PHASE 2 GEOMORPHIC ASSESSMENT AND CORRIDOR PLANNING
MCCABE'S BROOK WATERSHED
CHARLOTTE AND SHELBURNE, VERMONT

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CONTENTS

APPENDICES

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EXECUTIVE SUMMARY

The purpose of this study is to provide site level assessments to inform stream corridor planning and riparian management recommendations.

McCabe's Brook is a tributary of the LaPlatte River that flows through Charlotte and Shelburne, draining to Shelburne Bay. Shelburne Bay is a drinking water source for Chittenden County, so sediment and nutrient loading to the Bay is a concern. This project consisted of a Stream Geomorphic Assessment of McCabe's Brook (watershed area = 6.2 square miles, length = 8.3 miles) and river corridor planning to identify potential projects for conservation or restoration.

McCabe's Brook headwaters are dominated by flat wetlands in a primarily agricultural area in Charlotte. The upper reaches have significant impacts including historic channel straightening and dredging due to agricultural practices. The upper fluvial reaches were found to be in good or reference geomorphic condition, and are stable without significant transformational processes occurring. In Shelburne, the channel is in closer proximity to development and roads. The channel is in various stages of incision, widening, and planform change in this area. Downstream of the undersized Route 7 culvert, the channel has departed from a reference C-type channel to an F-type and was found to be in poor condition. Assessed stream segments were identified to have good to fair overall physical habitat conditions.

Encroachments and channel modifications have been identified in the river corridor. There has been channel straightening in the upper watershed (T1.08), near Route 7 (T1.05A & T1.05B), and Shelburne Village (T1.03). Residential and municipal development in Shelburne Village has encroached on the channel. Undersized culverts are impacting sediment transport and aquatic organism passage at Route 7, Bostwick Road, Lime Kiln Road, and small farm crossings.

River conditions are being impacted by changes in hydrology caused by land use conversion away from natural vegetative cover. McCabe's Brook subwatersheds have low to moderate amounts of impervious cover except at the village center of Shelburne where impervious cover is up to 20%. Most subwatersheds have urban land cover of 9% or higher. Agriculture also influences stormwater runoff and sediment production and there is a high percentage of agriculture in all subwatersheds. A large number of stormwater inputs were identified in Shelburne Village (T1.03, T1.05B) and from the rural area near Lime Kiln Road (T1.06A). Previous water quality analysis as part of another project indicates that agricultural practices are likely impacting water quality downstream of Limekiln Road.

River corridor planning has led to general watershed recommendations for improvement of Drainage and Stormwater Management, Floodplain and River Corridor Planning and Protection, Buffer Establishment and Protection, and Stream Crossings. Site specific projects have been identified and prioritized based on the potential improvement in the river condition (Table ES-1). A constriction of the river channel and floodplain by the Route 7 embankment has been identified to be contributing to channel destabilization and creation of mass failures of the valley wall. Creation of a new compound channel and floodplain is recommended to remove the constriction and restore natural river processes while protecting Route 7. Bostwick Road is located at a critical break in slope in the valley and downstream of a massive sediment supply. Replacement is recommended because the culvert is undersized and created a sediment delta upstream, disrupting sediment supply to downstream reaches and potentially increasing incision downstream.

Table ES-1: Project Identification Table Ten Priority Projects.

Priority Rank	River Segment / Condition	Site Description including Stressors and Constraints	Project or Strategy Description	Project Benefits
1	**T1.05B/A #1**	Route 7: The road embankment completely fills the floodplain at the crossing location. Downstream of the crossing the river turns and flows parallel to the embankment, where it is severely constricted by the embankment fill. Mass failures have resulted upstream and downstream of the constriction. Armor at toe of Route 7 embankment has some damage.	Remove Constriction / Floodplain Restoration: Remove constriction caused by embankment. Route 7 is a major travel corridor and unlikely to be re-routed or accommodate a narrower embankment. Explore creation of a compound channel with floodplain using undeveloped land on the opposite bank.	Improved sediment transport; reduced erosion risk; Improved floodplain attenuation.
2	**T1.05A #4**	Bostwick Road Culvert: This culvert is undersized and completely filling the floodplain with a tall embankment. The structure is accumulating debris upstream and has a very large cobble and gravel delta extending a few hundred feet upstream. Scour is occurring downstream and an outlet drop of 0.5 ft blocks AOP.	Replace Structures - The Bostwick Road culvert should be replaced with a larger structure than can accommodate sediment and flood water movement along with AOP.	Wildlife habitat connectivity; sediment continuity; reduce erosion risk.
3	**T1.03 #3**	At the Shelburne Town Garage and Wastewater Treatment Plant on Turtle Lane the riparian buffer is narrow and lacking natural vegetation. The buildings are less than 100 ft from river. Fill is visible at the top of the bank and storage of materials is in the floodplain. The riparian buffer is narrow and non-existent in locations.	Plant Stream Buffers / Restore Floodplain - Remove storage of materials and fill from the riparian zone behind the buildings. Plant woody stream buffers in riparian areas.	
4	**T1.05B #5**	Route 7: Culvert is undersized and the embankment fills the floodplain. Sediment is accumulating upstream.	Replace Structure - Replace culvert with a larger structure that will accommodate sediment transport.	Improved habitat. Wildlife habitat connectivity.
5	**T1.08 #3**	Pizzagalli Property: A farm road runs parallel to the channel. The road is raised and blocks access to the left floodplain. There is evidence of periodic dredging along with road maintenance. The channel has the form of a straight, wide, featureless ditch at the edge of the road. Natural vegetation and shade is minimal due to road location.	Restore Wetland Channel - Reconnect channel to left wetlands. This could mean abandoning or removing road where it prevents access to adjacent wetlands. Recommend no more dredging in channel. Work with landowner to allow for passive restoration of the channel by allowing natural vegetation to grow on the banks and not ditching.	Improved habitat; Improve adjacent wetland attenuation.
6	**T1.07B/A + T1.06B #3**	Nordic Farm: River Corridor is primarily undeveloped and forested. The riparian area is in good condition and protections should be put in place to ensure that this will not be lost to future land use changes.	Protect River Corridors - Preserve these "in-regime" reaches by preventing future encroachment. The property has an easement with the Vermont Land Trust already. Work with landowners to secure specific protections for the river corridor.	Improve floodplain attenuation; Reduce channel erosion.

Priority Rank	River Segment / Condition	Site Description including Stressors and Constraints	Project or Strategy Description	Project Benefits
7	**T1.04B #1**	This reach is exhibiting incision and planform change. Erosion is occurring and the channel will continue to meander as it reaches equilibrium. It has reduced floodplain connectivity due to moderate incision. This would be an attenuation asset, located downstream of a reach that is out of its sediment regime.	Protect River Corridors - This reach flows through a primarily undeveloped forested riparian area. Protection of this corridor will allow the river to meander as necessary to reach equilibrium, continue to provide habitat and water quality functions, and prevent unnecessary flood and erosion risks.	Improved habitat; improved water quality.
8	**T1.02B #1**	This reach is very close to Lake Champlain and therefore management directly impacts the Bay and Lake. The majority of the river corridor and a large amount of the subwatersheds has been conserved, but specific land management should be investigated for compatibility with the river and lake.	Protect River Corridors - Work with landowners to manage inputs of runoff and sediment to river.	Improved water quality.
9	**T1.08 #6**	A small partially breached run-of-river dam is located upstream of a farm ford on the Nordic Farm property near the downstream end of the reach. The remaining stone structure impounds the river approximately 600 feet upstream. Impoundment is covered in thick algae that would smother natural species.	Remove Structure - Removal of remaining stone spillway and rubble would remove the impoundment and restore natural sediment and organism passage.	Restore channel to natural conditions; improve habitat.
10	**T1.08 #1**	This reach has a significant amount of agriculture in the corridor. The wetland has been straightened and natural vegetation has been lost post agriculture. The section near and upstream of Hinesburg Road has residential development encroaching on the wetland.	Protect Wetland Corridors - Work with landowners to protect identified wetland areas from additional development or active agriculture.	Improved habitat; improved water quality.

1.0 PROJECT OVERVIEW

McCabe's Brook is a tributary of the LaPlatte River which feeds into the Shelburne Bay. Shelburne Bay is a drinking water source for Chittenden County, so sediment and nutrient loading to the Bay is a concern. This study has collected Stream Geomorphic Assessment data for McCabe's Brook, adding to previous studies, and began river corridor planning.

Stream geomorphic assessments provide a basis for understanding existing conditions relative to natural river form and processes, and can guide planning efforts for conservation and restoration. The Vermont Agency of Natural Resources (VTANR), through its River Management Program (RMP) has developed a three-part Stream Geomorphic Assessment (VTANR, 2007). Phase 1 of *The Protocols,* a map-based watershed assessment, identifies expected stream type based on its valley. Phase 2 of *The Protocols* is a field exercise that identifies physical channel characteristics (e.g., width, depth, slope, meander pattern, particle size distribution) via observation and measurement, and verifies data collected during Phase 1. Phase 3 of *The Protocols* consists of a survey assessment where expanded observations and field survey are conducted to verify previous observations and create the detailed data set and site plan necessary for the evaluation of restoration alternatives.

This Phase 2 stream geomorphic assessment was completed in 2011 for the length of McCabe's Brook. The full Phase 2 was completed for the upper reaches (T1.08 - T1.05), while an update to the existing Phase 2 data with updated Reach Habitat Assessment (RHA) protocols was completed in the downstream reaches (T1.02-T1.04). The Phase 2 Geomorphic Assessment for the lower reaches of McCabe's Brook (T1.05B –T1.02) was completed by the LaPlatte Watershed Partnership (Godfrey, 2007). Since the 2007 assessment the RHA protocols have been updated.

The Lewis Creek Association contracted with Milone & MacBroom, Inc. to complete the Phase 2 Assessment and corridor planning of McCabe's Brook in 2011. VTANR has published a detailed guide for river corridor planning that was followed during this project (Kline, 2010). River corridor planning uses data collected during this Phase 2 assessment to develop projects and strategies to protect and restore natural river processes.

2.0 BACKGROUND WATERSHED INFORMATION

2.1 Geographic Setting

The assessment covers the McCabe's Brook from the influence of lake waters at the confluence with the LaPlatte River to the headwaters at the beginning of the defined channel (Figure 1). McCabe's Brook has a drainage area of 6.2 square miles including area in the Towns of Shelburne and Charlotte. The stream begins just south of Hinesburg Road in Charlotte and flows north through rural primarily agricultural lands to the border with Shelburne. It flows under Route 7 and passes the west edge of Shelburne Village before meeting the LaPlatte River near its confluence with Lake Champlain. McCabe's Brook was divided into 8 reaches during the Phase 1 Assessment and covers a total length of 8.3 miles. The watershed shape is long and narrow, with an average width of 1.2 miles wide near the mouth and 0.75 miles wide at the upstream end.

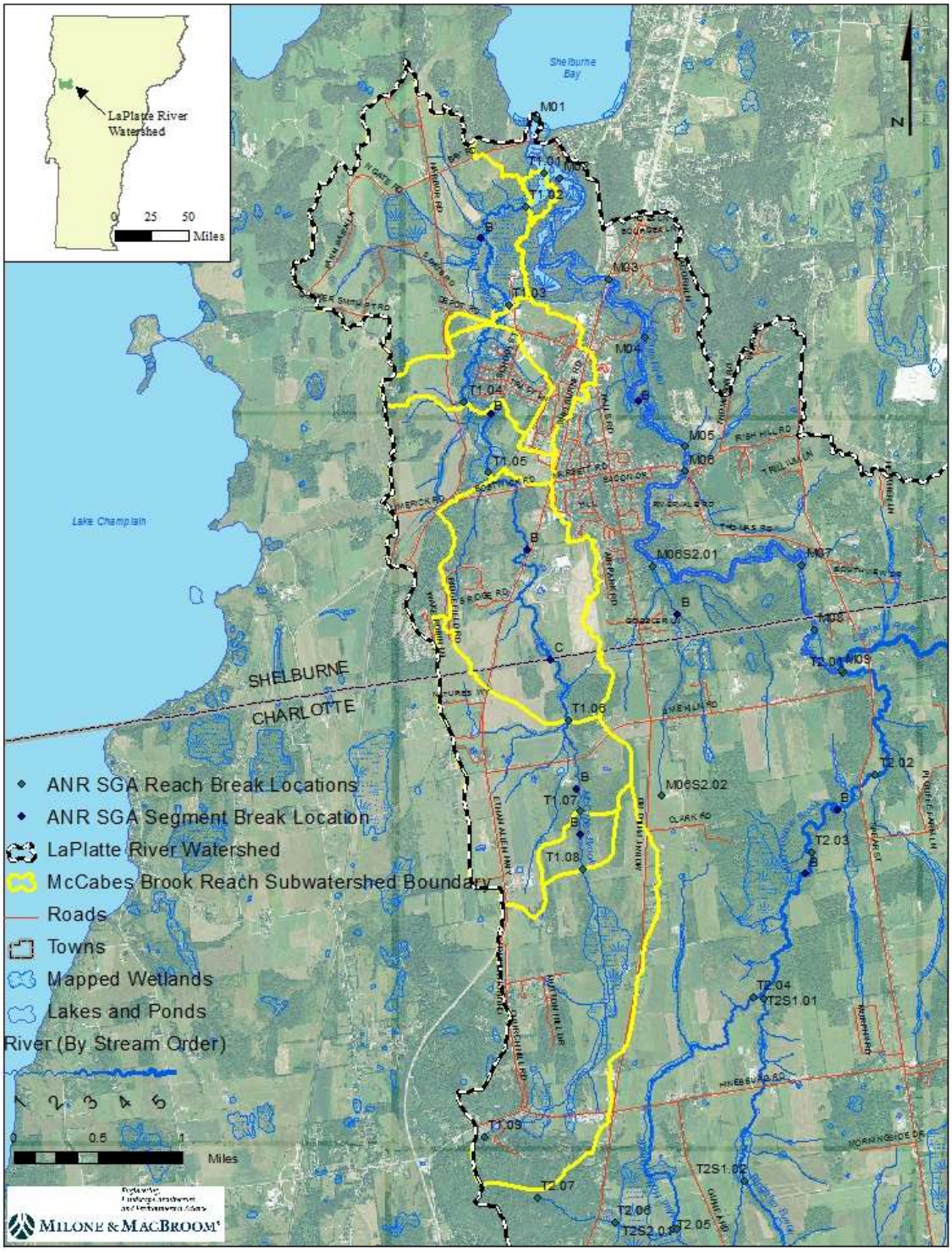

Figure 1: McCabe's Brook Location Map

2.2 Geologic Setting

McCabe's Brook is located within the geologic province of the Champlain Valley. This area was glaciated and as the glaciers retreated a large fresh water lake called Lake Vermont inundated the area. Lake Vermont receded approximately 10,000 years ago as the land rose.

Bedrock geology shows striations running north and south, parallel to the general river flow direction. The majority of the watershed is underlain with Monkton formation comprised of a quartzite with interbedded shale and dolostone. This rock structure is purplish and brown when weathered. The western strip of the watershed is underlain with the Stony Point formation, a mud brown weathering shale with interbedded limestone and dolostone. The Stony Point formation is typically west of the channel and main river corridor, except at T1.03 and T1.04, behind the School Street neighborhood in Shelburne where the main channel flows over this type of bedrock.

Mapped surficial geology shows most of the watershed to be glaciolacustrine deposits of silt, silt clay, and clay with boulders. These areas were lake bottom sediments from the Champlain Sea. Two small bands of till run on either side of the river corridor near reaches T1.06 and T1.07. The lower sections of the channel run through different deposits. The section of river approximately at reach T1.05A runs through a Champlain Sea Deposit of marine beach gravel. Then downstream near reaches T1.04 and T1.03 the river runs through a glaciolacustrine deposit of delta sand. Near the confluence with the LaPlatte River is a pluvial soil deposit made up of swamp, peat and muck. The watershed also includes smaller sections of bedrock exposure and till.

Soil types were determined from NRCS soil survey for Chittenden County, Vermont that includes Hydrologic Soil Group (HSG) classifications for all soils. The NRCS divides soils into four hydrologic soil groups: A, B, C, or D, depending on their infiltration capacity – the maximum rate water can enter the soil. Hydrologic soils are typically C and D within the watershed. Large wetland areas are typically found in areas with C and D soils. Soils are mainly clay soils, silt clay, and with some sections of stony loam.

2.3 Fluvial Geomorphic Setting

The geomorphic setting is influenced by slope, valley confinement, and riparian conditions. These factors were evaluated using remote sensing in the Phase 1 assessment and McCabe's Brook was divided into eight reaches with similar expected channel characteristics. Estimates of channel dimensions, reference stream type, and bedform were assigned based on the remote sensing data (Table 1, Figure 1). The reference stream type determined during the Phase 1 assessment is field verified and updated as necessary based on field conditions during the Phase 2 field assessment. The results of the Phase 2 assessment work is presented in following sections.

Table 1: Summary of McCabe's Brook Phase 1 information.

Reach ID	Reach Length (feet)	Drainage Area (square miles)	Valley Type	Channel Width (ft)	Channel Slope (%)	Sinuosity	Reference Stream Type	Channel Bedform
T1.01	1,265	6.16	Very Broad	29.2	0.00	1.02	C	Plane Bed
T1.02	4,204	6.06	Very Broad	28.9	0.06	1.48	E	Dune-Ripple
T1.03	3,040	4.6	Very Broad	25.6	0.29	1.57	E	Dune-Ripple
T1.04	3,099	4.18	Very Broad	24.6	0.78	1.08	C	Riffle-Pool
T1.05	9,278	3.54	Semi-Confined	22.9	1.16	1.34	C	Riffle-Pool
T1.06	2,901	2.51	Very Broad	19.6	0.64	1.41	C	Riffle-Pool
T1.07	1,793	1.59	Very Broad	16.1	0.84	1.07	C	Riffle-Pool
T1.08	11,017	1.47	Very Broad	15.5	0.54	1.02	C	Riffle-Pool

The slope influences channel morphology including channel shape and bed particle distribution. McCabe's Brook channel slope is low, averaging 0.7% over the length (Figure 2). The lower section, beginning between the railroad crossing and Harbor Road has an average slope of 0.15%. A steeper section with a slope of 2.5% exists approximately between the Railroad Crossing and Route 7, T1.05A. This section has significant exposed bedrock grade control across the channel. Upstream of the Route 7 crossing the slope is low with an average of 0.66%.

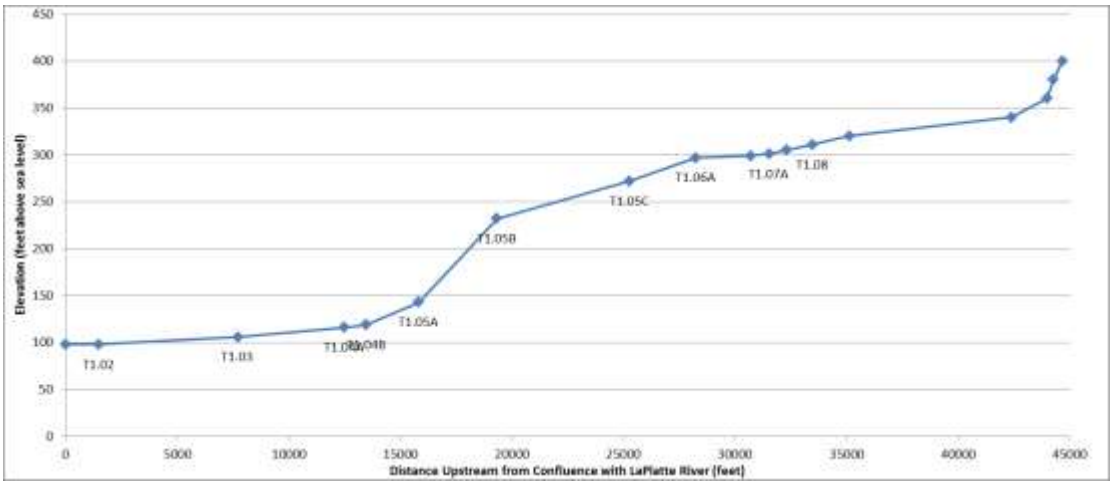

Figure 2: McCabe's Brook channel profile.

2.4 Hydrologic Setting

USGS does not operate a stream discharge gage on McCabe's Brook, but there is one on the mainstem of the LaPlatte River (USGS 04282795 LaPlatte River at Shelburne Falls, VT, Drainage Area = 44.6 square miles). Differences in drainage area and watershed characteristics make the mainstem gage a poor indicator of flows on McCabe's Brook.

USGS StreamStats web-application was used to determine approximate peak flows for McCabe's Brook at the confluence with the LaPlatte River. The application is based on

regression equations developed for Vermont (Olson, 2002). Peak flow estimates for the 2, 10, and 100 year recurrence intervals are 161, 285, and 447 cfs.

The LaPlatte Watershed Partnership coordinated a stream flow gaging project to determine discharge on McCabe's Brook (Clark et al., 2011). Gages were placed and continue to be used in the LaPlatte River watershed, including two on McCabe's Brook. The project is primarily to determine discharge when water quality samples are taken. Knowledge of flow data allows for conversion of nutrient concentration data to a load which is a function of flow. Staff gages were installed and rating curves were created to relate gage height to discharge (cubic feet per second, or cfs). Staff gages are present upstream of Vermont Teddy Bear Access Road (T1.05B) and downstream of Harbor Road behind Shelburne Rescue (T1.02). Work has not been done to characterize a typical hydrologic year or determine typical peak flow values using these gages.

2.5 Ecological Setting

McCabe's Brook is located in the Champlain Valley biophysical region that is generally known to be low, warm and dry relative to other areas of Vermont (Thompson and Sorenson, 2005). The lowlands are dominated by clay soils, with some more permeable alluvial sands and gravels along rivers.

The Champlain Valley was once dominated by clayplain forests communities. Today only remnants of these natural community types exist due to land cover conversion associated with timber harvest, agriculture, and development. Northern hardwood forest is the dominant forest type in upland areas.

The Champlain Valley supports large populations of snow and Canada geese during their spring and fall migrations. Lake Champlain, smaller lakes and ponds, and wetlands create important waterfowl habitat in the region. The Northern Hardwood forest in the valley supports a variety of wildlife and birds seen across Vermont.

The streams in the Champlain Valley tend to have a shallow slope and meander through fields and forest. Land cover conversion has lead to channel and floodplain alteration. The riparian corridors of streams, once dominated by wide expanses of forest and wet meadow, is now often narrow. This historic change in land cover and use impacts almost every component of the aquatic ecosystem including the amount of habitat present, the quality of the water, the stability of the stream channel, and ultimately the biological assemblage.

2.6 Water Quality

Water quality monitoring has been completed in the LaPlatte River and McCabe's Brook by the LaPlatte Watershed Partnership as part of its Volunteer Monitoring Program starting in 2004. Data have been compiled and analyzed up through the 2007 monitoring season (Hoadley, 2008). Past water quality reporting indicates that "Phosphorus concentrations in McCabe's Brook are significantly impacted by storm runoff from agricultural land and large impervious surfaces, as well as by stormwater runoff from urban/semi-urban areas in downstream stations (Hoadley, 2008)." These trends generally apply to suspended sediment and nitrogen concentrations. There

were increases in total Nitrogen, suspended solids, and Phosphorus between Bostwick Road and Harbor Road. Large increases in Phosphorus at the Teddy Bear access road were attributed to runoff from parking areas and buildings. These water quality results indicate that the identified stormwater outfalls at both the Teddy Bear Company and neighborhood upstream of Harbor Road in Shelburne Village should be targeted for stormwater mitigation.

Physical habitat types and condition is evaluated as part of the Phase 2 assessment as part of this project. Results are discussed for specific reaches in following sections.

3.0 METHODOLOGY

The assessment followed protocols developed by the Vermont Agency of Natural Resources (VTANR, 2007). Protocols were downloaded from the RMP website, and guidance for the new Rapid Habitat Assessment (RHA) (Schiff et al., 2008) was previously obtained during method development by MMI and RMP.

3.1 Field Assessment Methods

All project reaches were assessed on foot following the VTANR protocols. Segment breaks were identified during a stream walk based on cross section measurements and other reach data. A sketch of the stream was made during the stream walk. Current geomorphic condition was documented along with dominant channel processes at a representative cross section (i.e. aggradation, degradation, widening, planform change).

The habitat assessment followed the 2008 protocols. Large woody debris, pools, undercut banks, and identification of refuge areas were counted and measured during the stream walk and logged on a tally sheet. Field forms were completed at the representative cross section to quantify key habitat features on condition.

Bridge and Culvert assessments were completed for each structure in the project area using the protocols in Appendix G of the Stream Geomorphic Assessment. Structure width, clearance height, length and general characteristics describing the interaction of the channel and structure were recorded.

For downstream reaches, the existing Phase 2 data was reviewed, the channel was assessed on foot, and the RHA and Bridge and Culvert assessments were completed.

Assessments were completed between July 13, 2011 and August 9, 2011. Key physical and habitat features were sketched and approximately located using a hand-held GPS unit (*Garmin GPS 76*). Features were documented with a digital camera.

Features were indexed with reference to the Vermont Hydrography Dataset (VHD) using the Feature Indexing Tool in the SGAT (Version 4.59) GIS extension. Reach segmentation was recorded, where necessary, using the Segmentation Tool. Data was submitted online using the Data Management System (DMS).

3.2 Quality Assurance Methods

All data were thoroughly examined in-house by MMI. Geomorphic stream type and channel evolution stage were compared to various classification systems (e.g., Montgomery and Buffington, 1993; Rosgen and Silvey, 1996; Rosgen et al., 2006) to verify decision-making in the field. The data were submitted to RMP for QA review on December 15, 2011 and QA was completed February 2, 2012.

4.0 GEOMORPHIC ASSESSMENT RESULTS

Results of the stream geomorphic assessment for McCabe's Brook reaches T1.02 – T1.08 are presented here. Reaches and segments are presented from upstream to downstream. Reference to right bank and left bank assume facing downstream. Reach mapping can be found in Appendix A and data summary reports for each reach in Appendices B.

4.1 T1.08

This reach marks the upstream limits of McCabe's Brook, with the upper part of the reach dominated by wetland. The reach was not able to be fully assessed due to the wetland characteristics and impounded water at the downstream section. The segment was walked, sketched, photo-documented, and GPS points were taken to facilitate feature indexing. Notes were taken to guide corridor planning.

The Phase 1 reported the reference condition to be a Rosgen C5 riffle-pool channel. The upper section of the reach was dominated by wetlands and therefore does not fit within the alluvial classification system. At the stream location where flow consolidated enough to warrant assessment, the reach assessment did not apply due to ponding and alteration by both straightening and dredging. The actual reference condition was difficult to determine, but may have been an Rosgen E5 dune-ripple channel. Two cross-sections were measured in the altered area, but do not represent a reference condition.

Corridor management varies along this reach. Although the reach primarily flows through agricultural lands, there was no current animal access to the channel. Cattail dominated wetland exists between Homesteader Road and Hinesburg Road. The brook may be historically ditched downstream of Hinesburg Road for a few hundred feet through a farm with minimal buffer to the hayfields. It then flows through a cattail wetland before entering a farm pond. Downstream of the farm pond it flows through a 400 foot wide, fenced wetland field. No recent animal access, but it is unclear what the management of the field is. It then flows through a narrower field with an approximately 100 foot herbaceous buffer from a mowed field. The channel is undefined, but appears straight as though historically ditched in these areas. Approximately adjacent to Mutton Hill Lane, the channel enters a wooded area where it is paralleled by a farm road at the top of the bank and appears to have been recently ditched. It then parallels a small mowed field with a 5 foot left buffer where it also appears to have been dredged.

The most downstream 900 feet of channel is similar to T1.07B with a narrower valley than the upper part of the reach. This area, downstream of the left bank hayfield, has significant ponding, thick algae growth and stagnant water. The remains of an old dam is impounding water in this section and capturing fine sediments. The dam is broken, but the remaining pile of cobbles is approximately 1 foot above the downstream water surface. If the effect of the dam was absent, this 900 feet would probably have the same channel characteristics as T1.07B.

a)  b) 

Photo 1: T1.08 has an inline farm pond formed by a farm road and culvert on the downstream end and b) a wide ponded section with minimal buffer.

There are many crossings in this reach. A driveway at Homesteader Road dams the channel, creating a pond. The channel then passes under Hinesburg Road in a culvert. These culverts consolidate the otherwise wetland flow into a concentrated path. There are four farm crossings with culverts. Most of the pools observed in the reach were caused by the scour at the downstream end of the crossings. A tractor ford crosses near the downstream reach break.

4.2 T1.07

T1.07 has a more confined valley than the upstream channel. Channel dimensions and riparian vegetation type vary across the reach and caused segmentation.

Segment B

This segment begins just downstream of the old dam and farm ford behind the Nordic Farm. The channel flows through a herbaceous wetland area. At the downstream segment break, the brook flows into a forested area. At the treeline are the remains of an old earthen embankment dam. This dam is a floodplain constriction, although not constricting the channel. It is possible that the differences between the downstream wooded segment and this segment are due to historic effects of the dam. It is unknown if this area was originally similar to segment A. The water in this segment was noticeably turbid.

The channel is a Rosgen E-type channel with riffle-pool bedform in good condition. This segment is a subreach with a different reference type than the downstream C type channel. The channel bed is primarily gravel. The sand and clay banks are contributing fine sediments to the

channel and adding turbidity to the water column. It is in channel evolution stage I and has high sensitivity.

T1.07B has fair habitat (RHA score = 63%). Trees are lacking on the banks, in the buffer, and in form of Large Woody Debris (LWD). There is evidence of sediment mobility and high fining degrading the bed substrate cover. Bed features are poorly formed and the reach has a low number of pools and riffles. The nearbank vegetation is herbaceous, but does include invasive honeysuckle shrubs. The valleywalls are wooded. There is approximately a 100 foot wetland and wooded buffer on either side of the channel before hayfields.

a)  b) 

Photo 2: a) T1.07B flows through a herbaceous wetland area and is b) bordered by forest.

Segment A

T1.07A is a short section downstream of the remains of the dam in T1.07B. This section travels through a mature deciduous forest. Channel dimensions are wider than the upstream segment. The buffer along this segment is almost 1,000 feet.

The channel is a Rosgen C-type channel with riffle-pool bedform in good condition. It is in channel evolution stage II of the F-model and has high sensitivity. There is some incision (IR=1.3) that may be due to the breach of the upstream dam. The channel bed is gravel and cobble. There is some minor incision occurring, but the channel has not departed from its reference condition and has clear access to the forested floodplains.

T1.07A has good habitat (RHA score = 78%). The wide forested buffer is in good condition and providing shading, cover, and woody debris to the channel. There is minor fining occurring on the bed. The riffle pool pattern has fewer pools than reference and lacks fast-deep habitat. There is exposed substrate in the channel that may be due to recent lack of rain.

a)  b) 

Photo 3: T1.07A typical channel sections looking a) upstream and b) downstream.

4.3 T1.06

T1.06 was segmented due to differences in channel dimension, bed substrate, and riparian conditions. The upper segment is in a densely wooded area with a wider channel (BFW = 19.5 feet) and larger substrate. The lower segment transitions to a narrower channel (BFW=6.5 feet) with smaller substrate flowing through a wet meadow.

Segment B

T1.06 B flows through a wide, dense mixed forest. This is a short segment, limited to the forested area at the upper end of the reach. The channel has good connection to the adjacent floodplains, although minor incision has reduced its historic access (IR = 1.3). This segment is remote and does not have any encroachments or crossings.

The channel is a Rosgen C-type with a riffle-pool bedform and a gravel bed. The channel is in good condition in channel evolution stage II of the F-model with high sensitivity. There are minor signs of aggradation, widening and change in planform due to exposed substrate and bar formation. There is a large amount of substrate exposed that could be due to the recent dry weather.

T1.06B has good habitat (RHA score = 75). The wide forested riparian area provides LWD to the channel and excellent riparian and bank conditions. Fining and minor embeddedness is occurring, but may be natural due to sand and clay banks.

a)  b) 

Photo 4: T106B typical a) bank and b) channel sections.

Segment A

The segment break is where the canopy opens and riparian vegetation begins to have wetland characteristics. This segment is a subreach, exhibiting its reference conditions, which are different than segment B reference conditions. The channel flows through a natural wet meadow, with some sections of wetland. The left buffer here is reduced to as little as 50 feet at a horse farm upstream of Lime Kiln Road and to 100 feet at agricultural fields downstream. There are many breached historic beaver dams, but no actively maintained dams. These have caused some small planform changes and accumulation of fine sediments.

T1.06A is a Rosgen E-type channel with a dune-ripple bedform and primarily sand bed mixed with gravel. Its bankfull width at this location is 6.5 feet with a mean depth of 1.6 feet. It is in reference condition with minor planform change due to influence of beaver dams. It is in channel evolution stage I and has high sensitivity. There is good hydraulic connection to the wet meadow floodplains and many connected wetlands.

This reach has good habitat (RHA score = 70%). Although the reach has good buffers and natural vegetation, the wetland nature of the vegetation reduces canopy and woody debris cover and potential. The presence of beaver dams has increased fine material on the bed and sunny condition had allowed for algae mat growth.

The Lime Kiln Road culvert was failed during the July 15, 2011 site visit. The culvert constricts the channel and floodplain. Sometime after the initial visit the culvert was replaced with a similar 4 foot diameter round culvert. The bank and road was reconstructed and hard armoring was added. The replacement with the same size culvert did not provide additional conveyance.

a)  b) 

Photo 5: T1.06A a) typical section and b) failed Lime Kiln Road culvert viewed from upstream end.

4.4 T1.05

This reach was partially assessed in 2007 at which point it was segmented into three sections. At that time property access was not granted upstream of the Shelburne border and has since been allowed.

Segment C

This segment flows through a broad valley in a remote area upstream of the Teddy Bear Factory and downstream of Lime Kiln Road. The immediate riparian vegetation is wetland and wet meadow vegetation with very few trees, although the riparian vegetation a bit farther from the channel is wooded. The riparian buffer is in most locations very wide, with a minimum of 100 feet adjacent to hayfields at the lower end of the reach. There are many locations with thick cattail growth within the channel. Invasive species of purple loostrife and buckthorn exist along the channel.

There are multiple existing or damaged partial beaver dams in the segment that influence short sections of the channel both by impounding sediments and causing floodchutes. The downstream segment break is within the impoundment of a large downstream beaver dam and located at the Charlotte-Shelburne town boundary. Some sections of the reach have exposed substrate where the channel does not have above ground flow and water is probably flowing through the gravel on the bed.

The reach is a Rosgen E-type channel with dune-ripple bedform and a gravel bed. The channel is in reference geomorphic condition and in channel evolution stage I. There is some increase in fine sediments and creation of floodchutes caused by beaver dam influence. The banks are comprised of a non-cohesive sand layer under a cohesive clay layer. The banks are visibly contributing turbidity to the water column anywhere the water is moving along the clay portion of the bank.

T1.05C has good habitat (RHA score = 68%). There is good bank and riparian vegetation, although the near bank vegetation does not have many trees. This has led to reduced LWD in the channel. There is moderate fining on the bed substrate, typically near the beaver dams. There is little active bank erosion.

a)  b) 

Photo 6: T1.05C a) typical section and b) dry section near downstream segment break.

Segment B

This reach begins in a large beaver impoundment at the Charlotte-Shelburne town boundary. At the upstream end there is a 200 foot buffer to agricultural fields on both sides of the river. In this area there are a few beaver dams impounding short sections. The riparian buffer steadily decreases in width moving downstream. An agricultural field to the left has a minimum of 50 foot herbaceous buffer along parts of the field. There is what appears to be an old animal watering hole that has now been fenced away from the field, but has not returned to river form and vegetation is not natural. Sections of the channel are completely filled with vegetation either grasses (many locations along the segment) or mint (downstream of Teddy Bear Access Road).

A staff gage is located in this reach upstream of the Teddy Bear Factory Access Road. This gage is maintained by the LaPlatte Watershed Partnership, as discussed in Section 2.4.

The culvert at the Teddy Bear Factory is large and in good physical condition, but has reduced aquatic organism passage. A long apron with very shallow flows existing upstream creates a fish block. Also, the drop at the downstream outlet also is a fish passage issue. The valley significantly narrows at this culvert and continues to be narrow downstream. The Route 7 culvert is an undersized concrete box culvert that completely fills the floodplain with its tall embankment. Between the Teddy Bear Culvert and Route 7 culvert are two mass failures contributing a large amount of sediment to the river. Downstream of the Route 7 culvert the channel makes a large S-turn back towards the Route 7 embankment. It flows straight towards the embankment and is forced to make a sharp turn and flow against the embankment in a severely constricted straight channel for a few hundred feet. multiple large mass failures also exist. Looking at the topography of this section indicates that the embankment (and terrace on left) is severely constricting the flow (Figure 3). In addition to the mass failures upstream of the culvert there are several more extremely active failures downstream of Route 7, including in Segment T1.05A. The segment ends at this constriction.

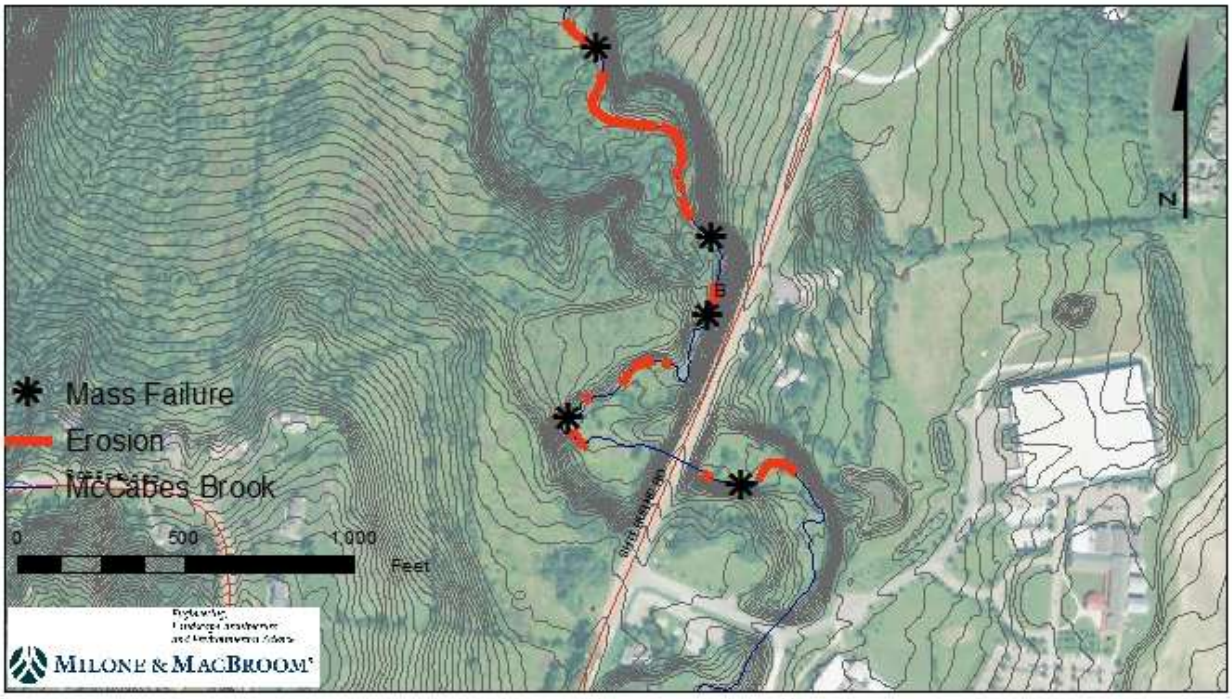

Figure 3: T1.05A and T1.05B have multiple mass failures and significant bank erosion in the vicinity of the Route 7 crossing, possibly caused by constriction of the floodplain.Two foot contour lines show locations of steep slopes and the edge of the river corridor.

a)  b) 

Photo 7: Culverts on T1.05B include a) Teddy Bear Factory Access Road (looking upstream) and b) Route 7 (looking downstream).

a)  b) 

Photo 8: T1.05B a) large mass failure near downstream end a) looking downstream and b) looking upstream.

The 2007 assessment was confirmed in the field, and showed that this segment is in good geomorphic condition. The channel is a Rosgen C-type channel with dune-ripple bedform and a primarily sand bed. The channel has good connection to its floodplains. It is in channel evolution stage IIc of the D evolution model and has high sensitivity.

T1.05B has fair habitat (RHA score = 61%). The riparian buffers were narrow with a lack of both trees and shrubs in the buffer and near the river. The lack of trees decreased the bank canopy, and reduced the amount of LWD present in the channel. There was significant fining on the bed possibly produced locally from the clay banks. Both culverts have reduced aquatic organism passage. The banks had few undercuts and although for most of the segment didn't have significant bank erosion, had multiple large mass failures at the lower end.

Segment A

This segment begins just downstream of the Route 7 embankment constriction. At the downstream end of the constriction a large bedrock grade control exists, bordered by a mass failure. There are additional bedrock grade controls and mass failures in this reach. The mass failures in this reach and upstream in T1.05B are till, and contribute a significant amount of mixed sediment to the river. This segment is heavily sedimented with primarily gravels. The majority of the bed substrate is exposed with large gravel bars filling bed features. There are sections of dry bed. Some of the visible gravel may be due to the underlying surficial geology, a band of Champlain Sea Deposit of marine beach gravel that is unlike the upstream and downstream clay and sand.

a)  b) 

Photo 9: a) A large mass failure with bedrock bed near upstream segment break and b) typical sedimented channel section.

a)  b) 

Photo 10: a) Bostwick Road culvert constricts the channel, accumulating debris and sediment upstream (shown looking downstream) and b) the railroad culvert reduces aquatic organism passage with a drop at the downstream end and flow under the culvert floor (shown looking upstream).

The Bostwick Road culvert severely constricts the channel and floodplain with its tall embankment. A massive sediment delta has formed upstream because it is not adequately conveying sediment or water. The culvert has scoured downstream and has a drop at the outlet that would block many aquatic organisms. The railroad crosses with a masonry arch with a concrete bottom. The bottom has separated so flow seeps under the floor, creating a dry bottom at low flows. A drop off the downstream apron would also inhibit organism passage.

The segment has poor geomorphic condition. The reference Rosgen C-type channel has departed to an F-type channel. The channel is in channel evolution stage III of the F model. The stream sensitivity is extreme. Incision has decreased connection to floodplains. The channel is currently widening and changing planform.

T1.05A has fair habitat (RHA score = 48%). There is little LWD in the channel due to lack of trees upstream and limited trees along the banks in this segment. There is some fining occurring, but most of the sediment deposition is gravel. The bedform pattern is dominted by deposition features and plane-bed runs and pools that do exist are small. The majority of the substrate is exposed.

4.5 T1.04

This reach was assessed in 2007 and at that time was segmented because the lower section was impounded by beaver dams. This section is no longer impounded, so a full Phase 2 assessment was completed for T1.04A.

Segment B

This reach starts just west of Shelburne Museum, downstream of the railroad culvert. There is an adequate riparian buffer along this segment approximately 300 feet wide. There are meadows adjacent to the stream that may have been abandoned hay fields, but do not appear to be used. In the areas that may have been fields the vegetation is herbaceous with a distinct lack of trees near the bank. There are wooded sections along the stream, as well as a wooded buffer farther from the river edge. Invasive honeysuckle is found along the river. The channel is a losing stream, with a long section with no visible water. Water is hypothesized to be flowing under the large amount of deposited gravel and within the underlying Champlain Sea Deposit.

The segment is a Rosgen C-type channel with riffle-pool bedform and a primarily gravel substrate. The channel is in fair geomorphic condition. The channel evolution stage is II in the F model with very high sensitivity. There is some incision and significant aggradation. Sediment is probably coming from the large mass failures upstream.

T1.04B has fair habitat (RHA score = 55%). The reduced number of trees on the banks and in nearby riparian area have also decreased the amount of LWD in the channel. There is some fining occurring and a significant amount of algae growth. Pools are generally small, with little cover. A majority of the substrate is dry and the lack of flow would block aquatic organism passage at low flows.

A grass footpath crosses the channel in the middle of the reach over a bridge. The bridge has significant scour along the footings. The flow is not aligned well with the river and is scouring behind one of the abutments.

a)  b) 

Photo 11: a) A dry section along T1.04B downstream of the railroad bridge and b) a typical section.

Segment A

This short segment was segmented in 2007 due to beaver dam impoundment and was not assessed at that time. The beaver dams were not present during the field visit for this project and the Phase 2 assessment was completed. The segment begins as the channel exits the treeline into a riparian area with an open canopy and wet meadow vegetation. The reach ends just upstream of the School Street neighborhood.

This segment is a Rosgen E-type channel with ripple-dune bedform. The bed substrate is primarily sand and significantly smaller here than upstream gravel dominated segment of the reach. The segment is in good geomorphic condition and is in channel evolution stage II of the F model. There is incision occurring, possibly due to the recent breach of beaver dam. The stream sensitivity is high.

T1.04A habitat is in fair condition (RHA score = 61%). The lack of trees along the bank and in upstream reaches has reduces LWD in the channel. There are a lot of vegetated bars along the channel edges. There is some fining occurring.

A small footbridge crosses the channel in this reach and does not appear to have significant conflict with river processes.

a)  b) 

Photo 12: a) T1.04A typical section and b) small footbridge.

4.6 T1.03

T1.03 begins adjacent to the School Street neighborhood, just south of Heritage Lane and extends downstream past Harbor Road to just below the Shelburne Public Works buildings on Turtle Lane. This reach feels fairly wild while walking in it, despite the proximity to the village center. The channel flows through a wetland, into a floodplain forest, and through a wet meadow with reduced tree cover. Many invasive species exist on the banks including honeysuckle, buckthorn, briar, and purple loostrife. Remains of old beaver dams are disrupting natural sediment transport and holding some pockets of fine sediment.

The RGA data collected in 2007 was confirmed in the field to be a Rosgen E-type channel with dune-ripple bed features with a primarily sand bed. The channel is in fair condition and is in stage II of the D channel evolution model. Slight incision has occurred, but there is still good access to the floodplain. This reach has extreme sensitivity due to the sand bed and fair condition.

T1.03 has good habitat (RHA score = 66%). Although in most locations an adequate forested buffer exists, riparian area condition was influenced by proximity to residential development. LWD and tree cover are lacking in the fields upstream of Harbor Road. Algae mats are present in the channel immediately downstream of the sewer treatment plant outfall.

Encroachments exist at a few residential properties in the School Street neighborhood. Most homes sit up on the valley wall, and only one home off of Davis Lane has removed the riparian buffer. The Shelburne Public Works building at the sewer treatment plant has encroached on the channel with some visible fill, no vegetated buffer, and storage of materials adjacent to the channel. Erosion is occurring at this location. Harbor Road crosses McCabe's Brook in this reach. The culvert was recently replaced with a structure that is as wide as bankfull width and is embedded and backwatered. It does not have significant conflict with either channel processes or AOP.

a)  b) 

Photo 13: T1.03 has a) encroachments from a home on Davis Lane and b) possible historic filling at the top of the bank behind the Shelburne Public Works building.

4.7 T1.02

This reach begins downstream of the Shelburne Public Works facilities and extends to the backwater from Lake Champlain. It mainly runs through land conserved by The Nature Conservancy on the right and at the edge of an active farm on the left. The farm does maintain buffers from the mainstem, through which run the Shelburne recreation trail and a utility corridor. Tributary channels to McCabe's Brook run through active areas on the farm and runoff is a concern. The farm has new ownership and has expressed interest in working with the LWP and LCA to improve farm/stream interaction.

a)  b) 

Photo 14: T1.02 typical channel sections a) upstream and b) near downstream end.

Phase 2 data collected in 2007 was confirmed to be a Rosgen E-type channel with dune-ripple bed features. Bed material was previously reported as sand and observations indicate that the material is predominately a mix of silt and clay with occasional bars or ripples of sand or fine gravel. Channel banks are comprised of a cohesive clay and hardpan clay spans the channel bed in many locations. Because of the low gradient nature of the channel, many locations have

accumulated fine sediments on the channel bed. This segment is in good geomorphic condition and is in Stage III of the D channel evolution model.

There is good connection to the many adjacent wetlands and wet meadows. Old hayfields border the channel in many locations, with limited riparian trees. Lack of tree cover adjacent to the channel has not limited in-channel large woody debris. Many invasive shrubs are present on the banks including honeysuckle and buckthorn. The channel has significant vegetation growth including cattails, an invasive flowering rush, emergent wetland vegetation, and duckweed.

T1.02 has good habitat (RHA score = 78%). The habitat is not in reference condition because of presence of invasive species, lack of trees in the riparian and bank areas, periodic bank erosion and fine sediment accumulation.

The downstream section was segmented doe to inundation from Lake Champlain. Management and landowners are the same. Moving downstream the inundation increased, water became stagnant, duckweed increased, and Eurasian milfoil was present.

5.0 SUMMARY OF ASSESSMENT RESULTS

5.1 Geomorphic Results Summary

The RGA was not completed for two segments; T1.02A because it was impounded by Lake Champlain and T1.08 because of its wetland and impounded condition. Reference condition of the segments was verified or adjusted to be either C or E type channels with Dune-Ripple or Riffle-Pool morphology (Table 2).

Upstream of the assessment in T1.08 the channel exhibits a wetland reference condition. It has had significant impacts including straightening and travels through land historically used for agriculture. Although this section was not assessed using the RGA protocol, it appears that it has departed from its reference condition.

The upper reaches, between T1.07 and T1.05C, were found to be in good or reference geomorphic condition. These reaches are in stage I of the F evolution model, which means that the reaches are stable without significant transformational processes occurring. Although not departed from their reference stream types, they have a high sensitivity to change due to their channel type. T1.06B and T1.07 A has some incision and is in Stage II of the F evolution model, possibly due to a breach of a dam located at the upstream end of the reach.

Segments from T1.05B and downstream were assessed in 2007 by others and findings were verified during the field investigations of this project. These segments are in various stages of incision, widening, and planform change. T1.05A has departed from a reference C-type channel to an F-type and was found to be in poor condition.

Table 2: Summary of Geomorphic Results

Reach ID	Length (feet)	Bankfull Width	Width to Depth Ratio	Entrenchment Ratio	Incision Ratio	Reference Stream Type	Existing Stream Type	Sub-reach	RGA Score	Process	Stream Condition	Channel Evolution Stage	Sensitivity
T1.02 A	2688	-	-	-	-	Impounded	Not Assessed		0.00	-	-	-	-
T1.02 B	3546	18	6.2	12.8	1.0	E5 D-R	E5 D-R		0.70	Planform, Aggradation,	Good	D III	High
T1.03	4766	15.2	5.2	55.9	1.1	E5 D-R	E5 D-R		0.64	Planform, Aggradation,	Fair	D IIc	Extreme
T1.04 A	979	13.5	9.6	14.1	1.4	E5 D-R	E5 D-R	Yes	0.66	Incision	Good	F II	High
T1.04 B	2364	18.4	18.4	2.7	1.3	C4 R-P	C4 R-P		0.49	Planform, Incision	Fair	F II	Very High
T1.05 A	3508	22.7	28.0	1.3	1.9	C4 R-P	F4 R-P		0.44	Widening and Planform	Poor	F III	Extreme
T1.05 B	5939	37.1	33.7	6.0	1.0	C5 D-R	C5 D-R	Yes	0.82	Planform and Widening	Good	D IIc	High
T1.05 C	2977	18.9	11.1	7.2	1.0	E4 D-R	E4 D-R	Yes	0.85	none	Reference	I	High
T1.06 A	2450	6.5	4.1	100.3	1.0	C4 R-P	E5 D-R	Yes	0.79	Planform	Reference	I	High
T1.06 B	830	19.5	15.0	7.4	1.3	C4 R-P	C4 R-P		0.71	Widening and Planform	Good	F II	High
T1.07 A	777	9	16.4	8.6	1.3	C4 R-P	C4 R-P		0.75	Degradation	Good	F II	High
T1.07 B	1136	5.5	6.9	7.0	1.0	E4 R-P	E4 R-P	Yes	0.84	none	Good	I	High
T1.08	11204	-	-	-	-	Wetland	Not Assessed		0.00	-	-	-	-

5.2 Habitat Results Summary

Assessed stream segments were identified to have good to fair overall physical habitat conditions, with no stream segment having exceptionally poor or reference habitat (Table 3).

Large woody debris condition is highly variable, with better condition at the upper and lower portions of the stream. T1.07A and T1.06B travel through a mature forested floodplain and have excellent woody debris condition. Some of the middle reaches flow through what appear to be recovering agricultural fields that are not yet producing woody debris. Other middle reaches are bordered by wet meadows that may naturally be limited in woody debris production and retention. T1.02B has accumulated large amounts of woody debris despite few trees growing adjacent to the channel.

River bank and riparian area condition is related to woody debris cover and also variable. Condition is excellent in forested upper reaches. T1.03 has residential and other development within the riparian area and limited tree cover. T1.04B has degraded bank habitat and significant erosion due to planform adjustment and limited tree cover in buffers. T1.05A also has significant bank erosion including multiple mass failures and reduced trees in the buffers due to development. T1.05B has active agricultural activity and poor tree cover in the riparian area, although does have an herbaceous buffer to agriculture.

Bed substrate cover was generally in good condition. Many reaches have evidence of sediment mobility and increased fining. Many of the reaches have a reference Dune-Ripple bedform where fine sediments are typically found on the bed. Deposition of fine materials is difficult to determine in these Dune-Ripple segments. T1.07B had significant fining and sediment mobility over the gravel bottom. The upstream wetland reaches and agricultural disturbance in the watersheds may contribute additional fine sediments. Dense algae growth was seen in T1.06A and T1.04B where limited tree cover increases sunlight exposure, T1.03 near the Sewage Treatment Plant outfall, and T1.02B where the water slows in proximity to the impoundment downstream.

Scour and deposition features were generally in good condition. Dune-Ripple and Riffle-Pool features had a distinct pattern in most reaches with a sufficient distribution, density, and size of bed features. Some limited overhanging vegetation and pool coverage was seen in reaches with reduced riparian vegetation. T1.05A has small pools and limited overhanging vegetation, caused by widening and planform changes. Possibly due to the historic impoundment, T1.07B had small pools, low riffle coverage, and poorly defined riffle-pool pattern. Pool sizes ranks were low in many segments due to shallow depths caused by overall small stream size.

Hydrologic characteristics were in reference or good condition in many segments. There was significant exposed substrate and reduced wetted width in T1.04A and T1.05A due to widening and planform changes. T1.05A and T1.06B also had minimal adjacent springs and wetlands.

Connectivity was generally good, with few obstructions. T1.04B had significant sections of dry riverbed which would block aquatic organism passage. T1.05A had two culverts that would

block organism passage. Low flow refuge areas were generally not abundant throughout the system, especially in T1.06A.

Table 3: Summary of Reach Habitat Assessment Results

Segment ID	Woody Debris Cover	Bed Substrate Cover	Scour and Deposition Features	Channel Morphology	Hydrologic Characteristics	Connectivity	River Banks, Left	River Banks, Right	Riparian Area, Left	Riparian Area, Right	Total Score (out of 160)	Total Score (Percent)	Overall Physical Habitat Condition	Geomorphic Stream Condition
T1.02 A	-	-	-	-	-	-	-	-	-	-	0	0	N/A	N/A
T1.02 B	19	13	13	17	16	18	6	6	9	7	124	78	Good	Good
T1.03	14	13	14	16	13	14	6	6	5	5	106	66	Good	Fair
T1.04 A	3	13	13	10	16	13	6	6	9	9	98	61	Fair	Good
T1.04 B	8	14	12	13	9	8	4	4	8	8	88	55	Fair	Fair
T1.05 A	8	13	9	7	8	11	3	3	7	7	76	48	Fair	Poor
T1.05 B	6	11	11	13	16	12	9	9	5	5	97	61	Fair	Good
T1.05 C	3	11	11	18	18	15	7	7	9	9	108	68	Good	Reference
T1.06 A	5	10	13	18	20	18	7	7	7	7	112	70	Good	Reference
T1.06 B	17	11	11	17	10	16	9	9	10	10	120	75	Good	Good
T1.07 A	18	13	13	14	13	16	9	9	10	10	125	78	Good	Good
T1.07 B	7	7	8	19	13	17	8	8	7	7	101	63	Fair	Good
T1.08	-	-	-	-	-	-	-	-	-	-	0	0	N/A	N/A

5.3 Bridge and Culvert Assessments

Bridge and culvert assessment results show that many of the stream crossing locations would disrupt either fish passage and/or sediment transport (Table 4, Appendix C). McCabe's Brook has long stretches of stream channel that are uninterrupted by crossing structures.

Downstream structures at Bay Road and Harbor Road are not causing problems with AOP or obvious disruption in sediment transport. The bridge at the grass trail in T1.04B is poorly aligned and scouring behind the upstream abutment and at the footers.

In T1.05A both the Railroad and Bostwick Road are undersized with a freefall and cascade type outlet that is expected to disrupt aquatic organism passage. Bostwick Road is significantly undersized and has accumulated a significant sediment delta upstream. These culverts are located at a break in valley slope which is critical for sediment transport.

The Route 7 culvert is extremely undersized and has completely blocked the floodplain, its embankment constricting the channel downstream.

Lime Kiln Road structure has recently failed and during the assessment was in extreme need of replacement. The upstream end of the structure has tipped down into the stream channel,

allowing a fraction of flow to enter. This structure was replaced with a new structure of the same size, instead of one that is at least as wide as bankful width.

Upstream structures are mostly compatible with stream processes although small compared to stream size. During flooding water can flow around the structures and therefore has not caused significant scour and erosion. Their short length and backwatered condition positively influence aquatic organism passage.

Table 4: Bridge and Culvert Assessment Summary

Reach	Road Name	Structure Type	Structure Length	Structure Height	Structure Span	Stream Width	% Span / Stream Width	FloodPlain Filled	Approach Angle	CulvertInvertFlowType
M01	Bay Road	Bridge	30	6.4	83	78	106.4	Entirely	Naturally Straight	
T1.03	Harbor Road	Culvert	43	5.6	15	15.2	98.7	Partially	Mild Bend	Entirely Backwatered
T1.04	Grass Trail	Bridge	14	6.5	17	18.4	92.4	Entirely	Mild Bend	
T1.05	Railroad	Culvert	87	12.4	11.9	22.7	52.4	Entirely	Naturally Straight	Free Fall
T1.05	Bostwick Road	Culvert	154	8.3	7.3	22.7	32.2	Entirely	Mild Bend	Cascade
T1.05	Shelburne Road	Culvert	113	10	9.75	37.1	26.3	Entirely	Naturally Straight	Entirely Backwatered
T1.05	dy Bear Factory Ac	Culvert	128	9	13	37.1	35.0	Entirely	Naturally Straight	Free Fall
T1.06	Lime Kiln Road	Culvert	40	4	4	7	57.1	Entirely	Naturally Straight	Entirely Backwatered
T1.08	Farm Road	Culvert	19.75	2	2	15.5	12.9	Partially	Naturally Straight	Entirely Backwatered
T1.08	Farm Road	Culvert	17	2	2	15.5	12.9	Partially	Naturally Straight	Entirely Backwatered
T1.08	Farm Road	Culvert	12.5	2	2	5	40.0	Partially	Channelized Straight	Partially Backwatered
T1.08	Farm Road	Culvert	24	2.5	2.5	5	50.0	Partially	Sharp Bend	Partially Backwatered
T1.08	Hinesburg Road	Culvert	47	2	2	5	40.0	Entirely	Naturally Straight	Entirely Backwatered

6.0 DEPARTURE ANALYSIS AND STRESSOR IDENTIFICATION

6.1 Hydrologic Regime Stressors

The hydrologic regime describes the flow events in the river including the timing, volume, and length of time. If a watersheds hydrology is changed, rivers can respond by adjusting their geomorphology to match the new flow patterns. Many watershed features contribute to the hydrologic regime. Hydrology can be tracked over time using flow gages, but McCabe's Brook does not have longterm gaging data.

Land Use and Land Cover area are factors contributing to watershed hydrology. Land use conversion away from natural vegetative cover tends to compact soils and create impervious surfaces that leads to reduced infiltration, reduced evapotranspiration, and increased runoff. Vegetation removal also leads to increased watershed export of sediment and nutrients. Land development is also associated with a reduction in watershed storage. The landuse in the McCabe's Brook watershed is primarily agriculture, with sections of forest and urban development (Figure 4). The land use and land cover has been broken down by reach subwatershed to better determine distribution along the corridor (Table 5).

Table 5: Land Use / Land Cover Summary by Reach Subwatershed Area

Landuse Type	T1.01 (%)	T1.02 (%)	T1.03 (%)	T1.04 (%)	T1.05 (%)	T1.06 (%)	T1.07 (%)	T1.08 (%)
Agriculture	0	58	22	57	62	77	74	54
Barren	0	0	0	0	0	0	0	0
Brush	0	1	5	4	6	6	12	8
Forest	83	26	20	22	18	8	14	26
Urban	0	11	37	11	10	9	0	9
Urban-Open	0	1	15	7	4	0	0	3
Water	17	0	0	0	0	0	0	0
Wetland	0	1	1	0	1	0	0	1
Area (acres)	23	922	387	406	673	585	78	947

Impervious area was examined by subwatershed to provide an overview of the stream reaches that are receiving runoff from higher amounts of impervious area (Figure 5). Thresholds of impervious cover above which water quality and stream conditions deteriorate have been found to range between 5 and 10% (e.g.,Brabec et al., 2002; CWP, 2003; Schiff and Benoit, 2007). McCabe's Brook subwatersheds had low to moderate amounts of impervious cover except at the village center of Shelburne where impervious cover was up to 37%.

Wetlands naturally detain water, both reducing the volume and timing of runoff to the channels. Hydric soils are an indication of areas that would naturally be wetlands, although may be an overestimation of the area that they would cover. Hydric soils were identified in areas where current landuse is urban or agriculture, assuming that these areas may represent a rough designation of lost weland areas (Figure 5).

Also mapped are stormwater inputs and flow modifiers observed during field investigations.

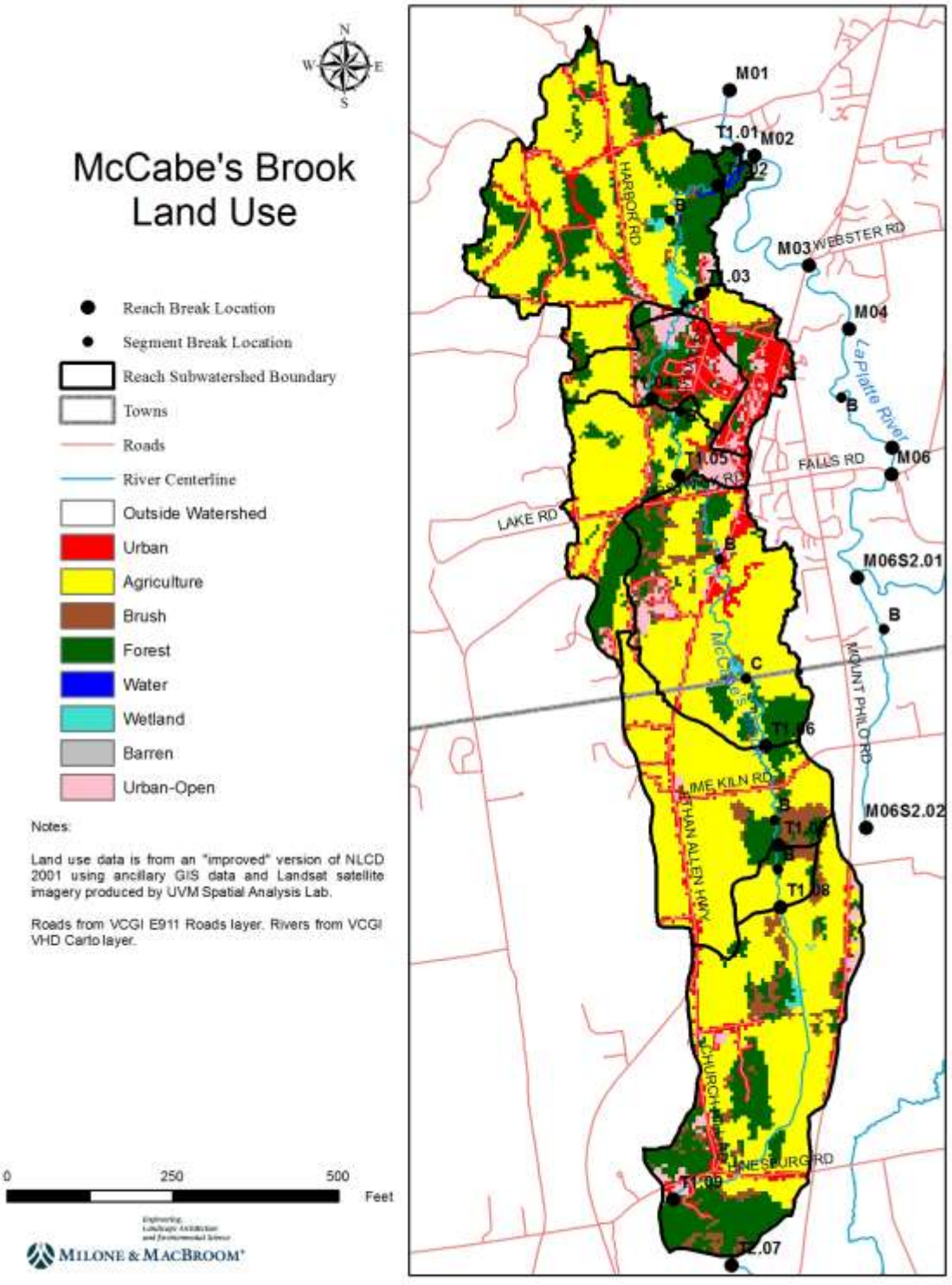

Figure 4: Land Use / Land Cover Map

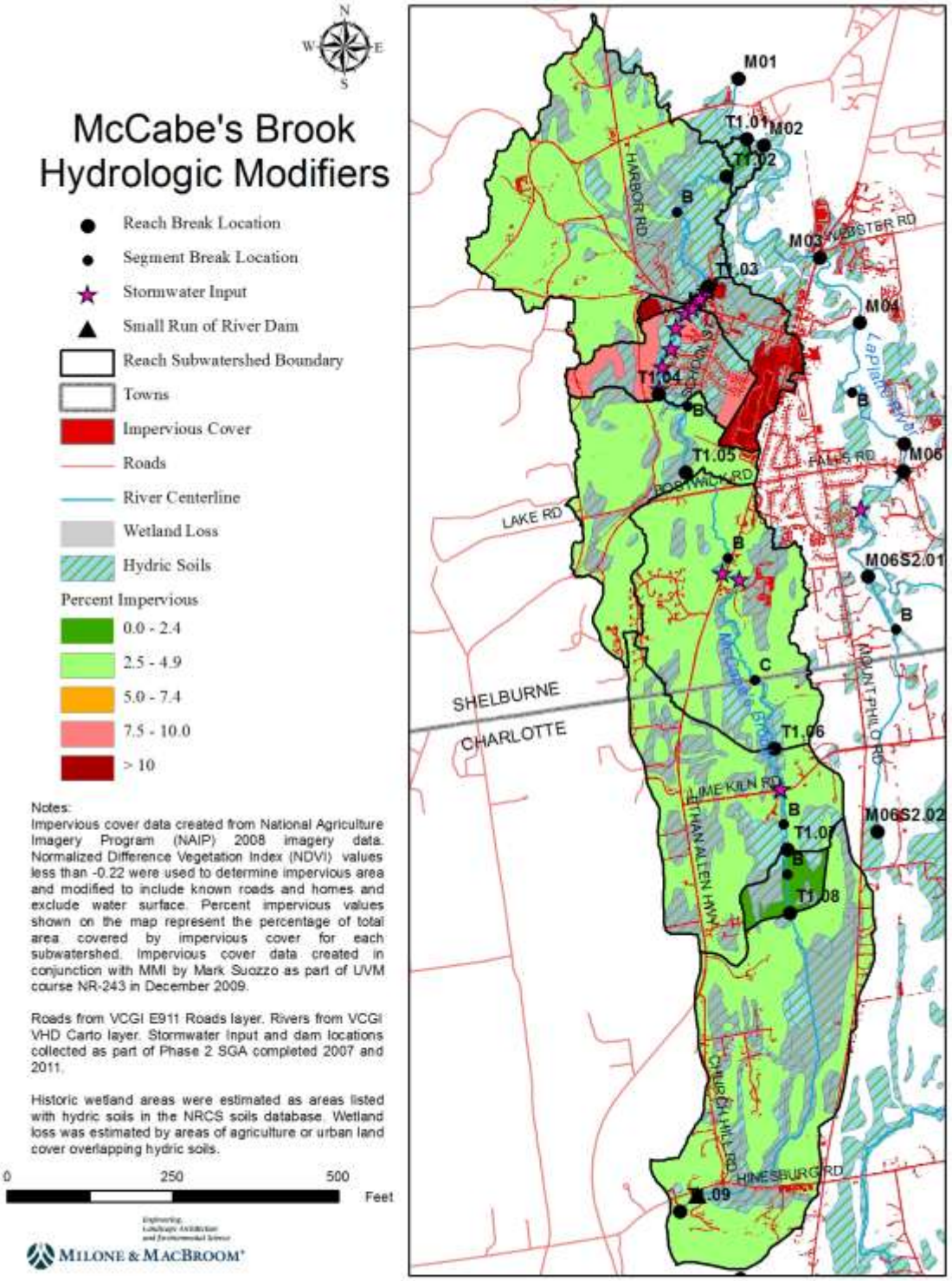

Figure 5: Hydrologic Alterations Map

Identified impacts to the Hydrologic Regime:

- High percentage of agricultural land in all subwatersheds except T1.01 (greater than 20%).

- High percentage of urban land. Most subwatersheds have urban land cover of 9% or higher, except T1.01 and T1.07. T1.03 has 37% urban land cover.

- High percentage of impervious cover in T1.03 (upstream of Harbor Road has 8.2% impervious and downstream has 19.6%).

- There are large areas of the watershed in each subbasin with hydric soils that are now used for either agriculture or urban uses.

- A small dam exists in T1.08 where Homesteader Road crosses McCabe's Brook. This driveway forms an earthen embankment across the floodplain and dams the channel.

6.2 Sediment Regime Stressors

The sediment regime of a river is complex, influenced by sediment sources, hydrology, valley and floodplain type and connection, and in-channel features. Stream sensitivity is closely related to the sediment regime. Larger sediments move in the form of bed load, carried or rolling along the bed, typically only during flood conditions. The movement of these sediments is directly correlated to stream power which is in turn related to the channel geometry, depth, slope and therefore velocity. Sediments also take the form of wash load which is smaller particles that move with the water until settling out in very low velocity conditions. This could occur on floodplains or in this case could be carried to Lake Champlain. As channel geometry and floodplain connections are changed the sediment carrying and depositional characteristics are changed.

6.2.1 Watershed Scale Sediment Regime Stressors

The changes in hydrology discussed in the previous section also affects the sediment regime. If peak volume or timing is changed, sediment transport is also changed. Increased runoff can increase sediment input to the river system. Conversely, instream impoundments or other channel constrictions can both trap sediments upstream and "starve" the channel of sediments downstream. Both cases disrupt the natural balance of transport.

Land use specifically can alter the sediment regime. Agricultural land often has exposed soils and is especially susceptible to surface erosion and can supply significant sediments to the channels. The previous analysis of land use is applicable to determining sediment regime stresses, both urban and agricultural landuse can alter sediment production.

A certain amount of erosion and deposition is natural in an alluvial channel. Some channel features indicate a high sediment load including: steep riffles, mid-channel bars, delta bars, flood chutes, avulsions, and braiding. Significant erosion, mass failures, gully erosion, and tributary rejuvenation contribute to additional instream sediments. When a high number of these features are present, the channel may not be transporting sediment at the equilibrium level (Figure 6).

Identified impacts to the Sediment Load:

- High percentage of agricultural land in all subwatersheds except T1.01.
- High bank erosion in T1.04B and T1.05A (greater than 20% of the banks).
- Moderate bank erosion in T1.03 (5-20% of the banks)
- Multiple mass failures in both T1.04B and T1.05A
- High number of steep riffles and migration features in T1.05A and T1.04B.
- High number of migration features, many due to beaver influence, in T1.03 and T1.05C.
- High density of deposition features in T1.03, T1.04B, T1.05 A,B,C, T1.06 A,B, and T1.07 A,B

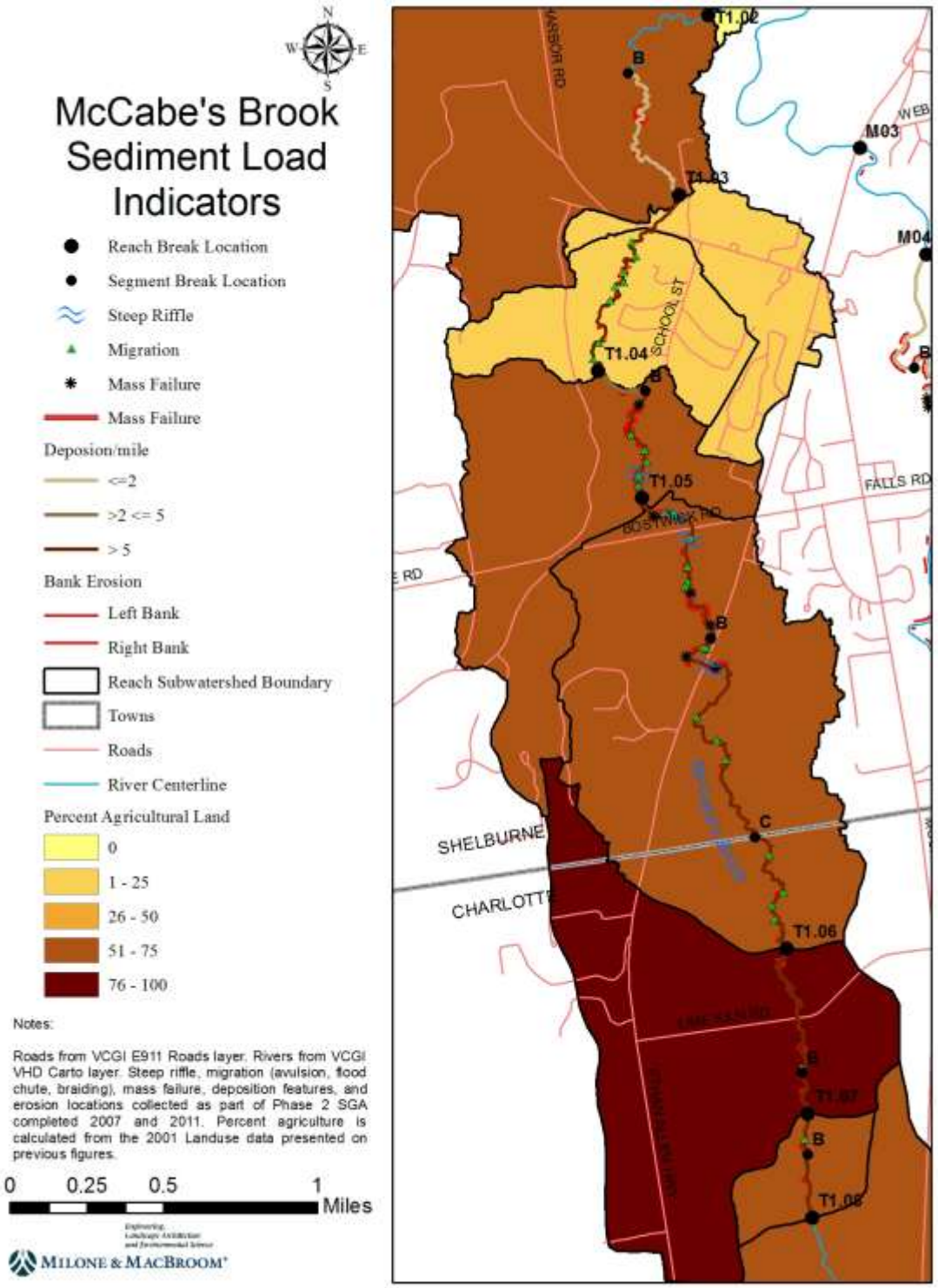

Figure 6: Sediment Load Indicators Map

6.2.2 Reach Scale Sediment Regime Stressors

The sediment load indicators discussed above have a watershed scale effect on sediment loads. Reach scale stressors also affect the stream power and resistance to stream power based on the boundary conditions. Slope and depth modifiers and their associated boundary resistance factors are explored separately.

When channel slopes are increased the channel can adjust causing bed erosion, incision, and trigger channel evolution. Reaches that have been straightened or channelized typically have an increased slope because the distance the channel travels has been reduced. Head cutting of the bed is a symptom of increased channel slope. River corridor encroachments and development can also lead to increased slope as the channel is modified to protect the investment.

Constrictions to either the channel or floodplain can cause backwater upstream. These backwater zones cause sediments to settle out of the water column and deposit. This can cause a decrease in the slope of the channel. These constrictions can be natural or manmade grade controls, undersized bridges or culverts (Figure 7).

Identified impacts that may increase the Channel Slope:

- Major Channel straightening in T1.08.
- Moderate Channel straightening in T1.03, T1.05A, and T1.05B.
- Development along T1.03.
- Headcutting in T1.05A.

Identified impacts that may decrease the Channel Slope:

- Two small dams in T1.08 are ponding water and trapping sediments.
- Natural beaver dams in T1.03, T1.04A, T1.05B and T1.05C.
- Natural grade controls in T1.05A.
- Undersized bridges and culverts specifically noted to attenuate sediment upstream Route 7 in T1.05B, at Bostwick Road in T1.05A, Lime Kiln Road in T1.06A, farm crossings in T1.08.

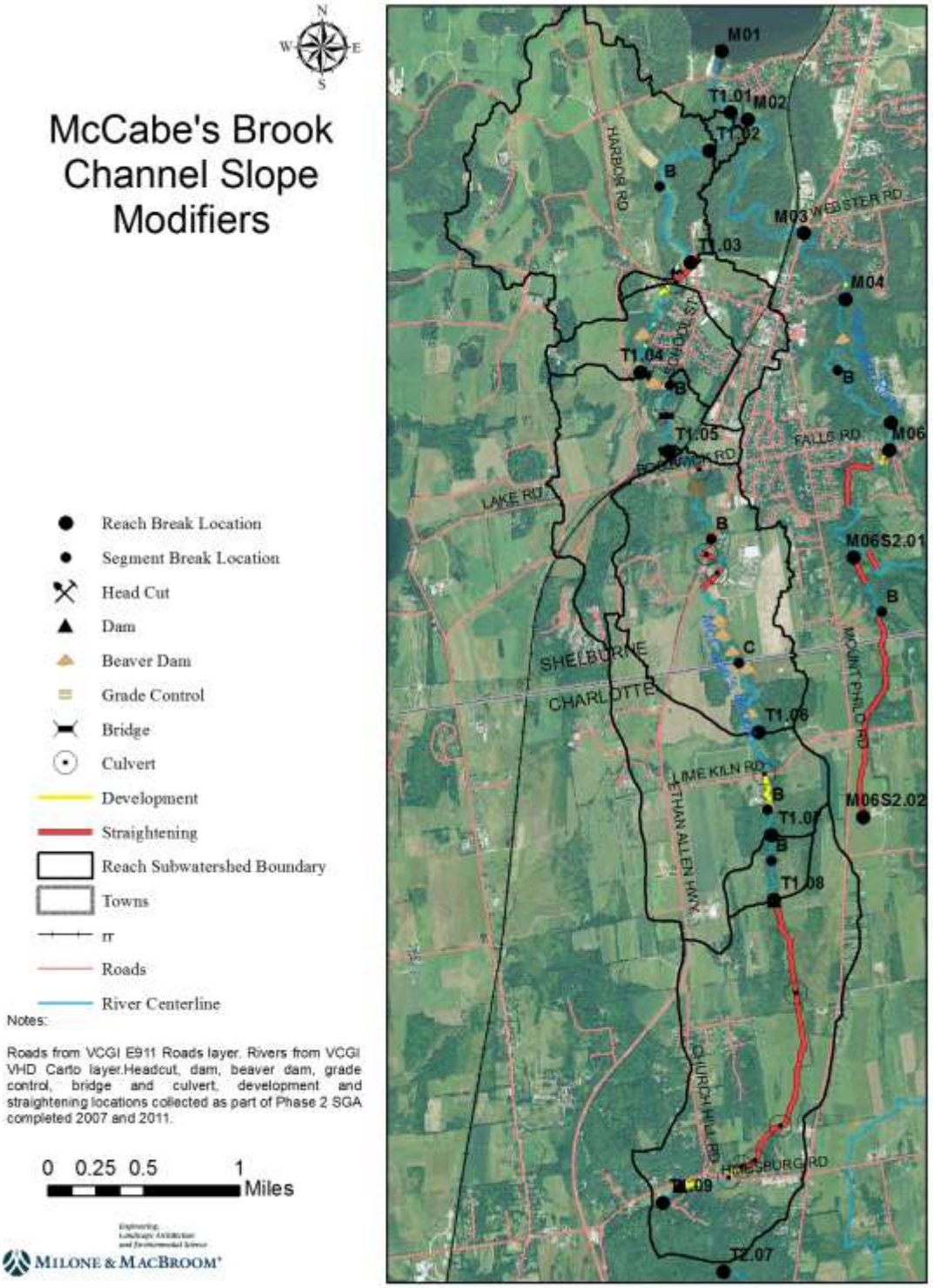

Figure 7: Channel Slope Modifiers Map

Channel depth is directly correlated to stream power (Figure 8). Increases in channel depths can increase stream power that can cause bed erosion, incision, and channel evolution. As a channel deepens, the flow has reduced access to its floodplain. This can be caused by filling of a floodplain, dredging, or incision. Roads, homes, railroads, trails, and other development adjacent to river commonly fills, causing an encroachment into the natural floodplain.

A decrease in channel depth will also affect stream power by spreading the flowing water out over a larger area and decreasing velocities. When depths are decreased, flow velocities decrease and sediments will be deposited. These conditions can occur after gravel mining or bar scalping, neither of which is occurring in McCabe's Brook.

Identified impacts that may increase the Channel Depth:

- Encroachment of Route 7 in T1.05A.
- Encroachment of farm road with possible dredging along T1.08.
- Significant stormwater inputs in T1.03.
- Moderate stormwater inputs in T1.05B and T1.06A.

Identified impacts that may decrease the Channel Depth:

- Sedimentation in the backwater area upstream of Bostwick Road has reduced depth in T1.05A.
- Sedimentation in backwater area upstream of beaver dams in T1.05B and T1.05C.

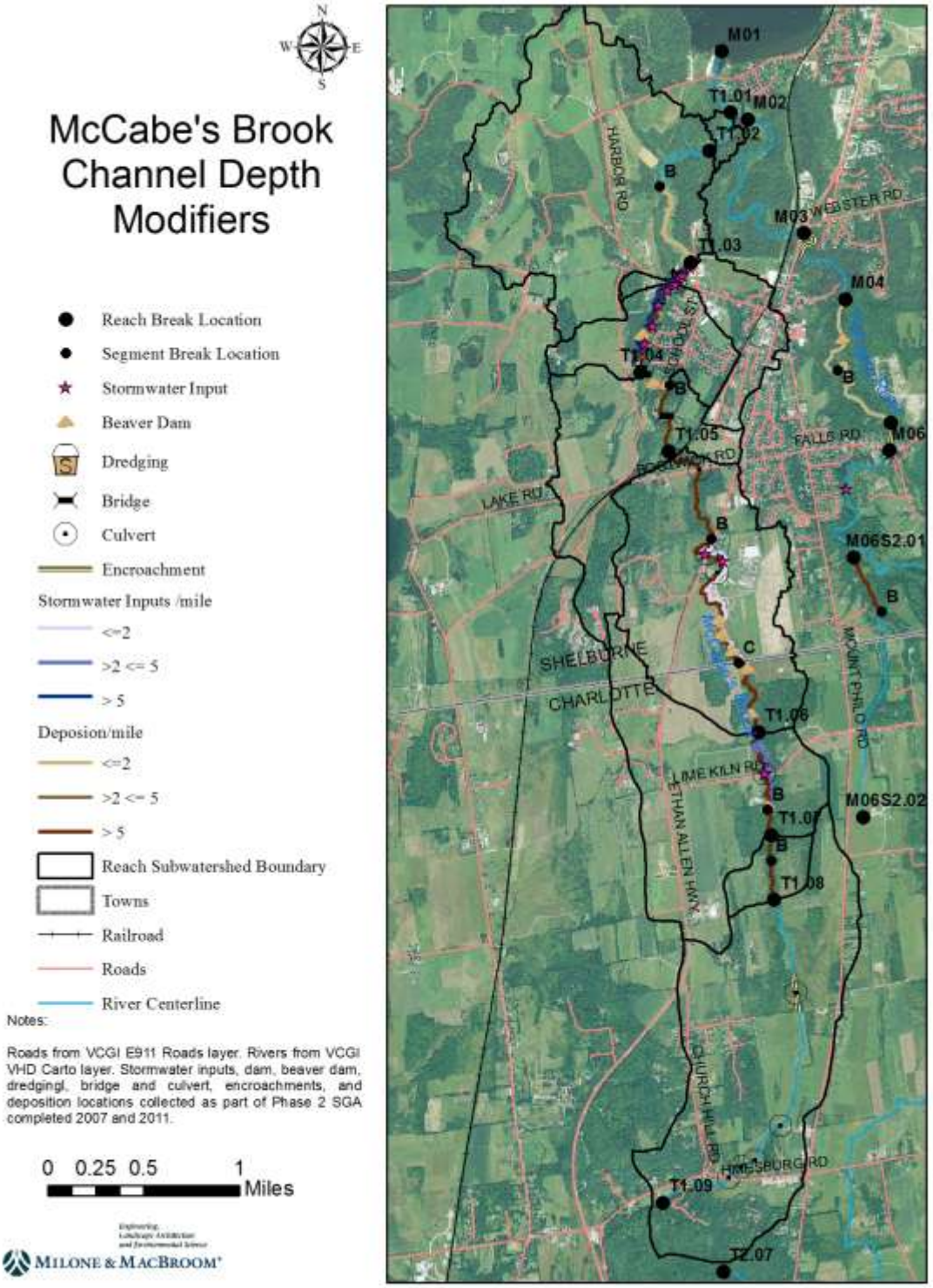

Figure 8: Channel Depth Modifiers Map

The resistance of the channel banks to changes is naturally determined by riparian vegetation and the size and cohesion of the bank materials. These factors determine if the bank will be resilient to shear stresses from the water or if erosion will occur. Bank boundary resistance would be reduced where riparian vegetation is reduced, such as in areas with less than 25 feet of vegetated buffer. Bank resistance would be higher in areas with cohesive bank materials. Channel bed boundary resistance would be increased where course bed material or grade controls are present.

Identified impacts that may increase the Boundary Resistance:

- Channel banks were cohesive for T1.02B, T1.03, T1.05C, T1.06B, T1.07A, and T1.07B.
- Channel bed had coarse channel material in T1.04B, T1.05A, T1.05C, T1.06B, T1.07A, T1.07B.
- Two small dams located in T1.08.
- Bank armoring located near road crossings at Teddy Bear Factory in T1.05B.
- Bank armoring located along Route 7 encroachment in T1.05A and B.
- Bank armoring located downstream of Bostwick Road crossing in T1.05A.
- Natural grade control in T1.05A.

Identified impacts that may decrease the Boundary Resistance:

- Buffers were less than 25 feet wide for a large portion of T1.08.
- Bank erosion is occurring at >20% of bank length in T1.04B and T1.05A.

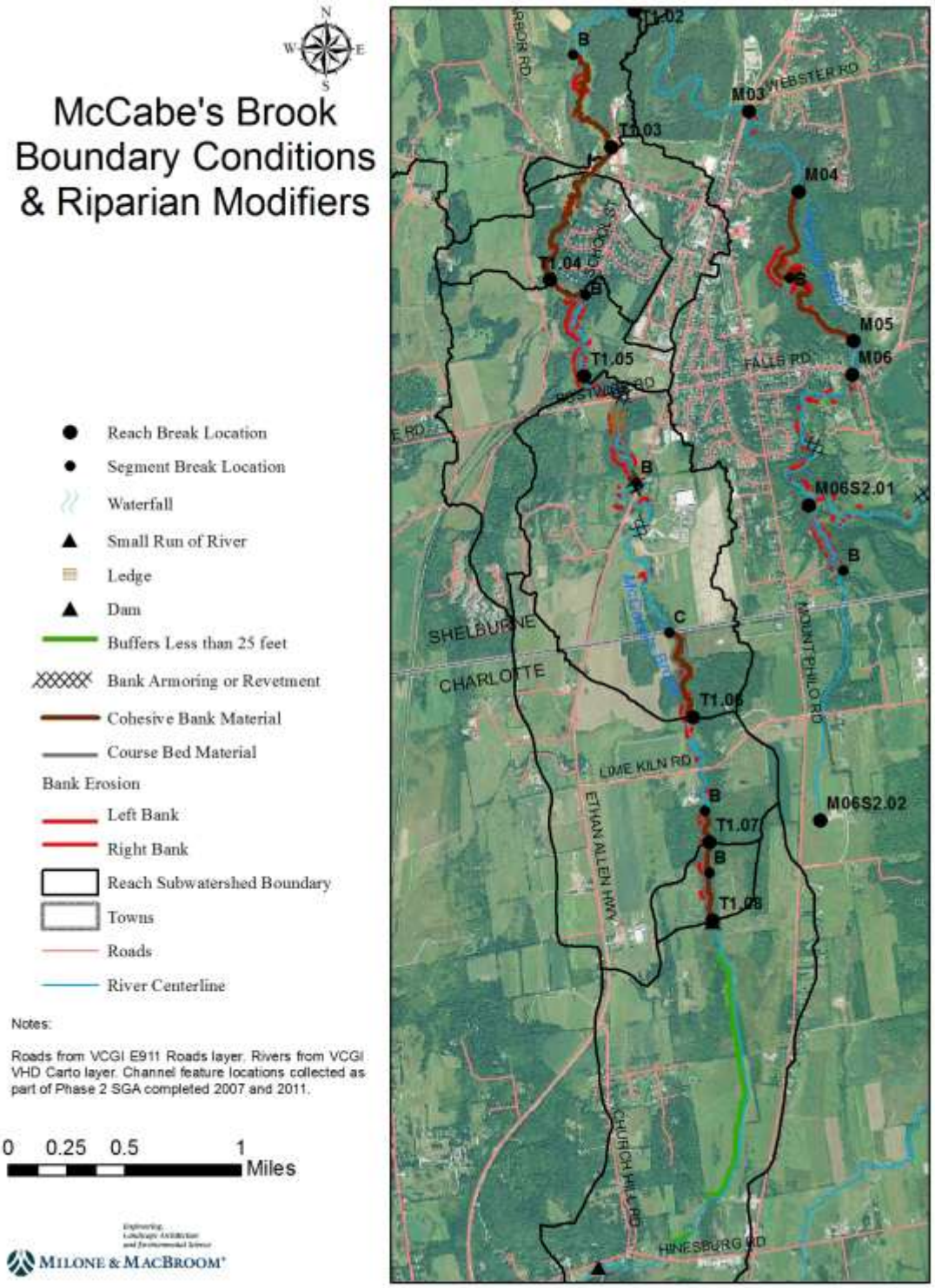

Figure 9: Boundary Condition and Riparian Modifiers Map

6.3 River Stressor Identification Summary

River Stressors have been identified in the previous sections based on river characteristics. Stressors have been summarized for each reach and segment (Table 6).

Table 6: River Stressor Identification Summary

	Watershed Input Stressors		Reach Modification Stressors	
River Segment	Hydrologic	Sediment Load	Stream Power	Boundary Resistance
T1.08	High Percent Ag Land; Small Run of River Dam; Loss of Wetland	High Percent Ag Land	Increase: Straightening; Encroachment; Dredging Decrease: Dams; Undersize Culverts	Increase: Small Run of River Dam Decrease: Narrow Buffers
T1.07B	High Percent Ag Land; Loss of Wetland	Depositional Features; High Percent Ag Land		Increase: Cohesive Banks; Coarse Bed Material
T1.07A	High Percent Ag Land; Loss of Wetland	Depositional Features; High Percent Ag Land		Increase: Cohesive Banks; Coarse Bed Material
T1.06B	High Percent Ag Land; Loss of Wetland	Depositional Features; High Percent Ag Land		Increase: Cohesive Banks; Coarse Bed Material
T1.06A	High Percent Ag Land; Loss of Wetland	Depositional Features; High Percent Ag Land	Increase: Development; Stormwater Input Decrease: Undersize Culvert	
T1.05C	High Percent Ag Land; Loss of Wetland	Depositional Features; High Percent Ag Land; Lateral Migration	Decrease: Beaver Dams	Increase: Cohesive Banks; Coarse Bed Material
T1.05B	High Percent Ag Land; Loss of Wetland	Depositional Features; High Percent Ag Land	Increase: Straightening; Stormwater Input Decrease: Beaver Dams; Undersize Culvert	Increase: Bank Armoring
T1.05A	High Percent Ag Land; Loss of Wetland	Mass Failures; High Bank Erosion; Depositional Features; High Percent Ag Land; Steep Riffles; Lateral Migration	Increase: Straightening; Headcutting Encroachment Decrease: Grade Control; Undersized Culvert	Increase: Coarse Bed Material; Bank Armoring; Grade Control Decrease: Bank Erosion

Table 6: River Stressor Identification Summary (continued)

	Watershed Input Stressors		Reach Modification Stressors	
River Segment	Hydrologic	Sediment Load	Stream Power	Boundary Resistance
T1.04B	High Percent Ag Land; Loss of Wetland	Mass Failures; High Bank Erosion; Depositional Features; High Percent Ag Land; Steep Riffles; Lateral Migration		Increase: Coarse Bed Material Decrease: Bank Erosion
T1.04A	High Percent Ag Land; Loss of Wetland	High Percent Ag Land	Decrease: Beaver Dams	
T1.03	Very High Percent Urban Land; High Percent Impervious Cover; High Percent Ag Land; Loss of Wetland; Stormwater Inputs	Moderate Bank Erosion; Depositional Features; High Percent Ag Land; Lateral Migration	Increase: Straightening; Development; Stormwater Input Decrease: Beaver Dams	Increase: Cohesive Banks
T1.02B	High Percent Ag Land; Loss of Wetland	High Percent Ag Land		Increase: Cohesive Banks
T1.02A	High Percent Ag Land; Loss of Wetland	High Percent Ag Land		

6.4 Constraints to Sediment Transport and Attenuation

A reach's current channel evolution process stage and an understanding of how quickly the stage might change is important to understand before implementation of projects. An analysis of stream departure and sensitivity has been conducted. A river channel will over time balance stream power and sediment in a dynamic equilibrium. Channel adjustments will occur when the channel is out of equilibrium. In equilibrium, reaches could be a transport reach or a sediment source reach based on natural channel conditions. Transport processes can be altered based on many of the stressors examined above. Viewing this information at the watershed scale is important for understanding the system as a whole.

The Phase 1 analysis has identified that all McCabe's Brook reaches would naturally be in Coarse Equilibrium with Fine Deposition (Figure 10). Streams of this type are generally sand, gravel or cobble bed streams in an unconfined valley that are not incised or entrenched. Streams

of this type would typically have buffers and minimal bank erosion. Transport and Deposition would be in equilibrium and fine sediment deposition can occur on floodplains.

The Phase 2 data indicates that many reaches are still in the reference sediment regime of Coarse Equilibrium with Fine Deposition. T1.04A, T1.05A, and T1.07B have departed from the reference condition and are currently Fine Source and Transport and Coarse Deposition reaches (Figure 10). These reaches have low bank armoring and an incision ratio > 1.3. These reaches may represent a departure due to a vertical profile change. These are often historically straightened, incised or entrenched streams with little boundary resistance and increased bank erosion. T1.07B could be considered to be in Equilibrium because it is in Stage I of the channel evolution process and in Good geomorphic condition.

Constraints to adjustment have also been considered (Figure 10). Natural grade controls and dams will prevent vertical adjustment. Bedrock under the channel bed controls vertical adjustment in T1.05A. Dams can also prevent vertical adjustment and are present in T1.08. Constraints from lateral adjustment have been identified with buildings, roads, and driveways in the river corridor assuming that adjustment would not be tolerated within 166 feet of buildings or 50 feet of roads and driveways. Protection of existing infrastructure often dictates river management. Lateral channel migration is often not tolerated near infrastructure and bank armoring or other management techniques are used to limit the channel location. These constraints help when planning for possible locations to mitigate for sediment regime departures.

Table 7: Departure Analysis Table

	Constraints		Transport		Attenuation		
River Segment	Vertical	Lateral	Natural	Converted	Natural	Increased	Asset
T1.08	human	human					
T1.07B				X		X	
T1.07A						X	
T1.06B						X	X
T1.06A		human				X	X
T1.05C						X	
T1.05B		human				X	
T1.05A	natural	human		X		X	
T1.04B						X	X
T1.04A				X			
T1.03		human				X	
T1.02B							X
T1.02A							X

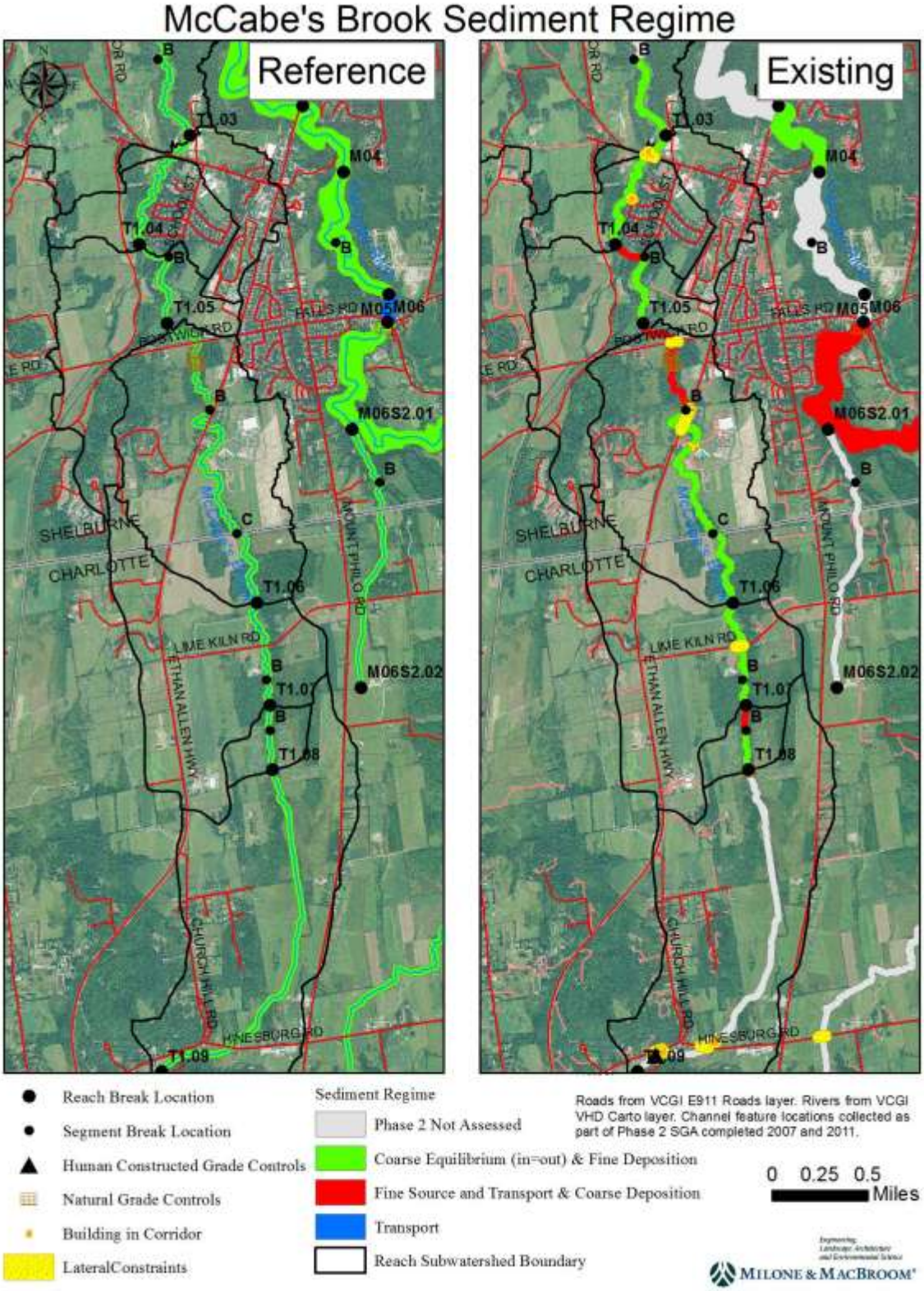

Figure 10: Sediment Regime Departure Map

Stream sensitivity is an indication of the likelihood of the occurrence of vertical and lateral adjustments and is controlled by natural and human caused processes. The Stream sensitivity is determined based on Phase 2 assessment data. The Sensitivity is assigned based on the Existing Geomorphic Stream type and its current condition if reference or good, in major adjustment or has departed from its reference stream type. Sensitivity considers that some stream types naturally undergo lateral or vertical adjustments more easily because of their materials or form.

Reference sensitivity for all McCabe's reaches is High. Stream sensitivity level has been raised for three reaches due to current conditions (Figure 11). T1.05A is extreme and T1.03 and T1.04B are very high. T1.05A has extreme sensitivity due to its poor condition and departure from a C4 to F4 stream type. T1.03 and T1.04B have very high sensitivity due to their fair geomorphic condition and adjustment.

Current aggradation and degredation processes were examined. T1.05A has experienced historic degradation. No reaches are currently experiencing vertical adjustment, either aggradation or degradation. If certain reaches were going through vertical adjustment, those reaches could be prioritized for certain restoration projects.

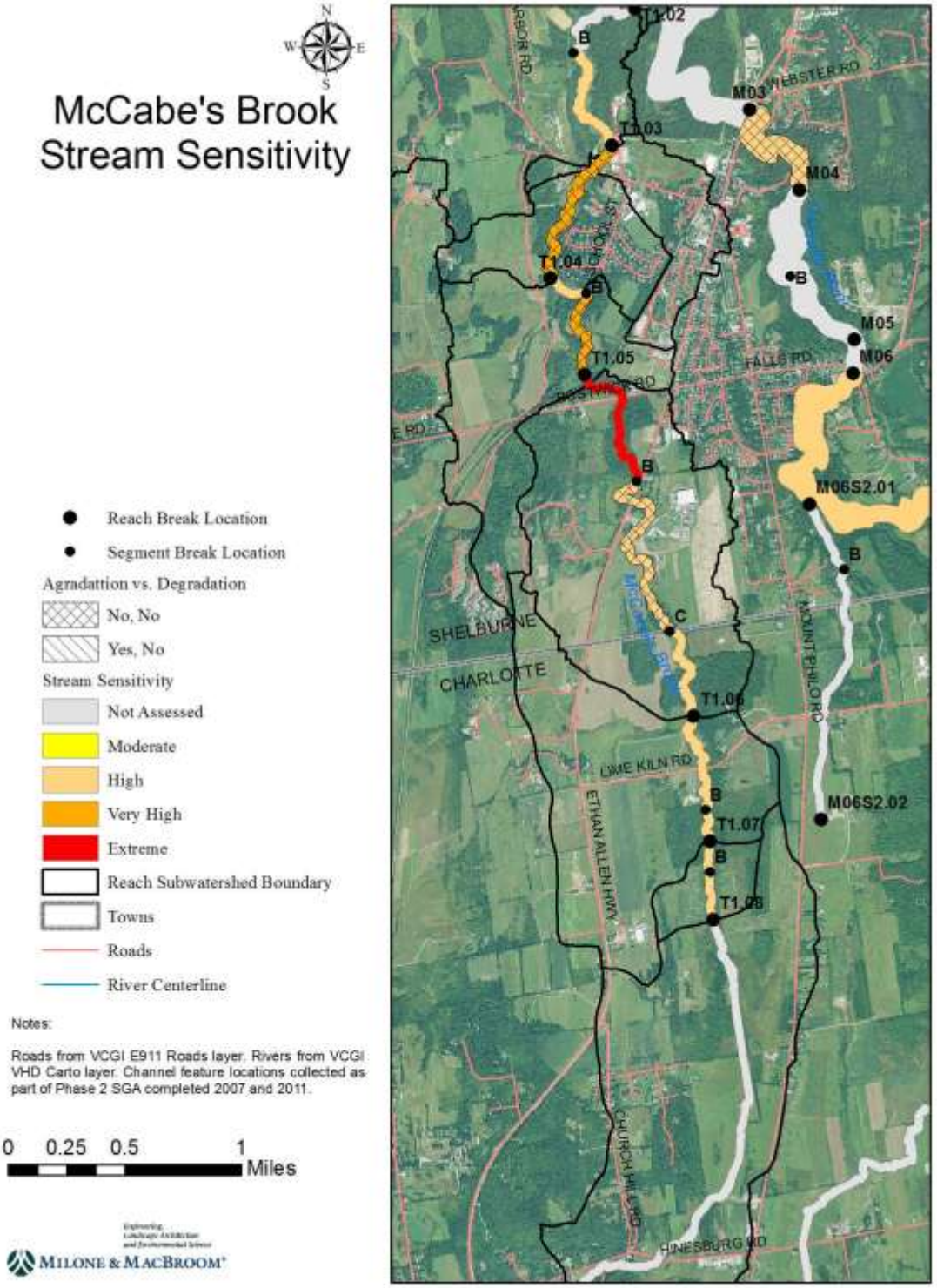

Figure 11: Stream Sensitivity Map

7.0 PRELIMINARY PROJECT IDENTIFICATION AND MANAGEMENT RECOMMENDATIONS

7.1 Watershed Level Management Options

7.1.1 Drainage and Stormwater Management

Watershed hydrology may contribute to adjustments occurring at the reach level. Runoff characteristics including the timing, volume, and duration of peak flows can be changed due to landuse changes. As hydrology changes, a stream channel will adjust to carry the new flows and try to reach equilibrium. Runoff from roads, construction sites, and agricultural fields also increase sediment supply to the rivers.

Most reaches have high percentages of both agricultural land and urban land. Urban land and impervious cover is concentrated at T1.03, but all subwatersheds have urban land cover of 9% or higher except T1.01 and T1.07. Runoff from developed urban land may have reached a critical level in the lower reaches near the Shelburne Village. Agricultural lands and rural residential areas in the upper reaches of the watershed also contribute stormwater runoff and increased sediment supply to the channel. Throughout the watershed landuse conversion has reduced wetlands which would have naturally detained stormwater runoff.

By planning proactively, Towns can reduce potential stormwater runoff problems and avoid costly future retrofit and repairs to damaged infrastructure. Overall goals to reduce negative impacts of stormwater runoff are to reduce sources, increase storage, and decrease transport. Strategies to address drainage and stormwater management:

- Require Low Impact Development principles for future development. Model ordinances and planning assistance is provided by the Vermont League of Cities and Towns.

- Increase required level of stormwater treatment for development projects. Specifically require treatment for smaller projects falling below the regulatory threshold for ACT250 review or the States Stormwater Management Rule.

- Shelburne also has a Stormwater-Impaired Watershed Overlay District that requires a higher level of stormwater treatment, but this district does not cover McCabe's Brook. Consider extending the provisions of that district to McCabe's Brook drainage.

- Slow drainage and reduce sediment inputs from rural roads. Use strategies provided by the VTANR Better Back Roads Program.

- Retrofit existing drainage systems collecting runoff from urban areas to include inline treatment.

- Disconnect impervious surfaces from drainage systems and encourage infiltration.

- Protect existing wetlands and floodplain storage areas from development so that these natural features can continue to store and treat stormwater runoff.

7.1.2 Floodplain and River Corridor Planning and Protection

Floodplains carry water that overflows from the main channel during storm events and serve to store water that could otherwise cause flooding and damage. Floodplains allow water to spread out and slow allowing sediments to settle out of the water and reduce stream power and potential erosion. Floodplain functions are reduced when they are filled during development or when a channel is straightened or incised and the water cannot access the floodplain during high flows.

Protection and enhancement of floodplain functions is the most cost effective strategy for protecting river function. Local zoning should limit structures and fill in the floodplain. By keeping development farther from the river it reduces need for active channel management to protect investments.

Shelburne and Charlotte both participate in FEMA's NFIP program that establishes floodplain boundaries and regulates land uses within them. The Special Flood Hazard Area (SFHA) is defined for McCabe's Brook downstream of the Railroad Crossing (downstream of Bostwick Road), but the floodplain is not defined or regulated by this program upstream of that crossing. Shelburne has a Water Course Overlay District that includes McCabe's Brook upstream of the Railroad Crossing that extends the regulations of the SFHA to include an area of 100 feet on both sides of McCabe's Brook. Within Shelburne this provides additional protections, but may not include the entire floodplain as would be defined in a detailed study. The SFHA does not extend into Charlotte, so this tool is not currently used.

Charlotte has included a 100 foot area of land on both sides of McCabe's Brook in its Conservation Zoning District. This district limits new construction to agriculture and forestry with conditional uses including accessory structure, municipal facilities, nature center, parking facility (unpaved surface only), and shoreland improvements.

VTANR has developed criteria for establishing a Fluvial Erosion Hazard Zone (FEH) which establishes a buffer zone around the river based on channel and valley characteristics and knowledge of the likelihood of channel movement. Some towns have adopted FEH zones into local zoning to limit development within these areas.

It is recommended that both Shelburne and Charlotte adopt a FEH zone around the corridor. This will enhance benefits of the established zones based on river science.

7.1.3 Buffer Establishment and Protection

Protection of the floodplains as discussed above works in tandem with buffer establishment and protection. The steps taken in floodplain protection are focused on maintaining flood storage and sediment removal benefits and reducing hazards. A riparian buffer of vegetation adjacent to a river is typically within the floodplain, but provides additional benefits to river stability and water and habitat quality. Establishment of a wooded vegetated buffer will improve river quality. There are many uses that may be appropriate for a floodplain that would degrade water quality if occurring near the river edge (i.e. animal grazing).

Regulatory policies should be put in place to encourage maintaining a wooded vegetated buffer on both sides of all water courses.

Specific projects identified in the following sections should be pursued to re-establish wooded buffers where they have been lost.

7.1.4 Stream Crossings

McCabe's Brook has 12 crossing structures along the assessed length. These crossing structures are often undersized and block natural movement of sediment and aquatic organism passage. Crossing structure do not just impact the local area of the stream. Fish migrations can be cut off, preventing the natural life cycle patterns. When the movement of sediment is blocked, the river downstream can become "sediment starved" and begin to erode the channel bed. Specific opportunities for addressing problems are discussed in the section below, although each structure has a much larger impact on the entire system.

7.2 Site Level Management Options

Site-level management options have been identified within the McCabe's Brook watershed (Table 8).

Table 8: River Corridor Plan Project Identification Table.

River Segment / Condition	Site Description including Stressors and Constraints	Project or Strategy Description	Technical Feasibility	Priority	Project Benefits	Costs	Landowner/ Commitment	Potential Partners with LWP
T1.08 #1 RGA: N/A Sens: N/A CEM: N/A	This reach has a significant amount of agriculture in the corridor. The wetland has been straightened and natural vegetation has been lost post agriculture. The section near and upstream of Hinesburg Road has residential development encroaching on the wetland.	Protect Wetland Corridors - Work with landowners to protect identified wetland areas from additional development or active agriculture.	High	#10: High	Improved habitat; improved water quality.	Variable	Nordic Farm; Pizzagalli; Ferreira; Foote; Schermerhorn ; Small Landowners near Hinesburg Road	
T1.08 #2	Historic agricultural practices have removed natural vegetation, some sections may naturally have wetland vegetation, but are currently grasses including switch grass. Long sections of the flow path have minimal buffers that lack woody vegetation.	Plant Stream Buffers / Wetland Restoration- Delineate wetland area and identify priority areas. Work with landowners to restore natural vegetation within the riparian buffer. Hydric soils indicate that some sections would naturally be wetlands.	High	High	Improved habitat; improved water quality.		Pizzagalli- 1,300' Left; Ferreira - 1,600' Both; Foote - 1,700' Both	
T1.08 #3	Pizzagalli Property: A farm road runs parallel to the channel. The road is raised and blocks access to the left floodplain. There is evidence of periodic dredging along with road maintenance. The channel has the form of a straight, wide, featureless ditch at the edge of the road. Natural vegetation and shade is minimal due to road location.	Restore Wetland Channel - Reconnect channel to left wetlands. This could mean abandoning or removing road where it prevents access to adjacent wetlands. Recommend no more dredging in channel. Work with landowner to allow for passive restoration of the channel by allowing natural vegetation to grow on the banks and not ditching.	High.	#5: High.	Improved habitat; Improve adjacent wetland attenuation.	Mod	Remo Pizzagalli	

River Segment / Condition	Site Description including Stressors and Constraints	Project or Strategy Description	Technical Feasibility	Priority	Project Benefits	Costs	Landowner/ Commitment	Potential Partners with LWP
T1.08 #4	Five small culvert crossings exist including Hinesburg Road and four farm crossings. Each structure is undersized with scour downstream. Culverts are backwatered and do not appear to be a problem for fish passage.	Remove/ Replace Structures - Each of the structures could be replaced with larger structures. Habitat quality and reconnected area should be considered before culvert replacement.	High, farm crossings do not have as many complications as road structures.	Low, although small, not in major conflict with river or organisms.	Improved habitat. Wildlife habitat connectivity.	High for Hinesburg Road. Low for farm crossings.	Town of Charlotte; Pizzagalli; Foote; Schermerhorn x 2	
T1.08 #5	A small run-of-river dam is located at Homesteader Road. The road embankment blocks the river, forming a small pond upstream. A pipe overflow outlet carries the stream flow through the embankment. Only access to four homes.	Remove/ Replace Structures - Removal or retrofit of this structure could be considered. The location at the upstream extent of the watershed limits upstream habitat. There are no reported flooding or erosion issues with this structure.	Low, Would need to remove pond and install culvert under road.	Low, very little habitat upstream. No other issues.	Restore channel to natural conditions. Reduce flood risk.	High	Church Hill Homeowners	
T1.08 #6	A small partially breached run-of-river dam is located upstream of a farm ford on the Nordic Farm property near the downstream end of the reach. The remaining stone structure impounds the river approximately 600 feet upstream. Impoundment is covered in thick algae that would smother natural species.	Remove Structure - Removal of remaining stone spillway and rubble would remove the impoundment and restore natural sediment and organism passage.	High, easy access from farm road. Minimal excavation.	#9: High, Effects large area upstream and captures a lot of sediment	Restore channel to natural conditions; improve habitat.	Low.	Nordic Farm	

River Segment / Condition	Site Description including Stressors and Constraints	Project or Strategy Description	Technical Feasibility	Priority	Project Benefits	Costs	Landowner/ Commitment	Potential Partners with LWP
T1.07B #1 RGA: Good Sens: High CEM: I (F)	Nordic Farm: Near bank vegetation is primarily herbaceous with some invasive honeysuckle and switch grass. Downstream corridor is wooded. Area part of historic impoundment.	Plant Stream Buffers - Evaluate appropriate species. Plant woody species in corridor and remove invasive	High, easy access. No other current uses.	High	Improved habitat; improved water quality.	Low.	Nordic Farm	
T1.07B #2	Nordic Farm: At the downstream end of the reach the remains of an old earthen dam embankment constrict floodplain flow. Rock rubble located in channel just upstream of dam embankment.	Remove Constriction - Excavate the earthen embankment to promote floodplain flow into the forested downstream reach. Remove rock rubble from channel.	High	Low	Improve floodplain attenuation; Reduce channel erosion.	Low	Nordic Farm	Landowner
T1.07B/A + T1.06B #3	Nordic Farm: River Corridor is primarily undeveloped and forested. The riparian area is in good condition and protections should be put in place to ensure that this will not be lost to future land use changes.	Protect River Corridors - Preserve these "in-regime" reaches by preventing future encroachment. The property has an easement with the Vermont Land Trust already. Work with landowners to secure specific protections for the river corridor.	High, Land currently forested and parcel conserved.	#6: High, Landowner controls a significant portion of watershed.	Improve floodplain attenuation; Reduce channel erosion.	Low, Land has easement. Outreach to understand management.	Nordic Farm	Landowner
T1.07A #1 RGA: Good Sens: High CEM: I (F)	Multi-reach river corridor protection project. See above.							
T1.06B #1 RGA: Good Sens: High CEM: I (F)	Multi-reach river corridor protection project. See above.							

River Segment / Condition	Site Description including Stressors and Constraints	Project or Strategy Description	Technical Feasibility	Priority	Project Benefits	Costs	Landowner/ Commitment	Potential Partners with LWP
T1.06A #1 RGA: Reference Sens: High CEM: I (F)	Nordic Farm and Binter horse farm on Lime Kiln Road: The channel is in reference condition. Flows through wet meadow and has adjacent wetlands. Some beaver activity.	Protect River Corridors - Preserve this "in-regime" reach by preventing future encroachment. The majority of the reach has an easement already. Work with landowners to secure specific protections for the river corridor and expand to unconserved property.	High, coordination with landowners	High, reference condition of reach is important to protect.	Improve water quality; Wildlife habitat connectivity.	Mod	Nordic Farm-ds of Lime Kiln Road; Binter - us of Lime Kiln Rd	Landowners
T1.06A #2	Lime Kiln Road Culvert: Structure is undersized. It is disrupting sediment transport and causing scour downstream. The culvert failed recently and was repaired with the same size culvert.	Replace Structure - Lime Kiln Road culvert with a larger structure that would be more compatible with stream processes.	High, straightforward culvert replacement on dirt rural road.	Mod, not extreme issues. When work is required, replace with larger culvert.	Improve aquatic organism passage; reduce erosion risks.	High.	Town of Charlotte	
T1.06A #3	Nordic Farm and horse farm on Lime Kiln Road: Near bank vegetation is primarily herbaceous and primarily hydric soils.	Maintain/Improve Stream Buffers - Plant woody species in corridor. Investigate appropriate species. Wet meadow is likely reference condition.	Mod	Mod				
T1.05C #1 RGA: Reference Sens: High CEM: I (F)	Nordic Farm and Titus property off of Lime Kiln Road: The channel is in reference condition. Flows through wet meadow and has adjacent wetlands. Some beaver activity.	Protect River Corridors - Preserve this "in-regime" reach by preventing future encroachment. The majority of the reach has an easement already. Work with landowners to secure specific protections for the river corridor.	High, coordination with landowners	High, reference condition of reach is important to protect.	Improve water quality; Wildlife habitat connectivity.	Mod	Nordic Farm; Titus - small segment on river bend.	Landowners

River Segment / Condition	Site Description including Stressors and Constraints	Project or Strategy Description	Technical Feasibility	Priority	Project Benefits	Costs	Landowner/ Commitment	Potential Partners with LWP
T1.05C #2	Nordic Farm: Near bank vegetation is primarily herbaceous. Little overhanging vegetation or shade.	Maintain/ Improve Stream Buffers - Plant woody species in corridor. Investigate appropriate species. Wet meadow is likely reference condition.						
T1.05B #3 RGA: Good Sens: High CEM: II (D)	Multiple Properties in lower section of reach: Riparian buffers are narrow and primarily herbaceous with little overhanging vegetation or shade. This area is historically agricultural and woody vegetation has not recovered.	Maintain / Improve Stream Buffers - Plant woody species in corridor. Upstream portion of reach has a wooded buffer, then flows close to agricultural field and Route 7 corridor development.	High	Mod	Improved habitat; improved water quality.	Low	Mack - 600'; TB - 1000' us driveway, 900' ds driveway; Ridgefield Homeowners Assoc. - 950'	CREP? Chris Smith, FWS
T1.05B #4	Teddy Bear Factory: Culvert is large enough, although perched creating a 0.5 ft drop at the outlet that would block AOP. Flat apron at upstream end could also affect AOP. Approach channels are constricted upstream and wide and flat downstream.	Retrofit Structure - Alter existing structure's inlet and outlet channels and entrances to improve AOP.	High	Mod, reference stream conditions upstream = good reconnected habitat.	Improved habitat. Wildlife habitat connectivity.	Mod	Teddy Bear Factory	FWS
T1.05B #5	Route 7: Culvert is undersized and the embankment fills the floodplain. Sediment is accumulating upstream.	Replace Structure - Replace culvert with a larger structure that will accommodate sediment transport.	Low, Route 7 is a high traffic road. Replacement unlikely.	#4: High.	Improved habitat. Wildlife habitat connectivity.	High	State of Vermont	Vtrans; FWS

River Segment / Condition	Site Description including Stressors and Constraints	Project or Strategy Description	Technical Feasibility	Priority	Project Benefits	Costs	Landowner/ Commitment	Potential Partners with LWP
T1.05B/A #1	Route 7: The road embankment completely fills the floodplain at the crossing location. Downstream of the crossing the river turns and flows parallel to the embankment, where it is severely constricted by the embankment fill. Mass failures have resulted upstream and downstream of the constriction. Armor at toe of Route 7 embankment has some damage.	Remove Constriction / Floodplain Restoration: Remove constriction caused by embankment. Route 7 is a major travel corridor and unlikely to be re-routed or accommodate a narrower embankment. Explore creation of a compound channel with floodplain using undeveloped land on the opposite bank.	Mod, Bedrock outcroppings are present downstream and may prevent excavation of a compound channel.	#1: High, This constriction appears to be destabilizing upstream and downstream reaches.	Improved sediment transport; reduced erosion risk; Improved floodplain attenuation.	High	Ridgefield Homeowners Association; Meach Real Estate Trust	Vtrans to protect Route 7.
T1.05B/A #2	Multiple mass failures exist both upstream and downstream of the Route 7 crossing. Tall till slopes are exposed, contributing large amounts of mixed sediment to the river downstream.	Bank Stabilization - Stabilize multiple mass failures. Guidance recommends waiting for channel to finish evolution because channel still in flux. Possibly address after active floodplain restoration?	Low, Channel out of regime.	Low, Channel out of regime and constricted upstream.				
T1.05A #3 RGA: Poor Sens: Extreme CEM: III (F)	This reach is unstable, in poor geomorphic condition, and exhibiting widening and planform change. It will continue to meander as it reaches equilibrium. It has reduced floodplain connectivity due to moderate incision. The channel is constrained at multiple locations by bedrock and two crossing structures. Deposition.	Protect River Corridors - This reach flows through a primarily undeveloped forested riparian area. Protection of this wooded corridor will allow the river to meander as necessary to reach equilibrium, continue to provide habitat and water quality functions, and prevent unnecessary flood and erosion risks.	High, currently undeveloped. Clearly unstable.	High	Wildlife habitat connectivity; reduce erosion risk.	Mod	Meach Cove Real Estate Trust - US of Bostwick; Shelburne Museum - DS of Bostwick.	

River Segment / Condition	Site Description including Stressors and Constraints	Project or Strategy Description	Technical Feasibility	Priority	Project Benefits	Costs	Landowner/ Commitment	Potential Partners with LWP
T1.05A #4	Bostwick Road Culvert: This culvert is undersized and completely filling the floodplain with a tall embankment. The structure is accumulating debris upstream and has a very large cobble and gravel delta extending a few hundred feet upstream. Scour is occurring downstream and an outlet drop of 0.5 ft blocks AOP.	Replace Structures - The Bostwick Road culvert should be replaced with a larger structure than can accommodate sediment and flood water movement along with AOP.	Mod, This is a very tall road embankment that will make replacement difficult.	#2: High, sediment and organism transport is greatly reduced.	Wildlife habitat connectivity; sediment continuity ; reduce erosion risk.	High	Town of Shelburne	FWS
T1.05A #5	Railroad Arch: This concrete and masonry arch structure has a concrete bottom. The structure is undersized. It blocks AOP due to low water depth and a 1 ft outlet drop. This structure has arrested a headcut, preventing incision from moving upstream. Coarse sediment has accumulated upstream.	Retrofit/ Replace Structure - The structure should be replaced to facilitate natural sediment transport. If replaced, the design should include grade controls to keep the headcut from moving upstream. The structure could be retrofit to better accommodate AOP if the replacement of the structure is not found to be feasible.	Mod, work at active railroad structures is difficult without failure.	Mod, downstream headcut must be considered.	Wildlife habitat connectivity; sediment continuity ; reduce erosion risk.	High	State of Vermont	FWS
T1.04B #1 RGA: Fair Sens: Very High CEM: II (F)	This reach is exhibiting incision and planform change. Erosion is occurring and the channel will continue to meander as it reaches equilibrium. It has reduced floodplain connectivity due to moderate incision. This would be an attenuation asset, located downstream of a reach that is out of its sediment regime.	Protect River Corridors - This reach flows through a primarily undeveloped forested riparian area. Protection of this corridor will allow the river to meander as necessary to reach equilibrium, continue to provide habitat and water quality functions, and prevent unnecessary flood and erosion risks.	High, already in floodplain overlay.	#7: High	Improved habitat; improved water quality.	Low	Shelburne Museum on Right; Meach Cove Real Estate Trust on Left	

River Segment / Condition	Site Description including Stressors and Constraints	Project or Strategy Description	Technical Feasibility	Priority	Project Benefits	Costs	Landowner/ Commitment	Potential Partners with LWP
T1.04B #2	The segment has an adequate wooded buffer over most of the length, but two sections have herbaceous vegetation in what appears to be historic agricultural fields.	Plant Stream Buffers - Plant woody stream buffers in riparian areas with no trees.	High	Low, small segments in wooded reach.	Improved habitat.	Low	Shelburne Museum-400' on Right; Meach Cove Real Estate Trust-750' on Left	
T1.04A #1 RGA: Good Sens: High CEM: II (F)	This reach is exhibiting incision. Erosion is occurring and the channel will continue to meander as it reaches equilibrium. It has reduced floodplain connectivity due to moderate incision. This would be an attenuation asset, located downstream of a reach that is out of it's sediment regime.	Protect River Corridors - This reach flows through an undeveloped herbaceous riparian area in relatively close proximity to a residential development. Protection of this corridor will allow the river to meander as necessary to reach equilibrium, continue to provide habitat and water quality functions, and prevent unnecessary flood and erosion risks.	High	High	Improved habitat; improved water quality.	Low	Town of Shelburne on Right; Meach Cove Real Estate Trust on Left	
T1.04A #2	The segment flows through an herbaceous riparian area with very few trees or shrubs. Invasive species are present. Some wet meadow conditions exist.	Plant Stream Buffers - Evaluate existing condition. Determine stream planting and invasive management plans.	High	Mod	Improved Water Quality; Improved habitat.	Low	Town of Shelburne-300' on Left & 800' on Right; Meach Cove Real Estate Trust 300' on Both	

River Segment / Condition	Site Description including Stressors and Constraints	Project or Strategy Description	Technical Feasibility	Priority	Project Benefits	Costs	Landowner/ Commitment	Potential Partners with LWP
T1.03 #1 **RGA:** Fair Sens: Very High CEM: IIc (D)	Residential development in the School Street neighborhood has encroached on the middle section of the reach. Reach is in residential zoning. Evolution stage II indicates that this segment may continue to adjust.	Protect River Corridors - Protect undeveloped areas to ensure the river has adequate corridor and does not become pinched between existing and future development.		Low, has floodplain overlay zone.			Town of Shelburne on Right; Meach Cove Real Estate Trust on Left; Harbor Crossing Owners Both Sides; Various small residential parcels	
T1.03 #2	Upstream of Harbor Road: The upper section of the reach is in a wooded floodplain. The lower section is primarily herbaceous plants with few trees.	Plant Stream Buffers - Plant woody stream buffers in riparian areas with no trees. This is an approximately 1,400 foot section upstream of Harbor Road.	High	High, significant development in vicinity impacting river.	Improved habitat; improved water quality.	low	Harbor Crossing Owners Association - Both Sides	
T1.03 #3	At the Shelburne Town Garage and Wastewater Treatment Plant on Turtle Lane the riparian buffer is narrow and lacking natural vegetation. The buildings are less than 100 ft from river. Fill is visible at the top of the bank and storage of materials is in the floodplain. The riparian buffer is narrow and non-existent in locations.	Plant Stream Buffers / Restore Floodplain - Remove storage of materials and fill from the riparian zone behind the buildings. Plant woody stream buffers in riparian areas.	High	#3: High, this will set a good example and clean up the floodplain and bank.			Town of Shelburne - 400' on right.	

River Segment / Condition	Site Description including Stressors and Constraints	Project or Strategy Description	Technical Feasibility	Priority	Project Benefits	Costs	Landowner/ Commitment	Potential Partners with LWP
T1.02B #1 RGA: Good Sens: High CEM: III (D)	This reach is very close to Lake Champlain and therefore management directly impacts the Bay and Lake. The majority of the river corridor and a large amount of the subwatersheds has been conserved, but specific land management should be investigated for compatibility with the river and lake.	Protect River Corridors - Work with landowners to manage inputs of runoff and sediment to river.	High, land conserved. Needs management plan.	#8: High, proximity to lake increases priority.	Improved water quality.	Low	The Nature Conservancy - Preserve adjacent to river; Michaela Ryan Farm - Conserved in corridor and tributary drainage.	
T1.02B #2	Floodplain areas have limited woody vegetation in what looks like historic agricultural fields. Invasive species are present including honeysuckle, buckthorn, and flowering rush.	Plant River Corridors - Investigate reference floodplain condition. Remove invasive species. Plant appropriate species if needed.	High, land conserved.	Low, land preserved.				
T1.02A RGA: N/A Sens: N/A CEM: N/A	Manage with T1.02A. Both are affected by lake influence depending on the season. These segments have the same landowners and management issues.	Projects for T1.02B apply.						
T1.01 RGA: N/A Sens: N/A CEM: N/A	NO PROJECTS. This reach is in The Nature Conservancy Preserve.							

8.0 REFERENCES

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McCabe's Brook Mapping Legend

- Reach Break Location
- Segment Break Location
- Stormwater Input
- Beaver Dam
- Debris Jam
- Dredging
- Gully
- Mass Failure
- Migration
- Cross Section NOT Representative
- Cross Section Representative
- Animal Crossing
- Irrigation
- Steep Riffle
- Head Cut
- Stream Ford
- Waterfall
- Small Run of River
- Ledge
- Dam
- Bridge
- Culvert

- Encroachment
- Mass Failure
- Straightening
- Development
- Buffers Less than 25 feet
- Bank Armoring or Revetment

Bank Erosion

- Left Bank
- Right Bank
- Reach Subwatershed Boundary
- Towns
- Roads
- River Centerline
- Parcel Boundary
- Town Land and TNC Land
- Vermont Land Trust Easement

Maping Sources:
Roads from VCGI E911 Roads layer. Rivers from VCGI VHD Carto layer. Channel feature locations collected as part of Phase 2 SGA completed 2007 and 2011. Conserved lands from Vermont Land Trust, Town Land and TNC Land updated January 2010 and VLT Easements updated December 2011. Map for planning purposes only. See legend on separate sheet. Updated December 2011.

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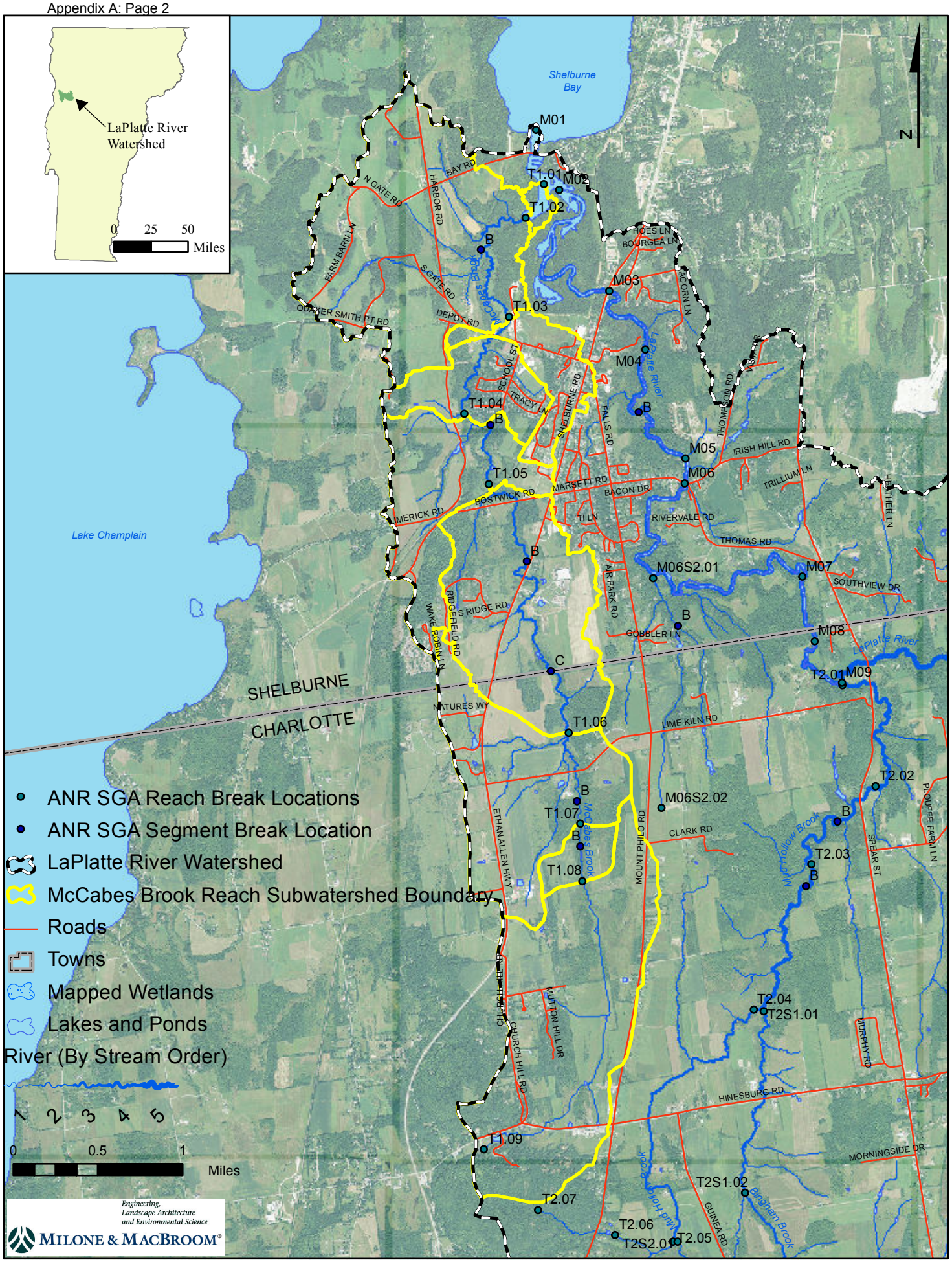
LaPlatte River Watershed
0 25 50 Miles
Shelburne Bay
Lake Champlain
SHELBURNE
CHARLOTTE
M01
M02
M03
M04
M05
M06
M06S2.01
M06S2.02
M07
M08
M09
T1.01
T1.02
T1.03
T1.04
T1.05
T1.06
T1.07
T1.08
T1.09
T2.01
T2.02
T2.03
T2.04
T2S1.01
T2S1.02
T2.05
T2.06
T2S2.01
T2.07
B
C
N
BAY RD
N GATE RD
HARBOR RD
FARM BARN LN
S GATE RD
QUAKER SMITH PT RD
DEPOT RD
SCHOOL ST
TRACY LN
SHELBURNE RD
FALLS RD
HOES LN
BOURGEA LN
ACORN LN
THOMPSON RD
IRISH HILL RD
TRILLIUM LN
HEATHER LN
BACON DR
RIVERVALE RD
THOMAS RD
SOUTHVIEW DR
MARSETT RD
BOSTWICK RD
MERICK RD
TI LN
AIR PARK RD
GOBBLER LN
S RIDGE RD
RIDGEFIELD RD
WAKE ROBIN LN
NATURES WY
LIME KILN RD
CLARK RD
ETHAN ALLEN HWY
MOUNT PHILO RD
CHURCH HILL RD
MUTTON HILL DR
HINESBURG RD
MORNINGSIDE DR
GUINEA RD
SPEAR ST
POUFFE FARM LN
MURPHY RD
McCabes Brook
Mud Hollow Brook
Bingham Brook
LaPlatte River
ANR SGA Reach Break Locations
ANR SGA Segment Break Location
LaPlatte River Watershed
McCabes Brook Reach Subwatershed Boundary
Roads
Towns
Mapped Wetlands
Lakes and Ponds
River (By Stream Order)
1 2 3 4 5
0 0.5 1 Miles
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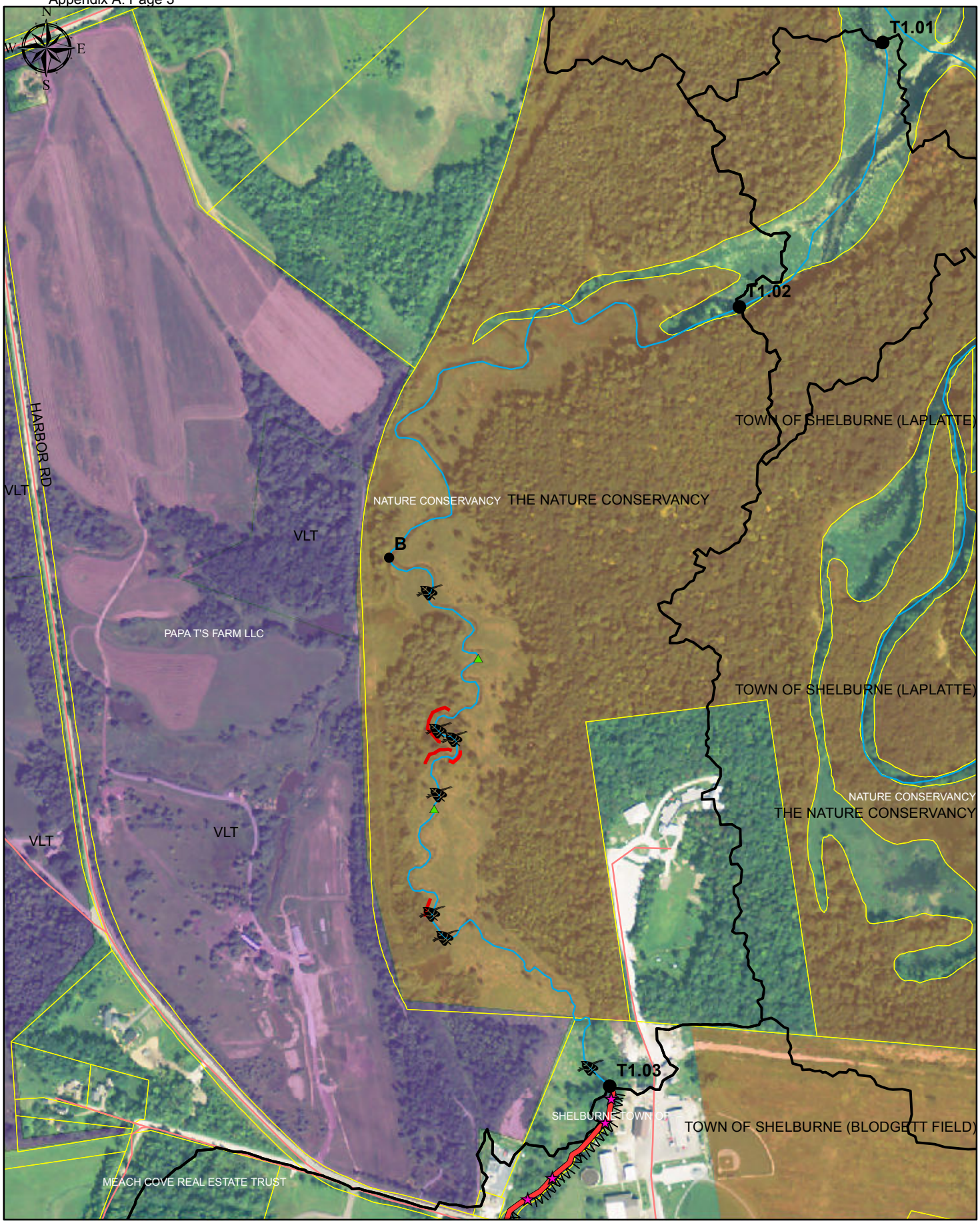
McCabe's Brook T1.01 & T1.02



0 0.125 0.25 Miles

Roads from VCGI E911 Roads layer. Rivers from VCGI VHD Carto layer. Channel feature locations collected as part of Phase 2 SGA completed 2007 and 2011. Conserved lands from Vermont Land Trust. Map for planning purposes only. See legend on seperate sheet. Updated December 2011.

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McCabe's Brook T1.03

0 0.125 0.25 Miles

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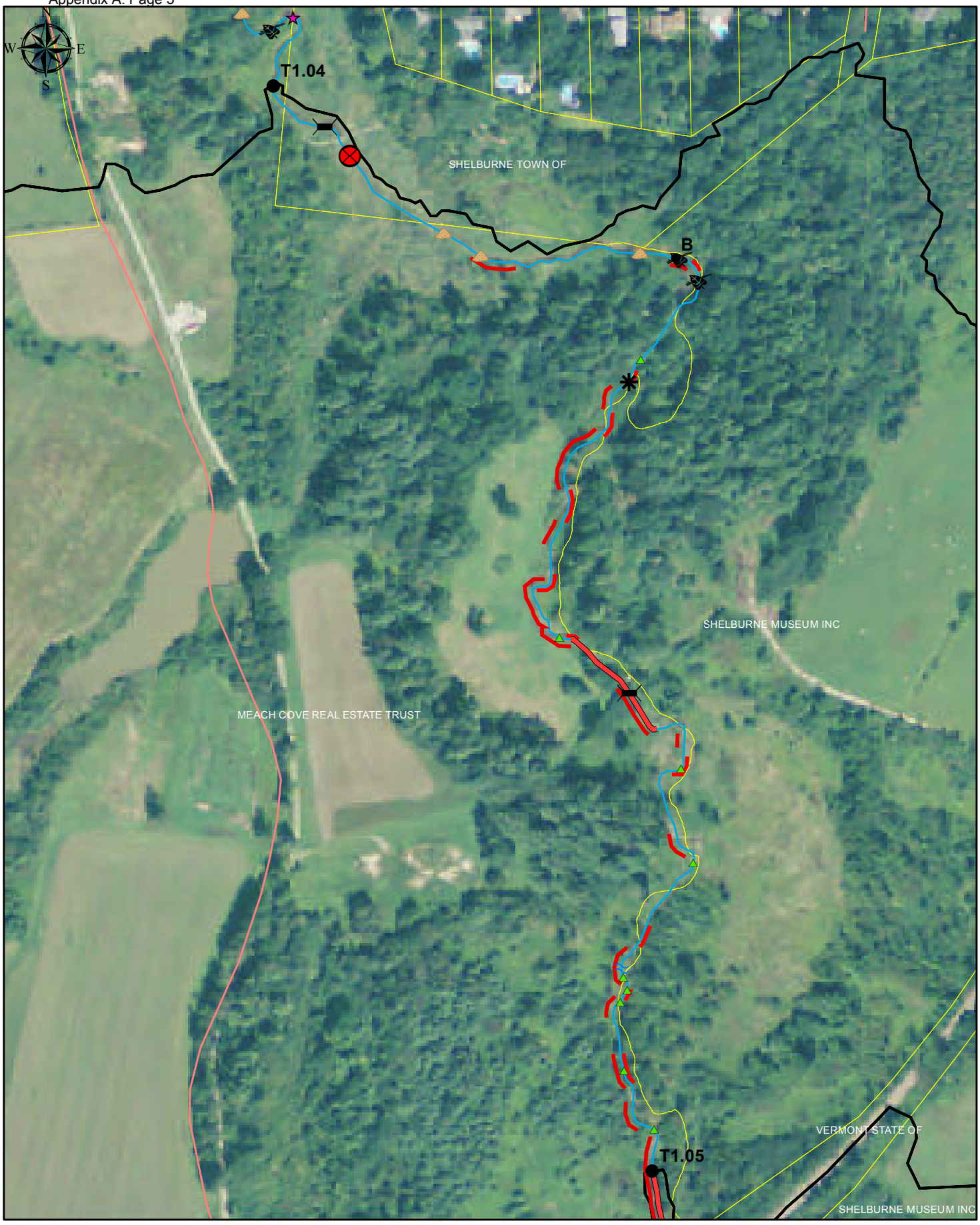
McCabe's Brook T1.04



0 500 1,000 Feet

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McCabe's Brook T1.05A

0 0.1 0.2 Miles

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McCabe's Brook T1.05B

0 0.1 0.2 Miles

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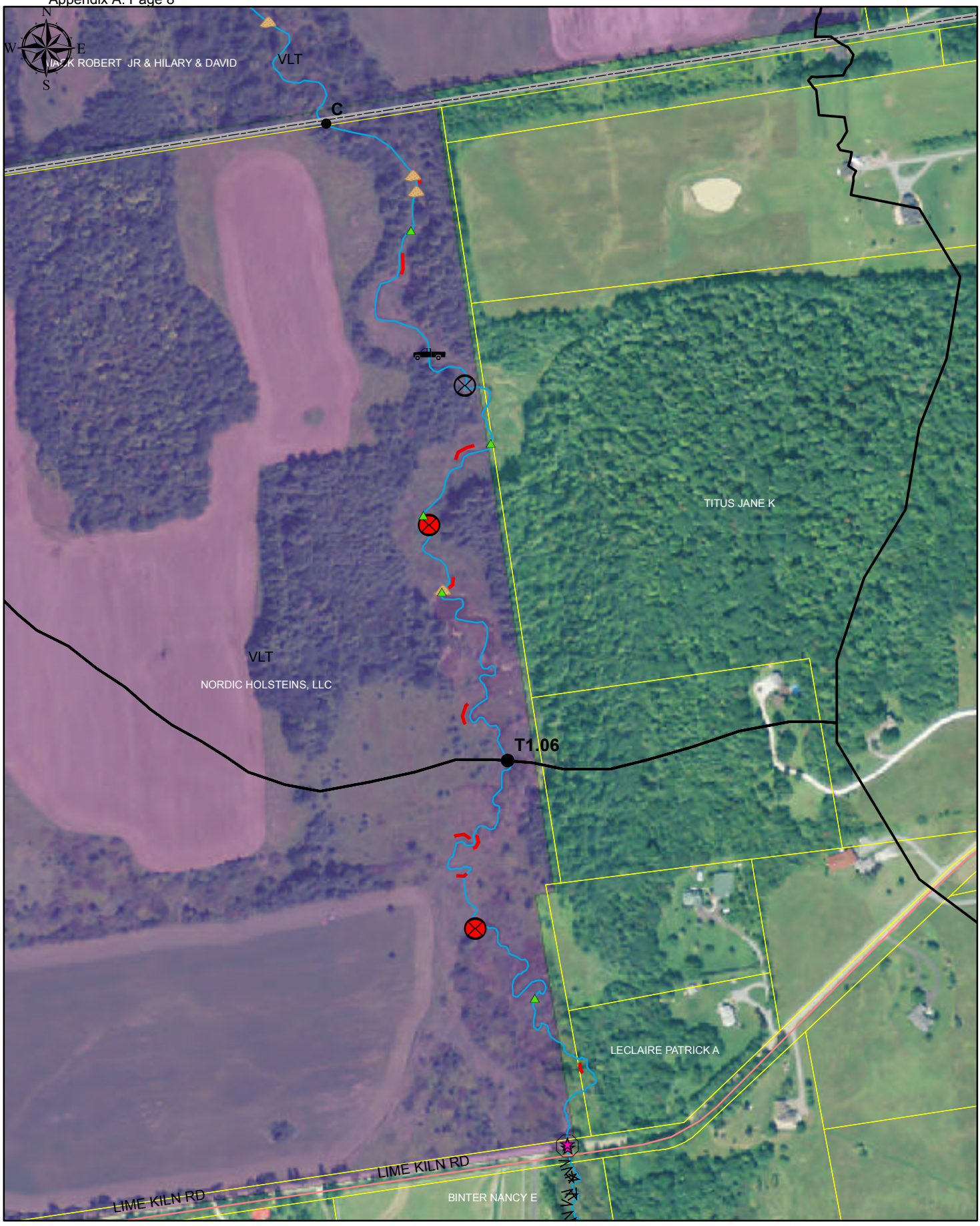
McCabe's Brook T1.05C



0 0.1 0.2 Miles

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McCabe's Brook T1.06

0 0.1 0.2 Miles

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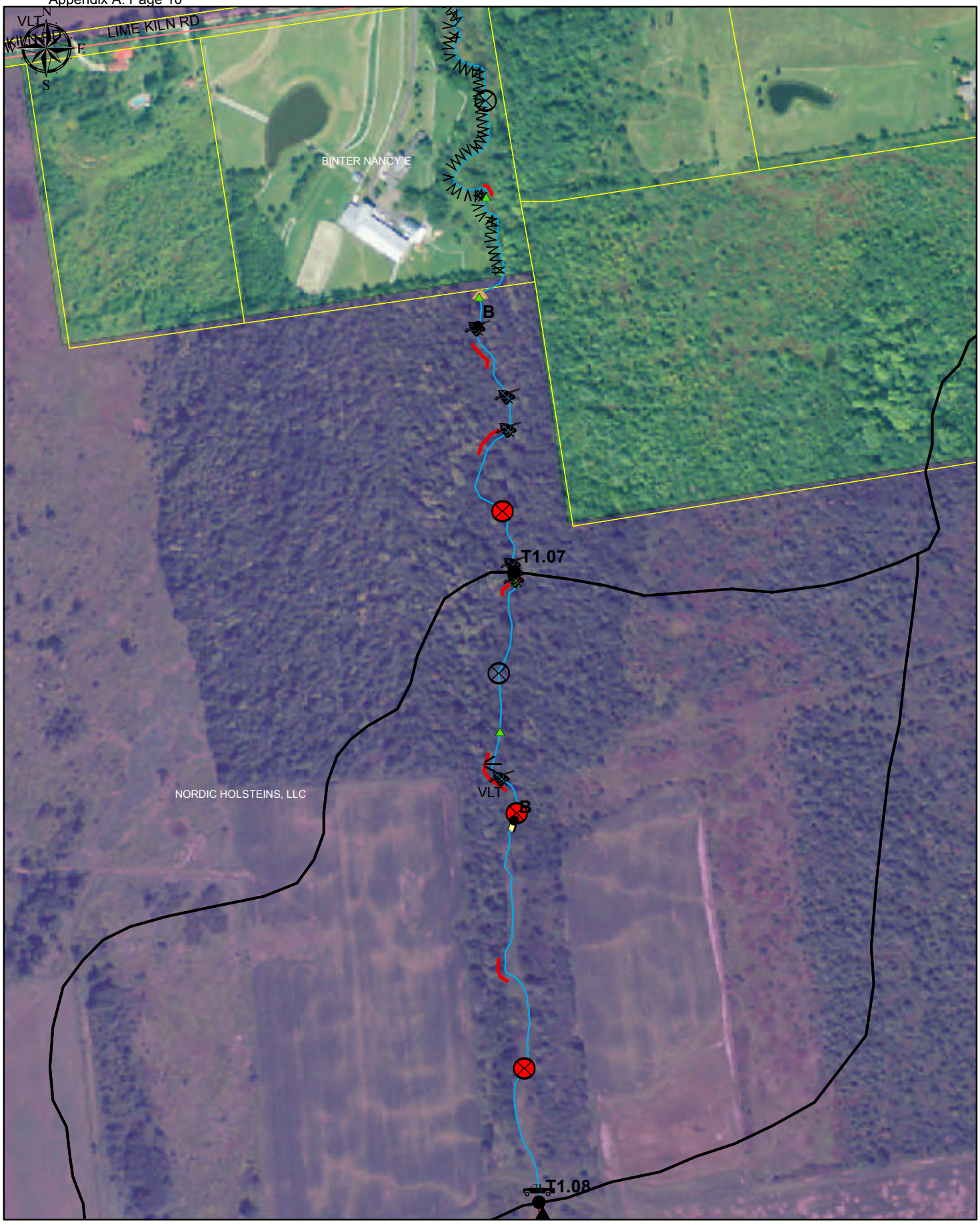
McCabe's Brook T1.07



0 0.1 0.2 Miles

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McCabe's Brook T1.08 Downstream Section

0 0.1 0.2 Miles

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McCabe's Brook T1.08 Middle Section

0 0.1 0.2 Miles

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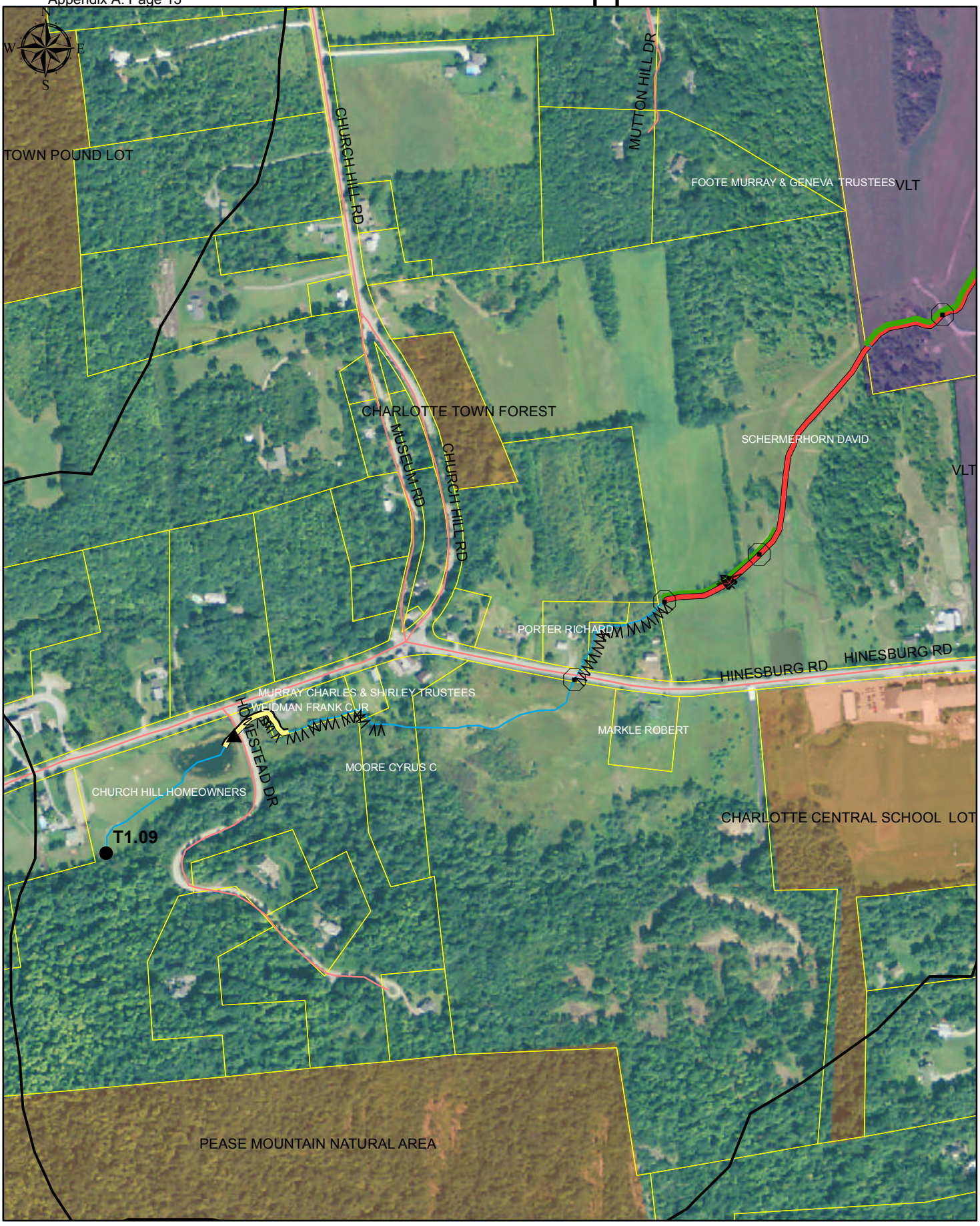
McCabe's Brook T1.08 Upper Section



0 0.1 0.2 Miles

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Phase 2 Segment Summary Report Laplatte

Stream: **McCabe's Brook**
Reach: **T1.02-A**
Segment Length(ft): **2,688**
Rain: **No**

SGAT Version: **4.53**
Organization: **Lewis Creek Association**
Observers: **J.Clark, M.Illick, A.Morgante**
Completion Date: **8/11/2011**
Qualtiy Control Status - Consultant: **Passed**
Qualtiy Control Status - Staff: **Provisional**
Why Not Assessed: **impounded**

Step 0 - Location: **This segment is impounded by Lake Champlain and segmented. Original Phase 2 assessment did not segment.**

Step 5 - Notes:

Step 7 - Narrative:

Step 1. Valley and Floodplain

1.1 Segmentation:
1.2 Alluvial Fan:
1.3 Corridor Encroachments:

Length (ft)	One	Height	Both	Height
Berm:				
Road:				
Railroad:				
Imp. Path:				
Dev.:				

1.4 Adjacent Side — Left — Right
Hillside Slope:
Continuous w/ Bank:
Within 1 Bankfull W:
Texture:

1.5 Valley Features
Valley Width (ft):
Width Determination:
Confinement Type:
In Rock Gorge:
Human Caused Change in Valley Width?:

1.6 Grade Controls:

Stream: McCabe's Brook Reach: T1.02-A

Step 2. Stream Channel

2.1Bankfull Width (ft.):		2.11 Riffle/Step Spacing:		2.13 Average Largest Particle on	
2.2 Max Depth (ft.):		2.12 Substrate Composition		Bed:	
2.3 Mean Depth (tf):		Bedrock:	%	Bar:	
2.4 Floodprone Width (ft.):		Boulder:	%	2.14 Stream Type	
2.5 Aband. Floodpn (ft.):		Cobble:	%	Stream Type:	
Human Elev FloodPln (ft.):		Coarse Gravel:	%	Bed Material:	
2.6 Width/Depth Ratio:	0.00	Fine Gravel:	%	Subclass Slope:	
2.7 Entrenchment Ratio:	0.00	Sand:	%	Bed Form:	
2.8 Incision Ratio:	0.00	Silt and Smaller:	%	Field Measured Slope:	
Human Elevated Inc. Rat.:	0.00	Silt/Clay Present:		2.15 Sub-reach Stream Type	
2.9 Sinuosity:		Detritus:	%	Reference Stream Type:	
2.10 Riffles Type:		# Large Woody Debris:		Reference Bed Material:	
				Reference Subclass Slope:	
				Reference Bedform:	

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope:

Bank Texture			Bank Erosion	Left	Right	Near Bank Vegetation Type	Left	Right
Upper	Left	Right	Erosion Length (ft.):			Dominant:		
Material Type:			Erosion Height (ft.):			Sub-dominant:		
Consistency:			Revetment Type:			Bank Canopy		
Lower			Revetment Length:			Canopy %:		
Material Type:						Mid-Channel Canopy:		
Consistency:								

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant		
Sub-Dominant		
W less than 25		
Buffer Vegitation Type		
Dominant		
Sub-Dominant		

3.3 Riparian Corridor

Corridor Land	Left	Right		Left	Right
Dominant			Mass Failures		
Sub-dominant			Height		
(Legacy)	Amount	Mean Hieght	Gullies Number		
Failures			Gullies Length		
Gullies					

Stream: **McCabe's Brook** Reach: **T1.02-A**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps:
4.2 Adjacent Wetlands:
4.3 Flow Status:
4.4 # of Debris Jams:
4.5 Flow Regulation Type
Flow Reg. Use:
Impoundments:
Impoundment Loc.:
4.6 Up/Down Strm flow reg.:
(old) Upstrm Flow Reg.:
4.7 Stormwater Inputs **None**
Field Ditch:
Road Ditch:
Other:
Tile Drain:
Overland Flow:
Urb Strm Wtr Pipe:
4.9 # of Beaver Dams:
Affected Length (ft):
4.8 Channel Constrictions:

Step 5. Channel Bed and Planform Changes

5.1 Bar Types
Diagonal:
Mid:
Delta:
Point:
Island:
Side:
Braiding:
5.2 Other Features
Flood chutes:
5.3 Steep Riffles and Head Cuts
Steep Riffles:
Neck Cutoff:
Avulsion:
Head Cuts:
Trib Rejuv.:
5.4 Stream Ford or Animal Crossing:
5.5 Straightening:
Straightening Length (ft.): **0**
5.5 Dredging:

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:
6.2 Pool Substrate:
6.3 Pool Variability:
Total Score:
Habitat Rating:
Habitat Stream Condition:
6.4 Sediment Deposition:
6.5 Channel Flow Status:
6.6 Channel Alteration:
6.7 Channel Sinuosity:
Stream Gradiant Type Left Right
6.8 Bank Stability:
6.9 Bank Vegetation Protection
6.10 Riparian Veg. Zone Width:

Step 7. Rapid Geomorphic Assessment Data

Confinement Type	Score	STD	Historic	
7.1 Channel Degradation				Geomorphic Rating
7.2 Channel Aggradation				Channel Evolution Model
7.3 Widening Channel				Channel Evolution Stage
7.4 Change in Planforml				Geomorphic Condition
Total Score				Stream Sensitivity

Phase 2 Segment Summary Report Laplatte

Stream: McCabe's Brook
Reach: T1.02-B
Segment Length(ft): 3,546
Rain: No

SGAT Version: 4.53
Organization: Lewis Creek Association
Observers: LG, TG
Completion Date: 11/4/2006
Qualtiy Control Status - Consultant: Passed
Qualtiy Control Status - Staff: Provisional

Step 0 - Location: **north of Harbor Road. Downstream of Shelburne STP.**

Step 5 - Notes: **Assessment updated based on 8/11/11 field visit by MMI (j.clark) and LCA (m.illick and a. morgante). Segmented due to impoundment. RHA information collected based on updated RHA protocols.**

Corridor is wetland, then outside is forest. A possible increase in flow from development may be causing some bed scour toward the upstream end.

Step 7 - Narrative: **Planform, minor aggradation and widening. Herbaceous bank vegetation, whichappeared natural in the wetland setting. Appears to be in the D-stage model, having gone through IIc and now in III. Beaver activity downstream could also have played a role.**

Step 1. Valley and Floodplain

1.1 Segmentation: Flow Status
1.2 Alluvial Fan: None
1.3 Corridor Encroachments:

Length (ft)	One	Height	Both	Height
Berm:	0		0	
Road:	0		0	
Railroad:	0		0	
Imp. Path:	0		0	
Dev.:	0		0	

1.4 Adjacent Side

	Left	Right
Hillside Slope:	Flat	Flat
Continuous w/ Bank:	Sometimes	Sometimes
Within 1 Bankfull W:	Sometimes	Sometimes
Texture:	N.E.	N.E.

1.5 Valley Features

Valley Width (ft):	230
Width Determination:	Estimated
Confinement Type:	VB
In Rock Gorge:	No
Human Caused Change in Valley Width?:	No

1.6 Grade Controls: None

Stream: **McCabe's Brook** Reach: **T1.02-B**

Step 2. Stream Channel

2.1Bankfull Width (ft.):	**18.00**	2.11 Riffle/Step Spacing:		2.13 Average Largest Particle on	
2.2 Max Depth (ft.):	**4.20**	2.12 Substrate Composition		Bed:	**N/A**
2.3 Mean Depth (tf):	**2.90**	Bedrock:	**%**	Bar:	**N/A**
2.4 Floodprone Width (ft.):	**230.00**	Boulder:	**%**	2.14 Stream Type	
2.5 Aband. Floodpn (ft.):	**4.20**	Cobble:	**%**	Stream Type:	**E**
Human Elev FloodPln (ft.):		Coarse Gravel:	**%**	Bed Material:	**Sand**
2.6 Width/Depth Ratio:	**6.21**	Fine Gravel:	**%**	Subclass Slope:	**None**
2.7 Entrenchment Ratio:	**12.78**	Sand:	**100.0 %**	Bed Form:	**Dune-Ripple**
2.8 Incision Ratio:	**1.00**	Silt and Smaller:	**%**	Field Measured Slope:	
Human Elevated Inc. Rat.:	**0.00**	Silt/Clay Present:	**Yes**	2.15 Sub-reach Stream Type	
2.9 Sinuosity:	**High**	Detritus:	**0.0 %**	Reference Stream Type:	
2.10 Riffles Type:	**Not Applicable**	# Large Woody Debris:	**83**	Reference Bed Material:	
				Reference Subclass Slope:	
				Reference Bedform:	

Step 3. Riparian Features

3.1 Stream Banks — Typical Bank Slope: **Steep**

Bank Texture	Left	Right	Bank Erosion	Left	Right	Near Bank Vegetation Type	Left	Right
Upper			Erosion Length (ft.):	**267.7**	**47.9**	Dominant:	**Herbaceous**	**Herbaceous**
Material Type:	**Clay**	**Clay**	Erosion Height (ft.):	**4.0**	**3.0**	Sub-dominant:	**Shrubs/Sapling**	**Shrubs/Sapling**
Consistency:	**Cohesive**	**Cohesive**	Revetment Type:	**None**	**None**	Bank Canopy		
Lower			Revetment Length:	**0.0**	**0.0**	Canopy %:	**1-25**	**1-25**
Material Type:	**Clay**	**Clay**				Mid-Channel Canopy:	**Open**	
Consistency:	**Cohesive**	**Cohesive**						

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**>100**	**>100**
Sub-Dominant	**None**	**None**
W less than 25	**0**	**0**
Buffer Vegitation Type		
Dominant	**Mixed Trees**	**Mixed Trees**
Sub-Dominant	**Herbaceous**	**Herbaceous**

3.3 Riparian Corridor

Corridor Land	Left	Right		Left	Right
Dominant	**Forest**	**Forest**	Mass Failures		
Sub-dominant	**Shrubs/Sapling**	**Shrubs/Sapling**	Height		
(Legacy)	Amount	Mean Hieght	Gullies Number	**0**	
Failures	**None**		Gullies Length		
Gullies	**None**				

Stream: **McCabe's Brook** Reach: **T1.02-B**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps: **Abundant**
4.2 Adjacent Wetlands: **Abundant**
4.3 Flow Status: **Low**
4.4 # of Debris Jams: **7**

4.5 Flow Regulation Type
Flow Reg. Use:
Impoundments: **None**
Impoundment Loc.:
4.6 Up/Down Strm flow reg.: **None**
(old) Upstrm Flow Reg.:

4.7 Stormwater Inputs **None**
Field Ditch: Road Ditch:
Other: Tile Drain:
Overland Flow: Urb Strm Wtr Pipe:
4.9 # of Beaver Dams: **0**
Affected Length (ft): **0**

4.8 Channel Constrictions: **None**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types
Diagonal: **0**
Mid: **0**
Delta: **0**
Point: **1**
Island: **0**
Side: **0**
Braiding: **0**

5.2 Other Features
Neck Cutoff: **2**
Flood chutes: **0**
Avulsion: **0**

5.3 Steep Riffles and Head Cuts
Head Cuts: **0**
Steep Riffles: **0**
Trib Rejuv.: **No**

5.4 Stream Ford or Animal Crossing: **No**
5.5 Straightening: **None**
Straightening Length (ft.): **0**
5.5 Dredging: **None**

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:
6.2 Pool Substrate:
6.3 Pool Variability:
Total Score: **0**
Habitat Rating: **0.00**
Habitat Stream Condition:

6.4 Sediment Deposition:
6.5 Channel Flow Status:
6.6 Channel Alteration:
6.7 Channel Sinuosity:

Stream Gradiant Type Left Right
6.8 Bank Stability:
6.9 Bank Vegetation Protection
6.10 Riparian Veg. Zone Width:

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**

	Score	STD	Historic
7.1 Channel Degradation	**17**	**None**	**No**
7.2 Channel Aggradation	**16**	**None**	**No**
7.3 Widening Channel	**14**	**None**	**No**
7.4 Change in Planforml	**9**	**None**	**No**
Total Score	**56**		

Geomorphic Rating **0.70**
Channel Evolution Model **D**
Channel Evolution Stage **III**
Geomorphic Condition **Good**
Stream Sensitivity **High**

Phase 2 Segment Summary Report Laplatte

Stream: McCabe's Brook
Reach: T1.03-0
Segment Length(ft): 4,766
Rain: Yes

SGAT Version: 4.53
Organization: Lewis Creek Association
Observers: Lisa
Completion Date: 1/11/2005
Qualtiy Control Status - Consultant: Passed
Qualtiy Control Status - Staff: Provisional

Step 0 - Location: **South of Harbor Rd**

Step 5 - Notes: **Updated habitat information based on 7/27/2011 assessment by MMI (j.clark) with b. gagnon and m.illick.**

sand/silt/clay banks, exposed clay in bed and on some lower banks. Erosion on outside bends, much bank slumping. Evidence of planform changes in reach as seen by outflanked beaver dams, old lodges on banks.

Step 7 - Narrative: **Major planform and minor aggradation, widening. There is a terrace just 0.3 ft above bankfull. Given the past straightening, It appears that this reach has mainly moved laterally. So the D-stage seems warranted.**

Step 1. Valley and Floodplain

1.1 Segmentation: None

1.2 Alluvial Fan: None

1.3 Corridor Encroachments:

Length (ft)	One	Height	Both	Height
Berm:	0		0	
Road:	0		0	
Railroad:	0		0	
Imp. Path:	0		0	
Dev.:	1,212		0	

1.4 Adjacent Side

	Left	Right
Hillside Slope:	Steep	Flat
Continuous w/ Bank:	Never	Never
Within 1 Bankfull W:	Never	Never
Texture:	N.E.	N.E.

1.5 Valley Features

Valley Width (ft): 459
Width Determination: Estimated
Confinement Type: VB
In Rock Gorge: No
Human Caused Change in Valley Width?: No

1.6 Grade Controls: None

Stream: **McCabe's Brook** Reach: **T1.03-0**

Step 2. Stream Channel

2.1Bankfull Width (ft.):	**15.20**	2.11 Riffle/Step Spacing:	**N/A**	2.13 Average Largest Particle on	
2.2 Max Depth (ft.):	**3.20**	2.12 Substrate Composition		Bed:	**N/A**
2.3 Mean Depth (tf):	**2.92**	Bedrock:	**0.0 %**	Bar:	**N/A**
2.4 Floodprone Width (ft.):	**850.00**	Boulder:	**0.0 %**	2.14 Stream Type	
2.5 Aband. Floodpn (ft.):	**3.50**	Cobble:	**0.0 %**	Stream Type:	**E**
Human Elev FloodPln (ft.):		Coarse Gravel:	**2.0 %**	Bed Material:	**Sand**
2.6 Width/Depth Ratio:	**5.21**	Fine Gravel:	**10.0 %**	Subclass Slope:	**None**
2.7 Entrenchment Ratio:	**55.92**	Sand:	**88.0 %**	Bed Form:	**Dune-Ripple**
2.8 Incision Ratio:	**1.09**	Silt and Smaller:	**0.0 %**	Field Measured Slope:	
Human Elevated Inc. Rat.:	**0.00**	Silt/Clay Present:	**Yes**	2.15 Sub-reach Stream Type	
2.9 Sinuosity:	**High**	Detritus:	**0.0 %**	Reference Stream Type:	
2.10 Riffles Type:	**Not Applicable**	# Large Woody Debris:	**49**	Reference Bed Material:	
				Reference Subclass Slope:	
				Reference Bedform:	

Step 3. Riparian Features

3.1 Stream Banks — Typical Bank Slope: **Steep**

Bank Texture	Left	Right	Bank Erosion	Left	Right	Near Bank Vegetation Type	Left	Right
Upper			Erosion Length (ft.):	**459.6**	**746.6**	Dominant:	**Herbaceous**	**Herbaceous**
Material Type:	**Clay**	**Clay**	Erosion Height (ft.):	**3.6**	**3.9**	Sub-dominant:	**Shrubs/Sapling**	**Shrubs/Sapling**
Consistency:	**Cohesive**	**Cohesive**	Revetment Type:	**None**	**None**	Bank Canopy		
Lower			Revetment Length:	**0.0**	**0.0**	Canopy %:	**1-25**	**1-25**
Material Type:	**Clay**	**Clay**				Mid-Channel Canopy:	**Open**	
Consistency:	**Cohesive**	**Cohesive**						

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**51-100**	**51-100**
Sub-Dominant	**0-25**	**0-25**
W less than 25	**0**	**0**
Buffer Vegitation Type		
Dominant	**Deciduous**	**Deciduous**
Sub-Dominant	**Herbaceous**	**Herbaceous**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Forest**	**Forest**
Sub-dominant	**Hay**	**Residential**
(Legacy)	Amount	Mean Hieght
Failures	**None**	
Gullies	**None**	

	Left	Right
Mass Failures		
Height	**0.0**	**0.0**
Gullies Number	**0**	
Gullies Length	**0**	

Stream: **McCabe's Brook** Reach: **T1.03-0**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps:	**Abundant**	4.5 Flow Regulation Type	**None**	4.7 Stormwater Inputs			
4.2 Adjacent Wetlands:	**Abundant**	Flow Reg. Use:		Field Ditch:	**3**	Road Ditch:	**2**
4.3 Flow Status:	**Moderate**	Impoundments:	**None**	Other:	**1**	Tile Drain:	**0**
4.4 # of Debris Jams:	**8**	Impoundment Loc.:		Overland Flow:	**0**	Urb Strm Wtr Pipe:	**1**
		4.6 Up/Down Strm flow reg.:	**None**	4.9 # of Beaver Dams:		**3**	
		(old) Upstrm Flow Reg.:	**None**	Affected Length (ft):		**0**	

4.8 Channel Constrictions:

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?	Problems
Bridge	**8**	**Yes**	**No**	**Yes**	**Yes**	**Deposition Above,Scour Below**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types	Diagonal:	**0**	5.2 Other Features	Neck Cutoff:	**1**	5.4 Stream Ford or Animal Crossing:		**No**	
Mid:	**2**	Delta:	**0**	Flood chutes:	**8**	Avulsion:	**0**	5.5 Straightening:	**Straightening**
Point:	**2**	Island:	**0**	5.3 Steep Riffles and Head Cuts		Head Cuts:	**0**	Straightening Length (ft.):	**790**
Side:	**2**	Braiding:	**0**	Steep Riffles:	**0**	Trib Rejuv.:	**No**	5.5 Dredging:	**None**

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:	**7**	6.4 Sediment Deposition:	**7**	Stream Gradiant Type	Left	Right
6.2 Pool Substrate:	**13**	6.5 Channel Flow Status:	**19**	6.8 Bank Stability:	**2**	**2**
6.3 Pool Variability:	**16**	6.6 Channel Alteration:	**14**	6.9 Bank Vegetation Protection	**5**	**5**
Total Score:	**108**	6.7 Channel Sinuosity:	**12**	6.10 Riparian Veg. Zone Width:	**3**	**3**
Habitat Rating:	**0.54**					
Habitat Stream Condition:	**Fair**					

Step 7. Rapid Geomorphic Assessment Data

Confinement Type	**Unconfined**	Score	STD	Historic		
7.1 Channel Degradation		**16**	**None**	**No**	Geomorphic Rating	**0.64**
7.2 Channel Aggradation		**12**	**None**	**No**	Channel Evolution Model	**D**
7.3 Widening Channel		**17**		**No**	Channel Evolution Stage	**IIc**
7.4 Change in Planforml		**6**		**No**	Geomorphic Condition	**Fair**
Total Score		**51**			Stream Sensitivity	**Extreme**

Phase 2 Segment Summary Report Laplatte

Stream: **McCabe's Brook**
Reach: **T1.04-A**
Segment Length(ft): **979**
Rain: **No**

SGAT Version: **4.53**
Organization: **Lewis Creek Association**
Observers: **J.Clark, M. Illick, B. Gagnon**
Completion Date: **8/9/2011**
Qualtiy Control Status - Consultant: **Passed**
Qualtiy Control Status - Staff: **Provisional**

Step 0 - Location: **between Bostwick Rd and Harbor Rd. Previously not assessed due to beaver impoundment.**

Step 5 - Notes: **Beaver Dams affected this segment historically.**

Step 7 - Narrative: **Moderately Incised. Recent incision possibly due to a recent beaver dam breach occurring since 2007.**

Step 1. Valley and Floodplain

1.1 Segmentation: **Other Reason**
1.2 Alluvial Fan: **None**
1.3 Corridor Encroachments:

Length (ft)	One	Height	Both	Height
Berm:	0		0	
Road:	0		0	
Railroad:	0		0	
Imp. Path:	0		0	
Dev.:	0		0	

1.4 Adjacent Side	Left	Right
Hillside Slope:	Hilly	Hilly
Continuous w/ Bank:	Never	Never
Within 1 Bankfull W:	Never	Never
Texture:	N.E.	N.E.

1.5 Valley Features
Valley Width (ft): **273**
Width Determination: **Measured**
Confinement Type: **VB**
In Rock Gorge: **No**
Human Caused Change in Valley Width?: **No**

1.6 Grade Controls: **None**

Stream: **McCabe's Brook** Reach: **T1.04-A**

Step 2. Stream Channel

2.1Bankfull Width (ft.):	**13.50**	2.11 Riffle/Step Spacing:	**80 ft.**	2.13 Average Largest Particle on	
2.2 Max Depth (ft.):	**2.40**	2.12 Substrate Composition		Bed:	**N/A**
2.3 Mean Depth (tf):	**1.40**	Bedrock:	**0.0 %**	Bar:	**N/A**
2.4 Floodprone Width (ft.):	**190.00**	Boulder:	**0.0 %**	2.14 Stream Type	
2.5 Aband. Floodpn (ft.):	**3.40**	Cobble:	**0.0 %**	Stream Type:	**E**
Human Elev FloodPln (ft.):		Coarse Gravel:	**21.0 %**	Bed Material:	**Sand**
2.6 Width/Depth Ratio:	**9.64**	Fine Gravel:	**14.0 %**	Subclass Slope:	**None**
2.7 Entrenchment Ratio:	**14.07**	Sand:	**51.0 %**	Bed Form:	**Dune-Ripple**
2.8 Incision Ratio:	**1.42**	Silt and Smaller:	**14.0 %**	Field Measured Slope:	
Human Elevated Inc. Rat.:	**0.00**	Silt/Clay Present:	**Yes**	2.15 Sub-reach Stream Type	
2.9 Sinuosity:	**Moderate**	Detritus:	**30.0 %**	Reference Stream Type:	**E**
2.10 Riffles Type:	**Not Applicable**	# Large Woody Debris:	**1**	Reference Bed Material:	**Sand**
				Reference Subclass Slope:	**None**
				Reference Bedform:	**Dune-Ripple**

Step 3. Riparian Features

3.1 Stream Banks — Typical Bank Slope: **Shallow**

Bank Texture	Left	Right	Bank Erosion	Left	Right	Near Bank Vegetation Type	Left	Right
Upper			Erosion Length (ft.):	**94.7**	**0.0**	Dominant:	**Herbaceous**	**Herbaceous**
Material Type:	**Sand**	**Sand**	Erosion Height (ft.):	**4.8**	**0.0**	Sub-dominant:	**Invasives**	**Invasives**
Consistency:	**Non-cohesive**	**Non-cohesive**	Revetment Type:	**None**	**None**	Bank Canopy		
Lower			Revetment Length:	**0.0**	**0.0**	Canopy %:	**1-25**	**1-25**
Material Type:	**Clay**	**Clay**				Mid-Channel Canopy:	**Open**	
Consistency:	**Cohesive**	**Cohesive**						

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**>100**	**>100**
Sub-Dominant	**None**	**None**
W less than 25	**0**	**0**
Buffer Vegitation Type		
Dominant	**Herbaceous**	**Herbaceous**
Sub-Dominant	**Mixed Trees**	**Mixed Trees**

3.3 Riparian Corridor

Corridor Land	Left	Right		Left	Right
Dominant	**Shrubs/Sapling**	**Shrubs/Sapling**	Mass Failures		
Sub-dominant	**Forest**	**Forest**	Height	**0.0**	**0.0**
(Legacy)	Amount	Mean Hieght	Gullies Number	**0**	
Failures	**None**		Gullies Length	**0**	
Gullies	**None**				

Stream: McCabe's Brook Reach: T1.04-A

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps:	Abundant	4.5 Flow Regulation Type	None	4.7 Stormwater Inputs	None
4.2 Adjacent Wetlands:	Abundant	Flow Reg. Use:		Field Ditch:	Road Ditch:
4.3 Flow Status:	Low	Impoundments:	None	Other:	Tile Drain:
4.4 # of Debris Jams:	0	Impoundment Loc.:		Overland Flow:	Urb Strm Wtr Pipe:
		4.6 Up/Down Strm flow reg.:	None	4.9 # of Beaver Dams:	3
		(old) Upstrm Flow Reg.:	None	Affected Length (ft):	0

4.8 Channel Constrictions: None

Step 5. Channel Bed and Planform Changes

5.1 Bar Types	Diagonal:	0	5.2 Other Features	Neck Cutoff:	0	5.4 Stream Ford or Animal Crossing:	No		
Mid:	1	Delta:	0	Flood chutes:	0	Avulsion:	0	5.5 Straightening:	None
Point:	4	Island:	0	5.3 Steep Riffles and Head Cuts		Head Cuts:	0	Straightening Length (ft.):	0
Side:	7	Braiding:	0	Steep Riffles:	0	Trib Rejuv.:	No	5.5 Dredging:	None

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:		6.4 Sediment Deposition:		Stream Gradiant Type	Left Right
6.2 Pool Substrate:		6.5 Channel Flow Status:		6.8 Bank Stability:	
6.3 Pool Variability:		6.6 Channel Alteration:		6.9 Bank Vegetation Protection	
Total Score:	0	6.7 Channel Sinuosity:		6.10 Riparian Veg. Zone Width:	
Habitat Rating:	0.00				
Habitat Stream Condition:					

Step 7. Rapid Geomorphic Assessment Data

Confinement Type	Unconfined	Score	STD	Historic		
7.1 Channel Degradation		11	None	No	Geomorphic Rating	0.66
7.2 Channel Aggradation		14	None	No	Channel Evolution Model	F
7.3 Widening Channel		11	None	No	Channel Evolution Stage	II
7.4 Change in Planforml		17	None	No	Geomorphic Condition	Good
Total Score		53			Stream Sensitivity	High

Phase 2 Segment Summary Report Laplatte

Stream: McCabe's Brook
Reach: T1.04-B
Segment Length(ft): 2,364
Rain: No

SGAT Version: 4.53
Organization: Lewis Creek Association
Observers: LG
Completion Date: 11/27/2006
Qualtiy Control Status - Consultant: Passed
Qualtiy Control Status - Staff: Provisional

Step 0 - Location: **North of the railroad crossing which is north of Bostwick Rd**

Step 5 - Notes: **Updated habitat information based on 7/27/2011 stream walk using updated RHA protocols by MMI (j.clark) with b.gagnon. Portions of segment were dry. Segment T1.04B began just downstream of a large, old railroad bridge. The bridge appeared to be causing increased velocities and incision downstream. Segment T1.04B had much bank erosion and signs of planform adjustment and aggradation such as flood chutes, diagonal bars, and multiple sediment deposits. Bank vegetation was herbaceous, as was corridor vegetation, with some shrubs/saplings and forested areas. One bridge constricted the bankfull width and had deposition upstream and scour downstream. The segment appeared to be slightly incised, but not entrenched.**

Step 7 - Narrative: **Extreme planform. Some current incision and aggradation.**

Step 1. Valley and Floodplain

1.1 Segmentation: **Other Reason**
1.2 Alluvial Fan: **None**
1.3 Corridor Encroachments:

	Length (ft)	One Height	Both	Height
Berm:	0		0	
Road:	0		0	
Railroad:	0		0	
Imp. Path:	0		0	
Dev.:	0		0	

1.4 Adjacent Side

	Left	Right
Hillside Slope:	Hilly	Hilly
Continuous w/ Bank:	Sometimes	Sometimes
Within 1 Bankfull W:	Sometimes	Sometimes
Texture:	N.E.	N.E.

1.5 Valley Features

Valley Width (ft): 326
Width Determination: Estimated
Confinement Type: VB
In Rock Gorge: No
Human Caused Change in Valley Width?: No

1.6 Grade Controls: None

Stream: **McCabe's Brook** Reach: **T1.04-B**

Step 2. Stream Channel

2.1Bankfull Width (ft.):	**18.40**	2.11 Riffle/Step Spacing:	**100 ft.**	2.13 Average Largest Particle on		
2.2 Max Depth (ft.):	**1.40**	2.12 Substrate Composition		Bed:	**4**	**inches**
2.3 Mean Depth (tf):	**1.00**	Bedrock:	**0.0 %**	Bar:	**1**	**inches**
2.4 Floodprone Width (ft.):	**49.10**	Boulder:	**0.0 %**	2.14 Stream Type		
2.5 Aband. Floodpn (ft.):	**1.80**	Cobble:	**1.0 %**	Stream Type:	**C**	
Human Elev FloodPln (ft.):		Coarse Gravel:	**42.0 %**	Bed Material:	**Gravel**	
2.6 Width/Depth Ratio:	**18.40**	Fine Gravel:	**19.0 %**	Subclass Slope:	**None**	
2.7 Entrenchment Ratio:	**2.67**	Sand:	**38.0 %**	Bed Form:	**Riffle-Pool**	
2.8 Incision Ratio:	**1.29**	Silt and Smaller:	**0.0 %**	Field Measured Slope:		
Human Elevated Inc. Rat.:	**0.00**	Silt/Clay Present:	**Yes**	2.15 Sub-reach Stream Type		
2.9 Sinuosity:	**Moderate**	Detritus:	**0.0 %**	Reference Stream Type:		
2.10 Riffles Type:	**Complete**	# Large Woody Debris:	**13**	Reference Bed Material:		
				Reference Subclass Slope:		
				Reference Bedform:		

Step 3. Riparian Features

3.1 Stream Banks — Typical Bank Slope: **Steep**

Bank Texture			Bank Erosion	Left	Right	Near Bank Vegetation Type	Left	Right
Upper	Left	Right	Erosion Length (ft.):	**928.5**	**413.1**	Dominant:	**Herbaceous**	**Herbaceous**
Material Type:	**Mix**	**Mix**	Erosion Height (ft.):	**3.3**	**2.8**	Sub-dominant:	**Shrubs/Sapling**	**Shrubs/Sapling**
Consistency:	**Non-cohesive**	**Non-cohesive**	Revetment Type:	**None**	**None**	Bank Canopy		
Lower			Revetment Length:	**0.0**	**0.0**	Canopy %:	**26-50**	**26-50**
Material Type:	**Mix**	**Mix**				Mid-Channel Canopy:	**Open**	
Consistency:	**Non-cohesive**	**Non-cohesive**						

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**>100**	**>100**
Sub-Dominant	**None**	**None**
W less than 25	**0**	**0**
Buffer Vegitation Type		
Dominant	**Herbaceous**	**Herbaceous**
Sub-Dominant	**Mixed Trees**	**Mixed Trees**

3.3 Riparian Corridor

Corridor Land	Left	Right		Left	Right
Dominant	**Shrubs/Sapling**	**Shrubs/Sapling**	Mass Failures		
Sub-dominant	**Hay**	**Forest**	Height	**20.0**	**20.0**
(Legacy)	Amount	Mean Hieght	Gullies Number	**0**	
Failures	**One**	**20.0**	Gullies Length	**0**	
Gullies	**None**				

Stream: **McCabe's Brook** Reach: **T1.04-B**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps:	**Minimal**	4.5 Flow Regulation Type	**None**	4.7 Stormwater Inputs	**None**
4.2 Adjacent Wetlands:	**Abundant**	Flow Reg. Use:		Field Ditch:	Road Ditch:
4.3 Flow Status:	**Moderate**	Impoundments:	**None**	Other:	Tile Drain:
4.4 # of Debris Jams:	**2**	Impoundment Loc.:		Overland Flow:	Urb Strm Wtr Pipe:
		4.6 Up/Down Strm flow reg.:	**None**	4.9 # of Beaver Dams:	**0**
		(old) Upstrm Flow Reg.:	**None**	Affected Length (ft):	**0**

4.8 Channel Constrictions:

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?	Problems
Bridge	**17**	**Yes**	**No**	**Yes**	**Yes**	**Deposition Above,Scour Below**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types	Diagonal:	**7**	5.2 Other Features	Neck Cutoff:	**1**	5.4 Stream Ford or Animal Crossing:	**No**		
Mid:	**2**	Delta:	**0**	Flood chutes:	**8**	Avulsion:	**0**	5.5 Straightening:	**Straightening**
Point:	**10**	Island:	**0**	5.3 Steep Riffles and Head Cuts		Head Cuts:	**0**	Straightening Length (ft.):	**257**
Side:	**2**	Braiding:	**0**	Steep Riffles:	**1**	Trib Rejuv.:	**No**	5.5 Dredging:	**None**

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:	**8**	6.4 Sediment Deposition:	**9**	Stream Gradiant Type	Left	Right
6.2 Pool Substrate:	**13**	6.5 Channel Flow Status:	**10**	6.8 Bank Stability:	**3**	**3**
6.3 Pool Variability:	**19**	6.6 Channel Alteration:	**19**	6.9 Bank Vegetation Protection	**6**	**6**
Total Score:	**128**	6.7 Channel Sinuosity:	**16**	6.10 Riparian Veg. Zone Width:	**8**	**8**
Habitat Rating:	**0.64**					
Habitat Stream Condition:	**Fair**					

Step 7. Rapid Geomorphic Assessment Data

Confinement Type	**Unconfined**	Score	STD	Historic		
7.1 Channel Degradation		**11**	**None**	**No**	Geomorphic Rating	**0.49**
7.2 Channel Aggradation		**13**	**None**	**No**	Channel Evolution Model	**F**
7.3 Widening Channel		**12**		**No**	Channel Evolution Stage	**II**
7.4 Change in Planforml		**3**		**No**	Geomorphic Condition	**Fair**
Total Score		**39**			Stream Sensitivity	**Very High**

Phase 2 Segment Summary Report Laplatte

Stream: McCabe's Brook
Reach: T1.05-A
Segment Length(ft): 3,508
Rain: Yes

SGAT Version: 4.53
Organization: Lewis Creek Association
Observers: LG
Completion Date: 5/10/2007
Qualtiy Control Status - Consultant: Passed
Qualtiy Control Status - Staff: Provisional

Step 0 - Location: **north of Route 7 crossing.**

Step 5 - Notes: **Updated based on 7/27/2011 stream walk by MMI (j.clark) with b. gagnon to update RHA data. Segment T1.05A had several bedrock ledges acting as grade controls, providing bed stability. The segment appeared to have incised from a former terrace, resulting in a stream type departure (C to F). Bed substrate was gravel. Current adjustment processes appeared to be widening and planform. Incision at headcut has been stopped by the arch bottom at the railroad crossing, but if allowed to migrate I think it would. Aggradation and incision do not typically occur in the same reach, but here they are. Historic incision (and current ds of railroad) have been stopped when the bed degraded down to grade control. Multiple gravel bars signaled minor aggradation. And major aggradation upstream of road crossing constrictions and bedrock grade controls. Lateral migration and mass failures are occurring at constrictions and incision can not occur due to bedrock grade control.**

Close to the channel was open with herbaceous vegetation and invasive honeysuckle. Further out in the corridor was more forested with deciduous trees and shrubs/saplings.

Step 7 - Narrative: **Widening and planform following historical degradation. Poor condition due to STD.**

Step 1. Valley and Floodplain

1.1 Segmentation: **Planform and Scope**
1.2 Alluvial Fan: **None**
1.3 Corridor Encroachments:

Length (ft)	One	Height	Both	Height
Berm:	0		0	
Road:	0		0	
Railroad:	0		0	
Imp. Path:	0		0	
Dev.:	0		0	

1.4 Adjacent Side	Left	Right
Hillside Slope:	Hilly	Steep
Continuous w/ Bank:	Sometimes	Sometimes
Within 1 Bankfull W:	Sometimes	Sometimes
Texture:	N.E.	N.E.

1.5 Valley Features
Valley Width (ft): 146
Width Determination: Estimated
Confinement Type: BD
In Rock Gorge: No
Human Caused Change in Valley Width?: No

1.6 Grade Controls:

Type	Location	Total Height	Total Height Above Water	Photo Taken?	GPS Taken?
Ledge	Mid-Segment	5.0	1.0		
Ledge	Mid-Segment	4.0	1.0		
Ledge	Mid-Segment	1.0	1.0		
Ledge	Mid-Segment	3.0	1.0		
Ledge	Mid-Segment	3.0	1.0		

Stream: **McCabe's Brook** Reach: **T1.05-A**

Step 2. Stream Channel

2.1Bankfull Width (ft.):	**22.70**	2.11 Riffle/Step Spacing:	**100 ft.**	2.13 Average Largest Particle on		
2.2 Max Depth (ft.):	**1.50**	2.12 Substrate Composition		Bed:	**9**	**inches**
2.3 Mean Depth (tf):	**0.81**	Bedrock:	**0.0 %**	Bar:	**3**	**inches**
2.4 Floodprone Width (ft.):	**30.40**	Boulder:	**0.0 %**	2.14 Stream Type		
2.5 Aband. Floodpn (ft.):	**2.90**	Cobble:	**12.0 %**	Stream Type:	**F**	
Human Elev FloodPln (ft.):		Coarse Gravel:	**33.0 %**	Bed Material:	**Gravel**	
2.6 Width/Depth Ratio:	**28.02**	Fine Gravel:	**12.0 %**	Subclass Slope:	**None**	
2.7 Entrenchment Ratio:	**1.34**	Sand:	**43.0 %**	Bed Form:	**Riffle-Pool**	
2.8 Incision Ratio:	**1.93**	Silt and Smaller:	**0.0 %**	Field Measured Slope:		
Human Elevated Inc. Rat.:	**0.00**	Silt/Clay Present:	**No**	2.15 Sub-reach Stream Type		
2.9 Sinuosity:	**Moderate**	Detritus:	**0.0 %**	Reference Stream Type:		
2.10 Riffles Type:	**Sedimented**	# Large Woody Debris:	**6**	Reference Bed Material:		
				Reference Subclass Slope:		
				Reference Bedform:		

Step 3. Riparian Features

3.1 Stream Banks — Typical Bank Slope: **Undercut**

Bank Texture			Bank Erosion	Left	Right	Near Bank Vegetation Type	Left	Right
Upper	Left	Right	Erosion Length (ft.):	**1,225.3**	**683.4**	Dominant:	**Herbaceous**	**Herbaceous**
Material Type:	**Clay**	**Clay**	Erosion Height (ft.):	**3.0**	**3.1**	Sub-dominant:	**Invasives**	**Invasives**
Consistency:	**Cohesive**	**Cohesive**	Revetment Type:	**Rip-Rap**	**Multiple**	Bank Canopy		
Lower			Revetment Length:	**98.0**	**314.3**	Canopy %:	**26-50**	**26-50**
Material Type:	**Mix**	**Mix**				Mid-Channel Canopy:	**Open**	
Consistency:	**Non-cohesive**	**Non-cohesive**						

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**>100**	**>100**
Sub-Dominant	**None**	**None**
W less than 25	**0**	**0**
Buffer Vegitation Type		
Dominant	**Deciduous**	**Deciduous**
Sub-Dominant	**Invasives**	**Invasives**

3.3 Riparian Corridor

Corridor Land	Left	Right		Left	Right
Dominant	**Forest**	**Forest**	Mass Failures		
Sub-dominant	**Shrubs/Sapling**	**Shrubs/Sapling**	Height	**20.0**	**20.0**
(Legacy)	Amount	Mean Hieght	Gullies Number	**0**	
Failures	**Multiple**	**19.0**	Gullies Length	**0**	
Gullies	**None**				

Stream: **McCabe's Brook** Reach: **T1.05-A**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps:	**Minimal**	4.5 Flow Regulation Type	**None**	4.7 Stormwater Inputs	**None**
4.2 Adjacent Wetlands:	**Minimal**	Flow Reg. Use:		Field Ditch:	Road Ditch:
4.3 Flow Status:	**Moderate**	Impoundments:	**None**	Other:	Tile Drain:
4.4 # of Debris Jams:	**1**	Impoundment Loc.:		Overland Flow:	Urb Strm Wtr Pipe:
		4.6 Up/Down Strm flow reg.:	**None**	4.9 # of Beaver Dams:	**0**
		(old) Upstrm Flow Reg.:	**None**	Affected Length (ft):	**0**

4.8 Channel Constrictions:

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?	Problems
Instream Culvert	**7.4**	**Yes**	**No**	**Yes**	**Yes**	**Deposition Above,Scour Below**
Instream Culvert	**11.9**	**Yes**	**Yes**	**Yes**	**Yes**	**Deposition Above,Deposition Below**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types	Diagonal:	**2**	5.2 Other Features		Neck Cutoff:	**0**	5.4 Stream Ford or Animal Crossing:		**No**
Mid:	**1**	Delta:	**0**	Flood chutes:	**6**	Avulsion:	**2**	5.5 Straightening:		**Straightening**
Point:	**10**	Island:	**0**	5.3 Steep Riffles and Head Cuts		Head Cuts:	**1**	Straightening Length (ft.):		**644**
Side:	**4**	Braiding:	**0**	Steep Riffles:	**2**	Trib Rejuv.:	**No**	5.5 Dredging:		**None**

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:	**11**	6.4 Sediment Deposition:	**7**	Stream Gradiant Type	Left	Right
6.2 Pool Substrate:	**6**	6.5 Channel Flow Status:	**7**	6.8 Bank Stability:	**3**	**3**
6.3 Pool Variability:	**18**	6.6 Channel Alteration:	**15**	6.9 Bank Vegetation Protection	**7**	**7**
Total Score:	**121**	6.7 Channel Sinuosity:	**18**	6.10 Riparian Veg. Zone Width:	**10**	**9**
Habitat Rating:	**0.61**					
Habitat Stream Condition:	**Fair**					

Step 7. Rapid Geomorphic Assessment Data

Confinement Type	**Unconfined**	Score	STD	Historic		
7.1 Channel Degradation		**5**	**C to F**	**Yes**	Geomorphic Rating	**0.44**
7.2 Channel Aggradation		**12**	**None**	**No**	Channel Evolution Model	**F**
7.3 Widening Channel		**8**		**No**	Channel Evolution Stage	**III**
7.4 Change in Planforml		**10**		**No**	Geomorphic Condition	**Poor**
Total Score		**35**			Stream Sensitivity	**Extreme**

Phase 2 Segment Summary Report Laplatte

Stream: McCabe's Brook
Reach: T1.05-B
Segment Length(ft): 5,939
Rain: No

SGAT Version: 4.53
Organization: Lewis Creek Association
Observers: LG
Completion Date: 5/10/2007
Qualtiy Control Status - Consultant: Passed
Qualtiy Control Status - Staff: Provisional

Step 0 - Location: **From just north of Rt 7 south.**

Step 5 - Notes: **Updated based on 7/25/2011 stream walk by MMI (j.clark) to update RHA with new protocols. Segment T1.05B had a shallower slope, smaller substrate size and in a broad valley setting. The segment appeared to be "in regime," being a C Dune-Ripple stream type and in "good" condition. Minor planform and widening processes were observed, and could be related to the lack of woody bank vegetation.**

Bank and buffer vegetation was herbaceous with some shrubs/saplings. Some areas of forested corridor were present in the upstream portion of the segment. RHA condition was "good" but lacking sufficient mix of substrates and large pools. A cattle watering area had been fenced out in the channel and had turned into a large pool. For water quality purposes, cattle should be fenced out of the channel and alternative watering methods used.

Some bank planting projects were apparent in the downstream half of the segment, although not all of the trees had survived. Additional plantings could be installed.

Step 7 - Narrative: **Minor Planfrom and widening likely related to the non woody bank vegetation. Stage IIc seems to describe what is going on here, while clay was not observed, the banks appear to be less resistant than the bed to erosion.**

Step 1. Valley and Floodplain

1.1 Segmentation: Planform and Scope
1.2 Alluvial Fan: None
1.3 Corridor Encroachments:

Length (ft)	One	Height	Both	Height
Berm:	0		0	
Road:	0		0	
Railroad:	0		0	
Imp. Path:	0		0	
Dev.:	0		0	

1.4 Adjacent Side

	Left	Right
Hillside Slope:	Hilly	Hilly
Continuous w/ Bank:	Sometimes	Sometimes
Within 1 Bankfull W:	Sometimes	Sometimes
Texture:	N.E.	N.E.

1.5 Valley Features

Valley Width (ft):	225
Width Determination:	Measured
Confinement Type:	BD
In Rock Gorge:	No
Human Caused Change in Valley Width?:	No

1.6 Grade Controls: None

Stream: **McCabe's Brook** Reach: **T1.05-B**

Step 2. Stream Channel

2.1Bankfull Width (ft.):	**37.10**	2.11 Riffle/Step Spacing:		2.13 Average Largest Particle on	
2.2 Max Depth (ft.):	**2.90**	2.12 Substrate Composition		Bed:	**N/A**
2.3 Mean Depth (tf):	**1.10**	Bedrock:	**0.0 %**	Bar:	**N/A**
2.4 Floodprone Width (ft.):	**222.50**	Boulder:	**0.0 %**	2.14 Stream Type	
2.5 Aband. Floodpn (ft.):	**2.90**	Cobble:	**5.0 %**	Stream Type:	**C**
Human Elev FloodPln (ft.):		Coarse Gravel:	**8.0 %**	Bed Material:	**Sand**
2.6 Width/Depth Ratio:	**33.73**	Fine Gravel:	**3.0 %**	Subclass Slope:	**None**
2.7 Entrenchment Ratio:	**6.00**	Sand:	**84.0 %**	Bed Form:	**Dune-Ripple**
2.8 Incision Ratio:	**1.00**	Silt and Smaller:	**0.0 %**	Field Measured Slope:	
Human Elevated Inc. Rat.:	**0.00**	Silt/Clay Present:	**No**	2.15 Sub-reach Stream Type	
2.9 Sinuosity:	**Moderate**	Detritus:	**0.0 %**	Reference Stream Type:	**C**
2.10 Riffles Type:	**Not Applicable**	# Large Woody Debris:	**26**	Reference Bed Material:	**Sand**
				Reference Subclass Slope:	**None**
				Reference Bedform:	**Dune-Ripple**

Step 3. Riparian Features

3.1 Stream Banks — Typical Bank Slope: **Undercut**

Bank Texture			Bank Erosion	Left	Right	Near Bank Vegetation Type	Left	Right
Upper	Left	Right	Erosion Length (ft.):	**214.0**	**304.4**	Dominant:	**Herbaceous**	**Herbaceous**
Material Type:	**Clay**	**Clay**	Erosion Height (ft.):	**4.0**	**3.0**	Sub-dominant:	**Shrubs/Sapling**	**Shrubs/Sapling**
Consistency:	**Cohesive**	**Cohesive**	Revetment Type:	**None**	**Rip-Rap**	Bank Canopy		
Lower			Revetment Length:	**0.0**	**369.5**	Canopy %:	**1-25**	**1-25**
Material Type:	**Mix**	**Mix**				Mid-Channel Canopy:	**Open**	
Consistency:	**Non-cohesive**	**Non-cohesive**						

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**>100**	**>100**
Sub-Dominant	**None**	**None**
W less than 25	**0**	**0**
Buffer Vegitation Type		
Dominant	**Herbaceous**	**Herbaceous**
Sub-Dominant	**Shrubs/Sapling**	**Shrubs/Sapling**

3.3 Riparian Corridor

Corridor Land	Left	Right		Left	Right
Dominant	**Shrubs/Sapling**	**Shrubs/Sapling**	Mass Failures		
Sub-dominant	**Forest**	**Forest**	Height	**13.3**	**13.3**
(Legacy)	Amount	Mean Hieght	Gullies Number	**1**	
Failures	**Multiple**	**15.0**	Gullies Length	**0**	
Gullies	**One**	**15.0**			

Stream: **McCabe's Brook** Reach: **T1.05-B**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps:	**Minimal**	4.5 Flow Regulation Type	**None**	4.7 Stormwater Inputs			
4.2 Adjacent Wetlands:	**Abundant**	Flow Reg. Use:		Field Ditch:	**0**	Road Ditch:	**0**
4.3 Flow Status:	**Moderate**	Impoundments:	**None**	Other:	**0**	Tile Drain:	**0**
4.4 # of Debris Jams:	**0**	Impoundment Loc.:		Overland Flow:	**0**	Urb Strm Wtr Pipe:	**0**
		4.6 Up/Down Strm flow reg.:	**None**	4.9 # of Beaver Dams:		**5**	
		(old) Upstrm Flow Reg.:	**None**	Affected Length (ft):		**390**	

4.8 Channel Constrictions:

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?	Problems
Instream Culvert	**9.8**	**Yes**	**No**	**Yes**	**Yes**	**Scour Below**
Instream Culvert	**13.5**	**Yes**	**No**	**Yes**	**Yes**	**Scour Below**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types	Diagonal:	**1**	5.2 Other Features		Neck Cutoff:	**0**	5.4 Stream Ford or Animal Crossing:		**Yes**
Mid:	**3**	Delta:	**0**	Flood chutes:	**5**	Avulsion:	**0**	5.5 Straightening:	**Straightening**
Point:	**3**	Island:	**0**	5.3 Steep Riffles and Head Cuts		Head Cuts:	**0**	Straightening Length (ft.):	**1,532**
Side:	**0**	Braiding:	**0**	Steep Riffles:	**1**	Trib Rejuv.:	**No**	5.5 Dredging:	**None**

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:	**7**	6.4 Sediment Deposition:	**16**	Stream Gradiant Type	Left	Right
6.2 Pool Substrate:	**14**	6.5 Channel Flow Status:	**18**	6.8 Bank Stability:	**8**	**8**
6.3 Pool Variability:	**8**	6.6 Channel Alteration:	**17**	6.9 Bank Vegetation Protection	**7**	**7**
Total Score:	**134**	6.7 Channel Sinuosity:	**8**	6.10 Riparian Veg. Zone Width:	**8**	**8**
Habitat Rating:	**0.67**					
Habitat Stream Condition:	**Good**					

Step 7. Rapid Geomorphic Assessment Data

Confinement Type	**Unconfined**	Score	STD	Historic		
7.1 Channel Degradation		**19**	**None**	**No**	Geomorphic Rating	**0.82**
7.2 Channel Aggradation		**17**	**None**	**No**	Channel Evolution Model	**D**
7.3 Widening Channel		**15**		**No**	Channel Evolution Stage	**IIc**
7.4 Change in Planforml		**15**		**No**	Geomorphic Condition	**Good**
Total Score		**66**			Stream Sensitivity	**High**

Phase 2 Segment Summary Report Laplatte

Stream: McCabe's Brook
Reach: T1.05-C
Segment Length(ft): 2,977
Rain: Yes

SGAT Version: 4.53
Organization: Lewis Creek Association
Observers: J.Clark, M. Mainer
Completion Date: 7/25/2011
Qualtiy Control Status - Consultant: Passed
Qualtiy Control Status - Staff: Provisional

Step 0 - Location: **Portion of T1.05 in Charlotte, north of Lime Kiln Rd, south of VT Teddy Bear. Reach previously unassessed in 2007 due to property access.**

Step 5 - Notes: **Sediment transport and bar formation influenced by beaver dams and old beaver dams.**

Step 7 - Narrative: **No channel adjustment occuring.**

Step 1. Valley and Floodplain

1.1 Segmentation: Property Access
1.2 Alluvial Fan: None
1.3 Corridor Encroachments:

Length (ft)	One	Height	Both	Height
Berm:	0		0	
Road:	0		0	
Railroad:	0		0	
Imp. Path:	0		0	
Dev.:	0		0	

1.4 Adjacent Side	Left	Right
Hillside Slope:	Hilly	Hilly
Continuous w/ Bank:	Never	Never
Within 1 Bankfull W:	Never	Never
Texture:	Mixed	Mixed

1.5 Valley Features	
Valley Width (ft):	136
Width Determination:	Measured
Confinement Type:	BD
In Rock Gorge:	No
Human Caused Change in Valley Width?:	No

1.6 Grade Controls: None

Stream: **McCabe's Brook** Reach: **T1.05-C**

Step 2. Stream Channel

2.1Bankfull Width (ft.):	**18.90**	2.11 Riffle/Step Spacing:	**110 ft.**	2.13 Average Largest Particle on		
2.2 Max Depth (ft.):	**3.40**	2.12 Substrate Composition		Bed:	**58**	**mm**
2.3 Mean Depth (tf):	**1.70**	Bedrock:	**0.0 %**	Bar:	**58**	**mm**
2.4 Floodprone Width (ft.):	**136.00**	Boulder:	**0.0 %**	2.14 Stream Type		
2.5 Aband. Floodpn (ft.):	**3.40**	Cobble:	**0.0 %**	Stream Type:	**E**	
Human Elev FloodPln (ft.):		Coarse Gravel:	**33.0 %**	Bed Material:	**Gravel**	
2.6 Width/Depth Ratio:	**11.12**	Fine Gravel:	**20.0 %**	Subclass Slope:	**None**	
2.7 Entrenchment Ratio:	**7.20**	Sand:	**24.0 %**	Bed Form:	**Dune-Ripple**	
2.8 Incision Ratio:	**1.00**	Silt and Smaller:	**24.0 %**	Field Measured Slope:		
Human Elevated Inc. Rat.:	**0.00**	Silt/Clay Present:	**Yes**	2.15 Sub-reach Stream Type		
2.9 Sinuosity:	**Moderate**	Detritus:	**20.0 %**	Reference Stream Type:	**E**	
2.10 Riffles Type:	**Complete**	# Large Woody Debris:	**3**	Reference Bed Material:	**Gravel**	
				Reference Subclass Slope:	**None**	
				Reference Bedform:	**Dune-Ripple**	

Step 3. Riparian Features

3.1 Stream Banks — Typical Bank Slope: **Steep**

Bank Texture			Bank Erosion	Left	Right	Near Bank Vegetation Type	Left	Right
Upper	Left	Right	Erosion Length (ft.):	**93.8**	**119.9**	Dominant:	**Herbaceous**	**Herbaceous**
Material Type:	**Sand**	**Sand**	Erosion Height (ft.):	**2.6**	**2.0**	Sub-dominant:	**None**	**None**
Consistency:	**Non-cohesive**	**Non-cohesive**	Revetment Type:	**None**	**None**	Bank Canopy		
Lower			Revetment Length:	**0.0**	**0.0**	Canopy %:	**0**	**0**
Material Type:	**Clay**	**Clay**				Mid-Channel Canopy:	**Open**	
Consistency:	**Cohesive**	**Cohesive**						

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**>100**	**>100**
Sub-Dominant	**None**	**None**
W less than 25	**0**	**0**
Buffer Vegitation Type		
Dominant	**Mixed Trees**	**Mixed Trees**
Sub-Dominant	**Herbaceous**	**Herbaceous**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Forest**	**Forest**
Sub-dominant	**Hay**	**Hay**
(Legacy)	Amount	Mean Hieght
Failures	**None**	
Gullies	**None**	

	Left	Right
Mass Failures		
Height		
Gullies Number	**0**	
Gullies Length	**0**	

Stream: **McCabe's Brook** Reach: **T1.05-C**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps:	**Minimal**	4.5 Flow Regulation Type		4.7 Stormwater Inputs	**None**
4.2 Adjacent Wetlands:	**Abundant**	Flow Reg. Use:		Field Ditch:	Road Ditch:
4.3 Flow Status:	**Low**	Impoundments:		Other:	Tile Drain:
4.4 # of Debris Jams:	**0**	Impoundment Loc.:		Overland Flow:	Urb Strm Wtr Pipe:
		4.6 Up/Down Strm flow reg.:		4.9 # of Beaver Dams:	**3**
		(old) Upstrm Flow Reg.:		Affected Length (ft):	**165**

4.8 Channel Constrictions: **None**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types	Diagonal:	**0**	5.2 Other Features	Neck Cutoff:	**0**	5.4 Stream Ford or Animal Crossing:	**Yes**		
Mid:	**0**	Delta:	**0**	Flood chutes:	**4**	Avulsion:	**0**	5.5 Straightening:	**None**
Point:	**3**	Island:	**2**	5.3 Steep Riffles and Head Cuts		Head Cuts:	**0**	Straightening Length (ft.):	**0**
Side:	**11**	Braiding:	**0**	Steep Riffles:	**0**	Trib Rejuv.:	**No**	5.5 Dredging:	**None**

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:		6.4 Sediment Deposition:		Stream Gradiant Type	Left Right
6.2 Pool Substrate:		6.5 Channel Flow Status:		6.8 Bank Stability:	
6.3 Pool Variability:		6.6 Channel Alteration:		6.9 Bank Vegetation Protection	
Total Score:	**0**	6.7 Channel Sinuosity:		6.10 Riparian Veg. Zone Width:	
Habitat Rating:	**0.00**				
Habitat Stream Condition:					

Step 7. Rapid Geomorphic Assessment Data

Confinement Type	**Unconfined**	Score	STD	Historic		
7.1 Channel Degradation		**18**	**None**	**No**	Geomorphic Rating	**0.85**
7.2 Channel Aggradation		**16**	**None**	**No**	Channel Evolution Model	**None**
7.3 Widening Channel		**16**	**None**	**No**	Channel Evolution Stage	**I**
7.4 Change in Planforml		**18**	**None**	**No**	Geomorphic Condition	**Reference**
Total Score		**68**			Stream Sensitivity	**High**

Phase 2 Segment Summary Report Laplatte

Stream: McCabe's Brook
Reach: T1.06-A
Segment Length(ft): 3,256
Rain: Yes

SGAT Version: 4.53
Organization: Lewis Creek Association
Observers: J.Clark
Completion Date: 7/15/2011
Qualtiy Control Status - Consultant: Passed
Qualtiy Control Status - Staff: Provisional

Step 0 - Location: **Flows through wet meadow beginning 800 feet upstream of Lime Kiln Road and going 1500 feet downstream of Lime Kiln Road.**

Step 5 - Notes: **Lime Kiln Culvert failed. Will need to be replaced. Little encroachment. Good buffers from adjacent farm.**

Step 7 - Narrative: **Minor change in planform caused by historic beaver dams. These have held up sediment and locally changed channel course.**

Step 1. Valley and Floodplain

1.1 Segmentation: Channel Dimensions
1.2 Alluvial Fan: None
1.3 Corridor Encroachments:

Length (ft)	One	Height	Both	Height
Berm:	0		0	
Road:	0		0	
Railroad:	0		0	
Imp. Path:	0		0	
Dev.:	1,035		0	

1.4 Adjacent Side

	Left	Right
Hillside Slope:	Hilly	Steep
Continuous w/ Bank:	Never	Sometimes
Within 1 Bankfull W:	Never	Sometimes
Texture:	N.E.	Mixed

1.5 Valley Features

Valley Width (ft): 652
Width Determination: Measured
Confinement Type: VB
In Rock Gorge: No
Human Caused Change in Valley Width?: No

1.6 Grade Controls: None

Stream: **McCabe's Brook** Reach: **T1.06-A**

Step 2. Stream Channel

2.1Bankfull Width (ft.):	**6.50**	2.11 Riffle/Step Spacing:	**60 ft.**	2.13 Average Largest Particle on	
2.2 Max Depth (ft.):	**2.10**	2.12 Substrate Composition		Bed:	**N/A**
2.3 Mean Depth (tf):	**1.60**	Bedrock:	**0.0 %**	Bar:	**N/A**
2.4 Floodprone Width (ft.):	**652.00**	Boulder:	**0.0 %**	2.14 Stream Type	
2.5 Aband. Floodpn (ft.):	**2.10**	Cobble:	**3.0 %**	Stream Type:	**E**
Human Elev FloodPln (ft.):		Coarse Gravel:	**22.0 %**	Bed Material:	**Sand**
2.6 Width/Depth Ratio:	**4.06**	Fine Gravel:	**18.0 %**	Subclass Slope:	**None**
2.7 Entrenchment Ratio:	**100.31**	Sand:	**35.0 %**	Bed Form:	**Dune-Ripple**
2.8 Incision Ratio:	**1.00**	Silt and Smaller:	**22.0 %**	Field Measured Slope:	
Human Elevated Inc. Rat.:	**0.00**	Silt/Clay Present:	**Yes**	2.15 Sub-reach Stream Type	
2.9 Sinuosity:	**Moderate**	Detritus:	**20.0 %**	Reference Stream Type:	**E**
2.10 Riffles Type:	**Not Applicable**	# Large Woody Debris:	**2**	Reference Bed Material:	**Sand**
				Reference Subclass Slope:	**None**
				Reference Bedform:	**Dune-Ripple**

Step 3. Riparian Features

3.1 Stream Banks — Typical Bank Slope: **Steep**

Bank Texture			Bank Erosion	Left	Right	Near Bank Vegetation Type	Left	Right
Upper	Left	Right	Erosion Length (ft.):	**83.2**	**66.5**	Dominant:	**Herbaceous**	**Herbaceous**
Material Type:	**Clay**	**Clay**	Erosion Height (ft.):	**1.6**	**2.4**	Sub-dominant:	**Shrubs/Sapling**	**Shrubs/Sapling**
Consistency:	**Cohesive**	**Cohesive**	Revetment Type:	**None**	**None**	Bank Canopy		
Lower			Revetment Length:	**0.0**	**0.0**	Canopy %:	**1-25**	**1-25**
Material Type:	**Sand**	**Sand**				Mid-Channel Canopy:	**Open**	
Consistency:	**Non-cohesive**	**Non-cohesive**						

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**51-100**	**>100**
Sub-Dominant	**26-50**	**None**
W less than 25	**0**	**0**
Buffer Vegitation Type		
Dominant	**Herbaceous**	**Herbaceous**
Sub-Dominant	**Shrubs/Sapling**	**Shrubs/Sapling**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Shrubs/Sapling**	**Forest**
Sub-dominant	**Pasture**	**Shrubs/Sapling**
(Legacy)	Amount	Mean Hieght
Failures	**None**	
Gullies	**None**	

	Left	Right
Mass Failures		
Height		
Gullies Number	**0**	
Gullies Length		

Stream: **McCabe's Brook** Reach: **T1.06-A**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps: **Abundant**
4.2 Adjacent Wetlands: **Abundant**
4.3 Flow Status: **Low**
4.4 # of Debris Jams: **0**

4.5 Flow Regulation Type
Flow Reg. Use:
Impoundments: **None**
Impoundment Loc.:
4.6 Up/Down Strm flow reg.: **None**
(old) Upstrm Flow Reg.:

4.7 Stormwater Inputs
Field Ditch: **0** Road Ditch: **2**
Other: **0** Tile Drain: **0**
Overland Flow: **0** Urb Strm Wtr Pipe: **0**

4.9 # of Beaver Dams: **1**
Affected Length (ft): **0**

4.8 Channel Constrictions:

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?	Problems
Instream Culvert	**4**	**Yes**	**Yes**	**Yes**	**Yes**	**Deposition Above,Scour Below**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types
Diagonal: **0**
Mid: **2**
Delta: **0**
Point: **1**
Island: **0**
Side: **2**
Braiding: **0**

5.2 Other Features
Neck Cutoff: **2**
Flood chutes: **1**
Avulsion: **0**

5.3 Steep Riffles and Head Cuts
Head Cuts: **0**
Steep Riffles: **0**
Trib Rejuv.: **No**

5.4 Stream Ford or Animal Crossing: **No**
5.5 Straightening: **None**
Straightening Length (ft.): **0**
5.5 Dredging: **None**

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:
6.2 Pool Substrate:
6.3 Pool Variability:
Total Score: **0**
Habitat Rating: **0.00**
Habitat Stream Condition:

6.4 Sediment Deposition:
6.5 Channel Flow Status:
6.6 Channel Alteration:
6.7 Channel Sinuosity:

Stream Gradiant Type Left Right
6.8 Bank Stability:
6.9 Bank Vegetation Protection
6.10 Riparian Veg. Zone Width:

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**

	Score	STD	Historic
7.1 Channel Degradation	**18**	**None**	**No**
7.2 Channel Aggradation	**16**	**None**	**No**
7.3 Widening Channel	**16**	**None**	**No**
7.4 Change in Planforml	**13**	**None**	**No**
Total Score	**63**		

Geomorphic Rating **0.79**
Channel Evolution Model **None**
Channel Evolution Stage **I**
Geomorphic Condition **Reference**
Stream Sensitivity **High**

Phase 2 Segment Summary Report Laplatte

Stream: **McCabe's Brook**
Reach: **T1.06-B**
Segment Length(ft): **822**
Rain: **Yes**

SGAT Version: **4.53**
Organization: **Lewis Creek Association**
Observers: **J.Clark**
Completion Date: **7/13/2011**
Qualtiy Control Status - Consultant: **Passed**
Qualtiy Control Status - Staff: **Provisional**

Step 0 - Location: **Wooded section upstream of Lime Kiln Road.**

Step 5 - Notes:

Step 7 - Narrative: **This reach is similar to T1.07A with minor incision occuring. The affects of upstream alteration and historic dam may have contributed to this incision.**

Step 1. Valley and Floodplain

1.1 Segmentation: **Channel Dimensions**
1.2 Alluvial Fan: **None**
1.3 Corridor Encroachments:

	Length (ft)	One	Height	Both	Height
Berm:		0		0	
Road:		0		0	
Railroad:		0		0	
Imp. Path:		0		0	
Dev.:		0		0	

1.4 Adjacent Side

	Left	Right
Hillside Slope:	**Steep**	**Hilly**
Continuous w/ Bank:	**Never**	**Sometimes**
Within 1 Bankfull W:	**Never**	**Sometimes**
Texture:	**N.E.**	**Mixed**

1.5 Valley Features
Valley Width (ft): **144**
Width Determination: **Measured**
Confinement Type: **BD**
In Rock Gorge: **No**
Human Caused Change in Valley Width?: **No**

1.6 Grade Controls: **None**

Stream: **McCabe's Brook** Reach: **T1.06-B**

Step 2. Stream Channel

2.1Bankfull Width (ft.):	**19.50**	2.11 Riffle/Step Spacing:	**70 ft.**	2.13 Average Largest Particle on		
2.2 Max Depth (ft.):	**1.75**	2.12 Substrate Composition		Bed:	**152**	**mm**
2.3 Mean Depth (tf):	**1.30**	Bedrock:	**0.0 %**	Bar:	**128**	**mm**
2.4 Floodprone Width (ft.):	**144.00**	Boulder:	**2.0 %**	2.14 Stream Type		
2.5 Aband. Floodpn (ft.):	**2.30**	Cobble:	**18.0 %**	Stream Type:	**C**	
Human Elev FloodPln (ft.):		Coarse Gravel:	**33.0 %**	Bed Material:	**Gravel**	
2.6 Width/Depth Ratio:	**15.00**	Fine Gravel:	**27.0 %**	Subclass Slope:	**None**	
2.7 Entrenchment Ratio:	**7.38**	Sand:	**14.0 %**	Bed Form:	**Riffle-Pool**	
2.8 Incision Ratio:	**1.31**	Silt and Smaller:	**6.0 %**	Field Measured Slope:		
Human Elevated Inc. Rat.:	**0.00**	Silt/Clay Present:	**Yes**	2.15 Sub-reach Stream Type		
2.9 Sinuosity:	**Moderate**	Detritus:	**40.0 %**	Reference Stream Type:		
2.10 Riffles Type:	**Complete**	# Large Woody Debris:	**34**	Reference Bed Material:		
				Reference Subclass Slope:		
				Reference Bedform:		

Step 3. Riparian Features

3.1 Stream Banks — Typical Bank Slope: **Moderate**

Bank Texture	Left	Right	Bank Erosion	Left	Right	Near Bank Vegetation Type	Left	Right
Upper			Erosion Length (ft.):	**181.0**	**0.0**	Dominant:	**Coniferous**	**Coniferous**
Material Type:	**Clay**	**Clay**	Erosion Height (ft.):	**2.0**	**0.0**	Sub-dominant:	**Deciduous**	**Deciduous**
Consistency:	**Cohesive**	**Cohesive**	Revetment Type:	**None**	**None**	Bank Canopy		
Lower			Revetment Length:	**0.0**	**0.0**	Canopy %:	**76-100**	**76-100**
Material Type:	**Sand**	**Sand**				Mid-Channel Canopy:	**Closed**	
Consistency:	**Non-cohesive**	**Non-cohesive**						

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**>100**	**>100**
Sub-Dominant	**None**	**None**
W less than 25	**0**	**0**
Buffer Vegitation Type		
Dominant	**Coniferous**	**Coniferous**
Sub-Dominant	**Deciduous**	**Deciduous**

3.3 Riparian Corridor

Corridor Land	Left	Right		Left	Right
Dominant	**Forest**	**Forest**	Mass Failures		
Sub-dominant	**None**	**None**	Height		
(Legacy)	Amount	Mean Hieght	Gullies Number	**0**	
Failures	**None**		Gullies Length		
Gullies	**None**				

Stream: **McCabe's Brook** Reach: **T1.06-B**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps: **Minimal**
4.2 Adjacent Wetlands: **Minimal**
4.3 Flow Status: **Low**
4.4 # of Debris Jams: **4**

4.5 Flow Regulation Type
Flow Reg. Use:
Impoundments: **None**
Impoundment Loc.:
4.6 Up/Down Strm flow reg.: **None**
(old) Upstrm Flow Reg.:

4.7 Stormwater Inputs **None**
Field Ditch: Road Ditch:
Other: Tile Drain:
Overland Flow: Urb Strm Wtr Pipe:
4.9 # of Beaver Dams: **0**
Affected Length (ft): **0**

4.8 Channel Constrictions: **None**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types
Diagonal: **0**
Mid: **1**
Delta: **0**
Point: **4**
Island: **0**
Side: **5**
Braiding: **0**

5.2 Other Features
Neck Cutoff: **0**
Flood chutes: **0**
Avulsion: **0**

5.3 Steep Riffles and Head Cuts
Head Cuts: **0**
Steep Riffles: **0**
Trib Rejuv.: **No**

5.4 Stream Ford or Animal Crossing: **No**
5.5 Straightening: **None**
Straightening Length (ft.): **0**
5.5 Dredging: **None**

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:
6.2 Pool Substrate:
6.3 Pool Variability:
Total Score: **0**
Habitat Rating: **0.00**
Habitat Stream Condition:

6.4 Sediment Deposition:
6.5 Channel Flow Status:
6.6 Channel Alteration:
6.7 Channel Sinuosity:

Stream Gradiant Type Left Right
6.8 Bank Stability:
6.9 Bank Vegetation Protection
6.10 Riparian Veg. Zone Width:

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**

	Score	STD	Historic
7.1 Channel Degradation	**14**	**None**	**No**
7.2 Channel Aggradation	**15**	**None**	**No**
7.3 Widening Channel	**14**	**None**	**No**
7.4 Change in Planforml	**14**	**None**	**No**
Total Score	**57**		

Geomorphic Rating **0.71**
Channel Evolution Model **F**
Channel Evolution Stage **II**
Geomorphic Condition **Good**
Stream Sensitivity **High**

Phase 2 Segment Summary Report Laplatte

Stream: **McCabe's Brook**
Reach: **T1.07-A**
Segment Length(ft): **777**
Rain: **Yes**

SGAT Version: **4.53**
Organization: **Lewis Creek Association**
Observers: **J.Clark**
Completion Date: **7/13/2011**
Qualtiy Control Status - Consultant: **Passed**
Qualtiy Control Status - Staff: **Provisional**

Step 0 - Location: **Wooded section upstream of Lime Kiln Road.**

Step 5 - Notes:

Step 7 - Narrative: **Channel in good condition. Minor incision has occured, possibly due to breach of upstream dam - located at reach break. Some access to floodplains still available.**

Step 1. Valley and Floodplain

1.1 Segmentation: **Channel Dimensions**
1.2 Alluvial Fan: **None**
1.3 Corridor Encroachments:

Length (ft)	One	Height	Both	Height
Berm:	0		0	
Road:	0		0	
Railroad:	0		0	
Imp. Path:	0		0	
Dev.:	0		0	

1.4 Adjacent Side

	Left	Right
Hillside Slope:	Steep	Hilly
Continuous w/ Bank:	Never	Sometimes
Within 1 Bankfull W:	Never	Sometimes
Texture:	N.E.	Sand

1.5 Valley Features
Valley Width (ft): **140**
Width Determination: **Measured**
Confinement Type: **VB**
In Rock Gorge: **No**
Human Caused Change in Valley Width?: **No**

1.6 Grade Controls: **None**

Stream: **McCabe's Brook** Reach: **T1.07-A**

Step 2. Stream Channel

2.1Bankfull Width (ft.):	**9.00**	2.11 Riffle/Step Spacing:	**50 ft.**	2.13 Average Largest Particle on		
2.2 Max Depth (ft.):	**0.75**	2.12 Substrate Composition		Bed:	**146**	**mm**
2.3 Mean Depth (tf):	**0.55**	Bedrock:	**0.0 %**	Bar:	**150**	**mm**
2.4 Floodprone Width (ft.):	**77.00**	Boulder:	**3.0 %**	2.14 Stream Type		
2.5 Aband. Floodpn (ft.):	**1.00**	Cobble:	**31.0 %**	Stream Type:	**C**	
Human Elev FloodPln (ft.):		Coarse Gravel:	**14.0 %**	Bed Material:	**Gravel**	
2.6 Width/Depth Ratio:	**16.36**	Fine Gravel:	**20.0 %**	Subclass Slope:	**None**	
2.7 Entrenchment Ratio:	**8.56**	Sand:	**9.0 %**	Bed Form:	**Riffle-Pool**	
2.8 Incision Ratio:	**1.33**	Silt and Smaller:	**23.0 %**	Field Measured Slope:		
Human Elevated Inc. Rat.:	**0.00**	Silt/Clay Present:	**Yes**	2.15 Sub-reach Stream Type		
2.9 Sinuosity:	**Low**	Detritus:	**40.0 %**	Reference Stream Type:		
2.10 Riffles Type:	**Complete**	# Large Woody Debris:	**17**	Reference Bed Material:		
				Reference Subclass Slope:		
				Reference Bedform:		

Step 3. Riparian Features

3.1 Stream Banks — Typical Bank Slope: **Moderate**

Bank Texture			Bank Erosion	Left	Right	Near Bank Vegetation Type	Left	Right
Upper	Left	Right	Erosion Length (ft.):	**165.7**	**26.4**	Dominant:	**Deciduous**	**Deciduous**
Material Type:	**Boulder/Cobble**	**Boulder/Cobble**	Erosion Height (ft.):	**1.7**	**2.0**	Sub-dominant:	**None**	**None**
Consistency:	**Cohesive**	**Cohesive**	Revetment Type:	**None**	**None**	Bank Canopy		
Lower			Revetment Length:	**0.0**	**0.0**	Canopy %:	**76-100**	**76-100**
Material Type:	**Gravel**	**Gravel**				Mid-Channel Canopy:	**Closed**	
Consistency:	**Cohesive**	**Cohesive**						

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**>100**	**>100**
Sub-Dominant	**None**	**None**
W less than 25	**0**	**0**
Buffer Vegitation Type		
Dominant	**Mixed Trees**	**Mixed Trees**
Sub-Dominant	**None**	**None**

3.3 Riparian Corridor

Corridor Land	Left	Right		Left	Right
Dominant	**Forest**	**Forest**	Mass Failures		
Sub-dominant	**None**	**None**	Height		
(Legacy)	Amount	Mean Hieght	Gullies Number	**1**	
Failures	**None**		Gullies Length		
Gullies	**One**	**5.0**			

Stream: **McCabe's Brook** Reach: **T1.07-A**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps: **Abundant**
4.2 Adjacent Wetlands: **Minimal**
4.3 Flow Status: **Low**
4.4 # of Debris Jams: **2**

4.5 Flow Regulation Type
Flow Reg. Use:
Impoundments: **None**
Impoundment Loc.:
4.6 Up/Down Strm flow reg.: **None**
(old) Upstrm Flow Reg.:

4.7 Stormwater Inputs **None**
Field Ditch: Road Ditch:
Other: Tile Drain:
Overland Flow: Urb Strm Wtr Pipe:
4.9 # of Beaver Dams: **0**
Affected Length (ft): **0**

4.8 Channel Constrictions: **None**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types
Diagonal: **0**
Mid: **4**
Delta: **0**
Point: **2**
Island: **0**
Side: **2**
Braiding: **0**

5.2 Other Features
Neck Cutoff: **0**
Flood chutes: **2**
Avulsion: **0**

5.3 Steep Riffles and Head Cuts
Head Cuts: **0**
Steep Riffles: **0**
Trib Rejuv.: **Yes**

5.4 Stream Ford or Animal Crossing: **No**
5.5 Straightening: **None**
Straightening Length (ft.): **0**
5.5 Dredging: **None**

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:
6.2 Pool Substrate:
6.3 Pool Variability:
Total Score: **0**
Habitat Rating: **0.00**
Habitat Stream Condition:

6.4 Sediment Deposition:
6.5 Channel Flow Status:
6.6 Channel Alteration:
6.7 Channel Sinuosity:

Stream Gradiant Type Left Right
6.8 Bank Stability:
6.9 Bank Vegetation Protection
6.10 Riparian Veg. Zone Width:

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**

	Score	STD	Historic
7.1 Channel Degradation	**11**	**None**	**No**
7.2 Channel Aggradation	**17**	**None**	**No**
7.3 Widening Channel	**16**	**None**	**No**
7.4 Change in Planforml	**16**	**None**	**No**
Total Score	**60**		

Geomorphic Rating **0.75**
Channel Evolution Model **F**
Channel Evolution Stage **II**
Geomorphic Condition **Good**
Stream Sensitivity **High**

Phase 2 Segment Summary Report Laplatte

Stream: McCabe's Brook
Reach: T1.07-B
Segment Length(ft): 1,136
Rain: Yes

SGAT Version: 4.53
Organization: Lewis Creek Association
Observers: J.Clark
Completion Date: 7/13/2011
Qualtiy Control Status - Consultant: Passed
Qualtiy Control Status - Staff: Provisional

Step 0 - Location: **From farm ford behind nordic farm (off of Route 7) through wetland area to treeline. No road crossings in segment. Lime Kiln Road 2400 ft downstream, Hinesburg Road 8500 ft upstream.**

Step 5 - Notes: **Remains of an old dam abutments at treeline at downstream end of segment suggests that this segment could have been created by the historic influence of an old dam. Segment could have historically been similar to the wooded segment below.**

Step 7 - Narrative: **Channel in good condition.**

Step 1. Valley and Floodplain

1.1 Segmentation: **Channel Dimensions**
1.2 Alluvial Fan: **None**
1.3 Corridor Encroachments:

Length (ft)	One	Height	Both	Height
Berm:	0		20	6
Road:	0		0	
Railroad:	0		0	
Imp. Path:	0		0	
Dev.:	0		0	

1.4 Adjacent Side	Left	Right
Hillside Slope:	Steep	Steep
Continuous w/ Bank:	Never	Never
Within 1 Bankfull W:	Sometimes	Sometimes
Texture:	Sand	Sand

1.5 Valley Features
Valley Width (ft): 40
Width Determination: Measured
Confinement Type: BD
In Rock Gorge: No
Human Caused Change in Valley Width?: No

1.6 Grade Controls: None

Stream: **McCabe's Brook** Reach: **T1.07-B**

Step 2. Stream Channel

2.1Bankfull Width (ft.):	**5.50**	2.11 Riffle/Step Spacing:	**40 ft.**	2.13 Average Largest Particle on		
2.2 Max Depth (ft.):	**1.20**	2.12 Substrate Composition		Bed:	**120**	**mm**
2.3 Mean Depth (tf):	**0.80**	Bedrock:	**0.0 %**	Bar:	**138**	**mm**
2.4 Floodprone Width (ft.):	**38.50**	Boulder:	**1.0 %**	2.14 Stream Type		
2.5 Aband. Floodpn (ft.):	**1.20**	Cobble:	**5.0 %**	Stream Type:	**E**	
Human Elev FloodPln (ft.):		Coarse Gravel:	**20.0 %**	Bed Material:	**Gravel**	
2.6 Width/Depth Ratio:	**6.88**	Fine Gravel:	**42.0 %**	Subclass Slope:	**None**	
2.7 Entrenchment Ratio:	**7.00**	Sand:	**16.0 %**	Bed Form:	**Riffle-Pool**	
2.8 Incision Ratio:	**1.00**	Silt and Smaller:	**16.0 %**	Field Measured Slope:		
Human Elevated Inc. Rat.:	**0.00**	Silt/Clay Present:	**Yes**	2.15 Sub-reach Stream Type		
2.9 Sinuosity:	**Moderate**	Detritus:	**10.0 %**	Reference Stream Type:	**E**	
2.10 Riffles Type:	**Complete**	# Large Woody Debris:	**6**	Reference Bed Material:	**Gravel**	
				Reference Subclass Slope:	**None**	
				Reference Bedform:	**Riffle-Pool**	

Step 3. Riparian Features

3.1 Stream Banks — Typical Bank Slope: **Steep**

Bank Texture	Left	Right	Bank Erosion	Left	Right	Near Bank Vegetation Type	Left	Right
Upper			Erosion Length (ft.):	**61.6**	**0.0**	Dominant:	**Herbaceous**	**Herbaceous**
Material Type:	**Sand**	**Sand**	Erosion Height (ft.):	**3.0**	**0.0**	Sub-dominant:	**Shrubs/Sapling**	**Shrubs/Sapling**
Consistency:	**Non-cohesive**	**Non-cohesive**	Revetment Type:	**None**	**None**	Bank Canopy		
Lower			Revetment Length:	**0.0**	**0.0**	Canopy %:	**1-25**	**1-25**
Material Type:	**Clay**	**Clay**				Mid-Channel Canopy:	**Open**	
Consistency:	**Cohesive**	**Cohesive**						

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**51-100**	**51-100**
Sub-Dominant	**None**	**None**
W less than 25	**0**	**0**
Buffer Vegitation Type		
Dominant	**Herbaceous**	**Herbaceous**
Sub-Dominant	**Mixed Trees**	**Mixed Trees**

3.3 Riparian Corridor

Corridor Land	Left	Right		Left	Right
Dominant	**Hay**	**Hay**	Mass Failures		
Sub-dominant	**Forest**	**Forest**	Height		
(Legacy)	Amount	Mean Hieght	Gullies Number	**0**	
Failures	**None**		Gullies Length		
Gullies	**None**				

Stream: **McCabe's Brook** Reach: **T1.07-B**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps: **Minimal**
4.2 Adjacent Wetlands: **Abundant**
4.3 Flow Status: **Low**
4.4 # of Debris Jams: **0**

4.5 Flow Regulation Type
Flow Reg. Use:
Impoundments: **None**
Impoundment Loc.:
4.6 Up/Down Strm flow reg.: **None**
(old) Upstrm Flow Reg.: **None**

4.7 Stormwater Inputs **None**
Field Ditch: Road Ditch:
Other: Tile Drain:
Overland Flow: Urb Strm Wtr Pipe:
4.9 # of Beaver Dams: **0**
Affected Length (ft): **0**

4.8 Channel Constrictions:

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?	Problems
Old Abutment	**15**	**Yes**	**Yes**	**No**	**Yes**	**Deposition Above,Scour Below**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types
Diagonal: **0**
Mid: **3**
Delta: **0**
Point: **0**
Island: **0**
Side: **0**
Braiding: **0**

5.2 Other Features
Neck Cutoff: **0**
Flood chutes: **0**
Avulsion: **0**

5.3 Steep Riffles and Head Cuts
Head Cuts: **0**
Steep Riffles: **0**
Trib Rejuv.: **No**

5.4 Stream Ford or Animal Crossing: **Yes**
5.5 Straightening: **None**
Straightening Length (ft.): **0**
5.5 Dredging: **None**

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:
6.2 Pool Substrate:
6.3 Pool Variability:
Total Score: **0**
Habitat Rating: **0.00**
Habitat Stream Condition:

6.4 Sediment Deposition:
6.5 Channel Flow Status:
6.6 Channel Alteration:
6.7 Channel Sinuosity:

Stream Gradiant Type Left Right
6.8 Bank Stability:
6.9 Bank Vegetation Protection
6.10 Riparian Veg. Zone Width:

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**

	Score	STD	Historic
7.1 Channel Degradation	**16**	**None**	**No**
7.2 Channel Aggradation	**15**	**None**	**No**
7.3 Widening Channel	**18**	**None**	**No**
7.4 Change in Planforml	**18**	**None**	**No**
Total Score	**67**		

Geomorphic Rating **0.84**
Channel Evolution Model **None**
Channel Evolution Stage **I**
Geomorphic Condition **Good**
Stream Sensitivity **High**

Phase 2 Segment Summary Report Laplatte

Stream: **McCabe's Brook**
Reach: **T1.08-0**
Segment Length(ft): **11,204**
Rain: **Yes**

SGAT Version: **4.53**
Organization: **Lewis Creek Association**
Observers: **J.Clark, R.Schiff**
Completion Date: **7/18/2011**
Qualtiy Control Status - Consultant: **Passed**
Qualtiy Control Status - Staff: **Provisional**
Why Not Assessed: **wetland**

Step 0 - Location: **Begins just west of Homesteader Drive (off of Hinesburg Road) at headwaters. Travels through wetlands across Hinesburg Road through fields. Ends at farm ford behind Nordic Farm (on Route 7). This reach is also impounded at lower section.**

Step 5 - Notes:

Step 7 - Narrative:

Step 1. Valley and Floodplain

1.1 Segmentation:

1.2 Alluvial Fan: **None**

1.3 Corridor Encroachments:

	Length (ft)	One Height	Both Height
Berm:	0		0
Road:	347	4	0
Railroad:	0		0
Imp. Path:	1,008	1	0
Dev.:	1,094		0

1.4 Adjacent Side — Left — Right

Hillside Slope:

Continuous w/ Bank:

Within 1 Bankfull W:

Texture:

1.5 Valley Features

Valley Width (ft):

Width Determination:

Confinement Type:

In Rock Gorge:

Human Caused Change in Valley Width?:

1.6 Grade Controls:

Type	Location	Total Height	Total Height Above Water	Photo Taken?	GPS Taken?
Dam		**1.0**	**5.0**		

Stream: **McCabe's Brook** Reach: **T1.08-0**

Step 2. Stream Channel

2.1Bankfull Width (ft.):		2.11 Riffle/Step Spacing:		2.13 Average Largest Particle on	
2.2 Max Depth (ft.):		2.12 Substrate Composition		Bed:	
2.3 Mean Depth (tf):		Bedrock:	%	Bar:	
2.4 Floodprone Width (ft.):		Boulder:	%	2.14 Stream Type	
2.5 Aband. Floodpn (ft.):		Cobble:	%	Stream Type:	
Human Elev FloodPln (ft.):		Coarse Gravel:	%	Bed Material:	
2.6 Width/Depth Ratio:	**0.00**	Fine Gravel:	%	Subclass Slope:	
2.7 Entrenchment Ratio:	**0.00**	Sand:	%	Bed Form:	
2.8 Incision Ratio:	**0.00**	Silt and Smaller:	%	Field Measured Slope:	
Human Elevated Inc. Rat.:	**0.00**	Silt/Clay Present:		2.15 Sub-reach Stream Type	
2.9 Sinuosity:		Detritus:	%	Reference Stream Type:	
2.10 Riffles Type:		# Large Woody Debris:		Reference Bed Material:	
				Reference Subclass Slope:	
				Reference Bedform:	

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope:

Bank Texture			Bank Erosion	Left	Right	Near Bank Vegetation Type	Left	Right
Upper	Left	Right	Erosion Length (ft.):	**0.0**	**0.0**	Dominant:		
Material Type:			Erosion Height (ft.):	**0.0**	**0.0**	Sub-dominant:		
Consistency:			Revetment Type:	**None**	**None**	Bank Canopy		
Lower			Revetment Length:	**0.0**	**0.0**	Canopy %:		
Material Type:						Mid-Channel Canopy:		
Consistency:								

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant		
Sub-Dominant		
W less than 25	**6,502**	**3,982**
Buffer Vegitation Type		
Dominant		
Sub-Dominant		

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant		
Sub-dominant		
(Legacy)	Amount	Mean Hieght
Failures	**None**	
Gullies	**None**	

	Left	Right
Mass Failures		
Height		
Gullies Number	**0**	
Gullies Length	**0**	

Stream: **McCabe's Brook** Reach: **T1.08-0**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps:
4.2 Adjacent Wetlands:
4.3 Flow Status:
4.4 # of Debris Jams: **1**

4.5 Flow Regulation Type
Flow Reg. Use:
Impoundments:
Impoundment Loc.:
4.6 Up/Down Strm flow reg.:
(old) Upstrm Flow Reg.:

4.7 Stormwater Inputs **None**
Field Ditch: Road Ditch:
Other: Tile Drain:
Overland Flow: Urb Strm Wtr Pipe:
4.9 # of Beaver Dams: **0**
Affected Length (ft): **0**

4.8 Channel Constrictions:

Step 5. Channel Bed and Planform Changes

5.1 Bar Types Diagonal:
Mid: Delta:
Point: Island:
Side: Braiding: **0**

5.2 Other Features Neck Cutoff: **0**
Flood chutes: **0** Avulsion: **0**
5.3 Steep Riffles and Head Cuts Head Cuts: **0**
Steep Riffles: **0** Trib Rejuv.:

5.4 Stream Ford or Animal Crossing: **No**
5.5 Straightening: **Straightening**
Straightening Length (ft.): **8,412**
5.5 Dredging: **None**

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:
6.2 Pool Substrate:
6.3 Pool Variability:
Total Score:
Habitat Rating:
Habitat Stream Condition:

6.4 Sediment Deposition:
6.5 Channel Flow Status:
6.6 Channel Alteration:
6.7 Channel Sinuosity:

Stream Gradiant Type Left Right
6.8 Bank Stability:
6.9 Bank Vegetation Protection
6.10 Riparian Veg. Zone Width:

Step 7. Rapid Geomorphic Assessment Data

Confinement Type	Score	STD	Historic
7.1 Channel Degradation			
7.2 Channel Aggradation			
7.3 Widening Channel			
7.4 Change in Planforml			
Total Score			

Geomorphic Rating
Channel Evolution Model
Channel Evolution Stage
Geomorphic Condition
Stream Sensitivity

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Stream Geomorphic Assessment

Agency of Natural Resouces

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August, 11 2011

Bridge Summary Report

Laplatte

General Information

SgaID	100001000004131	Local SgaID		VOBCIT struct_num	990001000204131
Observers	JSC	Assessment Date	5/18/2010	Project Name	Laplatte
Town	Shelburne	Latitude	44.39852	Longitude	-73.2344
Location	Bay Road at mouth of LaPlatte River at Lake Champlain			Reach VTID	M01
Road Name	BAY RD	Road Type	Paved	Stream Name	LaPlatte River
High Flow Stage	No			Channel Width	78

Bridge Information

Bridge Width	30	Material	Concrete
Bridge Clearance	6.4	Number of bridge piers/arches	0
Bridge/Arch Span	83		
		Skewed to roadway?	No

Geomorphic Information

General

Floodplain filled by roadway approaches	Entirely	Structure is located at significant break in valley slope	No

Upstream

Obstructions at the opening of the structure	None	Estimated distance avulsion would follow road	
Steep riffle present immediately upstream of structure	No	Angle of stream flow approaching structure	Naturally Straight
If channel avulses, stream will	Cross Road		

Downstream

Pool present immediately downstream of structure	Yes
Downstream bank heights are substantially higher than upstream bank heights	No
Pool Depth at point of streamflow entry	Yes

	Upstream	Downstream	In Structure
Dominant Bed Material	Unknown	Unknown	Unknown
Bedrock Present	No	No	No
Type of Sediment Deposits	None	None	None
Elevation of sediment deposits >= 1/2 bankfull	No	No	No
Bank Erosion	None	None	
Hard Bank Armoring	Intact	Intact	
Stream bed scour causing undermining around or under structure	None	None	
Beaver Dam near Structure	No	No	
Beaver Dam distance (ft.)			

Vegetation

	Upstream	Downstream	In Structure
Dominant Vegetation Type - Left	Deciduous Forest	Herbaceous/Grass	
Dominant Vegetation Type - Right	Herbaceous/Grass	Herbaceous/Grass	

Does a band of shrub/forest vegetation 50 ft. wide start within 25 ft. of the structure and extend at least 500 ft. up/downstream?

Vegitation Band - Left	Yes	No	
Vegitation Band -Right	No	No	

Wildlife

	Roadkill	Outside Structure	Inside Structure
Species	None	None	None

Other Information

Spatial location data collected with GPS?	Yes	Photos taken?	No

Comments **Spalling concrete on upstream abutments. Backwatered from Lake Champlain.**

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Stream Geomorphic Assessment

Agency of Natural Resouces

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August, 11 2011

Culvert Summary Report

Laplatte

General Information

SgaID	**400413000204131**	Local SgaID		VOBCIT struct_num	**700001003504133**
Observers	**JSC, MI**	Assessment Date	**8/9/2011**	Project Name	**Laplatte**
Town	**Shelburne**	Latitude	**44.38293**	Longitude	**-73.23856**
Location	**Just west of the school and town garage.**			Reach VTID	**T1.03**
Road Name	**HARBOR RD**	Road Type	**Paved**	Stream Name	**McCabe's Brook**
High Flow Stage	**No**			Channel Width	**15.2**

Culvert Information

Culvert Length	**43**	Material	**Concrete**
Culvert Height	**5.6**	Number of culverts	**1**
Culvert Width	**15**	Culvert Overflow Pipe	**No**
		Skewed to roadway?	**No**

Geomorphic Information

General

Floodplain filled by roadway approaches	**Partially**	Structure is located at significant break in valley slope	**No**
		Culvert slope as compared with channel slope is significantly	**Same**

Upstream

Obstructions at the opening of the structure	**None**	Estimated distance avulsion would follow road	
Steep riffle present immediately upstream of structure	**No**	Angle of stream flow approaching structure	**Mild Bend**
If channel avulses, stream will	**Cross Road**		

Downstream

Pool present immediately downstream of structure	**Yes**	Water depth in culvert (at outlet)	**1**
Downstream bank heights are substantially higher than upstream bank heights	**No**	Culvert outlet invert	**Entirely Backwatered**
Stepped Footers	**1 ft.**	Backwater Length (measured from outlet)	**43**
Maximum pool depth	**2.5 ft.**	Backwater Length (measured from outlet)	**0**

	Upstream	Downstream	In Structure
Dominant Bed Material	**Sand**	**Sand**	**Sand**
Bedrock Present	**No**	**No**	
Type of Sediment Deposits	**Point**	**None**	**None**
Material Present throughout			**Yes**
Elevation of sediment deposits >= 1/2 bankfull	**Yes**	**No**	**No**
Bank Erosion	**Low**	**None**	
Hard Bank Armoring	**Intact**	**Intact**	
Stream bed scour causing undermining around or under structure	**None**	**None**	
Beaver Dam near Structure	**No**	**No**	
Beaver Dam distance (ft.)	**0**	**0**	

Vegetation

	Upstream	Downstream	In Structure
Dominant Vegetation Type - Left	**Herbaceous/Grass**	**Shrub/Sapling**	
Dominant Vegetation Type - Right	**Shrub/Sapling**	**Shrub/Sapling**	

Does a band of shrub/forest vegetation 50 ft. wide start within 25 ft. of the structure and extend at least 500 ft. up/downstream?

Vegitation Band - Left	**Yes**	**Yes**	
Vegitation Band -Right	**Yes**	**Yes**	

Wildlife

	Roadkill	Outside Structure	Inside Structure
Species	**None**	**None**	**None**

Other Information

Spatial location data collected with GPS?	**Yes**	Photos taken?	**Yes**

Comments **Structure recently replaced. Sidewalk over downstream side, extending ceiling over wingwalls. Reported longer length including sidewalk.**

VERMONT

Stream Geomorphic Assessment

Agency of Natural Resouces

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August. 11 2011

Bridge Summary Report

Laplatte

General Information

SgaID	990000000004133	Local SgaID		VOBCIT struct_num	
Observers	JSC, BG	Assessment Date	7/27/2011	Project Name	Laplatte
Town	Shelburne	Latitude	44.37289	Longitude	-73.23933
Location	behind Shelburne Museum. Downstream of Railroad Bridge. Grass path connects to Limerick Road to the west.			Reach VTID	T1.04
Road Name		Road Type	Trail	Stream Name	McCabes Brook
High Flow Stage	No			Channel Width	18.4

Bridge Information

Bridge Width	14	Material	Concrete
Bridge Clearance	6.5	Number of bridge piers/arches	1
Bridge/Arch Span	17		
		Skewed to roadway?	No

Geomorphic Information

General

Floodplain filled by roadway approaches	Entirely	Structure is located at significant break in valley slope	No

Upstream

Obstructions at the opening of the structure	Wood debris	Estimated distance avulsion would follow road	
Steep riffle present immediately upstream of structure	No	Angle of stream flow approaching structure	Mild Bend
If channel avulses, stream will	Cross Road		

Downstream

Pool present immediately downstream of structure	No		
Downstream bank heights are substantially higher than upstream bank heights	No		
Pool Depth at point of streamflow entry	Yes 0 ft.		0

	Upstream	Downstream	In Structure
Dominant Bed Material	Gravel	Gravel	Gravel
Bedrock Present	No	No	No
Type of Sediment Deposits	Side	Delta,Side	Side
Elevation of sediment deposits >= 1/2 bankfull	No	Yes	No
Bank Erosion	High	Low	
Hard Bank Armoring	None	None	
Stream bed scour causing undermining around or under structure	Footers,Wing walls	Footers	
Beaver Dam near Structure	No	No	
Beaver Dam distance (ft.)	0	0	

Vegetation

	Upstream	Downstream	In Structure
Dominant Vegetation Type - Left	Shrub/Sapling	Mixed Forest	
Dominant Vegetation Type - Right	Herbaceous/Grass	Mixed Forest	

Does a band of shrub/forest vegetation 50 ft. wide start within 25 ft. of the structure and extend at least 500 ft. up/downstream?

Vegitation Band - Left	Yes	Yes	
Vegitation Band -Right	Yes	Yes	

Wildlife

	Roadkill	Outside Structure	Inside Structure
Species	None	None	None

Other Information

Spatial location data collected with GPS?	Yes	Photos taken?	Yes

Comments **Ownership unknown. No trespassing signs posted on west side of bridge. Path mowed grass.**

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Stream Geomorphic Assessment

Agency of Natural Resouces

VT DEC

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August. 11 2011

Comments

Culvert Summary Report

Laplatte

General Information

SgaID	**700000000404133**	Local SgaID		VOBCIT struct_num	
Observers	**JSC, BG**	Assessment Date	**7/27/2011**	Project Name	**Laplatte**
Town	**Shelburne**	Latitude	**44.36966**	Longitude	**-73.23877**
Location	**Downstream of Bostwick Road.**			Reach VTID	**T1.05**
Road Name		Road Type	**Railroad**	Stream Name	**McCabes Brook**
High Flow Stage	**No**			Channel Width	**22.7**

Culvert Information

Culvert Length	**87**	Material	**Concrete**
Culvert Height	**12.4**	Number of culverts	**1**
Culvert Width	**11.9**	Culvert Overflow Pipe	**No**
		Skewed to roadway?	**No**

Geomorphic Information

General

Floodplain filled by roadway approaches	**Entirely**	Structure is located at significant break in valley slope	**No**
		Culvert slope as compared with channel slope is significantly	**Lower**

Upstream

Obstructions at the opening of the structure	**None**	Estimated distance avulsion would follow road	
Steep riffle present immediately upstream of structure	**Yes**	Angle of stream flow approaching structure	**Naturally Straight**
If channel avulses, stream will	**Cross Road**		

Downstream

Pool present immediately downstream of structure	**Yes**	Water depth in culvert (at outlet)	**0.1**
Downstream bank heights are substantially higher than upstream bank heights	**No**	Culvert outlet invert	**Free Fall**
Stepped Footers	**0.6 ft.**	Backwater Length (measured from outlet)	**0**
Maximum pool depth	**1.1 ft.**	Backwater Length (measured from outlet)	**0.8**

	Upstream	Downstream	In Structure
Dominant Bed Material	**Cobble**	**Cobble**	**None**
Bedrock Present	**No**	**No**	
Type of Sediment Deposits	**Side,Mid-channel**	**Mid-channel**	**None**
Material Present throughout			**No**
Elevation of sediment deposits >= 1/2 bankfull	**Yes**	**No**	**No**
Bank Erosion	**None**	**Low**	
Hard Bank Armoring	**None**	**None**	
Stream bed scour causing undermining around or under structure	**None**	**None**	
Beaver Dam near Structure	**No**	**No**	
Beaver Dam distance (ft.)	**0**	**0**	

Vegetation

	Upstream	Downstream	In Structure
Dominant Vegetation Type - Left	**Deciduous Forest**	**Shrub/Sapling**	
Dominant Vegetation Type - Right	**Deciduous Forest**	**Mixed Forest**	

Does a band of shrub/forest vegetation 50 ft. wide start within 25 ft. of the structure and extend at least 500 ft. up/downstream?

Vegitation Band - Left	**Yes**	**Yes**	
Vegitation Band -Right	**Yes**	**Yes**	

Wildlife

	Roadkill	Outside Structure	Inside Structure
Species	**None**	**None**	**None**

Other Information

Spatial location data collected with GPS?	**No**	Photos taken?	**Yes**

VERMONT

Stream Geomorphic Assessment

Agency of Natural Resouces

VT DEC

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August, 11 2011

Culvert Summary Report

Laplatte

General Information

SgaID	**70000302440413**	Local SgaID		VOBCIT struct_num	**700003007304133**
Observers	**JSC, BG**	Assessment Date	**7/27/2011**	Project Name	**Laplatte**
Town	**Shelburne**	Latitude	**44.3689**	Longitude	**-73.2358**
Location	**Just west of Rt 7**			Reach VTID	**T1.05**
Road Name	**BOSTWICK RD**	Road Type	**Paved**	Stream Name	**McCabe's Brook**
High Flow Stage	**No**			Channel Width	**22.7**

Culvert Information

Culvert Length	**154**	Material	**Steel Corrugated**
Culvert Height	**8.3**	Number of culverts	**1**
Culvert Width	**7.3**	Culvert Overflow Pipe	**No**
		Skewed to roadway?	**No**

Geomorphic Information

General

Floodplain filled by roadway approaches	**Entirely**	Structure is located at significant break in valley slope	**No**
		Culvert slope as compared with channel slope is significantly	**Lower**

Upstream

Obstructions at the opening of the structure	**Wood debris**	Estimated distance avulsion would follow road	**900**
Steep riffle present immediately upstream of structure	**Yes**	Angle of stream flow approaching structure	**Mild Bend**
If channel avulses, stream will	**Follow Road**		

Downstream

Pool present immediately downstream of structure	**Yes**	Water depth in culvert (at outlet)	**0.1**
Downstream bank heights are substantially higher than upstream bank heights	**No**	Culvert outlet invert	**Cascade**
Stepped Footers	**0.1 ft.**	Backwater Length (measured from outlet)	**0**
Maximum pool depth	**2 ft.**	Backwater Length (measured from outlet)	**1.2**

	Upstream	Downstream	In Structure
Dominant Bed Material	**Cobble**	**Cobble**	**None**
Bedrock Present	**Yes**	**No**	
Type of Sediment Deposits	**Delta,Side**	**Delta,Side,Mid-channel**	**None**
Material Present throughout			**No**
Elevation of sediment deposits >= 1/2 bankfull	**Yes**	**Yes**	**No**
Bank Erosion	**Low**	**None**	
Hard Bank Armoring	**Intact**	**Intact**	
Stream bed scour causing undermining around or under structure	**None**	**None**	
Beaver Dam near Structure	**No**	**No**	
Beaver Dam distance (ft.)	**0**	**0**	

Vegetation

	Upstream	Downstream	In Structure
Dominant Vegetation Type - Left	**Mixed Forest**	**Mixed Forest**	
Dominant Vegetation Type - Right	**Mixed Forest**	**Mixed Forest**	

Does a band of shrub/forest vegetation 50 ft. wide start within 25 ft. of the structure and extend at least 500 ft. up/downstream?

Vegitation Band - Left	**Yes**	**Yes**	
Vegitation Band -Right	**Yes**	**Yes**	

Wildlife

	Roadkill	Outside Structure	Inside Structure
Species	**None**	**None**	**None**

Other Information

Spatial location data collected with GPS? **No**

Photos taken? **Yes**

Comments **Large sediment deposits upstream.**

VERMONT

Stream Geomorphic Assessment

Agency of Natural Resouces

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August, 11 2011

Culvert Summary Report

Laplatte

General Information

SgaID	**200007000004132**	Local SgaID		VOBCIT struct_num	**300019014304131**
Observers	**JSC, MM**	Assessment Date	**7/25/2011**	Project Name	**Laplatte**
Town	**Shelburne**	Latitude	**44.3624**	Longitude	**-73.23495**
Location	**Route 7 just south of Shelburne Village.**			Reach VTID	**T1.05**
Road Name	**SHELBURNE RD**	Road Type	**Paved**	Stream Name	**McCabes Brook**
High Flow Stage	**No**			Channel Width	**37.1**

Culvert Information

Culvert Length	**113**	Material	**Concrete**
Culvert Height	**10**	Number of culverts	**1**
Culvert Width	**9.75**	Culvert Overflow Pipe	**No**
		Skewed to roadway?	**No**

Geomorphic Information

General

Floodplain filled by roadway approaches	**Entirely**	Structure is located at significant break in valley slope	**No**
		Culvert slope as compared with channel slope is significantly	**Higher**

Upstream

Obstructions at the opening of the structure	**None**	Estimated distance avulsion would follow road	
Steep riffle present immediately upstream of structure	**Yes**	Angle of stream flow approaching structure	**Naturally Straight**
If channel avulses, stream will	**Cross Road**		

Downstream

Pool present immediately downstream of structure	**Yes**	Water depth in culvert (at outlet)	**1**
Downstream bank heights are substantially higher than upstream bank heights	**No**	Culvert outlet invert	**Entirely Backwatered**
Stepped Footers	**2 ft.**	Backwater Length (measured from outlet)	**113**
Maximum pool depth	**2 ft.**	Backwater Length (measured from outlet)	**0**

	Upstream	Downstream	In Structure
Dominant Bed Material	**Cobble**	**Cobble**	**Cobble**
Bedrock Present	**No**	**No**	
Type of Sediment Deposits	**Side,Mid-channel**	**None**	**None**
Material Present throughout			**No**
Elevation of sediment deposits >= 1/2 bankfull	**Yes**	**No**	**No**
Bank Erosion	**High**	**None**	
Hard Bank Armoring	**Intact**	**None**	
Stream bed scour causing undermining around or under structure	**None**	**None**	
Beaver Dam near Structure	**No**	**No**	
Beaver Dam distance (ft.)	**0**	**0**	

Vegetation

	Upstream	Downstream	In Structure
Dominant Vegetation Type - Left	**Herbaceous/Grass**	**Herbaceous/Grass**	
Dominant Vegetation Type - Right	**Herbaceous/Grass**	**Herbaceous/Grass**	

Does a band of shrub/forest vegetation 50 ft. wide start within 25 ft. of the structure and extend at least 500 ft. up/downstream?

Vegitation Band - Left	**No**	**Yes**	
Vegitation Band -Right	**No**	**No**	

Wildlife

	Roadkill	Outside Structure	Inside Structure
Species	**None**	**None**	**None**

Other Information

Spatial location data collected with GPS?	**No**	Photos taken?	**Yes**

Comments **an apron at the upstream end is included in the length.**

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August, 11 2011

Culvert Summary Report

Laplatte

General Information

SgaID	**700000000004133**	Local SgaID		VOBCIT struct_num	
Observers	**JSC**	Assessment Date	**5/18/2010**	Project Name	**Laplatte**
Town	**Shelburne**	Latitude	**44.36104**	Longitude	**-73.23384**
Location	**Teddy Bear Factory Access Road**			Reach VTID	**T1.05**
Road Name		Road Type	**Paved**	Stream Name	**McCabes Brook**
High Flow Stage	**No**			Channel Width	**37.1**

Culvert Information

Culvert Length	**128**	Material	**Steel Corrugated**
Culvert Height	**9**	Number of culverts	**1**
Culvert Width	**13**	Culvert Overflow Pipe	**No**
		Skewed to roadway?	**No**

Geomorphic Information

General

Floodplain filled by roadway approaches	**Entirely**	Structure is located at significant break in valley slope	**No**
		Culvert slope as compared with channel slope is significantly	**Same**

Upstream

Obstructions at the opening of the structure	**None**	Estimated distance avulsion would follow road	
Steep riffle present immediately upstream of structure	**No**	Angle of stream flow approaching structure	**Naturally Straight**
If channel avulses, stream will	**Cross Road**		

Downstream

Pool present immediately downstream of structure	**Yes**	Water depth in culvert (at outlet)	**0.2**
Downstream bank heights are substantially higher than upstream bank heights	**No**	Culvert outlet invert	**Free Fall**
Stepped Footers	**1.1 ft.**	Backwater Length (measured from outlet)	
Maximum pool depth	**3 ft.**	Backwater Length (measured from outlet)	**0.4**

	Upstream	Downstream	In Structure
Dominant Bed Material	**Gravel**	**Gravel**	**Gravel**
Bedrock Present	**No**	**No**	
Type of Sediment Deposits	**None**	**None**	**None**
Material Present throughout			**No**
Elevation of sediment deposits >= 1/2 bankfull	**No**	**No**	**No**
Bank Erosion	**None**	**Low**	
Hard Bank Armoring	**Intact**	**Intact**	
Stream bed scour causing undermining around or under structure	**None**	**Culvert**	
Beaver Dam near Structure	**No**	**No**	
Beaver Dam distance (ft.)			

Vegetation

	Upstream	Downstream	In Structure
Dominant Vegetation Type - Left	**Herbaceous/Grass**	**Shrub/Sapling**	
Dominant Vegetation Type - Right	**Herbaceous/Grass**	**Shrub/Sapling**	

Does a band of shrub/forest vegetation 50 ft. wide start within 25 ft. of the structure and extend at least 500 ft. up/downstream?

Vegitation Band - Left	**No**	**No**	
Vegitation Band -Right	**No**	**No**	

Wildlife

	Roadkill	Outside Structure	Inside Structure
Species	**None**	**None**	**None**

Other Information

Spatial location data collected with GPS?	**No**	Photos taken?	**Yes**

Comments **Upstream has 16 foot flat apron - slime covered. Upstream of culvert riprap extends 100 feet.**

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August, 11 2011

Comments **Flow is going under a section of the concrete arch bottom. This structure is made of masonry and the bottom was at one point coated with concrete that is now breaking apart and allowing flow under it.**

Culvert Summary Report

Laplatte

General Information

SgaID	70001202800404	Local SgaID		VOBCIT struct_num	700012031304043
Observers	JSC	Assessment Date	7/15/2011	Project Name	Laplatte
Town	Charlotte	Latitude	44.346	Longitude	-73.229
Location	Approx 0.5 mi east of Rt 7 and 0.5 miles west of Mount Philo Road.			Reach VTID	T1.06
Road Name	LIME KILN RD	Road Type	Gravel	Stream Name	McCabe's Brook
High Flow Stage	No			Channel Width	7

Culvert Information

Culvert Length	40	Material	Steel Corrugated
Culvert Height	4	Number of culverts	1
Culvert Width	4	Culvert Overflow Pipe	No
		Skewed to roadway?	No

Geomorphic Information

General

Floodplain filled by roadway approaches	Entirely	Structure is located at significant break in valley slope	No
		Culvert slope as compared with channel slope is significantly	Same

Upstream

Obstructions at the opening of the structure	Sediment,Deformation,Wood debris	Estimated distance avulsion would follow road	
Steep riffle present immediately upstream of structure	No	Angle of stream flow approaching structure	Naturally Straight
If channel avulses, stream will	Cross Road		

Downstream

Pool present immediately downstream of structure	Yes	Water depth in culvert (at outlet)	1
Downstream bank heights are substantially higher than upstream bank heights	No	Culvert outlet invert	Entirely Backwatered
Stepped Footers	1 ft.	Backwater Length (measured from outlet)	40
Maximum pool depth	> 4.0 ft.	Backwater Length (measured from outlet)	0

	Upstream	Downstream	In Structure
Dominant Bed Material	Sand	Sand	Sand
Bedrock Present	No	No	
Type of Sediment Deposits	Delta,Side	Side	None
Material Present throughout			Yes
Elevation of sediment deposits >= 1/2 bankfull	Yes	No	No
Bank Erosion	High	None	
Hard Bank Armoring	None	None	
Stream bed scour causing undermining around or under structure	Culvert	None	
Beaver Dam near Structure	No	No	
Beaver Dam distance (ft.)	0	0	

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Stream Geomorphic Assessment

VT DEC

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August. 11 2011

Vegetation

	Upstream	Downstream	In Structure
Dominant Vegetation Type - Left	**Herbaceous/Grass**	**Herbaceous/Grass**	
Dominant Vegetation Type - Right	**Herbaceous/Grass**	**Herbaceous/Grass**	

Does a band of shrub/forest vegetation 50 ft. wide start within 25 ft. of the structure and extend at least 500 ft. up/downstream?

Vegitation Band - Left	**Yes**	**Yes**
Vegitation Band -Right	**Yes**	**Yes**

Wildlife

	Roadkill	Outside Structure	Inside Structure
Species	**None**	**None**	**None**

Other Information

Spatial location data collected with GPS? **No** Photos taken? **Yes**

Comments **Culvert has failed. Upstream end is tipped down into channel. Erosion is gouging into roadway surface.**

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Agency of Natural Resouces

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August, 11 2011

Culvert Summary Report

Laplatte

General Information

SgaID	700000000504043	Local SgaID		VOBCIT struct_num	
Observers	JSC, RKS	Assessment Date	7/19/2011	Project Name	Laplatte
Town	Charlotte	Latitude	44.32803	Longitude	-73.22492
Location	Farm Road. At treeline in line with Mutton Hill Road.			Reach VTID	T1.08
Road Name		Road Type	Trail	Stream Name	McCabes Brook
High Flow Stage	No			Channel Width	15.5

Culvert Information

Culvert Length	19.75	Material	Steel Corrugated
Culvert Height	2	Number of culverts	1
Culvert Width	2	Culvert Overflow Pipe	No
		Skewed to roadway?	No

Geomorphic Information

General

Floodplain filled by roadway approaches	Partially	Structure is located at significant break in valley slope	No
		Culvert slope as compared with channel slope is significantly	Same

Upstream

Obstructions at the opening of the structure	None	Estimated distance avulsion would follow road	
Steep riffle present immediately upstream of structure	No	Angle of stream flow approaching structure	Naturally Straight
If channel avulses, stream will	Cross Road		

Downstream

Pool present immediately downstream of structure	Yes	Water depth in culvert (at outlet)	1
Downstream bank heights are substantially higher than upstream bank heights	No	Culvert outlet invert	Entirely Backwatered
Stepped Footers	1 ft.	Backwater Length (measured from outlet)	19.75
Maximum pool depth	1.5 ft.	Backwater Length (measured from outlet)	0

	Upstream	Downstream	In Structure
Dominant Bed Material	Sand	Sand	Sand
Bedrock Present	No	No	
Type of Sediment Deposits	None	None	None
Material Present throughout			Yes
Elevation of sediment deposits >= 1/2 bankfull	No	No	No
Bank Erosion	None	None	
Hard Bank Armoring	None	None	
Stream bed scour causing undermining around or under structure	None	None	
Beaver Dam near Structure	No	No	
Beaver Dam distance (ft.)	0	0	

Vegetation

	Upstream	Downstream	In Structure
Dominant Vegetation Type - Left	Herbaceous/Grass	Deciduous Forest	
Dominant Vegetation Type - Right	Herbaceous/Grass	Deciduous Forest	

Does a band of shrub/forest vegetation 50 ft. wide start within 25 ft. of the structure and extend at least 500 ft. up/downstream?

Vegitation Band - Left	No	Yes	
Vegitation Band -Right	No	Yes	

Wildlife

	Roadkill	Outside Structure	Inside Structure
Species	None	None	None

Other Information

Spatial location data collected with GPS? Yes

Photos taken? Yes

Comments

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Stream Geomorphic Assessment

Agency of Natural Resouces

VT DEC

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August, 11 2011

Culvert Summary Report

Laplatte

General Information

SgaID	700000000404043	Local SgaID		VOBCIT struct_num	
Observers	JSC, RKS	Assessment Date	7/19/2011	Project Name	Laplatte
Town	Charlotte	Latitude	44.31923	Longitude	-73.22662
Location	Farm Road. Behind farm at intersection of Mt. Philo Road and Hinesburg Road. Downstream of pond.			Reach VTID	T1.08
Road Name		Road Type	Trail	Stream Name	McCabes Brook
High Flow Stage	No			Channel Width	15.5

Culvert Information

Culvert Length	17	Material	Concrete
Culvert Height	2	Number of culverts	1
Culvert Width	2	Culvert Overflow Pipe	No
		Skewed to roadway?	No

Geomorphic Information

General

Floodplain filled by roadway approaches	Partially	Structure is located at significant break in valley slope	No
		Culvert slope as compared with channel slope is significantly	Same

Upstream

Obstructions at the opening of the structure	None	Estimated distance avulsion would follow road	
Steep riffle present immediately upstream of structure	No	Angle of stream flow approaching structure	Naturally Straight
If channel avulses, stream will	Cross Road		

Downstream

Pool present immediately downstream of structure	Yes	Water depth in culvert (at outlet)	1
Downstream bank heights are substantially higher than upstream bank heights	No	Culvert outlet invert	Entirely Backwatered
Stepped Footers	1 ft.	Backwater Length (measured from outlet)	17
Maximum pool depth	1.5 ft.	Backwater Length (measured from outlet)	0

	Upstream	Downstream	In Structure
Dominant Bed Material	Sand	Sand	Sand
Bedrock Present	No	No	
Type of Sediment Deposits	None	None	None
Material Present throughout			Yes
Elevation of sediment deposits >= 1/2 bankfull	No	No	No
Bank Erosion	None	None	
Hard Bank Armoring	None	None	
Stream bed scour causing undermining around or under structure	None	None	
Beaver Dam near Structure	No	No	
Beaver Dam distance (ft.)	0	0	

Vegetation

	Upstream	Downstream	In Structure
Dominant Vegetation Type - Left	Herbaceous/Grass	Herbaceous/Grass	
Dominant Vegetation Type - Right	Herbaceous/Grass	Herbaceous/Grass	

Does a band of shrub/forest vegetation 50 ft. wide start within 25 ft. of the structure and extend at least 500 ft. up/downstream?

Vegitation Band - Left	No	No	
Vegitation Band -Right	No	No	

Wildlife

	Roadkill	Outside Structure	Inside Structure
Species	None	None	None

Other Information

Spatial location data collected with GPS? Yes

Photos taken? Yes

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Agency of Natural Resouces

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August. 11 2011

Culvert Summary Report

Laplatte

General Information

SgaID	**700000000304043**	Local SgaID		VOBCIT struct_num	
Observers	**JSC, RKS**	Assessment Date	**7/19/2011**	Project Name	**Laplatte**
Town	**Charlotte**	Latitude	**44.31848**	Longitude	**-73.22759**
Location	**Farm Road. North of firepond off of Hinesburg Road, north of school.**			Reach VTID	**T1.08**
Road Name		Road Type	**Trail**	Stream Name	**McCabes Brook**
High Flow Stage	**No**			Channel Width	**5**

Culvert Information

Culvert Length	**12.5**	Material	**Steel Corrugated**
Culvert Height	**2**	Number of culverts	**1**
Culvert Width	**2**	Culvert Overflow Pipe	**No**
		Skewed to roadway?	**No**

Geomorphic Information

General

Floodplain filled by roadway approaches	**Partially**	Structure is located at significant break in valley slope	**No**
		Culvert slope as compared with channel slope is significantly	**Same**

Upstream

Obstructions at the opening of the structure	**None**	Estimated distance avulsion would follow road	
Steep riffle present immediately upstream of structure	**No**	Angle of stream flow approaching structure	**Channelized Straight**
If channel avulses, stream will	**Cross Road**		

Downstream

Pool present immediately downstream of structure	**Yes**	Water depth in culvert (at outlet)	**0.5**
Downstream bank heights are substantially higher than upstream bank heights	**No**	Culvert outlet invert	**Partially Backwatered**
Stepped Footers	**0.75 ft.**	Backwater Length (measured from outlet)	**12.5**
Maximum pool depth	**0.75 ft.**	Backwater Length (measured from outlet)	**0**

	Upstream	Downstream	In Structure
Dominant Bed Material	**Sand**	**Sand**	**Sand**
Bedrock Present	**No**	**No**	
Type of Sediment Deposits	**None**	**None**	**None**
Material Present throughout			**Yes**
Elevation of sediment deposits >= 1/2 bankfull	**No**	**No**	**No**
Bank Erosion	**None**	**None**	
Hard Bank Armoring	**Intact**	**Intact**	
Stream bed scour causing undermining around or under structure	**None**	**None**	
Beaver Dam near Structure	**No**	**No**	
Beaver Dam distance (ft.)	**0**	**0**	

Vegetation

	Upstream	Downstream	In Structure
Dominant Vegetation Type - Left	**Herbaceous/Grass**	**Herbaceous/Grass**	
Dominant Vegetation Type - Right	**Herbaceous/Grass**	**Herbaceous/Grass**	

Does a band of shrub/forest vegetation 50 ft. wide start within 25 ft. of the structure and extend at least 500 ft. up/downstream?

Vegitation Band - Left	**No**	**No**	
Vegitation Band -Right	**No**	**No**	

Wildlife

	Roadkill	Outside Structure	Inside Structure
Species	**None**	**None**	**None**

Other Information

Spatial location data collected with GPS? **Yes**

Photos taken? **Yes**

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Agency of Natural Resouces

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August. 11 2011

Culvert Summary Report

Laplatte

General Information

SgaID	700000000204043	Local SgaID		VOBCIT struct_num	
Observers	JSC, RKS	Assessment Date	7/19/2011	Project Name	Laplatte
Town	Charlotte	Latitude	44.31613	Longitude	-73.23074
Location	Along treeline just north of hinesburg road crossing on farm road.			Reach VTID	T1.08
Road Name		Road Type	Trail	Stream Name	McCabes Brook
High Flow Stage	No			Channel Width	5

Culvert Information

Culvert Length	24	Material	Concrete
Culvert Height	2.5	Number of culverts	1
Culvert Width	2.5	Culvert Overflow Pipe	No
		Skewed to roadway?	No

Geomorphic Information

General

Floodplain filled by roadway approaches	Partially	Structure is located at significant break in valley slope	No
		Culvert slope as compared with channel slope is significantly	Same

Upstream

Obstructions at the opening of the structure	None	Estimated distance avulsion would follow road	
Steep riffle present immediately upstream of structure	No	Angle of stream flow approaching structure	Sharp Bend
If channel avulses, stream will	Cross Road		

Downstream

Pool present immediately downstream of structure	Yes	Water depth in culvert (at outlet)	1
Downstream bank heights are substantially higher than upstream bank heights	No	Culvert outlet invert	Partially Backwatered
Stepped Footers	1.5 ft.	Backwater Length (measured from outlet)	24
Maximum pool depth	1.5 ft.	Backwater Length (measured from outlet)	0

	Upstream	Downstream	In Structure
Dominant Bed Material	Sand	Sand	Sand
Bedrock Present	No	No	
Type of Sediment Deposits	None	None	None
Material Present throughout			Yes
Elevation of sediment deposits >= 1/2 bankfull	No	No	No
Bank Erosion	None	None	
Hard Bank Armoring	None	Intact	
Stream bed scour causing undermining around or under structure	None	None	
Beaver Dam near Structure	No	No	
Beaver Dam distance (ft.)	0	0	

Vegetation

	Upstream	Downstream	In Structure
Dominant Vegetation Type - Left	Herbaceous/Grass	Herbaceous/Grass	
Dominant Vegetation Type - Right	Mixed Forest	Herbaceous/Grass	

Does a band of shrub/forest vegetation 50 ft. wide start within 25 ft. of the structure and extend at least 500 ft. up/downstream?

Vegitation Band - Left	Yes	No	
Vegitation Band -Right	Yes	No	

Wildlife

	Roadkill	Outside Structure	Inside Structure
Species	None	None	None

Other Information

Spatial location data collected with GPS? Yes

Photos taken? Yes

Comments Farm Road.

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August, 11 2011

Culvert Summary Report

Laplatte

General Information

SgaID	**100002000004041**	Local SgaID		VOBCIT struct_num	**700002006404043**
Observers	**JSC, RKS**	Assessment Date	**7/19/2011**	Project Name	**Laplatte**
Town	**Charlotte**	Latitude	**44.31522**	Longitude	**-73.23145**
Location	**between Church Hill Road and Mt. Philo Rd.**			Reach VTID	**T1.08**
Road Name	**HINESBURG RD**	Road Type	**Paved**	Stream Name	**McCabes Brook**
High Flow Stage	**No**			Channel Width	**5**

Culvert Information

Culvert Length	**47**	Material	**Plastic Corrugated**
Culvert Height	**2**	Number of culverts	**1**
Culvert Width	**2**	Culvert Overflow Pipe	**No**
		Skewed to roadway?	**No**

Geomorphic Information

General

Floodplain filled by roadway approaches	**Entirely**	Structure is located at significant break in valley slope	**No**
		Culvert slope as compared with channel slope is significantly	**Same**

Upstream

Obstructions at the opening of the structure	**None**	Estimated distance avulsion would follow road	
Steep riffle present immediately upstream of structure	**No**	Angle of stream flow approaching structure	**Naturally Straight**
If channel avulses, stream will	**Cross Road**		

Downstream

Pool present immediately downstream of structure	**Yes**	Water depth in culvert (at outlet)	**1**
Downstream bank heights are substantially higher than upstream bank heights	**No**	Culvert outlet invert	**Entirely Backwatered**
Stepped Footers	**1 ft.**	Backwater Length (measured from outlet)	**47**
Maximum pool depth	**1.5 ft.**	Backwater Length (measured from outlet)	**0**

	Upstream	Downstream	In Structure
Dominant Bed Material	**Sand**	**Sand**	**Sand**
Bedrock Present	**No**	**No**	
Type of Sediment Deposits	**None**	**None**	**None**
Material Present throughout			**Yes**
Elevation of sediment deposits >= 1/2 bankfull	**No**	**No**	**No**
Bank Erosion	**None**	**None**	
Hard Bank Armoring	**None**	**None**	
Stream bed scour causing undermining around or under structure	**None**	**None**	
Beaver Dam near Structure	**No**	**No**	
Beaver Dam distance (ft.)	**0**	**0**	

Vegetation

	Upstream	Downstream	In Structure
Dominant Vegetation Type - Left	**Herbaceous/Grass**	**Herbaceous/Grass**	
Dominant Vegetation Type - Right	**Herbaceous/Grass**	**Herbaceous/Grass**	

Does a band of shrub/forest vegetation 50 ft. wide start within 25 ft. of the structure and extend at least 500 ft. up/downstream?

Vegitation Band - Left	**No**	**No**	
Vegitation Band -Right	**No**	**No**	

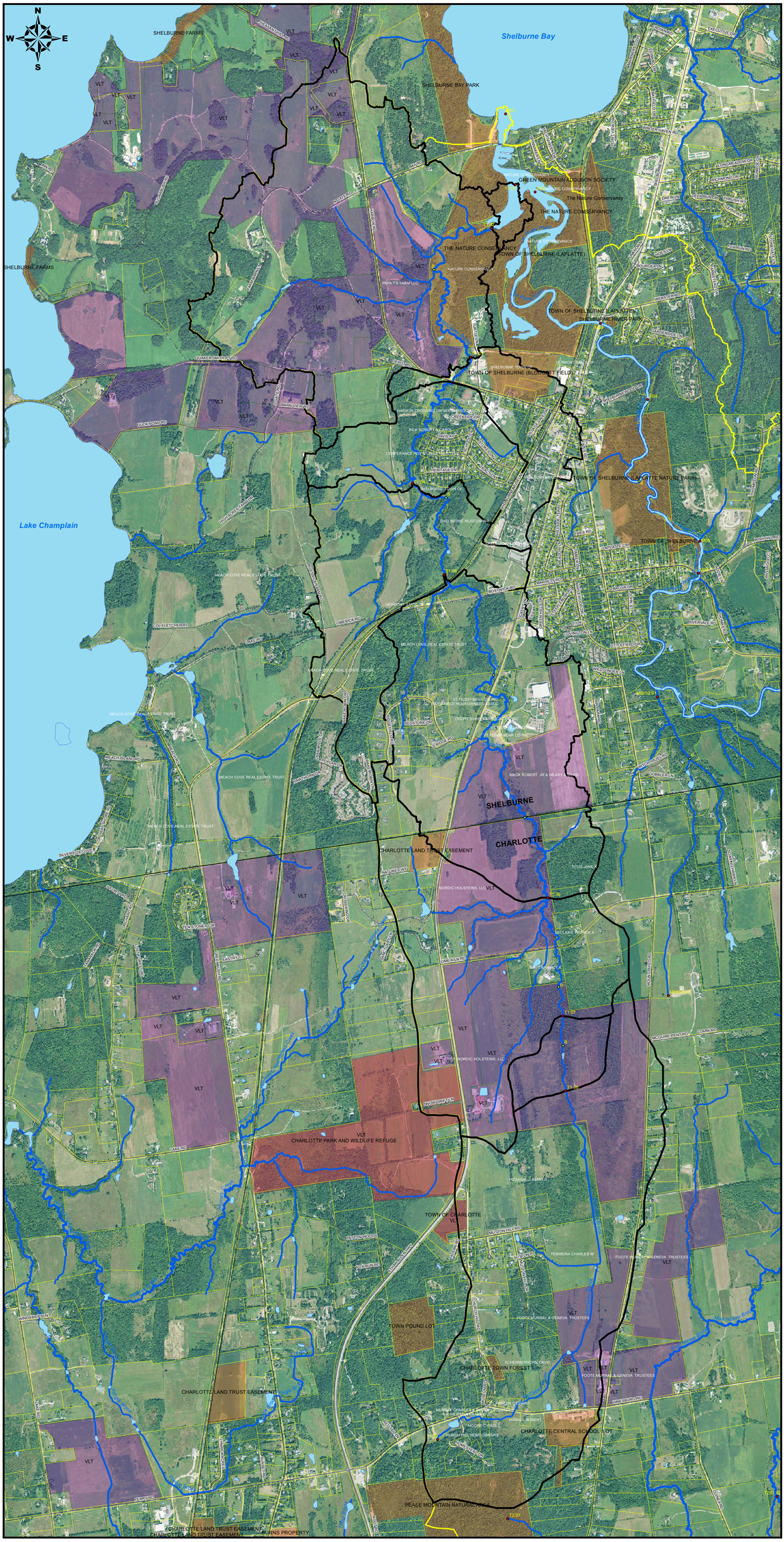
Wildlife

	Roadkill	Outside Structure	Inside Structure
Species	**None**	**None**	**None**

Other Information

Spatial location data collected with GPS?	**Yes**	Photos taken?	**Yes**

Comments **Lots of iron oxide in downstream channel.**



McCabe's Brook Watershed Conserved Lands

Charlotte and Shelburne, Vermont January 2012

- SGA Reach Breaks
- SGA Segment Breaks
- Reach Subwatershed Boundary
- LaPlatte River Watershed
- Lakes and Ponds
- Towns
- Railroad
- Roads
- Parcel Boundary
- Town Owned and TNC Easement
- Vermont Land Trust Easement

River (By Stream Order)

0 0.125 0.25 0.5 Miles

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Conservation Parcel information obtained from Vermont Land Trust, updated January 2010. Parcel boundary data approximate. Data obtained from Vermont Center for Geographic Information for Lakes and Ponds, Railroads, Roads, Counties, Towns. River information from Vermont Hydrography Dataset. LaPlatte River Watershed delineated by Milone & MacBroom, Inc. Reach and Segment breaks identified during Vermont Agency of Natural Resources Stream Geomorphic Assessment. Background aerial photographs taken in 2008 by National Agricultrual Inventory Program. Map intended for planning purposes only.