

STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION



OFFICE OF ADJUDICATIONS

IN THE MATTER OF : APPLICATION NO. IW-2006-02983

CONNECTICUT DOT
RT. 44 SAFETY IMPROVEMENTS : MARCH 5, 2008

PROPOSED FINAL DECISION

I

SUMMARY

The Connecticut Department of Transportation (applicant) has applied to the Department of Environmental Protection Inland Water Resources Division for an inland wetland and watercourses permit. General Statutes §22a-39. The permit would allow the applicant to conduct regulated activities associated with the construction of safety and stormwater improvements along a 1.4-mile stretch of Rt. 44 running west from the border of West Hartford and Avon to a location 500 feet east of the intersection of Rt. 44 and Rt. 10. The project will permanently impact 0.67 acres of wetlands.

The applicant and the DEP are the only parties in this matter. DEP staff supports issuance of this permit and has submitted into the record a revised draft permit that would authorize the applicant's proposed regulated activities (Attachment B).

The purpose of this project (DOT Project No. 4-123) is to provide safety improvements with the intent of reducing the number and severity of accidents. The proposed improvements include: softening curves, widening shoulders, ending the current lane drop near the Avon-West Hartford border, adding dedicated left turning lanes, providing medians, and realigning offset intersections. In addition to the traffic improvements, the proposed project also makes several

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stormwater improvements, including the repair or replacement of failing or inadequate conveyances that will help to stabilize the flow and reduce erosion and sedimentation.

The proposed project is the result of a corridor study by the Capitol Region Council of Governments (CRCOG), which noted that U.S Route 44 is a major east/west corridor linking the Hartford metropolitan area with the Farmington River Valley and beyond. CRCOG rated this section of U.S. Route 44 as its highest priority. The project has been planned to minimize wetland impacts while meeting current highway design, safety, and drainage standards. These proposed regulated activities, if conducted in accordance with the terms and conditions of the revised draft permit, would be consistent with the applicable legal standards for issuance of the permit. I therefore recommend that the permit be issued.

II

DECISION

A

FINDINGS OF FACT

I adopt the parties' stipulated proposed findings of fact (Attachment A). These facts include a description of the project and its purpose, descriptions of the impact sites, consideration of alternatives to the project, the permanent and temporary impacts of the project on the environment and the applicant's mitigation plans. These proposed findings and the additional finding that follows provide the basis for my conclusions.

1. The draft permit specifically authorizes the applicant to alter 0.67 acres of inland wetlands and watercourses in conformance with the applicants permit application and attached plans (application). Any deviation from the application requires review and approval by the Commissioner. (Ex. DEP-9.) The permit sets forth the terms and conditions for the project's construction as well as the construction and implementation of the compensatory mitigation plan,

including the post-construction monitoring requirements. (Exs. APP-5, DEP-9, 10; Test. 11/19/08¹, K. Lesay, S. Radasci.)

B

CONCLUSIONS OF LAW

The purposes and policies set forth in the Inland Wetlands and Watercourses Act are met through the process and criteria outlined in §22a-41 of the General Statutes. Section 22a-41(b)(1) provides that where a permit application has been the subject of a hearing, the Commissioner must find that there is no feasible and prudent alternative to the proposed action before issuing a permit. In determining whether such an alternative exists, the Commissioner must consider all relevant facts and circumstances, including but not limited to, the six statutory factors outlined in §22a-41(a).

The six factors set forth in §22a-41(a) are:

- (1) The environmental impact of the proposed regulated activity on wetlands or watercourses;
- (2) The applicant's purpose for, and any feasible and prudent alternatives to, the proposed regulated activity which alternatives would cause less or no environmental impact to wetlands and watercourses;
- (3) The relationship between the short-term and long-term impacts of the proposed regulated activity on wetlands or watercourses and the maintenance and enhancement of long-term productivity of such wetlands or watercourses;
- (4) Irreversible and irretrievable loss of wetland or watercourse resources which would be caused by the proposed regulated activity, including the extent to which such activity would foreclose a future ability to protect, enhance or restore such resources, and any mitigation measures which may be considered as a condition of issuing a permit for such activity including, but not limited to, measures to (A) prevent or minimize pollution or other environmental damage, (B) maintain or enhance existing environmental quality, or

¹ All references to testimony are from the hearing held on November 19, 2007 at the Avon Senior Center. The audio recording of this hearing is on file with the Office of Adjudications and is the official record of this proceeding.

(C) in the following order of priority: Restore, enhance and create productive wetland or watercourse resources;

(5) The character and degree of injury to, or interference with, safety, health or the reasonable use of property which is caused or threatened by the proposed regulated activity; and

(6) Impacts of the proposed regulated activity on wetlands and watercourses outside the area for which the activity is proposed and future activities associated with, or reasonably related to, the proposed regulated activity which are made inevitable by the proposed activity and which may have an impact on wetlands and watercourses.

See also Regs., Conn. State Agencies §22a-39-6.1.

Applying these factors to this permit application, I conclude as follows:

(1) *Environmental Impacts*

The applicant designed the project to avoid or minimize impacts on natural resources and adjacent properties as much as possible. The proposed project will result in the loss of 0.67 acres of wetlands and watercourses and some disturbance to wetlands during construction. These unavoidable impacts have been minimized through the incorporation of permit terms and conditions suggested by DEP as well as by overall project design and chosen construction methods.

Any loss of the functional values of the wetlands and of watercourses that will be permanently impacted by this project has been minimized. The applicant has incorporated measures proposed by the DEP Fisheries Division in its design plans and construction contracts to avoid long-term adverse impacts to aquatic resources and habitat. These measures, including: limited timeframes for in-stream construction; the relocation and modification of culverts; and the design of the relocated stream in accordance with Inland Fisheries guidelines, will not only minimize and avoid impact by protecting aquatic resources, but also provide opportunities to increase aquatic habitat.

Short-term impacts during construction will be reduced through measures to control erosion and sedimentation, stabilize embankments, and restore vegetation. Secondary impacts to the wetland areas will be minimized by adherence to appropriate Best Management Practices during construction.

To compensate for the loss of wetlands and watercourses, the applicant intends to create, restore, and enhance a total of 1.48 acres of mitigation wetlands to provide open-water plant and wildlife habitat functions. The applicant will also provide for the preservation of an 8.26-acre upland site that protects a vernal pool similar in nature to the one impacted by the project on the northerly side of Route 44 near Parsons Way.

The project will result in permanent impacts to 0.67 acres of wetlands and watercourses. These impacts, although unavoidable, have been minimized and will be compensated for by the mitigation and preservation efforts required of the applicant. The short-term impacts to adjacent resources will be controlled during construction through incremental grading, fill, and stabilization methods and best management practices such as erosion and sedimentation control. As a result of the project, some aquatic habitat and fisheries resources in or adjacent to the impacted areas will be enhanced. The improvements to existing culverts, closure or relocation of inadequate culverts, and efforts to direct stormwater drainage away from certain resource areas will prevent flooding, facilitate correct drainage patterns, minimize erosion, and enhance potential for the existing wetlands system to provide additional wetland functions, including habitat. The proposed project, coupled with these enhancements and the mitigation plan, will not diminish the overall natural capacity of the wetland and watercourse systems to support desirable biological life, prevent flooding, control sediment, facilitate drainage, and promote public health and safety.

(2) *Alternatives*

There are no feasible or prudent alternatives to the project plan proposed by the applicant. Various alternatives, including taking no action, would not meet the goals of the project to implement safety improvements needed to meet current standards in consideration of the existing and projected traffic demands on this vital corridor. The applicant considered numerous

alternatives to the proposed design to achieve needed safety improvements while minimizing wetlands impacts and project costs. The applicant reasonably rejected alternatives to the proposed design that would have negatively impacted a greater amount of resource area or would have resulted in longer and more disruptive construction timeframes. The project has been designed to minimize environmental impacts to the greatest extent possible. The applicant's proposed plan is reasonable in light of the social benefits to be derived from a safer roadway. The applicant has sufficiently demonstrated that there is no feasible and prudent alternative to the final proposed safety improvements.

(3) Short-term Uses of the Environment/Maintenance and Enhancement of Long-term Productivity

The short-term impacts of the project, primarily due to the construction activities, will be minimized through erosion and sedimentation control guidelines that will be included in the construction contracts as required by the applicant. These guidelines will protect ground and surface water quality, minimize the possibility of siltation and sedimentation, and minimize adverse effects to aquatic habitat.

The project will improve the functioning of some areas of the present wetland system that display signs of erosion and degradation and function primarily to provide flow conveyance. These improvements will likely allow the wetlands to provide additional functions including habitat, groundwater recharge, and nutrient, sediment, and toxicant retention. Stable outlets and embankment slopes and improvements to the stormwater collection system will minimize sedimentation and improve water quality. The new wetland mitigation site, an area larger than the area of wetlands to be lost, will enhance, restore, and create a functioning wetland system to replace any long-term values lost to the project.

The project will have short-term and long-term impacts on the environment. However, the long-term impacts will be minimized or offset and the short-term impacts due to construction will be mitigated by the use of sedimentation and erosion controls and will abate after construction is completed as will the temporary disturbance to wildlife. Some improvements will enhance the long-term productivity of the impacted areas and the mitigation site will compensate for areas that are permanently lost. The project will have minimal impact on the

maintenance and enhancement of long-term productivity of the existing wetlands or on the natural development of the wetlands in the future.

(4) *Irreversible/Irretrievable Commitment of Resources and Mitigation Measures*

The proposed project has been carefully designed to minimize the irreversible and irretrievable commitment of wetlands resources. In recognition of wetlands as an indispensable, irreplaceable fragile natural resource, the project is designed to protect existing wetland areas to the greatest extent possible. To compensate for the irretrievable loss of 0.67 acres of wetlands, the mitigation site will be created. The primary goal of this site is to provide open water plant and wildlife habitat. The mitigation plan also includes a preservation area consisting of 8.26 acres that will mitigate specifically for impacts to the vernal pool habitat disturbed by the project.

The project will also improve and enhance some of the functions of existing wetlands by enhancing aquatic resources, stabilizing areas of existing erosion, improving drainage, and removing invasive species and debris. The commitment of wetland resources to the proposed project will not result in an unacceptable loss of irretrievable or irreplaceable wetland resources and the project will create, restore and enhance productive wetland resources.

(5) *Impact on Safety and Health*

The project, which will result in improved traffic flow and a safer roadway, has been designed to avoid adverse impacts to the wetlands to the greatest extent possible. The applicant will take measures to mitigate the potential for harm during construction, including the protection of ground and surface water. The success of these measures will be monitored through regular inspections during the construction phase of the project. Potential impacts to aquatic resources will be minimized through measures that include the incorporation of DEP recommendations. When concluded, improvements such as stabilized slopes, replacement culverts, new stormwater drainage systems, and the removal of impervious surfaces will enhance aquatic resources at the site and further downstream and will enhance the ability of the system to control stormwater. The impacts to the wetlands do not pose a threat of injury or interference with the public health or safety or the reasonable use of property.

(6) Impact on Wetlands Outside the Area and Inevitable Future Activities

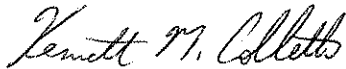
There is no evidence that the proposed project will have a negative impact on wetlands outside of the project area. The measures that will be taken during construction will prevent erosion and sedimentation that could encroach upon surrounding wetlands. Improvements to the existing culverts, replacement or closure of inadequate culverts, and the overall modifications to the unnamed stream as a result of the project will enhance overall water quality in this system. The wetland mitigation sites and preservation areas will offset the project's permanent impacts, and could benefit wetland systems that surround the area.

III

RECOMMENDATION

The requirements of General Statutes §22a-41(b) have been met by this permit application. The record presented and all relevant facts and circumstances, including the six factors outlined in §22a-41(a), demonstrate that there is no feasible and prudent alternative to the proposed project that meets the purpose of the project and that would cause substantially fewer impacts to the natural resources.

The construction of the proposed safety improvements on Route 44 will result in a safer roadway and more efficient transportation system. The proposed plan strikes an appropriate balance between the obligation of the applicant to improve a road that is presently a risk to human health and safety and the mission of the DEP to protect the environment. I therefore recommend that the permit that is the subject of this application be issued.



Kenneth M. Collette, Hearing Officer

P A R T Y L I S T

CT DOT/Rt. 44 – Avon Mountain Safety Improvements
Application #IW-2006-02983

PARTY

The Applicant

Connecticut Department of Transportation
Environmental Planning
2800 Berlin Turnpike
P.O. Box 317546
Newington, CT 06131-7546

REPRESENTED BY

Charles H. Walsh, AAG
Office of the Attorney General
55 Elm Street
P.O. Box 120
Hartford, CT 06141-0120

Department of Environmental Protection
Bureau of Water Protection and Land Reuse
Inland Water Resources Division
79 Elm Street
Hartford, CT 06106

Jeffrey Caiola
Sara Radasci

Attachment A

STIPULATED FINDINGS OF FACT

1. The Application

On November 28, 2006, the Department of Transportation (“DOT”) submitted an application to the Department of Environmental Protection (“DEP”) Inland Water Resources Division for an Inland Wetland and Watercourses permit. A hearing was requested by DEP upon determination of significant impact, and a hearing was held on November 19, 2007. The record remained open until December 19, 2007 to allow time for the submission of additional written public comments.

2. The Project

a. Purpose and Need

The proposed regulated activities that are the subject of this permit application (the “project”) are all associated with the proposed safety and traffic improvements to Route 44. The project will begin approximately 500 feet east of the intersection with Route 10 and proceed easterly to the Avon/West Hartford town line. Generally, the existing roadway will be shifted and widened to accommodate the creation of two continuous lanes in each direction, the softening of the horizontal curves, the installation of medians, the realignment of offset intersections, the creation of wider shoulders, and the creation of left-turn lanes at intersecting local roads (IWRD Permit Application, APP-1).

The proposed project has been identified by the DOT as a priority due to steep grades, sharp horizontal curves, narrow shoulders, and a lack of left-turn lanes, all of which contribute to a consistent pattern of accidents. The majority of the accidents within the project area occur in the vicinity of the horizontal curves. The project was initiated as a result of a corridor study that was conducted by the Capitol Region Council of Governments (“CRCOG”). U.S. Route 44 is a major east/west corridor linking the Hartford metropolitan area with the Farmington River Valley and beyond. This section of U.S. Route 44 was ranked by CRCOG as its highest priority. The project aims to provide safety improvements with the intent to reduce the number and severity of accidents. The length of the project is 1.4 miles (Testimony of Richard Zbrozek, APP-6A).

Improvements to the road include softening of the three curves within the project area and making their curvature more uniform to improve driver expectancy. The first two of these curves are located at the summit of Avon Mountain in the

vicinity of Deercliff Road and Parsons Way and the third is located immediately east of the Pine Tree Lane/Wright Drive intersection. Existing shoulders in the project area will be expanded from the existing width of between two and four feet to eight feet to allow for emergency pull-offs, deceleration into driveways and flexibility with regard to incident management. In addition, several shoulder areas measuring fourteen feet wide will be provided for police enforcement and traffic calming. A second westbound lane is proposed to be extended from the West Hartford – Avon Town line, where it currently ends, to the vicinity of Pine Tree Lane, where it currently resumes, for a distance of 0.8 miles. This improvement will address the safety concerns of the lane drop at the West Hartford – Avon Town line where motorists often accelerate to jockey for position. Medians are proposed throughout much of the project limits in order to reduce crossover type accidents (Testimony of Richard Zbrozek, APP-6A).

The project also includes improvements to four local roads that intersect this area of Route 44. These roads are, from west to east, Wright Drive, Pine Tree Lane, Deercliff Road and Parsons Way. The offset intersection at Pine Tree Lane and Wright Drive will be realigned to oppose each other. All intersections, other than the eastern leg of Pine Tree Lane will have dedicated left turning lanes from Route 44 Eastbound or Westbound as applicable. Additionally, the present intersection of Montevideo Road with Route 44 will be discontinued, and access to Montevideo Road will be provided through Parsons Way. This will eliminate undesirable turning movements and enhance overall safety (Testimony of Richard Zbrozek, APP-6A).

The frequency and severity of accidents is high; between the years 1999 and 2004, there were 190 accidents with 99 injuries and 2 fatalities. In addition, there were three more fatal accidents during 2005, resulting in six more fatalities within the project limits. The prevalent accident patterns include cross-over, run-off-the-road, rear-end, and side-swipe type accidents. The cross-over type accidents have resulted in fifty one percent of the total injuries. It is significant to note that most of the accidents occur in the vicinity of the horizontal curves. The length of project is 1.4 miles. The project is intended to provide safety improvements with the intent to reduce the number and severity of accidents (Testimony of Richard Zbrozek, APP-6A).

b. Water Resources

Water resources for this project have been separated into three location sites, each of which is comprised of several drainage systems. Running from east to west, Site 1 includes the Ely Pond drainage system (including Lake Erie Brook) and Culverts H, I and L; Site 2 includes an unnamed watercourse and Culverts D, E, F and G; and Site 3 includes two United States Geological Survey (“USGS”) mapped unnamed streams and Culvert B (APP-2 and 2A; Testimony of Richard Zbrozek, APP-6A; Testimony of Amanda Freitas, APP-7A).

Site 1

Drainage improvements are also proposed as part of the project. Upgrades within Site 1 are proposed to Culverts I and L and to systems 2, 3, 3A, 4, 4A and 5 (Testimony of Richard Zbrozek, APP-6A).

An existing 36" corrugated metal pipe ("CMP") under Route 44 connects the wetlands north of Ely Pond to the pond. This culvert, referred to as Culvert I, originally maintained flow in a southerly direction under Route 44 so that the wetlands drained into the pond. The inlet to this culvert has settled and is currently lower than its outlet and therefore, the original drainage pattern is no longer maintained. The existing 36" metal culvert is proposed to be replaced with a 5 foot x 5 foot box culvert with a 2 foot x 2 foot wildlife shelf. The elevations for the new Culvert I will be set to ensure the wetlands to the north are not drained and that fish could not migrate into this area (Testimony of Richard Zbrozek, APP-6A).

Ely Pond discharges flow through a dam equipped with a control valve and located on the eastern edge of Deercliff Road. From the dam the water enters an open vegetated channel running northerly and parallel to Deercliff Road. The flow then crosses under Deercliff Road via a twenty four-inch reinforced concrete pipe ("RCP"), identified as Culvert H, into a flat earth ditch, then a steep riprap channel which leads into a concrete inlet and outfalls through a 30" clay pipe referred to as Culvert L. This pipe, which shows signs of deterioration and failure, will be replaced with a fifty four-inch plastic pipe. Due to steep topography, Culvert L will be stepped down through drop manholes and outletted into a stabilized pool (Testimony of Richard Zbrozek, APP-6A).

System No. 2 will drain the median and shoulder using curbed and curbless catch basins connected with fifteen inch RCP. The discharge of 3.0 cubic feet per second ("cfs"), flows into a modified riprap channel four feet wide and then into Ely Pond (Testimony of Richard Zbrozek, APP-6A).

System 3 is being modified to remove roadway drainage from the vernal pool. Its present outlet will be plugged. The closed drainage system on Parsons Way will include the roadway low point catch basins and the extension of the drainage system across U.S. Route 44. The proposed culvert is a fifteen inch RCP which will convey 4.7 cfs and outlet into a splash pad adjacent to the outlet for System No. 2. The combined flow of 6.6 cfs at a velocity of 4.8 feet per second ("f/s") will discharge into a modified riprap channel four feet wide and then into Ely Pond (Testimony of Richard Zbrozek, APP-6A).

System 3A is a cross culvert replacement. The existing system drains a localized depression at the northwest corner of the intersection of Route 44 and Parsons Way and conveys the flow easterly under Parsons Way to a vernal pool wetland located on the north side of Route 44 opposite Ely Pond. It also includes

two low point curbed catch basins on Parsons Way. The new culvert will be an eighteen-inch RCP and a manhole used to facilitate a grade change and avoid a conflict with System 3. This new culvert will continue to utilize the localized depression as a detention basin and meter the flow through the eighteen-inch RCP at a maximum rate of 2.0 cfs and velocity of 3.5 f/s into a riprap splash pad and overland to the vernal pool. This system will not include the two curbed catch basins at Parsons Way low point which will be incorporated into System 3 (Testimony of Richard Zbrozek, APP-6A).

System 4 replaces a closed drainage system from Montevideo Road to the thirty-inch clay pipe outlet at station 63+75 far right. The new system is comprised of seven catch basins (one redundant catch basin) interconnected with reinforced concrete pipe and outletting 9.2 cfs through an eighteen-inch RCP into a roadside sodded swale. System 4A, located at station 61+00, has been broken out of System No. 4 and consists of three curbless catch basins conveying flow of 4.2 cfs through an eighteen-inch RCP and into Culvert L (Testimony of Richard Zbrozek, APP-6A).

System 5 is another minor drainage system at station 61+00 which consists of three curbless catch basins conveying 3.7 cfs through a fifteen-inch CMP onto a splash pad where the flow dissipates into a well defined basin southwest of the project (Testimony of Richard Zbrozek, APP-6A).

Site 2

Upgrades within Site 2 are proposed to Culverts D, E, F and G, and to systems 8 and 8A. Site 2 consists of an interconnected series of swales, ditches, channels and associated wetlands. Under present conditions starting at station 57+80 Left an inlet structure conveys flow from the roadside pavement and outlets into a concrete lined ditch at station 53+00 Left. The concrete lined ditch extends westerly for 1,500 feet where it combines flow with an interceptor ditch to an open earth ditch for 500 feet and then into a twenty four-inch CMP (Culvert G) under Route 44, from north to south. From that point an unnamed watercourse four hundred sixty feet in length conveys the flow before crossing under Route 44 through a twenty four-inch RCP (Culvert E) at station 29+50, from south to north. The flow then enters a one hundred fifty-foot long earthen ditch and intercepts additional flow from a twenty four-inch RCP under Pine Tree Lane (East), (Culvert F). The combined flow of the one hundred fifty-foot long earthen ditch and Culvert F discharges through a twenty four-inch RCP (Culvert D) under Pine Tree Lane (West). This watercourse continues westerly for twenty two hundred feet to Nod Road and eventually reaches the Farmington River (Testimony of Richard Zbrozek, APP-6A).

Through an extensive analysis of the roadway's alignment, expansion and associated impacts, the DOT design engineers determined that the unnamed stream, from station 29+50 Right to station 34+00 Right, required relocation or

pipng. The DOT decided to relocate the unnamed stream to the north side of Route 44 because the realignment of the road would require the unnamed stream to be piped if it remained in its original location on the south side of the highway. The Hydrology/Hydraulic Reports (Exhibits APP10 and 10A) indicate that both twenty four-inch culverts under Route 44 (Culverts E and G) are inadequate to handle design flows, and overtopping of the stream embankment occurs at both inlets. Stormwater runoff would find relief at the northerly inlet by draining westerly overland across Pine Tree Lane (East) and eventually reaching the outlet on Pine Tree Lane (West). Likewise, at the 24" CMP (Culvert E) southerly inlet the overtopping flow would relieve itself through the 30" RCP (Culvert C) under Wright Drive (Testimony of Richard Zbrozek, APP-6A; Hydrology/Hydraulics Report Volumes 1 and 2, APP-10 and APP-10A).

The proposed system extends from a roadside swale at station 61+00 Left westerly eight hundred feet to station 53+00 Left where it drains into an intermediate riprap ditch which parallels Route 44 for twelve hundred feet to station 41+00 Left. Flow will then enter a thirty six-inch by twenty two-inch culvert two hundred forty feet in length and discharges into another intermediate riprap ditch seventy five feet in length at station 38+00 Far Left where it combines with a mountain side interceptor ditch and meanders for four hundred feet before reaching the unnamed mountain stream at station 35+00 Far Left. From this point, a four-foot wide channel is proposed to extend westerly to a new 6-foot by 5-foot box culvert (Culvert J) under Pine Tree Lane (East). The 6-foot by 5-foot culvert is one hundred fifty five feet long, as it has been extended away from the influence of a septic field. In addition, a minor drainage system (8A) which conveys flow from the Pine Tree Lane (East) low point is brought through the 6-foot by 5-foot culvert outlet wingwall. System 8A is comprised of three catch basins interconnected within an eighteen-inch RCP. The outflow is 5.1 cfs. The proposed four foot channel continues westerly along Route 44 and bends at 90° to the north along Pine Tree Lane (West). The twenty four-inch RCP from System No.8 as described below enters into the four foot channel at the bend. The outer channel embankment is being protected from scour along the bend with permanent sheet piling which will be below the finished surface and not exposed. The proposed channel continues northerly under a private driveway via a 6-foot by 5.5-foot box culvert (Culvert K). Appropriate outlet scour protection is provided and the flow continues in a natural channel to Nod Road. Additional details are available in the Hydrology/Hydraulic reports (Exhibits 10 and 10A) as well as in the testimony of Ali Mohamood (APP-9A) (Testimony of Richard Zbrozek, APP-6A).

Drainage system 8 is a closed drainage system. It begins at a median catch basin at station 37+00 and extends easterly to a drainage outlet at station 29+00. This system is comprised of four median curbless catch basins one of which is redundant, and five roadway shoulder catch basins. Its outlet is a twenty four-inch RCP which conveys 9.7 cfs to an intermediate riprap ditch. This system collects stormwater from the roadway pavement and median. The roadway is

banked from north to south (superelevated) at this location and therefore the system favors Route 44's southerly gutter since that would be the low side of the roadway. Under the present condition storm runoff from the roadway pavement outfalls through a series of paved leakoffs located in the southerly gutter and into the existing unnamed water course. To improve water quality System No.8 has been designed with the last two catch basins in the southerly gutter or low side of the road, with four-foot sumps (Testimony of Richard Zbrozek, APP-6A).

System 8A is the 3 catch basin system located within Pine Tree Lane (East) and was described in the major system for Site No. 2 above.

Site 3

Site 3 includes Culvert B under Route 44 and drainage systems 9 and 10. Culvert B is an existing seven-foot by ten-foot Concrete Box Culvert conveying flow under Route 44 at station 8+00. This culvert is adequate and will not be modified. Two minor drainage systems numbered 9 and 10 as described below are contributing to this box culvert (Testimony of Richard Zbrozek, APP-6A).

System 9 is a closed drainage system that is being modified to allow for shoulder expansion and the lead-in taper for a runaway truck ramp which will be built earlier than this project as a separate project. This system primarily drains roadway runoff by gutter flow and a series of catch basins starting at station 20+15 Right and discharges through a twenty four-inch RCP into an existing seven-foot by ten-foot box culvert. The modified system will start in the vegetated median at station 23+40, cross over to the northerly roadway gutter and continue westerly as a new system linking into a catch basin at Station 19+20 Left. It will discharge through a system composed of fifteen-inch RCP and two more catch basins installed by separate project and then into the pre-existing drainage system. This drainage system, new and existing, is comprised of nine catch basins and utilizes the existing twenty four-inch RCP as the outfall into the seven-foot by ten-foot box culvert. The discharge is 10.4 cfs. This is a net decrease of approximately 4.0 cfs which will be conveyed by system No. 10 located on the south side of Route 44 (Testimony of Richard Zbrozek, APP-6A).

The existing System 10 is limited to a roadside depressed area at Station 9+00 Right that enters the southeast wingwall for the seven-foot by ten-foot culvert (Culvert B) through a fifteen-inch CMP. The proposed system begins at station 22+00 Right with a series of drain basins located behind a proposed retaining wall and drains into a short new system of two catch basins and a fifteen-inch RCP before entering an existing eighteen-inch RCP. A proposed manhole at station 14+60 Right will be used to turn the flow toward the southerly gutter via fifteen-inch RCP to station 8+00 Right. This drainage system then turns ninety degrees south and conveys the flow into an existing curbless catch basin where an existing fifteen-inch CMP then discharges 7.5 cfs through the wingwall of Culvert B (Testimony of Richard Zbrozek, APP-6A).

Water quality is expected to improve due to the use of four-foot sumps in the last catch basins for both Systems 9 and 10 (Testimony of Richard Zbrozek, APP-6A).

Other Systems

Three of the twelve minor drainage systems within the project, numbered 1, 6 and 7, fall outside the three water resource locations shown on Exhibits numbered APP2 and APP2A. System 1 is an existing closed drainage system draining easterly and away from the project limits. The proposed work to this system is limited to resetting two catch basins. System 6 is a closed drainage system that starts at a median catch basin at station 59+50 and ends at a riprap splash pad at station 51+50 Right. It is comprised of six catch basins conveying 2.9 cfs through a fifteen-inch RCP. The flow dissipates on land owned by the DOT. No wetlands are involved. System 7 is comprised of four catch basins and conveys 5.2 cfs through a fifteen-inch RCP into a splash pad where the flow then dissipates. Currently the stormwater from the areas of System No. 6 and System No. 7 is discharged through a roadway leakoff and into a swale. There is also an existing catch basin within the driveway at Station 45+00 which outlets through a fifteen-inch RCP at the same location as that proposed for System No.7 (Testimony of Richard Zbrozek, APP-6A).

The storm drainage design for the catch basins and piping in the project area conforms to applicable state and federal guidelines ((IWRD Permit Application, APP-1; Hydrology/Hydraulics Report Volumes 1 and 2, APP-10 and APP-10A).

c. Watercourses/ Flood Control

Two watercourses that would be impacted by the proposed work are located within the limits of the project. Additionally, seven culverts within the project area will be created, replaced or eliminated. Site 1, the furthest east of the three drainage systems within the project, contains an eighty five-foot long, thirty six-inch CMP under Route 44 at approximately Station 73+90, referred to as Culvert I, which connects the vernal pool wetland north of Route 44 to Ely Pond (as shown in APP-1, Plate 13 and Testimony of Amanda Freitas, APP-7A). Culvert I originally maintained flow in a southerly direction under the road so that the wetlands drained into the pond. The culvert has been compromised to the point where there appears to be very little transport of flows from one side of the culvert to the other in either direction ((IWRD Permit Application, APP-1; Testimony of Amanda Freitas, APP-7A; Testimony of Richard Zbrozek, APP-6A).

On the southern side of culvert I, Ely Pond is a mapped waterbody that has recently been drained by the property owner (APP-1, Plates 12-13 and Testimony of Amanda Freitas, APP-7A). Prior to draining activities, when water levels within the pond would reach the height of the concrete dam/headwall located several feet off of

the eastern edge of Deercliff Road, water from the pond would flow over the headwall into an approximately one hundred eighty-foot long open channel running northward and parallel to Deercliff Road. From the open channel, flow would enter under Deercliff Road via Culvert H and outlet to a one hundred fifty five-foot long earth-ditch that leads from a mowed lawn on a private residence out to and along the southern Route 44 right of way (APP-1, Plate 11). The earth ditch terminates at a masonry structure, which connects to a thirty-inch clay pipe. This pipe, which formerly collected water from the pond and continues to collect stormwater from the road, outlets on the south side of Route 44 down a steep embankment. Segments of the pipe at the outlet and mid-section have broken off, and the pipe continues to erode back into the roadway embankment. The entire length of the watercourse that formerly began at the outlet of Ely Pond and eventually terminates at its confluence with the Farmington River to the west of the site is a USGS mapped, unnamed stream. Federal Emergency Management Agency flood maps label this watercourse as Lake Erie Brook. Since the draining of Ely Pond, flows have not been observed during any of multiple field visits to the site (IWRD Permit Application, APP-1; Testimony of Amanda Freitas, APP-7A).

Site 2 consists of the interconnected series of ditches, channels, and associated wetlands that runs along Route 44 and Pine Tree Lane and includes culverts D, E, F and G. This portion of the project extends along Route 44 from the end of an existing concrete ditch at approximately Station 38+00, westerly to the Pine Tree Lane/Wright Drive intersection. Approximately fifteen hundred feet of concrete ditch is located on the north side of Route 44 and carries roadway and mountain runoff from approximately Station 53+00 to Station 38+00 (APP-1, Plates 7-9). The ditch ends at a point where it intersects a higher interceptor ditch located on the mountainside embankment. The higher ditch is approximately eleven hundred fifty feet long and runs about fifty feet north of and somewhat parallel to the concrete ditch and collects mountain runoff. Downslope of the intersection of these two ditches, the combined flow travels through an open earth ditch approximately five hundred feet long and into an approximately one hundred five-foot long twenty four-inch CMP culvert (Culvert G) under Route 44. Also contributing flows to Culvert G are numerous shallow watercourses that converge into one to the north of the culvert inlet at the sharp bend in the ditch approximately sixty feet from the culvert inlet. Once this unnamed watercourse exits Culvert G on the south side of Route 44, it flows in a westerly direction for approximately four hundred sixty feet along the bottom of the existing roadway embankment slope as shown on APP-1, Plates 6-7 (IWRD Permit Application, APP-1; Testimony of Amanda Freitas, APP-7A).

At Station 29+50 the stream enters another twenty four-inch cross-culvert approximately seventy feet long under Route 44 (Culvert E) and exits on the north side where it connects to a twenty four-inch RCP, approximately two hundred sixty five feet long, that runs along the western leg of Pine Tree Lane (APP-1, Plate 6). Beyond Culvert E and the twenty four-inch RCP that carries the watercourse under 47 Pine Tree Lane and the southern portion of 15 Pine Tree Lane, the flow then enters a one hundred fifty-foot long earth ditch that flows in a northerly direction along the

western leg of Pine Tree Lane. The topography in this portion of the site is more gradual, and as a result, much of the property at 15 Pine Tree Lane consists of a wooded swamp. This wooded swamp is fed by an open channel approximately two hundred eighty feet long that carries runoff from a twenty four-inch RCP (Culvert F) under the eastern leg of Pine Tree Lane (IWRD Permit Application, APP-1).

It should be noted that the one hundred fifty-foot earthen ditch is one of two swales located between the western leg of Pine Tree Lane and the wooded swamp and constructed with substantial berms that prevent surface water from the wetland from entering the ditches. The only surface connection between these two ditches and the wetland associated with the two hundred eighty-foot channel is located at the downstream terminus of the ditches, which occurs at a low point in the landscape at the inlet of a fifty-foot long, twenty four-inch RCP (Culvert D) that carries the combined flow under the western leg of Pine Tree Lane. Once the flow exits Culvert D, it reaches a well-defined watercourse running westerly across approximately twenty two hundred feet of open land to a culvert under Nod Road (Culvert A) within Site 3 (Testimony of Amanda Freitas, APP-7A).

The third and westernmost drainage system on the site extends along Route 44 from Station 23+00 westerly to Station 7+00 where an existing seven-foot by ten-foot box culvert (Culvert B) conveys an unnamed watercourse north under Route 44. The watercourse flows through an open channel to a second stream that flows under Nod Road (Culvert A) and then continues west to the Farmington River. Roadway runoff contained in the gutter enters a series of catch basins and outlets via a twenty four-inch RCP through the northeast wing-wall of Culvert B. A small, localized roadside depressed area at Station 9+00 Rt. collects overland flow from 0.75 acres and enters through the southeast wing-wall of Culvert B via a fifteen-inch CMP. Another unrelated closed system conveys water from nearby developed areas and enters the stream through a twenty four-inch RCP near Culvert B's inlet (IWRD Permit Application, APP-1; Testimony of Amanda Freitas, APP-7A; Testimony of Richard Zbrozek, APP-6A).

According to the Federal Emergency Management Agency's ("FEMA") Flood Insurance Rate Map ("FIRM") dated June 17, 1986 and August 19, 1991, a FEMA flood zone is designated for Ely Pond as well as for the stream that drains the pond in the vicinity of Deercliff Road. Portions of the project fall within the floodplain of Ely Pond. There are no FEMA flood zones designated for any other watercourses or waterbodies in or near the project area (IWRD Permit Application, APP-1; Testimony of Amanda Freitas, APP-7A).

All the culverts provide waterway for drainage areas of less than a square mile and are thus classified as small structures in accordance with the DOT Drainage Manual. Small structures conveying a watercourse are designed to pass a fifty-year storm with one foot of freeboard and checked for the effects of a one hundred-year storm. Existing culverts were thus evaluated for hydraulic adequacy for the fifty-year

design storm using FHWA HY8 computer program (Testimony of Ali Mohamood, APP-9A; Hydrology/Hydraulics Report Volumes 1 and 2, APP-10 and APP-10A). Condition survey observations as well as the adequacy determinations are shown in Section II of the Hydrology/Hydraulics Report, Volume 1 and are tabulated below.

Culverts conveying unnamed Stream

Culvert Label & Size	Pipe/Culvert	Inlet/Outlet Condition	Hydraulic Adequacy (Existing Condition)	Proposed Replacement
A 10'WX5'H RC Box	Appears to be in fairly good structural condition.	Stable inlet and outlet. Intermediate riprap protection@ the outlet.	Inadequate	No. Town Structure. Outside project Limits.
B 10.5X5'H RC Box	Appears to be in fairly good structural condition. Extended at both the inlet and outlet side. Middle section is an arch. Opening at the center larger than at the inlet and outlet sides.	Stable inlet and outlet. Intermediate riprap protection@ the outlet.	Adequate.	No.
C 30" RCP	Appears to be in good structural condition.	Scour hole at the outlet. Outlet invert is 3.8' above stream bed. Severe erosion at the stream banks downstream of the pipe.	Inadequate	No. Town Structure. Outside project Limits.
D 24" RCP	Pipe appears to be in good structural condition.	No outlet protection. Scour hole at the outlet. Outlet invert approximately 1' above stream bed. Inlet/outlet headwalls in poor condition.	Inadequate	6'W X 5.5'H RC Box culvert (sunken1').
E 24" RCP	Pipe slightly silted in. Pipe appears to be structurally in good shape.	Outlet invert is buried approximately 1'.	Inadequate	Culvert will be eliminated due to relocation of the stream it conveys.
F 24" RCP	Pipe is in good structural condition.	Inlet is sedimented halfway. Outlet and downstream channel are stable.	Inadequate	No. Town Structure. Outside project Limits.
G 24" CMP	Pipe condition not known. Not easily accessible	Inlet invert silted in approximately 1'.	Inadequate	Culvert will be eliminated due to relocation of the stream it conveys.

Culverts conveying Elv Pond Brook

Culvert Label & Size	Pipe/Culvert	Inlet/Outlet Condition	Hydraulic Adequacy	Proposed Replacement
H 24" RCP	Pipe appears to be in fair condition.	Inlet invert silted in approximately 1'.	Inadequate	No. Town Structure. Outside project Limits.
I 36" CMP	CMP under high fill. Sections of the pipe caved in.	Asphalt coating at the inlet invert broke up.	Inadequate (Headwaters too High)	5'W X 5'H RC Box with a 2'W X 2'H shelf for wild life passage.
L 30" Clay Pipe	Clay pipe outleting into a steep bank. Segments of the pipe at the outlet broke off.	Well armored outlet.	Inadequate	Pipe will be replaced 54" HDPE

As the chart above shows, Culverts B is the only culvert that was determined to be hydraulically adequate under existing conditions and, therefore, will not be replaced. Four of the culverts determined to be hydraulically inadequate, Culverts A, C, F and H, are not proposed to be replaced because they are Town structures. It may be noted that all of these culverts were assessed in the field to be in fair or better condition. Culverts E and G are proposed to be eliminated entirely due to the relocation of the unnamed stream they convey. The three remaining culverts, Culverts D, I and L, are proposed to be replaced as part of the project, and the replacement culverts have been determined to be hydraulically adequate for the fifty-year storm. Additionally, two new culverts will be installed on the project. Culvert J is a 6-foot wide by 5-foot high reinforced concrete box culvert that will be installed under the eastern leg of Pine Tree Lane, and Culvert K is a 6-foot wide by 5.5-foot high reinforced concrete box culvert that will be installed under the driveway of 47 Pine Tree Lane. Both of these culverts will be installed to accommodate the relocated section of the unnamed stream on Site 2, and both culverts were found to be hydraulically adequate for the fifty-year design storm (Testimony of Ali Mohamood, APP-9A; Hydrology/Hydraulics Report Volumes 1 and 2, APP10 and APP-10A).

The new roadway will permit passage of the fifty-year flood. The proposed culvert replacements as well as the relocated unnamed stream design will not adversely affect any upstream or downstream properties. All of the proposed culverts will meet the DOT's hydraulic design criteria with regard to providing a minimum of one foot of freeboard for the fifty-year design discharge, with the exception of culvert D. Culvert D is proposed to be a 6-foot wide by 5.5-foot high box culvert that is to be sunken one foot, and this culvert has 0.93' of roadway freeboard for the fifty-year design storm (Testimony of Ali Mohamood, APP-9A; Hydrology/Hydraulics Report Volumes 1 and 2, APP-10 and APP-10A).

According to current Department of Public Health data, there are no community or non-community wells located within the proposed work area. The closest public well is located approximately three hundred forty feet north of the project and is an active non-community well associated with Avon Old Farms Inn. According to current Geographic Information Systems data available from DEP (August 2007), an aquifer protection area referred to as Fisher Meadows is mapped in the eastern portion of the site at the sharp curve west of Ely Pond. The majority of the aquifer protection area is located on the southern side of Route 44, although a small portion extends across the road. This aquifer protection area is associated with a community well for the Avon Old Farms School, which is approximately two miles from the project and is managed by the Avon Water Company (Testimony of Amanda Freitas, APP-7A).

d. Wetland Impact Sites/ Proposed Activities

The impacted wetlands on this project consist predominantly of wooded and shrub swamps. The current project will impact five wetland areas. A total of 0.67 acre of wetlands will be impacted by the project. Most of these impacts are

minimal and are unavoidable with the proposed alignment (Testimony of Richard Zbrozek, APP-6A; Testimony of Amanda Freitas, APP-7A).

1. Site 1 (Station 60+00 to Station 74+00) two wetland impact areas, one on either side of Route 44 at Culvert I.
 - The north side of Culvert I on Route 44 at approximately Station 73+90 consists of a frequently inundated shrub swamp that serves as vernal pool habitat. The approximately one-acre wetland that contains the pool is dominated by common buttonbush (*Cephalanthus occidentalis*) with highbush blueberry (*Vaccinium corymbosum*), sweet pepperbush (*Clethra alnifolia*) and red maple (*Acer rubrum*) in the shallower areas of the pool and along the outer perimeter. Witch-hazel (*Hamamelis Virginiana*) dominates the western slope leading to Parsons Way, and the road embankment leading down to the wetland on the north side of the road is dominated by the invasive species tree-of-heaven (*Ailanthus altissima*) and Oriental bittersweet (*Celastrus orbiculata*). On May 23, 2007, this pool was sampled with the use of a dip net to check for the presence of any endangered, threatened, or special concern vernal pool species. No listed species were encountered during the visual inspection of the site or as a result of the sampling. The following is a list of species found in the pool: marbled salamander (*Ambystoma opacum*) larva; small ($\leq 1''$) salamander larvae that were presumed to be spotted salamander (*Ambystoma maculatum*) due to the present of unsuccessful spotted salamander egg masses in the pool; wood frog (*Rana sylvatica*) tadpoles; occupied as well as abandoned caddisfly (family: Limnephilidae) cases; predacious diving beetle larvae; dragonfly and damselfly larvae; backswimmers; a phantom midge; springtails; amphipods; isopods; amphibious snails (Lymnaeidae, Physidae, and Planorbidae); fingernail clams; nematodes and aquatic oligochaete worms (Testimony of Amanda Freitas, APP-7A).

Principal functions and values of this wetland consist of groundwater recharge/discharge, floodflow alteration, sediment/toxicant retention, nutrient retention/transformation, and wildlife habitat. In addition to the vernal pool species listed above, this area may also provide habitat for other amphibians, as well as for various reptile, mammal, and bird species in the area. The wildlife habitat provided by this wetland may be compromised by the wetland's proximity to Route 44, by the steep embankment associated with Route 44, and by the recent construction of Parsons Way. As previously discussed, however, limited field studies appear to indicate the presence of a healthy and diverse vernal pool community. While the majority of the vernal pool itself is dominated by native wetland plant species, the portion of the impact area that consists of the existing fill slope is dominated by non-native invasive plant species (Testimony of Amanda Freitas, APP-7A).

On the southern side of culvert I is Ely Pond, a mapped waterbody that has recently been drained by the property owner (APP-1, Plates 12-13). Prior to draining activities, the open water in the northeastern arm of the pond had extended northward to within less than thirty feet of the roadway with only a narrow fringe of wetland. During an August 28, 2007 field visit, however, there was no standing water remaining in the pond. Prior to draining activities, when water levels within the pond would reach the height of the concrete dam/headwall located several feet off of the eastern edge of Deercliff Road, water from the pond would flow over the headwall into an open channel running northward and parallel to Deercliff Road. This channel, which is approximately one hundred eighty feet long, is presently vegetated with herbaceous species such as grasses, jewelweed (*Impatiens capensis*), and poison ivy (*Toxicodendron radicans*). From the open channel, flow would enter under Deercliff Road via Culvert H and outlet to a one hundred fifty five-foot earth ditch that leads from a mowed lawn on a private residence out to and along the southern Route 44 right of way (APP-1, Plate 11). The earth ditch terminates at a masonry structure, which connects to a thirty-inch clay pipe. This pipe, which formerly collected water from the pond and continues to collect stormwater from the road, outlets on the south side of Route 44 down a steep embankment. Segments of the pipe at the outlet and mid-section have broken off, and the pipe continues to erode back into the roadway embankment. The channel downstream of the pipe is wide, and it is obvious from the steep slope of the embankment at the outlet, the signs of erosion and deposition in the channel below, and the deeply cut and predominantly non-vegetated character of the channel, that it formerly sustained flash flows. Much of the outlet channel is well armored with angular riprap, and there is little vegetation below the channel banks other than a couple of trees located between the two major flow paths within the channel (Testimony of Amanda Freitas, APP-7A).

The entire length of the watercourse that formerly began at the outlet of Ely Pond and eventually terminates at its confluence with the Farmington River to the west of the site is a USGS mapped, unnamed stream. FEMA mapped this watercourse as Lake Erie Brook. Since the draining of Ely Pond which was first observed by DOT Office of Environmental Planning on August 28, 2007, no flow out of the pond has been observed during any of multiple follow up visits to the site. When flows do not pass over the weir structure of the pond into the outlet channel, Lake Erie Brook conveys stormwater only. As a result, the character of Ely Pond at this time has changed from an open waterbody to a wetland that is primarily wet meadow with pockets of emergent marsh (Testimony of Amanda Freitas, APP-7A).

Principal functions and values of Ely Pond presently include groundwater recharge/discharge, floodflow alteration, sediment/toxicant retention, nutrient retention/transformation, and wildlife habitat (Testimony of Amanda Freitas, APP-7A).

- Approximately 0.3 acres of wetland will be impacted within Site 1, 0.29 acre of which will be to the vernal pool on the north side of Route 44 and the remaining .01 acre of which will be on the south side. Additionally, thirty linear feet of watercourse impact is proposed. The total wetland fill will be approximately 4,000 cubic yards, and the total excavation of unsuitable materials to be backfilled with free-draining material is approximately 913.4 cubic yards (Testimony of Amanda Freitas, APP-7A).
- Impacts to regulated wetlands within Site 1 will primarily occur in the vernal pool on the north side of Route 44 as a result of the proposed roadway shifting and widening. The existing southern edge of Route 44 is proposed to be shifted north a maximum distance of nine feet, and the existing northern edge is proposed to be shifted north approximately thirty five feet to accommodate the proposed vegetated median and wider shoulders. These impacts are associated with removal of the existing organic material; approximately five feet deep, for the roadway shift and associated guide rail, 2:1 vegetated fill slope, and installation of an approximately one hundred forty foot long, 5-foot by 5-foot box culvert. The culvert will have a two foot by two foot concrete wildlife shelf, a ramp to access the shelf on either side of the culvert, and a cutoff wall. This culvert will replace the existing approximately ninety-foot long, thirty six-inch culvert (Culvert I) and will meet the “openness ratio” requirements of the new ACOE General Permit. Additionally, the new culvert will be set at an elevation so as to maintain the existing drainage pattern in the area, ensuring that the vernal pool to the north of the pond is not drained and that, under normal circumstances, fish can not migrate to this area as a result of the upgrade. (Testimony of Amanda Freitas, APP-7A).

A retaining wall was considered on the north side of Route 44 in this area as an alternative to the proposed vegetated fill slope but was eliminated from further consideration due to the need for an additional construction season as well as increased cost and potential traffic safety risk from the prolonged construction period. The applicant in coordination with staff, determined that the 2:1 fill slope was the preferred alternative since it only required a single construction season. (Testimony of Richard Zbrozek, APP-6A).

The 0.1 acre of wetland impacts on the south side of Route 44 in this area are limited to a small portion of the formerly narrow wetland fringe

that abutted the open water of the pond adjacent to the road where the replacement/extension of Culvert I and the installation of the southern ramp to access the wildlife passage shelf are proposed. As a result, the proposed work in this area will result in only an incremental loss to the functions and values associated with this portion of the site, such as groundwater recharge/discharge and floodflow alteration (Testimony of Amanda Freitas, APP-7A).

Impacts to the stream bed itself are limited to the restoration of approximately thirty linear feet of the thirty-inch clay pipe at the outlet on the south side of Route 44 (APP-1, Plate 11). While the outlet of the clay pipe is proposed to be extended beyond its present terminus, this is largely because the outlet end has been eroding back into the roadway embankment over time. Essentially, the extension is intended only to replace what has been lost. The stream leading out of Ely Pond has very limited functions and values. During storm events, flow will likely be too flashy to provide any appreciable groundwater recharge, floodflow alteration, or sediment and/or nutrient retention. As a result, the upgrade to the current outfall will actually improve the channel and the functions associated with it by dissipating the energy and preventing further erosion of this site (Testimony of Amanda Freitas, APP-7A).

- As described in Section 2(c) of this Agreed Draft Decision, all three culverts within Site 1 were determined to be hydraulically inadequate, however, only Culverts I and L are proposed to be upgraded since Culvert H is a Town structure outside of the project limits (Hydrology/Hydraulics Report Volumes 1 and 2, APP10 and APP-10A).
2. Site 2 (Station 27+30 to Station 38+00)
- Site 2 water resources consist of the interconnected series of ditches, channels, and associated wetlands that runs along Route 44 and Pine Tree Lane from the end of an existing concrete ditch at approximately Station 38+00, westerly to the Pine Tree Lane/Wright Drive intersection. Approximately fifteen hundred feet of concrete ditch is located on the north side of Route 44 and carries roadway and mountain runoff from approximately Station 53+00 to Station 38+00 (APP-1, Plates 7-9). The ditch ends at a point where it intersects a higher interceptor ditch located on the mountainside embankment. The higher ditch is approximately eleven hundred fifty feet long, runs about fifty feet north of and somewhat parallel to the concrete ditch, and collects mountain runoff. Downslope of the intersection of these two ditches, the combined flow travels through an open earth ditch approximately five hundred feet long and into a twenty four-inch CMP culvert (Culvert G) under Route 44. Also contributing flows to Culvert G are numerous shallow watercourses that converge into one to the north of the culvert inlet at the sharp bend in the ditch

approximately sixty feet from the culvert inlet. Once this unnamed watercourse exits Culvert G on the south side of Route 44, it flows in a westerly direction for approximately four hundred sixty feet along the bottom of the existing roadway embankment slope as shown on APP-1, Plates 6 and 7. Vegetation within and along the banks of the watercourse includes American elm (*Ulmus americana*), northern spicebush (*Lindera benzoin*), Japanese barberry (*Berberis thunbergii*), burdock (*Artium sp.*), smartweed (*Polygonum sp.*), jewelweed, field horsetail (*Equisetum arvense*), Oriental bittersweet and grape (*Vitis sp.*) (IWRD Permit Application, APP-1; Testimony of Amanda Freitas, APP-7A).

The functions and values of the portion of Site 2 described above are limited by the fact that the resources upstream from Pine Tree Lane within the proposed work area seldom extend beyond the limits of the channels. The existing anthropogenic influences and the steep area grades have contributed to the present site condition of steep, highly channelized watercourses with very little adjacent wetland. Due to this condition, principal functions of this portion of Site 2 are likely limited to flow conveyance and, to a lesser degree, production export. A wetland's production export capacity refers to its ability to produce food or usable products for living organisms. While the presence of moving water and organic material almost always results in some level of production export, proximity to the road and the highly channelized and flashy nature of flow in this area greatly reduce the ratio of desirable to undesirable materials transported (Testimony of Amanda Freitas, APP-7A).

The one exception is located on the south side of Route 44 where wetland resources do abut the existing watercourse that flows between the Culvert G outlet and Culvert E inlet. This wetland is located to the east of the Culvert G outlet at Station 34+30 Right. Vegetation in and adjacent to this wooded swamp includes sugar maple (*Acer saccharum*), red maple, white ash (*Fraxinus americana*), red oak (*Quercus rubra*), shag-bark hickory (*Carya ovata*), American elm, northern spicebush (*Lindera benzoin*), Japanese barberry (*Berberis thunbergii*), smartweed, jewelweed, Oriental bittersweet and grape. This area does provide some functions beyond flow conveyance. These additional functions include groundwater recharge/discharge, floodflow alteration, sediment/toxicant retention and nutrient retention/transformation. The proximity of this wetland to the road makes it unlikely that this wetland serves to any appreciable degree as wildlife habitat (Testimony of Amanda Freitas, APP-7A).

At Station 29+50 the stream enters another cross-culvert under Route 44 (Culvert E) and exits on the north side where it connects to a twenty four (24) inch RCP running along the western leg of Pine Tree Lane (APP-1, Plate 6). Although the portion of the stream that flows just northeast of the intersection of Route 44 and the western leg of Pine Tree

Lane is piped for the entire length of 47 Pine Tree Lane, there is an isolated wetland on this property that extends as far south as the toe of the fill slope for Route 44. Vegetation in this wetland includes white pine (*Pinus strobus*), white ash, sugar maple, red maple, black cherry (*Prunus serotina*), American elm, buckthorn (*Rhamnus sp.*), multiflora rose (*Rosa multiflora*), winged euonymus (*Euonymus alata*), northern spicebush, poison ivy and hedge bindweed (*Calystegia sepium*). This wetland is characterized by marginally hydric soils, indicating that saturation of these soils is not prolonged and that water inputs to this wetland are flashy. This observation is consistent with the facts that this area does not receive stream flow and the main hydrologic input appears to be stormwater runoff from the road and steeply graded uplands (Testimony of Amanda Freitas, APP-7A).

As stated above, the wetland at the northeast corner of the intersection of Route 44 and the western leg of Pine Tree Lane is graded in such a way and is characterized by a combination of signs of hydrology, plant species composition, and soil characteristics that indicate that its hydrologic inputs are irregular. Therefore, the primary functions and values of this wetland are likely to also be limited to flow conveyance and production export. Although this wetland may provide groundwater recharge/discharge and nutrient, sediment and toxicant retention, the soils and vegetation in this area indicate that these are not primary functions of this wetland (Testimony of Amanda Freitas, APP-7A).

Beyond Culvert E and the twenty four (24) inch RCP that carries the watercourse under 47 Pine Tree Lane and the southern portion of 15 Pine Tree Lane, the flow then enters a one hundred fifty-foot long earth ditch that flows in a northerly direction along the western leg of Pine Tree Lane. The topography in this portion of the site is more gradual, and as a result, much of the property at 15 Pine Tree Lane consists of a wooded swamp. This wooded swamp is fed by an open channel approximately two hundred eighty feet long that carries runoff from a twenty four-inch RCP (Culvert F) under the eastern leg of Pine Tree Lane (Testimony of Amanda Freitas, APP-7A).

It should be noted that the one hundred fifty-foot earthen ditch is one of two swales located between the western leg of Pine Tree Lane and the wooded swamp and constructed with substantial berms that prevent surface water from the wetland from entering the ditches. The only surface connection between these two ditches and the wetland associated with the two hundred eighty-foot channel is located at the downstream terminus of the ditches. This terminus occurs at a low point in the landscape in an area of suppressed vegetation that is likely a result of the heavy sediment deposition that has occurred primarily due to erosion of the unstable banks along the channel. Beyond the confluence of the

watercourses the combined flow is carried under the western leg of Pine Tree Lane via a twenty four-inch RCP (Culvert D). Once the flow exits Culvert D, it reaches a well-defined watercourse running westerly across approximately twenty two hundred feet of open land to a culvert under Nod Road (Culvert A). Eventually this watercourse reaches the Farmington River (Testimony of Amanda Freitas, APP-7A).

Vegetation in the vicinity of the two earth ditches and the wetland to the northeast of them includes red maple, sugar maple, white ash, American elm, buckthorn, common spicebush, multiflora rose, jewelweed, garlic mustard (*Alliaria petiolata*), and poison ivy (Testimony of Amanda Freitas, APP-7A).

While the wetland itself provides for groundwater recharge/discharge, floodflow alteration, sediment/toxicant retention, nutrient retention/transformation, and wildlife habitat, the functionality of the earthen ditches as they presently exist is largely limited to flow conveyance and production export by the grading of the channels and their isolation from the adjacent wetland (Testimony of Amanda Freitas, APP-7A).

- Approximately .37 acre of wetland will be impacted within Site 2. The total fill will be approximately 1,850 cubic yards. 340 cubic yards of excavation is associated with the regrading of the one hundred fifty-foot channel and with the installation of the inlet wingwalls at the replaced Culvert D at the terminus of the channel. This area was presented in the permit application as linear feet (IWRD Permit Application, APP-1).
- Roadway work resulting in impacts to wetlands includes the widening of Route 44 approximately ten feet on the north side and twenty feet on the south side at approximately Station 28+50, widening approximately ten feet on the north side and eighteen feet on the south side at Station 29+50, and the roadway being shifted south and widened at approximately Station 34+30. At this last station, the northern edge of the road is proposed to be shifted about twenty five feet and the southern edge is proposed to be shifted about fifty five feet. In addition to the widening of Route 44 at Station 28+50, the intersection of Pine Tree Lane and Wright Drive with Route 44 is proposed to be realigned so that the two local roads are aligned opposite one another. The wetland and watercourse impacts that would result from the proposed changes to the roadway configuration are described below (IWRD Permit Application, APP-1; Testimony of Amanda Freitas, APP-7A).

Shifts and widening to Route 44 from approximately Station 29+50 (Culvert E) to Station 36+00 will impact 0.2 acres of wetland located immediately east of Station 34+30 Right (Culvert G outlet) as well as the

four hundred sixty-foot section of open channel that runs along the southern embankment of Route 44 from the outlet of Culvert G to the inlet of Culvert E (Testimony of Amanda Freitas, APP-7A).

The DOT design engineers and staff from the DOT Office of Environmental Planning coordinated with staff from the Department of Environmental Protection Fisheries Unit regarding relocation options for the four hundred sixty-foot channel. The alternative selected will relocate the channel to the north side of Route 44 along the path that currently floods during storm events and will eliminate two culvert crossings. The new configuration will result in an overall net gain of two hundred sixty feet of open stream channel. Relocating this segment of the stream is preferable from an ecological as well as an engineering standpoint, as it will eliminate Culverts E and G and provide natural light and stream bed material to an additional section of the stream. These factors are important for water quality as well as for invertebrate habitat. It should also be noted that a section of the new stream channel on the north side of Route 44 is proposed in the location of an existing abandoned roadbed. Thus the work in this area will also include the conversion of pavement to pervious surface consisting of open channel bordered by native plantings (Testimony of Amanda Freitas, APP-7A).

As a result of the channel relocation described above, the last sixty feet of the existing five hundred foot open earth ditch upstream from Culvert G on the north side of Route 44 will need to be filled. This is necessary in order to reroute flows so that they are no longer directed under the Route 44, but instead continue along the north side of the roadway where the creation/relocation of open channel is proposed to continue west as far as the western leg of Pine Tree Lane, and then north along Pine Tree Lane until it reaches Culvert D. Relocation of the stream to the north side of Route 44 will require installation of a new 5-foot by 6-foot concrete box culvert under the eastern leg of Pine Tree Lane. The bottom of the new box culvert will be buried one foot below grade so that the culvert bottom has a natural substrate (Testimony of Amanda Freitas, APP-7A).

The entire length of new stream channel created by the combined channel relocation and creation will extend approximately eight hundred seventy feet and will be approximately four feet deep with a four foot wide bottom and 2:1 side slopes. In order to slow flows and minimize erosion, the bottom and side slopes will be lined with stone riprap, and the channel will have steep longitudinal grades alternating with flat grades to create pools (Testimony of Amanda Freitas, APP-7A).

The widening of Route 44 at approximately Station 28+50, the alignment of Pine Tree Lane and Wright Drive, and the creation of approximately eighty feet of the proposed open stream channel through

the existing wetland to the northeast of the intersection of Route 44 and the western leg of Pine Tree Lane will result in 0.15 acre of impact to that wetland. This section of the existing stream is presently contained by a two hundred sixty five foot long, twenty four inch RCP that connects Culvert E to the existing one hundred fifty foot long earth ditch located downstream to the north. The creation of open channel through this area will necessitate the replacement of the existing eight-inch PVC pipe under the driveway to 47 Pine Tree Lane at approximately Station 202+00 Rt. with a new 5.5-foot by 6-foot concrete box culvert. The bottom of the new box culvert will be buried one foot below grade so that the culvert bottom has a natural substrate. As noted above, this wetland is of low value, as it is vegetated with numerous invasive and upland species and fed primarily by stormwater runoff from the road and steeply graded uplands (IWRD Permit Application, APP-1; Testimony of Amanda Freitas, APP-7A).

The existing twenty four-inch RCP (Culvert D) under the western leg of Pine Tree Lane will also be replaced with a 5.5-foot by 6-foot concrete box culvert with the bottom of the new box culvert buried one foot below grade so that the culvert bottom has a natural substrate. In order to replace Culvert D and ensure that the recreated stream channel drains properly through the new culvert, the existing one hundred fifty-foot open earth ditch along the eastern side of the western leg of Pine Tree Lane will be regraded, and 0.02 acre of wetland at the northern terminus of this ditch will be impacted. While one hundred fifty feet of the proposed open channel is located within the existing ditch, the existing ditch is not presently stabilized or graded to drain properly, and the area at the bottom of the ditch at the inlet of Culvert D has accumulated sediments. This accumulation has in turn resulted in very little vegetative growth in this area and reduced functionality in this wetland. The temporary impact to this area includes regrading the area to drain properly, the installation of the new culvert and the removal of built up sediment. This will improve flow to and through the culvert, and the design of the new, stabilized channel in this area will discourage such accumulation of sediment in the future (Testimony of Amanda Freitas, APP-7A).

- As described in Section 2 (c) above of this Agreed Draft Decision, all five existing culverts within Site 2 were determined to be hydraulically inadequate. However, only Culvert D is proposed to be upgraded since Culverts C and F are Town owned structures outside of the project limits and Culverts E and G will be eliminated by the relocation of the stream they convey under Route 44 (Hydrology/Hydraulics Report Volumes 1 and 2, APP10 and APP-10A).
3. Site 3 (Station 23+00 to Station 7+00)
- Site 3 extends along Route 44 from Station 23+00 westerly to Station 7+00 where an existing seven-foot by ten-foot box culvert (Culvert B)

conveys an unnamed watercourse north under Route 44. The stream channel in the vicinity of the culvert is wide with a substrate of sand, small stones and cobbles, and a few large boulders. Vegetation on and immediately above the banks is composed of white pine, black cherry, red oak, Norway maple (*Acer platanoides*), staghorn sumac (*Rhus typhina*), arborvitae (*Thuja occidentalis*), multiflora rose, Japanese knotweed (*Polygonum cuspidatum*), grape, Oriental bittersweet and garlic mustard. From Culvert B, the watercourse flows through an open channel between the Avon Old Farms Inn at 280 Avon Mountain Road and its associated parking lot, then under the parking lot to a second stream that flows under Nod Road (Culvert A) and then continues west to the Farmington River. This second stream also has a wide bottom with a sandy stony substrate, and vegetation in the vicinity of Culvert A is heavily dominated by Japanese knotweed. Roadway runoff, overland flow, and stormwater from nearby developments outlet into the stream system via the wing-walls of Culvert B (Testimony of Amanda Freitas, APP-7A).

- Modifications are proposed to the two closed storm drainage systems originating on Route 44 and outletting through Culvert B's wing-walls. However, no work is proposed on Culverts A or B or their wing-walls, and there will be no direct wetland impacts resulting from the work. The stormwater improvements to these two drainage systems are expected to reduce the amount of sediment reaching this watercourse and therefore improve functions and values (Testimony of Richard Zbrozek, APP-6A; Testimony of Amanda Freitas, APP-7A).
 - As described in Section 2 (c) above of this Agreed Draft Decision, no culvert replacements are proposed within Site 3. Culvert B was determined to be hydraulically adequate. While Culvert A was determined to be hydraulically inadequate, it is a Town owned structure located outside of the project limits (Hydrology/Hydraulics Report Volumes 1 and 2, APP10 and APP-10A).
- i. The DOT design engineers and staff from the DOT Office of Environmental Planning coordinated with staff from the Department of Environmental Protection Fisheries Division concerning the best course of action with regard to the watercourses on site and recommendations for minimizing impacts to fisheries resources. The proposed course of action incorporates DEP Fisheries' input and recommendations (Testimony of Kimberly Lesay, APP-8A).

3. Mitigation

Wetland Mitigation Sites

- a. a. As mitigation for the planned impacts, the DOT proposes the restoration, enhancement and expansion of a 2.94-acre existing black spruce (*Picea mariana*)

bog, an uncommon and important plant community. This bog is located at the existing DOT Avon maintenance facility located on the west side of Waterville Road/State Route 10 between Avonwood and Chidsey Roads. The DOT has obtained copies of aerial photography in this area taken over the course of several decades and overlaid photographs from different years in order to determine historical impacts to this wetland. The goal of the mitigation site is to restore the Black Spruce bog to its original functions and values in order to compensate for the loss of 0.67 acres of inland wetlands and watercourses and associated habitats that will occur as a result of the project impacts. The total proposed mitigation at the maintenance facility is 1.48 acres, to be broken out as follows: Restoration to 0.35 acre of scrub/shrub wetland community is proposed where aerial photography dating from 1958 to 1970 indicates that the bog was partially filled during this time period. The area will be planted with species such as sweet gale (*Myrica gale*), swamp azalea (*Rhododendron viscosum*) and American cranberry (*Vaccinium macrocarpon*). The enhancement of 0.53 acre in the northeast corner of the wetland where the invasive species *Phragmites australis* is proposed to be removed via a minimum of two feet of overexcavation of soils. This portion of the wetland is proposed to be left as open water habitat. The creation of 0.60 acre of new scrub/shrub wetland with plant species specific to this type of plant community as described above and as depicted on Exhibit APP-4 is proposed landward of the 1958 wetland boundary (Testimony of Kimberly Lesay, APP-8A).

- b. Additional mitigation for the impact to the vernal pool at Site 1 is proposed by DOT in the form of the purchase and preservation of two approved subdivision lots farther north on Parson's Way. Lots numbered 8 and 9, which are each 4.13 acres in size, contain an existing vernal pool which is very similar in nature to the pool which is being impacted (Testimony of Kimberly Lesay, APP-8A). The pool itself is approximately 1.4 acres in size, with buttonbush dominating a dense shrub layer. Red maple dominates the canopy layer surrounding the pool, and winterberry and highbush blueberry are also present in the wetland. The upland portions of these parcels are predominately hemlock forest. Purchase of these two 4.13 acre lots (8.26 acres total) would preclude the construction of two houses with septic systems, thus preventing secondary impacts and encroachment on the pool. The State will own these parcels in perpetuity and thus protect them from future development. In addition, existing stormwater drainage from the cul-de-sac of Parson's Way which currently is directed to this northern pool and stormwater drainage from the southern portion of Parson's Way which currently is directed to the vernal pool on Site 1 will both be removed as part of this construction project. The elevation of the cul-de-sac will be raised, and the drainage pipe plugged, preventing any further secondary impacts to the northerly vernal pool from the storm drainage system. All of the redirected drainage from Parson's Way will be properly discharged toward Ely Pond on the opposite side of Route 44 (Testimony of Kimberly Lesay, APP-8A).

Other Mitigation Alternatives Considered

- a. In consideration of appropriate mitigation for the impact to the vernal pool at Site 1, the DOT investigated numerous possibilities in the project area. Since it was felt that vernal pool habitat could not be properly replicated at the proposed wetland mitigation site, DOT investigated preservation of other existing vernal pools in the area. The DOT had originally agreed to purchase an approved subdivision lot on Parson's Way in Avon. This lot (Lot #4) is directly adjacent to and surrounds the impacted vernal pool, as well as another pool on the same parcel. The 9.54 acre lot is currently approved for one house and consists of two vernal pools and surrounding upland forested property. During right of way investigations on this parcel DOT staff discovered an undefined easement for access to undeveloped property to the east, with which the Connecticut Department of Environmental Protection ("DEP") staff expressed concerns. In addition, DEP staff did not believe that the northern pool on Lot #4 was of high value and the preservation of this lot was questionable ecologically due to nearby surrounding residential development. As a result, the DOT is not pursuing the purchase of this property (Testimony of Kimberly Lesay, APP-8A).
- b. The DEP recommended DOT consider preservation alternatives in proximity to the Farmington River in the Avon/Simsbury area. The DOT investigated the possibility of preserving a 6 acre parcel in Simsbury which lies within and adjacent to an old oxbow of the Farmington River. Concerns raised by the U.S. Environmental Protection Agency (USEPA) regarding the proper replacement of functions and values, coupled with the fact that this wetland system is already protected under current laws and regulations, resulted in this parcel also being dropped from consideration as a proper preservation site (Testimony of Kimberly Lesay, APP-8A).

Mitigation Plan Details

- a. The planting plan for the mitigation site has been designed to provide and maintain the ecological diversity and productive habitat function and value for the wetlands. The plan has also been designed to maximize species diversity, minimize erosion, and discourage the establishment of invasive species (Testimony of Kimberly Lesay, APP-8A).
- b. The DOT developed grading and planting plans for the wetland restoration, creation and enhancement area as presented in Exhibit APP-4. The planting plan includes 849 plants over the 0.95 acres of restoration and creation. The enhancement area which consists of removal of Phragmites will recreate open water habitat as suggested by CT DEP staff. To reduce the immediate threat and minimize the long-term potential of degradation, the species included on the "Invasive and Other Unacceptable Plant Species" list in Table 4 of the New England District Mitigation Plan Guidance have not been and will not be included as planting stock in the overall project. Only plant materials indigenous to the region shall be used. In the areas where a scrub/shrub community is the goal, the

- DOT proposes to plant woody stock in densities not less than six hundred trees and shrubs per acre. The DOT will require the use of soils with between four and twelve percent minimum organic *carbon* content (between nine and twenty one percent organic *matter*) on a dry weight basis be used in the wetland replication and creation areas. The Applicant included detailed material specifications in the proposed contract documents contained in Appendix C of APP-5 (Compensatory Mitigation Plan, APP-5; Testimony of Kimberly Lesay, APP-8A).
- c. The non-inundated portions of the wetland mitigation area and adjacent disturbed slopes will be seeded at the completion of excavation for stabilization purposes. The appropriate wetland seed mixture, Conservation Seeding for Slopes and/or Wetland Grass Establishment, will be used at the wetland mitigation site (Compensatory Mitigation Plan, APP-5; Testimony of Kimberly Lesay, APP-8A).
 - d. A member of the Office of Environmental Planning staff, as well as a DOT inspector, will monitor construction of the wetland mitigation area to ensure compliance with the mitigation plan. Minor modifications to the grading and planting plan may be achieved in the field. This will assist in matching the hydrology at the mitigation site to that observed in the adjacent wetland as well as ensuring the success of the mitigation site in meeting its objectives. In addition, a specialist from the DOT's Environmental Compliance Unit or their representative will perform inspections in regard to the proper handling and disposal of the fill material being removed from the wetland (Compensatory Mitigation Plan, APP-5; Testimony of Kimberly Lesay, APP-8A).
 - e. The creation of the wetland will be monitored after construction and planting of herbaceous plant materials. One of the goals of monitoring will be to determine whether the wetlands are maintaining their functional values. Woody plantings will be delayed one year to ascertain hydrologic conditions. Minor adjustments to the grading and planting plans may be made at the time of construction to achieve the appropriate mitigation acreage and to ensure the success of the mitigation site in meeting its objectives. Major modifications to the plan may only be implemented after prior consultation with and written authorization from the DEP staff. The revised Post Construction Monitoring section of the proposed mitigation plan requires ten years of monitoring following the completion of construction of the mitigation site. Specifically, the site will be monitored and annual monitoring reports submitted for years 1, 2, 3, 5, 7, and 10 (Compensatory Mitigation Plan, APP-5).

Construction Mitigation: Erosion and Sedimentation Controls

- a. Short-term impacts will be minimized during construction through use of proper water handling techniques, construction phasing and Best Management Practices as outlined in Section 1.10 of the State of Connecticut Department of Transportation, Standard Specifications for Roads, Bridges and Incidental Construction, Form 816. Adherence to these guidelines will assure minimization

of adverse effects to fisheries or riparian habitat as a result of this project (Testimony of Kimberly Lesay, APP-8A).

b. In addition to Best Management Practices as outlined in the State of Connecticut Department of Transportation, Standard Specifications for Roads, Bridges and Incidental Construction, Form 816, Section 1.10, the following specific erosion and sedimentation control measures are proposed:

1. Silt fencing will be installed in conjunction with all disturbed and new soil slopes that could affect other areas;
2. Exposed soils will be seeded with an approved erosion control mixture within seven days of the contractor reaching the appropriate grade;
3. Sedimentation control measures will be installed around all catch basins receiving flow from unstabilized areas;
4. Existing paved leakoffs will be eliminated to avoid direct discharges of untreated stormwater to wetlands and watercourses;
5. Vegetated swales will be used in some areas;
6. Riprap splash pads or plunge pools, as appropriate, will be installed at stormwater discharge locations where erosion potential has been determined to be high;
7. New catch basin sumps will be incorporated into the drainage run to capture sediment and reduce sediment loads downstream;

Additionally, with regard to the existing vernal pool that is proposed to be impacted, the following precautions will be taken to protect the remainder of the pool:

8. Grubbing of sections of the existing fill slope will be delayed until necessary to construct the slope embankment, which will be constructed in lifts. This will prevent erosion of the embankment and reduce the chance for siltation into the adjacent wetland.
9. Erosion Control measures such as silt fencing will be installed at the toe of the fill slope as well as at the edge of proposed disturbance to prevent any siltation from entering the wetlands.
10. The wetland impact area will be staked in the field prior to any construction activities.

11. Work will be completed from the western edge of the wetland, with access being limited to one haul road.
12. The contractor will be instructed to place the fill at this embankment in lifts in order to minimize the threat of erosion and sedimentation, stabilizing the slope as work proceeds.
13. The contractor will be instructed to place the fill embankment to its final grade so that the finished grade will be achieved during an accepted planting season, further preventing chances of erosion of the fill slope.

(IWRD Permit Application, APP-1; Compensatory Mitigation Plan, APP-5; Testimony of Kimberly Lesay, APP-8A).

Impact Avoidance and Mitigation Design Measures

During the design of the project, the design engineers worked with the Office of Environmental Planning to avoid and minimize wetland impacts. In particular, various options were explored at wetland site 1. The estimated area of the wetland which contains the vernal pool is 1.07 acres. The design engineers investigated shifting the proposed alignment southerly towards Ely Pond. They found that shifting the proposed alignment would considerably impact the pond and surrounding wetlands. The proposed roadway layout is such that the shift would occur on the inside of the curve. The curve would have to be sharpened, resulting in inadequate banking and transition runoff distance. These changes would substantially worsen roadway safety. To counteract this undesirable condition in the curve, a much greater shift in alignment would be required. The alignment changes would have to begin at Deercliff Road and go well beyond the current limit of construction to the east. Extensive impacts in addition to the impacts to Ely Pond, including rock cuts and clearing of vegetation, were anticipated. Furthermore, the culvert under Route 44 between Ely Pond and the wetland would still have to be replaced, resulting in some temporary impact and disruption to the vernal pool, despite any shifts in alignment. (Testimony of Kimberly Lesay, APP-8A).

A retaining wall was originally designed at this site in order to minimize wetland impacts. The impact for the retaining wall is estimated at 0.24 acres, including an approximately fifteen-foot wide swath of temporary impact to build the wall itself (0.06 acre) and to allow for excavation of unsuitable material necessary for the footing of the wall. The originally proposed retaining wall would have been approximately three hundred feet long and twenty feet in height at an estimated cost of \$510,000. Further into design, it was realized that the actual construction of the retaining wall would require an extra construction season due to the maintenance and protection of traffic necessary in this area. This extra construction season would result in a longer time period of temporary disturbance within the vernal pool itself compared to the fill embankment. A

longer period of disturbance, although temporary, could prove more deleterious to the amphibians utilizing the vernal pool for the breeding and developmental portions of their life cycle than a short duration permanent impact. Also, due to safety concerns on this stretch of roadway, it was deemed that traffic shifts and the duration of overall construction should be kept to a minimum (Testimony of Kimberly Lesay, APP-8A).

The design engineers also investigated a 1.5 to 1 (run over rise or horizontal to vertical) fill slope. A 1.5 to 1 fill slope is fairly steep and may be unstable, thus precluding properly planting the slope. As a result, a 1.5 to 1 fill slope would require a rip-rap rock slope to assure the stability of the slope. The sun heats the riprap rock slope, and this heat is transferred to the adjacent water body, resulting in a secondary thermal impact to the vernal pool. The design engineers dismissed the 1.5 to 1 fill slope alternative due to the concerns of thermal heating of the pool (Testimony of Kimberly Lesay, APP-8A).

The design engineers then considered a 2:1 slope since it could be stabilized with vegetation and planted with native plantings to provide shade. The 2:1 fill slope would result in 0.30 acre of impact, including the removal of material that is unsuitable to support the roadway embankment. The difference in permanent impact between the retaining wall and the 2:1 fill slope is 0.06 acre and is minimal and reasonable. In light of the fact that there would be no additional temporary disturbance to the vernal pool from an additional year of construction and that the fill slope could be planted with native plantings, this alternative is the preferred alternative (Testimony of Kimberly Lesay, APP-8A).

In addition to avoidance and mitigation measures, the Applicant made considerable efforts to improve stormwater management within the project area. The project will replace closed pipe systems as well as paved leakoffs and ditches with open, pervious (riprap or vegetated) swales wherever possible. In addition, a number of measures have been taken to separate stormwater from clean base flows. Also, the project will incorporate new catch basin sumps into the drainage run to capture sediment and reduce sediment loads downstream (Testimony of Kimberly Lesay, APP-8A).

Most noteworthy among the improvements is the removal of twelve hundred sixty linear feet of a fifteen hundred-foot concrete ditch carrying a combination of overland runoff and street drainage on the north side of Route 44 near Site 2. This concrete flume is proposed to be removed and replaced with a properly sized riprap ditch to minimize erosion and slow stormwater flows. The remaining two hundred forty feet of concrete ditch that cannot be replaced with open channel must be piped in order to avoid cutting into the adjacent steep, vegetated slopes and undermining the interceptor ditch that collects overland runoff upslope of the concrete ditch. This ditch carries stormwater which drains to an unnamed stream. Thus, the substantial water quality improvements proposed for this

system will also improve water quality downstream, and will enhance downstream fisheries habitat as a result (Testimony of Kimberly Lesay, APP-8A).

In this eastern most area of the proposed channel, an unstable abandoned roadbed currently exists and carries excess stormwater during heavier storm events. Since the proposed streambed will occupy an area currently occupied by the abandoned roadbed, the work will include the conversion of pavement to a more pervious surface consisting of open channel bordered by native plantings. The conversion of this abandoned roadbed to a more natural step-pool surface will aid in dissipating energy, providing for invertebrate habitat and reducing the potential for erosion, which in turn will improve downstream water quality (Testimony of Kimberly Lesay, APP-8A).

Culvert E which measures seventy feet in length and culvert G which measures one hundred five feet in length will be replaced with open channel. The existing two hundred sixty five-foot RCP that connects Culvert E to the existing earth channel will also be replaced with open stream channel, for a total of four hundred forty linear feet of channel being removed from closed culverts (Testimony of Kimberly Lesay, APP-8A).

Approximately one hundred fifty feet of the new channel will result in temporary impacts to the existing channel that leads north along Pine Tree Lane to the Culvert D inlet. The temporary impacts associated with this area will include removal of the heavy sediment accumulation, which will be excavated, and then properly graded. This accumulation is currently impeding natural flow patterns, flood storage capacity, and healthy vegetative colonization and growth. Therefore, the end result of the work in this area will represent a substantial improvement in functions and values over existing conditions (Testimony of Kimberly Lesay, APP-8A).

Overall, four hundred sixty linear feet of watercourse will be relocated. One hundred fifty feet of channel will be temporarily impacted, but substantially improved and four hundred forty feet of channel will be removed from culverts. The new channel will be seven hundred twenty feet in length, for an overall net gain of two hundred sixty feet of open stream channel. The enhancements to this unnamed watercourse are expected to improve invertebrate and downstream fisheries habitat, as well as improve production export, and eliminate unstable, erodable conditions which currently exist (Testimony of Kimberly Lesay, APP-8A).

A DEP Stormwater Discharge Registration will be required for the project. A Pollution Control Plan will also be developed in association with that registration.

During construction, the contractor is required to inspect, report and repair any erosion. An on-site project engineer and staff of the DOT Environmental

Planning Division will monitor the contractor's work to ensure compliance with DEP and DOT regulations and guidance.

4. State Threatened, Endangered, or Species of Special Concern

The February 2006 DEP Natural Diversity Database Maps¹ revealed that an area adjacent to the project had been identified as habitat for endangered, threatened, or special concern species. The DOT sent a request for information to the DEP Bureau of Natural Resources regarding this area, and on June 29, 2006, DEP responded by stating that the project will not impact any known populations of Federal or State Special Concern Species in the area. Although the State and Federal Listed Species and Natural Communities Maps were updated in June of 2007, the mapping has not changed substantially in the vicinity of the project. No state or federal endangered, threatened, or special concern species have been encountered during field visits (Testimony of Kimberly Lesay, APP-8A).

5. Alternatives

During the planning and design of this project, a continuous examination of design alternatives was conducted. Numerous alternatives were considered in consultation with the various units of the DOT, as well as the DEP, the U.S. Army Corps of Engineers, the Town of Avon, concerned citizens and regulatory agencies. Among the factors considered when assessing alternatives were geometric constraints, historical and archeological concerns, impacts to private property, and environmental concerns. The following alternatives were considered when examining the potential range of alternatives.

- **No build:** This option was not adopted because it does not address any of the existing deficiencies; the accident experience indicates a strong need for roadway improvements (IWRD Permit Application, APP-1).
- **Provide the 50-mph Design Speed:** The geometric design features of the highway are based on design speed (i.e. stopping sight distance (SSD), minimum radius, superelevation, max. grade). Trying to attain the higher values associated with the higher design speed would require a flatter minimum curve (758' vs. 587') and longer SSD (425' vs. 360'). This would lead to impacts on additional adjacent properties and deeper cuts into the already impacted properties, resulting in increased sliver

¹ DEP Natural Diversity Database mapping includes information regarding critical biological resources available to the DEP. The information is a compilation of data collected over the years by the DEP Natural Resource Center's Geological and Natural History Survey and cooperating units of the DEP, private conservation groups, and the scientific community.

acquisitions and possibly one additional total acquisition. This would lead to significant additional costs. Also the superelevation required for the sharpest curve just west of Deercliff Rd. couldn't be accomplished because the tangent length between this curve and the next curve by Ely Pond would be too short to allow for the proper transitions. As a result of the conditions described above, the overall additional impacts (environmental, right of way, effects on adjacent properties, cost) associated with this alternative would be prohibitive (IWRD Permit Application, APP-1).

- **Provide the 12-ft wide through lanes:** This option would meet standards but would lead to a wider proposed cross-section and would give the roadway an expressway look not compatible with the character of the area. The Route 44 Corridor Study prepared by the Capitol Region Council of Governments recommended eleven-foot lanes and advised against excessive widening. The wider lane would not be consistent with the "reduced pavement/traffic calming" concerns expressed by the public during the preliminary design phase.

Widening the roadway to provide twelve-foot lanes would lead to additional impacts to the wetlands and to the adjacent properties, and would increase the paved area by about 3000 SY. In addition, even minor incremental widening will result in significant additional impacts to the large cuts (thirty-foot cuts) at the top of the mountain adjacent to the westbound lanes and to the fill slopes adjacent to the eastbound lanes in the vicinity of Pine Tree (IWRD Permit Application, APP-1).

- **Provide the 4% superelevation recommended for an Urban Arterial highway:** Route 44 is classified as an Urban Arterial highway. This option would meet the standards. However, the sharpest curve (R= 589') west of Deercliff Rd., which is proposed to be superelevated at 8%, would only accommodate a 41.5 mph speed; similarly the curve east of Pine Tree Lane (R=650') would accommodate a 43 mph speed.

AASHTO 2004 (pg. 145) advises that "Where snow and ice are factors, tests and experience show that a superelevation of about 8% is a logical maximum to minimize vehicles sliding across a highway when stopping or attempting to start slowly from a stopped position." (IWRD Permit Application, APP-1).

- **Provide the 7% maximum grade versus the existing 8.92 %:** This option is impractical, since the entire side of Avon Mountain that carries Rte 44, starting at the crest and extending westerly for about one mile, would have to be cut with prohibitive impacts to the environment and to the adjacent properties, and forty-foot tall retaining walls would need to be constructed along parts of Rte 44.

The additional impacts to wetlands as well as properties and the construction cost combined with the additional cost to buy more rights of way to accommodate the widening and to compensate for residential relocation would be prohibitive (IWRD Permit Application, APP-1).

ATTACHMENT B

Permittee: Connecticut Department of Transportation
2800 Berlin Turnpike
P.O. Box 317546
Newington, CT 06131-7546

Attn: Edgar T. Hurle

Permit No: IW-200602983
Permit Type: Inland Wetlands and Watercourses
Town: Avon
River: Connecticut
Project: DOT Project Number 4-123

Pursuant to Connecticut General Statutes Sections 22a-39 the Commissioner of Environmental Protection hereby grants a permit to the Connecticut Department of Transportation (the "permittee") to conduct activities within inland wetlands and watercourses in the Town of Avon in accordance with its application and plans which are part thereof filed with this Department on December 1, 2006 signed by Edgar T. Hurle and dated November 28, 2006 revised August 16, 2007 (the "plans"). DOT project 4-123 entails operational and safety improvements along Route 44 from 500 feet east of Route 10 in the town of Avon to the West Hartford town line (the "site").

AUTHORIZED ACTIVITY

Specifically, the permittee is authorized to alter 0.67 acres of inland wetlands or watercourses for the safety improvements along Route 44 in accordance with said application and as shown on plans entitled "Safety & Traffic Operational Improvements on Route 44 (Avon Mountain)" and dated September 20, 2007.

This authorization constitutes the permits and approvals required by Sections 22a-39 of the Connecticut General Statutes and is subject to and does not derogate any present or future property rights or other rights or powers of the State of Connecticut, conveys no property rights in real estate or material nor any exclusive privileges, and is further subject to any and all public and private rights and to any federal, state, or local laws or regulations pertinent to the property or activity affected hereby.

PERMITTEE'S FAILURE TO COMPLY WITH THE TERMS AND CONDITIONS OF THIS PERMIT SHALL SUBJECT PERMITTEE AND PERMITTEE'S CONTRACTOR(S) TO ENFORCEMENT ACTIONS AND PENALTIES AS PROVIDED BY LAW.

This authorization is subject to the following conditions:

SPECIAL CONDITIONS

1. If any changes are proposed in the water-handling plan at the site from that which is shown on the permit plates, the permittee shall submit such changes to the Commissioner for review and written approval. The permittee shall not implement any such plan until an approval is issued.
2. If any changes are proposed in the storm drainage system at the site, including any proposed swales, from that which is shown on the permit plates, the permittee shall submit such changes to the Commissioner for review and written approval. The permittee shall not implement any such plan until an approval is issued.
3. If any changes are proposed in the bank protection from that which is shown on the permit plates, the permittee shall submit such changes to the Commissioner for review and written approval. The permittee shall not implement any such plan until an approval is issued.
4. The permittee shall complete all wetland mitigation two years from the initiation date of construction.
5. The applicant shall construct and monitor the wetland mitigation plan in accordance with the document entitled, "Safety and Operational Improvements on Route 44 Avon Mountain, DOT Project #4-123, Compensatory Mitigation Plan", dated August 2007.
6. The permittee shall conduct all unconfined instream work from June 1 through September 30 in any given calendar year.

GENERAL CONDITIONS

1. **Initiation and Completion of Work.** At least five (5) days prior to starting any construction activity at the site, the permittee shall notify the Commissioner of Environmental Protection (the "Commissioner"), in writing, as to the date activity will start, and no later than five (5) days after completing such activity, notify the Commissioner, in writing, that the activity has been completed.

2. **Expiration of Permit.** If the activities authorized herein are not completed by five years after the date of this permit, said activity shall cease and, if not previously revoked, this permit shall be null and void.

Any application to renew or reissue this permit shall be filed in accordance with Sections 22a-6j and 22a-39 of the General Statutes and Section 22a-3a-5(c) of the regulations of Connecticut State Agencies. In order to be considered timely, any such application must be filed at least 120 days prior to the expiration date of this permit.

3. **Compliance with Permit.** All work and all activities authorized herein conducted by the permittee at the site shall be consistent with the terms and conditions of this permit. Any regulated activities carried out at the site, including but not limited to, construction of any structure, excavation, fill, obstruction, or encroachment, that are not specifically identified and authorized herein shall constitute a violation of this permit and may result in its modification, suspension, or revocation. In constructing or maintaining the activities authorized herein, the permittee shall not store, deposit or place equipment or material including without limitation, fill, construction materials, or debris in any wetland or watercourse on or off site unless specifically authorized by this permit. Upon initiation of the activities

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authorized herein, the permittee thereby accepts and agrees to comply with the terms and conditions of this permit.

4. **Transfer of Permit.** This authorization is not transferable without the written consent of the Commissioner.
5. **Reliance on Application.** In evaluating the permittee's application, the Commissioner has relied on information provided by the permittee. If such information subsequently proves to be false, deceptive, incomplete or inaccurate, this permit may be modified, suspended or revoked.
6. **Best Management Practices.** In constructing or maintaining the activities authorized herein, the permittee shall employ best management practices, consistent with the terms and conditions of this permit, to control storm water discharges and erosion and sedimentation and to prevent pollution. Such practices to be implemented by the permittee at the site include, but are not necessarily limited to:
 - a. Prohibiting dumping of any quantity of oil, chemicals or other deleterious material on the ground;
 - b. Immediately informing the Commissioner's Oil and Chemical Spill Section at 424-3338 of any adverse impact or hazard to the environment, including any discharges, spillage or loss of oil or petroleum or chemical liquids or solids, which occurs or is likely to occur as the direct or indirect result of the activities authorized herein;
 - c. Separating staging areas at the site from the regulated areas by silt fences or haybales at all times.
 - d. Prohibiting storage of any fuel and refueling of equipment within 25 feet from any wetland or watercourse.

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- e. Preventing pollution of wetlands and watercourses in accordance with the document "Connecticut Guidelines for Soil Erosion and Sediment Control" as revised. Said controls shall be inspected by the permittee for deficiencies at least once per week and immediately after each rainfall and at least daily during prolonged rainfall. The permittee shall correct any such deficiencies within forty eight (48) hours of said deficiencies being found.
- f. Stabilizing disturbed soils in a timely fashion to minimize erosion. If a grading operation at the site will be suspended for a period of thirty (30) or more consecutive days, the permittee shall, within the first seven (7) days of that suspension period, accomplish seeding and mulching or take such other appropriate measures to stabilize the soil involved in such grading operation. Within seven (7) days after establishing final grade in any grading operation at the site the permittee shall seed and mulch the soil involved in such grading operation or take such other appropriate measures to stabilize such soil until seeding and mulching can be accomplished.
- g. Prohibiting the storage of any materials at the site which are buoyant, hazardous, flammable, explosive, soluble, expansive, radioactive, or which could in the event of a flood be injurious to human, animal or plant life, below the elevation of the five-hundred (500) year flood. Any other material or equipment stored at the site below said elevation by the permittee or the permittee's contractor must be firmly anchored, restrained or enclosed to prevent flotation. The quantity of fuel stored below such elevation for equipment used at the site shall not exceed the quantity of fuel that is expected to be used by such equipment in one day.
- h. Immediately informing the Commissioner's Inland Water Resources Division (IWRD) of the occurrence of pollution or other environmental damage resulting from

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construction or maintenance of the authorized activity or any construction associated therewith in violation of this permit. The permittee shall, no later than 48 hours after the permittee learns of a violation of this permit, report same in writing to the Commissioner. Such report shall contain the following information:

- (i) the provision(s) of this permit that has been violated;
- (ii) the date and time the violation(s) was first observed and by whom;
- (iii) the cause of the violation(s), if known
- (iv) if the violation(s) has ceased, the duration of the violation(s) and the exact date(s) and times(s) it was corrected;
- (v) if the violation(s) has not ceased, the anticipated date when it will be corrected;
- (vi) steps taken and steps planned to prevent a reoccurrence of the violation(s) and the date(s) such steps were implemented or will be implemented;
- (vii) the signatures of the permittee and of the individual(s) responsible for actually preparing such report, each of whom shall certify said report in accordance with section 9 of this permit.

For information and technical assistance, contact the Department of Environmental Protection's Inland Water Resources Division at (860)424-3019.

7. **Contractor Liability.** The permittee shall give a copy of this permit to the contractor(s) who will be carrying out the activities authorized herein prior to the start of construction. The permittee shall submit written

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notification to the Department that the contractor has received such copy. The permittee's contractor(s) shall conduct all operations at the site in full compliance with this permit and, to the extent provided by law, may be held liable for any violation of the terms and conditions of this permit.

8. **Monitoring and Reports to the Commissioner.** The permittee shall record all actions taken pursuant to Condition Number 6(e) of this permit and shall, on a monthly basis, submit a report of such actions to the Commissioner. This report shall indicate compliance or noncompliance with this permit for all aspects of the project which is the subject of this permit. The report shall be signed by the environmental inspector assigned to the site by the permittee and shall be certified in accordance with Condition Number 9 below. Such monthly report shall be submitted to the Commissioner no later than the 15th of the month subsequent to the month being reported. The permittee shall submit such reports until the subject project is completed.
9. **Certification of Documents.** Any document, including but not limited to any notice, which is required to be submitted to the Commissioner under this permit shall be signed by the permittee, a responsible corporate officer of the permittee, a general partner of the permittee, or a duly authorized representative of the permittee and by the individual or individuals responsible for actually preparing such document, each of whom shall certify in writing as follows:

"I have personally examined and am familiar with the information submitted in this document and all attachments and certify that based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief, and I understand that any false statement made in this document or its attachments

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may be punishable as a criminal offense in accordance with Section 22a-6 under Section 53a-157b of the Connecticut General Statutes."

10. **Submission of Documents.** The date of submission to the Commissioner of any document required by this permit shall be the date such document is received by the Commissioner. Except as otherwise specified in this permit, the word "day" as used in this permit means the calendar day. Any document or action which falls on a Saturday, Sunday, or legal holiday shall be submitted or performed by the next business day thereafter.

Any document or notice required to be submitted to the Commissioner under this permit shall, unless otherwise specified in writing by the Commissioner, be directed to:

The Director
DEP/Inland Water Resources Division
79 Elm Street, 3rd Floor
Hartford, Connecticut, 06106-5127

Issued by the Commissioner of Environmental Protection on:

Date

Gina McCarthy, Commissioner