FUTURE FISHERIES IMPROVEMENT PROGRAM GRANT APPLICATION

All sections must be addressed, or the application will be considered invalid

I. APPLICANT INFORMATION

A. Applicant Name: Big Blackfoot Chapter of Trout Unlimited-Ryen Neudecker

Mailing Address: PO Box 1

City: Ovando State: MT Zip: 59854

Telephone: 406-240-4824 E-mail: ryen@montanatu.org

B. Contact Person (if different than applicant): See above

Address:

City: State: Zip:

Telephone: E-mail:

C. Landowner and/or Lessee Name (if different than applicant): Wil & Johnna Sutton

Mailing Address: PO Box 902

City: Bonner State: MT Zip: 59823

Telephone: 406-544-7866 E-mail: willysdisc@yahoo.com

II. PROJECT INFORMATION

A. Project Name: Johnson Creek Fish Screen Project

River, stream, or lake: Johnson Creek

Location: Township: 13N Range: 18W Section: 11

Latitude: 46.892395 Longitude: -113.844045 *within project (decimal degrees)*

County: Powell

B. Purpose of Project:

The purpose of this project is to upgrade an existing unregulated irrigation diversion on Johnson Creek with a fish screen to eliminate trout entrainment, conserve water and improve fish passage. The project will benefit pure westslope cutthroat trout, a species of special concern, as well as rainbow trout and brown trout.

C. Brief Project Description (attach additional information to end of application):

Johnson Creek is a second-order tributary to the lower Blackfoot River, entering near river mile three and provides important thermal refugia to the river with water temperatures not exceeding 58 degrees in August. Johnson Creek flows primarily through USFS land (>99%) before transitioning to a small area of private land near its mouth and supports populations of pure westslope cutthroat, rainbow and brown trout. The stream was part of an FWP/TU fluvial trout population spawning and movement study in 2020 and a weir trap at the mouth of Johnson Creek captured a trout from the middle Clark Fork near Thompson Falls showing the connection between the Clark Fork River and Blackfoot River. Several culvert removal/upgrade projects have been completed in the drainage to improve fish passage and reduce sediment sources. The only other known remaining issue impacting Johnson Creek is an unscreened, unregulated diversion near stream-mile 0.5 that has been entraining trout. The system does not have a headgate, preventing flow regulation and creating water use inefficiencies. Johnson Creek is an important spawning area for migratory trout and the ditch location is directly downstream from the spawning areas. The point of diversion is located on the outside bend of a meander and continues to scour, further increasing entrainment probability.

This project will install a Zinvent fish screen along with a headgate and valve at the existing point of diversion. To improve water conveyance, a pipeline will also be installed to transport diverted flows ~1,600 feet down the ditch.

The goal of this project involves working with the private landowner and USFS on upgrading the diversion point with a fish screen and headgate to 1) improve fish passage, 2) prevent entrainment, and 3) regulate flows for water conservation benefits. This project will benefit trout within Johnson Creek and improve trout recruitment and cold-water input to the lower Blackfoot River in a section that receives high amounts of angling pressure.

D. Length of stream or size of lake that will be treated (project extent): 50 feet

Length/size of impact, if larger than project extent (e.g. stream miles opened): 1-mile

E. Project Budget:

Grant Request (Dollars):	**$**	**7,750**
Matching Dollars:	**$**	**19,350**
Matching In-Kind Services:*	**$**	**3,980.70**
**salaries of government employees are not considered matching contributions*		
Other Contributions (not part of this app)	**$**	
Total Project Cost:	**$**	**31,080.70**

F. **Attach** itemized (line item) budget – *see budget template*

G. **Insert** or **attach** a project location map showing the project area in relation to a major landmark or town. Please indicate if the project location is on public or private property.

H. **Attach** specific project plans (e.g. detailed sketches, plan views [showing location and type of channel modifications], example photographs), current condition photographs, and maps. **If project involves water leasing or water salvage complete and attach a supplemental questionnaire (fwp.mt.gov/habitat/futurefisheries/supplement2.doc).*

I. **Attach** letters or statements of support. This includes landowner consent, community or public support, and fish biologist support.

J The project agreement includes a 20-year maintenance commitment. Please indicate (yes or no) that you will ensure project protection for 20 years. Discuss your ability to meet this commitment.

Yes [x] No [ ]

The landowner will sign a 20-year maintenance commitment agreement.

K. **Describe** or **attach** land management & maintenance plans, including changing to grazing regimes, that will ensure protection of the restored area.

The screen will be used to deliver water from Johnson Creek into the existing ditch.

III. PROJECT BENEFITS (attach additional information to end of application):

A. What species of fish will benefit from this project?

Westslope cutthroat trout, rainbow trout, and brown trout.

B. How will the project protect or enhance wild fish habitat?

Screening irrigation diversions is an important strategy in our efforts to conserve and restore native trout populations in the Blackfoot River watershed. Additional cold-water input will be delivered to the lower Blackfoot River by installing a headgate to allow for ditch flow regulation.

C. Will the project improve fish populations and/or fishing? To what extent? What are the expected short term and long term benefits to the fishery?

Yes, by eliminating a source of entrainment, which will protect wild trout recruitment to the Blackfoot River fishery. The Blackfoot River is a popular angling destination with over 65,000 angler days per year. Moreover, the additional cold-water input to the Blackfoot River is beneficial to the mainstem fishery and native trout have been documented using this plume for thermal refugia.

D. Will the project increase public fishing opportunity for wild fish and, if so, how?

Yes, by upgrading this existing irrigation diversion that is entraining trout, recruitment should improve in a highly popular reach of the Blackfoot River for anglers. Several tagged trout from Johnson Creek were caught by anglers in the Blackfoot River and Clark Fork River, highlighting the benefits of protecting post-spawn migratory trout and offspring from entrainment when out-migrating.

E. What was the cause of habitat degradation in the area of this project and how will the project correct the cause?

Entrainment of wild trout through the existing irrigation diversion will be addressed by upgrading the diversion with a headgate and fish screen.

F. What public benefits will be realized from this project?

This project advances the overall Blackfoot River Restoration program, in this case by benefiting native trout conservation, wild trout fishery enhancement and irrigation infrastructure upgrades that are fish-friendly. Specific public benefits include: 1) expanding suitable habitat and fish passage conditions for westslope cutthroat trout and 2) eliminating a limiting factor for trout populations and 3) conserving instream flows and contributing cold water to the lower Blackfoot River.

G. Will the project interfere with water or property rights of adjacent landowners? (explain):

No. The new screen will be designed to meet the water rights of the diversion site. The USFS also has a water right on this ditch and is in the process of converting their water to instream flows.

H. Will the project result in the development of commercial recreational use on the site? (explain):

No.

I. Is this project associated with the reclamation of past mining activity?

No.

Each approved project applicant must enter into a written agreement with Montana Fish, Wildlife & Parks specifying terms and duration of the project. The applicant must obtain all applicable permits prior to project construction. A competitive bid process must be followed when using State funds.

IV. AUTHORIZING STATEMENT

I (we) hereby declare that the information and all statements to this application are true, complete, and accurate to the best of my (our) knowledge and that the project or activity complies with rules of the Future Fisheries Improvement Program.

Applicant Signature: Ryer Nendecker Date: November 8, 2021

Sponsor (if applicable): _____

Submittal: **Applications must be signed and received on or before November 15 and May 15 to be considered for the subsequent funding period**. Late or incomplete applications will be rejected.

Mail to:	FWP Future Fisheries Fish Habitat Bureau PO Box 200701 Helena, MT 59620-0701	Email:	Future Fisheries Coordinator FWPFFIP@mt.gov (electronic submissions must be signed) For files over 10MB, use https://transfer.mt.gov and send to mmcgree@mt.gov

Applications may be rejected if this form is modified.

BUDGET TEMPLATE SHEET FOR FUTURE FISHERIES PROGRAM APPLICATIONS Johnson Creek fish screen 006-2022

Both tables must be completed or the application will be returned

PROJECT COSTS					CONTRIBUTIONS			
WORK ITEMS (Itemize by Category)	**NUMBER OF UNITS**	**UNIT DESCRIPTION***	**COST/UNIT**	**TOTAL COST**	**FUTURE FISHERIES REQUEST**	**MATCH (Cash or Services)****	**OTHER (Not part of this application)**	**TOTAL**
Personnel* **								
Survey	10	Hrs	$100.00	$ 1,000.00		1,000.00		$ 1,000.00
Design	20	Hrs	$100.00	$ 2,000.00		2,000.00		$ 2,000.00
Engineering	20	Hrs	$100.00	$ 2,000.00		2,000.00		$ 2,000.00
Permitting	20	Hrs	$45.00	$ 900.00		900.00		$ 900.00
Oversight	10	Hrs	$100.00	$ 1,000.00		1,000.00		$ 1,000.00
Project Mgmt	62	Hrs	$45.00	$ 2,790.00		2,790.00		$ 2,790.00
			Sub-Total	$ 9,690.00	$ -	$ 9,690.00	$ -	$ 9,690.00
Travel								
Mileage	510	miles	$0.57	$ 290.70		290.70		$ 290.70
Per diem				$ -				$ -
			Sub-Total	$ 290.70	$ -	$ 290.70	$ -	$ 290.70
Construction Materials****								
Fish Screen	1	LS	$1,500.00	$ 1,500.00	750.00	750.00		$ 1,500.00
Headgate	1	LS	$2,500.00	$ 2,500.00	1,000.00	1,500.00		$ 2,500.00
Valve	2	LS	$800.00	$ 1,600.00		1,600.00		$ 1,600.00
PVC pipe	1600	LF	$4.50	$ 7,200.00	3,000.00	4,200.00		$ 7,200.00
				$ -				$ -
			Sub-Total	$ 12,800.00	$ 4,750.00	$ 8,050.00	$ -	$ 12,800.00
Equipment, Labor, and Mobilization								
Excavator	40	hrs	$150.00	$ 6,000.00	3,000.00	3,000.00		$ 6,000.00
Labor	40	hrs	$45.00	$ 1,800.00		1,800.00		$ 1,800.00
Mob	1	LS	$500.00	$ 500.00		500.00		$ 500.00
			Sub-Total	$ 8,300.00	$ 3,000.00	$ 5,300.00	$ -	$ 8,300.00
			TOTALS	$ 31,080.70	$ 7,750.00	$ 23,330.70	$ -	$ 31,080.70

OTHER REQUIREMENTS:

All of the columns in the budget table and the matching contribution table MUST be completed appropriately or the application will be invalid. Please see the example budget sheet for additional clarification.

*Units = feet, hours, inches, etc. Do not use lump sum unless there is no other way to describe the costs.

**Can include in-kind materials. Justification for in-kind labor (e.g. hourly rates used). Do not use government salaries as match. Describe here or in text.

***The Review Panel suggests that design and oversight costs associated with a proposed project not exceed 15% of the total project budget. If design and oversight costs are in excess of 15%, applications must include a justification or minimum of two competitive bids for the cost of undertaking the project.

****The Review Panel recommends a maximum fencing cost of $1.50 per foot. Additional costs may be the responsibility of the applicant and/or partners.

Additional details:

APPLICATION MATCHING CONTRIBUTIONS

(do not include requested funds or contributions not associated with the application)

CONTRIBUTOR	IN-KIND	CASH	TOTAL	Secured? (Y/N)
USFWS	$ -	$ 14,350.00	$ 14,350.00	Yes
Montana Trout Unlimited		$ 5,000.00	$ 5,000.00	Yes
BBCTU	$ 3,980.70		$ 3,980.70	Yes
TOTALS	$ 3,980.70	$ 19,350.00	$ 23,330.70	

OTHER CONTRIBUTIONS

(contributions not associated with the application)

CONTRIBUTOR	IN-KIND	CASH	TOTAL	Secured? (Y/N)
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
TOTALS	$ -	$ -	$ -	

Photo 1: Standing in Johnson Creek looking downstream towards the Hammond Ditch inlet. Note the lack of check structure and headgate.

Photo 2: Standing in ditch looking upstream

FWP.MT.GOV

THE **OUTSIDE** IS IN US ALL.

Montana Fish, Wildlife and Parks
Region 2 Headquarters
3201 Spurgin Road
Missoula, MT 59804

November 5, 2021

Montana Fish, Wildlife and Parks
Attn: Michelle McGree
1420 East 6th Ave.
Helena, MT 59620

Dear Future Fisheries Panel:

I am writing in support of the Johnson Creek fish screen application submitted by the Big Blackfoot Chapter of Trout Unlimited. Johnson Creek has significant native species and sport fishery values. A restoration project in 1997 replaced impassable culverts with a bridge directly downstream from this location. Furthermore, all former industrial timberlands in the drainage were acquired by the Lolo National Forest where they subsequently made management improvements, including culvert removals and road crossing upgrades. Over 99% of the drainage is now in public ownership, providing immense public benefits and angling opportunity. This unscreened and unregulated irrigation ditch is the last major issue remaining in Johnson Creek.

A research investigation in 2020 documented a significant spawning run of migratory trout using Johnson Creek, revealing its importance as a production area. Moreover, several tagged fish from Johnson Creek were caught by anglers in the lower Blackfoot River and in the Clark Fork River upstream and downstream of the Blackfoot confluence, highlighting this tributary's contribution to the popular Missoula Area Fishery. Furthermore, a rainbow trout tagged in the Thompson Falls Dam fish ladder was captured in Johnson Creek, elucidating the connection between the Blackfoot River and lower Clark Fork drainage. This unique life history demonstrates the broad-reaching benefits of working in this tributary. Water temperatures at the mouth of Johnson Creek reached a maximum of 57.4°F during August 2020, indicating Johnson Creek is among the coldest tributary inputs to the lower Blackfoot River.

This cost-effective project will provide a great return on investment given the direct fishery benefits. This project will facilitate increased recruitment of trout to the Missoula Area Fishery and provide additional cold-water input to the lower Blackfoot River. Thank you very much for consideration of this funding request.

Sincerely,

Randy Arnold
Regional Supervisor

RDG
RIVER DESIGN GROUP

Date: October 12, 2021

To: Ryen Neudecker
Big Blackfoot Chapter of Trout Unlimited

From: Chris Nelson, P.E.
River Design Group, Inc.

Subject: Preliminary Design for Hammond Ditch Fish Screen

This memo summarizes work completed to date to develop a preliminary design for the Hammond Ditch Fish Screen Project. Water rights data were reviewed and concept level designs for diversion fish screens were developed. Three fish screen alternatives were analyzed that use different approaches to meet screening criteria. Preliminary designs and cost opinions were prepared for each alternative.

The Hammond Ditch is located on Johnson Gulch Creek, a tributary to the Blackfoot River approximately 2 miles north of Bonner, MT. The existing diversion is comprised of an open ditch on the right bank of a Johnson Gulch Creek. There is no headgate or other means of controlling flow into the ditch, so the ditch flows year-round. The diversion has been entraining trout for many years. Johnson Gulch Creek is an important westslope cutthroat tributary in the lower Blackfoot River. Fish surveys show that trout travel all the way up the Clark Fork River from Thompson Falls to use this tributary.

The goals of this project are to prevent entrainment, conserve water and ensure the landowner can divert flows that are used to fill ponds on his property. Specific objectives include:

- Prevent entrainment by installing a fish screen that requires minimal maintenance;
- Maintain or improve diversion system efficiency;
- Control flow into the ditch; and,
- Minimize future ditch maintenance.

Water rights are listed by priority date in Table 1 and summarized by diversion type in Table 2. Table 2 does not include the USDA Forest Service water right of 170 cfs as it is anticipated that it will be converted to an instream flow water right.

Table 1. Hammond Ditch Water Rights by Priority Date

WR #	Priority Date	Type	OWNER	Flow (GPM)	Area (Ac.)
76F 116426 00*	1/1/1961	HEADGATE	USDA FOREST SERVICE	170	10
76F 104956 00	7/31/1963	HEADGATE	SUTTON JOHNNA K	34	2
76F 214564 00	6/30/1973	PUMP	CAMBRIDGE LINDA M	50	8
76F 39117 00	12/3/1981	PIPELINE	SUTTON JOHNNA K	60	4

* In process of conversion to instream flow

Table 2. Water Rights by Type

Type	(GPM)	(CFS)
HEADGATE	34	0.08
PUMP	50	0.11
PIPELINE	60	0.13
TOTAL	**144**	**0.32**

RDG developed three alternatives to provide screens to meet project objectives (see attached map). The first alternative would be to install a gravity-fed or pumped screen at the existing point of diversion. The second alternative would be to install a pumped screen near the ponds. Several screen types could be used in each of the alternatives. Screens considered include a bank-mounted vertical panel screen, the Corrugated Water Screen, and the Zinvent screen (Figure 1). Screen pros and cons are compared in Table 3. Preliminary design profiles are shown in Figure 2. A plan view layout and detailed cost opinions are attached. Estimated costs are summarized in Table 4.

Figure 1. Examples of bank vault screen (left), Corrugated Water Screen (middle), and bed-mounted Zinvent screen (right).

Table 3-1. Relative comparison of fish screen alternatives.

	Alternative 1a/1b Bed-mounted Zinvent Screen	Alternative 2 Corrugated Water Screen	Alternative 3 Bank Vault Screen
Fish Screening Performance	Excellent (meets NFMS standard)	Excellent (meets NFMS standard)	Excellent (meets NFMS standard)
Approach Velocity	< 0.2 ft/sec	< 0.2 ft/sec	< 0.2 ft/sec
Debris Maintenance	Medium (check daily/weekly – scrub screen as necessary)	Medium (check daily/weekly - remove debris; scrub screen as necessary)	Medium (check daily/weekly - remove accumulated sediment)
Screen Maintenance	Medium (periodically check screen, remove accumulated sediment as required, may be difficult during high flow)	Low (periodically check screen bay, remove sediment with shovel)	Low (periodically check vault, remove sediment with shovel)
Constructability	Easy, ~1 week	Easy, ~1 week	Easy, ~1 week

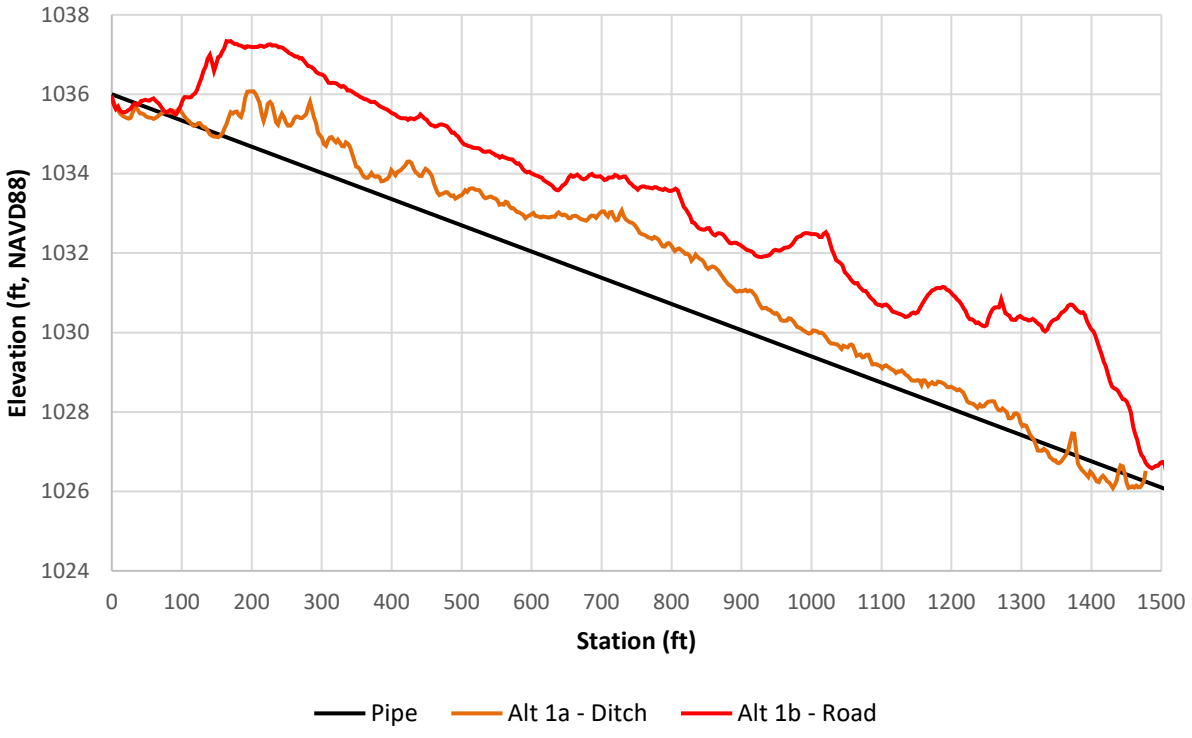


Figure 2. Preliminary design profiles.

Johnson Creek fish screen

006-2022

Alt's 1a & 1b Install Zscreen in constructed run feature; Alt 1d Install vertical screen in bank vault

Existing POD

Alt 1c Install headgate & CWS in ditch w/ fish return pipe

UNITED STATES OF AMERICA

Alt's 1b, 2 & 3 - 6" Smooth-wall Pipe Buried in Road

Alt 1a - 6" Corrugated HDPE Pipe Buried in Ditch

Johnson Gulch Cr. Flow

UNITED STATES OF AMERICA

Route pipe through existing culvert

Existing Ditch Flow

Install v-notch wier for flow measurement

Install flow control at head of west ditch and weir or flume for flow measurement

PRIVATE

Upper Pond

Lower Pond

PRIVATE

Johnson Gulch Creek - Hammond Ditch Preliminary Design Alignments

RDG 2021-10-12

1 inch = 100 feet

Feet

0 50 100 200 300 400

Fish Screen Sizing

Developed by Chris Smith, P.E. - revision 1.1 by Chris Nelson, P.E.

Project: Johnson Gulch Creek
Site: Existing POD
Client: Big Blackfoot Chapter of Trout Unlimited
Description: Passive Screen Sizing for Maximum Water Right
Date: 10/13/21

Diversion Information

Certified Water Right =	**0.32**	**cfs**
	13	**MI**
	144	**GPM**
Design Rate for Screen =	**0.70**	**cfs**
	28	**MI**
	314	**GPM**

Maximum Approach Velocities

Active Screen =	0.4	fps	*NMFS section 11.6.1.1*
Passive Screen =	0.2	fps	*NMFS section 11.6.1.1*

Approach vel. is calculated by dividing the max screened flow amount by the vertical projection of the effective screen area.

Maximum Screen Openings

Screen Open Area =	**50**	%	Min. 27% per		NMFS section 11.7.1.6
Perforated Plate (Circular Screen)=	0.09375	(3/32) in. dia.	*2.30*	mm dia.	NMFS section 11.7.1.1
Slotted Screens =	0.07143	(~1/16) in.	*1.75*	mm	NMFS section 11.7.1.2
Square Screens =	0.09375	(3/32) in.	*2.30*	mm	NMFS section 11.7.1.3

Minimum Effective Screen Area Required

Active Screen Minimum Effective Area =	**1.75**	sq. ft.	*NMFS section 11.6.1.2 (Based on max approach velocity)*
Passive Screen Minimum Effective Area =	**3.50**	sq. ft.	*NMFS section 11.6.1.2 (Based on max approach velocity)*

Passive Screen Design

Length =	7	**ft**	Note: Passive screen design only valid for Q < 3.0 cfs
Height =	1	**ft**	
Nominal Area =	7.00	sq. ft.	
Effective Area =	3.50	sq. ft.	50% Open area slotted screen
Approach Velocity =	0.20	fps	

Definitions:

Approach velocity: For screen design, approach velocity is calculated by dividing the maximum screened flow amount by the vertical projection of the effective screen area. An exception may be made to this definition of approach velocity for screen where a clear egress route minimizes the potential for impingement. If this exception is approved be NMFS, the approach velocity is calculated using the entire effective screen area, and not a vertical projection. For drum screens, submergence must not exceed 85%, nor be less than 65% of drum diameter (NMFS 11.6.1.3).

Sweeping velocity: The vector component of canal flow velocity that is parallel and adjacent to the screen face, measured as close as physically possible to the boundary layer turbulence generated by the screen face. Minimum design sweeping velocity is 2.5 ft/s for screens less than 6 feet (NMFS 11.6.1.7.12). For screens longer than 6 feet must be greater than approach velocity (0.8 ft/s - 3 ft/s recommended).

Effective screen area: The total submerged screen area, excluding major structural members, but including the screen face material. For rotating drum screens, effective screen area consists only of the submerged area projected onto a vertical plane, excluding major structural members, but including screen face material. The minimum effective screen area must be calculated by dividing the maximum screened flow by the allowable approach velocity.

Conveyance Pipe - 6" PVC / Dual Wall HDPE @ 0.67% Avg. Slope

Variables to be Entered			Req'd Full Pipe Size	
Design Flow =	**0.32**	cfs		
c =	**1.49**	dimensionless		
n =	**0.012**	dimensionless		
alternate pipe slope s =	**0.0038**	ft/ft	**5.67**	inches
alternate pipe slope s =	**0.0067**	ft/ft	**5.09**	inches
alternate pipe slope s =	**0.0086**	ft/ft	**4.86**	inches

Pipe Design Selected		
Selected Design Diameter =	**6.0**	inches
c =	**1.49**	dimensionless
n =	**0.012**	dimensionless
Design Slope =	**0.0067**	ft/ft

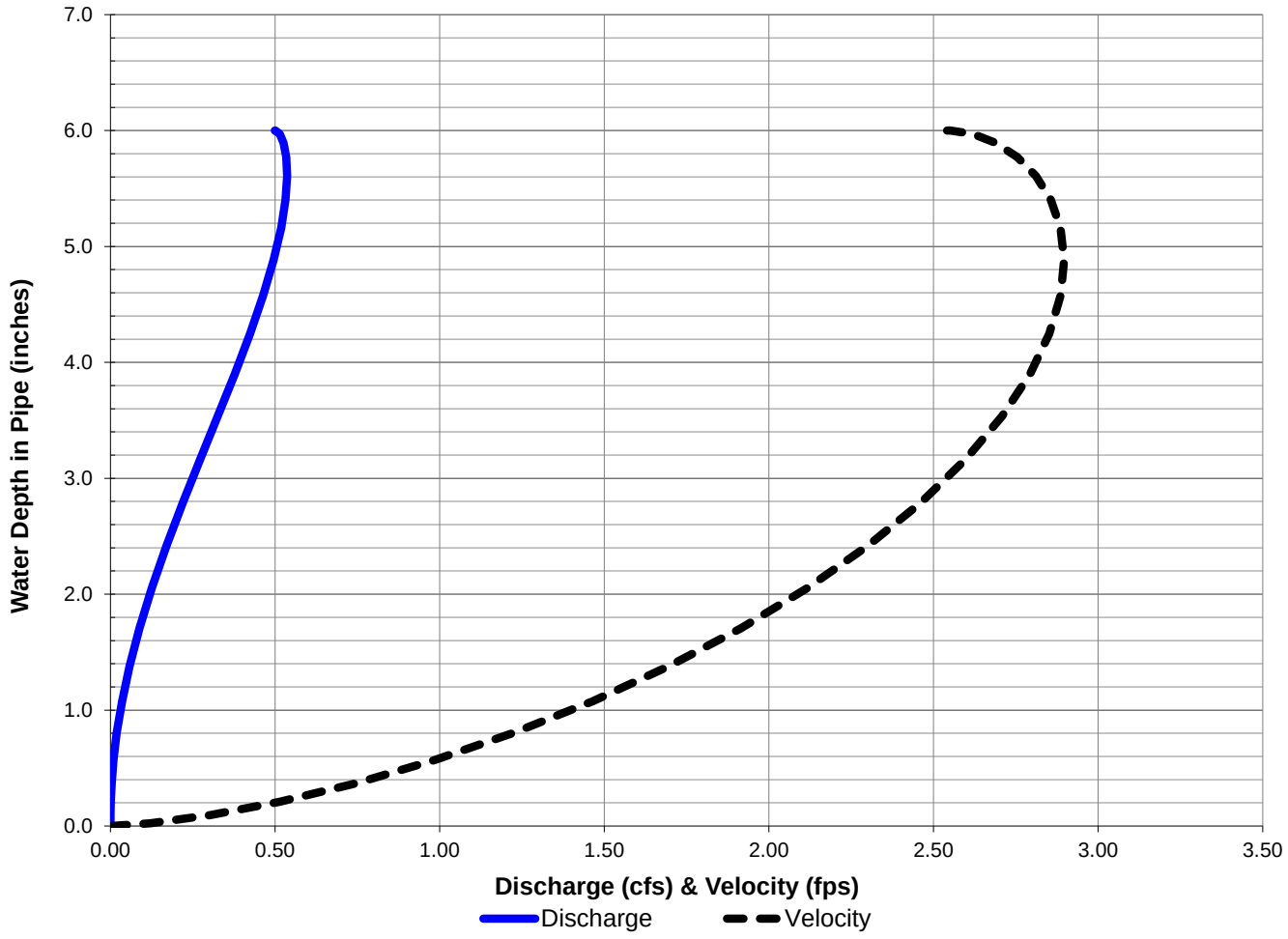
Pipe Flowrate (cfs)	Depth (in.)	Velocity (fps)	h in 10ths of foot
0.1	1.8	2.0	0.2
0.321	3.5	2.7	0.3

Design Based on Manning's Equation:

$$Q = \frac{c}{n} AR^{2/3} \sqrt{s}$$

where
"c" is 1.49 for english units and 1.00 for S. I.
"n" is manning roughness coefficient for particular material
"A" is area of pipe
"R" is hydraulic radius of the pipe
"s" is slope of the pipe

Water Depth vs Discharge & Velocity



River Design Group, Inc.
236 Wisconsin Ave.
Whitefish, MT 59937

Conveyance Pipe - 6" corrugated (single wall) HDPE @ 0.4% Min. Slope

Variables to be Entered			Req'd Full Pipe Size	
Design Flow =	**0.32**	cfs		
c =	**1.49**	dimensionless		
n =	**0.015**	dimensionless		
alternate pipe slope s =	**0.0038**	ft/ft	**6.17**	inches
alternate pipe slope s =	**0.0067**	ft/ft	**5.53**	inches
alternate pipe slope s =	**0.0086**	ft/ft	**5.28**	inches

Pipe Design Selected		
Selected Design Diameter =	**6.0**	inches
c =	**1.49**	dimensionless
n =	**0.015**	dimensionless
Design Slope =	**0.0067**	ft/ft

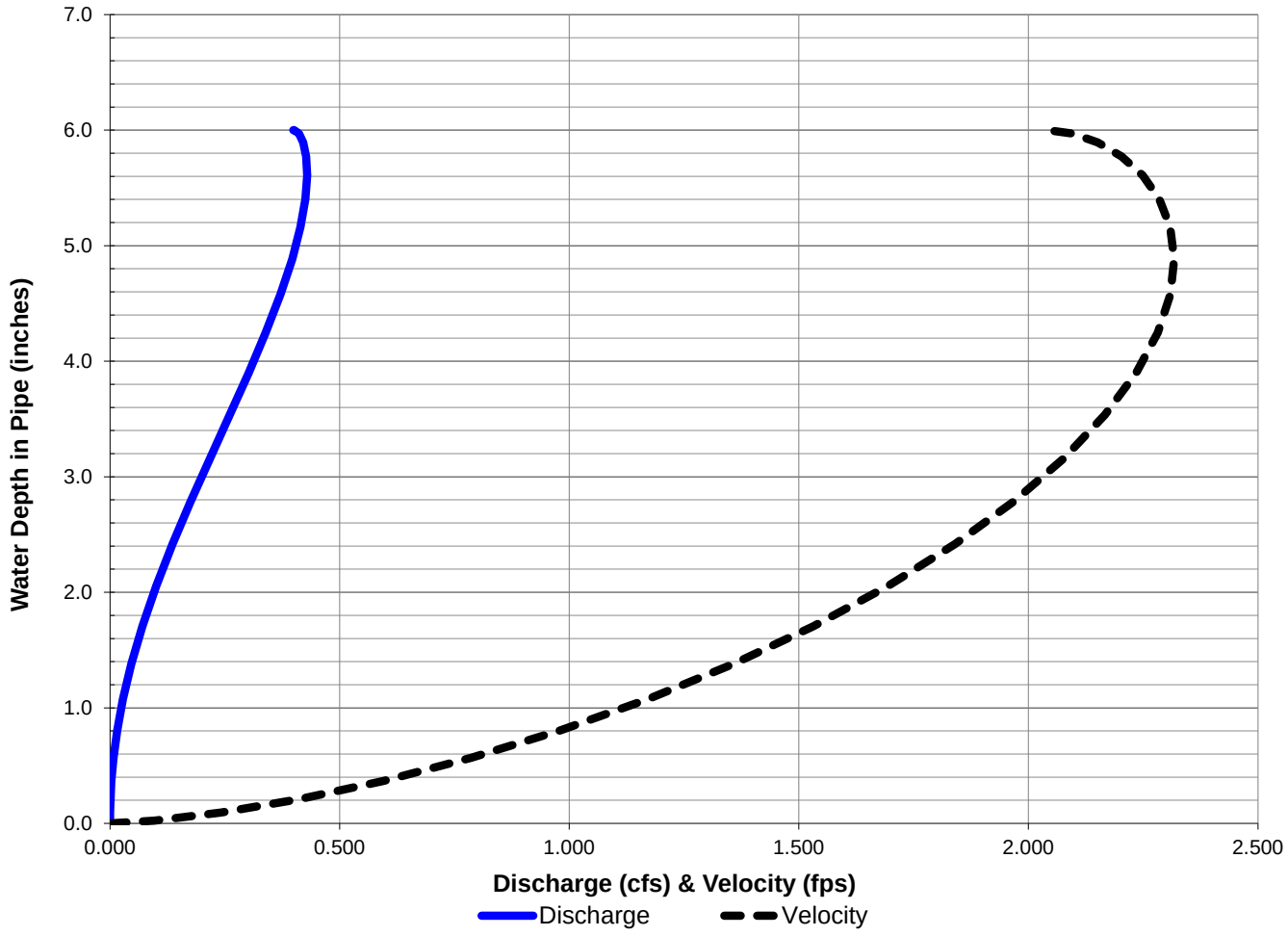
Pipe Flowrate (cfs)	Depth (in.)	Velocity (fps)	th in 10ths of foot
0.1	2.0	1.7	0.2
0.321	4.1	2.3	0.3

Design Based on Manning's Equation:

$$Q = \frac{c}{n} AR^{2/3} \sqrt{s}$$

where
"c" is 1.49 for english units and 1.00 for S. I.
"n" is manning roughness coefficient for particular material
"A" is area of pipe
"R" is hydraulic radius of the pipe
"s" is slope of the pipe

Water Depth vs Discharge & Velocity



River Design Group, Inc.
236 Wisconsin Ave.
Whitefish, MT 59937