

APPENDIX A:

**Phase 1 Stream Geomorphic
Assessment Data**

Hoosic Tribs

Phase 1 - Reach Summary Report

Basin: **Hoosic, Walloomsac, Batten Kill**
 Stream Name: **Tubbs Brook**
 Topo Maps: **NORTH POWNAL**
 Watershed: **Hoosic River**
 Sub-watershed: **Hoosic River -- Ladd Brook to Walloomsac River**

Reach ID: **M01T1.01**
 SGAT Version: **4.56**
 Date Last Edited: **February, 23 2017**
 QA Status: **Step 7 done**
 Is Reach An Impoundment?: **No**

Step 1. Reach Location

This reach extends from the first reach break between Skiparee and Tubbs Rd and flows downstream to the confluence with the main stem of the Hoosic River.

1.1 Reach Description:

1.2 Towns: **Pownal**

1.3 Downstream Latitude: **42.803197**

1.3 Downstream Longitude: **-73.273327**

Step 2. Stream Type

2.1 Elevation Upstream: **530**

2.1 Elevation Downstream: **493**

2.1 Is Gradient Gentle?: **No**

2.2 Valley Length: **1,973.0 ft. 0.37 Miles**

2.3 Valley Slope: **1.9**

2.4 Channel Length: **3,347.4 ft. 0.63 Miles**

2.5 Channel Slope: **1.12 %**

2.6 Sinuosity: **1.70**

2.7 Watershed Area: **5.8 Square Miles**

2.8 Channel Width: **28.4 feet**

2.9 Valley Width: **1,026.9 feet**

2.10 Confinement Ratio: **36.1**

2.10 Confinement Type: **Very Broad**

2.11 Reference Stream Type: **C**

Bedform: **Riffle-Pool**

Sub-Class Slope: **None**

Bed Material: **Gravel**

Step 3. Basin Characteristics

3.1 Alluvial Fan: **None**

3.2 Grade Control: **None**

3.3 Dominant Geological Mat.: %

3.3 Sub-dom. Geological Mat.:

3.4 Valley Slope Left: **Hilly**

3.4 Valley Slope Right: **Hilly**

3.5 Soils

Hydrologic Group: %

Flooding: %

Water Table Deep: %

Water Table Shallow: %

Erodibility: **slight** %

7.4 Comments:

This reach is reference C in a very broad valley. It has been highly straightened and encroached through decades of agricultural land use and development in the corridor, likely resulting in a departure to F-type channel geometry in the phase 2 assessment. Sinuosity was automatically calculated at 1.7 but is likely lower.

Step 4. Land Cover - Reach Hydrology

4.1 Watershed

Historic Land Cover: **Crop**

Current Dominant Land Cover: **Forest 64.0 %**

Current Sub-Dominant Land Cover: **Field**

4.2 Corridor

Historic Land Cover:: **Forest**

Current Dominant Land Cover: %

Current Sub-Dominant Land Cover:

4.3 Riparian Buffer **Left Bank Right Bank**

Dominant: **26-50 26-50**

Sub-dominant: **0-25 >100**

Length w / less than 25 ft.: **999.0 ft. 608.0 ft.**

4.4 Ground Water Inputs: **Minimal**

Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old):

Type: **None**

Use:

5.2 Bridges and Culverts: **3 1.4 %**

5.3 Bank Armoring: **413.3 12.3 %**

Left: **294.6 ft.** Right: **118.7 ft.**

5.4 Channel Straightening: **693.0 20.7 %**

5.5 Dredging History: **None**

Step 6. Floodplain Modifications

6.1 Berms & Roads - old: **540.2 ft. 16.1**

One Side Both Sides

Road: **330.3 ft. 209.9 ft.**

Railroad: **0.0 ft. 0.0 ft.**

Berm: **0.0 ft. 0.0 ft.**

Improved Path: **0.0 ft. 0.0 ft.**

6.2 Development: **195.8 ft. 702.3 ft.**

6.3 Channel Bars: **Multiple**

6.4 Meander Migration: **Multiple**

6.5 Meander Width: **62 ft. Ratio: 2.2**

6.6 Wavelength: **356 ft. Ratio: 12.5**

Step 7. Windshield Survey

7.1 Bank Erosion: **495.162 ft**

7.2 Bank Height: **3 ft**

7.3 Ice/Debris Jam Potential: **None**

4.1	4.2	4.3	5.1	5.2	5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.1	7.3	Total
1	0	2	0	0	1	2	0	1	2	2	1	2	0	1	0	15
Low	N.S.	High	N.S.	N.S.	Low	High	N.S.	Low	High	High	Low	High	N.S.	Low	N.S.	

Hoosic Tribs

Phase 1 - Reach Summary Report

Basin: **Hoosic, Walloomsac, Batten Kill**
 Stream Name: **First Unnamed Tributary to Tubbs Brook**
 Topo Maps: **NORTH POWNAL**
 Watershed: **Hoosic River**
 Sub-watershed: **Hoosic River -- Ladd Brook to Walloomsac River**

Reach ID: **M01T1.01S1.01**
 SGAT Version: **4.56**
 Date Last Edited: **January, 16 2017**
 QA Status: **Step 7 done**
 Is Reach An Impoundment?: **No**

Step 1. Reach Location **This reach is bound by the southern most reach breaks that straddle Skiparee Rd.**

1.1 Reach Description:

1.2 Towns: **Pownal**

1.3 Downstream Latitude: **42.807385**

1.3 Downstream Longitude: **-73.264606**

Step 2. Stream Type

2.1 Elevation Upstream: **596**

2.1 Elevation Downstream: **533**

2.1 Is Gradient Gentle?: **No**

2.2 Valley Length: **1,181.0 ft.** **0.22** Miles

2.3 Valley Slope: **5.4**

2.4 Channel Length: **1,195.9 ft.** **0.23** Miles

2.5 Channel Slope: **5.28 %**

2.6 Sinuosity: **1.01**

2.7 Watershed Area: **0.4** Square Miles

2.8 Channel Width: **9.0** feet

2.9 Valley Width: **45.0** feet

2.10 Confinement Ratio: **5.0**

2.10 Confinement Type: **Narrow**

2.11 Reference Stream Type: **B**

 Bedform: **Riffle-Pool**

 Sub-Class Slope:

 Bed Material: **Gravel**

Step 3. Basin Characteristics

3.1 Alluvial Fan: **None**

3.2 Grade Control: **None**

3.3 Dominant Geological Mat.: %

3.3 Sub-dom. Geological Mat.: %

3.4 Valley Slope Left: **Ext. Steep**

3.4 Valley Slope Right: **Ext. Steep**

3.5 Soils

 Hydrologic Group: %

 Flooding: %

 Water Table Deep: %

 Water Table Shallow: %

 Erodibility: **slight** %

7.4 Comments:

During the windshield survey this reach had a B-type channel geometry with moderate floodplain access. The slope measured during the windshield survey was around 2%, less than the DMS generated slope of 5%, supporting the B type channel designation.

Step 4. Land Cover - Reach Hydrology

4.1 Watershed

 Historic Land Cover: **Crop**

 Current Dominant Land Cover: **Forest** **57.0 %**

 Current Sub-Dominant Land Cover: **Field**

4.2 Corridor

 Historic Land Cover:: **Forest**

 Current Dominant Land Cover: %

 Current Sub-Dominant Land Cover:

4.3 Riparian Buffer Left Bank Right Bank

 Dominant: **51-100** **51-100**

 Sub-dominant: **26-50** **>100**

 Length w / less than 25 ft.: **0.0 ft.** **0.0 ft.**

4.4 Ground Water Inputs: **Minimal**

Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old):

 Type: **None**

 Use:

5.2 Bridges and Culverts: **0** **0.0 %**

5.3 Bank Armoring: **24.4** **2.0 %**

 Left: **0.0 ft.** Right: **24.4 ft.**

5.4 Channel Straightening: **0.0** **0.0 %**

5.5 Dredging History: **None**

Step 6. Floodplain Modifications

6.1 Berms & Roads - old: **58.7 ft.** **4.9**

One Side Both Sides

 Road: **0.0 ft.** **58.7 ft.**

 Railroad: **0.0 ft.** **0.0 ft.**

 Berm: **0.0 ft.** **0.0 ft.**

 Improved Path: **0.0 ft.** **0.0 ft.**

6.2 Development: **163.2 ft.** **240.7 ft.**

6.3 Channel Bars: **None**

6.4 Meander Migration: **None**

6.5 Meander Width: **N/A** Ratio: **0.0**

6.6 Wavelength: **N/A** Ratio: **0.0**

Step 7. Windshield Survey

7.1 Bank Erosion: **0** ft

7.2 Bank Height: **No Data** ft

7.3 Ice/Debris Jam Potential: **Culvert**

4.1	4.2	4.3	5.1	5.2	5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.1	7.3	Total
1	0	0	0	0	0	0	0	0	2	0	0	0	0	0	1	4
Low	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	High	N.S.	N.S.	N/A	N/A	N.S.	Low	

Hoosic Tribs

Phase 1 - Reach Summary Report

Basin: **Hoosic, Walloomsac, Batten Kill**
 Stream Name: **Tubbs Brook**
 Topo Maps: **NORTH POWNAL**
 Watershed: **Hoosic River**
 Sub-watershed: **Hoosic River -- Ladd Brook to Walloomsac River**

Reach ID: **M01T1.02**
 SGAT Version: **4.56**
 Date Last Edited: **January, 16 2017**
 QA Status: **Step 7 done**
 Is Reach An Impoundment?: **No**

Step 1. Reach Location **This reach flows from the reach break south of the intersection of John Lee and Skiparee Rd. and extends downstream to the southern most reach break between Tubbs and Skiparee Rd.**

1.1 Reach Description:
 1.2 Towns: **Pownal**
 1.3 Downstream Latitude: **42.807693**
 1.3 Downstream Longitude: **-73.264462**

Step 2. Stream Type

2.1 Elevation Upstream: **656**
 2.1 Elevation Downstream: **530**
 2.1 Is Gradient Gentle?: **No**
 2.2 Valley Length: **4,486.3 ft. 0.85 Miles**
 2.3 Valley Slope: **2.8**
 2.4 Channel Length: **4,776.4 ft. 0.90 Miles**
 2.5 Channel Slope: **2.64 %**
 2.6 Sinuosity: **1.06**
 2.7 Watershed Area: **5.3 Square Miles**
 2.8 Channel Width: **27.2 feet**
 2.9 Valley Width: **125.0 feet**
 2.10 Confinement Ratio: **4.6**
 2.10 Confinement Type: **Narrow**
 2.11 Reference Stream Type: **C**
 Bedform: **Riffle-Pool**
 Sub-Class Slope: **b**
 Bed Material: **Cobble**

Step 3. Basin Characteristics

3.1 Alluvial Fan: **None**
 3.2 Grade Control: **Multiple**
 3.3 Dominant Geological Mat.: %
 3.3 Sub-dom. Geological Mat.: %
 3.4 Valley Slope Left: **Ext. Steep**
 3.4 Valley Slope Right: **Very Steep**
 3.5 Soils
 Hydrologic Group: %
 Flooding: %
 Water Table Deep: %
 Water Table Shallow: %
 Erodibility: **slight** %

7.4 Comments:
The LWD observed during the windshield survey suggests there is potential for debris jams further downstream.

Step 4. Land Cover - Reach Hydrology

4.1 Watershed
 Historic Land Cover: **Crop**
 Current Dominant Land Cover: **Forest 65.0 %**
 Current Sub-Dominant Land Cover: **Field**
 4.2 Corridor
 Historic Land Cover:: **Forest**
 Current Dominant Land Cover: %
 Current Sub-Dominant Land Cover:
 4.3 Riparian Buffer Left Bank Right Bank
 Dominant: **>100 >100**
 Sub-dominant: **26-50 26-50**
 Length w / less than 25 ft.: **75.0 ft. 173.0 ft.**

4.4 Ground Water Inputs: **Minimal**

Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old):
 Type: **None**
 Use:
 5.2 Bridges and Culverts: **1 0.6 %**
 5.3 Bank Armoring: **0.0 0.0 %**
 Left: **0.0 ft.** Right: **0.0 ft.**
 5.4 Channel Straightening: **0.0 0.0 %**
 5.5 Dredging History: **None**

Step 6. Floodplain Modifications

6.1 Berms & Roads - old: **1,041.6 ft. 21.8**
One Side Both Sides
 Road: **1,041.6 ft. 0.0 ft.**
 Railroad: **0.0 ft. 0.0 ft.**
 Berm: **0.0 ft. 0.0 ft.**
 Improved Path: **0.0 ft. 0.0 ft.**
 6.2 Development: **141.3 ft. 0.0 ft.**
 6.3 Channel Bars: **Multiple**
 6.4 Meander Migration: **Flood Chute**
 6.5 Meander Width: **N/A Ratio: 0.0**
 6.6 Wavelength: **N/A Ratio: 0.0**

Step 7. Windshield Survey

7.1 Bank Erosion: **771.559** ft
 7.2 Bank Height: **4** ft
 7.3 Ice/Debris Jam Potential: **Debris**

4.1	4.2	4.3	5.1	5.2	5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.1	7.3	Total
1	0	1	0	0	0	0	0	2	0	2	1	0	0	1	0	8
Low	N.S.	Low	N.S.	N.S.	N.S.	N.S.	N.S.	High	N.S.	High	Low	N/A	N/A	Low	N.S.	

Hoosic Tribs

Phase 1 - Reach Summary Report

Basin: **Hoosic, Walloomsac, Batten Kill**
 Stream Name: **Second Unnamed Tributary to Tubbs Brook**
 Topo Maps: **NORTH POWNAL**
 Watershed: **Hoosic River**
 Sub-watershed: **Hoosic River -- Ladd Brook to Walloomsac River**

Reach ID: **M01T1.02S1.01**
 SGAT Version: **4.56**
 Date Last Edited: **January, 16 2017**
 QA Status: **Step 7 done**
 Is Reach An Impoundment?: **No**

Step 1. Reach Location **This reach flows from the reach break 300ft south of the town border between Bennington and Pownal and extends downstream to the reach break south of the intersection of John Lee and Skiparee Rd.**

1.1 Reach Description:
 1.2 Towns: **Pownal**
 1.3 Downstream Latitude: **42.818335**
 1.3 Downstream Longitude: **-73.261077**

Step 2. Stream Type

2.1 Elevation Upstream: **1,062**
 2.1 Elevation Downstream: **656**
 2.1 Is Gradient Gentle?: **No**
 2.2 Valley Length: **7,240.0 ft. 1.37 Miles**
 2.3 Valley Slope: **5.6**
 2.4 Channel Length: **7,459.2 ft. 1.41 Miles**
 2.5 Channel Slope: **5.45 %**
 2.6 Sinuosity: **1.03**
 2.7 Watershed Area: **1.5 Square Miles**
 2.8 Channel Width: **15.5 feet**
 2.9 Valley Width: **70.0 feet**
 2.10 Confinement Ratio: **4.5**
 2.10 Confinement Type: **Narrow**
 2.11 Reference Stream Type: **B**

Bedform: **Riffle-Pool**
 Sub-Class Slope:
 Bed Material: **Cobble**

Step 3. Basin Characteristics

3.1 Alluvial Fan: **None**
 3.2 Grade Control: **Ledge**
 3.3 Dominant Geological Mat.: %
 3.3 Sub-dom. Geological Mat.:
 3.4 Valley Slope Left: **Ext. Steep**
 3.4 Valley Slope Right: **Ext. Steep**
 3.5 Soils
 Hydrologic Group: %
 Flooding: %
 Water Table Deep: %
 Water Table Shallow: %
 Erodibility: **slight** %

7.4 Comments:

The slope observed during the windshield survey was representative of a B-type geometry, despite the DMS suggesting A-type slope. A large grade control and the beginning of this reach is partially responsible for this discrepancy. The large buffers along most of the reach and the forested subwatershed suggest there is a reduced chance for stream type departure due to human activity.

Step 4. Land Cover - Reach Hydrology

4.1 Watershed
 Historic Land Cover: **Forest**
 Current Dominant Land Cover: **Forest 63.0 %**
 Current Sub-Dominant Land Cover: **Field**
 4.2 Corridor
 Historic Land Cover:: **Forest**
 Current Dominant Land Cover: %
 Current Sub-Dominant Land Cover:
 4.3 Riparian Buffer Left Bank Right Bank
 Dominant: **>100 >100**
 Sub-dominant: **51-100 51-100**
 Length w / less than 25 ft.: **0.0 ft. 0.0 ft.**

4.4 Ground Water Inputs: **Minimal**

Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old):
 Type: **None**
 Use:
 5.2 Bridges and Culverts: **1 0.2 %**
 5.3 Bank Armoring: **0.0 0.0 %**
 Left: **0.0 ft.** Right: **0.0 ft.**
 5.4 Channel Straightening: **0.0 0.0 %**
 5.5 Dredging History: **None**

Step 6. Floodplain Modifications

6.1 Berms & Roads - old: **194.1 ft. 2.6**
One Side Both Sides
 Road: **194.1 ft. 0.0 ft.**
 Railroad: **0.0 ft. 0.0 ft.**
 Berm: **0.0 ft. 0.0 ft.**
 Improved Path: **0.0 ft. 0.0 ft.**
 6.2 Development: **0.0 ft. 0.0 ft.**
 6.3 Channel Bars: **Point**
 6.4 Meander Migration: **Not Evaluated**
 6.5 Meander Width: **N/A Ratio: 0.0**
 6.6 Wavelength: **N/A Ratio: 0.0**

Step 7. Windshield Survey

7.1 Bank Erosion: **0** ft
 7.2 Bank Height: **No Data** ft
 7.3 Ice/Debris Jam Potential: **None**

4.1	4.2	4.3	5.1	5.2	5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.1	7.3	Total
1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2
Low	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	Low	N.S.	N/A	N/A	N.S.	N.S.	

Hoosic Tribs

Phase 1 - Reach Summary Report

Basin: **Hoosic, Walloomsac, Batten Kill**
 Stream Name: **Tubbs Brook**
 Topo Maps: **NORTH POWNAL**
 Watershed: **Hoosic River**
 Sub-watershed: **Hoosic River -- Ladd Brook to Walloomsac River**

Reach ID: **M01T1.03**
 SGAT Version: **4.56**
 Date Last Edited: **January, 16 2017**
 QA Status: **Step 7 done**
 Is Reach An Impoundment?: **No**

Step 1. Reach Location **This reach is bound by the reach breaks that straddle the Hemlock Hill Rd. crossing.**

1.1 Reach Description:

1.2 Towns: **Pownal**

1.3 Downstream Latitude: **42.818425**

1.3 Downstream Longitude: **-73.260624**

Step 2. Stream Type

2.1 Elevation Upstream: **735**

2.1 Elevation Downstream: **656**

2.1 Is Gradient Gentle?: **No**

2.2 Valley Length: **1,700.5 ft. 0.32 Miles**

2.3 Valley Slope: **4.7**

2.4 Channel Length: **1,703.1 ft. 0.32 Miles**

2.5 Channel Slope: **4.65 %**

2.6 Sinuosity: **1.00**

2.7 Watershed Area: **2.9 Square Miles**

2.8 Channel Width: **20.9 feet**

2.9 Valley Width: **100.0 feet**

2.10 Confinement Ratio: **4.8**

2.10 Confinement Type: **Narrow**

2.11 Reference Stream Type: **C**

Bedform: **Riffle-Pool**

Sub-Class Slope: **None**

Bed Material: **Cobble**

Step 3. Basin Characteristics

3.1 Alluvial Fan: **None**

3.2 Grade Control: **Multiple**

3.3 Dominant Geological Mat.: %

3.3 Sub-dom. Geological Mat.: %

3.4 Valley Slope Left: **Steep**

3.4 Valley Slope Right: **Ext. Steep**

3.5 Soils

Hydrologic Group: %

Flooding: %

Water Table Deep: %

Water Table Shallow: %

Erodibility: **slight** %

7.4 Comments:

The multiple large cascades and bedrock grade controls in this reach allow an overestimation of slope along this reach. During the windshield survey the channel slope was estimated between 2 and 3% supporting the B-type channel designation. At the bottom of the reach there is a road crossing that has multiple culverts posing a minor risk of impact along Skiparee Rd.

Step 4. Land Cover - Reach Hydrology

4.1 Watershed

Historic Land Cover: **Forest**

Current Dominant Land Cover: **Forest 67.0 %**

Current Sub-Dominant Land Cover: **Field**

4.2 Corridor

Historic Land Cover:: **Forest**

Current Dominant Land Cover: %

Current Sub-Dominant Land Cover:

4.3 Riparian Buffer **Left Bank Right Bank**

Dominant: **>100 >100**

Sub-dominant: **0-25 None**

Length w / less than 25 ft.: **496.0 ft. 0.0 ft.**

4.4 Ground Water Inputs: **Minimal**

Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old):

Type: **None**

Use:

5.2 Bridges and Culverts: **0 0.0 %**

5.3 Bank Armoring: **163.0 9.6 %**

Left: **85.0 ft.** Right: **78.0 ft.**

5.4 Channel Straightening: **259.6 15.2 %**

5.5 Dredging History: **None**

Step 6. Floodplain Modifications

6.1 Berms & Roads - old: **62.5 ft. 3.7**

One Side Both Sides

Road: **0.0 ft. 0.0 ft.**

Railroad: **0.0 ft. 0.0 ft.**

Berm: **0.0 ft. 62.5 ft.**

Improved Path: **0.0 ft. 0.0 ft.**

6.2 Development: **0.0 ft. 272.3 ft.**

6.3 Channel Bars: **Multiple**

6.4 Meander Migration: **Flood Chute**

6.5 Meander Width: **N/A Ratio: 0.0**

6.6 Wavelength: **N/A Ratio: 0.0**

Step 7. Windshield Survey

7.1 Bank Erosion: **50.0004** ft

7.2 Bank Height: **3** ft

7.3 Ice/Debris Jam Potential: **Culvert**

4.1	4.2	4.3	5.1	5.2	5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.1	7.3	Total
1	0	2	0	0	1	1	0	0	1	1	0	0	0	0	1	8
Low	N.S.	High	N.S.	N.S.	Low	Low	N.S.	N.S.	Low	Low	N.S.	N/A	N/A	N.S.	Low	

Hoosic Tribs

Phase 1 - Reach Summary Report

Basin: **Hoosic, Walloomsac, Batten Kill**
 Stream Name: **Third Unnamed Tributary to Tubbs Brook**
 Topo Maps: **NORTH POWNAL, POWNAL**
 Watershed: **Hoosic River**
 Sub-watershed: **Hoosic River -- Ladd Brook to Walloomsac River**

Reach ID: **M01T1.03S1.01**
 SGAT Version: **4.56**
 Date Last Edited: **January, 16 2017**
 QA Status: **Step 7 done**

Is Reach An Impoundment?: **No**

Step 1. Reach Location

This reach flows from the southern most reach break between Mount Anthony and Carpenter Hill Rd and extends downstream to the reach break east of the Hemlock Hill Rd crossing.

1.1 Reach Description:

1.2 Towns: **Pownal**

1.3 Downstream Latitude: **42.820731**

1.3 Downstream Longitude: **-73.255885**

Step 2. Stream Type

2.1 Elevation Upstream: **945**

2.1 Elevation Downstream: **735**

2.1 Is Gradient Gentle?: **No**

2.2 Valley Length: **3,090.0 ft. 0.59 Miles**

2.3 Valley Slope: **6.8**

2.4 Channel Length: **3,090.2 ft. 0.59 Miles**

2.5 Channel Slope: **6.80 %**

2.6 Sinuosity: **1.00**

2.7 Watershed Area: **0.6 Square Miles**

2.8 Channel Width: **10.2 feet**

2.9 Valley Width: **50.0 feet**

2.10 Confinement Ratio: **4.9**

2.10 Confinement Type: **Narrow**

2.11 Reference Stream Type: **B**

Bedform: **Riffle-Pool**

Sub-Class Slope: **a**

Bed Material: **Cobble**

Step 3. Basin Characteristics

3.1 Alluvial Fan: **None**

3.2 Grade Control: **Ledge**

3.3 Dominant Geological Mat.: %

3.3 Sub-dom. Geological Mat.: %

3.4 Valley Slope Left: **Ext. Steep**

3.4 Valley Slope Right: **Steep**

3.5 Soils

Hydrologic Group: %

Flooding: %

Water Table Deep: %

Water Table Shallow: %

Erodibility: **slight** %

7.4 Comments:

Aerial imagery and the windshield survey suggest B type channel geometry with a relatively accessible forested floodplain. The channel narrows slightly along the field edge likely due to historical encroachment.

Step 4. Land Cover - Reach Hydrology

4.1 Watershed

Historic Land Cover: **Field**

Current Dominant Land Cover: **Field 46.0 %**

Current Sub-Dominant Land Cover: **Forest**

4.2 Corridor

Historic Land Cover:: **Forest**

Current Dominant Land Cover: %

Current Sub-Dominant Land Cover:

4.3 Riparian Buffer **Left Bank Right Bank**

Dominant: **>100 >100**

Sub-dominant: **0-25 51-100**

Length w / less than 25 ft.: **326.0 ft. 30.0 ft.**

4.4 Ground Water Inputs: **Abundant**

Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old):

Type: **None**

Use:

5.2 Bridges and Culverts: **1 1.0 %**

5.3 Bank Armoring: **0.0 0.0 %**

Left: **0.0 ft.** Right: **0.0 ft.**

5.4 Channel Straightening: **191.7 6.2 %**

5.5 Dredging History: **None**

Step 6. Floodplain Modifications

6.1 Berms & Roads - old: **701.7 ft. 22.7**

One Side Both Sides

Road: **701.7 ft. 0.0 ft.**

Railroad: **0.0 ft. 0.0 ft.**

Berm: **0.0 ft. 0.0 ft.**

Improved Path: **0.0 ft. 0.0 ft.**

6.2 Development: **0.0 ft. 0.0 ft.**

6.3 Channel Bars: **Point**

6.4 Meander Migration: **Migration**

6.5 Meander Width: **N/A Ratio: 0.0**

6.6 Wavelength: **N/A Ratio: 0.0**

Step 7. Windshield Survey

7.1 Bank Erosion: **0 ft**

7.2 Bank Height: **No Data ft**

7.3 Ice/Debris Jam Potential: **None**

4.1	4.2	4.3	5.1	5.2	5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.1	7.3	Total
2	0	1	0	0	0	1	0	2	0	1	1	0	0	0	0	8
High	N.S.	Low	N.S.	N.S.	N.S.	Low	N.S.	High	N.S.	Low	Low	N/A	N/A	N.S.	N.S.	

Hoosic Tribs

Phase 1 - Reach Summary Report

Basin: **Hoosic, Walloomsac, Batten Kill**
 Stream Name: **Tubbs Brook**
 Topo Maps: **NORTH POWNAL**
 Watershed: **Hoosic River**
 Sub-watershed: **Hoosic River -- Ladd Brook to Walloomsac River**

Reach ID: **M01T1.04**
 SGAT Version: **4.56**
 Date Last Edited: **March, 01 2017**
 QA Status: **Step 7 done**
 Is Reach An Impoundment?: **No**

Step 1. Reach Location **This reach flows from the northern most reach break along Mount Anthony Rd and extends downstream to the southern most reach break between Hemlock Hill and Mount Anthony Rd.**

1.1 Reach Description:
 1.2 Towns: **Bennington, Pownal**
 1.3 Downstream Latitude: **42.820877**
 1.3 Downstream Longitude: **-73.255912**

Step 2. Stream Type

2.1 Elevation Upstream: **1,318**
 2.1 Elevation Downstream: **735**
 2.1 Is Gradient Gentle?: **No**
 2.2 Valley Length: **9,550.0 ft.** **1.81** Miles
 2.3 Valley Slope: **6.1**
 2.4 Channel Length: **9,761.0 ft.** **1.85** Miles
 2.5 Channel Slope: **5.97 %**
 2.6 Sinuosity: **1.02**
 2.7 Watershed Area: **2.3** Square Miles
 2.8 Channel Width: **18.8** feet
 2.9 Valley Width: **90.0** feet
 2.10 Confinement Ratio: **4.8**
 2.10 Confinement Type: **Narrow**
 2.11 Reference Stream Type: **B**
 Bedform: **Step-Pool**
 Sub-Class Slope: **None**
 Bed Material: **Cobble**

Step 3. Basin Characteristics

3.1 Alluvial Fan: **None**
 3.2 Grade Control: **Multiple**
 3.3 Dominant Geological Mat.: %
 3.3 Sub-dom. Geological Mat.: %
 3.4 Valley Slope Left: **Steep**
 3.4 Valley Slope Right: **Steep**
 3.5 Soils
 Hydrologic Group: %
 Flooding: %
 Water Table Deep: %
 Water Table Shallow: %
 Erodibility: **slight** %

7.4 Comments:
Multiple large cascades and bedrock grade controls are visible in the aerial imagery and suggest an overestimation of channel slope along this reach. Windshield survey estimations of slope ranged between 2 and 4% supporting the B-type channel designation.

Step 4. Land Cover - Reach Hydrology

4.1 Watershed
 Historic Land Cover: **Forest**
 Current Dominant Land Cover: **Forest 76.0 %**
 Current Sub-Dominant Land Cover: **Field**
 4.2 Corridor
 Historic Land Cover: **Forest**
 Current Dominant Land Cover: %
 Current Sub-Dominant Land Cover:
 4.3 Riparian Buffer Left Bank Right Bank
 Dominant: **>100** **>100**
 Sub-dominant: **51-100** **26-50**
 Length w / less than 25 ft.: **741.0 ft.** **1,705.0 ft.**

4.4 Ground Water Inputs: **Abundant**

Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old):
 Type: **None**
 Use:
 5.2 Bridges and Culverts: **7** **1.8 %**
 5.3 Bank Armoring: **924.7** **9.5 %**
 Left: **334.7 ft.** Right: **590.0 ft.**
 5.4 Channel Straightening: **3,039.2** **31.1 %**
 5.5 Dredging History: **None**

Step 6. Floodplain Modifications

6.1 Berms & Roads - old: **4,583.6 ft.** **47.0**
One Side Both Sides
 Road: **4,583.6 ft.** **0.0 ft.**
 Railroad: **0.0 ft.** **0.0 ft.**
 Berm: **0.0 ft.** **0.0 ft.**
 Improved Path: **0.0 ft.** **0.0 ft.**
 6.2 Development: **0.0 ft.** **0.0 ft.**
 6.3 Channel Bars: **Multiple**
 6.4 Meander Migration: **Multiple**
 6.5 Meander Width: **N/A** Ratio: **0.0**
 6.6 Wavelength: **N/A** Ratio: **0.0**

Step 7. Windshield Survey

7.1 Bank Erosion: **869.952** ft
 7.2 Bank Height: **2** ft
 7.3 Ice/Debris Jam Potential: **Debris**

4.1	4.2	4.3	5.1	5.2	5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.1	7.3	Total
1	0	2	0	0	1	2	0	2	0	2	1	0	0	1	0	12
Low	N.S.	High	N.S.	N.S.	Low	High	N.S.	High	N.S.	High	Low	N/A	N/A	Low	N.S.	

Hoosic Tribs

Phase 1 - Reach Summary Report

Basin: **Hoosic, Walloomsac, Batten Kill**
 Stream Name: **Fourth Unnamed Tributary to Tubbs Brook**
 Topo Maps: **NORTH POWNAL, POWNAL**
 Watershed: **Hoosic River**
 Sub-watershed: **Hoosic River -- Ladd Brook to Walloomsac River**

Reach ID: **M01T1.04S1.01**
 SGAT Version: **4.56**
 Date Last Edited: **March, 01 2017**
 QA Status: **Step 7 done**

Is Reach An Impoundment?: **No**

Step 1. Reach Location

This reach flows from the northern most reach break between Mount Anthony and Hemlock Hill Rd. and extends downstream to the northern most reach break between Hemlock Hill and Mount Anthony Rd.

1.1 Reach Description:

1.2 Towns: **Pownal**

1.3 Downstream Latitude: **42.824297**

1.3 Downstream Longitude: **-73.255368**

Step 2. Stream Type

2.1 Elevation Upstream: **1,146**

2.1 Elevation Downstream: **856**

2.1 Is Gradient Gentle?: **No**

2.2 Valley Length: **3,390.0 ft. 0.64 Miles**

2.3 Valley Slope: **8.5**

2.4 Channel Length: **3,438.8 ft. 0.65 Miles**

2.5 Channel Slope: **8.42 %**

2.6 Sinuosity: **1.01**

2.7 Watershed Area: **0.7 Square Miles**

2.8 Channel Width: **11.0 feet**

2.9 Valley Width: **60.0 feet**

2.10 Confinement Ratio: **5.5**

2.10 Confinement Type: **Narrow**

2.11 Reference Stream Type: **B**

Bedform: **Riffle-Pool**

Sub-Class Slope:

Bed Material: **Cobble**

Step 3. Basin Characteristics

3.1 Alluvial Fan: **None**

3.2 Grade Control: **None**

3.3 Dominant Geological Mat.: %

3.3 Sub-dom. Geological Mat.:

3.4 Valley Slope Left: **Ext. Steep**

3.4 Valley Slope Right: **Steep**

3.5 Soils

Hydrologic Group: %

Flooding: %

Water Table Deep: %

Water Table Shallow: %

Erodibility: **slight** %

7.4 Comments:

The access along Mount Anthony Road suggested B-type geometry with a slope between 2 and 3%. This is greatly lower slope than calculated by the DMS, though is likely explained by locally higher slope up and downstream, bedrock grade controls, and more sinuosity than is captured by the VHD.

Step 4. Land Cover - Reach Hydrology

4.1 Watershed

Historic Land Cover: **Forest**

Current Dominant Land Cover: **Forest 83.0 %**

Current Sub-Dominant Land Cover: **Field**

4.2 Corridor

Historic Land Cover:: **Forest**

Current Dominant Land Cover: %

Current Sub-Dominant Land Cover:

4.3 Riparian Buffer **Left Bank Right Bank**

Dominant: **>100 >100**

Sub-dominant: **51-100 26-50**

Length w / less than 25 ft.: **136.0 ft. 195.0 ft.**

4.4 Ground Water Inputs: **Abundant**

Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old):

Type: **None**

Use:

5.2 Bridges and Culverts: **1 0.9 %**

5.3 Bank Armoring: **0.0 0.0 %**

Left: **0.0 ft.** Right: **0.0 ft.**

5.4 Channel Straightening: **0.0 0.0 %**

5.5 Dredging History: **None**

Step 6. Floodplain Modifications

6.1 Berms & Roads - old: **252.1 ft. 7.3**

One Side Both Sides

Road: **252.1 ft. 0.0 ft.**

Railroad: **0.0 ft. 0.0 ft.**

Berm: **0.0 ft. 0.0 ft.**

Improved Path: **0.0 ft. 0.0 ft.**

6.2 Development: **0.0 ft. 197.9 ft.**

6.3 Channel Bars: **Multiple**

6.4 Meander Migration: **Multiple**

6.5 Meander Width: **N/A Ratio: 0.0**

6.6 Wavelength: **N/A Ratio: 0.0**

Step 7. Windshield Survey

7.1 Bank Erosion: **429.71 ft**

7.2 Bank Height: **3 ft**

7.3 Ice/Debris Jam Potential: **Debris**

4.1	4.2	4.3	5.1	5.2	5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.1	7.3	Total
0	0	1	0	0	0	0	0	1	1	2	0	0	0	1	0	6
N.S.	N.S.	Low	N.S.	N.S.	N.S.	N.S.	N.S.	Low	Low	High	N.S.	N/A	N/A	Low	N.S.	

Hoosic Tribs

Phase 1 - Reach Summary Report

Basin: **Hoosic, Walloomsac, Batten Kill**
 Stream Name: **Ladd Brook**
 Topo Maps: **POWNAL**
 Watershed: **Hoosic River**
 Sub-watershed: **Hoosic River -- Ladd Brook to Walloomsac River**

Reach ID: **M05S1.01**
 SGAT Version: **4.56**
 Date Last Edited: **March, 01 2017**
 QA Status: **Step 7 done**
 Is Reach An Impoundment?: **No**

Step 1. Reach Location

This reach flows from the reach break 90ft west of the Route-7 crossing and continues downstream to the confluence with the main stem of the Hoosic River.

1.1 Reach Description:

1.2 Towns: **Pownal**

1.3 Downstream Latitude: **42.762966**

1.3 Downstream Longitude: **-73.239507**

Step 2. Stream Type

2.1 Elevation Upstream: **616**

2.1 Elevation Downstream: **528**

2.1 Is Gradient Gentle?: **No**

2.2 Valley Length: **2,055.0 ft.** **0.39** Miles

2.3 Valley Slope: **4.3**

2.4 Channel Length: **2,429.9 ft.** **0.46** Miles

2.5 Channel Slope: **3.64 %**

2.6 Sinuosity: **1.18**

2.7 Watershed Area: **1.8** Square Miles

2.8 Channel Width: **17.0** feet

2.9 Valley Width: **740.3** feet

2.10 Confinement Ratio: **43.5**

2.10 Confinement Type: **Very Broad**

2.11 Reference Stream Type: **C**

Bedform: **Riffle-Pool**

Sub-Class Slope: **b**

Bed Material: **Gravel**

Step 3. Basin Characteristics

3.1 Alluvial Fan: **None**

3.2 Grade Control: **Dam**

3.3 Dominant Geological Mat.: %

3.3 Sub-dom. Geological Mat.: %

3.4 Valley Slope Left: **Very Steep**

3.4 Valley Slope Right: **Hilly**

3.5 Soils

Hydrologic Group: %

Flooding: %

Water Table Deep: %

Water Table Shallow: %

Erodibility: **slight** %

7.4 Comments:

There is potential for a large impact due to a debris or ice jam. The reach takes two 90 degree bends into culverts, which poses a large threat to damming of the structures and the brook jumping its banks.

Step 4. Land Cover - Reach Hydrology

4.1 Watershed

Historic Land Cover: **Field**

Current Dominant Land Cover: **Forest 68.0 %**

Current Sub-Dominant Land Cover: **Field**

4.2 Corridor

Historic Land Cover:: **Commercial**

Current Dominant Land Cover: %

Current Sub-Dominant Land Cover:

4.3 Riparian Buffer **Left Bank Right Bank**

Dominant: **26-50 26-50**

Sub-dominant: **51-100 0-25**

Length w / less than 25 ft.: **628.0 ft. 1,163.0 ft.**

4.4 Ground Water Inputs: **Minimal**

Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old):

Type: **None**

Use:

5.2 Bridges and Culverts: **4 9.3 %**

5.3 Bank Armoring: **548.0 22.6 %**

Left: **104.0 ft.** Right: **444.0 ft.**

5.4 Channel Straightening: **1,132.2 46.6 %**

5.5 Dredging History: **None**

Step 6. Floodplain Modifications

6.1 Berms & Roads - old: **481.6 ft. 19.8**

One Side Both Sides

Road: **481.6 ft. 0.0 ft.**

Railroad: **274.4 ft. 0.0 ft.**

Berm: **95.5 ft. 0.0 ft.**

Improved Path: **0.0 ft. 0.0 ft.**

6.2 Development: **483.6 ft. 1,164.7 ft.**

6.3 Channel Bars: **Mid-channel**

6.4 Meander Migration: **None**

6.5 Meander Width: **17 ft. Ratio: 1.0**

6.6 Wavelength: **17 ft. Ratio: 1.0**

Step 7. Windshield Survey

7.1 Bank Erosion: **322.978** ft

7.2 Bank Height: **3** ft

7.3 Ice/Debris Jam Potential: **Bend**

4.1	4.2	4.3	5.1	5.2	5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.1	7.3	Total
2	0	2	0	1	2	2	0	1	2	1	0	2	2	1	2	20
High	N.S.	High	N.S.	Low	High	High	N.S.	Low	High	Low	N.S.	High	High	Low	High	

Hoosic Tribs

Phase 1 - Reach Summary Report

Basin: **Hoosic, Walloomsac, Batten Kill**
 Stream Name: **Ladd Brook**
 Topo Maps: **POWNAL**
 Watershed: **Hoosic River**
 Sub-watershed: **Hoosic River -- Ladd Brook to Walloomsac River**

Reach ID: **M05S1.02**
 SGAT Version: **4.56**
 Date Last Edited: **March, 01 2017**
 QA Status: **Step 7 done**
 Is Reach An Impoundment?: **No**

Step 1. Reach Location **This reach flows from the reach break between Lavino and Hidden Valley Rd along Ladd Rd and extends downstream to the reach break 90ft west of the Route-7 crossing.**

1.1 Reach Description:
 1.2 Towns: **Pownal**
 1.3 Downstream Latitude: **42.766381**
 1.3 Downstream Longitude: **-73.233858**

Step 2. Stream Type

2.1 Elevation Upstream: **1,052**
 2.1 Elevation Downstream: **616**
 2.1 Is Gradient Gentle?: **No**
 2.2 Valley Length: **6,332.2 ft. 1.20 Miles**
 2.3 Valley Slope: **6.9**
 2.4 Channel Length: **6,420.9 ft. 1.22 Miles**
 2.5 Channel Slope: **6.80 %**
 2.6 Sinuosity: **1.01**
 2.7 Watershed Area: **1.7 Square Miles**
 2.8 Channel Width: **16.7 feet**
 2.9 Valley Width: **50.0 feet**
 2.10 Confinement Ratio: **3.0**
 2.10 Confinement Type: **Semi-confined**
 2.11 Reference Stream Type: **B**
 Bedform: **Riffle-Pool**
 Sub-Class Slope: **a**
 Bed Material: **Cobble**

Step 3. Basin Characteristics

3.1 Alluvial Fan: **None**
 3.2 Grade Control: **Multiple**
 3.3 Dominant Geological Mat.: %
 3.3 Sub-dom. Geological Mat.: %
 3.4 Valley Slope Left: **Ext. Steep**
 3.4 Valley Slope Right: **Ext. Steep**
 3.5 Soils
 Hydrologic Group: %
 Flooding: %
 Water Table Deep: %
 Water Table Shallow: %
 Erodibility: **slight** %

7.4 Comments:
This reach maintained B-type channel geometry with a moderately accessible floodplain throughout, despite having some variable valley widths. The primarily forested stream buffer provides potential for debris jams, though the only risk of impact would be along areas of development.

Step 4. Land Cover - Reach Hydrology

4.1 Watershed
 Historic Land Cover: **Forest**
 Current Dominant Land Cover: **Forest 71.0 %**
 Current Sub-Dominant Land Cover: **Field**
 4.2 Corridor
 Historic Land Cover: **Forest**
 Current Dominant Land Cover: %
 Current Sub-Dominant Land Cover: %
 4.3 Riparian Buffer Left Bank Right Bank
 Dominant: **>100 26-50**
 Sub-dominant: **26-50 0-25**
 Length w / less than 25 ft.: **266.0 ft. 739.0 ft.**

4.4 Ground Water Inputs: **Minimal**

Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old):
 Type: **None**
 Use:
 5.2 Bridges and Culverts: **3 3.7 %**
 5.3 Bank Armoring: **2,011.3 31.3 %**
 Left: **342.2 ft.** Right: **1,669.1 ft.**
 5.4 Channel Straightening: **542.3 8.4 %**
 5.5 Dredging History: **None**

Step 6. Floodplain Modifications

6.1 Berms & Roads - old: **591.3 ft. 9.2**
 One Side Both Sides
 Road: **591.3 ft. 0.0 ft.**
 Railroad: **0.0 ft. 0.0 ft.**
 Berm: **0.0 ft. 0.0 ft.**
 Improved Path: **0.0 ft. 0.0 ft.**
 6.2 Development: **611.9 ft. 0.0 ft.**
 6.3 Channel Bars: **Multiple**
 6.4 Meander Migration: **Flood Chute**
 6.5 Meander Width: **N/A Ratio: 0.0**
 6.6 Wavelength: **N/A Ratio: 0.0**

Step 7. Windshield Survey

7.1 Bank Erosion: **234.898** ft
 7.2 Bank Height: **6** ft
 7.3 Ice/Debris Jam Potential: **Debris**

4.1	4.2	4.3	5.1	5.2	5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.1	7.3	Total
1	0	1	0	0	2	1	0	1	1	2	0	0	0	0	0	9
Low	N.S.	Low	N.S.	N.S.	High	Low	N.S.	Low	Low	High	N.S.	N/A	N/A	N.S.	N.S.	