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Mailing Address:

Water Resources Data System
University of Wyoming, Dept 3943
1000 E University Avenue
Laramie, WY 82071

Phone: (307) 766-6651

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HOBACK RIVER WATERSHED, LEVEL I STUDY

PREPARED FOR

WYOMING WATER DEVELOPMENT COMMISSION



November 14, 2022

FINAL REPORT

PREPARED BY:

RIO VERDE ENGINEERING

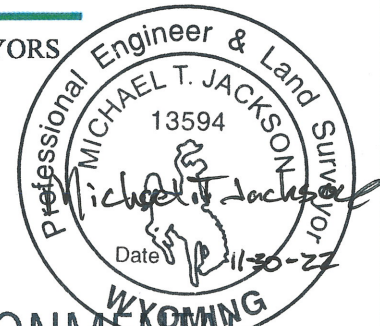
CONSULTING ENGINEERS AND LAND SURVEYORS

PINEDALE, WYOMING 82941

rioverde@wyoming.com

PHONE (307) 367-2826

IN ASSOCIATION WITH:



ALDIR ENVIRONMENTAL
water | wetlands : ecological consulting

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ABBREVIATIONS AND ACRONYMS

ACEC	Area of Critical Environmental Concern
AML	Appropriate Management Level
AOI	Area of Influence
AUM	Animal Unit Month
BLM	Bureau of Land Management (U.S. Department of the Interior)
BOR	U.S. Bureau of Reclamation (Department of the Interior)
CFS	Cubic Feet per Second
CHPA	Crucial Habitat Priority Area
DDCT	Density Disturbance Calculation Tool
DMI	Domestic, Municipal, and Industrial
EA	Environmental Assessment
EHPA	Enhancement Habitat Priority Area
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ESA	Endangered Species Act
ESD	Ecological Site Description
GPM	Gallons per Minute
KNWA	Key Nongame Wildlife Area
MOC	Means of Conveyance
MRLC	Multi-resolution Land Characteristics Consortium
NLCD	National Land Cover Database
NOAA	National Oceanic and Atmospheric Association
NPL	Normally Pressured Lance
NPS	National Park Service
NRCS	Natural Resources Conservation Service (U.S. Department of Agriculture)
NWI	National Wetlands Inventory
PGA	Peak Ground Acceleration
POD	Point of Diversion
POU	Point of Use
RVE	Rio Verde Engineering
SCCD	Sublette County Conservation District
SEO	Wyoming State Engineer's Office
SGCN	Species of Greatest Conservation Need
SHP	Strategic Habitat Plan
SHPO	State Historic Preservation Office
SNOTEL	Snow Telemetry
SVCD	Star Valley Conservation District
SWAP	State Wildlife Action Plan
SWPP	Small Water Projects Program
TCD	Teton Conservation District

USACE	U.S. Army Corps of Engineers
USFS	U.S. Forest Service (U.S. Department of Agriculture)
USFWS	U.S. Fish and Wildlife Service (U.S. Department of the Interior)
USGS	U.S. Geological Survey (U.S. Department of the Interior)
WDEQ	Wyoming Department of Environmental Quality
WGFD	Wyoming Game and Fish Department
WGS	Wyoming State Geological Survey
WRDS	Water Resources Data System
WWCS	Wyoming Wetlands Conservation Strategy
WWDC	Wyoming Water Development Commission
WWDO	Wyoming Water Development Office
WYNDD	Wyoming Natural Diversity Database

1. INTRODUCTION

1.1 DOCUMENT CONTENT

Each section contained within this study was defined by the WWDC and systematically organized in a concise format. The following list defines each section and provides a brief explanation of each:

- **Section 1 – Introduction:** explanation of the background and purpose of the watershed study along with project meetings and public participation
- **Section 2 – Review of Background Information:** a data gathering effort to document past studies and available information to identify existing data gaps and to eliminate the duplication of research efforts
- **Section 3 – Watershed Inventory and Descriptions:** the inventory, description, and analysis of the Physical, Biological, and Anthropogenic Systems within the watershed
- **Section 4 – Streamflow Hydrology:** use of existing data, hydrologic models, and available streamflow gage data to characterize streamflow within the watershed
- **Section 5 – Watershed Management and Rehabilitation Plan:** the preparation of a management and rehabilitation plan that establishes specific project suggestions to improve watershed condition and function and to provide benefit for wildlife, livestock, and the environment
- **Section 6 – Cost Estimates and Economic Analysis:** the compilation of cost estimates for those projects identified in Section 5
- **Section 7 – Permits:** identification of alternative funding sources, application requirements, and eligibility requirements with respect to funding agency criteria and conditions

1.2 BACKGROUND AND PROJECT PURPOSE

In 2020, the Sublette County Conservation District (SCCD), Teton Conservation District (TCD), and Star Valley Conservation District (SVCD) as joint sponsors, presented a request to the Wyoming Water Development Commission (WWDC) for a Level I Study of the Hoback River Watershed, which also includes the entirety of the Greys River Watershed and a portion of the Snake River Watershed from Hoback Junction to Alpine, WY. This joint request was made by the sponsors to include those regions in northwest Wyoming that had not been previously included in a prior watershed study. In April of 2021 and following the consultant interview and selection process, the WWDC subsequently entered into a contract with Rio Verde Engineering (RVE) and its subconsultants, Stantec Consulting Services, Inc. (Stantec) and Alder Environmental, LLC (Alder) to perform the work necessary to complete the Level I study. The evaluation of watershed function, associated resource evaluations, water rights mapping, and identification of improvement opportunities are the key objectives of this study. Related information regarding climate, hydrology, surface water, groundwater, geology, land cover, fish and wildlife, and anthropogenic systems are also evaluated and described herein. The following report also includes data and references to past studies conducted within the confines of the defined Watershed, more specifically outlined below in **Figure 1**.

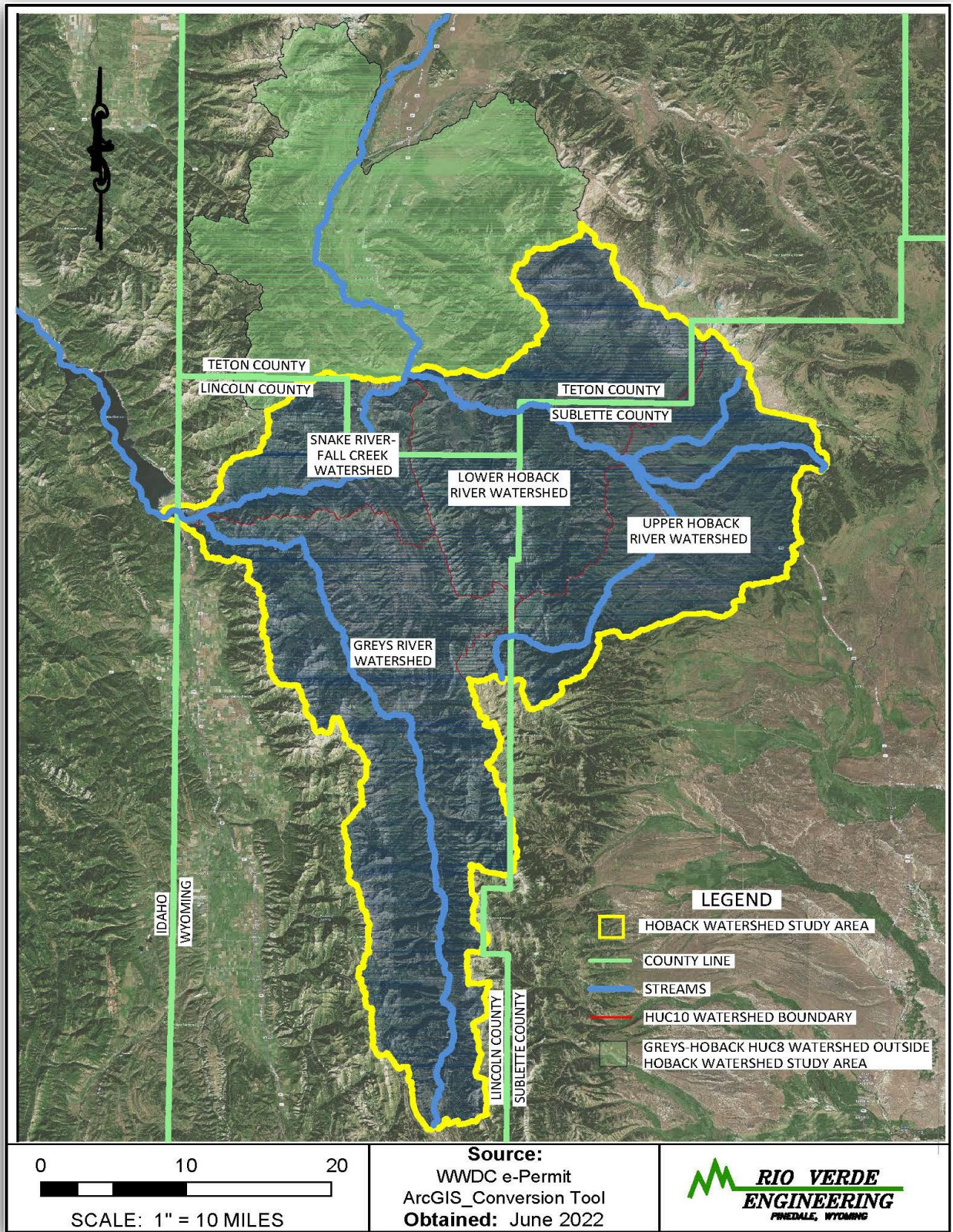


Figure 1: Hoback River Watershed, Level I Study Area

The intent of this Level I Study was to compile this existing information and data, effectively carrying out research and additional studies where apparent data/information gaps exist, and creating a composite database that is focused on the natural resources, wildlife, and human influence within the entire Hoback River Watershed.

Ultimately, the data and accompanying spatial properties gathered during this study were compiled and included within a comprehensive GIS Geodatabase. The construction of said geodatabase was based on the existing WWDC GIS Framework Plan for state-wide integration purposes. This map-based platform will allow the Sponsor(s) and other interested users to more efficiently conduct research and to disseminate the data compiled within the body of this report. As part of the water rights mapping work performed, RVE also worked with Richard Greenwood of Greenwood Mapping, Inc. to develop a temporary web based mapserver to depict water rights related information. This effort was made to demonstrate an alternative method for conducting water rights research on a publicly available GIS platform.

1.3 PROJECT MEETINGS AND PUBLIC PARTICIPATION

Two (2) project meetings were carried out during the course of this study. The first meeting was held at the Bondurant Volunteer Fire Department and the second meeting was held at the Hoback Volunteer Fire Department. Both meetings were advertised in local newspapers and by way of flyer postings, personal phone calls, known email lists provided by SCCD and TCD, social media, and the Sublette/Teton County Conservation District's website(s). Meeting agendas and copies of the Small Water Projects Program (SWPP) applications were provided at each of the meetings in order to more effectively inform participants and stakeholders about potential funding opportunities, project purpose, and project goals.

The project scoping meeting was held on June 14, 2021 where team members from RVE, Stantec, and Alder conducted a power point presentation outlining the Hoback River Watershed Study objectives and their proposed strategy to carry out the tasks outlined in the WWDC scope of services. In addition to the project team members, Mabel Jones (Office project manager), Michael Henn (SCCD/sponsor), Carlin Girard (TCD/sponsor), and Mark Kot (WWDC) also actively participated in the presentation and Q/A portion of the meeting. Detailed information relative to the project tasks and the team approach to conducting the work was presented via power point. Most of the Q/A portion of the meeting with stakeholders dealt with project applicability and permitting.

On August 16, 2021, a successive public meeting was held to inform stakeholders and interested parties about the progress of the study, specifically identifying work completed, milestones reached, and remaining data gathering efforts required to complete the study objective(s). In addition to the RVE team members, Mabel Jones (Office project manager), Michael Henn (SCCD/sponsor), and Robb Sgroi and Tom Segerstrom (TCD/sponsor) also attended and actively participated in the Q/A portion of the meeting. One of the major talking points and main subject of the Q/A session dealt with water quality in the Hoback Junction area. Specifically, differences and parallels were discussed between the ongoing WYDEQ water quality study, the former Hoback Junction Water Supply Level I Study conducted in 2006, and the current Hoback River Watershed Level I Study.

A transcript of the scoping meeting and public meeting minutes can be found in **Appendix A**, along with each respective agenda and attendance sheet. A current copy of the SWPP application can also be found in said appendix.

In addition to the above-mentioned public meetings, several unscheduled meetings were held with the project sponsor(s) (SCCD/TCD/SVCD) and Mabel Jones (WWDO) to discuss study progress, potential projects, water rights, and other related housekeeping items. Regular communications with the Office project manager were also conducted regarding progress updates, report content, and joint scheduling efforts related to meetings.

2 REVIEW OF BACKGROUND INFORMATION

2.1 WATER RESOURCES DATA SYSTEM LIBRARY ARCHIVES

As part of the preparatory objective of this report, research was conducted using the Water Resources Data System (WRDS) Library. This web-based information hub offers an assortment of valuable data pertaining to the Hoback River Watershed including relative information regarding climate, weather, drought, articles and publications (past studies), and links to outside agency publications. The information contained in this repository was used extensively to determine initial information data gaps and to supplement the contents of this report. The complete report of each referenced study can be found at <http://library.wrds.uwyo.edu/wwdcrept/wwdcrept.html>.

Lincoln/Sublette County, WY

Sunrise Engineering, Inc., **Alpine Junction Water Level I Study, Final Report**, Oct, 1995
 Rio Verde Engineering, **Alpine Spring Irrigation Supply Project, Final Report**, Oct, 2001
 Rendezvous Engineering, P.C., **Alpine Master Plan Update – Level II**, Apr, 2009
 Western Water Consultants, Inc., **Report on the Feasibility of Providing Instream Flow in Grey’s River Instream Flow Segment No. 1**, Oct, 1994
 Arrow Land & Water, LLC, **Report on the Feasibility of Providing Instream Flows on the Greys-Hoback Basin Area Tributaries**, Nov, 2013

Teton County, WY

Nelson Engineering, **Hoback Junction Water Supply - Level I Study**, Mar, 2006
 Sunrise Engineering, Inc., **Snake/Salt River Basin Plan, Final Report**, Jun, 2003
 Wyoming State Geological Survey, **Snake/Salt River Basin Water Plan Update – Groundwater Study, Technical Memorandum No. 7**, Jun, 2014
 Jorgensen Engineering and Land Surveying, P.C., **Teton County Water Supply Master Plan, Final Report**, Feb. 1999
 Olsson Associates, **Upper Snake River Watershed – Level I Study, Final Report**, Nov, 2016

The past WWDC study areas and Instream Flow reports are tabulated in **Table 1** and graphically depicted in **Figure 2**. As depicted, those areas localized to Alpine, WY and Hoback Junction have been studied in some form in recent years. This is largely attributable to the fact that the majority of the subject watershed is composed of U.S. Forest Service lands and sparse population.

Table 1. Past WWDC studies conducted within the Hoback River Watershed

PROJECT ID	STUDY TYPE	STUDY NAME	YEAR	AREA	LATITUDE	LONGITUDE
1	Drinking Water	Alpine Junction Water Level I Study	1995	Alpine & Unincorporated Lincoln County North of Snake River	-	-
2	Irrigation	Alpine Spring Irrigation Supply Project	2001	Town of Alpine & 1.5 mi SE of it in USFS (Confluence of 2 Drainages)	43°09'25"	111°00'15"
3	Drinking Water	Level II - Alpine Master Plan Update	2009	Town of Alpine	43°08'35"	110°58'37"
4	Drinking Water	Hoback Junction Water Supply Study, Level I	2006	7,340 Ac. Surrounding Hoback Junction	-	-
4.1	Well Options & Storage	Camp Davis	2006	South & East Areas up the Hoback from Hoback Junction	-	-

4.2	Well Options & Storage	Hoback Junction	2006	Rogers Point, Deer Creek Palmer Creek, Deer Creek Heights, Double R Ranch, & J-W Subdivisions	-	-
4.3	Well Options & Storage	North of Hoback Junction, West of Snake River	2006	NW Area of Study	-	-
4.4	Well Options & Storage	North of Hoback Junction, East of Snake River	2006	NE Area of Study	-	-
5	River Basin Plan / Water Use	Snake/Salt River Basin Plan	2003	Snake/Salt River Basin	-	-
6	River Basin Plan / Water Use	Snake/Salt River Basin Water Plan Update	2014	Snake/Salt River Drainage Basin (3.27 Million Ac) & Tributary Areas in Idaho (0.28 Million Ac)	-	-
7	Drinking Water	Level I, Teton County Water Supply Master Plan	1999	The Area encompassing Jackson/South Park, Teton Village, Aspens/Teton Pines/Wilson, JH Golf & Tennis, Kelly, Hoback Junction, Hog Island, Alta/Grand Targhee, Rivermeadows, & Indian Paintbrush	-	-
8	Watershed Function Study	Upper Snake River Level I Watershed Study	2016	Starting North at the Headwaters of the Snake River in Yellowstone and continuing South to the Confluence of the Snake and Hoback at Hoback Junction (1.7 Million Ac. Primarily in Teton County)	-	-
9	Instream Flow Segment	Report on the Feasibility of Providing Instream Flow in Grey's River Instream Flow Segment No. 1	1994	10.1 mile reach of Greys River located in Lincoln County, WY (T36N-R118W, T37N-R117W, & T37N-R118W)	-	-
10	Instream Flow Segment	Report on the Feasibility of Providing Instream Flows on the Greys-Hoback Basin Area Tributaries	2013	Granite Creek, Willow Creek, Hoback River Lower/Upper, Dell Creek, Little Greys River, Cliff Creek Lower/Upper, N. Fork Fisherman Creek, Shoal Creek Inflow Segments - located in Sublette and Lincoln County, WY	-	-

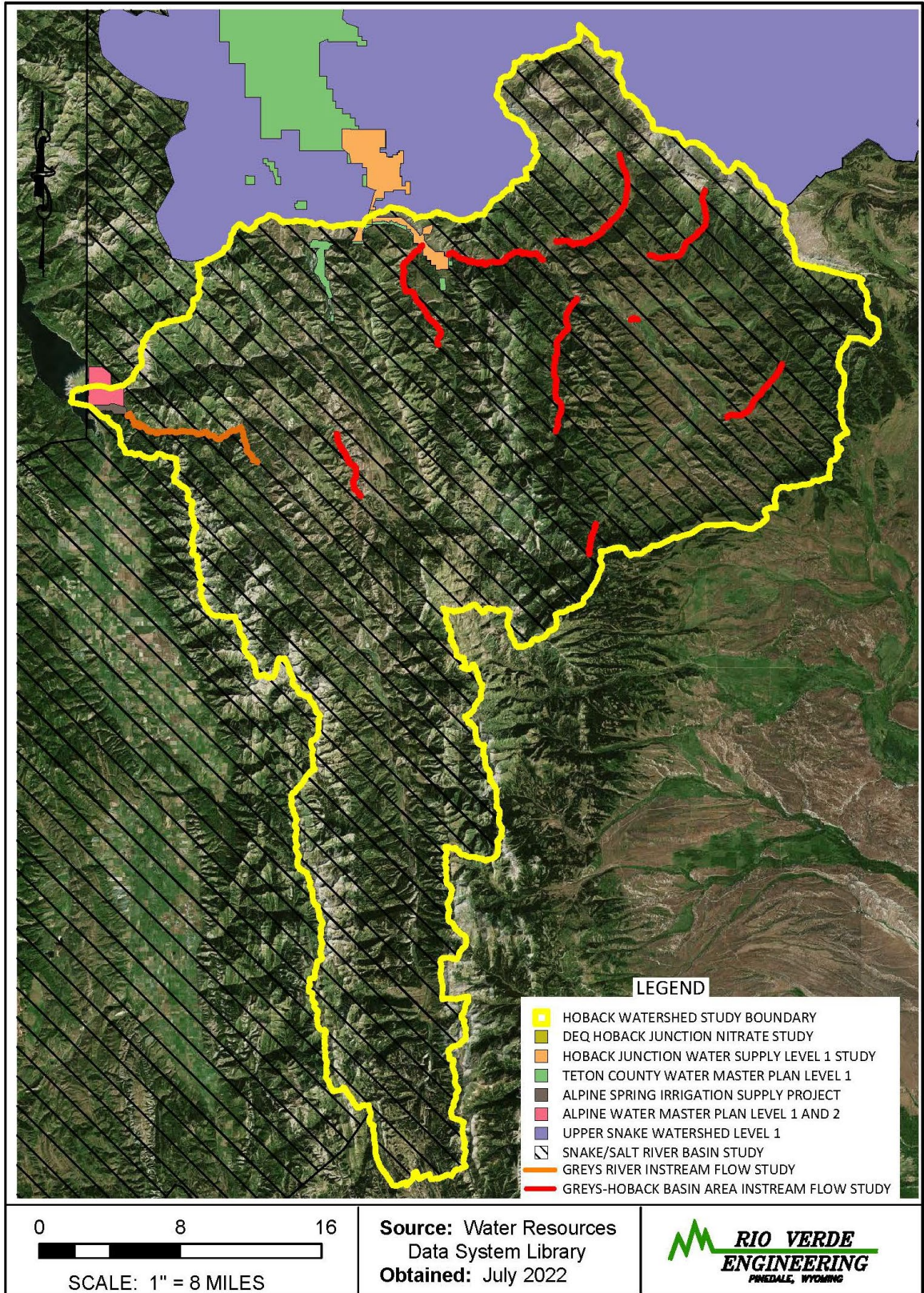


Figure 2. Past WWDC study areas within the Hoback River Watershed

2.2 EXISTING GIS PRODUCTS AND METADATA

A broad spectrum of useful information has been developed and geo-spatially referenced in recent years. As an initial step in the study process, the project team collaborated to identify relative GIS information sources involving the study area. Types of existing information available include transportation routes, ownership and parcel boundaries, FEMA flood zones, National Wetlands Inventory (NWI), conservation easements, oil and gas leases, zoning district boundaries, aerial imagery, grazing allotments, wildlife migration routes, biological assessments, cultural resource products, and other related data. In addition to the GIS information available from the WWDC studies listed in Table 1., a specific list of other outside agency resources is more particularly listed below.

- Sublette County Mapserver
 - <https://maps.greenwoodmap.com/sublette/mapsserver/>
- Teton County Mapserver
 - <https://maps.greenwoodmap.com/tetonwy/mapsserver/>
- Lincoln County Mapserver
 - <https://maps.lcwy.org/webmaps/LinCoParcels/>
- USDA – U.S. Forest Service
- USDA – Natural Resources Conservation Service
- USDI – Bureau of Land Management
- Wyoming Oil and Gas Conservation Commission
 - <http://wogccms.state.wy.us/flexviewers/unitmap/>
- Wyoming Geospatial Hub (WYGISC)
 - <https://geospatialhub.org/>
- Wyoming Association of Conservation Districts (SuiteWater)
 - <https://suitewater.wygisc.org/>

3 INVENTORY AND DESCRIPTIONS

The adjoining watersheds that make up the study area are located in western Wyoming and encompass a total tributary area of 1,145 square miles, which includes land within three (3) counties; Sublette (30%), Teton (16%), and Lincoln (54%). The study area is made up of 1.) the Hoback River Watershed, 2.) the Greys River Watershed, and 3.) that portion of the Snake River Watershed that lies between Hoback Junction and Alpine, WY.

Collectively, the areas described above are referred to as the Hoback River Watershed within this report unless specifically stated otherwise. The graphical extent of the study area can be found in **Figure 3.**

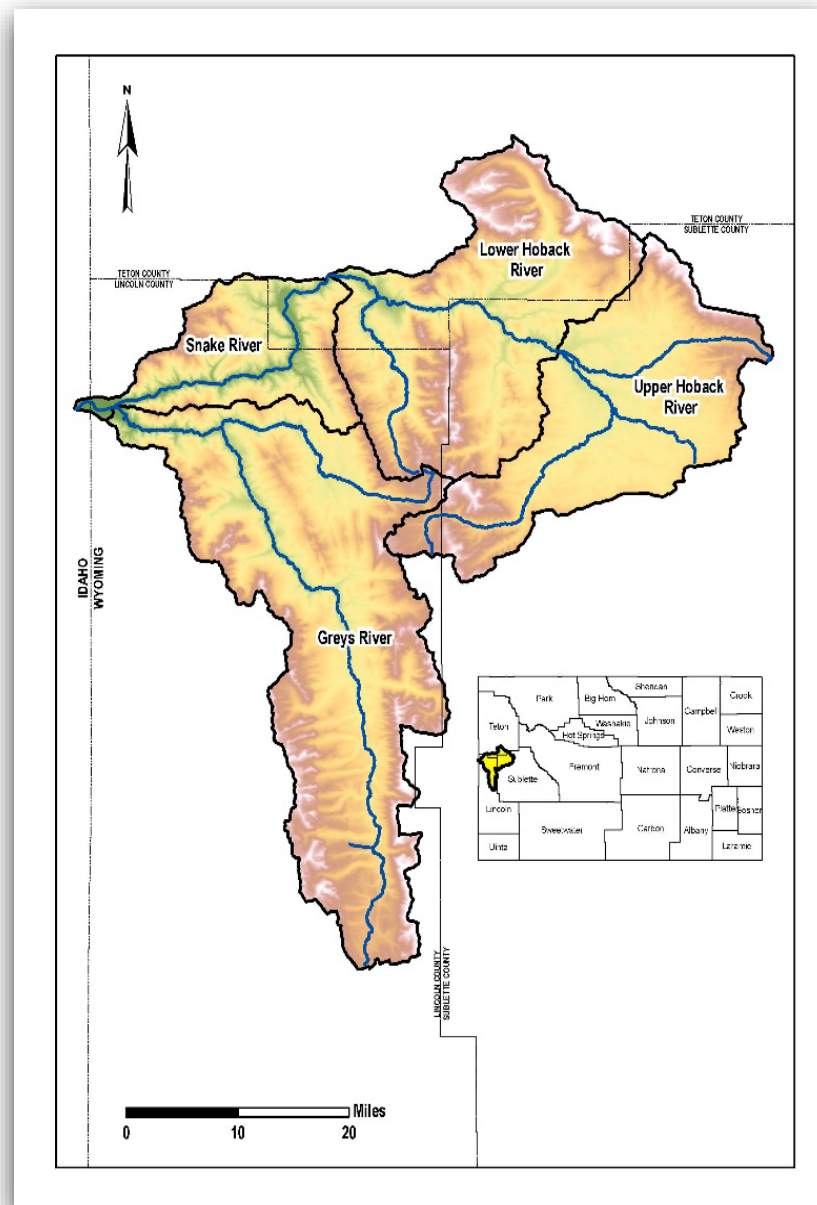


Figure 3. Hoback River Watershed Study Area Location

The following section of the Watershed Study describes the Physical, Biological, and Anthropogenic Systems that are interactive in characterizing the Hoback River Watershed. The Physical Systems analyzed in this document include surface water, geology, and climate. Similarly, the Biological Systems that are characterized herein include Fish and Wildlife, as well as Land Cover. Lastly, this section will describe the Anthropogenic Systems, also described as systems that are created or impacted by human activity.

3.1 PHYSICAL SYSTEMS

3.1.1 Surface Water

The Hoback River Watershed, with a tributary area of approximately 1,145 square miles, is highly dependent on snowmelt to supply surface water. Surface water in the Hoback River Watershed principally originates in the Wyoming, Salt River, and Gros Ventre Ranges. The Snake, Hoback and Greys River are the three largest streams in the watershed and are all principally fed by snowmelt. During a normal flow year, average monthly flows in the Hoback, Snake, and Greys River, peak at 2,388 cfs (144,106 acre-feet), 12,760 cfs (769,925 acre-feet), and 1,842 cfs (111,163 acre-feet), respectively. The months of May and June combined account for 41%, 54%, and 48% of annual flow in the Hoback, Snake, and Greys River, respectively.

3.1.1.1 Hydrography

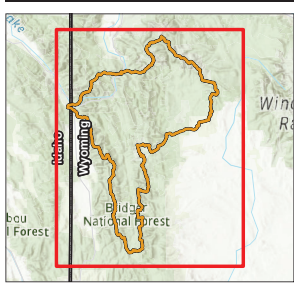
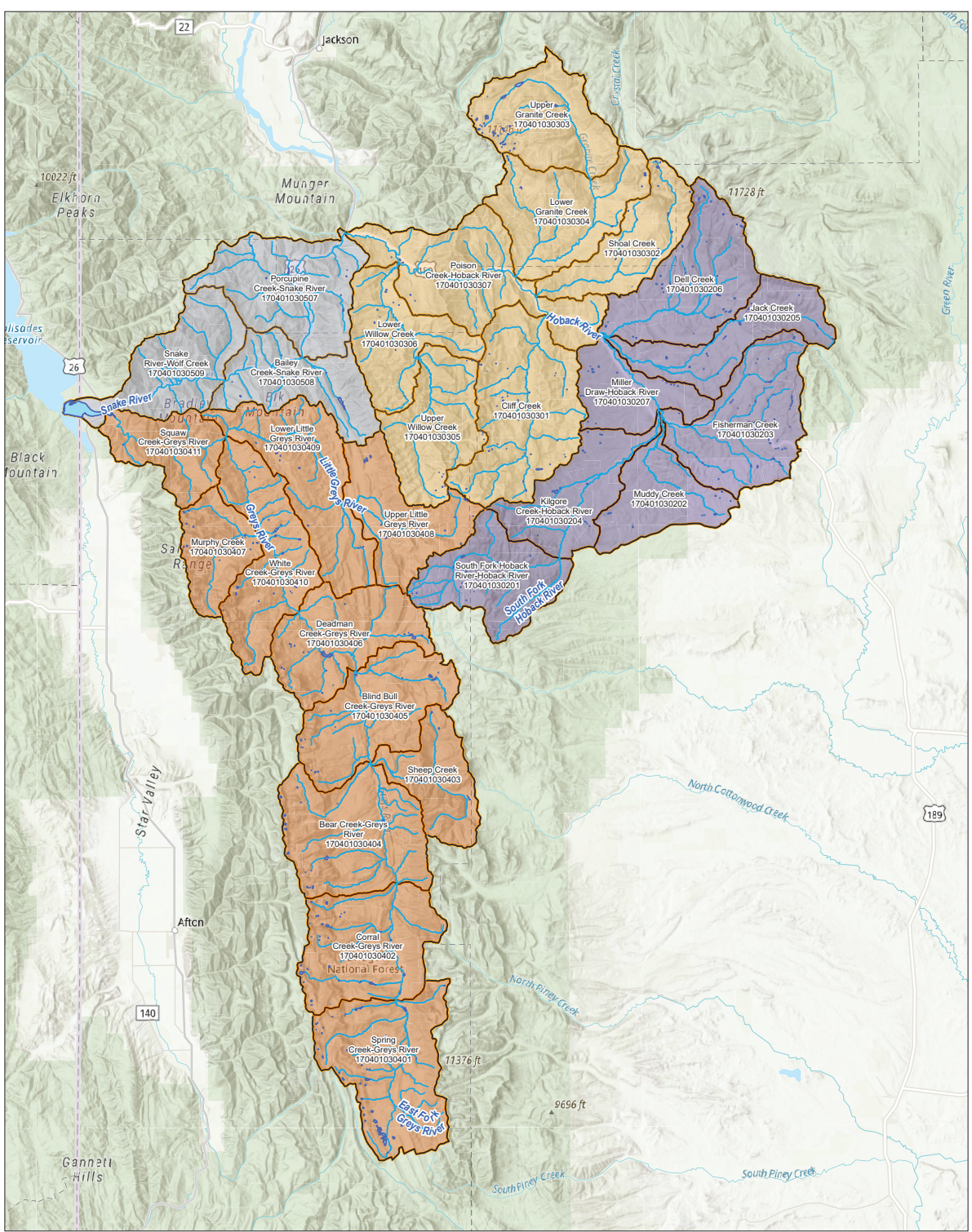
3.1.1.1.1 Hydrologic Units

The United States Geologic Service (USGS) identifies and classifies watersheds using a six-level numeric system. Each level is designated by a two-digit number which, in series, divide a large watershed into discrete hydrologic units (HUC) (**Table 2**). The Hoback River Watershed study area lies within the Greys-Hoback subbasin, which is cataloged by the USGS as an 8-digit HUC – 17040103. The four two-digit pairs indicate the region, subregion, basin, and subbasin of the Greys-Hoback Watershed. The Hoback River Watershed study area is in the Pacific Northwest Region, Upper Snake Subregion, Snake Headwaters Basin, and Greys Hoback Subbasin. The Greys-Hoback subbasin is further subdivided into four 10-digit HUCs as shown in **Table 2** and **Figure 4**. Each 10-digit HUC is further divided into 12-digit HUCs. The 12-digit HUCs are displayed in **Table 2** and **Figure 4** for reference but are not analyzed in this report.

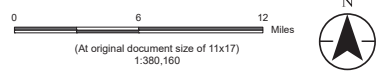
Table 2. Hydrologic Unit Code of the Hoback River Watershed

Level	Unit	Digits	Code	Name
First	Region	2-digit	17	Pacific Northwest
Second	Subregion	4-digit	1704	Upper Snake
Third	Basin	6-digit	170401	Snake Headwaters
Fourth	Subbasin	8-digit	17040103	Greys-Hoback
Fifth	Watershed	10-digit	1704010302	Upper Hoback River
Sixth	Subwatershed	12-digit	170401030201	South Fork Hoback River-Hoback River
			170401030202	Muddy Creek
			170401030203	Fisherman Creek
			170401030204	Kilgore Creek-Hoback River
			170401030205	Jack Creek
			170401030206	Dell Creek
			170401030207	Miller Draw-Hoback River
Fifth	Watershed	10-digit	1704010303	Lower Hoback River
Sixth	Subwatershed	12-digit	170401030301	Cliff Creek
			170401030302	Shoal Creek

			170401030303	Upper Granite Creek
			170401030304	Lower Granite Creek
			170401030305	Upper Willow Creek
			170401030306	Lower Willow Creek
			170401030307	Poison Creek-Hoback River
Fifth	Watershed	10-digit	1704010304	Greys River
Sixth	Subwatershed	12-digit	170401030401	Spring Creek-Greys River
			170401030402	Corral Creek-Greys River
			170401030403	Sheep Creek
			170401030404	Bear Creek-Greys River
			170401030405	Blind Bull Creek-Greys River
			170401030406	Deadman Creek-Greys River
			170401030407	Murphy Creek
			170401030408	Upper Little Greys River
			170401030409	Lower Little Greys River
			170401030410	White Creek-Greys River
			170401030411	Squaw Creek-Greys River
Fifth	Watershed	10-digit	1704010305	Snake River-Fall Creek
Sixth	Subwatershed	12-digit	170401030507	Porcupine Creek-Snake River
			170401030508	Bailey Creek-Snake River
			170401030509	Snake River-Wolf Creek



- ### Legend
- Waterbodies
 - Streams
 - HUC 10 Watersheds**
 - Greys River (1704010304)
 - Lower Hoback River (1704010303)
 - Snake River-Fall Creek (1704010305)
 - Upper Hoback River (1704010302)
 - HUC 12 Watersheds



Project Location: Lincoln, Sublette, and Teton Co., WY
 Prepared by HDR on 2022-06-06

Client/Project: Wyoming Water Development Commission
 Hoback River Watershed Study
 Hydrology
 227704133

Figure No.: 4
 Title:

Hoback River Watershed HUC 12 Subwatersheds

- Notes**
1. Coordinate System: NAD 1983 2011 UTM Zone 12N
 2. Data Sources: USGS
 3. Background: USGS 7.5 Minute Quadrangle

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3.1.1.1.2 Stream Types

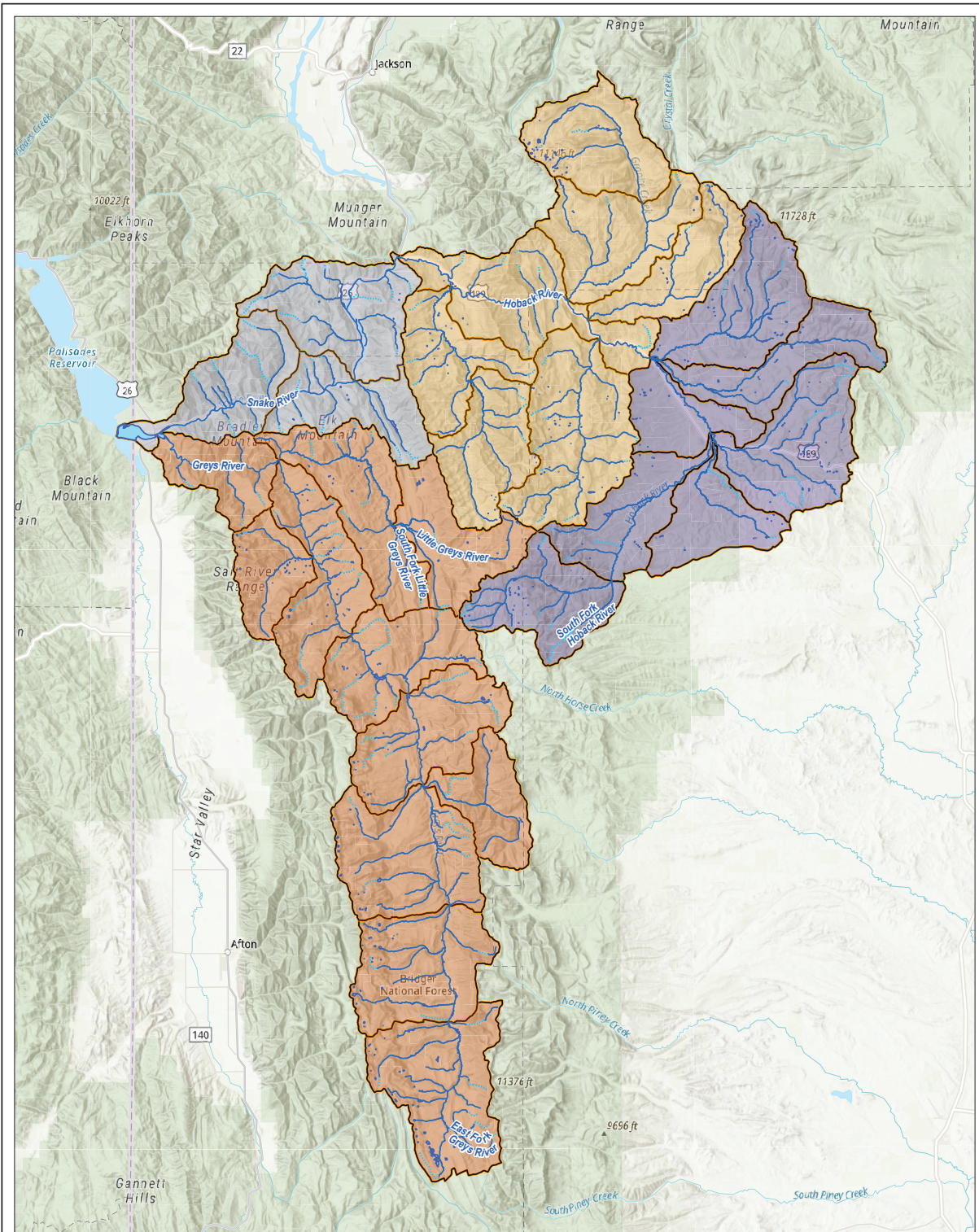
The Hoback River Watershed can be described as a high-altitude mountainous area with distinct flow patterns. Most streams within this watershed are perennial streams, and flow year-round. Other streams within the watershed with lower flows are intermittent due to freezing during the winter or waning snowmelt during the summer (**Figure 5**).

The most notable streams in the Hoback River Watershed are the Snake, Hoback and Greys River. Originating in the northwestern mountains of Wyoming, the Snake River, Hoback River and Greys River are the streams in the watershed that have high flows year-round and are considered perennial streams. These streams provide water to agricultural and municipal users, along with supply to the Palisades Reservoir.

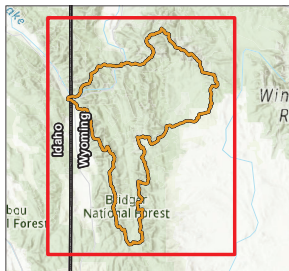
The Snake River originates near the Continental Divide inside of Yellowstone National Park from mountain streams created by runoff. The Snake River then flows south into Jackson Lake, which was enlarged in 1911 with the Jackson Lake Dam. From Jackson Lake, the Snake River flows south collecting water from Pacific Creek, Buffalo Fork River, Spread Creek, Ditch Creek, Gros Ventre River, Fish Creek, Spring Creek, Flat Creek and the Hoback River. The Snake River then flows into the Palisades Reservoir before continuing northwest and eventually feeding into the Columbia River.

The Hoback River originates in the northern Wyoming Range from mountain streams created by runoff. The upper reach is immediately fed by First Creek, Second Creek, Third Creek, Fourth Creek, Bare Creek, Cascade Creek, and Grizzly Creek. In Sublette County, the South Fork Hoback River then feeds into the Hoback River. Continuing north, Jamb Creek, Kilgore Creek, Fisherman Creek, Dell Creek and Jack Creek feed into Hoback River. Further north, Cliff Creek, Granite Creek, Lime Creek, Bull Creek, Cow Creek, Red Creek, Buck Creek, Bear Creek, Poison Creek, Willow Creek and Camp Creek are tributary waters before the Hoback River confluences with the Snake River.









The Greys River begins in the middle of the Wyoming Range and flows northerly. The following list describes major tributaries of said river as it tracks towards Alpine, Wyoming: East Fork Greys River, Poison Creek, Mink Creek, Clear Creek, Lookout Creek, Kinney Creek, Flat Creek, Spring Creek, Dick Creek, Box Canyon Creek, Corral Creek, North Corral Creek, Crow Creek, Marten Creek, Rock Creek, Red Creek, Ridge Creek, South Forks Creek, South Twin Creek, North Twin Creek, Elk Creek, Park Creek, Bear Creek, Sheep Creek, Cabin Creek, Moffat Creek, Dead Horse Creek, Meadow Creek, Blind Bull Creek, Anderson Creek, Henderson Creek, Pearson Creek, Moose Creek, Man Creek, Little Elk Creek, White Creek, Porcupine Creek, Lost Creek, Dead Dog Creek, Fawn Creek, Murphy Creek, Deer Creek, Hot Foot Creek, Weiner Creek, Lynx Creek, Lake Creek, Little Greys River, Fire Trail Creek, Higby Creek Squaw Creek and Mill Creek. The Greys River then terminates in the Snake River at the southern end of the Palisades Reservoir.



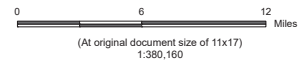
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Legend

-  Waterbodies
- Streams**
-  Intermittent
-  Perennial
- HUC 10 Watersheds**
-  Greys River (1704010304)
-  Lower Hoback River (1704010303)
-  Snake River-Fall Creek (1704010305)
-  Upper Hoback River (1704010302)
-  HUC 12 Watersheds

Notes
 1. Coordinate System: NAD 1983 2011 UTM Zone 12N
 2. Data Sources: USGS
 3. Background: USGS 7.5 Minute Quadrangle



Project Location
 Lincoln, Sublette, and Teton Co., WY

Prepared by HDR on 2022-06-06

Client/Project
 Wyoming Water Development Commission

227704133

Figure No.
5

Title
Hoback Watershed Surface Water Resources

Disclaimer: This document has been prepared based on information provided by others as cited in the Notes section. Stantec has not verified the accuracy and/or completeness of this information and shall not be responsible for any errors or omissions which may be incorporated herein as a result. Stantec assumes no responsibility for data supplied in electronic format, and the recipient accepts full responsibility for verifying the accuracy and completeness of the data.

3.1.1.1.3 Streamflow Gages

Streamflow data in the Hoback River Watershed is available at eleven locations, of which one (13023000) is currently active (**Table 3, Figure 6, and Figure 7**). Five of the eleven locations are natural flow gages: 13020500, 13021000, 13021500, 13022000, and 13019438. Natural flow gages are located upstream of diversions, irrigation return flows, or other human influences and therefore capture natural hydrologic activity. Gages 13022500, 13029000 and 13023500 are located downstream of Jackson Lake Dam. As a result, the streamflow measured at these locations are influenced by human activities.

All eleven gages were originally installed and operated by the USGS. The full period of record for all gages is available through the USGS website. The longest and most complete period of record is available from gage 13023000, a natural flow gage. While operating, 13023000 has recorded year-round flow data from 1977 to present (**Figure 6**).

USGS gages 13020000, 13020500, 13021000, 13021500, and 13022000 recorded seasonal data from 1917 to 1918. USGS gage 13029000 recorded seasonal data from 1916 to 1918. USGS gage 13022500 recorded your-round data from 1966 to 1977. USGS gage 13019500 collected data seasonally from 1917 to 1918, then year-round from 1944 to 1958. All other gages recorded year-round data during their entire period of record.

Table 3: USGS Streamflow Gage Names and Active Status within the Hoback River Watershed

Stream Gage ID	Site Name	Active	Agency
13020000	FALL CREEK NEAR JACKSON, WY	No	USGS
13020500	DOG CREEK NEAR CHENEY, WY	No	USGS
13021000	CABIN CREEK NEAR JACKSON, WY	No	USGS
13019500	HOBACK RIVER NR JACKSON WY	Yes	USGS
13021500	BAILEY CREEK NR ALPINE WY	No	USGS
13022000	WOLF CREEK NR ALPINE WY	No	USGS
13022500	SNAKE RIVER AB RESERVOIR NR ALPINE WY	Yes	USGS
13029000	SNAKE RIVER AT ALPINE WY	No	USGS
13023500	SNAKE RIVER BL GREYS RIVER AT ALPINE WY	No	USGS
13023000	GREYS RIVER AB RESERVOIR NR ALPINE WY	Yes	USGS
13019438	LITTLE GRANITE CREEK AT MOUTH NR BONDURANT WY	No	USGS

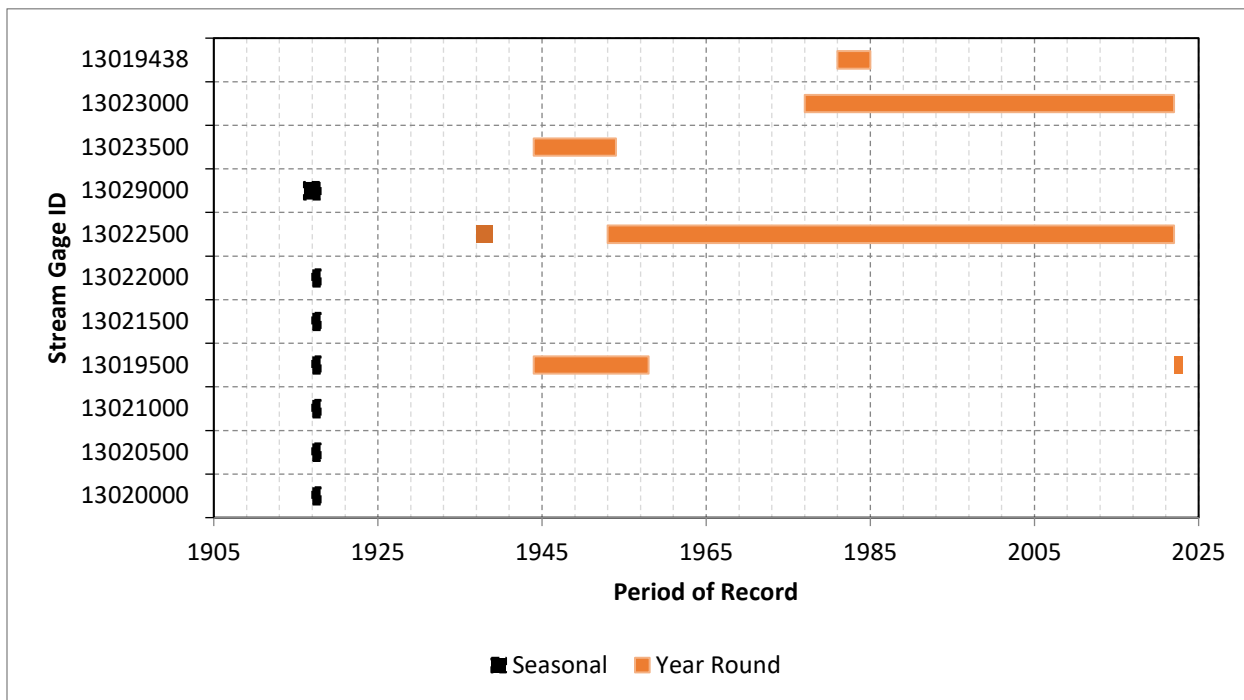
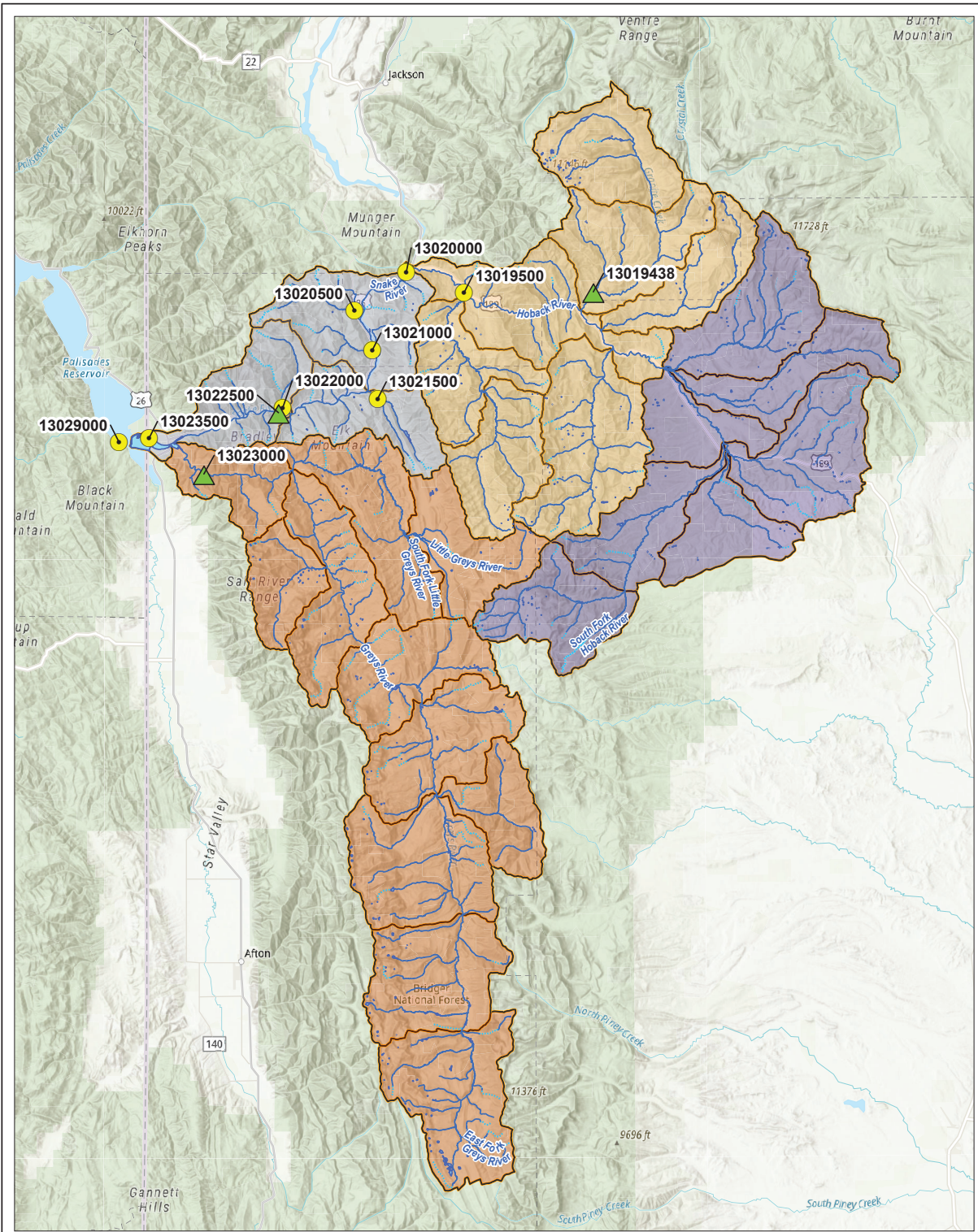
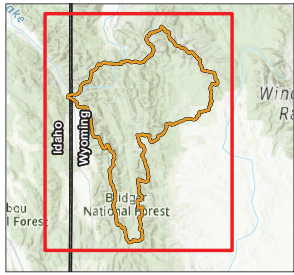


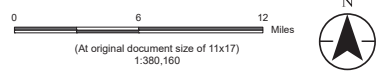
Figure 6. Period of record for active and historic USGS Streamgages in the Hoback River Watershed.



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- Legend**
- Streamflow Monitoring Station
 - ▲ Streamflow and Water Quality Monitoring Station
 - Waterbodies
 - Streams**
 - ~ Intermittent
 - Perennial
 - HUC 10 Watersheds**
 - Greys River (1704010304)
 - Lower Hoback River (1704010303)
 - Snake River-Fall Creek (1704010305)
 - Upper Hoback River (1704010302)
 - HUC 12 Watersheds



Project Location
Lincoln, Sublette, and Teton Co., WY

Client/Project
Wyoming Water Development Commission
Hoback River Watershed Study
Hydrology

Figure No.
7

Title
Hoback Watershed Stream Monitoring

Notes

1. Coordinate System: NAD 1983 UTM Zone 12N
2. Data Sources: USGS
3. Background: USGS 7.5 Minute Quadrangle

3.1.1.2 Water Quality

3.1.1.2.1 Stream Classifications

The Wyoming Department of Environmental Quality classifies streams based on water quality, quantity, and appropriate uses. Stream classifications in the Hoback River Watershed range from Class 1 (outstanding water quality) to Class 2AB (good water quality). Granite Creek, a tributary to the Hoback River, is the only stream in the Hoback River Watershed that is classified as Class 1, Outstanding Waters. The Wyoming Department of Environmental Quality (WDEQ) defines Class 1 streams as:

Class 1 waters are those surface waters in which no further water quality degradation by point source discharges other than from dams will be allowed. Nonpoint sources of pollution shall be controlled through implementation of appropriate best management practices. Pursuant to Section 7 of these regulations, that water quality and physical and biological integrity which existed on the water at the time of designation will be maintained and protected. In designation Class 1 waters, the Environmental Quality Council (Council) shall consider water quality, aesthetic, scenic, recreational, ecological, agricultural, botanical, zoological, municipal, industrial, historical, geological, cultural, archaeological, fish and wildlife, the presence of significant quantities of developable water, and other values of present and future benefit to the people.

The Snake River below Highway 22, Hoback River, and Greys River are classified as 2AB. In addition Little Greys River, Murphy Creek, White Creek, Deadman Creek, Bear Creek, Sheep Creek, Willow Creek, Shoal Creek and Dell Creek are classified as 2AB streams. The WDEQ defines Class 2AB waters as follows:

Class 2AB waters are those known to support game fish populations or spawning and nursery areas at least seasonally and all their perennial tributaries and adjacent wetlands and where a game fishery and drinking water use is otherwise attainable. Class 2AB waters include all permanent and seasonal game fisheries and can be either “cold water” or “warm water” depending upon the predominance of cold water or warm water species present. All Class 2AB waters are designated as cold water game fisheries unless identified as a warm water game fishery by a “ww” notation in the Wyoming Surface Water Classification List. Unless it is shown otherwise, these waters are presumed to have sufficient water quality and quantity to support drinking water supplies and are protected for that use. Class 2AB waters are also protected for nongame fisheries, fish consumption, aquatic life other than fish, recreation, wildlife, industry, agriculture, and scenic value uses.

3.1.1.2.2 Clean Water Act

Impairments

Two sections of Flat Creek were listed as impaired under Section 303(d) of the Clean Water Act in 2000 and 2020. The impairment causes from 2000 are listed as physical substrate habitat alteration from discharges from the municipal separate storm water system in the Town of Jackson and Escherichia Coli (E Coli.) from an unknown source. These two impairments affect three designated uses: Aquatic Life other than Fish, Cold Water Fishery, and Recreation. This impaired segment stretches 8 miles from High School Road to the confluence with the Snake River. The impairment cause from 2020 is listed as physical substrate habitat alteration from an unknown source. The affected designated use of this section of Flat Creek is Aquatic Life other than Fish. This impaired

segment stretches 3.4 miles from High School Road to its confluence with Cache Creek. At the downstream-most sample site of Flat Creek, the total maximum daily load (TMDL) of 126 organisms/100mL, has been exceeded. The other two sampling sites within this stretch did not exceed the TMDL. While these two impairments do not directly lie within the Hoback River Watershed boundary, Flat Creek flows into the Snake River.

The entirety of Fish Creek (18.6 mile) was listed as impaired under Section 303(d) of the Clean Water Act. The impairment cause is listed as exceedance of the TDML of E Coli from an unknown source. TDML for Fish Creek is set at 126 organisms/100mL, which three of the four sample sites exceed. As a result, Recreation use is not supported within Fish Creek. Fish Creek is a confluence to the Snake River approximately 4 miles north of the subject watershed study boundary.

No other streams in the Hoback River Watershed have been evaluated for impairments. Evaluated reaches in the Snake River Basin are depicted in **Figure 8**.

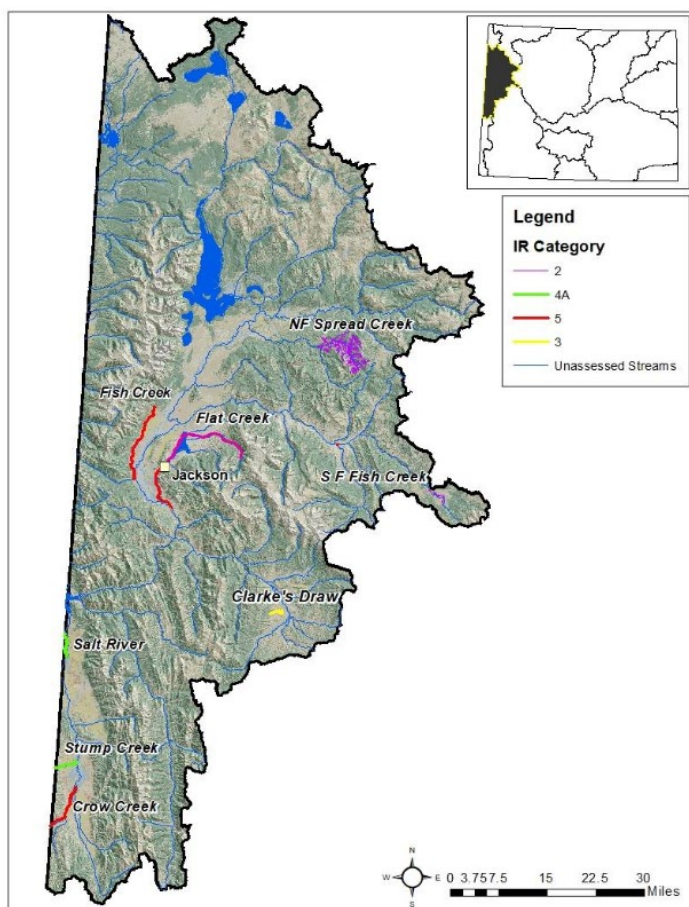


Figure 8. Stream Reaches in the Snake River Basin Evaluated for Impairment.

Pollution Discharge and Elimination Permits

Eight Wyoming Pollution Elimination and Discharge (WYPDES) Permits were identified in the Hoback River Watershed using the EPA ECHO interactive map (**Table 4**). Two search parameters were applied: the data type was set to "Water" and geographic location was limited to the Greys-Hoback HUC code (17040103). One facility, Astoria Hot Springs Park has recorded four violations within the past three years (as of April 2022).

Table 4. WYPDES Permits Identified in the Hoback River Watershed

	NPDES ID	FRS ID	Quarters with Noncompliance (3 years)	Effluent Violations (3 years)	Industry	Latitude	Longitude
Astoria Hot Springs Park	WY0096440	110070867915	4	Unknown	No data	43.30016	110.7757
Snake River Canyon Ranch Resort	WYR105995	110070672609	0	0	No data	43.27613	110.7814
Town of Alpine Wastewater Facility	WY0035611	110055163969	0	0	Sewerage Systems	43.162803	111.0327
Lincoln County Customs	Unknown	110070650107	0	Unknown	Unknown	Unknown	Unknown
New Fisherman Pit	WYR320618	110055189834	0	0	Construction Sand and Gravel	43.159833	110.2996
Fisherman Creek Pit	WYR320375	110055164094	0	0	Construction Sand and Gravel	43.163833	110.2974
Bondurant Gravel Pit	WYR320475	110055175536	0	0	Construction Sand and Gravel	43.235233	110.4291
McKee Pit	WYR320844	110070237825	0	0	Construction Sand and Gravel	43.238583	110.4436

3.1.1.2.3 Snake River Compact

Located in the Pacific Northwest Basin, the Snake River is ultimately governed by the Snake River Compact and associated laws and agreements. The main purposes of the Snake River Compact, in accordance with Article I thereof, is to provide the most efficient use of waters of the Snake River for multiple purposes; to promote interstate comity; to recognize that the most efficient utilization of such waters is required for the development of the drainage area of the Snake River and its tributaries in Wyoming and Idaho; and to promote joint action by the United States in the development/use of such waters and the control of floods. The state of Wyoming and Idaho senates ratified this compact in 1950.

As of the date of the compact, all existing rights in Wyoming were recognized. The compact permits Wyoming unlimited use for domestic and stock uses, providing that all stock reservoirs do not exceed 20 acre-feet. It also permits Wyoming to divert up to 4% of the Wyoming-Idaho State line flow of the

Snake River for new developments. Water use is limited strictly to diversions within the Snake River drainage basin, unless both states agree otherwise. Preference for use of water is given to domestic, stock, and irrigation uses rather than storage for generation of power.

3.1.1.2.4 Hoback Junction Area Nitrate Investigation

The Wyoming Department of Environmental Quality (WDEQ) received a complaint and a request to investigate two septic systems in the Hoback Junction Area in February of 2020. After completing an investigation into the two septic systems, WDEQ, with assistance from Teton County, determined that one system needed an Underground Injection Control (UIC) permit, and one did not. The facility was brought into compliance with the assistance of the landowner and WDEQ.

Following the septic system inspections, a second complaint and request for investigation was received in June 2020 due to nitrate levels exceeding EPA maximum levels of 10mg/L in groundwater. The complaint specifically requested to investigate and determine the cause(s) of nitrates. As of April 2022, there has not been a determination of what is causing the contamination.

Based on discussions held at project meetings during the course of this study, additional funding opportunities for studies specific to this noted issue are available through the WWDC, with the caveat that a formal wastewater district is formed. To date, no formalized district has been organized. Current information specific to this issue is available from the WDEQ website at the following link: [Hoback Junction Area Nitrate Investigation - Wyoming Department of Environmental Quality](#).

3.1.1.2.5 Water Quality Sampling Sites

The USGS conducted water quality sampling in the Hoback River Watershed at three locations between 1985 and 1999 (**Table 5** and **Figure 9**). Parameters measured by the USGS at each site are listed in **Table 6**. Sublette County Conservation District (SCCD) has been performing water quality sampling in the Hoback River Watershed at seven (7) locations between 2002 and present (see **Figure 10**). Sampling Sites and parameters measured by SCCD are listed in **Table 7** and **Table 8**, respectively.

Table 5. USGS Water Quality Sampling Sites and Period of Record

Site Number	Site Name	Parameters Measured	Sampling Events
13019438	LITTLE GRANITE CREEK AT MOUTH, NR BONDURANT, WY	122	130
13022500	SNAKE RIVER ABOVE RESERVOIR, NEAR ALPINE, WY	126	109
13023000	GREYS RIVER ABOVE RESERVOIR, NEAR ALPINE, WY	7	102

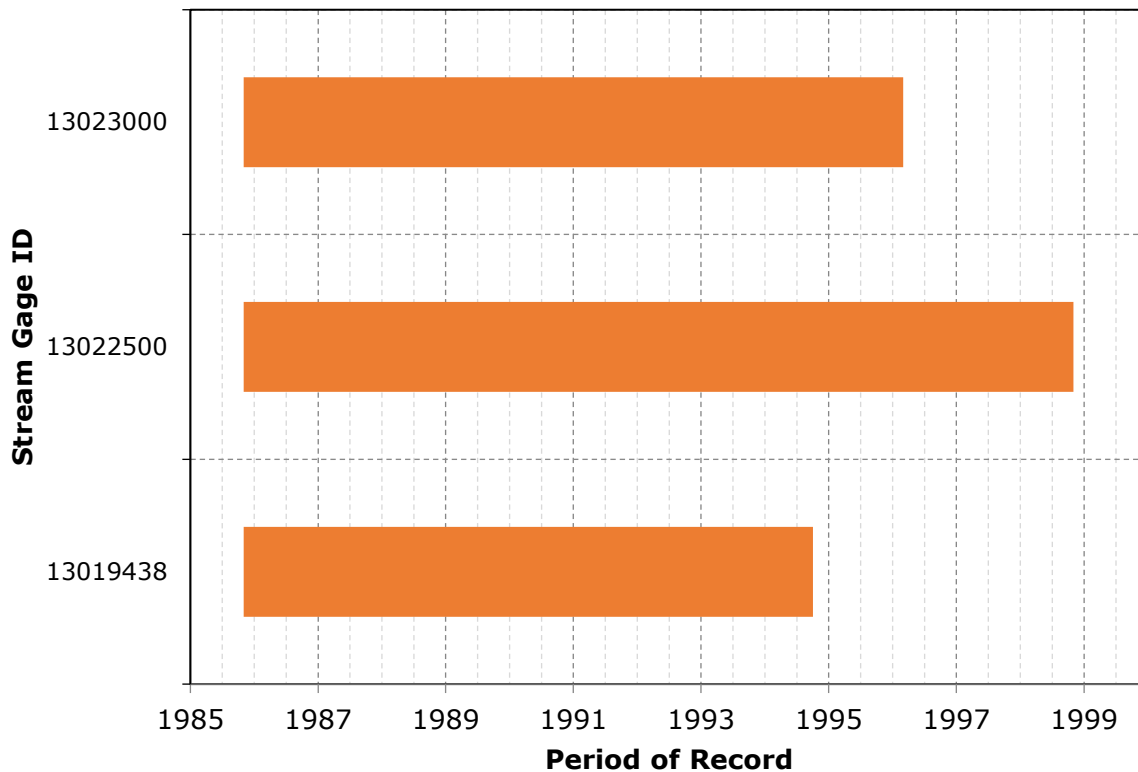


Figure 9. USGS water quality sampling sites and period of record

Table 6: Water Quality Parameters Measured at USGS Sampling Sites

	13019438	13022500	13023000
<i>Sampling Events</i>	<i>130</i>	<i>109</i>	<i>102</i>
Temperature, water, degrees Celsius	X	X	X
Temperature, air, degrees Celsius	X	X	X
Barometric pressure, millimeters of mercury	X		
Agency analyzing sample, code	X	X	X
Weather, World Meteorological Organization (WMO) code		X	X
Discharge, instantaneous, cubic feet per second	X	X	X
Number of sampling points, count	X		
Gage height, feet	X		
Turbidity, water, unfiltered, nephelometric turbidity units	X		
Specific conductance, water, unfiltered, microsiemens per centimeter at 25 degrees Celsius	X	X	
Hydrogen ion, water, unfiltered, calculated, milligrams per liter	X	X	X
Dissolved oxygen, water, unfiltered, milligrams per liter	X	X	
Dissolved oxygen, water, unfiltered, percent of saturation	X	X	
pH, water, unfiltered, field, standard units	X	X	
pH, water, unfiltered, laboratory, standard units	X		

Carbon dioxide, water, unfiltered, milligrams per liter	X		
Acid neutralizing capacity, water, unfiltered, fixed endpoint (pH 4.5) titration, field, milligrams per liter as calcium carbonate	X		
Acid neutralizing capacity, water, unfiltered, inflection-point titration method (incremental titration method), field, milligrams per liter as calcium carbonate	X		
Bicarbonate, water, unfiltered, fixed endpoint (pH 4.5) titration, field, milligrams per liter	X		
Carbonate, water, unfiltered, fixed endpoint (pH 8.3) titration, field, milligrams per liter	X		
Carbonate, water, unfiltered, inflection-point titration method (incremental titration method), field, milligrams per liter	X		
Bicarbonate, water, unfiltered, inflection-point titration method (incremental titration method), field, milligrams per liter	X		
Biomass, periphyton, ash weight, grams per square meter	X		
Biomass, periphyton, dry weight, grams per square meter	X		
Total nitrogen [nitrate + nitrite + ammonia + organic-N], water, unfiltered, milligrams per liter	X	X	
Total nitrogen [nitrate + nitrite + ammonia + organic-N], water, filtered, milligrams per liter	X	X	
Organic nitrogen, water, unfiltered, milligrams per liter as nitrogen	X	X	
Organic nitrogen, water, filtered, milligrams per liter as nitrogen	X	X	
Ammonia (NH ₃ + NH ₄ ⁺), water, filtered, milligrams per liter as nitrogen	X	X	
Ammonia (NH ₃ + NH ₄ ⁺), water, unfiltered, milligrams per liter as nitrogen	X		
Nitrite, water, filtered, milligrams per liter as nitrogen	X	X	
Nitrate, water, filtered, milligrams per liter as nitrogen	X	X	
Ammonia plus organic nitrogen, water, filtered, milligrams per liter as nitrogen	X	X	
Ammonia plus organic nitrogen, water, unfiltered, milligrams per liter as nitrogen	X	X	
Nitrate plus nitrite, water, unfiltered, milligrams per liter as nitrogen	X		
Nitrate plus nitrite, water, filtered, milligrams per liter as nitrogen	X	X	
Orthophosphate, water, filtered, milligrams per liter as PO ₄	X	X	
Phosphorus, water, unfiltered, milligrams per liter as phosphorus	X	X	
Phosphorus, water, filtered, milligrams per liter as phosphorus	X	X	
Orthophosphate, water, filtered, milligrams per liter as phosphorus	X	X	
Organic carbon, water, filtered, milligrams per liter	X		
Organic carbon, suspended sediment, total, milligrams per liter	X		
Cyanide, water, unfiltered, milligrams per liter	X		
Hardness, water, milligrams per liter as calcium carbonate	X		
Noncarbonate hardness, water, unfiltered, field, milligrams per liter as calcium carbonate	X		
Calcium, water, filtered, milligrams per liter	X		
Magnesium, water, filtered, milligrams per liter	X		

Sodium, water, filtered, milligrams per liter	X		
Sodium adsorption ratio (SAR), water, number	X		
Sodium fraction of cations, water, percent in equivalents of major cations	X		
Potassium, water, filtered, milligrams per liter	X		
Chloride, water, filtered, milligrams per liter	X		
Sulfate, water, filtered, milligrams per liter	X		
Fluoride, water, filtered, milligrams per liter	X		
Silica, water, filtered, milligrams per liter as SiO ₂	X		
Arsenic, water, filtered, micrograms per liter	X		
Arsenic, water, unfiltered, micrograms per liter	X		
Barium, water, filtered, micrograms per liter	X		
Barium, water, unfiltered, recoverable, micrograms per liter	X		
Beryllium, water, filtered, micrograms per liter	X		
Cadmium, water, filtered, micrograms per liter	X		
Cadmium, water, unfiltered, micrograms per liter	X		
Chromium, water, filtered, micrograms per liter	X		
Chromium, water, unfiltered, recoverable, micrograms per liter	X		
Cobalt, water, filtered, micrograms per liter	X		
Copper, water, filtered, micrograms per liter	X		
Copper, water, unfiltered, recoverable, micrograms per liter	X		
Iron, water, unfiltered, recoverable, micrograms per liter	X		
Iron, water, filtered, micrograms per liter	X		
Lead, water, filtered, micrograms per liter	X		
Lead, water, unfiltered, recoverable, micrograms per liter	X		
Manganese, water, unfiltered, recoverable, micrograms per liter	X		
Molybdenum, water, filtered, micrograms per liter	X		
Silver, water, filtered, micrograms per liter	X		
Silver, water, unfiltered, recoverable, micrograms per liter	X		
Strontium, water, filtered, micrograms per liter	X		
Vanadium, water, filtered, micrograms per liter	X		
Zinc, water, filtered, micrograms per liter	X		
Zinc, water, unfiltered, recoverable, micrograms per liter	X		
Lithium, water, filtered, micrograms per liter	X		
Selenium, water, filtered, micrograms per liter	X		
Selenium, water, unfiltered, micrograms per liter	X		
Propachlor, water, filtered, recoverable, micrograms per liter		X	
Butylate, water, filtered, recoverable, micrograms per liter		X	
Bromacil, water, filtered, recoverable, micrograms per liter		X	
Simazine, water, filtered, recoverable, micrograms per liter		X	
Prometon, water, filtered, recoverable, micrograms per liter		X	

2-Chloro-4-isopropylamino-6-amino-s-triazine, water, filtered, recoverable, micrograms per liter		X	
Cyanazine, water, filtered, recoverable, micrograms per liter		X	
Fonofos, water, filtered, recoverable, micrograms per liter		X	
Gage height, above datum, meters	X		
Discharge, instantaneous, cubic meters per second	X	X	X
Bag mesh size, bedload sampler, millimeters	X		
Fecal coliforms, M-FC MF (0.7 micron) method, water, colony forming units per 100 milliliters	X		
Fecal streptococci, KF streptococcus MF method, water, colony forming units per 100 milliliters	X		
alpha-HCH, water, filtered, recoverable, micrograms per liter		X	
p,p'-DDE, water, filtered, recoverable, micrograms per liter		X	
Dicamba, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
Linuron, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
MCPA, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
MCPB, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
Methiocarb, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
Propoxur, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
Bentazon, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
2,4-DB, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
Fluometuron, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
Oxamyl, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
Chlorpyrifos, water, filtered, recoverable, micrograms per liter		X	
Lindane, water, filtered, recoverable, micrograms per liter		X	
Dieldrin, water, filtered, recoverable, micrograms per liter		X	
Metolachlor, water, filtered, recoverable, micrograms per liter		X	
Malathion, water, filtered, recoverable, micrograms per liter		X	
Parathion, water, filtered, recoverable, micrograms per liter		X	
Diazinon, water, filtered, recoverable, micrograms per liter		X	
Atrazine, water, filtered, recoverable, micrograms per liter		X	
2,4-D, water, filtered, recoverable, micrograms per liter		X	
2,4,5-T, water, filtered, recoverable, micrograms per liter		X	
Silvex, water, filtered, recoverable, micrograms per liter		X	
Alachlor, water, filtered, recoverable, micrograms per liter		X	
Triclopyr, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
Propham, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	

Acetochlor, water, filtered, recoverable, micrograms per liter		X	
Picloram, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
Oryzalin, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
Norflurazon, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
Neburon, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
Methomyl, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
Fenuron, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
2-Methyl-4,6-dinitrophenol, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
Diuron, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
Dinoseb, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
Dichlorprop, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
Dichlobenil, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
DCPA monoacid, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
Clopyralid, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
Chlorothalonil, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
3-Hydroxy carbofuran, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
Carbofuran, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
Carbaryl, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
Bromoxynil, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
Aldicarb, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
Aldicarb sulfone, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
Aldicarb sulfoxide, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
Acifluorfen, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
Biomass, periphyton, ash free dry mass, grams per square meter	X		
Site visit purpose, code	X	X	
Site visit purpose, code			
Chloramben methyl ester, water, filtered, recoverable, micrograms per liter		X	
Dissolved solids dried at 180 degrees Celsius, water, filtered, milligrams per liter	X		

Dissolved solids, water, filtered, sum of constituents, milligrams per liter	X		
Dissolved solids, water, short tons per day	X		
Dissolved solids, water, filtered, short tons per acre-foot	X		
Suspended sediment, sieve diameter, percent smaller than 0.0625 millimeters	X	X	
Ammonia (NH ₃ + NH ₄ ⁺), water, unfiltered, milligrams per liter as NH ₄	X		
Ammonia (NH ₃ + NH ₄ ⁺), water, filtered, milligrams per liter as NH ₄	X	X	
Nitrate, water, filtered, milligrams per liter as nitrate	X	X	
Nitrite, water, filtered, milligrams per liter as nitrite	X	X	
Total nitrogen [nitrate + nitrite + ammonia + organic-N], water, unfiltered, milligrams per liter as nitrate	X		
Mercury, water, filtered, micrograms per liter	X		
Mercury, water, unfiltered, recoverable, micrograms per liter	X		
Sample purpose, code	X	X	
Suspended sediment concentration, milligrams per liter	X	X	
Suspended sediment discharge, short tons per day	X	X	
Bedload sediment discharge, short tons per day	X		
Bedload sediment, sieve diameter, percent smaller than 0.0625 millimeters	X		
Bedload sediment, sieve diameter, percent smaller than 0.125 millimeters	X		
Bedload sediment, sieve diameter, percent smaller than 0.25 millimeters	X		
Bedload sediment, sieve diameter, percent smaller than 0.5 millimeters	X		
Bedload sediment, sieve diameter, percent smaller than 1 millimeter	X		
Bedload sediment, sieve diameter, percent smaller than 2 millimeters	X		
Bedload sediment, sieve diameter, percent smaller than 4 millimeters	X		
Bedload sediment, sieve diameter, percent smaller than 8 millimeters	X		
Bedload sediment, sieve diameter, percent smaller than 16 millimeters	X		
Bedload sediment, sieve diameter, percent smaller than 32 millimeters	X		
Bedload sediment, sieve diameter, percent smaller than 64 millimeters	X		
Starting time, 24 hour clock, hour-minute (hhmm)	X		
Lead, street debris smaller than 1 millimeters, dry weight, milligrams per kilogram	X		
Sampling method, code	X		
Metribuzin, water, filtered, recoverable, micrograms per liter		X	
2,6-Diethylaniline, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
Trifluralin, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	

Ethalfuralin, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
Phorate, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
Terbacil, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
Linuron, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
Methyl parathion, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
EPTC, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
Pebulate, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
Tebuthiuron, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
Molinate, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
Ethoprop, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
Benfluralin, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
Carbofuran, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
Terbufos, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
Propyzamide, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
Disulfoton, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
Triallate, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
Propanil, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
Carbaryl, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
Thiobencarb, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
DCPA, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
Pendimethalin, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
Napropamide, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
Propargite, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
Azinphos-methyl, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
cis-Permethrin, water, filtered (0.7 micron glass fiber filter), recoverable, micrograms per liter		X	
Sampler type, code	X		
Specific conductance, water, unfiltered, laboratory, microsiemens per centimeter at 25 degrees Celsius	X		

Acid neutralizing capacity, water, unfiltered, fixed endpoint (pH 4.5) titration, laboratory, milligrams per liter as calcium carbonate	X		
Diazinon-d10, surrogate, water, filtered (0.7 micron glass fiber filter), percent recovery		X	
Terbutylazine, surrogate, water, filtered (0.7 micron glass fiber filter), percent recovery		X	
alpha-HCH-d6, surrogate, water, filtered (0.7 micron glass fiber filter), percent recovery		X	
Noncarbonate hardness, water, milligrams per liter as calcium carbonate	X		
Set number, NWQL schedule 2010		X	
Set number, NWQL schedule 2051		X	
Sample volume, NWQL schedule 2051, milliliters		X	
Sample volume, NWQL schedule 2010, milliliters		X	

Table 7 SCCD Water Quality Sampling Sites

Site Name/Number	Parameters Measured	Sampling events
HB1*	22	79
HB2*	22	79
HB3*	22	79
HB4*	22	79
HB5*	22	79
HB6*	22	79
HB7*	22	79

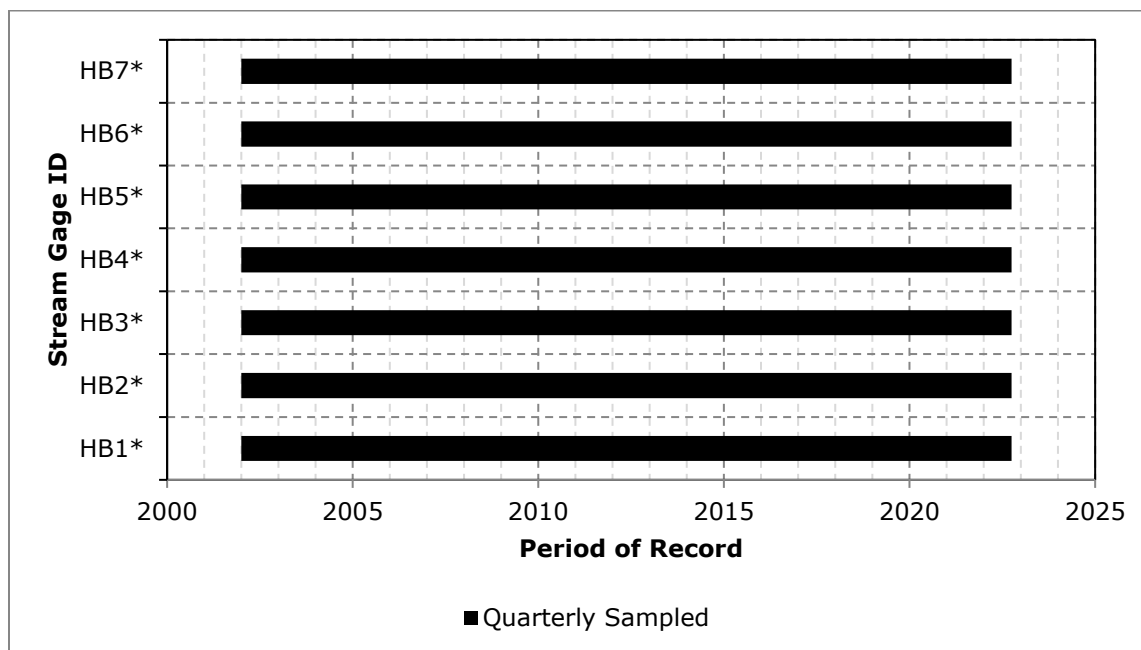


Figure 10 SCCD Water Quality Sampling Sites and Period of Record

Table 8 Water Quality Parameters Measured at SCCD Sampling Sites

	HB1*	HB2*	HB3*	HB4*	HB5*	HB6*	HB7*
<i>Sampling Events</i>	79	79	79	79	79	79	79
Temperature	X	X	X	X	X	X	X
DO	X	X	X	X	X	X	X
pH	X	X	X	X	X	X	X
Conductivity	X	X	X	X	X	X	X
TDS	X	X	X	X	X	X	X
Turbidity	X	X	X	X	X	X	X
Alkalinity	X	X	X	X	X	X	X
Carbonate	X	X	X	X	X	X	X
BiCarbonate	X	X	X	X	X	X	X
Calcium	X	X	X	X	X	X	X
Magnesium	X	X	X	X	X	X	X
Total Nitrogen	X	X	X	X	X	X	X
Phosphorus	X	X	X	X	X	X	X
Sodium	X	X	X	X	X	X	X
Potassium	X	X	X	X	X	X	X
Sulfur	X	X	X	X	X	X	X
TSS	X	X	X	X	X	X	X
TDS	X	X	X	X	X	X	X
Anion	X	X	X	X	X	X	X
Cations	X	X	X	X	X	X	X
A/C Balance	X	X	X	X	X	X	X
Macroinvertebrate sampling	X	X	X	X	X	X	X

3.1.1.3 Flooding and Runoff

Areas with flooding and runoff have become an apparent issue within the Hoback River Watershed, which further accelerates issues related to slope stability, water quality, and ecological system degradation. Areas that are prone to flooding within the Hoback River Watershed are along the major rivers. The areas subject to runoff specific issues can be related to previous forest fires, landslides/mudslides, and agricultural activity.

Flood prone areas along the Snake, Hoback, and Greys Rivers have been identified within the Hoback River Watershed. When flooding occurs, the water action disturbs sediment along the river, which affects slope stability, water quality, and the ecological system downstream. Best Management Practices (BMPs) that can be used to counter the negative effects from flooding include boulder revetments, vegetating banks, rock gabions, and stream barbs. These measures aid in creating stronger streambanks, therefore decreasing amounts of sediment going into the stream and subsequently improving water quality.

Within the Hoback River Watershed, nine problem areas have been identified due to forest fires (**Figure 11**). These problem areas meet a criterion of occurring within the last 10 years and having a

burn area of 1 acre or larger. In 2013, 2014, 2015, 2017 and 2019, there were no reported fires that meet the criterion according to the Teton Interagency Fire website (**Table 9**).

Table 9: Forest Fires within the Hoback River Watershed (2012-2022)

Year	Name	Size (acres)
2012	Fontenelle	65,220
	Rock	12.5
	Forest Park	41
2016	Cliff Creek	34,313
2018	Marten Creek Fire	6,491
	Fire Trail Fire	30
	Roosevelt Fire	61,511
2020	Shoal Creek	17
	Cow Creek	8.5
2021	Little Granite Creek Fire	20

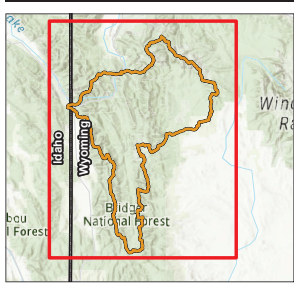
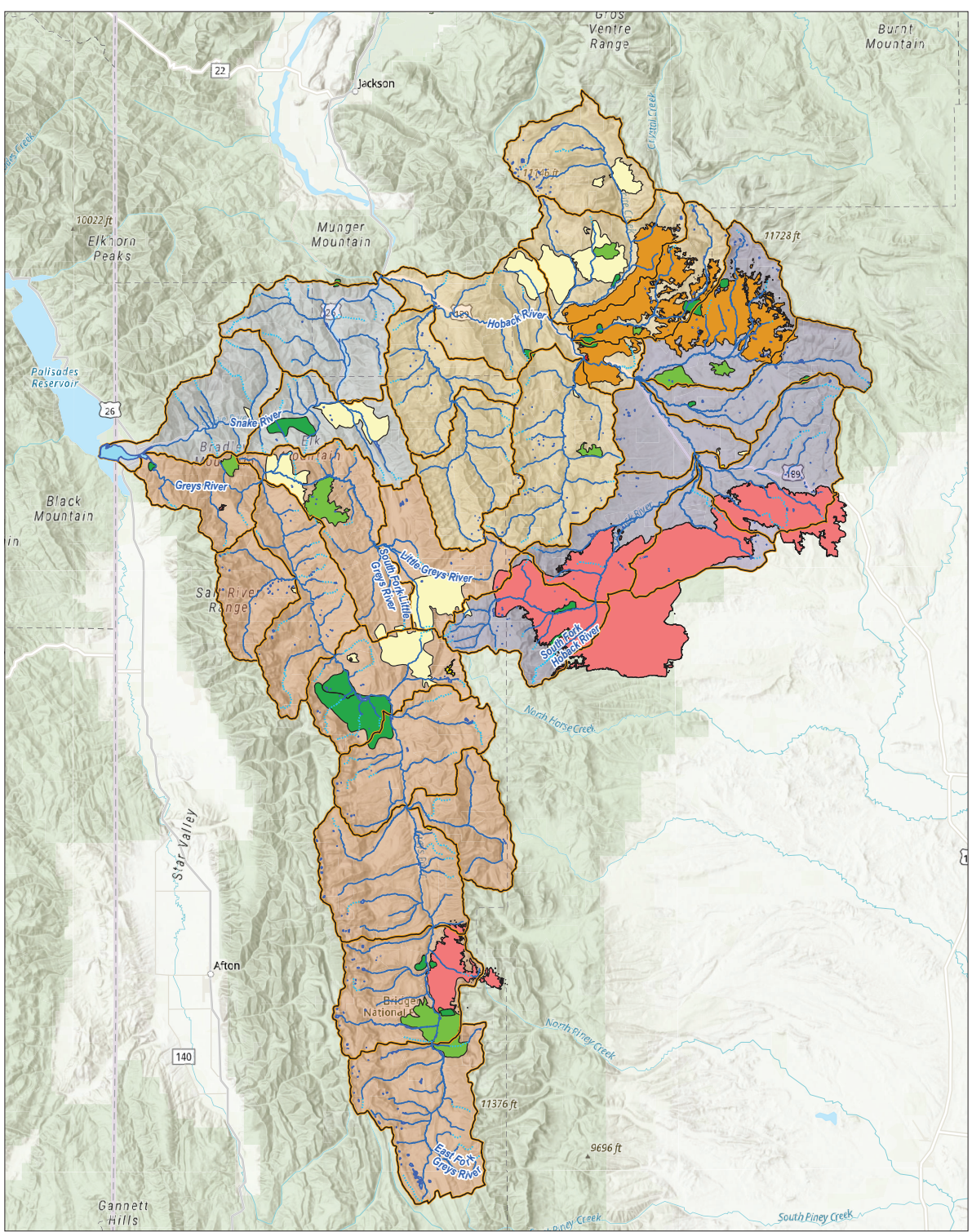
Issues that arise from wildfires includes increased sedimentation within streams from accelerated runoff due to soil becoming hydrophobic and loss of vegetation (**Figure 12**). Precautions that can be taken to counter increased sedimentation in streams and water bodies are removing debris from the area, preserving existing vegetation, minimizing soil disturbance, reducing impact of livestock, constructing waterbars, reseeding affected areas, and the utilization of BMPs. Using silt fence, wattles, or contour logs are types of BMPs that can be used to control the amount of sediment runoff. Silt fences and wattles are effective for up to two years while the revegetation process occurs. Other BMPs that should be considered are to minimize the amount of stream vehicle crossings and to re-establish vegetation on temporary roads. If constant stream vehicle crossing is inevitable to access certain areas, the installation of controlled crossings should be considered.

Landslides/mudslides in the Hoback River Watershed are common due to the mountainous terrain, geology, and recent forest fire activity. The most recent mudslide in the Snake River Canyon was in 2018 along Highway 26/89. In the Greys River Canyon, the most recent landslide was in 2018 near Porcupine Creek. In the Hoback Canyon, the most recent landslide to occur was in 2018 about 13 miles south of Hoback Junction. Revegetating and restabilizing the landslide prone hills are the most common practices for preventative efforts. By revegetating and restabilizing, the soil will be much more stable, thereby avoiding sediment from landslides propelling into streams. The Geology Section of the report will discuss this further.



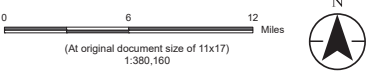
Figure 11: Photo taken in Spring of 2019 following Roosevelt Fire (Hoback Ranches north entrance)

In Teton, Lincoln, and Sublette County, agriculture is a large economic driver. There are multiple areas in the Hoback River Watershed along the Snake, Hoback, and Greys River that are considered Pasture/Hay lands according to NLCD (**Figure 13**). Pasture/Hay lands increase the possibility of sedimentation in streams due to agricultural use. Mitigation and preventative efforts that can be made to counter this effect are as follows: develop access roads for fixed travel, create runoff control via BMPs such as silt fencing or wattle installation, vegetation enhancement along channels/banks/berms, and the installation of sediment basins. Keeping a barrier between livestock pasture fields and streams to minimize livestock crossings or creating controlled crossings can improve water quality, bank stability, and ecological systems of the stream. By protecting the ecological systems of the streams, an improved environment for aquatic organisms and riparian zones may be created. As mentioned previously, silt fence and wattles are considered to be a temporary measure that may be employed for up two years until vegetation can be grown to stabilize the soil(s).



- ### Legend
- #### Historic Wildfires
- Pre-1980
 - 1980 - 2000
 - 2000 - 2010
 - 2010 - 2015
 - 2016
 - 2018
 - 2020
 - Waterbodies

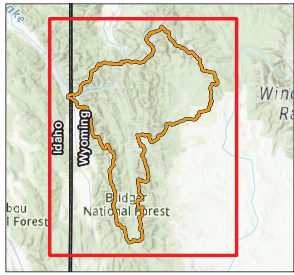
- #### Streams
- ~ Intermittent
 - ~ Perennial
- #### HUC 10 Watersheds
- Greys River (1704010304)
 - Lower Hoback River (1704010303)
 - Snake River-Fall Creek (1704010305)
 - Upper Hoback River (1704010302)
- #### HUC 12 Watersheds
- HUC 12 Watersheds



Project Location: Lincoln, Sublette, and Teton Co., WY
 Client/Project: Wyoming Water Development Commission
 Hoback River Watershed Study
 Hydrology
 Figure No.: 12
 Title: Hoback Wildfires

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Notes
 1. Coordinate System: NAD 1983 2011 UTM Zone 12N
 2. Data Sources: USGS
 3. Background: USGS 7.5 Minute Quadrangle

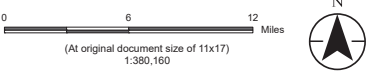


Legend

- Waterbodies
- Streams
- HUC 12 Watersheds
- HUC 10 Watersheds

National Land Cover Dataset 2019

- Open Water
- Perennial Snow/Ice
- Developed, Open Space
- Developed, Low Intensity
- Developed, Medium Intensity
- Developed, High Intensity
- Barren Land
- Deciduous Forest
- Evergreen Forest
- Mixed Forest
- Shrub/Scrub
- Herbaceous
- Hay/Pasture
- Cultivated Crops
- Woody Wetlands
- Emergent Herbaceous Wetlands



Project Location: Lincoln, Sublette, and Teton Co., WY
 Client/Project: Wyoming Water Development Commission
 Hoback River Watershed Study
 Hydrology

Figure No. 13

Title: Hoback NLDC 2019 Land Cover

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Notes
 1. Coordinate System: NAD 1983 2011 UTM Zone 12N
 2. Data Sources: USGS
 3. Background: USGS 7.5 Minute Quadrangle

3.1.2 Geomorphology

The purpose of this section is to summarize the geomorphology of the Greys-Hoback River Watershed that includes the Upper and Lower Hoback, Greys, and lower portion of the Snake River – Fall Creek sub watersheds, referred to as the Hoback River Watershed for this study. Specifically, this section focuses on the Level 1 stream assessment developed by Rosgen (Rosgen, 1996, 2006).

As subsequently described in the geology section, the study area consists of faulted mountains of sedimentary rock with Precambrian rock beneath. The sedimentary rock produces the colluvium parent material. The structural and surficial geology provide material for sediment transport through the system. Streams are dynamic systems and evolve in response to geologic or climatic events.

To identify the current state of the streams in the Hoback River Watershed, the Rosgen (Rosgen, 1996, 2006) stream classification was used which provides various levels of stream classification from high level desktop reviews to detailed data collection of stream hydraulics. For this study, streams were classified using the Level 1 characterization. Level 1 studies examine the following attributes:

- Drainage network (stream order and drainage densities)
- Valley types
- Channel Slope
- Sinuosity
- Channel Shape
- Channel Pattern

3.1.2.1 Previous Studies

Previous studies on the geomorphology of the Hoback River Watershed are limited. The Wyoming Department of Game and Fish reviewed instream flows on Dell Creek (Robertson, 2012). The study focused on the necessary sustaining flow for cutthroat trout in the tributary. The geomorphic review provided a high-level overview of stream conditions in relation to fish habitat.

3.1.2.2 Drainage Network

Understanding drainage networks as related to stream order and drainage density provides a context for high level assessments. For this study, the USGS National Hydrographic Dataset (USGS, 2020) was used to determine streams. Typically, streams are delineated using a topographic map and follow contours with a “U” or “V” shape. The collection of water to concentrated flow paths in headwater reaches (upper portions of watersheds) form ephemeral or intermittent channels depending on the water source. As more water accumulates to a focalized flow point, a defined channel forms.

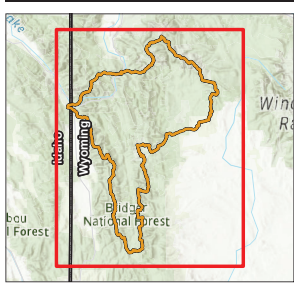
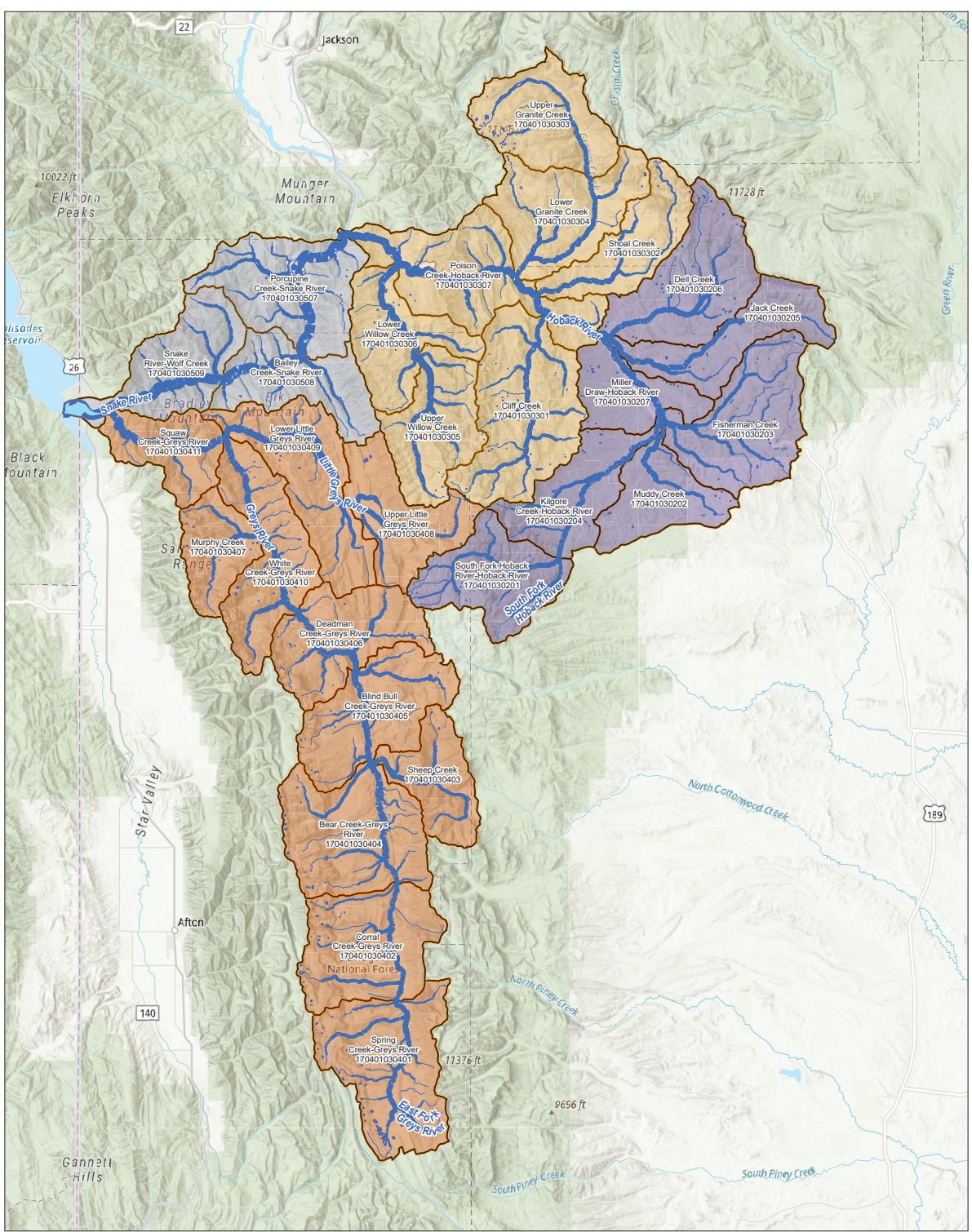
To characterize streams based on the relative flow in a system, Strahler (1957) developed a system to number channels. In headwater reaches, when concentrated flow paths begin to form are classified as first order streams. Second order streams are classified when two first order streams merge. The downstream reach increases in value when two streams of the same value merge (i.e. 4th order and 4th order combine to form a 5th order stream). Alternatively, streams can be classified using Horton (1945), Shreve’s stream magnitude (source), Hack (1957), and Topographical interpretation. For this study, the Strahler stream numbering method was used. In the Hoback River Watershed, the largest stream order is 6. The Snake River between Fall Creek and Palisades Reservoir was classified for minor contributing tributaries; the greater Snake River was not characterized for stream order. **Figure 14** includes the delineated stream orders for the Hoback, Greys, and tributaries to the Snake River.

Drainage density examines how well a defined area can transport stormflow to the watershed outlet. Drainage density is calculated by summing all of the stream lengths and dividing by the watershed area. Watersheds with a high drainage density exhibit a fast-rising hydrograph. The Hoback and Greys River sub watersheds both have moderate drainage densities. The streams used to calculate drainage density are defined by the USGS NHD dataset and may not include all ephemeral streams. **Table 10** provides the drainage densities for each HUC 12 (See **Figure 14** for HUC 12 Number).

Table 10: Drainage Density by HUC 12

HUC	Name	Total Stream Length (mi)	Watershed Area (mi ²)	Drainage Density (mi/mi ²)
170401030201	South Fork Hoback River-Hoback River	95.2	38.8	2.5
170401030202	Muddy Creek	78.1	29.4	2.7
170401030203	Fisherman Creek	123.6	50.0	2.5
170401030204	Kilgore Creek-Hoback River	100.7	34.8	2.9
170401030205	Jack Creek	87.6	34.9	2.5
170401030206	Dell Creek	106.6	48.3	2.2
170401030207	Miller Draw-Hoback River	86.1	25.4	3.4
170401030301	Cliff Creek	140.8	61.2	2.3
170401030302	Shoal Creek	61.2	32.2	1.9
170401030303	Upper Granite Creek	80.1	40.1	2.0
170401030304	Lower Granite Creek	102.4	44.9	2.3
170401030305	Upper Willow Creek	102.7	37.4	2.7
170401030306	Lower Willow Creek	78.3	34.5	2.3
170401030307	Poison Creek-Hoback River	109.8	55.4	2.0
170401030401	Spring Creek-Greys River	105.5	56.3	1.9
170401030402	Corral Creek-Greys River	87.2	49.1	1.8
170401030403	Sheep Creek	49.5	27.4	1.8
170401030404	Bear Creek-Greys River	101.4	54.5	1.9

170401030405	Blind Bull Creek-Greys River	93.1	46.8	2.0
170401030406	Deadman Creek-Greys River	97.1	42.1	2.3
170401030407	Murphy Creek	50.2	23.4	2.1
170401030408	Upper Little Greys River	110.6	36.3	3.0
170401030409	Lower Little Greys River	119.8	48.0	2.5
170401030410	White Creek-Greys River	95.0	45.3	2.1
170401030411	Squaw Creek-Greys River	57.7	25.9	2.2
170401030507	Porcupine Creek-Snake River	122.7	70.3	1.7
170401030508	Bailey Creek-Snake River	82.0	34.9	2.4
170401030509	Snake River-Wolf Creek	100.0	39.5	2.5



- Legend**
- Waterbodies
 - Stream_Order
 - 1
 - 2
 - 3
 - 4
 - 5
 - 6
 - 7
 - HUC 10 Watersheds**
 - Greys River (1704010304)
 - Lower Hoback River (1704010303)
 - Snake River-Fall Creek (1704010305)
 - Upper Hoback River (1704010302)
 - HUC 12 Watersheds



Project Location: Lincoln, Sublette, and Teton Co., WY
 Prepared by HDK on 2022-06-08

Client/Project: Wyoming Water Development Commission
 Hoback River Watershed Study
 Geomorphology

Figure No.: 14

Title: Hoback River Watershed Stream Order

Notes

1. Coordinate System: NAD 1983 2011 UTM Zone 12N
2. Data Sources: USGS
3. Background: USGS 7.5 Minute Quadrangle

V:\2277\hoback\22777941\31303_data\figs_and_graphics\geomorphology\Geomorphology.aprx, Revised: 2022-06-08 By: haczmarek

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3.1.2.3 Level I Rosgen Stream Classification

The Level 1 Rosgen stream classification framework provides a high-level understanding of stream classification. Often, a Level 1 study characterizes streams and the forces that shape the stream. These assessments can be conducted with a GIS desktop review of sources. For assessing the Hoback River Watershed, several publicly available GIS datasets were used to determine the valley and stream type.

3.1.2.3.1 Valley Classification

Valley types are characterized by the topography and the formation of the landscape. **Table 11** describes the valley types and notes which valleys are present in the Hoback River Watershed.

Table 11: Valley Types (Rosgen 1994, 1996, 2009)

Valley Types	Summary Description of Valley Types	Present in Study Area
I	Steep, confined, "V" notched canyons, rejuvenated side slopes	Yes – headwater reaches
II	Moderately steep, gentle-sloping side slopes often in colluvial valleys	Yes
III	Alluvial fans and debris cones	Yes
IV	Gentle gradient canyons, gorges, and confined alluvial and bedrock-controlled valleys	Yes
V	Moderately Steep, "U" shaped glacial-trough valleys	Yes
VI	Moderately steep, fault, join, or bedrock (structural controlled valleys)	No
VII	Steep fluvial dissected, high-drainage density alluvial slopes	No
VIII	Wide, gentle valley slope with well-developed floodplain adjacent to river and/or glacial terraces - alluvial valley fills	Yes
IX	Broad, moderate to gentle slopes, associated with glacial outwash, and or eolian sand dunes	No
X	Very broad and gentle valley slope, associated with glacio- and non-glacio-lacustrine deposits	No
XI	Deltas	No

Valley types were classified using USGS quadrangles and recent aerial imagery. Valley types were characterized for streams greater than 4th order. Streams less than 4th order exhibited similar valley types. In headwater reaches, the dominant valleys are type II and V. Other valley types were observed in the Hoback River Watershed but type II valleys are the most predominant throughout the general study area. Type III valleys are limited in the watershed to a few areas. The dominant feature in type III valleys is the presence of debris from mass-wasting events such as landslides. In some instances, the debris feature has revegetated, therefore a topographic map may further assist with classifying the valley.

Larger “U” shaped valleys are the result of glaciers moving and scraping the sides of the valley walls, which are present in headwater reaches and identifiable by cirque features. Cirques typically form during alpine glaciation events where bowls are created at the glacier head. After the glacier melts, a tarn (small lake) may form in the remnant glacial depression.

Finally, valley type VIII are encountered in developed fluvial systems. Streams in valley type VIII are low gradient and have clear floodplains. In some systems, floodplain terraces may have formed; however, multiple flood terrace systems are indicative of valley type X. Type X systems are found in semi-arid regions, the Great Plains, and Coastal Plains (Rosgen, 1996). **Figure 15** provides a broad overview of the stream valley types in the Hoback River watershed (not all valley types are delineated within the watershed).

3.1.2.3.2 Stream Types

The second component to the Level 1 framework includes classifying the stream type. The Rosgen methodology allows for several levels of classification of stream types. Stream classification utilizes the following elements: entrenchment ratio, width to depth ratio, sinuosity, slope, and channel material. Classifications range from a single letter such as G, down to an alphanumeric classification (example: G1c). For the purposes of this Level 1 assessment, the following features were examined to develop the stream type: channel slope and sinuosity. Other attributes including entrenchment ratio and width to depth ratio are better suited with field measurement for stream depth and bankfull conditions. **Table 12** provides a summary of the stream types developed by Rosgen.

Table 12: Stream Types (Rosgen 1994, 1996, 2009)

Stream Type	General Description	Entrenchment Ratio	Width to Depth Ratio	Sinuosity	Slope
Aa+	Very steep, deeply entrenched, debris transport, torrent streams.	< 1.4	< 12	1.0 to 1.1	>0.10
A	Steep, entrenched, cascading, step/pool streams. High energy/debris transport associated with depositional soils. Very stable if bedrock-or boulder dominated channels	< 1.4	< 12	1.0 to 1.2	0.04 to 0.10
B	Moderately entrenched, moderate gradient, riffle-dominated channel, width infrequent spaced pools. Very stable plan and profile. Stable Banks	1.4 to 2.2	> 12	> 1.2	0.02 to 0.039
C	Low gradient, meandering, point bar, riffle/pool, alluvial channels with broad, well-defined floodplains	> 2.2	> 12	> 1.2	<0.02
D	Braided channel with longitudinal and transverse bars. Very wide channel with eroding banks. Example: glacial outwash plains	n/a	> 40	n/a	< 0.04
DA	Anastomosing (multiple channels), narrow and deep with extensive, well vegetated floodplains and associated wetlands. Very gentle relief with highly variable sinuosity and width/depth ratios. Stable banks. Example: Lower Mississippi River near Gulf of Mexico	> 2.2	Highly Variable	Highly Variable	< 0.005
E	Low gradient, meandering riffle/pool system with low width/depth ratio and little deposition. Very efficient and stable.	>2.2	< 12	> 1.5	< 0.02

F	Entrenched meandering riffle/pool channel on low gradients with high width/depth ratio.	< 1.4	> 12	> 1.2	< 0.02
G	Entrenched gully step/pool and low width/depth ratio on moderate gradients.	< 1.4	< 12	> 1.2	< 0.039

Stream types were classified for streams equal to or greater than order 4. In general, streams less than order 4 can be broadly classified into A, C, or E channels. Classification A channels in the Hoback and Greys Rivers are located in type I valley headwater reaches. Streams transition from A channels to B channels as the slope decreases. In lower gradient headwater reaches (generally 3rd order streams), C and E channels are present. **Figure 16** presents the stream types in the Hoback River watershed.

As mentioned above, channel sinuosity and slope were the primary indicators for developing the stream type. Channel sinuosity is calculated by measuring the total length of channel divided by the valley length. Streams were evaluated for sinuosity in 2-to-3-mile segments. For lower order streams assessed (order 4), centerlines were modified from the NHD dataset based on National Agricultural Imagery Program aerial photos for Wyoming (USDA-NAIP, 2020). The revised channel centerlines were utilized to calculate the total stream length. Sinuosity ranged from 1.06 (straight) to 2.40 (high meander pattern) throughout the study area.

Stream slope was also evaluated to determine the stream type. The Hoback River Watershed has LiDAR (light detection and ranging) data available for most of the watershed. Data was collected by USGS in 2019 and 2020 (USGS, 2019 and USGS 2020). Slopes were evaluated from the revised channel centerline in 2-to-3-mile segments. In areas where LiDAR was not available, a USGS 7.5' quadrangle was used to estimate the stream slope.

Following classification of each reach, the data was aggregated into larger stream reaches to determine the Rosgen stream type. Entrenchment ratios and width to depth ratios are also used to determine stream types. In most cases, the sinuosity and channel slope, along with reviewing the aerial plan view are sufficient to determine the stream type. The additional attributes of entrenchment and width to depth ratios assist in classifying closely related stream types. However, the available data does not allow for penetrating the water surface to determine the bed elevation. To accurately estimate the entrenchment and width to depth ratios, field data should be collected to verify stream types.

A Level 1 stream classification can assist with understanding the intricacies of the watershed. Classifying the stream valleys and identifying stream types provide a high-level overview of the system type. The Rosgen framework includes multiple levels for evaluating stream systems to identify streams out of equilibrium. Level 2 evaluations further evaluate the stream by collecting in-field data such as cross-sections, surveying longitudinal profiles, identifying bankfull elevations/features, and reviewing sediment transport (pebble counts). This additional data allows for further refinement of the stream type that includes measured stream slope, and grain size (example: B4a – 4% stream channel with a D50 of gravel material). Level 3 evaluations develop data further to classify the vegetation, deposition, habitat, flow, and bank stability. Following a Level 3 assessment, restoration plans are developed. Level 4 assessments may directly measure sediment transport and collect stream biota to develop an index of biological integrity (IBI).

Level 1 stream classifications provide a broad overview of the watershed and identify areas of concern or potential concern. Concerns in the watershed evolve around protecting and maintaining irrigation infrastructure. Headgates and other irrigation inlets experience frequent maintenance needs due to sedimentation. One possible explanation for the increased sediment loads stem from the observed stream type. Stream types “C” and “D” are associated with increased sediment loads. In “C” type streams, there are pool-riffle-run sequences with point bars on the inside bend. On an aerial photo, the point bars are visible and do not have active vegetation. The lack of vegetation is indicative of a shorter return period, associated with channel forming (bankfull) events. Point bars are also dynamic and may shift under channel forming flow or other flood events. Depending on the grain size, sands and gravels will entrain in the water column and deposit as higher flows recede. “D” stream types consist of braided, multiple threaded channels. Sediment is readily available for transport and shift patterns under channel forming flow conditions. Streams naturally evolve as changes in flow, land use, or other natural phenomena impact the ability to transport sediment. For example, one possible succession pattern from type “C” streams may include:

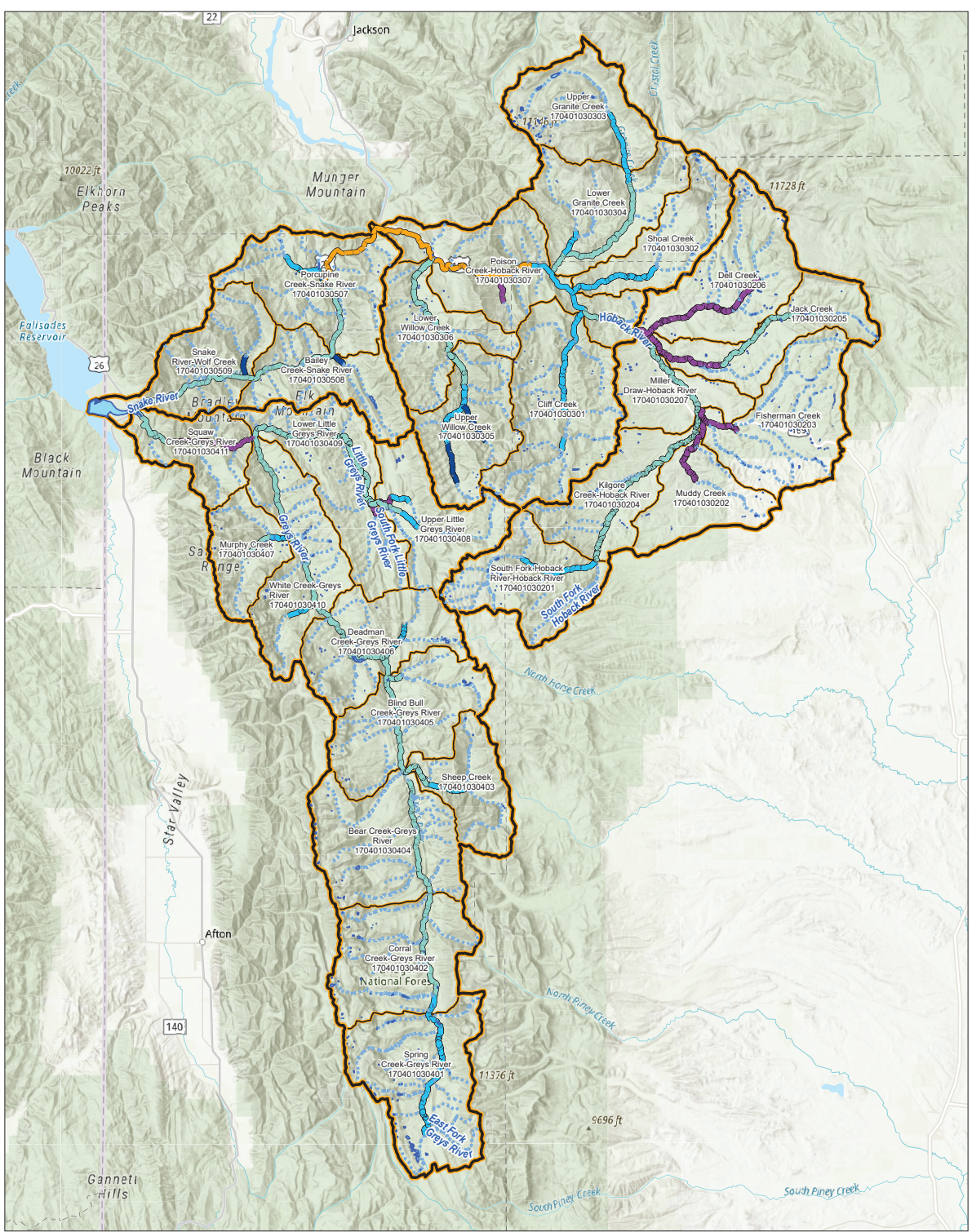
- Transition to “D”, forming as the slope decreases from aggradation and multiple channels form;
- A large event removes the sediment from the reach and the type “C” channel returns.

Other examples include:

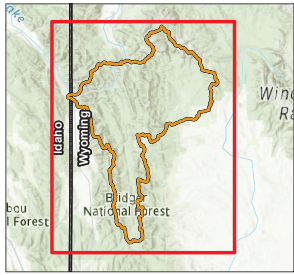
- C → D → G → C (excess sediment leads to aggregation; down cutting occurs, forming an incised stream; incising increases to create a wide, shallow channel; downcutting continues and stabilizes with a dynamic sediment flow)
- E → G → F → C → E (disturbance in the watershed leads to downcutting, forming an entrenched channel; the incised stream increases in width to form a shallow, wide stream; stream develops a low flow channel and floodplain; stream stabilizes to a low gradient, meandering channel)
- C → G → F → C (downcutting occurs in the stream to create an incised channel; the incised stream increases in width to form a shallow, wide stream; through the over-widening of the stream, downcutting occurs to form a low flow channel. This type of system is sediment rich)

In areas where the channel does not have access to a traditional floodplain, accelerated erosion may occur. These areas include channels with a confined channel. Flood waters are not able to disperse over a larger area, which leads to accelerated bank erosion and the increase of sediment loading within the stream.

To stabilize the streams in disequilibrium, there are solutions for in-channel and floodplain alterations. One possible solution to curb sedimentation at headgate locations is to install stream barbs. These structures consist of large boulders that extend into the thalweg and create a scour pool on the downstream side of the structure. For areas where the stream is incised and access to the floodplain is limited, stream restoration may be an option. Using natural channel design with woody debris, rootwads, and vegetated riprap provides bank protection. Other solutions include creating a floodplain bench on exposed bank faces or reconnecting oxbow channels.

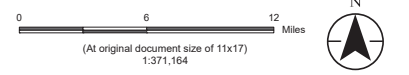


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 Revised: 2022-06-08 By: haczmarek



Legend

- Waterbodies
- Rosgen Stream Type**
 - A
 - B
 - C
 - E
 - F
 - Not Classified
- HUC 10 Watersheds**
 - HUC 10 Watersheds
 - HUC 12 Watersheds



Stantec

Project Location: Lincoln, Sublette, and Teton Co., WY
 Client/Project: Wyoming Water Development Commission Hoback River Watershed Study Geomorphology
 Figure No.: 16
Hoback River Watershed Stream Types

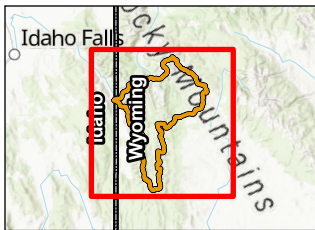
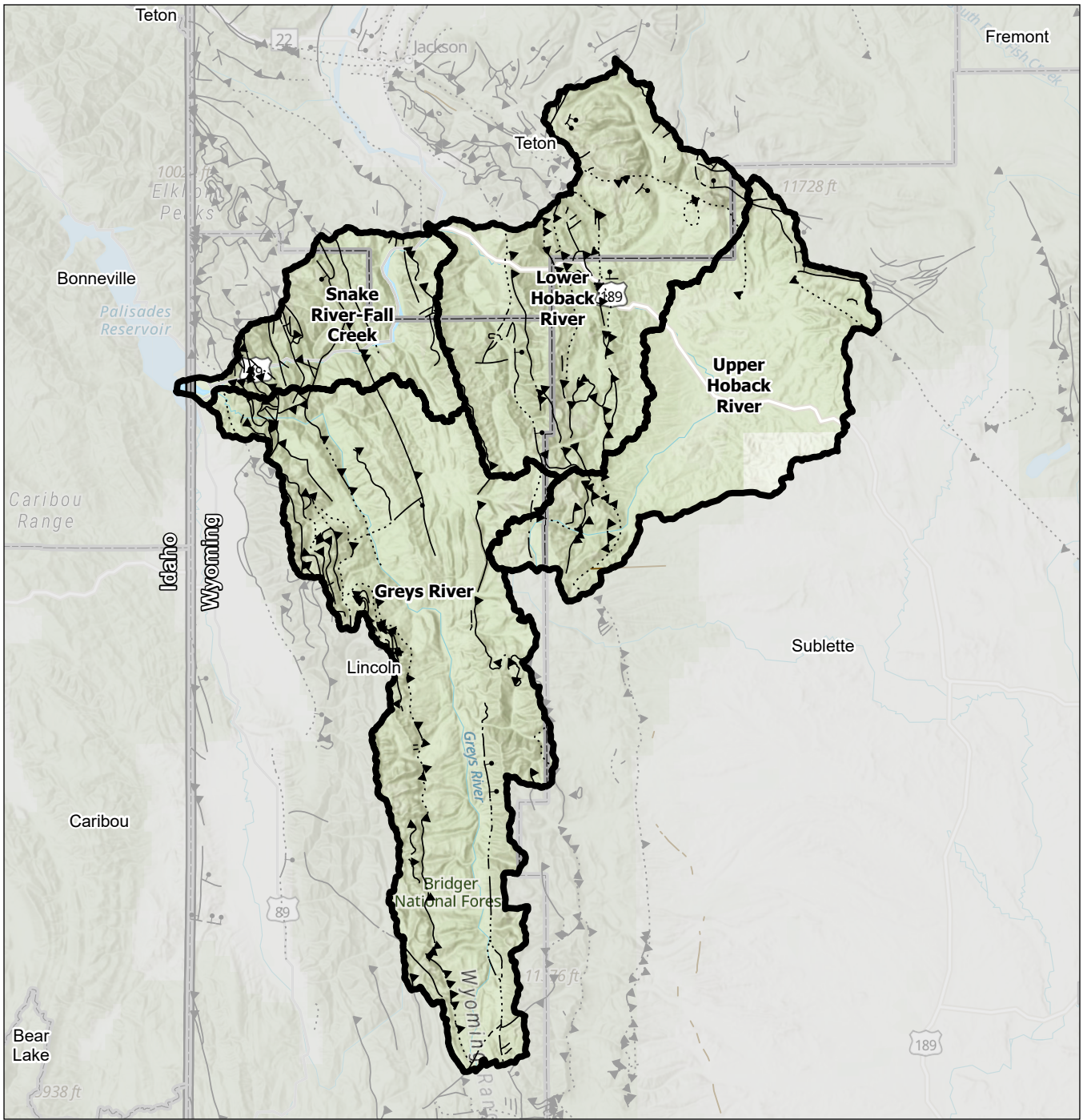
Notes

1. Coordinate System: NAD 1983 2011 UTM Zone 12N
2. Data Sources: USGS
3. Background: USGS 7.5 Minute Quadrangle

3.1.3 Geology

The purpose of this section is to present existing geologic and topographic conditions within the Upper and Lower Hoback River, Greys River, and Snake River-Fall Creek HUC 10 watersheds, collectively known as the Hoback River Watershed for the purpose of this study. These watersheds encompass approximately 1,144 square miles across Idaho and Wyoming, including portions of Bonneville County in Idaho and Sublette, Lincoln, and Teton Counties in Wyoming. **Figure 17** shows the general locations of these watersheds and geological faults within the states of Wyoming and Idaho.

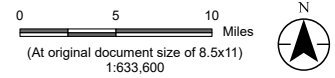
I:\corp\ads\data\Virtual_Workspace\workgroup\227704133\03_data\gis_cad\gis\proj\Hoback_Watershed\Hoback_Watershed.aprx Revised: 2022-05-26 By: ftfremblay



- Notes**
1. Coordinate System: NAD 1927 UTM Zone 12N
 2. Data Sources: Stantec, Love and Christiansen (1985)
 3. Background: USGS 7.5 Minute Quadrangle

Legend

- HUC 10 Watershed Boundaries
- Faults Type**
- Fault
- Concealed Fault
- Normal Fault
- Concealed Normal Fault
- Thrust Fault
- Concealed Thrust Fault
- Fault based on source maps
- Nonprinting contact



Project Location Lincoln, Sublette, and Teton Co., WY
Prepared by FT on 2022-05-26
 TR by SW on 2022-05-XX
 IR by SW on 2022-05-XX

Client/Project Wyoming Water Development Commission
 Hoback River Watershed Study
 Topography and Geology Tech Memo
Figure No. 17
Title 227704133

Faults Within and Near the Combined Watershed Area

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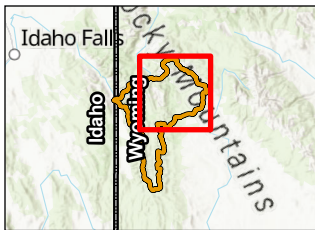
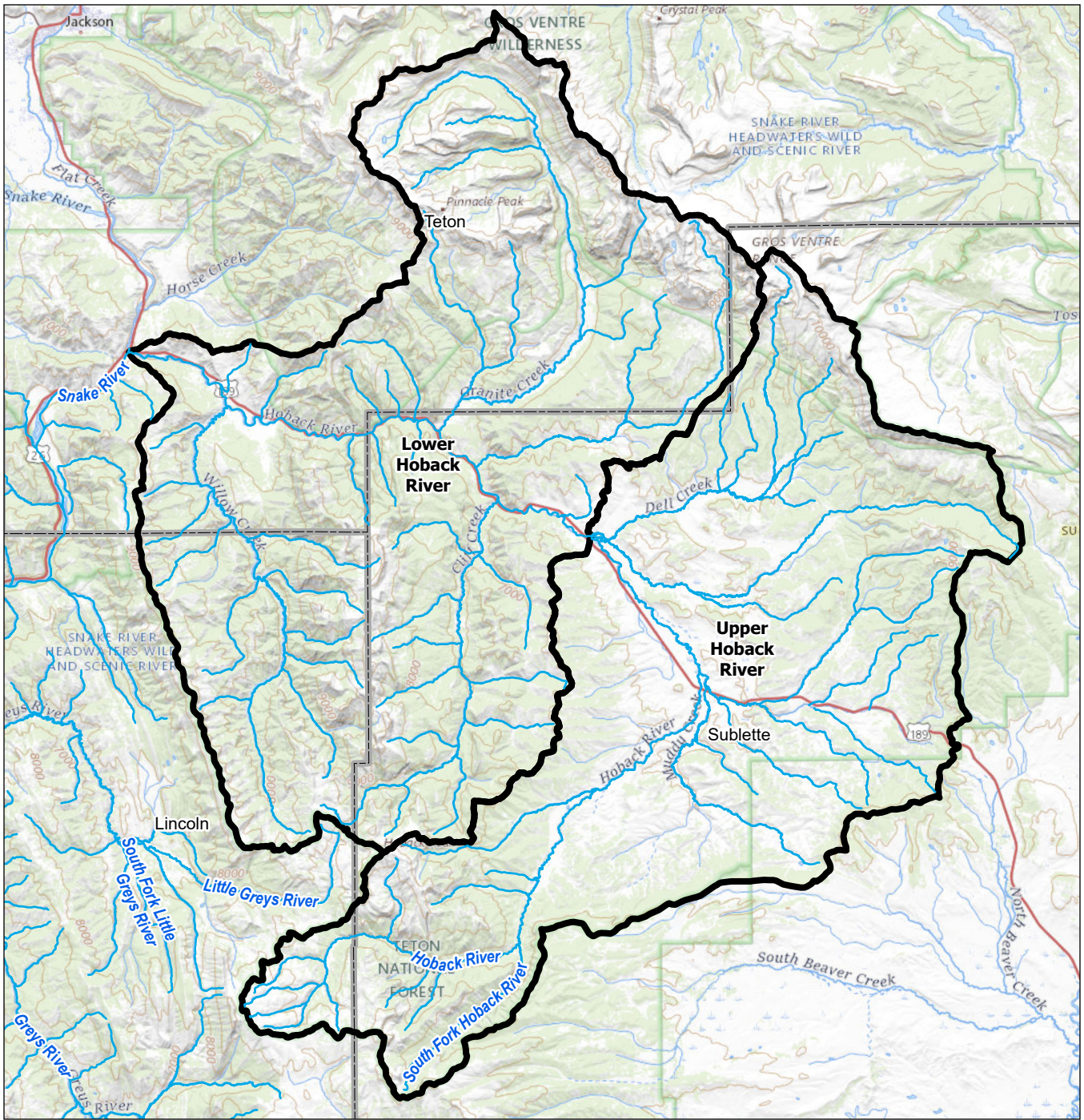
3.1.3.1 Topography

The Upper and Lower Hoback River Watersheds, as well as the Greys River and Fall Creek-Snake River Watersheds are characterized by a series of rugged mountain peaks and ridges cut by numerous gorges and canyons with nearly perpendicular canyon walls.

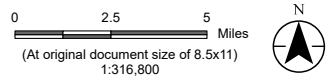
The Hoback River Watershed lies within Sublette, Teton, and Lincoln Counties in northwestern Wyoming (**Figure 18**) and is separated into upper and lower portions of the watershed. The Upper Hoback River Watershed encompasses about 262 square miles and is characterized by many moderate relief unchanneled colluvial valleys in both the Wyoming Range to the west and the Gros Ventre Range to the northeast. These channels eventually meet the alluvial plain of the Hoback River and flow northwest through the community of Bondurant. The Lower Hoback River Watershed encompasses about 306 square miles and is characterized by steep valley walls of the Hoback canyon. A northeast-southwest extending ridge between the two mountain ranges separates the Hoback River Watershed from the Green River Basin which encompasses much of southwestern Wyoming. The Upper and Lower Hoback River Watershed boundaries follow the Gros Ventre Range to the northwest, Deadman Mountain to the southwest, Grayback Ridge of the Wyoming Range to the west, and Pyramid peak to the north. The highest point of elevation in both the Upper and Lower Hoback River Watershed is located at the summit of Doubletop Peak (11,720 feet) and the lowest is located at the confluence of the Hoback River and the Snake River at Hoback Junction (5,894 ft). The Upper and Lower Hoback River Watersheds have the lowest mean slope angle of 39° due to gentler sloping alluvial plains in the center of the upper watershed.

The overwhelming majority of the Greys River Watershed lies within Lincoln County with a small area located in Sublette County (**Figure 19**). The Greys River Watershed is a north-south trending watershed originating in the Bridger-Teton National Forest to the south and draining directly into Palisades Reservoir near the Town of Alpine, Wyoming. The Greys River Watershed is bounded by the Middle Ridge of the Wyoming Range to the East and the Salt River Range to the west encompassing about 455 square miles. The watershed is characterized by north-south trending ranges separated by narrow, alluvium-filled valleys and a mean slope angle of 43°. The drainage pattern is typically trellis with high stream dissection evidenced by narrow floodplains and over steepened valley walls (Greys River Ranger District, 2005). The Greys River Watershed boundary follows the Grayback Ridge of the Wyoming Range to the east, to Elk and Bradley Mountain to the north, to the Salt River Range to the west, to Wyoming Peak and Mount Coffin to the southeast, and to Mount McDougal to the east. The highest point of elevation in the Greys River Watershed is located at the summit of Wyoming Peak in the Wyoming Range (11,383 feet) and the lowest is located where the Greys River drains into the Palisades Reservoir in the Town of Alpine (5,634 feet).

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- Legend**
- Streams
 - HUC 10 Watershed Boundaries

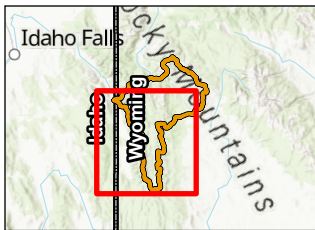
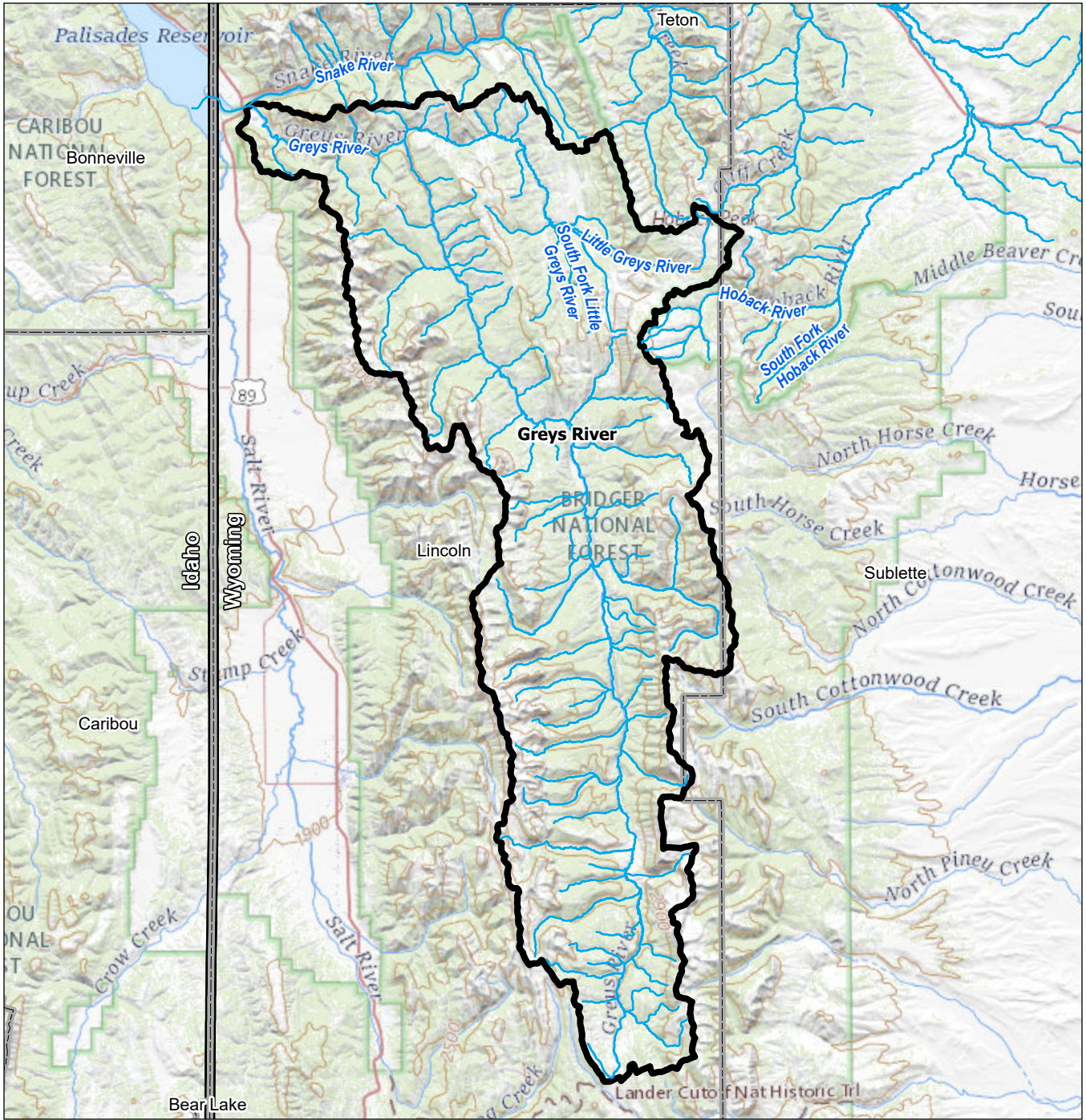


Project Location: Lincoln, Sublette, and Teton Co., WY Prepared by FT on 2022-06-13

Client/Project: Wyoming Water Development Commission Hoback River Watershed Study Topography and Geology Tech Memo

Figure No. 18 Title: Hoback River Watershed General Location

- Notes**
1. Coordinate System: NAD 1927 UTM Zone 12N
 2. Data Sources: USGS, Stantec
 3. Background: USGS 7.5 Minute Quadrangle



- Notes**
1. Coordinate System: NAD 1927 UTM Zone 12N
 2. Data Sources: USGS, Stantec
 3. Background: USGS 7.5 Minute Quadrangle

Legend

- Streams
- HUC 10 Watershed Boundaries

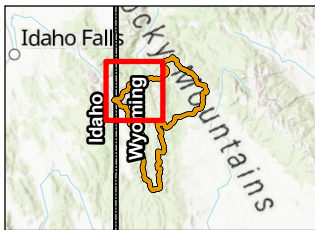
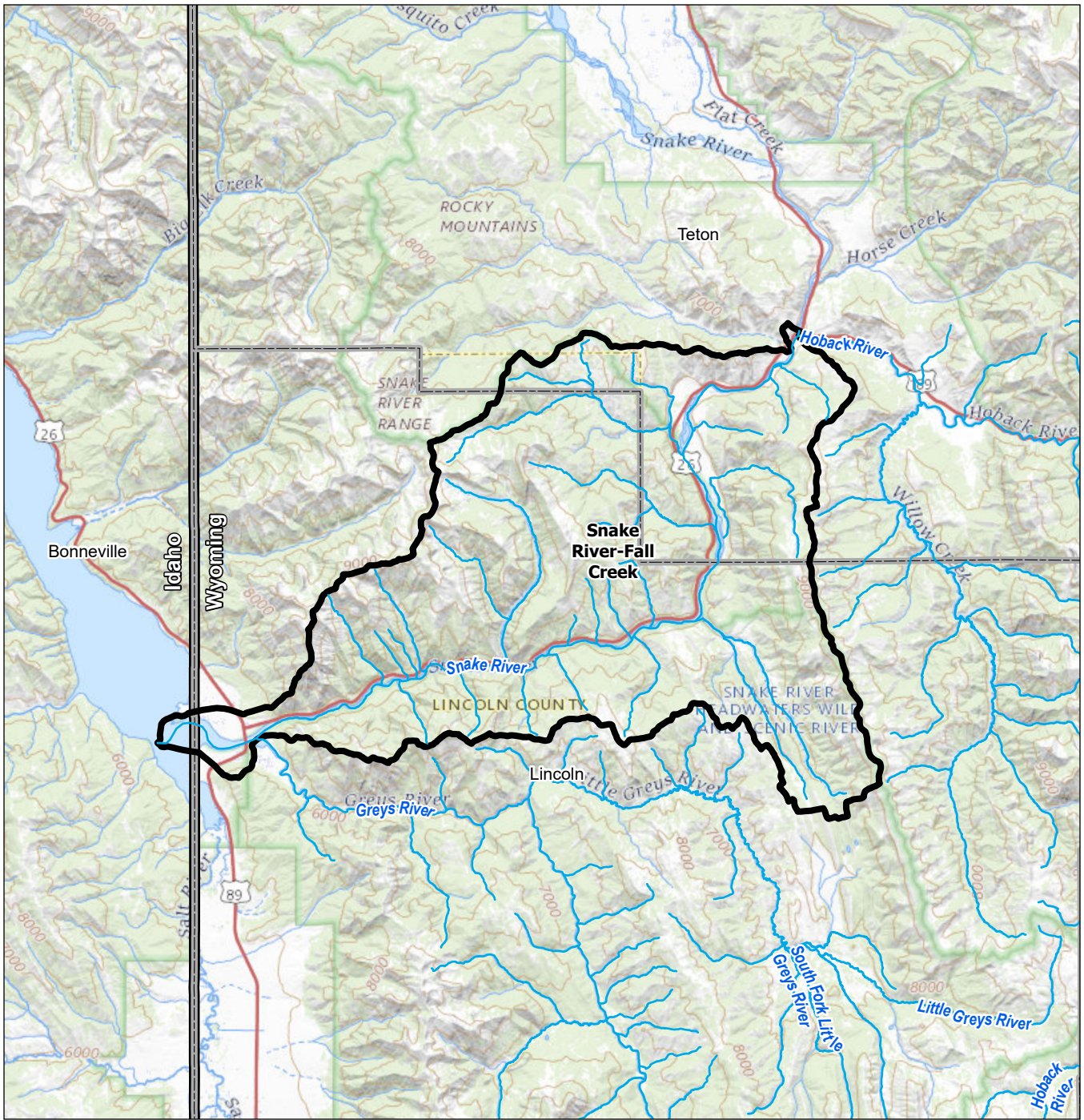
0 2.5 5 Miles
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Project Location Lincoln, Sublette, and Teton Co., WY
Prepared by FT on 2022-06-13
Client/Project Wyoming Water Development Commission
 Hoback River Watershed Study
 Topography and Geology Tech Memo

Figure No.
19
Title
Greys River Watershed General Location

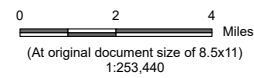
The portion of the Fall Creek-Snake River Watershed analyzed in this study (**Figure 20**) lies within Teton and Lincoln County, Wyoming and partially in Bonneville County, Idaho. For the purpose of this study, the Fall-Creek Snake River Watershed begins at the confluence of the Snake and Hoback Rivers and continues from this confluence to Palisades Reservoir. This watershed encompasses about 403 square miles and located between the Snake River Range to the north and the Salt River Range to the south. This watershed is characterized by deeply incised bedrock river valleys which drain into the Palisades Reservoir. The Fall Creek-Snake River watershed boundary follows the Grayback Ridge of the Wyoming Range to the east, to Deadhorse Peak to the northwest, to Palisades Reservoir to the west, and to Bradley and Elk Mountain to the south. The highest point of elevation in the Fall Creek-Snake River watershed is located at the summit of Red Peak (9,771 feet) and the lowest is located where the Snake River drains into the Palisades Reservoir near the Town of Alpine (5,632 feet). The highest mean slope angle of 48° is found in the Fall Creek-Snake River watershed as a result of the deeply incised river valleys.



- Notes**
1. Coordinate System: NAD 1927 UTM Zone 12N
 2. Data Sources: USGS, Stantec
 3. Background: USGS 7.5 Minute Quadrangle

Legend

- Streams
- HUC 10 Watershed Boundaries



Project Location
Lincoln, Sublette, and Teton
Co., WY

Prepared by FT on 2022-06-13

Client/Project
Wyoming Water Development Commission
Hoback River Watershed Study
Topography and Geology Tech Memo

227704133

Figure No.

20

Title

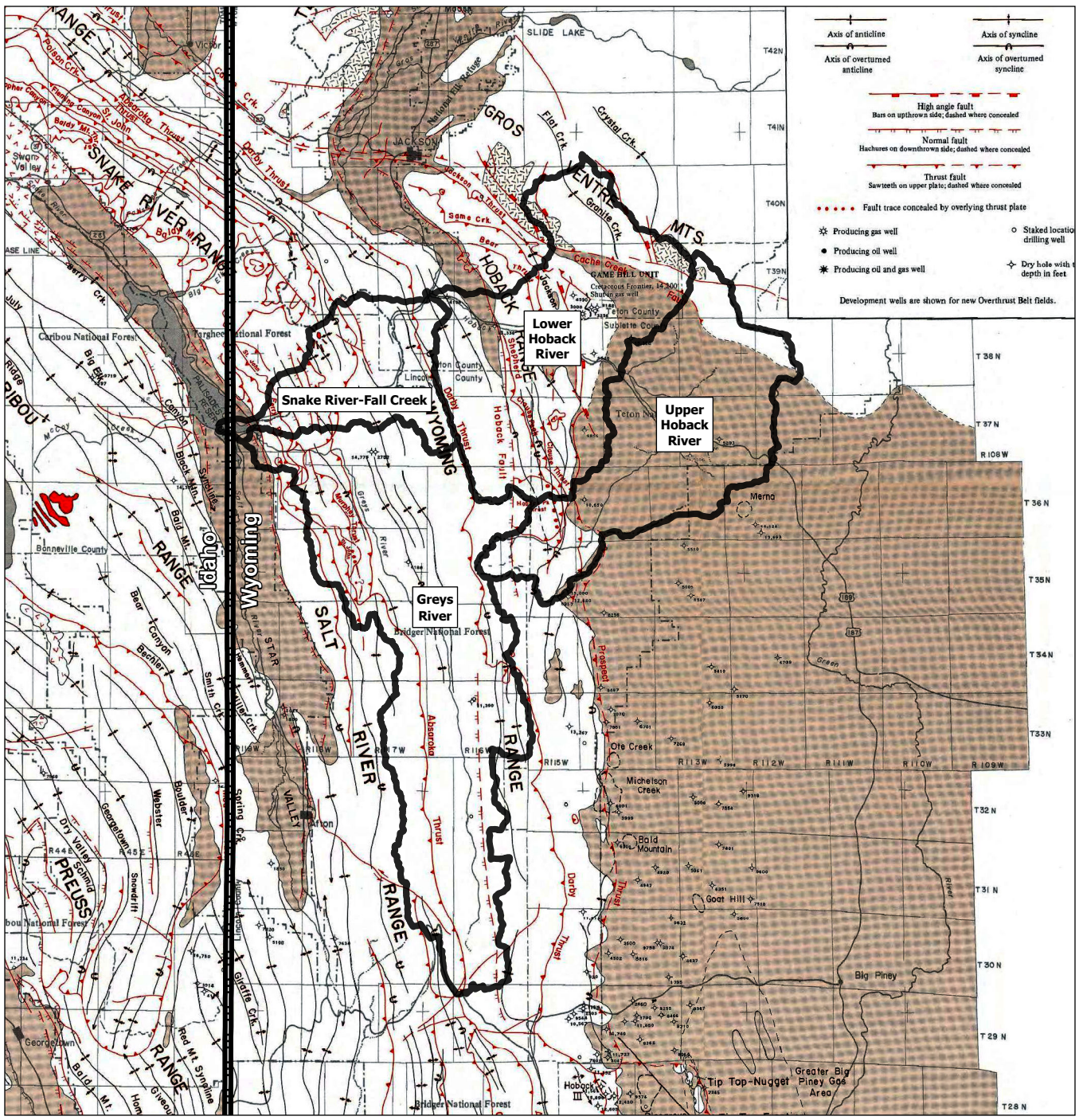
**Fall Creek-Snake River Watershed
General Location**

3.1.3.2 Regional Geology

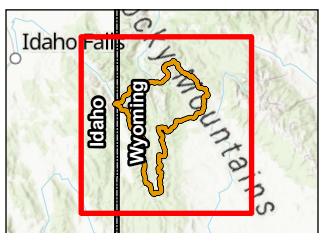
The Hoback River, Greys River, and Fall Creek-Snake River watersheds are bordered by or positioned across several north-south trending mountain ranges (**Figure 21**). These mountains in the western margin of Wyoming are part of the Wyoming-Utah-Idaho Thrust Belt, also known as the thrust belt. This thrust belt is part of the larger Cordilleran thrust belt system spanning from Mexico to northern Alaska (WGS 2022).

The western-most range is the Salt River Range, a north-south trending range which forms a divide between the Salt River to the west and the Greys River to the east. The Salt River range is composed of sedimentary rocks with two major folds: one anticline and one syncline with a series of faults (Mansfield 1916). The Greys Ridge parallels the Salt River and Wyoming Ranges. The Wyoming range parallels the Salt River Range approximately 8 to 10 miles to the east and is rugged and mountainous. Along its eastern edge, an abrupt base with basset edges of limestone strata is present. Locally, the area is characterized by intricately folded and faulted sedimentary rocks underlain by thrust faulted and folded anticlines with Precambrian cores. Bounding the Hoback River Watershed to the northeast, the Gros Ventre Range extends from southeast Jackson Hole to the Wind River Range nearly opposite the mouth of the Green River Canyon. The range is an asymmetric anticlinal uplift that has Precambrian rocks in the core. The northeast flank is a broad area of gently dipping Paleozoic and Mesozoic strata. South of the Gros Ventre Mountains is the Hoback Range. The Hoback Range Paleozoic and Mesozoic sedimentary rocks and characterized by low angle thrust sheets and is underlain and bounded by the Jackson thrust fault on its northern margin. The Hoback Range is then abruptly terminated by the north face of the Thompson Plateau.

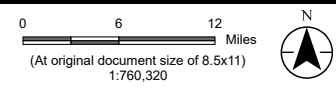
I:\corp_data\Virtual_Workspace\workgroup\227704133\03_data\gis_cad\gis\proj\Hoback_Watershed\Hoback_Watershed.aprx Revised: 2022-06-15 By: ftrremblay



Axis of anticline	Axis of syncline
Axis of overturned anticline	Axis of overturned syncline
<p>High angle fault Bars on upthrown side; dashed where concealed</p> <p>Normal fault Hashures on downthrown side; dashed where concealed</p> <p>Thrust fault Sawtooth on upper plate; dashed where concealed</p> <p>..... Fault trace concealed by overlying thrust plate</p>	
✱ Producing gas well	○ Staked location drilling well
● Producing oil well	◇ Dry hole with depth in feet
✱ Producing oil and gas well	
Development wells are shown for new Overthrust Belt fields.	



- Notes**
1. Coordinate System: NAD 1927 UTM Zone 12N
 2. Data Sources: Stantec, Blackstone (1979)
 3. Background: Tectonic Map Of The Overthrust Belt, Western Wyoming, Southeastern Idaho And Northeastern Utah: Showing Current Oil And Gas Drilling And Development (1979)



Project Location: Lincoln Co., WY Prepared by FT on 2022-06-15

Client/Project: Wyoming Water Development Commission Hoback River Watershed Study Topography and Geology Tech Memo

Figure No. **21**
Regional Geology

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3.1.3.3 Structural Geology

The Hoback, Greys, and Fall Creek-Snake River Watersheds lie atop a heavily faulted and folded geologic terrain. Hundreds of faults of all scales have been identified in these watersheds by the USGS and Wyoming State Geological Survey (WGS) (**Figure 17**). Faults in this area generally follow a northwest to southeast azimuth reflecting the general trend of the regional thrust belt. While most of the mapped faults are believed to be dormant, two notable Quaternary-age faults (active within the last 2.6 million years) are present (USGS 2001). The Hoback fault is in the west-central portion of the Lower Hoback River Watershed. This fault extends approximately 11 miles from the narrow valley of Flat Creek south and east to the vicinity of Little Horse Creek, about 11.3 miles from end to end. This fault is classified as a normal fault with a southwest dip direction. The slip rate is estimated to be less than 0.2 mm/year. The Greys River fault, runs parallel to the Salt River and Wyoming Range through the Greys River watershed. The fault extends from south of Blink Trail Creek south to the East Fork of the Greys River, about 30.6 miles in length. This fault is classified as a high-angle normal fault with a north dip direction. The slip rate is estimated between 0.2-1.0 mm/year.

The USGS defined four categories of faults (Classes A-D) based on demonstrable evidence of tectonic movement during the Quaternary (known or presumed to be associated with large-magnitude earthquakes). Because the Hoback Fault has a slip rate of less than 0.2 mm/year and a normal slip-sense it is classified as a Class B fault. The Greys River fault is less than 15,000 years in age, with a slip rate between 0.2-1.0 mm/year and a normal slip-sense and is classified as Class A. Definitions of the classes are explained by the USGS below:

Class A Geologic evidence demonstrates the existence of a Quaternary fault of tectonic origin, whether the fault is exposed for mapping or inferred from liquefaction or other deformational features.

Class B Geologic evidence demonstrates the existence of a fault or suggests Quaternary deformation, but either (1) the fault might not extend deeply enough to be a potential source of significant earthquakes, or (2) the currently available geologic evidence is too strong to confidently assign the feature to Class C but not strong enough to assign it to Class A.

Class C Geologic evidence is insufficient to demonstrate (1) the existence of tectonic fault, or (2) Quaternary slip or deformation associated with the feature.

Class D Geologic evidence demonstrates that the feature is not a tectonic fault or feature; this category includes features such as demonstrated joints or joint zones, landslides, erosional or fluvial scarps, or landforms resembling fault scarps, but of demonstrable non-tectonic origin.

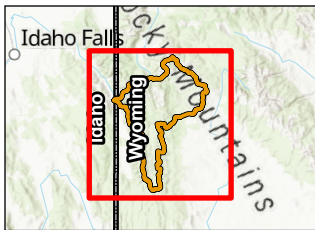
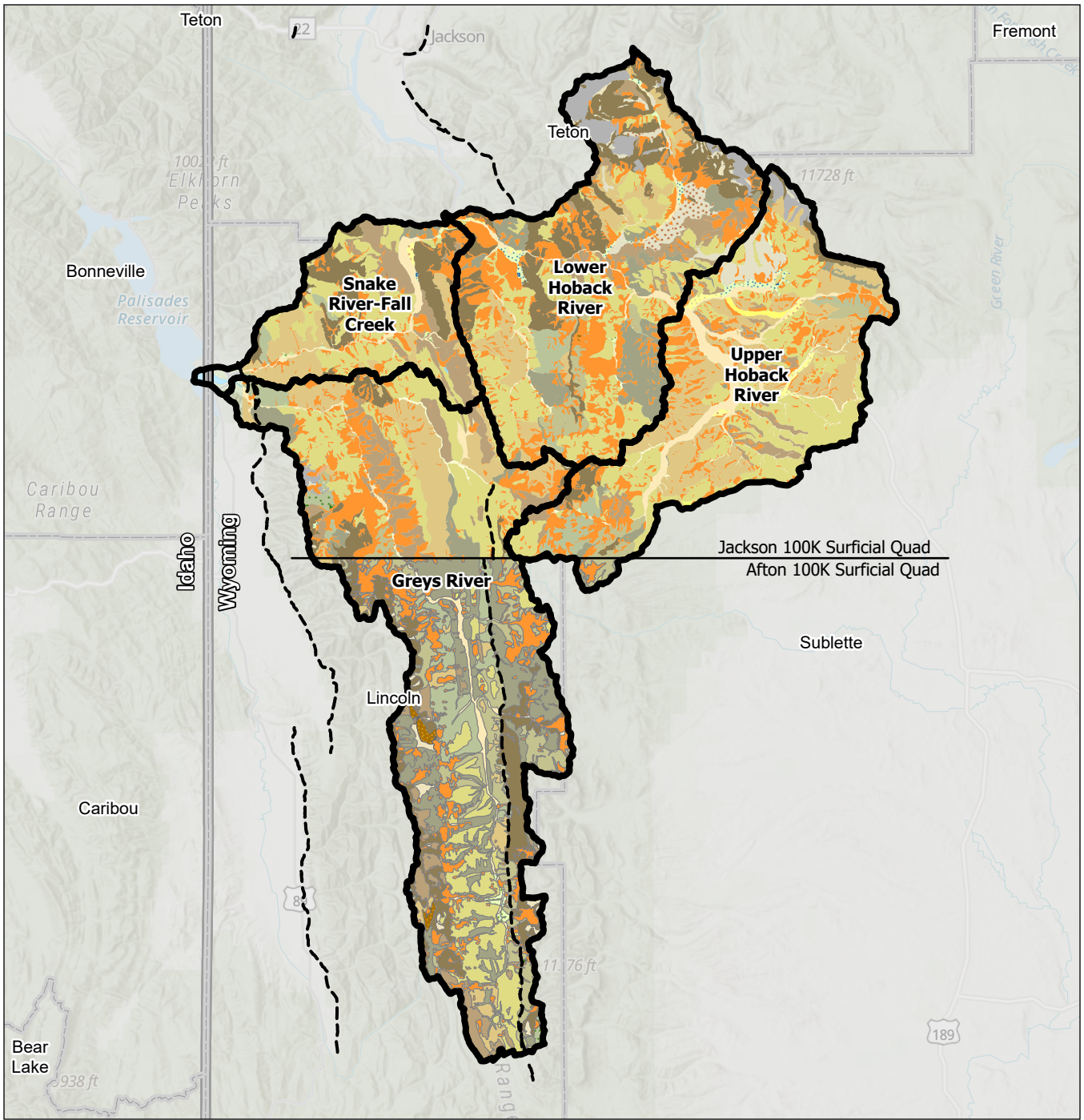
3.1.3.4 Surficial Materials

Surficial geology refers to quaternary-aged sediments that overlie bedrock within the combined watershed area. Surficial units are similar to soil units, but typically have low organic content and little to no agronomic value. These units often include components of bedrock outcrop, alluvium, colluvium, residuum, slopewash, and alluvial fan deposits. The most common surficial unit in the Hoback, Greys, and Snake River-Fall Creek Watersheds are residuum, landslide deposits, slopewash, and less common: glacial and alluvium deposits (**Figure 22** and **Figure 23**). Surficial geology data was downloaded from two 1:100,000 scale geologic maps from the Wyoming State

Geologic Survey. Most of the surficial data was sourced from the Jackson Quadrangle (Wittke et al., 2016) and the southern portion of the Greys River Watershed sourced from the Afton Quadrangle (Larsen et al., 2015). In more mountainous areas, bedrock outcrops and colluvium/residuum (and components of slopewash) was the most common mapping unit. Surface deposits are often co-occurring and most mapped surficial geology in the watershed contains more than one type of surface material. General definitions of common surficial materials are provided below:

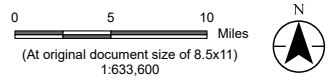
- Residuum is unconsolidated, weathered – or partly weathered – mineral material that disintegrated in place and has not been transported. Residuum and associated soils are typically produced by chemical weathering and are mineralogically similar to underlying bedrock.
- Landslide deposits are loose, unconsolidated deposits of clay, silt, sand, gravel and bedrock fragments moved downslope under gravitational influence. Soil and rock usually become loosened from a hillside and slide, flow, or fall down the slope as a result.
- Glacial deposits are deposits having been formed through glacial action, such as till and moraine. Secondary deposits, like periglacial deposits and glacial outwash are also common. Periglacial deposits form in conditions adjacent to glacial margins, such as ice wedges, solifluction, and patterned ground. Glacial outwash occurs as alluvial and drift deposits placed by meltwater streams beyond active glacier ice.
- Alluvium is a loose, unconsolidated deposit of clay, silt, sand, and gravel transported and deposited by flowing streams and deposited in non-marine setting. Soils are termed alluvial when the deposition cannot be attributed to a specific deposition process such as fluvial (river sediments), or glacial till.
- Colluvium is loosely consolidated weathered soil or rock particles deposited at the bottom of steep slopes by creep, slide, or local wash. In contrast to alluvium, which is fine grained and often well sorted, colluvium is typically a heterogeneous mixture of rock fragments and sediments. Colluvium is generally found in gently sloping aprons or fans accumulated at the base of drainage channels on hills or mountains.
- Slopewash is material transported downslope by rain and non-channelized flows such as sheet flow. In contrast to Colluvium, slopewash accumulates at the base of hills or mountains where well-defined drainage channels are absent.

\\corp.ads\data\Virtual_Workspace\workgroup\227704133\03_data\gis_cad\gis\proj\Hoback_Watershed\Hoback_Watershed.aprx Revised: 2022-05-25 By: ftfremblay



- Notes**
1. Coordinate System: NAD 1927 UTM Zone 12N
 2. Data Sources: Stantec, Jackson: Witke, Carnes, and Lichtner (2016), Afton: Larsen, LaForge, and Witke (2015)
 3. Background: USGS 7.5 Minute Quadrangle

Legend	
	HUC 10 Watershed Boundaries
	Faults
	Jackson Quad Surficial Units
	a
	af
	as
	at
	Ad
	t
	ta
	to
	td
	ts
	f
	fa
	fs
	fd
	b
	l
	g
	ga
	gc
	ge
	go
	gG
	oa
	qr
	cG
	cs
	sa
	sR
	sc
	sg
	sr
	rR
	rc
	rs
	Rc
	Rr
	Rs
	water
	eR
	l
	gG
	qr
	o
	sa
	sc
	sf
	sR
	sr
	cs
	rc
	rR
	rs
	Rc
	Rr
	Rs
	M
	Water
	Ad
	t
	ta
	to
	td
	Td
	f
	fa
	fs
	fd
	md
	er



Project Location: Lincoln, Sublette, and Teton Co., WY Prepared by FT on 2022-05-25

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Figure No. 22

Surficial Geology within Combined Watershed Area

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Legend

HUC 10 Watershed Boundaries

Faults

Jackson Quad Surficial Units

- a - Alluvium
- af - Alluvium and alluvial fan deposits
- as - Alluvium and slopewash
- at - Alluvium and terrace deposits
- Ad - Dissected old alluvial plain
- t - Terrace deposits
- ta - Terrace deposits and alluvium
- to - Terrace deposits and glacial outwash
- ts - Terrace deposits and slopewash
- td - Dissected terrace deposits
- f - Alluvial fan deposits
- fd - Dissected alluvial fan deposits
- fa - Alluvial fan deposits and alluvium
- fs - Alluvial fan and slopewash deposits
- b - Bench deposit
- l - Landslide deposit
- g - Glacial deposits
- ga - Glacial deposits and alluvium
- gc - Glacial deposits and colluvium

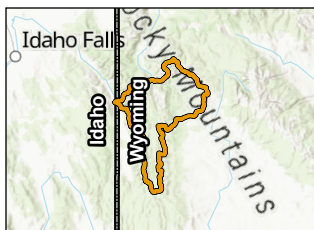
- ge - Glacial deposits and eolian deposits
- go - Glacial deposits and outwash deposits
- gG - Glacial deposits and glaciated bedrock outcrops
- gr - Glacial deposits and residuum
- gs - Glacial deposits and slopewash
- Gg - Glaciated bedrock outcrops and glacial deposits
- oa - Glacial outwash and alluvium
- qr - Periglacial deposits and residuum
- sa - Slopewash and alluvium
- sR - Slopewash and bedrock outcrops
- sc - Slopewash and colluvium
- sg - Slopewash and glacial deposits
- sr - Slopewash and residuum
- cG - Colluvium and glaciated bedrock outcrops
- cs - Colluvium and slopewash
- rR - Residuum and bedrock outcrops
- rc - Residuum and colluvium

- rs - Residuum and slopewash
- Rc - Bedrock outcrops and colluvium
- Rr - Bedrock outcrops and residuum
- Rs - Bedrock outcrops and slopewash
- water

Afton Quad Surficial Units

- a - Alluvium
- af - Alluvium and alluvial fan deposits
- as - Alluvium and slopewash
- at - Alluvium and terrace deposits
- Ad - Dissected old alluvial plain
- t - Terrace deposits
- ta - Terrace deposits and alluvium
- to - Terrace deposits and glacial outwash
- td - Dissected terrace deposits
- Td - Dissected structural terrace deposits
- f - Alluvial fan deposits
- fa - Alluvial fan and alluvial deposits
- fs - Alluvial fan and slopewash deposits
- fd - Dissected alluvial fan deposits
- md - Dissected Mesa

- er - Eolian deposits and residuum
- eR - Eolian deposits and bedrock outcrops
- l - Landslide Deposits
- gG - Glacial deposits and glaciated bedrock outcrops
- qr - Periglacial deposits and residuum
- o - Glacial outwash
- sa - Slopewash and alluvium
- sc - Slopewash and colluvium
- sf - Slopewash and alluvial fan deposits
- sR - Slopewash and bedrock outcrops
- sr - Slopewash and residuum
- cs - Colluvium and slopewash
- rc - Residuum and colluvium
- rR - Residuum and bedrock outcrops
- rs - Residuum and slopewash
- Rc - Bedrock outcrops and colluvium
- Rr - Bedrock outcrops and residuum
- Rs - Bedrock outcrops and slopewash
- M - Disturbed ground
- Water



Notes
 1. Coordinate System: NAD 1927 UTM Zone 12N
 2. Data Sources: Stantec, Jackson: Wittke, Carnes, and Lichtner (2016), Afton: Larsen, LaForge, and Wittke (2015)
 3. Background: USGS 7.5 Minute Quadrangle



Project Location: Lincoln, Sublette, and Teton Co., WY
 Prepared by FT on 2022-05-25

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 Hoback River Watershed Study
 Topography and Geology Tech Memo

Figure No. **23**

Surficial Unit Descriptions

3.1.3.5 Bedrock

Love and Christiansen's (1985) 1:500,000-scale statewide bedrock geologic data was downloaded from the WGS and used for this analysis. 1:100,000-scale bedrock geologic mapping has not been completed in the combined watershed area up to this point. In descending order from the largest percent of watershed area to lowest, the primary bedrock formations in the Hoback River Watershed are:

- Pass Peak Formation (and equivalents) (Tp) – comprises approximately 16 percent of the total watershed area, Eocene in age, and is composed of gold-bearing quartzite conglomerate, interbedded to the south with sandstone, claystone, and the Lookout Mountain Conglomerate Member of the Wasatch Formation.
- Hoback Formation (Th) – comprises approximately 11 percent of the total watershed area, Paleocene in age, and is composed of interbedded gray sandstone and claystone, and locally contains thick beds of red and gray conglomerate.
- Madison Limestone and Darby Formation, called the Madison Group, and the Three Forks and Jefferson Formations (MD) – these units are mapped together and comprise approximately 7 percent of the total watershed area, Devonian to Carboniferous (pre-Permian) in age, primarily composed of limestone and dolomite with minor siltstone and shale.
- Blind Bull formation (Kbb) – comprises approximately six percent of the total watershed area, late Cretaceous in age, and is composed of gray to tan conglomeratic sandstone, siltstone, claystone, coal, and bentonite.

Alluvium, colluvium, and landslide deposits make up 19 percent of the total watershed area according to the Geologic Map of Wyoming (1985) but are not included in this list since they are surficial units that are discussed in the section above. 28 other units are mapped in this watershed but make up less than 5 percent of the total watershed area.

In descending order from the largest percent of watershed area to lowest, the primary bedrock formations in the Greys River Watershed are:

- Aspen Shale (Ka) – comprises approximately 14 percent of the total watershed area, early Cretaceous in age, and is composed of light- to dark-gray siliceous tuffaceous shale and siltstone, with thin bentonite beds and sandstone interbeds.
- Blind Bull formation (Kbb) – comprises approximately 10 percent of the total watershed area, late Cretaceous in age, and is composed of gray to tan conglomeratic sandstone, siltstone, bentonitic claystone, and coal interbeds.
- Bear River Formation (Kbr) – comprises approximately 9 percent of the total watershed area, early Cretaceous in age, and composed of black shale, fine-grained brown sandstone, with thin interbeds of limestone and bentonitic interbeds.
- Madison Limestone and Darby Formation, also known as the Madison Group, and the Three Forks and Jefferson Formations (MD) – these units are mapped together and comprise approximately 8 percent of the total watershed area, Devonian to Carboniferous in age, and are composed of limestone and dolomite with minor siltstone and shale interbeds.

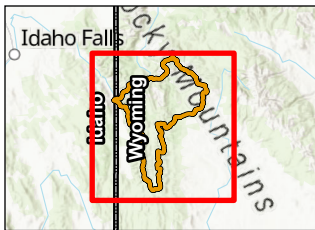
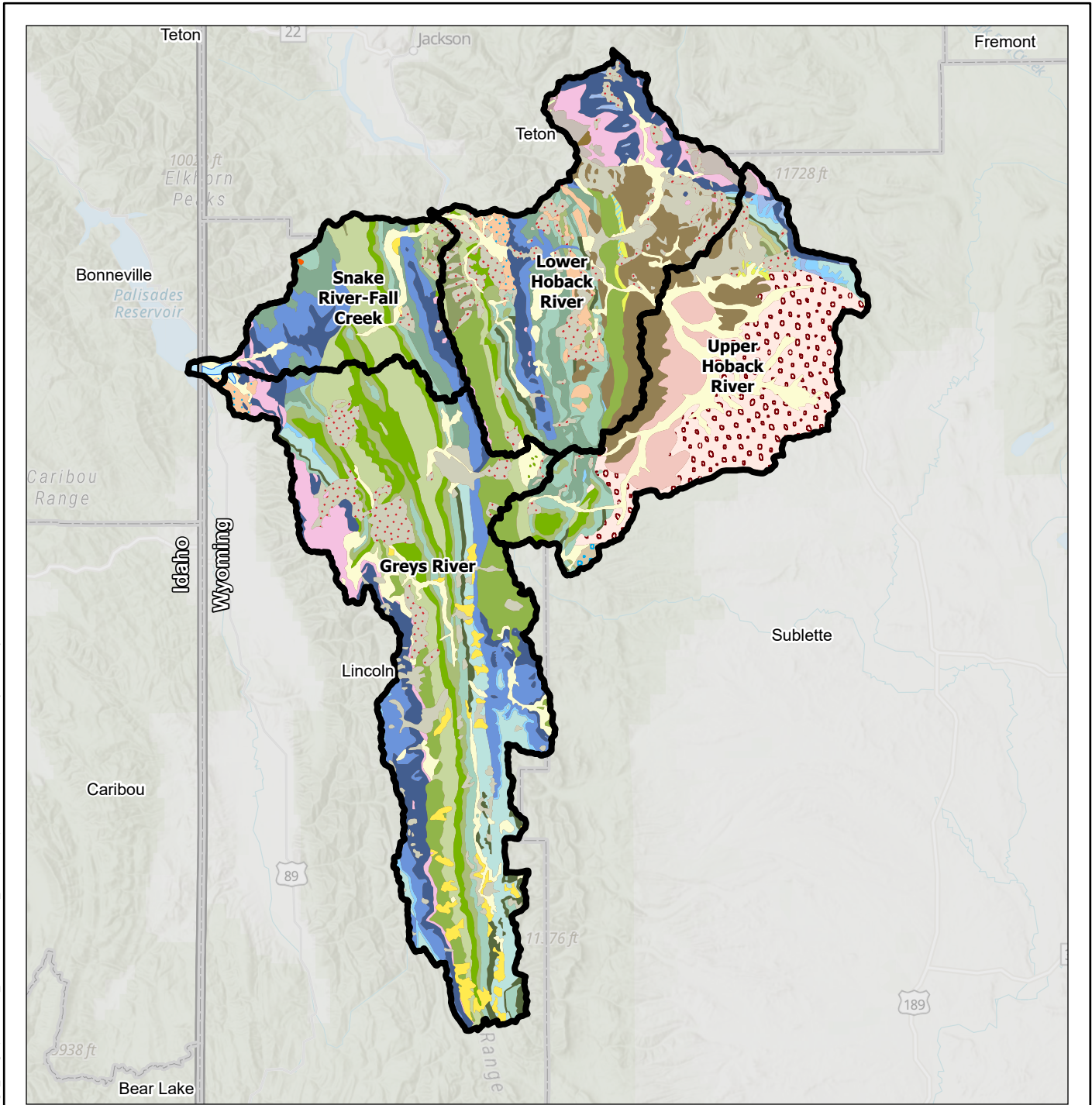
15 other units are mapped in the watershed but make up less than 8 percent of the total watershed area.

In descending order from the largest percent of watershed area to lowest, the primary bedrock formations in the Snake River - Fall Creek Watershed are:

- Aspen Shale (Ka) – comprises approximately 53 percent of the total watershed area, early Cretaceous in age, and composed of light- to dark-gray siliceous tuffaceous shale and siltstone, thin bentonite beds, and quartzitic sandstone;
- Several units mapped together, specifically the Phosphoria, Wells, and Amsden Formations (P*Ma) – comprises approximately 29 percent of the total watershed area, Carboniferous to Permian in age, and primarily composed of chert, shale, phosphorite, dolomite and sandstone;
- Bear River Formation (Kbr) – comprises approximately 26 percent of total watershed area, early Cretaceous in age, and composed of black shale, fine-grained brown sandstone, with thin limestone, and bentonitic claystone interbeds;
- Several units mapped together, specifically the Nugget Sandstone, Ankareh Formation, Thaynes Limestone, Woodside Shale, and Dinwoody Formation (J^nd) – comprises approximately 23 percent of the total watershed area, Triassic to Jurassic in age, and primarily composed of sandstone and quartzite, limestone, dolomite, siltstone and shale.

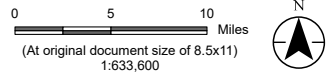
13 other units are mapped in the watershed but make up less than 23 percent of the total watershed area.

Figure 24 shows the bedrock geology within the watershed (Love and Christiansen 1985). Bedrock material unit definitions are provided in **Figure 25**.



Notes
 1. Coordinate System: NAD 1983 UTM Zone 12N
 2. Data Sources: Stantec, Love and Christiansen (1985)
 3. Background: USGS 7.5 Minute Quadrangle

Legend	
HUC 10 Watershed Boundaries	Twdr
Bedrock Geology Symbols	Tp
Qa	Twc
Qt	Tep
Qg	Tdb
Qls	Th
Qu	TKp
QTC	Kha
Thr	Kmv
Tii	Kc
Tsi	Kso
Tte	Ksb
Tr	Kbb
Tcd	Kb
Ta	Kf
Tw	Kft
Tgw	Kss
Twg	Ka
Twd	Kws
	Kmt
	Kbr
	Kg
	KJ
	KJg
	Jst
	Jsg
	J^
	J^n
	J^nd
	^ad
	^cd
	Pp
	P*Ma
	P*M
	PM
	MD
	O_
	Wgn
	Wmu
	Wg
	H2O



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Figure No. **24**
 Title: **Bedrock Geology of the Combined Watershed Area**

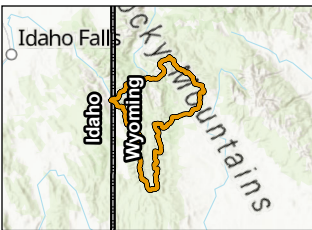
I:\corp\ads\data\Virtual_Workspace\workgroup\227704133\03_data\gis_cad\gis\proj\Hoback_Watershed\Hoback_Watershed.aprx Revised: 2022-05-17 By: ftfremblay

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Legend

Bedrock Geology Symbols

- Qa - Alluvium and Colluvium
- Qt - Gravel, Perdent, and Fan Deposits
- Qg - Glacial Deposits
- Qls - Landslide Deposits
- Qu - Undivided Surficial Deposits
- QTc - Jackson Hole Conglomerate
- Thr - Huckleberry Ridge Tuff of Yellowstone Group
- Tii - Intrusive and Extrusive Igneous Rocks
- Tsi - Shooting Iron Formation
- Tsl - Salt Lake Formation
- Tte - Teewinot Formation
- Tr - Red Conglomerate on top of Hoback and Wyoming Ranges
- Tcd - Camp Davis Formation
- Ta - Aycross Formation of the Absaroka Volcanic Supergroup
- Tw - Main body of the Wasatch Formation
- Tgw - Wilkins Peak Member of the Green River Formation
- Twg - New Fork Tongue of Wasatch and Fontenelle Tongue or Member of Green River
- Twd - Diamictite and sandstone
- Twdr - Wind River Formation - At base locally includes equivalent Indian Meadows Formation
- Tp - Pass Peak and Equivalents
- Twlc - La Barge and Chappo Members
- Tep - Conglomerate of Roaring Creek
- Tdb - Devils Basin Formation
- Th - Hoback Formiion
- TKp - Pinyon Conglomerate
- Kha - Harebell Formation
- Kmv - Mesaverde Formation
- Kc - Cody Shale
- Kso - Sohare Formation
- Ksb - Sohare Formation and Bacon Ridge Sandstone
- Kbb - Blind Bull Formation
- Kb - Bacon Ridge Sandstone
- Kf - Fronteir Formation
- Kft - Fronteir Formation and Mowry and Thermopolis Shales
- Kss - Sage Junction, Quealy, Cokeville, Thomas Fork, and Smiths Formation
- Ka - Aspen Shale
- Kws - Wayan and Smiths Formations
- Kmt - Mowry and Thermopolis Shales
- Kbr - Bear River Formation
- Kg - Gannett Group - Includes Smoot Formation, Draney Limestone, Bechler Conglomerate, Peterson Limestone, and Ephraim Conglomerate
- KJ - Cloverly and Morrison Formations
- KJg - Cloverly, Morrison, Sundance, and Gypsum Spring Formations and Nuggets Sandstone
- Jst - Stump Formation, Preuss Sandstone or Redbeds, and Twin Creek Limestone
- Jsg - Sundance and Gypmsum Spring Formations
- J^ - Sundance and Gypsum Spring Formations and Nugget Sandstone
- J^nd - Nugget Sandstone, Ankareh Formation, Thaynes Limestone, Woodside Shale, and Dinwoody Formation
- J^ad - Ankareh Formation, Thaynes Limestone, Woodside Shale, and Dinwoody Formation
- ^cd - Chugwater and Dinwoody Formations
- Pp - Phosphoria Formation and related rocks
- P*Ma - Phosphoria, Wells, and Amsden Formations, Phosphoria Formation and related rocks, Quadrant Sandstone, and Amsden Formation and related rocks, Tensleep Sandstone, and Amsden Formation
- P*M - Wells and Amsden Formations, or Casper Formation and Madison Limestone
- PM - Tensleep Sandstone and Amsden Formation
- MD - Madison Limestone or Group, and Darby Formation, or Madison Group, and Three Forks and Jefferson Formations
- O_ - Bighorn Dolomite, Gallatin Limestone, and Gros Ventre Formation
- Wgn - Granite gneiss
- Wmu - Metasedimentary and metavolcanic rocks - metamorphosed mafic and ultramafic rocks
- Wg - Granitic rocks of 2,600-Ma age group
- H2O - Water



- Notes**
1. Coordinate System: N/A
 2. Data Sources: Stantec, Love and Christiansen (1985)
 3. Background: N/A



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Figure No. **25**

Title: **Bedrock Unit Descriptions**

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3.1.3.6 Soils

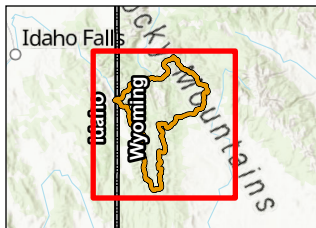
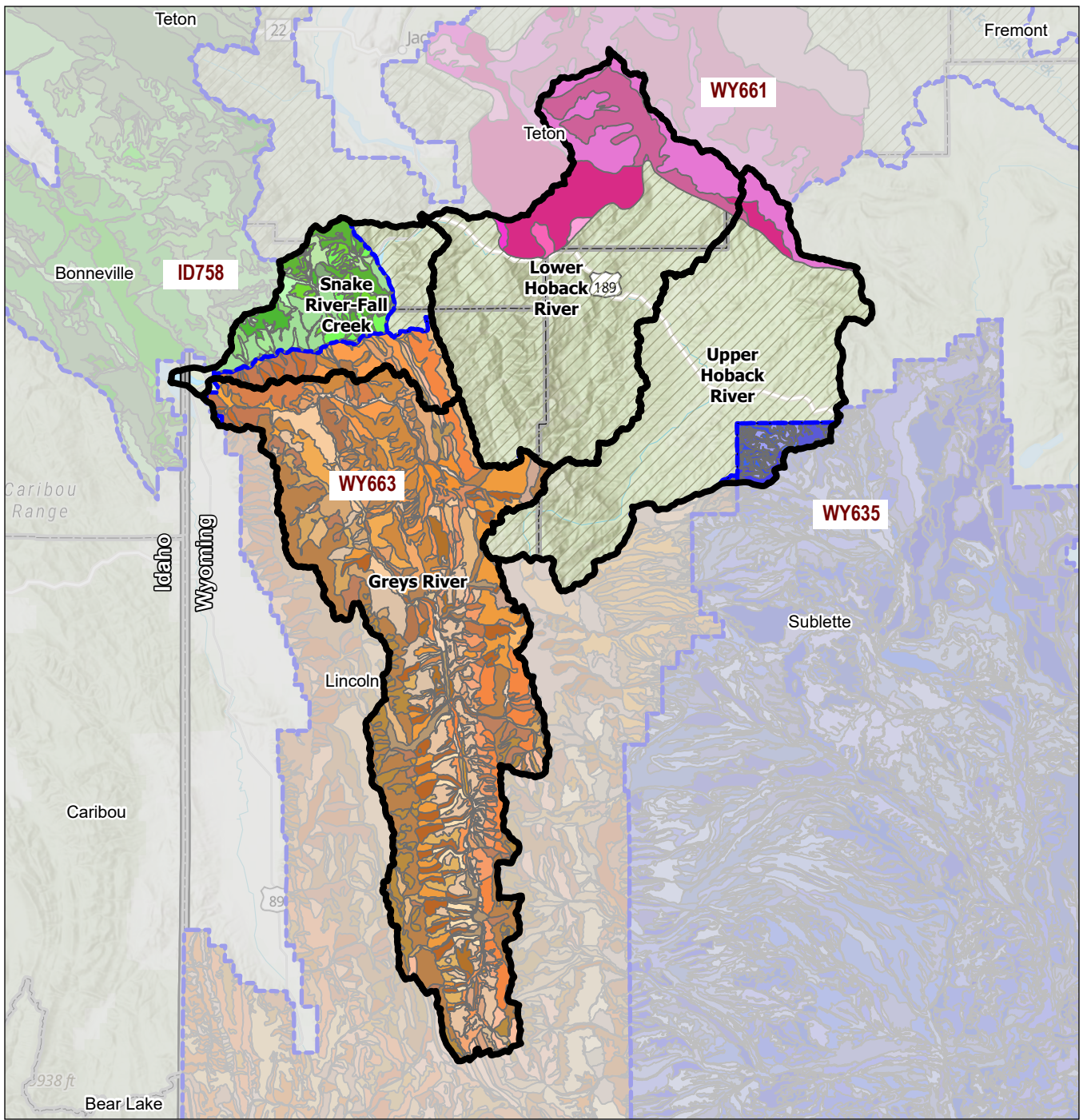
Soil data was downloaded from the National Resource Conservation Service (NRCS) geospatial data gateway and soil groups are shown in **Figure 26**. Soil units differ from surficial geology units because of their agronomic use and crop yield potential. NRCS soil map unit codes are shown in **Figure 27** with descriptions of each soil group. Four soil surveys have been conducted in the combined Upper and Lower Hoback River, Greys River, and Snake River-Fall Creek Watershed areas at a 1:24,000 scale.

Soil Survey WY663, titled Targhee National Forest, Idaho and Wyoming (2021), encompasses the entire Greys River watershed and the southern portion of the Snake River-Fall Creek Watershed. The most common soil type in this soil survey in the combined watershed areas is soil unit 286 or the Rock outcrop-Kamack family-Pishkun family soil complex with 40 to 90 percent slopes.

Soil Survey ID758, titled Targhee National Forest, Idaho and Wyoming (2021), covers the northwestern portion of the Snake River-Fall Creek Watershed. The most common soil type in this soil survey in the combined watershed areas is soil unit 1106 or the ABLA/PHMA5 Gany-PSMEG/BERE,SYOR2 Fritz association with 40 to 70 percent slopes.

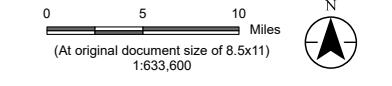
Soil survey WY661, titled Teton National Forest, Wyoming, Parts of Teton, Fremont, Park, Sublette, and Lincoln Counties (2019), encompasses nearly all the Upper and Lower Hoback River Watershed areas, although, the soil survey is incomplete and only delineates soil units in the northern portions of the watersheds. The most common soil type in this soil survey in the combined watershed areas is soil unit NOTCOM which indicates that the area has not been mapped and no digital data is available.

Soil survey WY635, titled Sublette County Area, Wyoming (2021), maps approximately 24 square miles in the southeastern portion of the Upper Hoback River Watershed. The most common soil type in this soil survey in the combined watershed areas is soil unit 5329 or the Sig hill-South rim-Watson draw complex with 3 to 15 percent slopes.



Notes
 1. Coordinate System: NAD 1927 UTM Zone 12N
 2. Data Sources: Stantec, ID758: USDA, NRCS (2021-09-09), WY635: USDA, NRCS (2021-09-13), WY661: USDA, NRCS (2019-09-17), WY663: USDA, NRCS (2021-09-13)
 3. Background: USGS 7.5 Minute Quadrangle

Legend	
● HUC 10 Watershed Boundaries	GRE
■ Soil Survey Area	Hb
■ Soil Survey Area	RTC
■ Outline - labeled by soil survey area symbol	RTD
	W
ID758 - Targhee National Forest, Idaho and Wyoming selection	WY663 - Bridger National Forest, Wyoming, Western Part selection
Map Unit Code	Map Unit Code
1106	101
1110	102
1175	110
1280	120
1316	121
1999	130
3220	140
3221	201
3225	203
3315	206
3335	211
3340	212
3404	221
3416	222
3425	223
3475	2235
GRD	224
	225
	234
	236
	243
	244
	246
	256
	264
	266
	273
	274
	282
	286
	301
	303
	305
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	346
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	366
	373
	385
	401
	403
	404
	411
	412
	413
	414
	416
	425
	433
	434
	5330
	5625
W	NOTCOM
WY635 - Sublette County, Wyoming selection	
Map Unit Code	
1112	
2235	
303	
5329	
5330	
5525	
5528	
5624	
5625	
5626	
WY661 - Teton National Forest, Wyoming, Parts of Teton, Fremont, Park, Sublette, and Lincoln Counties selection	
Map Unit Code	
1	
12	
15	
18	
2	
22	
3	



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Figure No. 26

Title: NRCS Soil Units in the Combined Watershed Area

Legend

ID758 - Targhee National Forest, Idaho and Wyoming selection

- 1106 - ABLA/PHMA5 Gany-PSMEG/
- BERE.SYOR2 Fritz association, 40 to 70 percent slopes
- 1110 - ARTRV/FEID Reynoldson, 1 to 15 percent slopes
- 1175 - ABLA/Tall Forb Yodal, 35 to 60 percent slopes
- 1280 - Rubble Land-Low Alpine Forb Haplocryepts, loamy-skeletal-Rock outcrop complex, 40 to 70 percent slopes
- 1316 - Koffgo-Koffgo, low effective
- precipitation-Rock outcrop complex, 40 to 70 percent slopes
- 1999 - Alluvial land, 4 to 25 percent slopes
- 3220 - Water-Riverwash-Tetonville complex, 0 to 2 percent slopes
- 3221 - ARTRV/PSSP6 Povey Family-PSMEG/SYAL Farlow Family complex, 5 to 25 percent slopes
- 3225 - Tall Forb Clayburn Family-Tall Forb Heath Family complex, 15 to 50 percent slopes
- 3315 - ABLA/PHMA5 Stringam Family-PIEN/
- GATR3 Swifton Family complex, 10 to 40 percent slopes
- 3335 - ABLA/PHMA5 Stringam Family-PIEN/
- GATR3 Swifton Family complex, 40 to 70 percent slopes
- 3340 - Tall Forb Clayburn Family-Tall Forb Swede Family complex, 15 to 50 percent slopes
- 3404 - ARTRV/FEID Quazar Family, moderately deep-ARTRV/FEID Clayburn Family-JUSC2/ARTRV/PSSP6 Agneston Family complex, 20 to 55 percent slopes
- 3416 - PSMEG-POTRS/SYAL Geomere Family-JUSC2/ARTRV/PSSP6 Agneston Family-Rubble land, talus complex, 50 to 90 percent slopes
- 3425 - ARTRV/PSSP6 Maciver Family-ARTRV/FEID Monida Family-JUSC2/ARTRV/PSSP6 Agneston Family complex, 25 to 70 percent slopes
- 3475 - Tall Forb Clayburn Family-Tall Forb Swede Family complex, 50 to 90 percent slopes
- GRD - Greyback-Roostet association, hilly
- GRE - Greyback-Roostet association, steep
- Hb - Hobacker gravely sandy loam
- RTC - Robana-Turnerville association, undulating
- RTD - Robana-Turnerville association, hilly
- W - Water

WY663 - Bridger National Forest, Wyoming, Western Part selection

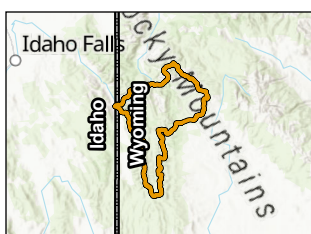
- 101 - Redlodge family-Aquic Cumulic Haplocryolls-Tetonville family, complex, 0 to 5 percent slopes -- draft
- 102 - Ezbin-Sawpit-Gateview families, complex, 0 to 30 percent slopes -- draft
- 110 - Fluventic Haplocryolls-Middlecreek family, complex, 0 to 5 percent slopes
- 120 - Pachic Haplocryolls-Tetonville family, complex, 0 to 5 percent slopes
- 121 - Beaverdam family-Inceptic Haplocryalls-Aquic Argicryolls complex, 0 to 20 percent slopes
- 130 - Ledgefork family-Aquic Cumulic Haplocryolls complex, 0 to 5 percent slopes
- 201 - Cochetopa family-Mollic Palecryalls complex, 0 to 15 percent slopes
- 203 - Savar-Wildcow family, complex, 10 to 45 percent slopes
- 206 - Rock outcrop-Rubble land complex
- 211 - Baird Hollow family-Eutric Glossocryalls-Bachus family, complex, 0 to 10 percent slopes
- 212 - Baird Hollow family-Mollic Haplocryalls-Wander family, association, 0 to 30 percent slopes
- 221 - Gateview-Tahquats-Danavore families, complex, 0 to 20 percent slopes
- 222 - Yata-Wesdy-Gilluly families, complex, 0 to 35 percent slopes
- 223 - Wander-Coldfeet-Badwater families, complex, 5 to 40 percent slopes
- 2235 - Beavmid-Libeg complex, 1 to 6 percent slopes
- 224 - Booneville-Mayflower-Wetopa, moderately deep, families, complex, 10 to 40 percent slopes
- 225 - Bucklon-Yata families, complex, 20 to 60 percent slopes
- 234 - Doolittle-Wetopa-Helmet families, complex, 10 to 50 percent slopes
- 236 - Wander-Kamak families, complex, 40 to 90 percent slopes -- draft
- 243 - Cimarron-Beaverdam families, complex, 5 to 30 percent slopes
- 244 - Tigeron, stony-Herd-Stringam families, complex, 15 to 50 percent slopes
- 246 - Garlet-Dromedary-Woodhurst families, complex, 30 to 70 percent slopes
- 256 - Pishkun, moderately deep-Helmville families, complex, 35 to 75 percent slopes -- draft
- 264 - Buckskin-Tongue River-Helmville families, association, 0 to 60 percent slopes
- 266 - Starman-Midfork families, complex, 40 to 90 percent slopes
- 273 - Tigeron-Hourglass families, complex, 0 to 30 percent slopes
- 274 - Midfork-Targhee families, complex, 30 to 70 percent slopes
- 282 - Kamack-Parkcity families, complex, 10 to 30 percent slopes
- 286 - Rock outcrop-Kamak family-Pishkun family, complex, 40 to 90 percent slopes
- 301 - Cluff family-Inceptic Haplocryalls-Foxton family, complex, 0 to 15 percent slopes
- 303 - Owlcan-Cluff-Worock families, complex, 10 to 50 percent slopes
- 305 - Reck-Tamarron families, complex, 30 to 90 percent slopes
- 311 - Hellroaring-Groomer families, complex, 0 to 10 percent slopes
- 312 - Lehunt family-Mollic Palecryalls-Tamarron family, complex, 5 to 30 percent slopes
- 313 - Muggins-Foxton-Pricepeet families, complex, 0 to 30 percent slopes
- 315 - Targhee family-Mollic Palecryalls-Vertic Haplocryalls complex, 30 to 60 percent slopes
- 316 - Storm family-Rubble land-Tamarron family, complex, 40 to 90 percent slopes
- 321 - Cuberant-Henson families, complex, 0 to 20 percent slopes
- 322 - Needleton family-Inceptic Haplocryalls-Owlcreek family, complex, 5 to 35 percent slopes -- draft
- 325 - Enentah family-Inceptic Haplocryalls-Rubble land complex, 40 to 90 percent slopes
- 331 - Mollic Palecryalls-Dromedary family-Foxton family, complex, 0 to 20 percent slopes
- 333 - Enentah-Gralic families, complex, 10 to 40 percent slopes
- 334 - Muggins, moderately deep-Lonniebie families, complex, 10 to 50 percent slopes
- 336 - Tamarron-Enentah-Badwater families, complex, 40 to 90 percent slopes -- draft
- 346 - Enentah-Coldfeet families, complex, 40 to 90 percent slopes
- 353 - Coldfeet-Needleton families, complex, 0 to 30 percent slopes
- 355 - Washboard-Gralic families, complex, 20 to 60 percent slopes -- draft
- 356 - Storm family-Kingmine family-Rubble land complex, 40 to 90 percent slopes
- 363 - Vertic Haplocryalls-Needleton family, complex, 0 to 30 percent slopes
- 365 - Muggins-Yata-Swede families, complex, 20 to 55 percent slopes
- 366 - Typic Cryorthents-Haycamp family, complex, 40 to 90 percent slopes
- 373 - Danavore-Ripple families, complex, 10 to 30 percent slopes
- 385 - Telcher-Dromedary families, complex, 30 to 70 percent slopes
- 401 - Swede-Dromedary, deep-Horsethief families, complex, 0 to 10 percent slopes
- 403 - Roundy family-Vertic Argicryolls-Typic Haplocryolls complex, 10 to 30 percent slopes
- 404 - Wesdy family-Mollic Haplocryalls-Goldflint family, complex, 5 to 60 percent slopes
- 411 - Baird Hollow-Coldfeet-Beaverdam families, complex, 0 to 10 percent slopes
- 412 - Gany, deep-Kamak-Quazar families, complex, 5 to 40 percent slopes -- draft
- 413 - Typic Haplocryepts-Dromedary family, complex, 0 to 30 percent slopes
- 414 - Parkcity-Garlet families, complex, 25 to 65 percent slopes
- 416 - Parkcity family-Muiral family-Rubble land complex, 40 to 90 percent slopes
- 425 - Frisco-Fulcher-Woodhurst families, complex, 30 to 60 percent slopes
- 433 - Beaverdam-Muggins, moderately deep-Buckskin families, complex, 0 to 30 percent slopes
- 434 - Muggins-Seth-Horsethief families, complex, 10 to 40 percent slopes
- 5330 - Gourley-Bridgimmer-Kismetpeak complex, 4 to 20 percent slopes
- 5625 - Sledrunner-Leavitt-Bridgimmer complex, 8 to 30 percent slopes
- 5626 - Gourley-Kismetpeak-Bridgerton complex, 15 to 40 percent slopes

WY661 - Teton National Forest, Wyoming, Parts of Teton, Fremont, Park, Sublette, and Lincoln Counties selection

- 1 - Larkspur family-Rock outcrop-Elkpeak family, association, 15 to 75 percent slopes, Broadly Defined
- Defined
- 12 - Ericson-Midfork-Nooney families, association, 15 to 70 percent slopes, Broadly Defined
- 15 - Doct-Elkpeak-Nooney families, association, 15 to 60 percent slopes, Broadly Defined
- 18 - Ericson-Nooney-Bigcoulee families, association, 8 to 35 percent slopes, Broadly Defined
- 2 - Midfork-Boatman-Larkspur families, association, 15 to 60 percent slopes, Broadly Defined
- 22 - Larkspur family-Nooney family-Rock outcrop association, 15 to 75 percent slopes, Broadly Defined
- 3 - Midfork family-Bigcoulee family-Cryaquepts association, 1 to 15 percent slopes, Broadly Defined
- NOTCOM - No Digital Data Available
- 1112 - Furniss mucky peat, 0 to 3 percent slopes
- 2235 - Beavmid-Libeg complex, 1 to 6 percent slopes
- 303 - Owlcan-Cluff-Worock families, complex, 10 to 50 percent slopes
- 5329 - Sighill-Southern-Watsondraw complex, 3 to 15 percent slopes
- 5330 - Gourley-Bridgimmer-Kismetpeak complex, 4 to 20 percent slopes
- 5525 - Sledrunner-Youga-Groomer complex, 5 to 30 percent slopes
- 5528 - Calsig-Kismetpeak complex, 10 to 35 percent slopes
- 5624 - Kismetpeak-Calsig complex, 35 to 70 percent slopes
- 5625 - Sledrunner-Leavitt-Bridgimmer complex, 8 to 30 percent slopes

WY635 - Sublette County, Wyoming selection

- 1112 - Furniss mucky peat, 0 to 3 percent slopes
- 2235 - Beavmid-Libeg complex, 1 to 6 percent slopes
- 303 - Owlcan-Cluff-Worock families, complex, 10 to 50 percent slopes
- 5329 - Sighill-Southern-Watsondraw complex, 3 to 15 percent slopes
- 5330 - Gourley-Bridgimmer-Kismetpeak complex, 4 to 20 percent slopes
- 5525 - Sledrunner-Youga-Groomer complex, 5 to 30 percent slopes
- 5528 - Calsig-Kismetpeak complex, 10 to 35 percent slopes
- 5624 - Kismetpeak-Calsig complex, 35 to 70 percent slopes
- 5625 - Sledrunner-Leavitt-Bridgimmer complex, 8 to 30 percent slopes



Notes
 1. Coordinate System: N/A
 2. Data Sources: Stantec, ID758: USDA, NRCS (2021-09-09), WY635: USDA, NRCS (2021-09-13), WY661: USDA, NRCS (2019-09-17), WY663: USDA, NRCS (2021-09-13)
 3. Background: N/A



Project Location: Lincoln, Sublette, and Teton Co., WY
 Prepared by FT on 2022-05-26

Client/Project: Wyoming Water Development Commission
 Hoback River Watershed Study
 Topography and Geology Tech Memo
 Figure No. 27

NRCS Soil Map Unit Code Descriptions

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3.1.3.7 Geologic Hazards

Within the combined Upper and Lower Hoback River, Greys River, and Snake River-Fall Creek Watershed areas, the primary potential geologic hazards include, landslides, expansive soils, karst, ground-shaking, and liquefaction. Karst is topography formed by dissolution of soluble rocks that can result in sinkholes and underground drainage systems. Ground-shaking is an earthquake caused geologic hazard that can trigger geologic hazards such as landslides and liquefaction.

3.1.3.7.1 Landslides

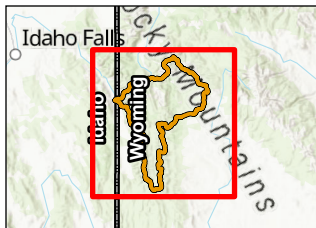
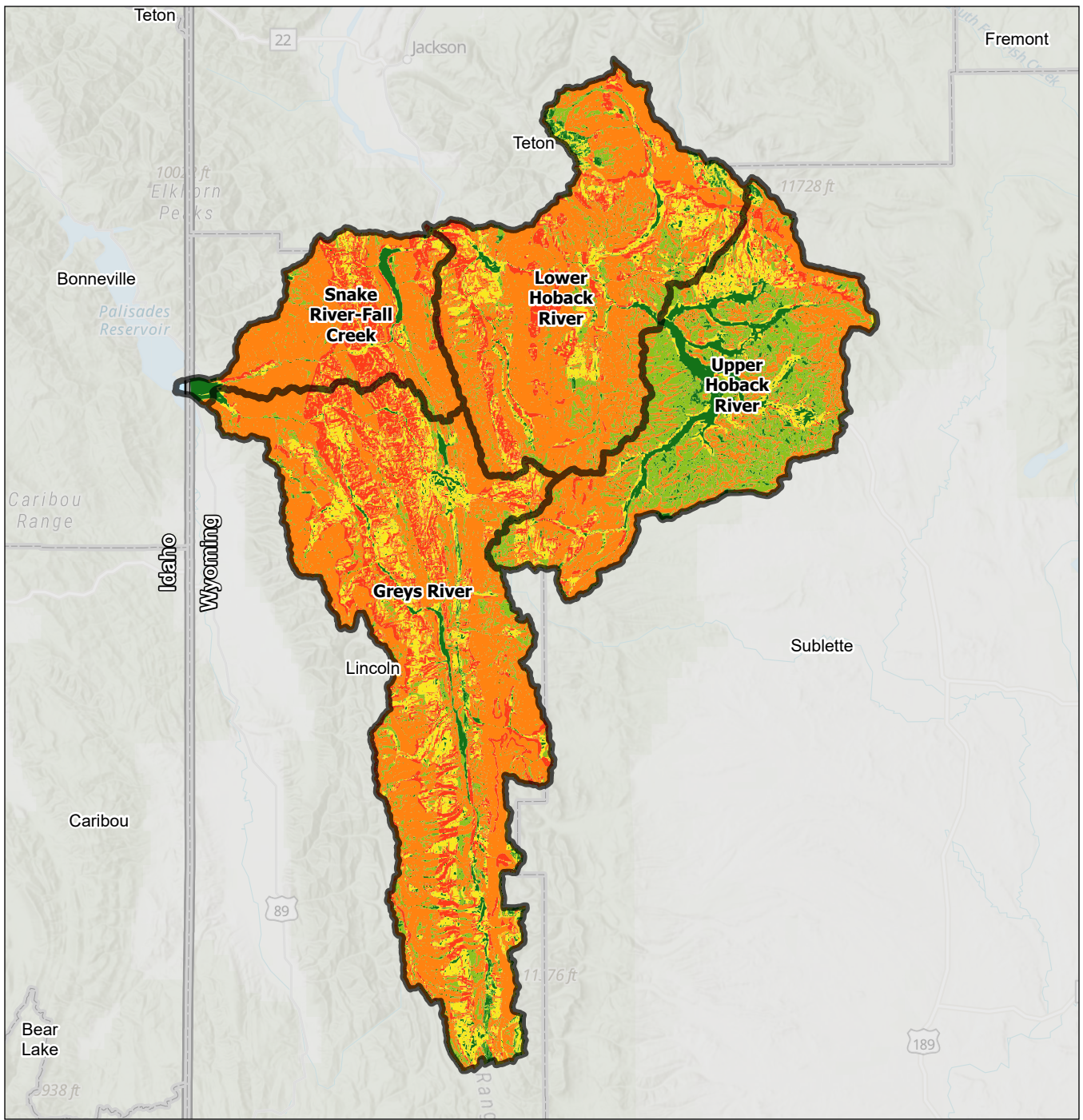
Landslides are the downslope movement of soil, rock, debris, and organic matter due to gravity and the resulting landforms (Highland and Bobrowsky, 2008). Landslides can occur as sudden, rapid downslope movement of debris or as gradual events spanning days to years. Landslides can change terrain, which affects rivers, farmland, and forests. Often forests and wildlife are negatively affected by landslides with forest and fish habitats temporarily or permanently destroyed. Landslides can also disrupt surface water by damming rivers and streams impacting water users and wildlife.

A study titled 'Susceptibility to Deep-Seated Landslides in Wyoming' (2019) used a combination of ground steepness (slope) and rock type to rate landslide susceptibility from 0 (least susceptible) to 10 (most susceptible). Steep slopes and areas made up of weak rock types, often found on the flanks of Wyoming's mountain ranges, typically show high susceptibility in this model. Low ratings (5 and below) represent areas with low susceptibility to deep-seated landslides, whereas high ratings (6 and above) indicate severe landslide hazard. Based on a GIS analysis conducted by Stantec, the following analysis was made:

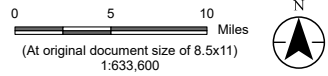
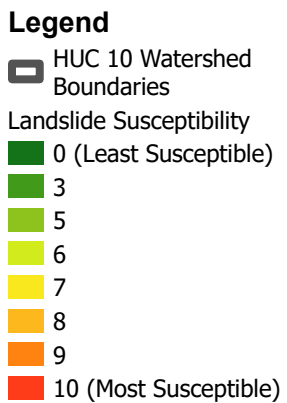
- In the Hoback River watershed, more than 59 percent of the area is ranked as a 7 or higher for landslide susceptibility. The most common landslide susceptibility rating is a 5 covering more than 29 percent of the watershed area.
- In the Greys River watershed, more than 79 percent of the area is ranked as a 7 or higher for landslide susceptibility. The most common landslide susceptibility rating is a 9 covering more than 28 percent of the watershed area.
- In the Fall Creek-Snake River watershed, more than 77 percent of the area is ranked as a 7 or higher for landslide susceptibility. The most common landslide susceptibility rating is a 10 covering more than 31 percent of the watershed area.

Landslide susceptibility as it pertains to watershed areas are shown on **Figure 28**.

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- Notes**
1. Coordinate System: NAD 1927 UTM Zone 12N
 2. Data Sources: Stantec, Wittke and Stafford (2019)
 3. Background: USGS 7.5 Minute Quadrangle



Project Location Lincoln Co., WY
Prepared by HDK on 2022-05-16
 TR by SW on 2022-05-10
 IR by SW on 2022-05-10

Client/Project Wyoming Water Development Commission
 Hoback River Watershed Study
 Topography and Geology Tech Memo

Figure No. 28
Title Geologic Hazards: Landslides

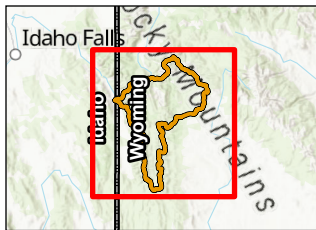
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3.1.3.7.2 Karst

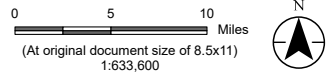
Karst refers to terrain largely drained by subsurface conduits and caves. Karst landscapes are characterized by surface features such as springs, sinkholes, shallow depressions, and rolling hills (Currens et al. 2014). Karst is created when surface or groundwater passes through soluble rock, dissolving the stone and carrying it away in solution (Alpha and Galloway, 1997). Karst regions are also known for their subsurface or below-ground features such as conduits and caves. Karst landscapes are susceptible to sinkhole collapse and flooding as well as groundwater pollution. In karst terrain, contaminants can easily enter the aquifer through fractures, sinkholes and conduits (Currens et al. 2014). These close connections mean pollutants in runoff like fertilizers, pesticides, gasoline, and bacteria can quickly reach the aquifer and discharge into streams and rivers posing threat to humans and wildlife.

The USGS has delineated principal karst aquifers across the United States and identified the Madison aquifer in Wyoming (Clark 2021). Although the Madison aquifer is not mapped as an individual unit within the study area, it is mapped together with the Darby aquifer. Limestone and dolostone are the main rock types within these aquifers. These aquifers encompass approximately 86 square miles or approximately 6 percent of the study area (**Figure 29**).

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- Legend**
- HUC 10 Watershed Boundaries
 - Karst Aquifers
 - Madison and Darby aquifers



Project Location: Lincoln, Sublette, and Teton Co., WY Prepared by HDK on 2022-05-16

Client/Project: Wyoming Water Development Commission
 Hoback River Watershed Study
 Topography and Geology Tech Memo

Figure No. **29**

Geologic Hazards: Karst Topography

- Notes**
1. Coordinate System: NAD 1927 UTM Zone 12N
 2. Data Sources: Stantec, USGS
 3. Background: USGS 7.5 Minute Quadrangle

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3.1.3.7.3 Ground Shaking

Ground shaking is an earthquake caused geologic hazard. Earthquakes can be naturally occurring or induced by human activities. The heavily faulted landscapes of northwestern Wyoming are particularly susceptible for fault slips which can trigger earthquakes. Earthquakes can also be induced by human activities like oil and gas extraction, injection into deep disposal wells, hydraulic fracturing, and construction of very large reservoirs (Hough and Page 2015). Primary earthquake hazards are typically limited to fault rupture and ground shaking, although, secondary hazards pose a much greater risk. Secondary risks are caused because of ground shaking and include ground settlement, lateral ground displacement, liquefaction, landslides, rock falls, floods, fires, and falling debris (Branz 2011). Secondary risks not only threaten structures but can threaten the health of a watershed by destroying habitat, wildlife populations, and diminishing water quality.

Both naturally occurring and induced earthquakes are possible within the Upper and Lower Hoback River, Greys River, and Snake River-Fall Creek Watersheds. The USGS documented 95 earthquakes with magnitude greater than or equal to 2.5 within the Hoback River, Greys River, and Snake River-Fall Creek Watersheds between 1950 and June 2022 (USGS 2022). The earthquakes ranged from magnitude 2.5 to 4.8 with the largest occurring in 1985 and 2016, 7.5 miles south of Hoback and 2.5 miles east-northeast of Bondurant.

The 2018 Update of the U.S. National Seismic Hazard Model defines the potential for earthquake ground shaking for various probability levels across the conterminous United States. The updated model represents an assessment in earthquake hazards and incorporates new findings on earthquake ground shaking, seismicity, and long-period amplification over deep sedimentary basins. The new model represents an update of the seismic hazard model; previous versions were developed in 1996, 2002, 2008, and 2014. Recently, the USGS incorporated induced earthquakes into the earthquake hazard forecast. The frequency, location, and magnitude of induced earthquakes can vary greatly from year-to-year as oil and gas or deep injection well operation changes. Therefore, the ground shaking hazard discussed may change in response to future oil and gas production operations.

Ground shaking hazards can be defined in terms of Peak Ground Acceleration (PGA). Earthquakes generate acceleration along both vertical and horizontal axes and PGA is defined as the largest absolute acceleration at a specific location. Earthquake engineering is often defined in terms of PGA (World Nuclear Association 2019) which is dependent on the intensity and proximity of an earthquake. Like flood events, PGA can be estimated for a variety of event occurrence intervals. PGA is commonly presented as a decimal fraction of Earth's gravitational acceleration (g) and is the nomenclature used in this document. For instance, a PGA of 0.3 is equivalent to 30 percent of Earth's gravitational acceleration.

Based on a combined data set symbolizing the PGA with a 1 percent probability of exceedance in 1 year for both the Central US and Western US (Peterson et al., 2017), the combined Hoback River, Greys River, and Snake River-Fall Creek Watersheds areas are subject to moderate ground shaking hazards. Estimates published by the USGS indicate that in a single year, there is between a 4 percent to 15 percent probability of an earthquake causing PGA between 0.02 to 0.06 (100-yr seismic event) in the combined watershed area (**Figure 30**). The highest risk is located (between 10-15 percent probability of exceedance) in the north-northwestern portion of the Greys River watershed. National and international design standards require evaluation of seismic events expected to occur less frequently than once every 100-years. The PGA of three additional return intervals was determined at four points centrally located in each watershed (**Figure 31**) using the USGS Unified Hazard Tool Conterminous U.S. 2014 v4.0 Edition (USGS):

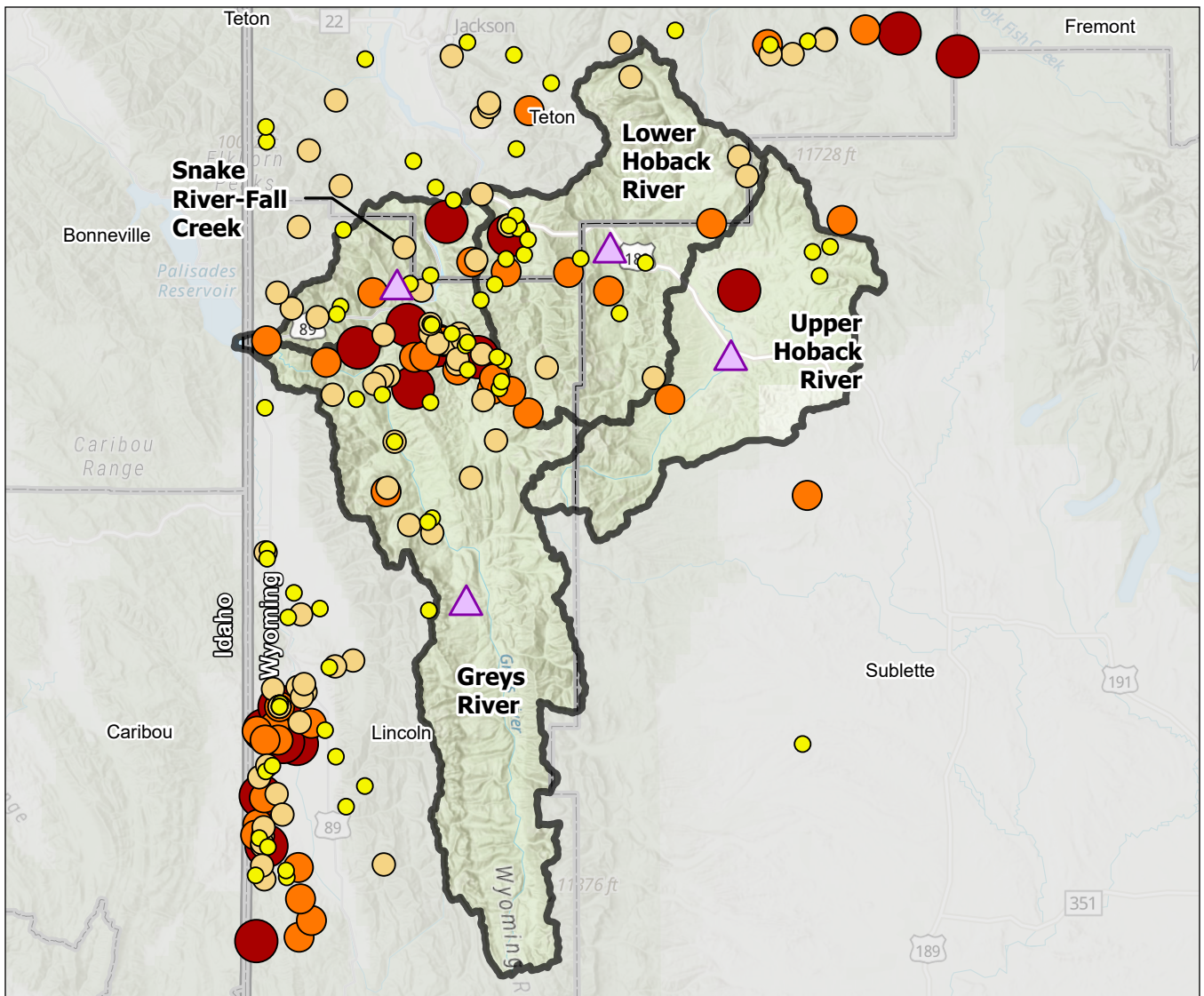
- 10 percent chance of exceedance in 50-years (475-year return interval)
- 5 percent chance of exceedance in 50-years (975-year return interval)
- 2 percent chance of exceedance in 50-years (2,475-year return interval)

Watershed	Lat	Long	PGA Chance of Exceedance in 50-years		
			2%	5%	10%
Upper Hoback River	43.266870	-110.539409	0.4070	0.2743	0.1947
Lower Hoback River	43.156455	-110.372002	0.3527	0.2310	0.1619
Greys River	42.908129	-110.740609	0.5805	0.3720	0.2498
Fall Creek-Snake River	42.230109	-110.836799	0.3839	0.2487	0.1693
Average	-	-	0.4310	0.2815	0.1939

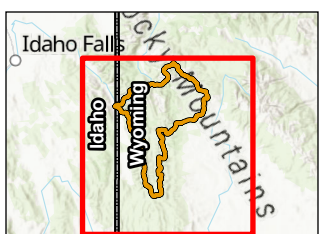
*See **Figure 31** for site locations

PGAs between 0.115 to 0.215 can potentially cause light damage with a strong perceived shaking. A PGA between 0.215 and 0.401 can potentially cause moderate damage with a very strong perceived shaking. A PGA of 0.5 is very high and structures must be well designed to withstand this level of ground shaking. Moderate to heavy structure damage is possible (Lorant 2010).

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Watershed	Lat	Long	PGA Chance of Exceedance in 50-years		
			2%	5%	10%
Upper Hoback River	43.266870	-110.539409	0.4070	0.2743	0.1947
Lower Hoback River	43.156455	-110.372002	0.3527	0.2310	0.1619
Greys River	42.908129	-110.740609	0.5805	0.3720	0.2498
Fall Creek-Snake River	42.230109	-110.836799	0.3839	0.2487	0.1693
Average	-	-	0.4310	0.2815	0.1939

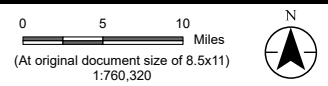


Legend

- ▲ Earthquake Sample Locations
- HUC 10 Watershed Boundaries

Earthquakes greater than >2.5 Magnitude

- 2.5-3.0
- 3.0-3.5
- 3.5-4.0
- 4.0-5.8



Project Location
Lincoln Co., WY

Prepared by FT on 2022-05-17
TR by SW on 2022-05-XX
IR by SW on 2022-05-XX

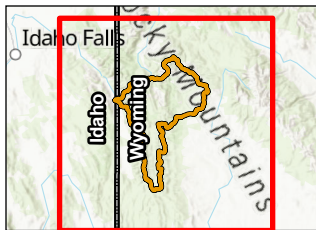
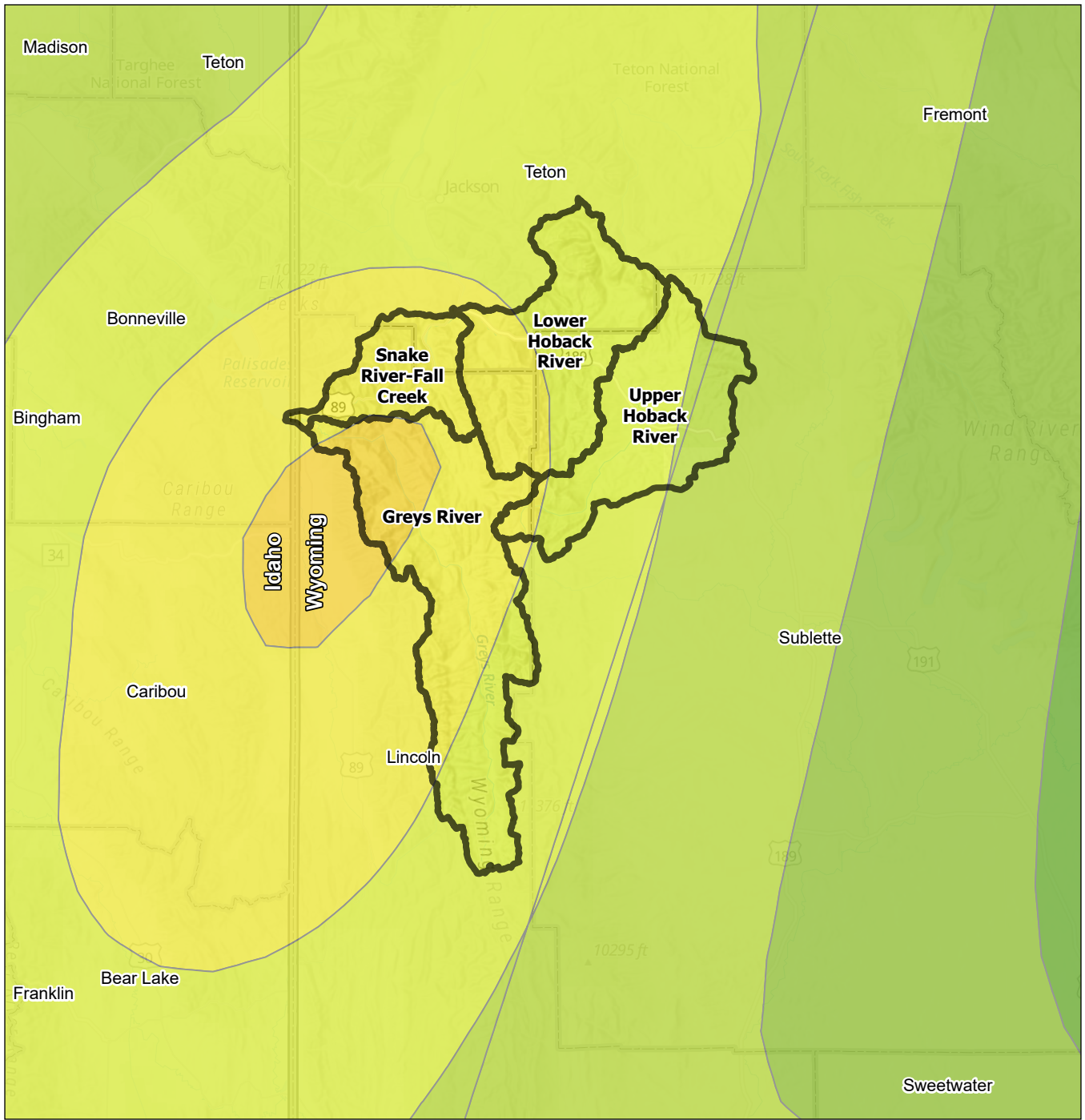
Client/Project
Wyoming Water Development Commission
Hoback River Watershed Study
Topography and Geology Tech Memo

Figure No.
30

Title
Geologic Hazards: Recorded Earthquake Magnitude since 1950 and Predicted PGA with 1% Probability in 1-year








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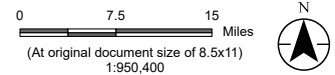
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- Notes**
1. Coordinate System: NAD 1927 UTM Zone 12N
 2. Data Sources: Stantec, National Seismic Hazard Model (2014)
 3. Background: USGS 7.5 Minute Quadrangle

Legend

-  HUC 10 Watershed Boundaries
- PGA 1% probability of exceedance in 1-year (units in percent g)
 -  2 - 3
 -  3 - 4
 -  4 - 6
 -  6 - 8
 -  8 - 10
 -  10 - 15



Project Location
Lincoln Co., WY

Prepared by FT on 2022-05-16
TR by SW on 2022-05-XX
IR by SW on 2022-05-XX

Client/Project
Wyoming Water Development Commission
Hoback River Watershed Study
Topography and Geology Tech Memo

Figure No.
31

Title
Geologic Hazards: Peak ground acceleration with a 1% probability of exceedance in 1 year

3.1.3.7.4 Liquefaction

Liquefaction can occur when seismic shaking agitates ground material and causes it to behave like a liquid. Soil liquefaction can occur due to sudden singular changes in stress or cyclic stress such as those caused by ground shaking. Loose and saturated granular soils are susceptible to liquefaction during ground shaking because they tend to decrease in volume, temporarily raising the pore pressure. Loose material begins to compress under the force of gravity, though the water already occupying the spaces resists the change and pressure begins to build in the material. Eventually, the pressure rises enough that the grains become buoyant and float in the water. At this point, the soil has completely lost its strength (Branz 2011).

Soils in the combined watershed area potentially susceptible to liquefaction include alluvium, alluvial fans, landslide deposits, glacial deposits, and other loose, saturated soils. During earthquakes, soil liquefaction can cause structures to sink into the soil or cause the soil to flow downslope (Kramer et al., 2008). The result of soil liquefaction can be catastrophic causing structures to experience a sudden loss of support. Buried utilities can float to the surface and crack due to irregular settlement. Earthen reservoir embankments can fail due to cracking or slumping. Though liquefaction primarily poses risk to structures, damaged infrastructure can introduce contaminants to nearby streams and river affecting both humans and wildlife.

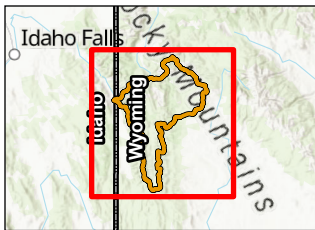
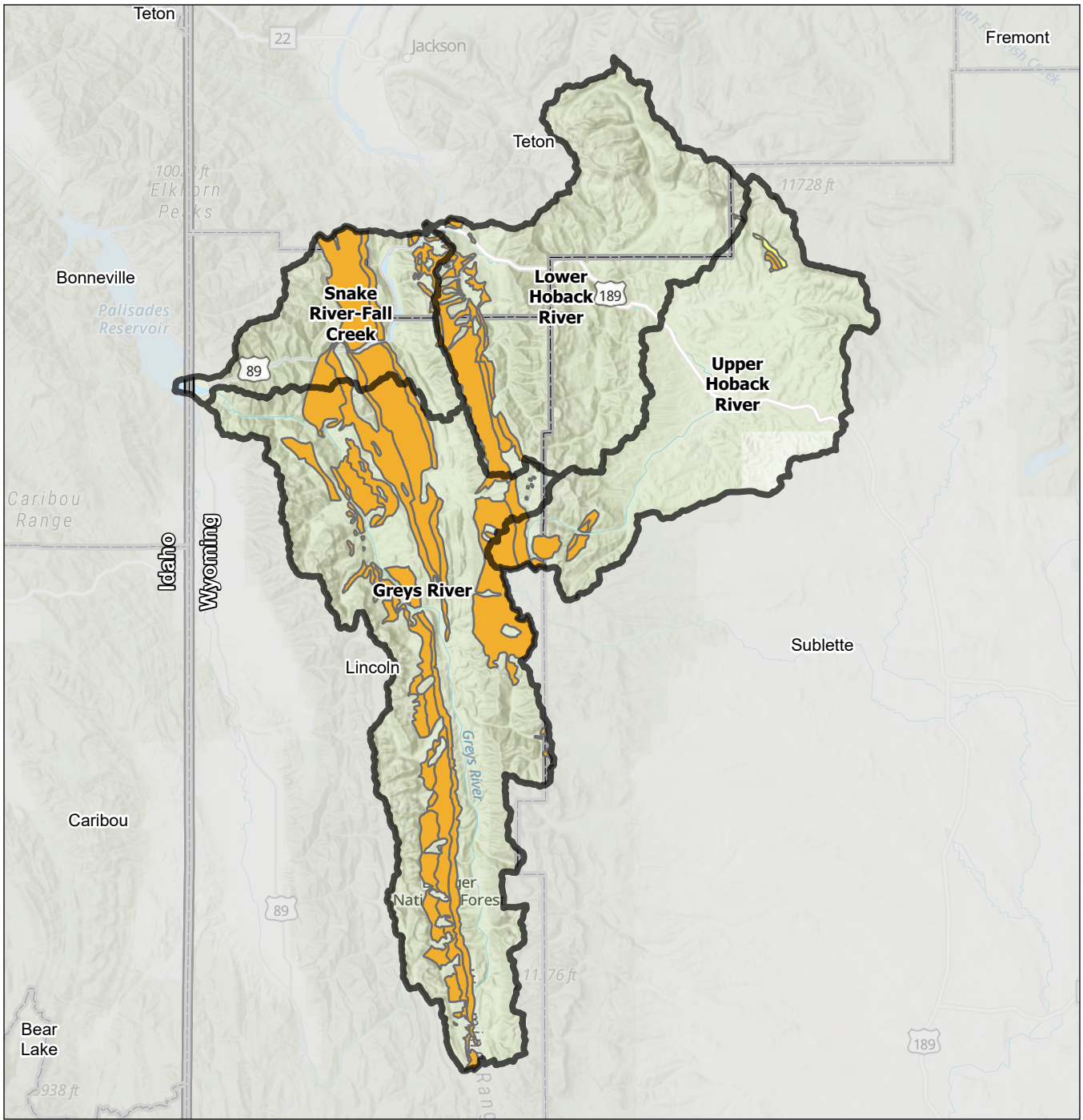
3.1.3.7.5 Expansive Soils

Expansive soils are identified as formations with known or suspected occurrences of shrink-swell clays which may lead to expansive soil development. Expansive soils contain minerals that can absorb water and expand, and consequently dry out and shrink in volume. The change in volume can exert force on structures causing damage to foundations, pipelines, sidewalks, and roads. Damaged infrastructure has the potential to introduce contaminants to nearby surface and groundwater posing a threat to humans and wildlife. The most common shrink-swell clays in Wyoming are bentonite (sodium-montmorillonite and calcium-montmorillonite). These clays are prevalent in late Cretaceous claystone and can occur locally in other formations (WGS 2014). Expansive soil hazards are divided into two classes:

- *Regionally susceptible, moderate hazard* – Cretaceous shales described by Love and Christiansen (2014) to contain sodium and/or calcium montmorillonite and with well-documented occurrences of expansive soils. Montmorillonite minerals from these shales have historically caused expansive soil damage and are susceptible to developing expansive soil issues on a regional scale.
- *Locally susceptible, low hazard* – Formations including Jurassic and early Cretaceous shales and Paleogene volcanoclastic rocks described by Love and Christiansen (2014) to contain sodium and/or calcium montmorillonite. Limited documentation of clays from these formations exists where infrastructure damage has occurred. These formations have potential to develop expansive soil issues in localized areas.

In the Upper and Lower Hoback River, Greys River, and Snake River-Fall Creek watershed, the most common formation potentially causing expansive soils is the Aspen Shale (Ka) with a moderate hazard. The Bear River Formation (Kbr) and the Blind Bull Formation (Kbb) are the second and third formations potentially causing expansive soils, both with moderate hazards (**Figure 32**).

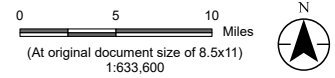
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- Notes**
1. Coordinate System: NAD 1927 UTM Zone 12N
 2. Data Sources: Stantec, Wyoming Geological Survey (2014)
 3. Background: USGS 7.5 Minute Quadrangle

Legend

- HUC 10 Watershed Boundaries
- Expansive Soils**
- Locally susceptible, low hazard
- Regionally susceptible, moderate hazard



Project Location
Lincoln Co., WY

Prepared by FT on 2022-05-16
TR by SW on 2022-05-XX
IR by SW on 2022-05-XX

Client/Project
Wyoming Water Development Commission
Hoback River Watershed Study
Topography and Geology Tech Memo

Figure No.
32

Title
Geologic Hazards: Expansive Soils

3.1.4 Climate

Climactic conditions in the Hoback River Watershed are climatically described as high alpine area with open canopy coniferous forests. High alpine areas receive nearly 23 inches of precipitation annually and experience average monthly high temperatures ranging between 50-degrees and 16-degrees Fahrenheit. The southeastern more arid lands, which is described by a climate station near Big Piney, WY that is not within the watershed boundary, receive only 11 inches of precipitation annually and experience monthly high temperature ranging between 55-degrees and 21-degrees Fahrenheit. The growing season greatly depends upon location, as lower elevations within the watershed will have longer growing seasons and higher elevations will have shorter growing seasons.

3.1.4.1 Climate Stations

Four (4) climate stations were identified within or near the Hoback River Watershed: Hoback Wyoming (RAWS), Bedford SE 3 (WY), Bondurant, and Big Piney 11W. All four stations have daily precipitation data and daily air temperature data, two stations include solar radiation: Hoback Wyoming (RAWS) and Big Piney 11W and two stations include snowfall: Bedford 3 SE (WY) and Bondurant (**Table 14**). Three climate stations – Hoback Wyoming (RAWS), Bedford 3 SE (WY), and Bondurant – are in the northern Wyoming Range mountains and the other climate station – Big Piney 11W – is in the arid southeast outside of the Hoback River Watershed HUC-10 boundary (**Figure 33**).

Hoback Wyoming (RAWS) recorded climate data between June 1st, 1996 and present. Complete data for the Hoback Wyoming (RAWS) climate station was downloaded from the RAWS USA Climate Archive webpage. The Hoback Wyoming (RAWS) climate station started recording solar radiation data on July 7th, 1998.

Bedford 3 SE (WY) recorded climate data between June 1st, 1975 to present.

Bondurant recorded climate data between August 1st, 1948 to present. The Bedford 3 SE (WY) and Bondurant climate stations complete data were downloaded from the cli-MATE, Midwestern Regional Climate Center webpage.

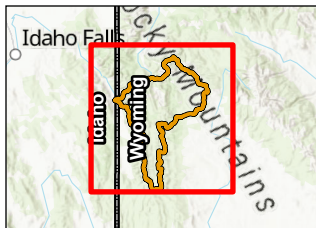
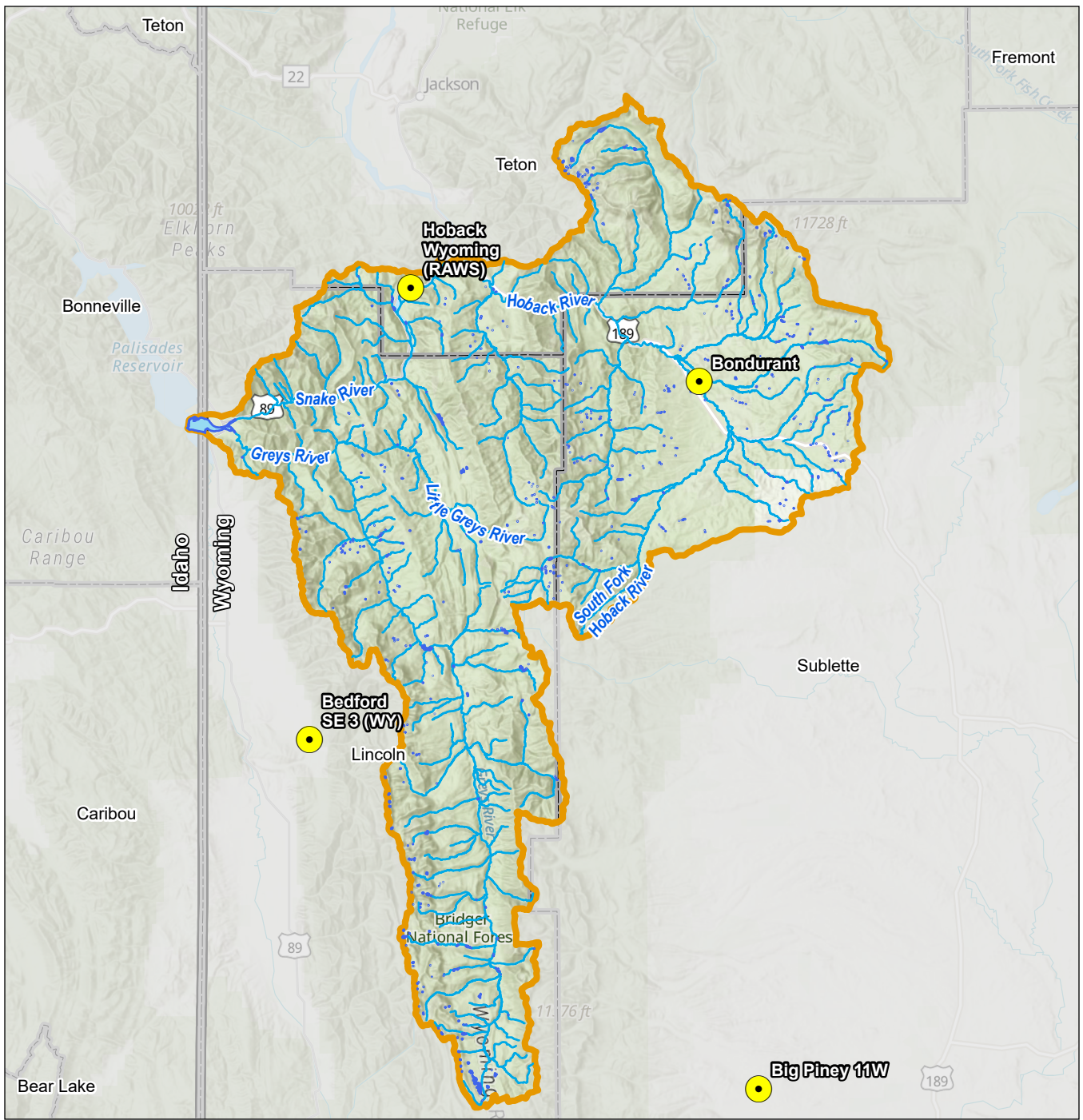
Big Piney 11W climate station data was downloaded from the Water Resources Data System & State Climate Office webpage. Average monthly climate data was calculated using Microsoft Excel for months missing 10 or fewer days of data.

Table 13. Climate stations in the Hoback River Watershed

Station		Period of Record	
Name	ID	Beginning	Ending
Hoback Wyoming (RAWS)	-	6/1/1996	Present
Bedford SE 3 (WY)	USC00480603	6/1/1975	Present
Bondurant	USC00480865	8/1/1948	Present





Table 14. Daily data types recorded by climate stations

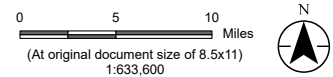
Station	Daily Data Types Recorded			
	Precipitation	Air Temperature	Snowfall	Solar Radiation
Hoback Wyoming (RAWS)	X	X		X
Bedford 3 SE (WY)	X	X	X	
Bondurant	X	X	X	
Big Piney 11W	X	X		X



Notes
 1. Coordinate System: NAD 1983 2011 UTM Zone 12N
 2. Data Sources: USGS
 3. Background: USGS 7.5 Minute Quadrangle

Legend

-  Climate Stations
-  Waterbodies
-  Streams
-  Hoback, Greys, Snake River Watershed
-  County Boundary
-  State Boundary



Project Location: Lincoln, Sublette, and Teton Co., WY
 Prepared by HDK on 2022-06-06

Client/Project: Wyoming Water Development Commission
 Hoback River Watershed Study
 Climatology

Figure No. **33**
 Title **Climate Stations**

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3.1.4.2 Air Temperature

In an average year at the Bedford 3 SE (WY) climate station, air temperature peaks in July and fluctuates between an average daily high of 78 and a low of 36 degrees Fahrenheit **Figure 34** and **Table 15**). During January, the coldest month, the average daily temperature ranges between a high of 23 and a low of -6 degrees Fahrenheit.

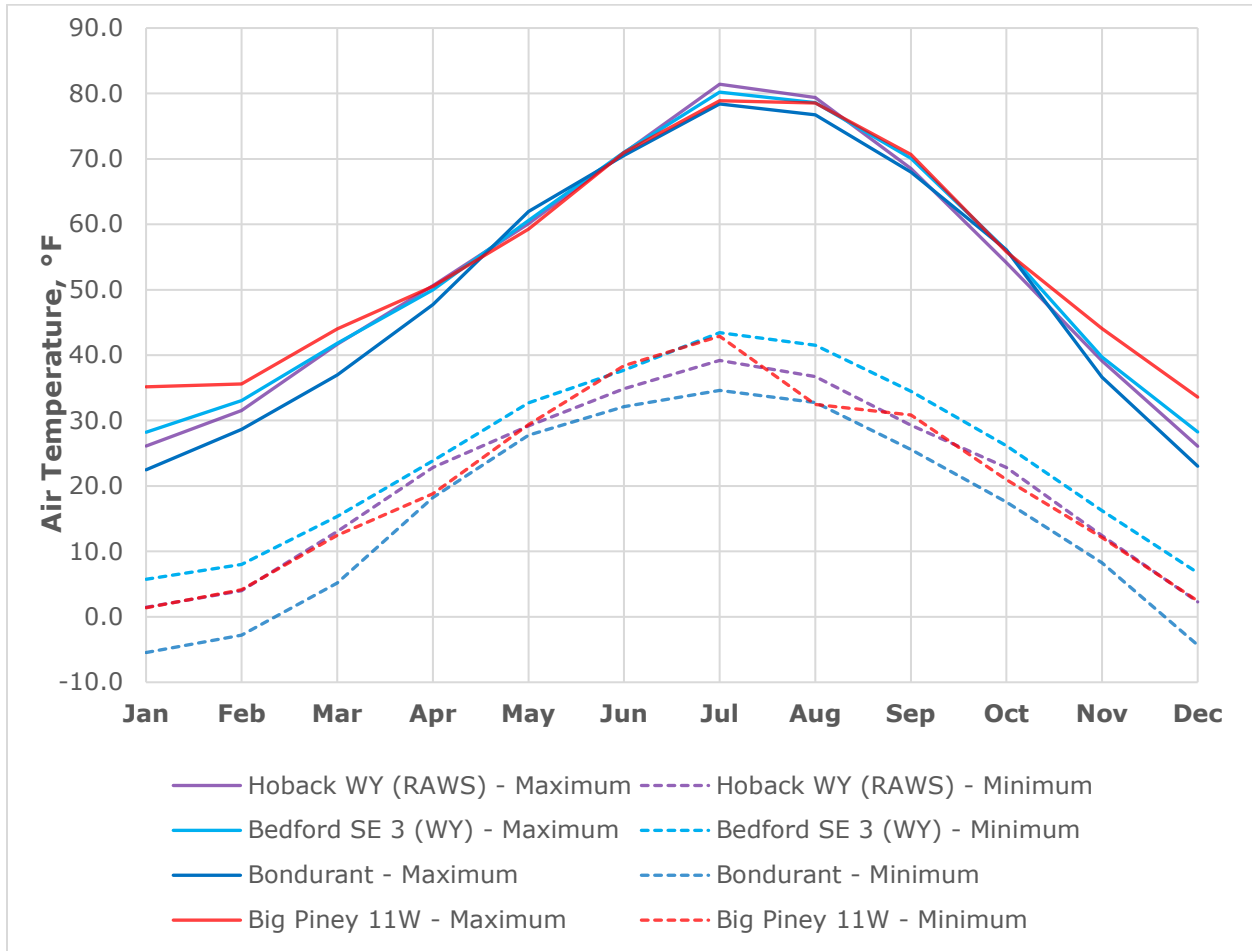


Figure 34: Average daily maximum and minimum air temperature

Table 15. Average monthly precipitation, maximum air temperature, and minimum air temperature

Hoback Wyoming (RAWS)													
Period of Record: 6/1/1996 to Present								Lat: 43.2993			Long: 110.775339		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	26.1	31.5	41.7	50.6	60.1	70.9	81.4	79.4	68.5	54.1	39.1	26.1	52.5
Average Min. Temperature (F)	1.5	4.0	13.1	22.9	29.2	34.8	39.2	36.7	29.3	22.8	12.4	2.3	20.7
Average Total Precipitation (in.)	1.4	0.9	1.1	1.4	1.9	1.6	0.8	1.1	1.3	1.4	1.0	0.7	14.6
Bedford SE 3 (WY) (USC00480603)													
Period of Record: 6/1/1975 to Present								Lat: 42.8731			Long: -110.9069		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	28.2	33.1	41.8	50.0	60.6	71.0	80.2	78.6	70.1	56.1	39.7	28.3	53.1
Average Min. Temperature (F)	5.7	8.0	15.4	23.9	32.7	37.7	43.4	41.5	34.5	26.2	16.3	6.8	24.3
Average Total Precipitation (in.)	2.2	2.2	2.0	2.0	2.8	1.9	1.1	1.4	1.7	1.9	2.1	2.0	23.2
Bondurant (USC00480865)													
Period of Record: 12/14/2016 to Present								Lat: 43.2095			Long: -110.4032		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	22.5	28.6	36.9	47.7	62.0	70.5	78.4	76.7	68.0	56.1	36.6	23.1	50.6
Average Min. Temperature (F)	-5.5	-2.8	5.2	18.3	27.8	32.1	34.6	32.8	25.6	17.6	8.2	-4.3	15.8
Average Total Precipitation (in.)	2.7	2.0	2.0	1.3	1.6	1.5	1.3	1.3	1.5	1.3	2.1	2.7	21.2
Big Piney 11W (WSEO)													
Period of Record: 10/29/2012 to Present								Lat: 42.541			Long: -110.3335		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	35.2	35.6	44.0	50.5	59.3	71.0	78.9	78.5	70.7	55.8	44.1	33.6	54.8
Average Min. Temperature (F)	1.4	4.1	12.4	18.8	29.4	38.4	42.9	32.4	30.9	21.0	12.1	2.5	20.5
Average Total Precipitation (in.)	0.5	1.3	0.7	0.9	2.1	0.8	0.7	0.8	1.6	0.7	0.5	0.3	10.9

Note: Average monthly values calculated by Stantec Consulting Services from data downloaded from: RAWS USA Climate Archive (accessed March 2022, available at: <https://www.raws.dri.edu>), cli-MATE, MRCC Application Tools Environment (accessed March 2022, available at: <https://www.mrcc.purdue.edu/CLIMATE/welcome.html>), and Wyoming Agricultural Climate Network (WAGNet) Wyoming State Engineer’s Office (accessed March 2022, available at: <https://www.wrds.uwyo.edu/WACNEet/WAC.html>). For precipitation and temperature, months missing 10 or more daily measurements were excluded when calculating the monthly average.

3.1.4.3 Precipitation

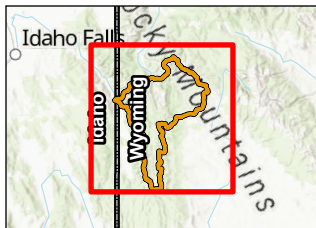
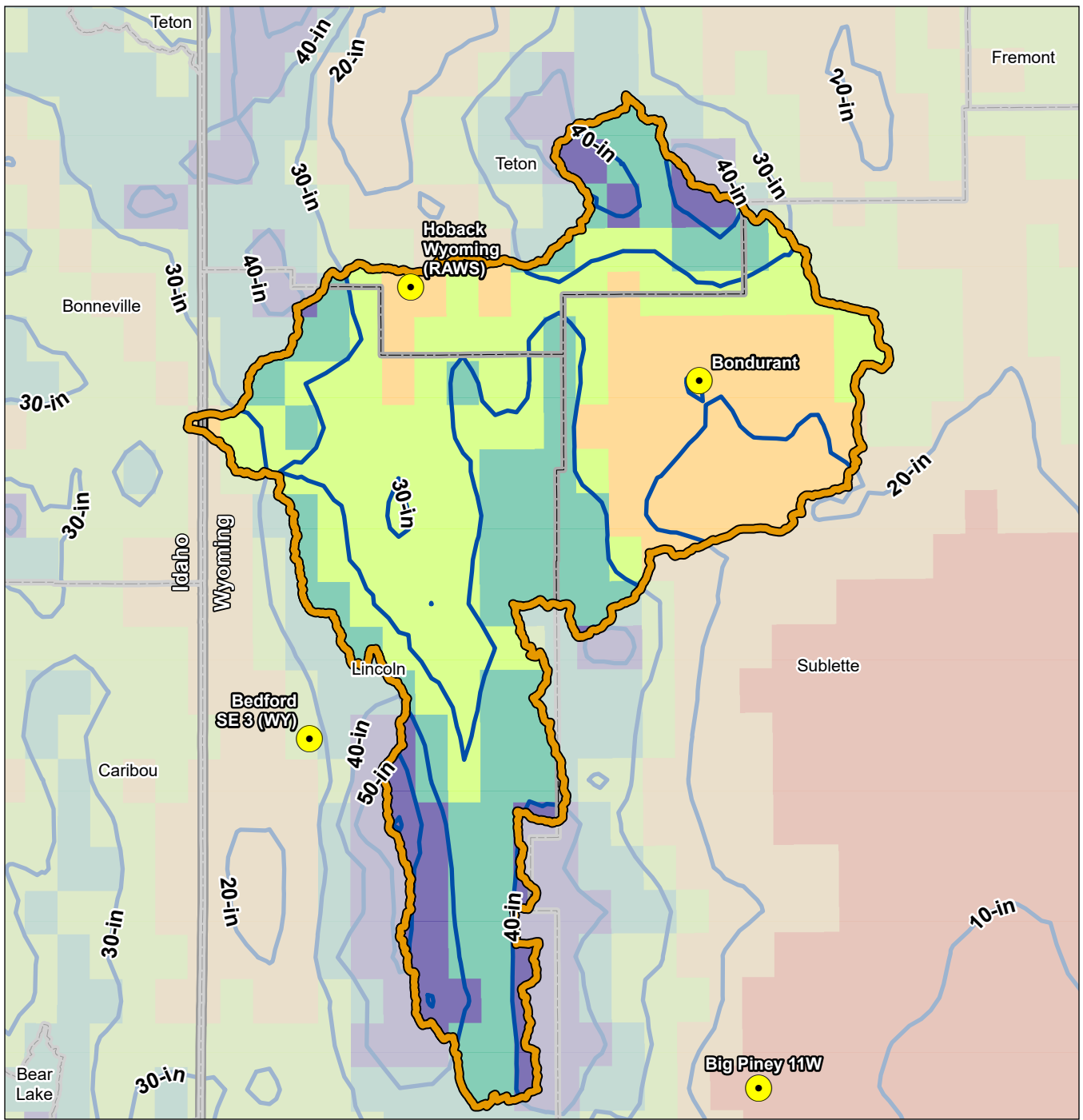
Average annual precipitation in the Hoback River Watershed varies widely depending on the location along the Wyoming Range. High alpine areas receive nearly 40-inches of precipitation annually while the northeastern lands near Bondurant receive 16-inches (**Figure 35**). Annual precipitation recorded at Hoback Wyoming (RAWS), Bedford SE 3 (WY), Bondurant, and Big Piney 11W climate stations are displayed in **Figure 36** and **Figure 37** for years with complete monthly data (i.e. no month is missing more than 10 days of data).

Outside of the watershed boundary, at Big Piney 11W climate station, May is the highest precipitation month, receiving an average of 2.1 inches. (**Figure 36** and **Figure 37**). The lowest precipitation month is December, which delivers an average of 0.3 inches at Big Piney 11W. Average precipitation during the remaining ten months is relatively constant, ranging between 0.5 inches and 1.6 inches. On average, Big Piney 11W records 10.9 inches of annual rainfall.

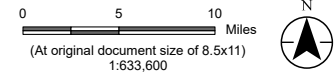
Average monthly precipitation trend at the Hoback Wyoming (RAWS) climate station generally agrees with precipitation recorded at Big Piney 11W with May being the highest precipitation month and December being the lowest precipitation month. Both climate stations indicate average monthly precipitation decreasing from May to July and then increasing again in the fall. Hoback Wyoming (RAWS) climate station receives an average of 1.9 inches of precipitation in May and 0.7 inches of precipitation in December.

The Bedford SE 3 (WY) climate station, which is located on the western slope of the Wyoming Range, just outside of the Hoback River Watershed boundary, records the highest precipitation in May, with an average of 2.8 inches; whereas, the lowest precipitation months are July and August, which both deliver an average of 1.1 and 1.3 inches, respectively, at the Hoback Wyoming (RAWS) station. Average precipitation during the remaining nine months is relatively constant, ranging between 1.7 and 2.2 inches. On average, Hoback Wyoming (RAWS) records 14.6 inches of annual precipitation.

At the Bondurant climate station, January and December record the highest precipitation, with an average of 2.7 inches for both months. The lowest precipitation months are April, July, August, and October, all having an average precipitation of 1.3 inches. Average precipitation during the remaining 7 months has a range between 1.5 and 2.1 inches.



- Legend**
- Climate Stations
 - Hoback, Greys, Snake River Watershed
 - County Boundary
 - State Boundary



Project Location Lincoln, Sublette, and Teton Co., WY *Prepared by* HDK on 2022-06-06

Client/Project Wyoming Water Development Commission Hoback River Watershed Study *227704133*

Figure No. **35**

Title **Annual Average Precipitation**

- Notes**
1. Coordinate System: NAD 1983 2011 UTM Zone 12N
 2. Data Sources: USGS
 3. Background: USGS 7.5 Minute Quadrangle

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Disclaimer: This document has been prepared based on information provided by others as cited in the Notes section. Stantec has not verified the accuracy and/or completeness of this information and shall not be responsible for any errors or omissions which may be incorporated herein as a result. Stantec assumes no responsibility for data supplied in electronic format, and the recipient accepts full responsibility for verifying the accuracy and completeness of the data.

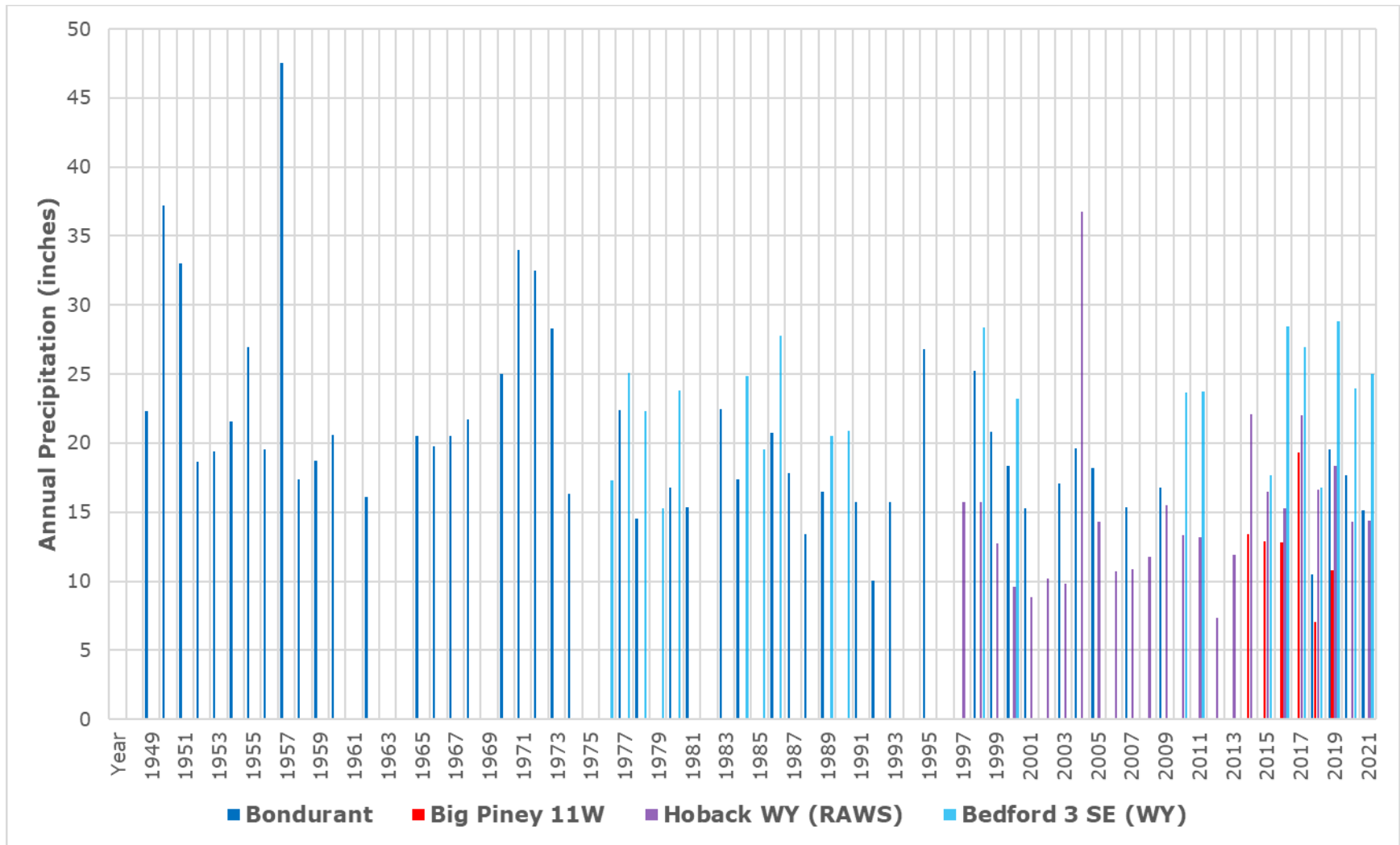


Figure 36. Annual precipitation at Bondurant, Big Piney 11W, Hoback WY (RAWS), and Bedford 3 SE (WY) for Years with Complete Monthly Data (An Incomplete Month is Missing More Than 10 Daily Data Entries) monthly data.

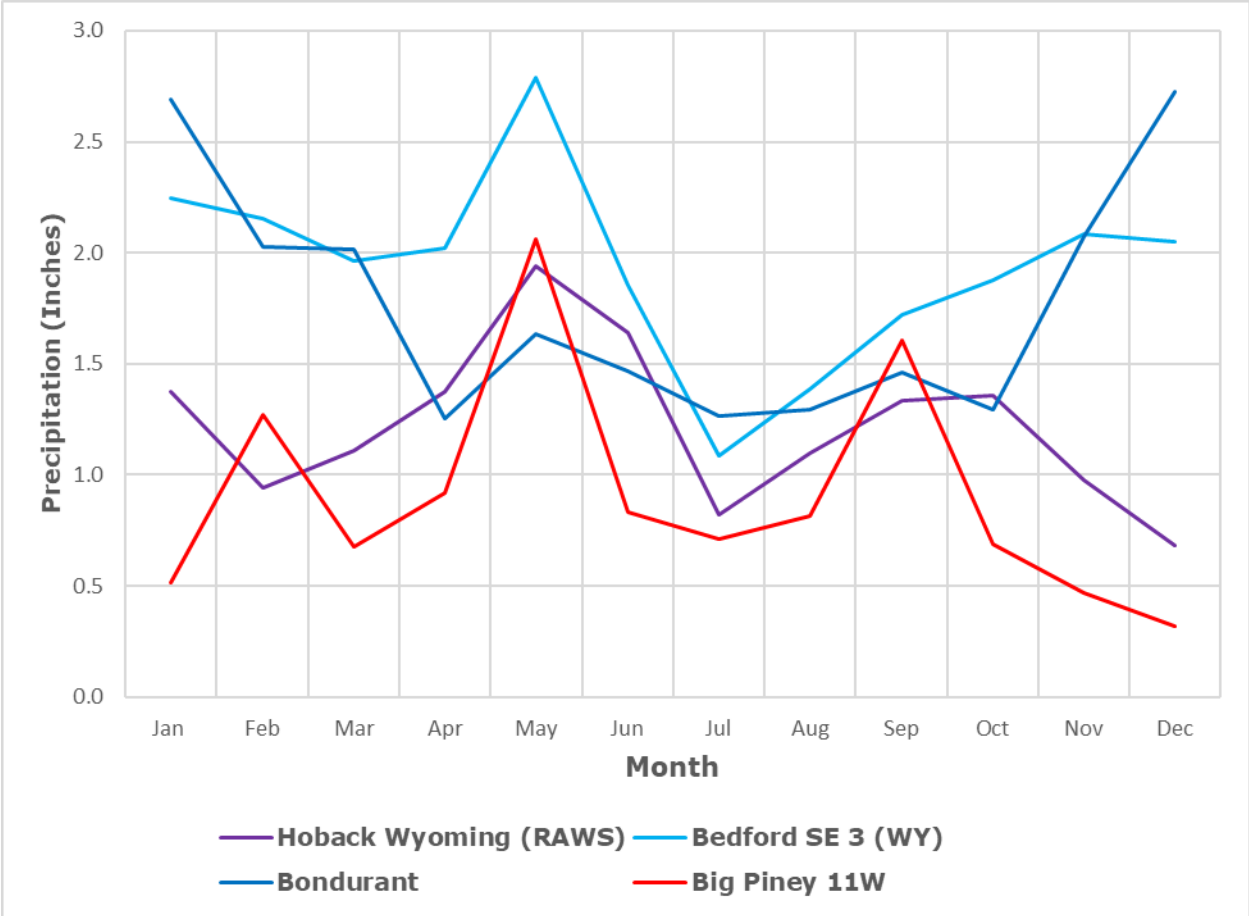


Figure 37. Average Monthly Precipitation

3.1.4.4 Growing Season

Within the Hoback River Watershed, agriculture is a major industry that contributes to one of Wyoming's largest industries. The crops that are grown in the Hoback River Watershed are hay and barley. The growing season is greatly dependent on precipitation, solar radiation, and first/last freeze of the year. Like most of Wyoming, the Hoback River Watershed has a short growing season, which ranges from 20 to 130 days for each given year. The first/last frost date can be seen in **Table 16**. The average last freeze of the year is dependent on location within the watershed due to elevations varying between 6,000 and 9,000 feet. There is one weather station (Bondurant) within the watershed boundary that collect first/last freezes of each year and three weather stations (Big Piney Airport, Bedford 3 SE WY, and Jackson Airport AWOS) are close, but not within the watershed boundary that can help describe the growing season.

The Bondurant climate station had the shortest growing season with an average last and first freeze of the year being July 25th and August 4th, respectively. The Big Piney Airport and Bedford 3 SE WY climate stations record nearly identical average last and first freezes. The average last and first freeze at the Big Piney Airport are June 26th and August 24th, respectively. At Bedford 3 SE WY station, the average last freeze is June 25th, and the average first freeze is August 27th. Jackson Airport AWOS climate station has an average last freeze of June 24th, and an average first freeze of September 3rd.

Table 16: Average Last and First Freeze from Climate Stations in or near the Hoback River Watershed

Station	Average Last Freeze	Average First Freeze
Bondurant WY	July 25	Aug 4
Big Piney Airport	June 26	August 24
Bedford 3 SE WY	June 25	August 27
Jackson Airport AWOS	June 24	September 3

3.2 BIOLOGICAL SYSTEMS

This section summarizes biological resources within the watershed. Primary biological resources addressed herein include fisheries, wildlife, and vegetation. This report focuses on wildlife issues most likely to affect projects in the watershed, including presence of federally listed threatened, endangered and proposed species, big game crucial ranges, greater sage-grouse (*Centrocercus urophasianus*) core areas and leks, species listed as Wyoming Species of Greatest Conservation Need (SGCN) and other sensitive species identified by the Bureau of Land Management (BLM), U.S. Forest Service (USFS) and Wyoming Natural Diversity Database (WYNDD). Of particular relevance to planning in the watershed is the presence of two fish species that may become federally listed in the future, the flannelmouth sucker (*Catostomus latipinnis*) and bluehead sucker (*Catostomus discobolus*). Vegetation resources of primary importance are riparian areas and wetlands.

3.2.1 Fish and Wildlife

3.2.1.1 Fisheries

The waterbodies within the Hoback River Watershed support a diverse population of fish. Two species have been listed as SGCN, bluehead sucker (*Catostomus discobolus*) and Snake River Cutthroat Trout (*Oncorhynchus clarkii spp.*). The Wyoming Game and Fish Department (WGFD) classifies fisheries resources based on the productivity of trout per mile measured in each river reach segment. The following classifications describe the quality of each stream or river as depicted in **Figure 38**.

- **Blue Ribbon:** National importance; premium trout waters and fisheries with trout production greater than 600 pounds of trout per mile
- **Red Ribbon:** Statewide importance; very good trout waters and fisheries with trout production of 300 – 600 pounds of trout per mile
- **Yellow Ribbon:** Regional importance; important trout waters and fisheries with trout production of 50 – 300 pounds of trout per mile
- **Green Ribbon:** Local importance; low production waters and fisheries with trout production of less than 50 pounds of trout per mile
- **Orange Ribbon:** Any cool- or warm-water fish present
- **Clear:** No trout present

The WGFD has not identified any Red or Orange Ribbon stream segments within the Hoback River Watershed. The watershed consists mostly of Green Ribbon tributaries which flow into the Hoback, Greys, and Snake Rivers. The Hoback and Greys River are classified as Yellow Ribbon and the section of the Snake River within the Hoback River Watershed (Snake River Canyon) is classified as Blue Ribbon. There are also tributaries designated as Clear with no trout present.

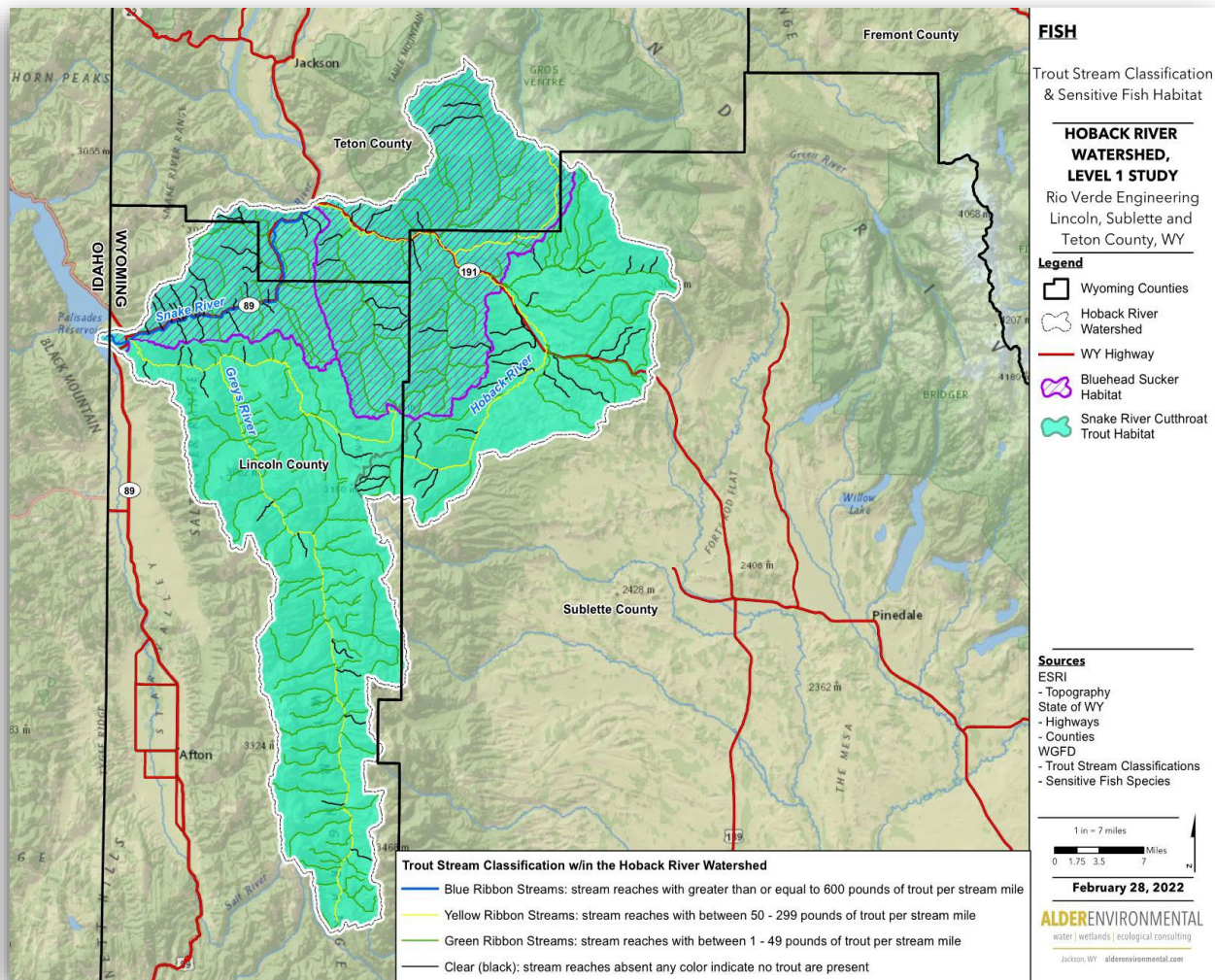


Figure 38. Trout stream classification and sensitive fish habitat within the Hoback River Watershed (data are clipped to the watershed boundary).

3.2.1.2 Wildlife

The U.S. Fish and Wildlife Service (USFWS) *Information, Planning and Consultation System* (IPAC, online database), the Wyoming Natural Diversity Database (WYNDD), and the Wyoming Game and Fish Department (WGFD) State Wildlife Action Plan (SWAP) were utilized to identify federally listed species and other species of concern within the Hoback River Watershed. Additional information about species of concern was obtained from the USFS and BLM. WGFD provided information on big game (i.e., ranges, parturition areas, major migration routes, and known migration barriers), greater sage-grouse (i.e., lek occupancy, core areas, and winter concentration areas), and habitat priority areas (WGFD 2012). WYNDD Data Explorer web application provided information on species listed as endangered, threatened or species of concern with known or suspected occurrence within the Hoback River Watershed.

3.2.1.2.1 Big Game

1. Pronghorn Antelope

A small portion of the Hoback River Watershed is considered habitat (spring-summer-fall range) for pronghorn (*Antilocapra americana*). There are two small sections of pronghorn migration routes that exist in the eastern part of the watershed (**Figure 39**). There are no WGFD designated parturition areas within the watershed.

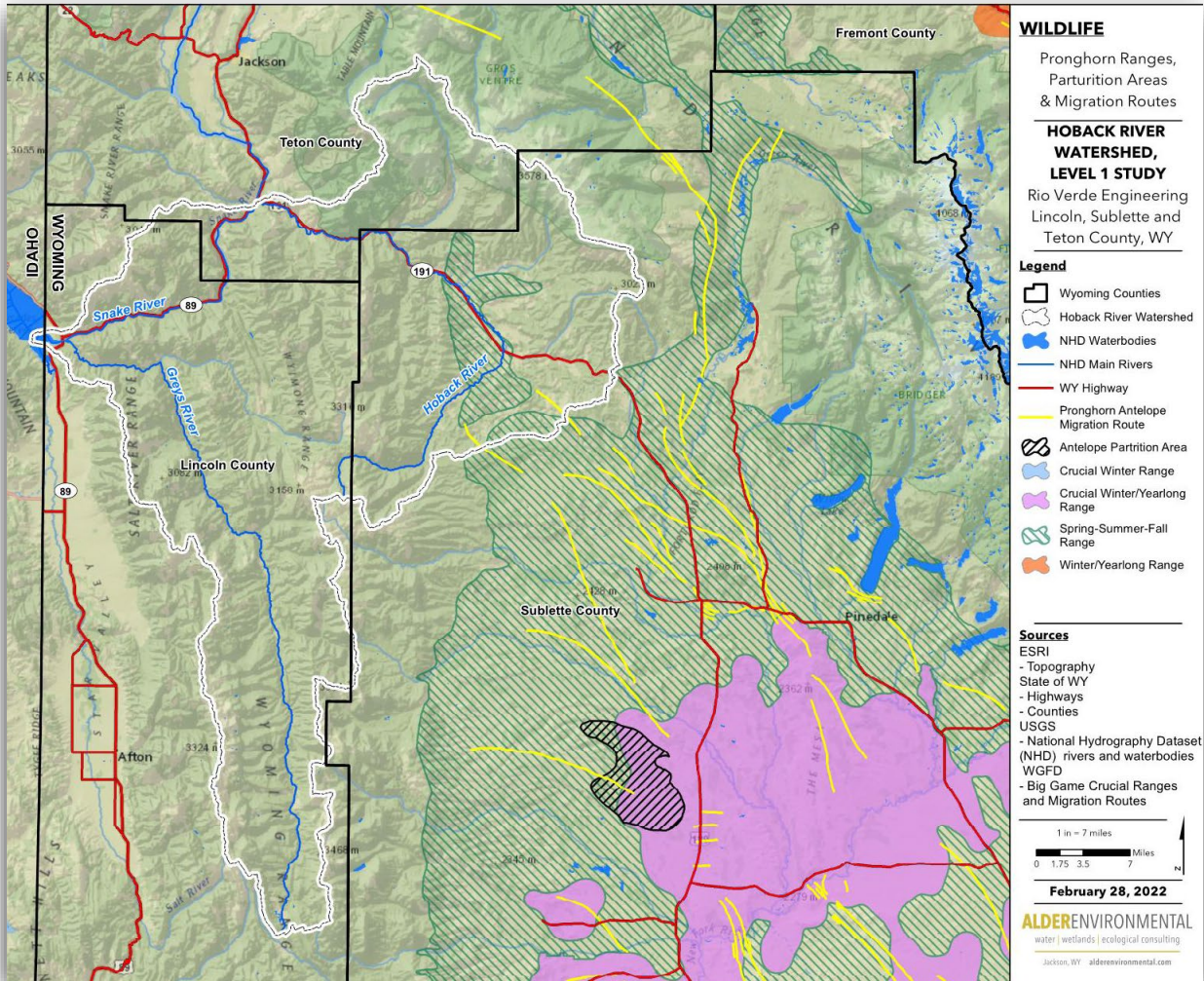


Figure 39. Crucial pronghorn habitat and migration routes within the Hoback River Watershed.

2. Mule Deer

Mule deer (*Odocoileus hemionus*) habitat and migration routes are present throughout the entire Hoback River Watershed (**Figure 40**). Smaller portions of the watershed are characterized as winter/year-long range by WGFD within the Snake River Canyon and along the Greys River. There is one section of WGFD designated crucial winter/year-long range along the lower section of the Hoback River and confluence with the Snake River.

According to the Wyoming Migration Initiative, deer migrate from the Hoback River Watershed to the southeast and down to the Red Desert (**Figure 41**). Western Wyoming supports the largest and most diverse ungulate populations in North America due to the ability to seasonally migrate. Ungulate populations cover wide ranges as they seasonally migrate from low-elevation winter ranges to high-elevation summer ranges in order to store up fat and energy for long Wyoming winters. The mule deer Red Desert to Hoback migration corridor is the longest migration ever recorded (150 miles) in the Lower 48 (Sawyer et al. 2014). This migration corridor is protected by the State of Wyoming as a Wyoming Governor Designated Migration Corridor (State of WY, Order 2020-1). As depicted in **Figure 41**, areas along the upper part of the Hoback River are as high use mule deer corridors WGFD designated parturition areas within the watershed (WGFD 2012).

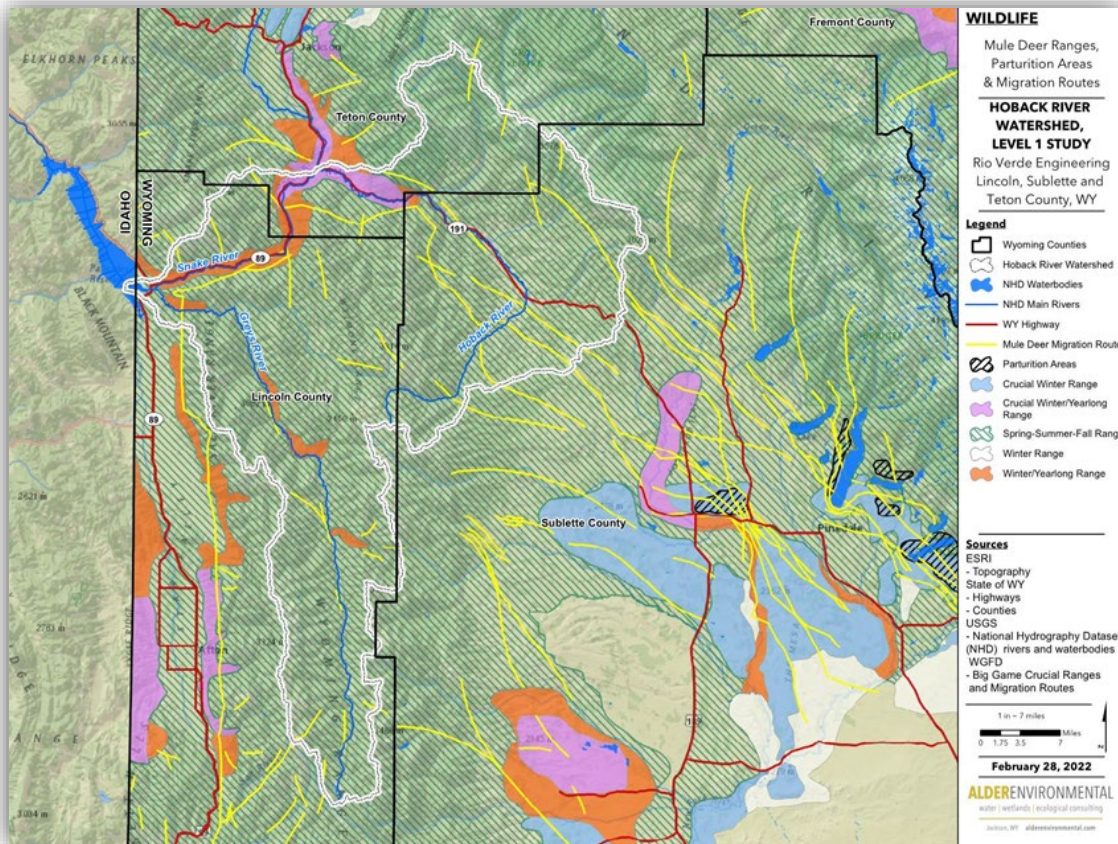


Figure 40. Mule deer ranges, parturition, and migration routes within the Hoback River Watershed.

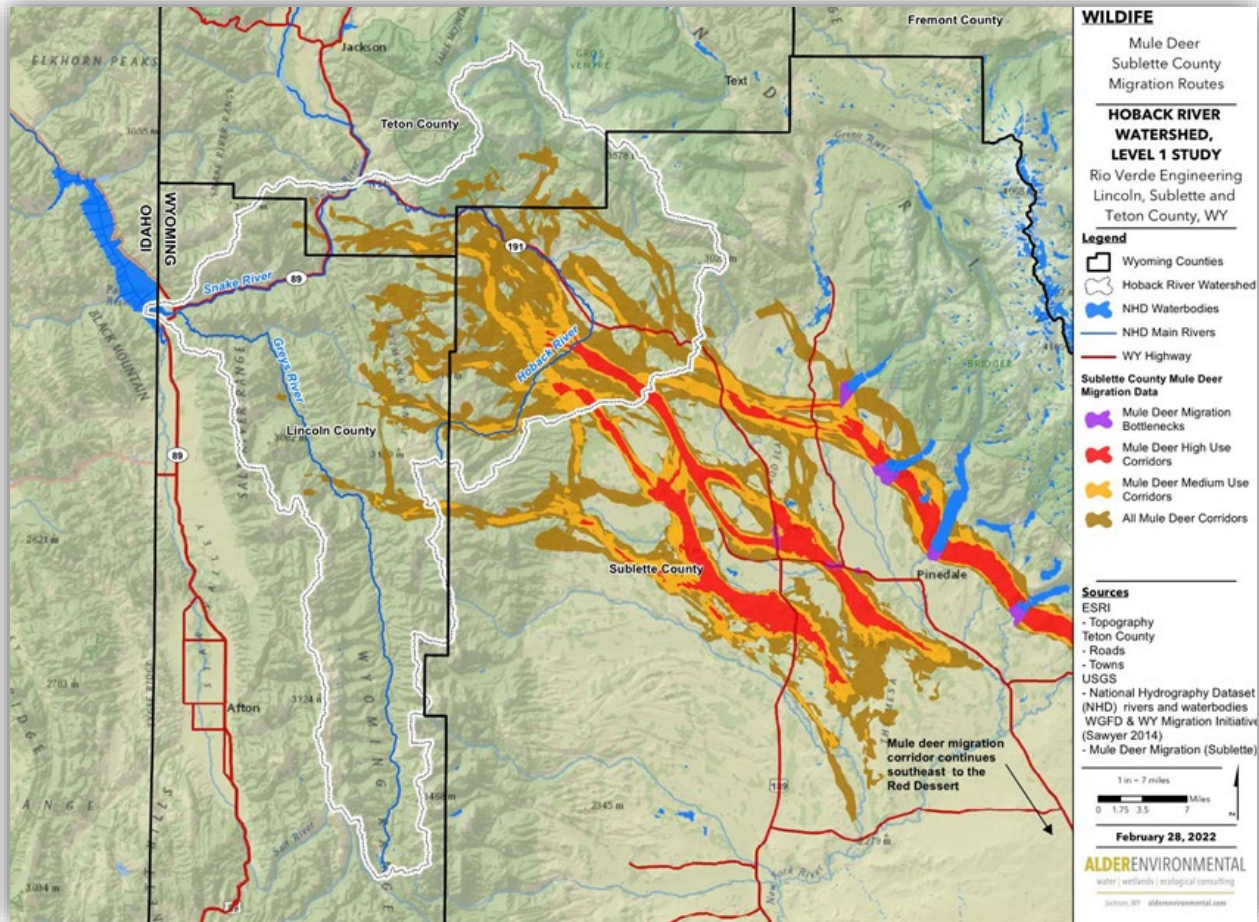


Figure 41. Mule deer migration routes in Sublette County, WY and within the Hoback River Watershed

3. Elk

Elk (*Cervus canadensis*) habitat and migration routes are present throughout the entire Hoback River Watershed (Figure 42). Portions of the eastern part of the watershed and along the Snake River Canyon are characterized as crucial winter/year-long range by WGFD. The majority of the Greys River and portions of the Hoback River are designated as crucial winter/year-long range. A small portion of the area around the confluence of the Hoback and Snake River is considered crucial winter range. There are several WGFD managed elk winter feed grounds within the watershed. Migration corridors and parturition areas are scattered throughout the watershed (WGFD 2012).

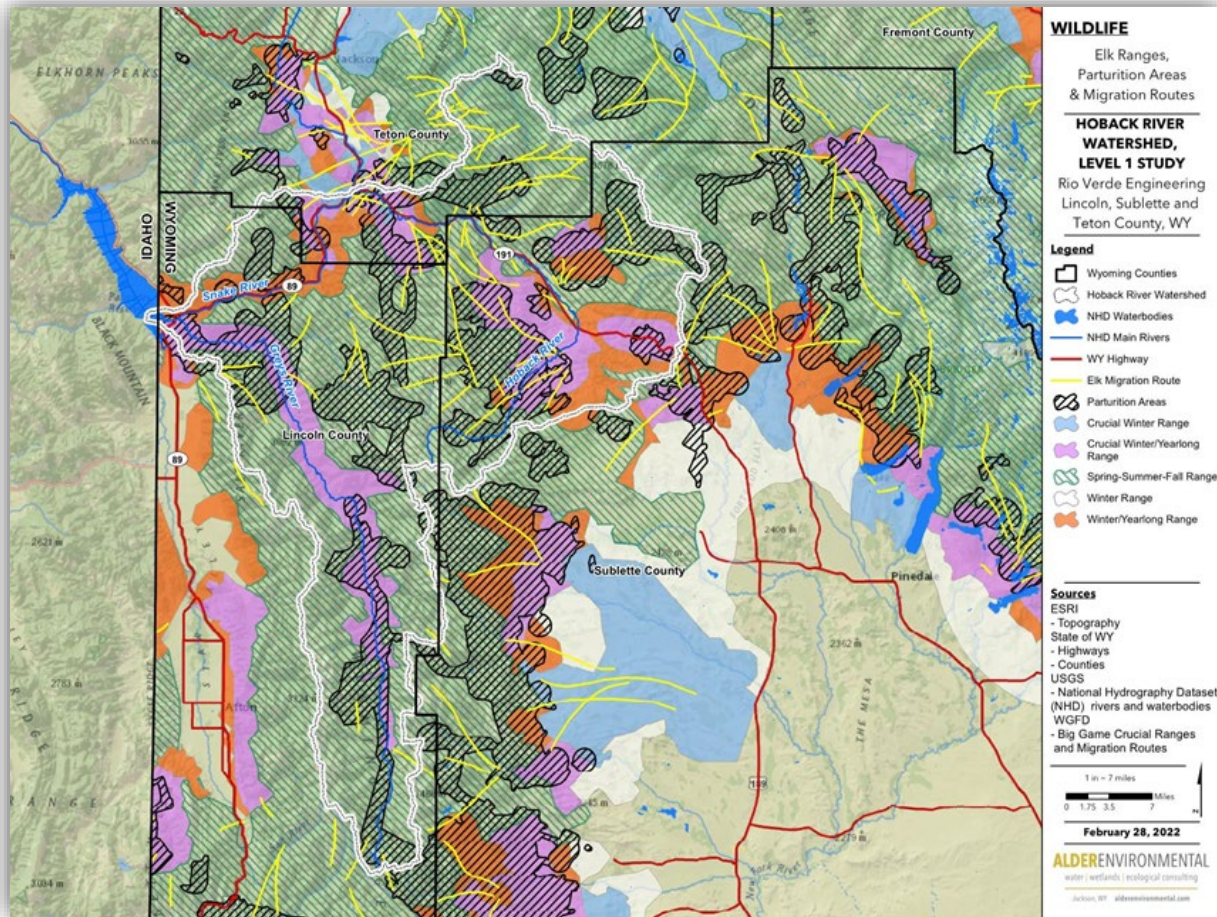


Figure 42. Elk ranges, parturition, and migration routes within the Hoback River Watershed.

4. Moose

Moose (*Alces alces*) habitat and migration routes are present throughout the entire Hoback River Watershed (Figure 43). A large portion of the eastern part of the watershed along the Hoback River and smaller areas along the Snake and Greys Rivers are characterized as crucial winter/year-long range by WGFD. Crucial winter/year-long range is designated along the Greys River and Snake River Canyon. Migration corridors are depicted in the northern part of the watershed around the Greys and Snake Rivers. There are no WGFD designated parturition areas within the watershed (WGFD 2012).

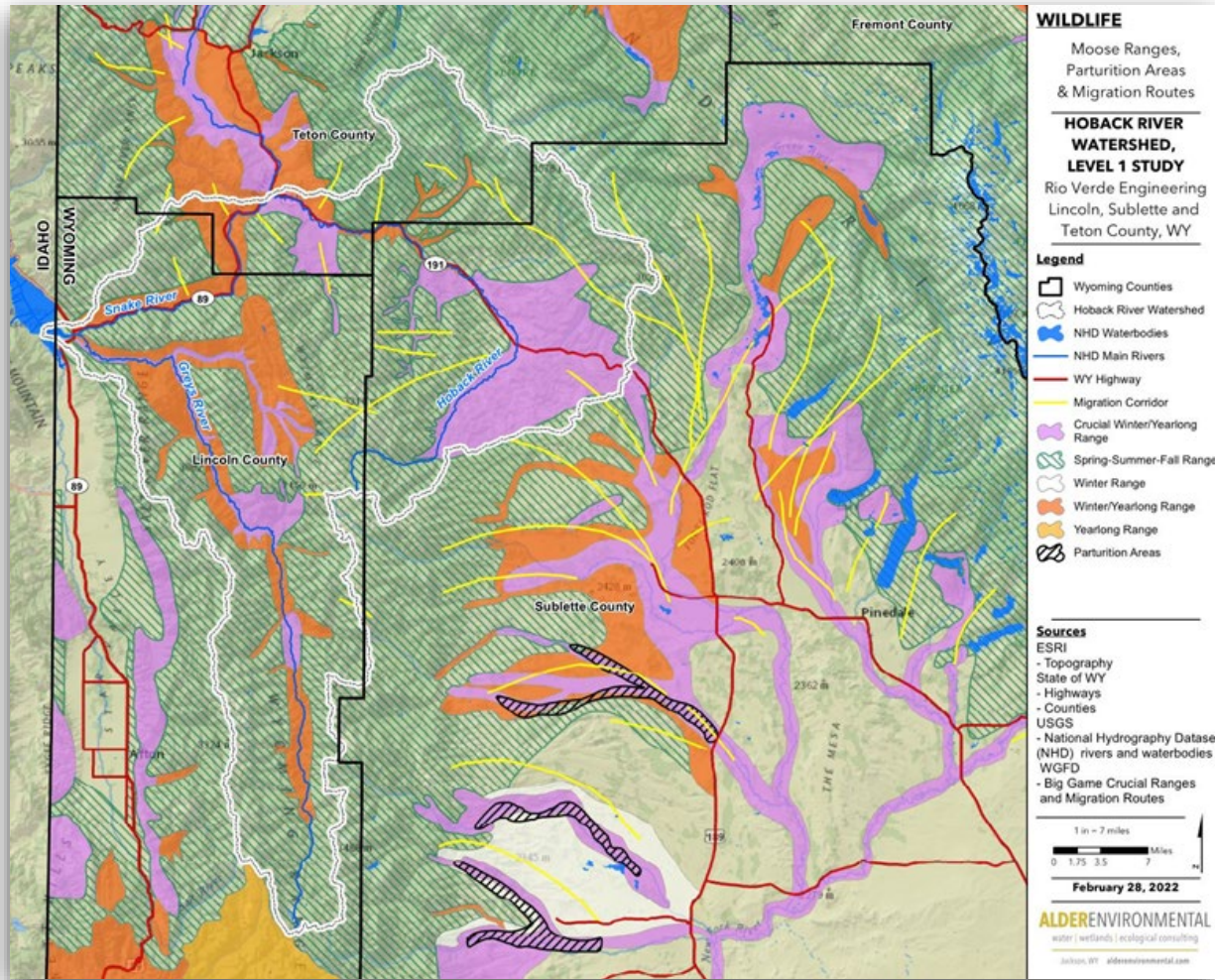


Figure 43. Moose ranges, parturition areas, and migration routes within the Hoback River Watershed

3.2.1.2.2 Greater Sage-Grouse

There are no WGFD designated Greater Sage-Grouse (*Centrocercus urophasianus*) Core Population Areas within the Hoback River Watershed. Sage-grouse habitat (31,890 ac) is present in the eastern portion of the watershed, south of Bondurant and Highway 189/191, and east of the Snake River Canyon along the Hoback River (2,933 ac). Based on the 2020 survey data from WGFD there are two occupied leks along the Hoback River as depicted in **Figure 44** below.

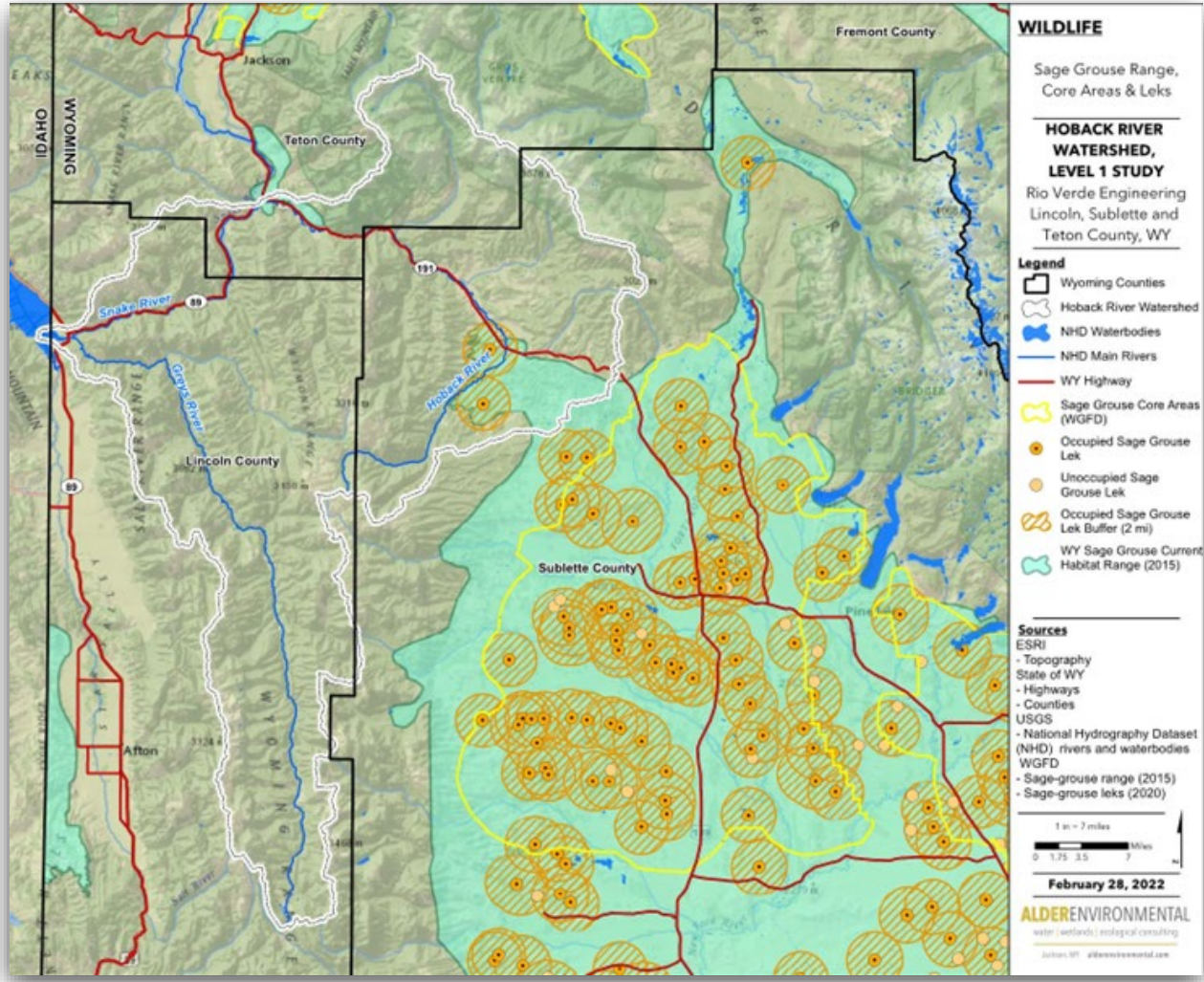


Figure 44. Greater Sage-Grouse habitat within the Hoback River Watershed

The 2015 Wyoming Executive Order (EO) 2015-4 mandating that new developments within the Greater Sage-Grouse Core Population Area will not cause declines in greater sage grouse populations. This order was revised and reissued in 2019 (State of WY, EO 2019-3). This executive order does not currently apply to lands within the Hoback River Watershed because there are no WGFD designated Greater Sage-Grouse Core Population Areas.

3.2.1.3 Federally Listed Species

Wildlife and plants species federally listed under the Endangered Species Act (ESA) of 1973 within the Hoback River Watershed were evaluated. The USFWS Information for Planning and Consultation (IPAC) database indicates there are four listed threatened species: Canada Lynx (*Lynx canadensis*), Grizzly Bear (*Ursus arctos horribilis*), Yellow-billed Cuckoo (*Coccyzus americanus*), and Ute Ladies'-tresses (*Spiranthes diluvialis*) and one proposed threatened species, Whitebark Pine (*Pinus albicaulis*) (Table 17).

3.1.2.3.3 Wildlife

The Canada lynx USFWS designated area of influence (AOI) is depicted throughout the Hoback River Watershed. The Grizzly bear AOI includes the majority of the watershed with the exception of a portion near the Greys River. The Yellow-billed Cuckoo AOI occurs throughout the watershed in lower elevation areas (Table 17).

3.1.2.3.4 Fish

There are four listed endangered fish species, Bonytail (*Gilia elegans*), Colorado Pikeminnow (*Ptychocheilus lucius*), Humpback Chub (*Gila cypha*), and Razorback Sucker (*Xyrauchen texanus*) (Table 15). None of these species are known to occur in the Hoback River Watershed however, they are present within the Colorado River Watershed (Figure 45). The two watersheds are not connected and therefore depletions within the Hoback River Watershed would not influence the Colorado River Watershed.

3. Insects

Monarch butterflies visit the Rocky Mountains during the summer months on their migration to overwintering sites, like Mexico and California. Monarchs depend on diverse nectar sources including species found in mesic shrub and mesic grasslands: Sulphur-flower buckwheat (*Eriogonum umbellatum*), Canada goldenrod (*Solidago canadensis*) and Rubber rabbitbrush (*Ericameria nauseosa*) (Fallon et al. 2016).

Table 17: Threatened and Endangered Species within the Hoback River Watershed (USFWS, 2022).

Common Name	Scientific Name	USFWS Status	Habitat Requirements	Potential Occurrence within Watershed
Mammals				
Canada Lynx	<i>Lynx canadensis</i>	Threatened	Subalpine coniferous forests with extensive horizontal cover	Moderate - species is documented in watershed as recently as 2003
Grizzly Bear	<i>Ursus arctos horribilis</i>	Threatened	Habitat generalist, forested areas and river corridors for movement	High - recent species observations in watershed
Birds				
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	Threatened	Riparian forest with dense understory	Moderate - along rivers and streams, species documented in watershed in 2004
Fish				
Bonytail	<i>Gilia elegans</i>	Endangered	Upper and Lower Colorado River, preferred habitat unknown	Low - not known to occur in watershed

Common Name	Scientific Name	USFWS Status	Habitat Requirements	Potential Occurrence within Watershed
Colorado Pikeminnow	<i>Ptychocheilus lucius</i>	Endangered	Upper Colorado and Green Rivers, adapted to warm rivers and requires uninterrupted passage with large spring peaks and stable base flows	Low - not known to occur in watershed
Humpback Chub	<i>Gila cypha</i>	Endangered	Upper Colorado and Green Rivers, required swift, turbid waters	Low - not known to occur in watershed
Razorback Sucker	<i>Xyrauchen texanus</i>	Endangered	Upper Colorado River, requires high spring flows, cobble bars for spawning and connected floodplains	Low - not known to occur in watershed
Insects				
Monarch Butterfly	<i>Danaus plexippus</i>	Candidate	Areas with nectar producing forbs and shrubs	Unknown at this time
Plants				
Ute Ladies'-tresses	<i>Spiranthes diluvialis</i>	Threatened	Along wetland meadows, springs, lakes, and perennial streams from 4,200-7,000 ft elevation (below 5,500 ft in Wyoming)	Moderate - could occur in lower elevations of watershed but not documented in watershed
Whitebark Pine	<i>Pinus albicaulis</i>	Proposed Threatened	Above 8000 ft elevation on cold and windy subalpine to alpine sites	High - species is common in watershed at higher elevations

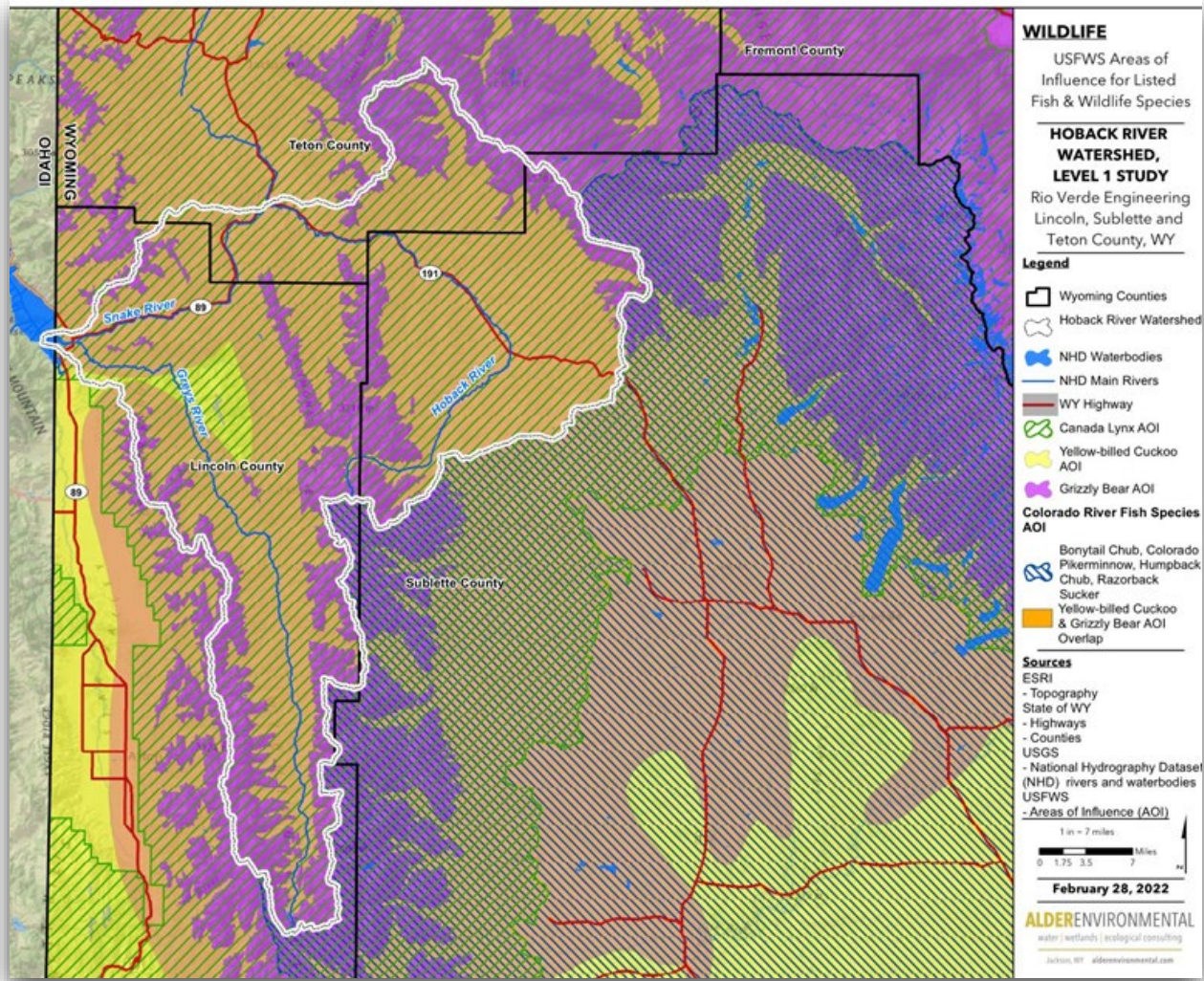


Figure 45. USFWS areas of influence for ESA listed fish and wildlife within the Hoback River Watershed

The WGFD State Wildlife Action Plan maintains a list of Species of Greatest Conservation Need (SGCN) as a tool to identify species in the state in need of conservation and management actions. SGCN species that are known or likely to occur within the Hoback River Watershed include 4 amphibian species, 64 bird species, 24 mammal species, 5 reptile species, 2 species of fish, and 8 species of mollusks (**Table 18**). The BLM maintains a list of species of concern, which includes 26 species that are known or likely to occur within the study area. The USFS maintains a list of sensitive species at the regional level. There are 32 USFS sensitive species listed within Regions 2 and 4 that are known or are suspected to occur in the Hoback River Watershed (**Table 18**).

Table 18: Wildlife species listed as endangered, threatened or species of concern with known or suspected occurrence within the Hoback River Watershed.

Class	Scientific Name	Common Name	G Rank	S Rank	USFWS	USFS	BLM	WGFD
Amphibians								
Amphibians	<i>Anaxyrus boreas</i>	Western Toad	G4	S1	NW	R4 Sensitive	Sensitive	Tier II
Amphibians	<i>Lithobates pipiens</i>	Northern Leopard Frog	G5	S4			Sensitive	Tier II
Amphibians	<i>Rana luteiventris</i>	Columbia Spotted Frog	G4	S3		R4 Sensitive	Sensitive	Tier II
Amphibians	<i>Spea intermontana</i>	Great Basin Spadefoot	G5	S4			Sensitive	Tier II
Birds								
Birds	<i>Accipiter gentilis</i>	Northern Goshawk	G5	S2S3BS3N	NW	R2 & R4 Sensitive	Sensitive	Tier I
Birds	<i>Aechmophorus clarkii</i>	Clark's Grebe	G5	S2S3				Tier II
Birds	<i>Aechmophorus occidentalis</i>	Western Grebe	G5	S3S4				Tier II
Birds	<i>Aegolius funereus</i>	Boreal Owl	G5	S2				Tier II
Birds	<i>Ammodramus savannarum</i>	Grasshopper Sparrow	G5	S4		R2 Sensitive		Tier II
Birds	<i>Anthus rubescens</i>	American Pipit	G5	S2				Tier III
Birds	<i>Aquila chrysaetos</i>	Golden Eagle	G5	S5BS4S5N				Tier II
Birds	<i>Archilochus alexandri</i>	Black-chinned Hummingbird	G5	S2				Tier II
Birds	<i>Ardea herodias</i>	Great Blue Heron	G5	S4				Tier II
Birds	<i>Artemisiospiza nevadensis</i>	Sagebrush Sparrow	G5	S3S4		R2 Sensitive	Sensitive	Tier II
Birds	<i>Asio flammeus</i>	Short-eared Owl	G5	S1S2				Tier II
Birds	<i>Athene cunicularia</i>	Burrowing Owl	G4	S3		R2 Sensitive	Sensitive	Tier I
Birds	<i>Bartramia longicauda</i>	Upland Sandpiper	G5	S4S5				Tier II
Birds	<i>Botaurus lentiginosus</i>	American Bittern	G5	S2S3		R2 Sensitive		Tier II
Birds	<i>Bubulcus ibis</i>	Cattle Egret	G5	S1S2				Tier II
Birds	<i>Buteo regalis</i>	Ferruginous Hawk	G4	S4S5BS3N	NW	R2 Sensitive	Sensitive	Tier II
Birds	<i>Buteo swainsoni</i>	Swainson's Hawk	G5	S5				Tier II
Birds	<i>Calcarius ornatus</i>	Chestnut-collared Longspur	G5	S3				Tier II
Birds	<i>Catherpes mexicanus</i>	Canyon Wren	G5	S4				Tier III
Birds	<i>Centrocercus urophasianus</i>	Greater Sage-Grouse	G4	S1	NW	R2 & R4 Sensitive	Sensitive	Tier II
Birds	<i>Charadrius montanus</i>	Mountain Plover	G3	S3	NW	R2 Sensitive	Sensitive	Tier I

Class	Scientific Name	Common Name	G Rank	S Rank	USFWS	USFS	BLM	WGFD
Birds	<i>Chlidonias niger</i>	Black Tern	G4G5	S1		R2 Sensitive		Tier II
Birds	<i>Chordeiles minor</i>	Common Nighthawk	G5	S5				Tier III
Birds	<i>Coccyzus americanus</i>	Yellow-billed Cuckoo	G5	S1	LT (W ContDvd)	R2 & R4 Sensitive	Sensitive	Tier II
Birds	<i>Cygnus buccinator</i>	Trumpeter Swan	G4	S3	NW	R2 & R4 Sensitive	Sensitive	Tier II
Birds	<i>Dolichonyx oryzivorus</i>	Bobolink	G5	S2S3				Tier II
Birds	<i>Egretta thula</i>	Snowy Egret	G5	S1S2				Tier II
Birds	<i>Empidonax traillii</i>	Willow Flycatcher	G5	S5				Tier II
Birds	<i>Falco columbarius</i>	Merlin	G5	S4				Tier III
Birds	<i>Falco peregrinus</i>	Peregrine Falcon	G4	S2BS2S3N	DM	R2 & R4 Sensitive	Sensitive	Tier II
Birds	<i>Falco sparverius</i>	American Kestrel	G5	S5				Tier III
Birds	<i>Gavia immer</i>	Common Loon	G5	S1BS3N		R4 Sensitive		Tier I
Birds	<i>Geothlypis tolmiei</i>	MacGillivray's Warbler	G5	S4				Tier II
Birds	<i>Geothlypis trichas</i>	Common Yellowthroat	G5	S5				Tier III
Birds	<i>Glaucidium gnoma</i>	Northern Pygmy-Owl	G4G5	S1S2				Tier II
Birds	<i>Haliaeetus leucocephalus</i>	Bald Eagle	G5	S4BS5N	DM	R2 & R4 Sensitive	Sensitive	Tier II
Birds	<i>Histrionicus histrionicus</i>	Harlequin Duck	G4	S1		R2 & R4 Sensitive		Tier II
Birds	<i>Hydroprogne caspia</i>	Caspian Tern	G5	S1				Tier II
Birds	<i>Lanius ludovicianus</i>	Loggerhead Shrike	G4	S4S5		R2 Sensitive	Sensitive	Tier II
Birds	<i>Leucophaeus pipixcan</i>	Franklin's Gull	G5	S1				Tier II
Birds	<i>Leucosticte atrata</i>	Black Rosy-Finch	G4	S1BS2N				Tier II
Birds	<i>Loxia curvirostra</i>	Red Crossbill	G5	S5				Tier II
Birds	<i>Melanerpes lewis</i>	Lewis's Woodpecker	G4	S3		R2 Sensitive		Tier II
Birds	<i>Numenius americanus</i>	Long-billed Curlew	G5	S3S4		R2 Sensitive		Tier II
Birds	<i>Oreoscoptes montanus</i>	Sage Thrasher	G4	S5			Sensitive	Tier II
Birds	<i>Oreothlypis virginiae</i>	Virginia's Warbler	G5	S1				Tier II
Birds	<i>Passerina caerulea</i>	Blue Grosbeak	G5	S1				Tier III
Birds	<i>Pelecanus erythrorhynchos</i>	American White Pelican	G4	S3S4				Tier II
Birds	<i>Picoides arcticus</i>	Black-backed Woodpecker	G5	S2	NW (BlackHills)	R2 Sensitive		Tier II
Birds	<i>Plegadis chihi</i>	White-faced Ibis	G5	S1			Sensitive	Tier II

Class	Scientific Name	Common Name	G Rank	S Rank	USFWS	USFS	BLM	WGFD
Birds	<i>Poliioptila caerulea</i>	Blue-gray Gnatcatcher	G5	S3S4				Tier III
Birds	<i>Psiloscoops flammeolus</i>	Flammulated Owl	G4	S1		R2 & R4 Sensitive		Tier III
Birds	<i>Rallus limicola</i>	Virginia Rail	G5	S2S4				Tier III
Birds	<i>Selasphorus calliope</i>	Calliope Hummingbird	G5	S2				Tier II
Birds	<i>Selasphorus rufus</i>	Rufous Hummingbird	G5	S3				Tier II
Birds	<i>Setophaga nigrescens</i>	Black-throated Gray Warbler	G5	S2				Tier II
Birds	<i>Sitta pygmaea</i>	Pygmy Nuthatch	G5	S2S3				Tier II
Birds	<i>Sphyrapicus thyroideus</i>	Williamson's Sapsucker	G5	S3S4				Tier II
Birds	<i>Spizella breweri</i>	Brewer's Sparrow	G5	S5		R2 Sensitive	Sensitive	Tier II
Birds	<i>Sterna forsteri</i>	Forster's Tern	G5	S1				Tier II
Birds	<i>Strix nebulosa</i>	Great Gray Owl	G5	S2				Tier II
Birds	<i>Tympanuchus phasianellus columbianus</i>	Columbian Sharp-tailed Grouse	G4T3	S1	NW	R2 & R4 Sensitive	Sensitive	Tier II
Birds	<i>Vireo olivaceus</i>	Red-eyed Vireo	G5	S2				Tier II
Birds	<i>Vireo vicinior</i>	Gray Vireo	G5	S1				Tier II
Fish								
Fish	<i>Catostomus discobolus</i>	Bluehead Sucker	G4	S3				Tier I
Fish	<i>Oncorhynchus clarkii spp.</i>	Snake River Cutthroat Trout	G4T1T2Q	S1			Sensitive	Tier II
Mammals								
Mammals	<i>Alces alces</i>	Moose	G5	S4				Tier II
Mammals	<i>Brachylagus idahoensis</i>	Pygmy Rabbit	G4	S2	NW	R4 Sensitive	Sensitive	Tier II
Mammals	<i>Corynorhinus townsendii</i>	Townsend's Big-eared Bat	G4	S2BS1N		R2 & R4 Sensitive	Sensitive	Tier II
Mammals	<i>Cynomys leucurus</i>	White-tailed Prairie Dog	G4	S2S3	NW	R2 Sensitive	Sensitive	Tier II
Mammals	<i>Glaucomys sabrinus</i>	Northern Flying Squirrel	G5	S3S4				Tier II
Mammals	<i>Gulo gulo</i>	Wolverine	G4	S1S2	NW			Tier II
Mammals	<i>Lemmyscurtatus</i>	Sagebrush Vole	G5	S4				Tier II
Mammals	<i>Lontra canadensis</i>	Northern River Otter	G5	S3S4	NW	R2 Sensitive		Tier II
Mammals	<i>Lynx canadensis</i>	Canada Lynx	G5	S1	LT			Tier I
Mammals	<i>Microtus richardsoni</i>	Water Vole	G5	S1		R2 Sensitive		Tier II
Mammals	<i>Myotis ciliolabrum</i>	Western Small-footed Myotis	G5	S4				Tier II

Class	Scientific Name	Common Name	G Rank	S Rank	USFWS	USFS	BLM	WGFD
Mammals	<i>Myotis evotis</i>	Long-eared Myotis	G5	S4S5			Sensitive	Tier III
Mammals	<i>Myotis lucifugus</i>	Little Brown Myotis	G3	S5	UR			Tier II
Mammals	<i>Myotis thysanodes</i>	Fringed Myotis	G4	S2S3		R2 Sensitive	Sensitive	Tier II
Mammals	<i>Myotis volans</i>	Long-legged Myotis	G4G5	S4S5				Tier III
Mammals	<i>Myotis yumanensis</i>	Yuma Myotis	G5	S1				Tier III
Mammals	<i>Ochotona princeps</i>	American Pika	G5	S2	NW			Tier II
Mammals	<i>Ovis canadensis</i>	Bighorn Sheep	G4	S2S3		R2 & R4 Sensitive		Tier II
Mammals	<i>Sorex nanus</i>	Dwarf Shrew	G4	S4S5				Tier II
Mammals	<i>Sorex preblei</i>	Preble's Shrew	G4	S2S3				Tier III
Mammals	<i>Spilogale gracilis</i>	Western Spotted Skunk	G5	S3S4				Tier III
Mammals	<i>Tamias amoenus</i>	Yellow-pine Chipmunk	G5	S3S4				Tier III
Mammals	<i>Tamias umbrinus</i>	Uinta Chipmunk	G5	S2S5				Tier III
Mammals	<i>Thomomys idahoensis</i>	Idaho Pocket Gopher	G4	S1S2	NW		Sensitive	Tier II
Mollusks								
Mollusks	<i>Discus whitneyi</i>	Forest Disc	G5	SNR				Tier III
Mollusks	<i>Gyraulus parvus</i>	Ash Gyro	G5	S4				Tier III
Mollusks	<i>Oreohelix pygmaea</i>	Pygmy Mountainsnail	G1	S1	NW	R2 Sensitive		Tier II
Mollusks	<i>Oreohelix strigosa</i>	Rocky Mountain Mountainsnail	G5Q	S2				Tier III
Mollusks	<i>Oreohelix subrudis</i>	Subalpine Mountainsnail	G5	SNR				Tier III
Mollusks	<i>Physa acuta</i>	Pewter Physa	G5Q	S4				Tier III
Mollusks	<i>Physa gyrina</i>	Tadpole Physa	G5	S4				Tier III
Mollusks	<i>Planorbella trivolvis</i>	Marsh Rams-horn	G5	S4				Tier III
Reptiles								
Reptiles	<i>Charina bottae</i>	Northern Rubber Boa	G5	S2				Tier II
Reptiles	<i>Phrynosoma hernandesi</i>	Greater Short-horned Lizard	G5	S4				Tier II
Reptiles	<i>Pituophis catenifer deserticola</i>	Great Basin Gophersnake	G5T5	S3				Tier II
Reptiles	<i>Plestiodon skiltonianus utahensis</i>	Great Basin Skink	G5T5	S1				Tier III
Reptiles	<i>Thamnophis sirtalis fitchi</i>	Valley Gartersnake	G5TNR	S2				Tier III

G = Global rank: range-wide probability of extinction assigned by NatureServe (1 = critically imperiled, 2 = imperiled, 3 = vulnerable, 4 = apparently secure, 5 = secure)

S = State rank: range-wide probability of extinction assigned by WYNDD (1 = critically imperiled, 2 = imperiled, 3 = vulnerable, 4 = apparently secure, 5 = secure)

T = Trinomial rank: range-wide probability of extinction for a subspecies or variety (1 = critically imperiled, 2 = M imperiled, 3 = vulnerable, 4 = apparently secure, 5 = secure)

Rank modifiers: B = Breeding rank: status of migratory species during breeding season, N = Non-breeding rank: indicates the status of a migratory species during the nonbreeding season H = possibly extinct or extirpated, Q = questions exist regarding taxonomic validity of species or subspecies, NR = not ranked, U = unrankable, X = presumed extirpated, ? = questions exist regarding assigned numerical score.

USFWS: DM = delisted/formally monitored, LE = Listed Endangered, LT = Listed threatened, NW = not warranted, PT = proposed threatened, UR = petition under review

USFS: R2 = region 2, R4 = region 4

WGFD: Tier I = highest priority, Tier II = moderate priority, Tier III = lowest

WGFD: SGCN = species of greatest conservation need, NSS: native species status rank (1 being most important, see WGFD matrix table at: <https://www.uwyo.edu/wyndd/find-data-info/about-our-data-information/codes-and-definitions/state-status/index.html>)

3.2.2 Sensitive Plant Species

Federally Listed Plant Species

One species listed as Threatened by the USFWS ESA, Ute Ladies'-tresses (*Spiranthes diluvialis*), has the potential to occur within the watershed (USFWS 2022). The USFWS AOI data shows one small area within the Hoback River Watershed east of Palisades Reservoir where there is potential habitat for Ute Ladies'-tresses (**Figure 46**). This species grows at lower elevations along riparian edges, gravel bars, old oxbows, high flow channels, and moist to wet meadows along perennial streams. This habitat is limited within the watershed because of the high elevations and narrow riparian corridors.

Whitebark pine (*Pinus albicaulus*), is common throughout the higher elevations within the Hoback River Watershed (USFWS 2022). The USFWS AOI data are mapped in these corresponding regions of the watershed (**Figure 46**). The Whitebark pine range extends from areas in northwestern Wyoming, southerly into the Wyoming and Slat River Ranges, and southeasterly along the crest of the Wind River Range.

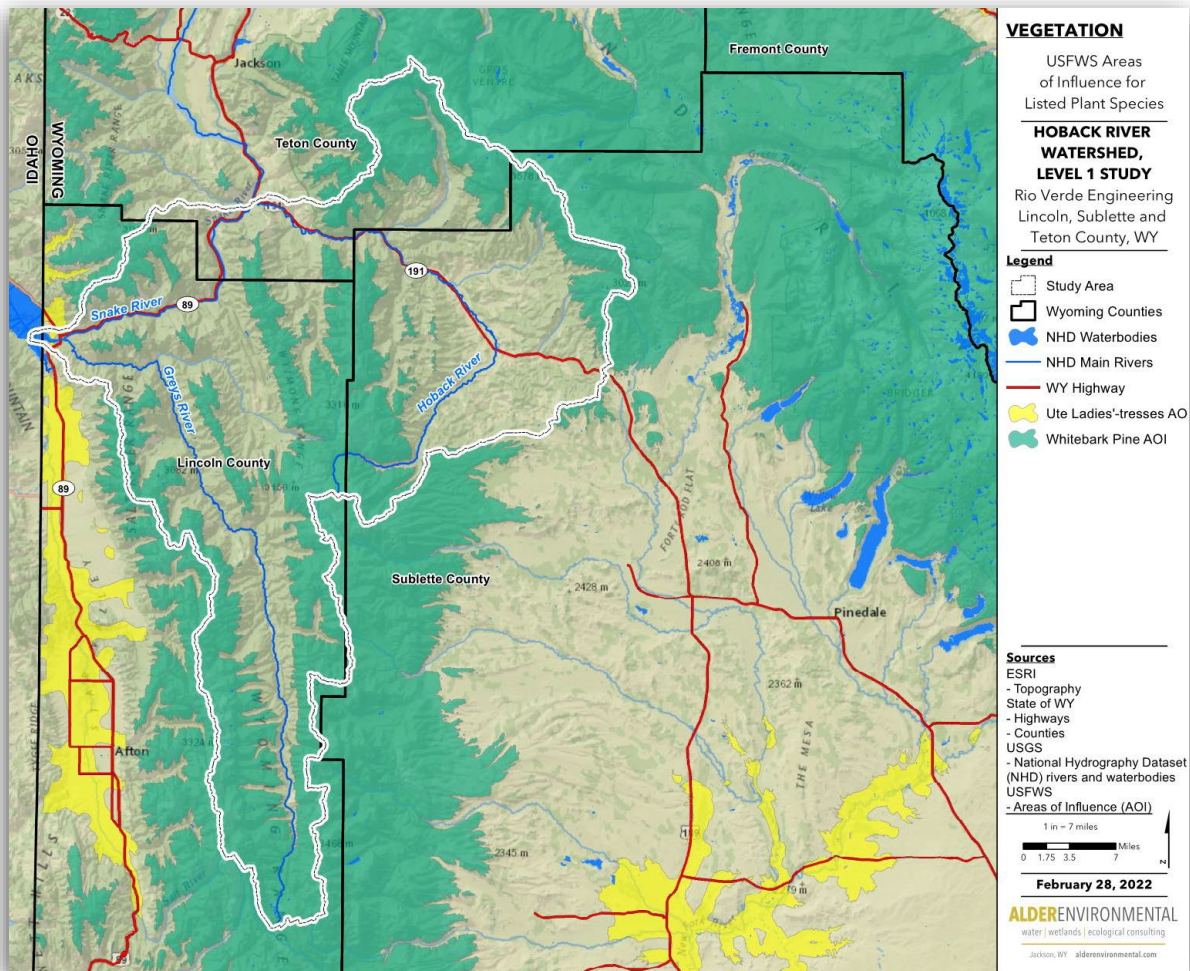


Figure 46. USFS areas of influence for listed plants within the Hoback River Watershed.

State Sensitive Plant Species

There are 25 plant species designated by the WYNDD as sensitive plant species that have known occurrences within the watershed (**Table 19**). Seven of these species are listed as critically imperiled in the state of Wyoming, as indicated in **Table 19** with State Rank classification of S1. Eight species are designated as sensitive by USFS, and no species are characterized as sensitive by BLM.

Table 19: Plant species of concern with known or suspected occurrences within the Hoback River Watershed.

<i>Scientific Name</i>	Common Name	Global Rank	State Rank	USFS Sensitive	BLM Sensitive
<i>Antennaria aromatica</i>	Scented pussytoes	G4	S3		
<i>Arceuthobium douglasii</i>	Douglas-fir dwarf mistletoe	G5	SH		
<i>Asplenium trichomanes-ramosum</i>	Brightgreen spleenwort	G5	S2S3		
<i>Astragalus paysonii</i>	Payson's milkvetch	G3	S2	USFS-R4	
<i>Astragalus shultziorum</i>	Shultz's milkvetch	G3Q	S3		
<i>Botrychium simplex</i>	Little grapefern	G5	S2	USFS-R4	
<i>Braya glabella ssp. glabella</i>	Smooth northern braya	G5T5?	S1	USFS-R2	
<i>Cryptogramma stelleri</i>	Fragile rockbrake	G5	S1		
<i>Draba borealis</i>	Boreal draba	G4G5	S2	USFS-R4	
<i>Draba crassa</i>	Thickleaf draba	G3G4	S3		
<i>Draba fladnizensis</i>	Austrian draba	G4G5	S2		
<i>Draba globosa</i>	Beavertip draba	G3	S2S3	USFS-R4	
<i>Draba paysonii</i>	Payson's draba	G5	S2		
<i>Lomatium bicolor</i>	Wasatch desertparsley	G4	S2		
<i>Monardella odoratissima var. glauca</i>	Pale monardella	G3G5TNR	S1		
<i>Orobanche corymbosa ssp. corymbosa</i>	Flat-top broomrape	G4T4	S1S2		
<i>Pedicularis pulchella</i>	Mountain lousewort	G3	S3		
<i>Physaria carinata ssp. paysonii</i>	Payson's keeled bladderpod	G3TNR	S3	USFS-R4	
<i>Physaria multiceps</i>	Western bladderpod	G3	S1		
<i>Potentilla subgorodkovii</i>	One-flower cinquefoil	G5	S2		
<i>Sabulina macrantha var. filiorum</i>	Thread-branch stitchwort	G3G4	S1		
<i>Silene repens</i>	Pink campion	G5	S1		
<i>Stephanomeria fluminea</i>	Teton wirelettuce	G2	S2		
<i>Symphyotrichum molle</i>	Soft aster	G3	S3	USFS-R4	
<i>Triteleia grandiflora</i>	Largeflower triteleia	G4G5	S2	USFS-R2	

G = Global rank: range-wide probability of extinction assigned by NatureServe (1 = critically imperiled, 2 = imperiled, 3 = vulnerable, 4 = apparently secure, 5 = secure)

S = State rank: range-wide probability of extinction assigned by WYNDD (1 = critically imperiled, 2 = imperiled, 3 = vulnerable, 4 = apparently secure, 5 = secure)

T = Trinomial rank: range-wide probability of extinction for a subspecies or variety (1 = critically imperiled, 2 = M imperiled, 3 = vulnerable, 4 = apparently secure, 5 = secure)

Rank modifiers: H = possibly extinct or extirpated, Q = questions exist regarding taxonomic validity of species or subspecies, NR = not ranked, ? = questions exist regarding assigned numerical score

3.2.3 State and Federal Important Habitats

WGFD Habitat Priority Areas

WGFD's Statewide Habitat Plan (SHP, formerly known as the Strategic Habitat Plan) identifies key wildlife habitat priority areas as crucial, restoration, and/or connectivity (fish and wildlife migration) areas to guide habitat projects (WGFD 2020b). Three types of habitat priority areas are defined by WGFD: Crucial Habitat Priority Areas, Restoration Habitat Priority Areas, and Connectivity Habitat Priority Areas, which are subdivided into Aquatic and Terrestrial. In addition, WGFD has designated Crucial Stream Corridors and Nongame Wildlife Areas. The BLM also has designated Areas of Critical Environmental Concern.

Crucial Habitat Priority Areas

According to WGFD, Crucial Habitat Priority Areas "are based on significant biological or ecological values. These are areas that need to be protected or managed to maintain viable healthy populations of terrestrial and aquatic wildlife for the present and future. They represent habitat values and identify where those values occur on the landscape. Examples of values include crucial winter range, sage grouse core area seasonal habitats, Species of Greatest Conservation Need (SGCN) diversity and uniqueness, quality and condition of vegetative communities, quality of watershed hydrologic function, etc." (WGFD 2020b). Most of the southern part of the Hoback River Watershed is classified as Aquatic Crucial Habitat Priority Area (**Figure 47**). Terrestrial Crucial Habitat Priority Area is designated along the Greys and Hoback Rivers and eastern part of the watershed (**Figure 46**).

Restoration Habitat Priority Areas

According to WGFD, Restoration Habitat Priority Areas "represent those with a realistic potential to address wildlife habitat issues and to improve, enhance, or restore wildlife habitats. These areas offer potential for improving habitat and focusing Department habitat efforts. They may overlap crucial areas or be distinct from them. Restoration areas are based on habitat issues. Like crucial areas where values are key, issues were identified by regional personnel and used to select restoration habitat areas. Examples of issues include loss of aspen communities, habitat fragmentation, development, water quality effects, water quantity limitations, beetle killed conifer, loss of fish to diversions, degraded habitat, etc." (WGFD 2020b). Within the Hoback River Watershed, the upper Hoback River and most of the Greys River are designated as Aquatic Restoration Habitat Priority Areas (**Figure 47**). The entire watershed is mapped as Terrestrial Restoration Habitat Priority Areas (**Figure 48**).

Connectivity Habitat Priority Areas

According to WGFD, Connectivity Habitat Priority Areas "were developed to reflect the high importance that issues related to connectivity among fish and wildlife populations have gained in recent years. These areas are meant to promote protecting connectivity where it currently occurs and focus attention on enhancing fish passage and wildlife migrations to improve connectivity. Officially designated wildlife migration corridors as well as informally identified migration routes are included under this goal. Likewise, fish passage areas are included. A sampling of issues addressed under this goal include road crossings that impede fish or wildlife, diversion dams that block fish, the location and accessibility of ungulate stopover areas, diversions that entrain high numbers of fish, and fences that block or impede migrations." (WGFD 2020b). Within the Hoback River Watershed, tributaries along the Snake River Canyon are designated as Connectivity Habitat Priority Areas (**Figure 47**). Terrestrial Connectivity Habitat Priority Areas include a mosaic of the eastern part of the watershed (**Figure 48**).

Crucial Stream Corridors

WGFD has defined Crucial Stream Corridors as river segments that have been identified to be unique, have high species richness, lack migration barriers, remain in relatively natural conditions, and provide connectivity between sources and sink locations. Corridors include main stem, side channels, and braided channel areas. The Snake River Canyon within the Hoback River Watershed is designated as a Crucial Stream Corridor (Figure 47).

Nongame Birds and Mammals in WY

WGFD has identified Nongame Birds and Mammals in WY (formerly Key Nongame Wildlife Areas) as habitat that supports birds and mammals classified as SGCN with a designated Native Species Status (NSS) and Neotropical Migratory Birds (NTMB) (WGFD 2022). The majority of the Hoback River Watershed is designated as nongame bird and mammal habitat based on the original 2006 Key Nongame Wildlife Area data (Figure 48).

Areas of Critical Environmental Concern - BLM

According to the BLM, Areas of Critical Environmental Concern (ACEC) are, “areas where special management attention is needed to protect important historical, cultural, and scenic values, or fish and wildlife or other natural resources” (BLM 2022). There are no ACECs within the Hoback River Watershed (Figure 47 and Figure 48).

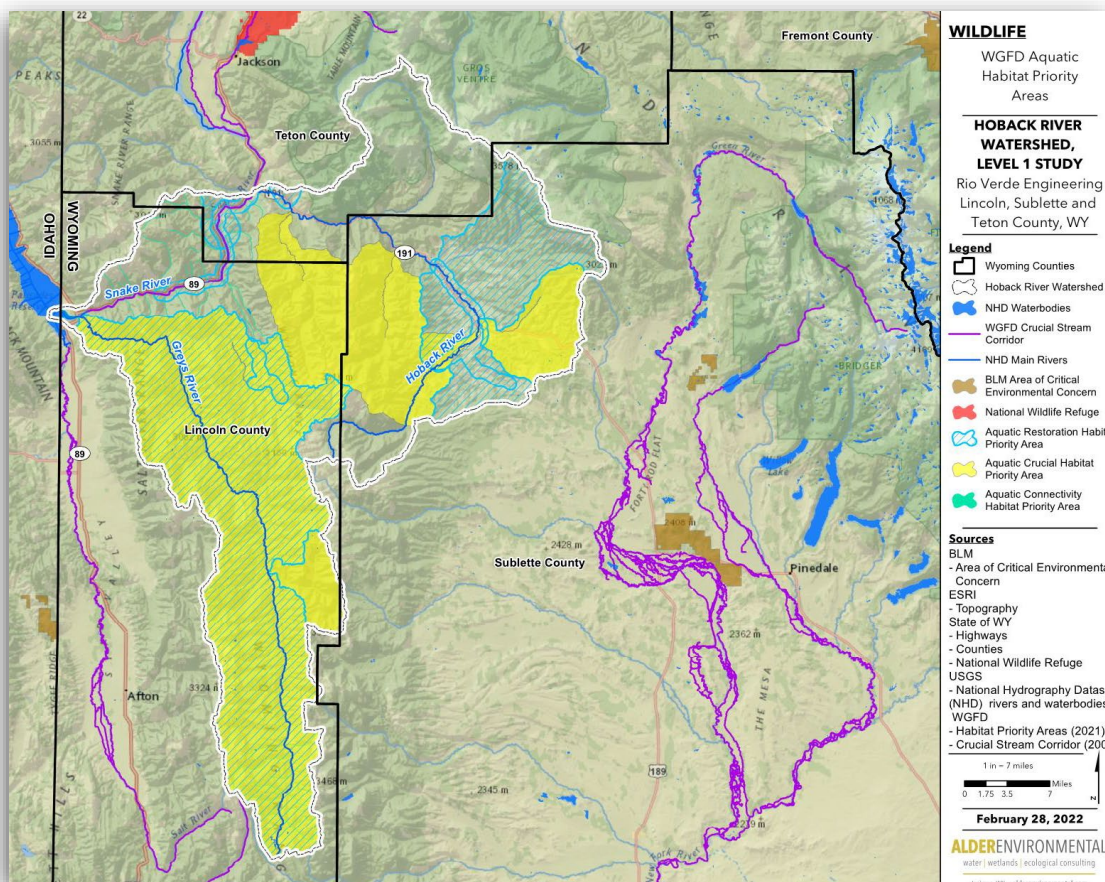


Figure 47. WGFD Aquatic Habitat Priority Areas within the Hoback River Watershed (habitat priority area data are clipped to the watershed boundary).

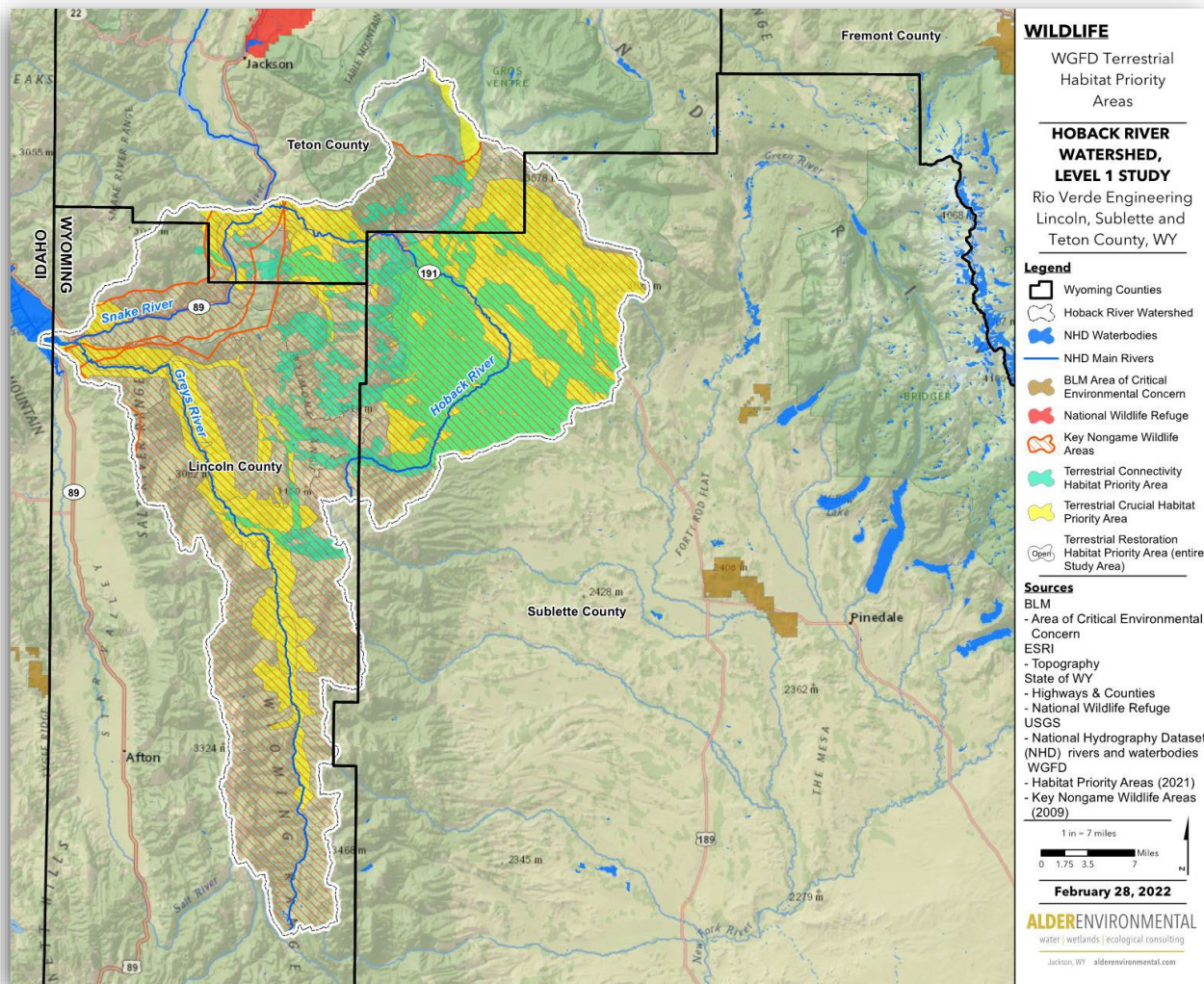


Figure 48. WGF D Terrestrial Habitat Priority Areas within the Hoback River Watershed (habitat priority area data and key nongame data are clipped to the watershed boundary).

3.2.4 Land Cover

The National Land Cover Database (NLCD) is generated in cooperation with the Multi-Resolution Land Characteristics Consortium (MRLC) a partnership of Federal agencies working together to produce current, nationally consistent, land cover products for all 50 states and Puerto Rico. The partnership includes the U.S. Geological Survey (USGS), the National Oceanic and Atmospheric Administration (NOAA), the BLM, the U.S. Environmental Protection Agency (EPA), the U.S. Department of Agriculture (USDA), LANDFIRE, the USFNLCD. NLCD uses Landsat satellite data to provide a generalized characterization of land surface classes at a 30-meter resolution (USGS 2019b).

3.2.4.1 Plant Communities

Land cover (as classified by NLCD) within the Hoback River Watershed is dominated by evergreen forest, which composes 46.96% of the study area. Shrub/Scrub is the next dominant vegetative cover at 35.54% followed by herbaceous at 13.39% of the study area. Emergent wetlands consist of

1.03% of the study area and all other land cover types each compose less than 1% of the study area as depicted in **Figure 49**.

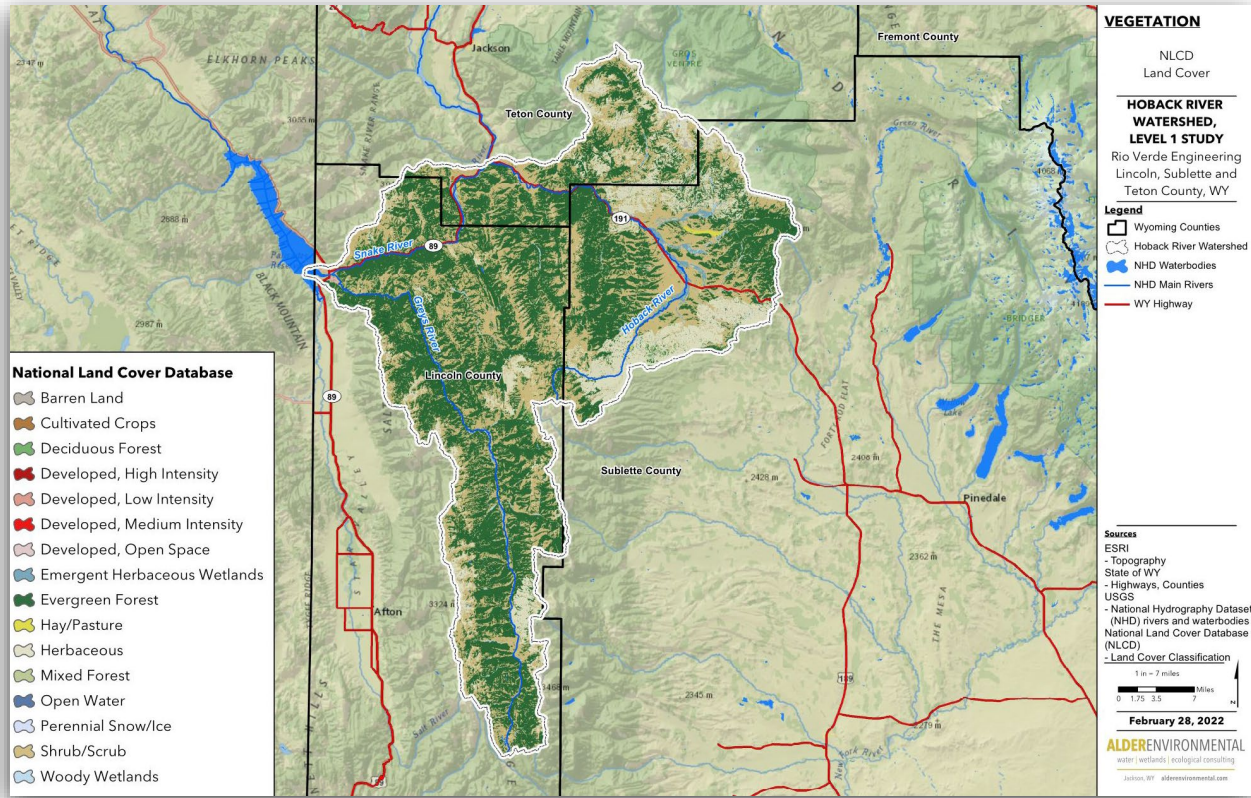


Figure 49. NLCD land cover types within the Hoback River Watershed (NLCD land cover types are clipped to the watershed boundary).

3.3 ANTHROPOGENIC SYSTEMS

This section of the document describes those systems affected by or resulting from the influence of human activity. These systems are more particularly defined as Agricultural Water Use, Domestic Water Use, Water Storage, and Land. Each component referenced here has been inventoried and further analyzed to define the inherently complex effects that human activity has had on relative physical systems within the Hoback River Watershed.

3.3.1 Agricultural Water Use

The majority of water use within the Hoback River Watershed evolves around irrigation and primarily occurs along the tributary and main stem drainage corridors therein, which coincides with patented private lands that were born from availability of water use for agricultural purposes. These lands are generally situated in proximity to their respective points of diversion due in large part, to geographic constraints and cost. Stock water supply reservoirs, spring developments, and stock water well developments are also prevalent within this watershed. Due to the relatively short growing season therein, these watering sources are extremely important to livestock and crop producers alike.

A full inventory of existing adjudicated water rights within the watershed was conducted as part of this study. Regarding surface water rights, the inventory and mapping includes sources of original supply and supplemental supply. No adjudicated secondary supply permits were discovered as part of the compilation process. RVE used the Tabulation of Adjudicated Water Rights of the State of Wyoming – Water Division Number IV, updated in February 2016, as the primary index for completing the associated surface water rights research (See **Appendix B**). This method was used to identify the many tributaries of the Hoback, Greys, and Snake Rivers, which was the primary basis for the initial search parameter using the e-permit database.

The effective watershed boundary defined for this Level I study is very unique in that it incorporates the Hoback, Greys, and Snake (partial) River watersheds. For this reason, the tabulations and information contained in this specific section will be reported under three (3) individual parts for ease of use by the end-user.

- Hoback River: 51 tributaries
- Greys River: 22 tributaries
- Snake River: 7 tributaries

A grand total of 80 tributaries, and each of the above listed main-stem rivers contain permitted water rights. The place of use for all adjudicated water rights within the overall watershed boundary were mapped according to the original application maps and certificate records, which were used in combination to determine what specific lands in each aliquot part have been adjudicated. This gathered information has been manually re-tabulated (See **Appendix C**) to calculate individual tributary adjudications and to track any changes made since the referenced February 2016 update was completed by the State of Wyoming. It should be noted that few differences were encountered during the research and mapping process.

Regarding ground water irrigation supply, the inventory and mapping includes sources of additional supply. RVE used the SEO e-Permit System as the primary application for completing the associated ground water rights research. The following sections will more fully describe the varying water system supplies, their physical properties, affected lands, beneficial use, and location within the Hoback River Watershed.

3.3.1.1 Irrigated Lands

3.3.1.1.1 Surface Water

The following summation of adjudicated surface water rights are outlined for each major basin with the subject watershed study area:

Hoback River Watershed: 7,035.85 acres having adjudicated original supply, with a permitted diversion rate of 105.24 cubic feet per second (cfs). Additionally, there are 1,382.43 acres permitted for supplemental supply.

Greys River Watershed: 387.10 acres having adjudicated original supply, with a permitted diversion rate of 7.86 cubic feet per second (cfs). Additionally, there are 153.60 acres permitted for supplemental supply. The Wyoming Water Development Commission is also the appropriator of an instream flow segment (1) within the Greys River for fishery purposes that is not to exceed the following rates: 204.0 cfs from October 1 through March 31; 350.0 cfs from April 1 through June 30; 204.0 cfs from July 1 through September 30 throughout the defined 10.1 mile stream mile segment as defined in CR No. 84, Page 9.

Snake River Watershed (Subject Portion): 784.94 acres having adjudicated original supply, with a permitted diversion rate of 95.08 cubic feet per second (cfs). Additionally, there are 7.64 acres permitted for supplemental supply.

Other Instream Flow Segments: The Wyoming Water Development Commission, as requested by the WGFD, has funded an instream flow feasibility study within the Greys-Hoback Basin Area where Temporary Filing Numbers have been assigned by the WSEO to ten (10) stream segments, more particularly outlined as follows:

Instream Flow Requests, Tributaries of Greys-Hoback Basin Tributaries (cfs)

Segment	Temp. Filing No.	Winter			Early Spring	Spring		Summer			Winter		
		Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Shoal Creek	35 4/217	6	6	6	30	45	45	15	15	15	6	6	6
North Fk Fisherman Ck	35 5/217	1.3	1.3	1.3	9	13	13	3	3	3	1.3	1.3	1.3
Cliff Creek Upper	35 6/217	11	11	11	20	20	20	17	17	17	11	11	11
Cliff Creek Lower	35 1/218	15	15	15	45	140	140	35	35	35	15	15	15
Upper Hoback River	35 2/218	23	23	23	25	35	35	46	46	46	23	23	23
Little Greys River	35 1/222	21	21	21	45	45	45	31	31	31	21	21	21
Granite Creek	35 6/221	29	29	29	70	65	65	65	65	65	29	29	29
Dell Creek	35 5/221	8.8	8.8	8.8	55	45	45	19	19	19	8.8	8.8	8.8
Willow Creek	35 4/221	20	20	20	30	45	45	40	40	40	20	20	20
Lower Hoback River	35 3/221	99	99	99	130	130	130	220	220	220	99	99	99

The location of all adjudicated surface water rights within the watershed is more particularly depicted below under **Figure 50**. See **Appendix C** for information on each individual permit and total adjudication amounts by watershed & respective tributaries.

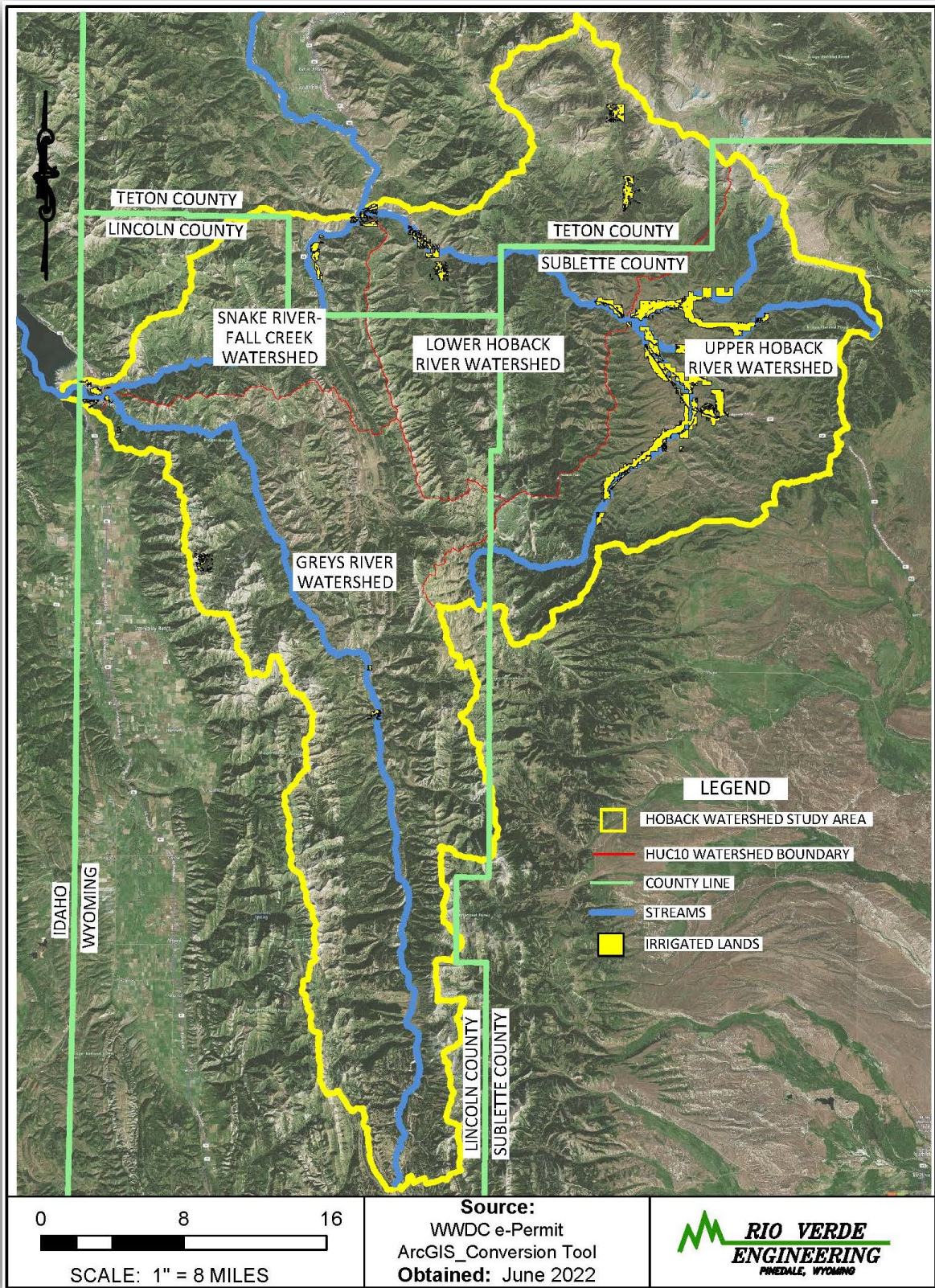
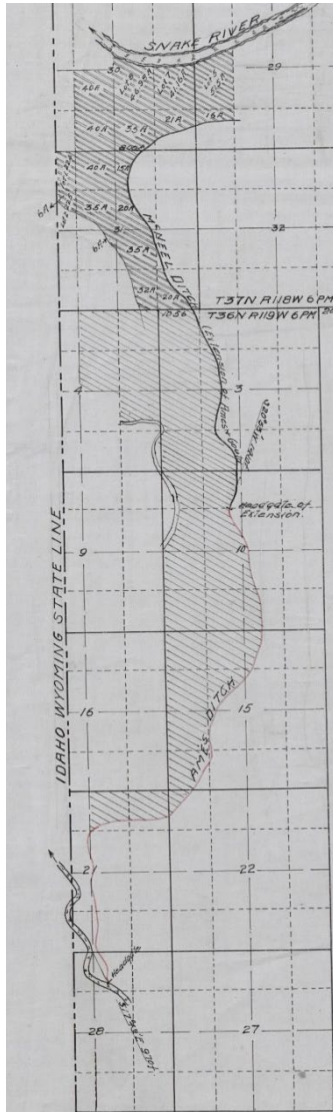


Figure 50: Irrigated Lands/Adjudicated Surface Water Rights within the Hoback River Watershed

3.3.1.1.2 Trans-Watershed Diversions

There is one (1) trans-watershed diversion that impacts the Hoback River Watershed. The Enl. Ames Ditch, P1227.0E (C.R. 42, Pg 586) conveys water from the Salt River to lands adjacent to and within the town of Alpine, WY. Said ditch conveys original & stock water supply to approximately 253 acres within the bounds of the defined watershed. (Figure 51 and Table 20).



17415

THE STATE OF WYOMING

CERTIFICATE OF APPROPRIATION OF WATER CERTIFICATE RECORD No. 42 PAGE 583

WHEREAS, G. W. McNeal has presented to the Board of Control of the State of Wyoming proof of the appropriation of water from Salt River tributary of Snake River through the Enl. Ames Ditch under Permit No. 1227 Enl. for irrigation of the lands herein described, lying and being in Lincoln County, Wyoming, and for Stock Purposes

Now Know Ye, That the Board of Control, under the provisions of Chapter 61, Compiled Statutes of Wyoming, 1910, has, by an order duly made and entered on the 13th day of April, A. D. 1922, in Order Record No. 6, Page 114, determined and established the priority and amount of such appropriation as follows:

Name of Appropriator G. W. McNeal; Postoffice Address Alpine, Idaho, Wyoming

Amount of Appropriation 5.68 cu. ft. per sec.; Date of Appropriation June 20, 1904; Description of land to be irrigated and for which this appropriation is determined and established; Total Acreage Three Hundred Ninety Eight & Sixty Four Hundredths (398.64) Acres 397.77

Twp.	Range	Sec.	NE¼				NW¼				SW¼				SE¼				TOTALS	
			NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼		
37N	116W	31			20														79.33	158.33
		29								4.8									35.38	86.107.60
		30								51.5	16								41.7	67.50
		30								40		40							41.6	85.21
		30																	45.98	224.14
																			227.74	566.74
																			397.77	997.77

*For change of point of diversion see O.S. 42-27
For voluntary abandonment of a portion (0.87 a.c.) see O.R. 71, P. 488.*

The right to water hereby confirmed and established is limited to irrigation and stock purposes and the use is restricted to the place where acquired and to the purpose for which acquired; rights for irrigation not to exceed one cubic foot per second for each seventy acres of land for which appropriation is herein determined and established.

In TESTIMONY WHEREOF, I, Frank C. Emerson, President of the State Board of Control, have hereunto set my hand this 14th day of June, A. D. 1922, and caused the seal of said Board to be hereunto affixed.

ATTEST: Julia Bartlett Franks, Secretary. Frank C. Emerson, President.

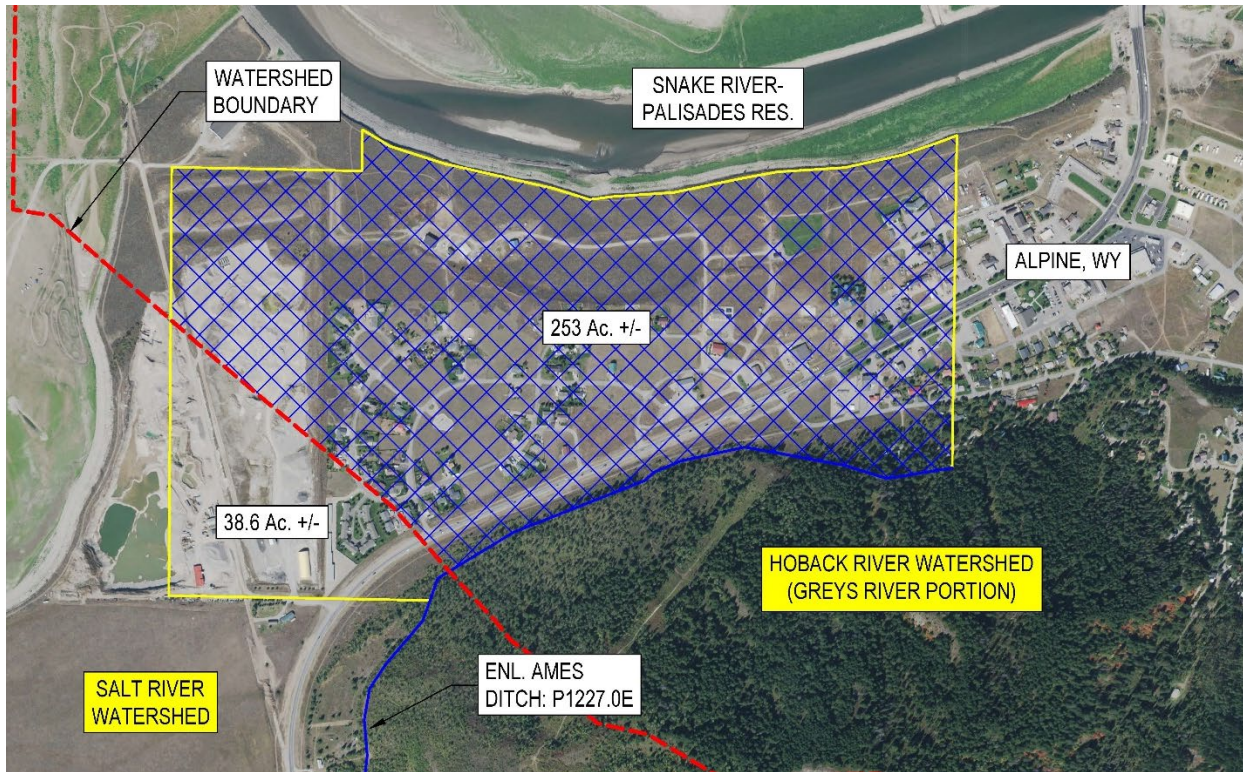


Figure 51: Trans-watershed Diversion (Salt River to Greys River Watershed)

Table 20: Permitted Trans-watershed Diversion Tabulation

PERMIT #	FACILITY NAME	PRIORITY	USE	C.F.S. / AF	ACRES	PROOF #	C.R. #	IN/OUT
P1227.0E	ENL. AMES DITCH	6/20/1904	IRR, STO	~3.61	~253.0	17415	CR CC42/586	IN
TOTAL:					~253.0			

3.3.1.1.3 Ground Water

Regarding adjudicated ground water sources for irrigation, there are 28.00 acres permitted for additional supply. In terms of irrigation use, the total appropriation for ground water is 100.00 gallons per minute (GPM). The total appropriated flow comes from a single source and involves the original permit and subsequent enlargement of the Simpson Well No. 2. See **Table 21** for the tabulation of adjudicated ground water sources used for irrigation (additional supply) within the Hoback River Watershed.

Table 21: Adjudicated groundwater sources for irrigation

PERMIT No.	PRIORITY DATE	APPLICANT: COMPANY/LAST NAME	FACILITY NAME	ADJUDICATED ACREAGE RECEIVING ADDITIONAL SUPPLY	ADJUDICATED ACREAGE RECEIVING ORIGINAL SUPPLY	APPROPRIATED FLOW (GPM)	CERTIFICATE RECORD
P99304.0W	5/22/1995	WJW HOLDINGS, LLLP	SIMPSON WELL No. 2	14.00	0	25	CR UW14/098
P180992.0W	4/9/2007	WJW HOLDINGS, LLLP	ENL. SIMPSON WELL No. 2	14.00	0	75	CR UW14/099
TOTAL:				28.00	0	100	

3.3.1.2 Irrigation Systems

As part of the research and mapping process mentioned above, point of diversion (POD) and means of conveyance (MOC) information was also compiled, checked for geographic accuracy, and included as part of the GIS deliverable of this Level I study. Initially, all POD's and MOC's were mapped using the existing SEO e-Permit database, utilizing the ArcGIS Tool developed by the WWDC. The imported data was then cross-examined for accuracy and modified to reflect the actual situation on the ground. This type of database amendment was conducted in order to accurately reflect actual field conditions and to aid in successive water rights research by the end user(s).

The areas where pivot irrigation methods are utilized were also mapped. Pivot and sprinkler irrigation is sparsely utilized within the watershed, whereas the majority of lands are irrigated using conventional flood irrigation methods. Specific to the Hoback Junction region of the watershed, many small acreage irrigation systems utilize a pump and pipeline configuration to divert water from the Hoback River onto private properties. These systems are generally used due to the high level of subdividing that has occurred over time along the banks of the Hoback River, making conventional ditches impracticable.

3.3.2 Domestic Water Use

Many of the permitted wells within the Hoback River Watershed have multiple beneficial uses, including Domestic and/or Stock, Irrigation, Industrial, Miscellaneous, Monitoring, or Test Well use. For the purposes of this section of the watershed study, RVE tabulated the existing wells that are permitted for domestic use. The intent of this compilation is to identify how groundwater is utilized within the watershed and to what extent.

3.3.2.1 Potable Water Systems

Within the Hoback River Watershed, there are 488 permitted wells for Domestic Use. The full list can be found in **Appendix D** for reference. The Watershed is largely defined as being rural with limited private lands located along drainage corridors. Potable water in the area is derived from groundwater sources by means of water well development or by spring development.

There are distinct areas within the watershed that have proven to be difficult in terms of well drilling. Issues with water exist in the Hoback Junction area, as more particularly described in **Section 3.1.1.2**. Based on interviews with residents in this area, both water quantity and quality has been a problem for many. That particular region in and around Hoback Ranches, along the eastern flank of the watershed, is also susceptible to non-producing wells. Based on past experience with water development in this area, along with the review of well completion logs, the producing aquifer can be difficult to access.

3.3.3 Water Storage

Within the Hoback Watershed, small reservoirs are prevalent. There are no major reservoirs or irrigation districts located within the Hoback River Watershed. Several factors contribute to the lack thereof, more particularly outlined below:

- The Hoback River Watershed is primarily made up of U.S. Forest Service lands (96%) whereas privately owned lands makeup a total of 3.4% of the watershed.
- As stated under the subsequent **Section 4.4**, none of the streams within the Hoback River Watershed study area have been put into state regulation within the last 26 years, with the single exception of Crow Creek, tributary of Greys River.

- The general topography within the study area does not lend itself to providing for economically viable large storage projects due to tributary/main stem gradients and typically narrow canyons.

While this watershed does not have any major reservoirs within the boundary, it is worth noting that Jackson Lake Dam is upstream of the defined watershed, which affects streamflow in the Snake River. The Jackson Lake Dam was constructed in 1916 and is capable of storing 847,000 acre-feet of water.

3.3.3.1 Reservoirs

There are 14 adjudicated reservoirs within the Hoback River Watershed, with a combined storage capacity of 129.41 acre-feet (Table 22). There are an additional 18 reservoirs that are designated as complete but not adjudicated. The combined storage within these unadjudicated reservoirs (or enlargements) total 61.97 acre-feet (Table 23).

Table 22: Adjudicated Reservoirs within the Hoback River Watershed

PERMIT No.	FACILITY NAME	APPROPRIATOR	PRIORITY	Ac-Ft	CR No.
P9212.0R	CAMP CREEK FISH POND	CAMP CREEK PROPERTIES LLC;	12/1/1986	0.47	CR CR23/330
P9431.0R	LAKE MARLENE RESERVOIR	HANS GRAF;	9/28/1988	13.90	CR CR13/224
P10417.0R	BILLY WELLS RESERVOIR	RICHARD EDGCOMB AND CAROLYN D. EDGCOMB;	9/25/1995	0.85	CR CR15/094
P10967.0R	LONE EAGLE CAMPGROUND RESERVOIR	PATHFINDER HOLDING CO, LLC;	3/4/1999	6.88	CR CR24/199
P11540.0R	HANS RESERVOIR	UPPER HOBACK RIVER RANCH, LLC	11/1/1999	2.00	CR CR26/374
P11004.0R	BRADLEY NO. 1 RESERVOIR	ROBERT H BRADLEY FAMILY TRUST;	1/14/2000	19.90	CR CR23/328
P11725.0R	SMILING S RESERVOIR	ROBERT AND COURTNEY STROHMENGER	11/8/2001	0.08	CR CR24/200
P11777.0R	HOBACK VISTAS NO. 1 RESERVOIR	ANGUS GERALD GOETZ III REVOCABLE LIVING TRUST;	5/10/2004	1.47	CR CR23/329
P14050.0R	BOX Y RESERVOIR	BOX Y RANCH, LLC	1/25/2011	2.05	CR CR25/013
P14207.0R	BEAVER RESERVOIR	CYGNUS CAPITAL INC; SNAKE RIVER BEND RANCH LLC;	8/21/2013	26.07	CR CR23/320
P14208.0R	HORSE RESERVOIR	CYGNUS CAPITAL INC;	8/21/2013	2.26	CR CR23/321
P14209.0R	TRUMPETER RESERVOIR	CYGNUS CAPITAL INC;	8/22/2013	47.42	CR CR23/322
P14210.0R	MARTIN CREEK RESERVOIR	CYGNUS CAPITAL INC;	8/23/2013	3.86	CR CR23/326
P14460.0R	LEEPER RESERVOIR	SCOTT R. LEEPER;	11/3/2015	2.20	CR CR24/343
Total:				129.41	

Table 23: Completed Reservoirs within the Hoback River Watershed

PERMIT No.	FACILITY NAME	APPROPRIATOR	PRIORITY	Ac-Ft	CR No.
P11516.0R	AVOCET RESERVOIR	FLORENCE R. SHEPARD	-	0.58	Complete
P11517.0R	SNIPE RESERVOIR	FLORENCE R. SHEPARD	-	0.14	Complete
P11518.0R	WILLIT RESERVOIR	FLORENCE R. SHEPARD	-	1.01	Complete
P13813.0R	SWAN POND	JOSEPH RICKETTS	-	2.30	Complete
P13285.0R	ENLARGEMENT OF LAKE MARLENE	RICKETTS RANCH, LLC	-	20.23	Complete
P15042.0R	BLIND BULL SOUTH POND 1	GREYS RIVER MEADOWS, LLC	-	2.40	Complete

P15043.0R	BLIND BULL SOUTH POND 2	GREYS RIVER MEADOWS, LLC	-	18.00	Complete
P14763.0R	WETLAND NO. 1 RESERVOIR	DEADMAN RANCH, LLC	-	0.38	Complete
P15044.0R	BLIND BULL SOUTH POND 3	GREYS RIVER MEADOWS, LLC	-	2.40	Complete
P15045.0R	BLIND BULL WEST POND	GREYS RIVER MEADOWS, LLC	-	7.90	Complete
P15046.0R	WETLAND RESERVOIR NO. 3	GREYS RIVER MEADOWS, LLC	-	0.85	Complete
P15060.0R	GREYS RIVER MEADOWS #1	GREYS RIVER MEADOWS, LLC	-	0.12	Complete
P15061.0R	GREYS RIVER MEADOWS #2	DEADMAN RANCH, LLC	-	0.61	Complete
P15133.0R	BLIND BULL SOUTH POND 4	GREYS RIVER MEADOWS, LLC	-	1.50	Complete
P15134.0R	ENL BLIND BULL SOUTH POND 3	GREYS RIVER MEADOWS, LLC	-	1.30	Complete
P14764.0R	WETLAND NO. 2 RESERVOIR	DEADMAN RANCH, LLC	-	0.20	Complete
P15062.0R	GREYS RIVER MEADOWS #3	DEADMAN RANCH, LLC	-	1.32	Complete
P15063.0R	GREYS RIVER MEADOWS #4	DEADMAN RANCH, LLC	-	0.73	Complete
Total:				61.97	

3.3.3.2 Upland Water Storage

There are 14 adjudicated stock water reservoirs within the Hoback River Watershed (Table 24). The total storage of all stock reservoirs combined is 78.566 acre-feet. The location of each is graphically depicted in Figure 52.

Table 24: Adjudicated Stock Reservoirs within the Hoback River Watershed

PERMIT No.	FACILITY NAME	APPROPRIATOR	PRIORITY	AC-FT	CR No.
P5484.0S	MCLEAN STOCK RESERVOIR	MILLER LAND AND LIVESTOCK CO.;	11/10/1965	16.400	CR CR03/460
P5486.0S	MUDDY STOCK RESERVOIR	MILLER LAND AND LIVESTOCK CO.;	11/10/1965	4.220	CR CR03/459
P5490.0S	HANSON STOCK RESERVOIR	MILLER LAND AND LIVESTOCK CO.;	11/22/1965	12.800	CR CR03/458
P5494.0S	HAY GULCH STOCK RESERVOIR	MILLER LAND AND LIVESTOCK CO.;	11/26/1965	3.390	CR CR03/457
P5495.0S	BURNEY STOCK RESERVOIR	MILLER LAND AND LIVESTOCK CO.;	11/26/1965	6.500	CR CR03/456
P8079.0S	BABE MACK STOCK RESERVOIR	E. G. MACK;	5/1/1975	7.330	CR CR08/432
P8222.0S	DAVICH STOCK RESERVOIR	MIKE AND SANDRA DAVICH;	3/4/1977	9.100	CR CR08/658
P8353.0S	BENSEN STOCK RESERVOIR	LEO AND ROSEMARY BENSON;	4/5/1978	0.850	CR CR08/782
P11164.0S	ARBARDEE STOCK RESERVOIR	JOHN BRANCA	12/13/1990	7.690	CR CR13/320
P13160.0S	ELLWOOD STOCK RESERVOIR	PAUL M AND BARBARA ELLWOOD;	7/14/1999	0.490	CR CR15/381
P18476.0S	AMBER STOCK RESERVOIR	TOM DAVID CROOK	11/30/2006	9.760	CR CR24/201
P19661.0S	BLIND STOCK RESERVOIR	USDA FOREST SERVICE BRIDGER TETON NATIONAL FOREST GREY'S RIVER RANGER DISTRICT;	8/21/2015	0.016	CR CR24/061
P19662.0S	McCAIN NO. 3 STOCK RESERVOIR	USDA FOREST SERVICE BRIDGER TETON NATIONAL FOREST GREY'S RIVER RANGER DISTRICT;	6/16/2010	0.005	CR CR24/062

P19663.0S	McCAIN NO. 1 STOCK RESERVOIR	USDA FOREST SERVICE BRIDGER TETON NATIONAL FOREST GREY'S RIVER RANGER DISTRICT;	6/16/2010	0.015	CR CR24/063
				TOTAL:	78.566

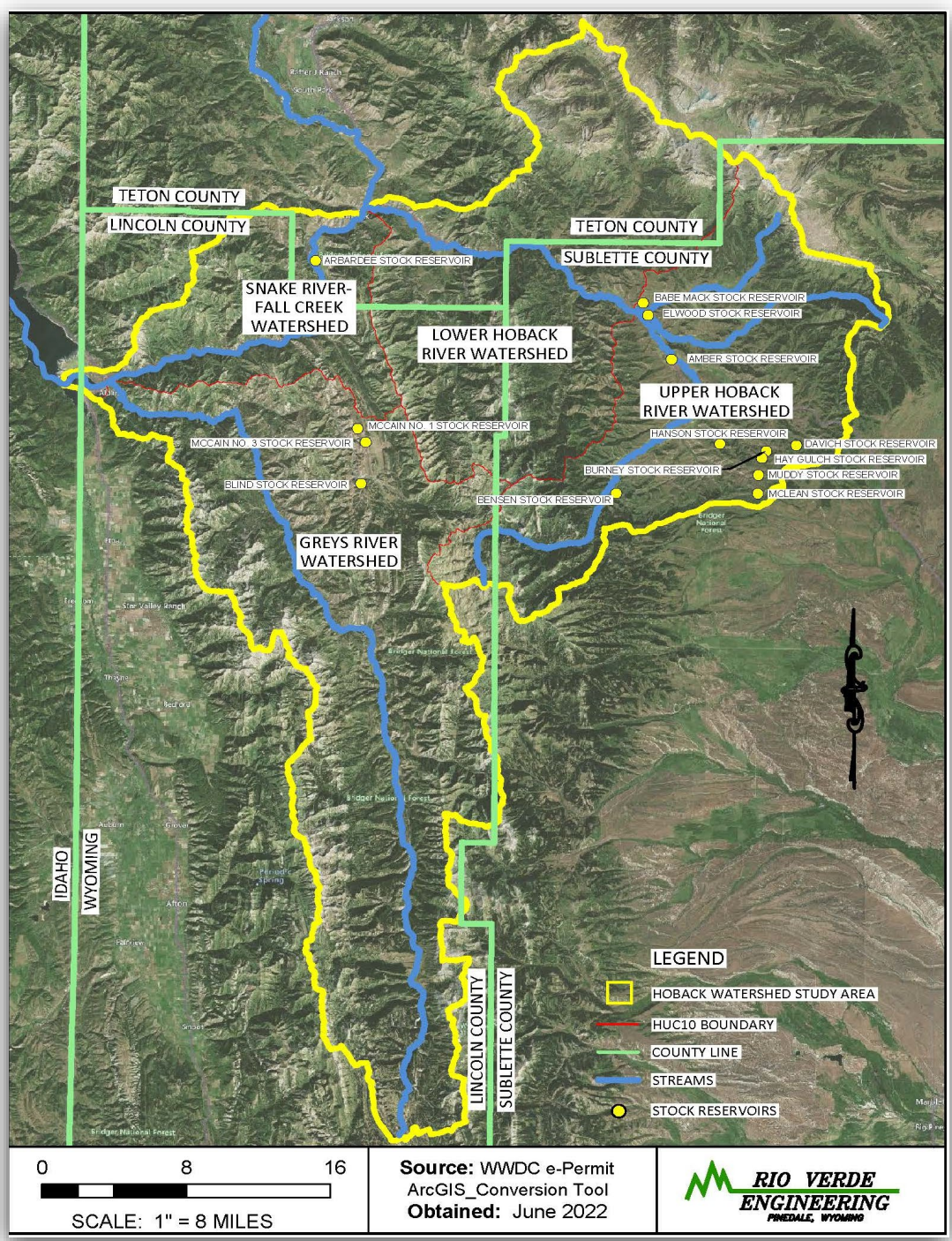


Figure 52: Adjudicated Stock Reservoirs within the Hoback River Watershed

In addition to permitted stock reservoirs, there are a total of 32 groundwater sources that are currently permitted for stock use within the Hoback River Watershed, per SEO e-Permit database records. These permitted sources list stock watering as a beneficial use. The following **Figure 53** identifies the geographic location of each. A tabulated list of each well being permitted for stock water use is also shown in **Table 25**.

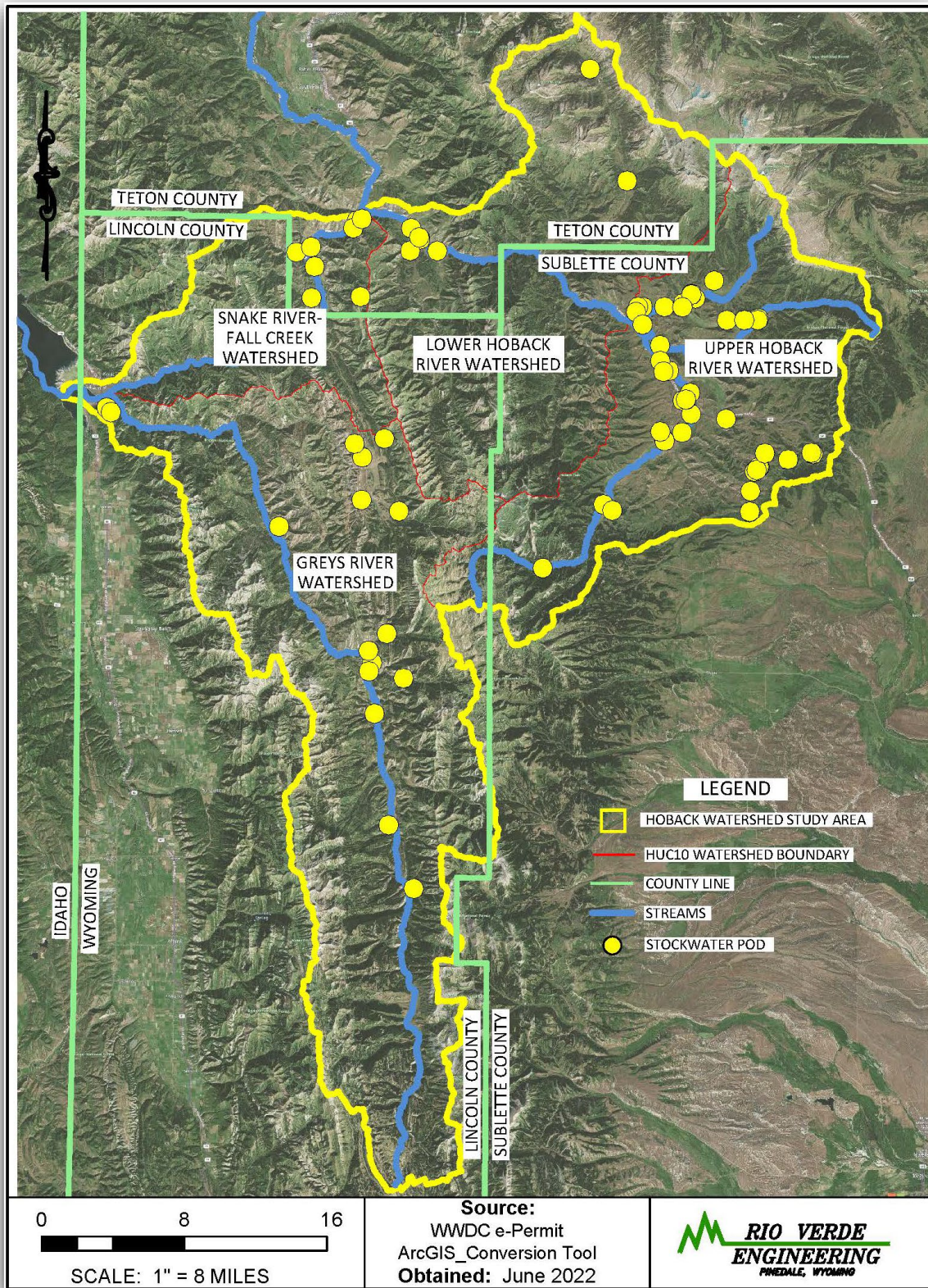


Figure 53: Groundwater Points of Diversion (POD) Permitted for Stock Use within the Hoback River Watershed

Table 25: Groundwater Sources Permitted for Stock Use within the Hoback River Watershed

PERMIT NO.	PRIORITY DATE	APPLICANT: COMPANY / LAST NAME	FACILITY NAME	USE
P12408.OP	3/31/1943	SANDERSON	SANDERSON #1	DOM_GW; STK
P5808.OP	5/31/1966	GRIGGS	GRIGGS #1	DOM_GW; STK
P9453.OP	4/30/1968	D'ATRI	ED #1	DOM_GW; STK
P9032.OW	4/27/1971	THOMAS	THOMAS #1	DOM_GW; STK
P9501.OW	6/21/1971	D'ATRI	ED #2	DOM_GW; STK
P9502.OW	6/21/1971	D'ATRI	BROWN #1	DOM_GW; STK
P21295.OP	5/3/1973	WILLIS	WILLS #1	DOM_GW; STK
P23273.OW	6/26/1973	MCNEEL	MCNEEL #1	DOM_GW; STK
P29873.OW	5/14/1975	RIGGAN	RIGGAN #1	DOM_GW; STK
P30097.OW	5/27/1975	LONG	LONG #1	DOM_GW; STK
P31294.OW	10/7/1975	PUCHE, JR.	PUCHE #1 (SPRING)	DOM_GW; STK
P86903.OW	3/22/1979	YOUNG	YOUNG WELL #1	DOM_GW; STK
P86904.OW	3/22/1979	YOUNG	YOUNG WELL #2	DOM_GW; STK
P53344.OW	8/19/1980	WELLS	WELLS #1	DOM_GW; STK
P56158.OW	3/20/1981	ALBRECHT	ARBARDEE RANCH #1	DOM_GW; STK
P75747.OW	10/19/1987	RIGGAN	RIGGAN #2	DOM_GW; STK
P78921.OW	1/19/1989	WAGSTAFF LAND AND CATTLE CO.	UPPER RANCH #3	DOM_GW; STK
P81822.OW	2/14/1990	GRIMES	GRIMES #1	DOM_GW; STK
P91305.OW	4/5/1993	GILROY	GILROY #2	DOM_GW; STK
P96253.OW	7/18/1994	VASSALLO	VASMO #1	DOM_GW; STK
P100017.OW	8/9/1995	R & P INVERTMENT CO	STONG PLACE WELL	DOM_GW; STK
P100066.OW	8/14/1995	KNEPSHIELD	BRYAN FLATS #5	DOM_GW; STK
P120534.OW	11/19/1999	WAGNER	WAGNER #1	DOM_GW; STK
P127928.OW	8/14/2000	SMITH	1 WELL	DOM_GW; STK
P170720.OW	10/31/2005	WJW HOLDINGS LLP	WJW #1	DOM_GW; STK
P177979.OW	10/26/2006	DEADMAN RANCH LLC	DEADMAN RANCH #1	DOM_GW; STK
P195883.OW	9/17/2010	ROBERTSON	STEVE ROBERTSON, 191 RANCH #2	DOM_GW;STK
P195616.OW	4/25/2011	USA-BRIDGER TETON NATN'L FOREST	BLIND BULL NO. 1 SPRING	DOM_GW;STK
P201372.OW	11/18/2013	BALDERSTON	RUOSCH SPRING	DOM_GW;STK
P203826.OW	5/4/2015	BURTOFT	BURTOFT #1	DOM_GW; STK
P204083.OW	6/16/2015	MEEKS	T. MEEKS WELL	DOM_GW; STK
P205639.OW	5/31/2016	DAISY SPRINGS RANCH LLC	DAISY SPRINGS RANCH LLC WELL	DOM_GW; STK

3.3.4 Land

The following section describes land attributes related to land use, land ownership, cultural resources, land management, and upland water resources.

3.3.4.1 Land Use

The Hoback River Watershed (including the Hoback, Greys, and Snake-Fall Creek) includes land coverage in three (3) counties located in western Wyoming; Sublette County, Teton County, and Lincoln County. The overall watershed contains 1,144 square miles (mi²). The majority of said watershed lies in Lincoln County (618 mi²), followed by Sublette County (346 mi²). Teton County covers the balance of the watershed (180 mi²).

Each of the counties noted above governs private land use individually. As such, permitted zoning district boundary definitions and descriptions vary from one to the next. The following three (3) tables (**Table 26**, **Table 27**, & **Table 28**) defines the applicable zoning definitions that exist in each of the listed counties, as they apply to private lands inside the Hoback River Watershed.

Table 26: Teton County Zoning

COUNTY	ZONING CLASSIFICATION	ZONING DEFINITION	PERMITTED USES
TETON	R-TC	RURAL - COUNTY	The purpose of the Rural - County (R-TC) Zone is to provide lands for the continuation of agriculture, as well as compatible related uses, and to preserve rural character by encouraging forms of development that protect large tracts of agricultural land and natural and scenic areas.
	R-1	RESIDENTIAL	Rural-1 (R-1) generally encompasses the largest holdings with the most potential for use as sites of greater than 70 acres that provide undeveloped habitat, scenery, and open space.
	R-2	RESIDENTIAL	Rural-2 (R-2) generally encompasses large parcels that are not in larger holdings, mostly in the 3-70 acre range, where site design is the focus of habitat, scenery and open space conservation efforts.
	R-3	RESIDENTIAL	Rural-3 (R-3) generally encompasses rural subdivisions and neighborhoods with lots sizes of 6 acres and less where rural character is defined by single-family neighborhoods and conservation is focused on wildlife permeability.
	NC	NEIGHBORHOOD CONSERVATION ZONE	This district is intended to accommodate commercial and retail uses. This zone and associated uses are most applicable where convenient access, infrastructure and services are available; however, it is not intended to be applied as a narrow commercial strip on each side of an important highway.
	AC	AUTO URBAN COMMERCIAL	The purpose of the Auto-Urban Residential - County (AR-TC) zone is to maintain the character and cohesiveness of residential neighborhoods while allowing for a wide range of residential types, including affordable housing.
	P	PUBLIC	The purpose of the Public/Semi-Public - County (P/SP-TC) zone is to provide locations for new and existing uses and facilities of a public or semi-public nature. Land in the P/SP-TC zone and/or facilities operated therein shall be under the control of federal, state, or local governments, or other governmental entities such as a school district or hospital district.
	PR	PLANNED RESORT	The purpose of the Planned Resort Zone is to provide for a mix of recreational, retail, and service-oriented activities which has a high degree of self-containment and provides economic and other benefits to the community. The Planned Resort Zone is intended to guide the creation or continuation of a planned development configured around a major recreational activity.

Table 27: Sublette County Zoning

SUBLETTE	A-1	AGRICULTURAL	This district maintains and continues the existing agricultural land use in the county.
	R	RESIDENTIAL	This district provides land for residential development within an area of one mile from the corporate limits of incorporated towns.
	R-R	RURAL RESIDENTIAL	This district provides areas in the rural portions of the County for residential development and uses.
	R-R 5	RURAL RESIDENTIAL (5 ACRE)	This district provides areas in the rural portions of the County for residential development and uses. A five (5) acre minimum parcel is required.
	R-R 10	RURAL RESIDENTIAL (10 ACRE)	This district provides areas in the rural portions of the County for residential development and uses. A ten (10) acre minimum parcel is required.
	R-R 20	RURAL RESIDENTIAL (20 ACRE)	This district provides areas in the rural portions of the County for residential development and uses. A twenty (20) acre minimum parcel is required.
	R MH	RESIDENTIAL MOBILE HOME	This district provides land for residential and/or mobile home development within an area of one mile from the corporate limits of incorporated towns.
	MH	MOBILE/MANUFACTURED HOME PARK	This district provides areas where mobile and manufactured home parks can be developed.
	MFR	MULTIPLE FAMILY RESIDENTIAL	This district provides areas for structures designed for occupancy by two (2) or more families, with each family occupying a separate dwelling unit which may be separated vertically or horizontally. Shared walls, entrances or stairs are common features of this type of housing. With public water and sewer, minimum lot size shall be one (1) acre and maximum density shall be eight (8) dwelling units per acre. With a septic system and well, minimum lot size is five (5) acres and maximum density is two (2) dwelling units per acre.
	C-1	GENERAL COMMERCIAL	This district provides areas for orderly and compact commercial development.
	CH-1	HIGHWAY COMMERCIAL	This district provides areas for orderly and compact highway related commercial development.
	RS-1	RECREATIONAL SERVICE	This district provides areas for recreation oriented service uses.
	I-L	LIGHT INDUSTRIAL	This district provides areas for safe, non-nuisance causing industrial use.
	I-H	HEAVY INDUSTRIAL	This district provides areas for general industrial uses.
RM	RURAL MIXED	This district provides land for a mixture of uses which are compatible to the residents of the district and adjoining property owners.	
PUD	PLANNED UNIT DEVELOPMENT	This district is an overlay district which provides a flexible procedure for tracts of land which are to be planned and developed as a whole; using a unified design, encouraging creative methods, and allowing a mixture of uses.	
RC	RESOURCE CONSERVATION	This district protects and conserves environmentally sensitive areas where development must be limited to prevent degradation of the areas.	

Table 28: Lincoln County Zoning

LINCOLN	R	RURAL ZONE	The purpose of the Rural Zone is to maintain the essential rural character of the great majority of the private lands in the county. The zone will provide for agricultural uses combined with low density (typically 5 or more acres average per lot) residential uses, including residential subdivisions where three or more lots are created. The zone will allow home occupation businesses as well as a few other commercial uses which will have a low impact for the neighbors and which are best suited for rural areas.
	M	MIXED ZONE	The purpose of the Mixed Zone is to provide a variety of land uses, allowing generally the land uses allowed in the Rural Zone, plus higher density residential development, community services, and most commercial activities. Areas zoned Mixed are generally grouped around areas historically recognized as community centers, including incorporated towns. This zone makes it more feasible to provide needed utility and transportation facilities to support growth, while maintaining the rural areas relatively free from traffic, noise, lights, etc., which tend to distract from the rural atmosphere. This zone will also provide for the establishment of Planned Unit Developments which will allow higher density but will require the installation of more services such as central sewer treatment.
	RC	RECREATIONAL ZONE	A significant attraction of Lincoln County is the scenic, sporting, and recreational resources of the county. The purpose of the Recreational Zone is to provide locations for the business and commercial facilities needed for tourist and recreational activities, along with residential uses, while preventing the intrusion of other types of commercial activities which will tend to spoil or detract from the scenic beauty and natural surroundings of these recreational areas. This zone will also provide for the establishment of Recreational Planned Unit Developments, which will allow higher density but will require the installation of more services, such as central sewer treatment.
	I	INDUSTRIAL ZONE	Lincoln County depends on industrial activities for economic well being. The purpose of the Industrial Zone is to provide areas for industrial activities to take place. Most other land uses are not allowed in the Industrial Zone to minimize conflicts between important industrial land uses and other residential and commercial needs. The Industrial Zone may provide for light industrial or all types of industrial land uses depending upon the specific community overlay zone.
	P	PUBLIC ZONE	Over half of the land in Lincoln County is managed by state and federal government. Because of this government ownership, this land is subject to different sets of uses, goals, and regulations. State and federal policies apply on these lands which do not apply to the privately held lands. At the same time, these public lands can normally be compatible with, and even enhance, the desirable characteristics of Lincoln County. The purpose of the Public Zone is to, in part, recognize areas owned/administered by the federal government, the State of Wyoming, and Lincoln County, and in part, provide for land uses appropriate for the publicly owned lands which are consistent with the historical uses of the public lands.

Source:

Teton County – Land Development Regulations, Updated 5/31/21; Sublette County – 1978 Zoning and Development Regulations Resolution with Amendments as of April, 2018; Lincoln County – Land Use Regulations, Updated July, 2019

Conservation easements are also dispersed throughout the defined watershed. The predominant conservancy is the Jackson Hole Land Trust, with other easements created by and through the Teton County Scenic Preserve Trust and the Rocky Mountain Elk Foundation. These easements have been installed to prevent further development and subdivision, promote/preserve wildlife habitat, and to provide for continued agricultural use.

The private lands within this subject study area are primarily used for residential needs and ranching operations. As referenced in the subsequent section, approximately 96% of the watershed is covered by federally owned national forest. This important resource is utilized in many different ways, including seasonal livestock grazing, timber harvests, oil and gas leases, tourism, and recreation. In a recreational sense, these public lands within the Hoback River Watershed provide

for world class big game hunting, fishing, back packing, horse back riding, ATV/UTV trail riding, snowmobiling, and water related sports such as rafting and kayaking.

The special blend of permitted uses within these public lands offers all outdoor enthusiasts an opportunity to enjoy its many attributes. The Wyoming and Salt River ranges are host to many ATV/UTV/dirt bike trails and, except for special winter ranges, these mountains are accessible by snowmobile throughout the winter months. The Gros Ventre range or “Sawtooths” also provide for ample motorized use but in contrast to the other mountain ranges, designated wilderness areas exist, which allows for increased solitude for the many outdoor enthusiasts who frequent it.

As with most areas throughout Wyoming, the first settlers that came to the area homesteaded lands along the river and stream corridors throughout. Based on this physical characteristic, it is apparent that water is an extremely valuable commodity within this watershed. Groundwater is the primary source for domestic use whereas surface water is the primary source utilized for agricultural production and livestock. Large water storage projects do not exist within the watershed mainly due to topography. However, the mountain ranges that are included within the Hoback River Watershed generally receive enough annual precipitation to sustain the limited number of users who reside in its drainages and basins.

The Hoback River Watershed contains a sparse number of oil and gas wells, which were originally drilled in or about the 1960's. A graphical depiction of well locations are located in **Figure 54**. In 2012, an agreement was reached between the Trust for Public Land and Plains Exploration & Production Company (PXP) to purchase oil and gas leases on 58,000 acres of land located in the Upper Hoback Basin (Noble Basin) which is located between the continental divide and Hoback River. The execution of this lease retirement was instrumental in protecting the environmentally sensitive lands and wildlife habitat that exist within said basin.

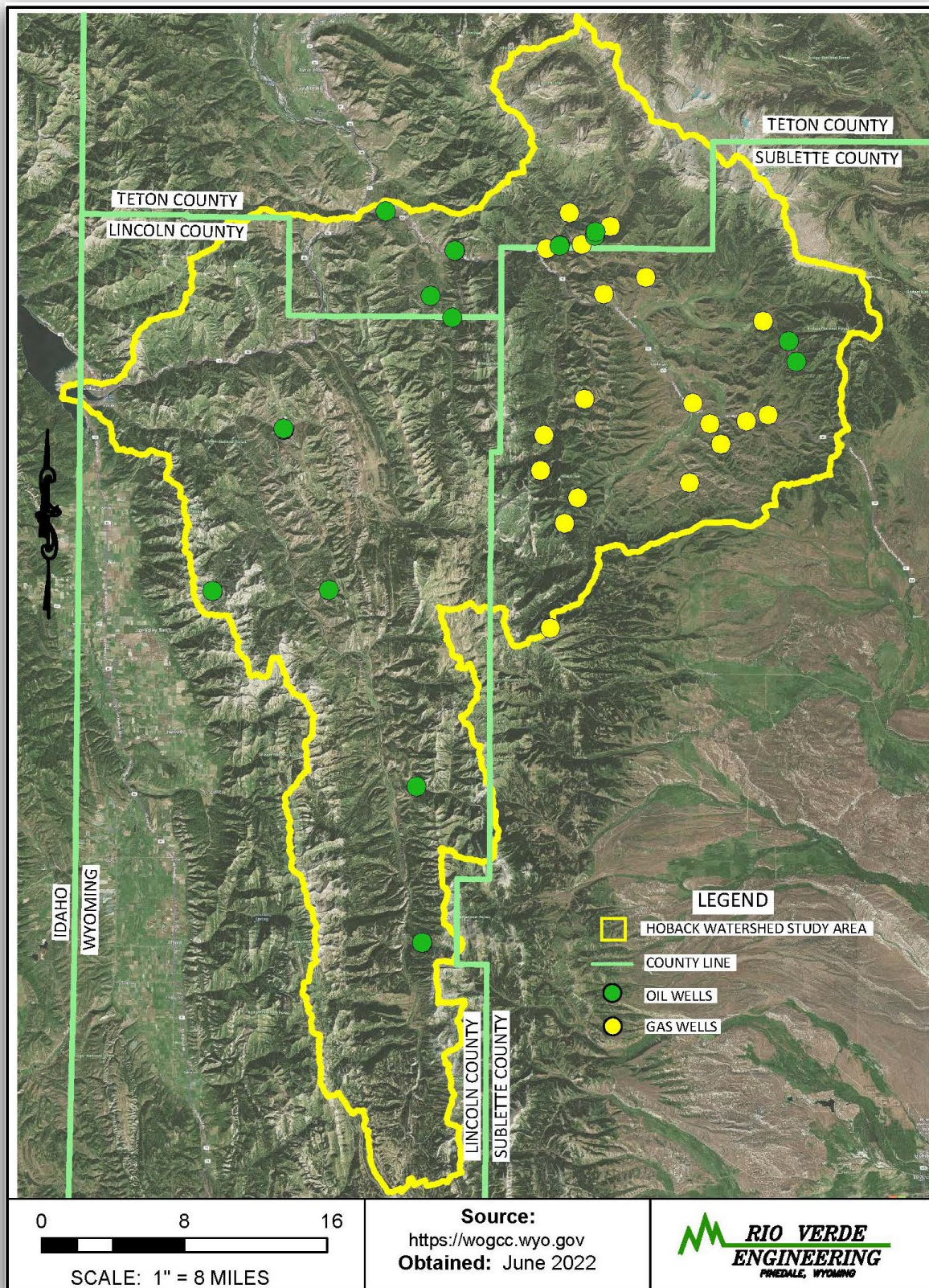


Figure 54: Oil and Gas Wells within the Hoback River Watershed

3.3.4.2 Land Ownership

The ownership distribution across the watershed is as listed below and graphically depicted in **Figure 55** and **Figure 56**:

- Bureau of Land Management (BLM): 3.1 mi²
- U.S. Forest Service (USFS): 1099.4 mi²
- Bureau of Reclamation (BOR): 2.3 mi²
- State of Wyoming (State): 0.7 mi²
- Private: 39.5 mi²

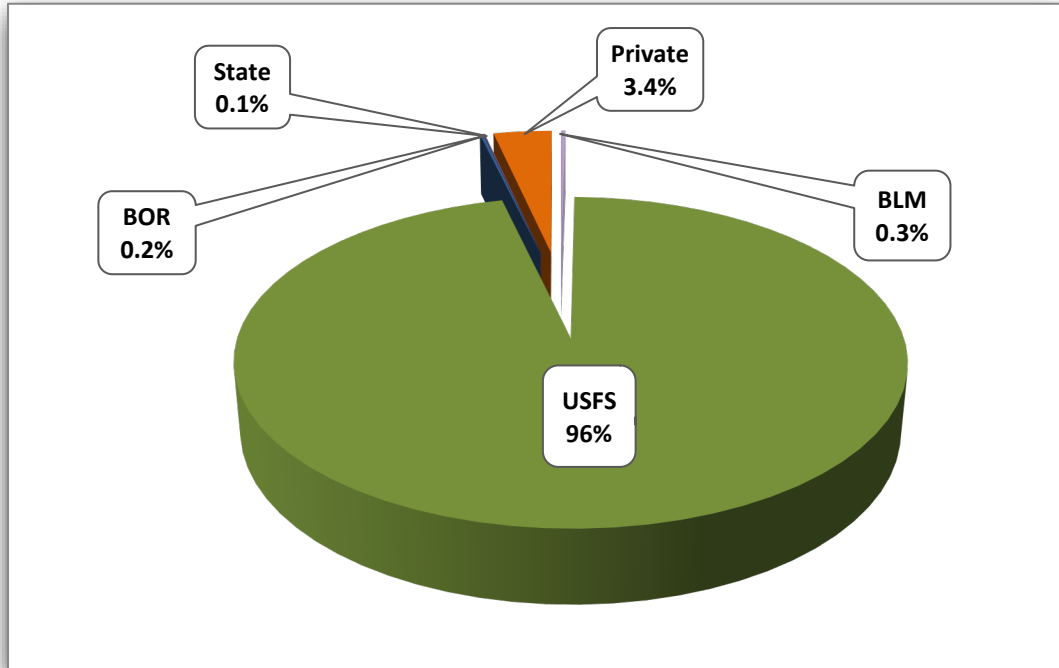


Figure 55: Land Ownership Distribution within the Hoback River Watershed

The vast majority of the watershed is under USFS jurisdiction (96%). The BLM administers just 0.3% of the overall study area, locally concentrated within the very southeast portion of the watershed adjacent to Hoback Ranches and near Alpine, WY. The BOR administers 0.2% of the land which is concentrated around the Palisades Reservoir (Alpine, WY). Only 0.1% of the land is owned by the State of Wyoming, which is more particularly located in the Greys River drainage within Lincoln County. Private lands make up the remainder of the total watershed area which equals 3.4%. Most of the private lands within the Hoback River Watershed are located at the lower elevations and in proximity to water resources.

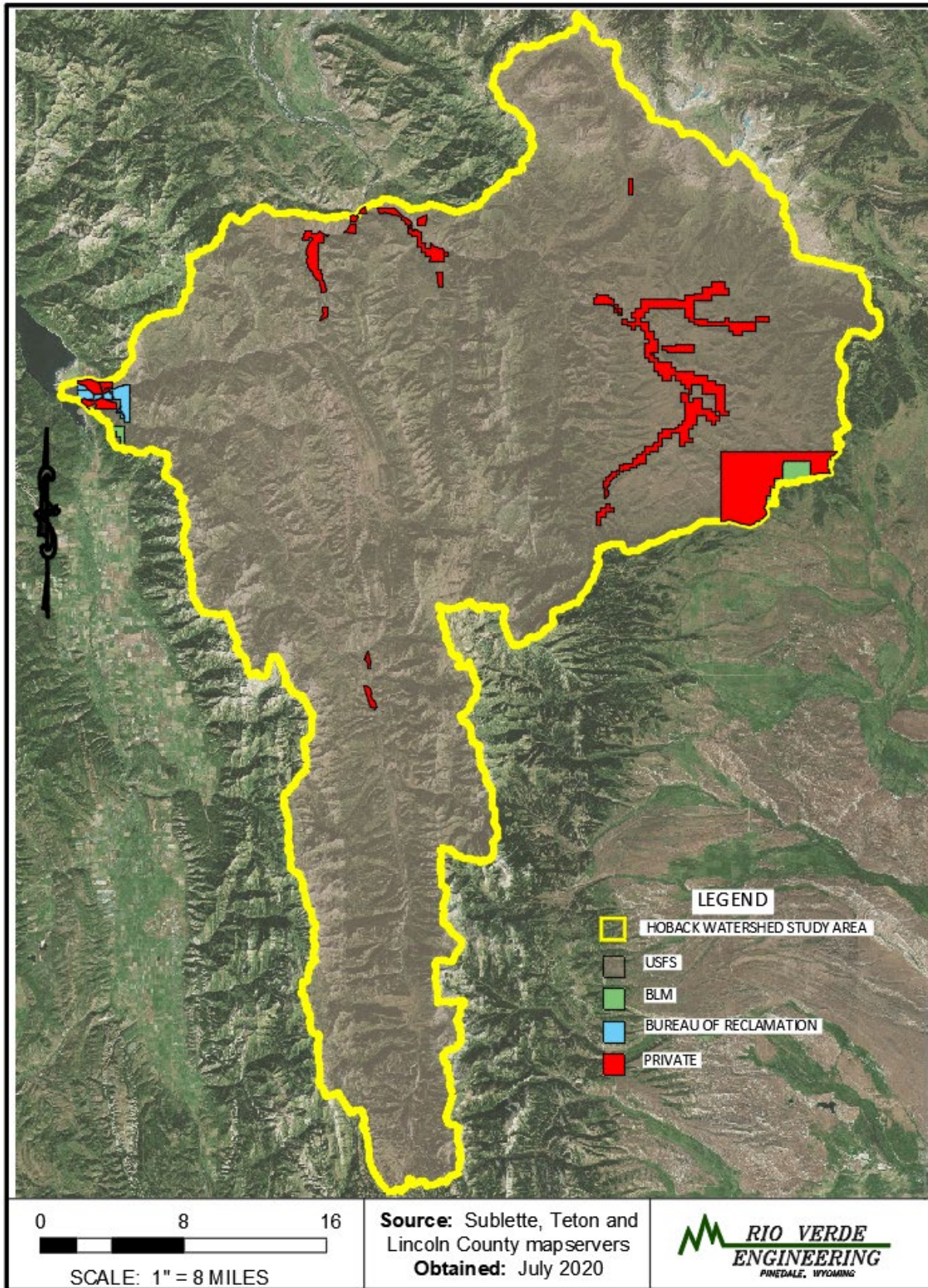


Figure 56: Land Ownership Identification within the Hoback River Watershed

3.3.4.3 Land Management and Upland Water Resources

Land management is highly dependent on the location and productivity of existing upland water resources within the Hoback River Watershed. Continual efforts and cooperation between local livestock companies and associated land administrators have been made to adequately sustain grazing operations. This has been accomplished by strategically developing water sources within each respective grazing allotment.

The following information (**Table 29** and **Table 30**) identifies the grazing allotments that are permitted by the BLM and USFS, respectively. The BLM allotment information was obtained from <https://reports.blm.gov/report/RAS/33/Allotment-Information> on June 14, 2022 and includes information obtained from the Pinedale Field (LLWYD01000) authorizing office. It should be noted that very few lands within the defined watershed are under BLM jurisdiction and as such, there are only about 2.80 square miles of permitted BLM allotments. The USFS allotment information was obtained from Dave Booth, Natural Resource Specialist for Bridger-Teton National Forest, Pinedale Ranger District. The geographic location of each allotment is depicted in **Figure 57**.

Table 29: BLM Grazing Allotments Tabulation within the Hoback River Watershed

ALLOTMENT #	ALLOTMENT NAME	CLASS	ACTIVE AUM'S	ACRES / AUM	ACRES WITHIN WATERSHED	% OF WATERSHED
2151	HOBACK RIM IND.	C	25	438.6	245	0.033%
736	KISMET IND.	C	75	56.67	29.3	0.004%
2169	N HOBACK RIM IND.	C	113	17.37	1518	0.207%
735	SIGNAL IND.	C	178	22.33	1.37	0.000%

Note: AUM = Animal Unit Month; C = Cattle

Table 30: USFS Grazing Allotments Tabulation within the Hoback River Watershed

ALLOTMENT #	ALLOTMENT NAME	CLASS	ALLOTMENT SIZE(AC)	ACTIVE AUM'S	ACRES / AUM	% OF WATERSHED
44005	ALPINE	C	2156	145	15	0.3%
3011	BAILEY LAKE	S, H	16503	1141	14	2.3%
2010	BARE MOUNTAIN S&G (VACANT)	-	11871	VACANT	-	1.6%
3001	BEAR CREEK	S, H	22370	987	23	3.1%
2001	BEAVER-HORSE C&H	C	25358	4273	6	3.5%
7002	BEAVER-TWIN	-	22002	1616	14	3.0%
3100	BIG GREYS RIVER	C, H	22171	2959	7	3.0%
3003	BIRCH CREEK-STAR PEAKS (FORAGE RESERVE)	-	14143	VACANT	-	1.9%
3004	BLACK CANYON	-	15791	VACANT	-	2.2%
3005	BLIND BULL	-	5144	VACANT	-	0.7%
3006	BLIND TRAIL	-	15066	VACANT	-	2.1%
1002	BUCKSKIN KNOLL	S	13058	734	18	1.8%
3007	CABIN CREEK	-	7653	VACANT	-	1.0%
3008	CORRAL CREEK	S, H	11270	734	15	1.5%

2011	CORRAL CREEK BIGHORN SHEEP	-	4496	CLOSED	-	0.6%
3009	COTTONWOOD	S, H	37190	793	47	5.1%
3010	DEADMAN	-	6714	VACANT	-	0.9%
416	DOG CREEK	S, H	29991	1148	26	4.1%
3013	ELK MOUNTAIN	S, H	7192	1141	6	1.0%
2012	FISHERMAN CRK C&H	C, H	47676	6122	8	6.5%
2035	FORTRESS HILL C&H	H	389	59	7	0.1%
420	GRAND VALLEY	S, H	5918	414	14	0.8%
4003	GRANITE CREEK C&H	C	25840	1459	18	3.5%
2038	GRAVEYARD HILL C&H	C, H	1221	389	3	0.2%
3014	GRIZZLY BASIN	-	8216	VACANT	-	1.1%
2023	GRIZZLY CREEK BIGHORN SHEEP	-	14133	CLOSED	-	1.9%
2017	HOBACK C&H	C, H	109314	12770	9	14.9%
2018	JACK CREEK C&H	C, H	32386	4172	8	4.4%
40104	KINKY CREEK	-	10526	CLOSED	-	1.4%
1028	LABARGE CREEK	C	49571	3506	14	6.8%
3103	LITTLE GREYS RIVER	C, H	16476	2796	6	2.3%
3030	MARTEN CREEK (FORAGE RESERVE)	-	11941	VACANT	-	1.6%
3015	MINK CREEK	S, H	19497	793	25	2.7%
4006	MOSQUITO-FALL CRK	-	45708	VACANT	-	6.2%
2019	MULE CREEK S&G (VACANT)	-	8475	VACANT	-	1.2%
4007	MUNGER MTN C&H	C, H	14596	1799	8	2.0%
2005	NORTH COTTONWOOD C&H	C	28175	4209	7	3.8%
2016	NORTH HORSE CREEK S&G (VACANT)	-	7046	VACANT	-	1.0%
3016	NORTH MIDDLE RIDGE	S, H	8761	962	9	1.2%
2020	NORTH PINEY S&G	-	15876	VACANT	-	2.2%
4043	PAFF PASTURE	-	4	CLOSED	-	0.0%
3018	PICKLE PASS BIGHORN SHEEP	-	9686	CLOSED	-	1.3%
2021	PROSPECT PEAK S&G	-	8917	VACANT	-	1.2%
3020	SNAKE RIVER	S, H	6575	1141	6	0.9%
40113	SNAKE RIVER O/O	-	417	CLOSED	-	0.1%
44003	SOUTH ELK	S, H	21036	1089	19	2.9%
3019	SOUTH FORK SHEEP CREEK (FORAGE RESERVE)	-	8534	VACANT	-	1.2%
426	SOUTH INDIAN-COTTONWOOD	S, H	20040	1030	19	2.7%
2024	SOUTH PINEY BIGHORN SHEEP	-	5695	CLOSED	-	0.8%

3023	SOUTH SALT RIVER	S	15690	987	16	2.1%
4074	SPOTTED HORSE TA	H	955	145	7	0.1%
3026	SQUAW CR-WEINER CR (FORAGE RESERVE)	-	19067	VACANT	-	2.6%
54008	STATION CREEK	S	8116	819	10	1.1%
3028	STEWART	-	8799	VACANT	-	1.2%
3105	STRAWBERRY	C	19516	420	46	2.7%
3012	THREE FORKS	C	26234	852	31	3.6%
7041	TOSI CREEK	-	12460	VACANT	-	1.7%
2025	TRIPLE PEAK S&G (VACANT)	-	7632	VACANT	-	1.0%
2026	TWIN PEAKS BIGHORN SHEEP	-	11665	CLOSED	-	1.6%
2033	UPPER GRAYBACK- PHOSPHATE BIGHORN	-	13548	CLOSED	-	1.9%
40117	UPPER GROS VENTRE (FORAGE RESERVE)	-	37796	VACANT	-	5.2%
3029	VIRGINIA PEAK	S	13043	987	13	1.8%
3031	WHITE CR-MAN PEAK (FORAGE RESERVE)	-	6390	VACANT	-	0.9%
4010	WILLOW CREEK	-	22214	CLOSED	-	3.0%

Note: AUM = Animal Unit Month; C=Cattle; S = Sheep; H = Horses

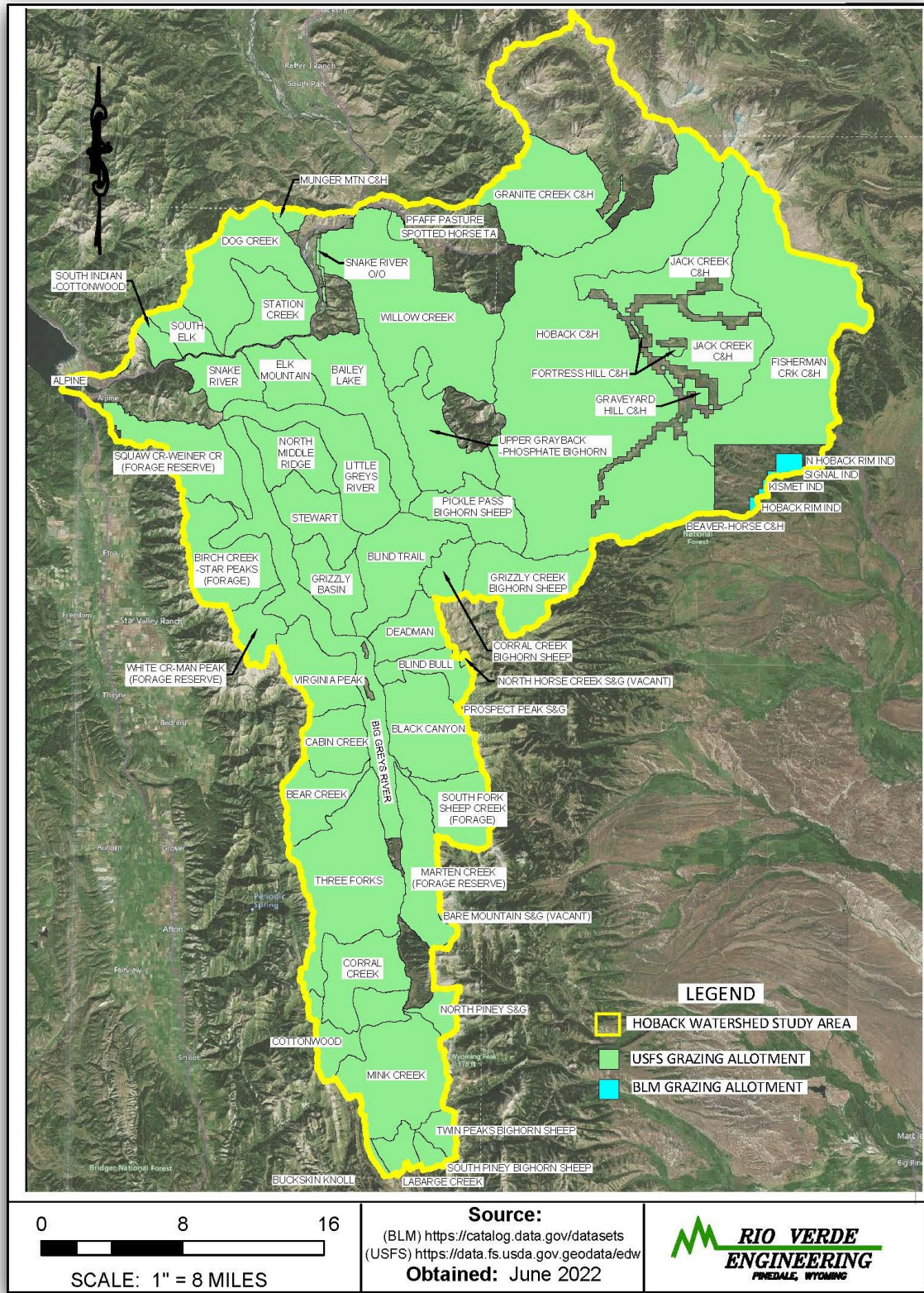


Figure 57: Grazing Allotments within the Hoback River Watershed (BLM & USFS)

3.3.4.4 Cultural Resources

Specific information about individual cultural resource status (CRS) and location is not available to the public. However, non-specific CRS sites are graphically depicted in **Figure 58** on the following page, retrieved from the Natural Resource and Energy Explorer (NREX). The legend indicates a number of known cultural resource sites by aliquot part within the defined Hoback River Watershed. As graphically depicted, known sites are more concentrated along waterways and distributed in a way that closely matches the location of private lands throughout the Watershed. Some exceptions to this generalization exist where known cultural resource sites are located in the upper elevations of the three involved mountain ranges (Gros Ventre, Wyoming, and Salt River Ranges).

The mapping product obtained from NREX indicates known sites. This does not indicate that archeological and cultural sites don't exist in those portions of the watershed that aren't identified as having known or eligible sites. For watershed improvement projects that are located on federal lands (BLM and USFS) and depending on scope of those projects, cultural inventories may be required prior to construction. This inventory requirement will be contingent upon the application for specific project and an official review by the governing entity.

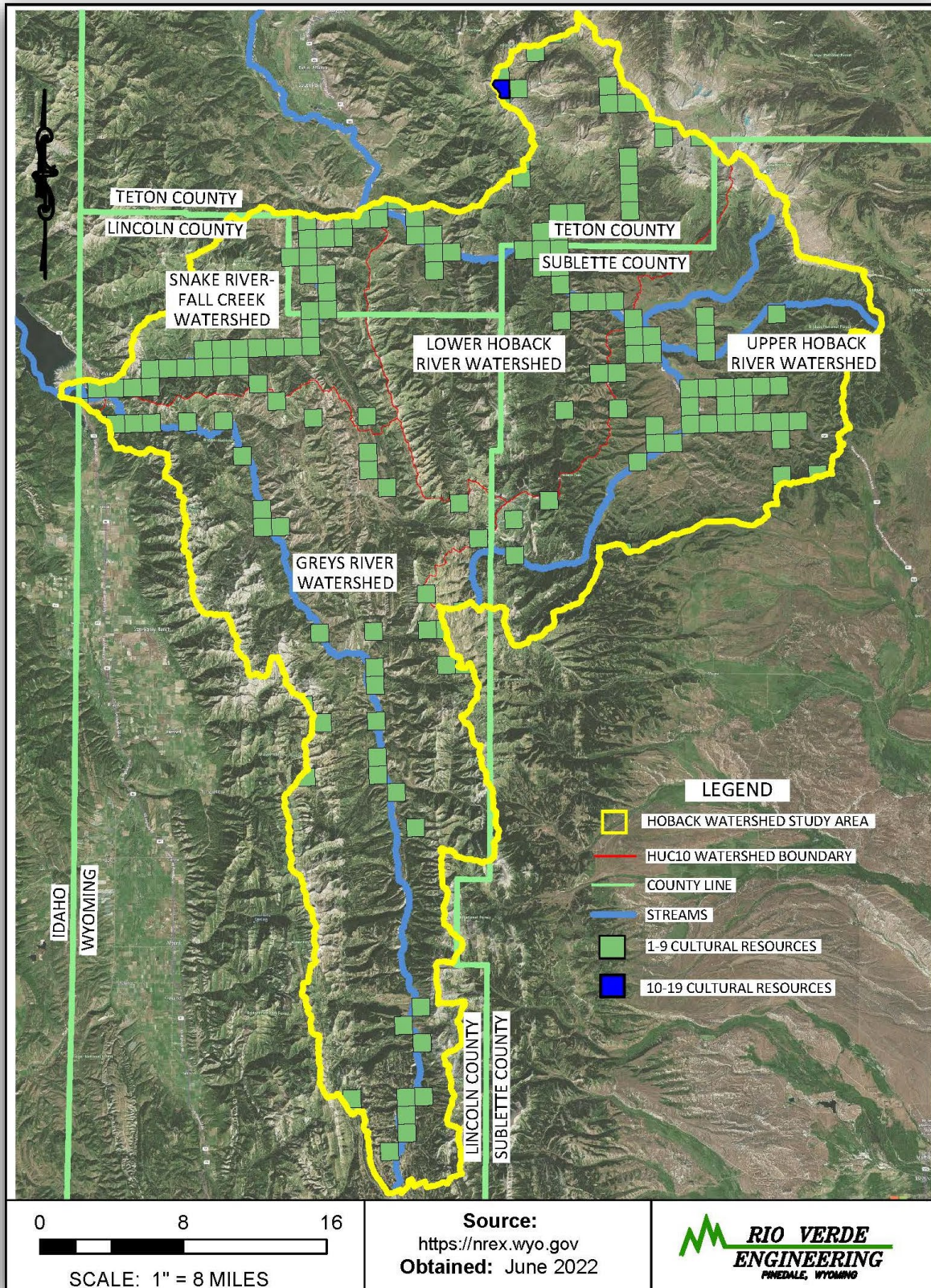


Figure 58: Significant Cultural Sites and Places within the Hoback River Watershed

4 STREAMFLOW HYDROLOGY

4.1 WET / NORMAL / DRY PATTERN

Streamflow can be characterized by dividing years into wet, normal, and dry years based on cumulative streamflow at a selected location. For this analysis, dry years are defined as the 20% of analyzed years with the lowest cumulative annual streamflow; wet years are defined as the 20% of analyzed years with the greatest cumulative annual streamflow; and normal years are defined as the remaining 60% of years.

The period of record selected for streamflow analysis in this report extends from 1978 to 2021. In the case of this 43-year study period, there are 10 dry, 25 normal, and 9 wet years (**Figure 59**). Cumulative streamflow in this analysis is calculated based on water year, which runs from October 1st to September 30st.

Wet, normal, and dry years were determined at gage 13023000, located on the Greys River. This gage is upstream of significant irrigation diversions, irrigation return flow, or other human activities and is representative of natural basin hydrology. Average monthly streamflow was calculated in Microsoft Excel for months missing 10 or fewer daily streamflow measurements (**Table 31**).

Between water year 1978 and water year 2021, the average monthly flow rate is year-round and continuous. In years with available winter flow data, 20% of total streamflow occurs during October through March. Therefore, the bulk (80%) of annual streamflow occurs from April to September and is captured by seasonal data recorded from 1978 to 2021. Using only summer-time flow to determine wet/average/dry years would produce a reasonable accurate result but could possibly mis-classify some boarder years.

Two wet/average/dry flow patterns were developed from the fully filled monthly average flow data at gage 13023000 (**Table 31**). One pattern was developed using year-round flow data, and the other was developed using only summer flow data (**Table 32**). The two year-round and seasonal data sets produced nearly identical wet/normal/dry patterns, showing differences in only 1993/1994. This indicates that excluding winter flow from the wet/normal/dry pattern introduces more error. Therefore, the wet/normal/dry pattern developed from year-round flow was selected for analysis of HUC10 hydrology in wet, normal, and dry years (**Table 32**). Due to stream gages within this watershed boundary, not having adequate periods of records to characterize the wet/normal/dry patterns, the developed pattern for gage 13023000 should be assumed for the entire Hoback River Watershed study area.

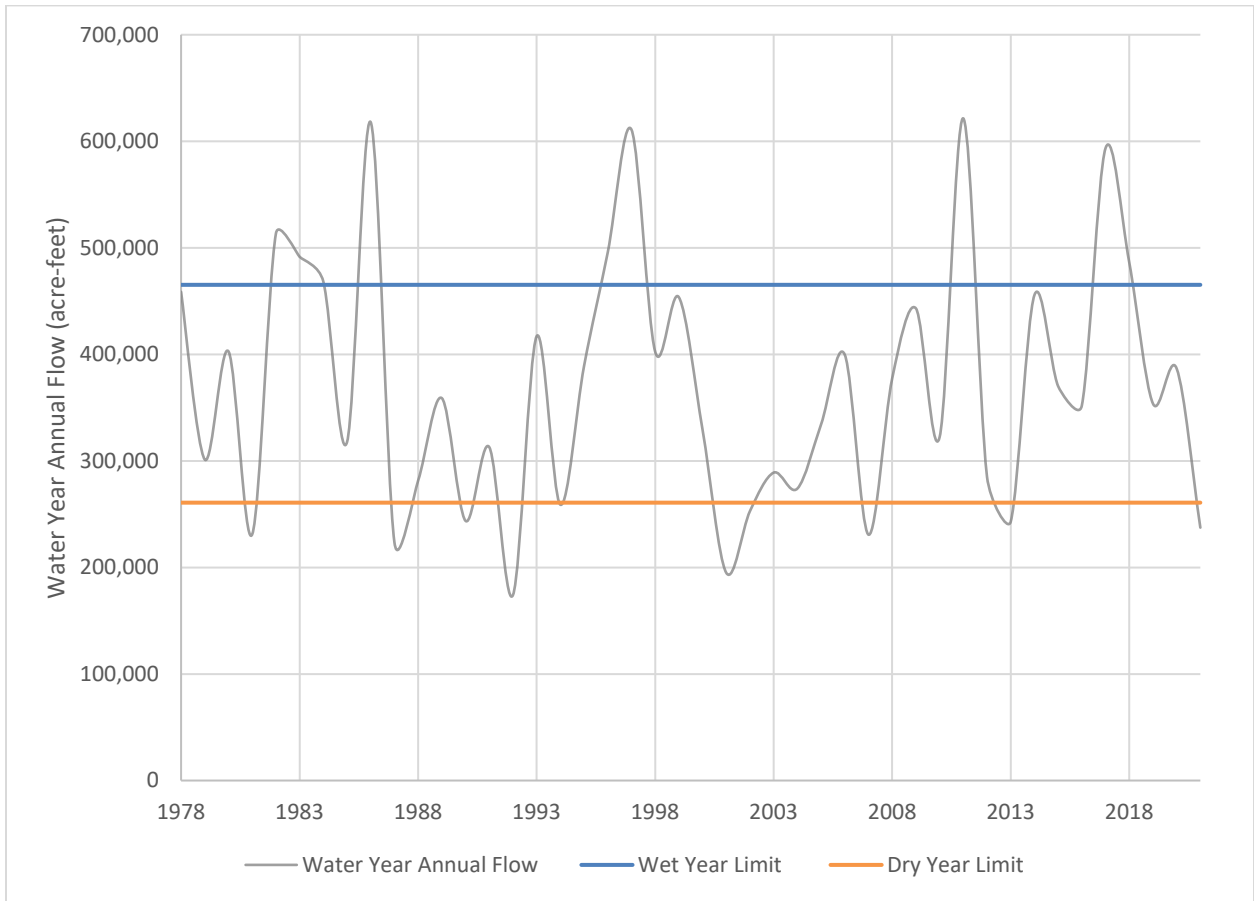


Figure 59: Wet/Normal/Dry Years Flow at 13023000

Table 31. Average monthly flow (acre-feet) at Gage 13023000. Blank cells indicate that the month is missing more than 10 days of data. The water year total precipitation is from October 1 – September 30.

Water Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1977						23,336	13,779	12,368	11,927	11,685	10,582	11,885	
1978	9,606	9,192	14,043	45,003	108,225	151,752	93,441	36,483	23,806	24,019	21,172	15,995	525,703
1979	12,290	13,928	13,425	26,755	97,923	86,675	43,874	26,697	19,340	17,889	15,593	14,618	402,093
1980	10,811	10,720	11,852	50,058	111,476	121,084	60,944	32,837	26,371	19,310	15,161	13,545	484,252
1981	12,078	11,377	12,436	28,351	59,640	70,832	33,725	21,100	17,387	16,381	13,711	12,368	314,942
1982	11,973	11,549	12,051	28,140	138,274	157,684	106,941	48,527	33,737	28,457	22,045	18,576	591,336
1983	17,441	16,931	18,773	30,712	115,710	177,875	94,311	43,366	29,636	27,431	27,430	22,108	613,834
1984	17,982	17,569	16,978	38,612	130,085	149,982	78,946	39,376	31,424	25,771	19,971	15,984	597,924
1985	14,658	12,454	13,360	57,616	111,982	72,797	33,604	22,318	19,286	17,451	14,473	11,977	419,802
1986	10,237	11,381	24,504	71,950	140,026	240,036	88,836	45,116	31,921	25,617	22,441	16,250	707,907
1987	12,677	13,012	12,763	42,024	72,650	45,572	27,550	20,069	15,708	13,613	11,427	10,260	326,333
1988	9,848	12,039	11,214	48,208	92,413	74,323	30,664	19,718	16,175	13,730	12,422	11,770	349,902
1989	13,160	12,596	17,146	62,774	101,881	98,942	47,095	27,318	20,905	17,556	14,841	13,812	439,739
1990	13,337	10,603	12,197	44,335	57,299	71,814	33,793	20,047	16,450	15,702	13,208	10,544	326,084
1991	8,709	9,069	10,702	26,059	81,287	115,956	45,137	26,219	18,312	15,735	14,395	11,364	380,903
1992	11,076	11,507	16,073	33,850	59,356	33,146	19,255	13,261	15,157	11,529	9,025	8,581	254,173
1993	8,030	7,940	11,079	30,121	131,926	125,629	65,126	39,090	25,110	19,635	14,606	12,831	473,186
1994	12,245	9,244	11,017	48,232	100,322	56,148	24,416	16,581	13,204	13,419	11,008	10,599	338,482
1995	10,883	12,286	17,334	34,891	78,502	131,742	84,899	34,062	24,941	19,857	18,958	17,770	464,565
1996	17,387	14,001	15,651	47,571	141,777	180,087	68,542	32,623	25,112	20,265	18,590	15,918	599,335
1997	16,752	13,596	22,359	54,740	182,899	215,984	79,308	43,635	34,352	24,325	19,026	13,857	718,398
1998	16,036	15,499	18,533	39,269	106,902	116,398	75,980	35,720	28,293	23,009	19,726	12,597	509,838
1999	11,074	10,666	16,544	41,174	105,898	158,268	78,272	39,990	30,006	23,369	19,465	13,753	547,224
2000	12,806	12,565	14,721	53,783	106,727	84,624	37,170	26,234	20,625	18,068	13,667	12,241	425,842
2001	10,548	10,235	13,138	26,803	78,257	41,493	20,475	14,962	12,961	12,654	11,748	8,972	272,849
2002	9,692	8,209	9,894	38,189	68,678	78,175	31,985	19,444	16,458	14,117	12,400	10,023	314,098
2003	8,660	10,084	12,520	44,269	87,993	84,481	33,748	21,735	16,774	13,228	11,103	9,569	356,804

2004	7,921	9,484	16,698	40,484	66,148	82,251	41,961	23,807	19,388	18,054	14,262	12,420	342,042
2005	11,755	10,220	12,952	36,281	99,119	99,807	49,428	27,859	21,802	18,605	16,806	14,635	413,959
2006	15,764	10,601	12,829	59,231	135,880	109,259	44,919	27,647	22,684	20,425	18,168	14,382	488,861
2007	13,039	13,445	19,592	38,503	79,890	52,753	25,518	18,391	15,716	15,674	13,737	10,371	329,822
2008	9,458	10,173	10,064	18,497	103,189	131,782	72,373	29,262	22,357	17,829	16,525	13,259	446,938
2009	11,813	11,359	11,753	40,130	130,266	153,763	66,436	30,372	22,192	20,117	16,271	13,506	525,695
2010	11,959	11,732	12,220	31,265	56,366	136,006	51,053	26,898	20,655	17,811	16,020	14,606	408,050
2011	13,623	11,762	13,627	30,019	128,212	214,295	156,042	57,162	35,750	29,072	23,555	21,075	708,930
2012	18,946	13,225	18,597	62,084	76,375	67,637	36,424	23,344	19,260	17,453	15,901	14,869	409,593
2013	11,661	12,167	12,915	27,261	81,462	66,026	32,394	18,989	16,760	14,886	12,643	9,604	327,858
2014	8,748	8,856	12,121	45,095	140,279	138,580	67,707	36,062	27,911	27,015	19,716	17,447	522,491
2015	15,429	16,809	27,958	62,181	115,251	104,432	40,873	25,343	22,059	19,162	16,623	14,365	494,513
2016	12,993	12,126	16,137	63,741	106,698	97,716	37,868	25,123	20,752	24,193	21,747	12,934	443,304
2017	12,401	23,324	50,705	87,620	169,704	189,800	75,252	39,526	31,571	25,467	27,581	20,674	738,778
2018	16,470	15,604	17,704	70,108	191,229	123,195	48,196	30,218	23,426	21,351	17,349	15,631	609,874
2019	12,621	12,723	12,206	46,187	86,347	116,197	53,945	27,610	23,543	19,368	16,675	14,166	445,712
2020	13,242	11,022	13,318	38,020	132,027	118,992	49,070	27,232	21,383	18,465	17,323	14,781	474,516
2021	14,764	13,895	13,541	28,613	76,920	70,720	26,900	18,907	15,346	14,366	13,283		330,174
Min	7,921	7,940	9,894	18,497	56,366	23,336	13,779	12,368	11,927	11,529	9,025	8,581	254,173
Max	18,946	23,324	50,705	87,620	191,229	240,036	156,042	57,162	35,750	29,072	27,581	22,108	738,778
Mean	12,559	12,200	15,574	43,609	105,533	111,957	53,959	28,726	22,176	19,181	16,497	13,784	459,470

Table 32. Cumulative Streamflow and Wet/Normal/Dry Pattern for Year-round and Seasonal Data Analysis Methodology.

Water Year	Cumulative-flow (acre-feet)			Wet/Normal/Dry	
	<i>Year Round</i>	<i>Seasonal</i>	<i>Difference</i>	<i>Year-Round</i>	<i>Seasonal</i>
1978	525,703	458,710	66,993	Normal	Normal
1979	402,093	301,264	100,829	Normal	Normal
1980	484,252	402,769	81,483	Normal	Normal
1981	314,942	231,036	83,906	Dry	Dry
1982	591,336	513,304	78,032	Wet	Wet
1983	613,834	491,611	122,223	Wet	Wet
1984	597,924	468,425	129,499	Wet	Wet
1985	419,802	317,603	102,199	Normal	Normal
1986	707,907	617,884	90,023	Wet	Wet
1987	326,333	223,573	102,761	Dry	Dry
1988	349,902	281,501	68,400	Normal	Normal
1989	439,739	358,915	80,824	Normal	Normal
1990	326,084	243,738	82,346	Dry	Dry
1991	380,903	312,969	67,934	Normal	Normal
1992	254,173	174,024	80,148	Dry	Dry
1993	473,186	417,002	56,184	Normal	Normal
1994	338,482	258,904	79,578	Normal	Dry
1995	464,565	389,036	75,529	Normal	Normal
1996	599,335	495,712	103,624	Wet	Wet
1997	718,398	610,918	107,481	Wet	Wet
1998	509,838	402,562	107,276	Normal	Normal
1999	547,224	453,607	93,616	Normal	Normal
2000	425,842	329,162	96,679	Normal	Normal
2001	272,849	194,952	77,898	Dry	Dry
2002	314,098	252,929	61,169	Dry	Dry
2003	356,804	289,000	67,804	Normal	Normal
2004	342,042	274,039	68,003	Normal	Normal
2005	413,959	334,296	79,663	Normal	Normal
2006	488,861	399,620	89,240	Normal	Normal
2007	329,822	230,771	99,051	Dry	Dry
2008	446,938	377,461	69,477	Normal	Normal
2009	525,695	443,158	82,538	Normal	Normal
2010	408,050	322,244	85,806	Normal	Normal
2011	708,930	621,480	87,449	Wet	Wet
2012	409,593	285,124	124,470	Normal	Normal
2013	327,858	242,892	84,966	Dry	Dry
2014	522,491	455,633	66,858	Normal	Normal

2015	494,513	370,139	124,374	Normal	Normal
2016	443,304	351,898	91,406	Normal	Normal
2017	738,778	593,474	145,304	Wet	Wet
2018	609,874	486,373	123,501	Wet	Wet
2019	445,712	353,829	91,882	Normal	Normal
2020	474,516	386,726	87,790	Normal	Normal
2021	330,174	237,405	92,769	Dry	Dry

4.2 WET / NORMAL / DRY MONTHLY FLOW AT NATURAL FLOW STREAM GAGES

13023000

At gage 130023000 the observed average annual flow during wet, normal, and dry years, respectively, is 55,070, 37,500, and 25,200 acre-feet. Observed monthly streamflow peaks in June (Figure 60), ranging between 240,100 acre-feet in an average wet year and 23,300 acre-feet in an average dry year. Observed monthly streamflow is lowest in February, ranging between 15,000 acre-feet in an average wet year and 11,600 acre-feet in an average dry year (Table 33). Due to this being the only gage within the watershed study boundary with a substantial period of record, wet/normal/dry monthly flow analysis was performed. Modeled flows within HUC10 boundaries can be found in 1.2.4.3 Wet/Normal/Dry Monthly Flow at HUC10 Watersheds.

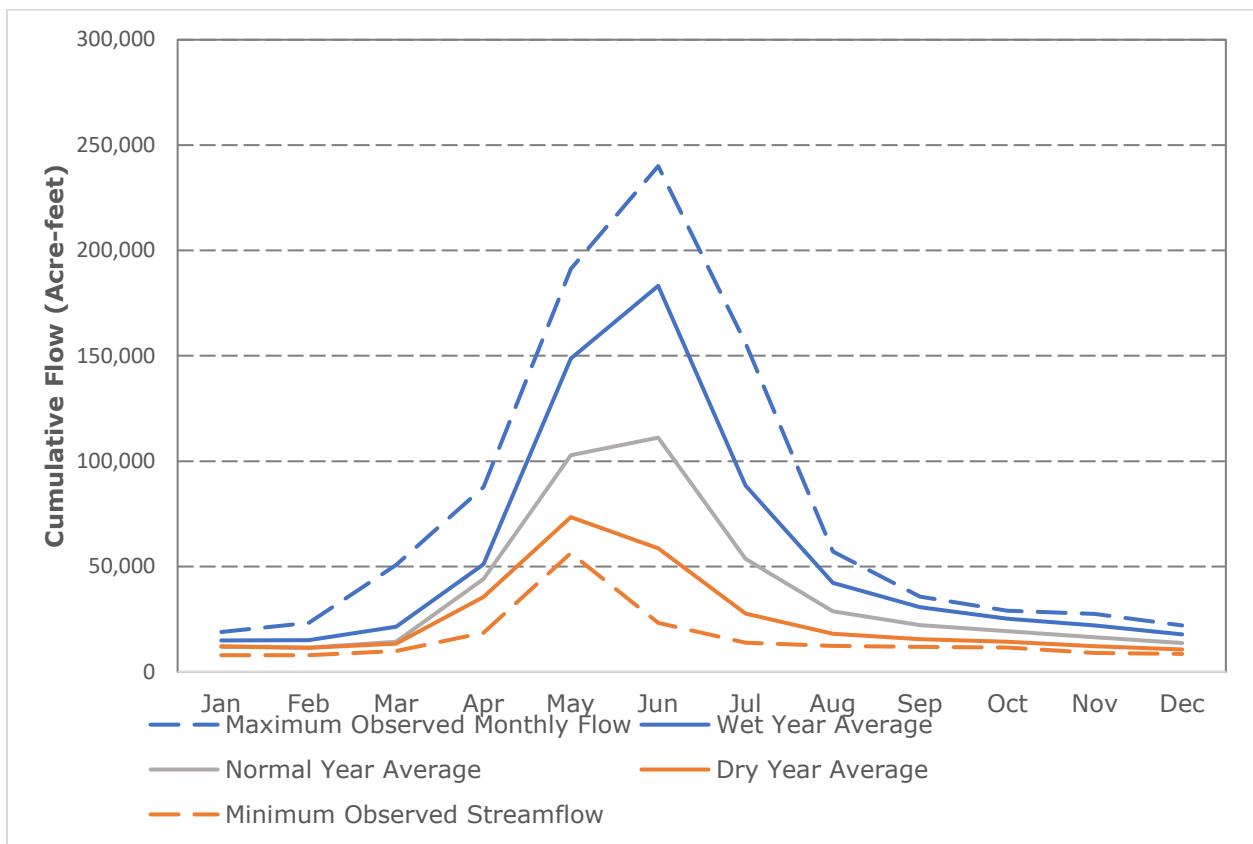


Figure 60: Observed Flow at 13023000 During Wet/Normal/Dry Year

Table 33. Observed Flow at 13023000 during Wet/Normal/Dry Year

Month	Jan	Feb	Mar	Apr	May	Jun
Number of Observed Monthly Values	N=44	N=44	N=44	N=44	N=44	N=45
Maximum Observed Monthly Flow	18,946	23,324	50,705	87,620	191,229	240,036
Wet Year Average	14,919	15,080	21,372	51,053	148,657	183,215
Normal Year Average	11,889	11,495	14,373	44,127	102,843	111,164
Dry Year Average	12,097	11,606	13,617	34,214	70,461	58,948
Minimum Observed Streamflow	7,921	7,940	9,894	18,497	56,366	23,336

Month	Jul	Aug	Sep	Oct	Nov	Dec
Number of Observed Monthly Values	N=45	N=45	N=45	N=45	N=45	N=44
Maximum Observed Monthly Flow	156,042	57,162	35,750	29,072	27,581	22,108
Wet Year Average	88,486	42,172	30,770	25,306	21,999	17,786
Normal Year Average	53,680	28,759	22,157	19,254	16,465	13,729
Dry Year Average	27,955	18,352	15,772	14,325	12,354	10,090
Minimum Observed Streamflow	13,779	12,368	11,927	11,529	9,025	8,581

4.3 WET / NORMAL / DRY MONTHLY FLOW AT HUC10 WATERSHEDS

The Hoback River Watershed is composed of four HUC10 watersheds (**Figure 4** and **Table 2**). HUC10 watersheds Greys River, Snake River-Fall Creek, Upper Hoback River, and Lower Hoback River. These four HUC10 watersheds contain high precipitation areas that feed perennial streams.

GREYS RIVER

Gage 13023000 is near the mouth of the Greys River, approximately 3 miles upstream from where it becomes a tributary of the Snake River. Because of its location, the streamflow measured at 13023000 measures nearly all surface water produced in the HUC10. With the exception of Mill Creek, there is no other stream confluence with the Greys River between 13023000 and the mouth of HUC 10. Therefore, the wet/normal/dry streamflow values developed for gage 13023000 are representative of the entire HUC10.

From 1977 to 2020, average annual production during wet, normal, and dry years, respectively, is 660,815, 449,935, and 10,090 acre-feet. Monthly streamflow peaks in June (**Figure 60**), ranging between 183,215 acre-feet in an average wet year and 27,955 acre-feet in an average dry year (**Table 33**). Monthly streamflow is lowest in January, ranging between 14,919 acre-feet in an average wet year and 12,097 acre-feet in an average dry year. The reported flow data is natural flow developed from observed flow at 13023000.

UPPER HOBACK RIVER

The Hoback River is the main river that all creeks and streams contribute to in the Upper Hoback HUC10 watershed. The Hoback River originates in the high alpine mountains of the Wyoming Range and flows northwest to the Snake River. The Upper Hoback River tributary area is similar to the Greys River tributary area in annual precipitation, topography, and elevation. As such, the production of upstream section of the Hoback River can be estimated by prorating it to the gaged flow at 13023000 using tributary area and annual precipitation data. The Upper Hoback River tributary area is 261.6 square miles in area and averages 20.8 inches of precipitation annually. The tributary area of gage 13023000 is 455 square miles and averages 34.75 inches of precipitation annually. From this, Upper Hoback River is expected to produce approximately 8% as much runoff as the Greys River. The equation used to prorate can be seen below.

$$\text{Upper Hoback Flow} = \frac{(\text{Upper Hoback tributary area}) * (\text{Upper Hoback Precipitation})}{(\text{Greys River tributary area}) * (\text{Greys River Precipitation})} * \text{Greys River Flow}$$

From 1978 to 2020, the average annual production of Upper Hoback HUC10 during wet, normal, and dry years, respectively, is 4,383, 2,985, and 1,990 acre-feet. Monthly streamflow peaks in June (**Figure 61**), ranging between 19,108 acre-feet in an average wet year and 4,693 acre-feet in an average dry year (**Table 34**). Monthly streamflow is lowest in January, ranging between 1,508 acre-feet in an average wet year and 631 acre-feet in an average dry year. Due to the wet/normal/dry year flows being prorated to the Greys River, the wet/normal/dry years would correlate with gage 13023000.

LOWER HOBACK RIVER

Stream gage 13019500 is located near the mouth of the Hoback River, where it flows into the Snake River. Due to a limited amount of data at gage 13019500, the Wyoming Water Development Office modeled reach outflow in the Hoback River in the Salt/Snake River Basin Plan Update, 2012. Therefore, the wet/normal/dry streamflow values developed in this model are representative of the entire HUC10.

The period of record in the Salt/Snake River Basin Plan Update, 2012 report is from 1971 to 2010. During this period of record, WWDO determined the average annual flow during wet, normal, and dry years, respectively, is 696,694, 500,351, and 336,482 acre-feet. Modeled monthly streamflow peaks in June (**Figure 62**), ranging between 224,538 acre-feet in an average wet year and 63,312 acre-feet in an average dry year. Modeled monthly streamflow is lowest in February, ranging between 11,183 acre-feet in an average wet year and 11,214 acre-feet in an average dry year (**Table 35**).

SNAKE RIVER- FALL CREEK

The Wyoming Water Development Office's Salt/Snake River Basin Plan Update, 2012 modeled flow at the Snake River before the Greys River confluence. Because of its location, the streamflow models most of the surface water produced in the HUC10. Therefore, the wet/normal/dry streamflow values modeled are representative of the entire HUC10.

The period of record of the study for the Salt/Snake River Basin Plan Update, 2012 report is from 1971 to 2010. During this period of record, WWDO determined the average annual flow in the Snake River above the Palisades Reservoir during wet, normal, and dry years, respectively, to be 4,438,246, 3,124,912, and 2,428,571 acre-feet. According to this study, monthly streamflow peaks in June (**Figure 63**), ranging from 468,957 acre-feet in an average dry year to 1,241,472 acre-feet in an average wet year. Modeled monthly streamflow is lowest in February, ranging between 104,241 acre-feet in an average wet year and 78,286 acre-feet in an average dry year (**Table 36**).

The Salt/Snake River Basin Plan Update, 2012, modeled flows were adjusted to take into account flow requirements of Jackson Lake operations, and other downstream appropriations further described in the report. After the flows were adjusted, the annual flow during wet, normal, and dry years, respectively, is 4,049,867, 2,717,548, and 1,775,752 acre-feet. Adjusted monthly streamflow is highest in June (**Figure 64**), ranging between 88,691 acre-feet in an average wet year and 346,712 acre-feet in an average dry year. Adjusted monthly streamflow is lowest in February, ranging between 88,691 acre-feet in an average wet year and 58,070 acre-feet in an average dry year (**Table 37**).

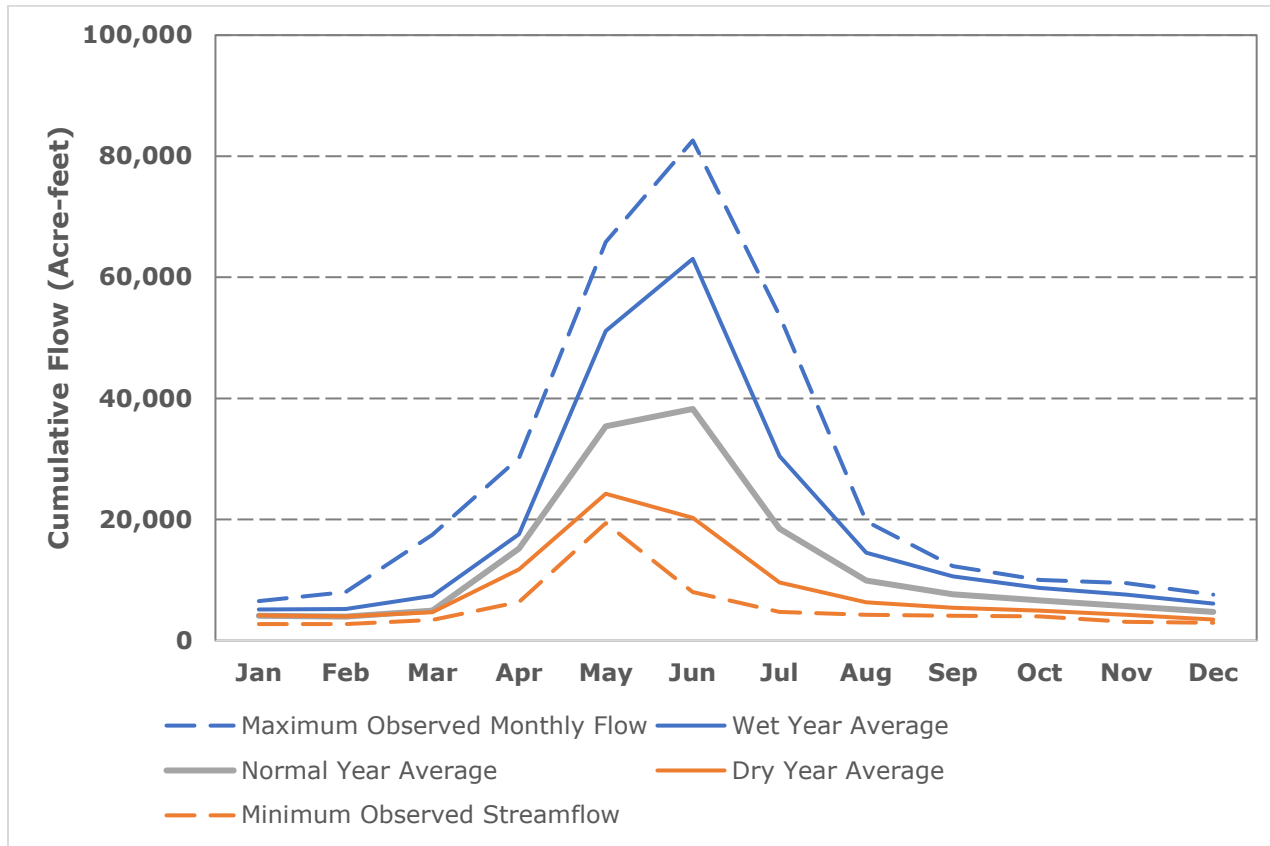


Figure 61: Modeled Flow at Upper Hoback River HUC10 During Wet/Normal/Dry Years

Table 34. Modeled flow at Upper Hoback River HUC10 during Wet/Normal/Dry years

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Maximum Observed Monthly Flow	6,520	8,027	17,450	30,154	65,809	82,606	53,700	19,672	12,303	10,005	9,492	7,608
Wet Year Average	5,134	5,190	7,355	17,569	51,159	63,051	30,451	14,513	10,589	8,709	7,571	6,121
Normal Year Average	4,091	3,956	4,946	15,186	35,392	38,256	18,474	9,897	7,625	6,626	5,666	4,725
Dry Year Average	4,163	3,994	4,686	11,775	24,248	20,286	9,620	6,316	5,428	4,930	4,251	3,472
Minimum Observed Streamflow	2,726	2,732	3,405	6,366	19,398	8,031	4,742	4,256	4,105	3,968	3,106	2,953

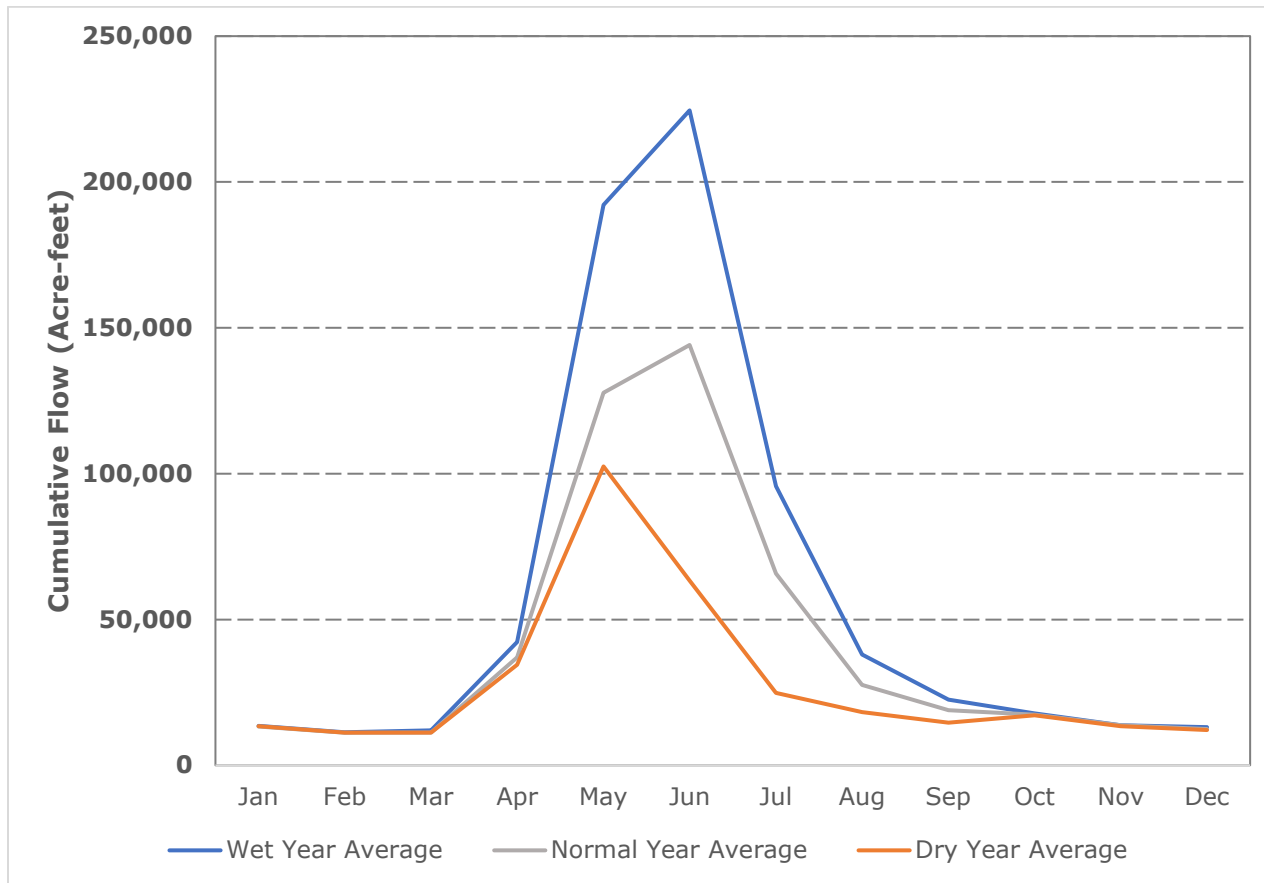


Figure 62: Observed Flow at Lower Hoback River HUC10 During Wet/Normal/Dry Year.

Table 35: Observed Flow at Lower Hoback River HUC10 During Wet/Normal/Dry Year

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wet Year Average	13,535	11,333	11,944	42,315	192,178	224,538	95,743	37,938	22,545	17,754	13,775	13,097
Normal Year Average	13,350	11,183	11,234	36,962	127,735	144,106	65,717	27,608	18,917	17,383	13,735	12,420
Dry Year Average	13,389	11,214	11,221	34,505	102,476	63,312	24,818	18,223	14,668	17,170	13,396	12,090

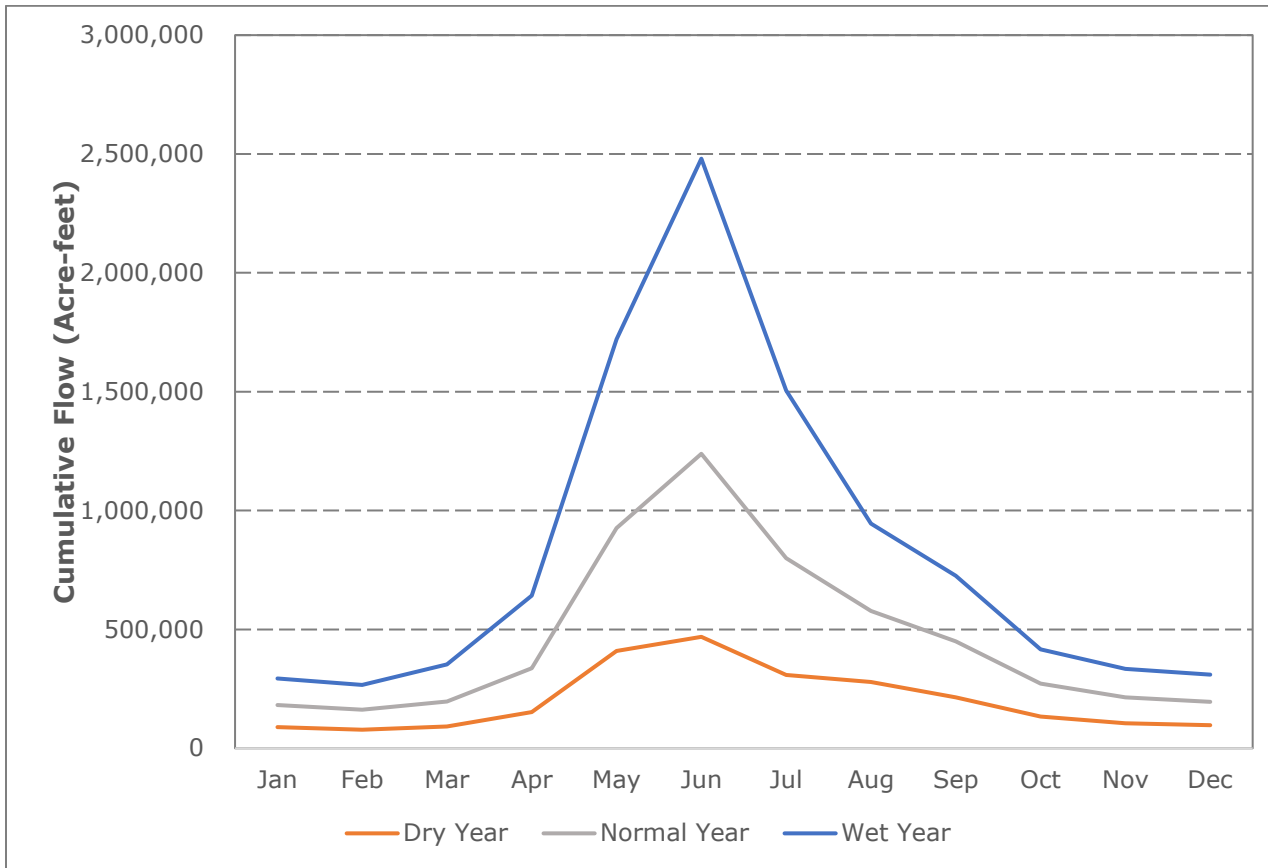


Figure 63: Modeled Flow at Snake River-Fall Creek HUC10 During Wet/Normal/Dry Year.

Table 36: Modeled Flow at Snake River-Fall Creek During Wet/Normal/Dry Year

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wet Year Average	13,535	11,333	11,944	42,315	192,178	224,538	95,743	37,938	22,545	17,754	13,775	13,097
Normal Year Average	13,350	11,183	11,234	36,962	127,735	144,106	65,717	27,608	18,917	17,383	13,735	12,420
Dry Year Average	13,389	11,214	11,221	34,505	102,476	63,312	24,818	18,223	14,668	17,170	13,396	12,090

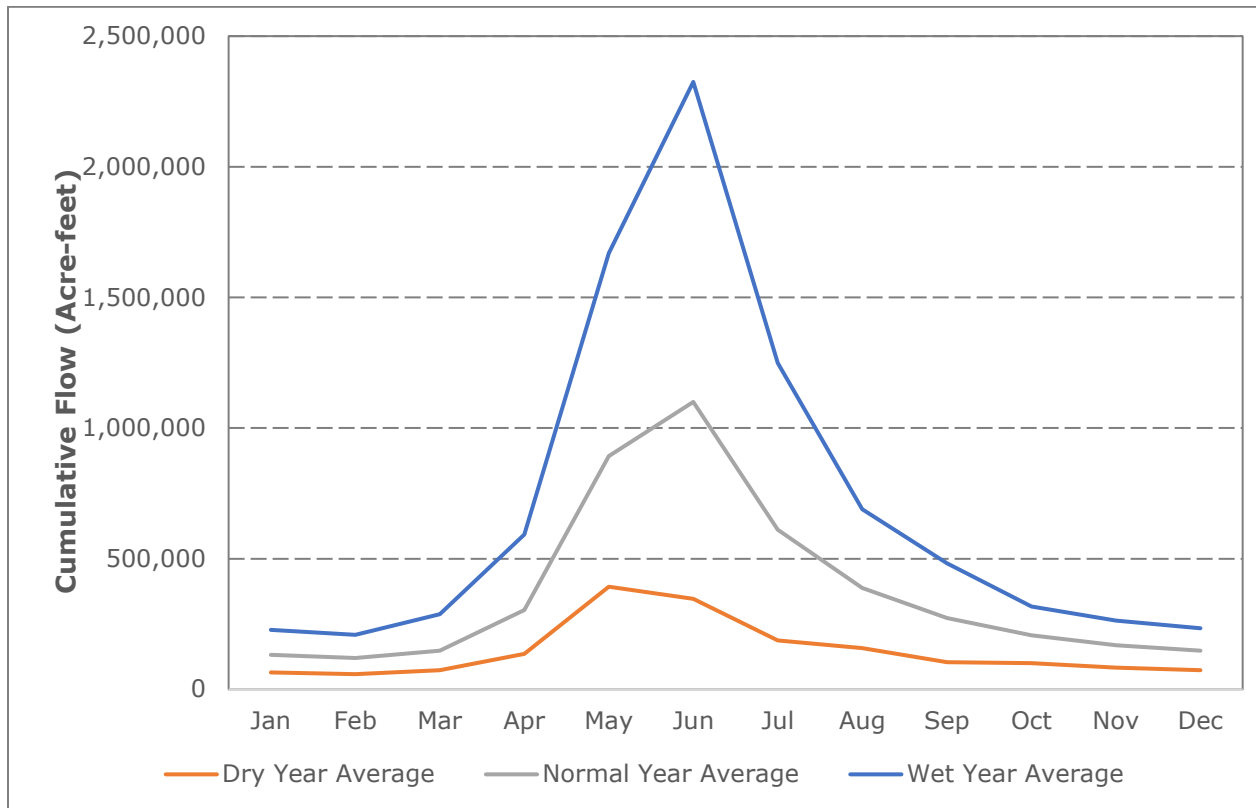


Figure 64: Adjusted Physically Available Flow at Snake River-Fall Creek HUC10 During Wet/Normal/Dry Year.

Table 37: Adjusted Physically Available Flow at Snake River-Fall Creek HUC10 During Wet/Normal/Dry Year

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wet Year Average	95,051	88,691	138,753	288,244	776,053	1,224,811	638,708	300,997	209,194	109,716	94,596	85,052
Normal Year Average	68,020	61,792	74,863	168,514	499,868	753,263	423,721	231,130	169,343	106,778	85,742	74,512
Dry Year Average	64,516	58,070	73,400	135,423	392,712	346,712	186,775	157,291	103,896	100,278	83,127	73,708

4.4 WATER SHORTAGES DURING A DRY YEAR

Under Wyoming water law, the earliest rights are entitled to water during periods of low supply over those with later rights. Due to the Hoback River Watershed area being mostly high alpine mountains with little irrigation and diversion, even during dry years, flows rarely go into state regulation. According to the Wyoming Division IV Hydrographer's Annual Reports from 1995 to 2021, the only regulations that have been set within the last 26 years is Crow Creek, which is a tributary to the Greys River, and has been called into state regulation in the years of 2001, 2002, 2007, and 2015. The WSEO District 8 Hydrographer explained that this regulation occurs due to a senior canal that would dry up the creek during dry years if regulations were not in place. All other streams within the watershed study area have not been put into state regulation within the last 26 years.

5 WATERSHED MANAGEMENT AND REHABILITATION PLAN

This section of the report identifies and evaluates specific rehabilitation, management, and development projects that were individually evaluated throughout the investigation phase of this study. The focus of this task is to bring forward recommendations that will ultimately improve watershed condition and function. Each individual Conservation District (sponsors) emphasized the need to develop this list and associated recommendations. Over the course of this study, 30 projects were identified by interested stakeholders. Input from these constituents was paramount in the process of identifying the listed watershed improvement opportunities. The following section contains detailed information relative to each.

5.1 SMALL WATER PROJECTS

The WWDC Small Water Projects Program (SWPP) was developed by the WWDC/WWDO to enable sponsoring agencies to facilitate grant funding for small projects that improve a watershed's condition and overall function. Ultimately, the program is intended for utilization by landowners to implement projects that meet this objective. Per SWPP qualification guidelines developed by the WWDC, eligible projects include new construction (Account I) or rehabilitation (Account II) of small reservoirs, wells, pipelines and conveyance facilities, springs, solar platforms, irrigation infrastructure, windmills, wetland developments, environmental projects that improve stream stability or provide erosion protection, projects that provide storage or supply for rural community fire suppression, and recreation based projects. Each proposed project must also provide for public benefit. The projects tabulated in the following sub-section will identify all opportunities and whether they are SWPP eligible or not. No large-scale projects were identified during the course of this study.

5.1.1 Small Water Projects Program

As stated previously, 30 individual projects were brought forward for consideration under the watershed management and rehabilitation plan. There are 18 projects that fall under Account I (New Development Projects) and the remaining 12 projects fall under Account II (Rehab Projects). **Figure 65** depicts the location of each project within the watershed and a supplemental list with associated descriptive information is provided in **Table 38**.

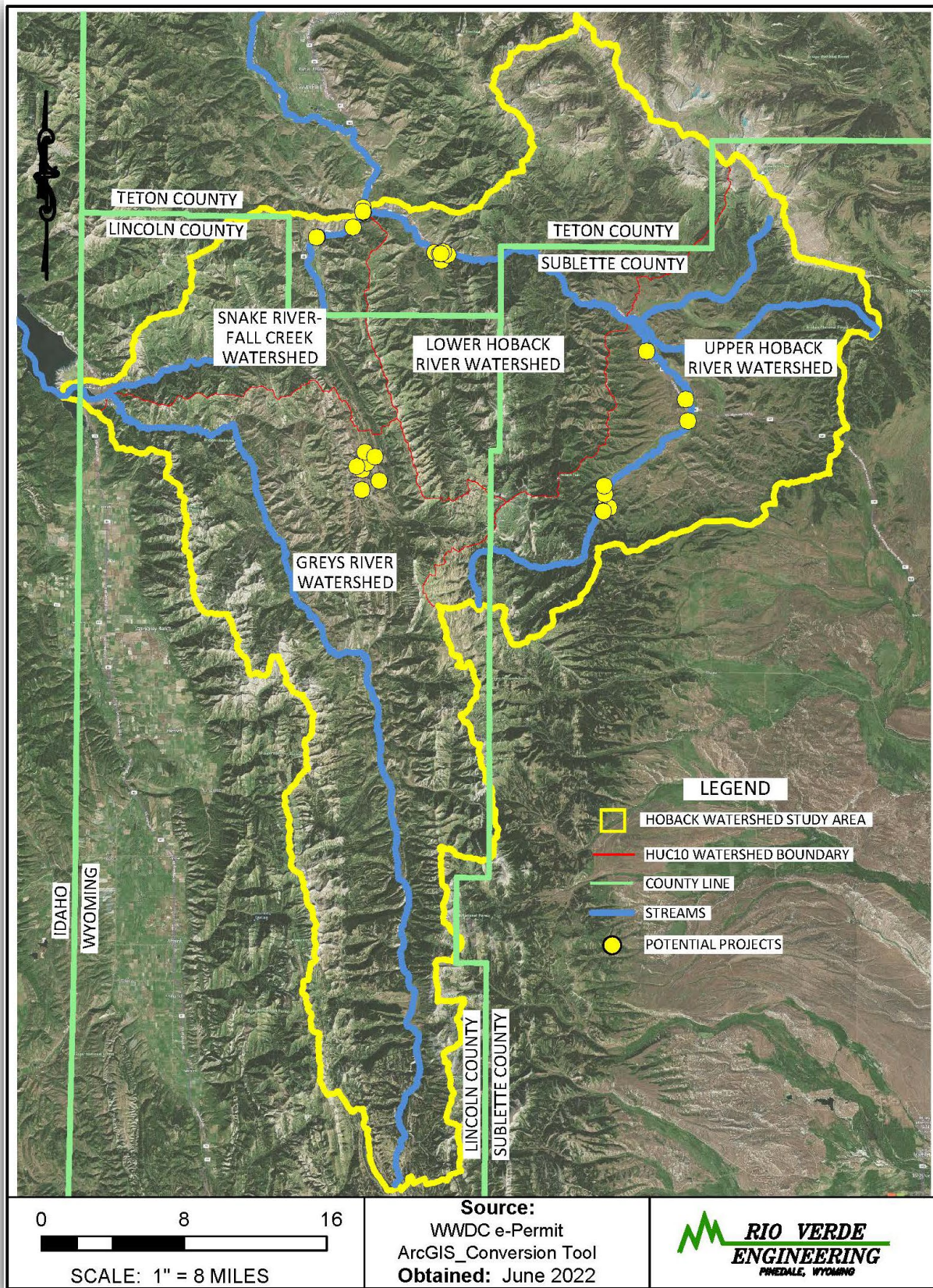


Figure 65. Small Water Project locations within the Hoback River Watershed

Table 38. Small Water Projects Program (SWPP) – Project Database

HOBACK RIVER WATERSHED, LEVEL I STUDY

WATERSHED MANAGEMENT & REHABILITATION PLAN
 SMALL WATER PROJECT PROGRAM (SWPP) DATABASE

Account I	(NEW DEVELOPMENT)
Account II	(REHABILITATION)

PROJECT ID	APPLICANT/LANDOWNER	PROJECT NAME	EXISTING PERMIT #	PROJECT TYPE	SWPP	PLSS LOCATION				GEODETIC COORDINATES (NAD83)	
					PROJECT PRIORITY	SECTION	ALIQUOT PART OR H.E.S.	TOWNSHIP (N)	RANGE (W)	LATITUDE (N)	LONGITUDE (W)
1.1	HARRISON, MELISSA	DAISY SPRINGS PUMP AND PIPELINE	N/A	SOURCE WATER DEVELOPMENT	Account I-1	23	NW/4NE/4	37	113	43.1681	110.37197
2.1	BAILEY, DAN	BAILEY #1 STOCK RES	P20711.0S	STORAGE	Account I-2	21	NW/4NE/4	36	114	43.08255	110.45981
2.2	BAILEY, DAN	DEAD SHOT No. 1 RES	P15325.0R	STORAGE	Account I-2	21	NW/4NE/4	36	114	43.08019	110.45639
3.1	BURROUGS, PAT	JULIUS MILLER DITCH REHAB	P18722.0D	CONVEYANCE FACILITY REHAB	Account II-3	9, 16	ALL	36	114	43.09111	110.46111
3.2	BURROUGS, PAT	JULIUS MILLER LATERAL REHAB	P18722.0D	CONVEYANCE FACILITY REHAB	Account II-3	9	S/2	36	114	43.09784	110.46188
4.1	CAMPBELL CATTLE CO.	BOWLSBY No.3 DIVERSION REHAB	P3895.0D	DIVERSION STRUCTURE	Account II-1	1	NW/4SE/4	37	113	43.20471	110.35138
5.1	TOLSON, DAN	LONG COOL CREEK DRAW - TOLSON IRRIGATION PUMP & PIPELINE	N/A	SOURCE WATER DEVELOPMENT	Account I-1	21	SE/4NW/4	36	114	43.07721	110.46320
5.2	TOLSON, DAN	TOLSON STOCK WATER TANK	N/A	SOURCE WATER DEVELOPMENT	Account I-1	21	SE/4NW/4	36	114	43.07703	110.46277
6.1	MEEKS, ZANE	AMREIN DITCH CONVEYANCE REHAB	P22668.0D	CONVEYANCE FACILITY REHAB	Account II-3	33	SE/4SW/4	38	113	43.20702	110.41544
7.1	RANIOLO, JAMES	RANIOLO PUMP AND PIPELINE	N/A	R.C. FIRE SUPPRESSION	Account I-1	26	(HES 107)	39	116	43.31855	110.73106
8.1	UPTAIN, SARAH	UPTAIN PUMP AND PIPELINE	N/A	SOURCE WATER DEVELOPMENT	Account I-1	26	(HES 107)	39	116	43.31915	110.73141
9.1	TAYLOR, MARCIA	TAYLOR IRRIGATION PUMP AND PIPELINE	N/A	SOURCE WATER DEVELOPMENT	Account I-1	4	SW/4NE/4	38	115	43.28697	110.64173
9.2	TAYLOR, MARCIA	SCARLETT #1 WELL STOCK TANK	P103930.0W	SOURCE WATER DEVELOPMENT REHAB	Account I-1	4	NE/4SE/4	38	115	43.28463	110.63654
9.3	TAYLOR, MARCIA	TAYLOR FIRE SUPPRESSION	N/A	R.C. FIRE SUPPRESSION	Account I-1	4	NW/4SE/4	38	115	43.28548	110.64575
9.4	TAYLOR, MARCIA	GILROY #2 STOCK TANK REHAB & SOLAR CONVERSION	P91305.0W	STOCK TANK REHAB	Account II-2	4	SW/4SE/4	38	115	43.27976	110.64394
9.5	TAYLOR, MARCIA	TAYLOR No. 1 RESERVOIR	N/A	STORAGE	Account I-2	4	NW/4SE/4	38	115	43.28545	110.64441
10.1	TRUMBOWER, MIKE	HOBACK FIRE STATION - FIRE SUPPRESSION REHAB	P54424.0W	R.C. FIRE SUPPRESSION REHAB	Account II-2	23	(HES 107)	39	116	43.32234	110.73147
11.1	RODE, BILL	RODE No. 1 WELL AND STOCK TANK	N/A	STOCK TANK	Account I-1	34	NW/4 (HES 198)	39	116	43.30633	110.74234
12.1	ASTORIA PARK CONSERVANCY	SNAKE RIVER BANK STABILIZATION	N/A	ENVIRONMENTAL	Account I-5	32	LOT 5	39	116	43.29789	110.78275
12.2	ASTORIA PARK CONSERVANCY	ASTORIA PARK - SOUTH POND REHAB	P11521.0R-CANCELLED	STORAGE REHAB	Account II-2	32	LOT 5	39	116	43.29754	110.78194

13.1	USFS	LONG DRAW SPRING No. 1	N/A	SOURCE WATER DEVELOPMENT	Account I-1	18	SE/4NW/4	36	116	43.09328	110.73036
13.2	USFS	MACS PASS SPRING REHAB	P72726.0W	SPRING REHAB	Account II-1	7	NW/4NE/4	36	116	43.10968	110.73006
13.3	USFS	McCAIN No. 2 SPRING REHAB	P195027.0W	SPRING REHAB	Account II-1	6	NE/4NW/4	36	116	43.12406	110.73624
13.4	USFS	McCAIN MEADOWS SPRING No. 1	N/A	SOURCE WATER DEVELOPMENT	Account I-1	5	SW/4SW/4	36	116	43.11519	110.72481
13.5	USFS	McCAIN MEADOWS SPRING No. 2	N/A	SOURCE WATER DEVELOPMENT	Account I-1	6	NE/4NE/4	36	116	43.12411	110.72709
13.6A	USFS	McCAIN SPRING No. 1-SOUTH REHAB	P203677.0W	SPRING REHAB	Account II-1	5	SW/4NE/4	36	116	43.12033	110.71593
13.6B	USFS	McCAIN SPRING No. 1-NORTH	P203677.0W	SPRING REHAB	Account I-1	6	SW/4NE/4	36	116	43.12033	111.71593
13.7	USFS	BIG DAD SPRING REHAB	P34836.0W	SPRING REHAB	Account II-1	8	SE/4SE/4	36	116	43.10087	110.71111
14.1	CARPENTER, SCOTT	BRYAN CREEK No. 1 RES	N/A	STORAGE	Account I-2	4	W/2	38	115	43.28625	110.65116
15.1	RIVERBEND RANCH	RIVER BEND RANCH RESTORATION AND PASSAGE PROJECT - PHASE 2	N/A	ENVIRONMENTAL	Account II-5	23, 24, 25, 26	ALL	37	113	43.15069	110.36931

	ACCOUNT I - PROJECT PRIORITIES	ACCOUNT II - PROJECT PRIORITIES
1	Source Water Development	Diversion structures and Spring Developments
2	Storage	Storage
3	Pipelines, Conveyance Facilities, Solar Platforms, and Windmills	Pipelines, Conveyance Facilities, Solar Platforms, and Windmills
4	Irrigation	Irrigation other than above
5	Environmental	Environmental
6	Recreational	Recreational

X.X	SUBLETTE COUNTY PROJECT
X.X	TETON COUNTY PROJECT
X.X	LINCOLN COUNTY PROJECT

As part of the management and rehabilitation plan, conceptual-level designs were prepared. These designs were primarily utilized to gain an understanding of individual project parameters, project cost, associated permitting requirements, and to assist in identifying any fatal flaws. The full set of designs can be found in **Appendix E**. Each project was assigned an individual identification number and is similarly referenced under the associated project cost estimates and permitting requirements under Section 6 and Section 7, respectively. Out of the total project list (30), there were two (2) projects where conceptual-level designs were not completed. An explanation and description of those projects is attached under **Appendix E**, in place of the project cost estimate. It should be noted that said Appendix includes project designs, project cost estimates, and project permitting requirements. This combined format will allow the sponsor(s) or interested stakeholders to research each project in a more streamlined and efficient manner.

All listed projects were evaluated in the field and when found necessary to improve design concepts, field surveys were conducted. Meetings with each respective landowner were scheduled in order to gain knowledge of the current problems or deficiencies, the desired product or corrective measures being sought, and what geographic or other physical related issues would need to be addressed.

5.1.1.1 Source Water Development Projects (Account I)

There were six (6) projects that involved developing water sources for stock use. Out of the total, two (2) wells, one (1) surface water diversion, and three (3) springs were identified for stock use. The previously developed wells that were identified as part of this rehabilitation plan are either unpermitted or will require the addition of stock water as a beneficial use. The surface water diversion slated for stock use will be supplied via pump and pipeline to an upland stock tank (Project ID: 5.2). All three (3) springs that were identified for development during the course of this study lie in the Greys River portion of the watershed whereby gravity driven pipeline systems were designed for trough supply. These projects vary in scope and magnitude based on existing site conditions, current/proposed power supply, and topography. Each identified project will also require new or rehabilitated stock tanks.



Figure 66: Rode No. 1 Well and Stock Tank Project (Project ID: 11.1)

5.1.1.2 Diversion Structure Projects (Account II)

There was one (1) Diversion Structure Rehab Project identified during this study. The associated project includes the rehabilitation of a push-up dike check structure for irrigation diversion on Jack Creek in Bondurant, WY (Project ID: 4.1). In its present state, the existing diversion feature has also created an unnatural fish barrier. The concept design associated with this check structure was

developed to not only regulate water elevations for successful diversion, but also to mitigate for successful fish passage.



Figure 67. Bowlsby No. 3 Diversion Rehab (Project ID: 4.1)

5.1.1.3 Environmental Projects (Account I)

There were two (2) identified Environmental Projects, both of which deal with bank stabilization or restoration. The Snake River Bank Stabilization Project (Project ID: 12.1) was brought to our attention by the Astoria Park Conservancy. This project has been brought forward by the stakeholder in an effort to mitigate the continued erosive effects that the river has been causing in recent years. The project consists of installing log structures that are strategically placed for energy deflection. Based on availability of materials, driven logs with root wads may also be an acceptable form of erosion control on this reach of the Snake River.

Trout Unlimited (TU) provided RVE with a 60% project design that involves restoration of the Hoback River. Based on information received, this project has been in the design and permitting phase since as early as 2017. Due to sensitive funding parameters, TU asked that the current funding shares be redacted from this public document.

5.1.1.4 Irrigation Projects (Account I)

There were four (4) Irrigation Projects that were brought forward by constituents during the course of this study. All of these projects involve pumping surface water to upland areas to receive either supplemental supply or original supply. The following list identifies each project and the associated acreage that each project may serve:

Daisy Springs Pump and Pipeline (Project ID: 1.1) 3.82 Ac.

Long Cool Creek Draw – Tolson Irrigation Pump and Pipeline (Project ID: 5.1) 13.5 Ac.

Uptain Pump and Pipeline (Project ID: 8.1) 1.0 Ac.

Taylor Irrigation Pump and Pipeline (Project ID: 9.1) 27.4 Ac.

In total, approximately 46 acres of newly developed irrigation would occur should each of the above named projects be completed. The Daisy Springs Pump and Pipeline Project would serve as supplemental supply to lands with original supply under P8413.0D. All other projects defined herein would be providing for original supply.



Figure 68: Proposed Water Source for Daisy Springs Pump and Pipeline (Project ID: 1.1)

5.1.1.5 Storage Projects (Account I and II)

There were five (5) Storage Projects identified during this study. One project involves the rehabilitation of an unpermitted reservoir (Astoria Park – South Pond Rehab, Project ID: 12.2). The remaining four projects involve small reservoirs with anticipated beneficial uses that include irrigation, fish/wildlife propagation, fire suppression, and/or stock water. Each of these projects is more particularly identified as follows:

- Bailey #1 Stock Reservoir (Project ID: 2.1)
- Dead Shot No. 1 Reservoir (Project ID: 2.2)
- Taylor No. 1 Reservoir (Project ID: 9.5)
- Bryan Creek No. 1 Reservoir (Project ID: 14.1)

Project 2.1 is an off-channel pit-type reservoir. The remaining reservoirs were all designed with embankment fill parameters. It should be noted that prior to this Level I Study, RVE previously aided a stakeholder in acquiring permits from the SEO regarding Projects 2.1 and 2.2. At the onset of this rehabilitation plan and at the request of the stakeholder, RVE compiled the necessary information to have each of these projects brought forward as shovel ready projects in 2021. Since that time, both projects were funded by the WWDC as part of the SWPP program and will be constructed in 2022.

5.1.1.6 Spring Rehabilitation Projects (Account II)

There were four (4) spring rehabilitation projects brought forward by stakeholders during the course of this study. One of the four projects (McCain Spring No. 1: 13.6) was split into two parts due to funding. It should be noted that the estimates for both projects (13.6A and 13.6B) include the actual spring development. This parameter was included under each project to give the stakeholder flexibility on project progression. With this fact being noted, one of the two parts of this project will not require the actual development of McCain Spring No. 1.

All developments brought forward include the installation of side hill spring collection systems, conveyance pipelines, and cattle troughs. Similarly, these springs are concentrated in the McCain Meadows area within the Greys River portion of the study area. These projects are currently permitted through the SEO and require rehabilitation only.



Figure 69: Big Dad Spring Rehab (Project ID: 13.7)

5.1.1.7 Conveyance Facility & Solar Platform Projects (Account I and II)

There were three (3) Conveyance Facility projects and one (1) solar platform and stock tank rehab project identified during the rehabilitation and management phase of this study. Two of the projects identified involve the rehabilitation of the Julius Miller Ditch and the Julius Miller Lateral. These conveyance features have been inoperable for many years and include the reconstruction of the original ditches, including culvert installations, two (2) flumes, and one (1) drop structure (Project ID: 3.1 and 3.2).

The Gilroy #2 Stock Tank Rehab and Solar Conversion (Project ID: 9.4) involves the conversion from generator power to solar power and the rehabilitation of an existing stock tank for year-round stock use. Said Gilroy #2 Well is currently permitted for stock use under P91305.0W.

During the scoping phase of this study, a third conveyance project was brought forward that involved flooding mitigation during snow melt runoff scenarios (Project 6.1). After several unsuccessful attempts to meet with the stakeholder onsite to discuss particulars, this specific project was placed on hold due to lack of information. Based on the limited information Rio Verde Engineering did receive, it is highly likely that Project 6.1 would be eligible for SWPP funding.

5.1.1.8 Fire Suppression Projects (Account I and II)

There were three (3) Fire Suppression Projects identified by stakeholders in the study area. One project (Project 10.1) includes the rehabilitation of an existing well and the inclusion of an underground cistern at the Hoback Fire Station. Project 9.3 includes a dry hydrant and was developed as a project that directly relies upon the construction of a small reservoir on Bryan Flat. The Raniolo Pump and Pipeline Project (Project 7.1) was also brought forward during this study. At the onset, it was apparent that this project (7.1) contained fatal flaws. The land on which the proposed reservoir would fall is owned by Teton County in the Hoback Junction area. With the Hoback Fire Station being located within 1,400 feet of the proposed reservoir and dry hydrant site,

no County (stakeholder) representation, and limited communication via phone with the project proponent, this project was not evaluated beyond the initial scoping phase.



Figure 70: Hoback Fire Station – Fire Suppression Rehab (Project ID: 10.1)

5.1.2 Small Water Projects Program - Process Description

This sub-section has been developed for informational purposes regarding the SWPP application process and the necessary steps to bring a conceptual-design phase project to completion. A detailed description of this process is well documented on the Wyoming Water Development Office website at the following link under the Small Water Project Program 101 Slideshow:

http://wwdc.state.wy.us/small_water_projects/small_water_project.html

The full document and relative descriptions can also be found under **Appendix F**.

6 COST ESTIMATES AND ECONOMIC ANALYSIS

This section of the report specifically identifies cost estimates for each project analyzed under the previous section. The costs in **Table 39** reflect estimated Total Project Costs associated with the conceptual-level designs completed. These total estimated costs were developed using a WWDC approved format and are itemized by unit cost within Appendix E of this report. As stated in Section 5, each project cost estimate is identified by a unique project ID number and combined with the respective conceptual-level design and permitting requirements.

The total project costs listed below include material and labor, preparation of final designs and specifications, permitting and mitigation, legal fees, acquisition of rights-of-way, construction engineering, and a contingency.

Table 39. Tabulation of individual SWPP project cost estimates (total)

PROJECT ID	PROJECT NAME	LANDOWNER	COST ESTIMATE
1.1	DAISY SPRINGS PUMP & PIPELINE	DAISY SPRINGS RANCH	\$ 16,892.00
2.1	BAILEY #1 STOCK RES	DANIEL & YVONNE BAILEY	\$ 139,552.00
2.2	DEAD SHOT No. 1 RES	DANIEL & YVONNE BAILEY	\$ 31,631.00
3.1	JULIUS MILLER DITCH REHABILITATION	PATRICIA BURROUGHS	\$ 52,243.00
3.2	JULIUS MILLER LATERAL REHABILITATION	PATRICIA BURROUGS	\$ 41,278.00
4.1	BOWLSBY No. 3 DIVERSION REHABILITATION	CAMPBELL CATTLE Co.	\$ 51,642.00
5.1	LONG COOL CREEK DRAW - TOLSON IRRIGATION PUMP & PIPELINE	DAN TOLSON	\$ 28,596.00
5.2	TOLSON STOCK WATER TANK	DAN TOLSON	\$ 22,438.00
6.1	AMREIN DITCH CONVEYANCE REHAB	ZANE MEEKS	N/A
7.1	RANIOLO PUMP & PIPELINE	JAMES RANIOLO	N/A
8.1	UPTAIN PUMP & PIPELINE	SARAH UPTAIN	\$ 27,703.00
9.1	TAYLOR IRRIGATION PUMP & PIPELINE	MARCIA TAYLOR	\$ 69,666.00
9.2	SCARLETT #1 WELL STOCK TANK	MARCIA TAYLOR	\$ 26,952.00
9.3	TAYLOR FIRE SUPPRESSION	MARCIA TAYLOR	\$ 12,020.00
9.4	GILROY #2 STOCK TANK REHAB & SOLAR CONVERSION	MARCIA TAYLOR	\$ 53,932.00
9.5	TAYLOR No. 1 RES	MARCIA TAYLOR	\$ 92,003.00
10.1	HOBACK FIRE STATION - FIRE SUPPRESSION REHAB	MIKE TRUMBOWER	\$ 223,896.00
11.1	RODE #1 WELL & STOCK TANK	BILL RODE	\$ 38,951.00
12.1	SNAKE RIVER BANK STABILIZATION	ASTORIA PARK CONSERVANCY	\$ 102,145.00
12.2	ASTORIA PARK - SOUTH POND REHAB	ASTORIA PARK CONSERVANCY	\$ 127,628.00
13.1	LONG DRAW SPRING No. 1	USFS	\$ 56,656.00
13.2	MAC'S PASS SPRING REHABILITATION	USFS	\$ 53,053.00
13.3	McCAIN No. 2 SPRING REHABILITATION	USFS	\$ 53,812.00
13.4	McCAIN MEADOWS SPRING No. 1	USFS	\$ 57,450.00
13.5	McCAIN MEADOWS SPRING No. 2	USFS	\$ 56,185.00
13.6A	McCAIN SPRING No. 1 REHAB (SOUTH)	USFS	\$ 66,325.00
13.6B	McCAIN SPRING No. 1 REHAB (NORTH)	USFS	\$ 50,215.00
13.7	BIG DAD SPRING REHAB	USFS	\$ 56,438.00

14.1	BRYAN CREEK No. 1 RES	SCOTT CARPENTER	\$ 67,848.00
15.1	RIVER BEND RANCH RESTORATION	JACKSON FORK & RIVER BEND RANCH(S)	REDACTED

AVERAGE PROJECT COST: \$ 62,116.67

RVE generated the applicable cost estimates based on past small water project design experience, associated bid results, and current knowledge of material and labor rates in the area. Each project estimate also includes a mobilization cost, which generally equates to 10% of the total material and labor cost of the project. The geographic location, method of access, and land ownership of each project are all factors that were taken into account when developing the individual cost estimates. Due to the rural location and difficult access to some of the projects analyzed, alternative material sources and products were also contemplated. It should be noted that supply chain issues in the construction industry may necessitate the need for alternative materials.

In reference to the unit description acronyms that are identified in **Appendix E**, the following definitions apply:

- LS = Lump Sum
- LF = Lineal Foot
- EA = Each
- SF = Square Foot
- SY = Square Yard
- CF = Cubic Foot
- CY = Cubic Yard

No large scale projects were identified during the course of this study. Accordingly, specific costs related to operation and maintenance, administration, and debt retirement were not made a part of the compiled estimates.

6.1 ALTERNATIVE FUNDING SOURCES

This section of the report describes alternative funding opportunities that may be utilized by constituents for management and rehabilitation purposes within the Hoback River Watershed. **Section 5** of this report detailed the SWPP process, eligibility, and funding process. The following information should be considered by those prospective applicants who wish to seek alternative or additional funding avenues outside of the SWPP program.

The subject of funding and economics is a vital aspect of any project. The projects in this study were brought forward by individuals or family ranches and financing these projects is one of the primary challenges for each. The SWPP program is an excellent funding opportunity but for some constituents, this program alone is not enough to make the desired project development feasible. The following information (**Table 40, Table 41, Table 42, Table 43, Table 44, and Table 45**) summarize federal, state, and local funding opportunities that may be applicable to the projects listed in this report. These opportunities may include 1.) construction or improvement of water management or irrigation structures, 2.) improvement of resource conditions such as soil quality, water quality, air quality, habitat quality, and energy, or 3.) implementation of conservation practices or activities.

Table 40. Natural Resources Conservation Service funding opportunities

FUNDING AGENCY	PROGRAM NAME	FUNDING CRITERIA	ELIGIBILITY/APPLICATION REQUIREMENTS
FEDERAL AGENCIES			
NRCS - Natural Resources Conservation Service	EQIP - Environmental Quality Incentives Program	Through EQIP, NRCS provides agricultural producers with financial resources and one-on-one help to plan and implement improvements, or what NRCS calls conservation practices. Using these practices can lead to cleaner water and air, healthier soil and better wildlife habitat, all while improving agricultural operations. Through EQIP, you can voluntarily implement conservation practices, and NRCS co-invests in these practices with you.	1.) Applications will be accepted for all eligible lands including: Cropland and Hayland, Rangeland, Pastureland, Non-industrial private forestland, Other farm or ranch lands, and Environmentally sensitive areas.
			2.) Applications will be accepted for all eligible person(s) including: Agricultural producers, Owners of non-industrial private forestland, Indian tribes, Those with interest in the agricultural or forestry operations.
			3.) Farm records must be established or updated with the Farm Service Agency for both the person(s) and the land for your application to be eligible and evaluated. Farm records for the person must indicate the applicant a.) Controls or owns eligible land, b.) Meets adjusted gross income (AGI) and payment limitation provisions, and c.) Is in compliance with highly erodible land and wetland conservation requirements.
	CSP - Conservation Stewardship Program	Through CSP, NRCS will provide financial and technical assistance to eligible producers to conserve and enhance soil, water, air, and related natural resources on their land. CSP encourages land stewards to improve their conservation performance by installing and adopting additional activities, and improving, maintaining, and managing existing activities on agricultural land and nonindustrial private forest land.	1.) Must be an operator of record in farm service agency record system.
			2.) Will control the land for the term of the contract (5years).
			3.) In compliance with highly erodible land and wetland conservation program.
			4.) In compliance with average adjusted gross income (AGI) provisions. If the AGI is greater than \$900,000, the person or legal entity is not eligible.
			5.) Land must be agricultural land or nonindustrial private forest land.
			6.) Must include all land in the applicants operation that will be controlled for the term of the contract (5 years).
AMA - Agricultural Management Assistance	The Agricultural Management Assistance (AMA) helps agricultural producers manage financial risk through diversification, marketing or natural resource conservation practices. Producers may construct or improve water management structures or irrigation structures; plant trees for windbreaks or to improve water quality; and mitigate risk through production diversification or resource conservation practices.	1.) AMA provides financial assistance up to 75 percent of the cost of installing conservation practices.	
		2.) Total AMA payments shall not exceed \$50,000 per participant for any fiscal year.	
		3.) Participants are not subject to Highly Erodible Land and Wetland Conservation provisions of the Food Security Act of 1985.	
		4.) Participants are subject to Adjusted Gross Income provisions of the Food Security Act of 1985.	
		5.) AMA offers an additional higher cost-share for historically underserved producers.	
		6.) Applications will be accepted for all eligible producers including: Livestock or agricultural producers, have an interest in the farming operation associated with the land being offered for AMA enrollment, have control of the land for the term of the proposed contract (5 years), be in compliance with the provisions for protecting the interests of tenants and sharecroppers, and be within appropriate payment limitation requirements.	

Table 41. Bureau of Land Management funding opportunities

FUNDING AGENCY	PROGRAM NAME	FUNDING CRITERIA	ELIGIBILITY/APPLICATION REQUIREMENTS
FEDERAL AGENCIES			
BLM - Bureau of Land Management	CFDA 15.244 - Fisheries and Aquatic Resource Management	Projects are primarily conducted on lands administered by the BLM but may also be conducted on other public or private lands. Most of these lands are located in the Western United States and Alaska. Assistance can be used to help protect, restore, and enhance aquatic habitats and aquatic ecosystem resources and to provide related public contact/education opportunities. Funding is highly variable each fiscal year.	1.) 2 CFR 200, Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards applies to this program.
			2.) 2 CFR, Part 200, Subpart C—Pre-Federal Award Requirements and Contents of Federal Awards. A Standard Form 424, Application for Federal Assistance, Standard Form 424A, Budget Information for Non-Construction Programs, Standard Form 424B, Assurances for Non-Construction Programs, and a written proposal, budget spreadsheet, a budget narrative/breakdown, and any other requirements specified in the Notice of Funding Opportunity Notice and must be submitted through www.grants.gov . State plan is not required for this application.
	CFDA 15.237 - Rangeland Resource Management	To provide financial assistance, through grants or cooperative agreements to manage, develop and protect public lands and enhance the understanding of rangeland and watershed resources, their ecological processes, and capabilities in order to meet rangeland and water quality standards for the improvement of rangelands on public lands. Projects and livestock administration for the management of rangeland ecosystems are conducted in a coordinated manner and consider the interrelationships of living organisms of plants and animals, the physical environment of soil, water, air, and landscape characteristics when developing and implementing resource objectives and management actions.	1.) 2 CFR 200, Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards applies to this program.
			2.) A Standard Form 424, Application for Federal Assistance, Standard Form 424A, Budget Information for Non-Construction Programs, Standard Form 424B, Assurances for Non-Construction Programs, and a written proposal should be submitted through Grants.gov or via a hardcopy to the project office and include: a title, objectives, timeframe, and a budget breakdown as specified in the funding opportunity announcement.

Table 42. Trout Unlimited

FUNDING AGENCY	PROGRAM NAME	FUNDING CRITERIA	ELIGIBILITY/APPLICATION REQUIREMENTS
TU – Trout Unlimited	Embrace A Stream Internal Grants Program	To provide financial assistance, for small-scale on-the-ground projects that support local water quality or habitat programs.	1.) \$1,000 to \$10,000 per project

Table 43. Wyoming Office of State Lands and Investments funding opportunities

FUNDING AGENCY	PROGRAM NAME	FUNDING CRITERIA	ELIGIBILITY/APPLICATION REQUIREMENTS
STATE AGENCIES			
SLIB - Wyoming Office of State Lands and Investments	Farm Loans	The Farm Loan program awards loans to 1.) purchase lands used principally for raising agricultural products, livestock, or dairying, 2.) purchase livestock, fertilizers, and equipment calculated to maintain or increase the earning capacity of the borrower's agricultural operation, 3.) purchase, construct, or install improvements calculated to maintain or increase the earning capacity of the borrower's agricultural operation, or 4.) liquidate debts of the borrower incurred in the furtherance of the borrower's agricultural operation.	<p>1.) Individuals, to be an eligible applicant, must be able to demonstrate that they are qualified Wyoming Electors as determined by Election Code Statutes of Title 22. Legal entities, to be an eligible applicant, must be able to demonstrate that a majority of the ownership is by individuals who meet the qualifications listed in subsection (a) of this section.</p> <p>2.) Farm loan applications may be considered at any regularly scheduled SLIB meeting.</p> <p>3.) The interest rate for loans under this chapter shall be pursuant to Chapter 14 of the rules as established by the Board in accordance with current interest rates. The application fee is \$100. Additionally, 1% origination fee is charged and shall be paid by the borrower at closing. The term of each loan shall be set by the Board with due regard given to repayment ability and the security offered, but in no event shall the term exceed thirty (30) years. Loans shall be payable in equal, annual installments.</p> <p>4.) (Lead Time to Qualify): Loan applications must be received by the Office of State Lands and Investments at least eight (80) days prior to any regularly scheduled SLIB meeting. Applicants must cure any defects in their applications no later than forty-five (45) calendar days before any regularly scheduled SLIB meeting.</p> <p>5.) Each prospective borrower shall submit a written loan application, on the form furnished by the Office.</p>

Table 44. Wyoming Water Development Commission funding opportunities

FUNDING AGENCY	PROGRAM NAME	FUNDING CRITERIA	ELIGIBILITY/APPLICATION REQUIREMENTS
STATE AGENCIES			
WWDC - Wyoming Water Development Commission	Level I and Level II Project Feasibility Studies - Agricultural Water Projects	Funding for projects is based on WWDC recommendations and is appropriated by the legislature from the Water Development Accounts. Legislative authorization is required before the WWDC can begin project work. Level I and Level II applications for projects to the Water Development Program must be submitted no later than March 1. Level III applications must be submitted by September 1. Applicants seeking Level I reconnaissance studies or Level II feasibility studies for dams and reservoirs need not be an entity of local government. However, applicants for all other Level II feasibility studies and any Level III construction funding must be an entity of local government with taxing and/or assessment authority. Private corporations and individuals are not eligible for assistance. If the applicant is not a public entity, they are required to document the steps they are taking towards entity formation.	1.) The person signing the application must have authority to commit the entity to a binding contract.
	Level III Construction Projects - Construction Funding for Agricultural Projects		2.) A notarized copy of a resolution supporting this application passed by the board or other governing body of the entity must be provided.
			3.) A check for the \$1,000.00 filing fee must accompany the application. If the application is denied, 75% of the application fee will be refunded to the applicant.
	Groundwater Exploration Grant Program		4.) A project area map (8.5" x 11" preferred) showing corporate boundaries, project location and features should be provided. Include any reports or other supporting information available.
Small Water Project Program (SWPP)	SWPP applications are normally submitted through the respective Conservation Districts (CD) within each county. Application due dates vary by CD. Qualifying projects are eligible for 50% match funding, up to a maximum grant of \$35,000 per project.	5.) Before applying for project funding, the Wyoming Water Development Commission strongly recommends to complete a Public Water System Survey or Irrigation Systems Survey.	See Section 5 and Appendix F for detailed information related to the SWPP funding criteria and application requirements.

Table 45. Sublette, Teton, and Star Valley Conservation District funding opportunities

FUNDING AGENCY	PROGRAM NAME	FUNDING CRITERIA	ELIGIBILITY/APPLICATION REQUIREMENTS
LOCAL AGENCIES			
SCCD, TCD & SVCD - Sublette, Teton, & Star Valley Conservation Districts	Technical Assistance, State & Federal Grant Partnering, & Grant Applications	These respective Districts have valuable knowledge and expertise regarding range land improvements, water quality, wildlife and habitat, and project implementation. The District's may also be utilized for sponsorship of grant applications and qualified SWPP projects.	None

7 PERMITS

Permit acquisition is an ever-growing and constantly evolving process that should be taken into consideration during project planning, prior to implementation. Each project identified during the management and rehabilitation phase of this study was analyzed to determine what permit(s) are necessary, both prior to commencement of construction and in some cases, post construction. As stated in the previous sections, an individual permit requirement was completed for each conceptual-level design and referenced in **Appendix E**. Most of the projects evaluated as part of this Level I Study will require some type of permit from the Wyoming State Engineer's Office. For projects located on private lands that are encumbered by conservation easements, it will be important to submit designs to the respective easement holders prior to final design. Based on preliminary research conducted as part of the conceptual design process, no fatal flaws were identified with respect to water development.

Other permit requirements that were evaluated include U.S. Army Corps of Engineers, Wyoming Department of Environmental Quality, U.S. Forest Service, Wyoming Game and Fish Department, Environmental Protection Agency, and U.S. Fish and Wildlife Service. It should be noted that some permitting requirements will be more particularly defined once an onsite meeting is conducted with the appropriate administrative agency, prior to final design.

8 CONCLUSIONS AND RECOMMENDATIONS

This study was completed in order to evaluate the current state of the Hoback River Watershed and to plan for implementation of projects and/or management practices that can improve the overall health of the watershed. The information contained in this report will enable the Wyoming Water Development Commission and the Sublette/Teton/Star Valley Conservation Districts to more effectively delineate prospective projects that will aid in the conservation and efficient use of the water resources available in this watershed. The following list itemizes key outcomes and recommendations that are supported by the contents of this study:

- Groundwater is a vital resource that largely impacts the health and function of rangeland, wildlife, livestock, and anthropogenic systems throughout the watershed. Specifically, groundwater is essential for domestic use. Results of that ongoing Hoback Junction groundwater contamination investigation conducted by the WDEQ will be beneficial in understanding root causes of the elevated nitrate levels. These results may also dictate the course of action pertaining to water district formation in the area and ultimately, further investigative work and project designs for a centralized public water system.
- Surface water is largely influenced by winter precipitation that falls within the Gros Ventre Range, Wyoming Range, and Salt River Mountains. Very little storage exists within the Watershed but records indicate that regulation is an extremely rare occurrence.
- Many areas of interface between livestock pasture lands and riparian areas show increased levels of erosion and sedimentation. Possible solutions for these affected areas include the construction of fenced water gaps, partnering with federal and state agencies on stream restoration projects, and collaborative efforts to manage grazing operations.
- Water rights research and documentation provided in this report will allow constituents to effectively plan for future water resource projects, identify upland water shortages, and to plan for conservation measures that will benefit their respective operations and the Watershed as a whole.
- Those segments of the Hoback River and Jack Creek located in the Bondurant Basin are generally unstable whereby massive shifts in water course are common. This phenomenon in geomorphology causes issues with historic irrigation diversions, riparian areas, and other anthropogenic improvements. The SWPP program will continue to be a valuable asset for local stakeholders in addressing issues such as these.
- The rehabilitation and management plan contained in this report identifies opportunities to improve watershed function. This is not an exhaustive list however, this report may also be utilized to plan for future/alternative projects and to streamline the planning process. The funding opportunities listed herein can also be used as a general guideline for landowners considering future project implementation. The individual project information contained within Appendix E will allow the sponsors to efficiently conduct the necessary research to complete applications on behalf of the varying constituents who expressed interest during the course of this study.

9 REFERENCES

- A.J. Crone and R.L. Wheeler, 2000. "Data for Quaternary Faults, Liquefaction Features, and Possible Tectonic Features in the Central and Eastern United States, East of the Rocky Mountain Front". United States Geologic Survey.
- Alpha, T.R., Galloway, J.P., Tinsley III, J.C. "Karst Topography – Teacher’s Guide and Paper Model". United States Geologic Survey. <https://geomaps.wr.usgs.gov/parks/cave/karst.html> Online. Accessed October 22, 2021
- Behrendt, John Charles, et al., *A geophysical study in Grand Teton National Park and Vicinity, Teton County, Wyoming: With sections on stratigraphy and structure and precambrian rocks*. No. 516-E. US Geological Survey, 1968.
- Blackstone, D.L., Jr., *Tectonic map of the overthrust belt, western Wyoming, southeastern Idaho and northeastern Utah*, Showing current oil and gas drilling and development: Geological Survey of Wyoming [Wyoming State Geological Survey] Map Series 4, scale 1:316,800. 1979.
- Bureau of Land Management. "BLM Allotment Information". <https://reports.blm.gov/report/RAS/33/Allotment-Information>, Online, Accessed: June, 2022.
- Bureau of Land Management. "Areas of Critical Environmental Concern". <https://www.blm.gov/programs/planning-and-nepa/planning-101/special-planning-designations/acec>, Online, Accessed: February 2022.
- Clark, Allan K., *Karst Aquifers*, US Geological Survey Publication, 2019.
- Cowardin, L. M.; Carter, V.; Golet, F. C.; LaRoe, E. T. "Classification of Wetlands and Deepwater Habitats of the United States". U.S. Department of the Interior, Fish and Wildlife Service. <https://www.fws.gov/program/national-wetlands-inventory>
- Currens, Benjamin J., Fryar, Alan, and Agouridis, Carmen T. *Common Hazards in Karst Terrain*. Agriculture and Natural Resources Publications. 131. 2014.
- Earthquake Hazards. *Seismic Resilience: Minimizing Building Damage*, Branz, 2011. <http://www.seismicresilience.org.nz/topics/seismic-science-and-site-influences/earthquake-hazards/>.
- Galloway, John P., and J. C. Tinsley III. *Karst topography; computer animation and paper model*. No. 97-536-B. US Geological Survey, 1997.
- Geological Survey (US), and Michael N. Machette. *Map and data for Quaternary faults and folds in Wyoming*. US Geological Survey, 2001.
- Governor of Wyoming. 2019. "Greater Sage-Grouse Core Area Protection" Executive Order (EO) 2019-3. https://wgfd.wyo.gov/WGFD/media/content/PDF/Habitat/Sage%20Grouse/Governor-Gordon-Greater-Sage-Grouse-EO-2019-3_August-21-2019_Final-Signed_2.pdf

- Greenwood Mapping, Inc. (Sublette County MapServer)
<https://maps.greenwoodmap.com/sublette/mapserver/>, Online, Accessed: 2021, 2022.
- Greenwood Mapping, Inc. (Teton County MapServer)
<https://maps.greenwoodmap.com/tetonwy/mapserver/>, Online, Accessed: 2021, 2022.
- Greys River Ranger District. *Middle Greys River Watershed Assessment*. Bridger-Teton National Forest. Lincoln County, Wyoming, 2005.
- Hack, J. (1957). Studies of longitudinal stream profiles in Virginia and Maryland. *U.S. Geological Survey Professional Paper, 294-B*.
- Highland, L.M. and Bobrowsky, P., *The landslide Handbook – A Guide to Understanding Landslides*, United States Geologic Survey, <https://pubs.er.usgs.gov/publication/cir1325>, 2008.
- Horton, R. (1945). Erosional development of streams and their drainage basins: hydro-physical approach to quantitative morphology. *Geological Society of America Bulletin, 56*(3), 275-370.
- Hough, S. and Page, M., *A Century of Induced Earthquakes in Oklahoma*, Seismological Society of America. Volume 106, Issue 6, 2015.
- Institute of Professional Engineers of New Zealand. “*IPE NV Liquefaction Fact Sheet*.” Institute of Professional Engineers of New Zealand.
<https://web.archive.org/web/20110505003900/http://www.ipenz.org.nz/ipenz/forms/pdfs/ChChFactSheets-Liquefaction.pdf>, Online, Accessed: July 2019.
- Kramer, Steven L., Roy T. Mayfield, and Yi-Min Huang, *Performance-Based Liquefaction Potential Evaluation*, 2008.
- Larsen, M.C., LaForge, J.S., and Wittke, S.J., *Surficial geologic map of the Afton 30' x 60' quadrangle, Sublette and Lincoln counties, Wyoming: Wyoming State Geological Survey Open File Report 15-9*, scale 1:100,000, 2015.
- Lincoln County Mapserver (Lincoln County Mapserver)
<https://maps.lcwy.org/webmaps/LinCoParcels/>, Online, Accessed: 2021, 2022.
- Lorant, G., *Seismic Design Principles*, Whole Building Design Guide, National Institute of Building Sciences, <http://www.wbdg.org/resources/seismic-design-principles>, Online, Accessed: 2022.
- Love, J.D., and Christiansen, A.C., *Geologic map of Wyoming*, US Geological Survey, scale 1:500,000, 1985.
- Mansfield, George Rogers. *A reconnaissance for phosphate in the Salt River Range, Wyoming*. US Government Printing Office, 1916.
- National Centers for Environmental Information. “*Data Tools: Find a Station*” National Climatic Data Center, National Ocean and Atmospheric Administration. www.ncdc.noaa.gov/cdo-web/datatools/findstation, Online, Accessed: August 30, 2021.

- National Resource Conservation Council. "Web Soil Survey". National Resource Conservation Council. <https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>, Online, Accessed: October 19, 2018.
- Petersen, M.D., Mueller, C.S., Moschetti, M.P., Hoover, S.M., Shumway, A.M., McNamara, D.E., Williams, R.A., Llenos, A.L., Ellsworth, W.L., Michael, A.J., Rubinstein, J.L., McGarr, A.F., and Rukstales, K.S., *2017 One-Year Seismic Hazard Forecast for the Central and Eastern United States from Induced and Natural Earthquakes: U.S. Geological Survey data release*, 2017.
- Robertson, M. (2012). *Instream flow studies on Dell Creek, a tributary of the Hoback River*. State of Wyoming, Game and Fish Department. Cheyenne: Wyoming Game and Fish Department. https://wgfd.wyo.gov/WGFD/media/content/PDF/Fishing/Instream%20Flow/ISF_139_DellCreek.pdf?ext=.pdf
- Rosgen, D. (1994). A classification of natural rivers. *Catena*, 169-199.
- Rosgen, D. (1996). *Applied River Morphology*. Pagosa Springs: Wildland Hydrology.
- Rosgen, D. (2009). *Watershed Assessment of River Stability and Sediment Supply (WARSSS)*. Canada: Wildland Hydrology.
- Sawyer, H., M. Hayes, B. Rudd, and M. J. Kauffman. (2014). The Red Desert to Hoback Mule Deer Migration Assessment. Wyoming Migration Initiative, University of Wyoming, Laramie, WY.
- Schultz, Alfred Reginald. *Geology and geography of a portion of Lincoln County, Wyoming*. No. 543. US Government Printing Office, 1914.
- Shreve, R. (1966). Statistical Law of Stream Numbers. *Geology*, 74, 17-37.
- State of Wyoming. (2020). State of Wyoming Executive Department Executive Order 2020-1 Wyoming Mule Deer and Antelope Migration corridor Protection. Office of the Wyoming Governor. Cheyenne, WY.
- State of Wyoming Geologic Survey. "GIS Data: Wyoming Faults". Wyoming State Geologic Survey. <http://www.wsgs.wyo.gov/pubs-maps/gis.aspx>, Online, Accessed: 2022.
- State of Wyoming Geologic Survey. "GIS Data: Wyoming Surficial Geology". Wyoming State Geologic Survey. <http://www.wsgs.wyo.gov/pubs-maps/gis.aspx>, Online, Accessed: 2022.
- Strahler, A. (1957). Quantitative analysis of watershed geomorphology. *Transactions of the American Geophysical Union*, 8(6), 913-920.
- Teton Interagency Fire. "Fire Archives". Teton Interagency Dispatch Center. <https://gacc.nifc.gov/gbcc/dispatch/wy-tdc/home/information/wildfires-incidents>, Online, Accessed: April 29, 2022.
- U.S. Army Corps of Engineers. 1995. "The highway methodology workbook supplement: wetland functions and values – a descriptive approach". U.S. Army Corps of Engineers New England Division.

- U.S. Environmental Protection Agency. "Enforcement and Compliance History Online: Facility Search – Enforcement and Compliance Data". United States Environmental Protection Agency. Online, Accessed: April 27, 2022. <https://echo.epa.gov/facilities/facility-search>
- U.S. Department of Agriculture, Natural Resources Conservation Service, WY663, "Soil Survey Geographic (SSURGO) database for Bridger National Forest, Wyoming, Western Part, scale 1:24,000", 2021.
- U.S. Department of Agriculture, Natural Resources Conservation Service, ID758, "Soil Survey Geographic (SSURGO) database for Targhee National Forest, Idaho and Wyoming, scale 1:24,000", 2021.
- U.S. Department of Agriculture, Natural Resources Conservation Service, WY661, "Soil Survey Geographic (SSURGO) database for Teton National Forest, Wyoming, Parts of Teton, Fremont, Park, Sublette, and Lincoln Counties, scale 1:24,000", 2019.
- U.S. Department of Agriculture, Natural Resources Conservation Service, WY635, "Partial Soil Survey Geographic (SSURGO) Database for Sublette County, Wyoming, scale 1:24,000", 2021.
- U.S. Fish and Wildlife Service (USFWS). 2022. iPaC – Information, Planning and Conservation System Teton County, WY Endangered Species Act species list. <https://ecos.fws.gov>, Online, Accessed: January 2022.
- U.S. Fish and Wildlife Service (USFWS). 2012. National Wetlands Inventory GIS data layer. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. <http://www.fws.gov/wetlands/>, Online, Accessed: February 2022.
- U.S. Geologic Survey, *Earthquake Hazards Program: Search Earthquake Catalog*, United States Geological Survey, <https://earthquake.usgs.gov/earthquakes/search/>, Online, Accessed: February 2022.
- U.S. Geologic Survey, *Earthquake Hazards Program: Unified Hazard Tool*, Conterminous U.S. 2014 v4.0 Edition., United States Geological Survey, <https://www.usgs.gov/programs/earthquake-hazards/hazards>, Online, Accessed: February 2022.
- U.S. Geological Survey (USGS). 2019a. Gap Analysis Program. US Geological Survey. <https://www.usgs.gov/programs/gap-analysis-project>, Online, Accessed: February 2022.
- U.S. Geological Survey (USGS). 2019b. National Land Cover Database. US Geological Survey. <https://www.usgs.gov/centers/eros/science/national-land-cover-database>, Online, Accessed: Accessed February 2022.
- U.S. Geological Survey (USGS). 2012. National Hydrography Dataset GIS data layer. U.S. Department of the Interior, United Geological Survey. <http://nhd.usgs.gov>, Online, Accessed: February 2022.
- U.S. Geologic Service. "USGS Surface-Water Daily Data for the Nation." *National Water Information System: Web Interface*, United States Geological Service. https://nwis.waterdata.usgs.gov/nwis/dv/?referred_module=sw, Online, Accessed: April 1, 2022.

- U.S. Geologic Service. USGS LiDAR Point Cloud Wyoming FEMA East 2019. Reston, Virginia, United States. U.S. Fish and Wildlife Service. 2021. "Information, Planning and Consultation System". <https://apps.nationalmap.gov/viewer/>, Online, Accessed: August 29, 2021.
- U.S. Fish and Wildlife Service. 2021. "National Wetlands Inventory" United States Fish and Wildlife Service. <https://www.fws.gov/wetlands/data/Mapper.html>, Online, Accessed: 2021.
- U.S. Geologic Survey. "Earthquake Hazards Program: Unified Hazard Tool" United States Geologic Survey. <https://earthquake.usgs.gov/hazards/interactive/>, Online, Accessed: 2021.
- U.S. Geologic Survey. 2021. "USGS Surface-Water Daily Data for the Nation". National Water Information System: Web Interface, United States Geologic Survey. https://nwis.waterdata.usgs.gov/nwis/dv/?referred_module=sw, Online, Accessed: 2021.
- U.S. Geologic Survey. 2005. "Chapter 2: The Southwestern Wyoming Province – Introduction to a Geologic Assessment of Undiscovered Oil and Gas Resources". United States Geologic Service. https://pubs.usgs.gov/dds/dds-069/dds-069-d/REPORTS/69_D_CH_2.pdf, Online, Accessed: 2021.
- U.S. Geologic Survey. 2006. "Quaternary Fault and Fold Database of the United States". <https://earthquake.usgs.gov/arcgis/rest/services/haz/qfaults/MapServer>, Online, Accessed: 2022.
- U.S. Geologic Survey. "Earthquake Hazards Program: Search Earthquake Catalog". United States Geological Survey. <https://earthquake.usgs.gov/earthquakes/search/>, Online, Accessed: 2021.
- U.S. Geologic Survey. "Earthquake Hazards Program: Induced Earthquakes, Hazard Estimation". United States Geologic Survey. <https://www.usgs.gov/programs/earthquake-hazards>, Online, Accessed: July 2021.
- Wittke, S.J., and Stafford, J.E., *Susceptibility to deep-seated landslides in Wyoming: Wyoming State Geological Survey Open File Report 2019-7*, scale 1:850,000, 2019.
- Wittke, S.J., Carnes, J.D., and Lichtner, D.T., *Preliminary surficial geologic map of the Jackson 30' x 60' quadrangle, Sublette, Teton, Lincoln, and Fremont counties, Wyoming: Wyoming State Geological Survey Open File Report 2016-6*, scale 1:100,000, 2016.
- World Nuclear Association. "Nuclear Power Plants and Earthquakes". World Nuclear Association. <https://www.world-nuclear.org/information-library/safety-and-security/safety-of-plants/nuclear-power-plants-and-earthquakes.aspx>, Online, Accessed: 2022.
- Wyoming Department of Environmental Quality Water Quality Division. "Wyoming's 2020 Integrated 305(b) and 303(d) Report." Wyoming Department of Environmental Quality. <https://deq.wyoming.gov/water-quality/watershed-protection/water-quality-assessment/>, Online, Accessed: April 27, 2022.
- Wyoming Department of Environmental Quality, 2021. "Wyoming Surface Water Classification List" Wyoming Department of Environmental Quality.

- Wyoming Game and Fish Department. "SGCN = species of greatest conservation need, NSS: native species status rank". <https://www.uwyo.edu/wyndd/find-data-info/about-our-data-information/codes-and-definitions/state-status/index.html>, Online, Accessed: June 2022.
- Wyoming Game and Fish Department (WGFD). 2022. Nongame Birds and Mammals in Wyoming. Wyoming Game and Fish Department. <https://wgfd.wyo.gov/Wildlife-in-Wyoming/More-Wildlife/Nongame-Birds> Online, Accessed: February 2022.
- Wyoming Game and Fish Department (WGFD). 2020b. Statewide Habitat Plan. Wyoming Game and Fish Department. Cheyenne, WY.
- Wyoming Game and Fish Department (WGFD). 2017. State Wildlife Action Plan. Wyoming Game and Fish Department. Cheyenne, WY.
- Wyoming Game and Fish Department (WGFD). 2012. Big Game Ranges Geographic Information Systems Layers. Cheyenne, WY.
- Wyoming State Engineer's Office, 2021. "Division IV Hydrographer's Annual Reports" State of Wyoming.
- Wyoming State Engineer's Office. 2021. Wyoming State Engineer's Office. "Realtime Streamflow Data". Wyoming State Engineer's Office. <https://seoflow.wyo.gov/>, Online, Accessed: 2021.
- Wyoming Natural Diversity Database (WYNDD). 2022. Wyoming Species List Data Request. University of Wyoming. Laramie, WY. Data Request February 2022.
- Wyoming State Engineers Office e-Permit system. <http://seoweb.wyo.gov/e-Permit/common/login.aspx?ReturnUrl=%2fe-Permit%2f>, Online, Accessed: 2022.
- Wyoming State Geological Survey, and Seth Wittke, *Geologic History of Wyoming*, Wyoming State Geological Survey, <https://www.wsgs.wyo.gov/wyoming-geology/geologic-history.aspx#> Online, Accessed: June 24, 2022.
- Wyoming State Water Plan. "Snake River Compact, 1949." Wyoming Water Development Office. https://waterplan.state.wy.us/BAG/snake/briefbook/ss_compact.html Online, Accessed: April 28, 2022.

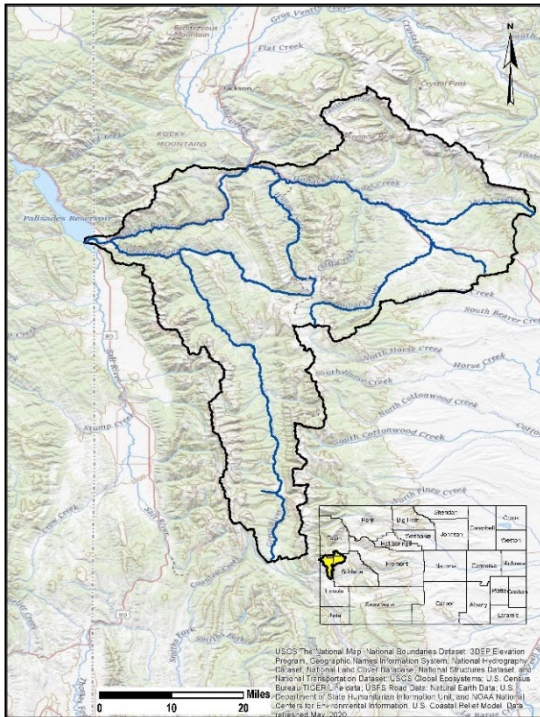
APPENDIX A

HOBACK RIVER WATERSHED STUDY

STUDY AREA INCLUDES HOBACK/GREYS RIVER AND SNAKE RIVER CANYON



BRING US YOUR WATER PROJECT IDEAS!



Project Scoping Meeting

June 14, 2021 - 7:00 p.m.

Bondurant Fire Department

(M.M. 142.7 U.S. HIGHWAY 189/191)

The Sublette, Teton, and Star Valley Conservation Districts and Wyoming Water Development Office are holding a project scoping meeting for the Hoback River Watershed Level I Study. Stakeholders and water right holders are encouraged to attend to:

- Learn about watershed study objectives.
- Share your ideas for water development and rehabilitation projects which improve water conveyance, supply, quality, and habitat.
- Discuss funding opportunities for water development and system rehabilitation.

If you have project plans in the works, please bring any information you have for discussion following the formal presentation.

Find out more at <https://www.facebook.com/SubletteCD/>

To participate remotely contact the Project Consultant at rioverde@wyoming.com

For questions please contact:

Project Consultant - Mike Jackson, Rio Verde Engineering:	(307) 367-2826
Project Sponsor - Mike Henn, Sublette County Conservation District:	(307) 367-2257
Project Co-Sponsor - Tom Segerstrom, Teton Conservation District:	(307) 733-2110
Project Co-Sponsor - Kay Lynn Nield, Star Valley Conservation District:	(307) 885-7823
Project Manager - Mabel Jones, Wyoming Water Development Office:	(307) 777-7626

Hoback River Watershed Level I Study

Date: June 14, 2021
Location: Bondurant Fire Department
Time: 7:00 p.m.

Objectives:

- Introduction to the team, WWDO manager(s), and Sponsor(s)
- Inform stakeholders on overall purpose and associated goals of the study
- Describe specific tasks included within the study and purpose for each
- Discuss rehabilitation plan and the need for stakeholder input
- Identify funding opportunities
- Discuss project timeline and deadlines
- Discuss water rights research and mapping tools to be implemented (GIS)

Agenda:

1. **Background Information Review and Compilation**
2. **Watershed Inventory**
 - ***Physical Systems***
 - Surface Water
 - Geology
 - Climate
 - ***Biological Systems***
 - Fish & Wildlife
 - Land Cover
 - ***Anthropogenic Systems***
 - Agricultural Water Use
 - Domestic, Municipal, and Industrial (DMI) Water Use
 - Water Storage
 - Land
3. **Streamflow Hydrology**
 - Pre-existing models available
 - Dry, Average, and Wet Year Streamflow Analysis
 - Identify Shortages
 - Identify areas affected by common regulation
4. **Watershed Management and Rehabilitation**
 - ***Identify projects that will improve watershed health***
 - ***Input from Stakeholders***
 - Surface Water Storage
 - Irrigation Supply Systems
 - Rehabilitation of Water Conveyance and Diversion Structures
 - Livestock and Wildlife Upland Water Development
 - Groundwater Storage and Recharge
 - Grazing Management
 - ****November 15, 2021 - Deadline for stakeholder project proposals***
 - ***Funding Opportunities***
 - Wyoming Water Development Commission (WWDC)
 - Small Water Project Program (SWPP)

- Level III New Development and Rehabilitation Program
- Natural Resources Conservation Service (NRCS) www.nrcs.usda.gov
 - Environmental Quality Incentives Program (EQIP)
 - Agricultural Management Assistance (AMA)
 - Conservation Stewardship Program (CSP)

5. Cost Estimates, Economic Analysis, and Permit Requirements

6. Geographic Information System

- All inclusive
- Build upon framework already developed
- Creation of a comprehensive planning tool

7. Encourage open discussion and questions

8. Catalogue Stakeholder Projects

9. SWPP Applications and Operating Criteria will be available for stakeholders to obtain

Summary of Key Water Related Studies in the Hoback Watershed

There are three state lead studies in the Hoback Watershed: one funded by the Wyoming Water Development Commission (WWDC) and two under the direction of the Wyoming Department of Environmental Quality (WDEQ). While there is overlap between these projects, each aims to achieve different goals. The following table and descriptions provide a summary of these projects.

Project	Lead Agency	Study Area	Collect Water Samples
Hoback Watershed Level I Study	WWDC	Hoback River Watershed	No
2021 Water Quality Monitoring Plan	WDEQ	Snake/Salt River Basin	Yes
Investigation of Groundwater Contamination in the Hoback Junction Area	WDEQ	Hoback Junction Groundwater	Yes

Hoback Watershed Level I Study

The WWDC Study will aggregate, organize, and summarize **existing data** about natural and man-made characteristics of the Hoback Watershed. Examples of natural characteristics include the watershed climate, hydrologic record, geology, geography, water quality, and stream classification. Examples of man-made characteristics include irrigation canals, diversion structures, dams, water treatment facilities, and erosion control structures. The WWDC study will compile this existing information to identify and prioritize potential future water projects in the Hoback Watershed. The WWDC study will identify projects eligible for WWDC funding. Projects owned/sponsored by irrigation companies, public water systems, and other incorporated entities are eligible for WWDC funding. Improvement or repairs to privately owned wells, septic systems, and lagoons are not eligible for WWDC funding and will not be investigated by this project.

2021 Water Quality Monitoring Plan

This DEQ study will **collect new water quality samples** from 50 randomly selected primary sites in the Bear/Snake River Basin. DEQ will use results from these sites to identify high quality waters and identify potentially impaired reaches for targeted follow-up monitoring.

Investigation of Groundwater Contamination in the Hoback Junction Area

This DEQ study is investigating the claim that **septic systems in the Hoback Junction Area** are contributing to nitrates in the groundwater near Hoback Junction. The project is focusing on assessing nitrates in groundwater that supplies public water systems and private wells. Data collected during this study will support future decisions about what, if any, actions are necessary to address nitrates in the groundwater near Hoback Junction.

HOBACK RIVER WATERSHED, LEVEL I STUDY



PROJECT TEAM

1. TEAM INTRODUCTION – PRIMARY CONTACTS

- 1. RIO VERDE ENGINEERING**
MIKE JACKSON, P.E., L.S. Project Manager
(307) 367-2826 rioverde@wyoming.com
- 2. STANTEC**
SKYLOR WADE, P.E. Project Engineer
(307) 631-0730 swade@wenck.com
- 3. ALDER ENVIRONMENTAL**
BRIAN REMLINGER, P.W.S. Environmental Scientist
(307) 733-5031 brian@alderenvironmental.com

2. SPONSOR & WWDO INTRODUCTION

- 1. WWDO - MABEL JONES** Project Manager
(307) 777-7626 mabel.jones@wyo.gov
- 2. SCCD – MICHAEL HENN** Sponsor
(307) 367-2257 mhenn@sublettecd.com
- 3. TCD – TOM SEGERSTROM** Co-Sponsor
(307) 733-2110 tom@tetonconservation.org
- 4. SVCD – KAY LYNN NIELD** Co-Sponsor
(307) 885-7823 knield@starvalleycd.org

PROJECT GOALS

WWDC OBJECTIVE STATEMENT:

“The objective of a Watershed Study is to evaluate an individual watershed’s existing conditions, and, from collaboration with landowners, stakeholders, and public outreach, develop a Watershed Management and Rehabilitation Plan and identify projects that are eligible for funding from WWDC and other sources that may improve or maintain watershed function and systems.”

- **REVIEW BACKGROUND INFORMATION AND EXISTING STUDIES**
- **COMPILE EXISTING DATA AND AUGMENT WITH NEW DATA TO CREATE A SNAPSHOT OF THE CURRENT WATERSHED’S FUNCTIONALITY AND OVERALL HEALTH**
- **DETERMINE DEFICIENCIES WITHIN THE WATERSHED & OUTLINE RECOMMENDATIONS FOR IMPROVEMENT**
- **DEVELOP A COMPREHENSIVE GEOGRAPHIC INFORMATION SYSTEM (GIS) DATABASE**
- **DEVELOP A WATER RIGHTS RESEARCH TOOL**
- **IDENTIFY PROJECT OPPORTUNITIES - DEVELOP CONCEPTUAL DESIGNS AND ESTIMATES FOR SPECIFIC PROJECTS THAT IMPROVE WATERSHED HEALTH AND FUNCTIONALITY**


TASK 1: PROJECT MEETINGS AND PUBLIC PARTICIPATION

- **MEETINGS**

- a) Welcome to the project scoping meeting!
- b) Up to three (3) more Project meetings to be held during the course of this study
 - Hoback Junction area
 - Alpine area

- **HANDOUTS**

- a) Small Water Project Program (SWPP) Application Criteria and Project Examples
- b) Description of ongoing DEQ study in Hoback Junction area and how their development of a conceptual site model relates to this Level I Study



TASK DESCRIPTION	2021										2022							
	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	
Task 1: Project Meetings and Public Participation																		
a.) Scoping Meeting		X																
b.) Project Meetings					X			X			X							
Task 2: Review of Background Information																		
Task 3: Inventory and Description																		
a.) Physical Systems																		
b.) Biological Systems																		
c.) Anthropogenic Systems																		
Task 4: Streamflow Hydrology																		
Task 5: Watershed Management and Rehabilitation Plan																		
Task 6: Cost Estimates and Economic Analysis																		
Task 7: Permits																		
Task 8: Draft Report																	X	
Task 9: Report Presentations																	X	
Task 10: Final Report and Deliverables																	X	

Note: The above chart depicts projected scoping/project/presentation dates. More specific dates will be coordinated with the Office project manager and Sponsor(s).

KEY PROJECT TASKS

TASK 1: PROJECT MEETINGS AND PUBLIC PARTICIPATION

TASK 2: REVIEW OF BACKGROUND INFORMATION

TASK 3: INVENTORY AND DESCRIPTIONS

- a. Physical Systems
- b. Biological Systems
- c. Anthropogenic Systems

TASK 4: STREAMFLOW HYDROLOGY

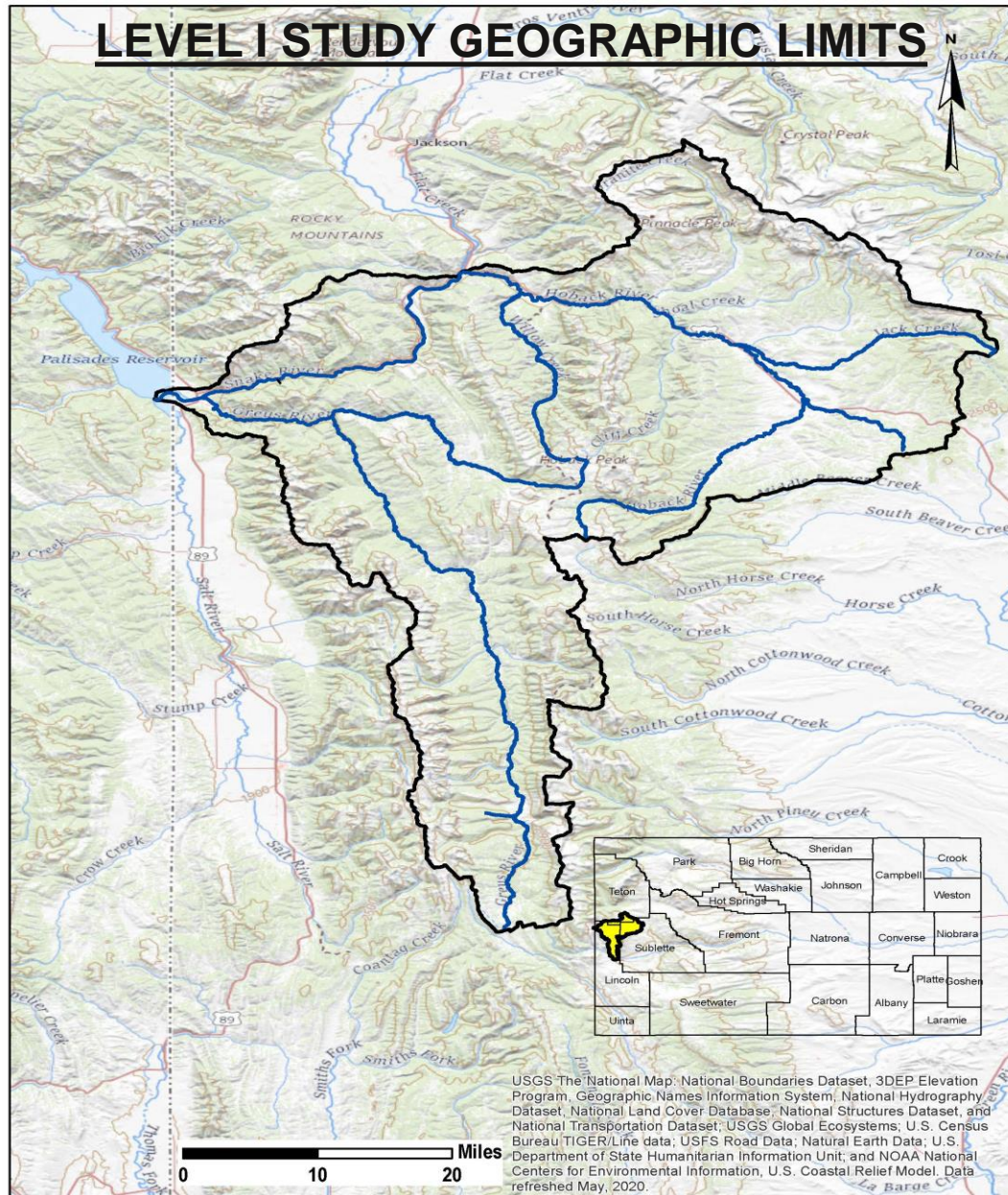
TASK 5: WATERSHED MANAGEMENT AND REHABILITATION PLAN

TASK 6: COST ESTIMATES & ECONOMIC ANALYSIS

TASK 7: PERMITS

THE INFORMATION COMPILED DURING THE ABOVE TASKS WILL BE INTEGRATED INTO THE GIS DATABASE.

LEVEL I STUDY GEOGRAPHIC LIMITS



USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; USGS Global Ecosystems; U.S. Census Bureau TIGER/Line data; USFS Road Data; Natural Earth Data; U.S. Department of State Humanitarian Information Unit; and NOAA National Centers for Environmental Information, U.S. Coastal Relief Model. Data refreshed May, 2020.

TASK 2: REVIEW OF BACKGROUND INFORMATION

A. INVENTORY OF PAST & ONGOING STUDIES

- Alpine Junction Water, Level I Study
- Alpine Spring Irrigation Supply Project
- Hoback Junction Water Supply, Level I Study
- DEQ Groundwater – Conceptual Site Model
- Snake/Salt River Basin Plan
- Teton County Water Supply Master Plan
- Upper Snake River Watershed, Level I Study

B. OTHER AVAILABLE WATERSHED SPECIFIC STUDIES AND INFORMATION

- Wildlife Data
- Wildfire Information / Mapping
- Wyoming State Geological Survey (Groundwater/Geology)
- Economic
- Biological
- Ecological
- SuiteWater

C. USED TO IDENTIFY **DATA GAPS AND CHANGES WITHIN THE WATERSHED**

D. INCORPORATED INTO THE FINAL GIS DELIVERABLE

TASK 3: INVENTORY AND DESCRIPTION

A. PHYSICAL SYSTEMS (3A)

- Surface Water
- Geology
- Climate

B. BIOLOGICAL SYSTEMS (3B)

- Fish and Wildlife
- Land Cover

C. ANTHROPOGENIC SYSTEMS (3C)

- Agricultural Water Use
- Domestic Water Use
- Water Storage
- Land (Use, Ownership, Management)



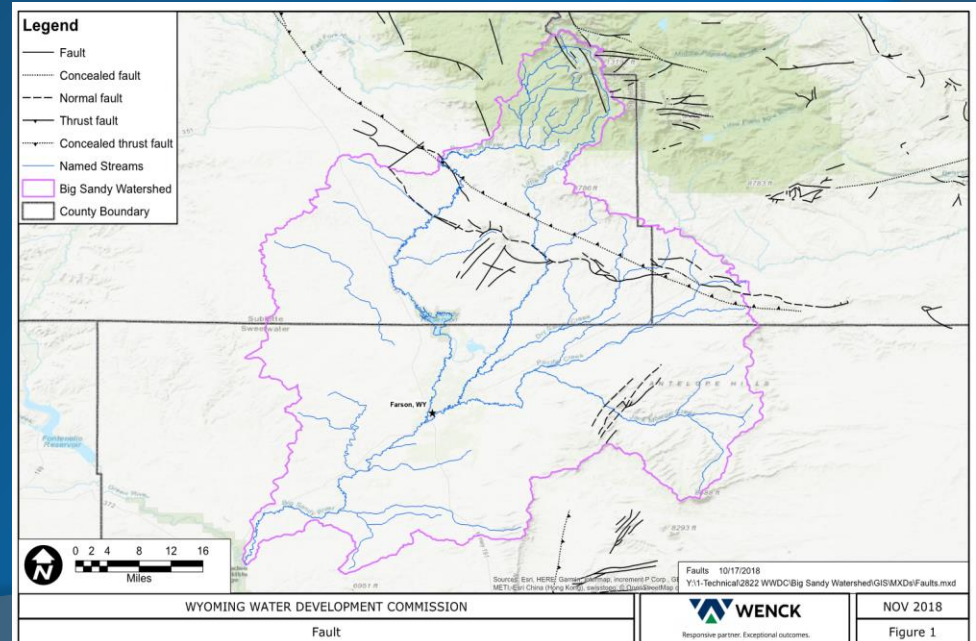
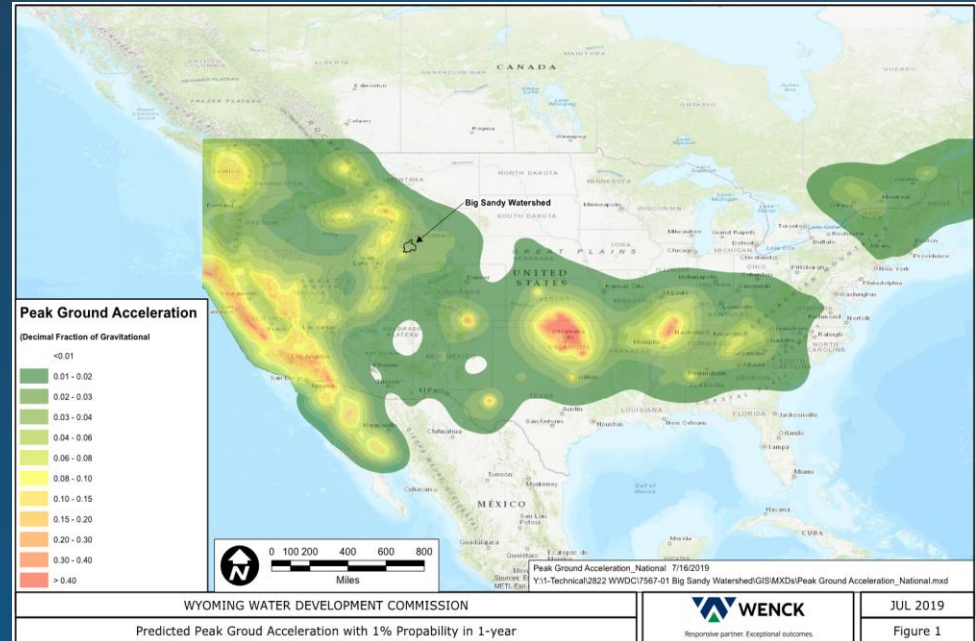
PHYSICAL SYSTEMS

I. GEOLOGY

- a) **Geologic Hazards**
 - Landslides
 - Faults
- b) **Geologic Features**
 - Bedrock type
 - Surface Soils
 - Extents and Thicknesses

II. GEOMORPHOLOGY

- a) **FEMA Floodplain Data**
- b) **Expected Floodplain Distribution**
- c) **Level I Rosgen Inventory**



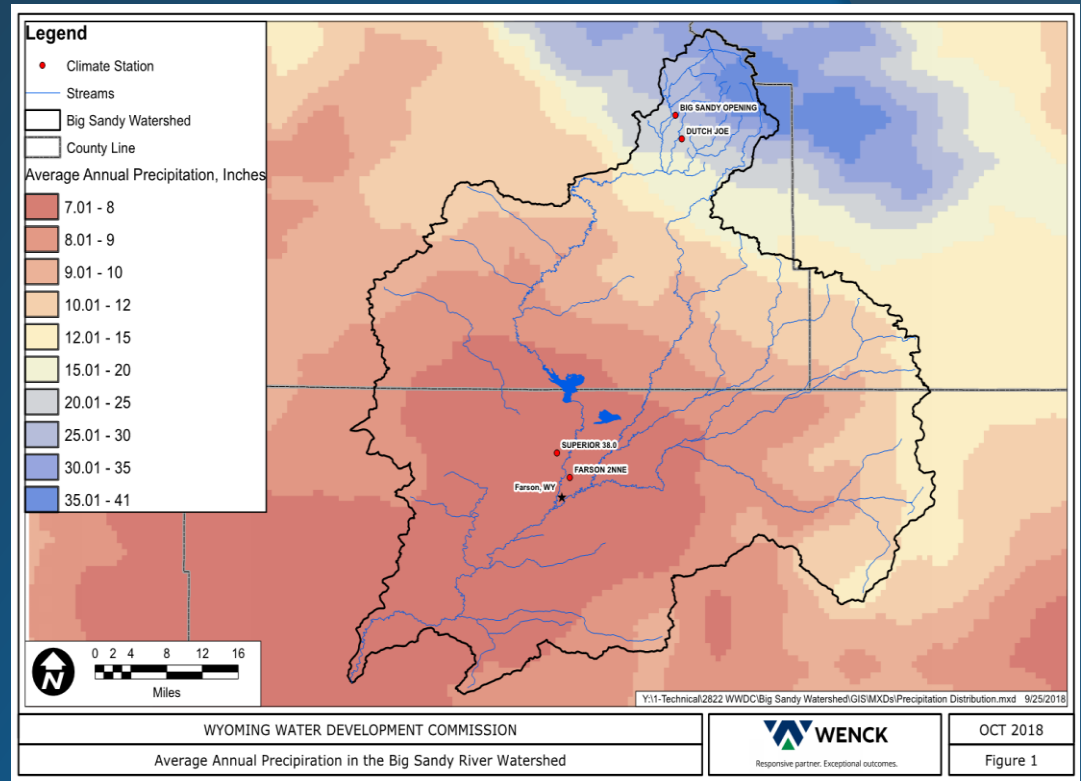
PHYSICAL SYSTEMS

I. CLIMATE

- a) Precipitation
- b) Temperature
- c) Climate Zones

II. Sources

- a) National Oceanographic and Atmospheric Administration
- b) High Plains Regional Climate Center
- c) Automated Weather Data Network
- d) Wyoming Agricultural Climate Network



End Goal: Recommendation for BMP's based on historic climatic data

Station		Period of Record			Daily Data Types Recorded			
Name	ID	Beginning	Ending	Coverage	Precipitation	Air Temperature	Snow Depth	Evaporation
Farson 2 NNE	USC00483170	1/1/1915	Present	82%	X	X	X	X
Superior 38.0	US1WYSW0007	1/17/2006	5/18/2018	5%	X			
Big Sandy Opening	USS0009G09S	9/30/1978	Present	98%	X	X	X	
Dutch Joe	USC00482780	1/12/1915	10/28/1926	50%	X	X		

STREAMFLOW HYDROLOGY

- Streamflow Gauges

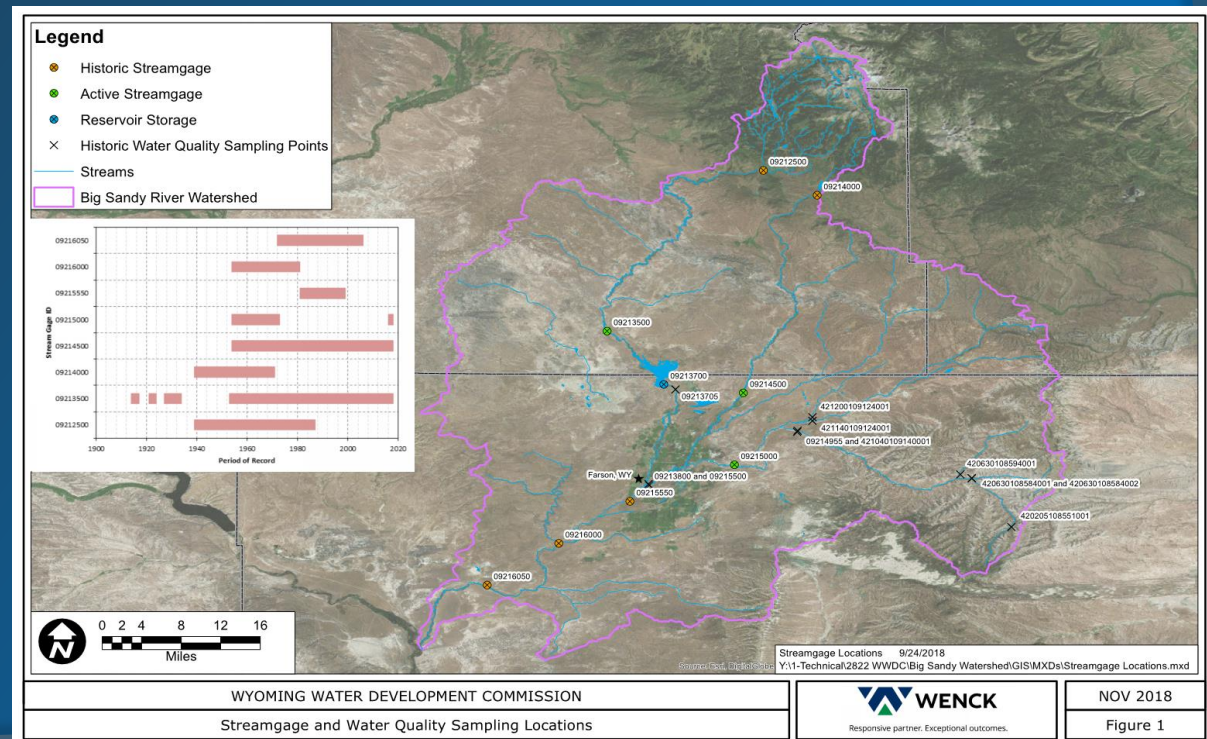
- USGS
- WSEO
- Fill Gaps by Regression
- Wet, Normal, and Dry Years

- End Goal

- Describe When and Where Shortages Occur
- Develop Foundational Data
- Support Future Project Analysis and Selection

- Data Results

- Maps
- Hydrographs
- Tables



TASK 3B – BIOLOGICAL SYSTEMS

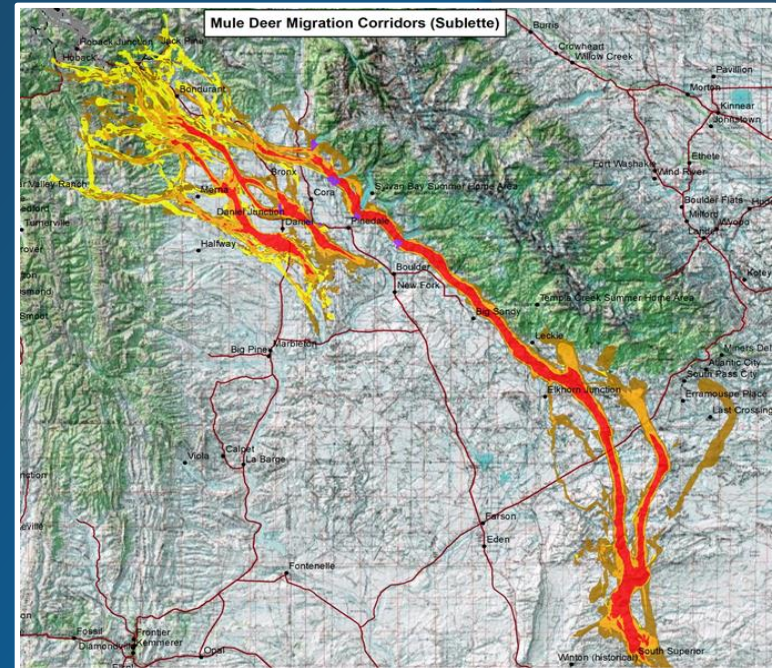
I. FISH AND WILDLIFE

a) Fisheries

b) Wildlife Habitat, Game, and Sensitive Species

c) Sage Grouse

- Compile data on threatened, endangered and sensitive fish, wildlife, and plant species (WGFD, WYNDD, USFWS, USFS, BLM)
- Identify critical wildlife, plant habitat, and fish passage barriers
- Map and discuss critical migration corridors for ungulates
- Summarize vegetation and plant communities that support sensitive species
- Map Greater Sage-grouse core areas, leks, and winter concentration areas



TASK 3C – ANTHROPOGENIC SYSTEMS

I. AGRICULTURAL WATER USE

- a) Irrigated Lands
 - Irrigation Methods (Flood, Center Pivot, Wheel Line, etc.)
 - Dry / Average / Wet Year Comparisons

- b) Irrigation Systems: Tabulated from Division IV Surface Water Rights Index
 - Point of Diversion (POD)
 - Place of Use (POU)
 - Means of Conveyance (MOC)
 - Mapping and GIS Inclusion
 - Develop method to integrate compiled water rights information with existing county mapservers

II. DOMESTIC WATER USE

- a) Potable Water Systems
 - Quantify and tabulate

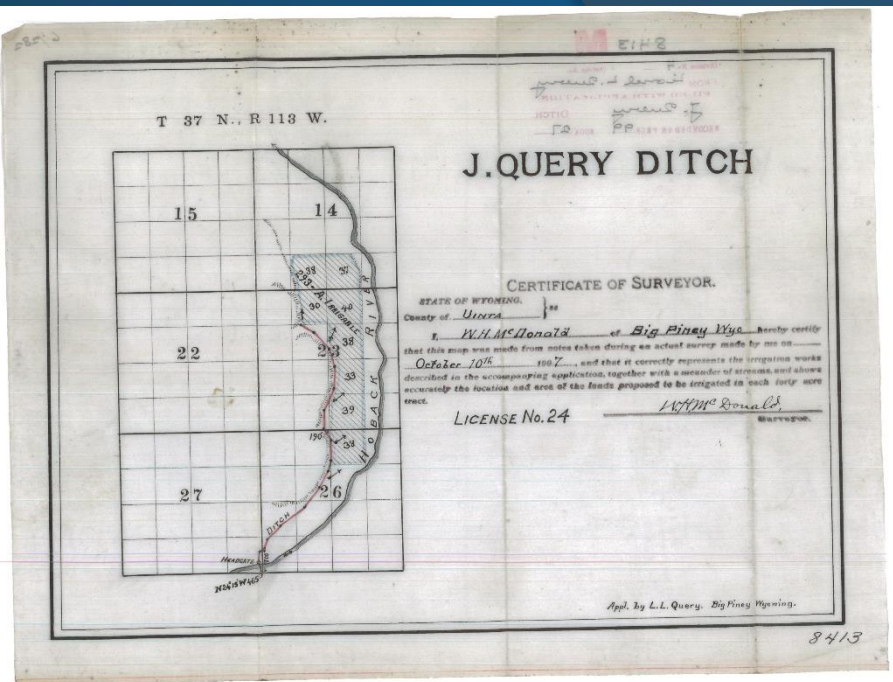
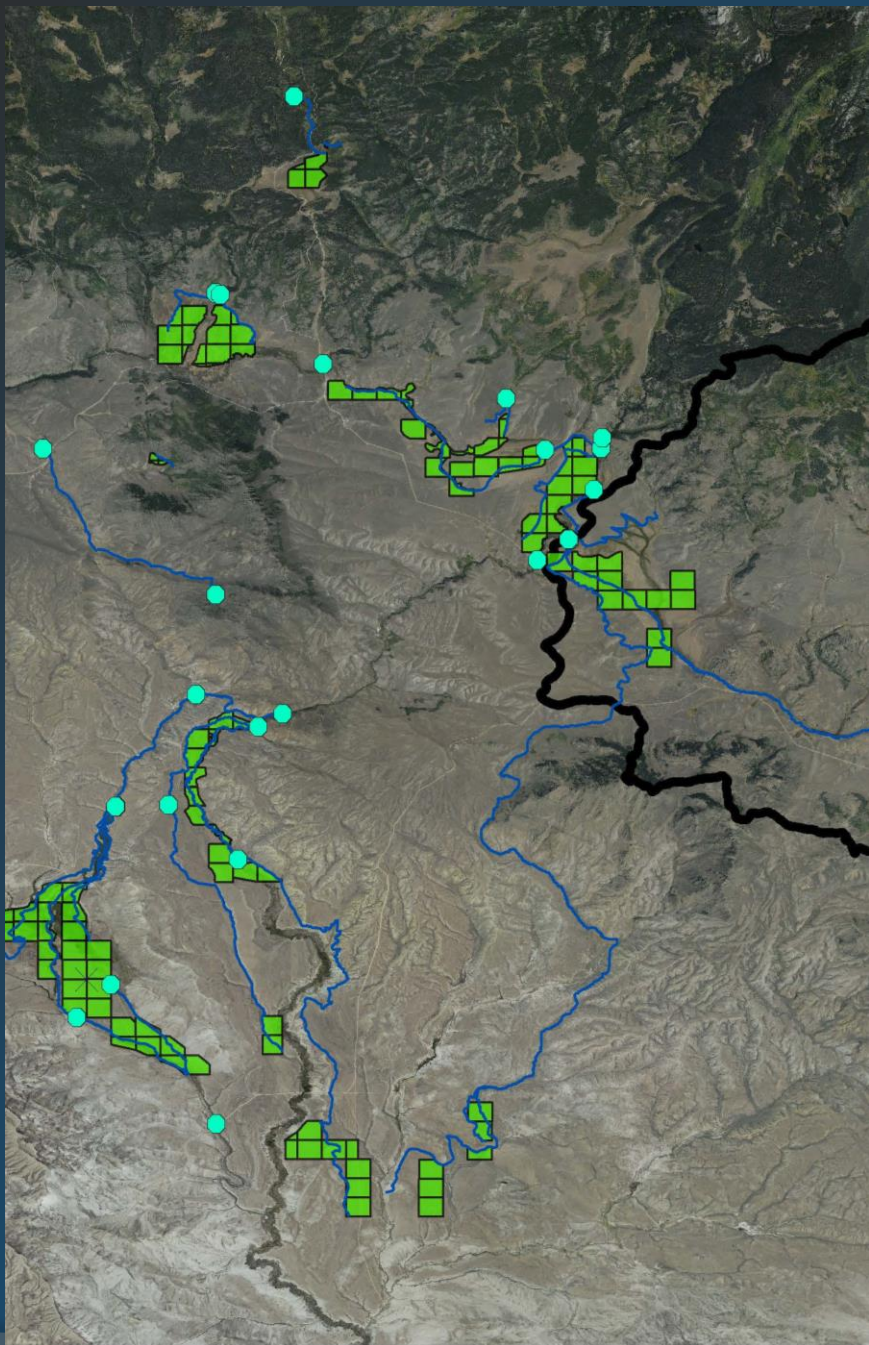
III. WATER STORAGE

- a) Reservoirs
 - Storage location, capacity, status, purpose
 - Stock
 - Fish Propagation & Wildlife
 - Irrigation
 - Fire Protection

- b) Upland Water Storage Sites, Opportunities, & Shortages
 - Identify existing sites
 - Identify shortages (geographically and from data gathered during Task 4)

IV. LAND

- a) Mapping of political boundaries, ownership, zoning, cultural resources, land use, etc.



17568

THE STATE OF WYOMING
CERTIFICATE OF APPROPRIATION OF WATER

Certificate Record No. 48 Page 517

WHEREAS, Kemmer Savings Bank has presented to the Board of Control of the State of Wyoming proof of the appropriation of water from Hoback River, Tributary of Snake River, Wyo. 4-21-07 through the Lionel L. Query Ditch under Permit No. 8413 for irrigation of the lands herein described, lying and being in Sublette County, Wyoming.

Now Know Ye, That the State Board of Control, under the provisions of Chapters 65 and 68, Wyoming Compiled Statutes, 1909, has, by an order duly made and entered on the 26th day of April, A. D. 1927, in Order Record No. 6, Page 778, determined and established the priority and amount of such appropriation as follows:

Name of Appropriator. Kemmer Savings Bank; Postoffice Address. Kemmer, Wyoming;
Date of Appropriation April 30th, 1908; Total Acreage Two hundred twenty-three (223) Acres
Amount of Appropriation 4.18 cu. ft. per sec.; Description of land to be irrigated and for which this appropriation is determined and established:

Twp.	Range	Sec.	NE 1/4			NW 1/4			SW 1/4			SE 1/4			TOTAL
			NE 1/4	NW 1/4	SE 1/4	NE 1/4	NW 1/4	SE 1/4	NE 1/4	NW 1/4	SE 1/4	NE 1/4	NW 1/4	SE 1/4	
27N	118W	14													78
		25	40	55	50										180
		26	58												58
															223 Acres

*For change in extent of appropriation see O.R. 12, P. 324
for more complete description of lands to be irrigated see Ord. 76, pg. 61.*

The right to water hereby confirmed and established is limited to irrigation _____ and the use is restricted to the place where acquired and to the purpose for which acquired; rights for irrigation not to exceed one cubic foot of water per second for each seventy acres of land for which the appropriation is herein determined and established.

In TESTAMENT WHEREOF, I, JOHN A. WHITING, President of the State Board of Control, have hereunto set my hand this 30th day of June, A. D. 1927, and caused the seal of said Board to be hereunto affixed.

ATTEST: GRACE L. FLETCHER, Secretary. John A. Whiting, President.

Data obtained from the ePermit ArcGIS Tool



Shape files created in reference to CR's and Application Maps from ePermit database research



Hyperlink pdf documents by creating new table in the watershed geodatabase using ArcCatalog

TASK 4: STREAMFLOW HYDROLOGY

- **Previous Studies**
 - Snake/Salt River Basin Plan update – 2012
- **USGS Streamflow Gauges**
- **Regression Equations**
 - Characterize watershed hydrology during wet, normal, and dry years
- **Specific reaches mapped and labeled**
- **Hydrographs to illustrate monthly streamflows**
- **Description of when and where shortages may occur**

TASK 5: WATERSHED MANAGEMENT AND REHABILITATION PLAN

- Stakeholder involvement is paramount
- Perform individual site investigations
- Identify methods and Best Management Practices (BMP's) to resolve issues
- Concept level designs for use in applying for WWDC funds through the SWPP
- Site specific permit requirements
- GIS implementation





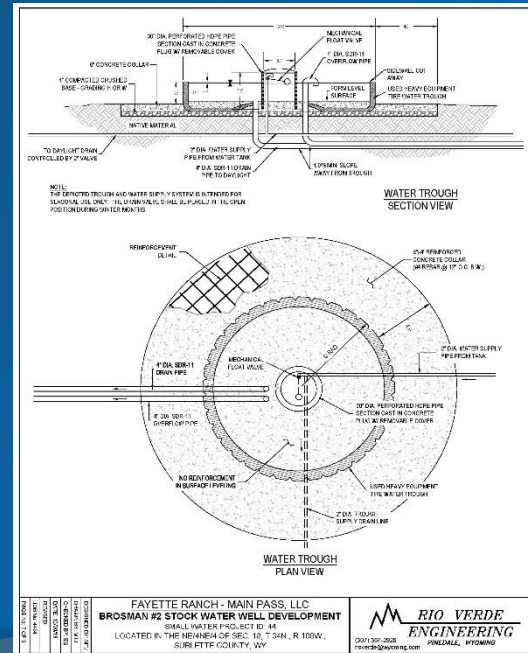
SMALL WATER STORAGE



UPLAND WATER DEVELOPMENT



DIVERSION / IRRIGATION REHAB



EXAMPLE CONCEPT LEVEL DESIGN

TASK 6: COST ESTIMATES & ECONOMIC ANALYSIS

a) **BASED ON CONCEPT LEVEL DESIGNS**

- **WWDC & SWPP eligible components**
- **Delivered in appropriate WWDC format**
- **Material Schedule & Quantities**
- **Permitting**
- **Legal Fees**
- **Right-of-Way Acquisition**

b) **DEVELOP ACCURATE CONSTRUCTION COSTS BASED ON:**

- **Location**
- **Material Availability**
- **Project Scope**
- **Knowledge of local contractors**
- **Knowledge of jurisdictional permit requirements**



TASK 6: COST ESTIMATES & ECONOMIC ANALYSIS, (continued)

a) Funding Sources

Natural Resources Conservation Service

- a) Environmental Quality Incentives Program (EQIP)**
- b) Agricultural Management Assistance (AMA)**
- c) Conservation Stewardship Program (CSP)**

Wyoming Water Development Commission grants and loans

- a) Small Water Project Program (SWPP)**
- b) Level III - New Development and Rehabilitation program**

b) Work with stakeholders to determine financial commitment



TASK 7: PERMITS

a) SITE SPECIFIC EVALUATIONS

b) JURISDICTIONAL AGENCIES

- USACE
- USFWS
- WDEQ
- SLIB
- WYGFD
- WSEO
- SHPO

c) COUNTY SPECIFIC – LAND DEVELOPMENT REGULATIONS



2017 Nationwide Permits, General Conditions, District Engineer's Decision, Further Information, and Definitions¹

A. Index of Nationwide Permits, General Conditions, District Engineer's Decision, Further Information, and Definitions

Nationwide Permits

1. Aids to Navigation
2. Structures in Artificial Canals
3. Maintenance
4. Fish and Wildlife Harvesting, Enhancement, and Attraction Devices and Activities
5. Scientific Measurement Devices
6. Survey Activities
7. Outfall Structures and Associated Intake Structures
8. Oil and Gas Structures on the Outer Continental Shelf
9. Structures in Fleeting and Anchorage Areas
10. Mooring Buoys
11. Temporary Recreational Structures
12. Utility Line Activities
13. Bank Stabilization
14. Linear Transportation Projects
15. U.S. Coast Guard Approved Bridges
16. Return Water From Upland Contained Disposal Areas
17. Hydropower Projects
18. Minor Discharges
19. Minor Dredging
20. Response Operations for Oil or Hazardous Substances
21. Surface Coal Mining Activities
22. Removal of Vessels
23. Approved Categorical Exclusions
24. Indian Tribe or State Administered Section 404 Programs
25. Structural Discharges
26. [Reserved]
27. Aquatic Habitat Restoration, Establishment, and Enhancement Activities
28. Modifications of Existing Marinas
29. Residential Developments
30. Moist Soil Management for Wildlife
31. Maintenance of Existing Flood Control Facilities
32. Completed Enforcement Actions
33. Temporary Construction, Access, and Dewatering
34. Cranberry Production Activities
35. Maintenance Dredging of Existing Basins

¹ The 2017 Nationwide Permits, General Conditions, District Engineer's Decision, Further Information, and Definitions were published in the *Federal Register* on January 6, 2017 (82 FR 1860).

GEOGRAPHIC INFORMATION SYSTEM

a) INCLUDES COMPILED DATA FROM ALL PREVIOUS TASKS

b) DATA ACQUISITION

- WWDC GIS – common base data sets
- Suitewater
- Landfire
- WyGIS
- Bureau of Land Management
- US Forest Service
- Conservation District(s)
- Sublette County GIS (Greenwood Mapping)
- Teton County GIS (Greenwood Mapping)
- Lincoln County GIS (Lincoln County)

d) APPLY EXISTING TEMPLATES, FORMATS, AND STANDARDS

- WWDC GIS framework for Watershed Studies

e) GIS DATABASE GOALS:

- Create effective watershed research tool
- Identify rehabilitation opportunities
- Accurate and easy to access water rights inventory
- Easy replication of maps and data
- Work with Greenwood Mapping to develop a data structure that can readily be integrated into the Sublette/Teton County Mapservers

QUESTIONS?

RIO VERDE ENGINEERING

MIKE JACKSON, P.E., L.S. Project Manager
(307) 367-2826 rioverde@wyoming.com

STANTEC

SKYLOR WADE, P.E. Project Engineer
(307) 631-0730 swade@wenck.com

ALDER ENVIRONMENTAL

BRIAN REMLINGER, P.W.S. Environmental Scientist
(307) 733-5031 brian@alderenvironmental.com

WWDO - MABEL JONES

Project Manager
(307) 777-7626 mabel.jones@wyo.gov

SCCD – MICHAEL HENN

Sponsor
(307) 367-2257 mhenn@sublettecd.com

TCD – TOM SEGERSTROM

Co-Sponsor
(307) 733-2110 tom@tetonconservation.org

SVCD – KAY LYNN NIELD

Co-Sponsor
(307) 885-7823 knield@starvalleycd.org

Hoback River Watershed, Level I Study Scoping Meeting Minutes

Date: June 14, 2021
Location: Bondurant Fire Hall
Time: 7:00 p.m.

A Scoping Meeting for the Hoback River Watershed, Level I Study was held on June 14, 2021 at 7:00 pm in the Bondurant Fire Hall. An attendance list, slide presentation, and meeting handouts are attached to this Memo.

Mike Jackson of Rio Verde Engineering began the meeting by introducing team members, managers, and sponsors in attendance and continued by familiarizing attendees with the Watershed study objectives and how landowners can benefit from the program. The Wyoming Water Development Commission (WWDC) watershed study objective statement was referenced. Emphasis was placed on utilizing background information and studies to identify data gaps that may need addressed or updated during the course of the study. It was also noted that the team would not be re-creating or repackaging any existing data. A general description of the tasks identified for completion as part of the study were outlined.

Mr. Jackson stated that the most useful rehabilitation directives come from landowners within the watershed, who are most effectively able to identify problem areas based on their historical use within and extensive knowledge of the study area. He encouraged attendees to bring water related projects forward during the study as the conceptual designs, cost estimates, and permit requirements would be developed at no cost to landowners. Projects will be accepted until November 15, 2021 or until weather prohibits an adequate window to evaluate potential projects in the field.

Mr. Jackson when on to explain that three (3) additional meetings were planned and will be hosted in different locations throughout the study area (notably Hoback Junction and Alpine).

Task 3 involves physical, biological, and anthropogenic systems. Skylor Wade (Stantec) talked about on-going DEQ studies in the area and described how those studies will be incorporated into the Hoback River Watershed Study. Under physical systems, characteristics such as flood prone areas, geology, and geomorphology will be analyzed to characterize the landscape. Existing USGS stream gage data will help identify the natural stream characteristics as well as climate analytics. This information will assist in determining best management practices (BMP's) for constituents and for the development of

the rehabilitation plan. Regarding hydrology, Mr. Wade went on to discuss how the use of regression equations and existing hydrological data will be used to develop hydrographs that will ultimately be useful in determining areas that are more prone to water shortage and in identifying potential storage opportunities during the rehabilitation phase of this study.

Brian Remlinger (Alder Environmental) presented information related to biological systems within the Watershed. Topics discussed during this segment included the following:

- Threatened or endangered species
- Wetlands / Riparian areas
- Snake River Cutthroat fishery
- Migration corridors
- Land Cover – Vegetation
- Wildfire impacts

A spatial analysis of each topic listed will be useful in determining permit requirements for projects identified under the rehabilitation plan and how each of these projects may impact biological systems as a whole.

Mr. Jackson then went on to discuss human influences and effects on the watershed (anthropogenic systems) to finish out Task 3. An analysis of water used for irrigation, domestic supply, storage, and livestock will be performed as part of this task. Regarding adjudicated water rights, certificate records and application maps will be compiled, tabulated, and mapped for inclusion within the GIS platform that will be created as part of this study. The goal of this exercise is to identify actual place of use within each 40 acre subdivision. Existing geospatial data pertaining to points of diversion (POD) and means of conveyance (MOC) for each adjudicated water right will be included. The results of this task will be used to understand water system demands on each tributary, where these demands are realized, and for what purpose. Ultimately, our goal is to present this system mapping and information on a publicly available GIS platform such as Sublette/Teton County GIS. This effort will be conducted so that constituents can have easy access to water rights information/location without the need to purchase GIS software. Domestic wells, stock water wells, and water storage facilities in the form of reservoirs (stock, irrigation, wildlife, fire protection) will also be mapped and tabulated according to specific WWDC standards.

Information relative to land use, cultural resources, ownership, zoning criteria, and political boundaries will also be compiled as part of this sub-task. Because the subject watershed spans across 3 different counties (Sublette, Teton, Lincoln), individual planning and zoning criteria will be compiled and used for reference when identifying project permitting requirements.

Mr. Jackson then continued with a presentation focusing on the watershed management and rehabilitation plan. Specifically, he discussed funding parameters and how the WWDC Small Water Project Program (SWPP) is setup to benefit water users within Wyoming. Example projects were identified, which included reservoirs, diversion/headgate rehabilitations, upland stock water development, irrigation related projects, and source water development. Mike Henn (Sublette County Conservation District) went on to discuss how this program has been successful in benefitting constituents in other regions. Mr. Henn explained how the opportunities presented during this study will enable landowners to obtain free engineering, cost estimates, and permitting requirements for water related projects. Under the SWPP, once the project is reviewed, accepted as being eligible, and funding has been secured, project costs will be split 50/50 up to a maximum match amount of \$35,000. There is no limit on total project cost. It was also brought up that the program is being utilized more and more throughout the state, and that funding into the future may get harder to get.

Mike Jackson then opened the meeting for questions and discussion.

Q. If there is a shared water right, who gets the say if a project can be done or not?

A. Mike Henn (SCCD) – I have seen it both ways. A single user did the leg work with all landowners' approval. I have also seen where all landowners enter into an agreement and share the cost.

Q. Does this only apply to landowners with water rights?

A. Mabel Jones (WWDO) stated that in some instances such as an eroding bank, a water right might not be needed to apply.

Q. How many bids are necessary before selecting a contractor for a project?

A. Mike Henn stated that more than 1 is required. The contractors have been really good to work with. If you just need materials and have the means to do it yourself, the state can generally reimburse you based on established rates. Mike Jackson – there will be an engineer's estimate to give you a reasonable idea of what the total project costs will be, generally a little conservative, but usually close. I will setup site visits to meet with landowners about projects, generally starting the process with a phone conversation consultation beforehand so that proper research and planning is completed beforehand. The information gathered will be used to for project development.

Q. What does the NEPA process entail for rehabilitation projects on federal lands.

A. When dealing with rehabilitation of a pre-existing and permitted right, the project is generally exempt. However, the governing authorities (USFS, USACE, WYGFD, etc.) will be contacted for clarification during the permitting phase of this study, specific to each individual project where necessary.

GIS Discussion: The goal is to get the water rights information onto a public server. It is currently difficult to get information out to users with the traditional GIS platform. A noted issue was brought up regarding routine maintenance of the water rights data once it has been uploaded.

SWPP Discussion: Mabel Jones (WWDO) talked about which types of projects are covered by the program. There has been funding in the past for fire suppression projects and this area seems to be of high concern for fires. If a level II rehab study is ongoing, you can apply for level III funding.

Leslie Steen (Trout Unlimited) also informed attendees that the Snake River Cutthroat is a species of focus. They have worked on various projects in the area and are willing to help with project costs if they have a positive impact on fish habitat. If state funding is not sufficient, reach out to them or Mike J with your project criteria and they may be able to provide additional funding.

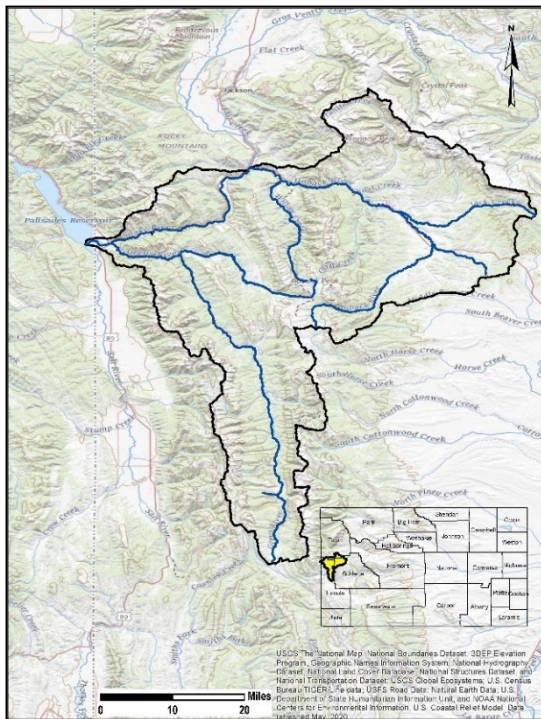
The meeting adjourned at 8:07 pm and individual discussions ensued.

HOBACK RIVER WATERSHED STUDY

STUDY AREA INCLUDES HOBACK/GREYS RIVER AND SNAKE RIVER CANYON



BRING US YOUR WATER PROJECT IDEAS!



Project Meeting

August 16, 2021 - 6:00 p.m.

**Hoback Volunteer Fire Department
10995 US HWY 89, Hoback Junction**

The Sublette, Teton, and Star Valley Conservation Districts and Wyoming Water Development Office are holding a project meeting for the Hoback River Watershed Level I Study. Stakeholders and water right holders are encouraged to attend to:

- Learn about watershed study objectives.
- Bring us your ideas for water development and rehabilitation projects which improve water conveyance, supply, quality, or habitat.
- Discuss funding opportunities for water development and system rehabilitation.

If you have project plans in the works, please bring any information you have for discussion following the formal presentation.

Find out more at <https://www.facebook.com/SubletteCD/>
To participate remotely contact the Project Consultant at rioverde@wyoming.com

For questions please contact:

Project Consultant - Mike Jackson, Rio Verde Engineering:	(307) 367-2826
Project Sponsor - Mike Henn, Sublette County Conservation District:	(307) 367-2257
Project Co-Sponsor - Tom Segerstrom, Teton Conservation District:	(307) 733-2110
Project Co-Sponsor - Kay Lynn Nield, Star Valley Conservation District:	(307) 885-7823
Project Manager - Mabel Jones, Wyoming Water Development Office:	(307) 777-7626

COMMUNITY

Public invited to learn more about Hoback River watershed study



Sponsored by Wyoming Water Development Commission Aug 13, 2021



 The public is invited to attend a meeting on August 16 to learn more about the upcoming Hoback River project. Photo: Zach Andres

JACKSON, Wyo. — The Wyoming Water Development Commission (WWDC) has sponsored a [Level One Watershed Study](#) for the Hoback River watershed area. On August 16, 2021 the Sublette, Teton, and Star Valley Conservation District's welcome the public to attend a project meeting at the Hoback Firehouse from 6:00-7:00 p.m. to learn more about how this study can support watershed health through on-the-ground projects.

Although, this study will **not** focus on drinking water (other WWDC programs do that), it presents great opportunities to assist in design, engineering, and implementation of almost all other types of water development projects. According to the Wyoming Water Development Office, "The objective of a Watershed Study is to evaluate an individual watershed's existing conditions, and, through collaboration



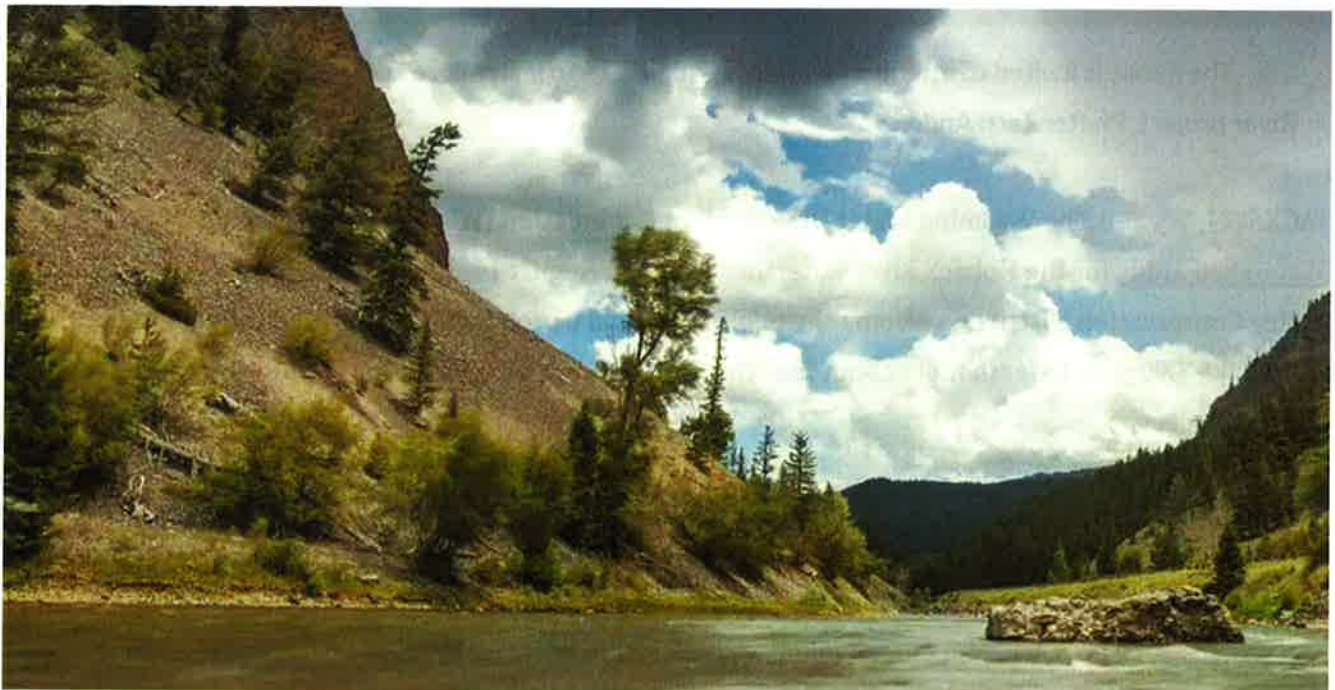
with landowners, stakeholders, and public outreach, develop a Watershed Management and Rehabilitation Plan and identify projects that are eligible for funding from WWDC and other sources that may improve or maintain watershed function and systems.”

To name a few project categories that can be supported from this Level 1 Watershed Study, project proponents should consider attending if they have project interests related to:

- irrigation systems (think control structures or headgates)
- stock water facilities
- fire suppression
- stream bank restoration
- projects that improve water quality

Robb Sgroi, Teton Conservation District’s Land Resources Specialist, explains that “projects that are included in this study will not only benefit from initial design engineering and cost estimates, but will also bring them that much closer to eligibility for Small Water Project Program grant funding. Getting project ideas included in the study helps elevate their priority for future grant funding.”

This is a rare opportunity to leverage state resources to get projects over the hump, and improve water use for yourself, the public, and the watershed. Please contact Mike Jackson from Rio Verde Engineering (mjackson@rioverdeengineering.com, 307-367-2826) or your local conservation district with questions or if you have project ideas.



Hoback River Watershed Level I Study

Date: August 16, 2021
Location: Hoback Volunteer Fire Department
Time: 6:00 p.m.

Objectives:

- Inform stakeholders on overall purpose and associated goals of the study
- Discuss rehabilitation plan and the need for stakeholder input
- Identify funding opportunities
- Discuss project timeline and deadlines
- Discuss water rights research and mapping tools to be implemented (GIS)

Agenda:

- 1. Project Area, Study Purpose, and Work to Date**
- 2. Watershed Inventory**
 - *Physical Systems*
 - Surface Water
 - Geology
 - Climate
 - *Biological Systems*
 - Fish & Wildlife
 - Land Cover
 - *Anthropogenic Systems*
 - Agricultural Water Use
 - Domestic, Municipal, and Industrial (DMI) Water Use
 - Water Storage
 - Land
- 3. Streamflow Hydrology**
 - Pre-existing models available
 - Dry, Average, and Wet Year Streamflow Analysis
 - Identify Shortages
 - Identify areas affected by common regulation
- 4. Watershed Management and Rehabilitation**
 - **November 15, 2021 - Deadline for stakeholder project proposals*
 - *Funding Opportunities*

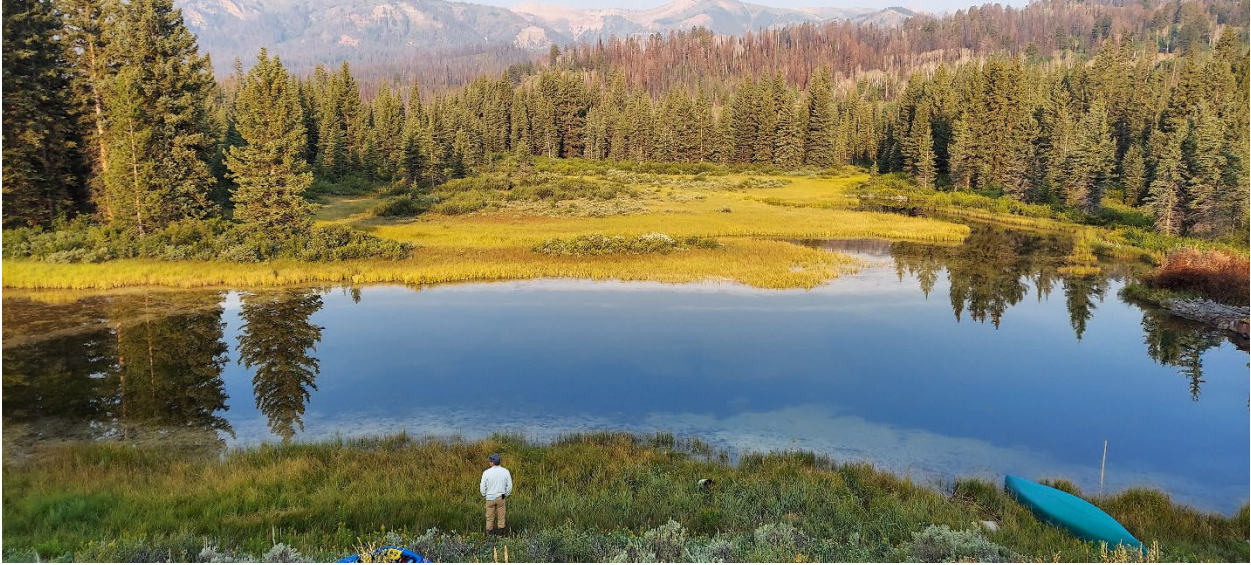
- Wyoming Water Development Commission (WWDC)
 - Small Water Project Program (SWPP)
 - Public Benefit (req'd)
 - Account I – New Development
 - Account II - Rehabilitation
- Natural Resources Conservation Service (NRCS) www.nrcs.usda.gov
 - Environmental Quality Incentives Program (EQIP)
 - Agricultural Management Assistance (AMA)
 - Conservation Stewardship Program (CSP)
- Trout Unlimited (TU)

5. Cost Estimates, Economic Analysis, and Permit Requirements

6. Geographic Information System

- All inclusive
- Build upon framework and information already developed
- Creation of a comprehensive planning tool
- Create water rights information platform
- Work with Greenwood Mapping to develop method to upload information to the existing web-based Teton and Sublette County GIS Mapserver

HOBACK RIVER WATERSHED – PROJECT EXAMPLES



Example 1: Existing beaver pond to be enlarged for fish habitat (Account 1 – Irrigation & Environmental)



Example 2: Stream to be permitted for supplemental supply to irrigated lands by use of pump and pipeline (Account 1 – Source Water Development, Irrigation)



Example 3: Diversion structure to be reconstructed by use of cross vane (Account II – Diversion Structures)



Example 4: Stream to be permitted for small reservoir project (Account I – Storage, Irrigation)

COMPLETED SWPP PROJECT EXAMPLES



Example 5: Diversion structure and headgate rehabilitation project (New Fork River Watershed Study)



Example 6: Artesian well development and stock water tank project (New Fork River Watershed Study)



Example 7: Stock water well, solar platform, and stock water tank project



Example 8: Diversion structure and head gate rehabilitation project (Big Sandy Watershed Study)

Summary of Key Water Related Studies in the Hoback River Watershed

There are three state lead studies in the Hoback River Watershed: one funded by the Wyoming Water Development Commission (WWDC) and two under the direction of the Wyoming Department of Environmental Quality (WDEQ). While there is overlap between these projects, each aims to achieve different goals. The following table and descriptions provide a summary of these projects.

Project	Lead Agency	Study Area	Collect Water Samples
Hoback Watershed Level I Study	WWDC	Hoback River Watershed	No
2021 Water Quality Monitoring Plan	WDEQ	Snake/Salt River Basin	Yes
Investigation of Groundwater Contamination in the Hoback Junction Area	WDEQ	Hoback Junction Groundwater	Yes

Hoback River Watershed Level I Study

The WWDC Study will aggregate, organize, and summarize existing data about natural and man-made characteristics of the Hoback Watershed. Examples of natural characteristics include the watershed climate, hydrologic record, geology, geography, water quality, and stream classification. Examples of man-made characteristics include irrigation canals, diversion structures, dams, water treatment facilities, and erosion control structures. The WWDC study will compile this existing information to identify and prioritize potential future water projects in the Hoback Watershed. The WWDC study will identify projects eligible for WWDC funding. Projects owned/sponsored by irrigation companies, public water systems, and other incorporated entities are eligible for WWDC funding. Improvement or repairs to privately owned wells, septic systems, and lagoons are not eligible for WWDC funding and will not be investigated by this project.

2021 Water Quality Monitoring Plan

This DEQ study will collect new water quality samples from 50 randomly selected primary sites in the Bear/Snake River Basin. DEQ will use results from these sites to identify high quality waters and identify potentially impaired reaches for targeted follow-up monitoring.

Investigation of Groundwater Contamination in the Hoback Junction Area

This DEQ study is investigating the claim that septic systems in the Hoback Junction Area are contributing to nitrates in the groundwater near Hoback Junction. The project is focusing on assessing nitrates in groundwater that supplies public water systems and private wells. Data collected during this study will support future decisions about what, if any, actions are necessary to address nitrates in the groundwater near Hoback Junction.

Hoback River Watershed, Level I Study Project Meeting Minutes – Hoback Junction

Date: August 16, 2021
Location: Hoback Junction Fire Hall
Time: 6:00 p.m.

A scheduled Project Meeting for the Hoback River Watershed, Level I Study was held on August 16, 2021 at 6:00 pm in the Hoback Junction Fire Hall. An attendance list, meeting handouts, and agenda are attached to this Memo.

Mike Jackson of Rio Verde Engineering began the meeting by introducing himself and briefing the attendees on the purpose of the subject Level I Study. Mabel Jones and members of the respective conservation districts also introduced themselves. Mike referenced the meeting agenda and reinstated how the Level I Study benefits stakeholders within the study area, which improves the watershed. The meeting was conducted informally, with questions welcomed throughout. Mike noted early in the presentation that culinary water (supply/quality) was not included as a viable Small Water Project Program (SWPP) option.

An attendee then asked the valid question(s): Why doesn't this study focus on 1.) monitoring stream flows within the Hoback River near Hoback Junction, 2.) monitor water quality within the same reach, 3.) Why this study doesn't include environmental restoration/remediation, and 4.) Why ground water quality isn't a focus of the study? Mike then went on to explain the defined scope of this Level I Study. "The broad-spectrum analysis that is conducted during a Level I Study excludes finite measurements and acquisition of data to supplement existing data. This is the case unless a qualifying project under the SWPP program is brought to our attention." Due to the magnitude of the study area and very limited time available for data gathering, stream flow gaging is not considered to be a wise use of WWDC funds. Specifically, water quality monitoring is not listed in the scope of work. Level I Studies are intended to gather information from past studies to paint a picture of the overall health of the watershed. This enables the consultant to identify problem areas and to recommend future actions that may be taken to rectify them.

It is known that groundwater has been an ongoing issue for residents in and around Hoback Junction for decades. The Hoback Junction Water Supply Level I Study was funded by the WWDC in 2006. A recommendation that came out of that study was for the landowners in the area to form a special

district, ultimately, for the purpose of being able to apply for a Level II Study through the WWDC, whereby funding can be leveraged to perform a more intensive water quality and supply analysis of the area. Teton County sponsored the noted Level I Study. To this point, no district has been formed. The ongoing study conducted by the Wyoming Department of Environmental Quality (WYDEQ) was also cited by Tom Segerstrom of the Teton Conservation District (TCD). After a period of discussion on these related topics, the meeting proceeded as per the agenda.

Mr. Jackson stated that the most useful rehabilitation directives come from landowners within the watershed, who are most effectively able to identify problem areas based on their historical use within and extensive knowledge of the study area. He encouraged attendees to bring water related projects forward during the study as the conceptual designs, cost estimates, and permit requirements would be developed at no cost to landowners. Projects will be accepted until November 1, 2021 or until weather prohibits an adequate window to evaluate potential projects in the field.

Several projects were inquired about during the meeting, including rural fire suppression project(s), source water developments, and spring rehabilitation projects. Each project was determined to be viable based on SWPP parameters though further analysis of each project will be conducted as part of this study to make a final determination. Specific details about the application process, funding parameters, and public benefit descriptions were also discussed at this juncture in the meeting. Under the SWPP, once the project is reviewed, accepted as being eligible, and funding has been approved by the WWDC, project costs will be split 50/50 up to a maximum match amount of \$35,000. There is no limit on total project cost. It was also brought up by Mike Henn (Sublette Conservation District) that the program is being utilized throughout the state and gaining popularity on an annual basis. Therefore, acquisition of funding is getting more and more competitive. It was also noted that shovel ready projects would naturally rank higher than similar conceptual projects.

Mr. Jackson then went on to discuss water rights place of use and the proposed Geographic Information System (GIS) platform. He went on to explain that the goal of this exercise is to identify actual place of use within each 40 acre subdivision throughout the study area. Existing geospatial data pertaining to points of diversion (POD) and means of conveyance (MOC) for each adjudicated water right will be included. The results of this task will be used to understand water system demands on each tributary, where these demands are realized, and for what purpose. Ultimately, the goal is to present this system mapping and information on a publicly available GIS platform such as Sublette/Teton County GIS. This effort will be conducted so that constituents can have easy access to water rights information/location without the need to purchase expensive GIS software.

After a more general discussion related to project ideas brought forward by attendees was complete, the meeting adjourned at 7:30 pm and individual discussions ensued.

Sign-in Sheet

Aug 16, 2021

Hoback River Watershed Level I Study

Hoback Junction Meeting 6:00 pm

	<u>Name</u>	<u>e-mail</u>	<u>phone #</u>
Project	Mike Trumbow	mtrumbow@wyoenergy.com	307 690 1998
	Bill Prode	blrode@g.com	733 6801
Project	TREVOR ROBINSON	trevor.robinson01@gmail.com	699-0801
	Sarah Uptain	Tuptains@gmail.com	690-7869
	Frodeman, Robert	flr1848@gmail	940-453-1416

APPENDIX B

EXPLANATION OF TABLES FOR SURFACE WATER

Ordering

Water rights are shown under the heading of the stream from which diversion is actually made according to the best information available. However, in some cases the source of supply which was given in the early adjudication as the main stream or the name of the tributary was in error.

First: The Main stream; parantheticals following a source name indicate either the mouth of a stream or the location of a spring or springs.

Second: Tributary sequences begin at the mouth of the stream or at the state boundary line and proceed toward the source of the main stream.

Third: Each stream, according to the date of priority of the appropriation.

Permit Explanation

T1234-	Territorial Appropriation	Court Decree priorities are indicated by number.
P592R	Permit No. 592 Reservoir	Where permits do not exist the column has been left blank.
P10SR	Permit No. 10 Stock Reservoir	In double permits (5686-6684), the latter is an amendment of the first. This
P139E	Permit No. 139 Enlargement	occurred before petitions were required.

Priority

Order of administration of priorities:	Month, Day, Year	5-15-1884
	Month and Year	5- 0-1884
	Specified Season and Year	Season 1884
	Year only	1884
	Before Year	Before 1884
	Board Orders or Court Orders may also establish a specific priority.	

Abbreviations

CFS	Cubic feet per second, for ditches	ORI	Original supply	HG Loc.	Headgate location, reservoir or spillway, given by section, township, and range (30-55-101)
ACFT	acre-feet, for reservoirs	SUP	Supplemental supply	I.F.	Instream Flow
GPM	gallons per minute	SEC	Secondary supply		

Use:

AQU	Aquaculture	ICE	Ice Cutting	REC	Recreation
CBM	Coal Bed Methane	IND	Industrial	RES	Reservoir Supply
CHE	Chemical	IRR	Irrigation	REW	Reclamation Watering
CIS	Consumptive Instream Flow	ISF	Instream Flow (W.S. 41 3 1001, et seq.)	SED	Sedimentation
CNG	Coal Bed Natural Gas	MAI	Maintenance (Equipment Washing)	SNO	Snow Making
COM	Commercial	MAN	Manufacturing	STE	Steam
DOM	Domestic Use	MEC	Mechanical	STKNDMS	Stock and Domestic Use
DSP	Domestic Supply	MED	Medicinal	STO	Stock (STO) Use
ECAP	Existing Capacity	MIL	Milling	STS	Stock Supply
ERO	Erosion Control	MIN	Mining	TEM	Temporary
FIR	Fire Protection (reservoir only)	MIS	Miscellaneous	TENL	Total Enlargement for this application
FIS	Fish Propagation	MUN	Municipal	TRA	Transportation
FLO	Flood Control	OIL	Oil Drilling	UTL	Utilities
FTH	Flow Through	OTH	Other	W&S	Wild and Scenic
GWR	Ground Water Recharge	PCT	Pollution Control	WET	Wetlands
HEX	Heat Extraction	POW	Power	WL	Wildlife
HYD	Hydropower Generation	RAI	Railroad		

EXPLANATION OF TABLES FOR SURFACE WATER

Unit of Measure

Wyoming law provides that measurement of flowing water shall be in terms of cubic feet per second of time. The volume of stored water is measure in acre-feet.

1 cubic foot	7.48 gallons, which weigh 62.4 pounds
1 cubic foot per second	448.83 gallons per minute
1 cubic foot per second	26,930.00 gallons per hour
1 cubic foot per second	646,317.00 gallons per day
1 cubic foot per second	1.9835 acre-feet per day; 2 acre-feet per day is used for administration of small heads of water
1 acre foot	43,560.00 cubic feet or the quantity of water necessary to cover one acre one foot in depth

Tabulation of Adjudicated Water Rights of the State of Wyoming - Water Division Number IV, Surface Water

Permit No.	Facility Name	Appropriator	Priority	Use	C.F.S/AF	Acres	HG LOC	Proof No.	CR No.
SNAKE RIVER									
P2901.0D	FLEMMING BROTHERS DITCH	FLEMMING BROTHERS;	10/22/1900	IRR_SW	0.200	14.38	042N-116W-20-SWSE	10285	CR CC30/466
P3225.0D	ALASKA DITCH	FALL CREEK ASSOCIATES AND PHOSPHORIA, LLC;	06/01/1901	IRR_SW	0.000	183	040N-117W-14-SESW	14157	CR CC92/168
P3384.0D	PALMER DITCH CO. DITCH	JOHN S. BRASFIELD;	08/26/1901	DOM_SW, IRR_SW	0.920	65	042N-116W-09-SWNE	10286	CR CC30/467
P3542.0D	VAN WINKLE DITCH	SYLVESTER CHENEY;	11/15/1901	DSP, IRR_SW	1.760	123.07	041N-116W-06-SWNE	10290	CR CC30/471
P3542.0D	VAN WINKLE DITCH	JACKSON HOLE RACQUET CLUB;	11/15/1901	IRR_SW	1.700	119.22	041N-116W-06-SENE	10287	CR CC75/282
P3542.0D	VAN WINKLE DITCH	LAKE CREEK DEVELOPMENT COMPANY;	11/15/1901	IRR_SW	2.640	185	041N-116W-06-SENE	10288	CR CC75/283
P3542.0D	VAN WINKLE DITCH	JACKSON HOLE RACQUET CLUB ET AL;	11/15/1901	IRR_SW	0.360	25.1	041N-116W-06-SENE		CR CC75/284
P3542.0D	VAN WINKLE DITCH	RICHARD A. AND NANCY LOVE COLLISTER;	11/15/1901	RES	0.090	0	041N-116W-06-SWNE		CR CC83/029
P3611.0D	JOHN L. DODGE DITCH	JOHN DODGE;	12/13/1901	IRR_SW	0.420	30	042N-116W-32-NWNW	10291	CR CC30/472
P3910.0D	IRON ROCK DITCH ACIPT THE WALTON DITCH	H M ELY;	05/19/1902	IRR_SW	2.720	190.91	041N-117W-13-SENE	10292	CR CC30/473
P3910.0D	IRON ROCK DITCH ACIPT THE WALTON DITCH	OTHO WILLIAMS;	05/19/1902	IRR_SW, S&D	2.710	190	041N-117W-13-SENE	10293	CR CC30/474
P3910.0D	IRON ROCK DITCH ACIPT THE WALTON DITCH	NANCY ELY;	05/19/1902	DOM_SW, IRR_SW	0.280	20	041N-117W-13-SENE	10294	CR CC30/475
P5689.0D	PROSPERITY DITCH	J. J. HARMISON;	12/02/1903	IRR_SW	0.250	18	041N-117W-13-SWSW	10296	CR CC30/477
P5689.0D	PROSPERITY DITCH	CARRIE HARMISON;	12/02/1903	IRR_SW	0.770	54	041N-117W-13-SWSW	10297	CR CC30/478
P5689.0D	PROSPERITY DITCH	GEORGE GOODRICK;	12/02/1903	IRR_SW	1.690	118.12	041N-117W-13-SWSW	10298	CR CC30/479
P5689.0D	PROSPERITY DITCH	JAMES SCHOFIELD;	12/02/1903	IRR_SW	1.480	100.72	041N-117W-13-SWSW	10299	CR CC30/480
P5689.0D	PROSPERITY DITCH	WILLIAM D. AND ANDREA B. BRAYLES;	12/02/1903	FTH, RES	0.050	0	041N-117W-13-SWSW	10299	CR CC82/095
P6097.0D	OWL DITCH	JOHN GRAY;	06/25/1904	IRR_SW	0.800	56	042N-116W-10-SWNW	10300	CR CC30/481
P6097.0D	OWL DITCH	NEPHI MOULTON;	06/25/1904	IRR_SW	0.280	20	042N-116W-10-SWNW	10301	CR CC30/482
P6097.0D	OWL DITCH	CAMILLE SEELEMIRE;	06/25/1904	IRR_SW	1.170	82.1	042N-116W-10-SWNW	10302	CR CC30/483
P6718.0D	LUDWIG DITCH	GEORGE LUDWIG;	06/08/1905	IRR_SW	0.570	40	040N-116W-30-SENW	10303	CR CC30/484
P6718.0D	LUDWIG DITCH	J. G. AND SUSANNAH IMESON;	06/08/1905	IRR_SW	0.560	39.21	040N-116W-30-SENW	26008	CR CC64/466
P7091.0D	BLUE BIRD DITCH	ALFRED NETHERCOTT J;	02/26/1906	IRR_SW	0.950	66.68	041N-117W-14-NESE	10304	CR CC30/485
P894.0R	JACKSON LAKE RESERVOIR	USDI BLM;	08/23/1906	IRR_SW	299000.000AF	0	045N-114W-18-SESW	29875	CR CR06/104
P1713.0E	ENL. DELAND DITCH	JAMES BRUNK;	06/01/1907	IRR_SW	0.210	15	043N-116W-36-SENW	36365	CR CC79/294
P1740.0E	ENL. PALMER DITCH CO. DITCH	GEORGE HALE;	07/26/1907	DOM_SW, IRR_SW	0.570	40	042N-116W-09-SWNE	10305	CR CC30/486
P1903.0R	ENL. JACKSON LAKE RESERVOIR	U.S. DEPARTMENT OF INTERIOR;	08/18/1910	IRR_SW	93990.000AF	0	045N-114W-18-SESW	29876	CR CR06/105
P10337.0D	DELAND DITCH	KELL B. AND JACQUELINE K. BENSON;	10/07/1910	FTH, RES	0.090	0	043N-116W-36-SENW		CR CC83/100
P10337.0D	DELAND DITCH	W. RICHARD HOWARD LIVING TRUST;	10/07/1910	FTH, RES	0.080	0	043N-116W-36-SENW	14159	CR CC85/211
P10337.0D	DELAND DITCH	W. RICHARD HOWARD LIVING TRUST;	10/07/1910	FTH, RES	0.000	0	043N-116W-36-SENW	14160	CR CC85/212
P10337.0D	DELAND DITCH	JAMES DAVENPORT;	10/07/1910	FTH, IRR_SW, RES	2.090	111	043N-116W-36-SENW	14158	CR CC37/545
P10337.0D	DELAND DITCH	FRANK CONNELL;	10/07/1910	IRR_SW	1.910	133.35	043N-116W-36-SENW	14159	CR CC37/546
P10337.0D	DELAND DITCH	ANNA LINGERFELTER;	10/07/1910	IRR_SW	2.170	151.76	043N-116W-36-SENW	14160	CR CC37/547
P10337.0D	DELAND DITCH	PETER MCCABE;	10/07/1910	IRR_SW	1.710	119.44	043N-116W-36-SENW	15779	CR CC40/156
P10611.0D	BENNIE L. LINN DITCH	BENNIE L LINN;	03/04/1911	IRR_SW	1.900	133.29	041N-116W-07-NWNW	14162	CR CC37/549
P2424.0E	ENL. PROSPERITY DITCH	ALBERT LINN;	03/13/1911	IRR_SW	1.878	131.48	041N-117W-13-SWSW	14161	CR CC37/548
P11400.0D	SNAKE RIVER DITCH	AUGUST CHRISTIANSEN;	06/17/1911	DOM_SW, IRR_SW	1.420	99.35	041N-117W-24-	15778	CR CC40/155
P11400.0D	SNAKE RIVER DITCH	HARRY BRITTENHAM;	06/17/1911	FTH, RES	0.180	0	041N-117W-24-		CR CC83/146
P2185.0R	ENL. JACKSON LAKE RESERVOIR	USDI;	07/24/1911	IRR_SW	45010.000AF	0	045N-114W-18-SESW	29877	CR CR06/106
P2894.0R	ENL. JACKSON LAKE RESERVOIR	USDI BUREAU OF RECLAMATION;	05/20/1912	DOM_SW, IRR_SW	300000.000AF	0	045N-114W-18-SESW	29878	CR CR06/107
P2895.0R	ENL. JACKSON LAKE RESERVOIR	U S DEPARTMENT OF INTERIOR;	05/24/1913	DOM_SW, IRR_SW	100000.000AF	0	045N-114W-18-SESW	29879	CR CR06/108
P3855.0E	ENL. AUGUST CHRISTIANSEN DITCH	ELMER E. HODGES;	10/08/1917	IRR_SW	1.640	115	041N-117W-24-NESW	17640	CR CC43/077
P3855.0E	ENL. AUGUST CHRISTIANSEN DITCH	OSCAR SEATON;	10/08/1917	IRR_SW	1.200	84.34	041N-117W-24-	18433	CR CC44/176
P17842.0D	HUYLER SNAKE RIVER DITCH	COULTER D HUYLER;	09/02/1930	IRR_SW	6.140	429.78	042N-116W-20-SWSE	20290	CR CC47/223
P18638.0D	GRISAMER SUPPLEMENTAL DITCH	ORA L. AND FANNIE GRISAMER;	12/16/1935	IRR_SW	2.740	191.88	040N-116W-33-SWNW	21718	CR CC52/464
P18858.0D	RESOR POWER PLANT DITCH	STANLEY RESOR;	01/21/1938	POW	53.970	0	042N-116W-29-SESW	22060	CR CC56/323
P19238.0D	RESOR SUPPLEMENTAL DITCH	STANLEY ROGER RESOR; HELEN HAUGE; ANN LAUGHLIN;	09/18/1939	IRR_SW, STO	3.900	273.27	042N-116W-09-SWNE	28231	CR CC68/167
P5469.0E	ENL. PROSPERITY DITCH	MAURICE R. AND BESSIE A. BARNEY;	04/26/1948	IRR_SW	0.520	36.39	041N-117W-13-SWSW	26662	CR CC65/480

Tabulation of Adjudicated Water Rights of the State of Wyoming - Water Division Number IV, Surface Water

Permit No.	Facility Name	Appropriator	Priority	Use	C.F.S/AF	Acres	HG LOC	Proof No.	CR No.
P5469.0E	ENL. PROSPERITY DITCH	WATLER CALLAHAN;	04/26/1948	IRR_SW	0.910	63.92	041N-117W-13-SWSW	25888	CR CC64/373
P5469.0E	ENL. PROSPERITY DITCH	GERRIT AND LAMAR ALTA HARDEMAN;	04/26/1948	IRR_SW	0.550	38.89	041N-117W-13-SWSW	25889	CR CC64/374
P5469.0E	ENL. PROSPERITY DITCH	SCHOFIELD BROTHERS;	04/26/1948	IRR_SW	0.000	55	041N-117W-13-SWSW	25890	CR CC64/375
P5469.0E	ENL. PROSPERITY DITCH	ALBERT E. AND MAY K. SCHWABACHER;	04/26/1948	IRR_SW	0.460 ORI SUP	32.48	041N-117W-13-SWSW	25388	CR CC63/428
P5519.0E	ENL. BENNIE L. LINN DITCH	RALPH AND JEAN BURROWS;	10/31/1950	IRR_SW	0.000	5	041N-116W-06-NESW	26109	CR CC65/054
P5519.0E	ENL. BENNIE L. LINN DITCH	THOMAS E AND MAXINE L DOUGHTY;	10/31/1950	IRR_SW	0.000	8.2	041N-116W-06-NESW	26110	CR CC65/055
P5519.0E	ENL. BENNIE L. LINN DITCH	DAN AND CAROLE JARVIS;	10/31/1950	IRR_SW	0.000	1	041N-116W-06-NESW	26111	CR CC65/056
P5519.0E	ENL. BENNIE L. LINN DITCH	GENE AND ANGIE JARVIS;	10/31/1950	IRR_SW	0.000	1.55	041N-116W-06-NESW	26112	CR CC65/057
P5519.0E	ENL. BENNIE L. LINN DITCH	JOSEPH W AND MARGARET B MORROW;	10/31/1950	IRR_SW	0.000	5	041N-116W-06-NESW	26113	CR CC65/058
P5519.0E	ENL. BENNIE L. LINN DITCH	REIGO NETHERCOTT;	10/31/1950	IRR_SW	0.000	46.75	041N-116W-06-NESW	26114	CR CC65/059
P5519.0E	ENL. BENNIE L. LINN DITCH	GLEN L AND ELIZABETH S STILSON;	10/31/1950	IRR_SW	0.000	7	041N-116W-06-NESW	26115	CR CC65/060
P20629.0D	GRANITE CREEK SUPPLEMENTAL DITCH	STANLEY RESOR ESTATE; WYOMING STATE BOARD OF LAND COMM.;	02/27/1951	IRR_SW	11.100 ORI SUP	777.1	042N-116W-09-SWNE	27879	CR CC67/293
P20629.0D	GRANITE CREEK SUPPLEMENTAL DITCH	NEW MORAINE, L.L.C.;	02/27/1951	FTH, RES	0.070	0	042N-116W-09-SWNE	27879	CR CC93/005
P20629.0D	GRANITE CREEK SUPPLEMENTAL DITCH	NEW MORAINE, L.L.C.;	02/27/1951	FTH, RES	0.000	0	042N-116W-09-SWNE	27879	CR CC93/008
P5636.0E	ENL. GRANITE CREEK SUPPLEMENTAL DITCH	SNAKE RIVER ASSOCIATES;	08/08/1952	IRR_SW	1.930 ORI SUP	135.53	042N-116W-09-	31451	CR CC72/229
P5783.0E	ENL. IRON ROCK DITCH ACT WALTON DITCH	JOHN E P MORGAN J; GLORIA AND GREENLEY MORGAN; HARRY C AND MARGARET S BARKER J;	01/17/1955	IRR_SW, STO	0.440	31	041N-117W-13-SENE	31452	CR CC72/230
P5783.0E	ENL. IRON ROCK DITCH ACT WALTON DITCH	PAUL WALTON;	01/17/1955	IRR_SW	1.500	105	041N-116W-07-NESW	27880	CR CC67/294
P21986.0D	BILLY WELLS DITCH	WILLIAM B AND GLADYS H WELLS;	01/14/1959	IRR_SW, STO	0.360	25.2	038N-116W-05-NENW	26464	CR CC65/358
P5957.0E	ENL. PROSPERITY DITCH	GERRIT HARDEMAN;	05/14/1959	IRR_SW	0.000	58	041N-117W-13-SWSW	27329	CR CC66/488
P22079.0D	WALTON DITCH	PAUL T. WALTON;	01/14/1960	IRR_SW, STO	1.810	127	041N-116W-07-NESW	27881	CR CC67/295
P5996.0E	ENL. IRON ROCK DITCH ACT WALTON DITCH	PAUL WALTON;	01/14/1960	IRR_SW, STO	1.660	116	041N-116W-07-NWSE	27882	CR CC67/296
P22079.0D	WALTON DITCH	WALTON RANCH COMPANY;	01/14/1960	IRR_SW, STO	0.316	18	041N-116W-07-NESW	42309	CR CC95/077
P22654.0D	SHATTO FISH CREEK NO. 1 SUPPLEMENTARY SUPPLY CHANNEL	JOHN HINZ;	01/10/1964	IRR_SW	0.000	86.79	041N-117W-26-NWSW	31124	CR CC72/041
P6147.0E	ENL. IRON ROCK DITCH ACT WALTON DITCH	PAUL WALTON;	05/27/1965	IRR_SW, STO	2.980	208.63	041N-116W-07-NWSE	27883	CR CC67/297
P23084.0D	LES' PIPELINE	ASTORIA MINERAL SPRINGS INC.;	05/05/1966	IRR_SW	0.000		039N-116W-33-	29561	CR CC69/493
P23396.0D	O B DITCH	LYLE I AND JEANETTE L O'BLENNES;	02/27/1970	IRR_SW, STO	0.180	12.52	040N-116W-33-SWNW	30031	CR CC70/157
P7547.0R	GILBERT FISHING RESERVOIR	JAMES H. GILBERT;	03/29/1972	FIS	0.560AF	0	041N-117W-35-NESE	31144	CR CR07/353
P7447.0R	EVANS FISHING RESERVOIR	DAVID EVANS;	04/26/1972	FIS, FLO	1.200AF	0	040N-116W-33-NESE	30791	CR CR07/148
P7463.0R	O'BLENNES FISHING RESERVOIR	LYLE O'BLENNES;	06/06/1972	FIS, FLO	1.100AF	0	040N-116W-33-SWNW	30792	CR CR07/149
P6439.0E	ENL. BENNIE L. LINN DITCH	JESSE AND DAISEY B TUCKER;	10/30/1972	IRR_SW	0.260	18.42	041N-116W-06-SWNE	31289	CR CC72/137
P6472.0E	ENL. SNAKE RIVER DITCH	JAMES GILBERT;	09/04/1973	RES	0.000	0	041N-117W-24-		CR CC72/042
P7048.0E	ENL. SNAKE RIVER DITCH	HARRY AND HEATHER BRITTENHAM;	01/10/1975	FTH, RES	0.110	0	041N-117W-24-		CR CC83/147
P7048.0E	ENL. SNAKE RIVER DITCH	RALPH GILL, ET AL.;	01/10/1975	IRR_SW	13.830 ORI SUP	968.06	041N-117W-24-SWSW	36929	CR CC80/382
P25954.0D	GRIMES PIPELINE NO. 1	FRANK J AND KAREN A GRIMES;	08/08/1977	IRR_SW, STO	0.000	4	039N-116W-27-NESE	32755	CR CC74/070
P27600.0D	ROBYN'S PIPE LINE (PORTABLE)	ROBERT J. AND NANCY R. JAYCOX;	12/28/1979	IRR_SW	0.040	2.66	039N-116W-11-SESE	37608	CR CC81/346
P8345.0R	CRESCENT H RANCH RESERVOIR	DONALD H. ALBRECHT;	03/10/1980	FIS	18.000AF	0	040N-117W-03-NESW	33748	CR CR10/203
P27411.0D	CRESCENT H RANCH SUPPLY DITCH	DONALD ALBRECHT;	06/11/1980	RES	13.300	0	040N-116W-03-NESW		CR CC75/136
P8631.0R	CORKY'S FISH RESERVOIR	FALL CREEK ASSOCIATES;	03/04/1981	STO	1.000AF	0	040N-117W-23-	33866	CR CR10/301
P6807.0E	ENL. GRANITE CREEK SUPPLEMENTAL DITCH	SNAKE RIVER ASSOCIATES AND FALL CREEK ASSOCIATES;	10/02/1981	IRR_SW	5.230 ORI SUP	365.78	042N-116W-09-SWNE	36366	CR CC79/295
P6808.0E	ENL. HUYLER SNAKE RIVER DITCH	CORE PARTNERS AND HENRY R LAUGHLIN;	10/02/1981	IRR_SW, STO	1.780	124.45	042N-116W-20-SWSE	35872	CR CC78/302
P29290.0D	MILL STREAM DITCH	SNAKE RIVER RANCH;	10/02/1981	STO	47.820	0	042N-116W-32-NENW	34637	CR CC76/192
P8722.0R	GLENN FISHING RESERVOIR	J MICHAEL AND FRANCESCA HAMMER;	12/17/1982	FIS	0.400AF	0	041N-117W-35-SENE	37904	CR CR15/236
P6733.0E	ENL. SNAKE RIVER DITCH	J AND FRANCESCA HAMMER;	12/17/1982	RES	232.950	0	041N-117W-24-SESW		CR CC82/056
P9644.0S	DAVID A EVANS STOCK RESERVOIR	DAVID EVANS;	03/28/1985	STO	13.330AF	0	040N-116W-33-NESE	36678	CR CR13/490
P9170.0R	PINES NO. 1 RESERVOIR	LIMITED PARTNERSHIP JACKSON HOLE RACQUET CLUB;	09/13/1985	REC	7.800AF	0	041N-117W-14-NWNE	34664	CR CR11/397
P9174.0R	PINES NO. 5 RESERVOIR	LIMITED PARTNERSHIP JACKSON HOLE RACQUET CLUB;	09/13/1985	REC	12.900AF	0	041N-117W-14-SENE	34665	CR CR11/398
P9178.0R	PINES NO 9 RESERVOIR	JACKSON HOLE RACQUET CLUB LIMITED PARTNERSHIP;	09/13/1985	REC	6.300AF	0	041N-117W-11-NESE		CR CR11/399
P9181.0R	PINES NO. 12 RESERVOIR	JACKSON HOLE RACQUET CLUB	09/13/1985	REC	8.100AF	0	041N-117W-14-NENW	34667	CR CR11/400

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Permit No.	Facility Name	Appropriator	Priority	Use	C.F.S/AF	Acres	HG LOC	Proof No.	CR No.
P9173.0R	PINES NO. 4 RESERVOIR	LIMITED PARTNERSHIP; JACKSON HOLE RACQUET CLUB	09/13/1985	REC	40.800AF		0 041N-117W-14-SWNE	34669	CR CR11/402
P9175.0R	PINES NO. 6 RESERVOIR	LIMITED PARTNERSH; JACKSON HOLE RACQUET CLUB	09/13/1985	REC	27.000AF		0 041N-117W-14-SENE	34670	CR CR11/403
P9176.0R	PINES NO. 7 RESERVOIR	LIMITED PARTNERSHIP; JACKSON HOLE RACQUET CLUB	09/13/1985	REC	20.100AF		0 041N-117W-14-NENE	34671	CR CR11/404
P9177.0R	PINES NO. 8 RESERVOIR	LIMITED PARTNERSHIP; JACKSON HOLE RACQUET CLUB	09/13/1985	REC	29.700AF		0 041N-117W-14-NENE	34672	CR CR11/405
P9182.0R	PINES NO. 13 RESERVOIR	LIMITED PARTNERSHIP; JACKSON HOLE RACQUET CLUB	09/13/1985	REC	5.700AF		0 041N-117W-14-NENE	34673	CR CR11/406
P9180.0R	PINES NO. 11 RESERVOIR	LIMITED PARTNERSHIP; JACKSON HOLE RACQUET CLUB	09/13/1985	REC	4.800AF		0 041N-117W-11-SWSE	34678	CR CR11/411
P6817.0E	ENL. VAN WINKLE DITCH	LIMITED PARTNERSHIP JACKSON HOLE RACQUET CLUB;	09/13/1985	RES	144.600		0 041N-116W-06-SWNE	34638	CR CC76/193
P6867.0E	ENL. ROBYN'S PIPE LINE	ROBERT J AND NANCY R JAYCOX;	07/20/1987	IRR_SW	0.040	2.66	039N-116W-11-NESW	37609	CR CC81/347
P29998.0D	EXPLORER BASE PIPELINE	GREAT SALT LAKE COUNCIL, BOY SCOUTS OF AMERICA;	09/22/1987	IRR_SW	0.000	3.64	039N-116W-27-NWSE	35485	CR CC77/327
P10366.0S	LAZY "W" STOCK RESERVOIR	PETER A AND NANCY L WISWELL;	03/10/1988	STO	0.620AF		0 041N-117W-12-NENW	37820	CR CR15/183
P10700.0S	WISWELL-STILL STOCK RESERVOIR	PETER A AND NANCY L WISWELL;	04/06/1989	STO	2.500AF		0 041N-117W-12-NENW	37821	CR CR15/184
P9528.0R	WALTER CALLAHAN POND NO. 2 RESERVOIR	ARLO CURTIS;	06/23/1989	FIS	4.400AF		0 041N-117W-26-SWSW	36278	CR CR13/264
P9529.0R	WALTER CALLAHAN POND NO. 3 RESERVOIR	ARLO CURTIS;	06/23/1989	FIS	4.000AF		0 041N-117W-26-SWSW	36279	CR CR13/265
P9527.0R	WALTER CALLAHAN POND NO. 1	MARK AND MARCIE FELDMAN TRUST;	06/23/1989	FIS	4.000AF		0 041N-117W-26-SWSW	38676	CR CR16/215
P9538.0R	EWING RESERVOIR	ROBERT EWING J;	09/28/1989	FIS	0.940AF		0 041N-116W-06-NWSE	36989	CR CR14/188
P9540.0R	MECHEM RESERVOIR	THOMAS O AND ANNE A MULLER T;	10/11/1989	FIS	1.950AF		0 041N-116W-06-SESW	37664	CR CR15/104
P30348.0D	MECHEM SUPPLY DITCH	THOMAS O. III AND ANNE A. MULLER;	10/11/1989	FIS, RES	1.000		0 041N-116W-06-SESW	37630	CR CC81/368
P11094.0S	CASE STOCK RESERVOIR	DOUGLAS CASE;	09/10/1990	STO	0.010AF		0 041N-116W-06-SWNE	36186	CR CR13/223
P30684.0D	MERRELL PIPELINE	ORVIL C. AND CLAUDINE C. MERRELL;	09/24/1990	IRR_SW	0.029	2	039N-116W-02-SWSW	36367	CR CC79/296
P7011.0E	ENL. BENNIE L. LINN DITCH	BEATRICE GUTHRIE;	03/04/1991	FIS, RES	5.900		0 041N-116W-06-SWSE		CR CC79/297
P7012.0E	ENL. BENNIE L. LINN DITCH	DANIEL R AND PHYLLIS R FISCHEL;	03/04/1991	FIS, RES	5.900		0 041N-116W-06-SWSE		CR CC79/298
P9716.0R	GUTHRIE NO. 1 RESERVOIR	BEATRICE GUTHRIE;	03/04/1991	FIS	1.120AF		0 041N-116W-06-SWNE	36406	CR CR13/316
P9717.0R	GUTHRIE NO. 2 RESERVOIR	BEATRICE GUTHRIE;	03/04/1991	FIS	0.040AF		0 041N-116W-06-SESW	36407	CR CR13/317
P9718.0R	FISCHEL NO. 1 RESERVOIR	DANIEL R. AND PHYLLIS R. FISCHEL;	03/04/1991	FIS	6.790AF		0 041N-116W-07-NWNW	36408	CR CR13/318
P9719.0R	FISCHEL NO. 2 RESERVOIR	DANIEL R. AND PHYLLIS R. FISCHEL;	03/04/1991	FIS	0.900AF		0 041N-116W-07-NWNW	36409	CR CR13/319
P7053.0E	ENL. SNAKE RIVER DITCH	JACKSON HOLE LAND TRUST;	04/28/1991	RES	12.660		0 041N-117W-24-SESW	38997	CR CC84/125
P30970.0D	SAPP PIPELINE	V. ALEX AND DEBORAH SAPP;	07/10/1992	DOM_SW	0.090		0 039N-116W-27-NESE	36551	CR CC80/085
P11689.0S	RIVER HOLLOW STOCK RESERVOIR	RIVER HOLLOW, INC.;	08/06/1992	STO	7.810AF		0 041N-117W-23-NESE	36677	CR CR13/489
P7084.0E	ENL. DELAND DITCH	275 REED DRIVE LLC; PAULINE F AUL IRREVOCABLE 2012 TRUST; BRUCE AND SANDRA SENNETT TULLY; ROBERT L AND PATRICIA D GILL FAMILY LIVING TRUSTS;	06/21/1993	FTH, RES			0 043N-116W-36-SENW	42552	CR CC95/206
P10012.0R	REED NO. 1 RESERVOIR	275 REED DRIVE LLC; PAULINE F AUL IRREVOCABLE TRUST;	06/21/1993	FIS	4.600AF		0 042N-116W-15-NENW	42596	CR CR24/049
P10013.0R	REED NO. 2 RESERVOIR	BRUCE TULLY AND SANDRA SENNETT TULLY;	06/21/1993	FIS	4.510AF		0 042N-116W-15-SENW	42597	CR CR24/050
P10014.0R	REED NO. 3 RESERVOIR	ROBERT L GILL AND PATRICIA D GILL FAMILY LIVING TR;	06/21/1993	FIS	0.500AF		0 042N-116W-15-NWSW	42598	CR CR24/051
P11783.0S	RIVER HOLLOW NO 1 STOCK RESERVOIR	RIVER HOLLOW HOMEOWNERS ASSOCIATION INC;	06/24/1993	STO	0.140AF		0 041N-117W-23-		CR CR16/320
P11784.0S	RIVER HOLLOW NO 2 STOCK RESERVOIR	RIVER HOLLOW HOMEOWNERS ASSOCIATION INC;	06/24/1993	STO	0.140AF		0 041N-117W-23-		CR CR16/321
P11786.0S	RIVER HOLLOW NO 4 STOCK RESERVOIR	RIVER HOLLOW HOMEOWNERS ASSOCIATION INC;	06/24/1993	STO	0.140AF		0 041N-117W-23-		CR CR16/322
P11785.0S	RIVER HOLLOW NO. 3 STOCK RESERVOIR	RIVER HOLLOW, INC.;	06/24/1993	STO	0.140AF		0 041N-117W-23-	36943	CR CR14/159
P11787.0S	RIVER HOLLOW NO. 2 (A) STOCK	LESLYE HARDIE;	07/15/1993	STO	0.050AF		0 041N-117W-23-SESW	36944	CR CR14/160

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Permit No.	Facility Name	Appropriator	Priority	Use	C.F.S/AF	Acres	HG LOC	Proof No.	CR No.
P10137.0R	RESERVOIR TUCKER RANCH NO. 1 RESERVOIR	TUCKER RANCH LP, A WYOMING PARTNERSHIP;	09/13/1993	WET	0.700AF		0 041N-117W-12-SESW	37100	CR CR14/255
P10138.0R	TUCKER RANCH NO. 2 RESERVOIR	TUCKER RANCH LP, A WYOMING PARTNERSHIP;	09/13/1993	WET	7.750AF		0 041N-117W-12-SESW	37101	CR CR14/256
P10139.0R	TUCKER RANCH NO. 3 RESERVOIR	TUCKER RANCH LP, A WYOMING PARTNERSHIP;	09/13/1993	WET	2.050AF		0 041N-117W-12-SESW	37102	CR CR14/257
P10140.0R	TUCKER RANCH NO. 4 RESERVOIR	TUCKER RANCH LP, A WYOMING PARTNERSHIP;	09/13/1993	WET	0.800AF		0 041N-117W-12-SESW	37103	CR CR14/258
P10141.0R	TUCKER RANCH NO. 5 RESERVOIR	TUCKER RANCH LP, A WYOMING PARTNERSHIP;	09/13/1993	WET	0.750AF		0 041N-117W-12-SESW	37104	CR CR14/259
P10142.0R	TUCKER RANCH NO. 6 RESERVOIR	TUCKER RANCH LP, A WYOMING PARTNERSHIP;	09/13/1993	WET	3.350AF		0 041N-117W-12-SESW	37105	CR CR14/260
P10143.0R	TUCKER RANCH NO. 7 RESERVOIR	TUCKER RANCH LP, A WYOMING PARTNERSHIP;	09/13/1993	WET	0.900AF		0 041N-117W-12-SESW	37106	CR CR14/261
P10144.0R	TUCKER RANCH NO. 8 RESERVOIR	TUCKER RANCH LP, A WYOMING PARTNERSHIP;	09/13/1993	WET	2.200AF		0 041N-117W-12-SESW	37107	CR CR14/262
P10145.0R	TUCKER RANCH NO. 9 RESERVOIR	TUCKER RANCH LP, A WYOMING PARTNERSHIP;	09/13/1993	WET	0.600AF		0 041N-117W-12-SESW	37108	CR CR14/263
P10146.0R	TUCKER RANCH NO. 10 RESERVOIR	TUCKER RANCH LP, A WYOMING PARTNERSHIP;	09/13/1993	WET	1.400AF		0 041N-117W-12-SESW	37109	CR CR14/264
P10147.0R	TUCKER RANCH NO. 11 RESERVOIR	TUCKER RANCH LP, A WYOMING PARTNERSHIP;	09/13/1993	WET	0.850AF		0 041N-117W-12-SESW	37110	CR CR14/265
P10148.0R	TUCKER RANCH NO. 12 RESERVOIR	TUCKER RANCH LP, A WYOMING PARTNERSHIP;	09/13/1993	WET	1.100AF		0 041N-117W-13-NENW	37111	CR CR14/266
P10149.0R	TUCKER RANCH NO. 13 RESERVOIR	TUCKER RANCH LP, A WYOMING PARTNERSHIP;	09/13/1993	WET	0.400AF		0 041N-117W-12-SESW	37112	CR CR14/267
P10150.0R	TUCKER RANCH NO. 14 RESERVOIR	TUCKER RANCH LP, A WYOMING PARTNERSHIP;	09/13/1993	WET	0.950AF		0 041N-117W-13-NENW	37113	CR CR14/268
P10151.0R	TUCKER RANCH NO. 15 RESERVOIR	TUCKER RANCH LP, A WYOMING PARTNERSHIP;	09/13/1993	WET	0.850AF		0 041N-117W-13-NENW	37114	CR CR14/269
P10152.0R	TUCKER RANCH NO. 16 RESERVOIR	TUCKER RANCH LP, A WYOMING PARTNERSHIP;	09/13/1993	WET	0.700AF		0 041N-117W-13-NENW	37115	CR CR14/270
P10153.0R	TUCKER RANCH NO. 17 RESERVOIR	TUCKER RANCH LP, A WYOMING PARTNERSHIP;	09/13/1993	WET	0.900AF		0 041N-117W-12-SESW	37116	CR CR14/271
P10154.0R	TUCKER RANCH NO. 18 RESERVOIR	TUCKER RANCH LP, A WYOMING PARTNERSHIP;	09/13/1993	WET	0.450AF		0 041N-117W-12-SESW	37117	CR CR14/272
P10155.0R	TUCKER RANCH NO. 19 RESERVOIR	TUCKER RANCH LP, A WYOMING PARTNERSHIP;	09/13/1993	WET	0.350AF		0 041N-117W-12-SESW	37118	CR CR14/273
P10156.0R	TUCKER RANCH NO. 20 RESERVOIR	TUCKER RANCH LP, A WYOMING PARTNERSHIP;	09/13/1993	WET	0.450AF		0 041N-117W-12-SESW	37119	CR CR14/274
P10157.0R	TUCKER RANCH NO. 21 RESERVOIR	TUCKER RANCH LP, A WYOMING PARTNERSHIP;	09/13/1993	WET	1.850AF		0 041N-117W-13-NENW	37120	CR CR14/275
P10158.0R	TUCKER RANCH NO. 22 RESERVOIR	TUCKER RANCH LP, A WYOMING PARTNERSHIP;	09/13/1993	WET	1.750AF		0 041N-117W-13-NENW	37121	CR CR14/276
P10159.0R	TUCKER RANCH NO. 23 RESERVOIR	TUCKER RANCH LP, A WYOMING PARTNERSHIP;	09/13/1993	FIS, WET	145.690AF		0 041N-117W-13-NENW	37122	CR CR14/277
P10160.0R	TUCKER RANCH NO. 24 RESERVOIR	TUCKER RANCH LP, A WYOMING PARTNERSHIP;	09/13/1993	FIS, WET	269.530AF		0 041N-117W-13-NENW	37123	CR CR14/278
P7115.0E	ENL. BENNIE L. LINN DITCH	TUCKER RANCH LP, A WYOMING PARTNERSHIP;	09/13/1993	RES	17.980		0 041N-116W-06-SESW	37088	CR CC81/100
P7092.0E	ENL. DELAND DITCH	THOMAS MANGELSEN;	03/28/1994	RES	9.800		0 043N-116W-36-SESW		CR CC84/010
P10043.0R	MANGELSEN FISHING PRESERVE	THOMAS MANGELSEN;	03/28/1994	DOM_SW, FIS	2.700AF		0 042N-116W-02-NESEW	38849	CR CR16/308
P11963.0S	WOLFENSOHN NO. 1 STOCK RESERVOIR	JAMES WOLFENSOHN;	04/29/1994	STO	0.220AF		0 042N-116W-32-SWNE	37644	CR CR15/084
P11964.0S	WOLFENSOHN NO. 2 STOCK RESERVOIR	JAMES WOLFENSOHN;	04/29/1994	STO	0.200AF		0 042N-116W-32-SWNE	37645	CR CR15/085
P11965.0S	WOLFENSOHN NO. 3 STOCK RESERVOIR	JAMES WOLFENSOHN;	04/29/1994	STO	0.210AF		0 042N-116W-32-SWNE	37646	CR CR15/086
P11966.0S	WOLFENSOHN'S NO. 4 STOCK RESERVOIR	JAMES WOLFENSOHN;	04/29/1994	STO	0.250AF		0 042N-116W-32-SWNE	37647	CR CR15/087
P11967.0S	WOLFENSOHN'S NO. 5 STOCK RESERVOIR	JAMES WOLFENSOHN;	04/29/1994	STO	0.180AF		0 042N-116W-32-NWSE	37648	CR CR15/088
P11968.0S	WOLFENSOHN'S NO. 6 STOCK RESERVOIR	JAMES WOLFENSOHN;	04/29/1994	STO	0.360AF		0 042N-116W-32-NWSE	37649	CR CR15/089
P11969.0S	WOLFENSOHN'S NO. 7 STOCK	JAME WOLFENSOHN;	04/29/1994	STO	0.300AF		0 042N-116W-32-NWSE	37650	CR CR15/090

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Permit No.	Facility Name	Appropriator	Priority	Use	C.F.S/AF	Acres	HG LOC	Proof No.	CR No.
P11970.0S	RESERVOIR WOLFENSOHN'S NO. 8 STOCK RESERVOIR	JAMES WOLFENSOHN;	04/29/1994	STO	0.140AF		0 042N-116W-32-NWSE	37651	CR CR15/091
P10133.0R	MICHAEL'S LANDSCAPING RESERVOIR	MICHAEL'S FAMILY ESTATE;	06/30/1994	REC	4.810AF		0 042N-116W-10-SWSE	37652	CR CR15/092
P7112.0E	ENL. DELAND DITCH	MICHAEL'S FAMILY ESTATE;	06/30/1994	REC, RES	4.810		0 043N-116W-36-SENW		CR CC81/348
P12107.0S	CHRISTY BALL STOCK RESERVOIR	CHRISTY ANNE BALL;	09/30/1994	STO	3.800AF		0 040N-116W-19-NWSW	37653	CR CR15/093
P10368.0R	NOVACK NO. 2 RESERVOIR	RONALD S AND ROSE J NOVAK;	10/24/1994	FIS	0.970AF		0 041N-117W-12-NWSE	38031	CR CR15/282
P10369.0R	NOVACK NO. 1 RESERVOIR	RONALD S AND ROSE J NOVAK;	10/24/1994	FIS	1.750AF		0 041N-117W-12-NWSE	38032	CR CR15/283
P7154.0E	ENL. BENNIE L. LINN DITCH	RONALD S. AND ROSE J. NOVAK;	10/24/1994	FIS, RES	0.050		0 041N-116W-06-SWNE	38011	CR CC82/148
P7153.0E	ENL. BENNIE L. LINN DITCH	JOHN O. AND NANCY M. CARNEY J;	10/24/1994	RES	6.100		0 041N-116W-06-SESW	38998	CR CC84/126
P10370.0R	CARNEY RESERVOIR	JOHN O. AND NANCY M. CARNEY J;	10/24/1994	FIS	0.780AF		0 041N-117W-12-NWSE		CR CR16/362
P12187.0S	HHR STOCK RESERVOIR	THE LAZY J A LLC;	05/22/1995		0.000AF		041N-117W-23-SWNW	37142	CR CR14/297
P7139.0E	ENL. OF ALASKA DITCH	FALL CREEK ASSOCIATES; SEWELL PARTNERS; STATE BOARD OF LAND COMMISSIONERS;	05/25/1995	IRR_SW	3.626 ORI SUP	250	040N-117W-14-SESW	37089	CR CC81/101
P12536.0S	M R B NO.1 STOCK RESERVOIR	MAURICE BARNEY;	08/21/1995	STO	1.590AF		0 041N-117W-26-NWSW	37124	CR CR14/279
P12537.0S	M R B NO. 2 STOCK RESERVOIR	MAURICE BARNEY;	08/21/1995	STO	0.590AF		0 041N-117W-26-NWSW	37125	CR CR14/280
P10417.0R	BILLY WELLS RESERVOIR	L RICHARD AND CAROLYN D EDGEComb;	09/25/1995	IRR_SW	0.850AF		0 038N-116W-05-SENW	37654	CR CR15/094
P7165.0E	ENL. BILLY WELLS DITCH	L RICHARD AND CAROLYN D EDGEComb;	09/25/1995	IRR_SW, RES	1.300	91.3	038N-116W-05-NENW	37611	CR CC81/349
P10459.0R	ANDREWS RESERVOIR	BILL AND CAROL ANDREWS;	06/17/1996	FIS	3.750AF		0 041N-117W-26-	38034	CR CR15/285
P10501.0R	FLAT CREEK FISHING CLUB NO. 1	JOEL M AND MELISSA G EASTMAN;	06/21/1996	FIS	0.940AF		0 040N-116W-20-NWSW	38677	CR CR16/216
P10502.0R	FLAT CREEK FISHING CLUB NO. 2	JOSEPH AND LYNETTE K. SHANAGHY;	06/21/1996	FIS	0.940AF		0 040N-116W-20-NWSW	38678	CR CR16/217
P10503.0R	FLAT CREEK FISHING CLUB NO. 3	RICHARD MCKAY;	06/21/1996	FIS	1.310AF		0 040N-116W-20-NWSW	38679	CR CR16/218
P10504.0R	FLAT CREEK FISHING CLUB NO. 4	DAVID AND PATRICA TAYLOR;	06/21/1996	FIS	1.230AF		0 040N-116W-20-NWSW	38680	CR CR16/219
P10505.0R	FLAT CREEK FISHING CLUB NO. 5	BRET AND SUSAN KING;	06/21/1996	FIS	1.020AF		0 040N-116W-20-NESW	38681	CR CR16/220
P10506.0R	FLAT CREEK FISHING CLUB NO. 6	WOUTER J.P. SYLMANS AND WILHELMINA B. VON ELDIK;	06/21/1996	FIS	1.290AF		0 040N-116W-20-SWSW	38682	CR CR16/221
P10787.0R	RIVER HOLLOW NO. 1 RESERVOIR	RIVER HOLLOW HOMEOWNERS ASSOCIATION, INC.;	08/21/1996	WET	1.210AF		0 041N-117W-23-SESW	38851	CR CR16/310
P10788.0R	RIVER HOLLOW NO. 2	RIVER HOLLOW HOMEOWNERS ASSOCIATION, INC.;	08/21/1996	WET	2.110AF		0 041N-117W-23-SESW	38852	CR CR16/311
P10789.0R	RIVER HOLLOW NO. 15	RIVER HOLLOW HOMEOWNERS ASSOCIATION, INC.;	08/21/1996	WET	0.420AF		0 041N-117W-23-SESW	38853	CR CR16/312
P10597.0R	ENL. PINES NO. 8 RESERVOIR	TETON PINES LIMITED LIABILITY COMPANY;	05/08/1997	REC	33.480AF		0 041N-117W-14-NENE	37799	CR CR15/162
P10598.0R	ENL. PINES NO. 9 RESERVOIR	TETON PINES LIMITED LIABILITY COMPANY;	05/08/1997	REC	8.820AF		0 041N-117W-11-NESE	37800	CR CR15/163
P10614.0R	PINES NO. 26 RESERVOIR	TETON PINES LIMITED LIABILITY COMPANY;	05/08/1997	REC	0.280AF		0 041N-117W-14-NENW	37823	CR CR15/186
P10606.0R	PINES NO. 18 RESERVOIR	TETON PINES LIMITED LIABILITY COMPANY;	05/08/1997	REC	2.800AF		0 041N-117W-11-SWSE	37830	CR CR15/193
P10608.0R	PINES NO. 20 RESERVOIR	TETON PINES LIMITED LIABILITY COMPANY;	05/08/1997	REC	0.370AF		0 041N-117W-14-NWNE	37832	CR CR15/195
P10609.0R	PINES NO. 21 RESERVOIR	TETON PINES LIMITED LIABILITY COMPANY;	05/08/1997	REC	0.730AF		0 041N-117W-14-SWNE	37833	CR CR15/196
P10610.0R	PINES NO. 22 RESERVOIR	TETON PINES LIMITED LIABILITY COMPANY;	05/08/1997	REC	8.930AF		0 041N-117W-14-SWNE	37834	CR CR15/197
P10611.0R	PINES NO. 23 RESERVOIR	TETON PINES LIMITED LIABILITY COMPANY;	05/08/1997	REC	1.100AF		0 041N-117W-14-SWNE	37835	CR CR15/198
P10612.0R	PINES NO. 24 RESERVOIR	TETON PINES LIMITED LIABILITY COMPANY;	05/08/1997	REC	1.100AF		0 041N-117W-14-SWNE	37836	CR CR15/199
P10613.0R	PINES NO. 25 RESERVOIR	TETON PINES LIMITED LIABILITY COMPANY;	05/08/1997	REC	1.050AF		0 041N-117W-11-SWSE	37837	CR CR15/200
P10615.0R	PINES NO. 27 RESERVOIR	TETON PINES LIMITED LIABILITY COMPANY;	05/08/1997	REC	0.150AF		0 041N-117W-11-SESE	37802	CR CR15/165
P7212.0E	ENL. VAN WINKLE DITCH	TETON PINES LLC;	05/08/1997	RES	33.100		0 041N-116W-06-SENE		CR CC81/446
P10644.0R	WEST SOLITUDE NO. 1 RESERVOIR	CATHERINE CHRISTIE BUSCH TRUST; MICHAEL BUSCH TRUST; JAMES CHRISTIE BUSCH TRUST; SHANE BURKE BUSCH TRUST;	06/02/1997	FIS, WET	2.880AF		0 042N-116W-09-NENW	39988	CR CR18/190
P10647.0R	WEST SOLITUDE NO. 4 RESERVOIR	EDWIN L. ARTZT REVOCABLE TRUST;	06/02/1997	FIS, WET	2.820AF		0 042N-116W-09-NESE	39989	CR CR18/191

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Permit No.	Facility Name	Appropriator	Priority	Use	C.F.S/AF	Acres	HG LOC	Proof No.	CR No.
P10648.0R	WEST SOLITUDE NO. 5 RESERVOIR	EDWIN L. ARTZT REVOCABLE TRUST;	06/02/1997	FIS	1.560AF		0 042N-116W-09-NESE	39990	CR CR18/192
P10646.0R	WEST SOLITUDE NO. 3 RESERVOIR	EDWIN L ARTZT REVOCABLE TRUST; G BRENT AND KAREN A BACKMAN;	06/02/1997	FIS, WET	3.060AF		0 042N-116W-09-	40236	CR CR19/027
P10700.0R	PIPER RESERVOIR	PAUL AND SHIRLEY PIPER;	06/30/1998	FIS	0.060AF		0 041N-117W-12-	38033	CR CR15/284
P10831.0R	BROYLES RESERVOIR	NOKES WYOMING LLC;	10/19/1998	FIS	2.980AF		0 041N-117W-27-NENE	41373	CR CR22/112
P13084.0S	PACHOE NO.1 STOCK RESERVOIR	STEVEN E. AND ALLISON PACHOE;	11/09/1998	STO	3.640AF		0 041N-117W-34-NENE	38324	CR CR16/042
P10790.0R	RIVER HOLLOW NO. 5	RIVER HOLLOW HOMEOWNERS ASSOCIATION, INC.;	11/18/1998	WET	2.150AF		0 041N-117W-23-SESW	38854	CR CR16/313
P10791.0R	RIVER HOLLOW NO. 6	RIVER HOLLOW HOMEOWNERS ASSOCIATION, INC.;	11/18/1998	WET	3.840AF		0 041N-117W-23-SESW	38855	CR CR16/314
P32488.0D	BENSON PIPELINE	DENNIS BENSON;	07/19/1999	DSP	0.010		0 039N-116W-03-SESE	38556	CR CC83/116
P11110.0R	JHLT RESERVOIR	JACKSON;	10/21/1999	FIS	27.010AF		0 041N-117W-22-NESE		CR CR16/374
P11058.0R	KENT RESERVOIR	HAUB REVOCABLE TRUST;	11/17/1999	WET, WL	5.800AF		0 041N-117W-23-SWSW	41372	CR CR22/111
P7292.0E	ENL. PROSPERITY DITCH	HAUB REVOCABLE TRUST;	11/17/1999	FTH, RES	11.980		0 041N-117W-23-SWSW	41351	CR CC94/022
P10999.0R	FURRER NO. 1	JOHN R. AND ANNIE W. FURRER;	02/24/2000	FIS, REC	0.010AF		0 041N-117W-12-SWNE	38856	CR CR16/315
P11000.0R	FURRER NO. 2	JOHN R. AND ANNIE W. FURRER;	02/24/2000	FIS, REC	0.020AF		0 041N-117W-12-SWNE	38857	CR CR16/316
P11001.0R	FURRER NO. 3	JOHN R. AND ANNIE W. FURRER;	02/24/2000	FIS, REC	0.330AF		0 041N-117W-12-SWNE	38858	CR CR16/317
P11150.0R	HHR-1 RESERVOIR	THE LAZY J A LIMITED LIABILITY COMPANY;	05/11/2000	FIS, REC, WET, WL	12.910AF		0 041N-117W-22-NENE	38573	CR CR16/159
P11151.0R	HHR-2 RESERVOIR	THE LAZY J A LIMITED LIABILITY COMPANY;	05/11/2000	FIS, REC, WET, WL	15.750AF		0 041N-117W-22-SENE	38574	CR CR16/160
P11153.0R	HHR-4 RESERVOIR	THE LAZY J A LIMITED LIABILITY COMPANY;	05/11/2000	FIS, REC, WET, WL	19.350AF		0 041N-117W-23-SWNW	38577	CR CR16/163
P11154.0R	HHR-5 RESERVOIR	THE LAZY J A LIMITED LIABILITY COMPANY;	05/11/2000	FIS, REC, WET, WL	7.490AF		0 041N-117W-23-SWNW	38578	CR CR16/164
P11155.0R	HHR-6 RESERVOIR	THE LAZY J A LIMITED LIABILITY COMPANY;	05/11/2000	FIS, REC, WET, WL	24.900AF		0 041N-117W-23-SWNW	38579	CR CR16/165
P11156.0R	HHR-7 RESERVOIR	THE LAZY J A LIMITED LIABILITY COMPANY;	05/11/2000	FIS, REC, WET, WL	7.500AF		0 041N-117W-23-SWNW	38580	CR CR16/166
P11157.0R	HHR-8 RESERVOIR	THE LAZY J A LIMITED LIABILITY COMPANY;	05/11/2000	FIS, REC, WET, WL	15.590AF		0 041N-117W-23-SWNW	38581	CR CR16/167
P11158.0R	HHR-9 RESERVOIR	THE LAZY J A LIMITED LIABILITY COMPANY;	05/11/2000	FIS, REC, WET, WL	1.330AF		0 041N-117W-22-SENE	38582	CR CR16/168
P11159.0R	HHR-10 RESERVOIR	THE LAZY J A LIMITED LIABILITY COMPANY;	05/11/2000	FIS, REC, WET, WL	5.830AF		0 041N-117W-22-SENE	38583	CR CR16/169
P11160.0R	HHR-11 RESERVOIR	THE LAZY J A LIMITED LIABILITY COMPANY;	05/11/2000	FIS, REC, WET, WL	5.220AF		0 041N-117W-22-SENE	38584	CR CR16/170
P11163.0R	HHR-14 RESERVOIR	THE LAZY J A LIMITED LIABILITY COMPANY;	05/11/2000	FIS, REC, WET, WL	4.960AF		0 041N-117W-23-SWNW	38585	CR CR16/171
P11161.0R	HHR-12 RESERVOIR	THE LAZY J A LIMITED LIABILITY COMPANY;	05/11/2000	FIS, REC, WET, WL	20.390AF		0 041N-117W-22-SWNE	38575	CR CR16/161
P11152.0R	HHR-3 RESERVOIR	THE LAZY J A LIMITED LIABILITY COMPANY;	05/11/2000	FIS, REC, WET, WL	0.770AF		0 041N-117W-23-SWNW	38576	CR CR16/162
P7310.0E	ENL. BENNIE L. LINN DITCH	THE LAZY J A LIMITED LIABILITY COMPANY;	05/11/2000	FTH, RES	1.500		0 041N-116W-06-SWSE	38557	CR CC83/117
P7312.0E	ENL. VAN WINKLE DITCH	THE LAZY J A LIMITED LIABILITY COMPANY;	05/11/2000	FTH, RES	1.500		0 041N-116W-06-SENE	38558	CR CC83/118
P11099.0R	WEST SOLITUDE NO. 6 RESERVOIR	EDWIN L. ARTZT REVOCABLE TRUST;	08/08/2000	FIS	0.860AF		0 042N-116W-09-NESE	39991	CR CR18/193
P11120.0R	WOMACK RESERVOIR	CARL WOODSON WOMACK AND MARIA EDITH WOMACK TRUST;	09/26/2000	OTH	0.320AF		0 042N-116W-10-NWSW	38859	CR CR16/318
P7315.0E	ENL. CRESCENT H RANCH SUPPLY DITCH	J CLIFFORD AND TRACY FORREST;	11/30/2000	FTH, RES	13.300		0 040N-117W-03-NWSW	40567	CR CC91/121
P11188.0R	ENL. CRESCENT H RANCH RESERVOIR	J CLIFFORD AND TRACY FORREST;	11/30/2000	FIS	1.540AF		0 040N-117W-03-NESW	40579	CR CR20/043
P7316.0E	ENL. AUGUST CHRISTIANSEN DITCH	BALKANSKI FAMILY TRUST 2002; JHG REALTY LLC;	12/19/2000	FTH, RES			0 041N-117W-24-SESW	42311	CR CC95/079
P11212.0R	HUNT NO. 1 RESERVOIR	BALKANSKI FAMILY TRUST 2002;	12/19/2000	CMU, FIS, REC	4.110AF		0 041N-117W-35-NESE	42368	CR CR23/317
P11213.0R	HUNT NO. 2 RESERVOIR	BALKANSKI FAMILY TRUST 2002;	12/19/2000	CMU, FIS, REC	0.220AF		0 041N-117W-35-NESE	42369	CR CR23/318
P11214.0R	HUNT NO. 3 RESERVOIR	BALKANSKI FAMILY TRUST 2002; JHG REALTY LLC;	12/19/2000	CMU, FIS, REC	3.510AF		0 041N-117W-35-NESE	42370	CR CR23/319
P11144.0R	TAYLOR RESIDENCE-WILDLIFE PRESERVE	AGREEMENT OF TRUST OF KENNETH H TAYLOR JR.;	01/25/2001	WL	0.160AF		0 040N-117W-03-	41895	CR CR23/122
P11222.0R	DAY RESIDENCE - WILDLIFE PRESERVE	TIMOTHY DAY;	01/25/2001	OTH, WL	0.270AF		0 041N-116W-06-SENW	39818	CR CR18/131

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Permit No.	Facility Name	Appropriator	Priority	Use	C.F.S/AF	Acres	HG LOC	Proof No.	CR No.
P11244.0R	LIVINGOOD NO. 1	JODI LIVINGOOD REVOCABLE TRUST;	10/12/2001	WET	1.480AF		0 041N-117W-26-SENW	39088	CR CR17/018
P11245.0R	LIVINGOOD NO. 2	JODI LIVINGOOD REVOCABLE TRUST;	10/12/2001	WET	0.770AF		0 041N-117W-26-SENW	39089	CR CR17/019
P11246.0R	LIVINGOOD NO. 3	JODI LIVINGOOD REVOCABLE TRUST;	10/12/2001	WET	0.720AF		0 041N-117W-26-SENW	39090	CR CR17/020
P11247.0R	LIVINGOOD NO. 4	JODI LIVINGOOD REVOCABLE TRUST;	10/12/2001	REC	0.020AF		0 041N-117W-26-SENW	39091	CR CR17/021
P11250.0R	FELDMAN RANCH RESERVOIR	MARK AND MARCIE FELDMAN TRUST;	03/21/2002	FIS	14.200AF		0 041N-117W-26-SWSW	39397	CR CR17/161
P11853.0R	SHERMAN NO. 1	SHERMAN FAMILY LIVING TRUST;	07/10/2003	REC	0.039AF		0 042N-116W-10-NWSW	41898	CR CR23/125
P11854.0R	SHERMAN NO. 2	SHERMAN FAMILY LIVING TRUST;	07/10/2003	REC	0.011AF		0 042N-116W-10-NWSW	41899	CR CR23/126
P11855.0R	SHERMAN NO. 3	SHERMAN FAMILY LIVING TRUST;	07/10/2003	REC	0.019AF		0 042N-116W-10-NWSW	41900	CR CR23/127
P12761.0R	OHNMEIS RESERVOIR	KEITH OHNMEIS;	08/04/2003	FIS	0.410AF		0 041N-117W-23-SESW	39993	CR CR18/195
P12188.0R	LETSON RESERVOIR	ALAN D. AND SUSAN R. LETSON RESIDENCE TRUST AGREEM;	03/18/2004	FIS, REC	2.380AF		0 042N-116W-10-SWNE	39398	CR CR17/162
P7435.0E	ENL. DELAND DITCH	ALAN AND SUSAN LETSON RESIDENCE TRUST;	03/18/2004	RES	9.040		0 043N-116W-36-SENW	39387	CR CC85/144
P11907.0R	JOHNSON RESERVOIR	ARGAND HOLDINGS WY LLC;	04/29/2004	FIS, WL	3.700AF		0 042N-116W-10-SWNE	40537	CR CR19/179
P7434.0E	ENL. GRANITE CREEK SUPPLEMENTAL DITCH	GRANITE CREEK PARTNERSHIP LLC; JACKSON HOLE LAND TRUST;	05/05/2004	IRR_SW, STO	0.056 ORI		0 042N-116W-09-SWNE	42312	CR CC95/080
P11768.0R	WAGGONER RESERVOIR	LYLE AND SHARON WAGGONER INTER VIVOS REV TRUST;	05/10/2004	CMU, FIS, WET	2.800AF		0 041N-117W-36-SWNW	41374	CR CR22/113
P12101.0R	GIFFORD NO. 1 RESERVOIR	VIRGINIA GIFFORD;	02/24/2005	WL	1.040AF		0 042N-116W-10-NWNE	39992	CR CR18/194
P12126.0R	GRANITE RANCH A RESERVOIR	GRANITE CREEK PARTNERSHIP LLC;	03/24/2005	CMU, FIS, REC, STO	7.150AF		0 042N-116W-19-SENE	42374	CR CR23/323
P12127.0R	GRANITE RANCH B RESERVOIR	GRANITE CREEK PARTNERSHIP LLC;	03/24/2005	CMU, FIS, REC, STO	0.070AF		0 042N-116W-19-SENE	42375	CR CR23/324
P12147.0R	ENL. TAYLOR RESIDENCE WILDLIFE PRESERVE	AGREEMENT OF TRUST OF KENNETH H TAYLOR JR.;	04/25/2005	WL	0.540AF		0 040N-117W-03-NESW	41896	CR CR23/123
P12172.0R	HARTMAN NO. 1 RESERVOIR		06/06/2005	FIS, WET	1.030AF		0 042N-116W-22-SWSW	40536	CR CR19/178
P7438.0E	ENL. GRANITE CREEK SUPPLEMENTAL DITCH	GRANITE CREEK PARTNERSHIP LLC;	07/05/2005	FTH, RES			0 042N-116W-09-SWNE	42313	CR CC95/081
P12323.0R	SHIRLEY NO.1 FISHING PRESERVE RESERVOIR	SHIRLEY FAMILY TRUST;	07/29/2005	FIS	1.100AF		0 042N-116W-10-NENW	40916	CR CR21/013
P12328.0R	EWING YODLER RESERVOIR	JOHN L III AND BARBARA E NAU T;	11/09/2005	FIS	2.860AF		0 042N-116W-20-NWSE	42376	CR CR23/325
P34413.0D	PHOSPHORIA DITCH	FALL CREEK ASSOCIATES AND PHOSPHORIA LLC; DAVID OCONNOR TRUST;	08/24/2010	REC, STO	45.980		0 040N-117W-14-SWSE	41851	CR CC94/266
P13793.0R	GIVENS	JACKSON HOLE RANCH 2 LLC;	03/28/2011	REC	0.260AF		0 042N-116W-03-SESE	41897	CR CR23/124
P7693.0E	ENL. GRANITE CREEK SUPPLEMENTAL DITCH	NEW MORAINNE LLC AND SNAKE RIVER ASSOCIATES;	07/20/2011	FTH, RES	0.000		0 042N-116W-09-SWNE	41129	CR CC93/084
P7717.0E	ENL. WALTON DITCH	FINTAN D RYAN;	03/30/2012	FTH, RES			0 041N-116W-07-NESW	42310	CR CC95/078
P14076.0R	CHIMNEY	PHOSPHORIA LLC;	05/25/2012	CMU, FIS, REC, STO	4.890AF		0 040N-117W-23-SENW	41914	CR CR23/141
P7730.0E	ENL. ALASKA DITCH	PHOSPHORIA LLC;	05/25/2012	FTH, RES	0.000		0 040N-117W-14-NWSW	41852	CR CC94/267
P14002.0R	VINCENT'S RESERVOIR	FINTAN D RYAN; THE NATURE CONSERVANCY;	11/13/2012	WL	18.410AF		0 041N-117W-25-SWNE	42366	CR CR23/315
P7766.0E	ENL. BILLY WELLS DITCH	CYGNUS CAPITAL INC SNAKE RIVER BEND RANCH LLC;	08/21/2013	FTH, REC, RES, WET			0 038N-116W-05-NENW	42314	CR CC95/082
P14207.0R	BEAVER RESERVOIR	CYGNUS CAPITAL INC SNAKE RIVER BEND RANCH LLC;	08/21/2013	CMU, FIS, REC, STO	26.070AF		0 038N-116W-08-SWNE	42371	CR CR23/320
P14208.0R	HORSE RESERVOIR	CYGNUS CAPITAL INC;	08/21/2013	CMU, FIS, REC	2.260AF		0 038N-116W-08-NWNE	42372	CR CR23/321
P14209.0R	TRUMPETER RESERVOIR	CYGNUS CAPITAL INC;	08/21/2013	FIS, REC, WET	47.420AF		0 038N-116W-08-SWNE	42373	CR CR23/322
P7767.0E	ENL. GRANITE CREEK SUPPLEMENTAL DITCH	SNAKE RIVER ASSOCIATES LLC ET AL;	02/06/2014	REC, STO	390.000		0 042N-116W-09-SWNE	42315	CR CC95/083
P14268.0R	ENL. HUNT NO. 1 RESERVOIR	BALKANSKI FAMILY TRUST 2002;	05/02/2014	CMU, FIS, WL	0.840AF		0 041N-117W-35-NESE	42367	CR CR23/316
SOUTH BOONE CREEK, TRIBUTARIES OF BOONE CREEK, FALLS RIVER, HENRY'S FORK, SNAKE RIVER									
P20315.0D	WEAVER DITCH	WYOMING FUR AND LIVESTOCK DEVELOPMENT CO.;	10/10/1949	IRR_SW, STO	2.280	160	047N-118W-03-	26012	CR CC64/470
P20476.0D	PORTER DITCH	MILBURN PORTER;	08/09/1950	IRR_SW, STO	4.050	283.75	047N-118W-02-NESW	24641	CR CC62/168
P21586.0D	BOOM CREEK CANAL COMPANY DIVERSION AND HEADWORKS AND CANAL DITCH	BOOM CREEK CANAL COMPANY;	01/17/1955	IRR_SW	42.560	2979	047N-118W-02-SENW	36664	CR CC80/209

Permit No.	Facility Name	Appropriator	Priority	Use	C.F.S/AF	Acres	HG LOC	Proof No.	CR No.
HARVEY CROOK SPRING NO. 3, TRIBUTARIES OF CROOK DRAW, CEDAR DRAW, CEDAR CANYON CREEK, SALT RIVER, SNAKE RIVER									
P23764.0D	CROOK NO. 3 PIPE LINE	LOUIS RUSSELL AND EVELYN C STUART;	09/23/1970	STO	0.056	0	030N-118W-28-SWNE	36157	CR CC79/153
GRAHAM CREEK, TRIBUTARIES OF SALT RIVER, SNAKE RIVER									
P16155.0D	TEDDY DITCH	CHARLES GOMM;	07/20/1921	DOM_SW, IRR_SW	1.000	70	030N-118W-29-NWNE	18202	CR CC43/659
P30650.0D	ELLIOT SUPPLY DITCH	PAUL AND CAROL ELLIOT;	12/15/1989	RES	0.880	0	030N-118W-29-NWNE		CR CC78/314
P9644.0R	UPPER POND RESERVOIR	PAUL AND CAROL ELLIOT;	12/15/1989	FIS	0.650AF	0	030N-118W-29-NWNE	35927	CR CR13/125
P9645.0R	LOWER POND RESERVOIR	PAUL AND CAROL ELLIOT;	12/15/1989	FIS	0.090AF	0	030N-118W-29-NWNE	35928	CR CR13/126
LOWER GOMM SPRING, TRIBUTARIES OF GRAHAM CREEK, SALT RIVER, SNAKE RIVER									
P30651.0D	ELLIOT PIPELINE	PAUL AND CAROL ELLIOT;	12/15/1989	RES	0.430	0	030N-118W-29-NWNE		CR CC78/315
HARVEY CROOK SPRING NO. 4, TRIBUTARIES OF SALT RIVER, SNAKE RIVER									
P23765.0D	CROOK NO. 4 PIPE LINE	LOUIS RUSSELL AND EVELYN C STUART;	09/23/1970	STO	0.056	0	030N-118W-28-NWSW	36158	CR CC79/154
PARKIN SPRING NO. 1, TRIBUTARIES OF PARKIN SPRING CREEK, SALT RIVER, SNAKE RIVER									
P22226.0D	PARKIN PIPE LINE	RAYMOND M PARKIN LIVING TRUST;	11/01/1961	DOM_SW, STO	0.045	0	030N-118W-29-SWSE	37613	CR CC81/351
HORSE CREEK, TRIBUTARIES OF SALT RIVER, SNAKE RIVER									
P14318.0D	WM. MCCOY DITCH	WILLIAM MCCOY;	07/20/1916	DOM_SW, IRR_SW, STO	0.070	5	030N-118W-33-SWNE	17057	CR CC42/213
AUSTON SPRING, TRIBUTARIES OF LANCASTER DRAW, DELMAR LANCASTER SPRING NO. 2, SALT RIVER, SNAKE RIVER									
P17552.0D	PORTER PIPE LINE	DENNIS W AND LESLIE D LANCASTER;	03/27/1929	DOM_SW	0.023	0	030N-118W-33-NESE	37388	CR CC81/222
P7239.0E	ENLARGED PORTER PIPELINE	DENNIS W AND LESLIE D LANCASTER;	10/02/1998	DOM_SW, STO	0.105	0	030N-118W-33-NWSE	38234	CR CC82/310
DELANO LANCASTER SPRING NO. 1, TRIBUTARIES OF SALT RIVER, SNAKE RIVER									
P23771.0D	DELANO LANCASTER PIPE LINE NO. 1	LEVON LANCASTER;	09/23/1970	STO	0.056	0	030N-118W-32-SENE	36154	CR CC79/150
GREY'S RIVER, TRIBUTARIES OF SNAKE RIVER									
P18201.0D	YOUNG DITCH NO. 1	LORRAINE AND REX YOUNG;	06/15/1932	IRR_SW, STO	0.610	42.8	034N-116W-08-SWNW	36548	CR CC80/082
P21291.0D	YOUNG DITCH	SAM YOUNG J;	11/05/1953	IRR_SW	0.000	153.6	034N-116W-29-NWNE	25891	CR CC64/376
P11.0F	GREY'S RIVER INSTREAM FLOW SEGMENT 1	WYOMING WATER DEVELOPMENT COMMISSION;	10/08/1993			0	036N-117W-07-NWSW	38844	CR CC84/009
REESE'S SPRINGS, TRIBUTARIES OF GREY'S RIVER, SNAKE RIVER									
P10181.0D	LILLIE DITCH	Mrs D H REESE;	08/25/1910	DOM_SW, IRR_SW, STO	0.020	2	037N-118W-29-SWSE	12611	CR CC35/335

Permit No.	Facility Name	Appropriator	Priority	Use	C.F.S/AF	Acres	HG LOC	Proof No.	CR No.
PINE CREEK, TRIBUTARIES OF GREY'S RIVER, SNAKE RIVER									
P16203.0D	REESE DITCH	SARAH JANE REESE REEVES;	06/20/1921	IRR_SW	2.160	151.2	036N-119W-01-NWNW	19577	CR CC45/626
MILL CREEK SPRINGS AREA, TRIBUTARIES OF MILL CREEK, PINE CREEK, GREY'S RIVER, SNAKE RIVER									
P24104.0D	ALPINE WATER AND SEWAGE DISTRICT PIPELINE	TOWN OF ALPINE;	07/09/1973	MUN_SW	1.750	0	036N-119W-01-NWNW		CR CC80/420
P6910.0E	ENLARGED ALPINE WATER AND SEWAGE DISTRICT PIPELINE	TOWN OF ALPINE;	12/27/1985	MUN_SW	0.000	0	036N-119W-01-NWNW		CR CC80/421
GILLIS SPRING, TRIBUTARIES OF GREY'S RIVER, SNAKE RIVER									
P12664.0D	GILLIS DITCH	JOSEPH GILLIS;	08/20/1914	DOM_SW, IRR_SW, STO	0.070	5	037N-118W-32-NENE	21052	CR CC49/342
WATERDOG CREEK, TRIBUTARIES OF WATERDOG LAKE (A CLOSED BASIN), LITTLE GREY'S RIVER, GREY'S RIVER, SNAKE RIVER									
P34855.0D	WATERDOG CAMP SITE NO. 2	USDA FOREST SERVICE BRIDGER TETON NATIONAL FOREST;	04/25/2011	STO	0.056	0	037N-116W-36-SENE	42561	CR CC95/215
P34680.0D	WATERDOG CAMP SITE NO. 1 PIPELINE	USDA FOREST SERVICE BRIDGER TETON NATIONAL FOREST;	12/05/2011	DOM_SW	0.056	0	037N-116W-36-NWNE	42560	CR CC95/214
MCCAIN NO. 1 SPRING, TRIBUTARIES OF MCCAIN DRAW, MCCAIN NO. 3 DRAW, LITTLE GREY'S RIVER, GREY'S RIVER, SNAKE RIVER									
P19663.0S	MCCAIN NO. 1 STOCK RESERVOIR	USDA FOREST SERVICE BRIDGER TETON NATIONAL FOREST;	06/16/2010	STO	0.015AF	0	037N-116W-34-NESE	42610	CR CR24/063
MCCAIN NO. 3 SPRING, TRIBUTARIES OF MCCAIN NO. 3 DRAW, LITTLE GREY'S RIVER, GREY'S RIVER, SNAKE RIVER									
P19662.0S	MCCAIN NO. 3 STOCK RESERVOIR	USDA FOREST SERVICE BRIDGER TETON NATIONAL FOREST;	06/16/2010	STO	0.005AF	0	036N-116W-06-SWNE	42609	CR CR24/062
STAR VALLEY SPRING NO. 1, TRIBUTARIES OF STAR VALLEY SPRING NO. 1 DRAW, LITTLE GREY'S RIVER, GREY'S RIVER, SNAKE RIVER									
P34897.0D	STAR VALLEY SPRING NO. 1 PIPELINE	USDA FOREST SERVICE;	12/05/2011	DOM_SW, STO	0.000	0	036N-116W-21-NESE	42067	CR CC92/283
BIG DAD SPRING, TRIBUTARIES OF STEER CREEK, LITTLE GREY'S RIVER, GREY'S RIVER, SNAKE RIVER									
P34836.0D	BIG DAD SPRING	USDA FOREST SERVICE BRIDGER TETON NATIONAL FOREST;	07/23/2010	DOM_SW	0.056	0	036N-116W-08-SESE	42559	CR CC95/213
BLIND SPRING, TRIBUTARIES OF BLIND DRAW, SOUTH FORK LITTLE GREY'S RIVER, LITTLE GREY'S RIVER, GREY'S RIVER, SNAKE RIVER									
P19661.0S	BLIND STOCK RESERVOIR	USDA FOREST SERVICE BRIDGER TETON NATIONAL FOREST;	06/16/2010	STO	0.016AF	0	036N-116W-18-SWSE	42608	CR CR24/061
MURPHY SPRING, TRIBUTARIES OF DEER CREEK (29-36-117), GREY'S RIVER, SNAKE RIVER									
P33906.0D	MURPHY CREEK CAMPGROUND SPRING	USDA FOREST SERVICE BRIDGER TETON NATIONAL FOREST;	03/12/2008	DOM_SW	0.056	0	036N-117W-29-SWSW	42557	CR CC95/211

Tabulation of Adjudicated Water Rights of the State of Wyoming - Water Division Number IV, Surface Water

Permit No.	Facility Name	Appropriator	Priority	Use	C.F.S/AF	Acres	HG LOC	Proof No.	CR No.
SOUTH DOE CREEK, TRIBUTARIES OF GREY'S RIVER, SNAKE RIVER									
P34854.0D	SOUTH DOE CREEK NO. 1 PIPELINE	USDA FOREST SERVICE;	04/25/2011	DOM_SW, STO	0.000	0	036N-117W-32-SWNE	42068	CR CC92/284
DEAD MAN CREEK, TRIBUTARIES OF GREY'S RIVER, SNAKE RIVER									
P18202.0D	YOUNG DITCH NO. 2	LORRAINE AND REX YOUNG;	06/15/1932	IRR_SW, STO	0.210	14.5	034N-116W-08-NWNW	36549	CR CC80/083
DEAD MAN SPRING NO. 1, TRIBUTARIES OF DEAD MAN SPRING DRAW, DEAD MAN CREEK, GREY'S RIVER, SNAKE RIVER									
P34892.0D	DEADMAN SPRING NO. 1 PIPELINE	USDA FOREST SERVICE BRIDGER TETON NATIONAL FOREST;	12/05/2011	DOM_SW, STO	0.011	0	035N-116W-33-NWNW	42558	CR CC95/212
BLIND BULL CAMP CREEK, TRIBUTARIES OF BLIND BULL CREEK, GREY'S RIVER, SNAKE RIVER									
P34816.0D	BLIND BULL CAMP PIPELINE	USDA FOREST SERVICE;	12/05/2011	DOM_SW, STO	0.000	0	034N-116W-09-SESE	42069	CR CC92/285
WRAY SPRING, TRIBUTARIES OF GREY'S RIVER, SNAKE RIVER									
P34837.0D	WRAY SPRING PIPELINE		07/23/2010	DOM_SW	0.000	0	034N-116W-17-SENW	42070	CR CC92/286
YOUNG'S SPRING, TRIBUTARIES OF GREY'S RIVER, SNAKE RIVER									
P21290.0D	YOUNG'S PIPE LINE	SAM YOUNG J;	11/05/1953	DOM_SW	0.040	0	034N-116W-20-NWNW	25892	CR CC64/377
MEADOW CREEK, TRIBUTARIES OF GREY'S RIVER, SNAKE RIVER									
P17756.0D	MEADOWS R. S. IRRIGATION DITCH	USDA FOREST SERVICE;	07/24/1930	DOM_SW, IRR_SW	0.260	18	034N-116W-20-SWSW	20112	CR CC47/038
P18205.0D	LOW DITCH	SAMUEL YOUNG;	12/28/1932	DOM_SW, IRR_SW, STO	2.190	153.6	034N-116W-20-NESW	21420	CR CC52/143
UNNAMED SPRING, TRIBUTARIES OF MOOSE CREEK, GREY'S RIVER, SNAKE RIVER									
P19166.0D	MOOSE FLAT CAMP GROUND PIPE LINE	USDA FOREST SERVICE;	07/18/1939	DOM_SW, REC	0.016	0	034N-117W-35-SESW	23081	CR CC58/302
UNNAMED CREEK, TRIBUTARIES OF GREY'S RIVER, SNAKE RIVER									
P19164.0D	FOREST PARK PIPE LINE	USDA FOREST SERVICE;	07/18/1939	DOM_SW, REC	0.045	0	033N-116W-21-SENE	23082	CR CC58/303
FOREST PARK FEEDGROUND SPRING NO. 1, TRIBUTARIES OF FOREST PARK FEEDGROUND SPRING NO. 1 DRAW, GREY'S RIVER, SNAKE RIVER									
P34893.0D	FOREST PARK FEEDGROUND NO. 1 PIPELINE	USDA FOREST SERVICE;	12/05/2011	DOM_SW, STO	0.000	0	033N-116W-21-SWSW	42071	CR CC92/287
GRT DRAW, TRIBUTARIES OF GREY'S RIVER, SNAKE RIVER									
P34853.0D	GRT CAMP NO. 1	USDA FOREST SERVICE BRIDGER TETON NATIONAL FOREST;	04/25/2011	DOM_SW, STO	0.056	0	032N-116W-08-SESE	42556	CR CC95/210

Permit No.	Facility Name	Appropriator	Priority	Use	C.F.S/AF	Acres	HG LOC	Proof No.	CR No.
MARTIN CREEK, TRIBUTARIES OF SNAKE RIVER									
P11921.0D	NORTH DITCH	RAY ELY;	07/12/1913				---	15803	CR CC40/180
P11922.0D	SOUTH DITCH	RAY ELY;	07/12/1913				038N-116W-08-SESE	15804	CR CC40/181
P4179.0E	ENLARGED NORTH DITCH	E CRAIL;	12/14/1920				038N-116W-000-	19617	CR CC46/046
P16170.0D	LAMBS NO. 2 DITCH	GEORGE T. LAMB;	03/14/1921				038N-116W-08-SESE	19616	CR CC46/045
P14210.0R	MARTIN CREEK RESERVOIR	CYGNUS CAPITAL INC;	08/21/2013	CMU, FIS, REC	3.860AF		0 038N-116W-08-SESE	42377	CR CR23/326
LAMBS SPRINGS, TRIBUTARIES OF MARTIN CREEK, SNAKE RIVER									
P16101.0D	LAMBS NO. 1 DITCH	GEORGE LAMB;	03/14/1921				038N-116W-16-	19618	CR CC46/047
ARBARDEE CREEK, TRIBUTARIES OF SNAKE RIVER									
P11164.0S	ARBARDEE STOCK RESERVOIR	JOHN BRANCA;	12/13/1990		0.000AF		038N-116W-08-SWNE	36410	CR CR13/320
WARM SPRINGS AREA, TRIBUTARIES OF SNAKE RIVER									
P12036.0D	WARM SPRINGS DITCH	ASTORIA MINERAL SPRINGS, INC.;	09/20/1913	COM, DOM_SW	0.410		0 039N-116W-32-NESE		CR CC67/228
P23083.0D	COUNT'S HOT SPRINGS PIPELINE	ASTORIA MINERAL SPRINGS, INC.;	05/05/1966	DOM_SW	0.000		039N-116W-32-NESE	29565	CR CC69/497
SAWPIT CREEK, TRIBUTARIES OF SNAKE RIVER									
P12037.0D	COUNTS DITCH ACT BRUCE'S PIPE LINE	ASTORIA MINERAL SPRINGS, INC.;	09/20/1913	OTH	0.300		0 039N-116W-33-	15802	CR CC67/229
WEST FORK SAWPIT CREEK, TRIBUTARIES OF SAWPIT CREEK, SNAKE RIVER									
P23082.0D	BRUCE'S PIPELINE	ASTORIA MINERAL SPRINGS INC.;	05/05/1966		0.476		039N-116W-33-	29562	CR CC69/494
CALLER DRAW, TRIBUTARIES OF SNAKE RIVER									
P27743.0D	CALLER SPRINKLER SYSTEM	JOE AND ANN CALLER; LARRY CALLER; JOE CALLER J; HAROLD CALLER;	09/03/1981	MIS_SW, STO	0.056		0 039N-116W-34-	33743	CR CC75/137
ZAJAC SPRING, TRIBUTARIES OF ZAJAC SPRING CREEK, SNAKE RIVER									
P24202.0D	ZAJAC PIPE LINE	JACK AND CORDA ZAJAC;	08/01/1973	DOM_SW	0.014		0 039N-116W-34-	31579	CR CC72/298
PARMER CREEK, TRIBUTARIES OF SNAKE RIVER									
P14863.0D	BIG PAUL'S DITCH	PAUL IMESON;	09/19/1917	DOM_SW, IRR_SW	0.430	30	039N-116W-34-	16305	CR CC41/008
PAUL IMESON SPRING, TRIBUTARIES OF SNAKE RIVER									
P22252.0D	PAUL IMESON SPRING PIPELINE	AUSTIN HOLMES;	04/13/1960	DOM_SW, STO	0.011		0 039N-116W-26-	34639	CR CC76/194

Permit No.	Facility Name	Appropriator	Priority	Use	C.F.S/AF	Acres	HG LOC	Proof No.	CR No.
FALL CREEK, TRIBUTARIES OF SNAKE RIVER									
P10394.0D	BIG CUT DITCH	CORNELIUS HAWKINS;	12/12/1910	DOM_SW, IRR_SW	0.870	61	039N-116W-27-SWNE	14169	CR CC37/556
P10565.0D	COBURN'S FALL CREEK DITCH	RUFUS COBURN;	03/16/1911	IRR_SW	0.660	46	---	14170	CR CC37/557
P24574.0D	FALL CREEK DITCH	GORDON HURST;	12/12/1974	RES	0.630	0	039N-117W-11-		CR CC72/299
P7651.0R	FALL CREEK FISHING POND RESERVOIR	GORDON HURST;	12/12/1975	FIS	0.630AF	0	039N-117W-000-	31609	CR CR08/061
SOUTH FORK FALL CREEK, TRIBUTARIES OF FALL CREEK, SNAKE RIVER									
P35013.0D	FALL CREEK RANCH DIVERSION PIPELINE	FALL CREEKS RANCH LLC;	05/30/2013	DSP, RES	1.750	0	039N-117W-000-	42562	CR CC95/216
P14107.0R	FALL CREEK RANCH POND RESERVOIR	FALL CREEKS RANCH LLC;	05/30/2013	DSP, FIS, WET	1.172AF	0	039N-117W-10-	42600	CR CR24/053
RED TOP MEADOW CREEK, TRIBUTARIES OF FALL CREEK, SNAKE RIVER									
P8770.0S	REDTOP VALLEY RANCH #1 STOCK RESERVOIR	DON MOYER;	01/21/1981	STO	3.680AF	0	039N-117W-000-	33177	CR CR09/258
P10428.0S	LEEPER #1 STOCK RESERVOIR	LYNNETTE HATELEY;	07/18/1988	STO	1.060AF	0	039N-117W-02-	35929	CR CR13/127
COBURN CREEK, TRIBUTARIES OF FALL CREEK, SNAKE RIVER									
P10564.0D	COBURN'S COBURN CREEK DITCH	RUFUS COBURN;	03/16/1911	IRR_SW	0.790	55.5	039N-117W-000-	14171	CR CC37/558
HOBACK RIVER, TRIBUTARIES OF SNAKE RIVER									
P3417.0D	PFISTERER NO. 1 DITCH	FRANK VAN VLECK;	09/16/1901	IRR_SW	2.540	178	038N-113W-29-NWNW	16249	CR CC40/646
P3569.0D	NOBLE DITCH	CHARLES NOBLE;	11/29/1901	IRR_SW	2.140	150	036N-114W-02-NESW	21114	CR CC49/419
P1373.0E	ENLARGED NOBLE DITCH	CHARLES NOBLE;	02/15/1905	IRR_SW	2.570	180	036N-114W-02-NESW		CR CC56/396
P7161.0D	KILGORE NO. 1 DITCH	J. B. BUDD;	04/12/1906	IRR_SW	2.310	162	036N-114W-16-NWSE	15255	CR CC39/295
P8413.0D	LIONEL L. QUERY DITCH	KEMMERER SAVINGS BANK;	04/30/1908	IRR_SW	4.180	293	037N-113W-34-NENE	19568	CR CC45/617
P10399.0D	HICKS DITCH	DAVID HICKS;	12/19/1910	IRR_SW	1.660	116	037N-113W-34-NENE	14583	CR CC38/201
P13250.0D	HATHAWAY DITCH	CHARLES NOBLE;	07/29/1915	IRR_SW	1.170	82	036N-114W-03-SESE	21057.5	CR CC49/362
P13250.0D	HATHAWAY DITCH	HANS R AND SUSAN M GRAF;	07/29/1915	IRR_SW	0.440	31	036N-114W-03-SESE	35488	CR CC77/330
P14672.0D	PRIDE DITCH ACT AMREIN DITCH	F. W. MILLER;	11/27/1916	DOM_SW, IRR_SW	2.280	160	037N-113W-14-NENW	16298	CR CC41/001
P3809.0E	ENLARGED PFISTERER NO 1 DITCH	HELEN WILHELM EDWARDS;	08/30/1917	IRR_SW	0.240	17	038N-113W-29-NWNW	19907	CR CC46/357
P15008.0D	WATTS NO.2 DITCH	FRED WATTS;	02/26/1918	IRR_SW	1.610	113	037N-113W-14-NESE	18623	CR CC44/394
P16922.0D	HIATT NO 2 DITCH	WALLACE HIATT;	12/08/1924	DOM_SW, IRR_SW	0.760	52.8	037N-113W-03-NWSW	19569	CR CC45/618
P16923.0D	HIATT NO 3 DITCH ACIPT WELLS AND STROBEL NO 1 AND NO 2 DITCHES	WALLACE HIATT;	12/08/1924	IRR_SW	0.400	28	037N-113W-04-SWNE	19570	CR CC45/619
P17129.0D	STONG DITCH	WILLIAM STRONG;	08/11/1926	IRR_SW	1.140	80	037N-113W-27-SESE	20407	CR CC47/354
P18722.0D	JULIUS MILLER DITCH	JULIUS MILLER;	04/15/1936	DOM_SW, IRR_SW, STO	2.020	142	036N-114W-21-NENW	22061	CR CC56/324
P18788.0D	ROBINSON NO. 2 DITCH	E. S. ROBINSON;	11/12/1936	IRR_SW, STO	1.140	80	037N-113W-14-SESE	23400	CR CC59/262
P19100.0D	NUTTING-STONG DITCH	W H STRONG;	07/23/1938	DOM_SW, IRR_SW, STO	0.630	44	037N-113W-34-SENW	23861	CR CC60/413
P19100.0D	NUTTING-STONG DITCH	ROBERT L AND PAULA KAY MCNEEL;	07/23/1938	IRR_SW, STO	1.430	100	037N-113W-34-SENW	35328	CR CC77/193
P19312.0D	ART HICKS DITCH	BARBARA CULL;	02/08/1940	IRR_SW, STO	2.010	141	037N-113W-26-SESW	23295	CR CC59/038
P19313.0D	CAROLINE DITCH	BARBARA CULL;	02/08/1940	IRR_SW, STO	0.330	23	037N-113W-23-SESE	23296	CR CC59/039
P19907.0D	HIATT NO. 2 DITCH	WALLACE E. AND ALICE C HIATT; LLOYD E. AND DOROTHY LACEY;	06/02/1944	IRR_SW	1.110	77.9	038N-115W-04-SWNW	24322	CR CC61/374
P19972.0D	MILLER DITCH	EDWARD D'ATRI;	03/02/1945	IRR_SW	1.170	81.68	036N-114W-29-SENE	28808	CR CC69/098
P19990.0D	HIATT NO. 1 DITCH	C F TRONSEN;	09/29/1945	DOM_SW, IRR_SW, STO	0.690	48	037N-113W-03-SWSW	23985	CR CC61/064
P22668.0D	AMREIN DITCH	LEOLA AMREIN;	01/29/1962	IRR_SW	1.670 ORI	116.55	037N-113W-14-NENW	28096	CR CC68/050
						SUP 174.69			
P24563.0D	RAINBOW PIPE LINE	DEAN M AND GRANCE G BERG;	01/07/1975	IRR_SW	0.017	1.19	039N-115W-31-	31581	CR CC72/300

Permit No.	Facility Name	Appropriator	Priority	Use	C.F.S/AF	Acres	HG LOC	Proof No.	CR No.
P27265.0D	PFAFF PIPELINE	YVONNE PFAFF; LYNN AND ROBIN BLAIR;	07/27/1981	MIS_SW	0.067		0 039N-115W-31-	33054	CR CC74/291
P27370.0D	DOLENCE PIPELINE	JOHN AND JOE DOLENCE;	07/30/1981	MIS_SW	0.560		0 039N-115W-31-		CR CC74/290
P30073.0D	PEET PIPELINE	CHARLES PEET;	08/22/1988	IRR_SW	0.010		1 039N-115W-000-	36159	CR CC79/155
P30178.0D	J-W PIPELINE	J-W HOMEOWNERS ASSOCIATION INC; JOSEPH S. BROADBENT;	04/10/1989	DOM_SW	0.200		039N-116W-26-	36160	CR CC79/156
P30852.0D	GRAF DITCH	HANS GRAF;	02/06/1992	FIS, RES, WL	1.960		0 036N-114W-09-NESE		CR CC79/157
P31100.0D	MANTEY PIPELINE	ERVING W AND CARYL S MANTEY;	04/12/1993	DOM_SW	0.100		0 039N-115W-000-	36931	CR CC80/384
P31426.0D	SIMON PIPELINE	RANDE L AND BARBARA E SIMON;	06/22/1995	DOM_SW	0.110		0 039N-115W-31-	37621	CR CC81/359
P31641.0D	APKER PIPELINE	GLEN MYERS;	09/29/1995	DSP	0.110		0 039N-115W-000-	38507	CR CC83/063
P31785.0D	SCHWINDT PIPELINE	DAVID SCHWINDT;	02/04/1997	DOM_SW	0.056		0 039N-116W-26-	38508	CR CC83/064
P31787.0D	WOOLWINE PIPELINE	WILLARD F. AND CONNIE MAY WOOLWINE;	02/04/1997	DOM_SW	0.056		0 039N-116W-26-	38509	CR CC83/065
P31784.0D	SAUNDERS PIPELINE	ALLEN D AND ELLINORE SAUNDERS;	02/04/1997	DOM_SW	0.056		0 039N-116W-26-	38235	CR CC82/311
P31843.0D	GABRIELSON PIPELINE	STEVEN B AND MARY L GABRIELSON LIVING TRUST;	03/31/1997	IRR_SW	0.990		69 038N-115W-04-SWNW	38236	CR CC82/312
P31880.0D	GRUTZMACHER WATER SYSTEM	JENNIFER MEAGHER;	06/13/1997	DOM_SW, STO	0.090		0 039N-115W-31-	39077	CR CC84/214
P11004.0R	BRADLEY NO. 1 RESERVOIR	ROBERT H BRADLEY FAMILY TRUST;	01/14/2000	CMU, FIS, STO	19.900AF		0 039N-115W-32-NESW	42379	CR CR23/328
P32257.0D	BRADLEY DITCH	ROBERT H BRADLEY FAMILY TRUST;	01/14/2000	FTH, IRR_SW, RES	0.210		0 039N-115W-32-NESW	42320	CR CC95/088
P11777.0R	HOBACK VISTAS NO. 1 RESERVOIR	ANGUS GERALD GOETZ III REVOCABLE LIVING TRUST;	05/10/2004	FIR, WL	1.470AF		0 039N-115W-31-	42380	CR CR23/329
P7593.0E	ENL. HIATT DITCH NO 1	JAMES AND IRENE BRINKERHOFF;	10/07/2008	DOM_SW	0.056		0 037N-113W-03-SWSW	40897	CR CC92/142
P7608.0E	ENLARGED HIATT DITCH NO 1	RICHARD CHARLES MELBY;	03/03/2009	DOM_SW	0.056		0 037N-113W-03-SWSW	40898	CR CC92/143
P35066.0D	EMMY PIPELINE	JOHN PATRICK MICKUS;	08/15/2013	DOM_SW	0.056		0 039N-116W-26-	42321	CR CC95/089
RIDGE CREEK, TRIBUTARIES OF HOBACK RIVER, SNAKE RIVER									
P21442.0D	RIDGE CREEK DITCH	ORAL G AND MELBA WHEELER; IRENE NELSON; R.D. AND MARIE O MCGHIE;	04/05/1954	IRR_SW	0.000	17.81	039N-115W-31-	25505	CR CC64/020
EMIL'S SPRING, TRIBUTARIES OF HOBACK RIVER, SNAKE RIVER									
P22681.0D	EMIL'S SPRING PIPELINE	EMIL J AND ANGELA GAILE BERTAGNOLLI;	01/14/1965	DOM_SW, IRR_SW	0.030		2 039N-115W-31-	28097	CR CC68/051
CAMP CREEK, TRIBUTARIES OF HOBACK RIVER, SNAKE RIVER									
P11906.0D	LINCOLN DITCH	LINCOLN IMESON;	06/26/1913	DOM_SW, IRR_SW	0.310	21.9	039N-115W-32-NWSW	16302	CR CC41/005
P12962.0D	CAMP CREEK DITCH	JAMES E. WILSON ESTATE;	01/11/1915	DOM_SW, IRR_SW	0.140	10	039N-115W-32-	16556	CR CC41/446
P9212.0R	CAMP CREEK FISH POND	CAMP CREEK PROPERTIES LLC;	12/01/1986	FIS	0.470AF		0 039N-115W-32-	42381	CR CR23/330
BILL SPRING, TRIBUTARIES OF CAMP CREEK, HOBACK RIVER, SNAKE RIVER									
P20129.0D	GREENE PIPELINE	WILBUR GREENE;	05/26/1947	DOM_SW	0.120		0 039N-115W-32-	25506	CR CC64/021
BERTAGNOLLI SPRING, TRIBUTARIES OF HOBACK RIVER, SNAKE RIVER									
P21559.0D	BERTAGNOLLI SPRING PIPELINE	THOMAS M. AND DIAN BESS;	12/20/1954	DOM_SW	0.022		0 039N-115W-32-	28232	CR CC68/168
WILLOW CREEK (32-39-115), TRIBUTARIES OF HOBACK RIVER, SNAKE RIVER									
P19962.0D	BERTAGNOLLI DITCH	ORAL G AND MELBA WHEELER; IRENE NELSON; R.D. AND MARIE O MCGHIE;	02/10/1945	IRR_SW	0.410	28.93	038N-115W-05-NWNW	25507	CR CC64/022
P22490.0D	HIATT NO. 3 DITCH	HAROLD B AND MARY E BOYD;	07/12/1963	IRR_SW, STO	0.610	43	038N-115W-06-SENE	27884	CR CC67/298

Permit No.	Facility Name	Appropriator	Priority	Use	C.F.S/AF	Acres	HG LOC	Proof No.	CR No.
IMESON CREEK, TRIBUTARIES OF HOBACK RIVER, SNAKE RIVER									
P10041.0D	HOBACK DITCH	ELIAS WILSON;	08/10/1910	DOM_SW, IRR_SW	0.070		5 038N-115W-05-SESE	14220	CR CC37/607
P17679.0D	CAMP DAVIS PIPE LINE	UNIVERSITY OF MICHIGAN;	12/23/1929	DOM_SW, IRR_SW, POW	0.010		1 038N-115W-05-SESE	20594	CR CC47/534
BRYAN CREEK, TRIBUTARIES OF HOBACK RIVER, SNAKE RIVER									
P11941.0D	BRYAN DITCH	USDA FOREST SERVICE;	07/26/1913	DOM_SW, IRR_SW	1.150	81	038N-115W-09-	17051	CR CC42/207
LOWER SPRING, TRIBUTARIES OF BRYAN CREEK, HOBACK RIVER, SNAKE RIVER									
P19567.0D	BRYANT FLAT R. S. WATER SYSTEM	USDA FOREST SERVICE;	06/20/1941	DOM_SW	0.005	0	038N-115W-09-NESW	23401	CR CC59/263
UPPER SPRING, TRIBUTARIES OF BRYAN CREEK, HOBACK RIVER, SNAKE RIVER									
P19566.0D	BRYANT FLAT R. S. WATER SYSTEM PIPELINE	USDA FOREST SERVICE;	06/20/1941	DOM_SW	0.022	0	038N-115W-09-NESW	23402	CR CC59/264
BUCK CREEK, TRIBUTARIES OF HOBACK RIVER, SNAKE RIVER									
P19402.0D	HOBACK CAMPGROUND WATER SUPPLY SYSTEM PIPELINE	USDA FOREST SERVICE;	07/01/1940	DOM_SW, REC	0.056	0	038N-115W-12-	23083	CR CC58/304
SLIDE GULCH SPRING, TRIBUTARIES OF GRANITE CREEK, HOBACK RIVER, SNAKE RIVER									
P20215.0D	SLIDE GULCH PIPELINE	GROVER BASSETT;	08/05/1948	DOM_SW	0.040	0	039N-113W-17-	24853	CR CC62/410
P20215.0D	SLIDE GULCH PIPELINE	D. G. MACLEOD;	08/05/1948	DOM_SW	0.010	0	039N-113W-17-	24854	CR CC62/411
SWIFT CREEK, TRIBUTARIES OF GRANITE CREEK, HOBACK RIVER, SNAKE RIVER									
P20216.0D	SWIFT CREEK DITCH	GROVER BASSETT;	08/05/1948	IRR_SW	1.310	91.7	039N-113W-08-	25509	CR CC64/024
GARDEN CREEK, TRIBUTARIES OF HOBACK RIVER, SNAKE RIVER									
P3418.0D	PFISTERER NO. 2 DITCH	FRANK VAN FLECK;	09/16/1901				---	16299	CR CC41/002
P14841.0D	GARDEN DITCH	HELEN WILHELM EDWARDS;	08/30/1917	IRR_SW	0.960	67	038N-113W-20-SWNW	19908	CR CC46/358
DELL CREEK, TRIBUTARIES OF HOBACK RIVER, SNAKE RIVER									
P8492.0D	STULTS DITCH	J. P. PFISTERER;	06/17/1908	IRR_SW	1.310	92	038N-113W-23-NENW	17050	CR CC42/206
P13875.0D	RIHLING DITCH	T. R. WINEMAN;	11/04/1915	IRR_SW	1.610	113	038N-113W-13-SWSW	19837	CR CC46/297
P14465.0D	PARODY DITCH	G. E. PARODY;	10/06/1916	IRR_SW	0.900	63	038N-113W-13-SESE	17198	CR CC42/360
P4070.0E	ENLARGED STULTZ DITCH ACIPT HANSEN DITCH	GRACE PARRY;	01/19/1920	IRR_SW	1.060	74	038N-113W-23-NENW	21512	CR CC52/238
P4070.0E	ENLARGED STULTZ DITCH ACIPT HANSEN DITCH	ANDREW ERICKSON;	01/19/1920	IRR_SW	2.090	146	038N-113W-22-SWNE	23862	CR CC60/414
P4393.0E	ENLARGED STULTZ DITCH ACIPT HANSEN DITCH	W. L. JONES;	12/03/1923	IRR_SW	0.640	45	038N-113W-23-NENW	20105	CR CC47/031
P4393.0E	ENLARGED STULTZ DITCH ACT HANSEN DITCH	G. A. BEEMAN;	12/03/1923	DOM_SW, IRR_SW	1.340	94	038N-113W-23-NWNW	20106	CR CC47/032
P5696.0E	ENLARGED STULTZ DITCH	THOMAS F AND GENEVIEVE C KEARNS;	07/31/1953	IRR_SW, STO	1.700	119	038N-113W-23-NENW	25697	CR CC64/204
P5697.0E	ENLARGED HANSEN DITCH	THOMAS F AND GENEVIEVE C KEARNS;	07/31/1953	IRR_SW, STO	0.370	26	038N-113W-22-SENW	25698	CR CC64/205

Tabulation of Adjudicated Water Rights of the State of Wyoming - Water Division Number IV, Surface Water

Permit No.	Facility Name	Appropriator	Priority	Use	C.F.S/AF	Acres	HG LOC	Proof No.	CR No.
P21260.0D	NORTH KEARNS DITCH ACT HANSEN DITCH AND STULTZ DITCH	THOMAS F. AND GENEVIEVE C. KEARNS;	08/11/1953	IRR_SW, STO	0.530	37	038N-113W-14-NESE	26009	CR CC64/467
P21261.0D	SOUTH KEARNS DITCH ACIPT RIHLING DITCH	THOMAS F. AND GENEVIEVE C. KEARNS;	08/11/1953	IRR_SW, STO	1.720	121	038N-113W-14-NESE	26010	CR CC64/468
P6195.0E	ENLARGED PARODY DITCH	JAMES BOSONE;	05/01/1963	IRR_SW	0.360	25	038N-113W-13-SESE	30035	CR CC70/161
KEARNS SPRING NO. 1, TRIBUTARIES OF PARODY CREEK, DELL CREEK, HOBACK RIVER, SNAKE RIVER									
P21844.0D	KEARNS PIPE LINE NO. 1	ROBERT WAGSTAFF;	04/15/1957	STKNDMS	0.800	0	038N-113W-23-SENW	29431	CR CC69/390
KEARNS SPRING NO. 2, TRIBUTARIES OF PARODY CREEK, DELL CREEK, HOBACK RIVER, SNAKE RIVER									
P21845.0D	KEARNS PIPE LINE NO. 2	ROBERT WAGSTAFF;	04/15/1957	DOM_SW, STO	0.800	0	038N-113W-23-SENW	29432	CR CC69/391
HALEY CREEK, TRIBUTARIES OF DELL CREEK, HOBACK RIVER, SNAKE RIVER									
P22419.0D	MACK DITCH	E. G. MACK;	09/05/1962	IRR_SW, STO	0.140	10	038N-113W-21-SWNW	27527	CR CC67/101
MACK SPRING, TRIBUTARIES OF HALEY CREEK, DELL CREEK, HOBACK RIVER, SNAKE RIVER									
P21891.0D	MACK SPRING PIPELINE	E G MACK;	07/31/1957	DOM_SW, STO	0.010	0	038N-113W-20-NESE	26308	CR CC65/232
BEAMAN SPRING NO. 1, TRIBUTARIES OF HALEY CREEK, DELL CREEK, HOBACK RIVER, SNAKE RIVER									
P21892.0D	BEAMAN SPRING NO. 1 PIPELINE	E. G. MACK;	07/31/1957	DOM_SW, STO	0.010		038N-113W-20-SENE	26663	CR CC65/481
WICKETT SPRING, TRIBUTARIES OF WICKETT DRAW, HALEY CREEK, DELL CREEK, HOBACK RIVER, SNAKE RIVER									
P23179.0D	WICKETT PIPELINE	HERSHEL H AND LILLIAM L WICKETT;	03/08/1968	DOM_SW, STO	0.044	0	038N-113W-20-SENE	30037	CR CC70/163
BABE MACK SPRING, TRIBUTARIES OF WICKETT DRAW, HALEY CREEK, DELL CREEK, HOBACK RIVER, SNAKE RIVER									
P24270.0D	BABE MACK SPRING PIPELINE	E. G. MACK;	09/24/1973	STO	0.056	0	038N-113W-20-SENE	32124	CR CC72/472
P6583.0E	ENLARGED BABE MACK SPRING PIPELINE	E G MACK;	05/01/1975	DOM_SW, RES	0.060	0	038N-113W-20-SENE	32125	CR CC72/473
P8079.0S	BABE MACK STOCK RESERVOIR	E. G. MACK;	05/01/1975	STO	7.330AF	0	038N-113W-20-NESE	32146	CR CR08/432
JONES CREEK, TRIBUTARIES OF DELL CREEK, HOBACK RIVER, SNAKE RIVER									
P16658.0D	JONES DITCH	WILLIE JONES;	08/30/1923	DOM_SW, IRR_SW	0.440	31	038N-113W-14-SESW	20107	CR CC47/033
ROCK CREEK, TRIBUTARIES OF DELL CREEK, HOBACK RIVER, SNAKE RIVER									
P20345.0D	BOSONE DITCH	JAMES BOSONE;	06/12/1948	IRR_SW	1.080	75.9	038N-113W-13-NWNE	25508	CR CC64/023
HAMILTON CREEK, TRIBUTARIES OF DELL CREEK, HOBACK RIVER, SNAKE RIVER									
P7386.0D	BOWLSBY NO. 2 DITCH	PERRY BOWLSBY;	08/23/1906	IRR_SW	4.070	285	038N-112W-08-SESW	15827	CR CC40/204

Permit No.	Facility Name	Appropriator	Priority	Use	C.F.S/AF	Acres	HG LOC	Proof No.	CR No.
HOUSE CREEK, TRIBUTARIES OF DELL CREEK, HOBACK RIVER, SNAKE RIVER									
P22805.0D	HOUSE CREEK DITCH	JAMES BOSONE;	05/01/1963	IRR_SW, STO	0.000	63.8	038N-112W-07-SWSW	30036	CR CC70/162
BAKER SPRING, TRIBUTARIES OF BAKER SPRING CREEK, DELL CREEK, HOBACK RIVER, SNAKE RIVER									
P22028.0D	BAKER SPRINGS PIPELINE	BILLY R AND EILEEN DOCKHAM;	01/27/1959	DOM_SW, STO	0.012	0	038N-112W-30-NENE	29233	CR CC68/169
JACK CREEK, TRIBUTARIES OF HOBACK RIVER, SNAKE RIVER									
P3895.0D	BOWLSBY NO. 3 DITCH	WILLIAM BOWLEBY;	05/12/1902	IRR_SW	1.930	135	037N-113W-01-NWSE	16536	CR CC41/425
P10460.0D	BAKER DITCH	LORENZO CAMPBELL;	01/20/1911	IRR_SW	1.640	115	038N-112W-28-NWNE	16537	CR CC41/426
P10460.0D	BAKER DITCH	HEARLEY FRONK;	01/20/1911	DOM_SW, IRR_SW	2.280	160	038N-112W-28-NWNE	19157	CR CC45/164
P10460.0D	BAKER DITCH	VINCENT FRONK;	01/20/1911	IRR_SW	1.060	74	038N-112W-28-NWNE	20918	CR CC49/137
P10460.0D	BAKER DITCH	SHELTON BAKER;	01/20/1911	DOM_SW, IRR_SW	3.910	274	038N-112W-28-NWNE	15826	CR CC40/203
P10460.0D	BAKER DITCH	EILEEN AND BILLY R. DOCKHAM;	01/20/1911	IRR_SW	0.570	40	038N-112W-28-NWNE	29239	CR CC69/281
P14101.0D	BONDURANT NO. 1 DITCH	B. F. BONDURANT;	04/19/1916	IRR_SW, STO	1.540	108	038N-113W-34-NWSW	15823	CR CC40/200
P14102.0D	BONDURANT NO 2 DITCH	B. F. BONDURNANT;	04/19/1916	IRR_SW	1.200	84	038N-113W-33-SENE	15824	CR CC40/201
P14103.0D	BONDURANT NO. 3 DITCH	B. F. BONDURANT;	04/19/1916	IRR_SW	0.740	52	038N-113W-28-SWSE	15825	CR CC40/202
P4522.0E	ENLARGED BAKER DITCH	EUGENE HOLT;	01/06/1927	IRR_SW	1.530	107	038N-112W-28-NWNE	20300	CR CC47/233
P4933.0E	ENLARGED BAKER DITCH	VINCENT FRONK;	07/24/1934	DOM_SW, IRR_SW, STO	0.270	19	038N-112W-28-NWNE	20917	CR CC49/136
P18617.0D	FRONK DITCH	DANIEL FRONK;	07/30/1934	IRR_SW, STKNDMS	2.000	140	038N-112W-22-SENE	21511	CR CC52/237
P20855.0D	LAZY J. C. DITCH	ROY THOMAS FISK;	10/26/1951	DOM_SW, IRR_SW	1.080	76	038N-113W-35-SESW	25829	CR CC64/323
P22024.0D	BULL PASTURE DITCH	BILLY R. AND EILEEN DOCKHAM; EILEEN DOCKHAM;	01/27/1959	IRR_SW	0.640	45	038N-112W-28-SENW	28235	CR CC68/171
ELLWOOD SPRING CREEK, TRIBUTARIES OF JACK CREEK, HOBACK RIVER, SNAKE RIVER									
P13160.0S	ELLWOOD STOCK RESERVOIR	PAUL M AND BARBARA ELLWOOD;	07/14/1999	STO	0.490AF	0	038N-113W-28-SWNW	38251	CR CR15/381
HEARLEY SPRING, TRIBUTARIES OF JACK CREEK, HOBACK RIVER, SNAKE RIVER									
P21887.0D	HEARLEY SPRING PIPELINE	MARVIN PEARSON;	07/15/1957	DOM_SW, STO	0.022	0	038N-112W-29-NENE	28234	CR CC68/170
UNNAMED STREAM, TRIBUTARIES OF HOBACK RIVER, SNAKE RIVER									
P19404.0D	HOBACK GUARD STATION WATER SUPPLY SYSTEM PIPELINE	USDA FOREST SERVICE;	07/01/1940	DOM_SW	0.015	0	038N-113W-32-SENE	23084	CR CC58/305
BOOKER SLOUGH, TRIBUTARIES OF HOBACK RIVER, SNAKE RIVER									
P16659.0D	BARRETT DITCH	LOUIS R. AMREIN;	08/30/1923	DOM_SW, IRR_SW	0.140	10.1	037N-113W-04-NWSE	26782	CR CC66/056
SPRING CREEK (SENW 10-37-113), TRIBUTARIES OF HOBACK RIVER, SNAKE RIVER									
P17820.0D	BRONNENBERG NO. 2 DITCH	LOUIS AMREIN;	11/28/1930	DOM_SW, IRR_SW	0.280	20	037N-113W-10-SENW	26784	CR CC66/058
CLARKS BUTTE DRAW, TRIBUTARIES OF HOBACK RIVER, SNAKE RIVER									
P22669.0D	CLARKS BUTTE DRAW DIVERSION OF AMREIN DITCH	LEOLA AMREIN;	01/29/1962	IRR_SW	0.000	291.24	037N-113W-10-SESW	28098	CR CC68/052

Permit No.	Facility Name	Appropriator	Priority	Use	C.F.S/AF	Acres	HG LOC	Proof No.	CR No.
SPRING CREEK NO. 2, TRIBUTARIES OF CLARKS BUTTE DRAW, HOBACK RIVER, SNAKE RIVER									
P17819.0D	BRONNENBERG NO. 1 DITCH	LOUIS AMREIN;	11/28/1930	DOM_SW, IRR_SW	0.280	20	037N-113W-10-SWNW	26783	CR CC66/057
SPRING CREEK (NWSE 10-37-113), TRIBUTARIES OF HOBACK RIVER, SNAKE RIVER									
P14854.0D	RICHARDS DITCH ACT AMREIN DITCH	WILLIAM BOOKER;	09/14/1917	IRR_SW	2.160	151	037N-113W-15-NENE	16533	CR CC41/421
P22672.0D	SPRING CREEK DIVERSION AMREIN DITCH	LEOLA AMREIN;	01/29/1966	IRR_SW	0.000	286.65	037N-113W-15-NENE	28099	CR CC68/053
HICKS SPRING CREEK, TRIBUTARIES OF SPRING CREEK (NWSE 10-37-113), HOBACK RIVER, SNAKE RIVER									
P22671.0D	HICKS SPRING CREEK DIVERSION AMREIN DITCH	LEOLA AMREIN;	01/29/1962	IRR_SW	0.000	411.24	037N-113W-14-NWNW	28100	CR CC68/054
LITTLE SPRING CREEK, TRIBUTARIES OF HOBACK RIVER, SNAKE RIVER									
P13302.0D	CENTRAL DITCH	ANDREW JOHNSON;	08/05/1915	IRR_SW	0.860	60	037N-113W-12-SWSW	16538	CR CC41/422
P17077.0D	NOBLE NO. 1 DITCH	FRIEDA E. NOBLE HITTLE;	06/28/1923	IRR_SW	0.260	18	037N-113W-12-SESW	19838	CR CC46/298
P17078.0D	NOBLE NO. 2 DITCH	FRIEDA E. NOBLE HITTLE;	06/28/1923	IRR_SW	0.690	48	037N-113W-12-SESW	19839	CR CC46/299
NUTTING CREEK, TRIBUTARIES OF HOBACK RIVER, SNAKE RIVER									
P19101.0D	NUTTING DITCH	ROBERT L. AND PAULA KAY MCNEEL;	07/23/1938	IRR_SW, STO	0.000	81	037N-113W-27-SWSW	35329	CR CC77/194
KILGORE SPRING CREEK, TRIBUTARIES OF HOBACK RIVER, SNAKE RIVER									
P9431.0R	LAKE MARLENE RESERVOIR	HANS GRAF;	09/28/1988	FIS	13.900AF	0	036N-114W-10-SWNW	36187	CR CR13/224
WILLOW CREEK (3-36-114), TRIBUTARIES OF HOBACK RIVER, SNAKE RIVER									
P15244.0D	DEMPSEY DITCH	MARY DEMPSEY;	07/27/1917	IRR_SW	0.310	22	036N-114W-10-NWNW	16532	CR CC41/420
P15244.0D	DEMPSEY DITCH	J. B. BUDD;	07/27/1917	IRR_SW	0.570	40	036N-114W-10-NWNW	16561	CR CC41/453
BELLEM DRAW, TRIBUTARIES OF HOBACK RIVER, SNAKE RIVER									
P24538.0D	BELLEM DRAW DITCH NO. 1	EDWARD MARSLAND;	11/13/1974	IRR_SW	0.390	27.2	036N-114W-28-NENW	31582	CR CC72/301
MUDDY CREEK, TRIBUTARIES OF HOBACK RIVER, SNAKE RIVER									
P5486.0S	MUDDY STOCK RESERVOIR	MILLER LAND AND LIVESTOCK CO.;	11/10/1965	STO	4.220AF	0	036N-113W-14-NWNE	27918	CR CR03/459
MCLEAN CREEK, TRIBUTARIES OF MUDDY CREEK, HOBACK RIVER, SNAKE RIVER									
P5484.0S	MCLEAN STOCK RESERVOIR	MILLER LAND AND LIVESTOCK CO.;	11/10/1965	STO	16.400AF	0	036N-113W-23-SWNE	27919	CR CR03/460
FISHERMAN CREEK, TRIBUTARIES OF HOBACK RIVER, SNAKE RIVER									
P1098.0D	SAILOR DITCH	J. P. PFISTERER;	11/22/1895	IRR_SW	2.490	174	037N-112W-21-SWSW	19840	CR CC46/300
P1098.0D	SAILOR DITCH	J. P. PFISTERER;	11/22/1895	IRR_SW	1.710	120	037N-112W-21-SWSW	20108	CR CC47/034
P741.0E	ENLARGED SAILOR DITCH	J P PFISTERER;	11/29/1901	IRR_SW	1.670	117	037N-112W-21-SWSW	19841	CR CC46/301

Permit No.	Facility Name	Appropriator	Priority	Use	C.F.S/AF	Acres	HG LOC	Proof No.	CR No.
P3561.0E	ENLARGED SAILOR DITCH	EUGENE ROBINSON;	11/17/1915	IRR_SW	1.150		81 037N-112W-21-SWSW	17197	CR CC42/359
P16154.0D	HIBBEN DITCH ACT PFISTERER DITCH	SHERMAN A. LLOYD;	07/18/1921	IRR_SW	1.010		71 037N-112W-30-NWNE	20109	CR CC47/035
P17079.0D	ROBINSON DITCH	FRIEDA E. NOBLE HITTLE;	07/02/1924	IRR_SW	0.060		4 037N-113W-24-NWNW	19842	CR CC46/302
P17079.0D	ROBINSON DITCH	EUGENE ROBINSON;	07/02/1924	IRR_SW	0.200		14 037N-113W-24-NWNW	19843	CR CC46/303
P17080.0D	ROBINSON DITCH	EUGENE ROBINSON;	07/02/1924	IRR_SW	0.000		56 037N-113W-24-NWNW	19844	CR CC46/304
P17080.0D	ROBINSON DITCH	FRIEDA E. NOBLE HITTLE;	07/02/1924	IRR_SW	0.000		25 037N-113W-24-NWNW	19845	CR CC46/305
P17128.0D	HANCOCK DITCH	BARBARA CULL;	08/11/1926	IRR_SW	0.500		35 037N-114W-24-	23294	CR CC59/037
P17250.0D	ORIN NO. 1 DITCH	ORIN ROBINSON;	07/18/1927	IRR_SW	0.940		66 037N-112W-30-NWSE	20249	CR CC47/195
P5295.0E	ENLARGED ROBINSON DITCH	CARROLL NOBLE;	01/28/1941	IRR_SW, STO	1.970		138 037N-113W-24-NWNW	23455	CR CC59/328
P22845.0D	PFISTERER DITCH	GENE HARMON PFISTERER;	02/20/1963	IRR_SW, STO	0.070		5 037N-112W-30-NENE	29564	CR CC69/496
HAY GULCH CREEK, TRIBUTARIES OF FISHERMAN CREEK, HOBACK RIVER, SNAKE RIVER									
P5495.0S	BURNEY STOCK RESERVOIR	MILLER LAND AND LIVESTOCK CO.;	11/26/1965	STO	6.500AF		0 036N-113W-01-SWSW	27915	CR CR03/456
SOUTH BRANCH OF HAY GULCH CREEK, TRIBUTARIES OF HAY GULCH CREEK, FISHERMAN CREEK, HOBACK RIVER, SNAKE RIVER									
P5494.0S	HAY GULCH STOCK RESERVOIR	MILLER LAND AND LIVESTOCK CO.;	11/26/1965	STO	3.390AF		0 036N-113W-11-NENE	27916	CR CR03/457
LITTLE FISH CREEK, TRIBUTARIES OF FISHERMAN CREEK, HOBACK RIVER, SNAKE RIVER									
P5490.0S	HANSON STOCK RESERVOIR	MILLER LAND AND LIVESTOCK CO.;	11/22/1965	STO	12.800AF		0 036N-112W-04-NWNW	27917	CR CR03/458
SLED-RUNNER CREEK, TRIBUTARIES OF FISHERMAN CREEK, HOBACK RIVER, SNAKE RIVER									
P8222.0S	DAVICH STOCK RESERVOIR	MIKE AND SANDRA DAVICH;	03/04/1977	STO	9.100AF		0 036N-112W-06-SENE	32539	CR CR08/658
SPRING, TRIBUTARIES OF FISHERMAN CREEK, HOBACK RIVER, SNAKE RIVER									
P17251.0D	ORIN NO. 2 DITCH	ORIN ROBINSON;	07/18/1927	IRR_SW	0.280		20 037N-113W-24-SESE	20250	CR CC47/196
DEAD SHOT CREEK, TRIBUTARIES OF HOBACK RIVER, SNAKE RIVER									
P8353.0S	BENSEN STOCK RESERVOIR	LEO AND ROSEMARY BENSON;	04/05/1978	STO	0.850AF		0 036N-114W-21-SENE	32760	CR CR08/782
IMESON SPRING, TRIBUTARIES OF SNAKE RIVER									
P19283.0D	ATWATER PIPE LINE	LENORA ATWATER;	12/21/1939		0.000		039N-116W-23-	22730	CR CC58/008
P23119.0D	WILLIAMS PIPE LINE	W H SKIPWITH J; JAMES WILLIAMS J; SHELLEY JO WILLIAMS; LACEY LEIGH WILLIAMS;	10/06/1966	DOM_SW, STO	0.060		0 039N-116W-23-	29563	CR CC69/495
BIG HORSE CREEK, TRIBUTARIES OF SNAKE RIVER									
P15521.0D	WILSON NO. 2 DITCH	GEORGE WILSON;	06/13/1919	DOM_SW, IRR_SW	0.570		40 039N-115W-000-	19158	CR CC45/165
P15522.0D	WILSON NO. 3 DITCH	GEORGE WILSON;	06/13/1919	DOM_SW, IRR_SW	0.260		18 039N-115W-000-	19159	CR CC45/166
P16461.0D	CASTLE ROCK DITCH	CLARK BRODY;	08/23/1922	IRR_SW	0.600		42 039N-116W-13-	19456	CR CC45/502
P16689.0D	WILSON NO. 4 DITCH	GEORGE WILSON;	10/27/1923	IRR_SW	0.100		6.75 039N-115W-18-SWNW	19160	CR CC45/167
P30720.0D	WATTS PIPELINE	JAMES HOWARD WATTS JR. AND MELISSA ELLEN WATTS;	11/16/1990	DOM_SW	0.056		0 039N-116W-22-	36550	CR CC80/084
P31130.0D	JOHNSTON PIPELINE	WILLIAM H. AND JOAN M. LINEBERRY; WYOMING DEPARTMENT OF TRANSPORTATION;	11/27/1991	IRR_SW	0.004		0.27 039N-116W-14-	37299	CR CC81/170

APPENDIX C

HOBACK RIVER: TABULATION OF ADJUDICATED WATER RIGHTS

PERMIT No.	FACILITY NAME	APPROPRIATOR	PRIORITY	C.F.S. / AF	ACRES	CR No.
HOBACK RIVER, TRIBUTARIES OF SNAKE RIVER						
P3417.0D	PFISTERER NO. 1 DITCH	FRANK VAN VLECK;	9/16/1901	2.540	178.00	CR CC40/646
P3569.0D	NOBLE DITCH	CHARLES NOBLE;	11/29/1901	2.140	150.00	CR CC49/419
P1373.0E	ENLARGED NOBLE DITCH	CHARLES NOBLE;	2/15/1905	2.570	180.00	CR CC56/396
P7161.0D	KILGORE NO. 1 DITCH	J. B. BUDD;	4/12/1906	2.310	162.00	CR CC39/295
P8413.0D	LIONEL L. QUERY DITCH	KEMMERER SAVINGS BANK;	4/30/1908	4.180	293.00	CR CC45/617
P10399.0D	HICKS DITCH	DAVID HICKS;	12/19/1910	1.660	116.00	CR CC38/201
P13250.0D	HATHAWAY DITCH	CHARLES NOBLE;	7/29/1915	1.170	82.00	CR CC49/362
P13250.0D	HATHAWAY DITCH	HANS R AND SUSAN M GRAF;	7/29/1915	0.440	31.00	CR CC77/330
P14672.0D	PRIDE DITCH ACT AMREIN DITCH	F. W. MILLER;	11/27/1916	2.280	160.00	CR CC41/001
P3809.0E	ENLARGED PFISTERER NO 1 DITCH	HELEN WILHELM EDWARDS;	8/30/1917	0.240	17.00	CR CC46/357
P15008.0D	WATTS NO.2 DITCH	FRED WATTS;	2/26/1918	1.610	113.00	CR CC44/394
P16922.0D	HIATT NO 2 DITCH	WALLACE HIATT;	12/8/1924	0.760	52.80	CR CC45/618
P16923.0D	HIATT NO 3 DITCH ACIPT WELLS AND STROBEL NO 1 AND NO 2 DITCHES	WALLACE HIATT;	12/8/1924	0.400	28.00	CR CC45/619
P17129.0D	STONG DITCH	WILLIAM STRONG;	8/11/1926	1.140	80.00	CR CC47/354
P18722.0D	JULIUS MILLER DITCH	JULIUS MILLER;	4/15/1936	2.020	142.00	CR CC56/324
P18788.0D	ROBINSON NO. 2 DITCH	E. S. ROBINSON;	11/12/1936	1.140	80.00	CR CC59/262
P19100.0D	NUTTING-STONG DITCH	W H STRONG;	7/23/1938	0.630	44.00	CR CC60/413
P19100.0D	NUTTING-STONG DITCH	ROBERT L AND PAULA KAY MCNEEL;	7/23/1938	1.430	100.00	CR CC77/193
P19312.0D	ART HICKS DITCH	BARBARA CULL;	2/8/1940	2.010	141.00	CR CC59/038
P19313.0D	CAROLINE DITCH	BARBARA CULL;	2/8/1940	0.330	23.00	CR CC59/039
P19907.0D	HIATT NO. 2 DITCH	WALLACE E. AND ALICE C HIATT; LLOYD E. AND DOROTHY LACEY;	6/2/1944	1.110	77.90	CR CC61/374
P19972.0D	MILLER DITCH	EDWARD D'ATRI;	3/2/1945	1.170	81.68	CR CC69/098
P19990.0D	HIATT NO. 1 DITCH	C F TRONSEN;	9/29/1945	0.690	48.00	CR CC61/064
P22668.0D	AMREIN DITCH	LEOLA AMREIN;	1/29/1962	1.670	116.55	CR CC68/050
P22668.0D	AMREIN DITCH	LEOLA AMREIN;	1/29/1962	0.000	174.69	CR CC68/050
P24563.0D	RAINBOW PIPE LINE	DEAN M AND GRANCE G BERG;	1/7/1975	0.017	1.19	CR CC72/300
P27265.0D	PPAFF PIPELINE	YVONNE PFAFF; LYNN AND ROBIN BLAIR;	7/27/1981	0.067	0.00	CR CC74/291
P27370.0D	DOLENCE PIPELINE	JOHN AND JOE DOLENCE;	7/30/1981	0.560	0.00	CR CC74/290
P30073.0D	PEET PIPELINE	CHARLES PEET;	8/22/1988	0.010	1.00	CR CC79/155
P30178.0D	J-W PIPELINE	J-W HOMEOWNERS ASSOCIATION INC; JOSEPH S. BROADBENT;	4/10/1989	0.200	0.00	CR CC79/156
P30852.0D	GRAF DITCH	HANS GRAF;	2/6/1992	1.960	0.00	CR CC79/157
P31100.0D	MANTEY PIPELINE	ERVING W AND CARYL S MANTEY;	4/12/1993	0.100	0.00	CR CC80/384
P31426.0D	SIMON PIPELINE	RANDE L AND BARBARA E SIMON;	6/22/1995	0.110	0.00	CR CC81/359
P31641.0D	APKER PIPELINE	GLEN MYERS;	9/29/1995	0.110	0.00	CR CC83/063
P31785.0D	SCHWINDT PIPELINE	DAVID SCHWINDT;	2/4/1997	0.056	0.00	CR CC83/064
P31787.0D	WOOLWINE PIPELINE	WILLARD F. AND CONNIE MAY WOOLWINE;	2/4/1997	0.056	0.00	CR CC83/065
P31784.0D	SAUNDERS PIPELINE	ALLEN D AND ELLINORE SAUNDERS;	2/4/1997	0.056	0.00	CR CC82/311
P31843.0D	GABRIELSON PIPELINE	STEVEN B AND MARY L GABRIELSON LIVING TRUST;	3/31/1997	0.990	69.00	CR CC82/312
P31880.0D	GRUTZMACHER WATER SYSTEM	JENNIFER MEAGHER;	6/13/1997	0.090	0.00	CR CC84/214
P11004.0R	BRADLEY NO. 1 RESERVOIR	ROBERT H BRADLEY FAMILY TRUST;	1/14/2000	19.900	0.00	CR CR23/328
P32257.0D	BRADLEY DITCH	ROBERT H BRADLEY FAMILY TRUST;	1/14/2000	0.210	0.00	CR CC95/088
P11777.0R	HOBACK VISTAS NO. 1 RESERVOIR	ANGUS GERALD GOETZ III REVOCABLE LIVING TRUST;	5/10/2004	1.470	0.00	CR CR23/329
P7593.0E	ENL. HIATT DITCH NO 1	JAMES AND IRENE BRINKERHOFF;	10/7/2008	0.056	0.00	CR CC92/142
P7608.0E	ENLARGED HIATT DITCH NO 1	RICHARD CHARLES MELBY;	3/3/2009	0.056	0.00	CR CC92/143
P35066.0D	EMMY PIPELINE	JOHN PATRICK MICKUS;	8/15/2013	0.056	0.00	CR CC95/089
P14460.0R	LEEPER RESERVOIR	SCOTT R. LEEPER;	11/3/2015	2.200	0.00	CR CR24/343
P10967.0R	LONE EAGLE CAMPGROUND RESERVOIR	PATHFINDER HOLDING CO, LLC;	3/4/1999	6.880	0.00	CR CR24/199
P11516.0R	AVOCET RESERVOIR	FLORENCE R. SHEPARD		0.580	0.00	
P11517.0R	SNIPE RESERVOIR	FLORENCE R. SHEPARD		0.140	0.00	

P11518.0R	WILLIT	FLORENCE R. SHEPARD		1.010	0.00	
P11540.0R	HANS RESERVOIR	UPPER HOBACK RIVER RANCH, LLC	11/1/1999	2.000	0.00	CR CR26/374
P13285.0R	ENLARGEMENT OF LAKE MARLENE	RICKETTS RANCH, LLC		34.130		
P13813.0R	SWAN POND	JOSEPH RICKETTS		2.300		

RIDGE CREEK, TRIBUTARIES OF HOBACK RIVER, SNAKE RIVER						
P21442.0D	RIDGE CREEK DITCH	ORAL G AND MELBA WHEELER; IRENE NELSON; R.D. AND MARIE O MCGHIE;	4/5/1954	0.000	17.81	CR CC64/020

EMIL'S SPRING, TRIBUTARIES OF HOBACK RIVER, SNAKE RIVER						
P22681.0D	EMIL'S SPRING PIPELINE	EMIL J AND ANGELA GAILE BERTAGNOLLI;	1/14/1965	0.030	2.00	CR CC68/051

CAMP CREEK, TRIBUTARIES OF HOBACK RIVER, SNAKE RIVER						
P11906.0D	LINCOLN DITCH	LINCOLN IMESON;	6/26/1913	0.310	21.90	CR CC41/005
P12962.0D	CAMP CREEK DITCH	JAMES E. WILSON ESTATE;	1/11/1915	0.140	10.00	CR CC41/446
P9212.0R	CAMP CREEK FISH POND	CAMP CREEK PROPERTIES LLC;	12/1/1986	0.470	0.00	CR CR23/330

BILL SPRING, TRIBUTARIES OF CAMP CREEK, HOBACK RIVER, SNAKE RIVER						
P20129.0D	GREENE PIPELINE	WILBUR GREENE;	5/26/1947	0.120	0.00	CR CC64/021

BERTAGNOLLI SPRING, TRIBUTARIES OF HOBACK RIVER, SNAKE RIVER						
P21559.0D	BERTAGNOLLI SPRING PIPELINE	THOMAS M. AND DIAN BESS;	12/20/1954	0.022	0.00	CR CC68/168

WILLOW CREEK (32-39-115), TRIBUTARIES OF HOBACK RIVER, SNAKE RIVER						
P19962.0D	BERTAGNOLLI DITCH	ORAL G AND MELBA WHEELER; IRENE NELSON; R.D. AND MARIE O MCGHIE;	2/10/1945	0.410	28.93	CR CC64/022
P22490.0D	HIATT NO. 3 DITCH	HAROLD B AND MARY E BOYD;	7/12/1963	0.610	43.00	CR CC67/298

IMESON CREEK, TRIBUTARIES OF HOBACK RIVER, SNAKE RIVER						
P10041.0D	HOBACK DITCH	ELIAS WILSON;	8/10/1910	0.070	5.00	CR CC37/607
P17679.0D	CAMP DAVIS PIPE LINE	UNIVERSITY OF MICHIGAN;	12/23/1929	0.010	1.00	CR CC47/534

BRYAN CREEK, TRIBUTARIES OF HOBACK RIVER, SNAKE RIVER						
P11941.0D	BRYAN DITCH	USDA FOREST SERVICE;	7/26/1913	1.150	81.00	CR CC42/207

LOWER SPRING, TRIBUTARIES OF BRYAN CREEK, HOBACK RIVER, SNAKE RIVER						
P19567.0D	BRYANT FLAT R. S. WATER SYSTEM	USDA FOREST SERVICE;	6/20/1941	0.005	0.00	CR CC59/263

UPPER SPRING, TRIBUTARIES OF BRYAN CREEK, HOBACK RIVER, SNAKE RIVER						
P19566.0D	BRYANT FLAT R. S. WATER SYSTEM PIPELINE	USDA FOREST SERVICE;	6/20/1941	0.022	0.00	CR CC59/264

BUCK CREEK, TRIBUTARIES OF HOBACK RIVER, SNAKE RIVER						
P19402.0D	HOBACK CAMPGROUND WATER SUPPLY SYSTEM PIPELINE	USDA FOREST SERVICE;	7/1/1940	0.056	0.00	CR CC58/304

SLIDE GULCH SPRING, TRIBUTARIES OF GRANITE CREEK, HOBACK RIVER, SNAKE RIVER						
P20215.0D	SLIDE GULCH PIPELINE	GROVER BASSETT;	8/5/1948	0.040	0.00	CR CC62/410
P20215.0D	SLIDE GULCH PIPELINE	D. G. MACLEOD;	8/5/1948	0.010	0.00	CR CC62/411

SWIFT CREEK, TRIBUTARIES OF GRANITE CREEK, HOBACK RIVER, SNAKE RIVER						
P20216.0D	SWIFT CREEK DITCH	GROVER BASSETT;	8/5/1948	1.310	91.70	CR CC64/024

GARDEN CREEK, TRIBUTARIES OF HOBACK RIVER, SNAKE RIVER						
P14841.0D	GARDEN DITCH	HELEN WILHELM EDWARDS;	8/30/1917	0.960	67.00	CR CC46/358

DELL CREEK, TRIBUTARIES OF HOBACK RIVER, SNAKE RIVER							
P8492.0D	STULTS DITCH	J. P. PFISTERER;	6/17/1908	1.310	92.00	CR CC42/206	
P13875.0D	RIHLING DITCH	T. R. WINEMAN;	11/4/1915	1.610	113.00	CR CC46/297	
P14465.0D	PARODY DITCH	G. E. PARODY;	10/6/1916	0.900	63.00	CR CC42/360	
P4070.0E	ENLARGED STULTZ DITCH ACIPT HANSEN DITCH	GRACE PARRY;	1/19/1920	1.060	74.00	CR CC52/238	
P4070.0E	ENLARGED STULTZ DITCH ACIPT HANSEN DITCH	ANDREW ERICKSON;	1/19/1920	2.090	146.00	CR CC60/414	
P4393.0E	ENLARGED STULTZ DITCH ACIPT HANSEN DITCH	W. L. JONES;	12/3/1923	0.640	45.00	CR CC47/031	
P4393.0E	ENLARGED STULTZ DITCH ACT HANSEN DITCH	G. A. BEEMAN;	12/3/1923	1.340	94.00	CR CC47/032	
P5696.0E	ENLARGED STULTZ DITCH	THOMAS F AND GENEVIEVE C KEARNS;	7/31/1953	1.700	119.00	CR CC64/204	
P5697.0E	ENLARGED HANSEN DITCH	THOMAS F AND GENEVIEVE C KEARNS;	7/31/1953	0.370	26.00	CR CC64/205	
P21260.0D	NORTH KEARNS DITCH ACT HANSEN DITCH AND STULTZ DITCH	THOMAS F. AND GENEVIEVE C. KEARNS;	8/11/1953	0.530	37.00	CR CC64/467	
P21261.0D	SOUTH KEARNS DITCH ACIPT RIHLING DITCH	THOMAS F. AND GENEVIEVE C. KEARNS;	8/11/1953	1.720	121.00	CR CC64/468	
P6195.0E	ENLARGED PARODY DITCH	JAMES BOSONE;	5/1/1963	0.360	25.00	CR CC70/161	

KEARNS SPRING NO. 1, TRIBUTARIES OF PARODY CREEK, DELL CREEK, HOBACK RIVER, SNAKE RIVER							
P21844.0D	KEARNS PIPE LINE NO. 1	ROBERT WAGSTAFF;	4/15/1957	0.800	0.00	CR CC69/390	

KEARNS SPRING NO. 2, TRIBUTARIES OF PARODY CREEK, DELL CREEK, HOBACK RIVER, SNAKE RIVER							
P21845.0D	KEARNS PIPE LINE NO. 2	ROBERT WAGSTAFF;	4/15/1957	0.800	0.00	CR CC69/391	

HALEY CREEK, TRIBUTARIES OF DELL CREEK, HOBACK RIVER, SNAKE RIVER							
P22419.0D	MACK DITCH	E. G. MACK;	9/5/1962	0.140	10.00	CR CC67/101	

MACK SPRING, TRIBUTARIES OF HALEY CREEK, DELL CREEK, HOBACK RIVER, SNAKE RIVER							
P21891.0D	MACK SPRING PIPELINE	E G MACK;	7/31/1957	0.010	0.00	CR CC65/232	

BEAMAN SPRING NO. 1, TRIBUTARIES OF HALEY CREEK, DELL CREEK, HOBACK RIVER, SNAKE RIVER							
P21892.0D	BEAMAN SPRING NO. 1 PIPELINE	E. G. MACK;	7/31/1957	0.010		CR CC65/481	

WICKETT SPRING, TRIBUTARIES OF WICKETT DRAW, HALEY CREEK, DELL CREEK, HOBACK RIVER, SNAKE RIVER							
P23179.0D	WICKETT PIPELINE	HERSHEL H AND LILLIAM L WICKETT;	3/8/1968	0.044	0.00	CR CC70/163	

BABE MACK SPRING, TRIBUTARIES OF WICKETT DRAW, HALEY CREEK, DELL CREEK, HOBACK RIVER, SNAKE RIVER							
P24270.0D	BABE MACK SPRING PIPELINE	E. G. MACK;	9/24/1973	0.056	0.00	CR CC72/472	
P6583.0E	ENLARGED BABE MACK SPRING PIPELINE	E G MACK;	5/1/1975	0.060	0.00	CR CC72/473	
P8079.0S	BABE MACK STOCK RESERVOIR	E. G. MACK;	5/1/1975	7.330	0.00	CR CR08/432	

JONES CREEK, TRIBUTARIES OF DELL CREEK, HOBACK RIVER, SNAKE RIVER							
P16658.0D	JONES DITCH	WILLIE JONES;	8/30/1923	0.440	31.00	CR CC47/033	

ROCK CREEK, TRIBUTARIES OF DELL CREEK, HOBACK RIVER, SNAKE RIVER							
P20345.0D	BOSONE DITCH	JAMES BOSONE;	6/12/1948	1.080	75.90	CR CC64/023	

HAMILTON CREEK, TRIBUTARIES OF DELL CREEK, HOBACK RIVER, SNAKE RIVER							
P7386.0D	BOWLSBY NO. 2 DITCH	PERRY BOWLSBY;	8/23/1906	4.070	285.00	CR CC40/204	

HOUSE CREEK, TRIBUTARIES OF DELL CREEK, HOBACK RIVER, SNAKE RIVER							
P22805.0D	HOUSE CREEK DITCH	JAMES BOSONE;	5/1/1963	0.000	63.80	CR CC70/162	

BAKER SPRING, TRIBUTARIES OF BAKER SPRING CREEK, DELL CREEK, HOBACK RIVER, SNAKE RIVER							
P22028.0D	BAKER SPRINGS PIPELINE	BILLY R AND EILEEN DOCKHAM;	1/27/1959	0.012	0.00	CR CC68/169	

JACK CREEK, TRIBUTARIES OF HOBACK RIVER, SNAKE RIVER							
P3895.0D	BOWLSBY NO. 3 DITCH	WILLIAM BOWLEBY;	5/12/1902	1.930	135.00	CR CC41/425	
P10460.0D	BAKER DITCH	LORENZO CAMPBELL;	1/20/1911	1.640	115.00	CR CC41/426	
P10460.0D	BAKER DITCH	HEARLEY FRONK;	1/20/1911	2.280	160.00	CR CC45/164	
P10460.0D	BAKER DITCH	VINCENT FRONK;	1/20/1911	1.060	74.00	CR CC49/137	
P10460.0D	BAKER DITCH	SHELTON BAKER;	1/20/1911	3.910	274.00	CR CC40/203	
P10460.0D	BAKER DITCH	EILEEN AND BILLY R. DOCKHAM;	1/20/1911	0.570	40.00	CR CC69/281	
P14101.0D	BONDURANT NO. 1 DITCH	B. F. BONDURANT;	4/19/1916	1.540	108.00	CR CC40/200	
P14102.0D	BONDURANT NO 2 DITCH	B.F. BONDURNANT;	4/19/1916	1.200	84.00	CR CC40/201	
P14103.0D	BONDURANT NO. 3 DITCH	B. F. BONDURANT;	4/19/1916	0.740	52.00	CR CC40/202	
P4522.0E	ENLARGED BAKER DITCH	EUGENE HOLT;	1/6/1927	1.530	107.00	CR CC47/233	
P4933.0E	ENLARGED BAKER DITCH	VINCENT FRONK;	7/24/1934	0.270	19.00	CR CC49/136	
P18617.0D	FRONK DITCH	DANIEL FRONK;	7/30/1934	2.000	140.00	CR CC52/237	
P20855.0D	LAZY J. C. DITCH	ROY THOMAS FISK;	10/26/1951	1.080	76.00	CR CC64/323	
P22024.0D	BULL PASTURE DITCH	BILLY R. AND EILEEN DOCKHAM; EILEEN DOCKHAM;	1/27/1959	0.640	45.00	CR CC68/171	

ELLWOOD SPRING CREEK, TRIBUTARIES OF JACK CREEK, HOBACK RIVER, SNAKE RIVER							
P13160.0S	ELLWOOD STOCK RESERVOIR	PAUL M AND BARBARA ELLWOOD;	7/14/1999	0.490	0.00	CR CR15/381	

HEARLEY SPRING, TRIBUTARIES OF JACK CREEK, HOBACK RIVER, SNAKE RIVER							
P21887.0D	HEARLEY SPRING PIPELINE	MARVIN PEARSON;	7/15/1957	0.022	0.00	CR CC68/170	

UNNAMED STREAM, TRIBUTARIES OF HOBACK RIVER, SNAKE RIVER							
P19404.0D	HOBACK GUARD STATION WATER SUPPLY SYSTEM PIPELINE	USDA FOREST SERVICE;	7/1/1940	0.015	0.00	CR CC58/305	

BOOKER SLOUGH, TRIBUTARIES OF HOBACK RIVER, SNAKE RIVER							
P16659.0D	BARRETT DITCH	LOUIS R. AMREIN;	8/30/1923	0.140	10.10	CR CC66/056	

SPRING CREEK (SENW 10-37-113), TRIBUTARIES OF HOBACK RIVER, SNAKE RIVER							
P17820.0D	BRONNENBERG NO. 2 DITCH	LOUIS AMREIN;	11/28/1930	0.280	20.00	CR CC66/058	
P18476.0S	AMBER STOCK RESERVOIR	TOM DAVID CROOK	11/30/2006	9.760	0.00	CR CR24/201	
P33733.0D	AMBER DITCH	TOM DAVID CROOK	11/30/2006	0.000	0.00	CR CC95/353	

CLARKS BUTTE DRAW, TRIBUTARIES OF HOBACK RIVER, SNAKE RIVER							
P22669.0D	CLARKS BUTTE DRAW DIVERSION OF AMREIN DITCH	LEOLA AMREIN;	1/29/1962	0.000	291.24	CR CC68/052	

SPRING CREEK NO. 2, TRIBUTARIES OF CLARKS BUTTE DRAW, HOBACK RIVER, SNAKE RIVER							
P17819.0D	BRONNENBERG NO. 1 DITCH	LOUIS AMREIN;	11/28/1930	0.280	20.00	CR CC66/057	
P11725.0R	SMILING S RESERVOIR	ROBERT AND COURTNEY STROHMENGER	11/8/2001	0.080	0.00	CR CR24/200	

SPRING CREEK (NWSE 10-37-113), TRIBUTARIES OF HOBACK RIVER, SNAKE RIVER							
P14854.0D	RICHARDS DITCH ACT AMREIN DITCH	WILLIAM BOOKER;	9/14/1917	2.160	151.00	CR CC41/421	
P22672.0D	SPRING CREEK DIVERSION AMREIN DITCH	LEOLA AMREIN;	1/29/1966	0.000	286.65	CR CC68/053	

HICKS SPRING CREEK, TRIBUTARIES OF SPRING CREEK (NWSE 10-37-113), HOBACK RIVER, SNAKE RIVER							
P22671.0D	HICKS SPRING CREEK DIVERSION AMREIN DITCH	LEOLA AMREIN;	1/29/1962	0.000	411.24	CR CC68/054	

LITTLE SPRING CREEK, TRIBUTARIES OF HOBACK RIVER, SNAKE RIVER							
P13302.0D	CENTRAL DITCH	ANDREW JOHNSON;	8/5/1915	0.860	60.00	CR CC41/422	
P17077.0D	NOBLE NO. 1 DITCH	FRIEDA E. NOBLE HITTLE;	6/28/1923	0.260	18.00	CR CC46/298	
P17078.0D	NOBLE NO. 2 DITCH	FRIEDA E. NOBLE HITTLE;	6/28/1923	0.690	48.00	CR CC46/299	

NUTTING CREEK, TRIBUTARIES OF HOBACK RIVER, SNAKE RIVER						
P19101.0D	NUTTING DITCH	ROBERT L. AND PAULA KAY MCNEEL;	7/22/1938	0.000	25.00	CR CC77/193
P19101.0D	NUTTING DITCH	ROBERT L. AND PAULA KAY MCNEEL;	7/23/1938	0.000	56.00	CR CC77/193

KILGORE SPRING CREEK, TRIBUTARIES OF HOBACK RIVER, SNAKE RIVER						
P9431.0R	LAKE MARLENE RESERVOIR	HANS GRAF;	9/28/1988	13.900	0.00	CR CR13/224

WILLOW CREEK (3-36-114), TRIBUTARIES OF HOBACK RIVER, SNAKE RIVER						
P15244.0D	DEMPSEY DITCH	MARY DAMPSEY;	7/27/1917	0.310	22.00	CR CC41/420
P15244.0D	DEMPSEY DITCH	J. B. BUDD;	7/27/1917	0.570	40.00	CR CC41/453

BELLEM DRAW, TRIBUTARIES OF HOBACK RIVER, SNAKE RIVER						
P24538.0D	BELLEM DRAW DITCH NO. 1	EDWARD MARSLAND;	11/13/1974	0.390	27.20	CR CC72/301

MUDDY CREEK, TRIBUTARIES OF HOBACK RIVER, SNAKE RIVER						
P5486.0S	MUDDY STOCK RESERVOIR	MILLER LAND AND LIVESTOCK CO.;	11/10/1965	4.220	0.00	CR CR03/459

MCLEAN CREEK, TRIBUTARIES OF MUDDY CREEK, HOBACK RIVER, SNAKE RIVER						
P5484.0S	MCLEAN STOCK RESERVOIR	MILLER LAND AND LIVESTOCK CO.;	11/10/1965	16.400	0.00	CR CR03/460

FISHERMAN CREEK, TRIBUTARIES OF HOBACK RIVER, SNAKE RIVER						
P1098.0D	SAILOR DITCH	J. P. PFISTERER;	11/22/1895	2.490	174.00	CR CC46/300
P1098.0D	SAILOR DITCH	J. P. PFISTERER;	11/22/1895	1.710	120.00	CR CC47/034
P741.0E	ENLARGED SAILOR DITCH	J P PFISTERER;	11/29/1901	1.670	117.00	CR CC46/301
P3561.0E	ENLARGED SAILOR DITCH	EUGENE ROBINSON;	11/17/1915	1.150	81.00	CR CC42/359
P16154.0D	HIBBEN DITCH ACT PFISTERER DITCH	SHERMAN A. LLOYD;	7/18/1921	1.010	71.00	CR CC47/035
P17079.0D	ROBINSON DITCH	FRIEDA E. NOBLE HITTLE;	7/2/1924	0.060	4.00	CR CC46/302
P17079.0D	ROBINSON DITCH	EUGENE ROBINSON;	7/2/1924	0.200	14.00	CR CC46/303
P17080.0D	ROBINSON DITCH	EUGENE ROBINSON;	7/2/1924	0.000	56.00	CR CC46/304
P17080.0D	ROBINSON DITCH	FRIEDA E. NOBLE HITTLE;	7/2/1924	0.000	25.00	CR CC46/305
P17128.0D	HANCOCK DITCH	BARBARA CULL;	8/11/1926	0.500	35.00	CR CC59/037
P17250.0D	ORIN NO. 1 DITCH	ORIN ROBINSON;	7/18/1927	0.940	66.00	CR CC47/195
P5295.0E	ENLARGED ROBINSON DITCH	CARROLL NOBLE;	1/28/1941	1.970	138.00	CR CC59/328
P22845.0D	PFISTERER DITCH	GENE HARMON PFISTERER;	2/20/1963	0.070	5.00	CR CC69/496

HAY GULCH CREEK, TRIBUTARIES OF FISHERMAN CREEK, HOBACK RIVER, SNAKE RIVER						
P5495.0S	BURNEY STOCK RESERVOIR	MILLER LAND AND LIVESTOCK CO.;	11/26/1965	6.500	0.00	CR CR03/456

SOUTH BRANCH OF HAY GULCH CREEK, TRIBUTARIES OF HAY GULCH CREEK, FISHERMAN CREEK, HOBACK RIVER, SNAKE RIVER						
P5494.0S	HAY GULCH STOCK RESERVOIR	MILLER LAND AND LIVESTOCK CO.;	11/26/1965	3.390	0.00	CR CR03/457

LITTLE FISH CREEK, TRIBUTARIES OF FISHERMAN CREEK, HOBACK RIVER, SNAKE RIVER						
P5490.0S	HANSON STOCK RESERVOIR	MILLER LAND AND LIVESTOCK CO.;	11/22/1965	12.800	0.00	CR CR03/458

SLED-RUNNER CREEK, TRIBUTARIES OF FISHERMAN CREEK, HOBACK RIVER, SNAKE RIVER						
P8222.0S	DAVICH STOCK RESERVOIR	MIKE AND SANDRA DAVICH;	3/4/1977	9.100	0.00	CR CR08/658

SPRING, TRIBUTARIES OF FISHERMAN CREEK, HOBACK RIVER, SNAKE RIVER						
P17251.0D	ORIN NO. 2 DITCH	ORIN ROBINSON;	7/18/1927	0.280	20.00	CR CC47/196

DEAD SHOT CREEK, TRIBUTARIES OF HOBACK RIVER, SNAKE RIVER						
P8353.0S	BENSEN STOCK RESERVOIR	LEO AND ROSEMARY BENSON;	4/5/1978	0.850	0.00	CR CR08/782

GRAND TOTAL ORIGINAL SUPPLY:	105.24	CFS
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	6991.85	AC
GRAND TOTAL SUPPLEMENTAL SUPPLY:	1382.43	AC
STOCK RESERVOIR STORAGE:	70.84	AC-FT
RESERVOIR STORAGE:	85.06	AC-FT
GRAND TOTAL STORAGE:	155.90	AC-FT
TRANS-WATERSHED DIVERSION:	0	CFS

SNAKE RIVER: TABULATION OF ADJUDICATED WATER RIGHTS

PERMIT No.	FACILITY NAME	APPROPRIATOR	PRIORITY	C.F.S. / AF	ACRES	CR No.
SNAKE RIVER						
P7165.OE	ENLARGED BILLY WELLS DITCH	RICHARD EDGCOMB AND CAROLYN D. EDGCOMB;	9/25/1995	1.300	91.30	CR CC81/349
P7766.OE	ENLARGED BILLY WELLS DITCH	CYGNUS CAPITAL INC; SNAKE RIVER BEND RANCH LLC;	8/21/2013	83.380	0.00	CR CC95/082
P10417.OR	BILLY WELLS RESERVOIR	RICHARD EDGCOMB AND CAROLYN D. EDGCOMB;	9/25/1995	0.850	0.00	CR CR15/094
P11164.OS	ARBARDEE STOCK RESERVOIR	JOHN BRANCA	12/13/1990	7.690	0.00	CR CR13/320
P14207.OR	BEAVER RESERVOIR	CYGNUS CAPITAL INC; SNAKE RIVER BEND RANCH LLC;	8/21/2013	26.070	0.00	CR CR23/320
P14208.OR	HORSE RESERVOIR	CYGNUS CAPITAL INC;	8/21/2013	2.260	0.00	CR CR23/321
P14209.OR	TRUMPETER RESERVOIR	CYGNUS CAPITAL INC;	8/22/2013	47.420	0.00	CR CR23/322
P14210.OR	MARTIN CREEK RESERVOIR	CYGNUS CAPITAL INC;	8/23/2013	3.860	0.00	CR CR23/326
P21986.OD	BILLY WELLS DITCH	WILLIAM B. WELLS AND GLADYS H. WELLS	1/14/1999	0.360	25.20	CR CC65/358
P25954.OD	GRIMES PIPELINE NO. 1	FRANK J. AND KAREN A. GRIMES	8/8/1977	0.056	4.00	CR CC74/070
P29998.OD	EXPLORER BASE PIPELINE	GREAT SALT LAKE COUNCIL, BOY SCOUTS OF AMERICA;	9/22/1987	0.000	3.64	CR CC77/327
P30970.OD	SAPP PIPELINE	V. ALEX SAPP AND DEBORAH SAPP	7/10/1992	0.090	0.00	CR CC80/085

CALLER DRAW, TRIBUTARIES SNAKE RIVER

P27743.OD	CALLER SPRINKLER SYSTEM	JOE AND ANNE CALLER; LARRY J. CALLER; JOE P. CALLER, JR; HAROLD W. CALLER;	9/3/1981	0.056	1.00	CR CC75/137
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WARM SPRINGS, TRIBUTARIES SNAKE RIVER

P12036.OD	COUNT'S HOT SPRINGS PIPELINE	ASTORIA MINERAL SPRINGS, INC.;	9/20/1913	0.410	30.00	CR CC67/228
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SAWPIT CREEK, TRIBUTARIES SNAKE RIVER

P12037.OD	BRUCE'S PIPELINE	ASTORIA MINERAL SPRINGS, INC.;	9/20/1913	0.300	0.00	CR CC67/229
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FALL CREEK, TRIBUTARIES SNAKE RIVER

P10394.OD	BIG CUT DITCH	CORNELIUS HAWKINS	12/12/1910	0.870	61.00	CR CC37/556
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PARMER CREEK, TRIBUTARIES SNAKE RIVER

P14863.OD	BIG PAULS DITCH	PAUL A. IMESON	9/19/1917	0.430	30.00	CR CC41/008
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SALT RIVER, TRIBUTARIES SNAKE RIVER

P1227.OE	ENLARGED AMES AND GOULD	JULIA McNEEL	6/20/1904	0.430	30.07	CR CC32/300
P1227.OE	ENLARGED AMES	JAMES R. AND LYDIA SYDENSTRICKER	6/21/1904	1.690	118.40	CR CC42/585
P1227.OE	ENLARGED AMES	G.W. McNEEL	6/22/1904	5.690	397.97	CR CC42/586

ZAJAC SPRING, TRIBUTARIES SNAKE RIVER

P24202.OD	ZAJAC PIPELINE	JACK ZAJAC AND CORDA ZAJAC	8/1/1973	0.014	0.00	CR CC72/298
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GRAND TOTAL ORIGINAL SUPPLY:	95.08	CFS
	784.94	AC
GRAND TOTAL SUPPLEMENTAL SUPPLY:	7.64	AC
STOCK RESERVOIR STORAGE:	7.69	AC-FT
RESERVOIR STORAGE:	80.46	AC-FT
GRAND TOTAL STORAGE:	88.15	AC-FT
TRANS-WATERSHED DIVERSION:	0	CFS

GREYS RIVER: TABULATION OF ADJUDICATED WATER RIGHTS

PERMIT No.	FACILITY NAME	APPROPRIATOR	PRIORITY	C.F.S. / AF	ACRES	CR No.
GREY'S RIVER, TRIBUTARIES SNAKE RIVER						
P11.0F	GREY'S RIVER INSTREAM FLOW SEGMENT 1	WYOMING WATER DEVELOPMENT COMMISSION	10/8/1993	204.000	0.00	CR CC84/009
P18201.0D	YOUNG DITCH NO. 1	LORRAINE AND REX YOUNG;	6/15/1932	0.610	42.80	CR CC80/082
P21291.0D	YOUNG DITCH	SAM YOUNG J;	11/5/1953	0.000	153.60	CR CC64/376
BIG DAD SPRING, TRIBUTARIES STEER CREEK, LITTLE GREY'S RIVER, GREY'S RIVER, SNAKE RIVER						
P34836.0D	BIG DAD SPRING	USDA FOREST SERVICE BRIDGER TETON NATIONAL FOREST GREY'S RIVER RANGER DISTRICT;	7/23/2010	0.056	0.00	CR CC95/213
BLIND BULL CAMP CREEK, TRIBUTARIES BLIND BULL CREEK, GREY'S RIVER, SNAKE RIVER						
P34816.0D	BLIND BULL CAMP PIPELINE	USDA FOREST SERVICE;	12/5/2011	0.056	0.00	CR CC92/285
BLIND SPRING, TRIBUTARIES BLIND DRAW, SOUTH FORK LITTLE GREY'S RIVER, LITTLE GREY'S RIVER, GREY'S RIVER, SNAKE RIVER						
P19661.0S	BLIND STOCK RESERVOIR	USDA FOREST SERVICE BRIDGER TETON NATIONAL FOREST GREY'S RIVER RANGER DISTRICT;	8/21/2015	0.016	0.00	CR CR24/061
DEAD MAN CREEK, TRIBUTARIES GREY'S RIVER, SNAKE RIVER						
P18202.0D	YOUNG DITCH NO. 2	LORRAINE YOUNG AND REX YOUNG;	6/15/1932	0.210	14.50	CR CC80/083
DEAD MAN SPRING, TRIBUTARIES DEAD MAN SPRING DRAW, DEAD MAN CREEK, GREY'S RIVER, SNAKE RIVER						
P34892.0D	DEAD MAN SPRING NO. 1 PIPELINE	USDA FOREST SERVICE BRIDGER TETON NATIONAL FOREST GREY'S RIVER RANGER DISTRICT;	12/5/2011	0.011	0.00	CR CC80/083
FOREST PARK FEEDGROUND SPRING NO. 1, TRIBUTARIES FOREST PARK FEEDGROUND SPRING NO. 1 DRAW, GREY'S RIVER, SNAKE RIVER						
P34893.0D	FOREST PARK FEEDGROUND NO. 1 PIPELINE	USDA FOREST SERVICE;	12/5/2011	0.011	0.00	CR CC92/287
GILLIS SPRING, TRIBUTARIES GREY'S RIVER, SNAKE RIVER						
P12664.0D	GILLIS DITCH	JOSEPH E. GILLIS;	8/20/1914	0.070	5.00	CR CC49/342
GRT DRAW, TRIBUTARIES GREY'S RIVER, SNAKE RIVER						
P34853.0D	GRT CAMP NO. 1	USDA FOREST SERVICE BRIDGER TETON NATIONAL FOREST GREY'S RIVER RANGER DISTRICT;	4/25/2011	0.056	0.00	CR CC95/210
McCAIN NO. 1 SPRING, TRIBUTARIES McCAIN DRAW, McCAIN NO. 3 DRAW, LITTLE GREY'S RIVER, GREY'S RIVER, SNAKE RIVER						
P19663.0S	McCAIN NO. 1 STOCK RESERVOIR	USDA FOREST SERVICE BRIDGER TETON NATIONAL FOREST GREY'S RIVER RANGER DISTRICT;	6/16/2010	0.015	0.00	CR CR24/063
McCAIN NO. 3 SPRING, TRIBUTARIES McCAIN NO. 3 DRAW, LITTLE GREY'S RIVER, GREY'S RIVER, SNAKE RIVER						
P19662.0S	McCAIN NO. 3 STOCK RESERVOIR	USDA FOREST SERVICE BRIDGER TETON NATIONAL FOREST GREY'S RIVER RANGER DISTRICT;	6/16/2010	0.005	0.00	CR CR24/062
MEADOW CREEK, TRIBUTARIES GREY'S RIVER, SNAKE RIVER						
P17756.0D	MEADOWS R.S. IRRIGATION DITCH	UNITED STATES FOREST SERVICE;	7/24/1930	0.260	18.00	CR CC47/038
P18205.0D	LOW DITCH	SAMUEL YOUNG;	12/28/1932	2.190	153.60	CR CC52/143
MILL CREEK SPRING AREA, TRIBUTARIES MILL CREEK, PINE CREEK, GREY'S RIVER, SNAKE RIVER						
P6910.0E	ENLARGEMENT ALPINE WATER AND SEWER DISTRICT PIPELINE	TOWN OF ALPINE; (POINTS OF USE ONLY)	12/27/1985	0.000	0.00	CR CC80/421

P24104.0D	ALPINE WATER AND SEWER DISTRICT PIPELINE	TOWN OF ALPINE;	7/9/1973	1.750	0.00	CR CC80/420
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MURPHY SPRING, TRIBUTARIES DEER CREEK (29-38-117), GREY'S RIVER, SNAKE RIVER

P33906.0D	MURPHY CREEK CAMPGROUND SPRING	USDA FOREST SERVICE BRIDGER TETON NATIONAL FOREST GREY'S RIVER RANGER DISTRICT;	3/12/2008	0.056	0.00	CR CC95/211
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PINE CREEK, TRIBUTARIES GREY'S RIVER, SNAKE RIVER

P16203.0D	REESE DITCH	SARAH JANE REESE REEVES;	6/20/1921	2.160	151.20	CR CC45/626
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REESE'S SPRING, TRIBUTARIES GREY'S RIVER, SNAKE RIVER

P10181.0D	LILLIE DITCH	MRS. D. H. REESE;	8/25/1910	0.020	2.00	CR CC35/335
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SOUTH DOE CREEK, TRIBUTARIES GREY'S RIVER, SNAKE RIVER

P34854.0D	SOUTH DOE CREEK NO. 1 PIPELINE	USDA FOREST SERVICE;	4/25/2011	0.056	0.00	CR CC92/284
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STAR VALLEY SPRING NO. 1, TRIBUTARIES STAR VALLEY SPRING NO. 1 DRAW, LITTLE GREY'S RIVER, GREY'S RIVER, SNAKE RIVER

P34897.0D	STAR VALLEY SPRING NO. 1 PIPELINE	USDA FOREST SERVICE;	12/5/2011	0.056	0.00	CR CC92/283
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UNNAMED CREEK, TRIBUTARIES GREY'S RIVER, SNAKE RIVER

P19164.0D	FOREST PARK PIPELINE	UNITED STATES OF AMERICA, FOREST SERVICE;	7/18/1939	0.045	0.00	CR CC58/303
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UNNAMED SPRING, TRIBUTARIES MOOSE CREEK, GREY'S RIVER, SNAKE RIVER

P19166.0D	MOOSE FLAT CAMPGROUND PIPELINE	UNITED STATES OF AMERICA, FOREST SERVICE;	7/19/1939	0.016	0.00	CR CC58/302
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WATERDOG CREEK, TRIBUTARIES WATER DOG LAKE (A CLOSED BASIN), IN THE DRAINAGE OF LITTLE GREY'S RIVER, GREY'S RIVER, SNAKE RIVER

P34680.0D	WATERDOG CAMP SITE NO. 1 PIPELINE	USDA FOREST SERVICE BRIDGER TETON NATIONAL FOREST GREY'S RIVER RANGER DISTRICT;	12/5/2011	0.056	0.00	CR CC95/214
P34855.0D	WATERDOG CAMP SITE NO. 2 PIPELINE	USDA FOREST SERVICE BRIDGER TETON NATIONAL FOREST GREY'S RIVER RANGER DISTRICT;	4/25/2011	0.016	0.00	CR CC95/215

WRAY SPRING, TRIBUTARIES GREY'S RIVER, SNAKE RIVER

P34837.0D	WRAY SPRINGS PIPELINE	USDA FOREST SERVICE;	7/23/2010	0.056	0.00	CR CC92/286
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YOUNG'S SPRING, TRIBUTARIES GREY'S RIVER, SNAKE RIVER

P21290.0D	YOUNG'S PIPELINE	SAM A. YOUNG, JR.;	11/5/1953	0.040	0.00	CR CC64/377
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GRAND TOTAL ORIGINAL SUPPLY:	7.86	CFS
	387.10	AC
GRAND TOTAL SUPPLEMENTAL SUPPLY:	153.60	AC
STOCK RESERVOIR STORAGE:	0.04	AC-FT
RESERVOIR STORAGE:	0.00	AC-FT
GRAND TOTAL STORAGE:	0.04	AC-FT
INSTREAM FLOW:	204 to 350	CFS
TRANS-WATERSHED DIVERSION (SALT RIVER):	3.61	CFS

APPENDIX D

HOBACK RIVER WATERSHED DOMESTIC GROUNDWATER: COMPLETED WELL TABULATION

PERMIT NO.	PRIORITY DATE	APPLICANT: COMPANY / LAST NAME	FACILITY NAME	USE
P12408.OP	3/31/1943	SANDERSON	SANDERSON #1	DOM_GW; STK
P15908.OP	12/31/1952	BOWLSBY	BOWLSBY #1 WELL	DOM_GW
P418.OW	10/11/1960	BELL	WILLIAM H BELL #1	DOM_GW
P795.OW	11/1/1961	LAKE VIEW ESTATES INC.	LAKE VIEW #1	DOM_GW; IRR_GW
P8761.OP	8/25/1962	REEVES	PEW #1	DOM_GW
P13390.OP	11/30/1962	FEUZ	FEUZ RESIDENCE #1	DOM_GW
P25255.OP	7/29/1964	SHIDNER	RINGO #2	DOM_GW
P5808.OP	5/31/1966	GRIGGS	GRIGGS #1	DOM_GW; STK
P11171.OP	7/14/1966	OLIVER	OLIVER #1	DOM_GW
P20201.OP	12/31/1966	HALLING	UNNAMED-HALLING #1	DOM_GW
P9807.OP	6/12/1967	PEARSON	PEARSON #1	DOM_GW
P9453.OP	4/30/1968	D'ATRI	ED #1	DOM_GW; STK
P25254.OP	5/10/1968	SHIDNER	RINGO #1	DOM_GW
P25256.OP	5/10/1968	SHIDNER	JUNE #1	DOM_GW
P3794.OP	5/10/1969	FRANK	FRANK #1	DOM_GW
P2617.OW	6/3/1969	ZAKOTNIK JR.	ZAKOTNIK #1	DOM_GW; IRR_GW
P2710.OW	6/23/1969	BROWN	BROWN #1	DOM_GW
P4006.OW	8/26/1969	SHEPARD	AGNUS #1	DOM_GW
P3604.OW	11/24/1969	YOUNG	YOUNG #1	DOM_GW
P6210.OW	7/30/1970	BERG	RAINBOW #1	DOM_GW
P8532.OW	3/23/1971	JERGENSEN	B E J #1	DOM_GW
P9032.OW	4/27/1971	THOMAS	THOMAS #1	DOM_GW; STK
P9271.OW	5/11/1971	LOWDER	LOWDER #1	DOM_GW
P9336.OW	6/8/1971	PLAINS A TO Z TIRE CO. INC.	A TO Z #1	DOM_GW
P9342.OW	6/14/1971	ROBERTS	ROBERTS #2	DOM_GW
P9501.OW	6/21/1971	D'ATRI	ED #2	DOM_GW; STK
P9502.OW	6/21/1971	D'ATRI	BROWN #1	DOM_GW; STK
P10427.OW	8/31/1971	PERKO	PERKO #1	DOM_GW
P10644.OW	10/5/1971	HALL	HALL #1	DOM_GW
P11180.OW	11/12/1971	HOCH	Lawson No.1 Well	DOM_GW
P13830.OW	5/8/1972	JORGENSEN	3 RIVERS MEADOWS #1	DOM_GW
P14741.OW	7/17/1972	RIDDLE	RIDDLE #1	DOM_GW
P14948.OW	8/1/1972	KOS	TESS #1	DOM_GW; IRR_GW; STK
P15453.OW	9/11/1972	GALLAS	GALLAS #1	DOM_GW
P15467.OW	9/21/1972	HAMAN	HAMAN #1	DOM_GW
P15659.OW	10/10/1972	CRENSHAW	CRENSHAW #1	DOM_GW
P17216.OW	12/11/1972	SHOLL	SHOLL #1	DOM_GW
P20637.OW	4/6/1973	TREFREN	TREFREN #1	DOM_GW
P21295.OP	5/3/1973	WILLIS	WILLS #1	DOM_GW; STK
P21878.OW	5/18/1973	WHEELER	WHEELER #1	DOM_GW
P21879.OW	5/18/1973	HILL	HILL #1	DOM_GW
P21931.OW	5/18/1973	GARAMAN	GARAMAN #1	DOM_GW
P21873.OW	5/25/1973	DOLENCE	DOLENCE #1	DOM_GW

P21957.0W	6/1/1973	PETERSON	MOLGARD #1	DOM_GW
P21956.0W	6/13/1973	GODIN	GODIN #1	DOM_GW
P22733.0W	6/19/1973	KENDRICK	KENDRICK #1	DOM_GW
P22750.0W	6/21/1973	HOBACK RANCHES	HOBACK RANCH #1	DOM_GW
P23273.0W	6/26/1973	MCNEEL	MCNEEL #1	DOM_GW; STK
P24626.0W	8/13/1973	MECCA	MECCA #1	DOM_GW
P24933.0W	10/25/1973	KEIERLEBER	KEIERLEBER #1	DOM_GW
P26750.0W	5/20/1974	TELLER	TELLER #1	DOM_GW
P26991.0W	6/10/1974	FENNO II	ARTHUR SCHUELER #1	DOM_GW
P27307.0W	6/21/1974	WATKINS	WATKINS #1	DOM_GW
P27308.0W	7/2/1974	DAILY	IRVING #1	DOM_GW
P27317.0W	7/8/1974	SCOTT	SCOTT #1	DOM_GW
P27474.0W	7/22/1974	LICHTENDAHL	LICHTENDAHL #1	DOM_GW
P27579.0W	7/26/1974	LODER	LODER #1	DOM_GW
P27782.0W	8/21/1974	RYEL	J W RYEL #1	DOM_GW
P27986.0W	8/30/1974	SIDENER	SIDENER #1	DOM_GW
P28065.0W	9/16/1974	MUELLER	MUELLER #1	DOM_GW
P28267.0W	10/29/1974	ANSELM	ANSELM-SUMMER HOME #1	DOM_GW
P28499.0P	11/18/1974	CLARK	CLARK #1	DOM_GW
P29068.0P	11/18/1974	BREWER	BREWER #1	DOM_GW
P29305.0W	11/18/1974	WELLS	WELLS & STROBEL #1	DOM_GW; MIS
P29873.0W	5/14/1975	RIGGAN	RIGGAN #1	DOM_GW; STK
P30097.0W	5/27/1975	LONG	LONG #1	DOM_GW; STK
P29945.0W	5/28/1975	WEAVER	WEAVER #1	DOM_GW
P30392.0W	7/9/1975	HARBAUGH	MYRTLE #1 (DEEPENED)	DOM_GW
P31294.0W	10/7/1975	PUCHE, JR.	PUCHE #1 (SPRING)	DOM_GW; STK
P31295.0W	10/7/1975	PUCHE, JR.	PUCHE #2 (SPRING)	DOM_GW
P34050.0W	4/7/1976	MOLGARD	MPM #1	DOM_GW
P33374.0W	4/29/1976	PARAVICINI	PARAVICINI #1	DOM_GW
P33855.0W	6/22/1976	BRACKEN	BRACKEN #1	DOM_GW
P34380.0W	7/7/1976	CRAMER	CRAMER #1	DOM_GW
P34236.0W	7/14/1976	BUCHO	RIM ROAD #1	DOM_GW
P34704.0W	8/9/1976	LIKWARTZ	LIKWARTZ #1	DOM_GW
P36136.0W	2/8/1977	LARSEN	LARSEN #1	DOM_GW
P36714.0W	3/17/1977	KLADIANOS	KLADIANOS #1	DOM_GW
P39263.0W	3/25/1977	BLAIR	BLAIR #1	DOM_GW
P41068.0W	5/5/1977	BAER	A LEX BAER #1	DOM_GW
P37936.0W	5/16/1977	RIZZI	RIZZI #1	DOM_GW
P38636.0W	5/31/1977	CALLER	CALLER #1	DOM_GW
P39272.0W	7/25/1977	DRNAS	DRNAS #1	DOM_GW
P39483.0W	8/5/1977	GAUB	MYRTLE #II	DOM_GW
P39719.0W	8/17/1977	BENSON	LEO BENSON #1	DOM_GW
P36294.0W	8/26/1977	RADAKOVICH	RADAKOVICH SPRING #1	DOM_GW
P40618.0W	10/17/1977	OSMOND	OSMOND #1	DOM_GW
P40967.0W	11/4/1977	LARSEN	LARSEN #1	DOM_GW
P41903.0W	1/23/1978	WIDMAN	WIDMAN #1	DOM_GW
P43127.0W	3/27/1978	EASTMAN	EASTMAN #1	DOM_GW
P43362.0W	5/10/1978	BREWER	BREWER #1	DOM_GW

P43917.0W	6/20/1978	MANTEY	MANTEY SPRING #1	DOM_GW
P44446.0W	7/20/1978	JEPPESEN	JEPPESEN 1	DOM_GW
P45358.0W	8/28/1978	BEAN	RHODES #1	DOM_GW
P46101.0W	12/6/1978	SIDENER	SIDENER #2	DOM_GW
P46690.0W	2/16/1979	MASON	MASON #1	DOM_GW
P46852.0W	3/9/1979	MANTEY	MANTEY #1	DOM_GW
P86903.0W	3/22/1979	YOUNG	YOUNG WELL #1	DOM_GW; STK
P86904.0W	3/22/1979	YOUNG	YOUNG WELL #2	DOM_GW; STK
P47112.0W	3/26/1979	ORDWAY	ORDWAY #1	DOM_GW
P51899.0W	4/23/1980	BENSON	BENSON WELL #2	DOM_GW
P52893.0W	7/7/1980	HOCKETT	BALL #1	DOM_GW
P53066.0W	7/22/1980	LEE	CHARLES LEE #1	DOM_GW
P53220.0W	8/7/1980	HURLEY	HURLEY #1	DOM_GW
P53344.0W	8/19/1980	WELLS	WELLS #1	DOM_GW; STK
P53595.0W	9/9/1980	KOMINSKY	KOMINSKY #1	DOM_GW
P53888.0W	9/16/1980	PEARSON	GEAN PEARSON #1	DOM_GW
P54033.0W	10/3/1980	ALDER	ADLER #1	DOM_GW
P54239.0W	10/29/1980	NIELSON	NIELSON #1	DOM_GW
P56158.0W	3/20/1981	ALBRECHT	ARBARDEE RANCH #1	DOM_GW; STK
P56927.0W	5/21/1981	HILL	HILL #1	DOM_GW
P58306.0W	8/7/1981	GUAB	MRYLE E#4	DOM_GW
P60769.0W	2/22/1982	HILL	HILL #1	DOM_GW
P59929.0W	3/22/1982	PEARSON	SKY MOUNTAIN #1	DOM_GW
P60890.0W	5/19/1982	CLARK	RUNNER -190	DOM_GW
P62142.0W	9/13/1982	SNYDER	SNYDER-GEIGER #1	DOM_GW
P62147.0W	9/28/1982	GOLICH	GOLICH #1	DOM_GW
P63300.0W	2/24/1983	BROWN	BROWN #1	DOM_GW
P63667.0W	4/13/1983	EDIS	EDIS #1	DOM_GW
P64671.0W	7/5/1983	PFISTERER	HARMON PFISTERER WELL #1	DOM_GW
P64878.0W	7/5/1983	SENKOW II	LESLEY SPRING #1	DOM_GW
P64889.0W	7/25/1983	BARNES E. B.	BELLIN #1	DOM_GW
P65124.0W	8/15/1983	PETERSON	B PETERSON #1	DOM_GW
P67911.0W	4/23/1984	MCISAAC	MCISAAC #1	DOM_GW
P67643.0W	6/11/1984	BURNSTINE	BURRIS #1	DOM_GW
P67676.0W	6/15/1984	MADSEN	MADSEN #1	DOM_GW
P67731.0W	6/25/1984	ERKENBRACK	ERKENBRACK #1	DOM_GW
P68227.0W	8/1/1984	HAPPERSETT	HAPPERSETT #1	DOM_GW
P68653.0W	9/28/1984	WILLIAMS	ALMA #1	DOM_GW
P68686.0W	10/10/1984	CONLEY	CLEMENTS #1	DOM_GW
P69048.0W	10/26/1984	GOLICH	ENL GOLICH #1	DOM_GW
P70365.0W	6/10/1985	ALLGIER	L & A #1	DOM_GW
P70538.0W	7/1/1985	HUTCHINGS	YIPPY CHI YO #1	DOM_GW
P70947.0W	8/26/1985	WORTHINGTON	WORTHINGTON #1 SPRING	DOM_GW
P71071.0W	9/6/1985	FISCHER	AUNT LOTTIE #1	DOM_GW
P72220.0W	4/15/1986	JACKSON	TUCKER #2	DOM_GW
P72654.0W	6/11/1986	PAYSON	PAYSON I	DOM_GW
P72786.0W	6/23/1986	OLSEN	WILLIAM OLSEN #1	DOM_GW
P73004.0W	8/4/1986	JOHNSON	JOHNSON 1	DOM_GW

P73776.0W	12/15/1986	JOHNSON	EVERETT 1	DOM_GW
P74961.0W	5/11/1987	FENNO II	SCHUELER #2	DOM_GW
P74890.0W	6/15/1987	SUBLETTE COUNTY SCHOOL DISTRICT #1	BONDURANT ELEMENTARY SCHOOL #1	DOM_GW
P75308.0W	8/10/1987	SEIPP, SR.	SEIPP #1	DOM_GW
P75747.0W	10/19/1987	RIGGAN	RIGGAN #2	DOM_GW; STK
P76088.0W	12/14/1987	ESTATE OF DIANA NAUMAN	DIANA #1	DOM_GW
P77113.0W	6/9/1988	BRINKERHOFF	BRINKERHOFF	DOM_GW
P77275.0W	7/8/1988	LOVE	LOVE #1	DOM_GW
P78848.0W	7/8/1988	BRUCKS	BRUCKS #1	DOM_GW
P78416.0W	7/25/1988	REINIGER	BARTEK #1	DOM_GW
P77774.0W	8/4/1988	HAMU	HAMU #1	DOM_GW
P78072.0W	9/21/1988	CAMPBELL	CAMPBELL #1	DOM_GW
P78753.0W	12/16/1988	GRAF	GRAF #1	DOM_GW
P78920.0W	1/19/1989	WAGSTAFF LAND AND CATTLE CO.	BOZONI RANCH WELL #1	DOM_GW
P78921.0W	1/19/1989	WAGSTAFF LAND AND CATTLE CO.	UPPER RANCH #3	DOM_GW; STK
P79185.0W	3/1/1989	PROFILE PROPERTIES, LLC	LYON WELL #1	DOM_GW
P79358.0W	4/6/1989	LANCASTER	LANCASTER SPRING #1	DOM_GW
P79733.0W	5/5/1989	ANSEMI	ANSEMI #1	DOM_GW
P80591.0W	5/25/1989	WINN	DUSTY #1	DOM_GW
P80633.0W	8/31/1989	THOMAS	THOMAS #1	DOM_GW
P80977.0W	10/6/1989	PIERCE	PIERCE #1	DOM_GW
P81822.0W	2/14/1990	GRIMES	GRIMES #1	DOM_GW; STK
P81991.0W	3/19/1990	BARNES	ED #4	DOM_GW
P82120.0W	4/2/1990	SEIPP, SR.	SEIPP SPRING #1	DOM_GW
P82613.0W	5/25/1990	SAPP	SAPP #1	DOM_GW
P83002.0W	7/9/1990	MELBY	MELBY #1	DOM_GW
P83252.0W	8/10/1990	RUST	RUST #1 SPRING	DOM_GW
P83588.0W	9/14/1990	CAMPION	CAMPION #1	DOM_GW
P84682.0W	3/20/1991	MCNEALEY	FAWN RIDGE	DOM_GW
P85003.0W	5/2/1991	SHEPARD	KRALL-SHEPARD #1	DOM_GW
P85031.0W	5/2/1991	KRALL	KRALL-PRUS #1	DOM_GW
P85066.0W	5/10/1991	JENKINS	JENKINS #2	DOM_GW
P85122.0W	5/20/1991	EVANS	EVANS WELL #1	DOM_GW
P85238.0W	5/30/1991	KING	KING #1	DOM_GW
P85476.0W	5/30/1991	RADAKOVICH	RADAKOVICH #2	DOM_GW
P85483.0W	7/1/1991	CRENSHAW	CRENSHAW #1	DOM_GW
P85812.0W	7/8/1991	STONE	STONE #1	DOM_GW
P85767.0W	7/31/1991	CALDWELL	CALDWELL #1	DOM_GW
P87265.0W	8/23/1991	CHAMPNEYS	CHAMPNEYS #1	DOM_GW
P86182.0W	9/16/1991	FRENCH	WELL #6	DOM_GW
P86184.0W	9/23/1991	MADDEN	MADDEN #1	DOM_GW
P86335.0W	10/4/1991	STEVENSON	GOODMOTE #1	DOM_GW
P86339.0W	10/4/1991	OSSANNA	OSSANNA #1	DOM_GW
P86470.0W	10/24/1991	FEIGHTNER	FEIGHTNER #1	DOM_GW
P86607.0W	11/19/1991	THOMPSON	THOMPSON WELL #1	DOM_GW
P87183.0W	2/24/1992	FERNSTEN	FERNSTEN #1	DOM_GW
P87217.0W	3/2/1992	SVEC	SVEC #1	DOM_GW
P87428.0W	3/23/1992	FRENCH	WELL #9	DOM_GW

P87508.0W	4/3/1992	COLLARD	COLLARD RESIDENCE #1	DOM_GW
P87554.0W	4/3/1992	HENRY SR.	HENRY #2	DOM_GW
P87696.0W	4/30/1992	GOODRICK	REEVES #2	DOM_GW
P88073.0W	5/20/1992	ROBERTS	ROBERTS #1	DOM_GW
P88160.0W	5/26/1992	ROBINSON	W. ROBINSON #3	DOM_GW
P88163.0W	5/26/1992	SMITH	SMITH #1	DOM_GW
P88168.0W	5/28/1992	LAKE	LAKE #1	DOM_GW
P88626.0W	6/19/1992	WINN	DUSTY #2	DOM_GW
P89197.0W	8/14/1992	SWEEDE	SWEEDE #1	DOM_GW
P89163.0W	8/17/1992	PEET	PEET #1	DOM_GW
P89200.0W	8/17/1992	HAYNES	BRYAN FLATS #2	DOM_GW
P89201.0W	8/17/1992	MASSIE	BRYAN FLATS #3	DOM_GW
P89231.0W	8/24/1992	MAWYER	MAWYER #1	DOM_GW
P89329.0W	9/2/1992	BOWLES	BOWLES #1	DOM_GW
P89383.0W	9/8/1992	KLADIANOS	KLADIANOS #2	DOM_GW
P89516.0W	9/24/1992	GRIDLEY	BECK WELL #1	DOM_GW
P89525.0W	9/24/1992	FRENCH	WELL #1	DOM_GW
P89590.0W	9/28/1992	MEYERS	MEYERS #1	DOM_GW
P89992.0W	10/29/1992	ROBERTSON	ROBERTSON #1	DOM_GW
P90296.0W	11/16/1992	COOK	COOK #1	DOM_GW
P93171.0W	12/4/1992	DRA HOBACK PROPERTIES LLC/ ANSELM	ANSELM NO 2	DOM_GW
P91013.0W	3/15/1993	VITEK	WELL #8	DOM_GW
P91305.0W	4/5/1993	GILROY	GILROY #2	DOM_GW; STK
P91446.0W	4/19/1993	WATTS, JR.	DEBBAN WELL	DOM_GW
P91395.0W	4/21/1993	COLEMAN	ARROW #2	DOM_GW
P91678.0W	5/13/1993	FENN	FENN #1	DOM_GW
P91841.0W	5/14/1993	FISK	GAME HILL #1	DOM_GW
P91947.0W	6/7/1993	BROWN	BLACK WATER 12-1	DOM_GW
P92071.0W	6/14/1993	CRAMER	CRAMER #1	DOM_GW
P92176.0W	7/2/1993	POST	POST WELL #1	DOM_GW
P92209.0W	7/2/1993	BREWER	BREWER #1	DOM_GW
P92210.0W	7/2/1993	WALKER	WALKER #1	DOM_GW
P92177.0W	7/6/1993	VITEK	WELL #4	DOM_GW
P92218.0W	7/16/1993	MCISAAC	MCISAAC - LEEK #1 WELL	DOM_GW
P92495.0W	8/2/1993	WERMOTH	WERMOTH #1	DOM_GW
P92497.0W	8/2/1993	THE BAILEY FAMILY TRUST/ BAILEY	MILLER #1	DOM_GW
CR UW13/173	9/20/1993	TEASLEY	IDITAROD NO. 1 WELL	DOM_GW; MIS
P93142.0W	10/15/1993	COOK	COOK LOT #9	DOM_GW
P93246.0W	10/21/1993	LEEPER	LEEPER #1	DOM_GW
P93247.0W	10/21/1993	SIMON	RISEDORPH #1	DOM_GW
P93447.0W	11/8/1993	PFAFF	PFAFF #1	DOM_GW
P94417.0W	1/12/1994	BAKER	JERRY BAKER WELL #1	DOM_GW
P94874.0W	4/6/1994	GABRIELSON	GABRIELSON #1	DOM_GW
P94875.0W	4/6/1994	IRWIN	IRWIN #1	DOM_GW
P94935.0W	4/13/1994	OHMART	STARKEY #1	DOM_GW
P95011.0W	4/18/1994	PALMER	BETSY #1	DOM_GW
P95385.0W	5/18/1994	MCCOLLUM JR	MCCOLLUM #1	DOM_GW

P95488.0W	5/20/1994	SCHWARZ	SCHWARZ #1	DOM_GW
P95674.0W	6/16/1994	SHANKS	SHANKS #1	DOM_GW
P96010.0W	7/1/1994	CITTONI	CERVANTES WELL #1	DOM_GW
P96034.0W	7/5/1994	PERRIN	PERRIN #1	DOM_GW
P96253.0W	7/18/1994	VASSALLO	VASMO #1	DOM_GW; STK
P96385.0W	7/28/1994	ELLWOOD	ELWOOD #2	DOM_GW
P97311.0W	10/14/1994	COMER	COMER #1	DOM_GW
P97746.0W	11/10/1994	MELSAETHER	MELSAETHER #2	DOM_GW
P98498.0W	2/6/1995	COOK	COOK #1	DOM_GW
P98814.0W	4/21/1995	PETERS	PETERS SUB-DIVISION WELL #5	DOM_GW
P99127.0W	5/4/1995	OBERHELMAN	OBERHELMAN #1	DOM_GW
P99245.0W	5/22/1995	HUNSAKER	L.B. WELL #1	DOM_GW
P99407.0W	6/5/1995	EATON	DORTHY #1	DOM_GW
P99559.0W	6/5/1995	SCHANKER	SCHANKER #1	DOM_GW
P99446.0W	6/12/1995	WOODEN	WOODEN #1	DOM_GW
P99684.0W	6/26/1995	EDGCOMB	BACK WELL #1	DOM_GW
P99685.0W	6/26/1995	EDGCOMB	MAIN HOUSE #1	DOM_GW
P99688.0W	6/30/1995	ENVIRODESIGNS, INC	'ONE WELL'	DOM_GW
P99748.0W	7/10/1995	JOHNSON	JOHNSON #1	DOM_GW
P99843.0W	7/24/1995	JONES	JONES #1	DOM_GW
P100017.0W	8/9/1995	INVERTMENT CO	STONG PLACE WELL	DOM_GW; STK
P100066.0W	8/14/1995	KNEPSHIELD	BRYAN FLATS #5	DOM_GW; STK
P100883.0W	11/3/1995	MILLER	MILLER #1	DOM_GW
P101006.0W	11/29/1995	KLADIANOS	ENL KLADIANOS #2	DOM_GW
P101207.0W	1/2/1996	VAUGHAN	VAUGHAN #1	DOM_GW
P102347.0W	5/13/1996	SANDBERG	SANDBERG #1	DOM_GW
P102424.0W	5/22/1996	SMITH	SMITH #1	DOM_GW
P102565.0W	6/3/1996	ROBINSON	ROBINSON #1	DOM_GW
P103143.0W	7/16/1996	KOECKERITZ	JOHNSON-MAGILL #1	DOM_GW
P104039.0W	8/1/1996	JONES	JONES 1	DOM_GW
P103456.0W	8/19/1996	PEARSON	SKY MOUNTAIN #2	DOM_GW
P103713.0W	9/9/1996	JOHNSON	JOHNSON #1	DOM_GW
P104588.0W	9/13/1996	DOYLE CHILD FAMILY TRUST	TRUST #1	DOM_GW
P103930.0W	9/18/1996	SCARLETT	SCARLETT #1	DOM_GW
P103989.0W	9/23/1996	CONLEY	CONLEY #1	DOM_GW
P104642.0W	11/29/1996	ROBSON	ROBSON #01	DOM_GW
P104676.0W	12/16/1996	HRG RANCH	HANS #1	DOM_GW
P106003.0W	3/19/1997	CORNELL	CORNELL #1	DOM_GW
P105331.0W	3/24/1997	TWIN MOUNTAIN RIVER RANCH	TWIN MOUNTAIN RIVER RANCH #2	DOM_GW
P105334.0W	3/26/1997	HRG RANCH	HANS #2	DOM_GW
P106129.0W	5/29/1997	DOENGES	TRAPPER HOLLOW #1	DOM_GW
P106146.0W	6/9/1997	DROWNE	DROWNE #1	DOM_GW
P106608.0W	6/30/1997	DROWNE	DROWNE #1	DOM_GW
P106984.0W	8/1/1997	V. BRUCE AND THELMA F. CROOK 1980 FAMILY TRUST	DOUBLE BEAR SPRING #1	DOM_GW
P107339.0W	8/28/1997	BARR	BARR #1	DOM_GW
P107731.0W	9/29/1997	DOURNBOS	DOURNBOS #1	DOM_GW
P107935.0W	10/28/1997	MAGNUSON	BLACKBURN #1	DOM_GW

P110058.0W	5/15/1998	HOLZER	ASHLEY KATE WELL #1	DOM_GW
P110233.0W	5/28/1998	MOORE	SMOORE #1	DOM_GW
P110833.0W	7/6/1998	BOND	Aqua 1	DOM_GW
P110866.0W	7/13/1998	NEMETZ	Nemetz #2	DOM_GW
P111030.0W	7/17/1998	FUNK	Funk #1	DOM_GW
P111418.0W	8/14/1998	STEUBER	Tiger #1	DOM_GW
P111429.0W	8/17/1998	PEDERSEN	Pedersen #1	DOM_GW
P112338.0W	10/19/1998	HAPPERSETT	Happersett #1	DOM_GW
P112669.0W	11/2/1998	SMITH	SISTA DEAH WELL #1	DOM_GW
P115743.0W	5/6/1999	BEEBE	WELL/BEEBE #1	DOM_GW
P115982.0W	5/20/1999	DEBELBISS	SALT-TRAIL #1	DOM_GW
P115911.0W	5/26/1999	BARON	BARON BUBBLER	DOM_GW
P116181.0W	6/11/1999	GARDNER	W.R. GARDNER WELL #1	DOM_GW
P116328.0W	6/14/1999	GRANT JR.	GRANT #1	DOM_GW
P116334.0W	6/14/1999	SORENSEN	SORENSEN #1	DOM_GW
P117441.0W	7/22/1999	LABRECQUE	Labrecque #1	DOM_GW
CR UW23/351	7/23/1999	ROBERT H BRADLEY FAMILY TRUST	BRADLEY #1	DOM_GW
P117439.0W	7/23/1999	ROBERT H BRADLEY FAMILY TRUST	BRADLEY #1	DOM_GW
P117444.0W	7/23/1999	RODGERS	Rodgers #1	DOM_GW
P117799.0W	7/26/1999	SACKMAN	Sackman #1	DOM_GW
P118537.0W	8/26/1999	HITCHENS	HITCHENS #1	DOM_GW
P119496.0W	10/1/1999	BULLEN	BULLEN #1	DOM_GW
P119865.0W	10/18/1999	PARKER	Wyo Why #1	DOM_GW
P120534.0W	11/19/1999	WAGNER	Wagner #1	DOM_GW; STK
P120992.0W	12/1/1999	BRADLEY	Bradley Guest House #2	DOM_GW
P120994.0W	12/1/1999	HRG RANCH	Upper HRG #3	DOM_GW
P125161.0W	5/1/2000	PERRY	PERRY WELL #2	DOM_GW
P125381.0W	5/18/2000	BEERY	BEERY WELL ONE	DOM_GW
P125665.0W	5/26/2000	MEYERS	MEYERS #1	DOM_GW
P126611.0W	6/12/2000	LUBING	LUBING #1	DOM_GW
P127129.0W	6/29/2000	STILSON	LAURA J. #1	DOM_GW
P127280.0W	7/26/2000	KNEPSHIELD	KNEPSHIELD #1	DOM_GW
P127928.0W	8/14/2000	SMITH	1 WELL	DOM_GW; STK
P129037.0W	9/8/2000	RAU	RAU #1	DOM_GW
P129327.0W	9/26/2000	RICKETTS RANCH	RICKETTS RANCH #1	DOM_GW
P131390.0W	12/14/2000	GAUB	# 1 GAUB	DOM_GW
P135793.0W	6/16/2001	WATSABAUGH	WATSABAUGH # 1	DOM_GW
P138447.0W	8/27/2001	JOHNSON	JOHNSON 2	DOM_GW
P138906.0W	9/5/2001	BARROW	BARROWS 10	DOM_GW
P139067.0W	9/17/2001	BESS	BESS #1	DOM_GW
P139442.0W	10/2/2001	O'CONNOR	O'CONNOR 1	DOM_GW
P140330.0W	10/29/2001	SPOTTED HORSE RANCH	SPOTTED HORSE RANCH #2	DOM_GW
P140775.0W	11/13/2001	RUDD	WELLMA # 1	DOM_GW
P140913.0W	11/23/2001	BILLINGS	BILLING # 1	DOM_GW
P142016.0W	1/25/2002	BERCAW, CAROL L. / BESCH, TERESA H.	B & B 1	DOM_GW
P143327.0W	3/22/2002	HOLMES	HOLMES #1	DOM_GW
P144944.0W	6/20/2002	LITCHFIELD	LITCHFIELD # 2	DOM_GW
P147374.0W	10/7/2002	BURK	BURK # 1	DOM_GW

P147760.0W	10/28/2002	STEVENS	M. STEVENS # 1 AND P	DOM_GW
P148325.0W	12/9/2002	MASSIE	MASSIE # 2 CARETAKER	DOM_GW
P148334.0W	12/9/2002	IIA YOUNG (MRS. SAM YOUNG JR.)	YOUNG PIPELINE # 3	DOM_GW
P148687.0W	12/23/2002	MCELHENY	OH #1	DOM_GW
P149413.0W	2/21/2003	BEAN	BEAN #1	DOM_GW
P149414.0W	2/21/2003	JANUS HOMES, LLC	JANUS HOMES #1	DOM_GW
P149427.0W	2/21/2003	NIMMO	NIMMO #1	DOM_GW
P152117.0W	6/23/2003	UNITED STATES FOREST SERVICE	CORRAL GUARD STATION	DOM_GW
P152214.0W	7/7/2003	SHIDNER	SHIDNER #3	DOM_GW
P152755.0W	7/31/2003	CORBETT	CORBETT #1	DOM_GW
P155902.0W	1/12/2004	WESTERN LAND & HOME, LLC	WESTERN LAND #2	DOM_GW
P156363.0W	2/23/2004	KANE	MICHAEL KANE WELL	DOM_GW
P159389.0W	6/4/2004	SHIPEK	SHIPEK #1	DOM_GW
P159395.0W	6/7/2004	CROSS	FRANK #2	DOM_GW
P160578.0W	7/19/2004	MASSIE	HOBACK VISTAS #3	DOM_GW
P160912.0W	7/22/2004	HALLING	HALLING #1	DOM_GW
P164452.0W	12/15/2004	C.K. FARMS	C.K. FARMS #1	DOM_GW
P165572.0W	2/23/2005	MASSIE	HOBACK VISTAS WELL #1	DOM_GW
P166515.0W	4/1/2005	BESS	MALONEY #1	DOM_GW
P169144.0W	7/20/2005	ASPEN HILL INVESTMENTS, LLC	ALPINE VILLAGE #50	DOM_GW
P169271.0W	7/22/2005	BILLING	BILLING #2	DOM_GW
P169463.0W	8/17/2005	CAMERON	DONNA #2	DOM_GW
P169465.0W	8/17/2005	ZAJAC	ZAJAC #1	DOM_GW
P169695.0W	8/22/2005	EDGCOMB	RIVERBEND HILLTOP NO. 1	DOM_GW
P170711.0W	10/31/2005	ALBITRE	ALBITRE #1	DOM_GW
P170720.0W	10/31/2005	WJW HOLDINGS LLP	WJW #1	DOM_GW; STK
P172035.0W	12/14/2005	TAYLOR	TAYLOR #3	DOM_GW
P173380.0W	3/9/2006	HUSEIN INC	HUSEIN #5	DOM_GW
P173566.0W	3/13/2006	DOORNBOS	MEADOW LARK 1	DOM_GW
P173626.0W	3/21/2006	ROOKS	ONE WELL	DOM_GW
P181393.0W	6/12/2006	CAPPS	CAPPS 9-02	DOM_GW
CR UW13/174	6/26/2006	TEASLEY	ENL. IDITAROD NO. 1 WELL	DOM_GW
P177300.0W	9/20/2006	WESTERN PRODUCTION AND PUMPING INC RETIREMENT TRUST / ATWOOD	ENL. EVANS WELL #1	DOM_GW
P177476.0W	10/6/2006	CROOK	CROOK #1	DOM_GW
P177477.0W	10/6/2006	CROOK	CROOK #2	DOM_GW
P177493.0W	10/6/2006	WRIGHT	WRIGHT #1	DOM_GW
P177979.0W	10/26/2006	DEADMAN RANCH LLC	DEADMAN RANCH #1	DOM_GW; STK
P177994.0W	10/30/2006	SCAFFIDE	SCAFFIDE	DOM_GW
P178578.0W	11/20/2006	REED	REED #1	DOM_GW
P178879.0W	12/18/2006	HAHN	HAHN #1	DOM_GW
P178880.0W	12/18/2006	HAHN	HAHN #2	DOM_GW
P181527.0W	5/17/2007	MARTINEK	MARTINEK #1	DOM_GW
P182148.0W	7/12/2007	BARTLEY	BARTLEY #1	DOM_GW
P183046.0W	8/10/2007	CORKERY	CORKERY #1	DOM_GW
P183165.0W	8/27/2007	ARTES	ARTES #1	DOM_GW
P183389.0W	9/24/2007	JOHNSON	FOREST GLEN NO. 2	DOM_GW
P183504.0W	10/12/2007	CROOK	CROOK BARN WELL #3	DOM_GW

P183700.0W	11/7/2007	DIVAN	DIVAN #1	DOM_GW
P186953.0W	5/12/2008	UNITED STATES OF AMERICA BRIDGER TETON NATIONAL FO	JACK PINE SUMMER HOMES SPRING #1	DOM_GW
P186954.0W	5/12/2008	UNITED STATES OF AMERICA BRIDGER TETON NATIONAL FO	JACK PINE SUMMER HOMES SPRING #2	DOM_GW
P186955.0W	5/12/2008	UNITED STATES OF AMERICA BRIDGER TETON NATIONAL FO	JACK PINE SUMMER HOMES SPRING #3	DOM_GW
P186956.0W	5/12/2008	UNITED STATES OF AMERICA BRIDGER TETON NATIONAL FO	JACK PINE SUMMER HOMES SPRING #4	DOM_GW
P186957.0W	5/12/2008	UNITED STATES OF AMERICA BRIDGER TETON NATIONAL FO	JACK PINE SUMMER HOMES SPRING #5	DOM_GW
P186958.0W	5/12/2008	UNITED STATES OF AMERICA BRIDGER TETON NATIONAL FO	JACK PINE SUMMER HOMES SPRING #6	DOM_GW
P187040.0W	6/10/2008	WINNEY	HOBACK RANCHES 15-4	DOM_GW
P187239.0W	7/8/2008	ELLWOOD	ELLWOOD #1	DOM_GW
P187243.0W	7/10/2008	FALCEY	FALCEY NO. 2	DOM_GW
P188414.0W	8/11/2008	COOPER	REDGATE #1	DOM_GW
P189671.0W	2/19/2009	WHITE	CABIN 1	DOM_GW
P191442.0W	9/14/2009	JACKSON FORK RANCH LLC	JACKSON FORK RANCH LLC #2	DOM_GW
P191707.0W	10/16/2009	FELLOWS	FELLOWS #1	DOM_GW
P192692.0W	3/24/2010	SHAUL	SHAUL #1	DOM_GW
P193172.0W	5/28/2010	TOLBERT	TOLBERT #1	DOM_GW
P193131.0W	6/4/2010	GADE	ANGELI-GADE #1	DOM_GW
P193185.0W	6/17/2010	KING	KING #1	DOM_GW
P193870.0W	9/7/2010	ROBERTSON	STEVE ROBERTSON COW CAMP # 1 BONDURANT	DOM_GW
P195882.0W	9/17/2010	ROBERTSON	STEVE ROBERTSON, 191 RANCH #1	DOM_GW
P195883.0W	9/17/2010	ROBERTSON	STEVE ROBERTSON, 191 RANCH #2	DOM_GW;STK
P195616.0W	4/25/2011	USA-BRIDGER TETON NAT'N'L FOREST	BLIND BULL NO. 1 SPRING	DOM_GW;STK
P195853.0W	4/28/2011	LERCH	THOMAS P LERCH #1	DOM_GW
P195678.0W	5/12/2011	BEXTEL	CROFT-BEXTEL WELL	DOM_GW
P196258.0W	7/18/2011	MANNERING	MANNERING	DOM_GW
P196437.0W	8/12/2011	RYAN	RYAN #1	DOM_GW
P196557.0W	8/24/2011	HINCKLEY	HINCKLEY #1	DOM_GW
P197504.0W	2/21/2012	CANTWELL	RYAN NO. 1	DOM_GW
P198691.0W	8/16/2012	KINLEY	KINLEY #1	DOM_GW
P200226.0W	5/3/2013	HARRIS	HARRIS #2	DOM_GW
P200490.0W	6/14/2013	ALBITRE	ALBITRE	DOM_GW
P200515.0W	6/18/2013	ZAKOTNIK	ZAKOTNIK - JZ	DOM_GW
P200712.0W	8/1/2013	ROBINSON	ROBINSON #2	DOM_GW
P201372.0W	11/18/2013	BALDERSTON	RUOSCH SPRING	DOM_GW;STK
P201509.0W	1/31/2014	ROBINSON	ALVIN-GREY'S WELL	DOM_GW
P201540.0W	2/12/2014	SHIRK	SHIRK #1	DOM_GW
P201731.0W	3/27/2014	JACKSON FORK RANCH	JACKSON FORK RANCH	DOM_GW
P201895.0W	4/17/2014	SHIDNER	SHIDNER PIPELINE/WELL #2	DOM_GW
P201901.0W	4/21/2014	SUMRALL	SUMRALL #1	DOM_GW
P201917.0W	4/23/2014	JENSEN	JENSEN #1	DOM_GW
P202202.0W	6/5/2014	ROBERTSON	NR 12 AL	DOM_GW
P202203.0W	6/5/2014	ROBERTSON	VW 7787	DOM_GW
P202344.0W	6/30/2014	CADDY	CADDY #1	DOM_GW

P202509.0W	7/22/2014	COOK	COOK #1	DOM_GW
P202510.0W	7/22/2014	COOK	COOK #2	DOM_GW
P202652.0W	8/17/2014	BLEDSON	BLEDSON #1	DOM_GW
P202940.0W	10/20/2014	DEFTY	DEFTY #1	DOM_GW
P203524.0W	3/5/2015	BOECKMANN	BOECKMANN DOMESTIC WELL	DOM_GW
P203825.0W	5/4/2015	MASUNASA	MASUNASA #1	DOM_GW
P203826.0W	5/4/2015	BURTOFT	BURTOFT #1	DOM_GW; STK
P203866.0W	5/12/2015	KRAUSE	KRAUSE #1	DOM_GW
P204083.0W	6/16/2015	MEEKS	T. MEEKS WELL	DOM_GW; STK
P204200.0W	7/17/2015	SIMON	SIMON #1	DOM_GW
P204350.0W	8/10/2015	JONES	RRRJ #19	DOM_GW
P204532.0W	9/9/2015	PONSIGLIONE	ENL. JAMES PONSIGLIONE WELL	DOM_GW
P204534.0W	9/10/2015	JONES	JONES #1	DOM_GW
P205119.0W	2/16/2016	SHERRILL	SHERRILL #1	DOM_GW
P205204.0W	3/7/2016	DAISY SPRINGS RANCH, LLC	HARRISON #1	DOM_GW
P205292.0W	3/29/2016	CALDWELL	CALDWELL #1	DOM_GW
P205354.0W	4/8/2016	ROBERTSON	ROBERTSON #1	DOM_GW
P205409.0W	4/21/2016	SCHROTH	SCHROTH #1	DOM_GW
P205639.0W	5/31/2016	DAISY SPRINGS RANCH LLC	DAISY SPRINGS RANCH LLC WELL	DOM_GW; STK
P205788.0W	6/25/2016	MANVELYAN	MANVELYAN #1	DOM_GW
P206125.0W	8/29/2016	SCHUMAN	SCHUMAN #1	DOM_GW
P206167.0W	9/7/2016	MCNULTY	MCNULTY #1	DOM_GW
CR UW23/352	9/12/2016	ROBERT H BRADLEY FAMILY TRUST	ENL BRADLEY #1	DOM_GW; MIS
P206310.0W	9/12/2016	ROBERT H BRADLEY FAMILY TRUST	ENL BRADLEY #1	DOM_GW; MIS
P206217.0W	9/19/2016	ZUNINO	PICNIC RIDGE #70	DOM_GW
P206404.0W	10/26/2016	CORWIN FAMILY TRUST / CORWIN	WOOD # 1	DOM_GW
P206920.0W	3/14/2017	STRAUSS	STRAUSS WELL	DOM_GW
P207219.0W	4/25/2017	LEEPER	SCOTT LEEPER #1	DOM_GW
P207343.0W	5/25/2017	DREAN	DREAN #1	DOM_GW
P207446.0W	6/12/2017	LEDUC	LEDUC #1	DOM_GW
P207535.0W	6/27/2017	JOHNSON	JUDITH JOHNSON WELL	DOM_GW
P207576.0W	7/6/2017	GARDNER	GARDNER #2	DOM_GW
P207784.0W	8/7/2017	MARTINEZ	MARTINEZ #1	DOM_GW
P207869.0W	8/15/2017	COOPER	BRUCE AMY 84	DOM_GW
P208135.0W	9/18/2017	JC ALAN LLC	BAUER #1	DOM_GW
P208416.0W	12/8/2017	ROBLE	BOWLESBY #1	DOM_GW
P208929.0W	5/3/2018	CARMICAL	CARMICAL HOUSE WELL	DOM_GW
P209077.0W	5/25/2018	GRAY	GRAY #1	DOM_GW
P209298.0W	6/28/2018	DAIGLE	DAIGLE #1	DOM_GW
P209767.0W	9/19/2018	SAUNDERS	SAUNDERS 23	DOM_GW
P210717.0W	5/13/2019	HOVER	HOVER #1	DOM_GW
P210742.0W	5/20/2019	FITTS	FITTS #1	DOM_GW
P210769.0W	5/28/2019	RYAN	RYAN #1	DOM_GW
P210941.0W	6/17/2019	PHELON	DCP TRUST WELL #1	DOM_GW
P211118.0W	7/16/2019	HAIGLER	HAIGLER #1	DOM_GW
P211133.0W	7/18/2019	ERICKSON	ERICKSON WELL	DOM_GW
P211245.0W	8/12/2019	HANSEN	HANSEN 117	DOM_GW
P211267.0W	8/16/2019	SCHRADER	SCHRADER #1	DOM_GW

P211728.0W	12/18/2019	NEW WEST BUILDING COMPANY/ DOORNBOS	COTTAGE STREET #1	DOM_GW
P211963.0W	2/24/2020	GEIST	GEIST #1 WELL	DOM_GW
P212263.0W	4/30/2020	SMITH	SMITH #1	DOM_GW
P212316.0W	5/11/2020	COULTER	COULTER #1	DOM_GW
P212388.0W	5/26/2020	DOWNS	DOWNS #1	DOM_GW
P212458.0W	6/1/2020	CHRISTINA RIGGS	BENZ 1	DOM_GW
P212837.0W	7/11/2020	WILLIAMSON	WILLIAMSON NO 1	DOM_GW
P212770.0W	7/22/2020	CTGX HOLDINGS LLC / MOSHER	SOUTHLAKE ESTATES LOT 3	DOM_GW
P212851.0W	7/28/2020	TROUTMAN	PHILIP TROUTMAN	DOM_GW
P213011.0W	8/25/2020	USOZ	STEPHEN J USOZ 10 MUDDY CREEK ROAD BONDURANT	DOM_GW
P213162.0W	9/18/2020	SHREIAR FAMILY TRUST / SHREIAR	SHREIAR FAMILY TRUST NO 1	DOM_GW
P213324.0W	10/7/2020	BEDFORD PROPERTIES LLC / ALLRED	ALPINE ALLRED	DOM_GW
P213326.0W	10/12/2020	DEMELLO ENTERPRISES	LAZY B LOT 16	DOM_GW
P213378.0W	10/19/2020	COOK	LANDINGS 1	DOM_GW
P213385.0W	10/19/2020	WALLASCH	LANDINGS 2	DOM_GW
P213473.0W	10/19/2020	ROBERTSON	NR 2	DOM_GW
P213476.0W	11/12/2020	SCHARF	WELL 13585	DOM_GW
P213609.0W	12/7/2020	BEUS	BLUE	DOM_GW
P214096.0W	3/19/2021	JAMES	JAMES NO 1	DOM_GW
P214129.0W	3/25/2021	CATHERINE DOMBI	TRAUTMAN DOMBI WELL NO. 2	DOM_GW
P214262.0W	4/12/2021	STRADLEY	STRADLEY NO 1	DOM_GW
P214374.0W	4/20/2021	PHILIP TROUTMAN	DOMBI NO 1	DOM_GW
P214397.0W	4/27/2021	HARMENING	HARMENING WELL	DOM_GW
P214448.0W	5/3/2021	LAUSCHER	MID RIM	DOM_GW
P214986.0W	7/7/2021	BURRIS	D BAR B	DOM_GW
P215556.0W	9/8/2021	APKARIAN	MV 84	DOM_GW
P216652.0W	4/5/2022	4E LAND LLC / CANAVAN	CANAVAN 1	DOM_GW
P216938.0W	5/12/2022	NAEGELE	LEO NAEGELE	DOM_GW
P216934.0W	5/13/2022	HAMNER	HAMNER 45	DOM_GW
P216935.0W	5/13/2022	BRAY	14161 WELL	DOM_GW
P216939.0W	5/13/2022	NAEGELE	NAEGELE WELL	DOM_GW
P216975.0W	5/22/2022	BAUER	JC ALAN WELL	DOM_GW

APPENDIX E

HOBACK RIVER WATERSHED STUDY LEVEL I**Owner/Operator:** Daisy Springs Ranch**Project Type:** Source Water Development**Project ID:** 1.1**Project Name:** Daisy Springs Pump & Pipeline**Location (PLSS):** NW/4NE/4, Sec. 23, T37N, R113W**Location (Lat/Long):** 43.16810°N, 110.37197°W**PROJECT COMPONENTS (ENGINEER'S ESTIMATE)**

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1	Mobilization	1	LS	\$ 500.00	\$ 500.00
2	Sump Basin Materials/Install	1	LS	\$ 1,200.00	\$ 1,200.00
3	1-1/4" SDR-11 Pipeline	890	LF	\$ 3.50	\$ 3,115.00
4	1-1/4" Isolation Valves	4	EA	\$ 65.00	\$ 260.00
5	New Inline Centrifugal pump	1	EA	\$ 1,250.00	\$ 1,250.00
6	Install pump & Construct pump cover	1	LS	\$ 1,400.00	\$ 1,400.00
7	Wiring/Labor	1	LS	\$ 1,300.00	\$ 1,300.00
8	Control unit/Low water sensor/Power to pump	1	LS	\$ 850.00	\$ 850.00
TOTAL COMPONENT COST (SUBTOTAL #2):					\$ 9,875.00

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$ 1,200.00
PERMITTING AND MITIGATION:	\$ 3,200.00
LEGAL FEES:	\$ -
ACQUISITION OF ACCESS AND RIGHTS-OF-WAY:	\$ -
PRE-CONSTRUCTION COSTS (SUBTOTAL #1):	\$ 4,400.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 9,875.00

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%):	\$ 987.50
COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3):	\$ 10,862.50
CONTINGENCY (SUBTOTAL #3 X 15%):	\$ 1,629.38
TOTAL CONSTRUCTION COST (SUBTOTAL #4):	\$ 12,491.88

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): **\$ 16,891.88**

PERMITTING REQUIREMENTS

Project ID: 1.1

Project Name: Daisy Springs Pump & Pipeline

Land Jurisdiction: Private, Daisy Springs Ranch II, LLC

Greater Sage-Grouse Core Area Protection (Executive Order 2019-3)

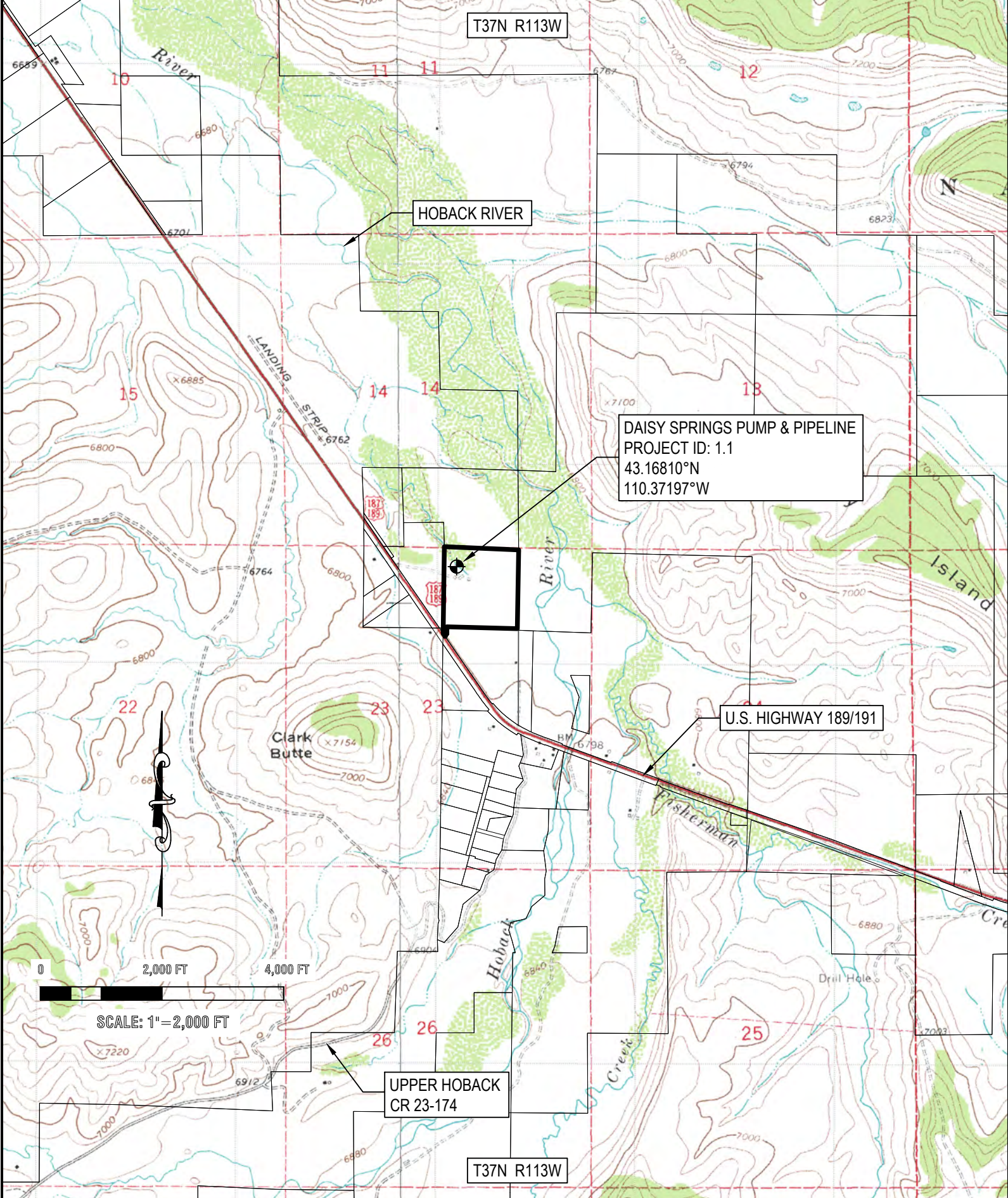
This project is located within the defined Non-Core Population area and would require surface disturbance for pipeline installation. Based on preliminary DDCT calculations, said project is located approximately 1.1 miles from an occupied lek (Clark Draw Lek – Occupied Non-Core). Under Appendix E of said executive order, there are no limitations to disturbance outside the 0.25 mile no surface occupancy buffer. Further, under Appendix G (Exempt “De Minimis” Activities), this project is considered to be an exempt activity under Item 5. However, a Density Disturbance Calculation Tool (DDCT) process should be conducted in order to verify the proximity of this project to occupied leks. This verification process will be used as part of the SEO permitting process as well as the impending SWPP application.

State Engineer’s Office

Current Permit: P8413.0D

Proposed Permit: SW-1 for Supplemental Supply

Irrigation of the subject property is currently permitted under P8413.0D through the Lionel L. Query ditch, CR 45, PG 617. An SW-1 application and accompanying map will need to be prepared and submitted to the SEO for permit issuance prior to construction.



T37N R113W

HOBACK RIVER

DAISY SPRINGS PUMP & PIPELINE
 PROJECT ID: 1.1
 43.16810°N
 110.37197°W

U.S. HIGHWAY 189/191

UPPER HOBACK
 CR 23-174

T37N R113W

SCALE: 1"=2,000 FT

PAGE No. 1 OF 4
JOB No. 4570
REVISED:
DATE: 05/10/22
CHECKED BY: EAS
DRAWN BY: MTJ
DESIGNED BY: MTJ

HOBACK RIVER WATERSHED - LEVEL I STUDY
DAISY SPRINGS PUMP & PIPELINE
 SMALL WATER PROJECT ID: 1.1
 LOCATED IN THE NW/4NE/4 OF SEC. 23, T.37N., R.113W.,
 SUBLETTE COUNTY, WY



**RIO VERDE
 ENGINEERING**
 PINEDALE, WYOMING

(307) 367-2826
 rioverde@wyoming.com



LANDS WITH ORIGINAL SUPPLY UNDER P8413.0D, PROOF No. 19568, CR No. 45, PG 617, THROUGH THE LIONEL L. QUERY DITCH UNDER THE KEMMERER SAVINGS BANK APPROPRIATION, WITH A PRIORITY DATE OF APRIL 30, 1908.

T37N R113W

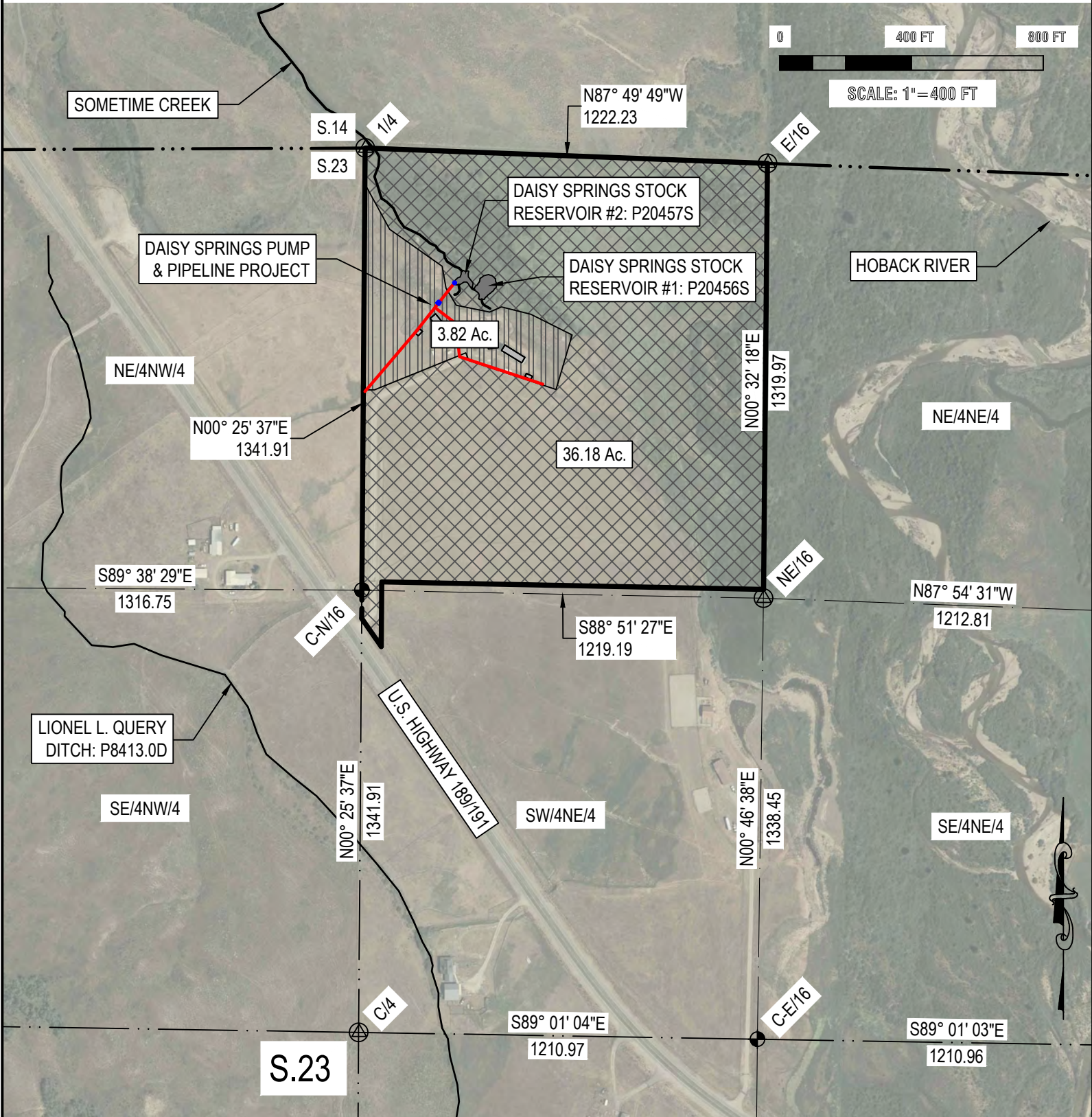
NW/4NE/4 S.23: 36.18 Ac
TOTAL: 36.18 Ac



LANDS TO RECEIVE SUPPLEMENTAL SUPPLY, HAVING ORIGINAL SUPPLY UNDER P8413.0D, PROOF No. 19568, CR No. 45, PG 617, THROUGH THE LIONEL L. QUERY DITCH UNDER THE KEMMERER SAVINGS BANK APPROPRIATION, WITH A PRIORITY DATE OF APRIL 30, 1908.

T37N R113W

NW/4NE/4 S.23: 3.82 Ac
TOTAL: 3.82 Ac



PAGE No. 2 OF 4
JOB No. 4570
REVISED:
DATE: 05/10/22
CHECKED BY: EAS
DRAWN BY: MTJ
DESIGNED BY: MTJ

HOBACK RIVER WATERSHED - LEVEL I STUDY
DAISY SPRINGS PUMP & PIPELINE
SMALL WATER PROJECT ID: 1.1
LOCATED IN THE NW/4NE/4 OF SEC. 23, T.37N., R.113W.,
SUBLETTE COUNTY, WY

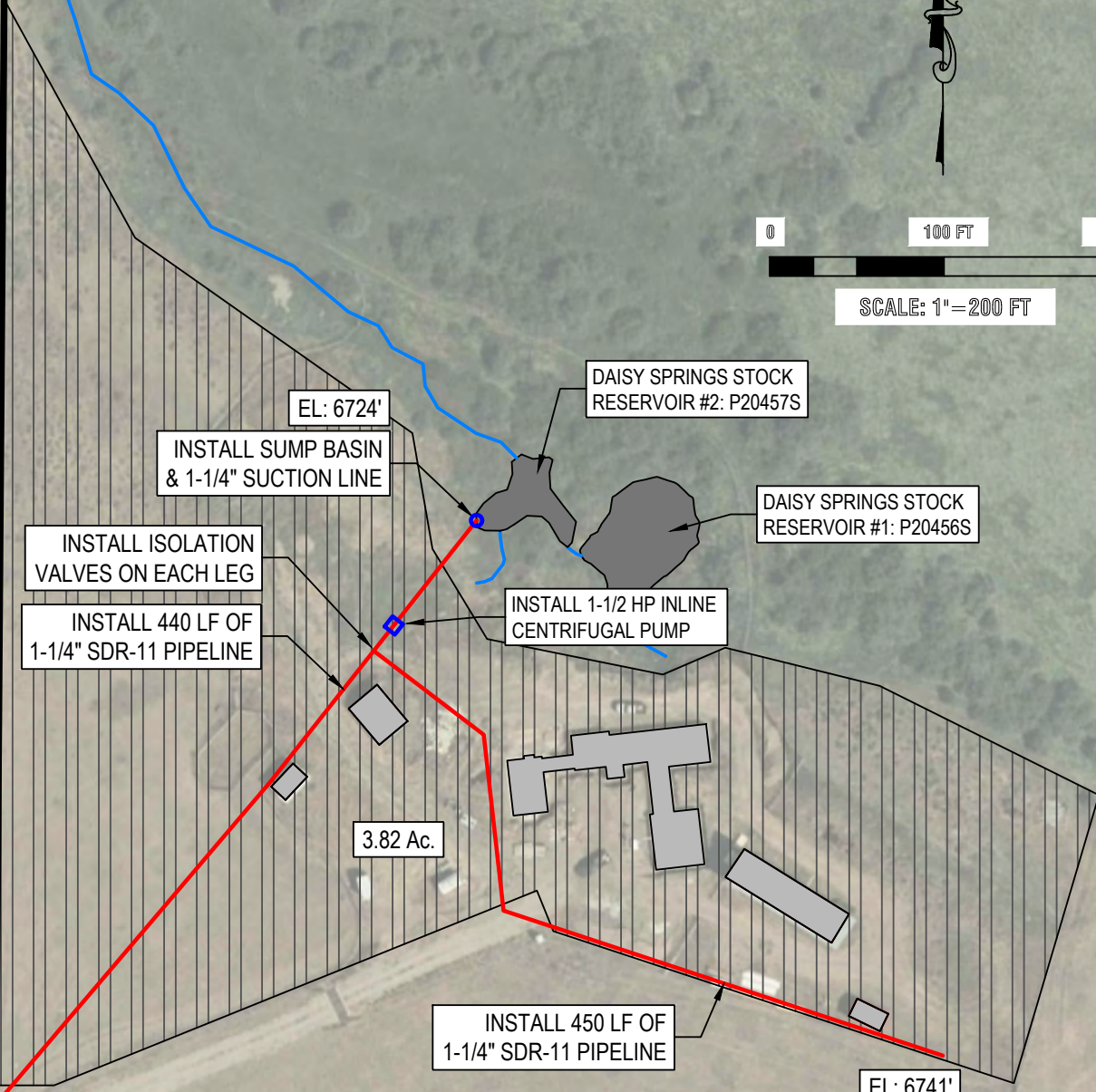


RIO VERDE
ENGINEERING
PINEDALE, WYOMING
(307) 367-2826
rioverde@wyoming.com

S.14
S.23
1/4



SCALE: 1"=200 FT



EL: 6724'

INSTALL SUMP BASIN & 1-1/4" SUCTION LINE

INSTALL ISOLATION VALVES ON EACH LEG

INSTALL 440 LF OF 1-1/4" SDR-11 PIPELINE

INSTALL 1-1/2 HP INLINE CENTRIFUGAL PUMP

DAISY SPRINGS STOCK RESERVOIR #2: P20457S

DAISY SPRINGS STOCK RESERVOIR #1: P20456S

3.82 Ac.

INSTALL 450 LF OF 1-1/4" SDR-11 PIPELINE

EL: 6741'

EL: 6741'

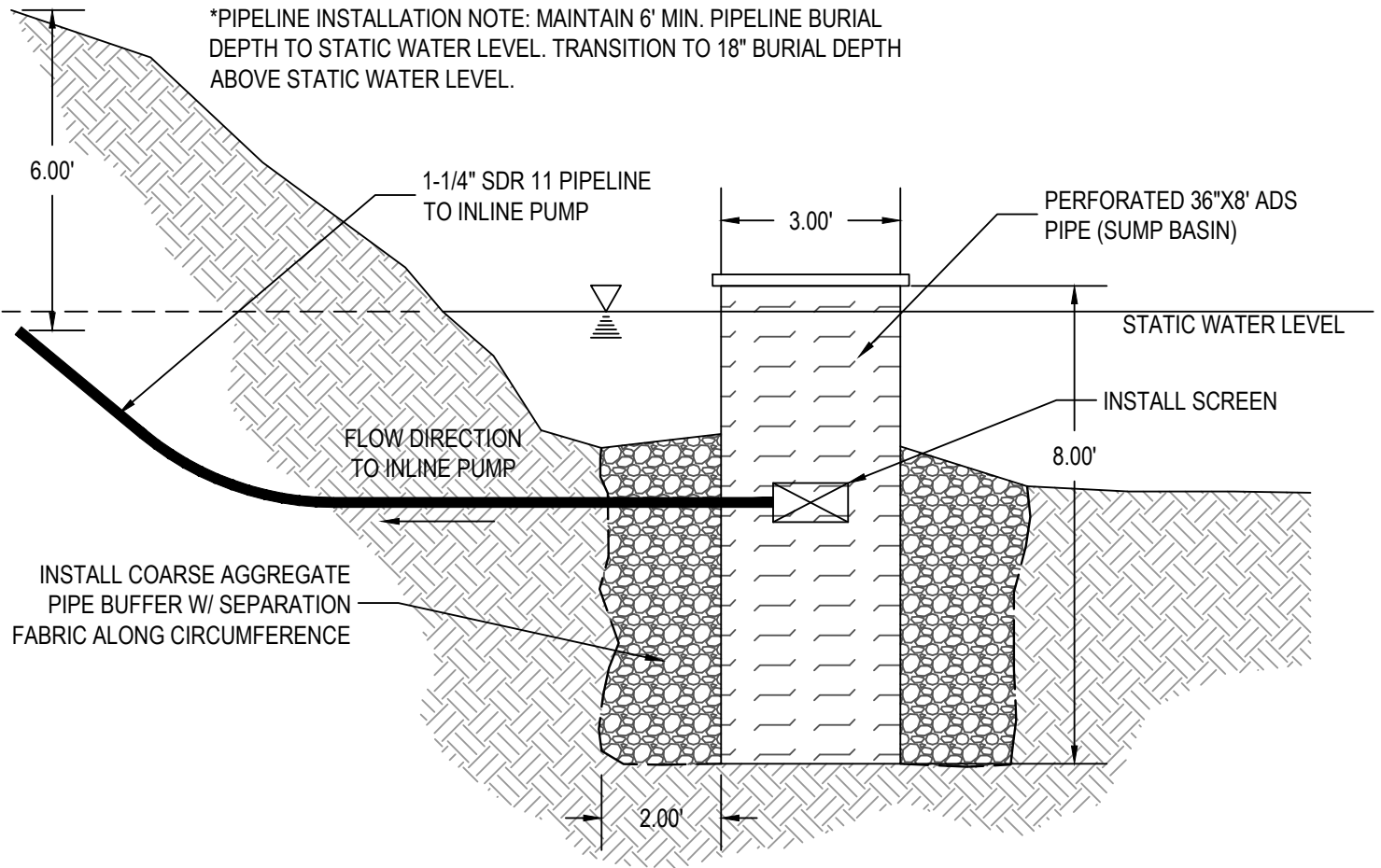
DESIGNED BY: MTJ
 DRAWN BY: MTJ
 CHECKED BY: EAS
 DATE: 05/10/22
 REVISED:
 JOB No. 4570
 PAGE No. 3 OF 4

HOBACK RIVER WATERSHED - LEVEL I STUDY
DAISY SPRINGS PUMP & PIPELINE
 SMALL WATER PROJECT ID: 1.1
 LOCATED IN THE NW/4NE/4 OF SEC. 23, T.37N., R.113W.,
 SUBLETTE COUNTY, WY

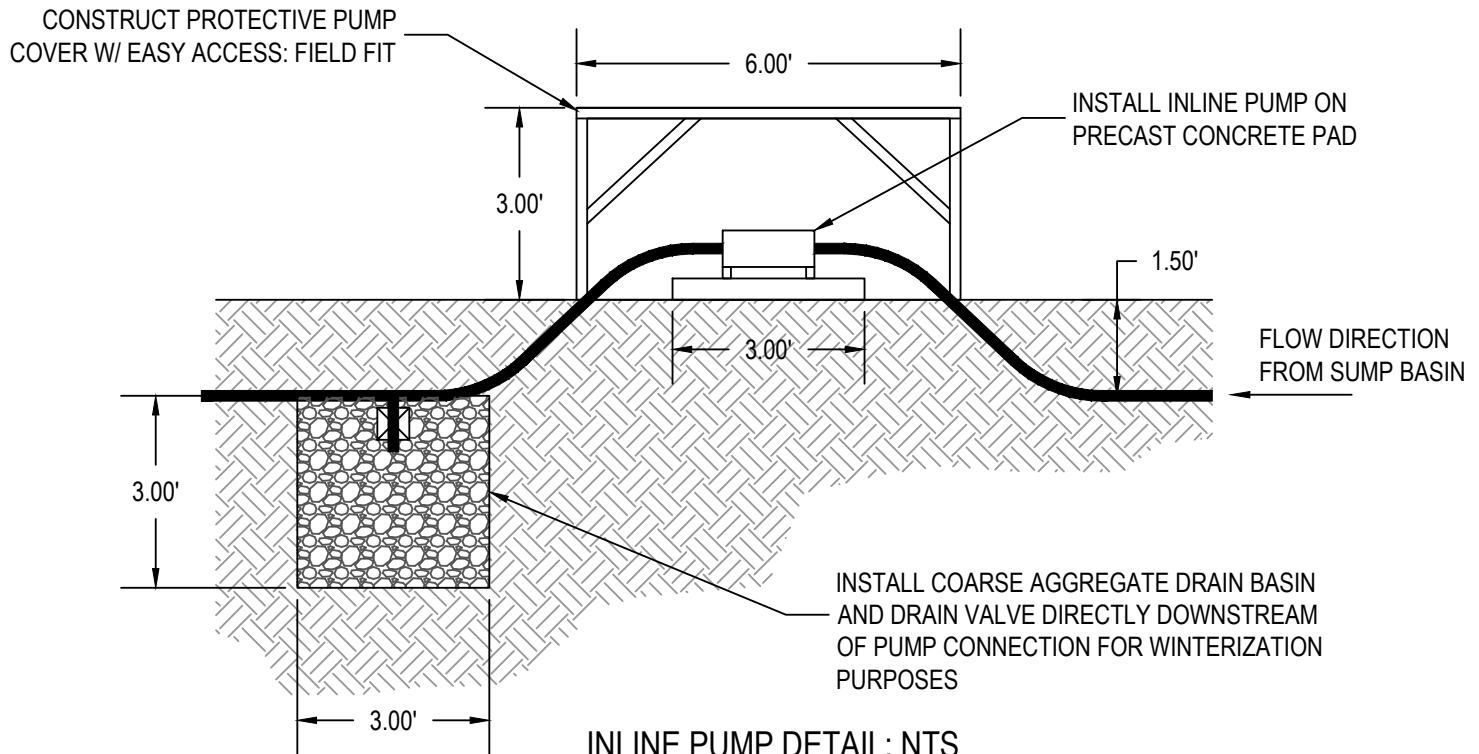


**RIO VERDE
ENGINEERING**
 PINEDALE, WYOMING
 (307) 367-2826
 rioverde@wyoming.com

*PIPELINE INSTALLATION NOTE: MAINTAIN 6" MIN. PIPELINE BURIAL DEPTH TO STATIC WATER LEVEL. TRANSITION TO 18" BURIAL DEPTH ABOVE STATIC WATER LEVEL.



SUMP BASIN DETAIL: NTS



INLINE PUMP DETAIL: NTS

HOBACK RIVER WATERSHED - LEVEL I STUDY
DAISY SPRINGS PUMP & PIPELINE
 SMALL WATER PROJECT ID: 1.1
 LOCATED IN THE NW/4NE/4 OF SEC. 23, T.37N., R.113W.,
 SUBLETTE COUNTY, WY

RIO VERDE
ENGINEERING
 PINEDALE, WYOMING
 (307) 367-2826
 rioverde@wyoming.com

DESIGNED BY: MTJ
 DRAWN BY: MTJ
 CHECKED BY: EAS
 DATE: 05/10/22
 REVISED:
 JOB No. 4570
 PAGE No. 4 OF 4

HOBACK RIVER WATERSHED, LEVEL I STUDY

Owner/Operator: Dan & Yvonne Bailey

Project Type: Stockwater Reservoir

Project ID: 2.1

Project Name: Bailey #1 Stock Res.

Location (PLSS): NW/4NE/4 Sec. 21, T36N, R114W

Location (Lat/Long): 43.08315° N, 110.45918° W

PROJECT COMPONENTS - ITEMIZED COSTS

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1	Mobilization	1	LS	\$ 6,400.00	\$ 6,400.00
2	Dewatering	1	LS	\$ 1,200.00	\$ 1,200.00
3	Topsoil Stripping & Haul to Field Site	3625	CY	\$ 2.50	\$ 9,062.50
4	Pit Excavation and Haul to North Pit	6500	CY	\$ 2.50	\$ 16,250.00
5	Pit Excavation and Haul to Field	7875	CY	\$ 2.50	\$ 19,687.50
7	Final Field Grading & Topsoil Spreading	18,800	CY	\$ 3.00	\$ 56,400.00
8	Bailey Ditch Construction	234	LF	\$ 2.00	\$ 468.00
9	D50=6" Inlet Rip-rap Section	1	LS	\$ 850.00	\$ 850.00
TOTAL COMPONENT COST (SUBTOTAL #2):					\$ 110,318.00

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$ -
PERMITTING AND MITIGATION:	\$ -
LEGAL FEES:	\$ -
ACQUISITION OF ACCESS AND RIGHTS-OF-WAY:	\$ -
PRE-CONSTRUCTION COSTS (SUBTOTAL #1):	\$ -

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%):	\$ 11,031.80
COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3):	\$ 121,349.80
CONTINGENCY (SUBTOTAL #3 X 15%):	\$ 18,202.47
TOTAL CONSTRUCTION COST (SUBTOTAL #4):	\$ 139,552.27

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4):	\$ 139,552.27
---	----------------------

PERMITTING REQUIREMENTS

Project ID: 2.1

Project Name: Bailey #1 Stock Res.

Land Jurisdiction: Private, Daniel & Yvonne Bailey

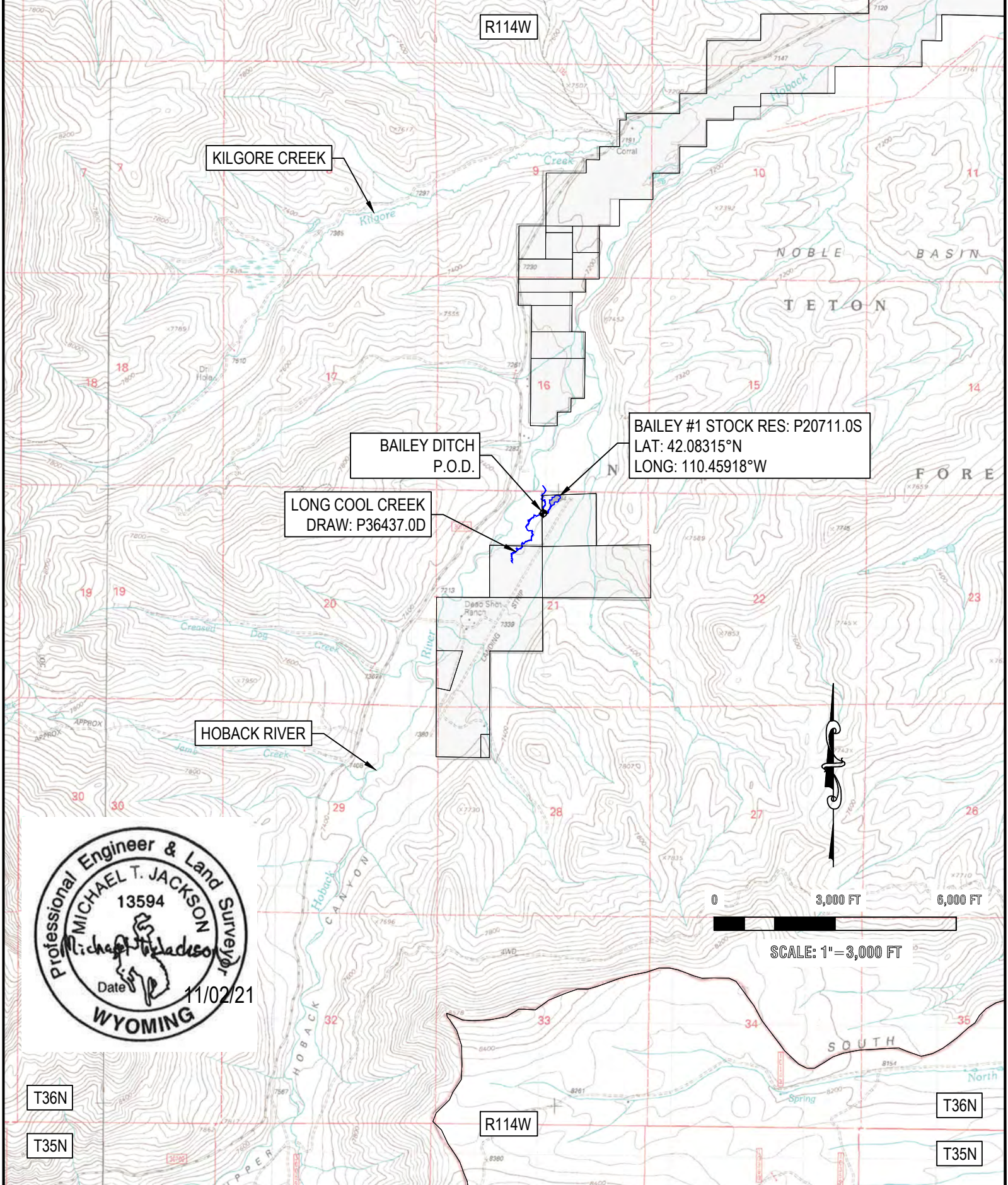
Greater Sage-Grouse Core Area Protection (Executive Order 2019-3)

This project is located within the defined Non-Core Population area and would require surface disturbance for pond construction. This project has been fully permitted by the Wyoming State Engineer's Office and has been awarded SWPP funding as part of this Watershed Study. No further action is required related to DDCT potential.

State Engineer's Office

Current Permit(s): P36437.0D & P20711.0S

The permits for diversion from Long Cool Creek Draw and Bailey #1 Stock Reservoir have been acquired from the SEO. Once construction is complete, the Notice of Completion of Construction and Beneficial Use will be submitted to the SEO for final adjudication proof inspections.



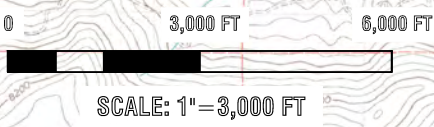
KILGORE CREEK

BAILEY DITCH
P.O.D.

LONG COOL CREEK
DRAW: P36437.0D

HOBACK RIVER

BAILEY #1 STOCK RES: P20711.0S
LAT: 42.08315°N
LONG: 110.45918°W



T36N

T35N

R114W

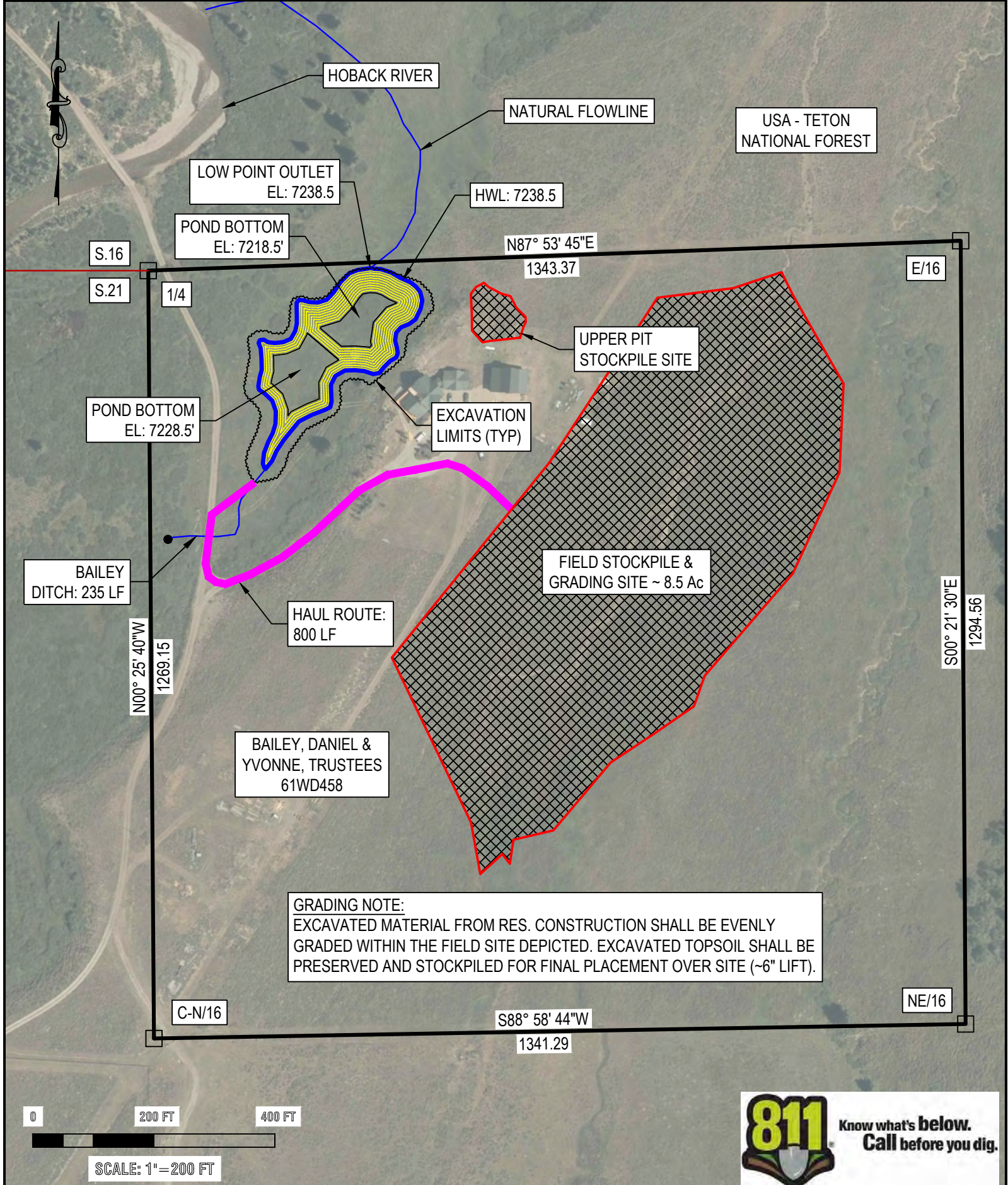
T36N

T35N

HOBACK RIVER WATERSHED - LEVEL I STUDY BAILEY #1 STOCK RES. SMALL WATER PROJECT ID: 2.1 LOCATED IN THE NW/4NE/4 OF SECTION 21, T.36N., R.114W., SUBLETTE COUNTY, WY	
DESIGNED BY: MTJ	
DRAWN BY: MTJ	
CHECKED BY: EAS	
DATE: 10/29/21	
REVISED:	
JOB No: 4570	
PAGE No: 1 OF 4	

RIO VERDE
ENGINEERING
PINEDALE, WYOMING

(307) 367-2826
rioverde@wyoming.com



HOBACK RIVER

NATURAL FLOWLINE

USA - TETON NATIONAL FOREST

LOW POINT OUTLET
EL: 7238.5

HWL: 7238.5

POND BOTTOM
EL: 7218.5'

N87° 53' 45"E
1343.37

S.16

S.21

1/4

E/16

UPPER PIT STOCKPILE SITE

POND BOTTOM
EL: 7228.5'

EXCAVATION LIMITS (TYP)

BAILEY DITCH: 235 LF

FIELD STOCKPILE & GRADING SITE ~ 8.5 Ac

HAUL ROUTE: 800 LF

N00° 25' 40"W
1269.15

S00° 21' 30"E
1294.56

BAILEY, DANIEL & YVONNE, TRUSTEES
61WD458

GRADING NOTE:
EXCAVATED MATERIAL FROM RES. CONSTRUCTION SHALL BE EVENLY GRADED WITHIN THE FIELD SITE DEPICTED. EXCAVATED TOPSOIL SHALL BE PRESERVED AND STOCKPILED FOR FINAL PLACEMENT OVER SITE (~6" LIFT).

C-N/16

S88° 58' 44"W
1341.29

NE/16

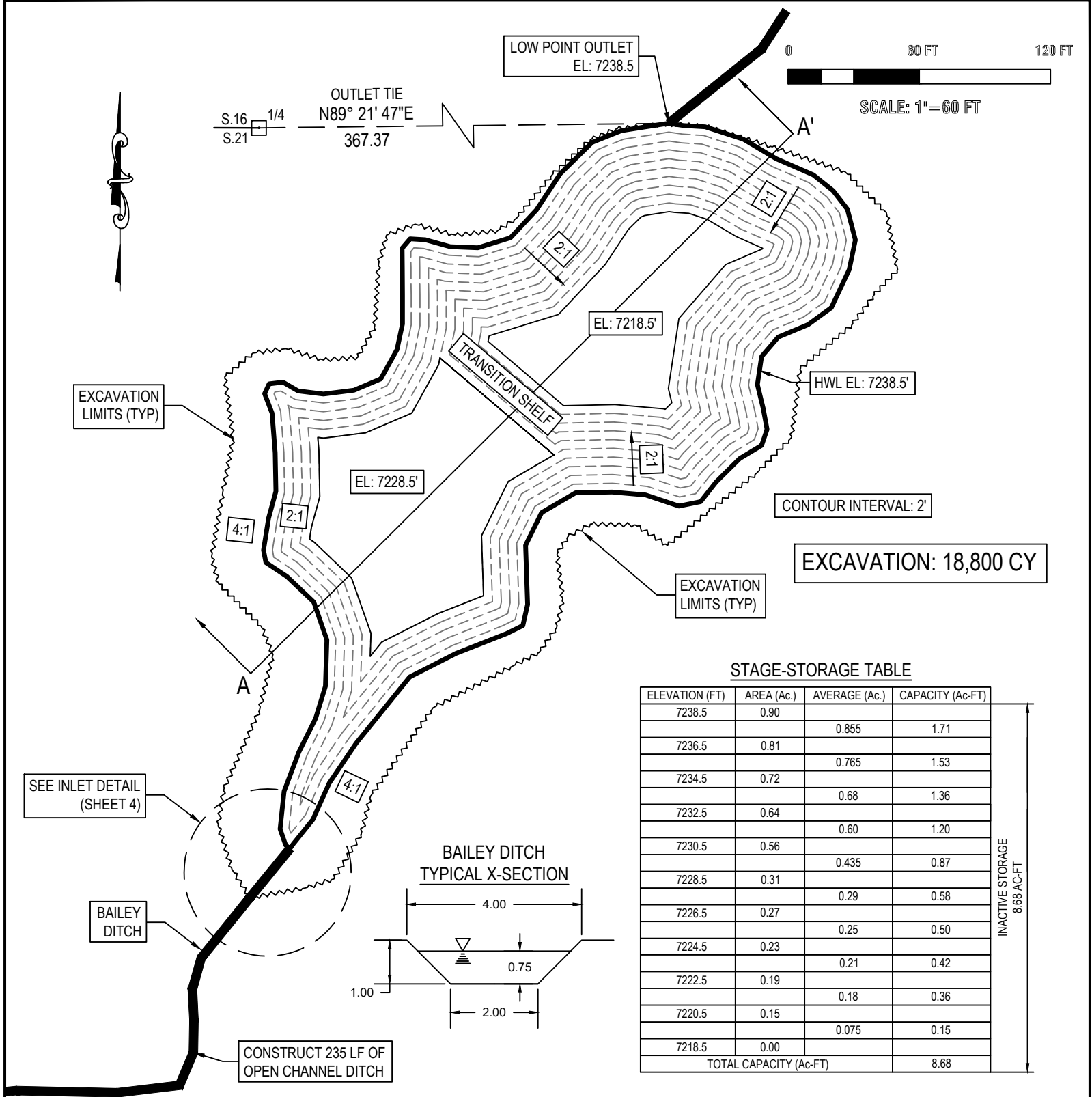


SCALE: 1"=200 FT



HOBACK RIVER WATERSHED - LEVEL I STUDY				
BAILEY #1 STOCK RES.				
SMALL WATER PROJECT ID: 2.1				
LOCATED IN THE NW/4NE/4 OF SECTION 21, T.36N., R.114W.,				
SUBLETTE COUNTY, WY				
DESIGNED BY: MTJ	CHECKED BY: EAS	DATE: 10/29/21	REVISID:	JOB No.: 4570
DRAWN BY: MTJ				PAGE No.: 2 OF 4

RIO VERDE ENGINEERING
 PINEDALE, WYOMING
 (307) 367-2826
 rioverde@wyoming.com

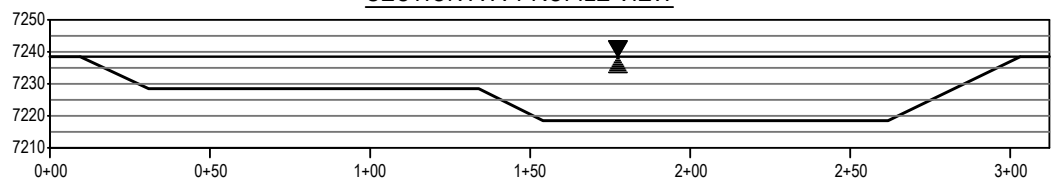


STAGE-STORAGE TABLE

ELEVATION (FT)	AREA (Ac.)	AVERAGE (Ac.)	CAPACITY (Ac-FT)
7238.5	0.90		
		0.855	1.71
7236.5	0.81		
		0.765	1.53
7234.5	0.72		
		0.68	1.36
7232.5	0.64		
		0.60	1.20
7230.5	0.56		
		0.435	0.87
7228.5	0.31		
		0.29	0.58
7226.5	0.27		
		0.25	0.50
7224.5	0.23		
		0.21	0.42
7222.5	0.19		
		0.18	0.36
7220.5	0.15		
		0.075	0.15
7218.5	0.00		
TOTAL CAPACITY (Ac-FT)			8.68

INACTIVE STORAGE 8.68 AC-FT

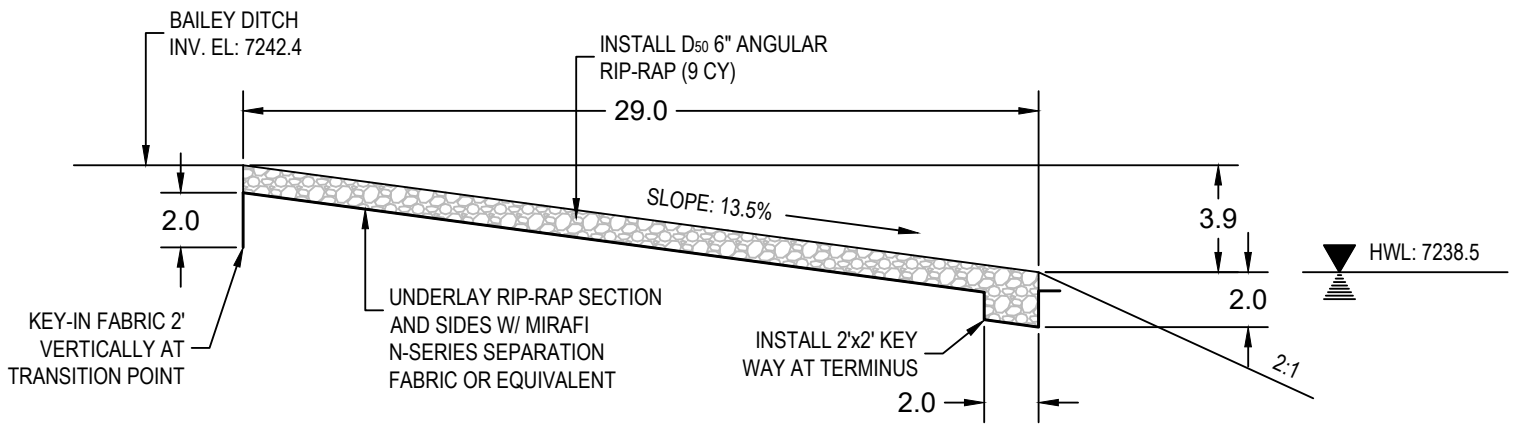
SECTION A-A' PROFILE VIEW



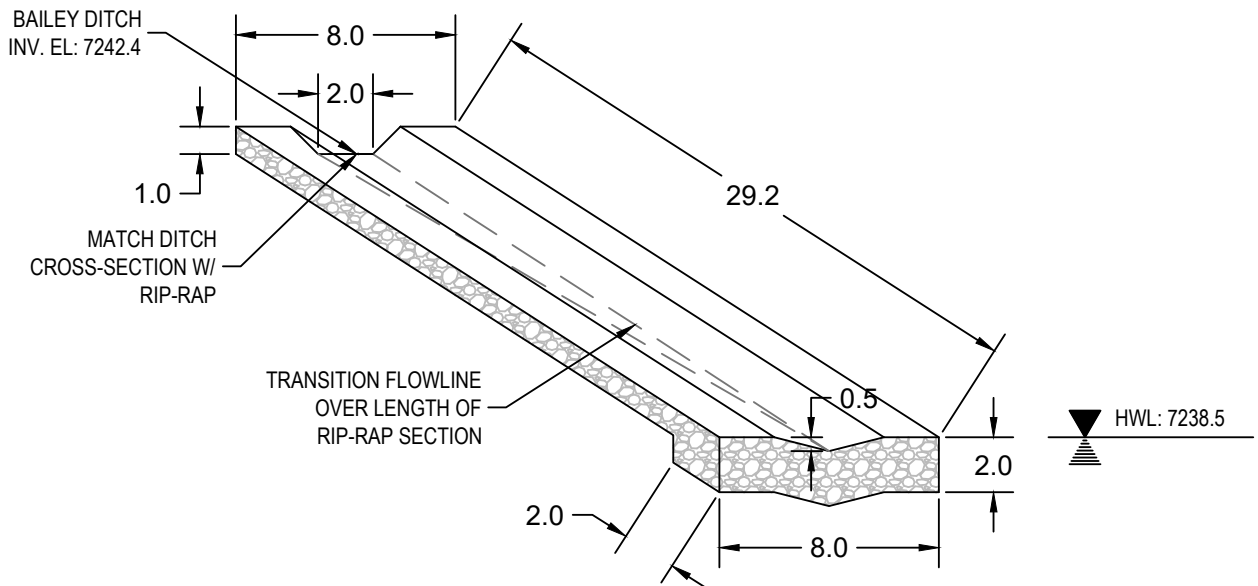
HOBACK RIVER WATERSHED - LEVEL I STUDY
BAILEY #1 STOCK RES.
 SMALL WATER PROJECT ID: 2.1
 LOCATED IN THE NW/4NE/4 OF SECTION 21, T.36N., R.114W.,
 SUBLETTE COUNTY, WY

DESIGNED BY: MTJ
 DRAWN BY: MTJ
 CHECKED BY: EAS
 DATE: 10/29/21
 REVISED:
 JOB No.: 4570
 PAGE No.: 3 OF 4

RIO VERDE ENGINEERING
 PINEDALE, WYOMING
 (307) 367-2826
 rioverde@wyoming.com



**BAILEY DITCH
RESERVOIR INLET RIP-RAP SECTION
CENTERLINE PROFILE VIEW**



**BAILEY DITCH
RESERVOIR INLET RIP-RAP SECTION
ISO VIEW**

11/04/19 10:00 AM

E30003
25.00

NOTE: Do not fold this form. Use typewriter or print neatly with black ink.

STATE OF WYOMING

OFFICE OF THE STATE ENGINEER

MELINDA FEGLER APPLICATION FOR PERMIT TO APPROPRIATE SURFACE WATER

THIS SECTION IS NOT TO BE FILLED IN BY APPLICANT

Filing/Priority Date

THE STATE OF WYOMING }
STATE ENGINEER'S OFFICE } SS.

This instrument was received and filed for record on the 4th day of November, 2019, at 10:00 o'clock A.M.

JASON FELTNER For State Engineer

Recorded in Book 129 of Stock Reservoir Permits, on Page 131

Fee Paid \$ 25.00 Map Filed

WATER DIVISION NO. 4 DISTRICT NO. 16 TEMPORARY FILING NO. 37 5/087S

PERMIT NO. P20711.0S STOCK RESERVOIR

NAME OF FACILITY

THE BAILEY #1 STOCK RESERVOIR

1. Name(s), mailing address and phone no. of applicant(s) is/are DANIEL AND YVONNE BAILEY, PO BOX 283, BONDURANT, Wyoming, 82922-0283, PH: 307-734-5030

E-mail address: ddeanbailey@gmail.com

(if more than one applicant, designate one to act as Agent for the others)

2. Name & address of agent to receive correspondence and notices RIO VERDE ENGINEERING, PO BOX 642, PINEDALE, Wyoming, 82941, PH: 307-367-2826

E-mail address: rioverde@wyoming.com

3. The use to which the water is to be applied is in-place stock watering purposes.

4. (a) The area of the high water line of the reservoir is 0.9 acres. (If a pipeline to additional points of storage will be used, include form SW4-A.)

(b) The capacity of the reservoir is 8.68 acre-feet.

(c) Body of Reservoir: Length Width Average Depth 10.0'

5. The source of the proposed appropriation is Long Cool Creek Draw tributary of Hoback River tributary of Snake River Source is Long Cool Creek Draw, Permit No. 36437.0D

6. The outlet of the reservoir is located in NW1/4NE1/4 of Section 21

T. 036N, R. 114W. Surveyed corner tie, if available: bearing

feet distant from the corner of Section, T., R.

Lot Block Subdivision Name

Latitude (Decimal Degrees) 43.08315 Longitude (Decimal Degrees) -110.45918

7. Are any of the lands covered by the proposed reservoir owned by the State or Federal government? If so, describe lands and designate whether State or Federally owned.

8. Fill out either (a) or (b).

(a) The reservoir is located in the channel of Long Cool Creek Draw

(b) The reservoir is to be filled through the

Canal, which has a carrying capacity of cubic feet per second (c.f.s.)

9. (a) The dam is to be constructed as follows contents = cubic yards.

(b) The water face of the dam is to be protected from wave action in the following manner:

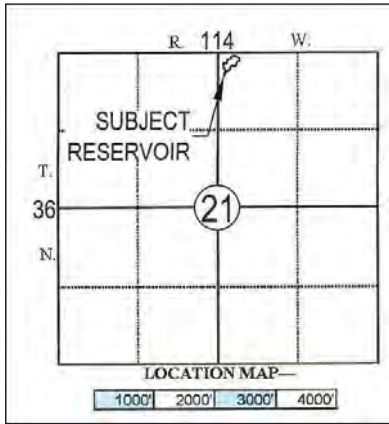
(c) Dam Height feet.

10. The accompanying map is prepared in accordance with the State Engineer's Rules and Regulations for filing applications and is hereby declared a part of this application.

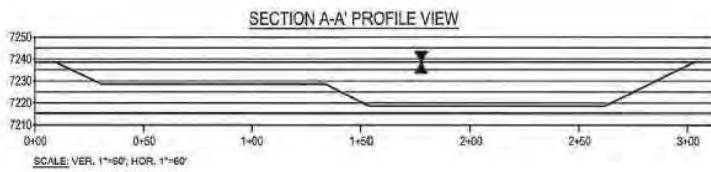
11. The estimated time required for completion of construction is 24 months

Permit No. P20711.0S Stk. Res.

Page No. 129/131
(Leave Blank)



LOCATION MAP - SCALE 1"=2000'
 *SEE NOTE BELOW
 PLSS: PM06 T036N, R114W, S21 NW1/4NE1/4 QQ



Capacity = [Area x Depth ÷ 3] = 8.68 Acre-Feet

NOTE: The location map shown above is not required if the application is accompanied by an aerial photograph or a U.S.G.S. quadrangle map, prepared in accordance with the State Engineer’s Rules and Regulations . However, the area map, cross-section of dam, profile of damsite and capacity computation must be completed in all applications.

CONSENT TO ENLARGE (if applicable): Consent to enlarge must be requested from all owners of reservoirs described in existing water rights, permits or applications for permits for the facility to be enlarged before the State Engineer will consider approval of the application. Where the reservoir operator is an incorporated company or irrigation district, consent may be made on behalf of the individual owners by that entity where the consent is an excerpt of meeting minutes showing approval and authority for the individual signing for the company or district to act in such capacity. Forms are available on the State Engineer’s website or may be obtained from the State Engineer’s Office.

DECLARATION

I declare that I have examined this application/map and to the best of my knowledge and belief it is true, correct and complete.

MIKE JACKSON
 Printed Name and Signature of Applicant or Agent

November 4, 2019
 Date

THE STATE OF WYOMING }
STATE ENGINEER'S OFFICE } ss.

TEMPORARY FILING NO. 37 5/087S

THIS IS TO CERTIFY that I have examined the foregoing application and do hereby grant the same subject to the following limitations and conditions:

This permit grants only the right to use the water available in the stream after all prior rights are satisfied.

This permit is conditioned on the holder of this permit securing and/or providing free and unencumbered access to this reservoir site to allow State Engineer personnel to perform their duties as prescribed by Law. These duties include, but are not limited to, construction inspections and water administration.

This permit is issued for one fill per water year from all sources.

Since the plans show that no outlet works are contemplated, the State Engineer may require the later installation of necessary outlet works or construction of a by-pass ditch or other means, which will facilitate regulation.

The time for completing the construction work shall terminate on December 31, 2021

Witness my hand this 19th day of November, A.D. 2019



NATHAN GRAVES For State Engineer

Permit No. P20711.0S Stk. Res.

Page No. 129/131

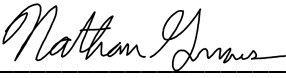
PERMIT NO. P20711.0S Stk. Res.

PERMIT STATUS

Priority Date November 4, 2019

Approval Date November 19, 2019

September 30, 2021 EXTENSION GRANTED, per request received September 15, 2021. Time for completion of construction has been extended to December 31, 2023. Documentation available electronically under this permit.


_____ for
Greg Lanning, P.E., State Engineer

NOTICE

This permit does not constitute a complete water right. It is your authority to begin construction work, which must be commenced within the time allowed in the permit.

Notice of completion of the work described in the permit, must be filed in the State Engineer's Office before the expiration of the time allowed in the permit.

If extensions of time beyond the time limits set forth in the permit are required, requests for same must be in writing, stating why the additional time is required, and must be received in the State Engineer's Office before the expiration of the time allowed in the permit.

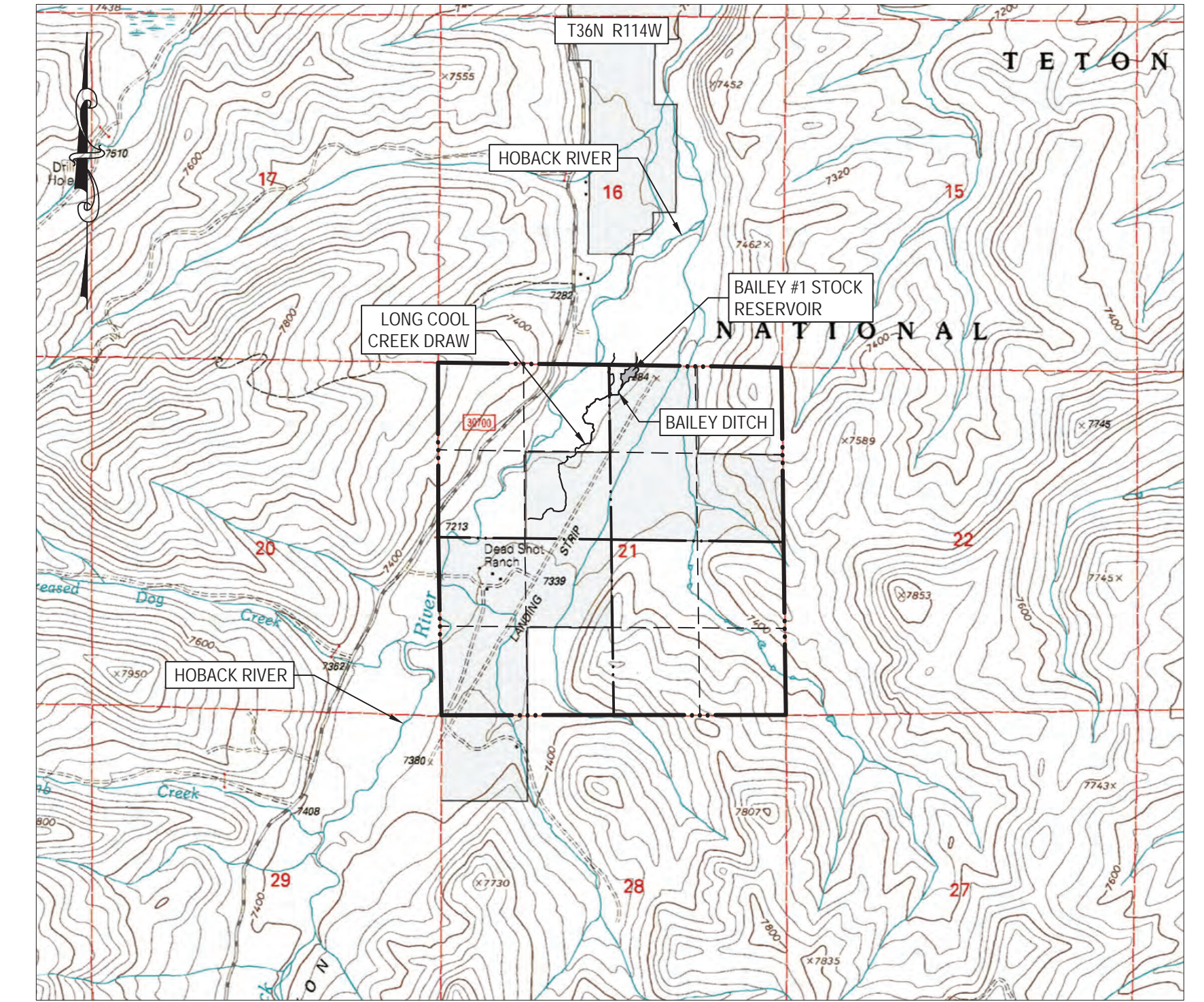
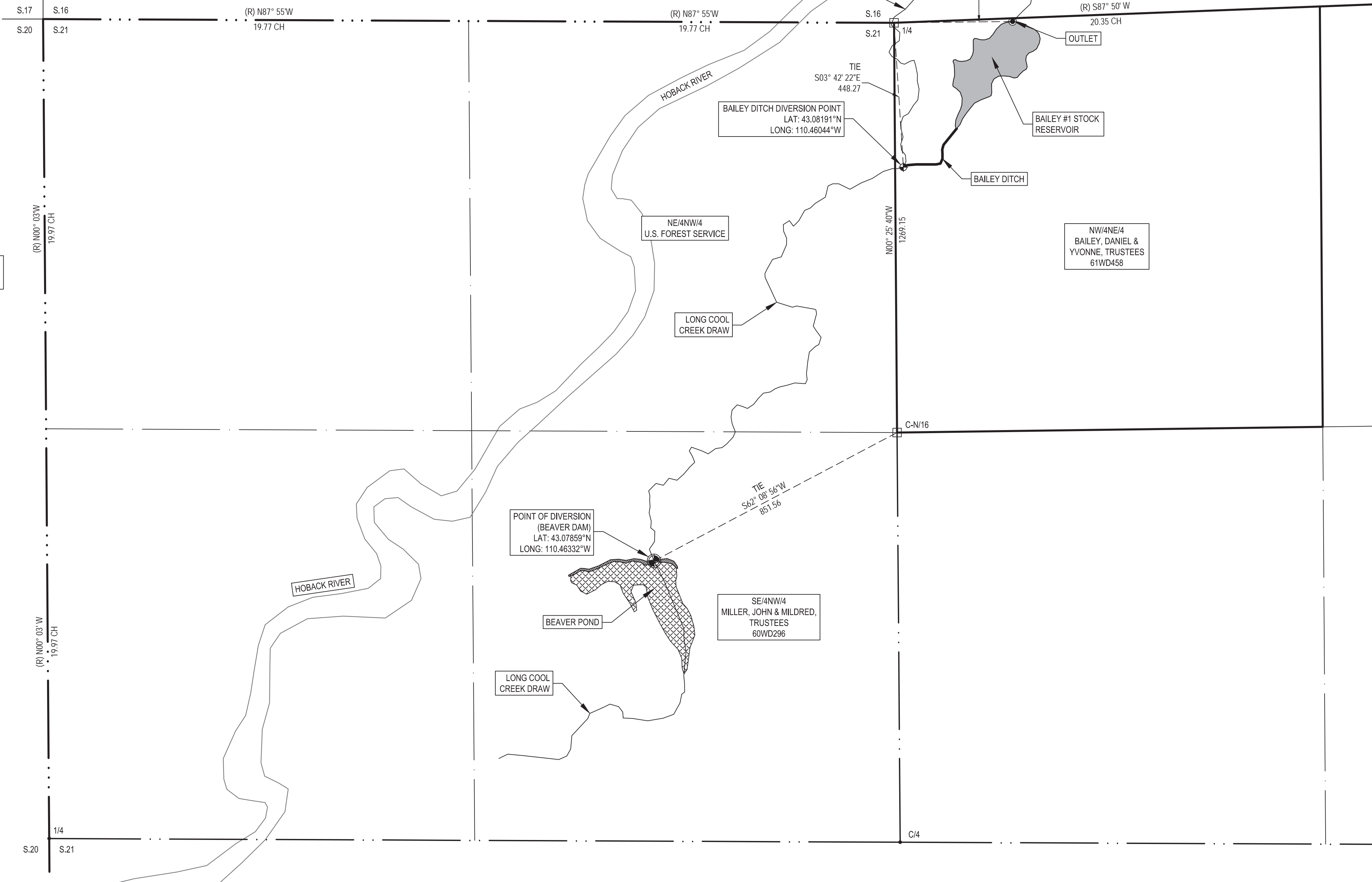
Once the Notice of Completion has been filed, Proof of Appropriation will be prepared and sent to your Water Division Superintendent. The Superintendent will arrange with you for an inspection of the facility. Should you desire adjudication, the Proof will be considered by the Board of Control, and, if found to be satisfactory, the Board will issue to you a Certificate of Construction which will constitute a completed water right.

The granting of a permit does not constitute the granting of right-of-way. If any right-of-way is necessary in connection with the application it should be understood that this responsibility is the applicant's.

DEPENDENT RESURVEY OF
SECTION 21, T36N, R114W, 6TH P.M.,
SUBLETTE COUNTY, WYOMING



PLAN VIEW
SCALE: 1"=200'



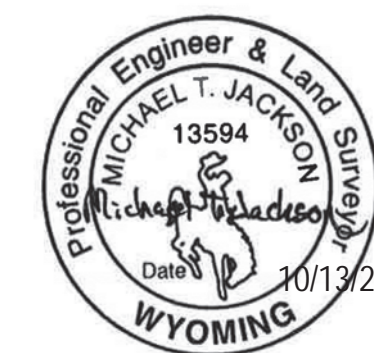
VICINITY MAP
SCALE: 1:24000

CERTIFICATE OF SURVEYOR

STATE OF WYOMING)
COUNTY OF SUBLETTE) SS.

I, MICHAEL T. JACKSON OF PINEDALE, WYOMING, HEREBY CERTIFY THAT THIS PLAT WAS MADE FROM NOTES TAKEN DURING AN ACTUAL SURVEY PERFORMED UNDER MY DIRECTION IN AUGUST, 2019 BY JON K. HITTLE, FOR WHOSE WORK I STAND PERSONALLY RESPONSIBLE, AND FROM RECORDS AVAILABLE IN THE OFFICE OF THE CLERK OF SUBLETTE COUNTY, WYOMING. SUCH SURVEY IS ACCURATELY REPRESENTED ON THIS PLAT AND CORRECTLY SHOWS THE LOCATION OF LONG COOL CREEK DRAW, BAILEY DITCH, POINT OF DIVERSION, AND THE ASSOCIATED PLACE OF USE AS DEPICTED HEREIN.

MICHAEL T. JACKSON
WYOMING PELS 13594



MEANS OF CONVEYANCE NOTE:

THE POINT OF DIVERSION, AS DEPICTED HEREON, IS LOCATED WITHIN A HISTORIC BEAVER DAM ACROSS LONG COOL CREEK. OCCASIONALLY, THE HEAD GATE AT THIS LOCATION IS OPENED TO PREVENT THE BEAVER DAM FROM WASHING OUT. LONG COOL CREEK THEN TRAVERSES NORTHERLY TO ITS CONFLUENCE WITH THE HOBACK RIVER. PRIOR TO SAID CONFLUENCE, AT THE BAILEY DITCH DIVERSION POINT, WATER IS CONVEYED TO THE BAILEY #1 STOCK RESERVOIR.

POINT OF DIVERSION INFORMATION

POINT OF DIVERSION (BEAVER DAM)
S.62°08'56"W, 851.56' FROM THE C-N/16
CORNER OF SECTION 21, T.36N., R.116W.
POD: LAT-43.07859°N, LONG-110.46332°W

BAILEY DITCH DIVERSION POINT
S.03°42'22"E, 448.27' FROM THE N/4
CORNER OF SECTION 21, T.36N., R.116W.
POD: LAT-43.08191°N, LONG-110.46044°W

PLACE OF USE INFORMATION

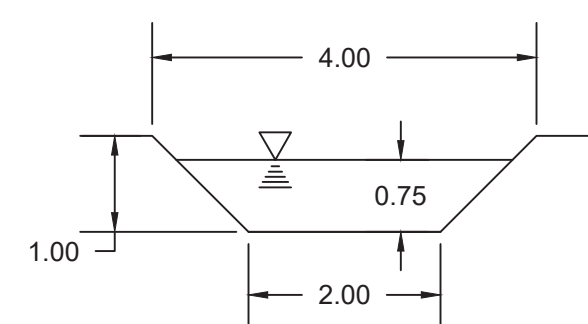
BAILEY #1 STOCK RESERVOIR OUTLET
N.89°21'47"E, 367.37' FROM THE N/4
CORNER OF SECTION 21, T.36N., R.116W.
LAT-43.08315°N, LONG-110.45918°W

SURVEY DATUM

REFERENCE FRAME:
NAD 83 (2011) (EPOCH: 2010.0000)
GEODETIC NORTH (GRID)

HYDRAULIC PROPERTIES

SLOPE = 0.2%
CHANNEL BOTTOM WIDTH = 2.0'
SIDE SLOPE = 1:1
DEPTH OF FLOW = 0.75 FT
WP = 4.12 FT
FLOW AREA = 2.06 SF
n = 0.05
VELOCITY = 0.84 FPS
CAPACITY = 1.73 CFS



LEGEND

- FOUND PLSS MONUMENT OF RECORD
- BAILEY #1 RESERVOIR OUTLET
- ⊙ POINT OF DIVERSION
- ⊕ BAILEY DITCH DIVERSION POINT
- POINT CALCULATED; NOT FOUND OR SET
- (R) RECORD BEARING AND DISTANCE; ALL OTHERS MEASURED
- SECTION BOUNDARY LINE
- - - MID-SECTION BOUNDARY LINE
- MID-QUARTER SECTION BOUNDARY LINE
- LONG COOL CREEK DRAW

MAP
TO ACCOMPANY SW-1 APPLICATION
FOR
LONG COOL CREEK DRAW

APPLICANTS:
DANIEL & YVONNE BAILEY
P.O. BOX 283
BONDURANT, WY 82922

AGENT:
RIO VERDE ENGINEERING
P.O. BOX 642
PINEDALE, WY 82941



DRAWN BY: MTJ OCTOBER 13, 2020 JOB NO. 4406

Approved: 10/17/2020
For:
Greg Lanning, P.E. State Engineer

CHA
\$50.00

RCVD 10-15-2020 7:05am

STATE OF WYOMING

OFFICE OF THE STATE ENGINEER

APPLICATION FOR PERMIT TO APPROPRIATE SURFACE WATER

THIS SECTION IS NOT TO BE FILLED IN BY APPLICANT

Filing/Priority Date

THE STATE OF WYOMING }
STATE ENGINEER'S OFFICE } SS.

This instrument was received and filed for record on the 15th day of October,
20 20, at 7:05 o'clock A M.

py Sma

Recorded in Book _____ of Ditch Permits, on Page _____ For State Engineer

Fee Paid \$ 50.00 Map Filed _____

WATER DIVISION NO. 4 DISTRICT NO. 16 COUNTY(IES) Sublette

TEMPORARY FILING NO. 37 6/167D PERMIT NO. 36437

NAME OF FACILITY LONG COOL CREEK DRAW

1. Name(s), mailing address and phone no. of applicant(s) is/are DANIEL & YVONNE BAILEY
P.O. BOX 283
BONDURANT, WY 82922-0283
(307) 734-5030 E-mail address: ddeanbailey@gmail.com
(if more than one applicant, designate one to act as Agent for the others)

2. Name & address of agent to receive correspondence and notices RIO VERDE ENGINEERING ATTN: MIKE JACKSON
P.O. BOX 642 PINEDALE, WY 82941
E-mail address: rioverde@wyoming.com

3. (a) The use to which the water is to be applied is STOCK WATER RESERVOIR SUPPLY
(b) If more than one beneficial use of water is applied for, the location and ownership of the point of use must be shown in item 10 of the application and the details of the facilities used to divert and convey the appropriation must be shown on the map in sufficient detail to allow the State Engineer to establish the amount of appropriation. In multiple use applications, stock and domestic purposes are limited to 0.056 cubic feet per second.

4. The source of the proposed appropriation is LONG COOL CREEK DRAW, TRIB. TO HOBACK RIVER, TRIB. TO SNAKE RIVER

5. The point of diversion of the proposed works is located S62° 08' 56"W., 851.56 feet distant from the C-N/16 corner of Section 21 T. 36 N., R. 114 W., and is in the SE SW ~~NW/4NE/4~~ of Section 21 T. 36 N., R. 114 W.
Lot _____ Block _____ Subdivision Name _____
Latitude 43.07859° N Longitude 110.46332° W

JS

6. Are any of the lands crossed by the proposed facility owned by the State or Federal government? If so, describe lands and indicate whether State or Federally owned.
LONG COOL CREEK DRAW TRAVERSES USFS (FEDERAL) LANDS. NO PHYSICAL CONSTRUCTION OR AMENDMENTS TO SAID CREEK ARE BEING PROPOSED.

7. The carrying capacity of the ditch, canal, pipeline or other facility at the point of diversion is 1.73 cubic feet per second (c.f.s.)

8. The accompanying map is prepared in accordance with the State Engineer's Rules and Regulations for filing applications and is hereby declared a part of this application. The State Engineer may require the filing of detailed construction plans.

9. The estimated time required for the completion of construction is 2 YEARS, and to complete the application of water to the beneficial uses stated in this application is 2 YEARS.

10. The land to be irrigated under this permit is described in the following tabulation. (Give irrigable acreage in each 40-acre subdivision. Designate ownership of land, Federal, State or private. If private, list names of owners and land owned separately.) If application is for stock, domestic, or for purposes other than irrigation, indicate point of use by 40-acre subdivision and owner.

Town-	Range	Sec.	NE ¹ / ₄				NW ¹ / ₄				SW ¹ / ₄				SE ¹ / ₄			
			NE ¹ / ₄	NW ¹ / ₄	SW ¹ / ₄	SE ¹ / ₄	NE ¹ / ₄	NW ¹ / ₄	SW ¹ / ₄	SE ¹ / ₄	NE ¹ / ₄	NW ¹ / ₄	SW ¹ / ₄	SE ¹ / ₄	NE ¹ / ₄	NW ¹ / ₄	SW ¹ / ₄	SE ¹ / ₄
36	114	21		X														
DANIEL & YVONNE BAILEY: NW/4NE/4, SEC. 21, T36N, R114W																		
RESERVOIR SUPPLY FOR P20711S IN THE AMOUNT 8.68AF																		

JS

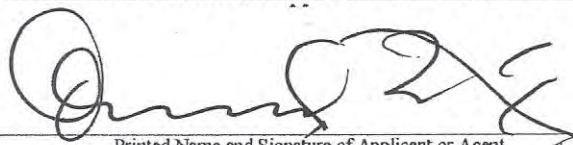
Number of acres to receive original supply _____
 Number of acres to receive supplemental supply _____
 Total number of acres to be irrigated _____

REMARKS

LONG COOL CREEK DRAW NATURALLY COURSES ONTO LANDS OWNED BY THE APPLICANTS. THIS APPLICATION IS FOR STOCK RESERVOIR SUPPLY, LOCATED ON LANDS OWNED BY SAID APPLICANTS.
 This application is a refiling of 36264D

JS

I declare that I have examined this application and to the best of my knowledge and belief it is true, correct and complete.


 Printed Name and Signature of Applicant or Agent
 DANIEL BAILEY

10/13/2020
 Date

THE STATE OF WYOMING }
STATE ENGINEER'S OFFICE } ss.

TEMPORARY FILING NO. 37 6/167

THIS IS TO CERTIFY that I have examined the foregoing application and do hereby grant the same subject to the following limitations and conditions:

This permit grants only the right to use the water available in the stream after all prior rights are satisfied.


Since the plans show that no diversion control structure or measuring device is contemplated, the State Engineer may require the later installation of such necessary works to facilitate regulation.

This permit is conditioned on the holder of this permit securing and/or providing free and unencumbered access to this facility to allow State Engineer personnel to perform their duties as prescribed by Law. These duties include, but are not limited to, construction inspections and water administration.

The time for completing the construction work shall terminate on December 31, 20 22.

The time for completing the application of water to beneficial use shall terminate on December 31, 20 22, and final proof of appropriation shall be made within 5 years thereafter.

Witness my hand this 17 th day of October, A.D. 2020.



GREG LANNING, P.E., State Engineer

Permit No. 36437

Page No. _____
(Leave Blank)

PERMIT NO. 36437

PERMIT STATUS

Priority Date October 15, 2020

Approval Date October 17, 2020

NOTICE

This permit, does not constitute a complete water right. It is your authority to begin construction work, which must be commenced within the time allowed in the permit.

Notice of completion of the work described in the permit, must be filed in the State Engineer's Office before the expiration of the time allowed in the permit.

If extensions of time beyond the time limits set forth in the permit are required, requests for same must be in writing, stating why the additional time is required, and must be received in the State Engineer's Office before the expiration of the time allowed in the permit.

Once the Notice of Completion has been filed, Proof of Appropriation will be prepared and sent to your Water Division Superintendent. The Superintendent will arrange with you for an inspection of the facility. Should you desire adjudication, the Proof will be considered by the Board of Control, and, if found to be satisfactory, the Board will issue to you a Certificate of Construction which will constitute a completed water right.

The granting of a permit does not constitute the granting of right-of-way. If any right-of-way is necessary in connection with the application it should be understood that this responsibility is the applicant's.

HOBACK RIVER WATERSHED, LEVEL I STUDY

Owner/Operator: Dan & Yvonne Bailey

Project Type: Small Reservoir & Irrigation

Project ID: 2.2

Project Name: Dead Shot No. 1 Reservoir

Location (PLSS): NW/4NE/4 Sec. 21, T36N, R114W

Location (Lat/Long): 43.08078° N, 110.45619° W

PROJECT COMPONENTS - ITEMIZED COSTS

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1	Mobilization	1	LS	\$ 2,500.00	\$ 2,500.00
2	Topsoil Stripping & Placement	740	SY	\$ 3.00	\$ 2,220.00
3	Unclassified Excavation	950	CY	\$ 2.50	\$ 2,375.00
4	Embankment Fill	950	CY	\$ 6.50	\$ 6,175.00
5	Inline Water Level Control Structure	1	LS	\$ 3,500.00	\$ 3,500.00
6	12" Dia. ADS N-12 Pipe	55	LF	\$ 45.00	\$ 2,475.00
6	Emergency Spillway / Bailey Ditch #1	150	LF	\$ 18.00	\$ 2,700.00
7	Irrigation Lateral Construction	1,020	LF	\$ 3.00	\$ 3,060.00
TOTAL COMPONENT COST (SUBTOTAL #2):					\$ 25,005.00

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$ -
PERMITTING AND MITIGATION:	\$ -
LEGAL FEES:	\$ -
ACQUISITION OF ACCESS AND RIGHTS-OF-WAY:	\$ -
PRE-CONSTRUCTION COSTS (SUBTOTAL #1):	\$ -

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%):	\$ 2,500.50
COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3):	\$ 27,505.50
CONTINGENCY (SUBTOTAL #3 X 15%):	\$ 4,125.83
TOTAL CONSTRUCTION COST (SUBTOTAL #4):	\$ 31,631.33

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4):	\$ 31,631.33
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PERMITTING REQUIREMENTS

Project ID: 2.2

Project Name: Dead Shot No. 1 Res.

Land Jurisdiction: Private, Daniel & Yvonne Bailey

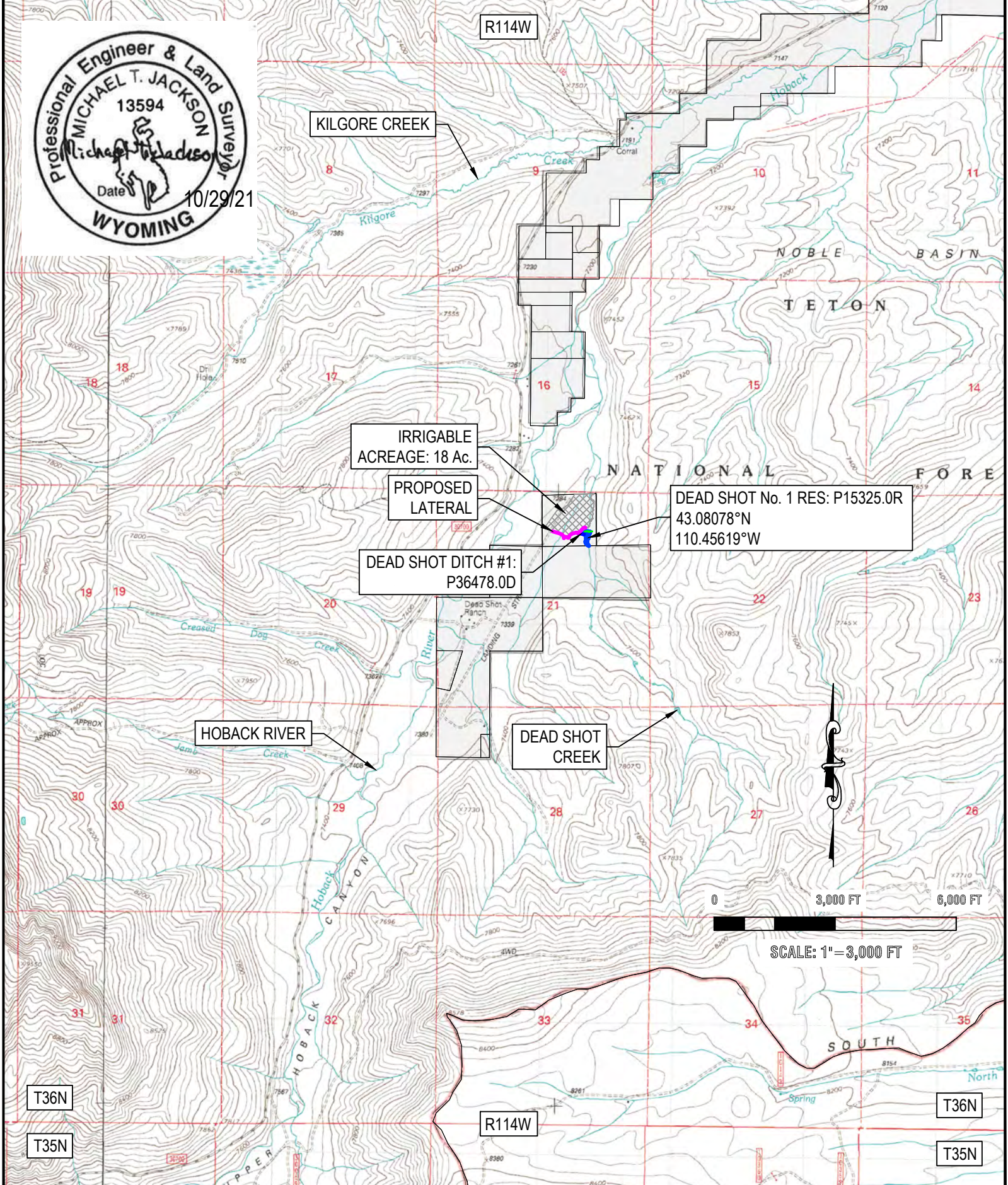
Greater Sage-Grouse Core Area Protection (Executive Order 2019-3)

This project is located within the defined Non-Core Population area and would require surface disturbance for pond construction. This project has been fully permitted by the Wyoming State Engineer's Office and has been awarded SWPP funding as part of this Watershed Study. No further action is required related to DDCT potential.

State Engineer's Office

Current Permit(s): P36478.0D & P15325.0R

The permits for diversion from Dead Shot Creek and Dead Shot No. 1 Reservoir have been acquired from the SEO. Once construction is complete, the Notice of Completion of Construction and Beneficial Use will be submitted to the SEO for final adjudication proof inspections.



KILGORE CREEK

IRRIGABLE ACREAGE: 18 Ac.

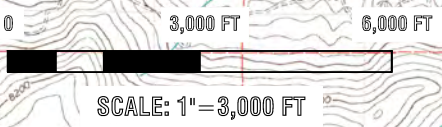
PROPOSED LATERAL

DEAD SHOT DITCH #1: P36478.0D

DEAD SHOT No. 1 RES: P15325.0R
43.08078°N
110.45619°W

HOBACK RIVER

DEAD SHOT CREEK



T36N

T35N

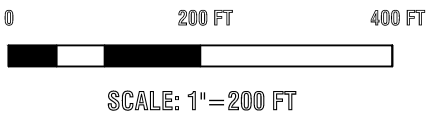
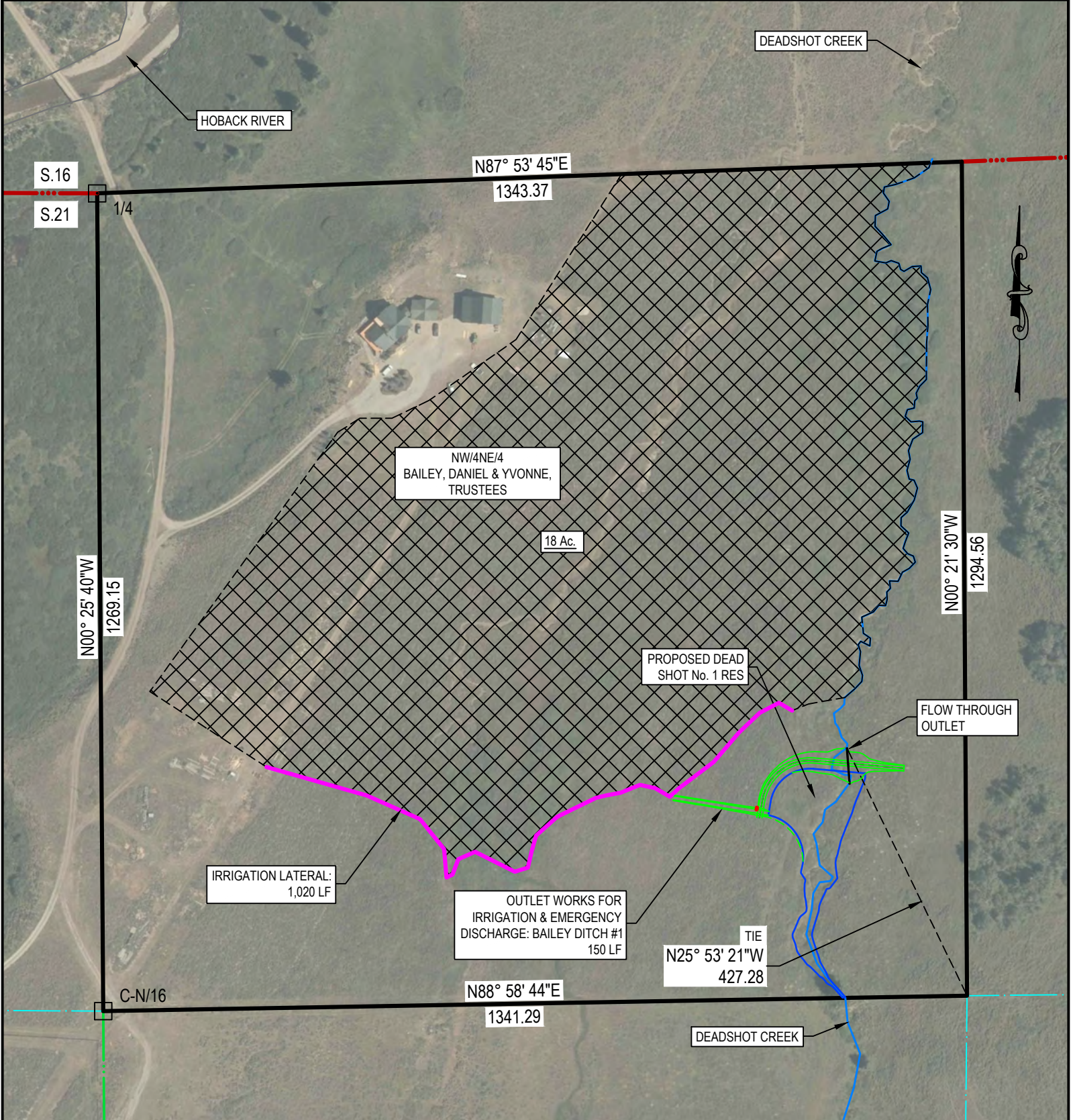
R114W

T36N

T35N

PAGE No. 1 OF 4	JOB No. 4570	REVISED:	DATE: 10/29/21	CHECKED BY: EAS	DRAWN BY: MTJ	DESIGNED BY: MTJ	HOBACK RIVER WATERSHED - LEVEL I STUDY DEAD SHOT No. 1 RESERVOIR SMALL WATER PROJECT ID: 2.2 LOCATED IN THE NW/4NE/4 OF SECTION 21, T.36N., R.114W., SUBLETTE COUNTY, WY	
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RIO VERDE ENGINEERING
 PINEDALE, WYOMING
 (307) 367-2826
 rioverde@wyoming.com



DESIGNED BY: MTJ
 DRAWN BY: MTJ
 CHECKED BY: EAS
 DATE: 10/29/21
 REVISED:
 JOB No.: 4570
 PAGE No. 2 OF 4

HOBACK RIVER WATERSHED - LEVEL I STUDY
DEAD SHOT No. 1 RESERVOIR
 SMALL WATER PROJECT ID: 2.2
 LOCATED IN THE NW/4NE/4 OF SECTION 21, T.36N., R.114W.,
 SUBLETTE COUNTY, WY

RIO VERDE
ENGINEERING
 PINEDALE, WYOMING
 (307) 367-2826
 rioverde@wyoming.com

DAM CREST: 7278'
 DAM HEIGHT: 10'
 2:1 DOWNSTREAM SLOPE
 3:1 UPSTREAM SLOPE
 DAM VOLUME: 950 CY
 HWL ELEV: 7275'

PROPOSED DAM

PROPOSED LANDS TO BE IRRIGATED

INLINE WATER SURFACE CONTROL STRUCTURE

PROPOSED BORROW AREA

PROPOSED LATERAL THIS PROJECT: 1,020 LF

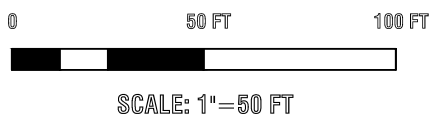
PROPOSED BAILEY #2 RES

OUTLET WORKS FOR IRRIGATION & EMERGENCY DISCHARGE: 150 LF



NW/4NE/4
 BAILEY, DANIEL &
 YVONNE, TRUSTEES

SW/4NE/4
 BENSON, ROSEMARY,
 TRUSTEE

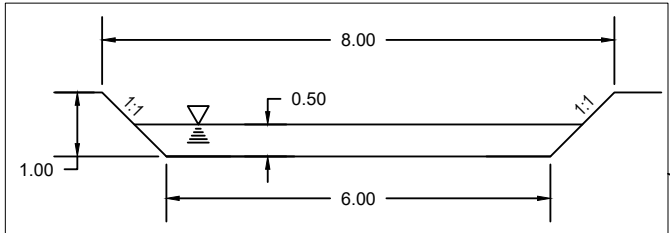


DEAD SHOT CREEK

PAGE No. 3 OF 4
 JOB No. 4570
 REVISED:
 DATE: 10/29/21
 CHECKED BY: EAS
 DRAWN BY: MTJ
 DESIGNED BY: MTJ

HOBACK RIVER WATERSHED - LEVEL I STUDY
DEAD SHOT No. 1 RESERVOIR
 SMALL WATER PROJECT ID: 2.2
 LOCATED IN THE NW/4NE/4 OF SECTION 21, T.36N., R.114W.,
 SUBLETTE COUNTY, WY

**RIO VERDE
 ENGINEERING**
 PINEDALE, WYOMING
 (307) 367-2826
 rioverde@wyoming.com

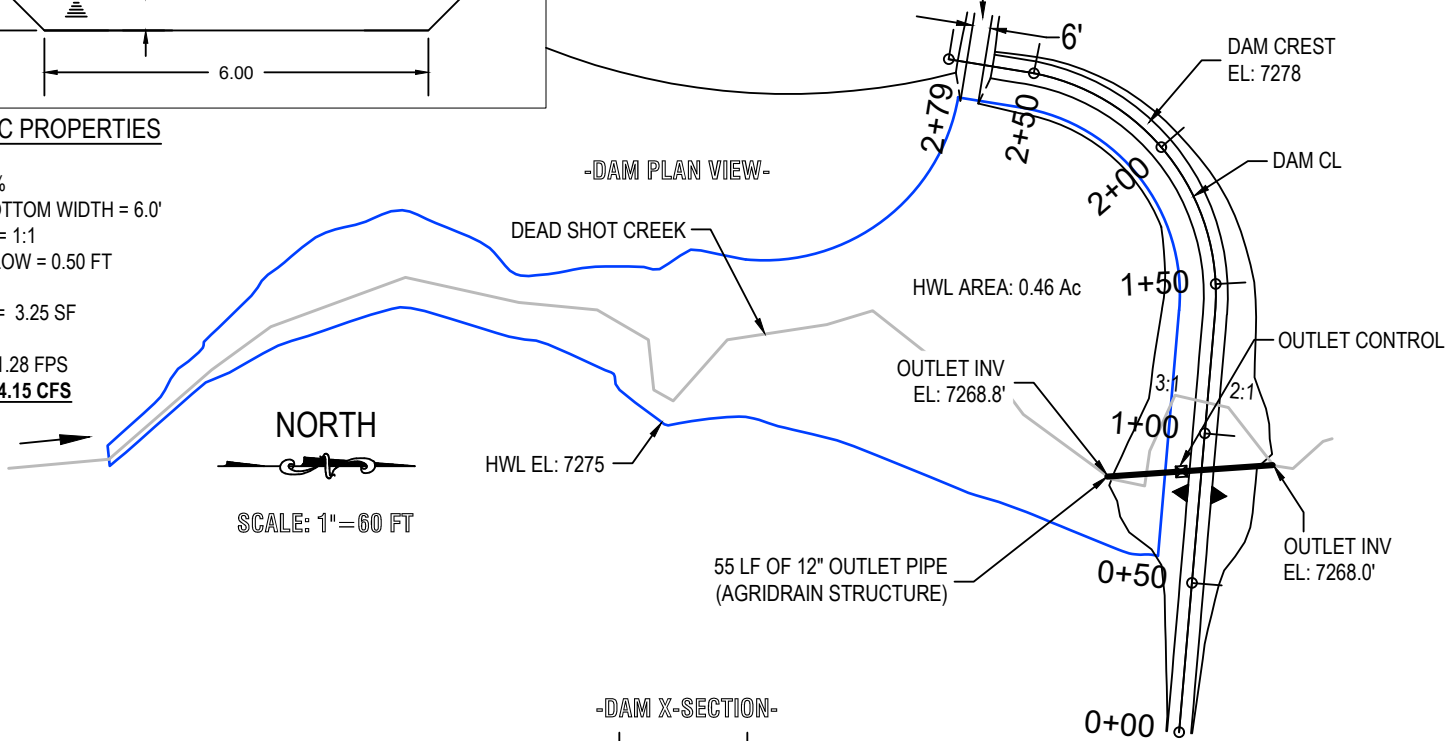


HYDRAULIC PROPERTIES

SLOPE = 0.2%
 CHANNEL BOTTOM WIDTH = 6.0'
 SIDE SLOPE = 1:1
 DEPTH OF FLOW = 0.50 FT
 WP = 7.41 FT
 FLOW AREA = 3.25 SF
 n = 0.03
 VELOCITY = 1.28 FPS
CAPACITY = 4.15 CFS

EMERGENCY SPILLWAY / DEAD SHOT DITCH POINT OF DIVERSION

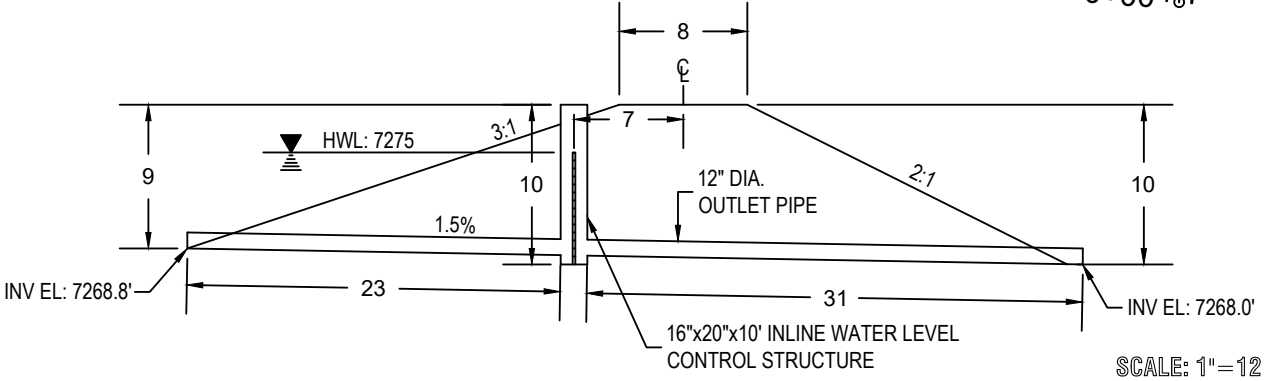
-DAM PLAN VIEW-



NORTH

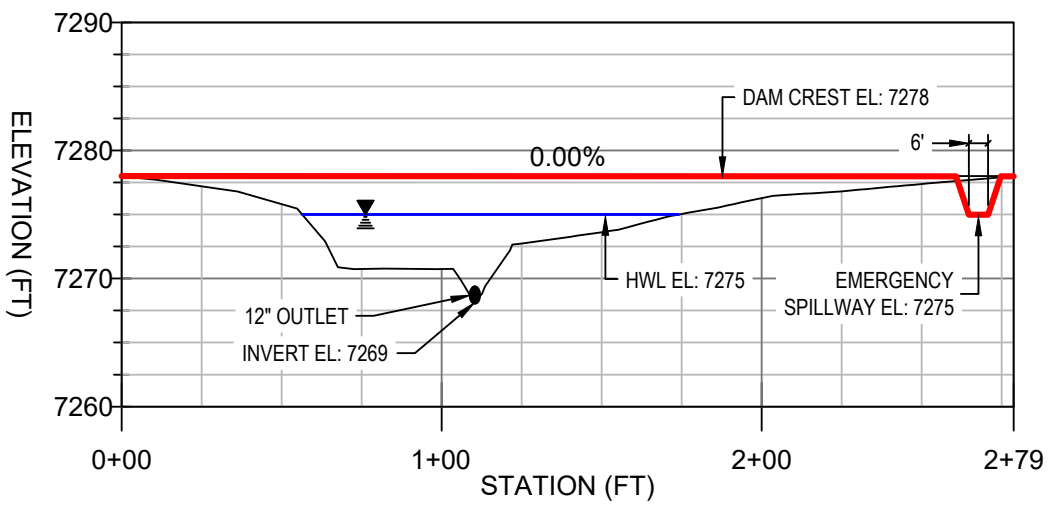
SCALE: 1"=60 FT

-DAM X-SECTION-



SCALE: 1"=12 FT

-DAM PROFILE VIEW-



SCALE:
 HZ 1"=60 FT
 VT 1"=15 FT

HOBACK RIVER WATERSHED - LEVEL I STUDY
DEAD SHOT No. 1 RESERVOIR
 SMALL WATER PROJECT ID: 2.2
 LOCATED IN THE NW/4NE/4 OF SECTION 21, T.36N., R.114W.,
 SUBLETTE COUNTY, WY

DESIGNED BY: MTJ
DRAWN BY: MTJ
CHECKED BY: EAS
DATE: 10/29/21
REVISED:
JOB No.: 4570
PAGE No.: 4 OF 4

RIO VERDE ENGINEERING
 PINEDALE, WYOMING
 (307) 367-2826
 rioverde@wyoming.com

NOTE: Do not fold this form. Use typewriter or print neatly with black ink.

CHA
\$25.00

STATE OF WYOMING

1-19-21
11:00 AM

Jsmith

OFFICE OF THE STATE ENGINEER

APPLICATION FOR PERMIT TO APPROPRIATE SURFACE WATER

THIS SECTION IS NOT TO BE FILLED IN BY APPLICANT

Filing/Priority Date

THE STATE OF WYOMING }
STATE ENGINEER'S OFFICE } SS.

This instrument was received and filed for record on the 19th day of January,
20 21, at 11 o'clock A M.

py Smith

For State Engineer

Recorded in Book _____ of Reservoir Permits, on Page _____

Fee Paid \$ 25 Map Filed _____

WATER DIVISION NO. 4 DISTRICT NO. 16 COUNTY (IES) _____ Sublette

TEMPORARY FILING NO. 37 4/188R PERMIT NO. 15325 RESERVOIR

NAME OF FACILITY

THE DEAD SHOT No. 1 RESERVOIR

1. Name(s), mailing address and phone no. of applicant(s) is/are _____

DANIEL & YVONNE BAILEY

P.O. BOX 283

BONDURANT, WY 82922-0283

E-mail address: ddeanbailey@gmail.com

(if more than one applicant, designate one to act as Agent for the others)

2. Name & address of agent to receive correspondence and notices RIO VERDE ENGINEERING ATTN: MIKE JACKSON

P.O. BOX 642

PINEDALE, WY 82941

E-mail address: rioverde@wyoming.com

3. The use to which the water is to be applied is IRRIGATION

(a) If more than one beneficial use of water is applied for, the reservoir capacity must be allocated in acre-feet to the various uses:

Active Capacity

0.46 Ac-Ft 0.95 Ac-Ft

Inactive Capacity

0.00 Ac-Ft

sl

(b) The area of the high water line of the reservoir is 0.46 acres.

(c) The total available capacity of the reservoir is 0.95 acre-feet.

(d) If enlargement, the capacity of this enlargement is _____ acre-feet.

4. The source of the proposed appropriation is (*stream, ditch, well, etc.*) _____

DEAD SHOT CREEK, TRIB. OF HOBACK RIVER, TRIB. OF SNAKE RIVER

5. The outlet of the proposed reservoir is located N25° 53' 21"W., 42728 feet distant from the NE/16

corner of Section 21 T. 36 N., R. 114 W., and is in the NW/4NE/4 of Section 21

T. 36 N., R. 114 W. Lot _____ Block _____ Subdivision Name _____

Latitude 43.08078° N Longitude 110.45619° W

6. Are any of the lands covered by the proposed reservoir owned by the State or Federal government? If so, describe lands and designate whether State or Federally owned. NO

7. (a) The dam is to be constructed as follows: COMP ACTED EARTH FILL

contents = 950 cubic yards.

(b) The water face of the dam is to be protected from wave action in the following manner: VEGETATION

(c) The dam height, as measured by the dam crest elevation minus the lowest downstream toe elevation is 10.0 feet.

Permit No. 15325 Res. _____

Page No. _____
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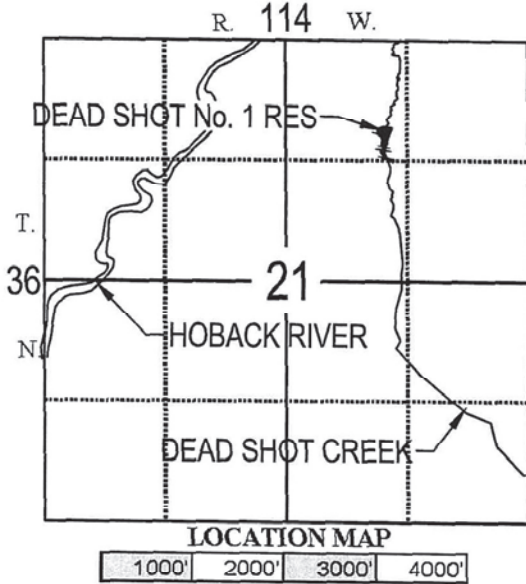
RESERVOIR APPLICATION SUPPLEMENTAL SHEET

(For use with Form S.W. 3)
for

THE DEAD SHOT No. 1

RESERVOIR

Temporary File No. _____ R



Show Cross-Section and Hydraulic Properties of the Spillway in the space provided below:

CAPACITY

Area at High Water Line (HWL): (a) 0.46 acres

Area at elevation of Outlet (invert): (b) 0.00 acres

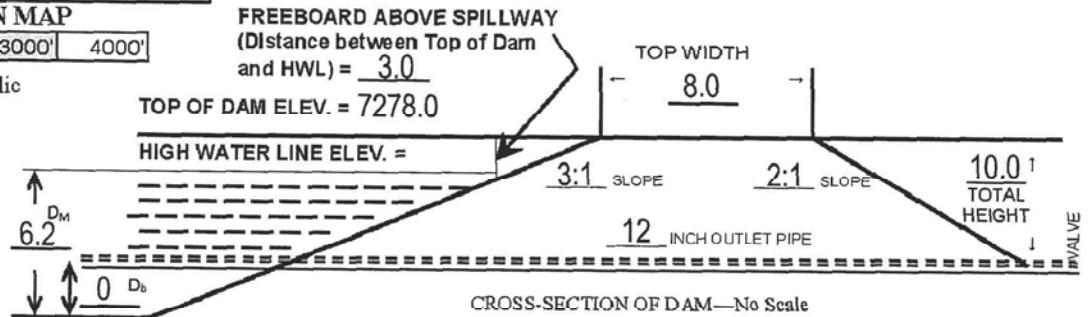
(D_M) Maximum water Depth (less freeboard): (c) 6.2 feet

(D_b) Water Depth below Outlet: (d) 0 feet

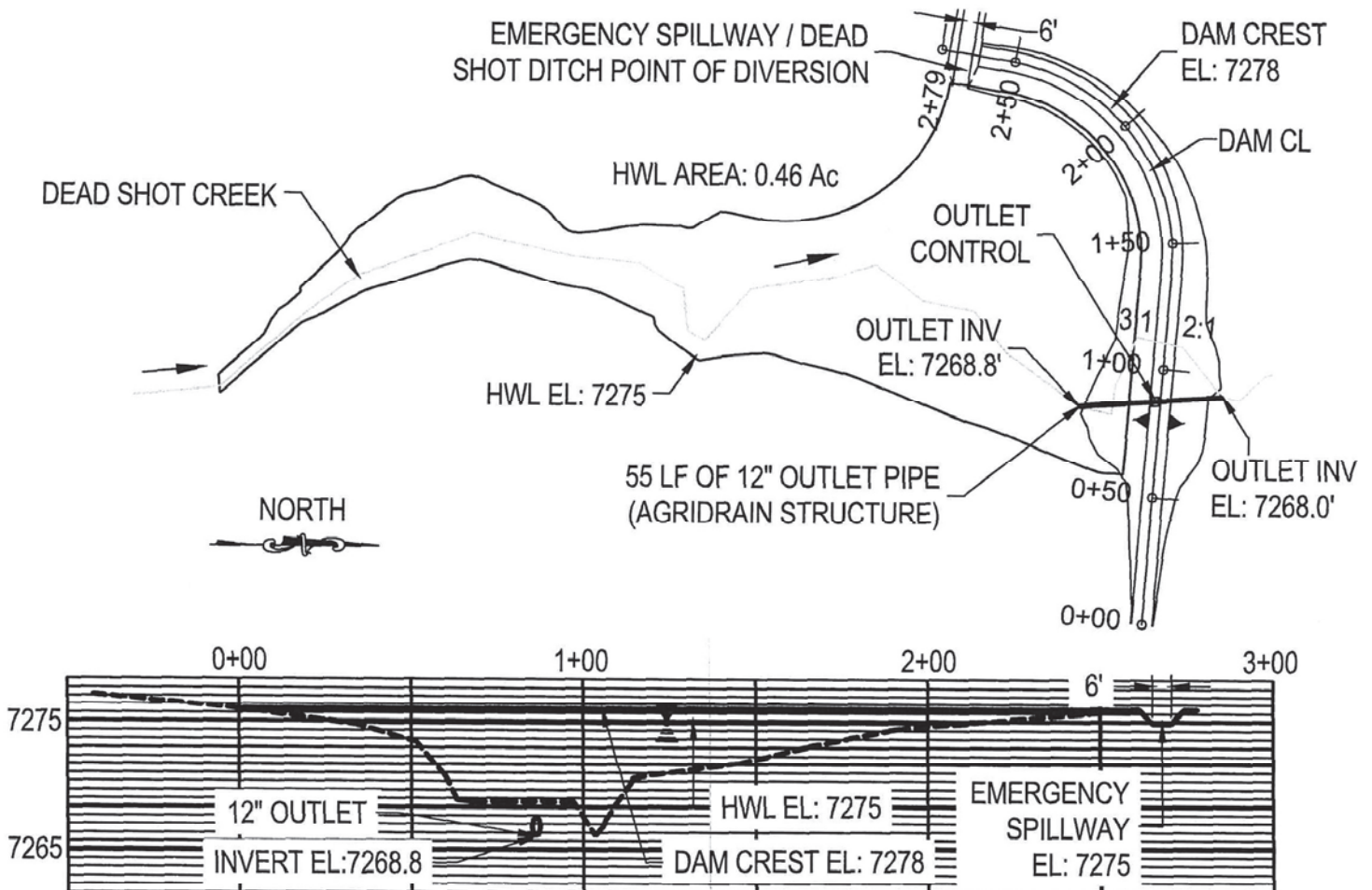
TOTAL CAPACITY = (a) x (c) ÷ 3 = 0.95 acre-feet

INACTIVE CAPACITY = (b) x (d) ÷ 3 = 0.00 acre-feet

ACTIVE CAPACITY = TOTAL CAPACITY - INACTIVE CAPACITY = 0.95 acre-feet



SHOW PLAN VIEW IN THE SPACE PROVIDED - SCALE: 1"= 30' (Use as large a scale as possible)



PROFILE OF DAM SITE or CROSS SECTION — of PIT (Looking Upstream) - Scale: Ver. 1"=13.3'; Hor. 1"=50'

DECLARATION

I declare that I have examined this application/map and to the best of my knowledge and belief it is true, correct and complete.

Mike Sackson, Agent *[Signature]*
Printed Name and Signature of Applicant or Agent

1/13/21 Date

THIS IS TO CERTIFY that I have examined the foregoing application and do hereby grant the same subject to the following limitations and conditions:

This permit grants only the right to use the water available in the stream after all prior rights are satisfied.

This permit is issued for one fill per water year from all sources.

This permit is conditioned on the holder of this permit securing and/or providing free and unencumbered access to this facility to allow State Engineer personnel to perform their duties as prescribed by Law. These duties include, but are not limited to, construction inspections and water administration.

This facility is located within a recognized Migration Corridor for Mule Deer or Antelope under Executive Order 2020-1. The Wyoming Game and Fish Department can provide best practices for the construction of your project to help ensure the protection of these habitats.

The applicant has requested waiver of the five-foot freeboard requirement and such waiver is granted by the State Engineer's endorsement hereon. However, such waiver does not relieve the appropriator of responsibility for safety of operation of the reservoir or of liability in case of failure of the dam. Documents are available electronically under this permit.

The time for completing the construction of the reservoir shall terminate on December 31, 20 23.

Witness my hand this 1 st day of February, A.D. 2021.



For:

GREG LANNING, State Engineer

Permit No. 15325 Res.

Page No. _____
(Leave Blank)

PERMIT NO. 15325 RES.

PERMIT STATUS

Priority Date January 19, 2021

Approval Date February 1, 2021

NOTICE

This permit, does not constitute a complete water right. It is your authority to begin construction work, which must be commenced within the time allowed in the permit.

Notice of completion of the work described in the permit, must be filed in the State Engineer's Office before the expiration of the time allowed in the permit.

If extensions of time beyond the time limits set forth in the permit are required, requests for same must be in writing, stating why the additional time is required, and must be received in the State Engineer's Office before the expiration of the time allowed in the permit.

Once the Notice of Completion has been filed, Proof of Appropriation will be prepared and sent to your Water Division Superintendent. The Superintendent will arrange with you for an inspection of the facility. Should you desire adjudication, the Proof will be considered by the Board of Control, and, if found to be satisfactory, the Board will issue to you a Certificate of Construction which will constitute a completed water right.

The granting of a permit does not constitute the granting of right-of-way. If any right-of-way is necessary in connection with the application it should be understood that this responsibility is the applicant's.

CHA
\$50.00

NOTE: Do not fold this form. Use typewriter
or print neatly with black ink.

STATE OF WYOMING

OFFICE OF THE STATE ENGINEER

1-19-21
11:00 AM

jsmith

APPLICATION FOR PERMIT TO APPROPRIATE SURFACE WATER

THIS SECTION IS NOT TO BE FILLED IN BY APPLICANT

Filing/Priority Date

THE STATE OF WYOMING }
STATE ENGINEER'S OFFICE } SS.

This instrument was received and filed for record on the 19th day of January,
20 21, at 11 o'clock A M.



For State Engineer

Recorded in Book _____ of Ditch Permits, on Page _____

Fee Paid \$ 50 Map Filed _____

WATER DIVISION NO. 4 DISTRICT NO. 16 COUNTY(IES) SUBLETTE

TEMPORARY FILING NO. 37 3/188D PERMIT NO. 36478

NAME OF FACILITY DEAD SHOT DITCH #1

1. Name(s), mailing address and phone no. of applicant(s) is/are DANIEL & YVONNE BAILEY
P.O. BOX 283
BONDURANT, WY 8222-0283
(307) 734-5030 E-mail address: ddeanbailey@gmail.com
(If more than one applicant, designate one to act as Agent for the others)

2. Name & address of agent to receive correspondence and notices RIO VERDE ENGINEERING ATTN: MIKE JACKSON
P.O. BOX 642 PINEDALE, WY 82941
E-mail address: riverde@wyoming.com

3. (a) The use to which the water is to be applied is IRRIGATION Secondary Supply
(b) If more than one beneficial use of water is applied for, the location and ownership of the point of use must be shown in item 10 of the application and the details of the facilities used to divert and convey the appropriation must be shown on the map in sufficient detail to allow the State Engineer to establish the amount of appropriation. In multiple use applications, stock and domestic purposes are limited to 0.056 cubic feet per second.

JS

4. The source of the proposed appropriation is DEAD SHOT CREEK, TRIB. OF HOBACK RIVER, TRIB. OF SNAKE RIVER

5. The point of diversion of the proposed works is located N48° 42' 19"W., 433.24 feet distant
from the NE/16 corner of Section 21 T. 36 N., R. 114 W., and is in the
NW/4NE/4 of Section 21 T. 36 N., R. 114 W.
Lot _____ Block _____ Subdivision Name _____
Latitude 43.0805° N Longitude 110.45619° W

6. Are any of the lands crossed by the proposed facility owned by the State or Federal government? If so, describe lands and indicate whether State or Federally owned.
NO.

7. The carrying capacity of the ditch, canal, pipeline or other facility at the point of diversion is 4.15 cubic feet per second (c.f.s.)

8. The accompanying map is prepared in accordance with the State Engineer's Rules and Regulations for filing applications and is hereby declared a part of this application. The State Engineer may require the filing of detailed construction plans.

9. The estimated time required for the completion of construction is 2 YEARS, and to complete the application of water to the beneficial uses stated in this application is 2 YEARS.

Permit No. 36478

Page No. _____
(Leave Blank)

THE STATE OF WYOMING }
STATE ENGINEER'S OFFICE } ss.

TEMPORARY FILING NO. 37 3/188

THIS IS TO CERTIFY that I have examined the foregoing application and do hereby grant the same subject to the following limitations and conditions:

This permit grants only the right to use the water available in the stream after all prior rights are satisfied.

Since the plans show that no diversion control structure or measuring device is contemplated, the State Engineer may require the later installation of such necessary works to facilitate regulation.

This permit is conditioned on the holder of this permit securing and/or providing free and unencumbered access to this facility to allow State Engineer personnel to perform their duties as prescribed by Law. These duties include, but are not limited to, construction inspections and water administration.


Secondary Permit, for Primary Permit see Permit Number 15325.0R.

This facility is located within a recognized Migration Corridor for Mule Deer or Antelope under Executive Order 2020-1. The Wyoming Game and Fish Department can provide best practices for the construction of your project to help ensure the protection of these habitats.

The time for completing the construction work shall terminate on December 31, 2023.

The time for completing the application of water to beneficial use shall terminate on December 31, 2023, and final proof of appropriation shall be made within 5 years thereafter.

Witness my hand this 1st day of February, A.D. 2021.

 For: _____
GREG LANNING, State Engineer

Permit No. 36478

Page No. _____
(Leave Blank)

PERMIT NO. 36478

PERMIT STATUS

Priority Date January 19, 2021

Approval Date February 1, 2021

NOTICE

This permit, does not constitute a complete water right. It is your authority to begin construction work, which must be commenced within the time allowed in the permit.

Notice of completion of the work described in the permit, must be filed in the State Engineer's Office before the expiration of the time allowed in the permit.

If extensions of time beyond the time limits set forth in the permit are required, requests for same must be in writing, stating why the additional time is required, and must be received in the State Engineer's Office before the expiration of the time allowed in the permit.

Once the Notice of Completion has been filed, Proof of Appropriation will be prepared and sent to your Water Division Superintendent. The Superintendent will arrange with you for an inspection of the facility. Should you desire adjudication, the Proof will be considered by the Board of Control, and, if found to be satisfactory, the Board will issue to you a Certificate of Construction which will constitute a completed water right.

The granting of a permit does not constitute the granting of right-of-way. If any right-of-way is necessary in connection with the application it should be understood that this responsibility is the applicant's.

HOBACK RIVER WATERSHED STUDY LEVEL I**Owner/Operator:** Pat Burroughs**Project Type:** Conveyance Facility Rehabilitation**Project ID:** 3.1**Project Name:** Julius Miller Ditch Rehabilitation**Location (PLSS):** Sec. 9 & 16, T36N, R114W**Location (Lat/Long):** 43.09111°N, 110.46111°W**PROJECT COMPONENTS (ENGINEER'S ESTIMATE)**

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1	Mobilization	1	LS	\$ 3,200.00	\$ 3,200.00
2	Ditch shaping, cleaning, & rehab	3140	LF	\$ 6.50	\$ 20,410.00
3	18" CMP & Installation	110	LF	\$ 60.00	\$ 6,600.00
4	12" X 20' Flume & Installation	1	LS	\$ 3,500.00	\$ 3,500.00
TOTAL COMPONENT COST (SUBTOTAL #2):					\$ 33,710.00

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$ 2,400.00
PERMITTING AND MITIGATION:	\$ 1,500.00
LEGAL FEES:	\$ 1,200.00
ACQUISITION OF ACCESS AND RIGHTS-OF-WAY:	\$ 4,500.00
PRE-CONSTRUCTION COSTS (SUBTOTAL #1):	\$ 9,600.00

TOTAL COMPONENT COST (SUBTOTAL #2):	\$ 33,710.00
--	---------------------

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%):	\$ 3,371.00
COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3):	\$ 37,081.00
CONTINGENCY (SUBTOTAL #3 X 15%):	\$ 5,562.15
TOTAL CONSTRUCTION COST (SUBTOTAL #4):	\$ 42,643.15

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4):	\$ 52,243.15
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PERMITTING REQUIREMENTS

Project ID: 3.1

Project Name: Julius Miller Ditch Rehab

Land Jurisdiction: Private (see below)

Author, William & Wiener, Allison

Burroughs, Patricia

Castillon, Anthony & Ashley

Cramer, William

Goody, Greyson & Talayeh

Miller, John & Mildred

Ryan, Hillary

Thompson, Terry & Elizabeth

Upper Hoback River Ranch, LLC

Ditch construction and maintenance easements should be secured prior to commencement of rehabilitation activities. It is encouraged to formalize cost share responsibilities prior to project submittal under the SWPP program. Water rights have been tabulated by owner on sheet 3 of the project plans to aid with this effort.

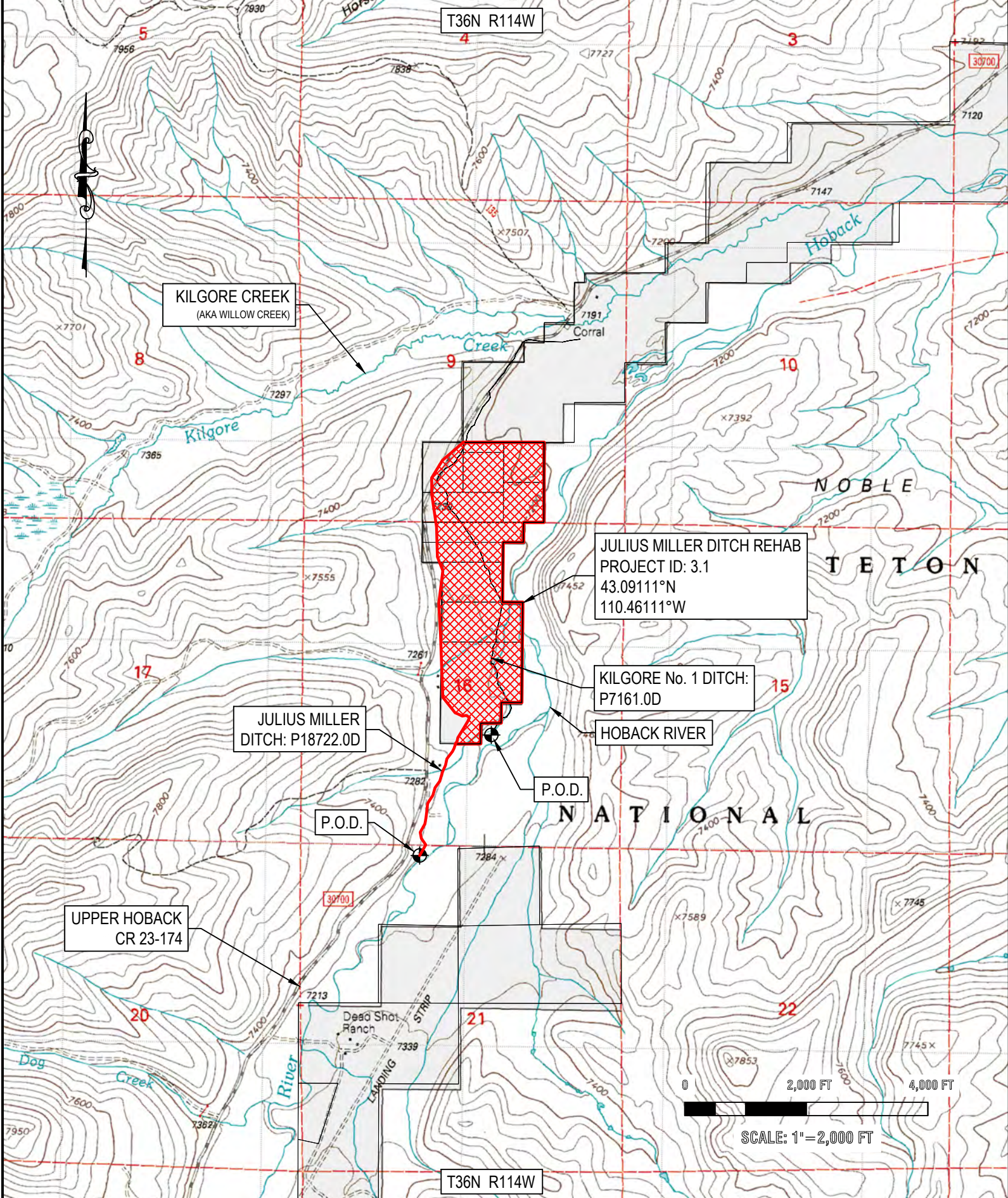
Greater Sage-Grouse Core Area Protection (Executive Order 2019-3)

This project is located within the defined Non-Core Population area and would require surface disturbance for ditch rehabilitation. Based on preliminary DDCT calculations, said project is located more than 2 miles from an occupied lek. Therefore, no restrictions on timing of construction is expected.

State Engineer's Office

Current Permit: P18722.0D

No additional permits proposed.



KILGORE CREEK
(AKA WILLOW CREEK)

JULIUS MILLER DITCH REHAB
PROJECT ID: 3.1
43.09111°N
110.46111°W

KILGORE No. 1 DITCH:
P7161.0D

JULIUS MILLER
DITCH: P18722.0D

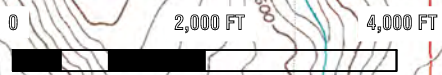
HOBACK RIVER

P.O.D.

P.O.D.

UPPER HOBACK
CR 23-174

T36N R114W

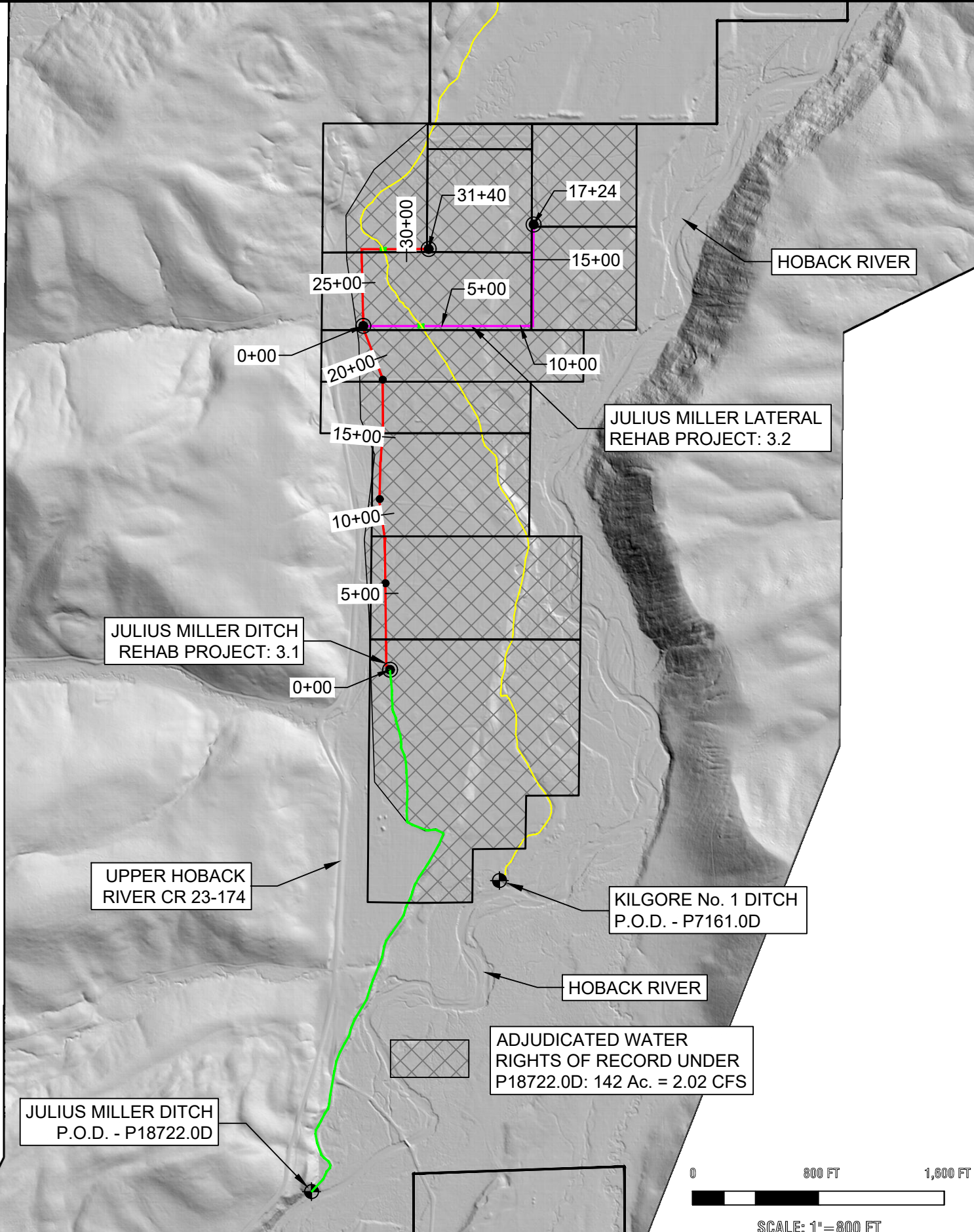


SCALE: 1"=2,000 FT

PAGE No. 1 OF 7
JOB No. 4570
REVISED:
DATE: 4/16/22
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DRAWN BY: MTJ

HOBACK RIVER WATERSHED - LEVEL I STUDY
JULIUS MILLER DITCH REHAB
SMALL WATER PROJECT ID: 3.1
LOCATED IN SECTIONS 9 AND 16, T.36N., R.114W., 6TH P.M.,
SUBLETTE COUNTY, WY

**RIO VERDE
ENGINEERING**
PINEDALE, WYOMING
(307) 367-2826
rioverde@wyoming.com



JULIUS MILLER DITCH REHAB PROJECT: 3.1

JULIUS MILLER LATERAL REHAB PROJECT: 3.2

UPPER HOBACK RIVER CR 23-174

KILGORE No. 1 DITCH P.O.D. - P7161.0D

HOBACK RIVER

ADJUDICATED WATER RIGHTS OF RECORD UNDER P18722.0D: 142 Ac. = 2.02 CFS


JULIUS MILLER DITCH P.O.D. - P18722.0D



SCALE: 1"=800 FT

DESIGNED BY: MTJ
 DRAWN BY: MTJ
 CHECKED BY: EAS
 DATE: 4/16/22
 REVISED:
 JOB No.: 4570
 PAGE No.: 2 OF 7

HOBACK RIVER WATERSHED - LEVEL I STUDY
JULIUS MILLER DITCH REHAB
 SMALL WATER PROJECT ID: 3.1
 LOCATED IN SECTIONS 9 AND 16, T.36N., R.114W., 6TH P.M.,
 SUBLETTE COUNTY, WY



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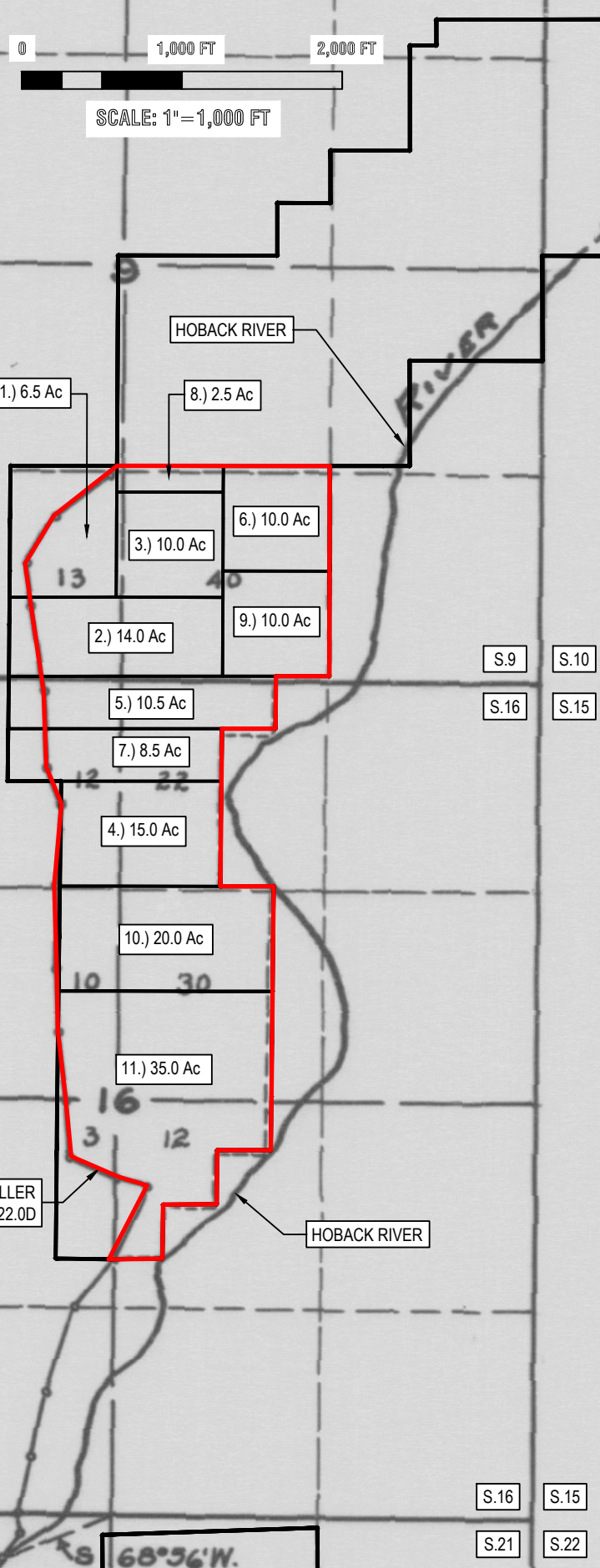
HOBACK RIVER WATERSHED STUDY

CONTACT PERSON: PAT BURROUGHS
 PROJECT: JULIUS MILLER DITCH REHAB (3.1) & JULIUS MILLER LATERAL REHAB (3.2)
 PERMIT No: 18722.0D
 TOTAL ADJUDICATED WATER RIGHTS OF RECORD: 142

WATER RIGHTS OWNERSHIP

ID	LANDOWNER(S)	OWNER PARCEL SIZE (Ac.)	ADJUDICATED WATER RIGHTS (Ac.)	PERCENTAGE OF TOTAL PERMIT
1	AUTHER, WILLIAM & WIENER, ALLISON	12.5	6.5	5%
2	BURROUGHS, PATRICIA	15.0	14.0	10%
3	CASTILLON, ANTHONY & ASHLEY	10.0	10.0	7%
4	CRAMER, WILLIAM	15.0	15.0	11%
5	GOODY, GREYSON & TALAYEH	12.5	10.5	7%
6	MILLER, JOHN & MILDRED	10.0	10.0	7%
7	RYAN, HILLARY	10.0	8.5	6%
8	THOMPSON, TERRY & ELIZABETH	2.5	2.5	2%
9	THOMPSON, TERRY & ELIZABETH	10.0	10.0	7%
10	UPPER HOBACK RIVER RANCH, LLC	20.0	20.0	14%
11	UPPER HOBACK RIVER RANCH, LLC	42.5	35.0	25%
TOTALS:		160	142	100%

***NOTE:** THE ABOVE LISTED ADJUDICATED WATER RIGHTS WERE DERIVED FROM THE ORIGINAL APPLICATION MAP SUBMITTED FOR THE JULIUS MILLER DITCH WHEREBY WATER RIGHTS ARE TIED TO 40 ACRE ALIQUOT PARTS. FOR THIS REASON, THE WATER RIGHTS WERE ROUNDED TO THE NEAREST 1/2 ACRE FOR EQUITY REASONS.

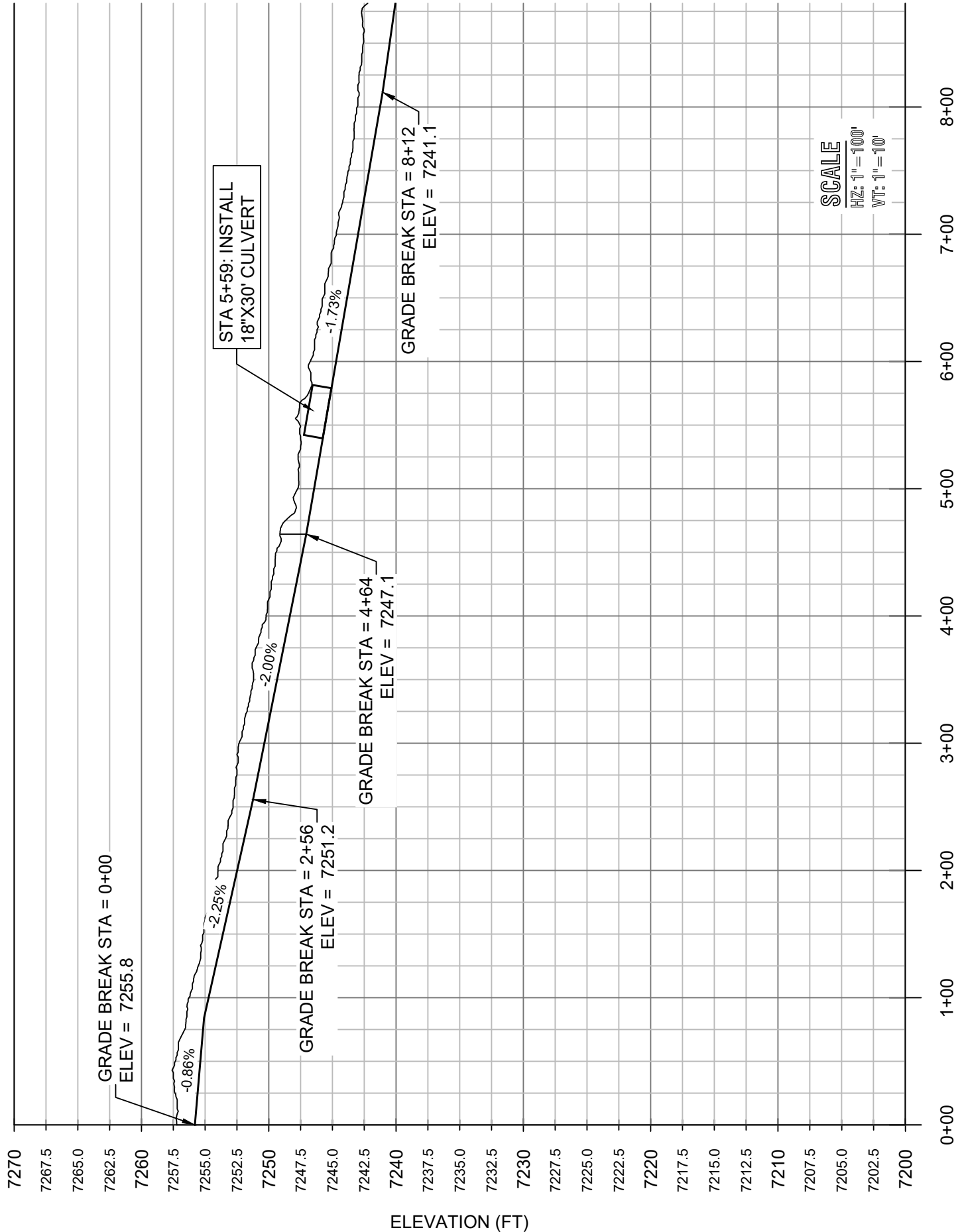


DESIGNED BY: MTJ
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 JOB No. 4570
 PAGE No. 3 OF 7

HOBACK RIVER WATERSHED - LEVEL I STUDY
JULIUS MILLER DITCH REHAB
 SMALL WATER PROJECT ID: 3.1
 LOCATED IN SECTIONS 9 AND 16, T.36N., R.114W., 6TH P.M.,
 SUBLETTE COUNTY, WY

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JULIUS MILLER DITCH REHAB PROJECT
-PROFILE VIEW-



SCALE
HZ: 1"=100'
VT: 1"=10'

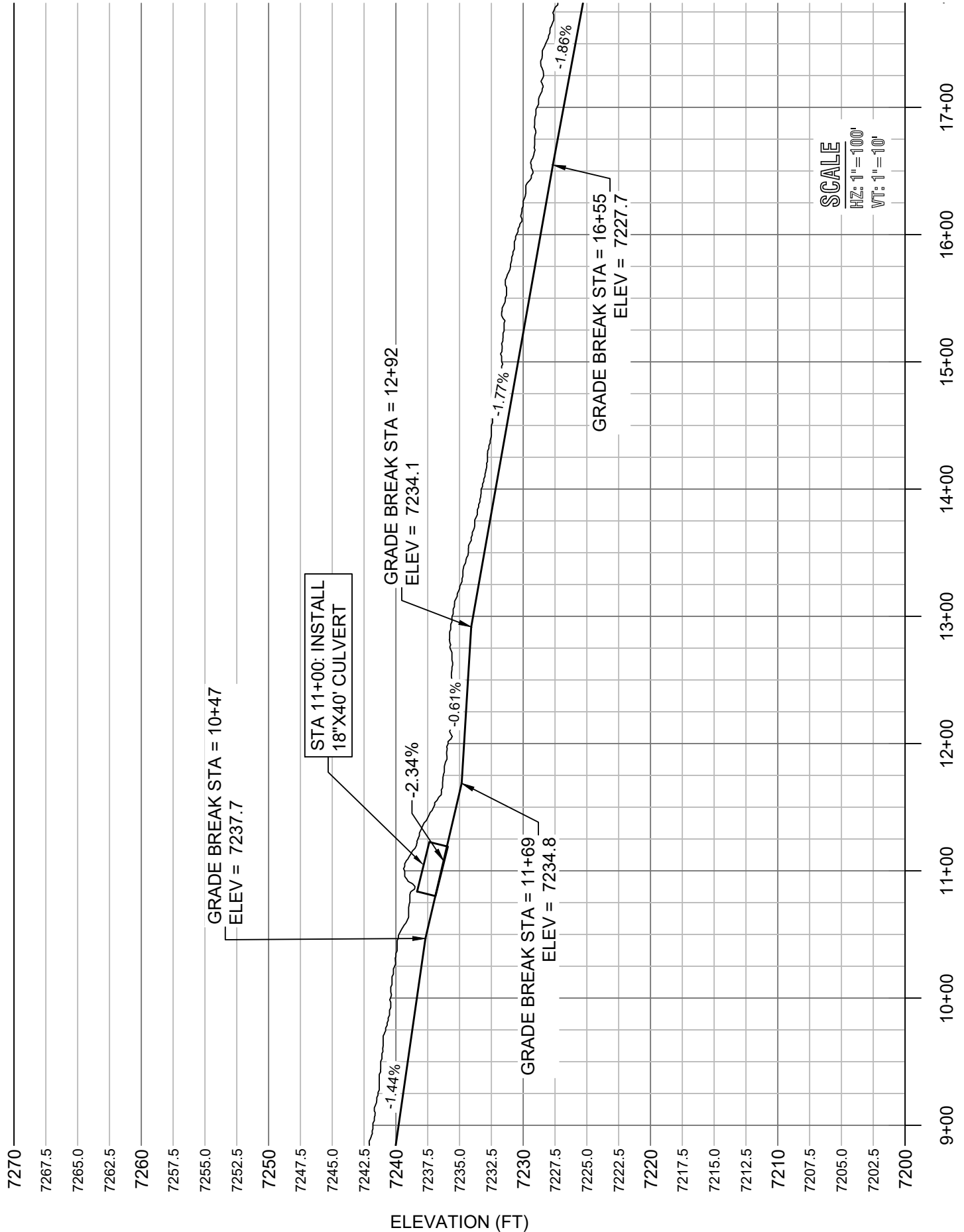
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JOB NO.: 4570
REVISED:
DATE: 4/16/22
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DESIGNED BY: MTJ

HOBACK RIVER WATERSHED - LEVEL I STUDY
JULIUS MILLER DITCH REHAB
SMALL WATER PROJECT ID: 3.1
LOCATED IN SECTIONS 9 AND 16, T.36N., R.114W., 6TH P.M.,
SUBLETTE COUNTY, WY



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JULIUS MILLER DITCH REHAB PROJECT
-PROFILE VIEW-



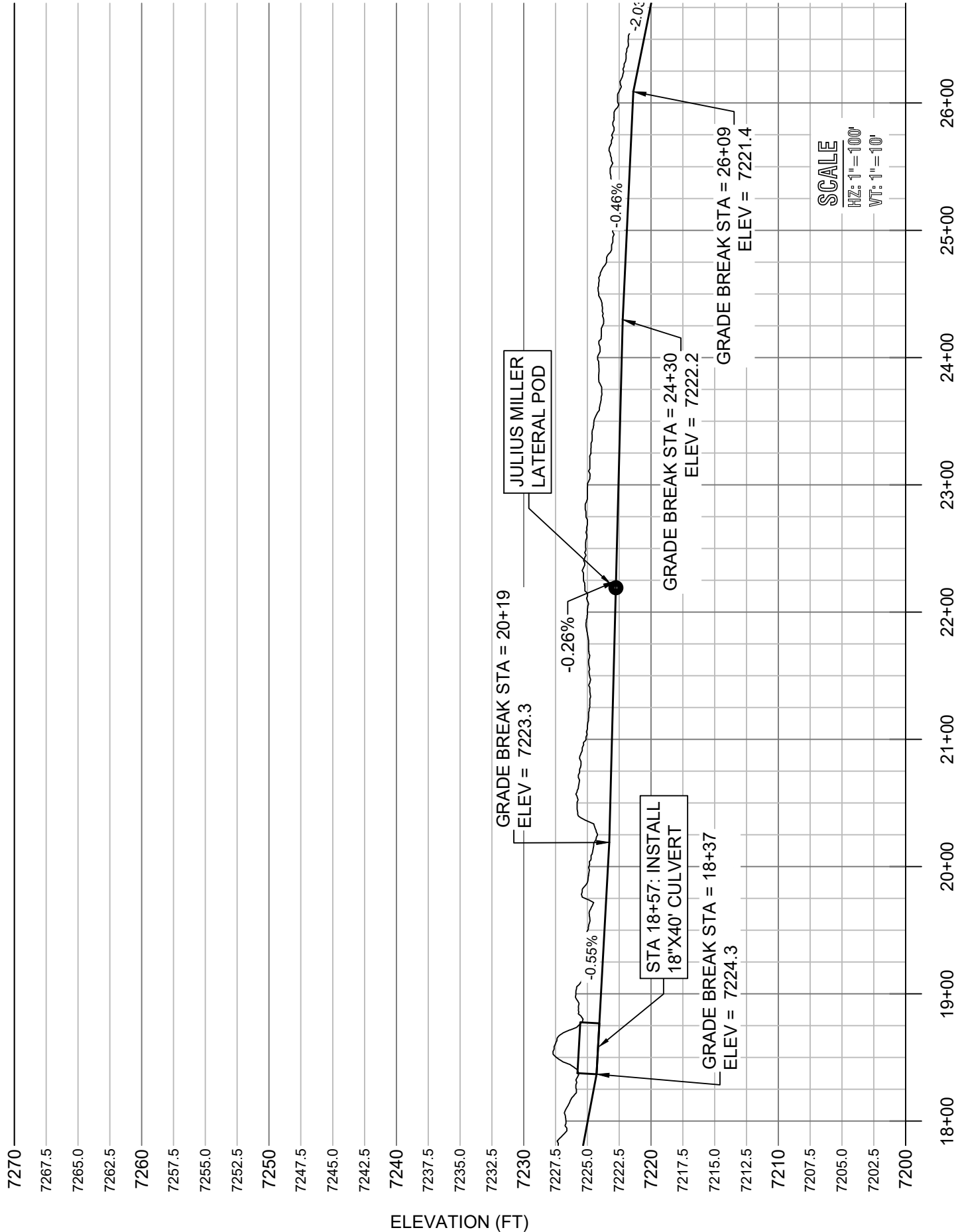
SCALE
HZ: 1"=100'
VT: 1"=10'

PAGE NO.: 5 OF 7
JOB NO.: 094570
REVISED:
DATE: 4/16/22
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DESIGNED BY: MTJ

HOBACK RIVER WATERSHED - LEVEL I STUDY
JULIUS MILLER DITCH REHAB
 SMALL WATER PROJECT ID: 3.1
 LOCATED IN SECTIONS 9 AND 16, T.36N., R.114W., 6TH P.M.,
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JULIUS MILLER DITCH REHAB PROJECT
-PROFILE VIEW-

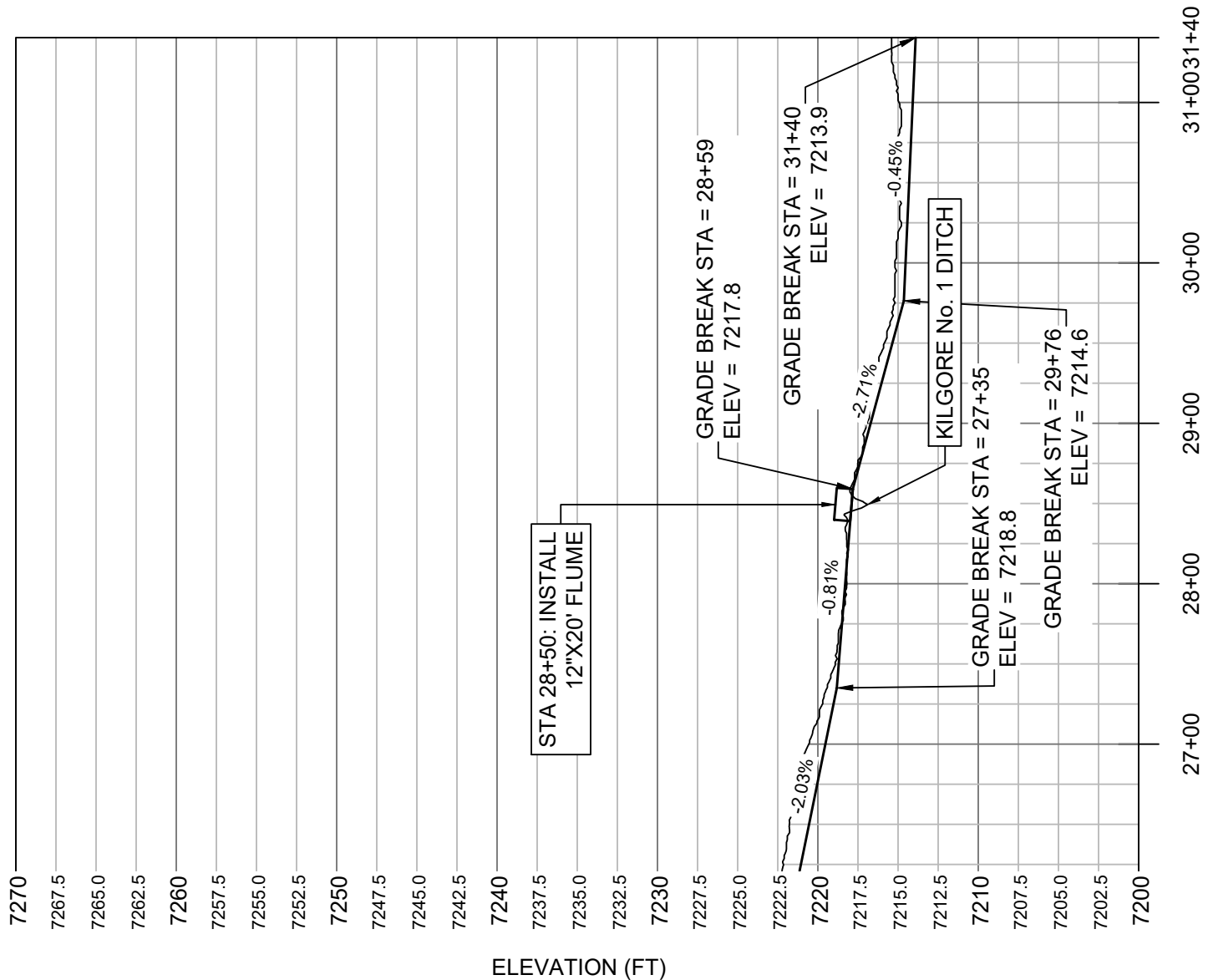


PAGE NO: 6 OF 6
JOB NO: 0757
REVISION:
DATE: 4/16/22
CHECKED BY: EAS
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DESIGNED BY: MTJ

HOBACK RIVER WATERSHED - LEVEL I STUDY
JULIUS MILLER DITCH REHAB
 SMALL WATER PROJECT ID: 3.1
 LOCATED IN SECTIONS 9 AND 16, T.36N., R.114W., 6TH P.M.,
 SUBLETTE COUNTY, WY

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JULIUS MILLER DITCH REHAB PROJECT
-PROFILE VIEW-



SCALE
 HZ: 1"=100'
 VT: 1"=10'

PAGE NO.: OF 7
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HOBACK RIVER WATERSHED - LEVEL I STUDY
JULIUS MILLER DITCH REHAB
 SMALL WATER PROJECT ID: 3.1
 LOCATED IN SECTIONS 9 AND 16, T.36N., R.114W., 6TH P.M.,
 SUBLETTE COUNTY, WY

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HOBACK RIVER WATERSHED STUDY LEVEL I**Owner/Operator:** Pat Burroughs**Project Type:** Conveyance Facility Rehabilitation**Project ID:** 3.2**Project Name:** Julius Miller Lateral Rehabilitation**Location (PLSS):** S1/2 Sec. 9, T36N, R114W**Location (Lat/Long):** 43.09784°N, 110.46188°W**PROJECT COMPONENTS (ENGINEER'S ESTIMATE)**

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1	Mobilization	1	LS	\$ 2,500.00	\$ 2,500.00
2	Ditch shaping	1449	LF	\$ 6.50	\$ 9,418.50
3	Ditch creation - Compacted Fill Length	275	LF	\$ 18.00	\$ 4,950.00
4	6' drop - 3/16" steel plate structure & install	1	LS	\$ 8,500.00	\$ 8,500.00
5	12" X 30' Flume & Installation	1	LS	\$ 4,100.00	\$ 4,100.00
TOTAL COMPONENT COST (SUBTOTAL #2):					\$ 29,468.50

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$ 2,500.00
PERMITTING AND MITIGATION:	\$ 1,500.00
LEGAL FEES:	\$ -
ACQUISITION OF ACCESS AND RIGHTS-OF-WAY:	\$ -
PRE-CONSTRUCTION COSTS (SUBTOTAL #1):	\$ 4,000.00

TOTAL COMPONENT COST (SUBTOTAL #2):	\$ 29,468.50
--	---------------------

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%):	\$ 2,946.85
COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3):	\$ 32,415.35
CONTINGENCY (SUBTOTAL #3 X 15%):	\$ 4,862.30
TOTAL CONSTRUCTION COST (SUBTOTAL #4):	\$ 37,277.65

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4):	\$ 41,277.65
--	---------------------

PERMITTING REQUIREMENTS

Project ID: 3.2

Project Name: Julius Miller Lateral Rehab

Land Jurisdiction: Private (see below)

Author, William & Wiener, Allison

Burroughs, Patricia

Castillon, Anthony & Ashley

Cramer, William

Goody, Greyson & Talayeh

Miller, John & Mildred

Ryan, Hillary

Thompson, Terry & Elizabeth

Upper Hoback River Ranch, LLC

Ditch construction and maintenance easements should be secured prior to commencement of rehabilitation activities. It is encouraged to formalize cost share responsibilities prior to project submittal under the SWPP program. Water rights have been tabulated by owner on sheet 3 of the project plans to aid with this effort.

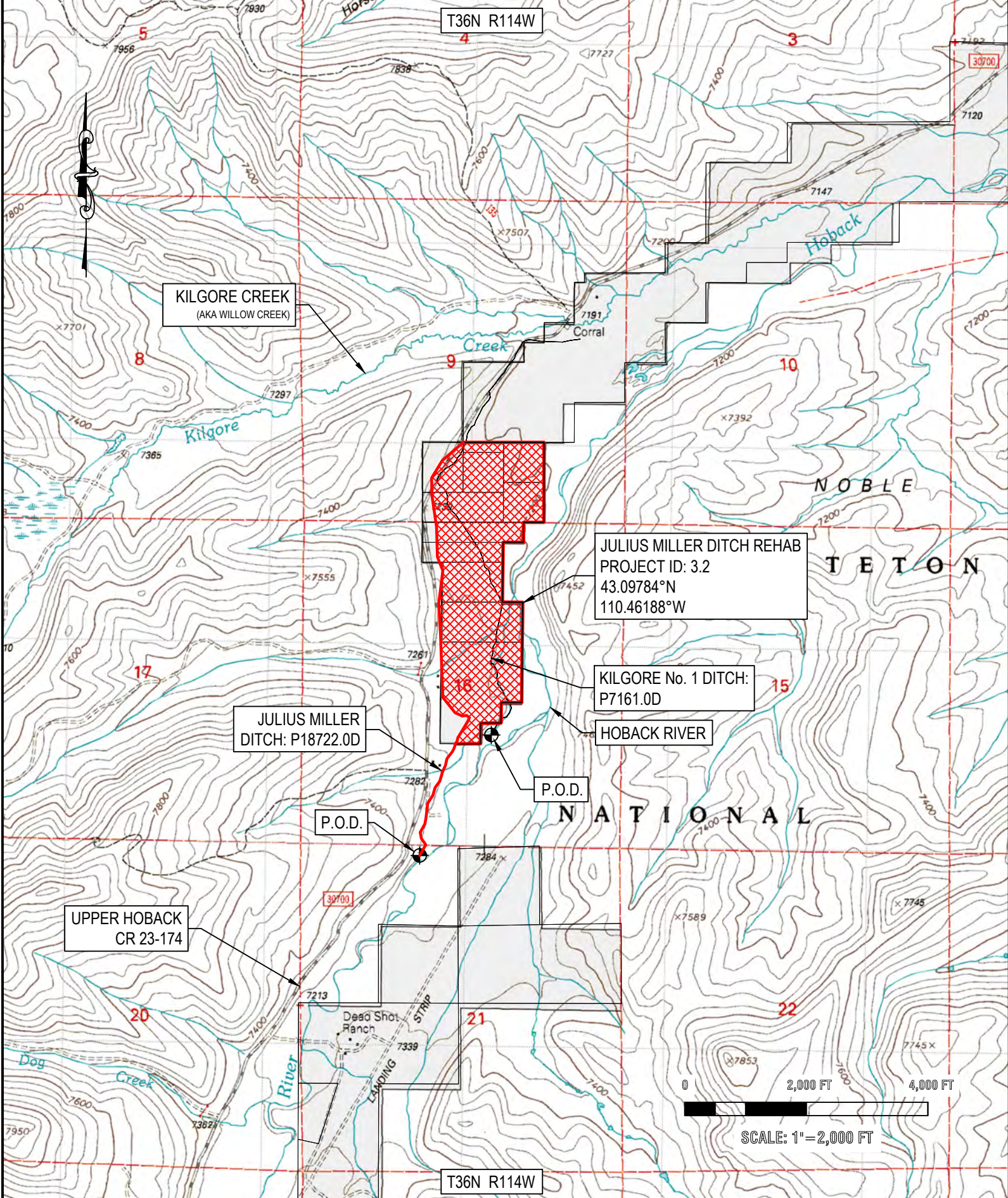
Greater Sage-Grouse Core Area Protection (Executive Order 2019-3)

This project is located within the defined Non-Core Population area and would require surface disturbance for ditch rehabilitation. Based on preliminary DDCT calculations, said project is located more than 2 miles from an occupied lek. Therefore, no restrictions on timing of construction are expected.

State Engineer's Office

Current Permit: P18722.0D

No additional permits proposed.

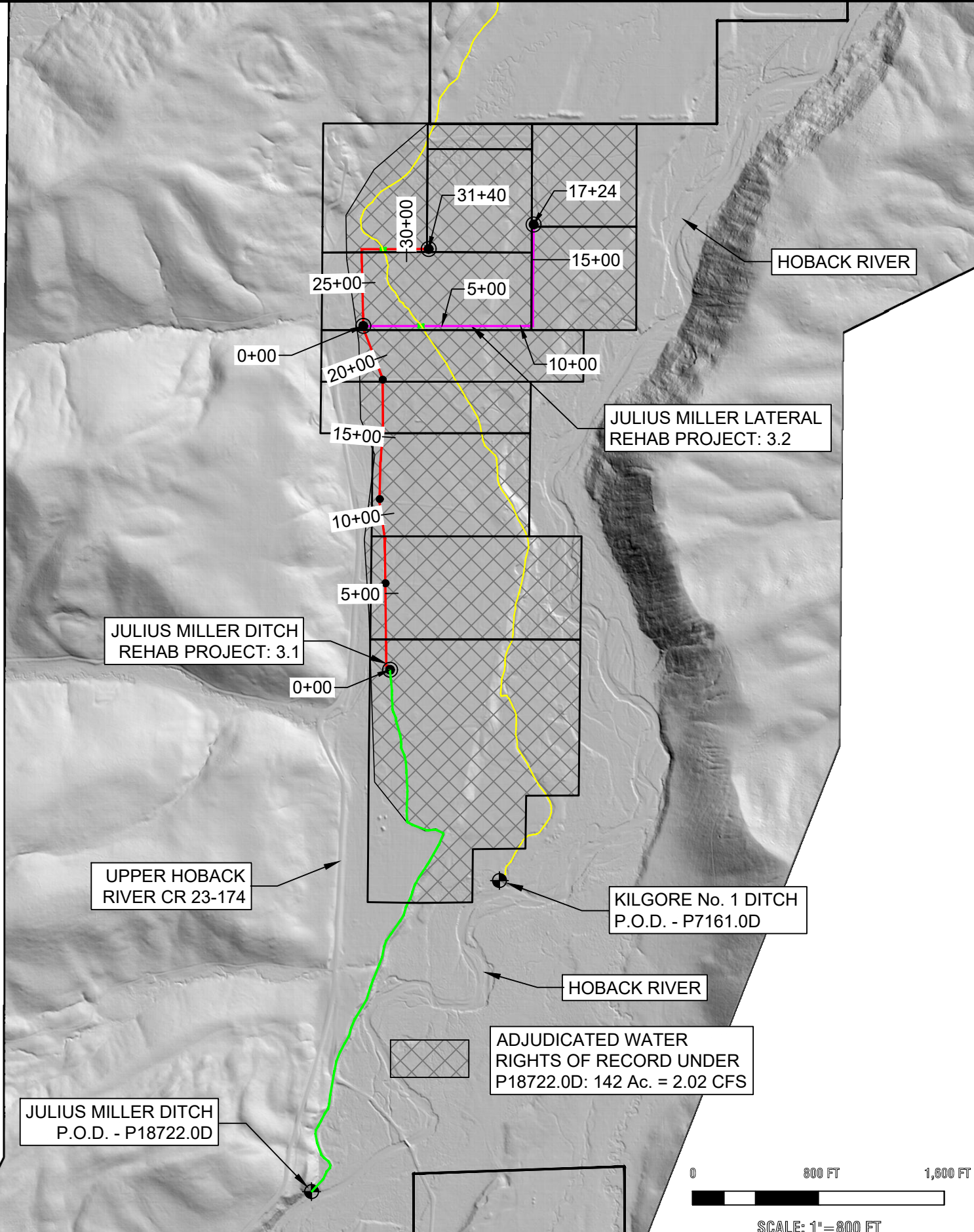


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 JOB No. 4570
 PAGE No. 1 OF 6

HOBACK RIVER WATERSHED - LEVEL I STUDY
JULIUS MILLER LATERAL REHAB
 SMALL WATER PROJECT ID: 3.2
 LOCATED IN SECTIONS 9 AND 16, T.36N., R.114W., 6TH P.M.,
 SUBLETTE COUNTY, WY



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 PINEDALE, WYOMING
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JULIUS MILLER DITCH REHAB PROJECT: 3.1

JULIUS MILLER LATERAL REHAB PROJECT: 3.2

UPPER HOBACK RIVER CR 23-174

KILGORE No. 1 DITCH P.O.D. - P7161.0D

HOBACK RIVER


ADJUDICATED WATER RIGHTS OF RECORD UNDER P18722.0D: 142 Ac. = 2.02 CFS

JULIUS MILLER DITCH P.O.D. - P18722.0D



SCALE: 1"=800 FT

HOBACK RIVER WATERSHED - LEVEL I STUDY				
JULIUS MILLER LATERAL REHAB				
SMALL WATER PROJECT ID: 3.2				
LOCATED IN SECTIONS 9 AND 16, T.36N., R.114W., 6TH P.M., SUBLETTE COUNTY, WY				
DESIGNED BY: MTJ	CHECKED BY: EAS	DATE: 4/16/22	REVISID:	JOB No.: 4570
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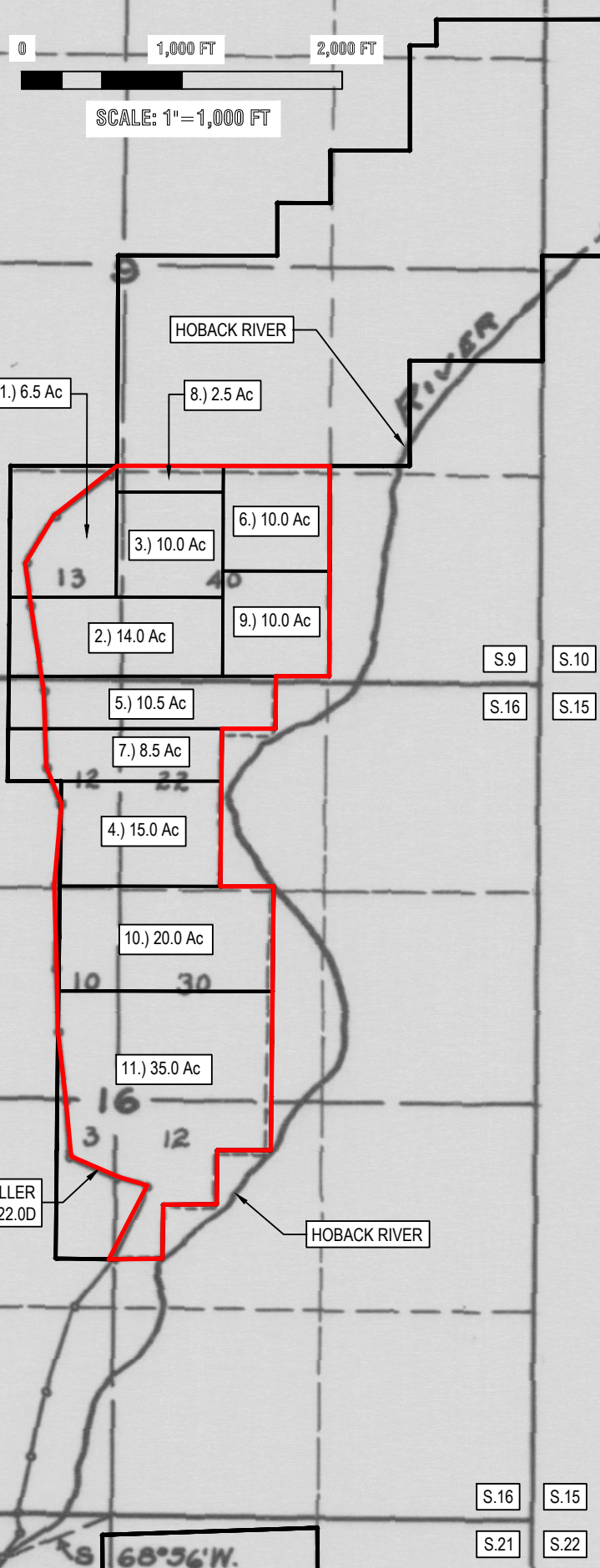
HOBACK RIVER WATERSHED STUDY

CONTACT PERSON: PAT BURROUGHS
 PROJECT: JULIUS MILLER DITCH REHAB (3.1) & JULIUS MILLER LATERAL REHAB (3.2)
 PERMIT No: 18722.0D
 TOTAL ADJUDICATED WATER RIGHTS OF RECORD: 142

WATER RIGHTS OWNERSHIP

ID	LANDOWNER(S)	OWNER PARCEL SIZE (Ac.)	ADJUDICATED WATER RIGHTS (Ac.)	PERCENTAGE OF TOTAL PERMIT
1	AUTHER, WILLIAM & WIENER, ALLISON	12.5	6.5	5%
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11	UPPER HOBACK RIVER RANCH, LLC	42.5	35.0	25%
TOTALS:		160	142	100%

***NOTE:** THE ABOVE LISTED ADJUDICATED WATER RIGHTS WERE DERIVED FROM THE ORIGINAL APPLICATION MAP SUBMITTED FOR THE JULIUS MILLER DITCH WHEREBY WATER RIGHTS ARE TIED TO 40 ACRE ALIQUOT PARTS. FOR THIS REASON, THE WATER RIGHTS WERE ROUNDED TO THE NEAREST 1/2 ACRE FOR EQUITY REASONS.



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HOBACK RIVER WATERSHED - LEVEL I STUDY
JULIUS MILLER LATERAL REHAB
 SMALL WATER PROJECT ID: 3.2
 LOCATED IN SECTIONS 9 AND 16, T.36N., R.114W., 6TH P.M.,
 SUBLETTE COUNTY, WY

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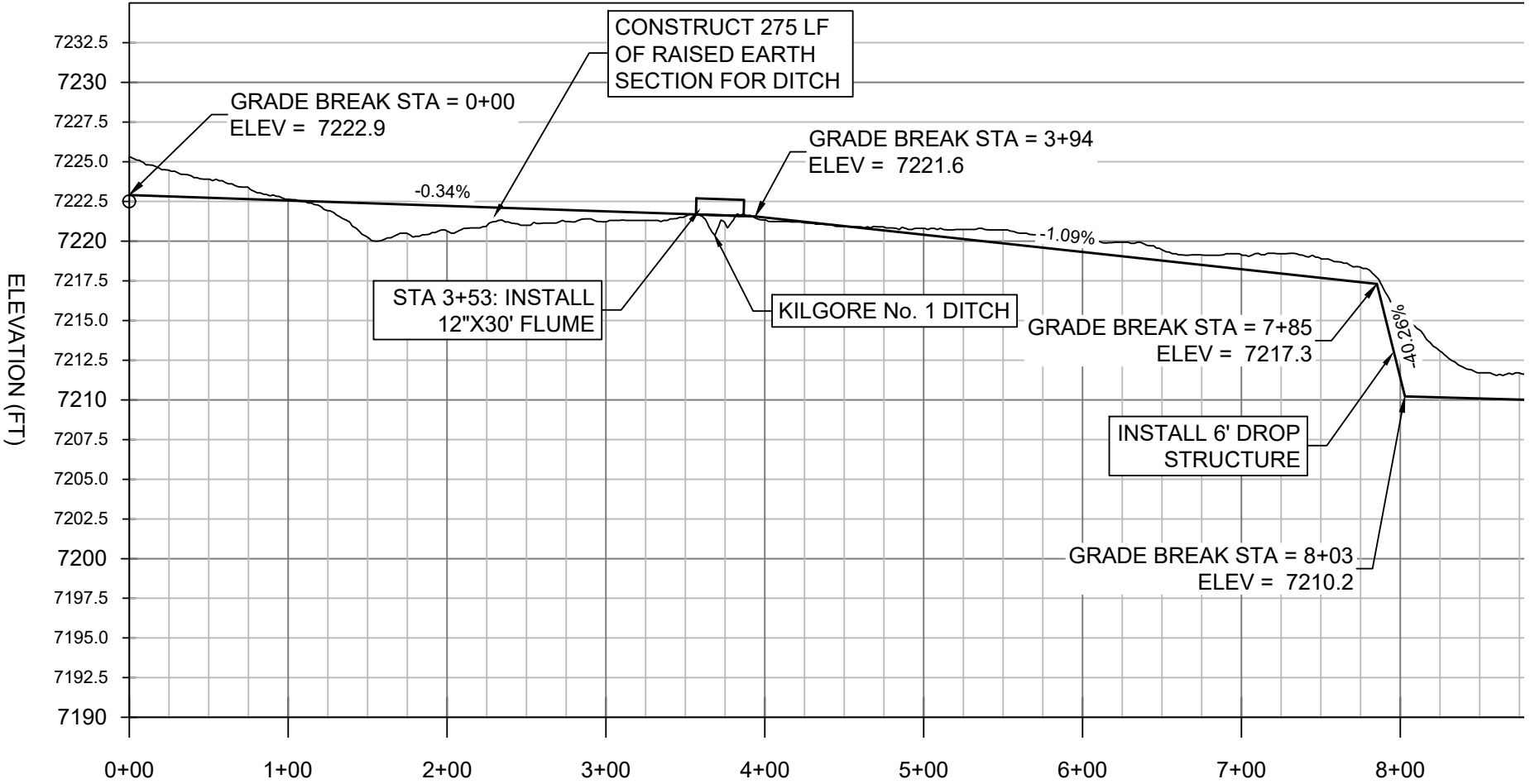
JULIUS MILLER LATERAL REHAB PROJECT

-PROFILE VIEW-

HOBACK RIVER WATERSHED - LEVEL I STUDY
JULIUS MILLER LATERAL REHAB
 SMALL WATER PROJECT ID: 3.2
 LOCATED IN SECTIONS 9 AND 16, T.36N., R.114W., 6TH P.M.,
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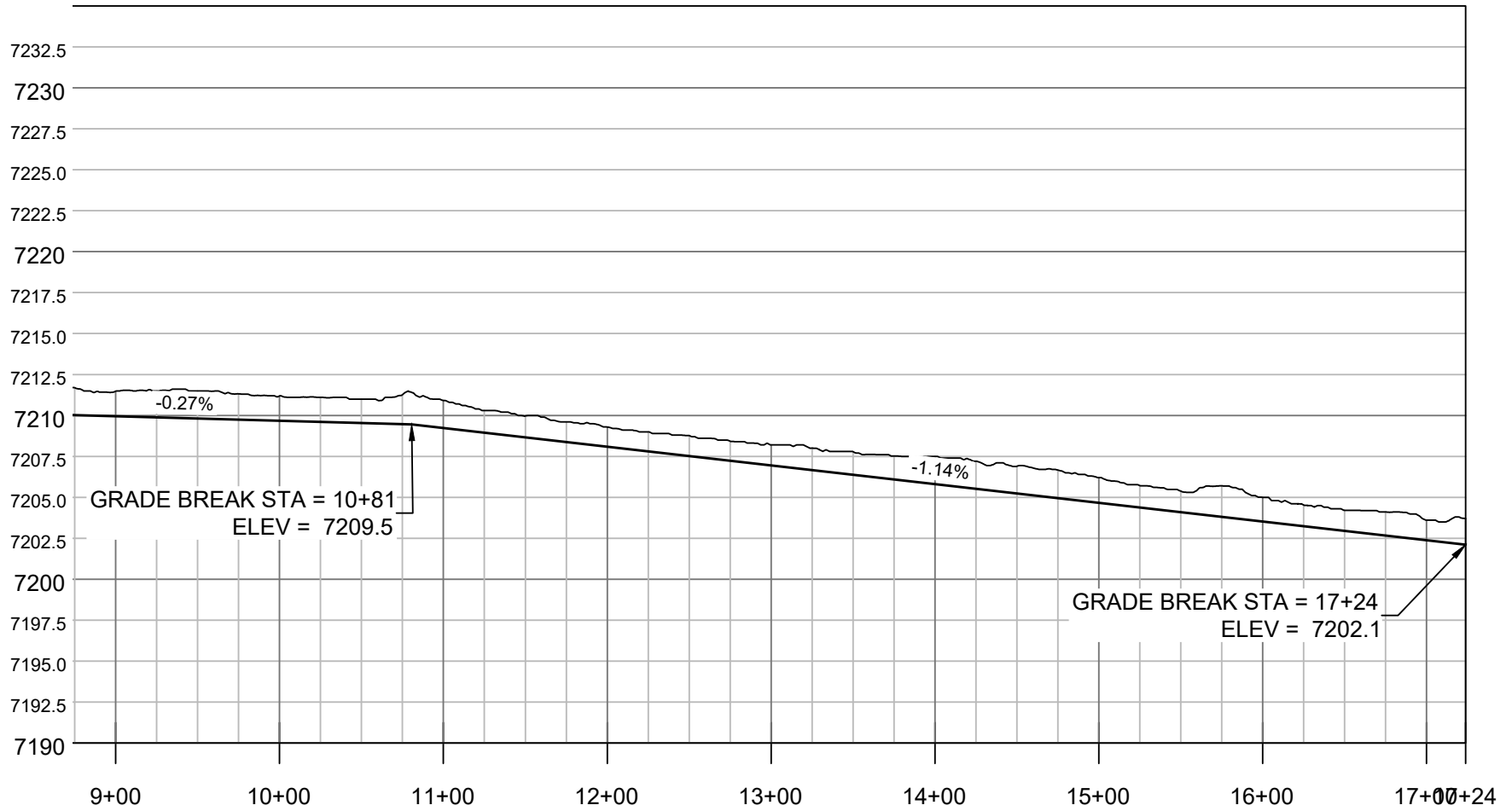
(307) 367-2826
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SCALE
 HZ: 1"=100'
 VT: 1"=10'

JULIUS MILLER LATERAL REHAB PROJECT

-PROFILE VIEW-



SCALE
 HZ: 1"=100'
 VT: 1"=10'

ELEVATION (FT)

HOBACK RIVER WATERSHED - LEVEL I STUDY

JULIUS MILLER LATERAL REHAB

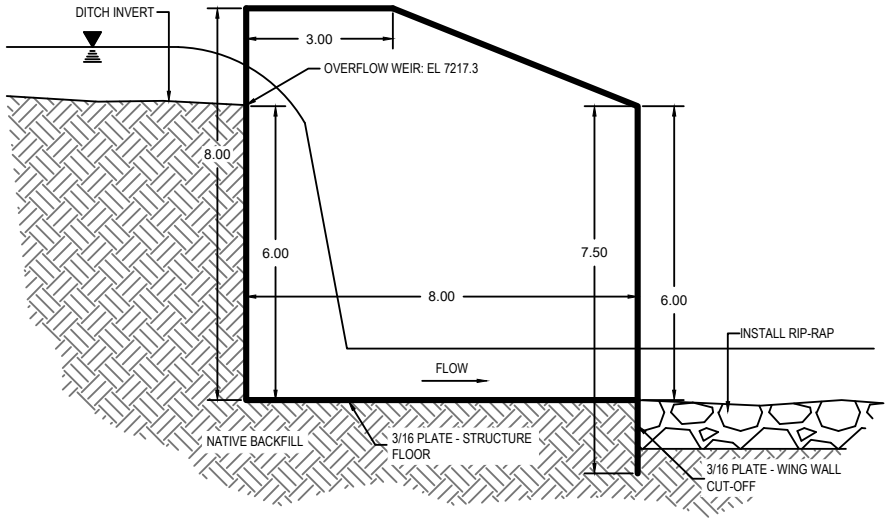
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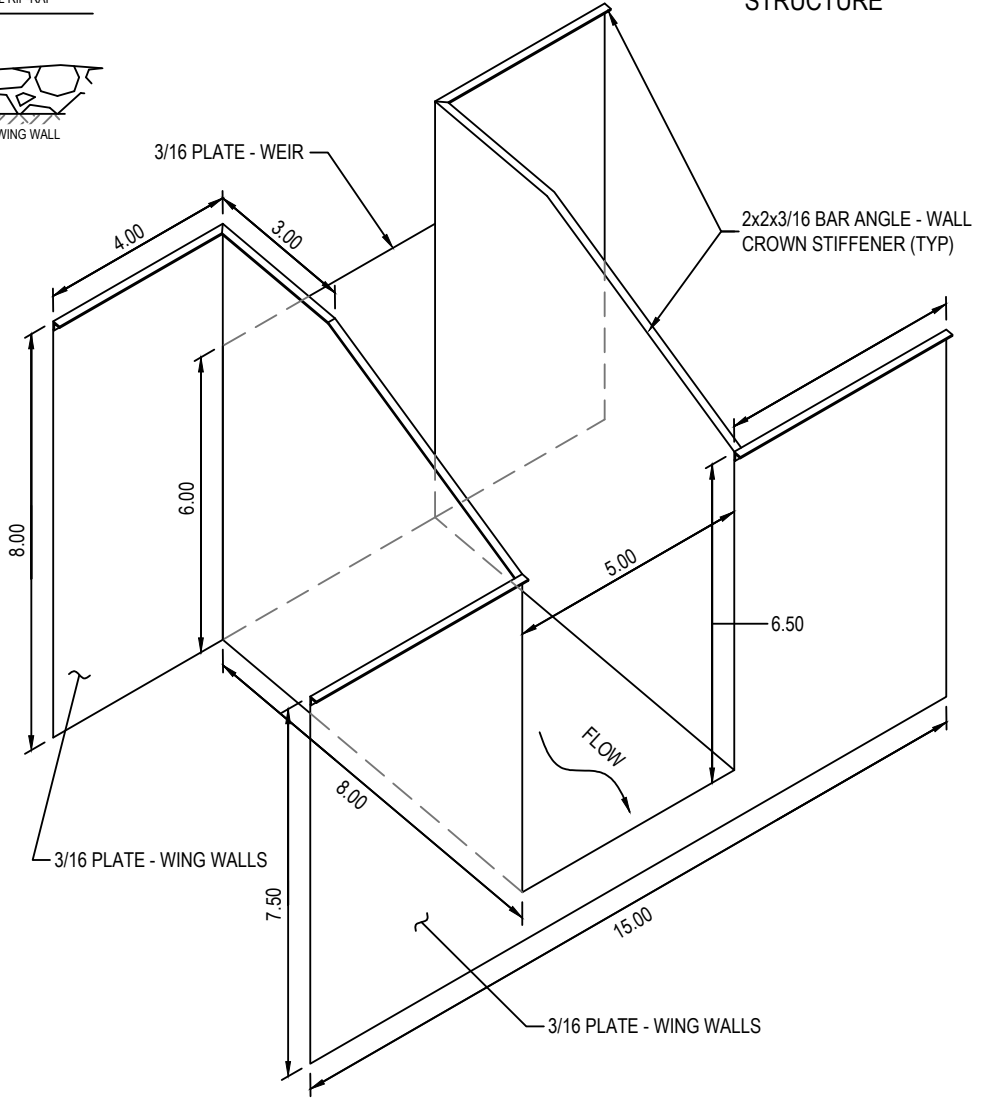
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HOBACK RIVER WATERSHED - LEVEL I STUDY
JULIUS MILLER LATERAL REHAB
 SMALL WATER PROJECT ID: 3.2
 LOCATED IN SECTIONS 9 AND 16, T.36N., R.114W., 6TH P.M.,
 SUBLETTE COUNTY, WY



PROFILE VIEW
JULIUS MILLER LATERAL DROP
STRUCTURE

ISOMETRIC VIEW
JULIUS MILLER LATERAL DROP
STRUCTURE



HOBACK RIVER WATERSHED STUDY LEVEL I**Owner/Operator:** Campbell Cattle Co.**Project Type:** Diversion Structure**Project ID:** 4.1**Project Name:** Bowsby No. 3 Diversion Rehabilitation**Location (PLSS):** NE/4SW/4, Sec. 1, T37N, R113W**Location (Lat/Long):** 43.20471°N, 110.35138°W**PROJECT COMPONENTS (ENGINEER'S ESTIMATE)**

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1	Mobilization	1	LS	\$ 3,500.00	\$ 3,500.00
2	Debris Removal & Rock Vane Foundation Prep	1	LS	\$ 1,500.00	\$ 1,500.00
3	Misc. Excavation & Placement	40	CY	\$ 26.00	\$ 1,040.00
4	Rock Vane & Scour Pool Construction	1	LS	\$ 32,000.00	\$ 32,000.00
5	Backfill Import & Placement	15	CY	\$ 38.00	\$ 570.00
TOTAL COMPONENT COST (SUBTOTAL #2):					\$ 38,610.00

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS: \$ 1,600.00

PERMITTING AND MITIGATION: \$ 450.00

LEGAL FEES: \$ -

ACQUISITION OF ACCESS AND RIGHTS-OF-WAY: \$ 750.00

PRE-CONSTRUCTION COSTS (SUBTOTAL #1): \$ 2,800.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 38,610.00

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%): \$ 3,861.00

COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3): \$ 42,471.00

CONTINGENCY (SUBTOTAL #3 X 15%): \$ 6,370.65

TOTAL CONSTRUCTION COST (SUBTOTAL #4): \$ 48,841.65

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): \$ 51,641.65

PERMITTING REQUIREMENTS

Project ID: 4.1

Project Name: Bowsby No. 3 Diversion Rehab

Land Jurisdiction: U.S.A. - USFS Teton National Forest

USFS

Though the existing diversion is permitted with the SEO, the USFS does not have a special use permit on file for the Bowsby No. 3 diversion/ditch. Per phone conversation, the USFS will require the applicant to register the facility through and by a special use permit. An SF-299 right-of-way acquisition will need to be completed by the applicant. An environmental assessment is not believed to be necessary regarding the diversion rehab however, an on-site meeting should be held with USFS personnel prior to SF-299 completion.

U.S. Army Corps of Engineers (USACE)

A project plan set should be submitted to the USACE Wyoming Regulatory Office for review prior to final submission to the WWDO. Based on the concept design, the proposed activities are considered to be routine maintenance that do not require Department of the Army authorization because Part 323.4(a)(3) of the regulations states that the following activities are exempt:

“Discharges associated with siphons, pumps, headgates, wingwalls, weirs, diversion structures, and such other facilities as are appurtenant and functionally related to irrigation ditches are included in this exemption.”

A letter of acknowledgment and final determination from the Department of the Army should be submitted to the WWDO along with the final project plans and specifications.

Greater Sage-Grouse Core Area Protection (Executive Order 2019-3)

This project is located within the defined Non-Core Population area and would require surface disturbance for diversion rehabilitation. Based on preliminary DDCT calculations, said project is located more than 2 miles from an occupied lek. Therefore, no restriction on timing of construction is expected.

State Engineer's Office

Current Permit: P3895.0D

No additional permits proposed.

STANDARD FORM 299
APPLICATION FOR TRANSPORTATION, UTILITY SYSTEMS, TELECOMMUNICATIONS AND FACILITIES
ON FEDERAL LANDS AND PROPERTY

FORM APPROVED
 OMB Control Number: 0596-0249
 Expiration Date: 02/28/2023

FOR AGENCY USE ONLY

NOTE: Before completing and filing the application for an authorization (easement, right-of-way, lease, license or permit), the applicant should completely review this package, including instructions, and schedule a pre-application meeting with representatives of the agency responsible for processing the application. Each agency may have specific and unique requirements to be met in preparing and processing the application. Many times, with the help of the agency representative, the application can be completed at the pre-application meeting.

Application Number

Date Filed

1. Name and address of applicant

2. Name and address of authorized agent if different from item 1

3. Applicant telephone number and email:

Authorized agent telephone number and email:

4. As applicant are you? *(check one)*

- a. Individual
- b. Corporation*
- c. Partnership/Association*
- d. State Government/State Agency
- e. Local Government
- f. Federal Agency

* If checked, complete supplemental page

5. Specify what application is for: *(check one)*

- a. New authorization
- b. Renewing existing authorization number
- c. Amend existing authorization number
- d. Assign existing authorization number
- e. Existing use for which no authorization has been received *
- f. Other*

* If checked, provide details under item 7

6. If an individual, or partnership, are you a citizen(s) of the United States? Yes No

7. Project description (describe in detail): (a) Type of use or occupancy, (e.g., canal, pipeline, road, telecommunications); (b) related structures and facilities; (c) physical specifications (Length, width, grading, etc.); (d) term of days/years needed; (e) time of year of use or operation; (f) Volume or amount of product to be transported; (g) duration and timing of construction; and (h) temporary work areas needed for activity/construction (Attach additional sheets, if additional space is needed.)

8. Attach a map covering area and show location of project proposal.

9. State or Local government approval: Attached Applied for Not Required

10. Nonrefundable application fee: Attached Not required To be determined by agency

11. Does project cross international boundary or affect international waterways? Yes No (if "yes," indicate on map)

12. Give statement of your technical and financial capability to construct, operate, maintain, and terminate system for which authorization is being requested.

13a. Describe other alternative locations considered.

b. Why were these alternatives not selected?

c. Give explanation as to why it is necessary to use or occupy Federal assets (lands or buildings).

14. List authorizations and pending applications filed for similar projects which may provide information to the authorizing agency. (*Specify number, date, code, or name*)

15. Provide statement of need for project, including the economic feasibility and items such as: (a) cost of proposal (construction, operation, and maintenance); (b) estimated cost of next best alternative; and (c) expected public benefits.

16. Describe probable effects on the population in the area, including the social and economic aspects, and the rural lifestyles.

17. Describe likely environmental effects that the proposed project will have on: (a) air quality; (b) visual impact; (c) surface and ground water quality and quantity; (d) the control or structural change on any stream or other body of water; (e) existing noise levels; and (f) the surface of the land, including vegetation, permafrost, soil, and soil stability; and, (g) historic or archaeological resources or properties.

18. Describe the probable effects that the proposed project will have on (a) populations of fish, plant life, wildlife, and marine life, including threatened and endangered species; and (b) marine mammals, including hunting, capturing, collecting, or killing these animals.

19. State whether any hazardous material, as defined in this paragraph, would be used, produced, transported or stored on or in a federal building or federal lands or would be used in connection with the proposed use or occupancy. "Hazardous material" shall mean (a) any hazardous substance under section 101(14) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. § 9601(14); (b) any pollutant or contaminant under section 101(33) of CERCLA, 42 U.S.C. § 9601(33); (c) any petroleum product or its derivative, including fuel oil, and waste oils; and (d) any hazardous substance, extremely hazardous substance, toxic substance, hazardous waste, ignitable, reactive or corrosive materials, pollutant, contaminant, element, compound, mixture, solution or substance that may pose a present or potential hazard to human health or the environment under any applicable environmental laws. The holder shall not store any hazardous materials at the site without prior written approval from the authorized officer. This approval shall not be unreasonably withheld. If the authorized officer provides approval, this permit shall include (or in the case of approval provided after this permit is issued, shall be amended to include) specific terms addressing the storage of hazardous materials, including the specific type of materials to be stored, the volume, the type of storage, and a spill plan. Such terms shall be proposed by the holder and are subject to approval by the authorized officer.

20. Name all the Federal Department(s)/Agency(ies) where this application is being filed.

I HEREBY CERTIFY, That I am of legal age and authorized to do business in the State and that I have personally examined the information contained in the application and believe that the information submitted is correct to the best of my knowledge.

Signature of Applicant

Date

Title 18, U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious, or fraudulent statements or representations as to any matter within its jurisdiction.

GENERAL INFORMATION
ALASKA NATIONAL INTEREST LANDS

This application will be used when applying for a right-of-way, permit, license, lease, or certificate for the use of Federal lands which lie within conservation system units and National Recreation or Conservation Areas as defined in the Alaska National Interest lands Conservation Act. Conservation system units include the National Park System, National Wildlife Refuge System, National Wild and Scenic Rivers System, National Trails System, National Wilderness Preservation System, and National Forest Monuments.

Transportation utility systems telecommunication installations facility uses for which the application may be used are:

1. Canals, ditches, flumes, laterals, pipes, pipelines, tunnels, and other systems for the transportation of water.
2. Pipelines and other systems for the transportation of liquids other than water, including oil, natural gas, synthetic liquid and gaseous fuels, and any refined product produced therefrom.
3. Pipelines, slurry and emulsion systems, and conveyor belts for transportation of solid materials.
4. Systems for the transmission and distribution of electric energy.
5. Wired and wireless systems for transmission or reception of radio, television, telephone, telegraph, and other electronic signals, and other means of communications.
6. Improved right-of-way for snow machines, air cushion vehicles, and all-terrain vehicles.
7. Roads, highways, railroads, tunnels, tramways, airports, landing strips, docks, and other systems of general transportation.

This application must be filed simultaneously with each Federal department or agency requiring authorization to establish and operate your proposal.

In Alaska, the following agencies will help the applicant file an application and identify the other agencies the applicant should contact and possibly file with:

Department of Agriculture
Regional Forester, Forest Service (USFS)
P.O. Box 21628
Juneau, Alaska 99802-1628
Telephone: (907) 586-7847 (or a local Forest Service Office)

Department of the Interior
Bureau of Indian Affairs (BIA)
Alaska Regional Office
709 West 9th Street
Juneau, Alaska 99802
Telephone: (907) 586-7177

Department of the Interior
Alaska State Office
Bureau of Land Management
222 West 7th Avenue #13
Anchorage, Alaska 99513
Public Room: 907-271-5960
FAX: 907-271-3684
(or a local BLM Office)

U.S. Fish & Wildlife Service (FWS)
Office of the Regional Director 1011
East Tudor Road Anchorage, Alaska
99503 Telephone: (907) 786-3440

National Park Service (NPS)
Alaska Regional Office
240 West 5th Avenue
Anchorage, Alaska 99501
Telephone: (907) 644-3510

Note - Filings with any Interior agency may be filed with any office noted above or with the Office of the Secretary of the Interior, Regional Environmental Officer, P.O. Box 120, 1675 C Street, Anchorage, Alaska 99513.

Department of Transportation
Federal Aviation Administration
Alaska Region AAL-4, 222 West 7th Ave., Box 14
Anchorage, Alaska 99513-7587
Telephone: (907) 271-5285

NOTE - The Department of Transportation has established the above central filing point for agencies within that Department. Affected agencies are: Federal Aviation Administration (FAA), Coast Guard (USCG), Federal Highway Administration (FHWA), Federal Railroad Administration (FRA).

OTHER THAN ALASKA NATIONAL INTEREST LANDS

Use of this form is not limited to National Interest Conservation Lands of Alaska.

Individual department/agencies may authorize the use of this form by applicants for transportation, utility systems, telecommunication installations and facilities on other Federal lands outside those areas described above.

For proposals located outside of Alaska, applications will be filed at the local agency office or at a location specified by the responsible Federal agency.

SPECIFIC INSTRUCTIONS
(Items not listed are self-explanatory)

- 7 Attach preliminary site and facility construction plans. The responsible agency will provide instructions whenever specific plans are required.
- 8 Generally, the map must show the section(s), township(s), and range(s) within which the project is to be located. Show the proposed location of the project on the map as accurately as possible. Some agencies require detailed survey maps. The responsible agency will provide additional instructions.
- 9, 10, and 12 The responsible agency will provide additional instructions.
- 13 Providing information on alternate locations in as much detail as possible, discussing why certain locations were rejected and why it is necessary to use Federal assets will assist the agency(ies) in processing your application and reaching a final decision. Include only reasonable alternate locations as related to current technology and economics.
- 14 The responsible agency will provide instructions.
- 15 Generally, a simple statement of the purpose of the proposal will be sufficient. However, major proposals located in critical or sensitive areas may require a full analysis with additional specific information. The responsible agency will provide additional instructions.
- 16 through 19 Providing this information with as much detail as possible will assist the Federal agency(ies) in processing the application and reaching a decision. When completing these items, you should use a sound judgment in furnishing relevant information. For example, if the project is not near a stream or other body of water, do not address this subject. The responsible agency will provide additional instructions.

Application must be signed by the applicant or applicant's authorized representative.

EFFECT OF NOT PROVIDING INFORMATION

Disclosure of the information is voluntary. If all the information is not provided, the proposal or application may be rejected.

DATA COLLECTION STATEMENT

The Federal agencies collect this information from proponents and applicants requesting a right-of-way, permit, license, lease, or certification for use of Federal assets. The Federal agencies use this information to evaluate a proponent's or applicant's proposal to use Federal assets.

BURDEN STATEMENT

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0596-0249. The time required to complete this information collection is estimated to average 8 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. The authority to collect this information is derived from 47 U.S.C. 1455(c)(3) and 16 U.S.C. 3210.

USDA NONDISCRIMINATION STATEMENT

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or part of an individual's income is derived from any public assistance. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at 202-720-2600 (voice and TDD).

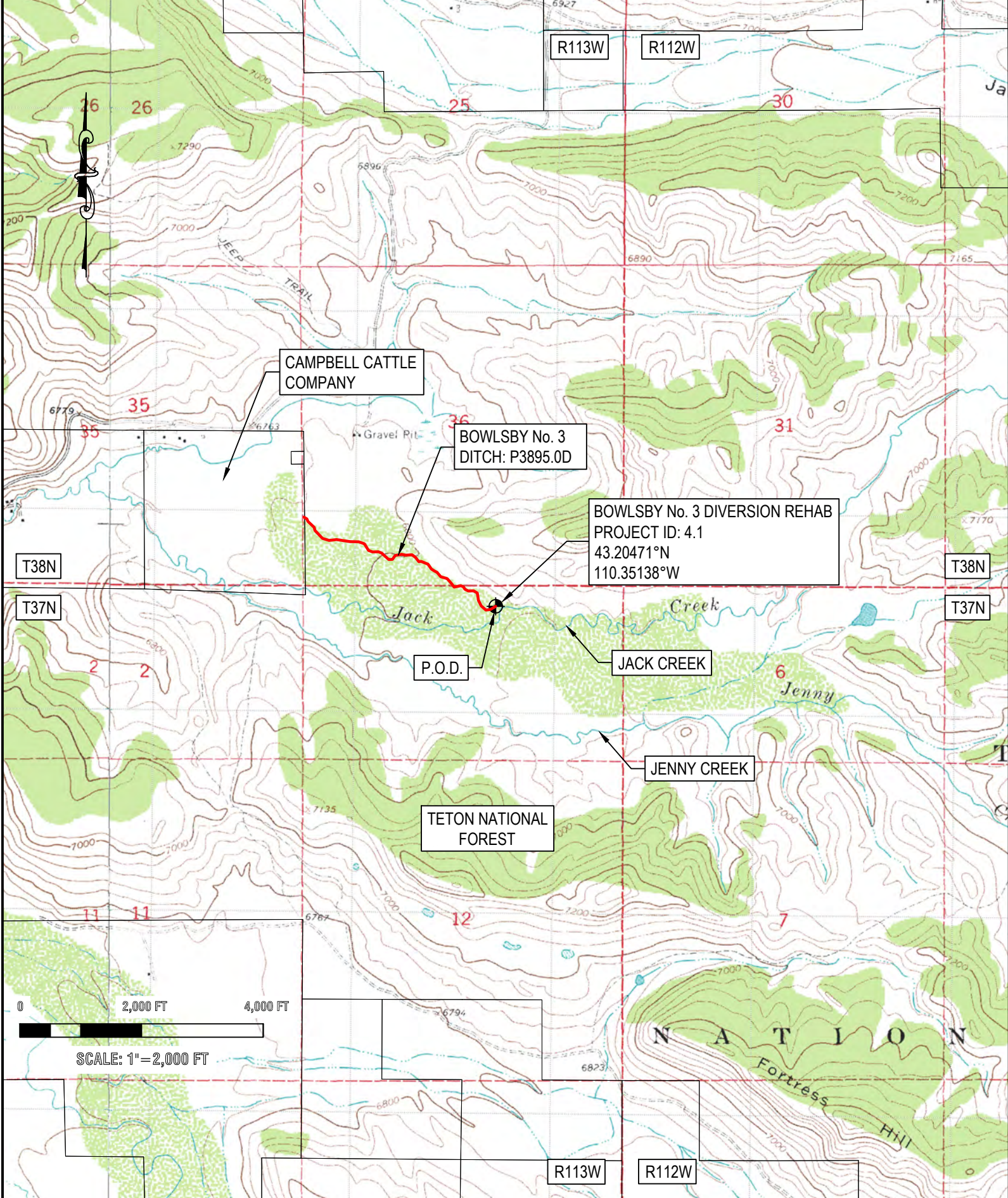
To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, 1400 Independence Avenue, SW, Washington, DC 20250-9410 or call toll free (866) 632-9992 (voice). TDD users can contact USDA through local relay or the Federal relay at (800) 877-8339 (TDD) or (866) 377-8642 (relay voice). USDA is an equal opportunity provider and employer.

The Privacy Act of 1974 (5 U.S.C. 552a) and the Freedom of Information Act (5 U.S.C. 552) govern the confidentiality to be provided for information received by the Forest Service.

SUPPLEMENTAL

NOTE: The responsible agency(ies) will provide instructions	CHECK APPROPRIATE BLOCK	
I - PRIVATE CORPORATIONS	ATTACHED	FILED*
a. Articles of Incorporation	<input type="checkbox"/>	<input type="checkbox"/>
b. Corporation Bylaws	<input type="checkbox"/>	<input type="checkbox"/>
c. A certification from the State showing the corporation is in good standing and is entitled to operate within the State	<input type="checkbox"/>	<input type="checkbox"/>
d. Copy of resolution authorizing filing	<input type="checkbox"/>	<input type="checkbox"/>
e. The name and address of each shareholder owning 3 percent or more of the shares, together with the number and percentage of any class of voting shares of the entity which such shareholder is authorized to vote and the name and address of each affiliate of the entity together with, in the case of an affiliate controlled by the entity, the number of shares and the percentage of any class of voting stock of that affiliate owned, directly or indirectly, by that entity, and in the case of an affiliate which controls that entity, the number of shares and the percentage of any class of voting stock of that entity owned, directly or indirectly, by the affiliate.	<input type="checkbox"/>	<input type="checkbox"/>
f. If application is for an oil or gas pipeline, describe any related right-of-way or temporary use permit applications, and identify previous applications.	<input type="checkbox"/>	<input type="checkbox"/>
g. If application is for an oil and gas pipeline, identify all Federal lands by agency impacted by proposal.	<input type="checkbox"/>	<input type="checkbox"/>
II - PUBLIC CORPORATIONS		
a. Copy of law forming corporation	<input type="checkbox"/>	<input type="checkbox"/>
b. Proof of organization	<input type="checkbox"/>	<input type="checkbox"/>
c. Copy of Bylaws	<input type="checkbox"/>	<input type="checkbox"/>
d. Copy of resolution authorizing filing	<input type="checkbox"/>	<input type="checkbox"/>
e. If application is for an oil or gas pipeline, provide information required by item "I - f" and "I - g" above.	<input type="checkbox"/>	<input type="checkbox"/>
III - PARTNERSHIP OR OTHER UNINCORPORATED ENTITY		
a. Articles of association, if any	<input type="checkbox"/>	<input type="checkbox"/>
b. If one partner is authorized to sign, resolution authorizing action is	<input type="checkbox"/>	<input type="checkbox"/>
c. Name and address of each participant, partner, association, or other	<input type="checkbox"/>	<input type="checkbox"/>
d. If application is for an oil or gas pipeline, provide information required by item "I - f" and "I - g" above.	<input type="checkbox"/>	<input type="checkbox"/>

*If the required information is already filed with the agency processing this application and is current, check block entitled "Filed." Provide the file identification information (e.g., number, date, code, name). If not on file or current, attach the requested information.



DESIGNED BY: MTJ
 DRAWN BY: MTJ
 CHECKED BY: EAS
 DATE: 4/16/22
 REVISED:
 JOB No. 4570
 PAGE No. 1 OF 5

HOBACK RIVER WATERSHED - LEVEL I STUDY
BOWLSBY No. 3 DIVERSION REHAB
 SMALL WATER PROJECT ID: 4.1
 LOCATED IN THE NW/4SE/4 OF SECTION 1, T.37N., R.113W.,
 6TH P.M., SUBLETTE COUNTY, WY



RIO VERDE
ENGINEERING
 PINEDALE, WYOMING
 (307) 367-2826
 rioverde@wyoming.com



EXISTING
ROCK DIKE



EXISTING
ROCK DIKE

P.O.D.

BOWLSBY No. 3
DITCH: P3895.0D

JACK CREEK



EXISTING
ROCK DIKE



SCALE: 1"=100 FT

HOBACK RIVER WATERSHED - LEVEL I STUDY

BOWLSBY No. 3 DIVERSION REHAB

SMALL WATER PROJECT ID: 4.1

LOCATED IN THE NW/4SE/4 OF SECTION 1, T.37N., R.113W.,
6TH P.M., SUBLETTE COUNTY, WY

DESIGNED BY: MTJ
DRAWN BY: MTJ
CHECKED BY: EAS
DATE: 4/16/22
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PAGE No. 2 OF 5



**RIO VERDE
ENGINEERING**

PINEDALE, WYOMING

(307) 367-2826
rioverde@wyoming.com



DITCH BANK/CREEK BANK
TO BE STABILIZED

HEADGATE
INVERT EL: 6779.1

BOWLSBY No. 3
DITCH: P3895.0D

MANMADE ROCK DIKE
TO BE REMOVED

PROPOSED CROSS -VANE
DIVERSION STRUCTURE
CENTERLINE (SEE DETAIL SHEETS)

MANMADE ROCK DIKE
TO BE REMOVED

JACK CREEK

JACK CREEK



SCALE: 1"=80 FT

HOBACK RIVER WATERSHED - LEVEL I STUDY

BOWLSBY No. 3 DIVERSION REHAB

SMALL WATER PROJECT ID: 4.1

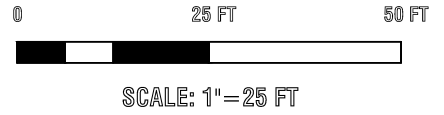
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6TH P.M., SUBLETTE COUNTY, WY



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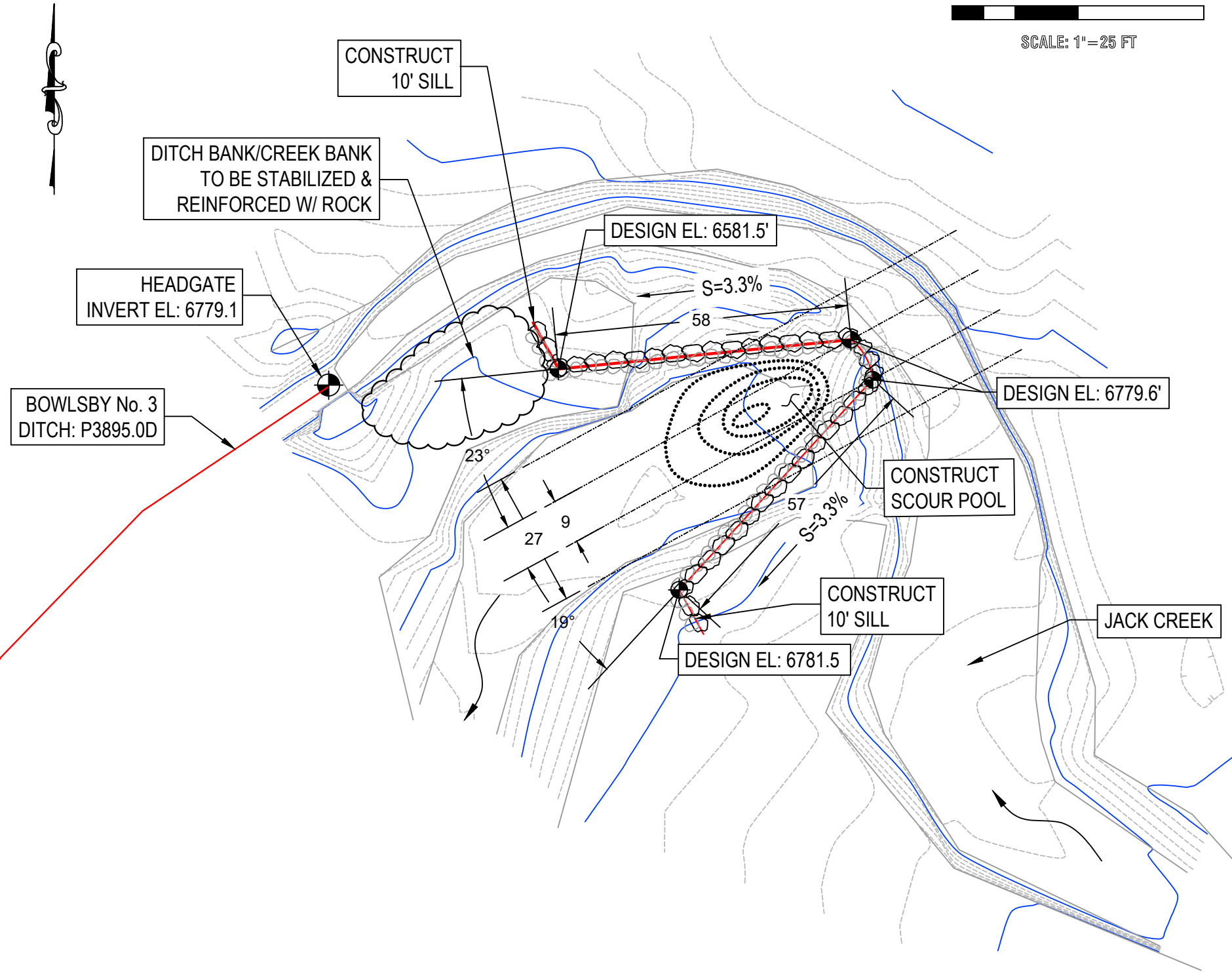
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HOBACK RIVER WATERSHED - LEVEL I STUDY
BOWLSBY No. 3 DIVERSION REHAB
 SMALL WATER PROJECT ID: 4.1
 LOCATED IN THE NW/4SE/4 OF SECTION 1, T.37N., R.113W.,
 6TH P.M., SUBLETTE COUNTY, WY

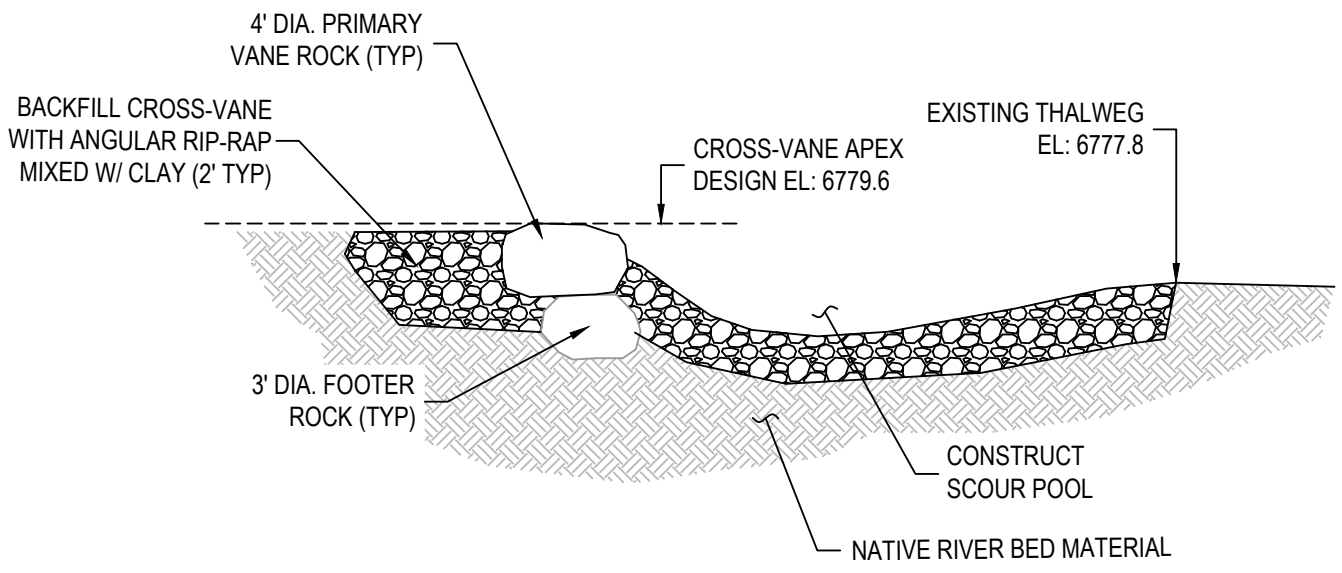
RIO VERDE
ENGINEERING
 PINEDALE, WYOMING
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HOBACK RIVER WATERSHED - LEVEL I STUDY
BOWLSBY No. 3 DIVERSION REHAB
 SMALL WATER PROJECT ID: 4.1
 LOCATED IN THE NW/4SE/4 OF SECTION 1, T.37N., R.113W.,
 6TH P.M., SUBLETTE COUNTY, WY

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PROFILE VIEW
CROSS-VANE CENTERLINE

HOBACK RIVER WATERSHED STUDY LEVEL I**Owner/Operator:** Dan Tolson**Project Type:** Source Water Development**Project ID:** 5.1**Project Name:** Long Cool Creek Draw - Tolson Irrigation Pump & Pipeline**Location (PLSS):** SE/4NW/4, Sec. 21, T36N, R114W**Location (Lat/Long):** 43.07721°N, 110.46320°W**PROJECT COMPONENTS (ENGINEER'S ESTIMATE)**

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1	Mobilization	1	LS	\$ 2,100.00	\$ 2,100.00
2	36" diameter X 8 ft ADS intake sump	1	LS	\$ 2,500.00	\$ 2,500.00
3	1-1/4" SDR-11 Pipeline	1380	LF	\$ 3.50	\$ 4,830.00
4	1-1/2" SDR-11 Pipeline	110	LF	\$ 4.50	\$ 495.00
5	1-1/4" Isolation Valves	2	EA	\$ 150.00	\$ 300.00
6	1-1/4" Tee	1	EA	\$ 65.00	\$ 65.00
7	New 2 HP Inline Centrifugal pump	1	EA	\$ 1,100.00	\$ 1,100.00
8	Install pump & Construct pump cover	1	LS	\$ 1,500.00	\$ 1,500.00
9	Wiring/Labor	1	LS	\$ 1,500.00	\$ 1,500.00
10	Control unit/Low water sensor/Power to pump	1	LS	\$ 4,500.00	\$ 4,500.00
TOTAL COMPONENT COST (SUBTOTAL #2):					\$ 18,890.00

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$ 1,200.00
PERMITTING AND MITIGATION:	\$ 3,500.00
LEGAL FEES:	\$ -
ACQUISITION OF ACCESS AND RIGHTS-OF-WAY:	\$ -
PRE-CONSTRUCTION COSTS (SUBTOTAL #1):	\$ 4,700.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 18,890.00

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%):	\$ 1,889.00
COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3):	\$ 20,779.00
CONTINGENCY (SUBTOTAL #3 X 15%):	\$ 3,116.85
TOTAL CONSTRUCTION COST (SUBTOTAL #4):	\$ 23,895.85

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): \$ 28,595.85

PERMITTING REQUIREMENTS

Project ID: 5.1

Project Name: Long Cool Creek Draw – Tolson Irrigation Pump & Pipeline

Land Jurisdiction: Private, Daniel & Dancy Tolson

Greater Sage-Grouse Core Area Protection (Executive Order 2019-3)

This project is located within the defined Non-Core Population area and would require surface disturbance for ditch rehabilitation. Based on preliminary DDCT calculations, said project is located more than 2 miles from an occupied lek. Therefore, no restrictions on timing of construction are expected.

U.S. Army Corp of Engineer's (USACE)

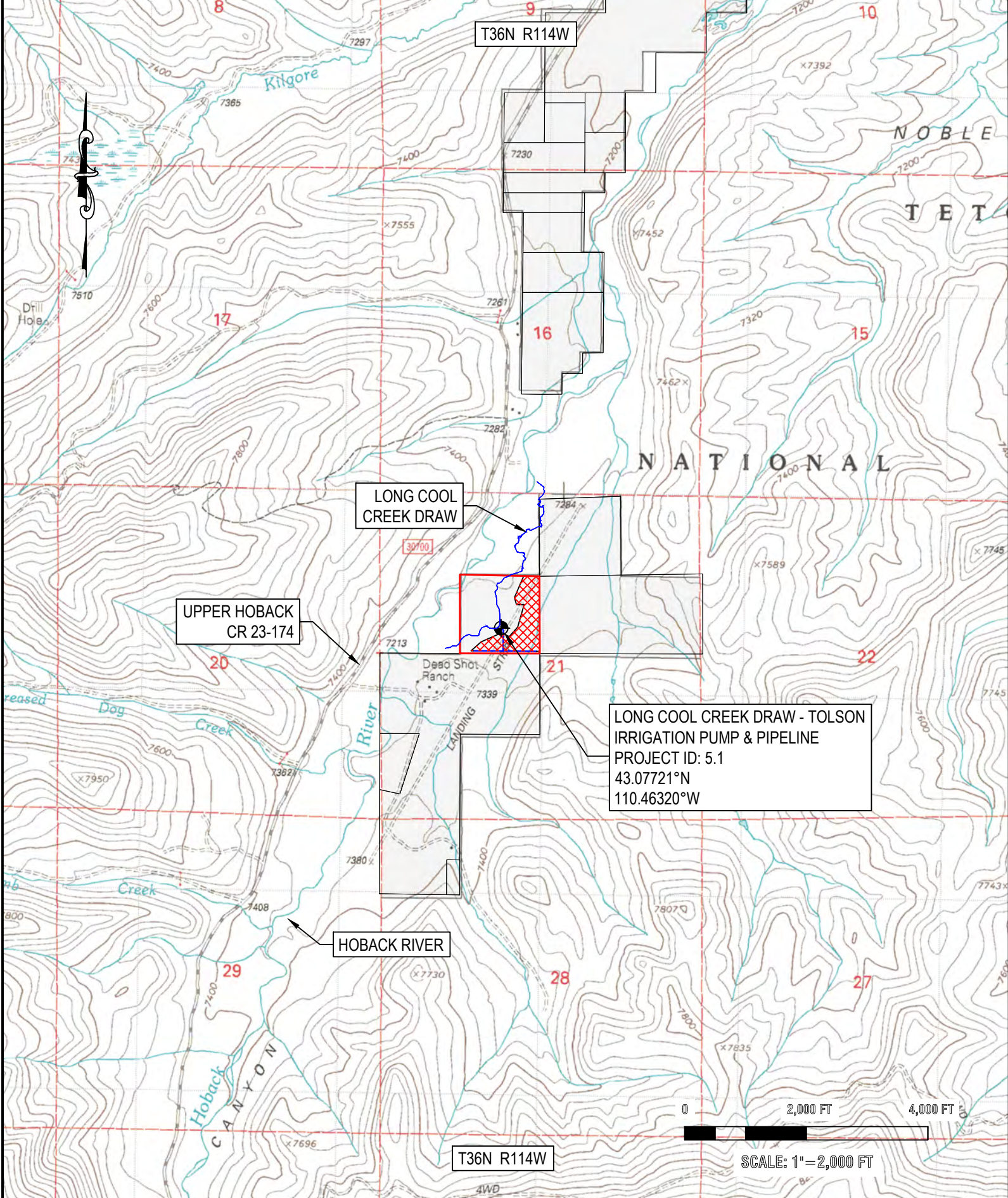
A project plan set should be submitted to the USACE Wyoming Regulatory Office for review prior to final submission to the WWDO. Due to the small quantity of fill associated with the installation of the sump basin, and the fact that the pipeline will be located on uplands, a wetland delineation and pre-construction notification are not being anticipated as a requirement. However, final determination rests with the Wyoming Regulatory Office. A USACE letter of acceptance should be submitted to the WWDO with the final design, prior to construction.

State Engineer's Office

Current Permit: None

Proposed Permit: SW-1 for Original Supply to irrigate approximately 13.5 Ac.

An SW-1 application and accompanying map will need to be prepared and submitted to the SEO for permit issuance prior to construction. Beneficial uses should include irrigation and stock water.



T36N R114W

LONG COOL CREEK DRAW

UPPER HOBACK CR 23-174

LONG COOL CREEK DRAW - TOLSON IRRIGATION PUMP & PIPELINE
PROJECT ID: 5.1
43.07721°N
110.46320°W

HOBACK RIVER

T36N R114W

0 2,000 FT 4,000 FT
SCALE: 1"=2,000 FT

PAGE No. 1 OF 5
JOB No. 4570
REVISED:
DATE: 4/16/22
CHECKED BY: EAS
DRAWN BY: MTJ
DESIGNED BY: MTJ

HOBACK RIVER WATERSHED - LEVEL I STUDY
LONG COOL CREEK DRAW - TOLSON IRRIGATION PUMP & PIPELINE
SMALL WATER PROJECT ID: 5.1
LOCATED IN SECTIONS 9 AND 16, T.36N., R.114W., 6TH P.M.,
SUBLETTE COUNTY, WY



RIO VERDE ENGINEERING
PINEDALE, WYOMING
(307) 367-2826
rioverde@wyoming.com



TOSLON, DANIEL & DANCY
SE/4NW/4, SEC. 21, T36N, R114W
64WD18

BEAVER POND #1

LONG COOL CREEK DRAW - TOLSON
IRRIGATION PUMP & PIPELINE
PROJECT ID: 5.1
43.07721°N
110.46320°W

BEAVER POND #2

IRRIGABLE
LAND~13.5 Ac.

BEAVER POND #3

POINT OF
DIVERSION

LONG COOL
CREEK DRAW

TOLSON
IRRIGATION PUMP

TOLSON IRRIGATION
PIPELINE



SCALE: 1"=200 FT

DESIGNED BY: MTJ
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JOB No. 4570
PAGE No. 2 OF 5

HOBACK RIVER WATERSHED - LEVEL I STUDY
LONG COOL CREEK DRAW - TOLSON IRRIGATION PUMP & PIPELINE
SMALL WATER PROJECT ID: 5.1
LOCATED IN THE SE/4NW/4 OF SEC. 21, T.36N., R.114W., 6TH P.M.,
SUBLETTE COUNTY, WY

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ENGINEERING**
PINEDALE, WYOMING
(307) 367-2826
rioverde@wyoming.com



TOSLON, DANIEL & DANCY
SE/4NW/4, SEC. 21, T36N, R114W
64WD18

BEAVER POND #1

LONG COOL CREEK DRAW - TOLSON
IRRIGATION PUMP & PIPELINE
PROJECT ID: 5.1
43.07721°N
110.46320°W

BEAVER POND #2

IRRIGABLE
LAND~13.5 Ac.

POINT OF
DIVERSION

BEAVER POND #3

TOLSON
IRRIGATION PUMP

LONG COOL
CREEK DRAW

TOLSON IRRIGATION
PIPELINE



SCALE: 1"=200 FT

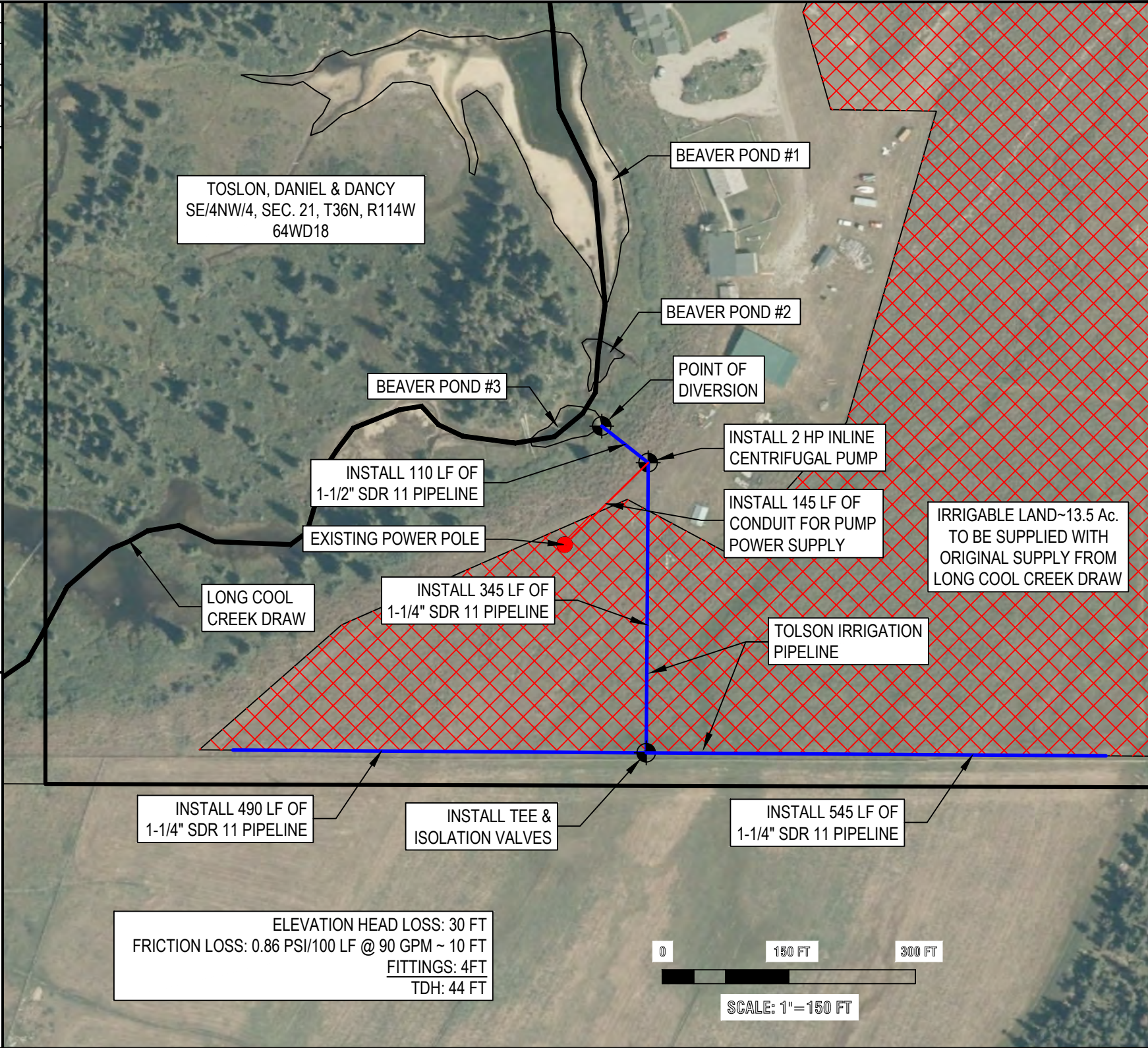
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HOBACK RIVER WATERSHED - LEVEL I STUDY
LONG COOL CREEK DRAW - TOLSON IRRIGATION PUMP & PIPELINE
SMALL WATER PROJECT ID: 5.1
LOCATED IN THE SE/4NW/4 OF SEC. 21, T.36N., R.114W., 6TH P.M.,
SUBLETTE COUNTY, WY

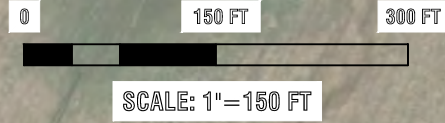
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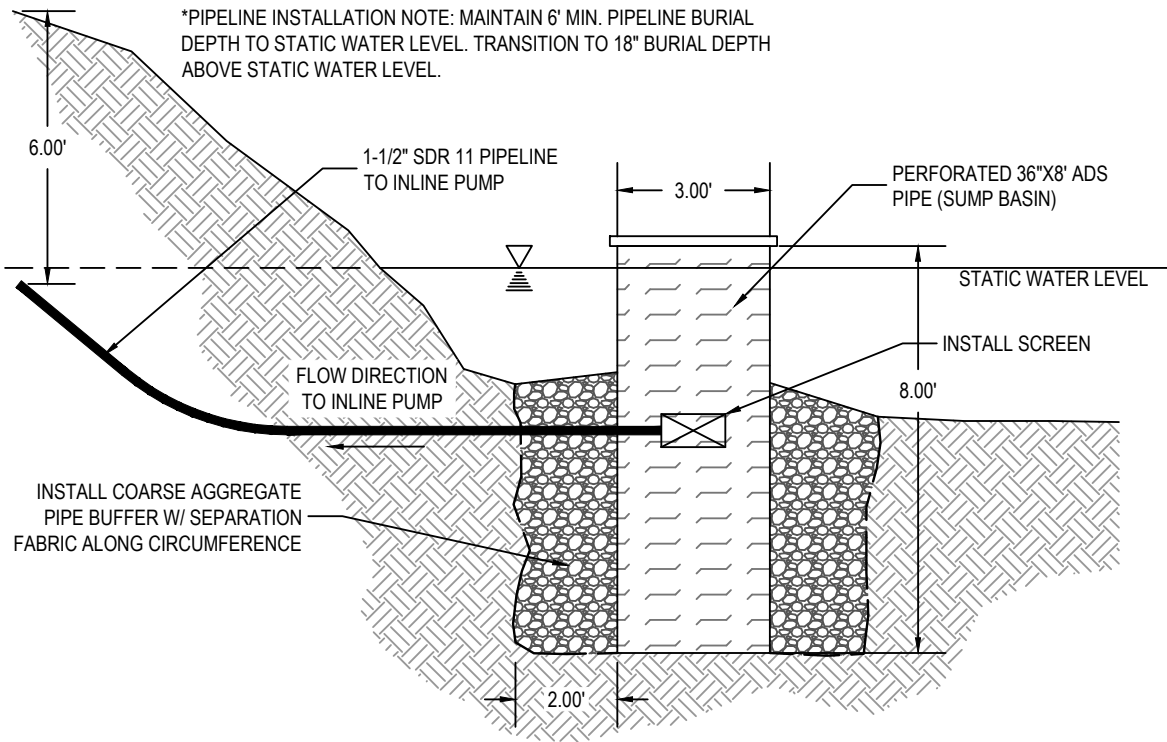
HOBACK RIVER WATERSHED - LEVEL I STUDY
LONG COOL CREEK DRAW - TOLSON IRRIGATION PUMP & PIPELINE
 SMALL WATER PROJECT ID: 5.1
 LOCATED IN THE SE/4NW/4 OF SEC. 21, T.36N., R.114W., 6TH P.M.,
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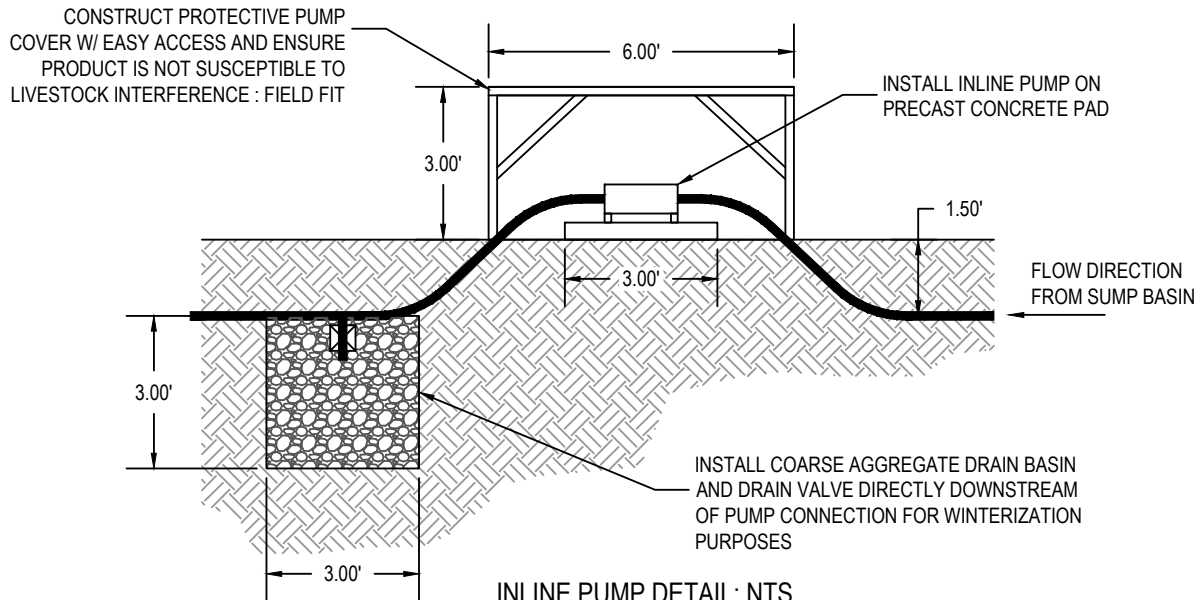


ELEVATION HEAD LOSS: 30 FT
 FRICTION LOSS: 0.86 PSI/100 LF @ 90 GPM ~ 10 FT
 FITTINGS: 4FT
 TDH: 44 FT





SUMP BASIN DETAIL: NTS



INLINE PUMP DETAIL: NTS

HOBACK RIVER WATERSHED - LEVEL I STUDY
LONG COOL CREEK DRAW - TOLSON IRRIGATION PUMP & PIPELINE
 SMALL WATER PROJECT ID: 5.1
 LOCATED IN THE SE/4NW/4 OF SEC. 21, T.36N., R.114W., 6TH P.M.,
 SUBLETTE COUNTY, WY

RIO VERDE
ENGINEERING
 PINEDALE, WYOMING

(307) 367-2826
 rioverde@wyoming.com

DESIGNED BY: MTJ
 DRAWN BY: MTJ
 CHECKED BY: EAS
 DATE: 4/16/22
 REVISED:
 JOB No. 4570
 PAGE No. 5 OF 5

HOBACK RIVER WATERSHED STUDY LEVEL I**Owner/Operator:** Dan Tolson**Project Type:** Source Water Development**Project ID:** 5.2**Project Name:** Tolson Stock Water Tank**Location (PLSS):** SE/4NW/4, Sec. 21, T36N, R114W**Location (Lat/Long):** 43.07703°N, 110.46277°W**PROJECT COMPONENTS (ENGINEER'S ESTIMATE)**

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1	Mobilization	1	LS	\$ 1,800.00	\$ 1,800.00
2	1-1/4" SDR-11 Pipeline	50	LF	\$ 3.50	\$ 175.00
3	4" SDR-11 Pipeline	90	LF	\$ 8.50	\$ 765.00
4	1-1/4" Isolation Valves	2	EA	\$ 150.00	\$ 300.00
5	1-1/4" Tee	1	EA	\$ 65.00	\$ 65.00
6	12 FT Dia. Stock Water Tank - Complete	1	EA	\$ 14,000.00	\$ 14,000.00
TOTAL COMPONENT COST (SUBTOTAL #2):					\$ 17,105.00

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$ 800.00
PERMITTING AND MITIGATION:	\$ -
LEGAL FEES:	\$ -
ACQUISITION OF ACCESS AND RIGHTS-OF-WAY:	\$ -
PRE-CONSTRUCTION COSTS (SUBTOTAL #1):	\$ 800.00

TOTAL COMPONENT COST (SUBTOTAL #2): **\$ 17,105.00**

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%):	\$ 1,710.50
COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3):	\$ 18,815.50
CONTINGENCY (SUBTOTAL #3 X 15%):	\$ 2,822.33
TOTAL CONSTRUCTION COST (SUBTOTAL #4):	\$ 21,637.83

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): **\$ 22,437.83**

PERMITTING REQUIREMENTS

Project ID: 5.2

Project Name: Tolson Stock Water Tank

Land Jurisdiction: Private, Daniel & Dancy Tolson

Greater Sage-Grouse Core Area Protection (Executive Order 2019-3)

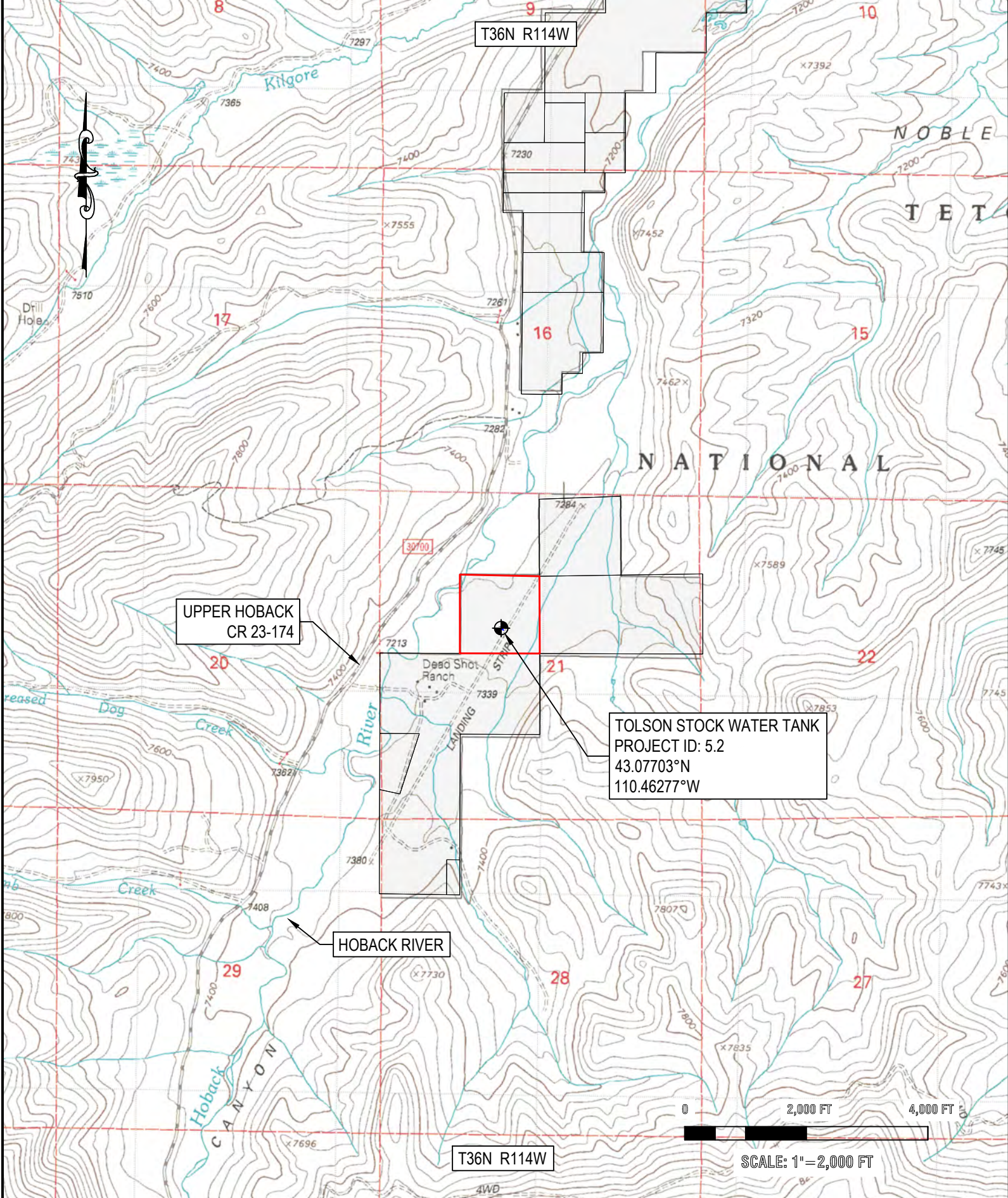
This project is located within the defined Non-Core Population area and would require surface disturbance for ditch rehabilitation. Based on preliminary DDCT calculations, said project is located more than 2 miles from an occupied lek. Therefore, no restrictions on timing of construction are expected.

State Engineer's Office

Current Permit: None

Proposed Permit: SW-1 for stock water supply - one (1) trough

An SW-1 application and accompanying map will need to be prepared and submitted to the SEO for permit issuance prior to construction. This permit can be combined with the SW-1 application for Project 5.1.



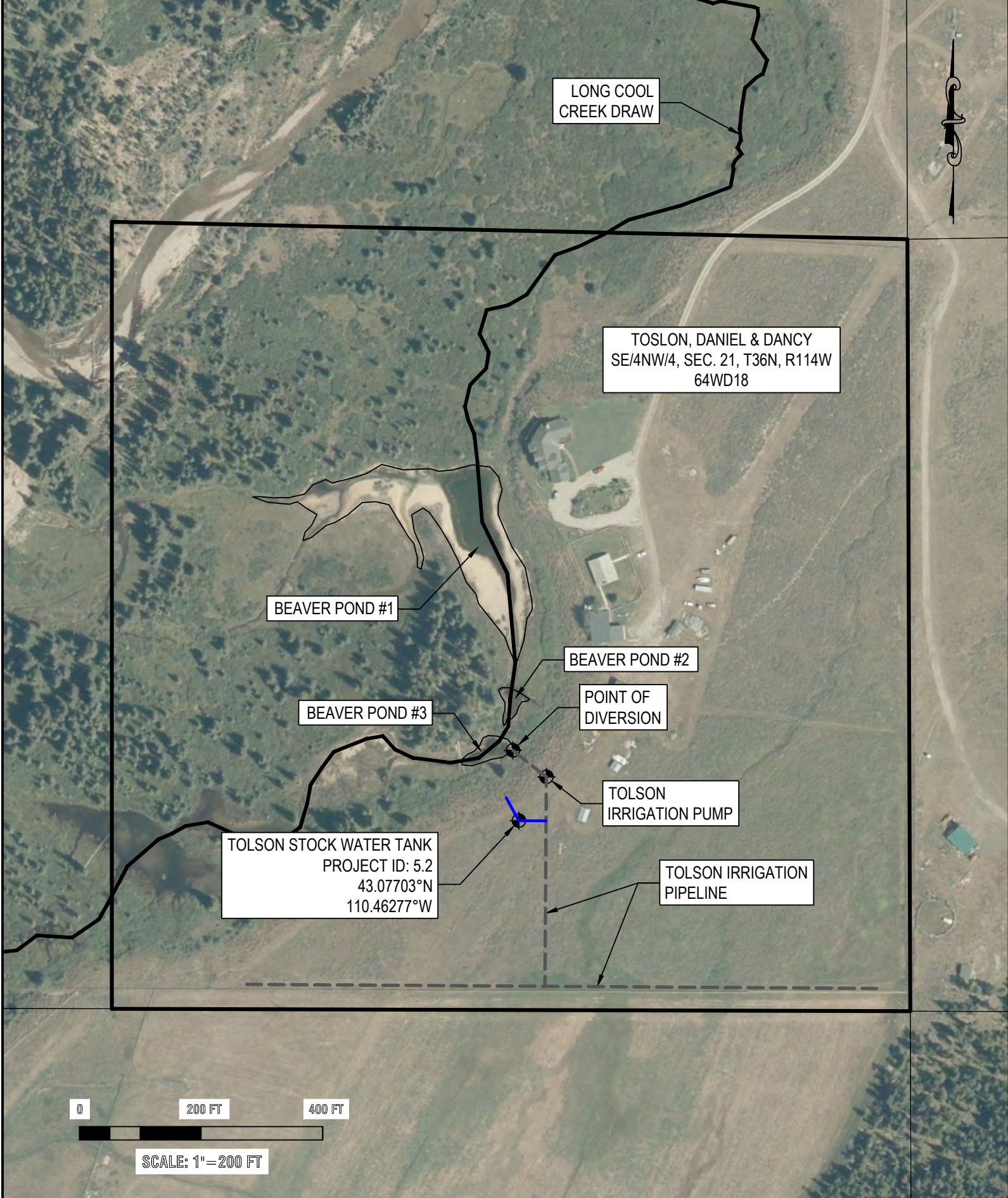
DESIGNED BY: MTJ
 DRAWN BY: MTJ
 CHECKED BY: EAS
 DATE: 4/16/22
 REVISED:
 JOB No. 4570
 PAGE No. 1 OF 5

HOBACK RIVER WATERSHED - LEVEL I STUDY
TOLSON STOCK WATER TANK
 SMALL WATER PROJECT ID: 5.2
 LOCATED IN THE SE/4NW/4, SEC. 21, T.36N., R.114W., 6TH P.M.,
 SUBLETTE COUNTY, WY



RIO VERDE
ENGINEERING
 PINEDALE, WYOMING

(307) 367-2826
 rioverde@wyoming.com



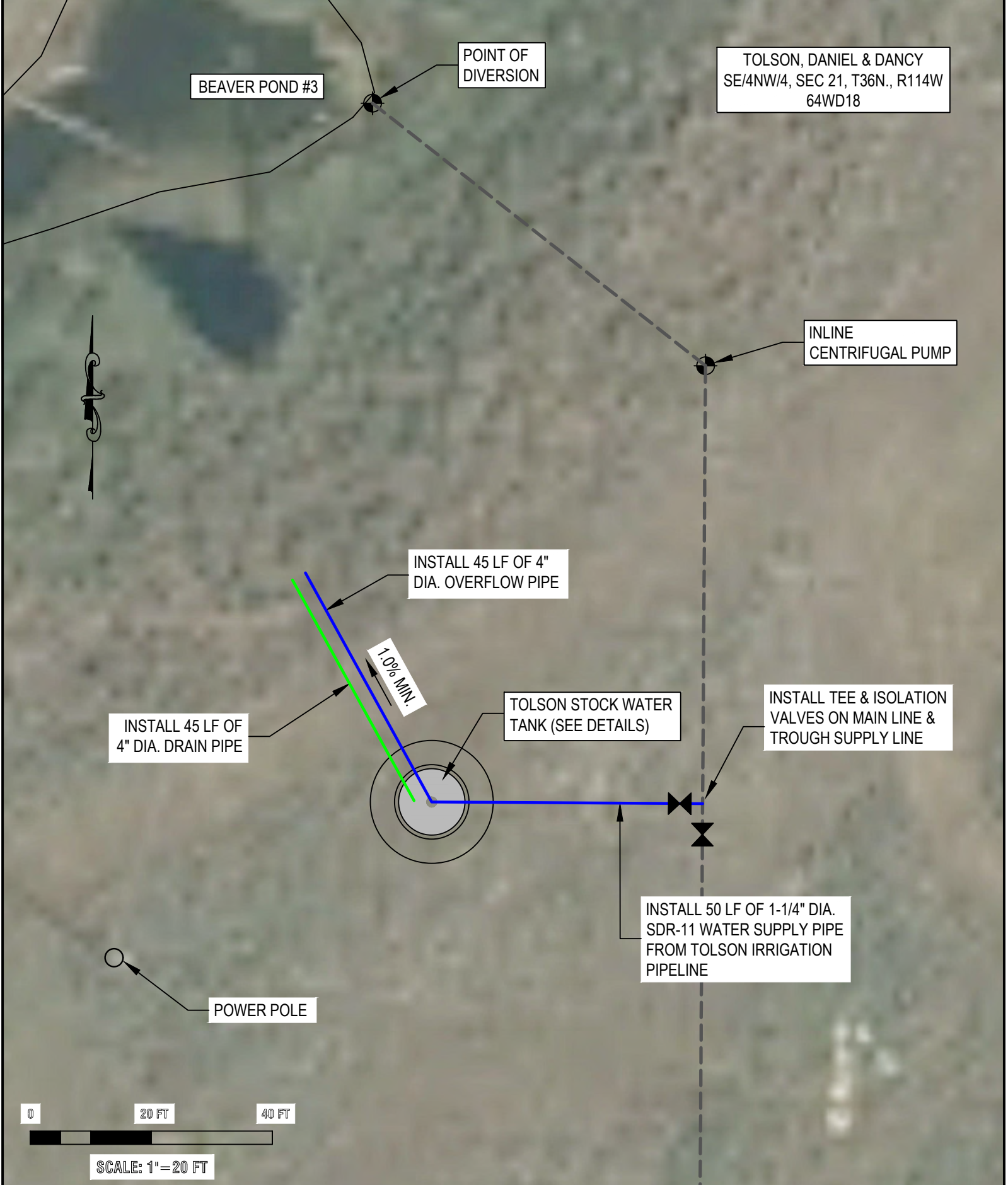
SCALE: 1" = 200 FT

DESIGNED BY: MTJ
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HOBACK RIVER WATERSHED - LEVEL I STUDY
TOLSON STOCK WATER TANK
 SMALL WATER PROJECT ID: 5.2
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BEAVER POND #3

POINT OF DIVERSION

TOLSON, DANIEL & DANCY
SE/4NW/4, SEC 21, T36N., R114W
64WD18

INLINE
CENTRIFUGAL PUMP

INSTALL 45 LF OF 4"
DIA. OVERFLOW PIPE

1.0% MIN.

INSTALL 45 LF OF
4" DIA. DRAIN PIPE

TOLSON STOCK WATER
TANK (SEE DETAILS)

INSTALL TEE & ISOLATION
VALVES ON MAIN LINE &
TROUGH SUPPLY LINE

INSTALL 50 LF OF 1-1/4" DIA.
SDR-11 WATER SUPPLY PIPE
FROM TOLSON IRRIGATION
PIPELINE

POWER POLE

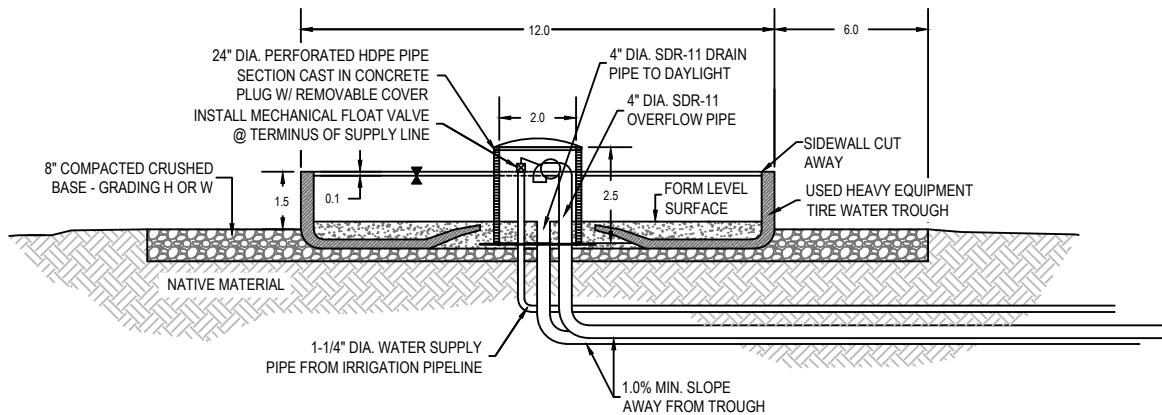


SCALE: 1" = 20 FT

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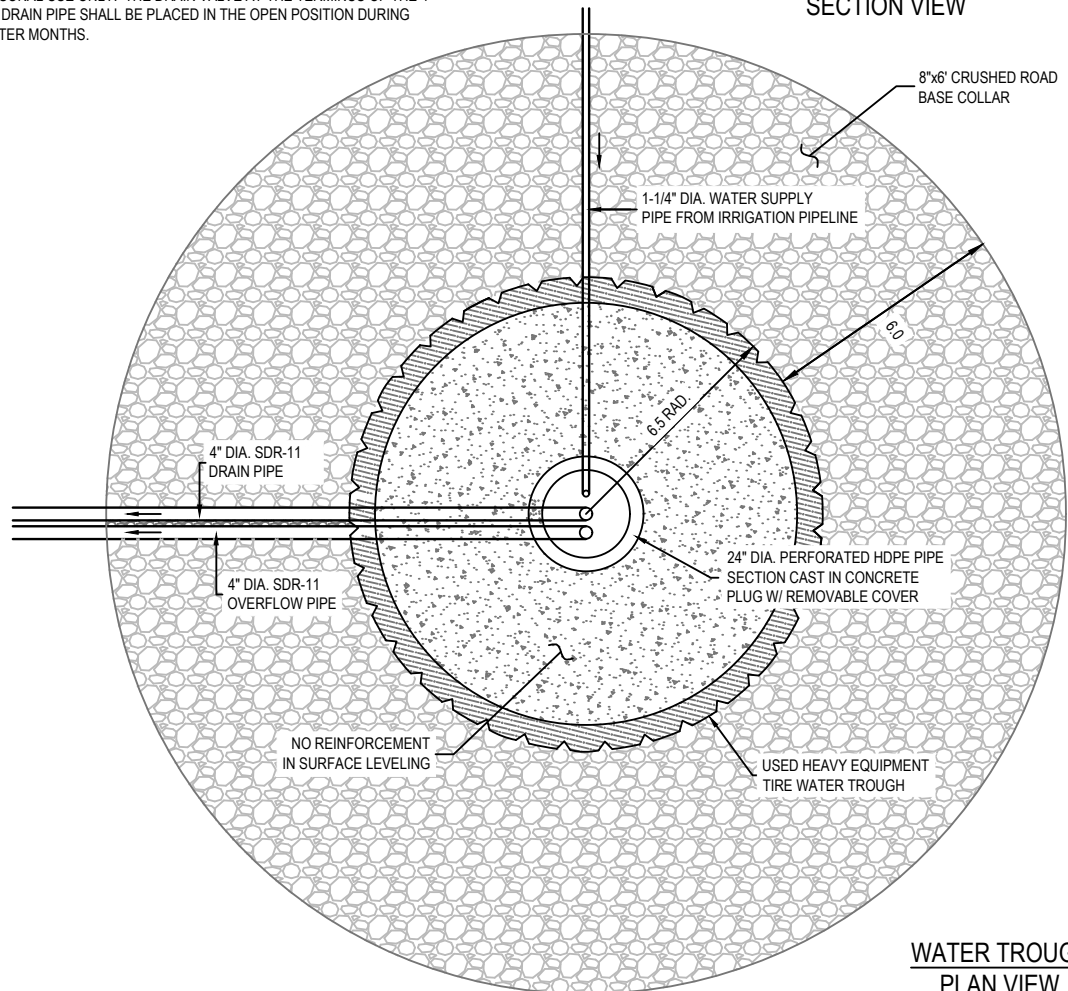
HOBACK RIVER WATERSHED - LEVEL I STUDY
TOLSON STOCK WATER TANK
SMALL WATER PROJECT ID: 5.2
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NOTE:
 THE DEPICTED TROUGH AND WATER SUPPLY SYSTEM IS INTENDED FOR SEASONAL USE ONLY. THE DRAIN VALVE AT THE TERMINUS OF THE 4" DIA. DRAIN PIPE SHALL BE PLACED IN THE OPEN POSITION DURING WINTER MONTHS.

WATER TROUGH SECTION VIEW

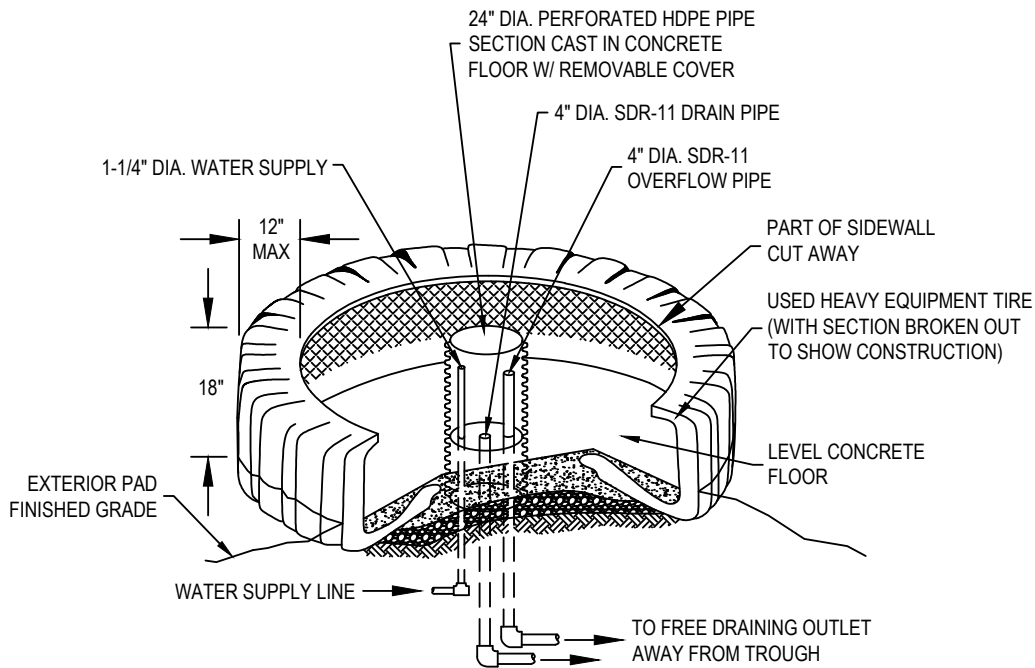


WATER TROUGH PLAN VIEW

HOBACK RIVER WATERSHED - LEVEL I STUDY
TOLSON STOCK WATER TANK
 SMALL WATER PROJECT ID: 5.2
 LOCATED IN THE SE/4NW/4, SEC. 21, T.36N., R.114W., 6TH P.M.,
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**WATERING TROUGH
ISOMETRIC VIEW**
N.T.S.

INFLOW PIPE DIA. - 1-1/4 IN.

OVERFLOW PIPE DIA. - 4 IN.

DRAIN PIPE DIA. - 4 IN.

INSTALLATION NOTES

- 1.) CUT AWAY PART OF SIDEWALL. THIS WILL BE THE TOP OF THE TROUGH
- 2.) USE THE CRUSHED ROAD BASE TO FILL AROUND THE PIPES AND TO LEVEL THE TIRE.
- 3.) POUR CONCRETE AROUND ADS PIPE, WATER SUPPLY, OVERFLOW PIPES AND WORK UNDER INTERIOR EDGE OF TIRE. FINISH THE TOP SURFACE OF CONCRETE TO FORM A LEVEL PAD ACROSS THE TROUGH BOTTOM.
- 4.) *PROVIDE AN ESCAPE DEVICE FOR SMALL BIRDS AND ANIMALS THAT MAY BECOME ENTRAPPED. A RAMP CONSTRUCTED OF A PIECE OF EXPANDED METAL EXTENDING FROM THE WATER SURFACE TO THE TOP SIDEWALL OR A FLOAT CONSISTING OF A PIECE OF LUMBER ARE TWO DEVICES THAT COULD BE USED.
- 5.) EXTEND CRUSHED ROAD BASE PAD 6 FT. OUT FROM EXTERIOR TIRE EDGE

*DESIGN BASED ON NRCS STANDARDIZED DRAWING AND DESIGN INPUT FROM BROGAN HYDROLOGIC CONSULTING. DESIGN MUST BE ADAPTED TO MEET SITE SPECIFIC CONDITIONS.

HOBACK RIVER WATERSHED - LEVEL I STUDY

TOLSON STOCK WATER TANK

SMALL WATER PROJECT ID: 5.2

LOCATED IN THE SE/4NW/4, SEC. 21, T.36N., R.114W., 6TH P.M.,
SUBLETTE COUNTY, WY



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rioverde@wyoming.com

PINEDALE, WYOMING

HOBACK RIVER WATERSHED STUDY LEVEL I**Owner/Operator:** Sarah Uptain**Project Type:** Source Water Development**Project ID:** 8.1**Project Name:** Uptain Pump & Pipeline**Location (PLSS):** NE/4 (HES 107), Sec. 26, T39N, R116W**Location (Lat/Long):** 43.31915°N, 110.73141°W**PROJECT COMPONENTS (ENGINEER'S ESTIMATE)**

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1	Mobilization	1	LS	\$ 1,600.00	\$ 1,600.00
2	4" Diameter Intake Screen	1	LS	\$ 2,500.00	\$ 2,500.00
3	1" SDR-11 Pipeline	320	LF	\$ 5.00	\$ 1,600.00
4	New 1 HP Inline Centrifugal pump	1	EA	\$ 850.00	\$ 850.00
5	Install pump & Construct pump cover	1	LS	\$ 1,500.00	\$ 1,500.00
6	Wiring/Labor	1	LS	\$ 1,500.00	\$ 1,500.00
7	Control unit/Low water sensor/Power to pump	1	LS	\$ 6,500.00	\$ 6,500.00
TOTAL COMPONENT COST (SUBTOTAL #2):					\$ 16,050.00

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$ 1,300.00
PERMITTING AND MITIGATION:	\$ 3,500.00
LEGAL FEES:	\$ 200.00
ACQUISITION OF ACCESS AND RIGHTS-OF-WAY:	\$ 2,400.00
PRE-CONSTRUCTION COSTS (SUBTOTAL #1):	\$ 7,400.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 16,050.00

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%):	\$ 1,605.00
COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3):	\$ 17,655.00
CONTINGENCY (SUBTOTAL #3 X 15%):	\$ 2,648.25
TOTAL CONSTRUCTION COST (SUBTOTAL #4):	\$ 20,303.25

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): \$ 27,703.25

PERMITTING REQUIREMENTS

Project ID: 8.1

Project Name: Uptain Pump and Pipeline

Land Jurisdiction: Private (see below)

Sarah Uptain, Trustee
Brackley, Bruce

A pipeline construction and maintenance easement shall be secured prior to commencement of project activities.

U.S. Army Corp of Engineer's (USACE)

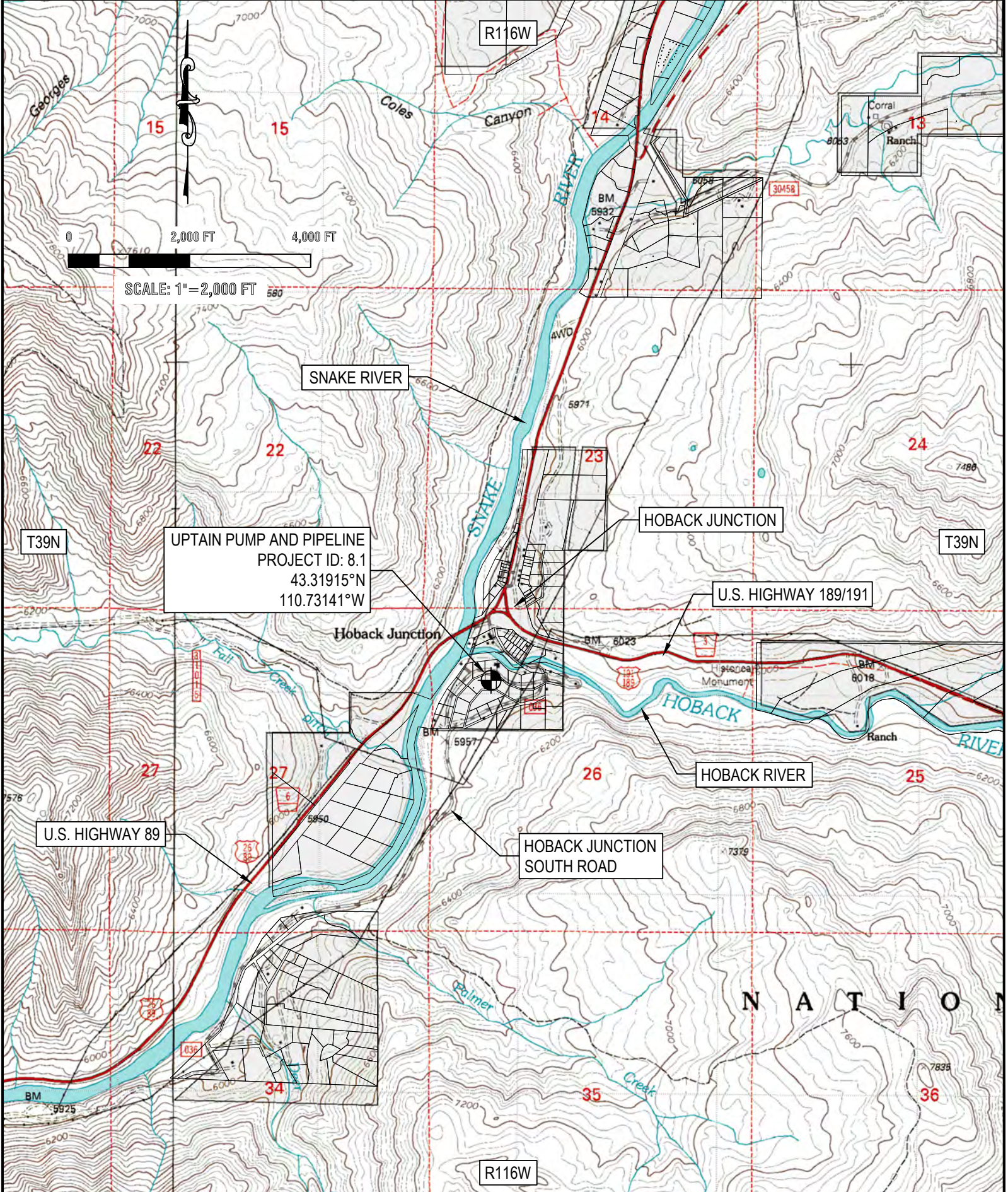
A project plan set should be submitted to the USACE Wyoming Regulatory Office for review prior to final submission to the WWDO. Due to the small quantity of fill associated with the installation of the pipeline and pump, a wetland delineation and pre-construction notification are not being anticipated as a requirement. However, final determination rests with the Wyoming Regulatory Office. A USACE letter of acceptance should be submitted to the WWDO with the final design, prior to construction.

State Engineer's Office

Current Permit: None


Proposed Permit: SW-1 for Domestic Supply to irrigate approximately 1.0 Ac.

An SW-1 application and accompanying map will need to be prepared and submitted to the SEO for permit issuance prior to construction. The beneficial use should be listed as domestic.



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 CHECKED BY: EAS
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 PAGE No. 1 OF 3

HOBACK RIVER WATERSHED - LEVEL I STUDY
UPTAIN PUMP AND PIPELINE
 SMALL WATER PROJECT ID: 8.1
 LOCATED IN THE NW/4 (HES 107) OF SECTION 26, T.39N., R.116W.,
 6TH P.M., TETON COUNTY, WY



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0 80 FT 160 FT

SCALE: 1"=80 FT

ELEVATION HEAD LOSS: 45 FT
FRICTION LOSS: 2.0 PSI/100 LF
@ Q_{MAX} (25 GPM) ~ 14 FT
FITTINGS: 4FT
TOTAL DYNAMIC HEAD: 63 FT

HOBACK JUNCTION
SOUTH ROAD

UPTAIN PUMP AND PIPELINE
PROJECT: POINT OF DIVERSION

INSTALL 1 HP IN-LINE JET
PUMP W/ PRESSURE SWITCH

PLOT G
ROGER POINT REVISED
HARGER, KEITH & DEANNA

HOBACK RIVER

INSTALL 320 LF OF
1" SDR-11 PIPE

PROPOSED 10' UTILITY EASEMENT
TO BE PROCURED PRIOR TO
PERMITTING & DEVELOPMENT

PLOT H
ROGERS POINT REVISED
BRACKLEY, BRUCE


E RIVER DRIVE

END OF SUPPLY LINE;
DISTRIBUTION NETWORK
PERFORMED BY OTHERS

PLACE OF USE: (DOMESTIC SUPPLY)
UPTAIN, SARAH, TRUSTEE
PLOT P, ROGERS POINT REVISED
DOC 1018867

PAGE No. 2 OF 3
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HOBACK RIVER WATERSHED - LEVEL I STUDY
UPTAIN PUMP AND PIPELINE
SMALL WATER PROJECT ID: 8.1
LOCATED IN THE NW/4 (HES 107) OF SECTION 26, T.39N., R.116W.,
6TH P.M., TETON COUNTY, WY

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CONSTRUCT PROTECTIVE
PUMP COVER

INSTALL 1" SDR-11
PIPE TO PLACE OF USE

SINGLE PHASE
POWER SUPPLY LINE
(115/230 V, 60 HZ)

RIGID PUMP SUPPORT
PLATFORM

INSTALL 1 HP IN-LINE JET PUMP W/
PRESSURE SWITCH
(GRUNDFOS JP PS OR EQUIVALENT)

INSTALL 1" SDR-11
PIPE FROM INTAKE
POINT TO PUMP

INSTALL PIPE SUPPORT
USING INSITU ROCK OR
OTHER MEANS

INSTALL INTAKE
SCREEN

26' MAX SUCTION LIFT

POINT OF DIVERSION
PROFILE VIEW

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HOBACK RIVER WATERSHED - LEVEL I STUDY
UPTAIN PUMP AND PIPELINE
 SMALL WATER PROJECT ID: 8.1
 LOCATED IN THE NW/4 (HES 107) OF SECTION 26, T.39N., R.116W.,
 6TH P.M., TETON COUNTY, WY



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ENGINEERING**
 PINEDALE, WYOMING
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HOBACK RIVER WATERSHED STUDY LEVEL I**Owner/Operator:** Marcia Taylor**Project Type:** Source Water Development**Project ID:** 9.1**Project Name:** Taylor Irrigation Pump & Pipeline**Location (PLSS):** SW/4NE/4, Sec. 4, T38N, R115W**Location (Lat/Long):** 43.28697°N, 110.64173°W**PROJECT COMPONENTS (ENGINEER'S ESTIMATE)**

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1	Mobilization	1	LS	\$ 5,000.00	\$ 5,000.00
2	36" diameter X 8 ft ADS intake sump	1	LS	\$ 3,000.00	\$ 3,000.00
3	4" SDR-11 Pipeline & Drain	2930	LF	\$ 8.50	\$ 24,905.00
4	4" HDPE Valve	1	EA	\$ 650.00	\$ 650.00
5	4" 90° Bends	1	EA	\$ 150.00	\$ 150.00
6	4" 45° Bends	2	EA	\$ 150.00	\$ 300.00
7	4" 22.5° Bends	2	EA	\$ 150.00	\$ 300.00
8	4" Tee	1	EA	\$ 190.00	\$ 190.00
9	4" Stainless Mesh Screens	2	EA	\$ 75.00	\$ 150.00
10	New 10 HP Inline Centrifugal pump	1	EA	\$ 12,000.00	\$ 12,000.00
11	Install pump & Construct pump cover	1	LS	\$ 2,500.00	\$ 2,500.00
12	Wiring/Labor (Existing Power Supply)	1	LS	\$ 600.00	\$ 600.00
13	Control unit/Low water sensor/Power to pump	1	LS	\$ 900.00	\$ 900.00
TOTAL COMPONENT COST (SUBTOTAL #2):					\$ 50,645.00

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$ 3,000.00
PERMITTING AND MITIGATION:	\$ 2,600.00
LEGAL FEES:	\$ -
ACQUISITION OF ACCESS AND RIGHTS-OF-WAY:	\$ -
PRE-CONSTRUCTION COSTS (SUBTOTAL #1):	\$ 5,600.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 50,645.00

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%):	\$ 5,064.50
COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3):	\$ 55,709.50
CONTINGENCY (SUBTOTAL #3 X 15%):	\$ 8,356.43
TOTAL CONSTRUCTION COST (SUBTOTAL #4):	\$ 64,065.93

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): \$ 69,665.93

PERMITTING REQUIREMENTS

Project ID: 9.1

Project Name: Taylor Irrigation Pump and Pipeline

Land Jurisdiction: Private, Marcia Taylor, Trustee

U.S. Army Corp of Engineer's (USACE)

A project plan set should be submitted to the USACE Wyoming Regulatory Office for review prior to final submission to the WWDO. Due to the small quantity of fill associated with the installation of the sump basin, and the fact that the pipeline will be located on uplands, a wetland delineation and pre-construction notification are not being anticipated as a requirement. However, final determination rests with the Wyoming Regulatory Office. A USACE letter of acceptance should be submitted to the WWDO with the final design, prior to construction.

State Engineer's Office

Current Permit: None

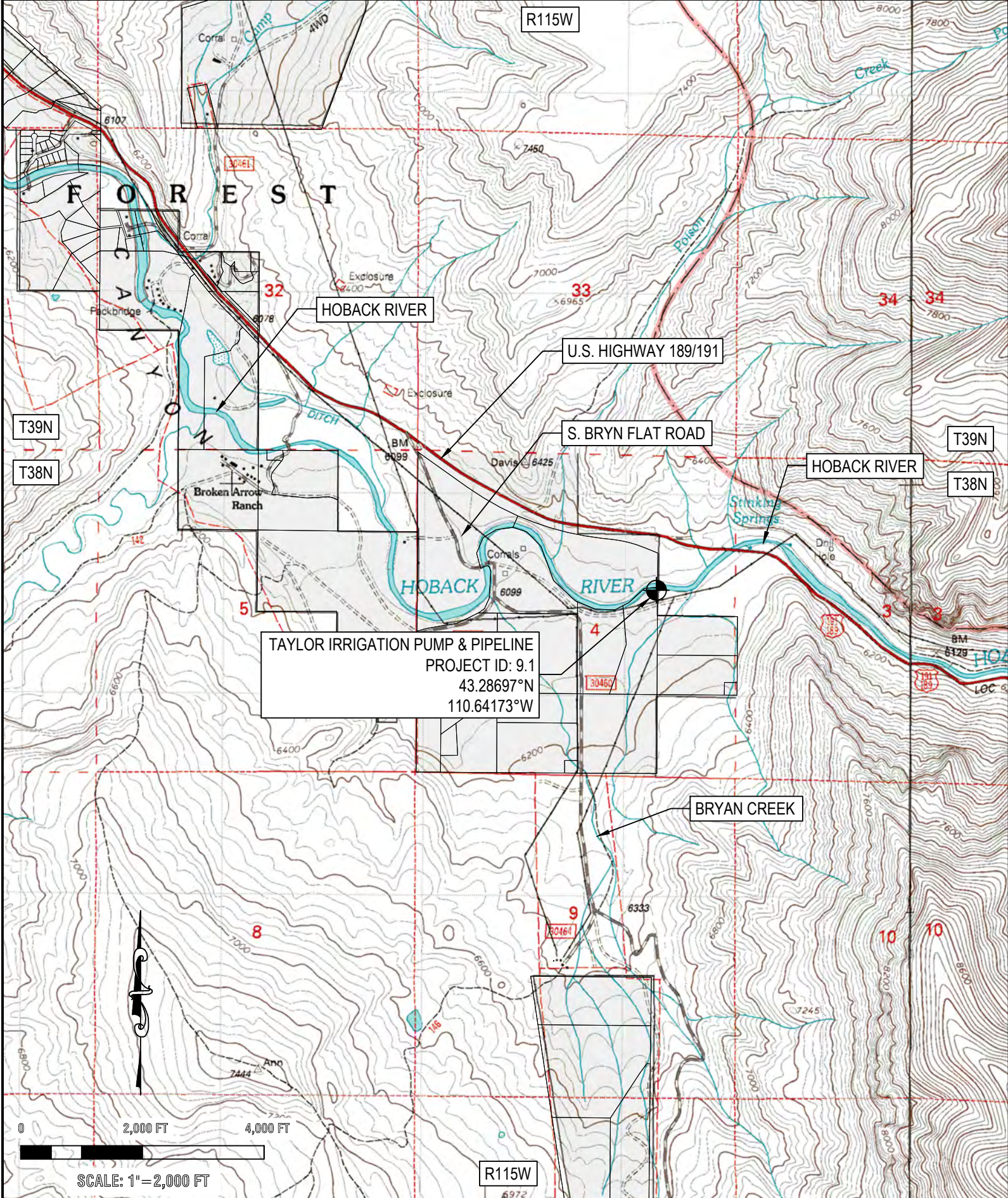
Proposed Permit: SW-1 for Original Supply to irrigate approximately 27.4 Ac.

An SW-1 application and accompanying map will need to be prepared and submitted to the SEO for permit issuance prior to construction. Beneficial uses should include irrigation and stock water.

A similar irrigation permit was submitted to the SEO in 1997 under the Knepshield Pipeline, P31835.0D. Said permit application was cancelled but may be used for reference in preparing the SW-1 described above.

Jackson Hole Land Trust

The subject property is currently encumbered by a conservation easement held by the Jackson Hole Land Trust (JHLT), as recorded in Book 446, Page 1092 in the Office of the Clerk of Teton County, Wyoming. In reference to page 8 of said document, under item 3.7, "Lawful use of water resources and irrigation is permitted". Once final designs and specifications have been completed and prior to being submitted for SWPP funding, JHLT should be consulted on the proposed irrigation plan.



TAYLOR IRRIGATION PUMP & PIPELINE
 PROJECT ID: 9.1
 43.28697°N
 110.64173°W

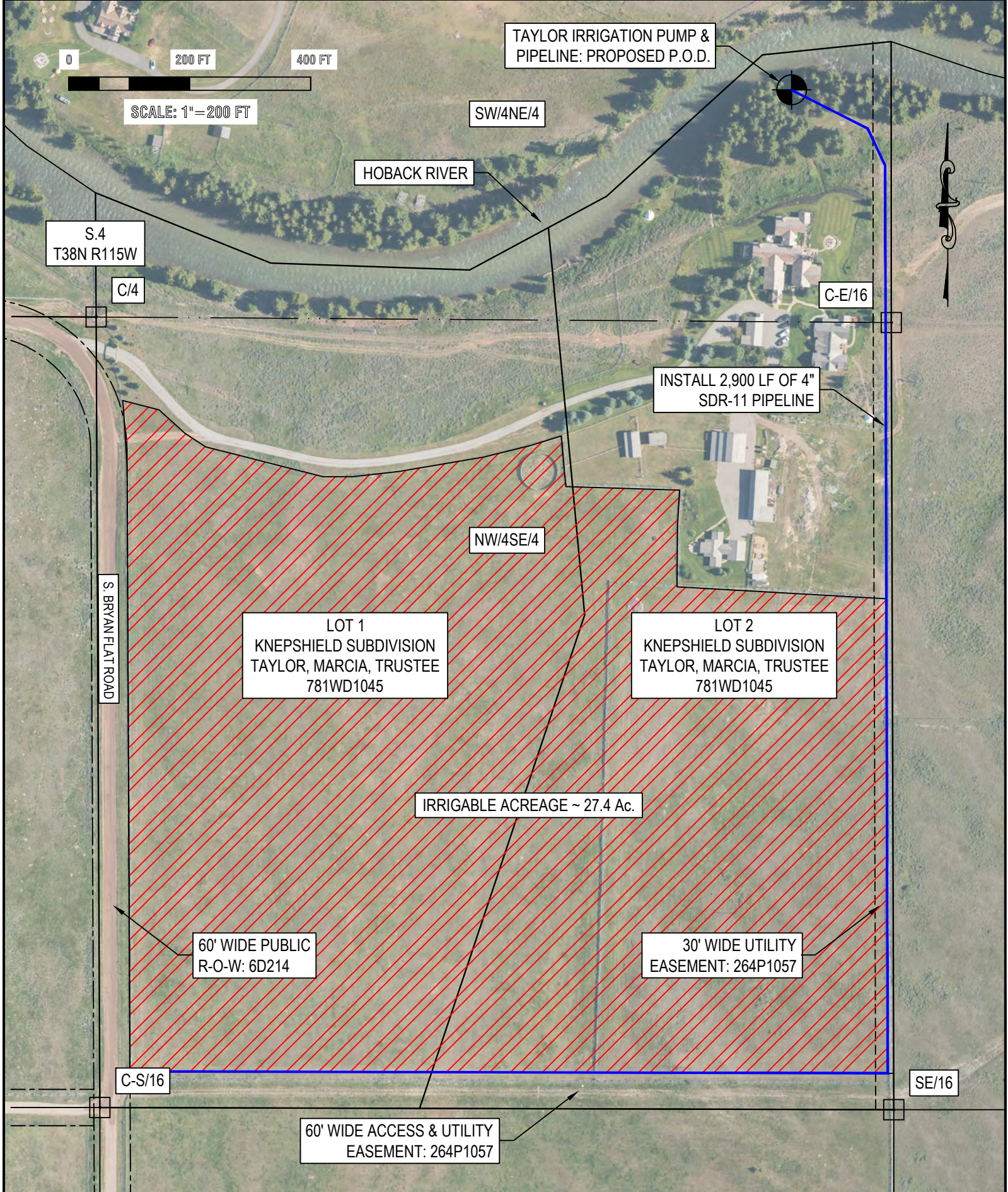
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HOBACK RIVER WATERSHED - LEVEL I STUDY
TAYLOR IRRIGATION PUMP & PIPELINE
 SMALL WATER PROJECT ID: 9.1
 LOCATED IN THE SW/4NE/4 & NW/SE/4 OF SECTION 4,
 T.38N., R.115W., 6TH P.M., TETON COUNTY, WY



RIO VERDE
ENGINEERING
 PINEDALE, WYOMING

(307) 367-2826
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TAYLOR IRRIGATION PUMP & PIPELINE: PROPOSED P.O.D.

SCALE: 1"=200 FT

SW/4NE/4

HOBACK RIVER

S.4
T38N R115W

C/4

C-E/16

INSTALL 2,900 LF OF 4" SDR-11 PIPELINE

NW/4SE/4

LOT 1
KNEPSHIELD SUBDIVISION
TAYLOR, MARCIA, TRUSTEE
781WD1045

LOT 2
KNEPSHIELD SUBDIVISION
TAYLOR, MARCIA, TRUSTEE
781WD1045

S. BRYAN FLAT ROAD

IRRIGABLE ACREAGE ~ 27.4 Ac.

60' WIDE PUBLIC R-O-W: 6D214

30' WIDE UTILITY EASEMENT: 264P1057

C-S/16

SE/16

60' WIDE ACCESS & UTILITY EASEMENT: 264P1057

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HOBACK RIVER WATERSHED - LEVEL I STUDY
TAYLOR IRRIGATION PUMP & PIPELINE
SMALL WATER PROJECT ID: 9.1
LOCATED IN THE SW/4NE/4 & NW/SE/4 OF SECTION 4,
T.38N., R.115W., 6TH P.M., TETON COUNTY, WY

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0 40 FT 80 FT

SCALE: 1"=40 FT



HOBACK RIVER

TAYLOR IRRIGATION PUMP & PIPELINE: PROPOSED P.O.D.

INSTALL 240V-10 HP INLINE CENTRIFUGAL PUMP

4" PIPELINE TO PLACE OF USE

30' UTILITY EASEMENT

ELEVATION HEAD LOSS: 110 FT
FRICTION LOSS ~ 35 FT
FITTINGS ~ 4FT
TDH: 149 FT

DESIGN FLOWRATE: 0.50 CFS

HOBACK RIVER WATERSHED - LEVEL I STUDY

TAYLOR IRRIGATION PUMP & PIPELINE

SMALL WATER PROJECT ID: 9.1

LOCATED IN THE SW/4NE/4 & NW/SE/4 OF SECTION 4,
T.38N., R.115W., 6TH P.M., TETON COUNTY, WY



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HOBACK RIVER

FLOW

BANK FULL RIVER BANK

APPROX. 9-12 FT

2"-6" COBBLE
ROCK BASIN EXTENDING
3' BEYOND PIPE ON ALL
SIDES. EXTENDED INTO
RIVER CHANNEL

36" DIA. PERFORATED
HDPE PIPE WITH LID

MIRIFI® HP570
GEOTEXTILE FABRIC
OR EQUIVALENT
LINING ROCK BASIN

4" DRAIN DAYLIGHT POINT
BACK TO RIVER LOCATION.
FIELD DESIGN DAYLIGHT POINT.
INSTALL 1/4" SCREEN MESH ON
END W/ STAINLESS CLAMPS

4" DRAIN PIPE POSITION & LENGTH
AS NEEDED TO DAYLIGHT POINT.
APPROXIMATELY 30' ANTICIPATED

4" WATER SUPPLY
TO INLINE PUMP

INSTALL 4" TEE & 4" VALVE
ON DRAIN SIDE OF TEE.

TAYLOR IRRIGATION PUMP & PIPELINE PUMP BASIN OVERVIEW

N.T.S.

HOBACK RIVER WATERSHED - LEVEL I STUDY

TAYLOR IRRIGATION PUMP & PIPELINE

SMALL WATER PROJECT ID: 9.1

LOCATED IN THE SW/4NE/4 & NW/SE/4 OF SECTION 4,
T.38N., R.115W., 6TH P.M., TETON COUNTY, WY



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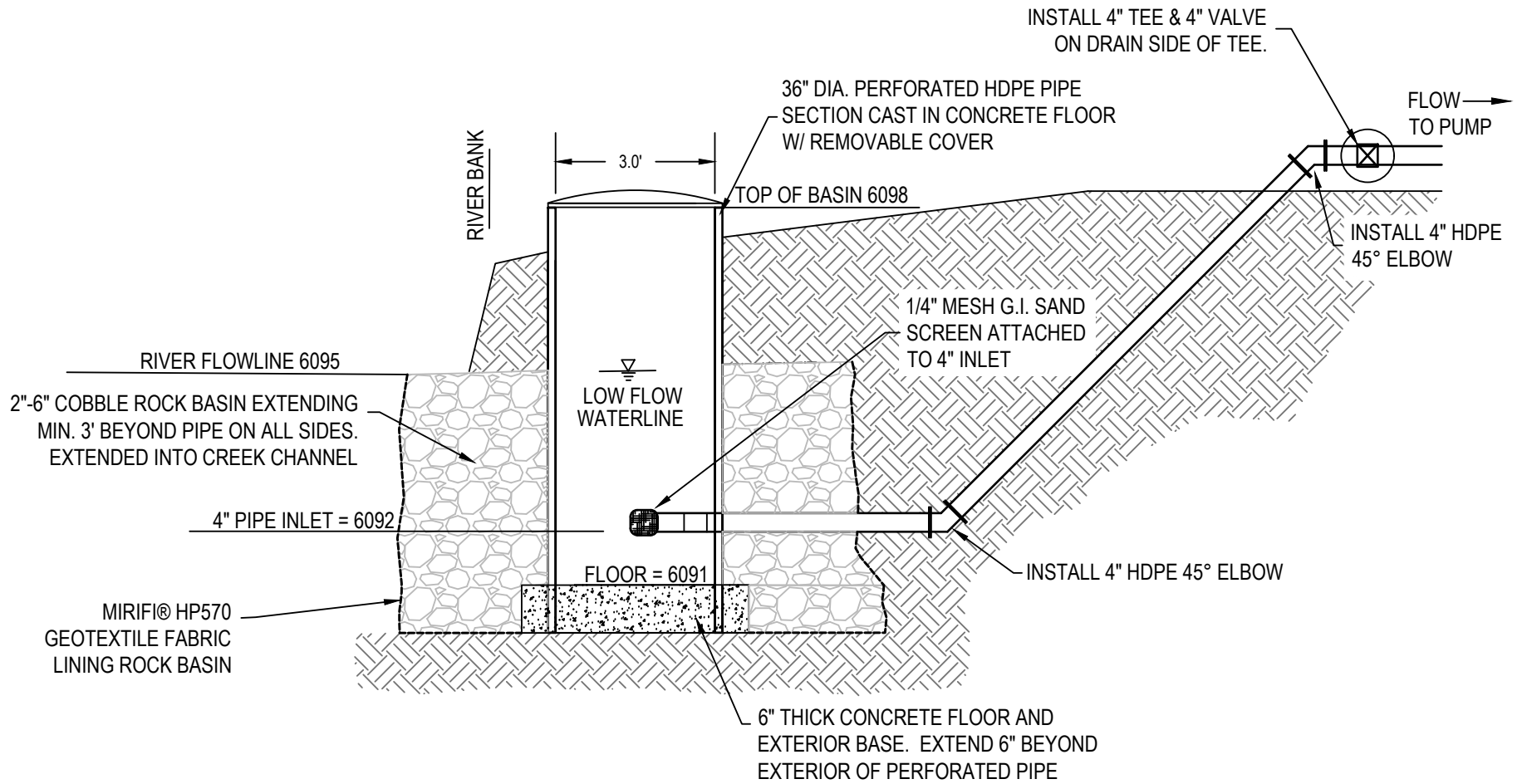
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HOBACK RIVER WATERSHED - LEVEL I STUDY
TAYLOR IRRIGATION PUMP & PIPELINE
 SMALL WATER PROJECT ID: 9.1
 LOCATED IN THE SW/4NE/4 & NW/SE/4 OF SECTION 4,
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TAYLOR IRRIGATION PUMP & PIPELINE
PUMP BASIN SECTION VIEW

N.T.S.

HOBACK RIVER WATERSHED STUDY LEVEL I**Owner/Operator:** Marcia Taylor**Project Type:** Source Water Development Rehabilitation**Project ID:** 9.2**Project Name:** Scarlett #1 Well Stock Tank**Location (PLSS):** NE/4SE/4, Sec. 4, T38N, R115W**Location (Lat/Long):** 43.28463°N, 110.63654°W**PROJECT COMPONENTS (ENGINEER'S ESTIMATE)**

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1	Mobilization	1	LS	\$ 2,000.00	\$ 2,000.00
2	1-1/4" SDR-11 Pipeline	90	LF	\$ 3.50	\$ 315.00
3	4" SDR-11 Pipeline	90	LF	\$ 8.50	\$ 765.00
4	4" Drain Valve & Cover	1	EA	\$ 250.00	\$ 250.00
5	Existing Well Connection	1	LS	\$ 500.00	\$ 500.00
6	Pump Float Controller & Installation (Optional)	1	LS	\$ 1,500.00	\$ 1,500.00
7	12 FT Diameter Stock Water Tank - Complete	1	EA	\$ 14,000.00	\$ 14,000.00
TOTAL COMPONENT COST (SUBTOTAL #2):					\$ 19,330.00

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$ 2,000.00
PERMITTING AND MITIGATION:	\$ 500.00
LEGAL FEES:	\$ -
ACQUISITION OF ACCESS AND RIGHTS-OF-WAY:	\$ -
PRE-CONSTRUCTION COSTS (SUBTOTAL #1):	\$ 2,500.00

TOTAL COMPONENT COST (SUBTOTAL #2): **\$ 19,330.00**

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%):	\$ 1,933.00
COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3):	\$ 21,263.00
CONTINGENCY (SUBTOTAL #3 X 15%):	\$ 3,189.45
TOTAL CONSTRUCTION COST (SUBTOTAL #4):	\$ 24,452.45

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): **\$ 26,952.45**

PERMITTING REQUIREMENTS

Project ID: 9.2

Project Name: Scarlett #1 Well Stock Tank

Land Jurisdiction: Private, Marcia Taylor, Trustee

State Engineer's Office

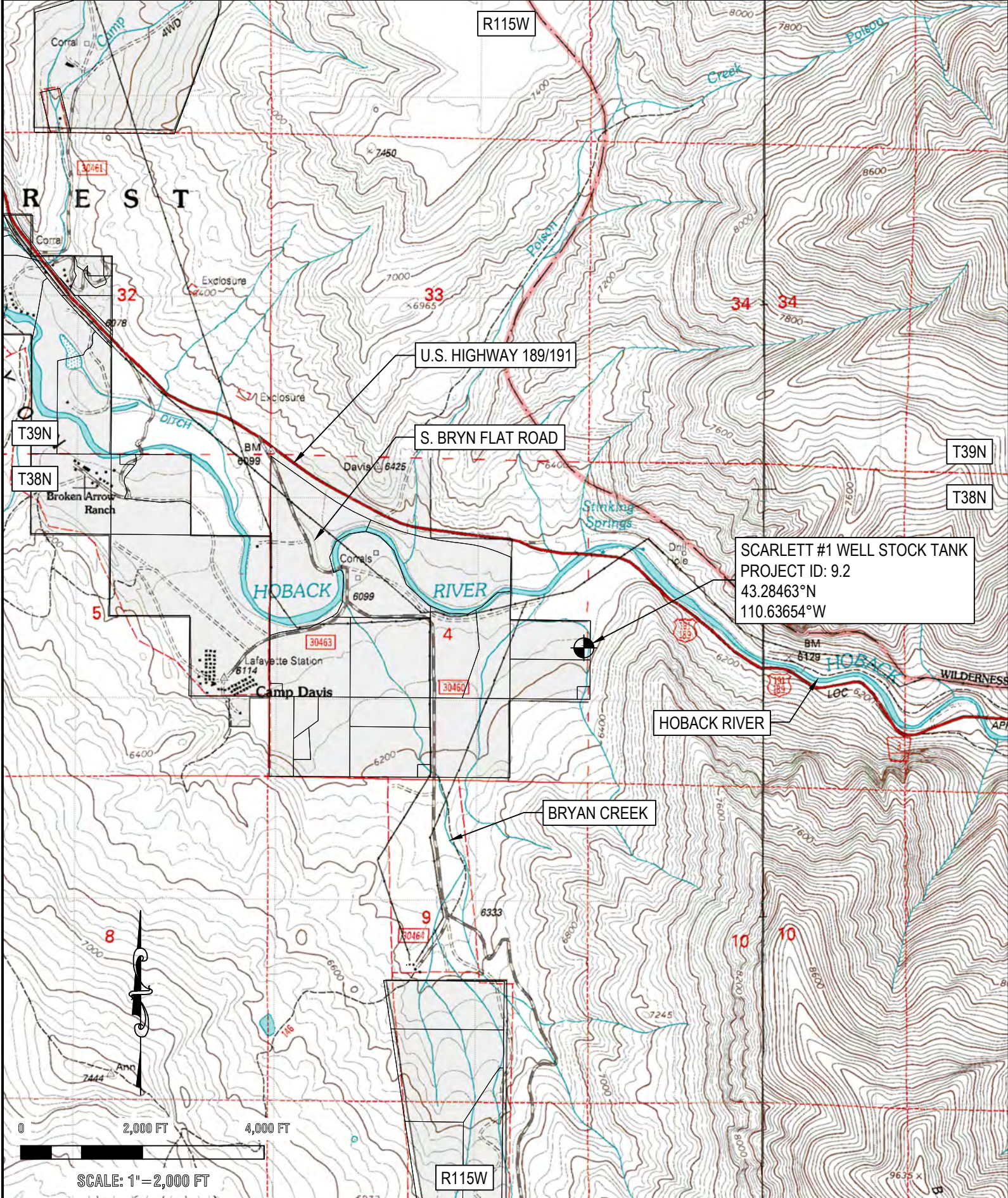
Current Permit: U.W. 103930

Proposed Permit: Enlargement of Permit U.W. 103930 to include stock watering (currently permitted for domestic use only).

A U.W. 5 application will need to be prepared and submitted to the SEO for permit issuance prior to construction. Beneficial uses should include domestic supply and stock water.

Jackson Hole Land Trust

The subject property is currently encumbered by a conservation easement held by the Jackson Hole Land Trust (JHLT), as recorded in Book 446, Page 1092 in the Office of the Clerk of Teton County, Wyoming. In reference to page 8 of said document, under item 3.7, "Lawful use of water resources and irrigation is permitted". Once final designs and specifications have been completed and prior to being submitted for SWPP funding, JHLT should be consulted on the proposed irrigation plan.



PAGE NO. 1 OF 5
 JOB NO. 4570
 REVISION:
 DATE: 09/17/21
 CHECKED BY: EAS
 DRAWN BY: MTJ
 DESIGNED BY: MTJ

HOBACK RIVER WATERSHED - LEVEL I STUDY
SCARLETT #1 WELL STOCK TANK
 SMALL WATER PROJECT ID: 9.2
 LOCATED IN THE NE/4SE/4 OF SECTION 4, T.38N., R.115W.,
 6TH P.M., TETON COUNTY, WY



RIO VERDE
ENGINEERING
 PINEDALE, WYOMING
 (307) 367-2826
 rioverde@wyoming.com



SCALE: 1" = 100 FT

PROPOSED SCARLETT #1 STOCK WATER TROUGH

TAYLOR, MARCIA, TRUSTEE
N/2NE/4SE/4 S.4
781WD1045

SCARLETT #1 WELL:
U.W. 103930



SCARLETT #1 WELL:
U.W. 103930

HOBACK RIVER WATERSHED - LEVEL I STUDY

SCARLETT #1 WELL STOCK TANK

SMALL WATER PROJECT ID: 9.2

LOCATED IN THE NE/4SE/4 OF SECTION 4, T.38N., R.115W.,
6TH P.M., TETON COUNTY, WY



**RIO VERDE
ENGINEERING**

(307) 367-2826
rioverde@wyoming.com

PINEDALE, WYOMING

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CHECKED BY: EAS
DATE: 4/16/22
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JOB No. 4570
PAGE No. 2 OF 5

NOTES:

- 1.) DAYLIGHT OVERFLOW & DRAIN PIPE & PROTECT VALVE RISER WITH BOULDER ARRANGEMENT.
- 2.) TROUGH IS DESIGNED TO OVERFLOW CONTINUOUSLY DURING DAYLIGHT HOURS. A PRESSURE TRANSDUCER MAY BE INSTALLED TO ELIMINATE OVERFLOW.

PROPOSED SCARLETT #1 STOCK WATER TROUGH (SEE DETAILS)

INSTALL 45 LF OF 4" DIA. OVERFLOW PIPE

1.0% MIN.

INSTALL 45 LF OF 4" DIA. DRAIN PIPE

INSTALL DRAIN VALVE FOR WINTERIZATION

TROUGH TO BE SITUATED FOR WATER SUPPLY TO BOTH SIDES OF EXISTING FENCE

INSTALL 135 LF OF 1-1/4" DIA. SDR-11 WATER SUPPLY PIPE FROM WELL

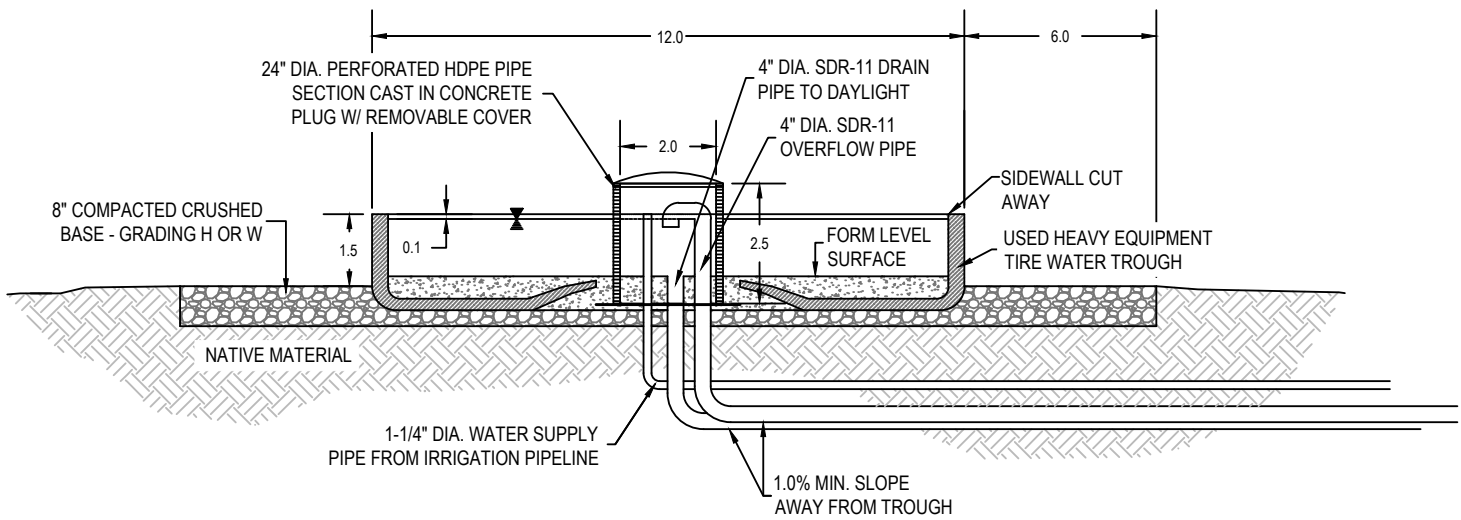
EXISTING SCARLETT #1 WELL (RESIDENTIAL): U.W. 103930 TO BE REPERMITTED FOR STOCK WATER SUPPLY



SCALE: 1"=20 FT

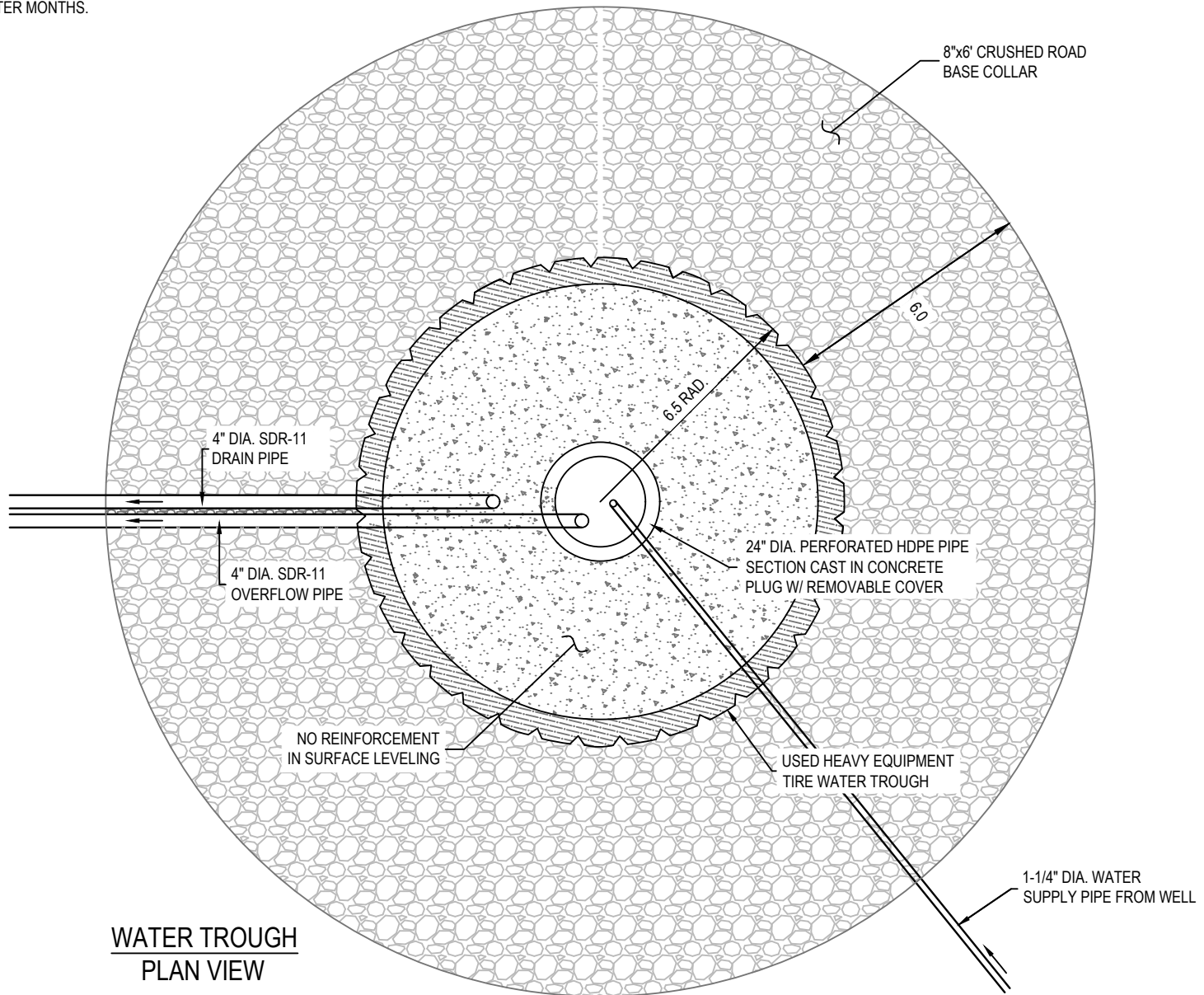
PAGE No. 3 OF 5	JOB No. 4570	REVISED:	DATE: 4/16/22	CHECKED BY: EAS	DRAWN BY: MTJ	DESIGNED BY: MTJ	HOBACK RIVER WATERSHED - LEVEL I STUDY SCARLETT #1 WELL STOCK TANK SMALL WATER PROJECT ID: 9.2 LOCATED IN THE NE/4SE/4 OF SECTION 4, T.38N., R.115W., 6TH P.M., TETON COUNTY, WY
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PINEDALE, WYOMING
(307) 367-2826
rioverde@wyoming.com



NOTE:
 THE DEPICTED TROUGH AND WATER SUPPLY SYSTEM IS INTENDED FOR SEASONAL USE ONLY. THE DRAIN VALVE AT THE TERMINUS OF THE 4" DIA. DRAIN PIPE SHALL BE PLACED IN THE OPEN POSITION DURING WINTER MONTHS.

**WATER TROUGH
 SECTION VIEW**

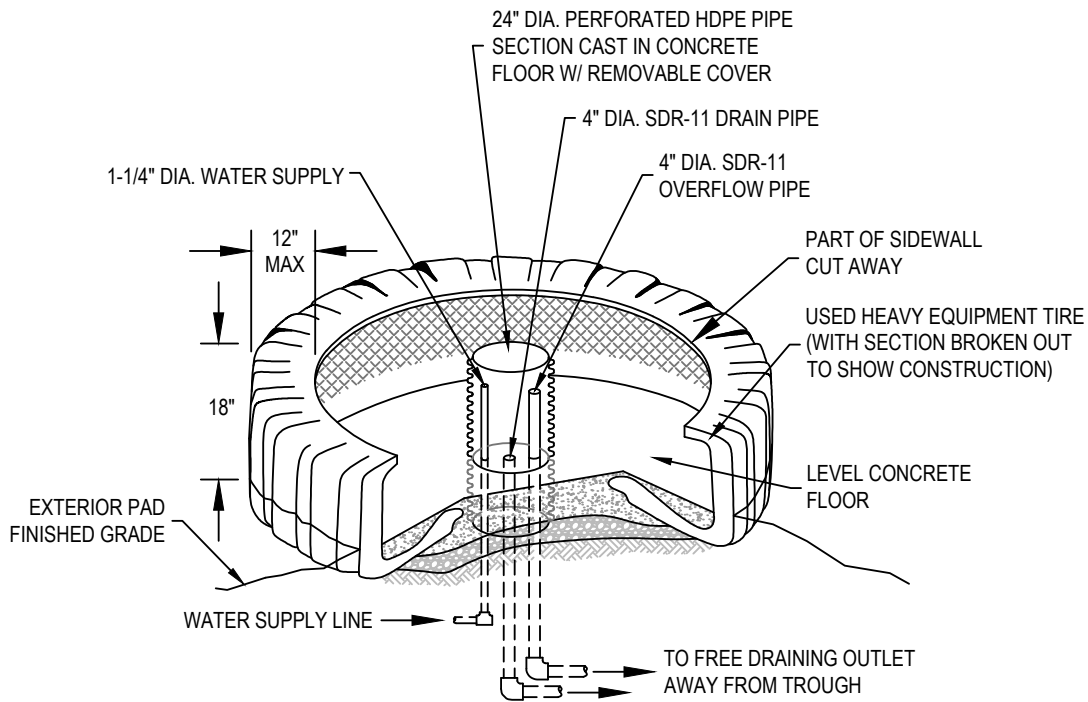


**WATER TROUGH
 PLAN VIEW**

HOBACK RIVER WATERSHED - LEVEL I STUDY
SCARLETT #1 WELL STOCK TANK
 SMALL WATER PROJECT ID: 9.2
 LOCATED IN THE NE/4SE/4 OF SECTION 4, T.38N., R.115W.,
 6TH P.M., TETON COUNTY, WY

**RIO VERDE
 ENGINEERING**
 PINEDALE, WYOMING
 (307) 367-2826
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 PAGE No. 4 OF 5



**WATERING TROUGH
ISOMETRIC VIEW**
N.T.S.

INFLOW PIPE DIA. - 1-1/4 IN.
OVERFLOW PIPE DIA. - 4 IN.
DRAIN PIPE DIA. - 4 IN.

INSTALLATION NOTES

- 1.) CUT AWAY PART OF SIDEWALL. THIS WILL BE THE TOP OF THE TROUGH
- 2.) USE THE CRUSHED ROAD BASE TO FILL AROUND THE PIPES AND TO LEVEL THE TIRE.
- 3.) POUR CONCRETE AROUND ADS PIPE, WATER SUPPLY, OVERFLOW PIPES AND WORK UNDER INTERIOR EDGE OF TIRE. FINISH THE TOP SURFACE OF CONCRETE TO FORM A LEVEL PAD ACROSS THE TROUGH BOTTOM.
- 4.) *PROVIDE AN ESCAPE DEVICE FOR SMALL BIRDS AND ANIMALS THAT MAY BECOME ENTRAPPED. A RAMP CONSTRUCTED OF A PIECE OF EXPANDED METAL EXTENDING FROM THE WATER SURFACE TO THE TOP SIDEWALL OR A FLOAT CONSISTING OF A PIECE OF LUMBER ARE TWO DEVICES THAT COULD BE USED.
- 5.) EXTEND CRUSHED ROAD BASE PAD 6 FT. OUT FROM EXTERIOR TIRE EDGE

*DESIGN BASED ON NRCS STANDARDIZED DRAWING AND DESIGN INPUT FROM BROGAN HYDROLOGIC CONSULTING. DESIGN MUST BE ADAPTED TO MEET SITE SPECIFIC CONDITIONS.

HOBACK RIVER WATERSHED - LEVEL I STUDY

SCARLETT #1 WELL STOCK TANK

SMALL WATER PROJECT ID: 9.2
LOCATED IN THE NE/4SE/4 OF SECTION 4, T.38N., R.115W.,
6TH P.M., TETON COUNTY, WY



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PINEDALE, WYOMING

(307) 367-2826
rioverde@wyoming.com

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DATE: 4/16/22

REVISED:

JOB No. 4570

PAGE No. 5 OF 5

HOBACK RIVER WATERSHED STUDY LEVEL I**Owner/Operator:** Marcia Taylor**Project Type:** R.C. Fire Suppression**Project ID:** 9.3**Project Name:** Taylor Fire Suppression**Location (PLSS):** NW/4SE/4, Sec. 4, T38N, R115W**Location (Lat/Long):** 43.28548°N, 110.64575°W**PROJECT COMPONENTS (ENGINEER'S ESTIMATE)**

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1	Mobilization	1	LS	\$ 3,000.00	\$ 3,000.00
2	Pipe Anchor	1	LS	\$ 650.00	\$ 650.00
3	6" Class 51 DIP Waterline	320	LF	\$ 3.50	\$ 1,120.00
4	6" 90° Flanged Bend	1	EA	\$ 65.00	\$ 65.00
5	8' long x 6" Diameter DIP FL X FL Spool	1	EA	\$ 66.00	\$ 66.00
6	90° 6" NHT/NST Male Threaded Capped Bend	1	EA	\$ 65.00	\$ 65.00
7	Pipe Perforated Screen	1	EA	\$ 900.00	\$ 900.00
TOTAL COMPONENT COST (SUBTOTAL #2):					\$ 5,866.00

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS: \$ 2,400.00

PERMITTING AND MITIGATION: \$ 2,200.00

LEGAL FEES: \$ -

ACQUISITION OF ACCESS AND RIGHTS-OF-WAY: \$ -

PRE-CONSTRUCTION COSTS (SUBTOTAL #1): \$ 4,600.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 5,866.00

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%): \$ 586.60

COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3): \$ 6,452.60

CONTINGENCY (SUBTOTAL #3 X 15%): \$ 967.89

TOTAL CONSTRUCTION COST (SUBTOTAL #4): \$ 7,420.49

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): \$ 12,020.49

PERMITTING REQUIREMENTS

Project ID: 9.3

Project Name: Taylor Fire Suppression

Land Jurisdiction: Private, Marcia Taylor, Trustee

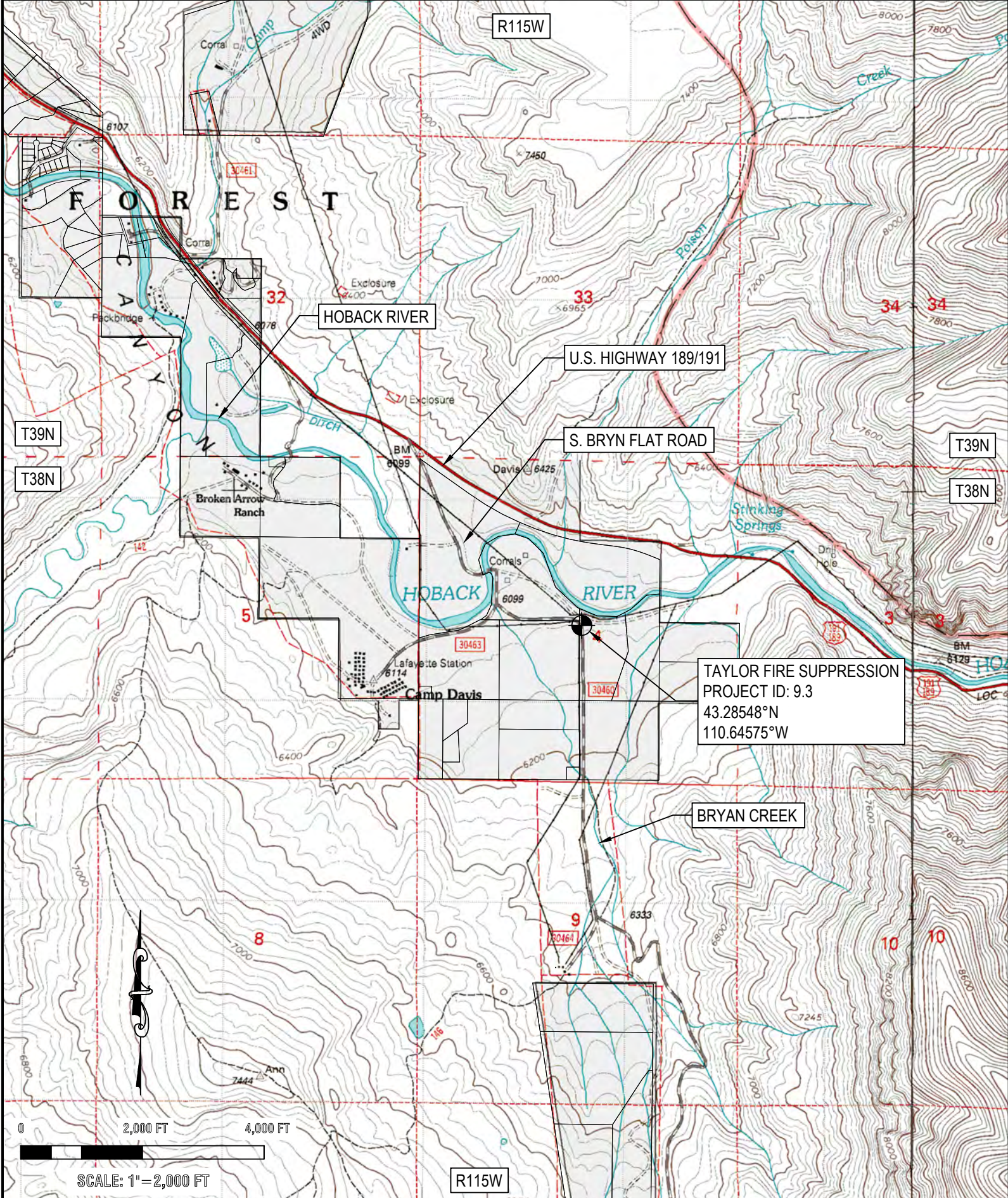
State Engineer's Office

Proposed Permits: SW-1

An SW-1 application will need to be prepared and submitted to the SEO for permit issuance prior to hydrant and pipeline installation. It should be noted that this fire suppression system may not meet all minimum standards as set out under the Teton County Fire Protection Resolution. However, the project would provide for fire suppression water to the public in and near Bryan Flat. Prior to final design, the plan should be reviewed by Teton County officials to determine project viability and options that may improve the system for County use.

Jackson Hole Land Trust

The subject property is currently encumbered by a conservation easement held by the Jackson Hole Land Trust (JHLT), as recorded in Book 446, Page 1092 in the Office of the Clerk of Teton County, Wyoming. In reference to page 8 of said document, under item 3.7, "Lawful use of water resources and irrigation is permitted". Once final designs and specifications have been completed and prior to being submitted for SWPP funding, JHLT should be consulted on the proposed suppression plan.



TAYLOR FIRE SUPPRESSION
 PROJECT ID: 9.3
 43.28548°N
 110.64575°W

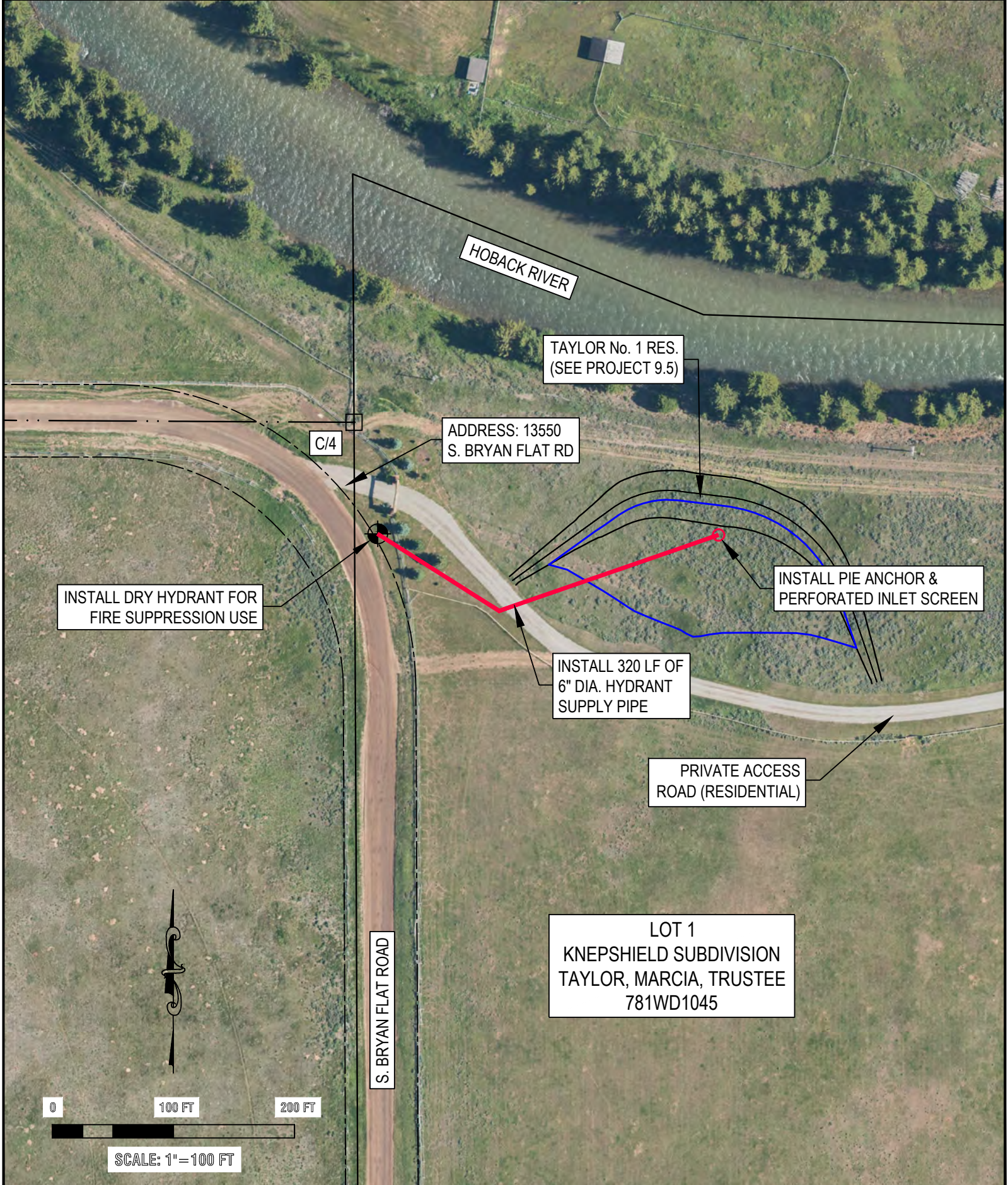
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 DATE: 09/17/21
 REVISED:
 JOB No. 4570
 PAGE No. 1 OF 3

HOBACK RIVER WATERSHED - LEVEL I STUDY
TAYLOR FIRE SUPPRESSION
 SMALL WATER PROJECT ID: 9.3
 LOCATED IN THE NW/4SE/4 OF SECTION 4, T.38N., R.115W.,
 6TH P.M., TETON COUNTY, WY



RIO VERDE
ENGINEERING
 PINEDALE, WYOMING

(307) 367-2826
 rioverde@wyoming.com



HOBACK RIVER

TAYLOR No. 1 RES.
(SEE PROJECT 9.5)

ADDRESS: 13550
S. BRYAN FLAT RD

C/4

INSTALL DRY HYDRANT FOR
FIRE SUPPRESSION USE

INSTALL PIE ANCHOR &
PERFORATED INLET SCREEN

INSTALL 320 LF OF
6" DIA. HYDRANT
SUPPLY PIPE

PRIVATE ACCESS
ROAD (RESIDENTIAL)

LOT 1
KNEPSHIELD SUBDIVISION
TAYLOR, MARCIA, TRUSTEE
781WD1045

S. BRYAN FLAT ROAD



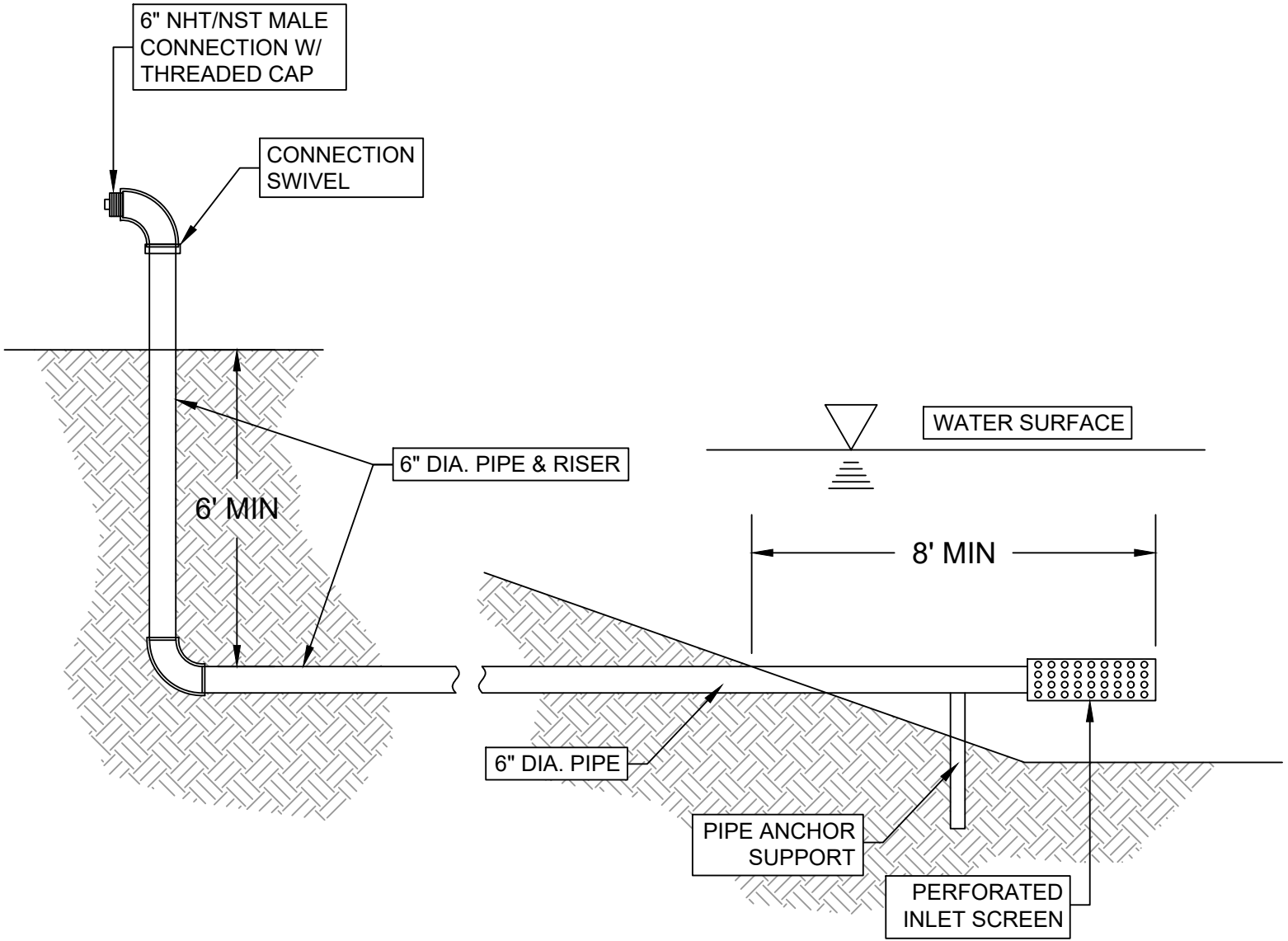
0 100 FT 200 FT

SCALE: 1"=100 FT

HOBACK RIVER WATERSHED - LEVEL I STUDY					
TAYLOR FIRE SUPPRESSION					
SMALL WATER PROJECT ID: 9.3					
LOCATED IN THE NW/SE/4 OF SECTION 4,					
T.38N., R.115W., 6TH P.M., TETON COUNTY, WY					
DESIGNED BY: MTJ					
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**RIO VERDE
ENGINEERING**
PINEDALE, WYOMING

(307) 367-2826
rioverde@wyoming.com



**DRY HYDRANT
TYPICAL DETAIL**

DESIGNED BY: MTJ
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 DATE: 4/16/22
 REVISED:
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 PAGE No. 3 OF 3

HOBACK RIVER WATERSHED - LEVEL I STUDY
TAYLOR FIRE SUPPRESSION
 SMALL WATER PROJECT ID: 9.3
 LOCATED IN THE NW/SE/4 OF SECTION 4,
 T.38N., R.115W., 6TH P.M., TETON COUNTY, WY



**RIO VERDE
ENGINEERING**
 PINEDALE, WYOMING
 (307) 367-2826
 rioverde@wyoming.com

HOBACK RIVER WATERSHED STUDY LEVEL I**Owner/Operator:** Marcia Taylor**Project Type:** Stock Tank Rehabilitation**Project ID:** 9.4**Project Name:** Gilroy #2 Stock Tank Rehab & Solar Conversion**Location (PLSS):** SW/4SE/4, Sec. 4, T38N, R115W**Location (Lat/Long):** 43.27976°N, 110.64394°W**PROJECT COMPONENTS (ENGINEER'S ESTIMATE)**

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1	Mobilization	1	LS	\$ 3,900.00	\$ 3,900.00
2	Well Pump, Plumbing, & Electrical Installation	1	LS	\$ 4,500.00	\$ 4,500.00
3	Solar Array and Well Pump Wiring (Complete)	1	LS	\$ 8,200.00	\$ 8,200.00
4	CU 200 Float Controller (or equivalent)	1	LS	\$ 1,000.00	\$ 1,000.00
5	12' Dia. Tire Water Stock Tank (Complete)	1	LS	\$ 14,000.00	\$ 14,000.00
6	1-1/4" SDR-11 Supply Pipe	170	LF	\$ 30.00	\$ 5,100.00
7	4" SDR-11 Drain Pipe	120	EA	\$ 8.50	\$ 1,020.00
8	4" SDR-11 Fused 90° Bend	2	EA	\$ 190.00	\$ 380.00
9	4" Poly Valve	1	EA	\$ 650.00	\$ 650.00
10	Valve Enclosure (Drain)	1	EA	\$ 75.00	\$ 75.00
11	Drain Water Basin w/ Cobble Rock	1	LS	\$ 1,200.00	\$ 1,200.00
TOTAL COMPONENT COST (SUBTOTAL #2):					\$ 40,025.00

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$ 2,800.00
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PERMITTING AND MITIGATION:	\$ 500.00
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LEGAL FEES:	\$ -
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ACQUISITION OF ACCESS AND RIGHTS-OF-WAY:	\$ -
--	------

PRE-CONSTRUCTION COSTS (SUBTOTAL #1):	\$ 3,300.00
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TOTAL COMPONENT COST (SUBTOTAL #2):	\$ 40,025.00
--	---------------------

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%):	\$ 4,002.50
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COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3):	\$ 44,027.50
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CONTINGENCY (SUBTOTAL #3 X 15%):	\$ 6,604.13
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TOTAL CONSTRUCTION COST (SUBTOTAL #4):	\$ 50,631.63
---	---------------------

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4):	\$ 53,931.63
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PERMITTING REQUIREMENTS

Project ID: 9.4

Project Name: Gilroy #2 Stock Tank Rehab & Solar Conversion

Land Jurisdiction: Private, Marcia Taylor, Trustee

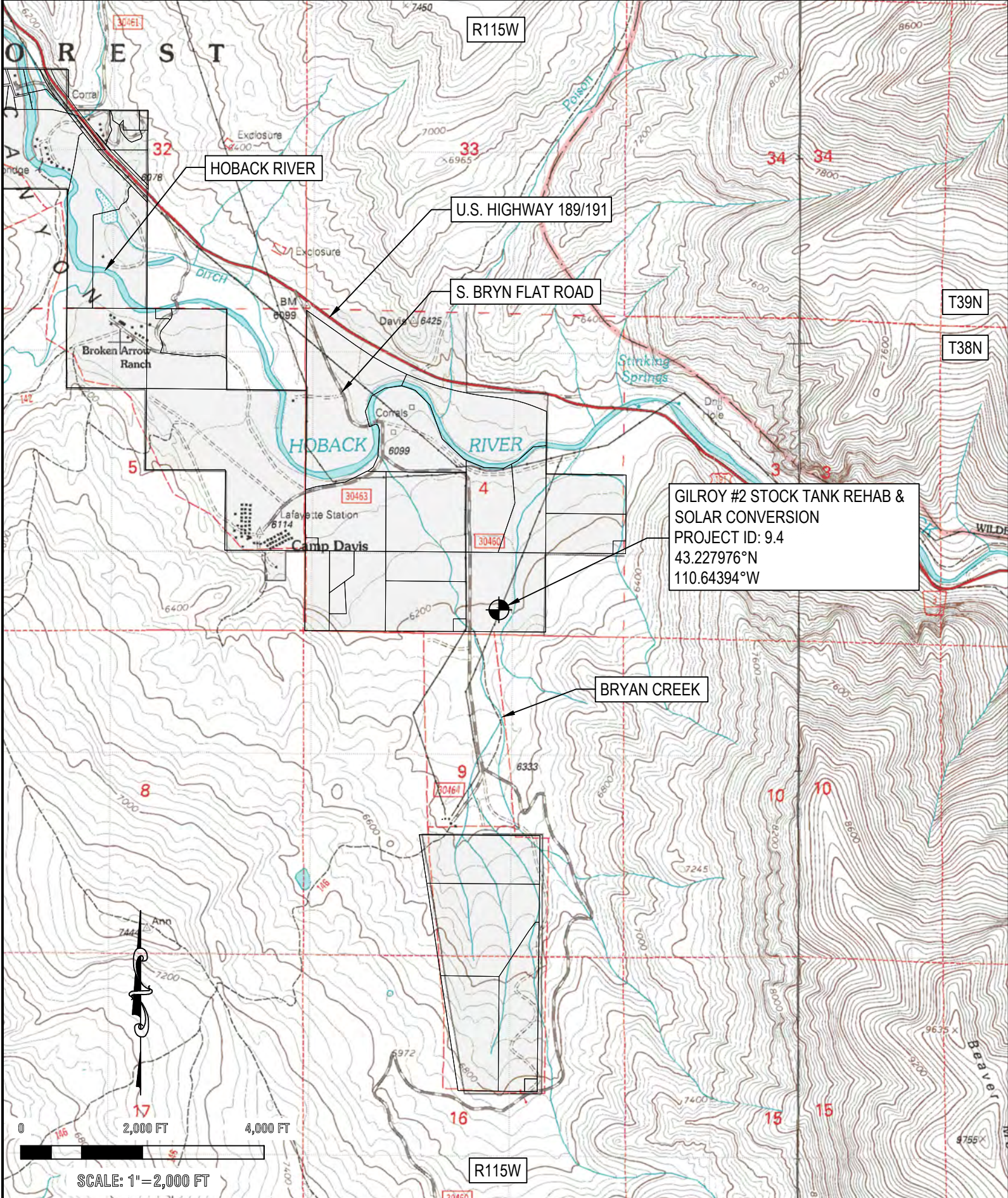
State Engineer's Office

Current Permit: U.W. 91305

The existing well is currently permitted for domestic use and stock watering applications. No further SEO permitting is necessary.

Jackson Hole Land Trust

The subject property is currently encumbered by a conservation easement held by the Jackson Hole Land Trust (JHLT), as recorded in Book 446, Page 1092 in the Office of the Clerk of Teton County, Wyoming. In reference to page 8 of said document, under item 3.7, "Lawful use of water resources and irrigation is permitted". Once final designs and specifications have been completed and prior to being submitted for SWPP funding, JHLT should be consulted on the proposed irrigation plan.



GILROY #2 STOCK TANK REHAB &
 SOLAR CONVERSION
 PROJECT ID: 9.4
 43.227976°N
 110.64394°W

HOBACK RIVER WATERSHED - LEVEL I STUDY
GILROY #2 STOCK TANK REHAB & SOLAR CONVERSION
 SMALL WATER PROJECT ID: 9.4
 LOCATED IN THE SW/4SE/4 OF SECTION 4, T.38N., R.115W.,
 6TH P.M., TETON COUNTY, WY



RIO VERDE
ENGINEERING
 PINEDALE, WYOMING

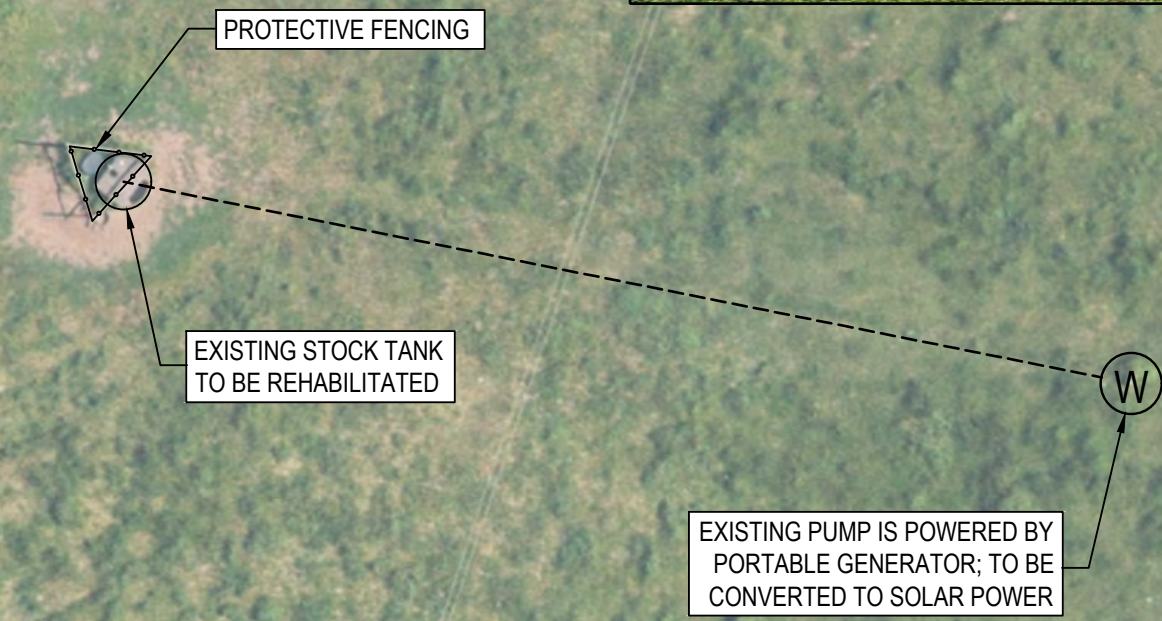
(307) 367-2826
 rioverde@wyoming.com

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HOBACK RIVER WATERSHED - LEVEL I STUDY
GILROY #2 STOCK TANK REHAB & SOLAR CONVERSION
 SMALL WATER PROJECT ID: 9.4
 LOCATED IN THE SW/4SE/4 OF SECTION 4, T.38N., R.115W.,
 6TH P.M., TETON COUNTY, WY

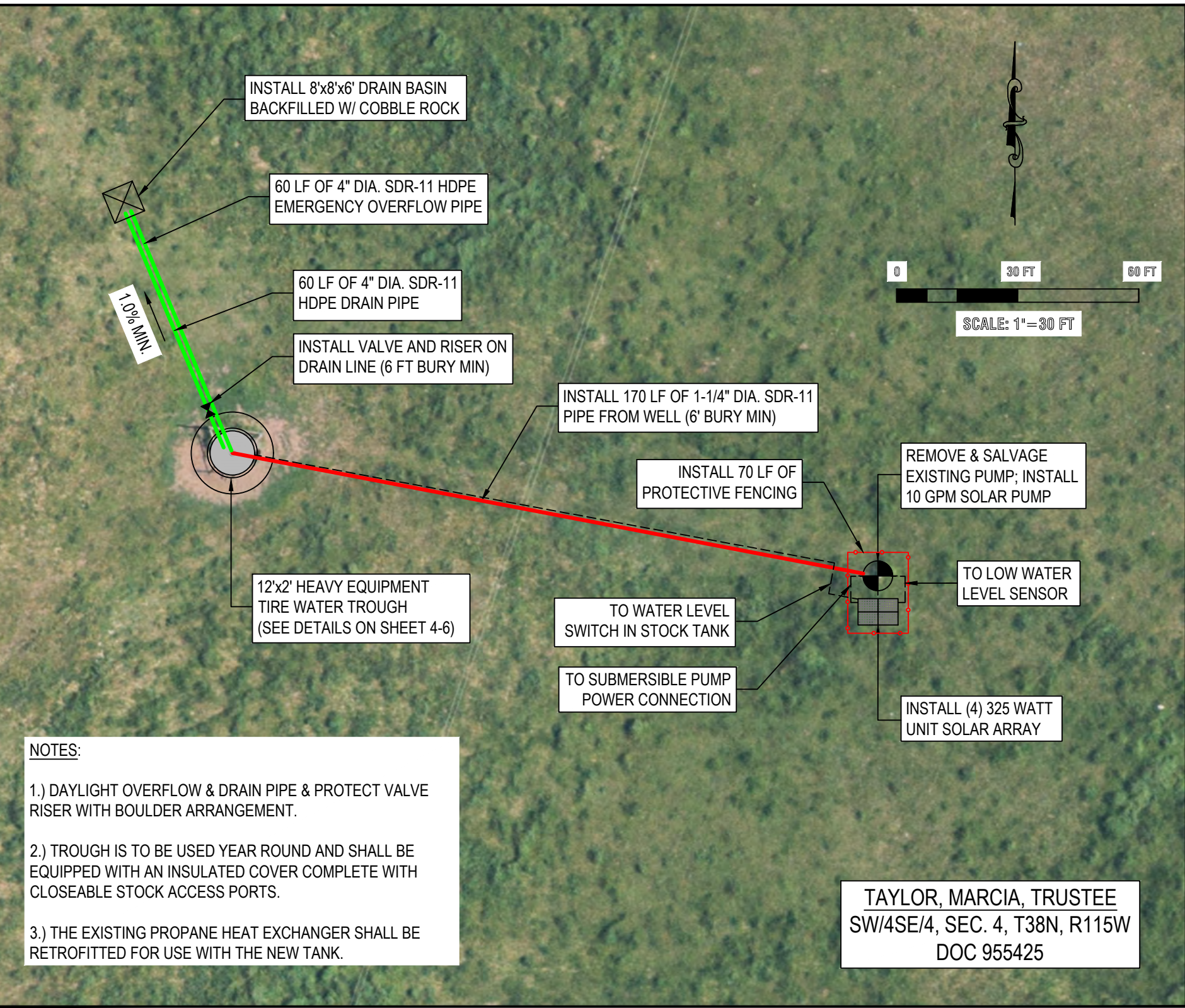
RIO VERDE
ENGINEERING
 PINEDALE, WYOMING
 (307) 367-2826
 rverde@wyoming.com



GILROY #2 WELL: U.W. 91305
 TOTAL DEPTH: 120 FT
 WATER BEARING FORMATION: 108-120 FT
 YIELD: 10-12 GPM

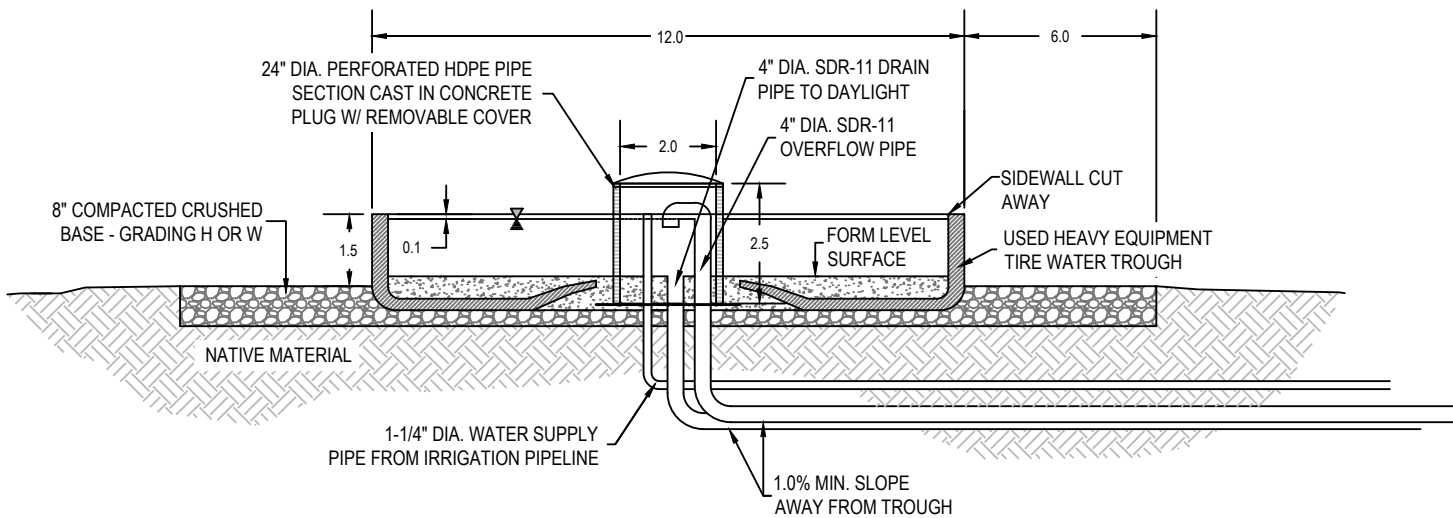


HOBACK RIVER WATERSHED - LEVEL I STUDY
GILROY #2 STOCK TANK REHAB & SOLAR CONVERSION
 SMALL WATER PROJECT ID: 9.4
 LOCATED IN THE SW/4SE/4 OF SECTION 4, T.38N., R.115W.,
 6TH P.M., TETON COUNTY, WY



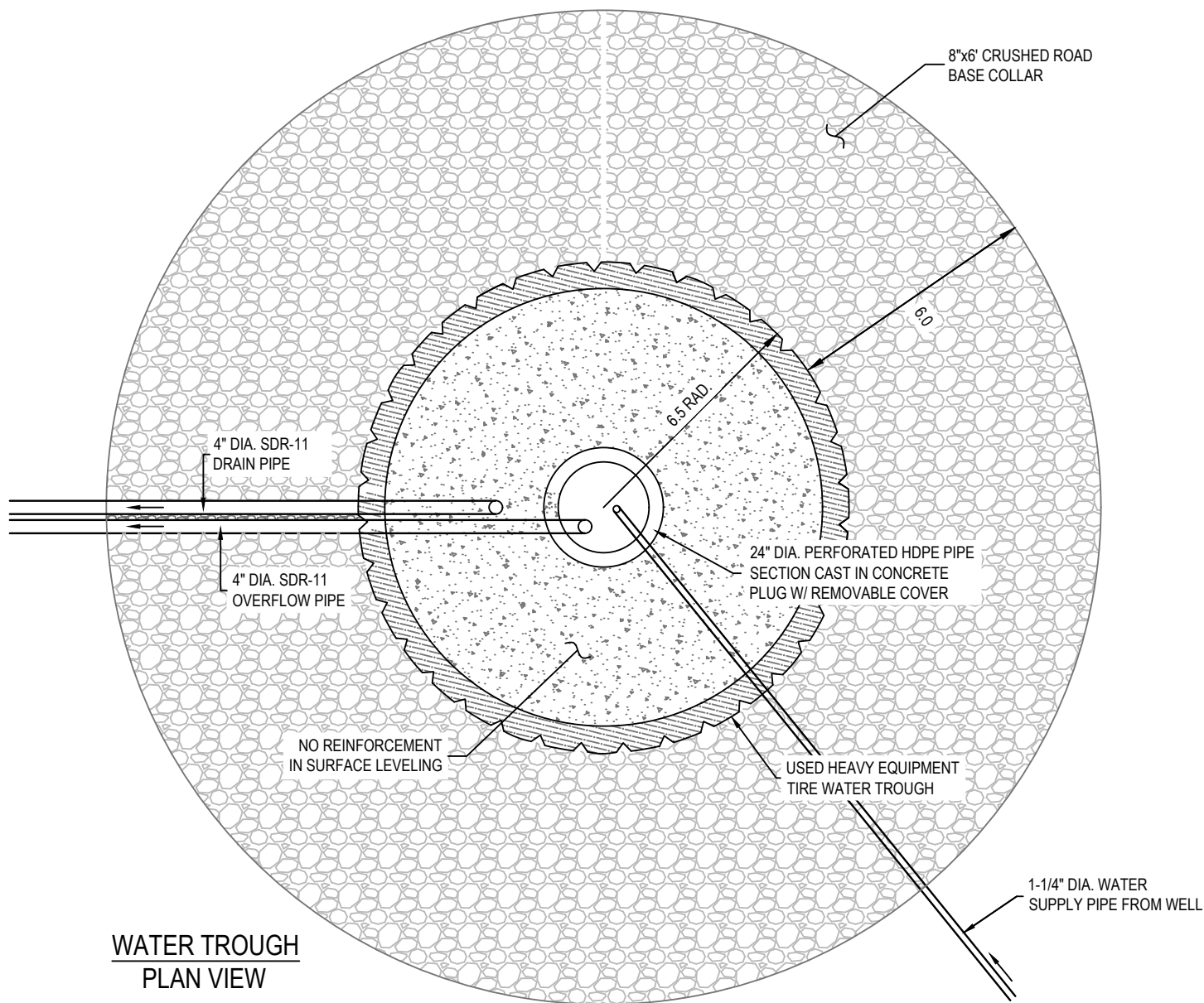
- NOTES:**
- 1.) DAYLIGHT OVERFLOW & DRAIN PIPE & PROTECT VALVE RISER WITH BOULDER ARRANGEMENT.
 - 2.) TROUGH IS TO BE USED YEAR ROUND AND SHALL BE EQUIPPED WITH AN INSULATED COVER COMPLETE WITH CLOSEABLE STOCK ACCESS PORTS.
 - 3.) THE EXISTING PROPANE HEAT EXCHANGER SHALL BE RETROFITTED FOR USE WITH THE NEW TANK.

TAYLOR, MARCIA, TRUSTEE
 SW/4SE/4, SEC. 4, T38N, R115W
 DOC 955425



NOTE:
 THE DEPICTED TROUGH AND WATER SUPPLY SYSTEM IS INTENDED FOR WINTER & SUMMER USE. THE WATER SUPPLY LINE SHALL BE BURIED A MINIMUM OF 6 FT FOR FROST PROTECTION.

WATER TROUGH SECTION VIEW



WATER TROUGH PLAN VIEW

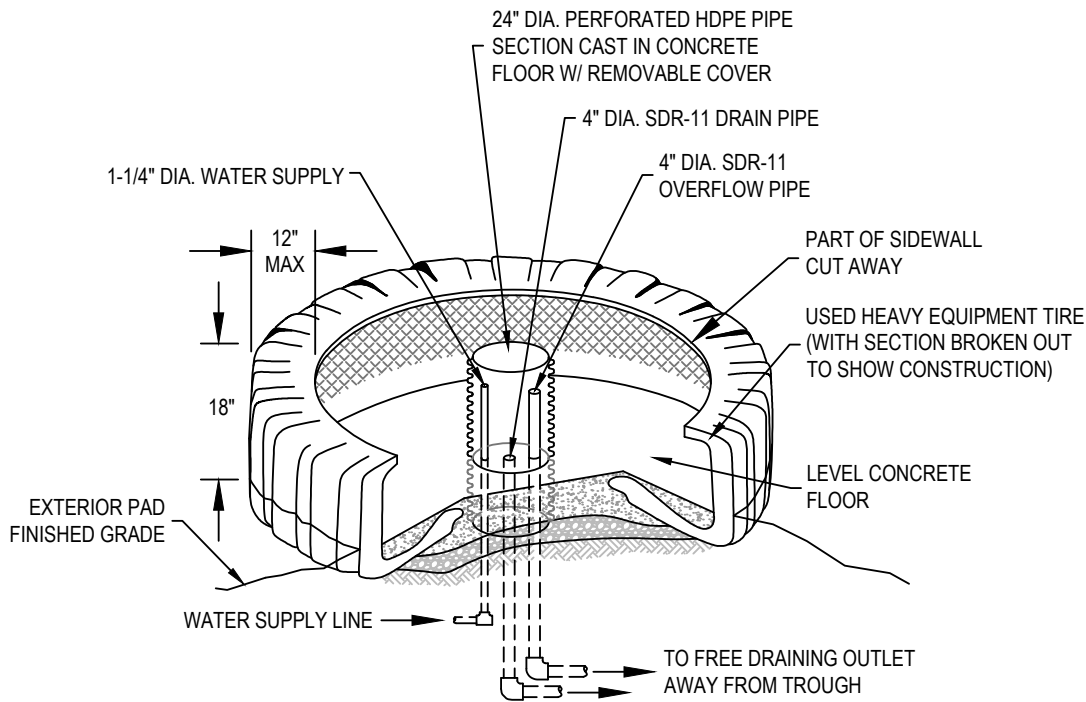
HOBACK RIVER WATERSHED - LEVEL I STUDY
GILROY #2 STOCK TANK REHAB & SOLAR CONVERSION
 SMALL WATER PROJECT ID: 9.4
 LOCATED IN THE SW/4SE/4 OF SECTION 4, T.38N., R.115W.,
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ENGINEERING
 PINEDALE, WYOMING

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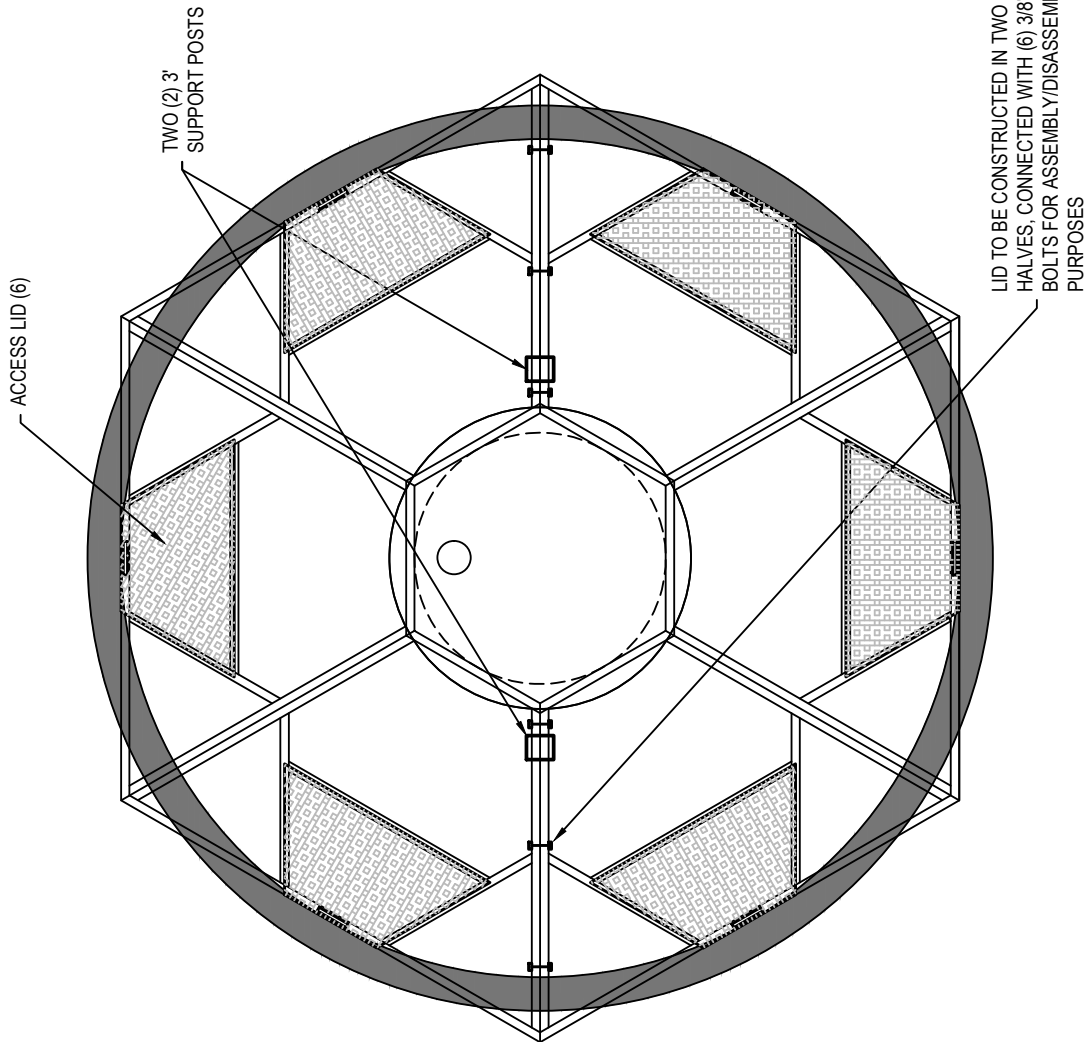
**WATERING TROUGH
ISOMETRIC VIEW**
N.T.S.

INFLOW PIPE DIA. - 1-1/4 IN.
OVERFLOW PIPE DIA. - 4 IN.
DRAIN PIPE DIA. - 4 IN.

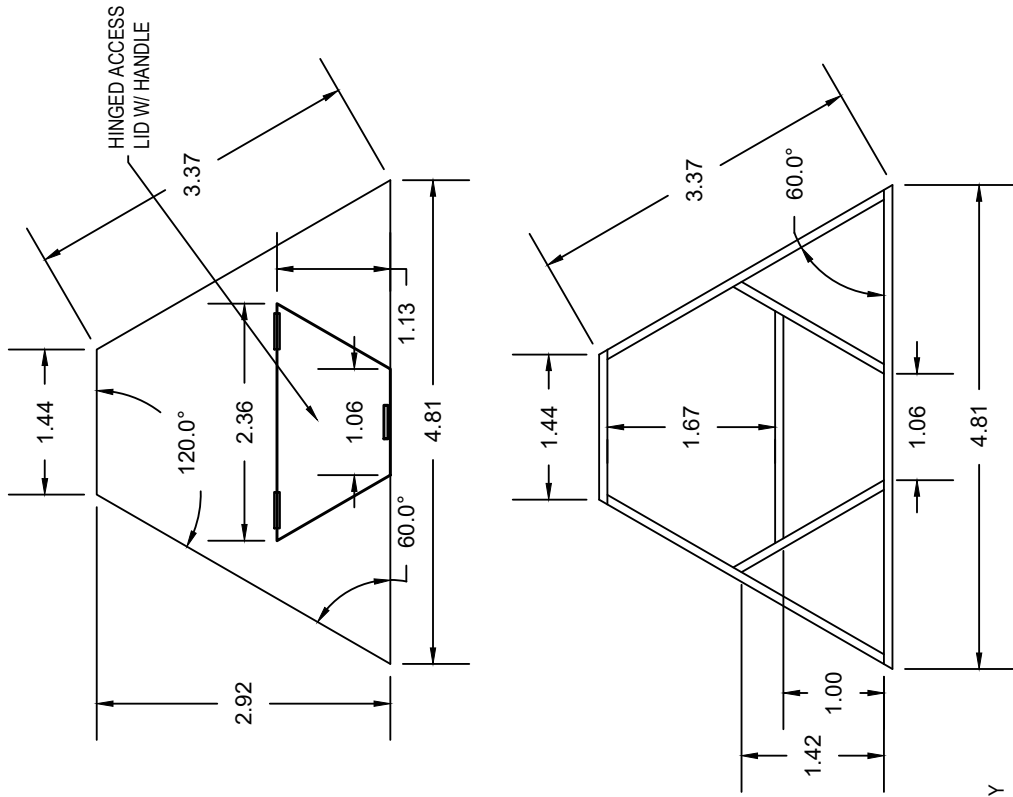
INSTALLATION NOTES

- 1.) CUT AWAY PART OF SIDEWALL. THIS WILL BE THE TOP OF THE TROUGH
- 2.) USE THE CRUSHED ROAD BASE TO FILL AROUND THE PIPES AND TO LEVEL THE TIRE.
- 3.) POUR CONCRETE AROUND ADS PIPE, WATER SUPPLY, OVERFLOW PIPES AND WORK UNDER INTERIOR EDGE OF TIRE. FINISH THE TOP SURFACE OF CONCRETE TO FORM A LEVEL PAD ACROSS THE TROUGH BOTTOM.
- 4.) *PROVIDE AN ESCAPE DEVICE FOR SMALL BIRDS AND ANIMALS THAT MAY BECOME ENTRAPPED. A RAMP CONSTRUCTED OF A PIECE OF EXPANDED METAL EXTENDING FROM THE WATER SURFACE TO THE TOP SIDEWALL OR A FLOAT CONSISTING OF A PIECE OF LUMBER ARE TWO DEVICES THAT COULD BE USED.
- 5.) EXTEND CRUSHED ROAD BASE PAD 6 FT. OUT FROM EXTERIOR TIRE EDGE

*DESIGN BASED ON NRCS STANDARDIZED DRAWING AND DESIGN INPUT FROM BROGAN HYDROLOGIC CONSULTING. DESIGN MUST BE ADAPTED TO MEET SITE SPECIFIC CONDITIONS.



**INSULATED TANK LID
PLAN VIEW**

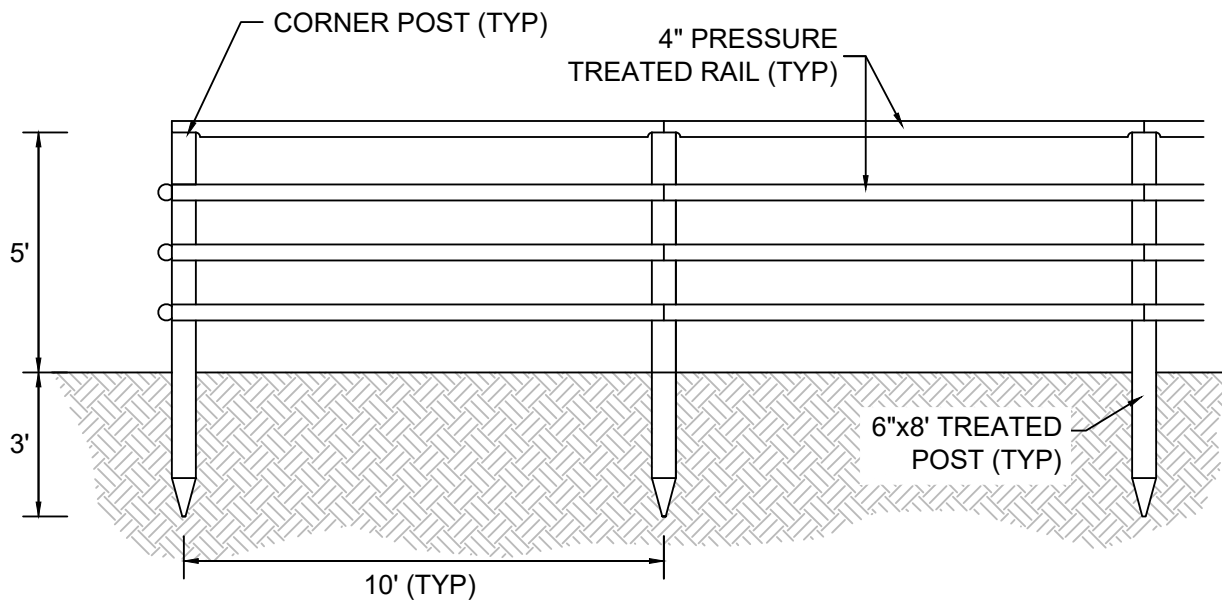


**ACCESS LID
DETAIL**

PAGE No. 6 OF 8
JOB No. 4570
REVISED:
DATE: 09/17/21
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DRAWN BY: MTJ
DESIGNED BY: MTJ

HOBACK RIVER WATERSHED - LEVEL I STUDY
GILROY #2 STOCK TANK REHAB & SOLAR CONVERSION
 SMALL WATER PROJECT ID: 9.4
 LOCATED IN THE SW/4SE/4 OF SECTION 4, T.38N., R.115W.,
 6TH P.M., TETON COUNTY, WY


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 PINEDALE, WYOMING
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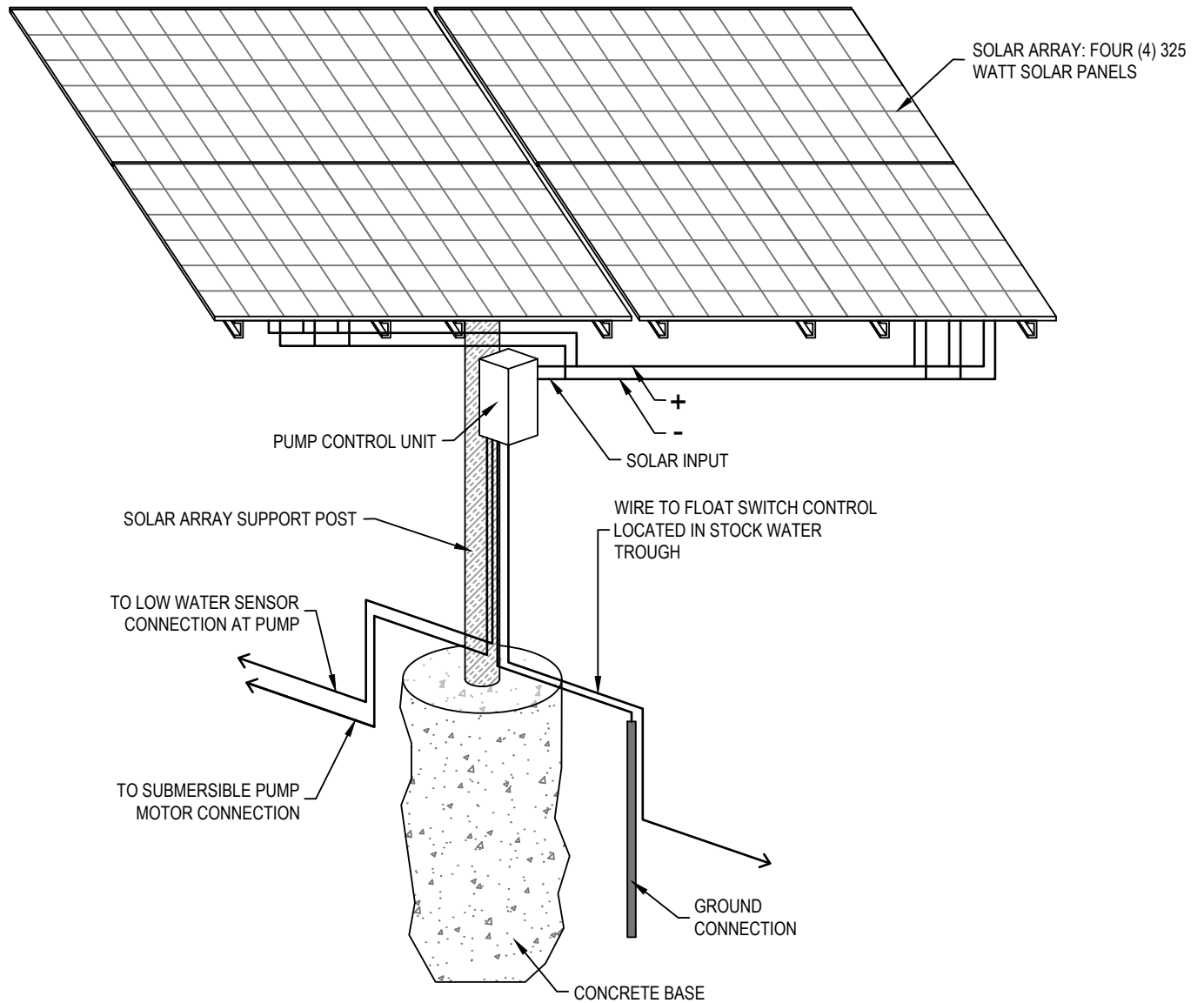
**WELL PROTECTION FENCE
PROFILE VIEW**

DESIGNED BY: MTJ
 DRAWN BY: MTJ
 CHECKED BY: EAS
 DATE: 09/17/21
 REVISED:
 JOB No. 4570
 PAGE No. 7 OF 8

HOBACK RIVER WATERSHED - LEVEL I STUDY
GILROY #2 STOCK TANK REHAB & SOLAR CONVERSION
 SMALL WATER PROJECT ID: 9.4
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 6TH P.M., TETON COUNTY, WY



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 rioverde@wyoming.com



TYPICAL SOLAR ARRAY

NOT TO SCALE

HOBACK RIVER WATERSHED - LEVEL I STUDY
GILROY #2 STOCK TANK REHAB & SOLAR CONVERSION
 SMALL WATER PROJECT ID: 9.4
 LOCATED IN THE SW/4SE/4 OF SECTION 4, T.38N., R.115W.,
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 DATE: 09/17/21
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 JOB No: 4570
 PAGE No: 8 OF 8

HOBACK RIVER WATERSHED STUDY LEVEL I**Owner/Operator:** Marcia Taylor**Project Type:** Storage**Project ID:** 9.5**Project Name:** Taylor No. 1 Reservoir**Location (PLSS):** NW/4SE/4, Sec. 4, T38N, R115W**Location (Lat/Long):** 43.28545°N, 110.64441°W**PROJECT COMPONENTS (ENGINEER'S ESTIMATE)**

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1	Mobilization	1	LS	\$ 6,500.00	\$ 6,500.00
2	Connect 4" to Existing 4" SDR-11 Pump Line	1	LS	\$ 500.00	\$ 500.00
3	4" SDR-11 Pipeline	1140	LF	\$ 8.50	\$ 9,690.00
4	4" HDPE Valve	2	EA	\$ 650.00	\$ 1,300.00
5	4" 90° Bends	2	EA	\$ 150.00	\$ 300.00
6	4" 45° Bends	1	EA	\$ 150.00	\$ 150.00
7	4" 11.25° Bends	1	EA	\$ 150.00	\$ 150.00
8	4" Pipe Outlet Anchor	1	LS	\$ 250.00	\$ 250.00
9	On-Site Excavation & Placement for Dike	2600	CY	\$ 18.00	\$ 46,800.00
10	Topsoil Stripping and Placement	100	CY	\$ 18.00	\$ 1,800.00
11	Seeding & Reclamation	1100	SY	\$ 1.00	\$ 1,100.00
TOTAL COMPONENT COST (SUBTOTAL #2):					\$ 68,540.00

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS: \$ 3,500.00

PERMITTING AND MITIGATION: \$ 1,800.00

LEGAL FEES: \$ -

ACQUISITION OF ACCESS AND RIGHTS-OF-WAY: \$ -

PRE-CONSTRUCTION COSTS (SUBTOTAL #1): \$ 5,300.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 68,540.00

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%): \$ 6,854.00

COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3): \$ 75,394.00

CONTINGENCY (SUBTOTAL #3 X 15%): \$ 11,309.10

TOTAL CONSTRUCTION COST (SUBTOTAL #4): \$ 86,703.10

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): \$ 92,003.10

PERMITTING REQUIREMENTS

Project ID: 9.5

Project Name: Taylor No. 1 Reservoir

Land Jurisdiction: Private, Marcia Taylor, Trustee

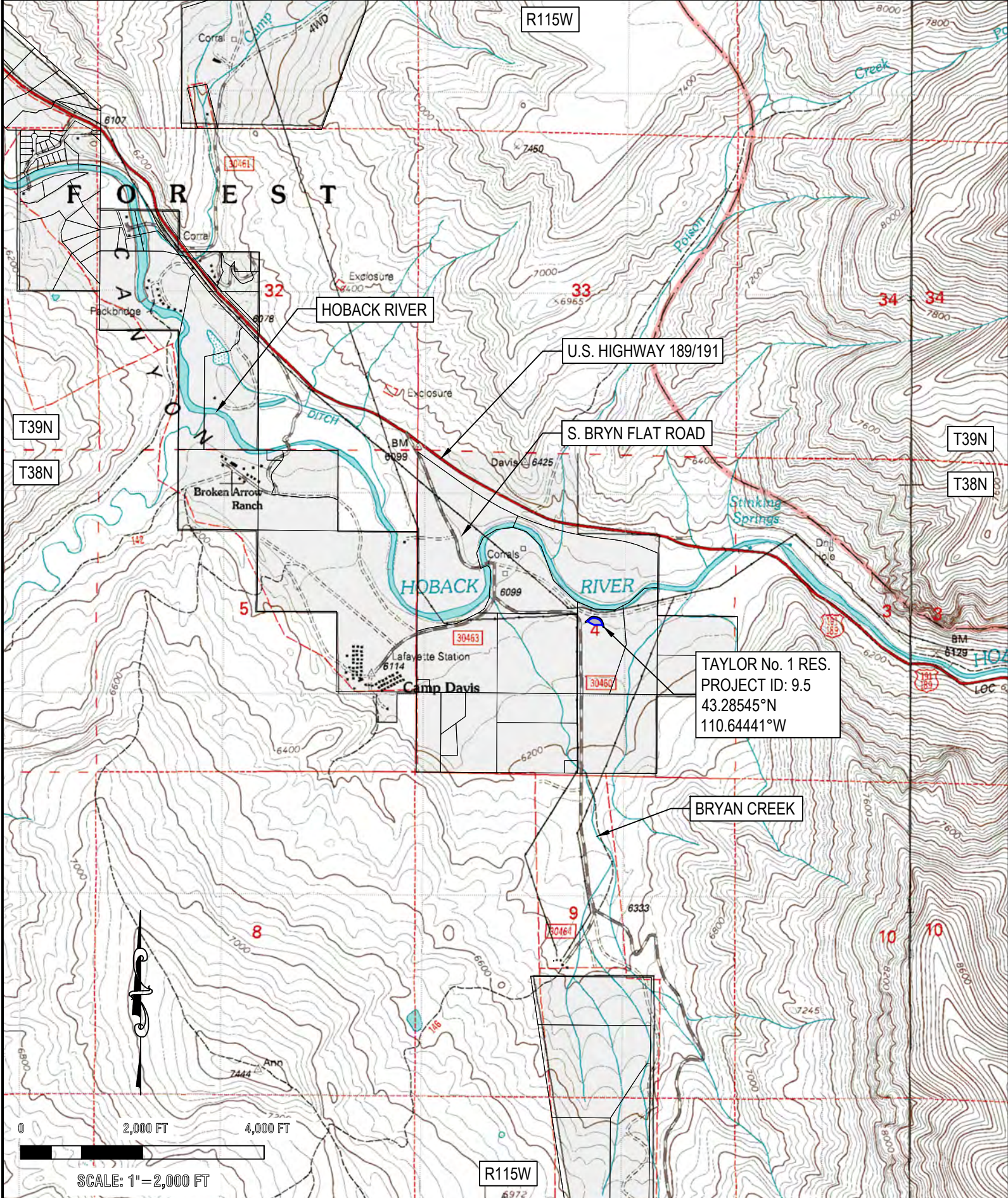
State Engineer's Office

Current Permit: None

An SW-1 application will need to be prepared for the reservoir supply and an SW-3/SW-3A application for reservoir construction will need to be prepared and submitted to the SEO for permit issuance prior to construction.

Jackson Hole Land Trust

The subject property is currently encumbered by a conservation easement held by the Jackson Hole Land Trust (JHLT), as recorded in Book 446, Page 1092 in the Office of the Clerk of Teton County, Wyoming. In reference to page 8 of said document, under item 3.7, "Lawful use of water resources and irrigation is permitted". Once final designs and specifications have been completed and prior to being submitted for SWPP funding, JHLT should be consulted on the proposed irrigation plan.



T39N

T38N

T39N

T38N

R115W

R115W

0 2,000 FT 4,000 FT

SCALE: 1" = 2,000 FT

TAYLOR No. 1 RES.
PROJECT ID: 9.5
43.28545°N
110.64441°W

DESIGNED BY: MTJ
DRAWN BY: MTJ
CHECKED BY: EAS
DATE: 09/17/21
REVISED:
JOB No. 4570
PAGE No. 1 OF 4

HOBACK RIVER WATERSHED - LEVEL I STUDY
TAYLOR No. 1 RES.
SMALL WATER PROJECT ID: 9.5
LOCATED IN THE NW/4SE/4 OF SECTION 4, T.38N., R.115W.,
6TH P.M., TETON COUNTY, WY

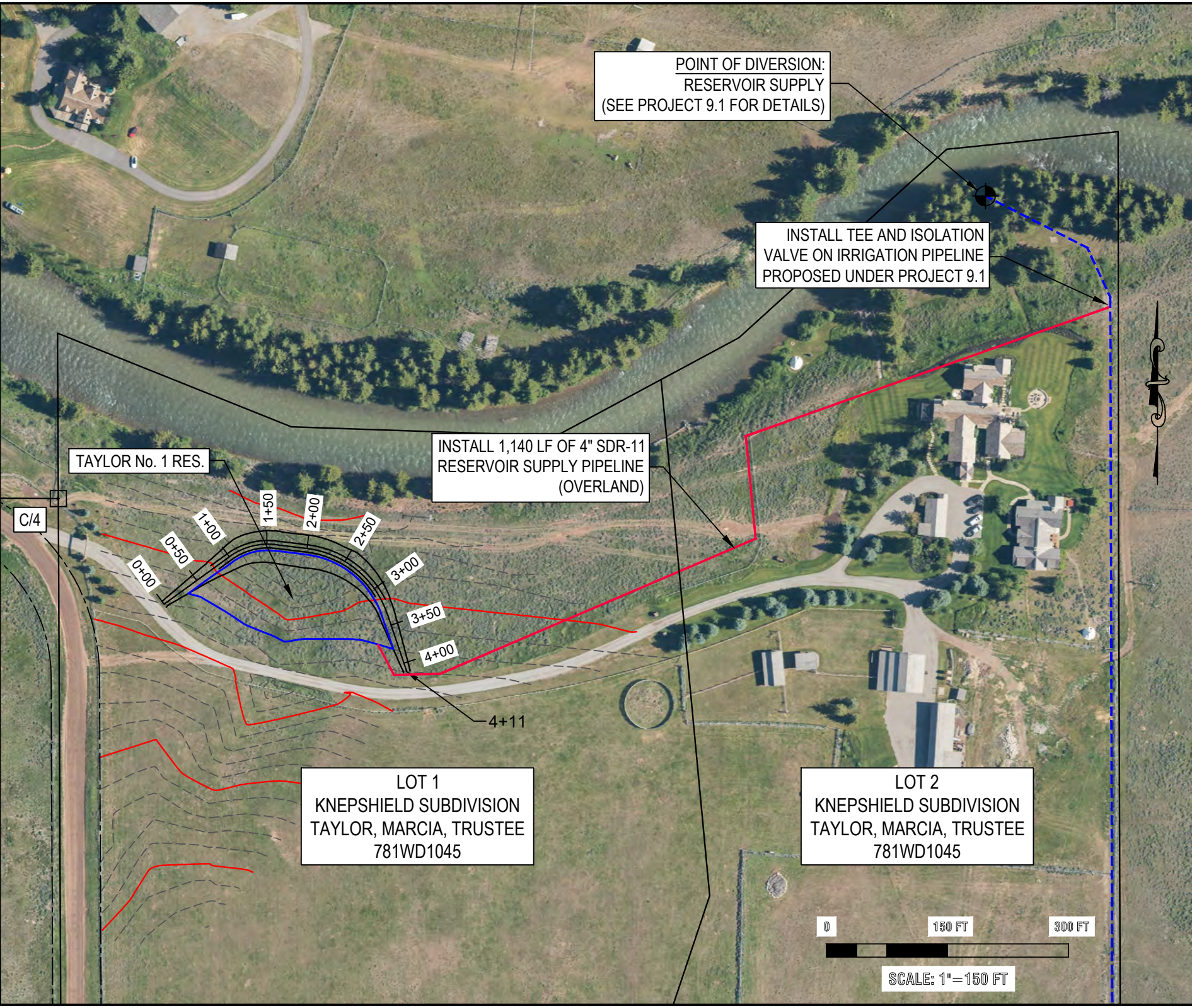


RIO VERDE
ENGINEERING
PINEDALE, WYOMING
(307) 367-2826
rioverde@wyoming.com

DESIGNED BY: MTJ
 DRAWN BY: MTJ
 CHECKED BY: EAS
 DATE: 4/16/22
 REVISED:
 JOB No.: 4570
 PAGE No.: 2 OF 4

HOBACK RIVER WATERSHED - LEVEL I STUDY
TAYLOR No. 1 RES.
 SMALL WATER PROJECT ID: 9.5
 LOCATED IN THE NW/SE/4 OF SECTION 4,
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POINT OF DIVERSION:
 RESERVOIR SUPPLY
 (SEE PROJECT 9.1 FOR DETAILS)

INSTALL TEE AND ISOLATION
 VALVE ON IRRIGATION PIPELINE
 PROPOSED UNDER PROJECT 9.1

INSTALL 1,140 LF OF 4" SDR-11
 RESERVOIR SUPPLY PIPELINE
 (OVERLAND)

TAYLOR No. 1 RES.

LOT 1
 KNEPSHIELD SUBDIVISION
 TAYLOR, MARCIA, TRUSTEE
 781WD1045

LOT 2
 KNEPSHIELD SUBDIVISION
 TAYLOR, MARCIA, TRUSTEE
 781WD1045

0 150 FT 300 FT
 SCALE: 1"=150 FT

PROPOSED DAM PROPERTIES
 DAM CREST: 6104'
 DAM HEIGHT: 7'
 2:1 DOWNSTREAM SLOPE
 3:1 UPSTREAM SLOPE
 HWL ELEV: 6102'

HOBACK RIVER

PROPOSED
 DIKE/DAM

TAYLOR No. 1 RES.

EMERGENCY
 SPILLWAY EL.: 6102

PROPOSED HWL EL.: 6102

RESERVOIR
 SUPPLY PIPELINE

ACCESS ROAD

6095

1+50

2+00

2+50

0+50

1+00

0+00

6100

6105

4+00

1+1+4

3+50

3+00

0

50 FT

100 FT

SCALE: 1" = 50 FT



DESIGNED BY: MTJ
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 PAGE No. 3 OF 4

HOBACK RIVER WATERSHED - LEVEL I STUDY

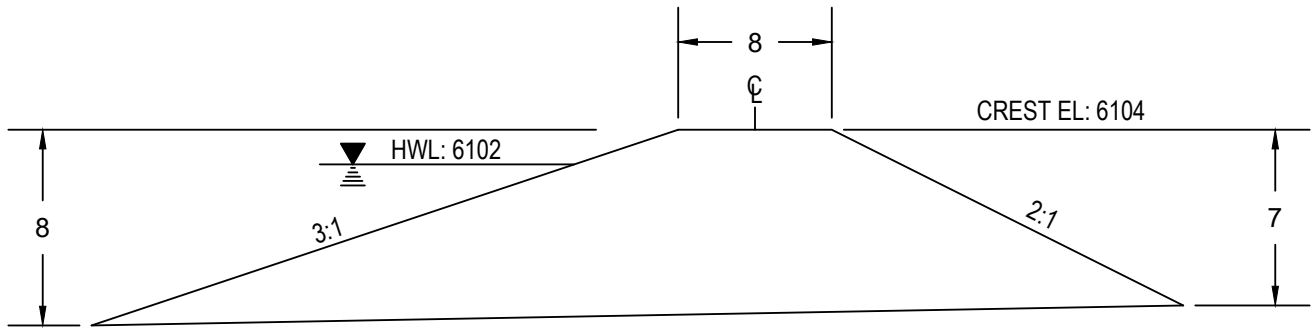
TAYLOR No. 1 RES.

SMALL WATER PROJECT ID: 9.5
 LOCATED IN THE SW/4NE/4 & NW/SE/4 OF SECTION 4,
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(307) 367-2826
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TAYLOR No. 1 RES
X-SECTION VIEW

STAGE-STORAGE TABLE

ELEVATION (FT)	AREA (Ac.)	AVERAGE (Ac.)	CAPACITY (Ac-FT)
6102	0.43		
		0.365	0.365
6101	0.30		
		0.255	0.255
6100	0.21		
		0.17	0.17
6099	0.13		
		0.095	0.095
6098	0.06		
		0.035	0.035
6097	0.01		
TOTAL CAPACITY (Ac-FT)			0.92

INACTIVE STORAGE
0.92 AC-FT

HOBACK RIVER WATERSHED - LEVEL I STUDY

TAYLOR No. 1 RES.

SMALL WATER PROJECT ID: 9.5
 LOCATED IN THE SW/4NE/4 & NW/SE/4 OF SECTION 4,
 T.38N., R.115W., 6TH P.M., TETON COUNTY, WY



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 PINEDALE, WYOMING

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 PAGE No. 4 OF 4

HOBACK RIVER WATERSHED STUDY LEVEL I**Owner/Operator:** Mike Trumbower**Project Type:** R.C. Fire Suppression**Project ID:** 10.1**Project Name:** Hoback Fire Station - Fire Suppression Rehab**Location (PLSS):** SW/4 (HES 107), Sec. 23, T39N, R116W**Location (Lat/Long):** 43.322234°N, 110.73147°W**PROJECT COMPONENTS (ENGINEER'S ESTIMATE)**

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1	Mobilization	1	LS	\$ 17,000.00	\$ 17,000.00
2	Well Head, Pump, & Controls Rehabilitation	1	LS	\$ 3,000.00	\$ 3,000.00
3	1-1/4" SDR-11 Pipeline	200	LF	\$ 30.00	\$ 6,000.00
4	1" Control Wire Conduit	200	LF	\$ 6.00	\$ 1,200.00
5	6" Gate Valve	1	EA	\$ 900.00	\$ 900.00
6	6" DIP Waterline	10	LF	\$ 80.00	\$ 800.00
7	6" Hydrant for Filling Trucks	1	EA	\$ 4,500.00	\$ 4,500.00
8	37,000 Gallon Water Storage Tank - Complete	1	LS	\$ 130,000.00	\$ 130,000.00
9	Asphalt Road Repair	1	LS	\$ 3,000.00	\$ 3,000.00
TOTAL COMPONENT COST (SUBTOTAL #2):					\$ 166,400.00

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$ 5,500.00
PERMITTING AND MITIGATION:	\$ 3,500.00
LEGAL FEES:	\$ 1,200.00
ACQUISITION OF ACCESS AND RIGHTS-OF-WAY:	\$ 3,200.00
PRE-CONSTRUCTION COSTS (SUBTOTAL #1):	\$ 13,400.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 166,400.00

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%):	\$ 16,640.00
COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3):	\$ 183,040.00
CONTINGENCY (SUBTOTAL #3 X 15%):	\$ 27,456.00
TOTAL CONSTRUCTION COST (SUBTOTAL #4):	\$ 210,496.00

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): **\$ 223,896.00**

PERMITTING REQUIREMENTS

Project ID: 10.1

Project Name: Hoback Fire Station – Fire Suppression Rehab

Land Jurisdiction: Wyoming Department of Transportation

State Engineer's Office

Current Permit: U.W. 54424 (Hoback FD #1)

The well is currently permitted for general fire house purposes, tank filling, and potable water. No change of use is proposed.

WYDOT

The existing fire station and well are constructed on lands leased to Teton County by the Wyoming State Highway Department (see attached). A lease amendment will need to be applied for through said Highway Department prior to the finalization of project plans for implementation. It is also understood that a separate site for a fire station has been evaluated by Teton County. A thorough grasp on this potential new construction should be acquired prior to project advancement.

STATE OF WYOMING
 OFFICE OF THE STATE ENGINEER
 BARRETT BUILDING
 CHEYENNE, WYOMING 82002

MICRO-FILMED DEC 03 '80

25.00

8:30

APPLICATION FOR PERMIT TO APPROPRIATE GROUND WATER

FOR OFFICE USE ONLY

Temporary Filing No. U.W. 15-5-27

PERMIT NO. U.W. 54424
 WATER DIVISION NO. 4 DISTRICT 16
 U.W. DISTRICT Teton Co.

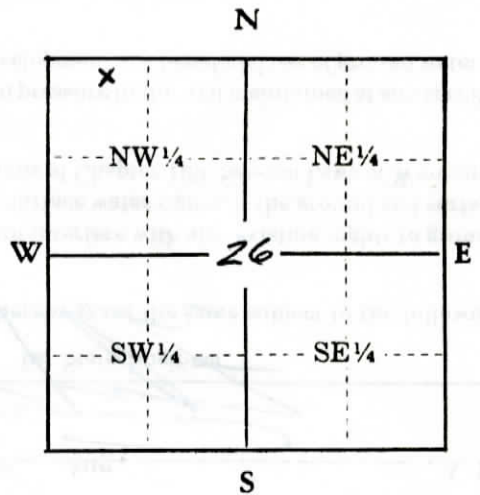
NOTE: Do not fold this form. Use typewriter or print neatly with black ink.
ALL ITEMS MUST BE COMPLETED BEFORE APPLICATION IS ACCEPTABLE.

NAME AND NUMBER OF WELL Hoback FD #1

- Name of applicant(s) Teton County Phone: 733-3340
- Address of applicant(s) P.O. Box 1727, Jackson, Wyoming Zip: 83001
- Name & address of agent to receive correspondence and notices Ken Sutton, Box 1727, Jackson, Wyo. 83001

4. Use to which the water will be applied: Domestic [] Stock Watering [] Irrigation [] Municipal [] Industrial [] Miscellaneous [X] (Describe completely and accurately) Well to be used for general fire house purposes including tank truck filling and potable water.

5. Location of the well: (NOTE: Quarter-quarter (40-acre subdivision) **MUST** be shown. EXAMPLE: SE $\frac{1}{4}$ NW $\frac{1}{4}$ of Sec. 12, Township 14 North, Range 68 West.)
Teton County, NW $\frac{1}{4}$ NW $\frac{1}{4}$ of Sec. 26
 T. 39 N., R. 116 W. of the 6th P.M. (or W.R.M.), Wyoming. If located in a platted subdivision, also provide Lot _____, Block _____ of the _____ Subdivision (or Add'n) of _____.



Scale: 2" = 1 mile

Above diagram represents one full section. Locate well accurately in small square representing 40 ac.

- Mark the well location on the section grid to the right. LOCATION SHOWN IN ITEM 5 MUST AGREE WITH GRID. If the proposed well is for irrigation use, sketch and label all irrigation ditches and canals, stream, reservoirs and other wells. Indicate the point of use or lands to be irrigated from other sources.
- Estimated depth of the well is 80 feet.
- MAXIMUM quantity of water to be developed and beneficially used: 25.0 gallons per minute. NOTE: If for domestic or stock use, this application will be processed for a maximum of 25 gallons per minute. SPRINGS: Only springs flowing 25 gallons per minute or less, where the proposed use is domestic or stockwatering, will be considered as ground water appropriations. After approval of this application, some type of artificial diversion must be constructed to qualify for a water right.
- If use is not irrigation, mark the point(s) or area(s) of use in the tabulation below.
- If for irrigation use:
 - Describe **MAXIMUM** acreage to be irrigated in each 40 acre subdivision in the tabulation below.
 - [] Land will be irrigated from this well only.
 - [] Land is irrigated from existing water right(s) with water from this well to be additional supply. Describe existing water right(s) under REMARKS.

Township	Range	Sec.	NE $\frac{1}{4}$				NW $\frac{1}{4}$				SW $\frac{1}{4}$				SE $\frac{1}{4}$				TOTALS
			NE $\frac{1}{4}$	NW $\frac{1}{4}$	SW $\frac{1}{4}$	SE $\frac{1}{4}$	NE $\frac{1}{4}$	NW $\frac{1}{4}$	SW $\frac{1}{4}$	SE $\frac{1}{4}$	NE $\frac{1}{4}$	NW $\frac{1}{4}$	SW $\frac{1}{4}$	SE $\frac{1}{4}$	NE $\frac{1}{4}$	NW $\frac{1}{4}$	SW $\frac{1}{4}$	SE $\frac{1}{4}$	
39	116	26					X												

11. If for irrigation use, describe method of irrigation, i.e. center pivot sprinkler, flood, etc. _____

12. The well is to be constructed on lands owned by Wyoming State Highway Department
 (The granting of a permit does not constitute the granting of right of way. If any easement or right of way is necessary in connection with this application, it should be understood that the responsibility is the applicant's. A copy of the agreement should accompany this application, if the land is privately owned and the owner is not a co-applicant.)
13. The water is to be used on lands owned by Wyoming State Highway Department
 (If landowner is not the applicant, a copy of the agreement relating to usage of appropriated water on the land should be submitted to this office. If the landowner is included as a co-applicant on the application, this procedure need not be followed.)

REMARKS: see attached Lease Agreement.

Under penalties of perjury, I declare that I have examined this application and to the best of my knowledge and belief it is true, correct and complete.

Kenneth B. Sutton Signature of Applicant or Authorized Agent July 21 Date, 19 80

THE LEGALLY REQUIRED FILING FEE MUST ACCOMPANY THIS APPLICATION

DOMESTIC AND/OR STOCK WATERING USES (Domestic use is defined as a single-family dwelling and the watering of lawns and gardens not exceeding one (1) acre)	\$10.00
IRRIGATION, MUNICIPAL, INDUSTRIAL, MISCELLANEOUS	\$25.00
MONITOR (For water level measurements or chemical quality sampling)	NO FEE

IF WELL WILL SERVE MULTIPLE USES, SUBMIT ONLY ONE (THE HIGHER) FILING FEE.

THIS SECTION IS NOT TO BE FILLED IN BY APPLICANT

THE STATE OF WYOMING)
) ss.
 STATE ENGINEER'S OFFICE)
 This instrument was received and filed for record on the 13 day of Aug., A. D. 19 80, at 8:30 o'clock A M.
 Permit No. U.W. 54424

[Signature]
 for State Engineer

THIS IS TO CERTIFY that I have examined the foregoing application and do hereby grant the same subject to the following limitations and conditions:

This application is approved subject to the condition that the proposed use shall not interfere with any existing rights to ground water from the same source of supply and is subject to regulation and correlation with surface water rights, if the ground and surface waters are interconnected. The use of water hereunder is subject to the further provisions of Chapter 169, Session Laws of Wyoming, 1957, and any subsequent amendments thereto.

Granting of a permit does not guarantee the right to have the water level or artesian pressure in the well maintained at any specific level. The well should be constructed to a depth adequate to allow for the maximum development and beneficial use of ground water in the source of supply.

If the well is a flowing artesian well, it shall be so constructed and equipped that the flow may be shut off when not in use, without loss of water into surface formations or at the surface.

Approval of this application may be considered as authorization to proceed with construction of the proposed well.
 Construction of well will begin within one (1) year from date of approval. A Statement of Completion will be filed within thirty (30) days of completion of construction, including pump installation.

Completion of construction and completion of the beneficial use of water for the purposes specified in Item 4 of this application will be made by December 31, 19 81.

The amount of appropriation shall be limited to the quantity to which permittee is entitled as determined at time of proof of application of water to beneficial use.

Witness my hand this 17th day of NOVEMBER, A.D. 19 80.

George L. Christopoulos
 State Engineer

May 7, 1981--Notice of commencement on May 6, 1981 received. **MICRO-FILMED JUN 17 '81**

August 26, 1981 - Statement of Completion on July 20, 1981 received. **MICRO-FILMED SEP 30 '81**

SEP 30 1981 **NOTICE OF EXPIRATION OF TIME FOR COMPLETION OF BENEFICIAL USE MAILED** **MICRO-FILMED SEP 2 '81** **MICRO-FILMED DEC 02 '80**

December 11, 1981--Proof of Beneficial use on November 2, 1981 received. **MICRO-FILMED JAN 20 '82**

PERMIT NO. U.W. 54424

PERMIT STATUS

Priority Date August 13, 1980

Approval Date November 17, 1980

January 25, 1982--Lease Agreement received. Filed in Certificate file under Wyoming
Highway Department.

SCANNED OCT 08 2012

MICRO-
FILMED FEB 17 '82

MICRO-
FILMED DEC 03 '80

uw54424

WYOMING STATE HIGHWAY DEPARTMENT

LEASE AGREEMENT

THIS AGREEMENT, entered into this 27th day of June 1980, by and between the WYOMING STATE HIGHWAY DEPARTMENT, hereinafter referred to as the Lessor and the COUNTY OF TETON, of the STATE OF WYOMING, hereinafter referred to as the Lessee:

WITNESSETH:

That for and in consideration of the covenants and agreements hereinafter mentioned, to be kept and performed by the said Lessee, the Lessor hereby leases to the Lessee, for an indefinite period from the 1st day of July, 1980, that portion or parcel of property more particularly described as follows:

A portion of land in Teton County, Wyoming, Township 39 North, Range 116 West H.E.S. #107, described by metes and bounds as follows:

Beginning at Point #1, which lies S. 36° 50' W., 145.21 feet and S. 53° 10' E., 33.57 feet from the most southerly corner of Lot #6 of Block #3 of the Rogers Point Subdivision. Thence S. 53° 10' E. a distance of 70.0 feet;

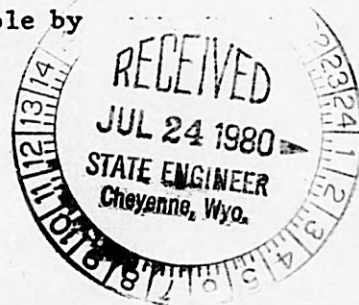
thence S. 36° 50' W. a distance of 80.0 feet;

thence N. 53° 10' W. a distance of 70.0 feet;

thence N. 36° 50' E. a distance of 80.0 feet, to the point of beginning, said tract containing 0.13 acres, more or less.

1. Lessee shall have the right to erect and maintain a fire house and station upon the land herein described and identified.
2. Lessee shall not sublet or sublease any portion of the portion of the property during the term of this lease.
3. Rental shall be \$25.00 per year, or other consideration, payable by

June 1, of each year, to: Wyoming State Highway Department
Right of Way Division
P. O. Box 1708
Cheyenne, Wyoming 82001



MICRO-FILMED DEC 03 '80

4W54424

4. Lease may be terminated by 60 day notice by either party and upon termination, lessee shall remove improvements thereon and return the property to lessor in a clean and presentable condition.

IN WITNESS WHEREOF, the parties hereto have caused these presents to be executed as of the day and year first above written.

WYOMING STATE HIGHWAY DEPARTMENT

LESSEE

By: [Signature]
Title: Superintendent & Chief Engineer

[Signature]
[Signature]



By: [Signature]
Title: [Signature]

ACKNOWLEDGEMENT

THE STATE OF _____ } ss.
COUNTY OF _____ }

The foregoing instrument was acknowledged before me this..... day of, 19....., by.....

Witness my hand and official seal.

My commission expires

NOTARY PUBLIC

ACKNOWLEDGEMENT

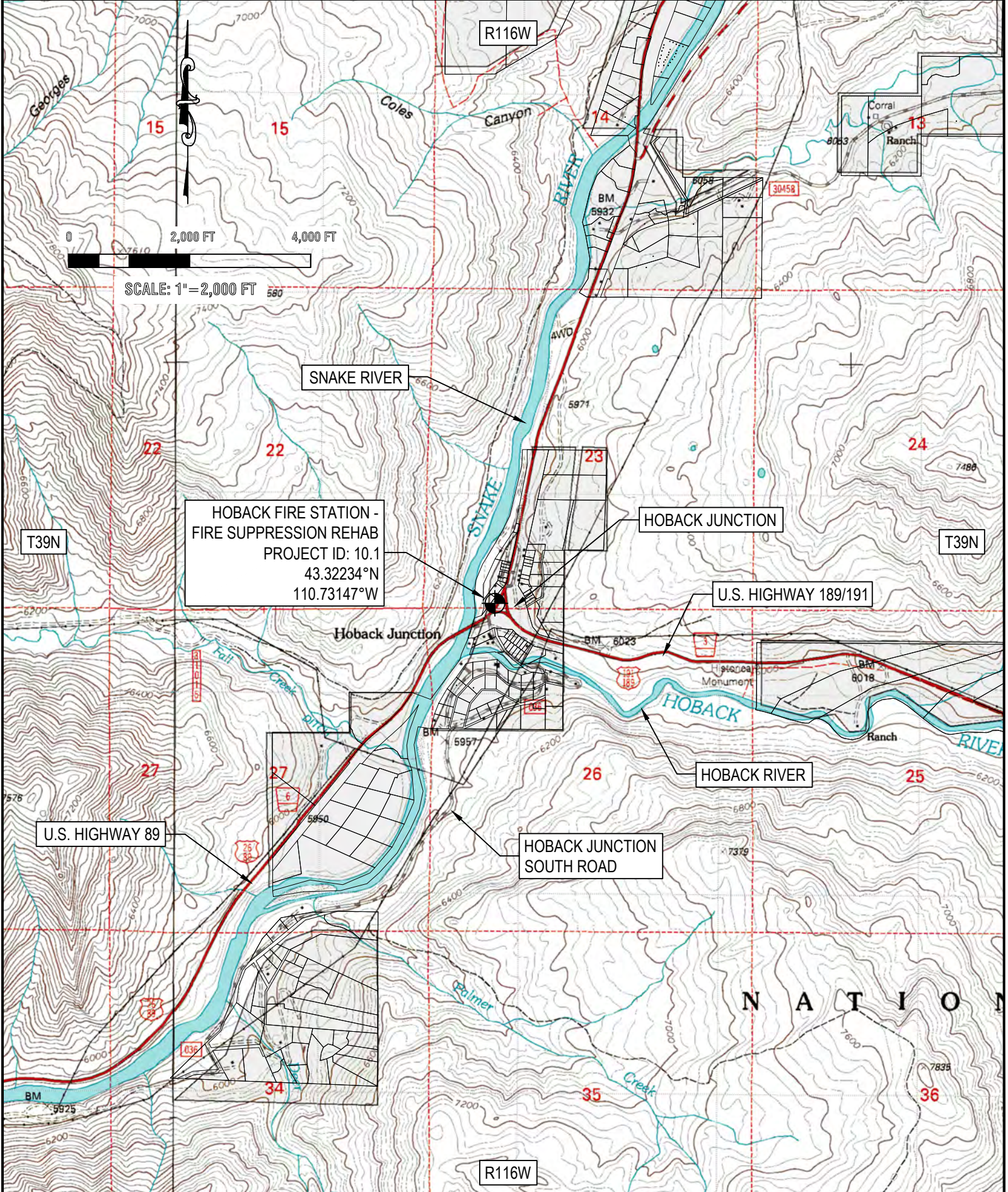
THE STATE OF _____ } ss.
COUNTY OF _____ }

The foregoing instrument was acknowledged before me this..... day of, 19....., by.....

Witness my hand and official seal.


My commission expires

NOTARY PUBLIC



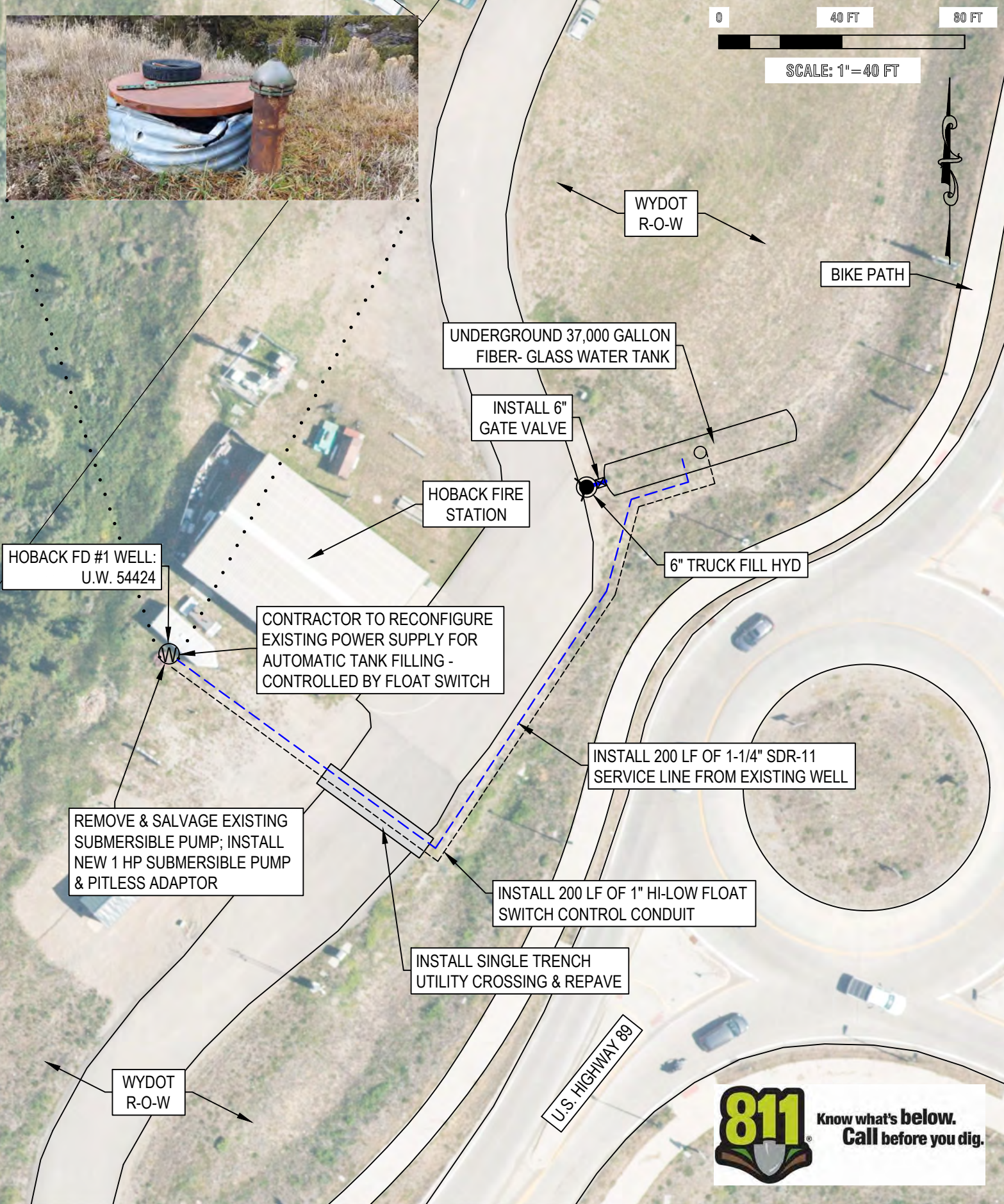
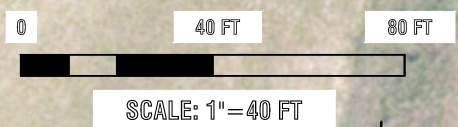
PAGE NO. 1 OF 9
 JOB NO. 4570
 REVISED:
 DATE: 09/17/21
 CHECKED BY: EAS
 DRAWN BY: MTJ
 DESIGNED BY: MTJ

HOBACK RIVER WATERSHED - LEVEL I STUDY
HOBACK FIRE STATION - FIRE SUPPRESSION REHAB
 SMALL WATER PROJECT ID: 10.1
 LOCATED IN THE SW/4 (HES 107) OF SECTION 23, T.39N., R.116W.,
 6TH P.M., TETON COUNTY, WY



RIO VERDE
ENGINEERING
 PINEDALE, WYOMING

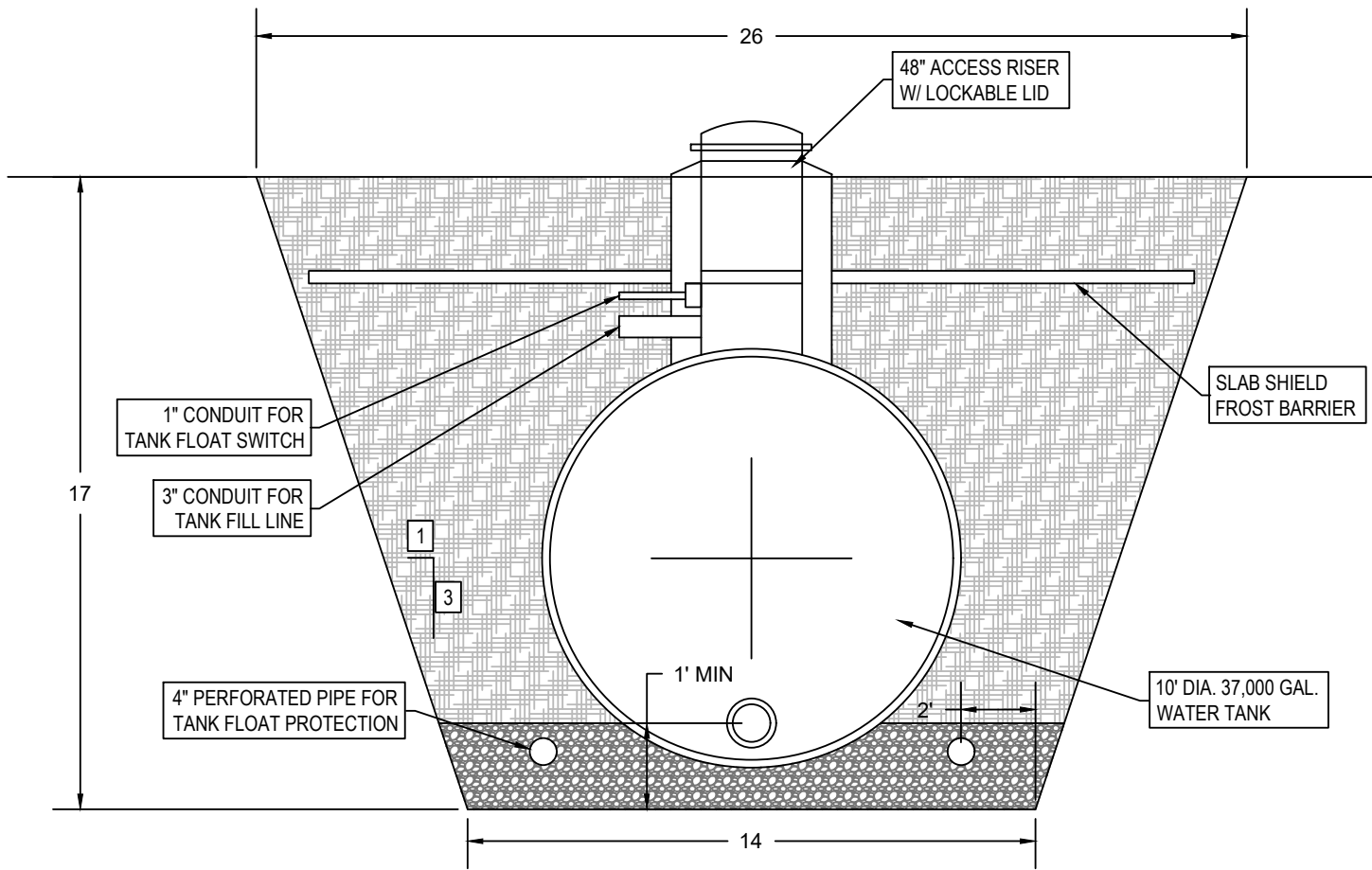
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TANK BURY
SECTION VIEW

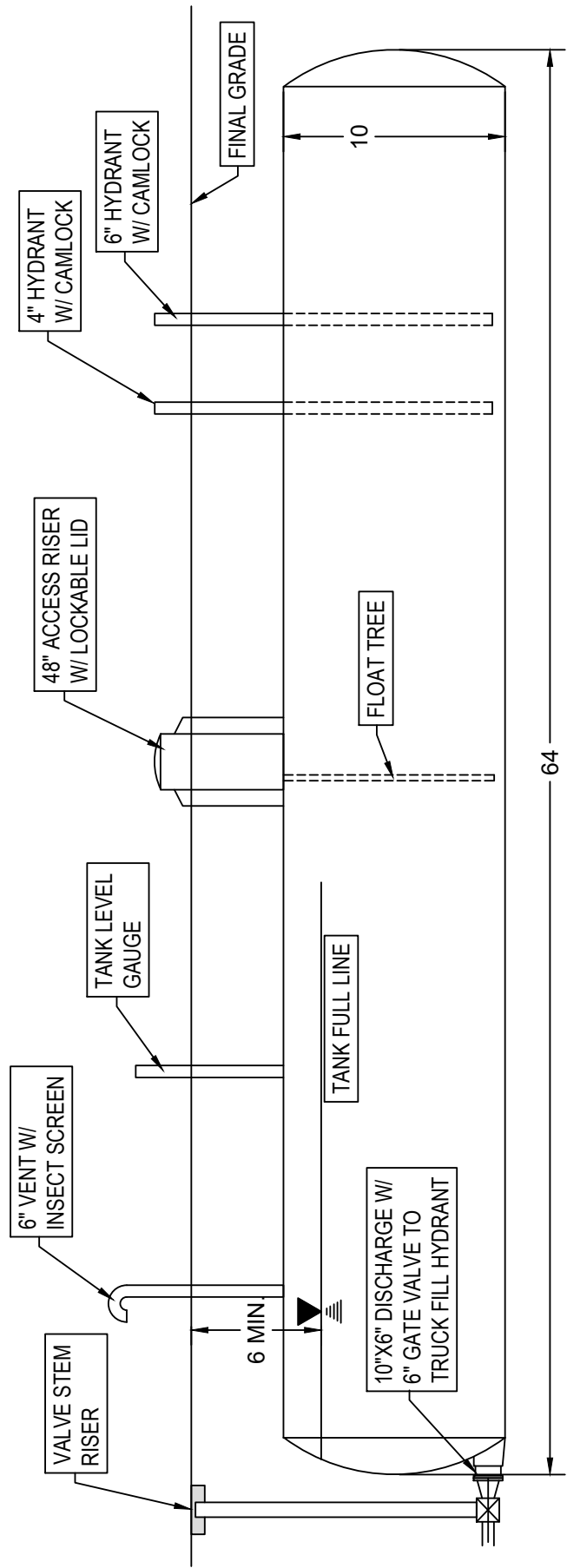
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TANK BURY
PROFILE VIEW

HOBACK RIVER WATERSHED - LEVEL I STUDY
HOBACK FIRE STATION - FIRE SUPPRESSION REHAB
 SMALL WATER PROJECT ID: 10.1
 LOCATED IN THE SW/4 (HES 107) OF SECTION 23, T.39N., R.116W.,
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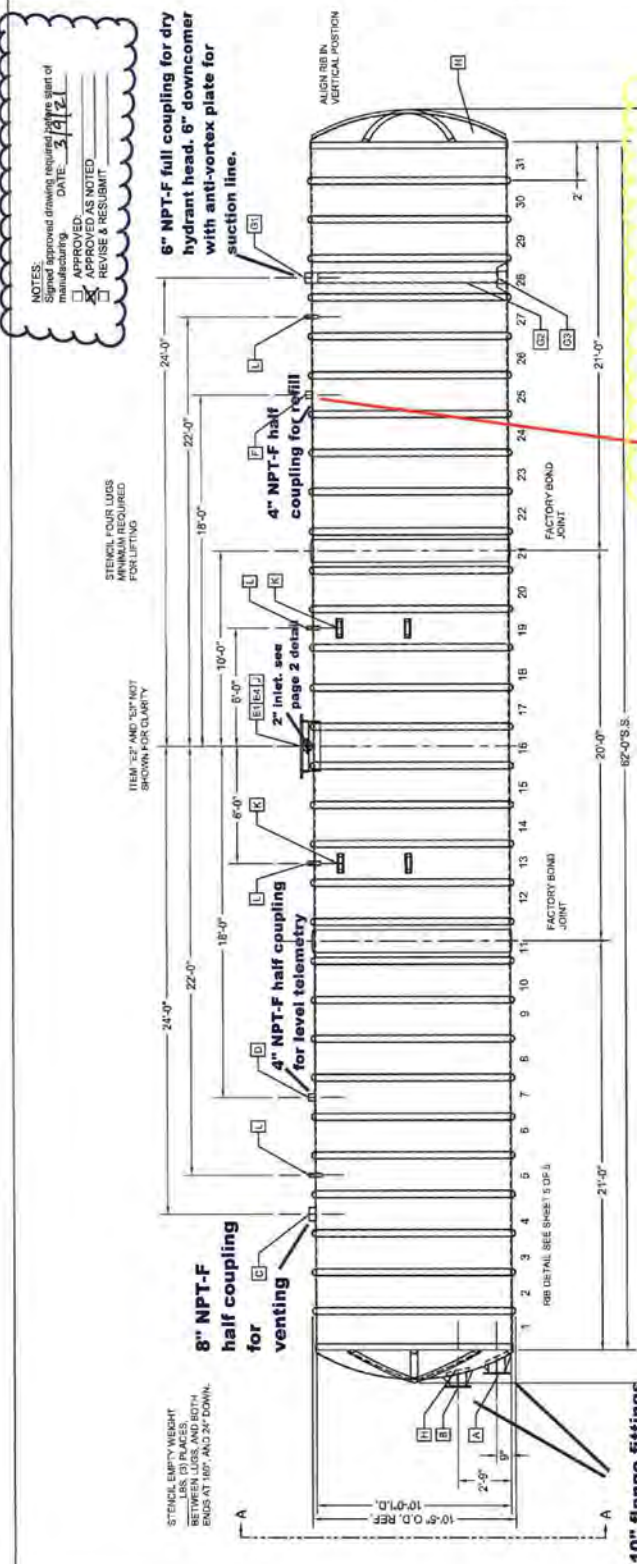
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GENERAL	LOCATION	DATE
NON-POTABLE WATER	WYOMING	09/17/21
WYOMING CLASSIFICATION	27,000 G.P.D.	
EST. CHARGE WGT.	17,800 LBS.	
EST. RVC WGT.	342,700 LBS.	
LINER RESIN	ISOPHTHALIC ANHYDRIDE	
LINER GLASS	E-GLASS	
STRUCTURAL RESIN	ORTH	
STRUCTURAL FIBER	MEP-COMP	
STRUCTURAL GLASS	E-GLASS	
SURFACE COLOR	GRAY	
SPECIFIC GRAVITY	1.0	
DESIGN PRESSURE	ATM.	
DESIGN TEMPERATURE	AMB.	
DARCO DESIGN	SD - 3 FEET MAX. BURY	
FITTING	CUSTOM	
TOP MANWAY	100 DRILL	
FLOID NOZZLE	NO	
QC / TESTING	2 FIN	
PRESSURE TEST	YES	
WATER TEST	YES	
MERCUURY	YES (99 MIN)	
PER ASTM D2093	YES	
ACRYLONE	YES, DARCO STANDARD	
VISUAL DEF.	YES	
DIMENSION	YES	
OUTGAS	YES	
BURNOUTS	YES	
MATERIAL CERT.	YES	
DOCUMENTATION	DARCO STANDARD	
NOTES		

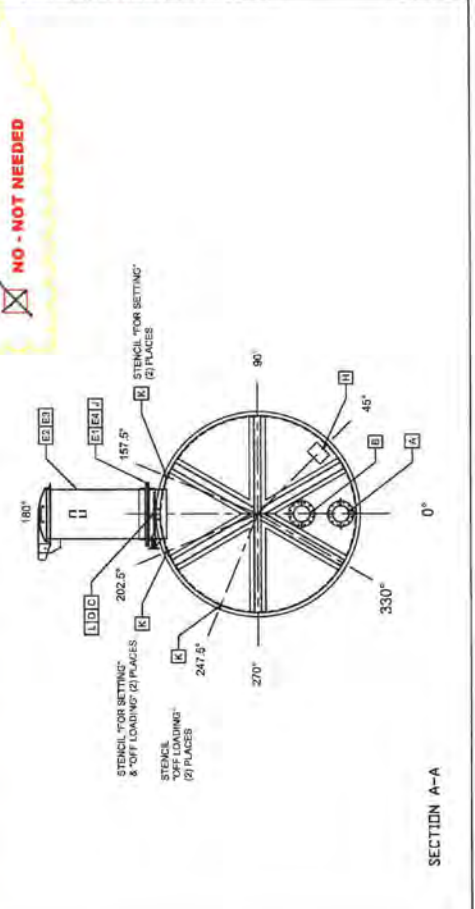


10" flange fittings with anti-vortex breaker plates in discharge nozzles

ADD: anti-vortex plate for possible suction from 4 inch refill line.
 YES - ADD
 NO - NOT NEEDED

ADD: 4" FRP downcomer to 6" from bottom of tank with clips. NO - Not Needed

NO.	QTY	DESCRIPTION	REMARKS
1	1	FRP 10" FLANGE	FRP 10" FLANGE
2	2	FRP 4" x 1/2" TAIL	FRP 4" x 1/2" TAIL
3	2	FRP 4" x 1/2" TAIL	FRP 4" x 1/2" TAIL
4	2	FRP 4" x 1/2" TAIL	FRP 4" x 1/2" TAIL
5	2	FRP 4" x 1/2" TAIL	FRP 4" x 1/2" TAIL
6	2	FRP 4" x 1/2" TAIL	FRP 4" x 1/2" TAIL
7	2	FRP 4" x 1/2" TAIL	FRP 4" x 1/2" TAIL
8	2	FRP 4" x 1/2" TAIL	FRP 4" x 1/2" TAIL
9	2	FRP 4" x 1/2" TAIL	FRP 4" x 1/2" TAIL
10	2	FRP 4" x 1/2" TAIL	FRP 4" x 1/2" TAIL
11	2	FRP 4" x 1/2" TAIL	FRP 4" x 1/2" TAIL
12	2	FRP 4" x 1/2" TAIL	FRP 4" x 1/2" TAIL
13	2	FRP 4" x 1/2" TAIL	FRP 4" x 1/2" TAIL
14	2	FRP 4" x 1/2" TAIL	FRP 4" x 1/2" TAIL
15	2	FRP 4" x 1/2" TAIL	FRP 4" x 1/2" TAIL
16	2	FRP 4" x 1/2" TAIL	FRP 4" x 1/2" TAIL
17	2	FRP 4" x 1/2" TAIL	FRP 4" x 1/2" TAIL
18	2	FRP 4" x 1/2" TAIL	FRP 4" x 1/2" TAIL
19	2	FRP 4" x 1/2" TAIL	FRP 4" x 1/2" TAIL
20	2	FRP 4" x 1/2" TAIL	FRP 4" x 1/2" TAIL
21	2	FRP 4" x 1/2" TAIL	FRP 4" x 1/2" TAIL
22	2	FRP 4" x 1/2" TAIL	FRP 4" x 1/2" TAIL
23	2	FRP 4" x 1/2" TAIL	FRP 4" x 1/2" TAIL
24	2	FRP 4" x 1/2" TAIL	FRP 4" x 1/2" TAIL
25	2	FRP 4" x 1/2" TAIL	FRP 4" x 1/2" TAIL
26	2	FRP 4" x 1/2" TAIL	FRP 4" x 1/2" TAIL
27	2	FRP 4" x 1/2" TAIL	FRP 4" x 1/2" TAIL
28	2	FRP 4" x 1/2" TAIL	FRP 4" x 1/2" TAIL
29	2	FRP 4" x 1/2" TAIL	FRP 4" x 1/2" TAIL
30	2	FRP 4" x 1/2" TAIL	FRP 4" x 1/2" TAIL
31	2	FRP 4" x 1/2" TAIL	FRP 4" x 1/2" TAIL
32	2	FRP 4" x 1/2" TAIL	FRP 4" x 1/2" TAIL
33	2	FRP 4" x 1/2" TAIL	FRP 4" x 1/2" TAIL
34	2	FRP 4" x 1/2" TAIL	FRP 4" x 1/2" TAIL
35	2	FRP 4" x 1/2" TAIL	FRP 4" x 1/2" TAIL
36	2	FRP 4" x 1/2" TAIL	FRP 4" x 1/2" TAIL
37	2	FRP 4" x 1/2" TAIL	FRP 4" x 1/2" TAIL
38	2	FRP 4" x 1/2" TAIL	FRP 4" x 1/2" TAIL
39	2	FRP 4" x 1/2" TAIL	FRP 4" x 1/2" TAIL
40	2	FRP 4" x 1/2" TAIL	FRP 4" x 1/2" TAIL
41	2	FRP 4" x 1/2" TAIL	FRP 4" x 1/2" TAIL
42	2	FRP 4" x 1/2" TAIL	FRP 4" x 1/2" TAIL
43	2	FRP 4" x 1/2" TAIL	FRP 4" x 1/2" TAIL
44	2	FRP 4" x 1/2" TAIL	FRP 4" x 1/2" TAIL
45	2	FRP 4" x 1/2" TAIL	FRP 4" x 1/2" TAIL
46	2	FRP 4" x 1/2" TAIL	FRP 4" x 1/2" TAIL
47	2	FRP 4" x 1/2" TAIL	FRP 4" x 1/2" TAIL
48	2	FRP 4" x 1/2" TAIL	FRP 4" x 1/2" TAIL
49	2	FRP 4" x 1/2" TAIL	FRP 4" x 1/2" TAIL
50	2	FRP 4" x 1/2" TAIL	FRP 4" x 1/2" TAIL



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DATE: 09/17/21
 CHECKED BY: [Signature]
 APPROVED BY: [Signature]

PH: 307-252-8660
 FAX: 307-252-8660
 WWW.DARCOINC.COM

JOB NUMBER: 4570
 SHEET NUMBER: 5 OF 9

SECTION A-A

CUT SHEET: FOR REFERENCE ONLY

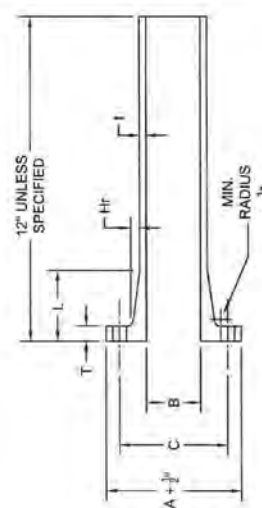
HOBACK RIVER WATERSHED - LEVEL I STUDY
HOBACK FIRE STATION - FIRE SUPPRESSION REHAB
 SMALL WATER PROJECT ID: 10.1
 LOCATED IN THE SW/4 (HES 107) OF SECTION 23, T.39N., R.116W.,
 6TH P.M., TETON COUNTY, WY

RIO VERDE ENGINEERING
 PINEDALE, WYOMING
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 rioverde@wyoming.com

NOZZLE FLANGE AND MANWAY DIMENSIONS

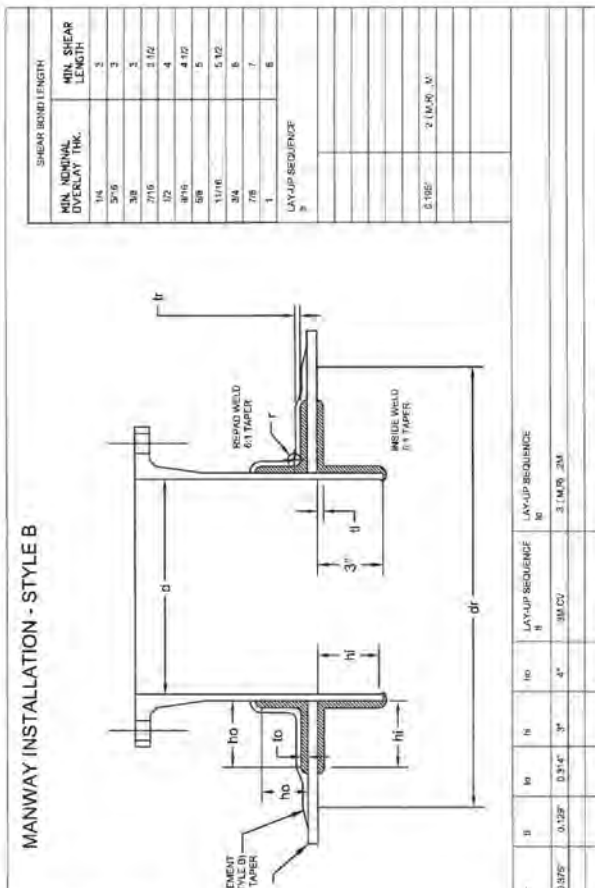
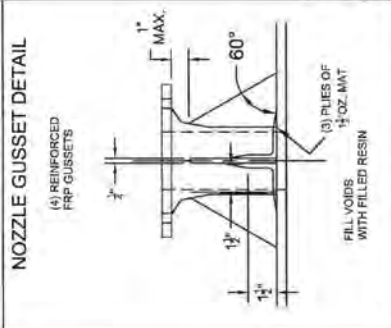
SIZE	A, IN.	C, IN.	MIN. I, IN.	MIN. L, IN.	NO. OF BOLTS	BOLT HOLE DIAMETER (1)	BOLT DIAMETER (2)	WASHER SIZE	BOLT HEAD TYPE
3"	6.125	1.34	0.350	3.03	4	2.6	5/8	1.5618	FLANGE
4"	8.125	1.34	0.350	4.34	12	1	7/8	1.34	FLANGE
5"	10.125	1.34	0.500	6	20	1.34	1.34	1.34	FLANGE
6"	12.125	1.34	0.500	6	20	1.34	1.34	1.34	FLANGE
8"	16.125	1.34	0.500	6	20	1.34	1.34	1.34	FLANGE
10"	20.125	1.34	0.500	6	20	1.34	1.34	1.34	FLANGE

*CORROSION BARRIER IS INCLUDED WITH THICKNESS ABOVE.
 WHEN FABRICATING NOZZLES AND MANWAYS, ALL STRUCTURAL LAMINATES SHALL START AND END WITH A "M" LAYER. A LAYER OF "M" MAY BE REPLACED BY "J" "M" AT ANY POINT OF LAMINATE CONSTRUCTION.



MATERIALS OF CONSTRUCTION

REVEN.	SHELL HEADS, MANWAY NOZZLES, NOZZLE NECKS, LINER, STRUCTURAL TUBES, STRUCTURAL MISC.	SAME AS VESSEL
1	FRP TANK	FRP TANK
2	FRP TANK	FRP TANK
3	FRP TANK	FRP TANK
4	FRP TANK	FRP TANK
5	FRP TANK	FRP TANK
6	FRP TANK	FRP TANK
7	FRP TANK	FRP TANK
8	FRP TANK	FRP TANK
9	FRP TANK	FRP TANK



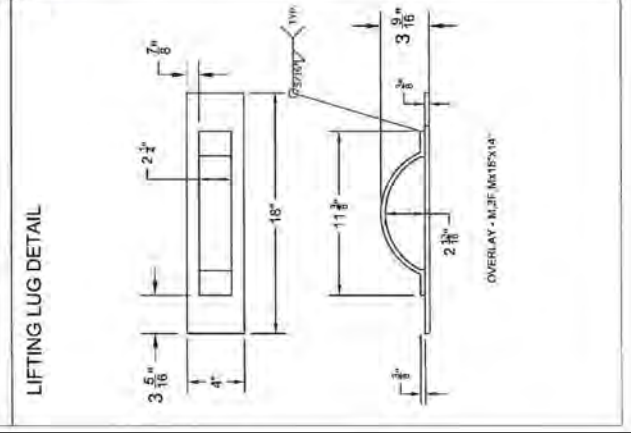
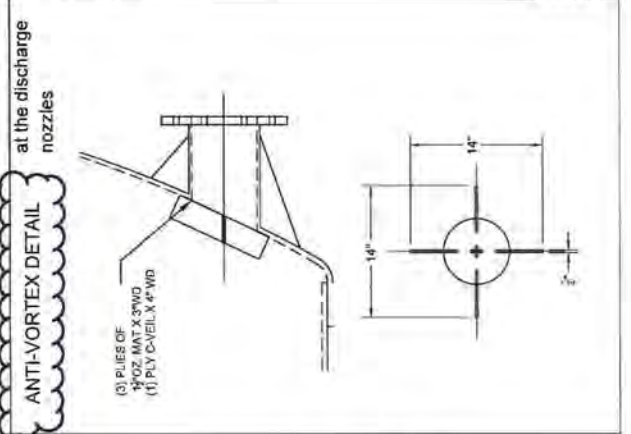
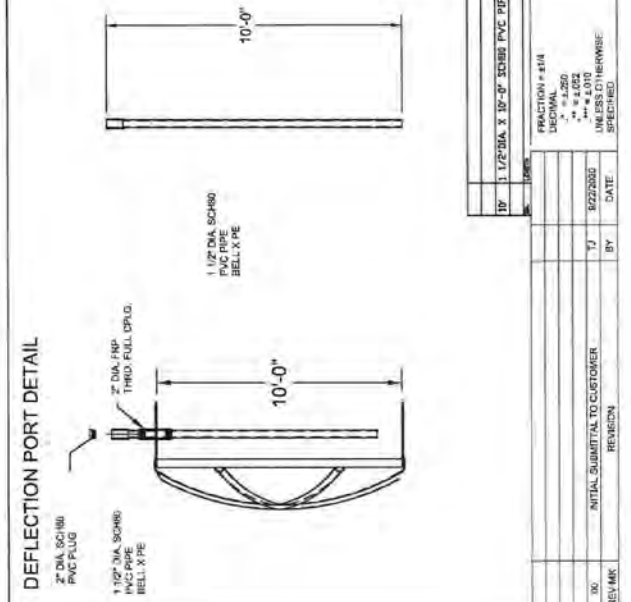
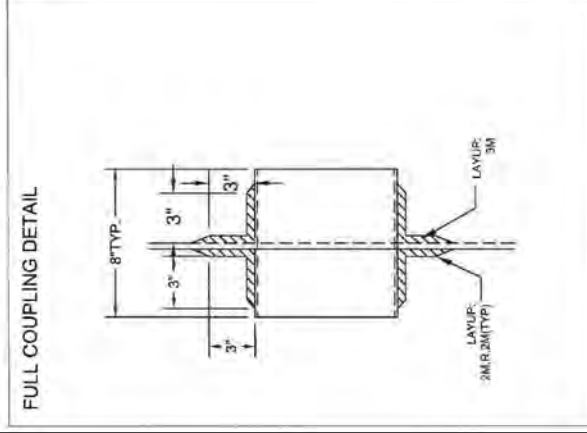
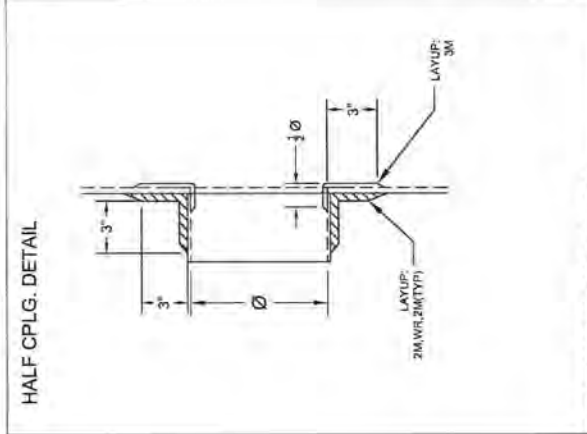
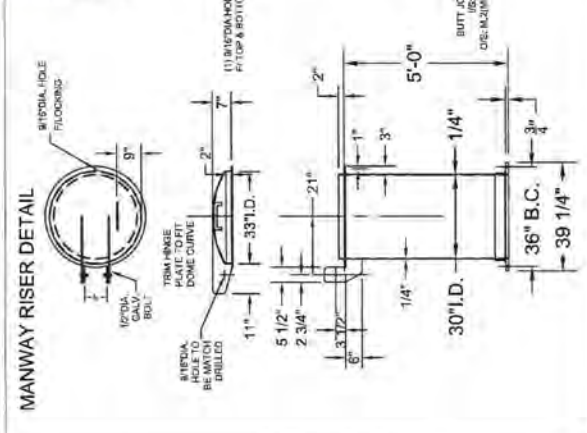
PAGE NO. 7 OF 9
 JOB NO. 4570
 REVISED:
 DATE: 09/17/21
 CHECKED BY: EAS
 DRAWN BY: MTJ
 DESIGNED BY: MTJ

HOBACK RIVER WATERSHED - LEVEL I STUDY
HOBACK FIRE STATION - FIRE SUPPRESSION REHAB
 SMALL WATER PROJECT ID: 10.1
 LOCATED IN THE SW/4 (HES 107) OF SECTION 23, T.39N., R.116W.,
 6TH P.M., TETON COUNTY, WY

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ENGINEERING
 PINEDALE, WYOMING
 (307) 367-2826
 rioverde@wyoming.com

MATERIALS OF CONSTRUCTION	
RESIN	SAME AS VESSEL
FRUIT LEGS	SAME AS VESSEL
FLANGES	SAME AS VESSEL
NOZZLES	SAME AS VESSEL
NOZZLE NECKS	SAME AS VESSEL
MATERIAL	
INNER MATCH VESSEL	
STRUCTURAL MATCH VESSEL	
INNER COUPLER	
STRUCTURAL	
ANCHOR	

NOTES:
 Signed drawing required upon start of manufacturing. DATE: 3/1/21
 APPROVED AS NOTED
 REVISIONS TO BE NOTED
 REVISE & RESUBMIT



NO.	REVISION	INITIAL	DATE	BY	REVISION
1	1/2\"/>				

NO.	REVISION	INITIAL	DATE	BY	REVISION
1	1/2\"/>				

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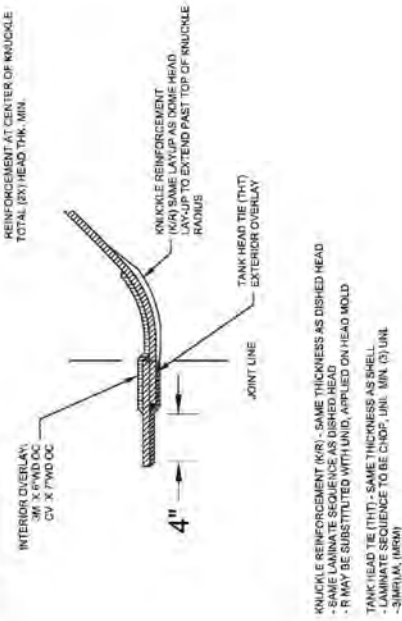
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DOME KNUCKLE DETAIL



KNUCKLE REINFORCEMENT (K/R) - SAME THICKNESS AS DISHED HEAD
 - SAME LAMINATE SEQUENCE AS DISHED HEAD
 - R MAY BE SUBSTITUTED WITH UNID, APPLIED ON HEAD MOLD
 TANK HEAD TIE (THT) - SAME THICKNESS AS SHELL
 - LAMINATE SEQUENCE TO BE CHOP, UNI, MN, (2) UNI, -3(MP)IA, (MRM)

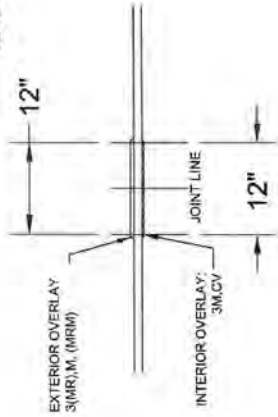
SHELL AND HEAD JOINT DETAIL
 SEE ASTM D-3299

2" RIB FOR DISHED HEAD DETAIL

2" RADIUS POLY CORE
 200 MIL CHOP + 15 OZ HOOP UNI 6" WIDE + 80 MIL CHOP
 NOTE:
 RIB UNI GLASS DIRECTION IS PARALLEL TO THE RIB AND PERPENDICULAR TO THE TANK AXIS.
 IF HOOP UNI IS UNAVAILABLE, USE 24 OZ. WOVEN ROVING.
 DOME HEAD RIB: (2) 4" WIDE UNID OVERLAPPING AT TOP 2".

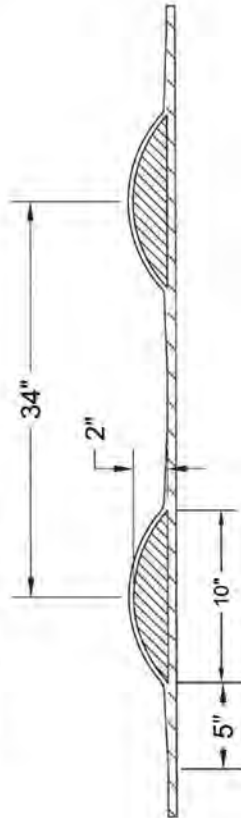


SIDEWALL SEAM DETAIL



NOTES:
 Signed approved drawing remains the property of manufacturing. DATE: 3/4/21
 APPROVED AS NOTED
 REVISE & RESUBMIT

10" X 2" RIB FOR SHELL DETAIL
 SEE TABLE SHEET 1 FOR RIB THICKNESS OVERWIND



RIB DETAIL
 STD. RIB SPACING
 24" ϕ TO ϕ

DESCRIPTION	10"X2MA, FRP TANK 10037K
CUSTOMER	WY FD
DATE	09/22/2020
CHECKED	DATE: 09/22/2020
APPROVED	DATE: 09/22/2020
DATE	09/22/2020

DARCO TANKAGE INC.

REV. NO.	BY	DATE	REVISION
01	TJ	09/22/2020	INITIAL SUBMITTAL TO CUSTOMER
02			UNLESS OTHERWISE SPECIFIED

JOB NUMBER	REF. SHEET NUMBER	DATE
10037K	5 OF 5	09/22/2020

CUT SHEET: FOR REFERENCE ONLY

HOBACK RIVER WATERSHED STUDY LEVEL I**Owner/Operator:** Bill Rode**Project Type:** Stock Tank**Project ID:** 11.1**Project Name:** Rode #1 Well and Stock Tank**Location (PLSS):** NW/4 (HES 198), Sec. 34, T39N, R116W**Location (Lat/Long):** 43.30633°N, 110.74234°W**PROJECT COMPONENTS (ENGINEER'S ESTIMATE)**

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1	Mobilization	1	LS	\$ 3,000.00	\$ 3,000.00
2	Well Pump, Plumbing, & Electrical Installation	1	LS	\$ 3,500.00	\$ 3,500.00
3	Electrical-Solar Array, Pump Wiring & Conduit	1	LS	\$ 4,100.00	\$ 4,100.00
4	CU 200 Float Controller (or equivalent)	1	LS	\$ 1,000.00	\$ 1,000.00
5	12' Dia. Tire Water Stock Tank (Complete)	1	LS	\$ 14,000.00	\$ 14,000.00
6	1-1/4" SDR-11 Supply Pipe	275	LF	\$ 5.00	\$ 1,375.00
7	4" SDR-11 Drain Pipe	80	EA	\$ 8.50	\$ 680.00
8	4" SDR-11 Fused 90° Bend	2	EA	\$ 190.00	\$ 380.00
9	4" Poly-Valve	1	EA	\$ 650.00	\$ 650.00
10	Valve Enclosure (Drain)	1	EA	\$ 75.00	\$ 75.00
11	Protective Fencing	45	LF	\$ 10.00	\$ 450.00
TOTAL COMPONENT COST (SUBTOTAL #2):					\$ 29,210.00

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$ 1,500.00
PERMITTING AND MITIGATION:	\$ 500.00
LEGAL FEES:	\$ -
ACQUISITION OF ACCESS AND RIGHTS-OF-WAY:	\$ -
PRE-CONSTRUCTION COSTS (SUBTOTAL #1):	\$ 2,000.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 29,210.00

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%):	\$ 2,921.00
COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3):	\$ 32,131.00
CONTINGENCY (SUBTOTAL #3 X 15%):	\$ 4,819.65
TOTAL CONSTRUCTION COST (SUBTOTAL #4):	\$ 36,950.65

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): **\$ 38,950.65**

PERMITTING REQUIREMENTS

Project ID: 11.1

Project Name: Rode No. 1 Well & Stock Tank

Land Jurisdiction: Private, William and Linda Rode

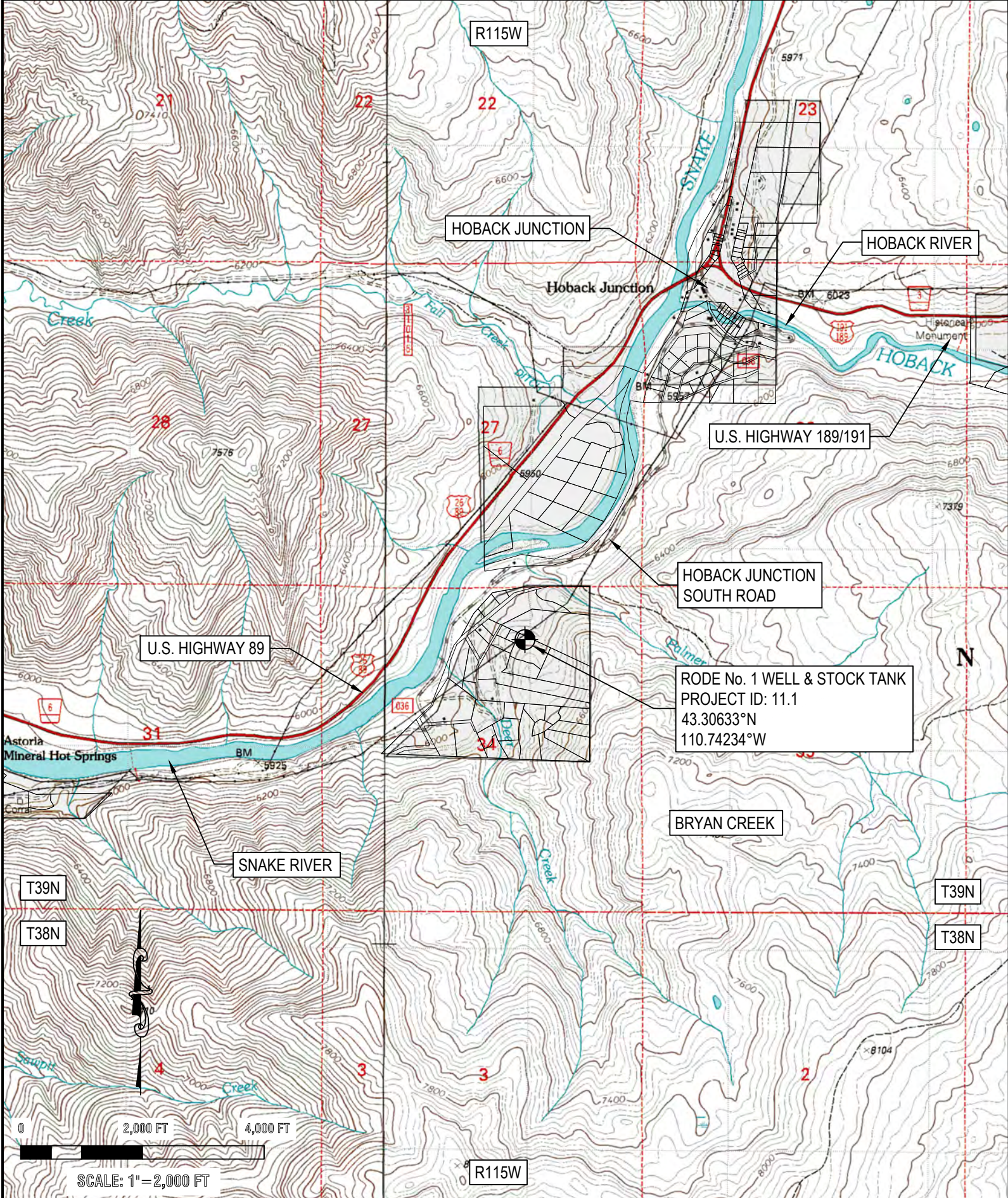
State Engineer's Office

Current Permit: None

As this project involves the development of an existing shallow well for stock water purposes, an application for permit to appropriate ground water should be submitted to the SEO. The SEO permit should then be submitted to the WWDO with the final project plans, prior to construction. Following construction, a statement of completion and proof of appropriation and beneficial use of groundwater should be completed and submitted to the SEO – Groundwater Division.


U.S. Army Corps of Engineers (USACE)

A project plan set should be submitted to the USACE Wyoming Regulatory Office for review prior to final submission to the WWDO. Due to the small quantity of fill associated with the installation of the stock tank and water supply line, a wetland delineation is not anticipated as a requirement. However, final determination rests with the Wyoming Regulatory Office. A USACE letter of acceptance should be submitted to the WWDO with the final design, prior to construction.



PAGE NO. 1 OF 7
 JOB NO. 4570
 REVISED:
 DATE: 09/17/21
 CHECKED BY: EAS
 DRAWN BY: MTJ

HOBACK RIVER WATERSHED - LEVEL I STUDY
RODE No. 1 WELL & STOCK TANK
 SMALL WATER PROJECT ID: 11.1
 LOCATED IN THE NW/4 (HES 198) OF SECTION 34, T.39N., R.116W.,
 6TH P.M., TETON COUNTY, WY

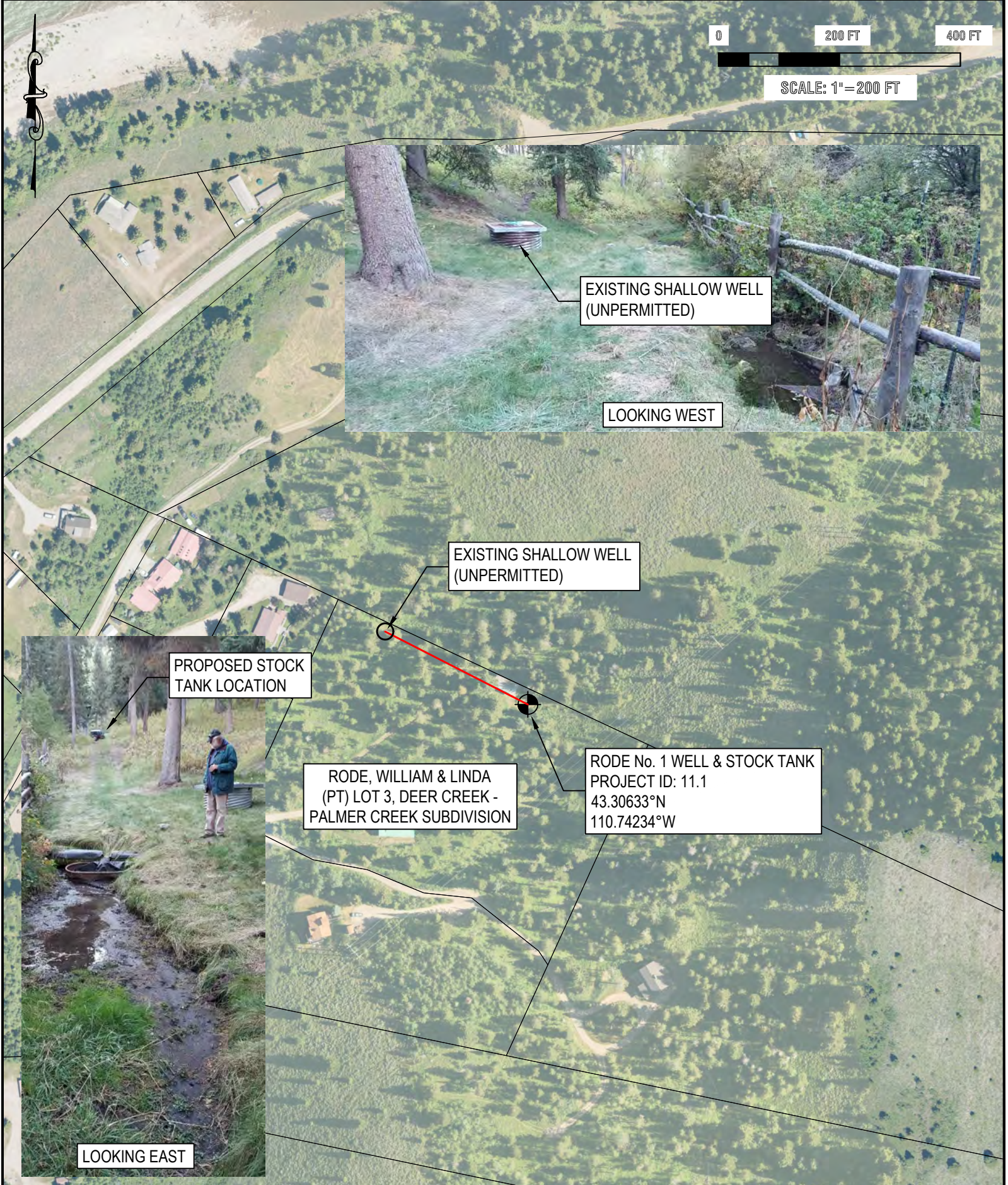


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SCALE: 1"=200 FT



EXISTING SHALLOW WELL (UNPERMITTED)

LOOKING WEST

EXISTING SHALLOW WELL (UNPERMITTED)

PROPOSED STOCK TANK LOCATION

RODE, WILLIAM & LINDA (PT) LOT 3, DEER CREEK - PALMER CREEK SUBDIVISION

RODE No. 1 WELL & STOCK TANK PROJECT ID: 11.1
43.30633°N
110.74234°W



LOOKING EAST

DESIGNED BY: MTJ
DRAWN BY: MTJ
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DATE: 09/17/21
REVISED:
JOB No. 4570
PAGE No. 2 OF 7

HOBACK RIVER WATERSHED - LEVEL I STUDY
RODE No. 1 WELL & STOCK TANK
 SMALL WATER PROJECT ID: 11.1
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 6TH P.M., TETON COUNTY, WY



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ZAJAC, JACK & CORDA
324WD1161

EXISTING SHALLOW WELL
(UNPERMITTED)

INSTALL 275 LF OF 1-1/4" DIA.
SDR-11 HDPE SUPPLY PIPE

INSTALL 10 GPM
SOLAR PUMP

EXISTING SHED

12'x2' HEAVY EQUIPMENT
TIRE WATER TROUGH
(SEE DETAILS ON SHEET 4-5)

TO WATER LEVEL
SWITCH IN STOCK TANK

INSTALL (4) 325 WATT UNIT
SOLAR ARRAY AND 45 LF OF
PROTECTIVE FENCING

TO LOW WATER
LEVEL SENSOR

TO SUBMERSIBLE PUMP
POWER CONNECTION

40 LF OF 4" DIA. SDR-11 HDPE
EMERGENCY OVERFLOW PIPE

40 LF OF 4" DIA. SDR-11
HDPE DRAIN PIPE

INSTALL VALVE AND
RISER ON DRAIN LINE

RODE, WILLIAM & LINDA
(PT) LOT 3, DEER CREEK -
PALMER CREEK SUBDIVISION



100 FT

50 FT

SCALE: 1" = 50 FT

HOBACK RIVER WATERSHED - LEVEL I STUDY

RODE No. 1 WELL & STOCK TANK

SMALL WATER PROJECT ID: 11.1

LOCATED IN THE NW/4 (HES 198) OF SECTION 34, T.39N., R.116W.,
6TH P.M., TETON COUNTY, WY

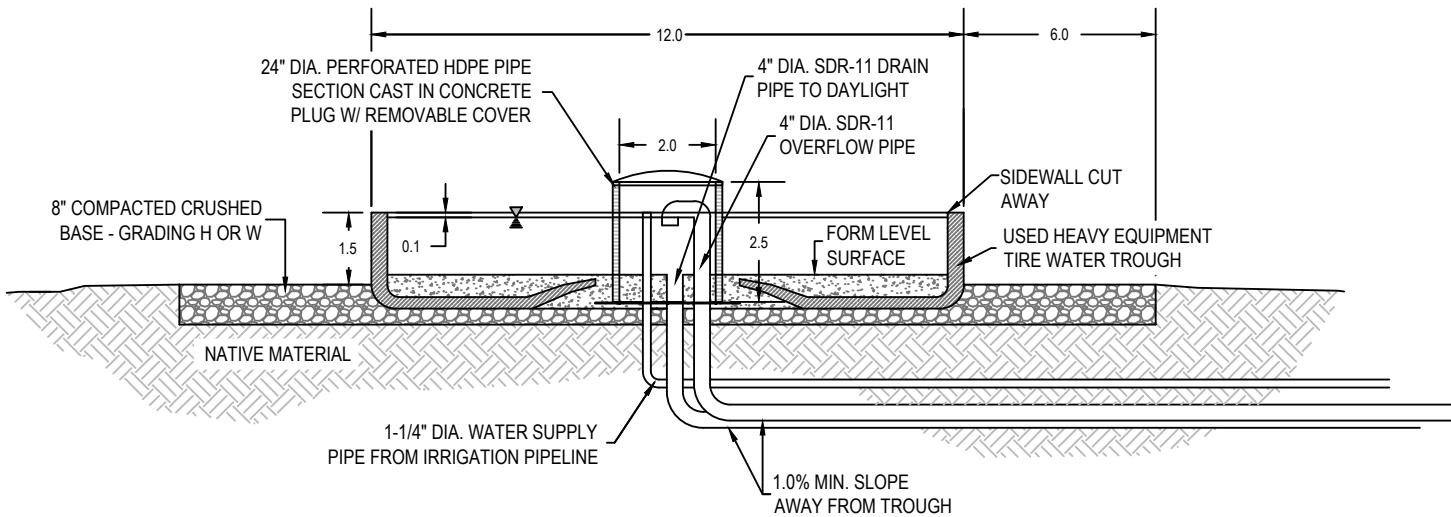


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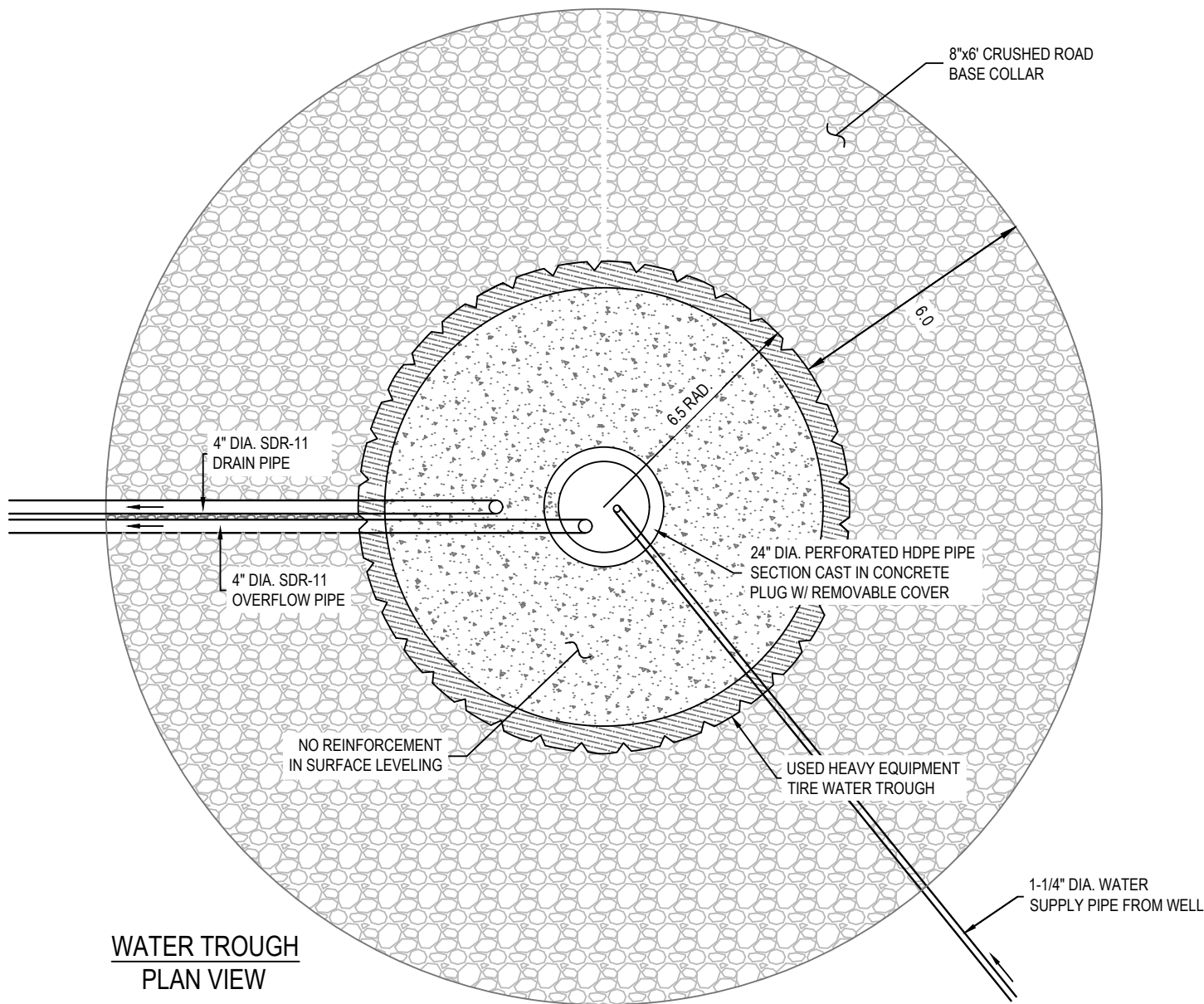
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JOB No. 4570
PAGE No. 3 OF 7



NOTE:
 THE DEPICTED TROUGH AND WATER SUPPLY SYSTEM IS INTENDED FOR
 SUMMER USE ONLY. THE TANK DRAIN VALVE SHALL BE LEFT OPEN
 DURING WINTER MONTHS AND THE PUMP DISCONNECTED.

**WATER TROUGH
 SECTION VIEW**

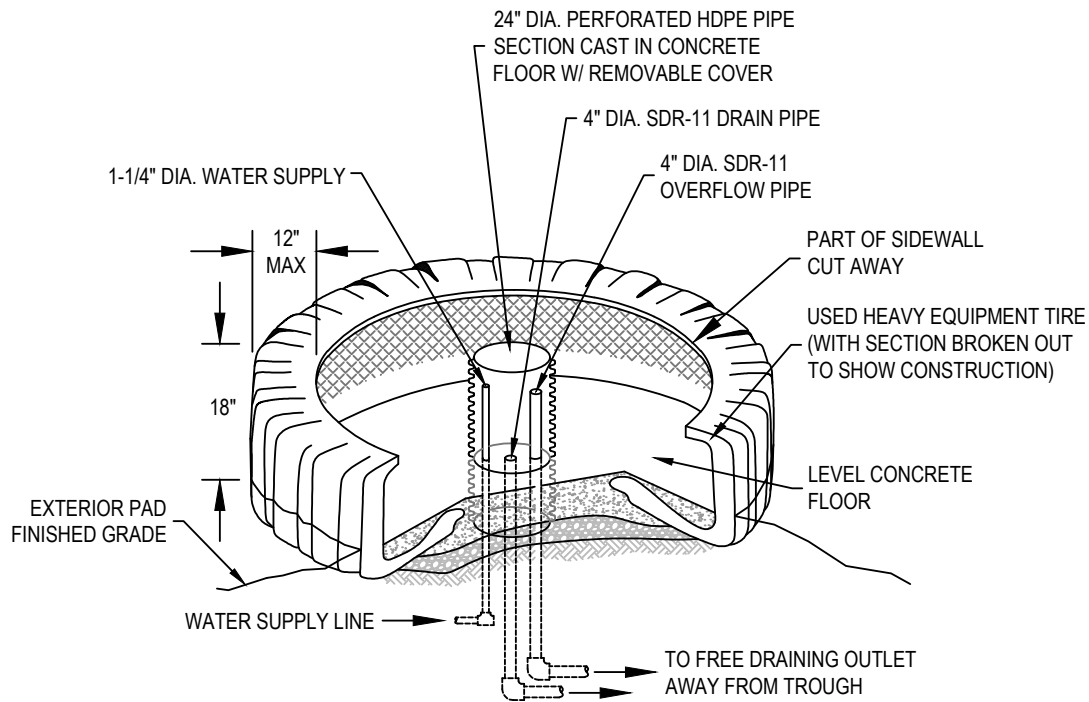


**WATER TROUGH
 PLAN VIEW**

DESIGNED BY: MTJ
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CHECKED BY: EAS
DATE: 09/17/21
REVISID:
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PAGE No. 4 OF 7

HOBACK RIVER WATERSHED - LEVEL I STUDY
RODE No. 1 WELL & STOCK TANK
 SMALL WATER PROJECT ID: 11.1
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**WATERING TROUGH
ISOMETRIC VIEW**
N.T.S.

INFLOW PIPE DIA. - 1-1/4 IN.
OVERFLOW PIPE DIA. - 4 IN.
DRAIN PIPE DIA. - 4 IN.

INSTALLATION NOTES

- 1.) CUT AWAY PART OF SIDEWALL. THIS WILL BE THE TOP OF THE TROUGH
- 2.) USE THE CRUSHED ROAD BASE TO FILL AROUND THE PIPES AND TO LEVEL THE TIRE.
- 3.) POUR CONCRETE AROUND ADS PIPE, WATER SUPPLY, OVERFLOW PIPES AND WORK UNDER INTERIOR EDGE OF TIRE. FINISH THE TOP SURFACE OF CONCRETE TO FORM A LEVEL PAD ACROSS THE TROUGH BOTTOM.
- 4.) *PROVIDE AN ESCAPE DEVICE FOR SMALL BIRDS AND ANIMALS THAT MAY BECOME ENTRAPPED. A RAMP CONSTRUCTED OF A PIECE OF EXPANDED METAL EXTENDING FROM THE WATER SURFACE TO THE TOP SIDEWALL OR A FLOAT CONSISTING OF A PIECE OF LUMBER ARE TWO DEVICES THAT COULD BE USED.
- 5.) EXTEND CRUSHED ROAD BASE PAD 6 FT. OUT FROM EXTERIOR TIRE EDGE

*DESIGN BASED ON NRCS STANDARDIZED DRAWING AND DESIGN INPUT FROM BROGAN HYDROLOGIC CONSULTING. DESIGN MUST BE ADAPTED TO MEET SITE SPECIFIC CONDITIONS.

HOBACK RIVER WATERSHED - LEVEL I STUDY

RODE No. 1 WELL & STOCK TANK

SMALL WATER PROJECT ID: 11.1

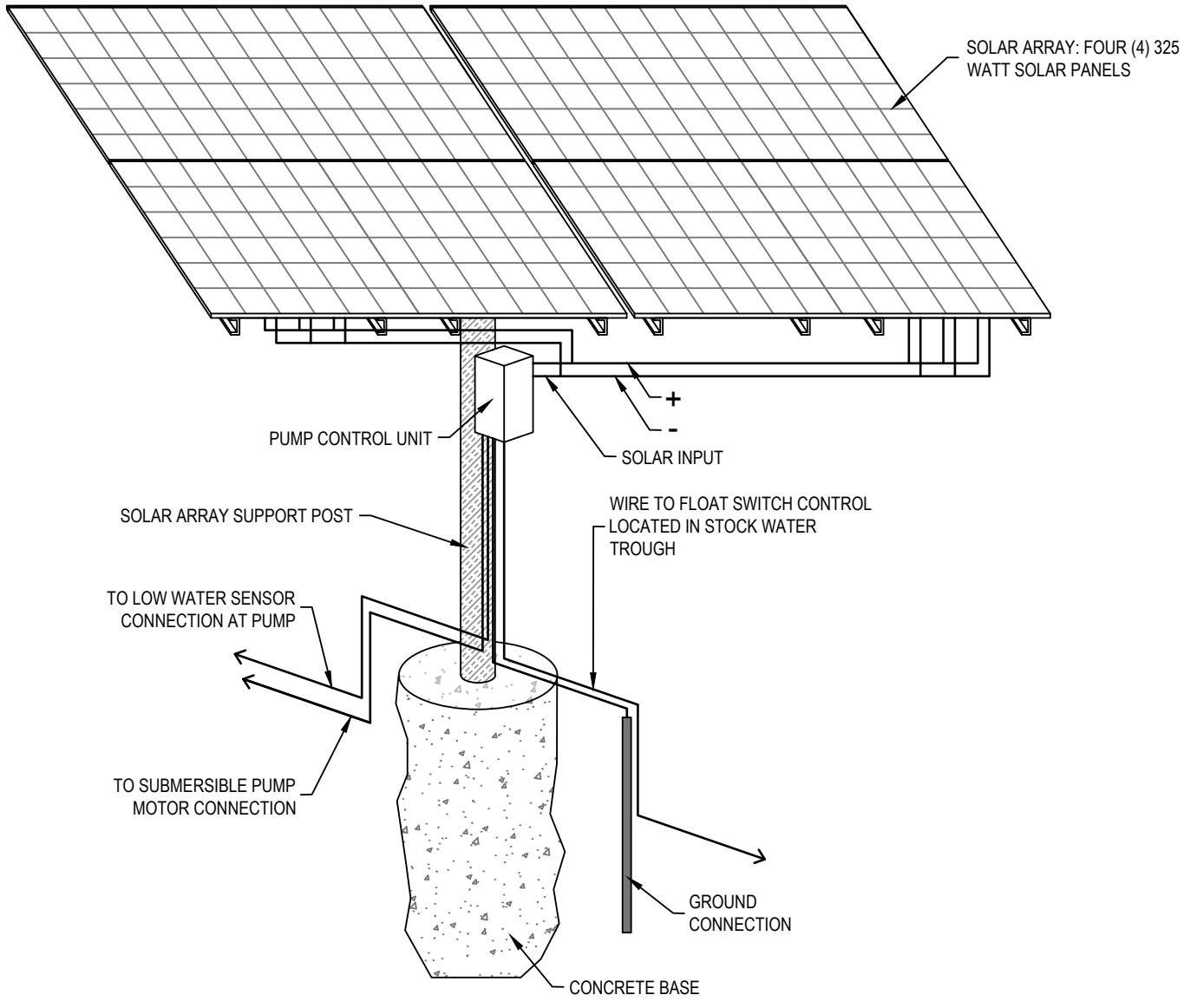
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PAGE No. 5 OF 7



TYPICAL SOLAR ARRAY

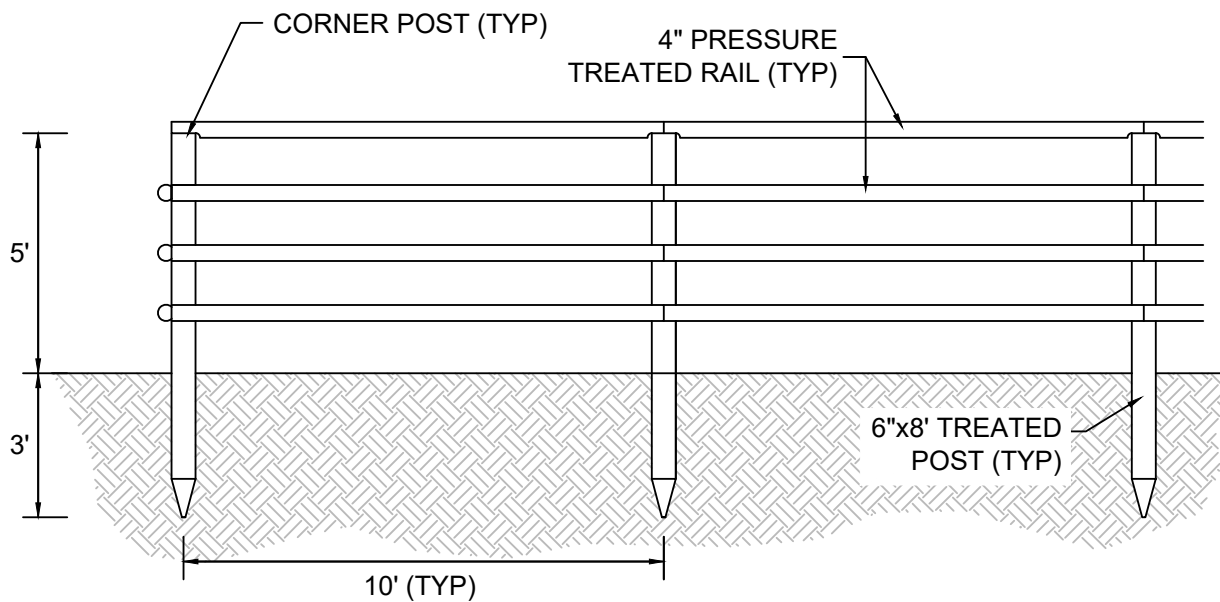
NOT TO SCALE

DESIGNED BY: MTJ
 DRAWN BY: MTJ
 CHECKED BY: EAS
 DATE: 09/17/21
 REVISED:
 JOB No. 4570
 PAGE No. 8 OF 7

HOBACK RIVER WATERSHED - LEVEL I STUDY
RODE No. 1 WELL & STOCK TANK
 SMALL WATER PROJECT ID: 11.1
 LOCATED IN THE NW/4 (HES 198) OF SECTION 34, T.39N., R.116W.,
 6TH P.M., TETON COUNTY, WY

RIO VERDE
ENGINEERING
 PINEDALE, WYOMING

(307) 367-2826
 rioverde@wyoming.com



**SOLAR ARRAY PROTECTION FENCE
PROFILE VIEW**

HOBACK RIVER WATERSHED - LEVEL I STUDY

RODE No. 1 WELL & STOCK TANK

SMALL WATER PROJECT ID: 11.1

LOCATED IN THE NW/4 (HES 198) OF SECTION 34, T.39N., R.116W.,
6TH P.M., TETON COUNTY, WY



**RIO VERDE
ENGINEERING**

PINEDALE, WYOMING

(307) 367-2826
rioverde@wyoming.com

DESIGNED BY: MTJ

DRAWN BY: MTJ

CHECKED BY: EAS

DATE: 09/17/21

REVISED:

JOB No. 4570

PAGE No. 7 OF 7

HOBACK RIVER WATERSHED STUDY LEVEL I**Owner/Operator:** Astoria Park Conservancy**Project Type:** Environmental**Project ID:** 12.1**Project Name:** Snake River Bank Stabilization**Location (PLSS):** Lot 5, Sec. 32, T39N, R116W**Location (Lat/Long):** 43.29789°N, 110.78275°W**PROJECT COMPONENTS (ENGINEER'S ESTIMATE)**

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1	Mobilization	1	LS	\$ 8,000.00	\$ 8,000.00
2	River Bank Shaping	850	LF	\$ 20.00	\$ 17,000.00
3	Stabilization - Logs/Root Balls	6	EA	\$ 6,000.00	\$ 36,000.00
4	Stabilization - Rock Anchors- Min. 2' Diameter	120	CY	\$ 100.00	\$ 12,000.00
TOTAL COMPONENT COST (SUBTOTAL #2):					\$ 73,000.00

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$ 4,800.00
PERMITTING AND MITIGATION:	\$ 5,000.00
LEGAL FEES:	\$ -
ACQUISITION OF ACCESS AND RIGHTS-OF-WAY:	\$ -
PRE-CONSTRUCTION COSTS (SUBTOTAL #1):	\$ 9,800.00

TOTAL COMPONENT COST (SUBTOTAL #2):	\$ 73,000.00
--	---------------------

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%):	\$ 7,300.00
COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3):	\$ 80,300.00
CONTINGENCY (SUBTOTAL #3 X 15%):	\$ 12,045.00
TOTAL CONSTRUCTION COST (SUBTOTAL #4):	\$ 92,345.00

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4):	\$ 102,145.00
--	----------------------

PERMITTING REQUIREMENTS

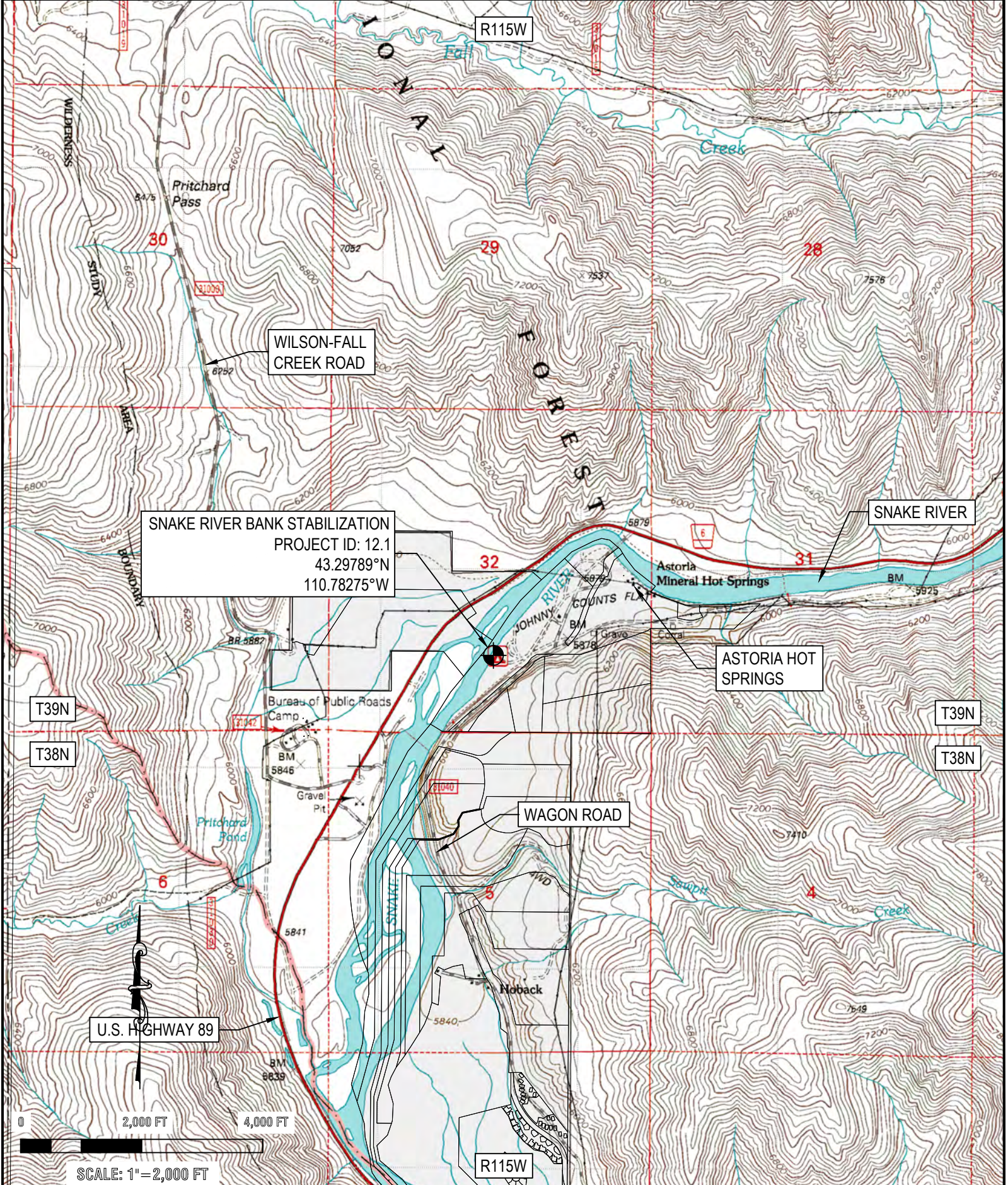
Project ID: 12.1

Project Name: Snake River Bank Stabilization

Land Jurisdiction: Private, Astoria Park Conservancy

U.S. Army Corps of Engineers (USACE)


A project plan set should be submitted to the USACE Wyoming Regulatory Office for review prior to final submission to the WWDO. Bank stabilization is specifically permitted via Nation Wide Permit (NWP) 13 and it is anticipated that a pre-construction notification will be required for this project. A site visit with USACE personnel should be conducted during the final design phase to clarify as to whether a wetland delineation will be required for permitting.



SNAKE RIVER BANK STABILIZATION
 PROJECT ID: 12.1
 43.29789°N
 110.78275°W

DESIGNED BY: MTJ
 DRAWN BY: MTJ
 CHECKED BY: EAS
 DATE: 09/17/21
 REVISED:
 JOB No. 4570
 PAGE No. 1 OF 4

HOBACK RIVER WATERSHED - LEVEL I STUDY
SNAKE RIVER BANK STABILIZATION
 SMALL WATER PROJECT ID: 12.1
 LOCATED IN LOT 5 OF SECTION 32, T.39N., R.116W.,
 6TH P.M., TETON COUNTY, WY

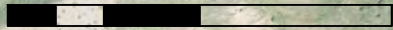


**RIO VERDE
 ENGINEERING**
 PINEDALE, WYOMING
 (307) 367-2826
 rioverde@wyoming.com

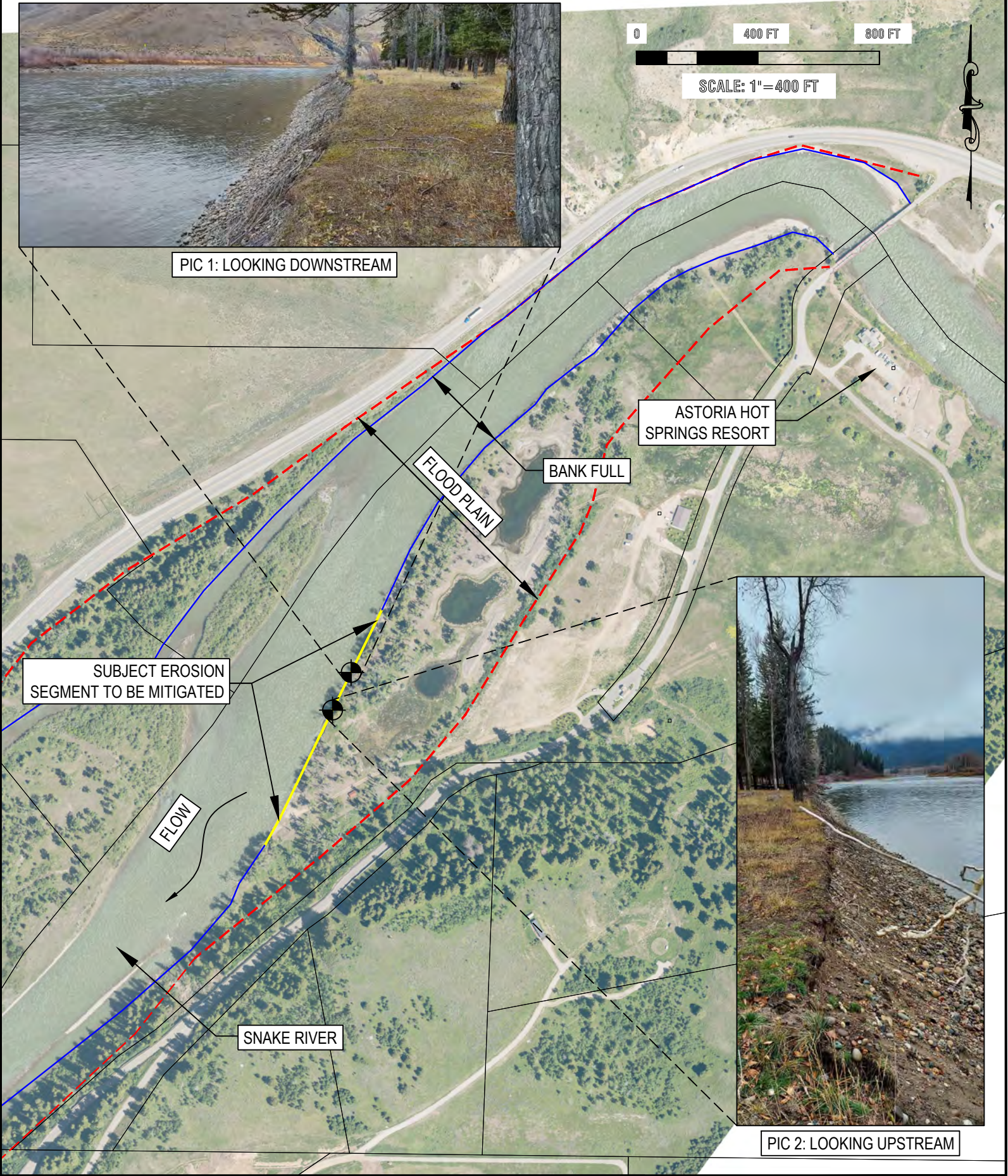


PIC 1: LOOKING DOWNSTREAM

0 400 FT 800 FT



SCALE: 1"=400 FT



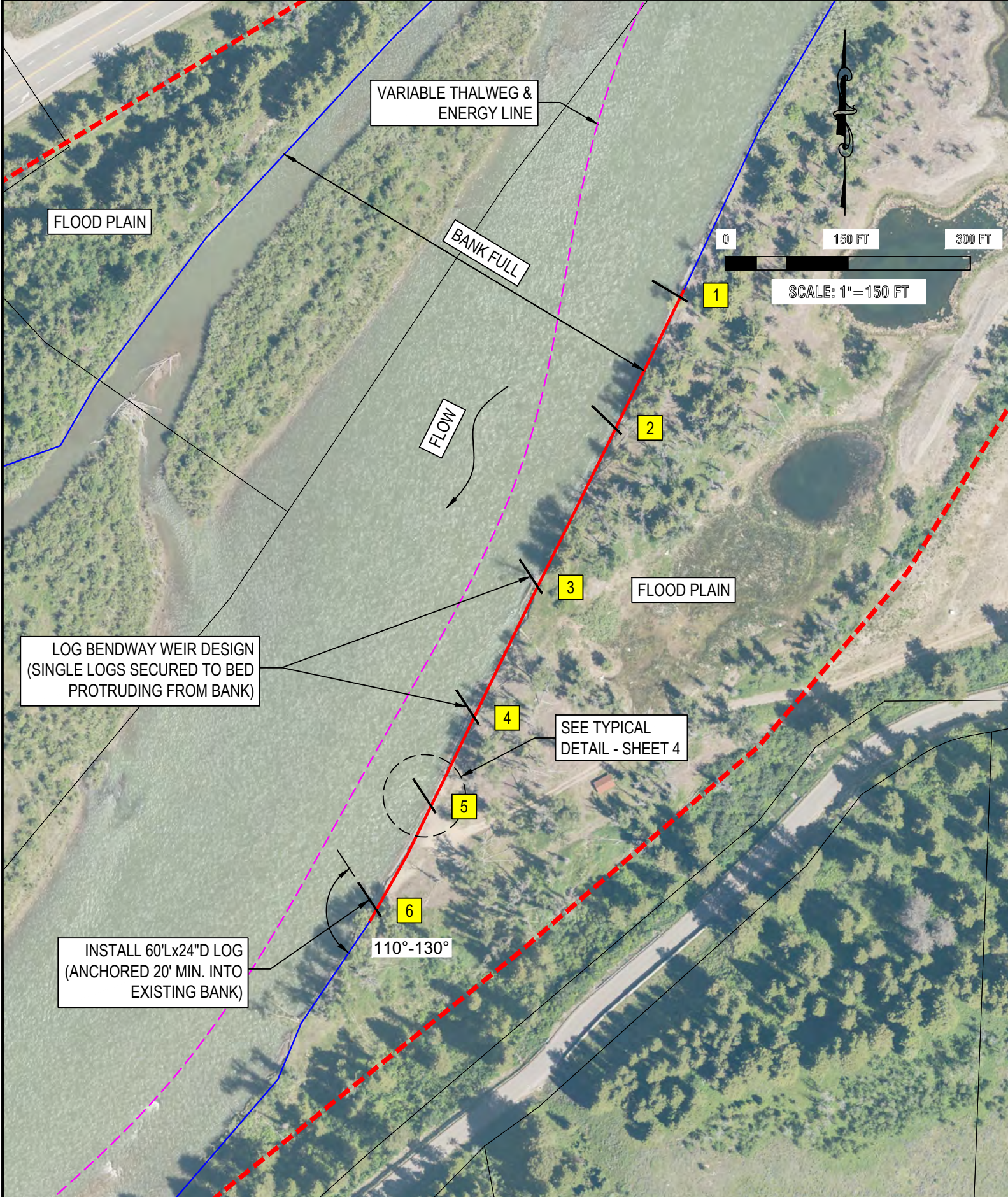
PIC 2: LOOKING UPSTREAM

DESIGNED BY: MTJ
DRAWN BY: MTJ
CHECKED BY: EAS
DATE: 09/17/21
REVISED:
JOB No. 4570
PAGE No. 2 OF 4

HOBACK RIVER WATERSHED - LEVEL I STUDY
SNAKE RIVER BANK STABILIZATION
 SMALL WATER PROJECT ID: 12.1
 LOCATED IN LOT 5 OF SECTION 32, T.39N., R.116W.,
 6TH P.M., TETON COUNTY, WY

RIO VERDE
ENGINEERING
 PINEDALE, WYOMING

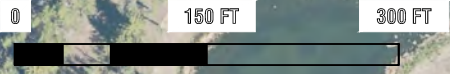
(307) 367-2826
 rioverde@wyoming.com



VARIABLE THALWEG & ENERGY LINE

FLOOD PLAIN

BANK FULL



SCALE: 1"=150 FT

FLOW

1

2

3

FLOOD PLAIN

LOG BENDWAY WEIR DESIGN
(SINGLE LOGS SECURED TO BED
PROTRUDING FROM BANK)

SEE TYPICAL
DETAIL - SHEET 4

4

5

6

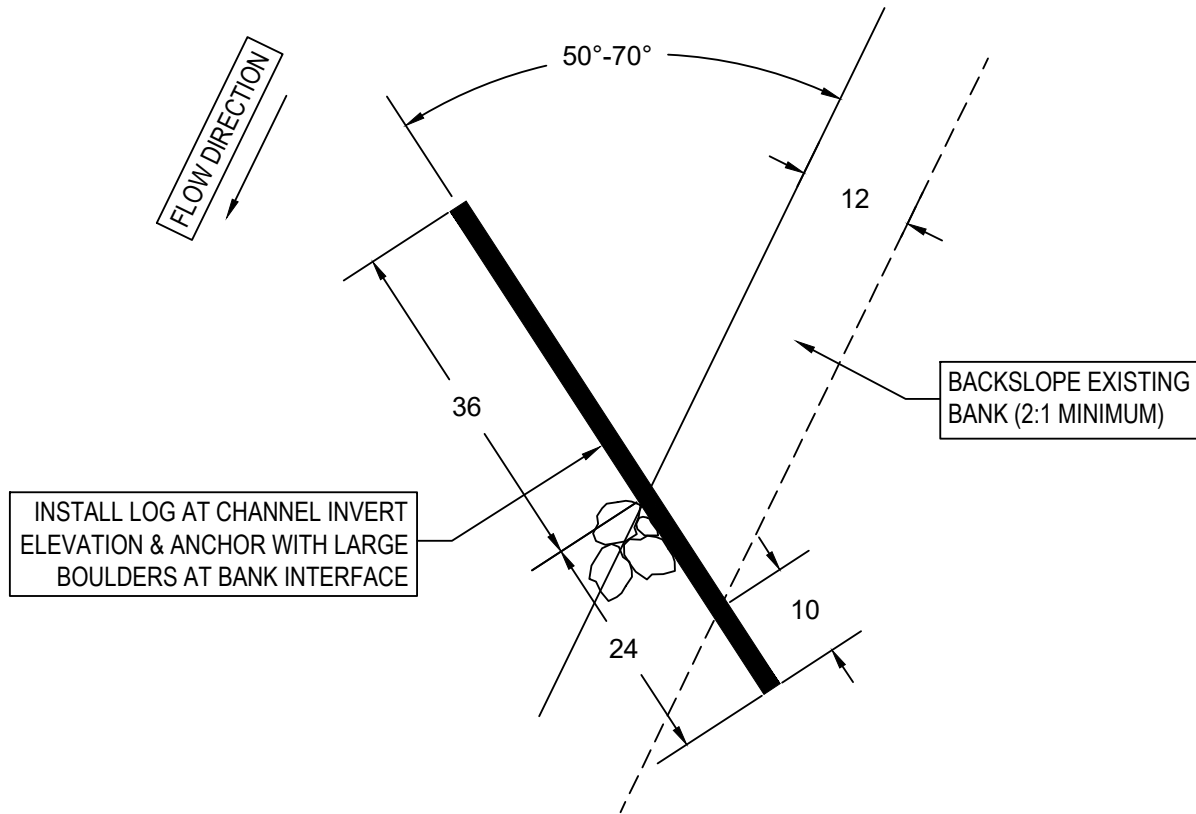
110°-130°

INSTALL 60'Lx24"D LOG
(ANCHORED 20' MIN. INTO
EXISTING BANK)

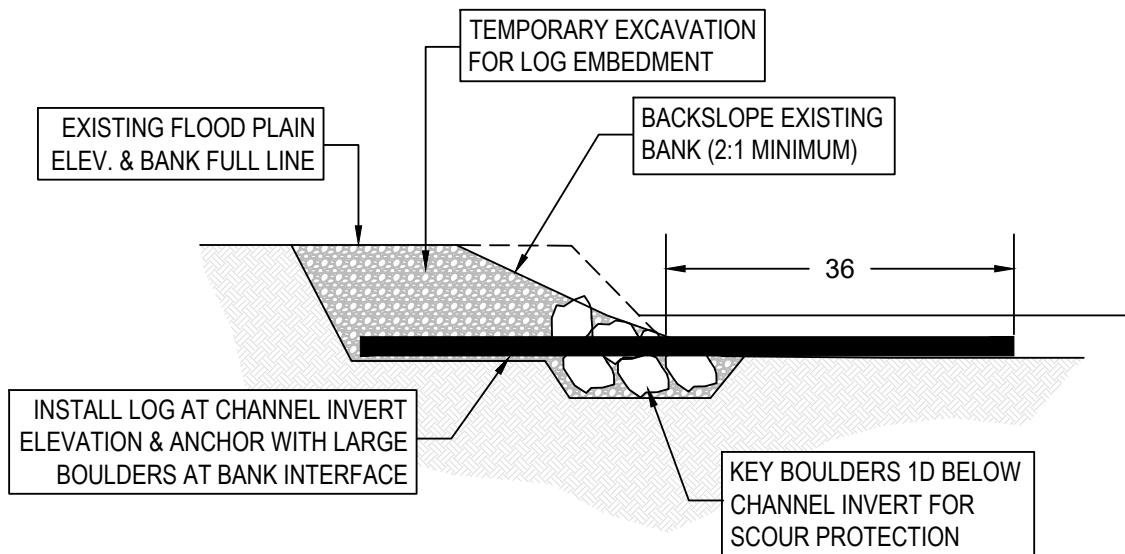
DESIGNED BY: MTJ
DRAWN BY: MTJ
CHECKED BY: EAS
DATE: 09/17/21
REVISED:
JOB No. 4570
PAGE No. 3 OF 4

HOBACK RIVER WATERSHED - LEVEL I STUDY
SNAKE RIVER BANK STABILIZATION
 SMALL WATER PROJECT ID: 12.1
 LOCATED IN LOT 5 OF SECTION 32, T.39N., R.116W.,
 6TH P.M., TETON COUNTY, WY

**RIO VERDE
ENGINEERING**
 PINEDALE, WYOMING
 (307) 367-2826
 rioverde@wyoming.com



**LOG WEIR INSTALLATION
PLAN VIEW**



**LOG WEIR INSTALLATION
PROFILE VIEW**

HOBACK RIVER WATERSHED - LEVEL I STUDY

SNAKE RIVER BANK STABILIZATION

SMALL WATER PROJECT ID: 12.1
 LOCATED IN LOT 5 OF SECTION 32, T.39N., R.116W.,
 6TH P.M., TETON COUNTY, WY



(307) 367-2826
 rioverde@wyoming.com

PINEDALE, WYOMING

DESIGNED BY: MTJ
 DRAWN BY: MTJ
 CHECKED BY: EAS
 DATE: 09/17/21
 REVISED:
 JOB No. 4570
 PAGE No. 4 OF 4

HOBACK RIVER WATERSHED STUDY LEVEL I**Owner/Operator:** Astoria Park Conservancy**Project Type:** Storage**Project ID:** 12.2**Project Name:** Astoria Park - South Pond Rehab**Location (PLSS):** Lot 5, Sec. 32, T39N, R116W**Location (Lat/Long):** 43.29754°N, 110.78194°W**PROJECT COMPONENTS (ENGINEER'S ESTIMATE)**

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1	Mobilization	1	LS	\$ 10,000.00	\$ 10,000.00
2	Pond draining & shaping	1	LS	\$ 12,000.00	\$ 12,000.00
3	Sand Placement for smoothing Rough Surface	125	CY	\$ 40.00	\$ 5,000.00
4	60-MIL HDPE Pond Liner & Installation	22000	SF	\$ 3.10	\$ 68,200.00
TOTAL COMPONENT COST (SUBTOTAL #2):					\$ 95,200.00

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$ 4,000.00
PERMITTING AND MITIGATION:	\$ 3,200.00
LEGAL FEES:	\$ -
ACQUISITION OF ACCESS AND RIGHTS-OF-WAY:	\$ -
PRE-CONSTRUCTION COSTS (SUBTOTAL #1):	\$ 7,200.00

TOTAL COMPONENT COST (SUBTOTAL #2):	\$ 95,200.00
--	---------------------

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%):	\$ 9,520.00
COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3):	\$ 104,720.00
CONTINGENCY (SUBTOTAL #3 X 15%):	\$ 15,708.00
TOTAL CONSTRUCTION COST (SUBTOTAL #4):	\$ 120,428.00

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4):	\$ 127,628.00
--	----------------------

PERMITTING REQUIREMENTS

Project ID: 12.2

Project Name: Astoria Park – South Pond Rehab

Land Jurisdiction: Private, Astoria Park Conservancy

State Engineer's Office

Current Permit: None

The existing reservoir was formerly permitted under P11521.0R for fish propagation purposes but was since cancelled in January of 2004. Said reservoir was scheduled for supply from ground water sources via U.W. 120989. Based on information received during the onsite inspection, the reservoir never functioned as designed due to the highly porous materials that make up the pit floor.

Prior to construction, a revised SW-3/SW-3A application will be required by the SEO. The ground water well has been completed however, once the well water is used for reservoir supply, a notice of beneficial use will also need to be submitted to the SEO for permit completion.

NOTE: Do not fold this permit. Use typewriter or print neatly with black ink.

STATE OF WYOMING

OFFICE OF THE STATE ENGINEER

MICRO FILMED

JAN 09 2004

#17951

\$25

B. Faigl

APPLICATION FOR PERMIT TO APPROPRIATE SURFACE WATER

THIS SECTION IS NOT TO BE FILLED IN BY APPLICANT

Filing/Priority Date

THE STATE OF WYOMING }
STATE ENGINEER'S OFFICE } SS.

CANCELLED

This instrument was received and filed for record on the 27th day of September, A.D. 1999, at 10:00 o'clock A. M.

John R. Barnes
JOHN R. BARNES, for State Engineer

Recorded in Book 57 of Reservoirs, on Page 71

Fee Paid \$ 25.00. Map filed Quad.

WATER DIVISION NO. 4 DISTRICT NO. 16 TEMPORARY FILING NO. 30 6/13

PERMIT NO. 11521 RESERVOIR Quad-1

NAME OF FACILITY

THE SRCR Trout No. 3 RESERVOIR

1. Name(s), mailing address and phone number of applicant(s) is/are Guyon (Quib), Inc. L.R. Edgcomb
1 River Bend Road 1 Johnny Counts Road, Jackson, WY 83001
Jackson, WY 83001 734-7727 O 307-733-0900 H

(If more than one applicant, designate one to act as Agent for the others)

2. Name and address of agent to receive correspondence and notices J.B. Crews, Cardinal Design Group
Thomas Thompson Box 4820 Jackson, WY 83001 2334 Rose Lane Riverton, WY 82501

3. The use to which the water is to be applied Fish Habitat Propagation

(a) If more than one beneficial use of water is to be applied for, the reservoir capacity must be allocated in acre-feet to the various uses.

Active Capacity Inactive Capacity
0 acre-feet Fish Habitat 5.6 AC-FT
Fish Propagation 5.6 acre-feet

(b) The area of the high-water line of the reservoir is 0.68 acres.

(c) The total available capacity of the reservoir is 5.6 acre-feet. (PIT RESERVOIR)

(d) If enlargement, the capacity of this enlargement is N/A acre-feet.

4. The source of the proposed appropriation is Alluvial flows of the Snake River & ground water from the Astoria #1 well, U.W. 102414 which is being re-permitted as SRCR Pond No. 1 for miscellaneous use and SRCR-SW-1, U.W. 117280.
Permit No. U.W. 120989.

5. The inlet of the proposed reservoir is located N 47° 52' W 2587 (per map) feet distant from the Southeast corner of Section 32 T 39 N R 116W W, and is in the Lot 4 of Section 32 T 39 N R 116 W.

6. Are any of the lands covered by the proposed reservoir owned by the State or Federal Government? If so, describe lands and designate whether State or Federally owned.
NO

7. Fill out for either (a) or (b). on an alluvial terrace in the Snake River Flood plain

(a) The reservoir is located in the channel X

(b) The reservoir is to be filled through the alluvial flows of Snake River and SRCR Pond No. 1 Canal, which has a carrying capacity of 100 GPM feet per second. Permit No. U.W. 120989

8. (a) The dam is to be constructed as follows: No dam - Totally excavated below grade pond

Contents = _____ Cubic Yards.

(b) The water face of the dam is to be protected from wave action in the following manner: No dam involved natural occurring rubble existing in the excavated pond

(c) The dam height, as measured by the dam crest elevation minus the lowest downstream toe elevation, is N/A feet.

*referencing in process of Astoria #1, U.W. 102414, and SRCR SW-1 U.W. Permit No. 11521 Res. Page No. 71

(Leave Blank)

9. The estimated time required for commencement of work is 1 year, for completion of construction is 1 year.

10. The accompanying map is prepared in accordance with the State Engineer's Manual of Regulations and Instructions for filing applications and is hereby declared a part of this application. The State Engineer may require the filing of detailed construction plans.

REMARKS

This reservoir will be constructed in the flood plain of the Snake River.
It will be for fish rearing and wildlife enhancement purposes.
The pond will be unlined. The pond is excavated below grade and will
float with the natural occurring ground water levels.
For request from agent to change applicant's name SEE MISCELLANEOUS NOTICES under
Permit No. 11520 Res.

** This is a pit reservoir and does not have an outlet

NOTICE

A copy of Instructions and Guidelines for filing applications will be furnished by the State Engineer's Office upon request.
This application must be accompanied by maps in duplicate, prepared in accordance with the Rules and Regulation manual (also available upon request) and by the required filing fee. All applications and maps are reviewed by the State Engineer's Office to assure compliance with both the Instructions and Guidelines and the Rules and Regulations by the applicant, the professional engineer or land surveyor.
This application is not your authority to begin construction work. You can commence work only after a permit is approved by the State Engineer.

NOTE: If construction under this application is for enlargement of an existing reservoir, the following consent to this enlargement must be completed.

CONSENT TO ENLARGE

the sole owner(s) of the _____ Reservoir, storing water from _____ under Permit No. _____ Res., for and in consideration of _____ do hereby give _____

my/our free and voluntary consent to the enlargement of said reservoir according to the terms of this application, for enlargement. (name of applicant(s))

Signature	Printed Name	Date	Acre/Feet Owned

Under penalties of perjury, I declare that I have examined this application and to the best of my knowledge and belief it is true, correct and complete.

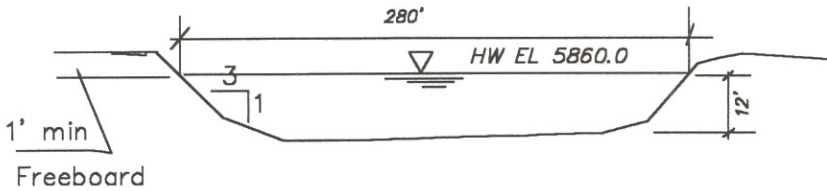
Jody B. Ciums _____ 9-24-99 _____
Signature of Applicant or Agent Date

RESERVOIR APPLICATION SUPPLEMENTAL SHEET

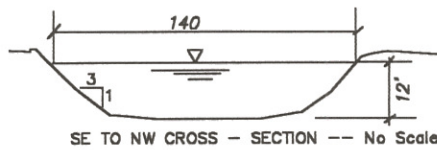
(Use with Form S.W. 3)
for

THE SRCR Trout No. 3 RESERVOIR Temporary
Filing No. 30 6/13

The following information, as applicable, must be furnished when filing applications under the provisions of Wyoming Statute 33-29-139. (Refer to Chapter VI of the Manual of Regulations and Instructions.)



SW TO NE CROSS - SECTION --- No Scale



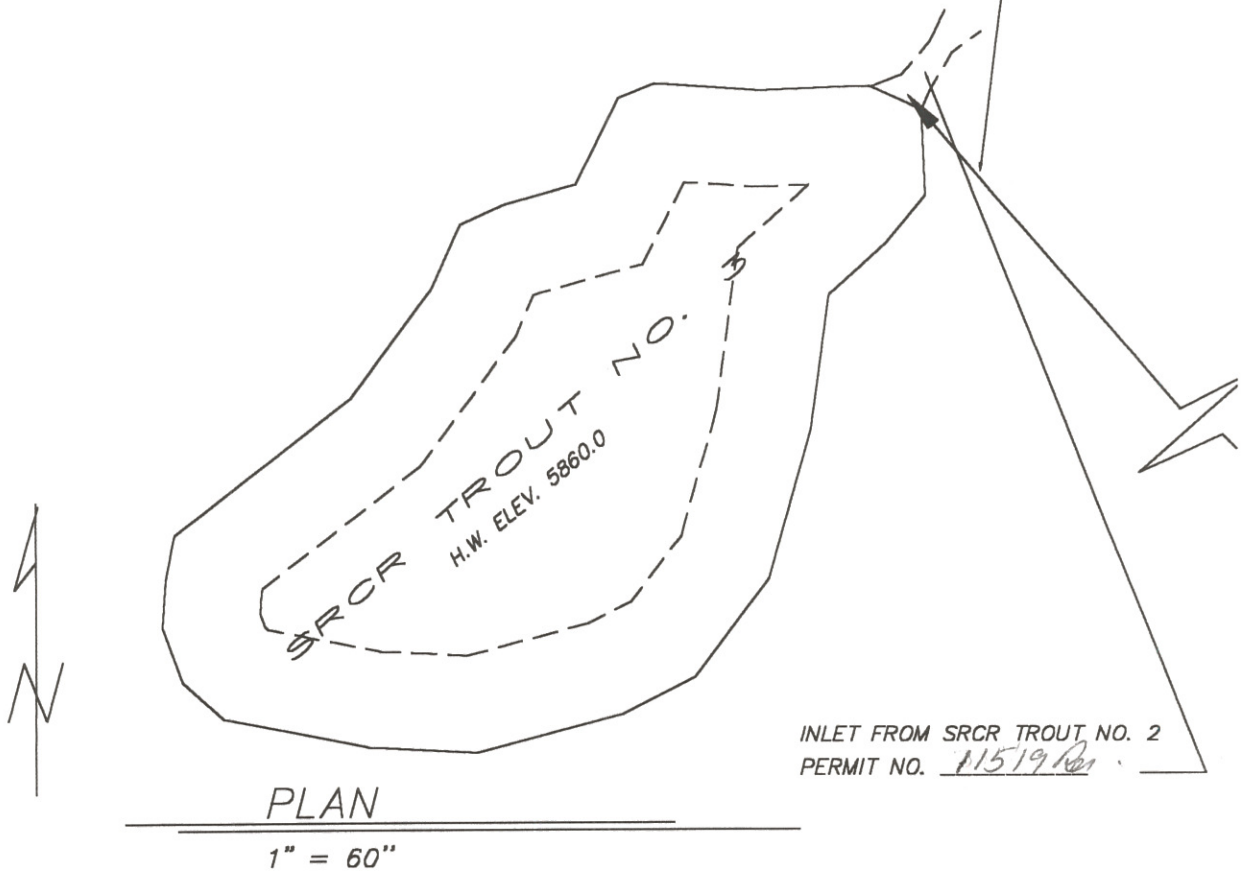
SE TO NW CROSS - SECTION --- No Scale

RESERVOIR CROSS SECTIONS

CAPACITY CALCULATION

Area at High Water Line [HWL] : 0.68 acre
 Area at Bottom: 0.25 acres
 Depth: 12 Feet
 TOTAL CAPACITY = $(0.68+0.25) * 12/2 = 5.6$ acre-feet
 INACTIVE CAPACITY = 5.6 acre-feet [Pit Reservoir]

TIE TO SE CORNER
 SECTION 32
~~N47°53'W 2,589'~~
 N 47°52' W - 2587 feet
 (per map)



PLAN

1" = 60"

INLET FROM SRCR TROUT NO. 2
 PERMIT NO. 11519 Res.

Under penalties of perjury, I declare that I have examined this application and the information contained herein, and to the best of my knowledge and belief it is true, correct and complete, and that the location of the proposed facility is accurately shown on an aerial photograph or U.S.G.S. quadrangle map accompanying this application.

Jim B. Cies
 Signature of Applicant or Agent

9-24-99
 Date

Permit No. 11521 Res.

Page No. 71

THIS IS TO CERTIFY that I have examined the foregoing application and do hereby grant the same subject to the following limitations and conditions:

This permit grants only the right to use the water available in the stream after all prior rights are satisfied.

This permit is granted for storage of 5.6 acre-feet (all inactive capacity) of water from all sources in any one year, for fish propagation only. The source permitted hereunder is U.W. 120989 **AND** alluvial flows of the Snake River.

For reservoir supply groundwater well, see Permit No. U.W. 120989, the SRCR Pond #1 Well. Water from the ground water well will be routed through the SRCR Trout Reservoirs 1-3, in sequence.

Water diverted from the alluvial flow of the Snake River will be routed through the SRCR Trout Reservoirs 1-3, in sequence.

Since the plans show that no outlet works are contemplated, the State Engineer may upon proper complaint by other interested water appropriators or appropriator, or when in his judgment it is necessary, require the later installation of necessary outlet works or construction of a by-pass ditch or other means which will permit proper regulation.

If the material excavated from this pit is spoiled on the downstream side of the pit, proper measures must be taken by the holder of this permit to ensure that no water is impounded against the resulting berm in excess of the storage capacity authorized by this permit.

The time for completing the construction of the reservoir shall terminate on December 31, 20 04.

Witness my hand this 14 day of July, A.D. 2003.


PATRICK T. TYRRELL, State Engineer

Permit No. 1 15 21 Res.

Page No. 71
(Leave Blank)

PERMIT NO. 11521 RES.


Quad-1
PERMIT STATUS

Priority Date September 27, 1999

Approval Date July 14, 2003

September 30, 2004 Notice of expiration of time for completion of construction mailed.

December 5, 2004 EXTENSION GRANTED, IN RESPONSE TO REQUEST RECEIVED November 22, 2004. Time for completion of construction has been extended to December 31, 2005. Letter filed in Extensions Granted under Permit No. 11519R.


JOHN R. BARNES, Administrator
Surface Water and Engineering
MICRO FILMED JAN 14 2005

September 30, 2005 Notice of expiration of time for completion of construction mailed.

March 21, 2006 This permit **CANCELLED** in accordance with provisions of Section 41-4-506, Wyoming Statutes.


PATRICK T. TYRRELL, State Engineer
SCANNED MAY 04 2006
MICRO FILMED AUG 18 2006

NOTICE

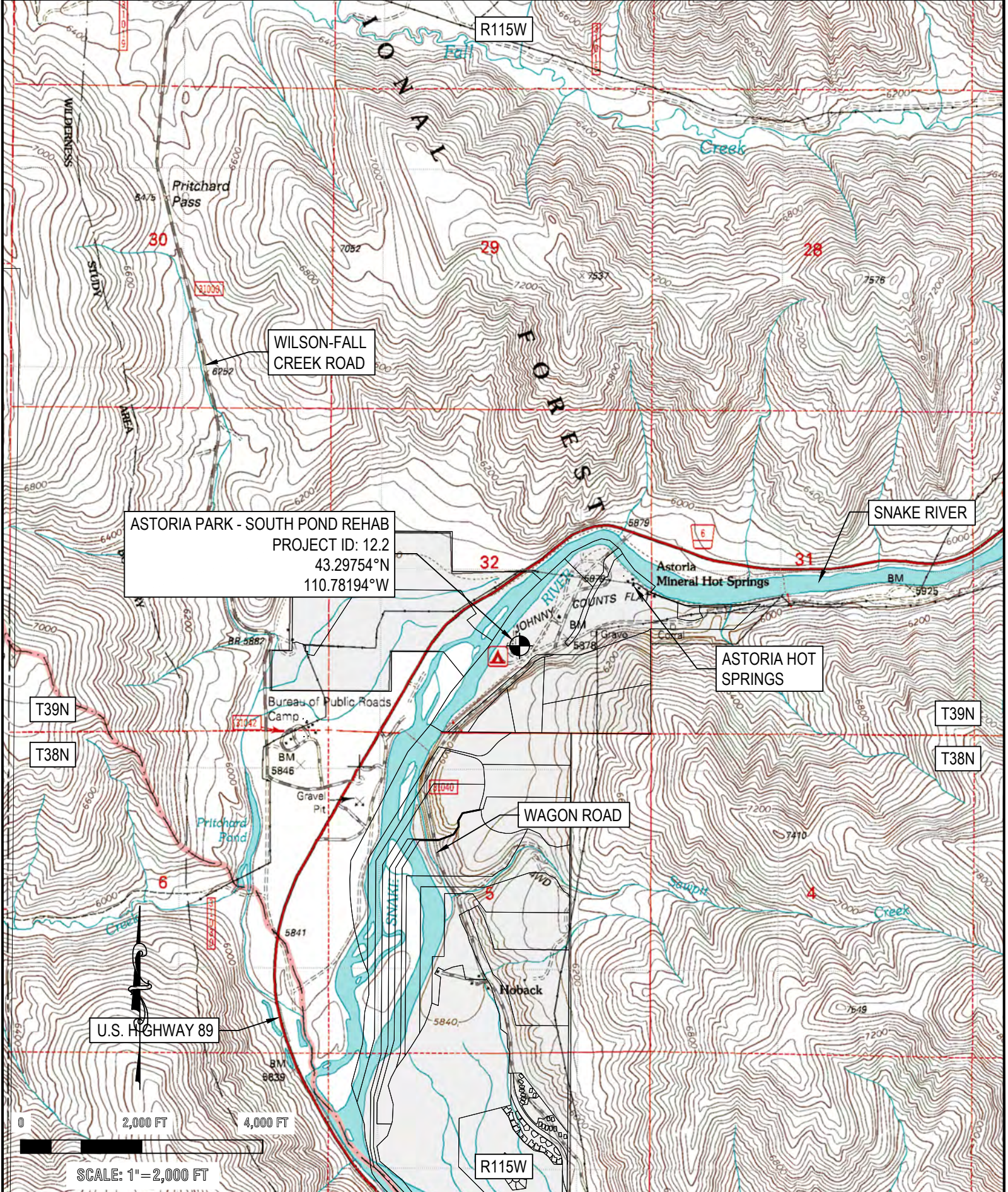
This permit, does not constitute a complete water right. It is your authority to begin construction work, which must be commenced within the time allowed in the permit.

Notice of completion of the work described in the permit, must be filed in the State Engineer's Office before the expiration of the time allowed in the permit.

If extensions of time beyond the time limits set forth in the permit are required, requests for same must be in writing, stating why the additional time is required, and must be received in the State Engineer's Office before the expiration of the time allowed in the permit.

Once the Notice of Completion has been filed, Proof of Appropriation will be prepared and sent to your Water Division Superintendent. The Superintendent will arrange with you for an inspection of the facility. After execution, the Proof will be considered by the Board of Control, and, if found to be satisfactory, the Board will issue to you a Certificate of Construction which will constitute a completed water right.

The granting of a permit does not constitute the granting of right-of-way. If any right-of-way is necessary in connection with the application it should be understood that this responsibility is the applicant's.



ASTORIA PARK - SOUTH POND REHAB
 PROJECT ID: 12.2
 43.29754°N
 110.78194°W

WILSON-FALL
 CREEK ROAD

SNAKE RIVER

ASTORIA HOT
 SPRINGS

WAGON ROAD

U.S. HIGHWAY 89

0 2,000 FT 4,000 FT

SCALE: 1" = 2,000 FT

HOBACK RIVER WATERSHED - LEVEL I STUDY ASTORIA PARK - SOUTH POND REHAB SMALL WATER PROJECT ID: 12.2 LOCATED IN LOT 5 OF SECTION 32, T.39N., R.116W., 6TH P.M., TETON COUNTY, WY	
DESIGNED BY: MTJ	
DRAWN BY: MTJ	
CHECKED BY: EAS	
DATE: 09/17/21	
REVISED:	
JOB No. 4570	
PAGE No. 1 OF 3	



RIO VERDE
ENGINEERING
 PINEDALE, WYOMING

(307) 367-2826
 rioverde@wyoming.com

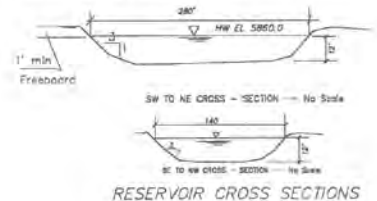


Form S.W. 3-A
Rev. 2-95

RESERVOIR APPLICATION SUPPLEMENTAL SHEET
(Use with Form S.W. 3)
for

THE SRCR Trout No. 3 RESERVOIR Temporary
Filing No. 30 6/11

The following information, as submitted, must be submitted when filing applications under the provisions of Wyoming Statute 22-25-128 (Refer to Chapter 19 of the Manual of Regulations and Instructions.)

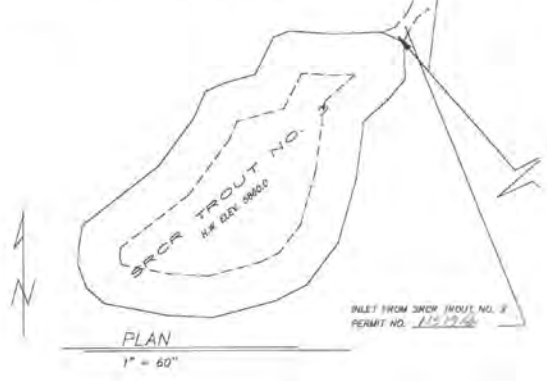


RESERVOIR CROSS SECTIONS

CAPACITY CALCULATION:

Area of High Water Line (HWL):	0.88	acres
Area of Bottom:	0.25	acres
Depth:	12	feet
TOTAL CAPACITY = (0.88+0.25) * 12/2	= 5.8	acres-feet
INACTIVE CAPACITY = 5.8	acres-feet	(Per Reservoir)

TIE TO SE CORNER
SECTION 32
N 47°52' W - 2587 Feet
(per map)



I, the undersigned, declare that I have examined this application and the information contained herein, and to the best of my knowledge and belief, it is true, correct and complete, and that the location of the proposed facility is accurately shown on an aerial photograph or U.S.C.S. topographic map accompanying this application.

Signature of Applicant or Agent

0-28-99
Date

Permit No. 11521 Res.

Page No. 71

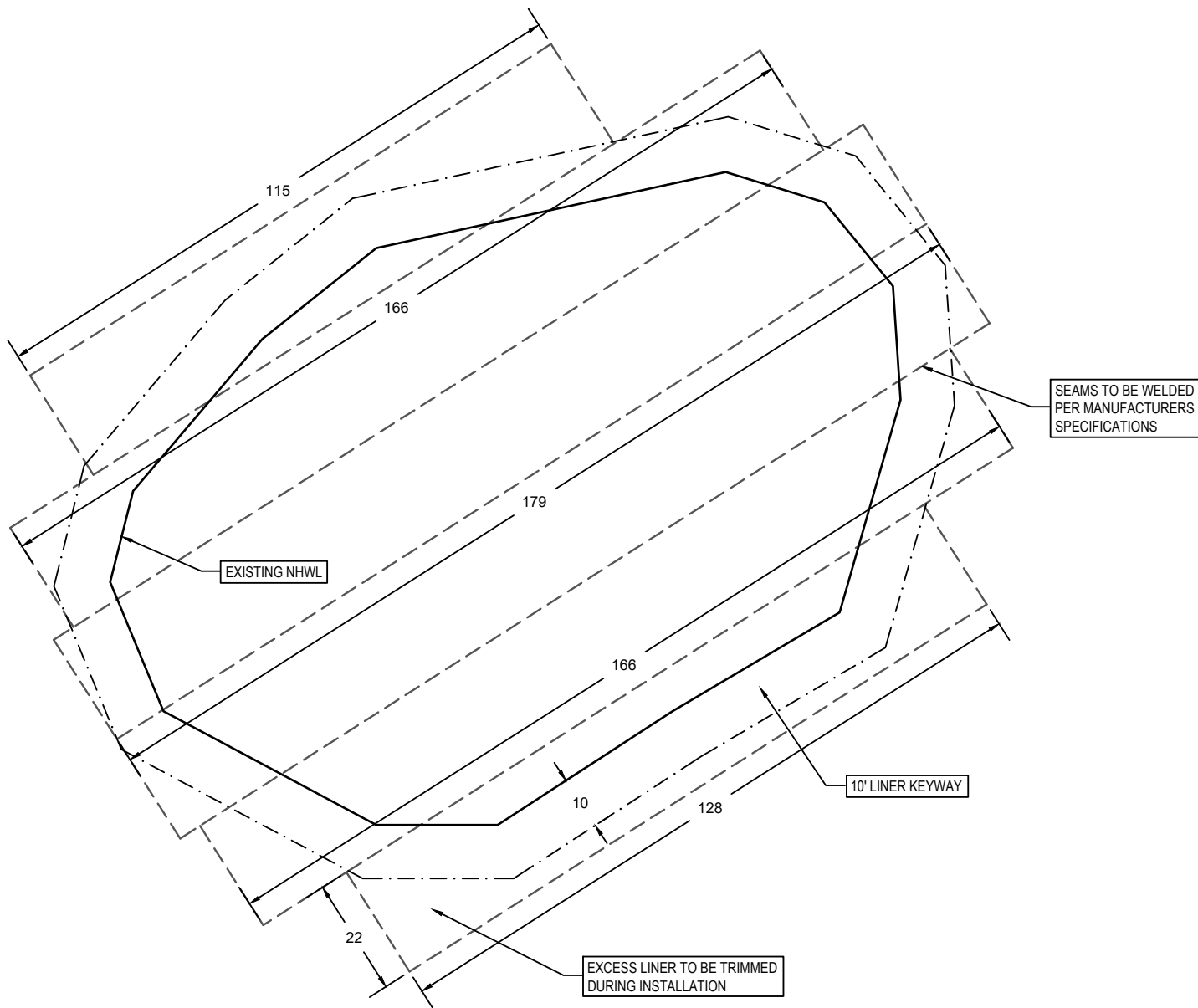
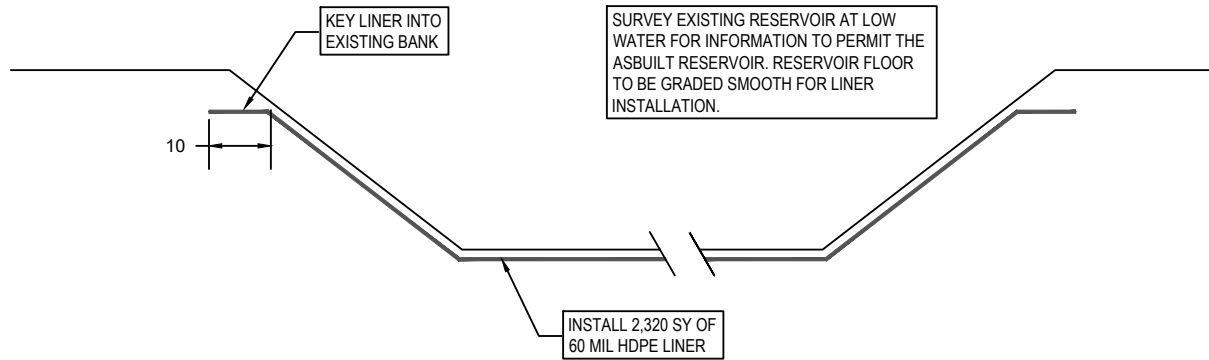
***NOTE:**
SUBJECT POND WAS ORIGINALLY APPLIED FOR UNDER P11521.0R AS SRCR TROUT No. 3 RES IN SEPTEMBER OF 1999. SAID PERMIT WAS LATER CANCELED IN MARCH, 2006 DUE TO FAILURE TO PROVIDE NOTICE OF COMPLETION OF CONSTRUCTION.

DESIGNED BY: MTJ
DRAWN BY: MTJ
CHECKED BY: EAS
DATE: 09/17/21
REVISED:
JOB No. 4570
PAGE No. 2 OF 3

HOBACK RIVER WATERSHED - LEVEL I STUDY
ASTORIA PARK - SOUTH POND REHAB
SMALL WATER PROJECT ID: 12.2
LOCATED IN LOT 5 OF SECTION 32, T.39N., R.116W.,
6TH P.M., TETON COUNTY, WY

RIO VERDE ENGINEERING
PINEDALE, WYOMING
(307) 367-2826
rioverde@wyoming.com

**LINER INSTALLATION
CROSS SECTION VIEW**



**LINER INSTALLATION
PLAN VIEW**

HOBACK RIVER WATERSHED - LEVEL I STUDY
ASTORIA PARK - SOUTH POND REHAB
 SMALL WATER PROJECT ID: 12.2
 LOCATED IN LOT 5 OF SECTION 32, T.39N., R.116W.,
 6TH P.M., TETON COUNTY, WY

**RIO VERDE
ENGINEERING**
 PINEDALE, WYOMING
 (307) 367-2826
 rioverde@wyoming.com

DESIGNED BY: MTJ
 DRAWN BY: MTJ
 CHECKED BY: EAS
 DATE: 09/17/21
 REVISED:
 JOB No. 4570
 PAGE No. 3 OF 3

LONG DRAW SPRING NO. 1 PROJECT

Owner/Operator: Nield, Kaylyn

Project Type: Spring Development

Project Name: Long Draw Spring No. 1 Project

Project ID: 13.1

Location (PLSS): SE/4 NW/4 OF SEC. 18, T.36N., R.116W.

Location (Lat/Long): 43.09328° N, 110.73036° W

PROJECT COMPONENTS (ENGINEER'S ESTIMATE) - ITEMIZED COSTS

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1	Mobilization	1	LS	\$ 6,000.00	\$ 6,000.00
2	12' Dia. TIRE STOCK TROUGH, COMPLETE-IN-PLACE	1	LS	\$ 14,000.00	\$ 14,000.00
3	2" SDR-11 HDPE PIPE	500	LF	\$ 4.00	\$ 2,000.00
4	4" SDR-11 HDPE PIPE (DRAINS)	100	LF	\$ 8.50	\$ 850.00
5	2" SDR-11 FUSED TEE	3	EA	\$ 160.00	\$ 480.00
6	2" POLY-VALVE	4	EA	\$ 300.00	\$ 1,200.00
7	4" POLY-VALVE	1	EA	\$ 650.00	\$ 650.00
8	1" STAND-PIPE AIR VENTS W/ SADDLES	2	EA	\$ 100.00	\$ 200.00
9	8" DIA. VALVE RISERS (VARYING LENGHTS)	4	EA	\$ 600.00	\$ 2,400.00
10	VALVE ENCLOSURE (AIR & DRAIN)	1	EA	\$ 35.00	\$ 35.00
11	30" WATER CATCHMENT DEVELOPMENT	1	LS	\$ 8,000.00	\$ 8,000.00
TOTAL COMPONENT COST (SUBTOTAL #2):					\$ 35,815.00

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$ 6,500.00
PERMITTING AND MITIGATION:	\$ 4,000.00
LEGAL FEES:	\$ -
ACQUISITION OF ACCESS AND RIGHTS-OF-WAY:	\$ 850.00
PRE-CONSTRUCTION COSTS (SUBTOTAL #1):	\$ 11,350.00

TOTAL COMPONENT COST (SUBTOTAL #2): **\$ 35,815.00**

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%):	\$ 3,581.50
COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3):	\$ 39,396.50
CONTINGENCY (SUBTOTAL #3 X 15%):	\$ 5,909.48
TOTAL CONSTRUCTION COST (SUBTOTAL #4):	\$ 45,305.98

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): **\$ 56,655.98**

PERMITTING REQUIREMENTS

Project ID: 13.1

Project Name: Long Draw Spring No. 1

Land Jurisdiction: Federal, USFS

U.S. Army Corp of Engineer's (USACE)

A project plan set should be submitted to the USACE Wyoming Regulatory Office for review prior to final submission to the WWDO. Due to the small quantity of fill associated with the installation of the spring collector, and the fact that the pipeline and trough will be located on uplands, a wetland delineation and pre-construction notification are not being anticipated as a requirement. However, final determination rests with the Wyoming Regulatory Office. A USACE letter of acceptance should be submitted to the WWDO with the final design, prior to construction.

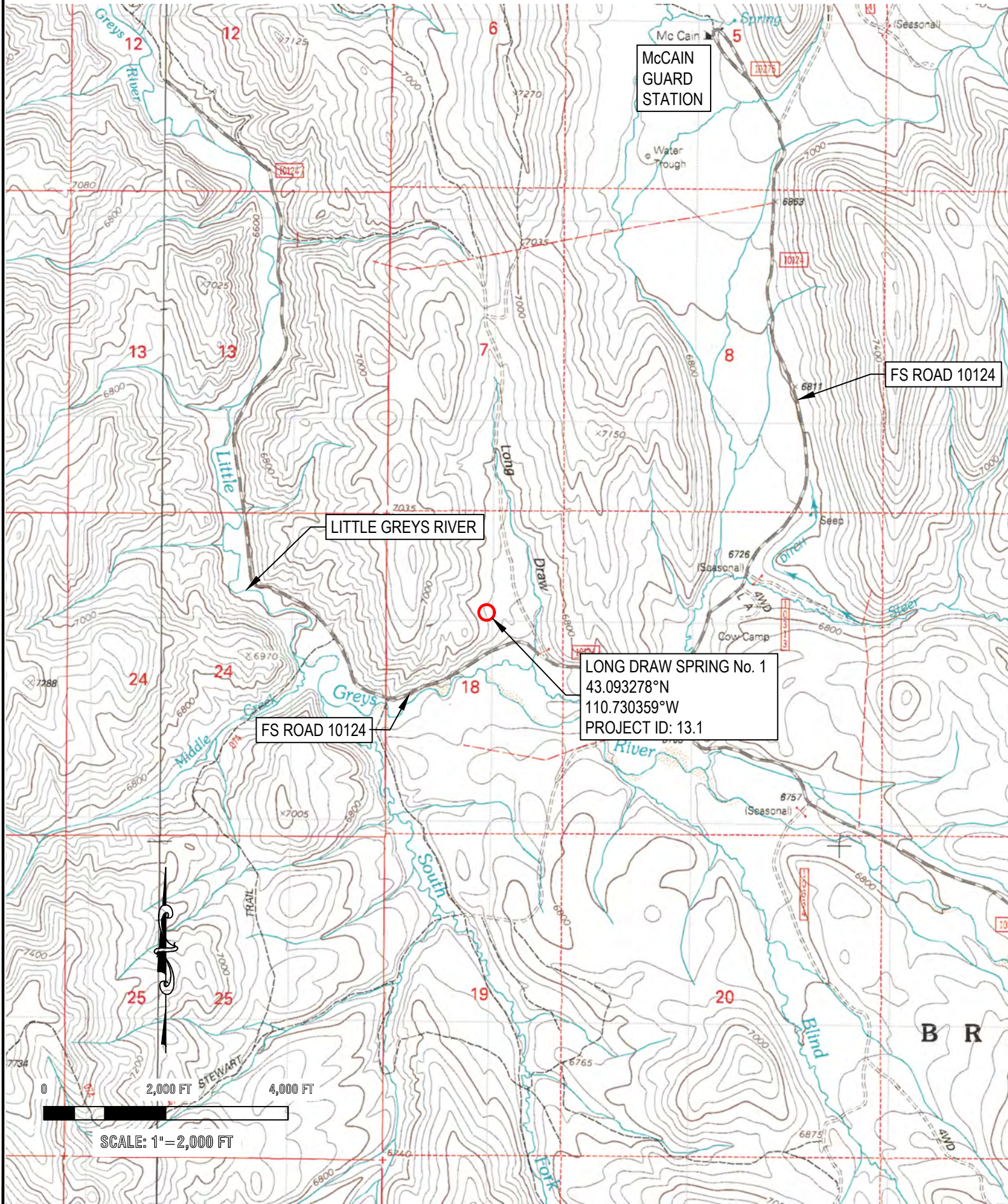
State Engineer's Office

Current Permit: None

As this project involves the development of an existing spring for stock water purposes, an application for permit to appropriate ground water should be submitted to the SEO. The SEO permit should then be submitted to the WWDO with the final project plans, prior to construction. Following construction, a statement of completion and proof of appropriation and beneficial use of groundwater should be completed and submitted to the SEO – Groundwater Division.

U.S. Forest Service – Bridger National Forest

A special use permit will be required for this project. An SF-299 right-of-way acquisition will need to be completed by the applicant. An environmental assessment is not believed to be necessary regarding the spring development, however an on-site meeting should be held with USFS personnel prior to SF-299 completion. Additional assessments or studies may be necessary depending on site conditions and review with USFS personnel.



McCain
Guard
Station

FS Road 10124

LITTLE GREYS RIVER

LONG DRAW SPRING No. 1
43.093278°N
110.730359°W
PROJECT ID: 13.1

FS ROAD 10124

SCALE: 1" = 2,000 FT

<p>HOBACK RIVER WATERSHED - LEVEL I STUDY LONG DRAW SPRING NO. 1 SMALL WATER PROJECT ID: 13.1 LOCATED IN SE¼ NW¼ SECTION 18, T.36N., R.116W., 6TH P.M., LINCOLN COUNTY, WY</p>				
DESIGNED BY: AFS	DRAWN BY: AFS	CHECKED BY: MTJ	DATE: 5/25/22	REVISIONS:
JOB No.: 4570	PAGE No.: 1 OF 4			



RIO VERDE
ENGINEERING
 PINEDALE, WYOMING

(307) 367-2826
 rioverde@wyoming.com



HILLSIDE SPRING

LONG DRAW

NEW INSTALL SPRING BOX DEVELOPMENT FOR SUPPLY LINE- EL. 6745'

INSTALL 500 L.F. OF 2" SDR 11 HDPE SUPPLY PIPE

INSTALL TROUGH TANK #1 - EL. 6726'
100 L.F. OF 4" DRAINS

LONG DRAW SPRING NO. 1

LITTLE GREYS RIVER RD.
FOREST ROAD 10124

LITTLE GREYS RIVER



TANK AREA

0 300 FT 600 FT

SCALE: 1" = 300 FT

HOBACK RIVER WATERSHED - LEVEL I STUDY

LONG DRAW SPRING NO. 1

SMALL WATER PROJECT ID: 13.1

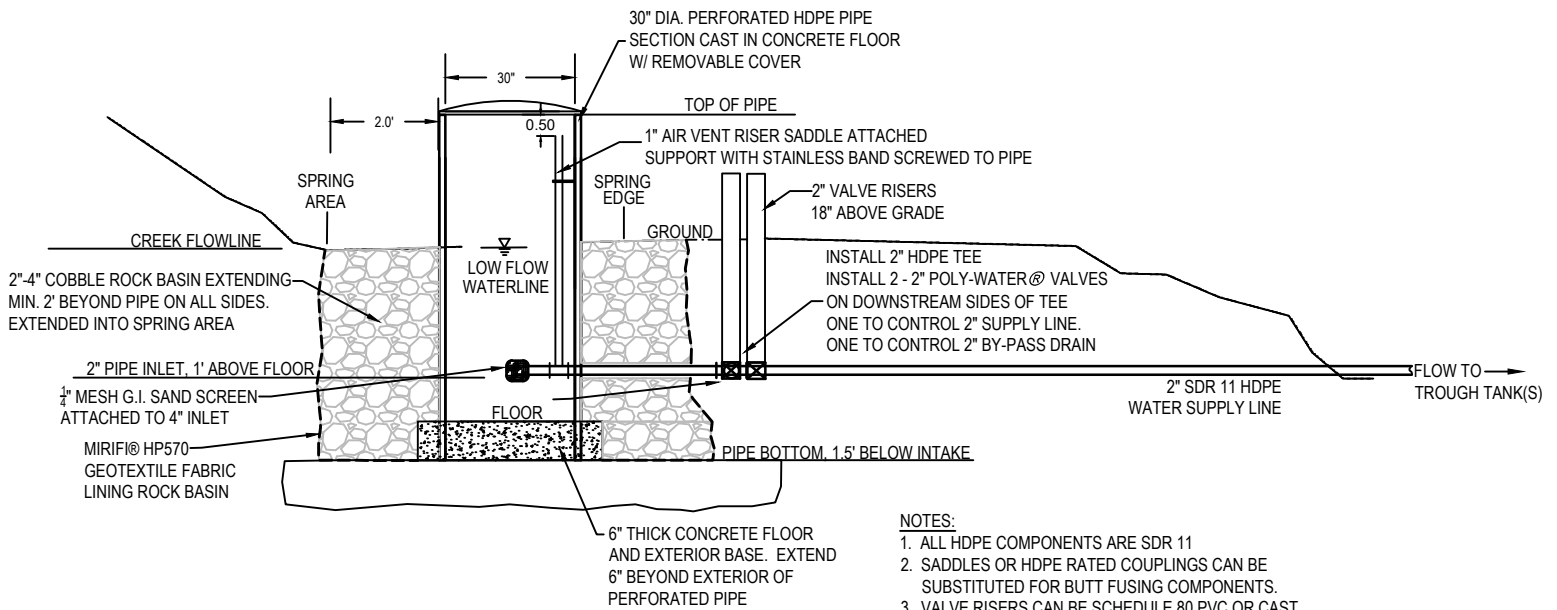
LOCATED IN SE $\frac{1}{4}$ NW $\frac{1}{4}$ SECTION 18, T.36N., R.116W., 6TH P.M., LINCOLN COUNTY, WY



RIO VERDE
ENGINEERING
PINEDALE, WYOMING

(307) 367-2826
rioverde@wyoming.com

DESIGNED BY: APS
DRAWN BY: APS
CHECKED BY: MTJ
DATE: 5/25/22
REVISED:
JOB No: 4570
PAGE No: 2 OF 4



WATER CATCHMENT STRUCTURE

N.T.S.

NOTES:

1. ALL HDPE COMPONENTS ARE SDR 11
2. SADDLES OR HDPE RATED COUPLINGS CAN BE SUBSTITUTED FOR BUTT FUSING COMPONENTS.
3. VALVE RISERS CAN BE SCHEDULE 80 PVC OR CAST IRON COMPONENTS, BUT SHOULD BE INSTALLED TO PREVENT THEM FROM BEING PULLED FROM THE GROUND.

HOBACK RIVER WATERSHED - LEVEL I STUDY

LONG DRAW SPRING NO. 1

SMALL WATER PROJECT ID: 13.1

LOCATED IN SE $\frac{1}{4}$ NW $\frac{1}{4}$ SECTION 18, T.36N., R.116W., 6TH P.M.,
LINCOLN COUNTY, WY



**RIO VERDE
ENGINEERING**
PINEDALE, WYOMING

(307) 367-2826
rioverde@wyoming.com

DESIGNED BY: APS

DRAWN BY: APS

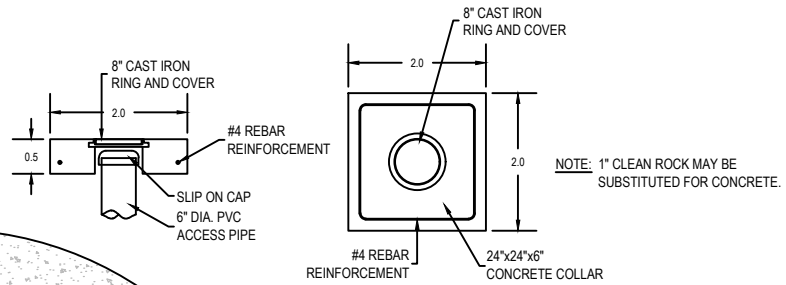
CHECKED BY: MTJ

DATE: 5/25/22

REVISED:

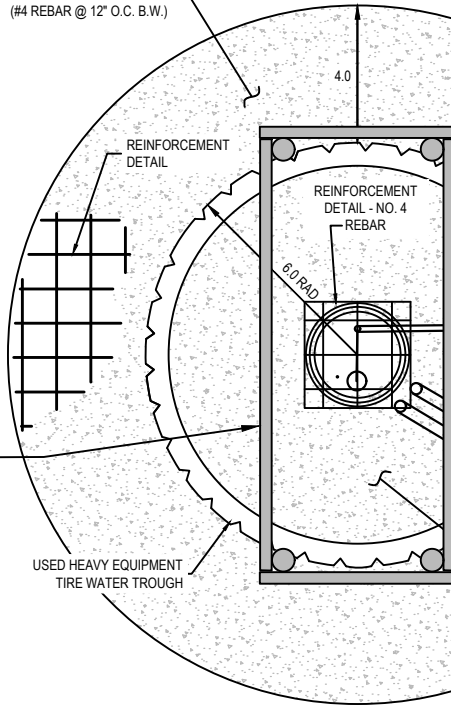
JOB No: 4570

PAGE No: 3 OF 4



**PROTECTIVE COVER
DETAIL**

6"x4" REINFORCED
CONCRETE COLLAR
(#4 REBAR @ 12" O.C. B.W.)



**WATER TROUGH
PLAN VIEW**

4-RAIL WOOD BARRIER FENCE
6' TALL x 8' Ø POSTS
5-6' Ø MIN. RAILS EVENLY
SPACED FROM TOP OF TIRE TO
TOP OF POSTS. RAILS ARE
APPROXIMATELY 12 FT LONG AS
SHOWN.
USER MAY ADJUST AS NEEDED
FIT LIVESTOCK USES.

USED HEAVY EQUIPMENT
TIRE WATER TROUGH

2" DIA. WATER SUPPLY
PIPE FROM WELL SUPPLY
INSTALL 2"x2"x2"
TEE FITTING
INSTALL 2"
MANUAL VALVE

INSTALL 6" PVC SLEEVE W/
REMOVABLE SLIP ON CAP (SEE
PROTECTIVE COVER DETAIL)

NOTE: AT LAST TROUGH ON EACH
SUPPLY LINE (#1 & #2) LOCATIONS
INSTALL A 2" VALVE ON
DOWSTREAM SIDE OF TEE AND
DAYLIGHT 2" MAIN SUPPLY TO
DISCHARGE AREA

+1.0% MIN.

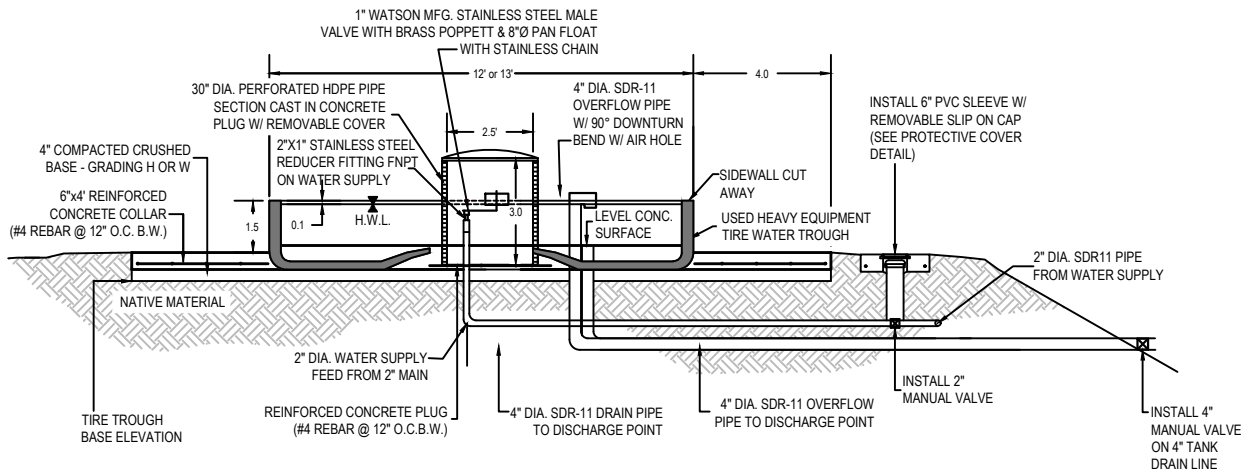
2" MAIN TO NEXT TANK.
DAYLIGHT IF LAST TANK.

4" DIA. SDR-11 DRAIN PIPE LENGTH AS
NEEDED TO DISCHARGE AREA, 20' MIN.)

INSTALL 4" MANUAL VALVE
FOR TANK DRAIN
AT DAYLIGHT POINT

4" DIA. SDR-11 OVERFLOW PIPE
LENGTH AS NEEDED TO DISCHARGE
AREA, 20' MIN.)

NOTE:
THE DEPICTED TROUGH AND WATER SUPPLY SYSTEM IS INTENDED FOR
SEASONAL USE ONLY. THE MANUAL BYPASS VALVE SHALL BE PLACED IN
THE OPEN POSITION FOR DRAINING OR BYPASSING OPERATIONS. THE
EXPANSION PLUG WITHIN THE ACTUAL TROUGH SHALL ALSO BE REMOVED
FOR EFFECTIVE TANK DRAINING DURING THE WINTERIZATION PROCESS.
ACTUAL ALIGNMENT OF WATER SUPPLY AND DRAIN LINES SHOULD BE
CONSTRUCTED TO FIT EACH INDIVIDUAL TROUGH SITE.



**WATER TROUGH TANK
SECTION VIEW**

NOTE: IT IS THE CONTRACTOR'S RESPONSIBILITY TO HAVE
UTILITY LOCATES PERFORMED FOR THIS PROJECT
SITE PRIOR TO ANY DIGGING OR EXCAVATION.

HOBACK RIVER WATERSHED - LEVEL I STUDY

LONG DRAW SPRING NO. 1

SMALL WATER PROJECT ID: 13.1

LOCATED IN SE $\frac{1}{4}$ NW $\frac{1}{4}$ SECTION 18, T.36N., R.116W., 6TH P.M.,
LINCOLN COUNTY, WY



(307) 367-2826
rioverde@wyoming.com

DESIGNED BY: APS
DRAWN BY: APS
CHECKED BY: MTJ
DATE: 5/25/22
REVISED:
JOB No: 4570
PAGE No: 4 OF 4

LONG DRAW SPRING NO. 1 PROJECT

Owner/Operator: Nield, Kaylyn

Project Type: Spring Development

Project Name: Mac's Pass Spring Rehabilitation Project

Project ID: 13.2

Location (PLSS): NW/4 NE/4 OF SEC. 7, T.36N., R.116W.

Location (Lat/Long): 43.10968° N, 110.73006° W

PROJECT COMPONENTS (ENGINEER'S ESTIMATE) - ITEMIZED COSTS

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1	Mobilization	1	LS	\$ 6,000.00	\$ 6,000.00
2	12' Dia. TIRE STOCK TROUGH, COMPLETE-IN-PLACE	1	LS	\$ 14,000.00	\$ 14,000.00
3	2" SDR-11 HDPE PIPE	450	LF	\$ 4.00	\$ 1,800.00
4	4" SDR-11 HDPE PIPE (DRAINS)	100	LF	\$ 8.50	\$ 850.00
5	2" SDR-11 FUSED TEE	3	EA	\$ 160.00	\$ 480.00
6	2" POLY-VALVE	4	EA	\$ 300.00	\$ 1,200.00
7	4" POLY-VALVE	1	EA	\$ 650.00	\$ 650.00
8	1" STAND-PIPE AIR VENTS W/ SADDLES	2	EA	\$ 100.00	\$ 200.00
9	8" DIA. VALVE RISERS (VARYING LENGHTS)	4	EA	\$ 600.00	\$ 2,400.00
10	VALVE ENCLOSURE (AIR & DRAIN)	1	EA	\$ 35.00	\$ 35.00
11	30" WATER CATCHMENT DEVELOPMENT	1	LS	\$ 8,000.00	\$ 8,000.00
TOTAL COMPONENT COST (SUBTOTAL #2):					\$ 35,615.00

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$ 6,500.00
PERMITTING AND MITIGATION:	\$ 1,500.00
LEGAL FEES:	\$ -
ACQUISITION OF ACCESS AND RIGHTS-OF-WAY:	\$ -
PRE-CONSTRUCTION COSTS (SUBTOTAL #1):	\$ 8,000.00

TOTAL COMPONENT COST (SUBTOTAL #2): **\$ 35,615.00**

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%):	\$ 3,561.50
COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3):	\$ 39,176.50
CONTINGENCY (SUBTOTAL #3 X 15%):	\$ 5,876.48
TOTAL CONSTRUCTION COST (SUBTOTAL #4):	\$ 45,052.98

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): **\$ 53,052.98**

PERMITTING REQUIREMENTS

Project ID: 13.2

Project Name: Mac's Pass Spring Rehabilitation

Land Jurisdiction: Federal, USFS

U.S. Army Corp of Engineer's (USACE)

A project plan set should be submitted to the USACE Wyoming Regulatory Office for review prior to final submission to the WWDO. Due to the small quantity of fill associated with the installation of the spring collector, and the fact that the pipeline and trough will be located on uplands, a wetland delineation and pre-construction notification are not being anticipated as a requirement. However, final determination rests with the Wyoming Regulatory Office. A USACE letter of acceptance should be submitted to the WWDO with the final design, prior to construction.

State Engineer's Office

Current Permit: U.W. 72726

This project involves the rehabilitation of an existing permitted spring for stock water purposes. No additional permits are necessary for rehabilitation. However, the proposed rehab plan should be verified by the SEO to ensure that the existing permit will cover the proposed improvements.

U.S. Forest Service – Bridger National Forest

A special use permit exists for this project. An environmental assessment is not believed to be necessary regarding the spring rehab, however an on-site meeting should be held with USFS personnel prior to SF-299 completion. Additional assessments or studies may be necessary depending on site conditions and review with USFS personnel.

INSTALL TROUGH
TANK #1 - EL. 6918'
40 L.F. OF 2" DRAIN

INSTALL 450 L.F. OF 2" SDR
11 HDPE SUPPLY PIPE

INSTALL SPRING BOX (REHAB)
DEVELOPMENT FOR SUPPLY
LINE - EL. 6986'

MAC'S PASS SPRING
(REHABILITATION)

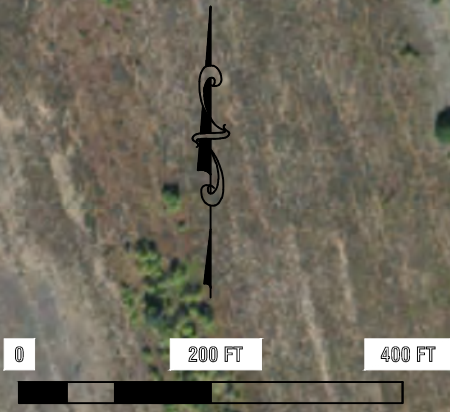


EXISTING BROKEN
WATER TROUGH



EXISTING SPRING
DEVELOPMENT

ACCESS FROM LONG
DRAW TO SOUTH OF
SPRING SITE

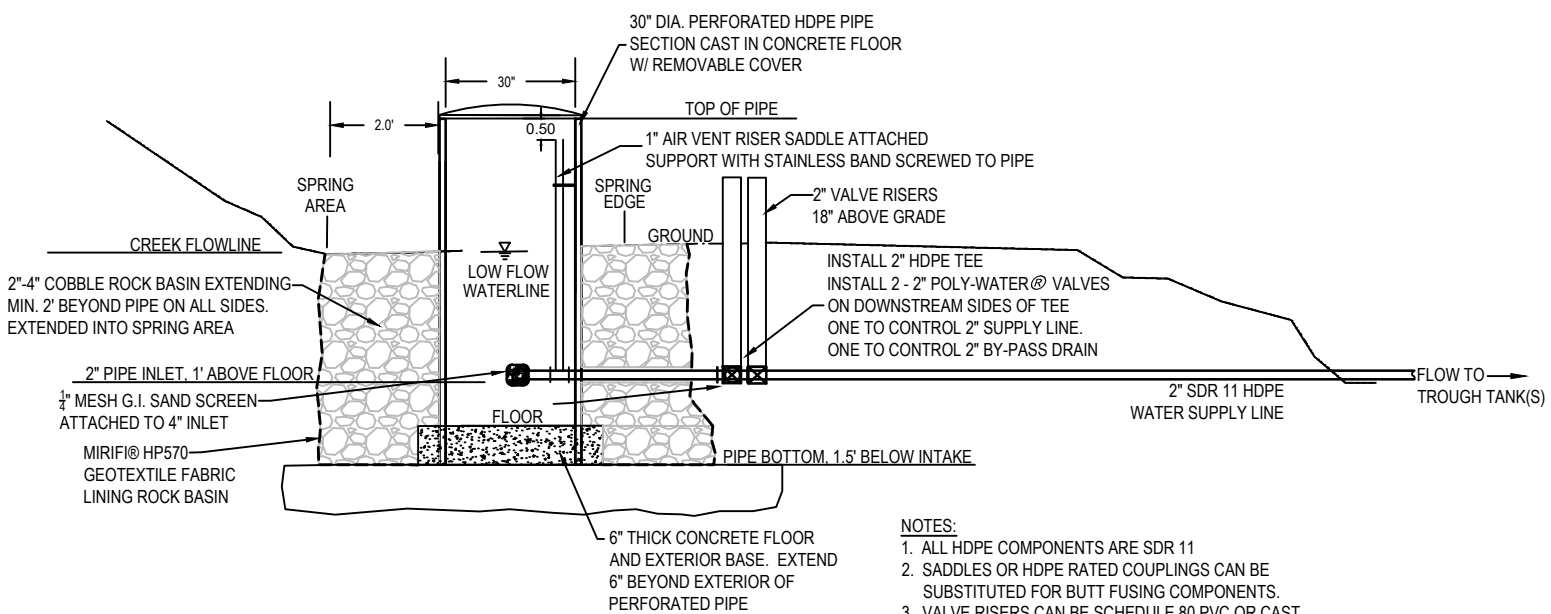


SCALE: 1"=200 FT

PAGE No: 2 OF 4
JOB No: 4570
REVISED:
DATE: 5/25/22
CHECKED BY: MTJ
DRAWN BY: APS
DESIGNED BY: APS

HOBACK RIVER WATERSHED - LEVEL I STUDY
MAC'S PASS SPRING REHABILITATION
SMALL WATER PROJECT ID: 13.2
LOCATED IN NW $\frac{1}{4}$ NE $\frac{1}{4}$ SECTION 7, T.36N., R.116W., 6TH P.M.,
LINCOLN COUNTY, WY

 **RIO VERDE**
ENGINEERING
PINEDALE, WYOMING
(307) 367-2826
rioverde@wyoming.com



WATER CATCHMENT STRUCTURE

N.T.S.

- NOTES:**
1. ALL HDPE COMPONENTS ARE SDR 11
 2. SADDLES OR HDPE RATED COUPLINGS CAN BE SUBSTITUTED FOR BUTT FUSING COMPONENTS.
 3. VALVE RISERS CAN BE SCHEDULE 80 PVC OR CAST IRON COMPONENTS, BUT SHOULD BE INSTALLED TO PREVENT THEM FROM BEING PULLED FROM THE GROUND.

DESIGNED BY: APS
 DRAWN BY: APS
 CHECKED BY: MTJ
 DATE: 5/25/22
 REVISED:
 JOB No. 4570
 PAGE No. 3 OF 4

HOBACK RIVER WATERSHED - LEVEL I STUDY
MAC'S PASS SPRING REHABILITATION
 SMALL WATER PROJECT ID: 13.2
 LOCATED IN NW¹/₄ NE¹/₄ SECTION 7, T.36N., R.116W., 6TH P.M.,
 LINCOLN COUNTY, WY

RIO VERDE ENGINEERING
 PINEDALE, WYOMING
 (307) 367-2826
 rioverde@wyoming.com

LONG DRAW SPRING NO. 1 PROJECT

Owner/Operator: Nield, Kaylyn

Project Type: Spring Development

Project Name: McCain No. 2 Spring Rehabilitation Project

Project ID: 13.3

Location (PLSS): NE/4 NW/4 OF SEC. 6, T.36N., R.116W.

Location (Lat/Long): 43.12406° N, 110.73624° W

PROJECT COMPONENTS (ENGINEER'S ESTIMATE) - ITEMIZED COSTS

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1	Mobilization	1	LS	\$ 8,000.00	\$ 8,000.00
2	12' Dia. TIRE STOCK TROUGH, COMPLETE-IN-PLACE	1	LS	\$ 14,000.00	\$ 14,000.00
3	2" SDR-11 HDPE PIPE	100	LF	\$ 4.00	\$ 400.00
4	4" SDR-11 HDPE PIPE (DRAINS)	100	LF	\$ 8.50	\$ 850.00
5	2" SDR-11 FUSED TEE	3	EA	\$ 160.00	\$ 480.00
6	2" POLY-VALVE	4	EA	\$ 300.00	\$ 1,200.00
7	4" POLY-VALVE	1	EA	\$ 650.00	\$ 650.00
8	1" STAND-PIPE AIR VENTS W/ SADDLES	2	EA	\$ 100.00	\$ 200.00
9	8" DIA. VALVE RISERS (VARYING LENGHTS)	4	EA	\$ 600.00	\$ 2,400.00
10	VALVE ENCLOSURE (AIR & DRAIN)	1	EA	\$ 35.00	\$ 35.00
11	30" WATER CATCHMENT DEVELOPMENT	1	LS	\$ 8,000.00	\$ 8,000.00
TOTAL COMPONENT COST (SUBTOTAL #2):					\$ 36,215.00

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$ 6,500.00
PERMITTING AND MITIGATION:	\$ 1,500.00
LEGAL FEES:	\$ -
ACQUISITION OF ACCESS AND RIGHTS-OF-WAY:	\$ -
PRE-CONSTRUCTION COSTS (SUBTOTAL #1):	\$ 8,000.00

TOTAL COMPONENT COST (SUBTOTAL #2): **\$ 36,215.00**

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%):	\$ 3,621.50
COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3):	\$ 39,836.50
CONTINGENCY (SUBTOTAL #3 X 15%):	\$ 5,975.48
TOTAL CONSTRUCTION COST (SUBTOTAL #4):	\$ 45,811.98

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): **\$ 53,811.98**

PERMITTING REQUIREMENTS

Project ID: 13.3

Project Name: McCain No. 2 Spring Rehabilitation

Land Jurisdiction: Federal, USFS

U.S. Army Corp of Engineer's (USACE)

A project plan set should be submitted to the USACE Wyoming Regulatory Office for review prior to final submission to the WWDO. Due to the small quantity of fill associated with the installation of the spring collector, and the fact that the pipeline and trough will be located on uplands, a wetland delineation and pre-construction notification are not being anticipated as a requirement. However, final determination rests with the Wyoming Regulatory Office. A USACE letter of acceptance should be submitted to the WWDO with the final design, prior to construction.

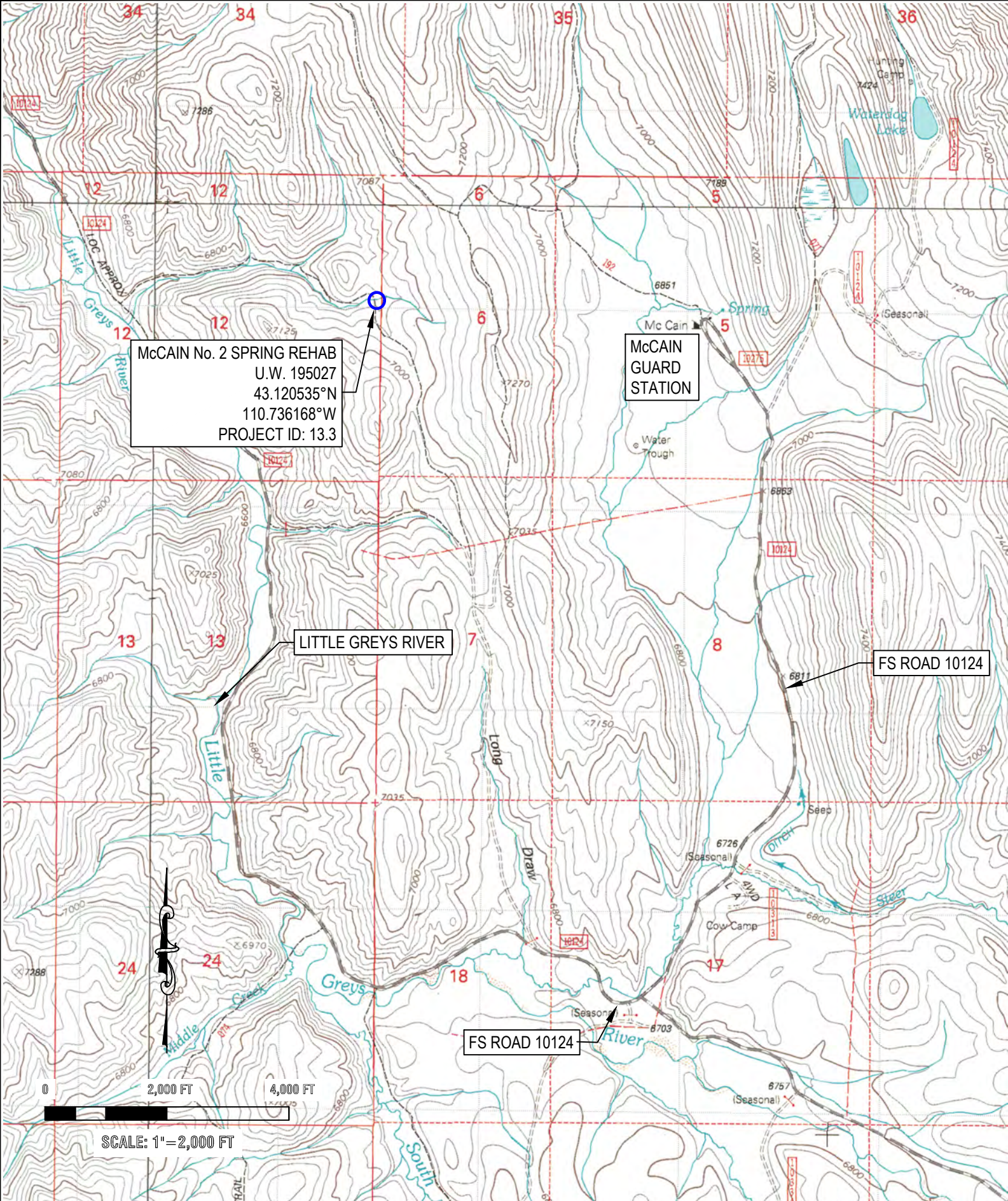
State Engineer's Office

Current Permit: U.W. 195027

This project involves the rehabilitation of an existing permitted spring for stock water purposes. No additional permits are necessary for rehabilitation. However, the proposed rehab plan should be verified by the SEO to ensure that the existing permit will cover the proposed improvements.

U.S. Forest Service – Bridger National Forest

A special use permit exists for this project. An environmental assessment is not believed to be necessary regarding the spring rehab, however an on-site meeting should be held with USFS personnel prior to SF-299 completion. Additional assessments or studies may be necessary depending on site conditions and review with USFS personnel.



McCAIN No. 2 SPRING REHAB
 U.W. 195027
 43.120535°N
 110.736168°W
 PROJECT ID: 13.3

McCAIN
 GUARD
 STATION

LITTLE GREYS RIVER

FS ROAD 10124

FS ROAD 10124

SCALE: 1" = 2,000 FT

DESIGNED BY: APS
DRAWN BY: APS
CHECKED BY: MTJ
DATE: 5/25/22
REVISED:
JOB No: 4570
PAGE No: 1 OF 4

HOBACK RIVER WATERSHED - LEVEL I STUDY
McCAIN NO. 2 SPRING REHABILITATION
 SMALL WATER PROJECT ID: 13.3
 LOCATED IN NE¼ NW¼ SECTION 6, T.36N., R.116W., 6TH P.M.,
 LINCOLN COUNTY, WY



**RIO VERDE
 ENGINEERING**
 PINEDALE, WYOMING
 (307) 367-2826
 rioverde@wyoming.com

INSTALL REHABED
SPRING BOX
DEVELOPMENT FOR
SUPPLY LINE - EL. 6948'



EXISTING SPRING
DEVELOPMENT -
UNUSABLE

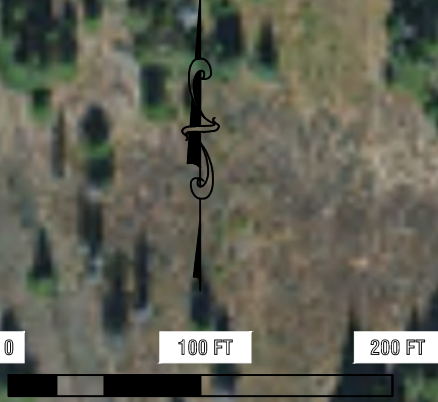
INSTALL 100 L.F. OF
2" SDR 11 HDPE
SUPPLY PIPE

INSTALL TROUGH
TANK #1 - EL. 6928'
40 L.F. OF 2" DRAIN

**McCAIN NO. 2
SPRING
(REHABILITATION)**



EXISTING BROKEN
WATER TROUGH



SCALE: 1"=100 FT

HOBACK RIVER WATERSHED - LEVEL I STUDY

McCAIN NO. 2 SPRING REHABILITATION

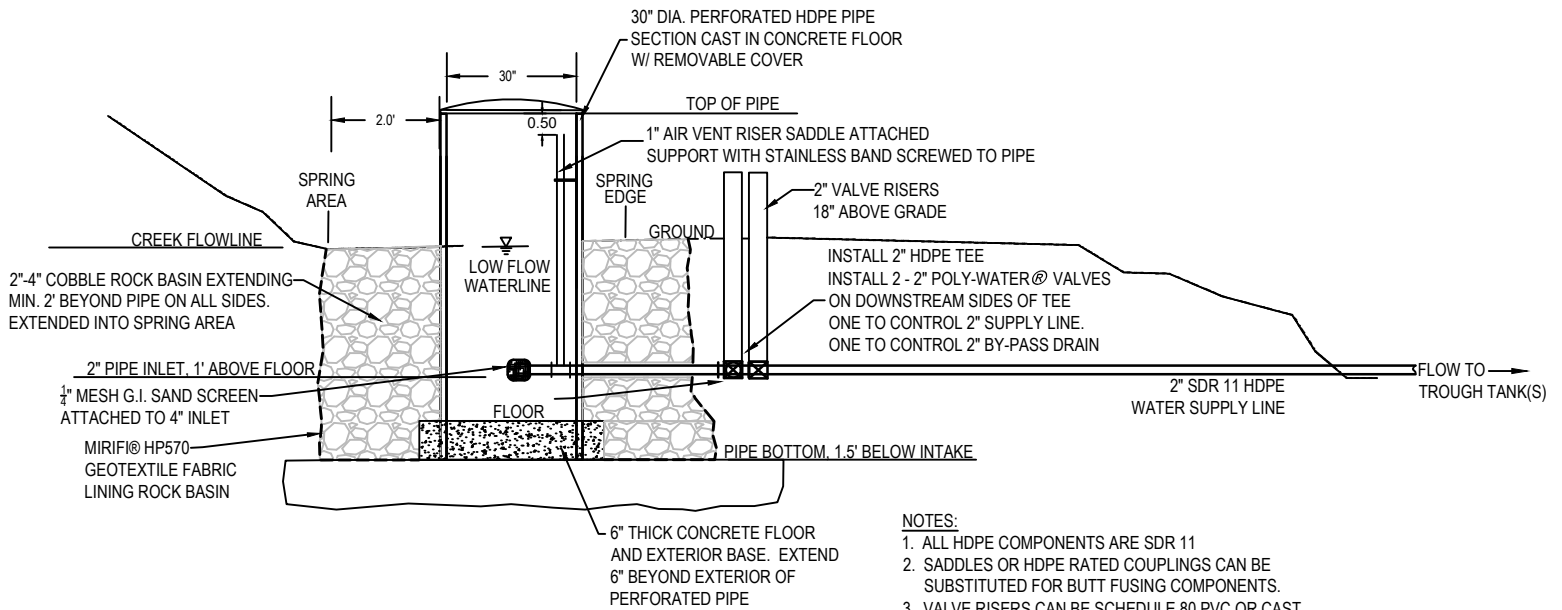
SMALL WATER PROJECT ID: 13.3

LOCATED IN NE $\frac{1}{4}$ NW $\frac{1}{4}$ SECTION 6, T.36N., R.116W., 6TH P.M.,
LINCOLN COUNTY, WY

**RIO VERDE
ENGINEERING**
PINEDALE, WYOMING

(307) 367-2826
rioverde@wyoming.com

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DRAWN BY: APS
CHECKED BY: MTJ
DATE: 5/25/22
REVISED:
JOB No: 4570
PAGE No: 2 OF 4



WATER CATCHMENT STRUCTURE

N.T.S.

NOTES:

1. ALL HDPE COMPONENTS ARE SDR 11
2. SADDLES OR HDPE RATED COUPLINGS CAN BE SUBSTITUTED FOR BUTT FUSING COMPONENTS.
3. VALVE RISERS CAN BE SCHEDULE 80 PVC OR CAST IRON COMPONENTS, BUT SHOULD BE INSTALLED TO PREVENT THEM FROM BEING PULLED FROM THE GROUND.

HOBACK RIVER WATERSHED - LEVEL I STUDY

McCAIN NO. 2 SPRING REHABILITATION

SMALL WATER PROJECT ID: 13.3

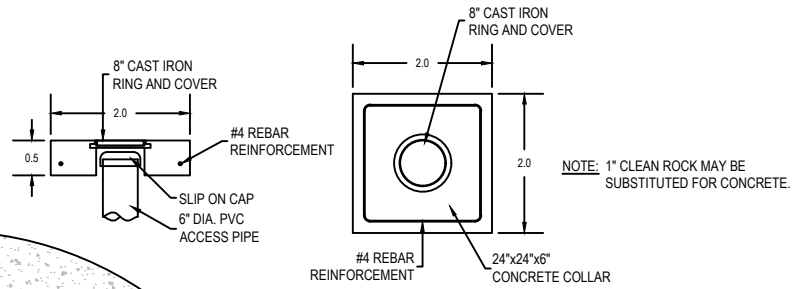
LOCATED IN NE $\frac{1}{4}$ NW $\frac{1}{4}$ SECTION 6, T.36N., R.116W., 6TH P.M.,
LINCOLN COUNTY, WY



**RIO VERDE
ENGINEERING**
PINEDALE, WYOMING

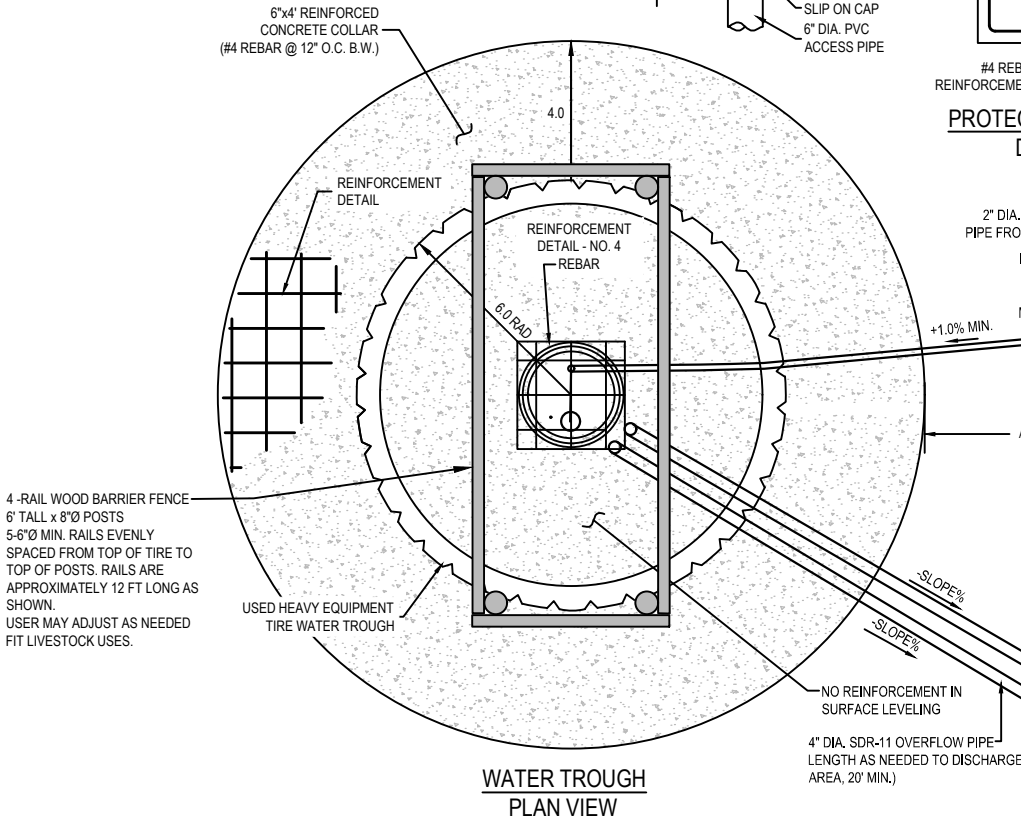
(307) 367-2826
rioverde@wyoming.com

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DRAWN BY: APS
CHECKED BY: MTJ
DATE: 6/25/22
REVISED:
JOB No. 4570
PAGE No. 3 OF 4

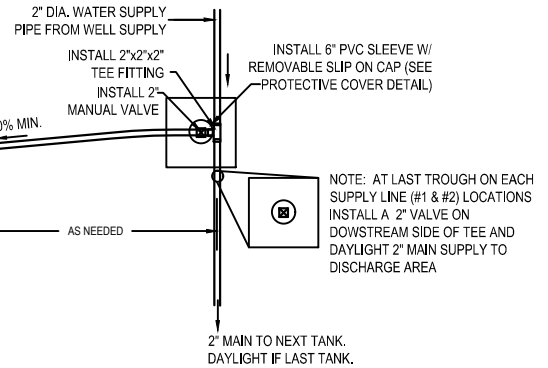


NOTE: 1" CLEAN ROCK MAY BE SUBSTITUTED FOR CONCRETE.

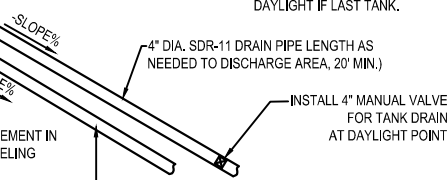
**PROTECTIVE COVER
DETAIL**



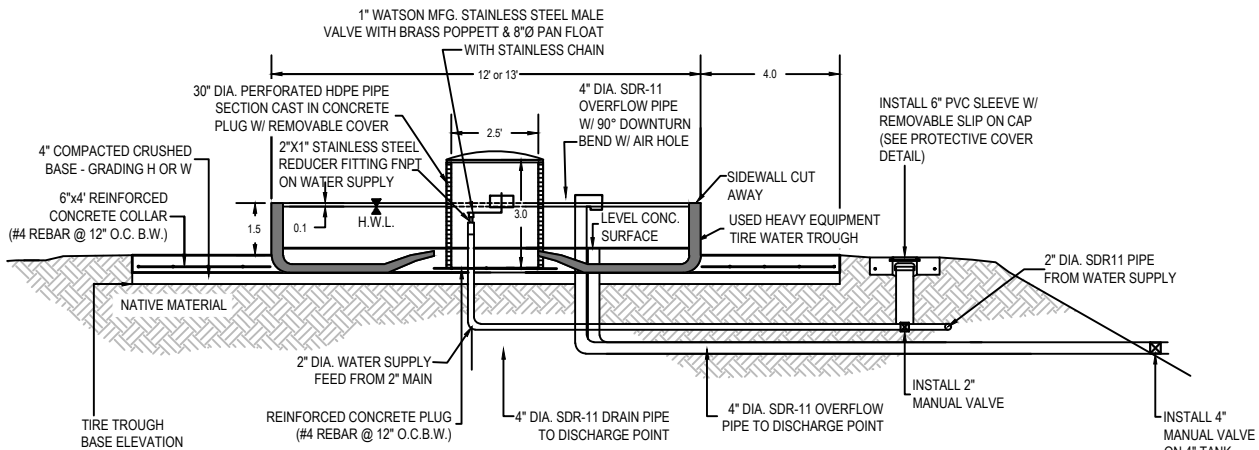
**WATER TROUGH
PLAN VIEW**



NOTE: AT LAST TROUGH ON EACH SUPPLY LINE (#1 & #2) LOCATIONS INSTALL A 2" VALVE ON DOWSTREAM SIDE OF TEE AND DAYLIGHT 2" MAIN SUPPLY TO DISCHARGE AREA



NOTE: THE DEPICTED TROUGH AND WATER SUPPLY SYSTEM IS INTENDED FOR SEASONAL USE ONLY. THE MANUAL BYPASS VALVE SHALL BE PLACED IN THE OPEN POSITION FOR DRAINING OR BYPASSING OPERATIONS. THE EXPANSION PLUG WITHIN THE ACTUAL TROUGH SHALL ALSO BE REMOVED FOR EFFECTIVE TANK DRAINING DURING THE WINTERIZATION PROCESS. ACTUAL ALIGNMENT OF WATER SUPPLY AND DRAIN LINES SHOULD BE CONSTRUCTED TO FIT EACH INDIVIDUAL TROUGH SITE.



**WATER TROUGH TANK
SECTION VIEW**

NOTE: IT IS THE CONTRACTOR'S RESPONSIBILITY TO HAVE UTILITY 'LOCATES' PERFORMED FOR THIS PROJECT SITE PRIOR TO ANY DIGGING OR EXCAVATION.

HOBACK RIVER WATERSHED - LEVEL I STUDY

McCain No. 2 Spring Rehabilitation

SMALL WATER PROJECT ID: 13.3

LOCATED IN NE $\frac{1}{4}$ NW $\frac{1}{4}$ SECTION 6, T.36N., R.116W., 6TH P.M., LINCOLN COUNTY, WY

**RIO VERDE
ENGINEERING**
PINEDALE, WYOMING

(307) 367-2826
rioverde@wyoming.com

DESIGNED BY: APS
DRAWN BY: APS
CHECKED BY: MTJ
DATE: 6/25/22
REVISED:
JOB NO: 4570
PAGE No: 4 OF 4

LONG DRAW SPRING NO. 1 PROJECT

Owner/Operator: Nield, Kaylyn

Project Type: Spring Development

Project Name: McCain Meadows Spring No. 1 Project

Project ID: 13.4

Location (PLSS): SW/4 SW/4 OF SEC. 5, T.36N., R.116W.

Location (Lat/Long): 43.11519° N, 110.72481° W

PROJECT COMPONENTS (ENGINEER'S ESTIMATE) - ITEMIZED COSTS

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1	Mobilization	1	LS	\$ 6,500.00	\$ 6,500.00
2	12' Dia. TIRE STOCK TROUGH, COMPLETE-IN-PLACE	1	LS	\$ 14,000.00	\$ 14,000.00
3	2" SDR-11 HDPE PIPE	700	LF	\$ 4.00	\$ 2,800.00
4	4" SDR-11 HDPE PIPE (DRAINS)	100	LF	\$ 8.50	\$ 850.00
5	2" SDR-11 FUSED TEE	3	EA	\$ 160.00	\$ 480.00
6	2" POLY-VALVE	4	EA	\$ 300.00	\$ 1,200.00
7	4" POLY-VALVE	1	EA	\$ 650.00	\$ 650.00
8	1" STAND-PIPE AIR VENTS W/ SADDLES	2	EA	\$ 100.00	\$ 200.00
9	8" DIA. VALVE RISERS (VARYING LENGHTS)	4	EA	\$ 600.00	\$ 2,400.00
10	VALVE ENCLOSURE (AIR & DRAIN)	1	EA	\$ 35.00	\$ 35.00
11	30" WATER CATCHMENT DEVELOPMENT	1	LS	\$ 8,000.00	\$ 8,000.00
TOTAL COMPONENT COST (SUBTOTAL #2):					\$ 37,115.00

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$ 6,500.00
PERMITTING AND MITIGATION:	\$ 4,000.00
LEGAL FEES:	\$ -
ACQUISITION OF ACCESS AND RIGHTS-OF-WAY:	\$ -
PRE-CONSTRUCTION COSTS (SUBTOTAL #1):	\$ 10,500.00

TOTAL COMPONENT COST (SUBTOTAL #2): **\$ 37,115.00**

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%):	\$ 3,711.50
COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3):	\$ 40,826.50
CONTINGENCY (SUBTOTAL #3 X 15%):	\$ 6,123.98
TOTAL CONSTRUCTION COST (SUBTOTAL #4):	\$ 46,950.48

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): **\$ 57,450.48**

PERMITTING REQUIREMENTS

Project ID: 13.4

Project Name: McCain Meadows Spring No. 1

Land Jurisdiction: Federal, USFS

U.S. Army Corp of Engineer's (USACE)

A project plan set should be submitted to the USACE Wyoming Regulatory Office for review prior to final submission to the WWDO. Due to the small quantity of fill associated with the installation of the spring collector, and the fact that the pipeline and trough will be located on uplands, a wetland delineation and pre-construction notification are not being anticipated as a requirement. However, final determination rests with the Wyoming Regulatory Office. A USACE letter of acceptance should be submitted to the WWDO with the final design, prior to construction.

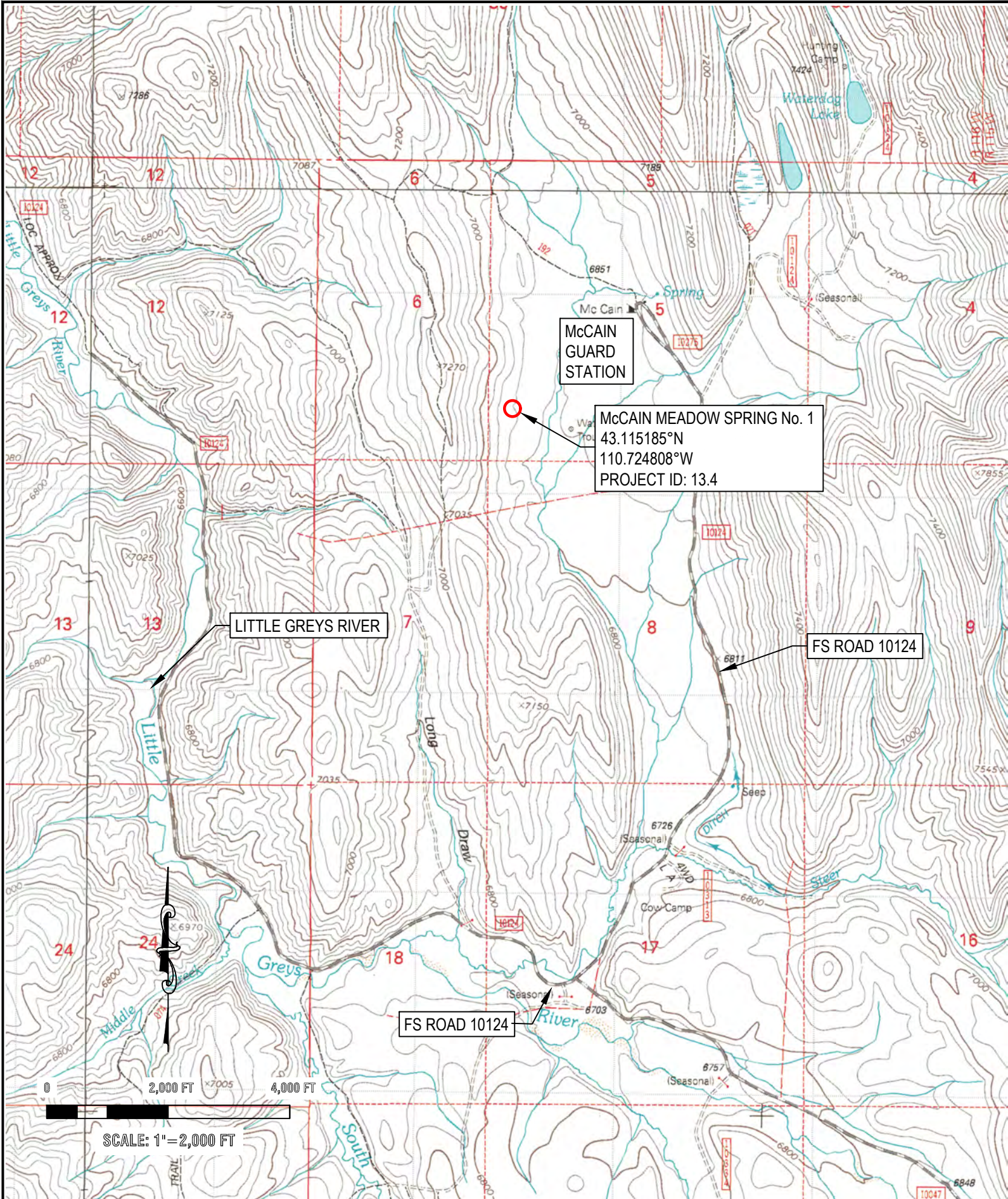
State Engineer's Office

Current Permit: None

As this project involves the development of an existing spring for stock water purposes, an application for permit to appropriate ground water should be submitted to the SEO. The SEO permit should then be submitted to the WWDO with the final project plans, prior to construction. Following construction, a statement of completion and proof of appropriation and beneficial use of groundwater should be completed and submitted to the SEO – Groundwater Division.


U.S. Forest Service – Bridger National Forest

A special use permit will be required for this project. An SF-299 right-of-way acquisition will need to be completed by the applicant. An environmental assessment is not believed to be necessary regarding the spring development, however an on-site meeting should be held with USFS personnel prior to SF-299 completion. Additional assessments or studies may be necessary depending on site conditions and review with USFS personnel.



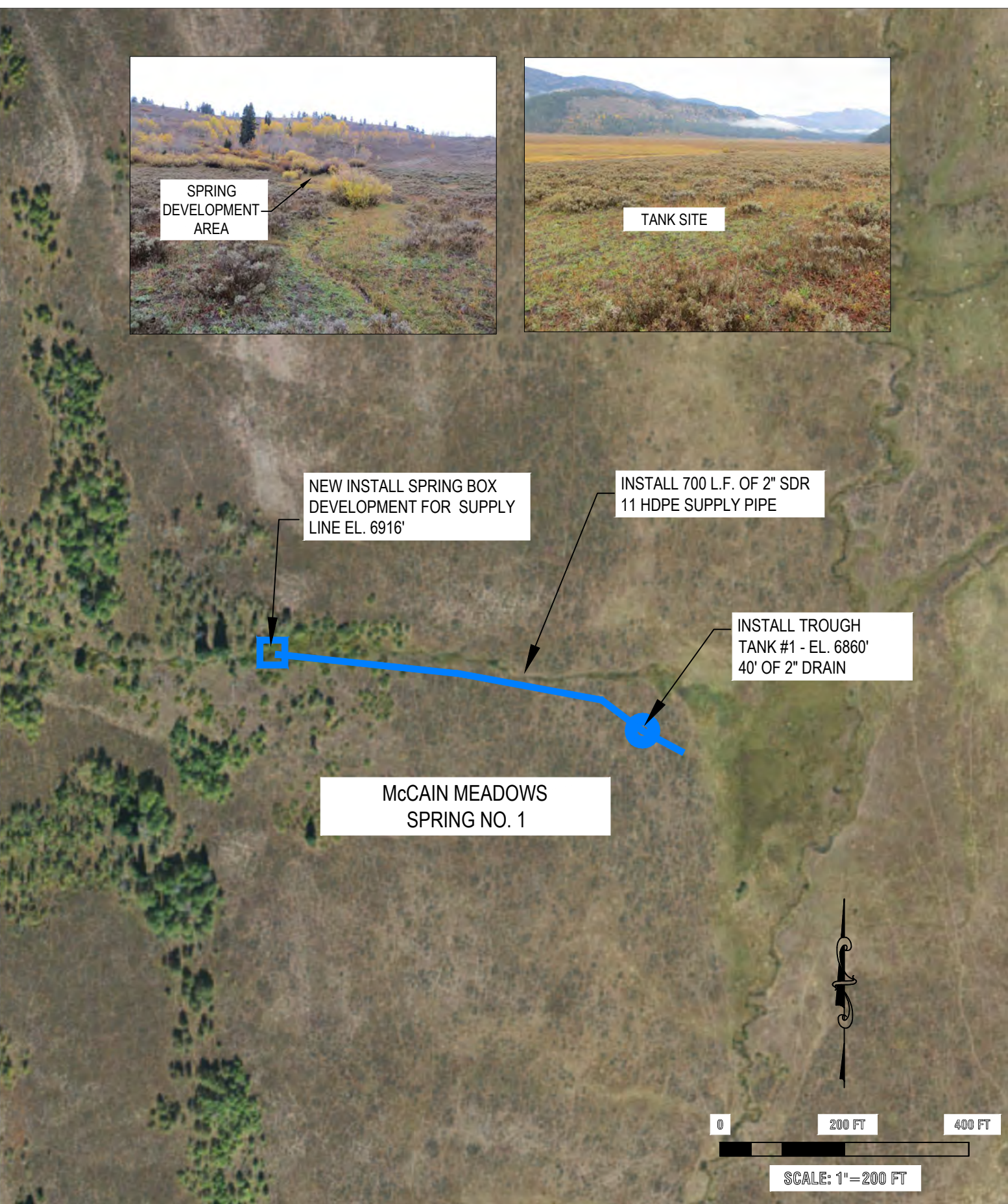
HOBACK RIVER WATERSHED - LEVEL I STUDY
McCain Meadows Spring No. 1
 SMALL WATER PROJECT ID: 13.4
 LOCATED IN SW $\frac{1}{4}$ SW $\frac{1}{4}$ SECTION 5, T.36N., R.116W., 6TH P.M.,
 LINCOLN COUNTY, WY

DESIGNED BY: ARS
 DRAWN BY: APS
 CHECKED BY: MTJ
 DATE: 5/25/22
 REVISED:
 JOB No: 4570
 PAGE No: 1 OF 4

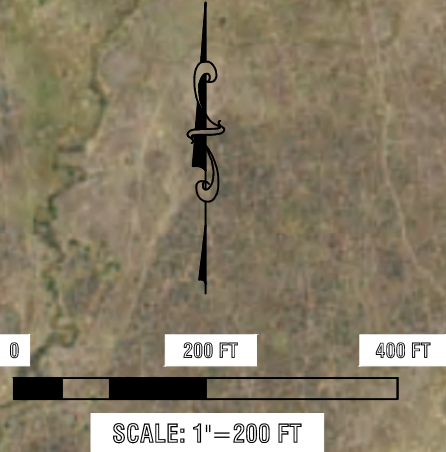


RIO VERDE
ENGINEERING
 PINEDALE, WYOMING

(307) 367-2826
 rioverde@wyoming.com

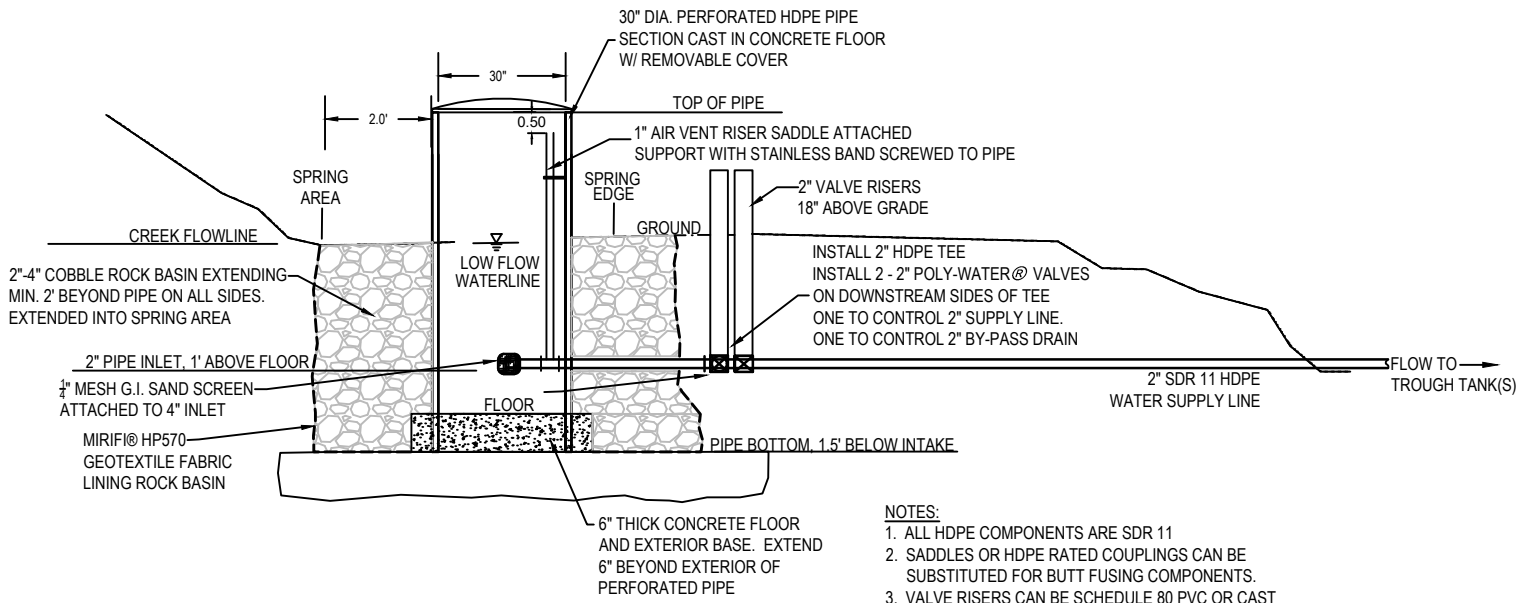


McCain Meadows Spring No. 1



HOBACK RIVER WATERSHED - LEVEL I STUDY	
McCain Meadows Spring No. 1	
SMALL WATER PROJECT ID: 13.4	
LOCATED IN SW $\frac{1}{4}$ SW $\frac{1}{4}$ SECTION 5, T.36N., R.116W., 6TH P.M., LINCOLN COUNTY, WY	
DESIGNED BY: APS	
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DATE: 5/25/22	
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PAGE No: 2 OF 4	

RIO VERDE ENGINEERING
 PINEDALE, WYOMING
 (307) 367-2826
 rioverde@wyoming.com



WATER CATCHMENT STRUCTURE

N.T.S.

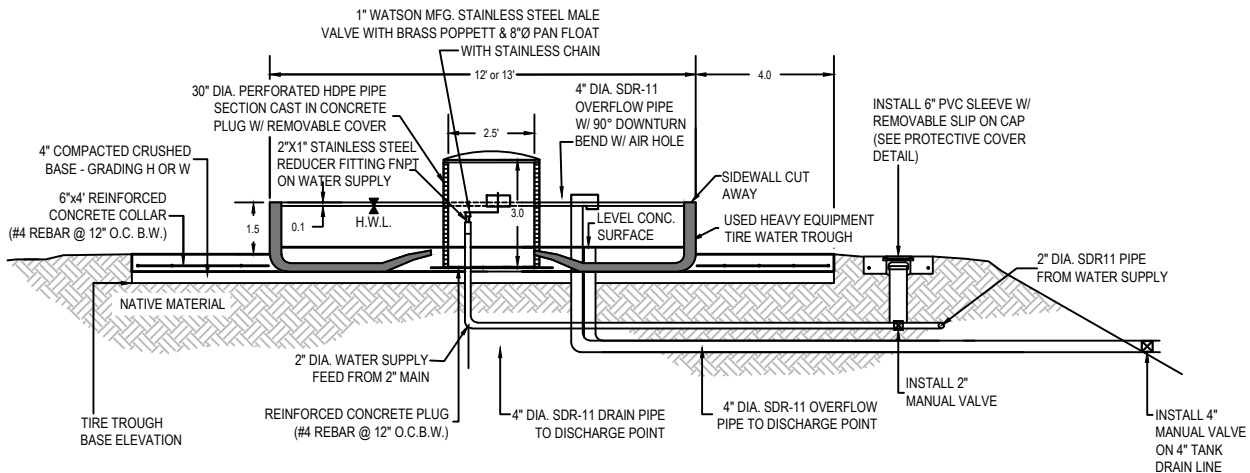
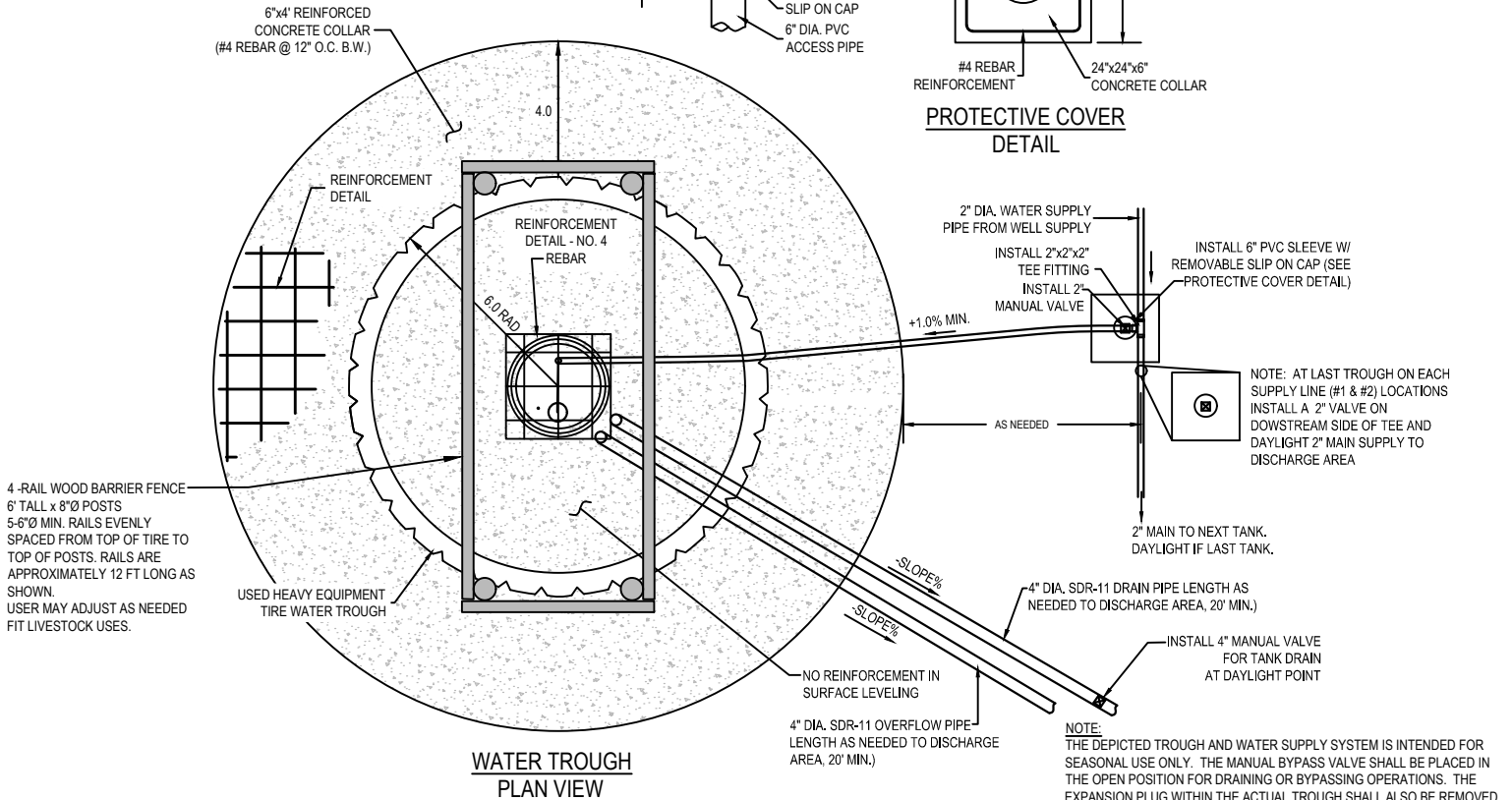
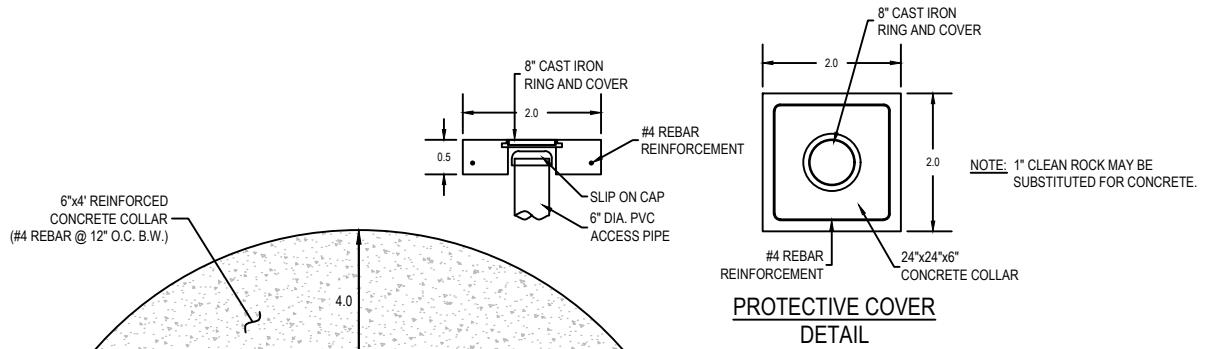
NOTES:

1. ALL HDPE COMPONENTS ARE SDR 11
2. SADDLES OR HDPE RATED COUPLINGS CAN BE SUBSTITUTED FOR BUTT FUSING COMPONENTS.
3. VALVE RISERS CAN BE SCHEDULE 80 PVC OR CAST IRON COMPONENTS, BUT SHOULD BE INSTALLED TO PREVENT THEM FROM BEING PULLED FROM THE GROUND.

DESIGNED BY: APS
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 CHECKED BY: MTJ
 DATE: 5/25/22
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 JOB No: 4570
 PAGE No: 3 OF 4

HOBACK RIVER WATERSHED - LEVEL I STUDY
McCain Meadows Spring No. 1
 SMALL WATER PROJECT ID: 13.4
 LOCATED IN SW¹/₄ SW¹/₄ SECTION 5, T.36N., R.116W., 6TH P.M.,
 LINCOLN COUNTY, WY

RIO VERDE
ENGINEERING
 PINEDALE, WYOMING
 (307) 367-2826
 rioverde@wyoming.com



NOTE: IT IS THE CONTRACTOR'S RESPONSIBILITY TO HAVE UTILITY 'LOCATES' PERFORMED FOR THIS PROJECT SITE PRIOR TO ANY DIGGING OR EXCAVATION.

HOBACK RIVER WATERSHED - LEVEL I STUDY
McCain Meadows Spring No. 1
SMALL WATER PROJECT ID: 13.4
LOCATED IN SW₄ SW₄ SECTION 5, T.36N., R.116W., 6TH P.M., LINCOLN COUNTY, WY

RIO VERDE ENGINEERING
PINEDALE, WYOMING
(307) 367-2826
riververde@wyoming.com

DESIGNED BY: APS
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DATE: 5/25/22
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JOB NO: 4570
PAGE NO: 4 OF 4

LONG DRAW SPRING NO. 1 PROJECT

Owner/Operator: Nield, Kaylyn

Project Type: Spring Development

Project Name: McCain Meadows Spring No. 2 Project

Project ID: 13.5

Location (PLSS): NE/4 NE/4 OF SEC. 6, T.36N., R.116W.

Location (Lat/Long): 43.12411° N, 110.72709° W

PROJECT COMPONENTS (ENGINEER'S ESTIMATE) - ITEMIZED COSTS

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1	Mobilization	1	LS	\$ 6,500.00	\$ 6,500.00
2	12' Dia. TIRE STOCK TROUGH, COMPLETE-IN-PLACE	1	LS	\$ 14,000.00	\$ 14,000.00
3	2" SDR-11 HDPE PIPE	450	LF	\$ 4.00	\$ 1,800.00
4	4" SDR-11 HDPE PIPE (DRAINS)	100	LF	\$ 8.50	\$ 850.00
5	2" SDR-11 FUSED TEE	3	EA	\$ 160.00	\$ 480.00
6	2" POLY-VALVE	4	EA	\$ 300.00	\$ 1,200.00
7	4" POLY-VALVE	1	EA	\$ 650.00	\$ 650.00
8	1" STAND-PIPE AIR VENTS W/ SADDLES	2	EA	\$ 100.00	\$ 200.00
9	8" DIA. VALVE RISERS (VARYING LENGHTS)	4	EA	\$ 600.00	\$ 2,400.00
10	VALVE ENCLOSURE (AIR & DRAIN)	1	EA	\$ 35.00	\$ 35.00
11	30" WATER CATCHMENT DEVELOPMENT	1	LS	\$ 8,000.00	\$ 8,000.00
TOTAL COMPONENT COST (SUBTOTAL #2):					\$ 36,115.00

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$ 6,500.00
PERMITTING AND MITIGATION:	\$ 4,000.00
LEGAL FEES:	\$ -
ACQUISITION OF ACCESS AND RIGHTS-OF-WAY:	\$ -
PRE-CONSTRUCTION COSTS (SUBTOTAL #1):	\$ 10,500.00

TOTAL COMPONENT COST (SUBTOTAL #2): **\$ 36,115.00**

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%):	\$ 3,611.50
COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3):	\$ 39,726.50
CONTINGENCY (SUBTOTAL #3 X 15%):	\$ 5,958.98
TOTAL CONSTRUCTION COST (SUBTOTAL #4):	\$ 45,685.48

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): **\$ 56,185.48**

PERMITTING REQUIREMENTS

Project ID: 13.5

Project Name: McCain Meadows Spring No. 2

Land Jurisdiction: Federal, USFS

U.S. Army Corp of Engineer's (USACE)

A project plan set should be submitted to the USACE Wyoming Regulatory Office for review prior to final submission to the WWDO. Due to the small quantity of fill associated with the installation of the spring collector, and the fact that the pipeline and trough will be located on uplands, a wetland delineation and pre-construction notification are not being anticipated as a requirement. However, final determination rests with the Wyoming Regulatory Office. A USACE letter of acceptance should be submitted to the WWDO with the final design, prior to construction.

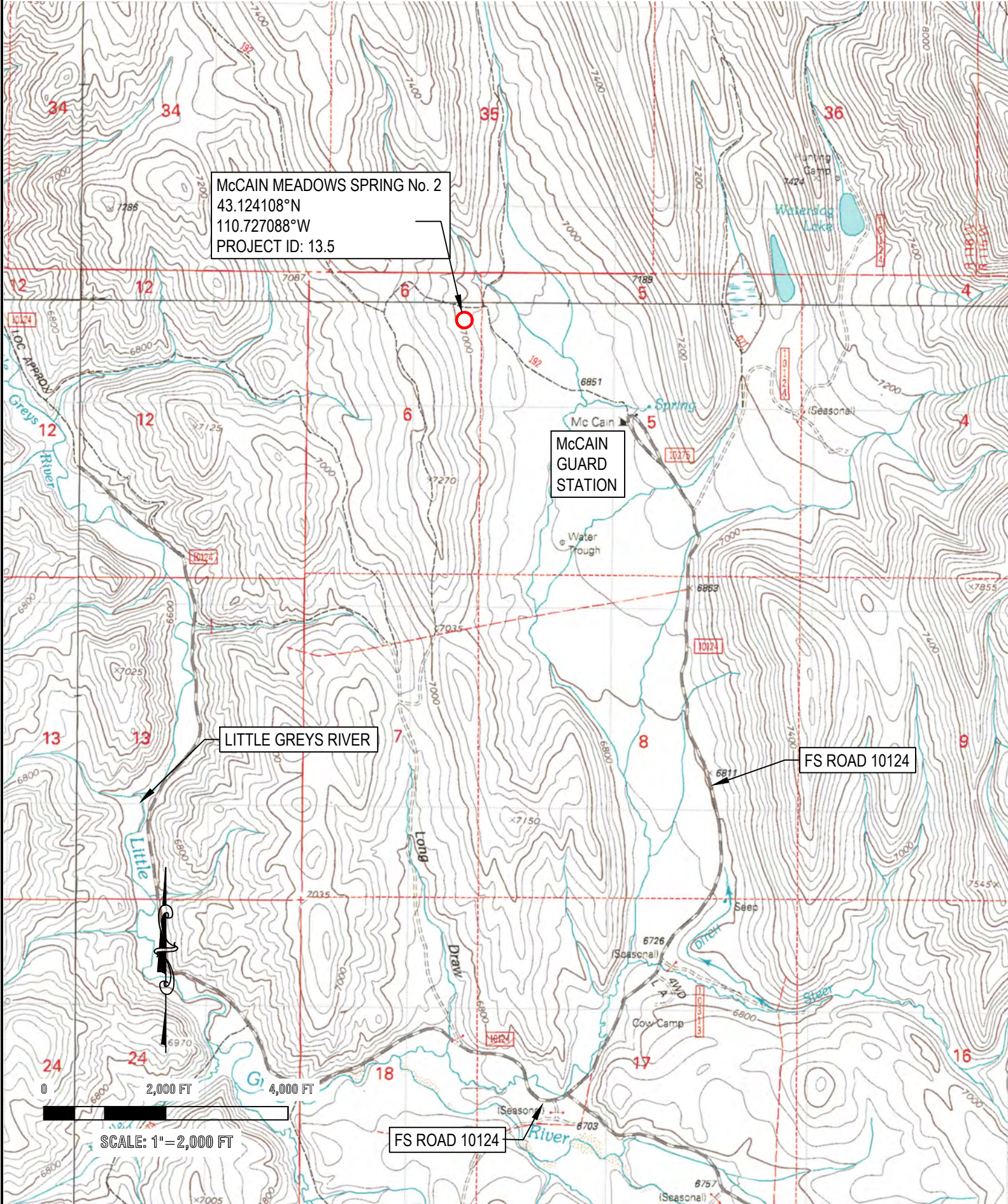
State Engineer's Office

Current Permit: None

As this project involves the development of an existing spring for stock water purposes, an application for permit to appropriate ground water should be submitted to the SEO. The SEO permit should then be submitted to the WWDO with the final project plans, prior to construction. Following construction, a statement of completion and proof of appropriation and beneficial use of groundwater should be completed and submitted to the SEO – Groundwater Division.

U.S. Forest Service – Bridger National Forest

A special use permit will be required for this project. An SF-299 right-of-way acquisition will need to be completed by the applicant. An environmental assessment is not believed to be necessary regarding the spring development, however an on-site meeting should be held with USFS personnel prior to SF-299 completion. Additional assessments or studies may be necessary depending on site conditions and review with USFS personnel.



McCain Meadows Spring No. 2
 43.124108°N
 110.727088°W
 PROJECT ID: 13.5

McCain
 GUARD
 STATION

LITTLE GREYS RIVER

FS ROAD 10124

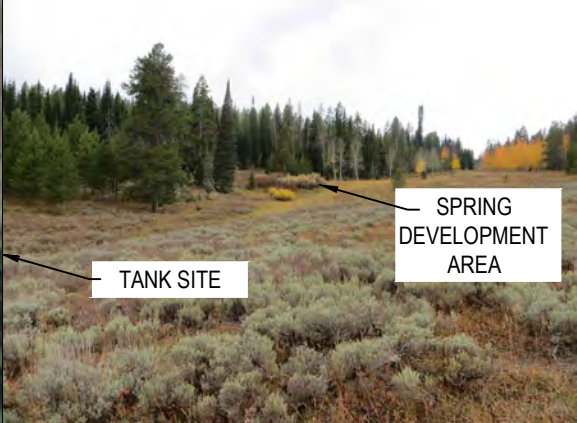
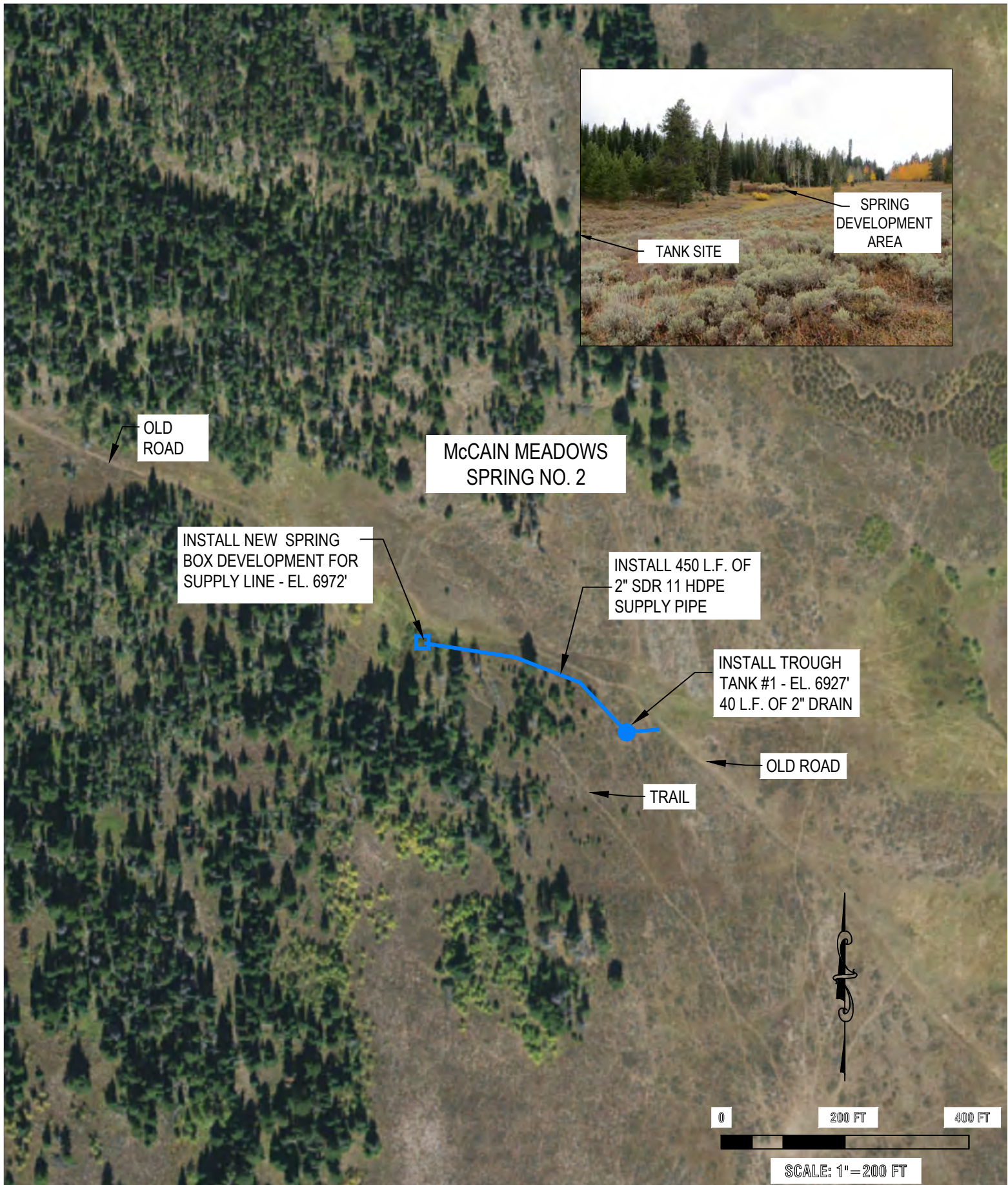
FS ROAD 10124

SCALE: 1"=2,000 FT

JOB No: 4570
 REVISION:
 DATE: 5/25/22
 CHECKED BY: MTJ
 DRAWN BY: APS
 DESIGNED BY: APS

HOBACK RIVER WATERSHED - LEVEL I STUDY
McCain Meadows Spring No. 2
 SMALL WATER PROJECT ID: 13.5
 LOCATED IN NE¼ NE¼ SECTION 6, T.36N., R.116W., 6TH P.M.,
 LINCOLN COUNTY, WY

RIO VERDE
ENGINEERING
 PINEDALE, WYOMING
 (307) 367-2826
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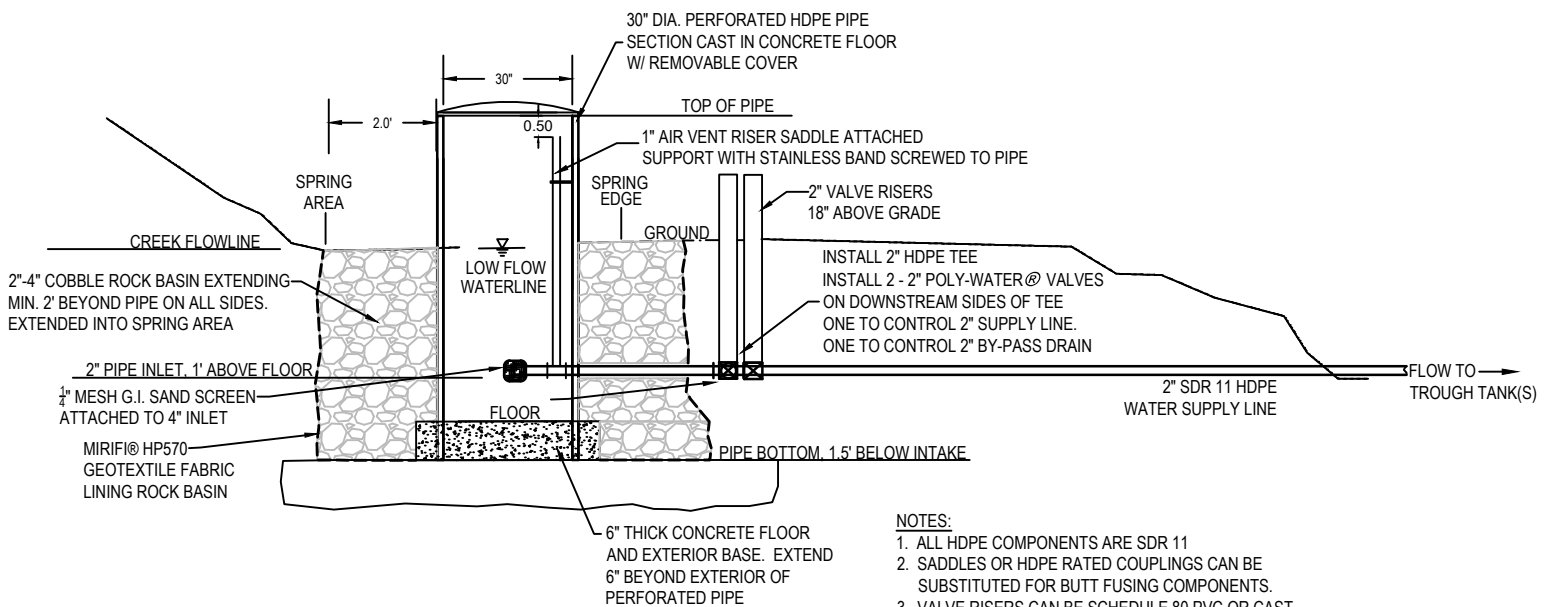
PAGE No: 2 OF 4
 JOB No: 4570
 REVISED:
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 CHECKED BY: MTJ
 DRAWN BY: APS
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HOBACK RIVER WATERSHED - LEVEL I STUDY
McCain Meadows Spring No. 2
 SMALL WATER PROJECT ID: 13.5
 LOCATED IN NE $\frac{1}{4}$ NE $\frac{1}{4}$ SECTION 6, T.36N., R.116W., 6TH P.M.,
 LINCOLN COUNTY, WY



RIO VERDE
ENGINEERING
 PINEDALE, WYOMING

(307) 367-2826
 rioverde@wyoming.com



WATER CATCHMENT STRUCTURE

N.T.S.

NOTES:

1. ALL HDPE COMPONENTS ARE SDR 11
2. SADDLES OR HDPE RATED COUPLINGS CAN BE SUBSTITUTED FOR BUTT FUSING COMPONENTS.
3. VALVE RISERS CAN BE SCHEDULE 80 PVC OR CAST IRON COMPONENTS, BUT SHOULD BE INSTALLED TO PREVENT THEM FROM BEING PULLED FROM THE GROUND.

HOBACK RIVER WATERSHED - LEVEL I STUDY

McCAIN MEADOWS SPRING NO. 2

SMALL WATER PROJECT ID: 13.5

LOCATED IN NE $\frac{1}{4}$ NE $\frac{1}{4}$ SECTION 6, T.36N., R.116W., 6TH P.M.,
LINCOLN COUNTY, WY

RIO VERDE
ENGINEERING
PINEDALE, WYOMING

(307) 367-2826
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DESIGNED BY: APS

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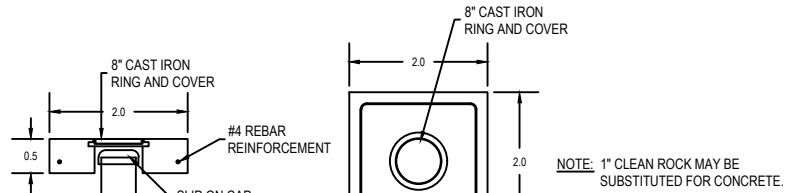
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DATE: 5/25/22

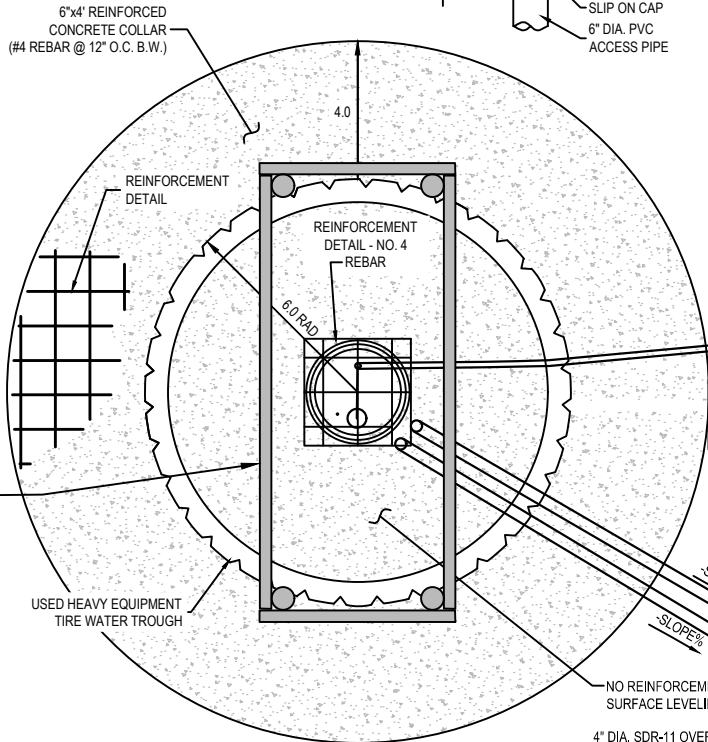
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JOB No: 4570

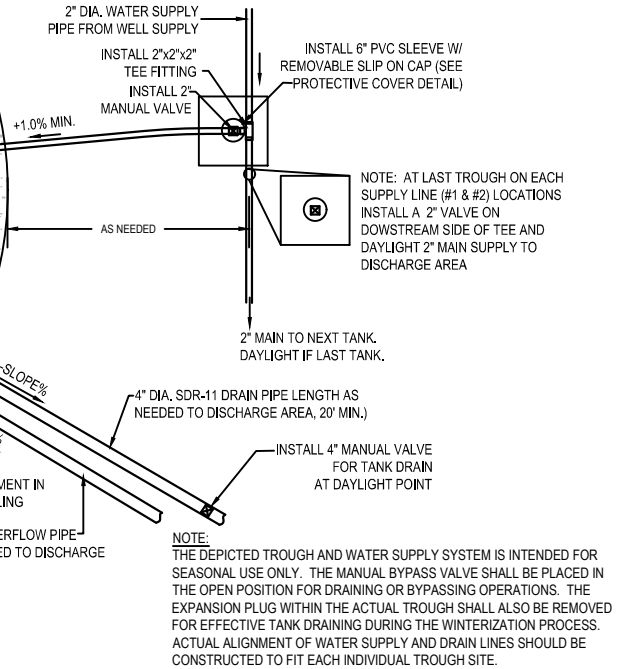
PAGE No: 3 OF 4



**PROTECTIVE COVER
DETAIL**



**WATER TROUGH
PLAN VIEW**



**WATER TROUGH TANK
SECTION VIEW**

NOTE: IT IS THE CONTRACTOR'S RESPONSIBILITY TO HAVE UTILITY 'LOCATES' PERFORMED FOR THIS PROJECT SITE PRIOR TO ANY DIGGING OR EXCAVATION.

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DATE: 5/25/22
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JOB NO. 4570
PAGE NO. 4 OF 4

HOBACK RIVER WATERSHED - LEVEL I STUDY
McCain Meadows Spring No. 2
SMALL WATER PROJECT ID: 13.5
LOCATED IN NE $\frac{1}{4}$ NE $\frac{1}{4}$ SECTION 6, T.36N., R.116W., 6TH P.M.,
LINCOLN COUNTY, WY

**RIO VERDE
ENGINEERING**
PINEDALE, WYOMING
(307) 367-2826
riververde@wyoming.com

HOBACK RIVER WATESHED, LEVEL I STUDY

Owner/Operator: Nield, Kaylyn

Project Type: Spring Development

Project Name: McCain Spring No. 1 Rehabilitation Project (South)

Project ID: 13.6A

Location (PLSS): SW/4 NE/4 OF SEC. 5, T.36N., R.116W.

Location (Lat/Long): 43.12033° N, 110.71593° W

PROJECT COMPONENTS (ENGINEER'S ESTIMATE) - ITEMIZED COSTS

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1	Mobilization	1	LS	\$ 6,500.00	\$ 6,500.00
2	12' Dia. TIRE STOCK TROUGH, COMPLETE-IN-PLACE	1	LS	\$ 14,000.00	\$ 14,000.00
3	2" SDR-11 HDPE PIPE	1870	LF	\$ 4.00	\$ 7,480.00
4	4" SDR-11 HDPE PIPE (INTAKE/DRAINS)	150	LF	\$ 8.50	\$ 1,275.00
5	4" SDR-11 FUSED TEE	1	EA	\$ 210.00	\$ 210.00
6	2" SDR-11 FUSED TEE	2	EA	\$ 160.00	\$ 320.00
7	4" X 2" REDUCER	1	EA	\$ 160.00	\$ 160.00
8	4" POLY-VALVE	3	EA	\$ 650.00	\$ 1,950.00
9	2" POLY-VALVE	1	EA	\$ 300.00	\$ 300.00
10	4" INSERTA TEE	2	EA	\$ 100.00	\$ 200.00
11	1" STAND-PIPE AIR VENTS W/ SADDLES	1	EA	\$ 100.00	\$ 100.00
12	AIR RELIEF/VACUUM VALVES BY IRRITEC W/ 2" SADDLES	2	EA	\$ 100.00	\$ 200.00
13	8" DIA. VALVE RISERS (VARYING LENGHTS)	4	EA	\$ 600.00	\$ 2,400.00
14	VALVE ENCLOSURE (AIR & DRAIN)	4	EA	\$ 35.00	\$ 140.00
15	36" WATER CATCHMENT DEVELOPMENT	1	LS	\$ 8,500.00	\$ 8,500.00
TOTAL COMPONENT COST (SUBTOTAL #2):					\$ 43,735.00

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$ 7,000.00
PERMITTING AND MITIGATION:	\$ 4,000.00
LEGAL FEES:	\$ -
ACQUISITION OF ACCESS AND RIGHTS-OF-WAY:	\$ -
PRE-CONSTRUCTION COSTS (SUBTOTAL #1):	\$ 11,000.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 43,735.00

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%):	\$ 4,373.50
COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3):	\$ 48,108.50
CONTINGENCY (SUBTOTAL #3 X 15%):	\$ 7,216.28
TOTAL CONSTRUCTION COST (SUBTOTAL #4):	\$ 55,324.78

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): \$ 66,324.78

PERMITTING REQUIREMENTS

Project ID: 13.6A

Project Name: McCain Spring No. 1 Rehab (South)

Land Jurisdiction: Federal, USFS

U.S. Army Corp of Engineer's (USACE)

A project plan set should be submitted to the USACE Wyoming Regulatory Office for review prior to final submission to the WWDO. Due to the small quantity of fill associated with the installation of the spring collector, and the fact that the pipeline and trough will be located on uplands, a wetland delineation and pre-construction notification are not being anticipated as a requirement. However, final determination rests with the Wyoming Regulatory Office. A USACE letter of acceptance should be submitted to the WWDO with the final design, prior to construction.

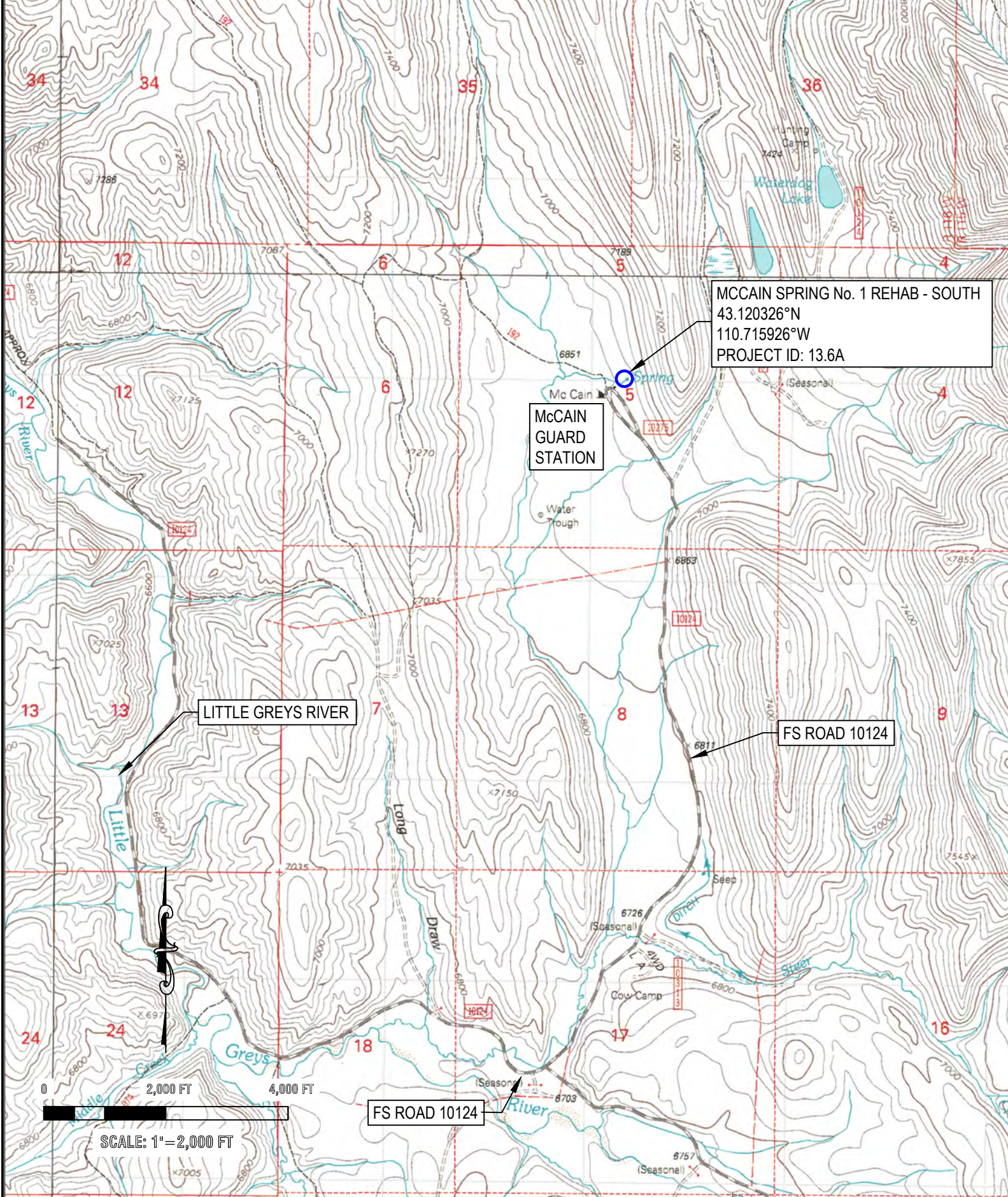
State Engineer's Office

Current Permit: U.W. 203677

This project involves the rehabilitation of an existing permitted spring for stock water purposes. No additional permits are necessary for rehabilitation. However, the proposed rehab plan should be verified by the SEO to ensure that the existing permit will cover the proposed improvements.

U.S. Forest Service – Bridger National Forest

A special use permit exists for this project. An environmental assessment is not believed to be necessary regarding the spring rehab, however an on-site meeting should be held with USFS personnel prior to SF-299 completion. Additional assessments or studies may be necessary depending on site conditions and review with USFS personnel.



MCCAIN SPRING No. 1 REHAB - SOUTH
 43.120326°N
 110.715926°W
 PROJECT ID: 13.6A

McCain
 GUARD
 STATION

LITTLE GREYS RIVER

FS ROAD 10124

FS ROAD 10124

SCALE: 1" = 2,000 FT

DESIGNED BY: APS
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 JOB No: 4570
 PAGE No: 1 OF 4

HOBACK RIVER WATERSHED - LEVEL I STUDY
McCain Spring No. 1 Rehab - (South)
 SMALL WATER PROJECT ID: 13.6A
 LOCATED IN SW $\frac{1}{4}$ NE $\frac{1}{4}$ SECTION 5, T.36N., R.116W., 6TH P.M.,
 LINCOLN COUNTY, WY



RIO VERDE
ENGINEERING
 PINEDALE, WYOMING

(307) 367-2826
 rioverde@wyoming.com

McCain Spring No. 1 North
Item 13.6B
Tie to previously installed
McCain Spring No. 1 Rehab
South Project
(shown for reference)
at 2" tee location

INSTALL 520 L.F.
OF 2" SDR 11
HDPE SUPPLY
PIPE

REHAB SPRING BOX
DEVELOPMENT FOR
NEW SUPPLY LINES
EL. 6918'

McCain
Guard
Station

McCain Spring No. 1
Rehab
South Tank & Spring
Rehabilitation Project
Item 13.6A

INSTALL 1350 L.F.
OF 2" SDR 11
HDPE SUPPLY
PIPE

INSTALL TROUGH SOUTH
TANK #1 - EL. 6874'
40 L.F. OF 4" DRAIN

McCain Guard
Station Road



EXISTING SPRING
DEVELOPMENT -
UNUSABLE



SCALE: 1"=300 FT



McCain
Guard
Station

TANK SITE

HOBACK RIVER WATERSHED - LEVEL I STUDY

McCain Spring No. 1 Rehab (South)

SMALL WATER PROJECT ID: 13.6A

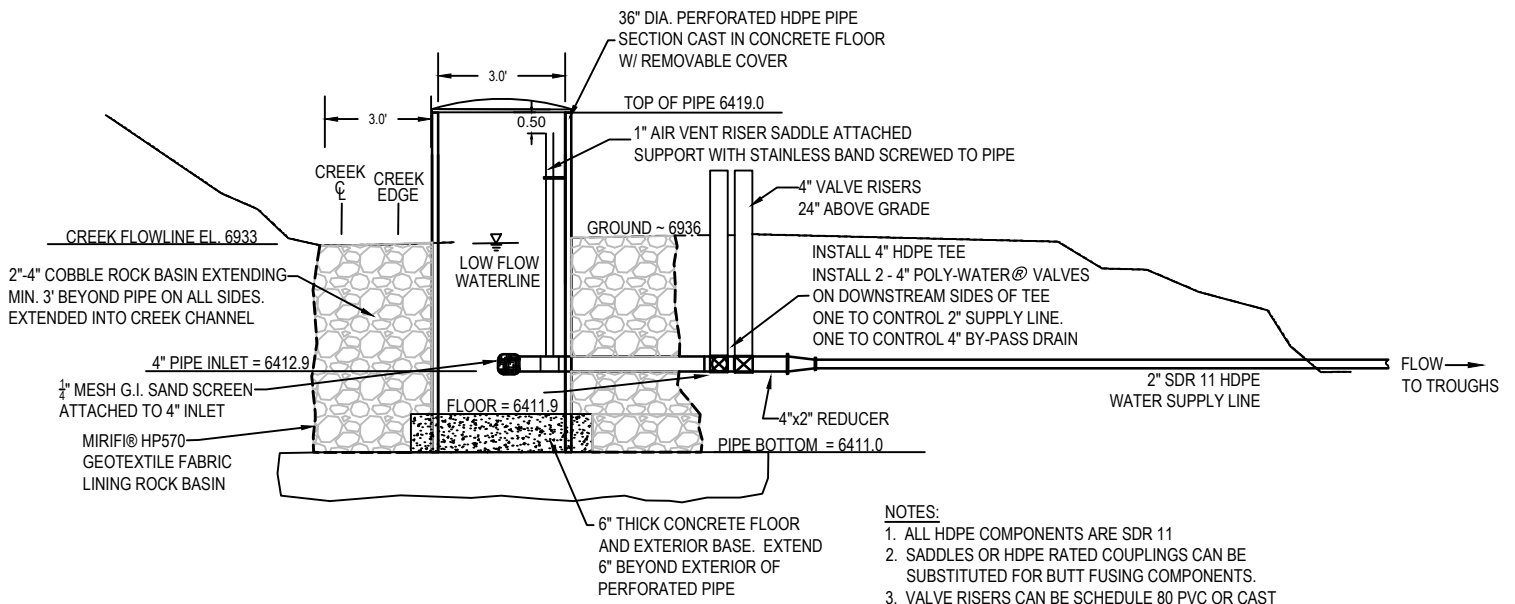
LOCATED IN SW $\frac{1}{4}$ NE $\frac{1}{4}$ SECTION 5, T.36N., R.116W., 6TH P.M.,
LINCOLN COUNTY, WY



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PINEDALE, WYOMING

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PAGE No: 2 OF 4



**McCain Spring No. 1
Water Catchment Structure**

N.T.S.

NOTES:

1. ALL HDPE COMPONENTS ARE SDR 11
2. SADDLES OR HDPE RATED COUPLINGS CAN BE SUBSTITUTED FOR BUTT FUSING COMPONENTS.
3. VALVE RISERS CAN BE SCHEDULE 80 PVC OR CAST IRON COMPONENTS, BUT SHOULD BE INSTALLED TO PREVENT THEM FROM BEING PULLED FROM THE GROUND.

HOBACK RIVER WATERSHED - LEVEL I STUDY

McCain Spring No. 1 REHAB

SMALL WATER PROJECT ID: 13.6A

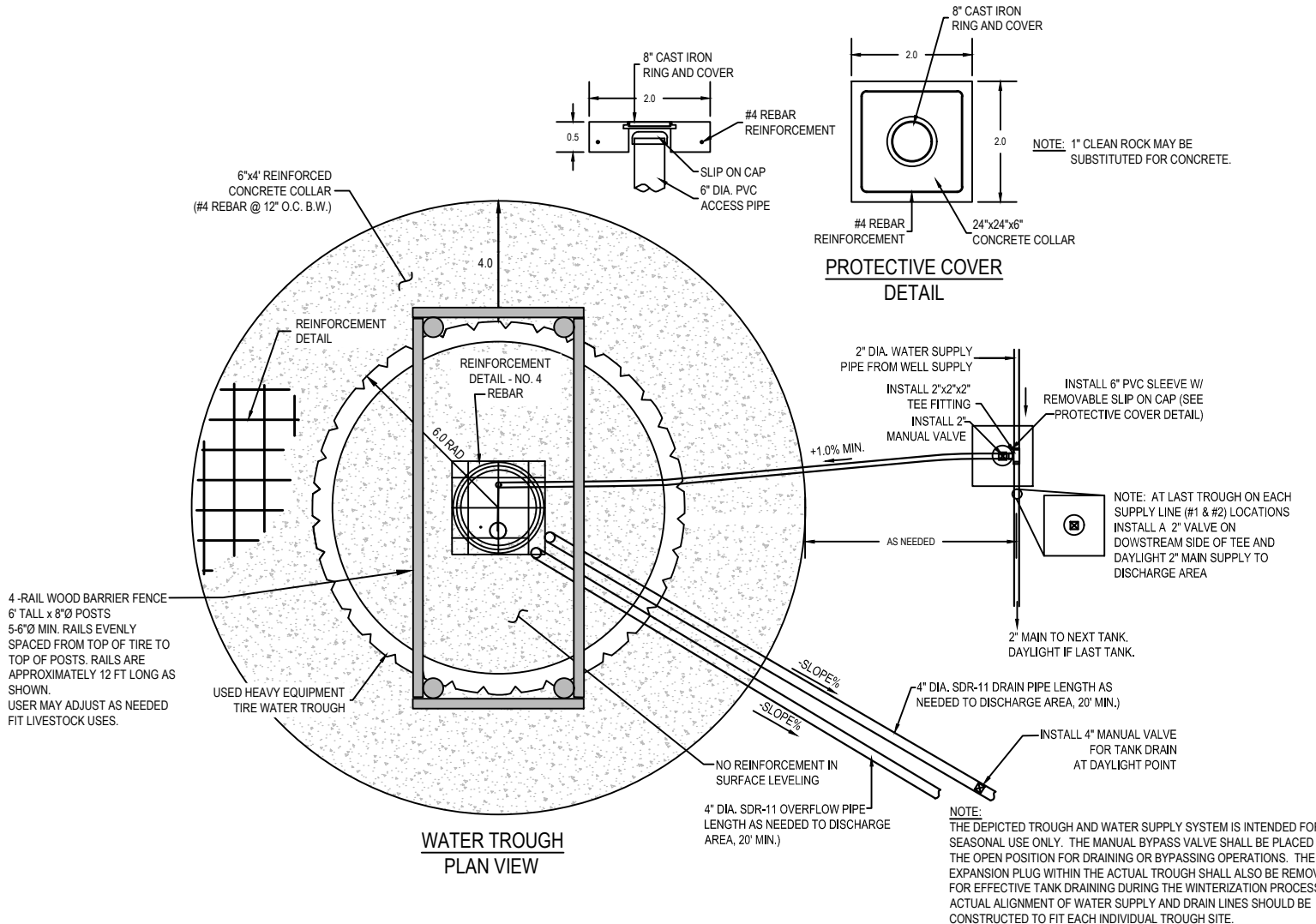
LOCATED IN SW¹/₄ NE¹/₄ SECTION 5, T.36N., R.116W., 6TH P.M.,
LINCOLN COUNTY, WY



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PINEDALE, WYOMING

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JOB No. 4570
PAGE No. 3 OF 4



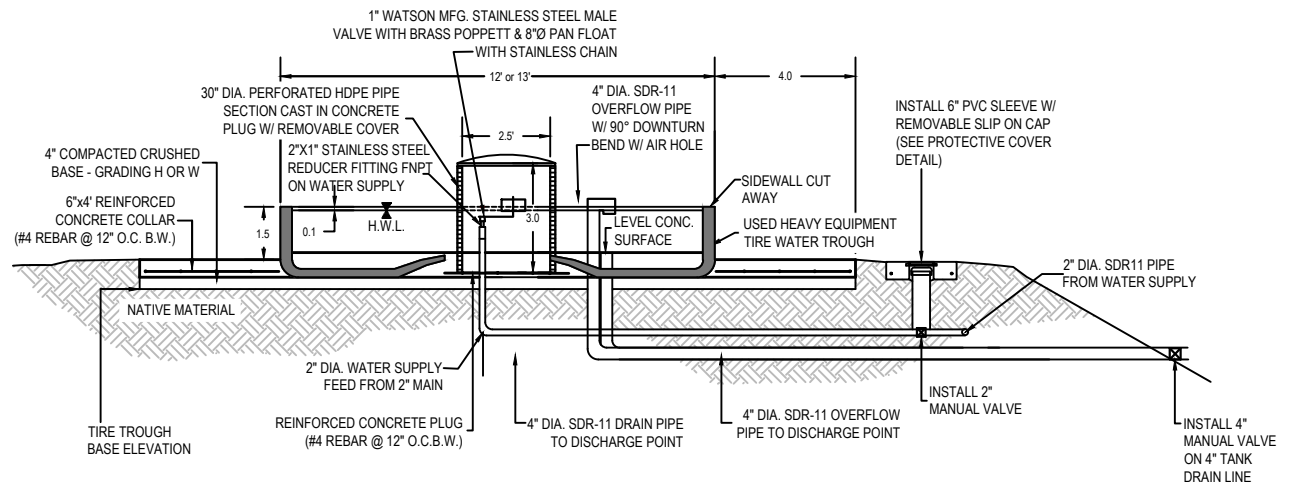
**WATER TROUGH
PLAN VIEW**

**PROTECTIVE COVER
DETAIL**

NOTE: 1" CLEAN ROCK MAY BE SUBSTITUTED FOR CONCRETE.

NOTE: AT LAST TROUGH ON EACH SUPPLY LINE (#1 & #2) LOCATIONS INSTALL A 2" VALVE ON DOWSTREAM SIDE OF TEE AND DAYLIGHT 2" MAIN SUPPLY TO DISCHARGE AREA

NOTE: THE DEPICTED TROUGH AND WATER SUPPLY SYSTEM IS INTENDED FOR SEASONAL USE ONLY. THE MANUAL BYPASS VALVE SHALL BE PLACED IN THE OPEN POSITION FOR DRAINING OR BYPASSING OPERATIONS. THE EXPANSION PLUG WITHIN THE ACTUAL TROUGH SHALL ALSO BE REMOVED FOR EFFECTIVE TANK DRAINING DURING THE WINTERIZATION PROCESS. ACTUAL ALIGNMENT OF WATER SUPPLY AND DRAIN LINES SHOULD BE CONSTRUCTED TO FIT EACH INDIVIDUAL TROUGH SITE.



**WATER TROUGH TANK
SECTION VIEW**

NOTE: IT IS THE CONTRACTOR'S RESPONSIBILITY TO HAVE UTILITY LOCATES PERFORMED FOR THIS PROJECT SITE PRIOR TO ANY DIGGING OR EXCAVATION.

PAGE No. 4 OF 4
JOB No. 4570
REVISED:
DATE: 5/25/22
CHECKED BY: MTJ
DRAWN BY: APS
DESIGNED BY: APS

HOBACK RIVER WATERSHED - LEVEL I STUDY
McCain Spring No. 1 Rehab (South)
SMALL WATER PROJECT ID: 13.6A
LOCATED IN SW₄ NE₄ SECTION 5, T.36N., R.116W., 6TH P.M.,
LINCOLN COUNTY, WY

**RIO VERDE
ENGINEERING**
PINEDALE, WYOMING
(307) 367-2826
riververde@wyoming.com

HOBACK RIVER WATESHED, LEVEL I STUDY**Owner/Operator:** Nield, Kaylyn**Project Type:** Spring Development**Project Name:** McCain Spring No. 1 Project - (North)**Project ID:** 13.6B**Location (PLSS):** NE/4 NW/4 OF SEC. 5, T.36N., R.116W.**Location (Lat/Long):** 43.12294° N, 110.72080° W**PROJECT COMPONENTS (ENGINEER'S ESTIMATE) - ITEMIZED COSTS**

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1	Mobilization	1	LS	\$ 6,500.00	\$ 6,500.00
2	12' Dia. TIRE STOCK TROUGH, COMPLETE-IN-PLACE	1	LS	\$ 14,000.00	\$ 14,000.00
3	2" SDR-11 HDPE PIPE	1530	LF	\$ 4.00	\$ 6,120.00
4	4" SDR-11 HDPE PIPE (INTAKE/DRAINS)	100	LF	\$ 8.50	\$ 850.00
5	4" SDR-11 FUSED TEE	1	EA	\$ 210.00	\$ 210.00
6	2" SDR-11 FUSED TEE	1	EA	\$ 160.00	\$ 160.00
7	4" POLY-VALVE	1	EA	\$ 650.00	\$ 650.00
8	2" POLY-VALVE	2	EA	\$ 300.00	\$ 600.00
9	4" INSERTA TEE	1	EA	\$ 100.00	\$ 100.00
10	1" STAND-PIPE AIR VENTS W/ SADDLES	1	EA	\$ 100.00	\$ 100.00
11	AIR RELIEF/VACUUM VALVES BY IRRITEC W/ 2" SADDLES	2	EA	\$ 100.00	\$ 200.00
12	8" DIA. VALVE RISERS (VARYING LENGHTS)	3	EA	\$ 600.00	\$ 1,800.00
13	VALVE ENCLOSURE (AIR & DRAIN)	3	EA	\$ 35.00	\$ 105.00
TOTAL COMPONENT COST (SUBTOTAL #2):					\$ 31,395.00

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$ 6,500.00
PERMITTING AND MITIGATION:	\$ 4,000.00
LEGAL FEES:	
ACQUISITION OF ACCESS AND RIGHTS-OF-WAY:	\$ -
PRE-CONSTRUCTION COSTS (SUBTOTAL #1):	\$ 10,500.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 31,395.00

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%):	\$ 3,139.50
COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3):	\$ 34,534.50
CONTINGENCY (SUBTOTAL #3 X 15%):	\$ 5,180.18
TOTAL CONSTRUCTION COST (SUBTOTAL #4):	\$ 39,714.68

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): \$ 50,214.68

PERMITTING REQUIREMENTS

Project ID: 13.6B

Project Name: McCain Spring No. 1 Rehab (North)

Land Jurisdiction: Federal, USFS

U.S. Army Corp of Engineer's (USACE)

A project plan set should be submitted to the USACE Wyoming Regulatory Office for review prior to final submission to the WWDO. Due to the small quantity of fill associated with the installation of the spring collector, and the fact that the pipeline and trough will be located on uplands, a wetland delineation and pre-construction notification are not being anticipated as a requirement. However, final determination rests with the Wyoming Regulatory Office. A USACE letter of acceptance should be submitted to the WWDO with the final design, prior to construction.

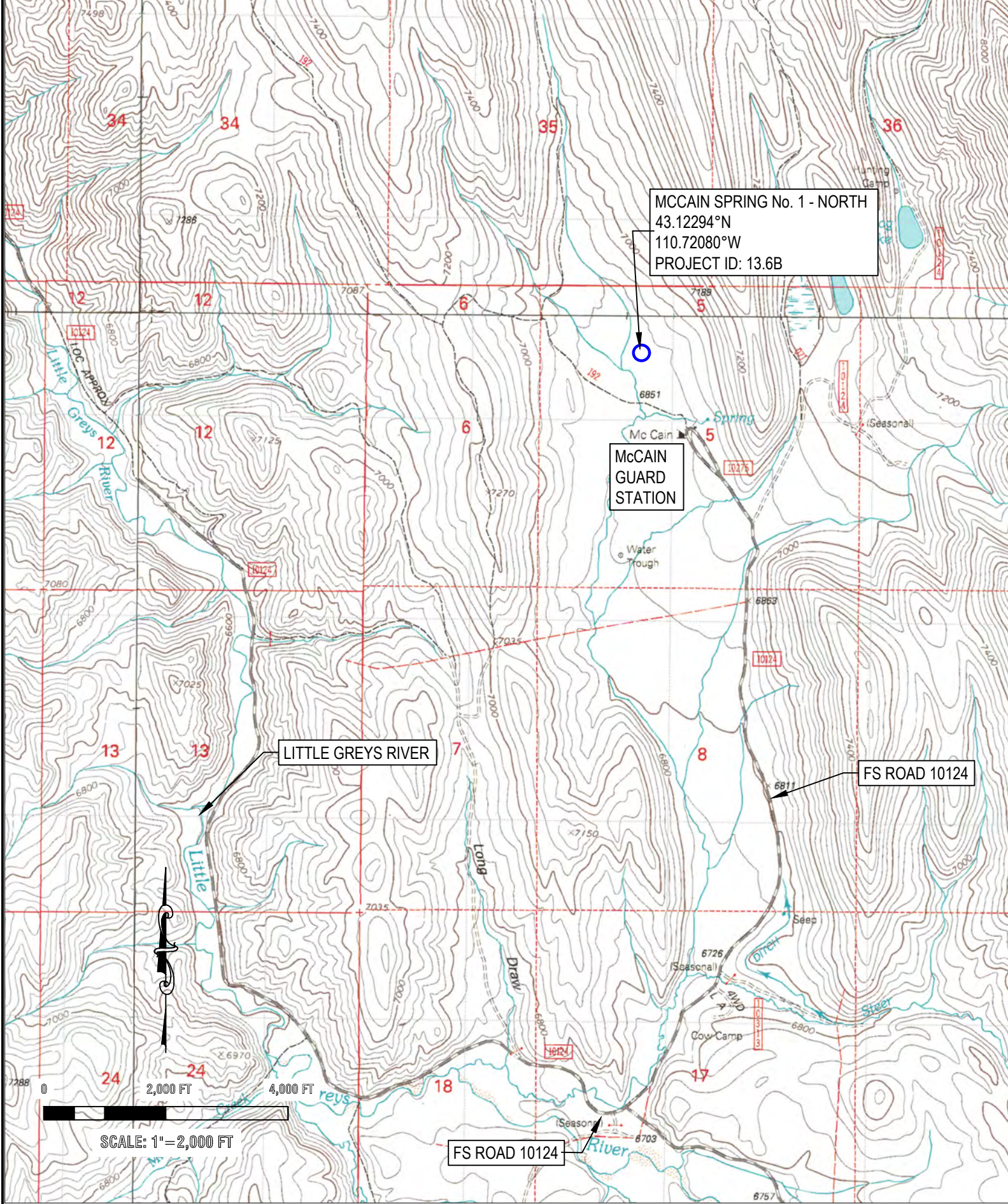
State Engineer's Office

Current Permit: U.W. 203677

This project involves the rehabilitation of an existing permitted spring for stock water purposes. No additional permits are necessary for rehabilitation. However, the proposed rehab plan should be verified by the SEO to ensure that the existing permit will cover the proposed improvements.

U.S. Forest Service – Bridger National Forest

A special use permit exists for this project. An environmental assessment is not believed to be necessary regarding the spring rehab, however an on-site meeting should be held with USFS personnel prior to SF-299 completion. Additional assessments or studies may be necessary depending on site conditions and review with USFS personnel.



MCCAIN SPRING No. 1 - NORTH
 43.12294°N
 110.72080°W
 PROJECT ID: 13.6B

MCCAIN
 GUARD
 STATION

LITTLE GREYS RIVER

FS ROAD 10124

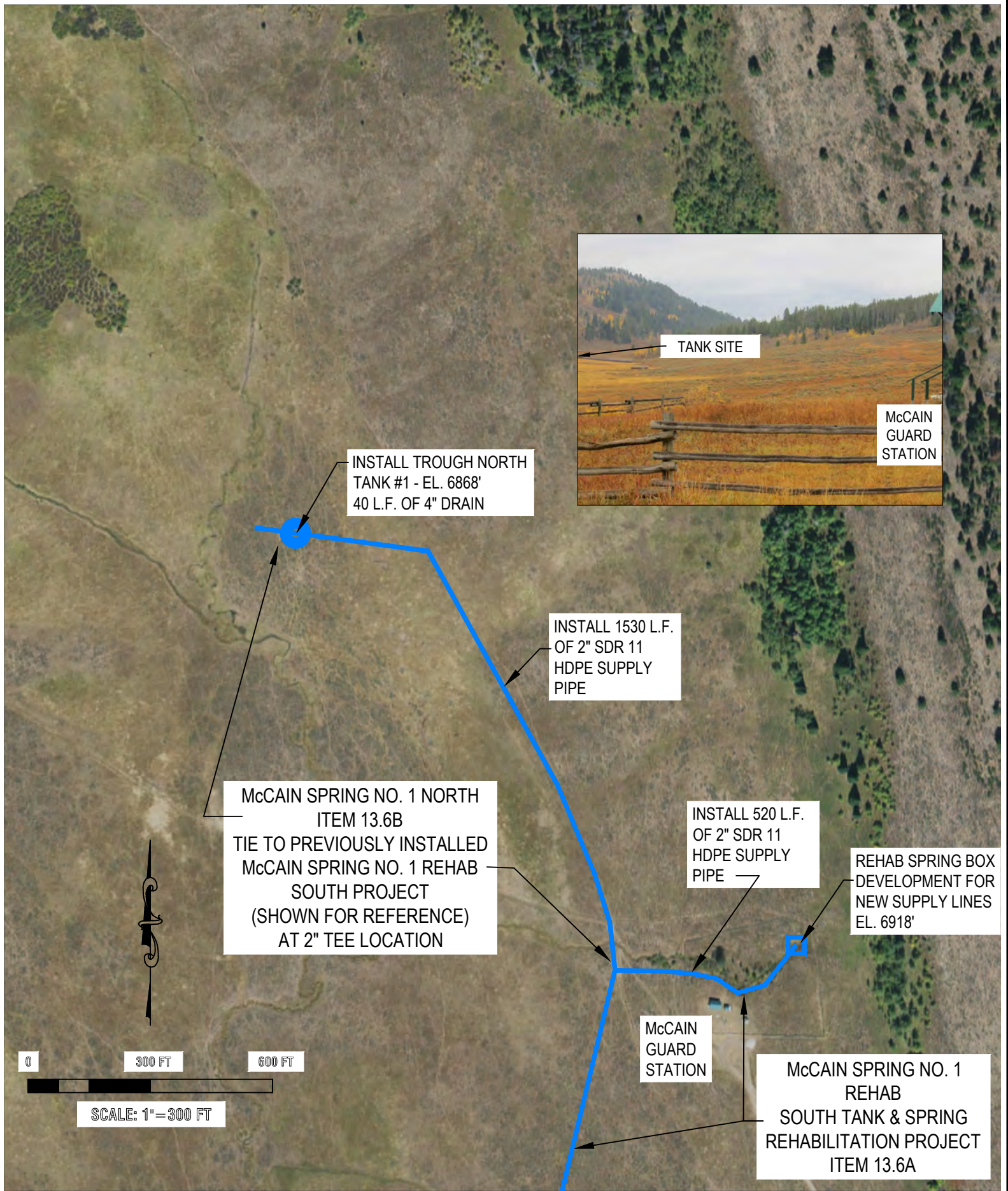
FS ROAD 10124

SCALE: 1" = 2,000 FT

PAGE No: 1 OF 3
 JOB No: 4570
 REVISION:
 DATE: 5/25/22
 CHECKED BY: MTJ
 DRAWN BY: APS
 DESIGNED BY: APS

HOBACK RIVER WATERSHED - LEVEL I STUDY
MCCAIN SPRING NO. 1 - NORTH
 SMALL WATER PROJECT ID: 13.6B
 LOCATED IN NE $\frac{1}{4}$ NW $\frac{1}{4}$ SECTION 5, T.36N., R.116W., 6TH P.M.,
 LINCOLN COUNTY, WY

RIO VERDE
ENGINEERING
 PINEDALE, WYOMING
 (307) 367-2826
 rioverde@wyoming.com



McCain Spring No. 1 North
 ITEM 13.6B
 TIE TO PREVIOUSLY INSTALLED
 McCain Spring No. 1 Rehab
 South Project
 (SHOWN FOR REFERENCE)
 AT 2" TEE LOCATION

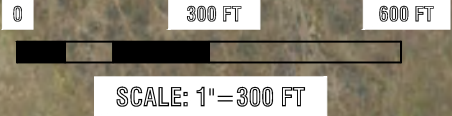
INSTALL TROUGH NORTH
 TANK #1 - EL. 6868'
 40 L.F. OF 4" DRAIN

INSTALL 1530 L.F.
 OF 2" SDR 11
 HDPE SUPPLY
 PIPE

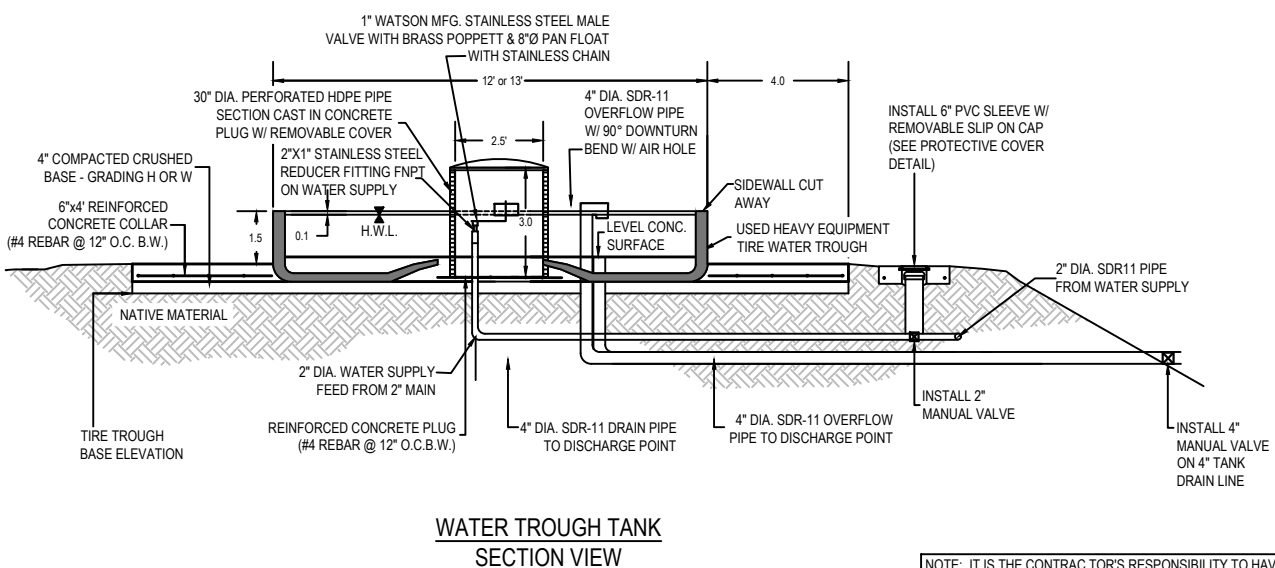
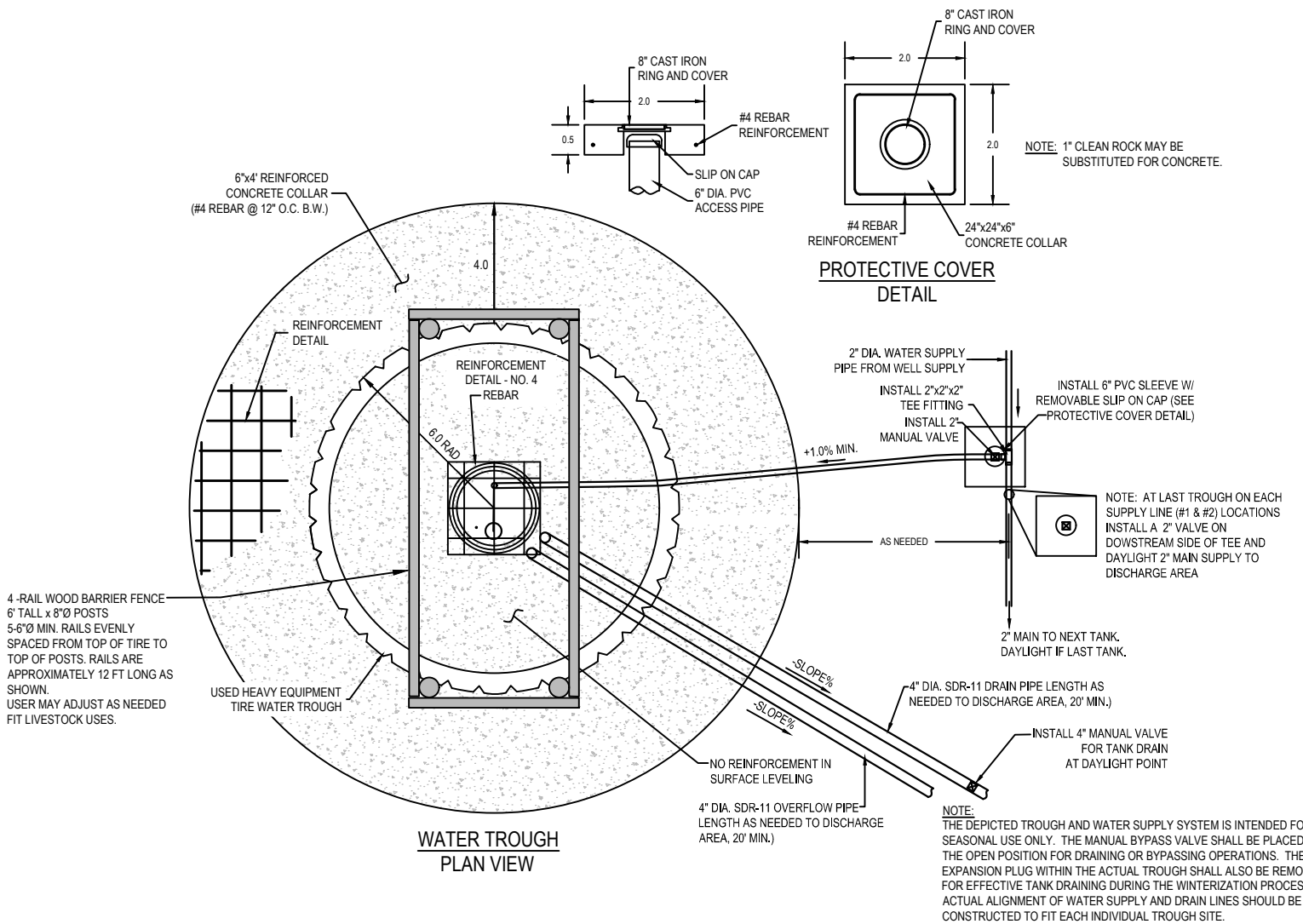
INSTALL 520 L.F.
 OF 2" SDR 11
 HDPE SUPPLY
 PIPE

REHAB SPRING BOX
 DEVELOPMENT FOR
 NEW SUPPLY LINES
 EL. 6918'

McCain Spring No. 1
 Rehab
 South Tank & Spring
 Rehabilitation Project
 ITEM 13.6A



DESIGNED BY: APS
DRAWN BY: APS
CHECKED BY: MTJ
DATE: 5/25/22
REVISED:
JOB No: 4570
PAGE No: 2 OF 3



NOTE: IT IS THE CONTRACTOR'S RESPONSIBILITY TO HAVE UTILITY LOCATES PERFORMED FOR THIS PROJECT SITE PRIOR TO ANY DIGGING OR EXCAVATION.

PAGE No. 3 OF 3
JOB No. 4570
REVISED:
DATE: 6/25/22
CHECKED BY: MTJ
DRAWN BY: APS
DESIGNED BY: APS

HOBACK RIVER WATERSHED - LEVEL I STUDY
McCain Spring No. 1 - North
SMALL WATER PROJECT ID: 13.6B
LOCATED IN NE $\frac{1}{4}$ NW $\frac{1}{4}$ SECTION 5, T.36N., R.116W., 6TH P.M., LINCOLN COUNTY, WY

RIO VERDE ENGINEERING
PINEDALE, WYOMING
(307) 367-2826
rioverde@wyoming.com

LONG DRAW SPRING NO. 1 PROJECT

Owner/Operator: Nield, Kaylyn

Project Type: Spring Development

Project Name: Big Dad Spring Rehabilitation Project

Project ID: 13.7

Location (PLSS): SE/4 SE/4 OF SEC. 8, T.36N., R.116W.

Location (Lat/Long): 43.10087° N, 110.71111° W

PROJECT COMPONENTS (ENGINEER'S ESTIMATE) - ITEMIZED COSTS

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1	Mobilization	1	LS	\$ 6,500.00	\$ 6,500.00
2	12' Dia. TIRE STOCK TROUGH, COMPLETE-IN-PLACE	1	LS	\$ 14,000.00	\$ 14,000.00
3	2" SDR-11 HDPE PIPE	500	LF	\$ 4.00	\$ 2,000.00
4	4" SDR-11 HDPE PIPE (DRAINS)	100	LF	\$ 8.50	\$ 850.00
5	2" SDR-11 FUSED TEE	3	EA	\$ 160.00	\$ 480.00
6	2" POLY-VALVE	4	EA	\$ 300.00	\$ 1,200.00
7	4" POLY-VALVE	1	EA	\$ 650.00	\$ 650.00
8	1" STAND-PIPE AIR VENTS W/ SADDLES	2	EA	\$ 100.00	\$ 200.00
9	8" DIA. VALVE RISERS (VARYING LENGHTS)	4	EA	\$ 600.00	\$ 2,400.00
10	VALVE ENCLOSURE (AIR & DRAIN)	1	EA	\$ 35.00	\$ 35.00
11	30" WATER CATCHMENT DEVELOPMENT	1	LS	\$ 8,000.00	\$ 8,000.00
TOTAL COMPONENT COST (SUBTOTAL #2):					\$ 36,315.00

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$ 6,500.00
PERMITTING AND MITIGATION:	\$ 4,000.00
LEGAL FEES:	\$ -
ACQUISITION OF ACCESS AND RIGHTS-OF-WAY:	\$ -
PRE-CONSTRUCTION COSTS (SUBTOTAL #1):	\$ 10,500.00

TOTAL COMPONENT COST (SUBTOTAL #2): \$ 36,315.00

CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%):	\$ 3,631.50
COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3):	\$ 39,946.50
CONTINGENCY (SUBTOTAL #3 X 15%):	\$ 5,991.98
TOTAL CONSTRUCTION COST (SUBTOTAL #4):	\$ 45,938.48

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4): \$ 56,438.48

PERMITTING REQUIREMENTS

Project ID: 13.7

Project Name: Big Dad Spring Rehabilitation

Land Jurisdiction: Federal, USFS

U.S. Army Corp of Engineer's (USACE)

A project plan set should be submitted to the USACE Wyoming Regulatory Office for review prior to final submission to the WWDO. Due to the small quantity of fill associated with the installation of the spring collector, and the fact that the pipeline and trough will be located on uplands, a wetland delineation and pre-construction notification are not being anticipated as a requirement. However, final determination rests with the Wyoming Regulatory Office. A USACE letter of acceptance should be submitted to the WWDO with the final design, prior to construction.

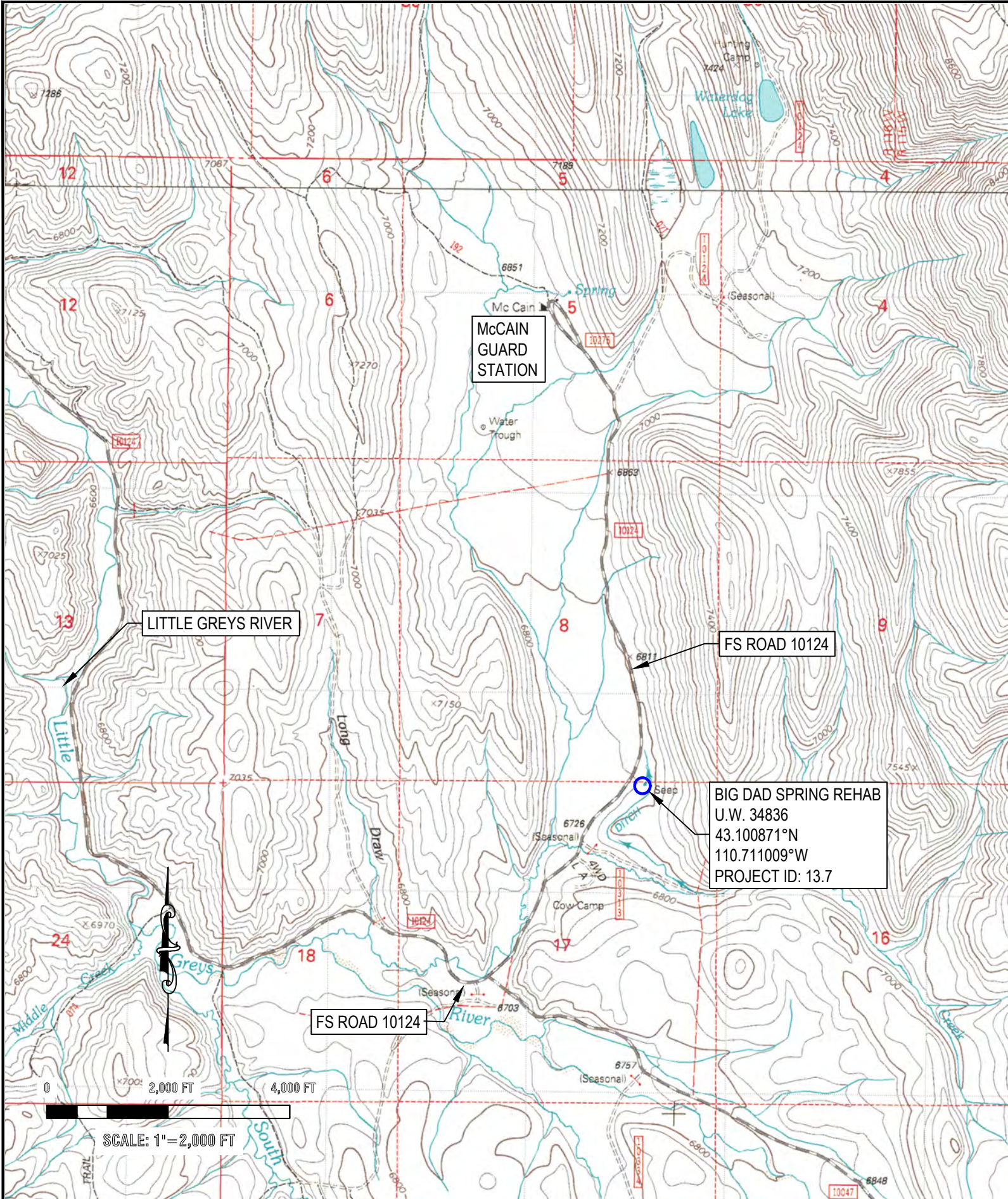
State Engineer's Office

Current Permit: U.W. 34836

This project involves the rehabilitation of an existing permitted spring for stock water purposes. No additional permits are necessary for rehabilitation. However, the proposed rehab plan should be verified by the SEO to ensure that the existing permit will cover the proposed improvements.

U.S. Forest Service – Bridger National Forest

A special use permit exists for this project. An environmental assessment is not believed to be necessary regarding the spring rehab, however an on-site meeting should be held with USFS personnel prior to SF-299 completion. Additional assessments or studies may be necessary depending on site conditions and review with USFS personnel.

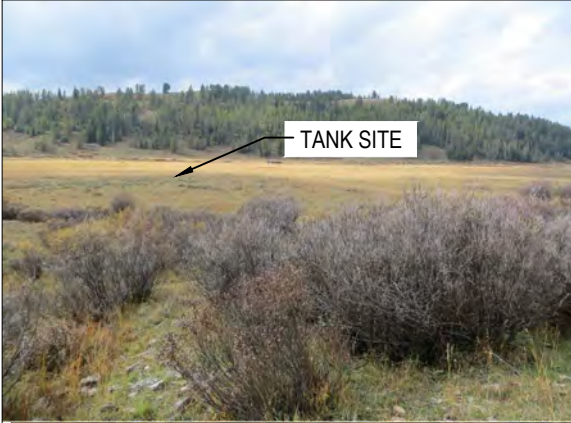
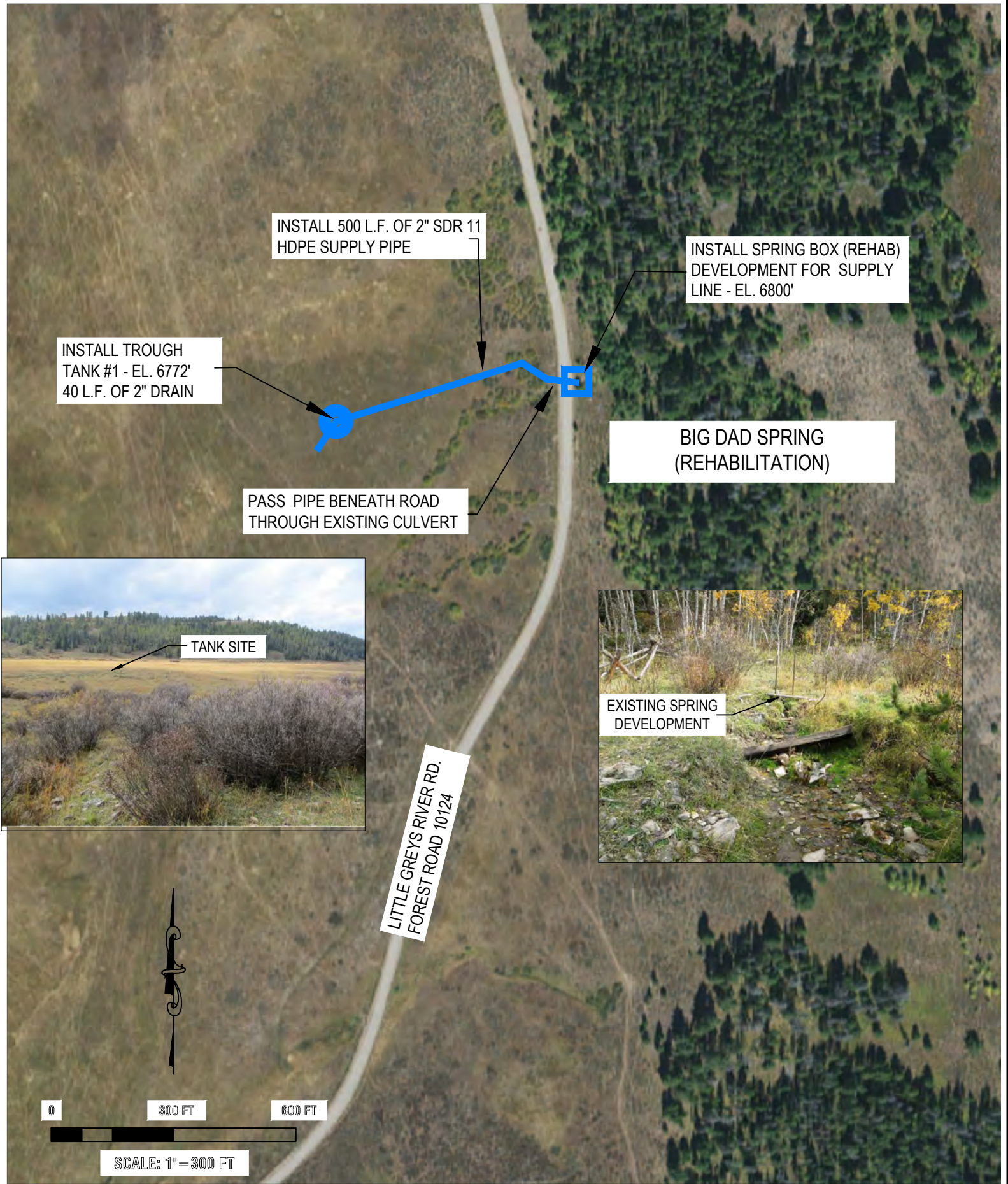


HOBACK RIVER WATERSHED - LEVEL I STUDY
BIG DAD SPRING REHABILITATION
 SMALL WATER PROJECT ID: 13.7
 LOCATED IN SE $\frac{1}{4}$ SE $\frac{1}{4}$ SECTION 8, T.36N., R.116W., 6TH P.M.,
 LINCOLN COUNTY, WY

RIO VERDE
ENGINEERING
 PINEDALE, WYOMING

(307) 367-2826
 rioverde@wyoming.com

DESIGNED BY: ARS
 DRAWN BY: APS
 CHECKED BY: MTJ
 DATE: 5/25/22
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 PAGE No: 1 OF 4



TANK SITE



EXISTING SPRING DEVELOPMENT

LITTLE GREYS RIVER RD.
FOREST ROAD 10124

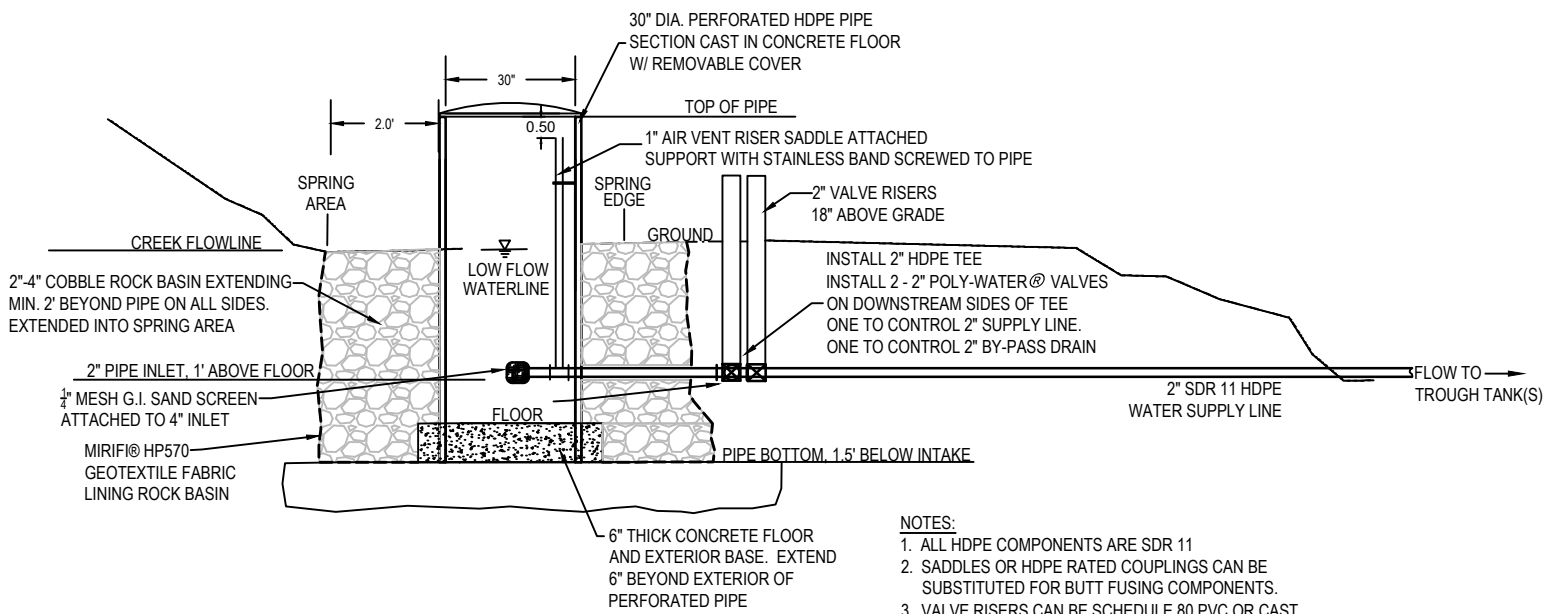


SCALE: 1" = 300 FT

HOBACK RIVER WATERSHED - LEVEL I STUDY	
BIG DAD SPRING REHABILITATION	
SMALL WATER PROJECT ID: 13.7	
LOCATED IN SE $\frac{1}{4}$ SE $\frac{1}{4}$ SECTION 8, T.36N., R.116W., 6TH P.M., LINCOLN COUNTY, WY	
DESIGNED BY: AFS	
DRAWN BY: AFS	
CHECKED BY: MTJ	
DATE: 5/25/22	
REVISED:	
JOB No: 4570	
PAGE No: 2 OF 4	

RIO VERDE
ENGINEERING
PINEDALE, WYOMING

(307) 367-2826
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WATER CATCHMENT STRUCTURE

N.T.S.

NOTES:

1. ALL HDPE COMPONENTS ARE SDR 11
2. SADDLES OR HDPE RATED COUPLINGS CAN BE SUBSTITUTED FOR BUTT FUSING COMPONENTS.
3. VALVE RISERS CAN BE SCHEDULE 80 PVC OR CAST IRON COMPONENTS, BUT SHOULD BE INSTALLED TO PREVENT THEM FROM BEING PULLED FROM THE GROUND.

HOBACK RIVER WATERSHED - LEVEL I STUDY

BIG DAD SPRING REHABILITATION

SMALL WATER PROJECT ID: 13.7

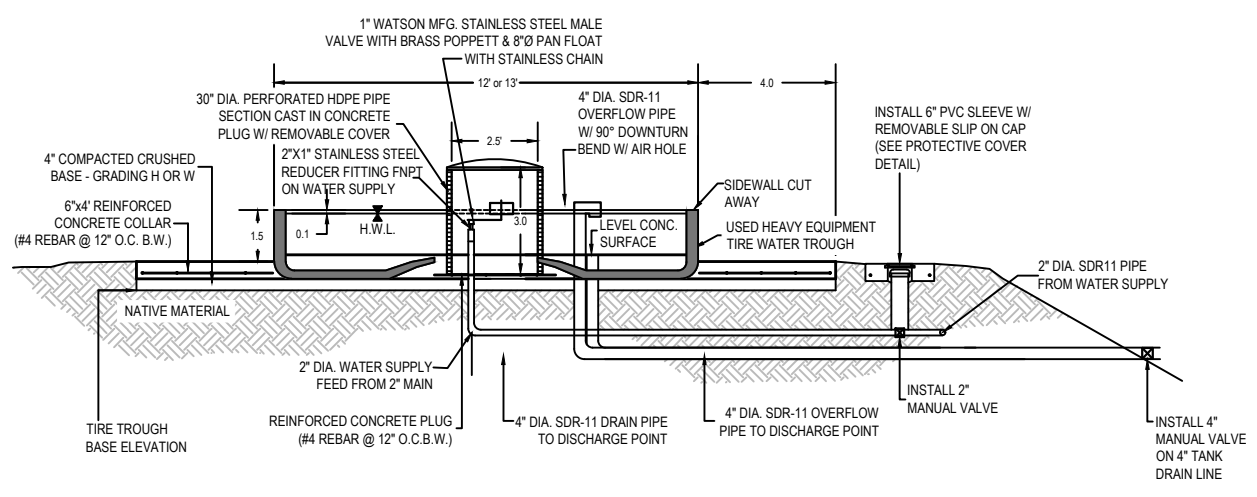
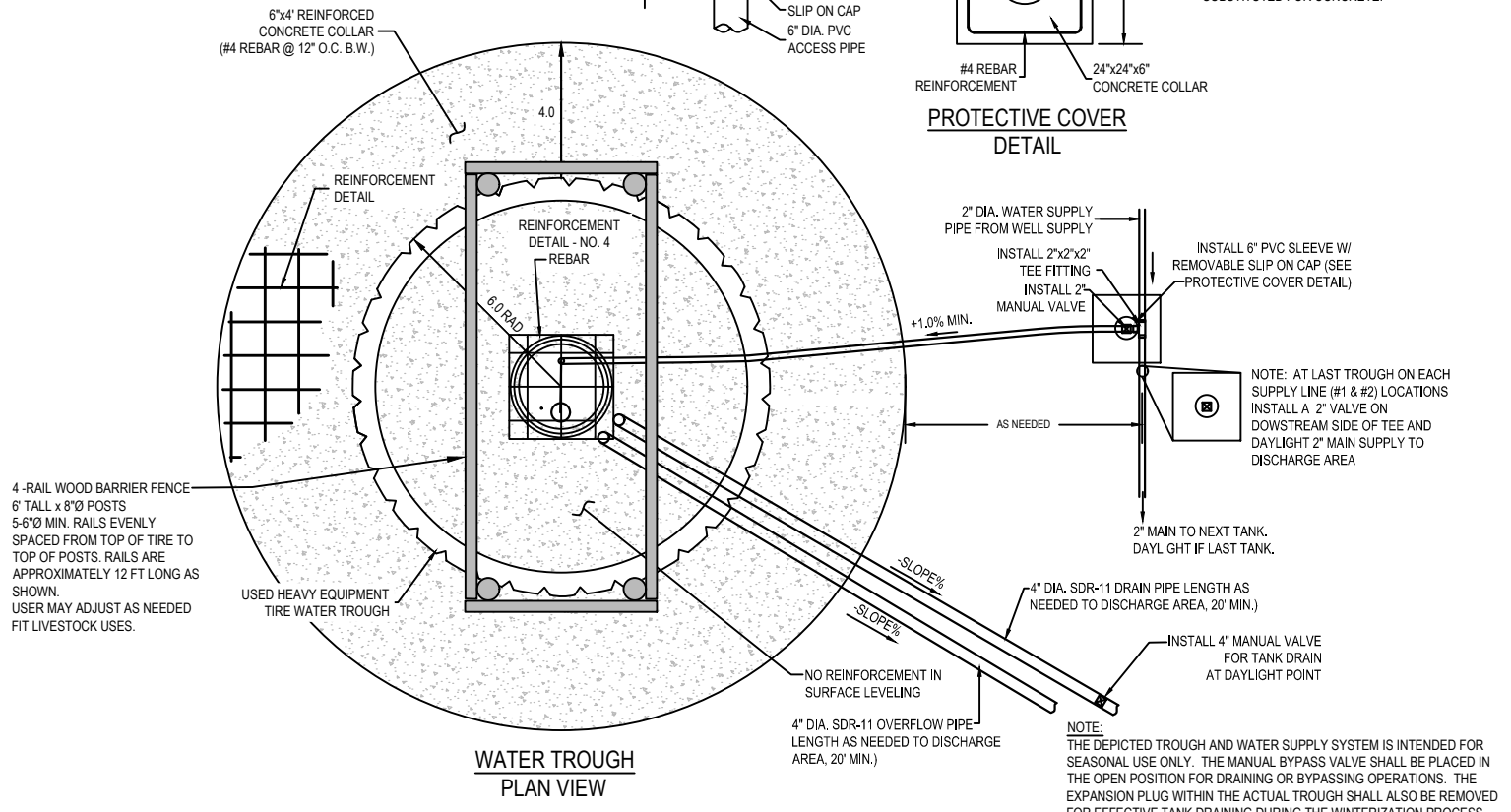
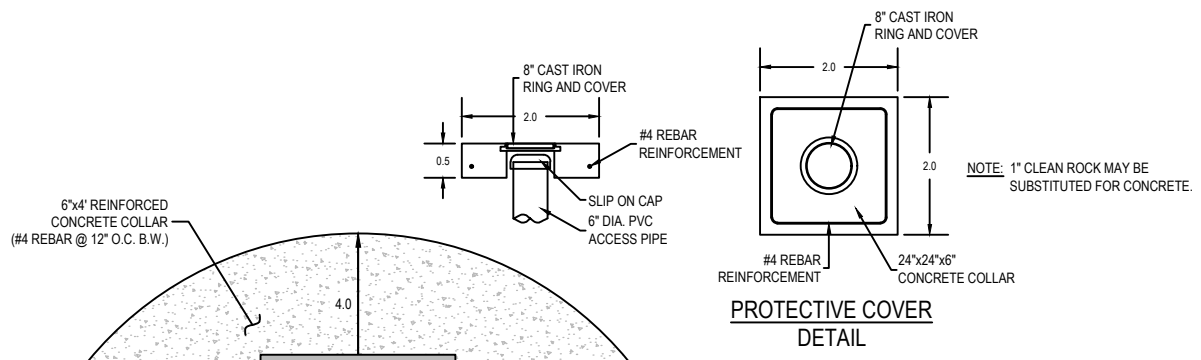
LOCATED IN SE $\frac{1}{4}$ SE $\frac{1}{4}$ SECTION 8, T.36N., R.116W., 6TH P.M.,
LINCOLN COUNTY, WY



(307) 367-2826
rioverde@wyoming.com

PINEDALE, WYOMING

DESIGNED BY: APS
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PAGE No. 3 OF 4



NOTE: IT IS THE CONTRACTOR'S RESPONSIBILITY TO HAVE UTILITY 'LOCATES' PERFORMED FOR THE PROJECT SITE PRIOR TO ANY DIGGING OR EXCAVATION.

DESIGNED BY: APS
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HOBACK RIVER WATERSHED - LEVEL I STUDY
BIG DAD SPRING REHABILITATION
SMALL WATER PROJECT ID: 13.7
LOCATED IN SE $\frac{1}{4}$ SE $\frac{1}{4}$ SECTION 8, T.36N., R.116W., 6TH P.M., LINCOLN COUNTY, WY

RIO VERDE ENGINEERING
PINEDALE, WYOMING
(307) 367-2826
rioverde@wyoming.com

HOBACK RIVER WATERSHED STUDY LEVEL I**Owner/Operator:** Scott Carpenter**Project Type:** Storage**Project ID:** 14.1**Project Name:** Bryan Creek No. 1 Reservoir**Location (PLSS):** W/2, Sec. 4, T38N, R115W**Location (Lat/Long):** 43.28625°N, 110.65116°W**PROJECT COMPONENTS (ENGINEER'S ESTIMATE)**

ITEM No.	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1	Mobilization	1	LS	\$ 8,000.00	\$ 8,000.00
2	Topsoil stripping and Replacement	7000	SY	\$ 1.50	\$ 10,500.00
3	Dike Construction, On-site Excavation & Fill	3800	CY	\$ 4.00	\$ 15,200.00
4	Well Abandonment per State Engineer Regs.	1	LS	\$ 800.00	\$ 800.00
5	2" SDR 11 HDPE Supply Line	110	LF	\$ 6.50	\$ 715.00
6	2" HDPE Isolation Valve	1	LS	\$ 150.00	\$ 150.00
7	Connect 2" Supply to Existing Pumped Supply	1	LS	\$ 1,000.00	\$ 1,000.00
8	18" CMP Culvert	30	LF	\$ 60.00	\$ 1,800.00
9	18"x20"x10' Water Control Structure	1	LS	\$ 3,800.00	\$ 3,800.00
10	Seeding & Reclamation	1	LS	\$ 2,500.00	\$ 2,500.00
TOTAL COMPONENT COST (SUBTOTAL #2):					\$ 44,465.00

PREPARATION OF FINAL DESIGNS & SPECIFICATIONS:	\$ 4,500.00
PERMITTING AND MITIGATION:	\$ 4,300.00
LEGAL FEES:	\$ 2,800.00
ACQUISITION OF ACCESS AND RIGHTS-OF-WAY:	\$ -
PRE-CONSTRUCTION COSTS (SUBTOTAL #1):	\$ 11,600.00

TOTAL COMPONENT COST (SUBTOTAL #2):	\$ 44,465.00
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CONSTRUCTION ENGINEERING COST (SUBTOTAL #2 x 10%):	\$ 4,446.50
COMPONENTS AND ENGINEERING COSTS (SUBTOTAL #3):	\$ 48,911.50
CONTINGENCY (SUBTOTAL #3 X 15%):	\$ 7,336.73
TOTAL CONSTRUCTION COST (SUBTOTAL #4):	\$ 56,248.23

TOTAL PROJECT COST (SUBTOTAL #1 + SUBTOTAL #4):	\$ 67,848.23
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PERMITTING REQUIREMENTS

Project ID: 14.1

Project Name: Bryan Creek No. 1 Reservoir

Land Jurisdiction: Private, Scott Carpenter

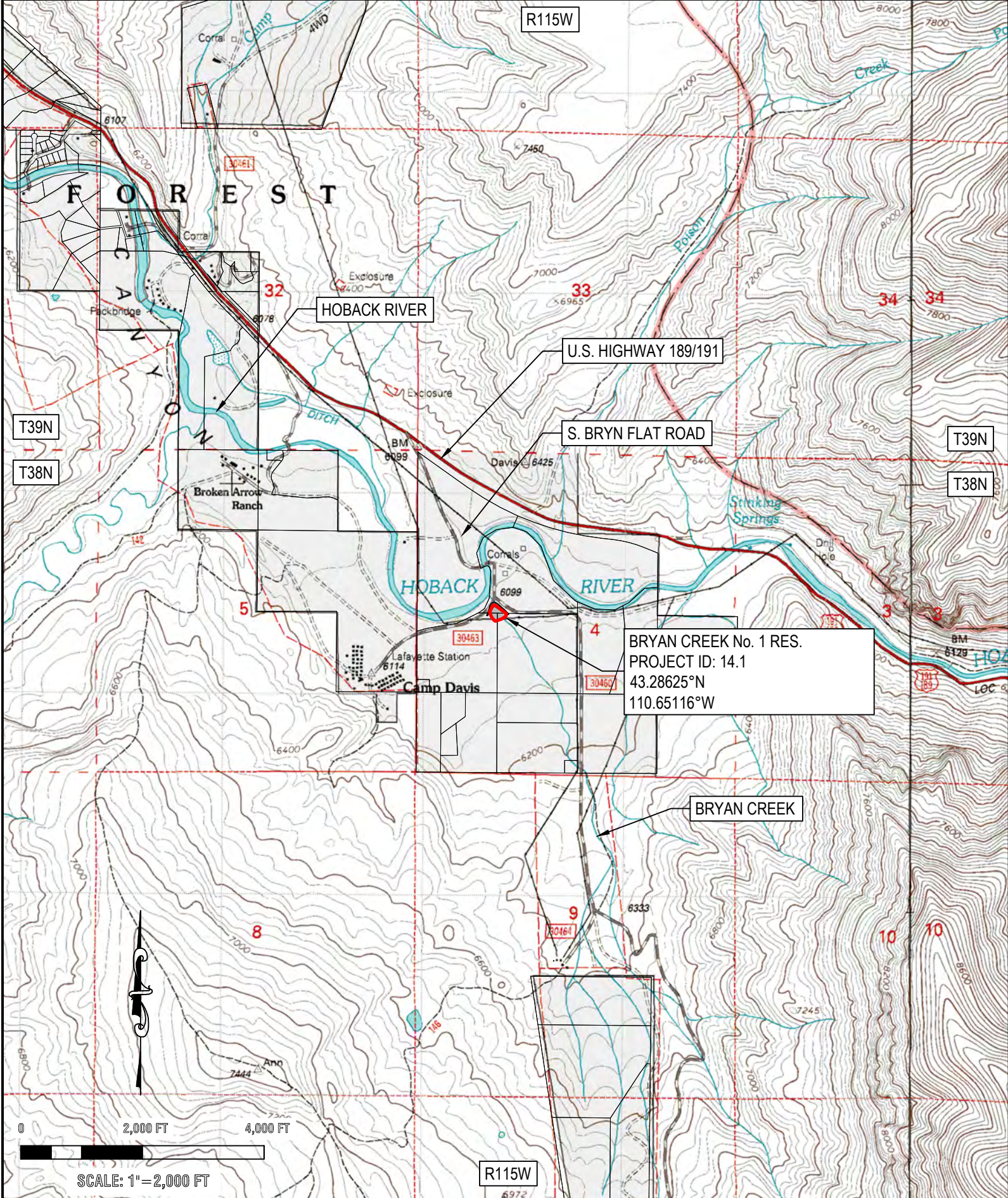
State Engineer's Office

Current Permit: None

The proposed reservoir is to be supplied by the Gabrielson Pipeline. Said pipeline and diversion is currently permitted under P31843.0D. An enlargement of said facility (SW-2) for the reservoir supply will be required along with the actual reservoir permit itself (SW-3).

Jackson Hole Land Trust

The subject properties where the proposed reservoir is to be constructed are partially encumbered by two (2) separate conservation easements held by the Jackson Hole Land Trust (JHLT), as recorded in Book 485, Page 721 and in Book 361, Page 762, respectively, in the Office of the Clerk of Teton County, Wyoming. Pond construction is specifically allowed for however, consent from the JHLT shall be obtained prior to construction.



HOBACK RIVER WATERSHED - LEVEL I STUDY

BRYAN CREEK No. 1 RES.
 SMALL WATER PROJECT ID: 14.1
 LOCATED IN THE W/2 OF SECTION 4, T.38N., R.115W.,
 6TH P.M., TETON COUNTY, WY



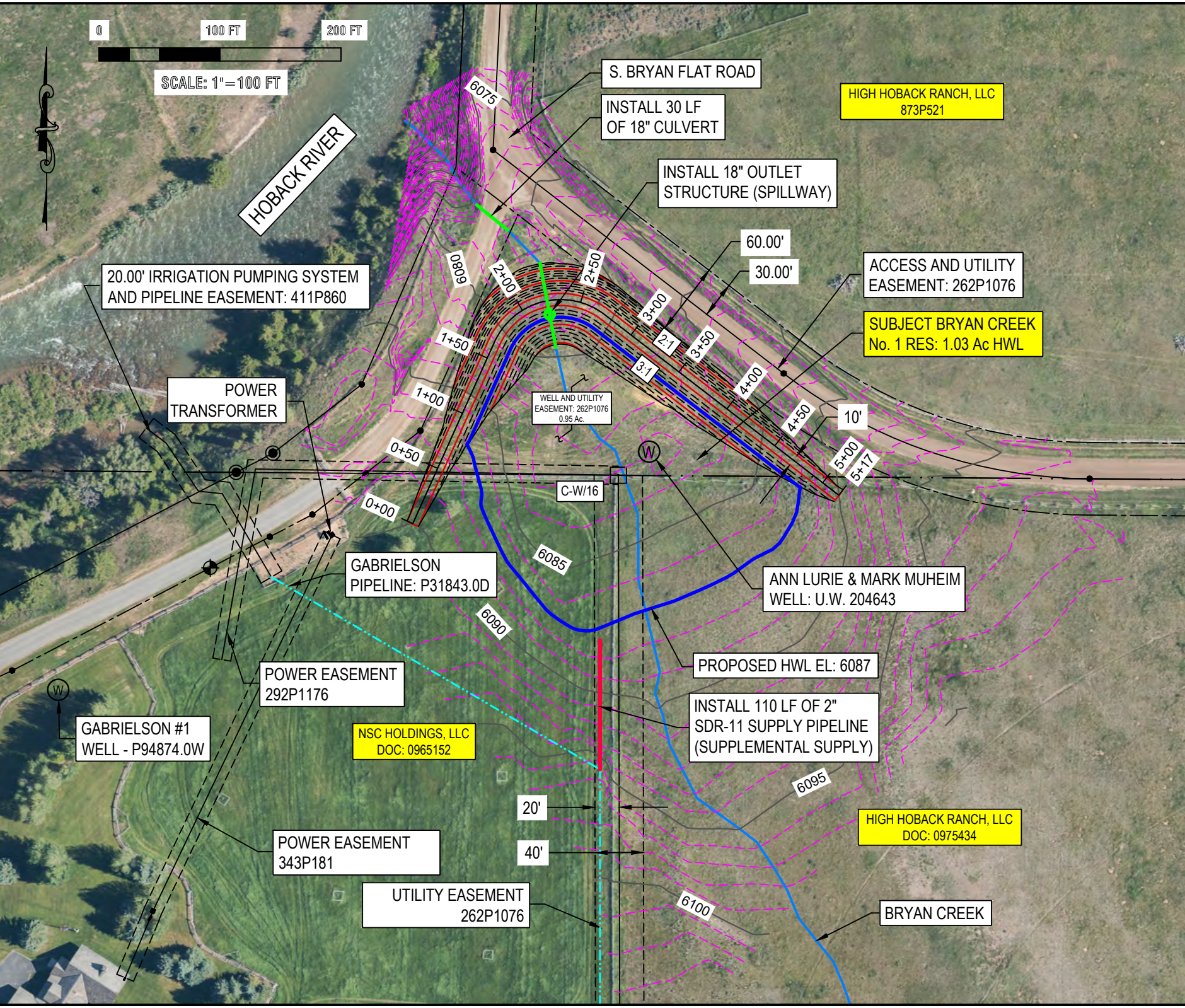
**RIO VERDE
ENGINEERING**
 PINEDALE, WYOMING

(307) 367-2826
 rioverde@wyoming.com

DESIGNED BY: MTJ
 DRAWN BY: MTJ
 CHECKED BY: EAS
 DATE: 09/17/21
 REVISED:
 JOB No. 4570
 PAGE No. 1 OF 4

HOBACK RIVER WATERSHED - LEVEL I STUDY
BRYAN CREEK No. 1 RES.
 SMALL WATER PROJECT ID: 14.1
 LOCATED IN THE W2 OF SECTION 4, T.38N., R.115W.,
 6TH P.M., TETON COUNTY, WY

RIO VERDE ENGINEERING
 PINEDALE, WYOMING
 (307) 367-2826
 rloverde@wyoming.com



0 100 FT 200 FT

SCALE: 1"=100 FT

HOBACK RIVER

S. BRYAN FLAT ROAD

INSTALL 30 LF OF 18" CULVERT

HIGH HOBACK RANCH, LLC
873P521

INSTALL 18" OUTLET STRUCTURE (SPILLWAY)

20.00' IRRIGATION PUMPING SYSTEM AND PIPELINE EASEMENT: 411P860

ACCESS AND UTILITY EASEMENT: 262P1076

SUBJECT BRYAN CREEK No. 1 RES: 1.03 Ac HWL

POWER TRANSFORMER

WELL AND UTILITY EASEMENT: 262P1076
0.95 Ac.

GABRIELSON PIPELINE: P31843.0D

ANN LURIE & MARK MUHEIM WELL: U.W. 204643

C-W/16

PROPOSED HWL EL: 6087

INSTALL 110 LF OF 2" SDR-11 SUPPLY PIPELINE (SUPPLEMENTAL SUPPLY)

POWER EASEMENT 292P1176

GABRIELSON #1 WELL - P94874.0W

NSC HOLDINGS, LLC
DOC: 0965152

HIGH HOBACK RANCH, LLC
DOC: 0975434

POWER EASEMENT 343P181

UTILITY EASEMENT 262P1076

BRYAN CREEK

20'

40'

6100

6095

6085

6090

0890

2400

2450

60.00'

30.00'

1+00

0+50

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3+00

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HOBACK RIVER WATERSHED - LEVEL I STUDY
BRYAN CREEK No. 1 RES.
 SMALL WATER PROJECT ID: 14.1
 LOCATED IN THE W12 OF SECTION 4, T.38N., R.115W.,
 6TH P.M., TETON COUNTY, WY

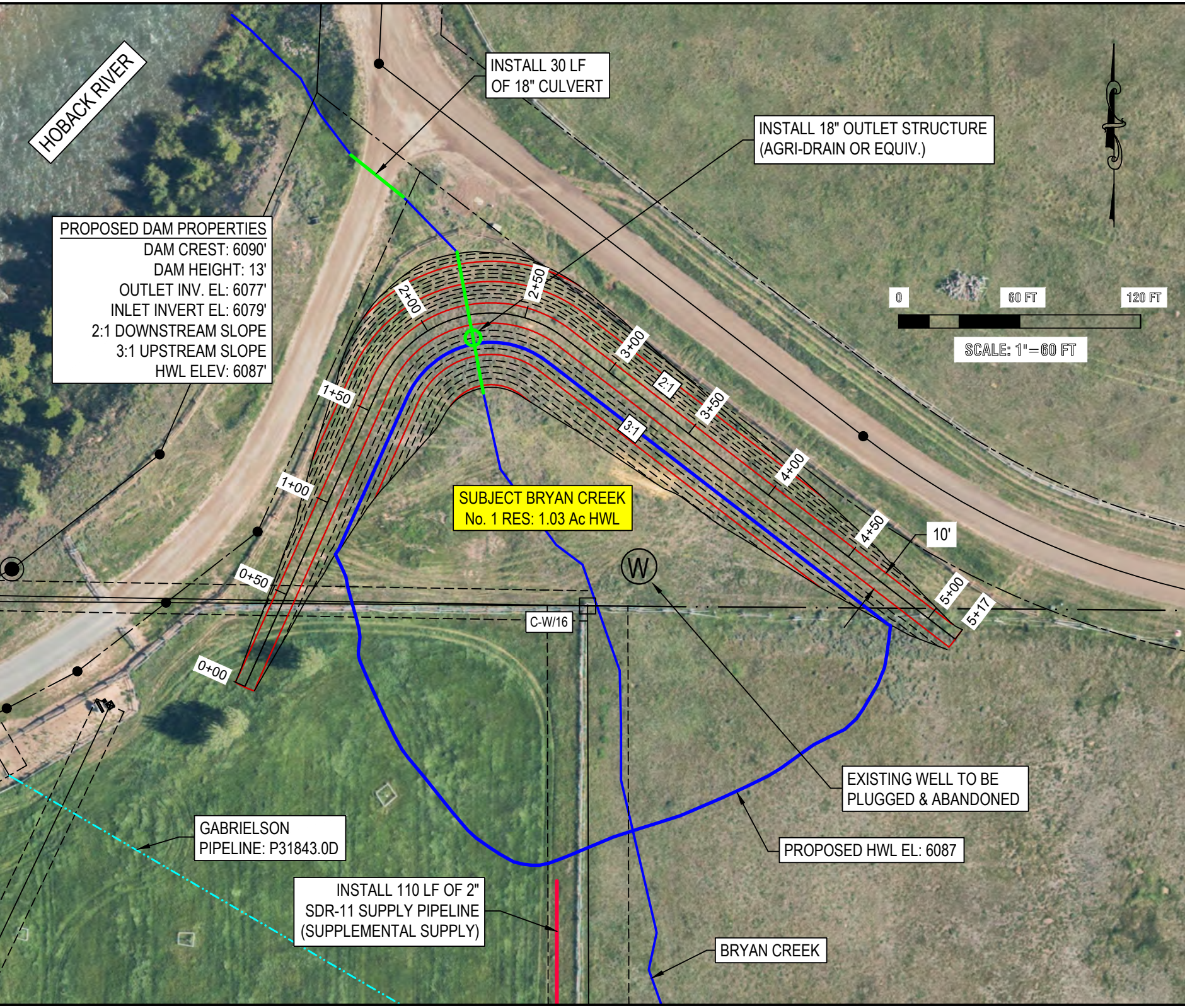
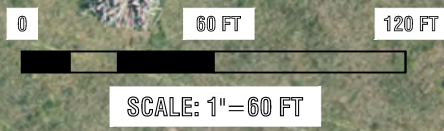
RIO VERDE ENGINEERING
 PINEDALE, WYOMING
 (307) 367-2826
 rloverde@wyoming.com

PROPOSED DAM PROPERTIES
 DAM CREST: 6090'
 DAM HEIGHT: 13'
 OUTLET INV. EL: 6077'
 INLET INVERT EL: 6079'
 2:1 DOWNSTREAM SLOPE
 3:1 UPSTREAM SLOPE
 HWL ELEV: 6087'

INSTALL 30 LF OF 18" CULVERT

INSTALL 18" OUTLET STRUCTURE (AGRI-DRAIN OR EQUIV.)

SUBJECT BRYAN CREEK
 No. 1 RES: 1.03 Ac HWL



GABRIELSON PIPELINE: P31843.0D

INSTALL 110 LF OF 2" SDR-11 SUPPLY PIPELINE (SUPPLEMENTAL SUPPLY)

PROPOSED HWL EL: 6087

EXISTING WELL TO BE PLUGGED & ABANDONED

BRYAN CREEK

C-W/16

W

HOBACK RIVER

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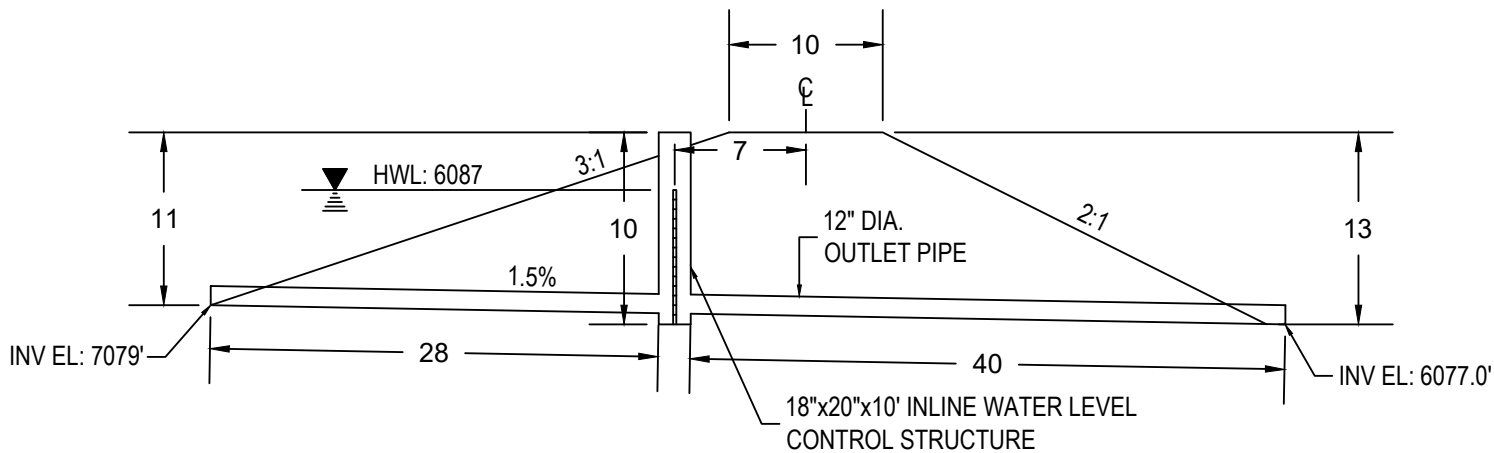
4+00

4+50

5+00

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10'



BRYAN CREEK No. 1 RES
X-SECTION VIEW

STAGE-STORAGE TABLE

ELEVATION (FT)	AREA (Ac.)	AVERAGE (Ac.)	CAPACITY (Ac-FT)
6087	1.03		
		0.83	1.66
6085	0.62		
		0.45	0.90
6083	0.27		
		0.17	0.34
6081	0.06		
		0.03	0.06
6079	0.00		
TOTAL CAPACITY (Ac-FT)			2.96

ACTIVE STORAGE
2.96 AC-FT

HOBACK RIVER WATERSHED - LEVEL I STUDY

BRYAN CREEK No. 1 RES.

SMALL WATER PROJECT ID: 14.1
LOCATED IN THE W/2 OF SECTION 4, T.38N., R.115W.,
6TH P.M., TETON COUNTY, WY



(307) 367-2826
rioverde@wyoming.com

PINEDALE, WYOMING

DESIGNED BY: MTJ
DRAWN BY: MTJ
CHECKED BY: EAS
DATE: 4/16/22
REVISED:
JOB No: 4570
PAGE No: 4 OF 4

PERMITTING REQUIREMENTS

Project ID: 15.1

Project Name: River Bend Ranch Restoration and Passage Project

Land Jurisdiction: Private/Federal, River Bend Ranch, Jackson Fork Ranch, USFS

The project listed above was developed between 2017 and 2021. This project was brought to our attention in correspondence with Leslie Steen of Trout Unlimited. Based on information received, the project is at 60% design completion and all necessary permits have either been submitted to or secured from the different agencies more particularly listed as follows:

NEPA: Bridger-Teton National Forest

USACE: NWP 27

WYDEQ: Turbidity Waiver



2021 Jackson Hole One Fly Stream Habitat Improvement Program Proposal Application

Title of Project: River Bend Ranch Restoration and Passage Project Phase 2

Total Amount Requested: [REDACTED]

Matching Funds Proposed (cash and/or in-kind 1:1): [REDACTED]

Total Project Cost: Total project budget: [REDACTED]

Proposed Grant Period (start date and end date): 7/1/2021 – 12/31/2023

Primary Project Contact:

Name: Leslie Steen

Title: NW Wyoming Program Director

Organization: Trout Unlimited

Address: PO Box 5002, Jackson, WY 83001

Email: leslie.steen@tu.org

Telephone: 307-699-1022

Website: www.tu.org

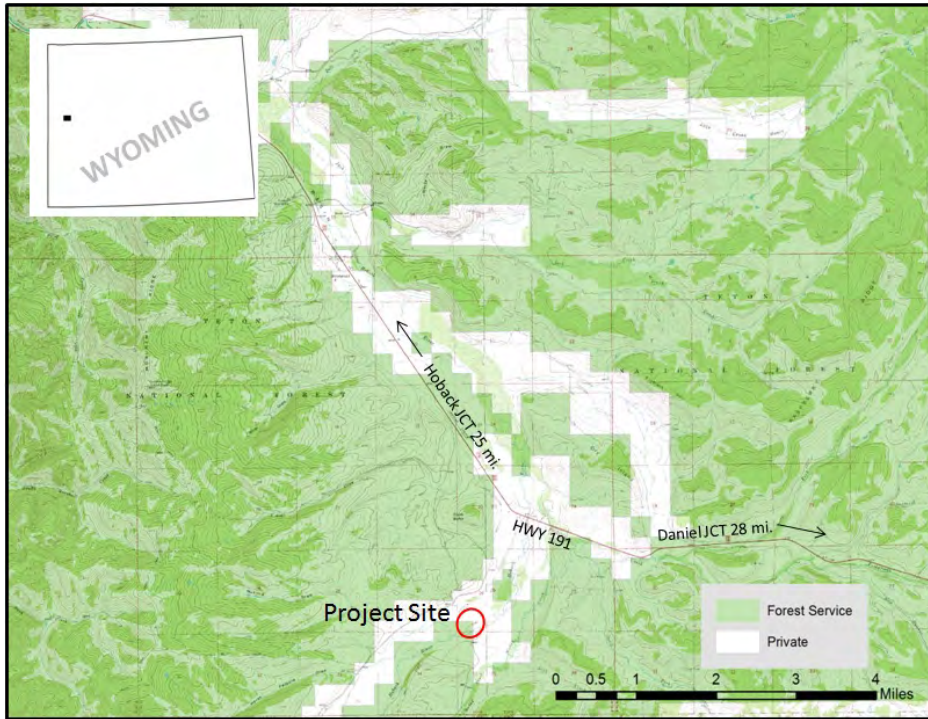
Organization Tax ID Number (required): EIN# 38-1612715

Project Summary (4-5 descriptive sentences that can be used for publication):

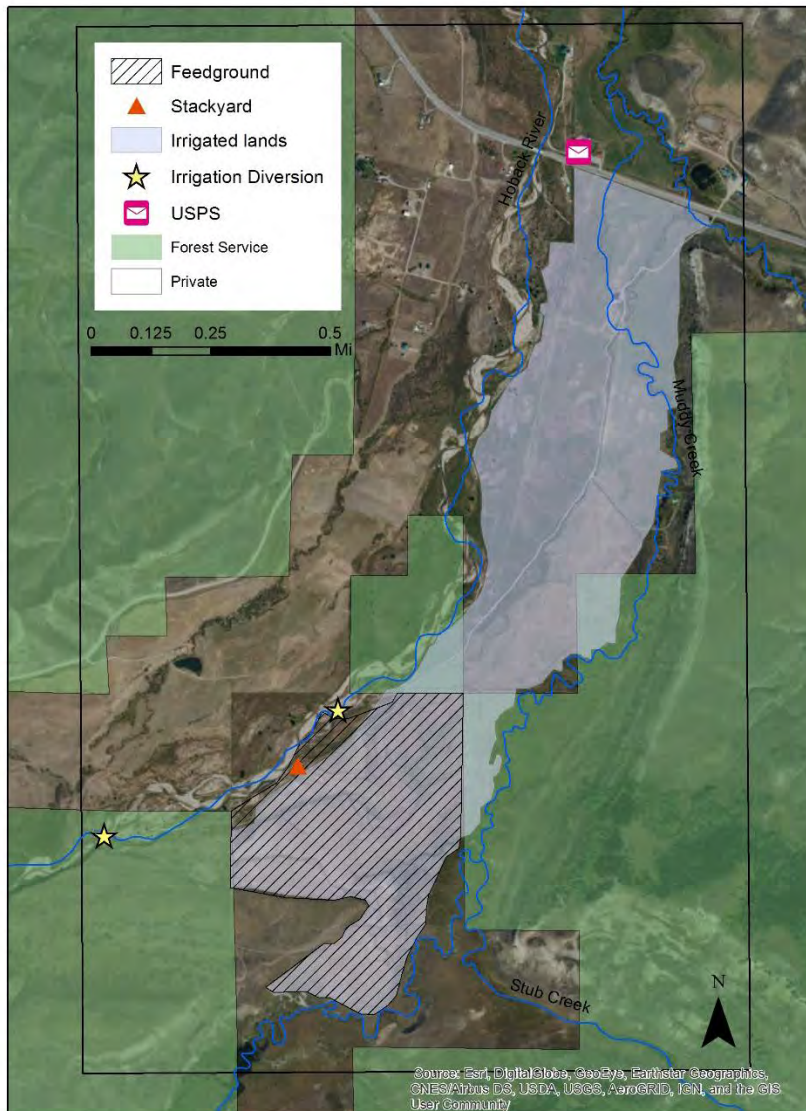
The River Bend Ranch Restoration and Passage Project Phase 2 is a collaborative effort to improve habitat and passage for native Snake River Cutthroat Trout; stream, floodplain and riparian function; and bank and channel stability on the upper Hoback River outside of Bondurant, Wyoming. The project is located on a mix of working cattle ranch, bison ranch, and Bridger-Teton National Forest (BTNF) lands, and is the site of the Wyoming Game and Fish Department's (WGFD) McNeel elk feedground and a Jackson Hole Land Trust conservation easement. Habitat degradation as a result of instream disturbances from two gravel push-up dams were addressed through the project's first phase in 2018-2019 through the installation of a fish passage-friendly rock diversion and headgate structure at a stable location. The project's second phase will address the entire 2.5 mile river corridor from the new diversion to the Highway 191 bridge through an innovative approach that works with the river's ecological processes. Together, these improvements will benefit fish habitat, fish passage, stream stability, and agricultural operations in one of the most degraded sections of the Hoback River.

Project Location (include specific site area description and maps):

The project is located on the upper Hoback River, a tributary of the Snake River in Sublette County, WY, on a mixture of private agricultural lands, a Wyoming Game and Fish Department elk feedground, and Bridger-Teton National Forest lands. The upstream end of the project area begins 2.5 miles SSW of the Bondurant, WY post office, and ends downstream at the Highway 191 bridge over the Hoback River.



Vicinity map showing upstream end of the project area in red and public and private landownership.



Zoomed in vicinity map showing the project location relative to Bondurant, WY post office and land uses in the area. Yellow stars mark the location of the gravel pushup dams replaced in Phase 1 of the project. Phase 2 of the project (current application) will seek to treat the river's entire 2.5 mile-long floodplain and riparian habitat from the lower left star to the highway. See attachments below for additional Phase 2 maps.

Permit Description (if applicable):

The Bridger-Teton National Forest is a project partner and landowner. As a partner, they will be shepherding the project through their "small NEPA" process in summer 2021. Applications for US Army Corps and Wyoming Department of Environmental Quality will be submitted in August 2021 once 60% designs are in-hand.

Permit Status:

- NEPA: The Bridger-Teton National Forest is expected to complete their "small NEPA" analysis for the project in summer 2021.
- US Army Corps Nationwide Permit No. 27: Applications will be submitted August 2021, to be received by October 2021.
- WY DEQ Turbidity Waiver: Applications will be submitted August 2021, to be received by October 2021.

Permit Contact Person:

Leslie Steen, NW Wyoming Program Director, Trout Unlimited, leslie.steen@tu.org

Permits/Approval Submittal-Approval Date:

Please see above.

FULL PROJECT PROPOSAL APPLICATION

Project Need:

The upper Hoback River in the project area, which encompasses two private ranches (River Bend Ranch and Jackson Fork Ranch) and Bridger-Teton National Forest (BTNF) lands, is a highly unstable channel that has resulted in reduced instream and riparian habitat for native fish and riparian-dependent wildlife, and threatens feedground, irrigation, and ranching operations. The project area has a history of willow removal, heavy ungulate browse pressure, riparian cattle grazing, flood control through dykes and ditches, and flood irrigation through the use of gravel push-up dams, which have collectively contributed to the high levels of bank and channel instability evidenced throughout the property and low quality aquatic and riparian habitat.

Project partners first focused on the project area in 2016 when extreme bank erosion threatened the Wyoming Game and Fish Department's (WGFD) McNeel feedground stackyard on the River Bend Ranch, which stores 500 tons of hay for winter elk feeding. While the bank adjacent to the stackyard was rip-rapped in December 2016 to prevent further bank loss, project partners realized that longer-term solutions would be needed to address the contributing factors of instability and loss of fish habitat in the area. In fall 2018 and spring 2019, the project's first phase addressed the impacts of annual instream disturbance from two gravel push-up dams (which had required excavators to manipulate the stream bed and banks multiple times a year to divert water) through a series of irrigation system improvements. The gravel push-up dams had resulted in degraded habitat for native fish and impeded fish passage seasonally and during low water years. The push-up dams were replaced with a single, fish-passage friendly rock diversion and headgate structure in a stable location. Associated bank and channel treatments, and improvements to irrigation infrastructure in and around the new diversion, also benefitted the ranch and feedground operations, stream stability, fish habitat, and fish passage.

The project's second phase seeks to address the second major source of stream instability and degraded fish habitat in the area: the loss of historic woody riparian vegetation (cottonwoods and willows), which has

resulted in floodplain instability, severe bank erosion, loss of land, stream channel abandonment and downcutting. Prior to land use changes for ranching and elk feedground operations, the upper Hoback River in the project area would have been a multi-thread, braided, and stable channel with high floodplain connectivity (see attachments below), held together by a robust cottonwood and willow community and hosting a diversity of habitats for all life stages of native cutthroat trout. Loss of this vegetation has resulted in a lack of habitat diversity and quality (very little cover, pool habitat, and backwater habitat) and low densities of trout. The project will improve the stream function of the entire 2.5 mile Upper Hoback River river corridor from the diversion to the Highway 191 bridge by addressing the remaining sources of impairment – ungulate and cattle grazing – and will utilize innovative techniques (further described below) to re-establish woody riparian vegetation in the floodplain and stabilize high-risk banks in the river’s braidplain. By doing so, in both the short-term and long-term, the river’s natural ecological processes will work together with the increased riparian vegetation to provide improved native fish habitat and passage throughout one of the most impaired reaches of the Hoback River.

Native Fish Conservation Benefits

The Hoback River is a major tributary of the Snake River and is an important, wild, native Snake River Cutthroat Trout fishery. It is a popular fishery that is self-sustained by wild recruitment (no stocking) and is a high conservation priority because of the robust, genetically pure Snake River Cutthroat Trout populations found within the watershed. Fifty-three stream miles within the Hoback River watershed are part of the National Wild and Scenic Rivers System through the Craig Thomas Snake Headwaters Legacy Act, and several segments of stream have instream flow rights filed with the Wyoming State Engineer’s Office for the benefit of the fishery and as a result of Wyoming Water Development Commission instream flow studies. Maintenance of the Hoback River fishery by restoring and improving degraded instream and riparian habitats benefits the public and future generations.

A recent WGFD-TU fish movement study in the Hoback River watershed demonstrated that fish overwinter in the Upper Hoback immediately upstream as well as downstream of the project area, where more pool and cover habitat is present, whereas the stream reach within the project area has very low densities of cutthroat trout, likely as a result of a lack of suitable spawning, rearing, and cover habitat. Improving habitat quality within the project area will benefit the public fishery by increasing spawning and rearing activity and reducing erosion so that less sediment is carried downstream and deposited on redds or in pools. In addition, the previous installation of the fish passage-friendly diversion structure, and the currently proposed treatments to provide increased cover and stability, will ensure that the upper Hoback River upstream of the project area will be more accessible to migratory native cutthroat trout.

This area has been identified in the WGFD’s Statewide Habitat Plan as a restoration priority for Snake River Cutthroat Trout, because it is one of the most degraded and altered sections of the Hoback River and is an important link between higher quality habitat upstream and downstream. It is within a high priority conservation area identified by the Yellowstone Cutthroat Trout (YCT) Work Group, a multi-agency group of researchers and managers that recently conducted a framework for assessing YCT populations (including Snake River Cutthroat Trout) to prioritize rangewide conservation and management actions that focus on maintaining life history diversity, genetic purity, population resilience, and climate resilience (Al-Chokachy et al. 2018) – and is also complementary to the goals of the Range-Wide Conservation Agreement for YCT. It is also aligned with the Western Native Trout Initiative’s strategic priorities focused on providing long-term protection of intact and healthy aquatic ecosystems that support priority populations, including actions that protect or enhance multiple populations (Snake River and Hoback River populations of SRC); and actions that provide immediate benefits to enhancing the viability of priority populations (restoring habitat quality and

connectivity in the Hoback River watershed for a genetically pure population of SRC, including both fluvial and resident life histories, in a watershed primarily composed of protected public lands).

Project Objectives:

Goals:

Restore stream and floodplain function on 2.5 miles of the upper Hoback River to improve habitat and connectivity for all life stages of Snake River Cutthroat Trout, re-establish a thriving riparian zone, promote bank and channel stability, and reduce erosion and land loss.

Objectives:

- Improve habitat quality and diversity and connectivity for all life stages of Snake River Cutthroat Trout.
- Re-establish the woody riparian vegetation community of cottonwoods and willows through floodplain revegetation units and riparian fencing treatments.
- Increase bank and channel stability and reduce risk to infrastructure through vegetated brush bank treatments at identified high-risk areas.
- Improve water quality by reducing downstream sedimentation from erosion.

Activities Proposed:

The restoration plan for the project utilizes a combination of activities to meet the above objectives. The project area's mix of land uses, particularly being a working cattle ranch and WGFD elk feedground, has required an innovative approach informed by input from project partners, ranch managers, and the project design team, River Design Group of Whitefish, MT.

A geomorphic analysis by the project design team revealed that historically, the river's stable form was as a multi-thread, braided, "anastomosed" channel type that wove through a robust cottonwood and willow-lined floodplain and provided a diversity of habitat types for Snake River Cutthroat Trout and other native fish. Rather than attempt to impose an intensive, costly, single-thread channel design on a naturally braided (but currently unstable) reach, the project design will utilize several treatment types to provide short-term and long-term improvements to stream and floodplain function and fish habitat, while also working within the parameters of a working cattle and bison ranch and allowing for ungulate movement to and from the elk feedground.

The first treatment type will be the establishment of a network of riparian revegetation units throughout the floodplain, which is currently devoid of woody riparian vegetation due to elk browsing and cattle grazing and therefore lacks quality fish habitat – which in a system like the Hoback River is often formed through scour against woody vegetation. Riparian revegetation units will consist of teardrop-shaped fencing, oriented to the river's flow, and encircling existing cottonwood and willow seedlings which over time will grow taller than browse and graze heights and provide stability, cover, and habitat. This fencing and revegetation technique, which accommodates wildlife migration needs (as opposed to exclusion fencing), has been successfully used in the Kootenai River watershed in Montana where providing for wildlife permeability is also necessary, as fencing is tall enough and encircles a small enough area to keep elk out and elk can freely move around the units. Floodplain roughness treatments, which consist of partially buried logs and brush on the surface of the floodplain to reduce surface erosion and increase the retention of sediment and nutrients for riparian revegetation, will be used in complement to the riparian revegetation units. In addition, riparian exclusion fencing for cattle will also be implemented in supplement to existing fencing to eliminate cattle grazing in the floodplain.

The second treatment type will be vegetated brush bank treatments, a “bioengineered” bank stabilization technique, located at high-risk banks along the river’s “braidplain” (the lateral extent of the river’s historical braiding pattern, rather than its current thalweg location, which is subject to shifting year-to-year). An analysis by the design team has identified the lateral limits of the river’s braidplain, and unstable streambanks along the edges of the braidplain that are at risk of failure and are therefore likely to threaten infrastructure or result in avulsion of the river channel in the future will receive this treatment. The treatment utilizes natural materials such as smaller logs, brush, and willow cuttings to protect banks in the short-term and encourage mature riparian vegetation to establish in the long-term. In turn, they provide channel margin roughness (which helps to dissipate the erosive forces of the river) and provide increased habitat complexity for fish.

Methodology:

The activities described above will be implemented over the course of two to three field seasons beginning in fall 2021. Standard fencing supplies will be acquired for the revegetation unit treatments, and a combination of on-site and locally-sourced materials will be acquired for the brush bank treatments. A “pilot” of 11 revegetation units was installed by project partners and volunteers from BTNF, WGFD, and TU and a heavy equipment operator (to drive fence posts into cobble) in fall 2020 over the course of two days in the area immediately adjacent to the new Phase 1 diversion structure. Depending on staff and volunteer availability and funding, future revegetation units will likely be installed in part by partners and volunteers as well for project cost savings. Brush bank treatments and floodplain roughness treatments will be installed by a heavy equipment operator experienced in stream restoration techniques (to be selected through a bid process). The main partners responsible for completing the work are TU, WGFD, and BTNF, with TU primarily responsible for fundraising and contracting, WGFD responsible for design review and monitoring, and BTNF responsible for design review, monitoring and permitting.

Anticipated timeline:

- Q3 2021: Planning, coordination, and fundraising for project. Grant writing and coordination with funding and in-kind partners. 60% designs in hand. Coordination with partners continues including planning volunteer days and monitoring field work.
- Q4: Planning and fundraising continues. Final design plans received. Permitting applications submitted and received. Next round of revegetation unit installation implemented.
- Q1 2022: Planning and fundraising continues.
- Q2: Planning, fundraising and monitoring continues. Heavy equipment contractor RFP distributed and contractor selected.
- Q3 – Q4: Materials acquired. Construction work on brush bank structures and floodplain roughness treatments using heavy equipment commences and is completed. Next round of revegetation unit installation implemented. Communications plan implemented.
- Q1-3 2023: Planning and monitoring continues.
- Q4 2023: Final round of revegetation unit installation implemented. Accounting, close-out of expenditures, and reporting occurs.

Short Term and Long Term Measurable Conservation Outcomes:

The primary conservation outcomes are improved habitat and connectivity for genetically pure Snake River Cutthroat Trout and other native fish including Mountain Sucker and Mountain Whitefish in the upper Hoback River watershed, a freestone tributary of the Snake River. The project will also increase stream and floodplain function on a highly degraded stretch of the upper Hoback River identified as a strategic habitat priority area by the WGFD, and 49 stream miles (the downstream mileage of the Hoback River below the project area) will also benefit from lowered sediment inputs and improved fish passage. Additionally, the re-establishment of a thriving riparian zone will benefit elk, mule deer, and riparian-dependent songbirds.

The project's conservation outcomes will be measured through the successful installation of the revegetation units (total number and area), floodplain roughness (total pieces of wood), and brush bank treatments (feet of bank stabilized) according to the project's design. Pre-and post-project fish population estimates, reduced sedimentation from bank erosion using the BANCS method, riparian revegetation success using orthomosaic imagery, and the functional lift of the project using the Wyoming Stream Quantification Tool will be quantified according to the project's monitoring plan further described below.

Another important conservation outcome of the project is the opportunity to showcase process-based stream restoration treatments that are innovative and cost-effective. In particular, the revegetation unit and brushbank treatments have not been commonly seen in the Jackson area, and provide unique responses to local design challenges including how to revegetate a floodplain without impeding wildlife migration and how to stabilize banks within a braided system.

Project Budget and Matching Contributions:

Project Expenses	One Fly Request	Partner Contribution: Cash	Partner Contribution: In-Kind	Total
Personnel: in-kind staff and volunteer time			██████	██████
Materials acquisition: wood, brush, cuttings, and containerized plants		██████		██████
Materials and contractual: fencing supplies and contractor costs	██████	██████		██████
Contractual: alternatives analysis, engineering, and design		██████		██████
Contractual: construction implementation equipment contractor	██████	██████		██████
Indirect Expenses: TU indirect overhead (depending on funding source)	██████	██████		██████
Total Expense	██████	██████	██████	██████

Income	Amount	Status
Bridger-Teton National Forest	██████	██████ received, remainder pending
Jackson Hole One Fly	██████	Applied for
Jackson Hole Trout Unlimited	██████	██████ received, remainder to be applied for
Ricketts Conservation Foundation	██████	Received
Rocky Mountain Elk Foundation	██████	To be applied for
Sublette Conservation District / Wyoming Department of Agriculture	██████	To be applied for
TU - private donors	██████	To be raised
US Fish and Wildlife Service Partners Program	██████	To be applied for (proposed JHOF match)

Water for Wildlife Foundation	██████	To be applied for
Wyoming Game and Fish Department Habitat Trust	██████	\$16,755 received, remainder to be applied for
Wyoming Governor's Big Game License Coalition	██████	To be applied for
Wyoming Landscape Conservation Initiative	██████	\$25,000 received, remainder to be applied for (proposed JHOF match)
Wyoming Wildlife and Natural Resources Trust	██████	To be applied for
Bridger-Teton National Forest: in-kind staff time	██████	Committed
Jackson Hole TU volunteers: in-kind labor	██████	Committed
Jackson Fork Ranch / Ricketts Conservation Foundation: in-kind labor	██████	Committed
River Bend Ranch: in-kind labor	██████	Committed
Trout Unlimited: in-kind staff time	██████	Committed
Wyoming Game and Fish Department: in-kind staff time	██████	Committed
Total Income	██████	

Evaluation and Monitoring:

TU will develop a monitoring plan with WGF and BTNF to evaluate and measure the success of our work. The monitoring plan will likely include pre- and post-construction longitudinal profile and channel cross-section measurements; fish population estimates; bank erosion rates calculated through a BANCS analysis to quantify sediment reduction; photo points; measurement of functional lift using the Wyoming Stream Quantification Tool; and aerial video comparisons by drone including orthomosaic imagery which can be used to assess changes in vegetation. The project design team will be tasked with construction oversight and will be responsible for verifying that the structures have been built according to plans and specifications.

Proposed Conservation Partnerships to implement the project:

<u>Partner</u>	<u>Role</u>
Bridger-Teton National Forest	Design review, NEPA analysis and permitting, monitoring, proposed funding partner
Jackson Hole One Fly	Proposed funding partner
Jackson Hole Trout Unlimited	Funding partner, volunteers
Ricketts Conservation Foundation / Jackson Fork Ranch	Funding partner and private landowner (bison ranch)
River Bend Ranch	Private landowner, grazing management (cattle ranch)
Rocky Mountain Elk Foundation	Proposed funding partner

Sublette Conservation District	Proposed technical assistance and funding partner
Trout Unlimited	Project planning lead, fundraising, grant writing, project administration, contracting, monitoring, volunteer and TU chapter coordination
U.S. Fish and Wildlife Service	Proposed funding partner
Water for Wildlife Foundation	Proposed funding partner
Wyoming Game and Fish Department	Design review, monitoring, funding partner
Wyoming Governor's Big Game License Coalition	Proposed funding partner
Wyoming Landscape Conservation Initiative / Bureau of Land Management	Funding partner and proposed additional funding partner
Wyoming Wildlife and Natural Resources Trust	Proposed funding partner

Dissemination:

TU will communicate about project successes in print and social media, locally, regionally, and nationally, to highlight its benefits to native fish, stream function, public lands, and working agricultural lands, using the following methods: blog post / press release distributed on tu.org and to local and regional newspapers; email newsletter feature to local and regional TU members and donors; social media on JHTU's Facebook page; short video produced to capture the project's goals, partnerships and successes; presentations and potential project tours.

Community Involvement / Stewardship:

A large number of community-based and state and national funding partners have been involved in the project's first phase, including the Bridger-Teton National Forest, Jackson Hole Trout Unlimited chapter, River Bend Ranch, Rocky Mountain Elk Foundation, Sublette County Conservation District, Wyoming Game and Fish Department, Wyoming Landscape Conservation Initiative, Wyoming Water Development Commission, Wyoming Wildlife and Natural Resources Trust, and the US Fish and Wildlife Service. It is expected that many of these same partners will be involved in the project's second phase, and new partners including the Jackson Hole One Fly will hopefully join as well. The primary technical and planning partners for the project are TU, BTNF, and WGFD. In addition, the River Bend Ranch and Jackson Fork Ranch are private landowner partners that are involved in grazing management to contribute to the project's success. The project will engage community members through volunteer opportunities hosted by the Jackson Hole TU chapter and potentially other TU chapters in the region including the Upper Green River TU chapter based in Pinedale, WY. The installation of the riparian vegetation units is expected to occur over the course of several years and rely on significant in-kind partner and volunteer involvement.

Project Team and Qualifications:

- Selita Ammond, Restoration Ecologist, River Design Group (14 years). Experience with vegetation assessments and revegetation design, NRCS technical service provider, GIS professional.

- Patrick Barry, Forest Fisheries Biologist, Watershed Program Manager, US Forest Service (21 years). Experience with project administration, fisheries habitat restoration, federal permitting requirements, peer reviewed publications.
- Matt Daniels, Principal Engineer, River Design Group (27 years). Lead engineer and designer with decades of experience as a civil engineer and project manager on numerous large river restoration projects.
- Rob Gipson, Fisheries Management Supervisor, Wyoming Game and Fish Department (26 years). Experience with fisheries management including monitoring of native species in the Hoback River watershed.
- Diana Miller, Fisheries Biologist, Wyoming Game and Fish Department (13 years). Experience with fisheries management including monitoring of native species and cutthroat trout movement in the Hoback River watershed.
- Kelly Owens, Forest Hydrologist, US Forest Service (10 years). Experience with project administration, federal permitting requirements (NEPA, 404), culvert design, natural channel design. Rosgen Level 4 certification.
- Ryan Richardson, Fluvial Geomorphologist, River Design Group (5 years). Experienced geologist and designer with GIS, mapping, remote sensing and drone survey expertise.
- Anna Senecal, Aquatic Habitat Biologist, Wyoming Game and Fish Department (11 years). Experience with project administration, habitat restoration projects, natural channel design. Rosgen Level 4 certification.
- Leslie Steen, NW Wyoming Program Director, Trout Unlimited (5 years). Project lead. Experience with project administration, fundraising, partnerships, fisheries biology. Rosgen Level 3 certification.
- Walter Wehtje, Director, Ricketts Conservation Foundation. PhD researcher with decades of experience in wildlife biology, conservation, and partnerships.

Other information (map of site and location in the watershed, optional photos or other information not requested above):

See below.

History of any past Jackson Hole One Fly grants:

Trout Unlimited has been a recipient of numerous Jackson Hole One Fly grants over the years – thank you for your continued and generous support! The following are projects in progress or completed within the past decade.

- Spread Creek Fish Passage Project Phase 2 (WY)
- Upper Blackfoot River Fish Habitat Improvement and Bank Stabilization (ID)
- Lower Swift Creek Stream Restoration and Stabilization Project (via Star Valley TU) (WY)
- Tincup Creek Stream Restoration Project, Phases 1, 2 and 3 (ID)
- Upper Gros Ventre River Tributary Restoration Project (via Trust for Public Land) (WY)
- Ray Peterson South Fork Snake River Bank Stabilization and Fisheries Habitat Project (ID)
- East Fork Wind River Tributary Reconnection (WY)
- BQ Diversion Fish Passage and Screening (WY)
- Gros Ventre Fish Passage Improvement (WY)
- Yellowstone Cutthroat Trout Assessment and Priority Actions (ID, MT, WY)
- Upper Greybull River Fish Passage Improvement (WY)
- South Fork Little Snake River Riparian Fencing (CO)
- Fish Passage Restoration in Spread Creek (WY) – II

Technical Reviews:

- Kelly Owens, Bridger-Teton National Forest

- Anna Senecal, Wyoming Game and Fish Department

TU is grateful for your continued and generous support of our local Snake River cutthroat trout and Yellowstone cutthroat trout waters!

Project Photos and Concepts



Photo 1: The upper gravel push-up dam location prior to being replaced by the installation of a permanent cross vane irrigation diversion structure and headgate during Phase 1.



Photo 2: The lower gravel push-up dam location that is no longer in use as a result of Phase 1 project activities. Note the disturbance in the foreground and background resulting from heavy equipment instream.



Photo 3: Pre-project fish monitoring by WGFD in 2017 and subsequent years has documented low densities of Snake River cutthroat trout and other native fish within the project area, which is atypical of adjacent upstream and downstream reaches.



Photo 4: Panoramic photo of diversion site showing j-hooks and bankfull bench upstream, new headgates and enlarged supply ditch, and cross-vane irrigation diversion structure installed in Phase 1.



Photo 5: WGFD, BTNF, and TU staff and volunteers install pilot riparian revegetation units in fall 2021. Fencing encircles existing cottonwoods that have been subject to intensive browse pressure from elk. It is expected that after several years, the cottonwoods will be above the elk browse height and will be able to establish and provide vegetative cover.



Photo Set 6: Riparian revegetation units in 2013 (top) and 2019 (bottom) demonstrating restoration of the floodplain and riparian zone in the Kootenai River watershed.



Photo 7: Vegetated brush bank structure for bank stability and improved fish habitat, Ball Creek, MT.



Photo 8: Brush bank structure 2 years post-treatment, Ninemile Creek, MT.

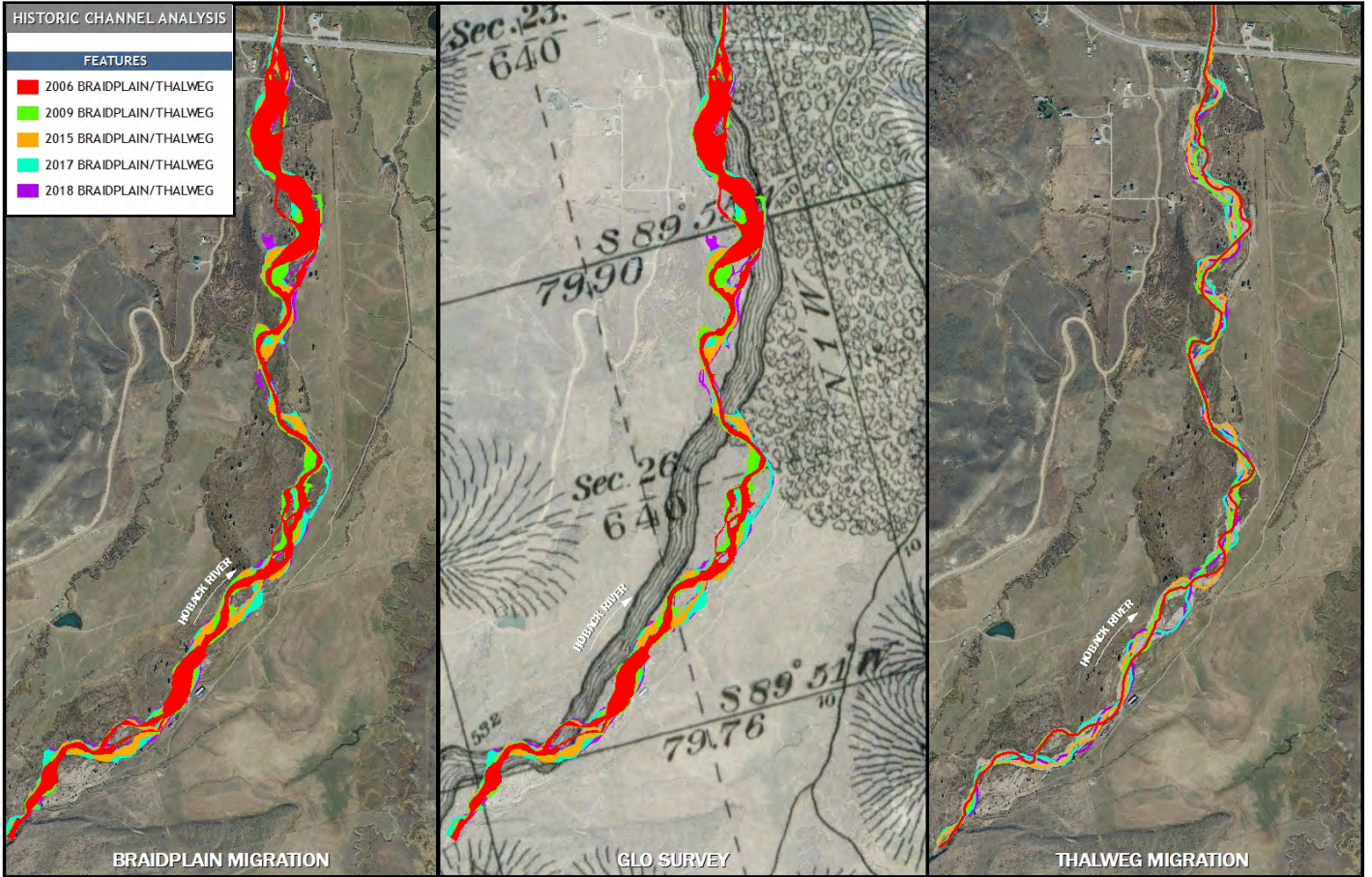
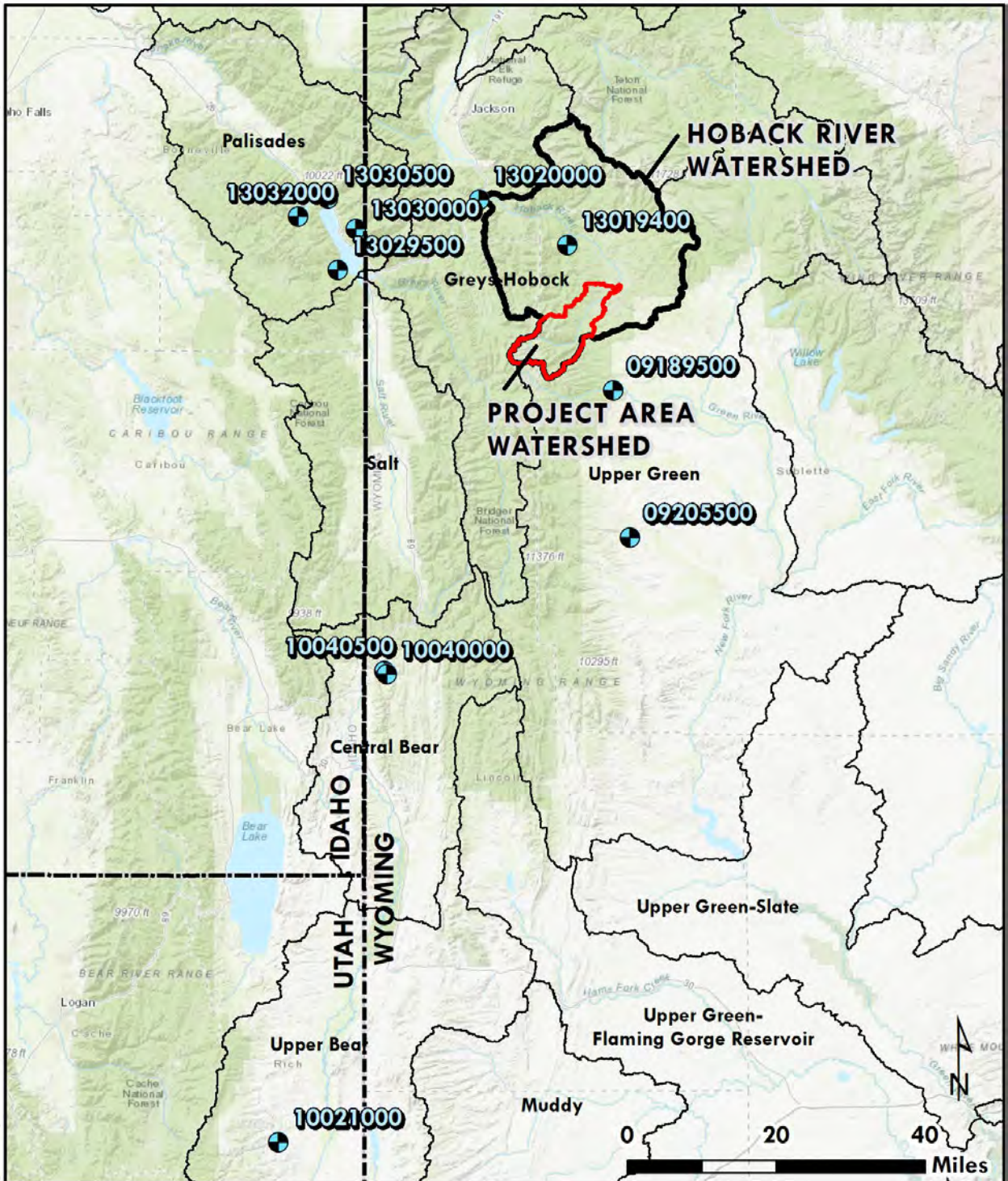


Image 1: Braidplain migration and thalweg migration analysis. Analyses have been used to determine the most effective locations for brush bank treatments. Historic survey map has been used to demonstrate that the Hoback River was braided, with cottonwoods.



Hoback River Restoration Watershed Overview

Features



USGS Stream Gage



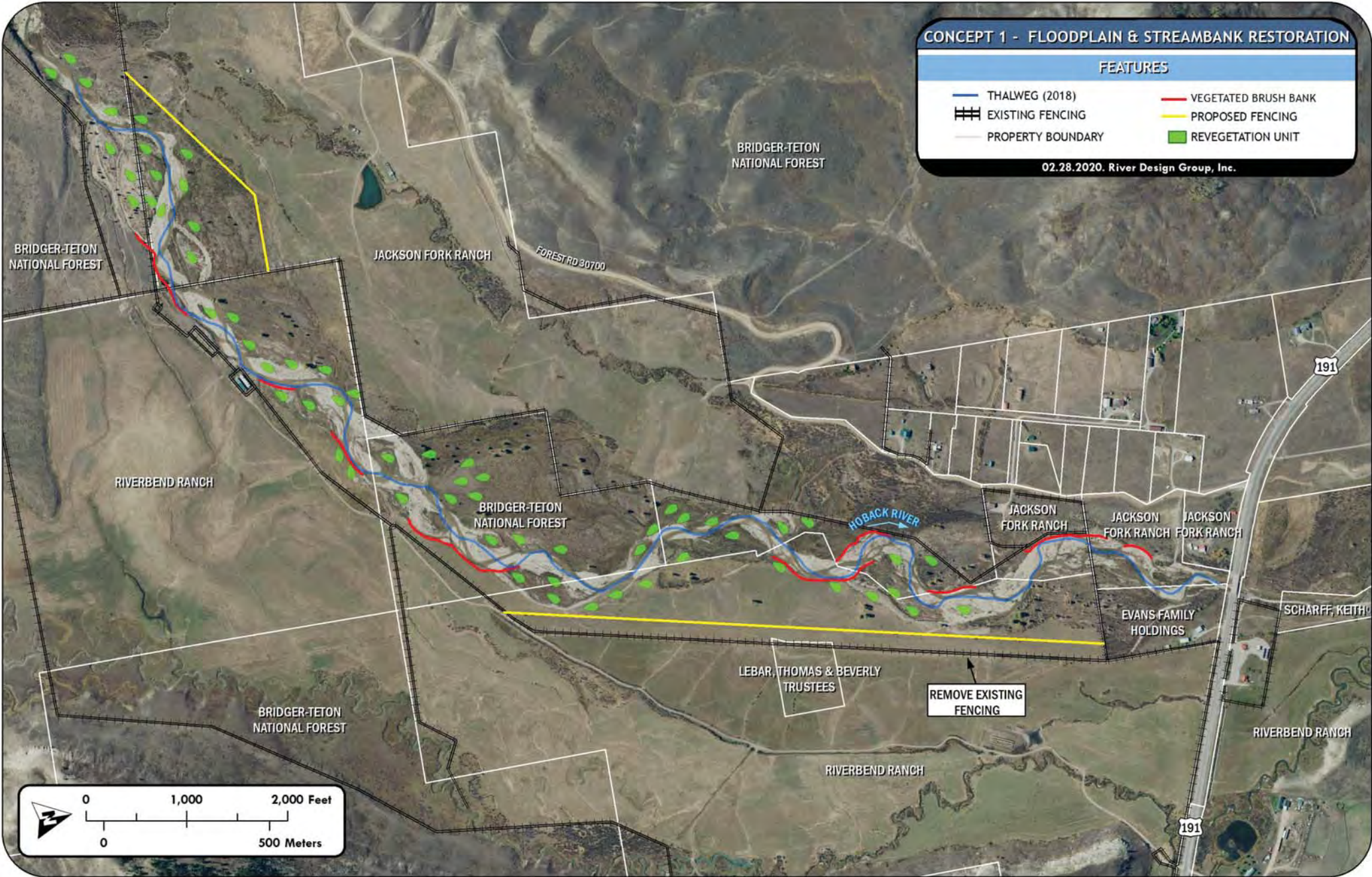
HUC-8 Watershed Boundary

CONCEPT 1 - FLOODPLAIN & STREAMBANK RESTORATION

FEATURES

- THALWEG (2018)
- EXISTING FENCING
- PROPERTY BOUNDARY
- VEGETATED BRUSH BANK
- PROPOSED FENCING
- REVEGETATION UNIT

02.28.2020. River Design Group, Inc.



BRIDGER-TETON NATIONAL FOREST

JACKSON FORK RANCH

BRIDGER-TETON NATIONAL FOREST

FOREST RD 30700

RIVERBEND RANCH

BRIDGER-TETON NATIONAL FOREST

HOBACK RIVER

JACKSON FORK RANCH

JACKSON FORK RANCH

JACKSON FORK RANCH

EVANS FAMILY HOLDINGS

SCHARFF, KEITH

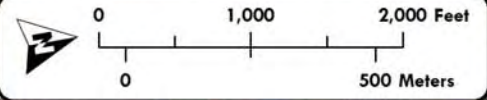
LEBAR, THOMAS & BEVERLY TRUSTEES

REMOVE EXISTING FENCING

BRIDGER-TETON NATIONAL FOREST

RIVERBEND RANCH

RIVERBEND RANCH



191

191

File Code: 2500
Date: February 18, 2021

Krystyna Wolniakowski
Grants Manager
Jackson Hole One Fly Foundation
PO Box 4158
Jackson, WY 83001

Dear Ms. Wolniakowski,

On behalf of the Bridger-Teton National Forest (BTNF), I would like to express my support for Trout Unlimited's (TU) River Bend McNeel Riparian and Channel Enhancement Project grant application to Jackson Hole One Fly. As the agency that manages a portion of the land upon which the project is planned, BTNF is invested in project success and its benefits to riparian and aquatic habitats, floodplain connectivity and overall river health and function.

BTNF has been actively involved in the River Bend McNeel project since its initial 2017 phase, which removed two gravel pushup dams, replacing them with an engineered rock cross vane and a new diversion structure. This initial phase improved bank stability, riparian and aquatic habitat, and improved irrigation efficiency. While the initial project was a success, additional floodplain and channel restoration efforts would not only continue to improve conditions at the project site but would also improve aquatic connectivity to upstream reaches and improve water quality and channel stability in downstream reaches.

Willow removal, historical land management and riparian grazing have created conditions where the river is no longer capable of maintaining a stable channel and floodplain. Unfortunately, such conditions are not uncommon on the BTNF. The traditional approach to mitigating river instability has been targeted and costly banks stabilization or flood prevention, such as dikes. TU's innovative proposal for this project works to repair fundamental river ecology processes such as floodplain and groundwater connectivity with the main channel, fine sediment and nutrient deposition on the floodplain, channel maintaining sediment transport during high flows and riparian vegetation. Project success will not only improve local conditions in the Hoback River but will also provide information and new tools for restoration across the BTNF.

The BTNF strongly supports TU's application for grant funding from Jackson Hole One Fly, and greatly appreciates your valuable time and consideration. If you have additional questions please do not hesitate to contact me at kelly.owens@usda.gov or (c)864-710-5116

Sincerely,



Kelly J Owens, Forest Hydrologist





WYOMING GAME AND FISH DEPARTMENT

5400 Bishop Blvd. Cheyenne, WY 82006

Phone: (307) 777-4600 Fax: (307) 777-4699

wgfd.wyo.gov

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BRIAN R. NESVIK

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RALPH BROKAW
GAY LYNN BYRD
RICHARD LADWIG
DAVID RAEI
KENNETH D. ROBERTS

February 16, 2021

Krystyna Wolniakowski
Jackson Hole One Fly Foundation
P.O. box 4158
Jackson, WY 83001

Dear Ms. Wolniakowski,

The Wyoming Game and Fish Department (Department) supports Trout Unlimited's efforts to improve Hoback River floodplain, riparian community and channel function throughout, and adjacent to, the River Bend Ranch and McNeel elk feedground. The upper Hoback River supports important habitat for native Snake River Cutthroat Trout. This particular section of river also links downstream, higher flow and velocity habitats with upstream, lower flow and velocity areas that are used by trout during winter months. However, this also happens to be one of the more intensely altered and degraded stretches of the Hoback River. Given this, the area is identified within the Department's Statewide Habitat Plan as a restoration priority.

Maintenance of fish passage for all species and throughout all seasons is a high Department priority. This work seeks not only to improve upstream connectivity, but also to enhance the quality of Hoback River habitat throughout the ranch and feedground lands. Historical land management, including channel straightening, flood control, willow removal and riparian grazing, have reduced the river's ability to maintain its floodplain, channel banks and sediment transport. Work to address these foundational deficits, as opposed to chasing short term emergency bank stabilization and flood mitigation fixes, will go a long way towards preserving Cutthroat Trout access to headwaters and also improving local habitats. Thank you for the opportunity to voice our support for this work. Please address additional questions or information requests to Anna Senecal, Aquatic Habitat Biologist (307)413-9157.

Sincerely,

Anna Senecal
Jackson Aquatic Habitat Biologist

AS/as/pd

Cc: Paul Dey, Aquatic Habitat Program Manager
Leslie Steen, Trout Unlimited Project Manager
File

HOBACK RIVER – RIVER BEND RANCH RESTORATION PROJECT

60% DESIGN PLAN SET

PROJECT PARTNERS



TROUT UNLIMITED
185 CENTER ST #B
JACKSON, WY 83001



WYOMING GAME & FISH DEPARTMENT
420 N CACHE ST
JACKSON, WY 83001

HOBACK RIVER VICINITY MAP



LEGAL DESCRIPTION: S25, S26, S27, S34, S35, T37N R113W, 6TH P.M., M
TETON COUNTY, WYOMING



DRAWING INDEX

- | | |
|------------------------------|--------------------------------------|
| 1.0 COVER SHEET | 5.1 PLAN VIEW AND STRUCTURE |
| ... NOTES | 5.2 PLAN VIEW AND STRUCTURE |
| 2.0 EXISTING CONDITIONS | 5.3 PLAN VIEW AND STRUCTURE |
| 3.0 RESTORATION PLAN | 6.0 VEGETATED BRUSH BANK DETAIL |
| ... MATERIALS AND QUANTITIES | 6.1 FLOODPLAIN TREATMENT DETAIL |
| 4.0 ACCESS AND STAGING PLAN | 7.0 WILDLIFE EXCLOSURE UNIT DETAIL |
| 4.1 SURVEY CONTROL PLAN | 7.1 WILDLIFE FRIENDLY FENCING DETAIL |
| 5.0 PLAN VIEW AND STRUCTURE | |

GEOLOGISTS SEAL

ENGINEERS SEAL



RDG
RIVER DESIGN GROUP
311 SW Jefferson Avenue
Corvallis, OR 97333
406.862.4927

COVER SHEET
HOBACK RIVER RESTORATION PROJECT
NEAR JACKSON, WYOMING

NO.	DATE	BY	DESCRIPTION	CHK
0	12/10/21	TH	60% DESIGN	MD
PRELIMINARY NOT FOR CONSTRUCTION				

PROJECT NUMBER
RDG-19-102

DRAWING NUMBER

1.0

Drawing 1 of 15

PROJECT DESCRIPTION

THE HOBACK RIVER IS A 55-MILE LONG TRIBUTARY OF THE SNAKE RIVER IN WYOMING. THE PROJECT SITE IS APPROXIMATELY 4 MILES SOUTHEAST OF BONDURANT, WYOMING ON THE RIVER BEND RANCH. THE PURPOSE OF THE PROJECT IS TO RESTORE HEALTHY AND STABLE FLOODPLAIN CONDITIONS OVER A 2.5-MILE REACH. THE FOLLOWING PROJECT GOALS WERE DEVELOPED BY THE PROJECT STAKEHOLDERS AND USED TO DEVELOP A RANGE OF TECHNIQUES AND STRATEGIES:

- IMPROVE FLOODPLAIN ECOLOGICAL FUNCTION AND STABILITY.
- REDUCE BANK EROSION/LAND LOSS AND ASSOCIATED SEDIMENT CONTRIBUTION.
- IMPROVE AQUATIC HABITAT FOR MIGRATORY SNAKE RIVER CUTTHROAT.

DUE TO THE DYNAMIC GEOMORPHIC NATURE OF THE HOBACK RIVER WITHIN THE PROJECT REACH, BOTH PASSIVE AND LIMITED ACTIVE RESTORATION TECHNIQUES WILL BE UTILIZED TO MEET THESE OBJECTIVES. WILDLIFE EXCLOSURE UNITS WILL BE INSTALLED THROUGHOUT THE REACH TO PROTECT STUNTED COTTONWOODS FROM HIGH LEVELS OF BROWSE AND HELP REESTABLISH A COTTONWOOD RIPARIAN FOREST. SELECTIVE BANK STABILIZATION ALONG THE MARGINS OF THE FLOODPLAIN WILL USE NATURAL CHANNEL DESIGN TECHNIQUES TO FURTHER REDUCE BANK EROSION AND PROMOTE IN-STREAM HABITAT COMPLEXITY. THESE TECHNIQUES WILL PROMOTE GREATER LEVELS OF FLOODPLAIN STABILITY AND ECOLOGICAL FUNCTION AS VEGETATION RECOVERS OVER TIME.

GENERAL NOTES

1. THE CONTRACTOR SHALL VERIFY EXISTING CONDITIONS IN THE FIELD PRIOR TO CONSTRUCTION. IF NECESSARY, ADJUSTMENTS TO THE DRAWINGS WILL BE MADE AS DIRECTED BY THE ENGINEER.
2. TOPOGRAPHY SHOWN ON THE DRAWINGS IS BASED ON MERGED LIDAR AND BATHYMETRIC SURVEY DATA. TOPOGRAPHIC AND BATHYMETRIC SURVEY WORK PERFORMED BY RDG USING SURVEY GRADE GPS in 2021. AERIAL LIDAR DATA WERE COLLECTED IN JUNE THROUGH SEPTEMBER 2019 FOR FEMA.
3. UTILITIES IDENTIFIED ON THE DRAWINGS ARE APPROXIMATE AND DO NOT REPRESENT ABSOLUTE HORIZONTAL AND VERTICAL LOCATIONS. THE CONTRACTOR SHALL COORDINATE WITH THE APPROPRIATE UTILITY LOCATE SERVICE PRIOR TO CONSTRUCTION TO IDENTIFY UTILITY LOCATIONS.
4. THE OWNER WILL PROVIDE COPIES OF APPLICABLE PERMITS REQUIRED TO PERFORM THE WORK PRIOR TO THE START OF CONSTRUCTION.
5. THE CONTRACTOR SHALL COMPLY WITH ALL SAFETY REQUIREMENTS DESCRIBED IN THE CONTRACT DOCUMENTS.
6. THE CONTRACTOR SHALL PROTECT ALL TREES AND LAND AREAS NOT LOCATED WITHIN THE PROJECT CONSTRUCTION, STAGING OR CONSTRUCTION LIMITS. EXERCISE CARE IN AREAS NOT MARKED TO AVOID DAMAGE TO EXISTING VEGETATION.
7. THE ENGINEER WILL PROVIDE SURVEY CONTROL AND GRADING SURFACES FOR EQUIPMENT WITH GPS MACHINE CONTROL CAPABILITY. THE CONTRACTOR SHALL PROVIDE SURVEY STAKING AND LAYOUT FOR CONSTRUCTION.
8. VERTICAL TOLERANCE FOR CONSTRUCTION COMPLIANCE WILL BE 0.3 FEET. HORIZONTAL TOLERANCE WILL BE 1.0 FEET.
9. THE CONTRACTOR SHALL CONFIRM QUANTITIES SHOWN ON THE DRAWINGS AND FOR OWNER-SUPPLIED MATERIALS.
10. EARTHWORK QUANTITIES REPORTED ON THE DRAWINGS ARE NEAT LINE QUANTITIES CALCULATED FROM THE DIFFERENCE BETWEEN THE FINISHED GROUND SURFACE AND EXISTING GROUND SURFACE.
11. THE VOLUME OF MATERIAL REQUIRED FOR FILL SURFACES MAY VARY DEPENDING ON COMPACTION AND MOISTURE CONTENT.
12. EARTHWORK QUANTITIES DO NOT INCLUDE SUBGRADE EXCAVATION QUANTITIES UNLESS NOTED OTHERWISE.
13. SLOPES DESIGNATED AS 2:1, 1.5:1, ETC., ARE THE RATIOS OF HORIZONTAL DISTANCE TO VERTICAL DISTANCE.
14. DIMENSIONS ARE GIVEN IN FEET AND TENTHS OF A FOOT.
15. 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.

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 DUPLICATION 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 25-YR RECURRENCE INTERVAL DISCHARGE FLOOD. REGIONAL CURVES WERE USED TO EVALUATE BANKFULL DISCHARGE, AND HIGHER RETURN INTERVAL DISCHARGES INCLUDING THE 100-YEAR FLOW.



RIVER DESIGN GROUP
311 SW Jefferson Avenue
Corvallis, OR 97333
541.738.2920

NOTES

HOBACK RIVER RESTORATION PROJECT

NEAR JACKSON, WYOMING

NO.	DATE	BY	DESCRIPTION	CHK
0	12/10/21	TH	60% DESIGN	MD
PRELIMINARY NOT FOR CONSTRUCTION				

PROJECT NUMBER
RDG-19-102

DRAWING NUMBER

1.1



IMAGE: RDG ORTHOPHOTO 2021 / MAXAR 2018

1 EXISTING CONDITIONS

1" = 700'

EXISTING CONDITIONS

THE HOBACK RIVER IS A TRIBUTARY OF THE SNAKE RIVER IN WESTERN WYOMING. THE HOBACK WATERSHED BEGINS ON LAND MANAGED BY THE TETON NATIONAL FOREST AND FLOWS APPROXIMATELY 11 MILES EAST TO THE CONFLUENCE WITH THE SOUTH FORK HOBACK RIVER. IT THEN FLOWS NORTH TOWARD BONDURANT, WYOMING WHERE IT JOINS FISHERMAN CREEK AND THEN WEST AND TO THE SNAKE RIVER. THE LOWER HALF OF THE WATERSHED IS DESIGNATED AS WILD AND SCENIC AS IT PASSES THROUGH HOBACK CANYON AND ENTERS THE SNAKE RIVER AT HOBACK JUNCTION, WYOMING. THE UPPER WATERSHED SHARES ITS BOUNDARY WITH THE CONTINENTAL DIVIDE, SEPARATING THE COLUMBIA RIVER BASIN FROM THE COLORADO RIVER BASIN. THE HEADWATERS OF THE HOBACK RIVER ARE IN THE BRIDGER-TETON NATIONAL FOREST AND ARE PREDOMINATELY ROADLESS AND UNDEVELOPED. RECENT WILDFIRES BURNED SWATHS OF THE FOREST. THESE WILDFIRES WILL LIKELY LEAD TO INCREASED FINE SEDIMENT CONTRIBUTION WITHIN THE PROJECT REACH FOR THE NEXT DECADE.

THE PROJECT AREA IS LOCATED APPROXIMATELY 22 MILES FROM THE UPSTREAM ORIGIN OF THE HOBACK WATERSHED. THE PROJECT REACH IS A HIGHLY DISTURBED, DYNAMIC SECTION OF THE HOBACK RIVER. IT HAS BEEN IMPACTED BY A NUMBER OF HISTORIC AND CONTEMPORARY FACTORS. THE CHANNEL EXHIBITS A BRAIDED MORPHOLOGY WITH SIGNIFICANT BEDLOAD TRANSPORT AND A HIGHLY DYNAMIC PLAN FORM. HISTORIC RIPARIAN VEGETATION COMMUNITIES WERE LIKELY DOMINATED BY COTTONWOOD RIPARIAN FOREST WITH A WILLOW UNDERSTORY ALONG THE ACTIVE MULTI-THREADED CHANNEL MARGINS. THIS IS SUPPORTED BY THE GLO SURVEY RECORDS OF THE SITE. COTTONWOOD REMOVAL BY EARLY SETTLERS AND ON-GOING GRAZING/WILDLIFE BROWSE HAVE STUNTED THE RECRUITED VEGETATION AND SUPPRESSED RECOVERY OF THE FLOODPLAIN. CHANNEL WIDENING FROM VEGETATION REMOVAL HAS PROMOTED AGGRADATION AND REDUCED SEDIMENT TRANSPORT CAPACITY. ADDITIONALLY, THE HIGHWAY 191 CROSSING CREATES A BACKWATER PROMOTING FURTHER INSTABILITY AND CHANNEL AGGRADATION IN THE LOWER PORTION OF THE PROJECT REACH. OVERALL, THESE DISTURBANCES HAVE SHIFTED A PRE-DISTURBANCE ANABRANCHING/ANASTOMOSING COTTONWOOD DOMINATED SYSTEM TO A GRASS AND WILLOW DOMINATED BRAIDED SYSTEM.

LEGEND

— PROPERTY BOUNDARY

HOBACK RIVER CHARACTERISTICS

DRAINAGE AREA	±72.7 SQ. MILES
STREAM GRADIENT	0.78%
STREAM TYPE	D3
STREAMBED D50	SMALL COBBLE
STREAMBED D84	MEDIUM COBBLE
1.5-YEAR FLOW	357 CFS
10-YEAR FLOW	717 CFS
25-YEAR FLOW	855 CFS
50-YEAR FLOW	942 CFS
100-YEAR FLOW	1,031 CFS
IN-WATER WORK PERIOD	PER PERMITS

NO.	DATE	BY	DESCRIPTION	CHK
0	12/10/21	TH	60% DESIGN	MD

PRELIMINARY
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PROJECT NUMBER
RDG-19-102

DRAWING NUMBER
2.0

Drawing 3 of 15

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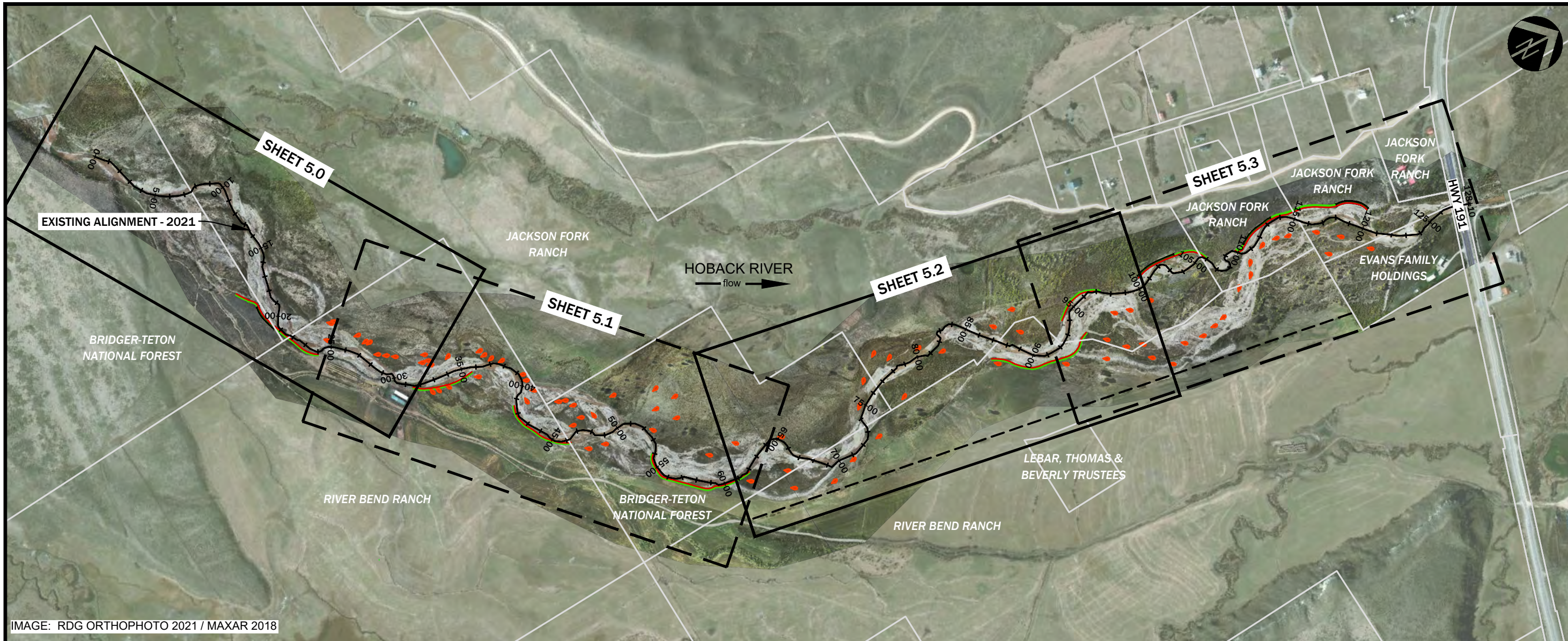
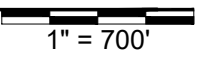


IMAGE: RDG ORTHOPHOTO 2021 / MAXAR 2018

1 RESTORATION PLAN



LEGEND	
	FLOODPLAIN GRADING EXTENTS
	BRUSH BANK STRUCTURES
	FLOODPLAIN TREATMENT
	WILDLIFE FRIENDLY FENCING
	FENCED PLANTING UNIT
	PROPERTY BOUNDARY

RESTORATION OBJECTIVES

THE PROJECT GOALS ARE TO IMPROVE FLOODPLAIN STABILITY AND ECOLOGICAL FUNCTION ALONG HOBACK RIVER ON THE RIVER BEND RANCH. THIS DESIGN UTILIZES BOTH ACTIVE AND PASSIVE RESTORATION TECHNIQUES TO ACHIEVE THESE GOALS BY REESTABLISHING NATIVE PLANT COMMUNITIES AND REDUCING BANK EROSION. THE FOLLOWING RESTORATION TREATMENTS WILL BE APPLIED:

- INSTALL WILDLIFE EXCLOSURE UNITS AROUND EXISTING COTTONWOOD AND WILLOW COMMUNITIES STUNTED BY HEAVY BROWSE.
- CONSTRUCT BRUSH BANKS TO STABILIZE EROSION MARGINS OF THE ACTIVE BRAIDPLAIN AND PROVIDE IN-CHANNEL HABITAT COMPLEXITY.
- EXCAVATE A BANKFULL FLOODPLAIN BENCH TO REDUCE STRESS ON BRUSH BANK STRUCTURES AND PROMOTE NATURAL RECRUITMENT OF NATIVE RIPARIAN SPECIES.
- INSTALL FLOODPLAIN ROUGHNESS TREATMENTS TO THE EXCAVATED SURFACE TO REDUCE FLOODPLAIN STRESS AND PROMOTE HIGH FLOW REFUGIA.
- REMOVE EXISTING CATTLE FENCING AND REPLACE WITH WILDLIFE FRIENDLY FENCING TO EXCLUDE CATTLE FROM RIPARIAN GRAZING (ONE SITE).

REDUCTION IN NEW SEDIMENT DELIVERY FROM BANK STABILIZATION WILL BE IMMEDIATE, BUT NATURAL RECRUITMENT AND GROWTH OF VEGETATION TO STABILIZE LARGE RAW SURFACES ON THE BRAIDPLAIN WILL OCCUR OVER A LONGER TIMEFRAME. AN ADAPTIVE MANAGEMENT APPROACH IS NEEDED TO MONITOR PROJECT SUCCESS AND ADAPT OVER TIME GIVEN THESE UNCERTAINTIES. THE DESIRED OUTCOME IS TO REESTABLISH A COTTONWOOD DOMINATED RIPARIAN FOREST ALONG THE ENTIRE REACH WITH AN ANABRANCHING/ANASTOMOSING CHANNEL.

NO.	DATE	BY	DESCRIPTION	CHK
0	12/10/21	TH	60% DESIGN	MD
PRELIMINARY NOT FOR CONSTRUCTION				

PROJECT NUMBER RDG-19-102
DRAWING NUMBER 3.0
Drawing 4 of 15

BRUSH BANK STRUCTURE			
ITEM	QUANTITY	UNIT	DIMENSIONS
STRUCTURES	4,909	LF	
SMALL LOGS	9,818	EA	8-10' LONG
MEDIUM LOGS WITH ROOTWADS	2,455	EA	10-12' LONG
BRUSH	14,727	EA	8-10' LONG
WILLOW CUTTINGS	49,090	EA	6-8' LONG
STREAMBANK FILL	2,945	CY	SEE GRADATION

FLOODPLAIN ROUGHNESS			
ITEM	QUANTITY	UNIT	DIMENSIONS
TREATMENT AREA	2.40	AC	
SMALL LOGS	120	EA	8-10' LONG
BRUSH	360	EA	8-10' LONG

WILLOW TRENCHES			
ITEM	QUANTITY	UNIT	DIMENSIONS
TRENCHES	982	LF	LENGTH VARIES
BRUSH	982	EA	8-10' LONG
WILLOW CUTTINGS	4,418	EA	6-8' LONG

TOTAL WOOD QUANTITIES			
ITEM	QUANTITY	UNIT	DIMENSIONS
MEDIUM LOGS WITH ROOTWADS	2,455	EA	15-20' LONG
SMALL LOGS	9,938	EA	8-10' LONG
BRUSH	16,069	EA	8-10' LONG
WILLOW CUTTINGS	53,508	EA	6-8' LONG

EARTHWORK		
ITEM	QUANTITY	UNIT
FLOODPLAIN BENCH EXCAVATION	1,531	CY

WILDLIFE EXCLOSURE FENCING UNITS			
ITEM	QUANTITY	UNIT	DIMENSIONS
FENCING UNITS	87	EA	
WOVEN WIRE GAME FENCE	14,355	LF	8' TALL
STEEL T-POSTS	1,218	EA	12' TALL
T-POST WIRE CLIPS	4,872	EA	11 GA
T-POST WIRE TWIST TIES	348	EA	14.5 GA

WILDLIFE FRIENDLY FENCING			
ITEM	QUANTITY	UNIT	DIMENSIONS
FENCING	4,301	LF	
SMOOTH WIRE	8,602	LF	
BARBED WIRE	8,602	LF	
WOODEN FENCE POSTS	261	EA	7' TALL
WOODEN CROSS BRACE	TBD	EA	16' TALL
PVC COVERS	261	EA	16.5'



MATERIALS AND QUANTITIES

HOBACK RIVER RESTORATION PROJECT
NEAR JACKSON, WYOMING

NO.	DATE	BY	DESCRIPTION	CHK	
				MD	
0	12/10/21	TH	60% DESIGN		

PRELIMINARY
NOT FOR CONSTRUCTION

PROJECT NUMBER
RDG-19-102

DRAWING NUMBER

3.1

Drawing 5 of 15



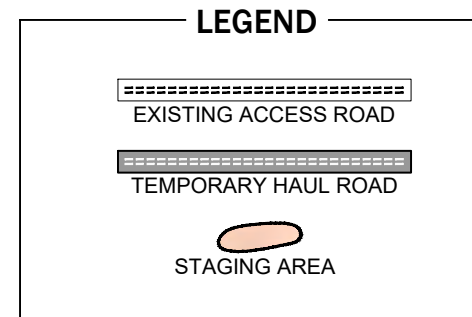
IMAGE: MAXAR 2018

1 ACCESS AND STAGING PLAN VIEW

1" = 700'

ACCESS AND STAGING

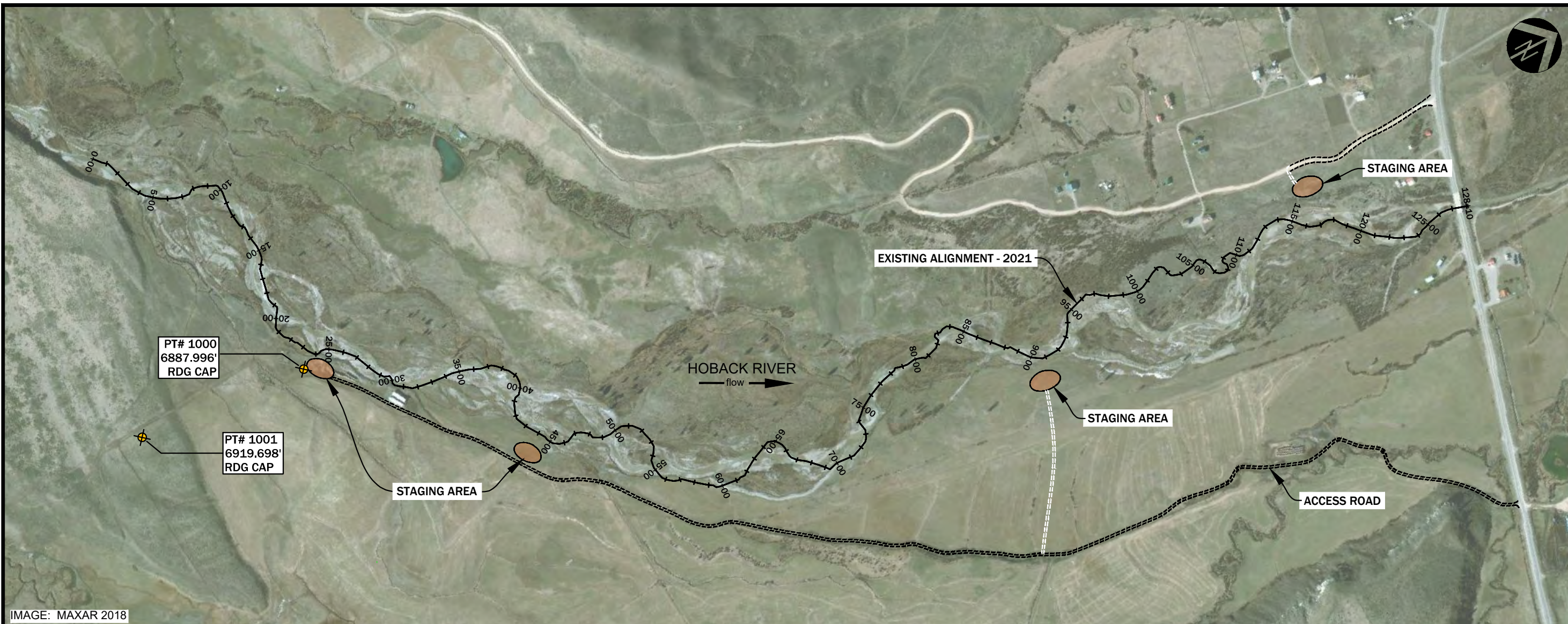
- 1** HEAD SOUTH ON HIGHWAY 191 FROM THE TOWN OF BONDURANT, WY FOR APPROXIMATELY 4 MILES. AFTER CROSSING THE HOBACK RIVER, PROCEED ON HIGHWAY 191 FOR 0.4 MILES.
- 2** TURN ONTO FOREST ROAD 30748 (SOUTH OF HIGHWAY). FOREST ROAD 30748 WILL SERVE AS THE PRIMARY ACCESS ROAD.
- 3** UTILIZE THE ROUTES SPECIFIED AS TEMPORARY HAUL ROADS. ADDITIONAL ROADS TO INDIVIDUAL WORK AREAS WILL BE ESTABLISHED.
- 4** FOREST ROAD 30700 WILL SERVE AS AN ALTERNATE ACCESS ROAD, USED TO ACCESS AN ADDITIONAL STAGING AREA ON RIVER LEFT (TO THE WEST OF THE HOBACK RIVER).



NOTES: CONTRACTOR IS RESPONSIBLE FOR MAINTAINING ACCESS ROADS AND TEMPORARY HAUL ROADS. EQUIPMENT, MAINTENANCE AND MATERIALS TO BE STAGED MINIMUM 150' FROM RIVER.

NO.	DATE	BY	DESCRIPTION	CHK
0	12/10/21	TH	60% DESIGN	MD
			PRELIMINARY	
			NOT FOR CONSTRUCTION	

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1 SURVEY CONTROL PLAN

1" = 700'

PROJECT DATUM

THE PROJECT COORDINATES ARE BASED ON THE FOLLOWING:
 HORIZONTAL PROJECTION: WYOMING STATE PLANE WEST
 HORIZONTAL DATUM: NAD83 (2011)
 UNITS: US SURVEY FEET
 VERTICAL DATUM: NAVD88 (GEOID 12B)

CONTROL POINTS

POINT NUMBER	EASTING	NORTHING	POINT ELEVATION	RAW DESCRIPTION
1000	1290283'	2546157'	6887.996'	5/8" REBAR WITH A 2" ALUMINUM CAP MARKED "RDG"
1001	1294451'	2550053'	6828.925'	5/8" REBAR WITH A 2" ALUMINUM CAP MARKED "RDG"

SURVEY CONTROL PLAN
 HOBACK RIVER RESTORATION PROJECT
 NEAR JACKSON, WYOMING

NO.	DATE	BY	DESCRIPTION	CHK
0	12/10/21	TH	60% DESIGN	MD
			PRELIMINARY NOT FOR CONSTRUCTION	

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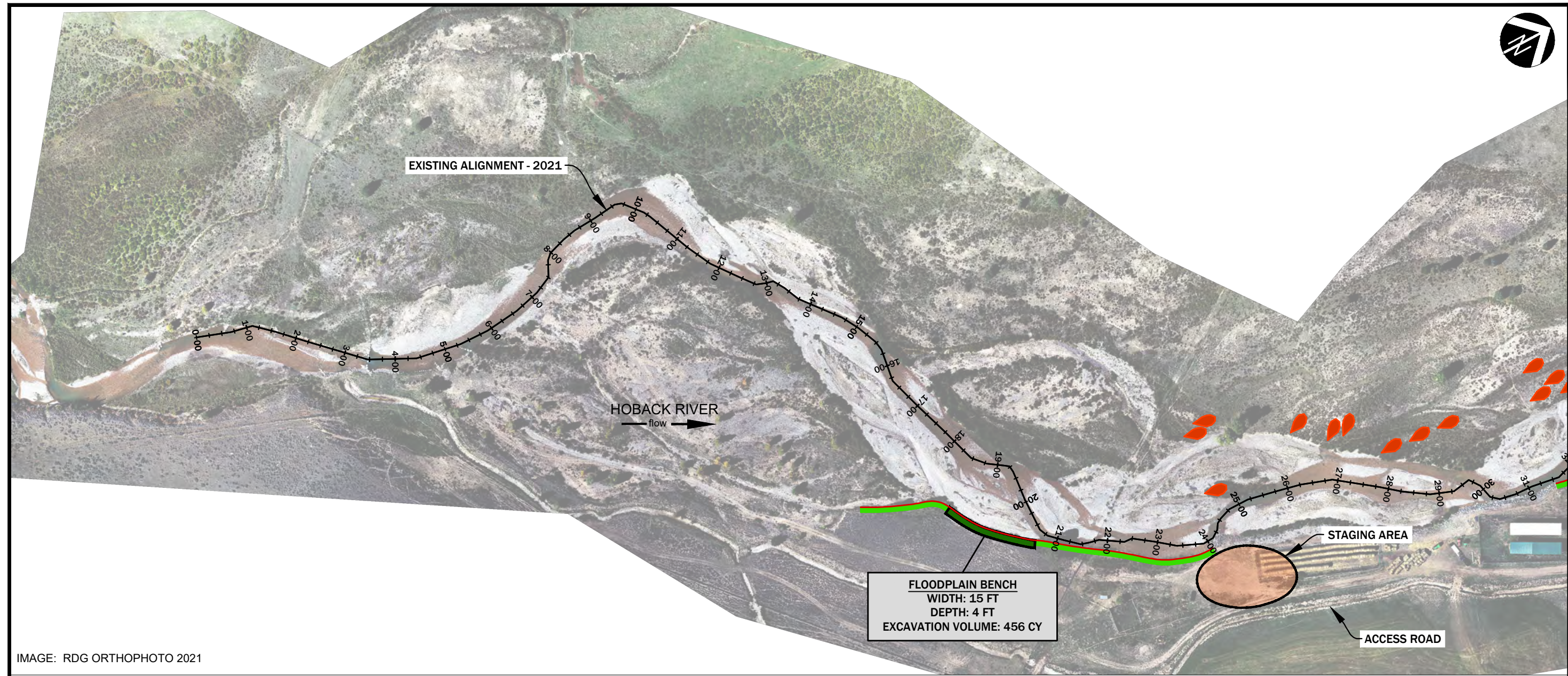


IMAGE: RDG ORTHOPHOTO 2021

1 HOBACK RIVER PLAN VIEW
 1" = 200'

LEGEND	
	FLOODPLAIN GRADING EXTENTS
	BRUSH BANK STRUCTURES
	FLOODPLAIN TREATMENT
	FENCED PLANTING UNIT

STRUCTURE SCHEDULE			
<u>VEGETATED BRUSH BANK</u>			
<u>START</u>	<u>END</u>	<u>LENGTH (LF)</u>	
17+00	24+00	700	
<u>TOTAL : 700 LF</u>			



PLAN AND STRUCTURE LAYOUT
 HOBACK RIVER RESTORATION PROJECT
 NEAR JACKSON, WYOMING

NO.	DATE	BY	DESCRIPTION	CHK
0	12/10/21	TH	60% DESIGN	MD
PRELIMINARY NOT FOR CONSTRUCTION				

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PLAN AND STRUCTURE LAYOUT
 HOBACK RIVER RESTORATION PROJECT
 NEAR JACKSON, WYOMING

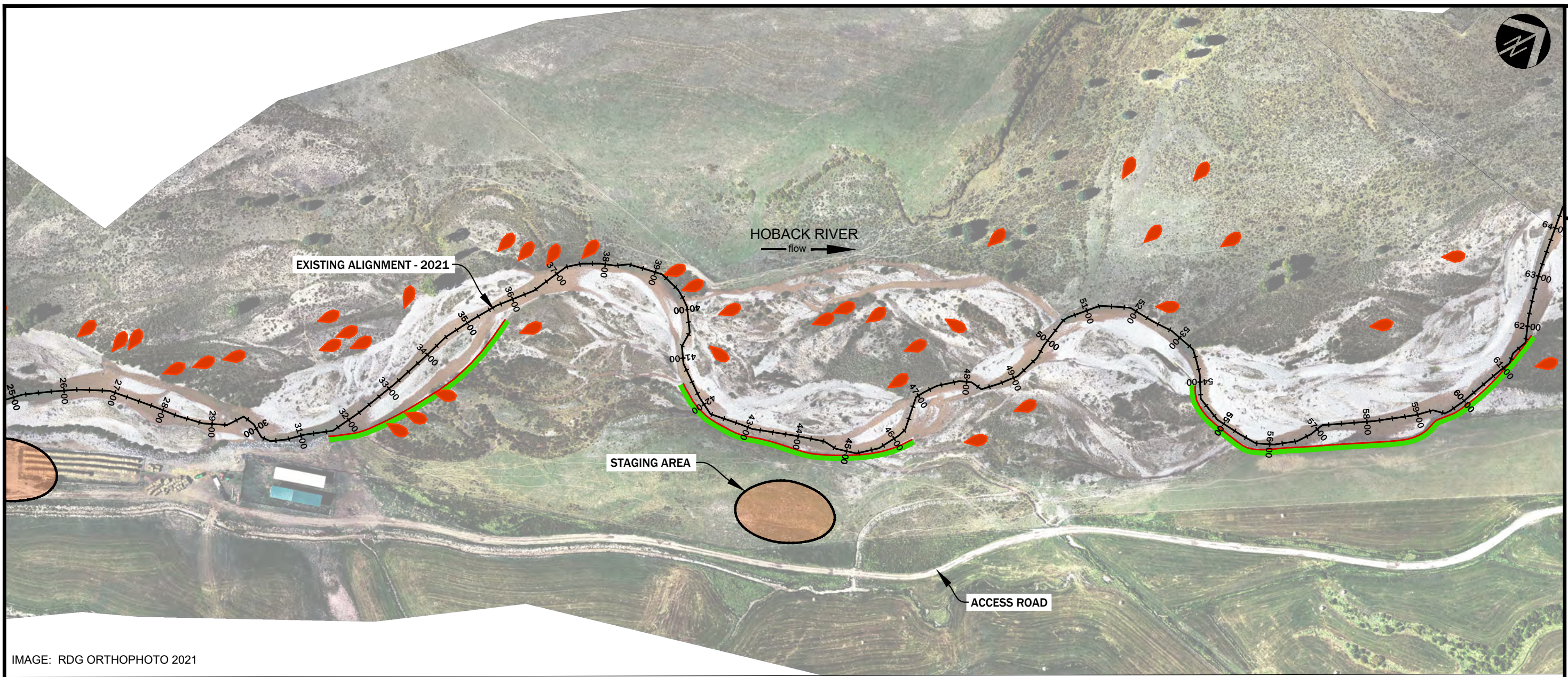


IMAGE: RDG ORTHOPHOTO 2021

1 HOBACK RIVER PLAN VIEW
 1" = 200'

LEGEND

	FLOODPLAIN GRADING EXTENTS
	BRUSH BANK STRUCTURES
	FLOODPLAIN TREATMENT
	FENCED PLANTING UNIT

STRUCTURE SCHEDULE

VEGETATED BRUSH BANK		
START	END	LENGTH (LF)
31+50	35+75	425
41+50	46+25	475
54+00	61+84	784
TOTAL : 1,684 LF		

NO.	DATE	BY	DESCRIPTION	CHK	
				MD	
0	12/10/21	TH	60% DESIGN		
PRELIMINARY NOT FOR CONSTRUCTION					

PROJECT NUMBER RDG-19-102
DRAWING NUMBER 5.1
Drawing 9 of 15

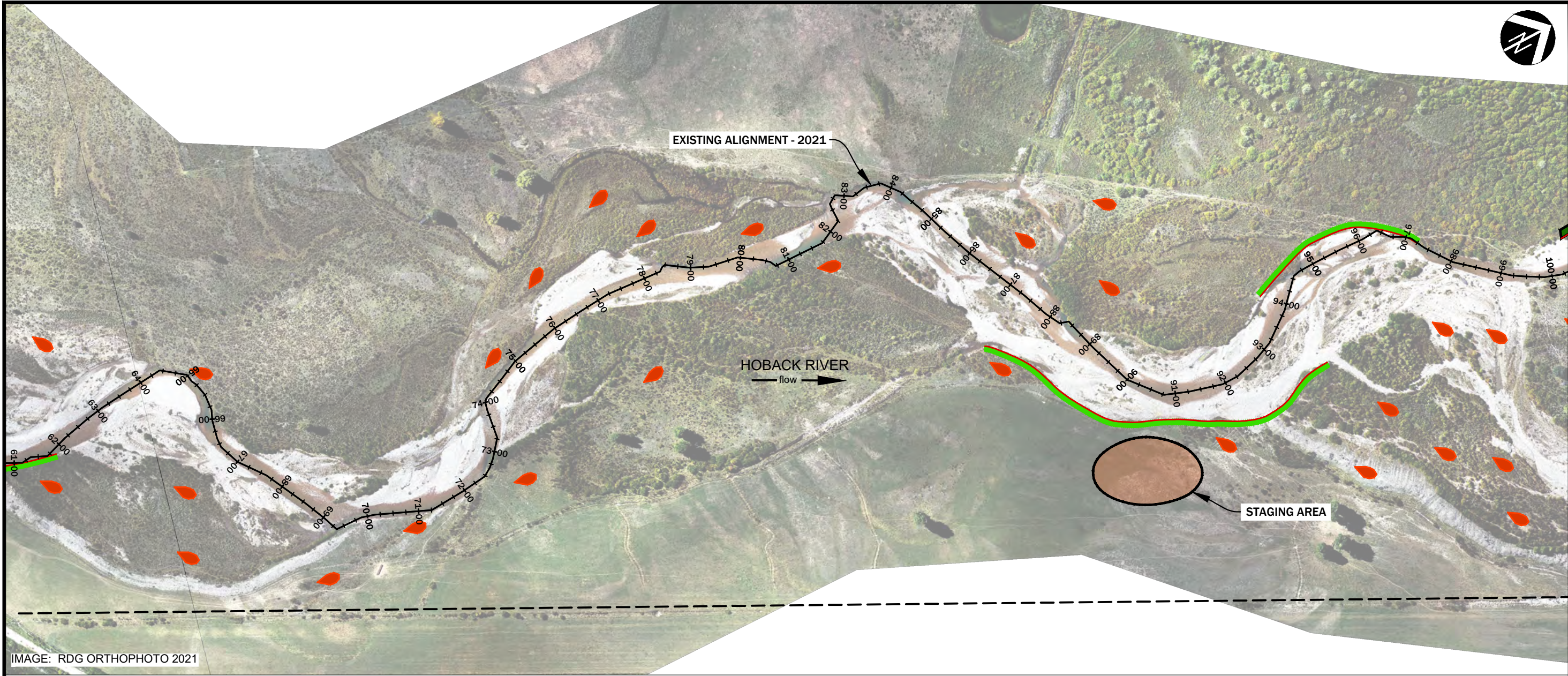


IMAGE: RDG ORTHOPHOTO 2021

PLAN AND STRUCTURE LAYOUT
 HOBACK RIVER RESTORATION PROJECT
 NEAR JACKSON, WYOMING

1 HOBACK RIVER PLAN VIEW
 1" = 200'

LEGEND

	FLOODPLAIN GRADING EXTENTS
	BRUSH BANK STRUCTURES
	FLOODPLAIN TREATMENT
	WILDLIFE FRIENDLY FENCING
	FENCED PLANTING UNIT

STRUCTURE SCHEDULE

VEGETATED BRUSH BANK		
START	END	LENGTH (LF)
87+00	93+50	650
94+00	97+00	300
TOTAL : 950 LF		

NO.	DATE	BY	DESCRIPTION	CHK
0	12/10/21	TH	60% DESIGN	MD

PRELIMINARY
 NOT FOR CONSTRUCTION

PROJECT NUMBER
RDG-19-102

DRAWING NUMBER
5.2

Drawing 10 of 15

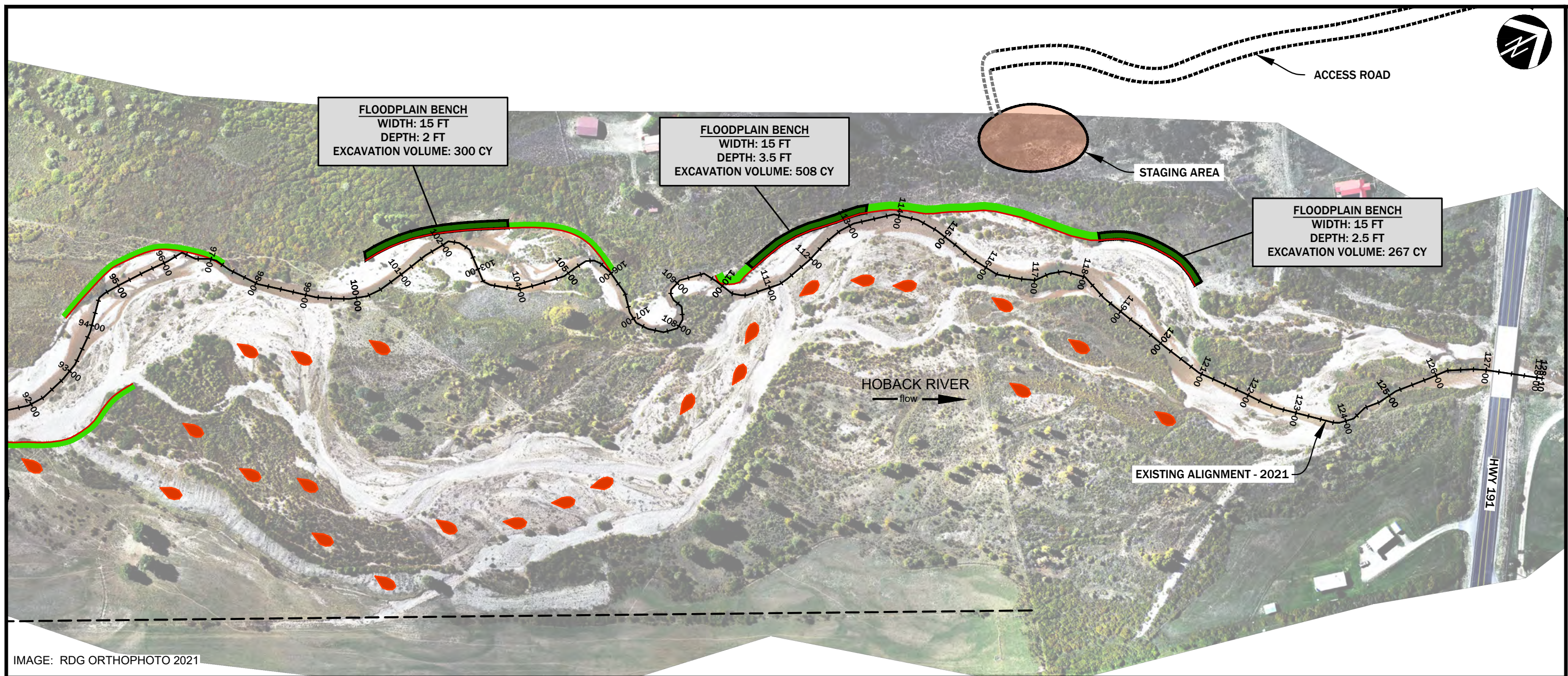


IMAGE: RDG ORTHOPHOTO 2021

1 HOBACK RIVER PLAN VIEW
 1" = 200'

LEGEND

	FLOODPLAIN GRADING EXTENTS
	BRUSH BANK STRUCTURES
	FLOODPLAIN TREATMENT
	WILDLIFE FRIENDLY FENCING
	FENCED PLANTING UNIT

STRUCTURE SCHEDULE

VEGETATED BRUSH BANK		
START	END	LENGTH (LF)
100+50	106+00	550
109+75	120+00	1,050
TOTAL : 1,600 LF		

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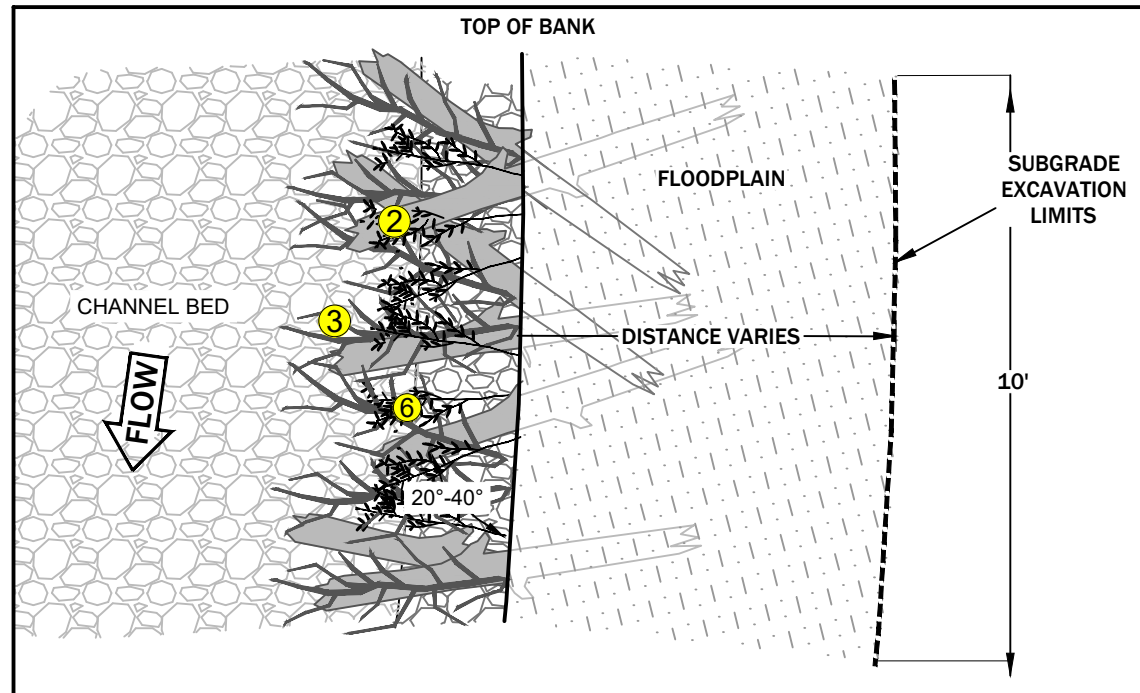
PRELIMINARY
 NOT FOR CONSTRUCTION

PROJECT NUMBER
 RDG-19-102

DRAWING NUMBER
5.3

Drawing 11 of 15

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1 VEGETATED BRUSH BANK
PLAN VIEW

STREAMBANK FILL GRADATION

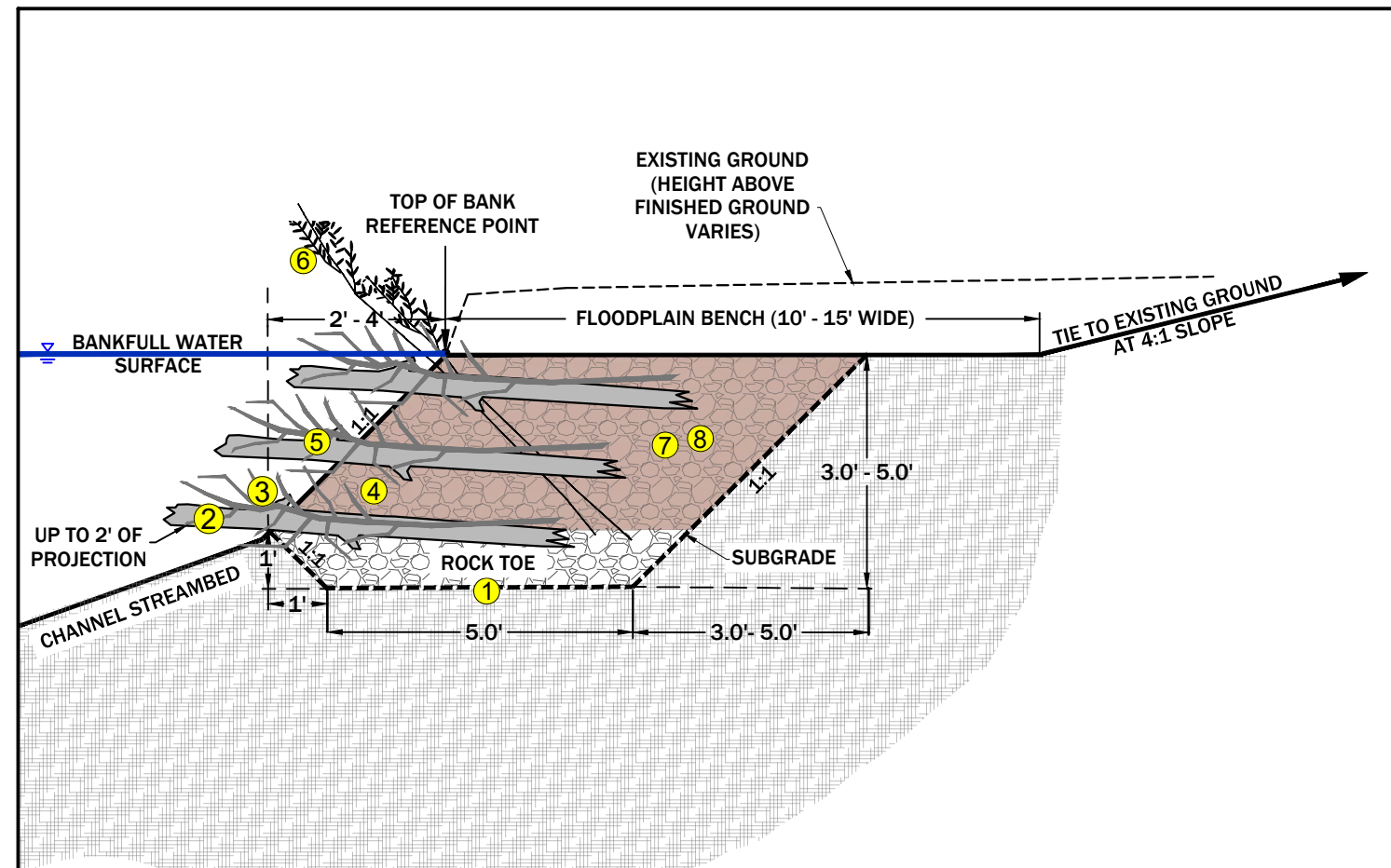
SIZE	% PASSING
8-INCH	100
6-INCH	80 - 90
4-INCH	60 - 70
3-INCH	40 - 50
2-INCH	20 - 30
FINES	0 - 10

MATERIAL SCHEDULE (PER LINEAR FOOT)

ITEM	QUANTITY	DIA. (IN)	LENGTH (FT)
1 CY OF SUBGRADE EXCAVATION	0.9		
7 8 CY OF STREAMBANK FILL	0.6		
2 SMALL LOGS	2	3-6	8-10
2 MEDIUM LOGS WITH ROOTWADS	0.5	6-12	10-12
3 BRUSH	3	1-3	8-10
6 WILLOW CUTTINGS	100	0.75-1.5	6-8

CONSTRUCTION NOTES

- 1 EXCAVATE STREAMBANK TO SUBGRADE GRADE ELEVATIONS AND PLACE STREAMBANK FILL TO DEPTHS SHOWN (SEE SPECIFIED GRADATIONS).
- 2 PLACE SMALL OR MEDIUM LOGS IN THE STREAMBANK AT SKEWED ANGLE TO THE STREAMBANK. LOGS MAY OVERLAP. NO CUT ENDS SHALL BE EXPOSED.
- 3 PLACE BRUSH WITHIN THE MATRIX OF SMALL LOGS. BRUSH SHALL BE PLACED BELOW TOP OF BANK LINE.
- 4 PLACE 0.5 FT LAYER OF 50/50 NATIVE MATERIAL AND STREAMBANK FILL MIX ON LOG/BRUSH MATRIX AND COMPACT.
- 5 REPEAT STEPS 2 THROUGH 4 UNTIL THE DESIRED TOP OF BANK ELEVATION IS ACHIEVED.
- 6 PLACE CUTTINGS INTO THE LOG/BRUSH MATRIX WITH THE STEMS IN CONTACT WITH THE BASEFLOW WATER TABLE AND THE LEAVES AT OR ABOVE THE TOP OF BANK ELEVATION.
- 7 BACKFILL STREAMBANK WITH A 50/50 MIX OF NATIVE MATERIAL AND STREAMBANK FILL.
- 8 WASH FINES AND WATER FROM ONSITE INTO THE STREAMBANK FILL TO SEAL THE VOIDS IN THE BACKFILL.



2 VEGETATED BRUSH BANK
SECTION VIEW

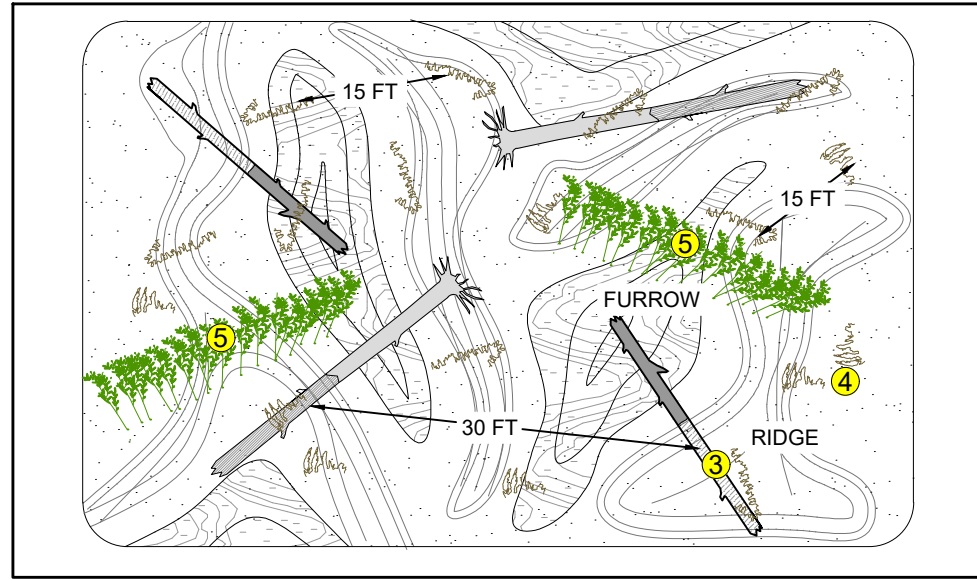
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PRELIMINARY
NOT FOR CONSTRUCTION

PROJECT NUMBER
RDG-19-102

DRAWING NUMBER

6.0



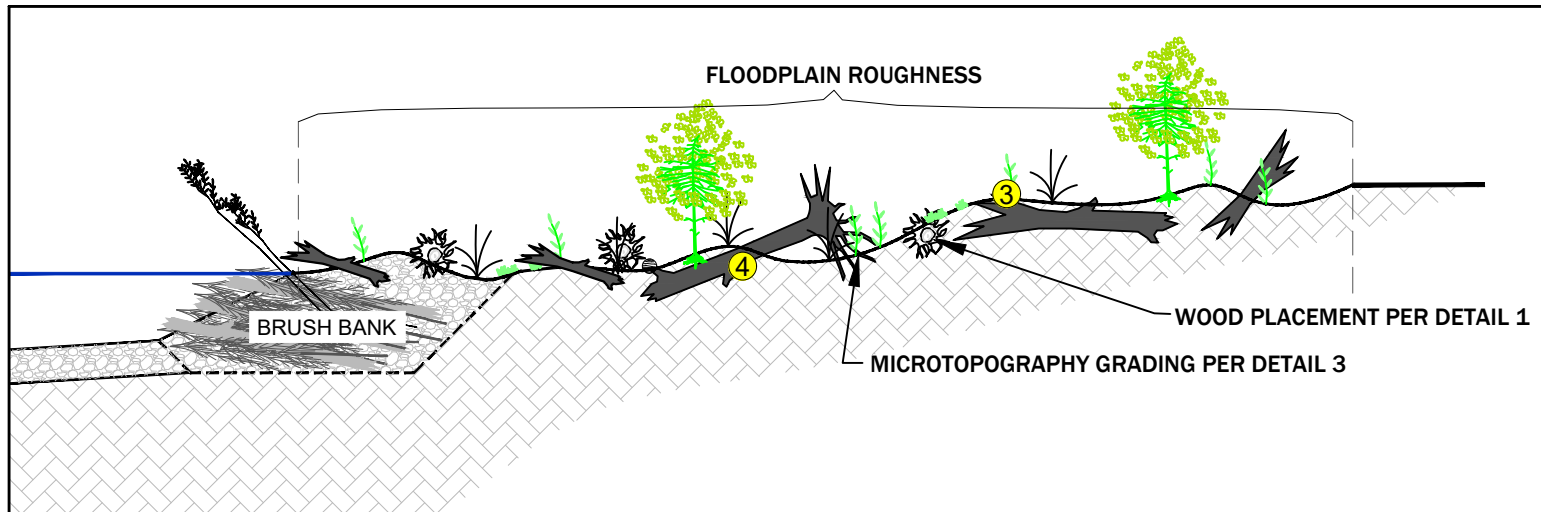
1 FLOODPLAIN ROUGHNESS WOOD PLACEMENT
TYPICAL PLAN VIEW NTS

CONSTRUCTION NOTES

- 1 CONSTRUCT FLOODPLAIN ROUGHNESS AFTER FINISHED GRADING AND AFTER PLACEMENT OF VEGETATIVE FILL FOR GROWTH MEDIA. CONSTRUCT FLOODPLAIN ROUGHNESS PRIOR TO SEEDING, PLANTING AND FENCING.
- 2 GRADE FURROWS AND RIDGES INTO THE FINISHED GROUND SURFACE.
- 3 PARTIALLY BURY SMALL LOGS INTO FURROWS AND RIDGES AT SPACING OF 30 FEET AND A DEPTH OF TWO FEET WITH ONE HALF THE LOG LENGTH BELOW THE SURFACE.
- 4 PARTIALLY BURY BRUSH INTO FURROWS AND RIDGES AT SPACING OF 15 FEET AND A DEPTH OF TWO FEET WITH ONE HALF THE BRUSH LENGTH BELOW THE SURFACE.
- 5 VEGETATED BRUSH TRENCHES WILL BE CONSTRUCTED WITHIN THE FLOODPLAIN AT THE DIRECTION OF THE CONSTRUCTION MANAGER. A TRENCH WILL BE CONSTRUCTED APPROXIMATELY 5' DEEP AND EXTEND THE LENGTH OF THE STAKED TREATMENT LOCATION. LIVE WILLOW CUTTINGS AND BRUSH WILL BE PLACED IN THE TRENCH SUCH THAT THEY ARE INTERMIXED AND ORIENTED AT A NEAR VERTICAL ANGLE. THE TRENCH WILL THEN BE BACKFILLED WITH THE SAME MATERIAL REMOVED TO CREATE THE TRENCH AND SHOULD MATCH THE ELEVATION OF THE SURROUNDING FLOODPLAIN GRADE.

FLOODPLAIN ROUGHNESS WOOD PLACEMENT CRITERIA

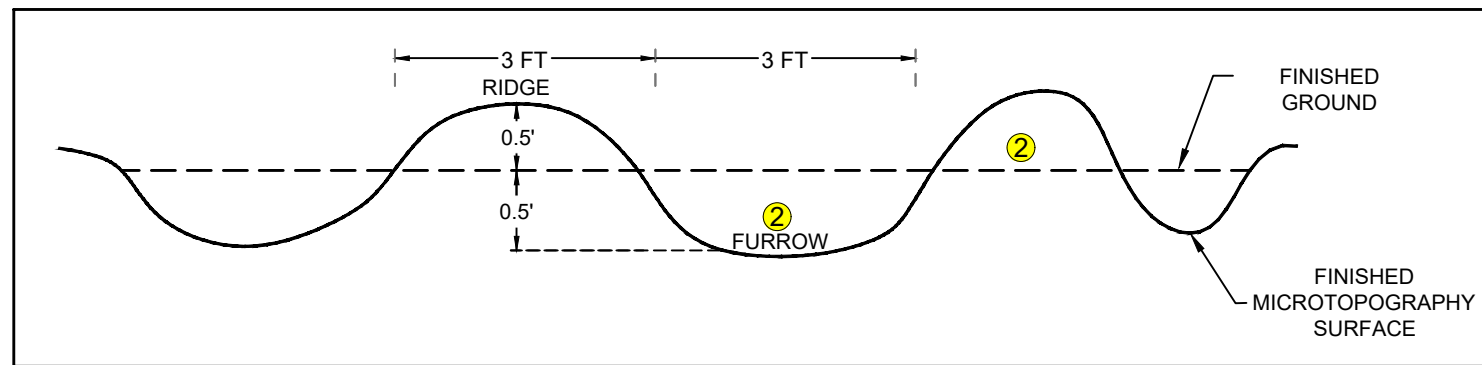
ITEM	DIA. (IN)	LENGTH (FT)	ROOTWAD (Y/N)	LIMBS	SPACING	BURIAL	RATE
3 SMALL LOGS	3-6	8-10	OPTIONAL	YES	30 FT	50%	50/ACRE
4 BRUSH	1-3	8-10	OPTIONAL	YES	15 FT	50%	150/ACRE



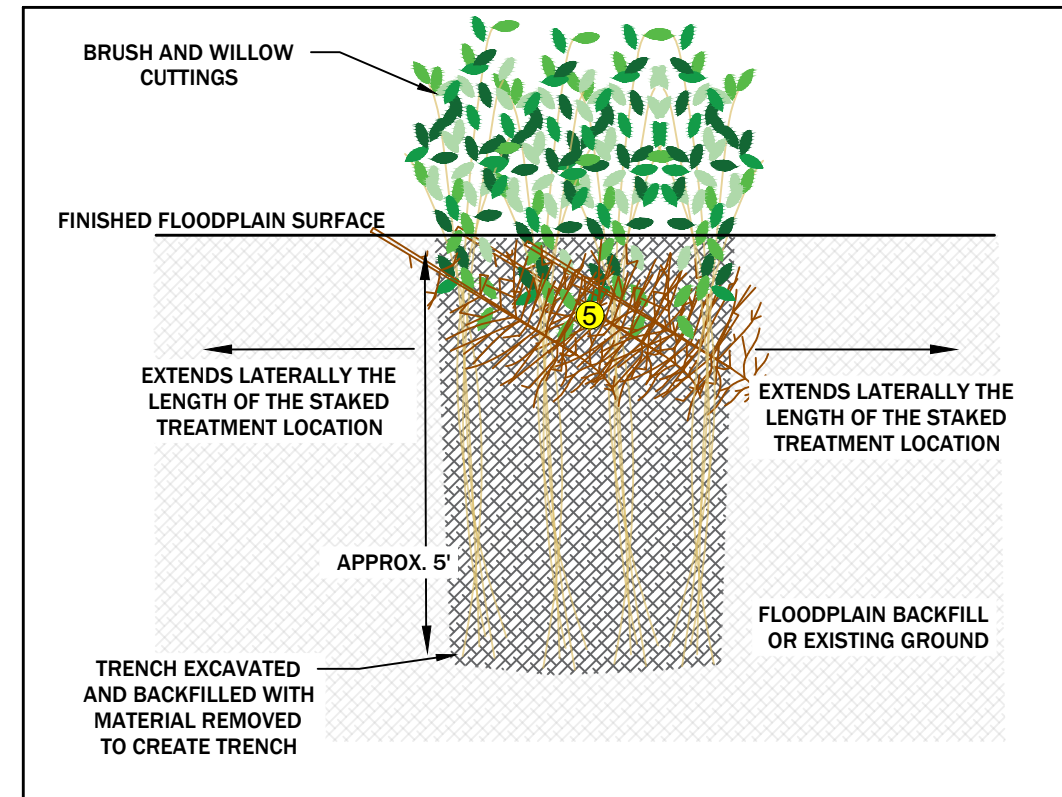
2 FLOODPLAIN ROUGHNESS
TYPICAL CROSS SECTION NTS

WILLOW TRENCH MATERIAL SCHEDULE

ITEM	DIA.	QUANTITY
5 BRUSH	< 3"	1
5 WILLOW CUTTINGS	0.25" - 1"	4.5



3 MICROTOPOGRAPHY GRADING
SECTION VIEW NTS



4 WILLOW TRENCH
SECTION VIEW NTS

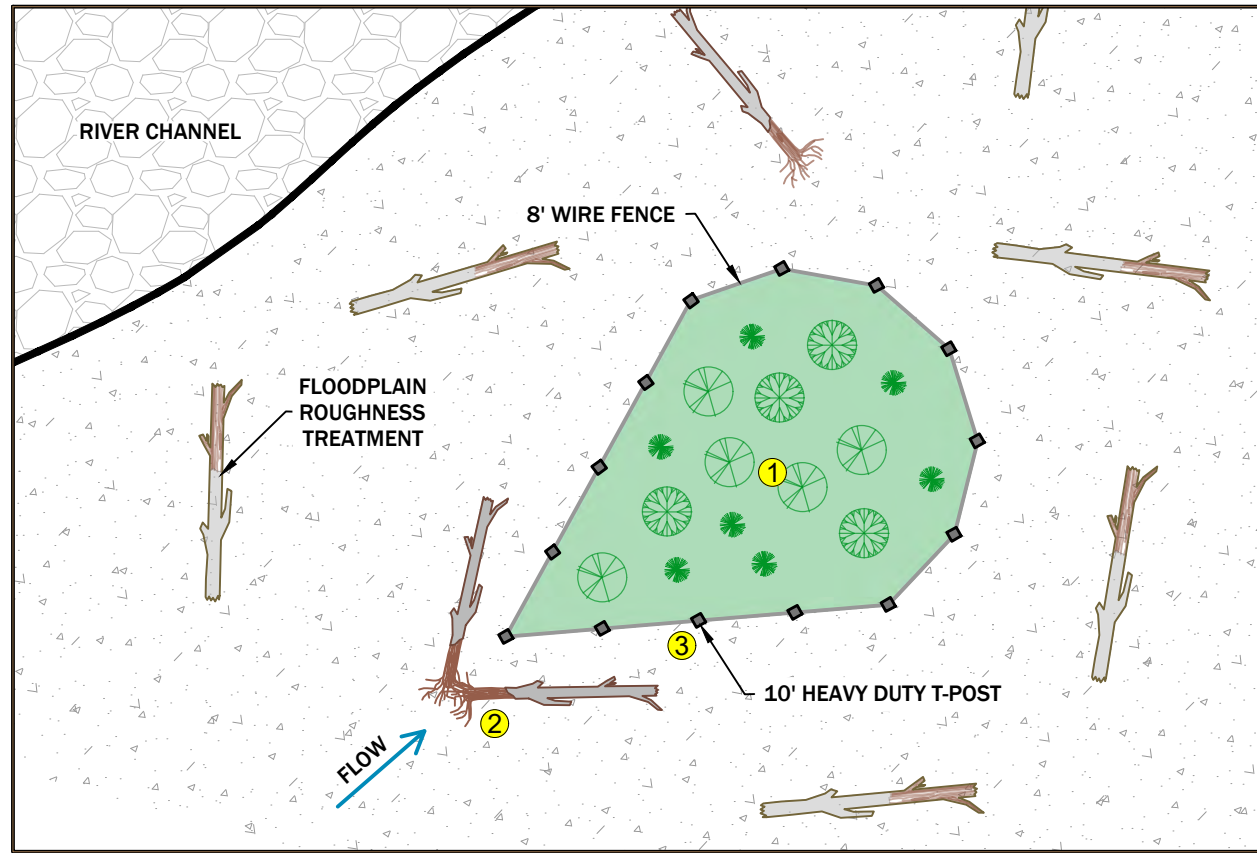
NO.	DATE	BY	DESCRIPTION	CHK
0	12/10/21	TH	60% DESIGN	MD

PRELIMINARY
NOT FOR CONSTRUCTION

PROJECT NUMBER
RDG-19-102

DRAWING NUMBER

6.1



1 WILDLIFE EXCLOSURE UNIT
PLAN VIEW
 0' 10' 20'

DESIGN INTENT

PURPOSE: THE PURPOSE OF THIS TREATMENT IS TO PROTECT PLANTED VEGETATION FROM WILDLIFE BROWSE. FENCES ARE DESIGNED TO INTERACT HYDRODYNAMICALLY WITH OVERBANK FLOWS.

PLACEMENT CRITERIA: EXACT LOCATIONS WILL BE STAKED IN THE FIELD PRIOR TO IMPLEMENTATION.

SUPPLEMENTAL INFORMATION: INDIVIDUAL FENCE UNITS WILL BE CONSTRUCTED USING 8' TALL WIRE FENCE AND FOURTEEN 10' TALL HEAVY DUTY T-POSTS. WIRE FENCE WILL BE FASTENED TO T-POSTS USING WIRE CLIPS.

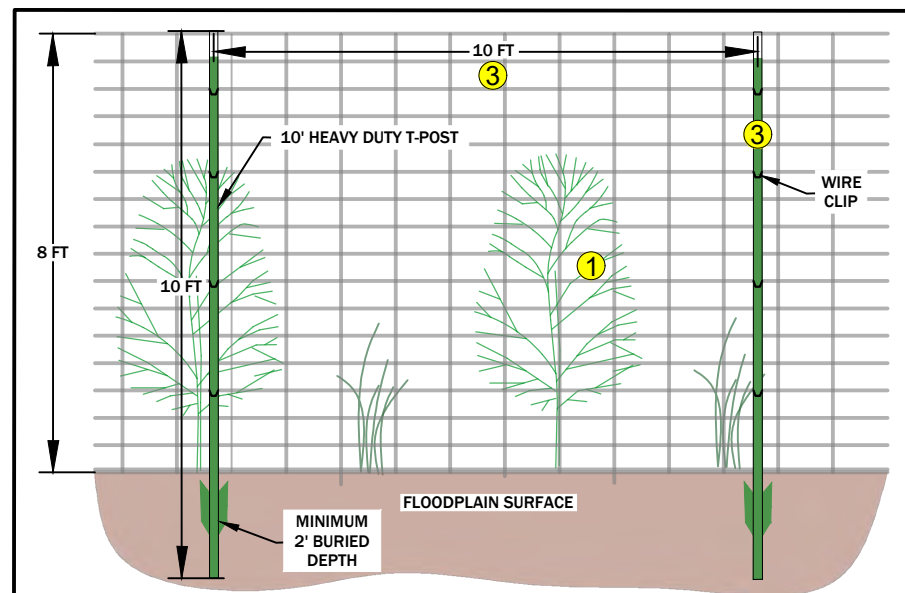
INSTALLATION NOTES

- 1 FENCES WILL BE BUILT AROUND PLANTED VEGETATION IN THE FLOODPLAIN TO PROTECT FROM BROWSE.
- 2 FENCE UNITS WILL BE UTILIZED IN CONJUNCTION WITH THE FLOODPLAIN ROUGHNESS TREATMENT TO WITHSTAND LARGE FLOW EVENTS THAT MAY COMPROMISE THE FENCE.
- 3 INDIVIDUAL FENCES WILL BE CONSTRUCTED WITH FOURTEEN 10' HEAVY DUTY T-POSTS AND APPROXIMATELY 140 LINEAR FEET OF 8' TALL WIRE FENCE MATERIAL. WIRE SHALL BE ATTACHED TO EACH POST WITH T-POST WIRE CLIPS.
- 4 ALL FENCES WILL CONTAIN ONE GATE LOCATED AT THE DOWNSTREAM END OF THE UNIT TO PROTECT FROM LARGE FLOW EVENTS. THE GATE WILL UTILIZE REUSABLE T-POST TWIST TIES CLOSING THE END OF WIRE FENCING TO THE NEAREST T-POST. GATES WILL BE CONSTRUCTED SO MAINTENANCE AND MONITORING PERSONNEL CAN EFFECTIVELY OPEN AND CLOSE THE FENCE UNIT.

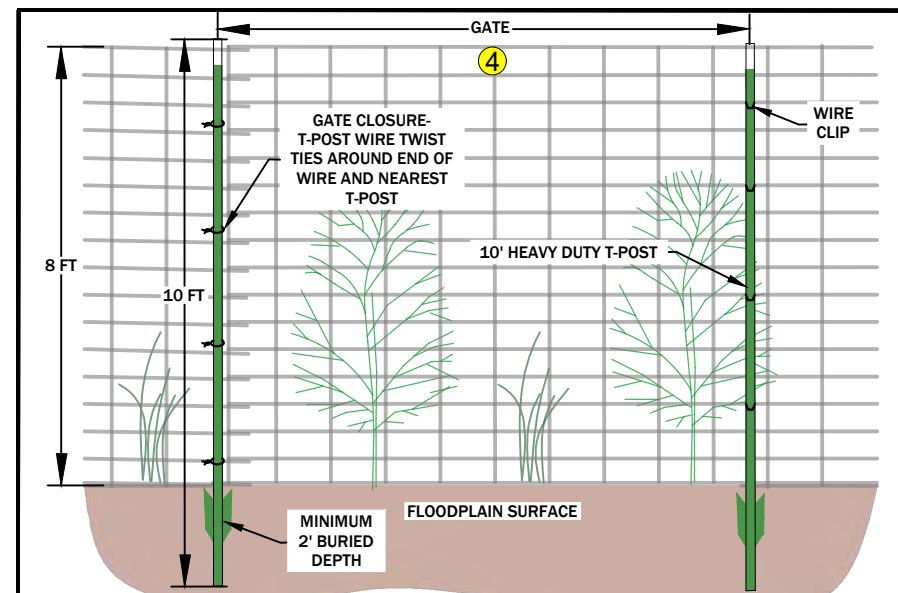
MATERIALS SCHEDULE

ITEM	QUANTITY	HEIGHT (FT)
2 WOVEN WIRE GAME FENCE	165 LF*	8
3 STEEL T-POST	14	10
3 T-POST WIRE CLIPS	56	
4 T-POST WIRE TWIST TIES	4	

*TOTAL FENCING QUANTITY ALLOWS FOR AN ACCEPTABLE AMOUNT OF OVERLAP AND SHOULD EQUATE TO HALF OF A STANDARD ROLL (330 FT).

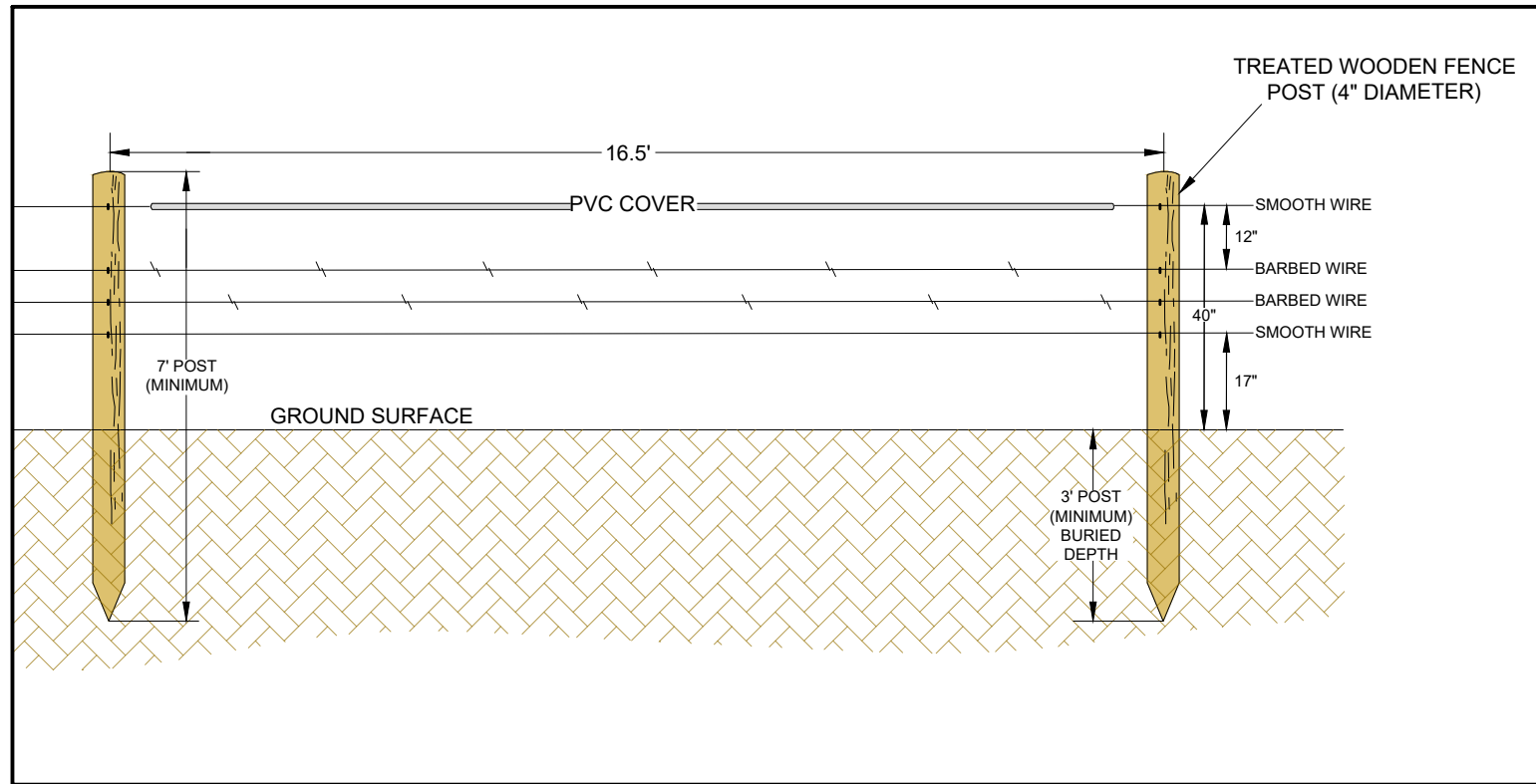


2 WILDLIFE EXCLOSURE UNIT
PROFILE VIEW
 NTS

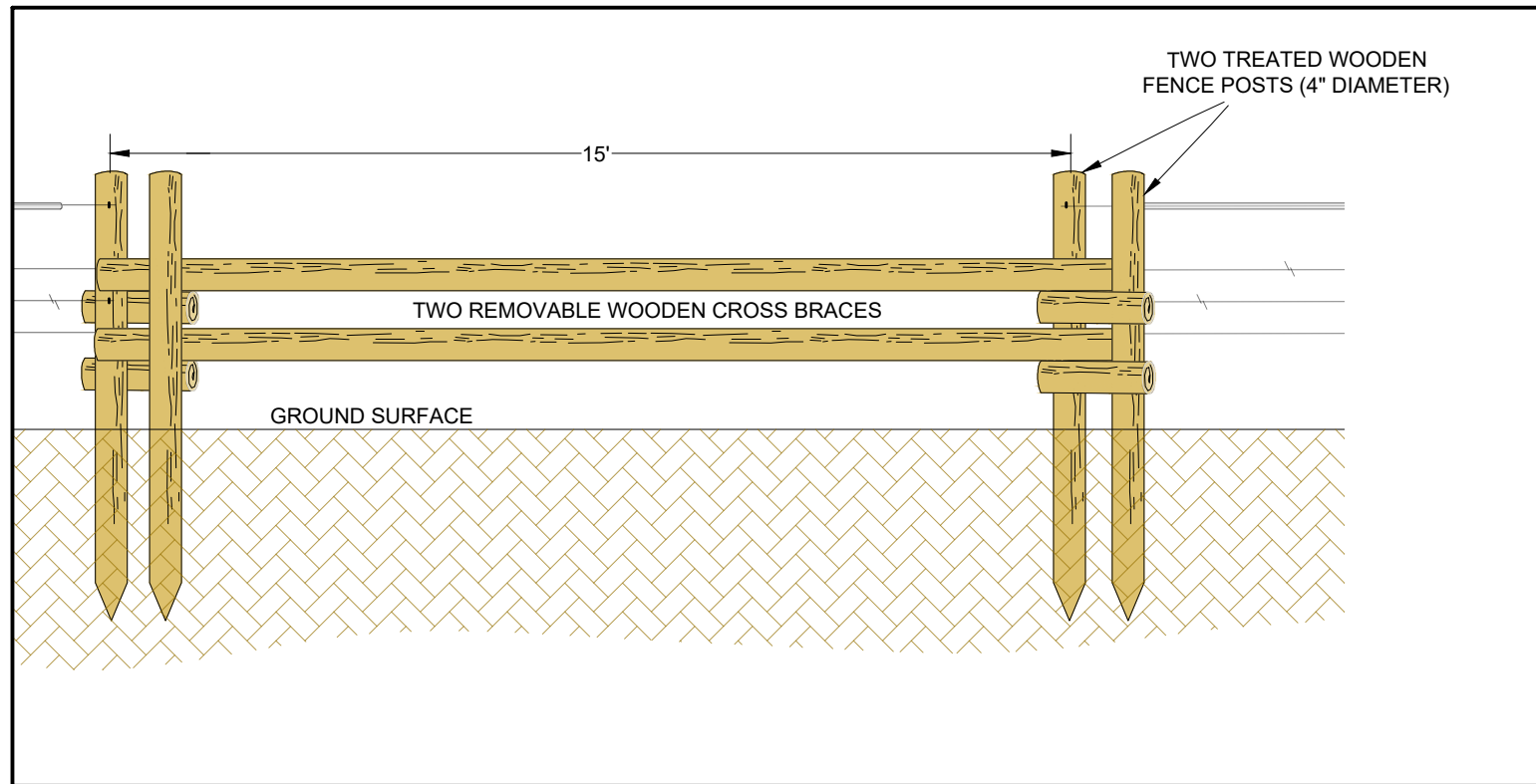
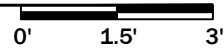


NO.	DATE	BY	DESCRIPTION	CHK
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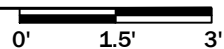
PRELIMINARY
 NOT FOR CONSTRUCTION



1 WILDLIFE FRIENDLY FENCING DETAIL
PROFILE VIEW



2 WILDLIFE FRIENDLY FENCING GATE DETAIL
PROFILE VIEW



MATERIAL SCHEDULE

ITEM	DIMENSIONS	QUANTITY
SMOOTH WIRE	N/A	8,602 LF
BARBED WIRE	N/A	8,602 LF
PVC PIPE COVERS	16.5'	261 EA
WOODEN FENCE POSTS	7' TALL	261 EA
WOODEN CROSS BRACE	16' TALL	TBD

NO.	DATE	BY	DESCRIPTION	CHK
0	12/10/21	TH	60% DESIGN	MD
PRELIMINARY NOT FOR CONSTRUCTION				

APPENDIX F

AUGUST 19, 2021



GUIDANCE DOCUMENT
SMALL WATER PROJECTS PROGRAM
WYOMING WATER DEVELOPMENT COMMISSION

JODIE PAVLICA, PE
PROGRAM MANAGER
Wyoming Water Development Office

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Chapter 1 Program Eligibility

Small Water Project applications are due by November 15th of each year. Applications may be downloaded from the Small Water Project Program website at:

https://wwdc.state.wy.us/small_water_projects/small_water_project.html

Applications may be submitted digitally to the Small Water Project Program Manager (Jodie.Pavlica@wyo.gov), or by mail to 6920 Yellowtail Rd, Cheyenne, WY 82002. Applications must be fully completed and signed by an authorized representative of the applying public entity. Applications must also contain a map of the project area that documents the location of the project and the proposed project components.

Public Entities

Applications for Small Water Projects may be submitted by eligible public entities as defined by the program criteria. Applications cannot be accepted from landowners.

The public entity is accepting several important responsibilities with a successful application to the Small Water Project Program. Successful Applicants (Sponsor's) will enter into a contractual arrangement with the Water Development Commission. Under this agreement sponsors are required to provide project designs, specifications, proof of permits, certify that a project has met all legal requirements necessary for construction, submit the project payment request, and make sure that all necessary deadlines are met prior to the expiration of the Project Agreement. It is important for the project sponsor to know that the Water Development Office (WWDO) is available to help with these tasks, but the responsibility for their completion is ultimately that of the sponsor. In other words, the WWDO will not allow the project sponsor to apply for the project, then turn over their responsibilities to the landowner.

Public Benefit

The Small Water Project Program is a State of Wyoming Funded Grant Program. Eligible projects will improve watershed condition and function, provide multiple benefits, and meet the funding criteria specified by Wyoming Statutes.

Wyoming Statutes 99-3-1903(k)(viii)(c), and 99-3-1904(m)(viii)(c) require that the public benefit of the project be substantiated by the project sponsor. Section 24 of the project application is provided for the Sponsor to document these benefits. This information will be quoted in the recommendation that is submitted for the Commission's approval at their March meeting. If the Commission believes that the public benefit is inadequate to justify the project grant they may ask the project sponsor to testify, to assist them in their decision to fund the project.

Estimated Total Project Cost

Section 29 of the project application includes the Sponsor's Estimated Total Project Cost. This value is used to determine the requested grant. The program legislation allows a 50% grant on eligible project expenses up to \$35,000. The sponsor's estimated total project cost is not adjusted by the WWDO, therefore it is important for the project sponsor to include in that estimate all eligible expenses, including estimates for contingencies. The WWDO can not authorize additional grant funding for the project after the project application is accepted and approved for funding by the Commission at their March meeting.

Project Readiness

Section 31 in the application gives project sponsors who wish to apply for shovel ready status the opportunity to document their readiness for construction. This step is not required for an application to be complete and recommended for funding. This is only required for projects that wish to seek a shovel ready funding priority. (Please refer to Chapter 3 for more information.) If a project sponsor is not seeking shovel ready status then it is better if the application and map are all that is provided. Project checklists are not helpful at this stage because the project design is incomplete, and as a result there are too many final details to be completed for the checklist to be relevant.

Chapter 2 Eligible Projects

Section C in the program criteria documents eligible project types. Projects are defined according to 11 specific definitions outlined in this section. Project eligibility is further determined by public benefits accrued as described in the previous chapter.

Small Reservoirs

The program criteria include small reservoirs as an eligible project type. The criteria do not limit the size of the reservoir, the use of the reservoir, or the cost of the reservoir. Project applications will be reviewed for public benefit and constructability based on the project description provided in the application. Project funds may also be used to rehabilitate existing small reservoirs.

Wells

Wells and their appurtenances may be eligible for program funding depending on the depth of the well and scope of the project. Well appurtenances may include pumps, power sources (either fixed in place solar or conventional electric service), storage tanks, troughs, and any plumbing necessary to make the project function in the manner intended. In most cases these items are required to put the water to beneficial use which is a prerequisite for payment.

Wells are divided into two categories, those that are drilled into proven aquifers and those that are drilled into unproven aquifers. The distinction of a proven vs unproven aquifer determines the requirements upon which the project is eligible for payment, with the primary difference being in the acceptance of risk.

If the proposed well is targeting an unproven aquifer, then the sponsor accepts the risk of proceeding with the project, knowing that if the quality or quantity of the well isn't sufficient to meet the demands of the project that they will have to bear the full cost. The program criteria explain this distinction in further detail. In order to facilitate the determination of a proven or unproven aquifer the project sponsor is required to provide a geologic report on the proposed well site prior to the issuance of Notice to Proceed. The geologic report will be reviewed by a professional geologist at the Water Development Office. If the proposed well is determined to be targeted for an unproven aquifer then the sponsor will be notified prior to the issuance of Notice to Proceed so that they may decide if they want to accept the risk associated with this designation.

Solar Platforms, Pipelines & Conveyance Facilities, Windmills

Solar Platforms, Pipelines & Conveyance Facilities, and Windmills are all eligible for program funding. These project components are frequently bundled with other project components like wells, and may be new construction or the rehabilitation of existing facilities. Stock water troughs and storage tanks are also eligible for funding as they are required to beneficially use the water, and beneficial use of the water is required before funds can be issued. Larger projects that may need to be phased, such as long stock water pipelines, are eligible for program funding as long as each phase provides a beneficial use of the water when it is complete.

Spring Development

Improving flows of existing springs and installation of collection facilities associated with springs may be eligible for program funding. These projects are frequently bundled together with tanks and solar systems.

Wetland Development

The development of wetlands may be eligible for funding through the program. Wetland projects must provide multiple benefits in addition to those discussed in the public benefit section of the application.

Environmental Projects

Environmental projects are defined as those that provide for stream bank stability, water quality improvements, or erosion protection. Projects in this category often provide multiple benefits that improve not just water quality but stream habitat as well. Projects outside of this definition may be eligible for funding under another project definition such as wetland development, recreational, or small reservoir.

Irrigation Projects

Program criteria states that Irrigation Projects may be eligible for funding through the program. This document attempts to provide guidance to the project sponsors as to which irrigation projects are eligible and which are not. See the list below for more details:

1. On Farm Improvements: On farm improvements such as center pivots and their appurtenances are not eligible for small water program funding. These projects don't meet the public benefit requirements outlined earlier in this document.
2. Ditch to pipe conversions: The conversion of an earthen ditch to pipe is an eligible project, with the understanding that the program will not pay for gated pipe for the same reason that center pivots are not eligible.
3. Diversion structures: Diversion structures are eligible projects, including those that are designed to be fish friendly using rock check structures.
4. Large projects that need to be phased: Large projects that may need to be phased are eligible for program funding as long as each phase provides a beneficial use of water when it is complete. As an example, the WWDC won't provide reimbursement funds for a well that is not pumping water into a stock tank. The same rule applies for larger irrigation projects, each phase must be complete and function on its own.

Rural Community Fire Suppression

Projects eligible for rural community fire suppression include projects that are in keeping with the larger Agency mission of "Supply, Transmission, and Storage". Projects that would not be eligible include: distribution lines, fire hydrants, irrigation systems for the purposes of green area buffer zones, etc.

Recreational

Recreational projects may be considered for funding through the Program. Projects must meet the same public benefit standards required of other projects. Eligible projects might include, but are not limited to: stream channel projects for the purposes of habitat improvement, fish passage, or fish screens.

Ineligible Projects/Expenses

Over the years there have been several project types that are regularly requested that are not recommended for funding. Those are listed below.

1. Cleaning or reshaping an earthen ditch: This is considered maintenance and is therefore not eligible for project funding.
2. Flumes and Measurement Devices: These expenses are the responsibility of the permit holder and not eligible expenses in the program.
3. On Farm Projects: These projects often have a difficult time providing the necessary public benefit documentation required by the legislation.
4. Drinking Water Projects: Projects of this type do not comport with the original intent of the program and therefore are not eligible.
5. Fencing: Fencing is only eligible as it is used to protect the infrastructure that is installed by the program. Program funds shall not be used to fence off riparian areas or wetland habitats.
6. Distribution Systems for Rural Community Fire Suppression: The installation of water distribution lines for the purposes of Rural Community Fire Suppression are not eligible for funding. Eligible projects must focus on supply, storage, and/or transmission.
7. Rehabilitation of a structure that has already been rehabilitated once. Program criteria limit projects to a one-time construction of a new project, a single rehabilitation of an existing project, or eligible subsequent appropriations provided the total grant doesn't exceed \$35,000.
8. Completed Projects: Program criteria prohibit the use of funds for the purposes of refinancing projects that have already been completed.
9. Sponsor budgets: Program criteria prohibit funds being used to augment operating budgets. Therefore, sponsors may not send invoices for employee time unless those employees are Licensed Professional Engineers or Geologists whose time was directly used to prepare Small Water Project deliverables.
10. Maintenance: Program criteria prohibit the use of funds for the purposes of maintenance.
11. Personal Items used to complete the project: Items like tools, fuel, generators, and extended warranties that were purchased through the course of the project are not eligible for reimbursement.

Chapter 3 Project Evaluation

New project applications are due by November 15th. This gives the Office time to evaluate the number of applications and prepare a request for funding the Small Water Program accounts with approval by the Commission and Select Water Committee at their December\January meetings.

Applications will be reviewed for eligibility and completeness by the Water Development Office and recommendations on specific projects will be made to the Commission and Select Water Committee at their March meetings. Applications may be downloaded at the following website.

https://wwdc.state.wy.us/small_water_projects/small_water_project.html

Project Description

This is an important part of the project application not only for describing the project in general terms to understand the larger picture benefits, but also for specifically detailing the project components that are proposed for installation. This information is used to determine eligibility and is included in the recommendation that is presented to the Commission for their approval. Any project changes that may be requested later in the project are first compared to the project description that was approved by the Commission. No changes will be approved by the office without Commission consideration if they are outside of the approved project description.

Additionally, the sponsor shall identify if the work is to be performed on a project that has already been funded by the Small Water Project Program, and if so, provide the previous project's name, the year the previous grant was awarded, and the total amount of SWPP funds disbursed by the Commission under the previous Small Project. Additionally, the project description shall contain enough detail to describe both projects and why it is necessary to split up the work. It is important to understand that the total amount of all WWDC appropriations for the same site shall not exceed \$35,000.

Project Location (Private, State, Federal)

Eligible projects may be located on Federal, State, other public, or private lands. Items 26 and 27 are included in the project application to document the owner of the land that the project is being constructed on and the owner of the project components that are being installed. Because these two owners are not always the same, this information is used to determine what documentation will be required for Notice to Proceed. If the project is being installed by someone who is different than the person who owns the land that it is being installed on, then a letter of approval will be required from the landowner prior to the issuance of construction. This saves money on formal legal authorizations, but still documents the landowner's awareness and acceptance of the project. These letters can come from federal agencies, private landowners, or public entities like the State of Wyoming.

Project Partners

Section 25 in the application is titled "Project Participants". This is the section of the application that documents who will be contributing to the project and what their role will be. Things like financial and technical oversight should be listed here. This data will help the Office determine if the project is ready for grant funding or if more project development time is required before a grant is awarded.

Project Priorities

Project priorities were established in the program criteria to effectively and efficiently utilize available program funds when the demand for grant dollars exceeds availability. Project priorities are listed below. Please note that the program priorities are not directly equivalent to the eligible project definitions identified in Chapter 2. This is because the project priorities are primarily looking at the purpose of the project, not the project type. In order to assign the new project applications to a priority, the Office relies heavily on the Project Description, the project components table, detailed cost estimates, and the public benefits statement provided with the application.

As an example, if a stock water project application is received and the single largest expense is the pipeline, then it will probably be classified as a priority 3 project. Whereas a similarly named stock water project whose largest expense is a well might be classified as a priority 1 project. Listed below with the project priority are some example projects and where they might fit into the priority system.

Account I Priorities

1. Source Water Development: Wells, New Spring Developments
2. Storage: New Small Reservoirs, Wetlands
3. Pipelines, Conveyance Facilities, Solar Platforms, and Windmills: Stock water systems, pipelines, etc.
4. Irrigation: New irrigation infrastructure (not rehabilitation of an existing system)
5. Environmental: Stream bank stabilization projects
6. Recreational: Fish or habitat projects not associated with irrigation system improvements

Account II Priorities

1. Diversion Structures and Spring Developments: Rehabilitation of existing diversions and spring developments
2. Storage: Rehabilitation of a washed-out stock pond, wetland restoration if an embankment is required
3. Pipelines, Conveyance Facilities, Solar Platforms, and Windmills: Rehabilitation of existing systems
4. Irrigation other than the above: Rehabilitation of turnouts or other in canal structures
5. Environmental
6. Recreational

Shovel Ready

Projects that are ready for construction before applying for Program funding may request a “shovel ready” classification. Projects receiving this classification may be considered as a priority at the Commission’s discretion. This is usually represented with a #1 priority, as the projects would be ready to start as soon as the contracts are signed putting the Commission’s money to work on the ground sooner. In order to qualify as a “Shovel Ready” project the application must include the following:

1. Completed 100% design plans
2. Specifications as necessary to instruct a contractor in proper construction
3. Letters of authorization from landowners as necessary
4. Before photos
5. One Call Notifications or other utility crossing approvals

6. All necessary permits, rights of way, and/or easements
7. Finalization of all other necessary financial agreements

If these items are provided with the application, a Notice to Proceed Review will be completed to establish the project's readiness for construction.

Limited Funding Analysis

Program Criteria allow the Commission to prioritize applications according to project priority during times of limited funding. New projects applications will be assigned a priority according to their primary project purpose as outlined in the project description and public benefits sections. It is recommended that the project sponsor include a detailed cost estimate with their application that includes a breakdown of project costs. This will allow the Office to better understand where project funds will be spent, which will allow for a more accurate classification of project priority.

Project Application funding will be cut off at an even priority, no effort will be made to fund projects in the next highest priority if not all of the projects within that priority can be funded. Any remaining funds would then stay in the Small Water Program Accounts and roll over to be used the next year. Additionally, the Commission may take into consideration a sponsor's existing back log of previously funded projects that are not completed when awarding grants for new projects.

Chapter 4 Project Development & Construction

After new project applications are approved by the Commission and Select Water Committee, projects will require the approval and signature of the sponsors governing body on a Project Agreement between the State of Wyoming and the sponsoring district. The project sponsor may proceed with project development after the final signed document is received by the Water Development Office.

Sponsors' Responsibilities

The sponsor is responsible for acquiring all necessary access agreements, permits, plans, specifications, change orders, operation & maintenance plans, funding participation & construction budgets, and any other document deemed necessary by the Commission. These documents will be submitted to the Office for review with the signed and completed checklists available for download at the Small Water Projects Program website. The documentation described above should be submitted to the Office prior to the start of any construction.

Notice to Proceed

The previous section discusses the documents that the Sponsor is required to provide the Office before written authorization to begin with construction will be issued. That written authorization is called "Notice to Proceed". The purpose of the review is to document the Sponsor's readiness to begin construction, and to document the project components that are being installed. This documentation will be used to ensure correct payments when reimbursement for completed construction is requested at the end of the project. **If the Sponsor initiates the construction process without prior written notification by the Commission to proceed with the project, then the Sponsor shall bear all costs resulting from said action.**

Project Sponsor Checklists

To aid the project sponsor with their project development responsibilities and to help with communication between the Office and Sponsor, checklists were developed. The first is the Project Sponsor Checklist. It includes a list of items that are required by the Office, and several more items that are often required by other State and Federal Agencies. Many of these items will be required before Notice to Proceed will be issued. For those components that are not always required, like a 404 permit, there is a NA box for the sponsor to check on the form. The Project Sponsor Checklist was designed to be filled out and signed right before the Sponsor is ready to submit a project for a Notice to Proceed Review, so the sponsor can use it to ensure the package is complete. It is much less helpful when this checklist is provided with the project application (unless shovel ready). This is because in most cases the project still has to complete final designs and acquire permits when the application is submitted, and that process often changes the sponsors answers on the checklist.

The second checklist that is required by the office is the Sage Grouse Analysis Sheet. The purpose of this checklist is to document the projects location relative to Sage Grouse Core Area and specific Sage Grouse Leaks. Based on the answers provided in this document, guidance in the Notice to Proceed Letter will be given regarding project construction timing.

Project Changes After Funding Award

It is common with all types of construction for unexpected things to happen while working on a project. Small Water Projects are no exception. Therefore, it is important for project sponsors to stay in touch

with the Office when changes are necessary to ensure that there are no problems with payments upon completion. Sponsors should either call or email the office before committing to any changes that might affect funding. The Office will document the change and provide a written approval for the sponsor's records.

The exception to this would be if the changes were significant enough to bring the project outside of the description originally provided to the Commission in the Recommendation when the initial application was approved. In that case, approval for a proposed change might have to wait until approval could be obtained at an upcoming Commission Meeting.

Bid Process

Program criteria require that construction contractors be selected using a competitive bid process. Sponsors should establish a procedure with their boards that is fair, open, and well documented. Records should be kept for the bid process on each project so they are available if they are requested by the Commission.

Certification of Completed Project

Program criteria require that the project engineer certify the project is functioning in the manner intended and providing a beneficial use of water before funds can be disbursed. In practice, this is sometimes difficult for project sponsors, so the Office also accepts a letter of inspection from a federal agency stating they have inspected the project and it is functioning in the manner intended and providing a beneficial use of water. Inspections by the project sponsor are not an acceptable substitute for the letter from a federal agency or for signed as-built plans from the Engineer.

Project Timeline

New Projects will expire on December 31st approximately 2 ½ years following the signatures on the project agreement. The bullets below give an overview of project deliverables and timelines:

- 1) Applications are due by November 15th. Project funding is awarded at the March Commission and Select Water Committee meetings the following spring.
- 2) Immediately following the project approval, agreements are sent to the Sponsors for signature by the respective district board.
- 3) After the sponsor signs the Project Agreement, all copies are sent back to the Office for additional processing. At this time the sponsor may begin to acquire permits, final designs, specifications, access letters (if necessary), before photos, and any other documentation required for construction.
- 4) When the documentation addressed in the previous item is complete, the project sponsor should assemble the required documentation along with signed copies of the Project Sponsor and Sage Grouse Checklists, available from the Small Water Website, and send to the Small Water Projects Program Manager (Jodie.Pavlica@wyo.gov) for review.
- 5) After the previous documents have been reviewed, the Office will provide any questions or comments to the sponsor via email. Once the Project Sponsor satisfactorily addresses the questions/comments, a Notice to Proceed Letter will be issued. This letter authorizes the project sponsor to begin construction. **If construction begins before the date on the Notice to Proceed Letter, then according to the program criteria it is ineligible for program funding.**
 - a) Project sponsors may, however, with acceptable documentation, purchase off the shelf materials (such as pipe and troughs) in advance of the notice to proceed letter, as long as they

are willing to accept the risk that if the plans are changed by the final plan review and the purchased materials are not longer required, they are solely responsible for those costs. This exception does not include the construction of custom items such as diversion boxes that are sized specifically for the project in the final plans.

- 6) Once the Sponsor receives their Notice to Proceed Letter, construction may begin. Project criteria require the selection of a construction contractor through a competitive bid process. The project sponsor is responsible for establishing the process through which Contractors are selected, and for maintaining a record of the bid process should the Office request a copy of the records.
- 7) After completion of project construction, the project sponsor will need to prepare a payment request for reimbursement of expenses. It is important that project sponsors keep very close track of project invoices as payment can only be made based on itemized invoices. Similarly, an "Affidavit of Publication" should be provided to document final settlement and the completion of the 41-day advertising period if the project Sponsor determines the project to be a "public work" as defined in W.S. 16-6-101 (a)(ix).
- 8) After receipt of the complete payment request package, the Office will review the documents provided by the project sponsor and provide any comments. Once the questions/comments are addressed then project funds are released to the project sponsor. Project sponsors are paid for 50% of invoiced eligible expenses up to \$35,000 not to exceed the approved grant amount. Remaining grant funds will revert to the small water program accounts for use on other projects. Program legislation allows for progress payments to be made throughout the project, but program criteria limit these types of payments to components that are providing beneficial use of water. In practice, most project sponsors prefer one payment request at the end of the project.

Chapter 5 Payments & Funding

Eligible Expenses

Small Water Program funds may be used for design, permit procurement, project land procurement, construction engineering, project materials, and invoiced contractor expenses.

In kind expenses, such as labor and materials are also eligible for reimbursement as long as they were purchased specifically for the project as documented by invoices. All invoices/receipts will be reviewed for ineligible items such as tools, extended warranties, personal items, portable generators, fuel, and fencing beyond that which is necessary for protection of the installed infrastructure. In kind invoices will also be reviewed for mileage and hourly labor rates. The Office understands that these rates will vary across the state, so no preapproved mileage and labor rates are provided. However, the sponsor will need to document the rates used should there be a need to review their reasonableness.

Required Documentation

Program Criteria lists several items that are required of each small water project. In addition to the items in the Criteria, the office also has a few items that that are required before final payment can be made. The required submittals are listed below.

- Operation and Maintenance Plan
- Certified Pay Request from Sponsor
- Contractor Invoices signed by the Project Sponsor
- Before & After Photos
- Latitude & Longitude Coordinates
- Affidavit of Publication of Final Settlement if the project is determined to be a “public work” by the project sponsor.
- Final As-Built Drawings, or a Letter of Certification that the project is providing beneficial use and functioning in the manner intended from a Federal Agency
- Finalized SEO Paperwork for Wells

Many of these items are required before notice to proceed is issued. However, because of their importance, a review of the file will be conducted before final payment is made to make sure that they are present.

Key Dates for Payment

Regarding the final payment, there are two key dates that the project sponsor needs to be aware of. The first is the date that Notice to Proceed was issued. **Construction activities that occur before the date Notice to Proceed was issued are not eligible for program funds.** All invoices that are submitted for reimbursement will be compared to the date that Notice to Proceed was issued, for eligibility.

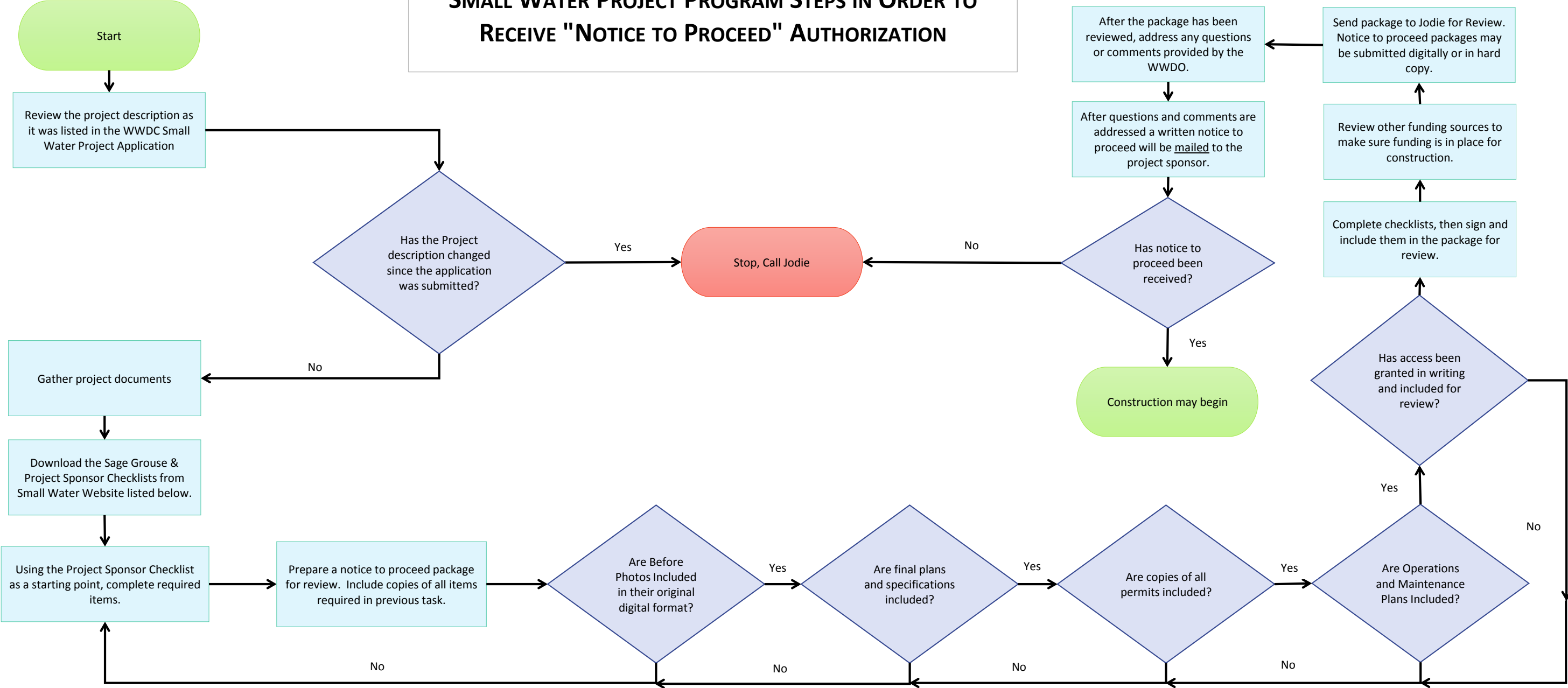
The second date that is important for each project is the expiration date listed in the Project Agreement. Project expiration dates are always set for December 31st, so working back from that date the following schedule is set for project sponsors who are finishing their projects in the final year of the agreement.

- Final payment requests need to be turned into the Office by December 1st so there is time for review and corrections, if necessary, before the expiration date at the end of the month.

- For those projects where the project sponsor determines the small water project meets the definition of a public work as defined in W.S. 16-6-101(ix), an affidavit of publication documenting the final settlement will be required. An affidavit of publication will be issued at the conclusion of the 41-day advertising period described in W.S. 16-6-116. To ensure that the advertising period is completed by December 1st, construction should be finalized in early October.

Utilizing the above dates as a starting point, a letter is sent to all project sponsors with expiring projects in May. The letter lists the projects that are expiring and the dates listed above for their reference when discussing project completion schedules with landowners and contractors.

SMALL WATER PROJECT PROGRAM STEPS IN ORDER TO RECEIVE "NOTICE TO PROCEED" AUTHORIZATION



Small Water Project Program Contact Information

Jodie Pavlica
 Small Water Project Program Manager
 6920 Yellowtail Rd
 Cheyenne, WY 82002

 (307)777-7626
 Jodie.Pavlica@wyo.gov



http://wwdc.state.wy.us/small_water_projects/small_water_project.html

Operating Criteria of the Small Water Project Program of the Wyoming Water Development Program

A. Introduction:

The purpose of the Small Water Project Program (SWPP) is to participate with land management agencies and sponsoring entities in providing incentives for improving watershed condition and function. Projects eligible for SWPP grant funding assistance include the construction or rehabilitation of small reservoirs, wells, pipelines and conveyance facilities, springs, solar platforms, irrigation works, windmills and wetland developments. Projects should improve watershed condition and function and provide benefit for wildlife, livestock and the environment. Projects may provide improved water quality, riparian habitat, habitat for fish and wildlife and address environmental concerns by providing water supplies to support plant and animal species or serve to improve natural resource conditions.

These criteria provide the Wyoming Water Development Commission (WWDC) and the Wyoming Water Development Office (WWDO) with general standards for evaluating and prioritizing applications for funding from the SWPP. In addition, the criteria serve as a tool to coordinate with the public and other state and federal agencies.

B. Legal and Institutional Constraints:

1. Sponsoring Entity: Pursuant to W.S. 99-3-1903(k)(i) and W.S. 99-3-1904(m)(i)¹, funding is available only to eligible public entities.

2. Eligible public entities are defined by state statute and include, but are not limited to, conservation districts, watershed improvement districts, water conservancy districts, irrigation districts, municipalities, a joint business council of the Eastern Shoshone and Northern Arapaho Indian Tribes, the Business Council of the Eastern Shoshone Indian Tribe, the Business Council of the Northern Arapaho Indian Tribe, or other approved assessment districts formed in accordance with Wyoming law.

3. Project Description: Pursuant to W.S. 99-3-1903(k)(iii) and W.S. 99-3-1904(m)(iii), the SWPP may provide for construction or rehabilitation and replacement of small dams, windmills, spring development, pipelines, etc., to impound, develop and convey water for livestock, wildlife, irrigation, environmental and recreational purposes.

4. Project Funding: Pursuant to W.S. 99-3-1903(k)(vii) and 99-3-1904(m)(vii), a small project is a project where the maximum financial contribution from the commission is thirty-five thousand dollars (\$35,000.00) or less.

C. Small Water Project Program Definitions:

1. Small Reservoir: Small reservoirs may be eligible for funding through the SWPP.

¹ For reference and identification only special statute numbers [appearing in Title “99” of the Wyoming Statutes] have been assigned to selected water projects by the Legislative Service Office.

2. Well: A well may be eligible for funding depending on the depth of the well and scope of the project. Projects that propose to drill into unproven aquifers, as determined by the WWDO, may be eligible for the SWPP at the discretion of the WWDC. Such discretion will be exercised in cases including, but not limited to, cases where the well does not meet the minimum requirements of the project in terms of quality and quantity.

The determination of unproven aquifer status will be clearly communicated by the WWDO prior to the issuance of notice to proceed so the project sponsor may decide to cancel the project before funding is committed. If the sponsor decides to proceed with a well into an unproven aquifer they should be prepared to pay the drilling cost with the understanding that reimbursement for eligible expenses will be contingent upon meeting minimum water quality and quantity requirements.

3. Solar Platforms: Construction of solar platforms may be eligible for funding through the SWPP.

4. Pipelines and Conveyance Facilities: Rehabilitation of existing pipelines or conveyance facilities or construction of new pipelines or conveyance facilities may be eligible for funding through the SWPP.

5. Springs: Improving flows of existing springs and installation of collection facilities associated with springs may be eligible for funding through the SWPP.

6. Wetland Development: Development of wetlands where multiple benefits accrue may be eligible for funding through the SWPP.

7. Environmental: Projects that provide for stream bank stability, water quality improvements, or erosion protection may be eligible for funding through the SWPP.

8. Irrigation: Irrigation projects may be eligible for funding through the SWPP.

9. Windmill: Rehabilitation of existing windmills or construction of new windmills may be eligible for funding through the SWPP.

10. Rural Community Fire Suppression: Supply and storage projects for rural community fire suppression may be considered for funding through the SWPP.

11. Recreational: Projects for recreational purposes may be considered for SWPP funding.

D. Application and Evaluation Process:

1. Small water projects must adequately demonstrate a public benefit. Public benefit may be demonstrated for projects included in WWDC Watershed Studies. Eligible projects may be located on Federal, State, public, or private lands.

2. Applications shall be received by November 15 of each calendar year. Applications meeting criteria requirements will be considered during the regularly scheduled WWDC meeting in March. Applications shall include a project application, detailed project description, description of public benefit, outline of financial and technical contributions, project location map, project cost estimates and any letters of authorization or commitment of participation that may be available from other funding sources.

3. Projects that improve watershed condition and function, provide multiple benefits, and meet the funding criteria specified in W.S. 99-3-1903(k)(vii) or W.S. 99-3-1904(m)(vii), as described in B.4 herein, are eligible for consideration.

4. The sponsoring entity will be required to address the WWDC and provide testimony and other additional supporting evidence that justifies SWPP funding whenever the public benefit documentation, as required in W.S. 99-3-1903(k)(viii)(c) and W.S. 99-3-1904(m)(viii)(c), submitted with the application is deemed to be insufficient by the WWDO.

5. In order to establish priorities for both New Development and Rehabilitation projects, and to utilize available program funds effectively and efficiently, it is necessary to develop priorities. A project's priority will be assigned based on the projects primary purpose, secondary benefits may be considered at the Commission's discretion. Project priorities in order of preference, are defined as follows.

Account I Project Priorities

- (1.) Source Water Development
- (2.) Storage
- (3.) Pipelines, Conveyance Facilities, Solar Platforms, and Windmills
- (4.) Irrigation
- (5.) Environmental
- (6.) Recreational

Account II Project Priorities

- (1.) Diversion structures and Spring Developments
- (2.) Storage
- (3.) Pipelines, Conveyance Facilities, Solar Platforms, and Windmills
- (4.) Irrigation other than the above
- (5.) Environmental
- (6.) Recreational

6. Projects that have completed the following requirements prior to application will be classified as "Shovel Ready", and may be considered as a funding priority at the Commission's discretion.

- Permit procurement
- State and Federal agency notifications
- Land procurement, right of way, or easement acquisition

- Have finalized all other financial agreements

To establish completion of the above listed requirements, the project applicant may be asked to submit additional documentation as determined by the Commission at the time of application.

7. In the case of limited funding for this program the WWDC will prioritize the applications according to project priority.

8. The Commission may take into consideration a Sponsor's existing back log of previously funded projects that are not completed, when awarding grants for new projects.

E. Project Development:

1. The sponsoring entity shall adhere to appropriate design standards for small water projects. Plans may be provided by the NRCS, an appropriate land management agency or a registered Professional Engineer and/or registered Professional Geologist.

2. Project water rights shall be in good standing with the State of Wyoming prior to construction of the project.

3. If the sponsoring entity initiates the construction process without prior written notification by the Commission, the sponsoring entity shall bear all costs resulting from said action.

F. Program Expenditures:

1. Project Description: Projects that develop unused and/or unappropriated water will be considered SWPP New Development Projects and will be funded from SWPP Account I, which is funded by appropriations from Water Development Account I [W.S. 41-2-124(a)(i)]. Projects that improve completed water projects, decrease operation and maintenance costs, and/or improve efficiency of use of existing water supplies will be considered SWPP Rehabilitation Projects and will be funded from SWPP Account II, which is funded by appropriations from Water Development Account II [W.S. 41-2-124(a)(ii)].

2. Project Funding: W.S. 99-3-1903(k)(vii) and W.S. 99-3-1904(m)(vii) as described in B.4 herein, establish the funding limitations for the SWPP.

3. Activities eligible for SWPP funding include design, permit procurement, project land procurement, construction engineering (design and construction inspections), project materials and invoiced contractor expenses. In-kind contributions are only eligible for installation of project materials that were purchased specifically for the project as documented by invoices.

4. Required permits and clearances shall be obtained prior to construction of the project. Copies of the final permits and clearances must be submitted to the WWDO before the WWDO will issue the notice to proceed for construction. WWDC funds may be used as necessary to secure the technical assistance required to complete permitting activities before construction commences.

5. The sponsoring entity shall provide the WWDO an operation and maintenance plan for the estimated life of the project.

6. SWPP funds shall not be used to refinance projects that have already been completed. SWPP funds shall not be used to augment the operating budget of a sponsor or any other entity. Maintenance costs, as determined by the WWDO, are not eligible expenditures under the SWPP. SWPP funding is limited to a one-time construction of a new project or a single rehabilitation of an existing project.

7. A Project Agreement between the WWDC and the sponsoring entity, which documents the roles and responsibilities of the project participants, must be finalized prior to expenditure of SWPP funds. Changes, modifications, revisions or amendments to the Project Agreement may be granted by the WWDC.

8. Construction contractors shall be selected using a competitive bid process.

9. Upon project completion, WWDC funds will be disbursed when a certified bill is received from the sponsoring entity including statement of completion, before and after photographs, project longitude/latitude coordinates and an affidavit of publication documenting final settlement as required under W.S. 16-6-116 if the Sponsor determines the Project meets the definition of a "public work" as defined in W.S. 16-6-101(ix).

10. If the sponsoring entity submits a certified bill, WWDC funds can be disbursed for a component of a project upon receipt of a certification by the project engineer that the component provides a beneficial use and functions in the manner intended. Retainage on the cost of the component may be held until conditions described in F.9 are met.

11. Upon receipt of WWDC funds, the sponsoring entity shall promptly pay outstanding obligations.

12. Unexpended funds allocated under the Project Agreement will revert to SWPP Account I or SWPP Account II, as appropriate, upon the expiration date of the Project Agreement. Expiration dates may be extended in writing by the WWDC.



THE STATE OF WYOMING

Water Development Commission

6920 YELLOWTAIL ROAD TELEPHONE: (307) 777-7626 CHEYENNE, WY 82002



2022 WATER DEVELOPMENT PROGRAM APPLICATION

SMALL WATER PROJECT PROGRAM

The purpose of the Small Water Project Program (SWPP) is to participate with land management agencies and sponsoring entities in providing incentives for improving watershed condition and function. Projects eligible for grant funding assistance include the construction or rehabilitation of small reservoirs, wells, pipelines and conveyance facilities, springs, solar platforms, irrigation works, windmills, wetland developments, environmental (as defined in the Criteria), rural community fire suppression, and recreational. Projects should improve watershed condition and function, and provide benefit for wildlife, livestock and the environment. Projects must also benefit the public. Public benefits may be provided from improved:

- Water quality
- Riparian habitat
- Water supplies to support plant and animal species
- Habitat for fish and wildlife
- Natural resource conditions

Refer to the operating criteria of the SWPP which provides the Wyoming Water Development Commission (WWDC) and the Wyoming Water Development Office (WWDO) with general standards for evaluating and prioritizing applications for funding from the SWPP:

http://wwdc.state.wy.us/small_water_projects/SWPPopCriteria.html

Applications to this program must be received by November 15 of each calendar year. Applications meeting criteria requirements will be considered during the regularly scheduled WWDC meeting in March.

APPLICATION

1. Project Name

2. Applicant – Name of Entity

3. Phone

4. Date

5. Physical Address (Street Address)

6. City

7. County

8. State

9. Zip Code

10. Mailing Address (If Different From Above)

11. Primary Contact Person (Type or Print Name)

12. Phone

13. Email

14. Authorized Official (Type or Print Name)

15. Signature of Authorized Official

16. Date

**By signing the above the sponsor understands and agrees with the conditions set forth in the operating criteria of the Small Water Project Program.*

If the application was prepared by someone other than the contact person, please provide the following:

17. Name

18. Affiliation

19. Phone

20. Email

24. Public Benefit

Wyoming statute 99-3-1903(k)(viii)(c) and 99-3-1904(m)(viii)(c) requires all Small Water Project Sponsors to substantiate the public benefit that is to be derived from the proposed project. Please provide all information necessary to accurately document public benefit from the proposed project. Additional information may be attached as necessary.

25. Project Participants

Please list all project participants (e. g.: District, NRCS, WWNRT, BLM, Landowner, etc.), and their type of participation (e.g.: technical, financial, project oversight, etc.).

26. Who is the owner of the project? _____

27. Who owns the land on which the project is to be built? _____

28. How many acres will benefit from this project? _____

29. What is the total estimated project cost? _____

30. Was the project specifically identified in a WWDC Watershed Study? Yes No
If yes, what was the name of the study? _____

31. Project Readiness

Projects that have completed the following requirements prior to application may request a “Shovel-Ready” designation and may be considered as a funding priority at the Commission’s discretion:

- Project designs and specifications
- Permit procurement
- State and federal agency notifications
- Land procurement, right of way, or easement acquisition
- Have finalized all other financial agreements

31a. Is the project seeking “Shovel-Ready” Status? Yes No

If No, then please continue to question # 32. The Project Sponsor Checklists described in question #31b are not required at this time if you are not seeking a shovel ready designation.

31b. If yes, please complete and attach the Project Sponsor Checklist, Well Evaluation, and Hydrologic Evaluation forms that are available at the following website:

http://wwdc.state.wy.us/small_water_projects/small_water_project.html

Additionally, please list all supporting documentation for a Shovel-Ready designation that is being attached. (If the Sponsor is not seeking a Shovel-Ready designation, this section may be left blank.)

32. Sage Grouse

Is the project located in a Sage Grouse Core Area or within ¼ mile from an active lek? Yes No

33. Project Location Map

A project location map is required for application consideration. Please attach a project location map to this application and submit both documents on or before November 15th.