APPENDIX C
MITIGATION AND COMPENSATION FRAMEWORK

WETLANDS COMPENSATORY MITIGATION FRAMEWORK

The following provides a framework that establishes a concept and a process to be undertaken for the mitigation and compensation of direct and indirect impacts to wetlands in the Route 11 corridor. Compensatory mitigation is required for impacts that cannot be avoided or minimized through impact minimization measures.

The complex process of mitigation and compensation, including acquisition of suitable land and the design of compensatory mitigation sites, requires significant time and coordination with the roadway design and permitting processes. Furthermore, future biological surveys may provide additional information for assessing potential impacts, especially to documented threatened or endangered species. Specific habitat attributes or other design criteria would then be incorporated into the compensatory mitigation sites.

The framework described herein was initiated and facilitated by the ACOE with guidance from the Route 11 Work Group. It represents a commitment on the part of the ACOE, FHWA, ConnDOT, EPA, FWS and DEP to work together to further develop the conceptual strategies during the design and permitting phase of the Route 11 project. However, this framework does not indicate acceptance or approval of the overall project or the elements of the final mitigation plan by any given agency. This framework together with a comprehensive list of other project avoidance, minimization and mitigation measures forms the Project Commitments of the FEIS.

Avoidance, Minimization and Mitigation

To avoid, minimize, or mitigate direct and indirect impacts, environmentally sensitive roadway design enhancements were incorporated into the roadway concept for the preferred alternative and ACOE's LEDPA, or will be incorporated during the design and permitting phase of the project. These include, but are not limited to:

- wetland avoidance through roadway design modifications (alignment shifts, reduced cross section, slope modifications);
- habitat fragmentation avoidance through roadway design and alignment modifications;
- added/extended bridges to minimize wetland impacts and preserve wildlife movement corridors;
- best management practices in accordance with Connecticut Guidelines for Soil Erosion and Sedimentation Control to minimize sedimentation impacts on the water quality of perennial and intermittent streams and wetlands, and to protect wetland functions and values as defined in the ACOE *The Highway Methodology Workbook, Supplement* (e.g. fish/shellfish, aquatic invertebrate, and other wildlife habitat, nutrient removal/retention/transformation, sediment/toxicant retention, etc);
- stormwater system design in accordance with the DEP Stormwater Quality Manual and ConnDOT Drainage Manual to minimize roadway runoff to streams and wetlands to protect

aquatic functions and values (e.g. nutrient production and export, surface water flow patterns and groundwater recharge and discharge, wildlife habitat, etc.);

- stormwater system designed to provide the level of treatment necessary to ensure that stormwater discharges will not result in degradation of the physical, chemical or biological integrity of the receiving waters;
- aquatic habitat enhancements to mitigate unavoidable indirect impacts, such as: re-vegetation of stream banks and/or upland buffers, restoration of natural stream channel meanders, and installation of rock weirs, boulders, or J-hook structures for fish habitat;
- compensatory flood storage features to mitigate floodplain impact;
- reduced vegetation clearing or prompt replacement with native, non-invasive plantings;
- light reduction techniques;
- over-sized culverts that allow wildlife passage;
- open median to mitigate wildlife mortality caused by collisions with vehicles during roadway crossings in areas without bridges or other passages. The design will incorporate a 100 foot wide vegetated median to provide a safe refuge for wildlife crossings at three locations within existing habitat blocks; one will be located in Habitat Block #1 and two in Habitat Block #2. The pre-cast concrete barrier that separates northbound and southbound lanes along the alignment will be discontinued at the open median areas to reduce obstacles to movement. Existing vegetation will be retained where feasible, or replaced with native, non-invasive plantings. The vegetated medians will also provide connectivity with nearby habitats and wetlands.

Compensatory Mitigation

In addition to the abovementioned avoidance, minimization and mitigation measures, compensatory measures will also be undertaken to offset remaining impacts. Compensatory mitigation for unavoidable direct impacts to wetlands will be accomplished by the full replacement of lost wetland functions and values through the restoration of existing degraded wetlands or the establishment of new wetlands. Compensatory mitigation for unavoidable indirect impacts to wetland functions and values and wildlife habitat will be achieved through the preservation and potential enhancement of undeveloped, ecologically valuable lands within or proximate to the Route 11 corridor.

The review process and goals for the compensatory mitigation plan for restoration/ establishment/ preservation or other mitigation measures will be as follows:

1. ConnDOT will identify viable restoration/establishment/preservation site(s) or other mitigation sites in coordination with ACOE and cooperating agencies.
2. ConnDOT will submit a concept/preliminary design for the agreed upon site(s).
3. ACOE and agencies will comment on concept design and subsequent design refinements in an iterative review process.
4. The mitigation design plan will include supporting information on how the plan addresses functions and values losses and how the design will provide replacement of those functions and values.
5. A mitigation site monitoring and assessment plan will be prepared during the permitting and design process in accordance with the requirements of the ACOE and DEP.

Direct Wetland Impact

Direct impacts to approximately 20 acres of wetlands will be compensated by the full replacement of permanently lost or degraded wetland functions and values through restoration or establishment of wetlands, either near the impact site or within other ecologically appropriate landscapes. Restoration involves the reestablishment or rehabilitation of functions and values within previously disturbed or displaced wetlands. Establishment is the creation of new wetlands requiring a site that is designed with the appropriate hydrology, hydric soils and hydrophytic vegetation within which targeted functions and values may be achieved. In accordance with state and federal policy, restoration is the preferred method of mitigation, followed by establishment.

Wetland mitigation sites must be of sufficient size, quality and location to ensure long-term success of mitigation goals, i.e., full replacement of lost wetland functions and values. Wetland restoration and establishment sites should also have sufficient area to include a permanently protected upland of between 100 and 300 feet.

Compensation for temporal impacts shall also be a consideration in the design of mitigation sites. Temporal impacts are those associated with the time needed for a wetland restoration or establishment area to reach full maturity (i.e., until the point at which its full function and value replacement design requirement has been attained). At the same time, it must be realized that temporal impacts gradually reduce as the mitigation site approaches maturity. As might be expected, temporal impacts are generally greater for restoration and establishment sites designed to become climax or later successional habitats (i.e. scrub-shrub or forested wetlands) rather than early successional habitats. However, some water quality functions in all wetlands can take many years to develop fully. Mitigation for temporal impacts, especially for forested wetlands, could include the restoration or enhancement of existing degraded forested wetlands. In this way, the wetland to be restored/enhanced already has the primary component of the wetland type (e.g., forest canopy), but would be enhanced by improving the target functions and values of that restoration or establishment site. Mitigation measures could include preservation of adjacent wetlands of the same type or installation of special habitat attributes that provide targeted functions (e.g., cover, nesting sites for wildlife). Other restoration efforts could include removal of invasive plants or control of beaver flooding, if warranted to protect known native plant or animal species.

Considerations for mitigation may also include opportunities to provide out-of-kind mitigation (as defined by ACOE guidelines) by creating or restoring habitats of higher ecological importance such as those designated by DEP as priority and declining in Connecticut. Examples include early-successional wetland habitats like some emergent marshes with unique community associations, grassy riparian zones, and other community types that are important for many native species.

Wetland restoration and establishment sites previously identified by ConnDOT during mitigation planning will be reevaluated and supplemented with additional sites. Previously identified sites included the restoration of 1.1 acres (3,200 linear feet) of degraded streambank along Latimer Brook at I-95 and rehabilitation of the existing fish ladder. This restoration effort would compensate for shoreline stabilization and fish habitat functions.

Priority will be given to sites exhibiting the following:

- stable, predictable water table

- beneficial habitat features, such as, "in-kind" community design and connectivity to other protected habitat
- proximity to other wetlands
- existing functional features (e.g. floodwater detention)
- imminent risk for destruction or degradation from development
- sufficient land area to provide an ecologically meaningful upland buffer
- previously degraded shrub-scrub or forested wetlands

Indirect Wetland Impact

The ACOE referred to the results of the University of Massachusetts' Conservation Assessment and Prioritization System (CAPS) Analysis in preparing a concept for compensation for indirect impacts of the proposed roadway project on aquatic communities and habitats. CAPS is a computer program that was used to perform a quantitative analysis of the indirect impacts on habitat communities and biodiversity value within the context of existing development in the corridor study area. The results showed that 485 biodiversity units would be directly and indirectly impacted by construction of the roadway. These units include 64 biodiversity units that would be indirectly impacted within wetland and aquatic communities. UMASS calculated that compensation for 485 biodiversity units would require preservation of 686 acres of high-value habitat.

The mitigation plan will include the preservation of a minimum of 686 acres of habitat that has high ecological and biodiversity values. This will require acquisition and/or protection of blocks of land of sufficient size to ensure the long-term viability of the high-value habitat to be compensated. Additional acreage may be required if the preservation areas do not meet all the qualities/attributes that characterize the impacted high-value/high-biodiversity habitat.

Priorities for the preservation strategy will include the acquisition and/or protection of land exhibiting one or more of the following characteristics:

- contiguous with existing preserved areas
- adjacent to areas with low potential for development
- probability for sustained ecological and biodiversity value for foreseeable future (e.g. low probability for future degradation from development of surrounding land)
- connects two or more preserved areas
- identified by CAPS as having a high biodiversity value
- habitat blocks under imminent threat from development
- contains important wetlands: riparian areas, vernal pools, high-value wetlands (e.g. significant in maintaining water quality, stream flow and aquatic habitat in a contiguous or downstream watercourse).
- contains habitat, or has the potential for creation of habitat, for any endangered species determined to be impacted by the project based on biological surveys currently underway.
- combination of the above to promote the creation of an ecological preserve

A mitigation framework (matrix) developed by the ACOE proposed ratios for compensation for indirect impacts ranging from 1:1 to 3:1 based on the CAPS data, depending on the nature of the

impact and the quality of the compensation area. However, EPA, FWS, and DEP believed that it was premature in the process to assign ratios. Therefore, the above discussion outlines only the process and the goals for the development of a mitigation plan to be undertaken during the design phase of the project.