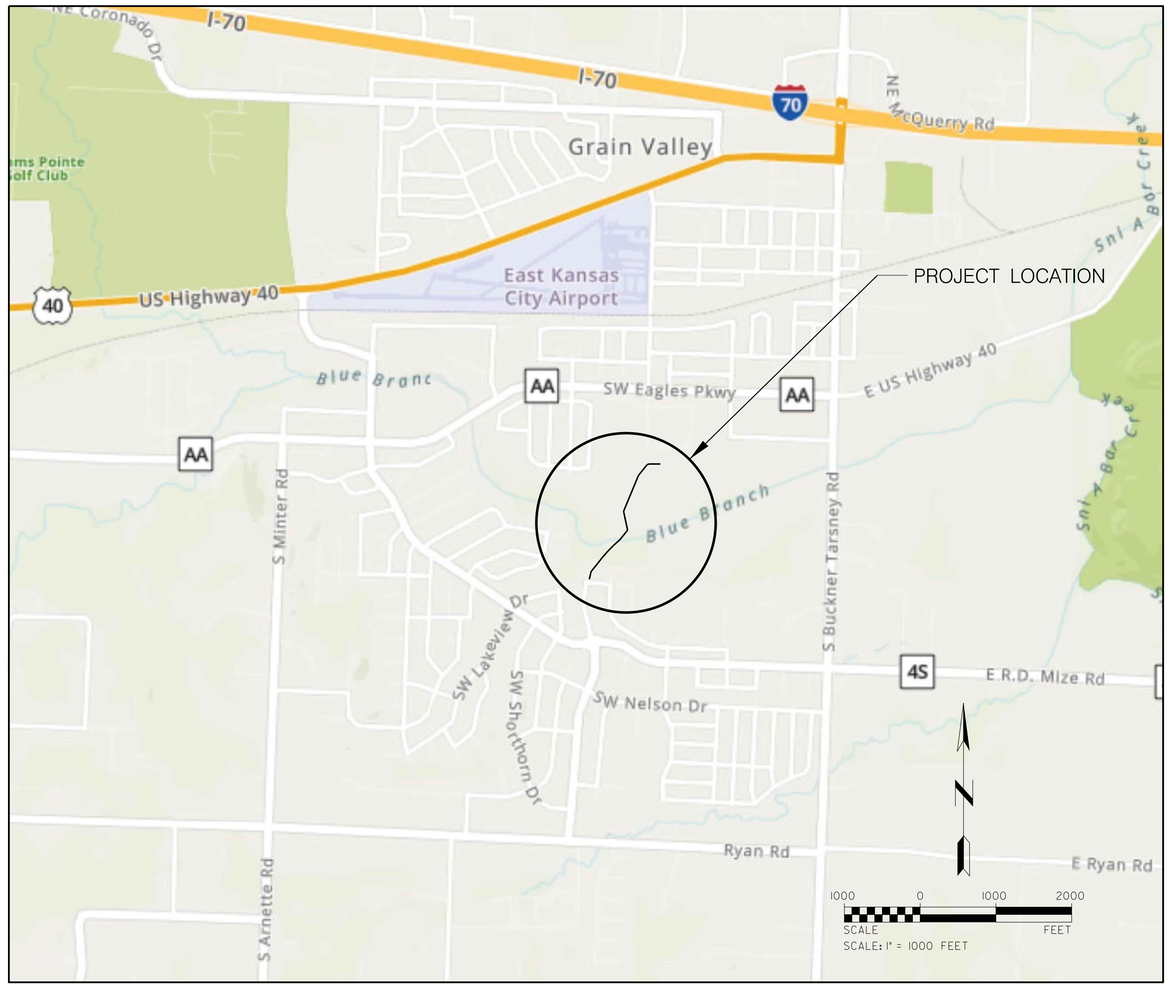
DESIGN DESIGNATION

NOT APPLICABLE

NO RIGHT-OF-WAY ACQUISITION

CITY OF GRAIN VALLEY
JACKSON COUNTY, MISSOURI

PLANS FOR PROPOSED
PEDESTRIAN BRIDGE
CROSS CREEK PARK
BLUE BRANCH CREEK
TAP 3356(406) Grain Valley Ped Bridge



CONVENTIONAL SYMBOLS
(USED IN PLANS)

	EXISTING	NEW
BUILDINGS AND STRUCTURES		
GUARD RAIL		
CONCRETE RIGHT-OF-WAY MARKER		
STEEL RIGHT-OF-WAY MARKER		
LOCATION SURVEY MARKER		
UTILITIES		
FIBER OPTICS	—FO—	—FO—
OVERHEAD TELEPHONE	—O—	—●—
UNDERGROUND TELEPHONE	—T—	—T—
OVERHEAD POWER	—□—	—■—
UNDERGROUND POWER	—P—	—P—
GAS	—G—	—G—
WATER	—W—	—W—
MANHOLE	SAN	
FIRE HYDRANT	HYD	
WATER VALVE	WV	
WATER METER	WM	
DROP INLET	DI	
DITCH BLOCK		
GROUND MOUNTED SIGN	SIGN	
LIGHT POLE		
H-FRAME POWER POLE		
TELEPHONE PEDESTAL	PED	
FENCE		
CHAIN LINK	—V—	
WOVEN WIRE	—X—	
GATE POST		
BENCHMARK	BM	

NOTE: DASHED OR OPEN SYMBOLS INDICATE EXISTING FEATURES

19-1123

INDEX OF SHEETS

DESCRIPTION	SHEET NUMBER
TITLE SHEET	1
PLAN AND PROFILE SHEETS	2-4
EROSION CONTROL PLAN	5
CROSS SECTIONS	6
BRIDGE DETAILS	7-9

BEGINNING OF PROJECT	STA. 14+43.04	
END OF PROJECT	STA. 15+77.15	
APPARENT LENGTH	134.11	FEET
EQUATIONS AND EXCEPTIONS		
TOTAL CORRECTIONS	0.00	FEET
NET LENGTH OF PROJECT	134.11	FEET
CITY LENGTH	0.025	MILES

"I HEREBY CERTIFY THAT THIS PROJECT HAS BEEN DESIGNED, AND THESE PLANS PREPARED, TO MEET OR EXCEED THE DESIGN CRITERIA OF GRAIN VALLEY, MISSOURI, IN CURRENT USAGE EXCEPT AS INDICATED BELOW."

ENGINEER: [signature]

DATE: 8/27/20

APPROVED BY

APPROVED BY

APPROVED BY

CONTRACT NO.

ADOPTED THIS _____ DAY OF _____ 2020

PROJECT NO: 19-1123

SHEET 1 OF 9

CFS ENGINEERS
cfse.com
1421 E. 104th Street, Ste. 100 KCMO 64131
o: 816-333-4477 f: 816-333-6688

STATE OF MISSOURI
HOLT S. BUELINGTON
NUMBER PE-2001018715
PROFESSIONAL ENGINEER

Mark	Description	Date

Designed by: --- | Dwn by: --- | Ckd by: --- | Submitted by: --- | Date: 00-00-00 | Reviewed by: --- | Plot scale: 1:1/2

File name: 91123-RD-SH-TITLESHEET.dgn
Plot date: 8/28/2020 12:59:36 PM

CITY OF GRAIN VALLEY
713 S. MAIN ST.
GRAIN VALLEY, MISSOURI

PEDESTRIAN BRIDGE
CROSS CREEK PARK/BLUE BRANCH CREEK

TITLE SHEET

Sheet reference number: 1

Sheet 1 of 9

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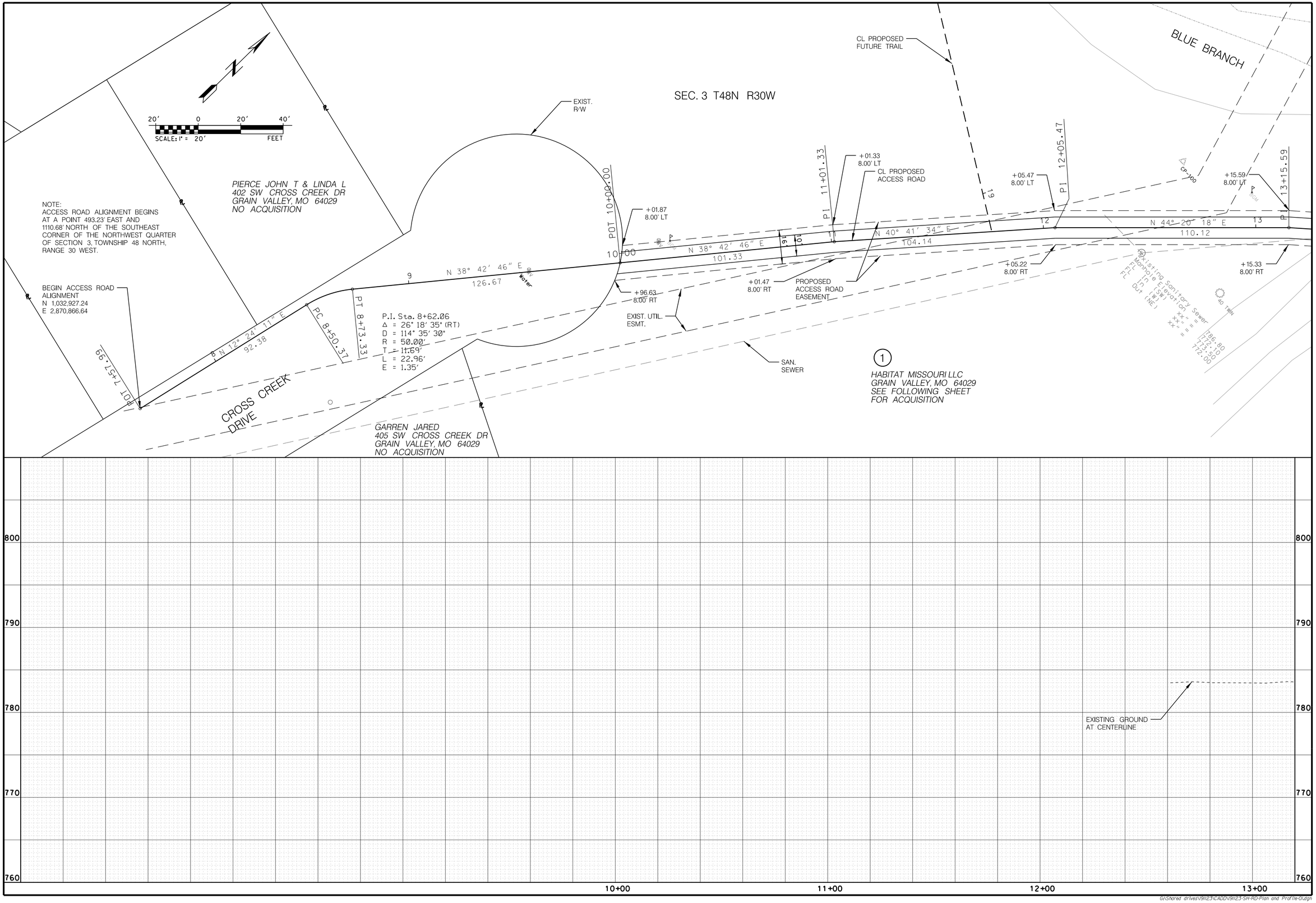

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STATE OF MISSOURI
CHORDEL E. BUELTMANN
NUMBER
PE-2001018715
PROFESSIONAL ENGINEER

Mark	Description	Date

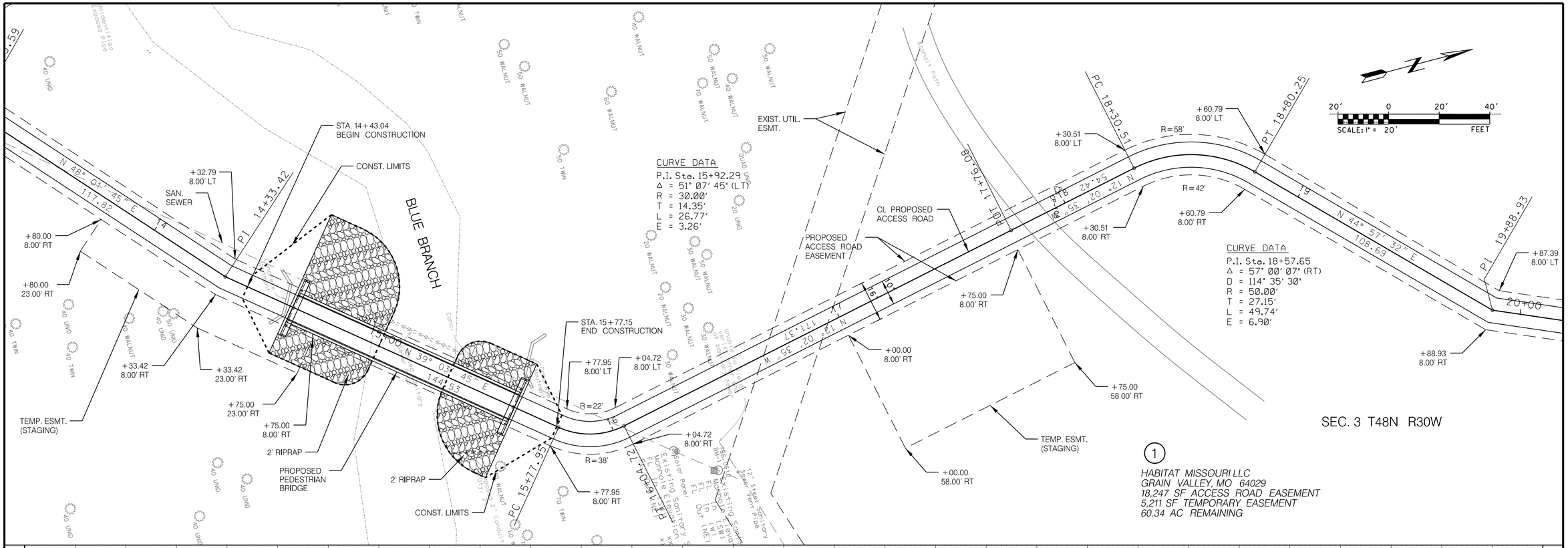
Designed by: ---
Dwn by: ---
Ckd by: ---
Submitted by: ---
Date: 00-00-00
Reviewed by: ---
Plot scale: 1:240
File name: 91123-SH-RD-Plan and Profile-01.dgn
Plot date: 6/28/2020

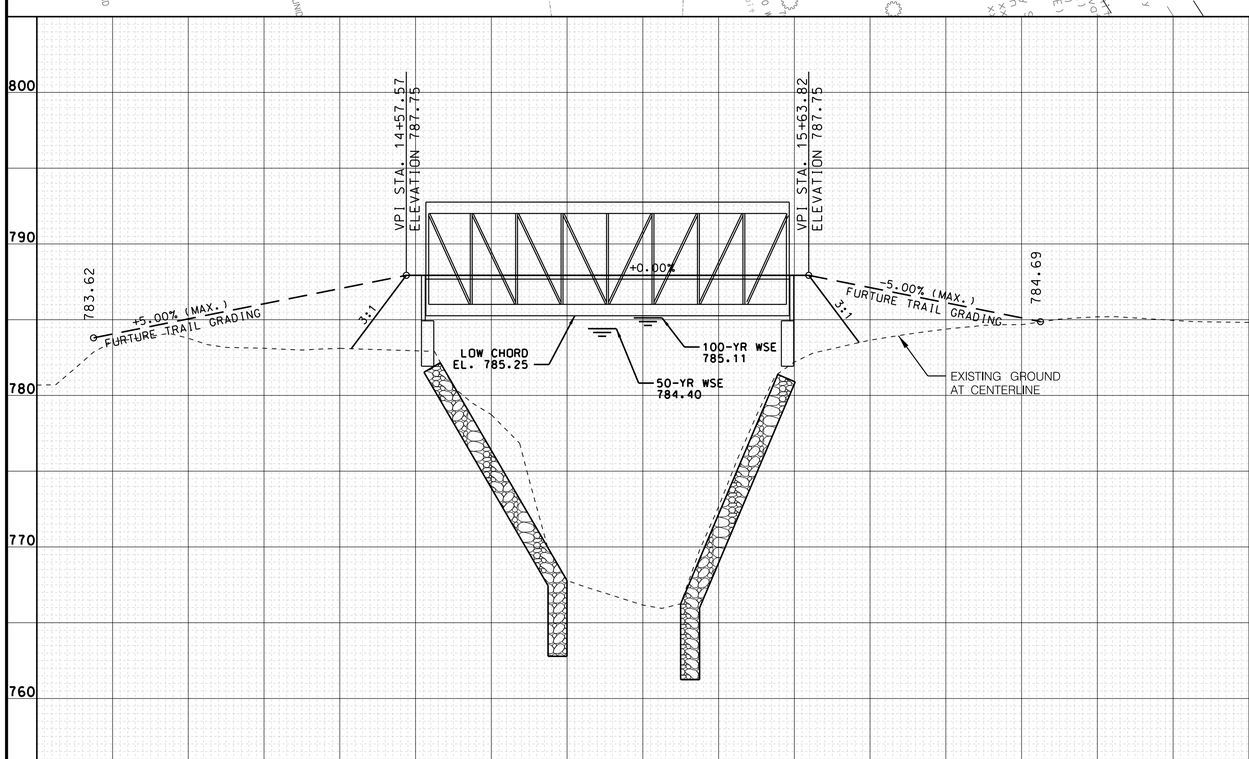
CITY OF GRAIN VALLEY
713 S. MAIN ST.
GRAIN VALLEY, MISSOURI

PEDESTRIAN BRIDGE
CROSS CREEK PARK/BLUE BRANCH CREEK

PLAN AND PROFILE
SHEET 1 OF 3

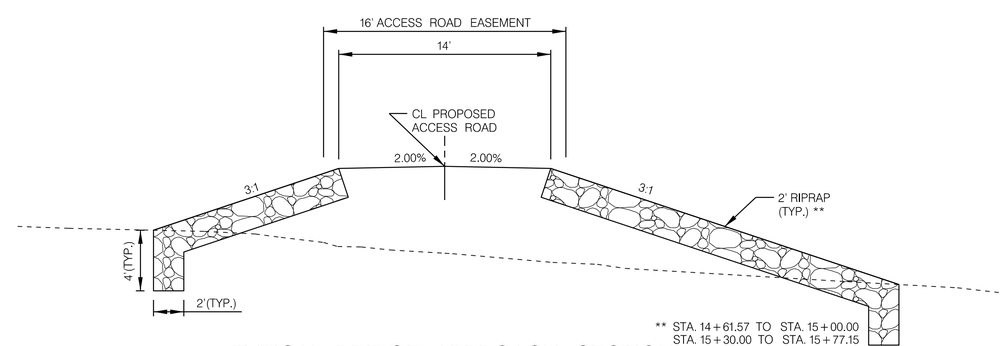
Sheet reference number:
2





SUMMARY OF QUANTITIES

ITEM	QTY.	UNIT
ROADWAY		
Clearing & Grubbing	0.6	ACRE
Removal of Improvements	1	LS
Embankment in Place	385	CY
Furnishing Type 2 Rock Blanket	301	CY
Placing Type 2 Rock Blanket	301	CY
Mobilization	1	LS
Permanent Erosion Control Geotextile	670	SY
Contractor Furnished Surveying and Staking	1	LS
Seeding – Cool Season Mixtures	0.5	ACRE
Silt Fence	210	LF
Type C Berm	156	LF
Restoration of Access Road	1	LS



TYPICAL BRIDGE APPROACH SECTION
N.T.S.

CFS ENGINEERS
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STATE OF MISSOURI
CHARLES E. BUELTMAN
NUMBER
PE-2001018715
PROFESSIONAL ENGINEER

Mark	Description	Date

Designed by: ---
Dwn by: ---
Ckd by: ---
Submitted by: ---
Date: 00-00-00
Reviewed by: ---
Plot scale: 1:240
File name: 91123-SH-RD-Plan and Profile-02.dgn
Plot date: 12/2/2020

CITY OF GRAIN VALLEY
713 S. MAIN ST.
GRAIN VALLEY, MISSOURI

PEDESTRIAN BRIDGE
CROSS CREEK PARK/BLUE BRANCH CREEK

PLAN AND PROFILE
SHEET 2 OF 3

Sheet reference number:
3

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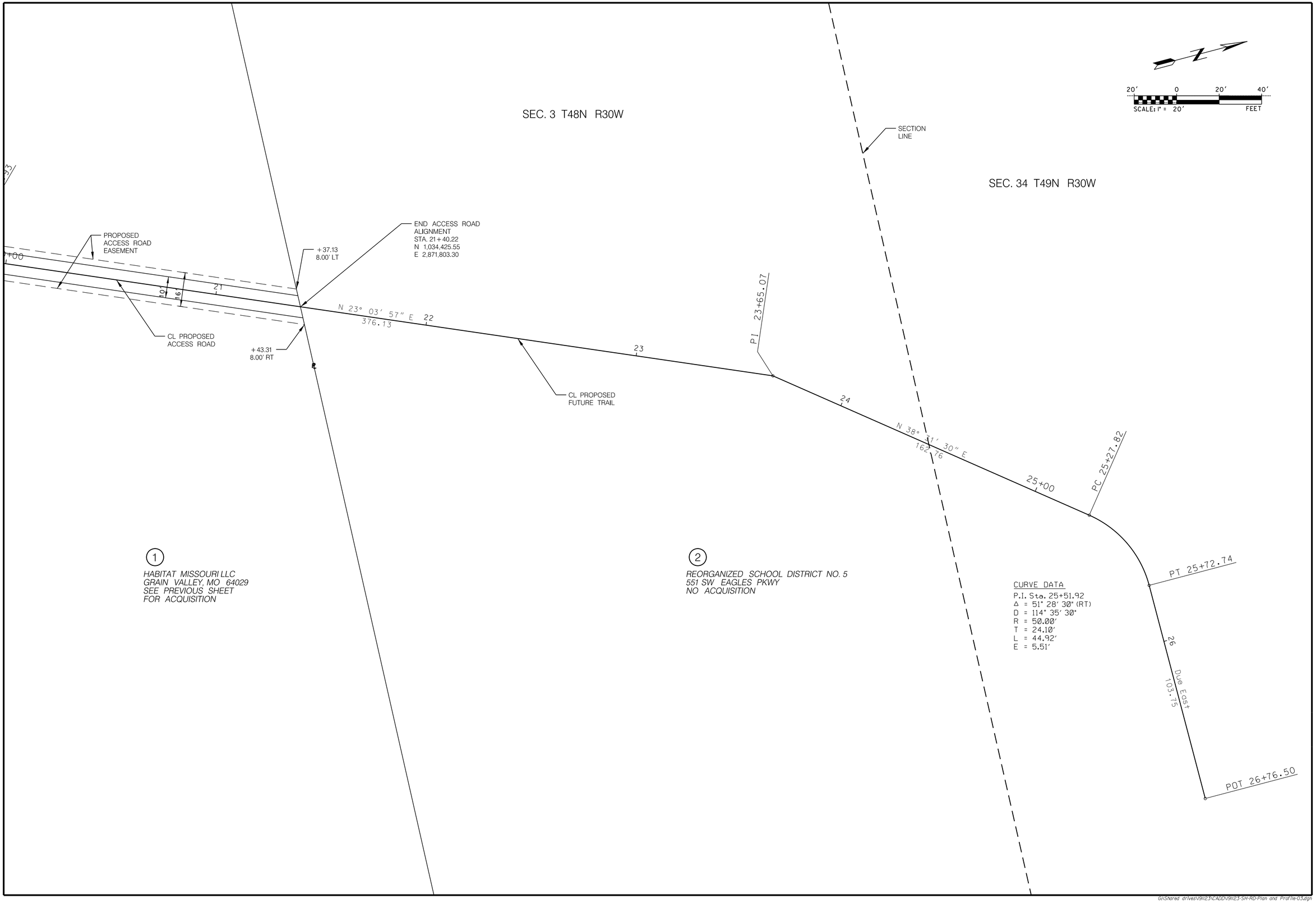

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STATE OF MISSOURI
NICHOLAS BUEHLINGTON
NUMBER PE-2001018715
PROFESSIONAL ENGINEER

Mark	Description	Date

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Dwn by: ---
Ckd by: ---
Submitted by: ---
Date: 00-00-00
Reviewed by: ---
Plot scale: 1:240
File name: 911123-SH-RD-Plan and Profile-03.dgn
Plot date: 8/28/2020

CITY OF GRAIN VALLEY
713 S. MAIN ST.
GRAIN VALLEY, MISSOURI

PEDESTRIAN BRIDGE
CROSS CREEK PARK/BLUE BRANCH CREEK

PLAN AND PROFILE
SHEET 3 OF 3

Sheet reference number:
4

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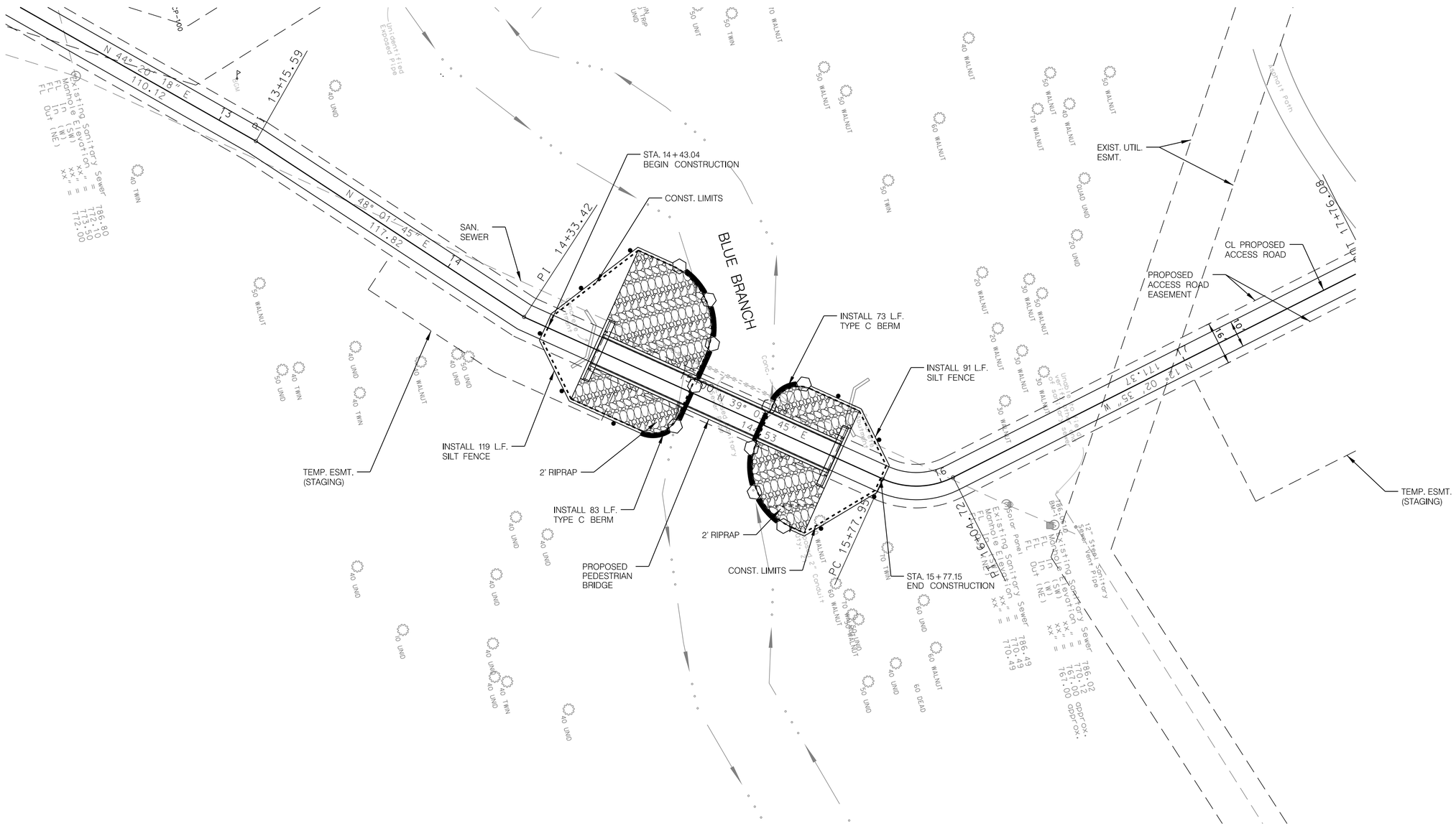
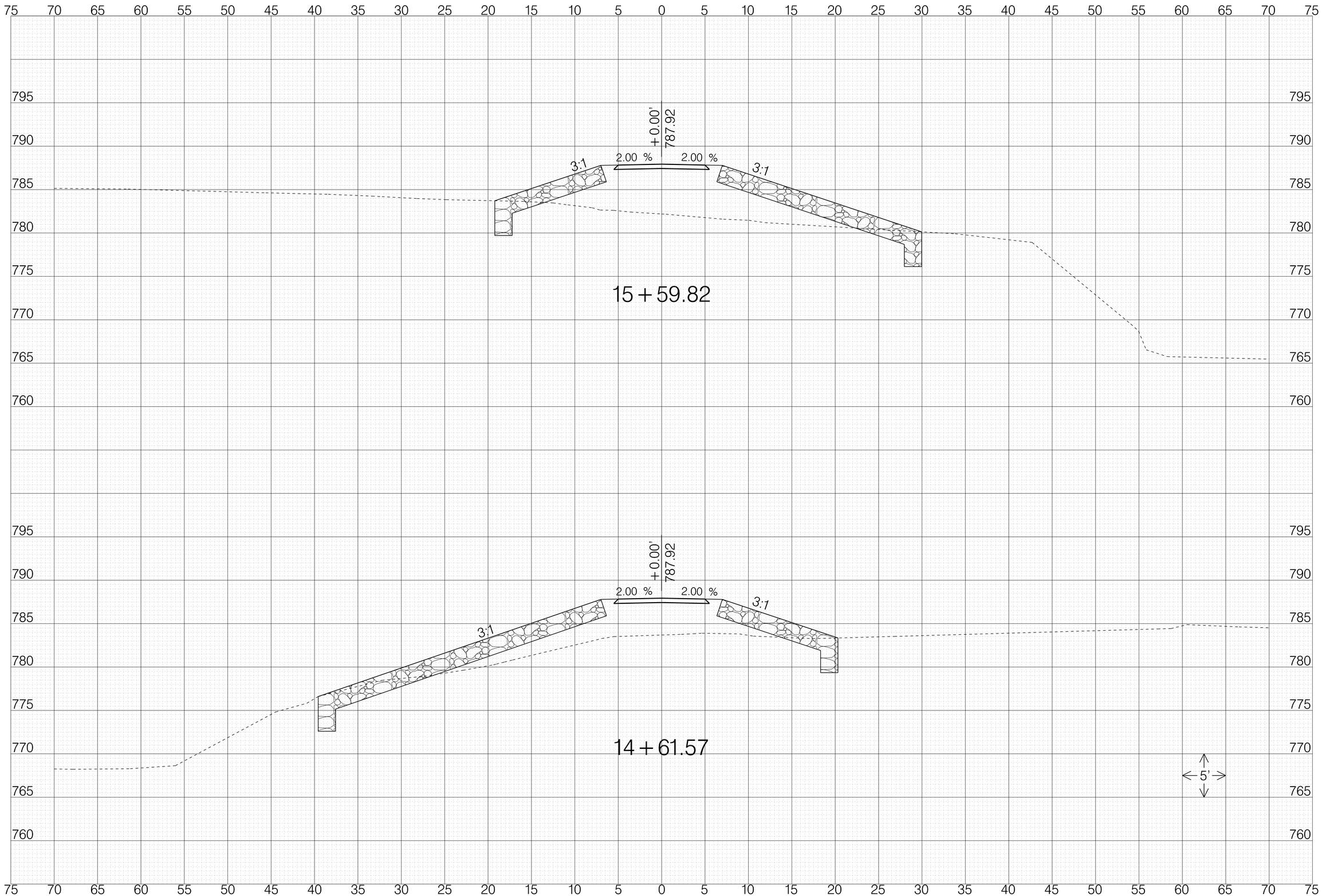

N 44° 20' 18" E
110.12
13+15.59
N 45° 01' 45" E
117.82
PI 14+33.42
STA. 14+43.04
BEGIN CONSTRUCTION
CONST. LIMITS
SAN. SEWER
BLUE BRANCH
INSTALL 73 L.F.
TYPE C BERM
INSTALL 91 L.F.
SILT FENCE
INSTALL 119 L.F.
SILT FENCE
2' RIPRAP
INSTALL 83 L.F.
TYPE C BERM
2' RIPRAP
CONST. LIMITS
PROPOSED
PEDESTRIAN
BRIDGE
TEMP. ESMT.
(STAGING)
PC 15+77.95
PI 16+04.72
STA. 15+77.15
END CONSTRUCTION
N 39° 01' 45" E
145.53
N 12° 02' 35" W
171.37
EXIST. UTIL.
ESMT.
CL PROPOSED
ACCESS ROAD
PROPOSED
ACCESS ROAD
EASEMENT
TEMP. ESMT.
(STAGING)
17+76.08
Asphalt Path
Existing Sanitary Sewer
Manhole Elevation (SW) xx.xx
FL In xx.xx
FL Out (NE) xx.xx
786.80
773.50
772.00
Existing Sanitary Sewer
Manhole Elevation (SW) xx.xx
FL In xx.xx
FL Out (NE) xx.xx
786.48
770.49
770.49
Existing Sanitary Sewer
Manhole Elevation (SW) xx.xx
FL In xx.xx
FL Out (NE) xx.xx
786.02 approx.
770.00 approx.
767.00 approx.
12" Steel Sanitary Sewer Vent Pipe
Solar Panel
Unidentified Exposed Pipe
Unidentified Exposed Sewer Pipe
Conc.
Concrete Footing
Concrete Footing
Concrete Footing



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STATE OF MISSOURI
NICOLE S. BUELINGTON
NUMBER
PE-2001018715
PROFESSIONAL ENGINEER

Mark	Description	Date

Designed by: ---
Dwn by: ---
Ckd by: ---
Submitted by: ---
Date: 00-00-00
Reviewed by: ---
Plot scale: 1:60
File name: 191123-SH-RD-SEC-01.dgn
Plot date: 11/28/2020 12:59:50 PM

CITY OF GRAIN VALLEY
713 S. MAIN ST.
GRAIN VALLEY, MISSOURI

PEDESTRIAN BRIDGE
CROSS CREEK PARK/BLUE BRANCH CREEK

CROSS SECTIONS
SHEET 1 OF 1

Sheet reference number:
6

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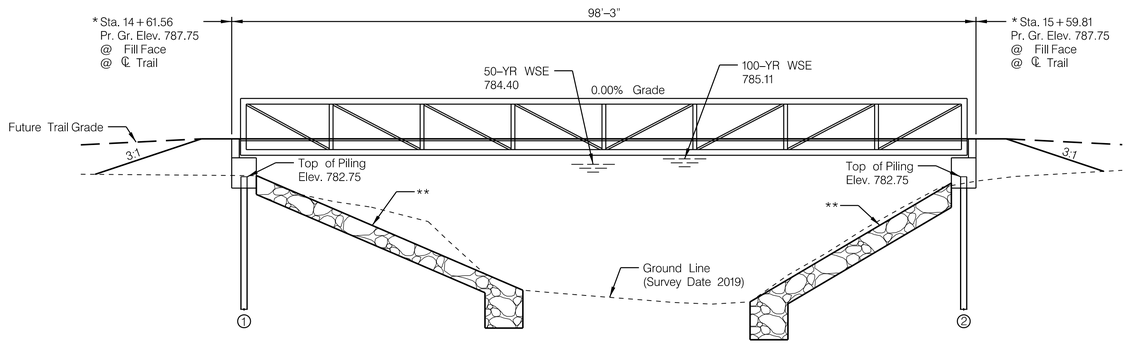
95'-0" PRATT STEEL TRUSS SPAN

"⊛" Indicates location of borings

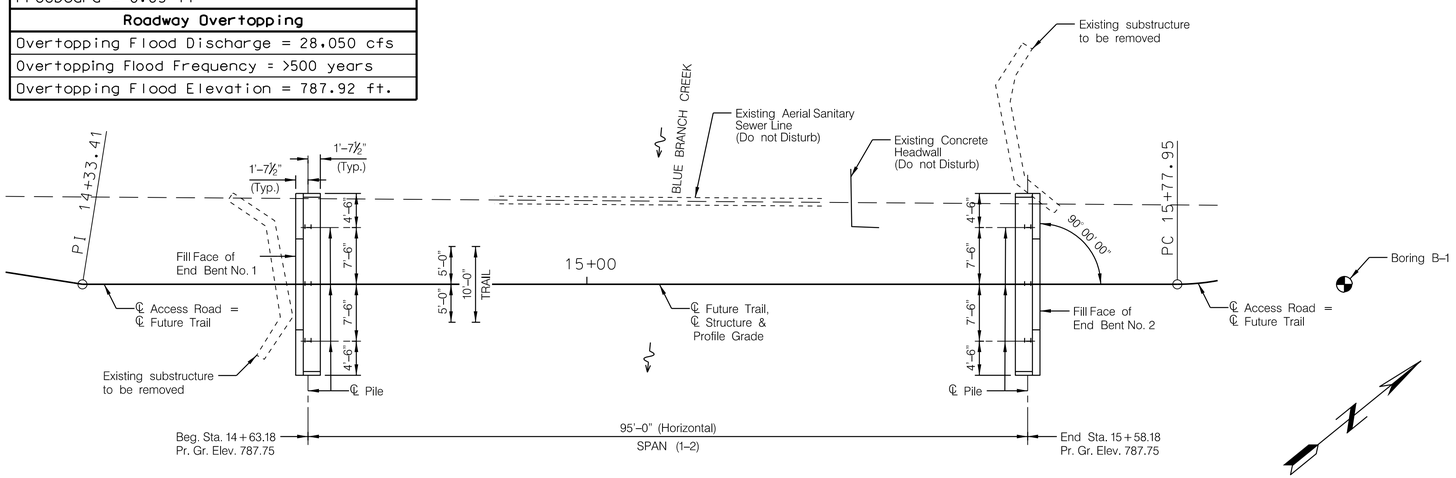


GENERAL ELEVATION

Hydrologic Data
Drainage Area = 13.9 mi²
Design Flood Frequency = 50 years
Design Flood Discharge = 8030 cfs
Design Flood (D.F.) Elevation = 784.40
Base Flood (100-year)
Base Flood Elevation = 785.11
Base Flood Discharge = 9480 cfs
Estimated Backwater = 0.00 ft
Average Velocity thru Opening = 4.41 ft/s
Freeboard (50-year)
Freeboard = 0.85 ft
Roadway Overtopping
Overtopping Flood Discharge = 28,050 cfs
Overtopping Flood Frequency = >500 years
Overtopping Flood Elevation = 787.92 ft.

* To be confirmed or set by the truss manufacturer.

** 2'-0" Type 2 Rock Blacket with Permanent Erosion Geotextile material.



PLAN

Estimated Quantities		
Item		Total
Class 1 Excavation	cu. yard	17
Structural Steel Pile (10 in)	linear foot	228
Pile Pt Reinforcement	each	6
Class B Concrete Substructure	cu. yard	26.8
Reinforcing Steel	pound	2,800
Structural Steel Truss	lump sum	1

Foundation Data			
Bent No.		1	2
Pile Type and Size		HP 10 X 42	HP 10 X 42
Number		3	3
Approximate Length	(Feet)	38	38
Pile Point Reinforcement	(Each)	3	3
Pile Driving Verification Method		DF	DF
Minimum Nominal Axial Pile Compression Resistance	(Kips)	145	145
Hammer Energy Required	(Ft. Lb.)	5,000	5,000

Minimum energy requirement of hammer is based on plan length and design bearing value of piles.

All piles shall be driven to practical refusal. Driving shall stop when in the opinion of the Engineer, additional driving may damage the piling prior to reaching plan tip elevation.

Manufactured pile point reinforcement shall be used on all piles in this structure.

DF= FHWA-modified Gates Dynamic Formula

Minimum Nominal Axial Compressive Resistance = $\frac{\text{Maximum Factored Loads}}{\text{Resistance Factor}}$

General Notes:

Design Specifications:

2017 AASHTO LRFD Bridge Design Specifications, 8th Edition.

For materials and construction procedures, the contractor shall follow the specifications as stated in the "Missouri Standard Specifications for Highway Construction - 2018" and current supplemental specification revisions. In addition, refer to the general and job special provisions which supercede the "Standard Specifications" for various items on this project.

Design Loading:

Live Load - 90 PSF on the full deck area or one 10,000 lb. vehicle load. The vehicle load shall be distributed as a four wheel vehicle with 80% of the load on the rear wheels(H5). The wheel track width of the vehicle shall be 6.0 feet and the wheelbase shall be 10.0 feet. The vehicle shall be positioned to produce the maximum stress in each member, including decking.

Earth Load - 120#/cu. ft., equivalent fluid pressure 45#/cu. ft.

Design Unit Stresses:

Concrete: All concrete shall be Class B-1 Concrete Grade 4.0 (AE) f'c = 4,000 psi. Bevel all exposed edges with a 3/4" triangular molding except as other wise noted. Construction joints other than those shown in plans shall be approved by the Engineer.
Reinforcing Steel (Grade 60) fy = 60,000 psi
Steel Pile fy = 50,000 psi

Reinforcing Steel:

All dimensions relative to placement of reinforcing steel are to the centerline of bars unless otherwise noted. Bar bending dimensions shall be as shown and noted in the bending diagrams. All reinforcing steel shall conform to the requirements of ASTM A615, Grade 60. Minimum clearance to reinforcing shall be 1 ½" unless otherwise shown.

General Construction Notes:

For reinforcing bar supports, see Missouri Standard Plan Drawing 706.35, "Bar Supports for Concrete Reinforcement."

Permanent erosion control geotextile shall be placed under the rock blanket and shall be in accordance with Sec. 1011. The cost of furnishing and installing permanent erosion control geotextile, complete in place, shall be included in the contract unity price for rock blanket.

MoDOT and FHWA may make inspections of the work and the contractor shall grant them access to all parts of the work.

See additional notes on the bridge detail sheets.

See Access Rd. sheet for Rock Blanket limits.

Remove existing substructure to 1' below final grade.

Bridge Excavation:

All Bridge excavation shall be Class 1. Backfill compaction is required at each end bent.

Anchor Bolts:

The Constractor shall make certain that reinforcing bars are located to allow for placement of the anchor bolts. The swedged anchor bolts, nuts and washers shall be stainless steel and epoxy grouted. All materials and labor for bearing devices including anchor bolts shall be included in the bid item "Structural Steel Truss".

Structural Steel Truss:

Provide 95' (nominal length) truss with 10' clear roadway. Exact locations of end bents shall be set by the truss manufacturer prior to driving piles and constructing end bents. All materials, labor and incidentals necessary to supply, transport and erect the structural steel truss shall be included in the item "Structural Steel Truss" lump sum. Suggested sources for the truss are "Wheeler Bridge, 9531 W. 78th St. Eden Prairie, MN" and "Contech Engineered Solutions LLC, 9025 Centre Pointe Drive West Chester, OH", or approved equal.

The Contractor shall submit shop drawings to the Engineer for approval.

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STATE OF MISSOURI
SHIPPY
NUMBER
PE-2019017242
PROFESSIONAL ENGINEER

Mark	Description	Date

Designed by: ---
Dwn by: ---
Ckd by: ---
Submitted by: ---
Reviewed by: --
Plot scale: 1:20
Date: 00-00-00
File name: 9123-SH-BR-FrontSheet.dgn
Plot date: 8/28/2020 10:53:37 PM

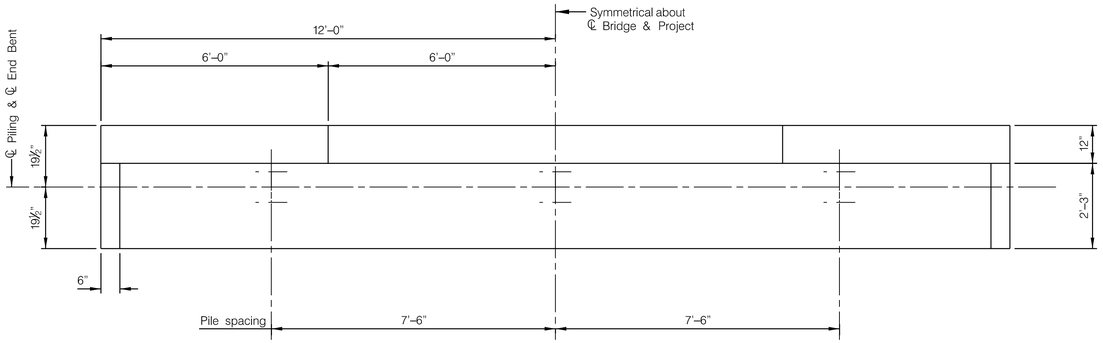
CITY OF GRAIN VALLEY
713 S. MAIN ST.
GRAIN VALLEY, MISSOURI

PEDESTRIAN BRIDGE
CROSS CREEK PARK/BLUE BRANCH CREEK

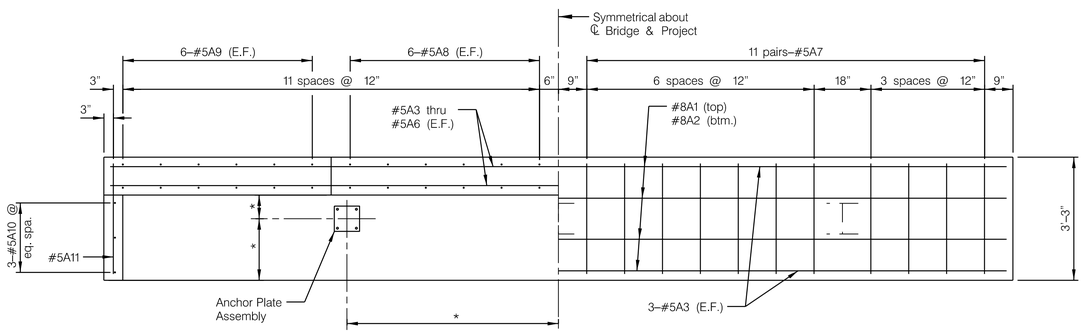
PLAN, GENERAL ELEVATION
GENERAL NOTES & QUANTITIES

Sheet reference number:
7

Note: E.F. indicates Each Face.



LAYOUT PLAN



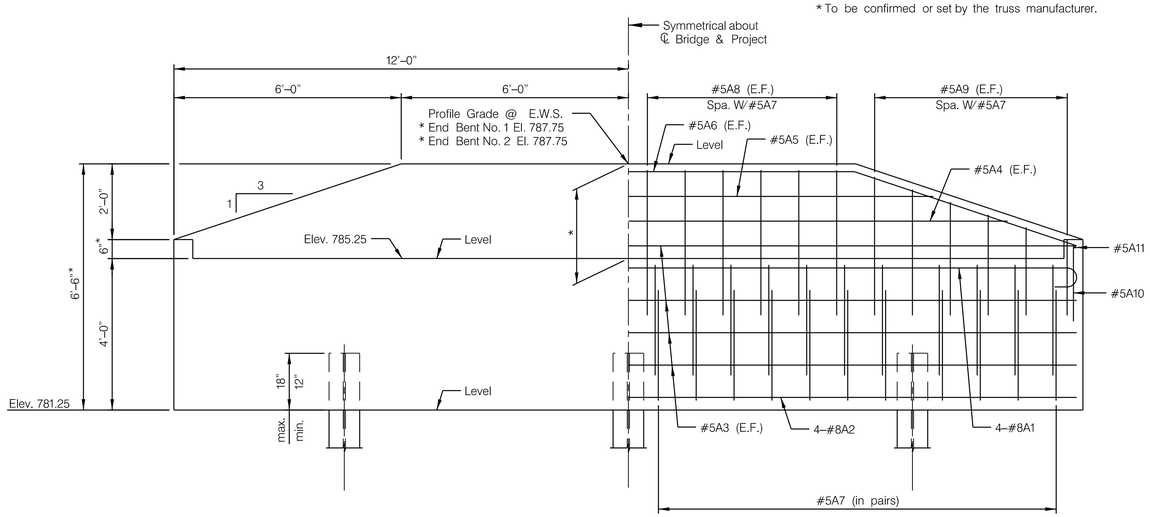
IN BACKWALL

IN BRIDGE SEAT

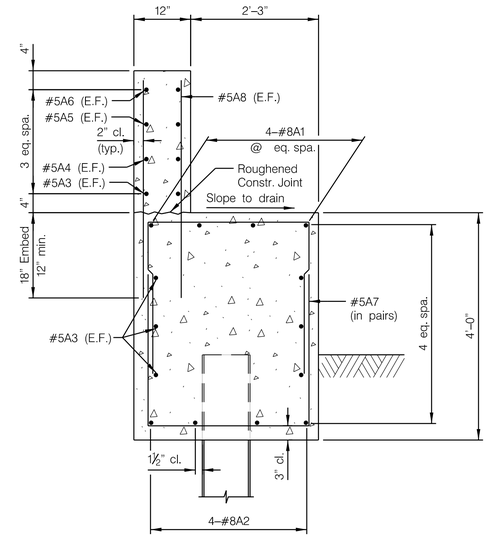
REINFORCING PLAN

Note: Dimensions of the height of the backwall and locations of anchor bolts shall be given by the truss manufacturer. Quantities are based on plan dimensions and no increase in plan quantities will be allowed for variations of the backwall.

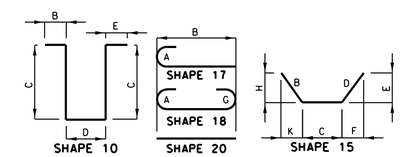
* To be confirmed or set by the truss manufacturer.



ELEVATION



TYPICAL SECTION



BILL OF REINFORCING STEEL

NO. REQ'D.	MARK NO. SIZE	MARK NO. MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	B FT.	B IN.	C FT.	C IN.	D FT.	D IN.	E FT.	E IN.	F FT.	F IN.	H FT.	H IN.	K FT.	K IN.	NOMINAL LENGTH FT.	NOMINAL LENGTH IN.	ACTUAL LENGTH FT.	ACTUAL LENGTH IN.	WEIGHT LBS.
			END BENT NO. 1																									
4	8	A1	BEAM SEAT		18		X			23	8													25	6	25	6	272
4	8	A2	BEAM SEAT		20		X			23	8													23	8	23	8	253
8	5	A3	BCKWALL/BM SEAT		20		X			23	8													23	8	23	8	197
2	5	A4	BACKWALL		20		X			20	0													20	0	20	0	42
2	5	A5	BACKWALL		20		X			16	4													16	4	16	4	34
2	5	A6	BACKWALL		15		X			6	3	11	10	6	3	23.5		5	10.4	23.5		5	10.4	24	4	24	4	51
44	5	A7	BEAM SEAT		10	S	X					2	8	2	10									8	2	7	11	363
24	5	A8	BCKWALL/BM SEAT		20		X			3	10													3	10	3	10	96
24	5	A9	BCKWALL/BM SEAT		20		X	V	4	2	0													2	0	2	0	
			INCREMENT =							3	8													3	8	3	8	71
			4 INCH																									
6	5	A10	BCKWALL/BM SEAT		20		X			2	0													2	0	2	0	13
2	5	A11	BCKWALL/BM SEAT		20		X			2	11													2	11	2	11	6
			END BENT NO. 2																									
4	8	A1	BEAM SEAT		18		X			23	8													25	6	25	6	272
4	8	A2	BEAM SEAT		20		X			23	8													23	8	23	8	253
8	5	A3	BCKWALL/BM SEAT		20		X			23	8													23	8	23	8	197
2	5	A4	BACKWALL		20		X			20	0													20	0	20	0	42
2	5	A5	BACKWALL		20		X			16	4													16	4	16	4	34
2	5	A6	BACKWALL		15		X			6	3	11	10	6	3	23.5		5	10.4	23.5		5	10.4	24	4	24	4	51
44	5	A7	BEAM SEAT		10	S	X					2	8	2	10									8	2	7	11	363
24	5	A8	BCKWALL/BM SEAT		20		X			3	10													3	10	3	10	96
24	5	A9	BCKWALL/BM SEAT		20		X	V	4	2	0													2	0	2	0	
			INCREMENT =							3	8													3	8	3	8	71
			4 INCH																									
6	5	A10	BCKWALL/BM SEAT		20		X			2	0													2	0	2	0	13
2	5	A11	BCKWALL/BM SEAT		20		X			2	11													2	11	2	11	6
			TOTALS																									
	5																											1746
	8																											1050
			TOTAL																									2796

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SHIPPY NUMBER PE-2019017242
PROFESSIONAL ENGINEER

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Designed by: --
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Ckd by: --
Submitted by: --
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Reviewed by: --
Plot scale: 1:24
File name: 191123-SH-BR-End Bent Details.dgn
Plot date: 01/28/2020 10:53:38 PM

CITY OF GRAIN VALLEY
713 S. MAIN ST.
GRAIN VALLEY, MISSOURI

PEDESTRIAN BRIDGE
CROSS CREEK PARK/BLUE BRANCH CREEK

END BENT DETAILS

Sheet reference number:
8

G:\Shared drives\191123\CADD\191123-SH-BR-End Bent Details.dgn

BORING NUMBER B-1

PAGE 1 OF 1

CFS ENGINEERS — CFS Engineers

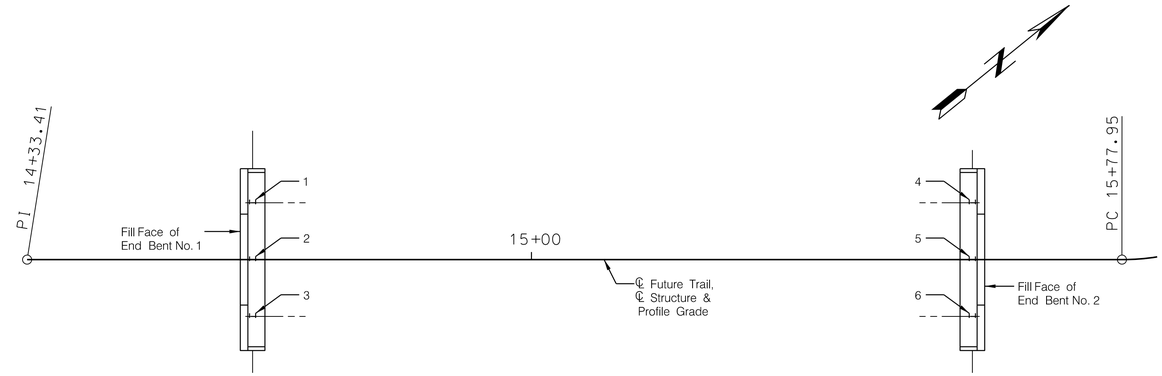
CLIENT Grain Valley
PROJECT NAME Blue Branch Creek Bridge
PROJECT NUMBER 19-1123
PROJECT LOCATION STA 16+00
DATE STARTED 20/01/16 **COMPLETED** 20/01/16
GROUND ELEVATION 784 ft MSL **HOLE SIZE** 6"
DRILLING CONTRACTOR CFS
GROUND WATER LEVELS:
DRILLING METHOD HSA
AT TIME OF DRILLING 17.00 ft / Elev 767.00 ft
LOGGED BY MM **CHECKED BY** PD
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	TESTS	GRAPHIC LOG	MATERIAL DESCRIPTION
0						0.5 TOPSOIL 783.5
	SS 1	78	2-2-2 (4)	PP = 2.5 tsf MC = 27.4% LL = 43 PL = 22		CLAY (CL) firm dark brown moist
						3.0 CLAY (CL) soft brown moist 781.0
5	SS 2	89	1-1-2 (3)	PP = 3 tsf MC = 24.2%		
	SS 3	89	1-2-3 (5)	PP = 3 tsf MC = 25.3%		
10	SS 4	100	1-2-3 (5)	PP = 2.25 tsf MC = 24.6%		
15	SS 5	100	0-1-1 (2)	PP = 1.5 tsf MC = 30.6%		
						17.0 CLAY (CL) very soft brown wet 767.0
20	SS 6	100	0-0-1 (1)	PP = 1.5 tsf MC = 30.6%		
25	SS 7	100	0-0-0 (0)	PP = 1.5 tsf MC = 30.9%		
30	SS 8	100	1-5-2 (7)	PP = 1.25 tsf MC = 29.1%		29.0 CLAY (CL) stiff brown moist gravelly 755.0
						33.0 SHALE dense gray weathered 751.0
	SS 9	100	17-50/6"	PP = 2 tsf MC = 19.4%		34.0 Spoon refusal on SHALE limey hard gray 750.0
35	RC 1	(58)				
						39.0 Rock core terminated on SHALE limey hard gray 745.0

GENERAL BH / TP / WELL - GINT STD US.GDT - 20/01/22 17:24 - G:\MY DRIVE\CORPORATE INFORMATION\CORPORATE KCK\ENGINEERING\ACTIVE GEOTECHS\19-1123 GRAIN VALLEY PED BRIDGE\LOG.GPJ

Note: For locations of borings, see Sheet No. 6.

BORING DATA



PLAN SHOWING PILE NUMBERING FOR RECORDING AS-BUILT PILE DATA

Note:
Indicate in remarks column:
A. Pile type and grade
B. Batter
C. Driven to practical refusal

This sheet to be completed by construction personnel.

As-Built Pile Data

Pile No.	Length in Place (ft)	Computed Nominal Axial Compressive Resistance (kips)	Remarks
			END BENT NO. 1
1			
2			
3			

As-Built Pile Data

Pile No.	Length in Place (ft)	Computed Nominal Axial Compressive Resistance (kips)	Remarks
			END BENT NO. 2
4			
5			
6			

CFS ENGINEERS
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o: 816-333-4477 f: 816-333-6688

STATE OF MISSOURI — COLE SHIPPY NUMBER PE-2019017242 — PROFESSIONAL ENGINEER — 8/27/20

Mark	Description	Date

Designed by: --- | Date: 00-00-00
Dwn by: --- | Ckd by: --- | Reviewed by: ---
Submitted by: --- | Plot scale: 1:2
File name: 19123-SH-BR-BoringData.dgn
Plot date: 8/28/2020 1:06:39 PM

CITY OF GRAIN VALLEY
713 S. MAIN ST.
GRAIN VALLEY, MISSOURI

PEDESTRIAN BRIDGE
CROSS CREEK PARK/BLUE BRANCH CREEK

BORING DATA AND AS-BUILT PILE DATA

Sheet reference number: 9

G:\Shared drives\19123\CADD\19123-SH-BR-BoringData.dgn