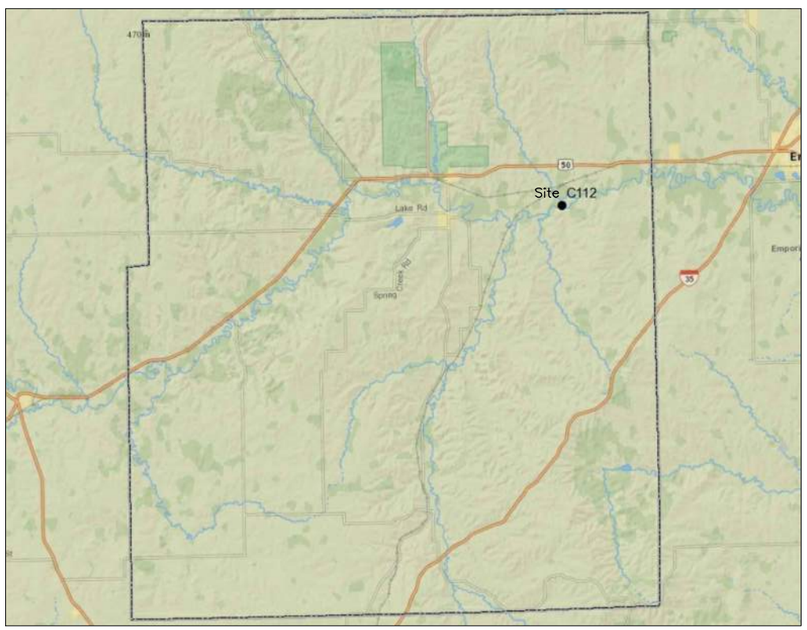
COTTONWOOD RIVER
STREAMBANK STABILIZATION
SITE C112
CHASE COUNTY, KANSAS

NE 1/4 SECTION 29, TOWNSHIP 19 SOUTH, RANGE 9 EAST
SE 1/4 SECTION 20, TOWNSHIP 19 SOUTH, RANGE 9 EAST



CHASE COUNTY MAP
NOT TO SCALE

Sheet Index

Sheet Number	Sheet Title
1	Cover Sheet
2 - 3	Plan Sheets
4	Detail Sheets
5 - 7	Cross Section Sheets

SITE QUANTITIES

Quantities List	
Rock / Cubic Yards	2,507
Rock / Tons	4,024
Soil moving / Cubic Yards	33,104
Bare Root Trees / Each	260
Streambank Slope Native Grass Seeding / Acres	2.2
Streambank Slope Wildrye / Pounds Pure Live Seed	55.0
Streambank Slope Cover Crop Seeding / Acres	2.2
Streambank Slope Oats / Pounds Pure Live Seed	88.0
66-Foot Buffer Seeding / Acres	2.1
66-Foot Buffer Oats / Pounds Pure Live Seed	84.0
66-Foot Buffer Deep Ripping / Acres	2.1
Streambank Slope Mulching / Acres	2.2
Streambank slope Mulching / Pounds	8,800

SITE LOCATION MAP
NOT TO SCALE

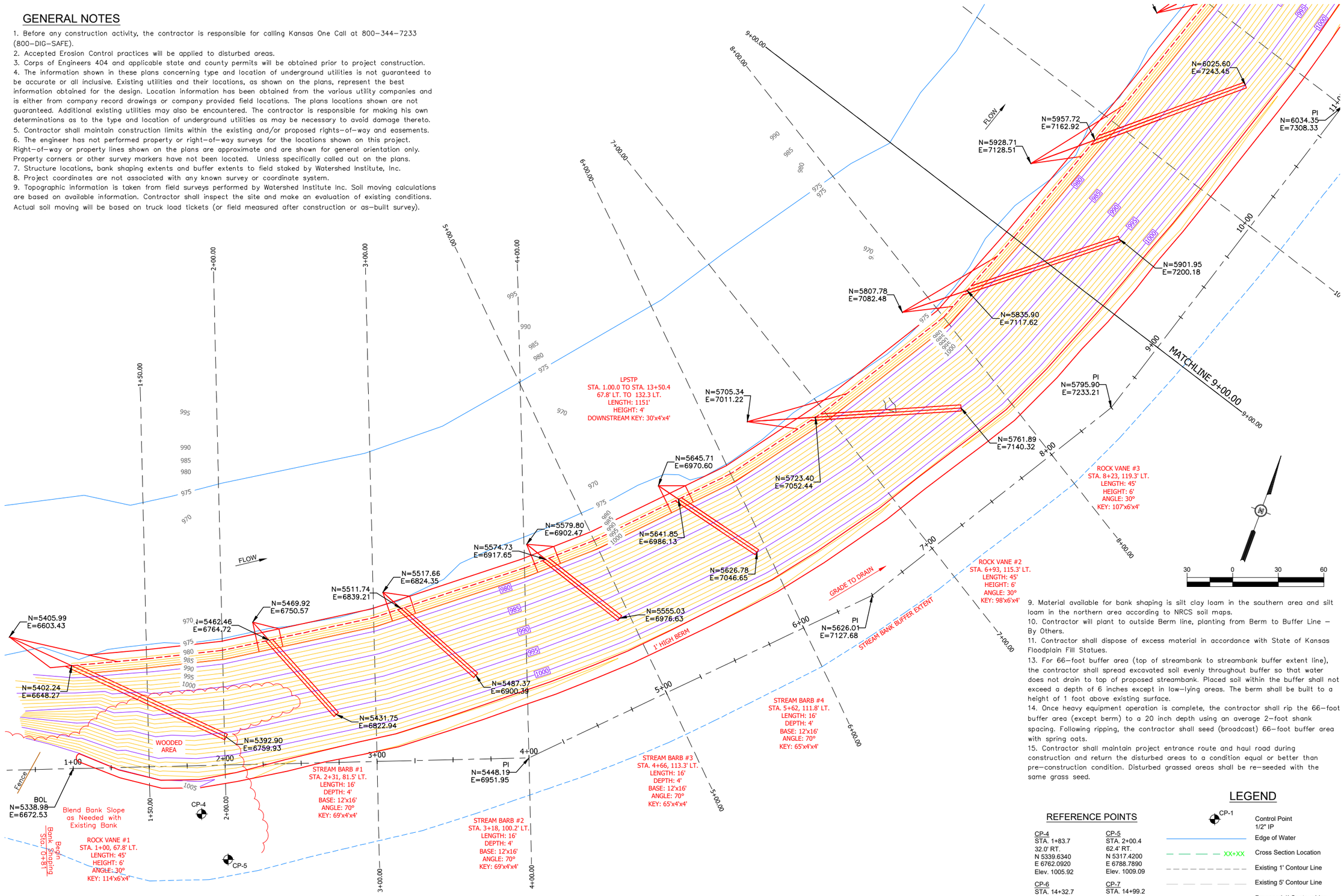
THE WATERSHED INSTITUTE
1200 SW Executive Dr. Topeka, KS 66615 (913) 685-4600

GREDELL Engineering Resources, Inc.
Environmental Engineering LAND - AIR - WATER
9718 Rosehill Road Telephone: (913) 808-5004
Lenexa, Kansas Fax: (913) 307-2028
When Experience Counts, Count on Us!

JOHN N. BROWNING LICENSED 10599 07-22-2020 KANSAS PROFESSIONAL ENGINEER

GENERAL NOTES

1. Before any construction activity, the contractor is responsible for calling Kansas One Call at 800–344–7233 (800–DIG–SAFE).
2. Accepted Erosion Control practices will be applied to disturbed areas.
3. Corps of Engineers 404 and applicable state and county permits will be obtained prior to project construction.
4. The information shown in these plans concerning type and location of underground utilities is not guaranteed to be accurate or all inclusive. Existing utilities and their locations, as shown on the plans, represent the best information obtained for the design. Location information has been obtained from the various utility companies and is either from company record drawings or company provided field locations. The plans locations shown are not guaranteed. Additional existing utilities may also be encountered. The contractor is responsible for making his own determinations as to the type and location of underground utilities as may be necessary to avoid damage thereto.
5. Contractor shall maintain construction limits within the existing and/or proposed rights–of–way and easements.
6. The engineer has not performed property or right–of–way surveys for the locations shown on this project. Right–of–way or property lines shown on the plans are approximate and are shown for general orientation only. Property corners or other survey markers have not been located. Unless specifically called out on the plans.
7. Structure locations, bank shaping extents and buffer extents to field staked by Watershed Institute, Inc.
8. Project coordinates are not associated with any known survey or coordinate system.
9. Topographic information is taken from field surveys performed by Watershed Institute Inc. Soil moving calculations are based on available information. Contractor shall inspect the site and make an evaluation of existing conditions. Actual soil moving will be based on truck load tickets (or field measured after construction or as–built survey).



9. Material available for bank shaping is silt clay loam in the southern area and silt loam in the northern area according to NRCS soil maps.
10. Contractor will plant to outside Berm line, planting from Berm to Buffer Line – By Others.
11. Contractor shall dispose of excess material in accordance with State of Kansas Floodplain Fill Statues.
13. For 66–foot buffer area (top of streambank to streambank buffer extent line), the contractor shall spread excavated soil evenly throughout buffer so that water does not drain to top of proposed streambank. Placed soil within the buffer shall not exceed a depth of 6 inches except in low–lying areas. The berm shall be built to a height of 1 foot above existing surface.
14. Once heavy equipment operation is complete, the contractor shall rip the 66–foot buffer area (except berm) to a 20 inch depth using an average 2–foot shank spacing. Following ripping, the contractor shall seed (broadcast) 66–foot buffer area with spring oats.
15. Contractor shall maintain project entrance route and haul road during construction and return the disturbed areas to a condition equal or better than pre–construction condition. Disturbed grassed areas shall be re–seeded with the same grass seed.

REFERENCE POINTS

CP-4	CP-5
STA. 1+83.7	STA. 2+00.4
32.0' RT.	62.4' RT.
N 5339.6340	N 5317.4200
E 6762.0920	E 6788.7890
Elev. 1005.92	Elev. 1009.09

CP-6	CP-7
STA. 14+32.7	STA. 14+99.2
216.1' RT.	70.9' RT.
N 6285.8660	N 6393.2340
E 7615.0850	E 7496.9200
Elev. 999.31	Elev. 999.93

LEGEND

- CP-1 — Control Point 1/2" IP
- Edge of Water
- XX+XX — Cross Section Location
- Existing 1' Contour Line
- Existing 5' Contour Line
- Proposed 1' Contour Line
- Proposed 5' Contour Line

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COTTONWOOD RIVER
CHASE COUNTY, KANSAS

SITE C112
PLAN SHEET

JOHN N. BROWNING LICENSED 10599 07-22-2020 KANSAS PROFESSIONAL ENGINEER

DESIGNED	PGB
DRAWN BY:	JAG
APPROVED BY:	JNB
DESIGN PROJ:	14668.119
CONST	----
SCALETAG	AS NOTED
DATE:	10/18/18
DRAWING NO:	CO2
SHEET NO:	2 of 7

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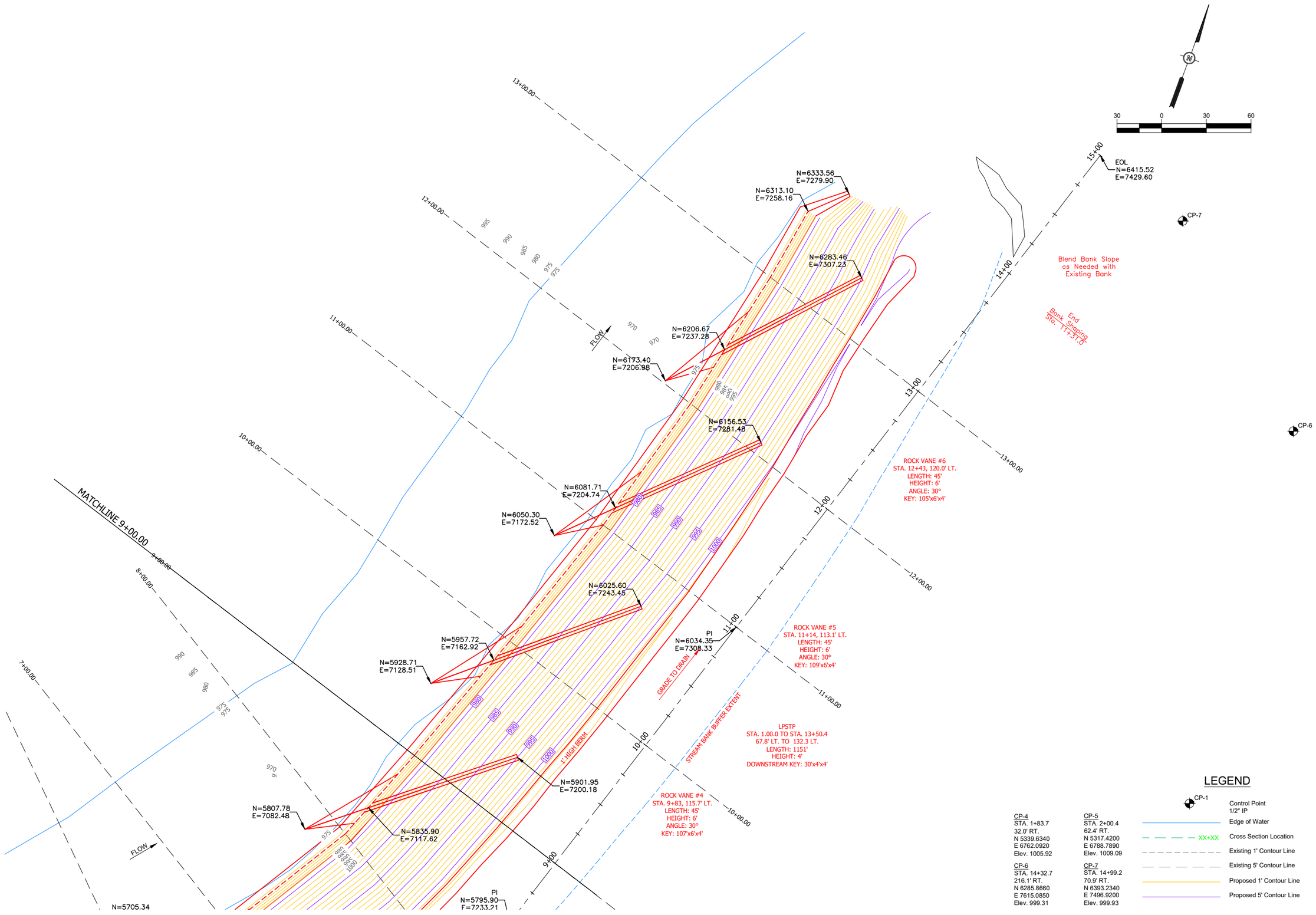

LEGEND

CP-1	Control Point 1/2" IP
	Edge of Water
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	Existing 1' Contour Line
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CHASE COUNTY, KANSAS

SITE C112
PLAN SHEET

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DRAWN BY:	JAG
APPROVED BY:	JNB
DESIGN PROJ:	14668.119
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SCALETAG	AS NOTED
DATE:	10/18/18
DRAWING NO:	CO3
SHEET NO:	3 of 7

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Last edit on: EDITDATE

Streambank Slope Native Grass Seeding Table

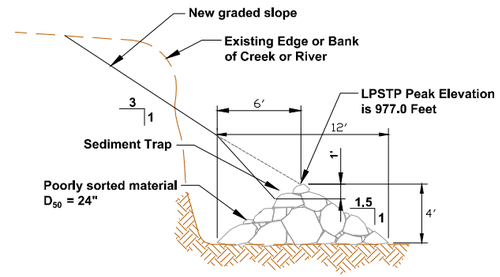
Species	Variety	PLS (lbs/acre)	Percent of Mix	PLS (lbs/acre)	Acres	Total PLS (lbs)
Virginia Wildrye	Omaha	25.0	100	25.00	2.2	55.00

Notes:
Native Grass to be planted between August 15-October 1; December 1-April 15

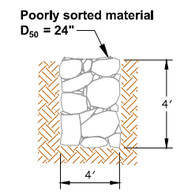
Streambank Slope Cover Crop Seeding Table

Species	PLS (lbs/acre)	Percent of Mix	PLS (lbs/acre)	Acres	Total PLS (lbs)
Oats	40.0	100	40.00	2.2	88.00

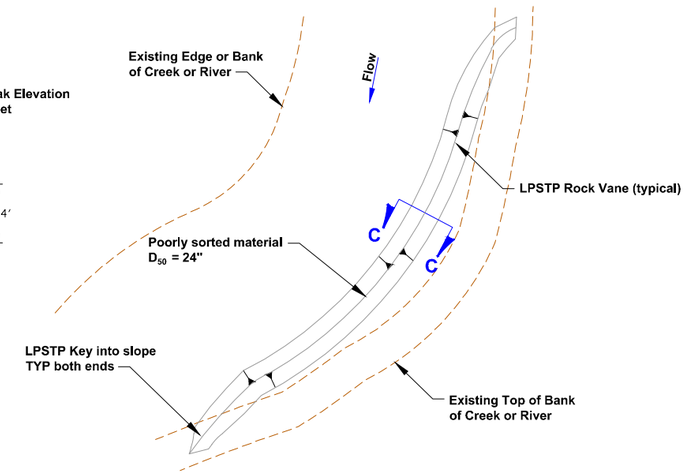
Notes:
Cover Crop to be planted following construction



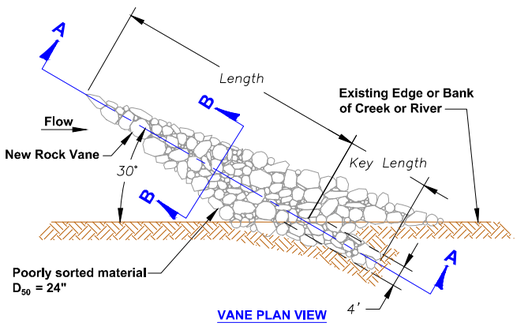
LPSTP 2 CROSS SECTION C-C



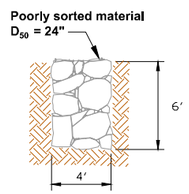
LPSTP KEY SECTION VIEW



LONGITUDINAL PEAKED STONE TOE PROTECTION (LPSTP)
PLAN VIEW



VANE PLAN VIEW

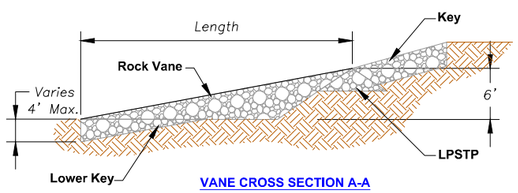


VANE KEY SECTION VIEW

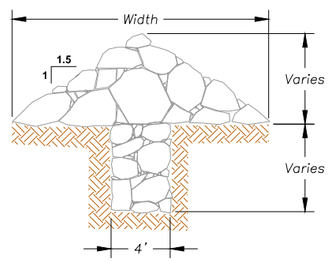
66-Foot Buffer Cover Crop Seeding Table

Species	PLS (lbs/acre)	Percent of Mix	PLS (lbs/acre)	Acres	Total PLS (lbs)
Oats	40.0	100	40.00	2.1	84.00

Notes:
Cover Crop to be planted following construction



VANE CROSS SECTION A-A



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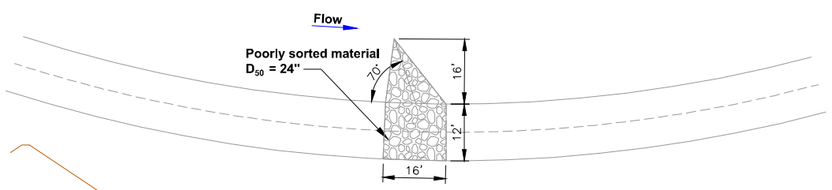
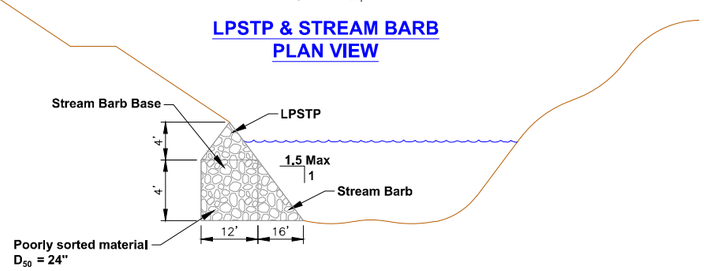


LPSTP & STREAM BARB
PLAN VIEW



LPSTP & STREAM BARB
CROSS SECTION

Structure Specification Sheet

Project Name	Stream	County	State	Bank	
C112	Cottonwood River	Chase	Kansas	Length	Height
				Shaped / Total	27.0
				1,314 / 1,500	

Structure Number	Type	Spacing (ft)	Angle (Degrees)	Height (ft)	Length (ft)	Key Length (ft)	Volume (yd^3)	Key Volume (yd^3)	Tons	Material Specifications
1	LPSTP	-	-	4	1151	30	1,024	18	1,717	Poorly Sorted Limestone Rock (D_{50} = 24")
1	Rock Vane	135	30	6	45	114	90	102	302	Poorly Sorted Limestone Rock (D_{50} = 24")
1	Stream Barb	95	70	4	16	69	48	41	141	Poorly Sorted Limestone Rock (D_{50} = 24")
2	Stream Barb	105	70	4	16	69	48	41	141	Poorly Sorted Limestone Rock (D_{50} = 24")
3	Stream Barb	98	70	4	16	65	48	39	138	Poorly Sorted Limestone Rock (D_{50} = 24")
4	Stream Barb	135	70	4	16	65	48	39	138	Poorly Sorted Limestone Rock (D_{50} = 24")
2	Rock Vane	135	30	6	45	98	90	88	281	Poorly Sorted Limestone Rock (D_{50} = 24")
3	Rock Vane	135	30	6	45	107	90	96	293	Poorly Sorted Limestone Rock (D_{50} = 24")
4	Rock Vane	135	30	6	45	107	90	96	293	Poorly Sorted Limestone Rock (D_{50} = 24")
5	Rock Vane	135	30	6	45	109	90	97	294	Poorly Sorted Limestone Rock (D_{50} = 24")
6	Rock Vane	-	30	6	45	105	90	94	290	Poorly Sorted Limestone Rock (D_{50} = 24")
							1,756	751	4,024	
						Total yds3	2,507			

Site Information

Bank Erodibility Hazard Index	35.8	BkF Elev	990.6	At Station	7+00
Near Bank Shear Stress (lb./sq. ft)	1.15	Rosgen Classification		E6	
Estimated Annual Erosion (ft/yr.)	0.9	Width/Depth Ratio		10.7	
Schumm Channel Stage	IV	Entrenchment Ratio		29.1	
Radius of Curvature (ft)	797	Channel Width (ft)		166	
Tortuosity	4.80	Shear Stress (lbs./sq. ft)		0.56	
Hydraulic Radius (ft)	14.5	Slope = (ft/ft)		0.00062	
Mean Depth (ft)	15.5	Wetted Perimeter (ft)		177.6	
Cross Sectional Area (sq. ft)	2,569	Manning's n		0.053	
Bank Full Discharge (cfs)	10,646	Mean Velocity (ft/sec)		4.14	
Q_5 Discharge (cfs)	26,542	Drainage Area (sq. mi)		1,657.0	

Quantities List

Rock / Cubic Yards	2,507
Rock / Tons	4,024
Soil moving / Cubic Yards	33,104
Bare Root Trees / Each	260
Streambank Slope Native Grass Seeding / Acres	2.2
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COTTONWOOD RIVER
CHASE COUNTY, KANSAS
SITE C112
DETAIL SHEET

JOHN N. BROWNING LICENSED 10599 07-22-2020 KANSAS PROFESSIONAL ENGINEER

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DRAWN BY:	JAG
APPROVED BY:	JNB
DESIGN PROJ:	14668.119
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SCALE:	AS NOTED
DATE:	10/18/2018
DRAWING NO:	CO4
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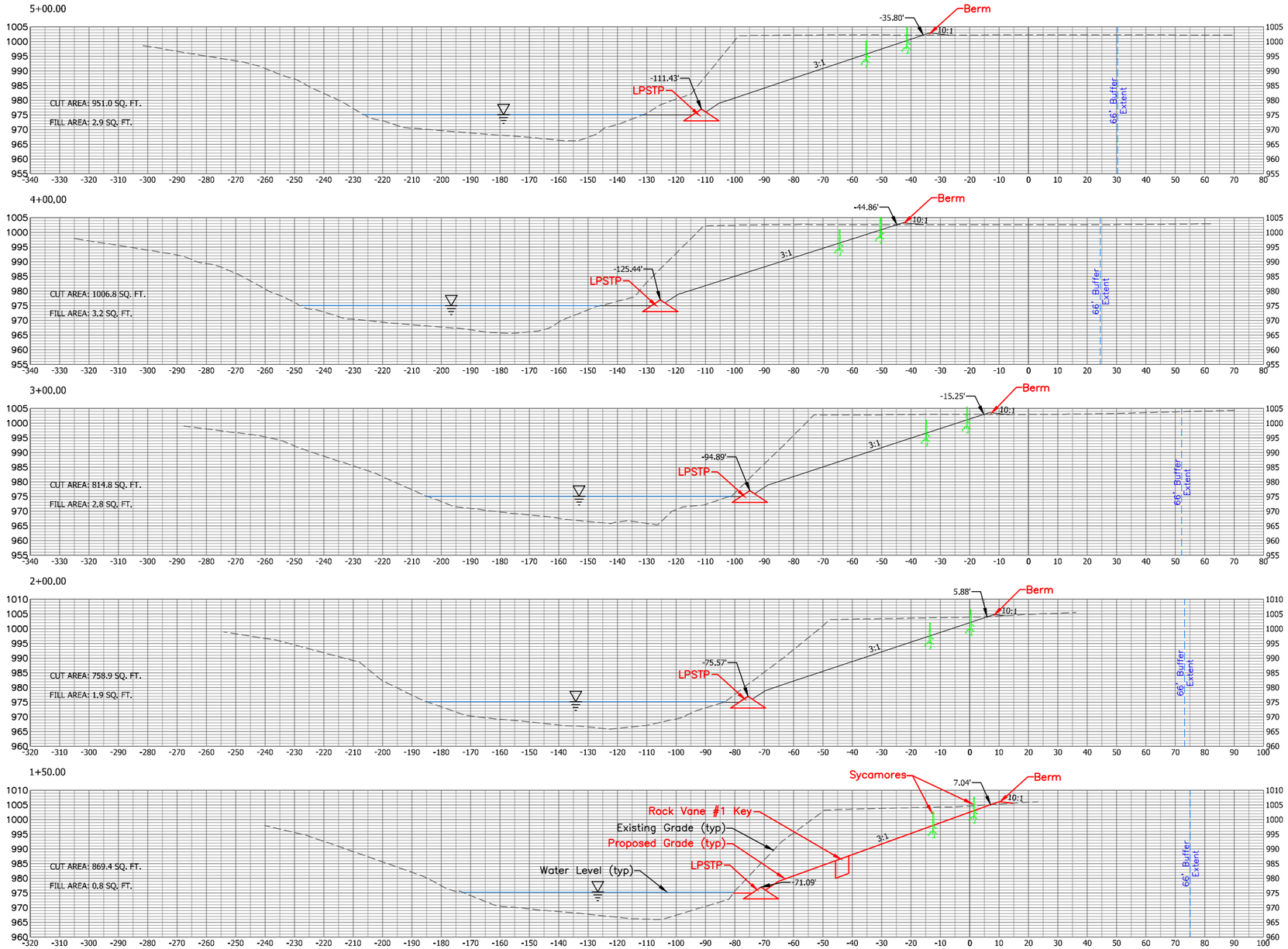

The first sycamore row is located 21-feet down-slope from top of bank. The second sycamore row is located 6-feet down-slope from top of bank. Within row spacing is 10-feet and between row spacing is 15-feet. Sycamores to be planted between March 1 - May 1.

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COTTONWOOD RIVER
CHASE COUNTY, KANSAS

SITE C112
CROSS SECTIONS

JOHN N. BROWNING LICENSED 10599 7-22-2020 KANSAS PROFESSIONAL ENGINEER

DESIGNED	PGB
DRAWN BY:	JAG
APPROVED BY:	JNB
DESIGN PROJ:	14668.119
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SCALETAG	AS NOTED
DATE:	10/18/18
DRAWING NO:	CO5
SHEET NO:	5 of 7

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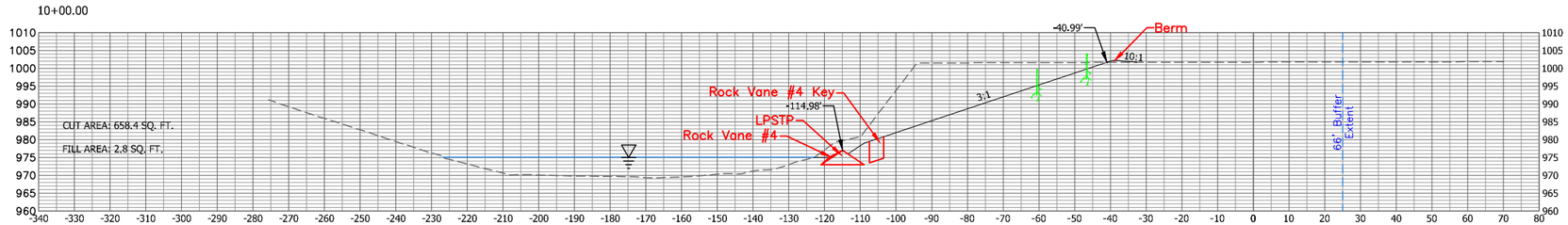

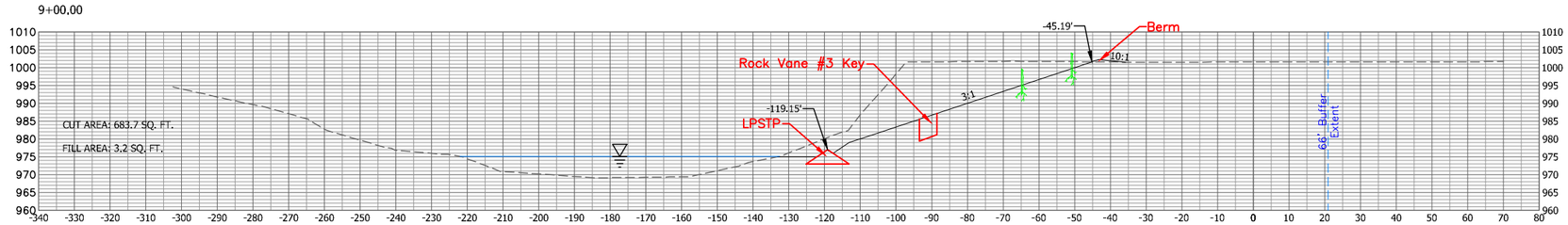

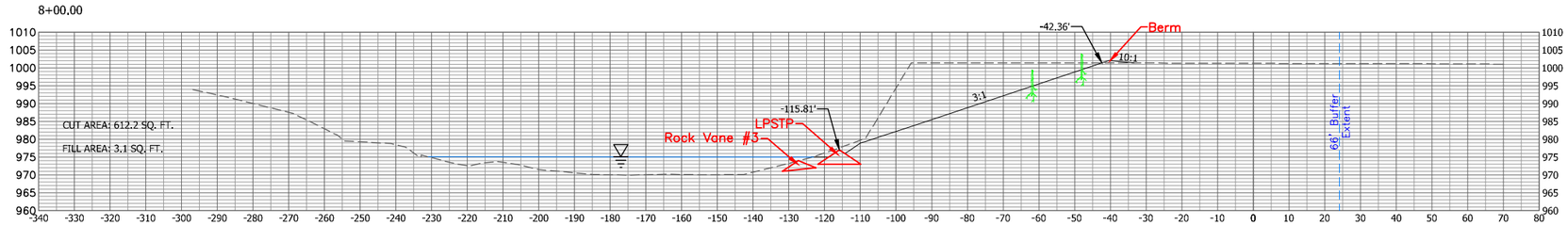

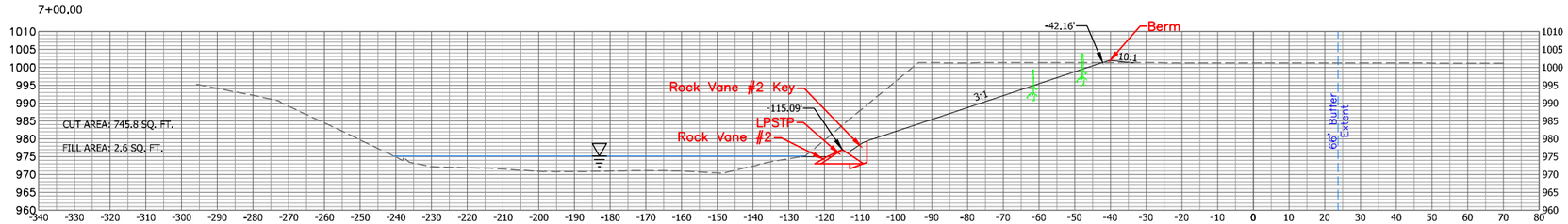

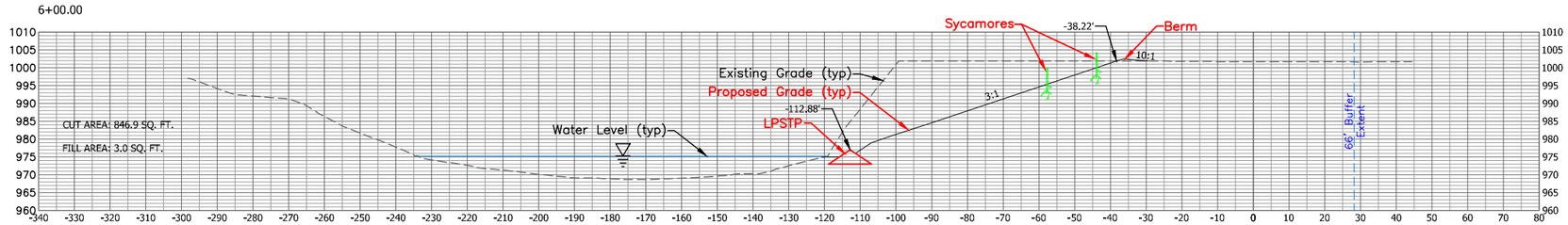

The first sycamore row is located 21-feet down-slope from top of bank. The second sycamore row is located 6-feet down-slope from top of bank. Within row spacing is 10-feet and between row spacing is 15-feet. Sycamores to be planted between March 1 - May 1.

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CHASE COUNTY, KANSAS

SITE C112
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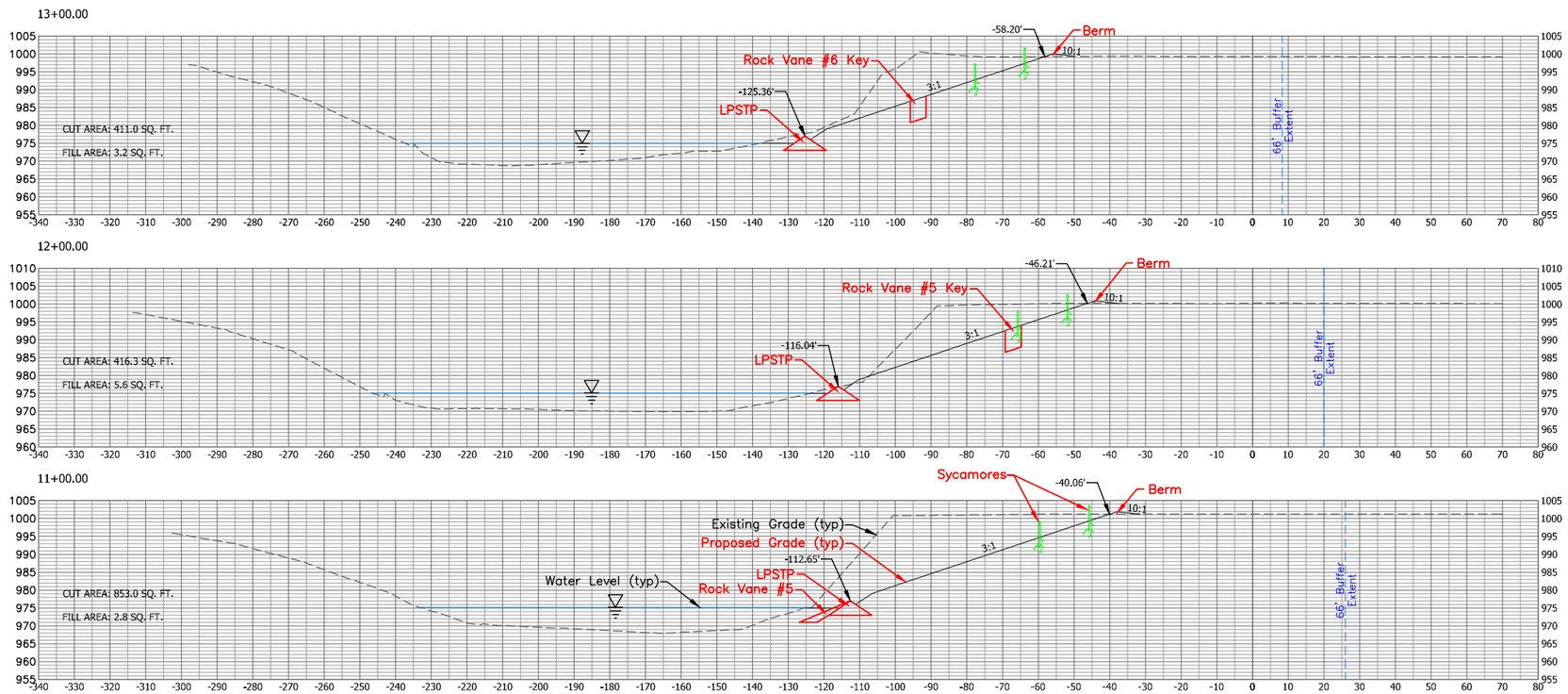

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