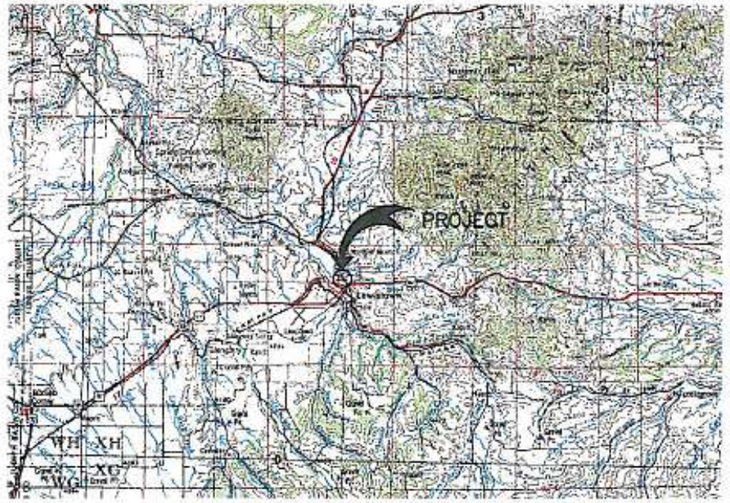
PLANS FOR THE CONSTRUCTION OF THE BIG SPRING CREEK RESTORATION PROJECT for MACHLER, ADAMS and MT FISH, WILDLIFE & PARKS EQUIP CONTRACTS #740325121YF & #7403251211JT in FERGUS COUNTY MONTANA

PREPARED BY

USDA United States Department of Agriculture
Natural Resources Conservation Service

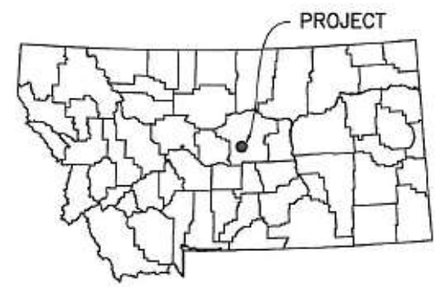
DRAFT



PROJECT LOCATION MAP

N 1/2, SW 1/4 Section 10 T15N R18E

7 0 7 14
Scale in Miles



MONTANA – FERGUS COUNTY

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Practice Standard 582 – Job Class V

GENERAL NOTES

1. *The project installer is responsible for the notification of all utility companies affected by this project. The project installer is responsible for determining the exact physical locations of all utilities affected by this project.*
2. *The landowners are responsible for acquiring all necessary approvals, permits and easements in regards to the installation of this project. The landowner and project installer are also responsible for compliance with all ordinances and laws pertaining to the installation of this project.*
3. *Survey work for the project was completed with Survey Grade GPS with the following settings: UTM Zone 12, NAD83 (CONUS MOL), Geoid Model 03, International Feet for Horizontal Coordinates and U. S. Survey Feet for Vertical Datum. Elevations were adjusted to NGVD29 based on surveyed NGS First Order Vertical Benchmarks (PID SR0347 – Designation L 195 & PID SR0348 – Designation J 195).*
4. *Survey reference stakes have been placed by NRCS in the field. It is the responsibility of the Contractor to protect Rebar #1, Rebar #3 and Rebar #4 from damage during construction.*
5. *These plans are intended to express the minimum requirements for the Stream Restoration Project. Any changes from the details shown in these plans will have the concurrence of both the Landowner and the NRCS Engineer prior to installation. Refer to the Special Provisions for additional requirements.*

		Date
Designed	K Hoffman	7/2014
Drawn	B Krueger	7/2014
Checked	K Hoffman	7/2014
Approved	----	

INDEX OF DRAWINGS
BIG SPRING CREEK RESTORATION PROJECT
MACHLER, ADAMS And MT FISH WILDLIFE & PARKS
FERGUS COUNTY MONTANA

USDA United States Department of Agriculture
Natural Resources Conservation Service

File No. BigSpCr_Cover.dwg
Drawing No. ####
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Sheet 1 of 27

SURVEY REFERENCE MAP

200 0 100 200
Scale in Feet

N

N 1/2, SW 1/4 Section 10 T15N R18E

– Survey Reference Point

Description	Northing	Easting	Elevation
Hub 1	17108635.67	2030717.97	3890.21
Hub 2	17108651.85	2030287.69	3887.70
Hub 3	17108549.03	2029755.52	3886.14
Hub 4	17108507.90	2031458.87	3894.49
Hub 5	17108475.72	2031251.87	3892.97
Hub 6	17108516.33	2031118.24	3890.68
Hub 10	17108546.25	2029929.51	3885.81
Hub 11	17108565.30	2030074.34	3887.02
Rebar 1-1	17108685.60	2031680.24	3899.94
Rebar 2	17108535.12	2031685.17	3901.25
Rebar 3	17109031.18	2031329.34	3894.12
Rebar 4	17108447.73	2029651.76	3885.00

NOTE: Survey work for the project was completed with Survey Grade GPS with the following settings: UTM Zone 12, NAD83 (CONUS MOL), Geoid Model 03, International Feet for both Vertical and Horizontal Datums. Elevations were adjusted to NGVD29 based on surveyed NGS First Order Vertical Benchmarks (PID SR0347 – Designation L 195 & Pid SR0348 – Designation J 195).

DRAFT

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Checked	K Hoffman	7/2014
Approved:		

SURVEY REFERENCE MAP
BIG SPRING CREEK RESTORATION PROJECT
MACHLER, ADAMS And MT FISH WILDLIFE & PARKS
FERGUS COUNTY MONTANA

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File No. BigSpCr_Sur.dwg

Drawing No. ####

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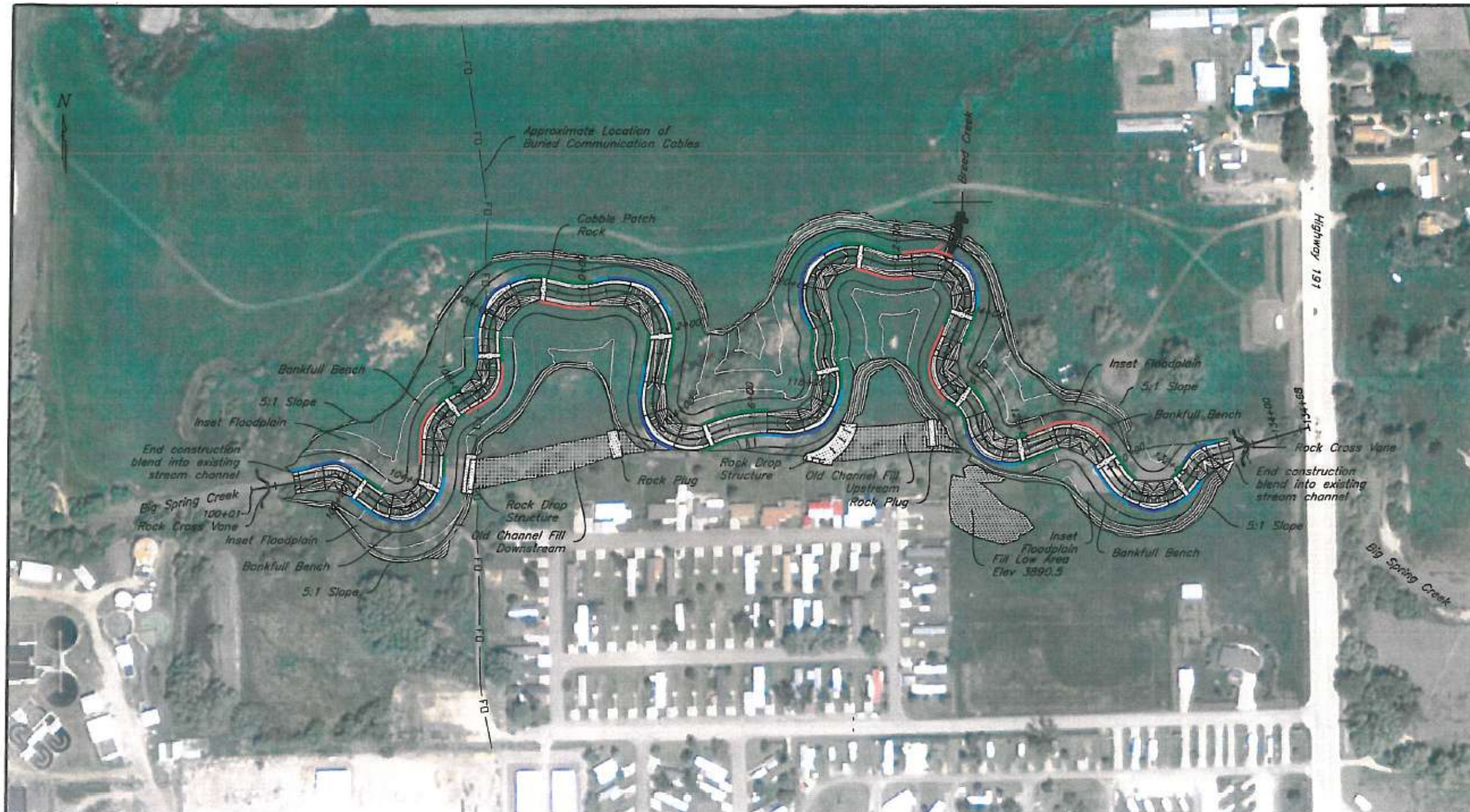

PLAN VIEW

BANK PROTECTION LEGEND

- Type I Bank Protection
- Type II Bank Protection
- Type III Bank Protection
- Type IV Bank Protection

PROPOSED CHANNEL CHARACTERISTICS	
Drainage Area:	185.5 sqmi
Bankfull Flow:	460 cfs
Slope:	0.0019 ft/ft
Sinuosity:	2.0
Bankfull Width:	43.6 ft
Bankfull Mean Depth:	3.0 ft
Stream Type:	C4
Valley Type:	VIII

DRAFT

100 0 100 200
Scale in Feet

LEGEND

- = Rock Cross Vane
- = Permanent Rock Plug

		Date
Designed	K Hoffman	7/2014
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Checked	K Hoffman	7/2014
Approved:		

PROJECT OVERVIEW
BIG SPRING CREEK RESTORATION PROJECT
MACHLER, ADAMS And MT FISH WILDLIFE & PARKS

FERGUS COUNTY MONTANA

USDA United States Department of Agriculture
Natural Resources Conservation Service

File No. BigSpPlanPro.dwg

Drawing No. ----

2/24/15 4:07 PM
Sheet 3 of 27

DRAFT

		Date
Designed	K Hoffman	7/2014
Drawn	B.Krueger	7/2014
Checked	K Hoffman	7/2014
Approved		

CONSTRUCTION NOTES

BIG SPRING CREEK RESTORATION PROJECT

MACHLER, ADAMS And MT FISH WILDLIFE & PARKS

FERGUS COUNTY MONTANA

USDA United States Department of Agriculture

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File No. BigSpCr_Const.dwg

Drawing No. ####

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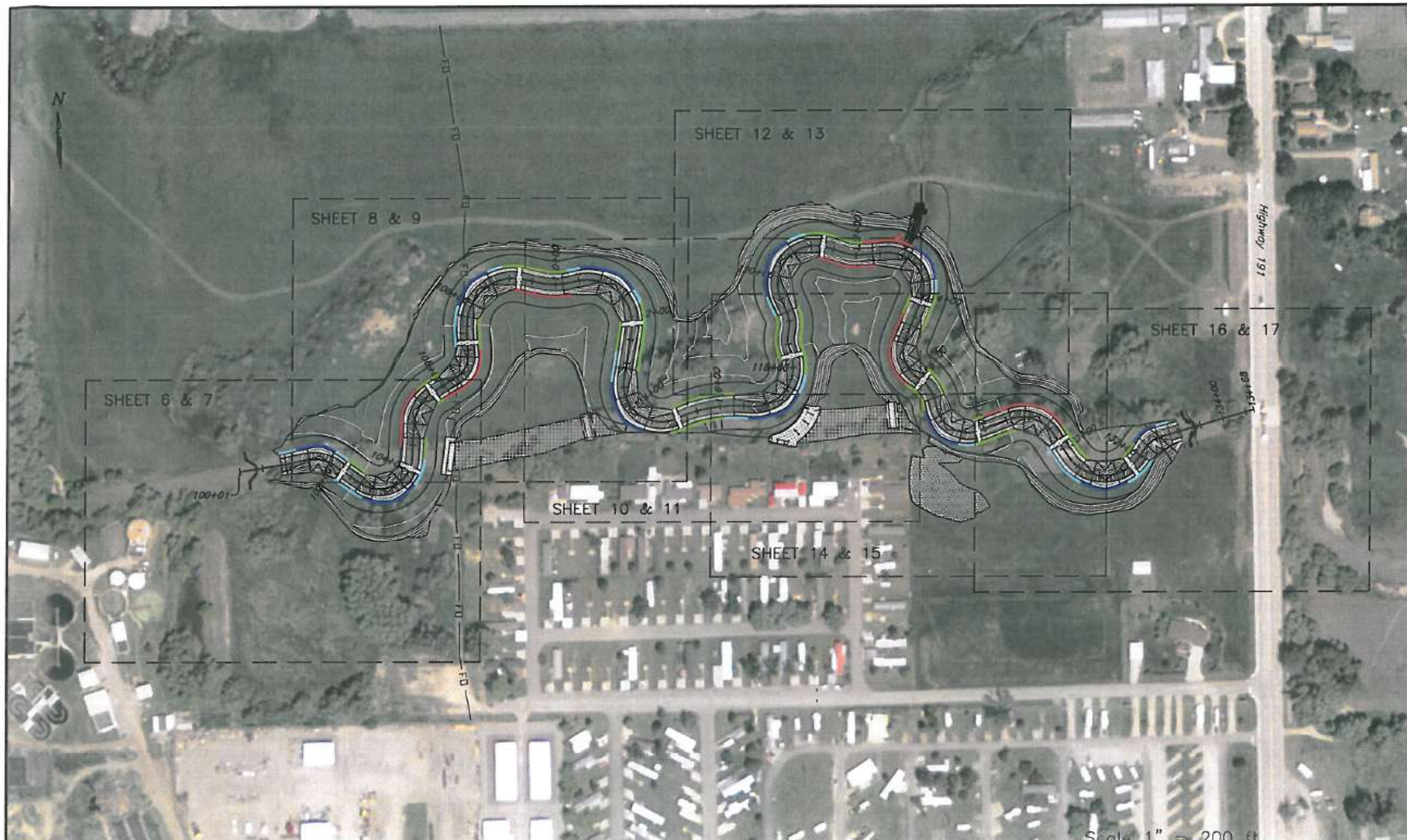

BANK PROTECTION LEGEND

- Type I Bank Protection
- Type II Bank Protection
- Type III Bank Protection
- Type IV Bank Protection

PLAN VIEW

DRAFT

100 0 100 200
Scale in Feet

		Date
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Drawn	B Krueger	7/2014
Checked	K Hoffman	7/2014
Approved:		

PLAN VIEW INDEX

BIG SPRING CREEK RESTORATION PROJECT

MACHLER, ADAMS And MT FISH WILDLIFE & PARKS

FERGUS COUNTY MONTANA

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File No. BigSpPlanPro.dwg

Drawing No. ----

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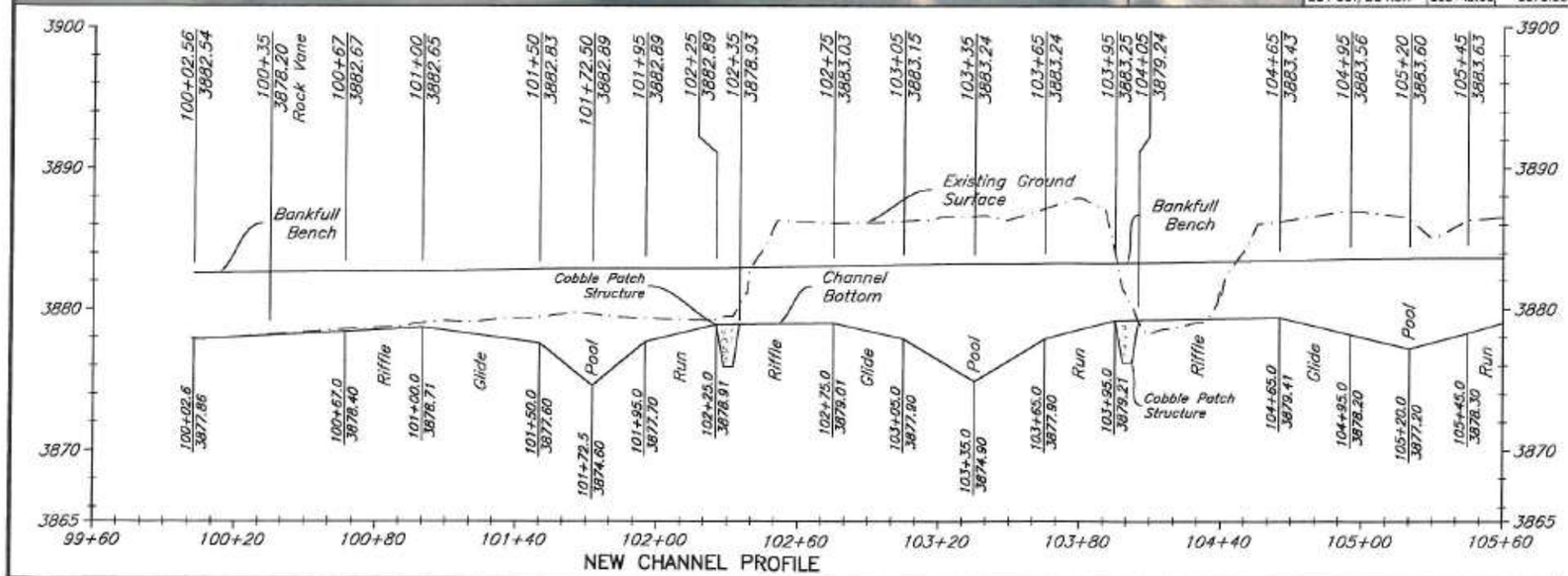
Sheet 5 of 27

PI	101+00.00	3878.71	3879.03	2029637.44	17108490.06	43.34			
PC	101+43.34	3877.75	3879.36	2029679.77	17108499.38	65.90	80.00	47.199	64.06
US Glide, DS Pool	101+50.00	3877.60	3,879.46	2029686.32	17108500.54				
Pool Bottom	101+72.50	3874.60	3,879.66	2029708.75	17108500.38				
US Pool, DS Run	101+95.00	3877.70	3,879.36	2029730.25	17108494.01				
PT	102+09.25	3878.28	3,879.29	2029742.61	17108486.96	65.10			
US Run, DS Riffile	102+25.00	3878.91	3,879.23	2029755.55	17108477.97				
PC	102+74.35	3879.01	3,886.10	2029796.08	17108449.82	148.17	69.62	121.9364	121.75
US Riffle, DS Glide	102+75.00	3879.01	3,886.10	2029796.62	17108449.45				
US Glide, DS Pool	103+05.00	3877.90	3,886.26	2029824.24	17108438.35				
Pool Bottom	103+35.00	3874.90	3,886.62	2029853.97	17108439.80				
US Pool, DS Run	103+65.00	3877.90	3,887.15	2029880.38	17108453.53				
US Run, DS Riffile	103+95.00	3879.21	3,884.04	2029898.64	17108477.05				
PT	104+22.51	3879.29	3878.79	2029905.33	17108503.55	70.12			
US Riffle, DS Glide	104+65.00	3879.41	3,886.23	2029907.44	17108545.98				
PC	104+92.63	3878.30	3,886.92	2029908.81	17108573.58	85.63	90.00	54.5133	82.44
US Glide, DS Pool	104+95.00	3878.20	3,886.93	2029908.96	17108575.94				
Pool Bottom	105+20.00	3877.20	3,886.38	2029914.27	17108600.29				
US Pool, DS Run	105+45.00	3878.30	3,886.33	2029926.06	17108622.25				



CHANNEL LAYOUT CHART

"PC" = Point of Curvature
"PT" = Point of Tangency
"PCC" = Point of Compound Curvature
"PRC" = Point of Reverse Curvature
"L" = Curve Length
"Delta <" = Angle at Curve Center Point (PC to PT)
"R" = Curve Radius
"C" = Chord Length
"O" = Curve Center Point

Note:
All stationing is located along approximate ℄ of channel.

DRAFT

		Date
Designed	K Hoffman	7/2014
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Approved		

PLAN & PROFILE STA 99+60–105+60
BIG SPRING CREEK RESTORATION PROJECT
MACHLER, ADAMS And MT FISH WILDLIFE & PARKS

FERGUS COUNTY MONTANA

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Drawing No. ----

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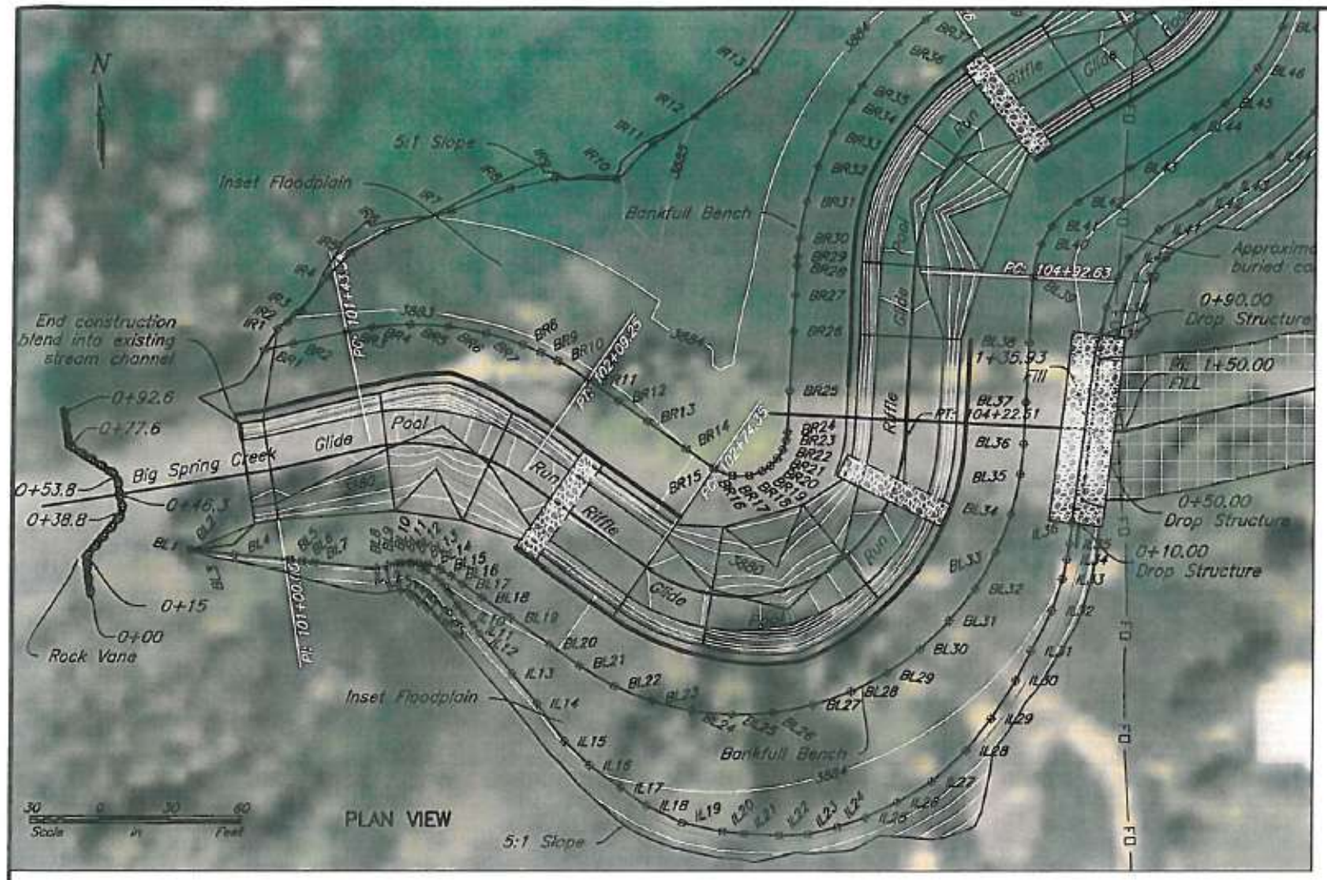
Sheet 6 of 27



Point Table Inset Flood Plain Right			
Point	Northing	Easting	Elevation
IR1	17108549.32	2029639.76	3882.89
IR2	17108552.37	2029644.00	3882.96
IR3	17108556.87	2029649.71	3883.06
IR4	17108570.89	2029660.65	3883.39
IR5	17108581.48	2029670.42	3883.63
IR6	17108590.82	2029686.09	3883.84
IR7	17108599.02	2029712.91	3884.09
IR8	17108608.30	2029737.36	3884.42
IR9	17108612.55	2029756.44	3884.65
IR10	17108612.24	2029782.62	3884.87
IR11	17108626.86	2029797.51	3885.32
IR12	17108638.63	2029815.03	3885.01
IR13	17108657.65	2029840.80	3884.64

BANK PROTECTION LEGEND

- Type I Bank Protection
- Type II Bank Protection
- Type III Bank Protection
- Type IV Bank Protection

Point Table Bankfull Bench Right			
Point	Northing	Easting	Elevation
BR1	17108540.55	2029634.20	3882.68
BR2	17108543.20	2029646.22	3882.72
BR3	17108548.21	2029669.02	3882.81
BR4	17108550.10	2029679.67	3882.83
BR5	17108551.25	2029695.87	3882.86
BR6	17108550.37	2029712.08	3882.88
BR7	17108547.48	2029728.06	3882.89
BR8	17108542.82	2029743.56	3882.89
BR9	17108539.48	2029751.05	3882.89
BR10	17108535.87	2029758.32	3882.89
BR11	17108528.03	2029771.13	3882.89
BR12	17108519.04	2029784.07	3882.89
BR13	17108510.48	2029796.39	3882.93
BR14	17108499.07	2029812.82	3882.99
BR15	17108490.89	2029824.60	3883.03
BR16	17108490.79	2029824.75	3883.03
BR17	17108487.66	2029832.54	3883.15
BR18	17108487.75	2029839.54	3883.23
BR19	17108489.60	2029844.85	3883.24
BR20	17108491.94	2029848.36	3883.24

Point Table Bankfull Bench Right			
Point	Northing	Easting	Elevation
BR21	17108494.97	2029851.29	3883.25
BR22	17108498.56	2029853.50	3883.25
BR23	17108502.54	2029854.90	3883.29
BR24	17108506.03	2029855.39	3883.32
BR25	17108523.50	2029856.26	3883.37
BR26	17108548.46	2029857.50	3883.43
BR27	17108563.45	2029858.24	3883.50
BR28	17108576.08	2029858.87	3883.55
BR29	17108579.74	2029859.10	3883.56
BR30	17108587.48	2029859.91	3883.57
BR31	17108602.75	2029862.80	3883.58
BR32	17108617.61	2029867.37	3883.60
BR33	17108631.88	2029873.56	3883.61
BR34	17108645.37	2029881.29	3883.62

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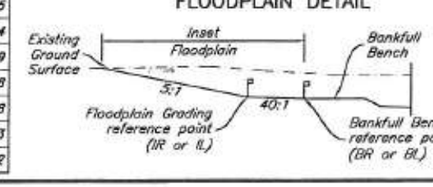
Point Table Inset Flood Plain Left			
Point #	Northing	Easting	Elevation
IL1	17108450.78	2029692.94	3882.83
IL2	17108450.70	2029697.08	3882.87
IL3	17108449.40	2029701.38	3882.93
IL4	17108448.10	2029703.45	3882.95
IL5	17108445.28	2029707.49	3882.98
IL6	17108443.23	2029709.82	3883.00
IL7	17108441.10	2029711.84	3883.02
IL8	17108438.62	2029713.44	3883.05
IL9	17108433.32	2029716.87	3883.11
IL10	17108429.96	2029719.56	3883.14
IL11	17108425.29	2029723.56	3883.19
IL12	17108421.59	2029726.23	3883.24
IL13	17108404.79	2029740.07	3883.44
IL14	17108392.03	2029750.72	3883.60
IL15	17108376.06	2029762.30	3883.82
IL16	17108365.85	2029773.11	3883.95
IL17	17108356.34	2029786.37	3884.08
IL18	17108348.86	2029797.20	3884.21
IL19	17108341.58	2029812.58	3884.34
IL20	17108337.74	2029829.48	3884.42
IL21	17108336.93	2029838.49	3884.45
IL22	17108336.10	2029853.37	3884.51
IL23	17108336.61	2029865.32	3884.55
IL24	17108339.85	2029877.97	3884.56
IL25	17108343.89	2029889.81	3884.55
IL26	17108350.28	2029903.19	3884.51
IL27	17108358.88	2029917.87	3884.48
IL28	17108372.13	2029931.93	3884.39
IL29	17108385.68	2029942.36	3884.29
IL30	17108401.82	2029952.63	3884.18
IL31	17108414.25	2029959.04	3884.11
IL32	17108431.35	2029967.73	3884.06
IL33	17108444.65	2029971.94	3884.01
IL34	17108452.52	2029973.71	3883.98
IL35	17108459.06	2029974.81	3883.96
IL36	17108467.81	2029975.80	3883.93
IL37	17108547.00	2029987.17	3884.19
IL38	17108558.50	2029989.79	3884.29
IL39	17108570.99	2029994.67	3884.52
IL40	17108579.50	2029999.33	3884.46
IL41	17108591.21	2030011.90	3884.42
IL42	17108602.33	2030029.41	3884.51
IL43	17108609.60	2030040.18	3884.56
IL44	17108622.08	2030058.41	3884.59

Point Table Rock Vane			
Point #	Station	Northing	Easting
2008	0+00	17108439.40	2029561.35
2009	0+15	17108454.20	2029558.94
2010	0+38.8	17108472.23	2029574.49
2011	0+46.3	17108479.63	2029573.28
2012	0+53.8	17108487.03	2029572.08
2013	0+77.6	17108499.21	2029551.63
2014	0+92.6	17108514.02	2029549.22

Point Table Bankfull Bench Left			
Point	Northing	Easting	Elevation
BL1	17108456.30	2029604.00	3882.66
BL2	17108456.29	2029604.04	3882.66
BL3	17108455.64	2029610.83	3882.66
BL4	17108454.51	2029622.56	3882.66
BL5	17108452.25	2029646.03	3882.67
BL6	17108451.78	2029650.99	3882.67
BL7	17108451.28	2029656.22	3882.69
BL8	17108448.76	2029682.37	3882.78
BL9	17108449.83	2029687.26	3882.79
BL10	17108450.55	2029690.52	3882.81
BL11	17108450.99	2029692.98	3882.83
BL12	17108451.25	2029696.72	3882.86
BL13	17108451.05	2029700.46	3882.88
BL14	17108450.38	2029704.15	3882.89
BL15	17108448.54	2029709.45	3882.89
BL16	17108445.90	2029714.08	3882.89
BL17	17108442.61	2029718.81	3882.89
BL18	17108436.91	2029727.02	3882.89
BL19	17108428.35	2029739.34	3882.93
BL20	17108416.94	2029755.77	3882.99
BL21	17108408.12	2029768.48	3883.03
BL22	17108399.50	2029783.33	3883.07
BL23	17108393.10	2029799.25	3883.11
BL24	17108389.04	2029815.93	3883.15
BL25	17108387.42	2029833.02	3883.18
BL26	17108388.25	2029850.17	3883.21
BL27	17108391.53	2029867.02	3883.24
BL28	17108397.19	2029883.23	3883.24
BL29	17108405.11	2029898.46	3883.24
BL30	17108415.13	2029912.40	3883.24
BL31	17108427.04	2029924.76	3883.24
BL32	17108440.60	2029935.29	3883.25
BL33	17108455.53	2029943.77	3883.25
BL34	17108471.51	2029950.03	3883.28
BL35	17108488.23	2029953.93	3883.30
BL36	17108501.06	2029955.27	3883.32
BL37	17108518.53	2029956.13	3883.37
BL38	17108543.50	2029957.38	3883.43
BL39	17108571.09	2029958.75	3883.55
BL40	17108585.03	2029962.00	3883.61
BL41	17108592.72	2029966.41	3883.63
BL42	17108602.79	2029977.12	3883.66

FLOODPLAIN DETAIL



		Date
Designed	K Hoffman	2/2015
Drawn	B Krueger	2/2015
Checked	K Hoffman	2/2015
Approved		

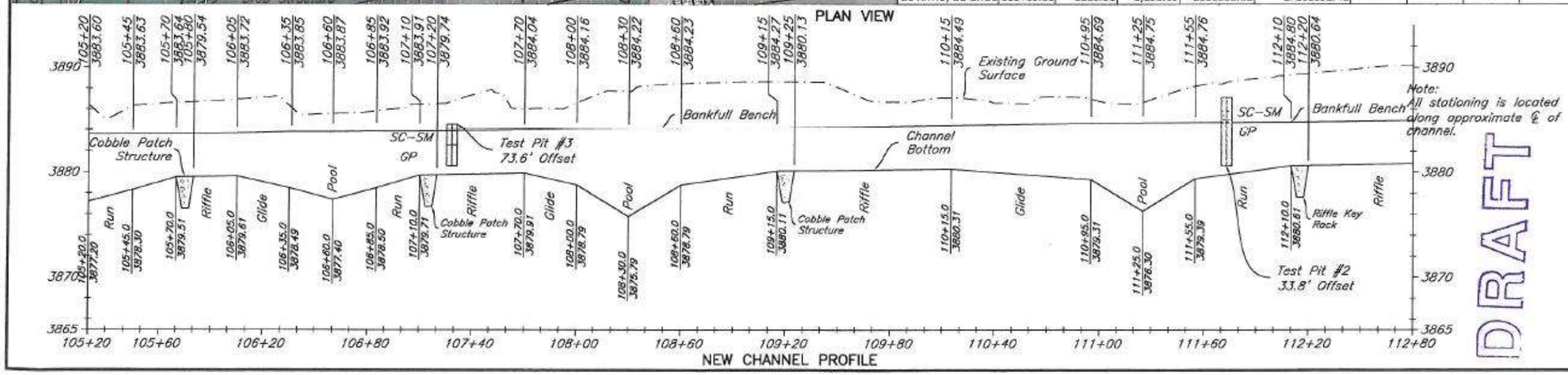
FLOODPLAIN GRADING STA 100+62–105+45
BIG SPRING CREEK RESTORATION PROJECT
MACHLER, ADAMS And MT FISH WILDLIFE & PARKS
FERGUS COUNTY MONTANA

USDA United States Department of Agriculture
Natural Resources Conservation Service

File No. BigSpGradingPlan.dwg
Drawing No. ----
2/24/15 6:47 AM
Sheet 7 of 27

Feature	Station	Design El.	Ground El.	Easting	Norhting	L (ft)	R (ft)	Delta <	C (ft)
US Run, DS Riffile	105+70.00	3879.51	3,886.62	2029943.42	17108640.13				
PT	105+78.26	3879.53	3,886.68	2029950.15	17108644.89	58.54			
US Riffle, DS Glide	106+05.00	3879.61	3,886.94	2029972.67	17108659.32				
US Glide, DS Pool	106+35.00	3878.49	3,886.34	2029997.94	17108675.50				
PC	106+36.79	3878.42	3,886.07	2029999.45	17108676.47	52.59	50.00	60.2658	50.20
Pool Bottom	106+60.00	3877.40	3,885.60	2030015.44	17108692.99				
US Pool, DS Run	106+85.00	3878.50	3,885.87	2030022.45	17108716.72				
PT	106+89.39	3878.71	3,885.94	2030022.41	17108721.11	57.16			
US Run, DS Riffile	107+10.00	3879.71	3,886.47	2030021.37	17108741.69				
PC	107+46.55	3879.83	3,887.70	2030019.52	17108778.19	185.41	100.00	106.2328	159.97
US Riffle, DS Glide	107+70.00	3879.91	3,886.04	2030021.07	17108801.54				
US Glide, DS Pool	108+00.00	3878.79	3,886.63	2030030.87	17108829.78				
Pool Bottom	108+30.00	3875.79	3,887.73	2030048.57	17108853.86				
US Pool, DS Run	108+60.00	3878.79	3,888.47	2030072.59	17108871.64				
US Run, DS Riffile	109+15.00	3880.11	3,888.64	2030125.69	17108883.06				
PT	109+31.96	3880.14	3,888.62	2030142.44	17108880.57	30.49			
PC	109+62.45	3880.21	3,887.22	2030172.11	17108873.54	67.96	150.00	25.9578	67.38
US Riffle, DS Glide	110+15.00	3880.31	3,887.14	2030224.31	17108870.54				
PT	110+30.41	3880.12	3,886.93	2030239.49	17108873.13	16.77			
PC	110+47.17	3879.91	3,886.62	2030255.85	17108876.80	184.68	95.00	111.3854	156.95
US Glide, DS Pool	110+95.00	3879.31	3,887.01	2030303.15	17108875.32				
Pool Bottom	111+25.00	3876.30	3,886.69	2030330.17	17108862.57				
US Pool, DS Run	111+55.00	3879.39	3,888.23	2030351.89	17108842.06				
US Run, DS Riffile	112+10.00	3880.61	3,889.31	2030371.34	17108791.44				
PT	112+31.86	3880.68	3,889.63	2030370.52	17108769.64	99.69			
US Riffle, DS Glide	113+10.00	3880.91	3,890.19	2030358.62	17108692.41				

PLAN VIEW



NEW CHANNEL PROFILE

Note: All stationing is located along approximate ℄ of channel.

DRAFT

Designed K Hoffman 7/2014
Drawn B Krueger 7/2014
Checked K Hoffman 7/2014
Approved

PLAN & PROFILE STA 105+60–112+80
BIG SPRING CREEK RESTORATION PROJECT
MACHLER, ADAMS And MT FISH WILDLIFE & PARKS
FERGUS COUNTY MONTANA

USDA United States Department of Agriculture
Natural Resources Conservation Service

File No. BigSpPlanPro.dwg
Drawing No.
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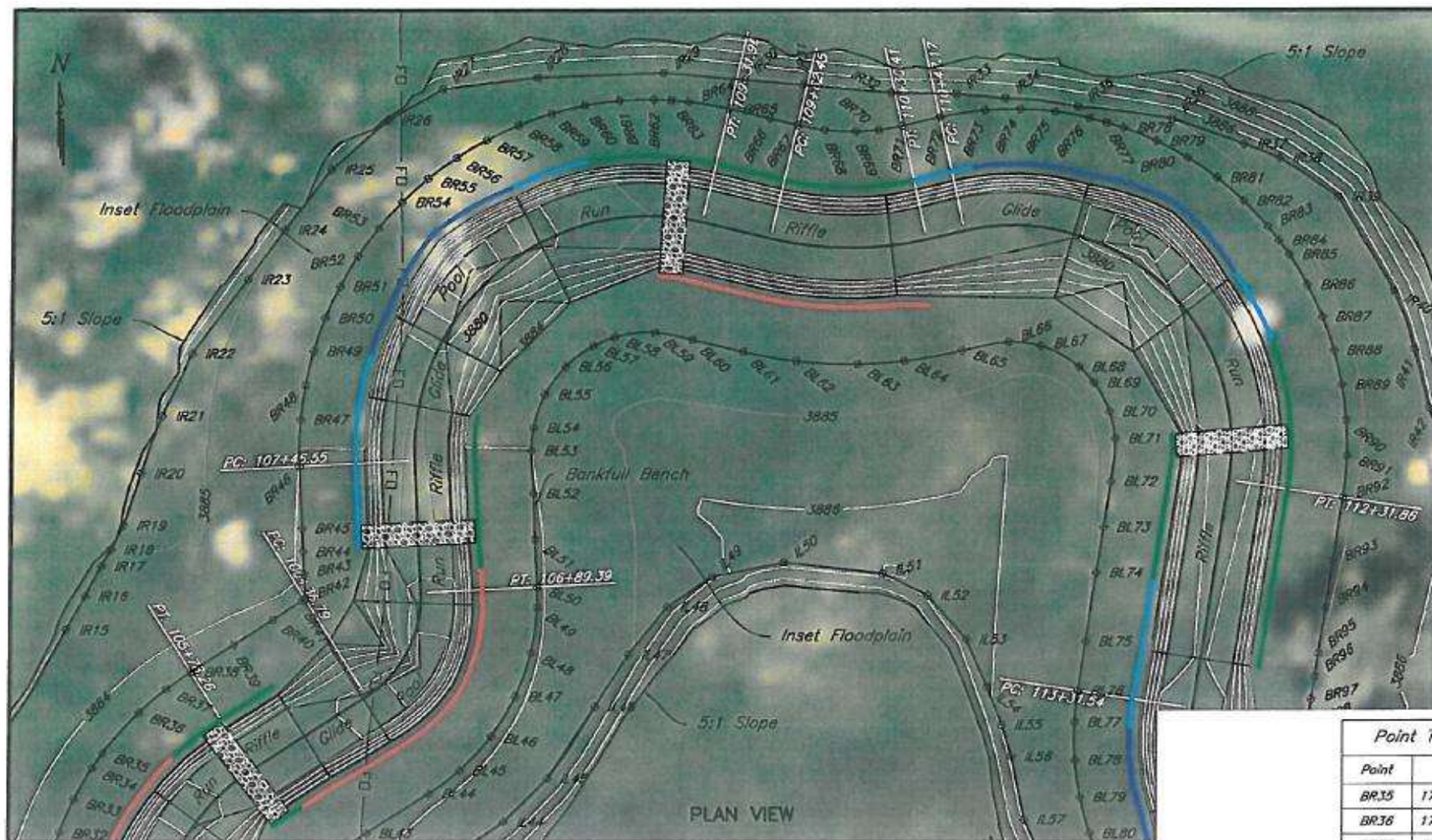
Sheet 8 of 25



30 0 30 60
Scale in Feet

Point Table Inset Flood Plain Left			
Point #	Northing	Easting	Elevation
IL44	17108622.08	2030058.41	3884.59
IL45	17108640.91	2030077.25	3884.63
IL46	17108671.93	2030097.73	3884.73
IL47	17108694.28	2030112.08	3884.95
IL48	17108715.16	2030128.62	3885.32
IL49	17108727.90	2030147.74	3885.81
IL50	17108734.26	2030178.89	3886.58
IL51	17108729.41	2030221.48	3886.75
IL52	17108720.01	2030240.83	3886.76
IL53	17108701.06	2030257.43	3886.31
IL54	17108680.33	2030266.55	3886.06
IL55	17108664.08	2030273.09	3885.89
IL56	17108650.34	2030277.39	3885.81

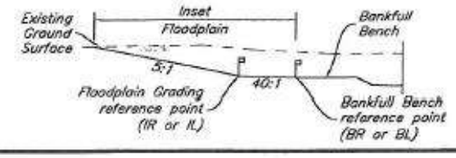
BANK PROTECTION LEGEND

- Type I Bank Protection
- Type II Bank Protection
- Type III Bank Protection
- Riffle Bank Protection

Point Table Bankfull Bench Left			
Point	Northing	Easting	Elevation
BL43	17108617.21	2029999.64	3883.72
BL44	17108634.36	2030026.42	3883.85
BL45	17108644.31	2030039.45	3883.86
BL46	17108659.09	2030052.87	3883.87
BL47	17108676.25	2030063.08	3883.88
BL48	17108695.09	2030069.68	3883.90
BL49	17108714.87	2030072.41	3883.92
BL50	17108723.64	2030072.35	3883.92
BL51	17108744.23	2030071.31	3883.91
BL52	17108764.20	2030070.29	3883.95
BL53	17108782.45	2030069.39	3884.00
BL54	17108792.40	2030070.23	3884.04
BL55	17108806.52	2030075.13	3884.16
BL56	17108818.56	2030083.98	3884.22
BL57	17108827.45	2030095.99	3884.23
BL58	17108831.22	2030105.23	3884.24
BL59	17108833.16	2030122.54	3884.27
BL60	17108830.06	2030138.74	3884.32

Point Table Bankfull Bench Left			
Point	Northing	Easting	Elevation
BL61	17108824.89	2030160.58	3884.37
BL62	17108820.84	2030183.62	3884.41
BL63	17108819.53	2030210.23	3884.46
BL64	17108820.89	2030230.18	3884.49
BL65	17108825.35	2030254.90	3884.54
BL66	17108829.07	2030275.15	3884.61
BL67	17108827.31	2030289.19	3884.69
BL68	17108818.40	2030305.75	3884.75
BL69	17108811.56	2030312.28	3884.76
BL70	17108799.12	2030319.04	3884.78
BL71	17108787.57	2030321.49	3884.80
BL72	17108769.20	2030319.86	3884.86
BL73	17108749.44	2030316.82	3884.90

FLOODPLAIN DETAIL



Point Table Inset Flood Plain Right			
Point	Northing	Easting	Elevation
IR15	17108705.11	2029869.70	3884.82
IR16	17108719.70	2029877.80	3884.97
IR17	17108732.59	2029884.63	3885.13
IR18	17108740.00	2029888.55	3885.24
IR19	17108750.31	2029894.02	3885.41
IR20	17108772.78	2029901.29	3885.70
IR21	17108797.40	2029910.13	3885.51
IR22	17108824.19	2029922.74	3885.32
IR23	17108855.98	2029946.43	3885.07
IR24	17108877.19	2029962.38	3885.00
IR25	17108903.18	2029982.54	3885.01
IR26	17108924.45	2030006.86	3884.99
IR27	17108937.61	2030030.17	3884.94
IR28	17108942.68	2030070.70	3884.66
IR29	17108944.70	2030125.43	3884.56
IR30	17108941.62	2030160.54	3884.65
IR31	17108939.42	2030185.61	3884.80
IR32	17108936.07	2030223.64	3884.89
IR33	17108935.45	2030251.86	3884.79
IR34	17108933.65	2030273.04	3884.73
IR35	17108930.06	2030304.61	3884.76
IR36	17108924.86	2030345.16	3885.01
IR37	17108913.85	2030376.32	3885.22
IR38	17108907.85	2030391.57	3885.35
IR39	17108891.03	2030417.29	3885.55

Point Table Bankfull Bench Right			
Point	Northing	Easting	Elevation
BR35	17108651.77	2029885.71	3883.63
BR36	17108659.37	2029900.98	3883.64
BR37	17108679.58	2029912.70	3883.64
BR38	17108687.00	2029923.19	3883.66
BR39	17108698.72	2029941.50	3883.71
BR40	17108709.51	2029958.34	3883.79
BR41	17108717.60	2029970.97	3883.85
BR42	17108718.57	2029972.48	3883.92
BR43	17108729.17	2029971.94	3883.91
BR44	17108739.16	2029971.43	3883.91
BR45	17108749.14	2029970.93	3883.93
BR46	17108775.66	2029969.58	3883.99
BR47	17108795.82	2029969.91	3884.02
BR48	17108810.68	2029971.91	3884.04
BR49	17108825.27	2029975.39	3884.08
BR50	17108839.43	2029980.30	3884.12
BR51	17108853.04	2029986.60	3884.16
BR52	17108865.94	2029994.23	3884.18
BR53	17108878.03	2030003.11	3884.20
BR54	17108889.16	2030013.15	3884.22
BR55	17108899.24	2030024.26	3884.22
BR56	17108908.15	2030036.31	3884.23
BR57	17108915.82	2030049.19	3884.23
BR58	17108922.17	2030062.78	3884.24
BR59	17108927.13	2030076.93	3884.24
BR60	17108930.65	2030091.50	3884.25

Point Table Bankfull Bench Right			
Point	Northing	Easting	Elevation
BR61	17108932.69	2030106.36	3884.26
BR62	17108933.25	2030121.34	3884.27
BR63	17108932.96	2030128.83	3884.27
BR64	17108932.30	2030136.30	3884.28
BR65	17108929.22	2030153.96	3884.31
BR66	17108925.06	2030171.52	3884.35
BR67	17108922.19	2030183.63	3884.37
BR68	17108920.17	2030195.15	3884.41
BR69	17108919.52	2030208.46	3884.46
BR70	17108920.19	2030218.43	3884.49
BR71	17108921.92	2030228.55	3884.53
BR72	17108925.59	2030244.91	3884.57
BR73	17108928.57	2030264.25	3884.60
BR74	17108929.07	2030279.49	3884.63
BR75	17108927.97	2030294.71	3884.65
BR76	17108925.27	2030309.73	3884.68
BR77	17108923.33	2030317.11	3884.69
BR78	17108921.01	2030324.37	3884.70
BR79	17108915.23	2030338.50	3884.72
BR80	17108908.01	2030351.93	3884.74
BR81	17108899.41	2030364.53	3884.75
BR82	17108889.53	2030376.16	3884.75
BR83	17108878.49	2030386.69	3884.76
BR84	17108872.57	2030391.50	3884.76
BR85	17108866.40	2030396.00	3884.76
BR86	17108853.41	2030403.99	3884.77

DRAFT

		Date
Designed	K Hoffman	2/2015
Drawn	B Krueger	2/2015
Checked	K Hoffman	2/2015
Approved		

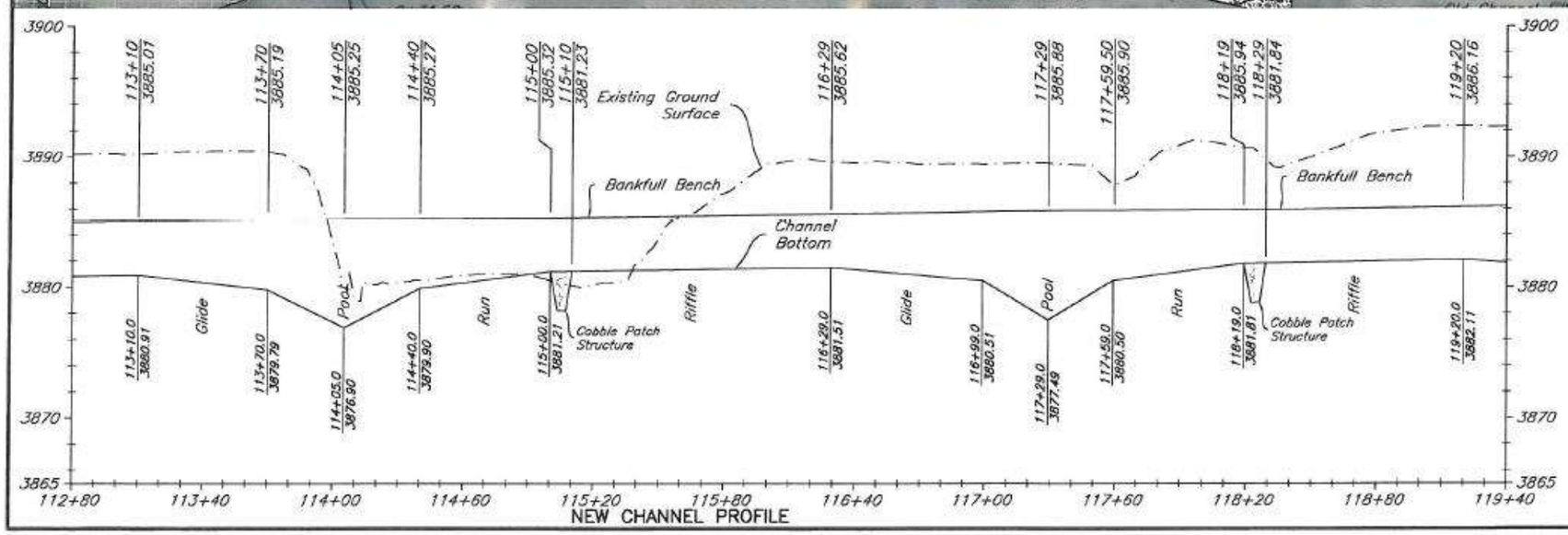
FLOODPLAIN GRADING STA 105+45–111+55
BIG SPRING CREEK RESTORATION PROJECT
MACHLER, ADAMS And MT FISH WILDLIFE & PARKS
FERGUS COUNTY MONTANA

USDA United States Department of Agriculture
Natural Resources Conservation Service

File No. BigSpGradingPlan.dwg
Drawing No. ---

2/24/15 6:47 AM
Sheet 9 of 27

Feature	Station	Design El.	Ground El.	Easting	Northing	L (ft)	R (ft)	Delta <	C (ft)
PC	113+31.54	3880.51	3,890.42	2030355.34	17108671.12	172.26	79.99	123.3858	140.85
US Glide, DS Pool	113+70.00	3879.79	3,890.37	2030358.68	17108633.18				
Pool Bottom	114+05.00	3876.90	3,880.00	2030376.73	17108603.52				
US Pool, DS Run	114+40.00	3879.90	3,880.54	2030405.65	17108584.30				
US Run, DS Riffle	115+00.00	3881.21	3,880.51	2030464.25	17108584.73				
PT	115+03.80	3881.22	3,880.33	2030467.74	17108586.23	158.39	297.75	30.478	156.53
US Riffle, DS Glide	116+29.00	3881.51	3,889.61	2030589.03	17108613.31				
PRC	116+62.19	3881.04	3,889.59	2030622.17	17108611.78	171.88	83.00	118.6511	142.77
US Glide, DS Pool	116+99.00	3880.51	3,889.41	2030658.42	17108616.14				
Pool Bottom	117+29.00	3877.49	3,889.51	2030684.28	17108631.02				
US Pool, DS Run	117+59.00	3880.50	3,887.87	2030703.21	17108654.09				
US Run, DS Riffle	118+19.00	3881.81	3,890.70	2030711.68	17108712.17				
PT	118+34.07	3881.86	3,889.17	2030707.13	17108726.52	1.31			
PC	118+35.38	3881.86	3,889.15	2030706.62	17108727.73	41.22	64.30	36.7306	40.52
PRC	118+76.60	3881.98	3,891.69	2030703.49	17108768.12	44.09	64.30	39.2884	43.23
US Riffle, DS Glide	119+20.00	3882.11	3,892.34	2030699.47	17108810.51				
PT	119+20.69	3882.10	3,892.34	2030699.18	17108811.14	28.08			



30 0 30 60
Scale in Feet

DRAFT

CHANNEL LAYOUT CHART

"PC" = Point of Curvature
"PT" = Point of Tangency
"PCC" = Point of Compound Curvature
"PRC" = Point of Reverse Curvature
"L" = Curve Length
"Delta <" = Angle at Curve Center Point (PC to PT)
"R" = Curve Radius
"C" = Chord Length
"O" = Curve Center Point

Note:
All stationing is located along approximate ℄ of channel.

		Date
Designed	K Hoffman	7/2014
Drawn	B Krueger	7/2014
Checked	K Hoffman	7/2014
Approved		

PLAN & PROFILE STA 112+80–119+40
BIG SPRING CREEK RESTORATION PROJECT
MACHLER, ADAMS And MT FISH WILDLIFE & PARKS
FERGUS COUNTY MONTANA

USDA United States Department of Agriculture
Natural Resources Conservation Service

File No. BigSpPlanPro.dwg
Drawing No. ----
2/24/15 4:07 PM
Sheet 10 of 27

PLAN VIEW

Point Table Inset Flood Plain Left			
Point #	Northing	Easting	Elevation
IL57	17108623.09	2030283.08	3885.81
IL58	17108602.56	2030292.52	3885.76
IL59	17108588.87	2030311.74	3885.50
IL60	17108582.56	2030327.22	3885.27
IL61	17108707.86	2030763.14	3885.94
IL62	17108726.12	2030773.32	3886.22

BANK PROTECTION LEGEND

- Type I Bank Protection
- Type II Bank Protection
- Type III Bank Protection
- Riffle Bank Protection

Point Table Bankfull Bench Left			
Point	Northing	Easting	Elevation
BL74	17108729.67	2030313.77	3884.95
BL75	17108700.02	2030309.21	3885.01
BL76	17108678.73	2030305.93	3885.07
BL77	17108665.06	2030304.56	3885.10
BL78	17108648.82	2030304.81	3885.13
BL79	17108632.74	2030307.08	3885.16
BL80	17108617.07	2030311.34	3885.19
BL81	17108602.05	2030317.52	3885.21
BL82	17108587.92	2030325.53	3885.22
BL83	17108581.22	2030330.52	3885.23
BL84	17108580.11	2030333.24	3885.24
BL85	17108574.63	2030352.51	3885.25
BL86	17108571.50	2030371.98	3885.26
BL87	17108565.75	2030387.14	3885.27
BL88	17108561.15	2030398.87	3885.27
BL89	17108557.89	2030414.56	3885.28
BL90	17108555.53	2030442.76	3885.30
BL91	17108555.07	2030455.27	3885.31
BL92	17108555.22	2030481.80	3885.31
BL93	17108555.37	2030471.39	3885.32
BL94	17108556.01	2030523.08	3885.47
BL95	17108556.18	2030532.75	3885.47
BL96	17108556.31	2030541.98	3885.48
BL97	17108553.13	2030566.29	3885.55

Point Table Bankfull Bench Left			
Point	Northing	Easting	Elevation
BL98	17108548.56	2030601.39	3885.65
BL99	17108545.43	2030658.28	3885.79
BL100	17108544.63	2030673.86	3886.21
BL101	17108545.55	2030677.10	3886.20
BL102	17108550.35	2030689.76	3886.18
BL103	17108557.90	2030703.13	3886.13
BL104	17108568.52	2030716.19	3886.07
BL105	17108576.90	2030723.85	3886.01
BL106	17108591.92	2030733.83	3885.89
BL107	17108606.14	2030740.03	3885.90
BL108	17108614.72	2030743.37	3885.90
BL109	17108628.43	2030748.05	3885.90
BL110	17108638.98	2030750.68	3885.90
BL111	17108658.49	2030754.76	3885.92
BL112	17108692.71	2030760.33	3885.93
BL113	17108706.97	2030762.98	3885.93
BL114	17108716.62	2030781.74	3885.93
BL115	17108732.22	2030758.11	3885.94
BL116	17108745.90	2030753.23	3885.96
BL117	17108749.13	2030752.04	3885.99
BL118	17108756.09	2030752.02	3886.06
BL119	17108761.99	2030753.32	3886.07
BL120	17108779.64	2030755.31	3886.09
BL121	17108794.99	2030754.81	3886.11

Point Table Inset Flood Plain Right			
Point	Northing	Easting	Elevation
IR40	17108850.70	2030441.54	3885.60
IR41	17108825.92	2030450.38	3885.63
IR42	17108800.41	2030456.79	3885.70
IR43	17108792.80	2030461.08	3885.80
IR44	17108790.98	2030471.98	3886.07
IR45	17108790.45	2030486.71	3886.44
IR46	17108790.05	2030498.01	3886.72
IR47	17108798.37	2030515.27	3887.16
IR48	17108814.48	2030533.18	3888.85
IR49	17108823.95	2030545.79	3888.48
IR50	17108840.45	2030567.75	3887.85

Point Table Bankfull Bench Right			
Point	Northing	Easting	Elevation
BR87	17108839.64	2030410.56	3884.78
BR88	17108825.26	2030415.66	3884.79
BR89	17108810.42	2030419.21	3884.79
BR90	17108795.30	2030421.19	3884.80
BR91	17108780.05	2030421.57	3884.82
BR92	17108762.03	2030419.93	3884.85
BR93	17108734.22	2030415.65	3884.90
BR94	17108714.45	2030412.61	3884.95
BR95	17108694.68	2030409.56	3884.99
BR96	17108684.80	2030408.04	3885.01
BR97	17108674.92	2030406.52	3885.04
BR98	17108663.51	2030404.76	3885.07
BR99	17108656.61	2030404.50	3885.13
BR100	17108649.28	2030406.01	3885.19
BR101	17108642.56	2030409.28	3885.22
BR102	17108635.85	2030414.12	3885.25
BR103	17108632.52	2030420.22	3885.26
BR104	17108630.96	2030423.62	3885.27
BR105	17108629.16	2030430.88	3885.29
BR106	17108629.22	2030438.36	3885.30
BR107	17108631.12	2030445.59	3885.32
BR108	17108634.63	2030453.51	3885.34
BR109	17108639.10	2030464.31	3885.37
BR110	17108643.20	2030475.24	3885.39
BR111	17108646.93	2030486.31	3885.41
BR112	17108650.28	2030497.49	3885.43

Point Table Bankfull Bench Right			
Point	Northing	Easting	Elevation
BR113	17108653.26	2030508.79	3885.46
BR114	17108655.86	2030520.17	3885.48
BR115	17108658.08	2030531.64	3885.50
BR116	17108659.90	2030543.17	3885.53
BR117	17108661.34	2030554.76	3885.55
BR118	17108662.39	2030566.39	3885.57
BR119	17108663.05	2030578.05	3885.60
BR120	17108663.32	2030589.73	3885.62
BR121	17108663.19	2030601.41	3885.64
BR122	17108662.68	2030613.08	3885.67
BR123	17108661.52	2030627.26	3885.70
BR124	17108661.55	2030634.33	3885.75
BR125	17108663.39	2030642.05	3885.81
BR126	17108667.01	2030649.11	3885.85
BR127	17108672.21	2030655.09	3885.89
BR128	17108678.69	2030659.67	3885.90
BR129	17108686.07	2030662.57	3885.91
BR130	17108693.94	2030663.62	3885.92
BR131	17108701.82	2030662.76	3885.94
BR132	17108708.35	2030660.53	3885.96
BR133	17108716.02	2030657.62	3885.98
BR134	17108733.24	2030653.26	3886.00
BR135	17108750.92	2030651.61	3886.02
BR136	17108768.64	2030652.72	3886.04
BR137	17108780.89	2030655.12	3886.07

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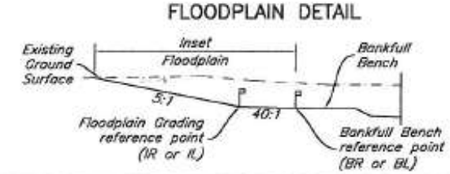
FLOODPLAIN DETAIL



		Date
Designed	K Hoffman	2/2015
Drawn	B Krueger	2/2015
Checked	K Hoffman	2/2015
Approved		

FLOODPLAIN GRADING STA 111+55–119+40
BIG SPRING CREEK RESTORATION PROJECT
MACHLER, ADAMS And MT FISH WILDLIFE & PARKS
FERGUS COUNTY MONTANA

USDA United States Department of Agriculture
Natural Resources Conservation Service

File No. BigSpGradingPlan.dwg

Drawing No. ----

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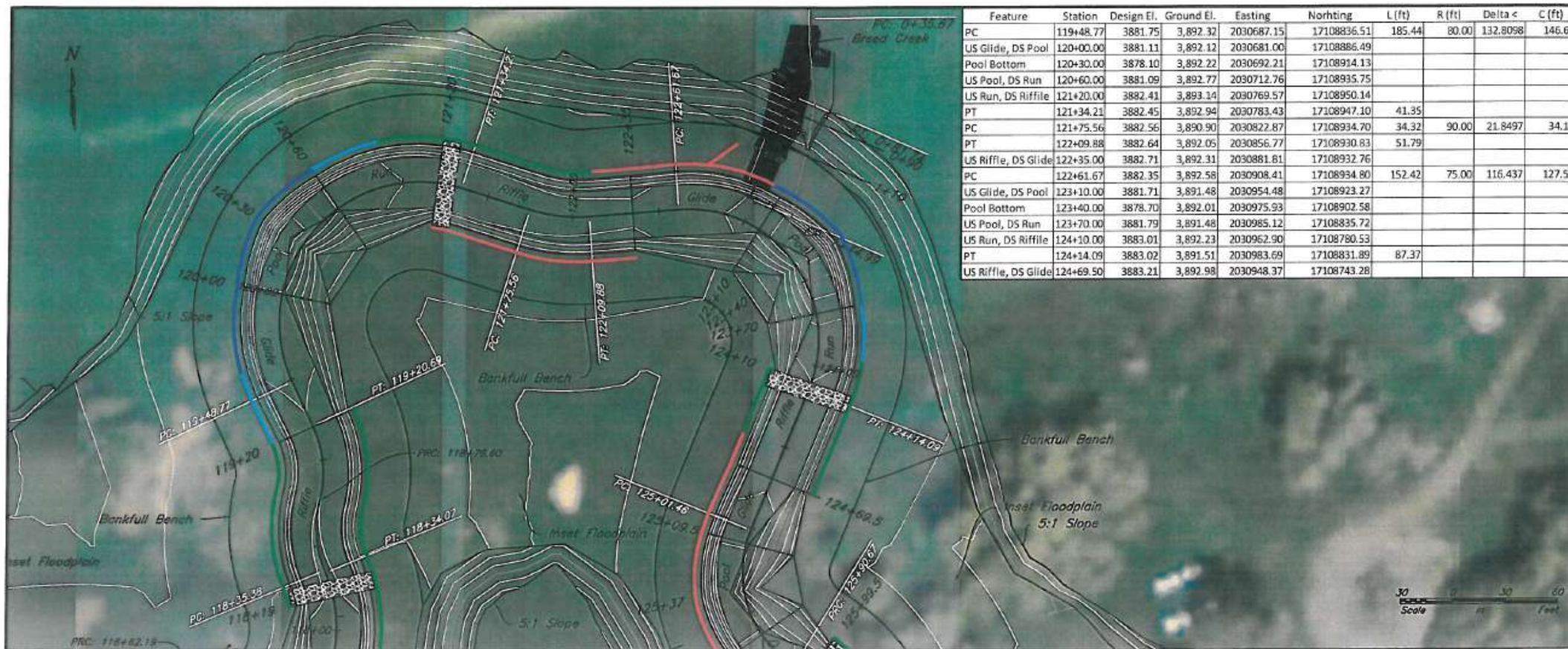
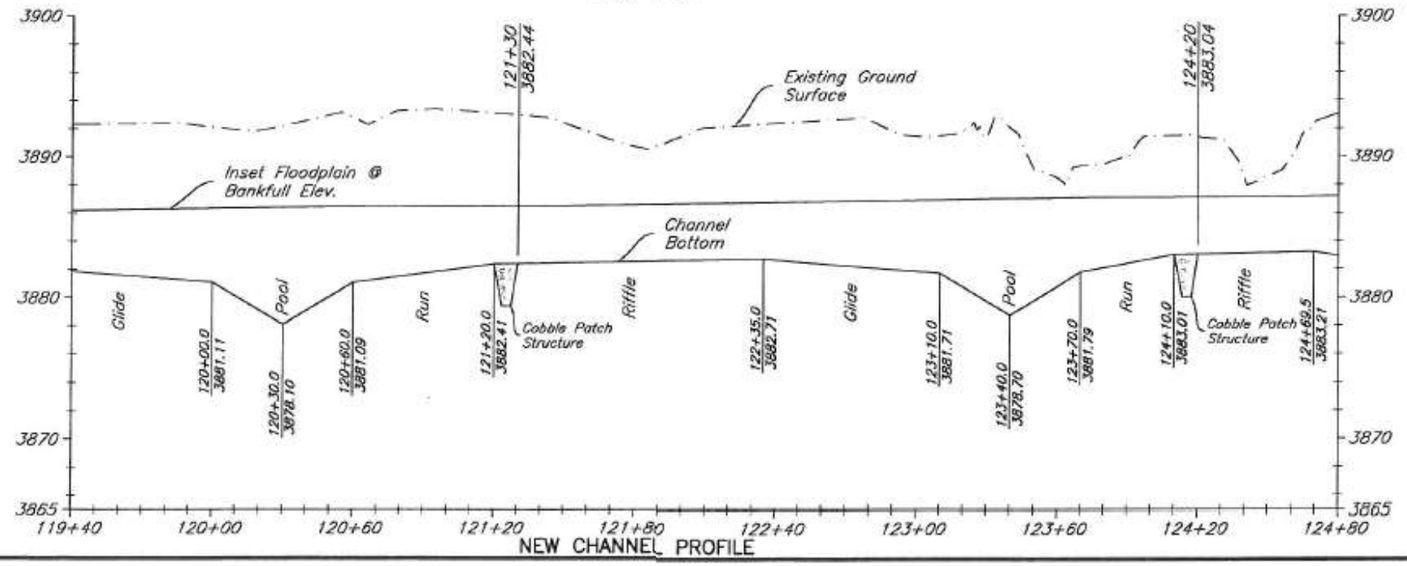
Feature	Station	Design El.	Ground El.	Easting	Norhting	L (ft)	R (ft)	Delta <	C (ft)
PC	119+48.77	3881.75	3,892.32	2030687.15	17108836.51	185.44	80.00	132.8098	146.62
US Glide, DS Pool	120+00.00	3881.11	3,892.12	2030681.00	17108886.49				
Pool Bottom	120+30.00	3878.10	3,892.22	2030692.21	17108914.13				
US Pool, DS Run	120+60.00	3881.09	3,892.77	2030712.76	17108935.75				
US Run, DS Riffile	121+20.00	3882.41	3,893.14	2030769.57	17108950.14				
PT	121+34.21	3882.45	3,892.94	2030783.43	17108947.10	41.35			
PC	121+75.56	3882.56	3,890.90	2030822.87	17108934.70	34.32	90.00	21.8497	34.11
PT	122+09.88	3882.64	3,892.05	2030856.77	17108930.83	51.79			
US Riffle, DS Glide	122+35.00	3882.71	3,892.31	2030881.81	17108932.76				
PC	122+61.67	3882.35	3,892.58	2030908.41	17108934.80	152.42	75.00	116.437	127.51
US Glide, DS Pool	123+10.00	3881.71	3,891.48	2030954.48	17108923.27				
Pool Bottom	123+40.00	3878.70	3,892.01	2030975.93	17108902.58				
US Pool, DS Run	123+70.00	3881.79	3,891.48	2030985.12	17108835.72				
US Run, DS Riffile	124+10.00	3883.01	3,892.23	2030962.90	17108780.53				
PT	124+14.09	3883.02	3,891.51	2030983.69	17108831.89	87.37			
US Riffle, DS Glide	124+69.50	3883.21	3,892.98	2030948.37	17108743.28				



PLAN VIEW



NEW CHANNEL PROFILE

CHANNEL LAYOUT CHART

"PC" = Point of Curvature
"PT" = Point of Tangency
"PCC" = Point of Compound Curvature
"PRC" = Point of Reverse Curvature
"L" = Curve Length
"Delta <" = Angle at Curve Center Point (PC to PT)
"R" = Curve Radius
"C" = Chord Length
"O" = Curve Center Point

DRAFT

Note:
All stationing is located along approximate ℄ of channel.

		Date
Designed	K Hoffman	7/2014
Drawn	B Krueger	7/2014
Checked	K Hoffman	7/2014
Approved		

PLAN & PROFILE STA. 119+40–124+80
BIG SPRING CREEK RESTORATION PROJECT
MACHLER, ADAMS And MT FISH WILDLIFE & PARKS
FERGUS COUNTY MONTANA

USDA United States Department of Agriculture
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File No. BigSpPlanPro.dwg
Drawing No. ----
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30 0 30 60
Scale in Feet

PLAN VIEW

Point Table Inset Flood Plain Right			
Point	Northing	Easting	Elevation
IR51	17108853.69	2030585.36	3887.35
IR52	17108860.88	2030591.89	3887.16
IR53	17108879.67	2030602.44	3886.87
IR54	17108906.57	2030615.39	3886.61
IR55	17108933.09	2030627.85	3886.52
IR56	17108956.24	2030641.11	3886.52
IR57	17108980.96	2030662.49	3886.55
IR58	17108996.12	2030688.28	3886.53
IR59	17109007.76	2030730.59	3886.55
IR60	17109004.75	2030773.82	3886.61
IR61	17108999.34	2030797.74	3886.71
IR62	17108990.24	2030861.70	3887.03
IR63	17108987.50	2030887.12	3886.97
IR64	17108940.98	2031012.42	3887.15
IR65	17108935.71	2031017.03	3887.16
IR66	17108923.51	2031024.45	3887.16
IR67	17108905.59	2031033.11	3887.17
IR68	17108886.97	2031039.43	3887.19
IR69	17108870.64	2031044.50	3887.26
IR70	17108835.64	2031055.36	3887.58
IR71	17108819.71	2031060.30	3887.79
IR72	17108798.43	2031068.09	3888.16
IR73	17108779.46	2031075.03	3888.53
IR74	17108761.63	2031081.55	3888.88
IR75	17108743.83	2031091.91	3889.53

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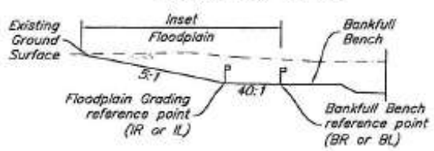
Point Table Inset Flood Plain Left			
Point #	Northing	Easting	Elevation
IL63	17108739.90	2030799.14	3886.95
IL64	17108743.01	2030844.27	3888.75
IL65	17108725.03	2030875.08	3887.97
IL66	17108705.72	2030888.75	3887.69
IL67	17108692.11	2030897.85	3887.56

FLOODPLAIN DETAIL



Point Table Bankfull Bench Left			
Point	Northing	Easting	Elevation
BL122	17108814.79	2030751.04	3886.14
BL123	17108832.56	2030744.36	3886.16
BL124	17108845.49	2030738.23	3886.20
BL125	17108857.93	2030732.33	3886.23
BL126	17108869.21	2030729.48	3886.31
BL127	17108880.30	2030730.99	3886.39
BL128	17108890.06	2030736.45	3886.46
BL129	17108897.98	2030746.78	3886.50
BL130	17108900.73	2030757.62	3886.51
BL131	17108899.40	2030768.44	3886.53
BL132	17108893.17	2030788.27	3886.56
BL133	17108887.00	2030807.88	3886.61
BL134	17108883.34	2030822.10	3886.63
BL135	17108881.47	2030833.96	3886.65
BL136	17108880.64	2030845.25	3886.67
BL137	17108880.98	2030860.61	3886.69
BL138	17108880.99	2030860.72	3886.69
BL139	17108882.90	2030885.65	3886.75

Point Table Bankfull Bench Left			
Point	Northing	Easting	Elevation
BL140	17108884.82	2030910.58	3886.81
BL141	17108884.34	2030919.97	3886.87
BL142	17108880.17	2030928.98	3886.95
BL143	17108872.81	2030935.65	3887.03
BL144	17108868.28	2030937.76	3887.06
BL145	17108858.44	2030939.11	3887.10
BL146	17108849.80	2030937.00	3887.11
BL147	17108831.26	2030929.49	3887.12
BL148	17108812.72	2030921.99	3887.14
BL149	17108794.19	2030914.49	3887.19
BL150	17108769.66	2030904.56	3887.25
BL151	17108755.15	2030899.80	3887.27
BL152	17108737.53	2030896.76	3887.31
BL153	17108719.65	2030896.53	3887.35
BL154	17108701.96	2030899.12	3887.38
BL155	17108684.89	2030904.46	3887.42
BL156	17108668.88	2030912.41	3887.43

Point Table Bankfull Bench Right			
Point	Northing	Easting	Elevation
BR138	17108789.58	2030654.06	3886.16
BR139	17108798.13	2030650.01	3886.19
BR140	17108807.17	2030645.73	3886.21
BR141	17108815.10	2030641.97	3886.23
BR142	17108832.08	2030635.34	3886.26
BR143	17108847.85	2030631.48	3886.29
BR144	17108863.98	2030629.62	3886.31
BR145	17108880.22	2030629.78	3886.34
BR146	17108896.31	2030631.97	3886.36
BR147	17108912.01	2030636.15	3886.39
BR148	17108927.06	2030642.25	3886.42
BR149	17108941.23	2030650.18	3886.44
BR150	17108954.30	2030659.82	3886.46
BR151	17108966.07	2030671.01	3886.48
BR152	17108976.35	2030683.58	3886.49
BR153	17108984.98	2030697.33	3886.50
BR154	17108991.84	2030712.05	3886.50
BR155	17108996.80	2030727.52	3886.50
BR156	17109000.54	2030751.57	3886.51
BR157	17109000.51	2030767.81	3886.52
BR158	17108999.74	2030775.89	3886.52
BR159	17108996.68	2030791.84	3886.53
BR160	17108994.80	2030798.42	3886.53
BR161	17108987.07	2030823.02	3886.57
BR162	17108982.40	2030837.87	3886.61

Point Table Bankfull Bench Right			
Point	Northing	Easting	Elevation
BR163	17108980.98	2030844.12	3886.64
BR164	17108980.68	2030852.93	3886.69
BR165	17108981.45	2030863.02	3886.71
BR166	17108982.61	2030877.97	3886.75
BR167	17108984.15	2030897.92	3886.79
BR168	17108984.66	2030904.57	3886.81
BR169	17108984.96	2030911.46	3886.82
BR170	17108984.96	2030911.46	3886.82
BR171	17108983.88	2030924.40	3886.94
BR172	17108982.42	2030942.20	3886.99
BR173	17108979.24	2030950.65	3886.99
BR174	17108977.46	2030954.72	3886.99
BR175	17108972.74	2030965.43	3887.00
BR176	17108965.84	2030981.64	3887.05
BR177	17108963.73	2030984.53	3887.06
BR178	17108960.18	2030988.49	3887.05
BR179	17108955.56	2030994.77	3886.96
BR180	17108950.82	2031000.04	3887.07
BR181	17108944.00	2031006.76	3886.99
BR182	17108930.95	2031017.10	3887.01
BR183	17108916.63	2031025.61	3887.04
BR184	17108901.31	2031032.15	3887.06
BR185	17108885.26	2031036.59	3887.08
BR186	17108868.76	2031038.86	3887.10
BR187	17108852.11	2031038.91	3887.10

		Date
Designed	K Hoffman	2/2015
Drawn	B Krueger	2/2015
Checked	K Hoffman	2/2015
Approved:		

FLOODPLAIN GRADING STA 119+40–124+80
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FERGUS COUNTY MONTANA

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2/24/15 6:47 AM
Sheet 13 of 27