



2026 On-the-Ground Project Application Form

General Information

Project Name

Applicant Name

Is your organization registered with the Montana Secretary of State?

Explanation: Each applicant must be registered with the Montana Secretary of State to do business in the state of Montana. Registration with the Secretary of State may be completed via the following website: <https://sosmt.gov/business/>

Is your organization registered with the federal System for Award Management (SAM)?

Explanation: Each applicant is required to register with SAM. To register or check your organization's status, go to <https://sam.gov/content/home>. If you get an "Unsupported Browser" error, copy, and paste the link into a Google Chrome browser window.

Primary Contact Title

Address City State Zip Code

Phone Number Email

Signature Digitally signed by Gretchen Watkins
Date: 2026.02.20 08:25:10 -07'00'

Explanation: This is the person who DEQ would routinely contact to discuss project progress, billing, etc.

Signatory Title

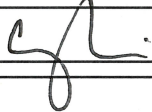
Address City State Zip Code

Phone Number Email

Signature Digitally signed by Brian Chaffin
Date: 2026.02.20 10:15:51 -07'00'

Explanation: This is the person who can legally sign contracts and other binding documents on behalf of the applicant (e.g., a board chair)

Note: The primary contact, signatory and landowner must sign the application. Signatures must be either signed electronically, or wet-signed, scanned and sent electronically.

Landowner Name 

Landowner Signature

Landowner Name

Landowner Signature

Landowner Name

Landowner Signature

Explanation: Landowner signatures are required. **Signing the application does not obligate the landowner to implement a project.** Instead, it is an indication that the landowner has read the application and agrees, in principle, with the project concept and goals.

Your organization's Unique Entity Identifier number (UEI #)

Explanation: Each applicant is required to have a current UEI number. The UEI number replaces the old DUNS number. If your organization had a DUNS number, you should have received a notification from the federal government indicating that your DUNS number has been changed to a UEI number. If you did not receive this notification, or if you never had a DUNS number, you will need to go to the federal government's System for Award Management (SAM - <https://sam.gov/content/home>) to obtain your UEI number. DEQ recommends starting this process early as it is very time-consuming, requires providing documentation-sometimes with follow-up requests for additional information, and can take up to 2 months to complete. If you need assistance, you may contact the federal help desk at 866-606-8220 Monday-Friday 8:00 a.m. through 8:00 p.m. EST.

Does your organization have adequate liability insurance for the risks associated with your project?

Explanation: Each applicant must have or obtain liability insurance coverage meeting the requirements stated in the Draft Sample Contract and/or requirements negotiated based on the appropriate level of risk associated with the project.

Describe the technical and administrative skills your organization will use to effectively and efficiently complete your proposed project(s).

Budget Form

Please fill out the On-the-Ground Project Budget Template (Excel file). Cells highlighted in yellow may be edited to fit the needs of your particular project. DEQ uses a template to construct nonpoint source grant contracts. The Budget Template contains tasks and typical deliverables that match up with the grant contract template. Please see the Example Contract and Scope of Work Template for a more detailed look at typical task requirements and deliverables.

Project Form

A separate Project Form (including providing separate attachments) must be submitted for each project included in your application. y lump and when to split projects.

Splitting Examples (fill out multiple Project Forms)

- Stream restoration work occurring on two separate streams..
- Two projects with significantly different sets of project partners.
- Two projects that address substantially different pollution sources (e.g., one project move a corral off of a streambank, and another removes mine tailings, with both projects being on the same property).

Lumping Examples

- Contiguous stream restoration work spanning multiple land parcels.
- Three projects that address similar sources of pollution on a single land parcel (e.g., moving a corral off a stream, implementing a grazing management plan, and relocating a manure storage facility out of the floodplain, all on the same ranch)

Project Form

A separate Project Form (including providing separate attachments) must be submitted for each project included in your application

Project Name:

Required Attachments in Addition to This Form

Letter of support from the organization that created or sponsored the creation of the DEQ-accepted Watershed Restoration Plan or the Tribe that created the EPA-approved Tribal Nonpoint Source Management Plan (if applicable).

Letter of support from EACH landowner associated with the proposed project area (if applicable).

Budget Table (see Microsoft Excel Template).

Detailed Project site map(s) Attach a map or set of maps showing the location and size of proposed activity if a site has been predetermined. The map scale must be between 1:1,000 and 1:12,500. The map(s) must have an aerial photo background (e.g., USDA NAIP photography, Google Earth imagery, etc.). The map(s) must show the latitude, longitude, site name, and landowner for the activity site. The map(s) should also identify waterbodies affected by the pollution that the activity is designed to address. *(This is in addition to adding points of the project location to the website on page 4).*

Optional Attachments

Attach additional items and information that could help reviewers better understand your project. Information could describe public health risks, opportunities to leverage other funding sources, etc. However, application reviewers may have limited time available, and excessively long, optional attachments might not get reviewed. Do not attach copies of TMDL documents, TMDL implementation evaluations, Watershed Restoration Plans, Tribal Nonpoint Source Plans, or large comprehensive studies. The following attachments may be included. Please no more than 20 pages.

Project Design Plans/Drawings

Preliminary Engineering Reports / Site Evaluations

Landowner Agreements / Construction Permits / Floodplain Permits

Site photos

Additional Letters of Support

Other: _____

Other: _____

Other: _____

Project Area

Please provide as detailed a description of the project area as possible.

List the counties in which the project will be located.

List the 12-digit Hydrologic Unit Codes (HUCs), sometimes referred to as Sixth Code HUCs, in which the project will take place. Use the following link to help assist you in determining the HUCs: <https://apps.nationalmap.gov/viewer/>

Project Location Map

In addition to providing your own project site map, please go to the following website and follow the instructions to add your project location to the map.

<https://gis.mtdeq.us/portal/apps/storymaps/stories/42f4a668285c4ef6aa94b1623f10df57>

Connection to a Previous or Ongoing Project

Is this project tied to a previous or ongoing project? If so, please describe the connection.

Project Purpose

Select the watershed restoration plan or tribal nonpoint source plan that your project will help implement (please type in if missing from list) (Not required for HAB reduction projects)

Letter of support from author, or if the author was contracted, the author sponsor, attached? (If no, explain why below.)

IMPAIRMENT LISTINGS: Projects that address water quality impairments on Montana's 2020 List of Impaired Waters are preferred though not a requirement. Funding may be used for projects that protect waterbodies that are demonstrated to be healthy.

Waterbody name from the 2020 List of Impaired Waters

Probable causes of impairment to be addressed

Waterbody name from the 2020 List of Impaired Waters

Probable causes of impairment to be addressed

HEALTHY WATERSHEDS: While project funding is prioritized to addressing known impairments, funding can be used to protect healthy waters from becoming impaired.

Name of healthy waterbody to be protected

Description of identified threat

Name of healthy waterbody to be protected

Description of identified threat

Project Partners

Identify each of the project partners and describe their contribution to the project. Include landowners, land managers, project designers, funders, and your own organization. Indicate whether each partner, other than your organization, has provided a letter of support. *(Note: each landowner must provide a letter of support if project site(s) have been predetermined.)*

Landowner

Contributions to Project

Letter of
Support
Attached?

Project Partner

Contributions to Project

Letter of
Support
Attached?

Project Coordination and Planning Task

This task would include completion of all applicable planning tasks from the list below, as well as coordination and oversight of the efforts of all project partners.

Identify the status of the following project planning tasks, where applicable.

	Completed?	Copy Attached?	To Be Completed Pre-Contract (Oct 2026)?	To Be Completed as Contract Deliverable?
*Draft Project Designs				
*Final Project Designs				
Consultation With Potential Regulators				
Necessary Permits				
Cultural Resources Inventory <i>(if relevant)</i>				
Other:				
Other:				
Other:				

***See Call for Applications Section 5.1 for minimum design standards.*

Describe any additional project planning that will have been completed prior to execution of a contract (October 2026).

Describe any additional project planning and coordination that will need to be completed after the execution of a contract (October 2026).

Landowner Agreement Task

DEQ includes the following language in every nonpoint source contract involving on-the-ground activities:

Contractor shall submit signed landowner agreement(s) verifying that Contractor and DEQ staff may access the project site, at reasonable times and with prior notification, for the purposes of project planning, implementation, and post-implementation monitoring. The agreement(s) must ensure appropriate operation and maintenance of all structures, vegetation, and management measures for the life of the project (typically 10 years). If grazing will be allowed within the project area, the agreement(s) must include a sustainable management plan for livestock grazing, designed to protect and enhance riparian function. If a signed landowner agreement does not meet the above-stated minimum requirements, Contractor shall negotiate an amended agreement with the landowner that ensures appropriate operation and maintenance of all structures, vegetation, management measures, and includes a sustainable management plan for any livestock grazing for the life of the project (typically 10 years).

Identify the status of the following landowner agreement tasks, where applicable.

	Completed?	Copy Attached?	To Be Completed Pre-Contract (Oct 2026)?	To Be Completed as Contract Deliverable?
Draft Landowner Agreement(s)				
Final Landowner Agreement(s)				
Grazing Management Plan				
Other:				
Other:				

Project Effectiveness Monitoring Task

If you will be conducting any on-the-ground implementation work, you will be required to complete the monitoring activities described in the task language below, as applicable. Describe below how you plan to determine the effectiveness of your project. Project effectiveness success criteria should be time-bound and assess each project objective quantitatively. Success criteria should clearly define adaptive management thresholds. Examples may include: a minimum 25% decrease in sediment/nitrogen/phosphorus load within 2 years; a 70% survival rate of containerized plantings after one year.

If you are applying for nonpoint source grant funding for project design only, and not for project implementation, you may either skip this task, or describe below which parts of this task you intend to complete:

Example Task Language

Contractor shall, in consultation with the DEQ Project Manager, develop a reasonable method or set of methods for evaluating and reporting on the effectiveness of the project in addressing water quality issues. Contractor shall complete a monitoring plan to guide monitoring activities. Contractor shall complete the following monitoring activities:

- *Estimate the sediment load reductions (tons/year) achieved through implementation of the proposed restoration activities and management practices.*
- *Estimate the nitrogen load reductions (pounds/year) achieved through implementation of the proposed restoration activities and management practices.*
- *Estimate the phosphorus load reductions (pounds/year) achieved through implementation of the proposed restoration activities and management practices.*
- *For projects designed to address pollution from pollutants other than nitrogen, phosphorus and sediment, evaluate and report on the effectiveness of the project in addressing water quality issues.*
- *Contractor shall collect data, as directed by the DEQ Project Manager, to be used in estimating sediment, nitrogen, and phosphorus load reductions (and for harmful algal bloom reduction projects, carbon sequestration/emissions reductions) achieved through implementation of restoration activities and management practices designed to address these pollutants.*
- *Use the following measures to evaluate the sustainability of restoration activities and management practices:*
 - *[Vegetation mortality rate.]*
 - *Pre- and post-construction photo point monitoring consistent with the “Oregon Watershed Enhancement Board Guide to Photo Monitoring” methodologies, or a similar published photo point monitoring method accepted by DEQ. The U.S. Forest Service provides additional photo point monitoring guidance in the “United States Forest Service Photo Point Monitoring Handbook”.*
 - *[Riparian survey.]*
 - *[Other.]*

Please describe any additional monitoring you intend to do as part of the project.

Project Implementation Task

Provide a **detailed description of the solution you are proposing** to implement to address a nonpoint source pollution problem.

- Describe the practices you intend to design and/or implement to solve the problem (what, where, when, how much or how many).
- Describe the anticipated maintenance needs (what, where, who, how long).
- Refer to the minimum design standards in the Call for Applications.
 - *Please fill out this section to the best of your ability, even if you are only seeking funding for project design.*

Education, Outreach and Training Task

To get good projects on the ground, trained staff and board members and educated, enthusiastic landowners are required. To promote the development of future projects, DEQ encourages project sponsors to use up to \$5,000 per project of funding to support training and conduct education and outreach. Example training topics might include: project management, public procurement, technical writing, GIS, water quality monitoring, web design, public speaking, human resource management, photo journalism, UAV (drone) piloting, financial management, and restoration techniques. Education and outreach activities might include targeted landowner outreach, conducting project site tours for local landowners, tabling at community events, holding a watershed festival, providing stipends and travel reimbursements for speakers and participants to attend a nonpoint source pollution prevention workshop, or generating articles for social media. The primary requirement for training and outreach is clearly explaining how the activity generates behavior change to address nonpoint source pollution. Funding may not be used to pay for food and beverages, or for honorariums and gifts.

Describe the education and outreach activities or training you will complete to promote behaviors or facilitate future efforts to reduce nonpoint source pollution. Additionally, identify the goals of the training/education and outreach activities.

Identify the specific target audience and method of delivery. Additionally, describe how the proposed training and/or education and outreach will increase local capacity and interest for addressing/promoting behavior change to reduce nonpoint source pollution.

Describe how you will evaluate the effectiveness of the proposed activities.

Project Administration Task

Please use the task description below as a guide when calculating your budget for project administration. DEQ typically includes these requirements in every nonpoint source grant contract, with only minor variation. Funding applied to the Project Administration Task on each project must not exceed 10% of the total amount of funding requested, or \$12,000, whichever is lower.

Example Task Language

Contractor shall oversee and be accountable for the completion of all tasks. Contractor shall maintain regular contact with the DEQ project manager. Contractor shall prepare and submit Status Reports, Final Reports and Attachment B Billing Statements according to the format and schedule described below.

Report Format

- *Contractor shall submit each Attachment B Billing Statement, Status Report and Final Report using the most current reporting guidance and templates provided by the DEQ project manager.*
- *Contractor shall ensure each Status Report and Final Report contains adequate documentation to justify accompanying reimbursement requests and match reporting, to the satisfaction of the DEQ project manager.*
- *Contractor shall ensure that the Final Report is a standalone document describing all contract activities and containing copies of all contract deliverables (even if the deliverables were previously submitted).*

Reporting Schedule

- *Status Reports: Due June 15th and December 15th of each year the Contract is in effect, and each time an Attachment B Billing Statement is submitted.*
- *Draft Final Report: Contractor shall submit a complete draft Final Report for DEQ review and comment at least 15 days prior to the contract expiration date.*
- *Final Report: Contractor shall submit a Final Report, addressing DEQ comments on the draft Final Report, on or before the Contract expiration date.*
- *Attachment B Billing Statements: Contractor shall submit an Attachment B Billing Statement with each Status Report, or Final Report submitted to DEQ while the Contract is in effect. To maintain cash flow, Contractor may submit interim Attachment B Billing Statements as frequently as monthly during the term of the Contract. However, each interim Attachment B Billing Statement must be accompanied by an Interim Report.*

Project Timeline

4Q 1Q 2Q 3Q 4Q 1Q 2Q 3Q 4Q 1Q 2Q 3Q
2026 2027 2027 2027 2027 2028 2028 2028 2028 2029 2029 2029

Project Coordination and Planning Task

Landowner Agreement Task

Project Effectiveness Monitoring Task

Project Implementation Task

Education, Outreach and Training Task

Project Administration Task

Co-Benefit Considerations

DEQ is committed to carrying out nonpoint source pollution reduction projects within engaged communities where the impact stretches beyond improving water quality. DEQ will award additional points in the scoring form where co-benefits extend beyond the project. Below are a few examples of how projects might exemplify co-benefits.

- Project will reduce economic hardship such as from livestock mortalities, cost and energy needs to treat municipal drinking and wastewater treatment, or loss of income from recreation
- Project will benefit underserved markets
- Project will improve or create equitable access to a clean and healthy environment
- Project planning included consultation with Tribal Nations
- Project will improve flood and drought resilience of the landscape
- Project impacts will benefit a downstream community and other natural systems (e.g., drinking water sources, human health, wildlife habitat, etc)

Please use this section to highlight co-benefits your project may have.

BUDGET

2026 Nonpoint Source Pollution Reduction Application - On-the-Ground Project Budget Template

Project Title:								
Instructions	Tasks and Potential Deliverables	Funding Request*	Non-Federal Match**	Other Funding***	Match Source	Match Secured? (Y/N)	Total Project Cost	Additional Information****
<p>This task includes completion of all planning tasks and coordination and oversight of the efforts of all project partners. Provide a detailed budget and add a row if needed.</p>	Project Planning						\$ -	
	Preliminary site investigation data and site maps						\$ -	
	Required Permits						\$ -	
	Draft Project Designs						\$ -	
	Final Project Designs						\$ -	
	Total		\$ -	\$ -	\$ -			\$ -
<p>This task includes costs for developing and managing landowner agreements and developing grazing management plans as applicable. Provide a detailed budget and add a row if needed.</p>	Landowner Agreements						\$ -	
	Draft Landowner Agreement						\$ -	
	Final Landowner Agreement						\$ -	
	Grazing Management Plan						\$ -	
Total		\$ -	\$ -	\$ -			\$ -	
<p>This task includes costs for developing and implementing a monitoring plan to evaluate effectiveness to reduce nonpoint source pollution. See example contract template or application instructions for required monitoring activities. Provide a detailed budget and add a row if needed.</p>	Effectiveness Monitoring						\$ -	
	Draft Monitoring Plan						\$ -	
	Final Monitoring Plan						\$ -	
	Written Summary of all Monitoring Activities						\$ -	
	Total		\$ -	\$ -	\$ -			\$ -
<p>This task includes all costs for implementation of the plans developed in the Project Planning task. If you are requesting funding for design only, leave this task blank. Provide a detailed budget and add a row if needed.</p>	Project Implementation						\$ -	
	Materials						\$ -	
	Labor						\$ -	
	Equipment costs						\$ -	
	Construction oversight						\$ -	
	As-built surveys						\$ -	
	Photo documentation						\$ -	
	Landowner recommendation letter						\$ -	
							\$ -	
	Total		\$ -	\$ -	\$ -			\$ -
<p>This task includes costs to develop and improve organizational capacity and to incorporate education and outreach into each on-the-ground projects. Provide a detailed budget and add a row if needed.</p>	Education and Outreach						\$ -	
	Volunteer Coordination						\$ -	
	Event/Tour Planning						\$ -	
	Outreach/Publication materials						\$ -	
	Total		\$ -	\$ -	\$ -			\$ -
<p>Funding applied to Project Administration task per project must not exceed 10% of the total amount of funding requested, or \$12,000, whichever is lower. Project includes normal business expenses and reporting requirements.</p>	Administration						\$ -	
	Mid/Annual/Interim Reports and Billing Statements						\$ -	
	Draft/Final Report and Billing Statements						\$ -	
	Communication with DEQ						\$ -	
	Total		\$ -	\$ -	\$ -			\$ -
		Funding Request*	Non-Federal Match**	Other Funding***			Total Project Cost	
Grand Totals		\$ -	\$ -	\$ -			\$ -	

*Funding Request - Must not exceed \$300,000 and must be at least \$125,000 for harmful algal bloom reduction projects

**Non-Federal Match - Can include in-kind materials.

***Other Funding - Include federal match here, or, for example, other funding that is supporting the project but cannot be reported as match on this grant because it is matching another funding source.

****Additional Information - Use to specify non-federal match and other funding sources, or use to justify cost if needed (e.g., hourly rates, rental costs, etc.)

**LETTERS
OF
SUPPORT**



March 12th, 2026

Meagan Gilmor, Water Quality Specialist
Nonpoint Source and Wetlands Section/Water Quality Planning Bureau
Montana Department of Environmental Quality
Kalispell Office

Dear Ms. Gilmor,

On behalf of the Missoula Conservation District (MCD) I am writing to express our enthusiastic support for the proposed on-the-ground project application for Lower Grant Creek Phase 2. The MCD supports the proposed restoration on the Frey and Cory Miller properties along the lower portion of Grant Creek. We have been a partner in identifying restoration work on the Frey property and will continue to work with NRCS, DEQ, DNRC, the landowners, and the Clark Fork Coalition to implement the best project possible.

We are excited about the new USDA regenerative agriculture program that will be implemented through NRCS and hope to be a part of this effort. The Missoula Conservation District hosts the Western Montana Grazing and Agriculture Conference, a regenerative agriculture conference where we not only teach these strategies but have also featured Cory Miller as a keynote speaker. The restoration on these properties brings together two areas of focus for MCD: promoting regenerative agricultural practices that improve soil health, and our responsibility to ensure that streams remain in their natural condition for the people of Montana, which is part of MCD's mandate under the Montana Natural Streambed and Land Preservation Act.

This project will help restore the lower watershed of Grant Creek by reducing sediment delivery to the stream, increasing spawning habitat for fish near a public fishing access site, maintaining cool stream temperatures, creating wetland habitat for non-game wildlife species, and providing important ecosystem services to the community. At the same time, it supports improvements to and maintains the existence of working agricultural lands, which is a priority for both Missoula County and the Missoula Conservation District.

We thank DEQ for supporting Phase 1 of this project and respectfully request that the agency continue to participate in this partnership by financially supporting the Clark Fork Coalition's grant proposal.

Sincerely,

A handwritten signature in black ink, appearing to read "Radley", written over a white background.

Radley Watkins
Executive Director



(406) 542-0539 

PO Box 7593 
Missoula, MT 59807

clarkfork.org 

19 February 2026

Meagan Gilmore | *Water Quality Specialist*
Nonpoint Source and Wetlands Section, Water Quality Planning Bureau
Montana Department of Environmental Quality
Office: 406-755-8985 | Kalispell Office

Dear Meagan,

I am writing to express my enthusiastic support for the proposed on-the-ground project application titled “Lower Grant Creek Phase 2.” As Executive Director of the Clark Fork Coalition, the organizational author of the DEQ-accepted Watershed Restoration Plan for Grant Creek, we endorse the proposed restoration on Cory Miller’s and MT Fish, Wildlife & Parks’ properties along the lower portion of Grant Creek.

The proposed project is clearly aligned with the goals and objectives outlined in the Watershed Restoration Plan. The project addresses critical issues such as temperature, sediment, and nutrient improvements in the stream, and it aims to achieve significant improvements in water quality, habitat restoration, and overall ecosystem health.

Grant Creek is a critical component of the regional watershed, providing essential habitat for native fish species, supporting local agriculture, and offering recreational opportunities for our community. The successful implementation of this project will not only enhance the ecological integrity of Grant Creek but also provide long-term benefits to the surrounding environment and community and be a showcase project to inspire future work.

The Clark Fork Coalition has a long history of working collaboratively with local stakeholders, including government agencies and community members, to achieve meaningful watershed conservation and water quality improvement outcomes. We are confident that this project will build on our collective efforts and contribute to the sustainable management of Grant Creek.

Thank you for your consideration of this project proposal. Please contact me if you have any questions or require additional information.

Sincerely,



Brian C. Chaffin, Ph.D.
Executive Director
Clark Fork Coalition
brian@clarkfork.org

MONTANA FISH, WILDLIFE & PARKS

Fisheries Division

FWP Statement

Project Title: Lower Grant Creek – Phase 2

Please describe the potential impact of the project, including the priorities of the Fisheries Division and the importance to Montana's anglers.

The proposed project on lower Grant Creek is an extension of a previously proposed and funded segment located just upstream on neighboring properties. The objectives of the proposed project are to enhance riparian and wetland habitat diversity, while maintaining upstream fish passage and recreational access through FWP properties to the Clark Fork River.

Lower Grant Creek presents a unique hydrologic and biological context. This segment is a 'gaining reach' in terms of instream flow due to spring inputs in the lower half mile of the drainage. Reaches upstream of this lower portion are intermittent and maintain surface flows for only a portion of the year. The proposed project reach is a complex, stream-river confluence area that lies within the Clark Fork River floodplain. Beaver activity and stream braiding are common, with potential for enhanced shrub and sedge communities.

In terms of fisheries, the proposed project reach acts as a migration corridor for salmonids and other species moving upstream and downstream – typically related to spawning. This reach also provides a cool thermal refugia in summer for trout experiencing stressful conditions in the Clark Fork River.

The proposed project is designed to enhance these wetland, riparian, and fisheries attributes in the lowest portion of Grant Creek near the stream mouth in consultation with FWP staff and adjacent private property owners.

Name of FWP Biologist

William Z. Tittel

Date:

2/18/26

Please attach to the FFIP application and materials and submit according to listed deadlines.

February 19, 2026

Meagan Gilmore | *Water Quality Specialist*
Nonpoint Source and Wetlands Section/Water Quality Planning Bureau
Montana Department of Environmental Quality
Office: 406-755-8985 | Kalispell Office

Dear Meagan,

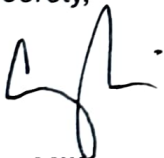
I am writing to express my support for the proposed Lower Grant Creek Phase 2 restoration project on my property and the adjacent Montana Fish, Wildlife & Parks (FWP) Fishing Access Site. As the landowner of the ranch immediately downstream of Phase 1, I have seen firsthand the challenges in this reach, including bank erosion, reed canary grass dominance, and beaver-related flooding and ice buildup. These issues affect both the health of the creek and the day-to-day operation of my ranch.

I strongly support the proposed restoration because it will improve water quality, stabilize the channel, and create a healthier, more functional floodplain. The project will also help resolve long-standing conflicts between ranching, recreation, and wildlife use by reducing erosion, and supporting a more resilient stream system. I appreciate that the Clark Fork Coalition are working closely with me, as well as with FWP's fisheries, nongame, and recreation staff, to design a project that meets water-quality goals while still supporting the practical needs of my operation, including a properly designed stock-water and irrigation system.

I am committed to participating in the design process by fencing the restoration, and supporting long-term stewardship of the restored reach. I believe this project will provide lasting benefits for my property, for the public using the Fishing Access Site, and for the overall health of Grant Creek.

Thank you for considering this important project. Please feel free to contact me if additional information is needed.

Sincerely,

A handwritten signature in black ink, appearing to read 'Cory Miller', with a stylized flourish at the end.

Cory Miller

Landowner, Lower Grant Creek

**MAPS/
DESIGNS**

LOWER GRANT CREEK RESTORATION PROJECT CONCEPTUAL DESIGN

PROJECT PARTNERS



CLARK FORK COALITION
P.O. BOX 7593
MISSOULA, MONTANA 59807



MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY
1520 E 6TH AVE
HELENA, MONTANA 59601



MISSOULA CONSERVATION DISTRICT
1075 SOUTH AVENUE W, SUITE 3
MISSOULA, MONTANA 59801



MONTANA FISH, WILDLIFE, AND PARKS
3201 SPURGIN ROAD
MISSOULA, MONTANA 59804



MONTANA DEPARTMENT OF NATURAL RESOURCES & CONSERVATION
CONSERVATION DISTRICT BUREAU
1539 ELEVENTH AVE.
HELENA, MONTANA 59601

PROJECT DESCRIPTION

RIVER DESIGN GROUP, INC. (RDG) WAS RETAINED BY CLARK FORK COALITION (CFC) IN COOPERATION WITH MISSOULA CONSERVATION DISTRICT, MONTANA FISH, WILDLIFE & PARKS, AND MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY TO PREPARE A CONCEPTUAL RESTORATION PLAN (CRP) FOR LOWER GRANT CREEK FROM MISSOULA MONTANA AIRPORT DOWNSTREAM TO THE CONFLUENCE WITH THE CLARK FORK RIVER. FROM THE RATTLESNAKE WILDERNESS BOUNDARY TO THE CLARK FORK RIVER (14.5 MILES), GRANT CREEK IS CLASSIFIED AS A B-1 WATERBODY AND LISTED AS WATER-QUALITY IMPAIRED FOR ALGAE, FLOW REGIME MODIFICATION AND ALTERATION IN STREAMSIDE COVER, NITRATE/NITRITE, TOTAL NITROGEN, SEDIMENT AND TEMPERATURE. PROBABLE SOURCES OF IMPAIRMENT INCLUDE IRRIGATED CROP PRODUCTION, LOSS OF RIPARIAN HABITAT, LAND DEVELOPMENT, STREAMBANK MODIFICATIONS, AND WATER DIVERSIONS. CFC, PROJECT PARTNERS, AND PRIVATE LANDOWNERS ARE INTERESTED IN ADDRESSING WATER QUALITY IMPAIRMENTS THROUGH IMPROVED LAND USE MANAGEMENT AND BOTH PASSIVE AND ACTIVE RESTORATION STRATEGIES TO ADDRESS GEOMORPHIC, AQUATIC, AND FLOODPLAIN LIMITING FACTORS IN THE LOWER WATERSHED. THIS CRP IS ACCOMPANIED BY A BASIS OF CONCEPTUAL DESIGN REPORT THAT PROVIDES MORE DETAILED INFORMATION ON THE INVESTIGATIONS THAT WERE CONDUCTED TO SUPPORT THE CONCEPTS AND RESTORATION STRATEGIES ILLUSTRATED IN THESE DRAWINGS.

THE CRP AIMS TO RESTORE, TO THE GREATEST EXTENT PRACTICAL GIVEN EXISTING SITE CONSTRAINTS, CHANNEL AND FLOODPLAIN AND VEGETATION CONDITIONS THAT WILL SUPPORT HIGH QUALITY WATER AND IMPROVED AQUATIC HABITAT FOR FOCAL FISH SPECIES INCLUDING THREATENED BULL TROUT (*SALVELINUS CONFLUENTUS*) USING LOWER GRANT CREEK AS A MIGRATORY CORRIDOR TO ACCESS HIGH QUALITY SPAWNING HABITAT IN THE UPPER WATERSHED. FURTHER, THE CRP PRESENTS CONCEPTS AND STRATEGIES TO REDUCE LAND LOSS ASSOCIATED WITH HIGH RATES OF BANK EROSION DUE TO LAND CLEARING AND CONVERSION OF SCRUB-SHRUB AND FORESTED RIPARIAN COMMUNITIES TO POST-AGRICULTURAL ASSEMBLAGES. RESTORATION STRATEGIES ARE EXPECTED TO INCREASE THE OVERALL VALUES AND FUNCTION OF THE AQUATIC ENVIRONMENT BY REDUCING NON-POINT SOURCE POLLUTANTS IDENTIFIED ON THE MONTANA 303(D) LIST OF IMPAIRED WATERBODIES (MDEQ 2014).

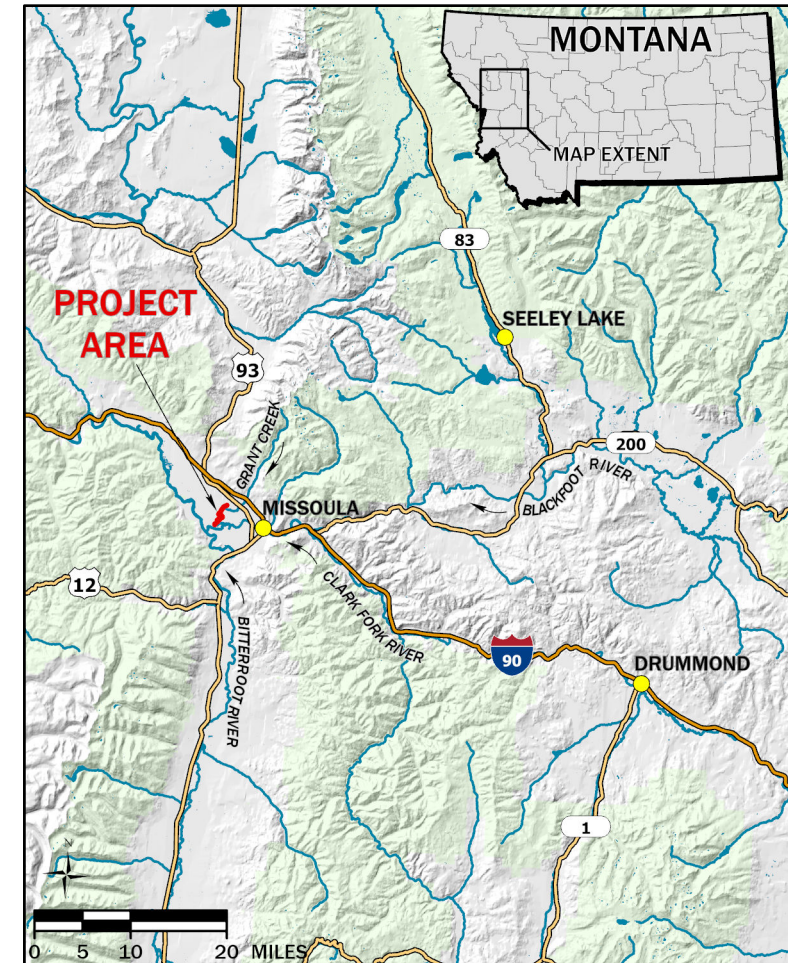
DRAWING INDEX

- 1.0 COVER PAGE AND NOTES
- 2.0 EXISTING CONDITIONS
- 2.1 EXISTING CONDITIONS PHOTO POINTS
- 3.0 PLAN VIEW INDEX
- 4.0 MATERIALS AND QUANTITIES
- 5.0 REACH 2 EXISTING CONDITIONS
- 5.1 REACH 2 EXISTING CONDITIONS RELATIVE ELEVATION MODEL
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- 5.3 REACH 2 PLAN AND PROFILE
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- 5.5 REACH 2 CHANNEL DESIGN CRITERIA
- 6.0 REACH 3 EXISTING CONDITIONS
- 7.0 REACH 4 EXISTING CONDITIONS
- 7.1 REACH 4 EXISTING CONDITIONS BEHI ASSESSMENT
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- 7.4 REACH 4 PLAN AND PROFILE
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- 8.0 CONSTRUCTED CHANNEL STREAMBED DETAIL
- 8.1 VEGETATED WOOD MATRIX DETAIL (TYPE 1)
- 8.2 VEGETATED WOOD MATRIX DETAIL (TYPE 2)
- 8.3 LARGE WOOD STRUCTURE DETAIL
- 8.4 TYPICAL WETLAND DETAIL

GENERAL NOTES

1. SLOPES DESIGNATED AS 2:1, 1.5:1 ET CETERA, ARE THE RATIOS OF HORIZONTAL DISTANCE TO VERTICAL DISTANCE.
2. DIMENSIONS ARE GIVEN IN FEET AND TENTHS OF A FOOT.
3. ALL EXISTING CONDITIONS ARE TO BE VERIFIED IN THE FIELD PRIOR TO CONSTRUCTION AND ANY ADJUSTMENTS TO THE DRAWINGS SHALL BE COORDINATED BY RDG.
4. PROTECT ALL VEGETATION AND LAND AREAS NOT LOCATED WITHIN THE PROJECT CONSTRUCTION, STAGING, OR EARTHWORK LIMITS. EXERCISE CARE IN AREAS NOT SO MARKED TO AVOID UNNECESSARY DAMAGE TO NATURAL VEGETATION.
5. THE PROJECT SPONSOR IS RESPONSIBLE FOR COMPLYING WITH ALL PERMITS INCLUDING ALL FEDERAL, STATE, COUNTY, AND LOCAL PERMIT CONDITIONS.
6. EXCAVATION, TRENCHING, SHORING, AND SHIELDING SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR PERFORMING THE WORK. THESE DRAWINGS ARE NOT INTENDED TO PROVIDE MEANS OR METHODS OF CONSTRUCTION.
7. 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.
8. ALL EXCAVATORS SHALL BE EQUIPPED WITH MACHINE GRADE GPS. CONSTRUCTION AREAS WILL BE STAKED OUT BY RDG PRIOR TO CONSTRUCTION.
9. RDG WILL PROVIDE SURVEY CONTROL FOR EQUIPMENT WITH GPS MACHINE CONTROL CAPABILITY. RDG SHALL PROVIDE SURVEY STAKING AND LAYOUT FOR CONSTRUCTION, INCLUDING HORIZONTAL CONSTRUCTION EXTENTS, SUBGRADE EXCAVATION EXTENTS, AND FINISHED GRADE ELEVATIONS.
10. VERTICAL TOLERANCE FOR CONSTRUCTION COMPLIANCE WILL BE 0.3 FEET. HORIZONTAL TOLERANCE WILL BE 1.0 FEET.
11. CONTRACTOR SHALL CONFIRM QUANTITIES. REPORTED VOLUMES ARE NEATLINE AND DO NOT INCLUDE ADJUSTMENTS FOR COMPACTION OR OTHER FACTORS.

LOWER GRANT CREEK VICINITY MAP



REUSE OF DRAWINGS

THESE DRAWINGS, THE IDEAS AND DESIGNS INCORPORATED HEREIN, AS AN INSTRUMENT OF PROFESSIONAL SERVICE, ARE THE PROPERTY OF RIVER DESIGN GROUP, INC. (RDG) AND ARE NOT TO BE USED, IN WHOLE OR IN PART, FOR ANY OTHER PROJECT WITHOUT THE WRITTEN AUTHORIZATION OF RDG. LIKEWISE, THESE DRAWINGS MAY NOT BE ALTERED OR MODIFIED WITHOUT AUTHORIZATION OF RDG. DRAWING DUPLICATIONS IS ALLOWED IF THE ORIGINAL CONTENT IS NOT MODIFIED.

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 AVERAGE ANNUAL PEAK FLOW DISCHARGE (90 CFS).



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COVER PAGE AND NOTES LOWER GRANT CREEK RESTORATION PROJECT

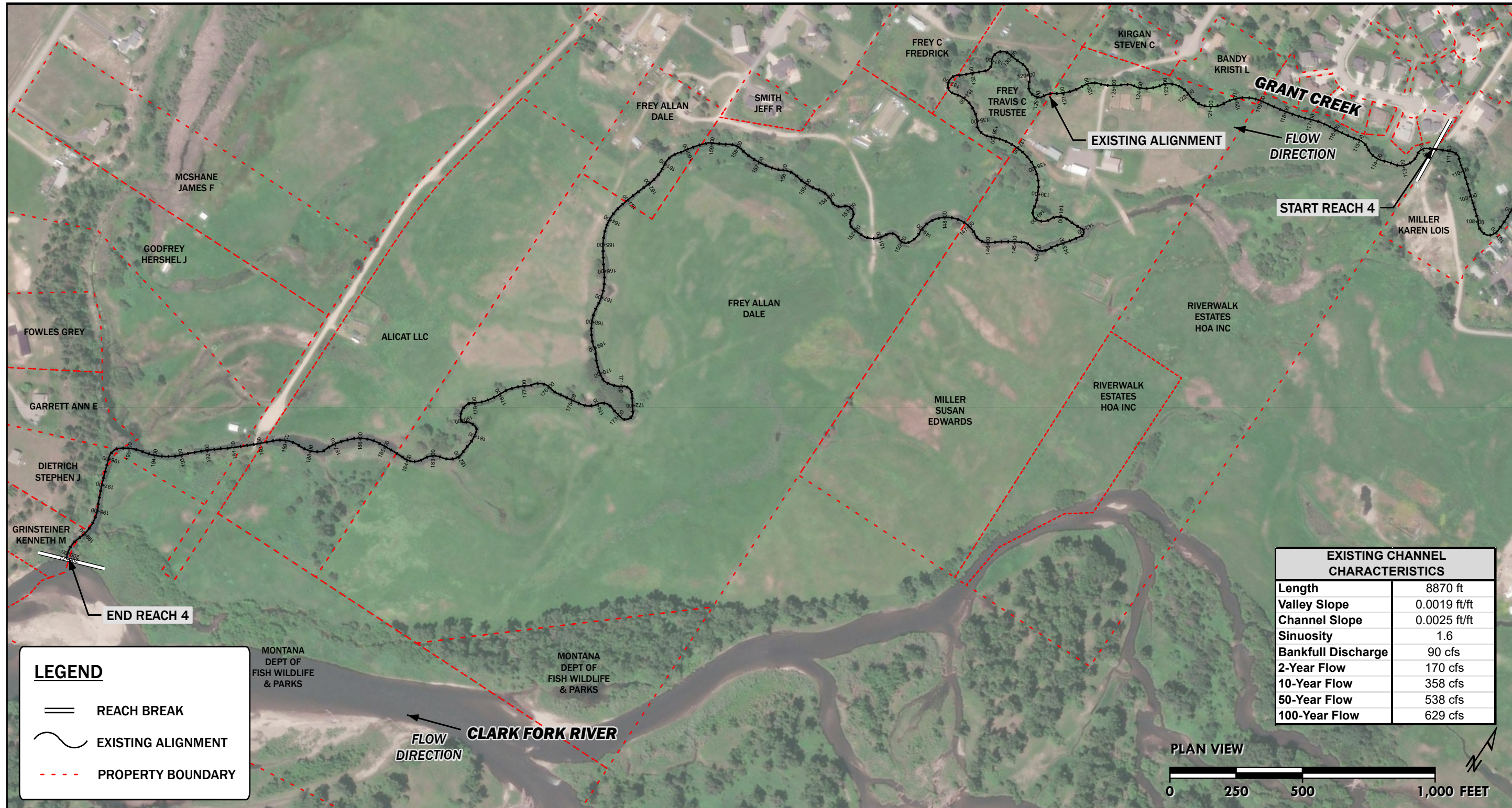
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2	09-06-24	DB	CONCEPTUAL DESIGN	JM

PROJECT NUMBER
RDG-24-041

DRAWING NUMBER

1.0

SHEET 1 OF 25



LEGEND

- REACH BREAK
- EXISTING ALIGNMENT
- PROPERTY BOUNDARY

EXISTING CONDITIONS, LIMITING FACTORS, & CONSTRAINTS

REACH 4 BEGINS WHERE THE CHANNEL EXITS THE RESIDENTAL DEVELOPMENT AND EXTENDS DOWNSTREAM TO THE CONFLUENCE WITH THE CLARK FORK RIVER. UPPER REACH 4 IS FORESTED AND SEVERELY ENTRENCHED WITH STEEP AND ERODING BANKS. RESTORATION IN UPPER REACH 4 IS CONSTRAINED BY THE PROXIMITY TO HOMES IN THE HISTORIC FLOODPLAIN. DOWNSTREAM OF THE FORESTED AREA WOODY RIPARIAN VEGETATION IS LIMITED AND THE REACH IS CHARACTERIZED AS INCISED AND OVER-WIDENED WITH LIMITED FLOODPLAIN CONNECTIVITY. EXCESS BANK EROSION AND SILTATION ARE PERSVASIVE IN REACH 4. AS A WHOLE, THE REACH LACKS HYDRAULIC AND GEOMORPHIC COMPLEXITY AND HIGH QUALITY AQUATIC HABITAT.

RESTORATION STRATEGIES

- RESTORATION STRATEGIES IN REACH 4 INCLUDE:
- CONSTRUCTING AN APPROPRIATELY SIZED BANKFULL CHANNEL THAT INCORPORATES PLANFORM AND LONGITUDINAL PROFILE COMPLEXITY AND PROMOTES HYPORHEIC EXCHANGE THROUGH THE USE OF RIFFLE, RUN, POOL, AND GLIDE HABITAT FEATURES;
 - RAISING THE CHANNEL BED PROFILE TO RECONNECT HISTORIC FLOODPLAIN SURFACES, PROMOTE GROUNDWATER RECHARGE, AND PROVIDE FLOOD ATTENUATION;
 - INSTALLING STREAMBANK STRUCTURES THAT REDUCE SEDIMENT LOADING AND PROMOTE THE ESTABLISHMENT OF WOODY RIPARIAN VEGETATION, COVER, AND AQUATIC HABITAT COMPLEXITY;
 - PLACING LARGE WOOD AND INSTALLING WILLOW TRENCHES ON THE FLOODPLAIN TO PROVIDE ROUGHNESS AND PROMOTE THE NATURAL RECRUITMENT OF WOODY RIPARIAN VEGETATION;
 - CONSTRUCTING OFF-CHANNEL WETLANDS TO PROVIDE HIGH QUALITY WILDLIFE HABITAT, FLOOD ATTENUATION, AND WATER QUALITY BENEFITS; AND
 - IMPLEMENTING A GRAZING MANAGEMENT PLAN TO PROTECT SENSITIVE FLOODPLAIN AND RIPARIAN AREAS.

RDG RIVER DESIGN GROUP

NOW PART OF SWCA ENVIRONMENTAL CONSULTANTS

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EXISTING CONDITIONS REACH 4

LOWER GRANT CREEK RESTORATION PROJECT

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2	09-06-24	DB	CONCEPTUAL DESIGN	JM

PROJECT NUMBER
RDG-24-041

DRAWING NUMBER
7.0

SHEET 13 OF 25

Lower Grant Creek Phase 4 Bank Erosion Hazard Index (BEHI) Assessment

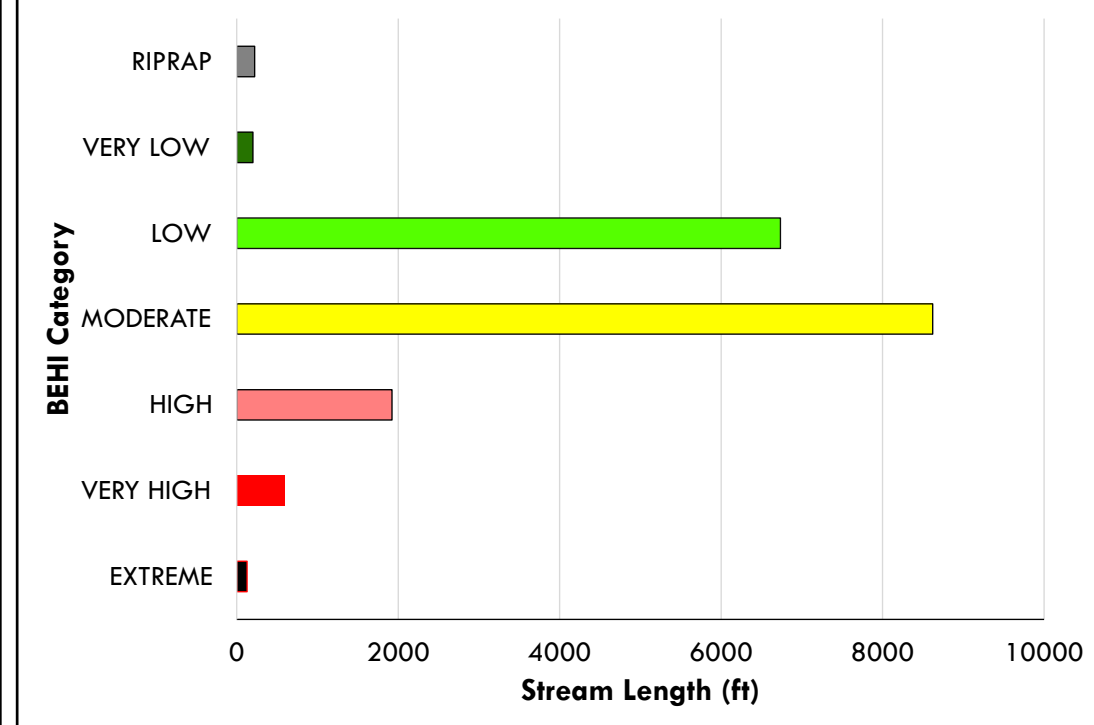
CATEGORY


- EXTREME
- VERY HIGH
- HIGH
- MODERATE
- LOW
- VERY LOW
- RIPRAP

LOWER GRANT CREEK PHASE 4 BANK EROSION SEDIMENT YIELD.

BEHI RATING	LENGTH (FT)	MIGRATION RATE (FT/YR)	BANK HEIGHT (FT)	DENSITY (LBS/FT ³)	SEDIMENT YIELD (TONS/YR)
EXTREME	129	0.47	7.0	100	21
VERY HIGH	598	0.39	6.1	100	71
HIGH	1923	0.31	5.0	100	149
MODERATE	8621	0.23	3.6	100	357
LOW	6735	0.17	3.0	100	172
VERY LOW	201	0.1	1.5	100	2
RIPRAP	222	0	3.0	100	0
TOTAL	18,430				772

Stream Length by BEHI Category





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REACH 4 EXISTING CONDITIONS BEHI ASSESSMENT

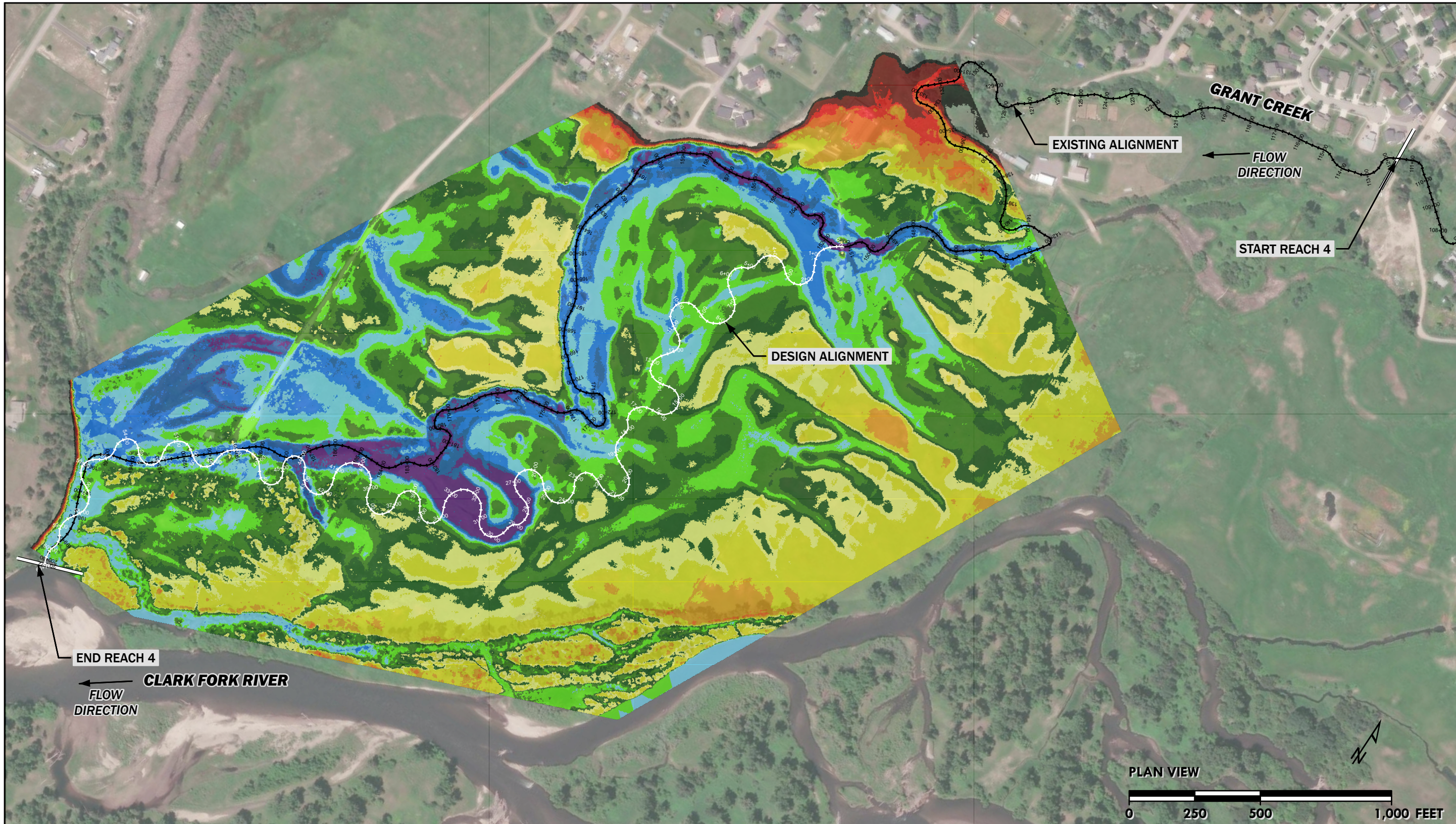
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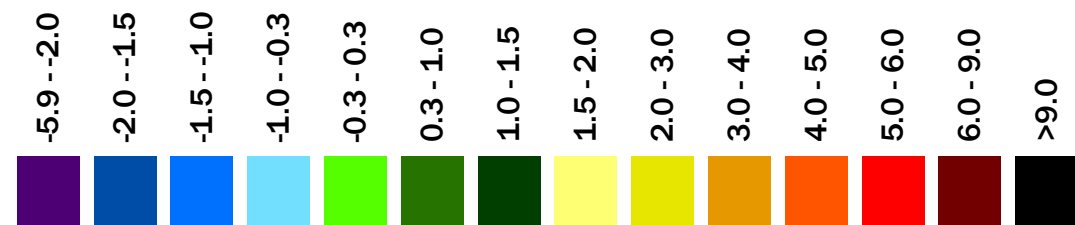
PROJECT NUMBER
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DRAWING NUMBER
7.1

SHEET 14 OF 25

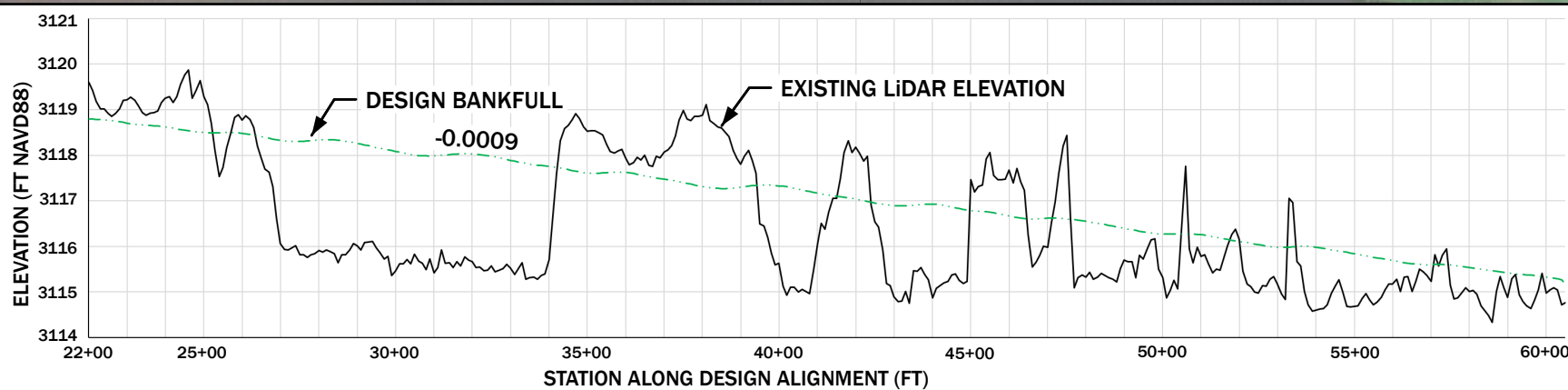
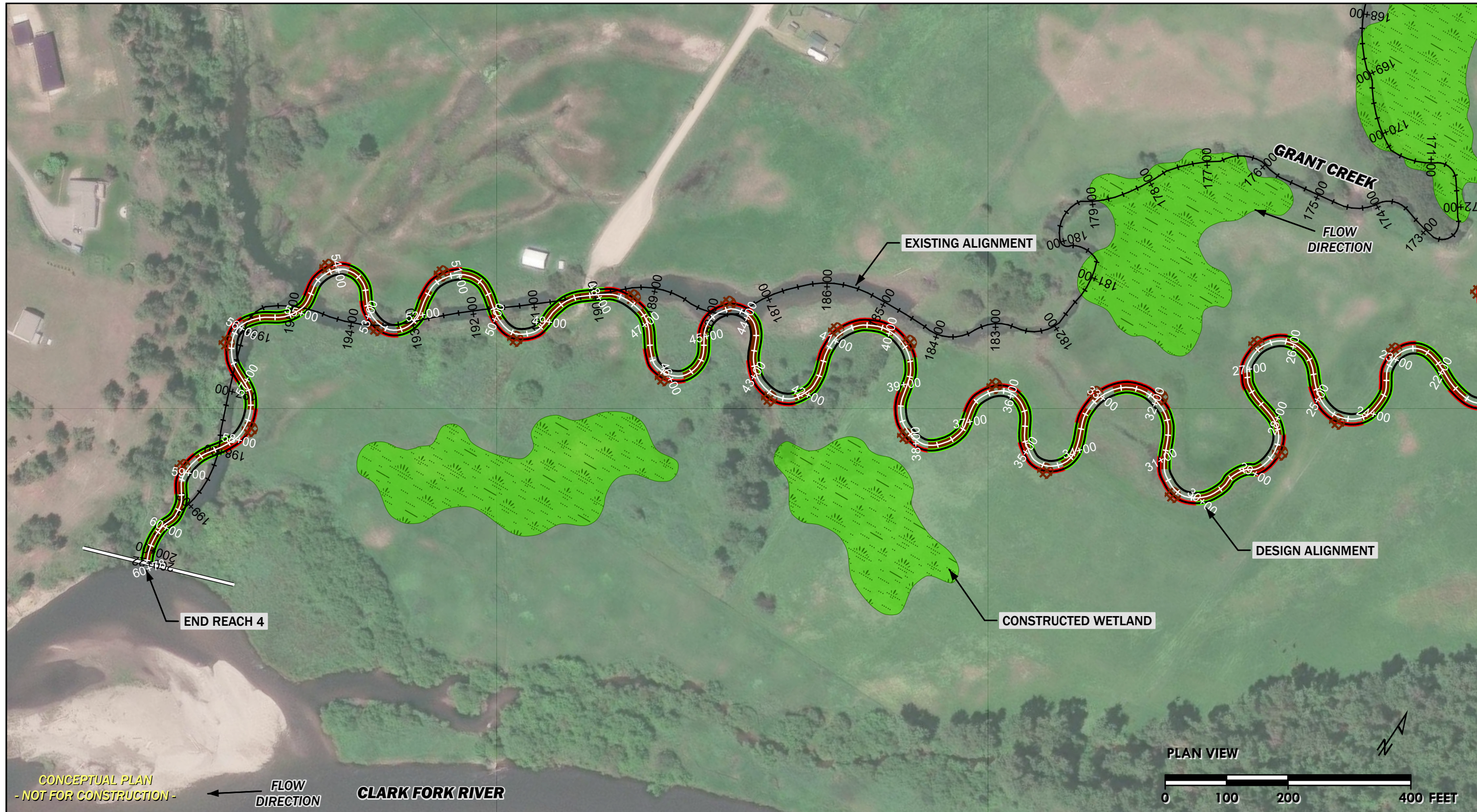


ELEVATION RELATIVE TO DESIGN BANKFULL (FT)



REACH 4 DESIGN CONDITIONS
RELATIVE ELEVATION MODEL
LOWER GRANT CREEK RESTORATION PROJECT

NO.	DATE	BY	DESCRIPTION	CHK
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2	09-06-24	DB	CONCEPTUAL DESIGN	JM
PROJECT NUMBER				
RDG-24-041				
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7.3				
SHEET 16 OF 25				



LEGEND

- VEGETATED WOOD MATRIX - TYPE 1
- VEGETATED WOOD MATRIX - TYPE 2
- CONSTRUCTED CHANNEL STREAMBED
- LARGE WOOD STRUCTURE
- CONSTRUCTED WETLAND

PLAN AND PROFILE
REACH 4
LOWER GRANT CREEK RESTORATION PROJECT

NO.	DATE	BY	DESCRIPTION	CHK
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CHANNEL DESIGN CRITERIA
REACH 4
LOWER GRANT CREEK RESTORATION PROJECT

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DRAWING NUMBER

7.7

BANKFULL CROSS SECTION DESIGN CRITERIA						
Variable	Riffle		Run		Pool	
	Value (ft)	Dimensionless Coefficient	Value (ft)	Dimensionless Coefficient	Value (ft)	Dimensionless Coefficient
Area	29		30.5	1.05	36.3	1.25
Width/Depth	10	1.0	8	1.0	13	1.0
Range (Low)	9	0.9	5	0.6	10	0.8
Range (High)	13	1.3	12	2.5	16	1.6
Width						
Average	17	1.0	18	1.05	21	1.25
Range (Low)	15	0.9	14	0.80	19	1.10
Range (High)	19	1.1	22	1.30	24	1.40
Avg. Depth						
Average	1.7	1.0	2.2	1.30	3.1	1.80
Range (Low)	1.5	0.90	1.8	1.20	2.7	1.60
Range (High)	2.0	1.20	2.9	1.40	3.4	2.00
Max. Depth						
Average	3.0	1.00	3.4	2.00	5.4	
Range (Low)	2.7	0.90	2.7	1.60	4.8	2.80
Range (High)	3.3	1.10	3.9	2.30	6.0	3.50
Max. Scour	3.4	2.00	4.3	2.50	6.8	4.00

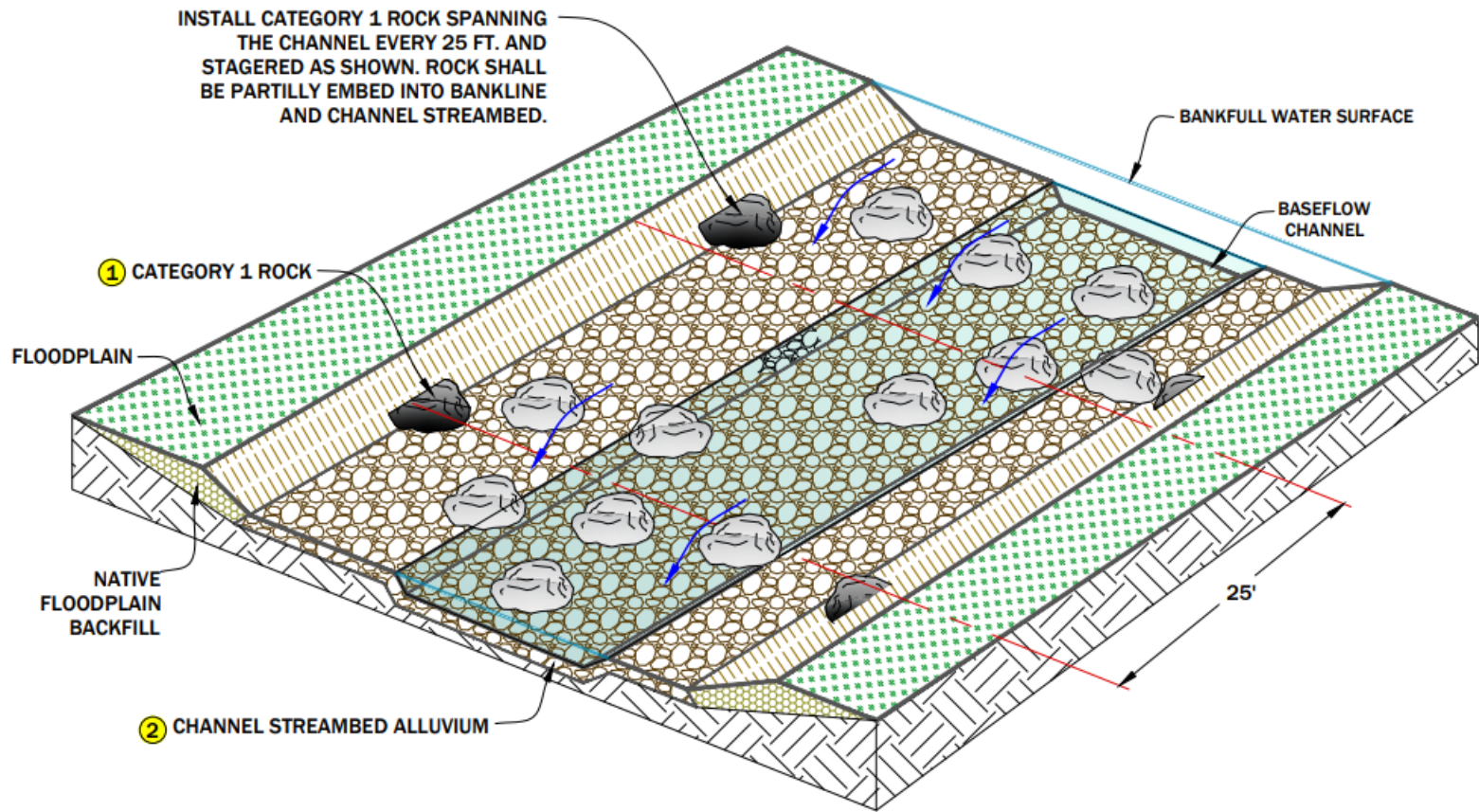
PLANFORM GEOMETRY DESIGN CRITERIA		
Variable	Value (ft)	Dimensionless Ratio
Bankfull Width	17	
Radius of Curvature		
Average	55	3.3
Range (Low)	43	2.5
Range (High)	68	4.0
Meander Length		
Average	204	12.0
Range (Low)	136	8.0
Range (High)	272	16.0
Belt Width		
Average	136	8.0
Range (Low)	34	2.0
Range (High)	238	14.0
Sinuosity	1.8	

GENERAL NOTES

1. CONSTRUCTION OF THE CHANNEL STREAMBED WILL OCCUR AFTER THE CHANNEL SUBGRADE IS PREPARED.
2. ANY CHANGES TO THE CONSTRUCTION SEQUENCE MUST BE APPROVED THE CONSTRUCTION MANAGER.
3. IT IS THE CONTRACTORS RESPONSIBILITY TO CUT WOOD INTO APPROPRIATE SIZE LENGTHS TO FIT STRUCTURE DIMENSIONS.
4. CONTRACTOR SHALL MARK THE UPSTREAM AND DOWNSTREAM EXTENTS OF THE LOCATIONS OF THE CONSTRUCTED CHANNEL STREAMBED STRUCTURES.

NOTES ON CONSTRUCTED CHANNEL STREAMBED INSTALLATION

1. PRIOR TO CONSTRUCTION OF THE CHANNEL STREAMBED, CONSTRUCTION MANAGER SHALL VERIFY CHANNEL SUBGRADE ELEVATIONS. CHANNEL SUBGRADE SERVES AS THE FOUNDATION FOR THE CONSTRUCTED CHANNEL STREAMBED.
2. CONTRACTOR SHALL STOCKPILE CHANNEL ALLUVIUM PER SPECIFICATIONS NOTED ON THE DRAWING.
3. PREPARE THE FRAMEWORK. CONTRACTOR SHALL PLACE 10-INCH TO 12-INCH BOULDER SILLS (CATEGORY 1 ROCK) ON THE SURFACE OF THE CHANNEL SUBGRADE PRIMARILY WITHIN THE LOW FLOW CHANNEL AS INDICATED ON THE DRAWING. DUE TO THE INHERENT VARIABILITY IN MATERIALS, BOULDER ELEVATIONS SHALL BE ADJUSTED TO ASSURE BOULDER PROTRUSION ABOVE FINISH GRADE WILL BE NO GREATER THAN 0.5-FT.
4. PREPARE THE MATRIX. AFTER THE FRAMEWORK BOULDER RIBS ARE INSTALLED AND INSPECTED BY CONSTRUCTION MANAGER, PLACE APPROPRIATE CHANNEL STREAMBED ALLUVIUM GRADATION AND WASH FINES INTO STREAMBED. CHANNEL STREAMED ALLUVIUM SHALL BE PLACED TO THE FULL COURSE THICKNESS OF 12-INCHES TO FINISHED GRADE.

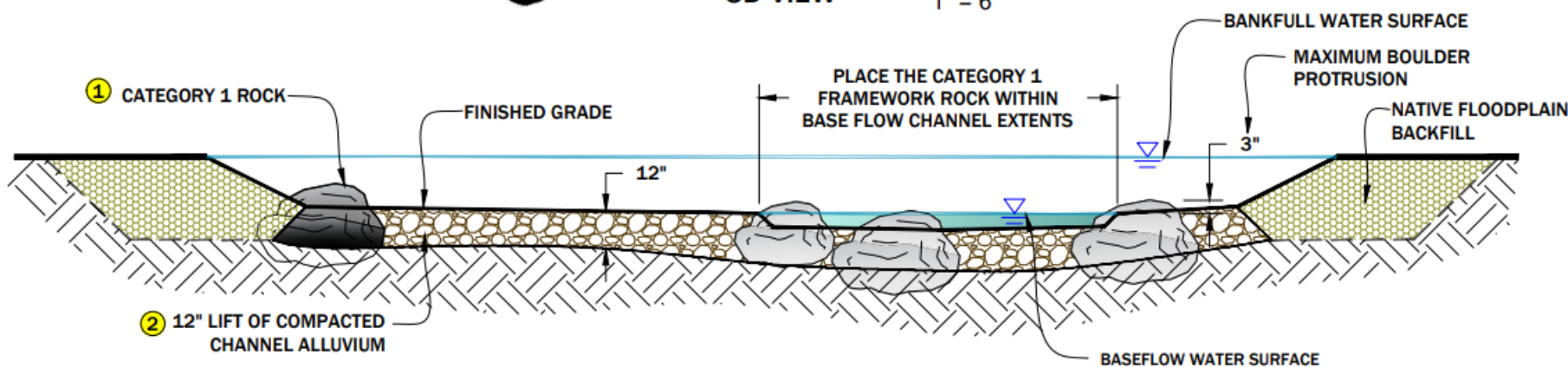


STREAMBED FILL GRADATION	
SIZE (IN)	PERCENT PASSING
4	80-100
3	30-80
1	10-30
0.08	10

NOTE: MIX SALVAGED MATERIAL AND IMPORTED MATERIAL TO ACHIEVE SPECIFIED GRADATION

MATERIAL SCHEDULE (PER FOOT)			
	ITEM	DIA. (IN)	QUANTITY (EA)
1	CATEGORY 1 ROCK	6" - 8"	0.2 EA
2	ALLUVIUM	4" MINUS	0.35 CY

1 CHANNEL STREAMBED ALLUVIUM AND FRAMEWORK INSTALLATION
3D VIEW 1" = 6'



2 CHANNEL STREAMBED ALLUVIUM AND FRAMEWORK INSTALLATION
SECTION VIEW 1" = 5'



CONSTRUCTED CHANNEL STREAMBED DETAIL
LOWER GRANT CREEK RESTORATION PROJECT

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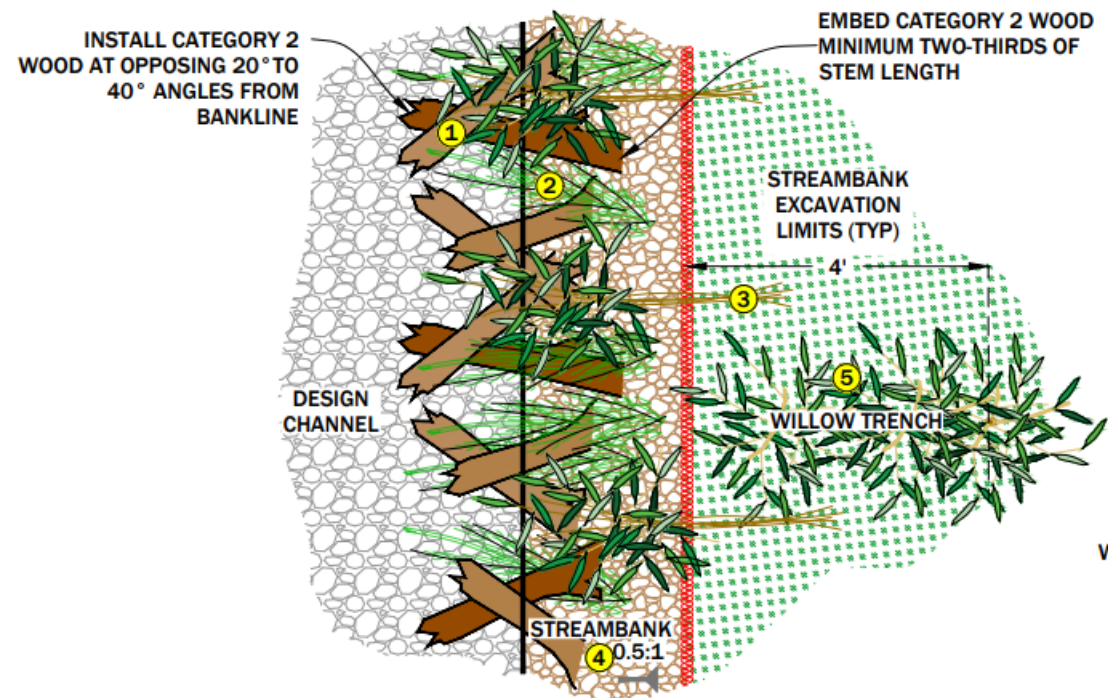
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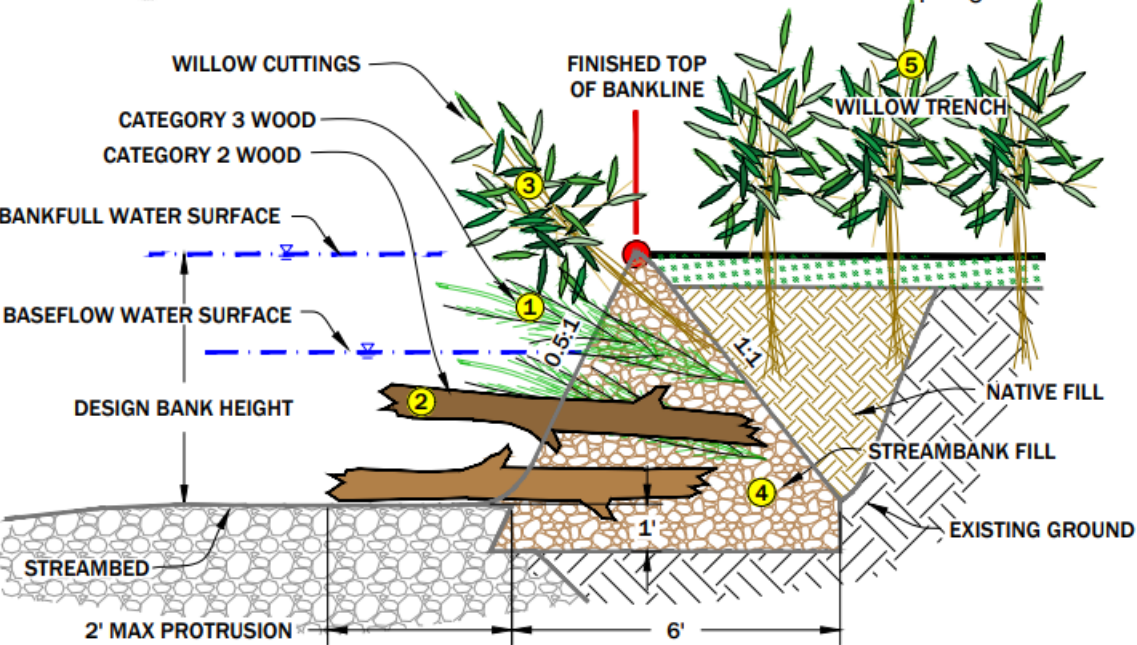
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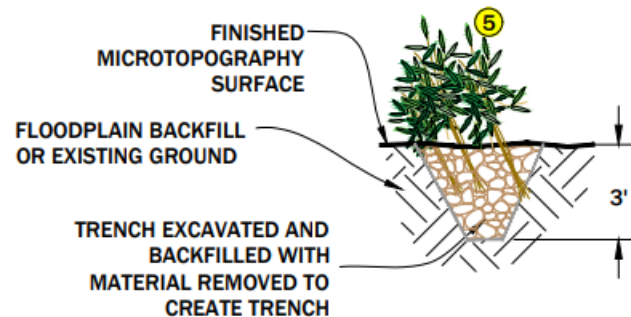
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1 VEGETATED WOOD MATRIX - TYPE 2
PLAN VIEW
1" = 3'

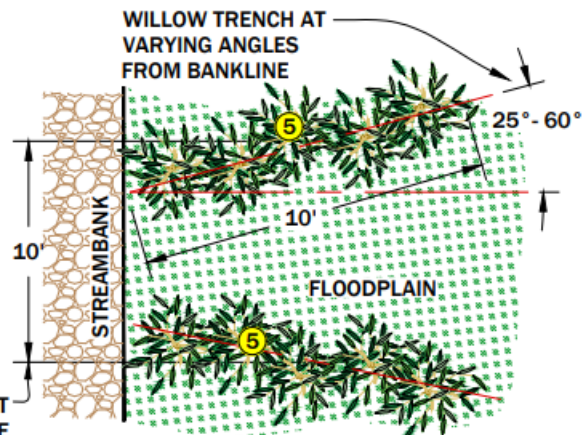


2 VEGETATED WOOD MATRIX - TYPE 2
SECTION VIEW
1" = 3'

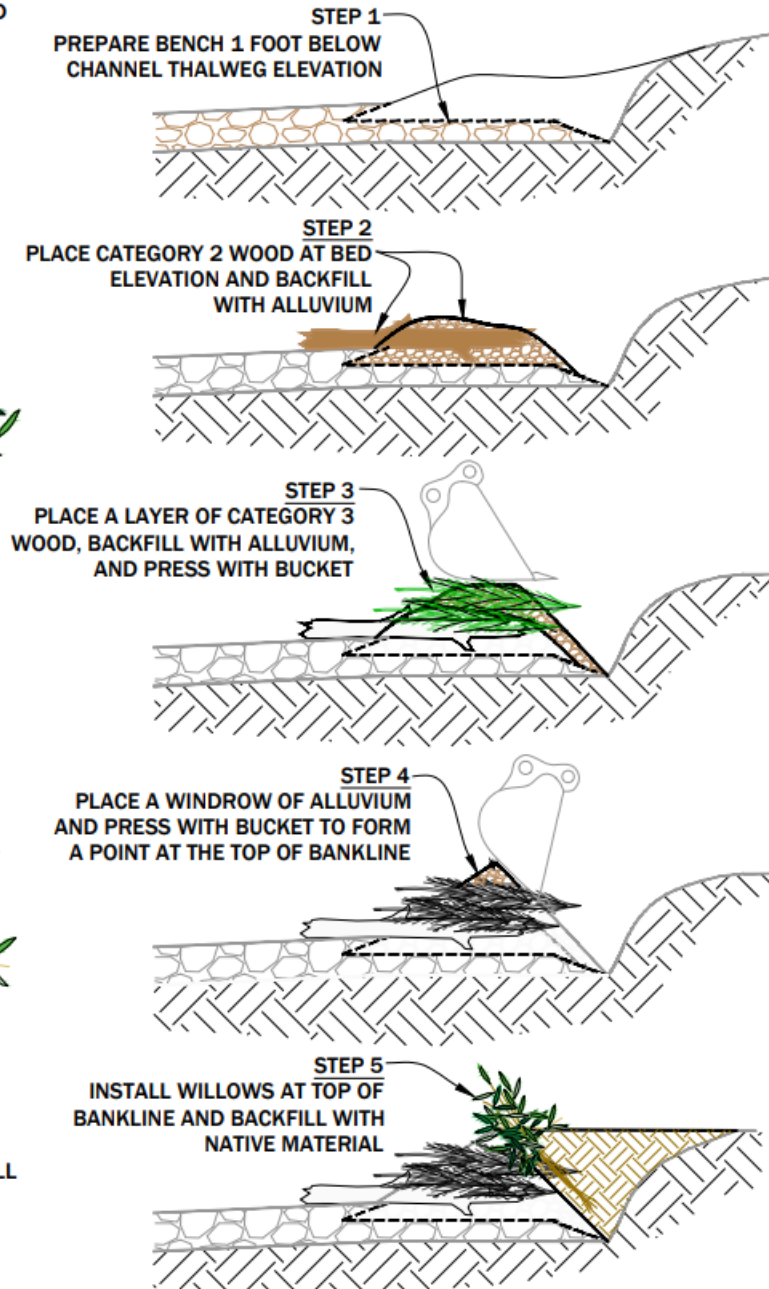


4 WILLOW TRENCH
SECTION VIEW
NTS

EVERY 10 LINEAL FEET OF BANKLINE INSTALL A 10 FOOT LONG WILLOW TRENCH



5 WILLOW TRENCH
PLAN VIEW
NTS



3 RECOMMENDED VEGETATED WOOD MATRIX INSTALLATION SEQUENCE
SECTION VIEW
1" = 5'

GENERAL NOTES

- IF VEGETATED WOOD MATRIX STRUCTURES ARE INSTALLED PRIOR TO OCTOBER 1, LEAVE BACK TRENCH UNFILLED AND COMPLETE STRUCTURE WHEN DORMANT WILLOWS ARE AVAILABLE.
- IT IS CONTRACTOR'S RESPONSIBILITY TO CUT WOOD INTO APPROPRIATE SIZE LENGTHS TO FIT STRUCTURE DIMENSIONS.
- ANY CHANGES TO THE CONSTRUCTION SEQUENCE MUST BE APPROVED BY CONSTRUCTION MANAGER.
- CONTRACTOR SHALL MARK AND CONSTRUCTION ENGINEER SHALL APPROVE THE GENERAL LOCATION FOR EACH VEGETATED WOOD MATRIX STRUCTURE PRIOR TO CONSTRUCTION.

INSTALLATION NOTES

- EXCAVATE TO THE EXCAVATION LIMITS AS SHOWN. EXCAVATED MATERIAL SHALL BE STOCKPILED ON THE FLOODPLAIN OUTSIDE OF THE IMMEDIATE WORK AREA.
- PREPARE THE BENCH OF THE STRUCTURE BY PLACING STREAMBED ALLUVIUM MINIMUM 1 FOOT BELOW CHANNEL THALWEG ELEVATION.
- CATEGORY 2 AND CATEGORY 3 WOOD, AND STREAMBED ALLUVIUM SHALL BE PLACED IN ALTERNATING LIFTS AND BUCKET COMPACTED UP TO THE TOP OF BANK ELEVATION AS SHOWN IN THE INSTALLATION SEQUENCE. PLACE 6 FT TO 8 FT. DORMANT WILLOW CUTTINGS AT A DENSITY OF 5 PER LINEAL FT ALONG THE TOP OF BANK LINE ELEVATION. WILLOW CUTTINGS SHALL SLOPE AT AN APPROXIMATE 1:1 SLOPE AS SHOWN IN SECTION VIEW. STEMS MAY OVERLAP. THE CUT ENDS SHALL BE PLACED AT THE BASE OF THE SLOPES WITH THE UN-CUT ENDS EXTENDING BEYOND THE EDGE OF THE TRENCH SO NO GREATER THAN ONE-THIRD OF THE TOTAL CUTTING LENGTH IS EXPOSED BEYOND THE TOP OF BANKLINE. WILLOW CUTTINGS SHOULD INTERCEPT THE DESIGN TOP OF BANKLINE AS SHOWN IN STEP 5 OF THE INSTALLATION SEQUENCE.
- THE UPSTREAM AND DOWNSTREAM ENDS OF THE STRUCTURE SHALL TRANSITION SMOOTHLY INTO ADJACENT STREAMBANK STRUCTURES TO MINIMIZE EROSION, FLANKING, AND BANK FAILURE.
- AFTER INSTALLATION OF THE VEGETATED WOOD MATRIX, BACKFILL THE STRUCTURE WITH STOCKPILED MATERIAL TO FINISHED GRADE, AND BUCKET COMPACT. INSTALL WILLOW TRENCHES AT A RATE OF 5 PER LINEAL FOOT (OR 50 PER TRENCH) AS SHOWN. NO AREAS BEHIND THE FINISHED BANKLINE ARE TO BE LEFT BELOW FINISHED GRADE.

TYPE 2 - VEGETATED WOOD MATRIX MATERIAL SCHEDULE (PER LINEAL FOOT)			
	ITEM	DIA. (IN)	QTY.
1	CATEGORY 2 WOOD	2"-4"	0.25
2	CATEGORY 3 WOOD	< 2"	2
3	BANK WILLOW CUTTINGS	0.25"-1.0"	5
4	STREAMBANK ALLUVIUM	4" MINUS	0.3 CY

WILLOW TRENCH MATERIAL SCHEDULE (PER LINEAL FOOT)			
	ITEM	DIA.	QUANTITY (EA)
5	TRENCH WILLOW CUTTINGS	0.25" - 1"	5

STREAMBED FILL GRADATION	
SIZE (IN)	PERCENT PASSING
4	80-100
3	30-80
1	10-30
0.08	10

NOTE: MIX SALVAGED MATERIAL AND IMPORTED MATERIAL TO ACHIEVE SPECIFIED GRADATION

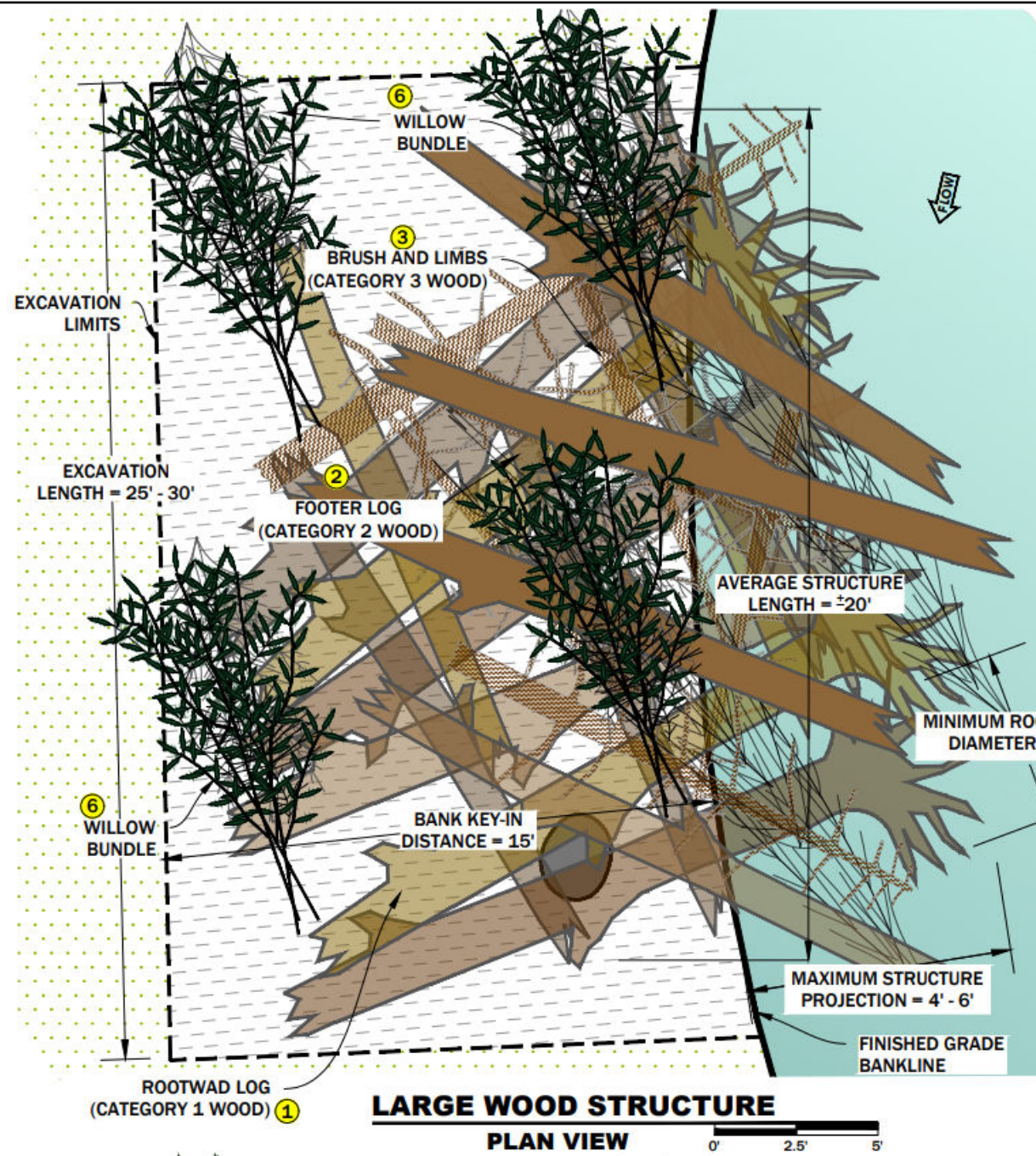
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JM	CONCEPTUAL DESIGN	DB	09-06-24	2

PROJECT NUMBER
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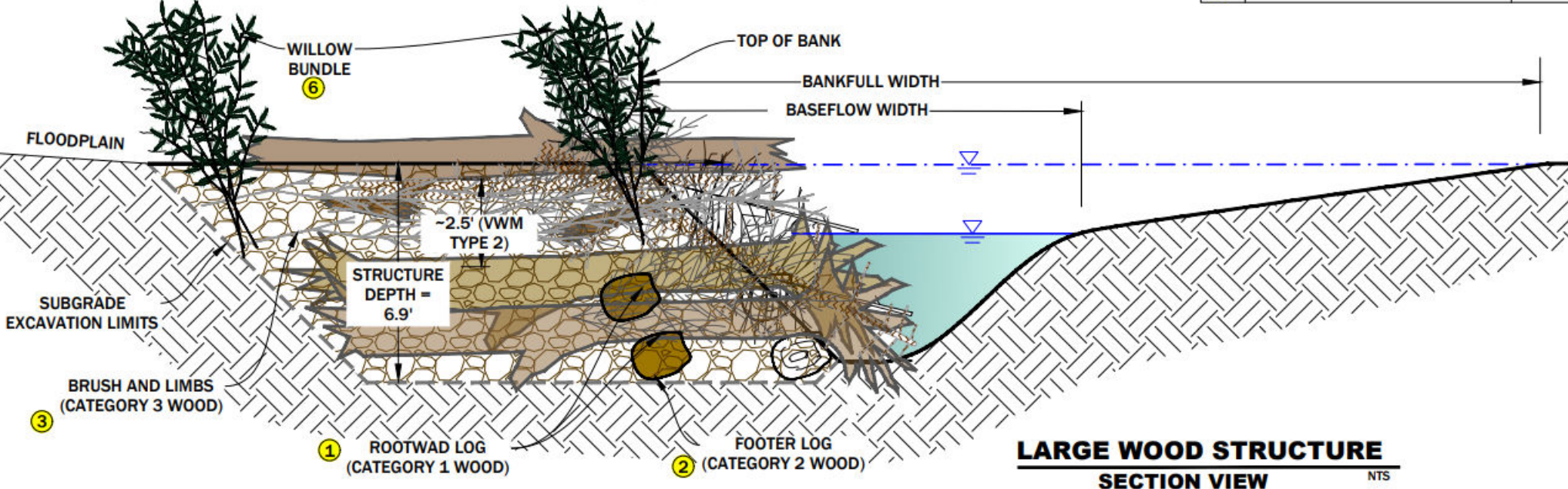
DRAWING NUMBER

8.2

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LARGE WOOD STRUCTURE
PLAN VIEW



LARGE WOOD STRUCTURE
SECTION VIEW
NTS



EXAMPLE OF A LARGE WOOD STRUCTURE

GENERAL NOTES

1. CONSTRUCTION OF THE LARGE WOOD STRUCTURE WILL OCCUR BEFORE THE CONSTRUCTED CHANNEL STREAMBED AND VEGETATED WOOD MATRIX BANK TREATMENTS ARE INSTALLED.
2. ANY CHANGES TO THE CONSTRUCTION SEQUENCE MUST BE APPROVED THE ENGINEER.
3. FIELD ENGINEER SHALL MARK THE GENERAL CONSTRUCTION LOCATION FOR EACH LARGE WOOD STRUCTURE PRIOR TO CONSTRUCTION.

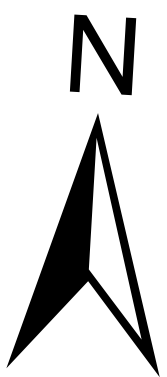
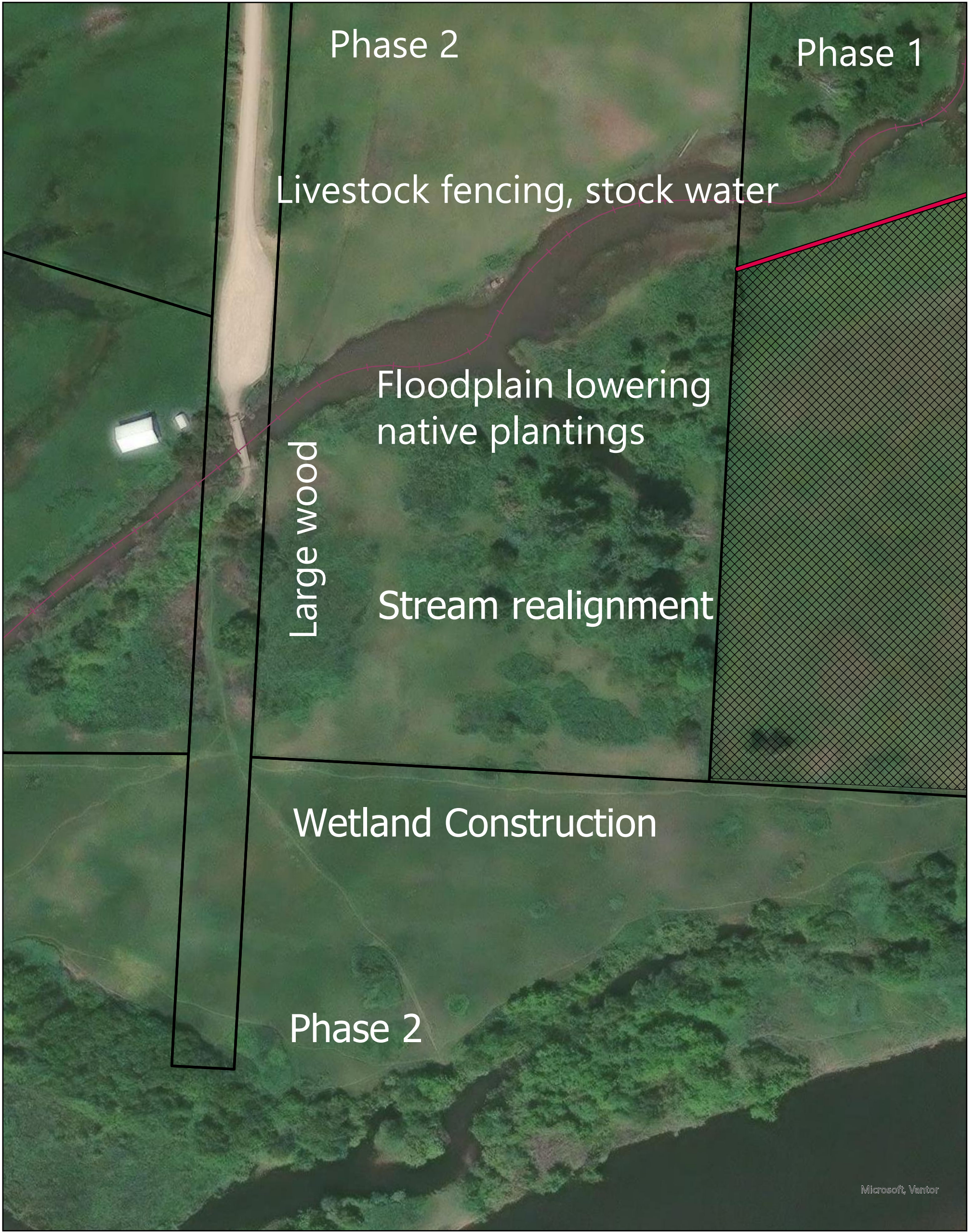
CONSTRUCTION NOTES

1. EXCAVATE TO THE EXCAVATION LIMITS. EXCAVATED MATERIAL SHALL BE STOCKPILED ON THE FLOODPLAIN OUTSIDE OF THE IMMEDIATE WORK AREA.
2. INSTALL TWO FOOTER LOGS (CATEGORY 2 WOOD) AT THE BASE OF THE EXCAVATED TRENCH AT THE ORIENTATIONS NOTED IN PLAN VIEW. FOOTER LOGS SHALL PROJECT NO GREATER THAN 1 FT. BEYOND THE FINISH GRADE BANK LINE. EXPOSED ENDS OF FOOTER LOGS SHALL BE BROKEN/ROUGHENED SO AS TO APPEAR NATURAL. SAWED ENDS OF FOOTER LOGS SHALL NOT BE EXPOSED.
3. INSTALL TWO ROOTWAD LOGS (CATEGORY 1 WOOD) INTERSECTING BOTH FOOTER LOGS AT THE ORIENTATION NOTED IN PLAN VIEW. THE UPSTREAM ROOTWAD SHALL NOT PROJECT INTO THE CHANNEL AND SHALL BE FLUSH WITH THE FINISHED BANK LINE. THE DOWNSTREAM ROOTWAD SHALL PROJECT NO GREATER THAN 3 FT. BEYOND THE FINISHED BANK LINE
4. BACKFILL TRENCH WITH STOCKPILED MATERIAL UP TO THE TOP OF THE FOOTER LOGS (CATEGORY 2 WOOD). BACKFILL SHALL BE BUCKET COMPACTED.
5. INSTALL A SECOND TIER OF TWO FOOTER LOG (CATEGORY 2 WOOD) FOOTER LOGS SHALL PROJECT NO GREATER THAN 1 FT. BEYOND THE FINISH GRADE BANK LINE. EXPOSED ENDS OF FOOTER LOGS SHALL BE BROKEN/ROUGHENED SO AS TO APPEAR NATURAL. SAWED ENDS OF FOOTER LOGS SHALL NOT BE EXPOSED.
6. INSTALL SMALL WOOD AND BRUSH (CATEGORY 3 WOOD) AT APPROXIMATE 45° ANGLE TO ROOTWAD STEMS. BRUSH AND LIMBS SHALL PROJECT NO GREATER THAN 3 FT. BEYOND THE FINISHED BANK LINE.
7. INSTALL ONE TO TWO ROOTWAD LOGS (CATEGORY 1 WOOD) INTERSECTING THE LOWER TIER OF ROOTWADS AT THE ORIENTATION NOTED IN PLAN VIEW. THE ROOTWADS SHALL PROJECT NO GREATER THAN 2 FT. BEYOND THE FINISHED BANK LINE.
8. INSTALL SMALL WOOD AND BRUSH (CATEGORY 3 WOOD) AND WILLOW CUTTINGS INTERWOMEN INTO WOOD MATRIX UP TO FINISHED GRADE. BRUSH, LIMBS, AND WILLOW CUTTINGS SHALL PROJECT NO GREATER THAN 4 FT. BEYOND THE FINISHED BANK LINE.
9. BACKFILL WOOD MATRIX WITH STREAMBED FILL UP TO FINISHED GRADE WITH STOCKPILED NATIVE MATERIAL. NO AREAS BEHIND THE FINISHED BANKLINE ARE TO BE LEFT BELOW FINISHED GRADE.
10. INSTALL DEFLECTOR LOGS (CATEGORY 2 WOOD) AT APPROXIMATE 45° ANGLE TO ROOTWAD STEMS. DEFLECTOR LOGS SHALL BE HALF EMBEDDED IN THE FLOODPLAIN AND PROJECT NO GREATER THAN 4 FT. BEYOND THE FINISHED BANK LINE. EXPOSED ENDS OF FOOTER LOGS SHALL BE BROKEN/ROUGHENED SO AS TO APPEAR NATURAL. SAWED ENDS OF FOOTER LOGS SHALL NOT BE EXPOSED.

LARGE WOOD STRUCTURE MATERIAL SCHEDULE (PER LINEAR STRUCTURE)

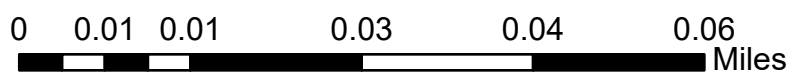
ITEM	DIA. (IN)	LENGTH (FT)	ROOTWAD (Y/N)	QTY.
① SUBGRADE EXCAVATION				5 CY
② CATEGORY 1 WOOD	10"-12"	12-15	YES - 18IN DIA. MIN	2 EA
③ CATEGORY 2 WOOD	3"-10"	10-15	NO	4 EA
④ CATEGORY 3 WOOD	1" - 3"	10-12	OPTIONAL 1-2 FT	10 EA

NO.	DATE	BY	DESCRIPTION	CHK
1	08-05-24	DW	CONCEPTUAL DESIGN	JM
2	09-06-24	DB	CONCEPTUAL DESIGN	JM



Phase 2 Proposed Restoration: Lower Grant Creek

Scale: 1:1,065



Legend	
	Links
	Fence
	Reach4_Existing_Alignm
	Reach4_Design_Channel
	Grazing Area
	Tax_Parcels
	Reach4_Constructed_Ch

OTHER ATTACHMENTS

