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Gorham Bypass Study : Natural Resources Technical Report

Gorham Bypass Study

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Cumberland County, Maine

Natural Resources Technical Report

Prepared For The

Environmental Assessment

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by:

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and

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Study Specific Acronyms and Abbreviations

Bo – Biddleford silt loam
CBEP – Casco Bay Estuary Project
CWA –Clean Water Act of 1972
DWP – Drinking Water Act
L1UB – Lacustrine Unconsolidated Bottom
L1UBx – Lacustrine, Limnetic, Unconsolidated Bottom
L2UB – Lacustrine, Littoral, Unconsolidated Bottom
MGS – Maine Geological Survey
On – Ondawas fine sandy loam
PSS1 – Palustrine, Scrub Shrub Deciduous
R2 – Riverine Lower Perennial
R2UB – Riverine, Lower Perennial, Unconsolidated Bottom
Ru – Rumney fine sandy loam
SDWA – Safe Water Drinking Act of 1974
Sn – Scantic silt loam
Sp – Sebago mucky peat
Sz – Swanton fine sandy loam

Standard Acronyms and Abbreviations

AADT – Annual Average Daily Traffic
AASHTO – American Association of State Highway and Transportation Officials
ac – acre
ACHP – Advisory Council on Historic Preservation
ACOE – United States Army Corps of Engineers
AFDC – Aid to Families with Dependent Children
ARAN – Automatic Road Analyzer
ATR – Automatic Traffic Recorder
ATV – All Terrain Vehicle
B/C – Benefit/Cost Ratio
BMP – Best Management Practice
BTIP – Biennial Transportation Improvement Program
CAAA – Clean Air Act Amendments of 1990
CAL3QHC – EPA's Modeling Methdology for Predicting Pollutant Concentrations near Roadway Intersections
CBER – Center for Business and Economic Research
CEQ – Council on Environmental Quality
CERCLIS – Comprehensive Environmental Response, Compensation and Liability Information System
CFR – Code of Federal Regulations
CO – Carbon monoxide
CRF – Critical Rate Factor
dBA – Loudness (sound pressure level) measured on a logarithmic scale in units of decibels (dB), using an A-weighted filter
DEIS – Draft Environmental Impact Statement
DHV – Design Hour Volume
E & T Plant List Maine Natural Area Program – Official List of Endangered and Threatened Plants in Maine
EA – Environmental Assessment
EFH – Essential Fish Habitat
EIS – Environmental Impact Statement
EPA –U.S. Environmental Protection Agency
FEIS – Final Environmental Impact Statement
FEMA – Federal Emergency Management Agency
FHWA – Federal Highway Administration
FIRM – Flood Insurance Rate Map
FONSI – Finding of No Significant Impact
FMVECP - Federal Motor Vehicle Emission Control Program
FPPA – Farmland Protection Policy Act
ft - feet
GIS – Geographic Information Systems
GRP – Gross Regional Product
GW-A – Groundwater A
ha - hectare
HCAMP – Habitat Consultation Areas Mapping Program
HCL – High Crash Location

km - kilometer
kph – kilometers per hour
LAWCON – Land and Water Conservation Fund
Leq – One-hour equivalent sound level
LMA – Labor Market Area
LOS – Level of Service
LURC – Maine Land Use Regulation Commission
m - meters
MASC – Maine Atlantic Salmon Commission
MBPL – Maine Bureau of Parks and Lands
MDEP – Maine Department of Environmental Protection
MDIF&W – Maine Department of Inland Fisheries and Wildlife
MDOC – Maine Department of Conservation
MDOT – Maine Department of Transportation
MDWP – Maine Drinking Water Program
ME-GAP – Maine Gap Analysis Program
MHPC – Maine Historic Preservation Commission
mi -miles
MNAP – Maine Natural Areas Program
MOA – Memorandum of Agreement
MOBILE5b – Mobile Source Emission Factor Model
mph – miles per hour
MPO – Metropolitan Planning Organization
M.R.S.A. – Maine Revised Statutes Annotated
MSA - Metropolitan Satisticical Area
MSPO – Maine State Planning Office
NAAQS – National Ambient Air Quality Standards
NAC – Noise Abatement Criteria
NEPA – National Environmental Policy Act
NFIP – National Flood Insurance Program
NHPA – National Historic Preservation Act
NHS – National Highway System
NMFS – National Marine Fisheries Service
NO – Nitric Oxide
NOx – Nitrogen Oxides
NO2 – Nitrogen Dioxide
NPL – National Priority List
NPS – Nonpoint source
NPS – National Park Service
NRCS – Natural Resources Conservation Service
NRHP – National Register of Historic Places
NRIMC – Natural Resource and Information Mapping Center
NRPA – Maine Natural Resources Protection Act
NWI – National Wetlands Inventory
OD – Origin-Destination
OGIS – Maine Office of Geographic Information Systems
ORS – Outstanding River Segment
PAC – Public Advisory Committee

PEM – Palustrine Emergent Wetland
PFO – Palustrine Forested Wetland
PIN – Project Identification Number
PLT -- Plantation
ppm – parts per million
PSS – Palustrine Scrub-Shrub Wetland
PUB – Palustrine Unconsolidated Bottom
RCRA – Resource Conservation and Recovery Act
REMI – Regional Economic Models, Inc. of Amherst, MA
ROD – Record Of Decision
RTAC – Regional Transportation Advisory Committee
S.A.D. – School Administrative District
SCS – Soil Conservation Service (now the NRCS)
SHPO – State Historic Preservation Officer
SIP – State Implementation Plan
SSA – Sole Source Aquifer
STPA – Maine's Sensible Transportation Policy Act
STIP – Statewide Transportation Improvement Program
SWPPP – Stormwater Pollution Prevention Plan
T15 R4 – Township 15 Range 4 (example, numbers used vary)
TCP – Traditional Cultural Property
TDM – Transportation Demand Management
TIP – Transportation Improvement Program
TNM – Traffic Noise Model
TSM – Transportation Systems Management
Twp – Township
USA – United States of America
U.S.C. – United States Code
USDA – United States Department of Agriculture
USFWS – United States Fish and Wildlife Service
USGS – United States Geological Survey
USDOT – United States Department of Transportation
v/c – volume/capacity ratio
VOCs – Volatile Organic Compounds
vpd – vehicles per day
VHT – Vehicle-Hours Traveled
VMT – Vehicle-Miles Traveled
WELS – West of the easterly line of the state (this term is part of naming the unorganized townships of the State)
WPA – Wellhead Protection Area

Standard Terms

85th Percentile Speed – The 85th-percentile speed is the speed at which eighty-five (85) percent of the vehicles on a given highway travel at or below. The most common application of the value is its use as one of the factors for determining the posted, legal speed limit of a highway section. In most cases, the field measurements for the 85th-percentile speed will be conducted during off-peak hours.

100-Year Floodplain – The portion of the floodplain submerged by the statistical flood event with a 1 percent probability of occurring in any year.

Activity center – Activity centers are generally defined as areas that generate economic activity or areas that support a major industry. Houlton, Presque Isle, Caribou and Madawaska are the largest economic activity centers in Aroostook County and are important regional transportation resources. Industrial parks and major trucking generators in Mars Hill, Easton, Ashland, Limestone, Fort Fairfield, Fort Kent, and Van Buren are other important activity centers within Aroostook County.

Additional Farmland Soils of Statewide Importance – Soils that are nearly Prime Farmland and that produce high yields of crops when treated and managed according to acceptable farming methods (see definition of "Prime Farmlands" below).

Advisory Council on Historic Preservation (ACHP) – The major policy advisor to the Federal government in the field of historic preservation. The 20 members of the Council are appointed by the President and include the Secretary of Agriculture, the Secretary of the Interior, the Architect of the Capitol, the chairman of the National Trust for Historic Preservation, and the president of the National Conference of State Historic Preservation Officers.

Alkaline – With a pH value greater than 7: generally applied to soils and surface water.

Alkalinity - A measure of the capacity of water to neutralize acid. Alkalinity is primarily a function of bicarbonate, carbonate, and hydroxide ions and is typically expressed in parts per million (ppm) of calcium or magnesium ions.

Annual Average Daily Traffic (AADT) – The total yearly traffic volume on a given highway segment divided by the number of days in the year. AADT is expressed in vehicles per day (vpd).

Aquifer – Rock or sediment that is saturated with water and sufficiently permeable to transmit economically significant quantities of water to wells and springs.

Archaeological resources – Materials and objects that remain below the ground surface as evidence of the life and culture of historic, prehistoric, or ancient people, such as artifacts, structures, or settlements. Resources of concern are located in areas known or suspected to contain subsurface artifacts of pre-european or post-european settlement populations. Areas of expected moderate to high archaeological sensitivity according to various factors including present and past topography, exposure, slope, distance to water, and availability of food.

Archaeologically Sensitive Shorelines – Shores of waterbodies determined by the Maine Historic Preservation Commission (MHPC) to be likely to yield prehistoric artifacts, based on a predictive model using topography, hydrology, and surficial soil types to assess sensitivity.

Archaeologically Sensitive Surficial Deposits – Land forms that are likely locations of prehistoric settlements or gathering places, based on a MHPC predictive model that uses surficial geology (waterbodies, alluvium, lake bottom deposits, glacial outwash, and eskers) to assess sensitivity.

Army Corps of Engineers (ACOE) – A federal agency that administers Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act; its regulatory programs address wetlands and waterways protection.

Arterials – Roads with high traffic volumes that provide linkage between major cities and towns and developed areas, capable of attracting travel over long distances. Basically, they provide service to interstate and intercounty travel demand. The arterial system typically provides for high travel speeds and the longest trip movements. The degree of access control on an arterial may range from full control (freeways) to entrance control on, for example, an urban arterial through a densely developed commercial area.

At-grade –The intersection of two roads, or a road and a railway, that cross at the same elevation.

At-Risk Watershed – Watersheds contributing to waterbodies that are at risk of eutrophication due to new development and phosphorus-laden runoff. These waterbodies include public drinking water supplies and waters that currently exhibit algal blooms or other signs of eutrophication. At-risk watersheds are defined according to criteria in Maine's Stormwater Law (5 M.R.S.A. § 3331).

Attainment area – A geographic area in which levels of a criteria air pollutant meet the health-based primary standard (National Ambient Air Quality Standard) for the pollutant. Attainment areas are defined using federal pollutant limits set by the U.S. Environmental Protection Agency.

Avian – Refers to all things of, relating to, or derived from birds

Basaltic – A dark-colored extrusive igneous rock composed chiefly of calcium plagioclase and pyroxene that underlies the oceanic basins and comprises oceanic crust.

Best Management Practice (BMP) – A structural and/or management practice employed before, during and after construction to protect receiving water quality. These practices either provide techniques to reduce soil erosion or remove sediment and pollutants from surface runoff.

Biodiversity –The diversity of genes, species, and ecosystems. This term includes the entire hierarchy of ecological organization, and encompasses regional ecosystem diversity (landscape diversity), local ecosystem diversity (community diversity), species diversity, and genetic diversity within populations of a species.

Biophysical region – A relatively homogeneous area based on analysis of topography, climate, and species richness of vertebrates and plants.

Business incubator – A facility intended to provide space and resources for newly-formed businesses.

Calcareous pelite – A fine-grained sedimentary rock consisting mostly of clay and/or silt that has an abundance of calcium carbonate.

Cambrian – The first geologic time period of the Paleozoic Era. The Cambrian period spanned from approximately 590 to 505 million years ago.

Carbon monoxide (CO) – A colorless, odorless, tasteless gas formed in large part by incomplete combustion of fuel. Full combustion activities (i.e. transportation, industrial processes, space heating, etc.) are the major sources of CO.

Collector Roads – Roads characterized by a roughly even distribution of their access and mobility functions. These routes gather traffic from local roads and streets and deliver it to the arterial system. Traffic volumes and speeds will typically be lower than those of arterials.

Community Cohesion – The interactions among persons and groups in a community, including social relationships and patterns.

Community Supply – A public water system that is comprised of one or multiple wells or reservoirs that serves at least 25 residents throughout the year.

Conglomerate – A clastic sedimentary rock composed of lithified beds of rounded gravel mixed with sand.

Controlled-Access Highway – A highway that provides limited points of access and egress. Freeways, such as I-95, are controlled access highways in which access points occur only at interchanges. These highways serve mobility needs, and are designed to accommodate higher travel speeds.

Cost effectiveness – In the context of this study, cost effectiveness is an economic measure used to evaluate and compare the corridors in this study. Cost effectiveness is defined as the present value of the 2030 gross regional product (GRP) growth per dollar of construction cost. In this way, cost effectiveness compares the relative future economic benefits against the size of the investment required to generate those benefits.

Cumulative impacts – The impacts on the environment that result from the incremental impact of a project when added to other past, present, and reasonable foreseeable future actions regardless of what agency or person undertakes such other actions.

Daily traffic volume – The number of vehicles that use a given roadway over a 24-hour period in both directions.

dBA –An abbreviation for A-weighted decibel. The decibel is a unit used to describe sound pressure levels on a logarithmic scale. For community noise impact assessment, an A-weighted frequency filter is used to approximate the way humans hear sound.

Deciduous – Refers to woody vegetation, such as oak or maple trees, that shed their leaves after the growing season.

Deer Yard – Areas of softwood-dominated forest that provide food resources and shelter for deer during severe winter conditions.

Demand – Vehicular traffic demand (volume) on a given highway segment, expressed in vehicles per day (vpd).

Demand shift – The change in demand (volume) on a given highway segment, expressed in vehicles per day (vpd). Demand shifts can be caused by new corridors that provide a faster and/or shorter travel route.

Design Hourly Volume (DHV) – The hour used for geometric design of highways, typically the 30th highest traffic volume of the year.

Design speed – The maximum safe speed that can be maintained over a specified section of highway when conditions are so favorable that the design features of the highway govern. The design speed should equal or exceed the posted/regulatory speed limit of the facility.

Development node – An area that has experienced or is expected to experience development and a resulting growth in employment and/or population.

Devonian – The oldest period of the Upper Paleozoic Era, covering a time span between approximately 400 and 360 million years ago.

Disadvantaged Population – A group of people, living in one area, who have a median income below the federal poverty level, or who exhibit other indicators of economic disadvantage.

Dolostone – A carbonate rock made up predominantly of the mineral dolomite, $CaMg(CO_3)_2$.

Draft Environmental Impact Statement (DEIS) – The document prepared by the Federal Highway Administration (FHWA) in accordance with FHWA National Environmental Policy Act (NEPA) regulations (23 CFR Part 771). These regulations require that the EIS evaluate all reasonable alternatives considered, discuss the reasons that alternatives have been eliminated from detailed study, summarize the studies, reviews, consultations, and coordination required by environmental laws and Executive Orders.

Driver eye height – The height above the road of the eyes of vehicle drivers, a function of the seating height, and important in stopping sight distance considerations.

Ecoregion – An area defined by similar climate, topography, and biological communities.

Edge effect – The potential impacts to natural plant and animal communities that result from the creation of new edge habitat, which may include increased predation, decreased reproductive success, and changes in community composition.

Edge habitat – An area along a transitional zone between two or more vegetation cover types that provides feeding, breeding, nesting, or cover habitat for wildlife.

Endangered Species – Any species which is in danger of extinction throughout all or a significant portion of its range.

Environmental Assessment (EA) – The document prepared by the Federal Highway Administration (FHWA) in accordance with FHWA National Environmental Policy Act (NEPA) regulations (23 CFR Part 771). The EA provides sufficient evidence of analysis that determines whether to prepare an Environmental Impact Statement or a Finding of No Significant Impact. The environmental assessment includes documentation specified in 40 CFR parts 1500-1508, §1508.9 and §1508.13.

Environmental Justice – Executive Order 12898 requires each federal agency to "make achieving environmental justice part of its mission by identifying and addressing... disproportionately high and adverse human health or environmental impacts on minority populations and low-income populations."

Esker – An elevated linear or sinuate glacial landform resulting from deposition of glacial streambed gravels.

Essential Fish Habitat (EFH) – Those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity, as defined by the regional Fishery Management Council.

Eutrophication – Change in the biological and physical characteristics of a body of water due to increased nutrient input that result in increased productivity. Eutrophication may occur naturally or through man-induced changes in nutrient inputs.

Farmland Protection Policy Act (FPPA) – A statute enacted in 1981 by the United States Congress to ensure that significant agricultural lands be protected from conversion to non-agricultural uses. For highway projects receiving federal aid, the regulations promulgated under the FPPA (7 CFR Part 658, 1984) require a state highway authority (MDOT) to coordinate with the USDA Natural Resources Conservation Service. The FPPA regulates four types of farmland soils; prime farmland, unique farmland, farmland of state-wide importance, and farmland of local importance.

Farmland Soils – Soils suited to producing crops; those with soil quality, growing season and moisture supply needed to produce a sustainable yield when treated and managed using acceptable methods. Specifically, farmland soils are those soil types designated by the Natural Resources Conservation Service (NRCS) in accordance with the Farmland Protection Policy Act (FPPA) of 1981 by the United States Department of Agriculture (USDA).

Federal Emergency Management Agency (FEMA) – A federal agency that regulates federal actions in floodplains.

Federal Highway Administration (FHWA) – The branch of the U.S. Department of Transportation responsible for administering the funding of federal-aid highway projects.

Federal-Aid System – The federal-aid system consists of those routes within Maine that are eligible for the categorical federal highway funds.

Felsic – A generally light-colored igneous rock with significant amounts of silica, oxygen, aluminum, and potassium.

Final Environmental Impact Statement (FEIS) – The document prepared after circulation of a draft EIS and consideration of comments received. FHWA NEPA regulations (23 CFR Part 771.125) require that the FEIS identify a preferred alternative, evaluate all reasonable alternatives considered, discuss and respond to substantive comments on the EIS, summarize public involvement, and describe the mitigation measures that will be incorporated into the proposed action.

Floodplain – The level area adjoining a river channel inundated during periods of high flow.

Floodway – The channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment in order that the 100-year flood is carried without substantial increases in flood heights.

Forest block – Units of forest uninterrupted by roadways or other disturbance.

Fragmentation – Subdivision of a forest or other habitat into isolated patches by roads, land clearing, or other human or natural alterations of the landscape, accompanied by the loss of a certain portion of the original habitat.

Freeways – The freeway (or interstate) is the highest level of arterial. Full control of access, high design speeds and a high level of driver comfort and safety characterize these highways.

Functional Conflict – Highways provide a balance between providing access (with multiple access points) and mobility (with limited access points). Freeways are designed to maximize mobility and serve regional traffic demands as opposed to local roads (or collectors) that provide multiple access points to adjacent land uses (residences or businesses). Functional conflicts arise when regional traffic that would be better served on a Freeway uses local roads.

Geographic Information System (GIS) – A computer-based application used to perform spatial analysis.

Geometric deficiency - A deficiency that occurs when a highway's geometric characteristics (lane width, shoulder width, horizontal curvature, vertical grade, etc.) do not meet prevailing design standards.

Glacial outwash – Surficial sand and gravel sediments deposited ahead of a glacier by glacial meltwater.

Glacial till – Compact surficial sediments consisting of poorly sorted, mixed minerals and rocks, deposited by melting glaciers.

Grade – The slope of a road along the direction of travel, normally characterized by the vertical rise per unit of longitudinal distance.

Grade separation – The intersection of two roads, or a road and a railway, that cross at different elevations. One roadway overpasses or underpasses the other roadway with a structure(s).

Gross Regional Product (GRP) – Gross Regional Product is one of the major economic indices of the socio-economic development of a region. GRP is equal to the total of added values in the regional economic industries, estimated as a difference between production and intermediate consumption.

Groundwater Recharge Protection Areas – Areas of land designated by water resource agencies that rainwater or snowmelt percolates and replenish the underlying aquifer in the area of a public well. These areas require special protection because they directly affect the quality and safety of the public drinking water supply.

GW-A – The highest groundwater classification in Maine. GW-A is applied to water suitable for direct human consumption without treatment.

Habitat Consultation Areas Mapping Program (HCAMP) – A cooperative program of the MDIF&W and MNAP to provide mapping showing the areas of state-listed endangered and threatened animals and plants.

Herpetofauna – Refers to reptile and amphibian species.

High Crash Location (HCL) – A High Crash Location is an intersection or highway segment that experiences an abnormally high number of accidents relative to the traffic demands that are served. For the State of Maine, the Maine Department of Transportation identifies HCLs.

Highway Reconstruction/Rehabilitation – Reconstruction of an existing highway is undertaken when the pavement structure or alignment of the existing facility is deficient. Reconstruction includes removal and replacement of the entire pavement structure, significant changes in the vertical or horizontal alignment, or addition of lanes. Rehabilitation includes

resurfacing and other minor repairs intended to extend the service life of the existing facility and enhance highway safety.

Historic resources – Properties, structures and districts that are listed in or have been determined to be eligible for listing in the National Register of Historic Places.

Hourly traffic volume – The number of vehicles that use a given road over a 1-hour period.

Hydric soils – Soils that are saturated, flooded, or ponded long enough during the growing season to develop at least temporary conditions where there is no free oxygen in the soil around the roots. Hydric soils correspond to federally and state regulated wetlands in many circumstances.

Hydrologic regime – The frequency and duration of inundation or soil saturation of a given area.

Impacted Receiver – A condition that exists if sound levels approach or exceed the Noise Abatement Criteria (NAC) or a 15-decibel (dBA) increase in ambient noise levels.

Impervious surface – Relating to hydrology. A surface through which precipitation cannot penetrate, causing direct runoff or perching (examples include asphalt paving roofs, and densely compacted gravel).

Interstate – A freeway-type highway that is part of the National Highway System.

Interstate Highway System – The network of Interstate Highways established by the Federal-Aid Highway Act of 1956. The statute established a 41,000-mile network of controlled-access highways (expanded to 42,000 miles by legislation in 1968) intended to connect all metropolitan areas with populations greater than 50,000 and all state capitals.

Just-In-Time Delivery – Commercial deliveries that arrive immediately prior to their use. Just-in-time deliveries help producers minimize storage or warehousing space.

Kettle – A depressional glacial landform resulting from a melting block of ice embedded in till.

Labor Market Area (LMA) – Labor market areas are regional areas with a high concentration of employment opportunities. These are economically integrated units within which workers may readily change jobs without changing their place of residence.

Lacustrine – Of and related to lakes.

Land and Water Conservation Fund – A system for funding Federal, State and local parks and conservation areas, created by the Land and Water Conservation Fund Act of 1964.

Limited-Access facility – A highway where access to abutting properties is restricted or limited by control of the right-of-way.

Link – A new or existing highway segment between two defined end-points.

Lithic sandstone (graywacke) – A variety of sandstones characterized by angular-shaped grains of quartz and feldspar and small fragments of dark rock set in a matrix of finer particles.

Local Roads and Streets – All public roads and streets not classified as arterials or collectors will have a local classification. Local roads and streets are characterized by many points of direct access to adjacent properties and have relatively minor role in accommodating mobility. Speeds and traffic volumes are usually low.

Mafic – A generally dark-colored igneous rock with significant amounts of one or more ferromagnesian minerals, or formed from a magma with significant amounts of iron and magnesium.

Magnuson-Stevens Fishery Conservation and Management Act – Legislation (16 U.S.C. 1855(b)) governing all fisheries resources within 320 kilometers (200 miles) of the U.S. coast that established regional Fishery Management Councils and required the preparation of Fisheries Management Plans.

Maine Highway Design Guide – A tool developed by the Maine Department of Transportation that provides guidance for the design of roads and highways in the State of Maine in addition to the Federal Highway Administration design criteria.

Maine Land Use Regulation Commission (LURC) – Title 12, M.R.S.A, Chapter 206 –A Commission established by Title 12, M.R.S.A., Chapter 206 to administer the Land Use Regulation Law (12 M.R.S.A. § 681) by preparing land use standards prescribing standards for the use of air, lands and waters within the plantations and unorganized townships of Maine.

Maine's Sensible Transportation Policy Act (STPA) – Maine's Sensible Transportation Policy Act is a state law enacted in 1991 by the citizens of Maine that provides a decision making framework for examining a range of alternatives. The STPA is applicable to transportation planning decisions, capital investment decisions, and project selection decisions made by the Maine Department of Transportation (MDOT).

Maine State Design Standards – State adopted (February 1997) travelway and shoulder design width criteria for non-National Highway System facilities.

Major Collector Road – Collector Roads that tend to serve higher traffic volumes than other Collector Roads. Major collector roads typically link arterials. Traffic volumes and speeds will typically be lower than those of Principal Arterials.

Mesoscale air quality analysis – A regional-level analysis of air for chemical constituents

Metamorphosed – With respect to rock, a rock formation that has been altered by the action of heat and pressure.

Microscale air quality analysis – An analysis of air for chemical constituents, typically conducted for a small study area such as an intersection.

Mill Rate – The property tax rate, per $1,000 of assessed value.

Minor Arterial – Minor arterials are highways that tend to link Collector Roads to Principal Arterials and serve lower traffic volumes than typical arterials. Minor Arterials are also typically designed at lower travel speeds than Principal Arterials.

Mitigation – Actions that avoid, minimize, or compensate for potential adverse impacts.

Multi-modal service – The act of providing alternative modes or choices of transportation service, such as bus, rail, taxi, etc.

National Ambient Air Quality Standards (NAAQS) – The prescribed level of pollutants in the outside air that cannot be exceeded during a specified time in a specified geographic area.

National Environmental Policy Act of 1969, as amended (NEPA) – The federal legislation that requires an interdisciplinary approach in planning and decision-making for federal-aid actions. The Act includes requirements for the contents of environmental impact statements

that are to accompany every recommendation for major federal actions significantly affecting the quality of the human environment. The interdisciplinary study approach includes the analysis of potential impacts to the natural, social and economic environment.

National Highway System (NHS) – The National Highway System is a system of those highways determined to have the greatest national importance to transportation, commerce and defense in the United States. It consists of the Interstate highway system, logical additions to the Interstate system, selected other principal arterials, and other facilities that meet the requirements of one of the subsystems within the NHS.

National Historic District – An area, comprising numerous buildings and their setting, identified as historic in the National Register of Historic Places.

National Priority List (NPL) – The "Superfund" statute (42 U.S.C. Sect. 9601) requires the EPA to establish a National Priorities List of sites which are to be given top priority consideration for removal of hazardous substances and remedial action.

National Register of Historic Places – A list of structures, sites and districts of national historical significance as determined by the Advisory Council on Historic Preservation under the National Historic Preservation Act.

National Wetlands Inventory (NWI) – A program administered by the U.S. Fish and Wildlife Service for mapping and classifying wetland resources in the United States.

Natural Resources Conservation Service (NRCS) – Formerly the Soil Conservation Service, NRCS is a department within the United State Department of Agriculture that is responsible for administering the Farmland Protection Policy Act.

New Location Highway – A highway proposed to be constructed on land not currently used for transportation facilities.

Nitrogen Oxides (NOx) – Nitric oxide (NO) and Nitrogen dioxide (NO2) are collectively referred to as oxides of nitrogen (NOx). NO forms during high temperature combustion process. NO2 forms when NO further reacts in the atmosphere. NOx reacts with the sunlight to form ozone, a colorless gas associated with smog or haze conditions. Ozone is a pollutant regulated by the Clean Air Act Amendments of 1990.

Noise abatement criteria (NAC) – Noise levels measured in decibels that are used as a basis of comparison for evaluating the impact from predicted design year noise and for determining whether noise abatement measures should be considered.

Noise abatement measures – Actions that reduce traffic noise impacts. Noise abatement measures can be traffic management measures, alteration of horizontal and vertical alignments, acquisition of property rights for construction of noise barrier, construction of noise barriers, acquisition of real property or interest for buffer zones, or noise insulation of public use or nonprofit institutional structures.

Noise receptor – Locations that may be affected by noise: sensitive receptors include residences, parks, schools, churches, libraries, hotels, and other public buildings.

Non-Community Supply – A public water system that serves at least 25 persons at least 60 days out of the year and is not a community or a seasonal water system.

Non-Point Source pollution (NPS) – Pollution of waterbodies that does not originate at a single specific source such as an industrial discharge or discharge from a wastewater treatment

plant. Sources of non-point pollution include runoff from highways, agricultural fields, golf courses, and lawns.

Other Principal Arterial – Highways that provide access between arterials and a major port, airport, public transportation facility or other Intermodal transportation facility. Other Principal Arterials tend to serve lower traffic demands than Principal Arterials.

Outstanding River Segment (ORS) – A section of a river or stream designated by the Maine Natural Resources Protection Act (12 M.R.S.A. § 403) for protection because of the special resource values of its flowing waters and shorelines.

Ozone – A gas which is a variety of oxygen. Ozone is a pollutant regulated by the Clean Air Act Amendments of 1990. Ground-level ozone is the main component of smog. Ozone is not directly emitted by motor vehicles, but is formed when oxides of nitrogen react with sunlight.

Palustrine – The group of vegetated wetlands traditionally called by such names as marsh, swamp, bog, fen, and prairie. Palustrine wetlands may be situated shoreward of lakes, river channels, or estuaries; on river floodplains; in isolated catchments; or on slopes.

Palustrine Forested Wetland (PFO) – A palustrine wetland dominated by trees, commonly referred to as a swamp.

Palustrine Emergent Wetland (PEM) – A palustrine wetland dominated by herbaceous species, typically cattails, sedges and grasses, commonly referred to as a marsh.

Palustrine Scrub-Shrub Wetland (PSS) – A palustrine wetland dominated by shrubs.

Passing Sight Distance – The distance a passing vehicle on a two lane road will travel during a passing movement, plus an equal distance that an oncoming vehicle will travel during that time, plus a clearance distance or safety factor.

Peak hour – The hour of the day when traffic volume on a given roadway is highest. A separate peak hour can be defined for morning and evening periods.

Peak hour volume – The traffic volume that occurs during the peak hour, expressed in vehicles per hour (vph). Peak hour volumes are typically 10 to 15 percent of daily volumes.

Peak Hour Leq – Represents the noisiest hour of the day/night and usually occurs during peak periods of motor vehicle traffic. The Leq is the equivalent sound level measurement, which means it averages background sound levels with short-term transient sound levels and provides a uniform method for comparing sound levels that vary over time.

Posted speed limit – The speed posted for a facility based on engineering and traffic investigation.

Prehnite – A silicate mineral that forms in the cavities of basaltic rocks, low temperature hydrothermal fissures, and in limestone.

Primary/direct impacts – The immediate effects on the social, economic, and physical environment caused by the construction and operation of a highway; these impacts are usually experienced within the right-of-way or in the immediate vicinity of the highway or other element of the proposed action.

Prime Farmland Soil – Soil map units that are designated by the Natural Resources Conservation Service as having the properties needed to produce sustained high yield crops when managed with modern farming techniques.

Principal Arterials – Highways in rural and urban areas that connect urban areas, international border crossings, major ports, airports, public transportation facilities or other Intermodal transportation facilities.

Pumpellyite – A silicate mineral, closely related to epidote that forms in pelitic and dolomite rocks.

Rare and Exemplary Natural Community – An assemblage of interacting plants and animals and their common environment, recurring across the landscape, in which the effects of recent human interference are minimal. Rare natural communities are those which occur infrequently. Exemplary natural communities are exceptional representatives of more common natural communities.

RCRA Generator – An entity that produces hazardous waste regulated under the Resource Conservation and Recovery Act (RCRA) (42 U.S.C. sect. 6901), which mandates the appropriate identification, tracking, and disposal of hazardous waste.

Record of Decision (ROD) – The document, prepared by the Federal Highway Administration, that presents the basis for the Federal agency action, summarizes any mitigation measures to be incorporated, and documents any required Section 4(f) approvals. No Federal agency action may be undertaken until a Record of Decision has been signed. A Record of Decision is prepared no sooner than 30 days after the public release of the FEIS.

Relocations – The displacement of a residence, business or other structure from a property owner, for public use, that requires the residents or business to be moved to an alternate location.

REMI Model – The REMI Model (Regional Economic Models Inc.) is a widely used and accepted econometric model maintained and updated by the Center for Business and Economic Research at the University of Southern Maine.

Riparian – An area of land that encompasses and is contiguous to a stream or other water body.

Riverine – Of and relating to rivers.

Safety deficiency – In the context of this study, a safety deficiency is a highway segment or intersection that contains a high crash location (HCL).

Secondary impacts – Impacts that are caused by the proposed action and are later in time or farther removed in distance, but are still reasonably foreseeable; secondary impacts may include induced changes to land use patterns, population density or growth rate, and related effects on natural systems, including ecosystems.

Section 10 of the Rivers and Harbors Act of 1899 (Section 10) – Legislation (33 U.S.C. Section 403) that resulted in a permit being required from the Army Corps of Engineers for projects requiring construction in or over navigable waters, the excavation from or dredging or disposal of materials in such waters, or any obstruction or alteration in a navigable water (e.g. stream channelization).

Section 106 of the Historic Preservation Act (Section 106) – The National Historic Preservation Act of 1966 (16 U.S.C. 470f), Section 106, requires Federal agencies to take into account the effect of their undertakings on properties included in or eligible for inclusion in the National Register of Historic Places and to afford the Advisory Council on Historic Preservation the opportunity to comment on such undertakings.

Section 4(f) of the Department of Transportation Act of 1966 (49 U.S.C., Section 303) (Section 4(f)) – Legislation protecting publicly owned parks, public recreation areas, historic properties or wildlife and waterfowl refuges. The statute states that no Department of Transportation project may use land from these areas unless there is demonstrated to be no prudent and feasible alternative to using the land, and the project includes all possible planning to minimize harm resulting from the use.

Section 404 of the Clean Water Act (Section 404) – The Federal Water Pollution Control Act Amendments of 1972 (33 U.S.C. 401 et seq.) is the enabling legislation for protection of waters of the United States by the Army Corps of Engineers and the U.S. Environmental Protection Agency.

Section 6(f) of the Land and Water Conservation Funds Act (Section 6(f)) – Legislation that provides for the public purchase and preservation of tracts of land.

Sight distance – The distance that a driver can see along the roadway before curvature or obstructions block the view.

Significant Sand and Gravel Aquifer – A porous formation of ice-contact and glacial outwash sand and gravel that contains significant removable quantities of water which is likely to provide drinking water supplies.

Significant Wildlife Habitat – Wildlife habitats, including deer wintering yards, waterfowl and wading bird habitat, seabird nesting habitat, and significant vernal pools, that are protected under 38 M.R.S.A. § 480-B.

Silurian – The third geologic time period of the Paleozoic. The Silurian period lasted from approximately 438 to 408 million years ago.

Sole Source Aquifer (SSA) – An aquifer designated by EPA as the "sole or principal source" of drinking water for a given aquifer service area; that is, an aquifer that is needed to supply 50% or more of the drinking water for that area and for which there are no reasonably available alternative sources should the aquifer become contaminated.

State Implementation Plan (SIP) – A plan created under The 1990 Clean Air Act Amendments (CAAA) that establishes emission reduction requirements for ozone and carbon monoxide non-attainment areas. Proposed projects must demonstrate that the impacts of their emissions are consistent with the appropriate SIP.

Stormwater Pollution Preservation Plan (SWPPP) – A plan required for major construction projects under the EPA's National Pollutant Discharge and Elimination System (NPDES) general permit for construction activities. The SWPPP is required to address measures to prevent erosion, sedimentation, and other potential discharges of pollutants to water bodies and wetlands.

Stormwater runoff – The portion of precipitation that flows toward stream channels, lakes, or other waterbodies as surface flow.

Surface Water Supply Watershed – The watershed that contributes to a public drinking water supply.

System compatibility – System compatibility describes how well alternatives, either new highways or upgrades, fit into the existing highway network and the planned transportation improvement plan.

System continuity – System continuity is defined by how often the existing highways transition between wide, higher speed segments to narrow, low speed segments.

Threatened Species – Any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Traditional Cultural Property (TCP) – A property or site that is eligible for inclusion in the National Register of Historic Places because of its association with cultural practices or beliefs of a living community that are rooted in that community's history and are important to maintaining the continuing cultural identity of the community.

Traffic generator – Any business, government office, or place of employment or destination that generates or attracts traffic.

Transportation deficiencies – A highway related facility that is unable to safely and efficiently satisfy travel demands because of the intensity of traffic volumes, capacity, and/or safety.

Transportation Demand Management (TDM) – A system of actions whose purpose is to alleviate traffic problems through improved management of vehicle trip demand as opposed to adding new highway segments.

Transportation Improvement Program (TIP) – A staged multiyear program of transportation projects funded by the Federal Highway Administration and Federal Transit Administration.

Transportation Systems Management (TSM) – Relatively low cost measures to increase capacity and/or provide safety improvements on the existing transportation system. These measures typically include traffic signal timing or phasing adjustments, designation of turning lanes at specific intersection or driveways, access management improvements, and enhanced signage or markings.

United States Department of Agriculture (USDA) – A federal agency responsible for administering programs that address farming issues

United States Environmental Protection Agency (EPA) – A federal agency responsible for administering programs that address environmental issues.

United States Fish and Wildlife Service (USFWS) – A federal agency responsible for addressing the protection of fish and wildlife including rare, threatened, or endangered species. The USFWS plays an advisory role in the Section 404 regulatory program administered by the U.S. Army Corps of Engineers.

Upgrade – A geometric improvement to an existing highway segment.

Upper Devonian – The Devonian Period, which lasted from approximately 408 to 360 million years ago, contains three epochs. The Upper Devonian Epoch lasted from approximately 365 to 360 million years ago.

Vegetation cover type – A biological community characterized by certain vegetation characteristics, such as hardwood forest, mixed forest, shrub, herbaceous, and urban or residential managed vegetation.

Vehicle-Hours Traveled (VHT) – VHT is a measure of automobile use and trip time. One vehicle traveling one hour constitutes one vehicle-hour.

Vehicle-Miles Traveled (VMT) – VMT is a measure of automobile use and trip length. One vehicle traveling one mile constitutes one vehicle-mile.

Vernal pool – A temporary pool of surface water that provides breeding habitat for certain amphibian and invertebrate species.

Volatile Organic Compounds (VOCs) – Colorless gaseous compounds originating, in part, from the evaporation and incomplete combustion of fuels. In the presence of sunlight VOCs react to form ozone, a pollutant regulated by the Clean Air Act Amendments.

Waterfowl and Wading Bird Habitat – Wetlands that provide habitat for waterfowl (geese, brant, ducks) and wading birds (heron, egrets, bittern, rails), and that meet certain criteria for size, quality, and percent open water as established by Department of Inland Fish & Wildlife regulations.

Watershed – A region or area that contains all land ultimately draining to a water course, body of water, or aquifer.

Wellhead Protection Area (WPA) – Areas of land where human activities are regulated to protect the quality of ground water that supplies public drinking water wells.

Wetland – Areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

Wild and Scenic River – A river or river segment, designated by the National Park Service, because of the outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural or other similar values (16 U.S.C. 1271-1287).

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1.0 Introduction

This technical report documents the existing natural resources environment in the Study Area for the Gorham Bypass Study and Environmental Assessment (EA) (Gorham Bypass Study). Resources and regulatory considerations which could influence the location and layout of alternatives are presented. The resource categories reviewed include: wetlands; surface water and groundwater resources; floodplains; threatened and endangered species; vegetative communities; wildlife habitat; aquatic habitats; prime and unique farmland; soils; surficial geology; and wellhead protection districts. The sources of data for the corridor level analysis of the study included existing reports, maps, and aerial imagery; communication with various resource agencies and non-profit organizations; and limited field investigations. Once corridors were selected, resource evaluation included in-depth field analysis to support evaluations of alignments.

Each resource is discussed in the context of relevant regulatory requirements, followed by a description of the data sources and evaluation methodology employed, and finally, a description of the existing environment. Where appropriate, the resource areas are depicted on environmental constraints maps for the Study Area. Resource constraints were used to aid in identifying potential bypass corridors 305 meters (1,000 feet) wide.

The Town of Gorham is located 15.3 kilometers (9.5 miles) west of Portland, Maine, Cumberland County, and is part of the Greater Portland Metropolitan Statistical Area (MSA). Highway access to Gorham is provided by U.S. Route 202, and State Routes 4, 22, 25, 114, and 237. State Route 22 connects to the Maine Turnpike, Interstate Route 95 (I-95), from Gorham Village approximately 10.3 km (6.4 mi) and Route 25 connects with the Maine Turnpike, Interstate Route 95 (I-95), approximately 11.6 kilometers (7.2 mi) to the east.

The Study Area is located in the southern third of the Town of Gorham and encompasses approximately 49.2 square kilometers (19 square miles) (Figure 1-1, page 1-2). The Study Area is generally centered around Gorham Village and includes Mosher Corner, at its northeast corner. To the southeast, the Study Area extends along Route 22 to Scarborough. To the southwest, the Study Area extends to the Buxton townline, in the vicinity of U.S. Route 202/Route 4 and Osborne Road. West Gorham is at the northwest corner of the Study Area.

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Study Area

- Study Area
- Highways
- Roadways
- County Line
- Electric Lines
- Old RR Grade
- Pipelines
- Fiber Optic Cable

274 0 274 548 822 1096 Meters

2250 0 2250 Feet

Figure 1-1

2.0 Inventory of Existing Natural Resources Within the Study Area

Corridor Level Data Collection

The primary source of data for the corridor level assessment of environmental resources within the Study Area was the Maine Office of Geographic Information Systems (Maine OGIS) website. This information was supplemented with agency information, such as the locations of the Deer Wintering Area, plant species information, and the known location of state and federal protected wildlife, when available, obtained during the year 2000.

For wetlands, additional data sources including hydric soils lists, and aerial photograph interpretation were reviewed, with limited field confirmation of resources. Once this review was completed, new information developed was added directly to the digitized maps. Other resources were supplemented with data from electronic sources such as various State of Maine agency websites to supplement written information for this technical report.

Alternative Level Data Collection

Five bypass corridors, 305 meters (1,000 feet) wide, were selected for further assessment. Within each of these corridors, a 61 meter (200 foot) highway right-of-way was determined along with a 12 meter (40 foot) wide road alignment for field review on aerial photographs of the alternative rights-of-way. These maps were utilized in the field to delineate wetlands which were then plotted on the resource maps based on field features. Other resources were field checked as well, including cover types, stream characteristics, and the presence of protected species including those species identified by the resource agencies.

The data collected in the field was converted into digital data in Geographic Information Systems (GIS) format for incorporation into Phase I constraints mapping. Updated mapping allowed for an accurate assessment of the alternatives using field delineated data.

2.1 Wetlands

Regulatory Review

Federal jurisdiction of wetlands lies with the U.S. Army Corps of Engineers (ACOE) and Environmental Protection Agency (EPA), in accordance with Section 404 of the Clean Water Act. Under Section 404, the ACOE can authorize the issuance of dredge and fill permits within waters of the United States which includes wetlands. The EPA has a program oversight role and has the authority to make final determinations of the applicability of Section 404 to specific projects. Input is solicited from the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS). Under Section 404, before a project may proceed with either dredging or filling of a wetland, it

must be shown that efforts have been made to avoid impacts, minimize unavoidable impacts, and compensate for any remaining impacts.

Executive Order 11990, Protection of Wetlands, also addresses wetland impacts, requiring all federal agencies to minimize the destruction, degradation, or loss of wetlands. The lead federal agency for a project must make appropriate findings documenting compliance with this Executive Order.

Freshwater wetlands are regulated by the State of Maine under the Natural Resources Protection Act (NRPA) (38 MRSA § 480-A through § 480-Z) and the MDEP's Wetland Protection Rules (Chapter 310). The Act regulates dredging, draining, filling, and other alterations. The NRPA program is administered by the Maine Department of Environmental Protection (MDEP).

Methodology

At the corridor level, federal and state jurisdictional wetlands within the Study Area were identified through the use of existing data. Preliminary information on the Study Area's wetlands was obtained from the Gorham National Wetlands Inventory map (USFWS, 1980), from the Soil Survey of Cumberland County, Maine (Hedstrom, 1974), and various previous studies conducted within and adjacent to the Study Area. Federal wetland classifications were assigned according to the criteria published by the USFWS in Cowardin et al., (1979), and are noted on Figure 2-1, page 2-3.

The various sources of existing data such as the extent of hydric soils on the soils maps and NWI mapping were utilized to identify wetlands for the Phase I mapping. Additional information on wetlands was obtained through photo interpretation of aerial photographs using long established remote sensing standards and techniques. These photos are black and white, large scale 9"x 9" paper photos taken on November 16, 1998 (MDOT, 1998). This date of photography allowed for photo interpretation of surface features in deciduous woodland and optimum seasonal surface water, which proved instrumental for constraints mapping. The presence of extensive non-deciduous vegetation across the Study Area influences the accuracy of photographic interpretation of wetlands. Specific locations with conflicting data were checked in the field during a windshield survey. Individual wetlands were reviewed from a vehicle, no field determination was made. This level of information was utilized through the corridor screening phase.

Once alignment alternatives were developed within each corridor, wetland boundaries within the alternative rights-of-way were identified in the field but were not flagged or surveyed. Sufficient documentation was collected at representative locations in order to confirm these findings. These wetlands are depicted in Figure 2-2, page 2-4.

Wetland functional assessments were performed in representative wetland locations for the alignments selected for more detailed examination. The performance of a wetland functional assessment is a required element in the determination of (1) the functional value of the wetlands and (2) the magnitude of functional impacts that might be incurred from the proposed project. The functional assessment methods used for this study are adapted from methods developed to satisfy the ACOE's Highway Methodology requirements as stated in the ACOE's Highway Methodology Workbook Supplement: Wetland Functions and Values. A Descriptive Approach (1995) and Guide for Permit

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Study Area Wetlands
Corridor Level

Study Area
Streams
Contours
Highways
Roadways

Wetlands

Palustrine Emergent
Palustrine Forest
Palustrine Scrub-Shrub
Lacustrine Unconsolidated Bottom
Palustrine Unconsolidated Bottom

274 0 274 548 822 1096 Meters

2250 0 2250 Feet

Source: Based on NWI maps, soil information, and photo interpretation

Figure 2-1

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Wetlands within Alternatives

- Study Area
- Electric Lines
- Old RR Grade
- Pipelines
- Highways
- Roadways
- Fiber Optic Cable
- Streams
- Contours

Wetlands

- Palustrine Emergent
- Palustrine Forest
- Palustrine Scrub-Shrub
- Lacustrine Unconsolidated Bottom
- Palustrine Unconsolidated Bottom

274 0 274 548 822 1096 Meters

2250 0 2250 Feet

Wetlands are based on limited field reconnaissance within general alignment of the Alternatives

Wetlands extend beyond Alternative right-of-way limits

The final five Build Alternatives (1c, 1e, 6b, 6c and 6d) are shown herein

Additional wetlands are shown for some Alternatives that were dismissed from further analysis

Figure 2-2

Applicants (1993). Information used in the assessment includes data collected in the field, aerial photographs, rare species data, floodplain and water resources information,and other sources. The 13 functions assessed for this study include:

- Groundwater recharge/discharge;
- Flood storage and desynchronization;
- Sediment and shoreline stabilization;
- Sediment/toxicant retention;
- Nutrient retention/transformation;
- Nutrient export;
- Aquatic diversity/abundance and fish and shellfish habitat;
- Wildlife habitat;
- Endangered species habitat;
- Recreation (consumptive and non-consumptive);
- Uniqueness/heritage;
- Education/scientific; and
- Visual quality/aesthetics.

The Functional Assessments are provided in Appendix A of this report.

Summary of Existing Resources

Wetland systems (Cowardin et al., 1979) identified within the Study Area includes Riverine, Lacustrine, and Palustrine. A total of six wetland classes were noted in the Study Area based on Cowardin et al (1979) as noted on the National Wetlands Inventory (NWI) maps. In addition, the Soil Survey of Cumberland County (Hedstrom, 1974) and aerial photography was used to identify wetland systems. The wetland classes found in the Study Area include Palustrine Forested (PFO), Palustrine Scrub-Shrub (PSS) and Palustrine Emergent (PEM), as well as Palustrine Unconsolidated Bottom (Pub), Lacustrine Unconsolidated Bottom (L1UB), and Riverine Lower Perennial (R2) and wetlands described in the Section, 3.3.6, page 3-18 of the Environmental Assessment (EA). Palustrine wetlands are described in Cowardin et al., as including all nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, and all such wetlands that occur in tidal areas with salinities less than 0.5%. Non-vegetated Palustrine wetlands are described in the Palustrine Unconsolidated bottom class, Section 3.3.6, page 3-18 of the EA. Other classes within Palustrine system include: Palustrine Emergent, Palustrine Forested, Palustrine Scrub-Shrub, Palustrine Unconsolidated Bottom, Lacustrine, and Riverine systems. Table 2-1 outlines the wetland classes and size within the Study Area.

Table 2-1
Wetland Classes and Acreage within Study Area

Wetland Type	Hectares (Acres)
Palustrine Emergent	37.8 ha (93.4 ac)
Palustrine Forested	133.1 ha (328.8 ac)
Palustrine Scrub-Shrub	70.8 ha (175.0 ac)
Palustrine Unconsolidated Bottom	15.1 ha (37.4 ac)
Lacustrine Unconsolidated Bottom	6.5 ha (16.0 ac)

Source: Based on NWI maps, Soils Information, and Photo Interpretation.

The number of wetlands noted in the Study Area is approximately 200. (Figure 2-1, page 2-3).

Of the various wetland communities defined at the corridor level, the majority are located south of Route 25. More specifically, wetlands in the southwest quadrant of the Study Area, from Flaggy Meadow Road south and east to Route 114 south, are nearly all Palustrine Forested (PFO) wetlands with large forested wetland communities west of Cressey Road and north of Narragansett Street. There is another PFO wetland community located west of Route 114 near Crestwood Drive.

The southeastern quadrant of the Study Area, namely east of Route 114 and north to New Portland Road contains a mix of forested wetland communities and scrub-shrub communities. The wetlands in this portion of the Study Area also appear to be more closely associated with drainageways including Indian Camp Brook.

In the northeast quadrant of the Study Area, north of New Portland Road and east of Route 114, the wetland communities are predominately PEM and PSS with the largest wetland area associated with Tannery Brook.

The wetland communities associated with the northwest quadrant, bounded by Flaggy Meadow Road to the south and Route 114 to the east is predominately PSS wetlands along with PFO wetlands. The largest wetland community in this portion of the Study Area is associated with the Little River. (See Figure 2-1, page 2-3)

2.2 Groundwater, Surface Water, and Floodplain Resources and Wellhead Protection Districts

Regulatory Review

Oversight of groundwater resources at the federal level is by the EPA through the administration of the Safe Drinking Water Act of 1974 (SDWA), as amended, and to a lesser extent the Clean Water Act Section 404 (CWA). At the state level, the MDEP is responsible for groundwater protection, while drinking water is administered through the Department of Human Services, Division of Health Engineering, Drinking Water Program (DWP) which is responsible for enforcing the federal SDWA in terms of water quality at the point of use.

Surface water resources are regulated under federal legislation enacted to protect the quality of the nation's surface water. The primary federal legislation pertaining to this study is the CWA (first passed in 1972, and amended several times thereafter), which establishes a federal policy to regulate the discharge of pollutants into the nation's surface waters. Any work within the "waters of the U.S." requires a permit under Section 404 of the CWA (33 U.S.C. s/s 121 et seq,1977). Other federal requirements include Section 401 (CWA) Water Quality Certification which is administered through the State of Maine. Section 303(d) of the CWA requires states to identify water body segments that do not attain water quality standards or are imminently threatened and are not expected to meet state water quality standards.

At the state level, the MDEP oversees surface water issues through a number of policies and regulations including the Maine NRPA (38 MRSA § 480-A et seq.). MDOT projects are also reviewed for compliance with the 1998 Stormwater Management MOA.

A water classification system established pursuant to 38 MRSA § 464 established designated uses, related characteristics of those uses, and criteria necessary to protect the uses. The State of Maine has four classes of freshwater rivers, Class AA, Class A, Class B, and Class C as defined in the regulations.

Wellhead Protection Areas are designated to protect public water supplies from sources of contamination. The SDWA is the federal act established to protect the quality of drinking water in the United States. This law focuses on all waters actually or potentially designated for drinking use, whether from aboveground or underground sources.

The SDWA authorized the Environmental Protection Agency (EPA) to establish safe standards for purity and required all owners or operators of public water systems to comply with primary health-related standards. State governments also encourage the attainment of secondary health-related standards.

The State of Maine implements a Wellhead Protection Program, under the DWP. The Maine DWP is administered by the Department of Human Services. The DWP is responsible for enforcing the SDWA and has primary responsibility for administering the state's rules related to drinking water.

In addition, public wells are regulated by the Maine Department of Human Services, Drinking Water Program regulation 10-144E CMR 231, § 2 in the Maine Rules Relating to Drinking Water. This regulation defines a public water well as "any water transmitted through a set of pipes for human consumption which serves at least 15 service connections or regularly serves at least 25 residents 60 days or more per year." Private water wells are not regulated under 10-144E, CMR 231, in the Maine Rules Relating to Drinking Water.

Methodology

Baseline information describing the quality and quantity of groundwater resources located within the Study Area was obtained from the Significant Aquifer Map for the Gorham Quadrangle, from Maine Geological Survey (MGS), Open File No. 98-143 (1998). Additional mapping available from other sources included Groundwater Resource maps of Cumberland County (Maine Geological Survey, 1976). The Town of Gorham provided specific information on the location of public wells. Other data were collected via personal communication with state regulatory agencies.

Baseline information describing the location of public water supplies was obtained through the Maine Department of Human Services, Division of Health Engineering. The location of public wells was obtained through the Maine OGIS, Drinking Water Program. The Customer Service Department of the Portland Water District was contacted for information on their service area and the source of their public water supply.

The information available from these sources identified known aquifers and well fields, and potential significant sand and gravel deposits. The term "aquifer" is applied to any water-bearing geologic formation capable of producing usable quantities of groundwater

to be pumped into a well. A significant aquifer in the State of Maine is defined by 38 MRSA § 482, 4-D, as "a porous formation of ice-contact and glacial-outwash sand and gravel or bedrock that contains significant recoverable quantities of water which is likely to provide drinking water supplies." The MGS considers a sand and gravel aquifer to be "significant" when a well in that deposit is capable of being continuously pumped at a rate of 38 liters (10 gallons) per minute or more (Neil, 1998). The location of each public well is shown on Figure 2-3, page 2-10 with a 91 meter (300-foot) radius Wellhead Protection Area. The 91 meter (300-foot) radius is established by the Maine Department of Health Services, Drinking Water Program and correlates to the amount of protection the wellhead area requires in relation to the population served by the water system.

Surface water resources within the Study Area were based primarily on the existing information contained on the U.S. Fish and Wildlife Services National Wetland Inventory mapping contained on the Maine OGIS website. This information was supplemented with interpretation of aerial photographs using remote sensing standards and techniques.

Surface water resources were defined according to the NRPA definition of great ponds, and river or stream or the Classification of Wetlands and Deepwater Habitats of the United States (Cowardin et al., 1979), which is the federal standard for remotely sensed wetland and deepwater habitat classification. For the purposes of this technical report, surface water resources were defined as any body of water which meets the criteria for either a lacustrine or riverine system by the Cowardin method.

Areas meeting the Cowardin definition were delineated directly on base maps. Limited field checking of existing or mapped resources was conducted for the corridor level studies.

Other data sources reviewed prior to and during photo interpretation included United States Geological Survey topographic quadrangle mapping (Gorham, 1985) and various fact sheets and guidance documents available on the state website.

Summary of Existing Resources

The Portland Water District, which draws its water supply from Sebago Lake (located outside the Study Area) supplies water to approximately 1,600 commercial and residential customers in the Town of Gorham (Coffin, 2000). Figure 2-3, page 2-10 depicts the Portland Water District service area within the Study Area. Private water wells are the principle source of drinking water for the remainder of the residents of the Study Area, with both overburden and bedrock wells being used for water supplies. The majority of the bedrock wells are 30-91 meters (100-300 feet) in depth and typical well yields are approximately 38-76 liters (10-20 gallons) per minute, although yields of up to 378.5 liters (100 gallons) per minute do occur (Caswell, 1976 [a]). The thickness of the area's overburden is generally in the range of 3-6 meters (10-20 feet)(Caswell, 1976 [c]).

There are seven public water supply wells within the Study Area, including: the Wake Up Call Restaurant well, the O'Brien Mobile Home Park well, two wells located at the Gorham Country Club, and three wells located at the Wassamki Springs area in South Gorham. Each well has a 91 meter (300-foot) radius wellhead protection area around it (See Figure 2-3, page 2-10). These well head protection areas are established by the Maine Drinking Water Program, Department of Human Services around both large and

small public water supply wells and are intended to be used as a planning tool to evaluate potential land uses and their impacts on the local water quality.

All or a portion of three Sand and Gravel Aquifer areas, where ground water yield is estimated to be greater than 38 liters (10 gallons) per minute, exist in the Study Area. The approximate areal extent of these areas is 1,092 hectares (2,700 acres).

The Water Resources Map (Figure 2-3, page 2-10) identifies approximate boundaries of the Significant Sand and Gravel Aquifers, as well as the location of public water supply wells. These aquifer areas are grouped by potential yields of the wells. The Significant Aquifer Map for the Study Area identifies three significant aquifers. The first is considered a "high yield" aquifer, located in the extreme southeast corner of the Study Area along the Gorham and Scarborough townline. This high yield aquifer is capable of yielding in excess of 189 liters (50 gallons) per minute. This area of high yield aquifer is surrounded by a second aquifer, an area of "medium yield" aquifer, located along Route 22 and the Gorham/Scarborough townline. It has a potential yield of up to 38-189 lpm (10-50 gpm).

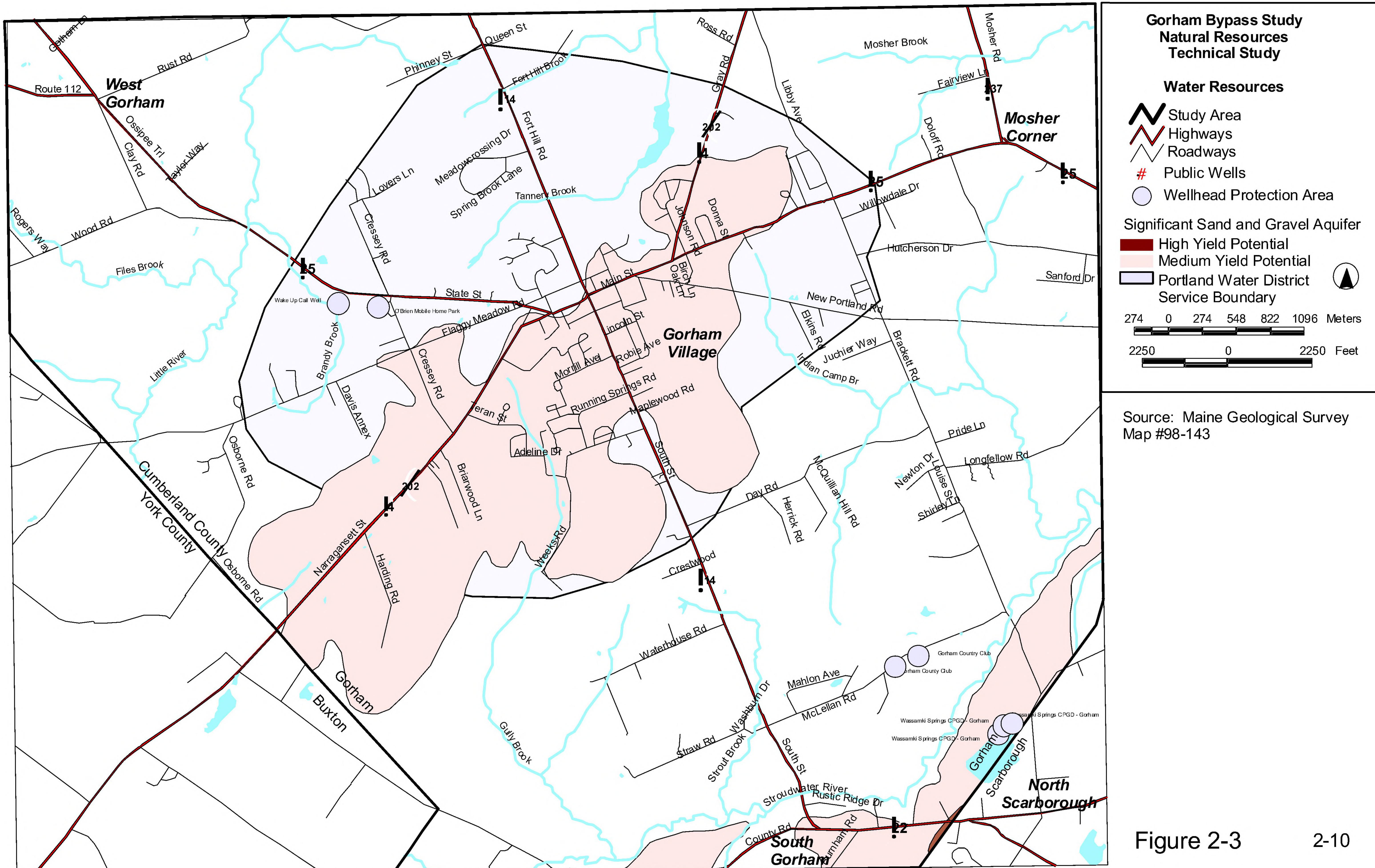
The third Significant Sand and Gravel Aquifer is a medium yield aquifer (i.e. aquifer with potential yields of 38-189 lpm (10-50 gpm) located in the vicinity of Gorham Village. This aquifer is oriented in a southwest to northeast direction extending along Route 202 to approximately the Cumberland County and York County line.

Fractured bedrock groundwater resources are used extensively in the Study Area (Neil, 1998), and while yields are generally less than those found in surficial aquifer wells, they are sufficiently large to meet most domestic needs, for individual wells.

In terms of surface waters, the Study Area lies within the drainage basins of two waterways, the Presumpscot River and the Stroudwater River. Route 202 west of Gorham Village and Route 25 east of the Gorham Village essentially delineate the drainage divide. The Presumpscot River flows from northwest to southeast and is located outside the Study Area. Tributaries of the Presumpscot River, which include Little River, Martin Brook, Fort Hill Brook, Tannery Brook, Files Brook, Brandy Brook, Mosher Brook, and several unnamed tributaries, drain the northwesterly portion of the Study Area. The Stroudwater River watershed drains the south/southeast portion of the Study Area. Its tributaries include Gully Brook, Deering Brook, Strout Brook, Indian Camp Brook, and several unnamed tributaries. These and other surface water features are shown on Figure 2-4, page 2-11.

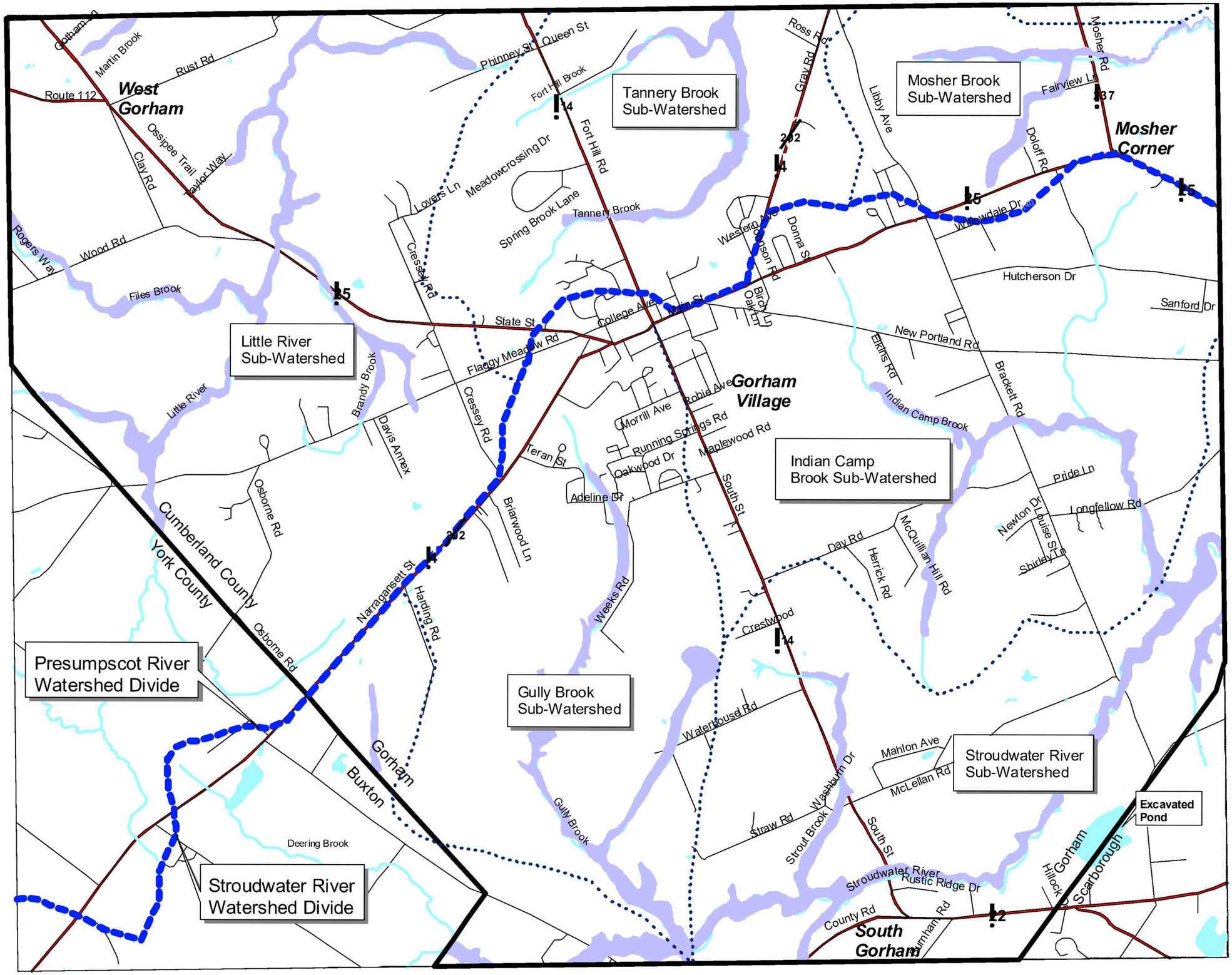
The Stroudwater River in the Study Area is classified as Riverine, Lower Perennial, Unconsolidated Bottom (R2UB), while the smaller streams such as Gully Brook and Indian Camp Brook are primarily Palustrine, Scrub-Shrub, Deciduous (PSS1). The Little River is classified as a riverine habitat as well as Palustrine Scrub-Shrub. Tannery Brook includes a ponded portion, Lacustrine, Littoral, Unconsolidated Bottom (L2UB), as well as Riverine portions (riverine, lower perennial, unconsolidated bottom-R2UB), and Palustrine Emergent and Scrub-Shrub wetlands (PEM and PSS)(Figure 2-1, page 2-3).

The Stroudwater River, all its tributaries, and all tributaries to the Presumpscot River below its outlet from Sebago Lake are listed as Class B waterways (38 MRSA § 465). Mosher Brook is cited in the 1998 Section 303(d) List of Water Quality Limited Rivers and Streams as a Class B stream due to non-attainment of dissolved oxygen



Source: Maine Geological Survey
Map #98-143

Figure 2-3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Surface Water
Study Area
Highways
Roadways
Streams
Lakes and Ponds
100--Year Floodplain
Presumpscot River Watershed/ Stroudwater River Watershed Divide
Sub-Watershed Divide
274 0 274 548 822 1096 Meters
2250 0 2250 Feet
Source: Maine Office of GIS; Federal Emergency Management Agency
West Gorham
Mosher Corner
Gorham Village
South Gorham
Tannery Brook Sub-Watershed
Mosher Brook Sub-Watershed
Little River Sub-Watershed
Indian Camp Brook Sub-Watershed
Gully Brook Sub-Watershed
Stroudwater River Sub-Watershed
Presumpscot River Watershed Divide
Stroudwater River Watershed Divide
Excavated Pond
Cumberland County
York County
Gorham
Buxton
Scarborough
Route 112
Ossipee Trail
Rust Rd
Martin Brook
Clay Rd
Taylor Way
Rogers Way
Wood Rd
Files Brook
Little River
Brandy Brook
Davis Annex
Osborne Rd
Deering Brook
Narragansett St
Harding Rd
Phinney St
Queen St
Fort Hill Brook
Fort Hill Rd
Meadowcrossing Dr
Spring Brook Lane
Tannery Brook
Lovers Ln
Cressey Rd
State St
Flaggy Meadow Rd
College Ave
Main St
Teran St
Briarwood Ln
Adeline Dr
Morrill Ave
Robie Ave
Running Springs Rd
Oakwood Dr
Maplewood Rd
South St
Weeks Rd
Crestwood
Waterhouse Rd
Gully Brook
Strout Brook
Straw Rd
Ross Rd
Gray Rd
Libby Ave
Western Ave
Johnson Rd
Donna St
Birch Ln
Oak Ln
Willowdale Dr
Doloff Rd
Mosher Rd
Fairview Ln
Hutcherson Dr
Sanford Dr
New Portland Rd
Elkins Rd
Bracket Rd
Indian Camp Brook
Pride Ln
Longfellow Rd
Newton Dr
Louise St Ln
Shirley Ln
Day Rd
Herrick Rd
McQuillan Hill Rd
Mahlon Ave
McLellan Rd
Washburn Dr
Rustic Ridge Dr
Stroudwater River
County Rd
Cumberland Rd
Hillock Ln
Gorham
Scarborough
202
4
14
15
12
237

Figure 2-4

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Threatened and Endangered Species/Wildlife Habitat

Contours
Study Area
Highways
Roadways
Streams

Moderate Value Waterfowl Wading Bird Habitat
State Listed Threatened Species-Upland Sandpiper
Deer Wintering Area

274 0 274 548 822 1096 Meters

2250 0 2250 Feet

Source:
Maine Department of Inland Fisheries & Wildlife and Maine Department of Conservation, Maine Natural Areas Program.

Figure 2-5

Unfragmented habitat blocks represent contiguous areas of forest and other vegetative communities with limited disturbance. The availability of unfragmented blocks of habitat within the Study Area was examined through the assessment methods described in the Vegetation Section 2.6, page 2-17.

Existing wildlife habitat information including Significant Wildlife Habitat in the Study Area was obtained through contacting MDIF&W regional wildlife biologist, Mr. Philip Bozenhard in Gray, Maine. Significant Wildlife Habitats include critical or important wildlife habitats, Essential Wildlife Habitats, Deer Wintering Areas, and Waterfowl and Wading Bird habitat. Records of protected wildlife species are noted in the Threatened and Endangered Species Section 2.3, page 2-12.

Summary of Existing Resources

The Study Area includes a broad range of potential wildlife habitats. The various vegetative communities across the site combine to provide the appropriate food and cover necessary which meet the requirements of a variety of wildlife species. These communities can be characterized as being primarily forested, however the interspersion of large areas of open land and scrub-shrub areas combine to add to the overall value of the Study Area. Forested habitats occur throughout the Study Area except in the Gorham Village area, which is considered an urban area, densely developed, with the largest tracts of forest land occurring on the west side of the Study Area. This community typically provides a variety of values including food, cover, and breeding habitat to birds and some amphibian species, as well as small and large mammals such as the white-tailed deer (*Odocoileus virginianus*). Open fields, more common in the outer portions of the Study Area but especially in the Mosher Corner area, and in the area north of the Gorham Village area, are an important element of the habitat requirements for a variety of bird species such as the eastern meadowlark (*Sturnella magna*) but also provide cover, nesting opportunity and breeding habitat for small mammals such the deer mouse (*Peromyscus maniculatus*) and foraging habitat for mammals such as the fox (*Vulpes vulpes)* and coyote (*Canis latrans*).

The identification and evaluation of wildlife species includes the following categories:

Amphibians and Reptiles

DeGraaf and Rudis (1986) indicate 14 amphibian and 12 reptile species may be found in the Study Area. A list of these species is included in Appendix B.

The "significant wildlife habitat" of vernal pools are a required habitat for a majority of the salamander species noted plus the wood frog (*Rana sylvatica*), however no vernal pools were identified by MDIF&W in the correspondence regarding "Significant Wildlife Habitat". By definition however if they occur within another protected natural resource such as a wetland they would be considered "Significant Wildlife Habitat". No vernal pools were identified during wetland delineation field work.

Birds

The Study Area with its variety of forested and open field habitats, as well as wetland and upland communities combines to provide habitats for a number of bird species. One hundred and forty-eight species of birds were identified by MDIF&W as likely inhabitants

in the various habitats of the Study Area. The table of bird species identified by MDIF&W (2002) as occurring in the Study Area is provided in Appendix A.

According to the mapped information provided by MDIF&W, Significant Wildlife Habitats include a Moderate Value Waterfowl Wading Bird Habitat at Tannery Brook Pond, just north of Gorham Village (Eldridge, 2001). This wildlife data is provided on the Threatened and Endangered Species/Wildlife Habitat Figure 2-5, page 2-13. No other wildlife resources were noted by MDIF&W.

Mammals

Thirty-six species of mammals were identified by the MDIF&W (2002), as likely inhabitants in the various habitats identified in the Study Area. A listing of mammal species with ranges overlapping the Study Area is included in Appendix A.

According to the mapped information provided by MDIF&W, Significant Wildlife Habitats include a Deer Wintering Area located on the south side of Day Road, east of Route 114. (Eldridge, 2000). This wildlife data is provided on the Threatened and Endangered Species/Wildlife Habitat, Figure 2-5, page 2-13. No other wildlife resources were noted by MDIF&W.

Unfragmented Habitats

The availability of unfragmented habitats in the Study Area is most easily observed by reviewing the Vegetation Coverage Map (Figure 2-6, page 2-19). Large blocks of forestland and other cover types are located throughout the Study Area. The configuration of these habitat areas is however affected by the presence of the existing road network, which radiates out from the Gorham Village center. Most of the habitat areas begin near Gorham Village and continue outside the Study Area. Initially it can be stated that impacts to these habitat areas will be more likely to occur as you travel away from the center of Gorham Village.

No wildlife concerns were identified by the USFWS.

2.5 Aquatic Habitat

Regulatory Review

Significant wildlife and aquatic habitat is protected by the State of Maine under NRPA (38 MRSA § 480-A through 480-Z). Activities may not "unreasonably harm any significant wildlife habitats, freshwater wetland plant habitat, aquatic habitat, travel corridor, freshwater, estuarine, or marine fisheries or other aquatic life." However, only significant habitats that are mapped are protected.

Specifically, Maine Department of Transportation projects "may not block any fish passage in any water course" and "shall use erosion control measures to prevent sedimentation of any surface waters" as described under NRPA (38 MRSA § 480-H, 1[A]).

Methodology

Fisheries information was requested from USFWS and NMFS.

Existing fisheries resources information within the Study Area was obtained by contacting the MDIF&W regional fisheries biologist in Gray, Mr. John Boland. In addition, the Atlantic Salmon Commission (ASC) and Maine Department of Marine Resources were contacted for information. At the alignment level of study, additional field work focused on a thorough examination of resources, specifically data on the quality of streams, susceptibility of communities to sedimentation, as well as the overall fishery values of specific streams.

Summary of Existing Resources

No fisheries concerns were noted by the USFWS or the NMFS. Correspondence from Mr. Norm Dube of the Atlantic Salmon Commission indicated no concerns with the Study Area and noted that no Atlantic Salmon habitat would be impacted by the proposed bypass. A review of files by Mr. Brian Swan of the Maine Department of Marine Resources (DMR), indicated a similar response of no marine resources located within the Study Area.

According to information provided by the MDIF&W, the Little River is stocked with brook trout and brown trout on an annual basis, while the Stroudwater River in the Gorham area is "periodically" stocked with brook trout. A number of the smaller tributary streams and headwater sections of the larger streams were identified as containing wild populations of brook trout. Based on this assessment all streams are assumed to provide fisheries habitat for the preliminary or corridor selection phase of the study. This information was further refined during later phases through field examination and further coordination with MDIF&W.

2.6 Vegetative Communities

Regulatory Review

The consideration of vegetative communities is provided in conjunction with wildlife habitat issues. Agencies responsible for these issues include the MDIF&W. Specific reference to "travel corridors" is noted in the Natural Resources Protection Act (38 MRSA § 480-D,3). Travel corridors provide a connection between two habitat areas.

Methodology

Information on vegetative cover was obtained through aerial photo interpretation and published data. The most comprehensive information currently available was found on the land use maps provided as part of the Casco Bay Estuary Project (CBEP) (USEPA, 1995). Other data resources reviewed included the Cumberland County, Maine, Soil Survey (1974); and the U.S. Geological Survey 7.5 minute series quadrangle map for Gorham (1975). In addition, several resource agencies were contacted during the preliminary phase of the study. Information was provided by the State of Maine, Natural Areas Program, and Maine Forest Service.

Land cover classification maps provided by the U.S. Fish and Wildlife Service based on the Casco Bay Estuary Project, Geographic Information Systems, (1996) served as the primary basis for the vegetative cover maps. This map was developed with satellite imagery and classifies communities into more than 26 different types, including the location and extent of forested communities. From the data in this map the various communities were combined to provide a basis for displaying forested and non-forested communities within the Study Area, as noted in Figure 2-6, page 2-19.

The data provided allows the examination of direct impacts to available wildlife habitat, such as the loss of scrub-shrub habitats, and also an overview of how the proposed bypass would fragment and disrupt available habitat. In general, the presence of large blocks of undisturbed habitat and potential travel corridors can be identified through the use of the vegetation maps, allowing an examination of the potential for bisecting or fragmenting these habitats by any highway corridor.

Additional data concerning specific plant species recorded in the Study Area are included in Section 2.3, page 2-12, Threatened and Endangered Species.

Summary of Existing Resources

The CBEP (1996) identified 24 different cover types such as high and low density/residential, four classes of hardwoods, and four classes of softwoods. The Vegetation Coverage Map (Figure 2-6, page 2-19) developed for this study utilized the CBEP data, consolidating a number of these categories to include classes such as hardwood, softwood and scrub-shrub. The Study Area vegetation has been aggregated into five vegetation cover types, in addition to developed lands:

(1) open lands, including grasslands, emergents and marshlands,
(2) scrub-shrub,
(3) softwood forest,
(4) hardwood forest,
(5) forested wetland, and,
(6) developed lands including residential, commercial.

- Open Land communities

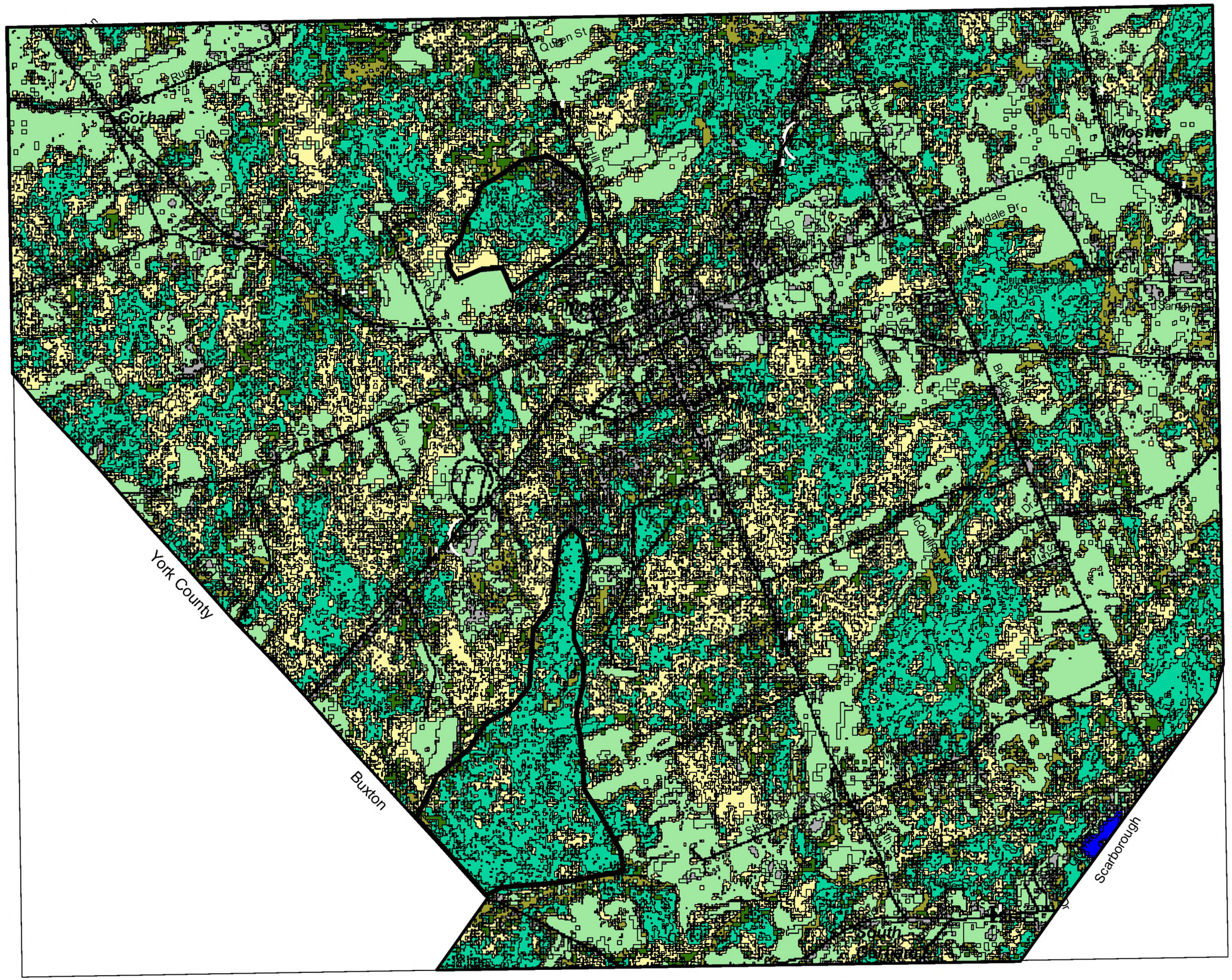
The Open Land communities include active agricultural areas such as hay fields, and other low-growing communities such as emergent or marshy areas. As noted in the Wildlife Habitat Section 2.4, page 2-14, these areas can be an important element of bird and small mammal habitat. Total acreage within the Study Area is 1,393 ha (3,443 ac).

- Scrub-Shrub communities

In general, Scrub-Shrub communities found in the Study Area were associated with wetlands, along roadsides, along utility corridors, and adjacent to streams and drainageways. These communities are characterized by woody vegetation less than 6 meters (20 feet) tall. Typical species include speckled alder (*Alnus incana rugosa*), gray *birch (Betula populifolia)*, and staghorn sumac (*Rhus typhina*). Total acreage within the Study Area is approximately 370 ha (914 ac).

- Softwood (coniferous) forest

The Softwood forest communities are distributed throughout the Study Area with large concentration in the south-central, and north-central portions of the Study Area. The



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Vegetation Coverage Map

- Study Area
- Highways
- Roadways
- Open Land
- Scrub-Shrub Wetland
- Softwood Forest
- Hardwood Forest
- Forested Wetland
- Water
- Developed Land
- Unfragmented Habitat Block

274 0 274 548 822 1096 Meters

2250 0 2250 Feet

Source: Casco Bay Estuary Project, Geographic Information System (1996)

Figure 2-6

forest is dominated by white pine (*Pinus strobus*) and spruce (*Picea) species*. Total acreage within the Study Area is approximately 1,385 ha (3424 ac).

- Hardwood (deciduous) forest

The Hardwood forest communities are distributed across the Study Area with the largest concentrations occurring in the southern and western portions of the Study Area. The hardwood component of the Study Area is best represented as Northern Hardwood forest. Total acreage within the Study Area is approximately 1,434 ha (3,543 ac).

- Forested Wetland communities

The Forested Wetland communities found in the Study Area are typically large communities located adjacent to streams or drainageways or are found in lower portions of the landscape. The forested communities are characterized by woody vegetation over six meters (20 feet) tall. Typical species include red maple (*Acer rubrum*) and eastern hemlock (*Tsuga canadensis*). Total acreage within the Study Area is approximately 168 ha (416 ac).

- Developed Land

The cover type of Developed Land includes those areas already developed for residential, commercial and industrial purposes, as well as the landscaped areas around these facilities. The developed land communities in the Study Area are generally associated with the Gorham Village area as well as areas adjacent to the existing roadways. Total acreage within the Study Area is 227 ha (562 ac).

Areas have also been covered by water, which are comprised of various streams, ponds and other types of waterbodies that were picked up from satellite imagery based on Casco Bay Estuary Project, Geographic Information System (1996).

The Vegetation Coverage Map provides a depiction of forested and non-forested communities, illustrating the extent of these resources, and their contiguous nature, allowing an assessment of the potential impacts to existing communities during the selection of bypass corridors and alignments.

2.7 Prime & Unique Farmland

Regulatory Review

The Farmland Protection Policy Act was established by Congress in 1981 to minimize the extent to which federal activities contribute to the conversion of agricultural land to nonagricultural uses. The Farmland Protection Policy Act is overseen by the U.S. Natural Resources Conservation Service (NRCS). The premise of the act is to ensure that federal policies are administered in a manner that will be compatible with state, local, and private policies that protect farmland. The NRCS looks at the amount of farmland that may be impacted by a proposed bypass road. Once the location(s) have been identified, a Farmland Conversion Impact Rating form (Form AD-1006) is completed by the federal agency undertaking the project, and the farmland significance is evaluated. Based on the Farmland Conversion Impact Rating form, a site rated with the most amount of points will be considered most suitable for protection.

Methodology

Available mapping of farmland soils within the Study Area was reviewed through information sources such as the NRCS Important Farmlands Map for Cumberland County (1980).

Summary of Existing Resources

In order to address potential impacts to farmlands, a soil classification system based on soil characteristics is used. This classification of farmland consists of four categories: prime farmland, unique farmland, additional farmland of state-wide importance, and additional farmland of local importance. Soils in these categories that have structures or pavement are considered to have been irreversibly "converted" and no longer available for agricultural production. In addition, farmland does not include lands identified as either "urbanized" on the Census Bureau Map, as an urban area mapped with a "tint overprint" on the USGS topographical maps or as "urban build-up" on the USDA Farmland Maps (7 CFR 658.2). Table 2-2 shows the prime farmland soils within the Study Area.

Table 2-2
Prime Farmland Soils Within the Study Area

Map Symbol	Prime Farmland Code	Soil Name and Description
BuB	2	Buxton silt loam, 3 to 8% slope
CaB	4	Canaan sandy loam, 3 to 8% slope
DeA	4	Deerfield loamy sand, 0 to 3% slope
DeB	4	Deerfield loamy sand, 3 to 8% slope
EmB	1	Elmwood fine sandy loam, 0 to 8% slope
HgB	4	Hermon sandy loam, 3 to 8% slope
HlB	4	Hinckley gravelly sandy loam, 3 to 8% slope
HnB	4	Hinckley-Suffield complex, 3 to 8% slope
HrB	4	Hollis fine sandy loam, 3 to 8% slope
LyB	4	Lyman fine sandy loam, 3 to 8% slope
MkB	1	Merrimac fine sandy loam, 3 to 8% slope
On	1	Ondawa fine sandy loam
PbB	1	Paxton fine sandy loam, 3 to 8% slope
PkB	1	Peru fine sandy loam, 0 to 8% slope
Py	1	Podunk fine sandy loam
WmB	4	Windsor loamy sand, 0 to 8% slope
WrB	1	Woodbridge fine sandy loam, 0 to 8 % slope

1=All areas are prime farmland
2=Only drained areas are prime farmland
4=Only irrigated areas are prime farmland

The soils that are irrigated or drained to be considered prime farmland are soils that are of statewide significance. Not all units of these soils are Prime and Unique Farmland if they are not identified by NRCS as being Prime and Unique Farmland. In addition,

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Prime and Unique Farmland

Study Area
Highways
Roadways

Farmland Categories

Prime Farmland
Urban and Built-Up Areas
Additional Farmland of Statewide Significance
Other Land

No Unique Farmland reported

274 0 274 548 822 1096 Meters

2250 0 2250 Feet

Source: Natural Resources Conservation Service (NRCS), 1980.

Figure 2-7

of Maine Surficial Geology, Gorham Quadrangle, File No. 99-84 (Maine Geological Survey, 1999). This information was available through the Maine Office of GIS (OGIS). Other information sources checked as part of the documentation process provided the same soils data. These data sources include the Maine Geological Survey, the Natural Resources Information and Mapping Center, and the Casco Bay Estuary Project, a project of the U.S. Fish and Wildlife Service (1995).

Farmland soils are addressed in Section 2.7, page 2-20.

Summary of Existing Resources

The surficial geology of the Gorham Bypass Study Area, as described and depicted on the Surficial Geology map, File No. 99-84 indicates both marine and glacial deposits including tills occur. Marine deposits predominate in the Study Area with glacial moraines and tills located as large blocks in that portion of the Study Area located north of Gorham Village or as isolated deposits to the south. The surficial geology map information is presented on Figure 2-8 page 2-25, and includes the following deposits, and, where available, the approximate thickness of the deposit. The following deposits are described by Maine Geological Survey (1999):

- Stream alluvium - Occurs as fine sands and silt with some gravel in floodplains along streams and rivers. As depicted on Figure 2-8, page 2-25 this deposit is limited to the Stroudwater River at the southern limit of the Study Area. Total acreage within the Study Area is 5.6 hectares (14 acres).

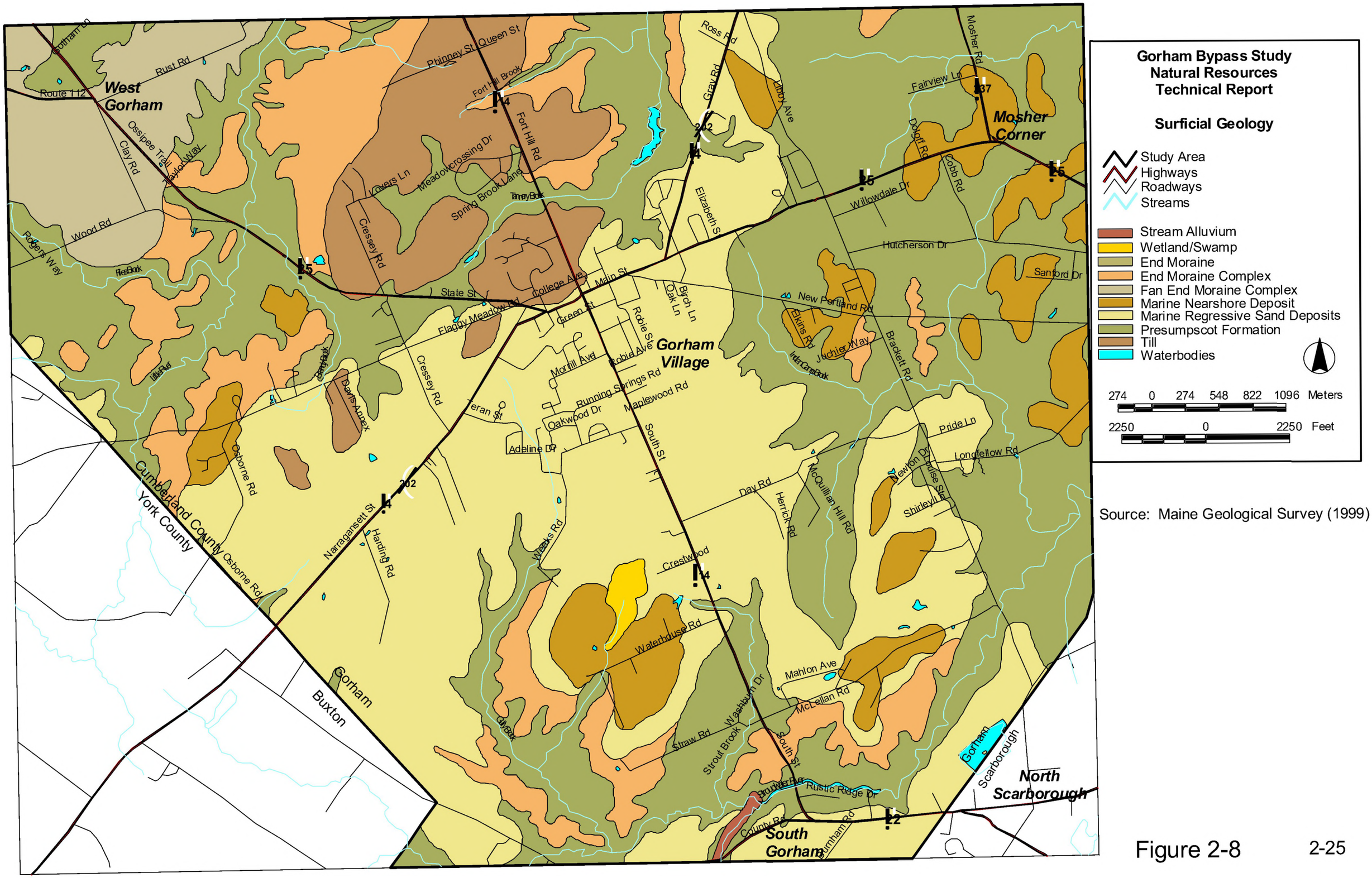
- Wetland, swamp - These muck, peat, silt and sand deposits are depicted on the map as small isolated units with the largest occurring south of Gorham Village, west of Route 114. Total acreage within the Study Area is 14 hectares (35 acres).

- End Moraine - These deposits occurs north of Flaggy Meadow Road, west of Cressey Road. This deposit consists of coarse gravel and sand and generally occurs in areas of glacial-marine sediments that are complexly stratified. Total area within the Study Area is 6.5 hectares (16 acres).

- End Moraine Complex - These glacial deposits are primarily located north of Route 25 and are generally oriented in a south-southwest direction. Smaller deposits occur in the southern half of the Study Area. These areas described as coarse gravel, sand, till and silt; commonly over shallow bedrock. They were formed at or near ice front during retreat of marine-based glacier. They are generally less than 5 meters (16 feet) thick. Total area is 486 hectares (1,202 acres).

- Fan End Moraine Complex - These deposits are located around West Gorham. A composite unit this complex incorporates elements of end moraines and subaqueous fans. A coarse to fine sand, this material overlies sediments of end moraines and end moraine complexes. Total area within the Study Area is 231 hectares (572 acres).

- Marine Nearshore Deposit – These deposits are found east of Gorham Village around Mosher Corner and along Waterhouse Road. These deposits occur in small patches generally in the southeastern quadrant of the Study Area. They are



Source: Maine Geological Survey (1999)

Figure 2-8

WETLAND SUMMARY SHEET — WETLAND ID#: 1

WETLAND DESCRIPTION

Project:	Gorham Bypass		
General description:	Powerline ROW wetlands	Watershed:	Stroudwater River
Classifications (fed):	PEM1, PSS1		
Principal vegetation:	sens. fern, buckthorn, cattails, meadowsweet		
Soil substrate:		Hydrology:	surface drainage
Disturbance:	Portions under powerline	Surrounding Land Use:	powerline ROW, field and woods
Water bodies:	None		
Wildlife observations:			

FUNCTIONAL ASSESSMENT	Occurrence Y	Occurrence N	Rationale (Question#) Y	Rationale (Question#) N	Principal Y	Principal N	Comments
1. Groundwater recharge/discharge	X		13,15	2-10		X	Field observations noted seepage areas as well as surface run off. Function not valuable
2. Flood storage & desynchronization		X	3,4,5,8	1,2,7,11,12 13-18		X	little flood storage potential, wetland small
3. Fish and Shellfish Habitat		X		1,2		X	No fish or shellfish habitat available. Area lacks water bodies.
4. Sediment/toxicant retention	X		4	1-3,5-9		X	These wetlands do provide retention of sediment, etc along powerline & roadway but sources limited
5. Nutrient retention/transformation		X	9	1,2,4-8,10 11,12		X	Potential for sources limited, Also limited retention.
6. Nutrient export	X		1,4,5,7 13	2,3,6,8,9 10		X	Limited flows and production for export.
7. Sediment/Shoreline Stabilization		X		1,3,4,7,8,9 10.		X	limited water course, although vegetation adequate.
8. Wildlife habitat	X		5,6,8,9,10	1,3,4,7,11,12	X		wetland provides habitat to surroundings with mixed emergent and shrub cover. w/ diverse surroundings
9. Recreation	X		9	1-8, 11,12		X	Existing snowmobile paths & trails available.
10. Education/Scientific Value		X	5	2-4, 7-10		X	No Known education or scientific values available
11. Uniqueness/Heritage		X	7	1, 8.-11 13		X	No Known unique or heritage present. Area lacks features of local significance
12. Visual Quality/Aesthetics		X	2,3,8	9, 10, 11, 12		X	Limited visibility; powerline does provide contrast to surrounding woodland.
13. Endangered Species Habitat		X		1,2		X	No Known endangered species habitat observed or noted by agencies.

Note: Federal functions derived from ACOE's Guide for Permit Applicants, 1993.

WETLAND SUMMARY SHEET

WETLAND ID#: 3

WETLAND DESCRIPTION

Project:	Gorham Bypass
General description: Southern Gully Brook trib.	Watershed: Stroudwater River
Classifications (fed): PSS1	
Principal vegetation: speckled alder	
Soil substrate: sand/organic	Hydrology: intermittent stream
Disturbance: Sediment deposit in stream (old)	Surrounding Land Use: old field, residential
Water bodies: area is intermittent stream channel	
Wildlife observations: songbirds	

FUNCTIONAL ASSESSMENT	Occurrence Y	Occurrence N	Rationale (Question#) Y	Rationale (Question#) N	Principal Y	Principal N	Comments
1. Groundwater recharge/discharge	X		10, 13, 15	1-5 7, 8		X	Upstream discharge noted
2. Flood storage & desynchronization	X		3, 4, 5	1, 2, 7, 11, 12 13, -18		X	Connected to floodplain but storage availability is limited since wetland is channel
3. Fish and Shellfish Habitat		X		1, 2			Although channel flow, is too low and intermittent to provide aquatic habitat
4. Sediment/toxicant retention	X		1, 2, 3, 4	6, 7, 8, 9	X		Upstream sources available from road, residences and field. Veg. dense but limited flow.
5. Nutrient retention/transformation	X		3, 6-9, 11 12	1, 2, 5, 6	X		Sediment and nutrient retention, good potential but unknown sources except field & residences
6. Nutrient export	X		7, 10, 14	2 → 6. 8, 9		X	Potential for export is available with flow and dense veg. Limited flow reduces overall value
7. Sediment/Shoreline Stabilization		X	2	1-8, 10-14		X	Dense vegetation on banks provides potential but low flow overall value
8. Wildlife habitat	X		5, 6, 8-10, 13 14, 17-19	1, 3, 4, 7, 11 20, 21, 22	X		Drainageway, provides diversity and travelway in vicinity. shrub cover in contrast w/ surroundings
9. Recreation		X	9	1-8, 11, 12		X	Limited recreational opportunity available in wetland
10. Education/Scientific Value		X	5	2-4, 7-10		X	No known educational or scientific value, limited accessibility
11. Uniqueness/Heritage		X	1, 2	3-26		X	No known unique or heritage features present, area lacks features of local significance
12. Visual Quality/Aesthetics	X		6	1, 3-12		X	Visible from Waterhouse Road and does provide visual contrast but overall access is limited
13. Endangered Species Habitat		X		1, 2		X	No known endangered species observed in field or noted by agencies.

Note: Federal functions derived from ACOE's Guide for Permit Applicants, 1993.

WETLAND SUMMARY SHEET — WETLAND ID#: 3

WETLAND DESCRIPTION

Project:	Gorham Bypass		
General description:	Lower Gully Brook Trib.	Watershed:	Stroudwater River
Classifications (fed):	PSS1, PF01		
Principal vegetation:	Red maple, soft rush, goldenrod		
Soil substrate:		Hydrology:	
Disturbance:		Surrounding Land Use:	
Water bodies:	none; drainage to Gully Brook		
Wildlife observations:			

FUNCTIONAL ASSESSMENT	Occurrence Y	Occurrence N	Rationale (Question#) Y	Rationale (Question#) N	Principal Y	Principal N	Comments
1. Groundwater recharge/discharge	X		13, 15	2-10		X	Upper limit of Gully Brook side channel. Groundwater breakout observed in upper end.
2. Flood storage & desynchronization		X	3, 4, 5	1, 2, 7, 11, 12 13-19		X	Little flood storage potential. Wetland small and part of channel - limited value.
3. Fish and Shellfish Habitat		X		1, 2		X	No fish or shellfish habitat available. Area lacks waterbodies
4. Sediment/toxicant retention		X	1, 2, 3, 4	6, 7, 8, 9		X	Limited sediment sources upslope or adjacent field. No watercourse.
5. Nutrient retention/transformation	X		3, 4, 5, 8	1, 2,		X	Potential nutrient sources in field but limited opportunity No watercourse to transform
6. Nutrient export		X	4, 7, 8	6, 9, 11		X	Potential for export but little opportunity since no flow available.
7. Sediment/Shoreline Stabilization	X		2, 5	1, 3, 6, 7 8, 9, 10, 11		X	Vegetated channel provides opportunity for stabilization. No velocity or little flow.
8. Wildlife habitat	X		1, 3, 5, 6, 7	9, 10, 11, 12, 23	X		Diverse habitat, provides travel way. Good upland habitat adjacent.
9. Recreation		X	9	1-8, 11, 12		X	No existing recreational trails. Adjacent residence - limited access
10. Education/Scientific Value		X	5	2, 3, 4, 7, 9, 10 11-13		X	No known educational or scientific value, and lack of access to site limits values.
11. Uniqueness/Heritage		X	1, 2	3-26		X	No known unique or heritage features present. Area lacks features of local significance for bio. features
12. Visual Quality/Aesthetics		X	6	1, 3-12		X	Area not visible or accessible.
13. Endangered Species Habitat		X		1, 2		X	No known endangered species habitat observed or species noted by agencies

Note: Federal functions derived from ACOE's Guide for Permit Applicants, 1993.

WETLAND SUMMARY SHEET — WETLAND ID#: 4

WETLAND DESCRIPTION

Project: Gorham Bypass

General description: Isolated wetlands — Watershed: Stroudwater River

Classifications (fed): PEM1

Principal vegetation: red maple, soft rush, sensitive fern

Soil substrate: — Hydrology: isolated areas, surface runoff

Disturbance: old logging disturbance in area — Surrounding Land Use: forested

Water bodies: none

Wildlife observations:

FUNCTIONAL ASSESSMENT	Occurrence Y	Occurrence N	Rationale (Question#) Y	Rationale (Question#) N	Principal Y	Principal N	Comments
1. Groundwater recharge/discharge		X		7,8,9,10 13		X	No groundwater discharge noted. Probably too small to contribute recharge
2. Flood storage & desynchronization		X	5,8	1,4,6,9→13		X	Too small to provide storage or desynchronization. No outlet or connection
3. Fish and Shellfish Habitat		X		1-2		X	No aquatic habitats. Unknown value as vernal pool habitat limit potential values. No watercourse!
4. Sediment/toxicant retention		X	5,	1,3,		X	Lack of adjacent sources limit values. No watercourse associated with site
5. Nutrient retention/transformation		X		1,2,4,5,8 9		X	Limited sources upstream. Not associated with a watercourse.
6. Nutrient export		X		2,3,6,		X	No outlet or flushing potential limit this function.
7. Sediment/Shoreline Stabilization		X		1,3,7,8 9,10,11		X	No potential flow for stabilization purposes. No watercourse!
8. Wildlife habitat	X		3,4,5,7		X		Isolated wetlands with unknown vernal pool value. Limited disturbance and surrounding habitat increase values
9. Recreation		X	5.	1,2,6-10		X	Limited access to site, small size of wetlands limit potential utilization
10. Education/Scientific Value		X	5,	1,3,6-10		X	Limited access to area limit existing potentials Potential isolated wetland habitats could be of value
11. Uniqueness/Heritage		X	13,16,19	1-12		X	Most unique features limited, access very limited
12. Visual Quality/Aesthetics		X	5,10	1-4,6,7		X	No access or visibility, Limited contrast to surroundings
13. Endangered Species Habitat		X		1,2		X	No known endangered species observed in area or noted by agencies

Note: Federal functions derived from ACOE's Guide for Permit Applicants, 1993.

WETLAND SUMMARY SHEET — WETLAND ID#: 5

WETLAND DESCRIPTION

Project: Gorham Bypass	
General description: Main Branch - Gully Brook	Watershed: Stroudwater River
Classifications (fed): PFO1	
Principal vegetation: Sphagnum, Red maple, hemlock	
Soil substrate: sand	Hydrology: incised stream channel, 12-15" wide, 2-3" deep
Disturbance: trails	Surrounding Land Use: wooded, development adjacent (recent)
Water bodies: Gully Brook	
Wildlife observations: tracks	

FUNCTIONAL ASSESSMENT	Occurrence Y	Occurrence N	Rationale (Question#) Y	Rationale (Question#) N	Principal Y	Principal N	Comments
1. Groundwater recharge/discharge	X		7, 13, 15	1-3, 5, 9, 12	X		well channelized but sinuous brook. Potential discharge from banks.
2. Flood storage & desynchronization	X		1, 4, 6, 7, 8 9, 14,		X		Channelized stream within high banked slopes. Total storage value unknown but valuable.
3. Fish and Shellfish Habitat	X		1, 2, 3, 4, 7 8, 12, 14, 17	6	X		Area includes Gully Brook. w/ 12-15" wide channel. Minnows (?) observed!
4. Sediment/toxicant retention	X		1, 3, 4, 10, 11	5, 7, 13	X		Higher velocities may limit value but deposition is evident
5. Nutrient retention/transformation		X	2, 3, 4, 6, 7	9, 10, 11 13, 14, 15		X	Limited vegetation and limited potential for attenuation exists. Fast moving stream
6. Nutrient export	X		4, 6, 10, 11	2, 3		X	Stream presents opportunity for exporting. Upstream sources unknown.
7. Sediment/Shoreline Stabilization	X		1, 2, 3, 6, 7 8, 12, 13	4, 9, 10, 11	X		Channel itself erodible. Adjacent shrub / plant community valuable for stream stabilization.
8. Wildlife habitat	X		3, 4, 8, 9	1, 10, 11, 12,	X		Interspersion of stream, shrub & herbaceous communities w/ valuable upland adjacent
9. Recreation	X		4, 5, 6, 7, 11 12, 14	1, 9, 10,	X		Existing path crosses stream. crossing is within 200 yards of existing road. Recreational opportunity.
10. Education/Scientific Value	X		4, 5, 11	1, 2, 3, 6, 7, 8 9, 10		X	Sinuous stream corridor, accessible from adjacent road provides opportunity.
11. Uniqueness/Heritage	X		2, 5, 6, 7, 8, 11 16, 17	1, 3, 4, 13, 14 20, 21, 23, 24		X	Potential access to site available. Little known heritage features limit sites value.
12. Visual Quality/Aesthetics	X		2, 5, 8, 9, 10			X	Limited visual access although site is accessible from adjacent site.
13. Endangered Species Habitat		X		12		X	No known endangered species observed in the field or noted by agencies.

Note: Federal functions derived from ACOE's Guide for Permit Applicants, 1993.

WETLAND SUMMARY SHEET — WETLAND ID#: 6

WETLAND DESCRIPTION

Project: Gorham Bypass	
General description: Large wetland south of 202	Watershed: Stroud water River
Classifications (fed): PFO1	
Principal vegetation: red maple, cinn. fern, sens. fern, yellow birch	
Soil substrate: hummocky surface	Hydrology:
Disturbance: surrounding area includes devel./trails	Surrounding Land Use: residential, junk yard
Water bodies: none	
Wildlife observations:	

FUNCTIONAL ASSESSMENT	Occurrence Y	Occurrence N	Rationale (Question#) Y	Rationale (Question#) N	Principal Y	Principal N	Comments
1. Groundwater recharge/discharge	X		5	3, 4, 6-10 13-17		X	Apparently fed by groundwater / surface runoff. Sandy soils.
2. Flood storage & desynchronization		X	1, 4, 5, 8, 9	7, 13, 15 14, 16		X	Lack of outlet limits potential to affect flow to offsite wetlands & streams. Areas may be isolated.
3. Fish and Shellfish Habitat		X		1, 2		X	No permanent standing water in wetland
4. Sediment/toxicant retention		X	1, 2, 4	3,		X	Lack of water course limits potential, opportunity for sediments to enter site limited.
5. Nutrient retention/transformation		X	1, 5, 7	2, 3		X	Lack of water course limits opportunity for attenuation.
6. Nutrient export		X	1, 4, 7	6, 10		X	No opportunity for nutrient export or flushing with no watercourse.
7. Sediment/Shoreline Stabilization		X	3,	1, 2, 5, 6, 7 9, 10, 11, 13		X	No flow or watercourse
8. Wildlife habitat	X		5, 7, 8, 11, 14	1, 3, 4, 9, 12	X		Diversity of wetland and adjacent upland habitats contribute to wildlife values.
9. Recreation	X		4, 5,	1, 2, 6, 8, 9 10,		X	Trail crosses through the site. Recreational opportunity exists, opportunity for parking unknown.
10. Education/Scientific Value		X	5,	1, 3, 4, 6, 7,		X	Access unknown with educational value also limited by lack of unique features
11. Uniqueness/Heritage		X	1, 2	3-26		X	No known unique or heritage features present. Area lacks features of local significance.
12. Visual Quality/Aesthetics		X	6	1, 3-12		X	Limited visibility Does not provide visual contrast to surroundings.
13. Endangered Species Habitat		X		1, 2		X	No endangered species observed or noted by agencies

Note: Federal functions derived from ACOE's Guide for Permit Applicants, 1993.

WETLAND SUMMARY SHEET

WETLAND ID#: 7

WETLAND DESCRIPTION

Project: Gorham Bypass	
General description: Wetland between Raceway & Flagg	Watershed: Presumpscott River
Classifications (fed): PFO1, PEM1 meadow	
Principal vegetation: red maple, emergents by Flagg Meadow Road	
Soil substrate:	Hydrology: Brandy Brook, overland flow from south, groundwater likely
Disturbance: old track area, disturbance on east side	Surrounding Land Use: farmland (nw), forested, track/fields (w)
Water bodies:	
Wildlife observations:	

FUNCTIONAL ASSESSMENT	Occurrence Y	Occurrence N	Rationale (Question#) Y	Rationale (Question#) N	Principal Y	Principal N	Comments
1. Groundwater recharge/discharge	X		13	1-12, 14	X		Upslope discharge noted at edges of wetland
2. Flood storage & desynchronization	X		5, 6, 7-10	1, 2, 3, 11-19	X		Large, well vegetated wetland with constricted outlet with good potential for storage.
3. Fish and Shellfish Habitat	X		1, 2			X	Unknown potential. Large wetland good hydrology but lacks water body reducing value
4. Sediment/toxicant retention	X		2, 3, 4, 5, 7, 8 9, 12, 13, 14		X		Good potential for sed & tox. trapping with diffuse flow, adjacent roads, development & farming.
5. Nutrient retention/transformation	X		1, 3, 4, 5, 6 11, 12		X		Sources associated with adjacent farmland, with dense vegetation & aquatic diversity to utilize
6. Nutrient export	X		1, 2, 4, 7, 8 9, 11			X	Potential for export exists but potential for flushing unknown
7. Sediment/Shoreline Stabilization	X		2, 3, 4, 6	5, 7, 10, 11		X	Dense vegetation but low velocities and lack of bank limit opportunity
8. Wildlife habitat	X		5, 6, 7, 8, 9, 13 15, 16, 17, 19	1, 3, 10, 11, 12	X		Large wetland with good interspersion in surrounding area, large unfragmented area to west.
9. Recreation	X		5, 7, 12	1, 2, 8, 10		X	Limited accessibility owing from Raceway but potential for trails etc
10. Education/Scientific Value		X	2, 5, 3,	7, 8, 9, 10		X	No known education or scientific value except habitat Limited access.
11. Uniqueness/Heritage		X	5, 7,	1, 3, 4, 8, 9		X	No known heritage features. Potential End. Species on site. Good viewing but very dense area.
12. Visual Quality/Aesthetics	X		1, 2, 3			X	Portions highly visible from Flagg Meadow Road.
13. Endangered Species Habitat		X		1, 2		X	Unknown. No endangered species observed in field. Mantain lavel observed off site

Note: Federal functions derived from ACOE's Guide for Permit Applicants, 1993.

WETLAND SUMMARY SHEET — WETLAND ID#: 18

WETLAND DESCRIPTION

Project: Gorham Bypass	
General description: Brandy Brook	Watershed: Presumpscott River
Classifications (fed): PFO1, PEM1	
Principal vegetation: R maple, sensitive fern	
Soil substrate:	Hydrology: streams & drainageways
Disturbance: includes narrow drainageways	Surrounding Land Use: residential, open field, woodland
Water bodies: Brandy Brook	
Wildlife observations:	

FUNCTIONAL ASSESSMENT	Occurrence Y	Occurrence N	Rationale (Question#) Y	Rationale (Question#) N	Principal Y	Principal N	Comments
1. Groundwater recharge/discharge	X		1,8,13	12,14	X		appears to be discharge at edges of wetland
2. Flood storage & desynchronization	X		7,8,10,13 15	1,3,4,6		X	Drainage channel too narrow to provide value for storage except under high volumes.
3. Fish and Shellfish Habitat		X	1,2			X	watercourse intermittent limiting habitat values.
4. Sediment/toxicant retention	X		1,2,3,10, 11,12	7,9,		X	Narrow channel with small areas of impoundment too provide limited storage.
5. Nutrient retention/transformation		X	3,6,12,14	1,2,8,10		X	Limited vegetation density and opportunity for nutrient utilization.
6. Nutrient export		X	4,	1,2,6,8,9,13		X	Unknown occurence of "flushing" of nutrients. Limited development of detritus in wetland available.
7. Sediment/Shoreline Stabilization	X		1,2,3,5,7 12	6,10,11	X		Narrow watercourse, limited vegetation, potentially high velocities provide opportunity
8. Wildlife habitat	X		5,7,	1,4,9,13,14		X	Available habitat values limited by disturbed area, narrow watercourse and lack of diversity
9. Recreation		X		1,2,3,5,7 9 10,11		X	Limited access, parking or travel ways on site. One driveway crosses wetland.
10. Education/Scientific Value		X		1,2,3,4,5 6,7		X	Provides limited access or educational value.
11. Uniqueness/Heritage		X	2,	3,4,6,9 10,12,13,		X	Limited significance of disturbed wetland area. Limited accessibility.
12. Visual Quality/Aesthetics		X		1,2,3,4,5		X	Limited visibility and access to wetland.
13. Endangered Species Habitat		X		1,2		X	No known endangered species habitat observed or noted by agencies.

Note: Federal functions derived from ACOE's Guide for Permit Applicants, 1993.

WETLAND SUMMARY SHEET — WETLAND ID#: 9

WETLAND DESCRIPTION

Project: Gorham Bypass

General description: West side of Little River drain. | Watershed: Presumpscott River

Classifications (fed): PEMI PFOI

Principal vegetation: grasses, soft rush

Soil substrate: | Hydrology: SURFACE DRAINAGE AND ASSOCIATED INTERMITTENT STREAM

Disturbance: field | Surrounding Land Use: AG FIELD AND LIMITED HOUSING ALONG HIGHWAY

Water bodies: Little River to east, adjacent

Wildlife observations: SONG BIRDS, PATRIDGE, DEER TRACK/SCAT, FROGS

FUNCTIONAL ASSESSMENT	Occurrence Y	Occurrence N	Rationale (Question#) Y	Rationale (Question#) N	Principal Y	Principal N	Comments
1. Groundwater recharge/discharge		X		3,4,5,8,13		X	PARENT SOIL MATERIAL CONSISTS OF MARINE SEDIMENTS W/O STRATIFIED SAND/GRAVEL
2. Flood storage & desynchronization	X		2,3,4,7,6	1		X	LARGE WETLAND AREA W/ SMALL OUTLET LOW POSITION OF FIELD PROVIDE STORAGE AREA.
3. Fish and Shellfish Habitat		X		1,2		X	No fish or shellfish habitat available.
4. Sediment/toxicant retention	X		2,3,4,7,8	1,9	X		HEADWATER AREA HAS A STATE HIGHWAY THAT IS SALTED IN WINTER. PORTIONS OF WETLAND AREA RETAIN WATER FOR LONG DURATIONS.
5. Nutrient retention/transformation	X		3,4,5,6,7 8,9,11,12	1,2,10	X		AG LAND POTENTIAL SOURCE OF NUTRIENTS.
6. Nutrient export		X	1,4,5,7	2,3,6,8 9,10		X	Limited flows and ability to export.
7. Sediment/Shoreline Stabilization		X		1-14		X	No channel or watercourse to stabilize Emergent vegetation present for stabilization
8. Wildlife habitat	X		3,5,8,11,13, 14,16,17,18, 19,20,21	1,4,6,12,23		X	COMBINATION OF HABITATS PROVIDED BY TRANSITION ZONES BETWEEN, FIELDS, SS, EM AND FOREST. VARIOUS FOOD SUPPLIES AND NESTING/BREEDING OPPORTUNITIES
9. Recreation		X				X	No access
10. Education/Scientific Value		X	5	2-4,7-10		X	NO Known education or scientific values
11. Uniqueness/Heritage		X	7	1,9-11 13		X	No Known unique or heritage features present.
12. Visual Quality/Aesthetics	X		1,2,3,5,7 8,11,	4,6,9,10,12		X	FROM THE HIGHWAY THE VIEWSHED INCLUDES OPEN FIELDS FRAMED BY WETLAND AREAS.
13. Endangered Species Habitat				1,2		X	NO OBSERVED DURING STUDY

Note: Federal functions derived from ACOE's Guide for Permit Applicants, 1993.

WETLAND SUMMARY SHEET

WETLAND ID#: 10

WETLAND DESCRIPTION

Project:	Gorham Bypass
General description:	Little River Crossing
Watershed:	Presumpscott River
Classifications (fed):	PEM1, PFO1
Principal vegetation:	Sp. al, red maple
Soil substrate:	
Hydrology:	river
Disturbance:	
Surrounding Land Use:	woodland, fields (west)
Water bodies:	Little River
Wildlife observations:	

FUNCTIONAL ASSESSMENT	Occurrence Y	Occurrence N	Rationale (Question#) Y	Rationale (Question#) N	Principal Y	Principal N	Comments
1. Groundwater recharge/discharge	X		2,6,7,8,12 15,	3,4,5,13,16	X		WETLAND ARE DIRECTLY ASSOCIATED W/THE LITTLE RIVER. DISCHARGE IS NOTED BY SEEPS AT THE TOE OF NEARBY SLOPES
2. Flood storage & desynchronization	X		3,7,6	1,5		X	A LIMITIE AREA NEAR THE RIVER IS CAPABLE OF STORING FLOOD WATER.
3. Fish and Shellfish Habitat	X		2,3,4,	1.	X		THE RIVER IS A PERENNIAL FLOW THAT SUPPORT A WIDE RANGE OF AQUATIC SPECIES AND IS ACCESSABLE FOR RECREATIONAL ACTIVITIES LIKE FISHING.
4. Sediment/toxicant retention	X		2,4,8,10,14 15,16	1,3,5,7,11, 12,13		X	THE AREAS ON BOTH SIDES OF THE RIVER, WHILE LIMITED IN SIZE PROVIDES FOR SEDIMENT RETENTION DURING ANNUAL FLOOD EVENTS
5. Nutrient retention/transformation		X	2,4,7,8	1,3,5,6,10 11,12,13,14		X	THE SMALL WETLAND AREAS HAVE LIMITED FUNCTIONS FOR RET/TRANS DUE TO THE INTERMITTENT DURATION OF FLOODING GENERALLY BEFORE THE GROWING SEASON
6. Nutrient export	X		1,2,4,6,7 8,9,12,13	3,5,10,11	X		RIVER FLOW TRANPORTS NUTRIENTS
7. Sediment/Shoreline Stabilization	X		1,2,3,5,6, 8	4	X		PLANT MATERIALS ON EMBANKMENT STABILIZE SOIL ALONG THE RIVERS BANKS
8. Wildlife habitat	X		1,2,3,4,6, 7,8,11,13,14 19,	5,9,10,12	X		THE COMBINATION OF THE RIVER, BANK, EM, SS, FO WETLANDS OFFER A RANGE OF WILDLIFE HABITATS AT THIS LOCATION.
9. Recreation	X		2,3,4,5, 6,8,12	1,7,9,10,11	X		HIKING AND FISHING ARE ACTIVITIES PROVIDED BY THE RIVER AND EMBANKMENT.
10. Education/Scientific Value	X		2,4,5,9, 10	1,3,7,8		X	A TYPICAL "CROSS SECTION" OF A WETLAND SYSTEM CAN BE OBSERVED IN A RELATIVELY SMALL AREA.
11. Uniqueness/Heritage	X		2,4,6,7, 8,11,12,16	3,9,10,14		X	A COMBINATION OF HABITAT AND WETLAND TYPES ARE PROVIDED IN THIS AREA.
12. Visual Quality/Aesthetics	X		1,2,3,5,7, 8,10,11	4,9,12		X	QUIET AND HABITAT RICH WITH A FLOWING STREAM
13. Endangered Species Habitat		X		1,2		X	NONE OBSERVED DURING STUDY OR NOTED

Note: Federal functions derived from ACOE's Guide for Permit Applicants, 1993.

WETLAND SUMMARY SHEET

WETLAND ID#: A-V

WETLAND DESCRIPTION

Project: Gorham Bypass

General description: East side drainages - Little R. | Watershed: Presumpscott River

Classifications (fed): PEM 1

Principal vegetation:

Soil substrate: | Hydrology: SURFACE DRAINAGE

Disturbance: old woods roads | Surrounding Land Use: forested,

Water bodies: none

Wildlife observations:

FUNCTIONAL ASSESSMENT	Occurrence Y	Occurrence N	Rationale (Question#) Y	Rationale (Question#) N	Principal Y	Principal N	Comments
1. Groundwater recharge/discharge	X		7, 1, 9, 12 6,	3, 4, 11	X		AREAS OF SLOPE TOES ASSOCIATED WITH THE WETLAND MARGINS EXHIBIT DISCHARGE
2. Flood storage & desynchronization		X	2, 3, 5, 9	1, 4, 7, 8 13, 14, 15		X	Limited flood storage availability since area is essentially drainageway
3. Fish and Shellfish Habitat		X		1, 2		X	No habitat or watercourse available.
4. Sediment/toxicant retention		X		1, 3, 5, 7, 9 11, 12		X	Unknown input of sediment sources, limited vegetation in channel, limited opportunity
5. Nutrient retention/transformation		X	5, 7	1, 2, 3, 8, 9		X	Limited opportunity for retention or transform. due to lack of veg. & slopes
6. Nutrient export		X	:	1, 6, 7, 8, 9		X	Flow available but export of production unknown.
7. Sediment/Shoreline Stabilization		X	1, 2, 5, 7	6, 10, 11, 12 13		X	Limited vegetation for stabilization purposes
8. Wildlife habitat	X		1, 3, 4, 5, 7, 8, 11, 13, 14, 17, 19	6,	X		A SERIES OF LONG AND NARROW ALONG WITH A LARGER MORE BROAD WETLAND PROVIDE A COMBINATION OF PRODUCTIVE WL HABITATS
9. Recreation	X		3, 5, 4, 7	1, 2,		X	HUNTING, HIKING, AND VISUAL QUALITIES PROVIDE RECREATIONAL USE
10. Education/Scientific Value		X	:	1, 2, 3, 6, 7 8, 11-14, 15, 16		X	No known educational or scientific values. Limited access. Limited values.
11. Uniqueness/Heritage		X	7	1, 3, 4, 5		X	No known unique or heritage features present.
12. Visual Quality/Aesthetics	X		1, 2, 3, 5, 6 7, 8, 10, 11	9, 12		X	SEVERAL POINTS W/ THE COMBINED SYSTEM PROVIDE AESTHETIC VIEWSHEDS.
13. Endangered Species Habitat		X		1, 2		X	NON OBSERVED DURING STUDY

Note: Federal functions derived from ACOE's Guide for Permit Applicants, 1993.

WETLAND SUMMARY SHEET — WETLAND ID#: 13

WETLAND DESCRIPTION

Project: Gorham Bypass	
General description: headwater area - Fort Hill brook	Watershed: Presumpscott River
Classifications (fed): PSS1, PFO1	
Principal vegetation: gray birch, Spec. alder, red maple, hemlock	
Soil substrate:	Hydrology: groundwater breakout, surface runoff
Disturbance: old logging activity	Surrounding Land Use:
Water bodies:	
Wildlife observations:	

FUNCTIONAL ASSESSMENT	Occurrence Y	Occurrence N	Rationale (Question#) Y	Rationale (Question#) N	Principal Y	Principal N	Comments
1. Groundwater recharge/discharge	X		1,6,9,12	3,4	X		LIMITED AREAS OF DRAINAGE DISCHARGE FORM THE TOE OF SLOPES.
2. Flood storage & desynchronization	X		2,3,4,5	1,6		X	FLOOD STORAGE CAPACITY RELATED TO LANDSCAPE DEPRESSIONS BETWEEN HILLS
3. Fish and Shellfish Habitat		X		1,2		X	No fish or shellfish habitat available
4. Sediment/toxicant retention		X	1,2,3 4	6,7,8,9		X	Upper reaches of stream/wetland. limited opportunity
5. Nutrient retention/transformation		X	3,4,5,8	1,2,4 9		X	Limited sources of nutrients and opportunity for transformation.
6. Nutrient export	X		1,4,5 7	2,3,6,8 9,10		X	Limited flows, although dense vegetation. Through wetland. Limited value
7. Sediment/Shoreline Stabilization	X			1-14		X	No channel in upper reaches. well vegetated wetland
8. Wildlife habitat	X		1,3,5,7,8 13,14,16,17 18,19	4,6,11,12	X		THE MAIN PORTION OF THE WETLAND SYSTEM IS A WET MEADOW SURROUNDED BY SS & FO AND PROVIDES A RANGE OF WL HABITATS.
9. Recreation	X		3,4,5,7	1,2.		X	Limited access.
10. Education/Scientific Value		X	5	2-4,7-10		X	No known education or scientific values
11. Uniqueness/Heritage		X	7	1,9-11 13		X	No known unique or heritage features present
12. Visual Quality/Aesthetics	X		1,2,3,5,6 7,8,10,11	9,12		X	THE CENTER OF THE WETLAND IS A WET MEADOW THAT HAS AN AESTHETIC VALUE
13. Endangered Species Habitat		X				X	NONE OBSERVED DURING STUDY

Note: Federal functions derived from ACOE's Guide for Permit Applicants, 1993.

WETLAND SUMMARY SHEET — WETLAND ID#: 14

WETLAND DESCRIPTION

Project: Gorham Bypass	
General description: South side drainages - Fort Hill	Watershed: Presumpscott River
Classifications (fed): PFO1 PSS1 Brook	
Principal vegetation: hemlock, yellow birch, red maple, sphagnum	
Soil substrate:	Hydrology: groundwater breakout, narrow drainageways
Disturbance: old logging activity and adjacent dist.	Surrounding Land Use: forested
Water bodies: none; drainageways leading to Tannery Brook	
Wildlife observations:	

FUNCTIONAL ASSESSMENT	Occurrence Y	Occurrence N	Rationale (Question#) Y	Rationale (Question#) N	Principal Y	Principal N	Comments
1. Groundwater recharge/discharge		X	10	Unknown		X	None observed, could potentially discharge from banks and upslope area. Unknown
2. Flood storage & desynchronization		X	2,3,5,9	1,4,7,8, 13,14,15		X	Limited flood storage available since area is on hillside and largely drainageways.
3. Fish and Shellfish Habitat		X		1,2		X	No water bodies available for habitat
4. Sediment/toxicant retention		X		1,3,5,7,9 11,12		X	Unknown input of sediments, limited vegetation in channel, limit opportunity for retention.
5. Nutrient retention/transformation		X	5,7	1,2,3,8,9		X	Limited opportunity for retention or transformation due to slopes and lack of dense veg on slopes.
6. Nutrient export		X		1,6,7,8,9		X	Stream flow available but no production available for export
7. Sediment/Shoreline Stabilization	X		1,2,5,7	6,10,11 12,13	X		Flow in drainages but limited vegetation for stabilization functions
8. Wildlife habitat	X		4,5,6,7,11,	9,10,13,14,15		X	Largely hemlock forest w/ drainages on hillside Limited habitat values except surrounding uplands
9. Recreation		X	4	1,2,7,9,10 11,		X	Limited access, water and
10. Education/Scientific Value		X		1,2,3,6,7 8,11-14,15-16		X	No known educational or scientific value, along with limited access, limit value for this function.
11. Uniqueness/Heritage		X	2	1,3,4,5		X	No known unique or heritage features present. Area lacks features of local significance.
12. Visual Quality/Aesthetics		X	5,	1,2,3,4,6 8,9,12		X	Limited visibility and accessibility.
13. Endangered Species Habitat		X		1,2		X	No known endangered species habitat observed in field or noted by agencies

Note: Federal functions derived from ACOE's Guide for Permit Applicants, 1993.

WETLAND SUMMARY SHEET

WETLAND ID#: 15

WETLAND DESCRIPTION

Project: Gorham Bypass	
General description: Tannery Brook	Watershed: Presumpscott River
Classifications (fed): PSS1, PFO1	
Principal vegetation: cinna. fern red maple, horsetail	
Soil substrate: sand & cobble bottom	Hydrology: 3' wide stream, north flowing 4"-1' deep
Disturbance:	Surrounding Land Use:
Water bodies: Tannery Brook	
Wildlife observations:	

FUNCTIONAL ASSESSMENT	Occurrence Y	Occurrence N	Rationale (Question#) Y	Rationale (Question#) N	Principal Y	Principal N	Comments
1. Groundwater recharge/discharge	X		7, 13, 15	1-3, 5, 9, 12		X	Well channelized but sinuous perennial stream Potentially discharging from bank and to west
2. Flood storage & desynchronization	X		1, 4, 6, 7, 8 9, 14		X		Channelized stream with high banked slopes. Total storage area unknown (in floodplain). Valuable
3. Fish and Shellfish Habitat	X		1, 2, 3, 4, 7 8, 12, 14, 17	6	X		Wetland includes Tannery Brook. Sinuous, perennial brook 3' wide 4"-1' deep
4. Sediment/toxicant retention	X		1, 3, 4, 10, 11	5, 7, 13	X		Stream has well defined channel; sand/mud bottom w/areas of deposition evident. Cloudy during visit
5. Nutrient retention/transformation	X		2, 3, 4, 6, 7	9, 10, 11, 13 14, 15		X	Limited potential for attenuation of nutrients in stream
6. Nutrient export	X		4, 6, 10, 11	2, 3		X	Opportunity for exporting available. Sources in upstream area unknown
7. Sediment/Shoreline Stabilization	X		1, 2, 3, 6, 7, 8 12, 13	4, 9, 10, 11	X		Channel highly erodible. Good shrub and plant layer in adjacent wetland w/upland habitat too.
8. Wildlife habitat	X		3, 4, 7, 9	1, 10, 11, 12	X		Good interspersion of stream, shrub & herbaceous communities
9. Recreation	X		4, 5, 6, 7, 11 12, 14	1, 9, 10	X		Limited access to area but existing path & bridge indicate recreational use
10. Education/Scientific Value	X		4, 5, 11	1, 2, 3, 6, 7, 8 9, 10		X	Potentially could be utilized for educational studies but overall access limited.
11. Uniqueness/Heritage	X		2, 5, 6, 7, 9 18, 16, 17	1, 3, 4, 13, 14 20, 21, 23, 24		X	Little known unique or heritage features. Access issues limit values
12. Visual Quality/Aesthetics	X		2, 5, 9, 9 10			X	Limited visual access to stream area, but existing foot bridge & trail crosses
13. Endangered Species Habitat		X		1, 2		X	No known endangered species observed in the field or noted by agencies

Note: Federal functions derived from ACOE's Guide for Permit Applicants, 1993.

WETLAND SUMMARY SHEET

WETLAND ID#: 16

WETLAND DESCRIPTION

Project: Gorham Bypass	
General description: Drainage swale near Route 202	**Watershed:** Presumpscott River
Classifications (fed): PSS1	
Principal vegetation: Spiral, buckthorn, raspberry	
Soil substrate:	**Hydrology:**
Disturbance: old woods trails, exist trails	**Surrounding Land Use:** residential, forested, rec. trails
Water bodies: none; drainage swales near houses	
Wildlife observations:	

FUNCTIONAL ASSESSMENT	Occurrence Y	Occurrence N	Rationale (Question#) Y	Rationale (Question#) N	Principal Y	Principal N	Comments
1. Groundwater recharge/discharge		X		1,2,3,4,13 15		X	Potential groundwater breakout but most likely road run off & surface drainage
2. Flood storage & desynchronization		X	3,4,5	1,3,7,11,12 13,-18		X	Flood storage limited due to small size & limited inputs.
3. Fish and Shellfish Habitat		X		1,2		X	No watercourse or habitat available
4. Sediment/toxicant retention	X		5	1,3,7,9, 11,12		X	Sediment sources may be available from road. Limited No watercourse.
5. Nutrient retention/transformation		X	5,7	1,2,3,8,9		X	No watercourse, Limited sources of nutrients available. - limited opportunity.
6. Nutrient export		X		2,3,6		X	Lack of flow for export & limited productivity
7. Sediment/Shoreline Stabilization	X			1,3,7,8 9,10,11		X	Dense vegetation is expected to provide good sediment stab. but no watercourse
8. Wildlife habitat	X		3,4,5,7			X	Small area - may provide accessway to river from road. Little value itself.
9. Recreation		X	9	1-8,11,12		X	Private property - limited access, although woods roads cross the site. Limited rec. values - too small.
10. Education/Scientific Value		X	5	2,3,4,7,8,9 10,11-13		X	No known education or scientific value. Small drainageway between houses
11. Uniqueness/Heritage		X	1,2	3,6		X	No known unique or heritage features present. Area lacks features of local significance - for bio. etc
12. Visual Quality/Aesthetics		X	6	1,3,12		X	Area visible from Route 114 but of little value or interest, Limited value
13. Endangered Species Habitat		X		1,2		X	No known endangered species observed in the field or noted by agencies.

Note: Federal functions derived from ACOE's Guide for Permit Applicants, 1993.

WETLAND SUMMARY SHEET							WETLAND ID#: 17
WETLAND DESCRIPTION							
Project: Gorham Bypass							
General description: Isolated wetland east of Libby Road				Watershed: PRESUMPSCOTT RIVER			
Classifications (fed): PFO1							
Principal vegetation:							
Soil substrate:				Hydrology: SURFACE RUNOFF			
Disturbance:				Surrounding Land Use:			
Water bodies:							
Wildlife observations:							

FUNCTIONAL ASSESSMENT	Occurrence Y	Occurrence N	Rationale (Question#) Y	Rationale (Question#) N	Principal Y	Principal N	Comments
1. Groundwater recharge/discharge	X		1, 7, 10, 13	3,4,11,16,		X	IN ADDITION TO COLLECTING SURFACE DRAINAGE, THE WETLAND SERVES AS A DISCHARGE POINT FOR THE SURROUNDING HILLY LANDSCAPE.
2. Flood storage & desynchronization		X		14,6.		X	Too small to provide storage
3. Fish and Shellfish Habitat		X		1,2		X	No watercourse or habitat
4. Sediment/toxicant retention	X		1,2,4,8,9 6,	5,7		X	AS THE HIGHEST WETLAND IN THE MOSHER BROOK WATERSHED, LOCAL DEVELOPMENT AND EXISTING ROADS POTENTIALLY CAN CREATE SED/TOX THAT CAN BE MINIMIZED BY THIS WETLAND.
5. Nutrient retention/transformation		X		1,2,4,5,8 9		X	
6. Nutrient export		X		2,3,6		X	No watercourse or channel for flushing.
7. Sediment/Shoreline Stabilization		X		1,3,7,8 9,10,11		X	No channel for stabilization purposes
8. Wildlife habitat	X		1,3,5,6,8 13,19,20	4,11,12	X		COMBINED W/ MOSHER BROOK, THIS WETLAND PROVIDES DIVERSIFIED HABITATS.
9. Recreation		X				X	No access
10. Education/Scientific Value	X		2,3,4,5, 9,10	1,8		X	AS THE HIGHEST WETLAND IN A SMALL DRAINAGE SYSTEM AND A DIRECT LINK W/ MOSHER BROOK THIS SMALL WETLAND HAS EDUCATIONAL VALUE.
11. Uniqueness/Heritage		X				X	No known unique or heritage features present. Lacks local significance
12. Visual Quality/Aesthetics		X				X	area NOT visible or accessible.
13. Endangered Species Habitat		X		1,2		X	No end. species habitat observed or species noted by agencies

Note: Federal functions derived from ACOE's Guide for Permit Applicants, 1993.

WETLAND SUMMARY SHEET

WETLAND ID#: 18

WETLAND DESCRIPTION

Project: Gorham Bypass	
General description: west end - Mosher Brook drain.	Watershed: PRESUMPSCOTT RIVER
Classifications (fed): PFO4	
Principal vegetation:	
Soil substrate:	Hydrology: SURFACE DRAINAGE
Disturbance: RECENT LOGGING OPERATION	Surrounding Land Use: FORESTLAND
Water bodies:	
Wildlife observations:	

FUNCTIONAL ASSESSMENT	Occurrence Y	Occurrence N	Rationale (Question#) Y	Rationale (Question#) N	Principal Y	Principal N	Comments
1. Groundwater recharge/discharge	X		6, 7, 9, 12 1	3, 4		X	SEVERAL SMALL WETLAND COLLECTIVELY MAKE UP THE GROUNDWATER DISCHARGE OF THEIR SURROUNDING AREA
2. Flood storage & desynchronization		X	3, 4, 5, 9	1, 2, 7, 11 12, 13-18		X	Upper reaches of wetland and watershed. Little storage ability - limited potential
3. Fish and Shellfish Habitat		X		1, 2		X	No fish or shellfish habitat available.
4. Sediment/toxicant retention	X		1, 3, 4, 5	2,			LOGGING ACTIVITIES OFFER THE POTENTIAL TO CREATE SOIL EROSION, WHICH COULD BE STABILIZED BY THE WETLAND BEFORE ENTERING MOSER BROOK
5. Nutrient retention/transformation		X	9	1, 2, 4-5 10, 11, 12		X	Potential nutrient sources limited. No watercourse
6. Nutrient export		X	1, 4, 5, 7 13	2, 3, 6 8, 9 10		X	Limited potential for export of detritus
7. Sediment/Shoreline Stabilization		X		1, 3, 4, 7, 8, 9 10		X	No watercourse to stabilize. No flow.
8. Wildlife habitat	X		1, 3, 4, 5, 7 8, 13, 16, 17	11, 12	X		WHILE SMALL, THE WETLAND THAT MAKE UP THIS GROUP ARE IN CLOSE PROXIMITY TO MOSHER BROOK. THE COMBINED SYSTEM OFFER A WIDE RANGE OF HABITATS.
9. Recreation		X		1-5, 11, 12		X	No access available
10. Education/Scientific Value		X	5	2-4, 7-10		X	No known educational or scientific values available. Limited access.
11. Uniqueness/Heritage		X	7	1, 5-11 13		X	No known unique or heritage sites present. Area lacks features of local significance.
12. Visual Quality/Aesthetics		X	2, 3, 5	9, 10, 11, 12		X	Limited visibility and access limit values of the site
13. Endangered Species Habitat		X		1, 2		X	NONE OBSERVED DURING STUDY

Note: Federal functions derived from ACOE's Guide for Permit Applicants, 1993.

WETLAND SUMMARY SHEET — WETLAND ID#: 19

WETLAND DESCRIPTION

Project:	Gorham Bypass		
General description:	Southern tributary; Mosher Brook	Watershed:	Presumpscott River
Classifications (fed):	PSS1, PEM1		
Principal vegetation:	cattail, alder, buckthorn, sensitive fern		
Soil substrate:	silt loam	Hydrology:	surface flow, groundwater
Disturbance:	excavated ditches	Surrounding Land Use:	fields, residential
Water bodies:	drainage ditches included		
Wildlife observations:			

FUNCTIONAL ASSESSMENT

	Occurrence Y	Occurrence N	Rationale (Question#) Y	Rationale (Question#) N	Principal Y	Principal N	Comments
1. Groundwater recharge/discharge	X		1,6,7,15	2,3,4,5 13,16		X	Drainage ditches in field; impervious soils at +- 20".
2. Flood storage & desynchronization	X		2,3,7,13 14,19	6,8,9	X		Size of wetland contributes potential storage
3. Fish and Shellfish Habitat		X				X	Lack of persistent water
4. Sediment/toxicant retention	X		2,13,15 14,14,16	1,3,11	X		Roads, residences and adjacent development may contribute to this function.
5. Nutrient retention/transformation	X		3,5,6,8,9 11,12	2,4	X		Limited agricultural use in area reduces function
6. Nutrient export	X		1,2,4,5,7 10,12			X	Off site drainage is limited, limiting potential for export of detritus, etc.
7. Sediment/Shoreline Stabilization	X		2;14	1;3-13		X	Well vegetated ditch and flow indicate value, low velocities limit potential.
8. Wildlife habitat	X		3,5,7,8,13 14,17,18,19	2,4,6,10	X		Overall large size, interspersion of plant communities contribute to value
9. Recreation	X		3,4,12	1,2,5,10 11	X		Three wheeler / snowmobile trails valuable. Limited values do to aesthetics
10. Education/Scientific Value	X			1,2,4,6,8		X	The lack of parking and limited diversity limit the overall value for edu.
11. Uniqueness/Heritage		X	2			X	Previous unique qualities lost as a result of past agricultural activities
12. Visual Quality/Aesthetics	X		9	1,2,3,4,5	X		Powerlines limit or reduce aesthetic qualities.
13. Endangered Species Habitat		X		1,2		X	No endangered species observed during field work or by agencies

Note: Federal functions derived from ACOE's Guide for Permit Applicants, 1993.

WETLAND SUMMARY SHEET

WETLAND ID#: 20

WETLAND DESCRIPTION

Project:	Gorham Bypass
General description:	Mosher Corner wetlands
Watershed:	Presumpscott River
Classifications (fed):	PEM1, PSS1
Principal vegetation:	sp. al, cattail, buckthorn
Soil substrate:	silt loam
Hydrology:	surface drainage via ditching, groundwater
Disturbance:	large open area including powerline
Surrounding Land Use:	field, powerline
Water bodies:	
Wildlife observations:	

FUNCTIONAL ASSESSMENT	Occurrence Y	Occurrence N	Rationale (Question#) Y	Rationale (Question#) N	Principal Y	Principal N	Comments
1. Groundwater recharge/discharge	X		1, 6, 7, 15	2, 3, 4, 5 13, 16		X	Drainage ditches across the site silt loam soils limit permeability
2. Flood storage & desynchronization	X		2, 3, 7, 13 4, 14	6, 8, 9	X		area and size of wetland could contribute storage and desynchronization values
3. Fish and Shellfish Habitat		X		1, 2		X	No open water persistent. watercourse is intermittent.
4. Sediment/toxicant retention	X		2, 3, 5, 7, 10 12, 13, 14		X		Adjacent roadways, houses and trails contribute to this function.
5. Nutrient retention/transformation	X		3, 4, 5, 7, 9 11, 14	1, 2, 10	X		Sediment/trapping potential exists w/ dense veg. Nutrient plus old agricultural area
6. Nutrient export	X		1, 2, 4, 7	6, 13, 14		X	High density and potential for export or "flushing" nutrients. Exists. Limited by intermittent nature of watercourse
7. Sediment/Shoreline Stabilization	X		2, 3 5, 8, 9	1, 6, 7, 10, 11 13		X	Dense vegetation, low velocities limit potential.
8. Wildlife habitat	X		5, 8, 11, 12 14, 15, 16, 17	1, 3, 4, 10	X		Large community w/ diverse surroundings contribute to value.
9. Recreation	X		3, 4, 12	1, 2, 5, 10 11	X		Existing trails for snowmobiles & access by power co.
10. Education/Scientific Value	X		3, 5, 8	1, 2, 4, 6, 7 14		X	Difficult access but is potential available. Good habitat and visibility.
11. Uniqueness/Heritage		X	7, 12, 13, 14 30	2, 3, 4, 5, 9 10, 23, → 27		X	Old agricultural area plus overhead powerlines limit this value
12. Visual Quality/Aesthetics	X				X		Visually accessible from Route 25 but overall impact of powerlines limit value
13. Endangered Species Habitat		X		1, 2		X	No endangered species observed during field work or noted by agencies

Note: Federal functions derived from ACOE's Guide for Permit Applicants, 1993.

APPENDIX B

Appendix B

Amphibians and Reptiles
Common Species with Ranges Overlapping the Study Area
(DeGraaf and Rudis, 1986)

Common Name	Scientific Name
Jefferson salamander	*Ambystoma opacum*
Spotted salamander	*Ambystoma maculatum*
Red-spotted newt	*Notophthalmus v. viridescens*
Northern dusky salamander	*Desmognatus f. fuscus*
Redback salamander	*Plethodon cinereus*
Northern two-lined salamander	*Eurycea b.bislineata*
Eastern American toad	*Bufo a. americanus*
Northern spring peeper	*Hyla c. crucifer*
Gray Treefrog	*Hyla versicolor*
Bullfrog	*Rana catesbeiana*
Green frog	*Rana clamitans melanota*
Wood frog	*Rana sylvatica*
Northern leopard frog	*Rana pipiens*
Pickerel frog	*Rana palustris*
Common snapping turtle	*Chelydra s. serpentina*
Stinkpot	*Sternotherus odoratus*
Eastern painted turtle	*Chrysemys p.picta*
Northern water snake	*Nerodia s. sipedon*
Northern brown snake	*Storeria d. dekayi*
Northern redbelly snake	*Storeria o. occipitomaculata*
Eastern garter snake	*Thamnophis s. sirtalis*
Eastern ribbon snake	*Thamnophis s. sauritus* **
Northern ringneck snake	*Diadophis punctatus edwardsi*
Northern black racer	*Coluber c. constrictor*
Eastern smooth green snake	*Opheodrys v. vernalis*
Eastern milk snake	*Lampropeltis t.triangulum*

** - species considered to be at the limit of their range (Degraaf and Rudis, 1986)

Bird Species
Occurring within the Study Area
(MDIFW, 2002)

Common Name	Scientific Name
Common loon	*Gavia immer*
American bittern	*Botaurus lentiginosus*
Great blue heron	*Ardea herodias*
Green-backed heron	*Butorides striatus*
Wood duck	*Aix sponsa*
American black duck	*Anas rubripes*
Mallard	*Anas platyrhynchos*
Ringed-neck duck	*Aythya collaris*
Common goldeneye	*Bucephala clangula*
Hooded merganser	*Lophodytes cucullaus*
Common merganser	*Mergus merganser*
Osprey	*Pandion haliaetus*
Bald eagle	*Haliaeetus leucocephalus*
American kestrel	*Falco sparverius*
Sharp-shinned hawk	*Accipiter striatus*
Cooper's hawk	*Accipiter cooperii*
Northern goshawk	*Accipiter gentiles*
Red-shouldered hawk	*Buteo lineatus*
Broad-winged hawk	*Buteo platypterus*
Red-tailed hawk	*Buteo jamaicensis*
Ruffed grouse	*Bonasa umbellatus*
Virginia rail	*Rallus limicola*
Sora	*Porzana carolina*
Killdeer	*Charadrius vociferous*
Spotted sandpiper	*Actitis macularia*
Common snipe	*Gallinago gallinago*
American woodcock	*Scolopax minor*
Mourning dove	*Zenaida macroura*
Black-billed cuckoo	*Coccyzus erythropthalmus*
Great horned owl	*Bubo virginianus*
Barred owl	*Strix varia*
Long-eared owl	*Asio otus*
Northern saw-whet owl	*Aegolius acadicus*
Common nighthawk	*Charadeiles minor*
Whip-poor-will	*Caprimulgus vociferous*
Chimney swift	*Chaetura pelagica*
Ruby-throated hummingbird	*Archilochus colubris*
Belted kingfisher	*Ceryle alcyon*
Yellow-bellied sapsucker	*Sphyrapicus varius*
Downy woodpecker	*Picoides pubescens*
Hairy woodpecker	*Picoides villosus*
Black-backed woodpecker	*Picoides articus*
Northern flicker	*Colaptes auratus*
Pileated Woodpecker	*Dryocopus pileatus*

Common Name	Scientific Name
Olive-sided flycatcher	*Contopus borealis*
Yellow-bellied flycatcher	*Empidonax flaviventris*
Alder flycatcher	*Empidonax alnorum*
Least flycatcher	*Empidonax minimus*
Eastern phoebe	*Sayornis phoebe*
Great-crested flycatcher	*Myiarchus crinitus*
Eastern kingbird	*Tyrannus tyrannus*
Tree swallow	*Tachycineata bicolor*
Northern rough-winged swallow	*Stelgidopteryx serripennis*
Bank swallow	*Riparia riparia*
Gray jay	*Perisoreus canadensis*
Blue jay	*Cyanocitta cristata*
American crow	*Corvus brachyrhynchos*
Common raven	*Corvus corax*
Black-capped chickadee	*Parus atricapillus*
Boreal chickadee	*Parus hudsonicus*
Red-breasted nuthatch	*Sitta canadensis*
White-breasted nuthatch	*Sitta carolinensis*
Brown creeper	*Certhia americana*
Winter wren	*Troglodytes troglodytes*
Marsh wren	*Cistothorus palustus*
Golden-crowned kinglet	*Polioptila caerulea*
Ruby-crowned kinglet	*Regulus calendula*
Eastern bluebird	*Sialia sialis*
Veery	*Catharus fuscescens*
Gray catbird	*Dumetella carolinensis*
Swainson's thrush	*Catharus ustulatus*
Hermit thrush	*Catharus guttatus*
Wood thrush	*Hylocichla mustelina*
American robin	*Turdus migratorius*
Cedar waxwing	*Bombycilla cedrorum*
Northern shrike	*Lanius excubitor*
European starling	*Sturnus vulgaris*
Philadelphia vireo	*Vireo philadelphicus*
Red-eyed vireo	*Vireo olivaceous*
Tennessee warbler	*Vermivora peregrina*
Nashville warbler	*Vermivora ruficapilla*
Northern parula	*Parula americana*
Yellow warbler	*Dendroica petechia*
Chestnut-sided warbler	*Dendroica pensylvanica*
Magnolia warbler	*Dendroica magnolia*
Cape May warbler	*Dendroica tigrina*
Black-throated blue warbler	*Dendroica caerulescens*
Yellow-rumped warbler	*Dendroica coronata*
Black-throated green warbler	*Dendroica virens*
Blackburnian warbler	*Dendroica fusca*
Palm warbler	*Dendroica palmarum*
Bay-breasted warbler	*Dendroica castanea*
Blackpoll warbler	*Dendroica striata*

Common Name	Scientific Name
Black and white warbler	*Mniotilta varia*
American redstart	*Setophaga ruticilla*
Ovenbird	*Seiurus aurocapillus*
Northern waterthrush	*Seiurus noveborecensis*
Mourning warbler	*Opornonis Philadelphia*
Common yellowthroat	*Geothlyphis tricas*
Canada warbler	*Wilsonia canadensis*
Scarlet tanager	*Piranga olivacea*
Rose-breasted grosbeak	*Pheucticus ludovicianus*
Indigo bunting	*Passerina cyanea*
Chipping sparrow	*Spizella passerina*
Savannah sparrow	*Passerculus sandwichencis*
Song sparrow	*Melospiza melodia*
Lincoln sparrow	*Melospiza lincolnii*
White-throated sparrow	*Zonotrichia albicollis*
Dark eyed junco	*Junco hyemalis*
Snow bunting	*Plectrophenax nivalis*
Bobolink	*Dolichonyx oryzivorus*
Red-winged blackbird	*Agelaius phoeniceus*
Eastern meadowlark	*Sturnella magna*
Brown-headed cowbird	*Molothrus ater*
Pine grosbeak	*Pinicola enucleator*
Purple finch	*Carpodacus purpureus*
Common redpoll	*Carduelis flammea*
Pine siskin	*Carduelis pinus*
American goldfinch	*Carduelis tritris*
Evening grosbeak	*Coccothraustes vesperimus*

Mammal Species
Occurring within the Study Area
(MDIF&W, 2002)

Common Name	Scientific Name
Masked shrew	*Sorex cinereus*
Water shrew	*Sorex palustris*
Smoky shrew	*Sorex fumeus*
Pygmy shrew	*Sorex hoyi* **
Hairy-tailed mole	*Parascalops breweri*
Star-nosed mole	*Condylura cristata*
Little brown myotis	*Myotis lucifugus*
Big brown bat	*Eptesicus fuscus*
Snowshoe hare	*Lepus americanus*
Eastern chipmunk	*Tamias striatus*
Woodchuck	*Marmota monax*
Red squirrel	*Tamiascciurus hud*sonicus
Northern flying squirrel	*Glaucomys sabrinus*
Beaver	*Castor Canadensis*
Deer mouse	*Peromyscus maniculatus*
Southern red-backed vole	*Clethrionomys gapperi*
Meadow vole	*Microtus pennsylvanicus*
Muskrat	*Ondatra zibethicus*
Southern bog lemming	*Synaptomys cooperi*
Northern bog lemming	*Synaptomys borealis*
Meadow jumping mouse	*Zapus hudsonicus*
Woodland jumping mouse	*Napeozapus insignis* **
Porcupine	*Erethizon dorsatum*
Coyote	*Canis latrans*
Red fox	*Vulpes vulpes*
Black bear	*Ursus americanus*
Raccoon	*Procyon lotor*
Ermine	*Mustela erminea*
Long-tailed weasel	*Mustela frenata*
Fisher	*Mates pennanti*
Mink	*Mustela vison*
Striped skunk	*Mephitis mephitis*
River otter	*Lutra canadensis*
Bobcat	*Felis rufus*
White-tailed deer	*Odocoileus virginianus*
Moose	*Alces alces*

** - species considered to be at the limit of their range (MDIF&W, 2002)

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