



319 Nonpoint Source Final Application

FY2017 Final Applications are due Monday, September 26, 2016 by 2:00 pm

Section I: General Information

Project Title Mud Creek Stream and Wetland Restoration Project - Final Design and Construction

Project Sponsor Information

Sponsor Name Lincoln Conservation District

Registered with the Secretary of State? Yes

Registered with SAM? Yes

County Lincoln County

Website lincolncd.org

Tax Identification # 81-0372019

DUNS # 009437082

Primary Contact Becky Lihme

Signatory Darris Flanagan

Title District Conservationist

Title Chairman, Lincoln Conservation District

Address PO Box 2170, 949 U.S. Highway 93 North

Address PO Box 2170, 949 U.S. Highway 93 North

City Eureka State Montana Zip Code 59917

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Phone Number (406) 297-2233

Phone Number (406) 297-2233

Fax Number (406) 296-7188

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E-mail Address lincolncd@interbel.net

E-mail Address lincolncd@interbel.net

Signature _____

Signature _____

Project Location

12 Digit HUC #(s) 1701010108 (Mud Creek, tributary to Therriault Creek in the upper Tobacco River watershed)

(1) Waterbody Name from 2016 List of Impaired Waters Mud Creek is a primary tributary to Therriault Creek, an impaired waterway

(1) Probable cause(s) of impairment to be addressed (ex. metals) Sedimentation/Siltation (impairment listings for Therriault Creek)

(2) Waterbody Name from 2016 List of Impaired Waters _____

(2) Probable cause(s) of impairment to be addressed (ex. metals) _____

(3) Waterbody Name from 2016 List of Impaired Waters _____

(3) Probable cause(s) of impairment to be addressed (ex. metals) _____

Activity 1 Name Stream and Wetland Restoration Latitude (1) 48.88746 Longitude (1) -114.06889

Activity 2 Name _____ Latitude (2) _____ Longitude (2) _____

Activity 3 Name _____ Latitude (3) _____ Longitude (3) _____

Nonpoint Source (NPS) Information

Which WRP does the project implement? Kootenai River Basin WRP (2015) What is the WRP status? DEQ-Accepted

Does the project address impairments identified in a TMDL? Yes Waterbody Type River/Stream

Functional Category Stream Bank Stabilization

1st Pollution Category Hydromodification (Removal of Riparian Vegetation) Percent of Total (%) 30

2nd Pollution Category Hydromodification (Channelization) Percent of Total (%) 30

3rd Pollution Category Construction (Land Development or Redevelopment) Percent of Total (%) 30

4th Pollution Category Construction (Highways/Roads/Bridges) Percent of Total (%) 10

Project Funding

319 Funds Requested	<input type="text" value="\$109,500.00"/>	Does the project sponsor have any open 319 contracts?	<input type="text" value="Yes"/>
Matching Funds		Project Title	<input type="text" value="Tobacco River Restoration"/>
<i>State Cash Match</i>	<input type="text" value="\$500.00"/>	DEQ Contract Number	<input type="text" value="216031"/>
<i>Local Cash Match</i>	<input type="text" value="\$20,000.00"/>	319 Award	<input type="text" value="\$288,996.00"/>
<i>In-Kind Match</i>	<input type="text" value="\$55,500.00"/>	Projected Closing Date	<input type="text" value="December 31, 2018"/>
Total Match	<input type="text" value="\$76,000.00"/>	Project Title	<input type="text"/>
Other Federal Funds	<input type="text" value="\$0.00"/>	DEQ Contract Number	<input type="text"/>
Total Project Budget	<input type="text" value="\$185,500.00"/>	319 Award	<input type="text"/>
Administrative Fee	<input type="text" value="\$10,500.00"/>	Projected Closing Date	<input type="text"/>

Section II: Project Description

Goal and Objectives: Describe the overall goal and specific objectives for this project.

The goal is to improve water quality and river and floodplain processes by restoring a 0.46 mile (2,445 feet) of Mud Creek, a primary tributary to Therriault Creek which is listed as water quality impaired for sedimentation/siltation. Project objectives include: 1) producing clean water consistent with supporting aquatic life and beneficial uses in Mud Creek and Therriault Creek; 2) improving riparian and floodplain conditions by reconnecting the floodplain and creating a complex matrix of wetlands characterized by emergent and scrub-shrub wetlands; 3) creating complex aquatic habitat components such as depth, velocity, substrate, cover, and pools that support populations of wild trout and other aquatic organisms; and 4) delivering a self-maintaining, maintenance-free restoration project.

Methods: Describe the approach selected to address/correct the problem(s), e.g. types of BMPs to be installed, and other important activities.

Restoration methods and techniques are based on the premise of natural channel design that involves restoring fluvial and biological processes so Mud Creek can be self-maintaining and resilient to floods and other natural disturbance regimes. The project will: 1) reconstruct a low width-to-depth ratio, meandering, riffle-pool, gravel bed, C4/E4 stream type (2,445 feet); 2) create and restore approximately 4.5 acres of emergent and scrub-shrub floodplain wetlands; and 3) re-establish fluvial connectivity and normal riverine processes by removing an existing earthen berm/impoundment. Restoration design components include: 1) channel and floodplain construction; 2) streambank restoration; and 3) establishing a diverse, native riparian vegetation community and connected floodplain. These components are integral to: 1) reducing bank erosion; and 2) providing clean, cold water to support designated beneficial uses in Mud Creek and Therriault Creek. Alternatives to stream and floodplain restoration were considered but dismissed from further consideration due to the high degree of floodplain disconnection, channelized and incised nature of Mud Creek, and severe bank erosion occurring at the site. Reconnecting the floodplain, and re-establishing proper dimensions is critical to meeting project objectives.

Summary: Provide a brief summary of the project.

Mud Creek is a third order tributary to Therriault Creek which has been identified as sediment impaired by the Montana Department of Environmental Quality. The project site was historically a timber milling operation which operated from 1954 through 1973. Mud Creek was channelized and straightened along Mud Creek Road and a cooling pond to support milling operations was constructed in the southeast corner of the project area. The site was identified in the Kootenai River Basin WRP (KRN, 2015) as a high priority project for stream and wetland restoration at the site of the old sawmill. Work will occur along 2,445 feet of channel and 5 acres of floodplain. Reconstructing Mud Creek away from Mud Creek Road will eliminate sediment delivery to the channel due to sanding of the roadway, bank erosion, road prism erosion, and vehicle contaminants.

In 2016, Lincoln Conservation District (LCD) with funding provided by the Montana Department of Natural Resources and Conservation (223 Grant), and in partnership with the landowner, Montana Fish, Wildlife & Parks, Kootenai River Network, Lincoln County Commissioners, and the Natural Resources Conservation Service, commissioned a preliminary restoration design that is included as an attachment to this final application. The design represents a 75% design level equivalent, and provides the framework necessary to complete the final engineering and implementation. 319 funding (this application) will be used to: 1) complete the project engineering and restoration design, 2) conduct a routine wetland delineation and functional assessment to support Section 404 Clean Water Act permitting, 3) prepare and submit regulatory permits; 4) implement project; 5) complete as-built monitoring surveys to quantify sediment load reduction using a modified BANCS model; and 6) develop and implement a public education and outreach program.

Section III: Background Information

Statement of Project Need and Intent

This project was identified in the Kootenai River Basin WRP as a high priority project for meeting EPA mandated sediment reduction targets established in the 2011 Tobacco Planning Area Sediment TMDLs and Framework Water Quality Improvement Plan (MDEQ 2011). The WRP recommends restoring Mud Creek and the drained wetlands at the site of the old mill upstream of U.S. Highway 93. This project will reduce sediment loading by restoring approximately 4,890 feet of streambanks, re-establish and connect functioning floodplain surfaces, and reducing stream temperature through removal of in-stream ponds. The Kootenai River Basin WRP identifies non-point source management measures and restoration projects, including Mud Creek, to address the causes of water quality impairment in the Kootenai Basin, including Therriault Creek, the receiving basin for water and sediment produced in Mud Creek. Human sources of sediment to Therriault Creek identified in the TMDL include roads/transportation, historic silviculture and grazing, and channel modification (DEQ 2011). Significant progress has been made to reduce sediment loading to Therriault Creek. Projects have included large-scale stream and wetland restoration, and fish passage/transportation corridor improvements.

Describe the pre-project planning that has already occurred.

Significant progress has been made to facilitate restoration of Mud Creek at the former mill site. In 2016, LCD in partnership with state, federal and local resource agencies and the landowner, completed a 75% restoration design for the site with funding provided by the DNRC. The restoration plan, included as an attachment to this application, described the factors limiting water quality in the project area, identified project goals, and developing design drawings and engineered plans to illustrate the desired future condition of Mud Creek and associated floodplain wetlands. The preliminary design was developed by a multi-disciplinary team comprised of engineers, hydrologists, wetland ecologist and fisheries biologist from state and federal agencies, as well as private consulting.

In anticipation of the project, the landowner has agreed to donate restoration materials to be used as in-kind match. Restoration materials that can be obtained on-site include wetland sod mats for streambank restoration, gravel/alluvium for channel bed construction including riffles and pools, and woody vegetation transplants including willows and alder. On-site woody vegetation will be salvaged during construction and incorporated in streambank restoration techniques. The landowner is continuing to work with LCD and the NRCS to develop a long-term management plan for the property which will include protection of riparian vegetation in the project area, and improved riparian and upland conditions for wildlife.

Collaborative Effort: Describe the collaborative effort you have engaged in to ensure support from all appropriate partners.

As reflected in the attached letters of support, the landowners and local, state and federal agencies are fully supportive of this project which has been conceptualized and developed over the past year through a collaborative process. The attached letter from the landowner, Mr. Barry Roose, outlines his commitment to the resource, environmental ethic, and in-kind contributions to the project. Agencies who have contributed to this project to date include the Natural Resources Conservation Service, Montana Fish, Wildlife & Parks, Lincoln Conservation District, Montana Department of Natural Resources and Conservation, Montana Department of Environmental Quality, Lincoln County Commissioner Mike Cole, and Kootenai River Network, Inc. As the main project sponsor, LCD has worked in earnest with the landowner and greater Eureka community to generate enthusiasm and support for the project. Through meetings and field tours, the project concepts have all been vetted and reflect input received from the landowner, agencies, and community at large. The landowner envisions this project will be an asset to the community by providing educational opportunities given its visibility and proximity to the towns of Fortine, Eureka, and U.S. Highway 93.

Partners and Roles: Identify the project partners and their roles.

Partner	Role
Lincoln Conservation District	- Project Lead - Grant Administrator - Public Education and Outreach
Barry Roose	- Landowner - In-Kind Donation of Restoration Materials - Cash Contribution
Department of Natural Resources and Conservation	- Stakeholder - Funding to Complete Preliminary Design
Montana Fish, Wildlife & Parks and Natural Resources Conservation Service	- Stakeholders - Technical Review of Preliminary and Final Design Deliverables - Fisheries and Land Management Technical Assistance
Kootenai River Network, Inc.	- Stakeholder - Lead Organization for Development of Kootenai River Basin W.R.P. (2015)

Technical and Administrative Qualifications

LCD will assume the lead role in administering the contract with MDEQ and subcontractors. LCD has a proven track record in applying for, receiving, and managing contracts, the most recent examples being the DNRC Resource Development Bureau planning grant for \$50,000, and MDEQ Section 319 grant for ~\$289,000. LCD and Barry Roose have contracted with River Design Group, Inc. (RDG) on the previous phases of this project which included development of a preliminary restoration design. RDG is a private consulting firm based in Whitefish, Montana specializing in river, stream, and wetland restoration projects in the Pacific Northwest. RDG maintains the highest level of technical expertise and a well-trained multi-disciplinary staff that works exclusively in the river restoration environment. The qualified engineering firm awarded the project will provide the following services: 1) complete routine wetland delineation to support final design and Section 404 Clean Water Act permitting; 2) prepare final restoration plan including technical specifications and special provisions; 3) prepare and submit Joint Permit Application and Floodplain Development Permit as applicable; 4) provide construction stakeout and construction oversight; and 5) implement monitoring plan and prepare as-built documentation.

Attached to this final grant application is the preliminary design illustrating the desired future condition for Mud Creek within the project area. The preliminary design describes the existing site conditions, restoration objectives, restoration treatments, and how construction implementation will be sequenced.

Past and Current Projects

Funding Organization	Award Amount	Project Description	Project Status	Contact Information
D.N.R.C. Conservation Districts Bureau HB223 Grant	\$15,700.00	- 2015 Mud Creek Restoration Project Conceptual Design plan set, drawings and specifications.	Completed	Lincoln Conservation District, Attention Becky Lihme (406) 297-2233
In-Kind Design Fees River Design Group, Inc.	\$5000.00	- In-kind consulting fees to prepare preliminary design - Cash contribution to acquire high resolution Light Detection and Ranging (LiDAR) data		

Section IV: Scope of Work

Task 1 Title Project Management and Grant Administration

Description

This task will be completed by LCD. Sub-tasks will include acquiring landowner agreements, completing monthly status reports, communicating with Montana DEQ, landowners and other state, federal and local agencies, and general administration of the grant including quarterly invoicing and reporting. LCD will assist Contractor with preparation of regulatory permit applications under Task 1 as needed.

LCD will also manage and oversee the selected engineering firm who will perform the work described under Tasks 2-4. This will include overseeing the sub-contractor for final design and permitting, construction implementation, and effectiveness monitoring.

LCD will coordinate with the landowner to develop a landowner agreement that ensures long term operation and maintenance of the project site in the restored condition.

Deliverables

- Signed landowner agreement
- Quarterly status reports for life of contract
- Annual status reports for life of contract
- Quarterly invoicing
- Assistance with Joint Permit Application

Task 1 Funding

319 Funds	\$7,500.00
Non-Federal Match	\$3,000.00
Other Federal Funds	
Total Cost	\$10,500.00
Is Match Secured?	Yes

Timeline 2017/18

Match Source Lincoln Conservation District

Task 2 Title Final Design, Engineering and Regulatory Permitting

Description

Contractor will finalize design documents (plan set, drawings, specifications) and prepare regulatory permit applications. This task will be completed in close coordination with the landowner, regulatory agencies, and funding partners. Final design tasks will include:

1. Hydraulic modeling to validate/refine channel design criteria;
2. Final grading plans for channel and floodplain (plan and profile sheets, channel cross-sections);
3. Streambank and channel treatments (details, drawings, and specifications);
4. Streambank and floodplain riparian revegetation plan;
5. Routine wetland delineation and functional assessment; and
6. Joint Permit Application and Floodplain Development Permit as applicable.

Applicable permits to be filed under the Joint Permit Application include: 1) 310 Permit (Lincoln Conservation District); 2) Floodplain Development Permit as applicable (Lincoln County / DNRC); 3) Section 404 Permit (US Army Corps of Engineers); 4) 318 Authorization (Montana DEQ); and 5) State Historic Preservation Office consultation (non-permit).

Deliverables

- Final restoration plan set, drawings and specifications
- Completed 310 Permit
- Completed Floodplain Development Permit as applicable
- Completed Section 404 Permit and Nationwide 27 Guidance Document
- Completed 318 Authorization
- Letter to file from State Historic Preservation Office regarding cultural resources.

Task 2 Funding

319 Funds	
Non-Federal Match	\$10,000.00
Other Federal Funds	
Total Cost	\$10,000.00
Is Match Secured?	Yes

Timeline 2017/18

Match Source Landowner

Task 3 Title Construction Implementation

Description

This task includes preparing the bid package, conducting a pre-bid tour of the project area, reviewing bids, and awarding the contract. Prior to construction, the project will be staked using GPS by qualified oversight personnel involved with the design. Equipment restriction zones will be flagged and identified, including sensitive riparian and wetland areas located within the project area. All harvestable shrubs will be gathered on-site and temporarily staged in a nursery. In kind materials will be generated on site as needed, including wetland sod acquisition, and gravel. All materials will be inspected and approved by the Contractor prior to construction.

Construction equipment will include 10-cubic yard tracked trucks, 200-class excavators with hydraulic thumb or equivalent, a D6 dozer or equivalent, and skidsteer. Prior to construction, BMPs will be installed including silt fences, straw wattles, and others as needed. The existing channel will serve as the bypass for all surface water. Construction will be supervised by a qualified stream restoration practitioner. Elevations, grading, and streambank and streambed structures will be inspected and approved by Contractor. GPS surveys will be completed to document the post-restoration conditions, and to facilitate preparation of the project completion report and QAPP/SAP, as described for Task 4.

Deliverables

- 2,445 feet of channel restoration
- 4,890 feet of streambank restoration and revegetation
 - + Approximately 17,950 riparian cuttings
 - + Approximately 120 1-gallon containerized plants with browse protectors and weed mats
 - + Approximately 0.5 acres of transplanted emergent wetland sod
- 4.5 acres of floodplain restoration
 - + Enhancement / restoration of emergent and scrub-shrub wetlands

Task 3 Funding

319 Funds	\$102,000.00
Non-Federal Match	\$10,000.00
Other Federal Funds	
Total Cost	\$112,000.00
Is Match Secured?	Yes

Timeline 2018

Match Source Landowner

Task 4 Title As-Built Documentation and Effectiveness Monitoring

Description

LCD will develop a Quality Assurance Project Plan/Sampling and Analysis Plan (QAPP/SAP) to evaluate the effectiveness of the project in reducing sediment loading to Mud Creek and the downstream receiving waterbody, Therriault Creek. Sediment loads will be predicted before and after restoration using the Bank Assessment for Non-Point Source Consequences of Sediment (BANCS) model (Rosgen 2001a). Vegetation sampling will be completed to document trends in floodplain and streambank plant community establishment and revegetation treatment effectiveness, including: 1) containerized plant survival; 2) percent cover of woody vegetation on restored streambanks; and 3) floodplain transects to document riparian plant community successional patterns.

Geomorphic monitoring parameters include Wolman pebble counts (2), channel cross-sections (6), photo points (5), and a complete as-built longitudinal profile (2,445 feet). The monitoring plan will be developed based on input from MDEQ and project stakeholders.

Deliverables

- QAPP/SAP Monitoring and As-Built Documentation Report
 - + Pre-construction sediment loading analysis using BANCS model
 - + Post-construction sediment loading reduction analysis using BANCS model
 - + Greenline transects and effectiveness monitoring of floodplain and streambank revegetation
 - + As-built channel cross-sections (6), longitudinal profile (2,445 feet), and Wolman pebble counts
 - + Project photo points (Before/After)

Task 4 Funding

319 Funds	\$3,000.00
Non-Federal Match	
Other Federal Funds	
Total Cost	\$3,000.00
Is Match Secured?	

Timeline 2018

Match Source N/A

Task 5 Title Education and Outreach

Description

LCD envisions this project to be a "showcase" for other potential natural resource restoration projects in the Tobacco River TPA. The project area is adjacent to Mud Creek Road and U.S. Highway 93 and is highly visible from both roads. The project will be displayed and highlighted on LCD's website, and articles will be submitted to the local newspapers, MACD newsletter "Montana Conservationist", and Montana NRCS newsletter. An educational display board will be created to place at the intersection of Mud Creek Road and Highway 93. An exhibit will be developed and hosted at the Lincoln County Fair in conjunction with the Tobacco River Restoration Project Phase 1 display. For all components of the education and outreach program, the target audience will include the greater community of Eureka, Lincoln County, City of Eureka, the Eureka school district, local contractors, and project stakeholders. A stream restoration workshop may be developed to educate local landowners and stakeholders which in turn could lead to further restoration of Mud Creek.

Deliverables

- Educational displays
- Conduct field tour of project with stakeholders and general public, both during and following construction
- Organize tour of other successful watershed restoration projects in the Eureka area
- Highlight project on LCD's website and display at Lincoln County Fair
- Articles to local newspapers, MACD newsletter "Montana Conservationist", and Montana NRCS newsletter

Task 5 Funding

319 Funds	<input type="text"/>
Non-Federal Match	<input type="text" value="\$5,000.00"/>
Other Federal Funds	<input type="text"/>
Total Cost	<input type="text" value="\$5,000.00"/>
Is Match Secured?	<input type="text" value="Yes"/>

Timeline 2017-2018

Match Source Lincoln Conservation District

Task 6 Title _____

Description

Deliverables

Task 6 Funding

319 Funds	<input type="text"/>
Non-Federal Match	<input type="text"/>
Other Federal Funds	<input type="text"/>
Total Cost	<input type="text"/>
Is Match Secured?	<input type="text"/>

Timeline _____

Match Source _____

Project Milestone Table: Complete the following Project Milestone Table by entering task numbers and titles in the left hand column, then check the box(es) for the appropriate quarter(s) and years(s) in which you will be working on the task.

Milestone	Spring 2017	Summer 2017	Fall 2017	Winter 2017	Spring 2018	Summer 2018	Fall 2018	Winter 2018	Spring 2019	Summer 2019	Fall 2019
Task 1. Project Management and Grant Administration	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					
Task 2A. Routine Wetland Delineation	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Task 2B. Final Design and Engineering	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Task 2C. Regulatory Permitting	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Task 3A. Channel and Floodplain Construction	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Task 3B. Revegetation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Task 3C. Materials Acquisition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Task 4A. Prepare QAPP/SAP	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Task 4B. Prepare As-Built Monitoring Report	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Task 5A. Articles, Website Development & Project Tours	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Submit **project map(s)** and **letters of support (at least 3)** along with the Final Project Proposal form. If your organization is not the author of the WRP you hope to implement, you must request a letter of support from the original authoring entity. If the authoring entity refuses to provide a letter of support, use the additional space at the end of the application to describe their response. If design drawings are available, provide those as well. For on-the-ground work, include copies of applicable permits if available.

- Project Map
- Letters of Support
- Design Drawings
- Applicable Permits
- Draft of amended WRP (if applicable)
- Photos
- Landowner Agreements

Use the space provided for any additional information that may not have been captured elsewhere in this Final Project Proposal

RESPONSE TO MDEQ'S COMMENTS ON PRE-APPLICATION (Page 2)

- Having worked in the Tobacco River TPA for over 20 years both as a USFS Forest Hydrologist and private consultant, my professional opinion is Mud Creek should be listed as impaired for sediment and temperature but is not listed due to lack of assessment data.
- Bass Lake likely attenuates some of the sediment (primarily bedload) that is delivered from Mud Creek. However, during high flow periods, the finer washload/suspended load is likely transported through Bass Lake and downstream to Therriault Creek.
- Upstream land use conditions vary in the watershed. The headwaters are forested and likely produce low sediment yields. Agricultural land uses upstream of the project site have impaired stream function. Segments of Mud Creek are channelized with limited riparian buffer. LCD has initiated discussions with landowners regarding setbacks and vegetated buffers, and the vision is to extend restoration work upstream following completion of restoration work at the former mill site, which will be used as a "demonstration project" for other landowners.
- The project has been designed to be self-maintaining and require little to no maintenance. Re-establishing proper channel geometry, and a connected floodplain with a diverse mosaic of wetlands, will improve water quality for the entire basin.
- Lining of the Glen Lake irrigation ditch will not affect Mud Creek hydrology based on discussions with Glen Lake Irrigation District.
- The project will eliminate in-stream ponds which elevate stream water temperatures and favor non-native fish.



319 Nonpoint Source Final Application

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Section I: General Information

Project Title Mud Creek Stream and Wetland Restoration Project - Final Design and Construction

Project Sponsor Information

Sponsor Name Lincoln Conservation District

Registered with the Secretary of State? Yes

Registered with SAM? Yes

County Lincoln County

Website lincolncd.org

Tax Identification # 81-0372019

DUNS # 009437082

Primary Contact Becky Lihme

Signatory Darris Flanagan

Title District Conservationist

Title Chairman, Lincoln Conservation District

Address PO Box 2170, 949 U.S. Highway 93 North

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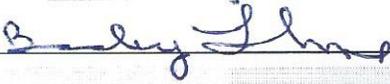
Phone Number (406) 297-2233

Fax Number (406) 296-7188

Fax Number (406) 296-7188

E-mail Address lincolncd@interbel.net

E-mail Address lincolncd@interbel.net

Signature 

Signature 

Project Location

12 Digit HUC #(s) 1701010108 (Mud Creek, tributary to Therriault Creek in the upper Tobacco River watershed)

(1) Waterbody Name from 2016 List of Impaired Waters Mud Creek is a primary tributary to Therriault Creek, an impaired waterway

(1) Probable cause(s) of impairment to be addressed (ex. metals) Sedimentation/Siltation (impairment listings for Therriault Creek)

(2) Waterbody Name from 2016 List of Impaired Waters _____

(2) Probable cause(s) of impairment to be addressed (ex. metals) _____

(3) Waterbody Name from 2016 List of Impaired Waters _____

(3) Probable cause(s) of impairment to be addressed (ex. metals) _____

Activity 1 Name Stream and Wetland Restoration

Latitude (1) 48.88746

Longitude (1) -114.06889

Activity 2 Name _____

Latitude (2) _____

Longitude (2) _____

Activity 3 Name _____

Latitude (3) _____

Longitude (3) _____

Nonpoint Source (NPS) Information

Which WRP does the project implement? Kootenai River Basin WRP (2015)

What is the WRP status? DEQ-Accepted

Does the project address impairments identified in a TMDL? Yes

Waterbody Type River/Stream

Functional Category Stream Bank Stabilization

1st Pollution Category Hydromodification (Removal of Riparian Vegetation)

Percent of Total (%) 30

2nd Pollution Category Hydromodification (Channelization)

Percent of Total (%) 30

3rd Pollution Category Construction (Land Development or Redevelopment)

Percent of Total (%) 30

4th Pollution Category Construction (Highways/Roads/Bridges)

Percent of Total (%) 10

ATTACHMENTS

Project Map

Letters of Support

Design Drawings

Photos

Landowner Agreement

116°0'0"W

115°0'0"W

Montana

Mud Creek Restoration Project Vicinity Map

Lincoln
County

Eureka

Tobacco
River

Grave Creek

**PROJECT
LOCATION**

93

Lake
Koochanusa

Libby

Whitefish

Kalispell

2

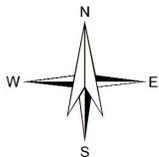
Flathead
Lake

Clark Fork River

Flathead River

93

90



48°0'0"N

116°0'0"W

115°0'0"W

114°0'0"W

49°0'0"N

49°0'0"N

48°0'0"N

114°0'0"W

Barry Roose
135 Central Avenue
Eureka, Mt 59917

September 15, 2016

Mark Ockey, Water Activities Work Group Leader
Water Quality Specialist
DEQ Watershed Protections Section
PO Box 200901
Helena, Mt 59620-0901

RE: Mud Creek 319 Grant Application

Dear Mr. Ockey;

I am the land owner of the subject property for which Lincoln Conservation District in Eureka, Montana is submitting a 319 Nonpoint Source Grant application. This grant is being requested to restore 4.5 +/- acres of floodplain and wetlands and reconstruction of approximately 2,400 feet of Mud Creek that have been impacted by sawmills operating from 1954 to 1973.

I was raised in Eureka and remember the sawmill during operations. I am an advocate of good conservation practices and stewardship of the land. This project will allow me to contribute to those beliefs by relocating Mud Creek from along the county road back to the original floodplain, restoring the surrounding wetland and floodplain.

Please accept this letter as my support for the project. I am happy to provide this support. Thank you for your consideration of our application for 319 funding.

Sincerely,


Barry Roose

LINCOLN COUNTY

STATE OF MONTANA

MARK L. PECK, COMMISSIONER
DISTRICT NO. 1, LIBBY

GREGORY L. LARSON, COMMISSIONER
DISTRICT NO. 2, TROY

MIKE COLE, COMMISSIONER
DISTRICT NO. 3, EUREKA

ROBIN A. BENSON
CLERK OF THE BOARD AND COUNTY RECORDER

September 13, 2016

Mark Ockey, Water Activities Workgroup Leader
Water Quality Specialist
DEQ Watershed Protections Section
P.O. Box 200901
Helena, MT 59620-0901

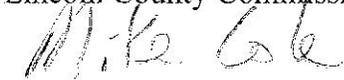
Dear Mr. Ockey:

I am writing, on the behalf of the Lincoln County Commissioners, in support of the Lincoln Conservation District grant proposal for the restoration project on Mud Creek, near Eureka, Montana through the Montana Department of Environmental Quality, 319 Nonpoint Source Program. Lincoln Conservation District has a long history of involvement in stream restoration of tributaries within the Tobacco River drainage.

Lincoln County is committed to providing continued support of these restoration efforts as they evolve. This grant will enable Lincoln Conservation District and the landowner to re-locate 2,445 feet of Mud Creek back to its original channel from the current ditch paralleling Mud Creek Road. The project will also restore approximately 5 acres of wetland and floodplain. The project will support high quality aquatic species.

We encourage the Montana Department of Environmental Quality to award funding under the 319 grant program. Lincoln County Commissioners view this as a valuable project. If you need further information, please contact me at (406) 297-3139.

Sincerely,
Lincoln County Commissioners



Mike Cole, Commissioner



James L. Dunnigan
Kootenai River Network
P.O. Box 419
Libby, MT 59923

August 26, 2016

Mark Ockey, Water Activities Workgroup Leader
Water Quality Specialist
DEQ Watershed Protection Section
P.O. Box 200901
Helena, MT 59620-0901

Dear Mark

Please consider this document to be a letter of support in principle from the Kootenai River Network (KRN) for the Mud Creek Restoration Project located on the Roose property. The KRN has a lengthy history of involvement in restoration efforts in the Tobacco River Watershed. We have taken a leadership role in providing planning documents to prioritize and guide restoration in this important watershed in northwest Montana. In addition, our group has restored the ecological function to many miles of streams within the Tobacco River watershed.

The KRN recently initiated a collaborative effort to develop a watershed restoration plan for the entire Montana portion of the Kootenai River Basin. This effort required building coalitions with private industry, state and federal governmental agencies, and local communities. The plan was completed in December 2015, and it identified and prioritized the Roose property for restoration action.

I have personally visited the proposed project area. The previous land use issues substantially contributed to the loss of ecological function at this site. Mr. Roose recently purchased this property with a desire to restore much of the ecological function that was previously lost due to land use practices. Indeed, if the previous landowners had shared the land stewardship principles held by Mr. Roose, restoration at this site would probably not be necessary today.

Completion of this important restoration project on Mud Creek will help move us closer to meeting water quality standards within the Therriault Creek watershed. This project is an excellent example of an engaged landowner initiating a meaningful restoration project, and seeking assistance to complete the work, and not an interested conservation or government agencies working to initiate the project. The former ensures that the landowner has ownership and a vested interest in the restoration efforts and increases the probability of success. Please give this project your consideration. If you have any questions please do not hesitate to call or write.

Sincerely,

James L. Dunnigan
Kootenai River Network President



Montana Fish, Wildlife & Parks

Mike E. Hensler MFWP
385 Fish Hatchery RD
Libby, MT 59923
(406) 293-4161
FAX 293-2235
mhensler@mt.gov
Ref: MH76.16
Date: 8/26/16

Mark Ockey, Water Activities Workgroup Leader
Water Quality Specialist
DEQ Watershed Protections Section
P.O. Box 200901
Helena, MT 59620-0901

SUBJECT: Letter of support for the reconstruction of Mud Creek at the Roose property

Mr. Ockey;

I have reviewed the preliminary project and design for the proposed reconstruction of Mud Creek. MFWP agrees with the basic design suggested for this project. Any opportunity to create, maintain or enhance stability and recapture historic pattern profile and dimensions of the stream is a step forward in protecting downstream habitat. Additionally, the restoration of 4.5 acres of floodplain and wetlands should help to sequester more fine sediment than it can in its current condition. Relatively simple, successful projects like this could provide a template for future projects in the Kootenai River drainage. Another important aspect to this project is that it is readily accessible for public viewing.

If you have any questions please contact me.

Sincerely,

Mike E. Hensler
Fisheries Management Biologist

/meh

United States Department of Agriculture



Natural Resources Conservation Service
949 Hwy 93 North
Eureka, MT 59917
Phone: (406) 296-7152
Fax: (406) 296-7188
E-mail: Brian.Ressel@mt.usda.gov

September 14, 2016

Dear Mr. Ockey,

The NRCS field office in Eureka, Montana would like to express our support for the proposed Mud Creek restoration project south of Eureka, Mt. The stream and surrounding flood plain has been severely altered by the previous landowners. Channelization has resulted in the loss of stream and wetlands function and the corresponding habitat values. Restoring the original channel and adjacent wetlands will have a positive effect on water quality, fisheries, and wildlife habitat. It will be a great compliment to the other nearby projects that have been completed in the vicinity. In addition, it will serve as a good example of stewardship for the community.

We are committed to supporting this process in any way possible. NRCS is willing to provide technical assistance during the planning and implementation phases of the project. We are also willing to assist the landowner to help ensure the integrity of the restoration is not compromised through land management or agricultural practices.

We are always excited to see good conservation on the ground in Lincoln County and look forward to our future partnership. Please feel free to contact us for any assistance we can provide.

Sincerely,

Brian Ressel

A handwritten signature in black ink that reads "Brian Ressel". The signature is written in a cursive style with a large initial "B".

Acting District Conservationist
USDA-NRCS
Eureka Field Office
406-296-7177

Helping People Help the Land

An Equal Opportunity Provider and Employer

9/18/2016

To: Lincoln Conservation District

Subject: Support for the Mud Creek Project

With 23 years of water resources experience in Lincoln County, I would like to lend my support to the Mud Creek restoration project on the Barry Roose property. The project will result in the restoration of native fisheries (Westslope cutthroat trout), reduction in sediment which is contributing to water quality problems in the Tobacco River system and provide improvements to wetland habitat and associated wildlife (waterfowl, amphibians, reptiles). I can see great benefit to water resources in the Tobacco River watershed through implementation of the project. Please consider fully-funding this highly visible restoration which will benefit aquatic and wetland species while providing a wonderful educational opportunity to the Eureka area.

Sincerely,

Kirk A. Sullivan

Retired NRCS/USFS Hydrologist and Natural Resources Specialist

MUD CREEK RESTORATION PROJECT CONCEPTUAL DESIGN

PROJECT DESCRIPTION

LOCATED IN THE UPPER TOBACCO RIVER WATERSHED NEAR THE TOWN OF FORTINE, MONTANA, MUD CREEK IS A THIRD ORDER TRIBUTARY THAT JOINS THERRIAULT CREEK, A PRIMARY TRIBUTARY TO THE TOBACCO RIVER THAT HAS BEEN IDENTIFIED AS WATER QUALITY IMPAIRED BY THE MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY. IN 2016, LINCOLN CONSERVATION DISTRICT RETAINED RIVER DESIGN GROUP, INC. TO DEVELOP A CONCEPTUAL RESTORATION PLAN TO ADDRESS WATER QUALITY AND AQUATIC HABITAT LIMITING FACTORS. PROJECT PLANNING AND CONCEPTUAL DESIGN EFFORTS WERE COORDINATED WITH THE LINCOLN CONSERVATION DISTRICT, MONTANA FISH, WILDLIFE AND PARKS, NATURAL RESOURCES CONSERVATION SERVICE, MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY, AND LANDOWNER.

AS PROPOSED AND ILLUSTRATED IN THE DRAWINGS, THE PROJECT WILL RESTORE APPROXIMATELY 1,920 FEET OF MUD CREEK USING NATURAL CHANNEL DESIGN TECHNIQUES. A LOW GRADIENT, MODERATELY SINUOUS, RIFFLE-POOL, GRAVEL BED STREAM TYPE WOULD BE CONSTRUCTED, REPLICATING THE LIKELY HISTORICAL CONDITIONS THAT EXISTED AT THE SITE PRIOR TO CHANNELIZATION AND DISTURBANCE.

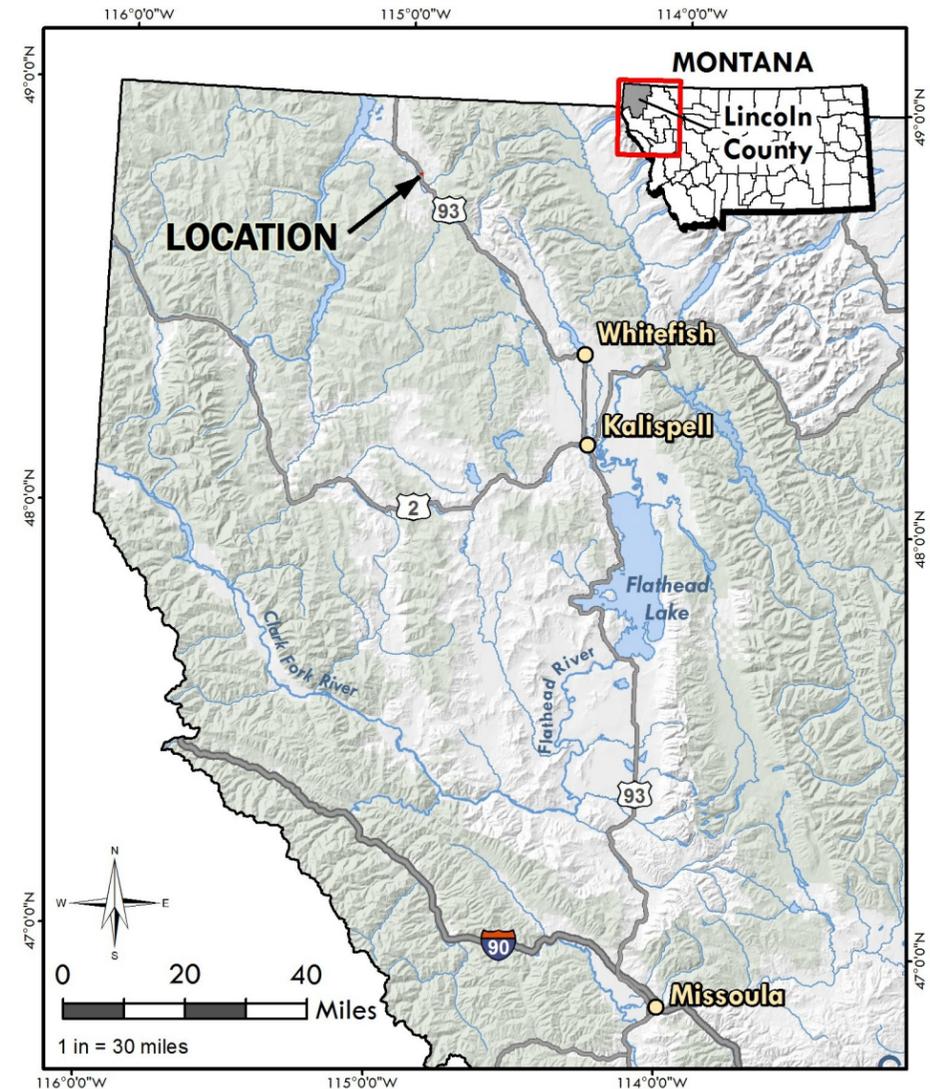
GENERAL NOTES

1. CONTOUR INTERVAL IS NOTED ON DRAWINGS.
2. SLOPES DESIGNATED AS 2:1, 1.5:1, ET CETERA. ARE THE RATIOS OF HORIZONTAL DISTANCE TO VERTICAL DISTANCE.
3. DIMENSIONS ARE GIVEN IN FEET AND TENTHS OF A FOOT.
4. TOPOGRAPHY IS BASED ON 2016 LIDAR DATA PROVIDED BY MONTANA LIDAR. ALL LIDAR DATA ACQUISITION WAS COORDINATED BY RDG.
5. ALL EXISTING CONDITIONS ARE TO BE VERIFIED IN THE FIELD PRIOR TO CONSTRUCTION AND ANY ADJUSTMENTS TO THE DRAWINGS SHALL BE MADE AS DIRECTED BY THE ENGINEER.
6. EXISTING PRIVATE IMPROVEMENTS, WHICH LIE WITHING THE CONSTRUCTION LIMITS, UNLESS OTHERWISE NOTED WILL BE REMOVED THE THE OWNER PRIOR TO CONSTRUCTION, OR ABANDONED IN PLACE.
7. PROTECT ALL TREES AND LAND AREAS NOT LOCATED WITHING THE PROJECT CONSTRUCTION, STAGING OR EARTHWORK LIMITS. EXERCISE CARE IN AREAS NOT SO MARKED TO AVOID UNNECESSARY DAMAGE TO NATURAL VEGETATION.
8. THE PROJECT SPONSOR IS RESPONSIBLE FOR COMPLYING WITH ALL PERMITS AND EASEMENTS INCLUDING ALL FEDERAL, STATE, COUNTY, AND LOCAL PERMIT CONDITIONS.
9. EXCAVATION, TRENCHING, SHORING, AND SHILEDING SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR PERFORMING THE WORK, THESE DRAWINGS ARE NOT INTENDED TO PROVIDE MEANS OR METHODS OF CONSTRUCTION.
10. EXCAVATION SHALL MEET THE REQUIREMENTS OF OSHA 29 CFR PART 1926, SUBPART P, EXCAVATIONS, ACTUAL SLOPES SHALL NOT EXCEED THE SLOPES AS INDICATED ON DRAWINGS.
11. ENGINEER WILL PROVIDE SURVEY CONTROL AND GRADING SURFACES FOR EQUIPMENT WITH GPS MACHINE CONTROL CAPABILITY. CONTRACTOR SHALL PROVIDE SURVEY STAKING AND LAYOUT FOR CONSTRUCTION.
12. VERTICAL TOLERANCE FOR CONSTRUCTION COMPLIANCE WILL BE 0.2 FEET. HORIZONTAL TOLERANCE WILL BE 0.5 FEET.
13. CONTRACTOR SHALL CONFIRM QUANTITIES. REPORTED VOLUMES ARE NEATLINE AND DO NOT INCLUDE ADJUSTMENTS FOR COMPACTION OR OTHER FACTORS.

DRAWING INDEX

- 1.0 COVER PAGE
- 2.0 EXISTING CONDITIONS
- 3.0 SITE PLAN
- 3.1 PLAN VIEW INDEX
- 4.0 SURVEY CONTROL PLAN
- 5.0 PLAN VIEW AND STRUCTURE LAYOUT 1
- 5.1 GRADING PLAN AND PROFILE 1
- 5.2 PLAN VIEW AND STRUCTURE LAYOUT 2
- 5.3 GRADING PLAN AND PROFILE 2
- 6.0 CROSS SECTIONS 1
- 6.1 CROSS SECTIONS 2
- 7.0 CHANNEL CROSS SECTION DIMENSIONS
- 8.0 CONSTRUCTED CHANNEL STREAMBED TYPE 1 DETAIL
- 8.1 VEGETATED SOD AND BRUSH BANK DETAIL
- 9.0 MATERIALS LIST

MUD CREEK VICINITY MAP



LOCATED IN SW 1/4 OF SW 1/4 OF T35N, R26W, S3

STANDARD OF PRACTICE

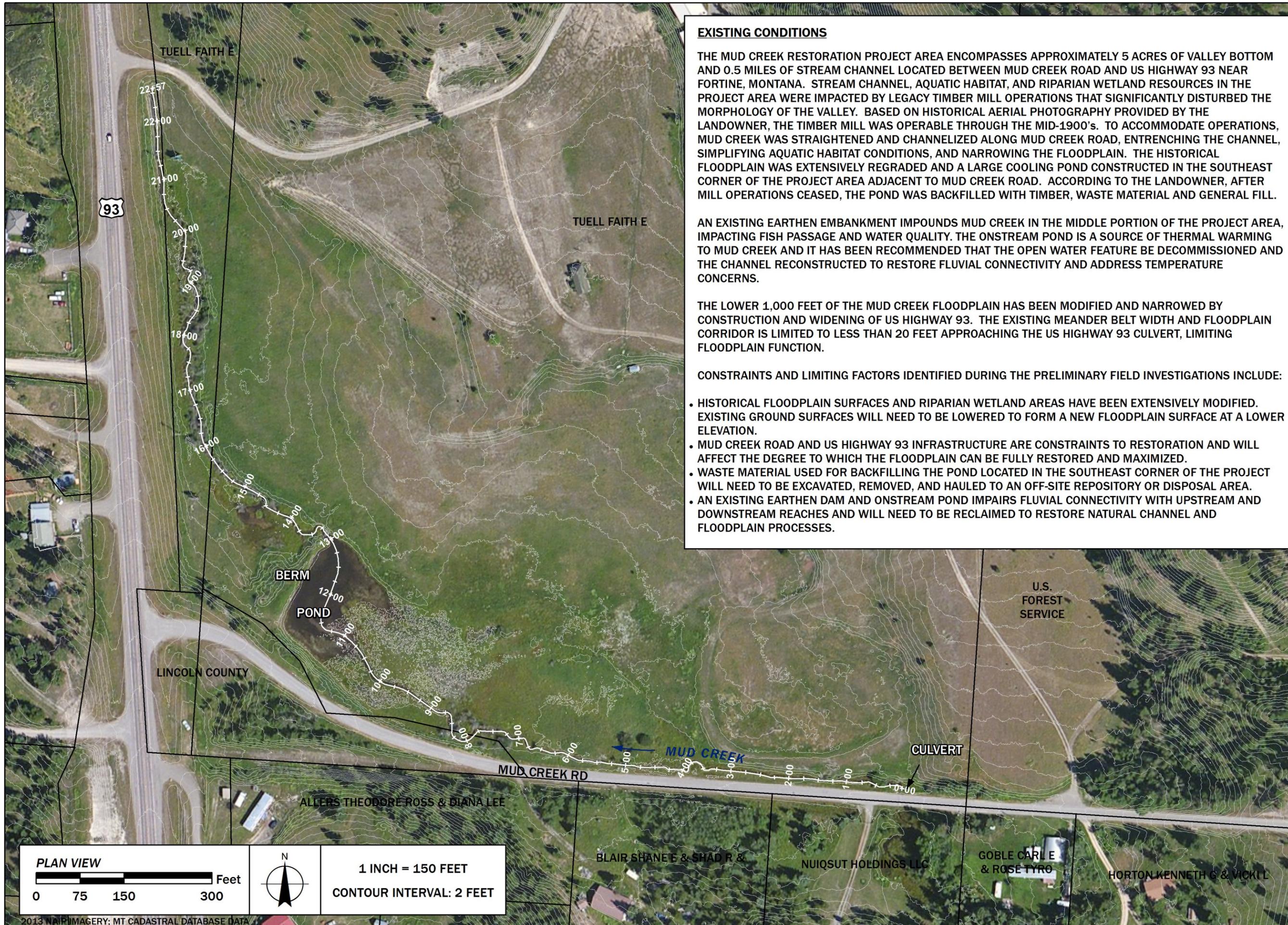
RIVER DESIGN GROUP, INC. WORKS EXCLUSIVELY IN THE RIVER ENVIRONMENT AND UTILIZES THE MOST CURRENT AND ACCEPTED PRACTICES AVAILABLE FOR PLANNING AND DESIGN OF RIVER, FLOODPLAIN, AND AQUATIC HABITAT RESTORATION PROJECTS. CURRENT STANDARDS FOR THE DESIGN OF RESTORATION PROJECTS VARY DEPENDING ON PROJECT GOALS. STABILITY CRITERIA INCLUDE DESIGNING STREAMBED AND STREAMBANK STRUCTURES FOR THE 25-YEAR RECURRENCE INTERVAL DISCHARGE FLOOD.

NO.	DATE	BY	DESCRIPTION	CHK
1	06-21-16	SA	CONCEPTUAL DESIGN	GD

PROJECT NUMBER
RDG-16-015

SHEET NUMBER

1.0



EXISTING CONDITIONS

THE MUD CREEK RESTORATION PROJECT AREA ENCOMPASSES APPROXIMATELY 5 ACRES OF VALLEY BOTTOM AND 0.5 MILES OF STREAM CHANNEL LOCATED BETWEEN MUD CREEK ROAD AND US HIGHWAY 93 NEAR FORTINE, MONTANA. STREAM CHANNEL, AQUATIC HABITAT, AND RIPARIAN WETLAND RESOURCES IN THE PROJECT AREA WERE IMPACTED BY LEGACY TIMBER MILL OPERATIONS THAT SIGNIFICANTLY DISTURBED THE MORPHOLOGY OF THE VALLEY. BASED ON HISTORICAL AERIAL PHOTOGRAPHY PROVIDED BY THE LANDOWNER, THE TIMBER MILL WAS OPERABLE THROUGH THE MID-1900's. TO ACCOMMODATE OPERATIONS, MUD CREEK WAS STRAIGHTENED AND CHANNELIZED ALONG MUD CREEK ROAD, ENTRENCHING THE CHANNEL, SIMPLIFYING AQUATIC HABITAT CONDITIONS, AND NARROWING THE FLOODPLAIN. THE HISTORICAL FLOODPLAIN WAS EXTENSIVELY REGRADED AND A LARGE COOLING POND CONSTRUCTED IN THE SOUTHEAST CORNER OF THE PROJECT AREA ADJACENT TO MUD CREEK ROAD. ACCORDING TO THE LANDOWNER, AFTER MILL OPERATIONS CEASED, THE POND WAS BACKFILLED WITH TIMBER, WASTE MATERIAL AND GENERAL FILL.

AN EXISTING EARTHEN EMBANKMENT IMPOUNDS MUD CREEK IN THE MIDDLE PORTION OF THE PROJECT AREA, IMPACTING FISH PASSAGE AND WATER QUALITY. THE ONSTREAM POND IS A SOURCE OF THERMAL WARMING TO MUD CREEK AND IT HAS BEEN RECOMMENDED THAT THE OPEN WATER FEATURE BE DECOMMISSIONED AND THE CHANNEL RECONSTRUCTED TO RESTORE FLUVIAL CONNECTIVITY AND ADDRESS TEMPERATURE CONCERNS.

THE LOWER 1,000 FEET OF THE MUD CREEK FLOODPLAIN HAS BEEN MODIFIED AND NARROWED BY CONSTRUCTION AND WIDENING OF US HIGHWAY 93. THE EXISTING MEANDER BELT WIDTH AND FLOODPLAIN CORRIDOR IS LIMITED TO LESS THAN 20 FEET APPROACHING THE US HIGHWAY 93 CULVERT, LIMITING FLOODPLAIN FUNCTION.

CONSTRAINTS AND LIMITING FACTORS IDENTIFIED DURING THE PRELIMINARY FIELD INVESTIGATIONS INCLUDE:

- HISTORICAL FLOODPLAIN SURFACES AND RIPARIAN WETLAND AREAS HAVE BEEN EXTENSIVELY MODIFIED. EXISTING GROUND SURFACES WILL NEED TO BE LOWERED TO FORM A NEW FLOODPLAIN SURFACE AT A LOWER ELEVATION.
- MUD CREEK ROAD AND US HIGHWAY 93 INFRASTRUCTURE ARE CONSTRAINTS TO RESTORATION AND WILL AFFECT THE DEGREE TO WHICH THE FLOODPLAIN CAN BE FULLY RESTORED AND MAXIMIZED.
- WASTE MATERIAL USED FOR BACKFILLING THE POND LOCATED IN THE SOUTHEAST CORNER OF THE PROJECT WILL NEED TO BE EXCAVATED, REMOVED, AND HAULED TO AN OFF-SITE REPOSITORY OR DISPOSAL AREA.
- AN EXISTING EARTHEN DAM AND ONSTREAM POND IMPAIRS FLUVIAL CONNECTIVITY WITH UPSTREAM AND DOWNSTREAM REACHES AND WILL NEED TO BE RECLAIMED TO RESTORE NATURAL CHANNEL AND FLOODPLAIN PROCESSES.



236 Wisconsin Avenue
Whitefish, MT 59937
Tel: 406.862.4927
Fax: 406.862.4963

311 SW Jefferson Avenue
Corvallis, OR 97333
Tel: 541.738.2920
Fax: 541.738.8524

EXISTING CONDITIONS

NO.	DATE	BY	DESCRIPTION	CHK
1	06-21-16	SA	CONCEPTUAL DESIGN	GD

PROJECT NUMBER
RDG-16-015

SHEET NUMBER

2.0

PLAN VIEW

0 75 150 300 Feet

1 INCH = 150 FEET
CONTOUR INTERVAL: 2 FEET

APPROXIMATE MATERIAL VOLUMES
 CUT: 9,067.6 CY
 FILL: 587.1 CY

STREAM RESTORATION
 19+75 to 24+45
 CHANNEL RE-ALIGNMENT,
 FLOODPLAIN EXCAVATION,
 REVEGETATION

RIPARIAN ENHANCEMENT
 14+50 to 19+75
 INVASIVE VEGETATION
 REMOVAL, REVEGETATION,
 TRASH CLEANUP

BERM REMOVAL
 EXCAVATE BERM
 AND GRADE TO
 FLOODPLAIN ELEVATION

STREAM RESTORATION
 0+00 to 14+50
 CHANNEL RE-ALIGNMENT,
 FLOODPLAIN EXCAVATION, REVEGETATION

REPLACE CULVERT

RESTORATION OBJECTIVES

THE MUD CREEK CONCEPTUAL RESTORATION PLAN ADDRESSES LIMITING FACTORS IDENTIFIED BY PROJECT STAKEHOLDERS BASED ON PREVIOUS STUDIES AND FIELD INVESTIGATIONS. THE PRIMARY GOAL OF THE PROJECT IS TO RESTORE CHANNEL AND FLOODPLAIN CONDITIONS THAT SUPPORT HIGH QUALITY AQUATIC HABITAT CONDITIONS, PROMOTE THE ESTABLISHMENT OF EMERGENT AND SCRUB SHRUB WETLANDS FOR THE BENEFIT OF RIPARIAN DEPENDENT WILDLIFE SPECIES, AND HIGH WATER QUALITY.

OBJECTIVES RELATED TO CHANNEL MORPHOLOGY, AQUATIC HABITAT, AND FLOODPLAIN AND WETLAND RESOURCES INCLUDE:

- PRODUCE CLEAN WATER CONSISTENT WITH SUPPORTING AQUATIC LIFE AND BENEFICIAL USES IN MUD CREEK AND DOWNSTREAM RECEIVING WATERBODIES, INCLUDING THERIAULT CREEK AND THE TOBACCO RIVER.
- CREATE COMPLEX AQUATIC HABITAT COMPONENTS SUCH AS DEPTH, VELOCITY, SUBSTRATE, COVER, AND POOLS THAT SUPPORT POPULATIONS OF WILD TROUT AND OTHER AQUATIC ORGANISMS;
- CONSTRUCT A STREAM CHANNEL THAT IS CONNECTED TO THE FLOODPLAIN AND INTERACTS WITH THE CHANNEL IN TERMS OF HYPORHEIC FLOW AND NUTRIENT EXCHANGE; AND
- CREATE A MORE COMPLEX MATRIX OF WETLANDS BY CREATING NEW FLOODPLAIN SURFACES THAT SUPPORT EMERGENT AND SCRUB-SHRUB WETLAND TYPES.

RESTORATION TREATMENTS

RESTORATION WORK WILL OCCUR ALONG APPROXIMATELY 2,445 FEET OF CHANNEL BEGINNING AT MUD CREEK ROAD AND EXTENDING DOWNSTREAM TO THE US HIGHWAY 93 CROSSING OF MUD CREEK. THE EXISTING CHANNEL, WHICH WAS CHANNELIZED AND STRAIGHTENED TO ACCOMMODATE HISTORICAL MILLING OPERATIONS, WILL BE RESHAPED TO FORM RIFFLE, RUN, POOL, AND GLIDE CHANNEL HABITAT UNITS. CHANNEL WIDTH WILL AVERAGE 6-FT. TO 8-FT. INCREASING CHANNEL SINUOSITY AND RE-ESTABLISHING A CONNECTED, FUNCTIONING FLOODPLAIN WILL IMPROVE AQUATIC HABITAT CONDITIONS AND REDUCE THERMAL WARMING. INCREASING THE FREQUENCY OF COMPLEX AQUATIC HABITAT FEATURES WILL IMPROVE SPAWNING, REARING, AND OVERWINTERING HABITAT FOR AQUATIC ORGANISMS AND WILD FISH.

APPROXIMATELY 4.5 ACRES OF FLOODPLAIN CHARACTERIZED BY EMERGENT AND SCRUB SHRUB WETLANDS WILL BE ENHANCED, RESTORED AND/OR CREATED. EXISTING WETLAND SODS WITHIN THE DISTURBANCE LIMITS OF THE PROJECT WILL BE EXCAVATED AND TEMPORARILY STOCKPILED FOR USE IN STREAMBANK RESTORATION TREATMENTS. FLOODPLAIN SURFACES WILL BE RESEEDED WITH A WETLAND SEED MIX, AND CONTAINERIZED PLANT STOCK CONSISTING OF WILLOWS, RED OSIER DOGWOOD, AND ALDER WILL BE OUTPLANTED.

TWO TYPES OF CHANNEL AND STREAMBANK STRUCTURES ARE PROPOSED. THE CHANNEL WILL BE RECONSTRUCTED WITH 5-INCH MINUS, GRADED ALLUVIUM. THE CHANNEL WILL BE GRADED TO INCLUDE RIFFLE, RUN, POOL AND GLIDE CHANNEL HABITAT FEATURES. STREAMBANKS TREATMENTS WILL CONSIST OF TRANSPLANTED EMERGENT WETLAND SOD AND SMALL DIAMETER BRUSH (<3-INCH DIAMETER).

CONSTRUCTION SEQUENCING

THE PROJECT WILL BE IMPLEMENTED IN TWO PHASES. PHASE 1 INCLUDES GRADING OF THE FLOODPLAIN AND TRANSITIONAL UPLAND SLOPES. PRIOR TO CONSTRUCTION, EXISTING SOD BORROW SOURCES WILL BE SALVAGED AND TEMPORARILY STOCKPILED. EXISTING UPLAND TERRACES WILL BE LOWERED TO BANKFULL OR FLOODPLAIN ELEVATION. CONSTRUCTED FLOODPLAIN SURFACES WILL HAVE VARIED ELEVATIONS TO ENCOURAGE NATURAL ESTABLISHMENT OF DIVERSE RIPARIAN AND WETLAND PLANT COMMUNITIES. MATERIAL EXCAVATED DURING FLOODPLAIN CONSTRUCTION WILL BE DISPOSED OF IN A NON-WETLAND, UPLAND AREA APPROVED BY THE LANDOWNER. TO MINIMIZE WATER QUALITY IMPACTS, THE EXISTING CHANNEL WILL BE UTILIZED AS A CLEARWATER BYPASS TO TEMPORARILY ISOLATE MUD CREEK FROM THE IMMEDIATE WORK AREA.

PHASE 2 INCLUDES CHANNEL CONSTRUCTION. WORK WILL PROCEED FROM UPSTREAM (MUD CREEK ROAD) TO DOWNSTREAM (US HIGHWAY 93). THE CHANNEL SHALL BE EXCAVATED TO SUBGRADE ELEVATION. CHANNEL STREAMBED ALLUVIUM WILL BE PLACED IN RIFFLE, RUN, POOL AND GLIDE CHANNEL HABITAT FEATURES TO WITHIN 0.2-FT. OF FINISHED GRADE ELEVATIONS. STREAMBANK TREATMENTS WILL BE CONSTRUCTED ACCORDING TO THE DRAWINGS. FINISHED GRADE OF STREAMBANKS WILL BE BLENDED WITH THE CONSTRUCTED FLOODPLAIN SURFACE TO FORM A SEAMLESS TRANSITION.

ENGINEER SHALL INSPECT AND APPROVE THE WORK BEFORE WATER IS INTRODUCED IN THE NEW CHANNEL. STREAMFLOW WILL BE INCREMENTALLY DIVERTED INTO THE NEW CHANNEL TO MINIMIZE DOWNSTREAM TURBIDITY. THE EXISTING BYPASS CHANNEL WILL BE BACKFILLED WITH ONSITE MATERIAL TO FINISHED GRADE ELEVATIONS.

FEATURES

-  MUD CREEK CHANNEL
-  FLOODPLAIN
-  SLOPE
-  EXISTING CHANNEL FILL
-  BERM REMOVAL



SITE PLAN

NO.	DATE	BY	DESCRIPTION	CHK
1	06-21-16	SA	CONCEPTUAL DESIGN	GD

PROJECT NUMBER
RDG-16-015

SHEET NUMBER

3.0

SHEETS 5.2-5.3

SHEETS 5.0-5.1

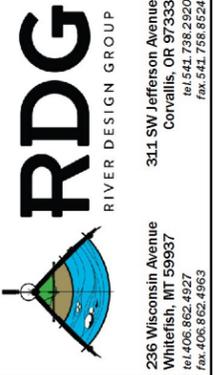
FLOW ↑

93

MUD CREEK RD



2013 NAIP IMAGERY; MT CADASTRAL DATABASE DATA



PLAN VIEW INDEX

NO.	DATE	BY	DESCRIPTION	CHK
1	06-21-16	SA	CONCEPTUAL DESIGN	GD

PROJECT NUMBER
RDG-16-015

SHEET NUMBER

3.1



SURVEY CONTROL PLAN

NO.	DATE	BY	DESCRIPTION	CHK
1	06-21-16	SA	CONCEPTUAL DESIGN	GD

PROJECT DATUM

PROJECT COORDINATES ARE BASED ON THE FOLLOWING:

HORIZONTAL PROJECTION: MONTANA STATE PLANE
 HORIZONTAL DATUM: NAD83 (CORS96 2002.00)
 UNITS: US SURVEY FEET
 VERTICAL DATUM: NAVD88 GEOID 09

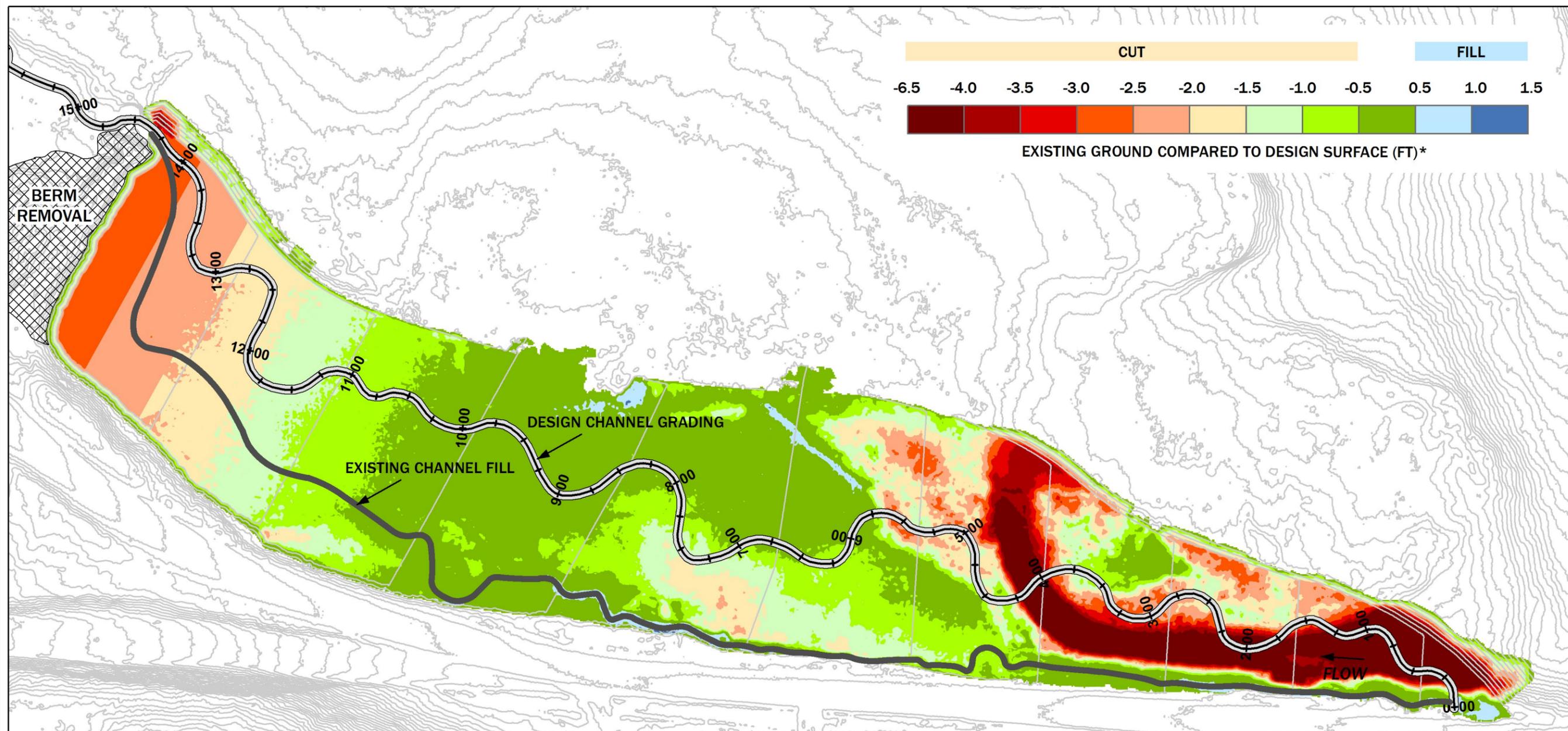
CONTROL POINTS



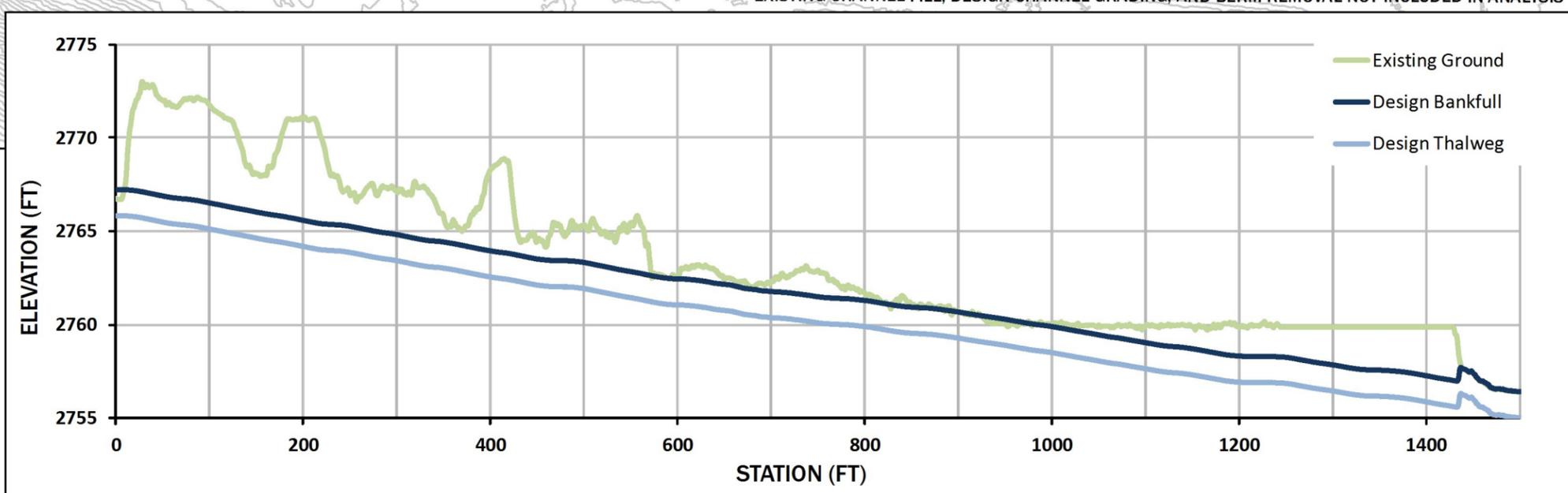
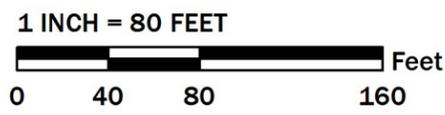
POINT NUMBER	EASTING	NORTHING	LONGITUDE	LATITUDE	ELEVATION	RAW DESCRIPTION
1	655976.584'	1711786.071'	-114.952727°	48.819743°	2776.527'	5/8" Rebar with a 2" aluminum cap marked "RDG"

PROJECT NUMBER
RDG-16-015

SHEET NUMBER
4.0



CONTOUR INTERVAL: 1 FOOT



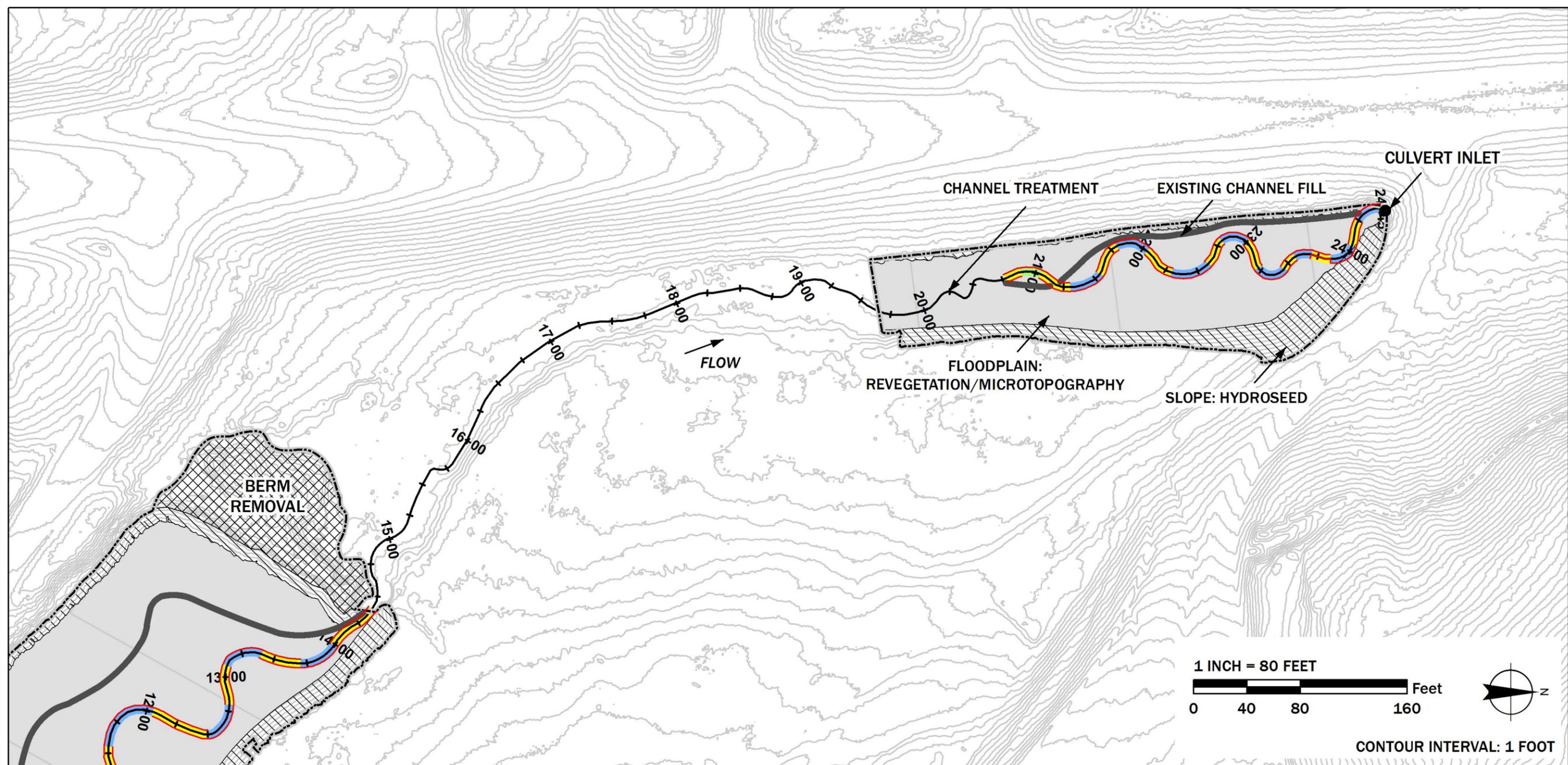
GRADING PLAN AND PROFILE 1

NO.	DATE	BY	DESCRIPTION	CHK
1	06-21-16	SA	CONCEPTUAL DESIGN	GD

PROJECT NUMBER
RDG-16-015

SHEET NUMBER

5.1



FEATURES

- MUD CREEK CENTERLINE
- FLOODPLAIN
- SLOPE
- CONSTRUCTED CHANNEL STREAMBED TYPE 1 (CCS1) 7.0, 8.0
- POOL 7.0
- RUN 8.1
- SOD AND BRUSH BANK
- EXISTING CHANNEL FILL
- CONSTRUCTION EXTENTS

DETAIL SHEET

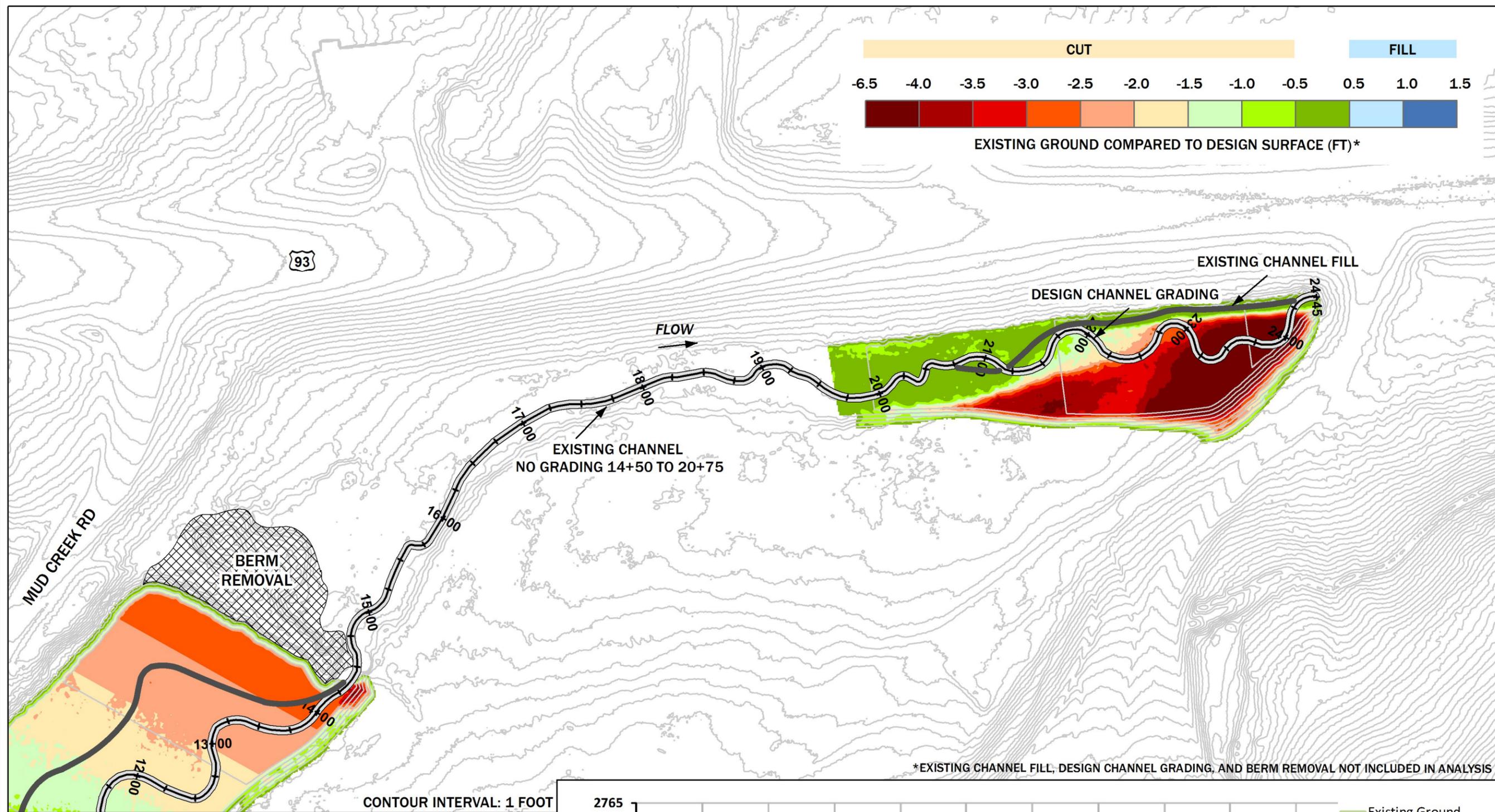
STRUCTURE SCHEDULE

	START	END	CHANNEL TOP OF BANK ELEVATIONS	
CCS1	20+77	20+90	20+00	2753.93
RUN	20+90	21+05	21+00	2753.39
CCS1	21+05	21+30	22+00	2752.83
POOL	21+30	21+55	23+00	2752.31
CCS1	21+55	21+80		
POOL	21+80	22+05		
CCS1	22+05	22+30		
POOL	22+30	22+60		
CCS1	22+60	22+80		
POOL	22+80	23+00		
CCS1	23+00	23+22		
POOL	23+22	23+45		
CCS1	23+45	23+57		
POOL	23+57	23+70		
CCS1	23+70	23+85		
POOL	23+85	24+05		
CCS1	24+05	24+25		

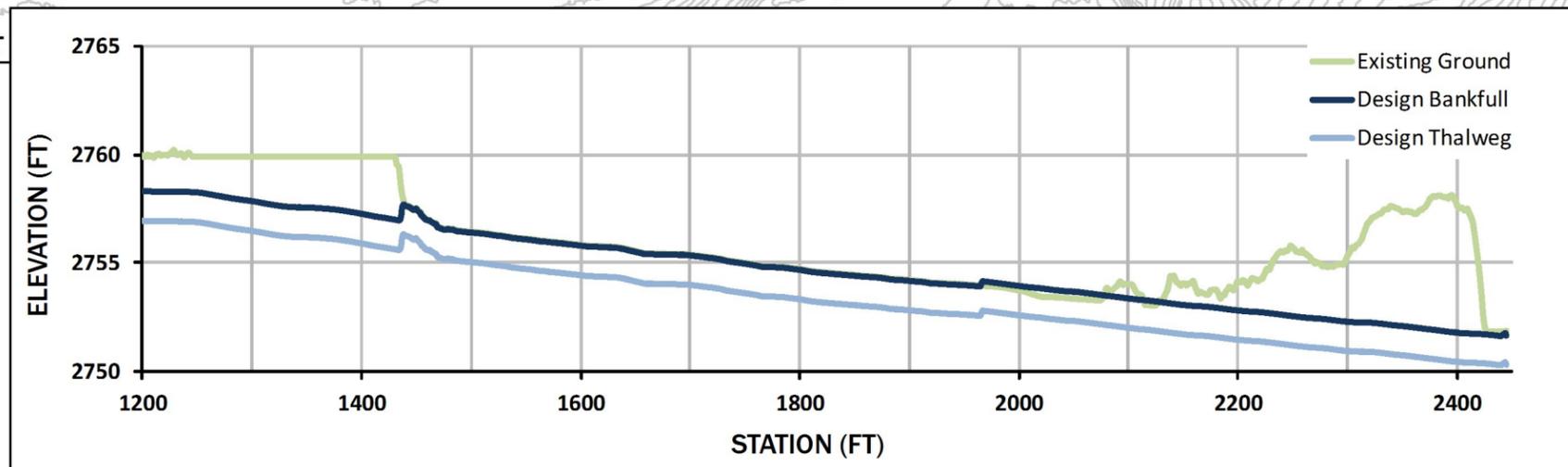
**PLAN VIEW AND
STRUCTURE LAYOUT 2**

CHK	DESCRIPTION	GD
	CONCEPTUAL DESIGN	

NO.	DATE	BY
1	06-21-16	SA



*EXISTING CHANNEL FILL, DESIGN CHANNEL GRADING, AND BERM REMOVAL NOT INCLUDED IN ANALYSIS



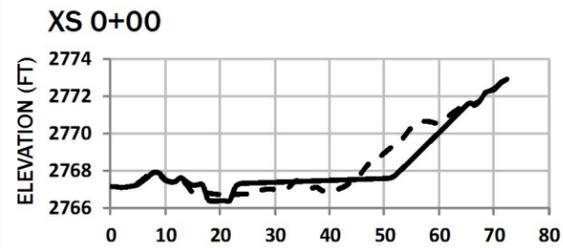
GRADING PLAN AND PROFILE 2

NO.	DATE	BY	DESCRIPTION	CHK
1	06-21-16	SA	CONCEPTUAL DESIGN	GD

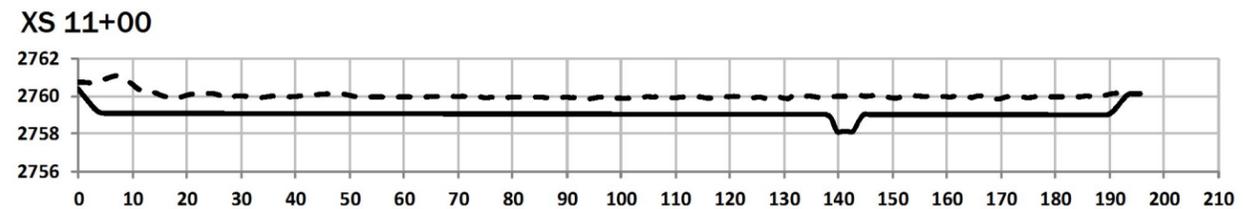
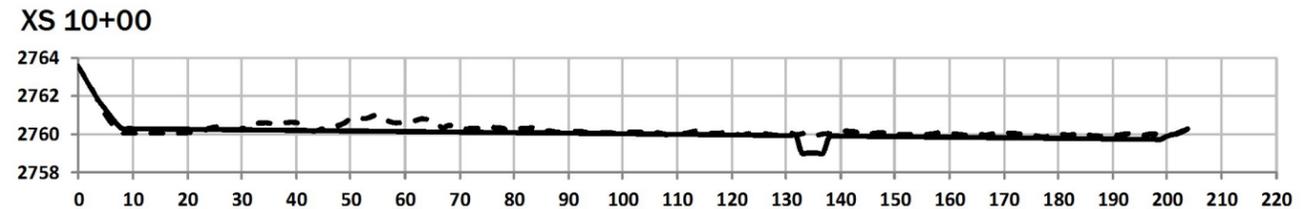
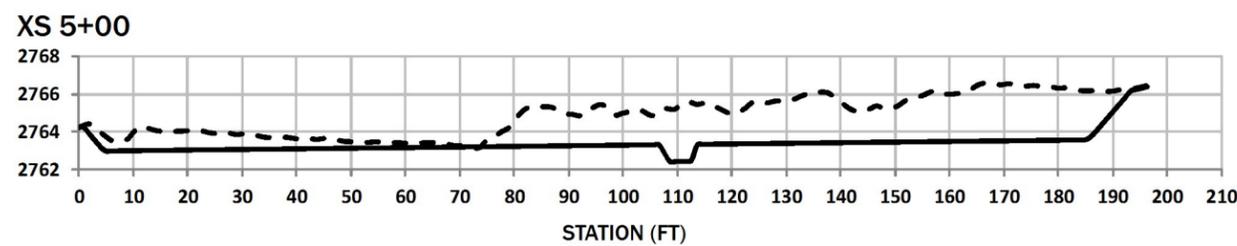
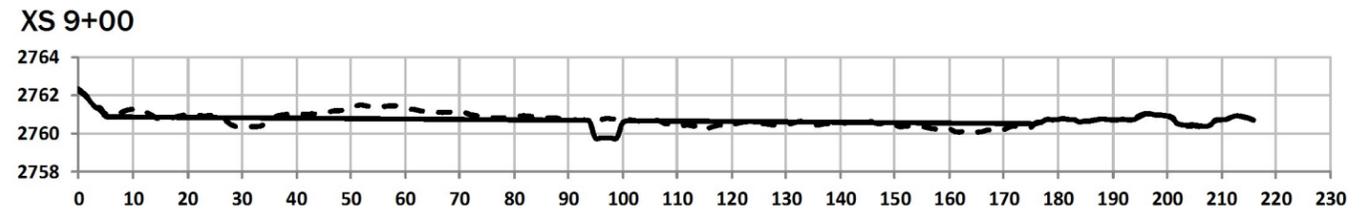
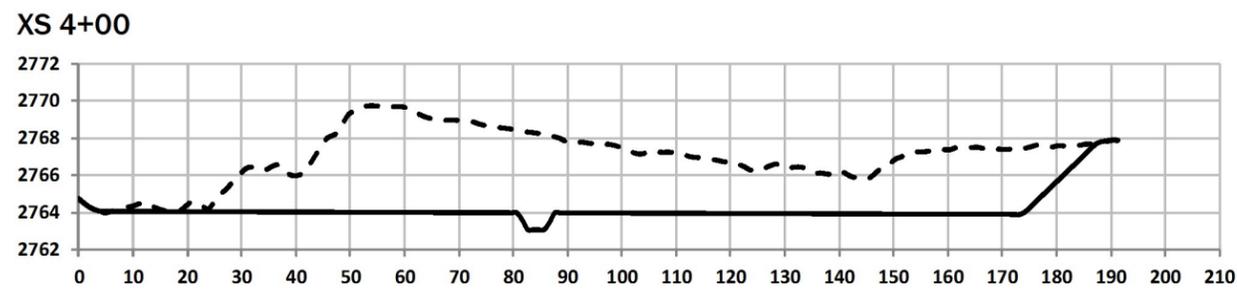
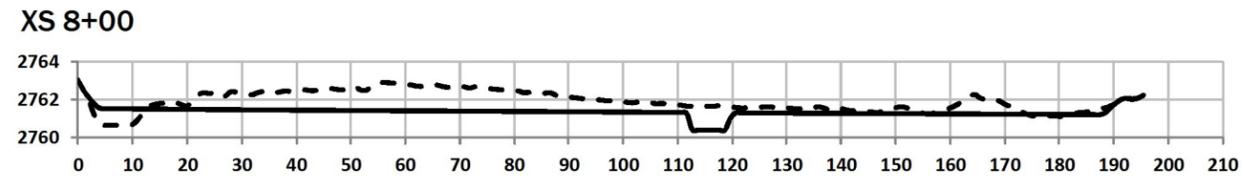
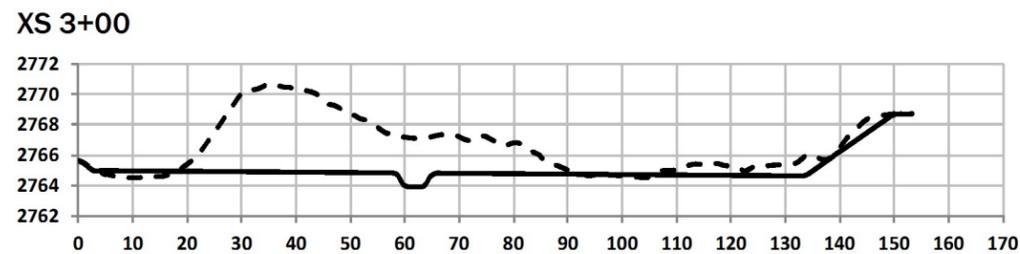
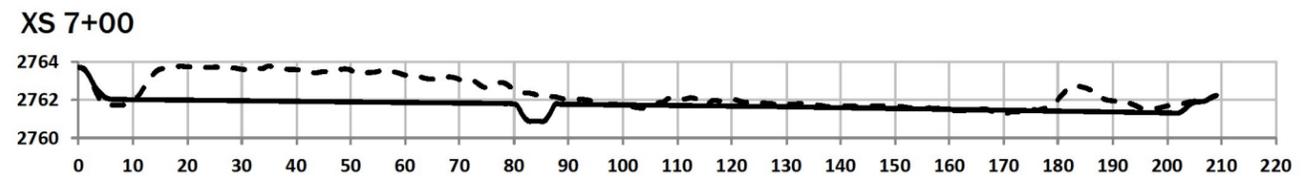
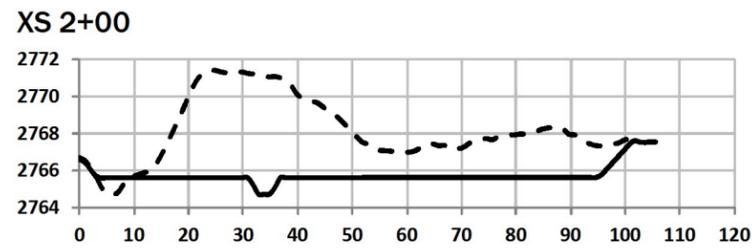
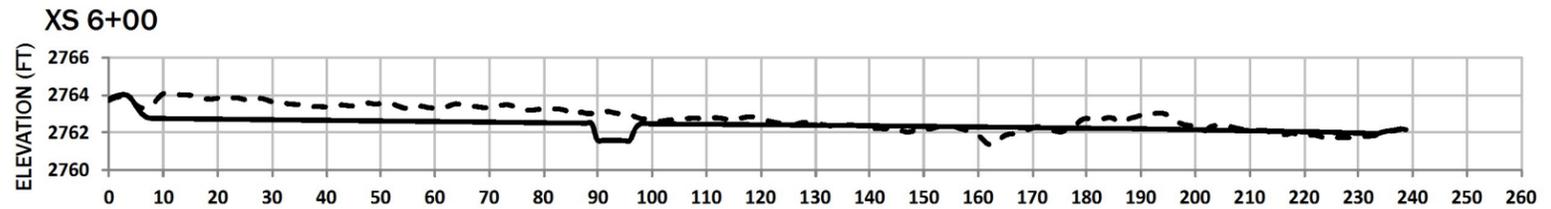
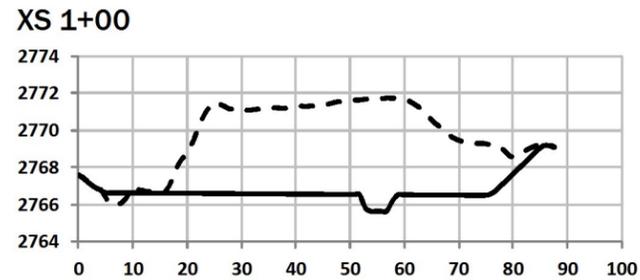
PROJECT NUMBER
RDG-16-015

SHEET NUMBER

5.3



LEGEND
 - - - EXISTING GROUND
 ——— PROPOSED GROUND



X: STATION FROM THE LEFT LOOKING DOWNSTREAM (FEET)
 Y: ELEVATION (FEET)

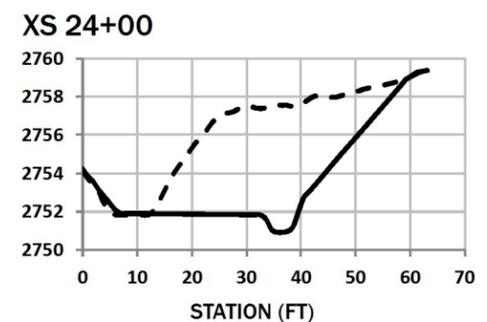
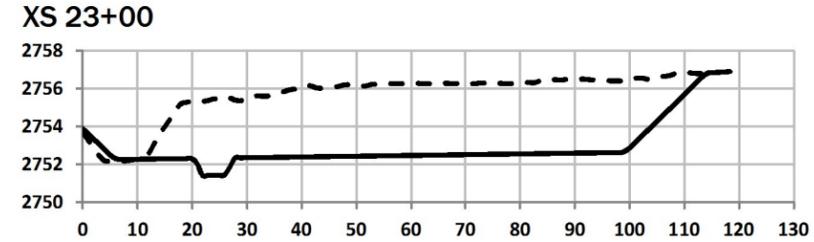
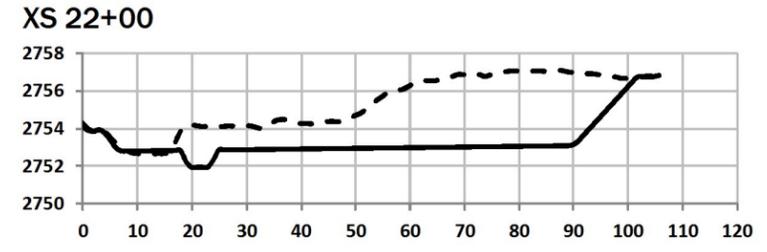
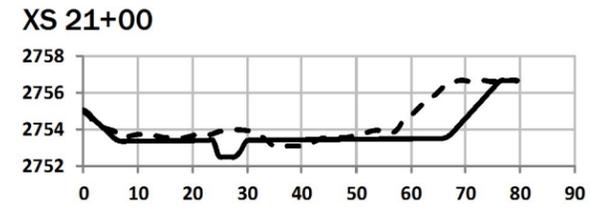
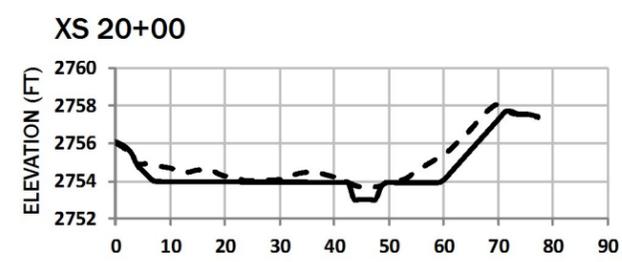
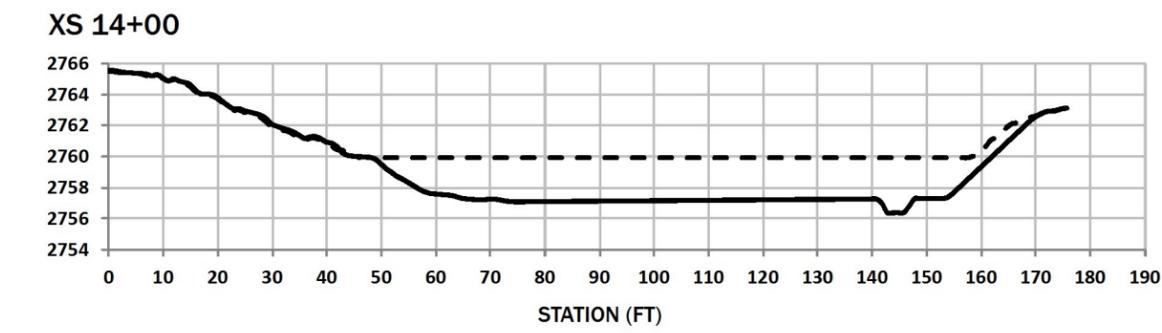
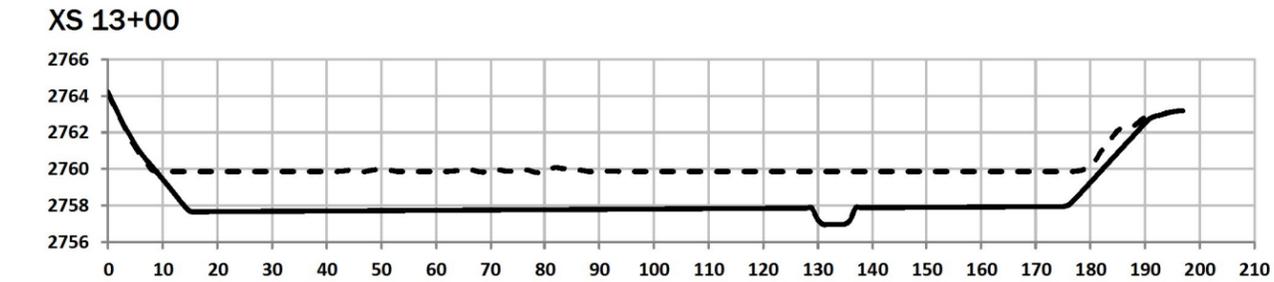
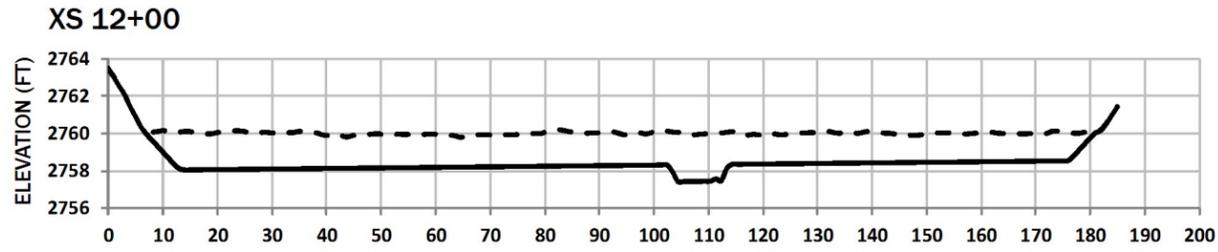


CROSS SECTIONS 1

NO.	DATE	BY	DESCRIPTION	GD
1	06-21-16	SA	CONCEPTUAL DESIGN	

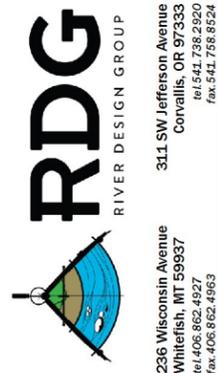
PROJECT NUMBER
 RDG-16-015

SHEET NUMBER
6.0



LEGEND
 - - - EXISTING GROUND
 ——— PROPOSED GROUND

X: STATION FROM THE LEFT LOOKING DOWNSTREAM (FEET)
 Y: ELEVATION (FEET)



CROSS SECTIONS 2

NO.	DATE	BY	DESCRIPTION
1	06-21-16	SA	CONCEPTUAL DESIGN

PROJECT NUMBER
 RDG-16-015

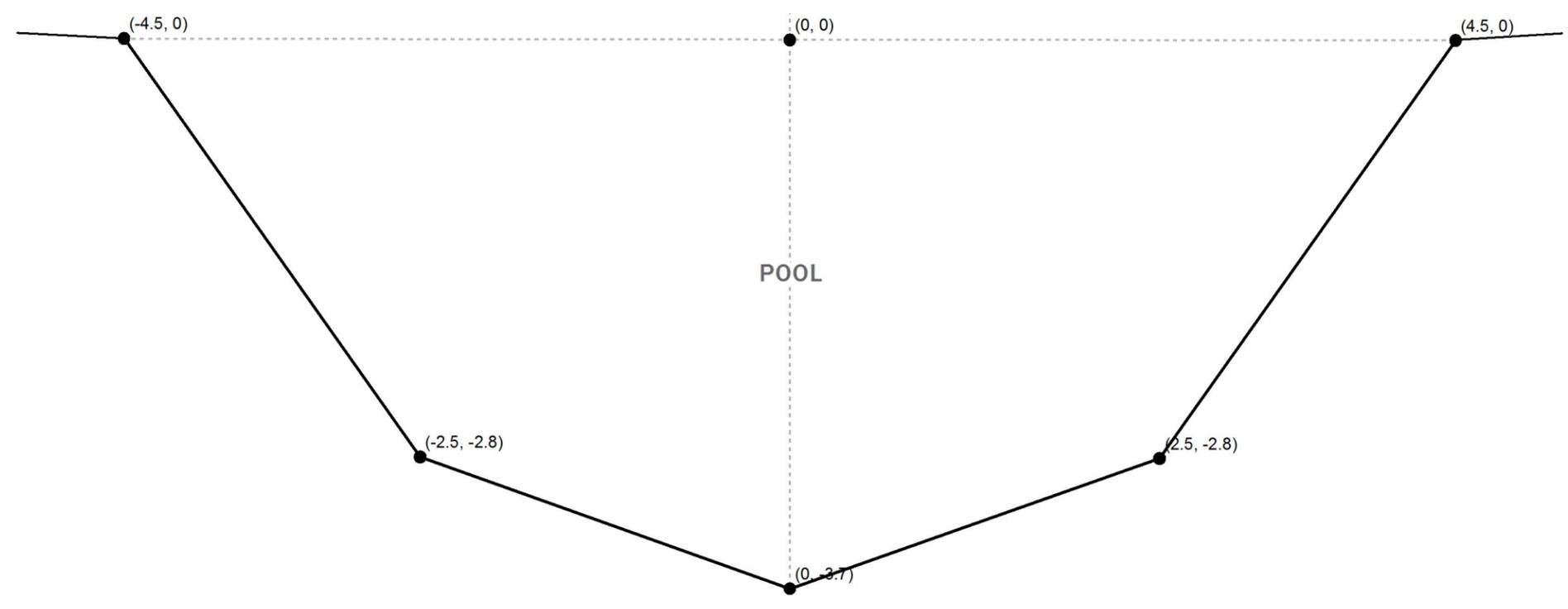
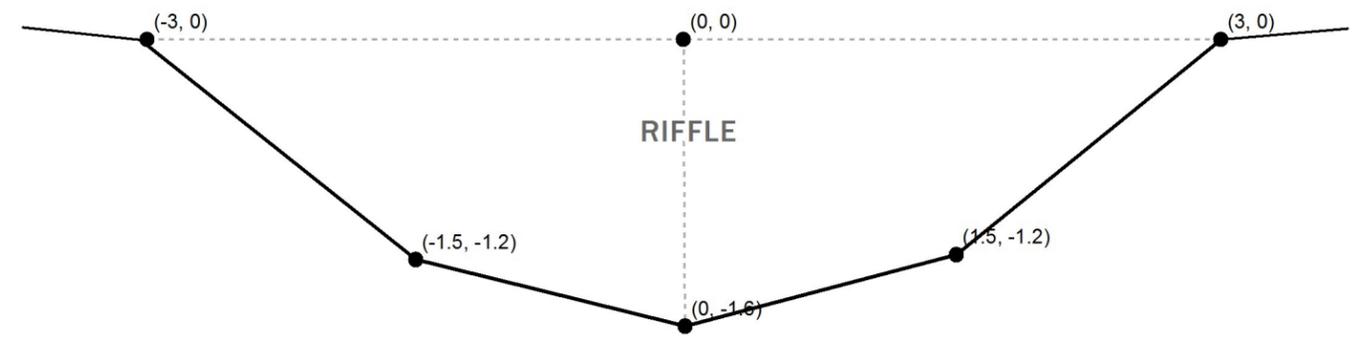
SHEET NUMBER

6.1

BANKFULL CHANNEL DESIGN CRITERIA

STREAM TYPE	E4-C4
DISCHARGE	12-15 CFS
VALLEY SLOPE	0.007
SINUOSITY	1.2-1.4
CHANNEL SLOPE	.0072-.0081

FEATURE/PARAMETER	RIFFLE	POOL
WIDTH	5-7 FT	8-9 FT
MEAN DEPTH	0.8-1.1 FT	0.9-1.1 FT
MAX DEPTH	1.2-1.6 FT	2.8-3.7 FT
XS AREA	6 FT ²	8 FT ²
WIDTH:DEPTH	5-9	7-10



**CHANNEL CROSS SECTIONS
TYPICAL**

0 0.5 1

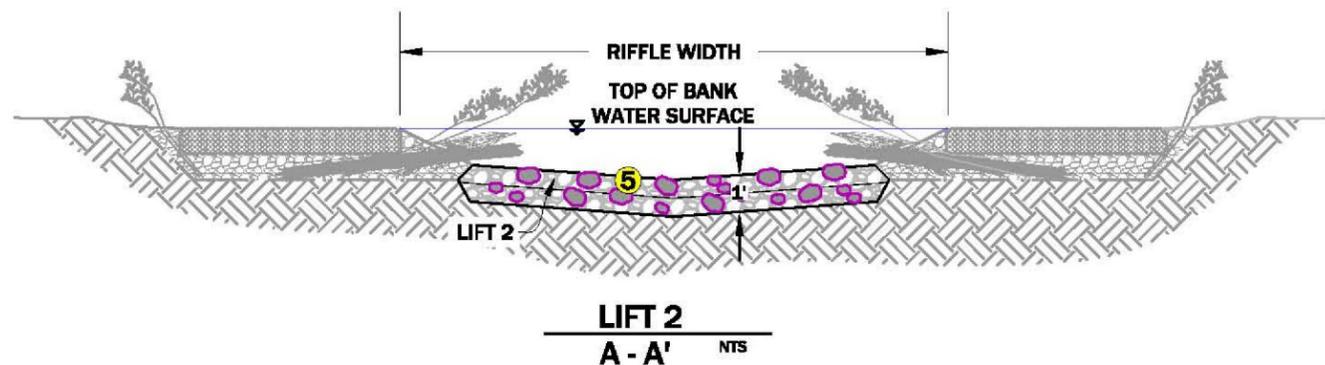
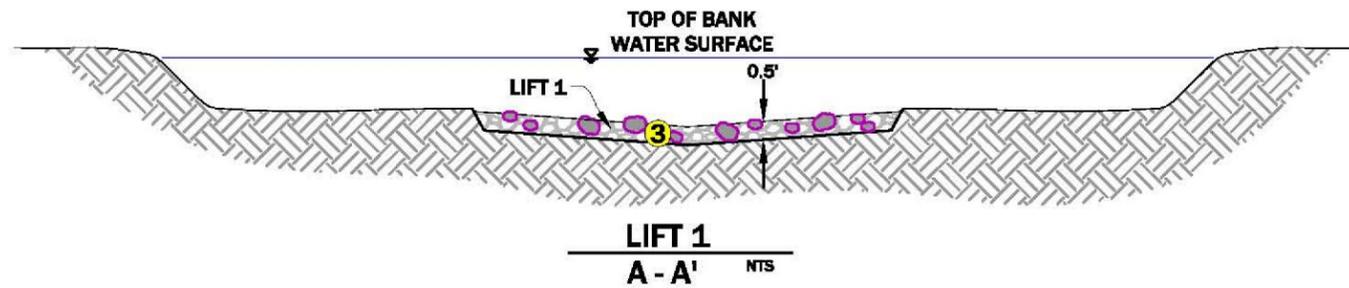
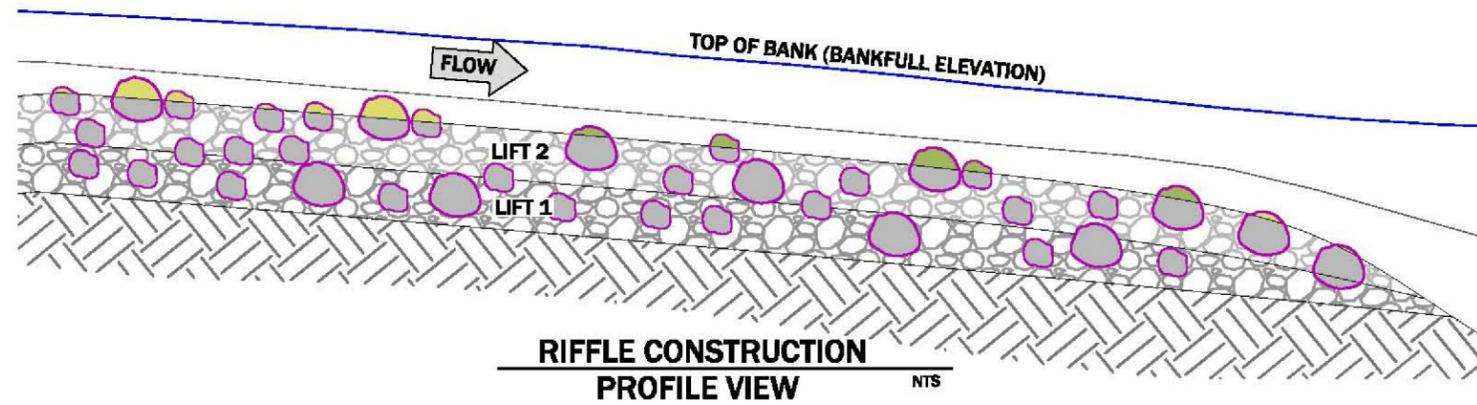
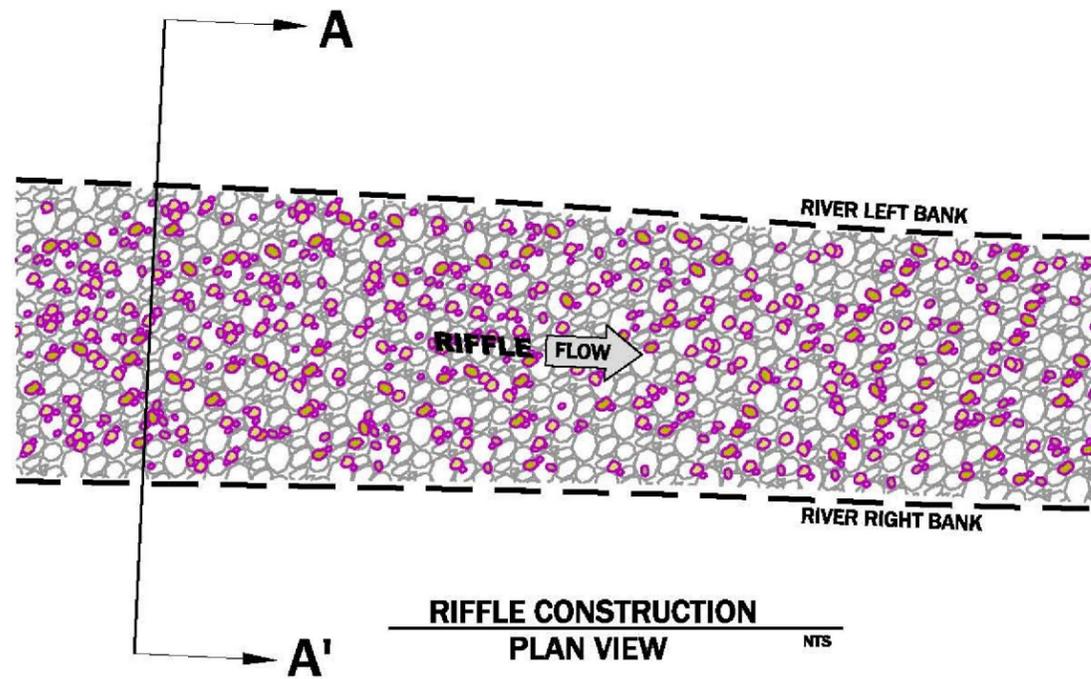
**CHANNEL CROSS
SECTION DIMENSIONS**

NO.	DATE	BY	DESCRIPTION	GD
1	06-21-16	NW	CONCEPTUAL DESIGN	

PROJECT NUMBER
RDG-16-015

SHEET NUMBER

7.0



DESIGN INTENT

THE PURPOSE OF THIS STRUCTURE IS TO PROVIDE VERTICAL STABILITY BETWEEN POOLS AND/OR MEANDER BENDS. THE STRUCTURE IS COMPOSED OF A WELL-GRADED MIX OF ALLUVIAL SUBSTRATES THAT REPLICATE NATURAL STREAMBED MATERIALS. A BOULDER FRAMEWORK MAY BE ADDED TO PROVIDE ADDITIONAL STABILITY.

CONSTRUCTION NOTES

- 1 EXCAVATE STREAMBED TO SUBGRADE ELEVATIONS. THE ENGINEER WILL CONFIRM WHETHER SUBGRADE EXCAVATION AND RIFFLE CONSTRUCTION ARE NECESSARY BASED ON OBSERVED SUBSTRATE CONDITIONS.
- 2 PLACE RIVERBED FILL IN TWO LIFTS. IF SPECIFIED, PLACE BOULDER FRAMEWORK BEFORE RIVERBED FILL.
- 3 PLACE THE FIRST LIFT OF RIVERBED FILL AND COMPACT USING WEIGHT OF EQUIPMENT.
- 4 WASH FINES AND WATER FROM ONSITE INTO THE RIVERBED FILL OF THE FIRST LIFT TO SEAL THE VOIDS.
- 5 PLACE THE SECOND LIFT USING MINIMAL COMPACTION.
- 6 WASH FINES AND WATER FROM ONSITE INTO THE RIVERBED FILL OF THE FIRST LIFT TO SEAL THE VOIDS.
- 7 GRADE THE RIVERBED TO MATCH FINISHED GROUND ELEVATIONS. LARGER ROCKS MAY PROJECT ABOVE THE FINISHED RIVERBED ELEVATION AS SHOWN.

MATERIAL SCHEDULE (PER LINEAR FOOT)

ITEM	DIAMETER (IN)	QUANTITY
2 STREAMBED FILL	SEE GRADATION	0.22 CY

STREAMBED FILL GRADATION

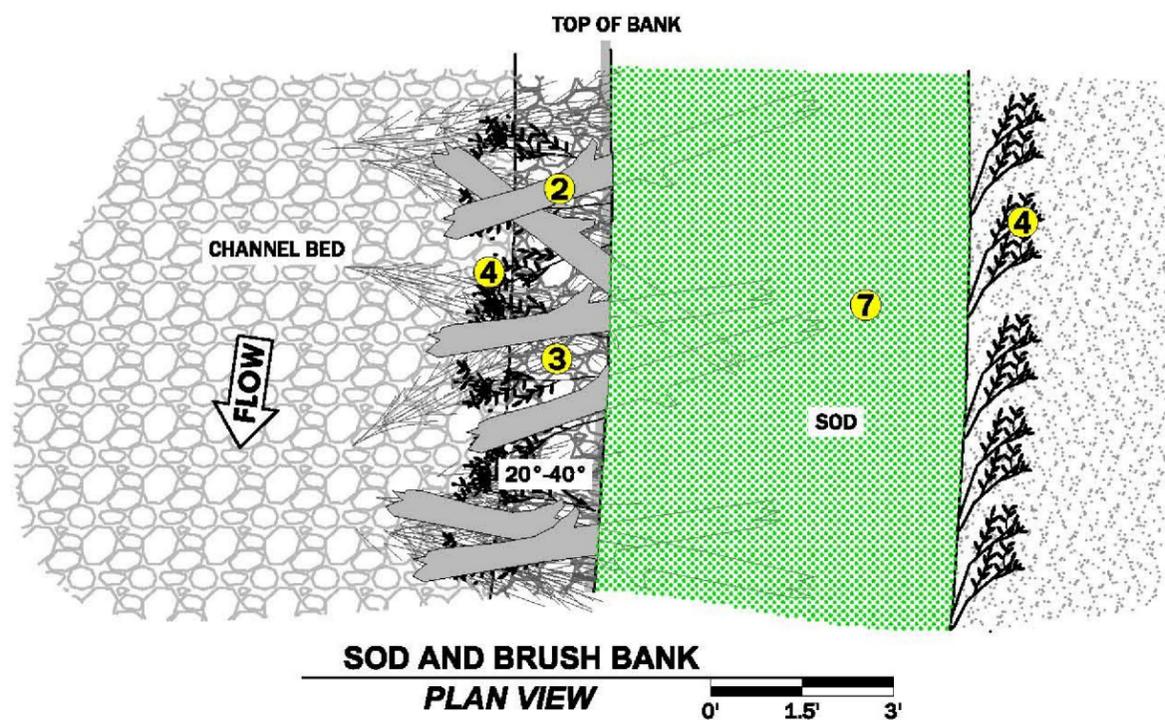
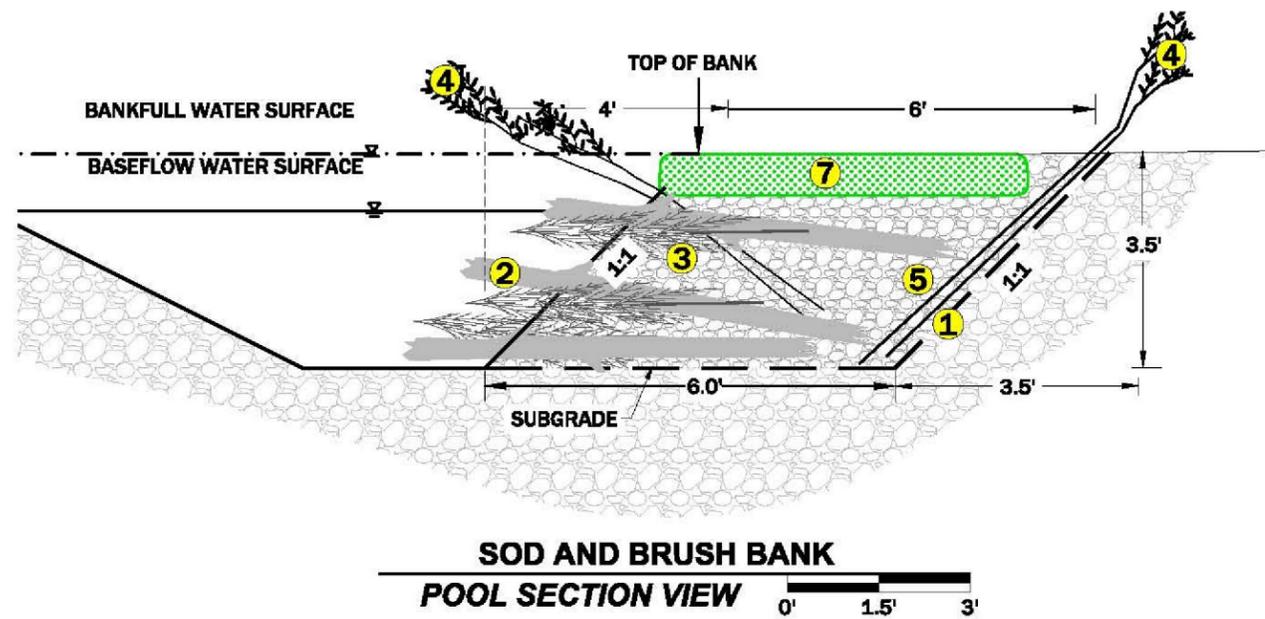
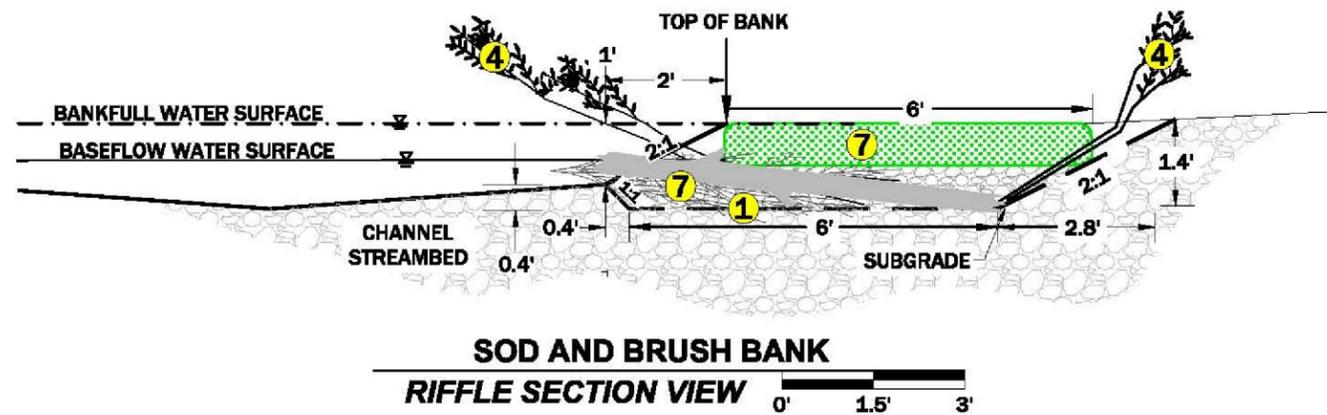
SIZE (INCHES)	PERCENT PASSING	REPRESENTATIVE SIZE CLASS
5	100	D100
4	90 - 100	D95
2-4	50 - 80	D65
1-2	30 - 50	D35
0.5-1.0	10 - 30	D15
FINES	0	

CONSTRUCTED CHANNEL STREAMBED TYPE 1 DETAIL

NO.	DATE	BY	DESCRIPTION
1	06-21-16	NW	CONCEPTUAL DESIGN

PROJECT NUMBER
RDG-16-015

SHEET NUMBER
8.0



DESIGN INTENT

PURPOSE: THE PURPOSE OF THIS STRUCTURE IS TO CREATE A COMPLEX, VEGETATED BANK MARGIN THAT SUPPORTS AQUATIC HABITAT, VEGETATION AND GEOMORPHIC OBJECTIVES.

PLACEMENT CRITERIA: THIS STRUCTURE IS DESIGNED TO FUNCTION ON A MODERATE STRESS BANK WITH LOW TO MODERATE CURVATURE.

SUPPLEMENTAL INFORMATION: THE SOD AND BRUSH STRUCTURE INCORPORATES NATIVE MATERIALS TO PROVIDE PREFERRED HABITAT CONDITIONS ALONG STREAMBANKS. THE STRUCTURE IS BUILT ON A ROCK AND WOOD TOE. STRUCTURE PERFORMANCE IS DEPENDENT ON TOE STABILITY AS WELL AS SMOOTH TRANSITIONS TO STABLE UPSTREAM AND DOWNSTREAM TIE-IN POINTS. APPLICATION OF ADEQUATE BACKFILL AND SOD MAT BALLAST IS CRITICAL TO COUNTERACT BUOYANCY AND SLIDING/ROTATION OF WOOD. PLACEMENT OF WOOD UP TO 8 INCHES BELOW BANKFULL CAPPED WITH A SOD MAT AND PLACEMENT OF HEALTHY WOODY VEGETATION IN CONTACT WITH THE WATER TABLE THROUGHOUT THE GROWING SEASON IS CRITICAL FOR RAPID VEGETATION ESTABLISHMENT.

CONSTRUCTION NOTES

- 1 EXCAVATE STREAMBANK TO SUBGRADE ELEVATIONS.
- 2 PLACE SMALL LOGS IN THE STREAMBANK AT SKEWED ANGLE TO THE STREAMBANK. LOGS SHALL BE PLACED BELOW THE TOP OF BANK ELEVATION. LOGS MAY OVERLAP.
- 3 PLACE BRUSH WITHIN THE MATRIX OF SMALL LOGS. BRUSH SHALL BE PLACED BELOW TOP OF BANK LINE.
- 4 PLACE CUTTINGS INTO THE LOG/BRUSH MATRIX WITH THE STEMS IN CONTACT WITH THE BASEFLOW WATER TABLE AND THE LEAVES AT OR ABOVE THE BANKFULL WATER SURFACE ELEVATION.
- 5 BACKFILL STREAMBANK WITH STREAMBANK FILL PER THE GRADATION SHOWN ON THE DRAWINGS.
- 6 WASH FINES AND WATER FROM ONSITE INTO THE STREAMBANK FILL TO SEAL THE VOIDS IN THE BACKFILL.
- 7 PLACE A 8-10 INCH SOD MAT BEGINNING AT BANKLINE AND EXTENDING BACK 6 FEET IN TO FLOODPLAIN TO MATCH FINISHED GROUND ELEVATIONS. REFER TO VEGETATION SALVAGE PLAN FOR SOD SOURCES.

STREAMBED FILL GRADATION

SIZE (INCHES)	PERCENT PASSING	REPRESENTATIVE SIZE CLASS
5	100	D100
4	90 - 100	D95
2-4	50 - 80	D65
1-2	30 - 50	D35
0.5-1.0	10 - 30	D15
FINES	0	

MATERIAL SCHEDULE (PER LINEAR FOOT)

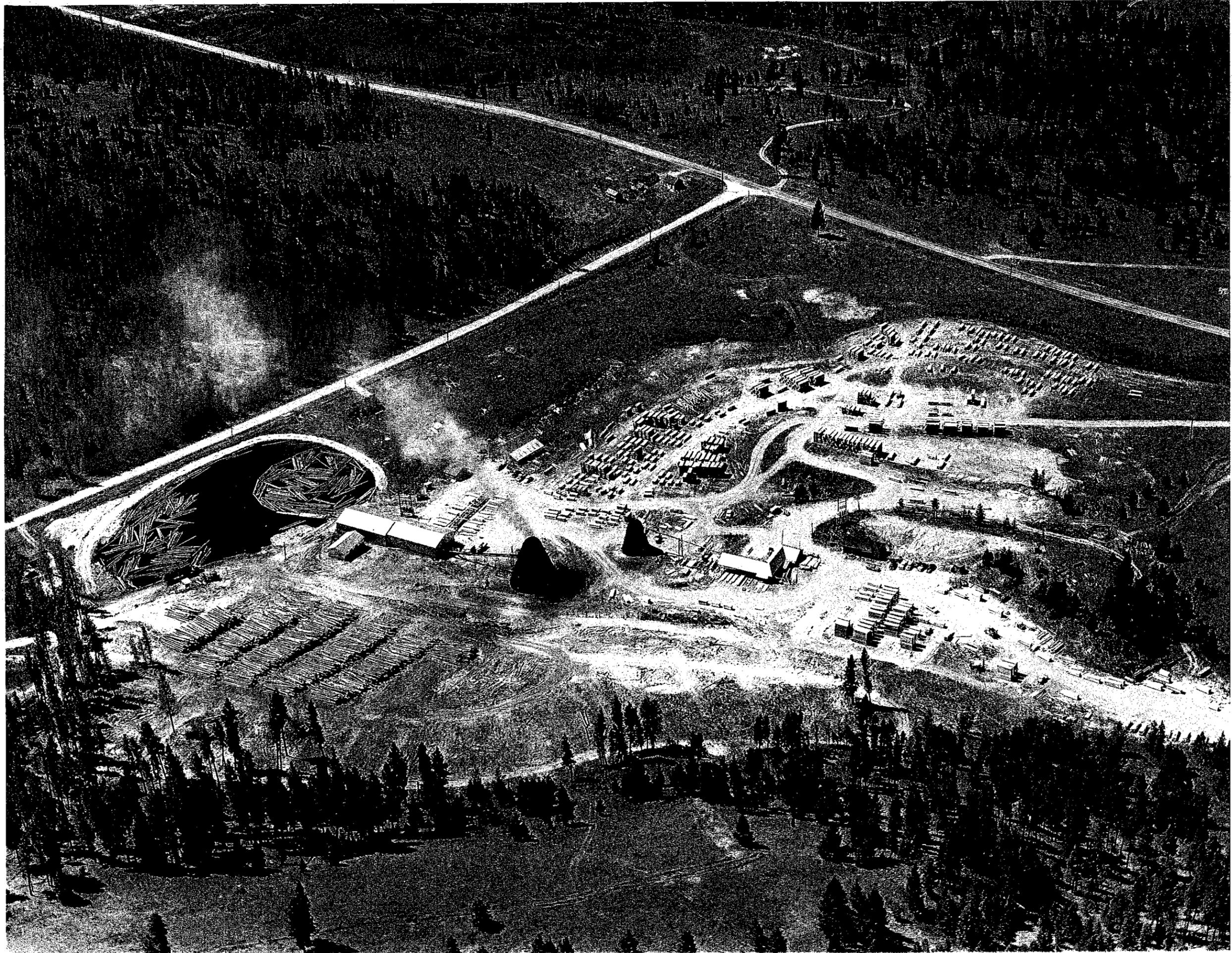
ITEM	RIFFLE QUANTITY	POOL QUANTITY	DIA. (IN)	LENGTH (FT)
1 CY OF SUBGRADE EXCAVATION	0.34	1		
5 CY OF STREAMBED FILL	0.05	0.3		
2 SMALL WOOD	0.4	0.85	3-6	8
3 BRUSH WOOD	0.4	0.85	1-3	8
7 SEDGE SOD MAT	12 SF	12 SF	8-10 (THICK)	3 X 6
4 WILLOW CUTTINGS	5	5	0.75-1.5	6-8

NO.	DATE	BY	DESCRIPTION	GD
1	06-21-16	NW	CONCEPTUAL DESIGN	

PROJECT NUMBER
RDG-16-015

SHEET NUMBER

8.1



LINCOLN CONSERVATION DISTRICT and BARRY ROOSE

COOPERATIVE AGREEMENT FOR MUD CREEK

By this agreement dated _____, Barry Roose (Cooperator) and Lincoln Conservation District (LCD) agree to the following terms:

Purpose. Cooperator and LCD declare that the purpose of this agreement is to restore, enhance, or prevent the degradation of fish and wildlife habitat on Cooperator's property for the benefit of Cooperator and the greater Eureka community. This agreement sets forth the terms by which LCD shall oversee the restoration, enhancement, or protection of the described lands ("the Project") in consideration for Cooperator's willingness to provide access to described land for project implementation and monitoring activities and for Cooperator's willingness to forego any management practices or activities contrary to the purpose of the agreement.

The project restoration design has been completed by and designed by _____ and the cost of the design has been paid by LCD in cooperation with the Montana Department of Environmental Quality. LCD shall be responsible for the restoration construction and revegetation which is expected to be completed by December 2019. LCD has raised funds to pay for 60% the construction and revegetation. The remaining 40% will be paid through cash or in-kind. LCD shall be responsible for operating and maintaining all stream structures, vegetation, management measures, and water quality benefits associated with the project.

Project Location. Cooperator and LCD and its agency partners will jointly conduct certain habitat management practices to restore, enhance or prevent the degradation of fisheries and wildlife habitat on the following described lands:

T35 R26 Section 3

Term of Agreement: The terms of this agreement will be effective for 10 years beginning _____ and continuing through _____.

Consideration: In addition to consideration otherwise expressed within this agreement:

LCD and its Agency partners agree to provide:

- Technical support and monetary funding for the Project as described in attached Project Plans, Scope of Work, and Project Budget.
- Oversight of the project including but not limited to interagency project coordination, grant writing, selection and oversight of contractors, acquisition of necessary permits,
- Short- and long- term project monitoring, and
- Notice to Cooperator of specific areas of concern requiring corrective action.

Cooperator agrees to provide:

- Reasonable site access for LCD or its agency cooperators to the Project Location at reasonable times with 48 hours notice to implement, maintain and monitor all phases of the Project,
- A warranty that Cooperator owns the lands described,
- Compliance with actions necessary to restore, enhance and prevent the degradation of habitats on the described lands.
- Maintain conditions that support water quality. This may include, but not limited to, supporting healthy riparian vegetation, revegetation of failed plantings, preventing and repairing stream bank erosion, supporting proper wetland function.

Forces Beyond Control of Parties: Cooperator acknowledges that funding is dependent upon availability of state, federal, and non-federal funds subject to circumstances beyond the control of LCD. LCD shall not be liable for failure to provide funds committed to the project if those funds have been withheld for events or circumstances beyond the control of LCD. However, if project funding fails, LCD shall release Cooperator from its obligations under this agreement. If Cooperator fails to meet terms of the agreement due to circumstances beyond its control, Cooperator shall release LCD from its obligations under this agreement.

Modification and Termination in Writing: This agreement may be modified at any time by mutual written consent of Cooperator and LCD. No other communication between the parties shall modify or be part of this agreement except by express written consent. This agreement may be terminated in writing by either party with thirty (30) days notice. If Cooperator terminates this agreement, fails to comply with terms and conditions of this Agreement, or fails to respond to reasonable requests from LCD to take corrective actions, the Cooperator shall reimburse LCD for the cost of the habitat developments on a pro rata basis.

Indemnity: Neither LCD, its agency partners nor Cooperator shall be liable for damages or injuries incurred during the Project except damages and injuries caused by willful misconduct or gross negligence occurring on the described lands pursuant to the Project.

Merger: This agreement is comprised of ___ pages including those documents checked below:

___ Map of Project Location

___ Project Plans

___ Scope of Work

____ Project Budget

Signatures:

Cooperator

Chairperson, Lincoln Conservation District

DRAFT