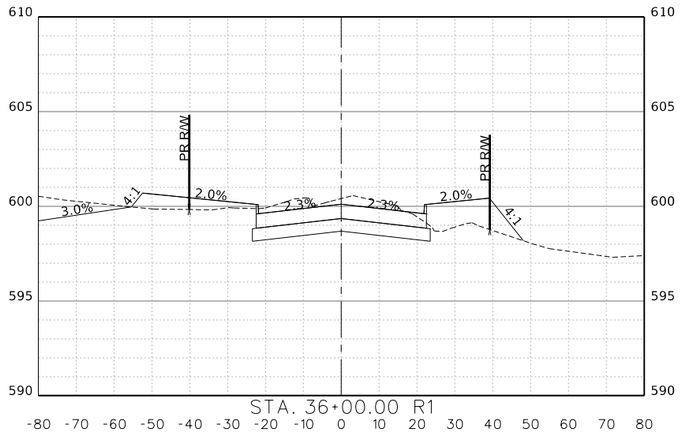
0 1"

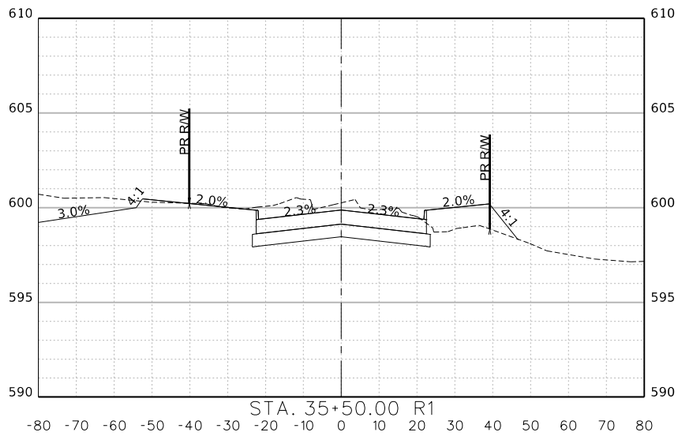
FNI JOB NO.	RKW19711
DATE	APRIL 2022
DESIGNED	CHM
DRAWN	KLH
REVISED	
CHECKED	SEC
FILE NAME	cv-trt-springer-xs.dgn

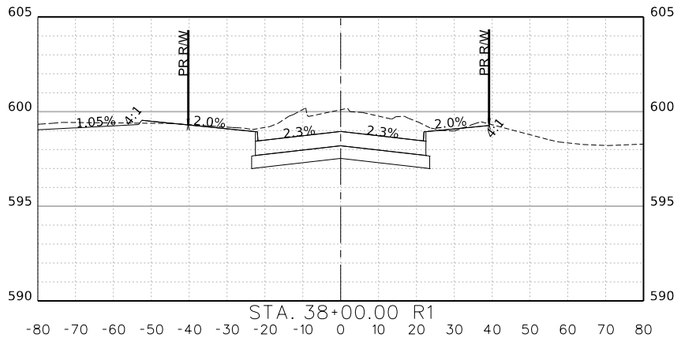
SHEET XS-14

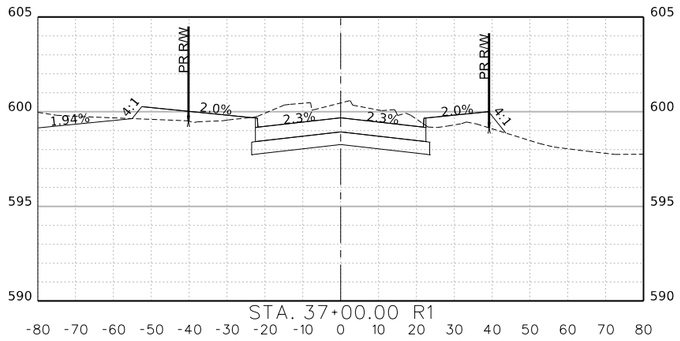
SEQ. 328











STA.35+50.00 R1 TO STA.38+00.00 R1

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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Dallas, Texas 75204
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Web - www.freese.com

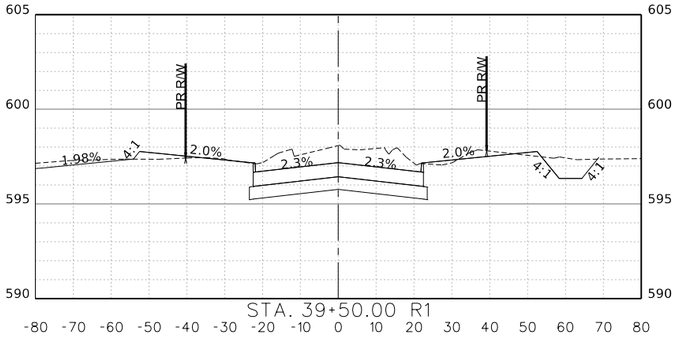
ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
CIVIL
SPRINGER RD CROSS SECTIONS STA 35+50.00 TO STA 38+00.00

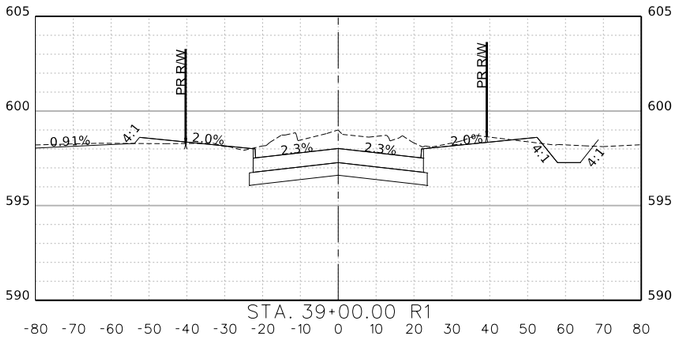
NO.	ISSUES	BY	DATE

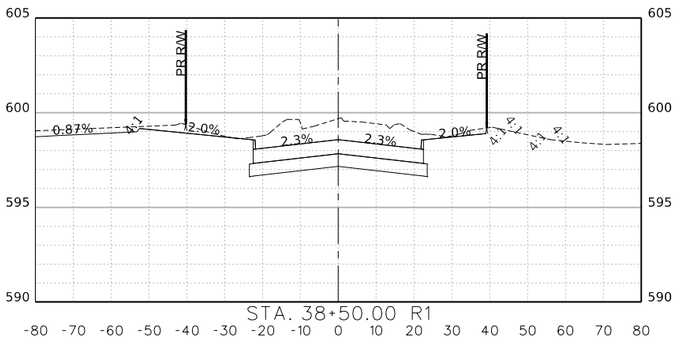
F&N JOB NO.	RKW19711
DATE	APRIL 2022
DESIGNED	CHM
DRAWN	KLH
REVISED	
CHECKED	SEC
FILE NAME	cv-trt-springer-xs.dgn

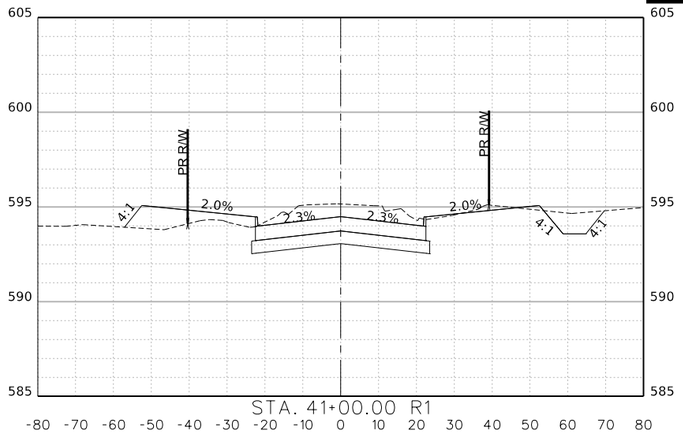
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale
0 1"

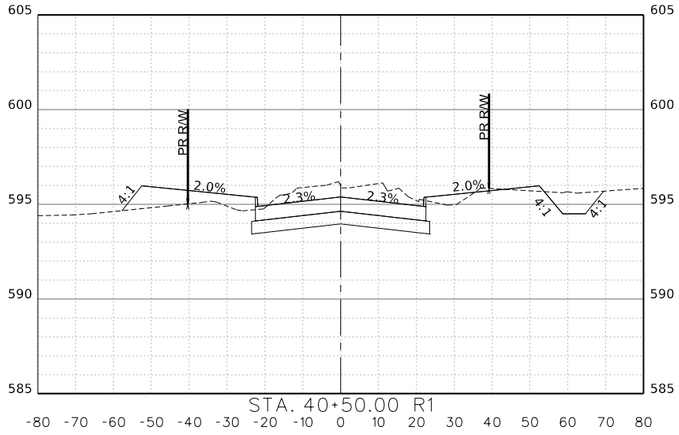
SHEET
XS-15
SEQ.
329

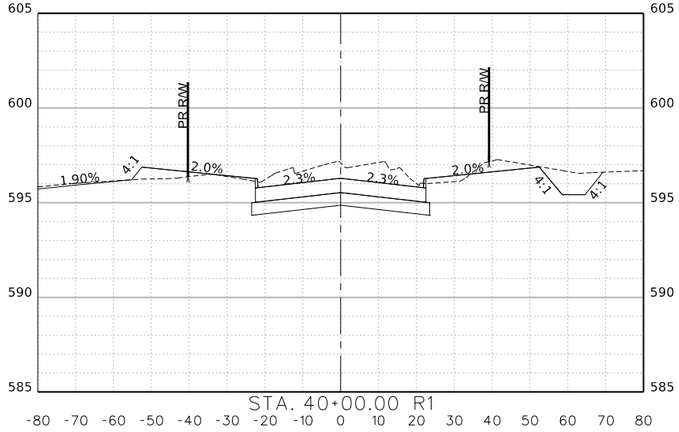












STA.38+50.00 R1 TO STA.41+00.00 R1

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RECORD DRAWINGS PREPARED ON:
8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone - (214) 217-2200
Fax - (214) 217-2201
Web - www.freese.com

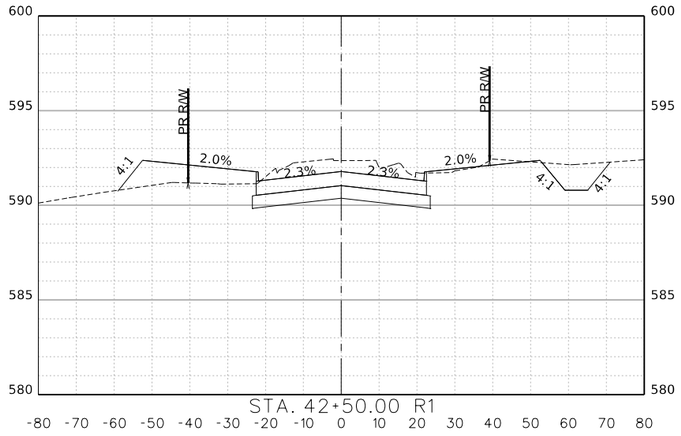
ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
CIVIL
SPRINGER RD CROSS SECTIONS
STA 38+50.00 TO STA 41+00.00

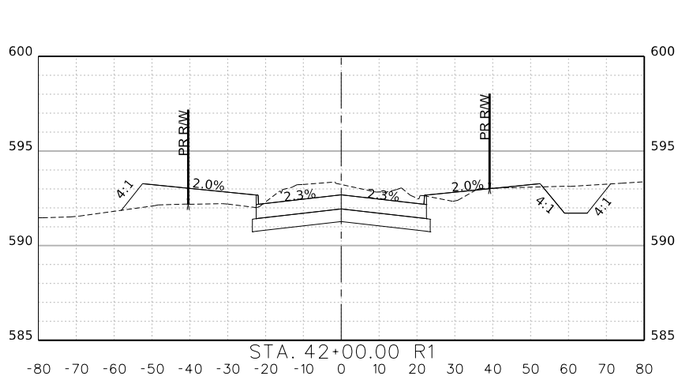
NO.	ISSUES	BY	DATE

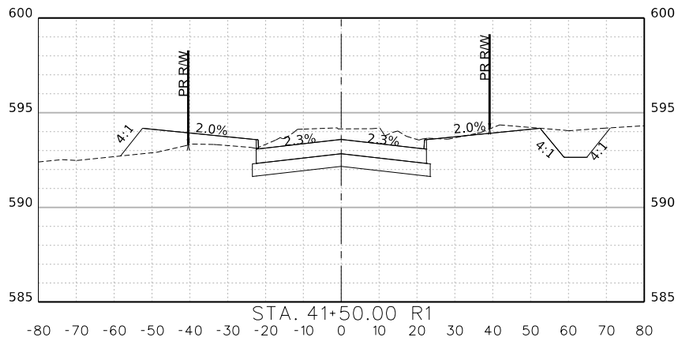
F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED CHM
DRAWN KLH
REVISED
CHECKED SEC
FILE NAME cv-trt-springer-xs.dgn

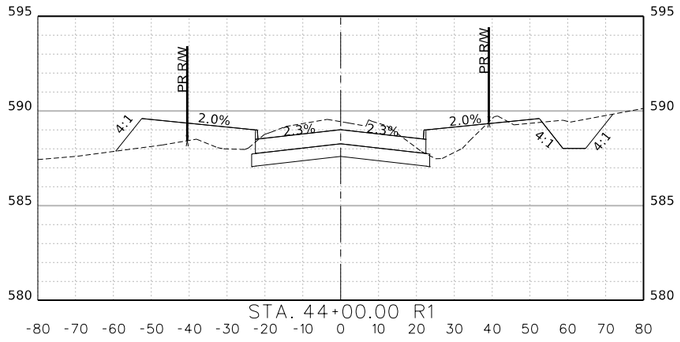
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale
0 1"

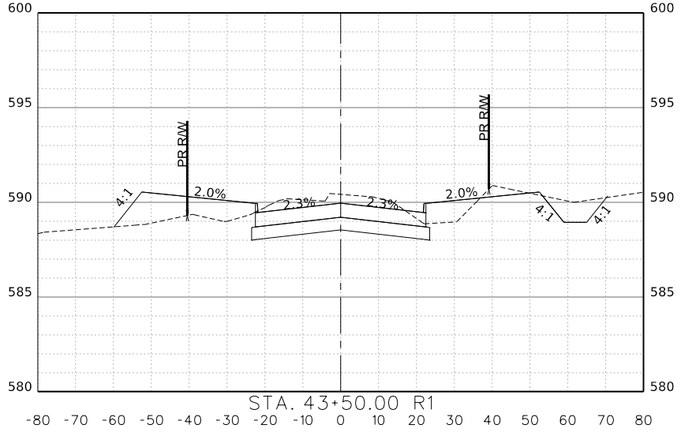
SHEET XS-16
SEQ. 330

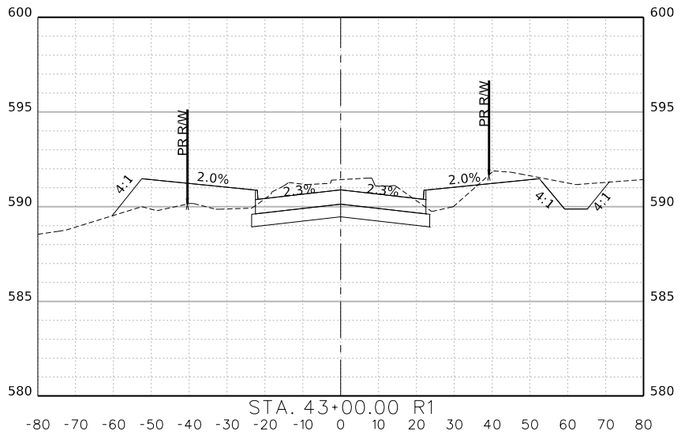












STA.41+50.00 R1 TO STA.44+00.00 R1

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASE THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
ALTERATION OF A SEALED DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone - (214) 217-2200
Fax - (214) 217-2201
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

SPRINGER RD CROSS SECTIONS STA 41+50.00 TO STA 44+00.00

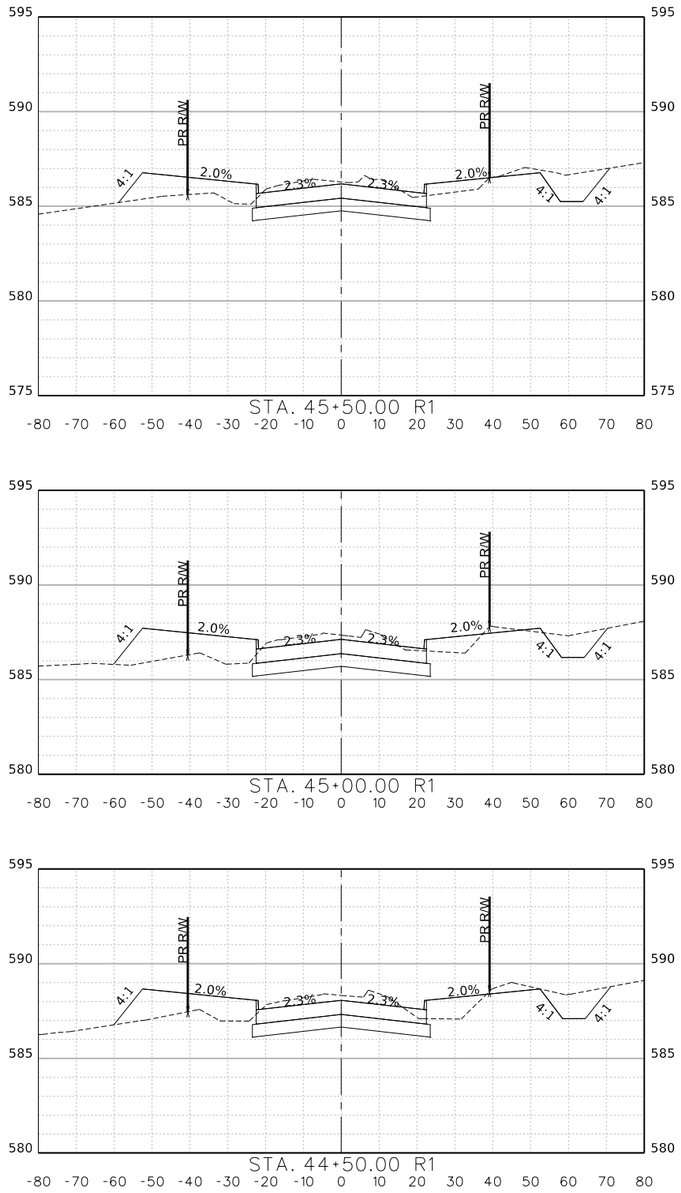
NO.	ISSUES	BY	DATE

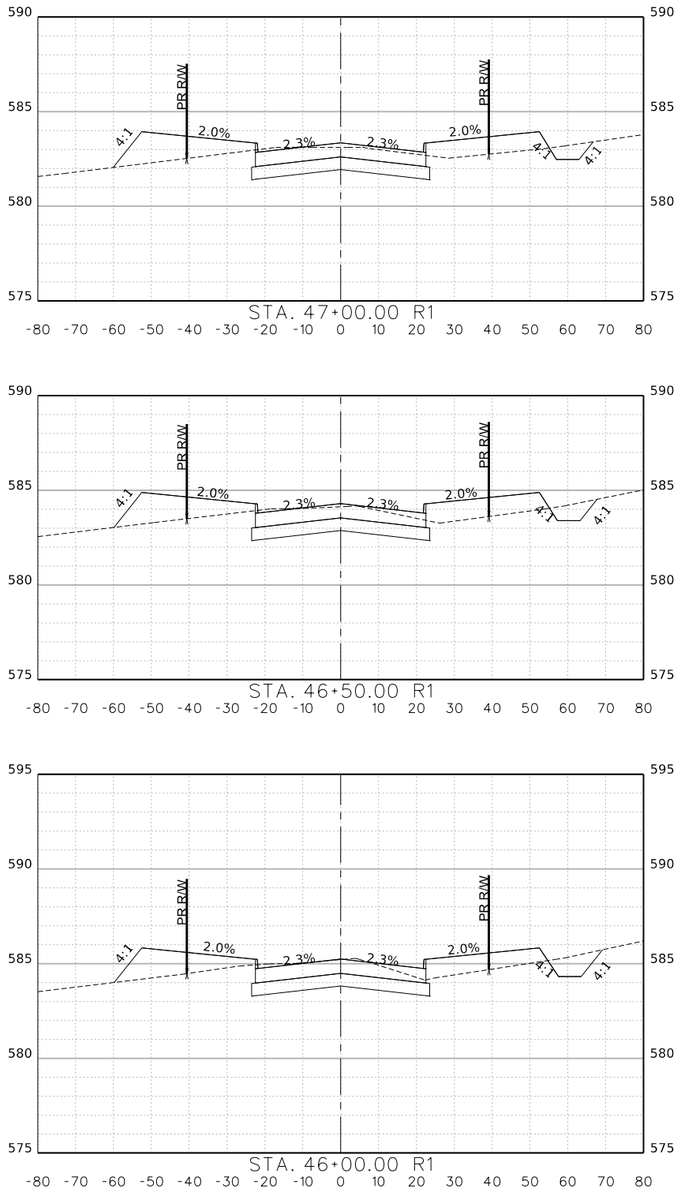
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale
0 1

FNI JOB NO.	RKW19711
DATE	APRIL 2022
DESIGNED	CHM
DRAWN	KLH
REVISED	
CHECKED	SEC
FILE NAME	cv-trt-springer-xs.dgn

SHEET XS-17

SEQ. 331





STA.44+50.00 R1 TO STA.47+00.00 R1

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RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

SPRINGER RD CROSS SECTIONS STA 44+50.00 TO STA 47+00.00

NO.	ISSUES	BY	DATE

VERIFY SCALE
Bar is one inch on original drawing.
If not one inch on this sheet, adjust scale

F&N JOB NO.	RKW19711
DATE	APRIL 2022
DESIGNED	CHM
DRAWN	KLH
REVISED	
CHECKED	SEC
FILE NAME	cv-trt-springer-xs.dgn

SHEET
XS-18
SEQ.
332

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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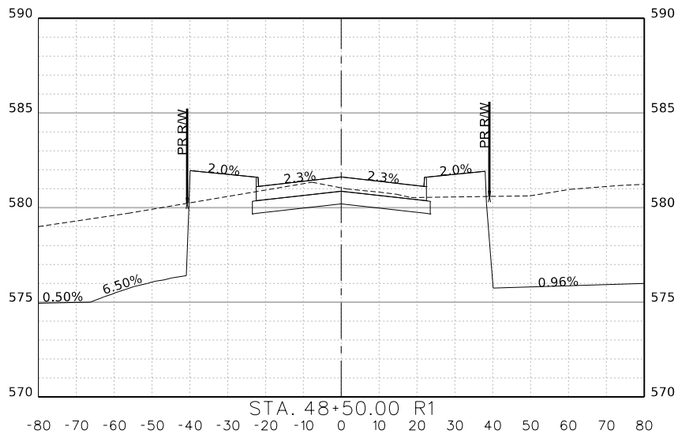
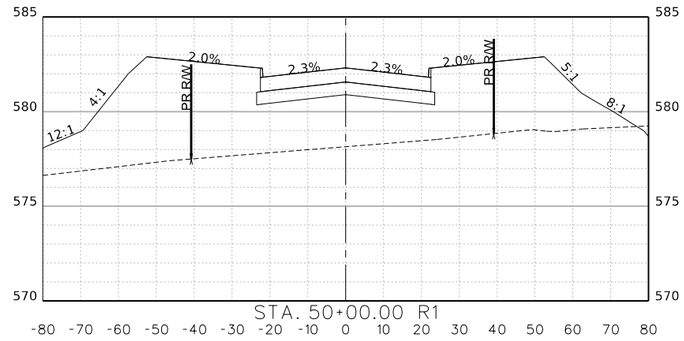
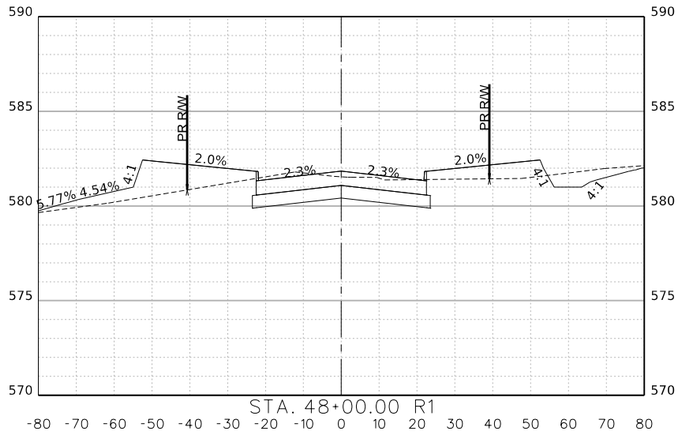
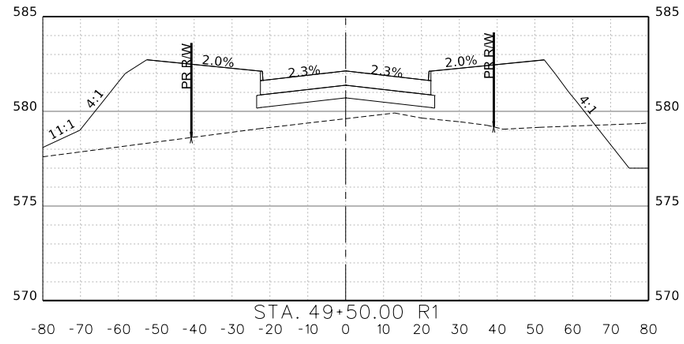
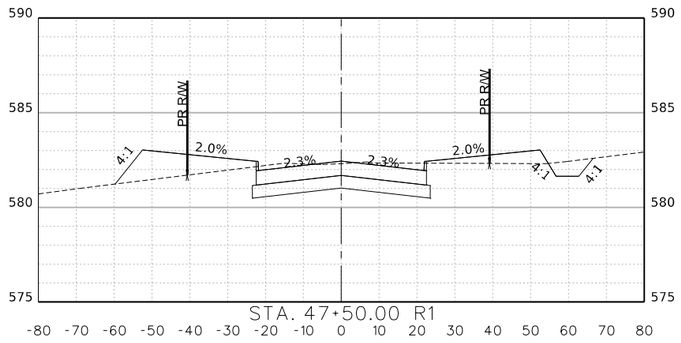
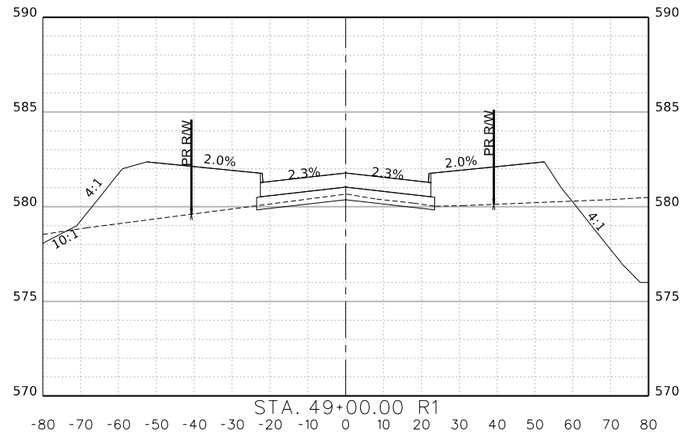












STA.47+50.00 R1 TO STA.50+00.00 R1

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

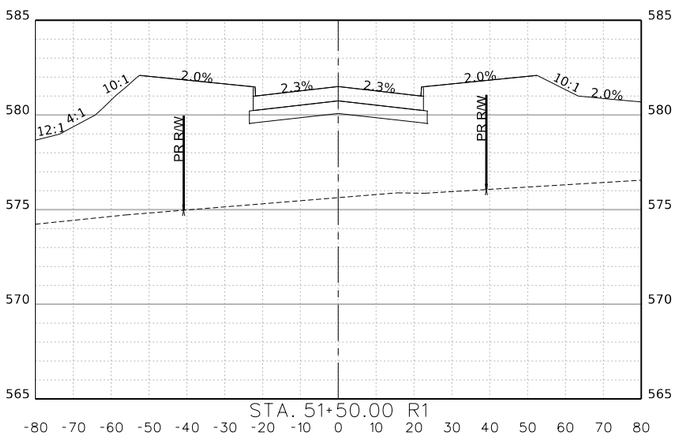
SPRINGER RD CROSS SECTIONS STA 47+50.00 TO STA 50+00.00

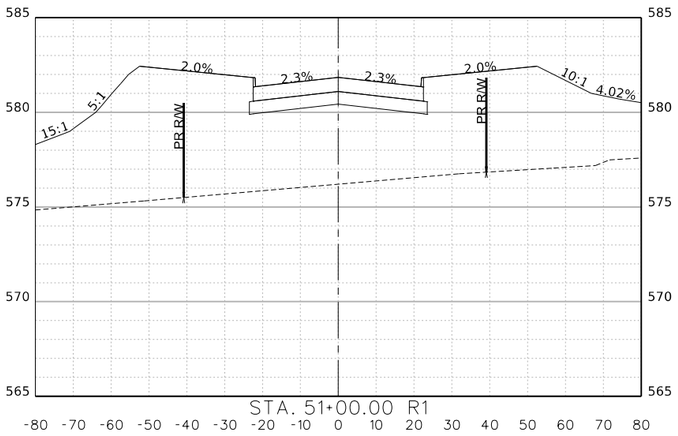
NO.	ISSUES	BY	DATE

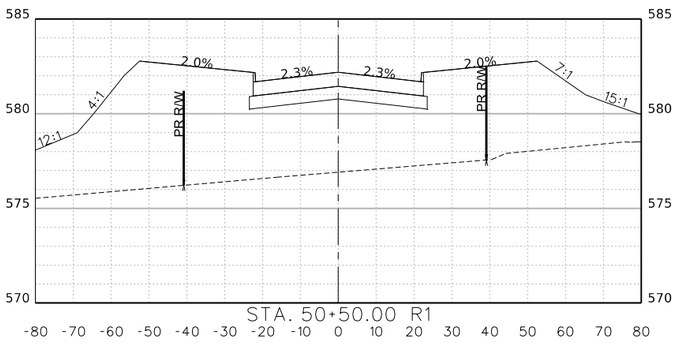
FNI JOB NO. RKW19711
DATE APRIL 2022
DESIGNED CHM
DRAWN KLH
REVISED
CHECKED SEC
FILE NAME cv-trt-springer-xs.dgn

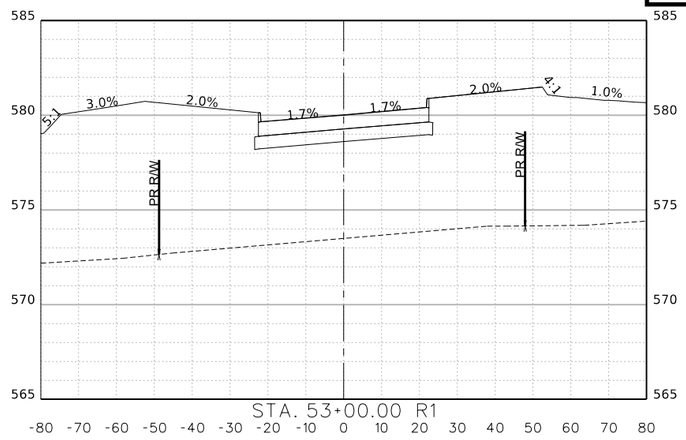
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale
0 1"

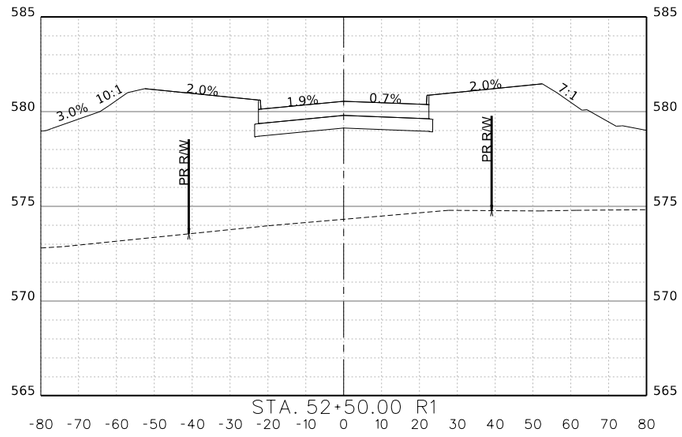
SHEET XS-19
SEQ. 333

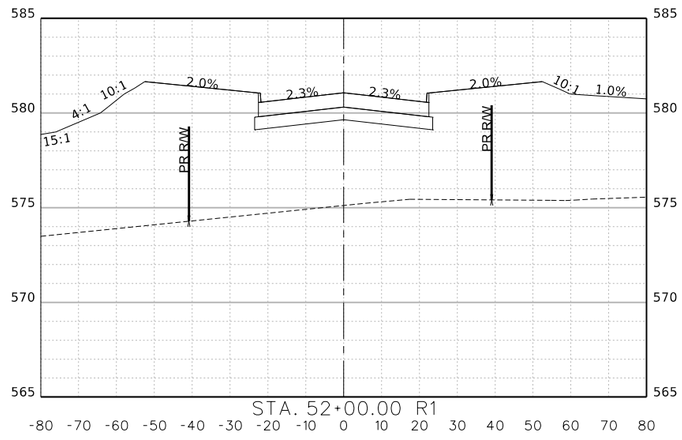












STA.50+50.00 R1 TO STA.53+00.00 R1

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

THE SEAL THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
ALTERATION OF SEALED DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

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2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
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Fax: (214) 217-2201
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

SPRINGER RD CROSS SECTIONS STA 50+50.00 TO STA 53+00.00

NO.	ISSUES	BY	DATE

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED CHM
DRAWN KLH
REVISED
CHECKED SEC
FILE NAME cv-trt-springer-xs.dgn

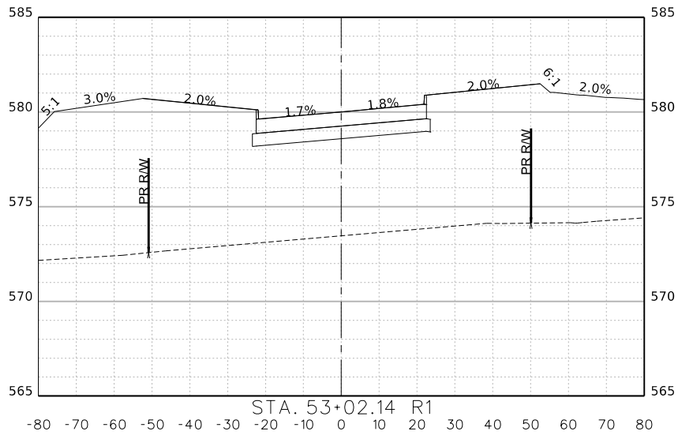
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1"

SHEET XS-20
SEQ. 334

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of

FREESE AND NICHOLS, INC.

RECORD DRAWINGS PREPARED ON: 8/20/2024



STA.53+02.14 R1 TO STA.53+02.14 R1

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

SPRINGER RD CROSS SECTIONS
STA 53+02.14

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED CHM
DRAWN KLH
REVISED
CHECKED SEC
FILE NAME cv-trt-springer-xs.dgn

NO.	ISSUES	BY	DATE

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

0 1"

SHEET XS-21

SEQ. 335

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

ROCHELL RD CROSS SECTIONS
STA 10+84.00 TO STA 13+50.00

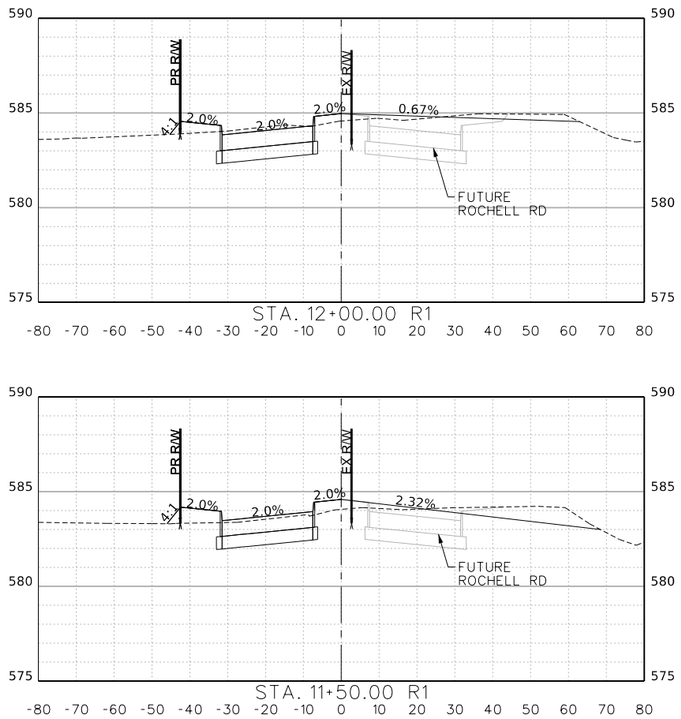
NO.	ISSUES	BY	DATE

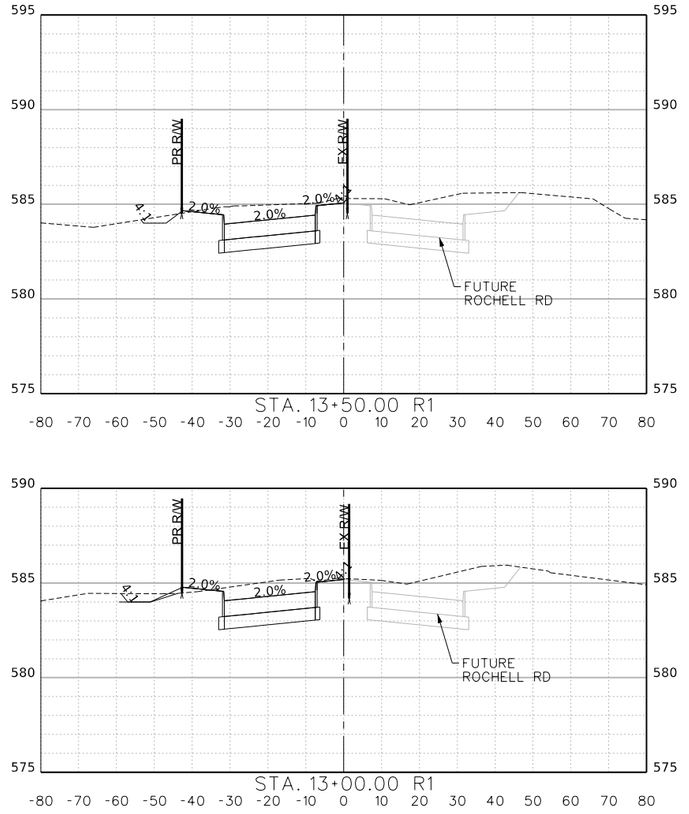
F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED CHM
DRAWN KLH
REVISED
CHECKED SEC
FILE NAME cv-trt-rochelle-xs.dgn

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

0 1"

SHEET XS-22
SEQ. 336

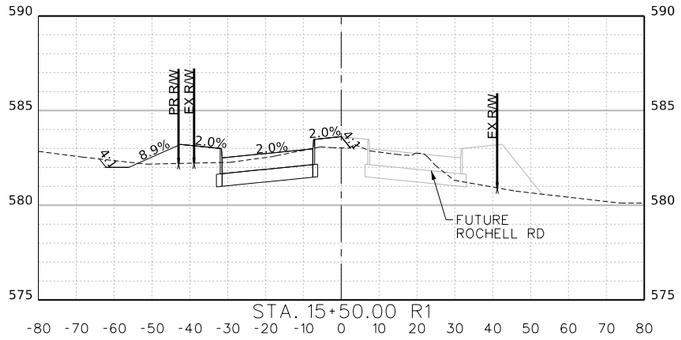


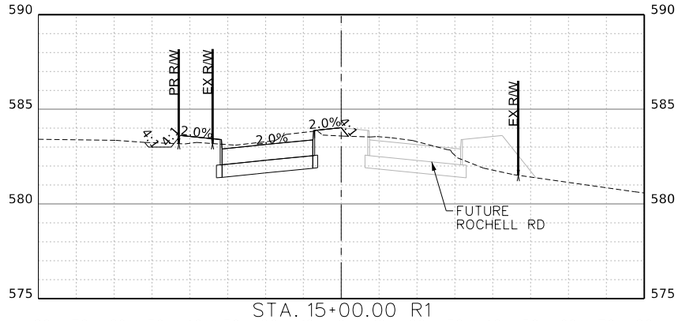


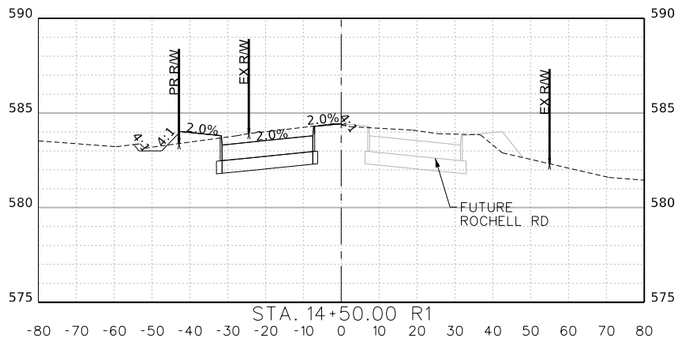
STA.10+84.00 R1 TO STA.13+50.00 R1

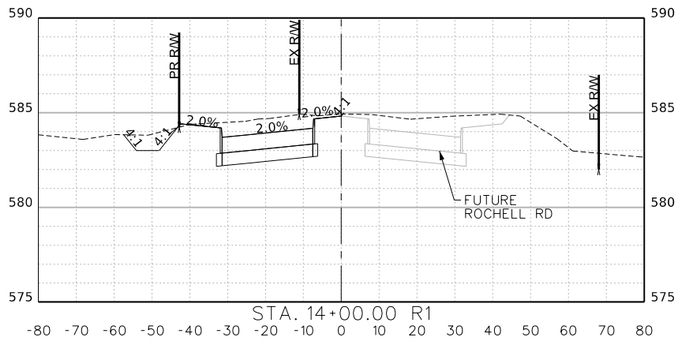
MicroStation V8 User: 90262 Office: On Site
Platter: J:\Projects\Active\RKW19711 - Rockwall Rhoads pltr.cfg
Plot Scale: 40.0687 ' In.
Date: Feb. 21, 2024 - 10:09:58 AM
Model: ROCH_6-30-2021
Project: Freese and Nichols, Inc. - True Type Fonts

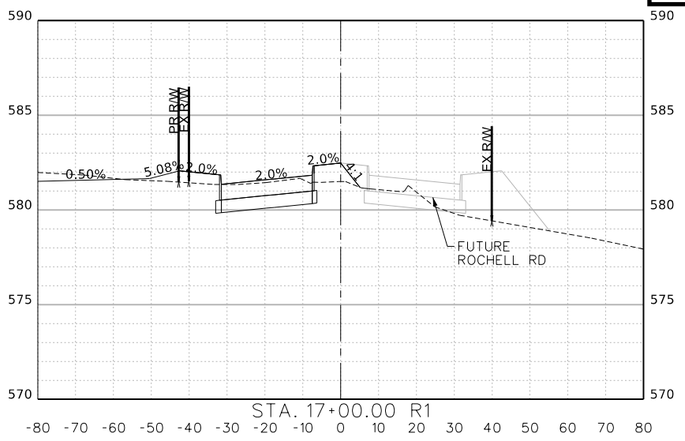
Office: On Site Date: Feb. 21, 2024 - 10:09:58 AM User: 90262 File: N:\ENG\cv-trt-rochelle-xs.dgn

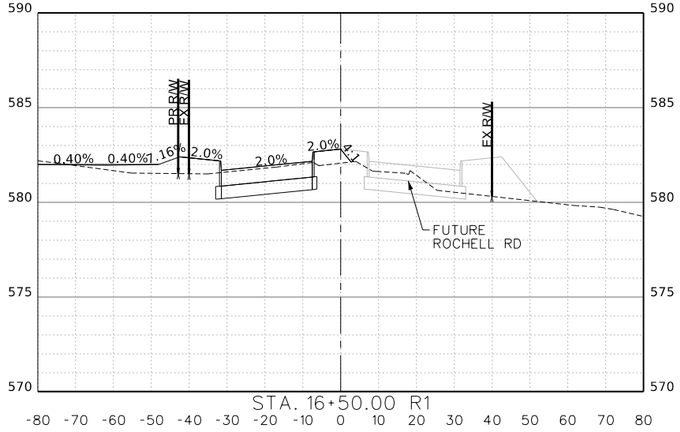


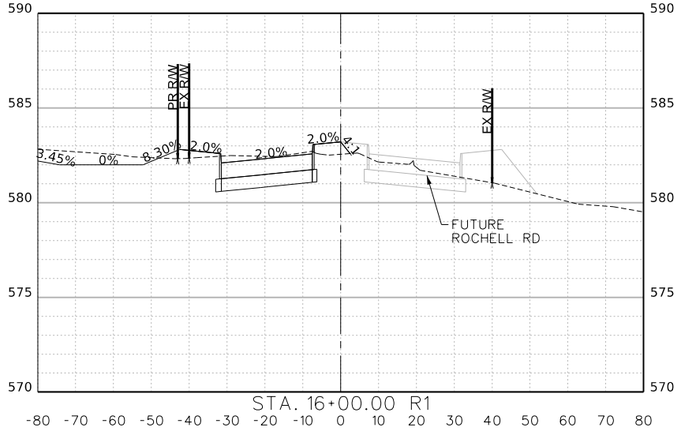












STA.14+00.00 R1 TO STA.17+00.00 R1

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

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Fax: (214) 217-2201
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

ROCHELL RD CROSS SECTIONS STA 14+00.00 TO STA 17+00.00

NO.	ISSUES	BY	DATE

VERIFY SCALE
Bar is one inch on original drawing.
If not one inch on this sheet, adjust scale.
0 1"

F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED CHM
DRAWN KLH
REVISED
CHECKED SEC
FILE NAME cv-trt-rochelle-xs.dgn

SHEET XS-23
SEQ. 337

MicroStation V8 User: 90262 Office: On Site
Plotter: J:\Projects\Active\RKW19711 - RWDP\Plan Plots.pltcfg
Plot Scale: 40.0087 ' in. Model: ROCH_6-30-2021
Date: Feb. 21, 2024 - 10:09:59 AM Project: Freese and Nichols, Inc. - True Type Fonts

Office: On Site Date: Feb. 21, 2024 - 10:09:59 AM User: 90262 File: N:\ENG\cv-trt-rochelle-xs.dgn

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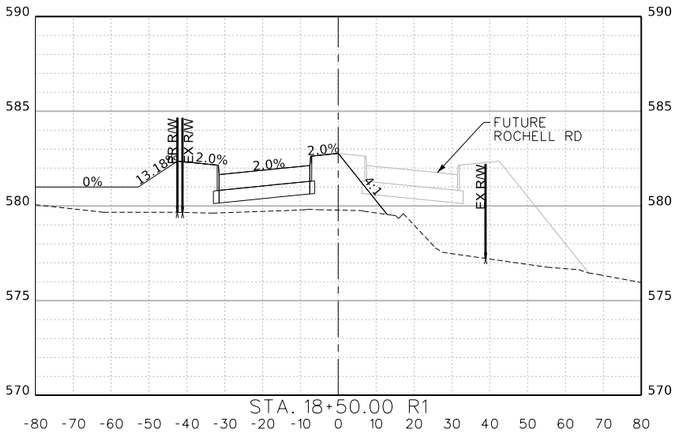
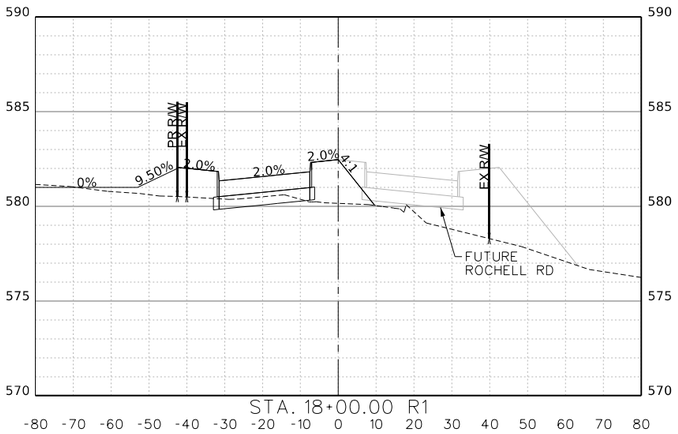
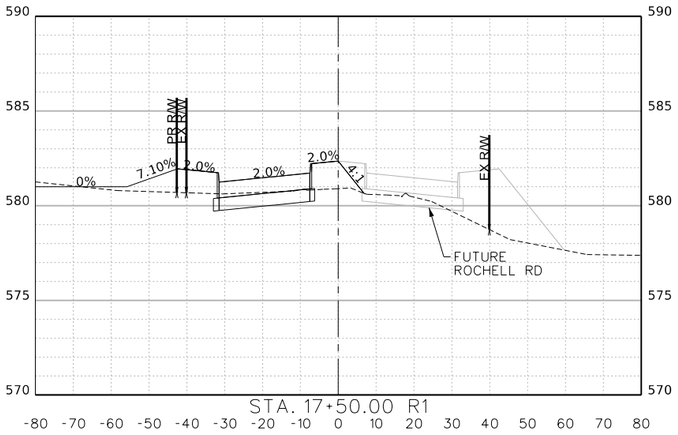
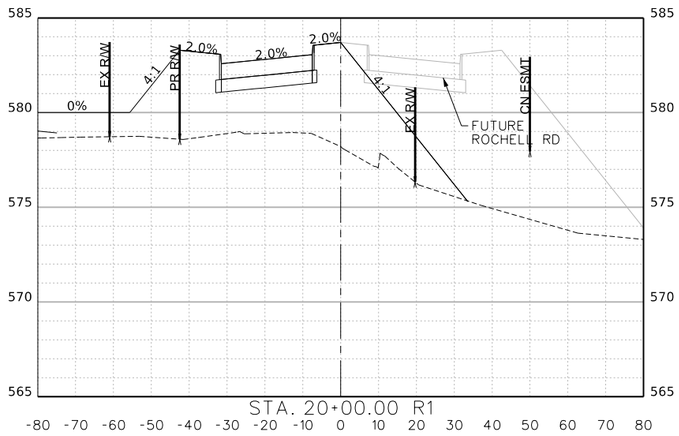
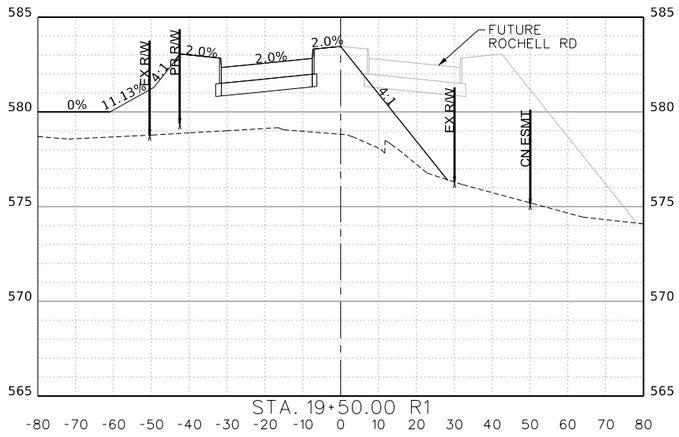
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

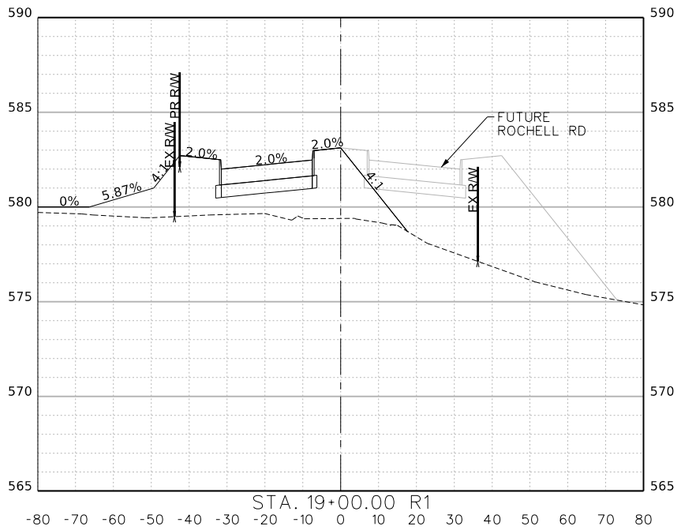












STA.17+50.00 R1 TO STA.20+00.00 R1

TEXAS REGISTERED ENGINEERING FIRM F-2144
FREESE AND NICHOLS, INC.

RELEASE FOR CONSTRUCTION
DOCUMENTS
THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
IT IS NOT TO BE USED OR RELEASED WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2201
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

ROCHELL RD CROSS SECTIONS STA 17+50.00 TO STA 20+00.00

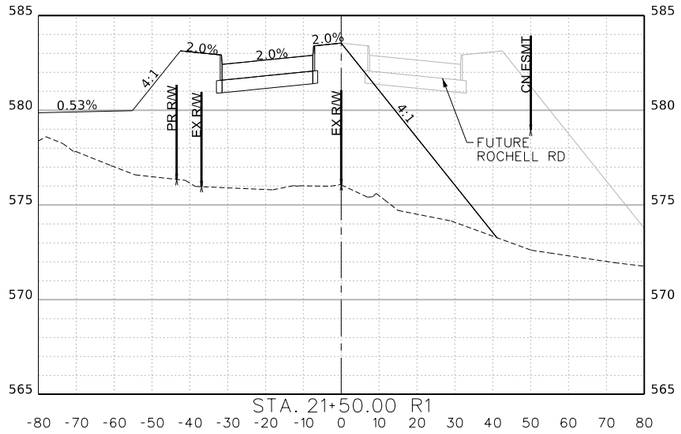
NO.	ISSUES	BY	DATE

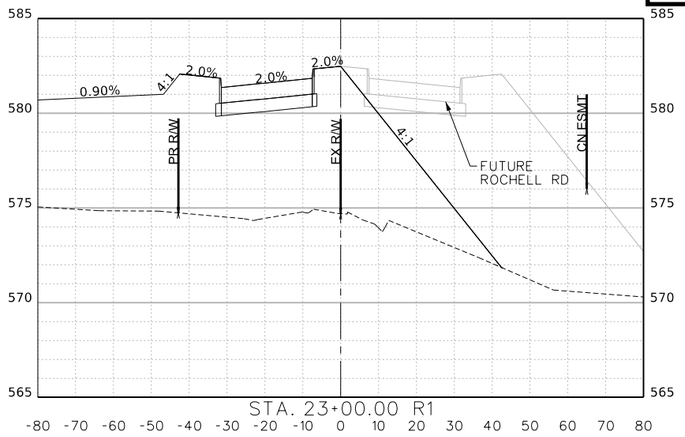
F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED CHM
DRAWN KLH
REVISED
CHECKED SEC
FILE NAME cv-trt-rochelle-xs.dgn

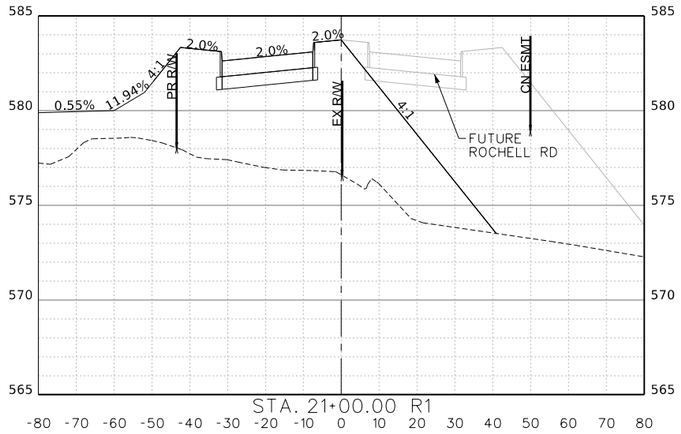
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale
0 1"

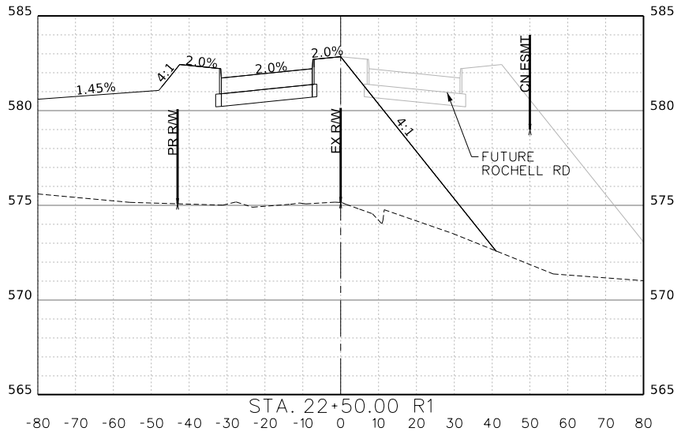
SHEET XS-24
SEQ. 338

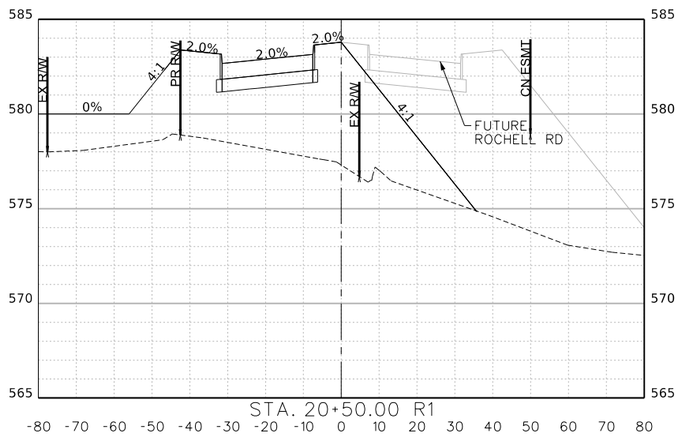
MicroStation V8 User: 90262 Office: On Site
N:\ENG\cv-trt-rochelle-xs.dgn
Plotter: HPPlotter.pltcfg (HP DesignJet 750C+ PostScript Mono.pltcfg)
Plot Scale: 40.0067 ' / In.
Date: Feb. 21, 2024 - 10:10:00 AM
Model: ROCH_6.30.2021
Project: Freese and Nichols, Inc. - True Type Fonts

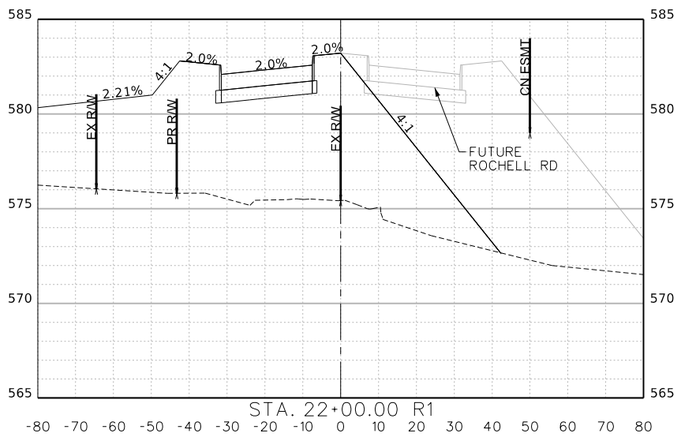












STA.20+50.00 R1 TO STA.23+00.00 R1

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASED FOR CONSTRUCTION
DOCUMENTS ARE NOT TO BE USED OR VIEWED OR MODIFIED IN ANY WAY WITHOUT THE WRITTEN AUTHORIZATION OF FREESE AND NICHOLS, INC.
THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
ALTERATION OF A SEALED DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE NICHOLS
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Fax: (214) 217-2201
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
CIVIL
ROCHELL RD CROSS SECTIONS
STA 20+50.00 TO STA 23+00.00

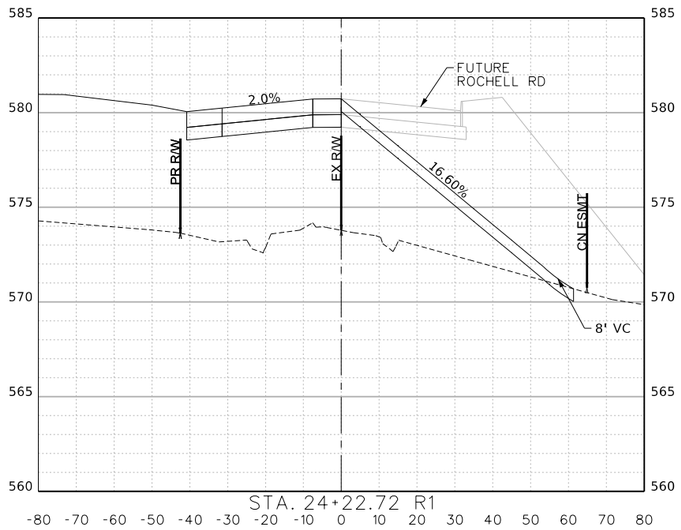
F&N JOB NO. RKW19271
DATE APRIL 2022
DESIGNED CHM
DRAWN KLH
REVISED
CHECKED SEC
FILE NAME cv-trt-rochelle-xs.dgn

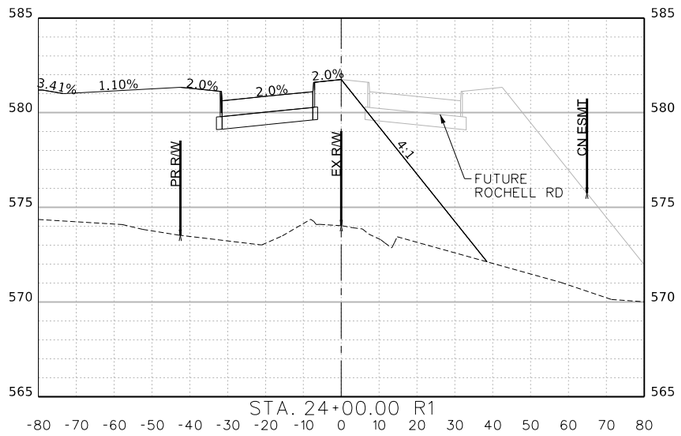
NO. ISSUES | BY | DATE

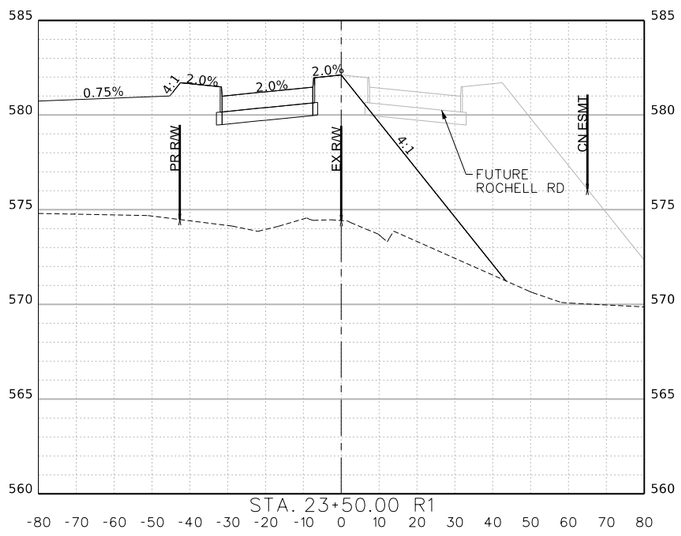
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale!
0 1"

SHEET XS-25
SEQ. 339

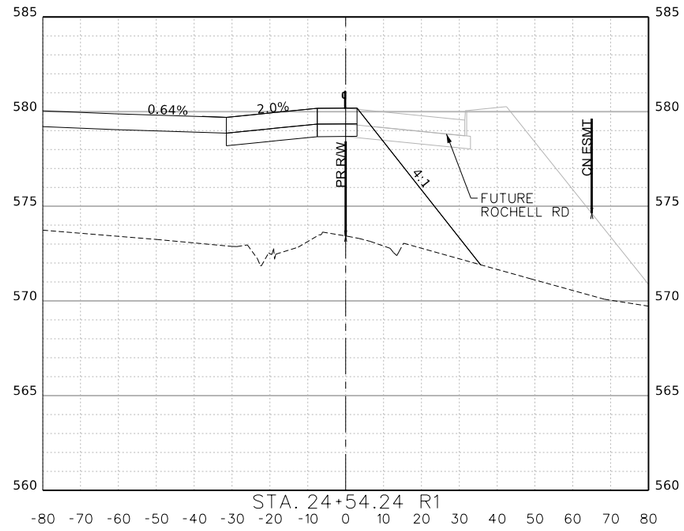
MicroStation V8 User: 90262 Office: On Site
N:\ENG\cv-trt-rochelle-xs.dgn
Plotter: \\Phoenix\HP Officejet 4630 Series
Plot Scale: 40.000 ' / in.
Date: Feb. 21, 2024 - 10:10:01 AM
Model: ROCH_6.30.2021
Project: Freese and Nichols, Inc. - True Type Fonts



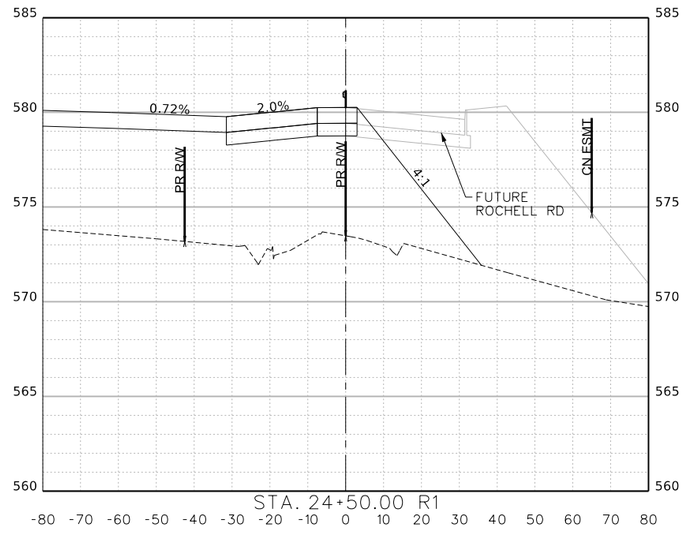




STA.23+50.00 R1 TO STA.24+54.24 R1



SPRINGER RD INTERSECTION



This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

THE SEAL THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
ALTERATION OF A SEALED DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

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Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
CIVIL
ROCHELL RD CROSS SECTIONS
STA 23+50.00 TO STA 24+54.24

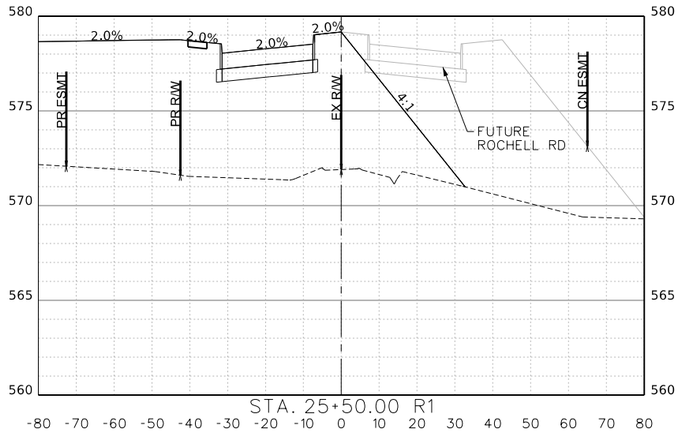
NO.	ISSUES	BY	DATE

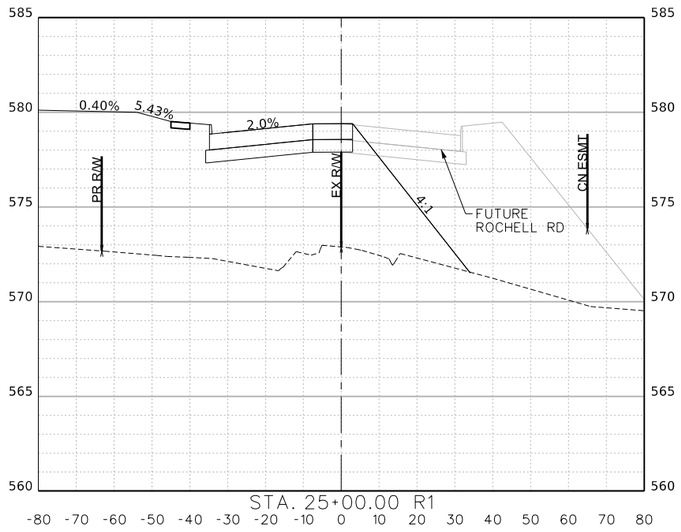
F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED CHM
DRAWN KLH
REVISED
CHECKED SEC
FILE NAME cv-trt-rochelle-xs.dgn

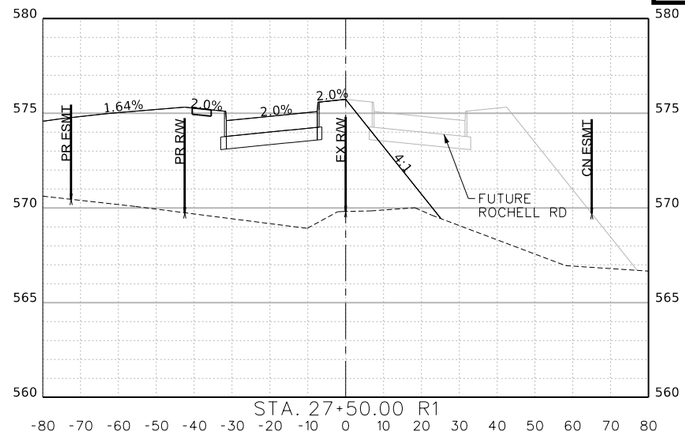
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale
0 1"

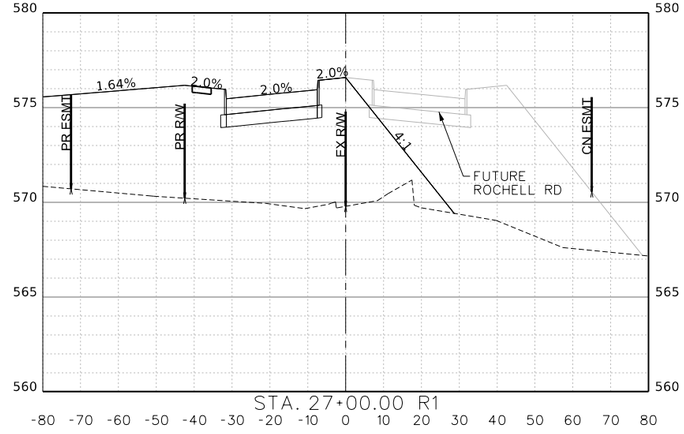
SHEET XS-26
SEQ. 340

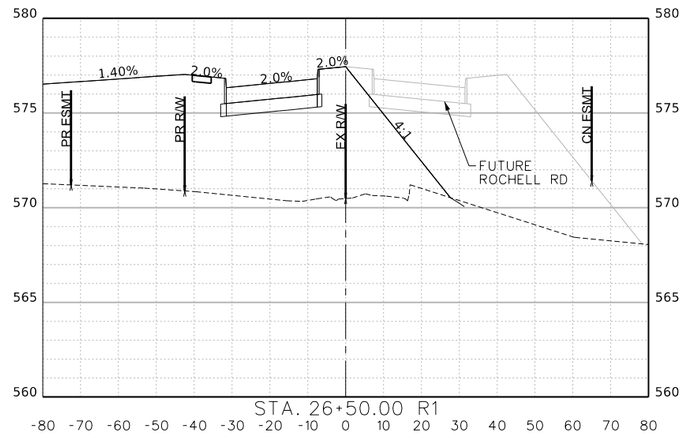
MicroStation V8 User: 90262 Office: On Site
Plotter: \\PW005-1-NSC_HP4050PS Mono.pltcfg
Plot Scale: 40.00 ' / In.
Date: Feb. 21, 2024 - 10:10:02 AM
Model: ROCH_6.30.2021
Project: FREESE and NICHOLS, Inc. - True Type Fonts











STA.25+00.00 R1 TO STA.27+50.00 R1

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASED FOR REVIEW ONLY
RELEASED FOR BIDDING OR CONSTRUCTION
RELEASED FOR PERMIT
RELEASED FOR AS-BUILT RECORDS
THIS DOCUMENT WAS ORIGINALLY ISSUED AND SEALED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
IT SHALL NOT BE USED FOR ANY PURPOSE BY ANY PERSON OR ENTITY WITHOUT PROPER AUTHORIZATION OR ADAPTATION OF THE INFORMATION HEREIN WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone - (214) 217-2200
Fax - (214) 217-2201
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

ROCHELL RD CROSS SECTIONS STA 25+00.00 TO STA 27+50.00

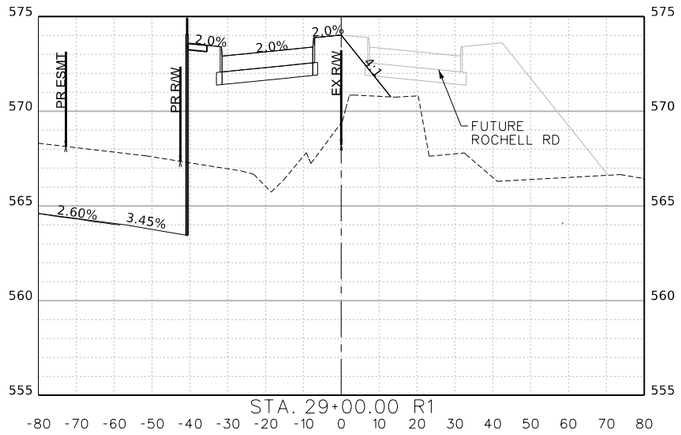
NO.	ISSUES	BY	DATE

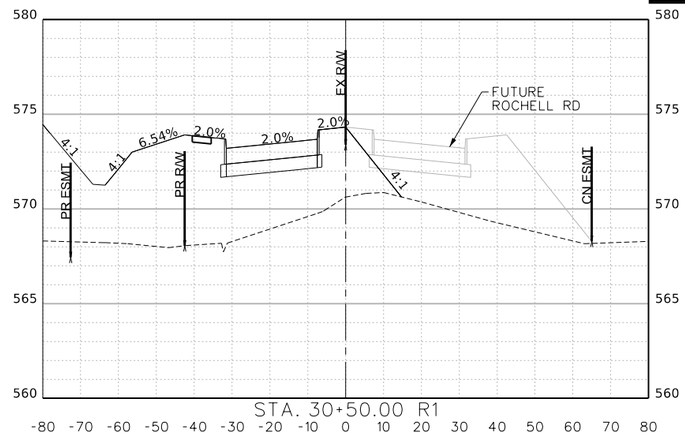
F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED CHM
DRAWN KLH
REVISED
CHECKED SEC
FILE NAME cv-trt-rochelle-xs.dgn

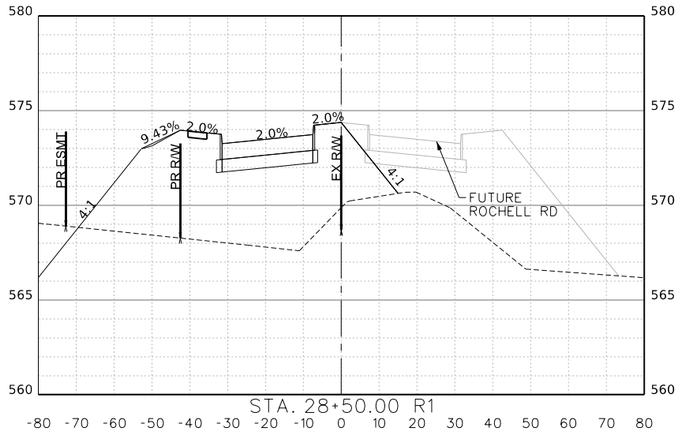
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1"

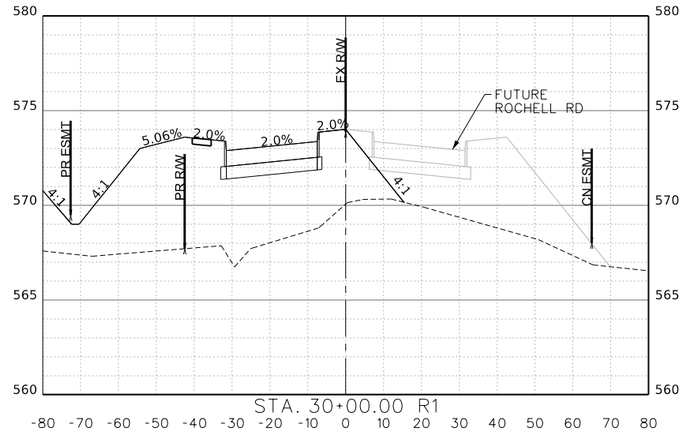
SHEET XS-27
SEQ. 341

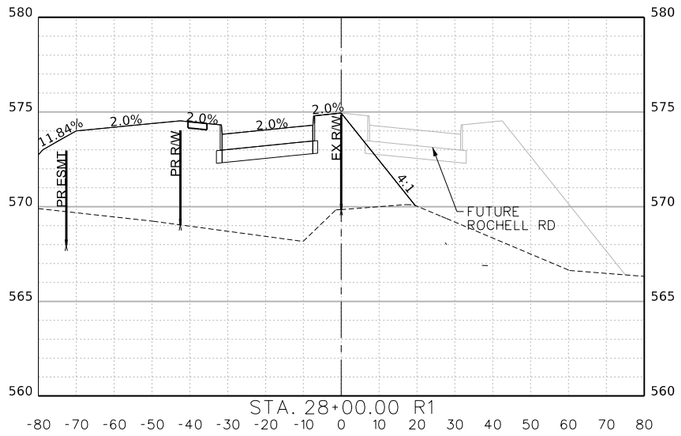
MicroStation V8 User: 90262 Office: On Site
Plotter: \\EN\ENG\cv-trt-rochelle-xs.dgn
Plot Scale: 40.0087 ' / In.
Date: Feb. 21, 2024 - 10:10:03 AM
Model: ROCH_6.30.2021
Project: Freese and Nichols, Inc. - True Type Fonts

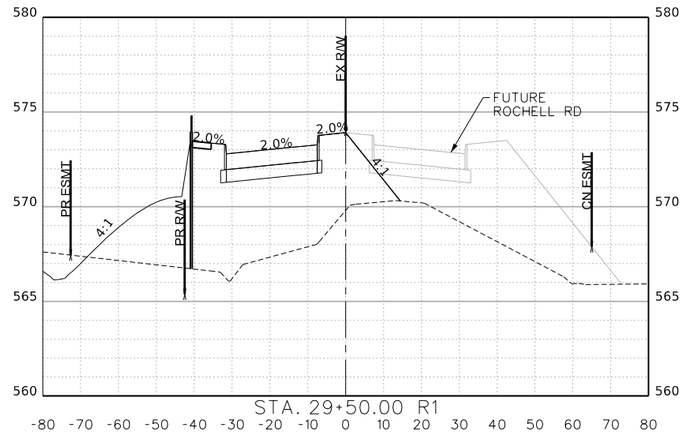












STA.28+00.00 R1 TO STA.30+50.00 R1

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASED FOR REVIEW
THIS DOCUMENT WAS PREPARED UNDER THE AUTHORITY OF SARAH E. CAUDLE, TEXAS NO. 134055, ON 10/21/2021. IT IS NOT TO BE USED FOR BIDDING OR CONSTRUCTION PURPOSES.

RELEASE THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
ALTERATION OF SEALED DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone - (214) 217-2200
Fax - (214) 217-2250
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

ROCHELL RD CROSS SECTIONS STA 28+00.00 TO STA 30+50.00

FAN JOB NO.	RKW19711
DATE	APRIL 2022
DESIGNED	CHM
DRAWN	KLH
REVISED	
CHECKED	SEC
FILE NAME	cv-trt-rochelle-xs.dgn

NO. | ISSUES | BY | DATE

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

0 1"

SHEET
XS-28

SEQ.
342

MicroStation V8 User: 90262 Office: On Site
N:\ENG\cv-trt-rochelle-xs.dgn
Platters: plPlotConfig_NAD83_HARN_Texas_North_Central_FIPS4202_Monochrome.pltcfg
Plot Scale: 40.000 ' / in.
Date: Feb. 21, 2024 - 10:10:04 AM
Model: ROCH_6.30.2021
Plotted: Freese and Nichols, Inc. - True Type Fonts

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASED THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
ALTERATION OF A SEALED DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

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Phone - (214) 217-2200
Fax - (214) 217-2201
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

ROCHELL RD CROSS SECTIONS STA 31+00.00 TO STA 33+50.00

F&N JOB NO.	RKW19711
DATE	APRIL 2022
DESIGNED	CHM
DRAWN	KLH
REVISED	
CHECKED	SEC

NO.	ISSUES	BY	DATE

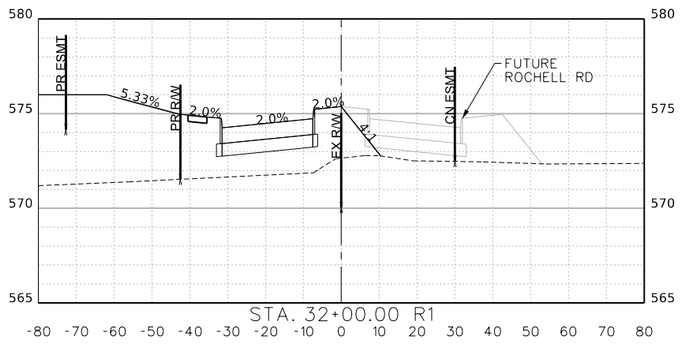
FILE NAME cv-trt-rochelle-xs.dgn

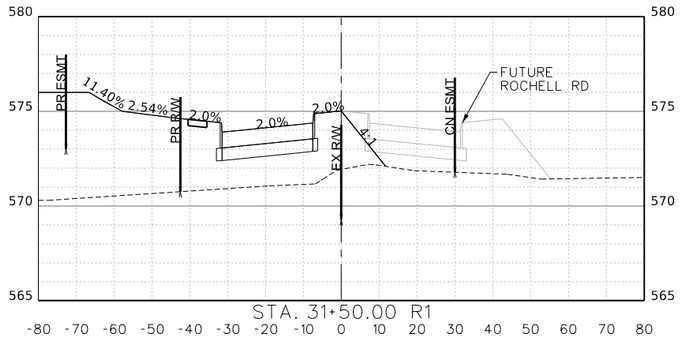
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

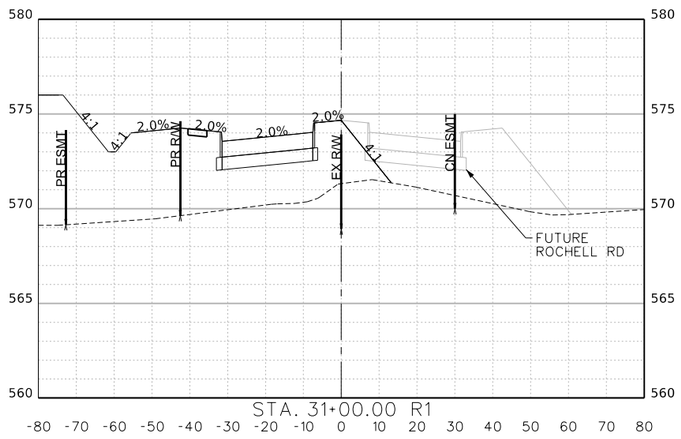
0 1"

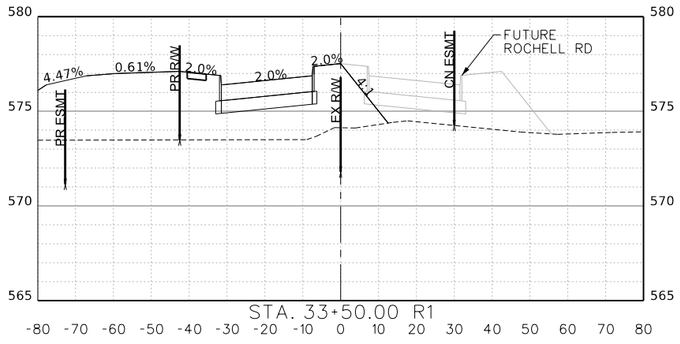
SHEET XS-29

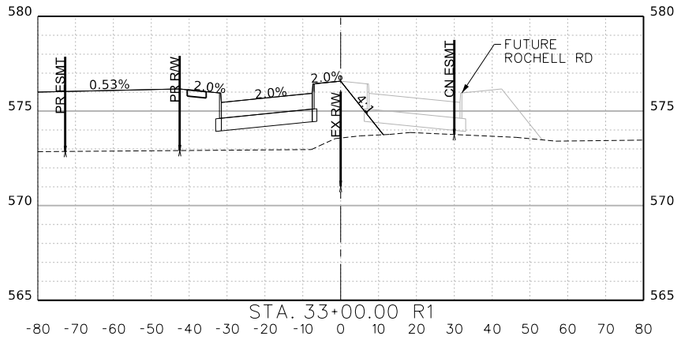
SEQ. 343

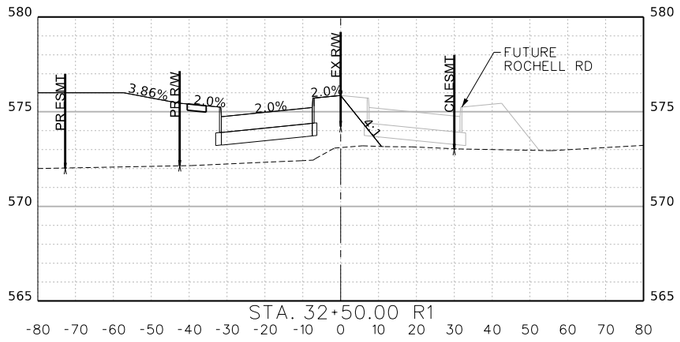






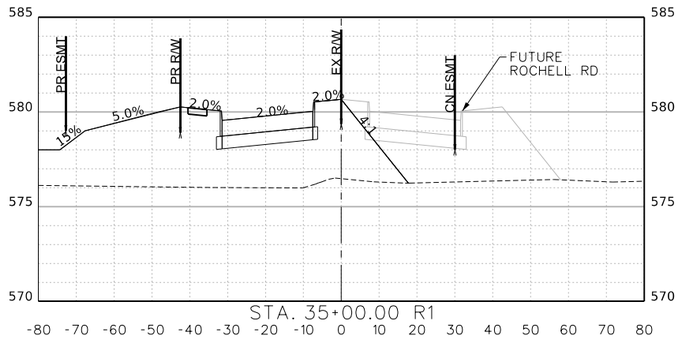


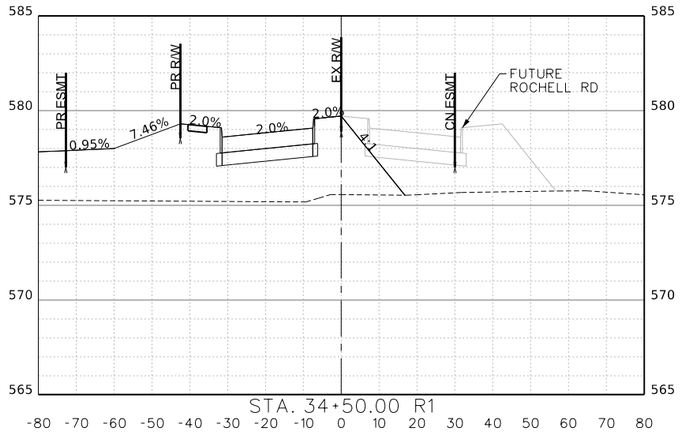


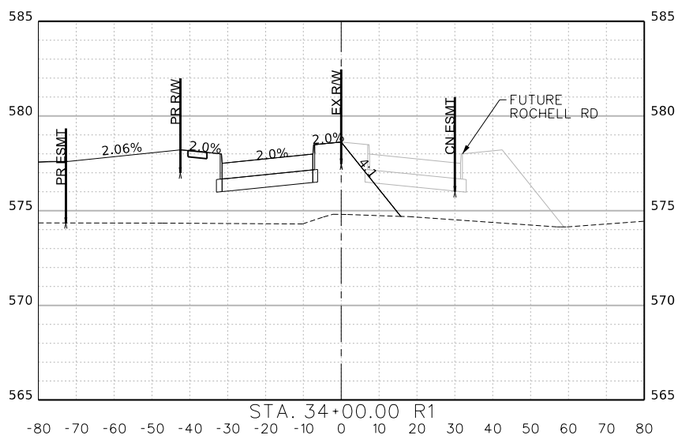


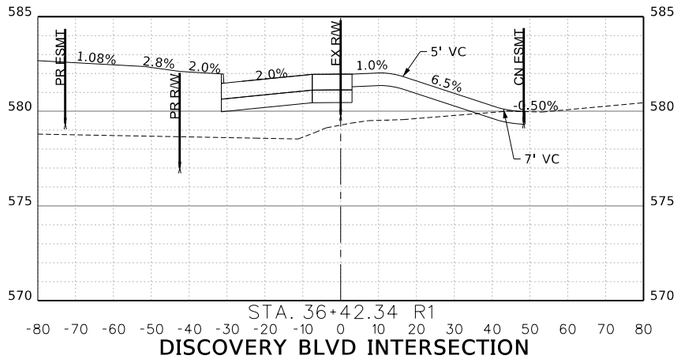
STA.31+00.00 R1 TO STA.33+50.00 R1

MicroStation V8 User: 90262 Office: On Site
Plotter: J:\PLOTS\Xerox 6700.pltcfg Model: ROCH_6-30-2021
Plot Scale: 40.0687 " In. = 1 Ft. Project: Freese and Nichols, Inc. - True Type Fonts
Date: Feb. 21, 2024 - 10:10:04 AM

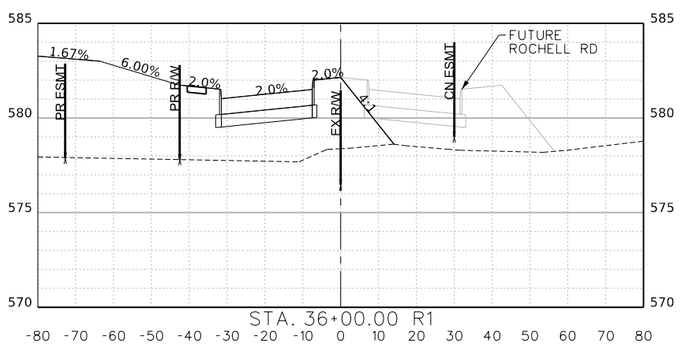


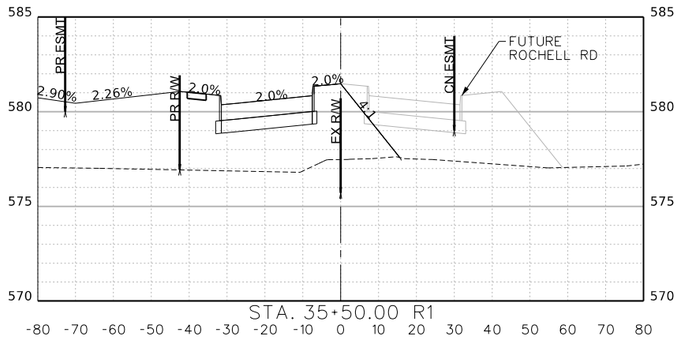






DISCOVERY BLVD INTERSECTION





STA.34+00.00 R1 TO STA.36+42.34 R1

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASE THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
ALTERATION OF RELEASED DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone - (214) 217-2200
Fax - (214) 217-2201
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

ROCHELL RD CROSS SECTIONS
STA 34+00.00 TO STA 36+42.34

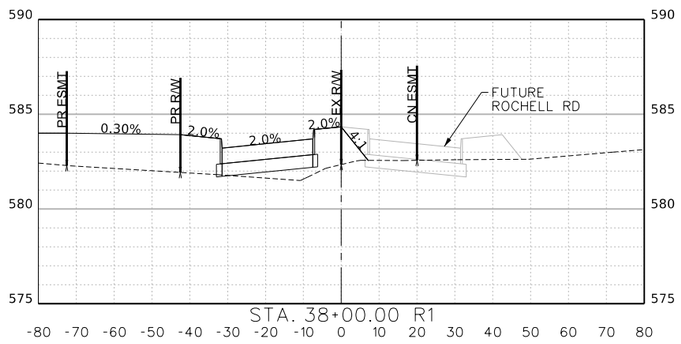
NO.	ISSUES	BY	DATE

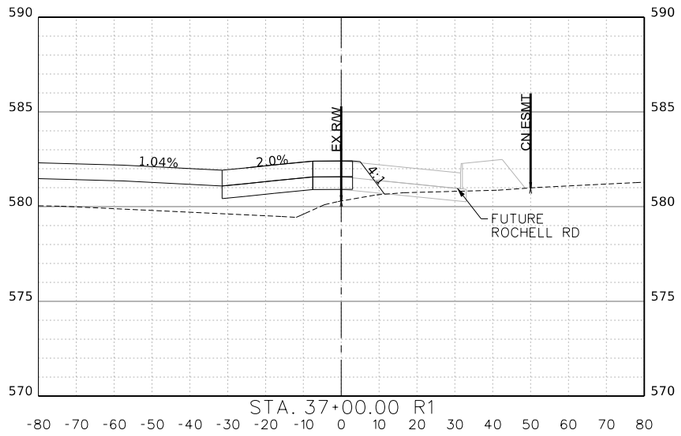
F&N JOB NO.	RKW19271
DATE	APRIL 2022
DESIGNED	CHM
DRAWN	KLH
REVISED	
CHECKED	SEC
FILE NAME	cv-trt-rochelle-xs.dgn

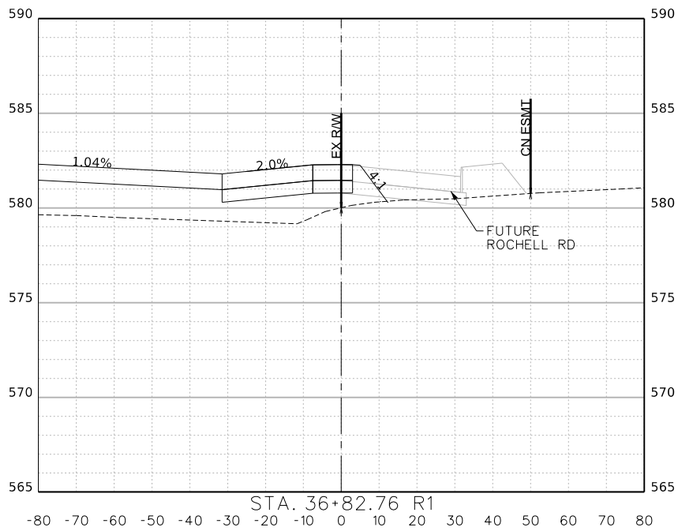
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale!
0 1

SHEET XS-30
SEQ. 344

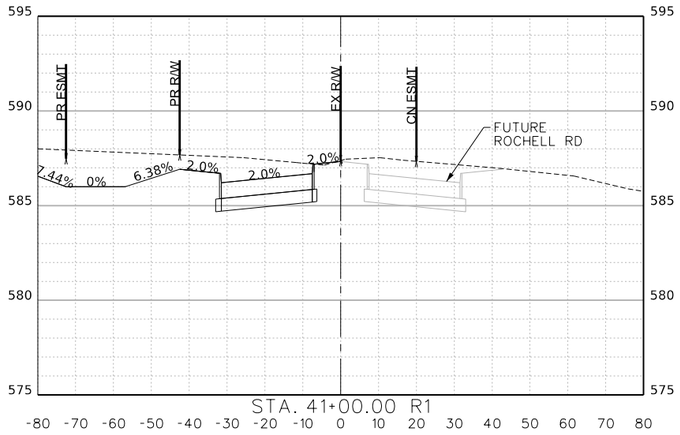
MicroStation V8 User: 90262 Office: On Site
Plotter: N:\ENG\cv-trt-rochelle-xs.dgn
Plot Scale: 40.000 ' / in. Plotted By: Kelsey Hanna
Date: Feb. 21, 2024 - 10:10:05 AM
Model: ROCH1_6.30.2021
Project: Freese and Nichols, Inc. - True Type Fonts

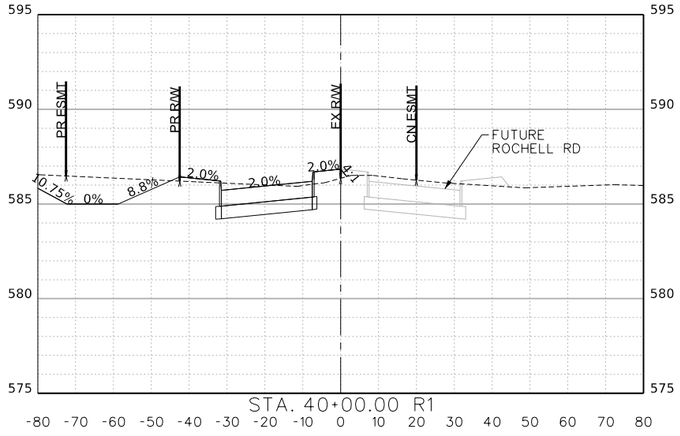


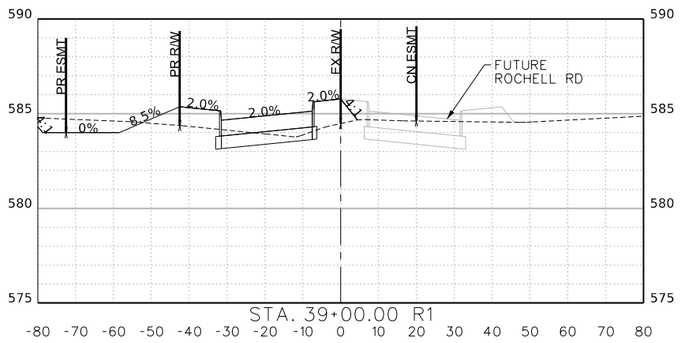




DISCOVERY BLVD INTERSECTION







STA.36+82.76 R1 TO STA.41+00.00 R1

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASE THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
ALTERATIONS TO THIS DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone - (214) 217-2200
Fax - (214) 217-2299
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

ROCHELL RD CROSS SECTIONS STA 36+82.76 TO STA 41+00.00

NO.	ISSUES	BY	DATE

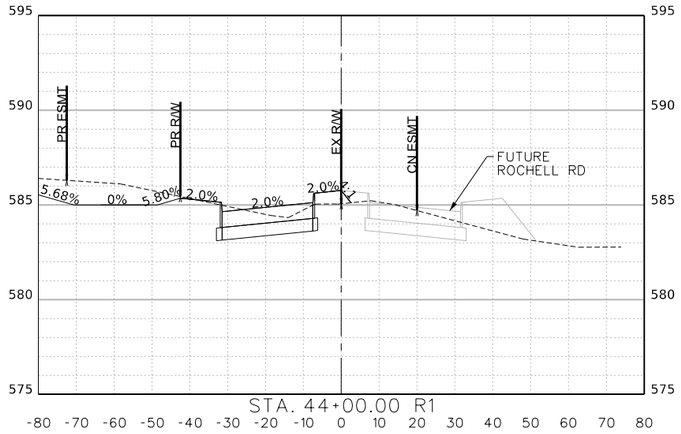
F&N JOB NO. RKW19711
DATE APRIL 2022
DESIGNED CHM
DRAWN KLH
REVISED
CHECKED SEC
FILE NAME cv-trt-rochelle-xs.dgn

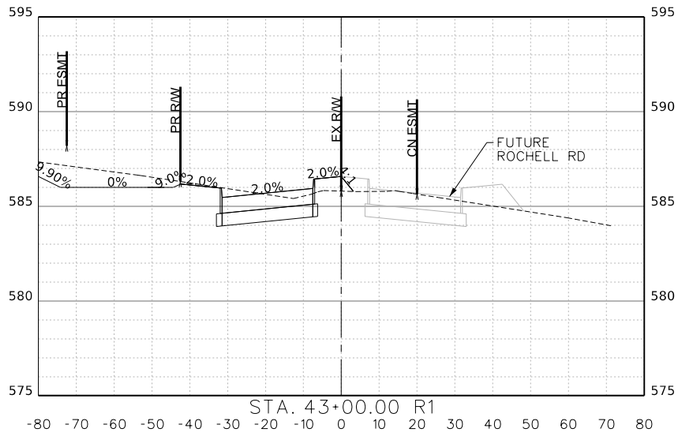
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale

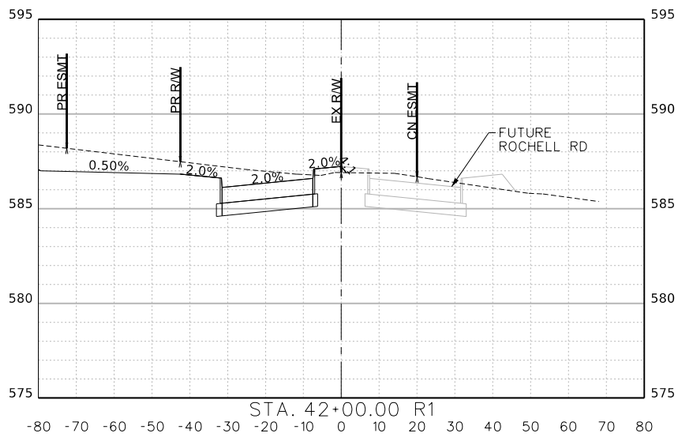
SHEET XS-31
SEQ. 345

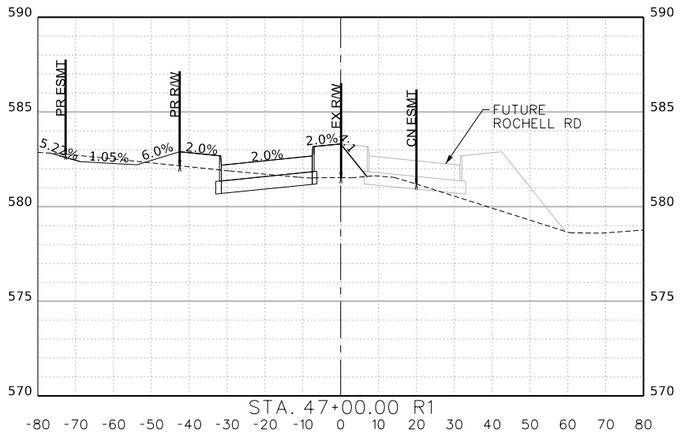
MicroStation V8 User: 90262 Office: On Site
N:\ENG\cv-trt-rochelle-xs.dgn
Platter: //\\Plotter_HP\HP Photo Mono.pltcfg
Plot Scale: 40.008 ' / in.
Date: Feb. 21, 2024 - 10:10:06 AM
Model: ROCH_8-30-2021
Project: Freese and Nichols, Inc. - True Type Fonts

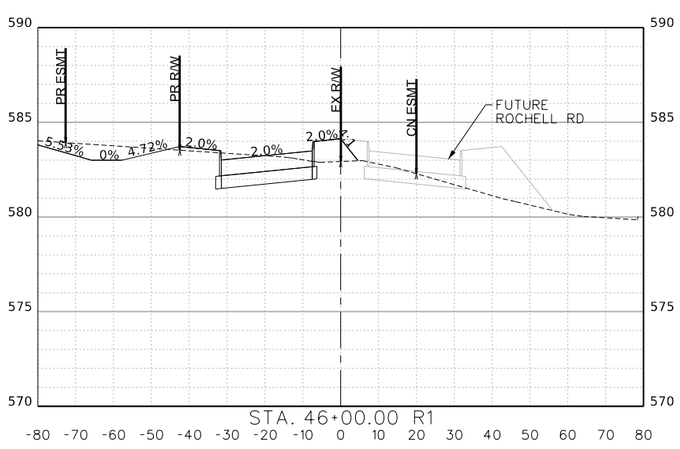
Office: On Site Date: Feb. 21, 2024 - 10:10:06 AM User: 90262 File: N:\ENG\cv-trt-rochelle-xs.dgn

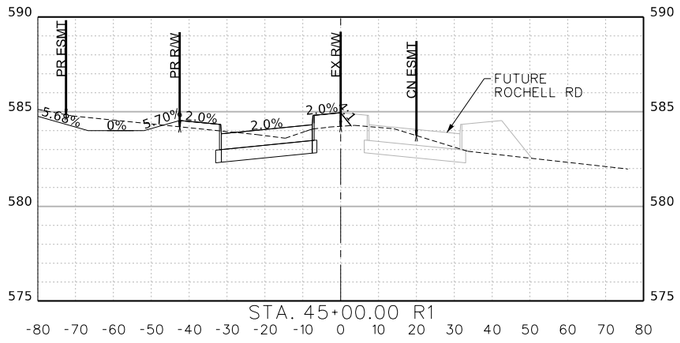












STA.42+00.00 R1 TO STA.47+00.00 R1

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FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON:
8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASE THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY SARAH E. CAUDLE
TEXAS NO. 134055 ON 10/21/2021
ALTERATION OF A SEALED DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2299
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
RTP PHASE V INFRASTRUCTURE
CIVIL
ROCHELL RD CROSS SECTIONS
STA 42+00.00 TO STA 47+00.00

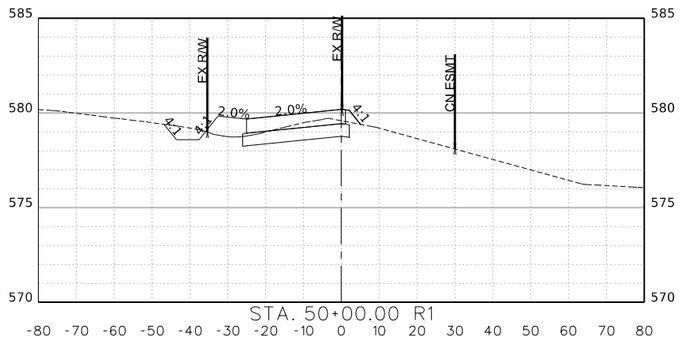
NO.	ISSUES	BY	DATE

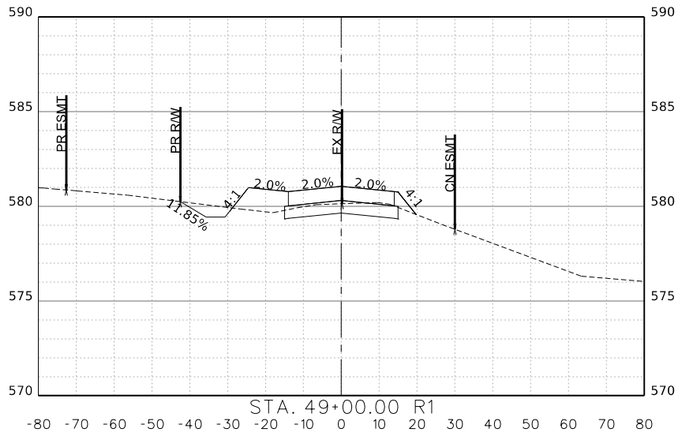
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale
0 1"

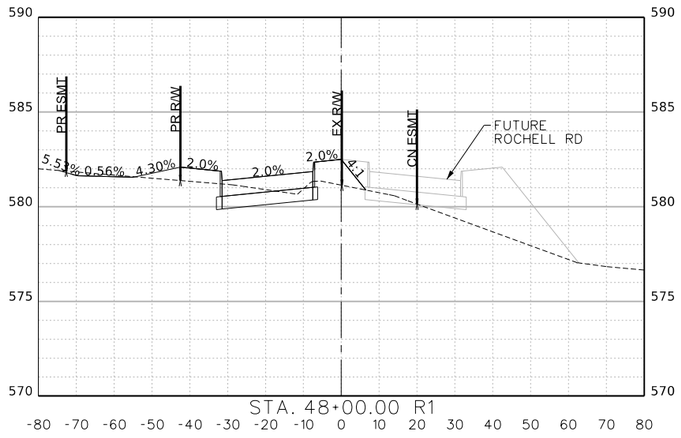
FAN JOB NO.	RKW19711
DATE	APRIL 2022
DESIGNED	CHM
DRAWN	KLH
REVISED	
CHECKED	SEC
FILE NAME	cv-trt-rochelle-xs.dgn

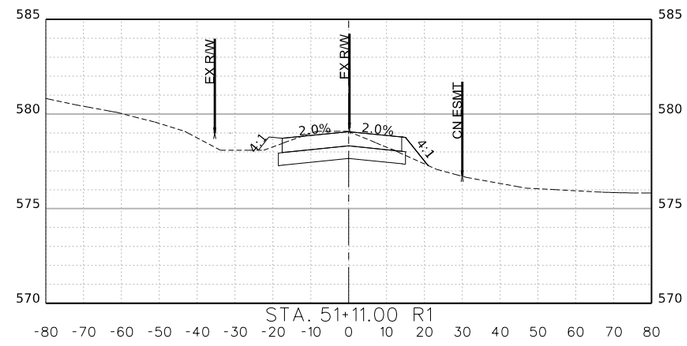
SHEET
XS-32
SEQ.
346

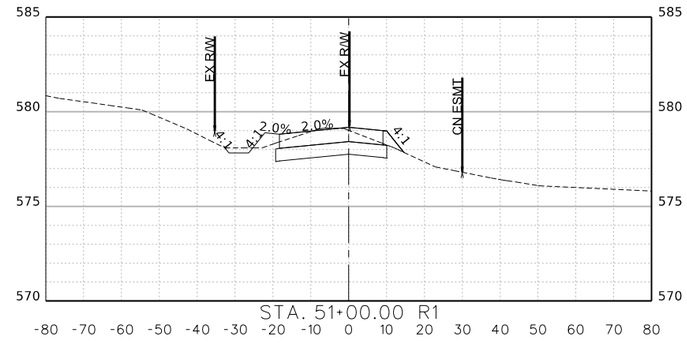
MicroStation V8 User: 90262 Office: On Site
Platter: N:\ENG\cv-trt-rochelle-xs.dgn
Plot Scale: 40.000 ' / in. Plot Style: Fill Patterns Mono.pltcfg
Date: Feb. 21, 2024 - 10:10:07 AM
Model: ROCH_6-30-2021
Plotted: Freese and Nichols, Inc. - True Type Fonts











STA.48+00.00 R1 TO STA.51+11.00 R1

This Record Drawing is a combination of the issued for construction drawings, changes made during construction, follow up survey at the site, and information furnished by the contractor reflecting changes in the Project made during construction. The original sealed drawings are on the files at the offices of
FREESE AND NICHOLS, INC.
RECORD DRAWINGS PREPARED ON: 8/20/2024

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

RELEASED FOR PERMITTING, NOT FOR CONSTRUCTION
PER SARAH E. CAUDLE, TEXAS NO. 134055
ON 10/21/2021
IT IS A VIOLATION OF LAW FOR ANY PERSON TO ALTER THIS DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FREESE NICHOLS
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
Phone: (214) 217-2200
Fax: (214) 217-2201
Web - www.freese.com

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION

RTP PHASE V INFRASTRUCTURE

CIVIL

ROCHELL RD CROSS SECTIONS STA 48+00.00 TO STA 51+11.00

NO.	ISSUES	BY	DATE

FAN JOB NO. RKW19711
DATE APRIL 2022
DESIGNED CHM
DRAWN KLH
REVISED
CHECKED SEC
FILE NAME cv-trt-rochelle-xs.dgn

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale
0 1"

SHEET XS-33
SEQ. 347

MicroStation V8 User: 90262 Office: On Site
N:\ENG\cv-trt-rochelle-xs.dgn
Platters: ...\plotcfg\HP Color LaserJet M651 PCL6.pltcfg
Plot Scale: 40.000 '/ in.
Date: Feb. 21, 2024 - 10:10:08 AM
Model: ROCH_6-30-2021
Models: Freese and Nichols, Inc. - True Type Fonts