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NPS Proj. # 07-04e

Morgan Brook Watershed Based Plan

Barkhamsted, New Hartford and Winchester, CT
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Prepared by the
Northwest Conservation District
www.conservect.org/northwest

Northwest Conservation District

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Executive Summary

Morgan Brook is listed as a Category 5 impaired waterbody on Connecticut's List of Impaired Waters according to the reporting requirements for Section 303(d) of the Federal Clean Water Act. In the case of Morgan Brook, high concentrations of *Escherichia coli* (*E. coli*) bacteria have impaired most of the stream for recreational use. While regular water quality sampling has revealed this issue, the source(s) of this impairment has not been identified. Therefore, a team of environmental scientists from the Northwest Conservation District (NCD) walked all the streams and tributaries of the watershed performing visual inspections of stream corridor health. Failing septic systems can cause high bacteria counts, but none were identified. Large areas of impervious surface (over 30 acres) in the upper watershed were surveyed and no stormwater quality or quantity treatment measures were identified. NCD has identified uncontrolled stormwater runoff from these large areas of impervious surface - associated primarily with commercial development - as the most likely source of *E. coli* bacteria as well as other water quality degrading nonpoint source pollutants impacting Morgan Brook. A series of Low Impact Development (LID) style retrofits are recommended to minimize the negative impacts of impervious surfaces. In addition, an agricultural operation close to a major tributary was noted which may also be contributing bacteria. NCD will encourage the farm manager to seek assistance from the USDA Natural Resource Conservation Service to address potential issues.

Watershed Description

Morgan Brook flows north from West Hill Pond in New Hartford, then East along State Route 44 through Barkhamsted before emptying into the West Branch of the Farmington River near Century Wood Working on Route 181, just south of the village of Pleasant Valley in Barkhamsted. The headwaters of Morgan Brook are West Hill Pond in New Hartford, and Mallory Brook which drains a section of Winchester along its southeastern border with Barkhamsted. The headwaters of the Morgan Brook Watershed begin at an elevation of 950 feet above mean sea level and empty to the Farmington River, approximately 450 feet above mean sea level. An elevation change of 500 feet occurs over 3 miles meaning Morgan Brook has a moderately steep stream gradient of 3%.

The flow energy created by the moderate stream gradient allows Morgan Brook to be very efficient at carrying sediments down its steam corridor and into the Farmington River. This was confirmed by the lack of sediment deposition noted throughout the watershed.

Figure 1. Typical Streamflow of Morgan Brook

The Morgan Brook Watershed, identified by the Connecticut Department of Energy & Environmental Protection (CT DEEP) as Subregional Basin #4305, is approximately 3 miles long and 4 miles wide at its greatest point. Morgan Brook watershed is nested within the Farmington Regional Basin (#43) which lies within the Connecticut River Major Basin (#4). The watershed is comprised of approximately 5,800 acres which is drained by approximately 9 miles of perennial streams, including the tributaries and the main stem of Morgan Brook. Greater than 80% of the watershed lies within the town of Barkhamsted. See Table 1 for additional data for Morgan Brook watershed.

Table 1
Background Data for Morgan Brook Watershed

Morgan Brook Subregional Basin #	4305
Farmington Regional Basin #	43
Connecticut River Major Basin #	4
Local Basin Size	5,800 acres / 9 square miles
Main Stem Stream Length	3.1 miles
Perennial Stream Density	1.1 miles of stream per square mile
State Highway Length (44, 318 and 181)	3 miles
Local Road Length	25 miles
Road Density	3 miles of road per square mile
Road Stream Crossings	32

Land use/land cover within the Morgan Brook watershed is mostly forested with a large area of commercial development within the Winchester headwater region. The remaining non commercial areas are characterized by forest or low density residential cover types with a few small agricultural operations. Watershed percentage of land use/land cover types are summarized in Table 2.

Table 2
Current Land Use / Cover Classifications in the Morgan Brook Watershed
(depicted as a percent of the watershed / approximate acres)

Low Density Residential	7.1% / 412 ac	Pasture	3.0% / 17 ac
Medium Density Residential	1.9% / 110 ac	Bare Ground	0.6% / 35 ac
High Density Residential	0.6% / 35 ac	Open Water	5.0% / 290 ac
Commercial Development	1.2 % / 70 ac	Wetland	2.6% / 151 ac
Industrial	0.1% / 6.0 ac	Forested	73.2% / 4245 ac
Institutional	0.1% / 6.0	Transportation	0.6 % / 35 ac
Turf & Grass	4.6% / 266 ac		

For many years the Farmington River Watershed Association (FRWA) has been performing regular bacteria sampling in Morgan Brook. This regular sampling has revealed steady increases in bacteria concentrations, placing three out of four segments of this watercourse on the List of Waterbodies Not

Meeting Water Quality Standards which has been developed by CT DEEP as required by Section 303(d) of the Federal Clean Water Act (CT DEEP, 2010) (See Appendix E). This list is also known as Connecticut's Impaired Waters List. For details on Morgan Brook see the Assessment Results and Impaired Waters List in the 2010 State of CT Integrated Water Quality Report (CT DEEP, 2010). (See Appendices D and E) Connecticut's Impaired Waters List states the source of the impairments as "unknown".

One way to address water quality problems is to assess the entire watershed and create a United States Environmental Protection Agency (EPA)-approved watershed based plan. This document can then be used to help guide the towns and other stakeholders through a series of priorities that should be addressed in order to remove this stream from Connecticut's Impaired Waters List. These priorities could include increased sampling to narrow down locations of water quality degrading pollutants, retrofitting existing outdated stormwater infrastructure, and rigorous review of development or redevelopment projects that are proposed in the watershed. The overarching goal is to identify and carry out any and all opportunities to reverse the steady increase of water quality degrading pollutants being added to surface water.

Funded in part by the Connecticut Department of Energy & Environmental Protection through a United States Environmental Protection Agency Clean Water Act§319 Nonpoint Source Grant, Northwest Conservation District (NCD) conducted a visual track down survey of the entire Morgan Brook watershed to identify conditions responsible for high bacteria concentrations causing the impairment. The goal of the track down survey was to collect information on all the potential sources of impairment, and design a watershed based plan to layout recommendations to eliminate the sources of bacteria. The next step would be to implement proposed solutions in an effort to have the stream removed from Connecticut's Impaired Waters List. Table 1 and 2 summarize watershed statistics and defining characteristics needed to complete an abbreviated nine-element EPA watershed based plan for Morgan Brook.

US EPA Nine Elements of the Morgan Brook Watershed-Based Plan.

This plan is organized according to the methodology of an abbreviated nine-element EPA watershed based plan for Morgan Brook. The purpose of the plan is to identify the source(s) of the impairment using a qualitative assessment of information gathered by a track down survey. The information gathered during the visual assessment can then be translated into action items that will be used to focus efforts directly on addressing problem area(s).

In addition, a simple pollutant loading model has been employed as a screening tool to identify areas with the largest pollutant loads relative to the size of the land use/land cover types. This can be used to set up a framework that interested parties can use to select the best approaches for addressing potential sources of water quality impairments.

EPA Element One: Impairment

Water Quality Status

The Farmington River Watershed Association (FRWA) has been performing bacteria sampling (including *E. coli*) throughout the Morgan Brook Watershed since 2004. The most recent bacteria sampling took place in July of 2011. The Farmington Valley Health District (FVHD) has also been performing regular *E. coli* sampling at West Hill Pond at two bathing beaches. There are a total of twelve bacteria sampling locations on Morgan Brook (MB), Mallory Brook (ML) and one of its tributaries (Mltrib), and West Hill Pond (WHP). (See Table 3) A map of the Morgan Brook watershed with bacteria sampling locations is included with this Watershed Based Plan. (See Attachment – Interactive Watershed Map) Appendix A contains the results of bacteria sampling in the Morgan Brook Watershed.

Table 3
Bacteria Sampling Locations
(sampling results are included in Appendix A)

Location ID	Location Description	Sampling Organization
MB-1	B. Sullak Road Stream Crossing, 500 Feet East of W. West Hill Road, Barkhamsted	FRWA
MB-1.1	B. Sullak Road Tributary to Morgan Brook, Barkhamsted	FRWA
MB-2	East West Hill Rd Bridge at Rte 44, Barkhamsted	FRWA
MB-3	Rt 181 Stream Crossing, 400 feet from confluence with Farmington River, Barkhamsted	FRWA
ML-1	Forest behind Ledgebrook Plaza, Barkhamsted	FRWA
ML-1.9	100 Feet upstream of ML-2; above beaver dam, Barkhamsted	FRWA
ML-2	Southwest corner of Mallory Brook Plaza, Barkhamsted	FRWA
ML-3	Southeast corner of Mallory Brook Plaza, Barkhamsted	FRWA
Mltrib-4	East side of Mallory Brook Plaza, Barkhamsted	FRWA
ML-5	Rte 44 Stream Crossing in local basin # 4305-02-2-R1	FRWA
WHP-1	Brodie Park Beach at West Hill Pond, New Hartford	FVHD
WHP-2	Dillon Beach at West Hill Pond, New Hartford	FVHD

Morgan Brook is listed as a Category 5 impaired waterway on Connecticut's List of Impaired Waters according to the reporting requirements for Section 303(d) of the Federal Clean Water Act. Category 5 waters have at least one designated use that cannot be supported and the creation of a Total Maximum Daily Load (TMDL) is needed. In the case of Morgan Brook, the high concentrations of *E. coli* bacteria have impaired three out of four segments of the stream for recreational use.

E. coli concentrations in Morgan Brook regularly exceed the safe threshold for human contact. However, these exceedances are borderline. According to CT DEEP Water Quality Standards, *E. coli* recreational criteria is the geometric mean of samples taken over a 30-day period which needs to be less than 126

Colony Forming Units (CFU) /100 ml, with no sample testing higher than 576 CFU/100 ml for recreational uses other than swimming (CT DEEP, 2011). For designated and non-designated swimming areas, the single sample maximums are 235 CFU /100 ml and 410 CFU /100 ml, respectively. (See Appendix F for Water Quality Criteria for Bacterial Indicators of Sanitary Quality) *E. coli* concentrations in the Morgan Brook watershed have regularly exceeded the geometric mean standard. However, the 576 CFU/100 ml maximum was never exceeded (see Appendix A for sampled bacteria concentrations). Currently, the source of this impairment has not been definitely determined. However, non-point source pollution in uncontrolled stormwater runoff from large impervious surfaces associated primarily with commercial developments high in the watershed is a likely contributing factor.

These large areas of impervious surface are located along a commercially developed stretch of Route 44 in Winchester and Barkhamsted which drain to Mallory Brook, a major tributary of Morgan Brook. Although Mallory Brook has been assessed, it is not listed as impaired. (See Appendix D and Attached – Interactive Watershed Map) This information is a little deceiving, however, because Mallory Brook has not been assessed specifically for recreational use and *E. coli*. Therefore, it is possible that Mallory Brook is actually impaired but sufficient data has not been collected to substantiate this theory. Because FRWA has collected samples showing high bacteria concentrations adjacent to these commercially developed areas, NCD strongly suspects that they are a significant source contributing to the downstream impairment in Morgan Brook. As a result, most of this Watershed Based Plan focuses on this section of the watershed.

Another anomaly is the impairment of the segment of Morgan Brook which is located between the West Hill Pond dam outlet and its confluence with Mallory Brook. (See Appendix E and Attached - Interactive Watershed Map) Morgan Brook originates from West Hill Pond, and regular water quality sampling by FVHD at bathing beaches at either end of this pond have not revealed any water quality problems. In addition, a recent stormwater runoff survey conducted on behalf of West Hill Pond Association by Lenard Engineering, Inc., observes that existing water quality in the pond is excellent and the goal is to maintain or improve these conditions (LEI, 2011). CT DEEP assessment of West Hill Pond shows it to be fully supporting for all uses, including recreational use. (See Appendix D) For these reasons, it appears unlikely that West Hill Pond is contributing to the impairment of the segment of Morgan Brook that flows out of it. Although there is a small cluster of residential and commercial development at the head of Morgan Brook near the lake, NCD did not observe any activities or issues that would necessarily lead to downstream impairment. The rest of this segment of Morgan Brook is mostly forested and undeveloped. (See Figure 1) As NCD's field investigations did not reveal any obvious sources impacting water quality in this stream segment, further investigation of this area is recommended.

Finally, the segment of Morgan Brook that stretches between its confluence with Mallory Brook, downstream to where East West Hill Road crosses it, is also not listed as impaired. (See Appendix E and Attached - Interactive Watershed Map) However, as with Mallory Brook, this segment of Morgan Brook has not been assessed for recreational use and *E. coli*. (See Appendix D) This section is downstream of an impaired segment of Morgan Brook, downstream of Mallory Brook which NCD suspects as being impaired, and just upstream of two contiguous and impaired segments of Morgan Brook. Therefore, it is highly possible that this "unimpaired" segment is also impaired but there currently is not enough data to support this hypothesis.

Identification of Impairment Sources Using Track Down Survey Method

After reviewing existing water quality information, NCD undertook a Track Down Survey to identify potential sources of bacterial impairment as well as other situations that might be impacting water quality. This visual survey of Morgan Brook and its tributaries was conducted in September of 2010 following the methods described in an US EPA approved Track Down Survey Methodology. A more detailed description of the Track Down Survey which utilized the Center for Watershed Protection's Unified Stream Assessment Method Manual #10 is described below. Site impacts were assessed for all potential nonpoint pollution sources observed during the field survey. No water chemistry testing was performed as part of the Track Down Survey. However, the location of bacteria samplings and concentration results collected and analyzed by the Farmington River Watershed Association and the Farmington Valley Health District (Appendix A) have been incorporated into the watershed assessment.

The Track Down Survey was conducted throughout the Morgan Brook Watershed according to a modified version of the Unified Stream Assessment (USA) method developed for small urban watersheds by the Center for Watershed Protection (CWP, 2005). The USA is a protocol for a stream walk assessment that systematically evaluates conditions of stream channels to identify improvement opportunities, including storm water retrofits, stream restoration, riparian management and discharge prevention. The USA method consists of four steps:

1) Pre-field Preparation;
2) Stream Corridor Assessment;
3) Quality Control; and
4) Data Evaluation/Interpretation.

NCD conducted the Track Down Survey of Morgan Brook according to these steps, as follows:

1. Pre-field Preparation:

Prior to conducting the surveys, the field team was established and trained, supplies gathered and organized, survey reaches defined, field maps generated, assessment routes and schedules planned, and the public/streamside landowners notified about the surveys. Aerial photos from 2004, topographic maps, and existing data about known problem areas were reviewed to assist in defining survey reaches of uniform character and to familiarize field staff with the area to be surveyed. The watershed contains 11 local basins or sub-watershed areas (identified on accompanying map). The field survey data sheets are identified and organized according to the local basin identification number (e.g., 4305-00-3-R2). District staff also worked with municipal officials in planning and conducting the surveys. Their local knowledge and experience were beneficial in the identification of stream impairments and their sources.

2. Stream Corridor Assessment:

A team of two staff conducted the field surveys. The surveys were conducted in September of 2010 when water flows were slower and water levels lower, making it safe to walk in the stream channel. Surveys were also conducted during dry weather to eliminate the possibility that a rain event might: wash away algae, obscure the presence of aquatic vegetation or otherwise make it difficult to determine normal conditions pertaining to water level, color, odor and turbidity.

Field assessment forms were used to document conditions, problems, and possible restoration/improvement actions. Eight "Impact Assessment Forms" were used to record specific

information about the condition and restorability of individual problem sites identified along the stream corridor. These include: Storm Water Outfalls, Severe Erosion, Impacted Buffers, Utility Impacts, Trash and Debris, Stream Crossings, Channel Modification, and Miscellaneous Impacts. These forms contain questions that collect field data that is important to evaluating pollution source problems, which could include bacteria. Photographs were archived with each survey form to document the condition of the stream at the assessed location. A map of the survey locations with their associated survey data sheets and photos are included in the watershed map on the CD attached to this report. (See Attachment – Interactive Watershed Map)

3. Quality Control:
Field team responsibilities were divided with one member focused on the impact assessment field survey data sheet and the other taking photos and recording GPS locations. The field team walked in an up-stream direction but turned and faced downstream when determining right/left bank issues. Individual impact sites were mapped and photographed as they were encountered, and impact assessment forms completed and ID numbers assigned. Survey data locations and characteristics were compiled in Appendix B. Data was entered immediately after fieldwork was completed, and spot checked by the QA manager. Field team members reviewed draft stream corridor maps with site impact assessment locations to identify inaccuracies in data entry and fill any gaps in stream corridor coverage.

4. Data Evaluation/Interpretation:
Stream Crossings/Stormwater Outfalls - Most of the survey sheets describe the many road crossings in the watershed (Figure 2). Stream crossing survey sheets were completed for thirty-two locations throughout the Morgan Brook watershed (Table 4). All of the stream crossings were stable. However, most had stormwater runoff directly entering the stream from stormwater outfall pipes or by sheet flow. While no one stream crossing stood out as a problem source, collectively, untreated runoff from these locations is likely altering the water quality in Morgan Brook. After reviewing all the potential sources of bacteria and water quality degrading pollutants, stream crossing were assigned a low priority as compared to the problem areas identified by both through visual inspections and the pollutant loading analysis describe below.


Figure 2 West Hill Road Structured Stream Crossing

Table 4 Field Survey Data Sheets Collected			
ID	Impact Sheet	Sheet Description	No. Completed
SC	Stream Crossing	Culvert, Bridge or Dam	32
OT	Stormwater Outfalls	Outfall into watercourse	8

Agricultural Activities - During the field investigation of the watershed, a small agricultural/livestock operation was noted on Route 44 in the middle of local basin # 4304-02-2-R1. The property was posted so the field team did not walk it. Agricultural operations have the potential to contribute high levels of bacteria to surface water through stormwater runoff.

Impervious Surfaces - Impairment of water quality in a watershed is often caused by uncontrolled stormwater runoff from impervious surfaces. The upper reaches of the Morgan Brook watershed has many acres of impervious surfaces abutting the stream. Most of these expanses of impervious surfaces are associated with commercial and/or transportation-related development. Through land use/land cover analysis as well as field review, NCD identified five key locations where large areas of contiguous impervious surface have no stormwater quality or quantity management measures. In other words, there are no structures that renovate stormwater runoff or even detain and meter it slowly into the surrounding wetlands. Trackdown Field Survey Data Sheets were not created for these large areas of contiguous impervious surfaces because of the lack of a stormwater management system that could be evaluated. The five areas identified and the approximate impervious cover associated with each are as follows:

Green Ridge Condominiums and Former KFC Restaurant, Winchester		~2 acres
Ledge Brook Plaza, Winchester		~11.4 acres
State Commuter Parking Lot, Barkhamsted		~1 acre
Mallory Brook Plaza, Barkhamsted		~11.6 acres
Car Dealership, Barkhamsted		~4 acres
	Total	~30 acres

The close proximity of these developed areas to Morgan and Mallory Brooks allows stormwater runoff to enter the watercourse directly without any renovation. (See Attachment – Interactive Watershed Map and identified Areas of Concern; Also, see Figures 3, 4 and 5).

The Center for Watershed Protection (CWP) published a research monograph that comprehensively reviews the available scientific data on the impacts of urbanization and impervious surfaces on small streams (Thomas Schueler and Heather K. Holland, 2002). The negative impacts that impervious surfaces can have on waterbodies are generally classified according to four broad categories which look at changes associated with hydrologic, physical, water quality and/or biological indicators. More than 225 research studies were assessed to document the adverse impact of urbanization and impervious surfaces on one or more of these key indicators. In general, most research was focused on smaller watersheds, with drainage areas ranging from a few hundred acres up to ten square miles (Morgan Brook Watershed is 9 sq/mi). One conclusion extracted from the research review is that surface water quality starts to significantly degrade as impervious surface coverage increases in a watershed. Significant impacts occur when impervious cover reaches 10% and above. Currently, impervious surface cover within the entire Morgan Brook Watershed is well below 10%. However, a majority of the large expanses of impervious surfaces with no stormwater controls are within a few feet of the stream, and are concentrated in a headwater region. Therefore, based on the visual inspection of the entire watershed, non-point source pollution from these impervious surfaces is most likely a significant source of the bacteria that is impairing Morgan Brook.

West Hill Pond Storm Water Runoff Survey

The track down survey for the Morgan Brook watershed did not include an assessment of West Hill Pond and its associated watershed. A detailed study was conducted by Lenard Engineering, Inc. for the West Hill Pond Association entitled West Hill Pond Storm Water Runoff Survey (LEI, 2011). This document also contains recommendations for stormwater management (See Appendix C). As discussed previously, NCD does not suspect West Hill Pond of contributing to downstream impairment. (Note – The West Hill Pond Storm Water Survey was funded in part by the CT DEEP through a U.S. EPA CWA Sec. 319 Nonpoint Source Grant to the Connecticut Federation of Lakes under a small grants program for Connecticut lake associations.)

EPA Element Two: Load Reduction

As described previously, the area most likely contributing the largest bacteria loads, relative to the size of the land use category, are the expanses of impervious surfaces associated primarily with commercial and transportation-related development in the upper watershed of the Morgan Brook. These same impervious areas are probably also contributing nonpoint source pollutants such as nutrients and metals that may be degrading the water quality of Morgan Brook, as well.

Bacteria - Unfortunately, at the present time, there is no consistent data documenting the concentrations of *E. coli* generated by different land use/land cover types in the research literature. Therefore, it was not possible to include this information in the pollutant loading calculations described below. However, *E. coli* research, to date, indicates that uncontrolled stormwater runoff from commercial development sites and local/state roadways is often a large source of bacteria contamination in open water systems (Tufford D. and Marshall W., December 2002). The average concentration of *Fecal coliform* bacteria in urban runoff situations is 1,500 col/ml. Although you can not directly extrapolate *E. coli* concentrations from *Fecal coliform* concentrations, it is safe to assume that *E. coli* concentrations would also increase as impervious surfaces areas increase. Since the upper portion of the Morgan Brook watershed has approximately 30 acres of contiguous impervious surfaces that feed directly into Mallory Brook (a major tributary of Morgan Brook), and there are no stormwater quality controls managing runoff from these locations, these areas are likely a significant source of bacteria. Because there is currently no stormwater renovation occurring, any improvements in stormwater management will reduce bacteria loading to the Morgan Brook Watershed.

Other Nonpoint Source Pollutants – NCD also conducted a pollutant loading analysis to better understand other sources of nonpoint pollution in the watershed. The following protocol was used to calculate pollutant loads entering Morgan Brook. Using the calculated areas in Table 1, it is possible to determine the pollutant contribution of each land use/land cover category by using The Simple Method developed by Tom Schueler, 1987, as follows:

The Simple Method:
$L=0.226(P)(Pj)(Rv)(C)(A)$ where:

L = Pollutant loads to adjacent water resources in pounds
P = Annual rainfall depth (inches)
Pj = Factor to correct for rain events with no runoff

Rv =Runoff coefficient to correct for fraction of rainfall that turns to runoff
I = Impervious coverage where present (acres)
C = Concentration of pollutant (mg/l)
A = Acres of the watershed in specific land use land cover category
0.229= Conversion Factor

The following pollutants were chosen for modeling because of their known adverse impacts to water quality:

1) Total Suspended Solids (TSS)
2) Total Phosphorus
3) Total Nitrogen
4) Zinc
5) Total Petroleum Hydrocarbons TPH
6) Dissolved Nitrogen

Each land use/land cover category contributes different pollutant concentrations (C) to stormwater runoff. Data was gleaned from the resources listed below and included in Table 5.

Table 5
Pollutant Load Contribution "C" for each Land Use / Land Cover Type
(pollutant concentration contained in runoff mg/l)

	TSS	TP	TN	Zn	TPH	DIN
Low Density Residential	60	0.38	2.1	0.16	0.5	0.51
Medium Density Residential	60	0.3	2.1	0.18	1.25	0.344
High Density Residential	60	.3	2.1	0.22	1.5	0.344
Commercial Development	58	0.25	2.6	0.15	3.0	0.324
Industrial Development	50	0.23	2.1	0.17	3.0	0.324
Institutional Development	58	0.27	2.1	0.67	3.0	0.521
Transportation	99	0.25	2.3	0.15	3.0	0.375
Turf and Grass	357	1.0	2.92	0	0	.215
Pasture	145	0.38	2.2	0	0	0.65
Forest	90	0.10	1.5	0	0	0.215
Wetlands	0	0.38	1..5	0	0	0
Bare Ground	1000	0.38	1.5	0	0	0

1) National Stormwater Quality Database (NSQD), version 1.1-9/4/05 by Maestre &Pitt
2) National Urban Runoff Program (NURP), 1983
3) University of New Hampshire Stormwater Center

Using the information in Table 5, pollutant load analyses were calculated. The results of these calculations are captured in the Table 6 and Table 7.

Table 6
Pollutant Loading to Morgan Brook Watershed by Land Use / Land Cover Type
(annual contribution in pounds)

	TSS	TP	TN	Zn	TPH	DIN
Low Density Residential	59,466	376	2,081	160	496	505
Medium Density Residential	26,168	131	916	77	545	150
High Density Residential	10,496	52	367	38	262	60
Commercial Development	36,864	159	1,652	99	1,908	206
Industrial Development	3,318	9	87	28	124	24
Institutional Development	2,246	10	77	7	116	20
Transportation	18,133	46	421	29	549	69
Turf and Grass	49,068	137	401	0	0	30
Pasture	13,161	34	200	0	0	59
Forest	197,924	219	3,298	0	0	473
Wetlands	0	29	116	0	0	59
Bare Ground	5705	2	8	0	0	0
Total	422,549	1,204	9,624	438	4,000	1,655

Table 7
Pollutant Loading to Morgan Brook Watershed by Land Use / Land Cover Type
(percent contribution)

	TSS	TP	TN	Zn	TPH	DIN
Low Density Residential	14.1%	31.2%	21.6%	36.5%	12.4%	30.5%
Medium Density Residential	6.2%	10.9%	9.5%	17.6%	13.6%	9.1%
High Density Residential	2.5%	4.3%	3.8%	8.7%	6.6%	3.6%
Commercial Development	8.7%	13.2%	17.2%	22.6%	47.7%	12.4%
Industrial Development	0.8%	0.7%	0.9%	6.4%	3.1%	1.5%
Institutional Development	0.5%	0.8%	0.8%	1.6%	2.9%	1.2%
Transportation	4.3%	3.8%	4.4%	6.6%	13.7%	4.2%
Turf and Grass	11.6%	11.4%	4.2%	0.0%	0.0%	1.8%
Pasture	3.1%	2.8%	2.1%	0.0%	0.0%	3.6%
Forest	46.8%	18.2%	34.3%	0.0%	0.0%	28.6%
Wetlands	0.0%	2.4%	1.2%	0.0%	0.0%	3.6%
Bare Ground	1.4%	0.2%	0.1%	0.0%	0.0%	0.0%
Total	100%	100%	100%	100%	100%	100%

Commercial development only makes up 1.2% of the total watershed yet, proportionately it contributes a significant amount - 13.2% and 17.2% - of the total phosphorus and nitrogen load to the watershed. (See highlighted text in Table 7) As described previously, it is reasonable to predict that the commercially developed areas are also generating high concentrations of bacteria (Tufford D. and Marshall W., December 2002). This loading analysis of land use/land cover types directed our approach to focus on stormwater management of the large expanses of impervious surface associated primarily with commercial development. Because there is currently no stormwater renovation occurring, any improvements in stormwater management will reduce nutrient and metal loadings, and most likely bacteria loading as well, to the Morgan Brook Watershed.

West Hill Pond Storm Water Runoff Survey

The West Hill Pond Storm Water Survey (LEI, 2011) documents and ranks locations around West Hill Pond that contribute to pollutant loads. This document ranks stormwater infrastructure retrofits that would work best to reduce pollutant loads to the pond. (See Appendix C).

EPA Element Three: Management Measures

This section primarily focuses on impervious surfaces since these are suspected of being the primary sources of bacteria and other nonpoint source pollutants. Most of the large scale commercial development as well as transportation infrastructure - and associated expanses of impervious surface - within the Morgan Brook watershed were built before the concepts and strategies of Low Impact Development (LID) were common practice. Since the commercial and other developed areas are tightly grouped in one section of the watershed, it would be most efficient to start water quality management efforts in these locations.

Bacteria removal efficiencies of LID structures as well as traditional stormwater management structures are variable and tough to predict. However, one particular journal article advises that the best management practices for reducing bacteria concentrations in runoff are bio-retention structures and stormwater retention ponds (Stormwater, May 2008). The key to effective bacteria reduction in stormwater is to pass it through structures that retain water which allows for one or more of the following processes to occur:

- Photo-degradation by sunlight
- Microbial predation
- Filtration through soils or sediments that contain a high organic component
- Sedimentation
- Creation of an anaerobic environment

Gravel Wetlands do not fall into the category of bio-retention structures or stormwater management ponds but also provide the above mentioned elements that have been proven to increase *E. coli* die off rates. The processes listed above are also very efficient at removing most other pollutants generated by impervious surfaces.

Although bacteria removal efficiencies are difficult to predict, load reduction efficiencies for other types of nonpoint source pollutants, using different types of LID stormwater management structures have been well documented. (See Table 8) These stormwater water management structures should also reduce bacteria concentrations because they incorporate one or more of the processes described previously.

Table 8
Stormwater Quality and Quantity Management Structures
Pollutant Removal Efficiency Rate (*% removal*)

	Total Suspended Solids	Total Phosphorus	Total Nitrogen	Zinc	Copper	Total Petroleum Hydro-carbons	Total Dissolved Nitrogen	Source
Bioretention / Rain Garden	99	5	29	99	97	58	29	UNHS C07
Vegetated Swale	60	0	0	88	0	67	0	UNHS C07
Tree Box Filter	96	0	37	96	0	88	37	UNHS C07
Pond / Wetland System	71	56	19	56	59	0	40	NPRD 07
Extended Detention Wetland	69	39	56	0	0	4	35	NPRD 07
Surface Sand Filter	87	59	32	80	49	98	0	NPRD 07
Grass Filter Strip	68	29	0	45	42	0	0	NPRD 07
Infiltration Trench	0	90	42	0	0	0	82	NPRD 07
Gravel Wetland	99	55	99	99	99	99	99	UNHS C07
Porous Asphalt	99	38	0	96	0	99	0	UNHS C07

Sources: University of New Hampshire Stormwater Center – 2007 Annual Report (UNHSC07)
National Pollutant Removal Database, Version 3, 2007 (NPRD07)

As described previously, five areas in the upper watershed most likely contribute significant bacteria and other nonpoint source pollutant loads to Morgan Brook. Management measures recommended for each of these five areas are as follows:

<u>Green Ridge Condominiums and the former KFC Restaurant</u> (Winchester) - In this location, approximately 2 acres of impervious surface drains directly to Mallory Brook via a rip-rap channel with no visible control technology at the outlet (Figure 3).

Fig- 3 Green Ridge Condominium and Former KFC Restaurant

Given the space constraints, there are a limited choice of stormwater management retrofits that would be effective in this developed area. Stormwater management strategies could be dispersed throughout the development to cumulatively renovate stormwater so that end of pipe discharges would have reduced pollutant loads.

Stormwater management practices appropriate for use throughout the condominium development and KFC include underground sand filters, infiltration trenches and bioretention areas. These measures are commonly used when space is limited.

Ledgebrook Plaza (Winchester) - Ledgebrook Plaza contains approximately 11.4 acres of contiguous impervious surfaces that drain directly to Mallory Brook (Figure 4). Currently there is no stormwater quality or quantity management of runoff from this area. The health of Mallory Brook – and subsequently Morgan Brook - would benefit greatly if runoff from this commercial development were routed through a properly sized gravel wetland or extended detention wetland.

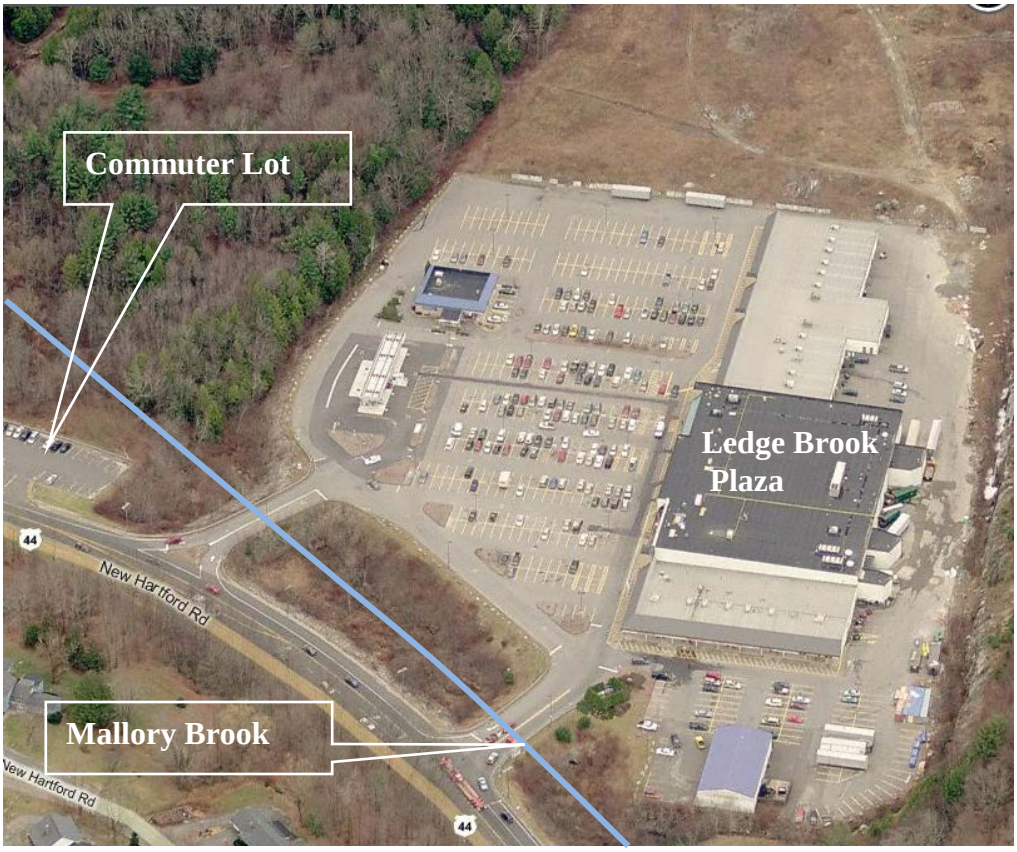

Figure 4 – Ledge Brook Plaza and State Commuter Parking Lot

State Commuter Parking Lot (Barkhamsted) - The State Commuter Parking Lot adjacent to Ledgebrook Plaza is almost 1 acre of pavement with no stormwater management measures (Figure 4). A simple bioretention measure or infiltration trench structure would help protect the water quality in Mallory Brook.

Mallory Brook Plaza (Barkhamsted) - Mallory Brook Plaza on Route 44 contains approximately 11.6 acres of contiguous impervious surfaces that drain directly to Mallory Brook (Figure 5). Currently there is no stormwater quality or quantity management in this area. It is recommended that runoff from this commercial development be routed through a properly sized gravel wetland or extended detention wetland. However, it may be necessary to use the combination of a smaller sized gravel wetland and extended detention wetland in a treatment train, given the extremely flat nature of the site.

In addition, the stream has been ditched between the Mallory Brook Plaza parking area and Route 44. Water quality would be improved if this portion of Mallory Brook could be returned to a more naturalized channel with meanders, pools and riffles. The ability for a stream to buffer against pollutant loading is greatly reduced when a stream is not allowed a more natural morphology. In other words, streams with a series of natural meanders pools and riffles, creating a diverse habitat for plants and animals, is better equipped to handle and renovate pollutant loads. Restoring stream morphology is an important retrofit consideration for this area.

Figure 5 Commercial Development and Car Dealership

Car Dealership (Barkhamsted) - A car dealership on the south side of Route 44 roughly opposite the Mallory Brook Plaza has 4 acres of contiguous impervious surfaces that drain directly to Mallory Brook (Figure 5). Stormwater quality management structure(s) are needed to treat stormwater runoff from the parking area and roof. Treatment systems could include a bio retention area, sand filter and perimeter bioswale. To minimize pollutants loads from generalized sheetflow, a filter strip should be combined with reestablishment of a riparian buffer.

Agriculture - To make sure the previously described agricultural operation is not or will not become a significant source of bacteria, NCD will approach the farm manager with assistance through a Conservation Technical Assistance Grant that is administered through the United States Department of Agriculture – Natural Resource Conservation Service USDA-NRCS.

West Hill Pond Storm Water Runoff Survey

As described previously, the West Hill Pond Storm Water Survey (LEI, 2011) contains recommendations for stormwater infrastructure retrofits that would work best to reduce pollutant loads to the pond. (See Appendix C).

Future Development - NCD also will continue to review development and re-development projects in the watershed to ensure the latest water quality management techniques are being employed. This will protect and improve the water quality in the Morgan Brook Watershed.

EPA Element Four: Technical and Financial Assistance

The approximate costs associated with design, permitting and construction of the stormwater structures discussed in the preceding section are as follows:

Greenridge Condominiums and Former KFC

See discussion under EPA Element Three – Management Measures. A more detailed assessment of stormwater management opportunities is needed to identify the most effective measures that would work on these challenging properties.

Ledge Brook Plaza

The University of New Hampshire just completed construction of a 1 acre Gravel Wetland that services 11 acres of impervious surfaces at a shopping plaza. The cost of constructing this 1 acre Gravel Wetland was over $200,000. Given that Ledge Brook Plaza also encompasses approximately 11 acres of impervious surface, NCD assumes that a gravel wetland retrofit for this area would also need to be at least one acre in size, and the cost would be approximately the same.

State Commuter Parking Lot

Installation cost of a bioretention structure would be approximately $20,000, and an infiltration trench would cost $30,000. A feasibility study would be needed to determine what the site conditions are, and which of these structures would be the most effective at treating stormwater at this site.

Mallory Brook Plaza

Similar to Ledge Brook Plaza, Mallory Brook Plaza would need a 1 acre Gravel Wetland installed for a cost of approximately $200,000. An alternative that may be cheaper to install would be an Extended Detention Wetland. The cost of a one acre Extended Detention Wetland would be approximately $150,000. It is difficult to estimate the cost of recreating a natural stream channel. However, this practice could be expensive, but efficiencies could be incorporated while implementing the recommended structures above.

Car Dealership

Stormwater quality management structure(s) to treat stormwater runoff from the parking area and roof could include any combination from the list below:

1) a bioretention area ($35,000)
2) a sand filter ($50,000)
3) a perimeter bioswale ($15,000)

Meanwhile, regrading and creating a vegetated filter strip in combination with a riparian buffer along Mallory Brook could be installed at a cost of approximately $30,000. This is assuming a 30 foot wide filter strip running for 150 feet along the stream bank.

Overall, the installation of the proper stormwater treatment infrastructure and reestablishment of a more natural stream channel in the upper Morgan Brook watershed could exceed $1,000,000. Funding and in kind services to design, permit and construct stormwater treatment structures in the upper Morgan Brook Watershed will need to originate from a number of private and public sources. These could include:

1) Commercial Property Owners
2) Towns of Winchester and Barkhamsted
3) Farmington River Coordinating Committee
4) Farmington River Watershed Association
5) Northwest Conservation District
6) Small Town Economic Assistance Program (STEAP) Grant
7) EPA Section §319 of the Clean Water Act Grant

Many of the entities listed above will need to be stakeholders along with NCD in implementing this Watershed Based Plan.

West Hill Pond Storm Water Runoff Survey

The West Hill Pond Survey (LEI, 2011) describes the cost associated with each stormwater retrofit recommendation. All the recommendations made in the survey would reduce pollutant loads to the pond, and protect and improve downstream water quality in Morgan Brook. (See Appendix C).

EPA Element Five: Public Information and Education

NCD has presented the results of the Watershed Based Plan to both the Town of Winchester Inland Wetland Commission and the Planning and Zoning Commission. NCD has also met with the First Selectman and Land use Administrator from the Towns of New Hartford and Barkhamsted to discuss the results of the Morgan Brook Watershed Based Plan (WBP). NCD will also provide each town with a hard copy and digital copy of the final Watershed Based Plan and map. NCD plans to continue working with the towns and other watershed stakeholders to facilitate small group brainstorming sessions to coordinate implementation of the Watershed Based Plan. Participation from Federal, State, municipal, non-profit and private sector entities will all be needed to achieve water quality improvement goals.

EPA Element Six and Seven: Implementation Schedule and Cost

In the grid below, projects have been ranked from highest to lowest priority, according to the greatest potential to reduce pollutant loading. The ranking was accomplished by looking at the amount of impervious surface that lacked water quality treatment and the ease of installing stormwater retrofits.

Project Priority Rank	Retrofit Installation and Estimated Cost	Proposed Time Frame: BMP research, project design, permitting and implementation
1. Ledge Brook Plaza	Gravel Wetland or Extended Detention Wetland ($200,000 to $250,000)	2 years
2. Mallory Brook Plaza	Gravel Wetland and/or Extended Detention Wetland ($200,000 and/or $150,000) Stream Morphology Repair (Cost unknown)	2 years
3. Car Dealership	1) Bioretention Area ($35,000) 2) Sand Filter ($50,000) 3) Perimeter Bioswale ($15,000) 4) Riparian Buffer & Filter Strip ($30,000)	1.5 years
4. State Commuter Parking Lot	Bioretention ($20,000 or Infiltration Trench, $30,000)	0.5 years
5. Green Ridge Condominiums / KFC Restaurant	Bioretention ($20,000 each) Infiltration Trenches ($30,000 each) Sand Filter ($50,00)	To Be Determined

Time estimates regarding the above proposed projects take into account the need for: more detailed site investigation, refinement of structure selection, property owner permission, engineered design, permitting and construction. Actual start date of implementation on any of these proposed measures will depend on developing cooperative relationships with property owners and other stakeholders, and raising adequate funds.

EPA Elements Eight and Nine: Milestones and Monitoring

Performance of stormwater management structures to treat runoff from all the impervious surfaces in the upper water will be measured by stream water quality monitoring. The Farmington River Watershed Association plans to continue sampling for bacteria from April through November at their established

sampling locations. In addition, Farmington Valley Health District will continue to sample West Hill Pond public swimming areas. Continued sampling for bacteria throughout the watershed will indicate if retrofit installations are effective. As discussed previously, the bacteria concentrations that trigger the impairment are borderline exceedances. Therefore, if any one of the problem areas is addressed, there is the potential that bacteria levels will drop to levels that would allow Morgan Brook and Mallory Brook to be removed from the Impaired Waters List.

Conclusion

After walking the entire watershed and performing visual inspections of all the stream channels and riparian corridors, NCD concluded that large areas of impervious surface associated primarily with dense commercial development in the upper watershed is the dominant factor contributing to the bacteria impairment of Morgan Brook. The fact that these large commercial developments are in the headwaters of the watershed makes management of stormwater a high priority. Degrading water quality and altering runoff volumes in the upper watershed can amplify problems throughout a watershed. Given the complete lack of stormwater management in this developed area, any stormwater improvements will bring measurable reductions in bacteria, nutrients and other nonpoint source pollutant loads. Managing stormwater will also reduce erosion throughout the watershed which will also improve water quality. NCD looks forward to working with the property owners, Towns of Barkhamsted and Winchester, and other stakeholder to address these important water quality management issues in the Morgan Brook watershed.

APPENDICES
Appendix A – Morgan Brook Bacteria Sampling Locations and Results
Appendix B – Track Down Survey Field Data Sheets with Photos (referenced on interactive map)
Appendix C – West Hill Pond Water Runoff Survey
Appendix D – 305(b) Assessment Results for Morgan Brook and Mallory Brook from 2010 Connecticut Integrated Water Quality Report
Appendix E – 303(d) Impaired Water Listings for Morgan and Mallory Brook from 2010 Connecticut Integrated Water Quality Report
Appendix F – Water Quality Criteria for Bacterial Indicators of Sanitary Quality – From 2011 Connecticut Water Quality Standards
Attachment – Interactive Watershed Map – Morgan Brook Impaired Watershed Study Area Map

Any comments or questions regarding this plan should be directed to the
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Sean Hayden, Executive Director
seanhayden@conservect.org
1185 New Litchfield Street
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Phone: (860)-626-7222

References

Bioretention Manual - Department of Environmental Resources, Prince Georges County Maryland, 2002

Clary, J, Jones, J, Urbonas, B, Quigley, M, Strecker, E, Wagner, T. 2008. Can Stormwater Management Measures Remove Bacteria? Stormwater The Journal For Surface Water Quality Professionals , Vol 9, No. 3.

CT DEP: 2004 Stormwater Quality Manual. Available from:
http://www.dep.state.ct.us/wtr/stormwater/strmwtrman.htm

CT DEEP. 2011. Water Quality Standards. Hartford (CT): Bureau of Water Protection and Land Reuse Planning and Standards Division. Available from:
http://www.ct.gov/dep/lib/dep/water/water_quality_standards/wqs_final_adopted_2_25_11.pdf

CT DEEP. 2010. State of Connecticut Integrated Water Quality Report, finalized May 2011.

CT LID Inventory by NEMO. Available from: clear.uconn.edu/tools/lid/lid_search.asp

CWP, 2005. Center for Watershed Protection Unified Stream Assesssment: A Users Manual, Version 2.0

Lake George Waterkeeper – Do-It-Yourself Water Quality , A Landowner's

Guide To Property Management That Protects Lake George. Available from: www.fundforlakegeorge.org

Lenard Engineering, Inc. 2011. West Hill Pond Stormwater Runoff Survey, prepared for West Hill Pond Association by Lenard Engineering Inc.

Low Impact Development – A Design Manual for Urban Areas, published by the Arkansas University Press, 2010.

The Low Impact Development Center, Inc. Sustainable Design and Water Quality Research. Available from: http://www.lowimpactdevelopment.org

Metropolitan Area Planning Council, Smart Growth and Regional Collaboration. Available from: http://www.mapc.org/resources/low-impact-dev-toolkit

New Hampshire Stormwater Manual. Available from: http://des.nh.gov/organization/divisions/water/stormwater/manual.htm

The New York State Stormwater Management Design Manual. Available from: http://www.dec.ny.gov/chemical/29072.html

North Carolina State University, College of Agriculture and Life Sciences College of Engineering, Stormwater Engineering Group. Available from: http://www.bae.ncsu.edu/stormwater/pubs.htm

Overland Park Kansas Stormwater Resources Center. Available from: http://www.opkansas.org/Doing-Business/Stormwater-Resources

Rain Gardens, A How To Manual for Homeowners, Wisconsin Department of Natural Resources. Available from: http://learningstore.uwex.edu/assets/pdfs/GWQ037.pdf

Schueler, Thomas R., Holland, Heather K. The Practice of Watershed Protection. Ellicot City (MD): Center for Watershed Protection; 2010.

(Stormwater, May 2008) *Stormwater - The Journal for Surface Water Quality Professionals* – Can Stormwater Management Measures Remove Bacteria? Stormwater, May 2008)

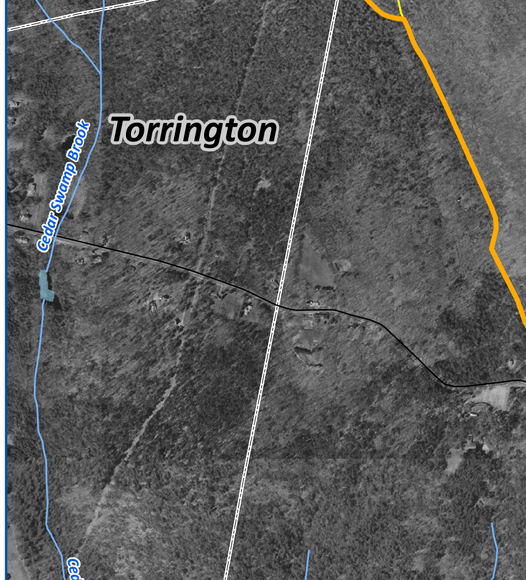
Tufford DL, Marshall WD. 2002. Fecal Coliform Source Assessment in a Small, Mixed Land use Watershed. Journal of the American Water Resources Association (JAWRA) Vol. 38 (6).

UCONN Cooperative Extension Rain Garden Manual. Available from: www.sustainability.uconn.edu/landscape/05-rain_gardens.html

UCONN Cooperative Extension Jordan Cove Project. Available from: www.cag.uconn.edu/nrme/jordancove/

UNH Stormwater Center. Available from: www.unh.edu/erg/cstev

Morgan Brook
Impaired Watershed Study Area
Section 319 Nonpoint Source Mgmt Program**



Map Key

- Morgan Brook Subregional Watershed (4305)
- Local Basins w/ ID (e.g.,4305-00-2-R1)
- Municipal Boundary
- CT Impaired Waters 303(d) 2010 (subset CT 305(b) Assessed Waters 2010)
- Morgan Brook
- Other Water Course
- Intermittent Water Course
- Primary Route
- Secondary Route
- Local Road/Throroughfare
- 4WD Road / Trail
- Waterbody
- Marsh/Swamp

Track Down Feature

- Storm Water Outfall
- Structured Steam Crossing
- FVHD-Bacteria Sampling Location
- FRWA-Bacteria Sampling Location
- Areas of Concern

0 2,000 4,000 Feet

0 0.15 0.3 0.6 Miles

N

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Map produced August 1, 2011
revisions/updates: May 25, 2012, August 14, 2012
by NCD GIS Center
Project #07-04e, Task 1.A.(3)

Sources:
-Connecticut Department of Environmental Protection, Environmental Geographic Information Center (EGIC)
-Connecticut Department of Transportation
-TeleAtlas
-Bacteria Sampling Locations provided by the Farmington River Watershed Association (FRWA) & Farmington Valley Heath District (FVHD)
-GPS data collection by Northwest Conservation District

file:MorganBrkImpairedWshdStudyV3.pdf

This map is not to be used as an accurate survey or as a substitute for a detailed field assessment.

**Funded in part by CT DEEP through a US EPA Clean Water Act §319 Non Point Source Grant
http://www.epa.gov/owow_keep/NPS/cwact.html

APPENDIX - A

Morgan Brook Watershed Management Plan

Bacteria Sampling Results - Morgan Brook Watershed

Sample Location	Sample Date	Analyte	Concentration cfu/100 mL
MB-1	4/15/09	Fecal Coliform via membrane filtration	7
MB-1	4/15/09	E. coli via MI agar	11
MB-1	5/13/09	Fecal Coliform via membrane filtration	28
MB-1	5/13/09	E. coli via MI agar	48
MB-1	6/10/09	MF_FC	80
MB-1	6/10/09	MF_MI	72
MB-1	7/8/09	Fecal Coliform via membrane filtration	48
MB-1	7/8/09	E. coli via MI agar	34
MB-1	9/14/09	Total coliform	697
MB-1	9/14/09	E.coli	31
MB-1	9/21/09	Total coliform	1,046
MB-1	9/21/09	E.coli	12
MB-1	9/28/09	Total coliform	3,968
MB-1	9/28/09	E.coli	231
MB-1	10/5/09	Total coliform	1,483
MB-1	10/5/09	E.coli	10
MB-1	10/7/09	Fecal Coliform via membrane filtration	110
MB-1	10/7/09	E. coli via MI agar	190
MB-1	4/28/10	Fecal Coliform via membrane filtration	48
MB-1	4/28/10	E. coli via MI agar	58
MB-1	7/7/10	Fecal Coliform via membrane filtration	40
MB-1	7/7/10	E. coli via MI agar	100
MB-1	11/3/10	Fecal Coliform via membrane filtration	60
MB-1	11/3/10	E. coli via MI agar	80
MB-1.1	9/21/09	Total coliform	727
MB-1.1	9/21/09	E.coli	33
MB-1.1	9/28/09	Total coliform	5,172
MB-1.1	9/28/09	E.coli	199
MB-1.1	10/5/09	Total coliform	1,483
MB-1.1	10/5/09	E.coli	52
MB-1.1	10/5/09	Total coliform	9,804
MB-1.1	10/5/09	E.coli	41
MB-2	4/15/09	Fecal Coliform via membrane filtration	4
MB-2	4/15/09	E. coli via MI agar	4
MB-2	5/13/09	Fecal Coliform via membrane filtration	80
MB-2	5/13/09	E. coli via MI agar	74
MB-2	6/10/09	MF_FC	265
MB-2	6/10/09	MF_MI	400
MB-2	7/8/09	Fecal Coliform via membrane filtration	27
MB-2	7/8/09	E. coli via MI agar	21
MB-2	9/14/09	Total coliform	1,918
MB-2	9/14/09	E.coli	110
MB-2	9/21/09	Total coliform	2,420
MB-2	9/21/09	E.coli	28
MB-2	9/28/09	Total coliform	11,199
MB-2	9/28/09	E.coli	691
MB-2	10/5/09	Total coliform	2,105
MB-2	10/5/09	E.coli	41
MB-2	10/7/09	Fecal Coliform via membrane filtration	200
MB-2	10/7/09	E. coli via MI agar	200
MB-2	4/28/10	Fecal Coliform via membrane filtration	76
MB-2	4/28/10	E. coli via MI agar	100
MB-2	7/7/10	Fecal Coliform via membrane filtration	50
MB-2	7/7/10	E. coli via MI agar	150
MB-2	11/3/10	Fecal Coliform via membrane filtration	14
MB-2	11/3/10	E. coli via MI agar	28

Morgan Brook Watershed Management Plan
Bacteria Sampling Results - Morgan Brook Watershed

Sample Location	Sample Date	Analyte	Concentration cfu/100 mL
MB-3	4/15/09	Fecal Coliform via membrane filtration	8
MB-3	4/15/09	E. coli via MI agar	6
MB-3	5/13/09	Fecal Coliform via membrane filtration	90
MB-3	5/13/09	E. coli via MI agar	80
MB-3	6/10/09	MF_FC	38
MB-3	6/10/09	MF_MI	34
MB-3	7/8/09	Fecal Coliform via membrane filtration	21
MB-3	7/8/09	E. coli via MI agar	15
MB-3	9/14/09	Total coliform	1,354
MB-3	9/14/09	E.coli	30
MB-3	9/21/09	Total coliform	866
MB-3	9/21/09	E.coli	7
MB-3	9/28/09	Total coliform	12,997
MB-3	9/28/09	E.coli	448
MB-3	10/5/09	Total coliform	1,374
MB-3	10/5/09	E.coli	31
MB-3	10/7/09	Fecal Coliform via membrane filtration	225
MB-3	10/7/09	E. coli via MI agar	110
MB-3	4/28/10	Fecal Coliform via membrane filtration	36
MB-3	4/28/10	E. coli via MI agar	40
MB-3	7/7/10	Fecal Coliform via membrane filtration	30
MB-3	7/7/10	E. coli via MI agar	20
MB-3	11/3/10	Fecal Coliform via membrane filtration	12
MB-3	11/3/10	E. coli via MI agar	8
ML-1	9/14/09	Total coliform	6,488
ML-1	9/14/09	E.coli	41
ML-1	9/21/09	Total coliform	1,300
ML-1	9/21/09	E.coli	17
ML-1	9/28/09	Total coliform	2,909
ML-1	9/28/09	E.coli	86
ML-1	10/5/09	Total coliform	958
ML-1	10/5/09	E.coli	20
ML-1.9	9/21/09	Total coliform	2,420
ML-1.9	9/21/09	E.coli	162
ML-1.9	9/28/09	Total coliform	19,863
ML-1.9	9/28/09	E.coli	305
ML-1.9	10/5/09	Total coliform	2,755
ML-1.9	10/5/09	E.coli	98
ML-2	9/14/09	Total coliform	4,106
ML-2	9/14/09	E.coli	52
ML-2	9/21/09	Total coliform	2,420
ML-2	9/21/09	E.coli	104
ML-2	9/28/09	Total coliform	11,199
ML-2	9/28/09	E.coli	432
ML-2	10/5/09	Total coliform	3,654
ML-2	10/5/09	E.coli	85
ML-3	9/14/09	Total coliform	10,462
ML-3	9/14/09	E.coli	86
ML-3	9/21/09	Total coliform	2,420
ML-3	9/21/09	E.coli	81
ML-3	9/28/09	Total coliform	4,907
ML-3	9/28/09	E.coli	262
ML-3	10/5/09	Total coliform	1,989
ML-3	10/5/09	E.coli	31

Morgan Brook Watershed Management Plan
Bacteria Sampling Results - Morgan Brook Watershed

Sample Location	Sample Date	Analyte	Concentration cfu/100 mL
Mltrib-4	9/14/09	Total coliform	4,884
Mltrib-4	9/14/09	E.coli	31
Mltrib-4	9/21/09	Total coliform	2,420
Mltrib-4	9/21/09	E.coli	73
Mltrib-4	9/28/09	Total coliform	5,172
Mltrib-4	9/28/09	E.coli	85
Mltrib-4	10/5/09	Total coliform	15,531
Mltrib-4	10/5/09	E.coli	51
ML-5	10/5/09	Total coliform	4,106
ML-5	10/5/09	E.coli	241
WHP-1	6/10/2008	E.coli	<10
WHP-1	6/26/2008	E.coli	10
WHP-1	7/15/2008	E.coli	<10
WHP-1	7/29/2008	E.coli	10
WHP-1	8/14/2008	E.coli	10
WHP-1	8/26/2008	E.coli	<10
WHP-1	6/18/2009	E.coli	10
WHP-1	6/29/2009	E.coli	10
WHP-1	7/14/2009	E.coli	<10
WHP-1	8/4/2009	E.coli	10
WHP-1	8/11/2009	E.coli	41
WHP-1	8/18/2009	E.coli	10
WHP-1	9/1/2009	E.coli	<10
WHP-1	6/8/2010	E.coli	<10
WHP-1	6/24/2010	E.coli	10
WHP-1	7/8/2010	E.coli	<10
WHP-1	7/27/2010	E.coli	<10
WHP-1	8/17/2010	E.coli	<10
WHP-1	8/31/2010	E.coli	10
WHP-1	6/20/2011	E.coli	31
WHP-1	7/7/2011	E.coli	<10
WHP-2	6/10/2008	E.coli	42
WHP-2	6/26/2008	E.coli	<10
WHP-2	7/17/2008	E.coli	<10
WHP-2	7/29/2008	E.coli	10
WHP-2	8/14/2008	E.coli	10
WHP-2	8/26/2008	E.coli	<10
WHP-2	6/18/2009	E.coli	<10
WHP-2	6/29/2009	E.coli	10
WHP-2	7/14/2009	E.coli	<10
WHP-2	8/19/2009	E.coli	31
WHP-2	6/3/2010	E.coli	20
WHP-2	6/24/2010	E.coli	10
WHP-2	7/8/2010	E.coli	<10
WHP-2	7/27/2010	E.coli	10
WHP-2	8/17/2010	E.coli	<10
WHP-2	9/2/2010	E.coli	10
WHP-2	6/7/2011	E.coli	<10
WHP-2	7/7/2011	E.coli	10

Appendix - B
Morgan Brook Watershed
Section 319 Nonpoint Source Management Progam
Track Down Survey Summary Table

Map ID	Site ID[1] Survey Form #	Site ID Local Basin #	Latidude	Longitude
1	4305-00-1_SCa	4305-00-1	41º53'29.2"N	73º2'9.89"W
2	4305-00-1_SCb	4305-00-1	41º53'30.35"N	73º2'5.22"W
3	4305-00-1_SCc	4305-00-1	41º53'43.97"N	73º1'51.99"W
4	4305-00-1_SCd	4305-00-1	41º54'9.06"N	73º2'3.14"W
5	4305-00-1-L1_OTa	4305-00-1-L1	41º52'22.34"N	73º2'38.38"W
6	4305-00-1-L1_SCa	4305-00-1-L1	41º53'26.45"N	73º2'12.01"W
7	4305-00-1-L1_SCb	4305-00-1-L1	41º53'2.18"N	73º2'42.91"W
8	4305-00-1-L1_SCc	4305-00-1-L1	41º52'21.1"N	73º2'20.05"W
9	4305-00-1-L1_SCd	4305-00-1-L1	41º52'21.93"N	73º2'37.23"W
10	4305-00-3-R1_OTa	4305-00-3-R1	41º54'23.72"N	72º59'54.52"W
11	4305-00-3-R1_SCa	4305-00-3-R1	41º54'30.51"N	73º0'2.04"W
12	4305-00-3-R1_SCb	4305-00-3-R1	41º54'41.39"N	73º0'29.62"W
13	4305-00-3-R1_SCc	4305-00-3-R1	41º54'44.51"N	73º1'3.97"W
14	4305-00-3-R1_SCd	4305-00-3-R1	41º54'31.63"N	72º59'56.64"W
15	4305-00-3-R2_OTa	4305-00-3-R2	41º54'16.69"N	72º59'46.77"W
16	4305-00-3-R2_SCa	4305-00-3-R2	41º54'6.01"N	72º59'21.87"W
17	4305-00-3-R2_SCb	4305-00-3-R2	41º54'8.25"N	72º59'33.16"W
18	4305-01-1_OTa	4305-01-1	41º53'17.72"N	73º1'13.9"W
19	4305-01-1_SCa	4305-01-1	41º53'53.03"N	73º1'30.56"W
20	4305-02-1_OTa	4305-02-1	41º54'42.9"N	73º3'6.93"W
21	4305-02-1_OTb	4305-02-1	41º54'38.1"N	73º3'2.05"W
22	4305-02-1_OTc	4305-02-1	41º54'34.57"N	73º2'36.06"W
23	4305-02-1_OTd	4305-02-1	41º54'33.08"N	73º2'54.6"W
24	4305-02-1_SCa	4305-02-1	41º54'38.79"N	73º2'28.73"W
25	4305-02-1_SCb	4305-02-1	41º54'35.54"N	73º2'57.35"W
26	4305-02-1_SCc	4305-02-1	41º54'41.87"N	73º3'3.54"W
27	4305-02-1_SCd	4305-02-1	41º54'41.99"N	73º3'4.33"W
28	4305-02-1_SCe	4305-02-1	41º54'35.16"N	73º2'36.28"W
29	4305-02-1_SCf	4305-02-1	41º54'32.98"N	73º2'53.5"W
30	4305-02-1_SCg	4305-02-1	41º54'48.78"N	73º3'5.93"W
31	4305-02-1_SCh	4305-02-1	41º54'48.07"N	73º3'6.23"W
32	4305-02-2-R1_SCa	4305-02-2-R1	41º54'43.35"N	73º1'37"W
33	4305-02-2-R1_SCb	4305-02-2-R1	41º54'42.22"N	73º2'19.02"W
34	4305-03-1_SCa	4305-03-1	41º54'46.75"N	73º2'27.17"W
35	4305-04-1_SCa	4305-04-1	41º54'18.77"N	72º59'52.66"W
36	4305-04-1_SCb	4305-04-1	41º53'53.24"N	73º1'22.22"W
37	4305-04-1_SCc	4305-04-1	41º54'0.93"N	73º1'1.03"W
38	4305-04-1_SCd	4305-04-1	41º54'4.37"N	73º0'24.11"W
39	4305-04-1_SCe	4305-04-1	41º53'49.49"N	73º1'7.41"W
40	4305-04-1_SCf	4305-04-1	41º53'21.63"N	73º0'53"W

(1) : SC = Structured Stream Crossing, OT = Storm Water Outfall

Map #1

Structured Stream Crossing **SC**

WATERSHED/SUBSHED: 4305-00-1	**DATE:** 11 / 19 / 2010	**ASSESSED BY:** SH, MM
SURVEY REACH ID:	**TIME:** 9 : 10 AM/PM	**PHOTO ID:** (*Camera-Pic #*) /# 00-1-SC-a,jpg
SITE ID: (*Condition-#*) **SC-** A	**LAT** 41 ° 53 ' 29.20 " **LONG** -73 ° 02 ' 09.89 " **LMK**_____	**GPS** (*Unit ID*) R1

TYPE: ☒ Road Crossing ☐ Railroad Crossing ☐ Dam ☐ Footbridge ☐ Geological Formation (+/- 2ft change) ☐ Other:

ROAD OR RAILROAD CROSSING ONLY

CROSSING SHAPE:
☐ Arch ☒ Circular
☐ Box ☒ Other: flared ends
☐ Bottomless
☐ Elliptical

 # BARRELS:
☒ Single
☐ Double
☐ Triple
☐ Other:

MATERIAL:
☒ Concrete
☐ Metal (smooth)
☐ Metal (corrugated)
☐ Other:

ALIGNMENT:
☐ Flow-aligned
☒ Not flow-aligned
☒ toward LT bank
☐ toward RT bank
☐ Do not know

DIMENSIONS: (*if varies sketch*)
Barrel diameter: 3 (ft)
Height: 3 (ft)
Culvert length: 45 (ft)
Width: 4 (ft)
Roadway elevation: 6 (ft)

CONDITION: (*Evidence of…*)
☐ Cracking/chipping/corrosion ☐ Downstream scour hole
☐ Sediment deposition ☐ Failing embankment
☐ Collected organic debris ☐ Other:

CULVERT SLOPE:
☐ Flat
☒ Slight (2° – 5°)
☐ Obvious (>5°)

UNDERSIZED?
☒ No ☐ Yes ☐ Unsure

DAMS

TYPE:
☐ Manmade
☐ Active Beaver
☐ Old/Abandoned Beaver

MATERIAL:
☐ Concrete (poured or block) ☐ Dry stone
☐ Mortared stone ☐ Gabion ☐ Other:
Height: (ft)

MATERIAL:
☐ Large woody debris ☐ Small woody debris
Height: (ft)

POTENTIAL RESTORATION CANDIDATE
☒ no
☐ Fish barrier removal ☐ Fish passage ☐ Upstream storage retrofit ☐ Stream repair
☐ Culvert repair/replacement ☐ Beaver deceiver/removal ☐ Other:

IS SC ACTING AS GRADE CONTROL ☒ No ☐ Yes ☐ Unknown

If yes for fish barrier (> 6 in drop or flow < ½ inch)

EXTENT OF PHYSICAL BLOCKAGE:
☐ Total ☐ Partial
☐ Temporary ☐ Unknown

CAUSE:
☐ Culvert raised, above stream _____ (in)
☐ Drop too high, water drop: _____ (in)
☐ Shallow flow, water depth: _____ (in)
☐ Other:

BLOCKAGE SEVERITY: (*circle #*)

5	4	3	2	1
A structure such as a dam or road culvert on a 3rd order or greater stream blocking the upstream movement of anadromous fish; no fish passage device present.		A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish.		A temporary barrier such as a beaver dam or a blockage at the very head of a stream with very little viable fish habitat above it; natural barriers such as waterfalls.

NOTES/SKETCH:

OTHER SURVEY FORMS COMPLETED FOR SAME AREA:

REPORTED TO AUTHORITIES: ☐ YES ☐ NO

Report sewage spill, significant pollution, or hazardous materials to CT DEP 860-424-3824 and local health department.

Map #2

Structured Stream Crossing **SC**

WATERSHED/SUBSHED: 4305-00-1 | **DATE:** 11 / 19 / 2010 | **ASSESSED BY:** SH, MM

SURVEY REACH ID: | **TIME:** 9 : 20 (AM)/PM | **PHOTO ID:** (*Camera-Pic #*) /# 00-1-SC-b.jpg

SITE ID: (*Condition-#*) SC-B | **LAT** 41 ° 53 ' 30.35 " **LONG** -73 ° 02 ' 05.22 " **LMK**_____ | **GPS** (*Unit ID*) R1

TYPE: ☒ Road Crossing ☐ Railroad Crossing ☐ Dam ☐ Footbridge ☐ Geological Formation (+/- 2ft change) ☐ Other:

ROAD OR RAILROAD CROSSING ONLY

CROSSING SHAPE:
- ☐ Arch ☒ Circular
- ☐ Box ☒ Other:
- ☐ Bottomless flared ends
- ☐ Elliptical

 # BARRELS:
- ☐ Single
- ☒ Double
- ☐ Triple
- ☐ Other:

MATERIAL:
- ☒ Concrete
- ☐ Metal (smooth)
- ☐ Metal (corrugated)
- ☐ Other:

ALIGNMENT:
- ☐ Flow-aligned
- ☒ Not flow-aligned
  - ☐ toward LT bank
  - ☒ toward RT bank
- ☐ Do not know

DIMENSIONS: (*if varies sketch*)
- Barrel diameter: 3 (ft)
- Height: 3 (ft)
- Culvert length: 50 (ft)
- Width: 4 (ft)
- Roadway elevation: 6 (ft)

CONDITION: (*Evidence of…*)
- ☐ Cracking/chipping/corrosion ☐ Downstream scour hole
- ☐ Sediment deposition ☐ Failing embankment
- ☐ Collected organic debris ☐ Other:

CULVERT SLOPE:
- ☐ Flat
- ☒ Slight (2° – 5°)
- ☐ Obvious (>5°)

UNDERSIZED?
☒ No ☐ Yes ☐ Unsure

DAMS

TYPE:
- ☐ Manmade
- ☐ Active Beaver
- ☐ Old/Abandoned Beaver

MATERIAL:
- ☐ Concrete (poured or block) ☐ Dry stone
- ☐ Mortared stone ☐ Gabion ☐ Other:
- ☐ Large woody debris ☐ Small woody debris

Height: (ft)

Height: (ft)

POTENTIAL RESTORATION CANDIDATE
☒ no
☐ Fish barrier removal ☐ Fish passage ☐ Upstream storage retrofit ☐ Stream repair
☐ Culvert repair/replacement ☐ Beaver deceiver/removal ☐ Other:

IS SC ACTING AS GRADE CONTROL ☒ No ☐ Yes ☐ Unknown

If yes for fish barrier (> 6 in drop or flow < ½ inch)

EXTENT OF PHYSICAL BLOCKAGE:
- ☐ Total ☐ Partial
- ☐ Temporary ☐ Unknown

CAUSE:
- ☐ Culvert raised, above stream _____ (in)
- ☐ Drop too high, water drop: _____ (in)
- ☐ Shallow flow, water depth: _____ (in)
- ☐ Other:

BLOCKAGE SEVERITY: (*circle #*)

5	4	3	2	1
A structure such as a dam or road culvert on a 3rd order or greater stream blocking the upstream movement of anadromous fish; no fish passage device present.		A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish.		A temporary barrier such as a beaver dam or a blockage at the very head of a stream with very little viable fish habitat above it; natural barriers such as waterfalls.

NOTES/SKETCH:

OTHER SURVEY FORMS COMPLETED FOR SAME AREA:

REPORTED TO AUTHORITIES: ☐ YES ☐ NO

Report sewage spill, significant pollution, or hazardous materials to CT DEP 860-424-3824 and local health department.

Map #3

Structured Stream Crossing **SC**

WATERSHED/SUBSHED: 4305-00-1 | **DATE:** 11 / 19 / 2010 | **ASSESSED BY:** SH, MM

SURVEY REACH ID: | **TIME:** 10 : 05 AM/PM | **PHOTO ID:** (*Camera-Pic #*) /# 00-1-SC-c2.jpg

SITE ID: (*Condition-#*) SC-C | **LAT** 41 ° 53 ' 43.97 " | **LONG** -73 ° 01 ' 51.99 " | **LMK**_____ | **GPS** (*Unit ID*) R1

TYPE: ☒ Road Crossing ☐ Railroad Crossing ☐ Dam ☐ Footbridge ☐ Geological Formation (+/- 2ft change) ☐ Other:

ROAD OR RAILROAD CROSSING ONLY

CROSSING SHAPE:
☐ Arch ☒ Circular
☐ Box ☒ Other:
☐ Bottomless flared ends
☐ Elliptical

 # BARRELS:
☐ Single
☒ Double
☐ Triple
☐ Other:

MATERIAL:
☒ Concrete
☐ Metal (smooth)
☐ Metal (corrugated)
☐ Other:

ALIGNMENT:
☐ Flow-aligned
☒ Not flow-aligned
☐ toward LT bank
☒ toward RT bank
☐ Do not know

DIMENSIONS: (*if varies sketch*)
Barrel diameter: 3 (ft)
Height: 3 (ft)
Culvert length: 36 (ft)
Width: 6 (ft)
Roadway elevation: 8 (ft)

CONDITION: (*Evidence of…*)
☐ Cracking/chipping/corrosion ☐ Downstream scour hole
☐ Sediment deposition ☐ Failing embankment
☐ Collected organic debris ☐ Other:

CULVERT SLOPE:
☐ Flat
☒ Slight (2° – 5°)
☐ Obvious (>5°)

UNDERSIZED?
☒ No ☐ Yes ☐ Unsure

DAMS

TYPE:
☐ Manmade
☐ Active Beaver
☐ Old/Abandoned Beaver

MATERIAL:
☐ Concrete (poured or block) ☐ Dry stone
☐ Mortared stone ☐ Gabion ☐ Other:

MATERIAL:
☐ Large woody debris ☐ Small woody debris

Height: (ft)

Height: (ft)

POTENTIAL RESTORATION CANDIDATE
☒ no
☐ Fish barrier removal ☐ Fish passage ☐ Upstream storage retrofit ☐ Stream repair
☐ Culvert repair/replacement ☐ Beaver deceiver/removal ☐ Other:

IS SC ACTING AS GRADE CONTROL ☒ No ☐ Yes ☐ Unknown

If yes for fish barrier (> 6 in drop or flow < ½ inch)

EXTENT OF PHYSICAL BLOCKAGE:
☐ Total ☐ Partial
☐ Temporary ☐ Unknown

CAUSE:
☐ Culvert raised, above stream _____ (in)
☐ Drop too high, water drop: _____ (in)
☐ Shallow flow, water depth: _____ (in)
☐ Other:

BLOCKAGE SEVERITY: (*circle #*)

A structure such as a dam or road culvert on a 3rd order or greater stream blocking the upstream movement of anadromous fish; no fish passage device present.	A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish.	A temporary barrier such as a beaver dam or a blockage at the very head of a stream with very little viable fish habitat above it; natural barriers such as waterfalls.
5	4 3	2 1

NOTES/SKETCH:

OTHER SURVEY FORMS COMPLETED FOR SAME AREA:

REPORTED TO AUTHORITIES: ☐ YES ☐ NO

Report sewage spill, significant pollution, or hazardous materials to CT DEP 860-424-3824 and local health department.

Map #4

Structured Stream Crossing **SC**

WATERSHED/SUBSHED: 4305-00-1		**DATE:** 11 / 19 / 2010	**ASSESSED BY:** SH, MM
SURVEY REACH ID:	**TIME:** 10 : 15 (AM)/PM	**PHOTO ID:** (*Camera-Pic #*)	/# 00-1-SC-d2.jpg
SITE ID: (*Condition-#*) **SC-** D	**LAT** 41 ° 54 ' 09.06 " **LONG** -73 ° 02 ' 03.14 "	**LMK**_____	**GPS** (*Unit ID*) R1

TYPE: ☒ Road Crossing ☐ Railroad Crossing ☐ Dam ☐ Footbridge ☐ Geological Formation (+/- 2ft change) ☐ Other:

ROAD OR RAILROAD CROSSING ONLY

CROSSING SHAPE:
☐ Arch ☒ Circular
☐ Box ☐ Other:
☐ Bottomless
☐ Elliptical

 # BARRELS:
☒ Single
☐ Double
☐ Triple
☐ Other:

MATERIAL:
☒ Concrete
☐ Metal (smooth)
☐ Metal (corrugated)
☒ Other: mortared stone

ALIGNMENT:
☒ Flow-aligned
☐ Not flow-aligned
☐ toward LT bank
☐ toward RT bank
☐ Do not know

DIMENSIONS: (*if varies sketch*)
Barrel diameter: 3 (ft)
Height: 3 (ft)
Culvert length: 40 (ft)
Width: 3 (ft)
Roadway elevation: 10 (ft)

CONDITION: (*Evidence of…*)
☒ Cracking/chipping/corrosion ☐ Downstream scour hole
☐ Sediment deposition ☐ Failing embankment
☐ Collected organic debris ☐ Other:

CULVERT SLOPE:
☐ Flat
☒ Slight (2° – 5°)
☐ Obvious (>5°)

UNDERSIZED?
☒ No ☐ Yes ☐ Unsure

DAMS

TYPE:
☐ Manmade
☐ Active Beaver
☐ Old/Abandoned Beaver

MATERIAL:
☐ Concrete (poured or block) ☐ Dry stone
☐ Mortared stone ☐ Gabion ☐ Other:
Height: (ft)

MATERIAL:
☐ Large woody debris ☐ Small woody debris
Height: (ft)

POTENTIAL RESTORATION CANDIDATE
☒ no
☐ Fish barrier removal ☐ Fish passage ☐ Upstream storage retrofit ☐ Stream repair
☐ Culvert repair/replacement ☐ Beaver deceiver/removal ☐ Other:

IS SC ACTING AS GRADE CONTROL ☒ No ☐ Yes ☐ Unknown

If yes for fish barrier (> 6 in drop or flow < ½ inch)

EXTENT OF PHYSICAL BLOCKAGE:
☐ Total ☐ Partial
☐ Temporary ☐ Unknown

CAUSE:
☐ Culvert raised, above stream _____ (in)
☐ Drop too high, water drop: _____ (in)
☐ Shallow flow, water depth: _____ (in)
☐ Other:

BLOCKAGE SEVERITY: (*circle #*)

5	4	3	2	1
A structure such as a dam or road culvert on a 3rd order or greater stream blocking the upstream movement of anadromous fish; no fish passage device present.		A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish.		A temporary barrier such as a beaver dam or a blockage at the very head of a stream with very little viable fish habitat above it; natural barriers such as waterfalls.

NOTES/SKETCH:

OTHER SURVEY FORMS COMPLETED FOR SAME AREA?

REPORTED TO AUTHORITIES: ☐ YES ☐ NO

Report sewage spill, significant pollution, or hazardous materials to CT DEP 860-424-3824 and local health department.

Map #5

Storm Water Outfalls **OT**

WATERSHED/SUBSHED: 4305-00-1-L1		**DATE:** 4 / 19 / 11	**ASSESSED BY:** SH,MM
SURVEY REACH ID:	**TIME:** 10:00 (AM)/PM	**PHOTO ID:** (*Camera-Pic #*)	/# 00-1-L1-OT-a.jpg
SITE ID (*Condition-#*): **OT-** A	**LAT** 41 ° 52 ' 22.34 " **LONG** -73 ° 02 ' 38.38 "	**LMK**	**GPS:** (*Unit ID*) R1

BANK: [X] LT [ ] RT [ ] Head

FLOW: [ ] None [X] Trickle [ ] Moderate [ ] Substantial [ ] Other:

TYPE: [X] Pipe [ ] Leak Off

MATERIAL: [X] Concrete [ ] Metal [ ] PVC/Plastic [ ] Brick [ ] Corrugated [ ] Other [ ] Vitrified Tile

SHAPE: [X] Circular [ ] Elliptical [ ] Other:

NUMBER: [ ] Single [ ] Double [ ] Triple

DIMENSIONS: Diameter: 10 (in)

FLARED END? [ ] Yes [X] No

HEADWALL? [ ] YES [X] NO

SUBMERGED: [ ] No [X] Partially [ ] Fully

[X] Channel — [ ] Concrete [ ] Riprap [X] Vegetated [X] Earth [ ] Other:

[ ] Trapezoid [ ] Parabolic [X] Other: rectangular 3' x 75'

Depth: 12 (in) Width (Top): 36 (in) " (Bottom): 36 (in)

Channel slope: 5 (degrees)

PIPE CONDITION: [X] Good [ ] Chip/Cracked [ ] Peeling Paint [ ] Corrosion [ ] Squashed [ ] Other:

ODOR: [X] No [ ] Gas [ ] Sewage [ ] Rancid/Sour [ ] Sulfide [ ] Other:

DEPOSITS/STAINS: [X] None [ ] Oily [ ] Flow Line [ ] Paint [ ] Other:

VEGGIE DENSITY BELOW OUTFALL: [ ] None [ ] Normal [X] Inhibited [ ] Excessive [ ] Other:

BENTHIC GROWTH IN PIPE: [X] None [ ] Sewage Fungus [ ] Brown [ ] Grey [ ] Orange [ ] Green [ ] Other:

POOL QUALITY: [ ] No pool [ ] Good/Clear [ ] Poor (see below) [ ] Odors [ ] Colors [ ] Oils [ ] Suds [ ] Algae [ ] Floatables [ ] Settled Solids [ ] Scour [ ] Inadeq. Outlet Protection [X] Other: full of sediment

FOR FLOWING ONLY

COLOR:	[X] Clear [ ] Brown [ ] Grey [ ] Yellow [ ] Green [ ] Orange [ ] Red [ ] Other:
TURBIDITY:	[X] None [ ] Slight Cloudiness [ ] Cloudy [ ] Opaque
FLOATING:	[X] None [ ] Sewage Solids [ ] Toilet Paper [ ] Trash [ ] Petroleum (oil sheen) [ ] Other:
SUSPENDED:	[X] None [ ] Sewage Solids [ ] Toilet Paper [ ] Trash [ ] Other:

OTHER CONCERNS: [ ] Excess Trash (paper/plastic bags) [ ] Dumping (bulk) [X] Excessive Sedimentation [ ] Headcut [ ] Needs Regular Maintenance [ ] Bank Erosion [ ] Steep Bank [ ] Other:

POTENTIAL RESTORATION CANDIDATE [X] no [ ] Discharge investigation [ ] Stream daylighting [ ] Outfall stabilization [ ] Storm water retrofit [ ] Channel stabilization [ ] Other:

If yes for daylighting:
Length of vegetative cover from outfall: _____ ft Type of existing vegetation: _____ Slope: _____ %

If yes for stormwater: Is stormwater currently controlled (quality and/or quantity)? [ ] No [ ] Not investigated
[ ] Yes Land Use description: _____ Stormwater BMP description: _____
Retrofit Area available:

OUTFALL SEVERITY: *(circle #)*

5	4	3	2	1
Heavy discharge with a distinct color and/or a strong smell. The amount of discharge is significant compared to the amount of normal flow in receiving stream; discharge appears to be having a significant impact downstream.		Small discharge; flow mostly clear and odorless. If the discharge has a color and/or odor, the amount of discharge is very small compared to the stream's base flow and any impact appears to be minor / localized.		Outfall does not have dry weather discharge; staining; or appearance of causing any erosion problems.

SKETCH/NOTES:

OTHER SURVEY FOR **REPORTED TO AUTHORITIES:** [ ] YES [ ] NO

Report sewage spill, significant pollution, or hazardous materials to CT DEP 860-424-3824 and local health department.

Structured Stream Crossing **SC**

Map #6

WATERSHED/SUBSHED: 4305-00-1-L1	**DATE:** 11 / 19 /2010	**ASSESSED BY:** SH, MM
SURVEY REACH ID:	**TIME:** 8 : 57 AM/PM	**PHOTO ID:** (*Camera-Pic #*) /# 00-1-L1-SC-a2.jpg
SITE ID: (*Condition-#*) **SC-** A	**LAT** 41 ° 53 ' 26.45 " **LONG** -73 ° 02 ' 12.01 " **LMK**____	**GPS** (*Unit ID*) R1

TYPE: ☒ Road Crossing ☐ Railroad Crossing ☒ Dam ☐ Footbridge ☐ Geological Formation (+/- 2ft change) ☐ Other:

ROAD OR RAILROAD CROSSING ONLY

CROSSING SHAPE:
☐ Arch ☐ Circular
☒ Box ☐ Other:
☐ Bottomless
☐ Elliptical

 # BARRELS:
☒ Single
☐ Double
☐ Triple
☐ Other:

MATERIAL:
☐ Concrete
☐ Metal (smooth)
☐ Metal (corrugated)
☒ Other: mortar & stone

ALIGNMENT:
☒ Flow-aligned
☐ Not flow-aligned
☐ toward LT bank
☐ toward RT bank
☐ Do not know

DIMENSIONS: (*if varies sketch*)
Barrel diameter: 3 (ft)
Height: 3 (ft)
Culvert length: 30 (ft)
Width: 3 (ft)
Roadway elevation: 10 (ft)

CONDITION: (*Evidence of…*)
☐ Cracking/chipping/corrosion ☐ Downstream scour hole
☐ Sediment deposition ☐ Failing embankment
☐ Collected organic debris ☐ Other:

CULVERT SLOPE:
☐ Flat
☒ Slight (2° – 5°)
☐ Obvious (>5°)

UNDERSIZED?
☒ No ☐ Yes ☐ Unsure

DAMS

TYPE:
☒ Manmade
☐ Active Beaver
☐ Old/Abandoned Beaver

MATERIAL:
☐ Concrete (poured or block) ☐ Dry stone
☒ Mortared stone ☐ Gabion ☐ Other:
Height: 10 (ft)

MATERIAL:
☐ Large woody debris ☐ Small woody debris
Height: (ft)

POTENTIAL RESTORATION CANDIDATE
☒ no
☐ Fish barrier removal ☐ Fish passage ☐ Upstream storage retrofit ☐ Stream repair
☐ Culvert repair/replacement ☐ Beaver deceiver/removal ☐ Other:

IS SC ACTING AS GRADE CONTROL ☐ No ☒ Yes ☐ Unknown

If yes for fish barrier (> 6 in drop or flow < ½ inch)

EXTENT OF PHYSICAL BLOCKAGE:
☐ Total ☐ Partial
☐ Temporary ☐ Unknown

CAUSE:
☐ Culvert raised, above stream ____ (in)
☐ Drop too high, water drop: ____ (in)
☐ Shallow flow, water depth: ____ (in)
☐ Other:

BLOCKAGE SEVERITY: (*circle #*)

5	4	3	2	1
A structure such as a dam or road culvert on a 3rd order or greater stream blocking the upstream movement of anadromous fish; no fish passage device present.		A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish.		A temporary barrier such as a beaver dam or a blockage at the very head of a stream with very little viable fish habitat above it; natural barriers such as waterfalls.

NOTES/SKETCH:

OTHER SURVEY FORMS COMPLETED FOR SAME AREA:

REPORTED TO AUTHORITIES: ☐ YES ☐ NO

Report sewage spill, significant pollution, or hazardous materials to CT DEP 860-424-3824 and local health department.

Structured Stream Crossing **SC**

Map #7

WATERSHED/SUBSHED: 4305-00-1-L1	**DATE:** 11 / 19 / 2010	**ASSESSED BY:** SH, MM
SURVEY REACH ID:	**TIME:** 11 : 34 (AM)/PM	**PHOTO ID:** (*Camera-Pic #*) /# 00-1-L1-SC-b2.jpg
SITE ID: (*Condition-#*) **SC-** B	**LAT** 41 ° 53 ' 2.18 " **LONG** -73 ° 02 ' 42.91 " **LMK**_____	**GPS** (*Unit ID*) R1

TYPE: ☒ Road Crossing ☐ Railroad Crossing ☐ Dam ☐ Footbridge ☐ Geological Formation (+/- 2ft change) ☐ Other:

ROAD OR RAILROAD CROSSING ONLY

CROSSING SHAPE:
☐ Arch ☒ Circular
☐ Box ☐ Other:
☐ Bottomless
☐ Elliptical

 # BARRELS:
☐ Single
☐ Double
☐ Triple
☒ Other: five

MATERIAL:
☒ Concrete
☐ Metal (smooth)
☐ Metal (corrugated)
☐ Other:

ALIGNMENT:
☐ Flow-aligned
☒ Not flow-aligned
☐ toward LT bank
☒ toward RT bank
☐ Do not know

DIMENSIONS: (*if varies sketch*)
Barrel diameter: 1.5 (ft)
Height: _____ (ft)
Culvert length: 25 (ft)
Width: 5 (ft)
Roadway elevation: 2 (ft)

CONDITION: (*Evidence of…*)
☐ Cracking/chipping/corrosion ☐ Downstream scour hole
☐ Sediment deposition ☐ Failing embankment
☐ Collected organic debris ☐ Other:

CULVERT SLOPE:
☐ Flat
☒ Slight (2° – 5°)
☐ Obvious (>5°)

UNDERSIZED?
☒ No ☐ Yes ☐ Unsure

DAMS

TYPE:
☐ Manmade
☐ Active Beaver
☐ Old/Abandoned Beaver

MATERIAL:
☐ Concrete (poured or block) ☐ Dry stone
☐ Mortared stone ☐ Gabion ☐ Other:

Height: (ft)

MATERIAL:
☐ Large woody debris ☐ Small woody debris

Height: (ft)

POTENTIAL RESTORATION CANDIDATE
☒ no
☐ Fish barrier removal ☐ Fish passage ☐ Upstream storage retrofit ☐ Stream repair
☐ Culvert repair/replacement ☐ Beaver deceiver/removal ☐ Other:

IS SC ACTING AS GRADE CONTROL ☐ No ☐ Yes ☐ Unknown

If yes for fish barrier (> 6 in drop or flow < ½ inch)

EXTENT OF PHYSICAL BLOCKAGE:
☐ Total ☐ Partial
☐ Temporary ☐ Unknown

CAUSE:
☐ Culvert raised, above stream _____ (in)
☐ Drop too high, water drop: _____ (in)
☐ Shallow flow, water depth: _____ (in)
☐ Other:

BLOCKAGE SEVERITY: (*circle #*)

5	4	3	2	1
A structure such as a dam or road culvert on a 3rd order or greater stream blocking the upstream movement of anadromous fish; no fish passage device present.		A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish.		A temporary barrier such as a beaver dam or a blockage at the very head of a stream with very little viable fish habitat above it; natural barriers such as waterfalls.

NOTES/SKETCH:

OTHER SURVEY FORMS COMPLETED FOR SAME AREA:

REPORTED TO AUTHORITIES: ☐ YES ☐ NO

Report sewage spill, significant pollution, or hazardous materials to CT DEP 860-424-3824 and local health department.

Structured Stream Crossing **SC**

Map #8

WATERSHED/SUBSHED: 4305-00-1-L1	**DATE:** 4 / 19 / 2011	**ASSESSED BY:** SH, MM
SURVEY REACH ID:	**TIME:** 9 : 55 AM/PM	**PHOTO ID:** (*Camera-Pic #*) /# 00-1-L1-SC-c.jpg
SITE ID: (*Condition-#*) **SC-** C	**LAT** 41 ° 52 ' 21.1 " **LONG** -73 ° 02 ' 20.05 " **LMK**____	**GPS** (*Unit ID*) R1

TYPE: ☒ Road Crossing ☐ Railroad Crossing ☐ Dam ☐ Footbridge ☐ Geological Formation (+/- 2ft change) ☐ Other:

ROAD OR RAILROAD CROSSING ONLY

CROSSING SHAPE:
☐ Arch ☒ Circular
☐ Box ☒ Other: flared ends
☐ Bottomless
☐ Elliptical

 # BARRELS:
☒ Single
☐ Double
☐ Triple
☐ Other:

MATERIAL:
☒ Concrete
☐ Metal (smooth)
☐ Metal (corrugated)
☐ Other:

ALIGNMENT:
☒ Flow-aligned
☐ Not flow-aligned
☐ toward LT bank
☐ toward RT bank
☐ Do not know

DIMENSIONS: (*if varies sketch*)
Barrel diameter: 1 (ft)
Height: 1 (ft)
Culvert length: 25 (ft)
Width: 3.0 (ft)
Roadway elevation: 3.5 (ft)

CONDITION: (*Evidence of…*)
☐ Cracking/chipping/corrosion ☐ Downstream scour hole
☒ Sediment deposition ☐ Failing embankment
☒ Collected organic debris ☐ Other:

CULVERT SLOPE:
☐ Flat
☒ Slight (2° – 5°)
☐ Obvious (>5°)

UNDERSIZED?
☒ No ☐ Yes ☐ Unsure

DAMS

TYPE:
☐ Manmade
☐ Active Beaver
☐ Old/Abandoned Beaver

MATERIAL:
☐ Concrete (poured or block) ☐ Dry stone
☐ Mortared stone ☐ Gabion ☐ Other:

MATERIAL:
☐ Large woody debris ☐ Small woody debris

Height: (ft)

Height: (ft)

POTENTIAL RESTORATION CANDIDATE
☒ no
☐ Fish barrier removal ☐ Fish passage ☐ Upstream storage retrofit ☐ Stream repair
☐ Culvert repair/replacement ☐ Beaver deceiver/removal ☐ Other:

IS SC ACTING AS GRADE CONTROL ☒ No ☐ Yes ☐ Unknown

If yes for fish barrier (> 6 in drop or flow < ½ inch)

EXTENT OF PHYSICAL BLOCKAGE:
☐ Total ☐ Partial
☐ Temporary ☐ Unknown

CAUSE:
☐ Culvert raised, above stream ____ (in)
☐ Drop too high, water drop: ____ (in)
☐ Shallow flow, water depth: ____ (in)
☐ Other:

BLOCKAGE SEVERITY: (*circle #*)

5	4	3	2	1
A structure such as a dam or road culvert on a 3rd order or greater stream blocking the upstream movement of anadromous fish; no fish passage device present.		A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish.		A temporary barrier such as a beaver dam or a blockage at the very head of a stream with very little viable fish habitat above it; natural barriers such as waterfalls.

NOTES/SKETCH:

Report sewage spill, significant pollution, or hazardous materials to CT DEP 860-424-3824 and local health department.

Map #9

Structured Stream Crossing **SC**

WATERSHED/SUBSHED: 4305-00-1-L1	**DATE:** 4 / 19 / 2011	**ASSESSED BY:** SH, MM
SURVEY REACH ID:	**TIME:** 9 : 57 (AM)/PM	**PHOTO ID:** (*Camera-Pic #*) /# 00-1-L1-SC-d.jpg
SITE ID: (*Condition-#*) **SC-** D	**LAT** 41 ° 52 ' 21.93 " **LONG** -73 ° 02 ' 37.23 " **LMK**____	**GPS** (*Unit ID*) R1

TYPE: ☒ Road Crossing ☐ Railroad Crossing ☐ Dam ☐ Footbridge ☐ Geological Formation (+/- 2ft change) ☐ Other:

ROAD OR RAILROAD CROSSING ONLY

CROSSING SHAPE:
☐ Arch ☒ Circular
☐ Box ☒ Other:
☐ Bottomless flared ends
☐ Elliptical

 # BARRELS:
☒ Single
☐ Double
☐ Triple
☐ Other:

MATERIAL:
☒ Concrete
☐ Metal (smooth)
☐ Metal (corrugated)
☐ Other:

ALIGNMENT:
☒ Flow-aligned
☐ Not flow-aligned
☐ toward LT bank
☐ toward RT bank
☐ Do not know

DIMENSIONS: (*if varies sketch*)
Barrel diameter: 1 (ft)
Height: 1 (ft)
Culvert length: 350 (ft)
Width: 3 (ft)
Roadway elevation: 3.5 (ft)

CONDITION: (*Evidence of…*)
☐ Cracking/chipping/corrosion ☐ Downstream scour hole
☒ Sediment deposition ☐ Failing embankment
☒ Collected organic debris ☐ Other:

CULVERT SLOPE:
☐ Flat
☒ Slight (2^o – 5^0)
☐ Obvious (>5^o)

UNDERSIZED?
☒ No ☐ Yes ☐ Unsure

DAMS

TYPE:
☐ Manmade
☐ Active Beaver
☐ Old/Abandoned Beaver

MATERIAL:
☐ Concrete (poured or block) ☐ Dry stone
☐ Mortared stone ☐ Gabion ☐ Other:
Height: (ft)

MATERIAL:
☐ Large woody debris ☐ Small woody debris
Height: (ft)

POTENTIAL RESTORATION CANDIDATE
☒ no
☐ Fish barrier removal ☐ Fish passage ☐ Upstream storage retrofit ☐ Stream repair
☐ Culvert repair/replacement ☐ Beaver deceiver/removal ☐ Other:

IS SC ACTING AS GRADE CONTROL ☒ No ☐ Yes ☐ Unknown

If yes for fish barrier (> 6 in drop or flow < ½ inch)

EXTENT OF PHYSICAL BLOCKAGE:
☐ Total ☐ Partial
☐ Temporary ☐ Unknown

CAUSE:
☐ Culvert raised, above stream ____ (in)
☐ Drop too high, water drop: ____ (in)
☐ Shallow flow, water depth: ____ (in)
☐ Other:

BLOCKAGE SEVERITY: (*circle #*)

5	4	3	2	1
A structure such as a dam or road culvert on a 3rd order or greater stream blocking the upstream movement of anadromous fish; no fish passage device present.		A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish.		A temporary barrier such as a beaver dam or a blockage at the very head of a stream with very little viable fish habitat above it; natural barriers such as waterfalls.

NOTES/SKETCH:
outlet into West Hill Pond

OTHER SURVEY FORMS COMPLETED FOR SAME AREA:

REPORTED TO AUTHORITIES: ☐ YES ☐ NO

Report sewage spill, significant pollution, or hazardous materials to CT DEP 860-424-3824 and local health department.

Storm Water Outfalls **OT**

Map #10

WATERSHED/SUBSHED: 4305-00-3-R1		**DATE:** 11 / 18 / 2010	**ASSESSED BY:** SH, MM
SURVEY REACH ID:	**TIME:** 9 : 45 AM/PM	**PHOTO ID:** (*Camera-Pic #*)	/# 00-3-R1-OT-a.jpg
SITE ID (*Condition-#*): **OT-** A	**LAT** 41 ° 54 ' 23.72 " **LONG** -73 ° 59 ' 54.52 "	**LMK**_____	**GPS:** (*Unit ID*) R1

BANK: ☐ LT ☒ RT ☐ Head

FLOW: ☐ None ☐ Trickle ☒ Moderate ☐ Substantial ☐ Other:

TYPE: ☒ Pipe ☐ Leak Off ☐ Channel

MATERIAL: ☐ Concrete ☐ Metal ☐ PVC/Plastic ☐ Brick ☒ Corrugated ☐ Other ☐ Vitrified Tile

☐ Concrete ☐ Riprap ☐ Vegetated ☐ Earth ☐ Other:

SHAPE: ☒ Circular ☐ Elliptical ☐ Other:

☐ Trapezoid ☐ Parabolic ☐ Other:

NUMBER: ☒ Single ☐ Double ☐ Triple

DIMENSIONS: Diameter: 25 (in)

FLARED END? ☐ Yes ☒ No

HEADWALL? ☐ YES ☒ NO

Depth: _____(in)

Width (Top): _____(in)

" (Bottom): _____(in)

SUBMERGED: ☒ No ☐ Partially ☐ Fully

Channel slope: _____ (degrees)

PIPE CONDITION: ☒ Good ☐ Chip/Cracked ☐ Peeling Paint ☐ Corrosion ☐ Squashed ☐ Other:

ODOR: ☒ No ☐ Gas ☐ Sewage ☐ Rancid/Sour ☐ Sulfide ☐ Other:

DEPOSITS/STAINS: ☒ None ☐ Oily ☐ Flow Line ☐ Paint ☐ Other:

VEGGIE DENSITY BELOW OUTFALL: ☒ None ☐ Normal ☐ Inhibited ☐ Excessive ☐ Other:

BENTHIC GROWTH IN PIPE: ☒ None ☐ Sewage Fungus ☐ Brown ☐ Grey ☐ Orange ☐ Green ☐ Other:

POOL QUALITY: ☐ No pool ☒ Good/Clear ☐ Poor (see below) ☐ Odors ☐ Colors ☐ Oils ☐ Suds ☐ Algae ☐ Floatables ☐ Settled Solids ☐ Scour ☐ Inadeq. Outlet Protection ☐ Other:

FOR FLOWING ONLY

COLOR:	☒ Clear ☐ Brown ☐ Grey ☐ Yellow ☐ Green ☐ Orange ☐ Red ☐ Other:
TURBIDITY:	☒ None ☐ Slight Cloudiness ☐ Cloudy ☐ Opaque
FLOATING:	☒ None ☐ Sewage Solids ☐ Toilet Paper ☐ Trash ☐ Petroleum (oil sheen) ☐ Other:
SUSPENDED:	☒ None ☐ Sewage Solids ☐ Toilet Paper ☐ Trash ☐ Other:

OTHER CONCERNS: ☐ Excess Trash (paper/plastic bags) ☐ Dumping (bulk) ☐ Excessive Sedimentation ☐ Headcut ☐ Needs Regular Maintenance ☐ Bank Erosion ☐ Steep Bank ☐ Other:

POTENTIAL RESTORATION CANDIDATE ☐ Discharge investigation ☐ Stream daylighting ☐ Outfall stabilization ☒ no ☐ Storm water retrofit ☐ Channel stabilization ☐ Other:

If yes for daylighting:

Length of vegetative cover from outfall: _____ft Type of existing vegetation:_____ Slope: _____%

If yes for stormwater: Is stormwater currently controlled (quality and/or quantity)? ☐ No ☐ Not investigated

☐ Yes Land Use description:_____ Stormwater BMP description:_____

Retrofit Area available:

OUTFALL SEVERITY: *(circle #)*

5	4	3	2	1
Heavy discharge with a distinct color and/or a strong smell. The amount of discharge is significant compared to the amount of normal flow in receiving stream; discharge appears to be having a significant impact downstream.		Small discharge; flow mostly clear and odorless. If the discharge has a color and/or odor, the amount of discharge is very small compared to the stream's base flow and any impact appears to be minor / localized.		Outfall does not have dry weather discharge; staining; or appearance of causing any erosion problems.

SKETCH/NOTES:

OTHER SURVEY FO

REPORTED TO AUTHORITIES: ☐ YES ☐ NO

Report sewage spill, significant pollution, or hazardous materials to CT DEP 860-424-3824 and local health department.

Map #11

Structured Stream Crossing **SC**

WATERSHED/SUBSHED: 4305-00-3-R1	**DATE:** 11 / 18 / 2010	**ASSESSED BY:** SH, MM
SURVEY REACH ID:	**TIME:** 9 : 55 AM/PM	**PHOTO ID:** (*Camera-Pic #*) /# 00-3-R1-SC-a.jpg
SITE ID: (*Condition-#*) **SC-** A	**LAT** 41 °54 '30.51 " **LONG** -73 °0.0 '02.04 " **LMK**_____	**GPS** (*Unit ID*) R1

TYPE: ☒ Road Crossing ☐ Railroad Crossing ☐ Dam ☐ Footbridge ☐ Geological Formation (+/- 2ft change) ☐ Other:

ROAD OR RAILROAD CROSSING ONLY

CROSSING SHAPE:
☐ Arch ☐ Circular
☒ Box ☐ Other:
☒ Bottomless
☐ Elliptical

 # BARRELS:
☒ Single
☐ Double
☐ Triple
☐ Other:

MATERIAL:
☒ Concrete
☐ Metal (smooth)
☐ Metal (corrugated)
☐ Other:

ALIGNMENT:
☒ Flow-aligned
☐ Not flow-aligned
☐ toward LT bank
☐ toward RT bank
☐ Do not know

DIMENSIONS: (*if varies sketch*)
Barrel diameter: _____(ft)
Height: _____(ft)
Culvert length: 30 (ft)
Width: 20 (ft)
Roadway elevation: 10 (ft)

CONDITION: (*Evidence of…*)
☒ Cracking/chipping/corrosion ☐ Downstream scour hole
☐ Sediment deposition ☐ Failing embankment
☐ Collected organic debris ☐ Other:

CULVERT SLOPE:
☐ Flat
☒ Slight (2° – 5°)
☐ Obvious (>5°)

UNDERSIZED?
☒ No ☐ Yes ☐ Unsure

DAMS

TYPE:
☐ Manmade
☐ Active Beaver
☐ Old/Abandoned Beaver

MATERIAL:
☐ Concrete (poured or block) ☐ Dry stone
☐ Mortared stone ☐ Gabion ☐ Other:
Height: (ft)

MATERIAL:
☐ Large woody debris ☐ Small woody debris
Height: (ft)

POTENTIAL RESTORATION CANDIDATE
☒ no
☐ Fish barrier removal ☐ Fish passage ☐ Upstream storage retrofit ☐ Stream repair
☐ Culvert repair/replacement ☐ Beaver deceiver/removal ☐ Other:

IS SC ACTING AS GRADE CONTROL ☒ No ☐ Yes ☐ Unknown

If yes for fish barrier (> 6 in drop or flow < ½ inch)

EXTENT OF PHYSICAL BLOCKAGE:
☐ Total ☐ Partial
☐ Temporary ☐ Unknown

CAUSE:
☐ Culvert raised, above stream _____ (in)
☐ Drop too high, water drop: _____ (in)
☐ Shallow flow, water depth: _____ (in)
☐ Other:

BLOCKAGE SEVERITY: (*circle #*)

5	4	3	2	1
A structure such as a dam or road culvert on a 3rd order or greater stream blocking the upstream movement of anadromous fish; no fish passage device present.		A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish.		A temporary barrier such as a beaver dam or a blockage at the very head of a stream with very little viable fish habitat above it; natural barriers such as waterfalls.

NOTES/SKETCH:

OTHER SURVEY FORMS COMPLETED FOR SAME AREA:

REPORTED TO AUTHORITIES: ☐ YES ☐ NO

Report sewage spill, significant pollution, or hazardous materials to CT DEP 860-424-3824 and local health department.

Map #12

Structured Stream Crossing **SC**

WATERSHED/SUBSHED: 4305-00-3-R1		**DATE:** 11 / 18 / 2010	**ASSESSED BY:** SH, MM
SURVEY REACH ID:	**TIME:** 10 : 15 AM/PM	**PHOTO ID:** (*Camera-Pic #*)	/# 00-3-R1-SC-b.jpg
SITE ID: (*Condition-#*) **SC-** B	**LAT** 41 ° 54 ' 41.39 "	**LONG** -73 ° 0.0 ' 29.62 "	**LMK**____ **GPS** (*Unit ID*) R1

TYPE: ☒ Road Crossing ☐ Railroad Crossing ☐ Dam ☐ Footbridge ☐ Geological Formation (+/- 2ft change) ☐ Other:

ROAD OR RAILROAD CROSSING ONLY

CROSSING SHAPE:
☒ Arch ☐ Circular
☐ Box ☐ Other:
☐ Bottomless
☐ Elliptical

 # BARRELS:
☒ Single
☐ Double
☐ Triple
☐ Other:

MATERIAL:
☒ Concrete
☐ Metal (smooth)
☐ Metal (corrugated)
☐ Other:

ALIGNMENT:
☐ Flow-aligned
☒ Not flow-aligned
☒ toward LT bank
☐ toward RT bank
☐ Do not know

DIMENSIONS: (*if varies sketch*)
Barrel diameter: ____ (ft)
Height: ____ (ft)
Culvert length: 40 (ft)
Width: 15 (ft)
Roadway elevation: 15 (ft)

CONDITION: (*Evidence of…*)
☐ Cracking/chipping/corrosion ☐ Downstream scour hole
☐ Sediment deposition ☐ Failing embankment
☐ Collected organic debris ☐ Other:

CULVERT SLOPE:
☐ Flat
☒ Slight (2° – 5°)
☐ Obvious (>5°)

UNDERSIZED?
☒ No ☐ Yes ☐ Unsure

DAMS

TYPE:
☐ Manmade
☐ Active Beaver
☐ Old/Abandoned Beaver

MATERIAL:
☐ Concrete (poured or block) ☐ Dry stone
☐ Mortared stone ☐ Gabion ☐ Other:

MATERIAL:
☐ Large woody debris ☐ Small woody debris

Height: (ft)

Height: (ft)

POTENTIAL RESTORATION CANDIDATE
☒ no
☐ Fish barrier removal ☐ Fish passage ☐ Upstream storage retrofit ☐ Stream repair
☐ Culvert repair/replacement ☐ Beaver deceiver/removal ☐ Other:

IS SC ACTING AS GRADE CONTROL ☒ No ☐ Yes ☐ Unknown

If yes for fish barrier (> 6 in drop or flow < ½ inch)

EXTENT OF PHYSICAL BLOCKAGE:
☐ Total ☐ Partial
☐ Temporary ☐ Unknown

CAUSE:
☐ Culvert raised, above stream ____ (in)
☐ Drop too high, water drop: ____ (in)
☐ Shallow flow, water depth: ____ (in)
☐ Other:

BLOCKAGE SEVERITY: (*circle #*)

5	4	3	2	1
A structure such as a dam or road culvert on a 3rd order or greater stream blocking the upstream movement of anadromous fish; no fish passage device present.		A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish.		A temporary barrier such as a beaver dam or a blockage at the very head of a stream with very little viable fish habitat above it; natural barriers such as waterfalls.

NOTES/SKETCH:

OTHER SURVEY FOR **REPORTED TO AUTHORITIES:** ☐ YES ☐ NO

Report sewage spill, significant pollution, or hazardous materials to CT DEP 860-424-3824 and local health department.

Structured Stream Crossing **SC**

Map #13

WATERSHED/SUBSHED: 4305-00-3-R1 | **DATE:** 11 / 18 / 2010 | **ASSESSED BY:** SH, MM

SURVEY REACH ID: | **TIME:** 10 : 30 AM/PM | **PHOTO ID:** (*Camera-Pic #*) /#00-3-R1-SC-c2.jpg

SITE ID: (*Condition-#*) **SC-** C | **LAT** 41 ° 54 ' 44.51 " **LONG** -73 ° 1.0 ' 03.97 " **LMK**_____ | **GPS** (*Unit ID*) R1

TYPE: ☒ Road Crossing ☐ Railroad Crossing ☐ Dam ☐ Footbridge ☐ Geological Formation (+/- 2ft change) ☐ Other:

ROAD OR RAILROAD CROSSING ONLY

CROSSING SHAPE:
☒ Arch ☐ Circular
☐ Box ☐ Other:
☒ Bottomless
☐ Elliptical

 # BARRELS:
☐ Single
☐ Double
☒ Triple
☐ Other:

MATERIAL:
☒ Concrete
☐ Metal (smooth)
☐ Metal (corrugated)
☐ Other:

ALIGNMENT:
☒ Flow-aligned
☐ Not flow-aligned
☐ toward LT bank
☐ toward RT bank
☐ Do not know

DIMENSIONS: (*if varies sketch*)
Barrel diameter: 6 (ft)
x2 Height: 6 (ft)
Culvert length: 20 (ft)
x1 Width: 10 (ft)
Roadway elevation: 10 (ft)

CONDITION: (*Evidence of…*)
☒ Cracking/chipping/corrosion ☐ Downstream scour hole
☐ Sediment deposition ☐ Failing embankment
☐ Collected organic debris ☐ Other:

CULVERT SLOPE:
☒ Flat
☐ Slight (2° – 5°)
☐ Obvious (>5°)

UNDERSIZED?
☒ No ☐ Yes ☐ Unsure

DAMS

TYPE:
☐ Manmade
☐ Active Beaver
☐ Old/Abandoned Beaver

MATERIAL:
☐ Concrete (poured or block) ☐ Dry stone
☐ Mortared stone ☐ Gabion ☐ Other:

Height: (ft)

MATERIAL:
☐ Large woody debris ☐ Small woody debris

Height: (ft)

POTENTIAL RESTORATION CANDIDATE
☒ no
☐ Fish barrier removal ☐ Fish passage ☐ Upstream storage retrofit ☐ Stream repair
☐ Culvert repair/replacement ☐ Beaver deceiver/removal ☐ Other:

IS SC ACTING AS GRADE CONTROL ☒ No ☐ Yes ☐ Unknown

If yes for fish barrier (> 6 in drop or flow < ½ inch)

EXTENT OF PHYSICAL BLOCKAGE:
☐ Total ☐ Partial
☐ Temporary ☐ Unknown

CAUSE:
☐ Culvert raised, above stream _____ (in)
☐ Drop too high, water drop: _____ (in)
☐ Shallow flow, water depth: _____ (in)
☐ Other:

BLOCKAGE SEVERITY: (*circle #*)

5	4	3	2	1
A structure such as a dam or road culvert on a 3rd order or greater stream blocking the upstream movement of anadromous fish; no fish passage device present.		A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish.		A temporary barrier such as a beaver dam or a blockage at the very head of a stream with very little viable fish habitat above it; natural barriers such as waterfalls.

NOTES/SKETCH:

OTHER SURVEY FO

REPORTED TO AUTHORITIES: ☐ YES ☐ NO

Report sewage spill, significant pollution, or hazardous materials to CT DEP 860-424-3824 and local health department.

Structured Stream Crossing **SC**

Map #14

WATERSHED/SUBSHED: 4305-00-3-R1	**DATE:** 04 / 19 / 2011	**ASSESSED BY:** SH, MM
SURVEY REACH ID:	**TIME:** 8 : 55 (AM)/PM	**PHOTO ID:** (*Camera-Pic #*) /# 00-3-R1-SC-d2.jpg
SITE ID: (*Condition-#*) SC-D	**LAT** 41 ° 54 ' 31.63 " **LONG** -73 ° 59 ' 56.64 " **LMK**____	**GPS** (*Unit ID*) R1

TYPE: ☒ Road Crossing ☐ Railroad Crossing ☐ Dam ☐ Footbridge ☐ Geological Formation (+/- 2ft change) ☐ Other:

ROAD OR RAILROAD CROSSING ONLY

CROSSING SHAPE:
☐ Arch ☒ Circular
☐ Box ☐ Other:
☐ Bottomless
☐ Elliptical

 # BARRELS:
☒ Single
☐ Double
☐ Triple
☐ Other:

MATERIAL:
☒ Concrete
☐ Metal (smooth)
☐ Metal (corrugated)
☒ Other: mortared stone

ALIGNMENT:
☒ Flow-aligned
☐ Not flow-aligned
☐ toward LT bank
☐ toward RT bank
☐ Do not know

DIMENSIONS: (*if varies sketch*)
Barrel diameter: 3 (ft)
Height: 3 (ft)
Culvert length: 40 (ft)
Width: 10 (ft)
Roadway elevation: 7 (ft)

CONDITION: (*Evidence of…*)
☐ Cracking/chipping/corrosion ☐ Downstream scour hole
☐ Sediment deposition ☐ Failing embankment
☒ Collected organic debris ☐ Other:

CULVERT SLOPE:
☐ Flat
☒ Slight (2° – 5°)
☐ Obvious (>5°)

UNDERSIZED?
☒ No ☐ Yes ☐ Unsure

DAMS

TYPE:
☐ Manmade
☐ Active Beaver
☐ Old/Abandoned Beaver

MATERIAL:
☐ Concrete (poured or block) ☐ Dry stone
☐ Mortared stone ☐ Gabion ☐ Other:

Height: (ft)

MATERIAL:
☐ Large woody debris ☐ Small woody debris

Height: (ft)

POTENTIAL RESTORATION CANDIDATE
☒ no
☐ Fish barrier removal ☐ Fish passage ☐ Upstream storage retrofit ☐ Stream repair
☐ Culvert repair/replacement ☐ Beaver deceiver/removal ☐ Other:

IS SC ACTING AS GRADE CONTROL
☒ No ☐ Yes ☐ Unknown

If yes for fish barrier (> 6 in drop or flow < ½ inch)

EXTENT OF PHYSICAL BLOCKAGE:
☐ Total ☐ Partial
☐ Temporary ☐ Unknown

CAUSE:
☐ Culvert raised, above stream ____ (in)
☐ Drop too high, water drop: ____ (in)
☐ Shallow flow, water depth: ____ (in)
☐ Other:

BLOCKAGE SEVERITY: (*circle #*)

5	4	3	2	1
A structure such as a dam or road culvert on a 3rd order or greater stream blocking the upstream movement of anadromous fish; no fish passage device present.		A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish.		A temporary barrier such as a beaver dam or a blockage at the very head of a stream with very little viable fish habitat above it; natural barriers such as waterfalls.

NOTES/SKETCH:

OTHER SURVEY FORMS COMPLETED FOR SAME AREA: ☐ NO

Report sewage spill, significant pollution, or hazardous materials to CT DEP 860-424-3824 and local health department.

Storm Water Outfalls **OT**

Map #15

WATERSHED/SUBSHED: 4305-00-3-R2 | **DATE:** 11 / 18 / 2010 | **ASSESSED BY:** SH, MM

SURVEY REACH ID: | **TIME:** 9 : 00 AM/PM | **PHOTO ID:** (*Camera-Pic #*) /# 00-3-R2-OT-a2.jpg

SITE ID (*Condition-#*): **OT-** A | **LAT** 41 ° 54 ' 16.69 " **LONG** -72 ° 59 ' 46.77 " | **LMK** | **GPS:** (*Unit ID*) R1

BANK: ☐ LT ☒ RT ☐ Head

FLOW: ☐ None ☐ Trickle ☒ Moderate ☐ Substantial ☐ Other:

TYPE: ☒ Pipe ☐ Leak Off ☐ Channel

MATERIAL: ☐ Concrete ☐ Metal ☒ PVC/Plastic ☐ Brick ☐ Corrugated ☐ Other ☐ Vitrified Tile

☐ Concrete ☐ Riprap ☐ Vegetated ☐ Earth ☐ Other:

SHAPE: ☒ Circular ☐ Elliptical ☐ Other: | **NUMBER:** ☒ Single ☐ Double ☐ Triple

☐ Trapezoid ☐ Parabolic ☐ Other:

DIMENSIONS: Diameter: 6 (in) | **FLARED END?** ☐ Yes ☒ No | **HEADWALL?** ☒ YES ☐ NO

Depth: (in) Width (Top): (in) " (Bottom): (in)

SUBMERGED: ☒ No ☐ Partially ☐ Fully

Channel slope: (degrees)

PIPE CONDITION: ☒ Good ☐ Chip/Cracked ☐ Peeling Paint ☐ Corrosion ☐ Squashed ☐ Other:

ODOR: ☐ No ☒ Gas ☒ Sewage ☒ Rancid/Sour ☐ Sulfide ☐ Other:

DEPOSITS/STAINS: ☐ None ☒ Oily ☐ Flow Line ☐ Paint ☒ Other: iron rust colored stains

VEGGIE DENSITY BELOW OUTFALL: ☒ None ☐ Normal ☐ Inhibited ☐ Excessive ☐ Other:

BENTHIC GROWTH IN PIPE: ☐ None ☒ Sewage Fungus ☐ Brown ☐ Grey ☒ Orange ☐ Green ☐ Other:

POOL QUALITY: ☐ No pool ☐ Good/Clear ☒ Poor (see below) ☒ Odors ☒ Colors ☒ Oils ☐ Suds ☒ Algae ☐ Floatables ☐ Settled Solids ☐ Scour ☐ Inadeq. Outlet Protection ☐ Other:

FOR FLOWING ONLY

COLOR:	☒ Clear ☐ Brown ☐ Grey ☐ Yellow ☐ Green ☐ Orange ☐ Red ☐ Other:
TURBIDITY:	☒ None ☐ Slight Cloudiness ☐ Cloudy ☐ Opaque
FLOATING:	☐ None ☐ Sewage Solids ☐ Toilet Paper ☐ Trash ☒ Petroleum (oil sheen) ☐ Other:
SUSPENDED:	☒ None ☐ Sewage Solids ☐ Toilet Paper ☐ Trash ☐ Other:

OTHER CONCERNS: ☐ Excess Trash (paper/plastic bags) ☐ Dumping (bulk) ☐ Excessive Sedimentation ☐ Headcut ☐ Needs Regular Maintenance ☐ Bank Erosion ☐ Steep Bank ☐ Other:

POTENTIAL RESTORATION CANDIDATE ☒ Discharge investigation ☐ Stream daylighting ☐ Outfall stabilization ☐ no ☐ Storm water retrofit ☐ Channel stabilization ☐ Other:

If yes for daylighting:
Length of vegetative cover from outfall: 20 ft Type of existing vegetation: tree/shrub Slope: 10 %

If yes for stormwater: Is stormwater currently controlled (quality and/or quantity)? ☒ No ☐ Not investigated
☐ Yes Land Use description: Stormwater BMP description:
Retrofit Area available:

OUTFALL SEVERITY: *(circle #)*

5	4	3
Heavy discharge with a distinct color and/or a strong smell. The amount of discharge is significant compared to the amount of normal flow in receiving stream; discharge appears to be having a significant impact downstream.	Small discharge; flow mostly clear and (discharge has a color and/or odor, the a discharge is very small compared to the flow and any impact appears to be mino	y weather opearance roblems.

SKETCH/NOTES: Grease budding at pipe,
Pipe discharge is within designated TROUT MGMNT AREA

OTHER SURVEY FORMS COMPLETED FOR SAME AREA: ES ☐ NO

Report sewage spill, significant pollution, or hazardous materials to CT DEP 860-424-3824 and local health department.

Structured Stream Crossing **SC**

Map #16

WATERSHED/SUBSHED: 4305-00-3-R2		**DATE:** 11 / 18 / 2010	**ASSESSED BY:** SH, MM
SURVEY REACH ID:	**TIME:** 8 : 20 AM/PM	**PHOTO ID:** (*Camera-Pic #*)	/# 00-3-R2-Sc-a.jpg
SITE ID: (*Condition-#*) **SC-**A	**LAT** 41 ° 54 ' 06.01 " **LONG** -72 ° 59 ' 21.87 "	**LMK**_____	**GPS** (*Unit ID*) R1

TYPE: ☒ Road Crossing ☐ Railroad Crossing ☐ Dam ☐ Footbridge ☐ Geological Formation (+/- 2ft change) ☐ Other:

ROAD OR RAILROAD CROSSING ONLY

CROSSING SHAPE:
☐ Arch ☐ Circular
☒ Box ☐ Other:
☒ Bottomless
☐ Elliptical

 # BARRELS:
☒ Single
☐ Double
☐ Triple
☐ Other:

MATERIAL:
☒ Concrete
☐ Metal (smooth)
☐ Metal (corrugated)
☐ Other:

ALIGNMENT:
☒ Flow-aligned
☐ Not flow-aligned
☐ toward LT bank
☐ toward RT bank
☐ Do not know

DIMENSIONS: (*if varies sketch*)
Barrel diameter: _____(ft)
Height: 9 (ft)
Culvert length: 30 (ft)
Width: 30 (ft)
Roadway elevation: 12 (ft)

CONDITION: (*Evidence of…*)
☐ Cracking/chipping/corrosion ☐ Downstream scour hole
☐ Sediment deposition ☐ Failing embankment
☐ Collected organic debris ☐ Other:

CULVERT SLOPE:
☐ Flat
☒ Slight (2° – 5°)
☐ Obvious (>5°)

UNDERSIZED?
☒ No ☐ Yes ☐ Unsure

DAMS

TYPE:
☐ Manmade
☐ Active Beaver
☐ Old/Abandoned Beaver

MATERIAL:
☐ Concrete (poured or block) ☐ Dry stone
☐ Mortared stone ☐ Gabion ☐ Other:

MATERIAL:
☐ Large woody debris ☐ Small woody debris

Height: (ft)

Height: (ft)

POTENTIAL RESTORATION CANDIDATE
☒ no
☐ Fish barrier removal ☐ Fish passage ☐ Upstream storage retrofit ☐ Stream repair
☐ Culvert repair/replacement ☐ Beaver deceiver/removal ☐ Other:

IS SC ACTING AS GRADE CONTROL ☒ No ☐ Yes ☐ Unknown

If yes for fish barrier (> 6 in drop or flow < ½ inch)

EXTENT OF PHYSICAL BLOCKAGE:
☐ Total ☐ Partial
☐ Temporary ☐ Unknown

CAUSE:
☐ Culvert raised, above stream _____ (in)
☐ Drop too high, water drop: _____ (in)
☐ Shallow flow, water depth: _____ (in)
☐ Other:

BLOCKAGE SEVERITY: (*circle #*)

5	4	3	2	1
A structure such as a dam or road culvert on a 3rd order or greater stream blocking the upstream movement of anadromous fish; no fish passage device present.		A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish.		A temporary barrier such as a beaver dam or a blockage at the very head of a stream with very little viable fish habitat above it; natural barriers such as waterfalls.

NOTES/SKETCH:

OTHER SURVEY FORMS COMPLETED FOR SAME AREA?

REPORTED TO AUTHORITIES: ☐ YES ☐ NO

Report sewage spill, significant pollution, or hazardous materials to CT DEP 860-424-3824 and local health department.

Structured Stream Crossing **SC**

Map #17

WATERSHED/SUBSHED: 4305-00-3-R2	**DATE:** 11 / 18 / 2010	**ASSESSED BY:** SH, MM
SURVEY REACH ID:	**TIME:** 8 : 30 AM/PM	**PHOTO ID:** (*Camera-Pic #*) /# 00-3-R2-SC-b.jpg
SITE ID: (*Condition-#*) **SC-** B	**LAT** 41 ° 54 ' 08.25 " **LONG** -72 ° 59 ' 33.16 " **LMK**____	**GPS** (*Unit ID*) R1

TYPE: ☐ Road Crossing ☐ Railroad Crossing ☐ Dam ☐ Footbridge ☐ Geological Formation (+/- 2ft change) ☐ Other:

ROAD OR RAILROAD CROSSING ONLY

CROSSING SHAPE:
☐ Arch ☐ Circular
☒ Box ☐ Other:
☐ Bottomless
☐ Elliptical

 # BARRELS:
☒ Single
☐ Double
☐ Triple
☐ Other:

MATERIAL:
☒ Concrete
☐ Metal (smooth)
☐ Metal (corrugated)
☒ Other: I-beam

ALIGNMENT:
☐ Flow-aligned
☒ Not flow-aligned
☒ toward LT bank
☐ toward RT bank
☐ Do not know

DIMENSIONS: (*if varies sketch*)
Barrel diameter: ____(ft)
Height: 10 (ft)
Culvert length: 30 (ft)
Width: 30 (ft)
Roadway elevation: 12 (ft)

CONDITION: (*Evidence of…*)
☐ Cracking/chipping/corrosion ☐ Downstream scour hole
☐ Sediment deposition ☐ Failing embankment
☐ Collected organic debris ☐ Other:

CULVERT SLOPE:
☐ Flat
☒ Slight (2° – 5°)
☐ Obvious (>5°)

UNDERSIZED?
☒ No ☐ Yes ☐ Unsure

DAMS

TYPE:
☐ Manmade
☐ Active Beaver
☐ Old/Abandoned Beaver

MATERIAL:
☐ Concrete (poured or block) ☐ Dry stone
☐ Mortared stone ☐ Gabion ☐ Other:

MATERIAL:
☐ Large woody debris ☐ Small woody debris

Height: (ft)

Height: (ft)

POTENTIAL RESTORATION CANDIDATE
☒ no
☐ Fish barrier removal ☐ Fish passage ☐ Upstream storage retrofit ☐ Stream repair
☐ Culvert repair/replacement ☐ Beaver deceiver/removal ☐ Other:

IS SC ACTING AS GRADE CONTROL ☒ No ☐ Yes ☐ Unknown

If yes for fish barrier (> 6 in drop or flow < ½ inch)

EXTENT OF PHYSICAL BLOCKAGE:
☐ Total ☐ Partial
☐ Temporary ☐ Unknown

CAUSE:
☐ Culvert raised, above stream ____ (in)
☐ Drop too high, water drop: ____ (in)
☐ Shallow flow, water depth: ____ (in)
☐ Other:

BLOCKAGE SEVERITY: (*circle #*)

5	4	3	2	1
A structure such as a dam or road culvert on a 3rd order or greater stream blocking the upstream movement of anadromous fish; no fish passage device present.		A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish.		A temporary barrier such as a beaver dam or a blockage at the very head of a stream with very little viable fish habitat above it; natural barriers such as waterfalls.

NOTES/SKETCH:

OTHER SURVEY FORMS COMPLETED FOR SAME AREA:

REPORTED TO AUTHORITIES: ☐ YES ☐ NO

Report sewage spill, significant pollution, or hazardous materials to CT DEP 860-424-3824 and local health department.

Storm Water Outfalls **OT**

Map #18

WATERSHED/SUBSHED: 4305-01-1		**DATE:** 04 / 19 / 2011	**ASSESSED BY:** SH, MM
SURVEY REACH ID:	**TIME:** 09 : 40 AM/PM	**PHOTO ID:** (*Camera-Pic #*)	/# 01-1-OT-a.jpg
SITE ID (*Condition-#*): **OT-** A	**LAT** 41 ° 53 ' 17.72 " **LONG** -73 ° 01 ' 13.90 "	**LMK**	**GPS:** (*Unit ID*) R1

BANK: ☐ LT ☐ RT ☒ Head

FLOW: ☐ None ☐ Trickle ☒ Moderate ☐ Substantial ☐ Other:

TYPE: ☒ Pipe ☐ Leak Off

MATERIAL: ☒ Concrete ☐ Metal ☐ PVC/Plastic ☐ Brick ☐ Corrugated ☐ Other ☐ Vitrified Tile

SHAPE: ☒ Circular ☐ Elliptical ☐ Other:

NUMBER: ☒ Single ☐ Double ☐ Triple

DIMENSIONS: Diameter: 18 (in)

FLARED END? ☐ Yes ☒ No

HEADWALL? ☒ YES ☐ NO

SUBMERGED: ☐ No ☒ Partially ☐ Fully

☐ Channel — ☐ Concrete ☐ Riprap ☐ Vegetated ☐ Earth ☐ Other: — ☐ Trapezoid ☐ Parabolic ☐ Other: — Depth: ____ (in) — Width (Top): ____ (in) — " (Bottom): ____ (in) — Channel slope: ____ (degrees)

PIPE CONDITION: ☒ Good ☐ Chip/Cracked ☐ Peeling Paint ☐ Corrosion ☐ Squashed ☐ Other:

ODOR: ☒ No ☐ Gas ☐ Sewage ☐ Rancid/Sour ☐ Sulfide ☐ Other:

DEPOSITS/STAINS: ☐ None ☒ Oily ☐ Flow Line ☐ Paint ☐ Other:

VEGGIE DENSITY BELOW OUTFALL: ☐ None ☒ Normal ☐ Inhibited ☐ Excessive ☐ Other:

BENTHIC GROWTH IN PIPE: ☐ None ☐ Sewage Fungus ☐ Brown ☐ Grey ☒ Orange ☐ Green ☐ Other:

POOL QUALITY: ☐ No pool ☐ Good/Clear ☐ Poor (see below) ☐ Odors ☒ Colors ☐ Oils ☐ Suds ☒ Algae ☐ Floatables ☐ Settled Solids ☐ Scour ☐ Inadeq. Outlet Protection ☐ Other:

FOR FLOWING ONLY

COLOR:	☒ Clear ☐ Brown ☐ Grey ☐ Yellow ☐ Green ☐ Orange ☐ Red ☐ Other:
TURBIDITY:	☐ None ☒ Slight Cloudiness ☐ Cloudy ☐ Opaque
FLOATING:	☐ None ☐ Sewage Solids ☐ Toilet Paper ☐ Trash ☒ Petroleum (oil sheen) ☐ Other:
SUSPENDED:	☒ None ☐ Sewage Solids ☐ Toilet Paper ☐ Trash ☐ Other:

OTHER CONCERNS: ☐ Excess Trash (paper/plastic bags) ☐ Dumping (bulk) ☐ Excessive Sedimentation ☐ Headcut ☐ Needs Regular Maintenance ☐ Bank Erosion ☐ Steep Bank ☐ Other:

POTENTIAL RESTORATION CANDIDATE ☐ Discharge investigation ☐ Stream daylighting ☐ Outfall stabilization ☒ no ☐ Storm water retrofit ☐ Channel stabilization ☐ Other:

If yes for daylighting:
Length of vegetative cover from outfall: _____ft Type of existing vegetation:_____ Slope: _____%

If yes for stormwater: Is stormwater currently controlled (quality and/or quantity)? ☐ No ☐ Not investigated
☐ Yes Land Use description:_____ Stormwater BMP description:_____
Retrofit Area available:

OUTFALL SEVERITY: *(circle #)*

5	4	3	2	1
Heavy discharge with a distinct color and/or a strong smell. The amount of discharge is significant compared to the amount of normal flow in receiving stream; discharge appears to be having a significant impact downstream.		Small discharge; flow mostly clear and odorless. If the discharge has a color and/or odor, the amount of discharge is very small compared to the stream's base flow and any impact appears to be minor / localized.		Outfall does not have dry weather discharge; staining; or appearance of causing any erosion problems.

SKETCH/NOTES:

OTHER SURVEY FO **REPORTED TO AUTHORITIES:** ☐ YES ☐ NO

Report sewage spill, significant pollution, or hazardous materials to CT DEP 860-424-3824 and local health department.

Map #19

Structured Stream Crossing **SC**

WATERSHED/SUBSHED: 4305-01-1		**DATE:** 04 / 19 / 2011	**ASSESSED BY:** SH, MM
SURVEY REACH ID:	**TIME:** 09 : 20 AM/PM	**PHOTO ID:** (*Camera-Pic #*)	/# 01-1-SC-a3.jpg
SITE ID: (*Condition-#*) **SC-** A	**LAT** 41 ° 53 ' 53.03 " **LONG** -73 ° 01 ' 30.56 " **LMK**____		**GPS** (*Unit ID*) R1

TYPE: ☒ Road Crossing ☐ Railroad Crossing ☐ Dam ☐ Footbridge ☐ Geological Formation (+/- 2ft change) ☐ Other:

ROAD OR RAILROAD CROSSING ONLY

CROSSING SHAPE:
☐ Arch ☒ Circular
☐ Box ☐ Other:
☐ Bottomless
☐ Elliptical

 # BARRELS:
☐ Single
☒ Double
☐ Triple
☐ Other:

MATERIAL:
☒ Concrete
☐ Metal (smooth)
☐ Metal (corrugated)
☒ Other: stone

ALIGNMENT:
☒ Flow-aligned
☐ Not flow-aligned
☐ toward LT bank
☐ toward RT bank
☐ Do not know

DIMENSIONS: (*if varies sketch*)
Barrel diameter: 2 (ft)
Height: 4 (ft)
Culvert length: 60 (ft)
Width: 10 (ft)
Roadway elevation: 6 (ft)

CONDITION: (*Evidence of…*)
☐ Cracking/chipping/corrosion ☐ Downstream scour hole
☐ Sediment deposition ☒ Failing embankment
☐ Collected organic debris ☐ Other:

CULVERT SLOPE:
☐ Flat
☒ Slight (2° – 5°)
☐ Obvious (>5°)

UNDERSIZED?
☒ No ☐ Yes ☐ Unsure

DAMS

TYPE:
☐ Manmade
☐ Active Beaver
☐ Old/Abandoned Beaver

MATERIAL:
☐ Concrete (poured or block) ☐ Dry stone
☐ Mortared stone ☐ Gabion ☐ Other:
Height: (ft)

MATERIAL:
☐ Large woody debris ☐ Small woody debris
Height: (ft)

POTENTIAL RESTORATION CANDIDATE
☒ no
☐ Fish barrier removal ☐ Fish passage ☐ Upstream storage retrofit ☐ Stream repair
☐ Culvert repair/replacement ☐ Beaver deceiver/removal ☐ Other:

IS SC ACTING AS GRADE CONTROL ☒ No ☐ Yes ☐ Unknown

If yes for fish barrier (> 6 in drop or flow < ½ inch)

EXTENT OF PHYSICAL BLOCKAGE:
☐ Total ☐ Partial
☐ Temporary ☐ Unknown

CAUSE:
☐ Culvert raised, above stream ____ (in)
☐ Drop too high, water drop: ____ (in)
☐ Shallow flow, water depth: ____ (in)
☐ Other:

BLOCKAGE SEVERITY: (*circle #*)

5	4	3	2	1
A structure such as a dam or road culvert on a 3rd order or greater stream blocking the upstream movement of anadromous fish; no fish passage device present.		A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish.		A temporary barrier such as a beaver dam or a blockage at the very head of a stream with very little viable fish habitat above it; natural barriers such as waterfalls.

NOTES/SKETCH:

OTHER SURVEY FORMS COMPLETED FOR SAME AREA:

REPORTED TO AUTHORITIES: ☐ YES ☐ NO

Report sewage spill, significant pollution, or hazardous materials to CT DEP 860-424-3824 and local health department.

Storm Water Outfalls **OT**

Map #20

WATERSHED/SUBSHED: 4305-02-1 | **DATE:** 11 / 19 / 2010 | **ASSESSED BY:** SH, MM

SURVEY REACH ID: | **TIME:** 12 : 30 AM/PM | **PHOTO ID:** (*Camera-Pic #*) /# 02-1-OT-a.jpg

SITE ID (*Condition-#*): **OT-** A | **LAT** 41 ° 51 ' 42.90 " **LONG** -73 ° 03 ' 06.93 " **LMK**____ | **GPS:** (*Unit ID*) R1

BANK: ☐ LT ☒ RT ☐ Head

FLOW: ☐ None ☐ Trickle ☐ Moderate ☐ Substantial ☐ Other:

TYPE: ☒ Pipe ☐ Leak Off

MATERIAL: ☒ Concrete ☐ Metal ☐ PVC/Plastic ☐ Brick ☐ Corrugated ☐ Other ☐ Vitrified Tile

SHAPE: ☐ Circular ☐ Elliptical ☐ Other:

NUMBER: ☐ Single ☐ Double ☐ Triple

DIMENSIONS: Diameter: 24 (in)

FLARED END? ☐ Yes ☒ No

HEADWALL? ☒ YES ☐ NO

SUBMERGED: ☐ No ☐ Partially ☐ Fully

☒ Channel — ☐ Concrete ☒ Riprap ☐ Vegetated ☐ Earth ☐ Other: — ☐ Trapezoid ☐ Parabolic ☐ Other: — Depth: 6 (in) — Width (Top): 72 (in) — " (Bottom): ____ (in) — Channel slope: 45 (degrees)

PIPE CONDITION: ☐ Good ☐ Chip/Cracked ☐ Peeling Paint ☐ Corrosion ☒ Squashed ☐ Other:

ODOR: ☒ No ☐ Gas ☐ Sewage ☐ Rancid/Sour ☐ Sulfide ☐ Other:

DEPOSITS/STAINS: ☒ None ☐ Oily ☐ Flow Line ☐ Paint ☐ Other:

VEGGIE DENSITY BELOW OUTFALL: ☐ None ☐ Normal ☐ Inhibited ☐ Excessive ☒ Other: invasive vegetation

BENTHIC GROWTH IN PIPE: ☒ None ☐ Sewage Fungus ☐ Brown ☐ Grey ☐ Orange ☐ Green ☐ Other:

POOL QUALITY: ☐ No pool ☐ Good/Clear ☐ Poor (see below) ☐ Odors ☐ Colors ☐ Oils ☐ Suds ☐ Algae ☐ Floatables ☐ Settled Solids ☐ Scour ☐ Inadeq. Outlet Protection ☐ Other:

FOR FLOWING ONLY

COLOR: ☒ Clear ☐ Brown ☐ Grey ☐ Yellow ☐ Green ☐ Orange ☐ Red ☐ Other:

TURBIDITY: ☒ None ☐ Slight Cloudiness ☐ Cloudy ☐ Opaque

FLOATING: ☒ None ☐ Sewage Solids ☐ Toilet Paper ☐ Trash ☐ Petroleum (oil sheen) ☐ Other:

SUSPENDED: ☒ None ☐ Sewage Solids ☐ Toilet Paper ☐ Trash ☐ Other:

OTHER CONCERNS: ☐ Excess Trash (paper/plastic bags) ☐ Dumping (bulk) ☐ Excessive Sedimentation ☐ Headcut ☐ Needs Regular Maintenance ☐ Bank Erosion ☐ Steep Bank ☐ Other:

POTENTIAL RESTORATION CANDIDATE ☐ Discharge investigation ☐ Stream daylighting ☐ Outfall stabilization ☐ no ☒ Storm water retrofit ☐ Channel stabilization ☐ Other:

If yes for daylighting:
Length of vegetative cover from outfall: _____ ft Type of existing vegetation: _____ Slope: _____ %

If yes for stormwater: Is stormwater currently controlled (quality and/or quantity)? ☐ No ☐ Not investigated
☐ Yes Land Use description: _____ Stormwater BMP description: _____
Retrofit Area available:

OUTFALL SEVERITY: *(circle #)*	Heavy discharge with a distinct color and/or a strong smell. The amount of discharge is significant compared to the amount of normal flow in receiving stream; discharge appears to be having a significant impact downstream.	Small discharge; flow mostly clear and odorless. If the discharge has a color and/or odor, the amount of discharge is very small compared to the stream's base flow and any impact appears to be minor / localized.	Outfall does not have dry weather discharge; staining; or appearance of causing any erosion problems.
	5	4 3	2 1

SKETCH/NOTES:
Green Ridge Condo complex
No stormwater renovation

OTHER SURVEY FORMS COMPLETED FOR SAME AREA:

REPORTED TO AUTHORITIES: ☐ YES ☐ NO

Report sewage spill, significant pollution, or hazardous materials to CT DEP 860-424-3824 and local health department.

Storm Water Outfalls **OT**

Map #21

WATERSHED/SUBSHED: 4305-02-1		**DATE:** 11 / 19 / 2010	**ASSESSED BY:** SH, MM
SURVEY REACH ID:	**TIME:** 1 : 00 AM/PM	**PHOTO ID:** (*Camera-Pic #*)	/# 02-1-OT-b.jpg
SITE ID (*Condition-#*): **OT-** B	**LAT** 41 ° 54 ' 38.10 " **LONG** -73 ° 03 ' 02.05 "	**LMK**_____	**GPS:** (*Unit ID*) R1

BANK: ☐ LT ☒ RT ☐ Head

FLOW: ☒ None ☐ Trickle ☐ Moderate ☐ Substantial ☐ Other:

TYPE: ☒ Pipe ☐ Leak Off

MATERIAL: ☐ Concrete ☐ Metal ☒ PVC/Plastic ☐ Brick ☒ Corrugated ☐ Other ☐ Vitrified Tile

SHAPE: ☒ Circular ☐ Elliptical ☐ Other:

NUMBER: ☐ Single ☐ Double ☐ Triple

DIMENSIONS: Diameter: 18 (in)

FLARED END? ☐ Yes ☒ No

HEADWALL? ☒ YES ☐ NO

SUBMERGED: ☒ No ☐ Partially ☐ Fully

☐ Channel — ☐ Concrete ☐ Riprap ☐ Vegetated ☐ Earth ☐ Other:

☐ Trapezoid ☐ Parabolic ☐ Other:

Depth: _____ (in)
Width (Top): _____ (in)
" (Bottom): _____ (in)

Channel slope: _____ (degrees)

PIPE CONDITION: ☒ Good ☐ Chip/Cracked ☐ Peeling Paint ☐ Corrosion ☐ Squashed ☐ Other:

ODOR: ☒ No ☐ Gas ☐ Sewage ☐ Rancid/Sour ☐ Sulfide ☐ Other:

DEPOSITS/STAINS: ☒ None ☐ Oily ☐ Flow Line ☐ Paint ☐ Other:

VEGGIE DENSITY BELOW OUTFALL: ☐ None ☒ Normal ☐ Inhibited ☐ Excessive ☐ Other:

BENTHIC GROWTH IN PIPE: ☒ None ☐ Sewage Fungus ☐ Brown ☐ Grey ☐ Orange ☐ Green ☐ Other:

POOL QUALITY: ☒ No pool ☐ Good/Clear ☐ Poor (see below) ☐ Odors ☐ Colors ☐ Oils ☐ Suds ☐ Algae ☐ Floatables ☐ Settled Solids ☐ Scour ☐ Inadeq. Outlet Protection ☐ Other:

FOR FLOWING ONLY

COLOR:	☒ Clear ☐ Brown ☐ Grey ☐ Yellow ☐ Green ☐ Orange ☐ Red ☐ Other:
TURBIDITY:	☒ None ☐ Slight Cloudiness ☐ Cloudy ☐ Opaque
FLOATING:	☒ None ☐ Sewage Solids ☐ Toilet Paper ☐ Trash ☐ Petroleum (oil sheen) ☐ Other:
SUSPENDED:	☒ None ☐ Sewage Solids ☐ Toilet Paper ☐ Trash ☐ Other:

OTHER CONCERNS: ☐ Excess Trash (paper/plastic bags) ☐ Dumping (bulk) ☐ Excessive Sedimentation ☐ Headcut ☐ Needs Regular Maintenance ☐ Bank Erosion ☐ Steep Bank ☐ Other:

POTENTIAL RESTORATION CANDIDATE ☐ Discharge investigation ☐ Stream daylighting ☐ Outfall stabilization ☐ no ☒ Storm water retrofit ☐ Channel stabilization ☐ Other:

If yes for daylighting:
Length of vegetative cover from outfall: _____ft Type of existing vegetation:_____ Slope: _____%

If yes for stormwater: Is stormwater currently controlled (quality and/or quantity)? ☐ No ☐ Not investigated
☐ Yes Land Use description:_____ Stormwater BMP description:_____
Retrofit Area available:

OUTFALL SEVERITY: (*circle #*)	Heavy discharge with a distinct color and/or a strong smell. The amount of discharge is significant compared to the amount of normal flow in receiving stream; discharge appears to be having a significant impact downstream.	Small discharge; flow mostly clear and odorless. If the discharge has a color and/or odor, the amount of discharge is very small compared to the stream's base flow and any impact appears to be minor / localized.	Outfall does not have dry weather discharge; staining; or appearance of causing any erosion problems.
	5	4 3	2 1

SKETCH/NOTES:
KFC site

OTHER SURVEY FORMS COMPLETED FOR SAME AREA:

REPORTED TO AUTHORITIES: ☐ YES ☐ NO

Report sewage spill, significant pollution, or hazardous materials to CT DEP 860-424-3824 and local health department.

Map #22

Storm Water Outfalls **OT**

WATERSHED/SUBSHED: 4305-02-1 | **DATE:** 11 / 19 / 2010 | **ASSESSED BY:** SH, MM

SURVEY REACH ID: | **TIME:** 2 : 30 AM (PM) | **PHOTO ID:** (*Camera-Pic #*) /# 02-1-OT-c.jpg

SITE ID (*Condition-#*): **OT-** C | **LAT** 41 ° 54 ' 34.57 " **LONG** -73 ° 02 ' 36.06 " | **LMK** | **GPS:** (*Unit ID*) R1

BANK: ☐ LT ☒ RT ☐ Head

FLOW: ☐ None ☒ Trickle ☐ Moderate ☐ Substantial ☐ Other:

TYPE: ☒ Pipe ☐ Leak Off

MATERIAL: ☒ Concrete ☐ Metal ☐ PVC/Plastic ☐ Brick ☐ Corrugated ☐ Other ☐ Vitrified Tile

SHAPE: ☒ Circular ☐ Elliptical ☐ Other:

NUMBER: ☒ Single ☐ Double ☐ Triple

DIMENSIONS: Diameter: 24 (in)

FLARED END? ☐ Yes ☒ No

HEADWALL? ☐ YES ☒ NO

SUBMERGED: ☐ No ☒ Partially ☐ Fully

☐ Channel — ☐ Concrete ☐ Riprap ☐ Vegetated ☐ Earth ☐ Other: — ☐ Trapezoid ☐ Parabolic ☐ Other: — Depth: (in) — Width (Top): (in) — " (Bottom): (in) — Channel slope: (degrees)

PIPE CONDITION: ☒ Good ☐ Chip/Cracked ☐ Peeling Paint ☐ Corrosion ☐ Squashed ☐ Other:

ODOR: ☒ No ☐ Gas ☐ Sewage ☐ Rancid/Sour ☐ Sulfide ☐ Other:

DEPOSITS/STAINS: ☒ None ☐ Oily ☐ Flow Line ☐ Paint ☐ Other:

VEGGIE DENSITY BELOW OUTFALL: ☐ None ☐ Normal ☒ Inhibited ☐ Excessive ☐ Other:

BENTHIC GROWTH IN PIPE: ☒ None ☐ Sewage Fungus ☐ Brown ☐ Grey ☐ Orange ☐ Green ☐ Other:

POOL QUALITY: ☐ No pool ☒ Good/Clear ☐ Poor (see below) ☐ Odors ☐ Colors ☐ Oils ☐ Suds ☐ Algae ☐ Floatables ☐ Settled Solids ☐ Scour ☐ Inadeq. Outlet Protection ☐ Other:

FOR FLOWING ONLY

COLOR: ☒ Clear ☐ Brown ☐ Grey ☐ Yellow ☐ Green ☐ Orange ☐ Red ☐ Other:

TURBIDITY: ☒ None ☐ Slight Cloudiness ☐ Cloudy ☐ Opaque

FLOATING: ☒ None ☐ Sewage Solids ☐ Toilet Paper ☐ Trash ☐ Petroleum (oil sheen) ☐ Other:

SUSPENDED: ☒ None ☐ Sewage Solids ☐ Toilet Paper ☐ Trash ☐ Other:

OTHER CONCERNS: ☐ Excess Trash (paper/plastic bags) ☐ Dumping (bulk) ☐ Excessive Sedimentation ☐ Headcut ☐ Needs Regular Maintenance ☐ Bank Erosion ☐ Steep Bank ☐ Other:

POTENTIAL RESTORATION CANDIDATE ☐ no ☐ Discharge investigation ☒ Storm water retrofit ☐ Stream daylighting ☐ Channel stabilization ☐ Outfall stabilization ☐ Other:

If yes for daylighting:
Length of vegetative cover from outfall: _____ft Type of existing vegetation:_____ Slope: _____%

If yes for stormwater: Is stormwater currently controlled (quality and/or quantity)? ☐ No ☐ Not investigated
☐ Yes Land Use description:_____ Stormwater BMP description:_____
Retrofit Area available:

OUTFALL SEVERITY: *(circle #)*

5	4	3	2	1
Heavy discharge with a distinct color and/or a strong smell. The amount of discharge is significant compared to the amount of normal flow in receiving stream; discharge appears to be having a significant impact downstream.		Small discharge; flow mostly clear and odorless. If the discharge has a color and/or odor, the amount of discharge is very small compared to the stream's base flow and any impact appears to be minor / localized.		Outfall does not have dry weather discharge; staining; or appearance of causing any erosion problems.

SKETCH/NOTES:
Lombard Ford,
no stormwater treatment before entering brook

OTHER SURVEY FORMS COMPLETED FOR SAME AREA:

REPORTED TO AUTHORITIES: ☐ YES ☐ NO

Report sewage spill, significant pollution, or hazardous materials to CT DEP 860-424-3824 and local health department.

Map #23

Storm Water Outfalls **OT**

WATERSHED/SUBSHED: 4305-02-1		**DATE:** 04 / 19 / 2011	**ASSESSED BY:** SH, MM
SURVEY REACH ID:	**TIME:** 8 : 48 AM/PM	**PHOTO ID:** (*Camera-Pic #*)	/# 02-1-OT-d.jpg
SITE ID (*Condition-#*): **OT-** D	**LAT** 41 ° 54 ' 33.08 " **LONG** -73 ° 02 ' 54.60 "	**LMK**_____	**GPS:** (*Unit ID*) R1

BANK: ☐ LT ☒ RT ☐ Head

FLOW: ☐ None ☐ Trickle ☐ Moderate ☐ Substantial ☐ Other:

TYPE: ☒ Pipe ☐ Leak Off

MATERIAL: ☒ Concrete ☐ Metal ☐ PVC/Plastic ☐ Brick ☐ Corrugated ☐ Other ☐ Vitrified Tile

SHAPE: ☒ Circular ☐ Elliptical ☒ Other: flared

NUMBER: ☐ Single ☐ Double ☐ Triple

DIMENSIONS: Diameter:_____(in)

FLARED END? ☒ Yes ☐ No

HEADWALL? ☐ YES ☒ NO

SUBMERGED: ☒ No ☐ Partially ☐ Fully

☒ Channel — ☐ Concrete ☒ Riprap ☐ Vegetated ☐ Earth ☐ Other:

☐ Trapezoid ☐ Parabolic ☐ Other:

Depth: _____(in) Width (Top):_____(in) " (Bottom):_____(in)

Channel slope: 40 (degrees)

PIPE CONDITION: ☒ Good ☐ Chip/Cracked ☐ Peeling Paint ☐ Corrosion ☐ Squashed ☐ Other:

ODOR: ☒ No ☐ Gas ☐ Sewage ☐ Rancid/Sour ☐ Sulfide ☐ Other:

DEPOSITS/STAINS: ☒ None ☐ Oily ☐ Flow Line ☐ Paint ☐ Other:

VEGGIE DENSITY BELOW OUTFALL: ☐ None ☒ Normal ☐ Inhibited ☐ Excessive ☐ Other:

BENTHIC GROWTH IN PIPE: ☐ None ☐ Sewage Fungus ☐ Brown ☐ Grey ☐ Orange ☒ Green ☐ Other:

POOL QUALITY: ☒ No pool ☐ Good/Clear ☐ Poor (see below) ☐ Odors ☐ Colors ☐ Oils ☐ Suds ☐ Algae ☐ Floatables ☐ Settled Solids ☐ Scour ☐ Inadeq. Outlet Protection ☐ Other:

FOR FLOWING ONLY

COLOR:	☒ Clear ☐ Brown ☐ Grey ☐ Yellow ☐ Green ☐ Orange ☐ Red ☐ Other:
TURBIDITY:	☒ None ☐ Slight Cloudiness ☐ Cloudy ☐ Opaque
FLOATING:	☒ None ☐ Sewage Solids ☐ Toilet Paper ☐ Trash ☐ Petroleum (oil sheen) ☐ Other:
SUSPENDED:	☒ None ☐ Sewage Solids ☐ Toilet Paper ☐ Trash ☐ Other:

OTHER CONCERNS: ☐ Excess Trash (paper/plastic bags) ☐ Dumping (bulk) ☐ Excessive Sedimentation ☐ Headcut ☐ Needs Regular Maintenance ☐ Bank Erosion ☐ Steep Bank ☐ Other:

POTENTIAL RESTORATION CANDIDATE ☐ Discharge investigation ☐ Stream daylighting ☐ Outfall stabilization ☒ no ☐ Storm water retrofit ☐ Channel stabilization ☐ Other:

If yes for daylighting:
Length of vegetative cover from outfall: _____ft Type of existing vegetation:_____ Slope: _____%

If yes for stormwater: Is stormwater currently controlled (quality and/or quantity)? ☐ No ☐ Not investigated
☐ Yes Land Use description:_____ Stormwater BMP description:_____
Retrofit Area available:

OUTFALL SEVERITY: *(circle #)*

5	4	3	2	1
Heavy discharge with a distinct color and/or a strong smell. The amount of discharge is significant compared to the amount of normal flow in receiving stream; discharge appears to be having a significant impact downstream.		Small discharge; flow mostly clear and odorless. If the discharge has a color and/or odor, the amount of discharge is very small compared to the stream's base flow and any impact appears to be minor / localized.		Outfall does not have dry weather discharge; staining; or appearance of causing any erosion problems.

SKETCH/NOTES:

OTHER SURVEY FORMS COMPLETED FOR SAME AREA: ☐ NO

Report sewage spill, significant pollution, or hazardous materials to CT DEP 860-424-3824 and local health department.

Map #24

Structured Stream Crossing **SC**

WATERSHED/SUBSHED: 4305-02-1		**DATE:** 11 / 18 / 2010	**ASSESSED BY:** SH, MM
SURVEY REACH ID:	**TIME:** 2 : 00 AM/PM	**PHOTO ID:** (*Camera-Pic #*)	/# 02-1-SC-a.jpg
SITE ID: (*Condition-#*) **SC-** A	**LAT** 41 ° 54 ' 38.79 " **LONG** -73 ° 02 ' 28.73 "	**LMK**____	**GPS** (*Unit ID*) R1

TYPE: ☒ Road Crossing ☐ Railroad Crossing ☐ Dam ☐ Footbridge ☐ Geological Formation (+/- 2ft change) ☒ Other: parking lot entrance

ROAD OR RAILROAD CROSSING ONLY

CROSSING SHAPE:
☐ Arch ☒ Circular
☐ Box ☐ Other:
☐ Bottomless
☐ Elliptical

 # BARRELS:
☐ Single
☒ Double
☐ Triple
☐ Other:

MATERIAL:
☐ Concrete
☐ Metal (smooth)
☒ Metal (corrugated)
☐ Other:

ALIGNMENT:
☒ Flow-aligned
☐ Not flow-aligned
☐ toward LT bank
☐ toward RT bank
☐ Do not know

DIMENSIONS: (*if varies sketch*)
Barrel diameter: 6 (ft)
Height: 6 (ft)
Culvert length: ____ (ft)
Width: ____ (ft)
Roadway elevation: ____ (ft)

CONDITION: (*Evidence of…*)
☐ Cracking/chipping/corrosion ☐ Downstream scour hole
☐ Sediment deposition ☐ Failing embankment
☐ Collected organic debris ☐ Other:

CULVERT SLOPE:
☒ Flat
☐ Slight ($2^o - 5^0$)
☐ Obvious ($>5^o$)

UNDERSIZED?
☐ No ☒ Yes ☐ Unsure

DAMS

TYPE:
☐ Manmade
☐ Active Beaver
☐ Old/Abandoned Beaver

MATERIAL:
☐ Concrete (poured or block) ☐ Dry stone
☐ Mortared stone ☐ Gabion ☐ Other:

Height: (ft)

MATERIAL:
☐ Large woody debris ☐ Small woody debris

Height: (ft)

POTENTIAL RESTORATION CANDIDATE
☒ no
☐ Fish barrier removal ☐ Fish passage ☐ Upstream storage retrofit ☐ Stream repair
☐ Culvert repair/replacement ☐ Beaver deceiver/removal ☐ Other:

IS SC ACTING AS GRADE CONTROL ☒ No ☐ Yes ☐ Unknown

If yes for fish barrier (> 6 in drop or flow < ½ inch)

EXTENT OF PHYSICAL BLOCKAGE:
☐ Total ☐ Partial
☐ Temporary ☐ Unknown

CAUSE:
☐ Culvert raised, above stream ____ (in)
☐ Drop too high, water drop: ____ (in)
☐ Shallow flow, water depth: ____ (in)
☐ Other:

BLOCKAGE SEVERITY: (*circle #*)

5	4	3	2	1
A structure such as a dam or road culvert on a 3rd order or greater stream blocking the upstream movement of anadromous fish; no fish passage device present.		A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish.		A temporary barrier such as a beaver dam or a blockage at the very head of a stream with very little viable fish habitat above it; natural barriers such as waterfalls.

NOTES/SKETCH:
Mallory Brook Plaza

OTHER SURVEY FORMS COMPLETED FOR SAME AREA:

REPORTED TO AUTHORITIES: ☐ YES ☐ NO

Report sewage spill, significant pollution, or hazardous materials to CT DEP 860-424-3824 and local health department.

Map #25

Structured Stream Crossing **SC**

WATERSHED/SUBSHED: 4305-02-1		**DATE:** 11 / 18 / 2010	**ASSESSED BY:** SH, MM
SURVEY REACH ID:	**TIME:** 2 : 24 AM/PM	**PHOTO ID:** (*Camera-Pic #*)	/# 02-1-SC-b.jpg
SITE ID: (*Condition-#*) SC-B	**LAT** 41 ° 54 ' 35.54 " **LONG** -73 ° 02 ' 57.35 "	**LMK**____	**GPS** (*Unit ID*) R1

TYPE: ☒ Road Crossing ☐ Railroad Crossing ☐ Dam ☐ Footbridge ☐ Geological Formation (+/- 2ft change) ☒ Other: parking lot entrance

ROAD OR RAILROAD CROSSING ONLY

CROSSING SHAPE:
☐ Arch ☒ Circular
☐ Box ☐ Other:
☐ Bottomless
☐ Elliptical

 # BARRELS:
☒ Single
☐ Double
☐ Triple
☐ Other:

MATERIAL:
☒ Concrete
☐ Metal (smooth)
☐ Metal (corrugated)
☐ Other:

ALIGNMENT:
☒ Flow-aligned
☐ Not flow-aligned
☐ toward LT bank
☐ toward RT bank
☐ Do not know

DIMENSIONS: (*if varies sketch*)
Barrel diameter: 3 (ft)
Height: 3 (ft)
Culvert length: ____ (ft)
Width: ____ (ft)
Roadway elevation: 12 (ft)

CONDITION: (*Evidence of…*)
☐ Cracking/chipping/corrosion ☐ Downstream scour hole
☐ Sediment deposition ☐ Failing embankment
☐ Collected organic debris ☐ Other:

CULVERT SLOPE:
☐ Flat
☒ Slight (2° – 5°)
☐ Obvious (>5°)

UNDERSIZED?
☒ No ☐ Yes ☐ Unsure

DAMS

TYPE:
☐ Manmade
☐ Active Beaver
☐ Old/Abandoned Beaver

MATERIAL:
☐ Concrete (poured or block) ☐ Dry stone
☐ Mortared stone ☐ Gabion ☐ Other:

Height: (ft)

MATERIAL:
☐ Large woody debris ☐ Small woody debris

Height: (ft)

POTENTIAL RESTORATION CANDIDATE
☒ no
☐ Fish barrier removal ☐ Fish passage ☐ Upstream storage retrofit ☐ Stream repair
☐ Culvert repair/replacement ☐ Beaver deceiver/removal ☐ Other:

IS SC ACTING AS GRADE CONTROL ☒ No ☐ Yes ☐ Unknown

If yes for fish barrier (> 6 in drop or flow < ½ inch)

EXTENT OF PHYSICAL BLOCKAGE:
☐ Total ☐ Partial
☐ Temporary ☐ Unknown

CAUSE:
☐ Culvert raised, above stream ____ (in)
☐ Drop too high, water drop: ____ (in)
☐ Shallow flow, water depth: ____ (in)
☐ Other:

BLOCKAGE SEVERITY: (*circle #*)

5	4	3	2	1
A structure such as a dam or road culvert on a 3rd order or greater stream blocking the upstream movement of anadromous fish; no fish passage device present.		A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish.		A temporary barrier such as a beaver dam or a blockage at the very head of a stream with very little viable fish habitat above it; natural barriers such as waterfalls.

NOTES/SKETCH:
Stop & Shop Plaza
Basin-in-Stream hybrid

OTHER SURVEY FORMS COMPLETED FOR SAME AREA:

REPORTED TO AUTHORITIES: ☐ YES ☐ NO

Report sewage spill, significant pollution, or hazardous materials to CT DEP 860-424-3824 and local health department.

Map #26

Structured Stream Crossing **SC**

WATERSHED/SUBSHED: 4305-02-1		**DATE:** 11 / 19 / 2010	**ASSESSED BY:** SH, MM
SURVEY REACH ID:	**TIME:** 2 : 08 AM/PM	**PHOTO ID:** (*Camera-Pic #*)	/# 02-1-SC-c.jpg
SITE ID: (*Condition-#*) SC-C	**LAT** 41 ° 54 ' 41.87 " **LONG** -73 ° 03 ' 03.54 "	**LMK**_____	**GPS** (*Unit ID*) R1

TYPE: ☒ Road Crossing ☐ Railroad Crossing ☐ Dam ☐ Footbridge ☐ Geological Formation (+/- 2ft change) ☐ Other:

ROAD OR RAILROAD CROSSING ONLY

CROSSING SHAPE:
☐ Arch ☒ Circular
☐ Box ☐ Other:
☐ Bottomless
☐ Elliptical

 # BARRELS:
☒ Single
☐ Double
☐ Triple
☐ Other:

MATERIAL:
☒ Concrete
☐ Metal (smooth)
☐ Metal (corrugated)
☐ Other:

ALIGNMENT:
☐ Flow-aligned
☒ Not flow-aligned
☐ toward LT bank
☒ toward RT bank
☐ Do not know

DIMENSIONS: (*if varies sketch*)
Barrel diameter: 5 (ft)
Height: 5 (ft)
Culvert length: 50 (ft)
Width: _____ (ft)
Roadway elevation: 10 (ft)

CONDITION: (*Evidence of…*)
☐ Cracking/chipping/corrosion ☐ Downstream scour hole
☐ Sediment deposition ☐ Failing embankment
☐ Collected organic debris ☐ Other:

CULVERT SLOPE:
☒ Flat
☐ Slight (2° – 5°)
☐ Obvious (>5°)

UNDERSIZED?
☒ No ☐ Yes ☐ Unsure

DAMS

TYPE:
☐ Manmade
☐ Active Beaver
☐ Old/Abandoned Beaver

MATERIAL:
☐ Concrete (poured or block) ☐ Dry stone
☐ Mortared stone ☐ Gabion ☐ Other:

MATERIAL:
☐ Large woody debris ☐ Small woody debris

Height: (ft)

Height: (ft)

POTENTIAL RESTORATION CANDIDATE
☒ no
☐ Fish barrier removal ☐ Fish passage ☐ Upstream storage retrofit ☐ Stream repair
☐ Culvert repair/replacement ☐ Beaver deceiver/removal ☐ Other:

IS SC ACTING AS GRADE CONTROL ☒ No ☐ Yes ☐ Unknown

If yes for fish barrier (> 6 in drop or flow < ½ inch)

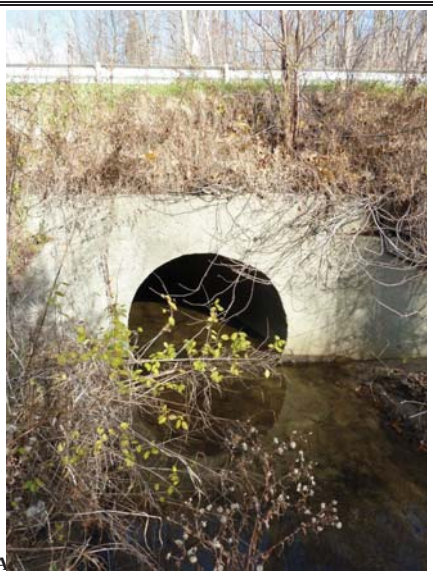
EXTENT OF PHYSICAL BLOCKAGE:
☐ Total ☐ Partial
☐ Temporary ☐ Unknown

CAUSE:
☐ Culvert raised, above stream _____ (in)
☐ Drop too high, water drop: _____ (in)
☐ Shallow flow, water depth: _____ (in)
☐ Other:

BLOCKAGE SEVERITY: (*circle #*)

5	4	3	2	1
A structure such as a dam or road culvert on a 3rd order or greater stream blocking the upstream movement of anadromous fish; no fish passage device present.		A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish.		A temporary barrier such as a beaver dam or a blockage at the very head of a stream with very little viable fish habitat above it; natural barriers such as waterfalls.

NOTES/SKETCH:



OTHER SURVEY FORMS COMPLETED FOR SAME AREA

REPORTED TO AUTHORITIES: ☐ YES ☐ NO

Report sewage spill, significant pollution, or hazardous materials to CT DEP 860-424-3824 and local health department.

Map #27

Structured Stream Crossing **SC**

WATERSHED/SUBSHED: 4305-02-1		**DATE:** 11 / 19 / 2010	**ASSESSED BY:** SH, MM
SURVEY REACH ID:	**TIME:** 2 : 12 AM PM	**PHOTO ID:** (*Camera-Pic #*)	/# 02-1-SC-d.jpg
SITE ID: (*Condition-#*) **SC-** D	**LAT** 41 ° 54 ' 41.99 " **LONG** -73 ° 03 ' 04.33 "	**LMK**_____	**GPS** (*Unit ID*) R1

TYPE: ☒ Road Crossing ☐ Railroad Crossing ☐ Dam ☐ Footbridge ☐ Geological Formation (+/- 2ft change) ☒ Other: parking entrance

ROAD OR RAILROAD CROSSING ONLY

CROSSING SHAPE:
☐ Arch ☒ Circular
☐ Box ☐ Other:
☐ Bottomless
☐ Elliptical

 # BARRELS:
☒ Single
☐ Double
☐ Triple
☐ Other:

MATERIAL:
☐ Concrete
☐ Metal (smooth)
☐ Metal (corrugated)
☒ Other: plastic corrugated pipe

ALIGNMENT:
☒ Flow-aligned
☐ Not flow-aligned
☐ toward LT bank
☐ toward RT bank
☐ Do not know

DIMENSIONS: (*if varies sketch*)
Barrel diameter: 2 (ft)
Height: 2 (ft)
Culvert length: 40 (ft)
Width: _____ (ft)
Roadway elevation: _____ (ft)

CONDITION: (*Evidence of…*)
☐ Cracking/chipping/corrosion ☐ Downstream scour hole
☐ Sediment deposition ☒ Failing embankment
☐ Collected organic debris ☒ Other: corrugated pipe is broken

CULVERT SLOPE:
☐ Flat
☒ Slight (2° – 5°)
☐ Obvious (>5°)

UNDERSIZED?
☒ No ☐ Yes ☐ Unsure

DAMS

TYPE:
☐ Manmade
☐ Active Beaver
☐ Old/Abandoned Beaver

MATERIAL:
☐ Concrete (poured or block) ☐ Dry stone
☐ Mortared stone ☐ Gabion ☐ Other:
Height: (ft)

MATERIAL:
☐ Large woody debris ☐ Small woody debris
Height: (ft)

POTENTIAL RESTORATION CANDIDATE
☐ no
☐ Fish barrier removal ☐ Fish passage ☐ Upstream storage retrofit ☐ Stream repair
☒ Culvert repair/replacement ☐ Beaver deceiver/removal ☐ Other:

IS SC ACTING AS GRADE CONTROL ☒ No ☐ Yes ☐ Unknown

If yes for fish barrier (> 6 in drop or flow < ½ inch)

EXTENT OF PHYSICAL BLOCKAGE:
☐ Total ☐ Partial
☐ Temporary ☐ Unknown

CAUSE:
☐ Culvert raised, above stream _____ (in)
☐ Drop too high, water drop: _____ (in)
☐ Shallow flow, water depth: _____ (in)
☐ Other:

BLOCKAGE SEVERITY: (*circle #*)

5	4	3	2	1
A structure such as a dam or road culvert on a 3rd order or greater stream blocking the upstream movement of anadromous fish; no fish passage device present.		A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish.		A temporary barrier such as a beaver dam or a blockage at the very head of a stream with very little viable fish habitat above it; natural barriers such as waterfalls.

NOTES/SKETCH:

OTHER SURVEY FO

REPORTED TO AUTHORITIES: ☐ YES ☐ NO

Report sewage spill, significant pollution, or hazardous materials to CT DEP 860-424-3824 and local health department.

Map #28

Structured Stream Crossing **SC**

WATERSHED/SUBSHED: 4305-02-1		**DATE:** 11 / 19 / 2010	**ASSESSED BY:** SH, MM
SURVEY REACH ID:	**TIME:** 02 : 20 AM/PM	**PHOTO ID:** (*Camera-Pic #*)	/# 02-1-SC-e.jpg
SITE ID: (*Condition-#*) SC-E	**LAT** 41 ° 54 ' 35.16 " **LONG** -73 ° 02 ' 36.28 " **LMK**____		**GPS** (*Unit ID*) R1

TYPE: ☒ Road Crossing ☐ Railroad Crossing ☐ Dam ☐ Footbridge ☐ Geological Formation (+/- 2ft change) ☐ Other:

ROAD OR RAILROAD CROSSING ONLY

CROSSING SHAPE:
☐ Arch ☐ Circular
☒ Box ☐ Other:
☒ Bottomless
☐ Elliptical

 # BARRELS:
☒ Single
☐ Double
☐ Triple
☐ Other:

MATERIAL:
☒ Concrete
☐ Metal (smooth)
☐ Metal (corrugated)
☐ Other:

ALIGNMENT:
☐ Flow-aligned
☒ Not flow-aligned
☒ toward LT bank
☐ toward RT bank
☐ Do not know

DIMENSIONS: (*if varies sketch*)
Barrel diameter: _____(ft)
Height: _____(ft)
Culvert length: 40 (ft)
Width: 8 (ft)
Roadway elevation: 8 (ft)

CONDITION: (*Evidence of…*)
☐ Cracking/chipping/corrosion ☐ Downstream scour hole
☐ Sediment deposition ☐ Failing embankment
☐ Collected organic debris ☐ Other:

CULVERT SLOPE:
☒ Flat
☐ Slight ($2^o - 5^0$)
☐ Obvious ($>5^o$)

UNDERSIZED?
☒ No ☐ Yes ☐ Unsure

DAMS

TYPE:
☐ Manmade
☐ Active Beaver
☐ Old/Abandoned Beaver

MATERIAL:
☐ Concrete (poured or block) ☐ Dry stone
☐ Mortared stone ☐ Gabion ☐ Other:

MATERIAL:
☐ Large woody debris ☐ Small woody debris

Height: (ft)

Height: (ft)

POTENTIAL RESTORATION CANDIDATE
☒ no
☐ Fish barrier removal ☐ Fish passage ☐ Upstream storage retrofit ☐ Stream repair
☐ Culvert repair/replacement ☐ Beaver deceiver/removal ☐ Other:

IS SC ACTING AS GRADE CONTROL ☒ No ☐ Yes ☐ Unknown

If yes for fish barrier (> 6 in drop or flow < ½ inch)

EXTENT OF PHYSICAL BLOCKAGE:
☐ Total ☐ Partial
☐ Temporary ☐ Unknown

CAUSE:
☐ Culvert raised, above stream _____ (in)
☐ Drop too high, water drop: _____ (in)
☐ Shallow flow, water depth: _____ (in)
☐ Other:

BLOCKAGE SEVERITY: (*circle #*)

5	4	3	2	1
A structure such as a dam or road culvert on a 3rd order or greater stream blocking the upstream movement of anadromous fish; no fish passage device present.		A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish.		A temporary barrier such as a beaver dam or a blockage at the very head of a stream with very little viable fish habitat above it; natural barriers such as waterfalls.

NOTES/SKETCH:
Near Lombard Ford

OTHER SURVEY FORMS COMPLETED FOR SAME AREA:

REPORTED TO AUTHORITIES: ☐ YES ☐ NO

Report sewage spill, significant pollution, or hazardous materials to CT DEP 860-424-3824 and local health department.

Structured Stream Crossing **SC**

Map #29

WATERSHED/SUBSHED: 4305-02-1 | **DATE:** 04 / 19 / 2011 | **ASSESSED BY:** SH, MM

SURVEY REACH ID: | **TIME:** 08 : 50 (AM)/PM | **PHOTO ID:** (*Camera-Pic #*) /# 02-1-SC-f.jpg

SITE ID: (*Condition-#*) SC-F | **LAT** 41 ° 54 ' 32.98 " **LONG** -73 ° 02 ' 53.50 " **LMK**_____ | **GPS** (*Unit ID*) R1

TYPE: ☒ Road Crossing ☐ Railroad Crossing ☐ Dam ☐ Footbridge ☐ Geological Formation (+/- 2ft change) ☒ Other: parking exit area

ROAD OR RAILROAD CROSSING ONLY

CROSSING SHAPE:
☐ Arch ☐ Circular
☐ Box ☒ Other: grated drop structure
☐ Bottomless
☐ Elliptical

 # BARRELS:
☒ Single
☐ Double
☐ Triple
☐ Other:

MATERIAL:
☒ Concrete
☐ Metal (smooth)
☐ Metal (corrugated)
☒ Other: metal grate

ALIGNMENT:
☒ Flow-aligned
☐ Not flow-aligned
☐ toward LT bank
☐ toward RT bank
☐ Do not know

DIMENSIONS: (*if varies sketch*)
Barrel diameter: _____(ft)
Height: _____(ft)
Culvert length: 120 (ft)
Width: 10 (ft)
Roadway elevation: 20 (ft)

CONDITION: (*Evidence of…*)
☐ Cracking/chipping/corrosion ☐ Downstream scour hole
☐ Sediment deposition ☐ Failing embankment
☐ Collected organic debris ☐ Other:

CULVERT SLOPE:
☐ Flat
☒ Slight (2° – 5°)
☐ Obvious (>5°)

UNDERSIZED?
☐ No ☐ Yes ☐ Unsure

DAMS

TYPE:
☐ Manmade
☐ Active Beaver
☐ Old/Abandoned Beaver

MATERIAL:
☐ Concrete (poured or block) ☐ Dry stone
☐ Mortared stone ☐ Gabion ☐ Other:

Height: (ft)

MATERIAL:
☐ Large woody debris ☐ Small woody debris

Height: (ft)

POTENTIAL RESTORATION CANDIDATE
☒ no
☐ Fish barrier removal ☐ Fish passage ☐ Upstream storage retrofit ☐ Stream repair
☐ Culvert repair/replacement ☐ Beaver deceiver/removal ☐ Other:

IS SC ACTING AS GRADE CONTROL ☒ No ☐ Yes ☐ Unknown

If yes for fish barrier (> 6 in drop or flow < ½ inch)

EXTENT OF PHYSICAL BLOCKAGE:
☐ Total ☐ Partial
☐ Temporary ☐ Unknown

CAUSE:
☐ Culvert raised, above stream _____ (in)
☐ Drop too high, water drop: _____ (in)
☐ Shallow flow, water depth: _____ (in)
☐ Other:

BLOCKAGE SEVERITY: (*circle #*)

5	4	3	2	1
A structure such as a dam or road culvert on a 3rd order or greater stream blocking the upstream movement of anadromous fish; no fish passage device present.		A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish.		A temporary barrier such as a beaver dam or a blockage at the very head of a stream with very little viable fish habitat above it; natural barriers such as waterfalls.

NOTES/SKETCH:

OTHER SURVEY FO

REPORTED TO AUTHORITIES: ☐ YES ☐ NO

Report sewage spill, significant pollution, or hazardous materials to CT DEP 860-424-3824 and local health department.

Map #30

Structured Stream Crossing **SC**

WATERSHED/SUBSHED: 4305-02-1 | **DATE:** 04 / 19 / 2011 | **ASSESSED BY:** SH, MM

SURVEY REACH ID: | **TIME:** 08 : 40 (AM)/PM | **PHOTO ID:** (*Camera-Pic #*) /# 02-1-SC-g2.jpg

SITE ID: (*Condition-#*) SC-G | **LAT** 41 ° 54 ' 48.78 " | **LONG** -73 ° 03 ' 05.93 " | **LMK**____ | **GPS** (*Unit ID*) R1

TYPE: ☒ Road Crossing ☐ Railroad Crossing ☐ Dam ☐ Footbridge ☐ Geological Formation (+/- 2ft change) ☒ Other: driveway private

ROAD OR RAILROAD CROSSING ONLY

CROSSING SHAPE:
☐ Arch ☒ Circular
☐ Box ☐ Other:
☐ Bottomless
☐ Elliptical

 # BARRELS:
☒ Single
☐ Double
☐ Triple
☐ Other:

MATERIAL:
☐ Concrete
☐ Metal (smooth)
☒ Metal (corrugated)
☐ Other:

ALIGNMENT:
☒ Flow-aligned
☐ Not flow-aligned
☐ toward LT bank
☐ toward RT bank
☐ Do not know

DIMENSIONS: (*if varies sketch*)
Barrel diameter: 2 (ft)
Height: 2 (ft)
Culvert length: 30 (ft)
Width: 2 (ft)
Roadway elevation: 3.5 (ft)

CONDITION: (*Evidence of…*)
☐ Cracking/chipping/corrosion ☐ Downstream scour hole
☐ Sediment deposition ☐ Failing embankment
☐ Collected organic debris ☐ Other:

CULVERT SLOPE:
☐ Flat
☐ Slight ($2^o - 5^0$)
☒ Obvious ($>5^o$)

UNDERSIZED?
☒ No ☐ Yes ☐ Unsure

DAMS

TYPE:
☐ Manmade
☐ Active Beaver
☐ Old/Abandoned Beaver

MATERIAL:
☐ Concrete (poured or block) ☐ Dry stone
☐ Mortared stone ☐ Gabion ☐ Other:

Height: (ft)

MATERIAL:
☐ Large woody debris ☐ Small woody debris

Height: (ft)

POTENTIAL RESTORATION CANDIDATE
☒ no
☐ Fish barrier removal ☐ Fish passage ☐ Upstream storage retrofit ☐ Stream repair
☐ Culvert repair/replacement ☐ Beaver deceiver/removal ☐ Other:

IS SC ACTING AS GRADE CONTROL ☒ No ☐ Yes ☐ Unknown

If yes for fish barrier (> 6 in drop or flow < ½ inch)

EXTENT OF PHYSICAL BLOCKAGE:
☐ Total ☐ Partial
☐ Temporary ☐ Unknown

CAUSE:
☐ Culvert raised, above stream ____ (in)
☐ Drop too high, water drop: ____ (in)
☐ Shallow flow, water depth: ____ (in)
☐ Other:

BLOCKAGE SEVERITY: (*circle #*)

5	4	3	2	1
A structure such as a dam or road culvert on a 3rd order or greater stream blocking the upstream movement of anadromous fish; no fish passage device present.		A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish.		A temporary barrier such as a beaver dam or a blockage at the very head of a stream with very little viable fish habitat above it; natural barriers such as waterfalls.

NOTES/SKETCH:

OTHER SURVEY FORMS COMPLETED FOR SAME AREA:

Report sewage spill, significant pollution, or hazardous materials to CT DEP 860-424-3824 and local health department.

Map #31

Structured Stream Crossing **SC**

WATERSHED/SUBSHED: 4305-02-1	**DATE:** 04 / 19 / 2011	**ASSESSED BY:** SH, MM
SURVEY REACH ID:	**TIME:** ___:___ AM/PM	**PHOTO ID:** (*Camera-Pic #*) /# 02-1-SC-h.jpg
SITE ID: (*Condition-#*) **SC-** H	**LAT** 41 ° 54 ' 48.07 " **LONG** -73 ° 03 ' 06.23 " **LMK**___	**GPS** (*Unit ID*) R1

TYPE: ☐ Road Crossing ☐ Railroad Crossing ☐ Dam ☐ Footbridge ☐ Geological Formation (+/- 2ft change) ☐ Other:

ROAD OR RAILROAD CROSSING ONLY

CROSSING SHAPE:
☐ Arch ☒ Circular
☐ Box ☒ Other:
☐ Bottomless flared end
☐ Elliptical

 # BARRELS:
☒ Single
☐ Double
☐ Triple
☐ Other:

MATERIAL:
☒ Concrete
☐ Metal (smooth)
☐ Metal (corrugated)
☐ Other:

ALIGNMENT:
☐ Flow-aligned
☒ Not flow-aligned
☒ toward LT bank
☐ toward RT bank
☐ Do not know

DIMENSIONS: (*if varies sketch*)
Barrel diameter: 4 (ft)
Height: 5 (ft)
Culvert length: 35 (ft)
Width: 15 (ft)
Roadway elevation: 7 (ft)

CONDITION: (*Evidence of…*)
☐ Cracking/chipping/corrosion ☐ Downstream scour hole
☐ Sediment deposition ☐ Failing embankment
☐ Collected organic debris ☐ Other:

CULVERT SLOPE:
☐ Flat
☒ Slight (2° – 5°)
☐ Obvious (>5°)

UNDERSIZED?
☒ No ☐ Yes ☐ Unsure

DAMS

TYPE:
☐ Manmade
☐ Active Beaver
☐ Old/Abandoned Beaver

MATERIAL:
☐ Concrete (poured or block) ☐ Dry stone
☐ Mortared stone ☐ Gabion ☐ Other:

MATERIAL:
☐ Large woody debris ☐ Small woody debris

Height: (ft)

Height: (ft)

POTENTIAL RESTORATION CANDIDATE
☒ no
☐ Fish barrier removal ☐ Fish passage ☐ Upstream storage retrofit ☐ Stream repair
☐ Culvert repair/replacement ☐ Beaver deceiver/removal ☐ Other:

IS SC ACTING AS GRADE CONTROL ☒ No ☐ Yes ☐ Unknown

If yes for fish barrier (> 6 in drop or flow < ½ inch)

EXTENT OF PHYSICAL BLOCKAGE:
☐ Total ☐ Partial
☐ Temporary ☐ Unknown

CAUSE:
☐ Culvert raised, above stream ____ (in)
☐ Drop too high, water drop: ____ (in)
☐ Shallow flow, water depth: ____ (in)
☐ Other:

BLOCKAGE SEVERITY: (*circle #*)

5	4	3	2	1
A structure such as a dam or road culvert on a 3rd order or greater stream blocking the upstream movement of anadromous fish; no fish passage device present.		A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish.		A temporary barrier such as a beaver dam or a blockage at the very head of a stream with very little viable fish habitat above it; natural barriers such as waterfalls.

NOTES/SKETCH:

O

Report sewage spill, significant pollution, or hazardous materials to CT DEP 860-424-3824 and local health department.

Map #32

Structured Stream Crossing **SC**

WATERSHED/SUBSHED: 4305-02-2-R1		**DATE:** 11 / 18 / 2010	**ASSESSED BY:** SH, MM
SURVEY REACH ID:	**TIME:** 12 : 00 AM/PM	**PHOTO ID:** (*Camera-Pic #*)	/# 02-2-R1-Sc-a.jpg
SITE ID: (*Condition-#*) **SC-** A	**LAT** 41 ° 54 ' 43.35 "	**LONG** -73 ° 01 ' 37.00 "	**LMK**____ **GPS** (*Unit ID*) R1

TYPE: ☐ Road Crossing ☐ Railroad Crossing ☐ Dam ☐ Footbridge ☐ Geological Formation (+/- 2ft change) ☐ Other:

ROAD OR RAILROAD CROSSING ONLY

CROSSING SHAPE:
☐ Arch ☐ Circular
☒ Box ☐ Other:
☐ Bottomless
☐ Elliptical

 # BARRELS:
☒ Single
☐ Double
☐ Triple
☐ Other:

MATERIAL:
☒ Concrete
☐ Metal (smooth)
☐ Metal (corrugated)
☐ Other:

ALIGNMENT:
☐ Flow-aligned
☒ Not flow-aligned
☐ toward LT bank
☒ toward RT bank
☐ Do not know

DIMENSIONS: (*if varies sketch*)
Barrel diameter: ____ (ft)
Height: ____ (ft)
Culvert length: 100 (ft)
Width: 8 (ft)
Roadway elevation: 12 (ft)

CONDITION: (*Evidence of…*)
☒ Cracking/chipping/corrosion ☐ Downstream scour hole
☐ Sediment deposition ☐ Failing embankment
☐ Collected organic debris ☐ Other:

CULVERT SLOPE:
☐ Flat
☒ Slight (2° – 5°)
☐ Obvious (>5°)

UNDERSIZED?
☒ No ☐ Yes ☐ Unsure

DAMS

TYPE:
☐ Manmade
☐ Active Beaver
☐ Old/Abandoned Beaver

MATERIAL:
☐ Concrete (poured or block) ☐ Dry stone
☐ Mortared stone ☐ Gabion ☐ Other:

MATERIAL:
☐ Large woody debris ☐ Small woody debris

Height: (ft)

Height: (ft)

POTENTIAL RESTORATION CANDIDATE
☒ no
☐ Fish barrier removal ☐ Fish passage ☐ Upstream storage retrofit ☐ Stream repair
☐ Culvert repair/replacement ☐ Beaver deceiver/removal ☐ Other:

IS SC ACTING AS GRADE CONTROL ☒ No ☐ Yes ☐ Unknown

If yes for fish barrier (> 6 in drop or flow < ½ inch)

EXTENT OF PHYSICAL BLOCKAGE:
☐ Total ☐ Partial
☐ Temporary ☐ Unknown

CAUSE:
☐ Culvert raised, above stream ____ (in)
☐ Drop too high, water drop: ____ (in)
☐ Shallow flow, water depth: ____ (in)
☐ Other:

BLOCKAGE SEVERITY: (*circle #*)

5	4	3	2	1
A structure such as a dam or road culvert on a 3rd order or greater stream blocking the upstream movement of anadromous fish; no fish passage device present.		A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish.		A temporary barrier such as a beaver dam or a blockage at the very head of a stream with very little viable fish habitat above it; natural barriers such as waterfalls.

NOTES/SKETCH:

OTHER SURVEY FOI

REPORTED TO AUTHORITIES: ☐ YES ☐ NO

Report sewage spill, significant pollution, or hazardous materials to CT DEP 860-424-3824 and local health department.

Map #33

Structured Stream Crossing **SC**

WATERSHED/SUBSHED: 4305-02-2-R1		**DATE:** 11 / 18 / 2010	**ASSESSED BY:** SH, MM
SURVEY REACH ID:	**TIME:** 12 : 30 AM/PM	**PHOTO ID:** (*Camera-Pic #*)	/# 02-2-R1-SC-b.jpg
SITE ID: (*Condition-#*) **SC-** B	**LAT** 41 ° 54 ' 42.22 " **LONG** -73 ° 02 ' 19.02 "	**LMK**_____	**GPS** (*Unit ID*) R1

TYPE: ☒ Road Crossing ☐ Railroad Crossing ☐ Dam ☐ Footbridge ☐ Geological Formation (+/- 2ft change) ☐ Other:

ROAD OR RAILROAD CROSSING ONLY

CROSSING SHAPE:
☐ Arch ☐ Circular
☒ Box ☐ Other:
☒ Bottomless
☐ Elliptical

 # BARRELS:
☒ Single
☐ Double
☐ Triple
☐ Other:

MATERIAL:
☒ Concrete
☐ Metal (smooth)
☐ Metal (corrugated)
☐ Other:

ALIGNMENT:
☒ Flow-aligned
☐ Not flow-aligned
☐ toward LT bank
☐ toward RT bank
☐ Do not know

DIMENSIONS: (*if varies sketch*)
Barrel diameter: _____(ft)
Height: _____(ft)
Culvert length: 10 (ft)
Width: 20 (ft)
Roadway elevation: 10 (ft)

CONDITION: (*Evidence of…*)
☐ Cracking/chipping/corrosion ☐ Downstream scour hole
☐ Sediment deposition ☐ Failing embankment
☐ Collected organic debris ☐ Other:

CULVERT SLOPE:
☒ Flat
☐ Slight ($2^o - 5^0$)
☐ Obvious ($>5^o$)

UNDERSIZED?
☐ No ☐ Yes ☐ Unsure

DAMS

TYPE:
☐ Manmade
☐ Active Beaver
☐ Old/Abandoned Beaver

MATERIAL:
☐ Concrete (poured or block) ☐ Dry stone
☐ Mortared stone ☐ Gabion ☐ Other:

Height: (ft)

MATERIAL:
☐ Large woody debris ☐ Small woody debris

Height: (ft)

POTENTIAL RESTORATION CANDIDATE
☒ no
☐ Fish barrier removal ☐ Fish passage ☐ Upstream storage retrofit ☐ Stream repair
☐ Culvert repair/replacement ☐ Beaver deceiver/removal ☐ Other:

IS SC ACTING AS GRADE CONTROL ☒ No ☐ Yes ☐ Unknown

If yes for fish barrier (> 6 in drop or flow < ½ inch)

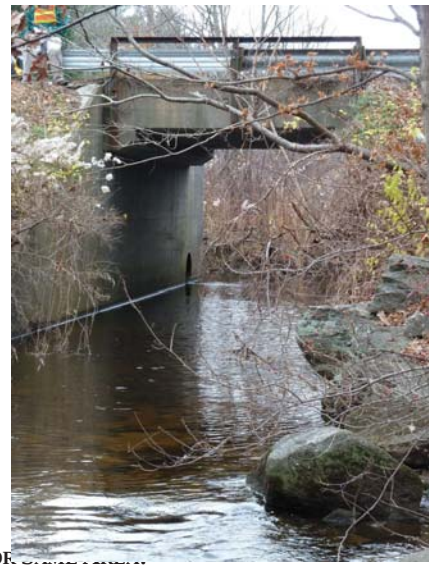
EXTENT OF PHYSICAL BLOCKAGE:
☐ Total ☐ Partial
☐ Temporary ☐ Unknown

CAUSE:
☐ Culvert raised, above stream _____ (in)
☐ Drop too high, water drop: _____ (in)
☐ Shallow flow, water depth: _____ (in)
☐ Other:

BLOCKAGE SEVERITY: (*circle #*)

5	4	3	2	1
A structure such as a dam or road culvert on a 3rd order or greater stream blocking the upstream movement of anadromous fish; no fish passage device present.		A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish.		A temporary barrier such as a beaver dam or a blockage at the very head of a stream with very little viable fish habitat above it; natural barriers such as waterfalls.

NOTES/SKETCH:



OTHER SURVEY FORMS COMPLETED FOR [illegible]

REPORTED TO AUTHORITIES: ☐ YES ☐ NO

Report sewage spill, significant pollution, or hazardous materials to CT DEP 860-424-3824 and local health department.

Map #34

Structured Stream Crossing **SC**

WATERSHED/SUBSHED: 4305-03-1 | **DATE:** 11 / 19 / 2010 | **ASSESSED BY:** SH, MM

SURVEY REACH ID: | **TIME:** 12 : 45 AM/PM | **PHOTO ID:** (*Camera-Pic #*) /# 03-1-SC-a.jpg

SITE ID: (*Condition-#*) SC- A | **LAT** 41 ° 54 ' 46.75 " **LONG** -73 ° 02 ' 27.17 " **LMK**_____ | **GPS** (*Unit ID*) R1

TYPE: ☒ Road Crossing ☐ Railroad Crossing ☐ Dam ☐ Footbridge ☐ Geological Formation (+/- 2ft change) ☐ Other:

ROAD OR RAILROAD CROSSING ONLY

CROSSING SHAPE:
☐ Arch ☐ Circular
☒ Box ☐ Other:
☒ Bottomless
☐ Elliptical

 # BARRELS:
☒ Single
☐ Double
☐ Triple
☐ Other:

MATERIAL:
☒ Concrete
☐ Metal (smooth)
☐ Metal (corrugated)
☐ Other:

ALIGNMENT:
☐ Flow-aligned
☒ Not flow-aligned
☐ toward LT bank
☒ toward RT bank
☐ Do not know

DIMENSIONS: (*if varies sketch*)
Barrel diameter: _____(ft)
Height: _____(ft)
Culvert length: 25 (ft)
Width: 8 (ft)
Roadway elevation: 6 (ft)

CONDITION: (*Evidence of…*)
☐ Cracking/chipping/corrosion ☐ Downstream scour hole
☐ Sediment deposition ☐ Failing embankment
☐ Collected organic debris ☐ Other:

CULVERT SLOPE:
☒ Flat
☐ Slight (2° – 5°)
☐ Obvious (>5°)

UNDERSIZED?
☒ No ☐ Yes ☐ Unsure

DAMS

TYPE:
☐ Manmade
MATERIAL:
☐ Concrete (poured or block) ☐ Dry stone
☐ Mortared stone ☐ Gabion ☐ Other:
Height: (ft)

☐ Active Beaver
☐ Old/Abandoned Beaver
MATERIAL:
☐ Large woody debris ☐ Small woody debris
Height: (ft)

POTENTIAL RESTORATION CANDIDATE
☒ no
☐ Fish barrier removal ☐ Fish passage ☐ Upstream storage retrofit ☐ Stream repair
☐ Culvert repair/replacement ☐ Beaver deceiver/removal ☐ Other:

IS SC ACTING AS GRADE CONTROL ☒ No ☐ Yes ☐ Unknown

If yes for fish barrier (> 6 in drop or flow < ½ inch)

EXTENT OF PHYSICAL BLOCKAGE:
☐ Total ☐ Partial
☐ Temporary ☐ Unknown

CAUSE:
☐ Culvert raised, above stream _____ (in)
☐ Drop too high, water drop: _____ (in)
☐ Shallow flow, water depth: _____ (in)
☐ Other:

BLOCKAGE SEVERITY: (*circle #*)

A structure such as a dam or road culvert on a 3rd order or greater stream blocking the upstream movement of anadromous fish; no fish passage device present.		A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish.		A temporary barrier such as a beaver dam or a blockage at the very head of a stream with very little viable fish habitat above it; natural barriers such as waterfalls.
5	4	3	2	1

NOTES/SKETCH:

OTHER SURVEY FORMS COMPLETED FOR SAME AREA?

REPORTED TO AUTHORITIES: ☐ YES ☐ NO

Report sewage spill, significant pollution, or hazardous materials to CT DEP 860-424-3824 and local health department.

Map #35

Structured Stream Crossing **SC**

WATERSHED/SUBSHED: 4305-04-1		**DATE:** 11 / 19 / 2010	**ASSESSED BY:** SH, MM
SURVEY REACH ID:	**TIME:** 9 : 30 AM/PM	**PHOTO ID:** (*Camera-Pic #*)	/# 04-1-SC-a.jpg
SITE ID: (*Condition-#*) SC- A	**LAT** 41 ° 54 ' 18.77 " **LONG** -72 ° 59 ' 52.66 " **LMK**____		**GPS** (*Unit ID*) R1

TYPE: ☒ Road Crossing ☐ Railroad Crossing ☐ Dam ☐ Footbridge ☐ Geological Formation (+/- 2ft change) ☐ Other:

ROAD OR RAILROAD CROSSING ONLY

CROSSING SHAPE:
☐ Arch ☐ Circular
☒ Box ☐ Other:
☐ Bottomless
☐ Elliptical

 # BARRELS:
☒ Single
☐ Double
☐ Triple
☐ Other:

MATERIAL:
☐ Concrete
☐ Metal (smooth)
☐ Metal (corrugated)
☐ Other:

ALIGNMENT:
☒ Flow-aligned
☐ Not flow-aligned
☐ toward LT bank
☐ toward RT bank
☐ Do not know

DIMENSIONS: (*if varies sketch*)
Barrel diameter: _____(ft)
Height: _____(ft)
Culvert length: 6 (ft)
Width: 6 (ft)
Roadway elevation: 8 (ft)

CONDITION: (*Evidence of…*)
☐ Cracking/chipping/corrosion ☐ Downstream scour hole
☐ Sediment deposition ☐ Failing embankment
☐ Collected organic debris ☐ Other:

CULVERT SLOPE:
☐ Flat
☒ Slight (2° – 5°)
☐ Obvious (>5°)

UNDERSIZED?
☒ No ☐ Yes ☐ Unsure

DAMS

TYPE:
☐ Manmade
☐ Active Beaver
☐ Old/Abandoned Beaver

MATERIAL:
☐ Concrete (poured or block) ☐ Dry stone
☐ Mortared stone ☐ Gabion ☐ Other:

Height: (ft)

MATERIAL:
☐ Large woody debris ☐ Small woody debris

Height: (ft)

POTENTIAL RESTORATION CANDIDATE
☒ no
☐ Fish barrier removal ☐ Fish passage ☐ Upstream storage retrofit ☐ Stream repair
☐ Culvert repair/replacement ☐ Beaver deceiver/removal ☐ Other:

IS SC ACTING AS GRADE CONTROL ☒ No ☐ Yes ☐ Unknown

If yes for fish barrier (> 6 in drop or flow < ½ inch)

EXTENT OF PHYSICAL BLOCKAGE:
☐ Total ☐ Partial
☐ Temporary ☐ Unknown

CAUSE:
☐ Culvert raised, above stream _____ (in)
☐ Drop too high, water drop: _____ (in)
☐ Shallow flow, water depth: _____ (in)
☐ Other:

BLOCKAGE SEVERITY: (*circle #*)

5	4	3	2	1
A structure such as a dam or road culvert on a 3rd order or greater stream blocking the upstream movement of anadromous fish; no fish passage device present.		A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish.		A temporary barrier such as a beaver dam or a blockage at the very head of a stream with very little viable fish habitat above it; natural barriers such as waterfalls.

NOTES/SKETCH:

OTHER SURVEY FO

REPORTED TO AUTHORITIES: ☐ YES ☐ NO

Report sewage spill, significant pollution, or hazardous materials to CT DEP 860-424-3824 and local health department.

Map #36

Structured Stream Crossing **SC**

WATERSHED/SUBSHED: 4305-04-1 | **DATE:** 04 / 19 / 2011 | **ASSESSED BY:** SH, MM

SURVEY REACH ID: | **TIME:** 9 : 25 AM/PM | **PHOTO ID:** (*Camera-Pic #*) /# 04-1-SC-b.jpg

SITE ID: (*Condition-#*) SC-B | **LAT** 41 ° 53 ' 53.24 " | **LONG** -73 ° 01 ' 22.22 " | **LMK**_____ | **GPS** (*Unit ID*) R1

TYPE: ☒ Road Crossing ☐ Railroad Crossing ☐ Dam ☐ Footbridge ☐ Geological Formation (+/- 2ft change) ☐ Other:

ROAD OR RAILROAD CROSSING ONLY

CROSSING SHAPE:
☐ Arch ☒ Circular
☐ Box ☐ Other:
☐ Bottomless
☐ Elliptical

 # BARRELS:
☒ Single
☐ Double
☐ Triple
☐ Other:

MATERIAL:
☐ Concrete
☐ Metal (smooth)
☐ Metal (corrugated)
☐ Other:

ALIGNMENT:
☐ Flow-aligned
☐ Not flow-aligned
☐ toward LT bank
☐ toward RT bank
☐ Do not know

DIMENSIONS: (*if varies sketch*)
Barrel diameter: 1 (ft)
Height: 1 (ft)
Culvert length: 60 (ft)
Width: 1 (ft)
Roadway elevation: 3 (ft)

CONDITION: (*Evidence of…*)
☐ Cracking/chipping/corrosion ☐ Downstream scour hole
☐ Sediment deposition ☐ Failing embankment
☐ Collected organic debris ☐ Other:

CULVERT SLOPE:
☒ Flat
☐ Slight (2° – 5°)
☐ Obvious (>5°)

UNDERSIZED?
☐ No ☒ Yes ☐ Unsure

DAMS

TYPE:
☐ Manmade
☐ Active Beaver
☐ Old/Abandoned Beaver

MATERIAL:
☐ Concrete (poured or block) ☐ Dry stone
☐ Mortared stone ☐ Gabion ☐ Other:

Height: (ft)

MATERIAL:
☐ Large woody debris ☐ Small woody debris

Height: (ft)

POTENTIAL RESTORATION CANDIDATE
☒ no
☐ Fish barrier removal ☐ Fish passage ☐ Upstream storage retrofit ☐ Stream repair
☐ Culvert repair/replacement ☐ Beaver deceiver/removal ☐ Other:

IS SC ACTING AS GRADE CONTROL
☒ No ☐ Yes ☐ Unknown

If yes for fish barrier (> 6 in drop or flow < ½ inch)

EXTENT OF PHYSICAL BLOCKAGE:
☐ Total ☐ Partial
☐ Temporary ☐ Unknown

CAUSE:
☐ Culvert raised, above stream _____ (in)
☐ Drop too high, water drop: _____ (in)
☐ Shallow flow, water depth: _____ (in)
☐ Other:

BLOCKAGE SEVERITY: (*circle #*)

5	4	3	2	1
A structure such as a dam or road culvert on a 3rd order or greater stream blocking the upstream movement of anadromous fish; no fish passage device present.		A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish.		A temporary barrier such as a beaver dam or a blockage at the very head of a stream with very little viable fish habitat above it; natural barriers such as waterfalls.

NOTES/SKETCH:

OTHER SURVEY FORMS COMPLETED FOR SAME AREA:

REPORTED TO AUTHORITIES: ☐ YES ☐ NO

Report sewage spill, significant pollution, or hazardous materials to CT DEP 860-424-3824 and local health department.

Structured Stream Crossing **SC**

Map #37

WATERSHED/SUBSHED: 4305-04-1		**DATE:** 11 / 18 / 2010	**ASSESSED BY:** SH, MM
SURVEY REACH ID:	**TIME:** 2 : 20 AM/PM	**PHOTO ID:** (*Camera-Pic #*)	/# 04-1-SC-c.jpg
SITE ID: (*Condition-#*) SC- C	**LAT** 41 ° 54 ' 0.93 " **LONG** -73 ° 01 ' 01.03 " **LMK**____		**GPS** (*Unit ID*) R1

TYPE: ☒ Road Crossing ☐ Railroad Crossing ☐ Dam ☐ Footbridge ☐ Geological Formation (+/- 2ft change) ☐ Other:

ROAD OR RAILROAD CROSSING ONLY

CROSSING SHAPE:
☐ Arch ☒ Circular
☐ Box ☐ Other:
☐ Bottomless
☐ Elliptical

 # BARRELS:
☒ Single
☐ Double
☐ Triple
☐ Other:

MATERIAL:
☒ Concrete
☐ Metal (smooth)
☐ Metal (corrugated)
☐ Other:

ALIGNMENT:
☐ Flow-aligned
☒ Not flow-aligned
☒ toward LT bank
☐ toward RT bank
☐ Do not know

DIMENSIONS: (*if varies sketch*)
Barrel diameter: 3 (ft)
Height: 3 (ft)
Culvert length: 55 (ft)
Width: ____ (ft)
Roadway elevation: 5 (ft)

CONDITION: (*Evidence of…*)
☒ Cracking/chipping/corrosion ☐ Downstream scour hole
☐ Sediment deposition ☐ Failing embankment
☐ Collected organic debris ☐ Other:

CULVERT SLOPE:
☐ Flat
☒ Slight (2° – 5°)
☐ Obvious (>5°)

UNDERSIZED?
☒ No ☐ Yes ☐ Unsure

DAMS

TYPE:
☐ Manmade
☐ Active Beaver
☐ Old/Abandoned Beaver

MATERIAL:
☐ Concrete (poured or block) ☐ Dry stone
☐ Mortared stone ☐ Gabion ☐ Other:

MATERIAL:
☐ Large woody debris ☐ Small woody debris

Height: (ft)

Height: (ft)

POTENTIAL RESTORATION CANDIDATE ☐ no
☐ Fish barrier removal ☐ Fish passage ☐ Upstream storage retrofit ☐ Stream repair
☒ Culvert repair/replacement ☐ Beaver deceiver/removal ☒ Other: health & safety issues

IS SC ACTING AS GRADE CONTROL ☒ No ☐ Yes ☐ Unknown

If yes for fish barrier (> 6 in drop or flow < ½ inch)

EXTENT OF PHYSICAL BLOCKAGE:
☐ Total ☐ Partial
☐ Temporary ☐ Unknown

CAUSE:
☐ Culvert raised, above stream ____ (in)
☐ Drop too high, water drop: ____ (in)
☐ Shallow flow, water depth: ____ (in)
☐ Other:

BLOCKAGE SEVERITY: (*circle #*)

5	4	3	2	1
A structure such as a dam or road culvert on a 3rd order or greater stream blocking the upstream movement of anadromous fish; no fish passage device present.		A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish.		A temporary barrier such as a beaver dam or a blockage at the very head of a stream with very little viable fish habitat above it; natural barriers such as waterfalls.

NOTES/SKETCH:

OTHER SURVEY FORMS COMPLETED FOR SAME AREA:

REPORTED TO AUTHORITIES: ☐ YES ☐ NO

Report sewage spill, significant pollution, or hazardous materials to CT DEP 860-424-3824 and local health department.

Structured Stream Crossing **SC**

Map #38

WATERSHED/SUBSHED: 4305-04-1 | **DATE:** 11 / 18 / 2010 | **ASSESSED BY:** SH, MM

SURVEY REACH ID: | **TIME:** 2 : 45 AM/PM | **PHOTO ID:** (*Camera-Pic #*) /# 04-1-SC-d.jpg

SITE ID: (*Condition-#*) SC-D | **LAT** 41 ° 54 ' 04.37 " | **LONG** -73 ° 00 ' 24.11 " | **LMK**____ | **GPS** (*Unit ID*) R1

TYPE: ☒ Road Crossing ☐ Railroad Crossing ☐ Dam ☐ Footbridge ☐ Geological Formation (+/- 2ft change) ☐ Other:

ROAD OR RAILROAD CROSSING ONLY

CROSSING SHAPE:
☐ Arch ☐ Circular
☒ Box ☐ Other:
☒ Bottomless
☐ Elliptical

 # BARRELS:
☒ Single
☐ Double
☐ Triple
☐ Other:

MATERIAL:
☒ Concrete
☐ Metal (smooth)
☐ Metal (corrugated)
☐ Other:

ALIGNMENT:
☒ Flow-aligned
☐ Not flow-aligned
☐ toward LT bank
☐ toward RT bank
☐ Do not know

DIMENSIONS: (*if varies sketch*)
Barrel diameter: _____(ft)
Height: _____(ft)
Culvert length: 100 (ft)
Width: 8 (ft)
Roadway elevation: 6 (ft)

CONDITION: (*Evidence of…*)
☐ Cracking/chipping/corrosion ☐ Downstream scour hole
☐ Sediment deposition ☐ Failing embankment
☐ Collected organic debris ☐ Other:

CULVERT SLOPE:
☐ Flat
☒ Slight (2° – 5°)
☐ Obvious (>5°)

UNDERSIZED?
☒ No ☐ Yes ☐ Unsure

DAMS

TYPE:
☐ Manmade
☐ Active Beaver
☐ Old/Abandoned Beaver

MATERIAL:
☐ Concrete (poured or block) ☐ Dry stone
☐ Mortared stone ☐ Gabion ☐ Other:

Height: (ft)

MATERIAL:
☐ Large woody debris ☐ Small woody debris

Height: (ft)

POTENTIAL RESTORATION CANDIDATE
☐ no
☐ Fish barrier removal ☐ Fish passage ☐ Upstream storage retrofit ☐ Stream repair
☐ Culvert repair/replacement ☐ Beaver deceiver/removal ☒ Other: no street treatment

IS SC ACTING AS GRADE CONTROL ☒ No ☐ Yes ☐ Unknown

If yes for fish barrier (> 6 in drop or flow < ½ inch)

EXTENT OF PHYSICAL BLOCKAGE:
☐ Total ☐ Partial
☐ Temporary ☐ Unknown

CAUSE:
☐ Culvert raised, above stream ____ (in)
☐ Drop too high, water drop: ____ (in)
☐ Shallow flow, water depth: ____ (in)
☐ Other:

BLOCKAGE SEVERITY: (*circle #*)

5	4	3	2	1
A structure such as a dam or road culvert on a 3rd order or greater stream blocking the upstream movement of anadromous fish; no fish passage device present.		A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish.		A temporary barrier such as a beaver dam or a blockage at the very head of a stream with very little viable fish habitat above it; natural barriers such as waterfalls.

NOTES/SKETCH:
Catch basins along road drop directly into river with any treatment considerations.

OTHER SURVEY FORMS COMPLETED FOR SAME AREA: ____ NO

Report sewage spill, significant pollution, or hazardous materials to CT DEP 860-424-3824 and local health department.

Structured Stream Crossing **SC**

Map #39

WATERSHED/SUBSHED: 4305-04-1	**DATE:** 11 / 18 / 2010	**ASSESSED BY:** SH, MM
SURVEY REACH ID:	**TIME:** 3 : 12 AM/PM	**PHOTO ID:** (*Camera-Pic #*) /# 04-1-SC-e2.jpg
SITE ID: (*Condition-#*) **SC-** E	**LAT** 41 ° 53 ' 49.49 " **LONG** -73 ° 01 ' 07.41 " **LMK**_____	**GPS** (*Unit ID*) R1

TYPE: ☒ Road Crossing ☐ Railroad Crossing ☐ Dam ☐ Footbridge ☐ Geological Formation (+/- 2ft change) ☐ Other:

ROAD OR RAILROAD CROSSING ONLY

CROSSING SHAPE:
☐ Arch ☒ Circular
☐ Box ☐ Other:
☐ Bottomless
☐ Elliptical

 # BARRELS:
☒ Single
☐ Double
☐ Triple
☐ Other:

MATERIAL:
☒ Concrete
☐ Metal (smooth)
☐ Metal (corrugated)
☐ Other:

ALIGNMENT:
☒ Flow-aligned
☐ Not flow-aligned
☐ toward LT bank
☐ toward RT bank
☐ Do not know

DIMENSIONS: (*if varies sketch*)
Barrel diameter: 3 (ft)
Height: 3 (ft)
Culvert length: _____ (ft)
Width: _____ (ft)
Roadway elevation: 6 (ft)

CONDITION: (*Evidence of…*)
☐ Cracking/chipping/corrosion ☐ Downstream scour hole
☐ Sediment deposition ☐ Failing embankment
☐ Collected organic debris ☐ Other:

CULVERT SLOPE:
☐ Flat
☒ Slight (2° – 5°)
☐ Obvious (>5°)

UNDERSIZED?
☒ No ☐ Yes ☐ Unsure

DAMS

TYPE:
☐ Manmade
☐ Active Beaver
☐ Old/Abandoned Beaver

MATERIAL:
☐ Concrete (poured or block) ☐ Dry stone
☐ Mortared stone ☐ Gabion ☐ Other:

MATERIAL:
☐ Large woody debris ☐ Small woody debris

Height: (ft)

Height: (ft)

POTENTIAL RESTORATION CANDIDATE
☒ no
☐ Fish barrier removal ☐ Fish passage ☐ Upstream storage retrofit ☐ Stream repair
☐ Culvert repair/replacement ☐ Beaver deceiver/removal ☐ Other:

IS SC ACTING AS GRADE CONTROL ☒ No ☐ Yes ☐ Unknown

If yes for fish barrier (> 6 in drop or flow < ½ inch)

EXTENT OF PHYSICAL BLOCKAGE:
☐ Total ☐ Partial
☐ Temporary ☐ Unknown

CAUSE:
☐ Culvert raised, above stream _____ (in)
☐ Drop too high, water drop: _____ (in)
☐ Shallow flow, water depth: _____ (in)
☐ Other:

BLOCKAGE SEVERITY: (*circle #*)

5	4	3	2	1
A structure such as a dam or road culvert on a 3rd order or greater stream blocking the upstream movement of anadromous fish; no fish passage device present.		A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish.		A temporary barrier such as a beaver dam or a blockage at the very head of a stream with very little viable fish habitat above it; natural barriers such as waterfalls.

NOTES/SKETCH:

OTHER SURVEY FORMS COMPLETED FOR SAME AREA:

REPORTED TO AUTHORITIES: ☐ YES ☐ NO

Report sewage spill, significant pollution, or hazardous materials to CT DEP 860-424-3824 and local health department.

Map #40

Structured Stream Crossing **SC**

WATERSHED/SUBSHED: 4305-04-1 | **DATE:** 04 / 19 / 2011 | **ASSESSED BY:** SH, MM

SURVEY REACH ID: | **TIME:** 09 : 30 (AM)/PM | **PHOTO ID:** (*Camera-Pic #*) /# 04-1-SC-f.jpg

SITE ID: (*Condition-#*) SC-F | **LAT** 41 ° 53 ' 21.63 " | **LONG** -73 ° 00 ' 53.0 " | **LMK**____ | **GPS** (*Unit ID*) R1

TYPE: ☒ Road Crossing ☐ Railroad Crossing ☐ Dam ☐ Footbridge ☐ Geological Formation (+/- 2ft change) ☐ Other:

ROAD OR RAILROAD CROSSING ONLY

CROSSING SHAPE:
☐ Arch ☒ Circular
☐ Box ☐ Other: flared ends
☐ Bottomless
☐ Elliptical

 # BARRELS:
☒ Single
☐ Double
☐ Triple
☐ Other:

MATERIAL:
☒ Concrete
☐ Metal (smooth)
☐ Metal (corrugated)
☐ Other:

ALIGNMENT:
☒ Flow-aligned
☐ Not flow-aligned
☐ toward LT bank
☐ toward RT bank
☐ Do not know

DIMENSIONS: (*if varies sketch*)
Barrel diameter: 1 (ft)
Height: 3 (ft)
Culvert length: ____ (ft)
Width: 5 (ft)
Roadway elevation: 3 (ft)

CONDITION: (*Evidence of…*)
☐ Cracking/chipping/corrosion ☐ Downstream scour hole
☐ Sediment deposition ☐ Failing embankment
☒ Collected organic debris ☐ Other:

CULVERT SLOPE:
☐ Flat
☒ Slight (2° – 5°)
☐ Obvious (>5°)

UNDERSIZED?
☒ No ☐ Yes ☐ Unsure

DAMS

TYPE:
☐ Manmade
MATERIAL:
☐ Concrete (poured or block) ☐ Dry stone
☐ Mortared stone ☐ Gabion ☐ Other:
Height: (ft)

☐ Active Beaver
☐ Old/Abandoned Beaver
MATERIAL:
☐ Large woody debris ☐ Small woody debris
Height: (ft)

POTENTIAL RESTORATION CANDIDATE
☒ no
☐ Fish barrier removal ☐ Fish passage ☐ Upstream storage retrofit ☐ Stream repair
☐ Culvert repair/replacement ☐ Beaver deceiver/removal ☐ Other:

IS SC ACTING AS GRADE CONTROL ☒ No ☐ Yes ☐ Unknown

If yes for fish barrier (> 6 in drop or flow < ½ inch)

EXTENT OF PHYSICAL BLOCKAGE:
☐ Total ☐ Partial
☐ Temporary ☐ Unknown

CAUSE:
☐ Culvert raised, above stream ____ (in)
☐ Drop too high, water drop: ____ (in)
☐ Shallow flow, water depth: ____ (in)
☐ Other:

BLOCKAGE SEVERITY: (*circle #*)

5	4	3	2	1
A structure such as a dam or road culvert on a 3rd order or greater stream blocking the upstream movement of anadromous fish; no fish passage device present.		A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish.		A temporary barrier such as a beaver dam or a blockage at the very head of a stream with very little viable fish habitat above it; natural barriers such as waterfalls.

NOTES/SKETCH:

OTHER SURVEY FORMS COMPLETED FOR SAME AREA?

REPORTED TO AUTHORITIES: ☐ YES ☐ NO

Report sewage spill, significant pollution, or hazardous materials to CT DEP 860-424-3824 and local health department.

APPENDIX C

West Hill Pond Storm Water Runoff Survey

Barkhamsted &
New Hartford, CT

Prepared For:
West Hill Pond Association

■ ***July 15, 2011***

Lenard Engineering, Inc.
Civil, Environmental & Hydrogeological Consultants

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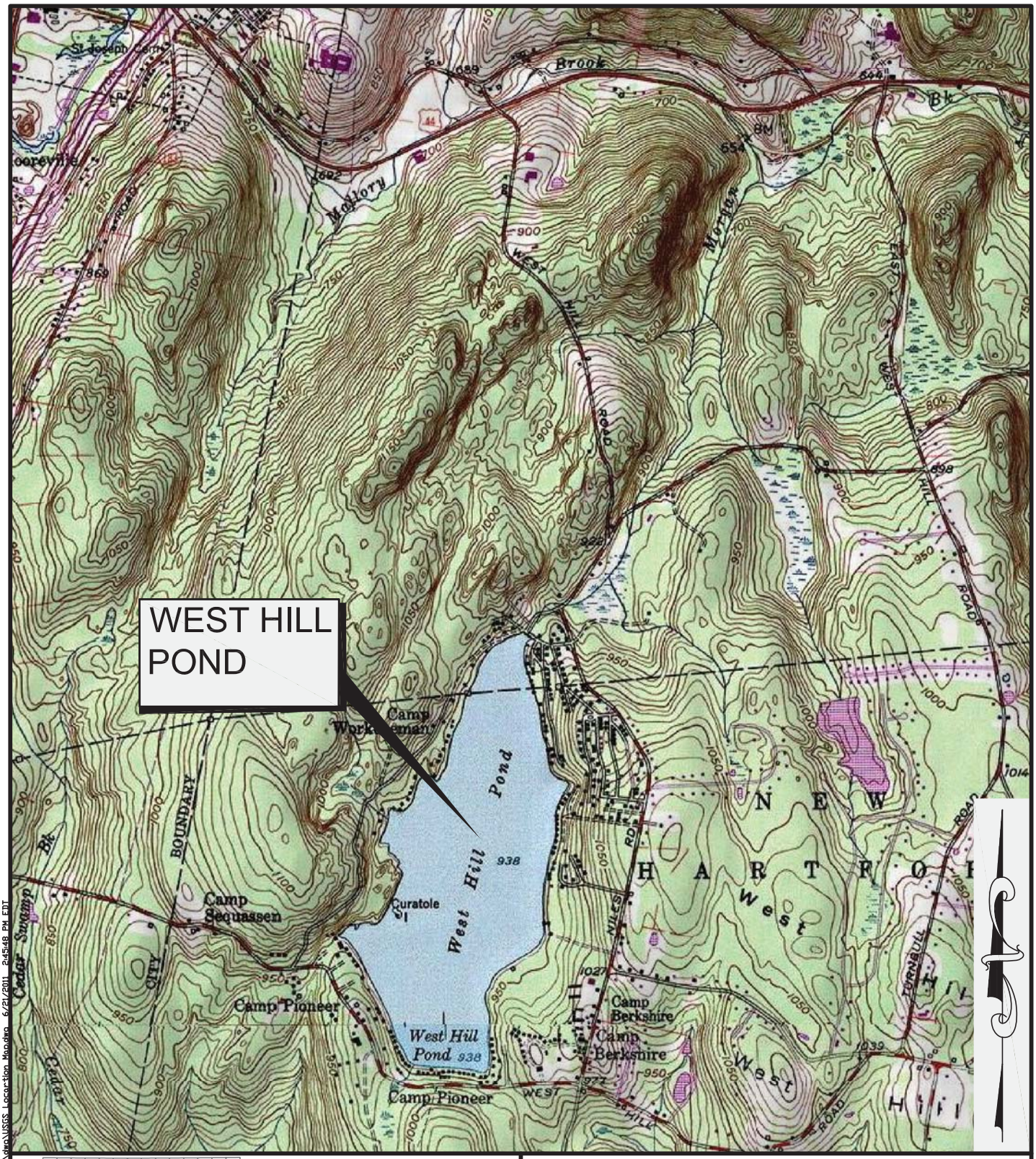
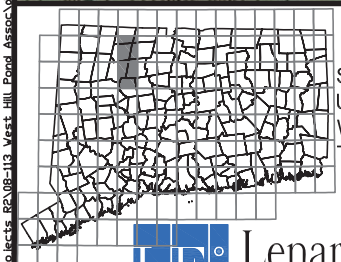




Source:
USGS TOPOGRAPHIC MAP
Winsted, CT QUADRANGLE
Torrington, CT QUADRANGLE

Lenard Engineering, Inc.
Winsted, CT

LOCATION MAP

USGS TOPOGRAPHIC QUADRANGLE MAP

WEST HILL POND DAM

CT 0502

NEW HARTFORD, CT

Scale 1:24000

K:\Local Projects R2\08-113 West Hill Pond Assoc\dwg\USGS Location Map.dwg 6/21/2011 2:45:48 PM EDT

INTRODUCTION

West Hill Pond is a high quality water resource which supports a variety of passive and active recreational uses. Many of Connecticut's water bodies have experienced "eutrophication"(caused by excessive nutrients entering the lake) which results in blooms of algae and increased weed growth. Fortunately West Hill Pond still has excellent water quality and is considered oligotropic with low levels of phosphorus, only minor rooted aquatic plants, and good transparency.

In 2011 the West Hill Pond Association (WHPA) received a grant from the Connecticut Federation of Lakes to locate and inventory the drainage area and corresponding discharges into West Hill Pond.

WHPA authorized Lenard Engineering Inc (LEI) to undertake a study to locate inflows into West Hill Pond, delineate their corresponding drainage areas, document existing conditions, create conceptual plans for improvements and prepare a preliminary priority for stormwater improvements to maintain or improve existing water quality within the lake.

LAKE AND WATERSHED DESCRIPTION

West Hill Pond is a 261 acre lake located in the towns of New Hartford and Barkhamsted, Connecticut with a maximum depth of 63 feet. The lake has a relatively small watershed of roughly three times the size of the lake area, or 790 acres. Since the watershed is relatively small related to the area and volume of the lake, the amount of runoff only replaces or flushes the lake about once every four to five years, thus any materials conveyed to the lake from the stormwater systems tend to have a long residence time.

OBSERVATIONS

LEI staff:

1. Visually located storm water discharge points in the impoundment and assigned a numerical rating, based possible impact to the lake. Approximate locations are depicted on the attached USGS map.
2. Visually located collection points and assigned a numerical rating based on contributing drainage areas. Drainage areas are depicted on the attached USGS map.
3. Met with the Towns of Barkhamsted and New Hartford staff to review possible information on drainage infrastructure.
4. Developed a priority for installation of storm water upgrades or enhancements based on the numerical rating system.
5. Photographically documented existing major system components and conditions.
6. Developed preliminary improvement concepts and conceptual budget estimates. The budget estimates do not include property acquisition or permitting costs.

About 15 inflow channel were observed and there are another 10 short overland areas with no appreciable channels. The west side of the lake is sparsely developed with residences located primarily along the shore line and a significant amount of undeveloped forested area. The south end of the lake has similar development pattern except the residences are more densely clustered along the shore line with a town road in close proximity (300 to 600 ft) to the shore. The southeast quadrant of the watershed is composed recreational land (Brodie Park) and only a few residences. The northeast portion of the watershed is the most intensely developed with many residences and small seasonal cottages. A public boat ramp, maintained by the State of Connecticut is located in the northeast corner of the lake.

TOWN OF BARKHAMSTED

The Town of Barkhamsted has limited drainage infrastructure adjacent to the lake, observed catch basins discharged to areas outside the lake's drainage basin.

TOWN OF NEW HARTFORD

The Town of New Hartford is responsible for several roads that have drainage discharging into the West Hill Pond drainage basin. West Hill Road on the south end of the lake has 10 catch basins that collect roadside drainage and discharge it to two inflow locations (6 & 7). Niles Road has 9 catch basins that discharge overland, not into a direct inflow to the lake, however the drainage paths in the vicinity of the catch basins contain road sand and silt that eventually makes it to the Lake (inflow 9). The Harriet Rd, Dorothy Dr, Davis Rd and Ricki Rd area has a limited number of catch basins (3), however the roads are predominantly gravel and during runoff events erosion from the roads is directed toward inflow 14. In terms of improvements the Town should attempt to install deep sump catch basins whenever it is necessary to repair existing or install new catch basins. The catch basins sumps should be cleaned on a yearly basis, or in the case of gravel road areas, as necessary.

PRIORITY

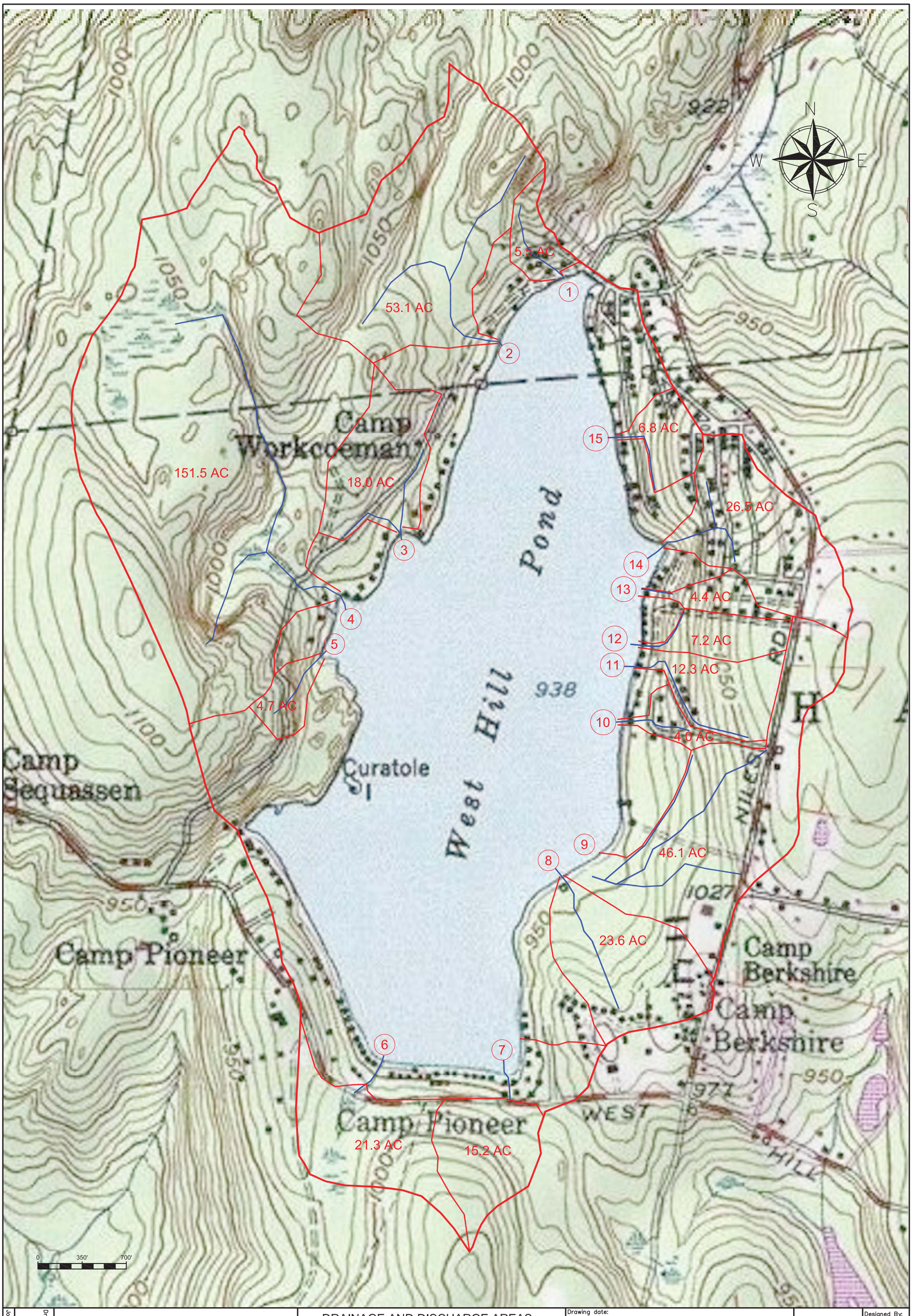
Based on potential impact to the impoundment and corresponding drainage areas the following priorities were assigned to the INFLOW.

INFLOW	PRIORITY
1	6
2	N/A [2]
3	10
4	Monitor [1]
5	N/A [2]
6	3
7	2
8	9
9	8
10	7
11	4
12	5 [3]
13	12
14	1
15	11

1 Due to the drainage area and potential impact on water quality, INFLOW 4 would be assigned PRIORITY 1, however recent improvement by the Boy Scout Camps and homeowners have significantly decreased erosion. The effects of the recent construction have not yet been monitored or observed.

2 N/A Both Inflows assigned this priority are undeveloped upland areas and unless there is development that might expose soil, they only need to be monitored.

3 The results of recent storms and resultant erosion would indicate a higher priority should be assigned to this INFLOW



Job #: 11-105

Drawing #: 1 of 1

Lenard Engineering, Inc.
Civil, Environmental and Hydrogeological Consultants
2210 Main Street, Glastonbury, CT 06033, (860) 659-3100
140 Willow Street, Winsted, CT 06098, (860) 379-6669
19 Midstate Drive, Auburn, MA 01501, (508) 721-7600

DRAINAGE AND DISCHARGE AREAS

STORM WATER SURVEY

WEST HILL POND

BARKHAMSTED & NEW HARTFORD

CONNECTICUT

Drawing date: May 27, 2011

Rev.	Date	Revision	By

Designed By: RPH

Drawn By: JS

Checked By: RPH

K:\LAND PROJECTS R2\11-105 WEST HILL POND ASSOC STORMWATER RECOMMENTATIONS\DWG\Composit Drawing.dwg 6/21/2011 2:22 PM

INFLOW 1

DRAINAGE AREA: 5.5 Ac.
LAKE IMPAC.T ASSESSMENT: Moderate (2)

EXISTING CONDITIONS:

Inadequate sized CB on west side of road typically plugged or covered with leaves, overflow puddles in road and then erodes LAPOA beach.

RECOMMENDATIONS:

Install a deep sump CB with "CL" top and hood, install new pipe under the road and to the pond, regrade road and construct an in pond basin. Provide Siltfence or filtrex sox during winter months along the beach front to reduce beach erosion.

CONSTRUCTION BUDGET COSTS: $ 6,000 -$ 8,000
PRIORITY: 6

INFLOW 2

DRAINAGE AREA: 53.1 Ac.
LAKE IMPAC.T ASSESSMENT: Low (3)

EXISTING CONDITIONS:

Stable drainage from undeveloped upland area.

RECOMMENDATIONS:

Monitor and insure entrance to culverts is kept clear to prevent overtopping roadway.

CONSTRUCTION BUDGET COSTS: $ 0
PRIORITY: N/A [2]

INFLOW 3

DRAINAGE AREA: 18 Ac.
LAKE IMPAC.T ASSESSMENT: Low (3)

EXISTING CONDITIONS:

A. Drainage from East side of road, crosses under several private drives and is used for deposition of landscape debris.

B. Drainage from playing fields/parking area on west side of road is collected in CB's and piped to rock lined outlet area with level spreader.

RECOMMENDATIONS:

A. Discontinue practice of filling channel with debris and brush.
Insure that culvert entrances and CB grates are kept clear.

B. Make sure sumps or CB's are cleaned out and monitor level spreader to insure that leaves and brush do not create a dam allowing water to pond and discharge over unprotected area causing erosion

CONSTRUCTION BUDGET COSTS: $ 0
PRIORITY: 10

INFLOW 4

DRAINAGE AREA: 151.5 Ac.
LAKE IMPAC.T ASSESSMENT: High (1)

EXISTING CONDITIONS:

The road was recently regraded and repaved to reduce roadside erosion and a settling pond for road runoff was created. A rock dam created to maintain a water levels in a large undeveloped wetland acts as a metering device to attenuate outflows and reduce erosion of banks below (east) of the road. Road regrading and paving appears to have significantly reduced erosion and sediment loads from road shoulders.

RECOMMENDATIONS:

Clean roadside sediment pond as necessary and monitor rock dam for debris accumulation that would cause high water levels allowing brook to overflow and erode material.

CONSTRUCTION BUDGET COSTS: $ 0
PRIORITY: 15 (Monitor [1])

Note: Significant work has been completed in the last year, but effect on Lake has not yet been monitored or documented

INFLOW 5

DRAINAGE AREA: 4.7 Ac.
LAKE IMPAC.T ASSESSMENT: Low (3)

EXISTING CONDITIONS:
Undeveloped upland area
RECOMMENDATIONS:
Nothing

CONSTRUCTION BUDGET COSTS: $ 0
PRIORITY: N/A [2]

INFLOW 6

DRAINAGE AREA: 21.3 Ac.
LAKE IMPAC.T ASSESSMENT: Moderate (2)

EXISTING CONDITIONS:

Roadside drainage through a Catch Basin (6) system into a wetland area on south side of West Hill Rd and then piped to outfall at edge of pond.

RECOMMENDATIONS:

Install deep sump (2-ft min) catch basins. Regrade and vegetate roadside area to reduce exposed soil. Create a well maintained, vegetated roadside shoulder. Create roadside sediment basin for yearly cleaning. If unable to create a sediment basin (property rights or wetland issues) then install a large particle separator (equivalent of a septic tank) alongside or under the road. Particle separator could be installed on lake side of road at beginning of pipe to lake.

CONSTRUCTION BUDGET COSTS: $ 22,000 $ 25,000
PRIORITY: 3

INFLOW 7

DRAINAGE AREA: 15.2 AC.
LAKE IMPAC.T ASSESSMENT: High (1)

EXISTING CONDITIONS:

Roadside drainage through a Catch Basin (4) system into a wetland area on south side of West Hill Rd and then culverted under the road to an open drainage to pond. End of brook is full of sediment and during high flows material is eroded into pond

RECOMMENDATIONS:

Install deep sump (2-ft min) CB's. Regrade and vegetate roadside area to reduce exposed soil. Create roadside sediment basin for yearly cleaning. If unable to create sediment basin (property rights or wetland issues) then install a large particle separator (equivalent of a septic tank) alongside or under road. Amour or maintain vegetated roadside discharge points. Remove accumulated sediment adjacent to pond to prevent ponding of storm flows and erosion into lake.

Amour roadside discharge point

CONSTRUCTION BUDGET COSTS: $ 20,000 - $ 22,000
PRIORITY: 2

INFLOW 8

DRAINAGE AREA: 23.6Ac.
LAKE IMPAC.T ASSESSMENT: Low (3)

EXISTING CONDITIONS:

Drainage from the Brodie Park area, and an access road to the Town Beach and then through wetlands to the lake. The road has multiple discharge points which fill up with eroded road surface material Outfall has deposits of sand covered with weedy/rush growth. Deposition can be eroded into pond during high flow events. The Beach area has a fine, silty sand which is easily eroded and drainage from parking area is directed over beach area.

RECOMMENDATIONS:

Clean road discharge points and establish vegetation.
Dredge deposited material from outfall and use boulders to establish an in pond sediment basin area at outfall which can be cleaned out as necessary.

Redirect parking lot runoff and create a vegetated swale along uphill side of beach area to redirect flows away from the beach.
Use coarser sand during future beach replenishments
Install silt fence or filtrex soxs along waters edge of beach during winter season.

CONSTRUCTION BUDGET COSTS: $ 6,000 - $ 8,000
PRIORITY: 9

Outfall Area

Wind Eroded Sand

Beach Erosion

INFLOW 9

DRAINAGE AREA: 46.1 AC.
LAKE IMPAC.T ASSESSMENT: Low (3)

EXISTING CONDITIONS:

Multiple diagonal swales from upland area and roadside runoff enter a wetland area with no distinct outfall to lake. Some of the swales have areas of exposed or disturbed soil due to recent driveway construction. There are currently 9 catch basins along Niles Road. Drainage paths adjacent to Niles road are filled with road sand.

RECOMMENDATIONS

Stabilize areas of exposed soils
Install Deep sump catch basins along Niles Road and remove accumulated sand yearly.

CONSTRUCTION BUDGET COSTS: $ 26,000 - $29,000
PRIORITY: 8

INFLOW 10 & 11

DRAINAGE AREA: 10 - 4 AC.
11 – 12.3AC.
LAKE IMPAC.T ASSESSMENT: Moderate (2)

EXISTING CONDITIONS:

Paved access way with paved roadside swale and a very steep eroding channel at north end of development.

RECOMMENDATIONS:

Maintain existing pavement and keep roadside area and ditch clean. Install 2 catch basins with deep sumps (to trap large particles) at the bottom of hill. Stabilize channel using rip rap and stone waterdrops (steppools). Keep channels clean to prevent dams from forming and allowing bypass erosion during high flows.

CONSTRUCTION BUDGET COSTS: $ 15,000 - $ 18,000
PRIORITY: Roadway (10) 7
Channel (11) 4

INFLOW 12

DRAINAGE AREA: 7.2 AC.
LAKE IMPAC.T ASSESSMENT: Moderate (2)

EXISTING CONDITIONS:

A paved road with roadside erosion and poorly maintained drainage paths. The lower portion of the access way is steep gravel with no drainage control.

RECOMMENDATIONS:

Reconstruct roadway (existing paved and graveled portions 0.2 miles) to allow overland drainage from shoulders. The lower south section should be paved due to steepness. Improve and maintain existing drainage swales.

CONSTRUCTION BUDGET COSTS: $44,000 - $47,000

PRIORITY: 5

INFLOW 13

DRAINAGE AREA: 4.4 AC.
LAKE IMPAC.T ASSESSMENT: Low (3)

EXISTING CONDITIONS:

Residential area with light to moderated development, previously installed sediment catch basin that has not been maintained. Roadway appears to stay wet from hillside seepage.

RECOMMENDATIONS:

Clean and maintain existing sediment catch basins or install deep sump basins
Regrade road to drain to roadside swale and existing CB.

CONSTRUCTION BUDGET COSTS: $10,000 - $14,000
PRIORITY: 12

INFLOW 14

DRAINAGE AREA: 26.5 AC.
LAKE IMPAC.T ASSESSMENT: High (1)

EXISTING CONDITIONS:

Drainage is from a relatively densely developed residential area through a system of culverts and open channels. Most of the roads are gravel with poor shoulder drainage, allowing storm flows to erode roadway. Lower portion of the channel is blocked by debris, and has actively eroding areas.

RECOMMENDATIONS:

Install deep sump catch basins or large particle separators Create roadside grassed channels or armor shoulders with 2-in stone. Remove debris and stabilize exposed channel banks

Install Large Particle Separator

Stabilize Area with Vegetation

CONSTRUCTION BUDGET COSTS: $45,000 - $50,000
PRIORITY: 1

Eroded Shoulders - Install shoulder armor or create grassed swales.

Outfall below Ricki Road

Evidence of Active Erosion that Progressively Moves Toward Pond

Remove Debris That Creates Dams, Forcing Flows to Erode Around Sides

INFLOW 15

DRAINAGE AREA: 6.8 AC.
LAKE IMPAC.T ASSESSMENT: Low (3)

EXISTING CONDITIONS:

Gravel access way with eroding roadside swale, culverted under access way and discharges to an open ditch alongside cottage. Large impervious paved area from former parking area.

RECOMMENDATIONS:

Stabilize roadside swale with vegetation or riprap, and install deep sump catch basin or large particle separator. Due to confined space, lower discharge will need to be conveyed in pipe system to outlet. It might be possible to create a small in pond sediment basin. Remove unnecessary impervious surface.

CONSTRUCTION BUDGET COSTS: $24,000 - $27,000
PRIORITY 11

Drainage goes under existing deck & is flooding yard
Insufficient room to create stabilized channel, Will require piping

BEST MANAGEMENT PRAC.TICES (BMP)

The best way to reduce nutrient loading is to reduce sediment inflow by minimizing areas of impervious surfAc.e and disturbed open soil. Minimizing disturbed areas should be a primary consideration in any watershed protection plan.

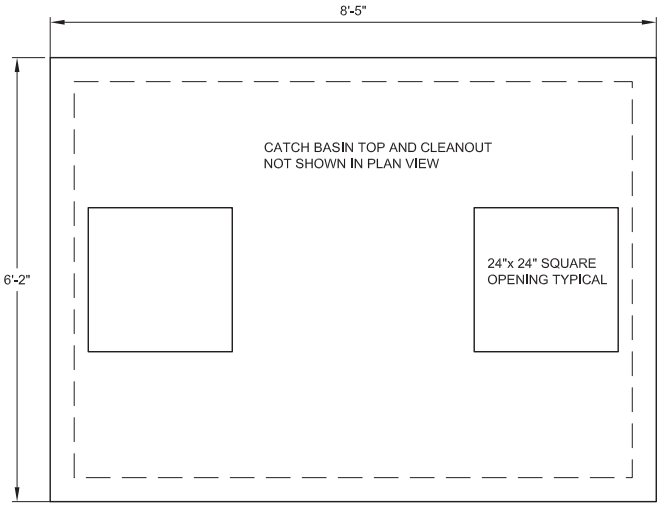
The following structural or constructed BMP's vary in their effectiveness in removing pollutants. Removal capAc.ities provided should be considered guideline that most likely will differ depending on storm events, site conditions, etc.

The estimated average removal rates for total suspended solids (TSS), total phosphorus (TP), total nitrogen (TN), nitrate (NO^3), and other pollutants (bAc.teria, metals) of Best Management PrAc.tices (BMP's) are presented below

Estimated Average Pollutant Removal Capacity of Different Stormwater Filter Systems

	Removal Efficiency (%)				
Management Practice	*TSS*	*TP*	*TN*	*N0*^{3}	*Other Pollutants*
Drainage Channel[1]	30	10	0	0	Bacteria negative
Grass Channel[1]	65	25	15	0	Hydrocarbons – 65% Metals – 80-90% Bacteria - negative
Dry Swale[1]	90	65	50	80	Metals 80-90%
Wet Swale[1]	80	20	40	50	Metals 40-70%
Vegetated Filter Strip[1]	70	10	65	75	Metals 40-70%
Gravel Filter [1]	80	80	65	75	Hydrocarbons – 85% Metals 40-70%
Catch Basin With Sump (Water Quality Inlet[2])	35	5	20	No data	Lead – 15% Zinc – 5%
Large Particle Separator	Same as Catch Basin with larger Storage capacity				

1 From Claytor & Schueler 1996
2 From Environmental Protection Agency 1990

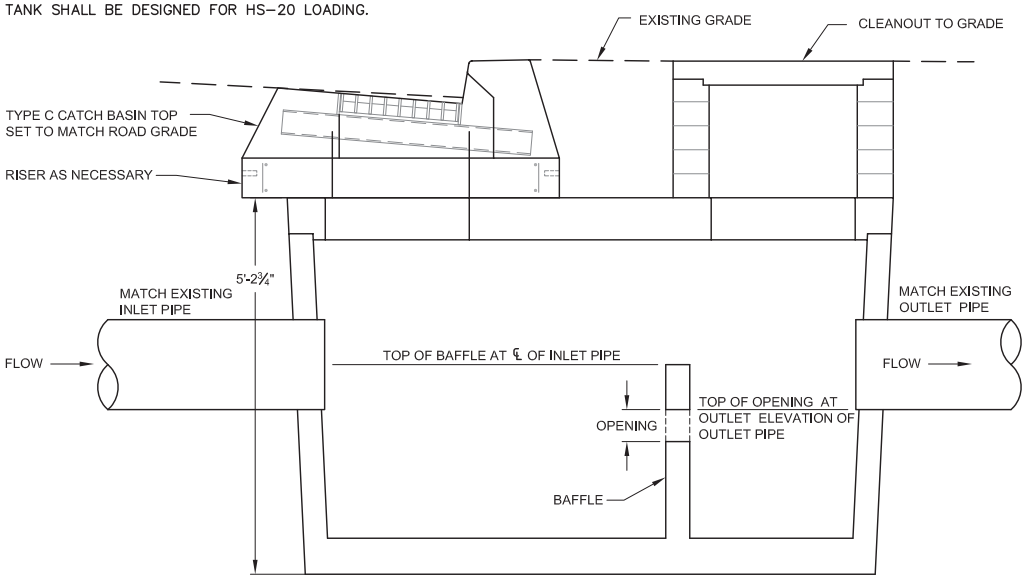


PLAN VIEW

NOTES:

TANK CAPACITY SHALL BE 1,000 GALLONS MINIMUM.

TANK SHALL BE DESIGNED FOR HS-20 LOADING.



SIDE VIEW

LARGE PARTICLE SEPARATOR

NOT TO SCALE

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Designed By: rph
Drawn By: JS
Checked By: RPH

Lenard Engineering, Inc.
Civil, Environmental and Hydrogeological Consultants
2210 Main Street, Glastonbury, CT 06033, (860) 659-3100
140 Willow Street, Winsted, CT 06098, (860) 379-6669
19 Midstate Drive, Auburn, MA 01501, (508) 721-7600

LARGE PARTICLE SEPARATOR

STORM WATER SURVEY

WEST HILL POND

BARKHAMSTED & NEW HARTFORD

CONNECTICUT

Drawing #: A

Drawing date: May 27, 2011

Job #: 11-105

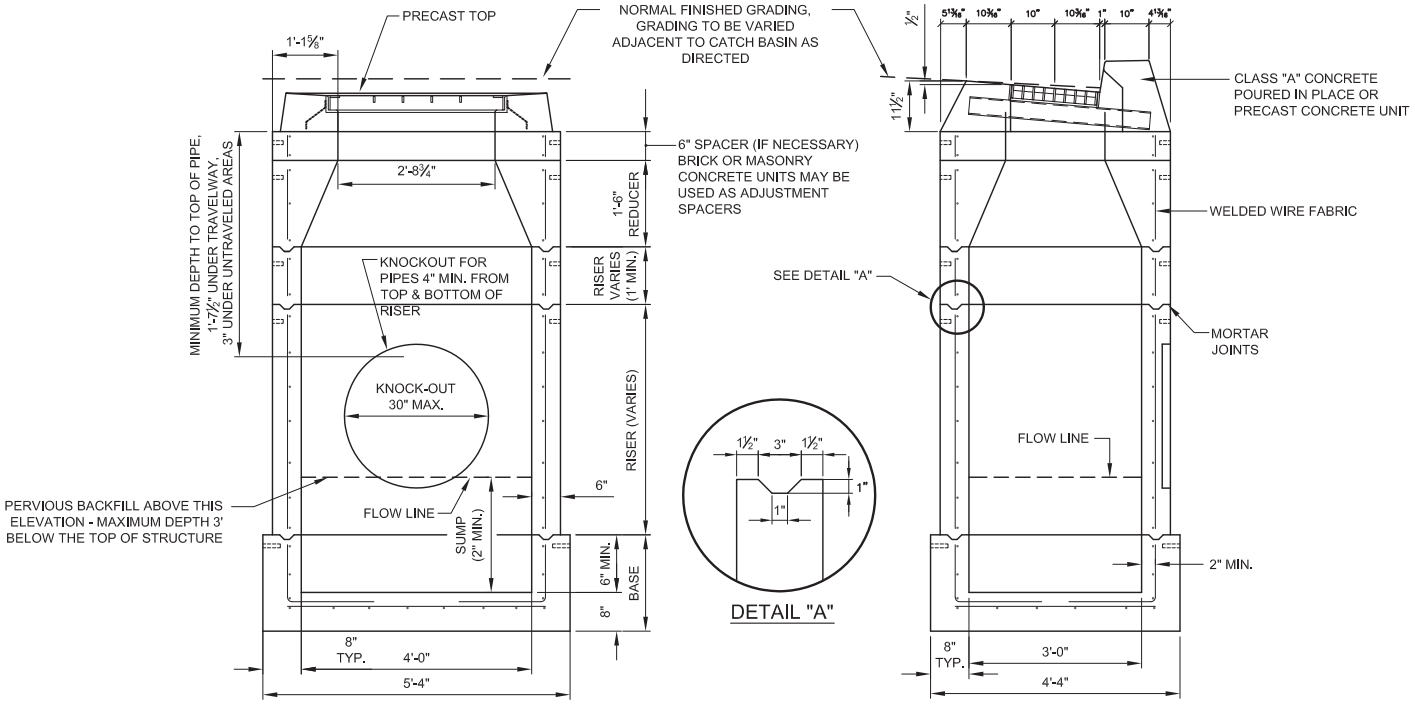
NOTES:

WHERE PRECAST CONCRETE UNIT IS USED FOR THE SUMP, THE TOP FOR THE UNIT SHALL BE AT LEAST 6" BELOW THE BOTTOM OF THE PIPE OUTLETTING FROM THE CATCH BASIN

FOR DETAILS OF FRAMES AND GRATES, SEE CONN. DOT STANDARD SHEET 507–K.

THE WALLS OF ALL CATCH BASINS OVER 10 FT. DEEP TO BE INCREASED TO 12" THICKNESS, WHILE INSIDE DIMENSIONS TO REMAIN THE SAME.

CATCH BASIN HOODS SHALL BE PLACED ON THE OUTLET PIPE OF EACH CATCH BASIN. CONTRACTOR SHALL SUBMIT SHOP DRAWING OF PROPOSED HOOD FOR APPROVAL



PRECAST CATCH BASIN

NOT TO SCALE

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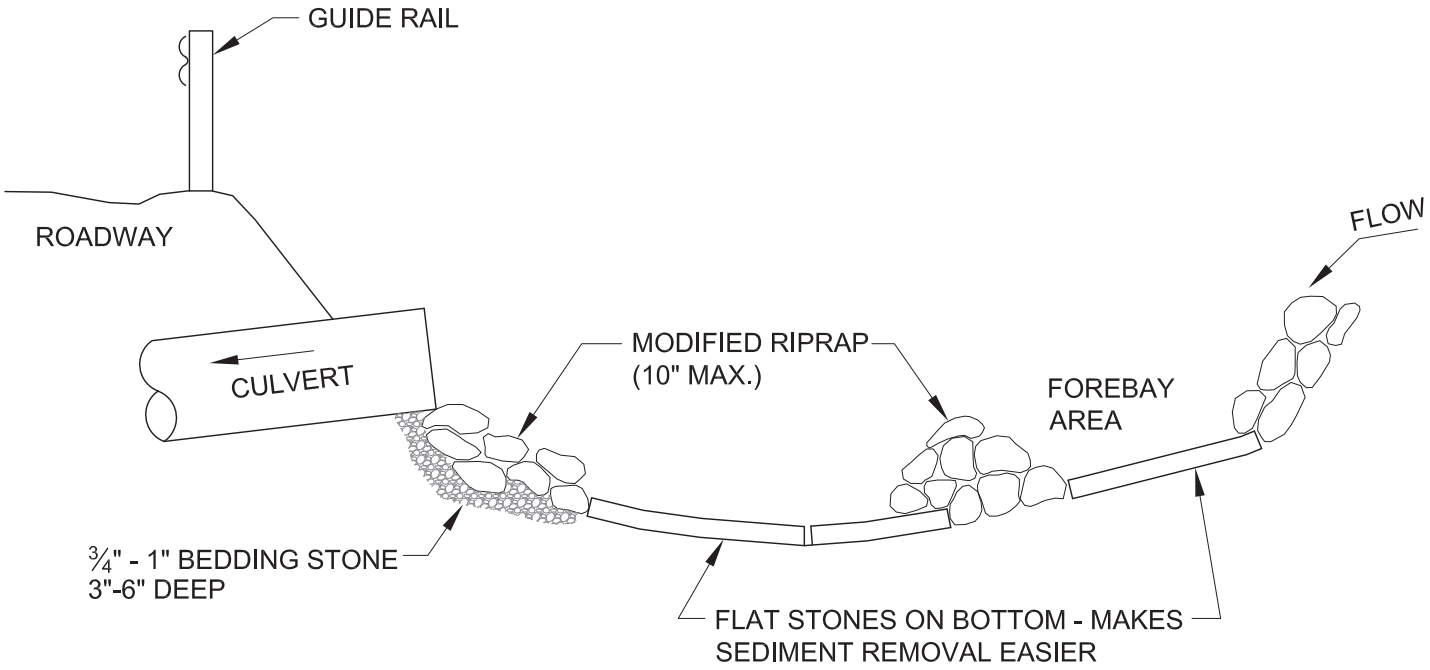
Designed By: rph	Lenard Engineering, Inc. Civil, Environmental and Hydrogeological Consultants 2210 Main Street Glastonbury, CT 06033 (860) 659–3100; 140 Willow Street Winsted, CT 06098 (860) 379–6669; 19 Midstate Drive Auburn, MA 01501 (508) 721–7600	PRECAST CATCH BASIN	Drawing #: B
Drawn By: JS		STORM WATER SURVEY WEST HILL POND BARKHAMSTED & NEW HARTFORD CONNECTICUT	Drawing date: May 27, 2011
Checked By. RPH			Job #: 11–105



NOTE:

FABRIC NOT USED. FUTURE CLEANING WITH A MACHINE WILL CATCH FABRIC & TEAR IT OUT CAUSING DAMAGE TO WHOLE BASIN

UPLAND SETTLING BASIN

NOT TO SCALE

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Designed By: rph
Drawn By: JS
Checked By: RPH

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UPLAND SETTLING BASIN

STORM WATER SURVEY

WEST HILL POND

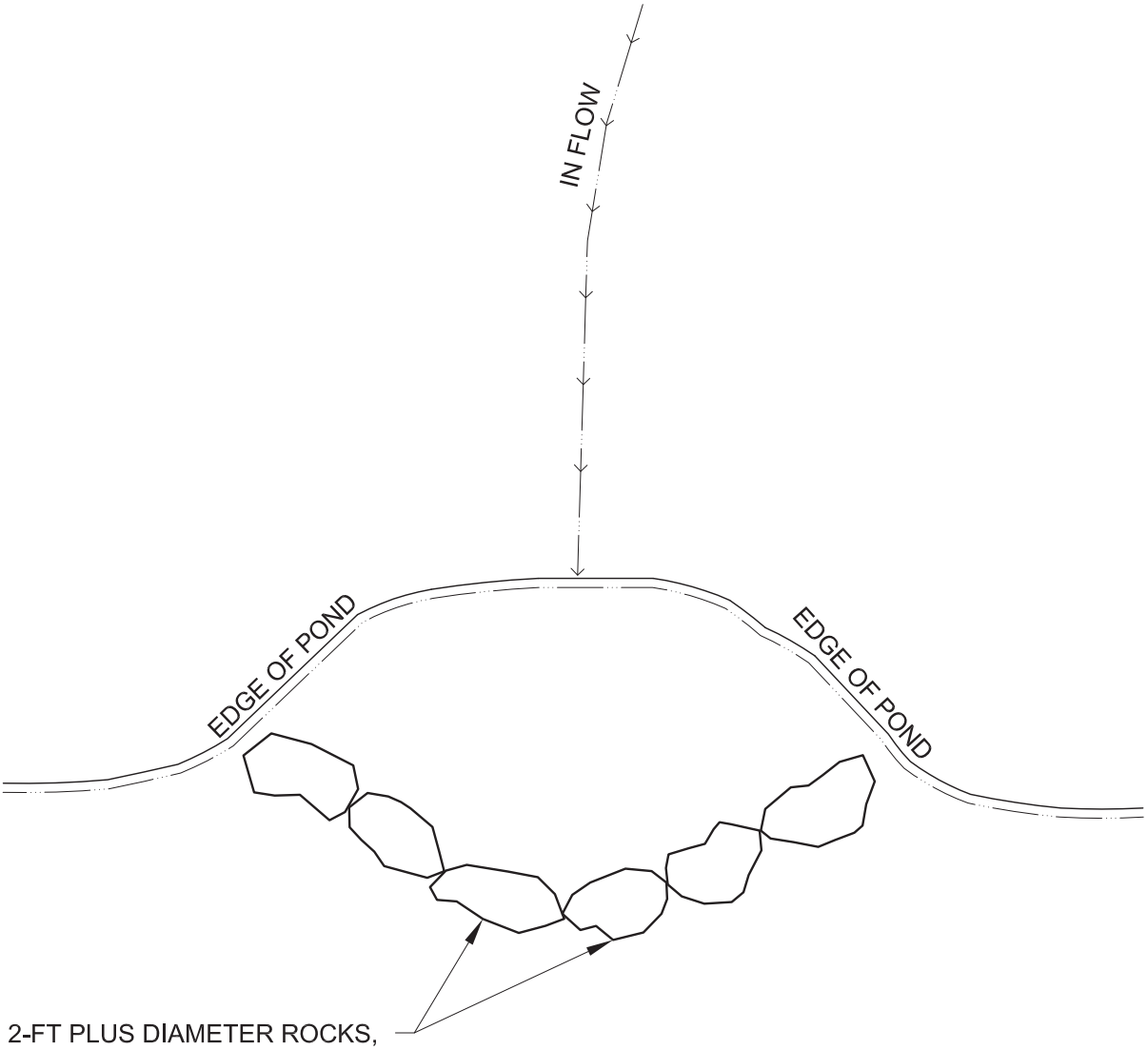
BARKHAMSTED & NEW HARTFORD

CONNECTICUT

Drawing #: C

Drawing date: May 27, 2011

Job #: 11-105



IN POND SETTLING BASIN

NOT TO SCALE

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Designed By: rph
Drawn By: JS
Checked By: RPH

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19 Midstate Drive, Auburn, MA 01501, (508) 721-7600

IN POND SETTLING BASIN

STORM WATER SURVEY

WEST HILL POND

BARKHAMSTED & NEW HARTFORD

CONNECTICUT

Drawing #: D

Drawing date: May 27, 2011

Job #: 11-105

INAPPROPRIATE ACTIONS

Allowing drainage channel to remain blocked by debris, creates dams and forces storm flows to create new paths, eroding material in the process

Disposal of landscaping wastes in drainage paths

Wrong gradation of beach sand, allows erosion by both wind & water

Improper grading and maintenance of drives and roads

RESULT IN

Erosion of bank material

Eventually entering the Lake

Causing infilling & vegetation growth

ID305B	NAME	LOCATION	MILES	AQUATIC LIFE	RECREATION	FISH CONSUMPTION
CT4303-00_04	Still River (Winsted/Torrington)-04	From confuence with Mad River (just US of Route 44/183 crossing), US to headwaters (on west side of Route 8, paralell with Exit 45 offramp), Torrington.	7.56	U	FULL	FULL*
CT4304-00_01	Sandy Brook (Colebrook)-01	From mouth at confluence with Still River (just DS of Old Forge Road crossing), Colebrook (Southeast), US to Massachusetts border, Norfolk (Northeast corner).	8.63	FULL	FULL	FULL*
CT4304-00_01a	Sandy Brook (Barkhamsted/Colebrook)-01a	From mouth at confluence with Farmington River, Barkhamsted, US to confluence with Still River, Colebrook. NOTE this portion was formerly called Still River-01 (CT4303-00_01).	1.35	FULL	NOT	FULL*
CT4304-08_01	Center Brook-01	From mouth at Sandy Brook, US to Route 183 (Colebrook Rd) crossing, Colebrook.	1.28	FULL	U	FULL*
CT4305-00_01	Morgan Brook-01	From mouth at West Branch Farmington River, US to confluence with tributary 4305-04 (first confluence) on east side of Route 44, Barkhamsted.	0.69	FULL	NOT	FULL*
CT4305-00_02	Morgan Brook-02	From confluence with tributary 4305-04 (end of seg-01) east side of Route 44, US to East West Hill Road crossing area (50 meters US of East West Hill Road crossing, entrance of 9/12/05 home heating fuel spill), Barkhamsted.	1.41	U	NOT	FULL*
CT4305-00_03	Morgan Brook-03	From East West Hill Road crossing area (50 meters US of East West Hill Road crossing, entrance of 9/12/05 home heating fuel spill), US to confluence with Mallory Brook, Barkhamsted.	0.48	U	U	FULL*
CT4305-00_04	Morgan Brook-04	From confluence with Mallory Brook, US to West Hill Pond outlet dam, Barkhamsted.	1.52	FULL	NOT	FULL*

Use Support:
FULL=Designated use Fully Supported **NOT**=Designated use Not Supported, See 303d listing for details. **U**=Not Assessed ///=Not applicable to Segment I= Insufficient Information to assess use
FULL*=Refer to Connecticut Department of Environmental Protection Angler's Guide, or online at www.ct.gov/dep for more information about fish consumption advisories.

ID305B	NAME	LOCATION	MILES	AQUATIC LIFE	RECREATION	FISH CONSUMPTION
CT4305-02_01	Mallory Brook-01	From confluence with Morgan Brook, US to Tennessee Gas pipeline crossing (near Barkhamsted and Winchester town line, south of Route 44), Barkhamsted.	1.54	U	U	FULL*
CT4305-02_02	Mallory Brook-02	From Tennessee Gas Pipeline Crossing (end of segment-01, near Barkhamsted and Winchester town line, south of Route 44), US to headwaters, Winchester.	0.7	FULL	U	FULL*
CT4306-00_01	Valley Brook-01	From mouth at northwestern most portion of Barkhamsted Reservoir, Hartland, US (towards northeast) to CT/MA state line.	0.73	FULL	U	FULL*
CT4307-00_01	Hubbard Brook-01	From mouth at northwestern most portion of Barkhamsted Reservoir, Hartland, US (towards northwest) to CT/MA state line.	0.57	U	U	FULL*
CT4308-00_01	Farmington River, East Branch-01	From mouth at Farmington River mainstem, New Hartford, US to Lake McDonough outlet dam.	1.11	NOT	NOT	FULL*
CT4308-01_01	Hurricane Brook (Hartland)-01	Mouth on Barkhamsted Reservoir, just DS of Route 20 crossing, US to HW at Emmons Pond, just US of Hurricane Brook Road crossing, Hartland.	2.24	FULL	U	FULL*
CT4308-11_01	Roaring Brook (Barkhamsted)-01	Mouth at inlet to Barkhamsted Reservoir, parallel to Kettle Brook, US to HW near Pine Mountain road, Barkhamsted.	2.4	FULL	U	FULL*
CT4308-13_01	Kettle Brook (Barkhamsted)-01	Mouth at inlet to Barkhamsted Reservoir, just DS of Ratlum Road crossing, US to HW just US of Route 219 crossing, Barkhamsted.	1.95	FULL	U	FULL*

Use Support:
FULL=Designated use Fully Supported **NOT**=Designated use Not Supported, See 303d listing for details. **U**=Not Assessed ///=Not applicable to Segment I= Insufficient Information to assess use
FULL*=Refer to Connecticut Department of Environmental Protection Angler's Guide, or online at www.ct.gov/dep for more information about fish consumption advisories.

ID305B	NAME	LOCATION	ACRES	AQUATIC LIFE	RECREATION	FISH CONSUMPTION
CT4303-02-1-L1_01	Burr Pond (Torrington)	South of Burr Mountain Rd, Northeast corner of Torrington.	83.39	FULL	FULL	FULL
CT4304-05-2-L2_01	Triangle, Lake (Colebrook)	Northwest corner of Colebrook (North Colebrook area); lake is east of Rte 183, access by Prock Hill Road on YMCA Camp Jewelll property.	49.2	FULL	U	FULL
CT4305-00-1-L1_01	West Hill Pond (New Hartford/Barkhamsted)	Northwest corner of New Hartford.	245.54	FULL	FULL	FULL
CT4308-00-1-L2_01	Compensating Res. (L. McDonough) (Barkhamsted/New Hartford)	Southeast Barkhamsted - northeast New Hartford.	385.75	FULL	FULL	NOT
CT4315-05-1-L1_01	Birge Pond (Bristol)	West of Rt 69 and Pond Street, Bristol	11.84	FULL	FULL	FULL
CT4315-10-1-L1_01	Pine Lake (Malones Pond) (Bristol)	East Bristol, south of Pine Street	8.13	FULL	FULL	FULL
CT4318-03-1-L1_01	Stratton Brook Park Pond (Simsbury)	Small impoundment of Stratton Brook, Simsbury; south of Rte 309.	2.35	U	FULL	FULL
CT4321-00-1-L2_01	Barber Pond (Bloomfield/Windsor)	NE corner of Bloomfield, near Windsor border, N of Newberry Road.	9.4	U	U	FULL
CT4401-00-1-L1_01	Batterson Park Pond (Farmington/New Britain)	Southeast Farmington - northeastern border of New Britain.	145.49	FULL	NOT	FULL
CT4402-04-2-L1_01	Mill Pond (Newington)	Municipal park in Newington; S of Rt 175 near intersection of Rts 175 and 176	2.71	FULL	U	FULL
CT4500-00-1-L1_01	Shenipsit Lake (Tolland/Ellington/Vernon)	At meeting point of Ellington, Vernon and Tolland. CT Water Company watershed.	511.85	FULL	U	FULL
CT4500-00-3-L3_01	Union Pond (Manchester)	Impoundment of Hockanum River in Manchester at Union Street.	49.9	NOT	FULL	NOT

Use Support:
FULL=Designated use Fully Supported **NOT**=Designated use Not Supported, See 303d listing for details. **U**=Not Assessed ///=Not applicable to Segment I= Insufficient Information to assess use
FULL*=Refer to Connecticut Department of Environmental Protection Angler's Guide, or online at www.ct.gov/dep for more information about fish consumption advisories.

Waterbody Name Sandy Brook (Barkhamsted/Colebrook)-01a **Waterbody Segment ID** CT4304-00_01a

Location From mouth at confluence with Farmington River, Barkhamsted, US to confluence with Still River, Colebrook. NOTE this portion was formerly called Still River-01 (CT4303-00_01). **Waterbody Segment Size** 1.35 Miles

Impaired Designated Use Recreation

Cause	Potential Source	
Escherichia coli	Source Unknown	**Category** 5

Waterbody Name Morgan Brook-01 **Waterbody Segment ID** CT4305-00_01

Location From mouth at West Branch Farmington River, US to confluence with tributary 4305-04 (first confluence) on east side of Route 44, Barkhamsted. **Waterbody Segment Size** 0.69 Miles

Impaired Designated Use Recreation

Cause	Potential Source	
Escherichia coli	Source Unknown	**Category** 5

Waterbody Name Morgan Brook-02 **Waterbody Segment ID** CT4305-00_02

Location From confluence with tributary 4305-04 (end of seg-01) east side of Route 44, US to East West Hill Road crossing area (50 meters US of East West Hill Road crossing, entrance of 9/12/05 home heating fuel spill), Barkhamsted. **Waterbody Segment Size** 1.41 Miles

Impaired Designated Use Recreation

Cause	Potential Source	
Escherichia coli	Source Unknown	**Category** 5

Waterbody Name Morgan Brook-04 **Waterbody Segment ID** CT4305-00_04

Location From confluence with Mallory Brook, US to West Hill Pond outlet dam, Barkhamsted. **Waterbody Segment Size** 1.52 Miles

Impaired Designated Use Recreation

Cause	Potential Source	
Escherichia coli	Source Unknown	**Category** 5

Waterbody Name Farmington River, East Branch-01 **Waterbody Segment ID** CT4308-00_01

Location From mouth at Farmington River mainstem, New Hartford, US to Lake McDonough outlet dam. **Waterbody Segment Size** 1.11 Miles

Impaired Designated Use Habitat for Fish, Other Aquatic Life and Wildlife

Cause	Potential Source	
Other flow regime alterations	Upstream Impoundments (e.g., Pl-566 NRCS Structures), Flow Alterations from Water Diversions	**Category** 4c

Impaired Designated Use Recreation

Cause	Potential Source	
Other flow regime alterations	Flow Alterations from Water Diversions, Upstream Impoundments (e.g., Pl-566 NRCS Structures)	**Category** 4c

APPENDIX F

APPENDIX B: WATER QUALITY CRITERIA FOR BACTERIAL INDICATORS OF SANITARY QUALITY
SEE ALSO STANDARDS # 23 AND 25

DESIGNATED USE	CLASS	INDICATOR	CRITERIA
Freshwater			
Drinking Water Supply [1]			
Existing / Proposed	AA	Total coliform	Monthly Moving Average less than 100/100ml Single Sample Maximum 500/100ml
Potential	A	----	--------
Recreation [2][3]			
Designated Swimming [4]	AA, A, B	*Escherichia coli*	Geometric Mean less than 126/100ml Single Sample Maximum 235/100ml
Non-designated Swimming [5]	AA, A, B	*Escherichia coli*	Geometric Mean less than 126/100ml Single Sample Maximum 410/100ml
All Other Recreational Uses	AA, A, B	*Escherichia coli*	Geometric Mean less than 126/100ml Single Sample Maximum 576/100ml
Saltwater			
Shellfishing [6]			
Direct Consumption	SA	Fecal coliform	Geometric Mean less than 14/100ml 90% of Samples less than 31/100ml
Indirect Consumption	SB	Fecal coliform	Geometric Mean less than 88/100ml 90% of Samples less than 260/100ml
Recreation			
Designated Swimming [4]	SA, SB	Enterococci	Geometric Mean less than 35/100ml Single Sample Maximum 104/100ml
All Other Recreational Uses	SA, SB	Enterococci	Geometric Mean less than 35/100ml Single Sample Maximum 500/100ml