4.17 WATER RESOURCES

4.17.1 Introduction

This chapter discusses the existing water resources within and adjacent to the South Coast Rail project corridors and potential impacts to water resources and water supply protection areas within the study area. This section provides background information on the South Coast Rail project as well as general information on water resources regulations. Section 4.17.2 identifies water resources in the project study area and defines the regulatory categories for water resources and the specific water resources in proximity to each of the alternatives. Section 4.17.3 describes potential impacts and mitigation associated with the alternatives under consideration.

4.17.1.1 Resource Definition

Surface and groundwater are important natural resources that have a variety of uses including public drinking water, irrigation, industrial, and wildlife habitat. Water quality is determined by the amount of dissolved or suspended material that the water may contain. The quality of surface water and groundwater is influenced by surficial geology, land use, and water quality of source waters. The use of water may be limited by its physical and chemical characteristics. Changes in temperature, pH, dissolved oxygen (DO) content, and pollutant concentrations may make surface waters or groundwater unsuitable for their existing uses.

The quality of a surface waterbody is largely determined by the terrain and condition of its contributing watershed. Pollutant sources can include point sources, such as municipal wastewater treatment plants and industrial discharges, with varying concentrations of particles and/or chemicals, as well as non-point sources, such as stormwater runoff, from farmland, containing sediment, fertilizer and pesticides.

Groundwater quality may also be affected by aboveground pollutant sources. Precipitation that infiltrates through the soil to the water table may carry pollutants encountered on the surface or in the soil. However, aquifers are often buffered from surface influences by underground hydrogeologic features, such as different soil types. Layers of clay may impede infiltration, preventing water from reaching the aquifer, while layers of sand may filter out many contaminants as the water travels through the soil. Drinking water wells are often located in highly-permeable soils to maximize potential pumping rates. These same soils can allow accidental spills to reach the well quickly, especially if the spills are close to the well itself. Therefore, protection of groundwater supplies must consider potential pollutant sources, well locations, and soil conditions.

The information presented in the following sections describes the surface and groundwater resources located adjacent to the alignments of the alternatives under consideration. Resources assessed include named surface waters such as rivers and lakes as well as public drinking water wells. Information on the existing quality and usage of these resources is based on publicly accessible information, including the *Massachusetts Integrated List of Waters*.[1]

[1] Massachusetts Department of Environmental Protection, Division of Watershed Management. *Massachusetts Year 2006 Integrated List of Waters*. October 2007.

4.17.1.2 Regulatory Context and Significance

Surface and groundwater resources are protected under several state and federal regulatory programs, including the federal Clean Water Act (Sections 402 and 404) and the Massachusetts Clean Waters Act (MGL Chapter 21, §26-53). Other applicable regulations include the Massachusetts Section 401 Discharge regulations (314 CMR 9.00), Groundwater Quality Standards (314 CMR 6.00), and Surface Water Quality Standards (314 CMR 4.00). Some waterways are also regulated under MGL Chapter 91, which protects the public interest in tidelands, Great Ponds, and non-tidal rivers.

Clean Water Act of 1977

Water quality must be addressed for compliance with the Federal Water Pollution Control Act, also known as the Clean Water Act, which provides the authority to the USEPA to establish water quality standards (or to states to establish standards equal to or more stringent than USEPA standards), to control discharges into surface and subsurface waters, to develop waste treatment management plans and practices. It requires states to monitor and classify waterbodies, establish goals, and publish lists of monitoring and classification results. The Clean Water Act gives states the authority and responsibility to publish water quality standards.[2]

Section 303(d) of the Clean Water Act

Section 303(d) of the Clean Water Act also establishes the Total Maximum Daily Load (TMDL) program. A TMDL is the allowable load of a single pollutant from all point and non-point sources to a waterbody. Under the TMDL program, states establish priority rankings for their waterbodies and identify the uses for these waterbodies (e.g., drinking water supply, recreation, etc.). TMDLs can then be set for individual pollutants to ensure that the quality is adequate for the designated uses. The USEPA must approve or disapprove any TMDL established by the state. If the USEPA disapproves a TMDL, it must set the TMDL itself.

If a project impacts a TMDL-listed waterbody, appropriate measures must be taken to control the discharge of the listed pollutant and meet the TMDL requirements. Some TMDLs may require additional measures (including stormwater treatment) in order to prevent an increase in pollutant loading to the receiving water.

Section 404 of the Clean Water Act

Section 404 of the Clean Water Act requires a Department of the Army permit (administered by the U.S. Army Corps of Engineers) for the discharge of dredged or fill material into waters of the United States, including adjacent wetlands. Any of the South Coast Rail Build Alternatives under consideration would require the issuance of an Individual Section 404 Permit (i.e., would not be eligible for the Corps' Massachusetts General Permit) if it results in the loss of more than 1 acre of waters of the United States.

The alternatives would require a Section 404 permit for the placement of fill in wetlands. The wetland filling is evaluated by the Corps using the U.S. Environmental Protection Agency Guidelines for Specification of Disposal Sites for Dredged or Fill Material (Section 404(b)(1) Guidelines). The Section 404(b) (1) guidelines are designed to avoid unnecessary filling of waters and wetlands.

[2] U.S. Code. Title 33, Chapter 26 – *Water Pollution Prevention and Control*. (November 27, 2002).

The Section 404(b)(1) Guidelines stipulate (in part) that:

- No discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences;

- No discharge of dredged or fill material shall be permitted if it: (1) causes or contributes to violations of any applicable State water quality standard; (2) violates any applicable toxic effluent standard or prohibition under Section 307 of the Clean Water Act; (3) Jeopardizes the continued existence of species listed as threatened or endangered under the Endangered Species Act; or (4) Violates any requirement imposed by the Secretary of Commerce to protect any marine sanctuary designated under the Marine Protection, Research and Sanctuaries Act of 1972.

- No discharge of dredged or fill material shall be permitted which will cause or contribute to significant degradation of the waters of the United States.

- No discharge of dredged or fill material shall be permitted unless appropriate and practicable steps have been taken which will minimize adverse effects of the discharge on the aquatic ecosystem

Safe Drinking Water Act

The Safe Drinking Water Act authorizes the USEPA to set national health-based standards for drinking water to protect against both naturally-occurring and man-made contaminants that may be found in drinking water.[3] If the project impacts a drinking water supply, appropriate mitigation measures must be provided to maintain compliance with the Safe Drinking Water Act.

USEPA NPDES Construction Permit

All South Coast Rail Build Alternatives would require a National Pollutant Discharge Elimination System (NPDES) Construction Permit pursuant to Section 402 of the Clean Water Act, which regulates erosion control, pollution prevention, and other stormwater management issues at construction sites over 1 acre. This permit would include a Stormwater Pollution Prevention Plan (SWPPP) that would specify proper stormwater management procedures for any disturbed areas.

Water Quality Certificate

Section 401 of the Clean Water Act (33 U.S.C. 1341) requires any applicant for a federal license or permit to conduct any activity that may result in a discharge of a pollutant into waters of the United States to obtain a certification from the state in which the discharge originates or would originate, that the discharge will comply with the applicable effluent limitations and water quality standards.[4] In addition, the MassDEP is required to issue Water Quality Certifications for projects that result in discharge of fill to a wetland or waterbody, pursuant to the Massachusetts Clean Waters Act (MGL Ch. 21 § 26-53). This project will require issuance of an individual Water Quality Certification if it results in the loss of more

[3] U.S. Code. Title 42, Chapter 6A, Subchapter XII – *Safety of Public Water Systems*. (January 6, 2003).
[4] 33 CFR 320.3(a)

than 5,000 square feet of wetlands subject to federal jurisdiction or places fill in Outstanding Resource Water (ORW).

Massachusetts Stormwater Management Standards and Regulations

The Build Alternatives would require work within Wetland Resource Areas and buffer zones as defined and regulated under the Massachusetts WPA. Projects that fall under the jurisdiction of the WPA must comply with the Massachusetts Stormwater Management Standards included in the WPA regulations (310 CMR 10). The Stormwater Management Standards define the requirements for proper stormwater management for new or re-development sites in the State of Massachusetts. The water quality issues addressed by the standards include erosion control, peak discharge rates, groundwater recharge, total suspended solids (TSS) removal, wellhead protection, construction management, long-term maintenance, and illicit (non-stormwater) discharges to the stormwater management system. Additional stormwater regulations (310 CMR 21) have been proposed by MassDEP that apply treatment requirements to projects in TMDL areas, impose restrictions on discharges to water supply protection areas, and require infiltration to offset the effects of impervious surfaces on runoff and groundwater recharge.

Chapter 91 Waterways License

The Massachusetts Public Waterfront Act (MGL Chapter 91) gives MassDEP jurisdiction over dredging, filling, construction, demolition, and changes in use within flowed tidelands, filled tidelands, Great Ponds (ponds covering over 10 acres in their natural states), and any non-tidal navigable streams on which public funds have been expended. The proposed project may require a Waterways License due to the construction of new or modified crossings over navigable streams.

National Wild and Scenic Rivers Act

The National Wild and Scenic Rivers Act (Public Law 90-542; 16 U.S.C. 1271 et seq.) was established to preserve the free-flowing conditions of rivers with outstanding natural, cultural, and recreational values. Designation of an entire river system, or segments of, is approved by Congress or the Secretary of the Interior. Rivers are then classified as Wild: free of impoundments, generally inaccessible (except by trail), with primitive watersheds/shorelines unpolluted waters; Scenic: free of impoundments, largely undeveloped watersheds/shorelines and accessible in places by roads; or Recreational: readily accessible by road or railroad with some development along their shorelines and some past impoundments or diversions. The administration of designated rivers is assigned to a federal or state agency.

The Taunton River was designated as a Wild and Scenic River on March 30, 2009; therefore, the Build Alternatives are subject to the Wild and Scenic Rivers Act provisions. The administration of this designation occurs through a partnership between the National Park Service and the Taunton River Stewardship Council. The entire river system was included in this designation from its headwaters at the confluence of the Town and Matfield rivers in Bridgewater downstream 40 miles to the confluence with the Quequechan River at the Interstate 195 Bridge in Fall River. Twenty-six miles of the Taunton River were classified as Scenic and 14 miles as Recreational.

The Act prohibits federal support for actions such as the construction of dams or other in stream activities that would harm the river's free-flowing condition, water quality, or Outstanding Resource Values (scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values).[5] However, it does not prohibit development near designated rivers; rather it encourages regional river management practices to protect the use and enjoyment of these rivers. New development on federal lands must be guided by land use and resource management objectives that are compatible with the river's classification.

4.17.2 Existing Conditions

This section describes the existing conditions of surface water resources and public water supply wells that could be affected by the South Coast Rail project alternatives presented in the FEIS/FEIR and identifies the specific resources that could be affected under these alternatives. Figure 4.17-1 shows the project area and major waterbodies. Figure 1.4-1 illustrates the alternative alignments and proposed station locations, in relation to these waterbodies.

4.17.2.1 Regional Overview

This section summarizes the relevant local water resources and explains regulatory classifications for surface and groundwater protection.

Surface Water Resources

A screening for surface water resources was performed to identify all waterbodies that would be crossed by or within 100 feet of the centerlines of the alternatives under consideration. This process used geographic information systems (GIS) data developed by the U.S. Geological Survey (USGS) and provided by MassGIS to identify named and unnamed waterbodies. Since this screening is based only on the conceptual routes taken by the alternatives, further analysis will be necessary to determine if the construction and operation of the alternatives result in any actual impacts to these waterbodies.

The screening process identified numerous named rivers, streams, and ponds as well as unnamed, minor waterbodies. The named waterbodies are listed in Table 4.17-1.

In Massachusetts, certain surface waters with exceptional socioeconomic, recreational, ecological, or aesthetic values are designated ORWs, which require additional protection. ORWs can include drinking water supplies as well as high-value wetlands areas (specified in 314 CMR 4.06[2]) such as ACECs. The Hockomock Swamp ACEC and its associated wetlands and water bodies are described by the Massachusetts DCR as the largest vegetated freshwater wetland system in Massachusetts. The only Hockomock Swamp ACEC waterbody that would be affected by the project is Black Brook in Easton (included in Table 4.17-1). The East Branch of the Neponset River flows into the Fowl Meadow and Ponkapoag Bog ACEC and may be affected by the project. The Three Mile River ACEC is also located within the project area as presented in the DEIS/DEIR but is no longer affected by stormwater discharges from project elements. Further information regarding ACECs can be found in Chapter 4.10, *Protected Open Space and Areas of Critical Environmental Concern*. Information regarding wetland resources within these ACECs, and potential impacts from the project, can be found in the Chapter 4.16, *Wetlands*.

[5] National Wild and Scenic Rivers webpage: http://www.rivers.gov/.

Table 4.17-1 Named Waterbodies Adjacent to or Crossed by Project Alternatives[1]

Waterbody	
Assawompset Pond	Pierce Brook
Cedar Swamp River	Pine Swamp Brook
Beaver Meadow Brook	Prospect Hill Pond
Black Brook	Pocksha Pond
Cedar Swamp River	Quequechan River
Cotley River	Queset Brook
Fall Brook	Rattlesnake Brook
Forge Pond (Canton)	Steep Brook
Long Pond	Taunton River
Mill River	Whitman Brook
New Bedford Inner Harbor	Terry Brook
Forge Pond (Freetown)	Assonet River

1 Waterbodies within 100 feet of the centerline of an alternative are considered adjacent.

The list of waterbodies in Table 4.17-1 includes two ORWs pursuant to the *Massachusetts Surface Water Quality Standards* (314 CMR 4.04): Black Brook (Easton), and Fall Brook (Freetown). Details on the existing quality and regulatory status of the waterbodies identified are provided in Section 4.17.2, *Existing Conditions*.

The Massachusetts Water Quality Standards (314 CMR 4.00) assign class designations to inland and coastal waters. These classes specify water quality standards based on the intended uses of the waterbodies. The standards for each class can address characteristics such as temperature, dissolved oxygen (DO), pH, bacteria, solids, color and turbidity, oil and grease, and taste and odor. The classes for inland waters are:

- Class A waters are designated as sources of public drinking water supply, as excellent fish and wildlife habitat, and for primary and secondary contact recreational activities. The standards for contact recreation must be met for Class A waters even if these activities are not permitted (e.g., in a reservoir). Class A waters also have excellent aesthetic value. This is the most stringent inland water classification and includes strict standards for bacteria, DO, and other characteristics to protect the designated uses of the water and human health.

- Class B waters are designated for primary and secondary contact recreational activities and for fish and wildlife habitat. Class B waters are suitable for compatible industrial processes and cooling, irrigation, and other agricultural uses. Class B waters also have consistently good aesthetic value. Some Class B waters are designated as suitable for public water supply with appropriate treatment.

- Class C waters are designated for secondary contact recreational activities and for fish and wildlife habitat. Class C waters are suitable for compatible industrial processes and cooling and for irrigation of crops that are intended for cooking before consumption. Class C waters also have good aesthetic value. This is the least stringent inland water classification.

The classes for coastal and marine waters are:

- **Class SA** waters are designated for primary and secondary contact recreational activities, and as excellent fish and wildlife habitat. Class SA waters also have excellent aesthetic value. Specific Class SA waters may be designated for shellfish harvesting in 314 CMR 4.00. Any desalination plant making withdrawals from a Class SA water must protect the existing and designated uses of the water. This is the most stringent coastal water classification and includes strict standards for bacteria, DO, and other characteristics to protect the designated uses of the water and human health.

- **Class SB** waters are designated for primary and secondary contact recreational activities and as fish and wildlife habitat. Class SB waters also have consistently good aesthetic value. Specific Class SB waters may be designated for shellfish harvesting in 314 CMR 4.00. Any desalination plant making withdrawals from a Class SB water must protect the existing and designated uses of the water.

- **Class SC** waters are designated for secondary contact recreational activities and as fish and wildlife habitat. Class SC waters are suitable for compatible industrial processes and cooling. Class SC waters also have good aesthetic value.

Most major waterbodies in Massachusetts are classified in 314 CMR 4.00. Waters not specified in the regulations are assumed to be Class B (inland) or Class SA (coastal). However, the regulations specify other ways that classifications can be determined. For example, tributaries to a drinking water supply (which would itself be designated Class A) would be designated as Class A waters in order to protect the intended uses downstream.

In addition to the water classifications in 314 CMR 4.00, MassDEP also maintains the *Massachusetts Integrated List of Waters*, which is updated every two years and provides more detail on individual waterbodies.[6] This list identifies what designated uses are attained, what impairments have been reported, and whether or not a TMDL has been prepared, if required. Waterbodies with ongoing impairments may require a TMDL for a given contaminant. TMDLs identify the major contributors to a given impairment (e.g., sources within a watershed that may contribute to the contamination or impairment) and specifies both general and individual discharge limits that must be met in order to reduce contaminant loading and improve the health of the waterbody. TMDLs are first developed in draft form and must be approved by USEPA in order to be implemented.

To summarize these details, the *Massachusetts Integrated List of Waters* divides waterbodies into various categories:

- **Category 1 Waters**: Waters attaining all designated uses.

- **Category 2 Waters**: Attaining some uses; other uses not assessed.

- **Category 3 Waters**: No uses assessed.

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[6] Massachusetts Department of Environmental Protection, Division of Watershed Management. *Massachusetts Year 2006 Integrated List of Waters*. October 2007.

- **Category 4a Waters**: TMDL is completed.
- **Category 4c Waters**: Impairment not caused by a pollutant.
- **Category 5 Waters**: Waters requiring a TMDL.

Waterbodies used for drinking water supply were identified separately from the basic waterbody screening discussed above. Massachusetts Drinking Water Regulations (310 CMR 22.00) define three different Surface Water Supply Protection Zones that surround reservoirs and other surface drinking water sources as follows:

- **Zone A** represents:
  - the land area between the surface water source and the upper boundary of the bank;
  - the land area within 400 feet of the upper boundary of the bank of a Class A surface water source, defined in 314 CMR 4.05(3)(a); and
  - the land area within 200 feet of the upper boundary of the bank of a tributary or associated surface waterbody.
- **Zone B** represents the land area within one-half mile of the upper boundary of the bank of a Class A surface water source, or the edge of the watershed, whichever is less. Zone B always includes the land area within 400 feet of the upper boundary of the bank of a Class A surface water source.
- **Zone C** represents the land area not designated as Zone A or B within the watershed of a Class A surface water source.

The screening process identified three drinking water supplies with Zone A areas that would be crossed by one or more alternatives: the Farm River/Richardi Reservoir system, the Long Pond/Assawompset Pond/Pocksha Pond system, and the Brockton Reservoir (also known as the Avon Reservoir). Details on these water supplies are provided in the section on Surface Water Resources.

Groundwater Resources

Groundwater resource areas are defined and regulated pursuant to the *Massachusetts Drinking Water Regulations*. Many of the municipalities in and along the project alternatives have public drinking water supply wells near the rail corridors.[7] These wells can include municipal supplies as well as any supplies that provide water to at least 15 service connections. Table 4.17-2 lists each town and the number of public water supply wells identified. The number of wells varies greatly between municipalities.

[7] The definition of public water supplies in 310 CMR 22.02 includes any systems that provide at least 15 service connections or regularly serve an average of at least 25 individuals daily at least 60 days of the year.

Table 4.17-2 Public Water Supply Wells by Municipality

Municipality	Public Water Supply Wells	Municipality	Public Water Supply Wells
Berkley	0	Lakeville	7
Canton	6	New Bedford	0
Easton	6	Raynham	14
Fall River	0	Stoughton	12
Freetown	1	Taunton	3

Groundwater resource areas are defined and regulated pursuant to the *Massachusetts Drinking Water Regulations*. The groundwater supply protection areas (310 CMR 22.21) surrounding public water supply wells are described:

- **Zone I:** The protective radius required around a public water supply well or well field. This radius varies in size from 100 to 400 feet based on the approved yield of the well.
- **Zone II:** The area of an aquifer that contributes water to a well under the most severe pumping and recharge conditions that can be realistically anticipated.
- **Zone III:** The area beyond Zone II from which surface water and groundwater drain into the Zone II.
- **Interim Wellhead Protection Area (IWPA):** The primary protected recharge area for public wells without a DEP-approved Zone II. The IWPA radius can range from a minimum of 400 feet to a maximum of 0.5 mile. The default radius is 0.5 mile.

The Groundwater Supply Protection regulations require that Zone I areas be "owned or controlled by the supplier of water" [310 CMR 22.21(1) (b)]. Zoning controls are required to restrict land use within Zone II and Zone III. Track, trains, roads, and parking areas are not prohibited uses in Zone II and Zone III areas.

Aquifers may be designated as Sole Source Aquifers (SSAs) by the USEPA if they provide at least 50 percent of a community's drinking water and there are no reasonable alternative drinking water sources available. Since the contamination of an SSA could leave residents without drinkable water, any projects proposed within an SSA that receive federal funding are subject to review by USEPA to ensure they do not endanger the aquifer. The proposed project alternatives do not cross any SSAs.

Details on the specific wells and protection areas near each alternative are provided in the section on Groundwater Resources.

4.17.2.2 Study Corridor

This section describes the existing conditions of surface water resources and public water supply wells that could be affected by the alternatives and identifies the specific resources that could be affected under each alternative. Figure 4.17-1 shows the project area and major waterbodies. Figure 1.4-1 illustrates the alternative alignments and associated station locations, in relation to these waterbodies.

Surface Water Resources

The classes and categories identified by MassDEP in the *Massachusetts Integrated List of Waters* and the *Massachusetts Water Quality Standards* (discussed in Section 4.17.2.1, *Regional Overview*) provide an effective summary of a waterbody's uses and overall health. Table 4.17-3 lists these and other relevant information for the waterbodies adjacent to the project. With one exception, these waterbodies are Class B or SB waters, indicating that they should be safe for recreational use and provide good fish and wildlife habitat but do not need to meet drinking water standards. The Wading River is considered a Class A water upstream of the Wading River Pumping Station in Mansfield and a Class B water downstream.

Table 4.17-3 Streams and Ponds Classified by MassDEP

Waterbody	Category	Class	ORW	Uses Attained	Impairments	TMDLs
Assonet River	2 and 5	B	No	Aquatic life, primary and secondary contact, aesthetics	Pathogens	
Beaver Meadow Brook	5	B	No		Organic enrichment/low DO, pathogens	Pathogens[1]
Cedar Swamp River	2	B	No	Aquatic life, primary and secondary contact, aesthetics		
Cotley River	3	B	No			
Forge Pond (Canton)	3	B	No			
Mill River	3	B	No			
New Bedford Inner Harbor	5	SB	No		Priority organics,-metals, nutrients, organic enrichment/low DO, pathogens, oil and grease, taste, odor and color, objectionable deposits	
Prospect Hill Pond	3	B	No			
Quequechan River	4c	B	No		Habitat alterations	
Queset Brook	3	B	No			
Rattlesnake Brook	2	B	No	Aquatic life, aesthetics		
Taunton River	5	B/SB[2]	No		Pathogens, organic enrichment/ low DO, additional unknown causes	Pathogens (draft)

1 Beaver Meadow Brook is covered by the pathogen TMDL for the Neponset River.

2 The Taunton River is considered a coastal water downstream of Route 24, where it is classified SB.

Not all of the streams identified in the screening process have been included in MassDEP assessments to date. Table 4.17-4 lists the named streams identified in the screening process that have not been assessed by MassDEP in the *Massachusetts Integrated List of Waters* and were not assigned classes in 314 CMR 4.00. Most of these streams are assumed to be Class B waters (based on 314 CMR 4.00) and have no known TMDLs or impairments. However, Fall Brook is tributary to Long Pond in Lakeville and Freetown, which is a public drinking water supply. Therefore, Fall Brook is a Class A water as it is tributary to a drinking water supply.

Table 4.17-4 Named Streams and Ponds Not Assessed by MassDEP

Waterbody	Class	ORW
Black Brook	B	Yes
Fall Brook	A	Yes
Pierce Brook	B	No
Pine Swamp Brook	B	No
Steep Brook	B	No
Whitman Brook	B	No

There are three separate surface drinking water supplies that have protection zones crossed by or adjacent to the project alternatives. Table 4.17-5 lists the waterbodies that make up these water supplies.

Table 4.17-5 Surface Drinking Water Supplies

Waterbody	Category	Class	ORW	Impairments	Users	Relevant Tributaries[1]
Assawompset Pond	3	A	Yes		New Bedford, Taunton	Fall Brook
Long Pond	4c	A	Yes	Exotic species		
Pocksha Pond	3	A	Yes			

1 These are tributaries that are adjacent to the proposed project alternatives.

Further details on the resources that are in proximity to each specific alternative are provided below.

Southern Triangle Study Area (Common to All Build Alternatives)

The "Southern Triangle" portion of the project (Figures 4.17-2a-e and 4.17-3a-c) requires the railbed, track, and signals along the existing Fall River Secondary and New Bedford Main Lines to be upgraded for passenger rail traffic. This portion of the project extends from Weir Junction in Taunton along the New Bedford Main Line through Berkley, Lakeville, Freetown and New Bedford and along the Fall River Secondary from Myricks Junction in Lakeville through Freetown and Fall River. The Southern Triangle would cross or run adjacent to 10 waterbodies, listed in Table 4.17-6. The Southern Triangle also crosses the Zone A areas for Long Pond, Assawompset Pond, and Pocksha Pond, which provide drinking water for the cities of New Bedford and Taunton.

Table 4.17-6 Named Waterbodies Adjacent to or Crossed By the Southern Triangle

Waterbody	Municipality	Rail Segment	Relationship
Taunton River	Taunton	New Bedford Main Line	Crossed by bridge
Assawompset Pond	Freetown, Lakeville	New Bedford Main Line	Zone A crossed by alternative
Assonet River	Lakeville	Fall River Secondary	Within 100 feet of alternative
Cedar Swamp River	Lakeville	Fall River Secondary, New Bedford Main Line	Crossed by bridge
Cotley River	Berkley	New Bedford Main Line	Within 100 feet of alternative
Fall Brook	Freetown	New Bedford Main Line	Crossed by bridge
Forge Pond (Freetown)[1]	Freetown	Fall River Secondary	Within 100 feet of alternative
Long Pond	Freetown, Lakeville	New Bedford Main Line	Zone A crossed by alternative
New Bedford Inner Harbor	New Bedford	Fall River Secondary, New Bedford Main Line	Within 100 feet of alternative
Pierce Brook	Lakeville	New Bedford Main Line	Crossed by bridge
Pocksha Pond	Freetown, Lakeville	New Bedford Main Line	Zone A crossed by alternative
Quequechan River	Fall River	Fall River Secondary	Crossed by bridge
Rattlesnake Brook	Freetown	Fall River Secondary	Crossed by bridge
Steep Brook	Fall River	Fall River Secondary	Crossed by bridge

1 This Forge Pond is separate and distinct from the Forge Pond in Canton.

Taunton River—The Taunton River is a major river that extends from the confluence of the Town River and Matfield River in Bridgewater to Mount Hope Bay. The river has a roughly 562 square mile watershed that includes parts of 40 different municipalities and 94 square miles of wetlands. The river has been designated as a Wild and Scenic River by the National Park Service. This designation requires specific review by the Corps for any alteration of flows to the river or its tributaries, as well as the protection of the river's viewsheds and any historic or scenic structures associated with the river.

The Taunton River is a Class B waterbody, indicating that it is not suitable for untreated drinking water supply but should be suitable for primary and secondary contact recreation and provide good fish and wildlife habitat. The Taunton River is considered a coastal water downstream of the Route 24 bridge, where its classification changes from Class B to Class SB. The Taunton River is designated by MA DEP as impaired due to excess bacteria (pathogens), excess organic enrichment/low DO, and additional unspecified impairments. A draft TMDL for bacteria has been proposed for the Taunton River. The TMDL will not take effect until it is approved by the USEPA. Meeting this TMDL will require substantial reductions in bacteria loading from municipal stormwater runoff, leaking sanitary sewer lines, and combined sewer overflows (CSOs). Limitations have also been proposed for wastewater treatment discharges to the Taunton River and its tributaries.

The Taunton River is crossed several times on existing bridges just north of Weir Junction along the Stoughton Line and again just south of Weir Junction along the New Bedford Main Line.

Assawompset Pond, Long Pond, and Pocksha Pond—The Southern Triangle is not adjacent to Assawompset Pond, Long Pond, or Pocksha Pond, but it crosses the Zone A areas for all three in Freetown and Lakeville (4.17-2c). Long Pond is contiguous with Assawompset Pond and Pocksha Pond, and they operate as a single waterbody. Together with Great Quittacas Pond, Little Quittacas Pond, and Elders Pond, these lakes provide drinking water for the cities of Taunton and New Bedford. Assawompset Pond was dammed at the Nemasket River in 1894, increasing the overall depth by approximately five feet. As a drinking water supply, the ponds are designated as Class A waterbodies and as ORWs. Long Pond is a Category 4c water and is listed as impaired due to exotic species. Assawompset Pond and Pocksha Pond are Category 3 waters, indicating that their intended uses have not been assessed by MassDEP.

Assonet River—The Assonet River (Figure 4.17-3a) is a tributary of the Taunton River and includes Assonet Bay, an inland waterbody with branches to the north, east, and south. The Assonet River continues east from Assonet Bay. The river is controlled by dams at Mill Street and at Forge Road in Assonet and continues upstream to Lakeville, where it becomes the Cedar Swamp River. The Assonet River is a Class B surface water, indicating that it should have consistently good aesthetic and habitat values, is intended for primary and secondary contact recreation, and is not intended for drinking water supply without treatment beforehand. The Assonet River is listed as both a Category 2 water and a Category 5 water, indicating that it meets some of its assessed uses but is also in need of a TMDL. The Assonet River is considered to attain its intended uses for aquatic life, primary and secondary contact recreation, and aesthetics, but it is also impaired due to excess pathogens, which requires a TMDL.

Cedar Swamp River—As discussed above, the Cedar Swamp River (Figure 4.17-2b) is an upstream continuation of the Assonet River and is therefore tributary to the Taunton River. The swamp surrounding the Cedar Swamp River is protected as part of the Assonet Cedar Swamp Wildlife Sanctuary. Like the Assonet River, the Cedar Swamp River is a Class B surface water, indicating that it should have consistently good aesthetic and habitat values, is intended for primary and secondary contact recreation, and is not intended for drinking water supply without treatment beforehand. The Cedar Swamp River is a Category 2 surface water and attains its intended uses for aquatic life, primary and secondary contact recreation, and aesthetics.

Cotley River—The Cotley River (Figure 4.17-2a) is a tributary of the Taunton River and runs through Barstows Pond to the Taunton River. The Cotley River is a Class B surface water, indicating that it should have consistently good aesthetic and habitat values, is intended for primary and secondary contact recreation, and is not intended for drinking water supply without treatment beforehand. The Cotley River is a Category 3 surface water, indicating that its intended uses have not been assessed by MassDEP.

Forge Pond (Freetown)—Forge Pond is located in Freetown (Figure 4.17-3a) and should not be confused with the Forge Pond located in Canton. Forge Pond is a Class B surface water, indicating that it should have consistently good aesthetic and habitat values, is intended for primary and secondary contact recreation, and is not intended for drinking water supply without treatment beforehand. Forge Pond is a Category 3 surface water, indicating that its intended uses have not been assessed by MassDEP.

New Bedford Inner Harbor—New Bedford Inner Harbor (Figure 4.17-2e) is the estuary of the Acushnet River, where the river flows into Buzzards Bay. The inner harbor is guarded by a hurricane barrier that protects boats in the harbor from severe storms. New Bedford Inner Harbor is a Class SB surface water, indicating that it should have consistently good aesthetic value and is intended for primary and secondary contact recreational activities and fish and wildlife habitat. The harbor is a Category 5 surface water and requires TMDLs to address impairments from priority organics, metals, nutrients, organic enrichment/low DO, pathogens, oil and grease, taste, odor and color, and objectionable deposits.

Quequechan River—The Quequechan River (Figure 4.17-3c) is a tributary of the Taunton River and runs from South Watuppa Pond to Battleship Cove on the Taunton River. The Quequechan River is a Class B surface water, indicating that it should have good aesthetic and habitat values, is intended for primary and secondary contact recreation, and is not intended for drinking water supply without treatment beforehand. The river is also a Category 4c surface water, indicating that it is impaired but that the impairment is not due to a contaminant. In this case, the river is impaired due to channelization of portions of the river, impacting its function as wildlife habitat.

Rattlesnake Brook—Rattlesnake Brook (Figure 4.17-3b) is a tributary of the Taunton River and runs through the Freetown-Fall River State Forest. The brook is a Class B surface water, indicating that it should have consistently good aesthetic and habitat values, is intended for primary and secondary contact recreation, and is not intended for drinking water supply without treatment beforehand. Rattlesnake Brook is a Category 2 surface water and attains its intended uses for aquatic life and aesthetics.

Unlisted Waterbodies—Fall Brook (Figure 4.17-2c), Pierce Brook (Figure 4.17-2b) and Steep Brook (Figure 4.17-3b) are all crossed by the Southern Triangle but have not been included on the *Massachusetts Integrated List of Waters* by MassDEP.

Fall Brook is a tributary of Long Pond, which is contiguous with Assawompset Pond and Pocksha Pond. These ponds are part of the surface drinking water supply for New Bedford and Taunton. Therefore, Fall Brook is a Class A surface water, indicating that it is designated as a public drinking water supply (or is tributary to one) and should provide excellent fish and wildlife habitat, support primary and secondary contact recreational activities, and have excellent aesthetic value. Fall Brook is also an ORW, and the area within 400 feet of the brook is designated as Zone A.

Pierce Brook is a Class B surface water, indicating that it should have consistently good aesthetic and habitat values, is intended for primary and secondary contact recreation, and is not intended for drinking water supply without treatment beforehand. The brook is located north of the Cedar Swamp River in the Assonet Cedar Swamp.

Steep Brook is a Class B surface water, indicating that it should have consistently good aesthetic and habitat values, is intended for primary and secondary contact recreation, and is not intended for drinking water supply without treatment beforehand.

Stoughton Alternative Study Area

The Stoughton Electric and Diesel Alternatives (Figures 4.17-4a through e) would provide commuter rail service through Stoughton, extending the existing Stoughton Line service. From Weir Junction in Taunton, trains would use the New Bedford and Fall River lines to reach the terminal stations. In addition to the 10 named waterbodies crossed by or adjacent to the Southern Triangle, the Stoughton Alternative (Electric and Diesel) would cross or run adjacent to eight named waterbodies. Table 4.17-7 lists the waterbodies unique to this alternative.

Information on the Taunton River is provided above. Other named waterbodies crossed by or adjacent to the Stoughton Alternative are discussed below.

Table 4.17-7 Named Waterbodies Adjacent to or Crossed By the Stoughton Alternative

Waterbody	Municipality	Rail Segment	Relationship
Beaver Meadow Brook	Canton	Stoughton Line	Crossed by bridge
Black Brook	Easton	Stoughton Line	Crossed by bridge
Forge Pond (Canton)[1]	Canton	Stoughton Line	Crossed by bridge
Mill River	Taunton	Stoughton Line	Crossed by bridge
Pine Swamp Brook	Raynham	Stoughton Line	Within 100 feet of alternative
Queset Brook	Easton	Stoughton Line	Crossed by bridge
Taunton River	Taunton	Stoughton Line	Crossed by bridge in
Whitman Brook	Easton, Stoughton	Stoughton Line	Crossed by bridge

Note: This table does not include waterbodies that are adjacent to or crossed by the Southern Triangle, listed in Table 4.17-6.
1 This Forge Pond is separate and distinct from the Forge Pond in Freetown that is crossed by the Southern Triangle.

Beaver Meadow Brook—Beaver Meadow Brook (Figure 4.17-4a) flows from Glen Echo Pond in Stoughton to Bolivar Pond in Canton. The brook is a Class B surface water, indicating that it should have consistently good aesthetic and habitat values, is intended for primary and secondary contact recreation, and is not intended for drinking water supply without treatment beforehand. Beaver Meadow Brook is a Category 5 surface water and requires a TMDL to address organic enrichment/low DO. The brook is also impaired due to pathogens, which is covered by the bacteria TMDL for the Neponset River.

Forge Pond (Canton)—Forge Pond (Figure 4.17-4a) is located in Canton (not to be confused with the Forge Pond located in Freetown that is crossed by the Southern Triangle). Forge Pond is a Class B surface water, indicating that it should have consistently good aesthetic and habitat values, is intended for primary and secondary contact recreation, and is not intended for drinking water supply without treatment beforehand. Forge Pond is a Category 3 surface water, indicating that its intended uses have not been assessed by MassDEP.

Mill River—The Mill River (Figure 4.17-4e) is located in Taunton and is a tributary of the Taunton River. The river runs from Lake Sabbatia through the City of Taunton to its confluence with the Taunton River. The Mill River is a Class B surface water, indicating that it should have consistently good aesthetic and habitat values, is intended for primary and secondary contact recreation, and is not intended for drinking water supply without treatment beforehand. The Mill River is a Category 3 surface water, indicating that its intended uses have not been assessed by MassDEP.

Queset Brook—Queset Brook (Figure 4.17-4b) is located in Easton and is a tributary of the Taunton River. The brook is a Class B surface water, indicating that it should have consistently good aesthetic and habitat values, is intended for primary and secondary contact recreation, and is not intended for drinking water supply without treatment beforehand. Queset Brook is a Category 3 surface water, indicating that its intended uses have not been assessed by MassDEP.

Unlisted Waterbodies—Black Brook (Figure 4.17-4c), Pine Swamp Brook (Figure 4.17-4d), and Whitman Brook (Figure 4.17-4b) are all crossed by The Stoughton Alternative (Electric and Diesel) but have not been included on the *Massachusetts Integrated List of Waters* by MassDEP.

Black Brook is located in Easton. The brook is a Class B surface water, indicating that it should have consistently good aesthetic and habitat values, is intended for primary and secondary contact recreation, and is not intended for drinking water supply without treatment beforehand.

Pine Swamp Brook is located in Raynham and runs from Prospect Hill Pond to the Taunton River. The brook is a Class B surface water, indicating that it should have consistently good aesthetic and habitat values, is intended for primary and secondary contact recreation, and is not intended for drinking water supply without treatment beforehand.

Whitman Brook is located in Stoughton and Easton. The brook is a Class B surface water, indicating that it should have consistently good aesthetic and habitat values, is intended for primary and secondary contact recreation, and is not intended for drinking water supply without treatment beforehand.

Whittenton Alternative Study Area

The Whittenton Alternative (Figures 4.17-4a-d and 4.17-5a-b) would avoid construction through the Pine Swamp. This would include restoration of the track system from the New Bedford Main Line up to Weir Junction in Taunton, and then connect to the Stoughton Line through the Whittenton Branch. In addition to the 10 named waterbodies crossed by or adjacent to the Southern Triangle, The Whittenton Alternative would cross or run adjacent to nine named waterbodies. Table 4.17-8 lists the waterbodies unique to this alternative. Information on Beaver Meadow Brook, Black Brook, Forge Pond, the Mill River, Pine Swamp Brook, Queset Brook, and Whitman Brook is presented above. Prospect Hill Pond is discussed below.

Table 4.17-8 Named Waterbodies Adjacent to or Crossed by the Whittenton Alternative

Waterbody	Municipality	Rail Segment	Relationship
Beaver Meadow Brook	Canton	Stoughton Line	Crossed by bridge
Black Brook	Easton	Stoughton Line	Crossed by bridge
Forge Pond (Canton)[1]	Canton	Stoughton Line	Crossed by bridge
Mill River	Taunton	Stoughton Line, Whittenton Branch	Crossed by bridge
Pine Swamp Brook	Raynham	Stoughton Line	Within 100 feet of alternative
Prospect Hill Pond	Taunton	Whittenton Branch	Within 100 feet of alternative
Queset Brook	Easton	Stoughton Line	Crossed by bridge
Whitman Brook	Easton, Stoughton	Stoughton Line	Crossed by bridge

Note: This table does not include waterbodies that are adjacent to or crossed by the Southern Triangle, listed in Table 4.17-6.
1 This Forge Pond is separate and distinct from the Forge Pond in Freetown that is crossed by the Southern Triangle.

Prospect Hill Pond—Prospect Hill Pond (Figure 4.17-5a) is located in Taunton and is the source of Pine Swamp Brook. The pond is a Class B surface water, indicating that it should have consistently good aesthetic and habitat values, is intended for primary and secondary contact recreation, and is not intended for drinking water supply without treatment beforehand. Prospect Hill Pond is a Category 3 surface water, indicating that its intended uses have not been assessed by MassDEP.

Station Sites

Twelve stations would be modified or constructed as part of the South Coast Rail project. Modifications are proposed at two existing stations (Canton Center and Stoughton). The modifications at the existing

Canton Center Station are limited to the construction of a new Americans with Disabilities Act- (ADA) compliant platform and canopy and do not involve the construction of additional impervious area. The existing Stoughton Station would be removed and replaced with a new station at a different location. New platform-only stations would be constructed at four sites: Easton Village, King's Highway, Whale's Tooth, and Battleship Cove. These are developed sites with existing parking facilities (King's Highway and Whale's Tooth) or are drop-off facilities without on-site parking (Easton Village and Battleship Cove). One station, at Fall River Depot, would be constructed on the site of the former railroad station and would include a structured parking facility that would maintain existing drainage patterns at the site.

Five new stations would be constructed that would discharge stormwater runoff to wetlands and would require compliance with the Stormwater Standards. Two of these stations (Taunton and Raynham Park) are located on previously developed sites. Three stations (North Easton, Taunton Depot, and Freetown) would be located on currently undeveloped sites.

None of the station sites contain surface water resources. However, many of the station sites are adjacent to waterbodies.

- The Battleship Cove, Taunton Depot, Freetown, Taunton, Raynham Park, and Freetown station sites are all within 100 feet of unnamed waterbodies. The Easton Village site is adjacent to Queset Brook, described above.

Layover Facility Study Areas

Two new overnight layover facilities are proposed as part of the South Coast Rail project. These facilities are proposed near the southern terminus of the New Bedford Main Line (Wamsutta) and the southern terminus of the Fall River Secondary (Weaver's Cove East). The facilities are necessary to provide locations for train sets to be stored overnight, for train crews to board the train at the start of each shift, and for minor maintenance activities to be performed to the trains.

- The Weaver's Cove East Layover Facility is located approximately 2.5 miles from the southern terminus of the Fall River Secondary line, between Main Street and the Secondary. The Wamsutta Layover Facility is located along the New Bedford Main Line, near the intersection of Wamsutta Street and Herman Melville Boulevard.

There are no source water resources located within the proposed layover facility options. However, the Taunton River is located approximately 100 feet from the Weaver's Cove East Facility. The Acushnet River is located approximately 400 feet from the Wamsutta Layover Facility site.

Groundwater Resources

The proposed alternatives have the potential to affect distinct public groundwater suppliers in the project area. These water suppliers were identified based on the Zone I and Zone II areas that would either be crossed by or within 100 feet of one or more alternatives. Table 4.17-9 lists the water suppliers that could be affected by the project and provides details on the extent and capacity of these water systems.

Table 4.17-9 Public Groundwater Supplies with Protection Zones Adjacent to or Crossed by the Alternatives

Water Supplier	Number of Wells	Wells with Potential Protection Zone Crossings	Typical System Pumping Rate (gallons per day)	Other Water Sources
Easton Water Division	6 wells	5 + 1 proposed	2 million	
North Raynham Water District	4 wells, 1 proposed well field,[1] 1 proposed well	5 + 2 proposed	340,000	Raynham is also served by the Raynham Center Water District.

1 Wellfields usually consist of multiple small-diameter wells pumped simultaneously.

This section discusses the groundwater protection zones that are crossed by or adjacent to the proposed project alternatives.

Southern Triangle Study Area (Common to All Build Alternatives)

The Southern Triangle would intersect the IWPAs for both of the wells operated by the Freetown-Lakeville Regional School District in Lakeville (Figure 4.17-2c). The wells themselves are located approximately half a mile east of the New Bedford Main Line.

Stoughton Alternative Study Area (Electric and Diesel)

In addition to the IWPA crossed by the Southern Triangle, the Stoughton Alternative (Electric and Diesel) would intersect Zone II areas for six wells, listed in Table 4.17-10.

Table 4.17-10 Public Water Supply Wells with Protection Areas Adjacent to or Crossed by the Stoughton Alternative (Electric and Diesel)

Well	Water System	Location of Well	Protection Zones within 100 feet of Project Area	Location of Protection Zone Crossings
Easton GP Well #1	Easton Water Division	Easton	Zone II	Easton, Stoughton
Easton GP Well #2		Easton	Zone II	Easton, Stoughton
Easton GP Well #4		Easton	Zone II	Easton, Stoughton
King Philip St. Well #3A	North Raynham Water District	Raynham	Zone II	Raynham
King Philip St. Well #3B		Raynham	Zone II	Raynham
King Philip Bedrock Well[1]		Raynham	Zone II	Raynham

Note: This table does not include the IWPA crossed by the Southern Triangle.
1 Proposed well

The Stoughton Alternative would intersect the Zone II for Easton GP Wells #1, #2, and #4, (Figure 4.17-4c), which are three of the six wells providing drinking water to the Town of Easton. Easton GP Well #1 is approximately 500 feet to the east of the Stoughton Line and is the well closest to this alternative. The Zone I for Easton GP Well #1 has a 400-foot radius, which is close to the alternative.

The alternative would also intersect the Zone II areas in Raynham for King Philip Street Wells #3A and #3B as well as the proposed King Philip Bedrock Well (Figure 4.17-4d). King Philip Street Wells #3A and #3b are approximately 1,800 feet east of the Stoughton Line. Although the King Philip Bedrock Well has not been put into service, the surrounding area is protected in order to ensure that the aquifer will remain usable when the well is constructed.

Whittenton Alternative

In addition to the IWPA crossed by the Southern Triangle, the Whittenton Alternative would intersect Zone II areas for 10 existing or proposed wells and one Zone I area. Table 4.17-11 lists the wells with protection zones crossed by this alternative.

The Whittenton Alternative would cross the protection zones for all six of the North Raynham Water District's wells, including the Zone I for King Philip Street Well #2 (Figure 4.17-5a). King Philip Street Well #2 is within 200 feet of the Whittenton Branch, and the Zone I area for the well has a 400-foot radius. The Whittenton Alternative would cross the Zone II areas for King Philip Street Wells #1, #2, #3A, and #3B, the First Street Replacement Well, and the proposed Noblin Wellfield. King Philip Street Well #1 is near King Philip Street Well #2 and is approximately 900 feet southeast of the Whittenton Branch. The First Street Replacement Well (Figure 4.17-5d) is located between the Stoughton Line and the Whittenton Branch. The proposed Noblin Wellfield has not been constructed but will be located east of the Whittenton Branch on the far side of Prospect Hill Pond.

Table 4.17-11 Public Water Supply Wells with Protection Areas Adjacent to or Crossed by the Whittenton Alternative

Well	Water System	Location of Well	Protection Zones within 100 feet of Project Area	Location of Protection Zone Crossings
Easton GP Well #1	Easton Water Division	Easton	Zone II	Easton, Stoughton
Easton GP Well #2		Easton	Zone II	Easton, Stoughton
Easton GP Well #4		Easton	Zone II	Easton, Stoughton
Noblin Well Field[1]	North Raynham Water District	Raynham	Zone II	Raynham, Taunton
First St. Replacement Well		Raynham	Zone II	Raynham, Taunton
King Philip St. Well #1		Raynham	Zone II	Raynham, Taunton
King Philip St. Well #2		Raynham	Zone I and Zone II	Raynham, Taunton
King Philip St. Well #3A		Raynham	Zone II	Raynham
King Philip St. Well #3B		Raynham	Zone II	Raynham
King Philip Bedrock Well[1]		Raynham	Zone II	Raynham

Note: This table does not include the IWPA crossed by the Southern Triangle.
1 Proposed well

The Whittenton Alternative would intersect the Zone II for Easton GP Wells #1, #2, and #4, (Figure 4.17-4c) and would be close to the Zone I for Easton GP Well #1, already discussed above.

Station Sites

None of the station sites intersect any Zone I areas. The Easton Village and North Easton sites are within the Zone II for Easton GP Wells #1, #2, and #4.

Layover Facility Sites

None of the proposed layover facility sites are located within groundwater resource areas, particularly drinking water protection areas.

Summary

This section documents and describes the surface waterbodies and public surface and groundwater supply protection areas that are crossed by or in proximity to the Southern Triangle (common to all Build Alternatives), and the portions of the Build Alternatives that are north of Weir Junction in Taunton.

All Build Alternatives cross or are adjacent to surface waters and public water supply protection areas. Table 4.17-12 summarizes the resources that are crossed by or adjacent to each alternative.

Table 4.17-12 Summary of Water Resources Crossed By or Adjacent to Each Alternative[1]

		Public Water Supplies With Protection Areas Crossed by or Adjacent to Each Alternative			
Alternative or Element	**Named Waterbodies**	**Zone A Areas[2]**	**Zone I Areas[3]**	**Zone II Areas[3]**	**IWPAs[3]**
Southern Triangle	14	1	0	0	2
Stoughton	8	0	0	6	0
Whittenton	8	0	1	10	0
Layover Facilities	2	0	0	0	0

1 Based on waterbodies and water supply protection areas within 100 feet of the project area.
2 Surface water supplies that consist of connected waterbodies, such as a reservoir with a tributary, are treated here as a single supply and single Zone A.
3 Proposed construction within 400 feet. Each existing or proposed groundwater well is treated as a separate public water supply.

4.17.3 Analysis of Impacts and Mitigation

4.17.3.1 Introduction

This section identifies the impacts to water resources that may result from implementing each of the South Coast Rail alternatives under consideration (including railroad or highway alignments, train stations, and layover facilities).

Surface and groundwater resources are protected under several state and federal regulatory programs, including the federal Clean Water Act and the Massachusetts Clean Waters Act (MGL Chapter 21, §26-53). Other applicable regulations include the Massachusetts Discharge Regulations (314 CMR 9.00), Groundwater Quality Standards (314 CMR 6.00), Surface Water Quality Standards (314 CMR 4.00), and Wetland Protection Regulations (310 CMR 10.00). The Massachusetts Department of Environmental Protection (MassDEP) is in the process of adopting new stormwater regulations (314 CMR 21.00) that would require specific forms of stormwater management for projects above a certain size or projects located in watersheds with designated total maximum daily loads (TMDLs) for one or more pollutants. Some waterways are also regulated under MGL Chapter 91, which protects the public interest in tidelands, Great Ponds, and non-tidal rivers. More detail on compliance with regulations protecting coastal resources is provided in the Chapter 4.18, *Coastal Zone Consistency and Chapter 91 Compliance*. Impacts to floodplains are discussed in Chapter 4.16, *Wetlands.*

Prior to publication of the DEIS/DEIR, the Secretary's Certificate on the ENF for the South Coast Rail project included a number of requirements for water resources analysis that are addressed in this section. These requirements include:

- Include cumulative totals for land alteration and impervious area.
- Identify any discharges to ORW and provide supporting documentation if a variance pursuant to 310 CMR 4.00 is required.
- Analyze potential impacts to public and private water supplies (both existing and proposed) during the construction and operation of the project and propose avoidance, minimization, and mitigation measures to address impacts.
- Consult with MWRA regarding any potential impacts to MWRA properties or easements.[8]
- Evaluate potential stormwater impacts from construction and operation of the project and demonstrate compliance with stormwater regulations, including the proposed statewide stormwater regulations (314 CMR 21.00). This evaluation should include the rail tracks as well as station sites and layover facilities and should address potential impacts from oil, lubricants, and herbicides. Include plans for stormwater management and details on proposed low impact development (LID) techniques.
- Consult with MassDEP on proposed stormwater management design and construction—related stormwater issues, especially for any discharges to Zone I areas, Zone A areas, or ORWs.
- Existing culverted streams in the right-of-way, as relevant, should be analyzed for upstream and downstream effects under flooding conditions such as the 100-year storm.
- Provide detailed information on waterways that may be impacted by the project, and assess potential impacts to tidal and inland waterways.
- Include streams along Attleboro Secondary in the impact analysis.
- Address compliance with 310 CMR 9.32(2) by avoiding, minimizing, and mitigating any encroachment into a waterway within an ACEC. Other applicable standards include preserving public rights in waterways and providing open space for recreation at or near the water's edge.

Requirements in the Secretary's Certificate related to culverts, stream crossings, and wetland resources are addressed in the Chapter 4.16, *Wetlands.* Requirements regarding tidelands, coastal resources, Chapter 91 jurisdiction, and performance standards for water-dependent structures and uses requiring Chapter 91 authorization are addressed in the Chapter 4.18, *Coastal Zone Consistency and Chapter 91 Compliance*. Comments from MassDEP on the Expanded Environmental Notification Form (EENF) raised concerns about meeting existing and proposed Massachusetts Stormwater Management Standards requirements, using the MBTA's recent Greenbush Line project as an example, with particular focus on drinking water protection. Comments from the North Raynham Water District raised concerns about drinking water wells in Raynham, which have groundwater protection areas that are crossed by the Stoughton and Whittenton Alternatives. These concerns are addressed in this section.

[8] None of the alternatives assessed in this chapter would affect any known MWRA properties or easements.

The Secretary's Certificate on the DEIS/DEIR included the following specific requirements:

- "The FEIR should describe how the project will comply with the Massachusetts Stormwater Standards for work proposed in wetland resource areas and buffer zones pursuant to 310 CMR 10.05(6)(k) and 314 CMR 9.06(6), as well as other state and federal requirements (including total Maximum Daily Load (TMDL) requirements) for stormwater discharges to existing outfall and/or for the proposed layover facilities. The FEIR should describe measures to ensure that stormwater discharges to the Neponset River will meet the TMDL pathogen removal requirements and Total Suspended Soils (TSS) removal requirements."

- "The FEIR should include an assessment of the ability of the proposed project to meet the ten Massachusetts Stormwater Standards or specify if a variance to the Stormwater Standards specified at 310 CMR 10.05(6)(k) and 314 CMR 9.06(6) may be required. For those components of the project where complete raze of existing development is proposed, MassDOT should be fully meeting the Stormwater Standards rather than only "to the extent possible'' as few constraints exist in such situations."

- "The FEIR should include a detailed evaluation of Environmentally Sensitive Site Design (ESSD) and Low Impact Development (LID) practices to manage stormwater at proposed stations and parking areas, and layover facilities. The FEIR should identify the design capacity for parking at each station. Deck parking should be evaluated as an alternative to at-grade parking to minimize the project's impervious footprint and reduce the amount of land taking required. The ESSD and LID alternatives analysis in the FEIR should also include evaluation of smaller parking stalls and circulation lanes; porous pavement; pavement disconnection versus traditional curb and gutter drainage; retention of existing mature non-invasive plants; exfiltrating bioretention in place of raised traffic islands; and tree box filters. The FEIR should clearly identify the ESSD and LID measures to which the Proponent is committed to implement. For those measures not being committed to, the FEIR should include a sound rationale as to why they are not feasible."

- "The FEIR should include information on stormwater peak runoff rates and whether attenuation requirements will be met. The FEIR should assess each station and layover site to determine if there is sufficient land available for attenuation structures or if any additional right-of-way purchase would be required. For those stations being upgraded, the FEIR should include an analysis and description of measures to meet stormwater standards to the Maximum Extent Practicable (MEP) and to improve existing conditions, The FEIR should include an analysis of potential stormwater impacts to critical areas including vernal pools, and how these impacts will be addressed."

- "The FEIR should include details on proposed stormwater management along the proposed rail tracks. As noted in MADEP's comment letter, the Greenbush rail line included an extensive drainage system. The FEIR should describe the proposed drainage design for the Stoughton rail line and demonstrate that sufficient treatment will be provided prior to any discharge of track drainage runoff to resource areas. The FEIR should include a detailed description of the proposed stormwater management system for all components of the project. [MEPA] refers MassDOT to additional guidance regarding stormwater management in MADEP's comment letter."

Additional comments received on the DEIS/DEIR included the following:

Other comments on the DEIS/DEIR related to stormwater and water resources topics were provided by federal and state governmental agencies and other interested parties.

The Massachusetts Department of Environmental Protection (MADEP) submitted the following comments on the DEIS/DEIR:

- Provide information on the ability of the selected alternative to meet each of the 10 Massachusetts Stormwater Standards or specify if a variance to the Stormwater Standards specified at 310 CMR 10.05(6)(k) and 314 CMR 9.06(6) may be required.

- Provide alternatives analysis of Environmentally Sensitive Site Design (ESSD) and Low Impact Development (LID) practices to manage stormwater runoff at proposed stations and parking facilities, such as deck parking, smaller parking stalls and circulation lanes than traditional parking lots, use of porous pavements.

- Provide conceptual design examples of a new station, a reconstructed station, and a section of track in an environmentally sensitive area demonstrating how those structures would be constructed and operated consistent with ESSD and LID concepts.

- Provide information regarding whether stormwater peak runoff rate attenuation requirements will be met and if land-intensive peak rate control structures are needed, whether each station and layover facility contains sufficient land area and whether additional rights-of-way need to be purchased along potential rail line routes to place attenuation structures.

- Provide an analysis of stormwater recharge for its potential to attenuate peak runoff rates and where it cannot be met; describe the use of open attenuation structures over closed structures.

- Identify the design capacity of the parking proposed at each station. For stations with parking lots for 1,000 vehicle trips or more describe additional measures for source control and pretreatment (e.g. porous asphalt), as such parking lots are classified as Land Uses with Higher Potential Pollutant Loads (LUHPPL) and require pre-treatment specified at 310 CMR 10.05(6)(k)(5).

- Describe how each alternative would impact public drinking water sources, vernal pools and other critical areas pursuant to 310 CMR 10.05(6)(k)(6) and how each alternative's stormwater requirements will be addressed so as not to conflict with such critical areas.

- Describe how (in addition to point source stormwater runoff) controls, the alternatives will include source-control measures to minimize potential for contaminants and treatment for areas involving more than 1 acre of land disturbance, which is classified as a point source by USEPA for purposes of the Construction General Permit.

- Provide a description of how compliance with the Massachusetts Stormwater Standards will be achieved for work proposed in wetland resource areas and buffer zones pursuant to310 CMR 10.05(6) (k) and 314 CMR 9.06(6), as well as other state and federal requirements (including Total Maximum Daily Load (TMDL) requirements) for stormwater discharges to existing outfalls and/or for the proposed layover facilities.

- For those components of the project where complete raze of existing development is proposed, demonstrate how the Stormwater Standards would be fully met rather than only "to the extent possible" as few constraints existing in such situations.

Other comments on the DEIS/DEIR related to water quality:

- Provide additional analysis of impacts on drinking water supply, especially for rail intersections with Zone IIs.
- Clarify the potential for contaminants (spills, drips, or exhaust) associated with rail operations to impact water quality in consideration of water quality data in the vicinity of active rail lines versus water quality data for comparable water resources not near an active rail line, as applicable and identify measures to minimize such impacts on water resources.
- Describe how nitrogen deposition in coastal embayments will be addressed more explicitly.
- Provide an analysis of potential environmental impacts that could be attributed to stormwater runoff associated with induced growth and estimate the maximum potential for stormwater contamination for each alternative.
- Describe how existing ditches along rail corridors that will be improved to ensure proper drainage will be designed to meet specifications listed in the Massachusetts Stormwater Handbook, Volume 2, so that they qualify as stormwater treatment BMPs.
- Include provisions in the Maintenance plan that prohibit the use of herbicides within Aquifer Protection Districts.
- Include in the project plans a Performance Guarantee against potential releases of Oils or Hazardous Materials that result in the contamination and subsequent disuse of drinking water wells.
- Provide for a 2-year pre-construction period of water quality testing and analysis to establish baseline conditions of the water bodies that would be receptors of aerial deposition of diesel exhaust.
- Update the 2006 MADEP's Massachusetts Integrated List of Waters with the most recent available MADEP data.
- Confirm the classifications identified for the water bodies described in Section 4.17.2.2 with the MassDEP.

This section evaluates specific impacts of each of the proposed alternatives to these water resources. Section 4.17.3.2 explains the methodology for evaluating direct and indirect impacts to water resources and describes potential pollutant sources. Section 4.17.3.3 identifies specific locations where impacts to water resources would occur under each alternative and discusses potential types of impacts. Section 4.17.3.5 summarizes the impacts that would be anticipated under each alternative. Section 4.17.3.6

summarizes the proposed mitigation measures to protect water resources, including steps taken to avoid impacts to water resources, possible ways to minimize impacts, and specific mitigation measures. Section 4.17.3.7 discusses the alternatives' compliance with relevant regulatory programs.

4.17.3.2 Impact Assessment Methodology

As required by the NEPA CEQ[9] the analysis of the environmental consequences requires discussion of the direct and indirect effects of a proposed action, and their significance. Direct effects are defined as those "which are caused by the action and occur at the same time and place."[10] Indirect effects are defined as those "which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems."[11]

Similarly, MEPA requires "a detailed description and assessment of the negative and positive potential environmental impacts of the Project and its alternatives. The EIR [Environmental Impact Report] shall assess (in quantitative terms, to the maximum extent practicable) the direct and indirect potential environmental impacts from the Project that are within the Scope. The assessment shall include both short-term and long-term impacts for all phases of the Project (e.g., acquisition, development, and operation) and cumulative impacts of the Project, any other Projects, and other work or activity in the immediate surroundings and region."[12]

For surface and groundwater resources, direct and indirect effects can usually be considered together, since direct and indirect effects are caused by the same sources. For example, any off-site or downstream impacts would have to be caused by on-site drainage or pollutant sources.

Potential effects on surface and groundwater resources were evaluated by reviewing areas where new construction would be required for each of the alternatives. For the purposes of this evaluation, "new construction" is defined as construction of stations and layover facilities, upgrades of existing rail lines, reconstruction of removed railroad infrastructure (e.g., old rails, ties, etc.) along historic railroad alignments, replacement of existing railroad bridges and culverts, construction of new permanent or temporary railroad bridges, reconfiguration of at-grade road/railroad crossings, and construction of new grade-separated road/railroad crossings. The purpose of this review was to identify where the rail corridors, stations, or layover facilities would pass through or be located in or adjacent to surface and groundwater resources or water resource protection areas. Maps and aerial photographs were examined in reference to preliminary engineering plans to identify potential effects on surface and groundwater resources.

Track and signal improvements are required throughout the system in order to provide commuter rail service that meets the project purpose. These improvements include minor alterations to vertical and horizontal track geometry, reconstruction of grade crossings and bridges, replacement of rail stock, and drainage improvements.

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[9] Code of Federal Regulations (CFR), Title 40: Protection of the Environment, Part 1502- Environmental Impact Statement, Section 1502.16 Environmental Consequences (40 CFR 1502.16).

[10] 40 CFR 1508.8(a).

[11] 40 CFR 1508.8(b).

[12] 301 Code of Massachusetts Regulations, Title 11.00: MEPA Regulations. Section 11.07- EIR Preparation and Filing, (6) Form and Content of EIR, (h) Assessment of Impacts. (11 CMR 11.07(6)(h)).

Throughout much of the project area, the existing track infrastructure included ditches along both sides of the track for drainage. These ditches have, in many places, been filled or blocked. As part of the proposed drainage improvements, the existing drainage features (ditches and culverts) would also be reconstructed in conjunction with the reconstruction of both active rail lines and the out of service segments. In general, these existing features follow the topography and natural drainage patterns of the corridor and would be rehabilitated or maintained as required in support of the project. In areas where the existing corridor alignment would be changed, the track profile would be altered, or subsequent development or disuse has eliminated surface drainage features, improved drainage features would be required. Improved stormwater management measures would be incorporated into the drainage design in order to comply with the DEP Stormwater Standards.

Although the horizontal and vertical track alignments have been refined since the DEIS/DEIR, the detailed grading plans and drainage analysis cannot be performed until a ground survey with 1-foot contours has been completed. Detailed grading plans and drainage analysis for the track would be completed in conjunction with final design. Specific drainage features have been developed in accordance with the requirements of the Secretary's Certificate. These features would be used where needed throughout the project area, particularly in stormwater critical areas or where other sensitive receptors are located.

For the impact analysis in Section 4.17.3.3, *Impacts of Alternatives by Element and Area*, potential stormwater discharges were identified based on the locations of any proposed stormwater outfalls, such as outlets from ditches, underdrains, detention ponds, or any other stormwater management features. In order to assess impacts conservatively, all discharges to waterbodies from a proposed drainage system were considered new discharges except where the proposed design would reuse a known, existing discharge point. In areas where no information was available on existing drainage designs, all proposed stormwater discharges should be assumed to be new discharges. Existing stormwater drainage features will be identified as the designs are refined, and the existing ditches and discharge points will be reused wherever possible throughout the project.

Potential impacts to drinking water wells were identified based on proposed activities within groundwater protection areas such as Zone I and Zone II areas. These protection areas are established by MassDEP around registered public drinking water supplies. Residences in some areas may not be served by municipal water systems but instead rely on individual private wells that may be located in proximity to one or more alternatives. An analysis of individual impacts to private wells was not performed for this report, but the steps taken to minimize the potential for groundwater contamination and drinking water supply impairment under each alternative would also reduce the potential for any impacts to private wells. Prior to the construction of any element discussed in this report, private wells would be located and inventoried. Based on this inventory, appropriate design modifications would be undertaken to minimize or avoid impacts to private wells.

Method for Assessing Direct Impacts

The limits of work proposed for each alternative were assumed to be the maximum extent of direct impacts. Potential direct impacts to water quality and quantity may result from a variety of actions:

- **Fill within surface waters**: Placing fill within a waterbody can disrupt the ecology of the streambed or lakebed and potentially increase flooding. During the construction period, placing fill may temporarily increase suspended sediment concentrations as well as the risk of contamination from spills or accidents with construction equipment.

- **Discharge of pollutants to surface waters**: Pollutants associated with the construction or operation of the project may contaminate local surface waters if spill controls and stormwater management features are not provided to contain or remove the pollutants. Contamination may occur from contaminated stormwater runoff or direct spills into a waterbody.

- **Discharge of pollutants to groundwater**: Pollutants associated with the construction or operation of the project may contaminate local groundwater supplies if spills or contaminated runoff are allowed to infiltrate into the ground. The potential consequences increase the closer the pollution source is to drinking water wells, as contamination close to a well may require additional treatment at the well to make the water safe to drink.

- **Changes in surface water hydrology**: Building new impervious surfaces, modifying channel geometry (such as by altering the shape of a culvert or the hydraulic opening beneath a bridge), or otherwise changing local drainage patterns can affect any receiving waters. Adding impervious surfaces to a watershed may change the hydrology by increasing the amount of runoff from precipitation. This can increase peak flows in surface waters, as flow rates during storms could increase due to the greater volume and rate of runoff. Increased peak flows of runoff can also promote erosion of soil and streambeds and potentially increase flooding. Changes in hydrology can also decrease or relocate flow, resulting in draining wetlands and streams.

- **Changes in groundwater recharge**: Building new impervious surfaces or otherwise changing local drainage patterns can reduce groundwater recharge, potentially reducing local groundwater supplies. Without mitigation, large-scale reductions in the groundwater supply may make low flows in streams more frequent and severe due to reduced baseflow (groundwater seeping into the stream through the streambed).

Method for Assessing Indirect Impacts

Direct impacts involving substantial changes to site hydrology or pollutant sources may also cause additional downstream impacts and increase the potential for flooding. These causes of these indirect (offsite) impacts are similar to those described under direct impacts.

- **Changes in stream geomorphology:** Increased peak flows result in bank erosion and/or down-cutting of stream systems. Sediment transported from eroding stream segments is deposited downstream in still water areas, resulting in shallower channels, higher water temperatures, and loss of deep water habitat.

- **Changes in bordering vegetated wetlands**: Stream down-cutting and reduced groundwater recharge impact adjacent bordering vegetated wetlands because lowered groundwater levels stress or eliminate wetland species as a result of the drying out that occurs.

- **Changes in water chemistry**: Some types of water-borne pollution are not harmful in and of themselves, however their presence may mobilize or alter naturally-occurring substances in ground or surface water that are harmful to aquatic life or are detrimental to human health.

- **Changes in water temperature**: Increases in water temperature, due to the discharge of cooling water from plants can disrupt the aquatic habitat values within waterbodies. In addition, impervious surfaces like asphalt can absorb heat thereby, increasing the temperature of runoff, which adversely affects the temperature of the aquatic habitat in the receiving waters.

Method for Assessing Potential Pollutant Sources

Each alternative was assessed for any new pollutant sources that would be introduced, such as potential contaminants associated with the construction or operation of the alternative and any hazardous materials stored or used at or along the corridor (rail greasers, traction power stations, etc.). Depending on their design and location, these sources may or may not increase the risk of water resource contamination. The direct impact analysis pays specific attention to Zone I and Zone A drinking water protection areas, which merit the greatest consideration and protection in order to maintain the quality of regional drinking water supplies. Construction and operation of the South Coast Rail project is allowable within Zone I and Zone A areas, but potential pollutant sources must be managed carefully and contained to prevent any emissions or spills from contaminating drinking water supplies or other sensitive water resources.

Rail lines generate different types of stormwater pollutants than highways, parking lots, and other paved surfaces. Unlike the station sites and layover facilities, the track requires a more decentralized approach to stormwater management because the track is a linear feature with nearly negligible width and no centralized location where stormwater BMPs could be constructed. This section describes the potential contaminants that may be encountered along the rail corridor and are considered in the water resource impact analysis.

The various potential sources of pollutants that could be generated by the South Coast Rail project were reviewed in order to determine the different types of treatment measures that would be required to protect surface and groundwater resources. Most potential rail contaminants are due to the train traffic on the rails, which may result in hazardous contamination from spills, drips, or exhaust. Rail lines themselves are not significant sources of pollutants, as the rails and ballast are made of stable, non-hazardous materials. Most pollutants generated by train operations would be found adsorbed (attached) to the surface of the stone ballast supporting the rail ties. Rail lines generate different types of stormwater pollutants than highways, parking lots, and other paved surfaces. This section summarizes the major rail pollutant sources that are considered in the design of track drainage BMPs.

Hydrocarbons are the most common contaminants found on rail ballast, primarily from drips of fuel or other fluids from trains. Rail greasers are also used to lubricate the inside edges of the rails near tight curves to reduce wheel friction and noise. Excess grease may build up on the nearby ballast and contribute additional hydrocarbons to stormwater and groundwater.

For the Stoughton and Whittenton Electric Alternatives, traction power substations would be required at intervals along the corridor to provide power for the locomotives. The transformers in these power stations would be filled with oil, which could contaminate local water resources in the event of a leak or other accident. Transformers at traction power substations would incorporate secondary containment systems to prevent the release of oil as the result of a leak or other accident.

Train operations may generate trace amounts of iron, which wears off train steel wheels and steel rails. Brake pads may also contain metals such as zinc that are worn off as the brakes are used for slowing and stopping the train. It is not anticipated that metals from either source would be generated in sufficient quantities to pose a threat to surface or groundwater resources.

Commuter trains incorporate on-board sanitary facilities and therefore store and transport sanitary waste during everyday operations. The sanitary waste (pathogens) could pose a risk to water resources if the storage tanks were to leak during travel or spill during unloading. Unloading of sanitary sewage would be performed at an existing MBTA maintenance facility. Leaks and spills of sanitary sewage would be considered an illicit discharge and are prohibited by the Stormwater Standards and the Clean Water Act. A leak or spill would also violate the TMDL waste load allocation (WLA) in watersheds with approved pathogen TMDLs, as the WLA for illicit discharges is zero. The off-loading of sanitary sewage is proposed to occur at the mid-day layover facility and would be addressed in a separate report for that facility once a site is selected.

In contrast to roadways or buildings, the track and associated ballast are pervious surfaces that would generate negligible quantities of total suspended solids (TSS). However, significant quantities of TSS can be released as a result of construction activities, when large areas of exposed soil may be present. A Stormwater Pollution Prevention Plan (SWPPP) would be developed during final design that would identify BMPs that would be used to protect receiving waters from sediment discharges during the construction period. Aeolian (i.e., wind or atmospheric) deposition of fine particles that can be suspended by stormwater runoff would not be altered by the project. Such particles may be trapped by the ballast or may run off into the drainage system, much as occurs under existing conditions. As a result, aeolian depositions are not considered contaminants of that require treatment. Outlets from closed drainage systems and other drainage discharge points can cause erosion and release sediment into the receiving waterbody. New and reconstructed swales within the rail corridor would include water quality features such as check dams, sediment forebays, and outlet protection stone to reduce the concentration of TSS in runoff from the project area.

The rail lines would require limited use of herbicides to keep the rail corridors free of intrusive or obstructive vegetation. Overuse of herbicides near surface waters could introduce herbicides into surface waters and damage the overall health and biodiversity of waterbodies downstream. Comments on the DEIS/DEIR included the request that MassDOT provide a commitment to develop an approved Vegetation Management Plan (VMP) restricting the use of herbicides near Aquifer Protection Districts. Chapter 4.14, *Biodiversity, Wildlife, and Vegetation*, discusses the use of herbicides along the track corridor and describes the VMP that would be developed for the project.

The Stoughton and Whittenton Electric Alternatives would not generate any exhaust within the rail corridor. If the Stoughton Diesel Alternative was selected, a small amount of emissions would be generated by train locomotives. However, aerial deposition of train-generated emissions is not a significant source of pollution of water resources because of the very low concentrations of pollutants in the vicinity of the track. Because trains are moving at operating speeds, emissions are dispersed over a large area and are not deposited adjacent to the track. Air quality and locomotive emissions are discussed in Chapter 4.9 of the FEIS/FEIR.

Potential Roadway Pollutants

Roadways, parking lots, and other impervious surfaces associated with the stations can contribute stormwater pollutants that are generated or deposited by the traffic they convey. However, stormwater that runs across these surfaces carry pollutants from other sources such as nearby land uses, wildlife and atmospheric deposition. The impact caused by an impervious area varies depending on the type of use that it receives, which can include new access roads, stations, parking areas, and layover facilities. Pollutants can collect on impervious surfaces and contaminate runoff, particularly the "first flush" of runoff at the beginning of a storm. Airborne deposition of nutrients and pollutants can occur on both paved and unpaved areas. The largest source of airborne pollutants on a roadway is from vehicular exhaust. Therefore, pollutant loading from paved surfaces is more directly correlated to the amount and type of traffic they receive rather than the total area of pavement. For example, a heavily-travelled roadway or high-turnover parking lot is subject to greater deposition of hydrocarbons, salts, heavy metals, and exhaust by vehicles and road treatments than lower-usage facilities of comparable size. As a result, higher-usage areas can contribute greater quantities of pollutants to runoff.

As a result of fecal deposition by birds and other wildlife, impervious surfaces may contribute some bacteria to stormwater, but they are not a major source of bacteria when compared to the potential impacts of septic systems or combined sewer overflows (CSOs). The potential for bacteria contribution varies with the type of roadway. Local roads where wildlife and domestic pets have abundant access are more likely to contribute bacteria to stormwater than highways that offer little or no access for animals and pedestrians.

Impervious surfaces like asphalt also absorb heat and can therefore increase the temperature of runoff, affecting the temperature of the aquatic habitat in the receiving waters. The increase in impervious surfaces could therefore have an impact on the temperature of runoff, just as the urbanized runoff from neighborhoods is warmer than runoff from vegetated areas. The travel of runoff through swales and surface channels prior to reaching any major waterbodies would reduce the thermal impact by evaporation and infiltration.

Methods to Assess Compliance with Stormwater Management Standards

The stormwater management features at each station site and layover facility were evaluated for compliance with state and federal stormwater regulations and with the requirements of the Secretary's Certificate. State regulations include the Stormwater Regulations at 310 CMR 10.05(6)(k); the Surface Water Quality Standards at 314 CMR 4.00; and the Clean Water Act Section 401 Water Quality Certification at 314 CMR 9.00. Federal regulations include the National Pollutant Discharge Elimination System (NPDES) regulations under the Clean Water Act (33 U.S.C. §1251 et seq.) and the Federal Water Pollution Control Act (33 U.S.C. §1342).

Evaluations were conducted for the five new stations that would discharge stormwater runoff to wetlands and would require compliance with the Massachusetts Stormwater Standards. The evaluations included hydrologic analysis, hydraulic analysis, geotechnical analysis, floodplain review, and Environmentally Sensitive Site Design (ESSD) and Low Impact Development (LID) evaluations. Non-structural BMPs for water quantity and quality control were evaluated for each station site and would be further refined during the final design process. Non-structural BMPs include measures such as snow management, spill prevention, and source control practices. Structural BMPs for water quantity and quality control were also evaluated for each station site and were selected to provide treatment trains appropriate for each site. Structural BMPs include catch basins with deep sumps and hoods, oil/grit separators, vegetated filter strips, vegetated swales, bioretention swales, bioretention basins, and infiltration basins. These analyses were not conducted for the relocated Stoughton Station as this site has not yet been advanced to preliminary design; these analyses would be conducted at a future date.

For the Weaver's Cove East Layover Facility, these evaluations included hydrologic analysis, hydraulic analysis, geotechnical analysis, floodplain review, and ESSD and LID evaluations. Except for floodplain review, these analyses were not conducted for the Wamsutta Layover Facility as this site has not yet been advanced to preliminary design; these analyses would be conducted at a future date. Non-structural BMPs for Water Quantity and Quality Control were evaluated for each layover facility and would be further refined during the final design process. Non-structural BMPs include measures such as Snow Management, Spill Prevention, and Source Control practices. Structural BMPs for Water Quantity and Quality Control were also evaluated for each layover facility and were selected to provide treatment trains appropriate for each site. Structural BMPs include drip trays, catch basins with deep sumps and hoods, oil/grit separators, gravel and grass filter strips, vegetated swales, sediment forebays, and infiltration basins.

Railroad layover facilities are considered a LUHPPL as defined in 310 CMR 10.04 and 314 CMR 9.02. As a result, certain BMPs are required to prevent contamination of local wetlands and water resources such as the New Bedford Inner Harbor or the Taunton River. The storage tracks would have drip pans (collection trays) to catch any incidental drips, leaks, or spills of hazardous materials that may occur during storage or maintenance. The drip pans would be connected to an oil/grit separator that would separate petroleum products from stormwater runoff prior to discharge, protecting wetland and water resources from contamination. Any oil or other hazardous materials stored at the site would be secured with secondary containment structures to catch any spills. With the proposed containment measures in place, neither layover facility would pose a significant risk to surface or groundwater resources. The electric alternatives and the diesel alternatives differ as follows with regard to potential pollutants:

- Fuel spills and ballast contamination is a greater concern for alternatives using diesel locomotives than for those with electric ones, since the electric vehicles would not use any diesel fuel or generate any exhaust. However, aerial deposition of diesel train-generated emissions is not a significant source of pollution of water resources because of the very low concentrations of pollutants in the vicinity of the track. Since trains are moving at operating speeds, emissions are dispersed over a large area and are not deposited adjacent to the track.

- Electric railroads require traction power substations to provide power for the locomotives. The transformers in these power stations would be filled with oil, which could contaminate local water resources in the event of a leak or other accident.

4.17.3.3 Impacts of Alternatives by Element and Area

This section evaluates the potential impacts to surface and groundwater resources associated with the alternatives. These alternatives include the No-Build Alternative (Enhanced Bus), Stoughton Alternative (Electric and Diesel), and Whittenton Alternative (Electric and Diesel). The alternatives considered would include construction of new rails, stations, and layover facilities. Figure 4.17-1 shows the major surface waterbodies throughout the project area. Figure 1.4-1 shows the route for each alternative and proposed station locations.

No-Build (Enhanced Bus) Alternative

The No-Build Alternative would improve transit service to Boston from New Bedford, Fall River, and Taunton by adding more buses and improving park-and-ride capacity and amenities with smaller capital investments than are proposed in the Build Alternatives. Under this alternative, no new rail or bus service would be provided to Southeastern Massachusetts. Three existing park-and-ride facilities (West Bridgewater, Mt. Pleasant Street, and Silver City Galleria) would be improved as part of the No-Build Alternative.

The West Bridgewater Park-and-Ride is near the southwest corner of the intersection of Routes 106 and 24 in West Bridgewater. Under the No-Build Alternative, the existing parking lot would be restriped for optimal capacity and efficiency. The improvements would occur within the existing lot and would not add any impervious surfaces or new pollutant sources. No changes to stormwater drainage would occur, and there would be no impact to water resources.

The Mt. Pleasant Street Park-and-Ride is on the northwest corner of the intersection of King's Highway and Route 140 in New Bedford. Under the No-Build Alternative, the existing lot would remain unchanged, and a new pickup location would be added using the existing parking lot at the proposed Whale's Tooth Station. Due to the existing uses of these sites and the proximity to existing highways and parking areas, changes to the park-and-ride facility would not introduce any new uses or pollutant sources to the area. There would be no expansion or construction needed for either parking lot, resulting in no new impervious area and no impact on waterbodies or drinking water protection areas.

The Silver City Galleria Park-and-Ride is adjacent to the Silver City Galleria shopping mall in Taunton. Under the No-Build Alternative, the existing parking lot would be restriped for optimal capacity and efficiency. The improvements would occur within the existing lot and would not add any impervious surfaces or new pollutant sources. No changes to stormwater drainage would occur, and there would be no impact to water resources.

As under existing conditions, the park-and-ride facilities would contribute roadway pollutants such as metals, hydrocarbons, salt, and sediment, all of which are associated with automobile traffic. The improvements to the park-and-ride facilities would not introduce new pollutant sources and would be expected to be, at most, incremental. No impacts to water resources are expected from expanding the park-and-ride facilities for the No-Build Alternative. These facilities would increase parking capacity in existing developed areas and would not substantially increase impervious area, automotive traffic, or stormwater pollution.

Build Alternatives

This section first describes typical stormwater management facilities and methods common to all Build Alternatives. This is followed by a discussion of impacts in the Southern Triangle, which is common to all Build Alternatives. This is followed by a description of impacts in the northern part of the South Coast Rail study area where the Build Alternatives differ in their alignments and where impacts are discussed separately for each alternative. This is followed by a description of impacts associated with station sites and layover facility sites for the entire study area.

Track Drainage (Common to all Build Alternatives)

As previously mentioned, the track requires a more decentralized approach to stormwater management because the track is a linear feature with nearly negligible width and no centralized location where stormwater BMPs could be constructed. The existing track infrastructure included ditches along both sides of the track for drainage. In many places, these ditches have been filled or blocked and are no longer capable of providing adequate drainage for the rail bed. As part of the track reconstruction project (in all segments of the rail lines), these ditches would be reconstructed to maintain proper drainage.

Under both existing and proposed conditions, stormwater would be conveyed through overland flow and through a drainage system consisting of drainage ditches alongside the tracks or underdrains installed in the rail ballast. In areas where no ditches or underdrains would be required to keep the rail bed dry, such as areas where the rail would be elevated above the surrounding land, stormwater is assumed to leave the rail corridor by overland flow, resulting in no point discharges of stormwater. In areas where the rail would run through a cut section, ditches and underdrains would be required to direct stormwater to safe discharge locations and to keep the ballast dry and stable.

Discharges from track drainage would be directed away from stormwater critical areas such as Outstanding Resource Waters (ORWs) and into adjacent upland areas to the maximum extent practicable. ORWs in the vicinity of the track include vernal pools, wetlands and waterways within the Hockomock Swamp ACEC, and tributaries to surface drinking water supplies. Selection of appropriate treatments for each location would occur during final design as part of the detailed grading plans and drainage analysis. Any treatments proposed would be constructed in a manner consistent with other measures intended to avoid, minimize and mitigate wildlife habitat impacts including between tie passages to facilitate movement of wildlife across the railbed, as well as the trestle within a section of the Hockomock Swamp.

A number of stormwater Best Management Practices (BMPs) would be incorporated. Drainage into the underdrains would contain minimal pollutants, as most suspended solids and other contaminants would be caught in the ballast above the underdrains. The use of surface ditches would allow stormwater infiltration as well as settling of suspended solids, reducing stormwater volumes and contaminant loads prior to discharge to any waterbodies or wetlands. Sediment forebays and check dams would be installed upstream of discharge points to provide additional sediment removal. Outfalls would be protected using crushed stone or concrete structures, as appropriate, to prevent erosion in the receiving waters or wetlands. Because the surface of the rail corridor consists of pervious stone ballast and does not include new impervious surfaces, there would be no change in the peak discharge rate from the rail corridor and no BMPs that provide rate control are required.

In accordance with the Secretary's Certificate, drainage improvements are proposed that would protect wetland and water resources in the vicinity of the rail corridor. Stormwater and drainage design plans from the Greenbush Commuter Line project, completed in 2007, were reviewed and stormwater management features from the track design have been incorporated into the project design. The specific percentage of credit granted for TSS removal from proposed measures would be evaluated as stormwater system design details become developed. MassDEP would be consulted during the design of project elements to ensure these standards are implemented.

Track drainage elements include vegetated drainage swales, sediment forebays with check dams, perforated pipe underdrains, stone swales with high density polyethylene (HDPE) liners, outlet protection stone, and infiltration trenches. These BMPs and the criteria used to determine where particular treatments should be used are described below.

Vegetated Drainage Swales

Vegetated drainage swales are proposed in order to provide positive drainage for the track ballast, maintain open space, and to allow runoff to infiltrate to the extent practicable. Side slopes of the swale may be no steeper than 2:1 and the floor of the swale must be at least 2 feet wide. The longitudinal slope of the swale must be less than 5 percent and maximum velocities should be less than 1 foot per second during the water quality event. Swales should end at sediment forebays with check dams. A typical detail and plan view of a vegetated drainage swale is shown on Figure 4.17-6.

Sediment Forebays

Sediment forebays with stone check dams are proposed at locations where swales discharge runoff to wetland resource areas. A typical detail and plan view of a sediment forebay and stone check dam is shown on Figure 4.17-6.

Perforated Pipe Underdrains

Perforated pipe underdrains are proposed for locations where the track corridor is constrained or where the adjacent grading does not allow open channel flow. Per MBTA design guidelines, a minimum pipe size of 12 inches is required. Underdrains shall be bedded in a trench filled with ¾-inch crushed stone wrapped in filter fabric. Cleanouts shall be spaced no more than 500 feet apart. A typical detail and plan view of a perforated pipe sub-drain is shown on Figure 4.17-7.

HDPE-Lined Swales

Stone-lined swales with HDPE liners are proposed in locations where the track is less than 200 feet from the Zone 1 of a drinking water supply well. This occurs in the vicinity of the Easton GP Well #1 on Gary Lane in Easton. In accordance with MassDEP regulations, drainage in this area would be directed away from the Zone 1. A typical detail and plan view of a stone-lined swale with an HDPE liner is shown on Figure 4.17-8.

Stone-lined swales with HDPE liners are also proposed in locations where vernal pools are located immediately adjacent to the track in order to prevent the track drainage from dewatering the pool. These locations would use the same detail as shown on Figure 4.17-8

Outlet Protection

Stone-lined scour protection pads are proposed at each end of swale and pipe segments to protect adjacent soils from erosion and to trap coarse debris. Scour protection stone and energy dissipation bowls must be sized for the discharge rates anticipated at each outlet. Details of a flared end section with stone scour protection and a headwall with stone scour protection are shown on Figure 4.17-9**.**

Southern Triangle Study Area (Common to All Build Alternatives)

Portions of the rail lines within the southern part of the South Coast Rail study area are common to all Build Alternatives (Figures 4.17-3a-c and 4.17-2a-e). These rail lines form a rough triangular shape running from Fall River to Myricks Junction (the Fall River Secondary Line) and from New Bedford to Weir Junction (the New Bedford Main Line), and are referred to as the Southern Triangle. Potential impacts to water resources along the Southern Triangle are described below.

Fall River Secondary Rail Segment

The existing Fall River Secondary freight track would be upgraded to Federal Rail Administration (FRA) Class 5[13] for the South Coast Rail project. Two new stations would be constructed in Fall River (Battleship Cove and Fall River Depot) and one in Freetown (Freetown). One new layover facility would be constructed in Fall River, at the Weaver's Cove site. Potential impacts to water resources resulting

[13] 49 CFR 213.9 Classes of Track: Operating Speed Limits

from developing the new stations and layover facilities are considered in the sections on Station and Layover Facility sites, respectively.

Table 4.17-13 lists waterbodies near the Fall River Secondary and identifies the waterbodies that would receive stormwater discharges from the rail line. Forge Pond, the Assonet River, and the Taunton River would all receive stormwater discharges from the rail drainage system. There would also be a discharge near the confluence of the Quequechan River and the Taunton River that would not affect the Quequechan River upstream. All other stormwater discharges from the Fall River Secondary would go to local wetland systems rather than to named waterbodies. Cedar Swamp River, Rattlesnake Brook, and Steep Brook would be crossed by the line but would not receive any direct stormwater discharges. No Zone A areas or groundwater protection areas (Zone I, Zone II, etc.) would be crossed by this line or receive any stormwater discharges. Potential impacts from the construction of culverts and other waterway crossings are discussed in Chapter 4.16, *Wetlands.*

Table 4.17-13 Stormwater Discharges on the Fall River Secondary Line

Waterbody	Municipality	ACEC/ ORW	Stormwater Discharges Proposed
Assonet River	Lakeville	No	Yes
Cedar Swamp River	Lakeville	No	No
Forge Pond (Freetown)[1]	Freetown	No	Yes
Quequechan River	Fall River	No	No[2]
Rattlesnake Brook	Freetown	No	No
Steep Brook	Fall River	No	No
Taunton River	Fall River	No	Yes
Terry Brook[3]	Freetown	No	Yes

1 This Forge Pond is separate and distinct from the Forge Pond in Canton.
2 A stormwater discharge occurs near the confluence of the Quequechan River and the Taunton River but would not affect the Quequechan River.
3 The Fall River Secondary crosses Terry Brook Pond, an impounded section of Terry Brook that is bisected by the Fall River Secondary alignment.

The stormwater discharges from the Fall River Secondary segment would not be expected to contribute contaminants that would impair any of these waterbodies. No new impervious surfaces would be constructed as part of the rail line itself, resulting in no changes in runoff rates. The track upgrades and new traffic would not introduce new pollutant sources because the Fall River Secondary rail segment is already an active rail line.

As described in Section 4.17.3.2, *Impact Assessment Methodology*, the rail corridor would use a combination of drainage ditches alongside the tracks and underdrains installed in the rail ballast to keep the railbed dry and stable. Potential temporary, construction-period impacts to surface and groundwater resources are discussed in Section 4.17.3.4, *Temporary Construction Impacts*. Mitigation proposed to prevent contamination of surface and groundwater resources from the pollutant sources discussed in the section on Potential Pollutant Sources are discussed in Section 4.17.3.6, *Mitigation*.

New Bedford Main Line Rail Segment

The existing New Bedford Main Line freight track would be upgraded to FRA Class 5 for the South Coast Rail project. Two new train stations would be constructed in New Bedford (Whale's Tooth and King's Highway) and one near Taunton (Taunton Depot). One new layover facility would be constructed in New

Bedford, at the Wamsutta site. Potential impacts to water resources resulting from developing the new stations and layover facilities are considered in the sections on Station and Layover Facility sites, respectively.

Table 4.17-14 lists waterbodies near the New Bedford Main Line and identifies the waterbodies that would receive stormwater discharges from the rail line. In Taunton, the Taunton River would receive stormwater discharge from the rail drainage system. All other stormwater discharges from the New Bedford Main Line would go to local wetland systems or municipal systems rather than directly to named waterbodies. Cedar Swamp River, Cotley River, and Pierce Brook would be crossed by the line, and New Bedford Inner Harbor is close to the line, but none of these waterbodies would receive any stormwater discharges from the proposed drainage system. There would be no direct stormwater discharges to Fall Brook, which is an Outstanding Resource Water (ORW). There would be stormwater discharges to the combined Zone A area associated with Fall Brook, Assawompset Pond, Long Pond, and Pocksha Pond. These discharges would be allowable under Massachusetts Stormwater Management Standards (310 CMR 10.05(6)) and the proposed Stormwater Management Regulations (314 CMR 21.00) because the New Bedford Main Line is an existing rail line. Zone A discharges are allowable if they originate on previously-developed impervious surfaces and if the discharge does not increase pollutant loadings to the drinking water supply in question. The improvements proposed to the New Bedford Main Line would not add any impervious surfaces to this area or increase pollutant loadings to Fall Brook or the water supplies downstream.

Table 4.17-14 Stormwater Discharges on the New Bedford Main Line

Waterbody	Municipality	ACEC/ORW	Stormwater Discharges Proposed
Assawompset Pond (Zone A only)	Freetown, Lakeville	No	Yes (Zone A only)
Cedar Swamp River	Lakeville	No	No
Cotley River	Berkley	No	No
Fall Brook (includes Zone A)	Freetown	Yes	Yes (Zone A only)
Long Pond (Zone A only)	Freetown, Lakeville	No	Yes (Zone A only)
New Bedford Inner Harbor	New Bedford	No	No
Pierce Brook	Lakeville	No	No
Pocksha Pond (Zone A only)	Freetown, Lakeville	No	Yes (Zone A only)
Taunton River	Taunton	No	Yes

None of the substations proposed on this line for the electrically-powered alternatives would be located in any Zone A areas or groundwater protection areas. Potential impacts from the construction of culverts and other waterway crossings are discussed in Chapter 4.16, *Wetlands.*

All Build Alternatives would require construction within the interim wellhead protection areas (IWPAs) for the two wells operated by the Freetown-Lakeville Regional School District in Lakeville. The wells are approximately 0.5 mile east of the New Bedford Main Line. There would be no stormwater discharges within this IWPA, with drainage redirecting stormwater flows to the west side of the tracks away from the wells.

The stormwater discharges from the New Bedford Main Line would not be expected to contribute contaminants that would impair any waterbodies or water supplies. No new impervious surfaces would be constructed as part of the rail line itself, resulting in no changes in runoff rates. The track upgrades and new traffic would not introduce new pollutant sources because the New Bedford Main Line is already an active rail line.

There would be no stormwater discharges within the IWPA for the Freetown Lakeville Regional School District. The existing stormwater discharges to the Zone A area for Fall Brook, Assawompset Pond, Long Pond, and Pocksha Pond would continue, but there would be no new impervious surfaces or pollutant sources tributary to this Zone A area. Due to the low potential for pollutant generation on the rail line, no impacts are expected to groundwater quality.

As described in Section 4.17.3.2, *Impact Assessment Methodology,* the rail corridor would use a combination of drainage ditches alongside the tracks and underdrains installed in the rail ballast to keep the railbed dry and stable. Potential temporary, construction-period impacts to surface and groundwater resources are discussed in Section 4.17.3.4, *Temporary Construction Impacts*. Mitigation proposed to prevent contamination of surface and groundwater resources from the pollutant sources discussed in the section on Potential Pollutant Sources are discussed in Section 4.17.3.6, *Mitigation.*

Stoughton Electric Alternative

The Stoughton Electric Alternative alignment would be comprised of a portion of the Northeast Corridor and the Stoughton Line (Figures 4.17-4a-e). This alternative would use the Northeast Corridor from South Station to Canton Junction, and the existing Stoughton Line from Canton Junction to Stoughton Station. From that point, commuter rail service would be extended, using an out-of-service railroad bed, south through Raynham Junction to Weir Junction in Taunton, where it would join the northern end of the Southern Triangle. This evaluation focuses on the Stoughton Line component only. This alternative would include the following stations: Canton Center, Stoughton, North Easton, Easton Village, Raynham Park, and Taunton. No layover facilities are planned within this segment. Potential impacts to water resources resulting from developing the new stations are considered in the section on Stations.

The existing Stoughton Line commuter rail track from Canton Junction to Stoughton would be upgraded to FRA Class 5 for the Stoughton Electric Alternative. New track would be placed on the railroad bed from Stoughton south to Weir Junction. A section from Foundry Street in Easton to Raynham Station through the Hockomock Swamp would be constructed on an elevated trestle. Two existing train stations along the Stoughton Line would be reconstructed (Canton Center and Stoughton). Four new train stations would be constructed along this alignment (North Easton, Easton Village, Raynham Park, and Taunton).

Table 4.17-15 lists waterbodies near the Stoughton Line and identifies the waterbodies that would receive stormwater discharges from the rail line. Beaver Meadow Brook, the East Branch Neponset River, Forge Pond, Mill River, Queset Brook, and the Taunton River would all receive stormwater discharges from the Stoughton Line. Black Brook, which is located within the Hockomock Swamp ACEC, would not receive any stormwater discharges, although there would be stormwater discharges to wetlands and unnamed channels near Black Brook. Black Brook, Pine Swamp Brook, and Whitman Brook would all be crossed by the Stoughton Line but would not receive any stormwater discharges from the proposed drainage system. No Zone A areas would be affected by construction on this line. Potential impacts from the construction of culverts and other waterway crossings are discussed in Chapter 4.16, *Wetlands*.

Table 4.17-15 Stormwater Discharges on the Stoughton Line

Waterbody	Municipality	ACEC/ORW	Stormwater Discharges Proposed
Beaver Meadow Brook	Canton	No	Yes
Black Brook	Easton	Yes[1]	No
East Branch Neponset River[2]	Canton	Yes[3]	Yes
Forge Pond (Canton)[4]	Canton	No	Yes
Mill River	Taunton	No	Yes
Pine Swamp Brook	Raynham	No	No
Queset Brook	Easton	No	Yes
Taunton River	Taunton	No	Yes
Whitman Brook	Easton, Stoughton	No	No

1 Hockomock Swamp ACEC.
2 East Branch Neponset River is sometimes referred to as the Canton River.
3 Fowl Meadow and Ponkapoag Bog ACEC.
4 This Forge Pond is separate and distinct from the Forge Pond in Freetown that is crossed by the Southern Triangle.

The Stoughton Alternative would require construction in Zone II areas for six public water supply wells along the Stoughton Line. There would also be stormwater discharges from the Stoughton Line in the Zone II areas for these six wells. The wells associated with these protection areas include three wells operated by the Easton Water Division and three wells operated by the North Raynham Water District. The individual wells and their protection zones are listed in Table 4.17-16. The Zone II areas crossed by the proposed Stoughton Line already contain developed areas and residential neighborhoods that are likely to have much larger impacts on water quality than a rail corridor. No Zone I areas would be affected by the construction on this line. Since the construction would occur on an out of service railroad bed, there would be no expected change in groundwater flow. No electrical substations would be located in any IWPAs, Zone I areas, or Zone A areas. One electrical substation would be located in the Zone II for Easton GP Wells #1, #2, and #4 and would include secondary containment to minimize the risk of any surface or groundwater contamination from this location.

Table 4.17-16 Construction and Stormwater Discharges in Public Water Supply Well Protection Areas on the Stoughton Line

Well	Distance From Proposed Limit of Work (miles)	Water System	Location of Protection Zone Crossings	Construction in Protection Zones	Stormwater Discharges in Protection Zones
Easton GP Well #1	0.1	Easton Water Division	Easton, Stoughton	Zone II	Zone II
Easton GP Well #2	0.4		Easton, Stoughton	Zone II	Zone II
Easton GP Well #4	0.3		Easton, Stoughton	Zone II	Zone II
King Philip St. Well #3A	0.3	North Raynham Water District	Raynham	Zone II	Zone II
King Philip St. Well #3B	0.3		Raynham	Zone II	Zone II
King Philip Bedrock Well[1]	0.5		Raynham	Zone II	Zone II

1 Proposed well

The stormwater discharges from the Stoughton Line would not be expected to contribute contaminants that would impair any waterbodies or water supplies. No new impervious surfaces would be constructed as part of the rail line itself, resulting in no changes in runoff rates. The portion of the rail corridor that would be built on a trestle would not require any constructed stormwater drainage features as the rails would be elevated above the ground, leaving the existing ground surface in place.

Since the Stoughton Electric Alternative involves reconstructing inactive portions of the Stoughton Line, this alternative would introduce new potential pollutant sources to some waterbodies and to the groundwater protection areas in proximity to the proposed Stoughton Line. However, with appropriate management, containment, and mitigation measures in place, these sources would not be expected to contribute contaminants that would impair any of the waterbodies or drinking water sources along the line. With proper design of the stormwater management system and regular maintenance of the track and trains, the new rail line and train operations would pose a minimal threat to waterbodies and drinking water supplies.

As described in Section 4.17.3.2, *Impact Assessment Methodology,* the rail corridor would use a combination of drainage ditches alongside the tracks and underdrains installed in the rail ballast to keep the railbed dry and stable. Potential temporary, construction-period impacts to surface and groundwater resources are discussed in Section 4.17.3.4, *Temporary Construction Impacts*. Mitigation proposed to prevent contamination of surface and groundwater resources from the pollutant sources discussed in the section on Potential Pollutant Sources, are discussed in Section 4.17.3.6, *Mitigation*.

Stoughton Diesel Alternative

The Stoughton Diesel Alternative is identical to the Stoughton Electric Alternative with the exception of the locomotive power source. As described previously for the Attleboro Diesel Alternative, diesel-powered train service differs from electric-powered service in not requiring electrical infrastructure but instead generating diesel exhaust and increasing the potential risk of fuel spills. Constructing the Stoughton Diesel Alternative along the Stoughton Line would be identical to the Stoughton Electric Alternative except without the new electrical infrastructure required for that alternative. This alternative would be near the same waterbodies and groundwater protection areas discussed for the Stoughton Electric Alternative.

Due to the use of diesel fuel, the Stoughton Diesel Alternative would likely have a higher rate of hydrocarbon accumulation on the rail ballast than the Stoughton Electric Alternative, and there would be a greater chance of fuel spills. However, aerial deposition of diesel exhaust would not be a significant source of pollution of water resources because of the very low concentrations of pollutants in the vicinity of the track. The regular operations proposed for this alternative would not be expected to contribute contaminants that would impair any of the waterbodies or drinking water sources along the line.

Potential temporary, construction-period impacts to surface and groundwater resources are discussed in Section 4.17.3.4, *Temporary Construction Impacts*. Mitigation proposed to prevent contamination of surface and groundwater resources from the pollutant sources discussed in the section on Potential Pollutant Sources, are discussed in Section 4.17.3.6, *Mitigation*.

Whittenton Electric Alternative

The Whittenton Electric Alternative is a variant of the Stoughton Electric Alternative alignment described previously. Specifically, at Raynham Junction near the southern end of the historic Stoughton

Line, the alignment would divert to the southwest, following the old Whittenton Branch (Figures 4.17-5a-b). This alignment would connect with the Attleboro Secondary at Whittenton Junction in Taunton, and then continue southeast to connect with the New Bedford Main Line at Weir Junction, at the northern end of the Southern Triangle. This evaluation focuses on the Whittenton Branch component only. Service along the southernmost portion of the Stoughton Line, from Raynham Junction to Weir Junction, would not be reestablished if this variant were selected. This alternative would include the following stations: Canton Center, Stoughton, North Easton, Easton Village, Raynham Park, and Dana Street. No layover facilities are planned within this segment.

Table 4.17-17 lists waterbodies near the Whittenton Branch and identifies the waterbodies that would receive stormwater discharges from the rail line. Prospect Hill Pond would receive stormwater discharges. Although the Whittenton Branch would cross the Mill River in Taunton, the river would not receive any stormwater discharges from the proposed drainage system. However, discharges to nearby wetlands and municipal systems may eventually reach the Mill River. No Zone A areas would be affected by the Whittenton Branch.

Table 4.17-17 Stormwater Discharges on the Whittenton Branch

Waterbody	Municipality	ACEC/ORW	Stormwater Discharges Proposed
Mill River	Taunton	No	No
Prospect Hill Pond	Taunton	No	Yes

This alternative would require construction within the groundwater protection zones for all seven of the North Raynham Water District's existing and proposed wells, including the Zone I area for King Philip Street Well #2. (It should be emphasized that this alternative would require work within *all* areas of Raynham's water supply.) No other Zone I areas would be affected, and no electrical substations would be located in any IWPAs, Zone A areas, or Zone I areas. The Zone II areas include numerous residential neighborhoods, but the Zone I area for King Philip Street Well #2 is largely undeveloped. The individual wells, their protection zones, and potential impacts are listed in Table 4.17-18. There would be no stormwater discharges in any Zone I areas, but there would be stormwater discharges in the Zone II area shared by these wells.

Table 4.17-18 Construction and Stormwater Discharges in Public Water Supply Well Protection Areas on the Whittenton Branch

Well	Distance from Proposed Limit of Work (miles)	Water System	Location of Protection Zone Crossings	Construction in Protection Zones	Stormwater Discharges in Protection Zones
Noblin Well Field[1]	0.4	North Raynham Water District (all)	Raynham, Taunton	Zone II	Zone II
First St. Replacement Well	0.6		Raynham, Taunton	Zone II	Zone II
King Philip St. Well #1	0.2		Raynham, Taunton	Zone II	Zone II
King Philip St. Well #2	0.02		Raynham, Taunton	Zone I and Zone II	Zone II
King Philip St. Well #3A	0.7		Raynham	Zone II	Zone II
King Philip St. Well #3B	0.6		Raynham	Zone II	Zone II
King Philip Bedrock Well[1]	0.7		Raynham	Zone II	Zone II

1 Proposed well

The stormwater discharges from the Whittenton Branch would not be expected to contribute contaminants that would impair any waterbodies or water supplies. No new impervious surfaces would be constructed as part of the rail line itself, resulting in no changes in runoff rates. Since the Whittenton Electric Alternative involves reconstructing the inactive Whittenton Branch, this alternative would introduce new potential pollutant sources to some waterbodies and to the groundwater protection areas adjacent to the Whittenton Branch. However, with appropriate management, containment, and mitigation measures in place, these sources would not be expected to contribute contaminants that would impair any of the waterbodies or drinking water sources along the line.

With proper design of the stormwater management system and regular maintenance of the track and trains, the new rail line and train operations would pose a minimal threat to waterbodies and drinking water supplies.

As described in Section 4.17.3.2, *Impact Assessment Methodology*, the rail corridor would use a combination of drainage ditches alongside the tracks and underdrains installed in the rail ballast to keep the railbed dry and stable. Potential temporary, construction-period impacts to surface and groundwater resources are discussed in Section 4.17.3.4, *Temporary Construction Impacts*. Mitigation proposed to prevent contamination of surface and groundwater resources from the pollutant sources discussed in the section on Potential Pollutant Sources, are discussed in Section 4.17.3.6, *Mitigation*.

Whittenton Diesel Alternative

The Whittenton Diesel Alternative is identical to the Whittenton Electric Alternative with the exception of the locomotive power source. As described above for the Attleboro Diesel Alternative, diesel-powered train service differs from electric-powered service in not requiring electrical infrastructure but instead generating diesel exhaust and increasing the potential risk of fuel spills. Constructing the Whittenton Diesel Alternative would be identical to the Whittenton Electric Alternative except without the new electrical infrastructure required for that alternative. This alternative would be near the same waterbodies and groundwater protection areas discussed for the Whittenton Electric Alternative.

Due to the use of diesel fuel, the Whittenton Diesel Alternative would likely have a higher rate of hydrocarbon accumulation on the rail ballast than the Whittenton Electric Alternative, and there would be a greater chance of fuel spills. However, aerial deposition of diesel exhaust would not be a significant source of pollution of water resources because of the very low concentrations of pollutants in the vicinity of the track. The regular operations proposed for this alternative would not be expected to contribute contaminants that would impair any of the waterbodies or drinking water sources along the line.

Potential temporary, construction-period impacts to surface and groundwater resources are discussed in Section 4.17.3.4, *Temporary Construction Impacts*. Mitigation proposed to prevent contamination of surface and groundwater resources from the pollutant sources discussed in the section on Potential Pollutant Sources, are discussed in Section 4.17.3.6, *Mitigation*.

Hockomock Swamp Trestle

In order to avoid and minimize impacts to the Hockomock Swamp, a 1.6 mile (8,500 foot) section of track would be constructed on an elevated trestle between Foundry Street and Raynham Station. The trestle would consist of pile bents spaced at 50 foot intervals, with concrete spans supporting a ballasted rail bed and a walkway for railroad maintenance personnel. Drainage from this structure would be managed in place through the use of infiltration trenches located at intervals beneath the trestle (Figures 4.17-10 thru 12). The remainder of this section describes the drainage design of the trestle and the proposed infiltration trenches.

Trestle Drainage

The trestle would consist of concrete and steel spans that supports a railbed consisting ballast, ties, and track. The ballast would be drained by a 6 inch underdrain (HDPE perforated pipe) that would be laid parallel to the track. The floor of the trestle would be sloped to direct water to the underdrain. In turn, the underdrain would be connected to downspouts located every 300 feet along the length of the trestle. These downspouts would carry runoff to infiltration trenches located beneath the trestle. Runoff directed to the infiltration trenches would infiltrate into the subsurface soils of the existing **railroad** embankment. During large storm events, runoff would also discharge down the slope of the embankment and into wetlands associated with the adjacent Hockomock Swamp.

The proposed infiltration trenches would each be 16 feet wide by 33 feet long. The length of the trenches is constrained by the spacing of the pile bents and the 5 foot setback that is required from each pile bent. The trenches are sized to provide the recharge volume and the 0.5 inch water quality volume. The floor of each trench would be lined with 6 inches of stone to prevent scour and would have a 4-foot long level spreader to act as an overflow weir. Approximately 30 infiltration trenches would be required along the length of the trestle to provide stormwater management for the structure.

Stormwater Analysis

A HydroCAD[14] analysis was performed to evaluate the storage volume of the ballast on the trestle as well as within the infiltration trench. The results of this analysis demonstrate that the peak rate control is met for the 2, 10, and 100 year storm events.

The recharge volume required for the unit discharge area was calculated to be 127 cubic feet. Each infiltration trench provides 254 cubic feet of recharge volume below the lowest outlet. An overflow weir is incorporated into each infiltration trench to safely dissipate flow from large storm events and prevent scour. During the 100 year storm event, peak flows are anticipated to remain less than 1 cfs, indicating that runoff would be captured and released at non-erosive rates[15] even during large storm events. Existing and proposed discharge rates for the Unit Discharge infiltration trench are shown for the 2, 10, and 100 year storm events in Table 4.17-19.

Table 4.17-19 Peak Discharge Rates (cfs[1])–Hockomock Swamp Trestle Unit Discharge

Design Point	2-year	10-year	100-year
Design Point: Wetland			
Existing	0.12	0.28	0.56
Proposed	0.05	0.14	0.26

1 cubic feet per second

[14] HydroCAD Software Solutions LLC. HydroCAD Stormwater Modeling System, Version 7, Owner's Manual. Chocorua, New Hampshire. 2004.

[15] The Massachusetts Stormwater Handbook defines a non-erosive flow velocity for drainage channels to be generally less than five feet per second.

Massachusetts Stormwater Standard 4 specifies that "Stormwater Management Systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS)." As previously noted, rail operations generate negligible quantities of TSS. Because the trestle consists of ballast placed inside a solid structure, stormwater runoff must be managed differently than that from ballast placed directly on the ground; however the TSS loading would be similarly negligible. Each infiltration trench has been designed to meet the 0.5 inch Water Quality Volume for its contributing drainage area. Because of the trestle's configuration and setting, it is not feasible to provide the full 1 inch Water Quality Volume and the 44 percent pretreatment required to receive credit for 80 percent TSS removal under the guidelines contained in the Stormwater Handbook. However, discharges from the trestle can be considered *de minimis* under the guidance provided in Volume 3, Chapter 1 of the Handbook. The Handbook specifies the following criteria for a *de minimis* determination:

- Physical site conditions preclude installation of a TSS treatment practice.
- The discharge is less than or equal to 1 cfs for runoff associated with the 2 year, 24 hour storm.
- 80 percent TSS removal is achieved on an average weighted basis from the site as a whole using the weighted average method.
- The stormwater outlets where additional controls are used to achieve more than 80 percent TSS removal must discharge to the same reach of the same wetland or waterbody as the outlets that achieve less than 80 percent TSS removal.
- Controls are placed at the outlet to prevent erosion or scour of the wetland/stream channel and bank.
- Standard 2 and Standard 3 must be achieved on a site-wide basis.
- Source control and pollution prevention measures that mitigate the impact of the untreated or partially treated discharges are identified in the Pollution Prevention Plan.
- The size of the drainage area contributing runoff to the untreated outlet has been reduced to the maximum extent practicable.

Compliance with Massachusetts Stormwater Standards

The Hockomock Swamp Trestle has been designed to comply fully with all ten of the Stormwater Standards. Compliance documentation is included in the Hockomock Swamp Stormwater Report (Appendix 4.17-A) and summarized in Table 4.17-20.

Table 4.17-20 Massachusetts Stormwater Standards Compliance[16]–Hockomock Swamp Trestle

Standard	Compliance Level Achieved
Standard 1: No New Untreated Discharges or Erosion to Wetlands	Full compliance would be achieved. BMPs are proposed to treat stormwater runoff from the site and outlets and conveyances are protected from erosion.
Standard 2: Peak Rate Attenuation	Full compliance would be achieved. Peak discharges rates at the design point are expected to be reduced between 0.08 and 0.30 cfs for the range of storm events analyzed.
Standard3: Stormwater Recharge	Full compliance would be achieved. 254 cubic feet of recharge volume is provided within each infiltration trench, exceeding the required recharge volume of 127 cubic feet per unit discharge area.
Standard 4: Water Quality	Full compliance would be achieved. The trestle drainage system meets the *de minimis* requirements for WQV and TSS removal.
Standard 5: Land Uses with Higher Potential Pollutant Loads	Full compliance would be achieved. The trestle does not meet any of the criteria of a LUHPPL.
Standard 6: Critical Areas	Full compliance would be achieved. The site discharges to wetlands within the Hockomock Swamp ACEC, a stormwater critical area.
Standard 7: Redevelopment Standards	Not applicable. This site is not a redevelopment.
Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Controls	Full compliance would be achieved. The project would obtain coverage under the NPDES Construction General Permit prior to the start of earthmoving activities.
Standard 9: Operation and Maintenance Plan	Full compliance would be achieved. MassDOT would develop a detailed O&M plan during final design as part of the Notice of Intent submittal.
Standard 10: Prohibition of Illicit Discharges	Full compliance would be achieved. Storm drainage structures remaining from the previous development which are part of the redevelopment area would be removed. The proposed station has been designed so that the components included therein are in full compliance with current standards. No statement is made with regard to the drainage system in portions of the site not included in the redevelopment project area.

Stations

This section describes each train station, indicates its location near any notable surface or groundwater resources, and evaluates the potential direct and indirect impacts to water resources that could result from the construction and operation of each station for the South Coast Rail project. The section includes a discussion of the design elements of the proposed railroad stations that relate to stormwater management and describes the results of the stormwater analyses and potential mitigation measures, as required by the Secretary's Certificate. The Massachusetts Stormwater Standards (the Stormwater Standards) provide a framework for evaluating the impacts of development activities and identifies mitigation measures that are required to offset those impacts. Twelve stations would be constructed or modified as part of the South Coast Rail project. Modifications are proposed at two existing stations

[16] www.mass.gov/dep/water/laws

(Canton Center and Stoughton). The modifications at the Canton Center Station are limited to the construction of a new Americans with Disabilities Act (ADA)-compliant platform and canopy and do not involve the construction of additional impervious area. The existing Stoughton Station would be removed and replaced with a new station at a different location.

New platform-only stations would be constructed at the Easton Village, King's Highway, Whale's Tooth, and Battleship Cove sites. These locations are developed sites with existing parking facilities (King's Highway and Whale's Tooth) or are drop-off facilities without on-site parking (Easton Village, Battleship Cove).

The Fall River Depot Station would be constructed on the site of the former railroad station and would include a structured parking facility that would maintain existing drainage patterns at the site.

The newly constructed stations would discharge stormwater runoff to wetlands and would require compliance with the Stormwater Standards. Two of these stations (Taunton and Raynham Park) would be located on previously developed sites that meet the redevelopment criteria under Standard 7 of the Stormwater Standards. Three stations (North Easton, Taunton Depot, and Freetown) would be located on undeveloped sites that would require full compliance with the Stormwater Standards.

For the hydrologic analysis, each of the five analyzed station sites was divided into one or more drainage areas that contribute runoff to one or more design points. Peak discharge rates were evaluated at these design points under pre- and post-development conditions in order to demonstrate compliance with the Stormwater Standards.

The rainfall-runoff response of each site under existing and proposed conditions was evaluated for storm events with recurrence intervals of 2, 10, and 100 years. Rainfall depths used for this analysis were based on the Natural Resources Conservation Service (NRCS) Type III, 24-hour storm event; they were 3.4, 4.8, and 7.0 inches, respectively. Curve numbers for the pre- and post-development conditions were determined using NRCS TR 55 methodology[17] as provided in HydroCAD. The HydroCAD model is based on the NRCS Technical Release 20 (TR 20) Model for Project Formulation Hydrology. Detailed printouts of the HydroCAD analyses are included in stormwater reports for individual station sites and are provided in Appendix 4.17-B. Drainage areas used in the analyses are summarized below and are fully described in the individual station stormwater reports. A summary of the existing and proposed conditions peak discharge rates is included for each station site.

The closed drainage system for each station was designed for the 25-year storm event, in accordance with the MBTA's requirements. Drainage pipes were sized using Manning's Equation[18] for full-flow capacity and the Rational Method. Additionally, the performance of the system was analyzed using StormCAD,[19] a HEC-22[20] based program. Pipe sizing calculations are included in the individual station stormwater reports provided in Appendix 4.17-B.

[17] US Department of Agriculture Natural Resources Conservation Service Conservation Engineering Division. 1986. Urban Hydrology for Small Watersheds, Technical Release 55

[18] The Mannings equation is an empirical equation that applies to uniform flow in open channels and is a function of the channel velocity, flow area and channel slope.

[19] StormCAD software provides comprehensive modeling for the design and analysis of storm sewer systems. See http://www.bentley.com/en-US/Products/StormCAD/

[20] Hydraulic Engineering Circular 22 Urban Drainage Design Manual FHWA-NHI-10-009

Soil characteristics for the five station sites were assessed according to the National Cooperative Soil Survey (NCSS)[21] and the NRCS. Individual geotechnical investigations were conducted for each station site. Soil conditions were found to vary considerably between sites, with some sites providing excellent opportunities allow stormwater to infiltrate into the ground and others providing limited to no opportunities for infiltration as the groundwater was already at or near the base of the proposed stormwater BMP. In accordance with the Stormwater Standards identified in Table 4.17-20, above, soil infiltration capacity was evaluated according to the 1982 Rawls Rates.[22] Depth to groundwater was evaluated for each location where infiltration BMPs were proposed in order to confirm that there was sufficient separation from seasonal high groundwater. Lined filtration BMPs were proposed for locations where it was not feasible to achieve the required 2 feet of separation from seasonal high groundwater. Geotechnical reports for each station site are included in the individual station stormwater reports provided in Appendix 4.17-B.

The latest FEMA Flood Insurance Rate Maps (FIRMs) were reviewed for each station site in order to evaluate for potential impacts within the 100 year floodplain. According to the latest maps available from FEMA, none of the station sites are within the 100 year floodplain. A copy of the latest FIRM for each station site is included in the station stormwater reports provided in Appendix 4.17-B.

The Secretary's Certificate on the DEIR and the Stormwater Regulations at 310 CMR 10.05(6)(k) require MassDOT to consider Environmentally Sensitive Site Design (ESSD) and Low Impact Development (LID) design practices. Between the constraints of the essentially fixed elevations of the rail bed and site access road(s), the proposed topography at each station site matches the existing topography to the extent practicable and existing drainage patterns would be maintained. Where necessary, retaining walls were used to minimize impact to wetlands or other sensitive areas. Existing mature vegetation would be preserved and unnecessary impervious areas would be removed. Runoff from existing and proposed impervious areas is disconnected where possible and directed to LID features such as filter strips, grassed swales, and bioretention basins. Infiltration basins were incorporated wherever possible to mimic natural hydrology and to improve groundwater recharge. Structured parking (parking garages) was evaluated as an alternative to at-grade parking in order to reduce the potential area of impervious cover at each station.

The following non-structural water quantity and quality control BMPs to be implemented at station sites:

- **Snow Management:** No snow would be placed in, or directly adjacent to wetland resource areas. As much as possible snow would be allowed to melt on pavement where debris and sand may be deposited and swept up for disposal. Snow melt would enter the stormwater management system where it would receive proper treatment.

- **Spill Prevention:** Spill prevention is achieved with the proper storage and handling of hazardous materials. During construction, this is addressed in the Stormwater Pollution

[21] The National Cooperative Soil Survey (NCSS) is a nationwide partnership of federal, regional, state and local agencies; and private entities and institutions. This partnership works together to cooperatively investigate, inventory, document, classify, interpret, disseminate, and publish information about soils of the United States. NCSS standards are common or shared procedures that enhance technology transfer, data sharing, and communications among soil survey participants.

[22] Rawls, Brakensiek and Saxton, 1982, Estimation of Soil Water Properties, Transactions American Society of Agricultural Engineers 25(5): 1316 - 1320, 1328

Prevention Plan (SWPPP) for Construction Activities that would be prepared prior to the start of construction activities.

- **Source Control:** A comprehensive source control program would be implemented at each station site, which includes regular pavement sweeping, catch basin cleaning, and enclosure and maintenance of all dumpsters, compactors, and loading areas. MBTA would develop a detailed Operations and Maintenance Plan (O&M Plan) during the final design phase of the project and would include it with the Notice of Intent submittal. This plan would address specific maintenance measures that must be performed and the required frequency in order to maintain the stormwater management measures at each station site.

The following structural water quantity and quality control BMPs to be implemented at station sites. Not all BMPs are suitable for each station site.

- **Catch Basins with Sumps and Oil/Debris Traps:** Catch basins at station sites are to be constructed with sumps (minimum 4 feet) and oil/debris traps to prevent the discharge of sediments and floating contaminants. Catch basins must be cleaned regularly to remove accumulated debris and maintain functionality. Catch basins would be inspected and cleaned according to the maintenance schedule laid out in the O&M Plan.

- **Oil/Grit Separator:** MADEP requires the use of a pretreatment BMP, such as an oil/grit separator for sites that constitute land uses with higher potential pollutant loads (LUHPPLs). These structures are underground storage tanks consisting of three chambers that are separated by interior baffle walls. The placement of the interior baffles and the outlet from the structure are designed to remove heavy particulates, floating debris and hydrocarbons from stormwater. Oil/grit separators must be cleaned regularly to remove accumulated debris and maintain functionality. Oil/grit separators would be inspected and cleaned according to the maintenance schedule laid out in the O&M Plan.

- **Vegetated (Grass & Gravel) Filter Strip:** A vegetated or grass filter strip is a linear stormwater management measure that is generally oriented parallel to the contributing drainage area and treats sheet flow or small quantities of concentrated flows that can be distributed along the width of the filter strip. A level spreader, consisting of a pea gravel diaphragm or other similar feature, runs the width of the area being treated. The level spread intercepts and dissipates runoff to minimize the risk of erosion due to concentrated flows. Vegetated filter strips are maintained (mowed) in conjunction with standard site landscape maintenance. Periodic inspections of filter strip are required to confirm that the pea gravel diaphragm has not clogged and that filter strip does not have areas of erosion or bare soil. Additional guidance for filter strip inspection and maintenance requirements would be provided in the O&M Plan.

- **Vegetated (Grass) Swales:** Vegetated swales provide some treatment, reduction, and distribution of stormwater during conveyance. Pollutant removal mechanisms include filtering by the swale vegetation (both on side slopes and on bottom), filtering through a subsoil matrix, and/or infiltration into the underlying soils. Trash removal and vegetation management are required in conjunction with standard landscape maintenance. Additional guidance for vegetated swale inspection and maintenance requirements would be provided in the O&M Plan.

- **Bioretention Swales:** Bioretention swales provide enhanced treatment and infiltration capacity with a conditioned soil mix, mulch layer, and an increased planting density in the conveyance swale. Trash removal and vegetation management are required in conjunction with standard landscape maintenance. Additional guidance for bioretention swale inspection and maintenance requirements would be provided in the O&M Plan.

- **Bioretention Basins:** A bioretention basin manages and treats stormwater runoff using a conditioned planting soil bed and planting materials to filter runoff stored within a shallow depression. The system consists of a flow regulation structure, a pretreatment filter strip or vegetated swale, a sand bed, a shallow ponding area, a surface organic layer of mulch, a planting soil bed, plant material, a gravel underdrain system (if required), and an overflow drain. The vegetation in a bioretention basin serves to filter and transpire runoff—improving water quality and reducing runoff quantity—and the root systems can enhance infiltration. The soil medium filters out pollutants and allows storage and infiltration of stormwater runoff; and the infiltration bed provides additional volume control. Trash removal and vegetation management are required in conjunction with standard landscape maintenance. A bioretention basin should also be inspected periodically during the first year and annually thereafter for sediment buildup, erosion, vegetative conditions. Additional guidance for bioretention basin inspection and maintenance requirements would be provided in the O&M Plan.

- **Infiltration Basin:** Infiltration basins are stormwater runoff impoundments that are constructed in areas with permeable soils. Pretreatment of runoff is critical to prevent the basin from becoming clogged with fine sediment and suffering premature failure. Runoff from the design storm is stored until it exfiltrates through the soil of the basin floor. Trash removal and vegetation management are required in conjunction with standard landscape maintenance. Periodic inspections are required to ensure that the basin drains within 72 hours of the design storm event. If the basin is not draining adequately, a layer of sediment may need to be removed from the floor of the basin to restore infiltration capacity. Additional guidance for infiltration basin inspection and maintenance requirements would be provided in the O&M Plan.

- **Porous Pavement:** Porous pavement is constructed with a base and subbase that allows stormwater to infiltrate through it thereby reducing runoff volume. MassDOT considered permeable pavement but determined that this is not a feasible surface finish because of the lack of ability to maintain the surface and because the amount of sand and salt that would be used during winter operations would clog the system. The MBTA does not currently use porous pavement for these reasons.

Any new or redeveloped station that would increase impervious area at the site would likely require a new or upgraded stormwater management system to prevent flooding or water quality impacts from the construction and operation of the stations. The following section provides a description as measures proposed (if necessary) to comply with MADEP stormwater standards.

Canton Center Station

Canton Center Station is an existing station located in Canton, Massachusetts on the Stoughton Line. The site is fully developed with the existing commuter rail station, a 219 car parking lot, and ancillary structures. The surrounding parcels are fully developed with commercial and industrial uses. Improvements would be limited to construction of a new canopy and platform, and does not involve the construction of additional impervious area. The conceptual design for Canton Center Station is shown on Figure 4.17-13.

Given the current active status of the Canton Center station in a developed area of Canton, the reconstruction of this station would have no impacts to surface or groundwater resources. No stormwater analysis was conducted for Canton Center Station because improvements at the station result in a negligible increase in impervious area. The station is within the Neponset River watershed which has an approved TMDL for bacteria. It is not anticipated that the proposed relocated platform at Canton Center would increase bacteria loads in the watershed.

Stoughton Station

The existing Stoughton Station would be relocated as part of the South Coast Rail project to eliminate conflicts with traffic in Stoughton Center and to meet regulatory requirements for access. Relocating the station would also support downtown revitalization efforts. The existing Stoughton Station is currently the terminal station on the Stoughton Branch of the MBTA commuter rail service. At the current station location, stopped trains block the nearby Wyman Street at-grade crossing while passengers board and alight the train. The low-level platforms of the current station do not meet Americans with Disabilities Act (ADA) accessibility requirements and must be replaced by a high-level platform.

As described in Chapter 3, four location options were reviewed by MassDOT operations and accessibility departments to select a station location and configuration that meets operational and regulatory requirements and provides benefits to the community at a reasonable cost. Option 3 was selected as the Preferred Alternative. This option would realign the tracks and relocate the station between Morton Street and Brock Street with high level platforms and parking on the west side of the tracks (Figure 4.17-24). It has two means of crossing the tracks (a pedestrian bridge and an at-grade crossing). Approximately 2.5 acres of the existing MBTA station parking lot land east of the tracks would be opened for potential development. It would require acquisition of up to 0.2 acres of residential and 9.6 acres of industrial or commercial properties.

As shown in Figure 4.17-14, the footprint of the relocated Stoughton Station and realigned tracks would comprise approximately 7.5 acres. The station would have ADA compliant platforms (with canopies) on either side of the realigned double tracks, with a pedestrian bridge over the tracks connecting the two platforms. Car parking would be provided on the west side of the tracks; a total of 642 spaces are proposed, comprised of 619 standard spaces, 17 accessible spaces, and 6 drop-off spaces. The entrance to the parking lot would be on the south side, off of Brock Street. Approximately 3.3 acres of new impervious surface would be created; added to the existing 2 acres of impervious surface, there would be a total of 5.3 acres of impervious surface at the relocated station site. The parking lot would be configured to avoid any on-site jurisdictional wetlands. The realigned tracks, new platforms, and new parking lot would occupy land currently used for industrial and commercial purposes; these businesses would be displaced. Land east of the realigned tracks, currently occupied by the existing track alignment and parking areas, would be available for redevelopment.

The station is within the Neponset River watershed which has an approved TMDL for bacteria in the watershed. It is not anticipated that the proposed relocated Stoughton Station would increase bacteria loads in the watershed.

The station would be designed in compliance with Massachusetts Stormwater Standards, using appropriate BMPs to maintain groundwater recharge and reduce the discharge of pollutants. No further stormwater analysis has been completed at this time.

North Easton Station

North Easton Station would be a new station located on the Stoughton Line and would be constructed on an approximately 10.0-acre site in Stoughton and Easton, Massachusetts. The site is bounded by undeveloped land to the north, a wetland to the south, office buildings to the east, and the out-of-service Stoughton Line tracks to the west (Figure 4.17-15a).

Station Description—North Easton Station would include a center platform with canopy, a parking lot with 506 spaces, access driveway, bus drop-off area, sidewalks, stairs and ramps associated with access from the parking lot to the platform, bicycle parking facilities, retaining walls and stormwater infrastructure. Construction of the station would involve clearing and grubbing wooded portions of the site and removing a small paved area that currently exists on the site. Construction of the station and associated parking facility would result in a net increase of approximately 1.8 acres of impervious area. The conceptual design for North Easton Station is shown on Figure 4.17-15b.

Wetland areas are located both north and south of the site, but the limits of work would not affect any waterbodies or drinking water protection areas. Whitman Brook, a certified vernal pool (CVP), and the Zone II area for Easton GP Wells #1, #2, and #4 are located nearby but would not be affected by the station site.

Since the site is largely undeveloped, the addition of parking and the station structures would require a new stormwater management system. A stormwater management area would be provided at the south end of the site to manage stormwater flows, reduce flooding, and remove settleable solids. The stormwater management system would discharge to the wetlands adjacent to the site outside of the Zone II area for the Easton wells. With a proper stormwater management design for the station site, there would be no impacts to surface or groundwater resources such as Whitman Brook, the CVP, or the Zone II.

Stormwater Analysis—For the North Easton Station site, three separate design points were identified and the contributing drainage areas to each were evaluated under existing and proposed conditions. Peak flow reductions were achieved for all storm events through the use of LID techniques and stormwater BMPs. These practices include minimizing disturbance to existing trees and vegetation, infiltration basins, bioretention basins, grassed swales, oil/grit separators, and the use of light colored pavement for sidewalks. The BMPs were sized to manage the water quality volume and recharge volume requirements identified under the Stormwater Standards. The station is within the Taunton River watershed and is subject to the approved TMDL for pathogens in the watershed. It is not anticipated that the proposed improvements at the site would increase bacteria loads in the watershed.

The proposed drainage areas for North Easton Station are shown on Figure 4.17-15b. Stormwater runoff from the northern portion of the site sheet flows off of the impervious surface and is conveyed via a grassed swale to Bioretention Basin 1. Bioretention Basin 1 drains to Wetland ST-10. Stormwater runoff from the southern portion of the site is collected in deep sump hooded catch basins, travels through the closed drainage system, passes through an oil/ grit separator prior to discharging to sediment forebays, and is ultimately discharged to Infiltration Basins 2, 3, 4, and 5. These infiltration basins drain to Wetland EA 1. Wooded areas in the northern portion of the property would be maintained in their existing conditions as much as possible. Existing and proposed peak discharge rates to each of the design points for the 2, 10, and 100 year storm events are shown in Table 4.17-21.

Table 4.17-21 Peak Discharge Rates (cfs[1])–North Easton Station

Design Point	2-year	10-year	100-year
Design Point 1: Wetland ST-10			
Existing	1.1	2.6	5.5
Proposed	1.0	2.2	4.3
Design Point 3: Wetland EA-1			
Existing	1.2	3.3	9.0
Proposed	0.8	2.8	7.8
Design Point 4: Wetland EA-1			
Existing	1.3	2.2	3.8
Proposed	1.0	1.8	3.0

1 cubic feet per second

Compliance with Massachusetts Stormwater Standards—North Easton Station has been designed to comply fully with all ten of the Stormwater Standards. Compliance documentation is included in the North Easton Station Stormwater Report (Appendix 4.17-B) and summarized in Table 4.17-22.

Table 4.17-22 Massachusetts Stormwater Standards Compliance–North Easton Station

Standard	Compliance Level Achieved
Standard 1: No New Untreated Discharges or Erosion to Wetlands	Full compliance would be achieved. BMPs are proposed to treat stormwater runoff from the site and outlets and conveyances are protected from erosion.
Standard 2: Peak Rate Attenuation	Full compliance would be achieved. Peak discharges rates at each design point are expected to be reduced between 0 and 1.4 cfs for the range of storm events analyzed.
Standard3: Stormwater Recharge	Full compliance would be achieved. The required recharge volume of 6,926 cubic feet is provided in three infiltration basins and a bioretention basin that provide a total of 55,745 cubic feet of recharge.
Standard 4: Water Quality	Full compliance would be achieved. Eighty percent total suspended solids (TSS) removal is achieved for all drainage areas with contributions from impervious surfaces and 44% pretreatment is also provided prior to infiltration BMPs.
Standard 5: Land Uses with Higher Potential Pollutant Loads	Full compliance would be achieved. The station is considered a LUHPPL because it has greater than 500 parking spaces. BMPs have been sized to treat the 1-inch Water Quality Volume and provide 44% pretreatment of TSS prior to infiltration.
Standard 6: Critical Areas	Full compliance would be achieved. The site does not discharge near or to a stormwater critical area.
Standard 7: Redevelopment Standards	Full compliance would be achieved. The site has been designed to fully comply would all ten Stormwater Standards.
Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Controls	Full compliance would be achieved. The project would obtain coverage under the NPDES Construction General Permit prior to the start of earthmoving activities.
Standard 9: Operation and Maintenance Plan	Full compliance would be achieved. MassDOT would develop a detailed O&M plan during final design as part of the Notice of Intent submittal.
Standard 10: Prohibition of Illicit Discharges	Full compliance would be achieved. The site was previously undeveloped and no sanitary sewer or storm drainage infrastructure is known to exist on the site. The proposed station has been designed in full compliance with current standards.

Easton Village Station

Easton Village Station would be a new platform-only station located adjacent to the historic Old Colony Railroad Station in North Easton, Massachusetts. The station site is adjacent to the existing paved parking area serving the adjacent Easton Historical Society (housed in the historic station building) and is within the existing ballasted right-of-way (Figure 4.17-16).

Station Description—Easton Village Station would include a side platform with canopy, ancillary landscape improvements, bicycle parking facilities, and utility improvements. No additional parking spaces would be added, however a second driveway would be added to improve traffic circulation. The conceptual design for Easton Village Station is shown on Figure 4.17-16.

This 0.5 acre site is located on Sullivan Avenue at the transition point to Mechanic Street (near the intersection with Pond Street) in Easton, within walking distance of downtown Easton. The station would be village-style and serve walk-in or bike-in customers. The station includes only 10 parking spaces, which are designated for pick up/drop off only.

The station would be located near Shovelshop Pond and Queset Brook. While the limit of work for the station would not affect Shovelshop Pond, Queset Brook passes beneath the track and platform at the southern end of the station. The station is located within the Zone II area for Easton GP Wells #1, #2, and #4, which are operated by the Easton Water Division. Stormwater from the parking lot would flow to Sullivan Street and would be discharged to Shovelshop Pond. The station would have negligible effects on groundwater recharge and groundwater quality, due to the existing development in this area, the minimal increase in impervious area, and the lack of pollutant sources at the station itself, which is only a platform with minimal parking. Groundwater impacts are not anticipated, and, with proper design of the station, there would be no impacts to surface or groundwater resources, including Shovelshop Pond.

Stormwater Analysis—No stormwater analysis was conducted for Easton Village Station because improvements at the station result in a negligible increase in impervious area. The station is within the Taunton River watershed and is subject to the approved TMDL for pathogens in the watershed. It is not anticipated that the proposed improvements at the site would increase bacteria loads in the watershed.

Compliance with Massachusetts Stormwater Standards—Improvements at the Easton Village Station result in a negligible increase in impervious area and would be designed to comply with all ten of the Stormwater Standards to the maximum extent practicable.

Raynham Park Station

Raynham Park Station would be a new station located on the Stoughton Line and would be constructed on an 11.4 acre site south of the former Raynham Park Greyhound Track in Raynham, Massachusetts (Figure 4.17-17a). The site consists almost entirely of previously developed land and is bounded to the north by the former Raynham Park Greyhound Track, to the south by industrial buildings, to the east by Route 138, and the Stoughton Line right-of-way and the Hockomock Swamp Area of Critical Environmental Concern (ACEC) to the west. Drainage from the site discharges to the Hockomock Swamp ACEC, either directly through surface channels or through the closed drainage system of the adjacent parking lot.

Station Description—Raynham Park Station would include a center platform with canopy, ancillary landscape improvements, a parking lot with 432 spaces, bicycle parking facilities, and utility improvements. Construction of the station would involve demolishing abandoned kennels and several small buildings currently on the site. Improvements at the site would reduce impervious area by 0.5 acres. The conceptual design for Raynham Park Station is shown on Figure 4.17-17a.

The limits of work would not affect any waterbodies or drinking water protection areas. The proposed station layout includes a subsurface detention and infiltration system to manage stormwater flows, reduce flooding, and remove settleable solids. The stormwater system would discharge to an unnamed perennial stream within the Hockomock Swamp ACEC. The use of an infiltration-based system would provide a high level of settling and filtration of any contaminants. With a proper stormwater management design for the station site, there would be no impacts to surface or groundwater resources, including the Hockomock Swamp.

Stormwater Analysis—For the Raynham Park Station site, four separate design points were identified and the contributing drainage areas to each were evaluated under existing and proposed conditions. Peak flow reductions were achieved for all storm events through the reduction of impervious area and the use of LID techniques and stormwater BMPs such as gravel and grass filter strips, grassed channels, bioretention basins, and a bioretention swale. The BMPs were sized to manage the water quality volume and recharge volume requirements identified under the Stormwater Standards. The station is within the Taunton River watershed and is subject to the approved TMDL for pathogens in the watershed. It is not anticipated that the proposed improvements at the site would increase bacteria loads in the watershed.

The proposed drainage areas for Raynham Park Station are shown on Figure 4.17-17b. Stormwater runoff from the northeastern portion of the site sheet flows off of the impervious surface and is conveyed via two grassed swales to Bioretention Basin 1. Overflows from this basin are discharged to the existing paved parking areas farther north and are captured by the existing closed drainage system in this portion of the site, as under existing conditions. Runoff from the landscaped area at the southeast portion of the site would sheet flow to Wetland R5. Runoff from the northwest portion of the site would be collected in a new closed drainage system that would discharge to Bioretention Basin 3. Overflows from this basin are discharged to the existing paved parking areas farther north and are captured by the existing closed drainage system in this portion of the site, as under existing conditions. The southwest portion of the site is drained by sheet flow to a gravel and grass filter strip and into a bioretention swale before discharging to an unnamed perennial stream west of the rail line. This stream flows north into the Hockomock Swamp ACEC. Existing and proposed peak discharge rates to each of the design points for the 2, 10, and 100 year storm events are shown in Table 4.17-23.

Compliance with Massachusetts Stormwater Standards—Raynham Park Station has been designed to comply fully with all ten of the Stormwater Standards. Compliance documentation is included in the Raynham Park Station Stormwater Report (Appendix 4.17-B) and summarized in Table 4.17-24.

Table 4.17-23 Peak Discharge Rates (cfs[1])–Raynham Park Station

Design Point	2-year	10-year	100-year
Design Point 1: Adjacent Parking Area			
Existing	21.8	31.1	45.7
Proposed	16.9	27.6	41.0
Design Point 2: Wetland R5			
Existing	5.3	7.8	11.6
Proposed	3.1	5.5	9.5
Design Point 3: Adjacent Parking Area/Drainage System			
Existing	15.8	23.2	34.7
Proposed	12.1	18.4	28.1
Design Point 4: Wetland R62.1			
Existing	7.4	11.6	18.0
Proposed	4.9	9.6	15.8

1 cubic feet per second

Table 4.17-24 Stormwater Standards Compliance–Raynham Park Station

Standard	Compliance Level Achieved
Standard 1: No New Untreated Discharges or Erosion to Wetlands	Full compliance would be achieved. BMPs are proposed to treat stormwater runoff from the site and outlets and conveyances are protected from erosion.
Standard 2: Peak Rate Attenuation	Full compliance would be achieved. Peak discharges rates at each design point are expected to be reduced between 0.5 and 9.3 cfs for the range of storm events analyzed.
Standard3: Stormwater Recharge	Full compliance would be achieved. The required recharge volume of 5,289 cubic feet is managed within one of the bioretention areas.
Standard 4: Water Quality	Full compliance would be achieved. Ninety percent TSS removal is achieved for all drainage areas with contributions from impervious surfaces.
Standard 5: Land Uses with Higher Potential Pollutant Loads	Full compliance would be achieved. The station does not qualify as a LUHPPL because it has fewer than 500 parking spaces and does not reach the 1,000 vehicle trip per day threshold.
Standard 6: Critical Areas	Full compliance would be achieved. Because of the proximity to the Hockomock Swamp ACEC, BMPs on the site have been designed to treat the 1-inch water quality volume and meet the 44% pretreatment criteria for infiltration practices.
Standard 7: Redevelopment Standards	Full compliance would be achieved. Although this site constitutes redevelopment, it would fully comply with all ten Stormwater Standards.
Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Controls	Full compliance would be achieved. The project would obtain coverage under the NPDES Construction General Permit prior to the start of earthmoving activities.
Standard 9: Operation and Maintenance Plan	Full compliance would be achieved. MassDOT would develop a detailed O&M plan during final design as part of the Notice of Intent submittal.
Standard 10: Prohibition of Illicit Discharges	Full compliance would be achieved. Storm drainage structures remaining from the previous development which are part of the redevelopment area would be removed. The proposed station has been designed so that the components included therein are in full compliance with current standards. No statement is made with regard to the drainage system in portions of the site not included in the redevelopment project area.

Taunton Station

Taunton Station would be a new station constructed on an 11.9 acre brownfield site located at the intersection of East Arlington Street and William Hooke Lane in Taunton, Massachusetts near the Taunton River (Figure 4.17-18a). The site is bounded by undeveloped land to the north, Arlington Street to the south, a wetland to the west, and an active segment of Stoughton Line tracks to the east. The remnant development at the site consists of building foundations and paved driveways left after the previous structures on the site burned down.

Station Description—Taunton Station would include a side platform with canopy, a parking lot with 210 spaces, access driveway, bus drop off area, sidewalks, stairs and ramps associated with access from the parking lot to the train platform, bicycle parking facilities, and a bioretention basin. Ancillary landscape improvements would be made across the site, including the removal of the existing concrete building pads and existing broken pavement. Improvements at the station site would reduce impervious area by 2.8 acres. The conceptual station design for Taunton Station is shown on Figure 4.17-18a.

The limits of work would not affect any waterbodies or drinking water protection areas. An unnamed stream flows through a wetland west of the site and the Taunton River to southeast of the site, but neither is within the limits of work. Given that the site is a previously-developed brownfield site, its redevelopment would be expected to reduce the potential for stormwater and groundwater pollution by removing or remediating existing contamination. With proper handling of existing contamination and a thorough stormwater management design, there would be no adverse impacts to the stream or any other surface or groundwater resources.

Stormwater Analysis—For the Taunton Station site, a single design point was identified and the contributing drainage areas to this design point were evaluated under existing and proposed conditions. Peak flow reductions were achieved for all storm events through the reduction of impervious area and the use of LID techniques and stormwater BMPs such as a grassed channels and bioretention basin. These BMPs were sized to manage the water quality volume and recharge volume requirements identified under the Stormwater Standards. The site is within the Taunton River watershed and is subject to the approved TMDL for pathogens in the watershed. It is not anticipated that the proposed commuter rail station would increase bacteria loads in the watershed.

The proposed drainage areas for Taunton Station are shown on Figure 4.17-18b. Under existing conditions, stormwater sheet flows untreated from impervious surfaces to Wetland T41. Stormwater from the proposed impervious surfaces would sheet flow into a grassed swale and then be conveyed to Bioretention Basin 1 for treatment. Discharge from this basin and from vegetated portions of the site would flow to Wetland T41. A significant reduction in impervious area would decrease runoff and increase recharge from the site. Existing and proposed peak discharge rates to the design point are shown for the 2, 10, and 100 year storm events in Table 4.17-25.

Table 4.17-25 Peak Discharge Rates (cfs[1])–Taunton Station

Design Point	2-year	10-year	100-year
Design Point: Wetland T41			
Existing	19.1	28.4	42.8
Proposed	13.9	23.0	37.1

1 cubic feet per second

Compliance with Massachusetts Stormwater Standards—Taunton Station has been designed to comply fully with all ten of the Stormwater Standards. Compliance documentation is included in the Taunton Station Stormwater Report (Appendix 4.17-B) and summarized in Table 4.17-26.

Table 4.17-26 Stormwater Standards Compliance–Taunton Station

Standard	Compliance Level Achieved
Standard 1: No New Untreated Discharges or Erosion to Wetlands	Full compliance would be achieved. BMPs are proposed to treat stormwater runoff from the site and outlets and conveyances are protected from erosion.
Standard 2: Peak Rate Attenuation	Full compliance would be achieved. Peak discharges rates at the design point are expected to be reduced between 5.2 and 5.7 cfs for the range of storm events analyzed.
Standard3: Stormwater Recharge	Full compliance would be achieved. 1,263 cubic feet of recharge volume is provided within the bioretention area, exceeding the required recharge volume of 970 cubic feet.
Standard 4: Water Quality	Full compliance would be achieved. Ninety percent TSS removal is achieved for all drainage areas with contributions from impervious surfaces.
Standard 5: Land Uses with Higher Potential Pollutant Loads	Full compliance would be achieved. The station does not qualify as a LUHPPL because it has fewer than 500 parking spaces and does not reach the 1,000 vehicle trip per day threshold.
Standard 6: Critical Areas	Full compliance would be achieved. The site does not discharge near or to a critical area.
Standard 7: Redevelopment Standards	Full compliance would be achieved. Although this site constitutes redevelopment, it would fully comply with all ten Stormwater Standards.
Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Controls	Full compliance would be achieved. The project would obtain coverage under the NPDES Construction General Permit prior to the start of earthmoving activities.
Standard 9: Operation and Maintenance Plan	Full compliance would be achieved. MassDOT would develop a detailed O&M plan during final design as part of the Notice of Intent submittal.
Standard 10: Prohibition of Illicit Discharges	Full compliance would be achieved. Storm drainage structures remaining from the previous development which are part of the redevelopment area would be removed. The proposed station has been designed so that the components included therein are in full compliance with current standards. No statement is made with regard to the drainage system in portions of the site not included in the redevelopment project area.

Taunton Depot Station

Taunton Depot Station would be a new station located on the New Bedford Main Line and would be constructed on a 13-acre site located at Taunton Depot Drive in Taunton, Massachusetts (Figure 4.17-19a). The site is west of the Taunton Depot Shopping Center and is bound by retail buildings to the east and by vegetated wetlands to the south, west, and north. The active New Bedford Main Line tracks are beyond the wetlands west of the site. An existing detention basin associated with the shopping center drainage system is located immediately southeast of the site.

Station Description—Taunton Depot Station would include a center platform with canopy, ancillary landscape improvements, a parking lot with 398 spaces, a pickup/drop off area, bicycle parking facilities, and utility improvements. A sidewalk that connects the station to the existing sidewalk on Taunton Depot Drive and to the Taunton Gardens apartment complex would be constructed. Improvements at the station site would increase the impervious area by 3.3 acres. The conceptual design for Taunton Depot Station is shown on Figure 4.17-19a.

The existing grading directs stormwater runoff into wetland areas adjacent to the site and the right-of-way. A wetland area containing an unnamed stream would be crossed by the proposed platform access from the parking area. The limits of work would not intersect any named waterbodies or drinking water protection areas. The station site is located in a developed area with existing roads and neighborhoods however; the station facility would introduce new uses and stormwater discharges to the area. The additional pavement and parking would require a stormwater management system to prevent impacts to receiving waters. Treated stormwater would discharge to wetlands adjacent to the site. With proper design of the drainage system, there would be no impacts to surface or groundwater resources.

Stormwater Analysis—For the Taunton Depot Station site, two separate design points were identified and the contributing drainage areas to each were evaluated under existing and proposed conditions. Peak flow reductions were achieved for all storm events through the use of LID techniques and stormwater BMPs such as bioretention basins, a grassed swale, and the use of light colored pavement for sidewalks. The BMPs were sized to manage the water quality volume and recharge volume requirements identified under the Stormwater Standards. The station is within the Taunton River watershed and is subject to the approved TMDL for pathogens in the watershed. It is not anticipated that the proposed commuter rail station would increase bacteria loads in the watershed.

The proposed drainage areas for Taunton Depot Station are shown on Figure 4.17-19b. Stormwater runoff from the northern portion of the site sheet flows off of the impervious surface and into Bioretention Basin 1. Bioretention Basin 1 drains to Wetland 1. Stormwater runoff from the southern portion of the site sheet flows off of the impervious surface and into Bioretention Basin 2. Bioretention Basin 2 drains to Wetland 1. Stormwater runoff from the driveway and eastern portion of the site drains to Bioretention Basin 3. Bioretention Basin 3 drains to Wetland 3. Runoff from the northern perimeter of the site is captured in a vegetated swale that discharges to Wetland 1. Runoff from the vegetated southern perimeter of the site sheet flows to Wetland 3. Existing and proposed peak discharge rates to each of the design points for the 2, 10, and 100 year storm events are shown in Table 4.17-27.

Table 4.17-27 Peak Discharge Rates (cfs[1])–Taunton Depot Station

Design Point	2-year	10-year	100-year
Design Point 1: Wetland 1			
Existing	3.1	7.2	15.2
Proposed	3.0	5.3	10.9
Design Point 2: Wetland 3			
Existing	0.5	1.3	3.0
Proposed	0.4	1.0	2.9

1 cubic feet per second

Compliance with Massachusetts Stormwater Standards—Taunton Depot Station has been designed to comply fully with all ten of the Stormwater Standards. Compliance documentation is included in the Taunton Depot Station Stormwater Report (Appendix 4.17-B) and summarized in Table 4.17-28.

Table 4.17-28 Massachusetts Stormwater Standards Compliance–Taunton Depot Station

Standard	Compliance Level Achieved
Standard 1: No New Untreated Discharges or Erosion to Wetlands	Full compliance would be achieved. BMPs are proposed to treat stormwater runoff from the site and outlets and conveyances are protected from erosion.
Standard 2: Peak Rate Attenuation	Full compliance would be achieved. Peak discharges rates at the design points are expected to be reduced between 0.1 and 4.3 cfs for the range of storm events analyzed.
Standard3: Stormwater Recharge	Full compliance achieved. The required recharge volume of 4,071 cubic feet is managed within the bioretention basins. Because of high groundwater, these basins must be lined and underdrained. Approximately 21,000 cubic feet of volume is provided in the basins and filtered through the soil media before being intercepted by an underdrain and discharged to the adjacent wetland.
Standard 4: Water Quality	Full compliance would be achieved. Eighty percent TSS removal is achieved for all drainage areas with contributions from impervious surfaces.
Standard 5: Land Uses with Higher Potential Pollutant Loads	Full compliance would be achieved. The station does not qualify as a LUHPPL because it has fewer than 500 parking spaces and does not reach the 1,000 vehicle trip per day threshold.
Standard 6: Critical Areas	Full compliance would be achieved. The site does not discharge near or to a critical area.
Standard 7: Redevelopment Standards	Not applicable. This site is not a redevelopment.
Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Controls	Full compliance would be achieved. The project would obtain coverage under the NPDES Construction General Permit prior to the start of earthmoving activities.
Standard 9: Operation and Maintenance Plan	Full compliance would be achieved. MassDOT would develop a detailed O&M plan during final design as part of the Notice of Intent submittal.
Standard 10: Prohibition of Illicit Discharges	Full compliance would be achieved. The site was previously undeveloped and no sanitary sewer or storm drainage infrastructure is known to exist on the site. The proposed station has been designed in full compliance with current standards.

Freetown Station

Freetown Station would be a new station located on the existing Fall River Secondary and would be constructed on an approximately 7 acre site located on South Main Street in Freetown, Massachusetts (Figure 4.17-20a). The site is bounded by woods and wetland to the north and southwest, grassed pasture to the northeast, the Fall River Secondary to the southeast, commercial development to the west, and by South Main Street to the northwest. A portion of this station site is within the Coastal Zone. Compliance with the Coastal Zone Management Regulations is described in Chapter 4.18, *Coastal Zone Management and Chapter 91*.

Station Description—Freetown Station would include a side platform with canopy, ancillary landscape improvements, a parking lot with 173 spaces, a pickup/drop off area, bicycle parking facilities, and utility improvements. Improvements at the site would increase impervious area by 2.4 acres. The conceptual design for Freetown Station is shown on Figure 4.17-20a.

The site is partially surrounded by wetland areas, including an unnamed stream on the northeast edge and another unnamed stream on the southwest edge. However, the limits of work would not intersect any named waterbodies or drinking water protection areas.

Given that this portion of the site is undeveloped, a new stormwater drainage system would be required. A stormwater management area would be included at the west end of the site to treat and manage stormwater flows from the west portion of the parking lot. This stormwater management area would discharge to the wetland southwest of the site. A second and third management area would be included at the northeast portion of the site to treat and manage stormwater flows from the entrance roadways and east portion of the parking lot. These stormwater management areas would discharge to the wetland north of the site. With proper design of the stormwater management system, there would be no impacts to surface or groundwater resources.

Stormwater Analysis—For the Freetown Station site, one design point was identified and the contributing drainage areas to that design point were evaluated under existing and proposed conditions. Peak flow reductions were achieved for all storm events through the use of LID techniques and stormwater BMPs such as minimizing disturbance to existing trees and vegetation, infiltration basins, grassed swales, and the use of light colored pavement for sidewalks. The BMPs were sized to manage the water quality volume and recharge volume requirements identified under the Stormwater Standards. The station is within the Taunton River watershed and is subject to the approved TMDL for pathogens in the watershed. It is not anticipated that the proposed commuter rail station would increase bacteria loads in the watershed.

The proposed drainage areas for Freetown Station are shown on Figure 4.17-20b. Stormwater runoff from the northern portion of the site sheet flows off of the impervious surface and into Infiltration Basin 1. Infiltration Basin 1 drains to Wetland 1. Stormwater runoff from the southern portion of the site sheet flows off of the impervious surface and into Infiltration Basin 2. Infiltration Basin 2 drains to Wetland 1. Stormwater runoff from the driveway and eastern portion of the site drains to Infiltration Basin 3. Infiltration Basin 3 drains to Wetland 3. Runoff from the northern perimeter of the site is captured in a vegetated swale that discharges to Wetland 1. Runoff from the vegetated southern perimeter of the site sheet flows to Wetland 3. Existing and proposed peak discharge rates to each of the design points for the 2, 10, and 100 year storm events are shown in Table 4.17-29.

Table 4.17-29 Peak Discharge Rates (cfs[1])–Freetown Station

Design Point	2-year	10-year	100-year
Design Point 1: Wetland 1			
Existing	10.8	18.3	33.4
Proposed	10.4	17.3	31.8

1 cubic feet per second

Compliance with Massachusetts Stormwater Standards—Freetown Station has been designed to comply fully with all ten of the Stormwater Standards. Compliance documentation is included in the Freetown Station Stormwater Report (Appendix 4.17-B) and summarized in Table 4.17-30.

Table 4.17-30 Massachusetts Stormwater Standards Compliance–Freetown Station

Standard	Compliance Level Achieved
Standard 1: No New Untreated Discharges or Erosion to Wetlands	Full compliance would be achieved. BMPs are proposed to treat stormwater runoff from the site and outlets and conveyances are protected from erosion.
Standard 2: Peak Rate Attenuation	Full compliance would be achieved. Peak discharges rates at the design point are expected to be reduced between 0.4 and 1.6 cfs for the range of storm events analyzed.
Standard 3: Stormwater Recharge	Full compliance would be achieved. Approximately 8,600 cubic feet of volume is provided in the infiltration basins, exceeding the required recharge volume of 4,676 cubic feet.
Standard 4: Water Quality	Full compliance would be achieved. Eighty percent TSS removal is achieved for all drainage areas with contributions from impervious surfaces.
Standard 5: Land Uses with Higher Potential Pollutant Loads	Full compliance would be achieved. The station does not qualify as a LUHPPL because it has fewer than 500 parking spaces and does not reach the 1,000 vehicle trip per day threshold.
Standard 6: Critical Areas	Full compliance would be achieved. The site does not discharge near or to a critical area.
Standard 7: Redevelopment Standards	Not applicable. This site is not a redevelopment.
Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Controls	Full compliance would be achieved. The project would obtain coverage under the NPDES Construction General Permit prior to the start of earthmoving activities.
Standard 9: Operation and Maintenance Plan	Full compliance would be achieved. MassDOT would develop a detailed O&M plan during final design as part of the Notice of Intent submittal.
Standard 10: Prohibition of Illicit Discharges	Full compliance would be achieved. The site was previously undeveloped and no sanitary sewer or storm drainage infrastructure is known to exist on the site. The proposed station has been designed in full compliance with current standards.

Fall River Depot Station

Fall River Depot Station would be a new station located on the existing Fall River Secondary and would be constructed on an approximately 7 acre site on North Davol Street in Fall River, Massachusetts (Figure 4.17-21). The site is bounded by North Davol Street to the west, Pearce Street to the north, Turner Street to the south, and the Fall River Secondary to the east. A portion of the station site is within the Coastal Zone. Compliance with the Coastal Zone Management Regulations is described in Chapter 4.18, *Coastal Zone Management and Chapter 91*.

Station Description—Fall River Depot Station would include a side platform with canopy, a parking lot with 524 spaces in a structured parking facility, bicycle parking facilities, a bus way, and utility improvements. Construction of the station would involve demolishing several commercial and industrial buildings that currently exist on the site. Because the site is completely covered by pavement or buildings under existing conditions, the improvements would result in no change to the amount of impervious area at the site. The conceptual design for Fall River Depot Station is shown on Figure 4.17-21.

This site was previously developed as a historic train station and subsequent industrial uses. The new station is envisioned to be a multi-modal transportation center with new mixed-use development and parking facilities. Under the Build Alternatives, the station would include approximately 534 parking spaces in a garage. Drainage inside the garage would discharge to the sanitary sewer as required by health codes, while outdoor stormwater would be discharged to the municipal stormwater system. The limits of work would not affect any waterbodies or drinking water protection areas.

Given the existing industrial character of the local waterfront and the other highways and parking areas nearby, the station would not be expected to increase the potential for water pollution. Existing peak flows into the municipal stormwater system would be maintained through the sizing of the closed drainage system and, if necessary, by the addition of subsurface detention chambers. With a stormwater design to prevent flooding and remove suspended solids, there would be no impacts to the local stormwater system or to surface or groundwater resources.

Stormwater Analysis—The reconstruction of Fall River Depot Station would occur within the existing footprint of a previously developed site and would constitute redevelopment. Under existing and proposed conditions, drainage from the site flows to the municipal separate storm sewer system. No wetland resources are present on the site and no construction is proposed within any water bodies or drinking water protection areas. In accordance with NPDES requirements, stormwater runoff from the lower level of the parking garage would be treated in an oil/grit separator and would be drained to the sanitary sewer system. The station is within the Taunton River watershed and is subject to the approved TMDL for pathogens in the watershed. It is not anticipated that the proposed improvements at the site would increase bacteria loads in the watershed.

Compliance with Massachusetts Stormwater Standards—Fall River Depot Station would be designed to comply with all ten of the Stormwater Standards to the maximum extent practicable.

Battleship Cove Station

Battleship Cove Station would be a new station on the existing Fall River Secondary and would be constructed at the existing Gates of Ponta Delgada monument on Water Street in Fall River, Massachusetts. The site is bounded by a commercial and industrial complex to the north, the Fall River Secondary to the east, Firestone Pond to the south, and the Ponta Delgada monument to the west. A portion of this station site is within the Coastal Zone. Compliance with the Coastal Zone Management Regulations is described in Chapter 4.18, *Coastal Zone Management and Chapter 91*.

Station Description—Improvements at Battleship Cove Station are limited to a side platform with canopy, construction of access walkways, stairs and ramps associated with access from the existing monument to the platform, bicycle parking facilities, and landscape retaining walls. No additional parking or other impervious areas would be created. The conceptual design for Battleship Cove Station is shown on Figure 4.17-22.

The Battleship Cove station site would not require development of an undeveloped area, which greatly reduces the net increase in impervious area and any potential for water resource impacts. The closest waterbodies are Firestone Pond and a pond east of the station, sometimes referred to as Crab Pond, which is fed by an unnamed stream that flows under the railroad right-of-way behind the station.

Firestone Pond is located across Water Street from the site but would not be affected by the new station. Crab Pond would be adjacent to the new platform but would not have any long-term impacts from the operation of the station. There would be no direct stormwater discharges to these ponds. Stormwater runoff from the station site would drain into the municipal stormwater system on Water Street. Potential drainage upgrades, if required for the final design, would be coordinated with the City of Fall River. Given the nature of the proposed use, the station would have no impacts to surface or groundwater resources.

Stormwater Analysis—No stormwater analysis was conducted for Battleship Cove Station because the proposed platform would result in a negligible increase in impervious area. The station is within the Taunton River watershed and is subject to the approved TMDL for pathogens in the watershed. It is not anticipated that the proposed platform construction would increase bacteria loads in the watershed.

Compliance with Massachusetts Stormwater Standards—The proposed platform at Battleship Cove Station would result in a negligible increase in impervious area and would be designed to comply with all ten of the Stormwater Standards to the maximum extent practicable.

King's Highway Station

King's Highway Station would be a new commuter rail station that would occupy part of an approximately 55 acre site that is now a shopping plaza with a large bituminous asphalt paved parking lot. The existing New Bedford Main Line runs along the eastern boundary of the existing parking lot.

Station Description—Construction of the new station would be limited to construction of an elevated platform and canopy within the existing right-of-way and a sidewalk to connect the platform and off-site walkways. The conceptual design for King's Highway Station is shown on Figure 4.17-23.

The station would include approximately 360 existing shared parking spaces. The King's Highway station site would reuse a developed area and would cause no net increase in impervious area. Since there would be no increase in impervious area and no change in use, there would be no modifications required to the stormwater drainage system and no impacts to water resources. The limits of work would not affect any waterbodies or drinking water protection areas. No impacts are anticipated to any surface or groundwater resources.

Stormwater Analysis—No stormwater analysis was conducted for King's Highway Station because improvements at the station result in a negligible increase in impervious area. The station is within the Buzzards Bay watershed and is subject to the approved TMDL for pathogens in the watershed. It is not anticipated that the proposed platform would increase bacteria loads in the watershed.

Compliance with Massachusetts Stormwater Standards—Improvements at the King's Highway Station result in a negligible increase in impervious area and would be designed to comply with all ten of the Stormwater Standards to the maximum extent practicable.

Whale's Tooth Station

Whale's Tooth Station would be a new commuter rail station at the existing 14-acre Whale's Tooth parking lot on Acushnet Avenue in New Bedford, Massachusetts. The station would be constructed adjacent to an existing parking lot constructed by the City of New Bedford. The site is bounded to the north by commercial and industrial buildings, to the east by the New Bedford Main Line, and to the south and west by Acushnet Avenue (Figure 4.17-24). A portion of this station site is within the Coastal Zone. Compliance with the Coastal Zone Management Regulations is described in Chapter 4.18, *Coastal Zone Management and Chapter 91*.

Station Description—Construction of the new station would be limited to construction of an elevated platform and canopy. Because the site is completely covered by pavement or ballast under existing conditions, the improvements would result in a negligible change to the amount of impervious area at the site. The conceptual design for Whale's Tooth Station is shown on Figure 4.17-24.

The limits of work would not affect any waterbodies or drinking water protection areas. New Bedford Harbor is east of the site and is separated from the site by existing industrial development. Given the existing industrial character of the local waterfront and the benign nature of the proposed use, the station would not be expected to increase the potential for water pollution. The existing parking lot has an underground drainage system that discharges near the tracks. This drainage system would remain in place for the station and may not require any upgrades to provide effective stormwater management, as the site improvements would occur almost entirely within the existing built footprint. No impacts are expected to surface or groundwater resources.

Stormwater Analysis—The Whale's Tooth Station would be constructed within the existing footprint of a previously developed site and would constitute redevelopment. Under existing and proposed conditions, drainage from the site flows to the municipal separate storm sewer system. No wetland resources are present on the site and no construction is proposed within any water bodies or drinking water protection areas. The station is within the Buzzards Bay watershed and is subject to the approved TMDL for pathogens in the watershed. It is not anticipated that the proposed platform would increase bacteria loads in the watershed.

Compliance with Massachusetts Stormwater Standards—Whale's Tooth Station would be designed to comply with all ten of the Stormwater Standards to the maximum extent practicable.

Dana Street Station

The DEIS/DEIR included a station in downtown Taunton that would serve the Whittenton Alternative (and the Attleboro Alternative, which has been dismissed from further consideration). The downtown Taunton Station site is no longer available, having been developed as a residential property in the interim. MassDOT reviewed other potential station locations along the Whittenton Branch and the short segment of the Attleboro Secondary that would be used for the Whittenton Alternative. A vacant site along the Attleboro Secondary just south of the Danforth Street at-grade crossing, within walking distance of downtown Taunton, has been selected. The station would be on the east side of the railroad, between the alignment and Dana Street, and would be identified as the Dana Street Station.

Dana Street Station (Figure 4.17-25) would serve walk-in, bike-in, and drive-in customers with 477 parking spaces. Space has been reserved for basins and drainage may tie in to the municipal system. The station would be designed in compliance with Massachusetts Stormwater Standards, using appropriate Best Management Practices (BMPs) to maintain groundwater recharge and reduce the discharge of pollutants. No further stormwater analysis has been completed at this time.

Station Summary

With the exception of Stoughton Station and Dana Street Station, stormwater management systems at each of the new stations have been designed to comply fully with the Stormwater Standards and the Clean Water Act.

Table 4.17-31 summarizes key stormwater information related to the station sites. Four of the proposed stations would consist of platforms only, and would result in a negligible increase in stormwater runoff. These platforms would all be within the existing railbed and are considered redevelopment. Seven new stations are proposed which would consist of parking lots and platforms. Fall River Depot Station would use a parking structure rather than at-grade parking. Two of the stations (Taunton and Raynham Park) would be redevelopment of previously disturbed, mostly paved, sites. The remaining three stations (North Easton, Taunton Depot, and Freetown) would be constructed in undeveloped vegetated areas. All of the stations would incorporate the appropriate BMPs and would fully comply with the Stormwater Standards.

Table 4.17-31 Station Site Summary

Station	Proposed Construction	Existing or Proposed Station	Meets Redevelopment Criteria	Discharge Location or Receiving Waterbody	Within TMDL Watershed	Change in Impervious Area (ac)[6]
Canton[1]	Relocated Platform	Existing	Yes	MS4	Yes[3]	-
North Easton	Platform & Parking	Proposed	No	Wetlands	Yes[4]	+1.8
Easton Village[1]	Platform Only	Proposed	Yes	Queset Brook	Yes[4]	-
Raynham Park	Platform & Parking	Proposed	Yes	Hockomock Swamp	Yes[4]	- 0.5
Taunton	Platform & Parking	Proposed	Yes	Wetland	Yes[4]	-2.8
Taunton Depot	Platform & Parking	Proposed	No	Wetland	Yes[4]	+3.3
Freetown	Platform & Parking	Proposed	No	Wetland	Yes[4]	+2.4
Fall River	Platform & Structured Parking	Proposed	Yes	MS4	Yes[4]	-
Battleship Cove[1]	Platform Only	Proposed	Yes	Wetland	Yes[4]	-
King's Highway[1]	Platform Only	Proposed	Yes	Wetland	Yes[5]	-
Whale's Tooth[1]	Platform Only	Proposed	Yes	MS4	Yes[5]	-

1 Construction/Reconstruction of platforms and canopy only.
2 Relocation of existing station, a separate report would be issued once conceptual design is completed.
3 MassDEP, 2002. *Total Maximum Daily Loads of Bacteria for the Neponset River Watershed*. May 2002. Control Number: CN 121.0.
4 MassDEP, 2011. *Final Pathogen TMDL for the Taunton River Watershed*. June 2011. Control Number: CN 256.0.
5 MassDEP, 2009. *Final Pathogen TMDL for the Buzzards Bay Watershed.* March 2009. Control Number: CN 251.1.
6 – denotes no change

Layover Facilities

Two new overnight layover facilities are proposed as part of the South Coast Rail project. These facilities are proposed near the southern terminus of the New Bedford Main Line (Wamsutta) and the southern terminus of the Fall River Secondary (Weaver's Cove East). The facilities are necessary to provide locations for train sets to be stored overnight, for train crews board the train at the start of each shift, and for minor maintenance activities to be performed to the trains.

Both proposed layover facilities would be located on previously developed sites and qualify under the Stormwater Standards as redevelopment. The stormwater management features at both layover facilities were evaluated for compliance with state and federal stormwater regulations and with the requirements of the Secretary's Certificate. As previously stated, railroad layover facilities are considered a LUHPPL as defined in 310 CMR 10.04 and 314 CMR 9.02. As a result, certain BMPs are required to prevent contamination of local wetlands and water resources such as the New Bedford Inner Harbor or the Taunton River. The storage tracks would have drip pans (collection trays) to catch any incidental drips, leaks, or spills of hazardous materials that may occur during storage or maintenance. The drip pans would be connected to an oil/grit separator that would separate petroleum products from stormwater runoff prior to discharge, protecting wetland and water resources from contamination. Any oil or other hazardous materials stored at the site would be secured with secondary containment structures to catch any spills. With the proposed containment measures in place, neither layover facility would pose a significant risk to surface or groundwater resources.

For the hydrologic analysis of the Weaver's Cove East Layover Facility, the site was divided into several drainage areas that contribute runoff to one or more design points. Peak discharge rates were evaluated at these design points under pre- and post-development conditions in order to demonstrate compliance with the Stormwater Standards.

The rainfall-runoff response of this site under existing and proposed conditions was evaluated for storm events with recurrence intervals of 2, 10, and 100 years. Rainfall depths used for this analysis were based on the NRCS Type III, 24-hour storm event; they were 3.4, 4.8, and 7.0 inches, respectively. Curve numbers for the pre- and post-development conditions were determined using NRCS TR 55 methodology as provided in HydroCAD. The HydroCAD model is based on the NRCS TR 20 Model for Project Formulation Hydrology. Detailed printouts of the HydroCAD analyses are included in the Weaver's Cove East Layover Facility Stormwater Report provided in Appendix 4.17-C. Drainage areas used in the analyses are summarized below and are fully described in Appendix 4.17-C. As noted above, these analyses were not conducted for the Wamsutta Layover Facility.

The closed drainage system for the Weaver's Cove East Layover Facility was designed for the 25-year storm event, in accordance with the MBTA's requirements. Drainage pipes were sized using Manning's Equation for full-flow capacity and the Rational Method. Additionally, the performance of the system was analyzed using StormCAD, a HEC-22 based program. Pipe sizing calculations are included in the Weaver's Cove East Layover Facility Stormwater Report provided in Appendix 4.17-C. These analyses were not conducted for the Wamsutta Layover Facility.

Soil characteristics for the Weaver's Cove East Layover Facility site were assessed according to the USDA NRCS soil mapping. In accordance with the Stormwater Standards, soil infiltration capacity was evaluated according to the 1982 Rawls Rates.

The latest FEMA Flood Insurance Rate Maps (FIRMs) were reviewed for each layover facility site in order to evaluate for potential impacts within the 100 year floodplain. According to the latest maps available from FEMA, neither site was found to be located within the 100 year floodplain. A copy of the latest FIRM for each site is included in the individual layover facility stormwater reports provided in Appendix 4.17-C.

The Secretary's Certificate on the DEIR and the Stormwater Regulations at 310 CMR 10.05(6)(k) require MassDOT to consider ESSD and LID design practices. Within the constraints of the fixed elevation of the existing rail bed and the need to have layover tracks be nearly level, the proposed topography at each layover facility matches the existing topography to the extent practicable and existing drainage patterns would be maintained. To reduce peak runoff rates, existing mature vegetation would be preserved and unnecessary impervious areas would be removed. Runoff from existing and proposed impervious areas is disconnected where possible and directed to LID features such as filter strips, grassed swales, and infiltration basins. Infiltration basins were incorporated wherever possible to mimic natural hydrology and to improve groundwater recharge. Additional LID features such as pervious pavement and rain barrels were evaluated to reduce the amount of connected impervious area at the operations and maintenance buildings.

Non-structural water quantity and quality control BMPs to be implemented at the layover facilities include:

- **Snow Management:** No snow would be placed in, or directly adjacent to wetland resource areas. As much as possible snow would be allowed to melt on pavement where debris and sand may be deposited and swept up for disposal. Snow melt would enter the stormwater management system where it would receive proper treatment.

- **Spill Prevention:** Spill prevention is achieved with the proper storage and handling of hazardous materials. During construction, this is addressed in the SWPPP for Construction Activities that would be prepared prior to the start of construction activities. As required under the Clean Water Act (40 CFR Part 112), an operational phase Spill Prevention, Control and Countermeasures (SPCC) Plan would also be prepared prior to the commencement of operations at each layover facility.

- **Source Control:** A comprehensive source control program would be implemented at each layover facility, which includes regular pavement sweeping, catch basin cleaning, and enclosure and maintenance of all dumpsters, compactors, and loading areas. MBTA would develop a detailed Operations and Maintenance (O&M) Plan during the final design phase of the project and would include it with the Notice of Intent submittal. This plan would address specific maintenance measures that must be performed and the required frequency in order to maintain the stormwater management measures at each layover facility.

Structural water quantity and quality control BMPs to be implemented at each layover facility (not all BMPs are suitable for each site) include:

- **Catch Basins with Sumps and Oil/debris Traps**: Catch basins at layover facilities are to be constructed with sumps (minimum 4 feet) and oil/debris traps to prevent the discharge of sediments and floating contaminants. Catch basins would be inspected and cleaned according to the maintenance schedule laid out in the O&M Plan.

- **Drip Pans (Collection Trays):** As previously described in the DEIS/DEIR, the storage tracks would have drip pans or collection trays to catch any incidental drips, leaks, or spills of hazardous materials that may occur during storage or maintenance of the trains. Runoff and contaminants collected in drip pans would be connected to an oil/grit separator prior to discharge to another BMP or to the municipal storm drain. Drip pans would be inspected and cleaned according to the maintenance schedule laid out in the O&M Plan.

- **Oil/Grit Separator:** MassDEP requires the use of a pretreatment BMP, such as an oil/grit separator, for sites that constitute LUHPPLs. These structures are underground storage tanks consisting of three chambers that are separated by interior baffle walls. The placement of the interior baffles and the outlet from the structure are designed to remove heavy particulates, floating debris and hydrocarbons from stormwater. Oil/grit separators would be cleaned regularly to remove accumulated debris and maintain functionality, in accordance with the maintenance schedule laid out in the O&M Plan.

- **Vegetated (Grass & Gravel) Filter Strip:** A vegetated or grass filter strip is a linear stormwater management measure that is generally oriented parallel to the contributing drainage area and treats sheet flow or small quantities of concentrated flows that can be distributed along the width of the filter strip. A level spreader, consisting of a pea gravel diaphragm or other similar feature, runs the width of the area being treated. The level spread intercepts and dissipates runoff to minimize the risk of erosion due to concentrated flows. Vegetated filter strips are maintained (mowed) in conjunction with standard site landscape maintenance. Periodic inspections of filter strip are necessary to ensure that it is operating as required. Additional guidance for filter strip inspection and maintenance requirements would be provided in the O&M Plan.

- **Vegetated (Grass) Swales:** Vegetated swales provide some treatment, reduction, and distribution of stormwater during conveyance. Pollutant removal mechanisms include filtering by the swale vegetation (both on side slopes and on bottom), filtering through a subsoil matrix,[23] and/or infiltration into the underlying soils. Trash removal and vegetation management are required in conjunction with standard landscape maintenance. Additional guidance for vegetated swale inspection and maintenance requirements would be provided in the O&M Plan.

- **Infiltration Basins:** Infiltration basins are stormwater runoff impoundments that are constructed in areas with permeable soils. Pretreatment of runoff is critical to prevent the basin from becoming clogged with fine sediment and suffering premature failure. Runoff from the design storm is stored until it exfiltrates through the soil of the basin floor. Trash removal and vegetation management are required in conjunction with standard landscape maintenance. Periodic inspections are required to ensure that the basin drains within 72 hours of the design storm event. If the basin is not draining adequately, a layer of sediment may need to be removed from the floor of the basin to restore infiltration capacity. Additional guidance for infiltration basin inspection and maintenance requirements would be provided in the O&M Plan.

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[23] The soil matrix is the portion (usually more than 50 percent) of a given soil layer that has the predominant color, http://www.wetlands.com/coe/87manp3b.htm.

Weaver's Cove East Layover Facility

The Weaver's Cove East Layover Facility would be a new overnight layover facility located near the terminus of the Fall River Secondary in Fall River, Massachusetts. The proposed facility would be constructed on an approximately 18 acre site located on the east side of the Fall River Secondary, northeast of the former Weaver's Cove Energy facility. Portions of the site were previously developed, and existing development on the site is limited to approximately 4.4 acres of paved areas, building foundations, and other impervious areas. The site is bounded to the north and south by residential development, to the east by North Main Street, and to the west by the Fall River Secondary and the Taunton River (Figure 4.17-26a). A portion of this layover facility is within the Coastal Zone. Compliance with the Coastal Zone Management Regulations is described in Chapter 4.18, *Coastal Zone Management and Chapter 91*.

Layover Facility Description—The Weaver's Cove East Layover Facility would include six layover tracks, a paved driveway and access aisle around the layover tracks, ancillary landscape improvements, a 41 space parking lot, two operation and maintenance buildings, a power substation and other utility improvements. Constructing this facility would include demolishing concrete pads and multiple bituminous driveways that currently exist on the site and would reduce the impervious area by 0.91 acres. The conceptual design of the Weaver's Cove East Layover Facility is shown on Figure 4.17-26a.

Stormwater Analysis—For the Weaver's Cove East Layover Facility, four design points were identified and the contributing drainage areas to each design point were evaluated under existing and proposed conditions. Peak flow reductions were achieved for all storm events through the use of LID techniques and stormwater BMPs such as reducing impervious area, drip pans, gravel and grass filter strips, oil/grit separators, vegetated swales, sediment forebays, and infiltration basins. The BMPs were sized to manage the water quality volume and recharge volume requirements identified under the Stormwater Standards. The layover facility is within the Taunton River watershed and is subject to the approved TMDL for pathogens in the watershed. It is not anticipated that the layover facility would increase bacteria loads in the watershed.

The proposed drainage areas for Weaver's Cove East Layover Facility are shown on Figure 4.17-26b. Drainage Areas 1, 3, and 4 include vegetated areas as well as smaller amounts of impervious cover from driveways and paved parking areas. Runoff from the impervious portions of these drainage areas would sheet flow over gravel and grass filter strips prior to discharge to vegetated swales that would convey flows to one of the sediment forebays that is associated with Infiltration Basin 2. Overflows from this basin would be discharged via an outlet control structure to the existing closed drainage system which subsequently discharges to the Taunton River.

Three of the drainage areas on the eastern portion of the site (Drainage Areas 2, 6, and 7) would be predominantly landscaped areas with insignificant amounts of impervious cover. Areas of impervious cover within these drainage areas would flow over gravel and grass filter strips for pretreatment. Stormwater runoff from these drainage areas would sheet flow into Infiltration Basins 1, 3, and 4, respectively. These basins are designed to infiltrate all stormwater drainage from their contributing drainage areas that is collected during a 100 year storm event.

Drainage from the western portion of the site that contains the layover tracks, paved access aisles, and paved driveways (Drainage Area 5) would be collected in an underdrain system and directed to an oil/grit separator. Treated flows from the oil/grit separator would then be discharged to a sediment forebay prior to entering Infiltration Basin 2. Overflows from this basin would be discharged via an outlet control structure to the existing closed drainage system which subsequently discharges to the Taunton River.

Two smaller drainage areas on the western portion of the site (Drainage Areas 8 and 9) consist of pervious areas that sheet flow to an existing ditch and culvert along the railroad right-of-way, prior to discharge to the Taunton River. This drainage pattern would be maintained under the proposed conditions.

Existing and proposed peak discharge rates to each of the design points for the 2, 10, and 100 year storm events are shown in Table 4.17-32.

Table 4.17-32 Peak Discharge Rates (cfs[1])–Weaver's Cove East Layover Facility

Design Point	2-year	10-year	100-year
Design Point 1: Taunton River			
Existing	14.5	23.6	39.0
Proposed	2.7	4.6	22.1
Design Point 2: Wet Area 2			
Existing	4.1	8.4	16.0
Proposed	0.0	0.0	0.0
Design Point 3: Wet Area 3			
Existing	1.5	3.1	5.7
Proposed	0.0	0.0	0.0
Design Point 4: Wetland 4			
Existing	1.5	2.8	5.2
Proposed	0.0	0.0	0.0

1 cubic feet per second

Compliance with Massachusetts Stormwater Standards—Weaver's Cove East Layover Facility has been designed to comply fully with all ten of the Stormwater Standards. Compliance documentation is included in the Weaver's Cove East Layover Facility Stormwater Report (Appendix 4.17-C) and summarized in Table 4.17-33.

Table 4.17-33 Massachusetts Stormwater Standards Compliance – Weaver's Cove East Layover Facility

Standard	Compliance Level Achieved
Standard 1: No New Untreated Discharges or Erosion to Wetlands	Full compliance would be achieved. BMPs are proposed to treat stormwater runoff from the site and outlets and conveyances are protected from erosion.
Standard 2: Peak Rate Attenuation	Full compliance would be achieved. Although this requirement may be waived because the site discharges to land subject to coastal storm flowage as defined in 310 CMR 10.04, peak discharge rates at the design points are expected to be reduced between 1.5 and 19.0 cfs for the range of storm events analyzed.
Standard3: Stormwater Recharge	Full compliance would be achieved. The required recharge volume of 4,785 cubic feet is managed within the infiltration basins. Approximately 118,525 cubic feet of volume is provided in the infiltration basins.
Standard 4: Water Quality	Full compliance would be achieved. Eighty percent TSS removal is achieved for all drainage areas with contributions from impervious surfaces.
Standard 5: Land Uses with Higher Potential Pollutant Loads	Full compliance would be achieved. The layover facility qualifies as a LUHPPL because the use is regulated under the NPDES Multi-Sector General Permit. Containment and treatment measures would be used to prevent the release of oil or hazardous materials.
Standard 6: Critical Areas	Full compliance would be achieved. The site does not discharge near or to a critical area.
Standard 7: Redevelopment Standards	Full compliance would be achieved. Although a portion of this site constitutes redevelopment, it would fully comply with all ten Stormwater Standards.
Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Controls	Full compliance would be achieved. The project would obtain coverage under the NPDES Construction General Permit prior to the start of earthmoving activities.
Standard 9: Operation and Maintenance Plan	Full compliance would be achieved. MassDOT would develop a detailed O&M plan during final design as part of the Notice of Intent submittal.
Standard 10: Prohibition of Illicit Discharges	Full compliance would be achieved. Storm drainage structures remaining from the previous development which are part of the redevelopment area would be removed. The proposed layover facility has been designed so that the components included therein are in full compliance with current standards. No statement is made with regard to the drainage system in portions of the site not included in the redevelopment project area.

Wamsutta Layover Facility

The Wamsutta Layover Facility would be a new overnight layover facility near the terminus of the New Bedford Main Line in New Bedford, Massachusetts. The site of the proposed facility is an approximately 9 acre parcel that was historically used as a railroad yard. A three-foot thick, permeable, engineered barrier was constructed on top of the historic railroad yard. The infrastructure for the proposed layover facility is designed to minimize disturbance to the engineered barrier and would be constructed with as few protrusions into the barrier as possible. The facility would be located between the existing freight tracks to the east, a row of commercial properties on Wamsutta Street to the north, Whale's Tooth Station to the south, and the New Bedford Main Line to the west (Figure 4.17-27). Construction of the layover facility would increase the impervious area by approximately 2.0 acres. A portion of this layover facility is within the Coastal Zone. Compliance with the Coastal Zone Management Regulations is described in Chapter 4.18, *Coastal Zone Management and Chapter 91*.

Layover Facility Description—The Wamsutta Layover Facility would include six layover tracks, a paved driveway and access aisle around the layover tracks, ancillary landscape improvements, a 39 space parking lot, two operations and maintenance buildings, a power substation and other utility improvements. The conceptual design of the Wamsutta Layover Facility is shown on Figure 4.17-27.

Stormwater Analysis—For the Wamsutta Layover Facility, three design points were identified and the contributing drainage areas to each design point were evaluated under existing and proposed conditions. LID techniques and stormwater BMPs such as drip pans, oil/grit separators, water quality manholes, and vegetated swales would be used to manage and treat runoff. The BMPs were sized to manage the water quality volume requirements identified under the Stormwater Standards. Because the layover facility is located on a site where contamination is capped in place, recharge is required only to the maximum extent practicable. The site drains to the municipal separate storm sewer within a coastal watershed and is not required to manage runoff for peak rate controls. The layover facility is within the Buzzards Bay watershed and is subject to the approved TMDL for pathogens in the watershed. It is not anticipated that the proposed layover facility would increase bacteria loads in the watershed.

At this time, no ground survey is available for the site. As a result, the proposed drainage design is conceptual and hydrologic, hydraulic, and geotechnical analyses have not been completed. It is important to note that the cap under the proposed Wamsutta Layover was designed and built with consideration for a future layover; it is staged, therefore, to accommodate the SCR facility. The Wamsutta Layover was also designed to not impact the cap. If, however, there is impact it would be mitigated to maintain the cap's functionality.

Compliance with Massachusetts Stormwater Standards—The Wamsutta Layover Facility would be designed to comply fully with all ten of the Stormwater Standards. Preliminary compliance documentation is included in the Wamsutta Layover Facility Stormwater Report (Appendix 4.17-C) and summarized in Table 4.17-34.

Table 4.17-34 Massachusetts Stormwater Standards Compliance–Wamsutta Layover Facility

Standard	Compliance Level Achieved
Standard 1: No New Untreated Discharges or Erosion to Wetlands	Full compliance would be achieved. The site would continue to drain to existing municipal storm sewers.
Standard 2: Peak Rate Attenuation	Full compliance would be achieved. This requirement may be waived because the site discharges to land subject to coastal storm flowage as defined in 310 CMR 10.04.
Standard3: Stormwater Recharge	Full compliance would be achieved. Because the site is located on a site where contamination is capped in place, MassDEP requires infiltration only to the maximum extent practicable.
Standard 4: Water Quality	Full compliance would be achieved. Eighty percent TSS removal would be achieved for all drainage areas with contributions from impervious surfaces.
Standard 5: Land Uses with Higher Potential Pollutant Loads	Full compliance would be achieved. The layover facility qualifies as a LUHPPL because the use is regulated under the NPDES Multi-Sector General Permit. Containment and treatment measures would be used to prevent the release of oil or hazardous materials.
Standard 6: Critical Areas	Full compliance would be achieved. The site does not discharge near or to a critical area.
Standard 7: Redevelopment Standards	Full compliance would be achieved. Although this site constitutes redevelopment, it would fully comply with all ten Stormwater Standards.
Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Controls	Full compliance would be achieved. The project would obtain coverage under the NPDES Construction General Permit prior to the start of earthmoving activities.
Standard 9: Operation and Maintenance Plan	Full compliance would be achieved. MassDOT would develop a detailed O&M plan during final design as part of the Notice of Intent submittal.
Standard 10: Prohibition of Illicit Discharges	Full compliance would be achieved. With the exception of storm drainage infrastructure that is associated with the engineered barrier at the site, storm drainage structures remaining from the previous development which are part of the redevelopment area would be removed. The proposed layover facility has been designed so that the components included therein are in full compliance with current standards. No statement is made with regard to the drainage system in portions of the site not included in the redevelopment project area.

Layover Summary

The two layover facilities that would be constructed would fully comply with the Stormwater Standards. Table 4.17-35 provides summarizes key stormwater information related to the proposed layover facilities. Both layover facilities are considered "redevelopment" since they have been partially or fully sited on previously developed land. The layover facilities have been designed with appropriate BMPs to manage and treat stormwater runoff from a LUHPPL. Both facilities are proposed within coastal watersheds, and are not required to manage runoff for peak rate controls.

Table 4.17-35 Layover Facility Summary

Layover Facility	Existing or Proposed Facility	Meets Redevelopment Criteria	Discharge Location or Receiving Waterbody	Within TMDL Watershed	Change in Impervious Area (ac)
Weaver's Cove East	Proposed	Yes	Taunton River	Yes[1]	+0.9
Wamsutta	Proposed	Yes	MS4	Yes[2]	+2.0

1 MassDEP, 2011. *Final Pathogen TMDL for the Taunton River Watershed*. June 2011. Control Number: CN 256.0.
2 MassDEP, 2009. *Final Pathogen TMDL for the Buzzards Bay Watershed.* March 2009. Control Number: CN 251.1.

4.17.3.4 Temporary Construction-Period Impacts

In the absence of mitigation, the construction phases for each Build Alternative could result in short-term, temporary impacts that would end when construction is complete. As construction would take several years, these impacts would vary in time and place as different phases of the project were completed. A NPDES permit, specifically, the General Permit for Discharges From Construction Activities[24] (effective February 16, 2012) would be required from the U.S. Environmental Protection Agency, and would specify measures required to prevent construction-related stormwater impacts.

Although the Build Alternatives differ, the types of construction-related impacts would be similar. Water quality impacts, reduction to groundwater recharge, and changes to surface hydrology due to construction could be caused by three primary types of activities:

- Erosion and sedimentation from earthwork;
- Spills of hazardous materials; and
- Dewatering.

The construction of rail lines, highways, bridges, culverts, stations, and layover facilities would expose unvegetated soil that could erode and be deposited in local waterways if appropriate mitigation measures were not taken. This increased sediment load could have an adverse effect on organisms in the receiving waters by increasing the turbidity of the water, altering the channel shape, covering eggs or other sensitive life stages with silt, or transporting any contaminants associated with the sediments. The construction of bridges or culverts may involve construction within a stream or other waterbody using cofferdams, which could disturb sediments in the streambed or lakebed and have similar effects. Cofferdams would temporarily alter flow in the stream channel and could cause increased sedimentation upstream until the cofferdams were removed. Excavation and construction near known contaminated sites would be more likely to encounter contaminated sediments than construction in clean or undisturbed areas.

Construction using heavy equipment would require storing and transporting fuel on site. An accidental release of fuel during refueling could have the potential to contaminate soil, groundwater, and surface water. Potential impacts would be more pronounced in proximity to drinking water supplies, such as within Zone I, Zone II, or Zone A areas. Spill containment procedures, including limiting the areas in which fueling could be performed, would be implemented to minimize any risk of spills or

[24] US Environmental Protection Agency. 2012. National Pollutant Discharge Elimination System General Permit for Discharges from Construction Activities. US EPA, April 16, 2013, <http://www.epa.gov/npdes/pubs/cgp2012_finalpermit.pdf> (April 25, 2013)

contamination. With proper containment and handling procedures in place, there would be no effects on surface or groundwater resources after construction was completed.

Construction near or within streams and wetland areas may require dewatering during construction activities to keep excavated areas free of groundwater. Untreated dewatering fluids are typically filled with silt and sediment, which could be harmful to surface waters if discharged directly. Dewatering could also expose pollutants from contaminated groundwater, particularly near existing contaminated sites. Any contamination encountered would be handled appropriately in compliance with Massachusetts standards and in coordination with MassDEP. All dewatering discharges would require controls as described in Section 4.17.3.6, *Mitigation*.

Based on this assessment, the potential impacts to surface and groundwater resources during construction could be prevented with proper construction management and monitoring. With mitigation in place, none of the potential construction-period impacts would have any significant or long-term effects on surface and groundwater resources. Section 4.17.3.6, *Mitigation*, describes proposed mitigation measures for short- and long-term impacts to surface and groundwater resources.

4.17.3.5 Summary of Impacts By Alternative

This section summarizes the potential direct and indirect effects on water resources from each of the South Coast Rail alternatives (Table 4.17-36). All of the Build Alternatives would have the potential to affect waterbodies and drinking water protection areas. All of the Build Alternatives would require construction within public water supply Zone I areas, which is the area within 400 feet of a well that is generally afforded the greatest protection from development. All of the Build Alternatives would upgrade existing transit corridors, which would have a negligible effect on pollutant loading. The Build Alternatives would upgrade existing transit corridors but would also build new rail lines on disused rail corridors, potentially introducing new pollutant sources in those areas. With mitigation and drainage features in place, none of the Build Alternatives are expected to impair any water resources.

Table 4.17-36 Summary of Potential Water Resource Impacts by Alternative

	Proposed Stormwater Discharges to Waterbodies		Construction in Drinking Water Protection Areas[1]				Proposed Stormwater Discharges to Drinking Water Protection Areas[1]			
Alternative	ACEC/ ORWs	Non-ORWs	Zone A	Zone I	Zone II	IWP A	Zone A	Zone I	Zone II	IWPA
Stoughton Electric	2	9	1	0	6	2	1	0	6	2
Stoughton Diesel	2	9	1	0	6	2	1	0	6	2
Whittenton Electric	2	10	1	1	10	2	1	0	10	2
Whittenton Diesel	2	10	1	1	10	2	1	0	10	2

Potential impacts to the Hockomock Swamp and Fowl Meadow ACEC would occur due to stormwater discharges to Black Brook and the East Branch of the Neponset River, respectively from the Stoughton and Whittenton Alternatives. However, minimal impacts to ACECs from stormwater discharges would occur from the project. None of the above-mentioned discharges are associated with constructed stations, station platforms or parking areas. These discharges would primarily occur from conveyed overland flow from ditches along the railroad, which would carry negligible contaminant loads. None of the proposed actions are expected to impair surface or groundwater resources within the ACEC. Compliance with the Massachusetts Stormwater Management Standards is provided for all stations except Stoughton and Dana Street. Compliance would be documented for these stations (as necessary) during later project design phase phases.

Stoughton Electric Alternative

The Stoughton Electric Alternative would involve construction within one Zone A area, Zone II areas for six wells, and the IWPA for two wells. These areas would be disturbed only temporarily and would not receive any long-term impacts. This alternative would also require stormwater discharges to one Zone A area, Zone II areas for six wells, the IWPA for two wells, and 10 different waterbodies, including one ORW within the Hockomock Swamp ACEC and the East Branch of the Neponset River in the Fowl Meadow ACEC.

One new station, Easton Village Station, would be located in a Zone II area but would not have any impact on groundwater quality. With stormwater management measures in place, none of the stations or layover facilities is expected to impair any surface or groundwater resources.

While much of the rail corridor for this alternative already conveys diesel rail traffic under existing conditions, reconstructing the Stoughton Line south of Stoughton Station would reintroduce rail traffic to a historic rail corridor. However, the Stoughton Electric Alternative is not expected to contribute contaminants that would impair surface or groundwater resources. The proposed drainage design includes measures to control new potential pollutant sources and would meet Massachusetts Stormwater Management Standards. Specifically, the proposed conceptual drainage design would ensure that treatment trains are used at station sites that provide 80 percent Total Suspended Solids (TSS) removal and at least 44 percent TSS removal for discharges to Zones I, II and IWPA areas, as required by the Standards. Appropriate setbacks, volume controls and pretreatment requirements for these Zones and ORW's would be met. Consultation with DEP, the North Raynham Water District, and Easton Water Division during design would be undertaken during the design process. With mitigation and drainage features in place, the Stoughton Electric Alternative is not expected to impair any surface or groundwater resources.

Stoughton Diesel Alternative

The Stoughton Diesel Alternative would be comprised of the same elements as the Stoughton Electric Alternative as listed above and would have the potential to affect the same water resources. The Stoughton Diesel Alternative would have a slightly greater potential for pollutant loading due to the use of diesel fuel. Much of the rail corridor for this alternative already conveys diesel rail traffic under existing conditions; however, reconstruction of the Stoughton Line south of Stoughton Station would reintroduce rail traffic to a historic rail corridor. With mitigation and drainage features in place, the Stoughton Diesel Alternative is not expected to contribute contaminants that would impair surface or groundwater resources.

Whittenton Electric Alternative

The Whittenton Electric Alternative would involve construction within one Zone A area, the Zone I area for one well, Zone II areas for 10 wells, and the IWPA for two wells. These areas would be disturbed only temporarily and would not receive any long-term impacts. This alternative would also require stormwater discharges to the Hockomock Swamp ACEC and the East Branch of the Neponset River in the Fowl Meadow ACEC.

However, this alternative would require stormwater discharges to one Zone A area, Zone II areas for 10 wells, the IWPA for two wells, and 11 different waterbodies. One new station, Easton Village Station, would be located in a Zone II area but would not have any impact on groundwater quality. With stormwater management measures in place, none of the stations or layover facilities is expected to impair any surface or groundwater resources.

While much of the rail corridor for this alternative already conveys diesel rail traffic under existing conditions, using the Whittenton Branch and reconstructing the Stoughton Line south of Stoughton Station would reintroduce rail traffic to a historic rail corridor. However, the Whittenton Electric Alternative is not expected to contribute contaminants that would impair surface or groundwater resources. The proposed drainage design includes measures to control new potential pollutant sources and would meet Massachusetts Stormwater Management Standards. With mitigation and drainage features in place, the Whittenton Electric Alternative is not expected to impair any surface or groundwater resources.

Whittenton Diesel Alternative

The Whittenton Diesel Alternative would be comprised of the same elements as the Whittenton Electric Alternative as listed above and would have the potential to affect the same water resources. The Whittenton Diesel Alternative would have a slightly greater potential for pollutant loading due to the use of diesel fuel. Much of the rail corridor for this alternative already conveys diesel rail traffic under existing conditions; however, using the Whittenton Branch and reconstruction of the Stoughton Line south of Stoughton Station would reintroduce rail traffic to disused rail corridors. With mitigation and drainage features in place, the Whittenton Diesel Alternative is not expected to contribute contaminants that would impair surface or groundwater resources.

4.17.3.6 Mitigation

This section summarizes the avoidance, minimization, and mitigation measures proposed to protect and maintain water resources under each of the alternatives assessed in this report.

Avoidance

This section discusses steps taken to avoid impacts to water resources under each alternative. The Build Alternatives are discussed together due to their similar design methodology and construction requirements.

No-Build (Enhanced Bus) Alternative

The No-Build Alternative does not involve any construction or potential water resource impacts. The alternative uses existing bus routes and park-and-ride locations and has negligible potential for impacts to surface and groundwater resources.

Build Alternatives

The transit corridors selected for each Build Alternative were based on existing and former transit corridors such as the New Bedford Main Line and the Stoughton Line. Total avoidance of water resources was not possible because these corridors have already been established and cross various surface and groundwater resources.

Stations and Layover Facilities

Where possible, new or reconstructed stations and new layover facilities were located away from waterbodies and drinking water protection areas. None of the stations or layover facilities are located in Zone I or Zone A areas, which require the greatest degree of protection from development in order to protect drinking water quality. However, the site selection for these facilities focused on locations that would enhance ridership and meet the operational requirements of the South Coast Rail alternatives.[25] Therefore, total avoidance of groundwater resources was not possible.

Minimization

Proposed station and parking facilities for all alternatives were located on developed sites whenever possible to minimize any increases in impervious area and to avoid introducing new pollutant sources to undeveloped areas. Additional minimization measures to reduce impervious surfaces such as deck parking, the use of water quality swales, narrower streets and green "islands", a reduced building footprint, and alternative (permeable) materials for parking areas, sidewalks and roads at stations would be considered during the design stage of the project. Further minimization along the proposed transit corridors was not possible, as the corridors themselves were determined by existing and former highway and rail alignments and could not be relocated without substantial increases in impacts to other resources.

Specific Mitigation Measures

This section discusses mitigation measures required to protect water resources under each of the Build Alternatives. Most of these measures are common to multiple alternatives. Only a few select mitigation measures are presented due to the steps taken to minimize potential impacts such as the avoidance of stormwater discharges to sensitive resource areas (Zone I) and the minimization of discharges throughout the alternative project areas. All stormwater BMPs would meet or exceed regulatory requirements to suggest mitigation for potential impacts. These BMPs would be further refined during the design stage of the project.

Common to All Build Alternatives — Construction

Construction of the Build Alternatives would require a General Permit for Discharges From Construction Activities (effective February 16, 2012) would be required from the U.S. Environmental Protection Agency, pursuant to the National Pollutant Discharge Elimination System (NPDES). A comprehensive Stormwater Pollution Prevention Plan (SWPPP) would be a condition of the General Permit. The SWPPP would describe potential pollutant sources on a site and dictate what best management practices (BMPs) must be implemented to manage stormwater and protect water quality. Any soil-disturbing activities would require erosion and sediment controls, including proper timing of construction to minimize the time that an area is left exposed, temporary stabilization of exposed areas using protective covers, and perimeter controls to capture sediment before it leaves the site. Erosion and sedimentation controls are for use during the earthwork and construction phases of the project and may include

[25] Executive Office of Transportation and Public Works, South Coast Rail Station Siting Report: EOT's Final Recommendations, October 10, 2008.

structural management practices such as hay bale barriers, silt fencing, compost mulch socks, catch basin inlet protection, gravel construction entrances, diversion channels, and temporary sedimentation basins. Non-structural management practices may include vegetative slope stabilization and construction sequencing. Daily monitoring would be performed to ensure that the controls are effective. Large areas of disturbance (such as at new station sites) could require temporary sedimentation basins.

Spill control procedures would be in place at designated fueling locations and temporary sanitary facilities to control any accidental spills of fuel or other hazardous materials. These locations would be isolated from surface waters and provided with spill-recovery equipment. Waste materials would be disposed of properly and not left in the open where they could contaminate soil or runoff.

Any dewatering activities for excavation, channel relocation, or fill would require proper handling of the dewatering discharge. To minimize dewatering discharges, the pump intake would be kept above the bottom of the excavation. Any contaminated dewatering discharge would be stored and disposed of in accordance with Massachusetts waste disposal standards in coordination with MassDEP. Uncontaminated water would be discharged to a vegetated land surface or pumped into an upland settling basin (or confined disposal facility) surrounded by hay bales or silt fences. Overflow water from the settling basin would be discharged into nearby waters of the United States in accordance with provisions of the Corps Section 404 permit, and the basin and all accumulated sediment would be removed following dewatering operations and the area would be seeded and mulched.

Common to All Build Alternatives—Stations

All proposed station sites would be designed to meet the Massachusetts Stormwater Management Standards (310 CMR 10.05(6)) and the proposed Massachusetts Stormwater Management Regulations (314 CMR 21.00). Together, these regulations require peak flow management as well as stormwater treatment such as removal of suspended solids.

Five stations require mitigation measures in order to comply with the Stormwater Standards. The BMPs incorporated into the design for these stations are summarized in Table 4.17-37, and include such LID and ESSD measures as vegetated swales, filter strips, bioretention swales, bioretention basins, and infiltration basins as well as structural BMPs such as oil/grit separators.

Table 4.17-37 Station Site Stormwater BMP Matrix

Station Name	Oil/Grit Separator	Vegetated Swale	Gravel & Grass Filter Strip	Bioretention Swale	Bioretention Basin	Infiltration Basin
North Easton Station	X	X			X	X
Raynham Park Station		X	X	X	X	
Taunton Station		X			X	
Taunton Depot Station		X			X	
Freetown Station		X				X
Fall River Depot Station	X					

Common to all Build Alternatives—Layover Facilities

The layover facilities would be regarded as Land Uses with Higher Potential Pollutant Loads (LUHPPLs) under the Stormwater Management Standards and would be held to a higher standard of treatment than the other elements of the project. The two overnight layover facilities have been designed with the appropriate BMPs to comply with the Stormwater Standards. The mitigation measures proposed for these facilities are summarized in Table 4.17-38, and include drip pans, oil/grit separators, vegetated swales, filter strips, and infiltration basins. A water quality manhole is proposed at the Wamsutta Layover Facility due to the unique constraints posed by this capped property.

Table 4.17-38 Layover Facility Stormwater BMP Matrix

Layover Facility Name	Drip Pan	Oil/Grit Separator	Vegetated Swale	Gravel & Grass Filter Strip	Water Quality Manhole	Infiltration Basin
Weaver's Cove East	X	X	X	X		X
Wamsutta	X	X	X		X	

Typical LID and infiltration-based stormwater management techniques may not be appropriate for the layover facilities due to their LUHPPL status, although open drainage systems may be possible for the access roads into the facilities. Closed or partially-closed drainage systems would be used to manage stormwater runoff within the site. The stormwater drainage would be designed to control runoff rates and maintain groundwater recharge. The only major potential pollutant source within the facilities would be locomotives in storage, which may drip small amounts of oil or other hazardous materials while in the facility. In addition to standard total suspended solids (TSS) removal BMPs for paved areas, the site would include specific drainage features to contain hazardous materials that may be encountered on the storage tracks. Drip trays and oil/water separators would be included in the layover facilities to capture and divert any pollutants that may collect under the locomotives. With these measures in place, the layover facilities are expected to satisfy the LUHPPL treatment requirement and meet the Stormwater Management Standards.

Build Alternatives

There are several mitigation measures that would be used along the rail lines and at the stations to prevent contamination of stormwater, groundwater, and waterbodies:

- The rail corridor would be supported by pervious ballast (or a trestle structure in some areas), which would have a minimal effect on stormwater drainage. Existing drainage ditches along the rail corridors would be improved, expanded, or relocated as needed to ensure proper drainage during storms. In accordance with the requirements of the Secretary's Certificate, drainage improvements would include specific measures to protect critical areas adjacent to the rail corridor. Detailed drainage plans for the entire project area would be completed in conjunction with final grading design. Locations where specific BMPs are recommended or required are identified below.

- Vegetated swales are proposed for use where the rail bed is in a cut or on a wide embankment with sufficient room to construct swales.

- Sediment forebays with checks dam are proposed for use at the downstream end of vegetated swales where flows are routed to a pipe for further conveyance, and at the downstream end of vegetated swales where flows are discharged to a wetland or other surface water.

- Underdrains with cleanouts are proposed for use where the right-of-way is too narrow to construct vegetated swales. In locations where underdrains are proposed in the vicinity of vernal pools, the elevation of seasonal high groundwater should be evaluated to ensure that underdrains do not inadvertently cause the vernal pool to drain prematurely.

- Stone-lined swales with HDPE liners are required for use near public water supply well Zone 1 areas, such as near the Easton GP Well #1 on Gary Lane in Easton. Lined swales are also required for use where drainage swales may intercept seasonally high groundwater in the vicinity of vernal pools. Interception of groundwater in these areas may cause pools to drain prematurely.

- Outlet scour protection is proposed for use where concentrated flow is discharged, typically pipe outlets with flared end sections or headwalls.

- Infiltration trenches are proposed for use to manage stormwater runoff associated with the Hockomock Swamp Trestle. Infiltration trenches would be constructed beneath the trestle at intervals to manage runoff from the overlying sections of trestle.

- The potential for creosote contamination from the rail ties can be reduced or eliminated by using alternative rail tie materials such as concrete wherever possible to avoid the need for creosote treatment. The South Coast Rail project has specified concrete ties as a standard element for new tracks. Wooden ties may be preferred at some turnouts, switches, special track work, and anywhere noise is a primary concern, as wooden ties usually result in quieter train operations than concrete ties.

- Rail greasers would be required at numerous curves in the track. Filter fabric would be placed atop the ballast at greaser locations to capture excess grease. This fabric would be replaced periodically in order to prevent excessive grease accumulation that could lead to stormwater or groundwater contamination.

- Herbicide would be used to keep the rail corridor free of intrusive and obstructive vegetation in order to ensure the stability of the railbed and the safety of trains. To minimize the potential for water quality impacts from herbicide use, an approved Vegetation Management Plan, as implemented with its Yearly Operating Plans would be adhered to which restrict the use of herbicides in areas adjacent to wetlands or sensitive resources.

- Traction power substations would be required along the rail line for the electrically-powered alternatives. To prevent potential water contamination from the oil in the transformers, these substations would be designed with secondary containment structures that would surround the equipment and contain any leaks or spills until the hazardous material could be collected.

- The sanitary tanks on the trains would be unloaded at the mid-day layover facility. The sanitary waste from the trains would not pose a risk to water resources under normal operations.

- Culverts would be evaluated for potential modification and upgrades to meet stream crossing standards and enhance wildlife, to the maximum extent practicable. All crossings would be evaluated. Where feasible, culverts would be replaced in-kind at stream crossings to prevent hydrologic changes to local streams, improve and restore fish and wildlife passing, decrease fragmentation of genetic pools, and improve connectivity between environmental resources. Design would be developed in consultation with DEP and the Corps and according to the Massachusetts River and Stream Crossing Standards.

Summary of Mitigation

All Build Alternatives would require stormwater management measures to prevent flooding and protect water quality. With the proposed mitigation measures in place, none of the Build Alternatives would be expected to substantially increase pollutant loading or impair any surface or groundwater resources.

4.17.3.7 Regulatory Compliance

Surface and groundwater resources are protected under several federal and state regulatory programs. This chapter documents how the proposed project complies with each water regulatory program.

Federal Regulations

Federal regulations related to stormwater and water quality include Sections 303(d), 311, and 402 of the Clean Water Act (33 U.S.C. 1251 et seq.) and the Safe Drinking Water Act (42 U.S.C. 300f et seq.).

Clean Water Act Section 303(d)

Section 303(d) of the Clean Water Act requires states, territories, and authorized tribes develop lists of impaired waters. These impaired waters do not meet the water quality standards that have been set for them, even after the minimum required levels of pollution control technology have been installed at point sources of pollution. The law requires that the jurisdiction establish priority rankings for waters on the lists and develop TMDLs for them. TMDLs identify the major contributors to a given impairment (e.g., sources within a watershed that may contribute to the contamination or impairment) and specifies both general and individual discharge limits that must be met in order to reduce contaminant loading and improve the health of the waterbody. If a project impacts a waterbody listed under the TMDL program, appropriate measures must be taken to control the discharge of the listed pollutant and meet the TMDL requirements. Some TMDLs may require additional measures (including stormwater treatment) in order to prevent an increase in pollutant loading to the receiving water.

Elements of the project are located within three watersheds with approved TMDLs; these watersheds are the Neponset River, Taunton River, and Buzzards Bay.[26,27,28] All of the project elements would be constructed to prevent the release of sanitary sewage into receiving waters, which is the major source

[26] MassDEP. 2009. *Final Pathogen TMDL for the Buzzards Bay Watershed* March 2009 (Control Number: CN 0251.1).
[27] MassDEP. 2011. *Final Pathogen TMDL for the Taunton River Watershed* June 2011 (Control Number: CN 0256.0).
[28] MassDEP. 2002. *Final Total Maximum Daily Loads of Bacteria for Neponset River Basin*. DEP, DWM TMDL Report MA73-01-2002. Control Number: CN 0121.0. May 31, 2002.

of bacteria or other pathogens that are the cause of the impairment under these TMDLs. As noted in the TMDL for the Taunton River watershed, "The expectation for WLAs [waste load allocations] and LAs [load allocations] for stormwater discharges is that they will be achieved through the implementation of BMPs and other controls." Filtration and infiltration practices are proposed at station sites and layover facilities with new impervious area. These BMPs would help to minimize bacteria loading from ambient sources such as birds and other wildlife. The project would not add any new sources of bacteria or other pathogens within the TMDL watersheds.

Clean Water Act Section 311

Section 311 of the Clean Water Act (40 CFR 112) regulates the prevention and response to accidental releases of oil and hazardous substances into navigable waters, on adjoining shorelines, or affecting natural resources belonging to or managed by the United States. As required under Section 311, an operational phase SPCC would be prepared prior to the commencement of operations at each layover facility.

Clean Water Act Section 402

Section 402 of the Clean Water Act regulates the discharge of pollutants to surface waters. Under the National Pollutant Discharge Elimination System (NPDES) program that is authorized by this section of the Clean Water Act, owners and operators of point source discharges and certain non-point discharges (such as stormwater runoff) are required to obtain a permit prior to discharging.

The South Coast Rail project would require authorization to discharge stormwater during construction under the NPDES General Permit for Construction Activities, administered in Massachusetts by the U.S. Environmental Protection Agency, and which regulates erosion control, pollution prevention, and stormwater management at construction sites over 1 acre. This permit would require a SWPPP that would specify proper stormwater management procedures for any disturbed areas. Construction period impacts to water quality would be reduced or eliminated through the use of appropriate BMPs. These BMPs would be documented in the SWPPP and would include perimeter sedimentation controls (silt fence, hay bales, filter berms, siltation booms), temporary stabilization of disturbed areas, and temporary siltation basins where appropriate. The SWPPP would be completed during the final design phase and must be implemented by the project contractor. Authorization to discharge stormwater under the General Permit for Construction Activities would be requested via a Notice of Intent prior to the commencement of construction.

In addition, the layover facilities would also require permission to discharge stormwater during operation. The NPDES Multi-Sector General Permit for Industrial Activities describes stormwater effluent limits, monitoring requirements and other conditions related to post-construction operations at the facilities. A site-specific SWPPP would be completed for each facility that provides an assessment of potential sources of pollutants in stormwater runoff and control measures that would be implemented at the layover facility to minimize the discharge of these pollutants in runoff from the site. These control measures include site-specific BMPs, maintenance plans, inspections, employee training, and reporting. Authorization to discharge stormwater under the Multi-Sector General Permit would be requested via a Notice of Intent prior to the commencement of operations at each facility.

Safe Drinking Water Act

The Safe Drinking Water Act authorizes the USEPA to set national health-based standards for drinking water to protect against both naturally occurring and man-made contaminants that may be found in drinking water. The South Coast Rail project would not impact public drinking water supplies and includes measures to prevent the release of contaminants in the vicinity of public water supplies.

State Regulations

The state applies regulatory measures pursuant to its authority under the Massachusetts Clean Waters Act (MGL Chapter 21, §26 53) and the Massachusetts Wetlands Protection Act (MGL Chapter 21, §26 53). Regulations promulgated under the Clean Waters Act include the Surface Water Quality Standards (314 CMR 4.00), Groundwater Quality Standards (314 CMR 6.00), and Section 401 Discharge regulations (314 CMR 9.00). Authority to regulate stormwater discharges is incorporated into the Massachusetts Wetlands Protection Act Regulations (310 CMR 10.05) as the Massachusetts Stormwater Standards [310 CMR 10.05(6)(k)].

Massachusetts Surface Water Quality Standards (314 CMR 4.00).

The Massachusetts Surface Water Quality Standards (314 CMR 4.00) assign class designations to inland and coastal waters. These classes specify water quality standards based on the intended uses of the waterbodies and prohibit degradation of these waterbodies by new discharges. The South Coast Rail project does not include any new discharges that would impair the ability of a waterbody to meet its designated use. Comments on the DEIS/DEIR asked MassDOT to confirm the classifications for the waterbodies potentially affected by the project and to update the listing of impaired waters with the most recent Integrated List of Waters. Based on information published by MADEP on their website, none of the waterbody classifications were found to have changed since the DEIS/DEIR.

In addition to the water classifications in 314 CMR 4.00, MADEP also maintains the Massachusetts Integrated List of Waters, which is updated every 2 years and provides more detail on individual waterbodies. This list identifies what designated uses are attained, what impairments have been reported, and whether or not a TMDL has been prepared, if required. The TMDL program is part of Section 303(d) of the Clean Water Act and is also described above under Federal Regulations. Comments on the DEIS/DEIR asked MassDOT to update the listing of impaired waters with the most recent Integrated List of Waters. MADEP most recently published the Integrated List of Waters in 2010.[29] Only minor changes to waterbodies potentially affected by the project were noted when comparing the 2006 list to the 2010 list. These changes included an assessment of Forge Pond in Canton that indicated that the pond is impaired for turbidity (the pond was previously unassessed) and the approval of TMDLs for the Buzzards Bay and Taunton River Watersheds. As previously noted, these approved TMDLs address pathogens in discharges within the watershed.

Massachusetts Groundwater Quality Standards (314 CMR 6.00)

Compliance with the Stormwater Standards ensures that the project would not affect groundwater discharge that supports base stream flows, as well as protecting water quality. The South Coast Rail

[29] MassDEP. 2010. Massachusetts Year 2010 Integrated List of Waters, Final Listing of the Condition of Massachusetts' Waters Pursuant to Sections 305(b), 314 and 303(d) of the Clean Water Act, Featuring new water quality assessments for the Chicopee, French, Quinebaug and Nashua watersheds and the Narragansett Bay and Mount Hope Bay Coastal Drainage Areas.

project includes BMPs designed to promote recharge of groundwater to the maximum extent practicable. Pretreatment of runoff prior to recharge would ensure that groundwater quality is not impacted by the project.

Massachusetts Section 401 Discharge Regulations (314 CMR 9.00)

Section 401 of the Clean Water Act (33 U.S.C. 1341) requires any applicant for a federal license or permit to conduct any activity that may result in a discharge of a pollutant into waters of the United States to obtain a certification from the State in which the discharge originates or would originate, that the discharge would comply with the applicable effluent limitations and water quality standards. Under these regulations, the MassDEP is required to issue Water Quality Certifications for projects that result in discharge of fill to a wetland or waterbody, pursuant to the Massachusetts Clean Waters Act (MGL Ch. 21 § 26-53). The South Coast Rail project would require issuance of an individual Water Quality Certification as it would result in the loss of more than 5,000 square feet of wetlands subject to federal jurisdiction.

Massachusetts Stormwater Standards (310 CMR 10.05)

The Stormwater Standards consist of ten stormwater performance standards that were developed by the MassDEP to reduce the impacts of development on water quality. This section lists each of the Stormwater Standards and identifies how the South Coast Rail project would comply with each one. Supporting calculations documenting compliance with each standard are presented in Appendix 4.17-B (Stations), Appendix 4.17-C (Layover Facilities), and Appendix 4.17-A (Hockomock Swamp Trestle).

1. No new stormwater conveyances may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.

- The South Coast Rail project has been designed to fully comply with Standard 1.
- BMPs proposed upgradient from any new discharge have been designed in accordance with the Massachusetts Stormwater Handbook and provide the required treatment volume.
- All proposed stormwater outlets and conveyances have been designed to not cause erosion or scour to wetlands or receiving waters. Outlets from closed drainage systems have been designed with flared end sections or headwalls with stone protection to dissipate discharge velocities. Overflows from BMPs that impound stormwater have been designed with stone to protect down gradient areas from erosion during large storm events.

2. Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. This Standard may be waived for discharges to land subject to coastal storm flowage as defined in 310 CMR 10.04.

- The South Coast Rail project has been designed to fully comply with Standard 2.
- For each station site, layover facility, and structure with new impervious area, the rainfall-runoff response was analyzed under existing and proposed conditions for storm events with recurrence intervals of 2, 10, and 100 years. Stormwater BMPs with volume storage are proposed at each location where post-development peak discharges would require attenuation. In accordance with Standard 2, sites with discharges to coastal waters (Fall

River Depot Station, Battleship Cove Station, Whale's Tooth Station, Weaver's Cove East Layover Facility, and Wamsutta Layover Facility) may waive this standard and are not required to incorporate attenuation structures.

3. Loss of annual recharge to groundwater shall be eliminated or minimized through the use of infiltration measures including environmentally sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil type. This Standard is met when the stormwater management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts Stormwater Handbook.

- The South Coast Rail project has been designed to fully comply with Standard 3.
- ESSD techniques and LID features have been incorporated into the design of each station site and layover facility. ESSD techniques incorporated in the project include reducing impervious area by removing unnecessary pavement, maintaining existing drainage patterns, and maintaining existing mature vegetation. LID features include disconnecting runoff from impervious surfaces, using sheet flow and surface conveyances as opposed to closed drainage systems, promoting groundwater recharge through bioretention and infiltration basins.
- Groundwater recharge requirements have been met for each project element.

4. Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). This Standard is met when (1) Suitable practices for source control and pollution prevention are identified in a long- term pollution prevention plan, and thereafter are implemented and maintained; (2) Structural stormwater best management practices are sized to capture the required water quality volume determined in accordance with the Massachusetts Stormwater Handbook; and (3) Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook.

- The South Coast Rail project has been designed to fully comply with Standard 4.
- Structural practices such as deep sump catch basins with hoods, oil/grit separators, gravel and grass filter strips, vegetated swales, and sediment forebays have been incorporated as appropriate in each site design in order to provide pretreatment of stormwater flows. Bioretention swales, bioretention basins, and infiltration basins have been incorporated as appropriate in each site design to provide treatment that meets or exceeds the 80 percent TSS removal requirement.
- The only location where the water quality volume and 80 percent TSS removal requirement could not be met was along the Hockomock Swamp Trestle. As described in Section 4.17.3.3, runoff from the trestle would be treated to the extent practicable and meets all of the requirements of the *de minimis* standard described in Volume 3 of the Massachusetts Stormwater Handbook.
- In order to comply with the on-going requirements of this standard, a long-term pollution prevention plan would be required as part of final design.

5. For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable. If through source control and/or pollution prevention all land uses with higher potential pollutant loads cannot be completely protected from exposure to rain, snow, snow melt, and stormwater runoff, the proponent shall use the specific structural stormwater BMPs determined by the Department to be suitable for such uses as provided in the Massachusetts Stormwater Handbook. Stormwater discharges from land uses with higher potential pollutant loads shall also comply with the requirements of the Massachusetts Clean Waters Act, MGL c. 21, §§ 26-53 and the regulations promulgated thereunder at 314 CMR 3.00, 314 CMR 4.00 and 314 CMR 5.00.

- The South Coast Rail project has been designed to fully comply with Standard 5.
- Three elements of the project qualify as LUHPPLs: North Easton Station, Weaver's Cove East Layover Facility, and Wamsutta Layover Facility. In accordance with the requirements of Standard 5, these sites incorporate specific structural stormwater BMPs such as deep sump catch basins with hoods, oil/grit separators and sediment forebays. The layover facilities also incorporate drip pans beneath the layover tracks to catch drips or spills from the trains stored at the facility.
- Appropriate source control and pollution prevention measures must be documented in a post-construction SWPPP. This plan would be completed in conjunction with the Notice of Intent for authorization under the NDPES Multi-Sector General Permit, prior to stormwater discharges from the layover facilities.

6. Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply and stormwater discharges near or to any other critical area require the use of the specific source control and pollution prevention measures and the specific structural stormwater best management practices determined by the Department to be suitable for managing discharges to such areas as provided in the Massachusetts Stormwater Handbook. A discharge is near a critical area, if there is a strong likelihood of a significant impact occurring to said area, taking into account site-specific factors. Stormwater discharges to Outstanding Resource Waters and Special Resource Waters shall be removed and set back from the receiving water or wetland and receive the highest and best practical method of treatment. A "storm water discharge" as defined in 314 CMR 3.04(2)(a)1 or (b) to an Outstanding Resource Water or Special Resource Water shall comply with 314 CMR 3.00 and 314 CMR 4.00. Stormwater discharges to a Zone I or Zone A are prohibited unless essential to the operation of a public water supply.

- The South Coast Rail project has been designed to fully comply with Standard 6.
- Stormwater discharges to ORWs would receive treatment and would be set back from the receiving water to the maximum extent practicable. Discharges to ORWs are limited to locations along the Hockomock Swamp Trestle and along track segments located near vernal pools. Typical details for stormwater treatment measures are described in Section 4.17.3.3. No discharges are proposed within a Zone 1 or Zone A of a public water supply.
- Selection of appropriate treatments for each location would occur during final design as part of detailed grading plans and drainage analysis.

7. A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural best management practice requirements of Standards 4, 5, and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions.

- The South Coast Rail project has been designed to fully comply with Standard 7.
- According to the guidance in the Massachusetts Stormwater Manual, all of the station sites, except for North Easton Station, Taunton Depot Station, Freetown Station, and both of the layover facilities, qualify as redevelopment projects. Redevelopment of station sites where new parking lots are proposed (Raynham Park and Taunton) have been designed to fully comply with all of the Stormwater Standards. The Weaver's Cove East Layover Facility has also been designed to fully comply with all of the Stormwater Standards.

8. A plan to control construction related impacts including erosion, sedimentation and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) shall be developed and implemented.

- The South Coast Rail project would fully comply with Standard 8.
- The project would obtain coverage under the NPDES Construction General Permit prior to the start of earthmoving activities. A construction-period SWPPP would be developed during final design as part of the Notice of Intent submittal. Recommended construction period BMPs have been described in the DEIS/DEIR.

9. A long-term operation and maintenance plan shall be developed and implemented to ensure that stormwater management systems function as designed.

- The South Coast Rail project would fully comply with Standard 9.
- MassDOT would develop a detailed O&M Plan during final design as part of the Notice of Intent submittal.

10. All illicit discharges to the stormwater management system are prohibited.

- The South Coast Rail project would fully comply with Standard 10.
- Proposed stations and layovers have been designed so that they are in full compliance with current standards. In locations where previous development has occurred, storm drainage structures remaining from those developments would be removed within the redevelopment area. New sanitary facilities at the two layover facilities would be designed in accordance with the sanitary code.
- No statement is made with regard to existing drainage systems in portions of project sites which are not included in the redevelopment project area.