RESERVOIR DAM WATER STORAGE AND FISH PASSAGE IMPROVEMENT PROJECT

SCITUATE, MASSACHUSETTS

MEPA DRAFT ENVIRONMENTAL IMPACT REPORT

SEPTEMBER 2019

PREPARED FOR
TOWN OF SCITUATE

SUBMITTED BY

TETRA TECH

TETRA TECH, INC.
160 FEDERAL STREET, 3RD FLOOR
BOSTON, MA 02110
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TETRA TECH

10 September 2019

Secretary Matthew A. Beaton
Executive Office of Energy and Environmental Affairs
Att. MEPA Office
100 Cambridge Street, Suite 900
Boston, MA 02108

RE: Reservoir Dam Water Storage and Fish Passage Improvement Project
MEPA Draft Environmental Report
EEA Number: 15711

Dear Secretary Beaton:

On behalf of the Town of Scituate, attached is the Draft Environmental Impact Report (DEIR) for the Reservoir Dam Water Storage and Fish Passage Improvement Project, prepared pursuant to the Massachusetts Environmental Policy Act (MEPA; M.G.L. c.30, ss.61-621) and Section 11.07 of the MEPA regulations (301 CMR 11.00) and in accordance with the Scope defined in the Secretary's Certificate EEA Number 15711. The DEIR includes a digital copy on a CD-ROM.

The Town of Scituate filed an Environmental Notification Form (ENF) that was noticed in the Environmental Monitor on June 7, 2017. The Secretary's Certificate, which was issued on July 21, 2017, determined that the project requires preparation of a Mandatory Environmental Impact Report (EIR). This DEIR provides a detailed description and analysis of the project and alternatives, an assessment of potential environmental impacts, and proposed Section 61 mitigation measures in sufficient detail for all State agencies to fulfil their MEPA obligations.

If you have questions or would like additional copies, please do not hesitate to contact me at (617) 443-7524.

Sincerely,
Tetra Tech, Inc.

Thomas C. Cook

Thomas C. Cook, P.E.
Principal Civil Engineer/Project Manager

Enclosure: MEPA Draft EIR for Reservoir Dam Water Storage and Fish Passage Improvement Project

Cc: Scituate Department of Public Works

See DEIR Circulation List page viii

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RESERVOIR DAM WATER STORAGE AND FISH PASSAGE IMPROVEMENT PROJECT SCITUATE, MASSACHUSETTS

MEPA DRAFT ENVIRONMENTAL IMPACT REPORT

EEA Number: 15711

Prepared for
Mr. Kevin Cafferty, Director
Department of Public Works
Town of Scituate
Town Hall
600 Chief Justice Cushing Way
Scituate, MA 02061

Funded by
Massachusetts Department of Environmental Protection
Dam and Seawall Repair or Removal Program
EOEEA Grant Project Number: 254-2018-1-58

Prepared by
Tetra Tech, Inc.
160 Federal Street, 3rd Floor
Boston, MA 02110

09/10/19

Thomas C. Cook, P.E. Date
Principal Civil Engineer

September 2019
Version: DRAFT

"This project has been funded partially with State Capital Funds from the Massachusetts Department of Environmental Protection under a Seawall and Dam Repair or Removal Program. The contents do not necessarily reflect the views of and policies of the Department, nor does the mention of trade names or commercial products constitute endorsement or recommendation for use."

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TABLES

APPENDICES

ACRONYMS/ABBREVIATIONS

Acronyms/Abbreviations	Definition
ac-ft	acre-feet
AULs	Active Use Limitations
BLSF	Bordering Land Subject to Flooding
BMPs	Best Management Practices
BVW	Bordering Vegetated Wetlands
cfs	cubic feet per second
CJCH	Chief Justice Cushing Highway (Route 3A)
CMR	Code of Massachusetts Regulations
CZM	Massachusetts Office of Coastal Zone Management
DCR	Massachusetts Department of Conservation and Recreation
DEIR	Draft Environmental Impact Statement
DEP	Massachusetts Department of Environmental Protection
DER	Massachusetts Division of Ecological Restoration
DFOP	Draft Final Operation Plan
DFW	Massachusetts Division of Fisheries and Wildlife
DMF	Massachusetts Division of Marine Fisheries
DOT	Massachusetts Department of Transportation
DPW	Scituate Department of Public Works
EAP	Emergency Action Plan
EIR	Environmental Impact Report
ENF	Environmental Notification Form
EOEEA	Massachusetts Executive Office of Energy and Environmental Affairs
FEIR	Final Environmental Impact Report
FEMA	Federal Emergency Management Agency
FOP	Final Operating Plan
ft.	feet
GHGs	greenhouse gases
GPM	Gallons Per Minute
HMR	Hydrometeorological Report
IOP	Interim Operational Plan
LF	Linear Feet
LUW	Land Under Waterbodies and Waterways
MAFL	Mean Annual Flood Level
MassBays	Massachusetts Bays National Estuary Program

Acronyms/Abbreviations	Definition
MEPA	Massachusetts Environmental Policy Act
MGD	million gallons per day
MGY	million gallons per year
MHC	Massachusetts Historical Commission
NAVD88	North American Vertical Datum 1988
NHESP	Natural Heritage and Endangered Species Program
NOI	Notice of Intent
NSRWA	North and South Rivers Watershed Association
O&M	Operations & Maintenance
ODS	Office of Dam Safety
PCN	Preconstruction Notification
PMF	Probable Maximum Flood
PMP	Probable Maximum Precipitation
RA	Riverfront Area
SCADA	supervisory control and data acquisition
SDF	spillway design flood
Secretary	Secretary of Environmental Affairs
SERO	Southeast Regional Office
SOC	Superseding Order of Conditions
SWD	Town of Scituate Water Division
SWMI	Sustainable Watershed Management Initiative
The Project	The Reservoir Dam Water Storage and Fish Passage Improvement Project
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USDOI	United States Department of the Interior
USFWS	United States Fish and Wildlife Service
WEAP	Water Evaluation and Planning
WMA	Water Management Area
WPA	Wetlands Protection Act
WRC	Town of Scituate Water Resource Commission

DEIR CIRCULATION LIST

Agency (Number of Paper Copies*)

Scituate Water Commissioner (0, electronic file only)

Scituate Department of Public Works (1)

Scituate Conservation Commission (1)

Scituate Board of Health (0, electronic file only)

Scituate Water Resource Commission (1)

Scituate Water Division (1)

Scituate Library (1)

MEPA Office (2)

MassDEP – Boston Office (1)

MassDEP- Southeast Regional Office (1)

MassDOT – Public/Private Development Unit (1)

MassDOT – District 5 (1)

Massachusetts Department of Conservation and Recreation - Office of Dam Safety (1)

Massachusetts Department of Conservation and Recreation – MEPA Coordinator (1)

Massachusetts Division of Marine Fisheries (0, electronic file only)

North and South Rivers Watershed Association (1)

US Army Corps of Engineers (1)

US Department of Environmental Protection (1)

* Each paper copy includes CD with electronic file.

SECRETARY'S CERTIFICATE

A copy of following documents is provided in this section:

- Town of Scituate's Conservation Commission's Wetlands Protection Act (WPA) Form 5 – Order of Conditions Project Denial
- Department of Environmental Protection (DEP) Wetlands File No. SE 68-2665 Superseding Order of Conditions Abeyance Notification Letter
- Certificate of the Secretary of Energy and Environmental Affairs (EEA) on the Environmental Notification Form (ENF) EEA Number 15711.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 5 – Order of Conditions

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40
and 30700 of the Town of Scituate Code of Bylaws
~~***DENIAL***~~

Provided by MassDEP:
68-2665
MassDEP File #

eDEP Transaction #

SCITUATE
City/Town

A. General Information

Please note: this form has been modified with added space to accommodate the Registry of Deeds Requirements

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.

1. From: SCITUATE
Conservation Commission

2. This issuance is for (check one): a. ☒ Order of Conditions b. ☐ Amended Order of Conditions

3. To: Applicant:

Al
a. First Name

Bangert
b. Last Name

Town of Scituate - DPW
c. Organization

600 Chief Justice Cushing Hwy.
d. Mailing Address

Scituate
e. City/Town

MA
f. State

02066
g. Zip Code

4. Property Owner (if different from applicant):

a. First Name

b. Last Name

c. Organization

d. Mailing Address

e. City/Town

f. State

g. Zip Code

5. Project Location:

430 Chief Justice Cushing Hwy.
a. Street Address

Scituate
b. City/Town

See attached list
c. Assessors Map/Plat Number

d. Parcel/Lot Number

Latitude and Longitude, if known:

42d11.2Nm s
d. Latitude

70d45.3Wm s
e. Longitude

A. General Information (cont.)

6. Property recorded at the Registry of Deeds for (attach additional information if more than one parcel):
PLYMOUTH
a. County
b. Certificate Number (if registered land)
c. Book
d. Page

7. Dates: 5/14/17 a. Date Notice of Intent Filed; 8/2/17 b. Date Public Hearing Closed; 8/17/17 c. Date of Issuance

8. Final Approved Plans and Other Documents (attach additional plan or document references as needed):
Town of Scituate DPW Reservoir Dam Water Storage & Fish Passage Improvement Project G101, C-101-C-103, C-104A-C-104F, C-106, C-107, C-110, C-112, C116
Tetra Tech
b. Prepared By
Thomas A. Cook, RPE
c. Signed and Stamped by
5/3/17
d. Final Revision Date
1" = 40'
e. Scale
f. Additional Plan or Document Title
g. Date

B. Findings

1. Findings pursuant to the Massachusetts Wetlands Protection Act:

Following the review of the above-referenced Notice of Intent and based on the information provided in this application and presented at the public hearing, this Commission finds that the areas in which work is proposed is significant to the following interests of the Wetlands Protection Act (the Act). Check all that apply:

a. ☒ Public Water Supply
b. ☒ Land Containing Shellfish
c. ☒ Prevention of Pollution
d. ☒ Private Water Supply
e. ☒ Fisheries
f. ☒ Protection of Wildlife Habitat
g. ☒ Groundwater Supply
h. ☒ Storm Damage Prevention
i. ☒ Flood Control

2. This Commission hereby finds the project, as proposed, is: (check one of the following boxes)

Approved subject to:

a. ☐ the following conditions which are necessary in accordance with the performance standards set forth in the wetlands regulations. This Commission orders that all work shall be performed in accordance with the Notice of Intent referenced above, the following General Conditions, and any other special conditions attached to this Order. To the extent that the following conditions modify or differ from the plans, specifications, or other proposals submitted with the Notice of Intent, these conditions shall control.

B. Findings (cont.)

Denied because:

b. ☒ the proposed work cannot be conditioned to meet the performance standards set forth in the wetland regulations. Therefore, work on this project may not go forward unless and until a new Notice of Intent is submitted which provides measures which are adequate to protect the interests of the Act, and a final Order of Conditions is issued. **A description of the performance standards which the proposed work cannot meet is attached to this Order.**

c. ☐ the information submitted by the applicant is not sufficient to describe the site, the work, or the effect of the work on the interests identified in the Wetlands Protection Act. Therefore, work on this project may not go forward unless and until a revised Notice of Intent is submitted which provides sufficient information and includes measures which are adequate to protect the Act's interests, and a final Order of Conditions is issued. **A description of the specific information which is lacking and why it is necessary is attached to this Order as per 310 CMR 10.05(6)(c).**

3. ☐ Buffer Zone Impacts: Shortest distance between limit of project disturbance and the wetland resource area specified in 310 CMR 10.02(1)(a) _____ a. linear feet

Inland Resource Area Impacts: Check all that apply below. (For Approvals Only)

Resource Area	Proposed Alteration	Permitted Alteration	Proposed Replacement	Permitted Replacement
4. ☒ Bank	1,414 a. linear feet	b. linear feet	c. linear feet	d. linear feet
5. ☒ Bordering Vegetated Wetland	569,329 a. square feet	b. square feet	c. square feet	d. square feet
6. ☒ Land Under Waterbodies and Waterways	378,972 a. square feet	b. square feet	c. square feet	d. square feet
	e. c/y dredged	f. c/y dredged		
7. ☒ Bordering Land Subject to Flooding	754,338 a. square feet	b. square feet	c. square feet	d. square feet
Cubic Feet Flood Storage	0 e. cubic feet	f. cubic feet	g. cubic feet	h. cubic feet
8. ☐ Isolated Land Subject to Flooding	a. square feet	b. square feet		
Cubic Feet Flood Storage	c. cubic feet	d. cubic feet	e. cubic feet	f. cubic feet
9. ☒ Riverfront Area	1st Herring Brook	52,000 b. total sq. feet		
Sq ft within 100 ft	c. square feet	d. square feet	e. square feet	f. square feet
Sq ft between 100-200 ft	g. square feet	h. square feet	i. square feet	j. square feet

B. Findings (cont.)

Coastal Resource Area Impacts: Check all that apply below. (For Approvals Only)

	Proposed Alteration	Permitted Alteration	Proposed Replacement	Permitted Replacement
10. ☐ Designated Port Areas	Indicate size under Land Under the Ocean, below			
11. ☐ Land Under the Ocean	a. square feet	b. square feet		
	c. c/y dredged	d. c/y dredged		
12. ☐ Barrier Beaches	Indicate size under Coastal Beaches and/or Coastal Dunes below			
13. ☐ Coastal Beaches	a. square feet	b. square feet	c. nourishment (cu yd)	d. nourishment (cu yd)
14. ☐ Coastal Dunes	a. square feet	b. square feet	c. nourishment (cu yd)	d. nourishment (cu yd)
15. ☐ Coastal Banks	a. linear feet	b. linear feet		
16. ☐ Rocky Intertidal Shores	a. square feet	b. square feet		
17. ☐ Salt Marshes	a. square feet	b. square feet	c. square feet	d. square feet
18. ☐ Land Under Salt Ponds	a. square feet	b. square feet		
	c. c/y dredged	d. c/y dredged		
19. ☐ Land Containing Shellfish	a. square feet	b. square feet	c. square feet	d. square feet
20. ☐ Fish Runs	Indicate size under Coastal Banks, Inland Bank, Land Under the Ocean, and/or inland Land Under Waterbodies and Waterways, above			
	a. c/y dredged	b. c/y dredged		
21. ☐ Land Subject to Coastal Storm Flowage	a. square feet	b. square feet		
22. ☐ Riverfront Area	a. total sq. feet	b. total sq. feet		
Sq ft within 100 ft	c. square feet	d. square feet	e. square feet	f. square feet
Sq ft between 100-200 ft	g. square feet	h. square feet	i. square feet	j. square feet

B. Findings (cont.)

* #23. If the project is for the purpose of restoring or enhancing a wetland resource area in addition to the square footage that has been entered in Section B.5.c (BVW) or B.17.c (Salt Marsh) above, please enter the additional amount here.

23. ☐ Restoration/Enhancement *:

a. square feet of BVW | b. square feet of salt marsh

24. ☐ Stream Crossing(s):

a. number of new stream crossings | b. number of replacement stream crossings

C. General Conditions Under Massachusetts Wetlands Protection Act

The following conditions are only applicable to Approved projects.

1. Failure to comply with all conditions stated herein, and with all related statutes and other regulatory measures, shall be deemed cause to revoke or modify this Order.
2. The Order does not grant any property rights or any exclusive privileges; it does not authorize any injury to private property or invasion of private rights.
3. This Order does not relieve the permittee or any other person of the necessity of complying with all other applicable federal, state, or local statutes, ordinances, bylaws, or regulations.
4. The work authorized hereunder shall be completed within three years from the date of this Order unless either of the following apply:
   a. The work is a maintenance dredging project as provided for in the Act; or
   b. The time for completion has been extended to a specified date more than three years, but less than five years, from the date of issuance. If this Order is intended to be valid for more than three years, the extension date and the special circumstances warranting the extended time period are set forth as a special condition in this Order.
   c. If the work is for a Test Project, this Order of Conditions shall be valid for no more than one year.
5. This Order may be extended by the issuing authority for one or more periods of up to three years each upon application to the issuing authority at least 30 days prior to the expiration date of the Order. An Order of Conditions for a Test Project may be extended for one additional year only upon written application by the applicant, subject to the provisions of 310 CMR 10.05(11)(f).
6. If this Order constitutes an Amended Order of Conditions, this Amended Order of Conditions does not extend the issuance date of the original Final Order of Conditions and the Order will expire on _____ unless extended in writing by the Department.
7. Any fill used in connection with this project shall be clean fill. Any fill shall contain no trash, refuse, rubbish, or debris, including but not limited to lumber, bricks, plaster, wire, lath, paper, cardboard, pipe, tires, ashes, refrigerators, motor vehicles, or parts of any of the foregoing.

C. General Conditions Under Massachusetts Wetlands Protection Act

8. This Order is not final until all administrative appeal periods from this Order have elapsed, or if such an appeal has been taken, until all proceedings before the Department have been completed.

9. No work shall be undertaken until the Order has become final and then has been recorded in the Registry of Deeds or the Land Court for the district in which the land is located, within the chain of title of the affected property. In the case of recorded land, the Final Order shall also be noted in the Registry's Grantor Index under the name of the owner of the land upon which the proposed work is to be done. In the case of the registered land, the Final Order shall also be noted on the Land Court Certificate of Title of the owner of the land upon which the proposed work is done. The recording information shall be submitted to the Conservation Commission on the form at the end of this Order, which form must be stamped by the Registry of Deeds, prior to the commencement of work.

10. A sign shall be displayed at the site not less then two square feet or more than three square feet in size bearing the words,

"Massachusetts Department of Environmental Protection" [or, "MassDEP"]

"File Number 68-2665 "

11. Where the Department of Environmental Protection is requested to issue a Superseding Order, the Conservation Commission shall be a party to all agency proceedings and hearings before MassDEP.

12. Upon completion of the work described herein, the applicant shall submit a Request for Certificate of Compliance (WPA Form 8A) to the Conservation Commission.

13. The work shall conform to the plans and special conditions referenced in this order.

14. Any change to the plans identified in Condition #13 above shall require the applicant to inquire of the Conservation Commission in writing whether the change is significant enough to require the filing of a new Notice of Intent.

15. The Agent or members of the Conservation Commission and the Department of Environmental Protection shall have the right to enter and inspect the area subject to this Order at reasonable hours to evaluate compliance with the conditions stated in this Order, and may require the submittal of any data deemed necessary by the Conservation Commission or Department for that evaluation.

16. This Order of Conditions shall apply to any successor in interest or successor in control of the property subject to this Order and to any contractor or other person performing work conditioned by this Order.

C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)

17. Prior to the start of work, and if the project involves work adjacent to a Bordering Vegetated Wetland, the boundary of the wetland in the vicinity of the proposed work area shall be marked by wooden stakes or flagging. Once in place, the wetland boundary markers shall be maintained until a Certificate of Compliance has been issued by the Conservation Commission.

18. All sedimentation barriers shall be maintained in good repair until all disturbed areas have been fully stabilized with vegetation or other means. At no time shall sediments be deposited in a wetland or water body. During construction, the applicant or his/her designee shall inspect the erosion controls on a daily basis and shall remove accumulated sediments as needed. The applicant shall immediately control any erosion problems that occur at the site and shall also immediately notify the Conservation Commission, which reserves the right to require additional erosion and/or damage prevention controls it may deem necessary. Sedimentation barriers shall serve as the limit of work unless another limit of work line has been approved by this Order.

19. The work associated with this Order (the "Project")
    (1) ☐ is subject to the Massachusetts Stormwater Standards
    (2) ☒ is NOT subject to the Massachusetts Stormwater Standards

    If the work is subject to the Stormwater Standards, then the project is subject to the following conditions:

    a) All work, including site preparation, land disturbance, construction and redevelopment, shall be implemented in accordance with the construction period pollution prevention and erosion and sedimentation control plan and, if applicable, the Stormwater Pollution Prevention Plan required by the National Pollution Discharge Elimination System Construction General Permit as required by Stormwater Condition 8. Construction period erosion, sedimentation and pollution control measures and best management practices (BMPs) shall remain in place until the site is fully stabilized.

    b) No stormwater runoff may be discharged to the post-construction stormwater BMPs unless and until a Registered Professional Engineer provides a Certification that:
    i. all construction period BMPs have been removed or will be removed by a date certain specified in the Certification. For any construction period BMPs intended to be converted to post construction operation for stormwater attenuation, recharge, and/or treatment, the conversion is allowed by the MassDEP Stormwater Handbook BMP specifications and that the BMP has been properly cleaned or prepared for post construction operation, including removal of all construction period sediment trapped in inlet and outlet control structures;
    ii. as-built final construction BMP plans are included, signed and stamped by a Registered Professional Engineer, certifying the site is fully stabilized;
    iii. any illicit discharges to the stormwater management system have been removed, as per the requirements of Stormwater Standard 10;

C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)

iv. all post-construction stormwater BMPs are installed in accordance with the plans (including all planting plans) approved by the issuing authority, and have been inspected to ensure that they are not damaged and that they are in proper working condition;

v. any vegetation associated with post-construction BMPs is suitably established to withstand erosion.

c) The landowner is responsible for BMP maintenance until the issuing authority is notified that another party has legally assumed responsibility for BMP maintenance. Prior to requesting a Certificate of Compliance, or Partial Certificate of Compliance, the responsible party (defined in General Condition 18(e)) shall execute and submit to the issuing authority an Operation and Maintenance Compliance Statement ("O&M Statement) for the Stormwater BMPs identifying the party responsible for implementing the stormwater BMP Operation and Maintenance Plan ("O&M Plan") and certifying the following:

i.) the O&M Plan is complete and will be implemented upon receipt of the Certificate of Compliance, and

ii.) the future responsible parties shall be notified in writing of their ongoing legal responsibility to operate and maintain the stormwater management BMPs and implement the Stormwater Pollution Prevention Plan.

d) Post-construction pollution prevention and source control shall be implemented in accordance with the long-term pollution prevention plan section of the approved Stormwater Report and, if applicable, the Stormwater Pollution Prevention Plan required by the National Pollution Discharge Elimination System Multi-Sector General Permit.

e) Unless and until another party accepts responsibility, the landowner, or owner of any drainage easement, assumes responsibility for maintaining each BMP. To overcome this presumption, the landowner of the property must submit to the issuing authority a legally binding agreement of record, acceptable to the issuing authority, evidencing that another entity has accepted responsibility for maintaining the BMP, and that the proposed responsible party shall be treated as a permittee for purposes of implementing the requirements of Conditions 18(f) through 18(k) with respect to that BMP. Any failure of the proposed responsible party to implement the requirements of Conditions 18(f) through 18(k) with respect to that BMP shall be a violation of the Order of Conditions or Certificate of Compliance. In the case of stormwater BMPs that are serving more than one lot, the legally binding agreement shall also identify the lots that will be serviced by the stormwater BMPs. A plan and easement deed that grants the responsible party access to perform the required operation and maintenance must be submitted along with the legally binding agreement.

f) The responsible party shall operate and maintain all stormwater BMPs in accordance with the design plans, the O&M Plan, and the requirements of the Massachusetts Stormwater Handbook.

C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)

g) The responsible party shall:
1. Maintain an operation and maintenance log for the last three (3) consecutive calendar years of inspections, repairs, maintenance and/or replacement of the stormwater management system or any part thereof, and disposal (for disposal the log shall indicate the type of material and the disposal location);
2. Make the maintenance log available to MassDEP and the Conservation Commission ("Commission") upon request; and
3. Allow members and agents of the MassDEP and the Commission to enter and inspect the site to evaluate and ensure that the responsible party is in compliance with the requirements for each BMP established in the O&M Plan approved by the issuing authority.

h) All sediment or other contaminants removed from stormwater BMPs shall be disposed of in accordance with all applicable federal, state, and local laws and regulations.

i) Illicit discharges to the stormwater management system as defined in 310 CMR 10.04 are prohibited.

j) The stormwater management system approved in the Order of Conditions shall not be changed without the prior written approval of the issuing authority.

k) Areas designated as qualifying pervious areas for the purpose of the Low Impact Site Design Credit (as defined in the MassDEP Stormwater Handbook, Volume 3, Chapter 1, Low Impact Development Site Design Credits) shall not be altered without the prior written approval of the issuing authority.

l) Access for maintenance, repair, and/or replacement of BMPs shall not be withheld. Any fencing constructed around stormwater BMPs shall include access gates and shall be at least six inches above grade to allow for wildlife passage.

Special Conditions (if you need more space for additional conditions, please attach a text document):
SEE ATTACHED

20. For Test Projects subject to 310 CMR 10.05(11), the applicant shall also implement the monitoring plan and the restoration plan submitted with the Notice of Intent. If the conservation commission or Department determines that the Test Project threatens the public health, safety or the environment, the applicant shall implement the removal plan submitted with the Notice of Intent or modify the project as directed by the conservation commission or the Department.

D. Findings Under Municipal Wetlands Bylaw or Ordinance

1. Is a municipal wetlands bylaw or ordinance applicable? ☒ Yes ☐ No

2. The SCITUATE hereby finds (check one that applies):
   Conservation Commission

   a. ☐ that the proposed work cannot be conditioned to meet the standards set forth in a municipal ordinance or bylaw, specifically:

   1. Municipal Ordinance or Bylaw — 2. Citation

   Therefore, work on this project may not go forward unless and until a revised Notice of Intent is submitted which provides measures which are adequate to meet these standards, and a final Order of Conditions is issued.

   b. ☒ that the following additional conditions are necessary to comply with a municipal ordinance or bylaw:

   Town of Scituate Code of Bylaws — 30700
   1. Municipal Ordinance or Bylaw — 2. Citation

3. The Commission orders that all work shall be performed in accordance with the following conditions and with the Notice of Intent referenced above. To the extent that the following conditions modify or differ from the plans, specifications, or other proposals submitted with the Notice of Intent, the conditions shall control.
   The special conditions relating to municipal ordinance or bylaw are as follows (if you need more space for additional conditions, attach a text document):
   SEE ATTACHED DENIAL

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 5 – Order of Conditions

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40
and 30700 of the Town of Scituate Code of Bylaws
DENIAL

Provided by MassDEP:
68-2665
MassDEP File #

eDEP Transaction #

SCITUATE
City/Town

E. Signatures

This Order is valid for three years, unless otherwise specified as a special condition pursuant to General Conditions #4, from the date of issuance.

8/17/17
1. Date of Issuance

Please indicate the number of members who will sign this form.
This Order must be signed by a majority of the Conservation Commission.

4
2. Number of Signers

The Order must be mailed by certified mail (return receipt requested) or hand delivered to the applicant. A copy also must be mailed or hand delivered at the same time to the appropriate Department of Environmental Protection Regional Office, if not filing electronically, and the property owner, if different from applicant.

Signatures:

Paul G. Parys

Penny Scott-Pipes

Penny Scott-Pipes

Lisa Caiese

Frank Snow

☐ by hand delivery on

Date

☒ by certified mail, return receipt requested, on
8/17/17
Date

F. Appeals

The applicant, the owner, any person aggrieved by this Order, any owner of land abutting the land subject to this Order, or any ten residents of the city or town in which such land is located, are hereby notified of their right to request the appropriate MassDEP Regional Office to issue a Superseding Order of Conditions. The request must be made by certified mail or hand delivery to the Department, with the appropriate filing fee and a completed Request for Departmental Action Fee Transmittal Form, as provided in 310 CMR 10.03(7) within ten business days from the date of issuance of this Order. A copy of the request shall at the same time be sent by certified mail or hand delivery to the Conservation Commission and to the applicant, if he/she is not the appellant.

Any appellants seeking to appeal the Department's Superseding Order associated with this appeal will be required to demonstrate prior participation in the review of this project. Previous participation in the permit proceeding means the submission of written information to the Conservation Commission prior to the close of the public hearing, requesting a Superseding Order, or providing written information to the Department prior to issuance of a Superseding Order.

The request shall state clearly and concisely the objections to the Order which is being appealed and how the Order does not contribute to the protection of the interests identified in the Massachusetts Wetlands Protection Act (M.G.L. c. 131, § 40), and is inconsistent with the wetlands regulations (310 CMR 10.00). To the extent that the Order is based on a municipal ordinance or bylaw, and not on the Massachusetts Wetlands Protection Act or regulations, the Department has no appellate jurisdiction.

DENIAL

Address: 430 Chief Justice Cushing Hwy
Assessors Map and Parcel: See Attached
Property owner: Town of Scituate
Applicant: Town of Scituate Department of Public Works
DEP File Number: SE 68-2665
Filing Date: May 4, 2017
Date Hearing Closed: August 2, 2017
Date Orders Issued: August 16, 2017
Plan of Record Information: "DPW Reservoir Dam Water Storage and Fish Passage Improvement Project" signed and stamped by Thomas A Cook, RPE of Tetra Tech, Inc. dated May 3, 2017

Permit Overview:

This project proposed by the Town of Scituate DPW to provide the town with a sustainable Public Water Supply and restore the existing nonfunctional fishway will alter 569,000 sf (13 acres) of BVW.
The Scituate Conservation Commission understands the overriding community benefit of the project; however, denies the project pursuant to 310 CMR 10.05(6) (b) as the amount of BVW proposed to be altered exceeds 5,000 sf.

Because the amount of BVW proposed to be altered is greater than 5,000 sf and there appears to be no Limited Project provisions applicable to the project, a Variance will be required pursuant to 310 CMR 10.05(10). Further, the project does not appear to qualify as a limited Ecological Restoration project.

Findings: The project proposes to raise the impoundment of Reservoir Pond and Tack Factory Pond by 1.5 ft above the existing maximum normal pool elevation. The dam spillway is proposed to be modified to lower the crest and install a bottom hinged crest gate to maintain the impoundment level at a lower level. The existing fishway at Reservoir Dam is proposed to be modified to lower the fishway exit channel into the impoundment by 3.9 ft. and incorporate removable weirs to provide passage of andronomous fish species at all reservoir water levels during the spring and fall migration periods. The fish channel is proposed to be reconfigured with channels and pools to attract fish. The project also proposes to install stone riprap protection along State Route 3A. Approximately 569,329 sq. ft. of wetlands would be inundated during certain times of the year.

Wetland resource areas on site include Bank, Bordering Vegetated Wetlands (BVW), Land Under Waterbodies and Waterways (LUW), Bordering Land Subject to Flooding (BLSF), and Riverfront Areas (RFA) associated with upstream and downstream First Herring Brook and an unnamed perennial stream south of Tack Factory Pond. The Commission finds the property is not within Priority and/or Estimated Habitat as mapped by the Division of Fisheries and Wildlife's (DFW) Natural Heritage and Endangered Species Program (NHESP) or an Area of Critical Environmental Concern (ACEC). Reservoir Pond and Tack Factory Pond are classified as Zone A Surface Water Supply Protection Areas and Outstanding Resource Waters (ORW) of the Commonwealth to protect the public drinking water supply.

The project will result in the following wetland resource impacts: Elimination of 1,414 linear feet of Bank; elimination of 52,000 sf of RFA; creation of 8.7 acres of LUW; creation of 17.31 acres of BLSF; and will increase the durations of seasonal flooding of 13.07 acres of BVW.

Therefore, based on the referenced findings, the Scituate Conservation Commission **DENIES** the project SE68-2665 for the Town of Scituate pursuant to the Massachusetts Wetlands Protection Act (MGL Chapter 131 section 40), Massachusetts Wetlands Protection Regulations (310 CMR 10.00), the Town of Scituate Wetlands Protection Bylaw (Chapter 10.00 – 10.99) and the Town of Scituate Wetland Protection Regulations (Section 30770). There are no reasonable conditions or alternatives which would allow this project to proceed in compliance with the regulations or mitigating measures that will allow the project to be conditioned so as to contribute to the protection of the interests identified in MGL Ch 131 ch. 40; and a Variance is necessary to accommodate an overriding community, regional, state or national public interest.

G. Recording Information

Prior to commencement of work, this Order of Conditions must be recorded in the Registry of Deeds or the Land Court for the district in which the land is located, within the chain of title of the affected property. In the case of recorded land, the Final Order shall also be noted in the Registry's Grantor Index under the name of the owner of the land subject to the Order. In the case of registered land, this Order shall also be noted on the Land Court Certificate of Title of the owner of the land subject to the Order of Conditions. The recording information on this page shall be submitted to the Conservation Commission listed below.

SCITUATE
Conservation Commission

Detach on dotted line, have stamped by the Registry of Deeds and submit to the Conservation Commission.

To:

SCITUATE
Conservation Commission

Please be advised that the Order of Conditions for the Project at:

430 Chief Justice Cushing Hwy.
Project Location

68-2665
MassDEP File Number

Has been recorded at the Registry of Deeds of:

PLYMOUTH
County

Book

Page

for: Town of Scituate
Property Owner

and has been noted in the chain of title of the affected property in:

Book

Page

In accordance with the Order of Conditions issued on:

8/17/17
Date

If recorded land, the instrument number identifying this transaction is:

Instrument Number

If registered land, the document number identifying this transaction is:

Document Number

Signature of Applicant

Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

Southeast Regional Office • 20 Riverside Drive, Lakeville MA 02347 • 508-946-2700

Charles D. Baker
Governor

Karyn E. Polito
Lieutenant Governor

Matthew A. Beaton
Secretary

Martin Suuberg
Commissioner

OCT 12 2017

Al Bangert
Scituate Department of Public Works
Scituate Town Hall
600 Chief Justice Cushing Highway
Scituate, Massachusetts 02061

RE: SCITUATE - Wetlands
File No. SE 68 - 2665
Compliance with MEPA
MGL c. 30, §§ 61 – 62H
and 301 CMR 11.00
Reservoir Pond Elevation

Dear Mr. Bangert:

At your request, the Department is reviewing the above referenced project for the issuance of a Superseding order of Conditions (SOC). The project proposes to raise the Reservoir Dam impoundment and Tack Factory Pond elevations approximately 1.5 feet above the existing 38.9 foot, maximum normal pool elevation to increase water supply storage and improve diadromous fish passage. Modifications to the dam's outlet control structures and fishways are also proposed. The Department's review of the project indicates that the proposal exceeds the following wetland thresholds as found in:

> 301 CMR 11.03(3)(a)1.a. : *Alteration of one or more acres of bordering vegetated wetlands;*
>
> 301 CMR 11.03(3)(a)1.b. : *Alteration of 10 or more acres of other wetlands;*
>
> 301 CMR 11.03(3)(a)2. : *Alteration requiring a variance in accordance with the Wetlands protection Act;*
>
> 301 CMR 11.03(3)(a)4. : *Structural alteration of an existing dam that causes an expansion of 20% or any decrease in impoundment Capacity; and*
>
> 301 CMR 11.03(3)(b)1.b. : *alteration of 500 or more linear feet of bank along a fish run or inland bank.*

Therefore, the project is subject to review under the Massachusetts Environmental Policy Act (MEPA) Regulations at 301 CMR 11.00 and, Massachusetts General Laws, Chapter 30, Sections 61-62H.

This information is available in alternate format. Contact Michelle Waters-Ekanem, Director of Diversity/Civil Rights at 617-292-5751.
TTY# MassRelay Service 1-800-439-2370
MassDEP Website: www.mass.gov/dep

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Consequently, the Town of Scituate filed an Environmental Notification Form (ENF) with the Executive Office of Energy and Environmental Affairs on May 30th, 2017 (EEA # 15711). On July 21st, 2017, Secretary Beaton issued a Certificate on the ENF determining that the project requires the preparation of a Mandatory Environmental Impact Report (EIR) and directed the proponent to submit a Draft EIR (DEIR) in accordance with the Scope of the Certificate.

Please be advised that in accordance with 310 CMR 10.05(7)(f)1., the Department shall issue a Superseding Order of Conditions within 40 days of the issuance of a statement by the Secretary of EOEEA that the applicant has complied with MGL c. 30, §§ 61 – 62H and 301 CMR 11.00.

Therefore, the Department's review of the above mentioned file will be in abeyance pending the Secretary's findings on the proponent's anticipated EIR.

If you have any question, please contact me at (508) 946-2762.

Very truly yours,

Greg DeCesare
Wetlands Program

cc: Scituate Conservation Commission

Tomas Cook
Tetra Tech, Inc.
160 Federal Street, 3rd Floor
Boston, MA 02110

MEPA Office
Executive Office of Environmental Affairs
251 Causeway St., Suite 900
Boston, Massachusetts 02114-2119

ecc: Lisa Rhodes, MassDEP - Boston Wetlands and Waterways Program

This information is available in alternate format. Call Donald M. Gomes, ADA Coordinator at 617-556-1057. TDD Service - 1-800-298-2207.This information is available in alternate format. Call Donald M. Gomes, ADA Coordinator at 617-556-1057. TDD Service - 1-800-298-2207.

MassDEP on the World Wide Web: http://www.mass.gov/dep
Printed on Recycled Paper

The Commonwealth of Massachusetts
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114

Charles D. Baker
GOVERNOR

Karyn E. Polito
LIEUTENANT GOVERNOR

Matthew A. Beaton
SECRETARY

Tel: (617) 626-1000
Fax: (617) 626-1081
http://www.mass.gov/eea

July 21, 2017

CERTIFICATE OF THE SECRETARY OF ENERGY AND ENVIRONMENTAL AFFAIRS
ON THE
ENVIRONMENTAL NOTIFICATION FORM

PROJECT NAME	: Reservoir Dam Water Storage and Fish Passage Improvements
PROJECT MUNICIPALITY	: Scituate
PROJECT WATERSHED	: South Coastal
EEA NUMBER	: 15711
PROJECT PROPONENT	: Town of Scituate – Department of Public Works (DPW)
DATE NOTICED IN MONITOR	: June 7, 2017

Pursuant to the Massachusetts Environmental Policy Act (MEPA; M.G. L. c. 30, ss. 61-62I) and Section 11.03 of the MEPA regulations (301 CMR 11.00), I have reviewed the Environmental Notification Form (ENF) and hereby determine that this project **requires** the preparation of a Mandatory Environmental Impact Report (EIR). The Proponent should submit a Draft EIR (DEIR) in accordance with the Scope below.

Project Description

As described in the ENF, the purpose of the project is to provide water storage for the Town of Scituate's public water supply and improve fish passage at the Reservoir Dam fishway and downstream locations. Specifically, the project proposes to raise the Reservoir Dam impoundment (also referred to as Reservoir Pond) and Tack Factory Pond by 1.5 feet (ft) above the existing maximum normal pool elevation (from El. 38.9 to El. 40.4).[1] The dam spillway will

[1] All elevations noted in this Certificate reference North American Vertical Datum 1988 (NAVD88) unless otherwise noted.

be modified to lower the crest (to El. 36.3) and to install a bottom hinged crest gate to maintain the impoundment level no higher than El. 40.4. The existing fishway at Reservoir Dam will also be modified to lower the fishway exit channel into the impoundment by 3.9-ft (to El. 35.0) and incorporate removable weirs to provide passage of anadromous fish species at all reservoir water levels during the spring and fall migration periods. The stream channel downstream of the fishway entrance will be reconfigured with channels and pools to attract fish. The project will also install stone riprap erosion protection along State Route 3A (Chief Justice Cushing Highway).

As a condition of its Water Management Act (WMA) Registration and Permit, the Town currently implements an Interim Operational Plan (IOP) which utilizes storage below the spillway crest (El. 38.9) to meet downstream water supply demands and environmental flow releases needed to maintain the habitat in First Herring Brook and to provide flows for upstream and downstream passage at a fishway located at downstream Old Oaken Bucket Dam. In accordance with the IOP, when the Reservoir Dam pool levels drop to El. 32, water is reserved for water supply and releases to support operation of the downstream Old Oaken Bucket Pond fish ladder flow are curtailed. As described in the ENF, the project will add approximately 108.8 ac-ft of storage to the reservoir, or the equivalent of 37 million gallons per day (MGD). This represents approximately 28 days of water supply at the Town's typical winter withdrawal rate. The ENF indicates that the project and reservoir operation could provide adequate fishway flow for successful passage 98% of the time during the spring outmigration and 85% of the time during the fall outmigration periods.

Project Site

The dam is owned by the Town of Scituate and impounds the First Herring Brook which flows through upstream Tack Factory Pond, beneath Route 3A causeway via a culvert and into Reservoir Pond. Route 3A acts as a causeway that separates Reservoir Pond and Tack Factory Pond. The ENF indicates that Tack Factory Pond is maintained at a higher elevation than Reservoir Pond. According to the ENF, Reservoir Dam was originally constructed as a storage reservoir for the Town of Scituate's public water supply. Specifically, the reservoir was created to supplement well water delivery to the water treatment plant at downstream Old Oaken Bucket Dam. The Reservoir Dam is an approximately 45-foot high earthen embankment with a concrete core wall, ogee spillway, low level outlet, and a pool and weir fishway. Normal pool levels in the Reservoir Dam impoundment are at the spillway crest, which is at El. 38.9-ft. The fishway is located east of the spillway and is comprised of 21 weirs to create pools that are approximately 3-ft wide and 3.5-ft long. The fishway exit channel is at the same elevation as the spillway crest and it currently functions only when impoundment levels are higher than the spillway crest.

Reservoir Pond and Tack Factory Pond are classified as Zone A Surface Water Supply Protection Areas and Outstanding Resource Waters (ORW) of the Commonwealth to protect the public drinking water supply. Wetland resource areas on-site include Bank, Bordering Vegetated Wetlands (BVW), Land under Waterbodies and Waterways (LUW), Bordering Land Subject to Flooding (BLSF), and Riverfront Areas (RFA) associated with upstream and downstream First Herring Brook and an unnamed perennial stream south of Tack Factory Pond. According to the Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Maps (FIRM) for

Plymouth County (Map Nos. 25023C0117K and 25023C0109K, both revised November 4, 2016), Reservoir Pond and Tack Factory Ponds are located within a designated AE Zone (Areas subject to inundation by the 1-percent-annual-chance flood event) and the majority of these waterbodies contain designated regulatory floodway areas. The Base Flood Elevations (BFE) in Tack Factory Pond, Reservoir Pond, and in First Herring Brook (immediately downstream of the dam) is El. 44, El. 42, and El. 29, respectively.

The project site is not located in Priority and/or Estimated Habitat as mapped by the Division of Fisheries and Wildlife's (DFW) Natural Heritage and Endangered Species Program (NHESP) or an Area of Critical Environmental Concern (ACEC). The site does not contain any structures listed in the State Register of Historic Places or the Massachusetts Historical Commission's (MHC) Inventory of Historic and Archaeological Assets of the Commonwealth.

Environmental Impacts and Mitigation

The project proposes to raise the water levels in the reservoir impoundment to provide additional water storage for the Town's public water supply while making downstream releases to maintain effective fish passage. Although it will provide fish passage and public water supply benefits, elevating the water surface of Tack Factory Pond and Reservoir Pond will inundate the existing BVWs and convert shrub swamps and forested bordered vegetated wetlands to open water or other wetland types. According to the ENF, the project will result in the following wetland resource impacts: elimination of 1,414 linear feet (lf) of Bank; elimination of 52,000 sf of Riverfront Area (RFA); creation of 8.7 acres of Land Under Water (LUW); creation of 17.31 acres of Bordering Land Subject to Flooding (BLSF); and will increase the duration of seasonal flooding of 13.07 acres of BVW.

The ENF indicates that the project will improve the sustainability of the Town's public water supply, restore the nonfunctioning fishway at Reservoir Pond, and improve downstream ecological conditions. Measures to avoid, minimize and mitigate impacts will be further refined in the DEIR and generally include installation of stone riprap erosion protection along Route 3A, installation of an oil/grit separator and bioswale in the catch basin on Sherman Drive to treat water entering the reservoir, and implementation of construction period Best Management Practices (BMPs) to control erosion and sedimentation.

Jurisdiction and Permitting

This project is subject to MEPA review and requires the preparation of a mandatory EIR because it requires State Agency Actions and exceeds the following EIR thresholds:

- Alteration of one or more acres of bordering vegetated wetlands (301 CMR 11.03(3)(a)(1)(a));
- Alteration of 10 or more acres of any other wetlands (301 CMR 11.03(3)(a)(1)(b));
- Alteration requiring a variance in accordance with the Wetlands Protection Act. (301 CMR 11.03(3)(a)(2)); and
- Structural alteration of an existing dam that causes an Expansion of 20% or any decrease in impoundment Capacity (301 CMR 11.03(3)(a)(4)).

The project will require a 401 Water Quality Certification (WQC), Water Management Act (WMA) Permit Addendum, a Variance from the provisions of the Wetlands Protection Act (WPA) and a Superseding Order of Conditions (SOC) from the Massachusetts Department of Environmental Protection (MassDEP). It requires a Fishway Construction Permit from the Division of Marine Fisheries (DMF), a Chapter 253 Dam Permit from the Department of Conservation and Recreation's Office of Dam Safety (DCR-ODS), and a Non-Vehicular Access Permit from the Massachusetts Department of Transportation (MassDOT). MassDEP's comments on the ENF also indicate that the project may require a Chapter 91 (c.91) License and/or Permit. The project will utilize State Financial Assistance in the form of one or more grants from the Sustainable Water Management Initiative (SWMI) program. The project is subject to review under the May 2010 MEPA Greenhouse Gas (GHG) Emissions Policy and Protocol ("the Policy").

The project will require an Order of Conditions from the Scituate Conservation Commission (or in the case of an appeal, a SOC from MassDEP). The project requires authorization from the U.S. Army Corps of Engineers (ACOE) under the General Permits for Massachusetts in accordance with Section 404 of the Federal Clean Water Act. The project may require Section 106 review by the ACOE and Massachusetts Historical Commission (MHC). The project also requires review and approval from the National Oceanic and Atmospheric Administration (NOAA) – National Marine Fisheries (NMF) and the U.S. Fish and Wildlife Services (USFWS).

SCOPE

General

The DEIR should follow Section 11.07 of the MEPA regulations for outline and content, as modified by this Scope.

Project Description and Permitting

The DEIR should include updated site plans for existing and proposed conditions, a detailed description of the proposed project (including improvements proposed at Tack Factory Pond), and describe any changes to the project since the filing of the ENF. The project description should include: a project history, a description of the overall project scope (including work at Tack Factory Pond), a discussion of key planning initiatives and reports completed to date regarding water supply planning and fish passage improvements, and identify project objectives and goals.

The DEIR should briefly describe each Federal, State, and local permit or agency action required or potentially required for the project, and should demonstrate that the project can meet applicable performance standards. The DEIR should contain sufficient information to allow the permitting agencies to understand the environmental consequences of their actions related to the project. In accordance with section 11.01(3)(a) of the MEPA regulations, the DEIR should discuss the consistency of the project with any applicable local or regional land use plans.

Alternatives Analysis

The ENF provided a link to the following studies: *Preliminary Assessment Report: First Herring Brook Fish Passage Improvements* (January 28, 2013), *Feasibility Report: Reservoir Dam Modifications for Higher Pond Levels: First Herring Brook Fish Passage Improvements* (June 26, 2013), and *Final Preliminary Design Memorandum for Reservoir Dam Fish Passage Project* (June 2014). These documents provide information regarding an expanded discussion of alternatives, hydraulic modeling results, and design flow constraints, which will support a comprehensive evaluation of alternatives. The presentation of the project in this Certificate, including its impacts, and potential mitigation measures, is informed and supported by the ENF and information provided in these studies. To provide a full and self-contained description and analysis of the project for the MEPA record, the DEIR should include a summary of each of these studies, provide electronic copies as appendices, and identify how review of hydraulic modeling results and the project alternatives evaluated in each study helped inform the design parameters and selection of the Preferred Alternative. It should provide additional narrative to explain and support the analysis of the project's impacts and mitigation, and extract relevant documentation and tables from these studies to supplement the narrative.

The ENF provided a summary of project alternatives to provide adequate storage capacity and fish passage improvements that were evaluated in greater detail in a 2013 study. The ENF indicated that the following five alternatives were considered: Alternative A- pond El. 40.9, Alternative B – pond El. 42.0, Alternative C – pond El.42.4, Alternative D – existing Pond El. 38.9, and Alternative E – pond El. 39.9. Alternatives A–C investigated fish passage viability with the existing fishway exit channel and a 6-inch deep, 18-inch wide notch in the exit channel. Options D-E modeled a lower fishway exit channel at El. 35.4. The ENF indicated that previous modeling considered various outdoor water ban trigger elevations and identified the potential impacts of higher water levels on private property, residences, and infrastructure. The ENF indicates a No-Build Alternative was not considered as it would not provide additional water storage needed to meet the Town's water supply demand, maintain aquatic habitat in First Herring Brook or provide fishway flow for effective fish passage. The ENF indicates that the Preferred Alternative (as described herein) is a combination of Alternatives A and E. As described in the ENF, this alternative was selected as it provides sufficient streamflow and water storage to meet the water supply demand while improving fish passage.

To provide context and support the selection of a Preferred Alternative, the DEIR should include an expanded alternatives analysis that summarizes the potential environmental impacts associated with Options A – E and compares these to the Preferred Alternative in a narrative and in a tabular format. The DEIR should identify each alternative's impacts on wetland resource areas and public and private infrastructure (Route 3A, private property shoreline, residences, sewer infrastructure, stormwater infrastructure, etc.).

The Alternatives Analysis should examine alternatives to balance the public water supply, flood control, storm damage prevention, wildlife habitat, and fish passage needs. The DEIR should include a narrative and modeling data to support the Proponent's adoption (or dismissal) of various operational scenarios as a feasible measure to avoid, minimize or mitigate

Damage to the Environment. Operating scenarios should evaluate the impacts of various target flow releases for fish passage and varying triggers for implementing the total water ban and curtailment of flow releases. The DEIR should identify the impact that each operating scenario will have on fish passage requirements, water storage capacity, the number of days a watering ban is enforced, and the number of days that releases are shut-off. The alternatives analysis should include a clear comparison, quantified to the extent possible, of the impacts of each alternative in a tabular format with supporting narrative. This analysis should be used to support identification of the Preferred Alternative (and operating scenario) that balances water demand with stream flow requirements and demonstrates that the project avoids, minimizes, and mitigates impacts to the maximum extent feasible.

The DEIR must expand upon the Preferred Alternative to identify how it can meet the regulatory criteria to be granted a 401WQC, Variance, and WMA Permit amendment. The DEIR should also evaluate alternatives to mitigate the loss of BVW and other alteration due to increased inundation of wetlands. The DEIR should address this issue in detail, evaluate the consistency of the proposed project with 401 WQC and Variance criteria, and ensure that the Alternatives Analysis supports evaluation of project impacts by MassDEP. Demonstration that the project can satisfy associated regulatory requirements and meet criteria for a Variance is a primary focus for MEPA review and, in particular, the focus of the DEIR.

Additional recommendations provided in this Certificate may result in a modified design that enhances the project's ability to avoid, minimize, or mitigate Damage to the Environment. The DEIR should discuss steps the Proponent will take to further reduce the impacts of the project since the filing of the EENF, or, if certain measures are infeasible, the DEIR should discuss why these measures will not be adopted.

Water Management

To provide additional context for the project, the DEIR should describe groundwater and surface water conditions of the Town's water supply system and the reservoir's role in the Town's water supply system. It should include a summary of the water withdrawal permits, registrations, and emergency authorizations and identify any relevant permit conditions. The DEIR should clearly specify the present and projected future demands on the Town's water supply system that may be a factor in the development of this project. The benefits of this project may be diminished over time if new water demands are not offset with conservation measures. The DEIR should identify measures the Town has implemented or is exploring to stabilize the long term water demand. This should include, but not be limited to implementation of a Water Conservation Plan and/or implementation of a water banking program. The DEIR should also identify other methods that were evaluated to address the Town's water needs either through reducing demand or providing additional storage (i.e. implementation of water restrictions, leak detection and pipe replacement, zoning or bylaw controls limiting new connections, dredging the reservoir to provide additional storage, and/or utilizing alternative water sources or interconnections).

The DEIR should include a copy of the current IOP and describe how the reservoir is currently operated to meet the Town's water demands. The DEIR should identify the target flow

releases from the reservoir and any other changes to the operation of the reservoir (including but not limited to modifying the triggers for the total water ban on nonessential outdoor water use and/or curtailment of flow releases). It should clarify whether the IOP will be updated to reflect these changes, and if so, should include a draft updated IOP or identify the schedule for its development.

The project will require an amendment to the Town's Water Management Act (WMA) Permit. Comments from MassDEP identify concerns regarding how the proposed operating scenario may impact the firm yield[2] of the reservoir. The firm yield is used as the basis for establishing the maximum annual withdrawal that can be permitted from the reservoir. The DEIR should evaluate the firm yield of the reservoir based on the proposed operation of the Preferred Alternative. Based on the results of this analysis, the DEIR should discuss whether resulting changes to the firm yield for the reservoir system will impact the Town's ability to meet future water needs or anticipate peak seasonal or peak day demands. The Proponent should consult with MassDEP prior to preparing this analysis. The DEIR should estimate the percentage of time that flow releases will be shut off and the number of days and level of outdoor water use restrictions that will be implemented under the Preferred Alternative. I refer the Proponent to MassDEP's comment letter which provides guidance on the methodology for this analysis. Finally, the DEIR should discuss how the project's consistency with the goals of SWMI.

Wetlands/Waterways/Stormwater

The project is subject to the WPA, its implementing regulations (310 CMR 10.00) and associated performance standards. The project will impact Bank, RFA, LUW, BLSF, and BVW. Comments from MassDEP confirm that the project requires a Variance from the provisions of the WPA as it will alter greater than 5,000 sf of BVW (310 CMR 10.55(4)(b)), and there are no applicable Limited Project provisions (310 CMR 10.53). The DEIR should describe the process for seeking a Variance and address how the project meets the criteria for a Variance provided in 310 CMR 10.05(10), including:

- there are no reasonable conditions or alternatives that would allow the project to proceed in compliance with the regulations;
- mitigating measures are proposed that will allow the project to be conditioned so at to contribute to the protection of the interests identified in M.G.L. c. 131 § 40; and
- that the variance is necessary to accommodate an overriding community, regional, state or national public interest.

To address the overriding public interest, the DEIR should document the need to provide additional water storage in the Scituate reservoir to meet water supply needs. Specifically, it should document current use, projected demand, water conservation efforts, storage needed to comply with permit requirements, and the impact of the project on the firm yield of the Scituate Reservoir system. The DEIR should specifically identify and quantify the public water supply and environmental benefits expected from the project. I refer the Proponent to MassDEP's

[2] The firm yield of a reservoir is the maximum average daily withdrawal that can be guaranteed from a reservoir without risk of failure during an extended drought period.

comment letter which provides further guidance and identifies additional information that should be included in the DEIR to support the request for a Variance.

Increasing the elevation of the impoundment will inundate existing BVW and convert shrub swamps and forested bordered vegetated wetlands to open water or other wetland types. The DEIR should quantify the change in wetland type from forested wetland and shrub swamp to open water and other wetland types. The DEIR should confirm the presence of wetland resource areas, characterize them, and estimate potential impacts. Impact calculations should be provided in a tabular format with a supporting narrative. The evaluation should assume complete inundation by the proposed new normal pool elevation and compare that to the wetland types that currently exist with the current normal pool elevation. I refer the Proponent to MassDEP's comment letter which provides additional guidance on this analysis. The DEIR should demonstrate compliance with the 401 WQC regulations and identify measures to avoid, minimize, and then mitigate the project's direct, indirect, and cumulative impacts. The DEIR should include plans depicting and quantifying any compensatory flood storage and wetland replication areas and should describe how altered wetland functions will be restored.

The DEIR should evaluate potential flood level increases during the 100-year flood, provide supporting hydrogeological and hydraulic analyses, and propose measures to avoid minimize, and mitigate any identified impacts. I note the site plans provided with the ENF reference a FEMA map (Map No. 25023C0117J, dated July 17, 2012) that may be out of date. Site plans, impact analysis, and hydraulic modeling provided with the DEIR should reflect the revised FEMA mapping. Comments from the EPA note the gate at Tack Factory Pond may require modification to avoid upstream flooding impacts. The DEIR should address this concern and describe any work proposed at the Tack Factory Pond gate

The DEIR should identify work activities and associated impacts to wetland resource areas that will be subject to ACOE review. I refer the Proponent to comments from the ACOE which provide guidance on this issue. The DEIR should identify applicable ACOE performance standards and regulations to assist in determining the potential overlap or conflict with State wetland permitting requirements. The DEIR should include narrative and supporting data or graphics as necessary to demonstrate that the project can meet all applicable performance standards and regulations.

The project includes new fill within the FEMA designated floodway at the dam crest and along Route 3A. The DEIR should quantify and describe the proposed fill and its impact on the horizontal and vertical extent of the 100-year flood. I refer the Proponent to comments from MassDEP which indicate the project must submit a Conditional Letter of Map Revision (CLOMR) or a Letter of Map Revision (LOMR) to FEMA to address the increase in flooding. The DEIR should provide an update on this process. It should clarify whether the increase to the flood elevation will extend onto properties not owned or controlled by the Town of Scituate and identify whether flood easements will be required.

The Public Waterfront Act (M.G.L. c.91) and its regulations (310 CMR 9.00) regulate activities within waterways, including certain non-tidal rivers and streams. Comments from MassDEP indicate that First Herring Brook, Tack Factory Pond, and Reservoir Pond may be

subject to Chapter 91 jurisdiction pursuant to 310 CMR 9.04. The Proponent should file a Request for Determination of Applicability with MassDEP prior to submittal of the DEIR to determine the jurisdictional status of the waterways. If the waterways are subject to c.91 jurisdiction, the DEIR should include the information identified in MassDEP's comment letter to facilitate their determination as to whether the project requires a c.91 License or Permit.

Comments from MassDEP indicate that the project may qualify as a redevelopment project for purposes of applying the Stormwater Management Standards (SMS). The DEIR should describe the proposed stormwater management improvements, including connection points to off-site stormwater conveyance infrastructure and BMPs. It should provide supporting documentation or data to demonstrate that the stormwater management infrastructure will be designed in compliance with the SMS to the maximum extent practicable. This can include stormwater management system plans and calculations regarding the water quality volume, infiltration volume, total suspended solids (TSS) removal and peak rates of runoff for pre- and post- development conditions. I refer the Proponent to comments from MassDEP that identify concerns regarding stormwater discharges to the reservoir from the drainage system located on the Route 3A causeway. I recognize that Route 3A is controlled by MassDOT. I encourage MassDOT to work collaboratively with the Proponent to identify opportunities to improve the stormwater infrastructure on Route 3A because it discharges directly into the reservoir, which is an ORW and Zone A drinking water supply area.

Division of Marine Fisheries

First Herring Brook supports a variety of diadromous fish species, including: alewife *(Alosa pseudoharengus)*, rainbow smelt *(Osmerus mordax)*, and American eel *(Anguilla rostrata)*. The project will require a Fishway Construction Permit from DMF. Comments from DMF request additional information on the construction schedule and in-water work to determine the project's potential impact on fall migrations. The DEIR should provide more information on proposed water control and silt containment measures that will be used during the summer and fall seasons. DMF recommends a time of year (TOY) restriction for any in-water work from March 1 to June 30 to avoid impacts to spring spawning migrations and glass eel immigrations. A TOY restriction from September 1 to November 14 may be required if construction activities cannot maintain adequate passage and containment of silt-producing work.

Climate Change

Executive Order 569: Establishing an Integrated Climate Change Strategy for the Commonwealth (EO 569) was issued on September 16, 2016. EO 569 recognizes the serious threat presented by climate change and directs agencies within the administration to develop and implement an integrated strategy that leverages state resources to combat climate change and prepare for its impacts. The Order seeks to ensure that Massachusetts will meet GHG emissions reduction limits established under the Global Warming Solution Act of 2008 (GWSA).

Greenhouse Gas Emissions

The project is subject to the MEPA Greenhouse Gas Policy and Protocol (GHG Policy) because it exceeds thresholds for a mandatory EIR. The GHG Policy includes a de minimus exemption for projects that will produce minimal amounts of GHG emissions. This project is proposed to improve the sustainability of the Town's public water supply, restore the nonfunctioning fishway at Reservoir Pond, and improve downstream ecological conditions. The GHG emissions are associated with the construction period of the project. As such, this project falls under the de minimis exemption; therefore, the Proponent is not required to prepare a GHG analysis. However, the DEIR should identify measures to avoid and minimize GHG emissions (and other air pollutants) during the construction period such as limiting idling and using bio-fuels in off-road construction equipment.

Climate Change Adaptation and Resiliency

The DEIR should discuss potential effects of climate change on the project in the context of improving the resiliency of the public water supply and fishway system. The DEIR should identify any potential impacts associated with increased frequency and intensity of precipitation events and extreme heat events and address how the project will be designed to adapt and/or sustain such impacts. The Proponent should consider these impacts when designing stormwater management improvements and the riprap design along Route 3A and when evaluating flooding impacts to Route 3A and associated culvert (discussed in greater detail below). To assist in the evaluation of climate change resiliency and adaptation measures the Proponent should review EEA's *Climate Change Adaptation Report* (September 2011).[3]

Transportation

The project includes installation of riprap along portions of Route 3A to prevent erosion of the highway embankment. The Proponent must obtain a Non-Vehicular Access Permit from MassDOT for this proposed work. The DEIR should describe how riprap will be installed, potential impacts to the state jurisdictional roadway, and identify the need and duration for any lane closure or shutdown during construction.

The DEIR should evaluate whether the proposed increase in flood elevation will cause Route 3A to flood at a greater frequency and identify measures to avoid, minimize, and mitigate any adverse impacts. It should identify the diameter and existing condition of the existing culvert that conveys First Herring Brook beneath Route 3A from Tack Factory Pond to Reservoir Pond. The DEIR should include an analysis to determine if the capacity of the culvert is sufficient to accommodate the expected higher normal water levels during storm events without overtopping Route 3A or flooding adjacent properties. The Proponent should coordinate with MassDOT Highway Division District 5 Office prior to submitting the DEIR.

[3] http://www.mass.gov/eea/docs/eea/energy/cca/eea-climate-adaptation-report.pdf

Construction Period Impacts

The DEIR should describe construction sequencing, methodology and staging activities and identify any special measures that may be necessary to prepare the project area (i.e. removal of trees, clearing of vegetation, abandonment of structures, etc.) prior to raising the maximum normal pool elevation. It should describe potential construction period impacts (including but not limited to traffic management, parking, air quality and noise impacts) and outline feasible measures that can be implemented to eliminate or minimize these impacts in a draft Construction Management Plan (CMP). The draft CMP should include appropriate erosion and sedimentation control BMPs. The Proponent should adopt erosion and sedimentation controls consistent with a Stormwater Pollution Prevention Plan prepared in accordance with the NPDES Construction General Permit requirements. The DEIR should elaborate on how quickly the reservoir impoundment will be increased to the proposed final elevation (El. 40.4). It should describe any pre-construction protocols to inform abutters of the increased water elevation in conjunction with the project.

I strongly encourage the Proponent to ensure contractors install emission control devices on all off-road vehicles in an effort to reduce emissions of volatile organic compounds (VOCs), carbon monoxide (CO) and particulate matter (PM) from diesel-powered equipment. Off-road vehicles are required to use ultra-low sulfur diesel fuel (ULSD).

Mitigation and Draft Section 61 Findings

The DEIR should provide a separate chapter summarizing proposed mitigation measures including draft Section 61 Findings for each anticipated State Agency Action. The DEIR should contain clear commitments to implement these mitigation measures, estimate the individual costs of each proposed measure, identify the parties responsible for implementation, and include a schedule for implementation.

Response to Comments

The DEIR should contain a copy of this Certificate and a copy of each comment letter received. To ensure that the issues raised by commenters are addressed, the DEIR should include direct responses to comments to the extent that they are within MEPA jurisdiction. This directive is not intended to, and shall not be construed to enlarge the scope of the DEIR beyond what has been expressly identified in this Certificate. I recommend that the Proponent use either an indexed response to comments format, or a direct narrative response.

Circulation

The Proponent should circulate the DEIR to those parties who commented on the ENF, to any State Agencies from which the Proponent will seek permits or approvals, and to any parties specified in section 11.16 of the MEPA regulations. A copy of the DEIR should be made available for review at the Scituate Public Library. The DEIR submitted to the MEPA office should include a digital copy (e.g., CD-ROM, USB drive) of the complete document.

July 21, 2017
Date

Matthew A. Beaton

Comments received:

06/27/2017 Department of Conservation and Recreation (DCR)
06/30/2017 Massachusetts Department of Transportation (MassDOT)
07/07/2017 U.S. Environmental Protection Agency (EPA)
07/11/2017 U.S. Army Corps of Engineers (ACOE)
07/11/2017 Division of Marine Fisheries (DMF)
07/11/2017 Massachusetts Department of Environmental Protection (MassDEP)
07/11/2017 North South River Watershed Alliance (NSRWA)

MAB/PRC/prc

Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

Southeast Regional Office • 20 Riverside Drive, Lakeville MA 02347 • 508-946-2700

Charles D. Baker
Governor

Karyn E. Polito
Lieutenant Governor

Matthew A. Beaton
Secretary

Martin Suuberg
Commissioner

July 11, 2017

Mathew A. Beaton,
Secretary of Environment and Energy
ATTN: MEPA Office
Executive Office of Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114

RE: ENF Review EOEEA #15711
SCITUATE. Reservoir Dam Water Storage and Fish Passage Improvement at 430 Chief Justice Cushing Highway

Dear Secretary Beaton,

The Southeast Regional Office of the Department of Environmental Protection (MassDEP) has reviewed the Notice of Project Change (NPC) for the proposed Reservoir Dam Water Storage and Fish Passage Improvement, located at 430 Chief Justice Cushing Highway, Massachusetts for the proposed (EOEEA # 15711). The Project Proponent provides the following information for the Project:

The purpose of the Reservoir Dam Water Storage and Fish Passage Improvement Project is to provide water storage for the Town of Scituate's public water supply while providing BIOQ10 flows to maintain aquatic habitat downstream of Reservoir Dam and Old Oaken Bucket Pond and effective fish passage at the Reservoir Dam fishway. Since the dam is classified as a Class I high hazard dam, modifications to the spillway are included in this Project to increase the discharge capacity for the design flood equal to one-half the Probable Maximum Flood (1/2 PMF) in accordance with Massachusetts General Law c.253, Section 46 and 301 Code of Massachusetts Regulations (CMR) 10.07. Modifications to the dam, spillway, and fishway conform to the dam safety regulations and will be approved by the Department of Conservation and Recreation (DCR), Office of Dam Safety (ODS).

Bureau of Water Resources Comments

Water Management Program Comments: The Water Management Program has reviewed the Environmental Notification Form (ENF) submitted by the Tetra Tech on behalf of the Town of Scituate for the Reservoir Dam Water Storage and Fish Passage Improvement Project, and in accordance with the Water Management Act (WMA), M.G.L. c. 21G, offers the following comments.

The Town of Scituate is currently authorized to withdraw up to 1.80 million gallons of water per day (MGD) from ground and surface water supplies in the South Coastal Basin under its Water Management Act (WMA) Registration #421264.01 and Permit #9P4421264.02. In addition, the following permit conditions relate to the proposed Project:

- requires Scituate to work with the Scituate Water Study Committee and First Herring Brook Watershed Initiative to refine and implement the minimum flow targets contained in the First Herring Brook Interim Operational Plan; and
- caps maximum withdrawals from Scituate's reservoir system at an average annual daily withdrawal of 0.79 MGD, based on the Old Oaken Bucket Pond Firm Yield Study, dated June 2003, which determined the firm yield for the reservoir system during the drought of record (1960's drought) with no downstream releases.

According to the Annual Statistical Reports (ASRs), the Town of Scituate has been withdrawing water below its total authorized volume in recent years (1.35 MGD in 2016, 1.47 MGD in 2015 and 1.54 MGD in 2014), and around 21% of its water supply enters the distribution system from the Old Oaken Bucket Pond, which is a relatively small reservoir and is supplemented by the Main Reservoir and by water pumped from Well 17A. During the drought period in 2016, the Main Reservoir had been reportedly under 25% full. The Project Proponent proposes raising the water levels in the Main Reservoir to provide additional water storage for the Town of Scituate's public water supply while making downstream releases to provide enough flow in First Herring Brook to maintain effective fish passage at the Main Reservoir Dam fishway. The Water Management Program has concerns over how the proposed operating scenario may impact the firm yield of the Main Reservoir.
The firm yield of a reservoir is the maximum average daily withdrawal that can be guaranteed from a reservoir without risk of failure during an extended drought period. The report "Refinement and Evaluation of the Massachusetts Firm-Yield Estimator Model Version 2.0" (SIR 2011-5125) published by the U.S. Geological Survey in 2011, evaluated the firm yield for the Scituate's Main Reservoir under several scenarios:

- operating at 100 percent reliability, with no controlled releases, the firm yield of the Reservoir is 0.63 MGD;
- operating at 100 percent reliability, with 10th-percentile monthly flow releases, the firm yield for the Reservoir is 0.13 MGD.

In the ENF, the Proponent did not specify the target flow releases from the Reservoir which makes it unclear how the combined increase in storage and target flow releases for fisheries passage may affect the firm yield of the reservoir. Currently, under the First Herring Brook Interim Operational Plan and the Scituate's WMA permit, the Town of Scituate has authority to implement a total ban on nonessential outdoor water use when the Reservoir falls to El. 36 ft. and shutoff the flow releases when the Reservoir drops to El. 32.0 ft. It is not clear whether the Proponent expects to modify the triggers for the total water ban and the release shutoff. Therefore, the Water Management Program suggests the Proponent first clarify whether there will be changes to the triggers for implementing the nonessential outdoor water use and curtailing the water release. An update to the First Herring Brook Interim Operational Plan may be necessary should those triggers change. Then the Proponent should evaluate the firm yield of the Reservoir under each operating scenario comparable to the methodology of the USGS Firm-Yield Estimator Model Version 2.0. The Proponent should estimate the percentage of the time that the Town may have to shutoff the flow releases under each operating scenario. The Proponent should also specify how many days of outdoor water use restrictions and what levels of the outdoor water use restrictions will be implemented under each operating scenario.
This Project will likely require an amendment to the Town of Scituate's WMA permit, and the above data will help the Water Management Program to better evaluate how raising the Main Reservoir water levels and increasing downstream releases will affect the firm yield and benefit the Town's public water supply.

Wetlands Program Comments. The Scituate Reservoir Dam Water Supply Storage and Fish Passage Improvement Project proposes to alter 569,000 square feet (13 acres) of Bordering Vegetated Wetlands (BVW) to provide the Town of Scituate with a sustainable Public Water Supply as well as to restore the existing nonfunctional fishway. Because the amount of Bordering Vegetated Wetland (BVW) proposed to be altered is greater than 5,000 square feet (310 CMR 10.55(4)(b)), and there are no Limited Project provisions (310 CMR 10.53) applicable to this Project, a Variance will be required pursuant to 310 CMR 10.05(10). MassDEP notes that there may be exceedances of other regulatory standards as well. The Proponent has filed a Wetlands Notice of Intent (NOI) with the Scituate Conservation Commission (DEP File #68-2665). The Department's review indicates that the proposed Project does not appear to be a limited Ecological Restoration Project. Accordingly, it appears that the Conservation Commission must deny the Project pursuant to 310 CMR 10.05(6)(b) since the amount of BVW proposed to be altered exceeds 5,000 square feet. The procedures and standards to obtain a variance from the Wetlands Regulations are specified at 310 CMR 10.05(10)(a) and provide, in part, that:

The Commissioner may waive the application of certain portions of the [wetland] regulation(s) when [the Commissioner] finds, after opportunity for an adjudicatory hearing, that:

(1) there are no reasonable conditions or alternatives that would allow the Project to proceed in compliance with the regulations;

(2) mitigating measures are proposed that will allow the Project to be conditioned so as to contribute to the protection of the interests identified in the Wetlands Act; and

(3) the variance is necessary to accommodate an overriding community, regional, state or national public interest.

In addition to the Variance, a 401 Water Quality Certificate is required from MassDEP pursuant to 314 CMR 9.04(1) and (2).

The Project requires a mandatory Environmental Impact Report to be prepared since more than 1-acre of BVW is proposed to be altered (301 CMR 11.03(3)(a)1.a.); more than 10-acres of other wetland resource area is proposed to be altered (301 CMR 11.03(3)(a)1.b. - Bordering Land Subject to Flooding); the Project requires a Variance to the Massachusetts Wetlands Protection Act (301 CMR 11.03(3)(a)2.); and the structural alteration to the existing dam will expand the impoundment capacity by at least 20% (301 CMR 11.03(3)(a)4.). In addition, the Project trips the MEPA Floodway threshold (301 CMR 11.03(3)(b)1.e.) since the dam crest is proposed to be raised and riprap is proposed to be placed along Rt. 3A within the FEMA designated Floodway. The Floodway is located within BLSF or other wetland resource areas.

The Project Proponent must address the three Variance criteria indicated above when filing for a Wetlands Protection Act Variance, and to the extent possible, these criteria should be addressed in the Environmental Impact Report. To address the overriding public interest, the Variance application must document the need to provide additional water storage in the Scituate reservoir to meet water supply needs, including documentation of current use, projected demand, water conservation efforts, storage needed to comply with Scituate's Water Management Permit Special Condition 6, Development of Minimum Streamflow Targets for Fish Passage, and the impact of the Project on the

firm yield of the Scituate Reservoir system. Additionally, the demonstration of need to restore the existing nonfunctional fishway should include comment from the Massachusetts Department of Fish and Game, as well as an analysis to examine alternatives to balance the Public Water Supply, flood control, storm damage prevention, wildlife habitat and fish passage needs. There was an insufficient amount of water released from the Scituate Reservoir to further fish passage in the First Herring Brook at least 20% of all days between October 2013 and the present (as recorded at the Massachusetts Riverways RIFLS stream gage located immediately downstream of the Scituate Reservoir). The alternatives analysis needs to examine issues with releasing sufficient water to the First Herring Brook year round from Tack Factory Pond, Scituate Reservoir, and Old Oaken Bucket reservoirs to provide streamflow depths to permit fish movement. Also, the alternatives analysis needs to examine the feasibility of enlarging the existing stream culverts that convey the First Herring Brook from Tack Factory Pond to the North River that currently appear to provide physical impediments to fish passage (including the New Driftway and Route 3A stream culverts). To be effective at providing fish passage, the restoration of the existing nonfunctional fish passageway needs to be partnered with stream flow restoration and enlarged stream culverts in the First Herring Brook.

The Project Proponent has estimated that 13 acres of BVW will be altered to increase the normal pool surface of the Scituate Reservoir and Tack Factory Pond by 1.5 feet over existing conditions. These wetlands are classified as Outstanding Resource Waters (ORW) of the Commonwealth to protect the Public Drinking Water supply. Elevating the water surface of the Scituate Reservoir and Tack Factory Pond will inundate the existing BVWs, converting shrub swamps and forested bordered vegetated wetlands to open water or other wetland types. For example, the existing woody trees and shrubs located in the BVWs will likely die due to the change in hydroperiod, and the shrub swamps and forested wetlands may transition to other wetland types such as open water or deep marsh. MassDEP recognizes that the water level in Scituate Reservoir and Tack Factory Pond fluctuates, especially during summer and autumn months due to demand. The Project Proponent should evaluate the alterations to wetland resource area types assuming complete inundation by the proposed new normal pool elevation and compare that to the wetland types that currently exist with the current normal pool elevation. The fluctuations that currently occur above and below the existing normal pool elevation would also be expected to occur with the proposed normal pool elevation. The change in wetland type from forested wetland and shrub swamp to open water and other wetland types (i.e. shrub swamp, marsh etc.) needs to be quantified. Converting BVW to land under water is considered a loss. The alternative analysis shall include measures to avoid, minimize, and then mitigate the proposed BVW loss. Alternatives to mitigate the loss and other alteration due to increased inundation of wetlands need to be analyzed in the Environmental Impact Report.

New fill is proposed within the FEMA designated Floodway of Bordering Land Subject to Flooding, Bank, or Land Under Water at the dam crest and along Route 3A. The Floodway is the portion of the FEMA designated flood prone area where no increase to the vertical and horizontal extent of flooding is allowed. This FEMA requirement coincides with 310 CMR 10.57 of the Wetland regulations which does not allow any increase to the vertical or horizontal extent of flooding, up to and including the 100-year flood. The proposed fill will increase the vertical and horizontal extent of the 100-year flood. The Proponent estimates that the proposed fill will increase the horizontal extent of flooding and the BLSF boundary by 17 acres. As no increase to the vertical and horizontal flooding is allowed by the FEMA floodway requirements and 310 CMR 10.57, the Proponent must either file a Conditional Letter of Map Revision (CLOMR) with FEMA, requesting a written opinion as to whether the Project as proposed complies with the FEMA floodway requirements or file a Letter of

Map Revision (LOMR) with FEMA requesting to increase the 100-year flood elevation. The Proponent should evaluate whether the increase to the flood elevation will extend onto properties not owned or controlled by the Town of Scituate, including whether the proposed increase will cause Route 3A to flood at a greater frequency. To mitigate flood increases, the Proponent is encouraged to obtain flood easements for any increased flooding on offsite properties as well as to increase the size of the stream culvert connecting Tack Factory Pond to the Scituate Reservoir.

The existing stormwater discharges directed from the causeway (Route 3A) impounding Tack Factory Pond do not appear to be specifically exempted from compliance with the stormwater standards pursuant to 310 CMR 10.05(6)(l) and 314 CMR 9.06(6)(b). As part of the Project, riprap is proposed to be placed in land under water and bank along the Route 3A. Provided no additional impervious area is proposed to be created, the Project would appear to be eligible to be considered a redevelopment for purposes of the stormwater standards. Redevelopment Projects are only required to demonstrate compliance with the stormwater standards to the maximum extent practicable in accordance with 310 CMR 10.05(6)(k)7 and 314 CMR 9.06(6)(a)7. Alternatives to address the Stormwater requirements specified at 310 CMR 10.05(6)(k) and 314 CMR 9.06(6)(a) should be evaluated to examine alternatives to improve the water quality of stormwater that is currently discharged directly to the Scituate Reservoir and Tack Factory Pond from the drainage system located on the causeway (Route 3A) between the Scituate Reservoir and Tack Factory Pond.

Waterways Program Comments. The Public Waterfront Act, M.G.L. c.91 and its regulations at 310 CMR 9.00 regulates activities within waterways, including certain non-tidal rivers and streams. Based on a review of the ENF, various maps and aerial photographs of the area, the Waterways Program has determined that First Herring Brook, including the reservoir and Tack Factory Pond which were created by damming a portion of the waterway, are likely subject to Chapter 91 jurisdiction pursuant the Waterways Regulations at 310 CMR 9.04. The Waterways Program has performed a cursory review of its data base and found no prior Chapter 91 authorization for the existing dam or culvert structures. In order to make a conclusive determination as to whether these waterways are jurisdictional, the Proponent may file a Request for Determination of Applicability pursuant to the Waterways Regulations at 9.06. Assuming that these waterways are subject to Chapter 91 jurisdiction, with the preparation of the EIR, the Proponent should conduct additional research to confirm that no licenses, contracts or legislative grants have been issued for the dam and the culvert structures at Route 3A. The EIR should also evaluate the different components of the Project to determine whether they may be exempt from licensing pursuant to 310 CMR 9.05 (3)(c) & (g). This information will be used by MassDEP to determine whether a License or Permit application will be required.

Bureau of Waste Site Cleanup Comments

The Bureau of Waste Site Cleanup (BWSC) searched its databases for disposal sites and release notifications that have occurred at or might impact the proposed Project area. A disposal site is a location where there has been a release to the environment of oil and/or hazardous material that is regulated under M.G.L. c. 21E, and the Massachusetts Contingency Plan [MCP – 310 CMR 40.0000].

There are no listed MCP disposal sites located at or in the vicinity of the site that might impact the proposed Project. Interested parties may view a map showing the location of BWSC disposal sites using the MassGIS data viewer (Oliver) at: http://maps.massgis.state.ma.us/map_ol/oliver.php. Under "Available Data Layers" select Regulated Areas", and then "DEP Tier Classified 21E Sites". The

compliance status and report submittals for specific MCP disposal sites may be viewed using the BWSC Waste Sites/Reportable Release Lookup at:
http://public.dep.state.ma.us/SearchableSites2/Search.aspx

The Project Proponent is advised that if oil and/or hazardous materials are identified during the implementation of this Project, notification pursuant to the Massachusetts Contingency Plan (310 CMR 40.0000) must be made to MassDEP, if necessary. A Licensed Site Professional (LSP) should be retained to determine if notification is required and, if need be, to render appropriate opinions. The LSP may evaluate whether risk reduction measures are necessary if contamination is present. The BWSC may be contacted for guidance if questions arise regarding cleanup.

Bureau of Air and Waste Comments

Air Quality. Construction and operation activities shall not cause or contribute to a condition of air pollution due to dust, odor or noise. To determine the appropriate requirements please refer to:

310 CMR 7.09 Dust, Odor, Construction, and Demolition
310 CMR 7.10 Noise

Massachusetts Idling Regulations. MassDEP requests that the Proponent state specifically in the subsequent environmental filing how it plans to prohibit the excessive idling during the construction period. Typical methods of reducing idling include driver training, periodic inspections by site supervisors, and posting signage. In addition, to ensure compliance with this regulation once the Project is occupied, MassDEP requests that the Proponent establish permanent signage limiting idling to five minutes or less at the completed Project.

Proposed s.61 Findings

The "Certificate of the Secretary of Energy and Environmental Affairs on the Environmental Notification Form" may indicate that this Project requires further MEPA review and the preparation of an Environmental Impact Report. Pursuant to MEPA Regulations 301 CMR 11.12(5)(d), the Proponent will prepare Proposed Section 61 Findings to be included in the EIR in a separate chapter updating and summarizing proposed mitigation measures. In accordance with 301 CMR 11.07(6)(k), this chapter should also include separate updated draft Section 61 Findings for each State agency that will issue permits for the Project. The draft Section 61 Findings should contain clear commitments to implement mitigation measures, estimate the individual costs of each proposed measure, identify the parties responsible for implementation, and contain a schedule for implementation.

The MassDEP Southeast Regional Office appreciates the opportunity to comment on this proposed Project. If you have any questions regarding these comments, please contact George Zoto at (508) 946-2820.

Very truly yours,

Jonathan E. Hobill,
Regional Engineer,
Bureau of Water Resources

JH/GZ

Cc: DEP/SERO

ATTN: Millie Garcia-Serrano, Regional Director
David Johnston, Deputy Regional Director, BWR
Maria Pinaud, Deputy Regional Director, BAW
Gerard Martin, Deputy Regional Director, BWSC
Jennifer Viveiros, Deputy Regional Director, ADMIN
Allen Hemberger, Site Management/BWSC
Jim Mahala, Section Chief, Wetlands and Waterways. BWR
David Hill, Wetlands and Waterways, BWR
Lealdon Langley, Director, Wetlands and Waterways, BWR. Boston
Thomas Maguire, Wetland and Waterways, BWR, Boston
Michael Stroman, Wetlands and Waterways, BWR, Boston
Lisa Rhodes, Wetlands and Waterways, BWR, Boston
Duane LeVangie, Section Chief, Water Management Program, BWR, Boston
Elizabeth McCann, Water Management, BWR, Boston
Shi Chen, Water Management, BWR, Boston.

Commonwealth of Massachusetts

Division of Marine Fisheries

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David E. Pierce
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Matthew A. Beaton
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George N. Peterson, Jr.
Commissioner
Mary-Lee King
Deputy Commissioner

July 11, 2017

Secretary Matthew A. Beaton
Executive Office of Energy and Environmental Affairs (EEA)
Attn: MEPA Office
Page Czepiga, EEA No. 15711
100 Cambridge Street, Suite 900
Boston, MA 02114

Dear Secretary Beaton:

The Division of Marine Fisheries (*MarineFisheries*) has reviewed the Environmental Notification Form by the Town of Scituate for the Reservoir Dam Water Storage and Fish Passage Improvement Project on First Herring Brook in the Town of Scituate. Proposed improvements described in the design plans include raising the Reservoir Dam impoundment and Tack Factory Pond 1.5 feet above the existing maximum normal pool elevation and modifying the spillway to lower the crest to 36.4 feet elevation. The overall storage capacity of the reservoir will be increased by 23%. The fishway exit channel would be lowered and a removable weir would also be incorporated into the new design to facilitate diadromous fish passage at all water levels. Existing marine fisheries resources and potential project impacts are outlined in the following paragraphs.

First Herring Brook currently supports a variety of diadromous fish species. Specifically, alewife (*Alosa pseudoharengus*), rainbow smelt (*Osmerus mordax*), and American eel (*Anguilla rostrata*) are all present in this system (Evans et al. 2011).

MarineFisheries offers the following comments for your consideration:

- To protect existing diadromous fish resources, in-water construction activities should be sequenced to avoid spring spawning migrations (rainbow smelt and alewives) and glass eel immigrations from **March 1 to June 30**.
- More information is needed on the construction schedule and related in-water work to determine if construction activities should be sequenced to avoid fall migrations. Specifically, more information is required on proposed water control and silt containment measures during the summer and fall seasons to ensure that passage and downstream habitats are not impacted during this time period. An addition fall TOY restriction of **September 1 to November 15** may be required if construction activities cannot maintain adequate passage and containment of silt-producing work.
- This project will require a Fishway Construction Permit from *MarineFisheries*. Our staff will work with the Town of Scituate during this process to prepare a final design plan and Operation and Maintenance (O&M) Plan for the diadromous fish passage facilities. The O&M plan will be essential for providing outflow to support river herring migrations.

Questions regarding this review may be directed to John Logan in our New Bedford office at (508) 990-2860 ext. 141.

Sincerely,

David E. Pierce, Ph.D.
Director

cc: Scituate Conservation Commission
Tom Cook, Tetra Tech, Inc.
Christopher Boelke & Alison Verkade, NMFS
Robert Boeri, CZM
Ed Reiner, EPA
Ken Chin, DEP
Richard Lehan, DFG
Kathryn Ford, Brad Chase, Pooja Potti, DMF

References

Evans NT, Ford KH, Chase BC, Sheppard J (2011) Recommended Time of Year Restrictions (TOYs) for Coastal Alteration Projects to Protect Marine Fisheries Resources in Massachusetts. Massachusetts Division of Marine Fisheries Technical Report, TR-47.

DP/JL/BC/sd

dcr
Massachusetts

June 27, 2017

Secretary Matthew A. Beaton
Executive Office of Energy and Environmental Affairs
Attn: MEPA Office, Page Czepiga
100 Cambridge Street, Suite 900
Boston, Massachusetts 02114

RE: EOEEA # 15711 Reservoir Dam Water Storage and Fish Passage Improvement

Dear Secretary Beaton:

The Department of Conservation and Recreation ("DCR") Office of Dam Safety ("ODS") has reviewed the Environmental Notification Form ("ENF") for the Reservoir Dam Water Storage and Fish Passage Improvement project located in the Town of Scituate submitted by the Town of Scituate, Department of Public Works (the "Proponent"). For clarification the Reservoir dam referred to in the ENF is defined in ODS records as First Herring Brook Reservoir dam, National ID: MA00478.

Background
ODS notes that First Herring Brook Reservoir dam is classified as "High Hazard Potential" dam in Good condition. Dams are deemed to be a High Hazard Potential where dam failure will likely cause loss of life and serious damage to home(s), industrial or commercial facilities, important public utilities, main highway(s), or railroad(s).

Project Description
As described in the ENF, the selected alternative for First Herring Brook Reservoir dam modification will include lowering of the spillway structure and spillway crest elevation and installation of a bottom hinged crest gate, lowering of the fishway exit channel and modification of the existing weirs within the fishway. These modifications are required to provide fish passage for anadromous species during reservoir operating levels during the spring and fall fish migration periods as well as providing additional water supply storage. ODS understand that the modifications will result in raising the normal reservoir level by 1.5 feet. Therefore, the Proponent will need to address spillway capacity and appropriate freeboard considerations in the final design.

A Dam Safety Chapter 253 permit will be processed and issued by ODS upon receipt of all required technical submittals that are in accordance with the dam safety regulations. As with any dam modification project, the Proponent will have to prepare a final design that will result in construction of a spillway that is compliant with the Spillway Design Flood ("SDF") requirements of the dam safety regulations. ODS is available to provide additional guidance through the permitting process.

DCR appreciates the opportunity to comment on this project. Please contact Mark Geib at (617) 626-1396 with any questions or to request additional information or coordination with the Office of Dam Safety.

Department of Conservation and Recreation
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Charles D. Baker
Governor

Karyn E. Polito
Lt. Governor

Matthew A. Beaton, Secretary, Executive
Office of Energy & Environmental Affairs

Leo Roy, Commissioner
Department of Conservation & Recreation

Sincerely,

Leo Roy
Commissioner

cc: Norman Orrall, DCR Chief Planning and Engineering
William Salomaa, Dam Safety Director
Nat Tipton, MEPA Review Coordinator

NSRWA

July 11, 2017

Secretary of Energy and Environmental Affairs
Executive Office of Energy and Environmental Affairs (EEA)
Attn: MEPA Office
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100 Cambridge Street, Suite 900
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Via email: page.czepiga@state.ma.us

RE: EEA# 15711 Scituate Reservoir Dam Storage and Fish Passage Improvement

Dear Ms. Czepiga:

The North and South Rivers Watershed Association (NSRWA) would like to offer the following comments and support of the Town of Scituate's proposal EEA #15711 Reservoir Dam Storage and Fish Passage Improvement project. The NSRWA has partnered with the Town of Scituate, Division of Ecological Restoration, Massachusetts Bays Program, and multiple other state, federal and nonprofit agencies and groups for a decade plus to restore more natural streamflow regimes in the First Herring Brook and aquatic habitat for migratory and resident fish populations in this system. This partnership approach has led to the current proposal under review – to raise the reservoir and make changes to infrastructure that are needed to allow for fish passage into the 80 plus acre town reservoir and provide the town with drought resiliency through additional storage.

The NSRWA has been a supportive and integral partner to the town of Scituate by providing technical support, and public outreach and education on the need for water conservation and the environmental impact the water supply has had on the First Herring Brook habitat. There have been multiple years of effort and projects that have helped the town to balance streamflow with water supply needs in the system. The town has implemented many of the conservation recommendations needed to balance demand with streamflow requirements including reducing their nonessential outdoor water use by over 300,000 gallons per day via irrigation system restrictions, banning new irrigation hook ups to the public water supply system and leak detection and pipe replacement efforts. In addition, they have undertaken infrastructure improvements to the Old Oaken Bucket fish ladder to make it passable for fish, implemented a streamflow release plan that maintains wetted habitat in between the Reservoir and Old Oaken Bucket pond and downstream of it. These efforts have allowed some limited returns of river herring to the lower portion of the system but the Reservoir remains unavailable for fish passage due to the design of the fish ladder exit and spillway elevation. The only remedy that will allow fish passage at this site will be to raise the dam and lower the fishway exit. These infrastructure improvements along with the increased storage that will provide the town more drought resiliency make this project in our

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opinion a unique habitat restoration effort that benefits people and nature and ready the town for future climate change.

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NSRWA

The MEPA process provides guidance to permitting authorities on impacts and mitigation to those impacts from development projects. This project is singularly unusual in that it is meeting the needs of both water supply improvements and habitat restoration for migratory fish passage. The raising of the reservoir will inundate bordering vegetated wetlands along the reservoir for longer periods than they currently experience. How much longer will depend upon water demands and precipitation patterns in any given year. The areas to be inundated currently experience flooded conditions, this project only lengthens and increases the frequency that these conditions would be experienced. We would hope that because of the net environmental benefit that this project will bring, for which there is no feasible alternative, would provide some relief from traditional wetland mitigation requirements as this is a nontraditional project.

One concern we have is that the town, while doing an exemplary job of conserving water, will be under continued pressure to increase their water demand through new development. Indeed today they have many new development projects that will need water and are already in the pipeline. In order to meet streamflow releases at the fish ladder the town will need to offset new demands with conservation in order to keep water demand flat at the 2011-2015 which is 1.5 MGD. The town's recently approved water conservation plan recommends that the town implement a water banking program that at a minimum requires 1:1 offset for new development – or if possible a 2:1 offset for new development that provides the town a mechanism for funding water conservation projects in the community and keeps the demand flat at current levels. The water conservation plan has been referenced in the town's Water Management Act Permit and the Water Resources Committee has it on their agenda for the future but in order to assure the environmental benefits of this project for the long term the demand must be stabilized at current levels.

We look forward to working with the town, state, and federal agencies to see this project through completion. We wish to reiterate our support for this project as a habitat restoration project that is unique and exemplary in the Commonwealth.

Sincerely,

Samantha Woods
Executive Director, NSRWA

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Charles D. Baker, Governor
Karyn E. Polito, Lieutenant Governor
Stephanie Pollack, MassDOT Secretary & CEO

massDOT
Massachusetts Department of Transportation

June 30, 2017

Matthew Beaton, Secretary
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114-2150

RE: Scituate: Reservoir Dam Water Storage and Fish Passage Improvement – ENF (EEA #15711)

ATTN: MEPA Unit
Page Czepiga

Dear Secretary Beaton:

On behalf of the Massachusetts Department of Transportation, I am submitting comments regarding the proposed Reservoir Dam Water Storage and Fish Passage Improvement in Scituate, as prepared by the Office of Transportation Planning. If you have any questions regarding these comments, please contact J. Lionel Lucien, P.E., Manager of the Public/Private Development Unit, at (857) 368-8862.

Sincerely,

David J. Mohler
Executive Director
Office of Transportation Planning

DJM/jll

Ten Park Plaza, Suite 4150, Boston, MA 02116
Tel: 857-368-4636, TTY: 857-368-0655
www.mass.gov/massdot

cc: Jonathan Gulliver, Acting Administrator, Highway Division
Patricia Leavenworth, P.E., Chief Engineer, Highway Division
Mary-Joe Perry, District 5 Highway Director
Neil Boudreau, State Traffic Engineer
Town of Scituate, Planning Board
PPDU Files

Charles D. Baker, Governor
Karyn E. Polito, Lieutenant Governor
Stephanie Pollack, MassDOT Secretary & CEO

massDOT
Massachusetts Department of Transportation

MEMORANDUM

TO: David J. Mohler, Executive Director
Office of Transportation Planning

FROM: J. Lionel Lucien, P.E., Manager
Public/Private Development Unit

DATE: June 30, 2017

RE: Scituate: Reservoir Dam Water Storage and Fish Passage Improvement – ENF (EEA #15711)

The Public/Private Development Unit (PPDU) has reviewed the Environmental Notification Form (ENF) for the Reservoir Dam Water Storage and Fish Passage Improvement project in Scituate. Reservoir Dam is a 4.3 square mile watershed located along both sides of Route 3A (Chief Justice Cushing Highway), midway between its intersections with First Parish Road and the Greenbush Rotary. The purpose of the project is to provide water storage for the Town of Scituate's public water supply and effective fish passage at the Reservoir Dam fishway. The proposed plans for the project are to raise the Reservoir Dam impoundment and Tack Factory Pound by about 1.5 feet above the existing maximum pool elevation. The dam spillway will be modified to lower the crest and install a bottom hinged crest gate. The existing fishway at Reservoir Dam will also be modified to lower the fishway exit channel into the impoundment and incorporate removable weirs to provide passage of anadromous species at all reservoir water levels during the spring and fall migration periods.

The Proponent has stated that the 1.5 foot increase in normal pond elevations will not impact the existing stormwater system on Route 3A; however, this roadway is already within the floodzone, and any increase in elevation may exacerbate conditions in a storm scenario. The Proponent should provide the MassDOT Highway Division District 5 Office with the appropriate analysis and/or mitigation plan to minimize flooding impacts on Route 3.

As part of the project, the Proponent proposes to install stone riprap along the northeast and southeast sides of Route 3A for erosion control. The Proponent has indicated that Best Management Practices (BMPs) will be utilized during construction and will include at a minimum erosion and sedimentation control, silk and turbidity curtains, and a storm retention pond for construction area runoffs. A MassDOT Non-Vehicular Access Permit will be required to armor the banks within the State Highway Layout.

MassDOT recommends that no further environmental review be required based on transportation issues. The details of the above and any other access-related issues can be addressed during the permitting process for the project. If you have any questions regarding these comments, please contact me at (857) 368-8862.

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Czepiga, Page (EEA)

From: Wilkinson, Sarah A CIV USARMY CENAE (US) <Sarah.A.Wilkinson@usace.army.mil>
Sent: Tuesday, July 11, 2017 9:09 AM
To: Czepiga, Page (EEA)
Subject: EEA 15711 Reservoir Dam Water Storage and Fish Passage Improvement Scituate

Page,

Please consider the bellow as comment to Secretary Beaton on the proposed project: Reservoir Dam Water Storage and Fish Passage Improvement EEA 15711

From the project plans it is difficult to gleam if there are any proposed jurisdiction impacts; however, from discussing project with agent it sounds like there is some proposed fill in wetlands/below OHWL. It is possible the Corps Self-Verification process could suffice but this will depend on the degree of impact.

If the project does not meet Self Verification limits/conditions and a Corps application (PCN) needs to be filed, plan drawings need to reflect Corps jurisdictional boundaries: wetland line and OHWL (i.e. not "edge of water").

Flooding land is not considered a jurisdiction impact that the Corps directly authorizes, only placement of fill or mechanized clearing/re-grading. However, FEMA should be contacted about project if that hasn't been done already.

If/when Corps application is filed, the project description should be put in terms of impacts to Corps jurisdictional resources, separated into wetland fill vs. fill below OHWL, permanent vs. temporary fill. Example:

Place X square feet of rip rap below OWHL

Place X square feet of gravel below OHWL to raise elevation to entrance/exit of fish ladder

Place X square feet of fill in wetlands for construction access (if applicable)

Place X square feet of temporary fill below OHWL for coffer dam (if applicable)

Clear X square feet of wetland via mechanized clearing (if applicable)

Sincerely, Sarah Wilkinson

Czepiga, Page (EEA)

From: Reiner, Edward <reiner.ed@epa.gov>
Sent: Friday, July 07, 2017 11:31 AM
To: Czepiga, Page (EEA)
Cc: Langley, Lealdon (DEP); Freed, Rachel (DEP); Chase, Brad (FWE); Feeney, Eileen (FWE); Kevin R. Kotelly; LeClair, Jacqueline; Logan, John (FWE); Rhodes, Lisa (DEP)
Subject: EEA No. 15711 - Scituate Reservoir Dam water storage and fish passage project.

EPA has reviewed the Environmental Notification Form and attended the June 21, 2017 MEPA meeting for the Scituate Reservoir Dam water storage and fish passage project and offers the following comments. We commend the Town for their interest and actions over many years intended to improve anadromous fish passage at the Scituate Reservoir Dam. The project has the potential to improve conditions for fish passage by the intended construction and operation of new gates to control water levels, increase storage capacity, and control flow releases for the fish ladder and downstream fish passage.

Wetlands:
Further information on the extent of expected changes to wetlands vegetation should be provided in the Environmental Impact Report. Since normal pool levels will be increased for both Tack Factory Pond and Scituate Reservoir, forested, scrub/shrub, and emergent wetlands may be affected by the longer duration inundation patterns associated with the higher normal pool level reservoir management. Some wetlands may be converted to open water. Mitigation for wetland losses may be required to comply with Section 230.10(d) of the EPA 404(b)(1) Guidelines.

In this particular case, there has been an estimated potential impact to 13 acres of wetlands. EPA understands that these wetlands are already subject to fluctuating water levels. The proposed project would be expected to lessen the fluctuations and restore water to the wetlands around the reservoir and Tack Factory Pond. Some loss of wetlands to open water may also occur where the wetlands cannot tolerate the higher normal pool water levels. The majority of the potential wetland vegetation changes would be expected to occur on the Tack Factory Pond area.

The Tack Factory Pond area is already held at a higher normal pool level with gates that are closed all the time. Water runs over an outlet structure by the gates. During the June 21 site visit, the gate structure had water milfoil accumulating against the structure which actually caused water levels to be slightly higher at Tack Factory Pond as compared to a condition without the accumulating vegetation at the outlet.

Flooding concerns:
EPA understands that water levels at Tack Factory Pond are affected by back water conditions at Scituate Reservoir, as well as the water level control gates at the outlet of Tack Factory Pond. The new adjustable gate control at the Reservoir Dam is intended to be used to control potential flooding. The EIR should include an analysis to determine if the capacity of the culvert is sufficient to accommodate the expected higher normal water levels, during storms without flooding of Chief Justice Cushing Highway or other property around the pond. Since the gates at Tack Factory Pond are normally in a closed position, and weeds accumulate against the gate structure artificially raising water levels, the gates themselves may need to be modified to avoid flooding impacts to upstream properties.

Efficacy for fish passage:
Fish passage improvements may not result in increased fish populations in part due to the potential outflow inadequacy in low precipitation years. In addition, EPA understands there has been some concern expressed about the poor water quality conditions in the ponds not being favorable for the fish. Without addressing the poor water quality of the pond, there is some concern that even with a better fish passage facility, the pond would not support a population of anadromous fish.

The operation and maintenance plan should include specific requirements for maintaining suitable outflow conditions. These requirements should be included in permit conditions. Requirements for conservation of water and restrictions during drought should also be detailed in order to provide adequate flow for fish passage.

Edward Reiner
Senior Wetland Scientist
USEPA
5 Post Office Square.
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Boston, MA 02109-3912

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e. Reiner.Ed@epa.gov

1.0 SUMMARY

1.1 OVERVIEW

This Draft Environmental Impact Report (DEIR) describes the proposed Reservoir Dam Water Storage and Fish Passage Improvement Project (the Project) located in Scituate, Massachusetts. This DEIR has been prepared pursuant to the Massachusetts Environmental Policy Act (MEPA) and Section 11.06 of the MEPA regulations (310 CMR 11.00) and in accordance with the Scope defined in the Certificate of the Secretary of Energy and Environmental Affairs (EEA) Number 15711.

The project meets the threshold for Environmental Impact Review because of the increase in the footprint and storage capacity of the Reservoir and the potential to impact 14.2 acres of the surrounding area including 7.5 acres of Bordering Vegetative Wetlands (BVW). The initial MEPA review indicated that the Project does not meet the complete ecological standards of 310 CMR 10.00 for a limited project as Ecological Restoration (according to Massachusetts Department of Environmental Protection (DEP) guidelines) because the primary purpose of this project is to provide the Town of Scituate a sustainable public water supply even though the plan would provide an ecological balance of water withdrawal, fish passage and long term ecological habitat protection.

The Project includes:

- modification to the existing spillway and installation of a bottom-hinged gate to increase the discharge capacity for the spillway design flood (SDF) flow and to raise the normal pool 1.5 ft above the existing fixed crest spillway;
- modification to the existing spillway exit channel and installation of removable baffles with adjustable weirs for upstream and downstream passage of river herring over the range of reservoir levels;
- installation of an automated control system for operation of the spillway gate to prevent unnecessary discharges and position the fishway exit channel baffles for effective fish passage in the spring and fall migration periods;
- installation of an eel fishway at Reservoir Dam;
- repair of the existing pool and weir fishway at Tack Factory Pond which is located immediately upstream of the Reservoir Dam impoundment;
- placement of stone riprap erosion protection on the Chief Justice Cushing Highway embankment adjacent to the Reservoir; and
- upgrade of the stormwater management system on Sherman Drive.

The Project will improve drought resiliency for the Town's public water supply by providing an additional 37 million gallons of water storage which equates to approximately 25 days of water supply at the average annual daily withdrawal rate of 1.5 million gallons per day (MGD).

The Project operating plan will provide fish passage 98% of the time during the river herring spring in-migration and 88% of the fall out-migration. The operating plan will meet the instream BioQ90 habitat flows 88% of the time in the September through November period and a higher percentage of time

during the remainder of the year. The Project will bring the spillway into compliance with the Department of Conservation and Recreation (DCR) Office of Dam Safety (ODS) regulations and will allow the Town to control releases during flood events.

The Project will result in an increased submergence time of approximately 7.5 acres BVW with no change in submergence at up to 40% of the time at the lower limit of the existing BVW during the growing season. The project will also reduce the Bank length by 169 linear feet (LF) and will reduce Riverfront Area (RA) by 2.5 acres. However, the overall functionality of the wetlands resource areas will be maintained with the higher proposed normal pool levels.

Twelve private properties with approximately 2.5 acres total abutting the Town-owned land around the Reservoir will be more frequently submerged by the Project's higher normal pool, but not to any depth that does not currently occur under specific storm events. Most of this property is primarily wetlands and is within the existing 200 foot Water Supply Protection District. One of the properties abutting Tack Factory Pond has an on-site septic system that currently has only 3 ft of separation above high groundwater and may need repair.

Project mitigation measures include:

- improve the quality of stormwater runoff discharging to the First Herring Brook and the Reservoir through upgrades to the existing stormwater management system;
- enhance the ecological habitat of First Herring Brook through instream flow releases throughout the entire year; and
- restore fish passage upstream of Reservoir Dam during the spring and fall herring migration and in the summer for American eels.

1.2 PROJECT DESCRIPTION

The Scituate Department of Public Works (DPW) and Water Resource Commission (WRC) has partnered with the North and South Rivers Watershed Association (NSRWA), Massachusetts Bays National Estuary Program (MassBays), U.S. Fish and Wildlife Service (USFWS), Massachusetts Division of Ecological Restoration (DER) and Massachusetts Division of Marine Fisheries (DMF) to expand the Town's water supply while restoring the river herring (alewife) run back to First Herring Brook and its impoundments.

The Project was initiated in 2007 with development of an Interim Operational Plan (IOP) to manage the flow in First Herring Brook to meet the Town's water demand while providing habitat flow releases and improving fish passage at the Old Oaken Bucket Pond, as required by the Town of Scituate's Water Management Act (WMA) Permit. The Water Evaluation and Planning (WEAP) model was used to create and evaluate water management options. The WEAP model has been refined through subsequent Project phases to reflect changes in water consumption and Project features and is a more robust model then previously used by both MassDEP and the United States Geologic Survey (USGS) models used to evaluate the reservoir firm yield.

1.2.1 Physical Characteristics

In the fall of 2012, the Town of Scituate, MA conducted a preliminary assessment of improvements for Old Oaken Bucket Dam and Reservoir Dam. The results of that assessment indicated that providing

more storage in the Reservoir by maintaining a higher normal pool level could allow the existing fishway to function during the spring upstream migration and fall out-migration periods while providing additional storage for the Town's water demand and increasing overall Reservoir firm yield. The 2012 assessment recommended a more detailed feasibility study of Reservoir Dam to further investigate options to restore fish passage to the Reservoir and evaluate potential impacts on the infrastructure around the Reservoir.

In 2013 using a DEP Sustainable Watershed Management Initiative (SWMI) grant, the Town conducted a detailed feasibility study of alternatives for normal pool levels to add storage capacity and improve fish passage at Reservoir Dam. The results of the feasibility study indicated that raising the Reservoir Dam normal pool one foot would have minimal impact on properties adjacent to the impoundment and . would allow herring migration by lowering of the fishway exit channel by 3.5 ft and triggering the outside water ban 3.5 feet higher than the current trigger. This scenario would have effective fish passage 98% of the time at both Reservoir Dam and Old Oaken Bucket Dam fish ladders for the spring migration and 94% of the time at Reservoir Dam fish ladder and 75% of the time at Old Oaken Bucket Dam fish ladder for the fall migration. This scenario of raising the reservoir and lowering the fish ladder exit channel also results in additional drought resilience for the town and firm yield of the Reservoir system.

A second SWMI grant was award to the Town in 2014 to complete the preliminary design of the spillway modifications needed to raise the normal pool elevations and fishway modifications necessary for spring and fall fish passage. The preliminary design indicated that spillway modifications were necessary to re-establish fish passage to Reservoir Dam and Factory Pond. This plan detailed fishway changes and shoreline improvements along Chief Justice Cushing Highway (CJCH).

The preliminary design plan proposed a lowered fishway exit channel with removable baffles to control flow and spillway modifications with a lower crest and a bottom-hinged gate to increase the spillway discharge capacity while increasing reservoir storage. A footbridge across the spillway and the fishway exit channel would be constructed for personnel access the facility. The existing weirs in the lower portion of the fishway would be modified to incorporate a wider weir for upstream fish passage and a low flow notch for downstream passage.

The plan proposed shoreline improvements along CJCH and Sherman Drive. Erosion protection would be installed along 700 ft of the CJCH highway embankment. The Tack Factory Dam gate structure, which is northwest of the highway, would be modified to assure continued access and minimize gate maintenance. A bioswale would be installed at the end of Sherman Drive to treat stormwater and protect and improve the reservoir water quality.

1.2.2 Physical Characteristics

Initial permitting and 60% design of the Project features was undertaken in 2017 with funding provided by a third SWMI grant. This report incorporated environmental and engineering analyses to advance the project design and initiate the permitting process. The design and permitting efforts included in this phase of the project included: an initial agency pre-application meeting and consultation; preparation and filing of the Scituate Conservation Commission Notice of Intent (NOI); preparation and filing of the MEPA ENF; hydraulic modeling and design of spillway modifications to increase the spillway capacity and achieve compliance with the ODS regulations; update of the WEAP model to simulate current water demand and water conservation measures; and 60% permit-level design plans for the project features.

The Conservation Commission reluctantly issued a WPA Form 3 – NOI Denial on August 10, 2017 as the DEP did not consider this Project ecological restoration because of the water supply component even though the Project will enhance fish passage and habit restoration. The Town filed a Request for Superseding Order of Conditions (SOC) on August 29, 2017 from the DEP. On October 12, 2017, the DEP issued a SOC Determination Abeyance Letter extending their Determination until after completion of the MEPA process. In response to the ENF, the Secretary issued Certificate EEA Number 15711 on July 21, 2017 requesting a DEIR and providing an outline which is the basis for this document.

The DEIR and 90% design has been prepared with a DEP Seawall and Dam Repair or Removal Program grant. This phase of the Project addresses the concerns and provides all information requested in Secretary's Certificate, advances the Project design to the 90% complete level, and includes draft applications for the Project permits, as understood at this time.

The 90% design incorporated a 1.5 ft lower fishway exit channel and additional removable baffles with adjustable weirs to provide more usable storage and improve fish passage. Detailed information prepared for the Project and incorporated into the DEIR is presented in Appendices:

A	WEAP Model Update
B	Proposed Spillway Design
C	Reservoir Level Frequency Study
D	Wetlands Vegetation Study
E	Groundwater Study
F	90% Design Plans
G	90% Design Supporting Calculations
H	90% Design Cost Estimate
I	Draft Final Operational Plan
J	Streamflow Advisory Tool
K	Chapter 91 RDA
L	Section 61 Draft Findings

Comments on the DEIR will be addressed and submitted in a Final Environmental Report (FEIR) in the next phase of the Project. Once the Secretary approves the FEIR, the Town anticipates DEP denial of the Request for Superseding Order of Conditions to the Massachusetts Wetlands Protection Act (WPA) as a potential to alteration of more than 5,000 square feet of Bordering Vegetative Wetland exists. At that time, the Town will file a Variance Request to allow the potential alteration of more than 5,000 square feet of wetland resource.

If the DEP grants the variance, the Project design and draft permit applications will be revised to address the conditions defined in the variance. Permit applications will be filed with all agencies and the appropriate consultation process conducted. After permits have been granted, Project documents will be updated to incorporate specified conditions prior to initiating the construction phase of the Project.

1.3 PERMIT AND FINAL ASSISTANCE STATUS

The status of the permits, financial assistance, or land transfer, and any required Federal environmental, or land-use permit, license, certificate, variance, or approval with a summary of the current status of each application is identified in the following list.

Table 1-1 Permit and Grant Status

Agency	Permit/Grant	Status	Submittal Date
Massachusetts Department of Environmental Protection (DEP)	2013 SWMI Grant BRP 2012-06	Complete	
	2014 SWMI-2-Grant BRP 2012-06	Complete	
	2017 SWMI Grant # BWR 2017-08	Complete	
	2018 Seawall and Dam Repair or Removal Grant Grant # 264-2018-1-5	Ongoing; 90% Complete	September 2019
	Environmental Notification Form (ENF)	Filed	May 30, 2017
	Certificate EEA Number 115711	Received	July 21, 2017
	Request for Superseding Order of Conditions (SOC)	Filed	August 29, 2017
	DEP SOC Determination Abeyance Letter	Received	October 12, 2017
	Wetlands Variance Request	Pending EIR approval	
	Chapter 91 RDA	Filed (DEIR Appendix K)	December 27, 2018
	Chapter 91 RDA Determination	Received (DEIR Appendix K)	January 28, 2019
	401 Water Quality Certification Application	Pending EIR approval	
	Chapter 91 Permit Application	Pending EIR approval	
	WMA Permit Amendment Application	Pending EIR approval	
Conservation Commission	WPA Form 3 – NOI	Filed	May 4, 2017
	WPA Form 3 – NOI Denial	Received	August 10, 2017
Department of Conservation and Recreation (DCR) Office of Dam Safety (ODS)	Dam Safety Permit Application	Pending EIR approval	
	Draft Emergency Action Plan Update	Pending EIR approval	
Department of Marine Fisheries (DMF)	Fishway Construction Permit	Pending EIR approval	
Massachusetts Department of Transportation (MassDOT)	Non-Vehicle Access Permit Application	Pending EIR approval	
United States Army Corps of Engineers (USACE)	Section 10 General Permit	Pending EIR approval	

1.4 ALTERNATIVES TO PROJECT

Numerous alternatives have been evaluated to provide additional water storage capacity and water use from Reservoir Dam for the Town's water supply and improving the instream aquatic habitat and fish passage in First Herring Brook. The following alternatives were previously evaluated:

- Augmentation of the water supply system (TNC 2010) by:
    - Dredging Old Oak Bucket Pond and Reservoir Dam;
    - Installing a new groundwater well at Satuit Meadow; and
    - Implementing water restriction during drought conditions;
- Improving fish passage and increasing storage in Reservoir Dam by raising normal pond levels (EA 2013) above the existing normal pool El. 38.9 ft. North American Vertical Datum 1988 (NAVD88). All elevations in this document refer to NAVD88 unless otherwise noted. Higher pond level options evaluated included:
    - Option A – Pond El. 40.9 ft with spillway gate (2.0 ft increase in normal pool);
    - Option B – Pond El. 41.4 ft with spillway gate (2.5 ft increase in normal pool);
    - Option C – Pond El. 42.4 ft with spillway gate (3.5 ft increase in normal pool);
    - Option D – Existing Pond El. 38.9 ft with no spillway modifications (no change in normal pool); and
    - Option E – Pond El. 39.9.0 ft with 1-ft high flashboards on the existing spillway crest (1.0 ft increase in normal pool);
- Lowering the existing spillway crest and installing a bottom-hinged gate to increase the normal pool level 1.5 ft to El. 40.4 ft (Tetra Tech 2014);
- In 2017, Tetra Tech prepared 60% design documents for spillway and fishway modifications for a 1.5 ft increase in normal pool to El. 40.4 ft (Tetra Tech 2017); and
- In 2018, Tetra Tech advanced the project design documents to the 90% level for the 1.5 ft increase in normal pool to El. 40.4 ft.

All options for increasing and utilizing water storage in Reservoir Dam were evaluated using the WEAP model to simulate reservoir operation for various water demands based on historic hydrologic conditions in the watershed. The model assessed the Reservoir Dam operations under various water supply demand scenarios, water restrictions, and conservation measures using the most conservative historic hydrologic conditions for the watershed.

1.5 PROPOSED MITIGATION MEASURES

The proposed Project modifications and operations will provide positive, long-term benefits for public safety and water supply, aquatic habitat, and fisheries in the First Herring Brook watershed. The Project will add storage capacity to Town's public water supply which will improve drought resiliency while enhancing the overall ecological habitat of First Herring Brook. Mitigation measures will improve the quality of water supply and the stormwater runoff discharging to the First Herring Brook and the Reservoir.

The spillway modifications will increase the spillway discharge capacity meeting the current Dam Safety Regulation. Operation of the spillway gate will prevent dam overtopping and reduce the risk for downstream flooding.

The Project operations will provide an additional 37 million gallons per year (MGY) (113 ac-ft/year) of storage, approximately 25 days of water supply at the average annual daily withdrawal rate of 1.5 MGD. Proposed operations will limit the percentage of years with total outdoor water bans to 33%. WEAP modeling indicates that 12 summer days per year on average will require a total outdoor watering ban. The additional storage will provide the Town with climate change resiliency.

The Project mitigation measures that will address the potential impacts of the higher normal pool levels on water quality will include:

- Slope protection along the CJCH embankments in areas that would be subjected to potential erosion;
- Stormwater management system upgrades on Sherman Drive to improve water quality of roadway drainage entering Reservoir Dam; and
- Homeowner assistant to monitor wastewater treatment system operation and groundwater levels for properties adjacent to the water supply.

A portion of the additional storage will be released throughout the year to maintain streamflows for habitat protection and fish passage while meeting the Town's water demand. Project operations will assure safe instream flow releases to First Herring Brook downstream of Reservoir Dam and Old Oaken Bucket Pond at least 88% of the time.

Effective fish passage at Reservoir Dam would be expected 98% of the time during the spring in-migration and 88% of the time during the fall out-migration. Effective fish passage at Old Oaken Bucket would be expected 97% of the time during the spring in-migration and 82% of the time during the fall out-migration.

The eel ladder will allow upstream eel migration into Reservoir Dam and Tack Factory Pond over the range of reservoir levels and First Herring Brook flows which has not been possible with the existing spillway.

The proposed Project requires minimal power to operate and the only greenhouse gas emissions would be associated with construction equipment. The construction management plan (CMP) will require compliance with vehicle and equipment operation such as idling limitations to minimize emission impacts.

Other construction mitigation measures in the CMP will include temporary water supply operations, wetlands protection, dewatering and flood control systems, and water quality protection.

2.0 PROJECT DESCRIPTION

2.1 PROPOSED FEATURES

The proposed Project would raise the Reservoir Dam impoundment 1.5 feet (ft.) above the existing maximum normal pool El. 38.9 ft. and Tack Factory Pond 1.1 ft. above the existing maximum normal pool El. 39.3 ft. The spillway will be modified to lower the crest to El. 36.4 ft. and install a bottom hinged crest gate. The existing fishway at Reservoir Dam will also be modified to lower the fishway exit channel into the impoundment and incorporate removable weirs to provide passage of anadromous species (alewife and blueback herring) at all reservoir water levels during the spring and fall migration periods.

The final Project will provide an additional 37 MGY (113 ac-ft/year) of storage, approximately 25 days of water supply at the average annual daily withdrawal rate of 1.5 MGD and will allow for more robust stream flow releases in order to enhance overall ecological habitat in the Reservoir Dam and Tack Factory Pond impoundments, First Herring Brook, and Old Oaken Bucket Pond.

The overall ecological modeling results indicate that proposed modifications and reservoir operation could have adequate fishway flow for successful passage 98% of the time during the spring outmigration and 88% of the during the fall outmigration. In addition, the deeper Reservoir will help equalize and balance seasonal temperature variability. Equalization of temperature will help maintain and increase oxygen retention and improve fish and other species mortality. Outmigration during the fall never occurs under present day operations. Without fall outmigration, any fish that migrated during the spring would be trapped and die making spring stream release futile.

In order to minimize adverse impacts on the Site's environmental resources, the Project incorporates best management practices (BMPs) such as erosion, sedimentation, and runoff discharge controls to avoid and minimize impacts. The specific construction requirements and proposed mitigation measures are:

Reservoir Improvements

- Shoreline and property improvements through updating septic systems and inspection and monitoring for groundwater control;
- Erosion protection for CJCH;
- Stormwater system upgrades for Sherman Drive;
- Modifications to Tack Factory Pond slide gate structure to access gate operators; and
- Upgrade of the Tack Factory Pond pool and weir fishway.

Spillway and Fishway Modification Activities

- Implementation of a water control plan to maintain a lowered reservoir level during construction of the spillway and fishway modifications;
- Installation of sediment and erosion control measures around the construction area including turbidity curtains and silt fences;

- Excavation of the dam embankment at the spillway and fishway;
- Reconstruction of the spillway ogee crest and abutment walls;
- Installation of the bottom hinged gate with electric motor operator;
- Installation of the prefabricated walkway bridge across the spillway;
- Installation of the water level sensor and supervisory control and data acquisition (SCADA) system upgrade;
- Demolition of the existing fishway upstream of weir #16 and the entire fishway exit channel;
- Reconstruction of the fishway exit channel;
- Reconstruction of the dam embankment at the spillway and fishway;
- Retrofitting the first fourteen weirs with fixed notched weirs;
- Installation of seven removable baffles with adjustable weirs in the fishway exit channel;
- Installation of an access walkway across the fishway exit channel;
- Installation of a 12 inch wide eel ladder along the spillway wall;
- Installation of two nature-like stone weirs in First Herring Brook at the fishway entrance to improve fish passage to fishway entrance; and
- Final site restoration.

Operation and Maintenance

- Monitoring pond levels on a daily basis with automatic spillway gate positioning to maintain an impoundment level no higher than El. 40.4 ft;
- Automatic operation of the low-level outlet and adjustment of the fishway adjustable weirs for each of the removable baffles to meet the water supply demand and instream habitat seasonal flow releases; and
- Annual inspection and routine maintenance of the spillway, fishway, and dam.

2.1.1 Physical Characteristics

Reservoir Dam is an earthen embankment with an ogee-shaped concrete spillway, a low-level outlet, and a pool and weir fishway. The dam height is 45 ft and has a high hazard potential classification as discussed in DEIR Appendix B. The low-level outlet is a 12-inch diameter pipe through the dam with an inlet structure at the bottom of the reservoir and a flow control valve on the downstream side of the dam. The low-level outlet flow control valve has an electric motor and is operated through a SCADA system. The fishway has 21 weirs approximately 3 ft. wide creating pools that are approximately 3.5 ft. long. The invert of the existing fishway exit channel is at the same elevation as the spillway crest and does not function at Reservoir Dam water levels lower than the spillway crest.

The existing spillway has a 37.5 ft. minimum length with the crest at El. 38.9 ft. The existing spillway has a total discharge capacity of 1,751 cubic feet per second (cfs) at the top of dam El. 45.0 ft.

Tack Factory Pond Dam is located west of the Reservoir Dam impoundment and CJCH. First Herring Brook has a 4.5 ft high by 10.5 ft wide concrete box that is 75 ft long crossing CJCH. The invert of the culvert outlet into Reservoir Dam invert is at El. 32.8 ft.

Tack Factory Pond Dam is an earthen embankment with a concrete outlet structure located upstream of the First Herring Brook culvert under CJCH. The dam is an earthen embankment less than 5 ft high and approximately 250 ft long extending from CJCH on the left abutment (looking downstream) to natural ground on the right abutment. The embankment top is at El. 41.0 ft. First Herring Brook passes through a 5.25 ft high by 9.5 ft wide concrete box culvert approximately 13.25 ft long in the dam. The invert of the box culvert is at El. 34.6 ft with crown at El. 39.8 ft and top at El. 40.7 ft.

A concrete weir structure is located 6.75 ft upstream of dam and box culvert. The weir structure is approximately 18 ft wide with two 4.3 ft wide by 3 ft high slide gates. The slide gates have double operator stems for manual opening. The top of the weir and gates are at El. 39.3 ft. The gates are typically closed to retain storage in Tack Factory Pond for emergency water supply during droughts. Concrete side walls transition between the weir and culvert under CJCH. The entire dam is overtopped at a 139 cfs stream flow. The CJCH culvert controls flow up to 750 cfs when the roadway is overtopped.

The reservoir impoundment including Tack Factory Pond has 422.1 ac-ft. of useable storage between the existing normal pool (El. 38.9 ft.) and the low level at which the current streamflow guidelines are discontinued (El. 30.9 ft.). Tack Factory Pond has slide gates that are normally closed and maintain the water level at El. 39.3 ft. Opening the gates provides an additional 5.0 ac-ft of useable storage between El. 39.3 ft and El. 38.9 ft water levels in Tack Factory Pond.

Reservoir Dam is categorized as a High Hazard Potential dam in accordance with both Massachusetts General Law c.253, Section 46 and 301 Code of Massachusetts Regulations (CMR) 10.00. CMR 10.06 requires spillways for High Hazard Potential dams to have a discharge capacity at least equal to the One-half Probable Maximum Flood (½ PMF). Modifications to a High Hazard Potential dam, including the spillway and fishway, must also conform to the dam safety regulations, and must be approved by the DCR ODS as discussed in DEIR Appendix B.

2.1.2 Spillway Modifications

The proposed project will include spillway modifications designed to pass the SDF requirement, installation of a bottom-hinged spillway gate to maintain a 1.5 ft. higher maximum normal pool (El. 40.4 ft.) providing additional water supply storage, and fishway modifications to allow upstream and downstream passage of river herring (DEIR Appendix F, Drawing C-110). The existing ogee spillway would be modified to lower the crest to El. 36.4 ft and install a bottom hinged crest gate. To anchor the new concrete ogee section consisting of two layers of reinforcing steel, concrete dowels would be drilled into the existing crest and abutment walls. The new ogee would transfer all the forces on the crest gate to the existing spillway mass concrete block. To contain flood flows and prevent embankment erosion, the abutment walls would be rebuilt and extended into the reservoir. The new walls would be reinforced concrete doweled into the existing abutment walls. The hinged crest gate operator would be supported by the new wall on the west side of the spillway. A walkway would be installed over the spillway and anchored to the spillway concrete abutment walls for DPW personnel access.

The bottom hinged crest gate would be remotely operated from the DPW's Water Treatment Plant. The electric motor operator would be located on the right side of the gate at the top of the abutment wall. In the event of power failure, the motor would be equipped with a handwheel for manual operation. The

36.5 ft. wide by 5.5 ft. high bottom hinged gate would be installed on the new spillway ogee crest. The gate would have two hinges spaced at 18.25 ft. on-center and side seals and a bottom seal along the entire gate. In the fully opened position, the top of the gate would be at a maximum El. 36.4 ft. to pass the one-half Probable Maximum Flood with acceptable freeboard on the dam embankment. These Dam improvements are necessary to bring the current dam into Dam Safety requirements.

2.1.3 Fishway Modifications at Reservoir Dam

Pool and Weir Ladder Ecological Enhancements

Restoration of fish passage into the Reservoir Dam impoundment and Tack Factory Pond would reestablish approximately 75 acres of pond for American eels and river herring. With reservoir levels at El. 40.4 ft., the median carrying capacity of herring is around 25,000 – 30,000 based on the 2013 Feasibility Study. The proposed Reservoir Dam water levels would also provide habitat upstream of Tack Factory Pond for blueback herring spawning. To facilitate fishway operation at lower reservoir levels for upstream and downstream fish passage, the fishway exit channel would be reconstructed according to USFWS guidelines. Removable baffles with adjustable weirs would expand the operational range for fish passage. The concrete weirs on the lower portion of the fishway would be modified with baffles to incorporate an 18 inch wide fixed weir for upstream passage with a 6 inch wide notch for downstream passage.

The existing seven upstream weirs (#15-#21) and entire exit channel would be removed as shown on Drawing C-112 in DEIR Appendix F. The lower weirs (#1-#14) would be retrofitted with fixed notched weirs. The bottom of the exit channel would be lowered from El. 38.9 ft to El. 33.25 ft. Seven removable baffles with adjustable weirs would be installed in the 3 ft wide exit channel to extend the operating range of the fishway from a minimum of El. 35.4 ft. with none of the removable weirs in the exit channel up to a maximum of El. 40.5 ft. with all removable weirs installed in position.

Both fixed and removable baffles would be retrofitted with notched weirs to minimize the flow required for effective fish passage and providing sufficient water depth over the weirs. Each baffle would have 1.5 ft. wide weirs, which would provide 2.53 cfs minimum flow with an 8 inch water depth for upstream passage, and a six inch wide notch centered on the larger weir to provide 0.42 cfs minimum flow with a 5 inch water depth.

The width of the larger weir meets the Draft Final Operational Plan (DFOP, DEIR Appendix I) streamflow guidelines between the Reservoir Dam and Old Oaken Bucket Dam. The low level outlet would provide additional releases needed to meet the DFOP streamflow guidelines below Old Oaken Bucket.

The fixed weirs would be bolted to the existing concrete weirs and fishway walls, while the removable weirs would be installed in guides in the exit channel walls. Each of the removable weirs would be a multiple disc slide gate with dual stem, electric motor operators. The top gate disc would have the 18 inch wide weir and 6 inch wide notch positioned by the motor operators. The top disc of all seven removable weirs would be identical with a 24 inch total height with a 6 inch travel from the full-open to full-close positions. Normal operation of the adjustable top disc would range from full 100% open to 50% open with the automatic control system at the water treatment plant. The control system would position each adjustable weir based on the Reservoir Dam water level monitoring and low-level outlet valve control system.

The bottom disc would vary in height from 1.75 ft minimum for weir #15 up to 4.85 ft for weir #21. The top disc would be manually closed from the water treatment plant, and when fully closed, the top disc of the gate would engage the lower disc to completely remove the entire weir from the exit channel. When not needed for fish passage, the removable weirs remain in the raised position. The removable weirs would be manually repositioned in the exit channel. For access to the removable weirs, a walkway would be installed along both sides of the exit channel walls.

In addition, a 3 ft. by 6.0 ft. high slide gate would be installed at the upstream end of the fishway exit channel with stop log guides. The frame of the slide gate would be mounted to the exit channel walls. The gate would be manually operated from the water treatment plant via a motor operator at El. 59 ft. A walkway would be installed over the 3 ft. wide fishway exit channel at El. 45.65 ft for DPW personnel access with a pre-fabricated floor grating and handrails on top of the fishway walls. The gate would be in the full-open position during the fish passage periods or in the full-close position during the remainder of the year. The isolation gate would be full closed for positioning of the removable baffles in and out of the fishway exit channel.

To create ideal hydraulic conditions for fish to reach the fishway entrance, the stream channel downstream the Reservoir Dam fishway entrance would be reconfigured with channels and pools for sufficient depth for passage. The existing stones in the stream would be used for the reconfiguration, providing velocities less than 5 ft/sec and pools with vertical drops less than 8 inches. During the September to October downstream migration period, smaller notches in the stone weirs would minimize flow and provide sufficient depth (a minimum of 5 inches) through the notches for fish passage.

Eel Ladder

The spillway modifications at Reservoir Dam would include installation of an eel ladder. Instream flow releases over the spillway at Old Oaken Bucket would provide wetted concrete surfaces, which should adequate for eel passage. At Reservoir Dam, a 12 inch wide eel ladder would be installed along the spillway east abutment wall (DEIR Appendix F, Drawing S-206). The entrance would be located immediately downstream of the pool and weir fishway. The eel ladder would ascend from the stream bottom, cross over the top of the pool and weir fishway, follow the top of the spillway abutment wall, and terminate under the access bridge upstream of the spillway gate.

The eel ladder sections would be fabricated from aluminum structural materials, plywood, and Enkamat substrate (DEIR Appendix F, Drawing S-206). The plywood would be bolted to the aluminum tray support frame with stainless steel bolts, washers, and nuts. The substrate will be Enkamat (Product No. 7222) and shall be stapled to the plywood. The plastic mesh cover shall be fastened to the sides of the cable tray support system.

The eel ladder water supply system would consist of a pump, pump stilling well, hoses, piping, header pipe, and valves (DEIR Appendix F, Drawing S-206). The power supply for the pump would be a 220 Volt, 100 Ampere service located near the spillway crest gate and bridge. An underground cable would be installed from the service to the fishway access walkway. A junction box would be located at this point where the power cable will be then be installed in conduit to the pump. The junction box would be mounted on the handrail with a locked door. A disconnect switch and a plug for the power cable on the pump would be installed in this box.

The pump will have a ½ horsepower maximum rating and would be capable of delivering 5 gallons per minute (gpm) to the eel ladder header pipe. A flexible rubber hose would connect the pump discharge to

the eel ladder header. The header would include a ball valve to bypass flow and control flow to the header.

The pump would be installed in a stilling well located upstream of the pool and weir fishway exit channel isolation gate. The stilling well would be constructed with PVC piping components and galvanized steel brackets. The stilling well would have a threaded cap to allow the pump will be disconnected and removed from the stilling well during periods when the eels are not migrating upstream.

2.1.4 Tack Factory Pond Weir Structure Improvements

The Project will require minor modifications to the Task Factory Pond weir structure. The changes will include installation of an access platform between the concrete bridge and the weir structure to access the weir gates and incorporation of a 6 inch wide by 6 inch deep low-flow notch in the south weir gate. These improvements will not significantly change the discharge capacity of the Tack Factory Pond weir. The access platform will not affect the discharge capacity of the weir structure. The proposed low-flow notch will add approximately 0.5 cfs to the discharge values at Tack Factory Pond water levels above El. 39.3 ft.

2.1.5 Tack Factory Pond Fishway

The existing fishway at the Tack Factory Pond has four 2.0 ft high weirs that create 2.67 ft wide by 4.2 ft long pools (DEIR Appendix F, Drawing C-119). Each weir has a trapezoidal shaped notch that is 6 inches deep with a 12 inch top width and a 6 inch bottom width. These weirs could provide effective fish upstream passage from a Reservoir Dam impoundment water level at El. 35.0 ft to an upper pool level at El. 38.7 ft immediately downstream of the weir structure gate assuming 6 inches of water depth over the top of weir. Since the bottom of the 6 inch deep notch in the weir structure gate is approximately the same as the water level in the top weir pool, herring may be able to pass upstream into Tack Factory Pond.

During the spring upstream migration, proposed Reservoir Dam water levels are expected to range from El. 40.4 ft down to El. 38.9 ft in Reservoir Dam and El. 40.4 ft down to El. 39.3 ft in Tack Factory Pond (DEIR Appendix D). Since the bottom of the 6 inch notch in the Tack Factory Pond weir gate is El. 38.8 ft and is slightly lower than the expected Reservoir Dam water surface in the spring.

The overall improvements in the Reservoir system would allow fish to swim upstream into Tack Factory Pond without a fish ladder, significantly improving the overall habitat of First Herring Brook as once established will allow fish passage several miles of new habitat into the Town of Norwell.

However, in the fall September-October outmigration period, water levels would be El. 39.3 ft minimum in Tack Factory Pond and as low as El. 34.7 ft in Reservoir Dam. Therefore, water in each of the existing pools would be necessary as drop pools for outmigrating fish that are passing through the weir gate notch.

Repairs to assure that the existing fishway concrete walls and weirs are water tight and can maintain a pool of water during the low flow fall outmigration period would be assessed through an adaptive management program. The existing weirs would be initially inspected in the dewatered condition during construction of the spillway modifications to determine the extent of the repairs. Cracks would be repaired with concrete grout and sealant to reduce potential leakage. During the first years of operation,

the fishway would be monitored to assess fish passage conditions. If passage appears to be an issue either during the upstream or downstream migration, repairs to the existing fishway, or a completely new fishway would be designed and permitted though DMF and ODS.

2.1.6 Chief Justice Cushing Highway Erosion Protection

Best management practices would be applied to minimize erosion and protect the CJCH adjacent to the water supply during construction and operation of the Project modifications. The BMPs would include the installation and maintenance of erosion and sedimentation controls. The proposed water levels would be below flood levels and similar to current spring water levels. Due to heavy vegetation on the majority of shoreline, except for CJCH, around the impoundment, additional shoreline stabilization would not be necessary to prevent erosion from in-pond wave action. In the future, any developed erosion areas would be repaired as necessary in accordance with the DPW's current inspection and maintenance plan. The embankment along CJCH would require erosion protection along both side slopes that would be exposed to in-pond wave action from the higher normal pond. The lowest point in the centerline profile of CJCH constrains the normal pool level to a 2 ft. minimum freeboard.

To mitigate erosion along the highway embankment, stone riprap would be installed along both sides with the higher reservoir normal pool. In locations where the proposed normal pool elevation is less than 15 ft. from the edge of the pavement, the riprap would be placed up to El. 41.9 ft. Approximately 300 LF and 80 LF of riprap would be installed along the northeast and southwest sides of CJCH, respectively. Similar to the existing riprap at the culvert, half of the stone would have a diameter of 8 inches (D50 = 8 inches).

2.1.7 Stormwater Management Measures

The quality of the Town's water supply must be protected from potential impacts by adjacent stormwater drainage systems. In the center of the cul-de-sac on Sherman Drive (See DEIR Appendix F Drawing C-117), is the stormwater catch basin that has an outlet pipe terminating in a drainage ditch extending from the street to the northwest and the impoundment. The outlet pipe of the catch basin would be cleaned and a bioswale would be constructed in the location of the drainage ditch and vegetation would be removed to protect water quality. The bioswale would consist of peat and stone layers with a perforated pipe underdrain collection system that would discharge back to the drainage ditch and eventually the reservoir. Nitrogen- and phosphorus-fixing vegetation would be planted in the bioswale to remove nutrients from the stormwater. To complete the bioswale, the general contractor would conduct additional survey and design work during the construction phase of the Project.

Since CJCH is a State Highway under DOT jurisdiction, Scituate does not have any authority to address stormwater discharges from CJCH, and therefore, stormwater control measures are not included in this Project. The methods to manage runoff discharging directly into the Reservoir from CJCH, vary in terms of cost, degree of treatment, and level of structural modifications to the existing system. Options that could be considered include construction of a bioswale to direct discharges from the existing catch basins along on CJCH for treatment, installing sediment filters in the existing catch basins, retrofitting the existing catch basins with water quality protection systems, or replace existing catch basins with complete stormwater filter systems.

2.1.8 Wastewater Treatment Systems

Three properties on CJCH have wastewater treatment systems adjacent to the Reservoir Dam impoundment and Tack Factory Pond. Groundwater levels at #401 CJCH, #436, and #439 CJCH with the proposed project are expected to be similar to the existing groundwater levels during flood conditions and would be just below the ground surface (see DEIR Appendix E). Groundwater levels at #401 CJCH and #439 CJCH generally tracks the Tack Factory Pond water levels while groundwater at #436 CJCH follows Reservoir Dam water levels.

These three systems would have to be reviewed at the time of sale to assure compliance with the Massachusetts State Environmental Code 310 CMR 15.00 Title 5 relative to on-site septic systems. Currently these systems at #401 CJCH and #439 CJCH are in compliance and a proposed plan for #436 CJCH has been submitted to the Board of Health.

2.1.9 Proposed Operational Plan

The DPW is currently implementing the IOP for restoring stream flow for native aquatic and migratory species in First Herring Brook. The IOP, which is a condition of the Town's WMA permit, was amended in 2015 to reduce the May stream releases. The DPW will continue to operate the Reservoir Dam in accordance with the current WMA permit and IOP until the proposed Project is constructed and a Final Operating Plan (FOP) is approved. A Draft Final Operational Plan (DFOP) is provided in DEIR Appendix I. The IOP and 2015 IOP Amendment are included as attachments to Appendix I. The current WMA permit is provided as Attachment 2 to DEIR Appendix A.

Interim Operational Plan

The IOP was developed through a multi-stakeholder process including federal and state environmental agency representatives, the NSRWA, and the town of Scituate using the WEAP model for various operating scenarios. The model has been updated during the preliminary 30% design, 60% permitting, and 90% DEIR phases of the Project to evaluate reservoir levels and water release schedules to improve fish passage at Reservoir Dam and meet the water supply demand. The WEAP model was updated to simulate operations for various spillway and fishway modifications over a range instream habitat conditions in First Herring Brook, fishway releases, and water conservation measures to reduce storage requirements while maintaining effective fish passage and habitat conditions. Streamflow guidelines developed with the model for the IOP are summarized in Table 2-1.

The average recorded town water demand during 1999-2007, which was the basis of the WEAP modeling for the IOP, was 615 million gallons per year (MGY). The average pumping rate for the updated WEAP modeling in the 2019 study was 535 MGY based on average supply delivered during the 2011-2016 period – this equates to 1.55 MGD. If nonew sources are developed outside the First Herring Brook Watershed, this water demand will need to be maintained or reduced in the future for both the interim and proposed final operational plan to work as envisioned.

The higher spillway level at Reservoir Dam is expected to improve the Town's ability to meet local water demand by increasing the system firm yield while providing adequate fish passage and environmental flows. The Scituate DPW will continue to perform the IOP until the spillway and fishway modifications are completed and ready for implementation of a new final operating plan.

Table 2-1 IOP Streamflow Guidelines

Bioperiod	Eisenhower Lane (Downstream of Reservoir Dam)		Country Way (Downstream of Old Oaken Bucket Dam)	
	Fishway (cfs)	River (cfs)	Fishway (cfs)	River (cfs)
March	0	2.56	0	3.78
April-May[1)]	0	2.56	5.20[2)]	3.78
June-August	0	0.22	0	0.39
September-October[1)]	0	0.25	2.56[2)]	0.45
November	0	0.25	0	0.45
December-February	0	2.13	0	3.15

1) April-May and September-October: manage releases over fishway weirs unless water is not available. If drought conditions are occurring, use staff gages to provide minimum river flow to maintain stream habitat.
2) An eight (8) inch water depth over the fishway weirs corresponds to 5.2 cfs; a five (5) inch water depth over the fishway weirs corresponds to 2.56 cfs. Because these flows exceed the river flow goals, all downstream releases during the migration season should be made through the fish ladder.

The First Herring Brook 2015 amended IOP dictates that when the reservoir level drops more than four feet below the spillway to El. 33.9 ft., a total outdoor watering ban is declared. The total watering ban was conservatively modeled as reducing water use to average winter water use levels (1.31 MGD). During 2010, total watering outdoor watering ban actual water use dropped to 1.00 MGD.

Draft Final Operational Plan

A draft of the final operational plan DFOP for the proposed Project was prepared to provide guidance to the Town of Scituate Water Division (SWD) to manage seasonal streamflows and operate the Old Oaken Bucket Pond and Reservoir fish ladders for aquatic community needs while maintaining adequate water supply for Town needs. The plan is based on a series of reports[i] detailing the Town's water system and investigating the impacts of streamflow releases on herring migration, resident aquatic communities, and water supply in First Herring Brook used to develop the IOP discussed above. The DFOP will be updated and implemented once infrastructure improvements have been completed at the Reservoir. Until that time, the 2015 Update of the IOP should be used.

The DFOP is provided in DEIR Appendix I and the streamflow guidelines developed with the WEAP model for the DFOP are summarized in Table 2-2.

During the fish migration periods, the Reservoir Dam adjustable weir gates in the fishway exit channel would be positioned to discharge the minimum streamflows. At Old Oaken Bucket, the fishway should be operated with the top board out at the fishway exit channel.

Table 2-2 DFOP Minimum Streamflow Guidelines

Bioperiod	Eisenhower Lane (Downstream of Reservoir Dam)[1]			Country Way (Downstream of Old Oaken Bucket Dam[2]		
	Low-Level Outlet (cfs)[2]	Fishway (cfs)	Total Stream (cfs)	Spillway (cfs)	Fishway (cfs)	Total Stream (cfs)
March	2.59	0	2.59	3.30	0	3.30
April[3]	0	2.59	2.59	0	3.30	3.30
May[3]	0	2.59	2.59	0	2.56	2.56
June-August	0.24	0	0.24	0.36	0	0.36
September-October[3]	0	0.31	0.31	0	0.44	0.44
November	0.31	0	0.31	0.44	0	0.44
December-February	2.23	0	2.23	2.85	0	2.85

1) Minimum flow released from Reservoir Dam though the fishway and low-level outlet at water levels less than El. 40.4 ft (top of spillway gate in full closed position) to meet streamflow guidelines.
2) Minimum flow released through fishway and over fixed crest spillways to meet streamflow guidelines.
3) April-May and September-October: manage releases over fishway weirs unless water is not available.

Water conservation measures would be implemented to restrict automatic irrigation sprinkler use and total outdoor watering bans during drought conditions. The Town would continue to utilize an adaptive management approach to operate Reservoir Dam and Old Oaken Bucket to achieve streamflow and water supply goals. The Streamflow Management Tool discussed in the following section would provide feedback on projected Reservoir supply and timing for implementing potential water bans and streamflow cutoffs points.

Water Conservation

The town of Scituate developed and approved a 2016 Water Conservation Plan that is being implemented to maintain or reduce their current water demand. Scituate's Water Resources Commission reports to the Scituate Water Commissioners and is responsible for implementing the recommendations in the plan. The measures include implementing a water banking offset policy. The town is considering 1:1 or 2:1 gallon offset for new developments over a certain size. The town of Scituate is currently undergoing a water study that will define further their seasonal population increases and future water demand needs. Water conservation measures that the town has already enacted include:

- No new irrigation system hookups to the public water system - enacted in 2014;
- From May 1 – September 30 automatic irrigation systems are allowed to be used one day a week before 9 am or after 5 pm – enacted 2011 updated 2015;
- Ongoing participation in regional WaterSmart South Shore water education programs (see Watersmartsouthshore.org– enacted 2016;
- Ongoing water conservation enforcement and messaging; and
- Investment in new pipes, leak detection and replacing water meters.

This water demand will need to be either met or reduced through enforcement of summer outdoor watering bans.

Streamflow Advisory Tool

As part to the adaptive management plan for implementation of the IOP, the NSRWA/MassBays developed a Streamflow Advisory Tool to monitor the conditions in Reservoir Dam and adjust streamflow releases to meet the Town's water demand throughout the summer and drought conditions.

The purpose of the Streamflow Advisory Tool is to: 1) provide a way to give data-based advice on streamflow adapted to current conditions and 2) provide a conduit for regular communication between NSRWA/MassBays and the Water Division. The tool is an Excel spreadsheet tool which will be operated by NSRWA/MassBays to ensure that the formulas remain intact. Table 2-3 presents an annotated explanation of the spreadsheet. A template of the Streamflow Advisory Tool and a printout of sample application results are provided in DEIR Appendix J.

This tool is based on using the volume of water available in the reservoir to determine the number of days remaining until a water ban should be enacted and/or streamflow cut off, based on the volume and projected level of the reservoir. It requires inputs of information from the Water Division, preferably on a weekly basis. The data that are entered into the spreadsheet are: date, reservoir level in inches, the average surface pumping over the previous week, and any relevant changes to the baseline condition not included in the surface pumping average. The tool then adds a projected volume of inflow to the system (i.e. precipitation) based on the period of record used for the WEAP model. The volume of inflow is conservative – 20th percentile to replicate a dry year. The tool also subtracts the volume of streamflow that is anticipated to be released based on the Interim Operation Plan. When the level of the reservoir in the tool reaches 48" down (water ban level) there is a correction factor applied to assume the 6% savings shown during the 2017 drought prior to more aggressive enforcement, which is assumed to be the typical resulting savings in a normal year. The calculation of volume remaining is based on a regression of the change of available water with reservoir level. The recommendations for streamflow and water ban are based on comparing the number of days of water remaining in the reservoir to reach the streamflow and water ban triggers to the number of days until October 15th, which is historically when the reservoir begins to recover. If the reservoir is predicted to fail before October 15th, streamflow is cut off, even if the reservoir level trigger for streamflow cutoff hasn't been reached yet. Water conservation is implemented prior to streamflow being cut off.

Table 2-3 Annotated Explanation of Spreadsheet Cells

Row #	Data [1)]	Explanation
1	Reservoir is down ? inches	[entered]
2	Reservoir level in feet	Conversion for row 3 formula (40-([Reservoir Inches **1**]/12)) (see note)
3	MG remaining	Best fit formula to calculate volume of reservoir based on level (see note) -(0.9582*([Reservoir Feet **2**]^2))-(51.907*[Reservoir Feet **2**])+700.57
4	Date	[entered]
5	7 day pumping average	[entered]

Row #	Data [1)]	Explanation
6	Projected pumping	A projection of average daily pumping assuming the current 7-day average [**5**] for the following week and then the 5-year average projected pumping for one week after the current date until October 15th, using a lookup table. (([7DayAveragePumping **5**]*7)+((LOOKUP(([Date **4**]+7), [date column], [pumping rate column]))*([Days Until Oct 15th **14**]-7)))/[Days Until October 15th **14**]
7	Changes +/-	[entered]
8	Precipitation	Anticipated 20th percentile precipitation (MG) based on WEAP period of record, using a lookup table. (LOOKUP([Date **4**],[date column],[precipitation column])
9	Streamflow	Anticipated streamflow released (MG) based on Interim Operational Plan, using a lookup table. (LOOKUP([Date **4**],[date column],[precipitation column])
10	Conservation	Correction factor for conservation, where rate of decline is 6% lower if the water ban is in place (i.e. reservoir level is more than 48 inches below the spillway). (IF([Reservoir Inches **1**]<48,1,0.94))
11	Days remaining to water ban	Calculates the number of days until the water ban is reached (can't be negative). (MAX(0,(([MG Remaining **3**]+[Precipitation **8]** –[Streamflow **9**])-[Volume at Ban Trigger 73.7])/((([Projected Pumping **6]** + [Changes **7]**)*[Conservation Factor **10**]))))
12	Days remaining to streamflow cutoff	Calculates the number of days until the streamflow cutoff is reached (can't be negative). (MAX(0,(([MG Remaining **3**]+[Precipitation **8]** –[Streamflow **9**])-[Volume at SF Cutoff 20.7])/((([Projected Pumping **6]** + [Changes **7]**)*[Conservation Factor **10**]))))
13	Days remaining in reservoir	Calculates the number of days until the reservoir is "empty" (can't be negative). (MAX(0,(([MG Remaining **3**]+[Precipitation **8]** –[Streamflow **9**]))/((([Projected Pumping **6]** + [Changes **7]**)*[Conservation Factor **10**]))))
14	Date Calculation	Days Until October 15th ([October 15th]- [Date **4**]
15	Streamflow is:	Final advisory on streamflow (on or off). If there are more days until October 15th than are projected to remain in the reservoir, there are zero days projected to the streamflow cutoff, or the streamflow trigger has been reached, turn off streamflow. (IF((OR([Days Until October 15th **14**]>[Days Remaining in Reservoir **13**], [Days Remaining to Streamflow Cutoff **12**] <0.01, [Reservoir Inches **1**]>=84)),"OFF", "ON")
16	Water Ban?	Final advisory on water ban (yes or no). If there are more days until October 15th than are projected to remain in the reservoir, there are zero days projected to the water ban trigger, or the water ban trigger has been reached, enact a water ban. (IF((OR([Days Until October 15th **14**]>[Days Remaining in Reservoir **13**], [Days Remaining to Water Ban **11**] <0.01, [Reservoir Inches **1**]>=48)),"YES", "NO")

1) Rows 1, 4, 5, and 7 are for data that is entered manually – all other cells are calculation cells.
2) Note: Formula and reservoir levels are based on a reference Reservoir Dam spillway crest El. 40,0 ft. Reference spillway crest El. 40.0 ft equals El. 38.9 ft NAVD 88.)

2.2 OBJECTIVES AND BENEFITS

The purpose of the Reservoir Dam Water Storage and Fish Passage Improvement Project is to provide water storage for the Town of Scituate's public water supply while providing BIOQ10 flows to maintain aquatic habitat downstream of Reservoir Dam and Old Oaken Bucket Pond and effective fish passage at the Reservoir Dam fishway. Since the dam is classified as a Class I high hazard dam, modifications to the spillway are included in this project to increase the discharge capacity for the design flood equal to one-half the Probable Maximum Flood (1/2 PMF) in accordance with Massachusetts General Law c.253, Section 46 and 301 Code of Massachusetts Regulations (CMR) 10.07. Modifications to the dam, spillway, and fishway conform to the dam safety regulations and will be approved by the DCR ODS.

The Project will restore habitat for anadromous species (alewife and blueback herring) and American eel through increased fish passage and enhanced ecological habitat in First Herring Brook, the Reservoir and Old Oaken Bucket Pond. Also, Project operations will allow for more robust stream flow releases in order to enhance overall ecological habitat in the Reservoir, First Herring Brook and Old Oaken Bucket Pond. The overall ecological results indicate that proposed modifications provide adequate flow releases for aquatic habitat and fish passage at least 88% of the time. The Project operations will provide an additional 37 MGY (113 ac-ft/year) of storage, approximately 25 days of water supply at an average annual daily rate of 1.5 MGD. A discussion of Project benefits with regard to climate change resiliency is provided in Section 5.7.

2.3 CONSTRUCTION COSTS AND SCHEDULE

2.3.1 Project Costs

The estimated construction cost for the proposed spillway and fishway modifications based on the 90% design is presented in Table 2-4. The 2019 present-day cost estimates reflect: 1) spillway modifications to pass ½ PMF for compliance with dam safety regulations, 2) reconstruction of the Reservoir Dam fishway to allow downstream fish passage in the fall, 3) complete automation of fishway removable weirs to minimize plant personnel commitments at the fishway, 4) installation of an eel ladder on the Reservoir Dam spillway abutment wall, 5) improvements to the First Herring Brook to assure fish access to the fishway entrance, 6) Repairs and upgrades to the Tack Factory Pond weir structure and fishway, 7) CJCH embankment slope erosion protection, 8) Sherman Drive stormwater management improvements, 9) flood protection for private property adjacent to the Reservoir, 10) impacted septic system upgrades, 11) access easements to Reservoir Dam, 12) 10% contingency, 11) remaining permitting and construction bid support, and 12) construction management and administration.

Table 2-4 90% Design Estimated Construction Cost

Task	Cost
Contractor Mob/Demob	$ 140,000
Temporary Construction Facilities	$ 32,000
Spillway Crest Modifications	$ 104,000
Spillway Abutment Wall Modifications	$ 117,000
Spillway Crest Gate	$ 356,000
Spillway Pedestrian Bridge	$ 45,000
Fishway Exit Channel Modifications	$ 177,000
Fishway Removable Adjustable Weirs	$ 188,000
Fishway Isolation Gate	$ 18,000
Fishway Fixed Weir Modifications	$ 29,000
Fishway Entrance Channel Improvements	$ 15,000
Tack Factory Pond Fishway Modifications	$ 24,000
Reservoir Dam Eel Fishway	$ 26,000
CJCH Erosion Protection	$ 114,000
Sherman Drive Drainage Bioswale	$ 28,000
Tack Factory Pond Weir Upgrade	$ 10,000
Property Flood Protection	$ 76,000
Septic System Upgrades	$ 37,000
Subtotal	$ 1,536,000
Contingency	$ 154,000
Subtotal	$ 1,690,000
Permitting and Construction Bid Support	$ 170,000
Reservoir Dam Access Easements	$ 10,000
Construction and Administration	$ 135,000
Total Project	**$ 2,005,000**

2.3.2 Project Schedule

The remaining effort for completing Phase III – Design, Permitting, and Construction Bid for the Reservoir Dam Water Storage and Fish Passage Improvement Project will require:

- Receipt and resolution of agency comments on the DEIR;
- Preparation and submittal of the FEIR;
- Receipt of DEP Wetlands Superseding Order of Conditions;
- Preparation and submittal of DEP Wetlands Variance Request;

- Receipt of DEP Variance with Conditions;
- Preparation and submittal of permit applications;
- Receipt of permit with Conditions;
- Update 90% design to incorporate permit conditions and prepare construction specifications;
- Prepare construction bid documents;
- Request and evaluate construction bids; and
- Award construction contract.

Target milestones for the remaining permitting effort are presented in Table 2-5.

Table 2-5 Permitting and Construction Bids Target Milestones

Milestone	Target Completion Date
Environmental Impact Report	
Receive comments on DEIR	30-Nov-10
Respond to DEIR comments	31-Dec-19
Update groundwater study	31-Jan-20
Update water level frequency study	31-Jan-20
Prepare FEIR	28-Feb-20
Submit FEIR	15-Mar-20
Receive comments on FEIR	15-Apr-20
Respond to FEIR comments	15-May-20
Permit Applications	
Appeal DEP Wetlands SOC	30-Jun-20
Request DEP Wetlands Variance	15-Aug-20
Receive DEP Wetlands Variance with Conditions	1-Oct-20
USFWS ESA Section 7 Consultation	1-Dec-20
MESA NHESP Consultation	1-Dec-20
MHC and THPO Section 106 Consultation	1-Dec-20
DEP Chapter 91 Permit Application and Consultation	1-Dec-20
NMFS Fisheries consultation	15-Jan-21
DMF Fishway Permit and Consultation	15-Jan-21
ODS EAP update	15-Jan-21
ODS Dam Safety Permit and consultation	15-Jan-21
DER Final Operational Plan Consultation	15-Jan-21
DEP Stormwater Management Consultation	15-Feb-21
DEP Section 401 Water Quality Certification and Consultation	15-Feb-21

Milestone	Target Completion Date
USACE Section 404 Category 2 Permit and Consultation	15-Feb-21
DOT Access Permit and Consultation	15-Feb-21
DEP WMA Permit Amendment and Consultation	15-Feb-21
FEMA Flood Insurance Map Revision	15-May-21
Construction Bid Documents	
Update 90% drawings for Permit Conditions	15-Apr-21
Prepare construction specifications	15-Apr-21
DPW final design review	1-May-21
Execute Final Operational Plan	15-May-21
Assist with Septic System Upgrade Designs RFP	15-May-21
Request construction bids	15-May-21
Conduct pre-bid meeting	1-Jun-21
Construction bids due	15-Jun-21
Evaluate bids and award construction contract	30-Jun-21

A detailed construction schedule will be prepared during the permitting and construction bid phase of the Project after the EIR has been completed and all permits have been issued by all agencies. Actual construction methods will be dependent on the General Contractor and the permit conditions, and will be selected to minimize environmental impacts while meeting the Town's water supply demand.

The 90% design indicates that construction of the spillway and fishway modifications would have to be sequenced in two phases over two six month construction seasons. All work on the spillway and fishway structure modifications, and the stream channel modifications at the fishway entrance would be completed during the first phase which would coincide with the low flow May-September period. Installation of the spillway gate, removable fishway baffles and access walkway, spillway gate and fishway baffle control system, spillway and fishway pedestrian bridge, eel ladder, security fencing and monitoring system, and site restoration would be completed during second phase.

Mobilization and installation of a water control system would be installed in April of the first phase. The water control system would consist of pumps and/or siphons designed to lower the reservoir below El. 30.0 ft and divert First Herring Brook flow around the spillway and fishway construction area. The low-level outlet would be used to convey First Herring Brook streamflow up to 15 cfs to Old Oaken Bucket Pond and the Water Treatment Plant. Dewatering pumps with total capacity of 50 cfs would be used to initially drawdown the reservoir and convey higher storm events past the construction area. If significant rainfall events 24 inch diameter siphon pipes with 25 cfs capacity will be utilized to prevent flooding of the construction site.

The pump diversion system would have a flow capacity of approximately 50 cfs. A pump system would have ten trailer-mounted trash pumps each with 4,500 gpm flow rate and a 12 inch diameter suction pipe and an 8 inch diameter discharge pipe. The siphon system would have two 24 inch diameter HDPE pipes

each with a 25 cfs capacity and a vacuum priming pump. Approximately 2 weeks would be required to set up the water control system and lower the reservoir.

Once the water level is lowered, a temporary portadam^{tm} cofferdam would be installed upstream of the spillway and fishway. The cofferdam would have a 10 ft maximum height at the bottom El. 32.0 ft and would extend up the dam embankment to El. 42.0 ft. The Cofferdam would be located inside water control system suction pipes and the existing low-level outlet intake. The Reservoir would then be allowed to refill to El. 34.0 ft to provide several feet of useable storage for water supply and 8 ft of flood storage for typical rainfall events in the watershed. Approximately 2 weeks would be required to install the cofferdam. Throughout the remainder of construction, the low level outlet would be used to convey streamflows up to approximately 15 cfs and the water control system operated as necessary for higher volumes. Strict water conservation measures would have to be implemented during construction because of the reduced Reservoir storage volume.

Approximately 4 weeks would then be required to excavate the earthen embankment and demolish the spillway concrete crest and abutment walls and fishway exit channel. Another 4 weeks would be necessary to place form and rebar, and pour concrete for the new spillway crest and abutment walls, and the fishway exit channel. A 28-day (4 weeks) curing period would be required for the concrete to reach design strength prior to backfilling the dam embankment. While the concrete is curing, modifications to the existing fixed concrete weirs and the stream channel at the fishway entrance would be completed. Reconstructing the earthen embankment, placing stone riprap on the upstream face would require an additional 4 weeks. The cofferdam and the water control system would then be removed allowing the reservoir to refill to the new spillway crest level starting at the beginning of October. Stop logs would be installed in the fishway exit channel and the site prepared for winter shutdown. The water control system would be used for 6 months total during the first phase of construction. During winter shutdown, streamflows would be discharged through the low level outlet and over the new spillway crest.

The smaller version of the water control system with 25 cfs capacity would be reinstalled over a one week period during the following May at the beginning of the second phase. This water control system would have sufficient capacity to quickly drawn down the reservoir level below the new spillway crest in a few days for installation of the spillway gate. The spillway gate mechanical installation would require 2 weeks followed by electrical and control system installation over another 2 weeks. Four weeks would be required to install the fishway removable weirs steel supports and access platform, and an additional 4 weeks to install the removable weirs and eel ladder components. The water control system would then be removed, the security fence and surveillance system installed, and the final site restoration completed over an additional 4 weeks. The water control system would be in place for a 4 month period during the second phase.

3.0 ALTERNATIVES TO THE PROJECT

3.1 OVERVIEW OF ALTERNATIVES

Numerous alternatives have been evaluated to provide additional water storage capacity in Reservoir Dam for the Town's water supply and First Herring Brook instream aquatic habitat and fish passage improvements. Alternatives have included:

- In 2009, the Town of Scituate WRC and the NSRWA initially investigated options to augment the water supply system (TNC 2010) by:
    - Dredging Old Oak Bucket Pond and Reservoir Dam;
    - Installing a new groundwater well at Satuit Meadow;
    - Implementing water restrictions during drought conditions; and
    - Redirecting the Cranberry Bog watershed back to Tack Factory Pond;
- In 2013, EA Engineering, Science, and Technology, Inc, (EA) conducted a feasibility study of four options to improve fish passage and increase storage in Reservoir Dam by raising normal pond levels 1.0 ft up to 3.5 ft higher than the existing normal pool at the fixed crest spillway (EA 2013). In addition, a fifth option investigated the existing normal pool level with a lower fishway exit channel;
- In 2014, Tetra Tech prepared a preliminary design of spillway modifications lowering the existing spillway crest and installing a bottom-hinged gate to increase the normal pool level 1.5 ft to El. 40.4 ft. (Tetra Tech 2014);
- In 2017, Tetra Tech prepared 60% design documents for spillway and fishway modifications for a 1.5 ft increase in normal pool to El. 40.4 ft. (Tetra Tech 2017); and
- In 2018, Tetra Tech advanced the project design documents to the 90% level for the 1.5 ft increase in normal pool to El. 40.4 ft.

All options for increasing and utilizing water storage in Reservoir Dam were evaluated using the WEAP model to simulate reservoir operation for various water demands and historical hydrologic conditions in the watershed. The model assessed the Reservoir Dam operations under various water supply demand scenarios, water restrictions, and conservation measures for historical hydrologic conditions in the watershed. The Scituate DPW is currently implementing the IOP which was developed in 2011 using the WEAP model. The IOP model simulations were based on the current spillway and did not include raising the normal pool levels. These simulations included dredging, a new well in Satuit Meadow, water conservation measures, and redirecting the Cranberry Bog watershed back to Tack Factory Pond to augment the water supply. The model results indicated that the small size of Cranberry Bog watershed had low natural flow during critical summer and fall periods and therefore the results were not included in the report (TNC 2010).

The 2013 WEAP modeling simulated conditions with normal pool levels at the existing spillway crest up to 3.5 ft higher than the existing spillway crest. The results indicated that increasing the normal pool to the highest level has the greatest potential to meet all of the water supply demands, instream habitat releases, and fish passage flows with the least impacts on water restrictions.

The 2014 preliminary design identified a 1.5 ft increase in maximum normal pond level as the most cost-effective option based on an extrapolation of the 2013 WEAP model results. The 1.5 ft increase in normal pool level was selected as the most feasible option to increasing water storage with least impact on CJCH and property adjacent to the Reservoir. The WEAP model refinements for demand assumptions and conservation practices were evaluated in 2017 and 2018 with the 1.5 ft increase in normal pool.

3.1.1 Higher Normal Pool Levels

The 2013 Feasibility Study investigated five options with normal pool levels higher than the existing normal pool level at the fixed crest overflow spillway. All elevations in the 2013 Feasibility Study refer to a local datum and were adjusted to NAVD 1988. The conversion is Local Datum = NAVD 1988 plus 1.1 ft. The Options included:

- Option A – Pond El. 40.9 ft with spillway gate (2.0 ft increase in normal pool);
- Option B – Pond El. 41.4 ft with spillway gate (2.5 ft increase in normal pool);
- Option C – Pond El. 42.4 ft with spillway gate (3.5 ft increase in normal pool);
- Option D – Existing Pond El. 38.9 ft with no spillway modifications or change in normal pool); and
- Option E – Pond El. 39.9.0 ft with 1-ft high flashboards on the existing spillway crest (1.0 ft increase in normal pool).

A summary of the WEAP model input and results for the four higher Reservoir Dam normal pool level options is provided below. The modeled options assumed that flow control mechanisms would be installed on the spillway crest to maintain the higher pond levels. An additional simulation for the existing reservoir level, but with a lower fishway exit channel, was completed for comparison to the higher pond level options, and that option is discussed in Section 3.1.2. Operational guidelines and fishway modifications required for effective fish passage are described for each option. A detailed report of the WEAP modeling for this study is presented in the 2014 Preliminary Design Report, Appendix B.

Option A – Pond El. 40.9 ft.

This option modeled a full pond of El. 40.9 ft and evaluated the existing fishway exit channel and an 18 inch wide, 6 inch deep notch in the fishway exit channel at Reservoir Dam. Full pond refers to target elevation at the beginning of April prior to the upstream fish migration period and is the maximum level that the DPW could control. This option was selected as a starting point since the 2011 WEAP modeling results indicated that there was generally sufficient storage to meet the IOP releases in the spring for the in-migration, but the summer water supply demand depleted the reservoir storage and there was insufficient water elevation for the fall out-migration.

Nine (9) different cases were simulated for Option A to evaluate various combinations of fishway flow, fishway exit elevation, and water ban target elevations. Input parameters for these cases included: fishway exit channel bottom at El. 38.9 ft and El. 38.4 ft; March-May fishway flow releases of 2.6 cfs and 5.2 cfs; September-October fishway flows of 0.45 cfs; water ban implementation levels at El. 33.9 ft, El. 39.8 ft, and El. 39.9 ft; and Memorial Day-Labor Day (summer) and May-September (extended) water ban periods. Minimum water level for effective fish passage was set at El. 39.4 ft with the existing fishway exit channel (El. 38.9 ft) and El. 38.9 ft with a 6 inch deep notch in the fishway exit channel.

Results of all Option A WEAP model cases indicate that fish ladder flows would be sufficient for fish passage at least 80% of the time during the spring in-migration and at least 40% of the time during the fall-out migration at both Reservoir Dam and Old Oaken Bucket. All of the cases with a watering ban trigger level at the 2011 IOP (El. 33.9 ft) indicated that a watering ban would be necessary less than 2 summer days. A trigger level at El. 39.9 ft would result in a water ban 34 summer days for all existing fishway exit channel and 6 inch deep exit channel notches and both the summer and extended water ban periods. Lowering the trigger point to El. 38.9 ft would reduce the water ban frequency to 14 summer days with both fishway exit channel configurations.

Option B – Pond El. 41.4 ft.

This option modeled a full pond of El. 41.4 ft and evaluated the existing fishway exit channel and an 18 inch wide, 6 inch deep notch in the fishway exit channel at Reservoir Dam. Six different cases were simulated for Option B to evaluate various combinations of the input parameters including: fishway exit channel bottom at El. 38.9 ft and El. 38.4 ft; March-May fishway flow releases of 2.6 cfs; June-August high demand period release of 0.22 cfs; September-October fishway flows of 0.45 cfs; water ban implementation levels at El. 33.9 ft, El. 38.9 ft, El. 39.9 ft, and El. 40.9 ft; and Memorial Day-Labor Day (summer) water ban periods. Minimum water level for effective fish passage was set at El.39.4 ft with the existing fishway channel and El. 38.9 ft with a 6 inch deep notch in the fishway exit channel.

Fish ladder flows for all cases would occur more than 90% of the time during the spring in-migration and more than 60% of the time during the fall-out migration at both Reservoir Dam and Old Oaken Bucket. The case with a watering ban trigger level at the 2011 IOP (El. 33.9 ft) indicated that a watering ban would be necessary less than one summer day. A trigger level at El. 39.9 ft would result in a water ban 20 summer days with the existing fishway exit channel and with a 6 inch deep notch in the exit channel. Lowering the trigger point to El. 38.9 ft would reduce the water ban frequency to 8 summer days with both fishway exit channel configurations.

Option C – Pond El. 42.4 ft.

This option modeled a full pond of El. 42.4 ft and evaluated the existing fishway exit channel and an 18 inch wide, 6 inch deep notch in the fishway exit channel at Reservoir Dam. Seven different cases were simulated for Option C to evaluate combinations input parameters including: fishway exit channel bottom at El. 38.9 ft and El. 38.4 ft; March-May fishway flow releases of 2.6 cfs and 5.2 cfs; June-August high demand period release of 0.22 cfs; September-October fishway flows of 0.45 cfs; water ban implementation levels at El. 33.9 ft, El. 38.9 ft, El. 39.9 ft, and El. 40.9 ft; and Memorial Day-Labor Day (summer) water ban periods. Minimum water level for effective fish passage was set at El. 39.4 ft with the existing fishway channel and El. 38.9 ft with a 6 inch deep notch in the fishway exit channel.

For all of the Option C cases, fish ladder flows would occur more than 80% of the time during the spring in-migration and more than 50% of the time during the fall-out migration at both Reservoir Dam and Old Oaken Bucket. The case with a watering ban trigger level at the 2011 IOP (El. 33.9 ft) indicated that a watering ban would be necessary less than 2 summer days. A trigger level at El. 39.9 ft would result in a water ban 6 summer days with the existing fishway exit channel and with a 6 inch deep notch in the exit channel. Lowering the trigger point to El. 38.9 ft would reduce the water ban frequency to 3 summer days with both fishway exit channel configurations.

Option E – Pond El. 39.9 ft.

This option modeled full pond El. 39.9 ft with the fishway exit channel lowered to El. 35.4 ft with one foot high flashboards installed in the spillway. This option would have the minimal impact on properties around Reservoir, but the greatest extent of modifications to the existing fishway for effective fish passage. Input parameters for the three cases evaluated for this option included: March-May fishway flow releases of 2.6 cfs; June-August high demand period release of 0.22 cfs; September-October fishway flows of 0.45 cfs; water ban implementation levels at El. 36.9 ft, El. 37.4 ft, El. 37.9 ft.; and Memorial Day-Labor Day (summer) water ban periods.

All of the Option E cases indicated that fish ladder flows would be greater than 95% of the time during the spring in-migration and greater than 70% of the time during the fall-out migration at both Reservoir Dam and Old Oaken Bucket. The frequency of the water ban for this option was 9-20% of the summer days depending on the trigger point.

Results of the WEAP modeling for the 2013 Feasibility Study indicated that raising the normal pool only 1 ft, lowering the fishway exit channel by 3.5 ft to El. 35.4 ft, and raising the water ban trigger by 3.5 ft would create sufficient storage to meet the water supply demand and the BioQ90 flows in the different downstream river reaches. BioQ90 flows are rates that exceed the minimum flow requirement 90% of the time for each biological period. The WEAP model results for these modifications indicate that fish ladder flows would provide effective passage 98% of the time at Reservoir Dam and 94% of the time at Old Oaken Bucket Dam during the spring in-migration, and 98% of the time at Reservoir Dam and 74% of the time at Old Oaken Bucket Dam during the fall out-migration. Water supply and BioQ90 flows would be released through the low level outlet when the reservoir levels are too low to operate the fishway. The frequency of the water ban for this option was 9-20% of the summer days depending on the trigger points consistent with the existing IOP. When raising the trigger 3.5 ft from the current operation, the frequency of summer days with total outdoor watering ban was 12% throughout the period of record - compared with the current situation of 11%.

In order to maximize water storage, the Scituate WRC agreed that the proposed management plan should reflect El. 40.4 ft as the normal pool level since a 1.5 ft higher pool should not be significantly different than the existing conditions. Therefore, a normal pool level of El.40.4 ft was selected as the preferred option for design and evaluation of potential impacts of the Project on adjacent properties. Section 3.3 discusses the 2014, 2017, and 2019 WEAP model updates for the 1.5 ft higher pool level.

3.1.2 Maintain Existing Normal Pool

The 2013 Feasibility Study investigated the option of maintaining the existing normal pool level with the fixed crest overflow spillway. This option D modeled a full pond El. 38.9 ft with the fishway exit channel lowered to El. 35.4 ft with no modifications to the spillway. This option would have the least impact on properties around the Reservoir, but the greatest extent of modifications to the existing fishway for effective fish passage. The three cases evaluated for this option included: March-May fishway flow releases of 2.6 cfs; June-August high demand period release of 0.22 cfs; September-October fishway flows of 0.45 cfs; water ban implementation levels at El. 35.9 ft and El. 36.9 ft; and Memorial Day-Labor Day (summer) and May-September (extended) water ban periods.

All of the Option D cases indicated that fish ladder flows would occur more than 95% of the time during the spring in-migration and more than 60% of the time during the fall-out migration at both Reservoir

Dam and Old Oaken Bucket. The frequency of the water ban for this option was 11-22% of the summer days depending on the trigger point.

In order to add storage, improve fish passage during the September-October outmigration, and provide spillway discharge capacity meeting the ODS Dam Safety Regulations, the spillway and fishway could be modified in a similar manner as the proposed Project with the normal pool 1.5 ft higher than the existing spillway crest. This alternative would require spillway modifications to pass the ½ PMF and fishway modifications for the spring and fall river herring migration while maintaining the current normal pool at El. 38.9 ft. This alternative would not provide any additional water supply storage. The existing ogee spillway would be modified to lower the crest to El. 36.4 ft and install a bottom hinged crest gate. To anchor the new concrete ogee section consisting of two layers of reinforcing steel, concrete dowels would be drilled into the existing crest and abutment walls. The new ogee would transfer all the forces on the crest gate to the existing spillway mass concrete block. To contain flood flows and prevent embankment erosion, the abutment walls would be rebuilt and extended into the reservoir. The new walls would be reinforced concrete doweled into the existing abutment walls. The hinged crest gate operator would be supported by the new wall on the west side of the spillway. A walkway would be installed over the spillway and anchored to the spillway concrete abutment walls for DPW personnel access.

The bottom hinged crest gate would be remotely operated from the DPW's Water Treatment Plant. The electric motor operator would be located on the right side of the gate at the top of the abutment wall. In the event of power failure, the motor would be equipped with a handwheel for manual operation. The 36.5 ft. wide by 5.0 ft. high bottom hinged gate would be installed on the new spillway ogee crest. The gate would have two hinges spaced at 18.25 ft. on-center and side seals and a bottom seal along the entire gate. In the fully opened position, the top of the gate would be at a maximum El. 36.4 ft. to pass the ½ Probable Maximum Flood with acceptable freeboard on the dam embankment.

The 3 ft wide fishway exit channel would be reconstructed with the bottom at El. 32.0 ft. Nine fishway weirs would be removed for the lower exit channel elevation and replaced by seven removable weirs to provide fish passage at pond levels ranging from El. 33.5 ft. to El. 38.9 ft. The weir #13 and entire exit channel would be removed and the first lower 12 weirs would be retrofitted with fixed notched weirs.

Both fixed and removable weirs would be retrofitted with notches to minimize the flow required for effective fish passage and providing sufficient water depth over the weirs. Notches in each weir would be 1.5 ft. wide, which would provide 2.53 cfs with an 8 inch water depth for upstream passage, and a six-inch notch centered on the larger notch to provide 0.42 cfs with a 5 inch water depth. The width of the larger notch meets the IOP streamflow guidelines between the Reservoir Dam and Old Oaken Bucket Dam. The low level outlet would provide additional releases needed to meet the streamflow guidelines.

Fixed weirs would be bolted to the existing concrete weirs and fishway walls, while the removable weirs would be installed in guides in the exit channel walls. Each of the removable weirs would be a multiple disc slide gate with dual stem, electric motor operators. The top gate disc would have the 18 inch wide weir and 6 inch wide notch positioned by the motor operators. The top disc of all seven removable weirs would be identical with a 24 inch total height with a 6 inch travel from the full-open to full-close positions. Normal operation of the adjustable top disc would range from full 100% open to 50% open with the automatic control system at the water treatment plant. The control system would position each

adjustable weir based on the Reservoir Dam water level monitoring and low-level outlet valve control system.

The bottom disc would vary in height from 1.75 ft minimum for weir #15 up to 4.85 ft for weir #21. The top disc would be manually closed from the water treatment plant, and when fully closed, the top disc of the gate would engage the lower disc to completely remove the entire weir from the exit channel. When not needed for fish passage, the removable weirs remain in the raised position. The removable weirs would be manually repositioned in the exit channel. For access to the removable weirs, a walkway would be installed along both sides of the exit channel walls.

In addition, a 3 ft. by 7.5 ft. high slide gate would be installed at the upstream end of the fishway exit channel with stop log guides. The frame of the slide gate would be mounted to the exit channel walls. The gate would be manually operated via a hand wheel at El. 59.0 ft. A walkway would be installed over the 3 ft. wide fishway exit channel for DPW personnel access with a pre-fabricated floor grating and handrails on top of the fishway walls.

To create ideal hydraulic conditions for fish to reach the fishway entrance, the stream channel downstream the Reservoir Dam fishway entrance would be reconfigured with channels and pools for sufficient depth for passage. The existing stones in the stream would be used for the reconfiguration, providing velocities less than 5 ft./sec and pools with vertical drops less than 8 inches. During the September to October downstream migration period, the removable weirs would minimize flow and provide sufficient depth (a minimum of 5 inches) through the notch for fish passage.

This alternative would have the greatest cost for fishway improvements, but an overall cost similar to the proposed 1.5 ft higher pool alternative. Maintaining the existing Reservoir Dam pool level at El. 38.9 ft eliminates all potential impacts on the wetland, houses, properties, and infrastructure around the Reservoir Dam associated with the proposed higher pool. Even though the spillway gate and fishway operations would provide the water supply, fish passage, and habitat stream flow releases comparable to the proposed 1.5 ft higher normal pool option, this option does not provide any additional storage and the firm yield of the Reservoir would be reduced to 0.36 MGD, which is 0.13 MGD less than the 0.49 MGD firm yield with the proposed 1.5 ft higher normal pool (DEIR Appendix A).

3.2 NO ACTION ALTERNATIVE

No alterations would be made to the Reservoir Dam embankment and spillway. This alternative does not provide additional water storage needed to meet the water supply demand, to maintain aquatic habitat in First Herring Brook, and to provide fishway flow required for effective fish passage. Reservoir Dam water levels are below the existing spillway crest and fishway exit channel bottom elevation approximately 50% of the time and are typically too low during the September-October outmigration period for fish passage through the fishway (see DEIR Appendix C). Therefore, no action does not allow fish passage and is not a feasible alternative.

The DPW currently operates Reservoir Dam in accordance with the First Herring Brook IOP (Table 2-1). The average recorded town water demand during 1999-2007, which was the basis of the WEAP modeling for the IOP, was 615 MGY. The average pumping rate for the updated WEAP modeling for the 2013 Feasibility Study was 533 MGY for 1999-2011. The IOP dictates that when the reservoir level drops more than five feet below the spillway to El. 33.9 ft, a total outdoor watering ban is declared. The total watering ban was conservatively modeled as reducing water use to average winter water use levels

(1.31 MGD). During 2010, total watering outdoor watering ban actual water use dropped to 1.00 MGD (Kearns 2013). The DPW currently has historically imposed a watering ban 30 days annually with the current Reservoir Dam operation.

Stream flows that river herring are dependent on for out-migration are currently not effective for downstream passage at Reservoir Dam. The spillway crest is the same level as the bottom of the fishway exit channel. Water levels in Reservoir Dam are typically below the spillway crest and fishway exit during the September-October river herring out-migration period.

The existing Reservoir Dam spillway would remain in non-compliance with the ODS regulations. Hydraulic modeling (see DEIR Appendix B) indicates that the Reservoir Dam spillway can pass only 1,751 cfs before overtopping the embankment. The embankment would have 1.4 ft of freeboard at the 100-year flood of 1,031 cfs. The embankment would be overtopped by 0.4 ft during the ½ PMF spillway design flood (SDF) with the existing spillway configuration. Spillway modifications similar to the proposed project would be necessary to provide a discharge capacity meeting the ODS regulations.

The Reservoir Dam operations would continue operate in accordance with the streamflow guidelines for the 2011 IOP. These BioQ90 flows are a minimum flow requirement and if flows fall below the BioQ90 flows, the low-level outlet at the dam would be opened to provide the minimum flow. Under the 2011 IOP, BioQ90 flows are shutoff when Reservoir Pond levels drop below El. 32.0 ft.

Under the existing IOP, no flows are provided for fish passage at Reservoir Dam and at Old Oaken Bucket Pond fish passage in the spring is met 86 % of the time and only 17% of the time in the fall bioperiods (Kearns 2013). The signifigant lack of flow during the outmigration has an overall signifignt impact on the viability of the project and may require DEP to re-evaluate even the current IOP in relation to firm yield impacts to the public water supply.

3.3 ANALYSIS OF FEASIBLE ALTERNATIVES

Evaluation of numerous alternatives throughout all of the Project design phases indicates that raising the Reservoir Dam normal pool 1.5 ft is the best feasible alternative to increasing storage in the Town's water supply system and meet the environmental goals for instream habitat and fish passage. The proposed Project incorporates Reservoir Dam spillway modifications required to meet the ODS Dam Safety Regulations and add storage capacity to the Town's water supply system. The proposed Project also incorporates modifications to the existing fishway for effective passage of river herring and installation of a new fishway for American eel.

The WEAP model results for the proposed Project (DEIR Appendix A) indicate:

- The mean annual water supply delivery would be 535 MGY (1.46 MGD);
- The minimum Reservoir storage would be 60.4 million gallons, providing drought resilience and a buffer for emergency use during drought conditions;
- The total water supply system has a firm yield of 1.46 MGD with the surface water firm yield of 0.46 MGD (a signifigant increase from the current firm yield of 0.36 with stream releases);
- Two-thirds (67%) of the years modeled would have no water ban days during June-September;
- A water ban would be expected an average of 12 days per year during June-September;

- An enforced water ban would be expected an average of 6 days per year during June-September;
- Fish passage success at Reservoir Dam would be 98% of the time in the spring and 88% in the fall;
- Fish passage success at Old Oaken Bucket would be 97% of the time in the spring and 82% in the fall;
- The percent of years with greater than 80% successful fish passage days at Reservoir Dam would be 96% in the spring and 84% in the fall;
- The percent of years with greater than 80% successful fish passage days at Old Oaken Bucket would be 89% in the spring and 42% in the fall;
- Successful fish passage would be expected for a portion of every year in the spring at Reservoir Dam and Old Oaken Bucket;
- No fish passage (zero successful days) would be expected during conditions similar to the drought of record (2% of the years);
- Over the 1961-2016 period of record modeled, only 13 zero flow days would occur in First Herring Brook downstream of Reservoir Dam and 195 zero flow days downstream of Old Oaken Bucket;
- The BioQ90 minimum streamflow goals in First Herring Brook downstream of Reservoir Dam would be met 88% of the time in September-November, 92% of time in December-February, 98% of the time in March-May, and 100% of the time in June-August; and
- The BioQ90 minimum streamflow goals in First Herring Brook downstream of Old Oaken Bucket would be met 94% of the time in September-November, 90% of time in December-February, 92% of the time in March-April, 97% of time in May, and 90% of the time in June-August.

The higher normal pond level could possibily affect the wetlands resource areas as described in DEIR Appendix D and summarized as follows:

- Reduce the total Bank length around Reservoir Dam and Tack Factory Pond by 169 LF from the 12,348 LF to 12,179 LF;
- The wetlands are currently subjected to seasonal submergence to elevations as high as El. 40.5 ft in the fall and winter. Water Department records indicate that water levels in the reservoir typically exceed the existing spillway crest El. 38.9 ft. approximately 50 percent of the fall and winter months and typically drop 4 to 6 ft. below the spillway crest during dry summer months and drought conditions. The proposed 1.5 ft higher normal pool would not alter the function of the wetlands vegetation in the BVW although it will be flooded 40% longer period during the growing season and would possibly enhance overall function of the wetland system by better water quality due to better stormwater design and higher volumes of water that should increase dissolved oxygem content;
- Increase LUW with the proposed 1.5 ft. higher impoundment in Reservoir Dam by 378,972 sq. ft. (8.7 acres), altering the existing LUW in Reservoir Dam from 52.1 acres and to 60.8 acres); However, this would only be for short periods of time and happens under current conditions;

- LUW in Tack Factory Pond would not change with the proposed 1.5 ft higher pool and would be 344,124 sq. ft. (7.9 acres) for both existing and proposed conditions;
- Bordering Land Subject to Flooding (BLSF) would not change with the proposed 1.5 ft. higher impoundment and would remain at 432,494 sq. ft. 9.9 acres total (301,814 sq. ft for Tack Factory Pond and 130,680 sq. ft. for Reservoir Dam;
- Reduce Riverfront Area (RA) by 108,622 sq. ft. around Tack Factory Pond with the proposed 1.5 ft higher normal pool (310,871 sq. ft. with existing conditions and 202,248 sq. ft. with proposed conditions). Reservoir Dam would have 144,865 sq. ft. of RA for both existing and proposed conditions. Total RA for the Project is 455,736 sq. ft. for existing conditions and would be 347,113 sq. ft. for the proposed Project; and
- The project area is not located within Natural Heritage and Endangered Species Program (NHESP) mapped Priority Habitat of Rare Species or Estimated Habitat of Rare Wildlife. No evidence of vernal pools was observed during site investigations of the project area.

The proposed higher normal pool in Reservoir Dam would be contained within Town owned land except for 2.48 acres. However, this area is also already submerged during storm events with current operation. The location of the 12 private properties with topography lower than the proposed normal pool are shown on Appendix C, Figure C-7. All of the private property impacted areas are within the 200 ft Water Supply Protection District in areas classified as BVW except for land below the Mean Annual Flood Level (MAFL) which defines the lower limit of BVW.

The low point in CJCH is El. 42.4 ft (see DEIR Appendix F, Drawing C-101) and there would 2 ft of freeboard at proposed normal pool level. The proposed Project would incorporate riprap slope protection in areas along the CJCH road embankment subjected to potential erosion with the 1.5 ft higher normal pool.

The current FEMA 100-year flood level is El. 42.0 ft in Reservoir Dam and El. 44.0 ft in Tack Factory Pond (FEMA 2016). The hydrologic and hydraulic analysis presented in DEIR Appendix B indicates that the 100-year flood level in Reservoir Dam is El. 43.6 ft with the existing spillway and El. 41.0 ft with the proposed spillway modifications and gate operation. The 100-year flood levels in Tack Factory Pond would be El. 44.0 ft with existing spillway and El. 43.7 ft with the proposed spillway.

The 1.5 ft higher normal pool level would increase groundwater elevations at three properties on CJCH adjacent to the Reservoir Dam impoundment and Tack Factory Pond. Groundwater levels at #401 CJCH, #436, and #439 CJCH with the proposed project are expected to be similar to the existing groundwater levels during flood conditions and would be just below the ground surface (see DEIR Appendix E). Proposed reservoir levels would reduce the groundwater separation distance to the #401 CJCH wastewater treatment system leaching field to 3 ft, less than the current 4 ft separation the existing reservoir operations. The wastewater system at #439 CJCH would have adequate groundwater separation with the higher normal pool. The groundwater at both of these properties are influenced by the Tack Factory Pond levels and have historically been at the proposed Project normal pool El. 40.4 ft NAVD88. Groundwater at #436 CJCH generally tracks the Reservoir Dam water level and has submitted a plan to the Scituate Board of Health for a wastewater system upgrade based on the proposed 1.5 ft higher normal pool.

3.4 COMPARISON OF FEASIBLE ALTERNATIVES

The proposed Project is the only feasible alternative for increasing water storage in Reservoir Dam. The additional storage would provide drought resiliency and a 60 million gallon storage buffer for emergency use in drought conditions. The spillway would be able to pass the design flood required by ODS regulations protecting downstream properties and infrastructure. The Project would have minimal impact on adjacent private property and incorporates measures to protect the quality of the drinking water supply. Erosion protection would be placed along the CJCH road embankment and assistance would be provided to home owner to upgrade wastewater treatment systems. The Town's stormwater system on Sherman Drive would be upgraded to treat stormwater runoff entering the Reservoir.

Wetlands around Tack Factory Pond will experience more submergence time with the proposed 1.5 ft higher normal pool than current conditions. However, these wetlands will continue to function comparable to the existing conditions.

The proposed Project would incorporate operational features for the spillway crest gate and fishway dual leaf adjustable weir gates. This system would provide the Town with automatic operation of Reservoir Dam from the water treatment plant similar to current operation of the low level outlet.

A comparison of the advantages and disadvantages for all alternative evaluated for this project is provided in Table 3-1.

Table 3-1 Comparison of Alternative Evaluated

Alternative	Advantages	Disadvantages
1.5 ft Higher Normal Pond	Additional storage for drinking water, stream habitat, or fish passage Increases water supply firm yield Dam safety improvements Minimal impact of CJCH and adjacent properties Minimal impact on wetlands **Meets goals of project**	
No Action	No change to existing Reservoir conditions and operation No impact on CJCH and adjacent properties No impact on wetlands	No additional storage for drinking water, stream habitat, or fish passage No change to water supply firm yield No fish passage into Reservoir Dam No dam safety improvements **Does not meet goals of project**
Dredging	Additional drinking water storage Increases water supply firm yield	No additional storage for stream habitat or fish passage No fish passage into Reservoir Dam No dam safety improvements **Does not meet goals of project**
New Groundwater Wells	No change to existing Reservoir conditions and operation No impact on CJCH and adjacent properties No impact on wetlands	No additional storage for drinking water, stream habitat, or fish passage No change to water supply firm yield No fish passage into Reservoir Dam No dam safety improvements **Does not meet goals of project**
1.0 ft Higher Normal Pond	Additional storage for drinking water, stream habitat, or fish passage Increases water supply firm yield Dam safety improvements Minimal impact on CJCH and adjacent properties Minimal impact on wetlands	**Provides minimal storage capacity to meet project goals**
2.0-3.5 ft Higher Normal Pond	Additional storage for drinking water, stream habitat, or fish passage Increases water supply firm yield Dam safety improvements	Greater potential impact on CJCH and adjacent properties Greater potential impact on wetlands **Greater cost to meet project goals**

3.5 ALTERNATIVES ELIMINATED FROM CONSIDERATION

3.5.1 No Action

Reservoir Dam has a fixed crest spillway and does not have any control over flood flow. The low level outlet provides flow releases at reservoir levels below the spillway crest. The existing fishway does not function at water levels below the spillway crest. No action does not provide any additional water supply storage. Reservoir Dam is a Class I high hazard dam and the spillway capacity does not meet the ODS Dam Safety Regulations. The no action alternative would not be feasible due to dam safety concerns and would not have the proposed Project's positive impacts on public safety, water storage, and populations of wildlife such as river herring, rainbow smelt, and American eels.

3.5.2 Reservoir Dam Dredging

The 2003 Town of Scituate Drinking Water Supply & Demand Analysis (CEI 2003) investigated sediment dredging of Tack Factory Pond, Reservoir Dam, and Old Oaken Bucket. The report indicates that dredging 1.35 ft of sediment (17,800 cy) from Tack Factory Pond would add 3.6 MG of storage, 2 ft of sediment (206,600 cy) from the Reservoir would add 40 MG, and 2.4 ft of sediment (46,140 cy) from Old Oaken Bucket would add 8 MG of useable storage. Hydraulic dredging would the preferred method of removing sediment, but there is not enough space around the Reservoir for the dewatering basins leaving mechanical dredging as the only realistic option.

Dredging Reservoir Dam and Old Oaken Bucket was included in the 2010 WEAP model. All of the dredging cases had minimal impacts on the water supply yield and generally resulted in lower average fall water levels (TMC 2010).

Dredging Reservoir Dam Pond would increase storage available for water supply, but would still require spillway modifications to meet dam safety regulation and fishway modifications for fish passage at lower Reservoir levels. Utilizing storage at the bottom of the Reservoir would subject wetlands plants to lower water levels and drier conditions during the growing season. Dredging a 50 acre area to a 2 ft depth, would result in approximately 161,333 cubic yards of dredged material adding 32.6 MG storage. There is no appropriate space within or adjacent to the project site where this material could conveniently be disposed of, so any dredging would result in significant transportation and disposal costs. Dredging would require significant planning and extensive permits. For these reasons, dredging was eliminated from further consideration.

3.5.3 Reservoir Dam Normal Pool Levels Higher Than El. 40.4 ft

Raising the normal Reservoir Dam pool level higher than 40.4 ft would increase the Town of Scituate's water storage capacity, but would also result in less than 2 ft of elevation difference between the normal pool level and the road surface of CJCH. Implementation of this alternative would necessitate raising the highway and would result in significantly greater impacts to wetlands and private properties. Higher normal pool levels would require a higher dam embankment, higher spillway abutment walls, a longer pool and weir fishway, and a deeper fishway exit channel.

3.5.4 Maintain Existing Normal Pool

The Reservoir Dam spillway has to be upgraded to meet the ODS Dam Safety Regulations and pass the SDF design goal of equal to the ½ PMF. This could be accomplished with spillway modifications

similar to the proposed Project with the lower crest elevation and a bottom hinged crest gate. A shorter height crest gate could be installed to maintain the existing normal pool at El. 39.8 ft. These spillway modifications would address the absolute minimum project changes required to address dam safety issues.

In order to permit any spillway changes, fishway modifications would more than likely be required to restore passage of river herring and American eel. These changes would be similar to the fishway changes for the proposed Project, but would have lower exit channel to assure effective fish passage at the lowest Reservoir levels in the fall. The fishway exit channel and removable adjustable weir gates would be designed to achieve fish passage success rates comparable to the proposed Project.

Maintaining the normal pool at El. 38.9 ft. would not have any impact on the properties, CJCH, and infrastructure around Reservoir Dam and Tack Factory Pond. Reservoir level, groundwater levels, and wetlands areas would not change from existing conditions.

Maintaining the normal pool at El. 38.9 ft. does not add any storage capacity and would require withdrawals at lower levels than the proposed Project to meet the mean annual water supply delivery. This option would have a lower firm yield and more water ban days than the proposed Project. The minimum Reservoir storage would be approximately 32 MG providing less drought resilience and a lower buffer for emergency use during drought conditions than the proposed Project. For these reasons, maintaining the existing normal pool is not considered a feasible alternative.

3.5.5 Installing Additional Groundwater Wells

The Town of Scituate Drinking Water Supply & Demand Analysis (Scituate 2003) evaluated two option for expanding the groundwater well supply system. The options included:

- Improvements to Well 2 – Kent Street Well and Well 20 - Fitts Well;
- Development of the Dolan Well Site; and
- Development of potential sites at: 1) the area between Stockbridge and First Parish Road east of Brushy Hill; 2) Satuit Meadow between Walnut Tree Hill and Buttonwood Hill; and 3) the South Swamp-Cedar Street-Clapp Road area in the northwest corner of the Town.

The Kent Street Well would only have a small quantity of that could be pumped while avoiding saltwater intrusion (Scituate 2003). The Fitts Well is located with one-half mile of the Town landfill and could have potential groundwater contamination from the landfill (Scituate 2003).

Studies conducted in 1982-1983 indicated that the Dolan Street Well site could only produce 200-300 gpm (Scituate 2003). The Dolan Street Well site is located near the Massachusetts Bay Transit Authority (MBTA) railroad line which could be a potential water quality concern (Scituate 2003). In addition, there is potential salt water intrusion, high color, and iron issues at the Dolan Street Well site (Scituate 2003). However, the Town has obtained a WS-17 Permit to re-evaluate this area as a public water supply.

Seismic survey of the Stockbridge-First Parish Road area and the South Swamp area did not have characteristics favorable for a municipal water supply (Scituate 2003). The Satuit Meadow site has major developments and the Town does not currently own any land in this area (Scituate 2003).

The First Herring Brook Environmental Flows Project (TNC 2010) investigated development of groundwater wells at Satuit Meadow. Two well supply amounts (0.75 MGD and 0.35 MGD) were evaluated in the WEAP model. Both scenarios had an indirect benefit of increasing streamflows when compared to the natural conditions. However, streamflow goals could only be met 44% of the time in the September-November outmigration with a 0.75 MGD Satuit Meadow well and 39% of the time with a 0.35 MGD well. Since both scenarios did not provide sufficient habitat flows during the fall outmigration, additional groundwater wells were not considered a feasible option.

4.0 EXISTING ENVIRONMENT

Scituate is located in the South Shore area of Massachusetts, located south of Boston and North of Cape Cod. The Town is bordered by Cohasset to the North, Scituate to the West, Marshfield to the South, and the Atlantic ocean to the West. The Reservoir Dam, built in the 1960s and owned by the Town of Scituate, impounds the First Herring Brook which flows through upstream Tack Factory Pond, beneath the CJCH causeway via a culvert and into Reservoir Pond. Reservoir Pond and Tack Factory Pond are classified as Zone A Surface Water Supply Protection Areas and Outstanding Resource Waters (ORW) of the Commonwealth to protect the public drinking water supply. The Reservoir is used to supplement well water delivery to the water treatment plant at Old Oaken Bucket Pond. CJCH acts as a causeway that separates Reservoir Pond and Tack Factory Pond. Tack Factory Pond is maintained at a higher elevation than Reservoir Pond.

Reservoir Dam was originally constructed as a storage reservoir for the Town of Scituate's public water supply. Specifically, the reservoir was created to supplement well water delivery to the water treatment plant at downstream Old Oaken Bucket Dam. The Reservoir Dam is an approximately 45-foot high earthen embankment with a concrete core wall, ogee spillway, low level outlet, and a pool and weir fishway. Normal pool levels in the Reservoir Dam impoundment are at the spillway crest, which is at El. 38.9-ft. The fishway is located east of the spillway and is comprised of 21 weirs to create pools that are approximately 3-ft wide and 3.5-ft long. The fishway exit channel is at the same elevation as the spillway crest and it currently functions only when impoundment levels are higher than the spillway crest.

The Project site is not within or adjacent to any known areas of critical environmental concern, rare species habitat, scenic rivers, or cultural resources. The Project site is not subject to any Activity and Use Limitations (AULs) nor is it associated with any known reportable conditions. No asbestos is known to exist at the Project site.

4.1 FIRST HERRING BROOK WATERSHED

The Project is situated in the First Herring Brook Watershed, which covers 3,169 acres of surface water, wetland, and upland, spanning portions of Scituate and Norwell in Plymouth County, Massachusetts with slopes ranging from 0 to 35 degrees. The watershed provides approximately 80% of Scituate’s water supply, sourced both from wells and surface water. The watershed is situated on the Dedham Granite formation, which is characterized by light grayish-pink to greenish-gray, equigranular to slightly porphyritic, variably altered, granite south and west of Boston; no mapped fault lines cross the area (USGS 2019). Review of the watershed footprint in the United States Department of Agriculture (USDA) Natural Resources Conservation Service’s Web Soil Survey indicates that over 60% of the soils within the watershed are categorized as very or extremely stony; 237.7 acres of the watershed are USDA Prime Farmland and 1,754.5 acres are considered farmland of unique or statewide importance (NRCS 2017). The area is characterized by forests and rolling hills and located in the Massachusetts coastal plain. No soils within the Project area are considered to be of statewide importance, unique, or USDA Prime Farmland.

Water areas are listed as containing areas of the hydric Freetown and Swansea soils in bogs, kettles, marshes and swamps. The Freetown series consists of deep, very poorly drained organic soils that formed in more than 51 inches of highly decomposed organic material. These soils are in bogs that are

on lake plains, outwash plains, till plains and moraines. Typically, they have a dark reddish-brown muck surface layer about 2 inches thick over black and dark reddish-brown muck to a depth of 60 inches. The Swansea series consists of very poorly drained organic soils that formed in 16 to 51 inches of highly decomposed organic material over sandy mineral material. These soils are in bogs that are on outwash plains, till plains and moraines. Typically, they have a dark reddish-brown muck surface layer about 2 inches thick over black muck to a depth of 26 inches. The substratum from 26 to 32 inches is light olive gray, loamy coarse sand and from 32 to 60 inches is light olive gray, gravelly coarse sand.

4.2 HYDROLOGIC AND GROUNDWATER CONDITIONS

4.2.1 Surface Water

Surface waters at the site as well as adjacent groundwater wells provide drinking water for the Town of Scituate. First Herring Brook provides the majority of the water flowing into Tack Factory Pond and Reservoir Pond. It starts in South Swamp along the Norwell/Scituate Line, flows through Norwell (where there is potential spring flow) and enters a swampy area in Scituate above Grove Street, crosses Maple Street, receives a tributary from the North, passes by the town water supply well area, and enters another area with potential spring flow before finally reaching the Project Study area at Tack Factory Pond. Water in Tack Factory Pond then flows underneath CJCH into Reservoir Pond, subsequently flowing over the Reservoir Pond Dam and down the brook to Old Oaken Bucket Pond. Water levels in Tack Factory Pond are generally higher than Reservoir Pond.

Water from Reservoir Dam is used to actively control the level of Old Oaken Bucket Pond in order to keep water available for transfer to the Scituate water treatment plant and distribution system. The Town's Water Management Act (WMA) permit sets withdrawals from Scituate's reservoir system at an average annual daily withdrawal of 0.79 MGD. Additional information on the existing hydrology of areas associated with the Project is provided in the First Herring Brook Environmental Flows Project Report, Attachment 1 to DEIR Appendix A and the WMA Permit as Attachment 2 to DEIR Appendix A. The firm yield of Reservoir Dam is discussed in Section 5.2.2.

4.2.2 Groundwater

The Town of Scituate also sources drinking water from wells in the vicinity of the Project within the First Herring Brook Watershed. The Groundwater Level Study Technical Memorandum completed in 2019, provides an analysis of groundwater levels in the area based on monitoring well data and other sources and is provided as DEIR Appendix E suggests that groundwater levels near Reservoir Pond are close to the surface. This is confirmed by the number of springs in the area.

Monitoring wells were installed at three properties with water treatment. Monitoring well water quality analysis conducted in 2014 indicate that nitrate is well below background levels (0.58 mg/L, USGS 2019) as well as the MCLs for both nitrate (10 mg/L) and nitrite (1 mg/L) in drinking water with bacteria results are typical of groundwater under the direct influence of surface water.

However, there are three properties with septic systems very close to the reservoir and are only 2-3 ft above the existing normal pool level. These properties are for #401 CJCH, #436 CJCH, and #439 CJCH, as shown on Drawing C-101 in DEIR Appendix F. Measured groundwater levels in the monitoring well at #401 CJCH are higher than the estimated high groundwater (EHG) level. However, differences in the subsurface conditions at the monitoring well and the leach field may result in lower groundwater levels

at the leach field. Even if groundwater level at the leach field is assumed to be similar to the monitoring well or to the proposed normal pool El. 40.4 ft, Title 5 allows the Board of Health to issue a variance to reduce the 5 ft separation requirement to 4 ft and the existing septic system would be in compliance with Title 5. In addition, DEP approval of alternative treatment systems (like those at #401 and #439 CHCH) allows further reduction of groundwater separation to 2 ft, which would also assure the existing system remains in in compliance.

Measured groundwater levels in the monitoring well at #439 CJCH are below the estimated high groundwater (EHG) and the septic system would still comply with Title V even if the groundwater level is the same as the proposed pool El. 40.4 ft. A new septic system at #436 CJCH would have to be designed for high groundwater determined during the Title 5 Soil evaluation process. The Groundwater Level Study Technical Memorandum (DEIR Appendix E) provides quantitative and qualitative analysis of groundwater conditions at the Project Site.

4.3 WETLAND RESOURCES

There are five types of wetland resource areas regulated under the Massachusetts Wetlands Protection Act (MGL, Chapter 131, Section 40, WPA) and Regulations (310 CMR 10.00) within the project area. Wetland resources areas present on the project site include the following:

4.3.1 Bank

As defined in the WPA, a Bank is the portion of the land surface which normally abuts and confines a water body. A Bank can occur between a water body and a vegetated bordering wetland and adjacent floodplain, or if these are not present, a Bank can occur between a water body and an upland area. A Bank may be partially or totally vegetated, or it may be comprised of exposed soil, gravel or stone. The lower boundary of Inland Bank is the Mean Annual Low Flow (MALF) level, the upper boundary of the Inland Bank is the first break in slope or the Mean Annual Flood Level (MAFL), whichever is lower.

Bank of Scituate Reservoir is based on the MAFL, El. 39.8 ft and MALF, El. 35.9 ft. Bank of Tack Factory Pond is based on the Mean Annual Flood Level MAFL, El. 39.8 ft and MALF, El. 39.3 ft. Except for the southern side of Tack Factory Pond, MAFL of Scituate Reservoir and Tack Factory Pond are coincident with the first break in slope. The first break in slope along the southern side of Tack Factory Pond is above MAFL. Bank along the unnamed perennial stream on the south side of Tack Factory Pond, First Herring Brook upstream of Tack Factory Pond, and the two intermittent streams flowing into Scituate Reservoir are derived from field flagging. The existing total Bank length for Reservoir Dam and Tack Factory Pond is 12,179 ft. (DEIR Appendix D).

4.3.2 Bordering Vegetated Wetland

Under the MA WPA, BVW are defined as freshwater wetlands which border on creeks, rivers, streams, ponds and lakes. Bordering Vegetated Wetlands are areas where the soils are saturated and/or inundated such that they support a predominance of wetland indicator plants. Several areas of BVW border on Tack Factory Pond, the Scituate Reservoir, and associated waterways. A discussion of plant species associated with these areas within the Project site is provided in Section 4.5.2. The existing BVW is 1,599,660 sq. ft. (DEIR Appendix D).

4.3.3 Land Under Water Bodies and Waterways

The MA WPA defines Land under Water Bodies and Waterways (LUW) as the land beneath any creek, river, stream, pond or lake. This land may be composed of organic muck or peat, fine sediments, rocks or bedrock. The land beneath Tack Factory Pond, the Scituate Reservoir, First Herring Brook, the unnamed stream flowing into Tack Factory Pond, and the two intermittent streams flowing into the Scituate reservoir contain LUW. The landward boundary of LUW is the MALF level which is El. 35.9 feet for the Scituate Reservoir and El. 39.3 ft for Tack Factory Pond. Due to the steepness of the banks associated with First Herring Brook, the unnamed stream flowing into Tack Factory Pond, and the two intermittent streams flowing into Scituate Reservoir, the landward limit of LUW is the flagged locations of Bank. The existing LUW is 52.1 acres and 7.9 acres for Reservoir Dam and Tack Factory Pond, respectively (DEIR Appendix D).

4.3.4 Land Subject to Flooding

The Federal Emergency Management Agency (FEMA) is responsible for establishing the flood zone elevation or height of water during certain flood events. FEMA publishes Flood Insurance Rate Maps (FIRMs) showing flood hazard areas. The Flood Maps showing the project site are Maps 25023C0109K and 25023C0117K, both dated November 4, 2016. The 100-year flood is an event that has a 1% probability of occurring in any given year. For Tack Factory Pond and the Scituate Reservoir, FEMA has determined that floodwater will rise to El. 44.0 ft. and El. 42.0 ft., respectively, during the 100-year event. Under the MA WPA, the boundary of Bordering Land Subject to Flooding (BLSF) is the estimated maximum lateral extent of flood water which will result from the 100-year event. The lower boundary of BLSF is the MAFL (aka Top of the Inland Bank) or the landward limit of BVW; and the upper boundary is the limit of the 100-year flood, El. 44.0 ft. and El. 42.0 ft. (NAVD88) for Tack Factory Pond and the Scituate Reservoir, respectively.The existing BLSF for Reservoir Dam and Tack Factory Pond is 432,494 sq. ft. (DEIR Appendix D).

4.3.5 Riverfront Area

Under the Massachusetts Wetlands Protection Act, First Herring Brook and the unnamed stream flowing into Tack Factory Pond qualify as perennial streams, a naturally flowing body of water that flows throughout the year. Because they are considered perennial streams, the Riverfront Area (RA) designation applies. Under the MA WPA, Riverfront Area is the area of land between a river's mean annual high water line and a parallel line measured horizontally 200 feet away. Due to the steep banks of First Herring Brook and the unnamed stream, the RA extends 200 feet from the flagged Bank line of these waterways. The existing RA is 144,865 sq. ft. for Reservoir Dam and 310,871 sq. ft. for Tack Factory Pond (DEIR Appendix D).

No vernal pools are known to have been observed within the Project site.

4.4 AIR QUALITY AND NOISE

The Project site is in a forested area adjacent to suburban residential areas. Air quality is assumed to be consistent with other such areas, where vehicle emissions and household energy consumption are the most significant expected sources of air pollution. No ambient noise or air data has been collected for the Project site or surrounding areas.

4.5 PLANT AND ANIMAL SPECIES AND HABITAT

4.5.1 Wildlife

Any significant impacts to wildlife during construction and operation of the Project would be limited spatially to the waters of First Herring Brook, between and including Tack Factory Pond and Old Oaken Bucket Pond and the areas impacted by proposed flooding. The most significant area of impact will be in Reservoir Pond. The current fishway was constructed with the intention allowing passage of fish and eel species including alewife (*Alosa pseudoharengus*), smelt (*Osmeridae*), and American eel (*Anguilla rostrate*). Using USFWS guidelines for pool and weir fishways, estimates for the existing pool and weir configuration indicate that the fishway could handle as many as 72 alewives per minute (4,300 alewives per hour) at Old Oaken Bucket Dam and 33 alewives per minute (2,000 alewives per hour) at Reservoir Dam. The median habitat carrying capacity of Reservoir Dam is 25,000-30,000 alewife as discussed in the 2013 Feasibility Report prepared by EA Engineering, Science, and Technology, Inc. (EA 2013). However, the fishway exit channel elevation at Reservoir Dam is too high to allow operation at low reservoir levels, preventing fish and eel migration.

4.5.2 Plants

Plant species associated with BVW have the potential of being impacted by this Project. Several areas of BVW border on Tack Factory Pond, the Scituate Reservoir, and associated waterways.

On the south side of the reservoir, north of Sherman Drive, there is a forested wetland dominated by red maple (*Acer rubrum*). Further west there is a forested, shrub/scrub, and emergent wetland located in the southwest corner of the reservoir on the east side of Route 3A, dominated by red maple, coast pepperbush (*Clethra alnifolia*), and cat briar (*Smilax* sp.). Common reed (*Phragmites australis*) dominates the reservoir edge in this area.

A forested wetland complex on the northwest side of the reservoir on the east side of Route 3A is dominated by red maple, coast pepperbush and cat briar, with fringes of common reed along the edge of the reservoir in some areas. Along the northern edge of the reservoir lies a forested wetland featuring red maple, coast pepperbush, and cat briar, as does another forest wetland complex on the northeastern and eastern sides of the reservoir. Common reed is clustered in areas along the reservoir edge.

A forested wetland complex borders the north, west, and south sides of Tack Factory Pond on the west side of Route 3A. Dominant wetland vegetation in this complex includes red maple, coast pepperbush, cat briar, and spicebush (*Lindera benzoin*).

4.5.3 Federally and State-Listed Species

There are thirteen USFWS-listed animal species and four listed plant species believed or known to occur in Massachusetts. The habitats of these species were reviewed using the USFWS Environmental Conservation Online System (ECOS 2019) in order to determine whether any of their habitat intersects the Project area (USFWS 2018). Three species, listed in Table 4-1, were identified by this analysis.

The Project is located approximately two miles from the shore of the Atlantic Ocean, known habitat for both the Piping Plover and the Red Knot. The Project is located inland, and potential construction and operational impacts are not expected to impact any Piping Plover and Red Knot habitats. The area surrounding Reservoir Pond is characterized by suburban development, interspersed with second growth

forest. All forested areas adjacent to Reservoir Pond are subject to edge effects, making them unsuitable habitat for the Northern Long-Eared Bat which is associated with mature interior forests.

Table 4-1 USFWS Listed Species

Status	Species	
Threatened	Piping Plover (*Charadrius melodus*)	Sandy beaches, tidal flats. Nests in open sandy situations near water, on beaches, sandbars, and gravel or sand flats. Winters along coast, on tidal flats and beaches. (Audubon 2019a).
Threatened	Red Knot (*Calidris canutus*)	Nests on Arctic Tundra during the summer, migrating and wintering on coastal mudflats, tidal zones, and sometimes open sandy beaches (Audubon 2019b.
Threatened	Northern Long-Eared Bat (*Myotis septentrionalis*)	Associated with mature interior forests, hunts along wooded hillsides and ridgelines, and roosts/hibernates in tight crevices and holes (Center for Biological Diversity 2019).

The Priority Habitats of Rare Species data layer, obtained from the Massachusetts Bureau of Geographical Information (MassGIS), contains polygons representing the geographical extent of Habitat of state-listed rare species in Massachusetts based on documented observations within the last 25 years; Priority Habitat polygons are the filing trigger for project proponents, municipalities, and all others for determining whether or not a proposed project or activity must be reviewed by the NHESP for compliance with the MESA and its implementing regulations. (MassGIS 2018). Review of this shapefile was conducted using Google Earth Pro and did not identify any intersections of priority habitats and the Project site.

Construction noise and emissions are not expected to significantly impact any of these species, even if unexpected species were to temporarily occur near the Project.

4.6 TRANSPORTATION RESOURCES

The Project site does not intersect any trails used by pedestrians or bicyclists. The proposed Project will include installation of erosion protection along the CJCH, also known as State Route 3A, a two-lane highway. Also, the proposed construction access road, located on Town easements associated with the dam, would connect the Project site to Sherman Drive in Scituate, a 42 foot wide residential road currently providing access to residential suburban neighborhood. A draft DOT Non-Vehicle Access Permit Application will be prepared after resolution of agency comments on the DEIR and the FEIR is approved.

4.7 RECREATIONAL RESOURCES

Reservoir Pond and Tack Factory Pond are classified as Zone A Surface Water Supply Protection Areas and Outstanding Resource Waters (ORW) of the Commonwealth of Massachusetts in order to protect the Scituate public water supply. Therefore, recreational activities such as canoeing, kayaking, swimming, and fishing are banned.

4.8 HISTORIC AND CULTURAL RESOURCES

The site does not contain any structures listed in the State Register of Historic Places or the Massachusetts Historical Commission's (MHC) Inventory of Historic and Archaeological Assets of the Commonwealth.

4.9 LAND USE

The built environment and human use of the Project site, its immediate surroundings and the region, including existing infrastructure (i.e., water supply, wastewater treatment and/or disposal, transportation, waste management, etc.), zoning districts and other relevant land-use designations or plans (i.e., local or regional capital improvement plans or infrastructure investments, economic development, growth planning and open space plans, etc.), business districts, industrial parks, housing stock, and vacancy rates.

Reservoir Pond and an associated 200 ft. perimeter buffer zone, owned by the Town of Scituate, encompass the Project site. The pond, fed by the First Herring Brook Watershed, provides drinking water for the town, and any other uses of the pond beyond water storage are prohibited. The pond is surrounded by forest and suburban residential homes, mostly single-family structures. The capacity of Scituate's water supply will be increased, which benefits all town residents, including those near the Project site.

The chronology below lists key developments adjacent to the Project between 1870 and 1970.

- 1868: Construction of Duxbury and Cohasset Railroad through nearby Greenbush village created a gradual shift of development focus away from Scituate Harbor to inland portions of the Town, including RDA Area;
- 1870: A Rubber cement factory became in operation along First Herring Brook;
- 1870's: Cranberry bog operations and several spring-water bottling firms began during this decade;
- 1893: Scituate Water Company was started as a private enterprise;
- 1900's: A few homes were constructed along Country Way – just north of current Scituate Reservoir;
- 1920's: The Scituate Water Company was taken over by the Town of Scituate;
- 1930's: Cushing Highway (Route 3A) constructed;
- 1960's: Residential development – area south of current Reservoir, and the Reservoir Dam was constructed to create the Scituate Reservoir;
- 1969: Reservoir Dam Constructed; and
- 1970's: Residential development – area south of current Reservoir.

4.10 UNIQUE SITE FEATURES

The Project site is a municipal water supply with unique features associated with this type of use. The current condition of the dam is preventing fish migration upstream, reducing important breeding habitat. Further discussion of the current conditions of fish habitat are provided in Sections 3.2 and 4.5.1.

4.11 LANDLOCKED TIDELANDS

There are no landlocked tidelands in the vicinity of the Project.

4.12 TIDELANDS

There are no tidelands in the vicinity of the Project. The DEP Determination of Applicability-310 CMR 9.00 (DEIR Appendix K) determined that First Herring Brook, including Tack Factory Pond and Scituate Reservoir is a non-tidal navigable waterway and subject to Chapter 91 jurisdiction.

5.0 ASSESSMENT OF IMPACTS

5.1 AIR QUALITY AND NOISE

There are no air quality or noise impacts associated with operation of the Project. The Tetra Tech and subcontractors will be required to prepare and implement an air emissions plan to limit emissions from construction equipment. Construction air and noise impacts are expected to be *de* minimis if mitigated using best management practices (BMPs) such as using appropriate fuels and avoiding idling.

5.2 HYDROLOGIC AND GROUNDWATER CONDITIONS

5.2.1 Surface Water

The Project will raise the Reservoir Dam impoundment and Tack Factory Pond 1.5 ft. above the existing maximum normal pool El. 38.9 ft. adding 113 ac.-ft. of storage, resulting in a maximum normal pool at El. 40.4 ft. This will provide an additional 25 days of storage at the Town's average annual water demand. A detailed discussion of the IOP currently being implemented by the Town and the DFOP for the proposed Project is provided in DEIR Appendix I. Appendix A summarizes the WEAP model simulations completed to develop the DFOP with the model development described in the First Herring Brook Environmental Flows Project (TNC 2010) in Attachment 1 to DEIR Appendix A.

The DEP Determination of Applicability-310 CMR 9.00 (DEIR Appendix K) determined that First Herring Brook, including Tack Factory Pond and Scituate Reservoir is a non-tidal navigable waterway and subject to Chapter 91 jurisdiction.

5.2.2 Firm Yield

The firm yield of a drinking water reservoir is the maximum average daily withdrawal that can be guaranteed from a reservoir without risk of failure to supply water during the drought of record accounting for inflow, precipitation, evaporation, stream flow releases, storage, and water consumption.

The Town of Scituate is currently authorized to withdraw up to 1.80 million gallons of water per day (MGD) from ground and surface water supplies in the South Coastal Basin under its Water Management Act (WMA) Registration #421264.01 and Permit #9P4421264 .02. Approximately 21% of the Towns water supply is derived from Old Oaken Bucket Pond, a relatively small reservoir supplemented by the Main Reservoir, Tack Factory Pond and by water pumped from Well 17A. The withdrawals from Scituate's reservoir system are set in the WMA permit at an average annual daily withdrawal of 0.79 MGD, based on the Old Oaken Bucket Pond Firm Yield Study, dated June 2003, which determined the firm yield for the reservoir system during the drought of record (1960's drought} with no downstream releases.

The WMA Program requested an analysis on how the proposed increased storage and downstream release operating scenario proposed may impact the firm yield of the reservoir system. This request comes in part based upon the 2011 USGS Firm Yield Estimator Model Version 2.0 (an updated version of the original DEP model)) published by the U.S. Geological Survey in 2011, evaluated the firm yield for Scituate's Main Reservoir (bathometry data was not available at the time for Old Oaken Bucket Pond) indicated the firm yield to be 0.63 MGD with no downstream releases. However, with 10th-percentile monthly flow releases, the USGS indicated the firm yield for the Reservoir drops to 0.13

MGD with any water bans or other institutional controls. The 2011 USGS model indicated approximately the same firm yield as the 2003 DEP model for the Main Reservoir only.

The WMA Program indicated that based on the proposed changes in storage and downstream release the Town of Scituate should evaluate the firm yield of the Reservoir under each operating scenario comparable to the methodology of the USGS Firm-Yield Estimator Model Version 2.0. The Town of Scituate has used the WEAP-integrated water resources model to evaluate the effects of management options on environmental and water supply objectives since 2009. The model is a mass balance model using the same parameter characteristics used in the USGS Firm Yield Estimator Model Version 2.0. Developed by the Stockholm Environment Institute, the WEAP model is used for the same types of purposes as the USGS model with better user interfaces and verified by numerous national and international projects.

The WEAP model indicates a firm yield of the Scituate reservoir system of 0.77 MGD and so therefore calibrates well with previous models on initial yield. (The slight variation in volumes is possibly due to slightly different and more current water demand numbers.)

Additional WMA permit condition requires Scituate to work with the Scituate Water Study Committee and First Herring Brook Watershed Initiative to refine and implement the minimum flow targets contained in the Initial First Herring Brook IOP. The WEAP model indicates the firm yield of the reservoir to drop to 0.36 MGD under current IOP which includes water bans, flow releases and current storage volumes.

Increases in storage by raising the Reservoir Dam normal pool 1.5 feet with similar water bans and flow releases as the IOP increases the firm yield of the system to 0.46 MGD. This information is fully documented in the report *Scituate Water Supply Reliability Prepared for the Town of* Scituate, Massachusetts; prepared by Corona Environmental Consulting and is included in DEIR Appendix A.

Using the WEAP model the Town has evaluated twenty-seven new model scenario management options on water supply reliability and environmental performance under a 1.5-foot increase in the storage elevation of Scituate's main reservoir.

These models estimate the percentage of the time that the Town may have to shut off the flow releases under each operating scenario and how many days of outdoor water use restrictions and what levels of the outdoor water use restrictions will be implemented under each operating scenario in order to balance fish passage with water supply interests.

By raising the Dam and developing a new IOP the WEAP model indicates that even in drought conditions:

- The reservoir always has more than 60 mg storage remaining;
- 67% of years not requiring Total Outdoor Water Ban;
- 12 summer days per year on average will have Total Outdoor Water Ban;
- 82-98% of fish migration days have adequate flow; and
- Instream flow release goals met 88-100% of the days with less than 1% of days having zero streamflow.

The WEAP modeling report (as well as from comments from DEP) indicates the IOP should be updated to reflect the modeling results by increasing the full storage elevation of the Reservoir by 1.5 feet and updating the fish ladder and spillway capacity. This has been done and is included in DEIR Appendix I.

One of the main components of this operating plan is to update, test and refine the adaptive management tool being develop by the NSRWA to regularly monitor system performance and provide management guidance, especially during abnormal conditions.

The results of the firm yield analysis have been discussed with WMA Program staff and upon review and implementation may require an amendment to the Town of Scituate's WMA permit. The data presented in this DEIR along with the new FOP should help the Water Management Program to better evaluate how raising the Main Reservoir water levels and increasing downstream releases will affect the firm yield and benefit the Town's public water supply.

5.2.3 Groundwater

A groundwater study was conducted in 2018-2019 to obtain data for the DEIR and assess potential impacts of the proposed project on properties adjacent to the Reservoir Dam impoundment and Tack Factory Pond. The results of this groundwater assessment are summarized in Section 4.2.2 with the complete study presented in DEIR Appendix E.

The water level measurements obtained for the groundwater study indicate that Tack Factory Pond water levels for the October 15, 2018 through April 1, 2019 period ranged between El. 39.3 ft up to El. 39. 8 ft with the existing spillway and reservoir operations. Tack Factory Pond water levels with the proposed spillway modifications and reservoir operations would generally be less than El. 40.5 ft at normal fall-spring hydrologic conditions.

The measurements at #439 CJCH generally follows Tack Factory Pond water level changes and historically are equal to or up to 0.2 ft higher than Tack Factory Pond levels. Groundwater at #439 CJCH with the proposed spillway modifications and project operations at normal fall-spring hydrologic conditions would be close to the ground surface El. 40.7 ft. The wastewater treatment system at #439 CJCH would not impacted by changes in proposed reservoir levels. The expected groundwater separation would be 5.2 ft, which is greater than Title 5 separation criteria of 5 ft.

Groundwater at #401 CJCH generally follows Tack Factory Pond water level changes and historically are equal to or up to 1.5 ft higher than Tack Factory Pond levels. The maximum measured groundwater in MW#401 was El. 41.5 ft which is 0.3 ft above the ground surface. Groundwater at #401 CJCH with the proposed spillway modifications and project operations at normal fall-spring hydrologic conditions would be similar to existing conditions, slightly higher than the ground surface El. 41.2 ft. Proposed reservoir levels would reduce the groundwater separation distance to the #401 CJCH wastewater treatment system leaching field to 3 ft. The groundwater separation distance is currently 4 ft with the existing spillway and reservoir operations.

Repair of the Tack Factory Pond weir structure as part of the proposed project would require flooding remediation measures to the properties at #401 CJCH and #439 CJCH. Plans for upgrade of the septic system at #436 CJCH have been submitted to the Board of Health. These plans are designed for expected groundwater levels associated with the proposed Reservoir Dam normal operating level at El. 40.4 ft.

Existing groundwater at MW #EA and MW #WA generally follow the Reservoir Dam water level changes and historically are no more than 4.2 ft higher than Tack Factory Pond levels. Existing groundwater levels at MW #EA and MW #WA generally lag the Reservoir Dam levels by 8 hours and 4 hours, respectively. Groundwater at MW #EA and MW #WA with the proposed spillway modifications and project operations would be expected to be approximately 4 ft higher than Reservoir Dam water levels (El. 44.4 ft at the normal proposed pool or El. 48.0 ft during the 100-year flood). Since these groundwater levels are below adjacent properties on both abutments of the dam, the proposed project would not impact properties near the dam.

5.3 WETLAND RESOURCES

Construction and operation of the Project will result in reclassification of wetland resources adjacent to Reservoir Pond and Tack Factory Pond. Although WPA "resource areas" may change (conversion of BVW to Bank), the functionality of the wetlands will remain the same due to limited additional inundation durations of the expanded Bank at the outer ends of the growing season and based on the life cycles of wetland vegetative species. The proposed 1.5 higher maximum impoundment level will:

- Reduce the Bank around the reservoir by 169 LF from the 12,179 LF delineated Bank;
- Subject 338,925 sq. ft. of BVW to additional seasonal flooding (1,599,660 sq. ft. at existing maximum pool El. 39.8 ft.; 1,260,735 sq. ft. at proposed maximum pool El. 40.4 ft.). All of the identified wetlands are currently subjected to seasonal submergence to elevations as high as El. 40.5 ft. The duration of submergence of the wetland plants is dependent on the hydrologic conditions. Water Department records indicate that water levels in the reservoir typically exceed the existing spillway crest El. 38.9 ft. approximately 50 percent of the time and typically drop 4 to 6 ft. below the spillway crest during dry summer months and drought conditions. This increase in flooding is not expected to change the wetland type or its functionality;
- Increase Land Under Water Bodies and Waterways (LUW) with the proposed 1.5 ft. higher impoundment by 378,972 sq. ft. (8.7 acres), altering the existing LUW conditions from 52.1 acres and to 60.8 acres) in Reservoir Dam. No change in LUW is expected in Tack Factory Pond;
- No alteration to the boundaries of Bordering Land Subject to Flooding (BLSF), maintaining current conditions with 301,814 sq. ft. for Tack Factory Pond and 93,569 sq. ft. for Reservoir Dam (432,494 sq. ft. total); and
- Reduce Riverfront Area (RA) by 108,522 sq. ft. from the existing RA of 310,771 sq. ft.

No impacts to vernal pools are expected to be associated with the Project.

5.4 PLANT AND ANIMAL SPECIES AND HABITAT

5.4.1 Wildlife

The Project would positively impact river herring populations, which have been negatively impacted by the restriction of upstream passage resulting from development in waterways. The Project is designed to restore river herring and eel habitat in the First Herring Brook in and above Reservoir Pond by restoring fish passage in First Herring Brook in and out of Reservoir Pond. Project operations will allow more robust stream flow releases in order to enhance overall ecological habitat in the Reservoir, First Herring

Brook and Old Oaken Bucket Pond. The overall ecological results indicate that proposed modifications would have fishway flow 98% of the time during the spring in-migration period and 88% of the time during the fall out-migration period. In addition, the deeper Reservoir will help equalize and balance long term temperature variability.

Restoration of fish passage into the Reservoir Dam impoundment and Tack Factory Pond would reestablish approximately 75 acres of pond for American eels and river herring. With reservoir levels at El. 40.4 ft., the median carrying capacity of herring is around 25,000 – 30,000 (EA 2013). The proposed Reservoir Dam water levels would also provide habitat upstream of Tack Factory Pond for blueback herring spawning.

The fishway exit channel would be reconstructed to allow fishway operation at lower reservoir levels for upstream and downstream fish passage. Removable weirs with adjustable crest heights would expand the operational range for fish passage. The removable weirs and the fixed concrete weirs on the lower portion of the fishway would be notched for downstream passage.

5.4.2 Plants

As discussed in DEIR Appendix D, The Project would increase the inundation of some Scrub Shrub Wetlands habitats. These impacted areas are currently dominated by Buttonbush, with the lower portions of the non-buttonbush dominated scrub shrub habitat are dominated by red maple saplings, alder, and sweet pepperbush, grading to red maple saplings and highbush blueberry. Buttonbush is capable of surviving the type of inundation expected to occur within these areas, but changes in inundation might result in changes in other plant communities, such as red maple saplings or alder. The ability of these species to survive in these areas would likely be diminished by the Project, but other species, such as swamp azalea, would likely benefit from the shift to increased and more frequent inundation associated with the Project.

Aside from these Scrub Shrub Wetlands areas, it is not expected that there will be any significant impacts to wetlands resources. While there will be some spatial changes in and near wetlands areas, significant changes in the functionality of these wetlands are not expected (DEIR Appendix D).

As discussed in Section 5.3, operational impacts of this project are not expected to change the functionality of wetlands serving as plant habitat. Therefore, no significant long-term impacts to plants are expected to be associated with this Project. Construction related dewatering and other construction activities could potentially result in minor short-term impacts to aquatic plants, but no significant permanent impacts are expected.

5.5 TRANSPORTATION RESOURCES

Raising the normal water level of Reservoir Pond by 1.5 ft. would not increase the risk of flooding along the section of Chief Justice Cushing Highway (State Route 3A) that runs between Tack Factory Pond and Reservoir Pond. Flood levels at CJCH with the proposed Project will be similar to existing flood levels as discussed in DEIR Appendix B. The proposed spillway modifications will provide flow control at Reservoir Dam that will limit flood levels to the existing conditions. Flood levels west of CJCH are controlled by the CJCH culvert. The proposed Project will not increase flood levels in Tack Factory Pond and at the CJCH culvert.

The proposed Project includes riprap slope protection along the portions of CJCH where the roadway embankment may be subject to erosion from wave action at the higher proposed normal pool level. The erosion protection is shown on Drawing C-118 in DEIR Appendix F.

Impacts to traffic on CJCH are expected during installation of riprap and improvements to existing stormwater management structures. These impacts will be minor and short-term. CJCH is a two-lane highway and staging for these activities will require closing one lane of traffic. Flaggers will direct traffic and traffic cones will be used to restrict traffic to one lane. Construction hours could be restricted in order to minimize traffic impacts if necessary. Due to the low levels traffic it is expected that impacts to local traffic would be minimal. The DOT Non-Vehicle Access Permit Application will be prepared after approval of the EIR.

5.6 LAND USE

All of the land at the proposed Project 1.5 ft higher normal pool is within the existing Water Supply Protection District (see Appendix F, Drawing C-103). The higher proposed Project normal pool would expand the 200 ft Water Supply Protection District and add approximately 23 acres of land to District buffer zone. All of the land at the proposed 1.5 ft higher normal pool is owned by the Town of Scituate except for 2.48 acres of residential property (Appendix C).

All of the land at the proposed normal pool shoreline including the private property is BVW or Bank similar to the existing conditions. No commercial or industrial areas are located adjacent to Tack Factory Pond or Reservoir Dam. The proposed Project would convert 338,925 sq. ft. of BVW to Bank (Appendix D). The Project will reduce the total Bank length by 169 LF of Bank and the total Riverfront Area by 108,623 sq. ft.

5.7 CLIMATE CHANGE AND RESILIENCY

There will be no operational greenhouse gas emissions as a result of this Project. Emissions associated with the Project will be limited to construction emissions, mitigated as discussed in Section 7.3.5.

Climate change is often characterized by higher temperatures and extreme, unpredictable weather. The increased potential for droughts coupled with increases in local population could increase gross municipal water consumption. This Project would add approximately 113 ac.-ft. of water to Reservoir Pond, increasing the volume of accessible surface water and raising groundwater levels. The propose Project will increase Scituate's resiliency to climate change impacts by securing a larger drinking water supply. This will mitigate increased demand during drought periods, which the EPA expects to become more severe during the summer months due to climate change (EPA 2016).

While droughts are expected to become more severe, the frequency and intensity of precipitation events are also increasing. Currently, the dam is considered high risk, and a higher number of such events may increase the likelihood of dam failure. The spillway redesign component of this project will potentially reduce this risk, positively impacting public safety and the security of Scituate's water supply.

River herring populations in Massachusetts have historically been negatively impacted by a number of factors, including dam construction, industrial pollution, increased predation, poaching, and the impacts of legal fishing such as bycatch, as discussed in section 5.2. Climate change is also impacting River herring populations along the eastern seaboard. Results of the National Oceanic and Atmospheric

Administration's National Marine Fisheries Service's Preliminary Analyses of the Effect of Climate Change on River Herring indicate that larger river herring populations will be more resistant to changes in environmental conditions associated with climate change (Nye et al. 2012). Habitat restoration resulting from this Project could result in significant, long-term, positive impacts on American river herring populations.

6.0 STATUTORY AND REGULATORY STANDARDS AND REQUIREMENTS

The applicable permits, variances, land transfers, and land-use restrictions with a summary of the current status of each application is identified in Table 6-1.

Table 6-1 Project Permit Requirements

Agency	Permit/Grant	Status
Scituate Conservation Commission	WPA Form 3 – NOI	Filed May 4, 2017
	WPA Form 3 – NOI Denial	Received August 10, 2017
Department of Environmental Protection (DEP)	Request for Superseding Order of Conditions (SOC)	Filed August 29, 2017
DEP	DEP SOC Determination Abeyance Letter	Received October 12, 2017
DEP	Wetlands Variance Request	Pending EIR approval
DEP	Chapter 91 RDA	Filed December 27, 2018 (see DEIR Appendix K)
DEP	Chapter 91 RDA Determination	Received January 28, 2019 (see DEIR Appendix K)
DEP	401 Water Quality Certification Application	Pending EIR approval
DEP	Chapter 91 Permit Application	Pending EIR approval
DEP	WMA Permit Amendment Application	Pending EIR approval
Department of Conservation and Recreation (DCR) Office of Dam Safety (ODS)	Dam Safety Permit Application	Pending EIR approval
	Draft Emergency Action Plan Update	Pending EIR approval
Department of Marine Fisheries (DMF)	Fishway Construction Permit	Pending EIR approval
Massachusetts Department of Transportation (MassDOT)	Non-Vehicle Access Permit Application	Pending EIR approval
United States Army Corps of Engineers (USACE)	Section 404 General Permit	Pending EIR approval
Scituate Selectmen	Access Easements	Pending EIR approval

The project does not meet the performance standards for impacts to BVW because it exceeds 5,000 square feet of alteration. The project also does not meet the performance standards for Bank because it exceeds impacts greater than 50 LF. The project therefore was denied by the Scituate Conservation Commission on July 19, 2017. A Request for SOC was submitted to the DEP on August 29, 2017. On October 12, 2017, the DEP sent a Determination Abeyance Letter delaying a determination until completion of the EIR. The project will require a variance to the WPA for the project modifications to maintain downstream habitat while meeting Scituate's water supply demand, and to restore fish passage

on First Herring Brook upstream of Reservoir Dam. The variance request will be filed after issuance of the DEP SOC Determination denying the project.

The DEP Jurisdictional Determination – Waterways Application Number JD19-5434 states that a portion of the proposed Project includes a waterway subject to jurisdiction under M.G.L. Chapter 91. Public funds were expended in the late 1960's for construction of the culvert under CJCH (Route 3A) connecting First Herring Brook non-tidal stream from Tack Factory Pond to the Reservoir Dam impoundment. Therefore, First Herring Brook, including Tack Factory Pond and the Reservoir Dam impoundment, is considered a non-tidal navigable waterway subject to Chapter 91 jurisdiction. The determination states that the proposed fishways are not subject to Chapter 91 jurisdiction, the proposed riprap erosion protection on the CJCH embankment may be subject to Chapter 91 jurisdiction, and the proposed spillway and earthen embankment riprap erosion protection is considered a new structure identified as a structure not subject to licensing. A Chapter 91 Permit Application will be filed after approval of the EIR.

Construction of the proposed Project will require a DEP BRP WW 10 Major Project 401 Water Quality Certification. This major fill/excavation certification applies since the Project has more than 5,000 square feet cumulative loss of BVW. The BRP WW 10 Application will be submitted after approval of the EIR.

The proposed Project modifications and operations will change the firm yield of the First Herring Brook water supply and will require a WMA Permit Amendment. A WMA Permit Amendment will be prepared after approval of the EIR.

Construction and operation of the proposed spillway and fishway modifications requires a Dam Safety Permit pursuant to M.G.L. Chapter 253. Any alteration to a dam requires a DCR ODS Dam Safety Permit. The Dam Safety Permit Application will be filed after approval of the EIR.

The proposed spillway modifications and operation of the spillway gate will require update of the Emergency Action Plan (EAP) pursuant to M.G.L. Chapter 253 and 302 CMR 10.00 for dams with a high hazard classification. The EAP for Reservoir Dam and Old Oaken Bucket will be updated to reflect the proposed Project after approval of the EIR.

The spillway and fishway modifications will require DMF Fishway Construction Permit. After approval of the EIR, a letter will be transmitted to DMF requesting a permit and submitting the final plans. DMF will coordinate review and approval of the project drawings with National Oceanic and Atmospheric Administration's National Marine Fisheries Service and USFWS. Construction will not be initiated until the permit is issued.

The proposed Project will require USACE Section 404 Permit since First Herring Brook is considered a navigable waterway. Section 404 of the Clean Water Act authorizes the USACE to regulate the discharge of dredged or fill material into waters of the United States. Section 9 of the Rivers and Harbors Act of 1899 authorizes the USACE to regulate construction of any dam or dike across navigable waters of the United States. Section 10 of the Rivers and Harbors Act of 1899 authorizes the USACE to regulate certain structures or work in or affecting navigable waters of the United States. During the DEIR review process, the USACE will be consulted to discuss the information in the DEIR to verify that the Project is authorized under a General Permit. The proposed spillway and fishway construction activities should qualify under General Permit 3 - Structures in Navigable Waterways, General Permit

14 - Temporary Construction, Access, and Dewatering, and General Permit 23 – Aquatic Habitat Restoration, Enhancement, and Establishment Activities. After approval of the EIR, a Preconstruction Notification (PCN) will be prepared and submitted as requested in the USACE comment letter on the ENF.

The Scituate DPW is currently negotiating easements with the landowners adjacent to the dam abutments for access to the dam for maintenance activities and construction of the proposed Project features.

7.0 MITIGATION MEASURES

7.1 POSITIVE LONG-TERM IMPACTS

The proposed Project modifications and operations will provide positive, long-term benefits for public safety and water supply, aquatic habitat, and fisheries in the First Herring Brook watershed.

The existing spillway at Reservoir Dam does not meet ODS dam safety standards. Reservoir Dam is classified as a high hazard dam, and the fixed crest spillway does not have the discharge capacity (SDF) that meets the ½ PMP storm event. The existing dam embankment would be overtopped during a ½ PMP storm, which could result in dam failure. The proposed Project will provide a SDF with adequate freeboard. The proposed spillway gate will allow the Town to lower water levels in anticipation of storm events and manage releases from Reservoir Dam to minimize downstream flood levels.

The WEAP model indicates a firm yield of the existing Scituate reservoir system of 0.77 MGD prior to implementation of the IOP in 2011. The model indicates the firm yield of the reservoir to drop to 0.36 MGD under current IOP which includes water bans, flow releases and current storage volumes. Increases in storage by raising the Reservoir Dam normal pool by 1.5 feet with similar water bans and flow releases as the IOP increases the firm yield of the reservoir to 0.46 MGD and the safe yield of the Scituate water supply system to 1.46 MGD including the Town's wells. Better management of streamflow. Installation of the spillway gate with automatic controls allows the Town to store water following storm events and minimize spilled water when the Reservoir is full.

The Project operations will provide an additional 37 MGY (113 ac-ft/year) of storage, approximately 25 days of water supply at an average annual daily rate of 1.5 MGD. The proposed Project will deliver adequate water to supply the Town's needs during droughts with a Reservoir storage buffer of 60 MG. Total Outdoor Water Bans would be limited to an average of 8-12 summer days per year and an average of 67-80% of years would have no summer days under a Total Outdoor Water Ban.

The proposed Project includes measures to protect water quality. These improvements include erosion protection along CJCH, septic system upgrades, and a bioswale treatment system on Sherman Drive stormwater system. The proposed higher normal pool in Reservoir Dam would be contained within Town owned land except for twelve private properties with a total of 2.48 acres area. All of the private property impacted areas are within the 200 ft Water Supply Protection District in areas classified as BVW above the MAFL which defines the lower limit of BVW. These areas are currently submerged during storm events when the spillway crest is overtopped with a full reservoir.

The low point in CJCH is El. 42.4 ft and there would 2 ft of freeboard at proposed normal pool level. The proposed Project would incorporate riprap slope protection in areas along the CJCH road embankment subjected to potential erosion with the 1.5 ft higher normal pool.

The 1.5 ft higher normal pool level would increase groundwater elevations at three properties on CJCH adjacent to the Reservoir Dam impoundment and Tack Factory Pond. Groundwater levels at #401 CJCH, #436, and #439 CJCH with the proposed project are expected to be similar to the existing groundwater levels during flood conditions and would be just below the ground surface. The proposed Project would include upgrade of the wastewater treatment system at #401 CJCH and monitoring of the groundwater levels at #401 CJCH, #439 CJCH, and #436 CJCH.

The stormwater catch basin in the center of the cul-de-sac on Sherman Drive that has an outlet pipe terminating in a drainage ditch extending from the street to the northwest and the impoundment. The proposed Project will include cleaning of the outlet pipe of the catch basin and construction of a bioswale in the location of the drainage ditch.

The proposed Project modifications and operations would improve the aquatic habitat in First Herring Brook. The WEAP model indicates that zero streamflow would be expected for less than 1% of days and would meet seasonal BioQ90 flow release goals 79-100% of days.

Modifications to the spillway and fishway at Reservoir Dam are intended to restore river herring and eel habitat in the First Herring Brook in and above the Reservoir Dam impoundment. The WEAP model indicates that seasonal fish ladder success with the proposed Project will range 82-98% at Reservoir Dam and Old Oaken Bucket. In the current dam configuration, the Reservoir ladder remains structurally inoperable and the Old Oaken Bucket Pond fish ladder continues to have lower success during the fall outmigration period (66% successful fall days).

Restoration of fish passage into the Reservoir Dam impoundment and Tack Factory Pond would reestablish approximately 75 acres of pond for American eels and river herring. With reservoir levels at El. 40.4 ft., the median carrying capacity of herring is around 25,000 – 30,000 based on the 2013 Feasibility Study. The proposed Reservoir Dam water levels would also provide habitat upstream of Tack Factory Pond for blueback herring spawning.

The proposed Project operations will produce minimal amounts of greenhouse gases (GHGs). Minimal power would be necessary to operate the spillway gate and fishway adjustable baffles and is expected to be less than 8,000 kWh/year. The proposed Project falls under the *de minimis* exemption for the MEPA GHG Policy as stated in the ENF Certificate # 15711.

This Project would add approximately 113 ac.-ft. of water to Reservoir Pond, increasing the volume of accessible surface water and raising groundwater levels. This additional storage volume will increase Scituate's resiliency to climate change impacts of higher drinking water supply demand during drought periods, which the EPA expects to become more severe during the summer months due to climate change (EPA 2016).

While droughts are expected to become more severe, the frequency and intensity of precipitation events are also increasing. Currently, the dam is considered high risk, and a higher number of such events may increase the likelihood of dam failure. The spillway redesign component of this project will potentially reduce this risk, positively impacting public safety and the security of Scituate's water supply.

Climate change is also impacting River herring populations along the eastern seaboard. Results of National Oceanic and Atmospheric Administration's National Marine Fisheries Service's Preliminary Analyses of the Effect of Climate Change on River Herring indicate that larger river herring populations will be more resistant to changes in environmental conditions associated with climate change (Nye et al. 2012). Habitat restoration resulting from this Project would result in significant, long-term, positive impacts on river herring populations.

7.2 LONG-TERM MITIGATION MEASURES

7.2.1 Public Safety

The spillway modifications would add discharge capacity reducing the risk of dam embankment overtopping and failure. Operation of the spillway gate would allow controlled releases in anticipation of flood events which would reduce the risk for downstream flooding of property and the water treatment plant, and overtopping of Country Way.

The proposed Project includes a security fence around the spillway and fishway exit channel adjustable baffles to prevent public access to the equipment. Security cameras will be strategically positioned to allow the Project to be monitored by operating personnel at the Water Treatment Plant.

A pedestrian bridge will be installed across the spillway and fishway exit channel outside of the security fence to allow safe public access across the dam. There is no public access across the existing spillway.

7.2.2 Water Supply

The proposed Project provides additional storage and incorporates protection measures for the Town's water supply. The water level monitoring system allows operation the spillway gate, fishway, and low-level outlet to better manage flow releases assuring water availability during drought conditions. The proposed Project operations results in fewer total water ban days and provides 45 days of storage capacity at a 1.5 MGD for emergency use during extreme drought conditions.

The proposed Project includes measures to protect the water quality in Reservoir Dam. The 200 ft Water Supply Protection District buffer zone would be expanded by approximately 23 acres of land to reflect the higher normal pool level. Upgrade and monitoring of the wastewater treatment system for the properties on CJCH at the reservoir shoreline and installation of erosion protection along CJCH will reduce the potential for future water quality issues.

One wastewater treatment system will be upgraded to meet the groundwater separation regulations and groundwater levels at three properties with wastewater treatment systems close the reservoir shoreline will be monitored to verify groundwater separation remains in conformance with the regulations.

To prevent erosion of the highway embankment, approximately 300 LF and 80 LF of stone riprap would be installed along the northeast and southeast sides of the CJCH highway, respectively. Existing stormwater management along the highway consists of about 20 catch basins on each side of the highway, spaced apart by 100 to 150 ft. The proposed 1.5 ft. higher reservoir levels will not impact the existing stormwater management system on CJCH.

The stormwater system on Sherman Drive will be upgraded to comply with the stormwater regulations. The catch basin at the end of Sherman Drive currently drains to the Reservoir and does not function properly. An oil/grit separator and bioswale will be installed to replace this catch basin to retain and filter water entering the reservoir.

7.2.3 Instream Aquatic Habitat

The proposed Project and operations allow BioQ90 seasonal aquatic habitat releases from Reservoir Dam. These releases improve the aquatic habitat in First Herring Brook between Reservoir Dam and Old

Oaken Bucket and downstream of Old Oaken Bucket. The minimum aquatic habitat flow goals would be met for 98% of time with the proposed operations.

The additional storage and Project operations result in higher Reservoir Dam impoundment levels during drought conditions increasing aquatic habitat in Reservoir Dam. The fishway modifications add alewife spawning habitat and American eel habitat in Reservoir Dam and Tack Factory Pond.

7.2.4 Fish Passage

The fishway modifications restores passage of alewife, blueback herring, American eel, and other riverine species upstream of Reservoir Dam. The fishway exit channel modifications and removable weirs with adjustable crests would allow fish passage over the entire range of reservoir levels. The stream channel downstream of the spillway would be reconfigured with channels and pools with sufficient depth for fish passage to the fishway entrance. The fishway weirs would have notches for downstream fish passage with a minimal amount of flow.

Effective fish passage at Reservoir Dam would be expected 98% of the time during the spring in-migration and 88% of the time during the fall out-migration. Effective fish passage at Old Oaken Bucket would be expected 97% of the time during the spring in-migration and 82% of the time during the fall out-migration.

The eel ladder will allow upstream eel migration into Reservoir Dam and Tack Factory Pond over the range of reservoir levels and First Herring Brook flows which has not been possible with the existing spillway.

7.2.5 Greenhouse Gases

The proposed Project requires minimal power to operate the spillway gate and fishway adjustable baffles. The only GHG emissions would be associated with construction equipment. Therefore, the proposed Project falls under the *de minimis* exemption for the MEPA GHG Policy and does not require a GHG analysis as stated in the ENF Certificate #15711. Mitigation measures relative to GHG emissions are discussed in Section 7.3.5.

7.2.6 Climate Change Resiliency

The higher normal pool level with the proposed Project provides an additional 37 MG of water storage or 25 days of water supply at an average of 1.5 MGD. In addition, the proposed Project operations would provide a minimum of 60 MG of water supply storage for emergency use during drought conditions. The additional storage and proposed operations would increase the resiliency of the Town's public water supply during extreme heat conditions expected with climate change.

The proposed spillway with the bottom drop gate would be designed for the ½ PMF design storm without overtopping the dam embankment. Flood levels at CJCH for the design storm with the proposed spillway would be lower than the flood levels with the existing spillway. The CJCH would be overtopped during the design storm with the existing spillway and the proposed spillway. However, the spillway gate would allow water levels in Reservoir Dam to be lowered in anticipation of storm events which are expected to be more frequent with climate change. Managing the Reservoir level would minimize flooding at CJCH and downstream of Reservoir Dam.

7.3 CONSTRUCTION MITIGATION MEASURES

Construction techniques of the proposed Project features will be employed and sequenced to avoid, minimize, and mitigate short-term impacts on the water supply, abutting properties, and CJCH.

7.3.1 Water Supply

Water levels in Reservoir Dam will be maintained as high as possible during construction to retain storage capacity for the Town's water supply. The spillway and fishway construction area will be isolated from the Reservoir with a cofferdam. The cofferdam top elevation is expected to be El. 36.0 ft, approximately 3 ft below the existing normal pool level. Streamflow and water stored behind cofferdam will be conveyed downstream to the First Herring Brook and the water treatment plant through the low-level outlet from Reservoir Dam.

During construction, the IOP BioQ90 flows will be released to maximum extent possible. The DER gages at Eisenhower Road and Country Way will be used to monitor streamflow. Water supply demand will take precedence over BioQ90 and fishway flows during construction because of the reduced storage during construction. First Herring Brook flow will only be released to meet the water supply demand unless streamflow is greater the demand and water levels are at the maximum height for the cofferdam. BioQ90 and fishway flows will be limited to the streamflow greater than water supply demand.

The Town may implement a complete outside watering ban during construction to reserve available storage for drinking water supply. In addition, the Town may investigate arrangements with adjacent towns to obtain additional drinking water supply if drought conditions are expected during construction.

7.3.2 Wetlands Resources

The construction specification will require the contractor to utilize erosion and sediment control measures to manage runoff from the construction areas. These measures will include silt fences, turbidity curtains, and a retention ponds. A turbidity curtain will be deployed in the Reservoir around the spillway and fishway to minimize impacts on water quality from installation of the upstream cofferdam. Another turbidity curtain will be placed across First Herring Brook downstream of Reservoir Dam. This turbidity curtain will be connected the silt curtain that will be installed around the entire construction area downstream of dam.

A timber bridge will be installed over First Herring Brook to access the construction area on east side of the spillway from the west abutment of the dam. Construction vehicles will be required to use the bridge to minimize disturbance to brook. The bridge will be located upstream of the turbidity curtain.

At construction completion, wetlands vegetation will be planted on the disturbed stream banks to restore the wetlands along First Herring Brook.

7.3.3 Reservoir Dam Dewatering and Water Control

Demolition of the spillway and fishway exit channel will be performed in the dry behind a cofferdam. Dewatering pumps will be installed in the Reservoir to lower the water level below the base of the cofferdam. The cofferdam will be installed in the Reservoir around the excavation area inside the turbidity curtain and the existing low-level outlet pipe extended beyond the cofferdam. The cofferdam height will be designed to maximize water supply storage in the Reservoir. Dewatering pumps will be sized for 500 cfs which is capacity of the CJCH culvert without overtopping road surface. The

dewatering pumps will be upstream of the cofferdam and will discharge clean water to First Herring Brook downstream of the construction area. Sumps installed downstream of the cofferdam will collect stormwater for pumping to sediment control ponds or tanks.

The existing low-level outlet pipe and valve will be used during construction to convey First Herring Brook streamflow and Reservoir Dam storage to Old Oaken Bucket for water supply. The large dewatering pumps will be operated to convey streamflow greater than low-level outlet capacity through the construction area. The dewatering pumps will also be used if necessary to drawdown the reservoir for additional storage upstream of cofferdam in anticipation of rainfall events.

7.3.4 Traffic Management

The construction specifications will require the CJCH embankment erosion protection to be installed during off-peak traffic periods. A one-way traffic pattern with a police detail will be part of the construction contractor's scope. Placement of the erosion protection is expected to have a one week duration.

The primary access to the dam is via Sherman Drive. Construction vehicles and equipment will be required to park on the dam abutments and will not be allowed to park on Sherman Drive. Construction crew personal vehicles will be requested to park in areas that will not block access to private property along Sherman Drive.

7.3.5 Solid and Hazardous Waste

Excavated earthen material will be temporarily stockpiled on-site and used to reconstruct the dam embankment. Excess excavation material and concrete demolition material will be transported off-site to an approved disposal facilities.

Construction specifications will include mitigation measures to minimize GHG emissions, other air pollutants, and water pollutants. The measures will include: idling limitations for all construction vehicles and machinery; use of biofuels and other fuel sources; and on-site fueling limitations in construction areas close to First Herring Brook.

7.3.6 Stormwater Management

Retention ponds and sediment separation tanks will be used for the stormwater collected in the construction and excavation areas. The sediment ponds and tanks will be located downstream of the dam embankment. Sump pumps will be positioned at low points in the excavation areas with discharge hoses routed to the ponds and tanks. The stormwater discharge management equipment will be monitored daily. Sediment will be removed, tested, and disposed of at a landfill approved for the material.

Excavated earthen material from the dam will be stockpiled on the east dam abutment for reuse. The stockpiles will be covered with tarps to minimize erosion and encompassed by a silt fence to contain sediment.

8.0 PROPOSED SECTION 61 FINDINGS

This section provides a concise summary of the mitigation and environmental benefits of the proposed Project as required by the Secretary's Certificate on the ENF. A draft of the proposed Section 61 Findings is provided in accordance with M.G.L. c. 30, Section 61 for each Agency Action to be taken on the Project. As discussed in Section 1.3, the following permits will be submitted after approval of the Final EIR:

- Department of Environmental Protection (DEP):
  - Wetlands Protection Act (WPA) Variance;
  - Chapter 91 Permit Application;
  - 401 Water Quality Certification Application; and
  - WMA Permit Amendment Application;
- Department of Conservation and Recreation (DCR) Office of Dam Safety (ODS):
  - Dam Safety Permit Application; and
  - Draft Emergency Action Plan Update;
- Department of Marine Fisheries (DMF):
  - Fishway Construction Permit; and
- Massachusetts Department of Transportation (MassDOT):
  - Non-Vehicle Access Permit Application.

A summary of the proposed mitigation measures for the potential impacts of the Project are presented in Table 8-1. Draft Chapter 61 Findings are provided in Appendix L to this DEIR.

The proposed Project will not result in any significant negative environmental impacts. Construction will include sediment and erosion control measures as required by state and federal regulations. Traffic impacts on CJCH will be minimized by scheduling activities along CJCH during off-peak traffic periods. The wetlands resource areas will continue to function with proposed Project features and operations similar to the existing project.

Changes in the spillway and fish passage structures, and the reservoir normal pool level will result in long-term positive impacts to the environment and the security of Scituate's water supply, while impacts from construction activities will be minimal and short-term.

Table 8-1 Summary of Proposed Mitigation Measures

Category	Impact	Mitigation Measures
Wetlands and Wetland Buffer Areas	Minor changes in boundaries and classifications of wetland areas.	Mitigations measures are not anticipated because the functionality of the wetlands resource areas will be maintained with the higher proposed normal pool levels. Conditions identified as part of the DEP's Wetlands Variance Request process will be incorporated into the Final Construction Documents.
Outstanding Water Resource	Construction activities within Reservoir Dam impoundment.	The Chapter 91 RDA requires submittal of an application for a Chapter 91 License for work in and adjacent to Reservoir Dam impoundment. Oversight of construction activities will be provided to ensure that no adverse impacts occur as a result of the construction. Water management control measures will be implemented during construction to maintain instream flow releases and fish passage at Old Oaken Bucket to the maximum extent possible.
Water Supply Protection	Construction activities within Reservoir Dam impoundment.	An application for a 401 Water Quality Certification will be submitted. Oversight of construction activities will be provided to ensure that no adverse impacts occur as a result of the construction. The construction contractor would utilize BMPs for erosion, sedimentation, and runoff discharge, such as silk curtains, turbidity curtains, and retention systems for stormwater runoff from the construction area.
Water Supply Protection	Water quality impacts with higher normal pool levels	The proposed Project will include the following measures to protect the Town's water supply: • Erosion protection along CJCH • Upgrades of septic systems on CJCH • Construction of a bioswale system for the Sherman Drive stormwater system

Category	Impact	Mitigation Measures
Water Management Act	Change in First Herring Brook water supply firm yield	A WMA Permit amendment application will be submitted firm the revised firm yield for First Herring Brook water supply with the proposed Project features and operations
Dam Safety	Modification of dam structures	An application for a Dam Safety Permit will be submitted to the ODS. The proposed changes in dam structure will increase the spillway discharge capacity to be in compliance with Dam Safety Regulations and will increase freeboard on the embankment during the spillway design flood.
Dam Safety	Changes in flood levels	The Reservoir Dam Emergency Action Plan will be updated to reflect the hydrologic and hydraulic analysis with the proposed spillway modifications. Proposed changes to the spillway structure at Reservoir Dam will reduce the risk of dam failure. Addition of the spillway gate will allow controlled releases in anticipation of storms and during flood conditions. Proposed spillway operation will reduce flood levels upstream of Reservoir Dam and provide adequate freeboard at the dam embankment.
Wildlife Habitat	Fishway modification and Eelway construction	An application for a Fishway Construction permit will be submitted to DMF. The proposed changes to the fishway and spillway structures will restore river herring and American eel migration in First Herring Brook upstream of Reservoir Dam. Construction of these structures will be sequenced, and water management control measures implemented to minimize impacts on the instream habitat and fish passage at Old Oaken Bucket.
Transportation	Partial closure of CJCH.	A Non-Vehicle Access Permit will be submitted to the DOT. Proposed construction activities at CJCH (riprap installation) will be scheduled to

Category	Impact	Mitigation Measures
		avoid periods of peak automotive traffic along the highway.
Transportation	Changes in maximum water elevations in Reservoir Dam and Tack Factory Pond.	To prevent erosion of the highway embankment, approximately 300 LF and 80 LF of stone riprap would be installed along the northeast and southeast sides of the CJCH highway, respectively.

9.0 RESPONSE TO COMMENTS

This section includes the comments and responses to each of the relevant comments received by the Secretary and is separated by commenter. Some comments have been shortened or reworked to allow them to be addressed easily. Every comment received has been addressed here or in a portion of the main text or an appendix.

9.1 MEPA COMMENTS

> ***Comment #1:*** *The DEIR should include updated site plans for existing and proposed conditions, a detailed description of the proposed project (including improvements proposed at Tack Factory Pond), and describe any changes to the project since the filing of the ENF.*
>
> *The project description should include: a project history, a description of the overall project scope (including work at Tack Factory Pond), a discussion of key planning initiatives and reports completed to date regarding water supply planning and fish passage improvements, and identify project objectives and goals.*

Response: The project scope, key planning initiatives, past reports, and project objectives and goals are discussed in Section 1 of the DEIR.

> ***Comment #2:*** *The DEIR should briefly describe each Federal, State, and local permit or agency action required or potentially required for the project, and should demonstrate that the project can meet applicable performance standards.*
>
> *The DEIR should contain sufficient information to allow the permitting agencies to understand the environmental consequences of their actions related to the project.*

Response: Descriptions of permits and agency actions required or potentially required for this Project are provided in section 6.0. An assessment of environmental impacts associated with the Project is provided in Section 5 and Appendix D-the Wetlands Vegetation Study.

> ***Comment #3:*** *In accordance with section 11.01(3)(a) of the MEPA regulations, the DEIR should discuss the consistency of the project with any applicable local or regional land use plans.*

Response: The project is consistent with local and regional land use plans that identify the needs of managing public water supply need and to balance anthropogenic water demand with overall habitat needs.

> ***Comment #4:*** *To provide a full and self-contained description and analysis of the project for the MEPA record, the DEIR should include a summary of each of these studies [Preliminary Assessment Report, Feasibility Report, and Final Preliminary Design Memorandum], provide electronic copies as appendices, and identify how review of hydraulic modeling results and the project alternatives evaluated in each study helped inform the design parameters and selection of the Preferred Alternative. It should*

provide additional narrative to explain and support the analysis of the project's impacts and mitigation, and extract relevant documentation and tables from these studies to supplement the narrative.

To provide context and support the selection of a Preferred Alternative, the DEIR should include an expanded alternatives analysis that summarizes the potential environmental impacts associated with Options A-E and compares these to the Preferred Alternative in a narrative and in a tabular format. The DEIR should identify each alternative's impacts on wetland resource areas and public and private infrastructure (Route 3A, private property shoreline, residences, sewer infrastructure, stormwater infrastructure, etc.).

The Alternatives Analysis should examine alternatives to balance the public water supply, flood control, storm damage prevention, wildlife habitat, and fish passage needs. The DEIR should include a narrative and modeling data to support the Proponent's adoption (or dismissal) of various operational scenarios as a feasibly measure to avoid, minimize, or mitigate Damage to the Environment.

Response: Discussions of various operational scenarios, including details of the proposed Project as well as dismissed alternatives, are provided in Sections 2 and 3, respectively. Detailed analysis of these alternatives is also presented in Appendix A.

***Comment #5:** Operating scenarios should evaluate the impacts of various target flow releases for fish passages and varying triggers for implementing the total water ban and curtailment of flow releases. The DEIR should identify the impact that each operating scenario will have on fish passage requirements, water storage capacity, the number of days a watering ban is enforced, and the number of days that releases are shut-off.*

Response: Detailed discussion of these aspects of each operating scenario are presented in the 2018 WEAP Model, presented as Appendix A.

***Comment #6:** The Alternatives Analysis should include a clear comparison, quantified to the extent possible, of the impacts of each alternative in a tabular format with supporting narrative. This analysis should be used to support identification of the Preferred Alternative (and operating scenario) that balances water demand with stream flow requirements and demonstrates that the project avoids, minimizes, and mitigates impacts to the maximum extent feasible.*

Response: Detailed discussion of these aspects of each operating scenario are presented in the 2018 WEAP Model, presented as Appendix A.

***Comment #7:** The DEIR must expand upon the Preferred Alternative to identify how it can meet the regulatory criteria to be granted a 401 WQC, Variance, and WMA Permit amendment.*

Response: The DEP Wetlands Variance Request, DEP Section 401 Water Quality Certification Application, and WMA Permit Amendment Application will be prepared and submitted after approval of the FEIR. Section 6.0 details the Project's compliance with regulatory criteria.

***Comment #8:** The DEIR should also evaluate alternatives to mitigate the loss of BVW and other alteration due to increased inundation of wetlands. The DEIR should address this issue in detail, evaluate the consistency of the proposed project with 401 WQC and*

Variance criteria, and ensure that the Alternatives Analysis supports evaluation of project impacts by Mass DEP.

Response: The existing wetlands resources and impacts to wetlands, such as loss of BVW, are discussed in Section 4.3 Section 5.3, respectively, of the DEIR. The Wetlands Vegetation Study, provided as Appendix D, provides additional discussion of wetland impacts.

Comment #9: *Demonstration that the project can satisfy associated regulatory requirements and meet criteria for a Variance is a primary focus for MEPA review and, in particular, the focus of the DEIR.*

The DEIR should discuss steps the Proponent will take to further reduce the impacts of the project since the filing of the ENF, or, if certain measures are infeasible, the DEIR should discuss why these measures will not be adopted.

Response: The Project's compliance with regulatory requirements is detailed in Section 6.0 with mitigation measures discussed in Section 7.0 of the DEIR. The DEP Wetlands Variance Request will be prepared and submitted after approval of the FEIR and receipt of DEP's Determination on the Town's Request for Superseding Order of Conditions on the WPA Form 3 Denial.

Comment #10: *To provide additional context for the project, the DEIR should describe groundwater and surface water conditions of the Town's water supply system and the reservoir's role in the Town's water supply system. It should include a summary of the water withdrawal permits, registrations, and emergency authorizations and identify any relevant permit conditions.*

The DEIR should clearly specify the present and projected future demands on the Town's water supply system that may be a factor in the development of this project. The benefits of this project may be diminished over time if new water demands are not offset with conservation measures.

The DEIR should identify measures the Town has implemented or is exploring to stabilize the long term water demand. This should include, but not be limited to, implementation of a Water Conservation Plan and/or implementation of a water banking program.

The DEIR should also identify other methods that were evaluated to address the Town's water needs either through reducing demand or providing additional storage (i.e. implementation of water restrictions, leak detection and pipe replacement, zoning or bylaw controls limiting new connections, dredging the reservoir to provide additional storage, and/or utilizing alternative water sources or interconnections).

Response: Discussion of the Town's water supply both for groundwater and surface conditions is provided in Sections 2.1 and 2.2. Alternatives for storage such as dredging are discussed in Section 3.4.

Comment #11: *The DEIR should include a copy of the current IOP and describe how the reservoir is currently operated to meet the Town's water demands.*

The DEIR should identify the target flow releases from the reservoir and any other changes to the operation of the reservoir (including, but not limited to, modifying the triggers for the total water ban on nonessential outdoor water use and/or curtailment of

flow releases). It should clarify whether the IOP will be updated to reflect these changes, and if so, should include a draft updated IOP or identify the schedule for its development.

Response: Target flow releases, modifications and water restriction triggers is discussed in detail in Section 2.1.9 and Appendix A of the DEIR. The IOP will be updated to reflect the new proposed operations and a DFOP is provided as Appendix I of the DEIR. A streamflow advisory tool was developed as part of the adaptive management plan to monitor conditions in the Reservoir and is provided in DEIR Appendix J.

Comment #12: *The project will require an amendment to the Town's Water Management Act (WMA) Permit.*

The DEIR should evaluate the firm yield of the reservoir based on the proposed operation of the Preferred Alternative. Based on the results of this analysis, the DEIR should discuss whether resulting changes to the firm yield for the reservoir system will impact the Town's ability to meet future water needs or anticipate peak seasonal or peak day demands. The Proponent should consult with MassDEP prior to preparing this analysis.

Response: See response to Comment #68.

Comment #13: *The DEIR should estimate the percentage of time that flow releases will be shut off and the number of days and level of outdoor water use restrictions that will be implemented under the Preferred Alternative.*

Response: The WEAP model estimates that instream flow release goals are met with less than 1% of days having no streamflow (4 days). As part to the adaptive management plan for implementation of the IOP, the NSRWA/MassBays developed a Streamflow Advisory Tool to monitor the conditions in Reservoir Dam and adjust streamflow releases to meet the Town's water demand throughout the summer and drought conditions. Based on modeling it is expected that there will be 12 days per year of complete water ban.

Comment #14: *The DEIR should discuss the project's consistency with the goals of SWMI.*

Response: The project is consistent with the goals of the Sustainable Water Management Initiative (SWMI). The whole focus of the project is to supply a balanced sustainable water supply with minimal environmental consequences. It should be noted that the studies for implanting this project have been funded by a number of SWMI grants.

Comment #15: *The DEIR should describe the process for seeking a Variance and address how the project meets the criteria for a Variance provided in 310 CMR 10.05(10), including:*

- *There are no reasonable conditions or alternatives that would allow the project to proceed in compliance with regulations;*
- *Mitigating measures are proposed that will allow the project to be conditioned so as to contribute to the protection of the interests identified in M.G.L. c. 131 § 40; and*
- *That the variance is necessary to accommodate an overriding community, regional, state, or national public interest.*

Response: Once the Secretary approves the FEIR, the Town anticipates DEP denial of the Request for Superseding Order of Conditions to the Massachusetts Wetlands Protection Act (WPA) after which the Town will file a Variance Request. Once the DEP grants the variance, the Project design and draft permit applications will be revised to address the conditions defined in the variance. Additional discussion is provided in Section 2.3.

Comment #16: *To address the overriding public interest, the DEIR should comment the needs to provide additional water storage in the Scituate reservoir to meet water supply needs. Specifically, it should document the current use, projected demand, water conservation efforts, storage needed to comply with permit requirements, and the impact of the project on the firm yield of the Scituate Reservoir system. The DEIR should specifically identify and quantify the public water supply and environmental benefits expected from the project.*

Response: Section 2, the WEAP Modeling Update (DEIR Appendix A) and the Draft Final Operations Plan (DEIR Appendix I) discuss in detail the water supply needs, projected demand and water conservation efforts. Refer to the response regarding firm yield in Comment #68.

Comment #17: *The DEIR should quantify the change in wetland type from forested wetland and shrub swamp to open water and other wetland types.*

Response: Changes in wetland type are summarized in section 5.3 of the DEIR. A detailed discussion of potential wetlands impacts is provided in the Wetlands Vegetation Study, Appendix D of the DEIR.

Comment #18: *The DEIR should confirm the presence of wetland resources areas, characterize them, and estimate potential impacts. Impact calculations should be provided in a tabular format with a supporting narrative. The evaluation should assume complete inundation by the proposed new normal pool elevation and compare that to the wetland types that currently exist with the current normal pool elevation. I refer the Proponent to MassDEP's comment letter which provides additional guidance on this analysis.*

Response: Existing wetlands are summarized in section 4.3 of the DEIR. A detailed discussion of existing is provided in the Wetlands Vegetation Study, Appendix D of the DEIR. A discussion of potential impacts is provided in Section 5.3 of the DEIR, with further discussion provided in DEIR Appendix D.

Comment #19: *The DEIR should demonstrate compliance with the 401 WQC regulations and identify measures to avoid, minimize, and then mitigate the project's direct, indirect, and cumulative impacts.*

Response: A DEP Section 401 Water Quality Permit Application will be filed upon completion of the MEPA process and during final design based on any additional comments and recommendations received.

Comment #20: *The DEIR should include plans depicting and quantifying any compensatory flood storage and wetland replication areas and should describe how altered wetlands functions will be restored.*

Response: Flood storage will not change as a result of this project. The system currently accommodates flood storage and the 100-year storm event. Wetland changes are discussed in DEIR Appendix D.

Comment #21*: The DEIR should evaluate potential flood level increases during the 100-year flood, provide supporting hydrogeological and hydraulic analyses, and propose measures to avoid, minimize, and mitigate and identified impacts.*

Response: See Response to Comment #20.

Comment #22: *[S]ite plans provided with the ENF reference a FEMA map (Map No. 25023C0117J, dated July 17, 2012) that may be out of date. Site plans, impact analysis, and hydraulic modeling provided with the DEIR should reflect the revised FEMA mapping.*

Response: There have been no changes to the FEMA mapping in the area of the project, as the area is not influenced by sea level rise and ample acreage is currently available for flood storage

Comment #23: *Comments from the EPA note the gate at Tack Factory Pond may require modification to avoid upstream flooding impacts. The DEIR should address this concern and describe any work proposed at the Tack Factory Pond gate.*

Response: Modification to the Tack Factory Pond gate weir structure are proposed to facilitate access to the gate operators. as discussed in Section 2 and shown on Drawing C-119 in DEIR Appendix F. The only change to the gates will be installation of a low-flow notch in the south gate to allow fish passage during the fall outmigration as discussed in Section 2.1.3.

Comment #24: *The DEIR should identify work activities and associated impacts to wetland resource areas that will be subject to ACOE review. I refer the Proponent to comments from the ACOE which provide guidance on this issue.*

Response: This comment is addressed in responses to ACOE comments #48 - #61.

Comment #25: *The DEIR should identify applicable ACOE performance standards and regulations to assist in determining the potential overlap or conflict with State wetland permitting requirements.*

Response: See responses to ACOE comments #48 - #61 below.

Comment #27: *The DEIR should include narrative and supporting data or graphics as necessary to demonstrate that the project can meet all applicable performance standards and regulations.*

Response: The DEIR demonstrates that the project meets all applicable performance standards and regulations.

Comment #28*: The DIER should quantify and describe the proposed fill and its impact on the horizontal and vertical extent of the 100-year flood.*

Response: The horizontal extent of changes to the spillway and fishway will be minimal. The vertical change in the spillway crest and installation of the bottom hinged gate will reduce the 100-year flood level in Reservoir Dam as discussed in DEIR Appendix B. The current FEMA 100-year flood level is El. 42.0 ft in Reservoir Dam and El. 44.0 ft in Tack Factory Pond. The hydrologic and hydraulic analysis presented in DEIR Appendix B indicates that the 100-year flood level in Reservoir Dam is El. 43.6 ft with the existing spillway and El. 41.0 ft with the proposed spillway modifications and gate operation. The 100-year flood levels in Tack Factory Pond would be El. 44.0 ft with existing spillway and El. 43.7 ft with the proposed spillway.

Comment #29: *I refer the Proponent to comments from the MassDEP which indicate the project must submit a Conditional Letter of Map Revision (CLOMR) or a Letter of Map Revision (LOMR) to FEMA to address the increase in flooding. The DEIR should provide an update on this process. It should clarify whether the increase to the flood elevation will extend onto properties not owned or controlled by the Town of Scituate and identify whether flood easements will be required.*

Response: See Response to Comment #76.

Comment #30: *The Proponent should file a Request for Determination of Applicability with MassDEP prior to submittal of the DEIR to determine the jurisdictional status of the waterways. If the waterways are subject to c.91 jurisdiction, the DEIR should include the information identified in the MassDEP's comment letter to facilitate their determination as to whether the project requires a c.91 License or Permit.*

Response: The Chapter 91 RDA and the DEP Determination is included as Appendix K of the DEIR. The DEP has determined that the Project is subject to Chapter 91 jurisdiction. A Chapter 91 Permit Application will be prepared and submitted after approval of the FEIR.

Comment #31*: Comments from MassDEP indicate that the project may qualify as a redevelopment project for purposes of applying the Stormwater Management Standards (SMS). The DEIR should describe the proposed stormwater management improvements, including connection points to off-site stormwater conveyance infrastructure and BMPs. It should provide supporting documentation or data to demonstrate that the stormwater management infrastructure will be designed in compliance with the SMS to the maximum extent practicable. This can include stormwater management system plans and calculations regarding the water quality volume, infiltration volume, total suspended solids (TSS) removal, and peak rates of runoff for pre- and post- development conditions. I refer the Proponent to comments from MassDEP that identify concerns regarding*

stormwater discharges to the reservoir from the drainage system located on the Route 3A causeway.

Response: Since CJCH is a State Highway under DOT jurisdiction, Scituate does not have any authority to address stormwater discharges from CJCH, and therefore, stormwater control measures from CJCH are not included in this Project. The Project does include upgrade of the stormwater system on Sherman Drive as discussed in Section 7.2.2 and shown on Drawing C-117 in DEIR Appendix F.

Comment #32: *I encourage MassDOT to work collaboratively with the Proponent to identify opportunities to improve stormwater infrastructure on Route 3A because it discharges directly into the reservoir, which is an ORW and Zone A drinking water supply area.*

Response: See Response to Comment #31.

Comment #33: *The project will require a Fishway Construction Permit from DMF.*

Response: A Fishway Construction Permit will be submitted upon completion of the MEPA process and incorporation of comments into the final design.

Comment #34: *The DEIR should provide more information on proposed water control and silt containment measures that will be used during the summer and fall seasons. DMF recommends a time of year (TOY) restriction for any in-water work from March 1 to June 30 to avoid impacts to spring spawning migrations and glass eel immigrations. A TOY restriction from September 1 to November 14 may be required if construction activities cannot maintain adequate passage and containment of silt-producing work.*

Response: Mitigation measures, including sediment and erosion control measures such as turbidity curtains and silt fences around the construction area are discussed in Section 2.1 and Section 7.3 of the DEIR. Erosion and sediment control measures are shown on Drawing C-106 and C-107 in DEIR Appendix F. These plans will be incorporated into the project specific stormwater pollution prevention plan (SWPPP) after the FEIR has been approved.

Comment #35: *The GHG emissions are associated with the construction period of the project. As such, this project falls under the de minimis exemption; therefore, the Proponent is not required to prepare a GHG analysis. However, the DEIR should identify measures to avoid and minimize GHG emissions (and other air pollutants) during the construction period, such as limiting idling and using biofuels in off-road construction equipment.*

Response: Measures to avoid and minimize GHG emissions during construction are discussed in Section 7.3.5. These measures will be incorporated into a construction management plan (CMP) after the FEIR is approved.

Comment #36: *The DEIR should discuss potential effects of climate change on the project in the context of improving resiliency of the public water supply and fishway system.*

Response: Section 5.7 of the DEIR provides a discussion of the relationship between climate change and the water supply and fish populations. Based on constantly maintaining 60 MG in the Reservoir, and balancing public water supply demand with habitat protection, the overall resiliency of the First Herring Brook system should improve.

Comment #37: *The DEIR should identify any potential impacts associated with increased frequency and intensity of precipitation events and extreme heat events and address how the project will be designed to adapt and/or sustain such impacts. The Proponent should consider these impacts when designing stormwater management improvements and the riprap design along Route 3A and when evaluating flooding impacts to Route 3A and associated culvert. To assist in the evaluation of climate change resiliency and adaptation measures, the Proponent should review EEA's Climate Change Adaptation Report (September 2011).*

Response: These potential impacts associated with increased precipitation and extreme heat have been considered and are included in the DEIR Appendix A. The analysis reflects changes in hydrologic conditions since 1966 and analyzed impacts under extreme drought scenarios and long periods with high rainfall. The results of the analysis were used to select the higher Project normal pool that provided as much additional water storage as possible while minimizing the impacts on CJCH and property adjacent to the impoundments as discussed in Section 3.1.1.

Comment #38: *The Proponent must obtain a Non-Vehicular Access Permit from MassDOT for this proposed work. The DEIR should describe how riprap will be installed, potential impacts to the state jurisdictional roadway, and identify the need and duration for any lane closure or shutdown during construction.*

Response: Placement of the riprap along the CJCH embankment is shown on Drawing C-118 in DEIR Appendix F and described in Section 7.3.4. A MassDOT Non-Vehicular Access Permit for this activity will be applied for after the MEPA process is complete and final design have been approved.

Comment #39: *The DEIR should evaluate whether the proposed increase in flood elevation will cause Route 3A to flood at a greater frequency and identify measures to avoid, minimize, and mitigate any adverse impacts. It should identify the diameter and existing condition of the existing culvert that conveys First Herring Brook beneath Route 3A from Tack Factory Pond to Reservoir Pond.*

Response: The proposed Project will not increase flood levels in Reservoir Dam and Tack Factory Pond and will not increase the frequency of flooding on Route 3A (CJCH). As summarized in Section 3.3 and discussed in detailed in DEIR Appendix B, the proposed spillway modifications and bottom hinged gate will increase discharge capacity of the existing fixed crest spillway. The proposed spillway with the gate in the full-open position will be able to pass the spillway design flood (½ PMF) at a lower flood level than with the existing fixed crest to provide adequate freeboard and prevent overtopping of the embankment. The spillway gate will allow the Town to lower the Reservoir level in anticipation of storm events which should reduce the risk of flooding on CJCH.

Comment #40: *The DEIR should include an analysis to determine if the capacity of the culvert is sufficient to accommodate the expected higher normal water levels during storm events without overtopping Route 3A or flooding adjacent properties.*

Response: The proposed Project does not impact the capacity of the CJCH culvert. As discussed in DEIR Appendix B, the culvert capacity with the culvert inlet water at the road surface low point (El. 42.3 ft) is 311 cfs with the outlet water level at the proposed El. 40.4 ft normal pool. To discharge 311 cfs with the existing spillway, the Reservoir level would be approximately El. 40.8 ft. No higher water levels expected at Route 3A (CJWH) as a result of this Project.

Comment #41: *The Proponent should coordinate with MassDOT Highway Division District 5 Office prior to submitting the DEIR.*

Response: MassDOT Highway Division District 5 was contacted, and the Non-Vehicular Access Permit Application downloaded from the MassDOT web site. Coordination with MassDOT will be conducted during preparation of Access Permit Application after approval of the FEIR.

Comment #42: *The DEIR should describe construction sequencing, methodology, and staging activities and identify any special measures that may be necessary to prepare the project area (i.e. removal of trees, clearing of vegetation, abandonment of structures, etc.) prior to raising the maximum normal pool elevation.*

Response: Construction sequencing is described in Section 2.3.1 of the DEIR. A final Construction Management Plan will be developed by the Town of Scituate after the MEPA process and approval of the FEIR.

Comment #43: *[The DEIR] should describe potential construction period impacts (including, but not limited to, traffic management, parking, air quality, and noise impacts) and outline feasible measures that can be implemented to eliminate or minimize these impacts in a draft Construction Management Plan (CMP).*

The draft CMP should include appropriate erosion and sedimentation controls consistent with a Stormwater Pollution Prevention Plan prepared in accordance with the NPDES Construction General Permit requirements.

Response: See Comment #42

Comment #44: *The DEIR should elaborate on how quickly the reservoir impoundment will be increased to the proposed final elevation (El. 40.4). It should describe any pre-construction protocols to inform abutters of the increased water elevation in conjunction with the project.*

Response: The elevation of the Reservoir will be controlled during construction to allow public water supply, instream flow, and fish passage at Old Oaken Bucket. As discussed in Section 2.3.1 and Section 7.3.3, a cofferdam will be used in the Reservoir around the spillway and fishway construction area to retain as much storage as possible during construction. The low-level outlet will be used to convey First Herring Brook streamflow up to 15 cfs to Old Oaken Bucket Pond and the Water Treatment Plant. Dewatering pumps with total capacity of 50 cfs would be used to initially drawdown the reservoir and convey higher storm events past the construction area. If significant rainfall events 24 inch diameter siphon pipes with 25 cfs capacity will be utilized to prevent flooding of the construction site. Once final construction is achieved, filling to the normal pool El. 40.4 ft will be controlled by precipitation events. Abutters have been notified of this potential increase through the Scituate Conservation Commission NOI process and will continued to be notified on the Project progress until the project is complete.

Comment #45*: I strongly encourage the Proponent to ensure contractors will install emission control devices on all off-road vehicles in an effort to reduce emissions of volatile organic compounds (VOCs), carbon monoxide (CO) and particulate matter (PM) from diesel-powered equipment. Off-road vehicles are required to use ultra-low sulfur diesel fuel (ULSD).*

Response: The CMP will include the current requirements of emission control devices.

Comment #46: *The DEIR should provide a separate chapter summarizing proposed mitigation measures including draft Section 61 Findings for each anticipated State Agency Action. The DEIR should contain clear commitments to implement these mitigation measures, estimate the individual costs of each proposed measure, identify the parties responsible for implementation, and include a schedule for implementation.*

Response: The Section 61 proposed mitigation measures are provided in Section 8.0 of the DEIR with Section 61 Draft Findings provided in Appendix L.

Comment #47*: The DEIR should contain a copy of this Certificate and a copy of each comment letter received. To ensure that the issues raised by commenters are address, the DEIR should include direct responses to comments to the extent that they are within MEPA jurisdiction. This directive is not intended to, and shall not be construed to enlarge the scope of the DEIR beyond what has been expressly identified in this Certificate. I recommend that the Proponent use either an indexed response to comments format, or a direct narrative response.*

The proponent should circulate the DEIR to those parties who commented on the ENF, to any State Agencies from which the Proponent will seek permits or approvals, and to any parties specified in section 11.16 of the MEPA regulations. A copy of the DEIR should be made available for review at the Scituate Public Library. The DEIR submitted to the MEPA office should include a digital copy (e.g., CD-ROM, USB drive) of the complete document.

Response: The Secretary's Certificate and comment letters and distribution list are provided after the acronym list at the beginning of the DEIR. A copy of the DEIR will be available for review at the Scituate Public Library and a digital copy of the EIR is attached to the written submission.

9.2 U.S. ARMY CORPS OF ENGINEERS COMMENTS

Comment #48: *From the project plans, it is difficult to gleam if there are any proposed jurisdiction impacts; however, from discussing the project with the agent, it sounds like there is some proposed fill in wetlands/below OHWL. It is possible the Corps Self-Verification process could suffice, but this will depend on the degree of impact.*

Response: After the MEPA process is complete and the FEIR is approved, the Town will work with the agent to determine if the Self-Verification process is appropriate or if a preconstruction notification (PCN) is appropriate for the Project.

Comment #49: *If the project does not meet Self-Verification limits/conditions and a Corps application (PCN) needs to be filed, plan drawings need to reflect Corps jurisdictional boundaries: wetland line and OHWL (i.e. not "edge of water").*

Response: The Self-Verification Form or a Section 404 PCN if appropriate, will be prepared and submitted after the FEIR is approved.

Comment #50: *Flooding land is not considered a jurisdiction impact that the Corp directly authorizes, only placement of fill or mechanized clearing/re-grading. However, FEMA should be contacted about project if that hasn't been done already.*

Response: FEMA will be contacted under the direction of ODS after the EIR process is finished.

Comment #51: *If / when Corps application is filed, the project description should be put in terms of impacts to Corps jurisdictional resources, separated into wetland fill vs. fill below OHWL, permanent vs. temporary fill. Example:*

- *Place X square feet of rip rap below OHWL.*
- *Place X square feet of gravel below OHWL to raise elevation to entrance/exit of fish ladder.*
- *Place X square feet of fill in wetlands for construction access (if applicable).*
- *Place X square feet of temporary fill below OHWL for coffer dam (if applicable).*
- *Clear X square feet of wetland via mechanized clearing (if applicable).*

Response: The Self-Verification Form or the Section 404 PCN if appropriate will be prepared with this guidance.

Comment #52: *Corps of Engineers jurisdiction at this location is triggered by the discharge of dredged of fill material below the ordinary high water line (OHWL) of waters and wetlands. The placement of concrete slabs, reorientation of large stones, and fills associated with the reconstruction of the fish ladder and new spillway below the OHWL would trigger our jurisdiction. Once our jurisdiction is triggered, the Corps will consider the impacts of the overall project on the reservoir.*

Response: Thank you for your comment. The Town will apply for permits and work with the USACE after the MEPA process is complete.

Comment #53: *I reviewed our database for previous permits for the reservoir and did not located any. I assume no previous Corps permits were issued for the reservoir.*

Response: There is no indication of previously issued Corps permits.

Comment #54: *It looks like there will be more than 13 acres of wetland impact. This will probably need to be reviewed as an Individual Permit (IP) by the Corps. An IP requires a 30-day public notice in order to solicit comments from the agencies and general public. What has been the reception so far on the increased inundation of the pond by adjacent property owners?*

Response: A majority of the adjacent property owners are the Town of Scituate. Most property owners are pleased by the possibility of restoring fish passage to the reservoir, some apprehensive, so far none opposed. The Town will work with all abutters to make this project work.

Comment #55: *More information on the wetland impacts needs to be provided such as the area and types of wetlands that currently exist, the area of these wetlands which will be inundated, for how long, and what wetland changes should be expected? Will any existing wetlands be permanently inundated and permanently lost? Will any new wetlands be created due to the increased inundation?*

Response: Existing wetlands and potential impacts associated with the Project are discussed in section 4.3 and 5.3, respectively. Additional details on wetlands impacts are provided in DEIR Appendix D, the Wetland Vegetation Study.

Comment #56: *The Corps will be looking to avoid, minimize, and mitigate wetland and open water impacts. The alternatives analysis will be important.*

Response: An analysis of alternatives is provided in Section 3.

Comment #57: *The Corps will coordinate with fisheries agencies on fisheries impacts or improvements.*

Response: Thank you for your comment and your help.

Comment #58: *The Corps will coordinate in any future application with the Massachusetts Historic Commission to determine if there are historic issues with existing dams, spillways, etc.*

Response: Thank you for your comment and help. It is expected no historic conditions exist.

Comment #59: *Will there be impacts to trees adjacent to the pond? Will any trees need to be removed? We need to consider impacts to northern long eared bat habitat.*

Response: Vegetative wetlands, including some containing trees, will be impacted by the project. No trees in wetlands areas are expected to require removal.

Comment #60: *The Corps will maintain this project in pre-application status and can participate in coordination during the MEPA process.*

Response: Thank you for your comment and the Town looks forward to your assistance once the MEPA process is complete.

Comment #61: *This project is most likely permittable with the Corps, but we will be looking to avoid, minimize, and possibly require mitigation for aquatic resource impacts.*

Response: Thank you for your comment. We are expecting that this project will enhance aquatic resources while supplying needed public water.

9.3 DEPARTMENT OF CONSERVATION AND RECREATION COMMENTS

Comment #62: *The Proponent will need to address spillway capacity and appropriate freeboard considerations in the final design.*

Response: The Spillway design is discussed in Section 2.1.1 of the DEIR. A more detailed description of the proposed spillway design is provided in DEIR Appendix B.

Comment #63: *A Dam Safety Chapter 253 permit will be processed and issued by ODS upon receipt of all required technical submittals that are in accordance with the dam safety regulations. As with any dam modification project, the Proponent will have to prepare a final design that will result in construction of a spillway that is compliant with the Spillway Design Flood ("SDF") requirements of the dam safety regulations. ODS is available to provide additional guidance through the permitting process.*

Response: A Dam Safety Permit Application will be prepared and filed with ODS after completion of the MEPA process.

9.4 DIVISION OF MARINE FISHERIES COMMENTS

Comment #64: *To protect existing diadromous fish resources, in-water construction activities should be sequenced to avoid spring spawning migrations (rainbow smelt and alewives) and glass eel immigrations from* ***March 1 to June 30****.*

Response: Construction methods and schedules will be optimized to prevent impacts to spawning migrations. Further discussion of construction methods and environmental impacts are provided in Sections 2.1.2 and 5.4. The Town anticipates that construction activities will not interrupt the spring and fall migrations at Old Oaken Bucket.

Comment #65: *More information is needed on the construction schedule and related in-water work to determine if construction activities should be sequenced to avoid fall migrations. Specifically, more information is required on proposed water control and silt containment measures during the summer and fall seasons to ensure that passage and downstream habitats are not impacted during this time period. An additional fall TOY restriction of* ***September 1 to November 15*** *may be required if construction activities cannot maintain adequate passage and containment of silt-producing work.*

Response: See response to Comment #64.

Comment #66: *This project will require a Fishway Construction Permit from Marine Fisheries. Our staff will work with the Town of Scituate during this process to prepare a final design plan and Operation and Maintenance (O&M) Plan for the diadromous fish passage facilities. The O&M plan will be essential for providing outflow to support river herring migrations.*

Response: The Draft Final Operational Plan is discussed in Section 2.1.8 and provided in Appendix I to the DEIR. The DMF Fishway Construction Permit Application will be prepared after approval of the FEIR. One of the goals of this Project is to restore river herring, rainbow smelt, and American eel migration into First Herring Brook upstream of Reservoir Dam.

9.5 MASSDEP COMMENTS

Comment #67: *The Water Management Program has concerns over how the proposed operating scenario may impact the firm yield of the Main Reservoir…In the ENF, the Proponent did not specify the target flow releases from the Reservoir which makes it unclear how the combined increase in storage and target flow releases for fisheries passage may affect the firm yield of the reservoir.*

Response: See response to Comment #68.

Comment #68: *Currently, under the First Herring Brook Interim Operational Plan and the Scituate`s WMA permit, the Town of Scituate has authority to implement a total ban on nonessential outdoor water use when the Reservoir falls to El. 36 ft. and shutoff the flow releases when the Reservoir drops to El. 32.0 ft. It is not clear whether the Proponent expects to modify the triggers for the total water ban and the release shutoff.*

Therefore, the Water Management Program suggests the Proponent first clarify whether there will be changes to the triggers for implementing the nonessential outdoor water use

and curtailing the water release. An update to the First Herring Brook Interim Operational Plan may be necessary should those triggers change. Then the Proponent should evaluate the firm yield of the Reservoir under each operating scenario comparable to the methodology of the USGS Firm-Yield Estimator Model Version 2.0. The Proponent should estimate the percentage of the time that the Town may have to shut off the flow releases under each operating scenario. The Proponent should also specify how many days of outdoor water use restrictions and what levels of the outdoor water use restrictions will be implemented under each operating scenario.

Response: The firm yield of the First Herring Brook Reservoir system was established in the early 2,000's and did not account for stream releases at 0.79 MGD. The WEAP model has reproduced this firm yield with no stream releases. Under the current IOP the firm yield has been reduced to 0.36 MGD.

Raising the dam and implementing the new FOP, the firm yield would increase to 0.49 MGD. This evaluation is discussed in Section 5.5.2 and described in detail in DEIR Appendix A.

Comment #69: *This Project will likely require an amendment to the Town of Scituate`s WMA permit, and the above data will help the Water Management Program to better evaluate how raising the Main Reservoir water levels and increasing downstream releases will affect the firm yield and benefit the Town`s public water supply.*

Response: The Town of Scituate will work with the First Herring Brook stakeholders and the DEP Bureau of Water Resources to adapt a Towns WMA Permit to balance long term water supply need and ecological stability and resilience. A WMA Permit Amendment Application will be prepared and submitted after the FEIR is approved.

Comment #70: *The Department's review indicates that the proposed Project does not appear to be a limited Ecological Restoration Project. Accordingly, it appears that the Conservation Commission must deny the Project pursuant to 310 CMR 10.05(6)(b) since the amount of BVW proposed to be altered exceeds 5,000 square feet. The procedures and standards to obtain a variance from the Wetlands Regulations are specified at 310 CMR 10.05(10)(a) and provide, in part, that:*

The Commissioner may waive the application of certain portions of the [wetland] regulation(s) when [the Commissioner] finds, after opportunity for an adjudicatory hearing, that:

1) *there are no reasonable conditions or alternatives that would allow the Project to proceed in compliance with the regulations;*
2) *mitigating measures are proposed that will allow the Project to be conditioned so as to contribute to the protection of the interests identified in the Wetlands Act; and*
3) *the variance is necessary to accommodate an overriding community, regional, state or national public interest.*

Response: Included in the DEIR is the denial of the project by the Scituate Conservation Commission (with Prejudice-they did not want to deny). A variance from potentially altering over 5,000 square feet of BVW will be filed with DEP after the completion of the MEPA process and the DEP has issued a Determination on the Request for Superseding Order of Conditions**.**

Comment #71: *In addition to the Variance, a 401 Water Quality Certificate is required from MassDEP pursuant to 314 CMR 9.04(1) and (2).*

Response: A draft DEP Section 401 Water Quality Permit Application will be filed upon completion of the MEPA process..

Comment #72: *The Project requires a mandatory Environmental Impact Report to be prepared since more than 1-acre of BVW is proposed to be altered (301 CMR 11.03(3)(a)1.a.); more than 10-acres of other wetland resource area is proposed to be altered (301 CMR 11.03(3)(a)1.b. - Bordering Land Subject to Flooding); the Project requires a Variance to the Massachusetts Wetlands Protection Act (301 CMR 11.03(3)(a)2.); and the structural alteration to the existing dam will expand the impoundment capacity by at least 20% (301 CMR 11.03(3)(a)4.).*

Response: Comment noted and this document is the Draft of the EIR.

Comment #73: *In addition, the Project trips the MEPA Floodway threshold (301 CMR 11.03(3)(b)1.e.) since the dam crest is proposed to be raised and riprap is proposed to be placed along Rt. 3A within the FEMA designated Floodway. The Floodway is located within BLSF or other wetland resource areas.*

Response: Comment noted and addressed in this DEIR.

Comment #74: *The Project Proponent must address the three Variance criteria indicated above when filing for a Wetlands Protection Act Variance, and to the extent possible, these criteria should be addressed in the Environmental Impact Report. To address the overriding public interest, the Variance application must document the need to provide additional water storage in the Scituate reservoir to meet water supply needs, including documentation of current use, projected demand, water conservation efforts, storage needed to comply with Scituate's Water Management Permit Special Condition 6, Development of Minimum Streamflow Targets for Fish Passage, and the impact of the Project on the firm yield of the Scituate Reservoir system. Additionally, the demonstration of need to restore the existing nonfunctional fishway should include comment from the Massachusetts Department of Fish and Game, as well as an analysis to examine alternatives to balance the Public Water Supply, flood control, storm damage prevention, wildlife habitat and fish passage needs.*

There was an insufficient amount of water released from the Scituate Reservoir to further fish passage in the First Herring Brook at least 20% of all days between October 2013 and the present (as recorded at the Massachusetts Riverways RIFLS stream gage located immediately downstream of the Scituate Reservoir). The alternatives analysis needs to examine issues with releasing sufficient water to the First Herring Brook year round from Tack Factory Pond, Scituate Reservoir, and Old Oaken Bucket reservoirs to provide streamflow depths to permit fish movement. Also, the alternatives analysis needs to examine the feasibility of enlarging the existing stream culverts that convey the First Herring Brook from Tack Factory Pond to the North River that currently appear to provide physical impediments to fish passage (including the New Driftway and Route 3A stream culverts). To be effective at providing fish passage, the restoration of the existing

nonfunctional fish passageway needs to be partnered with stream flow restoration and enlarged stream culverts in the First Herring Brook.

Response: The proposed project plan balances Public Water Supply, flood control, storm damage prevention (by repairing and upgrading an aging dam), enhancing wildlife habitat and providing fish passage. The whole purpose of the project is to restore connectivity of First erring Brook upstream and downstream of Reservoir Dam. River herring currently use the fishway at Old Oaken Bucket. Enhancements to downstream (below Old Oaken Bucket Pond) can be evaluated after this project is complete. However, herring can currently reach the spillway discharge apron downstream of Reservoir Dam. Any fish that can navigate the existing fishway get stranded because of the lack of a means to migrate downstream in the fall.

Improvements by raising the dam will have an immense and immediate impact to the fish population. Changes to the forested and scrub wetland vegetation should be considered *de minimis* to this overall restoration project, which the current regulation WPA ignores.

Comment #75: *MassDEP recognizes that the water level in Scituate Reservoir and Tack Factory Pond fluctuates, especially during summer and autumn months due to demand. The Project Proponent should evaluate the alterations to wetland resource area types assuming complete inundation by the proposed new normal pool elevation and compare that to the wetland types that currently exist with the current normal pool elevation. The fluctuations that currently occur above and below the existing normal pool elevation would also be expected to occur with the proposed normal pool elevation. The change in wetland type from forested wetland and shrub swamp to open water and other wetland types (i.e. shrub swamp, marsh etc.) needs to be quantified. Converting BVW to land under water is considered a loss. The alternative analysis shall include measures to avoid, minimize, and then mitigate the proposed BVW loss. Alternatives to mitigate the loss and other alteration due to increased inundation of wetlands need to be analyzed in the Environmental Impact Report.*

Response: Changes in wetland type are discussed in Section 4.3 and 5.3 with the Wetland Vegetation Study provided in DEIR Appendix D.

Comment #76: *The proposed fill will increase the vertical and horizontal extent of the 100-year flood. The Proponent estimates that the proposed fill will increase the horizontal extent of flooding and the BLSF boundary by 17 acres. As no increase to the vertical and horizontal flooding is allowed by the FEMA floodway requirements and 310 CMR 10.57, the Proponent must either file a Conditional Letter of Map Revision (CLOMR) with FEMA, requesting a written opinion as to whether the Project as proposed complies with the FEMA floodway requirements or file a Letter of Map Revision (LOMR) with FEMA requesting to increase the 100-year flood elevation. The Proponent should evaluate whether the increase to the flood elevation will extend onto properties not owned or controlled by the Town of Scituate, including whether the proposed increase will cause Route 3A to flood at a greater frequency. To mitigate flood increases, the Proponent is encouraged to obtain flood easements for any increased*

flooding on offsite properties as well as to increase the size of the stream culvert connecting Tack Factory Pond to the Scituate Reservoir.

Response: The proposed Project 100-year flood levels are below the 100-year FEMA flood elevation (see Comment #28). OSD will make a determination once application is made to them on whether a FEMA map revision is appropriate. Project design calculations are included in DEIR Appendix G.

Comment #77: *The existing stormwater discharges directed from the causeway (Route 3A) impounding Tack Factory Pond do not appear to be specifically exempted from compliance with the stormwater standards pursuant to 310 CMR 10.05(6)(l) and 314 CMR 9.06(6)(b). As part of the Project, riprap is proposed to be placed in land under water and bank along the Route 3A. Provided no additional impervious area is proposed to be created, the Project would appear to be eligible to be considered a redevelopment for purposes of the stormwater standards. Redevelopment Projects are only required to demonstrate compliance with the stormwater standards to the maximum extent practicable in accordance with 310 CMR 10.05(6)(k)7 and 314 CMR 9.06(6)(a)7. Alternatives to address the Stormwater requirements specified at 310 CMR 10.05(6)(k) and 314 CMR 9.06(6)(a) should be evaluated to examine alternatives to improve the water quality of stormwater that is currently discharged directly to the Scituate Reservoir and Tack Factory Pond from the drainage system located on the causeway (Route 3A) between the Scituate Reservoir and Tack Factory Pond.*

Response: Since CJCH is a State Highway under DOT jurisdiction, Scituate does not have any authority to address stormwater discharges from CJCH, and therefore, stormwater control measures are not included in this Project.

Comment #78: *The Waterways Program has performed a cursory review of its data base and found no prior Chapter 91 authorization for the existing dam or culvert structures. In order to make a conclusive determination as to whether these waterways are jurisdictional, the Proponent may file a Request for Determination of Applicability pursuant to the Waterways Regulations at 9.06. Assuming that these waterways are subject to Chapter 91 jurisdiction, with the preparation of the EIR, the Proponent should conduct additional research to confirm that no licenses, contracts or legislative grants have been issued for the dam and the culvert structures at Route 3A. The EIR should also evaluate the different components of the Project to determine whether they may be exempt from licensing pursuant to 310 CMR 9.05 (3)(c) & (g). This information will be used by MassDEP to determine whether a License or Permit application will be required.*

Response: There is no prior Chapter 91 authorization for the existing structures. A Chapter 91 RDA and the DEP determination are included in Appendix K. The DEP has determined that the Project is under Chapter 91 jurisdiction and a Chapter 91 Permit Application will be filed after approval of the FEIR.

Comment #79: *There are no listed MCP disposal sites located at or in the vicinity of the site that might impact the proposed Project. Interested parties may view a map showing the location of BWSC disposal sites using the MassGIS data viewer (Oliver).*

The Project Proponent is advised that if oil and/or hazardous materials are identified during the implementation of this Project, notification pursuant to the Massachusetts Contingency Plan (310 CMR 40.0000) must be made to MassDEP, if necessary. A Licensed Site Professional (LSP) should be retained to determine if notification is required and, if need be, to render appropriate opinions. The LSP may evaluate whether

risk reduction measures are necessary if contamination is present. The BWSC may be contacted for guidance if questions arise regarding cleanup.

Response: The Town of Scituate maintains an emergency management system and plans that includes an LSP along with many other emergency management measures if contamination is encountered during construction or if contamination enters the water supply system.

Comment #80: *Construction and operation activities shall not cause or contribute to a condition of air pollution due to dust, odor or noise. To determine the appropriate requirements please refer to:*

- *310 CMR 7.09 Dust, Odor, Construction, and Demolition*
- *310 CMR 7.10 Noise*

Response: No significant contributions to air pollution are expected to be associated with the Project. Any potential construction related emissions sources will be appropriately mitigated as discussed in Section 5.1 and Section 7.3.5.

Comment #81: *MassDEP requests that the Proponent state specifically in the subsequent environmental filing how it plans to prohibit the excessive idling during the construction period. Typical methods of reducing idling include driver training, periodic inspections by site supervisors, and posting signage. In addition, to ensure compliance with this regulation once the Project is occupied, MassDEP requests that the Proponent establish permanent signage limiting idling to five minutes or less at the completed Project.*

Response: The CMP will prohibit construction vehicle idling during the construction period. The CMP will be prepared after the FEIR is approved.

Comment #82: *Pursuant to MEPA Regulations 301 CMR 11.12(5)(d), the Proponent will prepare Proposed Section 61 Findings to be included in the EIR in a separate chapter updating and summarizing proposed mitigation measures. In accordance with 301 CMR 11.07(6)(k), this chapter should also include separate updated draft Section 61 Findings for each State agency that will issue permits for the Project. The draft Section 61 Findings should contain clear commitments to implement mitigation measures, estimate the individual costs of each proposed measure, identify the parties responsible for implementation, and contain a schedule for implementation.*

Response: See response to Comment #46.

9.6 MASSDOT COMMENTS

Comment #83: *The Proponent has stated that the 1.5 foot increase in normal pond elevations would not impact the existing stormwater system on Route 3A; however, this roadway is already within the flood zone, and any increase in elevation may exacerbate conditions in a storm scenario. The proponent should provide the MassDOT Highway Division District 5 Office with the appropriate analysis and/or mitigation plan to minimize flooding impacts on Route 3.*

Response: Since CJCH is a State Highway under DOT jurisdiction, Scituate does not have any authority to address stormwater discharges from CJCH, and therefore, stormwater control measures are not included in this Project. Flood levels at CJCH with the proposed Project will be similar to existing flood levels as discussed in Section 5.5 and DEIR Appendix B. The proposed spillway modifications will

provide flow control at Reservoir Dam that will limit flood levels to the existing conditions. Flood levels west of CJCH are controlled by the CJCH culvert. The proposed Project will not increase flood levels in Tack Factory Pond and at the CJCH culvert. The proposed riprap erosion protection plan for the CJCH roadway embankment is provided on Drawing C-118 in DEIR Appendix F.

> ***Comment #84:*** *A MassDOT Non-Vehicular Access Permit will be required to armor the banks within the State Highway Layout.*

Response: A MassDOT Non-Vehicular Access Permit for this activity will be applied for after the MEPA process is complete and the FEIR is approved. The proposed erosion protection along CJCH is shown on Drawing C-118 in DEIR Appendix F. Flood levels are discussed in DEIR Appendix B.

> ***Comment #85:*** *MassDOT recommends that no further environmental review be required based on transportation issues. The details of the above and any other access-related issues can be addressed during the permitting process for the project.*

Response: Thank you for your comment and support.

9.7 NORTH AND SOUTH RIVERS WATERSHED ASSOCIATION COMMENTS

> ***Comment #86:*** *The only remedy that will allow fish passage at this site will be to raise the dam and lower the fishway exit. These infrastructure improvements along with the increased storage that will provide the town more drought resiliency make this project in our opinion a unique habitat restoration effort that benefits people and nature and ready the town for future climate change.*

Response: Thank you for your comment and continued support.

> ***Comment #87:*** *This project is singularly unusual in that it is meeting the needs of both water supply improvements and habitat restoration for migratory fish passage. The raising of the reservoir will inundate bordering vegetated wetlands along the reservoir for longer periods than they currently experience. How much longer will depend upon water demands and precipitation patterns in any given year. The areas to be inundated currently experience flooded conditions, this project only lengthens and increases the frequency that these conditions would be experienced. We would hope that because of the net environmental benefit that this project will bring, for which there is no feasible alternative, would provide some relief from traditional wetland mitigation requirements as this is a nontraditional project.*

Response: Thank you for your comment and support.

> ***Comment #88:*** *One concern we have is that the town, while doing an exemplary job of conserving water, will be under continued pressure to increase their water demand through new development. Indeed, today they have many new development projects that will need water and are already in the pipeline. In order to meet streamflow releases at the fish ladder the town will need to offset new demands with conservation in order to keep water demand flat at the 2011-2015 which is 1.5 MGD. The town's recently approved water conservation plan recommends that the town implement a water banking program that at a minimum requires 1:1 offset for new development – or if possible a 2:1*

offset for new development that provides the town a mechanism for funding water conservation projects in the community and keeps the demand flat at current levels.

The water conservation plan has been referenced in the town's Water Management Act Permit and the Water Resources Commission has it on their agenda for the future but in order to assure the environmental benefits of this project for the long term the demand must be stabilized at current levels.

Response: Thank you for your comment and support.

Comment #89: *We look forward to working with the town, state, and federal agencies to see this project through completion. We wish to reiterate our support for this project as a habitat restoration project that is unique and exemplary in the Commonwealth.*

Response: Thank you for your comment and continued support.

9.8 U.S. ENVIRONMENTAL PROTECTION AGENCY COMMENTS

Comment #90: *We commend the Town for their interest and actions over the many years intended to improve anadromous fish passage at the Scituate Reservoir Dam. The project has the potential to improve conditions for fish passage by the intended construction and operation of new gates to control water levels, increase storage capacity, and control flow releases for the fish ladder and downstream fish passage.*

Response: Thank you for your comment and support.

Comment #91*: Further information on the extent of expected changes to wetlands vegetation should be provided in the Environmental Impact Report. Since normal pool levels will be increased for both Tack Factory Pond and Scituate Reservoir, forested, scrub/shrub, and emergent wetlands may be affected by the longer duration inundation patterns associated with the higher normal pool level reservoir management. Some wetlands may be converted to open water. Mitigation for wetland losses may be required to comply with Section 230.10(d) of the EPA 404(b)(1) Guidelines.*

Response: A summary of wetlands potentially impacted by this project, as well as a discussion of these impacts, are provided in sections 4.3 and 5.3, respectively, as well as DEIR Appendix D.

Comment #92: *EPA understands that these wetlands are already subject to fluctuating water levels. The proposed project would be expected to lessen the fluctuations and restore water to the wetlands around the reservoir and Tack Factory Pond. Some loss of wetlands to open water may also occur where the wetlands cannot tolerate the higher normal pool water levels. The majority of the potential wetland vegetation changes would be expected to occur on the Tack Factory Pond area.*

Response: Yes, the proposed project is expected to lessen water level fluctuations with the majority of impacts occurring in the summer. A detailed discussion of effects on wetland vegetation is included in Section 4.3, Section 5.3, and DEIR Appendix D.

Comment #93: *Milfoil accumulation will have minimal effects on TFP levels. Normal pool level in TFD will be El. 40.4 during spring which is approximately 1.1 ft above the*

weir gate. During the summer, TFP levels will drop to the existing weir El. 39.3 ft, or slightly higher.

Response: The operating manual will specify routine inspection and manual cleaning of weir structure when needed. The operating manual will be prepared after approval of the FEIR

***Comment #94:** The EIR should include an analysis to determine if the capacity of the culvert is sufficient to accommodate the expected higher normal water levels, during storms without flooding of Chief Justice Cushing Highway or other property around the pond. Since the gates at Tack Factory Pond are normally in a closed position, and weeds accumulate against the gate structure artificially raising water levels, the gates themselves may need to be modified to avoid flooding impacts to upstream properties.*

Response: See Comment #40. The culvert currently has sufficient capacity (up to 300 cfs) to accommodate these water levels because these water levels currently occur and will just happen more frequently with the proposed Project. The physical characteristics of the culvert are included in Section 2.3 and calculations related to the culvert are included in Appendix H.

***Comment #95:** Fish passage improvements may not result in increased fish populations in part due to the potential outflow inadequacy in low precipitation years. In addition, EPA understands there has been some concern expressed about the poor water quality conditions in the ponds not being favorable for the fish. Without addressing the poor water quality of the pond, there is some concern that even with a better fish passage facility, the pond would not support a population of anadromous fish.*

Response: Proposed operation will allow fish passage 98% of the time during upstream migration and 88% of the time during the Sept.-Oct downstream migration and has taken into account periods of low flow and less than normal precipitation. It is expected that with more storage both temperature and dissolved oxygen should improve.

The NSRWA/MassBays is proposing to update their water quality study (that was done a few years ago) during the next phase of the project. Appropriate action will be taken once results are available.

***Comment #96:** The operation and maintenance plan should include specific requirements for maintaining suitable outflow conditions. These requirements should be included in permit conditions.*

Response: The Draft Final Operational Plan is provided as Appendix I of the DEIR as well as reflected in the various permit documents as appropriate. See response to comment #95.

***Comment #97:** Requirements for conservation of water restrictions during drought should also be detailed in order to provide adequate flow for fish passage.*

Response: Water conservation measures are discussed in Section 2.1.9. The Draft Final Operational Plan provided in DEIR Appendix I discusses water restrictions.

10.0 REFERENCES

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LIST OF APPENDICES

A presentation of detailed technical data (e.g., traffic analyses, hydrologic calculations, modeling data), to the extent necessary to keep the main text of the EIR clear and readable. The main text of the EIR shall refer to and summarize any information contained in any appendix. Unless the Secretary has indicated otherwise in the Scope or as a part of a Special Review Procedure, the Proponent shall circulate appendices with the main text of the EIR in accordance with 301 CMR 11.16(3).

Appendix	Title
A	WEAP Model Update
B	Proposed Spillway Design
C	Reservoir Level Frequency Study
D	Wetlands Vegetation Study
E	Groundwater Study
F	90% Design Plans
G	90% Design Supporting Calculations
H	90% Design Cost Estimate
I	Draft Final Operational Plan
J	Streamflow Advisory Tool
K	Chapter 91 RDA and Permit Application
L	Section 61 Draft Findings