

APPENDIX A – ASSESSMENT DATA BY SITE

Site: Eight_2.42

Stream: Eightmile Creek

Survey Date: 4/28/2014

UTM CONUS NAD83: 12T 455261 E, 4714247 N

Key NIAP Site Characteristics

Culvert Slope	0.4	%
Channel Gradient (upstream)	0.6	%
Channel Gradient (downstream)	0.6	%
Outlet Drop	0.18	ft.
Inlet Gradient	5.5	%
Residual Inlet Depth	0	ft.
Residual Pool Depth	1.17	ft.
Ratio of Inlet to Bankfull Width	0.47	

Key FishXing Site Characteristics

<u>Crossing Installation Data</u> Culvert Type: 5.92 X 3.92 ft Pipe-Arch Material: Annular 2.67 x 1/2 inch Installation: Not Embedded Culvert Length: 32 ft Culvert Slope: 0.44% Culvert Roughness Coefficient: 0.021 Inlet Invert Elevation: 94.49 ft Outlet Invert Elevation: 94.35 ft Inlet Headloss Coefficient (Ke): 0.9	<u>Tailwater Information</u> Tailwater Option: Constant Tailwater Constant Tailwater Elevation: 95.14 ft Outlet-Pool Bottom Elevation: 93.14 ft
	<u>Design Flows</u> Low Passage Flow: 6.5 cfs (range 6.5-9.58 cfs) Rust Line Passage Flow: 80 cfs (based on rust line elevation) PK1.5 Passage Flow: 154 cfs (range 51.1 - 462 cfs) PK100 Passage Flow: 389 cfs (range 145 - 1040 cfs)

Fish Passage Results

National Inventory and Assessment Procedure (NIAP)	FishXing		Does the structure constrict bankfull flows?
Juvenile Fish Passage Rating: RED Why: bankfull ratio	Low Passage Design Flow High Passage Design Flow Passable Flow Range Depth Barrier	6.50 cfs 389.00 cfs 6.50 to 56.69 cfs None	Yes
Adult Fish Passage Rating: RED Why: bankfull ratio	Leap Barriers Velocity Barrier Pool Depth Barrier	None 56.69 cfs and Above None	



Eight_2.42 Culvert Outlet



Eight_2.42 Culvert Outlet



Eight_2.42 Culvert Outlet



Eight_2.42 Looking Downstream from road



Eight_2.42 Culvert Inlet (bent inlet, armor present)



Eight_2.42 Culvert Inlet

Site: Eight_5.81
Stream: Eightmile Creek

Survey Date: 4/29/2014

UTM CONUS NAD83: 12T 452875 E, 4709552 N

Key NIAP Site Characteristics

Culvert 1			Culvert 2		
Culvert Slope	2.9	%	Culvert Slope	2.18	%
Channel Gradient (upstream)	2.4	%	Channel Gradient (upstream)	2.4	%
Channel Gradient (downstream)	1	%	Channel Gradient (downstream)	1	%
Outlet Drop	0	ft.	Outlet Drop	0	ft.
Inlet Gradient	3.2	%	Inlet Gradient	2.6	%
Residual Inlet Depth	0.16	ft.	Residual Inlet Depth	0.06	ft.
Residual Pool Depth	0.88	ft.	Residual Pool Depth	0.88	ft.
Ratio of Inlet to Bankfull Width	0.58		Ratio of Inlet to Bankfull Width	0.58	

Key FishXing Site Characteristics

<u>Crossing Installation Data</u> Culvert Type: (2) 4.5 ft Circular Material: Annular 2.67 x 1/2 inch Installation: Not Embedded Culvert Length: 33.5 ft Culvert Slope: 2.9%, 2.18% Culvert Roughness Coefficient: 0.024 Inlet Invert Elevation: 95.45 ft, 95.55 ft Outlet Invert Elevation: 94.48 ft, 94.82 ft Inlet Headloss Coefficient (Ke): 0	<u>Tailwater Information</u> Tailwater Option: Tailwater channel cross-section Channel Bottom Slope: 1% Outlet-Pool Bottom Elevation: 94.73 ft
	<u>Design Flows</u> Low Passage Flow: 4.18 cfs (range 4.18-5.98 cfs) Rust Line Passage Flow: 94-100 cfs (based on rust line elevations) PK1.5 Passage Flow: 104 cfs (range 34.5-314 cfs) PK100 Passage Flow: 265 cfs (range 98.6-713 cfs)

Fish Passage Results

National Inventory and Assessment Procedure (NIAP)	FishXing			Does the structure constrict bankfull flows?
Juvenile Fish Passage Rating: RED	Low Passage Design Flow High Passage Design Flow Passable Flow Range Depth Barrier Leap Barriers Velocity Barrier Pool Depth Barrier	CULVERT 1	CULVERT 2	Yes
Why: culvert slope		5.00 cfs 256 cfs 5 - 64.33 cfs, 100 – 156.28 cfs	5.00 cfs 256 cfs 5 -92.92 cfs	
Adult Fish Passage Rating: RED		None	None	
Why: culvert slope		None	None	
		64.33 – 100 cfs, 156.28 cfs and above	92.92 cfs and above	
		None	None	



Eight_5.81 Culvert outlet and rip-rap Tailwater control

Eight_5.81 Culvert Outlet



Eight_5.81 Rip-rap tailwater control

Eight_5.81 Culvert inlet, poor alignment with stream



Eight_5.81 Culvert Inlet, poor alignment with stream

Eight_5.81 Culvert Inlet, poor alignment with stream

Site: Eight_7.69

Stream: Eightmile Creek

Survey Date: 8/3/2005, 4/29/2014

UTM CONUS NAD83: 12T 452154 E, 4706707 N

Key NIAP Site Characteristics

Culvert 1			Culvert 2
Culvert Slope	3.19	%	This additional crossing was not surveyed in 2005 because the channel was dry. During the field visit of 2014 this channel was active but had minimal flows. The structure did have a rust mark at 0.6 ft, indicating that this culvert is active during high flow periods. This additional culvert could impact passage and needs to be further assessed before rating this site for passage.
Channel Gradient (upstream)	3.2	%	
Channel Gradient (downstream)	1.14	%	
Outlet Drop	0.54	ft.	
Inlet Gradient	3.9	%	
Residual Inlet Depth	0	ft.	
Residual Pool Depth	0.55	ft.	
Ratio of Inlet to Bankfull Width	0.48		

Key FishXing Site Characteristics

<u>Crossing Installation Data</u> Culvert Type: 5.92 X 3.92 ft Pipe-Arch Material: Annular 2.67 x 1/2 inch Installation: Not Embedded Culvert Length: 27.9 ft Culvert Slope: 3.19% Culvert Roughness Coefficient: 0.024 Inlet Invert Elevation: 97.28 ft Outlet Invert Elevation: 96.39 ft Inlet Headloss Coefficient (Ke): 0.9	<u>Tailwater Information</u> Tailwater Option: Tailwater channel cross-section Channel Bottom Slope: 1.14% Outlet-Pool Bottom Elevation: 95.3 ft
	<u>Design Flows</u> Low Passage Flow: 2.87 cfs (range 2.87-3.99 cfs) Rust Line Passage Flow: 42 cfs (based on rust line elevation, range 30-63 cfs) PK1.5 Passage Flow: 70.8 cfs (range 23.3-215 cfs) PK100 Passage Flow: 186 cfs (range 68.7-502 cfs)

Fish Passage Results

National Inventory and Assessment Procedure (NIAP)	FishXing		Does the structure constrict bankfull flows?
Juvenile Fish Passage Rating: RED	Low Passage Design Flow	2.87 cfs	Yes If both structure widths were added, bankfull flows would still be constricted. Ratio of inlet to bankfull would be 0.87.
Why: culvert slope, outlet drop, bankfull ratio	High Passage Design Flow	186 cfs	
Adult Fish Passage Rating: RED	Passable Flow Range	6.25 to 27.43 cfs	
Why: culvert slope, bankfull ratio	Depth Barrier	0 to 6.25cfs	
	Leap Barriers	None	
	Velocity Barrier	27.43 cfs and Above	
	Pool Depth Barrier	None	



Eight_7.69 Culvert outlet



Eight_7.69 Culvert Outlet, looking downstream



Eight_7.69 Culvert Inlet and Rip-rap



Eight_7.69 Culvert inlet, looking upstream



Eight_7.69B Culvert Outlet



Eight_7.69B Culvert Inlet, poor alignment with stream

Site: Eight_8.47

Stream: Eightmile Creek

Survey Date: 8/3/2005, 4/29/2014

UTM CONUS NAD83: 12T 452446 E, 4705553 N

Key NIAP Site Characteristics

Culvert 1		
Culvert Slope	-1.6	%
Channel Gradient (upstream)	3.3	%
Channel Gradient (downstream)	2.2	%
Outlet Drop	0	ft.
Inlet Gradient	6.2	%
Residual Inlet Depth	1.13	ft.
Residual Pool Depth	0.78	ft.
Ratio of Inlet to Bankfull Width	0.52	

Key FishXing Site Characteristics

<u>Crossing Installation Data</u> Culvert Type: 5 ft Circular Material: Annular 2.67 x 1/2 inch Installation: Not Embedded Culvert Length: 22 ft Culvert Slope: -1.6% Culvert Roughness Coefficient: 0.024 Inlet Invert Elevation: 94.82 ft Outlet Invert Elevation: 95.2 ft Inlet Headloss Coefficient (Ke): 0.5	<u>Tailwater Information</u> Tailwater Option: Tailwater channel cross-section Channel Bottom Slope: 2.2% Outlet-Pool Bottom Elevation: 94.97 ft
	<u>Design Flows</u> Low Passage Flow: 2.37 cfs (range 2.37-3.26 cfs) Rust Line Passage Flow: 37 cfs (based on rust line elevation) PK1.5 Passage Flow: 56.1 cfs (range 18.5-171 cfs) PK100 Passage Flow: 153 cfs (range 56.6-416 cfs)

Fish Passage Results

National Inventory and Assessment Procedure (NIAP)	FishXing		Does the structure constrict bankfull flows?
Juvenile Fish Passage Rating: GRAY	Low Passage Design Flow High Passage Design Flow Passable Flow Range Depth Barrier	2.37 cfs 153 cfs 2.37 – 54.77 cfs None	Yes
Adult Fish Passage Rating: GRAY	Leap Barriers Velocity Barrier Pool Depth Barrier	None 54.78 cfs and Above None	



Eight_8.47 Culvert outlet



Eight_8.47 Tailwater control



Eight_8.47 Culvert Inlet and Rip-rap



Eight_8.47 Culvert inlet, looking upstream

Site: Stauf_2.70

Stream: Stauffer Creek

Survey Date: 4/30/2014

UTM CONUS NAD83: 12T 465476 E, 4699647 N

This stream crossing is located under the Nounan road on Stauffer Creek. The crossing consists of two 4 x 6 ft squashed culverts that are routinely submerged due to the systems low gradient. Both pipes have sediment throughout the structures (depths 1 -1.5 ft) and have low velocities (1.08 ft/sec measured on 4/30/2014). It is assumed that these crossings do not impede fish passage. No fish passage surveys were conducted at this site.

Fish Passage Results

National Inventory and Assessment Procedure (NIAP)	FishXing	Does the structure constrict bankfull flows?
Juvenile Fish Passage Rating: Not Assessed	Not Assessed	Yes
Adult Fish Passage Rating: Not Assessed		



Stauf_2.70 Culvert outlet



Stauf_2.70 Culvert inlet, looking down the pipe



Stauf_2.70 Culvert inlets

Site: Stauf 7.5**Stream: Stauffer Creek****Survey Date: 4/30/2014**

UTM CONUS NAD83: 12T 462087 E, 4696815 N

Key NIAP Site Characteristics

Culvert Slope	1.2	%
Channel Gradient (upstream)	3.06	%
Channel Gradient (downstream)	1.64	%
Outlet Drop	0.27	ft.
Inlet Gradient	3.7	%
Residual Inlet Depth	0	ft.
Residual Pool Depth	2.24	ft.
Ratio of Inlet to Bankfull Width	0.33	

Key FishXing Site Characteristics

<u>Crossing Installation Data</u> Culvert Type: 4.75 x 3.17 ft Pipe-Arch Material: Annular 2.67 x 1/2 inch Installation: Not Embedded Culvert Length: 24 ft Culvert Slope: 1.21% Culvert Roughness Coefficient: 0.024 Inlet Invert Elevation: 99.32 ft Outlet Invert Elevation: 99.03 ft Inlet Headloss Coefficient (Ke): 0.9	<u>Tailwater Information</u> Tailwater Option: Tailwater Channel Cross-Section Channel Bottom Slope: 1.64% Outlet-Pool Bottom Elevation: 96.52 ft	
	<u>Design Flows</u> Low Passage Flow: 2.77 cfs (range 2.77 – 3.81 cfs) Rust Line Passage Flow: 22.66 cfs (based on rust line elevation) PK1.5 Passage Flow: 53.1 cfs (range 17.4 - 162 cfs) PK100 Passage Flow: 148 cfs (range 54.4 – 401 cfs)	

Fish Passage Results

National Inventory and Assessment Procedure (NIAP)	FishXing		Does the structure constrict bankfull flows?
Juvenile Fish Passage Rating: RED Why: bankfull ratio, culvert slope	Low Passage Design Flow High Passage Design Flow Passable Flow Range Depth Barrier	2.77 cfs 148 cfs 5.79 – 49.05 cfs 0 to 5.79 cfs	Yes
Adult Fish Passage Rating: RED Why: bankfull ratio	Leap Barriers Velocity Barrier Pool Depth Barrier	None 49.05 cfs and Above None	



Stauf_7.5 Culvert Inlet with rip-rap



Stauf_7.5 Culvert outlet

Site: Stauf 7.71

Stream: Stauffer Creek

Survey Date: 4/29/2014

UTM CONUS NAD83: 12T 461783 E, 4696815 N

Key NIAP Site Characteristics

Culvert Slope	2.12	%
Channel Gradient (upstream)	4.7	%
Channel Gradient (downstream)	4.62	%
Outlet Drop	0.39	ft.
Inlet Gradient	4.7	%
Residual Inlet Depth	0	ft.
Residual Pool Depth	1.58	ft.
Ratio of Inlet to Bankfull Width	0.48	

Key FishXing Site Characteristics

<u>Crossing Installation Data</u> Culvert Type: 5.92 x 3.92 ft Pipe-Arch Material: Annular 2.67 x 1/2 inch Installation: Not Embedded Culvert Length: 31.5 ft Culvert Slope: 2.13% Culvert Roughness Coefficient: 0.021 Inlet Invert Elevation: 97.88 ft Outlet Invert Elevation: 97.21 ft Inlet Headloss Coefficient (Ke): 0.9	<u>Tailwater Information</u> Tailwater Option: Tailwater Channel Cross-Section Channel Bottom Slope: 4.62% Outlet-Pool Bottom Elevation: 95.24 ft
	<u>Design Flows</u> Low Passage Flow: 1.79 cfs (range 1.79 – 2.4 cfs) Rust Line Passage Flow: 28 cfs (based on rust line elevation) PK1.5 Passage Flow: 36.2 cfs (range 11.8 - 111 cfs) PK100 Passage Flow: 98 cfs (range 35.8 – 268 cfs)

Fish Passage Results

National Inventory and Assessment Procedure (NIAP)	FishXing		Does the structure constrict bankfull flows?
Juvenile Fish Passage Rating: RED Why: bankfull ratio, culvert slope, outlet drop	Low Passage Design Flow High Passage Design Flow Passable Flow Range Depth Barrier	1.79 cfs 98 cfs 5.83 – 26.84 cfs 0 to 5.83 cfs	Yes
Adult Fish Passage Rating: RED Why: bankfull ratio, culvert slope	Leap Barriers Velocity Barrier Pool Depth Barrier	None 26.84 cfs and Above None	



Stauf_7.71 Culvert Inlet with rip-rap



Stauf_7.71 Culvert outlet

Site: Stauf_8.66

Stream: North Stauffer Creek

Survey Date: 4/29/2014

UTM CONUS NAD83: 12T 461783 E, 4696815 N

Key NIAP Site Characteristics

Culvert Slope	3.95	%
Channel Gradient (upstream)	5.57	%
Channel Gradient (downstream)	7.25	%
Outlet Drop	0.3	ft.
Inlet Gradient	10.5	%
Residual Inlet Depth	0	ft.
Residual Pool Depth	1.61	ft.
Ratio of Inlet to Bankfull Width	0.60	

Key FishXing Site Characteristics

<u>Crossing Installation Data</u> Culvert Type: 4.08 x 2.75 ft Pipe-Arch Material: Annular 2.67 x 1/2 inch Installation: Not Embedded Culvert Length: 24.5 ft Culvert Slope: 3.96% Culvert Roughness Coefficient: 0.021 Inlet Invert Elevation: 97.99 ft Outlet Invert Elevation: 97.02 ft Inlet Headloss Coefficient (Ke): 0.9	<u>Tailwater Information</u> Tailwater Option: Tailwater Channel Cross-Section Channel Bottom Slope: 7.25% Outlet-Pool Bottom Elevation: 95.11 ft
	<u>Design Flows</u> Low Passage Flow: 0.85 cfs (range 0.85 – 1.08 cfs) Rust Line Passage Flow: 16 cfs (based on rust line elevation) PK1.5 Passage Flow: 16.4 cfs (range 5.21 – 51.7 cfs) PK100 Passage Flow: 42.6 cfs (range 15.2 – 120 cfs)

Fish Passage Results

National Inventory and Assessment Procedure (NIAP)	FishXing		Does the structure constrict bankfull flows?
Juvenile Fish Passage Rating: RED Why: bankfull ratio, culvert slope, outlet drop	Low Passage Design Flow High Passage Design Flow Passable Flow Range Depth Barrier	0 cfs 42.6 cfs 6.39 to 17.43 cfs 0 to 6.39 cfs	Yes
Adult Fish Passage Rating: RED Why: bankfull ratio, culvert slope	Leap Barriers Velocity Barrier Pool Depth Barrier	None 17.43 cfs and Above None	



Stauf_8.66 Culvert outlet and tailwater control



Stauf_8.66 Culvert outlet



Stauf_8.66 Culvert inlet



Stauf_8.66 stream gradient upstream of crossing

Site: Gtown_0.04

Stream: Georgetown Creek

Survey Date: 4/30/2014

UTM CONUS NAD83: 12T 467430 E, 4701942 N

Key NIAP Site Characteristics

Culvert 1			
Culvert Slope	2	%	
Channel Gradient (upstream)	NA	%	
Channel Gradient (downstream)	NA	%	
Outlet Drop	0.49	ft.	
Inlet Gradient	NA	%	
Residual Inlet Depth	0	ft.	
Residual Pool Depth	0.71	ft.	
Ratio of Inlet to Bankfull Width	0.89		

Key FishXing Site Characteristics

<u>Crossing Installation Data</u> Culvert Type: 9.33 x 6.25 ft Pipe-Arch Material: Multi-Plate (6 x 2 in) Installation: Not Embedded Culvert Length: 63.5 ft Culvert Slope: 2% Culvert Roughness Coefficient: 0.025 Inlet Invert Elevation: 96.8 ft Outlet Invert Elevation: 95.53 ft Inlet Headloss Coefficient (Ke): 0.5	<u>Tailwater Information</u> Tailwater Option: Constant Tailwater Constant Tailwater Elevation: 96.13 ft Outlet-Pool Bottom Elevation: 94.33 ft
	<u>Design Flows</u> Low Passage Flow: 6.6 cfs (range 6.6 – 9.87 cfs) PK1.5 Passage Flow: 227 cfs (range 75.4 - 684 cfs) PK100 Passage Flow: 544 cfs (range 203 - 1460 cfs) *No rust line information collected.

Fish Passage Results

National Inventory and Assessment Procedure (NIAP)	FishXing		Does the structure constrict bankfull flows?
Juvenile Fish Passage Rating: RED Why: culvert slope, outlet drop	Low Passage Design Flow High Passage Design Flow Passable Flow Range Depth Barrier	6.6 cfs 227 cfs 6.6 to 8.30 cfs None	Yes
Adult Fish Passage Rating: RED Why: culvert slope	Leap Barriers Velocity Barrier Pool Depth Barrier	None 8.31 cfs and Above None	



Gtown_0.04 Culvert outlet



Gtown_0.04 Culvert outlet, looking downstream



Gtown_0.04 Culvert inlet and rip-rap



Gtown_0.04 Culvert inlet, looking upstream

Site: Gtown_0.07

Stream: Georgetown Creek

Survey Date: 4/30/2014

UTM CONUS NAD83: 12T 467442 E, 4701975 N

Key NIAP Site Characteristics

Culvert 1		
Culvert Slope	-0.6	%
Channel Gradient (upstream)	1.32	%
Channel Gradient (downstream)	0.1	%
Outlet Drop	0	ft.
Inlet Gradient	1.32	%
Residual Inlet Depth	0.32	ft.
Residual Pool Depth	2.02	ft.
Ratio of Inlet to Bankfull Width	0.62	

Key FishXing Site Characteristics

<u>Crossing Installation Data</u> Culvert Type: 6 ft Circular Material: Annual (3 x 1 in) Installation: Embedded, Countersunk depth: 0.1 ft Culvert Length: 35 ft Culvert Slope: -0.66% Culvert Roughness Coefficient: 0.027 Inlet Invert Elevation: 96.92 ft Outlet Invert Elevation: 97.15 ft Inlet Headloss Coefficient (Ke): 0.9	<u>Tailwater Information</u> Tailwater Option: Tailwater Channel Cross Section Channel Bottom Slope: 0.1% Outlet-Pool Bottom Elevation: 95.22 ft
	<u>Design Flows</u> Low Passage Flow: 6.6 cfs (range 6.6 – 9.87 cfs) Rust Line Passage Flow: 11.3 cfs (based on rust line elevation) PK1.5 Passage Flow: 227 cfs (range 75.4 - 684 cfs) PK100 Passage Flow: 544 cfs (range 203 - 1460 cfs) *Highly regulated system, rust line measurement may be influenced by hydro power and irrigation extractions.

Fish Passage Results

National Inventory and Assessment Procedure (NIAP)	FishXing		Does the structure constrict bankfull flows?
Juvenile Fish Passage Rating: GRAY	Low Passage Design Flow	6.6 cfs	Yes
	High Passage Design Flow	227 cfs	
	Passable Flow Range	6.6 to 183.64 cfs	
	Depth Barrier	None	
	Leap Barriers	None	
Adult Fish Passage Rating: GRAY	Velocity Barrier	183.64 cfs and Above	
	Pool Depth Barrier	None	



Gtown_0.07 Culvert outlet



Gtown_0.07 Culvert outlet, looking downstream



Gtown_0.07 Culvert inlet and rip-rap



Gtown_0.07 Culvert inlet, looking upstream

Site: Gtown_1.35

Stream: Georgetown Creek

Survey Date: 7/12/2007, 4/30/2014

UTM CONUS NAD83: 12T 469237 E, 4702797 N

Key NIAP Site Characteristics

Culvert Slope	0.3	%
Channel Gradient (upstream)	2.55	%
Channel Gradient (downstream)	1.38	%
Outlet Drop	0.3	ft.
Inlet Gradient	6.4	%
Residual Inlet Depth	0	ft.
Residual Pool Depth	0.05	ft.
Ratio of Inlet to Bankfull Width	0.43	
*Substrate is present throughout entire structure		

Key FishXing Site Characteristics

<u>Crossing Installation Data</u> Culvert Type: 6.5 ft Circular Material: Steel Pipe Installation: Embedded, Countersunk depth: 0.5 ft Culvert Length: 36.3 ft Culvert Slope: 0.28% Culvert Roughness Coefficient: 0.024 Inlet Invert Elevation: 94.55 ft Outlet Invert Elevation: 94.45 ft Inlet Headloss Coefficient (Ke): 0.9	<u>Tailwater Information</u> Tailwater Option: Tailwater Channel Cross Section Channel Bottom Slope: 1.38% Outlet-Pool Bottom Elevation: 94.23 ft
	<u>Design Flows</u> Low Passage Flow: 6.5 cfs (range 6.5 – 9.77 cfs) Rust Line Passage Flow: 26 cfs (based on rust line elevation) PK1.5 Passage Flow: 223 cfs (range 74.1 - 673 cfs) PK100 Passage Flow: 528 cfs (range 197 - 1420 cfs)

Fish Passage Results

National Inventory and Assessment Procedure (NIAP)	FishXing		Does the structure constrict bankfull flows?
Juvenile Fish Passage Rating: RED Why: bankfull ratio	Low Passage Design Flow High Passage Design Flow Passable Flow Range Depth Barrier	6.5 cfs 223 cfs 8.83 to 205.69 cfs 0 to 8.83 cfs	Yes
Adult Fish Passage Rating: RED Why: bankfull ratio	Leap Barriers Velocity Barrier Pool Depth Barrier	None 205.69 cfs and Above None	



Gtown_1.35 Culvert outlet



Gtown_1.35 Culvert outlet, looking downstream



Gtown_1.35 Culvert inlet and rip-rap



Gtown_1.35 Culvert inlet, looking upstream

Site: Gtown_2.19

Stream: Georgetown Creek

Survey Date: 7/19/2007

UTM CONUS NAD83: 12T 470345 E, 4703486 N

Key NIAP Site Characteristics

Culvert Slope	1.58	%
Channel Gradient (upstream)	1.56	%
Channel Gradient (downstream)	2.77	%
Outlet Drop	0	ft.
Inlet Gradient	11.1	%
Residual Inlet Depth	0	ft.
Residual Pool Depth	0.41	ft.
Ratio of Inlet to Bankfull Width	0.29	
*Substrate is present throughout entire structure		

Key FishXing Site Characteristics

<u>Crossing Installation Data</u> Culvert Type: 5.5 x 4.25 ft Pipe-Arch Material: Annular 3 x 1 inch Installation: Embedded, Countersunk depth: 0.3 ft Culvert Length: 29.6 ft Culvert Slope: 1.59% Culvert Roughness Coefficient: 0.027 Inlet Invert Elevation: 96.25 ft Outlet Invert Elevation: 95.78 ft Inlet Headloss Coefficient (Ke): 0.9	<u>Tailwater Information</u> Tailwater Option: Tailwater Channel Cross-Section Channel Bottom Slope: 2.77% Outlet-Pool Bottom Elevation: 95.54 ft
	<u>Design Flows</u> Low Passage Flow: 6.37 cfs (range 6.37 - 9.5 cfs) Rust Line Passage Flow: 23.7 cfs (based on rust line elevation) PK1.5 Passage Flow: 225 cfs (range 74.6 - 678 cfs) PK100 Passage Flow: 542 cfs (range 202 - 1450 cfs)

Fish Passage Results

National Inventory and Assessment Procedure (NIAP)	FishXing		Does the structure constrict bankfull flows?
Juvenile Fish Passage Rating: RED Why: bankfull ratio, culvert slope	Low Passage Design Flow High Passage Design Flow Passable Flow Range Depth Barrier Leap Barriers Velocity Barrier Pool Depth Barrier	6.37 cfs 225 cfs 8.77 to 55.75 cfs 0 to 8.77 cfs None 55.75 cfs and Above None	Yes
Adult Fish Passage Rating: RED Why: bankfull ratio			



Gtown_2.19 Culvert outlet



Gtown_2.19 Culvert outlet, looking downstream



Gtown_2.19 Culvert inlet and rip-rap



Gtown_2.19 Culvert inlet, looking upstream

Site: Gtown_3.91

Stream: Georgetown Creek

Survey Date: 4/30/2014

UTM CONUS NAD83: 12T 472717 E, 4704512 N

This stream crossing is located under the Left Hand Fork road. The valley bottom of Georgetown Creek has been extensively filled to elevate the road way. Fill depths of 35' at the site made survey efforts tedious. To date fish passage surveys have not been completed at this site. However the condition of the culvert warrants replacement. The culvert has a drastic break in slope near the inlet and the culvert bottom is rusting out with holes visible. Site information: Round 4 ft culvert that is 55 ft long.

Fish Passage Results

National Inventory and Assessment Procedure (NIAP)	FishXing	Does the structure constrict bankfull flows?
Juvenile Fish Passage Rating: Not Assessed	Not Assessed	Yes
Adult Fish Passage Rating: Not Assessed		



Gtown_3.91 Culvert outlet



Gtown_3.91 Culvert inlet, looking down the pipe



Gtown_3.91 Culvert inlet, poor alignment



Gtown_3.91 Culvert inlet, grade break in culvert

Site: Gtown_4.06

Stream: Georgetown Creek

Survey Date: 4/30/2014

UTM CONUS NAD83: 12T 472902 E, 4704525 N

Key NIAP Site Characteristics

Culvert Slope	2.7	%
Channel Gradient (upstream)	2.59	%
Channel Gradient (downstream)	2.5	%
Outlet Drop	0	ft.
Inlet Gradient	5.02	%
Residual Inlet Depth	0	ft.
Residual Pool Depth	2.43	ft.
Ratio of Inlet to Bankfull Width	0.34	

Key FishXing Site Characteristics

<u>Crossing Installation Data</u> Culvert Type: 4 ft Circular Material: Annular 2.67 x 1/2 inch Installation: Not Embedded Culvert Length: 71 ft Culvert Slope: 2.70% Culvert Roughness Coefficient: 0.024 Inlet Invert Elevation: 94.03 ft Outlet Invert Elevation: 92.11 ft Inlet Headloss Coefficient (Ke): 0.9	<u>Tailwater Information</u> Tailwater Option: Tailwater Channel Cross-Section Channel Bottom Slope: 2.5% Outlet-Pool Bottom Elevation: 90.67 ft
	<u>Design Flows</u> Low Passage Flow: 4.45 cfs (range 4.45 – 6.47 cfs) Rust Line Passage Flow: 91 cfs (based on rust line elevation) PK1.5 Passage Flow: 160 cfs (range 53 - 483 cfs) PK100 Passage Flow: 402 cfs (range 149 - 1080 cfs) *Rust line is likely influenced by backwatering into the culvert.

Fish Passage Results

National Inventory and Assessment Procedure (NIAP)	FishXing		Does the structure constrict bankfull flows?
Juvenile Fish Passage Rating: RED Why: bankfull ratio, culvert slope	Low Passage Design Flow High Passage Design Flow Passable Flow Range Depth Barrier	4.45 cfs 160 cfs 4.45 to 4.61 cfs None	Yes
Adult Fish Passage Rating: RED Why: bankfull ratio, culvert slope	Leap Barriers Velocity Barrier Pool Depth Barrier	None 4.62 cfs and Above None	



Gtown_4.06 Culvert inlet



Gtown_4.06 Culvert inlet, looking upstream



Gtown_4.06 Culvert outlet and tailwater control



Gtown_4.06 Culvert outlet, looking downstream

Site: Gtown_4.85

Stream: Georgetown Creek

Survey Date: 7/19/2007, 4/30/2014

UTM CONUS NAD83: 12T 474163 E, 4704887 N

Key NIAP Site Characteristics

Culvert Slope	3.8	%
Channel Gradient (upstream)	1.89	%
Channel Gradient (downstream)	0.99	%
Outlet Drop	0.98	ft.
Inlet Gradient	11.25	%
Residual Inlet Depth	0	ft.
Residual Pool Depth	0.31	ft.
Ratio of Inlet to Bankfull Width	0.32	

Key FishXing Site Characteristics

<u>Crossing Installation Data</u> Culvert Type: 4 ft Circular Material: Annular 2.67 x 1/2 inch Installation: Not Embedded Culvert Length: 36.4 ft Culvert Slope: 3.85% Culvert Roughness Coefficient: 0.024 Inlet Invert Elevation: 94.83 ft Outlet Invert Elevation: 93.43 ft Inlet Headloss Coefficient (Ke): 0.5	<u>Tailwater Information</u> Tailwater Option: Tailwater Channel Cross-Section Channel Bottom Slope: 0.99% Outlet-Pool Bottom Elevation: 91.99 ft
	<u>Design Flows</u> Low Passage Flow: 4.21 cfs (range 4.21 – 6.1 cfs) Rust Line Passage Flow: 75.84 cfs (based on rust line elevation) PK1.5 Passage Flow: 150 cfs (range 49.5 - 452 cfs) PK100 Passage Flow: 372 cfs (range 138 - 1000 cfs)

Fish Passage Results

National Inventory and Assessment Procedure (NIAP)	FishXing		Does the structure constrict bankfull flows?
Juvenile Fish Passage Rating: RED Why: bankfull ratio, culvert slope, outlet drop	Low Passage Design Flow High Passage Design Flow Passable Flow Range	4.21 cfs 150 cfs 4.21 – 9.30 cfs, 76 - 81.88 cfs	Yes
Adult Fish Passage Rating: RED Why: bankfull ratio, culvert slope, outlet drop	Depth Barrier Leap Barriers Velocity Barrier Pool Depth Barrier	None None 9.30 – 76 cfs and 81.88 cfs and Above None	



Gtown_4.85 Culvert Inlet with flow measuring weir



Gtown_4.85 Culvert Inlet and flow measuring weir



Gtown_4.85 Flow measuring weir



Gtown_4.85 Culvert outlet and Tailwater control