Reach S-L2 (Pipeline ROW) Intermittent Spread F Summers County, West Virginia

Data	Included
Photos	\checkmark
SWVM Form	\checkmark
FCI Calculator and HGM Form	\checkmark
RBP Physical Characteristics Form	\checkmark
Water Quality Data	N/A – No flow
RBP Habitat Form*	\checkmark
RBP Benthic Form	\checkmark
Benthic Identification Sheet	N/A –No Flow
Wolman Pebble Count	\checkmark
Reference Reach Software Pebble Count Data	\checkmark
Longitudinal Profile and Cross Sections	\checkmark

*No Flow – Modified RBP.

Spread F Stream S-L2 (Pipeline ROW)



Photo Type: US Edge ROW, US View Location, Orientation, Photographer Initials: Upstream Edge of Right of Way, Upstream View, TF/EW/WP



Photo Type: US Edge ROW, DS View Location, Orientation, Photographer Initials: Upstream Edge of Right of Way, Downstream View, TF/EW/WP



Photo Type: Center ROW, US View Location, Orientation, Photographer Initials: Center Right of Way, Upstream View, TF/EW/WP



Photo Type: Center ROW, DS View Location, Orientation, Photographer Initials: Center of Right of Way, Downstream View, TF/EW/WP

Spread FStream S-L2 (Pipeline ROW)



Photo Type: DS Edge of ROW, US View Location, Orientation, Photographer Initials: Downstream Edge of Right of Way, Upstream View, TF/EW/WP



Photo Type: DS Edge ROW, DS View Location, Orientation, Photographer Initials: Downstream Edge of Right of Way, Downstream View, TF/EW/WP

"Q:\Charleston\2021 Projects\21-0244- MVP- STREAM AND WETLAND CONDITIONS ASSESSMENT AND SURVEY PLAN\002 - Pre-Crossing Monitoring\Spread F\S-L2"

West Virginia Stream and Wetland Valuation Metric (SWVM) Version 2.1, September 2017

USACE FILE NO./ Project Name: MOUNTAIN (v2.1, Sept 2015)			N VALLEY PIPELINE	IMPACT (in Dec	COORDINATES: cimal Degrees)	Lat.	37.671392	Lon.	-80.728311	WEATHER:		
IMPACT STREAM/SITE ID (watershed size {acreage}	AND SITE DES	SCRIPTION: ments)	UNT to Green	brier River (S-L	.2)		MITIGATION STREAM CLAS (watershed size {acr	S./SITE ID AND eage}, unaltered or in	D SITE DESCRIPTION: mpairments)			
STREAM IMPACT LENGTH:	88	FORM OF MITIGATION:	RESTORATION (Levels I-III)	MIT CO (in Dec	DORDINATES: cimal Degrees)	Lat.		Lon.		PRECIPITATION PAST 48 HRS:		
Column No. 1- Impact Existin	g Condition (Det	pit)	Column No. 2- Mitigation Existing (Condition - Base	eline (Credit)		Column No. 3- Mitigatior Post Comple	n Projected at Fivetion (Credit)	ve Years	Column No. 4- Mitigation P Post Completio	ojected at n (Credit)	Ten
Stream Classification:	Intern	nittent	Stream Classification:				Stream Classification:		0	Stream Classification:		
Percent Stream Channel SI	lope	13.3	Percent Stream Channel SI	оре			Percent Stream Channe	l Slope	0	Percent Stream Channel	Slope	
HGM Score (attach d	lata forms):		HGM Score (attach	data forms):			HGM Score (atta	ach data forms)):	HGM Score (attach	data form	s):
Hudrology	0.5	Average	Hudrology		Average		Livdrology		Average	Hudrology	_	
Biogeochemical Cycling Habitat	0.45	0.48	Biogeochemical Cycling Habitat		0		Biogeochemical Cycling		0	Biogeochemical Cycling Habitat	_	
PART I - Physical, Chemical and	Biological Indic	cators	PART I - Physical, Chemical ar	nd Biological Ind	licators		PART I - Physical, Chemica	I and Biological	Indicators	PART I - Physical, Chemical a	nd Biologic	al Ir
	Points Scale Range	Site Score		Points Scale Range	Site Score			Points Scale R	ange Site Score		Points Scale	R
PHYSICAL INDICATOR (Applies to all stream	s classifications)		PHYSICAL INDICATOR (Applies to all streams	classifications)			PHYSICAL INDICATOR (Applies to all stre	ams classifications)	PHYSICAL INDICATOR (Applies to all stream	ams classifica	ations
USEPA RBP (High Gradient Data Sheet)			USEPA RBP (Low Gradient Data Sheet)				USEPA RBP (High Gradient Data Shee	t)		USEPA RBP (High Gradient Data Sheet)	
1. Epifaunal Substrate/Available Cover	0-20		1. Epifaunal Substrate/Available Cover	0-20			1. Epifaunal Substrate/Available Cover	0-20		1. Epifaunal Substrate/Available Cover	0-20	
2. Embeddedness	0-20	17	2. Pool Substrate Characterization	0-20			2. Embeddedness	0-20		2. Embeddedness	0-20	
Velocity/ Depth Regime	0-20		3. Pool Variability	0-20			Velocity/ Depth Regime	0-20		Velocity/ Depth Regime	0-20	
4. Sediment Deposition	0-20	16	4. Sediment Deposition	0-20			4. Sediment Deposition	0-20		4. Sediment Deposition	0-20	_
5. Channel Flow Status	0-20 0-1		5. Channel Flow Status	0-20 0-1			5. Channel Flow Status	0-20	0-1	5. Channel Flow Status	0-20	_
6. Channel Alteration	0-20	16	6. Channel Alteration	0-20			6. Channel Alteration	0-20	-	6. Channel Alteration	0-20	_
7. Frequency of Riffles (or bends)	0-20		7. Channel Sinuosity	0-20			Frequency of Riffles (or bends)	0-20		Frequency of Riffles (or bends)	0-20	_
8. Bank Stability (LB & RB)	0-20	17	8. Bank Stability (LB & RB)	0-20			8. Bank Stability (LB & RB)	0-20		Bank Stability (LB & RB)	0-20	_
9. Vegetative Protection (LB & RB)	0-20	16	9. Vegetative Protection (LB & RB)	0-20			9. Vegetative Protection (LB & RB)	0-20		9. Vegetative Protection (LB & RB)	0-20	_
10. Riparian Vegetative Zone Width (LB & RB)	0-20	16	10. Riparian Vegetative Zone Width (LB & RB)	0-20			10. Riparian Vegetative Zone Width (LB & RE	3) 0-20	-	10. Riparian Vegetative Zone Width (LB & RB	/ 0-20	
Total RBP Score	Marginal	98	Total RBP Score	Poor	0		Total RBP Score	Poor	0	Total RBP Score	Po	Jor
Sub-Lotal CHEMICAL INDICATOR (Applies to Intermitte	ent and Perennial St	0.49 reams)	Sub-Total CHEMICAL INDICATOR (Applies to Intermitte)	nt and Perennial St	reams)		Sub-Total CHEMICAL INDICATOR (Applies to Interm	nittent and Perennia	U al Streams)	Sub-Total CHEMICAL INDICATOR (Applies to Interm	ittent and Per	renni
- 11		,	- X 11		,				,	- X 11		
WVDEP Water Quality Indicators (Genera	l)		WVDEP Water Quality Indicators (General)			WVDEP Water Quality Indicators (Gen	eral)		WVDEP Water Quality Indicators (Gene	ral)	
Specific Conductivity			Specific Conductivity		0		Specific Conductivity			Specific Conductivity		
	0-90			0-90				0-90			0-90	
100-199 - 85 points												_
рН		68	pH		0		рН			рН		4
	0-80			5-90				5-90	U-1		5-90	
5.6-5.9 = 45 points			D O				50			20		
DO	T		DO				DO			DO		-
	10-30			10-30				10-30			10-30	
Sub-Total			Sub-Total	11	0		Sub-Total	II	0	Sub-Total		
BIOLOGICAL INDICATOR (Applies to Intermi	ittent and Perennial	Streams)	BIOLOGICAL INDICATOR (Applies to Intermi	ttent and Perennial	Streams)		BIOLOGICAL INDICATOR (Applies to In	termittent and Per	rennial Streams)	BIOLOGICAL INDICATOR (Applies to Int	ermittent and	d Pe
WV Stream Condition Index (WVSCI)			WV Stream Condition Index (WVSCI)				WV Stream Condition Index (WVSCI)			WV Stream Condition Index (WVSCI)		
n	0-100 0-1			0-100 0-1				0-100	0-1		0-100	(
Sub-Total		0	Sub-Total		0		Sub-Total	1 1	0	Sub-Total		
					5				U	500-10tai		
PART II - Index and I	Init Score		PART II - Index and	Unit Score			PART II - Index	and Unit Score		PART II - Index and	Unit Score	~

A A C II - INDEX and ONL SCORE								
Index	Linear Feet	Unit Score						
0.563	88	49.5						

PART II - Index and Unit Score									
Index	Linear Feet	Unit Score							
0	0	0							

PART II - Index and Unit Score									
Index	Linear Feet	Unit Score							
0	0	0							

)		
	10-30	
ib-Total		
OLOGICAL INDICATOR (Applies to Interm	ittent and	Perer
V Stream Condition Index (WVSCI)		
	0-100	0-1
ib-Total		
PART II - Index and Ur	nit Score	
Index	Linear	Feet





PART II - Index and Unit Score									
Index	Linear Feet	Unit Score							
0	0	0							

FCI Calculator for the High-Gradient Headwater Streams in Appalachia

To ensure accurate calculations, the <u>UPPERMOST STRATUM</u> of the plant community is determined based on the calculated value for V_{CCANOPY} (≥20% cover is required for tree/sapling strata). Go to the SAR Data Entry tab and enter site characteristics and data in the yellow cells. For information on determining how to split a project into SARs, see Chapter 5 of the Operational Draft Regional Guidebook for the Functional Assessment of High-Gradient Headwater Streams and Low-Gradient Perennial Streams in Appalachia (Environmental Laboratory U.S. Army Corps of Engineers 2017).

Project Name: MVP Preliminary Assessment Location: UNT to Greenbrier River Sampling Date: 9-8-2021

Subclass for this SAR:

Intermittent Stream

Uppermost stratum present at this SAR:

Shrub/Herb Strata

SAR number: S-L2

Before Project

Functional Results Summary:

Enter Results in Section A of the Mitigation Sufficiency Calculator

Project Site

Function	Functional Capacity Index
Hydrology	0.50
Biogeochemical Cycling	0.45
Habitat	0.49

Variable Measure and Subindex Summary:

Variable	Name	Average Measure	Subindex
VCCANOPY	Percent canpoy over channel.	Not Used, <20%	Not Used
V _{EMBED}	Average embeddedness of channel.	3.90	1.00
V _{SUBSTRATE}	Median stream channel substrate particle size.	7.19	0.92
V _{BERO}	Total percent of eroded stream channel bank.	8.33	1.00
V _{LWD}	Number of down woody stems per 100 feet of stream.	1.67	0.21
V _{tdbh}	Average dbh of trees.	Not Used	Not Used
V _{SNAG}	Number of snags per 100 feet of stream.	0.00	0.10
V _{SSD}	Number of saplings and shrubs per 100 feet of stream.	0.00	0.00
V _{SRICH}	Riparian vegetation species richness.	0.00	0.00
V _{DETRITUS}	Average percent cover of leaves, sticks, etc.	43.75	0.53
V _{HERB}	Average percent cover of herbaceous vegetation.	56.25	0.75
V _{WLUSE}	Weighted Average of Runoff Score for Catchment.	0.42	0.44

High-Gradient Headwater Streams in Applaching Field Data Sheet and Cacuators Latitude/UTM Northing: 37.671392 Location: UNT to Green there Nerver Latitude/UTM Easting: 30.228311 Sare Number: SIZE Reach Length (ft): 60 Stream Type: Intermittent Stream Top Strata: Shrub/Herb Strata (determined from percent calculated in V _{CCNMOP}) Ste and Timing: Project Ste else revoject Stream: Shrub/Herb Strata (determined from percent calculated in V _{CCNMOP}) Variables 14 in stream channel by tree and sappling canopy. Measure at no fewer than 10 roughly equidistant points along the stream. Measure and to fewer than 30 roughly equidistant points along the stream. Measure at no fewer than 30 roughly equidistant points along the stream. Select a particle from the bed. Before moving it, determine the parcentage of the surface and calculater on point device its an artificial surface. 3.9 Venet Average enbeddedness of the stream channel. Measure at no fewer than 30 roughly equidistant points along the stream. Select a particle from the bed. Before moving it, determine the parcentage of the surface covered. surrounded, or buried by fine sediment. Taing scoce of 1. If the bed is an artificial s								_	_	_		Versio	on 10-20-17
IFIEW Location: TFEW Latitude/UTM Northing: 37.671392 Location: UNT to Greenhore River Longitude/UTM Easting: -80.728311 SAR Number: S.12 Reach Length (ft): 60 Stream Type: Intermittent Stream Somple Variables 14 in stream channel Sample Variables 14 in stream channel defore Project Intermittent Stream 1 Variables 14 in stream channel 1 Variables 14 in stream channel Measure at no fewer than 30 roughly equidistant points along the stream. Measure only if three/saping cover is at least 20%, entre at least an evalue between 0 and 19 to tingger Top Strata choice.) Variables 14 in stream channel. Measure at no fewer than 30 roughly equidistant points along the stream. Select a particle from the bed. Before moving it, determine the percentage of the surface covered by surrounded, or buried by fine sediment. (and the stream channel				High-G	radient	Headwat	ter Strea	ms ir	n Ap	opalachi	a		
Iterative Intervent Latitude UI M Nothell TM Easting: =80:728311 Project Name: SAR Number: S.1.2 Reach Length (ft): 60 Stream Type: Intermittent Stream		_			Field L	Data She	et and C	alcul	ato	r			
Project Name: MVP Prelimmary Assessment Location: UNT to Greenbrier River SAR Number: S-L2 Reach Length (ft): 60 Stream Type: intermittent Stream Top Strata: ShrubhHerb Strata (determined from percent calculated in V _{CCANOPY}) Site and Timing: Project Ste Sample Variables 1-4 in stream channel Versage percent cover over channel by tree and sapling canopy. Measure at no fewer than 10 roughly equidistant points along the stream. Measure on up it ree/sapling cover is at least 20%. (if less than 20%, enter at least one value between 0 and 19 to trigger Top Strata choice.) Ist the percent cover measurements at each point below: C	Team: TF/EW									_atitude/UTI	M Northing:	37.671392	
Location: UNIT to Greenther River Sampling Date: 94:2021 SAR Number; S-L2 Reach Length (ft): 60 Stream Type: Intermittent Stream Top Strata: Shrub/Herb Strata (determined from percent calculated in V _{GCANOP}) Stee and Timing: Project Site Before Project Image: Strate St	Pro	oject Name:	MVP Prelin	ninary Asse	ssment				L	ongitude/UT	M Easting:	-80.728311	
SAR Number: S-L2 Reach Length (ft): 60 Stream Type: Intermittent Stream Top Strata: Shrub/Herb Strata (determined from percent calculated in V _{GCMOPY}) Site and Timing: Project Ste Before Project Image: Stream Type:		Location:	UNT to Gre	enbrier Rive	ər			,		Sam	pling Date:	9-8-2021	
Top Strata: Shrub/Herb Strati (determined from percent calculated in V _{COLNOPY}) Site and Timing: Project Site Before Project Image: Strate Strate Strate Strate <tre>Strate Strate Str</tre>	SA	AR Number:	S-L2	Reach	Length (ft):	60	Stream Ty	/pe:	Inter	mittent Stream	n		▼
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Sample Variables 1-4 in stream channel 1 V _{CCMNCY} Average percent cover over channel by tree and sapling canopy. Measure at no fewer than 10 roughly equidistant points along the stream. Measure only if tree/sapling cover is at least 20%. (If less than 20%, enter at least one value between 0 and 19 to trigger Top Strata choice.) Not Used <20%	Site	and Timing:	Project Site				•	Before	Proje	ct			•
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List the percent cover measurements at each point below: 	1	V _{CCANOPY}	Average pe equidistant 20%, enter	points alon at least one	over chann g the strean e value betw	el by tree al n. Measure /een 0 and 1	nd sapling c only if tree/ 9 to trigger	anopy. sapling Top St	Mea cove rata	asure at no t er is at least choice.)	fewer than 7 20%. (If le	10 roughly ss than	Not Used, <20%
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Rating Rating Description - 5 -55 percent of surface covered, surrounded, or buried by fine sediment - 3 26 to 50 percent of surface covered, surrounded, or buried by fine sediment - 2 51 to 75 percent of surface covered, surrounded, or buried by fine sediment - 2 51 to 75 percent of surface covered, surrounded, or buried by fine sediment - 1 >75 percent of surface covered, surrounded, or buried by fine sediment (or artificial surface) - 4 4 4 4 - - 4 4 4 4 4 - - 4 4 4 4 4 - - - 4 4 4 4 4 - - - - 4 4 4 4 4 -			Minshall 19	983)	ioi giavei, c				scal		is, megana	n, anu	
5 <5 percent of surface covered, surrounded, or buried by fine sediment			Rating	Rating Des	scription								-
4 0 to 20 percent of surface covered, surrounded, or buried by fine sediment 3 26 to 50 percent of surface covered, surrounded, or buried by fine sediment 1 >75 percent of surface covered, surrounded, or buried by fine sediment 1 >75 percent of surface covered, surrounded, or buried by fine sediment 1 >75 percent of surface covered, surrounded, or buried by fine sediment 1 >75 percent of surface covered, surrounded, or buried by fine sediment 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 5 9 0 1 1 6 7 1			5	<5 percent	of surface of	covered, sur	rounded, or	buried	by fi	ne sedimen by fino codi	t (or bedroc mont	:K)	-
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List the ratings at each point below: 4 4 4 4 4 4 4 4 4 4 5 4 5 1 5 0 0 0 4 4 4 4 4 4 4 0 0 0 0 4 4 4 4 4 4 0 <td></td> <td></td> <td>1</td> <td>>75 percen</td> <td>t of surface</td> <td>covered, su</td> <td>irrounded, c</td> <td>or burie</td> <td>d by</td> <td>fine sedime</td> <td>nt (or artific</td> <td>ial surface)</td> <td>]</td>			1	>75 percen	t of surface	covered, su	irrounded, c	or burie	d by	fine sedime	nt (or artific	ial surface)]
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4 4		4	5	4	5	1	5						
4 4		4	4	4	4	4	4						
4 1 4		4	4	4	4	4	4						
3 VSUBSTRATE Medial Stream channel substrate particle size. Measure and rewel than 30 roughly equidistant points along the stream; use the same points and particles as used in VEMBED. 7.19 in Enter particle size in inches to the nearest 0.1 inch at each point below (bedrock should be counted as 99 in, asphalt or concrete as 0.0 in, sand or finer particles as 0.08 in): 16.60 7.48 16.60 2.60 16.60 9.50	2	4	1 Modian str	4	4 Leubetratou	4 porticlo sizo	4 Moosuro (at no fo	word	ban 30 rouv	ably oquidis	tant points	
Intermediate particles do doca in tremelo. Enter particle size in inches to the nearest 0.1 inch at each point below (bedrock should be counted as 99 in, asphalt or concrete as 0.0 in, sand or finer particles as 0.08 in): 16.60 7.48 16.60 2.60 16.60 9.50 16.60 4.65 99.00 3.90 99.00 0.08 99.00 1.90 1.00 3.50 14.20 7.50 3.10 7.50 1.90 1.00 1.00 1.18 0.08 20.90 13.20 20.90 4.70 1.10 1.18 0.08 20.90 13.20 20.90 4.70 1.10 1.18 0.80 20.90 13.20 20.90 4.70 1.80 1.80 8 % Left Bank: 0 ft Right Bank: 5 ft	3	V SUBSTRATE	along the s	tream: use f	he same po	particle size	rticles as us	ed in V		nan 30 1000	grify equicits	tant points	7.19 in
4 V _{BERO} Total percent of eroded stream channel bank. Enter the total number of feet of eroded bank on each side and the total percentage will be calculated. If both banks are eroded, total erosion for the stream may be up to 200%. 8 %		Enter parti	cle size in in	ches to the	nearest 0.1	inch at eac	h noint helo	w (bodu		p. should be a	ounted as 0	in in	
16.60 7.48 16.60 2.60 16.60 9.50 Image: Constraint of the stress of the stres		asphalt or	concrete as	0.0 in. sand	or finer par	ticles as 0.0)8 in):	w (beui	UCK .		Junieu as 3	5 m,	
4.65 99.00 3.90 99.00 0.08 99.00		16.60	7.48	16.60	2.60	16.60	9.50						1
3.50 14.20 7.50 3.10 7.50 1.90 Image: Constraint of the stress		4.65	99.00	3.90	99.00	0.08	99.00						
6.89 4.00 4.00 13.20 0.30 1.10 Image: constraint of the stress		3.50	14.20	7.50	3.10	7.50	1.90						1
1.18 0.08 20.90 13.20 20.90 4.70 Image: Constraint of the stream of the strea		6.89	4.00	4.00	13.20	0.30	1.10						1
4 V _{BERO} Total percent of eroded stream channel bank. Enter the total number of feet of eroded bank on each side and the total percentage will be calculated. If both banks are eroded, total erosion for the stream may be up to 200%. 8 % Left Bank: 0 ft Right Bank: 5 ft		1.18	0.08	20.90	13.20	20.90	4.70						1
side and the total percentage will be calculated If both banks are eroded, total erosion for the stream 8 % may be up to 200%. Left Bank: 0 ft Right Bank: 5 ft	4	V _{BERO}	Total perce	ent of eroded	stream cha	annel bank.	Enter the t	otal nur	mber	of feet of er	oded bank	on each	
Left Bank: 0 ft Right Bank: 5 ft			side and th may be up	e total perce to 200%.	entage will b	be calculate	d If both ba	nks are	e ero	ded, total e	rosion for th	ne stream	8 %
				Left Bank:	0	ft	I	Right B	ank:	5	ft		

Samp	le Variable	s 5-9 within t	the entire	riparian/buf	fer zone ad	jacent to t	the stream ch	nannel (25	feet from e	each bank).		
5	V _{LWD}	Number of down woody stems (at least 4 inches in diameter and 36 inches in length) per 100 feet of stream reach. Enter the number from the entire 50'-wide buffer and within the channel, and the amount per 100 feet of stream will be calculated.										
0	M	A	h = 6 (m = = =	/	Number of	downed v	voody stems:	t la a st 000/	1 \ T			
6	V _{TDBH}	Average dr	on of trees	(measure on	IY IF V _{CCANOF}	_Y tree/sap	ling cover is a	t least 20%	b). Trees ar	e at least 4	Not Used	
		List the dhr	o measurei	ments of indi	vidual trees	(at least 4	in) within the	huffer on e	ach side of			
		the stream	below:					builer on e				
			Left Side					Right Side				
7	V_{SNAG}	Number of	snags (at l	east 4" dbh a	and 36" tall)	per 100 fe	et of stream.	Enter num	ber of snag	s on each		
		side of the	stream, an	d the amoun	t per 100 fe	et will be c	alculated.				0.0	
			Left Side	:	0		Right Side:		0			
8	V_{SSD}	Number of	saplings a	nd shrubs (w	oody stems	up to 4 in	ches dbh) per	100 feet of	f stream (m	easure only		
		if tree cove	r is <20%). r 100 ft of c	Enter numb	per of saplin	gs and sh	rubs on each s	side of the	stream, and	d the	0.0	
		amount per	Left Side				Right Side:		0			
9	V _{SRICH}	Riparian ve	getation s	pecies richne	ess per 100	ieet of stream reach. Check all species present from						
		Group 1 in	the tallest	stratum. Ch	eck all exoti	c and inva	sive species p	present in a	ll strata. Sp	pecies	0.00	
		Grou	n 1 – 1 0			calculated	a noni inese u	aia. Group	2 (-1 0)			
	Acer rubr	um		Magnolia t	ripetala		Ailanthus al	Itissima		l onicera ia	nonica	
	Acer saco	harum		Nivssa sviv	atica		Δlbizia iulibi	rissin		Lonicera ta	atarica	
	Accorduce	flovo		Ovudondrun							ioulotuo	
	Aesculus	llava vilaka					Alliaria pelio	Jiala		Lotus com	liculatus	
	Asimina ti	nioda		Prunus ser	otina 		Alternanthe	ra		Lythrum se	alicaria	
	Betula alle	eghaniensis		Quercus a	ba		prilloxerolue	75		Microstegiui	m vimineum	
	Betula ler	nta		Quercus co	occinea		Aster tatario	cus		Paulownia	tomentosa	
	Carya alb	a		Quercus in	nbricaria		Cerastium f	ontanum		Polygonum	cuspidatum	
	Carya gla	bra		Quercus p	rinus		Coronilla va	aria		Pueraria m	ontana	
	Carya ova	alis		Quercus ru	ıbra		Elaeagnus ur	mbellata	\checkmark	Rosa multi	flora	
	Carya ova	ata		Quercus ve	elutina		Lespedeza	bicolor		Sorghum h	alepense	
	Cornus flo	orida		Sassafras	albidum		Lespedeza	cuneata		Verbena bi	rasiliensis	
	Fagus gra	andifolia		Tilia ameri	cana		Ligustrum ob	tusifolium				
	Fraxinus	americana		Tsuga can	adensis		Ligustrum s	inense				
	Liriodendro	on tulipifera		Ulmus ame	ericana							
	Magnolia	acuminata										
		0	Species in	Group 1				1	Species in	Group 2		

Sample bank. 1	e Variables The four sul	10-11 withi bplots shou	n at least 8 JId be place	3 subplots (40" x 40", o ed roughly equidistan	or 1m x 1m tly along ea) in the ripa ach side of	rian/buffei the stream	zone withi	n 25 feet fro	om each
10	V _{DETRITUS}	Average pe <36" long a	ercent cover are include.	of leaves, sticks, or oth Enter the percent cove	ner organic er of the detr	material. W rital layer at	oody debri: each subpl	s <4" diamet ot.	er and	43.75 %
			Left	Side		Right	t Side]	
		10	80		70	80				
11	Vhedr	Average pe	20 ercentage co	over of herbaceous veg	etation (me	asure only if	tree cover	is <20%). D	Do not	
	TERD	include woo vegetation at each sub	ody stems a percentage oplot.	at least 4" dbh and 36" t s up through 200% are	all. Because accepted.	e there may Enter the pe	be several rcent cover	layers of gro of ground v	ound cover regetation	56 %
			Left	Side		Right	t Side			
		90	20 80		30 90	20				
Commi	. Veriekle 1	30			30	30				
Sample			e entire cat	Connect of the stream	•					
12	VWLUSE	weighted F	Average of r	Runon Score for waters	neu.					0.42
			Land	Use (Choose From Dro	op List)			Runoff Score	% in Catch- ment	Running Percent (not >100)
	Forest and n	ative range (5	50% to 75% g	round cover)			-	0.7	52.94	52.94
	Open space	(pasture, lawr	ns, parks, etc.), grass cover <50%			-	0.1	47.06	100
							-			
								_		
							-			
							• 			
							•			
		S-L2				No	tes:			
V	ariable	Value	VSI	Land Cover Analysis	s was comp t satellite i	pleted using	g the 2019	National L	and Cover	Database
Vc	CANOPY	Not Used, <20%	Not Used	Watershed boundar	ies are bas	ed off field	delineate	d stream im	pacts.	
VE	MBED	3.9	1.00						-	
Vs	UBSTRATE	7.19 in	0.92							
VB	ERO	8 %	1.00							
VL	WD	1.7	0.21							
V _T	DBH	Not Used	Not Used							
Vs	NAG	0.0	0.10							
Vs	SD	0.0	0.00							
Vs	RICH	0.00	0.00							
VD	ETRITUS	43.8 %	0.53							
V _H	ERB	56 %	0.75							
Vw	LUSE	0.42	0.44							

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (FRONT)

STREAM NAMES-L2		LOCATION UNT to Greenbr	ier River Spread F	
STATION # R	IVERMILE	STREAM CLASS Intermit	tent	•
LAT 37.671392 LO	ONG -80.728311	COUNTY Summers	5	-
STORET #		AGENCYPotesta/Edge		
INVESTIGATORSTF/EV	V/AK			
FORM COMPLETED BY	TF	DATE 9-8-2021 TIME 12240	REASON FOR SURVEY Preliminary Assessment	e,
WEATHER CONDITIONS	Now storm rain (showers %cc cfe	(heavy rain) steady rain) s (intermittent) loud cover aar/sunny	Has there been a heavy rain in the last 7 days? Yes \swarrow No Air Temperature ^{75 F 0} C Other	
SITE LOCATION/MAP	Draw a map of the sit	e and indicate the areas sam FNP5T	pled (or attach a photograph) Folist	
	\checkmark	Y	Benlata W V	
	\checkmark	V V I		
	~	W Y	v v	
		Timber Bridse	100	
	ng f	itld	Forest	
STREAM CHARACTERIZATION Dry channel	Stream Subsystem Perennial Inter- Stream Origin Glacial Non-glacial montane Swamp and bog	ermittent Tidal	Stream Type ☐Coldwater	

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (BACK)

WATERSI FEATURE	HED 2S	Predom ✓ Forest Field/I Agricu Reside	inant Surrounding Lan Comme Pasture Industri Iltural Other _ Intial	duse rcial al	Local Watershed NPS No evidence Sor Obvious sources Local Watershed Eross None Moderate	Pollution ne potential sources				
RIPARIAN VEGETAT (18 meter l	N FION buffer)	Indicate	the dominant type and	record the do hrubs sa multiflora	minant species present □Grasses ☑He	rbaceous				
INSTREA FEATURE	M	Estimate Estimate Samplin Area in Estimate Surface (at thalw Stream 1	ed Reach Length 60 f ed Stream Width 2.8 g Reach Area 168 f km² (m²x1000) ed Stream Depth 0.4 Velocity no flow m reg) Dry	$m m m m^2 m^2 m^2 m^2 m^2 m^2 m^2 m^2 m^$	Canopy Cover Partly open □Part High Water Mark 4 Proportion of Reach R Morphology Types Riffless Pool 15 % Channelized □Yes Dam Present □Yes	ly shaded □Shaded 5.5 ft m epresented by Stream Run ²⁰ % ☑ No ☑ No				
LARGE W DEBRIS	/OODY	LWD Density	LWD 0 m ² Density of LWD 0 m ² /km ² (LWD/ reach area)							
AQUATIC VEGETAT	FION	Indicate Rooted Floatin Dominat	the dominant type and d emergent \square Rc ng Algae \square At nt species present n/a of the reach with aquat	record the do boted submerge tached Algae dry ic vegetation	minant species present nt ☐Rooted floating	Free floating				
WATER Q	QUALITY	Temper Specific Dissolve pH Turbidit WQ Inst	ature0 C Conductance d Oxygen y trument Used		Water Odors Normal/None □Sewage Petroleum Fishy Water Surface Oils Slick Slick Sheen Other Turbidity (if not measu Clear Slightly tur Opaque Stained	Chemical Other Globs Flecks red) rbid Turbid Other				
SEDIMEN SUBSTRA	SEDIMENT/ SUBSTRATE Odors Deposits Paper fiber □Sand SUBSTRATE Ohemical Anaerobic None Sludge □Sawdust □Paper fiber □Sand Other Other Deposits Other Oils Oils Paper fiber □Sand ☑ Absent □Slight □Moderate □Profuse □Yes ☑ No									
INO	RGANIC SUBS (should a	STRATE (dd up to 1)	COMPONENTS 00%)		ORGANIC SUBSTRATE C (does not necessarily add	OMPONENTS up to 100%)				
Substrate Type	Diamet	er	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Area				

Туре	Diameter	Sampling Reach	Туре	Characteristic	Sampling Area
Bedrock		10	Detritus	sticks, wood, coarse plant	0
Boulder	> 256 mm (10")	20		materials (CPOM)	0
Cobble	64-256 mm (2.5"-10")	5	Muck-Mud	black, very fine organic	0
Gravel	2-64 mm (0.1"-2.5")	40		(FPOM)	0
Sand	0.06-2mm (gritty)	10	Marl	grey, shell fragments	0
Silt	0.004-0.06 mm	15]		
Clay	< 0.004 mm (slick)	0]		

HABITAT ASSESSMENT FIELD DATA SHEET - HG - USE ON ALL STREAMS (FRONT)

STREAM NAMES	-L2	LOCATION							
STATION #	RIVERMILE	STREAM CLASS Intermittent	1						
LAT 37.671392	LONG80.728311	COUNTY Summers	-						
STORET #		AGENCY Potesta/Edge							
INVESTIGATORS	TF/EW/AK								
FORM COMPLETE	ED BY	DATE TIME 1240 AM PM REASON FOR SURVEY Preliminary Assessment							

	Habitat		Condition	Category	
	Parameter	Optimal	Suboptimal	Marginal	Poor
	1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
	_{SCORE} 0	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
ı sampling reach	2. Embeddedness	Gravel, cobble, and boulder particles are 0- 25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25- 50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50- 75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
ted in	score 17▼	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
eters to be evalua	3. Velocity/Depth Regime V N/A	All four velocity/depth regimes present (slow- deep, slow-shallow, fast- deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast- shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).
aram	$_{\rm SCORE}$ 0	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
Pa	4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
4	SCORE 16	20 19 18 17 🚺	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	5. Channel Flow Status N/A	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
	SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

Modified RBP; DRY CHANNEL

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

	Uahita4	Condition Category												
	Parameter	Optimal	Suboptimal	Marginal	Poor									
	6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.									
	_{score} 16▼	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0									
ling reach	7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.									
amp	$_{\rm SCORE} 0$	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0									
duated broader than	8. Bank Stability (score each bank) Note: determine left or right side by facing decomprised.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30- 60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.									
e eva	SCORE 9	Left Bank 10 🕘	8 7 6	5 4 3	2 1 0									
to b	SCORE 8	Right Bank 10 🕘	8 7 6	5 4 3	2 1 0									
Parameters	9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well- represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one- half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.									
	SCORE 8	Left Bank 10 9	8 7 6	5 4 3	2 1 0									
	SCORE 8 (1)	Right Bank 10 9	8 7 6	5 4 3	2 1 0									
	10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6- 12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.									
	SCORE O	Left Bank 10 9	8 7 6	5 4 3	2 1 0									
	SCORE 8 (1)	Right Bank 10 9	8 7 6	5 4 3	2 1 0									
	~ ~													

Total Score _____

A-8 Appendix A-1: Habitat Assessment and Physicochemical Characterization Field Data Sheets - Form 2

BENTHIC MACROINVERTEBRATE FIELD DATA SHEET

STREAM NAMES-L2		LOCATION						
STATION #	RIVERMILE	STREAM CLASS Intermitten	nt 🔽					
LAT 37.671392	LONG -80.728311	COUNTY Summers	•					
STORET #		AGENCYPotesta/Edge						
INVESTIGATORS	F/EW/AK		LOT NUMBER					
FORM COMPLETED	TF	DATE 9-8-2021 TIME 1240	REASON FOR SURVEY Preliminary Assessment					
HABITAT TYPES	Indicate the percentage of each habitat type present Cobble% Snags% Vegetated Banks% Sand% Submerged Macrophytes% Other ()%							
SAMPLE COLLECTION	Gear used D-frame How were the samples coll Indicate the number of jat Cobble Sn Submerged Macrophytes	kick-net Other	rom bank					
GENERAL COMMENTS	Dry Channel							

QUALITATIVE LISTING OF AQUATIC BIOTA

Indicate estimated abundance: 0 = Absent/Not Observed, 1 = Rare, 2 = Common, 3= Abundant, 4 = Dominant

Periphyton	0	1	2	3	4	Slimes	0	1	2	3	4
Filamentous Algae	0	1	2	3	4	Macroinvertebrates	0	1	2	3	4
Macrophytes	0	1	2	3	4	Fish	0	1	2	3	4

FIELD OBSERVATIONS OF MACROBENTHOS

Indicate estimated abundance: 0 = Absent/Not Observed, 1 = Rare (1-3 organisms), 2 = Common (3-9 organisms), 3= Abundant (>10 organisms), 4 = Dominant (>50 organisms)

Porifera	0	1	2	3	4	Anisoptera	0	1	2	3	4	Chironomidae	0	1	2	3	4
Hydrozoa	0	1	2	3	4	Zygoptera	0	1	2	3	4	Ephemeroptera	0	1	2	3	4
Platyhelminthes	0	1	2	3	4	Hemiptera	0	1	2	3	4	Trichoptera	0	1	2	3	4
Turbellaria	0	1	2	3	4	Coleoptera	0	1	2	3	4	Other	0	1	2	3	4
Hirudinea	0	1	2	3	4	Lepidoptera	0	1	2	3	4						
Oligochaeta	0	1	2	3	4	Sialidae	0	1	2	3	4						
Isopoda	0	1	2	3	4	Corydalidae	0	1	2	3	4						
Amphipoda	0	1	2	3	4	Tipulidae	0	1	2	3	4						
Decapoda	0	1	2	3	4	Empididae	0	1	2	3	4						
Gastropoda	0	1	2	3	4	Simuliidae	0	1	2	3	4						
Bivalvia	0	1	2	3	4	Tabinidae	0	1	2	3	4						
						Culcidae	0	1	2	3	4						

SITE ID: S - L2DATE: 8 |9| L1COLLECTOR(S): EW | TFSpread F

Volmen Pet	ble Count (R	each Wide)	· · · · · · · · · · · · · · · · · · ·							
423	1123	4227	420	423	423	423	425,	423	423	
118	99	ST	SI	37	42	51	8	T	6	
84	Cap.	KAD	285	190	285	190	285	285	190	
175	102	8	36	95	12	14	90	175	30	
530	530	530	530	530	48	225	30	30	150	
190	65	240	120	115	195	ŚI	245	245	195	
BR	BR	BR	BR	BR	BR	BR	51	51	SI	- 49-
360	79	49	SI	38	BR	BR	BR	9	4	
103	334	28	154	319	28	IZ	18	52	44	
ST	334	119	320	25	105	48	105	59	320	





Inche:	BRAY IE	Millimeters	
	Schellay	1,000	-8/0
	ver Fir€	.82 - 425	0
	fine	125 - 25	Ş
	Medium	75 - 50	A N
	Coarse	50-10	D
04. 18	Very Carne	16.5	
18-16	very fine	2.4	
16 - 22	Fine	2182	
22 - 31	Fine	57.9	G
31 - 24	Vedium	8 - 13	R
44 - 83	We drup	11.3 - 16	.Q1
63 - 89	Coarse	16+224	E:
\$3+12	Coarse	22.6 - 32	9
12-15	Very Source	32 - 45	
18.35	Very Opares	±€, €a	
25.35	Smalt	64 - 96	120
38-60	Sntall	90 - 128	Ze
51,473	Lange	128 - 180	ZĨ
7 1× 10 1	Large	160 - 266	n.
10.1 - 44.8	Sman	256 - 262	2
14.8 - 22	\$mat	362-512	Į Į
20 - 40	Vedium	\$12+1024	None I
40 - 90	Large-Vry Large	1024 - 2046	0
	Eedrocs		Ella

4

NOTES:

Bankfull Channel	•	
Material	Size Range (mm)	Count
silt/clay	0 - 0.062	11
very fine sand	0.062 - 0.125	
fine sand	0.125 - 0.25	
medium sand	0.25 - 0.5	
coarse sand	0.5 - 1	
very coarse sand	1 - 2	
very fine gravel	2 - 4	1
fine gravel	4 - 6	1
fine gravel	6 - 8	2
medium gravel	8 - 11	1
medium gravel	11 - 16	2
coarse gravel	16 - 22	1
coarse gravel	22 - 32	6
very coarse gravel	32 - 45	5
very coarse gravel	45 - 64	5
small cobble	64 - 90	4
medium cobble	90 - 128	10
large cobble	128 - 180	4
very large cobble	180 - 256	11
small boulder	256 - 362	10
small boulder	362 - 512	11
medium boulder	512 - 1024	5
large boulder	1024 - 2048	
very large boulder	2048 - 4096	
tota	al particle count:	90
bedrock		10
clay hardpan		
detritus/wood		
artificial		
	total count:	100
Note:		







AS-BUILT TABLE: S-L2 CROSS SECTION B					
	PRE-CROSSING		AS-BUILT		
PT. LOC.	NORTHING	EASTING	ELEV.	VERT. DIFF.	HORZ. DIFF.
TS-L	13679746.68	1718606.00	1614.22		
BS-L	13679747.50	1718605.55	1613.64		
тнw	13679747.77	1718605.40	1613.47		
BS-R	13679748.10	1718605.22	1613.50		
TS-R	13679749.57	1700078.25	1614.57		





SURVEY NOTES:

- THIS MAP HAS BEEN ORIENTED TO NAD 1983 UTM ZONE 17N, AND VERTICALLY TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88), USING REAL TIME DGPS. FIELD LOCATIONS WERE COMPLETED ON 9-8-2021.
- 2. EASEMENT LINES SHOWN ON PLAN VIEW WERE PROVIDED BY MOUNTAIN VALLEY PIPELINE.
- 3. SURVEY POINTS FOR CROSS SECTIONS AND THALWEG PROFILES COLLECTED IN 2021 HAVE BEEN USED IN COMBINATION WITH SURVEY POINTS AND COLLECTED PREVIOUSLY IN 2020 IN ORDER TO GENERATE THE PRE-CROSSING SURFACE SHOWN IN PLAN. DUE TO NATURAL EROSIONAL STREAM PROCESSES THAT OCCUR OVER TIME, MINOR ADJUSTMENTS TO THE PROFILE ALIGNMENTS MAY HAVE BEEN REQUIRED IN ORDER TO GENERATE A CLEAN PRE-CROSSING SURFACE.
- 4. ALL SECTION VIEWS SHOWN LEFT TO RIGHT FACING DOWNSTREAM.
- 5. POST-CROSSING SURVEY INFORMATION SHOWN IN RED. DATA PENDING.
- 6. POST-CROSSING SURVEY POINTS FOR CROSS SECTIONS AND THALWEG ARE PROJECTED ONTO PRE-CROSSING SECTION AND PROFILE VIEWS FOR COMPARISON.





PRE-CROSSING

Drawing No

-S-L2 CAD File No.