

**BWP SW 38 - APPLICATION FOR SITE SUITABILITY
FOR A MAJOR MODIFICATION OF AN EXISTING SITE
ASSIGNMENT**

**BOURNE INTEGRATED SOLID WASTE
MANAGEMENT FACILITY
BOURNE, MASSACHUSETTS**

**SITEC Environmental, Inc.
769 Plain Street, Unit C
Marshfield, Massachusetts 02350**

March 29, 2021

**BWP SW 38 - APPLICATION FOR
SITE SUITABILITY FOR A MAJOR MODIFICATION
OF AN EXISTING SITE ASSIGNMENT**

**TOWN OF BOURNE
BOURNE INTEGRATED SOLID WASTE MANAGEMENT FACILITY**

Prepared For:

**TOWN OF BOURNE
DEPARTMENT OF INTEGRATED SOLID WASTE MANAGEMENT
24 Perry Avenue
Bourne, Massachusetts 02532**

Prepared By

**SITEC Environmental, Inc.
769 Plain Street
Marshfield, Massachusetts 02050**



March 29, 2021

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TOWN OF BOURNE BOURNE INTEGRATED SOLID WASTE MANAGEMENT FACILITY

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Certification of Service of Copies

DEP Transmittal Form

DEP Form BWP SW 38, Site Suitability for a Major Modification of an Existing Site Assignment

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CERTIFICATION OF SERVICE OF COPIES

I certify that, to the best of my knowledge, appropriate copies of the Application Form For Site Assignment Major Modification for the Bourne Integrated Solid Waste Management Facility have been sent to all parties included on the following Circulation List. Copies have been delivered by hand or transmitted by Federal Express on or before March 29, 2021

Circulation List

Town of Bourne (2 copies)
Health Department
Town Hall -25 Perry Avenue
Bourne, MA 02532

Jonathan Bourne Public Library
19 Sandwich Road
Bourne, MA 02532

Department of Environmental Protection
Bureau of Waste Prevention
Business Compliance Division
1 Winter Street
Boston, MA 02108

Massachusetts Department of Public Health
Bureau of Environmental Health Assessment
250 Washington Street, 7th Floor
Boston, MA 02111

Mr. Mark Dakers, Section Chief
Department of Environmental Protection
Southeast Region
Solid Waste Management
20 Riverside Drive
Lakeville, MA 02347

Cape Cod Commission
3225 Main Street
P. O. Box 226
Barnstable, MA 02630

Signed under the pain and penalties of perjury, this 29th day of March 2021.

A. Raymond Quinn





Enter your transmittal number

Transmittal Number

Your unique Transmittal Number can be accessed online: http://mass.gov/dep/service/online/trasmfrm.shtml or call MassDEP's InfoLine at 617-338-2255 or 800-462-0444 (from 508, 781, and 978 area codes).

Massachusetts Department of Environmental Protection
Transmittal Form for Permit Application and Payment

1. Please type or print. A separate Transmittal Form must be completed for each permit application.

2. Make your check payable to the Commonwealth of Massachusetts and mail it with a copy of this form to: DEP, P.O. Box 4062, Boston, MA 02211.

3. Three copies of this form will be needed.

Copy 1 - the original must accompany your permit application. Copy 2 must accompany your fee payment. Copy 3 should be retained for your records

4. Both fee-paying and exempt applicants must mail a copy of this transmittal form to:

MassDEP
P.O. Box 4062
Boston, MA
02211

* Note: For BWSC Permits, enter the LSP.

A. Permit Information

BWP SW 38

Major Modification of a Site Suitability Report

1. Permit Code: 7 or 8 character code from permit instructions

2. Name of Permit Category

Modification of an Existing Site Assignment for Landfill Expansion

3. Type of Project or Activity

B. Applicant Information - Firm or Individual

Town of Bourne - Department of Integrated Solid Waste Management

1. Name of Firm - Or, if party needing this approval is an individual enter name below:

2. Last Name of Individual

3. First Name of Individual

4. MI

24 Perry Avenue

5. Street Address

Buzzards Bay

MA

02532

508-759-0600

4240

6. City/Town

7. State

8. Zip Code

9. Telephone #

10. Ext. #

Daniel T. Barrett

dbarrett@townofbourne.com

11. Contact Person

12. e-mail address (optional)

C. Facility, Site or Individual Requiring Approval

Town of Bourne Integrated Solid Waste Management Facility

1. Name of Facility, Site Or Individual

201 MacArthur Boulevard

2. Street Address

Bourne

MA

02532

508-759-0600

4240

3. City/Town

4. State

5. Zip Code

6. Telephone #

7. Ext. #

172356

8. DEP Facility Number (if Known)

9. Federal I.D. Number (if Known)

10. BWSC Tracking # (if Known)

D. Application Prepared by (if different from Section B)*

SITEC Environmental, Inc.

1. Name of Firm Or Individual

769 Plain Street, Unit C

2. Address

Marshfield

MA

02050

781-319-0100

12

3. City/Town

4. State

5. Zip Code

6. Telephone #

7. Ext. #

A. Raymond Quinn, PE

8. Contact Person

9. LSP Number (BWSC Permits only)

E. Permit - Project Coordination

1. Is this project subject to MEPA review? [X] yes [] no

If yes, enter the project's EOEA file number - assigned when an Environmental Notification Form is submitted to the MEPA unit:

11333

EOEA File Number

F. Amount Due

Special Provisions:

- 1. [X] Fee Exempt (city, town or municipal housing authority)(state agency if fee is \$100 or less). There are no fee exemptions for BWSC permits, regardless of applicant status.
2. [] Hardship Request - payment extensions according to 310 CMR 4.04(3)(c).
3. [] Alternative Schedule Project (according to 310 CMR 4.05 and 4.10).
4. [] Homeowner (according to 310 CMR 4.02).

DEP Use Only

Permit No:

Rec'd Date:

Reviewer:

Check Number

Dollar Amount

Date



BWP SW 01 Site Suitability Report for a New Site Assignment

Transmittal Number

BWP SW 38 Site Suitability for a Major Modification of an Existing Site Assignment

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Facility ID# (if known)

Instructions

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



BWP SW 01 Site Suitability Report for New Site Assignment:

The information requested on this application form must be supplied when filing an Application for a new Site Assignment pursuant to the provisions of the *Site Assignment Regulations for Solid Waste Management Facilities*, 310 CMR 16.00.

The form is divided into six parts that are to be completed as follows:

- I. General Information: All Applicants complete Part I.
- II. Facility Specific Criteria: Part II is divided into three sections,
 - II.A. For landfills,
 - II.B. For combustion facilities, and
 - II.C. For waste handling and processing facilities.

Applicants should complete only the appropriate section.

- III. General Criteria: All Applicants complete Part III.
- IV. Integrated Solid Waste Management: Complete Part IV only if the proposed facility is a landfill or combustion facility.
- V. Waiver: Complete Part V only if a waiver is requested.
- VI. Signatures and Certification: All Applicants must sign the application in Part VI.

BWP SW 38 Site Suitability Report for a Major Modification of a Site Assignment:

The information requested on this application form must be supplied when filing an Application for a major modification of an existing Site Assignment pursuant to the provisions of the *Site Assignment Regulations for Solid Waste Management Facilities* at 310 CMR 16. 22(2).

When applying for a Major Modification, the applicant need only complete those sections of the form that concern criteria affected by the major modification as determined in writing by the Department. The applicant shall obtain this written determination from the Solid Waste Section in the DEP Regional Office prior to completing and submitting this application.

General Information:

The Applicant should refer to the regulations themselves when completing the Application form. The Application form provides a format for presenting the information required to determine whether the site meets the criteria set forth in the Site Assignment Regulations themselves. The Application form is not a substitute for the regulations, and the Applicant is responsible for providing all the information relevant to evaluating the suitability of the site in accordance with 310 CMR 16.00.



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Instructions (cont.)

The application form is annotated with section numbers, enclosed in {braces}, that reference sections in the regulations. These references are included to make it easier to consult the regulations for guidance in completing the application. The references are abbreviated in that, for example, 310 CMR 16.05(2) is written as {16.05(2)}.

Completing the Application Form:

This application form contains three types of questions or requests for information:

- 1) Requests that documents be attached (e.g., maps). Please attach these documents and note on the application form where these documents can be found.
- 2) Questions that require a written response. Questions that require a very brief response may be answered in the space provided on the form itself. Longer responses should be attached to the form and the location of the attachment identified in the space provided.
- 3) Questions that require a "yes" or "no" response. Put an "X" in the appropriate box and indicate in the space provided where additional information or information supporting the response can be found.



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Section I. General Information

Instructions: All Applicants should complete Part I.

A. Site Location and Project Description

Please provide the information requested.

1. Project name:

Bourne Landfill - Phases 7, 8 and 9 Landfill Expansion
Name of Project

2. Site address:

201 MacArthur Boulevard
Street

Bourne
City/Town

MA
State

02532
Zip Code

3. Type of facility:

- landfill
 combustion
 waste handling and processing

4. Total area of the site, including all buffer zones:

99
acres

5. Total area to be site assigned for solid waste activities:

99
acres

6. Capacity and expected life of proposed facility:

a. State the maximum daily capacity of the proposed facility in tons per day. (This number should represent the maximum amount of waste to be accepted on any single day.):

700 tpd Landfilling
tons per day

b. State the average daily capacity of the proposed facility and describe how the average was computed:

600 tpd
average daily capacity (tons per day)

Actual
how average was computed



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A. Site Location and Project Description (cont.)

- c. State the yearly capacity of the proposed facility and, if the capacity is expected to change over the life of the facility, indicate the capacity in each year the proposed facility is expected to operate:

219,000
yearly capacity

Expected change in capacity (if applicable):

Expected yearly capacity	Year
<u>219,000</u>	<u>2021</u>
<u>219,000</u>	<u>2022</u>
<u>219,000</u>	<u>2023</u>
<u>219,000</u>	<u>2024</u>

- d. State the number of years the facility is expected to operate:

21
years

- e. State the total lifetime capacity of the proposed facility:

5,175,000 cubic yards
total lifetime capacity

7. Type of Waste: What type of waste will be accepted at the proposed facility? (check all that apply)

- municipal solid waste
- construction and demolition waste
- industrial waste
- other, please specify: Ash, Other Approved Wastes

8. Project Description: describe the proposed project:

A modification of an existing Site Assignment (See Attachment 2) to allow for the expansion of existing landfill operations onto a 25-acre parcel that is currently site assigned for handling operations and a 40-foot vertical expansion over existing site assigned Landfill space. (See Site Plans in Attachment 3.)



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B. Applicant Identification

1. Identify the owner of the site:

Town of Bourne

Name

24 Perry Avenue

Street Address

Buzzards Bay

City/Town

MA

State

02532

Zip Code

508-759-0600, Ext 4240

Telephone

Daniel Barrett

Contact Person

508-759-0600, Ext 4240

Contact Telephone

2. Identify the operator of the proposed facility if the owner has entered into an agreement with an operator:

Town of Bourne Department of Integrated Solid Waste Management

Name

201 MacArthur Boulevard

Street Address

Bourne

City/Town

MA

State

02532

Zip Code

508-759-0600, Ext 4240

Telephone

Daniel Barrett

Contact Person

508-759-0600, Ext 4240

Contact Telephone

C. Fees {16.08(4)}

1. Proof of Payment: Documentation must be submitted showing that the requirements for paying the Technical Fee to the Board of Health as per 16.08(4) have been satisfied.

Proof of payment may be either (please check which one you have provided):

Document from the Board of Health stating that the Board of Health has waived the technical fee or that the Applicant has satisfied the Technical Fee payment requirements; or

Receipt showing that the Applicant has paid the Maximum Technical Fee to the municipality.

Location of Attachment:

Attachment 4

section and/or page numbers



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C. Fees {16.08(4)} (cont.)

2. Amount of Maximum Technical Fee: Enter the Maximum Technical Fee as computed using Appendix A of 310 CMR 16.99:
\$ 99,033.33
Maximum Technical Fee

D. Collection Center for Household Hazardous Waste

Does the applicant intend to apply, pursuant to 310 CMR 30.190, for approval to operate a collection center for hazardous waste from households on the proposed site?

Yes No

If "yes," the Applicant should contact the Permitting Section of the Bureau of Waste Prevention in the appropriate DEP Regional Office.

E. Declaration of Waiver Request {16.08(5)(c)}

1. Is a waiver from any of the site suitability criteria being requested under provisions of 310 CMR 16.40(6)? (If "yes," complete Part V.A. of this application form.)
 Yes No
2. Is a waiver from any of the requirements of Part I of 310 CMR 16.00 being requested under provisions of 310 CMR 16.18? (If "yes," complete Part V.B. of this application form.)
 Yes No

F. Massachusetts Environmental Policy Act (MEPA) {16.08(5)(d)}

Indicate which one of the following is attached to the application:

- Evidence that the project does not require MEPA review.
- Certificate from the Secretary of the Executive Office of Environmental Affairs stating that an Environmental Impact Report is **not** required.
- Evidence that the MEPA process does apply and the Secretary has determined that an EIR is required. (Note: The DEP will not complete its technical review of the application until the applicant submits the Certificate from the Secretary of the Executive Office of Environmental Affairs stating that the Final Environmental Impact Report is acceptable.)
- Certificate from the Secretary of the Executive Office of Environmental Affairs stating that the Final Environmental Impact Report is acceptable.



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F. Massachusetts Environmental Policy Act (MEPA) {16.08(5)(d)} (cont.)

Location of Attachment:

Attachment 5

section and/or page numbers

G. Wetlands Resources

1. Buffer Zone: Is any part of the proposed site located within 100 feet of any wetlands?

Yes No

2. Riverfront Area: Is any part of the site located within a riverfront area?

Yes No

3. Floodplain: Is any part of the proposed site located within a 100-year floodplain?

Yes No

If the answer to question I.G.1, I.G.2 or I.G.3 is "yes," please describe what activities, if any, will occur within the 100-foot buffer zone, the riverfront area or the 100-year floodplain.

Respond here or identify location of attached response:

section and/or page numbers

4. Order of Conditions: Will an Order of Conditions under the Wetlands Protection Act (c.131, s.40) be required?

Yes No

5. Variance: Will a variance from the Wetlands regulations be required?

Yes No



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H. Maps

1. Ground Water Contour Map: Has a ground water contour map for the site been developed?

Yes No

If Yes, please attach the map and identify the location of the attachment:

Attachment 3, Figure 10

section and/or page numbers

Please submit the following with the Application:

2. Locus Map: A US Geological Survey (USGS) topographic map of at least 8.5 x 11 inches in size (7.5 minute series scale) should be attached which clearly delineates the proposed site boundaries and shows all access roads to the proposed site.

Identify the attachment:

Attachment 3, Figure 1

section and/or page numbers

3. Water Resources Site Plan: The following information regarding water resources should be indicated on a site plan (scale no larger than one inch equals two hundred feet) that covers the site plus a one-half mile extension in all directions from the site boundary. Please refer to the definitions at 310 CMR 16.02 for guidance on the meaning of the terms.

- All wetlands, associated buffer zones and riverfront areas as defined in 310 CMR 10.00
- All 100-year flood plains
- All surface water bodies (rivers, streams, ponds, lakes, reservoirs etc),
- All perennial streams draining to surface drinking water supplies,
- All private water supply wells
- All public water supply wells
- All or any fractions of Interim Wellhead Protection Areas (IWPA) or Zone II areas
- All or any fractions of Proposed Drinking Water Source Areas
- All or any fraction of a Zone A or B of a surface water supply

Identify the location of the attachment:

Attachment 3, Figure 12

section and/or page numbers



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H. Maps (cont.)

4. Land Use Site Plan: The following information regarding land use should be indicated on a site plan (scale no larger than one inch equals two hundred feet) that covers the site plus a one-half mile extension in all directions from the site boundary:
- All wildlife management areas,
 - All Areas of Critical Environmental Concern (ACEC) as established by the Secretary of the Executive Office of Environmental Affairs (EOEA),
 - All lands actively devoted to agricultural or horticultural uses and lands classified as Prime, Unique, or of State and Local Importance by the United States Department of Agriculture, Natural Resources Conservation Service;
 - All of the Following Open Space Protected Areas:
 - state forests
 - state or municipal parklands or conservation land, or other open space held for natural resource purposes in accordance with Article 97 of the Massachusetts Constitution
 - Department of Conservation & Recreation (DCR) reservations
 - lands with conservation, preservation, agricultural, or watershed protection restrictions approved by the Secretary of the Executive Office of Environmental Affairs
 - conservation land owned by private non-profit land conservation organizations that is open to the public
 - All residential dwellings on site and within 500 feet (1000 feet for landfills) of the property boundary,
 - All occupied commercial buildings within 500 feet of the property boundary,
 - All of the following:
 - health care facilities
 - prisons
 - Elementary Schools
 - middle schools
 - high schools
 - children's' pre-schools
 - licensed day care centers
 - senior centers
 - youth centers
 - Other Solid Waste Facilities
 - All proposed waste handling areas on the site,
 - All proposed areas of waste deposition on the site,
 - All buildings and other facilities proposed on the site,
 - All access roads on the site and traffic flow off the site,
 - All abutting properties and their appropriate zoning designation (include any zoning abbreviations in plan legend).
 - The zoning designation of the proposed site.

Identify the location of the attachment:

Attachment 3, Figure 13

section and/or page numbers



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Section II. Facility Specific Criteria

Part II is divided into three sections. Complete only the appropriate section.

- II.A. Landfills
- II.B. Combustion Facilities
- II.C. Waste Handling and Processing Facilities

A. Landfills {16.40(3)(a)}

Complete Part II.A., if Site Assignment is sought for a landfill.

1. Zone II of Existing Public Water Supply {16.40(3)(a)1.}: Will any area of waste deposition be located within the designated Zone II area of an existing public water supply well?

Yes No

Location of supporting information or comments:

Attachment 1, Page 16 and Figure 12

section and/or page numbers

2. IWPA of Existing Public Water Supply {16.40(3)(a)2.}: If the Zone II of an existing public water supply well has not been determined, will any area of waste deposition be within the Interim Wellhead Protection Area (IWPA) as defined at 310 CMR 22.02?

Yes No

If "Yes" see the note at Question II.A.4. and identify where additional information is attached:

section and/or page numbers

3. Zone II or IWPA of a Proposed Drinking Water Source Area {16.40(3)(a)3.}: Will any area of waste deposition be within the area of a Zone II or Interim Well Head Protection Area (IWPA) of a proposed drinking water source area for which the documentation necessary to obtain a source approval has been submitted prior to the earlier of either the site assignment application, or if the MEPA process does apply, the Secretary's Certificate on the Environmental Notification Form or Notice of Project Change, or where applicable, the Secretary's Certificate on the EIR or Final EIR;

Yes No

If "Yes" see the note at Question II.A.4. and identify where additional information is attached:

section and/or page numbers



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A. Landfills {16.40(3)(a)} (cont.)

4. 15,000 Feet Upgradient of Existing Public Water Source Well or Proposed Drinking Water Source Area {16.40(3)(a)4.}: In instances where the Zone II has not been calculated, will any area of waste deposition be 15,000 feet or less hydraulically upgradient of an existing public water source well or proposed drinking water source area?

Yes No

See the note and identify where additional information is attached:

Attachment 1, Page 16 and Figure 12

section and/or page numbers

Note: If the answer to Questions II.A.2., 3, or 4 is "YES," the applicant may conduct and submit with this application a preliminary Zone II study, approved of by the Department, showing that the waste deposition area would be beyond the Zone II of the public water supply well or proposed drinking water source area in question. Alternatively, the applicant may prepare and submit, with this application, other evidence showing the well or proposed drinking water source area and the ground water under the proposed site are not hydraulically connected

The Applicant should consult with the DEP Drinking Water Program in the Bureau of Resource Protection prior to conducting a preliminary Zone II investigation to determine the scope of the investigation. At a minimum, the preliminary Zone II submittal should consist of:

- 1) A review and discussion of all available pertinent geologic and hydrologic data including bedrock and surficial geologic maps, hydrologic data reports and atlases, consultant reports, and pumping test reports;
 - 2) An estimate and orientation of the regional hydraulic gradient across the well site;
 - 3) A preliminary conceptual model of the aquifer, including a discussion of pertinent recharge and till boundaries; and
 - 4) A preliminary estimate of the Zone II area as defined in the Drinking Water Program's Water Supply Guidelines.
5. Danger to existing or proposed drinking water source area {16.40(3)(a)5.}: State why a discharge from the facility would not pose a danger to any existing or proposed drinking water source area.

Respond here or identify where the response is attached:

Attachment 1, Page 17 and Attachment 6

section and/or page numbers



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A. Landfills {16.40(3)(a)} (cont.)

6. Sole Source Aquifer {16.40(3)(a)6.}: Will any area of waste deposition be located within the recharge area of a designated sole source aquifer? (Sole Source Aquifers are designated by the US Environmental Protection Agency. To inquire as to whether a site is located above a Sole Source Aquifer contact the US Environmental Protection Agency, Region I, Ground Water Management Section.)

Yes No

Identify location of attached information:

Attachment 1, Page 17

section and/or page numbers

If the answer to question II.A.6. is "yes," then the site is not suitable unless the criteria in 310 CMR 16.40(3)(a)6.a., b. and c. are met. Attach documentation showing that these criteria are satisfied.

Identify location of attached information:

Attachment 1, Page 17 and Attachment 6

section and/or page numbers

-
7. Zone of Contribution or Recharge Area {16.40(3)(a)7.}: Is any area of waste deposition within the zone of contribution of an existing public water supply or proposed drinking water source area, or the recharge area of a surface drinking water supply, pursuant to a municipal ordinance or by-law enacted in accordance with M.G.L. c. 40A, § 9?

Yes No

Identify location of supporting information or comments:

Attachment 1, Page 18 and Attachment 6

section and/or page numbers

-
8. Zone A or B of Surface Drinking Water Supply {16.40(3)(a)8.}: Will any area of waste deposition be within the Zone A or Zone B of a surface water supply?

Yes No

Identify location of supporting information or comments:

Attachment 1, Page 19

section and/or page numbers



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A. Landfills {16.40(3)(a)} (cont.)

9. Perennial stream draining to Surface Drinking Water Supply {16.40(3)(a)9.} Will any area of waste deposition be located within 400 feet upgradient, as defined by groundwater flow or surface water drainage, of a perennial water course that drains to a surface water supply that itself is within one mile of the waste deposition area?

Yes No

Identify location of supporting information or comments:

Attachment 1, Page 19

section and/or page numbers

10. Potentially Productive Aquifer {16.40(3)(a)10.}: Will any area of waste deposition be within a Potentially Productive Aquifer?

Yes No

Identify location of supporting information or comments:

Attachment 1, Page 19

section and/or page numbers

If the answer to question II.A.10. is "yes," then the site is not suitable unless documentation is attached showing that either 16.40(3)(a)10.a., b. or c. applies.

Identify location of attached documentation:

Attachment 1, Page 19, Attachment 6 and Figures 11 and 14

section and/or page numbers

11. Within 1000 feet Upgradient or Otherwise within 500 Feet of an Existing or Potential Private Water Supply Well {16.40(3)(a)11.}: Will any area of waste deposition be within 1000 feet upgradient, and where not upgradient, within 500 feet, of a private water supply well existing or established as a potential supply at the time of submittal of the application?

Yes No

Identify location of supporting information or comments

Attachment 1, Page 22 and Attachment 6

section and/or page numbers



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A. Landfills {16.40(3)(a)} (cont.)

If the answer to question II.A.11 is "yes," attach documentation showing a valid option to purchase each such supply. Also indicate whether a replacement drinking water supply will be provided.

Identify the location of attached documentation:

section and/or page numbers

12. Four Feet Depth to Ground Water {16.40(3)(a)12.}: Will the maximum high ground water level under any area of waste deposition be less than four (4) feet below the lowermost level of the waste or, if a liner system is employed, four feet below the bottom of the lower most liner?

Yes No

Identify location of supporting information or comments:

Attachment 1, Page 22 and Figure 10

section and/or page numbers

13. Wetlands 16.40(3)(a)13.}: Will any area of waste deposition or any leachate containment structure be within any resource area, including the 100 year floodplain, protected by the Wetlands Protection Act?

Yes No

Identify location of supporting information or comments:

Attachment 1, Page 23

section and/or page numbers

14. 400 Feet to a Lake or 200 feet to a Riverfront Area {16.40(3)(a)14.}: Will any area of waste deposition or any leachate containment structure be within 400 feet of a lake or within 200 feet of a Riverfront Area as defined in 310 CMR 10.00, that is not a drinking water supply?

Yes No

Identify location of supporting information or comments:

Attachment 1, Page 23

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A. Landfills {16.40(3)(a)} (cont.)

15. 1000 Feet to Various Occupied Facilities {16.40(3)(a)15.}: Will any area of waste deposition be within 1000 feet of any of the following (excluding equipment storage or maintenance structures):

- an occupied residential dwelling,
- health care facility
- prison,
- Elementary School
- middle school
- high school
- children's' pre-school
- licensed day care center
- senior center
- youth center

Yes No

Identify location of supporting information or comments:

Attachment 1, Page 23 and Figure 13

section and/or page numbers

If the answer to II.A.15. is "yes", attach documentation showing evidence of a valid option to purchase the facility in question.

Identify location of attached documentation:

section and/or page numbers

16. Ground water Protection System {16.40(3)(a)16.}: Will a ground water protection system be employed?

Yes No

If a ground water protection system will be employed, describe the general features and components of the system which will prevent the migration of leachate and avoid adverse impact to the ground water.

If a ground water protection system will not be employed, demonstrate that the facility will not discharge leachate that presents a threat of adverse impact to ground water.

Identify location of attached explanation:

Attachment 1, Page 8 & 23

section and/or page numbers



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B. Combustion Facilities {16.40(3)(c)}

Complete Part II.B. if site assignment is sought for a combustion facility.

1. Zone I of Public Water Supply {16.40(3)(c)1.}: Will any waste handling area be within the Zone I of a public water supply?

Yes No

Identify location of supporting information or comments:

section and/or page numbers

2. IWPA or Zone II of Existing Supply or Proposed Drinking Water Source Area {16.40(3)(c)2.}: Will any waste processing area be within:

- a) the Interim Wellhead Protection Area (IWPA) of an existing public supply

Yes No

Identify location of supporting information or comments:

section and/or page numbers

- b) Zone II of an existing public water supply

Yes No

Identify location of supporting information or comments:

section and/or page numbers

- c) a proposed drinking water source area, provided that the documentation necessary to obtain a source approval has been submitted prior to the earlier of either the site assignment application, or if the MEPA process does apply, the Secretary's Certificate on the Environmental Notification Form or Notice of Project Change, or where applicable, the Secretary's Certificate on the EIR or Final EIR,

Yes No



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B. Combustion Facilities {16.40(3)(c)} (cont.)

Identify location of supporting information or comments:

_____ section and/or page numbers _____

If the answer to all the above is "No," do not respond to the following and go on to section II.B.3. If the answer to any of the above is "Yes," respond to the following requests:

Supply information to demonstrate to the Department that the risk of an adverse impact to the ground water will be minimized.

Identify location of attached information:

_____ section and/or page numbers _____

Supply information to demonstrate to the Department that at least one of the following is true:

- 1) The proposed facility cannot reasonably be sited outside the IWPA or Zone II.
- 2) If the site has been previously used for solid waste management activities, there would be a net environmental benefit to the ground water by siting the facility within the Zone II or the IWPA.

Identify location of attached information:

_____ section and/or page numbers _____

3. Zone A of Surface Water Supply {16.40(3)(c)3.}: Will the waste processing area be within the Zone A of a surface water supply?

Yes No

Identify location of supporting information or comments:

_____ section and/or page numbers _____



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B. Combustion Facilities {16.40(3)(c)} (cont.)

- 4. Within 500 feet Upgradient or Otherwise within 250 Feet of an Existing or Potential Private Water Supply Well {16.40(3)(c)4.}: Will the waste processing area be within 500 feet upgradient, and where not upgradient, within 250 feet, of a private water supply well existing or established as a potential supply at the time of submittal of the application?

Yes No

Identify location of supporting information or comments:

section and/or page numbers

If the answer to question II.B.4 is "yes," attach documentation showing a valid option to purchase each such supply. Also indicate whether a replacement drinking water supply will be provided.

Identify location of attached documentation:

section and/or page numbers

- 5. Two Foot Depth to Ground Water {16.40(3)(c)5.}: Will the maximum high ground water level be less than 2 feet below the surface in any waste handling or processing area?

Yes No

Identify location of supporting information or comments:

section and/or page numbers

If "yes," indicate how the project can be designed to maintain a two foot separation.

Identify location of explanation:

section and/or page numbers



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B. Combustion Facilities {16.40(3)(c)} (cont.)

6. 500 Feet to Various Occupied Facilities {16.40(3)(c)6.}: Will any waste handling or processing area be within 500 feet of any of the following (excluding equipment storage or maintenance structures):

- an occupied residential dwelling,
- health care facility
- prison,
- Elementary School
- middle school
- high school
- children's' pre-school
- licensed day care center
- senior center
- youth center

Yes No

Identify location of supporting information or comments:

section and/or page numbers

If the answer to II.B.6. is "yes", attach documentation showing evidence of a valid option to purchase the facility in question.

Identify location of attached documentation:

section and/or page numbers

7. Riverfront Area {16.40(3)(c)7.}: Will the waste handling area be within the Riverfront Area as defined at 310 CMR 10.00?

Yes No

Identify location of supporting information or comments:

section and/or page numbers



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C. Waste Handling and Processing Facilities {16.40(3)(d)}

Complete Part II.C if site assignment is sought for a waste handling and processing facility (all facilities other than landfills and combustion facilities).

1. Zone I of Public Water Supply {16.40(3)(d)1.}: Will any waste handling area be within the Zone I of a public water supply?

Yes No

Identify location of supporting information or comments:

_____ section and/or page numbers

2. IWPA or Zone II of Existing Supply or Proposed Drinking Water Source Area {16.40(3)(d)2.}: Will any waste handling or processing area be within:

- a) the Interim Wellhead Protection Area (IWPA) of an existing public supply

Yes No

Identify location of supporting information or comments:

_____ section and/or page numbers

- b) the Zone II of an existing public water supply

Yes No

Identify location of supporting information or comments:

_____ section and/or page numbers

- c) a proposed drinking water source area, provided that the documentation necessary to obtain a source approval has been submitted prior to the earlier of either the site assignment application, or if the MEPA process does apply, the Secretary's Certificate on the Environmental Notification Form or Notice of Project Change, or where applicable, the Secretary's Certificate on the EIR or Final EIR,

Yes No



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C. Waste Handling and Processing Facilities {16.40(3)(d)} (cont.)

Identify location of supporting information or comments:

section and/or page numbers

If the answer to II.C.2.a, b and c is "No," do not respond to the following and go on to section II.C.3. If the answer to II.C.2.a, b or c is "Yes," respond to the following requests.

Supply information to demonstrate to the Department that the risk of an adverse impact to the ground water will be minimized.

Identify location of attached information:

section and/or page numbers

Supply information to demonstrate to the Department that at least one of the following is true:

- 1) The proposed facility cannot reasonably be sited outside the IWPA or Zone II.
- 2) If the site has been previously used for solid waste management activities, there would be a net environmental benefit to the ground water by siting the facility within the Zone II or the IWPA.

Identify location of attached information:

section and/or page numbers

3. Zone A of Surface Water Supply {16.40(3)(d)3.}: Will the waste handling or processing area be within the Zone A of a surface water supply?

Yes No

Identify location of supporting information or comments:

section and/or page numbers



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C. Waste Handling and Processing Facilities {16.40(3)(d)} (cont.)

4. Within 500 feet Upgradient or Otherwise within 250 Feet of an Existing or Potential Private Water Supply Well {16.40(3)(d)4.}: Will the waste handling or processing area be within 500 feet upgradient, and where not upgradient, within 250 feet, of a private water supply well existing or established as a potential supply at the time of submittal of the application?

Yes No

Identify location of supporting information or comments:

section and/or page numbers

If the answer to question II.C.4 is "yes," attach documentation showing a valid option to purchase each such supply. Also indicate whether a replacement drinking water supply will be provided.

Identify location of attached documentation:

section and/or page numbers

5. Minimum Distances to Various Occupied Facilities {16.40(3)(d)5.}:

- a) Is the facility a transfer station using a fully enclosed storage system such as a compactor unit that proposes to receive less than or equal to 50 tons per day of solid waste

Yes No

Identify location of supporting information or comments:

section and/or page numbers

- b) Is the waste handling area 250 feet or less from any of the following (excluding equipment storage or maintenance structures)

- an occupied residential dwelling,
- health care facility
- prison,
- Elementary School
- middle school
- high school
- children's' pre-school
- licensed day care center
- senior center
- youth center

Yes No

Note:
Respond to this question if the answer to question a) above is "Yes."



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C. Waste Handling and Processing Facilities {16.40(3)(d)} (cont.)

Identify location of supporting information or comments:

section and/or page numbers

Note:
Respond to this question if the answer to question a) above is "No."

c) Is the waste handling area 500 feet or less from any of the following (excluding equipment storage or maintenance structures)

- an occupied residential dwelling,
- health care facility
- prison,
- Elementary School
- middle school
- high school
- children's' pre-school
- licensed day care center
- senior center
- youth center

Yes No

Identify location of supporting information or comments:

section and/or page numbers

6. Riverfront Area {16.40(3)(d)6.}: Will the waste handling area be within the Riverfront Area as defined at 310 CMR 10.00?

Yes No

Identify location of supporting information or comments:

section and/or page numbers



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C. Waste Handling and Processing Facilities {16.40(3)(d)} (cont.)

7. Two Foot Depth to Ground Water {16.40(3)(d)7.}: Will the maximum high ground water level be less than 2 feet below the surface in any waste handling or processing area?

Yes No

Identify location of supporting information or comments:

section and/or page numbers

If "yes," indicate how the project can be designed to maintain a two foot separation.

Identify location of explanation:

section and/or page numbers



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Section III. General Criteria {16.40(4)}

All applicants should complete all sections of Part III.

Note: When a response includes a description of a potential adverse impact, the applicant should describe both the qualitative and quantitative aspects of the potential impact.

A. Agricultural Land {16.40(4)(a)}

1. Does the site contain any land classified as Prime, Unique, or of State and Local Importance by the United States Department of Agriculture, Natural Resources Conservation Service?

Yes No

Identify location of supporting information or comments:

Attachment 1, Page 24, Attachment 7, Attachment 8 and Attachment 3, Figure 15

section and/or page numbers

2. Does the site contain any land deemed Land Actively Devoted to Agricultural or Horticultural Uses, except where the facility is an agricultural composting facility?

Yes No

Identify location of supporting information or comments:

Attachment 1, Page 25

section and/or page numbers

3. Will the facility be less than 100 feet from any land classified as Prime, Unique, or of State and Local Importance by the United States Department of Agriculture, Natural Resources Conservation Service?

Yes No

Identify location of supporting information or comments:

Attachment 1, Page 25

section and/or page numbers



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A. Agricultural Land {16.40(4)(a)} (cont.)

4. Will the facility be less than 100 feet from any land deemed Land Actively Devoted to Agricultural or Horticultural Uses, except where the facility is an agricultural composting facility?

Yes No

Identify location of supporting information or comments:

Attachment 1, Page 25

section and/or page numbers

B. Traffic Impacts {16.40(4)(b)}

1. ENF/EIR Accepted by MEPA

If the applicant prepared an Environmental Notification Form (ENF) to comply with the requirements of the Massachusetts Environmental Policy Act (MEPA), please attach all portions of the ENF that are relevant to traffic impacts. If the applicant was also required to submit an Environmental Impact Report (EIR) to comply with MEPA, please attach all portions of the EIR relevant to traffic impacts.

- ENF/EIR traffic impacts attached
 ENF/EIR not required

Identify location of attachments or comments:

Attachment 1, Page 26 and Attachment 9 and Attachment 10

section and/or page numbers

2. ENF/EIR Not Required by MEPA

If no ENF or EIR was required to comply with MEPA, please provide the following information in an attachment:

- a) Maximum number of trips to the site per day by type of vehicle:
- b) Indicate, by vehicle type, the anticipated number of trips that will be made on each of the roads serving the facility.
- c) Identify any intersections, school zones, hospitals, or other locations on the roads serving the facility that may be adversely impacted by traffic accessing the site.



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B. Traffic Impacts {16.40(4)(b)} (cont.)

Identify the location of the attached information or comments

section and/or page numbers

C. Wildlife and Wildlife Habitat {16.40(4)(c)}

The Natural Heritage and Endangered Species Program (NHESP) of the Massachusetts Division of Fisheries and Wildlife administers the programs dealing with the Wildlife and Wildlife Habitats referred to in these questions. The NHESP should be contacted to obtain the information and documentation needed to respond to the questions in this section.

The applicant must obtain a specific response from NHESP regarding the proposed site and attach the response to this application.

1. Habitat of Endangered, Threatened, or Special Concern Animal or Plant: Is the proposed site within the habitat of a state-listed Endangered, Threatened, or Special Concern animal or plant, as documented by the Natural Heritage and Endangered Species Program in its database?

Yes No

Identify location of supporting information or comments:

Attachment 1, Page 27 and Attachment 11

section and/or page numbers

2. Ecologically Significant Natural Communities: Is the proposed site located in or adjacent to an area described on the most recent map of Ecologically Significant Natural Communities as documented by the Natural Heritage Program in its database?

Yes No

Identify location of supporting information:

Attachment 1, Page 28 and Attachment 11

section and/or page numbers



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C. Wildlife and Wildlife Habitat {16.40(4)(c)} (cont.)

3. Wildlife Management Area: Is the proposed site located in an area adjacent to or with the potential to impact upon a Wildlife Management Area designated and managed by the Division of Fisheries and Wildlife?

Yes No

Identify location of supporting information or comments:

Attachment 1, Page 28

section and/or page numbers

Instructions: If the answer to any of the above questions (III.C.1., III.C.2. or III.C.3.) is "yes," and the proposed facility does have the potential to adversely impact one or more Endangered, Threatened, or Special Concern animals or plants or Wildlife Management Area, then answer questions III.C.4. and, if necessary, III.C.5. If the answer to each of the above questions (III.C.1., III.C.2. and III.C.3.) is "no," do not answer question III.C.4. or III.C.5.

4. Adverse Impact on Habitat: Will the proposed site have an adverse impact on the habitat of a state-listed Endangered, Threatened, or Special Concern animal or plant, Ecologically Significant Natural Community, or Wildlife Management Area, as determined by the Natural Heritage and Endangered Species Program? (Attach determination from NHESP.)

Identify location of supporting information or comments:

Attachment 1, Page 27 and Attachment 11

section and/or page numbers

Instructions: If the Natural Heritage and Endangered Species Program has determined there will not be an adverse impact, do not answer question III.C.5. If NHESP determined there is a potential for an adverse impact, respond to question III.C.5.

5. Mitigation of Adverse Impacts: If there is a determination by the Natural Heritage and Endangered Species Program that the proposed facility may potentially impact the habitat of a state-listed Endangered, Threatened or Special Concern animal or plant, Ecologically Significant Natural Community, or Wildlife Management Area, are there any reasonable mitigation measures the proponent may use to minimize or eliminate any adverse impacts?

Yes No

If "no," then the site is unsuitable and the proposed facility shall not be sited.

If "yes," then with regard to this criterion the site may be assigned with conditions which will meet Division of Fisheries and Wildlife approval for mitigation of the adverse impacts. The mitigation measures proposed shall be appended to this application.



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C. Wildlife and Wildlife Habitat {16.40(4)(c)} (cont.)

Identify location of supporting information or comments:

Attachment 1, Page 27 and Attachment 11
section and/or page numbers

D. Areas of Critical Environmental Concern {16.40(4)(d)}

Programs for designating and protecting Areas of Critical Environmental Concern (ACEC) are administered by the Executive Office of Environmental Affairs (EOEA). EOEA should be contacted to obtain the information and documentation needed to respond to the questions in section III.D. Responses by EOEA should be appended to this application.

A specific response from EOEA is not required when EOEA's data show the site is not located near any ACEC.

1. Site Within ACEC: Is the proposed site located within the boundaries of an area designated as an Area of Critical Environmental Concern by the Secretary of EOEA?

Yes No

Identify location of supporting information or comments:

Attachment 1, Page 28
section and/or page numbers

If the answer to question III.D.1. is "yes, the site is not suitable.

2. Site Adjacent to ACEC: Is the proposed site adjacent to an ACEC with the potential to impact the resources designated by the Secretary of EOEA as worthy of protection? (As defined in 16.02, "adjacent" may include areas not contiguous to the boundaries of the site.)

Yes No

Identify location of supporting information or comments:

Attachment 1, Page 28
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D. Areas of Critical Environmental Concern {16.40(4)(d)} (cont.)

3. Mitigation Measures: If there is a determination by EOEA that the proposed facility may potentially adversely impact the ACEC, are there any reasonable mitigation measures the proponent may use to minimize or eliminate any adverse impacts?

Yes No

If "no," the site is not suitable.

If "yes," then with regard to this criterion the site may be assigned with conditions which will meet EOEA approval for mitigation of the adverse impacts. The mitigation measures proposed shall be appended to this application.

Identify location of supporting information or comments:

_____ section and/or page numbers

E. Protection of Open Space {6.40(4)(e)}

1. State Forests: Will the proposed solid waste management facility have an adverse impact on the physical environment of, or on the use and enjoyment of state forests?

Yes No

Identify location of supporting information or comments:

Attachment 1, Page 29

_____ section and/or page numbers

2. State or Municipal Lands: Will the proposed solid waste management facility have an adverse impact on the physical environment of, or on the use and enjoyment of state or municipal parklands or conservation land, or other open space held for natural resource purposes in accordance with Article 97 of the Massachusetts Constitution?

Yes No

Identify location of supporting information or comments:

Attachment 1, Page 29

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E. Protection of Open Space {6.40(4)(e)} (cont.)

3. MDC Reservation: Will the proposed solid waste management facility have an adverse impact on the physical environment of, or on the use and enjoyment of MDC reservations?

Yes No

Identify location of supporting information or comments:

Attachment 1, Page 29

section and/or page numbers

4. Lands Protected by EOE A Restrictions: Will the proposed solid waste management facility have an adverse impact on the physical environment of, or on the use and enjoyment of lands with conservation, preservation, agricultural, or watershed protection restrictions approved by the Secretary of the Executive Office of Environmental Affairs?

Yes No

Identify location of supporting information or comments:

Attachment 1, Page 29

section and/or page numbers

5. Privately Owned Public Conservation Land: Will the proposed solid waste management facility have an adverse impact on the physical environment of, or on the use and enjoyment of conservation land owned by private non-profit land conservation organizations and open to the public?

Yes No

Identify location of supporting information or comments:

Attachment 1, Page 29

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F. Air Quality Impacts {16.40(4)(f)}

Instructions: If the proposed facility is a combustion facility, complete only section III.f.1. If the proposed facility is **not** a combustion facility, complete only section III.f.2.

1. Air Quality Impacts: Combustion Facilities

The Applicant shall, pursuant to the Air Pollution Control regulations, 310 CMR 7.02, submit a complete application to the Department for its review. The application shall be submitted on forms furnished by the Bureau of Waste Prevention. A copy of the permit application shall be appended to this application.

In addition to the Air Quality Control application, the Applicant shall provide information on any populations within the area impacted by emissions from the facility which might be sensitive to the projected emissions from the facility. Information should include relevant health statistics for the impacted population.

Identify location of supporting information or comments:

section and/or page numbers

2. Air Quality Impacts: Non-Combustion Facilities

- a) Characterize the possible airborne emissions from the proposed facility. Include the composition and quantity of possible emissions. Indicate how these emissions are expected to vary over the life of the facility. Also characterize any other air emissions associated with the proposed facility such as emissions from vehicles.
- b) Demonstrate that the anticipated emissions from the facility will meet required state and federal air quality standards and criteria and otherwise will not constitute a danger to the public health, safety or the environment. Take into account the concentration and dispersion of emissions, the number and proximity of sensitive receptors and the attainment status of the area.

Identify location of supporting information or comments:

Attachment 1, Page 31 and Attachment 10

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G. Nuisance Conditions {16.40(4)(g)}

For each of the following nuisance conditions that could occur during the construction and/or operation of the proposed facility, indicate the extent of the possible nuisance conditions and the measures that will be taken to mitigate or prevent the occurrence of the nuisance condition:

- Noise,
- Dust,
- Litter;
- Vectors such as rodents and insects,
- Odors,
- Bird hazards to air traffic, and
- Other nuisance conditions (please specify).

Identify location of supporting information or comments:

Attachment 1, Page 32 and Attachment 12
section and/or page numbers

H. Size of Facility {16.40(4)(h)}

Explanation: The information requested in this section is needed to determine whether the size of the site, considering access roads, areas for vehicles to wait before unloading, unloading facilities, storage areas, waste processing areas and pollution control equipment, is adequate for a facility with the proposed daily capacity.

1. Discussion: Discuss the waste delivery, unloading, and handling (including processing and storage) activities and pollution control equipment to demonstrate whether the size of the site is adequate to properly manage the proposed facility. Be specific with respect to the proposed capacity of the facility.

Identify the location of supporting information or comments:

Attachment 1, Pages 10 and 35
section and/or page numbers

2. 100 Foot Set Back: Will the waste handling area or deposition area be less than 100 feet from any property boundary except where the property boundary borders a separate solid waste management facility?

Yes No



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H. Size of Facility {16.40(4)(h)} (cont.)

Identify location of supporting information or comments:

Attachment 1, Page 35

section and/or page numbers

I. Areas Previously Used for Solid Waste Disposal {16.40(4)(i)}

1. Previous Solid Waste Activities: Have the proposed site or any of the abutting properties been previously used for the legal or illegal disposal of solid wastes?

Yes No

Identify location of supporting information or comments:

Attachment 1, Pages 1 Through 5 and 35

section and/or page numbers

If "yes," please supply the following information and append to this application:

- a) Address: The address of the area previously used for the disposal of solid waste,
- b) Owner: The owner and the address of the owner of the area previously used for the disposal of solid waste,
- c) Dimensions: The dimensions of the area previously used for the disposal of solid waste,
- d) Status: Current status of the area previously used for the disposal of solid waste (e.g., active, inactive),
- e) Impacts on Site: The nature and extent to which the area previously used for the disposal of solid waste currently impacts or threatens to impact the proposed site,
- f) Impacts of Site: The nature and extent to which the proposed site may impact the area previously used for the disposal of solid waste,
- g) Combined Impacts: The nature and extent of any combined impacts from the area previously used for the disposal of solid waste and the proposed facility to public health, safety or the environment (Include factors such as ground water contamination and surface water runoff.),
- h) Mitigation: The extent to which use of the proposed site would result in mitigation of existing or potential impacts from the previously used site through remediation, closure or other activities.



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I. Areas Previously Used for Solid Waste Disposal {16.40(4)(i)} (cont.)

Identify location of supporting information or comments:

Attachment 1, Pages 1 Through 5 and 35
section and/or page numbers

J. Existing Disposal Facilities {16.40(4)(j)}

1. Existing Disposal Facilities in Municipality: Are there any existing (active or inactive) disposal facilities (solid waste landfills or combustion facilities) in the municipality in which the proposed site is located?

Yes No

Identify the location of supporting information or comments:

Attachment 1, Page 37
section and/or page numbers

2. Exclusive Use of Facility: Will the proposed facility be limited to the exclusive use of the municipality in which the proposed facility is to be sited?

Yes No

Identify the location of supporting information or comments:

Attachment 1, Page 37
section and/or page numbers

Instructions: If the answer to III.J.1. is "yes" and the answer to III.J.2. is "no," please provide the information requested in III.J.3. Otherwise, go on to question III.K.

3. Existing Facility Identification: Provide the following information about the existing disposal facility or facilities in the municipality in which the proposed site is located:
- Existing facility identification (name, address, type of facility):
 - How much of the waste (tons/day) accepted at the proposed facility will be generated in the municipality in which the facility is located?
 - What percentage of the waste accepted at the proposed facility will come from the municipality in which the site is located?



**BWP SW 01 Site Suitability Report for a New Site
Assignment**

Transmittal Number

**BWP SW 38 Site Suitability for a Major Modification
of an Existing Site Assignment**

172356

Facility ID# (if known)

J. Existing Disposal Facilities {16.40(4)(j)} (cont.)

- d) Discuss to what extent the proposed facility meets the needs of the region in which the site is located.
- e) Explain to what extent the proposed facility incorporates recycling, composting and waste diversion. (Refer to other responses, if appropriate.)

Identify the location where the information is attached:

Attachment 1, Page 37

section and/or page numbers

K. Other Sources of Contamination or Pollution {16.40(4)(k)}

Attach an evaluation of whether the projected impacts of the proposed facility pose a threat to public health, safety or the environment, taking into consideration the impacts of existing sources of pollution or contamination as defined by the Department, and whether the proposed facility will mitigate or reduce those sources of pollution or contamination.

The Department has prepared a guidance document that describes how to make this evaluation. The document is titled, *Interim Risk-Evaluation Guidance Document for Solid Waste Site Assignment and Permitting in Support of 310 CMR 16.00 and 19.000* (initially published June 8, 2001, and most recently revised on March 22, 2006). This guidance document, including its title, will be revised from time to time. Please contact the Department or visit the Department's web site to obtain the most recent version of the guidance document.

The applicant should contact the Department to discuss the scope of work prior to undertaking the evaluation.

Identify the location of the attached evaluation:

Attachment 1, Page 38 and Attachment 10

section and/or page numbers



**BWP SW 01 Site Suitability Report for a New Site
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Transmittal Number

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of an Existing Site Assignment**

172356

Facility ID# (if known)

L. Regional Participation

1. Municipal Participation in Regional Disposal: Does the municipality in which the proposed site is located now participate in a regional disposal facility?

Yes No

Identify location of supporting information or comments:

Attachment 1, Page 38

section and/or page numbers

Instructions: If the answer to question III.L.1. is "Yes," supply the information requested in question III.L.2. Otherwise, go on to part IV.

2. Proposed Facility: Provide the following information about the proposed facility:
- a) How much of the waste (tons/day) accepted at the proposed facility will be generated in the municipality in which the facility is located?
 - b) What percentage of the waste accepted at the proposed facility will come from the municipality in which the site is located?
 - c) Discuss to what extent the proposed facility meets the needs of the region in which the site is located.
 - d) Explain to what extent the proposed facility incorporates recycling, composting and waste diversion. (Reference other responses, if appropriate.)

Identify the location of the information or comments:

section and/or page numbers



Section IV. Integrated Solid Waste Management {16.40(5)}

Instructions: Complete Part IV only if site assignment is sought for a **Landfill** or **Combustion** facility.

It is likely that the information requested in Part IV will have been included in the EIR submitted to complete the MEPA process. If this is the case, the applicant should attach the relevant sections from the EIR that was accepted by the Secretary of EOE. If all the information requested below is not included in the EIR attach additional information.

In order to complete this section, the Applicant will need information on the Commonwealth's goals for recycling and composting and for establishing a statewide integrated solid waste management (ISWM) system. This information is contained in the Commonwealth's Solid Waste Master Plan which is available on the DEP's web site or by calling the DEP. The Master Plan is periodically revised and may be updated by issuing annual Status Reports, so it is important to make sure you have the current version before completing this application.

A. Capacity Need {16.40(5)(a)1.}

Demonstrate the need for the capacity that will be provided by the proposed facility. For each year of the expected life of the proposed facility identify the sources (residential, commercial, industrial) of the solid waste that will supply the amount of waste equal to the proposed capacity. Please be as specific as possible in identifying "sources." Include the municipalities in which the waste will be generated and the type of waste (demolition/construction, wood waste, sludge, ash, special wastes, commercial wastes, household wastes, etc.).

Show how the capacity that will be provided by the proposed facility will contribute to providing the capacity needed by the Commonwealth as identified in the most recent Solid Waste Master Plan and/or most recent annual Status Report.

B. Waste Diversion {16.40(5)(a)2.}

Explain how the proposed facility will maximize the diversion of recyclable and compostable materials from the waste prior to combustion or landfilling. Include a discussion of how the proposed facility will coordinate with other facilities or programs to maximize the diversion.

C. Contribution to ISWM {16.40(5)(a)3.}

How will the proposed facility contribute to the establishment and maintenance of a statewide system for integrated solid waste management? Include a discussion of how the proposed facility will complement the other facilities in the service area.



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D. Recycling and Composting {16.40(5)(b)}

Explain to what extent the proposed facility itself incorporates recycling and composting and explain how the proposed facility will be integrated into the recycling and composting activities in the service area.

Identify the location of the information requested in Part IV:

Attachment 1, Page 39

section and/or page numbers



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Facility ID# (if known)

Section V. Waivers

A. Site Suitability Criteria Waiver {16.40(6)}

The Site Suitability Criteria Waiver Application should be completed only if the applicant is seeking a waiver from one or more of the Site Suitability Criteria set forth in the Site Assignment Regulations, 310 CMR 16.40(3) or the setback distance at 310 CMR 16.40(4)(h). (The intention to seek a waiver must be noted in Part I of the Site Assignment Application Form.)

Note: As required by 310 CMR 16.08(5)(c), an application for a waiver must be accompanied by all data and documentation necessary to support the waiver request.

Check here if a waiver from the Site Suitability Criteria is requested.

Identify the location of the information requested in V.A.1 through V.A.9:

section and/or page numbers

1. **Criteria:** Identify the Site Suitability Criteria in 310 CMR 16.40(3) or 310 CMR 16.40(4)(h) from which a waiver is sought and for each explain the nature of the waiver being requested.
2. **Hardship:** State the nature of the hardship which would result if a waiver were not granted.
3. **Interest Served:** State the community, regional or state public interest that would be served by granting the waiver.
4. **Maintain Protection:** Explain why granting the waiver will not result in less protection of the public health and safety and the environment than would exist in the absence of the waiver.
5. **Alternative Site:** Explain why the proposed facility cannot be located at another site in the affected municipality or region at which a waiver would not be needed.
6. **Preferred Municipality:** Is the proposed site located in a preferred municipality as defined in MGL c.111, s. 150A1/2? (A "preferred Municipality" is a municipality that does not have existing disposal facilities and is not part of a regional waste disposal district.)
7. **Environmental Benefit:** Will granting the waiver result in any environmental benefits in excess of those benefits achievable in the absence of a waiver? Explain.
8. **Integrated Solid Waste Management:** Explain how the proposed facility contributes to integrated solid waste management.
9. **Waiver Needed for Project Goals:** Explain why the solid waste management objectives of the proposed project could not be achieved in the absence of the waiver.



B. Waiver from Application Process {16.18}

This waiver application should be completed only if the applicant is seeking a waiver from one or more of the provisions of Part I (310 CMR 16.01-16.19) of the Site Assignment Regulations that deals with the application process. (The intention to seek a waiver must be noted in Part I of the application form.)

Note: As required by 310 CMR 16.08(5)(c), an application for a waiver must be accompanied by all data and documentation necessary to support the waiver request.

Check here if a waiver from the Application Process is requested.

Identify the location of the information requested in V.B.1 through V.B.4.

1. **Regulatory Provision:** Identify the provision of the regulations from which a waiver is being requested and explain the specific nature of the request.
2. **Interest Served:** State the community, regional or state public interest that would be served by granting the waiver.
3. **Interference with Suitability Evaluation:** State why the granting of the waiver would not interfere with the ability of the Board of Health to evaluate the Suitability of the proposed site.
4. **Public Review and Comment:** State why granting the waiver would not diminish the ability of the general public to review and comment on the proposed project.



Massachusetts Department of Environmental Protection
Bureau of Waste Prevention – Solid Waste Management

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172356

Facility ID# (if known)

VI. Signatures and Certification {16.08(5)(e)}

A. Land Owner's Signature

Where the applicant is not the owner of the legal title to the land described as the "site" in this application, the owner or other person with control of the site pursuant to an order of a court of competent jurisdiction shall sign the application here:

[Handwritten Signature]
Owner's Signature
Mar 26, 2021
Date

B. Applicant's Signature and Certification

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate and complete. I am aware that there are significant penalties both civil and criminal for submitting false information including possible fines and imprisonment.

[Handwritten Signature]
Applicant's Signature
March 26, 2021
Date
[Handwritten Signature]
Agent's Signature
March 29, 2021
Date



ATTACHMENT 1

SUPPLEMENTAL APPLICATION INFORMATION

ATTACHMENT 1

SUPPLEMENTAL APPLICATION INFORMATION BWP SW 38 - SITE SUITABILITY REPORT FOR A MAJOR MODIFICATION OF AN EXISTING SITE ASSIGNMENT

1.0 INTRODUCTION

The Town of Bourne, Department of Integrated Solid Waste Management (ISWM) hereby submits this application for Site Suitability for a Major Modification of an Existing Site Assignment for the 99-acre site assigned solid waste management facility (DEP Facility No. 172356) located at 201 MacArthur Boulevard, Bourne, MA. See Attachment 2 for a copy of the existing site assignment for the 99-acre parcel, which is the subject of the modification proposed by this Application. Specifically, the Town is seeking to modify this existing site assignment to allow landfilling to occur on 25-acres of the 99-acre site assignment area, which is currently limited to solid waste handling operations by the existing site assignment. The original 74-acre parcel was site assigned by the Bourne Board of Health in 1972 for landfilling (See Attachment 2). In 2001 the Town purchased a 25-acre parcel to the immediate south of the 74-acre parcel and subsequently modified the original site assignment in 2005 to allow solid waste handling to be conducted on the 25-acre parcel. This proposed modification to the existing site assignment will allow landfilling, as currently conducted, to expand to the limits allowed by regulations, within the 25-acre parcel, and vertically to elevation of 225' on the 74-acre parcel.

More recently, in 2016 the Town purchased a 12-acre parcel, immediately to the south of the 25-acre parcel that it intends to seek a separate, new site, later in 2021 or in 2022, to conduct solid waste handling operations that will accommodate facilities that will over time be displaced by the landfill expansion onto the 25-acre parcel.

This Application is being filed in accordance with the Massachusetts Department of Environmental Protection's (MassDEP or the Department) Site Assignment Regulations, codified at 310 CMR 16.00. These regulations require that an application for Site Suitability for a Major Modification of an Existing Site Assignment (BWP SW 38) be filed when a proponent proposes to "Expand a Site".

1.1 Site Description

The 99-acre subject parcel, located at 201 MacArthur Boulevard, Bourne, MA, consists of the original 74-acre and the more recently acquired 25-acre parcel. The overall facility also includes a 12-acre parcel that abuts the 25-acre parcel for total facility acreage of approximately 111 acres. The 12-acre parcel is not the subject of this application but rather it will be considered in a separate filing later. The site is abutted by the eastern side of the northbound lane of Route 28 and comprises the Bourne Integrated Solid Waste Management Facility (Bourne ISWMF.) The Town of Bourne owns the three parcels which are under the management of the Department of

Integrated Solid Waste Management (ISWM.) On the 74-acre parcel, ISWM currently operates a state-of-the-art double-composite lined landfill, which has been constructed and operated in phases. Within the 25-acre parcel, ISWM operates a construction and demolition material (C&D) transfer station, a single stream recyclable materials transfer station, a residential recycling center (MSW, C&D, recyclables, organics wastes), an asphalt, brick and concrete stockpile and a brush and yard waste processing and composting operation. Also, ISWM offices and a salt shed are on the 25-acre parcel. The 12-acre parcel has not been disturbed.

Abutting properties include the Joint Base Cape Cod (JBCC) to the east, MassHighway (Route 28) to the west, the Monument Beach Sportsmen's Club to the north and undeveloped landlocked land to the south. See *Figure No. 1 - Locus Plan*, *Figure No. 2 – Property Line Plan* and *Figure No. 3 – Existing Conditions Site Plan* in Attachment 3.

1.2 Site History

Landfill

The present landfill site began operations in 1967 and was operated under the direction of the Department of Public Works (DPW.) In the early 1980s, the Town chose not to join other Cape communities in sending its waste to the SEMASS waste-to-energy facility in Rochester, MA. Instead, it was decided to continue landfilling in Bourne and to fully develop the present facility.

After several years of permitting in the early to mid 1990s, the Town received approval to construct Phase 2, its first lined landfill cell. However, because of MassDEP's moratorium on new MSW capacity at the time and after careful review with a team of consultants, public input and consultation with regulatory officials, the Board of Selectmen (BOS) decided to develop this cell and the remaining site-assigned landfill acreage as a regional, non-Municipal Solid Waste (non-MSW) landfill. This allowed the landfill to accept construction and demolition materials (C&D), bulky items and various other waste streams, but not household trash.

Later, the Massachusetts Environmental Policy Act Unit (MEPA) and the Cape Cod Commission (CCC) approved Bourne's Environmental Impact Report (EIR) through Phase 4 of development. This established a total site tonnage of 825 tons per day. Material can be variously managed either through landfilling, transfer, recycling or composting. Bourne then signed a 10-year contract with SEMASS, a regional municipal waste combustor in Rochester, MA to manage its MSW through 2006. The DPW collected MSW at the curb and transferred it to SEMASS via the Upper Cape Regional Transfer Station (UCRTS), which Bourne joined and became a part owner of in the mid 1990s. Subsequently, Bourne sought and received permits to resume acceptance of MSW in the Landfill as a result of its decision not to build a regional C&D processing facility. Currently, the Landfill is permitted to receive an average of 600 tons per day in the Landfill, with a maximum on any given day of 700 tons, a weekly cap of 4,900 tons and a yearly cap of 219,000 tons. The overall site tonnage remains at a cap of 825 tons per day as established during the EIR process.

Department

In 1998 the Town petitioned the state legislature to officially form ISWM as a new department to manage the increased complexity of operating an integrated solid waste management facility, including the lined Landfill. The bill was passed by the state legislature and was signed into law by the governor in 1999. ISWM is a fully self-funded department, financially separate from the Town's General Fund. Finances are managed in what is called the ISWM Enterprise Fund (Enterprise Fund.)

Residential Recycling

In 1989, Bourne developed its residential recycling center and composting area adjacent to the Landfill. Since then, these operations have been relocated to the 25-acre parcel, following the original modification to the site assignment. (See Attachment 2.)

Landfill Phasing

The landfill site is currently developed in seven phases: Phase 1, Phase 2, Phase 3, Phase 2A/3A, Phase 4, Phase 5, and Phase 6. See *Figure No. 3 – Existing Conditions Site Plan* in Attachment 3. Phase 1 consists of four cells, three of which, Phases 1A, 1B and 1C (Phase 1ABC) comprise a 21-acre unlined landfill located in the northwesterly corner of the Facility. Phase 1ABC received a final cover system in the summer of 2000. Phase 1D was a separate 6-acre unlined area located southwest of the former residential recycling center. This landfill has been completely reclaimed and its area has been incorporated into the Phase 4 Landfill. The Town of Bourne received approval from the Department for the reclamation of Phase 1D. Site preparation work for the Phase 1D Reclamation project commenced in November 2002 and reclamation activities commenced in January 2003. This work was temporarily halted for the construction of the Phase 3, Stage 3 Landfill during the summer and fall seasons of 2003. Reclamation activities began again during the winter months of 2004 and halted again for the construction of Stage 1 of the Phase 2A/3A landfill cell. The Phase 1D Reclamation activities began again in March of 2011 in preparation for the Phase 4 development and were completed in December 2011, in order to allow for the construction of Phase 4. Also, as part of the Phase 4 preparation work the former residential recycling center had to be relocated from the western limits of the Phase 4 area to the southern portion of the site, located on the 25-acre parcel. A detailed report of the Phase 1D reclamation project was part of a Notice of Project Change (NPC) submitted to the Massachusetts Environmental Policy Act (MEPA) office in December 2015 along with an update on Phase 5.

Phase 2 is an 8-acre lined cell divided into two stages and is located in the northeasterly corner of the Facility. A final cover system was completed in accordance with a DEP-approved Corrective Action Design (CAD) plan in the fall of 2002.

Phase 3 was developed in three stages. Stages 1 and 2 were constructed comprising approximately 8 acres of landfill cell using a double composite liner system with leak detection. A final cover system was installed over the eastern sideslope of these areas in the fall of 2004 and was constructed in accordance with a DEP-approved Corrective Action Design (CAD). The

western sideslope of the Phase 3 landfill has been overlain with waste material as part of Phase 2A/3A, Stage 1 operations. Phase 3, Stage 3 was constructed along the southerly extent of Phase 3 and includes approximately 4.25 acres of double composite landfill liner with leachate collection and leak detection capabilities. A final cover system was installed over the eastern sideslope of the Phase 3, Stage 3 area in the fall of 2006 and was constructed in accordance with a DEP-approved Corrective Action Design (CAD). The remaining sideslopes of the Phase 3, Stage 3 area are either overlain by the Phase 2A/3A, Stage 1 operations or are covered with intermediate cover soils. This area has been overlain by portions of Phase 4 and Phase 6.

Phase 2A/3A, Stage 1 consisted of a north and south cell, constructed in the valley created between the Phase 1, Phase 2 and Phase 3 cells. Together, the cells consist of 15.7 acres of liner, including a constructed 6.2-acre double composite liner system with leachate collection and leak detection located on the western portion of the Stage 1 area. The design on the eastern portion of the Stage 1 area incorporated components of the Phase 2 and Phase 3 liner and final cover systems. Approximately 5.3 acres of Phase 2 had previously been capped with a standard 40 mil high density polyethylene (HDPE) final cover system. The western 2.3 acres of the Phase 2 final cover system has been overlain with waste material during the Phase 2A/3A, Stage 1 landfilling operations.

Phase 2A/3A, Stage 2 consists of a single cell, built on the eastern sideslope of the Phase 1ABC landfill. The cell consists of 4.55 acres of double composite liner system with leachate collection and leak detection. The design of the Stage 2 area did not incorporate any components of the Phase 1ABC final cover system into the liner. The top soil of the Phase 1ABC cap was removed, leaving the sand drainage layer and 40 mil HDPE cap generally undisturbed. The double composite liner system was then built up above the remaining cap components and is tied into the Phase 2A/3A, Stage 1 liner and leachate collection systems.

Phase 4 is located in the western central portion of the Landfill parcel. It was constructed in two Stages, with Stage 1 being constructed in 2011 and 2012 and the second stage in 2013. The Phase 4, Stage 1 area was closed and capped in 2015. Stage 2 is now inactive, having reached final subgrades, but has not yet been capped. The final closure of the western sideslope of Phase 4, Stage 2 is scheduled to occur during the summer of 2021, with the plateau area being incorporated into the proposed Phase 9 Landfill.

The Phase 5 Landfill area consists of a 3.5 acre, double composite landfill liner constructed across the top plateau of the Phase 1ABC Landfill and overlays the western sideslope of the Phase 2A/3A Landfill and northern sideslope of the Phase 4, Stage 1 Landfill. The construction of this landfill expansion provided approximately 200,000 cubic yards (125 acre-feet) of gross air space capacity to the Facility. Phase 5 has been used solely for the disposal of ash from SEMASS now known as Covanta SEMASS Facility. Phase 5 is now inactive, having reached final subgrades, but has not yet been capped. The final closure of the western and northern sideslopes of Phase 5 is scheduled to occur during the summer of 2021, with the plateau area being incorporated into the proposed Phase 9 Landfill.

The Phase 6 landfill is the final portion of the horizontal development of the Landfill on the original 74-acre site assigned parcel. The Phase 6 Landfill area consists of landfill liner construction within previously unlandfilled area. Operations will overlay the southern sideslopes of the Phase 3, Stage 3 and the Phase 4, Stage 2 Landfills. The maximum potential build out of the Phase 6 Landfill Expansion would include the construction of about 9.8 acres of new landfill liner. The construction of this maximum build out of the Phase 6 Landfill Expansion would add up to approximately 1,670,000 cubic yards (1,035 acre-feet) of gross air space capacity (including cover materials) to the Facility. However, the Phase 6 liner construction and capacity as approved by issuance of an Authorization to Construct (ATC) by MassDEP on July 16, 2018 is a smaller liner area (6.9 acres) approximately 920,000 cubic yards (570 acre-feet) of gross air space capacity. This approved configuration will allow for future landfill expansion southward into Phase 7, which is to be located adjacent and to the south of Phase 6 and will extend onto the 25-acre parcel that is the subject of this Site Suitability Application. The full buildout of Phase 6 would have required a liner system over virgin soils to the south as support. Had this been done, a significant volume of future airspace would be lost. The proposed major modification will allow a smooth and orderly use of the site as it progresses southward without stranding unutilized volume. The Phase 6 Landfill is currently being used for the disposal of MSW from Bourne and the Town of Falmouth and ash from Covanta SEMASS .

2.0 FACILITY INFORMATION

The sections below provide the supplemental information requested on the DEP permit application form *BWP SW 38 - Site Suitability for a Major Modification of an Existing Site Assignment* and correspond to the sequence presented on the form. Detailed responses are provided where applicable.

SECTION I. GENERAL INFORMATION

A. Site Location and Project Description

6. Capacity and expected life of proposed facility

- b. The Town is proposing to maximize landfill capacity on 99-acres, which includes the original 74-acres that is site assigned for landfilling and the 25-acre parcel that is currently site assigned for solid waste handling operations. This expansion includes the Phase 7, Phase 8 and Phase 9 vertical and horizontal expansions which will provide an estimated 5,175,000 cubic yards of disposal capacity and will extend the life of the Landfill into the 2040s. See *Figure No. 4 – Schematic Site Buildout Plan* in Attachment 3.

8. Project Description

In 2016, the Town acquired approximately twelve acres of undeveloped land, abutting the residential recycling center at the extreme southern boundary of the site. This acquisition has enabled the Town to contemplate a site development plan whereby offices, maintenance

and handling facilities would be relocated to that new 12-acre parcel. By doing this, Phase 7 and Phase 8 could be developed on the 25-acre parcel thereby extending the life of the landfill operations. Currently the 25-acre parcel is site-assigned for only solid waste handling and is the location of the C&D transfer station, single stream recyclables transfer station, the residential recycling center and other facilities. In order to expand the Landfill into this area, the site assignment for the 25-acre parcel will need a major modification from the Bourne Board of Health. In addition, MassDEP has commented that the Phase 9 vertical expansion will also require a major modification to the Site Assignment of the original 74-acres, even though the existing site assignment specifically was approved to allow landfilling. See Figures 4, 5, 6, and 7 in Attachment 3 for phased site development plans.

Furthermore, a new site assignment will need to be obtained to allow solid waste handling operations on the 12-acre parcel where the LHF will be relocated. This will be a new site assignment and will be the subject of a separate application. Phase 6, Phase 7, Phase 8, Phase 9 and surrounding areas outside of the delineated habitat line are exempt from further Massachusetts Endangered Species Act (MESA) review. Letters confirming these determinations by NHESP is included in Attachment 7. Delineation of the habitat line is shown on the plans in Attachment 3.

As previously discussed, in addition to the Phase 7 and Phase 8 horizontal expansions, the Town is proposing a vertical expansion, designated as Phase 9. The Town has developed plans for the maximum long-term site development master plan so that the Bourne community and regulators will have a better understanding of the full potential of the Bourne Landfill to service the region's disposal needs with an active landfill. On August 12, 2019, these plans were shared in a public meeting that received wide-spread media coverage, in order to provide time for community response to the plan. A video recording of the meeting is on the ISWM website which can be found at townofbourne.com. After receiving positive feedback from the community, the Bourne Board of Selectmen voted on November 5, 2019, to pursue a full build-out site development plan which contemplates a 40-foot vertical expansion (Phase 9) over the entire footprint of the currently permitted landfill.

Phase 9 will increase the maximum height of the Landfill from elevation 185' mean sea level (MSL) to elevation 225' MSL over previously lined and filled areas of the Landfill including Phases 2, 2A/3A, 3, 4, 5 and 6. By increasing the height of the Landfill over already constructed phases, in currently site-assigned areas and filling this area in conjunction with the active Phase 6, the Town can utilize the time that this capacity will provide to develop a detailed plan for how and when to relocate structures that will be replaced by Phase 7 and Phase 8, thereby maximizing the useful lifespan of the existing large handling facility assets which represent significant capital investments by the Town.

Some of the technical issues associated with Phase 9 that will have to be resolved and approved by MassDEP include modifications to components of the existing landfill gas collection system that are within the Phase 9 overflow footprint. Additionally, Phase 9 will be constructed above portions of the landfill that will receive a long-term intermediate cover system versus a permanent cover system that will be constructed on outside slopes that have reached final design capacity. This has been approved by MassDEP as part of the Phase 4, Stage 2 and Phase 5 Corrective Action Design (CAD.) This will avoid capping an area that

will then be disturbed again within a few years to accommodate new capacity of Phase 9. This approach has been previously utilized along the southern slope of Phase 3, Stage 3 which is now being incorporated into the currently operational Phase 6 landfill. A similar approach will be proposed for each successive southern slope as the phases move southward into Phase 7 and Phase 8. Once the final southern slope is reached, a final cover system will be constructed.

The addition of a vertical expansion to elevation 225' MSL for Phase 9 will also have an effect on landfill expansions moving southward by allowing for more capacity in Phases 7 and 8. Those phases will be constructed in a manner to match the elevation of Phase 9, rather than as originally contemplated to be at a maximum elevation of 185' MSL.

The Phase 9 vertical expansion will provide approximately 1,255,000 cubic yards of additional airspace which could extend the life of the landfill at least four and a half years. As noted earlier, by permitting and operating Phase 9 as the next area of landfill development after Phase 6, the Town will have additional time to create a schedule for the required permitting, financing and relocation of existing operations and site preparation for Phases 7 and 8. The combination of Phase 7, Phase 8 and Phase 9 will ensure that ISWM can continue to provide vitally needed landfill capacity to the region into the late 2030s or early 2040s.

In addition to working with local government and elected leaders, ISWM will continue its close working relationship with the Southeast Regional Office of MA DEP to ensure that the design of the new expansions, as well as the closure of completed phases, are engineered to the highest standards and meet or exceed all regulations. ISWM regularly seeks to meet with MassDEP, at least on an annual basis, to update the Department on its short term and long term plans. ISWM and MassDEP had a pre-application conference call on January 29, 2021 to discuss this Site Suitability Application. ISWM anticipates and hopes that there may be a series of meetings with MassDEP on the proposed site expansion applications, so as to best assure that all of the Department's questions and concerns are adequately addressed.

In accordance with previous discussions with MassDEP, there will be two separate site assignment applications, one for a Major Modification of the Existing Site Assignment (BWP SW 38) and one for a new site assignment (BWP SW 01). The major modification to the site assignment for the Phase 7, Phase 8 and Phase 9 landfills is the subject of this application. The Large Handling Facility (LHF) will be the subject of the second application for a new site assignment. Following receipt of MassDEP's positive Site Suitability Report, the Bourne Board of Health will conduct public hearings in accordance with the requirements of the Site Assignment Regulations at 310 CMR 16.00.

The projects will also require approval of a Development of Regional Impact (DRI) from the Cape Cod Commission (CCC) prior to a hearing with the Bourne Board of Health (BOH.) ISWM will work closely with the BOH on the timing and will provide any necessary extensions of time to the BOH in order to satisfy regulatory requirements. It is anticipated that there will be a single DRI application that will include all components of

the project and that it will be presented to a subcommittee of the CCC first and then the full CCC at a final hearing for approval. ISWM has been in regular communication with CCC staff regarding this and previously proposed site development projects. The CCC staff has provided guidance to ISWM regarding the preparation of the DRI, which ISWM will rely on.

Separate ATC and Authorization to Operate (ATO) applications for each of the Phase 7, 8, 9 expansion and the LHF projects will be submitted to the Southeast Regional Office of MassDEP and will comply with all design standards and regulations for solid waste handling facilities, including leachate collection, landfill gas management and stormwater management. Since the Final Environmental Impact Report (FEIR) Certificate was issued in 1999, the Town has conducted extensive hydrogeological investigations, including a Final Comprehensive Site Assessment (FCSA), and modeling, including particle tracking, for areas downgradient of the ISWM facility, in full cooperation with and to the satisfaction of MassDEP and the CCC, which required expanded groundwater monitoring for several years as part of a prior DRI approval process.

Facility Design

The existing landfill operations include leachate collection and storage facilities, landfill gas collection and treatment systems and an environmental monitoring system that is sampled and evaluated for impacts to groundwater and soil gas conditions in the vicinity of the Landfill. (See *Figure 9 – Existing Environmental Monitoring Systems* plan in Attachment 3.) These systems will be expanded and maintained for the proposed expansion to the facilities. The leachate collection and storage systems include a double composite liner system with primary and secondary leachate collection and monitoring capabilities. The double composite liner system consists of 12 inches of low permeable soil, upon which multiple layers of geosynthetic liner materials are installed. These include primary and secondary geosynthetic clay liners (GCL) and 60-mil HDPE geomembranes, with an interstitial leak detection/drainage layer material that drains to a secondary sump and allows for the measurement of leachate that might leak through the primary liner system. On top of the primary geomembrane is a leachate collection system consisting of a network of pipes and 18-inches of drainage sand which allows for the collection and discharge of leachate to the primary leachate sump. There are pumps installed in both the primary and secondary leachate sumps, which pump the collected leachate through a force main to one of two leachate storage tanks. The stored leachate is transferred to tanker trucks and hauled to licensed wastewater treatment plants for treatment and disposal. The leachate collection system will be expanded to Phase 7 by extending the existing Phase 6 leachate collection system. It is anticipated that Phase 8 will be designed and constructed with its own collection system and leachate sump. Phase 9 will be developed by removing any final or intermediate cover systems onto which it will be built, so that leachate will flow vertically into the existing landfill phases and collection system. See Figures 5, 6, 7 and 8 in Attachment 3 for site development plans.

The current landfill facilities include an existing, extensive gas collection and treatment

system. These will be extended and modified as needed to expand the capacity for the collection of landfill gas. The system for the management of gas generated within the Landfill includes vertical extraction wells and horizontal gas collectors. There is an extensive network of piping to collect generated landfill gases and convey them to a flare station for treatment. The existing flare station is located to the northeast of the Phase 2 Landfill area and prevents the occurrence of odors and the off-site migration of landfill gas. The landfill gas collection system will be expanded by modifying the existing header system, by relocating portions of it to the perimeter sideslopes to prevent them from otherwise being buried by the Phase 9 vertical expansion. Existing gas extraction wells located within the proposed footprint of Phase 9 will be modified by converting the wells to having remote wellheads, also along the perimeter sideslopes. The Phase 7 and 8, as well as the Phase 9 overfill waste will have new extraction wells installed and operated in the same manner as the existing extraction wells. The existing flare treatment system was replaced and upgraded a few years ago and is adequately sized for future conditions.

Potential impact from the landfill to the environment has been monitored for several decades by a groundwater and soil gas monitoring program. The monitoring program has consisted of quarterly sampling that began in the 1990s. This program has contributed to the development and approval of a Comprehensive Site Assessment for the site. The scope of the current monitoring program was established in MassDEP's approval of the CSA in 2017. ISWM anticipates that MassDEP approvals for Phases 7 and 8 will include the placement of additional groundwater and gas monitoring wells along their perimeter. See *Figure 9 - Existing Environmental Monitoring Systems* in Attachment 3, which shows the existing monitoring systems. In addition, ISWM acknowledges its responsibility to make notification to MassDEP regarding any identified release of oil or hazardous materials in accordance with Massachusetts Contingency Plan (MCP) requirements and to further modify its environmental monitoring program to characterize any potential release. ISWM will fully conform with MassDEP Asbestos Regulations (310 CMR 7.15) when demolishing any of its buildings during the site development work.

Phase 9 will be a vertical expansion of landfilling over existing double composite lined landfill phases. Some of the phase areas have final cap installations that will require the removal of those cap components, including geomembrane barriers. Other areas upon which Phase 9 will be developed (Phase 4, Stage 2 and Phase 5) are currently not capped, because they have just recently stopped operating, having reached their current approved final subgrades. The other portions of the Phase 9 overfill area will be constructed over the future plateau area of the active Phase 6 Landfill, when those approved grades are achieved. A slope stability analysis is being conducted, that will determine the effects that Phase 9 will have on settlement of the underlying, existing landfill areas. With the approval of Phase 9 (including the completion of MEPA review, CCC DRI approval, site assignment modification, and ATC/ATO approval) ISWM plans to develop Phase 9 in stages. The first stage will be to fill the area that is over the Phase 5 Landfill. This will allow the final closure of the northwest corner of the landfill, which includes the currently uncapped Phase 5 sideslopes. The second stage would be to fill over the

currently uncapped Phase 4, Stage 2 plateau and the completed Phase 6 plateau. This sequence will allow the postponement of removal of the existing final cap over the remainder of the Phase 9 footprint and will allow for the progressive modification to the existing gas collection system that underlays the Phase 9 Landfill. The completion of the Phase 9 overfill will require sequentially removing stages of the existing final caps of the Phase 2, Phase 2A/3A, Phase 3 and Phase 4, Stage 1 landfills. The sequential cap removal work will be done in a manner that will minimize the area of open landfill surface that exists at any one time. See *Figure 5 – Initial Construction Phases Plan* in Attachment 3 for a plan that shows the anticipated sequential development of the Phase 9 Landfill.

There are areas, as described above, that will not have a final cover for several years before the Phase 9 filling occurs on them, as approved by MassDEP. In order to mitigate any potential impacts from occurring because of this, in accordance with Phase 4 and Phase 5 BWP SW 25 CAD there will be an intermediate cover layer installed over these areas upon achieving the currently approved subgrades. The intermediate cover will be an application of soil materials meeting the requirements of 310 CMR 19.130(15)(d) Intermediate Cover. Because of the possible long-term exposure of the intermediate cover material until Phase 9 is constructed, the cover soils material will be applied across the subgrade surface, so as to form an intermediate cover that is at least twelve inches (12") thick, when combined with existing daily cover will provide a total of eighteen inches (18") of cover. Should the intermediate cover materials fail, whereby odors are produced or excessive leachate is generated and cover repairs do not prove to be adequate, a temporary, sacrificial, geosynthetic cap may be installed.

Facility Operations

General

Landfill construction and operations in the Phases 7, 8 and 9 areas of the Facility will consist of the following procedures, in sequence:

- Subgrade and base grade preparations.
- Liner and leachate collection system construction.
- Filling with waste material.
- Covering of waste material.
- Installation of gas management devices.
- Capping and closure of the landfill.

The Facility will be operated in accordance with the approved MassDEP ATO and requirements stipulated by the Bourne Board of Health in the modified Site Assignment, such a capacity limits, hours of operation and other operating conditions.

Subgrade and base grade preparations for these phases involve the excavation and removal of natural soils and fill material, in order to meet the proposed subgrade

elevations and to provide a smooth subgrade and uniform working grade for the installation of the overlying groundwater protection system (GWPS). The GWPS consists of multiple layers of natural and engineered synthetic materials that are intended to intercept and collect leachate that passes through the waste, protecting groundwater quality within the area of the Landfill. Phases 7 and 8 subgrade preparation will include the excavation of approximately 500,000 cubic yards to achieve the proper elevations. Subgrade preparation for Phase 9 will be the removal of intermediate and final cover materials of the existing landfill areas where Phase 9 will overlay them.

Waste Placement

Waste placement in all phases must be carried out with great care to ensure that:

1. The double composite liner system is not damaged during the placement of waste.
2. Leachate collection piping is not damaged or moved from the design alignment during the placement of waste.
3. The placement and compaction of waste does not create instability and result in displacement of the geomembrane liners with respect to the low-permeability soil layer and GCL.
4. The placement and compaction of waste does not create instability and result in displacement of the landfill mass.

Recommended filling procedures for waste being placed in the landfill are described below.

Initial Waste Placement

The following is a general description for the sequencing of operations and is intended to be used as a guideline. Operations sequencing is important to ensure the integrity of the underlying liners, leachate collection systems, and to maintain the stability of the landfilled waste. Modifications to this plan may be required as landfilling operations progress.

First Lift

The placement of the first lift of waste directly onto the leachate collection layer is considered one of the most critical aspects of landfilling operations. The first lift must be constructed with extra caution so that damage to the primary geomembrane liner and leachate collection system does not occur. Therefore, the following precautions are to be implemented for the first lift:

1. The height of the first lift is a minimum of 5 feet in thickness.
2. The first lift is to be constructed of “select” waste, free of items greater than 18 inches in length. Ideally, processed material 3 inches in size or less should be used for the first 3 feet. For the remaining 2 feet, material 18 inches or less in size

may be used. Any material which has the potential to puncture the liner must not be placed in the first lift.

3. Waste trucks and landfill equipment with tires should not be permitted onto the lined area until at least 5 feet of “select” waste has been placed above the leachate collection layer.
4. Waste trucks and landfill equipment with tires should not be permitted over leachate collection sumps until the second lift has been completed over the sump areas.
5. “Track-mounted” landfill equipment should not be permitted onto the lined area until approximately 3-feet of “select” waste has been placed above the leachate collection layer.
6. Fueling of equipment should be avoided above the lined areas until approximately 10 feet of waste has been placed above the leachate collection layer.
7. The placement of the first lift of waste should be conducted under the supervision of the construction quality assurance engineer.

Construction of additional lifts may begin as described below.

Ensuing Lifts

In addition to exercising caution during the first lift, continued caution must be taken during the placement of ensuing lifts. Waste should be spread and compacted in lifts, approximately 10 feet thick, in a controlled manner until final elevations are attained. Each lift should be substantially completed before beginning a new lift. Waste should be compacted with a landfill compactor and/or a vibratory roller in layers no greater than two (2) feet thick.

Slope Filling

The Landfill area will be developed upon a GWPS that contains a layering of several components. The interface strength (frictional resistance) between these components is limited. Consequently, particular care must be used when landfilling in the vicinity of the sloped portions of the cell, as well as the containment berms.

In no case may waste be placed against a side-slope covered with a double composite liner, without a waste mound of sufficient height on the bottom area below the side-slope to resist downhill movements. The effects of low interface strength may be countered on the slopes by creating a wedge-shaped fill area near the slopes to allow support to resist the downhill movements. The downhill waste height should be approximately 10 feet above the side-slope fill and a top of waste slope of 5 percent towards the side-slope should be maintained during filling operations.

In places where landfilling is to occur against or above the current intermediate cover of the sideslopes and plateaus, the intermediate cover material is to be removed as landfilling progresses along those areas. The removal of the existing intermediate cover in these areas will connect the landfill areas to provide paths of least resistance for

infiltration of precipitation and landfill gas migration. However, if nuisance odor conditions are created by removing the sideslope caps, removal work can be delayed until better weather conditions prevail, or removal can be completely discontinued and the intermediate cover materials left in place.

Care should be taken so that waste is not placed beyond the limit of the perimeter containment berm. A layer of "select" waste, five feet (5') thick, must be placed against lined slopes.

General Filling

Waste placement in general should be performed as follows:

1. Incoming waste should be directed to the active face using signs or spotters.
2. The active area should be kept as small as feasible to minimize the amount of exposed waste - usually an active face width of 50 to 75 feet is adequate to meet the disposal needs for a landfill operation.
3. Once the waste is placed on the active face it should be spread in a layer no thicker than two (2) feet to assure maximum compaction - usually three to five passes with the compactor will provide the most efficient level of compaction, additional passes do not typically add substantially to the degree of compaction.
4. Daily cover must be placed on all waste received during a given operating day. The cover shall be applied in a layer not less than six inches (6") thick. The incoming bottom ash waste is suitable for daily cover.

Waste Compaction

Maximum waste compaction at the landfill is desirable for the following reasons:

1. It reduces the rate of air-space consumption and allows a greater amount of waste to be placed in the landfill.
2. It reduces future settlement of the waste, which reduces long-term care of landfill surfaces.
3. It reduces the amount of soil material needed to cover the waste, if soil is needed.

Generally speaking, it is best to spread waste from the toe upward onto the active face. Good compaction is best achieved on an active face that is sloped at less than 20 percent (1 foot vertical to 5 feet horizontal).

Gas Management System

The Phases 7, 8 and 9 gas management system will eventually be connected to the existing gas extraction and flare system. At the very least, the gas management system will be developed by the construction of vertical gas extraction wells and header piping in areas of the Landfill, once landfilling ceases and/or final grades are reached in those areas. Additionally, ISWM may install sacrificial, horizontal collection headers during the filling process as an interim measure to better contain and collect gas until a

permanent system is installed. ISWM is not anticipating that a horizontal system will be required, but it could be installed if gas migration or odor issues occur.

Final Cover

The placement of the cover system will be the final component of the landfill's operational sequence. A description of the final cover is provided below.

- A subgrade layer for surface preparation purposes, which may consist of 12 inches of graded daily or intermediate cover.
- A gas-venting layer, consisting of a minimum of 6 inches of granular material having a minimum hydraulic conductivity of 1×10^{-3} centimeters per second.
- A textured geomembrane high-density polyethylene (HDPE) or low-density polyethylene (LDPE), 40 mils thick.
- A drainage/protection layer, consisting of a minimum of 12 inches of granular material having a minimum hydraulic conductivity of 1×10^{-2} centimeters per second.
- A vegetative support layer, consisting of a minimum of 9 inches of soil capable of sustaining a healthy vegetative growth on the final cover.

Once the landfill final cover installation has been certified and all other aspects of landfill closure are complete, the post-closure care and monitoring period for the landfill will commence.

C. Fees {310 CMR 16.08(4)}

1. Proof of Payment of Technical Fee

On March 10, 2021 the Bourne Board of Health (BOH) approved a motion that states that all bills for services incurred by the BOH for review of the site assignment shall be forwarded to ISWM for payment. This arrangement was also acceptable to the Town Accountant and the Town Administrator. See *Attachment 4 – Technical Fee* for a copy of the motion.

2. Calculation of Technical Fee

From 310 CMR 16.99 Appendix A Table 1, the Maximum Technical Fee For Landfills is based on the total area of the site specified in the application, which is 99-acres. The Maximum Technical Fee for the proposed area of the modified site assignment is **\$99,033.33**. This fee is calculated as follows:

The Maximum Fee for the 25-acre plus 74-acre landfill parcels is \$30,000 for the first 25-acres and \$200 per acre for area over 25-acres (\$14,800). The \$44,800 amount was then adjusted for inflation by using the Boston Consumer Price Index (BCPI), as described in the regulation [the ratio of the September 2020 BCPI (297.1) to the September 1988

BCPI (134.4)]. This calculates as follows: $297.1/134.4 \times \$44,800 = \$99,033.33$.

F. Massachusetts Environmental Policy Act (MEPA) {310 CMR 16.08 (5) (d)}

The Bourne Landfill and the associated solid waste handling facilities, were the subject of a Final Environmental Impact Report (FEIR) in 1999. The filing described a full build-out of the Landfill through Phase 6. A FEIR Certificate was issued on November 29, 1999 which acknowledged the conceptual development of the Landfill in phases and required the Town to submit Notices of Project Change (NPC) to the MEPA Office for updates to the project.

Notice of Project Change 1 in 2003 addressed accepting a broader range of materials to include municipal solid waste (MSW) and municipal combustor ash while not increasing the daily tonnage limits to the site. Notice of Project Change 2 was submitted in 2007 as an Emergency Action to allow a temporary increase in daily tonnage to accept MSW that was displaced by a fire at the SEMASS waste-to-energy facility in Rochester, MA. Notice of Project Change 3 addressed construction of a potential landfill gas to energy facility utilizing reciprocating engines/electric generator sets to create up to 4.3 megawatts (MW) of electricity. Notice of Project Change 4 was submitted in 2016 and provided a report on the Phase 1D Reclamation Project and a final development plan for the Phase 5 Landfill Expansion. In all cases, the preparation of an EIR was not warranted. Notice of Project Change 5, which was an Expanded Notice of Project change (ENPC) was submitted in 2017 and a subsequent Single Supplemental Environmental Impact Report (SSEIR) was submitted in 2018 for the Phase 6 Landfill Expansion, the legislatively authorized disposition of Article 97 land on the adjacent JBCC and outlined further site development into Phases 7, 8, 9 and the relocation of the LHF.

Similar to Phase 6, the preparation of an EIR for the development of the Phases 7, 8 and 9 landfill expansions and the relocation of the LHF, was warranted because of the potential to create more than ten acres of impervious surface. After consultation with the MEPA Office, it was determined the Town would file an Expanded Notice of Project Change (ENPC) (Notice of Project Change 6) that would act in effect as an Expanded Environmental Notification Form (EENF) in which the Town requested that the Secretary consider allowing the preparation of a Single Supplemental EIR (SSEIR) as part of the ENPC Certificate. The Secretary subsequently issued an ENPC Certificate on April 24, 2020 that required the preparation of a Single Supplemental Environmental Impact Report (SSEIR) with a limited Scope. In response to that certificate, ISWM submitted a SSEIR on November 13, 2020. The Secretary subsequently issued a final certificate to the SSEIR on December 30, 2020 which determined that the SSEIR “adequately and properly complies with MEPA and its implementing regulations” and that no further MEPA review was required for the project. This certificate is included in Attachment 5.

H. Maps

1. Groundwater Contour Map

A groundwater contour map is included in Attachment 3 as *Figure 10 – Groundwater Contour Plan*. As shown on this plan the groundwater flow direction is to the west-northwest toward Buzzards Bay and between elevations 45 and 48 in the area of the Landfill. The plan represents groundwater elevations measurements taken in 1998. This round of groundwater measurements, which used eleven monitoring wells, is the most conclusive map of groundwater flow at the site because there were a number of measuring points within the footprint of the Landfill that were subsequently and properly abandoned and are now beneath the Landfill. This round of water levels is not only the most precise measurements available for groundwater flow, but also represents the maximum groundwater levels recorded to date for the site.

Figure 10 generally agrees with the much larger and regional groundwater flow maps developed over the past several decades using thousands of measuring points developed to analyze groundwater flow originating at Joint Base Cape Cod (JBCC), by the United States Army Corps of Engineers (USACE), which are currently being used to track and remediate groundwater contamination radiating from the center of the Sagamore Lens. A portion of this regional map is shown on *Figure 11 - USACE Groundwater Flow and Contaminant Plume* included in Attachment 3, which indicates the same groundwater flow trajectory that is shown on Figure 10.

SECTION II. FACILITY SPECIFIC CRITERIA

C. Waste Handling and Processing Facilities

The Facility-Specific Site Suitability Criteria that are applicable to the proposed modification of the solid waste handling facility site assignment of the 25-acre parcel to a landfill facility site assignment are presented below (in italics) as they appear in or are paraphrases of the regulations. Each criterion is addressed with respect to the proposed project.

3.1.1 310 CMR 16.40(3)(a) Criteria for Landfill Facilities

No site shall be determined to be suitable or be assigned as a solid waste landfill facility where:

1. *Any area of waste deposition would be within the Zone II of a public water supply well;*

The Bourne Landfill is not within a Zone II of an existing public water supply well. The nearest Zone II is approximately 0.4 miles to the south of the 25-acre parcel. Refer to *Figure 12 - Water Resources Plan* in Attachment 3. The site meets this criterion.

2. *Any area of waste deposition would be within the Interim Wellhead Protection Area (IWPA) of an existing public water supply provided that the proponent may conduct a preliminary Zone II study, approved of by the Department, to determine if the facility would be beyond the Zone II of the public water supply well in question;*

The Bourne Landfill is not within an IWPA of an existing public water supply. Refer to *Figure 12 - Water Resources Plan* in Attachment 3. The site meets this criterion.

3. *Any area of waste deposition would be within a Zone II or Interim Wellhead Protection Area (IWPA) of a proposed drinking water source area, provided that the documentation necessary to obtain a source approval has been submitted prior to the earlier of either the site assignment application, or if the MEPA process does apply, the Secretary's Certificate on the Environmental Notification Form or Notice of Project Change, or where applicable, the Secretary's Certificate on the EIR or Final EIR;*

The Bourne Landfill is not within an IWPA or a Zone II of a proposed drinking water source area. The site meets this criterion.

4. *Any area of waste deposition would be within 15,000 feet upgradient of the existing public water source well or proposed drinking water source area for which a Zone II has not been calculated; the proponent may conduct a preliminary Zone II study, approved of by the Department, to determine if the facility would be beyond the Zone II of the public water supply well or proposed drinking water source area in question;*

The nearest public drinking water supply well is about 0.83 miles south and cross-gradient (not downgradient) to the 25-acre parcel. Refer to *Figure 12 - Water Resources Plan* in Attachment 3. The Facility is therefore not upgradient of an existing public water supply well. The site is not in a proposed drinking water source area as the Bourne Board of Health has issued a regulation that prohibits (makes illegal) the installation of any public or private water supply wells downgradient of the Landfill. The site meets this criterion.

5. *It is determined by the Department that a discharge from the facility would pose a danger to an existing or proposed drinking water source area;*

The nearest public drinking water supply well is about 0.83 miles south and cross-gradient (not downgradient) to the 25-acre parcel. The Facility is not upgradient of an existing or potential public water supply. The Facility is not located within a "Current Drinking Water Source Area". While the Landfill and the downgradient area are within the medium yield, sole source Cape Cod aquifer, areas downgradient have been designated as Non Potential Drinking Water Source Areas on MassDEP resource maps (*Figure 14 – DEP Water Resource Map* in Attachment 3) and the Bourne Water District has stated in a letter included in *Attachment 6 – Water Resources Correspondence* that it does not have, nor will it seek to locate future drinking water sources downgradient of the

Landfill. Additionally, the Bourne Board of Health has issued a regulation that prohibits the installation of any public or private water supply wells downgradient of the Landfill, making it illegal to construct a water supply well, thus the entire area is a non-Potentially Productive Aquifer. A letter from the Bourne Board of Health, confirming this bylaw is also included in Attachment 6. All previously identified downgradient water supply wells have been replaced with connections to the public water supply system. The site meets this criterion.

6. *Any area of waste deposition would be over the recharge area of a Sole Source Aquifer, unless all of the following criteria are met:*

a. *There are no existing public water supplies or proposed drinking water source areas downgradient of the site;*

There are no existing or proposed public drinking water supply wells downgradient of the Bourne landfill. The Facility is not upgradient of an existing or potential public water supply. The Bourne Board of Health has made it illegal to install water supply wells downgradient of the Landfill. The site meets this criterion.

b. *There are no existing or potential private water supplies downgradient of the site; however, the applicant may have the option of providing an alternative public water supply to replace all the existing or potential downgradient private groundwater supplies; and*

The Bourne Water District has stated in a letter that it does not have existing, nor will it seek to locate future drinking water sources downgradient of the Landfill. Additionally, the Bourne Board of Health has issued a regulation that makes it illegal to install any public or private water supply wells downgradient of the Landfill. All previously identified water supply wells have been replaced with connections to the public water supply system. Consequently, there are no existing or potential private water supplies downgradient of the site. See *Attachment 6 – Water Resources Correspondence*. The site meets this criterion.

c. *There exists a sufficient existing public water supply or proposed drinking water source area to meet the municipality's projected needs;*

The Bourne Water District (BWD) is the water supply for the portion of Bourne that is on the Cape side of the Cape Cod Canal. The BWD is not responsible for providing sufficient water supplies to other parts of the municipality. BWD is supplied by ten different sources, seven are BWD gravel packed well sites and three are gravel packed well sites that are part of the Upper Cape Regional Water Supply Cooperative. Four of BWD well sites are in the Monument Beach area of the Town Forest and two wells are in the Cataumet area. The Bourne water supply includes the newly established well 4036000-08G which is located on JBCC. This well was

developed as part of the United States Army Corp of Engineering (USACE) project to identify water supplies on JBCC known as the Upper Cape Water Supply Project in 2001. This well was carefully sited along with three others to thread Zone II areas between JBCC contaminant plumes. In addition, the Town was connected by a metering station at Connery Avenue to the other wells of the Upper Cape Water Supply Cooperative which have a total permitted yield of three million gallons per day (MGD).

This cooperative allows BWD to obtain water along with other cooperative members (Sandwich Water District, Falmouth, Mashpee and JBCC) to withdraw any needed supplemental water from the legislatively established Upper Cape Water Supply Reserve. While currently permitted at 3 MGD the three Reserve wells are capable of producing 6 MGD. If ever needed the Cooperative has the ability of establishing additional water sources within the Reserve. Based on land use in all Cooperative member jurisdictions and environmental impacts to sensitive environmental areas, along with the relatively low cost for the Cooperative to develop future water supply sources, it is anticipated that any such need on the Upper Cape will be from the Reserve. All portions of the Reserve are up-gradient from the Landfill. The site meets this criterion.

7. *Any area of waste deposition is within the zone of contribution of an existing public water supply or proposed drinking water source area, or the recharge area of a surface drinking water supply, pursuant to a municipal ordinance or by-law enacted in accordance with M.G.L. c. 40A, § 9;*

All existing and proposed areas of waste deposition at the Bourne Landfill are not within the zone of contribution of an existing public water supply or proposed drinking water source area, or the recharge area of a surface drinking water supply. The nearest public drinking water supply well is about 0.83 miles south and cross-gradient (not downgradient) to the 25-acre parcel. The Facility is not upgradient of an existing or potential public water supply. The Facility is not located within a "Current Drinking Water Source Area", but the Facility is located within a "Potential Drinking Water Source Area" due to the mapped presence of a Potentially Productive Aquifer. A majority of the areas hydraulically downgradient of the Facility are located over the mapped Potentially Productive Aquifer. However, portions of aquifer beneath the highway corridor associated with MacArthur Boulevard and some areas immediately west of MacArthur Boulevard have been classified as "Non-Potential Drinking Water Source Areas" in accordance with the Massachusetts Contingency Plan ("MCP"). The Bourne Water District has stated in a letter included in Attachment 6 that it does not have, nor will it seek to locate future drinking water sources downgradient of the Landfill. Additionally, the Bourne Board of Health has issued a regulation, as confirmed in a letter also included in Attachment 6, that prohibits the installation of any public or private water supply wells downgradient of the Landfill. All previously identified water supply wells have been

replaced with connections to the public water supply system. The site meets this criterion.

8. *Any area of waste deposition would be within the Zone A or Zone B of a surface drinking water supply;*

The Bourne Landfill site is not within a Zone A or Zone B of a surface drinking water supply. The site meets this criterion.

9. *Any area of waste deposition would be less than 400 feet upgradient, as defined by groundwater flow or surface water drainage, of a perennial water course that drains to a surface drinking water supply which is within one mile of the waste deposition area;*

The Landfill is not located less than 400 feet upgradient, as defined by groundwater flow or surface water drainage, of a perennial water course that drains to a surface drinking water supply which is within one mile of the waste deposition area. The site meets this criterion.

10. *Any area of waste deposition would be within a Potentially Productive Aquifer unless:*

- a. *The proponent demonstrates to the Department's satisfaction, based on hydrogeological studies, that the designation of the area as a potentially productive aquifer is incorrect;*

The Facility is located on Cape Cod and therefore the site is defined in the Massachusetts Contingency Plan (MCP) as being located in a Potentially Productive Aquifer. As further defined in the MCP the Facility is not located within a "Current Drinking Water Source Area", but the Facility is by this definition, located within a "Potential Drinking Water Source Area" due to the presence of the Potentially Productive Aquifer. Portions of the aquifer downgradient from the site beneath the highway corridor associated with MacArthur Boulevard and some areas immediately west of MacArthur Boulevard have been classified as "Non-Potential Drinking Water Source Areas" in accordance with the MCP. Other contamination sources downgradient of the site, and in particular Phases 7 and 8, are two closed and unlined landfills (Brookside Landfill and Nightingale Stump Landfill). In addition, hydrogeologic studies conducted for the Facility (Mahoney and Douglas, April 11, 2003 and October 8, 2003) determined by particle tracking analysis supplied by the United States Geological Survey (USGS), that groundwater flows from the site in a generally west-northwest direction to tributaries of Buzzards Bay and the Cape Cod Canal, both salt or brackish waters. Water supply wells within the downgradient areas of the particle tracking plumes have the potential of pulling in brackish water, which could contaminate the wells. The results of the particle tracking analysis results are shown on *Figure 14 - DEP Water Resources Map*, which is included in Attachment 3 and in Attachment 6. As a result of these hydrogeologic studies the

Bourne Water District has determined that the areas downgradient of the Landfill are, for their purposes, "Non-Potential Drinking Water Source Areas" and that they will not seek to locate future drinking water sources in these areas. The Bourne Water District has stated this in a letter included in Attachment 6 that it does not have, nor will it seek to locate future drinking water sources downgradient of the Landfill. Additionally, as a result of the hydrogeologic studies the Bourne Board of Health has issued a regulation, as confirmed in a letter also included in Attachment 6, that prohibits the installation of any public or private water supply wells downgradient of the Landfill. All previously identified water supply wells have been replaced with connections to the public water supply system.

Actions taken as a result of hydrogeologic studies, have included the establishment of local by-laws and policies that prohibit and make illegal the construction of private or public water supply wells, which is characteristic of a Non-Potential Drinking Water Source Area. Therefore, despite the Facility being on Cape Cod, within the mapped limits of a Potentially Productive Aquifer, the designation of the area as a Potentially Productive Aquifer is incorrect and the site is in fact a Non-Potentially Productive Aquifer. The site meets this criterion.

b. *The proponent demonstrates to the Department's satisfaction, based on hydrogeological studies, that the aquifer cannot now, nor in the reasonably foreseeable future, be used as a public water supply due to existing contamination of the aquifer; or*

The Facility is located on Cape Cod and therefore the site is defined in the Massachusetts Contingency Plan (MCP) as being located in a Potentially Productive Aquifer. As further defined in the MCP the Facility is not located within a "Current Drinking Water Source Area", but the Facility is by this definition, located within a "Potential Drinking Water Source Area" due to the presence of the Potentially Productive Aquifer. Portions of the aquifer downgradient from the site beneath the highway corridor associated with MacArthur Boulevard and some areas immediately west of MacArthur Boulevard have been classified as "Non-Potential Drinking Water Source Areas" in accordance with the MCP. Other contamination sources downgradient of the site, and in particular downgradient of Phases 7 and 8, are two closed and unlined landfills (Brookside Landfill and Nightingale Stump Landfill). In addition, hydrogeologic studies conducted for the Facility (Mahoney and Douglas, April 11, 2003 and October 8, 2003) determined by particle tracking analysis supplied by the USGS, that groundwater flows from the site in a generally west-northwest direction to tributaries of Buzzards Bay and the Cape Cod Canal, both salt or brackish waters. Water supply wells within the downgradient areas of the particle tracking plumes have the potential of pulling in brackish water, which could contaminate the wells. The results of the particle tracking analysis are shown on *Figure 14 - DEP Water Resources Map*, which is included in Attachment 3 and in Attachment 6. In addition to these downgradient contamination sources, hydrogeologic studies

conducted on the JBCC site have determined that there is an existing plume of contamination that will eventually migrate through the Landfill to downgradient sites, making groundwater in this area unusable as a drinking water source. See *Figure 11 - USACE Groundwater Flow and Contamination Plume*, which is in Attachment 3. As a result of these hydrogeologic studies the Bourne Water District has determined that the areas downgradient of the Landfill are, for their purposes, "Non-Potential Drinking Water Source Areas" and that they will not seek to locate future drinking water sources in these areas. The Bourne Water District has stated this in a letter included in Attachment 6 that it does not have, nor will it seek to locate future drinking water sources downgradient of the Landfill. Additionally, as a result of the hydrogeologic studies the Bourne Board of Health has issued a regulation, as confirmed in a letter also included in Attachment 6, that prohibits the installation of any public or private water supply wells downgradient of the Landfill. All previously identified water supply wells have been replaced with connections to the public water supply system.

Based on hydrogeological studies, the aquifer downgradient of the Facility cannot now, nor in the reasonably foreseeable future, be used as a public water supply due to existing contamination of the aquifer. The site meets this criterion.

c. *The area has been excluded as a "Non-Potential Drinking Water Source Area" pursuant to 310 CMR 40.0932, or as otherwise defined at 310 CMR 40.0006: The Massachusetts Contingency Plan.*

Portions of aquifer beneath the highway corridor associated with MacArthur Boulevard and some areas immediately west of MacArthur Boulevard have been classified as "Non-Potential Drinking Water Source Areas" in accordance with the Massachusetts Contingency Plan ("MCP"). In addition, there are two closed, unlined landfills and the potential for the presence or the promotion of brackish water that should characterize the area as a "Non-Potential Drinking Water Source Areas". See the responses above. The site meets this criterion.

11. *Any area of waste deposition would be within 1,000 feet upgradient, and where not upgradient, within 500 feet, of a private water supply well existing or established as a potential supply at the time of submittal of the application; provided, however, the applicant may show a valid option to purchase the restricted area, including the well and a guarantee not to use the well as a drinking supply, the exercise of which shall be a condition of any site assignment;*

The Bourne Landfill area is currently served by the Bourne Water District for drinking water. There are no known private drinking water supply wells within 1,000 feet of the Bourne Landfill site. Additionally, there are no known potential private water supplies, as defined in 310 CMR 16.02, within 500 feet of the Bourne Landfill site. The Bourne Water District has stated in a letter included in Attachment 6 that it does not have, nor

will it seek to locate future drinking water sources downgradient of the Landfill. Additionally, the Bourne Board of Health has issued a regulation, as confirmed in a letter also included in Attachment 6, that prohibits the installation of any public or private water supply wells downgradient of the Landfill. All previously identified water supply wells have been replaced with connections to the public water supply system. The site meets this criterion.

12. *The maximum high groundwater table is within four feet of the ground surface in areas where waste deposition is to occur or, where a liner is designed to the satisfaction of the Department, within four feet of the bottom of the lower-most liner;*

Near the Bourne Landfill, the groundwater flow direction is to the west-northwest toward Buzzards Bay, as shown on *Figure 10 - Groundwater Contour Plan* in Attachment 3, which represents measurements taken in 1998. This round of groundwater measurements, which used eleven monitoring wells, is the most conclusive map of groundwater flow at the site because there were a number of measuring points within the footprint of the Landfill that were subsequently and properly abandoned and are now beneath the Landfill. This round of water levels is not only the most precise measurements available for groundwater flow, but also represents the maximum groundwater levels recorded to date for the site. Groundwater elevations have been recorded for decades on the Site, including a well that has been monitored by the USGS. The design elevation of the bottom of the low permeable soil at the leachate sump is the point to which the design groundwater separation distance of four feet is to be established. The anticipated design for the Phase 7 and Phase 8 Landfills will be that leachate from Phase 7 will drain to the currently active Phase 6 leachate sump, which was designed and approved to meet the minimum separation requirements, as part of the Phase 6 ATC approval process. A separate leachate collection and sump system will be designed for the Phase 8 Landfill, which will also meet that criteria. The site meets this criterion.

13. *The outermost limits of waste deposition or leachate containment structures would be within a resource area protected by the Wetlands Protection Act, M.G.L. c. 131, § 40, including the 100 year floodplain;*

The limits of the waste deposition area or leachate containment structures are not within any resource areas protected by the Wetlands Protection Act, M.G.L. c. 131, § 40, including the 100 year floodplain. The site meets this criterion.

14. *Any area of waste deposition or the leachate containment structures would be less than 400 feet to a lake, or 200 feet to a Riverfront Area as defined in 310 CMR 10.00, that is not a drinking water supply;*

The area of waste deposition or the leachate containment structures will not be less than 400 feet to a lake, or 200 feet to a Riverfront Area as defined in 310 CMR 10.00, that is not a drinking water supply. The site meets this criterion.

15. *Any area of waste deposition would be within 1000 feet of an occupied residential dwelling, health care facility, prison, elementary school, middle school or high school or children's pre-school, licensed day care center, senior center or youth center, excluding equipment storage or maintenance structures; provided, however, that the applicant may show a valid option to purchase the restricted area, the exercise of which shall be a condition of any site assignment; or*

There are no occupied residential dwellings, health care facilities, prisons, elementary schools, middle schools or high schools or children's pre-schools, licensed day care centers, senior centers or youth centers within 1,000 feet of the proposed waste deposition area. Within the 1,000 foot radius of the waste deposition area are campsites. These are used seasonally and occupied by tents, campers and trailers, which do not meet the definition of an "occupied residential dwellings". See *Figure 13 - Land Use Plan* included in Attachment 3. The site meets this criterion.

16. *Waste deposition on the site would result in a threat of an adverse impact to groundwater through the discharge of leachate, unless it is demonstrated to the satisfaction of the Department that a groundwater protection system will be incorporated to prevent such threat.*

A groundwater protection system will be incorporated into the design of the Landfill that will be a double composite liner with interstitial leak detection, which will meet or exceed MassDEP requirements for a groundwater protection system, as stipulated at 310 CMR 19.110. The site meets this criterion.

SECTION III. GENERAL CRITERIA

The General Site Suitability Criteria outlined in 310 CMR 16.40(4) apply to all types of solid waste management facilities, and address concerns such as traffic and access to a site, threatened and endangered species, and Areas of Critical Environmental Concern. The General Site Suitability Criteria apply equally to both handling facilities and landfills. Since the 25-acre parcel was demonstrated to meet all of the General Site Suitability Criteria as part of the site assignment process for a handling facility, modification to a landfill site assignment should not affect the results of the previous evaluation of the General Site Suitability Criteria. MassDEP has stated that it will require the evaluation of only select criteria for the Phase 9 vertical expansion, namely: Traffic and Access to the Site (b), Potential Air Quality Impacts (f), Potential for the Creation of Nuisances (g), Size of Facility (h), Areas Previously Used for Solid Waste Disposal (i), Consideration of Other Sources of Contamination or Pollution, (k) and Promotion of Integrated Solid Waste Management. The following discussions address the *General Criteria*

for Phases 7, 8 and 9 with references to the LHF on the adjacent 12-acre parcel, which is not part of this application but will be addressed in a separate Site Suitability Application.

The following Site Suitability Criteria shall apply to all types of solid waste management facilities.

- a. *Agricultural Lands.* *No site shall be determined to be suitable or would be assigned as a solid waste management facility where:*

1. *The land is classified as Prime, Unique, or of State and Local Importance by the United States Department of Agriculture, Natural Resources Conservation Service; or*

A Custom Soil Resource Report for Barnstable County, Massachusetts, Town of Bourne, ISWM Department was prepared by the United States Department of Agriculture, Natural Resources Conservation Service and is included in Attachment 7. In that report, the included soil map identifies the western portion of the 12-acre parcel and the 25-acre parcel, as well as the state-owned abutting land along the western boundary, to be Soil Group 431B, Barnstable sandy loam, 3 to 8 percent slopes, very stony and 431C, Barnstable sandy loam, 8 to 15 percent slopes, very stony with a Farmlands Classification of, "Farmland of statewide importance." The remaining portions of the town-owned parcels are identified as Soil Group 435B, Barnstable loamy coarse sand, 3 to 8 percent, very stony, with a Farmlands Classification of, "Not prime farmland."

The 25-acre parcel is currently site-assigned for solid waste handling and has been completely disturbed by historical clearing and gravel mining operations and approved solid waste handling operations. Historical aerial photos indicate this parcel was substantially disturbed prior to acquisition by the Town and may not have met the agricultural land classifications when ISWM acquired it. Included in Attachment 8 is a site specific soil survey report for the 25-acre parcel prepared by a Certified Professional Soil Scientist/Soil Classifier from LEC Environmental Consultants. This report documents and delineates the actual soil conditions of the parcel as it relates to this criterion and concluded that soils classified as supporting "Farmland of statewide importance" were no present.

Figure 15 - Proposed Site Assignment Modifications included in Attachment 3, indicates the specific areas where modifications to the site assignment are, or are not, proposed. The blue area on the figure is that portion of the 25-acre parcel where the existing solid waste handling site assignment is currently proposed to be modified for landfilling and represents the conceptual footprint of the Phase 7 and Phase 8 landfills. The yellow area is that portion of the 12-acre parcel that is not site assigned and is not part of this application but is currently proposed to be site assigned for solid waste handling, as defined by the property line and the 100-foot offset from the

“Farmland of statewide importance.” The green area is that area where no site assignment modification is currently proposed, which on the 25-acre parcel means the solid waste handling site assignment remains in effect and on the 12-acre parcel the area will remain without a site assignment.

Reportedly, there are proposed modifications to *310 CMR 16.00 Site Assignment Regulations for Solid Waste Facilities* that may revise this criteria’s requirements. Should this criteria be modified where there would be reduced restrictions on the application of a site assignment that would increase the area where solid waste handling or disposal can be increased, the Town will seek to modify the limits of the site assignment area. The site meets this criterion.

2. *The land is deemed Land Activity Devoted to Agricultural or Horticultural Uses, except where the facility is an agricultural facility; and*

The Bourne Landfill is not deemed to be *Land Activity Devoted to Agricultural or Horticultural Uses*. The site meets this criterion.

3. *A 100 foot buffer would not be present between the facility and those lands classified at 310 CMR 16.40(4)(a)1 or 2.*

On the 12-acre parcel and the 25-acre parcel, there will be a 100 foot buffer between the delineated “Farmland of statewide importance” and the areas that are proposed to be site-assigned for landfilling or for solid waste handling. Should the Site Assignment Regulations be modified, as discussed above, ISWM will seek to modify the area impacted by the 100 foot buffer, so as to optimize the facility’s design. The site meets this criterion.

- b. *Traffic and Access to the Site.* *No site shall be determined to be suitable or be assigned as a solid waste management facility where traffic impacts from the facility operation would constitute a danger to the public health, safety, or the environment taking into consideration the following factors: (1) traffic congestion, (2) pedestrian and vehicular safety, (3) road configurations, (4) alternate routes, and (5) vehicle emissions.*

1. *Traffic Congestion-* Site access, volume and regional impacts of traffic coming and going from the Bourne ISWM Facility were thoroughly analyzed during the EIR/DRI Joint review process with MEPA and CCC. Additionally, traffic impacts were again reviewed in 2003 when ISWM filed a Notice of Project Change (NPC) with MEPA, and a Major Modification with the Cape Cod Commission (CCC), to accept MSW at the landfill. All reviews, including those by the CCC, are complete. Since the proposed project, including the Phase 9 expansion, does not propose to increase the permitted tonnage to the site and thereby not changing the traffic volume that has been previously evaluated and approved, or changing the site access, there will be no change to the existing traffic impacts which have already been well

evaluated, therefore the facility's operation will not constitute a danger to the public health, safety, or the environment due to traffic. ISWM has stated that their preferred operating alternative is to continue to accept combustor ash from SEMASS, which will produce less traffic than the alternative of accepting only MSW. However, an all MSW scenario was considered and the facility is capable of managing the small difference in volume without creating new impacts.

Attachment 9 provides a Traffic Assessment and plan showing infrastructure improvements. This Traffic Assessment and plan are an update of the original FEIR, as well as what was part of the most recent MEPA ENPC and SSEIR submittal in 2018 and the submittal to the CCC for its Development of Regional Impact (DRI) review. The traffic engineer notes in the Assessment that previous project files dating back to the original EIR era were reviewed again and that it includes a review of recent crash data. The site meets this criterion.

2. Pedestrian and Vehicular Safety- The subject parcels are located south of the existing site assigned 74-acre landfill parcel which is accessed by a deceleration lane on the Route 28 north bound lane. This is the only site access point and it has been thoroughly reviewed for safety concerns. Pedestrians are prohibited along Route 28, therefore potential conflicts with pedestrian traffic will not arise. Furthermore, traffic coming to the site will use major highways and will not be traveling through or near congested urban areas, residential neighborhoods or schools. The site meets this criterion.
3. Road Configurations- As previously noted, access to the site is solely through the deceleration lane located on the Route 28, north bound lane, which has been approved by the Massachusetts Department of Transportation, Highway Division (MA DOT), constructed and has been operational for several years. Internal roads accessing the subject parcels consist of the existing main access road along the western perimeters of the 74-acre and 25-acre parcels and to roads and areas along the eastern side of the site, that are not accessible to the general public, which are used primarily for operations purposes. The existing main access road on the western perimeter will continue to be used as part of the Phase 7, 8 and 9 operations and for access to the residential recycling center area and the C&D Transfer Station. Adjustments and extensions to this network will be constructed once access to the 12-acre parcel is achieved. The site meets this criterion.
4. Alternate Routes- Access to the facility is limited to the Route 28, north bound lane as described above. The site meets this criterion.
5. Vehicle Emissions- ISWM has submitted and received approval of its Cumulative Impact Assessment (CIA) (See Attachment 10) which included analysis of potential emissions from the facility. Since the total permitted tonnage at the site will not change, emissions are not expected to change. ISWM has implemented a Best

Management Practice program in order to reduce diesel emissions from its heavy equipment. ISWM's policy for purchasing all new equipment requires that it meet or exceed all current air emissions standards applicable to heavy equipment operations. The site meets this criterion.

c. Wildlife and Wildlife Habitat. *No site shall be determined to be suitable or be assigned as a solid waste management facility where such siting would:*

1. *have an adverse impact on Endangered, Threatened, or Special Concern species listed by the Natural Heritage and Endangered Species Program of the Division of Fisheries and Wildlife in its data base;*

As identified by a representative from Natural Heritage and Endangered Species Program (NHESP) and Horsley & Witten, Inc., the 25-acre parcel provides a small area of habitat for the Eastern Box Turtle, a species of Special Concern. These areas are identified in the plans in Attachment 3, along the eastern boundary abutting the Joint Base Cape Cod facility. The Town has committed to maintaining a buffer along this boundary to protect this habitat. This buffer may include boulders, fencing or earthen berms to physically separate this area and protect it from disturbance. As indicated in a letter dated July 17, 2001, which is included in Attachment 11, NHESP agreed that rare species will not be directly impacted so long as this area is maintained as a buffer.

NHESP has determined in a February 5, 2020 letter that Phase 7, Phase 8, Phase 9 and surrounding areas outside of the delineated habitat line are exempt from further Massachusetts Endangered Species Act (MESA) review. This means that the permitting, construction and operation of Phases 7, 8 and 9 may proceed to completion without further NHESP action. See the NHESP comment letter on the ENPC, included in Attachment 11. The site meets this criterion.

2. *have an adverse impact on an Ecologically Significant Natural Community as documented by the Natural Heritage and Endangered Species Program in its data base; or*

NHESP has confirmed that there will be no impact on an Ecologically Significant Natural Community. The site meets this criterion.

3. *have an adverse impact on the wildlife habitat of any state Wildlife Management Area.*

A review of the Mass Wildlife Lands viewer confirms that the ISWM facility is not in a Wildlife Management Area. The site meets this criterion.

d. Areas of Critical Environmental Concern. *No site shall be determined to be suitable or be assigned as a solid waste management facility where such siting:*

1. *would be located within an Area of Critical Environmental Concern (ACEC), as designated by the Secretary of the Executive Office of Environmental Affairs; or*
2. *would fail to protect the outstanding resources of an ACEC as identified in the Secretary's designation if the solid waste management facility is to be located outside, but adjacent to the ACEC.*

The Bourne ISWM facility is not within or adjacent to an ACEC. The nearest ACEC is the Bourne Back River estuarine system. The boundary for the Bourne Back River ACEC is located along the western edge of Route 28, across the highway and within 500 feet of the site. However, the Secretary of the Executive Office of Environmental Affairs' Designation of the ACEC clearly identified that the watershed boundary is not part of the ACEC. The ACEC is limited to identified wetlands resource areas and their 100 foot buffer zones. The site meets this criterion.

- e. *Protection of Open Space.* *No site shall be determined to be suitable or be assigned as a solid waste management facility where such siting would have an adverse impact on the physical environment of, or on the use and enjoyment of:*

1. *State forests;*
2. *State or municipal parklands or conservation land or other open space held for natural resource purposes in accordance with Article 97 of the Massachusetts Constitution;*
3. *MDC reservations;*
4. *Lands with conservation, preservation, agricultural, or watershed protection restrictions approved by the Secretary of the Executive Office of Environmental Affairs; or*
5. *Conservation land owned by private non-profit land conservation organizations and open to the public.*

In December, 2004, ISWM staff met with the Environmental Manager and Natural Resources Manager of the Massachusetts Army National Guard's (Guard) Environmental and Readiness Center and the Environmental Officer of the Environmental Management Commission (EMC) to discuss ISWM's application to expand the original 74-acre site assignment to allow solid waste handling operations to be conducted on the 25-acre parcel and to address any concerns.

Together, the Guard and the EMC manage the habitat of Camp Edwards, a 15,000-acre parcel located on the Joint Base Cape Cod (JBCC) adjacent to the Town's parcel, to ensure that military training operations do not have an adverse impact on habitat, species or the groundwater. This is especially critical because this area has been designated as the Upper Cape Water Supply Reserve (Chapter

47 of the Acts of 2002 of the Massachusetts General Court) to recognize and protect the area as a drinking water source for the Upper Cape. To that end, the Guard, through its Groundwater Protection Policy, has chosen to treat this area as if it were a Zone II. In addition, this law created the EMC to oversee implementation of environmental management principles agreed to by the Guard. The EMC reports to three agencies that are part of the EOE and therefore this land could be considered open space as defined in items 2 and 4 listed above.

The Town wishes to support these efforts by eliminating any potential adverse impacts on the physical environment that its operations could have on the JBCC property. Therefore, ISWM has developed the following best management practices (BMPs) to help protect this land. In addition, ISWM will continue to work with officials overseeing the management of the Upper Cape Water Supply Reserve to make modifications to its operations, as necessary.

Litter - It is possible that wind-blown litter might escape the property while landfill operations are being conducted. To address this concern, ISWM has developed and implements a plan containing the following measures.

- Strategically placed permanent litter fencing.
- Use of temporary moveable litter fences.
- Use of tarps over temporary stockpiles to contain recyclables.
- Restrictions on loading and unloading operations on high wind days.
- Regular litter patrols along Canal View Road adjacent to the entire parcel and on Town property.

Dust - Landfill operations will be conducted on soil or ash surfaces that have the potential for creating dust. Therefore, mitigation of dust generation will be an active component of the Landfill's operation. ISWM will continue to use Town owned street sweepers and water trucks to maintain site roads to control dust. ISWM will also conduct active water applications to open surfaces that may generate dust, with particular attention being paid to the Landfill's access roads where heavy equipment operation is conducted. When a contractor is working on the site, they are contractually bound to control dust, principally by water application.

Stormwater/Groundwater - The proposed site assignment modification is to convert solid waste handling operations to landfilling operations on the 25-acre parcel and under a separate new site assignment to relocate existing handling and administration operations to the 12-acre parcel. The Phase 7 and Phase 8 landfill (cells) will be constructed in accordance with the current MassDEP groundwater protection standards, as stipulated at 310 CMR 19.111. These standards require that at least a double composite liner with leak detection be installed. All liners,

except for Phase 1-ABC (no liner) and Phase 2 (single composite liner) have been installed to meet the current design standard. Therefore, the risk of potential releases to groundwater is minimal, as determined by the current MassDEP groundwater protection system standards. All stormwater will be managed on site through the use of diversion berms, swales, culverts, retention basins and infiltration basins. This includes the existing large infiltration/sedimentation basin that is located at the northwest corner of the site and a new large infiltration/sedimentation basin that will be on the 12-acre parcel. The final design of the new sedimentation basin may vary but it will conform to the criteria of the Solid Waste Management Regulations and the Massachusetts Stormwater Management Standards.

Buffer - ISWM will maintain a natural buffer along the eastern boundary of the 25-acre parcel to protect the Eastern Box Turtle habitat. ISWM may utilize a variety of techniques to physically separate operations from the area including: earthen berms, fencing, boulders and infiltration basins.

As a result of these activities the site meets this criterion.

f. Potential Air Quality Impacts. *No site shall be determined to be suitable or be assigned as a solid waste management facility where the anticipated emissions from the facility would not meet required state and federal air quality standards or criteria or would otherwise constitute a danger to the public health, safety or the environment, taking into consideration:*

1. *the concentration and dispersion of emissions;*
2. *the number and proximity of sensitive receptors; and*
3. *the attainment status of the area.*

1. The concentration and dispersion of emissions - The proposed facility will not constitute a danger to the public health, safety, or the environment from anticipated air emissions. ISWM submitted a comprehensive document entitled, *Interim Risk Evaluation and Cumulative Impact Assessment of the Proposed Phased Landfill Development of the Town of Bourne Integrated Solid Waste Management Facility*, which is included in Attachment 10. The analysis examined all current solid waste management activities at the site, including disposal of municipal waste combustor ash, and a projection of a full landfill build-out that assumed a maximum tonnage of 1,000 tons per day. These conditions, except for the assumed increase in maximum daily tonnage, are consistent with the Phase 7, Phase 8 and Phase 9 landfill expansion projects.

After reviewing the report and supplemental information, Carol Rowan West, Director of MassDEP's Office of Research and Standards, stated in her letter dated July 1, 2003, "*We therefore recommend that this Facility Based Impact*

evaluation be approved with the caveats discussed above and detailed below.”

This review was accepted by MassDEP as part of the ATC application approval for the Phase 3, Stage 3 lined landfill expansion. ISWM has implemented a Best Management Practice program as described above, in order to reduce diesel emissions from its heavy equipment. The site meets this criterion.

2. The number and proximity of sensitive receptors - The closest school is the Bourne Middle School on Waterhouse Road, which is located approximately one mile northwest of the site. The Bourne Manor Health Care Facility is located greater than one half mile from the 25-acre parcel. There are condominiums on Waterhouse Road and at Brookside as well as a campground that are located within one half mile of the facility. All of these receptors are located across Route 28 from the facility. The site meets this criterion.
3. The attainment status of the area – Barnstable County has attained all of the national ambient air quality standards (NAAQS) established by EPA for sulfur dioxide (SO₂), particulate matter (PM_{2.5} and PM₁₀), ozone, lead, carbon monoxide and nitrogen dioxide (NO₂). The site meets this criterion.

g. Potential for the Creation of Nuisances. *No site shall be determined to be suitable or be assigned as a solid waste management facility where the establishment or operation of the facility would result in nuisance conditions which would constitute a danger to the public health, safety, or the environment, taking into consideration the following factors: (1) noise; (2) litter; (3) vermin such as rodents and insects; (4) odors, (5) bird hazards to air traffic, and (6) other nuisance problems.*

1. **Noise** - Certain levels of noise are associated with the operation of trucks and heavy equipment at the Facility. The operation of equipment, the closing of tailgates and the sound of back up signals are some of the more common and unavoidable sounds at the Facility. Back up signals are a requirement meant to provide a safer environment for the workers and visitors to the Facility.

Active operation and concurrent construction activities have occurred regularly at the Facility, without any indication that receptors have been adversely impacted by noise. The site is well buffered by distance, traffic noise along Route 28 and vegetation, mitigating potential impacts as confirmed in a previous noise survey. See *Attachment 12 – Sound Level Survey* for the 2001 study conducted by Cavanaugh Tocci Associates. The construction and operation of a landfill expansion in Phase 9, on the 25-acre parcel and handling operations of the 12-acre parcel will not result in any significant change of conditions from present and past noise impacts. The site meets this criterion.

2. **Litter** - Facility operations must be conducted to minimize blowing litter within the landfill and the handling facility area. The level of effort needed to control

windblown litter is dictated by waste materials accepted, weather conditions and wind conditions. Methods available to control windblown litter include the following:

Portable litter fence. The most suitable location for litter control fence should be determined on a daily, or even more frequent, basis, based on the wind's direction. The fencing should be placed as close to the active face as practical without interfering with the landfilling operations. The fencing should be constructed to allow the wind to pass through it.

Permanent litter fencing. Litter fencing has been installed along the northern, eastern and western property lines. The permanent, existing fencing will be extended southerly from the limit of the existing fencing along the eastern and western property lines to the southern limits of the proposed Phase 7 and Phase 8 Landfill expansion.

Application of cover material. Cover material should be applied frequently on the active face on windy days, if required, to minimize the blowing of lightweight waste materials.

Active face on interior slopes. On windy days, the active face should be maintained on interior slopes, if possible. Waste disposal on outer slopes should be avoided when it is windy.

Litter patrols. Litter collection crews are deployed regularly and as needed to gather windblown litter. In addition, these crews must routinely police areas along MacArthur Boulevard and properties abutting the Facility, including JBCC.

Temporary fence. Temporary fence is installed at strategic locations within the operating landfill to create additional interception and collection points for wind-blown litter.

Covering Vehicles. All vehicles entering or leaving the facility shall be covered to prevent wind-blown litter.

Indoor loading and unloading. Whenever possible loads that have the potential of generating wind-blown litter should be loaded and unloaded under cover. When that is not feasible, care should be taken to minimize the potential by loading/unloading in an area shielded from the wind or in an area protected by litter nets.

The site meets this criterion.

3. *Vermin* - Vermin (vector and rodent) control at the landfill and at the handling facility may be accomplished by employing the following control methods:

Periodic application of cover material. If vermin are a problem, cover material should be placed more often.

Immediate application of cover material. Waste loads that attract vermin should be covered immediately to discourage the proliferation of vermin.

Mixing waste with soil. Some waste loads may be mixed with soil materials to discourage vermin contact.

Limiting storage of putrescible materials. Putrescible materials that could provide a feedstock for vermin should be removed from the site as quickly as possible.

Exterminator. Contracting with a licensed exterminator who conducts rodent control actions.

By far the best method for minimizing vermin is the timely application of cover materials and placing cover materials in sufficiently thick layers to prevent vermin contact with the waste.

In order to reduce the presence of vermin, the Facility maintains a contract with a licensed exterminator to conduct vermin control actions, such as setting bait stations on a regular schedule and as needed.

Proper compaction techniques and the application of six-inches of daily cover soil or ash at the end of daily operations will reduce the presence of rodents. Additionally, the size of the daily operating area at the Landfill's face will be kept to a minimum. This promotes good compaction and helps to control litter and odors that might attract rodents to the operating face. The contracted, licensed exterminator also conducts rodent control actions concurrent with vector controls.

The site meets this criterion.

4. *Odors* - A potential source of odor is at the operating face of the Landfill and within the handling and transfer operations. Proper compaction and covering methods (daily and intermediate cover) help to minimize odors generated at the operating face. The operators are instructed to immediately deal with odors at the operating face, should they arise. Measures such as the placement of daily cover and/or dry lime, as needed, to the surface of the area(s) that may be generating excessive odors are effective mitigation measures that are used at the Facility. The elimination of accepting C&D residuals and fines materials and shifting to a

waste stream that is predominantly ash has significantly reduced the occurrence and/or magnitude of any odor generation. Another odor mitigation measure that is employed is the expansion and maintenance of the existing, active landfill gas collection and flare system. This system will continue to be expanded with the Landfill. Within the handling and transfer operations, odors are best mitigated by covering waste holding containers, and moving waste from floors and other accessible location and putting it into closed containers and removing them from the site or putting them in the Landfill. The site meets this criterion.

5. *Bird Hazards* – The operation of the Phase 7, Phase 8 and Phase 9 landfill expansions and the relocation of handling operations will not result in a bird hazard to aircraft. This has been demonstrated by the long-term operation of the Facility. While the Facility abuts the Joint Base Cape Cod, which includes Otis Air National Guard Base and Camp Edwards, the Facility is at least 4.5 miles from the closest runway area. No incidents involving bird hazards have been reported. It is unlikely that continued operation of these facilities will have any impact. The site meets this criterion.
6. *Other* - Due to the nature of landfilling and handling operations, dust will be generated during dry periods of the year. The following control measures are employed at the Facility:

Soil wetting. Facility access roads, on and off the landfill, are wetted using a water truck. This task is regularly performed several times during an operating day in the summer months.

Application of calcium chloride. Calcium chloride, a soil wetting agent, may be used to control dust. However, using calcium chloride in large quantities is costly and may affect groundwater quality and will only be conducted if necessary.

Vegetative cover. Inactive landfill areas may be seeded to encourage the growth of vegetation and reduce barren soils.

Secure Material Delivery. All Trucks delivering MSW, ash, stone, soil or any other material to the site must have their loads covered.

Pavement sweeping. The Facility operates a sweeper that it regularly uses to remove accumulated dirt from paved areas of the site. Removal of this dirt reduces dust generation.

The site meets this criterion.

- h. *Size of Facility. No site shall be determined to be suitable or be assigned as a solid waste management facility if the size of the proposed site is insufficient to properly operate and maintain the proposed facility. The minimum distance between the waste handling area or deposition area and the property boundary shall be 100 feet, provided that a shorter distance may be suitable for that portion of the waste handling or deposition area which borders a separate solid waste management facility.*

A 100 foot buffer will be maintained along the eastern and western boundaries of the 25-acre and 12-acre parcels and the southern boundary of the 12-acre parcel, as will all other buffers for receptors, as required by the Site Assignment Regulations. The northern boundary of the 25-acre parcel is adjacent to the current 74-acre parcel upon which ISWM currently operates the Landfill. Full landfill build-out of the 74-acre parcel, through the Phase 6 and Phase 9 expansions and the subsequent Phase 7 and Phase 8 expansions will extend landfill operations to the southern boundary of the 25-acre parcel. The current access roads and paved open areas within the 25-acre and 74-acre parcels, and those proposed for the 12-acre parcel, provide more than adequate room to maneuver and queue vehicles for all of the solid waste handling operations at the facility.

The Site Assignment Application requires the inclusion of a Land Use Plan, which is included as Figure 13 in Attachment 3. This plan identifies the location of certain sensitive receptors, relative to specified offsets from property and waste handling area limits. As can be noted from this plan, the facility is of adequate size to provide sufficient space for unencumbered, proposed operations and that there is adequate separation distance, or offset distance, from the identified, sensitive receptors.

The site meets this criterion.

- i. *Areas Previously Used for Solid Waste Disposal. Where an area adjacent to the site of a proposed facility has been previously used for solid waste disposal the following factors shall be considered by the Department in determining whether a site is suitable and by the board of health in determining whether to assign a site:*
1. *The nature and extent to which the prior solid waste activities on the adjacent site currently adversely impact or threaten to adversely impact the proposed site.*
 2. *The nature and extent to which the proposed site may impact the site previously used for solid waste disposal.*
 3. *The nature and extent to which the combined impacts of the proposed site and the previously used adjacent site adversely impact the public health, safety, and the environment taking into consideration:*
 - a. *whether the proposed site is an expansion of or constitutes beneficial integration of the solid waste activities with the adjacent site;*

- b. *whether the proposed facility is related to the closure and/or remedial activities at the adjacent site;*
- c. *the extent to which the design and operation of the proposed facility will mitigate existing or potential impacts from the adjacent site.*

The modification of the existing site assignment, so as to allow landfilling to occur within Phase 9, which is within the area that is currently site assigned for landfilling and on the 25-acre parcel that is currently site assigned for solid waste handling, and to the new site assignment which is to be under a separate application so as to allow solid waste handling to occur on portions of the 12-acre parcel, will provide beneficial, long term solid waste management capacity for Bourne and the greater Cape Cod region. Fortunately for the Town, it was able to acquire the 25-acre and 12-acre parcels, allowing it to proceed with its development of long term integrated solid waste management plans. The expansion of the proposed landfilling activities into Phase 9 and onto the 25-acre parcel is fully compatible with the current and projected build out of landfilling operations on the 74-acre parcel. The projected impacts from the future expansion of landfill operations into Phase 7, Phase 8 and Phase 9 will provide added disposal capacity and extended life to the Facility. The construction and operation of these phases will be the same as construction and operation of the existing landfill phases. With the build out of Phases 7 and 8, the solid waste handling, materials storage, residential recycling center and administration operations that currently occur on the 25-acre parcel, will be relocated to the 12-acre parcel.

The optimized use of the 74-acre parcel with Phase 9 and the development of the 25-acre parcel as the Phase 7 and Phase 8 landfill phases will allow the Town to maximize the potential utilization of the site for its solid waste management activities. ISWM can more fully use the combined parcels for landfilling, thereby providing a critical regional service as evidenced by the shortfall of disposal capacity in Massachusetts. The existing solid waste handling operations are intended to be relocated onto the 12-acre parcel that is immediately to the south of the 25-acre parcel, which was recently purchased by the Town. This relocation of solid waste handling operations will require a new site assignment that will allow solid waste handling operations to be permitted on portions of the 12-acre parcel which will provide regional solid waste management services after the landfill has closed.

The site meets this criterion.

- j. *Existing Facilities. In evaluating proposed sites for new solid waste management facilities the Department and the board of health shall give preferential consideration to sites located in municipalities in which no existing landfill or solid waste combustion facilities are located. This preference shall be applied only to new facilities which will not be for the exclusive use of the municipality in which the site is located. The Department and the board of health shall weigh such preference against the following*

considerations when the proposed site is located in a community with an existing disposal facility:

1. *the extent to which the municipality's or region's solid waste needs will be met by the proposed facility;*
2. *the extent to which the proposed facility incorporates recycling, composting, or waste diversion activities.*

Since the proposed expansion of landfill operations into Phase 7, Phase 8 and Phase 9 and the relocation of solid waste handling operations do not constitute a new facility, this criterion is not applicable. However, according to lists provided by the MassDEP on their website there are four identified landfills in Bourne. The inactive landfills are: Bourne Dump (SL0036.0020), MacArthur Boulevard; Nightingale Stump Landfill (SD0036.001), 260 MacArthur Boulevard; and Otis Air Force Base Landfill (SL 0036.003) Connery Road. The only active landfill is the Bourne Landfill (SL 0036.004), 201 MacArthur Boulevard, which is owned and operated by the Town. This is located on the 74-acre parcel that is site assigned for landfill operations, which includes the location of Phase 9 and the immediately adjacent 25-acre parcel that is site assigned for solid waste handling operations and is the subject of this Modification Application. Specifically, this Application seeks to modify the existing 74 acre landfilling site assignment, so as to allow for the operation of Phase 9, and on the 25-acre parcel to allow solid waste landfill operations to occur in this area. A separate Site Assignment Application will be made to site assign a portion of the 12-acre parcel allowing relocation of the solid waste handling operations to the adjacent 12-acre parcel. There are no combustion facilities in Bourne.

The proposed Phase 7 and Phase 8 expansion of landfill operations onto the 25-acre parcel will require the relocation of the handling operations onto the 12-acre parcel, located immediately south and contiguous to the 25-acre parcel. This will allow the continuation of services on a regional basis including ash and MSW disposal, C&D transfer, recycling and composting, as well as the residential drop off and recycling center. ISWM currently provides services to several municipalities on Cape Cod and the South Shore for management of C&D and recyclables. The vast majority of the waste that is disposed in the Landfill (87%) is ash from the SEMASS waste to energy facility which provides disposal services for many communities on Cape Cod, southeastern Massachusetts and beyond. Therefore, the site will not be for the exclusive use of the Town of Bourne and should be given preferential consideration.

While this criterion is not applicable it is met.

- k. *Consideration of Other Sources of Contamination or Pollution. The determination of whether a site is suitable and should be assigned as a solid waste management facility shall consider whether the projected impacts of the proposed facility pose a threat to public health, safety or the environment, taking into consideration the impacts of existing*

sources of pollution or contamination as defined by the Department, and whether the proposed facility will mitigate or reduce those sources of pollution or contamination.

In accordance with previous Department guidance, ISWM submitted an analysis entitled, *Interim Risk Evaluation and Cumulative Impact Assessment of the Proposed Phased Landfill Development of the Town of Bourne Integrated Solid Waste Management Facility* (CIA), which is included in Attachment 10. This examined the potential impact of the theoretical build out of the facility, which is consistent with the Phases 7, 8 and 9 expansions and relocation of handling operations to the 12-acre parcel, in conjunction with other local potential sources of contamination or pollution. The conclusion of the CIA is that there will be no significant impacts to receptors in the vicinity of the site and that Best Management Practices will be employed to mitigate any potential impacts from the facility. In addition, a review of the state's database revealed that local emissions of volatile organic compounds (VOCs) are insignificant. The site meets this criterion.

1. *Regional Participation. The Department and the board of health shall give preferential consideration to sites located in municipalities not participating in a regional disposal facility. The Department and the board of health shall weigh such preference against the following considerations when the proposed site is located in a community participating in a regional disposal facility:*

1. *the extent to which the proposed facility meets the municipality's and the region's solid waste management needs; and*

The proposed facility contributes to the Town of Bourne and the region's ability to provide an economic and efficient means for the private and public sectors to dispose and recycle solid waste. The MassDEP's Solid Waste Master Plan clearly shows a need for capacity of all types and use of this land will enable Bourne to better assist in fulfilling those needs by significantly extending the operating life of the Landfill. The CCC Regional Policy Plan also specifically identifies the need for integrated solid waste management infrastructure. The site meets this criterion.

2. *the extent to which the proposed facility incorporates recycling, composting, or waste diversion activities.*

The proposed Phase 7, Phase 8 and Phase 9 landfill expansions are intended for disposal of residual materials resulting from recycling operations, municipal solid waste collection and ash resulting from combustion of MSW and is not for the disposal of C&D. The relocation of solid waste handling operations will permit the continuation of the existing recycling, composting and other waste diversion activities. The site meets this criterion.

3.3 310 CMR 16.40(5) PROMOTION OF INTEGRATED SOLID WASTE MANAGEMENT

- (a) *In determining whether a site is suitable for a combustion facility or a landfill, the Department shall consider the following factors:*

1.The potential yearly and lifetime capacity created by the proposed site use(s) in relation to the reasonably anticipated disposal capacity requirements and reduction/diversion goals of the Commonwealth and the geographic area(s) which the site will serve.

Landfill capacity projections from MassDEP reveal a significant reduction in the number operational landfills starting in 2021, which provide capacity for many types of municipal solid waste (MSW) including; household and commercial trash, processing residuals, storm/disaster debris, municipal waste combustor ash, contaminated soils, dredge spoils and special wastes. The best management option for much of this waste, which cannot be recycled, composted or combusted, is for it to be disposed in a landfill.

Bourne will continue to play a critical role in providing regional solid waste infrastructure going forward. Primarily, ISWM will provide much needed local municipal waste combustor ash disposal capacity. This is important because operators of combustors must show they have several years of capacity for their ash as part of their operating plan. The proposed buildout of the Bourne Landfill capacity is part of the plan for SEMASS which has a contract with the Town running through the end of 2021, with options for extensions. This is especially important given that it is projected that the CMW Landfill in Carver, where ash and bypass MSW from SEMASS also are deposited, will close by the end of 2021.

The full buildout of the site for landfilling, as proposed, will add about 5,175,000 cubic yards of capacity, beyond the limits of the currently approved operations in Phase 6. If the current contract with SEMASS is continued indefinitely and the facility runs at its permitted capacity full time, the landfilling operations will extend to at least September 2041. If the current contract with SEMASS is discontinued and the facility switches to accepting only MSW and runs at its permitted capacity full time, the landfilling operations will extend to at least January 2036.

The site meets this criterion.

2.The extent to which the proposed site use(s), alone or in conjunction with other sites, provides or affords feasible means to maximize diversion or processing of each component of the anticipated waste stream in order to reduce potential adverse impacts from disposal and utilize reusable materials and only thereafter extract energy from the remaining solid waste prior to final disposal.

The Bourne facility provides feasible means to maximize diversion or processing of each component of the anticipated waste stream. With the current and anticipated future use of the Landfill being committed to 87% utilization for MSW combustor ash disposal, a significant component of the diversion of unprocessed waste from landfills is provided. Other components of the site's operations include the transfer of Single Stream Recyclables; a Residential Recycling Center that allows the source separation by residents and includes a Swap Shop; and processing and composting of brush and yard waste, and the processing of asphalt, brick and concrete (ABC) for reuse. The site meets this criterion.

3. The extent to which the proposed use(s) of the site, alone or in conjunction with other sites, will contribute to the establishment and maintenance of a statewide integrated solid waste management system which will protect the public health and conserve the natural resources of the Commonwealth.

From its very inception and being named the Bourne Integrated Solid Waste Management (ISWM) facility demonstrates the Town's commitment to providing facilities that are used to maximize the promotion of recycle/reuse and waste reduction. The facility is the predominant regional integrated solid waste management facility that can support other facilities in the region to protect the public health and conserve the natural resources of the Commonwealth. The site meets this criterion.

(b) In determining whether a site is suitable for a combustion facility or a landfill, the Department and the board of health shall consider the extent to which the proposed use of the site directly incorporates recycling and composting techniques or is otherwise integrated into recycling and composting activities for the geographic area(s) which the site will serve.

The proposed expansion of the facility will incorporate all of the existing solid waste management operations, which includes recycling and composting activities. These operations are available to the region. The site meets this criterion.

(c) A site proposed for a combustion facility or a landfill shall be reviewed to determine if the site is also suitable for a recycling or composting facility either in conjunction with or instead of the proposed facility.

The site is an existing recycling and composting facility and will continue to include these operations. The site meets this criterion.

(d) Site assignment applications which incorporate significant recycling or composting uses, in accordance with the goals of the statewide plan, shall receive preferred consideration.

The site has an existing site assignment, which is to be modified and will obtain a new site assignment to suit the proposed expansion of operations at the facility which incorporate significant recycling or composting uses, in accordance with the goals of the statewide plan. Consequently, the proposed site expansion should receive preferred consideration. The site meets this criterion.

ATTACHMENT 2
EXISTING SITE ASSIGNMENTS



TOWN OF BOURNE

BOARD OF HEALTH
BOURNE, MASS.

June 16, 1972

Paul T. Anderson, P. E.
Regional Sanitary Engineer
Southeastern Health Region
Lakewood Hospital
Lakewood, Massachusetts 02346

Dear Mr. Anderson:

The Bourne Board of Health following a public hearing voted to assign as a sanitary landfill site for the use of the Town of Bourne the following area: easterly of MacArthur Boulevard bounded: Northerly by land of Lura B. Crump, Easterly by the Massachusetts Military Reservation, Southerly by Gardner S. Nightingale, Westerly by the 1962 taking on the easterly side of MacArthur Blvd. said land is composed of 6 parcels comprising approximately 78 acres with the owners as follows: Monument Beach Sportsmans Club, Lawrence B. Killiam, Mary C. Peables, Elwood J. Smalley, Gardner S. Nightingale. All shown on plan entitled "Proposed Dump Site, Bourne, Mass., Scale 1 inch equals 200 feet, August 1966" a copy of which is on file in the office of the Town Clerk.

If there is any further information regarding this matter please be assured of our cooperation.

Sincerely,

George D. Denmark, Chairman
Board of Health
Town of Bourne

GDD/vmr

06-29-2005 @ 02:11p

TOWN OF BOURNE
BOARD OF HEALTH

In Re Town of Bourne Department of
Integrated Solid Waste Management
Site Assignment
Major Modification for:

25.22-acre expansion located adjacent to existing
Bourne Sanitary Landfill,
201 MacArthur Boulevard, Bourne, Massachusetts

DECISION AND STATEMENT OF FINDINGS

I. INTRODUCTION

On January 28, 2005, the Town of Bourne (the "Town" or "Applicant") submitted to the Massachusetts Department of Environmental Protection ("DEP") an application for Site Assignment Major Modification (the "Application"), entitled Site Suitability for a Major Modification of an Existing Site Assignment, relative to the proposed 25.22 acre expansion located adjacent to the existing Bourne Sanitary Landfill located at 201 MacArthur Boulevard, Bourne, Massachusetts (the "Site"). Bourne Board of Health ("BOH" or the "Board") Exh. 1.

On February 8, 2005, the DEP issued a Determination of Administrative Completeness for the Application (Transmittal # W056973, Site Suitability Report #293-004-C). BOH Exh. 37. On February 16, 2005, public notice inviting comment on the Application was published in the Cape Cod Times. BOH Exh. 38. On February 16, 2005, public notice inviting comment on the Application was published in the Massachusetts Environmental Policy Act ("MEPA") Monitor. BOH Exh. 38. During the twenty-one (21) day public comment period, the DEP received two comment letters. BOH Exhs. 39, 57 and 58. After reviewing the Application, public comment and other available information, DEP issued a Report on Site Suitability (#036-001-B), dated April 19, 2005 (the "Site Suitability Report"). BOH Exh. 41. The Board received the Site Suitability Report on April 20, 2005.

The Site Suitability Report states that DEP's Solid Waste Management Section, upon careful review of the submitted information and public comment, determined that the Application adequately satisfied and complied with the applicable site suitability criteria established in 310 CMR 16.40(3) and (4). See BOH Exhs. 41 at 2,3. Accordingly, DEP found the subject site, referenced as the proposed 25.22-acre expansion in the Application, to be suitable for the proposed solid waste handling and processing, subject to conditions specified within the Site Suitability Report.

PROPERTY ADDRESS: 201 MACARTHUR BOULEVARD, BOURNE, MA 02553

In accordance with DEP's Site Assignment Regulations for Solid Waste Facilities, 310 CMR 16.00 *et seq.* (the "Site Assignment Regulations"), the Board is required to schedule a public hearing within thirty (30) days of receipt of the Site Suitability Report. *See* 310 CMR 16.20(7)(a). The Board commenced a public hearing on May 18, 2005. The Board is required to render its written decision within forty-five (45) days of the start of the public hearing or no later than July 5, 2005. *See* 310 CMR 16.20(10)(k)(1). This Decision and Statement of Findings is issued by the Board on the basis of the information received as part of the public hearing record in this matter. Pursuant to M.G.L. ch. 111, §§ 150A and 150A1/2, and the Site Assignment Regulations, the Board issues this Decision and Statement of Findings on the Application.

II. STANDARD OF DECISION and TIME OF DECISION

The DEP issued the Site Suitability Report on April 19, 2005, with findings that the Site meets the site suitability criteria set forth in the Site Assignment Regulations. In accordance with 310 CMR 16.15(2), the Board was required, after receipt of the Site Suitability Report, to hold a public hearing pursuant to 310 CMR 16.20 "for the purpose of deciding whether to grant or refuse to grant a site assignment for the parcel of property which is the subject of the [Site Suitability Report]."

The standard of decision for the Board, set forth at M.G.L. ch. 111, § 150A and 31 CMR 16.20(10)(k)(2) is as follows:

A board shall determine that a site is suitable for assignment as a site for a new or expanded solid waste facility unless it makes a finding, supported by the record of the hearing, that the siting thereof would constitute a danger to the public health, safety or environment, based on the siting criteria set forth and established under 310 CMR 16.40.

If the Board reaches a determination to grant a site assignment in accordance with that standard, the DEP Regulations at 310 CMR 16.20(12) further provides the following:

The board may include in any decision to grant a site assignment such limitations with respect to the extent, character and nature of the facility or expansion thereof, as may be necessary to ensure that the facility or expansion thereof will not present a threat to the public health, safety or the environment.

III. SUMMARY OF PROCEDURAL MATTERS

A. Publication of Notice and Opportunity for Comment

After DEP issued a Determination of Administrative Completeness for the Application, the Applicant proceeded to implement the public notice requirements. In accordance with 310 CMR 16.10(4), public notice that the Application had been filed with the Board was published in the

Cape Cod Times and in the MEPA Monitor on February 16, 2005. BOH Exh. 28. During the twenty-one (21) day period following the publication of notice, the public was able to review the application at the Board's office and to provide comment to DEP. The DEP received two comment letters during the public comment period, one from the Cape Cod Commission and another from Waterhouse Properties. BOH Exhs. 39, 57 and 58. Following the close of the public comment period, DEP issued the Site Suitability Report on April 19, 2005. BOH Exh. 41.

Upon receipt of the Site Suitability Report from DEP, the Board initiated public notice in accordance with 310 CMR 16.20(7)(b) and (c). Notice of the public hearing was published in the Cape Cod Times on April 25, 2005. BOH Exh. 60. The Site Suitability Report, the Application and other public records were made available for review at the Board's offices prior to the commencement of the hearing on May 18, 2005.

B. Public Hearing

The public hearing was conducted on May 18, 2005, commencing at 7:00 p.m. Prior to the hearing, and by unanimous vote of the Board in accordance with 310 CMR 16.20(11)(a), the Board formally appointed John F. Shea, Esq. of Moehrke, Mackie & Shea, P.C. to serve as the Hearing Officer. Michael E. Scott, Esq. of Nutter McClennen & Fish LLP served as legal counsel to the Board.

Philip A. Goddard, an environmental manager for the Department of Integrated Solid Waste Management for the Town and Albert Raymond Quinn, a representative of SITEC Environmental, provided testimony at the hearing on behalf of the Town.

Mr. Goddard was sworn under oath, and the hearing commenced with a presentation by the Applicant. The hearing was recorded by a stenographer. No one appeared in opposition. A total of sixty-seven (67) exhibits (identified as BOH Exh. 1 through 67) were entered into and accepted as part of the record. *See* Record of Exhibits (attached). Questions from the Board were answered by Mr. Goddard and Mr. Quinn.

The public hearing was closed on May 18, 2005 at approximately 8:25 p.m.

IV. SUMMARY OF EVIDENCE

A. General Description of the Proposed Modifications

The proposed modification consists of a 25.22 acre parcel of land located adjacent to the existing Bourne Sanitary Landfill (the "Site"). The Application seeks a site assignment for solid waste handling and processing, including but not limited to, transfer operations, processing and handling, composting and recycling. Landfilling and/or combustion use is specifically excluded from the scope of the Application. The location of the currently assigned parcel and Site are shown on BOH Exh. 64.

B. DEP Site Suitability Report Approvals

On April 19, 2005, DEP issued the Site Suitability Report for the proposed modification, including a positive determination that the Site is suitable for the proposed processing and handling of solid waste. The Site Suitability Report also stated that the Site meets the applicable suitability criteria set forth in 310 CMR 16.40(3) and (4). See BOH Exh. 41 at 2,3.

C. MEPA Review

On July 24, 2001, the Applicant requested an Advisory Opinion from the Secretary of Environmental Affairs regarding the need to file a Notice of Project Change (NPC) for the proposed site assignment modification. BOH Exh. 13. On August 2, 2001, the MEPA Director determined that there is no requirement that a NPC be filed for the relocation of materials processing, recycling and composting facility to the Site. BOH Exh. 14.

V. CONFORMANCE WITH SITE SUITABILITY CRITERIA

In the following sections, the Board sets forth its findings, based upon the Application and other evidence in the record, with respect to compliance of the Site with the facility specific and general site suitability criteria.

A. FACILITY SPECIFIC SITE SUITABILITY CRITERIA

1. 310 CMR 16.40(3)(d) 1.: Zone I

No site shall be determined to be suitable or be assigned as a solid waste handling facility where the waste handling area would be within the Zone I of a public water supply;

The proposed site is not within the Zone I of a public water supply. The Applicant submitted a plan entitled "Water Resources Site Plan" depicting regulated water resource areas. No water supply wells are located or are presently proposed to be located within 400 feet of the Site. BOH Exh. 1.

Subject to the conditions set forth in Section VI., the Board has determined that the Site meets the 310 CMR 16.40(3)(d)1. criteria at this time.

2. 310 CMR 16.40(3)(d) 2.: Zone II

No site shall be determined to be suitable or be assigned as a solid waste handling facility where the waste handling area would be within the Interim Wellhead Protection Area (IWPA) or a Zone II of an existing public water supply well or within a proposed drinking water source area;

The Applicant submitted a plan entitled "Water Resources Site Plan" depicting regulated water resource areas including IWPA's and Zone II in the vicinity of the proposed site. BOH Exhs. 1 and 8. A Zone II exists to the south of the site. The nearest edge of the Zone II is approximately 1800 feet from the waste handling area.

The proposed site is not within the IWPA or a Zone II of an existing public water supply well.

Subject to the conditions set forth in Section VI., the Board has determined that the Site meets the 310 CMR 16.40(3)(d) 2. criteria at this time.

3. 310 CMR 16.40(3)(d) 3.: Zone A

No site shall be determined to be suitable or be assigned as a solid waste handling facility where the waste handling area would be within the Zone A of a surface drinking water supply;

The Applicant submitted a "Water Resources Site Plan" depicting regulated water resource areas including Zone A areas within one-half mile of the site. BOH Exhs. 1 and 8. The Site is not located within the Zone A of a surface drinking water supply.

Subject to the conditions set forth in Section VI., the Board has determined that the Site meets the 310 CMR 16.40(3)(d) 3. criteria at this time.

4. 310 CMR 16.40(3)(d) 4.: Private Well

No site shall be determined to be suitable or be assigned as a solid waste handling facility where the waste handling area would be within 500 feet upgradient, and where not upgradient, within 250 feet, of an existing or potential private water supply well existing or established as a Potential Private Water Supply at the time of submittal of the application, provided however, the applicant may show a valid option to purchase the restricted area including the well and a guarantee not reuse the well as a drinking water source, the exercise of which shall be a condition of any site assignment;

The Applicant provided a plan entitled "Water Resources Site Plan" depicting regulated water resource areas including existing private wells. BOH Exhs. 1 and 8. There are no private wells within 500 feet of the Site.

Subject to the conditions set forth in Section VI., the Board has determined that the Site meets the 310 CMR 16.40(3)(d) 4. criteria at this time.

5. 310 CMR 16.40(3)(d) 5.: Sensitive Receptors

No site shall be determined to be suitable or be assigned as a solid waste handling facility where the waste handling area of any other transfer station (greater than fifty (50) tons per day capacity) or any handling facility is within 500 feet from:

- i. an occupied residential dwelling; or*
- ii a prison, health care facility, elementary school, middle school or high school, children's preschool, licensed day care center, or senior center*

or youth center, excluding equipment storage or maintenance structures.

Included in Appendix C of the Application is a plan entitled "Land Use Site Plan." BOH Exhs. 1 and 7. This plan identifies land uses within one-half mile of the proposed site. There are no occupied residential dwellings, prisons, health care facilities, elementary schools, middle schools or high schools, children's preschools, licensed day care centers, or senior centers or youth centers shown on the plan within 500 feet of the Site.

Subject to the conditions set forth in Section VI., the Board has determined that the Site meets the 310 CMR 16.40(3)(d) 5. criteria at this time.

6. 310 CMR 16.40(3)(d) 6.: Riverfront Area

Riverfront Area: No site shall be determined to be suitable or be assigned as a solid waste handling facility where the waste handling area would be within the Riverfront Area as defined at 310 CMR 10.00;

A plan entitled "Water Resources Site Plan", included in Appendix C of the Application, indicates no river exists on the Site and the waste handling area will not be within a riverfront area.

Subject to the conditions set forth in Section VI., the Board has determined that the Site meets the 310 CMR 16.40(3)(d) 6. criteria at this time.

7. 310 CMR 16.40(3)(d) 7.: Groundwater Table

No site shall be determined to be suitable or be assigned as a solid waste handling facility where the maximum high groundwater table would be within two feet of the ground surface in areas where waste handling is to occur unless it is demonstrated that a two foot separation can be designed to the satisfaction of the Department.

The Applicant provided a plan entitled "Regional Groundwater Contour Map", which was included as part of Appendix C of its Application. Exhs. 1 and 5. The Regional Groundwater Contour Map indicates that groundwater elevations at the Site are at least forty (40) feet below the ground surface. Therefore, the vertical separation between groundwater and the waste handling ground surface elevation exceeds two (2) feet.

Subject to the conditions set forth in Section VI., the Board has determined that the Site meets the 310 CMR 16.40(3)(d) 7. criteria at this time.

B. GENERAL SITE SUITABILITY CRITERIA

1. 310 CMR 16.40(4)(a): Agricultural Lands

No site shall be determined to be suitable or be assigned as a solid waste management facility where:

1. *the land is classified as Prime, Unique, or of State and Local Importance by the United States Department of Agriculture, Natural Resources Conservation Service; or*
2. *the land is deemed Land Actively Devoted to Agricultural or Horticultural Uses, except where the facility is an agricultural composting facility; and*
3. *a one-hundred (100) foot buffer would not be present between the facility and those lands as classified at 310 CMR 16.40(4)(a)1 or 2.*

The Applicant submitted a plan entitled "Land Use Site Plan", depicting land uses in the vicinity of the proposed site. BOH Exhs. 1 and 7. The Land Use Site Plan indicates that the land area of the Site, and the land within one-hundred (100) feet of the Site, is not classified as Prime, Unique, or of State and Local Importance by the United States Department of Agriculture, Natural Resources Conservation Service or deemed Land Actively Devoted to Agricultural or Horticultural Uses.

Subject to the conditions set forth in Section VI., the Board has determined that the Site meets the 310 CMR 16.40(4)(a) criteria at this time.

2. 310 CMR 16.40(4)(b): Traffic and Access to the Site

No site shall be determined to be suitable or be assigned as a solid waste management facility where traffic impacts from the facility operation would constitute a danger to the public health, safety, or the environment taking into consideration the following factors: (1) traffic congestion, (2) pedestrian and vehicular safety, (3) road configurations, (4) alternate routes, and (5) vehicle emissions.

Traffic Congestion

The Record of Exhibits contains a Traffic Impact and Access Study (the "Traffic Study"), dated November 24, 1998, by HAS Corporation. BOH Exh. 18. This traffic study was submitted for the landfill expansion proposed at that time. The study area included Route 28 northbound at the landfill access road intersection and Route 28 northbound at the U-turn intersection from Route 28 southbound. Traffic impacts were later reviewed in 2003 as part the Town's submittals of a NPC with MEPA and a Major Modification with the Cape Cod Commission related to the proposed acceptance of municipal solid waste at the landfill. BOH Exh. 22.

The Town is not proposing to increase the waste tonnage permitted to be accepted at the Site or change the access to the Site. Since the waste tonnage will not increase, there will be no change in traffic volumes. In the Site Suitability Report, the DEP notes that it has not had reports of problems since completion of the Traffic Study and operation of the landfill under "Build" study conditions. However, the DEP did indicate that long delays at the Route 28 southbound U-turn onto Route 28 northbound could lead to queued vehicles exceeding the turning lane capacity and cause traffic to back up onto the main travel lane of Route 28 southbound. To mitigate the potential vehicular safety issues associated with this type of backup, the Department required the Applicant to include in all contracts with haulers a requirement that their vehicles not queue beyond the capacity of the left turn lane at any U-turn on Route 28 southbound or northbound.

As such, trucks are to be instructed to utilize the next available U-turn or rotary for reversing direction. The Board agrees with this finding and the condition imposed by the DEP.

Pedestrian and Vehicular Safety

The expansion area is located south of the existing site assigned 78-acre landfill parcel. Both areas are accessed by the same private driveway off Route 28. Potential conflicts with pedestrians should not arise as pedestrians are not allowed on Route 28. Traffic coming to the site will utilize major highways and will not be traveling through or near congested urban areas, residential neighborhoods or schools where pedestrians would likely be encountered.

Road Configurations

Ingress and Egress to and from the Site is via dedicated deceleration and acceleration lanes on Route 28. The twelve-foot wide acceleration and deceleration lanes were constructed in accordance with a permit issued by the Massachusetts Highway Department on January 14, 1999. BOH Exh. 19. Route 28 is the main thoroughfare in the area and is capable of handling facility traffic without impact.

Alternate Routes

Access to the facility is limited to the Route 28 north bound lane. Route 28 is the main route through the subject area.

Vehicle Emissions

The total approved tonnage at the site will not change. As such, traffic volume will not change and there will be no changes to vehicle emission rates. In order to minimize diesel emissions generated at the adjacent Landfill, the Town has begun implementing Best Management Practices. The Board encourages the Town to continue to take measures to reduce vehicle and equipment emissions.

Subject to the conditions set forth in Section VI., the Board has determined that the Site meets the 310 CMR 16.40(4)(b) criteria at this time.

3. 310 CMR 16.40(4)(c): Wildlife and Wildlife Habitat

No site shall be determined to be suitable or be assigned as a solid waste management facility where such siting would:

1. have an adverse impact on Endangered, Threatened, or Special Concern species listed by the Natural Heritage and Endangered Species Program of the Division of Fisheries and Wildlife in its database;

2. have an adverse impact on an Ecologically Significant Natural Community as documented by the Natural Heritage and Endangered Species Program in its database;
or

3. have an adverse impact on the wildlife habitat of any state Wildlife Management Area.

On July 17, 2001, the Natural Heritage and Endangered Species Program (NHESP) of the Division of Fisheries and Wildlife issued correspondence stating that a marginal habitat for the rare species Lepidoptera (moths) exists along the eastern boundary abutting the Massachusetts Military Reservation. BOH Exh. 26. The Town has committed to maintaining a buffer along this boundary to protect this habitat. This area contains an area of scrub oak and is twenty-five (25) feet to thirty (30) feet wide on the Town owned side of the property boundary. If this buffer area is maintained by the Town, NHESP stated that it does not appear that rare species will be directly impacted by the proposed project. Id.

In the Site Suitability Report, DEP noted that NHESP also identified nesting areas of Bank Swallows in the area. See BOH Exh. 41. The United States Fish & Wildlife Service ("U.S. F&W") was contacted and it determined that Bank Swallow nesting areas existed in the area but that construction activities may proceed in the nesting area(s) once the birds had migrated in the summer or early fall. The DEP imposed a condition that active nesting areas not be disturbed until it is determined that Bank Swallows present have migrated.

Subject to the conditions set forth in Section VI., the Board has determined that, at this time, the proposals in the Application will have no adverse impact on Endangered, Threatened or Special Concern Species, nor on an Ecologically Significant Natural Community or wildlife habitat, and that the Site meets the 310 CMR 16.40(4)(c) criteria at this time.

4. 310 CMR 16.40(4)(d): Areas of Critical Environmental Concern

No site shall be determined to be suitable or be assigned as a solid waste management facility where such siting:

1. would be located within an Area of Critical Environmental Concern (ACEC), as designated by the Secretary of the Executive Office of Environmental Affairs; or

2. would fail to protect the outstanding resources of an ACEC as identified in the Secretary's designation if the solid waste management facility is to be located outside, but adjacent to the ACEC

The Water Resources Site Plan, included as part of the Application indicates that there are no ACECs in the vicinity of the Site. BOH Exhs. 1 and 7. The nearest ACEC is located approximately ½ mile from the Site.

Subject to the conditions set forth in Section VI., the Board has determined that, at this time, the Site is not located in an ACEC and will have no adverse impact on outstanding resources of an ACEC, and that the Site meets the 310 CMR 16.40(4)(d) criteria at this time.

5. 310 CMR 16.40(4)(e): Protection of Open Space

No site shall be determined to be suitable or be assigned as a solid waste management facility where such siting would have an adverse impact on the physical environment of or on the use and enjoyment of:

1. *state forests;*
2. *state or municipal parklands or conservation land, or other open space held for natural resource purposes in accordance with Article 97 of the Massachusetts Constitution;*
3. *MDC reservations;*
4. *lands with conservation, preservation, agricultural, or watershed protection restrictions approved by the Secretary of the Executive Office of Environmental Affairs; or*
5. *conservation land owned by private non-profit land conservation organizations and open to the public.*

The Land Use Site Plan indicates that there are no state forests, state or municipal parklands, MDC reservations or conservation land owned by private non-profit land conservation organizations and open to the public within 500 feet of the Site. BOH Exh. 7.

In the Site Suitability Report, the DEP notes that the 15,000-acre land parcel located on the Massachusetts Military Reservation adjacent to the Site has been designated as the Upper Cape Water Supply Reserve to protect this area as a drinking water source for the Upper Cape and that this land could be considered open space. BOH Exh. 41.

In the Application, The Town has committed to implementing Best Management Practices (BMPs) to eliminate any potential impacts that facility operations could have on this open space. BMPs for litter control, dust control, and stormwater control will be implemented in addition to maintaining a buffer zone between the facility and the open space on the Massachusetts Military Reservation.

Subject to the conditions set forth in Section VI., the Board has determined that the Site meets the 310 CMR 16.40(4)(e) criteria at this time.

6. 311 CMR, 16.40(4)(F): Potential Air Quality Impacts

No site shall be determined to be suitable or be assigned as a solid waste management facility where the anticipated emissions from the facility would not meet required state and federal air quality standards or criteria or would otherwise constitute a danger to the public health, safety or the environment taking into consideration the following factors:

1. *the concentration and dispersion of emissions;*

2. *the number and proximity of sensitive receptors; and*
3. *the attainment status of the area.*

The concentration and dispersion of emissions

The Applicant prepared an assessment entitled, Interim Risk Evaluation and Cumulative Impact Assessment of the Proposed Phased Landfill Development of the Town of Bourne Integrated Solid Waste Management Facility. BOH Exh 31. This assessment examined all current solid waste management activities at the site, plus disposal of municipal waste combustor ash, and a projection of a full landfill build-out that assumed a maximum tonnage of 1,000 tons per day. DEP deemed the general risk assessment approach used in the report to be consistent with DEP guidance. BOH Exh 32 at 2. DEP recommended that this report be approved with certain caveats discussed in its July 1, 2003 review. Id.

The number and proximity of sensitive receptors

Sensitive receptors are considered to be occupied residential dwellings, prisons, health care facilities, elementary schools, middle schools or high schools, children's preschools, licensed day care centers, senior centers and youth centers. The Bourne Middle School and condominiums located on Waterhouse Road are the only sensitive receptors proximate to the Site. All of these receptors are located across Route 28 from the facility and not expected to be adversely impacted by the Site.

The Land Use Site Plan indicates that there are no prisons, health care facilities, elementary schools, middle schools or high schools, children's preschools, licensed day care centers, or senior centers or youth centers within 500 feet of the facility. BOH Exh. 7.

Attainment status of the area

The Commonwealth of Massachusetts, 2003 Air Quality Report states that ozone is the only pollutant for which Massachusetts monitors indicate violations of a standard. Massachusetts is in attainment for the other criteria pollutants, including carbon monoxide, lead, nitrogen dioxide, sulfur dioxide, and particulate matter (including PM10 and PM2.5).

Subject to the conditions set forth in Section VI., the Board has determined that the anticipated emissions from the proposed facility will meet required state and federal air quality standards or criteria and will not otherwise constitute a danger to the public health, safety or the environment and the Site meets the 310 CMR 16.40(4)(f) criteria at this time.

7. 310 CMR 16.40(4)(g): Potential for the Creation of Nuisances

No site shall be determined to be suitable or be assigned as a solid waste management facility where the establishment or operation of the facility would result in nuisance conditions which would constitute a danger to the public health, safety or the environment taking into consideration the following factors: (1) noise; (2) litter; (3) vermin such as rodents and insects; (4) odors; bird hazards to air traffic; and (6) other nuisance problems.

Noise

In 2001, the Applicant engaged Cavanaugh Tocci Associates, Inc. ("CTA") to conduct a pre-construction Sound Level Survey. BOH Exh. 30. This sound level survey was conducted to quantify and characterize the existing noise environment in the vicinity of the Site. Id. at 2. CTA concluded that the sound levels in the areas surrounding the new parcel will not significantly increase and will remain similar to the levels measured in the pre-construction survey. Id.

Dust

Best Management Practices for dust suppression will be performed for all solid waste operations that will be conducted across the Site. In addition to conducting all solid waste handling operations within an enclosed building, Best Management Practices shall include the following. As part of its current solid waste handling operations, the Applicant will routinely (daily during dry weather conditions) operate a water truck along site roadways to reduce dust. Paved areas, including the access road, will be swept as necessary by the Town-owned street sweeper as necessary to prevent fugitive dust emissions. In addition, the Applicant is considering the installation of misting system in the transfer station, as well as plastic curtains to further control fugitive dust emissions. The Board may request the installation of these items if fugitive dust emissions become an issue of concern.

Litter

All vehicles that will transport materials either to or from the site will be covered in order to prevent incidental littering. All C&D handling operations will be conducted within the enclosed transfer station structure to reduce the chance for wind blown litter. In the residential drop off areas, the waste materials will be directly deposited into a compactor unit or containers. The Applicant currently employs a full-time crew of litter pickers to continually police the site and its vicinity. This practice will continue for all future solid waste handling operations areas.

Vermin

The proposed solid waste handling operations on the 25-acre parcel are not expected to provide suitable habitat or attraction for vermin. C&D materials do not provide a food source, thus is not an attraction for vermin. Municipal solid waste ("MSW") will either be handled within an enclosed compaction unit at the residential area or within an enclosed building if a co-composting operation is built. There appears to be minimal attraction for vermin to this site, based upon the historical landfilling operations on the 75-acre parcel and the lack of the perceivable presence of vermin.

Odors

Odors are typically generated by the MSW stream. MSW will be handled either in a sealed compact unit at the residential area or within an enclosed structure if a co-composting operation is pursued. Both measures should mitigate odors from handling MSW. Currently, the Town operates a composting area on this parcel and routinely turns the windrows to promote rapid breakdown of materials and to eliminate the potential for odors.

Bird Hazard to Aircraft

Birds, particularly gulls, are primarily attracted to MSW. As discussed above, MSW will be managed in a sealed compaction unit at the residential area. The C&D waste stream is not expected to be an attraction for birds. The on-going landfill operations take active and aggressive bird deterrent measures to mitigate their presence around the landfill. These measures have proven to be successful in reducing the gull population in the vicinity of the landfill and will continue to be implemented.

Other

The proposed transfer station will be enclosed within a building. This structure is anticipated to mitigate *any* potential nuisance conditions that may be associated with the facility.

Subject to the conditions set forth in Section VI., the Board has determined that the Site meets the 310 CMR 16.40(4)(g) criteria at this time.

8. 310 C M 16.40(4)(h): Size of Facility

No site shall be determined to be suitable or be assigned as a solid waste management facility if the size of the proposed site is insufficient to properly operate and maintain the proposed facility. The minimum distance between the waste handling area or deposition area and the property boundary for the facility shall be 100 feet, provided that a shorter distance may be suitable for that portion of the waste handling or deposition area which borders a separate solid waste management facility.

A 100 foot buffer will be maintained along the southern, eastern and western boundaries of the Site. The Site is located adjacent to the existing 78-acre site-assigned area. The Applicant currently conducts solid waste handling and processing on the existing site-assigned area. There will be no increase in the volume of waste accepted. The Site will provide a greater operating area for the materials handling and processing operations. As such, the size of the facility will be increased and will be sufficient to properly operate and maintain the proposed facility.

Subject to the conditions set forth in Section VI., the Board has determined that the Site meets the 310 CMR 16.40(4)(h) criteria at this time.

9. 310 CMR 16.40(4)(i): Areas Previously Used for Solid Waste Disposal

Where an area adjacent to the site of a proposed facility has been previously used for solid waste disposal the following factors shall be considered by the Department in determining whether a site is suitable and by the board of health in determining whether to assign a site:

1. *the nature and extent to which the prior solid waste activities on the adjacent site currently adversely impact or threaten to adversely impact the proposed site;*

2. *the nature and extent to which the proposed site may impact the site previously used for solid waste disposal, and*
3. *the nature and extent to which the combined impacts of the proposed site and the previously used adjacent site adversely impact on the public health, safety and the environment, taking into consideration:*
 - a. *whether the proposed site is an expansion of or constitutes beneficial integration of the solid waste activities with the adjacent site;*
 - b. *whether the proposed facility is related to the closure and/or remedial activities at the adjacent site; and*
 - c. *the extent to which the design and operation of the proposed facility will mitigate existing or potential impacts from the adjacent site.*

The expansion of the proposed solid waste management activities onto the Site provides greater operational flexibility to the Town and is compatible with the current and projected build-out of the landfilling operations conducted on the currently assigned site. The greater area will allow the Town to improve intra-site traffic flow and separate residential traffic from commercial activities.

This site assignment modification and expansion onto the Site will enable the Town to continue to provide regional solid waste management services after the landfill closes.

Subject to the conditions set forth in Section VI., the Board has determined that the Site meets the 310 CMR 16.40(4)(i) criteria at this time.

10. 310 CMR 16.40(4)(j): Existing Facilities

In evaluating proposed sites for new solid waste management facilities, the Department and the board of health shall give preferential consideration to sites located in municipalities in which no existing landfill or solid waste combustion facilities are located. This preference shall be applied only to new facilities which will not be for the exclusive use of the municipality in which the site is located.

The Town of Bourne hosts a landfill. Accordingly, pursuant to 310 CMR 16.40(4)(j), the Department and the applicable local BOH shall give preferential consideration to applications for other sites located in other municipalities in which no existing landfill or solid waste combustion facilities exist, should such an application for another site be submitted.

11. 310 CMR 16.40(4)(k): Consideration of Other Sources of Contamination or Pollution

The determination of whether a site is suitable and should be assigned as a solid waste management facility shall consider whether the projected impacts of the proposed facility pose a threat to public health, safety or the environment, taking into consideration the impacts of existing sources of pollution or contamination as

defined by the Department, and whether the proposed facility will mitigate or reduce those source of pollution or contamination.

A Cumulative Impact Assessment ("CIA") level 2 impact evaluation was completed by the Applicant in order to assess the potential impact of the proposed facility in conjunction with other local potential sources of contamination or pollution. BOH Exh. 31. The CIA was completed in accordance with the Department's Interim Risk-Evaluation Guidance Document for Solid Waste Facility Site Assignment and Permitting ("Guidance Document"). The CIA concluded that there will be no significant impacts to receptors in the vicinity of the site. Id.

Subject to the conditions set forth in Section VI., the Board has determined that the Site meets the 310 CMR 16.40(4)(k) criteria at this time.

12. 310 CMR 16.40(4)(1): Regional Participation

The Department and the board of health shall give preferential consideration to sites located in municipalities not already participating in a regional disposal facility. The Department and the board of health shall weigh such preference against the following considerations when the proposed site is located in a community participating in a regional disposal facility:

1. *the extent to which the proposed facility meets the municipality's and the region's solid waste management needs; and*
2. *the extent to which the proposed facility incorporates recycling, composting, or waste diversion activities.*

The Town hosts the Bourne Integrated Solid Waste Management Facility landfill, which is a regional disposal facility. The proposed site assignment modification is intended to facilitate construction of waste transfer and processing facilities to complement the existing regional landfill. All solid waste activities proposed for the expanded site assigned area will be regional facilities designed to incorporate waste diversion and recycling.

Pursuant to 310 CMR 16.40(4)(1), the Department and the applicable local BOH shall give preferential consideration to applications for other sites located in other municipalities not already participating in a regional disposal facility, should such an application for another site be submitted.

C. Summary of Findings on Compliance with Site Suitability Criteria

Substantial primary evidence before the Board consists of the information provided in the Application. Additional evidence has been provided in the documents and testimony presented during the Public Hearing. Based upon the evidence in the record, the Board finds that the Applicant has demonstrated compliance with each of the specific criteria set forth in subsection V.A above and each of the general criteria set forth in subsection V.B above, and that the Site Assignment Major Modification does not constitute a danger to the public health, safety or the environment, provided the Applicant and its successors and assigns comply with the Conditions set forth below.

VI. CONDITIONS IMPOSED BY THE BOARD


The Board finds that the Site is suitable for solid waste handling and processing as described in the Application, provided that the Applicant and its successors and assigns comply with the Conditions set forth below. Therefore the Board approves this major modification of the Site Assignment for the Site, and grants the Site assignment, subject to the following conditions:

- i. The additional area herein assigned for the expansion shall include the area of 25.22 acres on land owned by the Town of Bourne, adjacent to the existing sanitary landfill, as shown on site plan included in the Application. BOH Exhs. 1 and 64.
- ii. The Applicant shall comply with all conditions imposed by the DEP in its Site Suitability Report relating to traffic, rare moth habitat and Bank Swallows.
- iii. The Applicant shall implement Best Management Practices to control litter, dust, stormwater and air emissions from equipment, vehicles and operations.
- iv. The maximum daily solid waste tonnage accepted at the combined 103 acre site assigned area shall not exceed 825 tons per day.
- v. The hours of operation at the Site shall be limited to 7:00 am to 5:00pm, seven days a week. No audible equipment shall be used prior to 6:30 am.
- vi. The Applicant shall construct and operate the improvements and activities on the Site in conformity with the Application and the materials submitted herein. The construction details of the proposed expansion shall be determined by the DEP in accordance with review and approval of any Authorization to Construct and Authorization to Operate that may be issued under 310 CMR 19.000.
- vii. The area described in the Application shall be considered a specific use Site Assignment pursuant to 310 CMR 16.21(3) and shall be utilized only for solid waste handling and processing, including but not limited to, transfer operations, processing and handling, composting and recycling. Landfilling and/or combustion use are expressly prohibited. Any solid waste activity other than handling or processing shall not be conducted at the Site except in accordance with a new or modified Site Assignment.
- viii. This Site Assignment shall take effect when recorded at the Registry of Deeds and after a certified copy of the same from the Registry of Deeds is provided to the Board of Health, with all recording fees and charges paid by the Applicant.
- ix. This Site Assignment may be modified, suspended or rescinded for good cause by the Board after notice to the owner and operator and after a public hearing.
- x. The Department of Integrated Solid Waste Management shall have sole operational responsibility for the site assigned areas. The operational responsibility for the site assigned areas shall not be assigned or transferred, in whole or in part, to another party, including an assignment or transfer to another department or board of the Town unless approved by a vote of the majority of the Board at a public hearing. Assignment or transfer shall include but not be limited to a lease, license, or other agreement related to the operation of the site assigned areas.

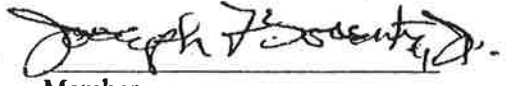
Dated this 27 day of June, 2005


Chairman


Vice Chairman


Member

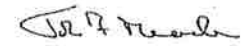
Member


Member

RECORD
SITE ASSIGNMENT HEARING

1439565.1

BARNSTABLE COUNTY
REGISTRY OF DEEDS
A TRUE COPY, ATTEST



JOHN F. MEADE, REGISTER

ATTACHMENT 3
PLANS AND FIGURES

LIST OF PLANS AND FIGURES

Figure 1 - Locus Plan

Figure 2 - Property Line Plan

Figure 3 - Existing Conditions Site Plan

Figure 4 – Schematic Site Buildout Plan

Figure 5 - Initial Construction Phases Plan

Figure 6 - Intermediate Construction Phases Plan

Figure 7 - Conceptual Site Buildout Plan

Figure 8 - Site Buildout Profiles

Figure 9 - Existing Environmental Monitoring Systems

Figure 10 - Groundwater Contour Plan

Figure 11 - USACE Groundwater Flow and Contaminant Plume

Figure 12 - Water Resources Plan

Figure 13 - Land Use Plan

Figure 14 - MassDEP Water Resource Map

Figure 15 - Proposed Site Assignment Modifications

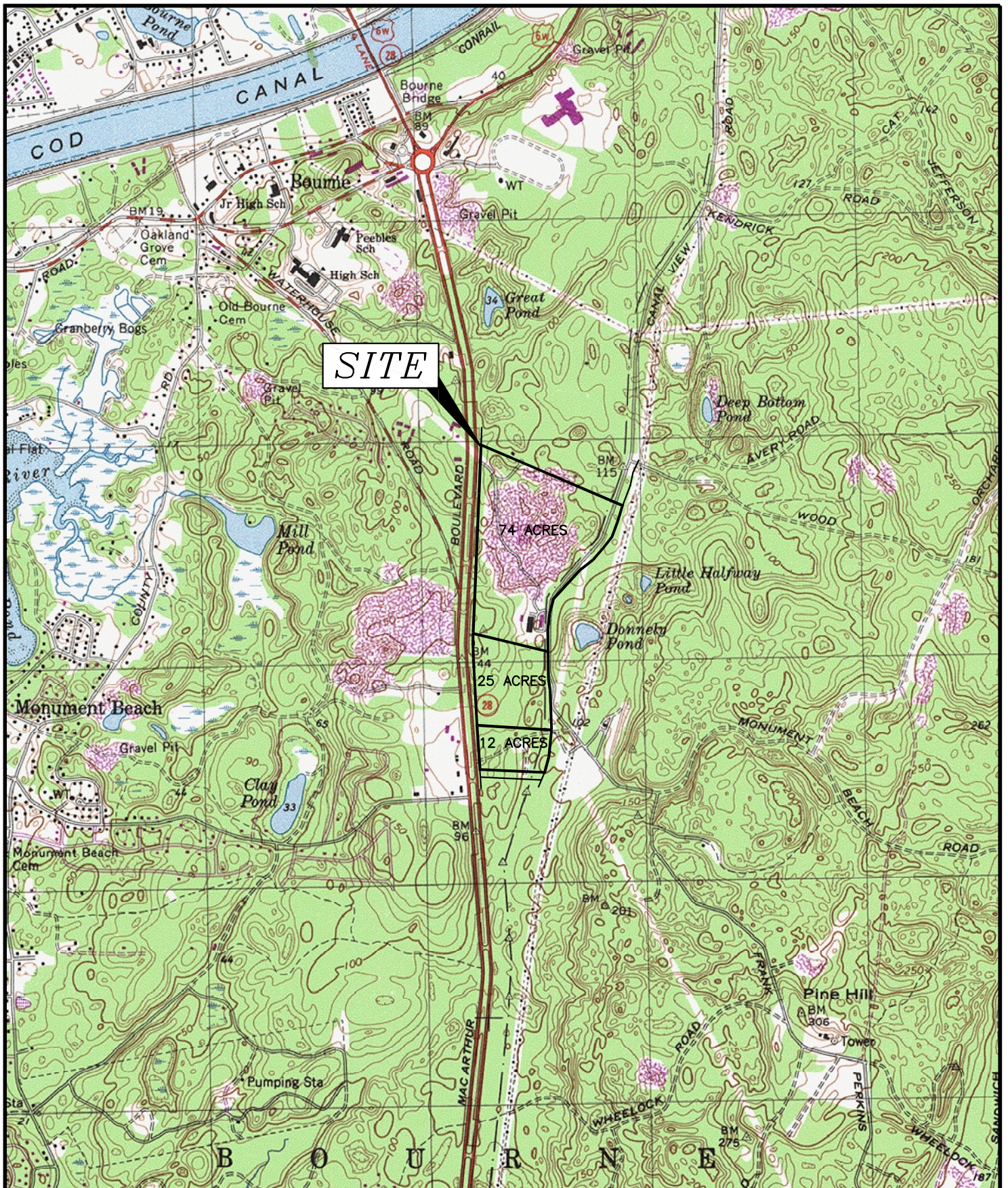
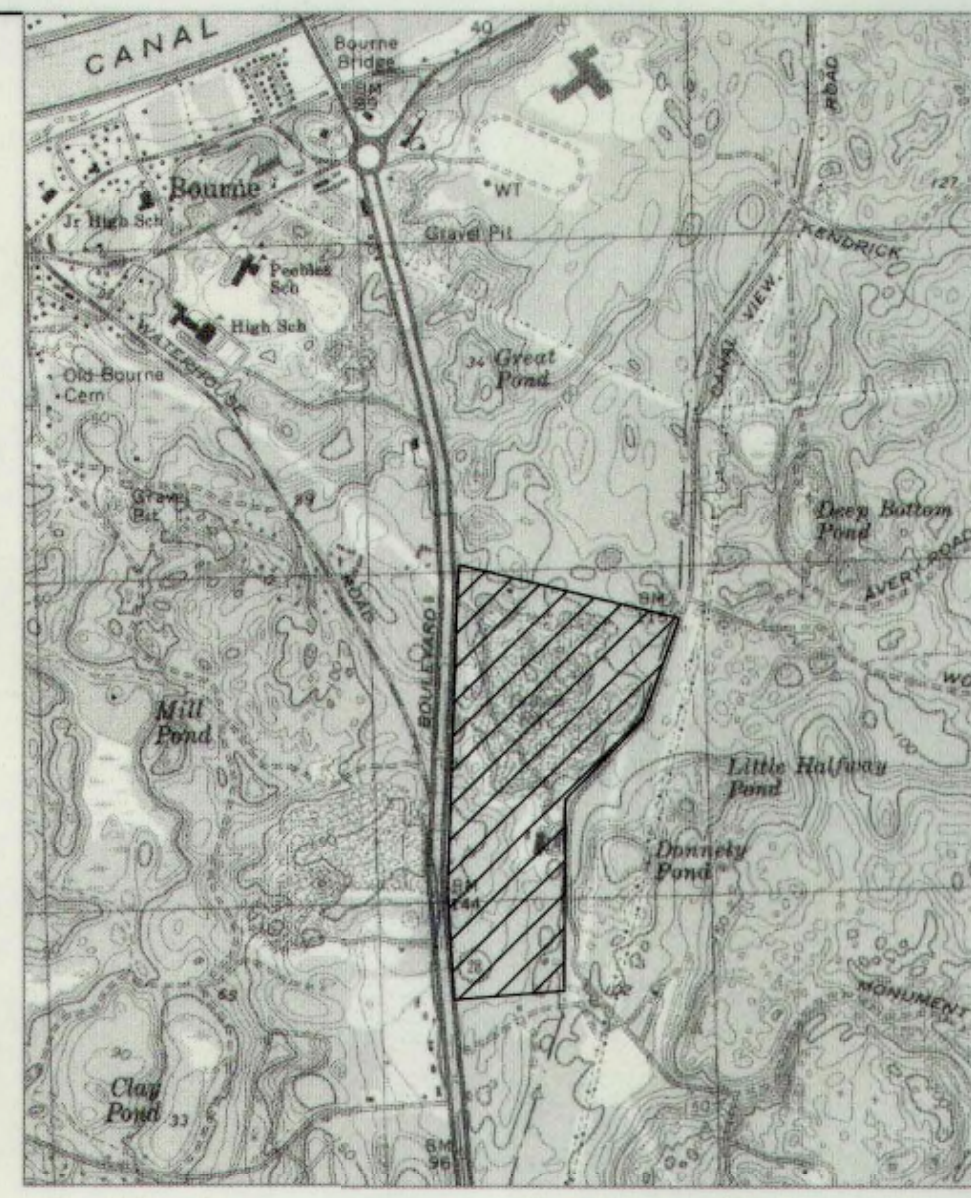
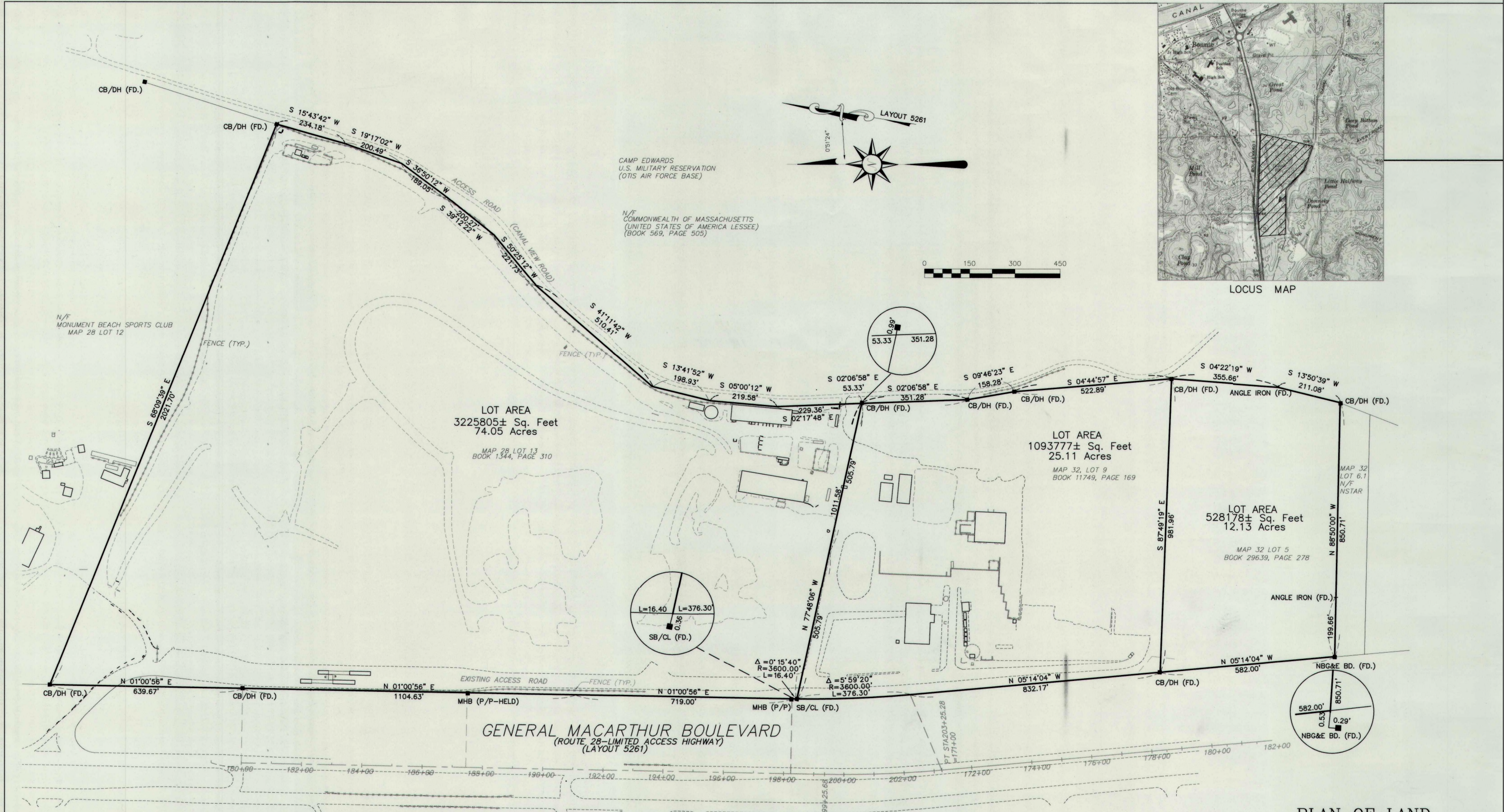


FIGURE 1 – LOCUS PLAN
 BOURNE LANDFILL
 201 MACARTHUR BOULEVARD
 BOURNE, MASSACHUSETTS

SITEC
ENVIRONMENTAL

Civil and Environmental Engineering
 Land Use Planning and Surveying
 Hazardous and Solid Waste Consultants
 700 Plain Street, Unit C
 Marshfield, MA 02050
 PHONE (781)-819-0100
 FAX (781) 834-4765





LOCUS MAP

PLAN REFERENCES
 PLAN BOOK 300, PAGE 98
 PLAN BOOK 562, PAGE 14
 PLAN BOOK 565, PAGE 63
 LAYOUT # 5261(1962)
 "RESERVATION MAP, CAMP EDWARDS"
 DRAWING 911-803
 DATED 5-15-41

I HEREBY CERTIFY THAT THIS PLAN HAS BEEN PREPARED IN CONFORMANCE WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS, AND;
 THAT THE LINES SHOWN HEREON ARE THE LINES DIVIDING EXISTING OWNERSHIPS AND THE LINES OF THE STREETS AND WAYS SHOWN ARE THOSE OF PUBLIC OR PRIVATE STREETS AND WAYS ALREADY ESTABLISHED, AND THAT NO NEW LINES FOR THE DIVISION OF EXISTING OWNERSHIP OR FOR NEW WAYS ARE SHOWN.

PLS *[Signature]* 4/12/2017
 DATE



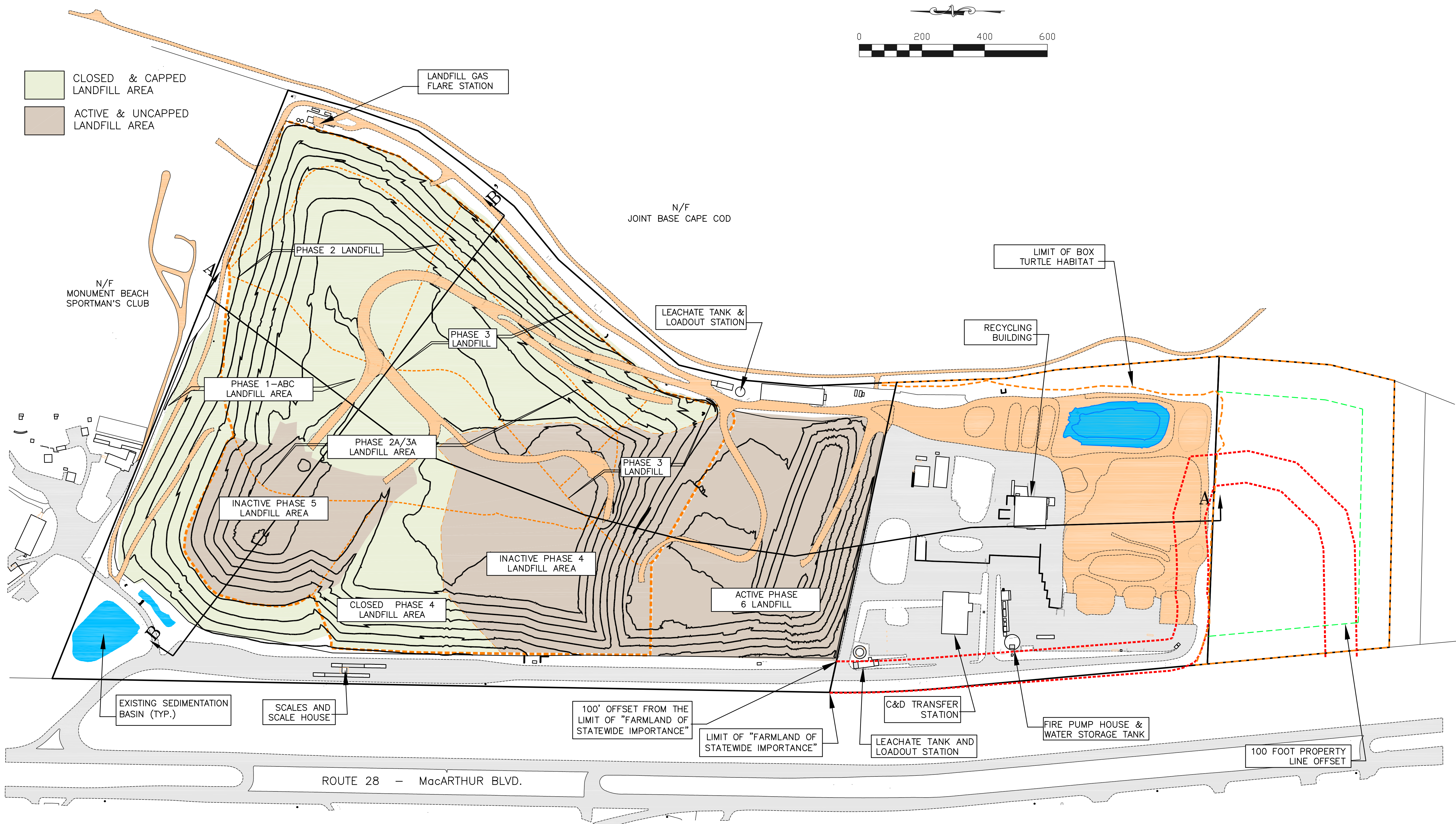
PLAN OF LAND
 IN
BOURNE, MA
 PREPARED FOR
 TOWN OF BOURNE

SCALE: 1"=150' APRIL 17, 2017

PREPARED BY

SITEC
 Civil and Environmental Engineering
 Land Use Planning
 SITEC, Inc.
 449 Founce Corner Road
 Dartmouth, MA 02747
 (508) 998-2125
 FAX (508) 998-7554

FIGURE 2 - PROPERTY LINE PLAN



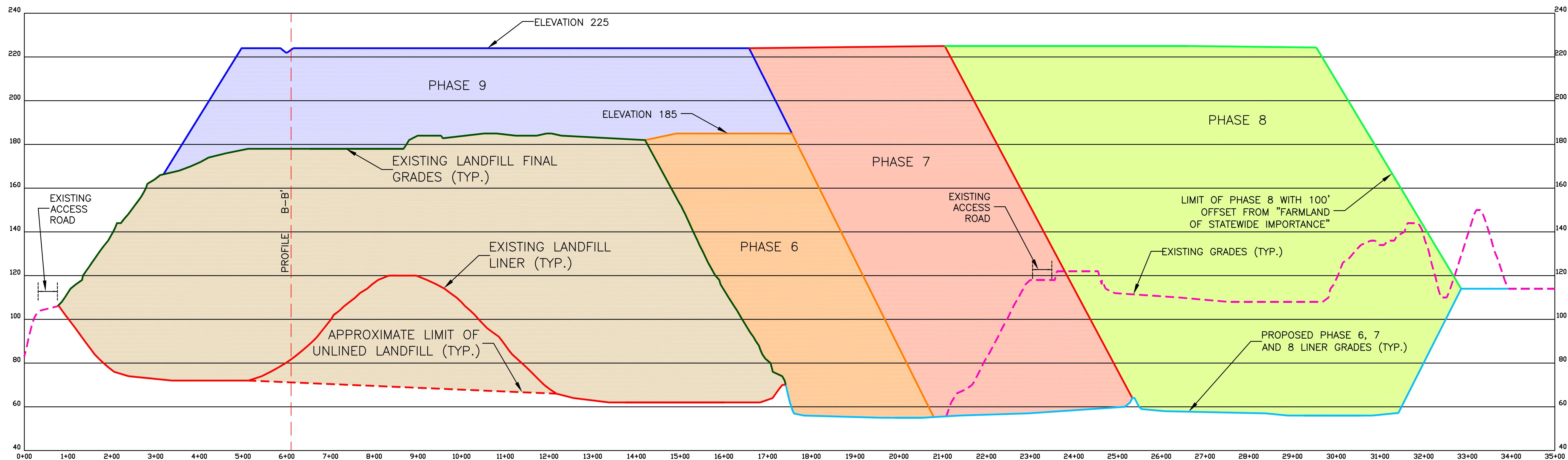
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drawn:	ARQ
checked:	ARQ
approved:	ARQ
drawing number:	

Project:	BOURNE LANDFILL SITE ASSIGNMENT MODIFICATION
Client:	BOURNE DEPARTMENT OF INTEGRATED SOLID WASTE MANAGEMENT
Drawing Title:	FIGURE 3 EXISTING CONDITIONS SITE PLAN

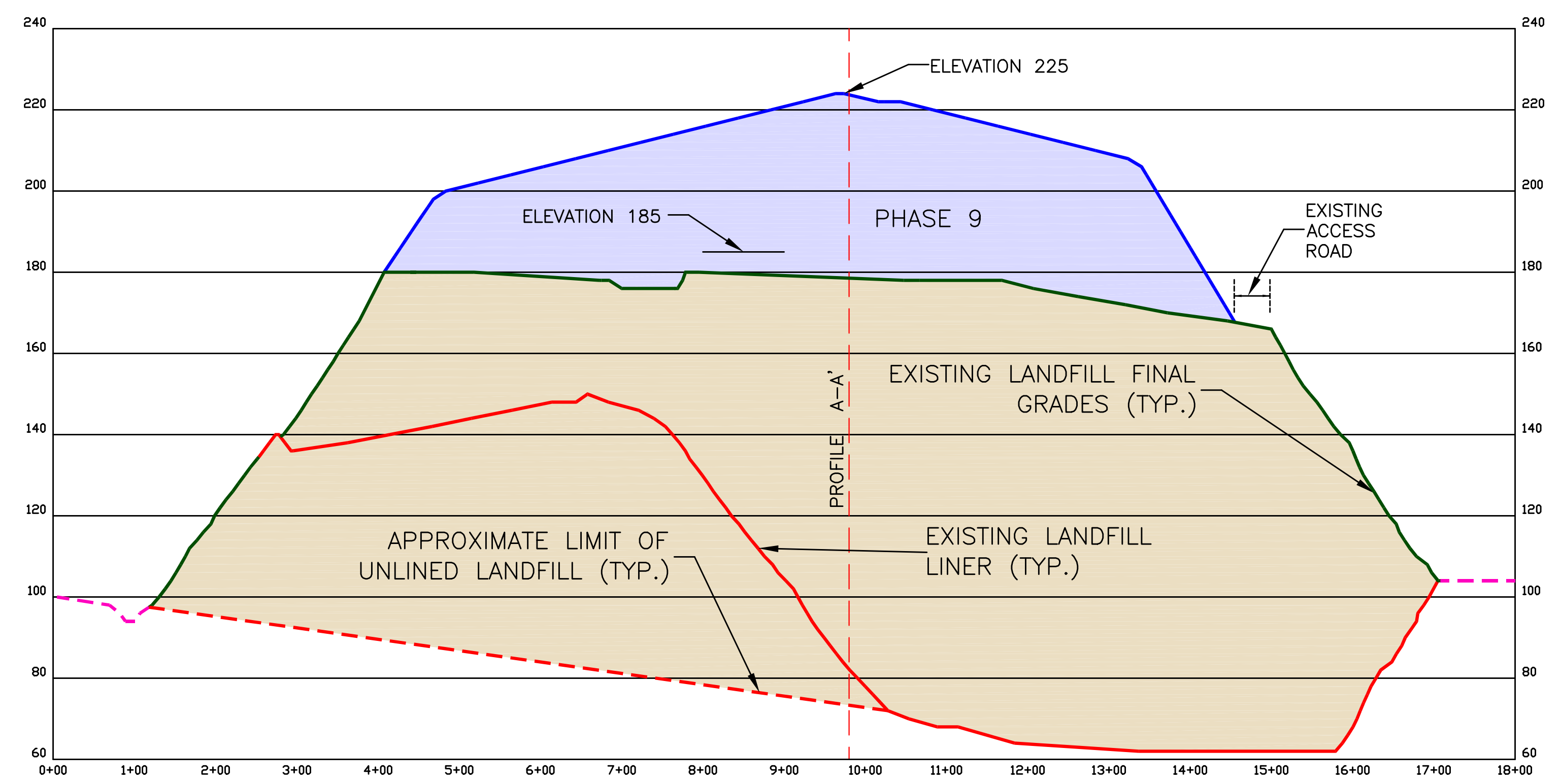
SITEC
 ENVIRONMENTAL
 Civil and Environmental Engineering
 Hazardous and Solid Waste Consultants

769 Plain Street, Unit C
 Bourne, MA 01929
 PHONE (781) 334-4783
 FAX (781) 334-4783

Acad No. SSEIR SITE PLAN-SOLAR ARRAY.dwg
 SE01-456-12



PROFILE A-A'
 HORIZONTAL SCALE: 1" = 120'
 VERTICAL SCALE: 1" = 24'



PROFILE B-B'
 HORIZONTAL SCALE: 1" = 120'
 VERTICAL SCALE: 1" = 24'

scale:	AS SHOWN
date:	FEB. 26, 2021
drawn:	ARQ
checked:	ARQ
approved:	ARQ
drawing number:	

project:	BOURNE LANDFILL SITE ASSIGNMENT MODIFICATION
client:	BOURNE DEPARTMENT OF INTEGRATED SOLID WASTE MANAGEMENT
drawing title:	FIGURE 8 SITE BUILDOUT PROFILES

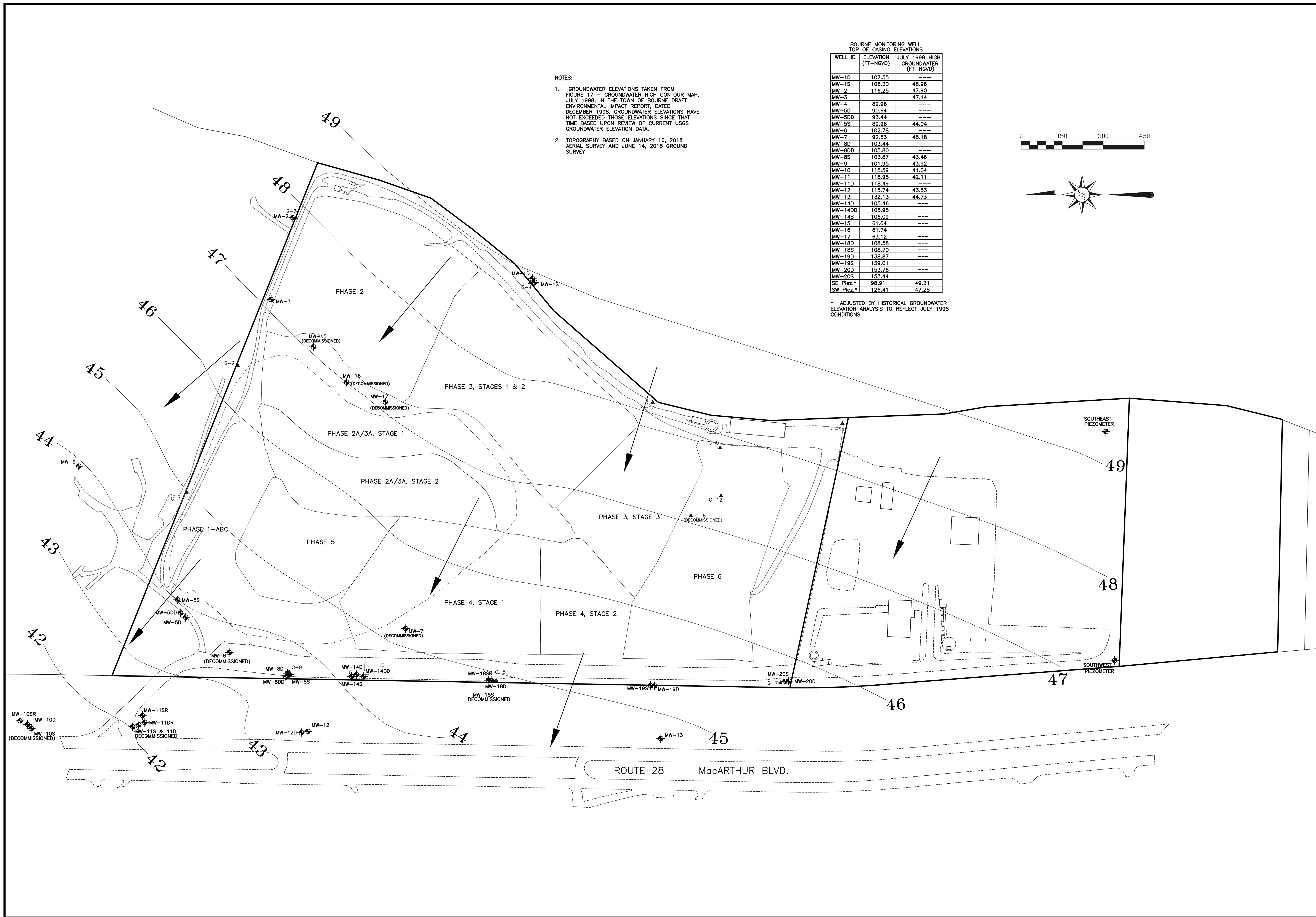
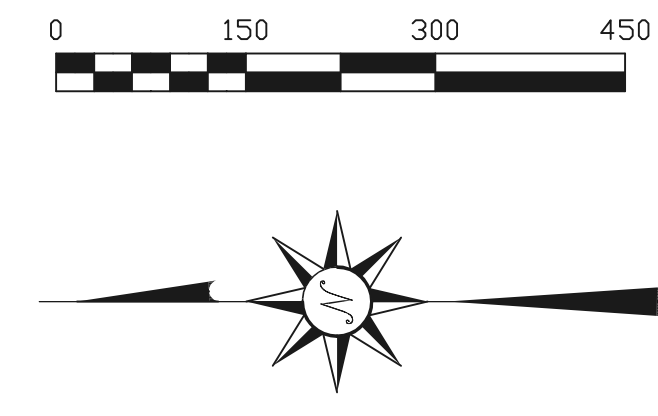
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 ENVIRONMENTAL
 Civil and Environmental Engineering
 Land Use Planning and Surveying
 Hazardous and Solid Waste Consultants
 1000 Main Street
 Northfield, MA 02059
 PHONE (781) 319-0100
 FAX (781) 834-4783

NOTES:

- GROUNDWATER ELEVATIONS TAKEN FROM FIGURE 17 - GROUNDWATER HIGH CONTOUR MAP, JULY 1998, IN THE TOWN OF BOURNE DRAFT ENVIRONMENTAL IMPACT REPORT, DATED DECEMBER 1998. GROUNDWATER ELEVATIONS HAVE NOT EXCEEDED THOSE ELEVATIONS SINCE THAT TIME BASED UPON REVIEW OF CURRENT USGS GROUNDWATER ELEVATION DATA.
- TOPOGRAPHY BASED ON JANUARY 16, 2018 AERIAL SURVEY AND JUNE 14, 2018 GROUND SURVEY

WELL ID	ELEVATION (FT-NGVD)	JULY 1998 HIGH GROUNDWATER (FT-NGVD)
MW-1D	107.55	---
MW-1S	108.30	48.96
MW-2	116.25	47.90
MW-3	---	47.14
MW-4	89.96	---
MW-5D	90.64	---
MW-5DD	93.44	---
MW-5S	89.96	44.04
MW-6	102.78	---
MW-7	92.53	45.18
MW-8D	103.44	---
MW-8DD	105.80	---
MW-8S	103.87	43.46
MW-9	101.95	43.92
MW-10	115.59	41.04
MW-11	116.98	42.11
MW-11D	118.49	---
MW-12	115.74	43.53
MW-13	132.13	44.73
MW-14D	105.46	---
MW-14DD	105.98	---
MW-14S	106.09	---
MW-15	61.04	---
MW-16	61.74	---
MW-17	63.12	---
MW-18D	108.58	---
MW-18S	108.70	---
MW-19D	138.87	---
MW-19S	139.01	---
MW-20D	153.76	---
MW-20S	153.44	---
SE Piez.*	98.91	49.31
SW Piez.*	126.41	47.28

* ADJUSTED BY HISTORICAL GROUNDWATER ELEVATION ANALYSIS TO REFLECT JULY 1998 CONDITIONS.



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drawing number:	

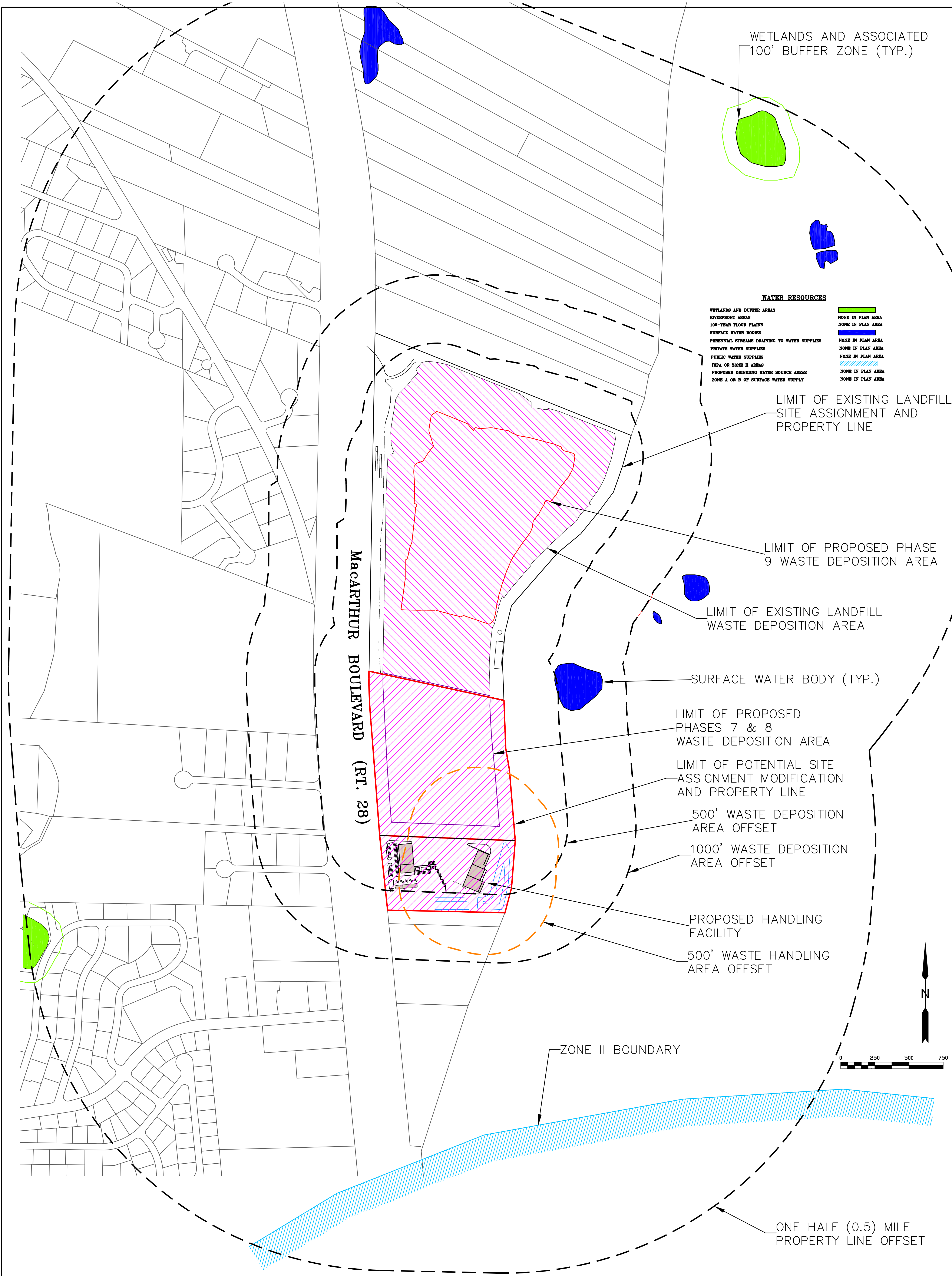
project:	BOURNE LANDFILL SITE ASSIGNMENT MODIFICATION
client:	BOURNE DEPARTMENT OF INTEGRATED SOLID WASTE MANAGEMENT
drawing title:	FIGURE 10 GROUNDWATER CONTOUR PLAN

SITEC ENVIRONMENTAL
 Civil and Environmental Engineering
 Environmental Impact Assessment
 Hazardous and Solid Waste Consultants
 789 Plain Street, Unit C
 Bourne, MA 02532
 Phone: (781) 334-0000
 Fax: (781) 834-4753

Acad No.
 ENV MONITOR SYS-07-22-2020.dwg
 SE01-456-12



Acq'd No. SSEIR SITE PLAN-EXIST COND.dwg SE01-456-12	
SITEC ENVIRONMENTAL Civil and Environmental Engineering Land Use Planning and Surveying Hazardous and Solid Waste Consultants 789 Plain Street, Unit C Mansfield, MA 02050 Phone: (508) 334-0100 Fax: (508) 334-4725	
Project: BOURNE LANDFILL SITE ASSIGNMENT MODIFICATION BOURNE DEPARTMENT OF INTEGRATED SOLID WASTE MANAGEMENT	Scale: NO SCALE Date: FEB. 26, 2021 Drawn: ARQ Checked: ARQ Approved: ARQ Drawing number:
USACE GROUNDWATER FLOW AND CONTAMINANT PLUME FIGURE 11	



WETLANDS AND ASSOCIATED 100' BUFFER ZONE (TYP.)

WATER RESOURCES

WETLANDS AND BUFFER AREAS	[Green]	NONE IN PLAN AREA
RIVERFRONT AREAS	[Blue]	NONE IN PLAN AREA
100-YEAR FLOOD PLAINS	[Blue]	NONE IN PLAN AREA
SURFACE WATER BODIES	[Blue]	NONE IN PLAN AREA
PERENNIAL STREAMS DRAINING TO WATER SUPPLIES	[Blue]	NONE IN PLAN AREA
PRIVATE WATER SUPPLIES	[Blue]	NONE IN PLAN AREA
PUBLIC WATER SUPPLIES	[Blue]	NONE IN PLAN AREA
WPA OR ZONE II AREAS	[Blue]	NONE IN PLAN AREA
PROPOSED DRINKING WATER SOURCE AREAS	[Light Blue]	NONE IN PLAN AREA
ZONE A OR B OF SURFACE WATER SUPPLY	[Light Blue]	NONE IN PLAN AREA

LIMIT OF EXISTING LANDFILL SITE ASSIGNMENT AND PROPERTY LINE

LIMIT OF PROPOSED PHASE 9 WASTE DEPOSITION AREA

LIMIT OF EXISTING LANDFILL WASTE DEPOSITION AREA

SURFACE WATER BODY (TYP.)

LIMIT OF PROPOSED PHASES 7 & 8 WASTE DEPOSITION AREA

LIMIT OF POTENTIAL SITE ASSIGNMENT MODIFICATION AND PROPERTY LINE

500' WASTE DEPOSITION AREA OFFSET

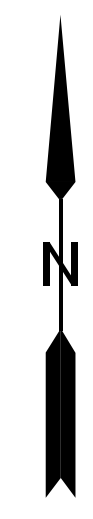
1000' WASTE DEPOSITION AREA OFFSET

PROPOSED HANDLING FACILITY

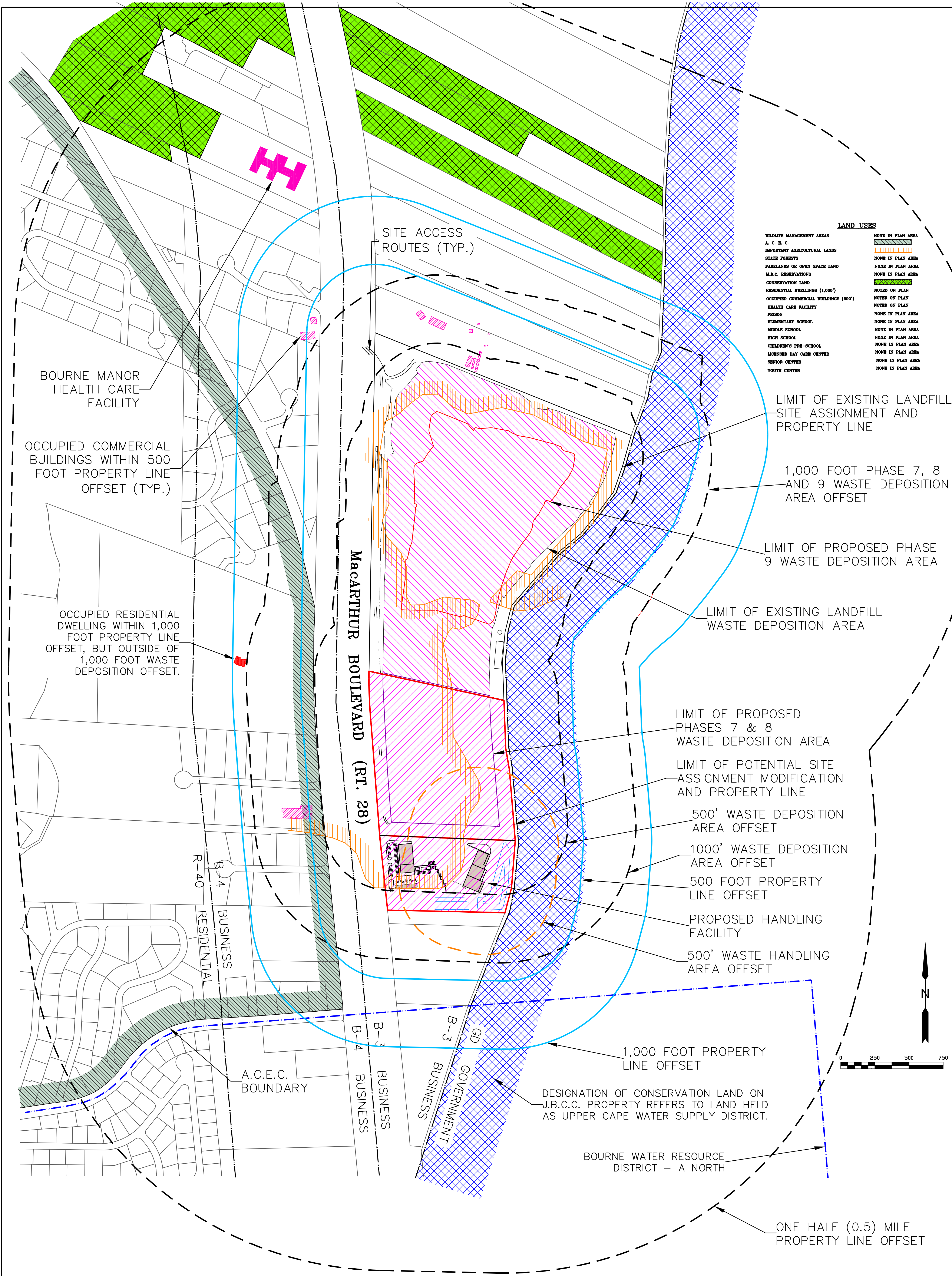
500' WASTE HANDLING AREA OFFSET

ZONE II BOUNDARY

ONE HALF (0.5) MILE PROPERTY LINE OFFSET



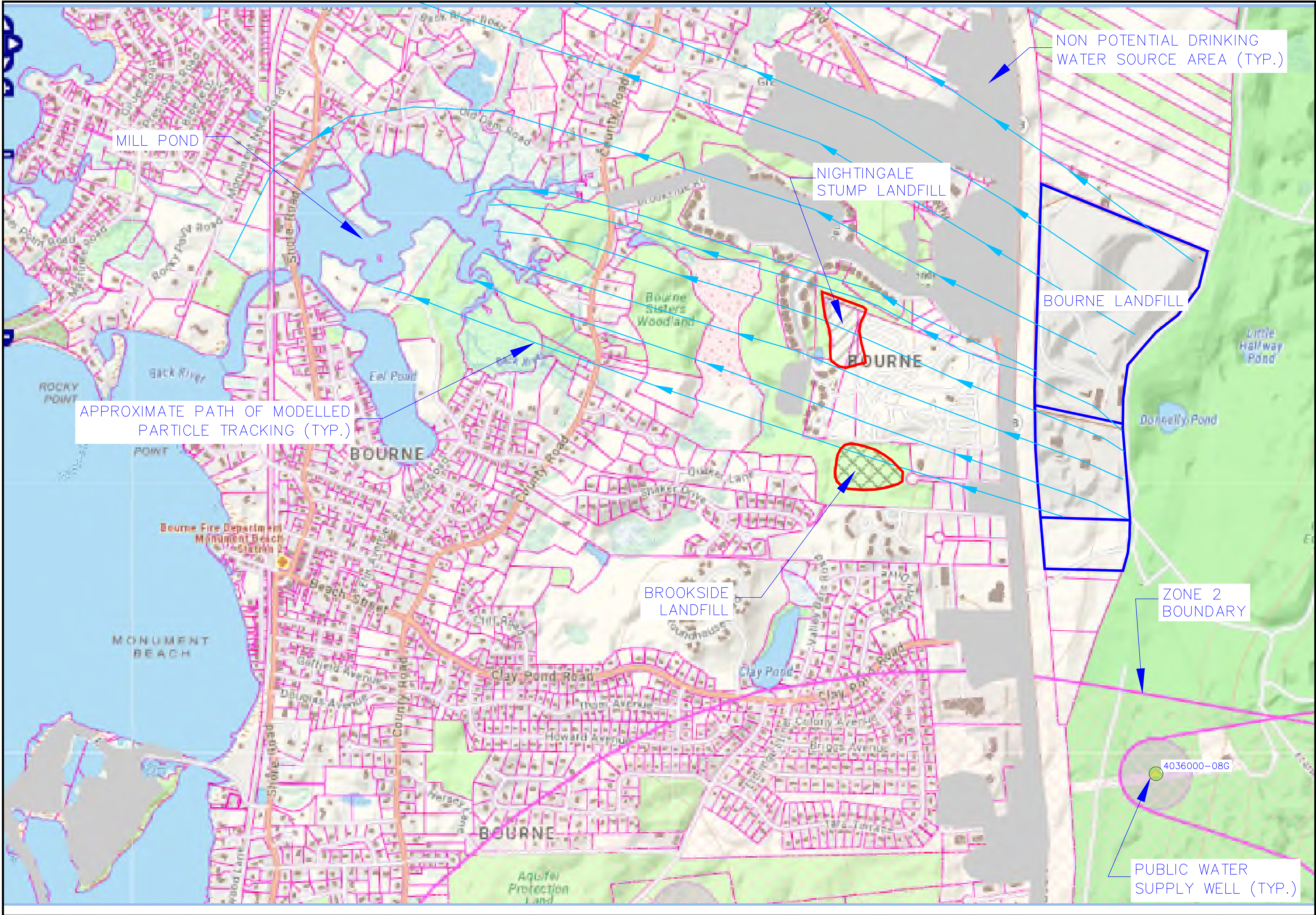
<p>File No. SE01-456-12</p> <p>Acid No.</p> <p>SITEC ENVIRONMENTAL Wetlands and Solid Waste Consultants</p> <p>SITEC Environmental, Inc. 769 Plain Street, Unit C Warefield, MA 02055 (781) 319-0100 FAX (781) 834-6783</p>	<p>project: BOURNE LANDFILL SITE ASSIGNMENT MODIFICATION</p>	<p>scale: AS SHOWN</p> <p>date: FEB. 26, 2021</p>	<table border="1"> <thead> <tr> <th>No.</th> <th>Date</th> <th>Revision Description</th> <th>Chkd. by</th> <th>Appvd. by</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table>	No.	Date	Revision Description	Chkd. by	Appvd. by																																													
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<p>client: BOURNE DEPARTMENT OF INTEGRATED SOLID WASTE MANAGEMENT</p>	<p>drawn: ARQ</p> <p>checked: ARQ</p> <p>approved: ARQ</p>																																																				
<p>drawing title: FIGURE 12 WATER RESOURCES PLAN</p>	<p>sheet ___ of ___</p> <p>drawing number: _____</p>																																																				



LAND USES

WILDLIFE MANAGEMENT AREAS	NONE IN PLAN AREA
A. C. E. C.	NONE IN PLAN AREA
IMPORTANT AGRICULTURAL LANDS	NONE IN PLAN AREA
STATE FORESTS	NONE IN PLAN AREA
PARKLANDS OR OPEN SPACE LAND	NONE IN PLAN AREA
M.D.C. RESERVATIONS	NONE IN PLAN AREA
CONSERVATION LAND	NOTED ON PLAN
RESIDENTIAL DWELLINGS (1,000')	NOTED ON PLAN
OCCUPIED COMMERCIAL BUILDINGS (500')	NOTED ON PLAN
HEALTH CARE FACILITY	NOTED ON PLAN
PRISON	NONE IN PLAN AREA
ELEMENTARY SCHOOL	NONE IN PLAN AREA
MIDDLE SCHOOL	NONE IN PLAN AREA
HIGH SCHOOL	NONE IN PLAN AREA
CHILDREN'S PRE-SCHOOL	NONE IN PLAN AREA
LICENSED DAY CARE CENTER	NONE IN PLAN AREA
SENIOR CENTER	NONE IN PLAN AREA
YOUTH CENTER	NONE IN PLAN AREA

<p>File No. SE01-456-12</p> <p>Acad. No.</p> <p>SITEC ENVIRONMENTAL Wastewater and Solid Waste Consultants</p> <p>SITEC Environmental, Inc. 769 Plain Street, Unit C Warefield, MA 02059 (781) 319-0100 (781) 834-4783</p>	<p>project: BOURNE LANDFILL SITE ASSIGNMENT MODIFICATION</p>	<p>scale: AS SHOWN</p>	<table border="1"> <thead> <tr> <th>No.</th> <th>Date</th> <th>Revision Description</th> <th>Chkd. by</th> <th>Appvd. by</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table>	No.	Date	Revision Description	Chkd. by	Appvd. by															
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<p>client: BOURNE DEPARTMENT OF INTEGRATED SOLID WASTE MANAGEMENT</p>	<p>date: FEB. 26, 2021</p>	<p>drawn: ARQ</p>																					
<p>drawing title: FIGURE 13 LAND USE PLAN</p>	<p>checked: ARQ</p>	<p>approved: ARQ</p>																					
<p>sheet ___ of ___ drawing number: ___</p>	<p> </p>	<p> </p>																					



MILL POND

APPROXIMATE PATH OF MODELLED PARTICLE TRACKING (TYP.)

NIGHTINGALE STUMP LANDFILL

NON POTENTIAL DRINKING WATER SOURCE AREA (TYP.)

BOURNE LANDFILL

BOURNE

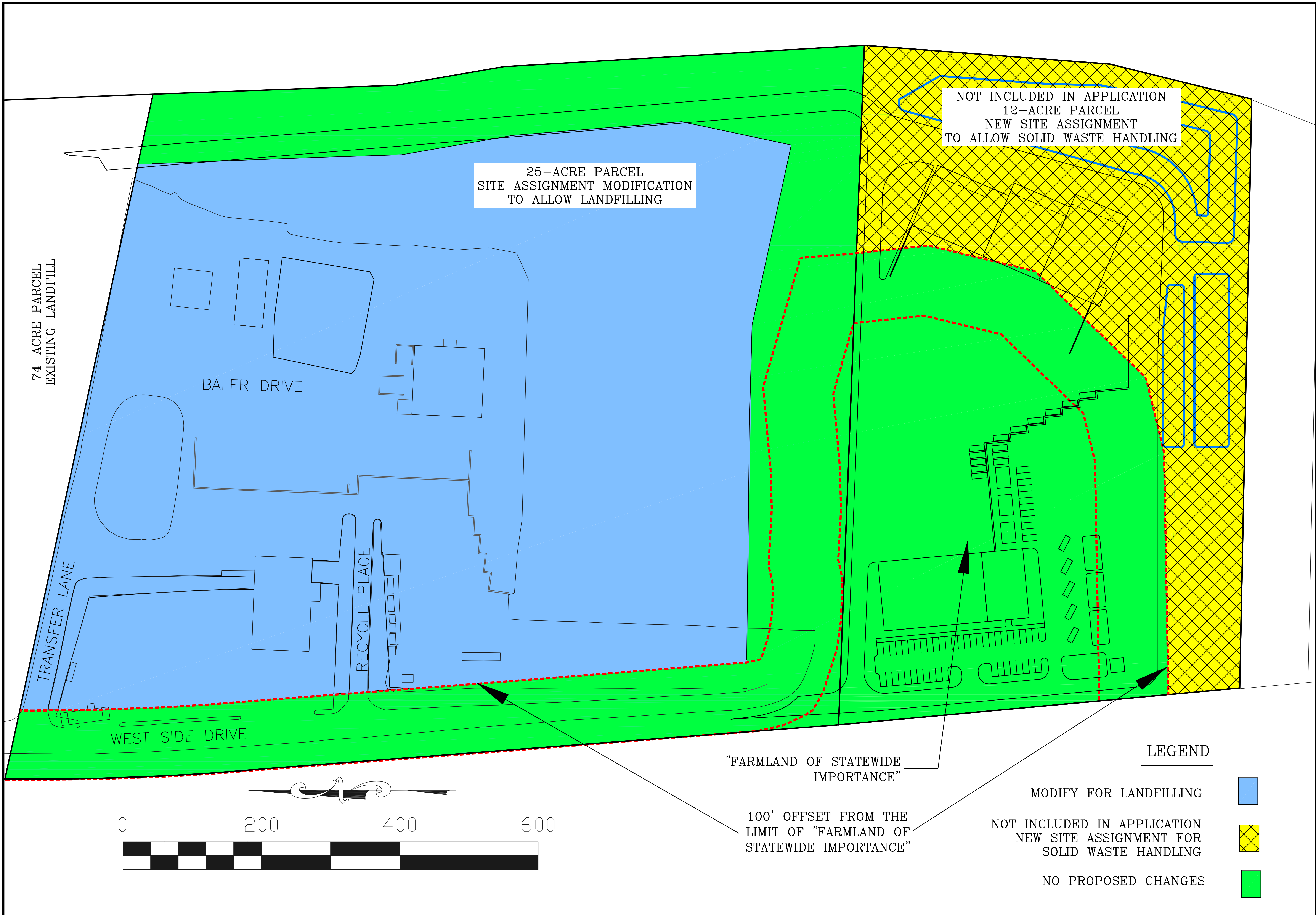
BROOKSIDE LANDFILL

ZONE 2 BOUNDARY

PUBLIC WATER SUPPLY WELL (TYP.)

4036000-08G

<p>scale: NO SCALE date: FEB. 26, 2021</p>	
<p>drawn: ARQ</p>	<p>checked: ARQ</p>
<p>approved: ARQ</p>	<p>drawing number:</p>
<p>project: BOURNE LANDFILL SITE ASSIGNMENT MODIFICATION</p>	<p>client: BOURNE DEPARTMENT OF INTEGRATED SOLID WASTE MANAGEMENT</p>
<p>figure 14 MassDEP WATER RESOURCES MAP</p>	
<p>SITEC Environmental, Inc. 789 Plain Street, Unit C PHONE (781) 319-0100 FAX (781) 834-4783</p>	
<p>SITEC ENVIRONMENTAL Civil, Mechanical, Electrical, and Surveying Land Use Planning and Surveying Hazardous and Solid Waste Consultants</p>	
<p>Acad No. SSEIR SITE PLAN-EXIST COND.dwg SE01-456-12</p>	



25-ACRE PARCEL
SITE ASSIGNMENT MODIFICATION
TO ALLOW LANDFILLING

NOT INCLUDED IN APPLICATION
12-ACRE PARCEL
NEW SITE ASSIGNMENT
TO ALLOW SOLID WASTE HANDLING

74-ACRE PARCEL
EXISTING LANDFILL

BALER DRIVE

TRANSFER LANE

RECYCLE PLACE

WEST SIDE DRIVE

"FARMLAND OF STATEWIDE
IMPORTANCE"

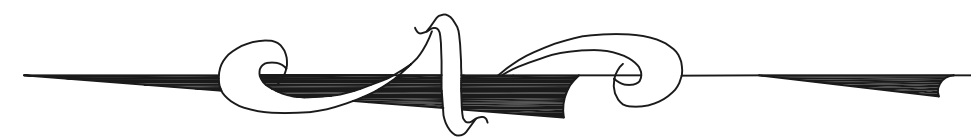
100' OFFSET FROM THE
LIMIT OF "FARMLAND OF
STATEWIDE IMPORTANCE"

LEGEND

MODIFY FOR LANDFILLING

NOT INCLUDED IN APPLICATION
NEW SITE ASSIGNMENT FOR
SOLID WASTE HANDLING

NO PROPOSED CHANGES



scale:	AS SHOWN
date:	FEB. 26, 2021
drawn:	KWR
checked:	KWR
approved:	KWR
drawing number:	

BOURNE LANDFILL SITE ASSIGNMENT MODIFICATION
BOURNE DEPARTMENT OF INTEGRATED SOLID WASTE MANAGEMENT
FIGURE 15 PROPOSED SITE ASSIGNMENT MODIFICATIONS

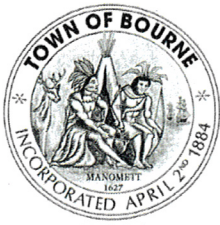
SITEC ENVIRONMENTAL
 Environmental Engineering
 Civil and Environmental
 Hazardous and Solid Waste Consultants

789 Plain Street, Unit C
 Plainfield, NJ 07060
 PHONE (781) 319-0100
 FAX (781) 834-0783

Acad No. SE01-456-04
 SITE SCHEMATIC OCT 19-R1.dwg

ATTACHMENT 4

TECHNICAL FEE



Terri A. Guarino
Health Agent

TOWN OF BOURNE BOARD OF HEALTH

24 Perry Avenue
Buzzards Bay, MA 02532
www.townofbourne.com/health
Phone (508) 759-0600 ext. 1513
Fax (508) 759-0679



To: Daniel Barrett, General Manager
Town of Bourne, ISWM Department

From: Terri Guarino, Health Agent
Bourne Board of Health

Date: March 11, 2021

RE: Technical Review and Public Hearing Fee

Please be advised that at its regular meeting on March 10, 2021 the Bourne Board of Health unanimously voted to approve the following:

That the Town of Bourne Board of Health submit for payment by the Town of Bourne, Department of Integrated Solid Waste Management (ISWM) all invoices incurred by the Board of Health for the implementation of the "ISWM Technical and/or Public Hearing Fee" as necessary to complete its review of the site assignment major modification. The "Technical Fee" is defined in 310 CMR 16.30 (2) and calculated according to 310 CMR 16.99 Appendix A and the "Public Hearing Fee" is defined and calculated according to 310 CMR 16.30 (3).

Upon receipt of a Report on Suitability from the Massachusetts Department of Environmental Protection regarding the vertical and horizontal expansion of the landfill on approximately 100 acres shown on Town of Bourne Assessor's Map 28, Parcel 13 and Map 32, Parcel 9, owned by the Town of Bourne, located at 201 MacArthur Boulevard, for which ISWM is seeking a vertical expansion of the landfill on Map 28, Parcel 13 and a change of status from solid waste handling only on Map 32, Parcel 9 to also include a vertical and horizontal landfill expansion, the Board of Health will forward to ISWM additional Technical Fee and/or Public Hearing Fee invoices for payment as needed to complete its review of said site assignment modification.

Said bills shall be paid in full to the satisfaction of the Bourne Board of Health or its Agent before any approvals from the Board of Health become valid. Should you have any questions, please do not hesitate to contact me.

Sincerely,

Terri Guarino, RS, CHO
Health Agent

C.C.: Board of Health
Anthony Schiavi, Town Administrator
Erica Flemming, Finance Director

BWP SW 38 Site Assignment Hearing Fees ISWM Department

310 CMR 16.30 Fees

16.30 (1) (a)

Applicant Fees

1. Technical Fee
2. Public Hearing Fee

1. Landfill Technical Fee

Maximum fee = \$30,000 plus \$200 for each acre in excess of 25.

25 acres	\$30,000
74 acres	\$14,800
99 acres	\$44,800

Landfill Technical Fee adjusted for inflation

Boston CPI-U, Sep. 1988	134.4	
Boston CPI-U, Sep. 2020	297.1	
	$297.1/126.2 \times \$44,800$	\$99,033.33

2. Public Hearing Fee

Initial public hearing fee assessment = 50% of the maximum allowable Technical Fee.

Additional public hearing fees may be assessed if the initial fee is insufficient to cover the costs.

Total Initial Public Hearing Fee	\$49,516.67
---	--------------------

TOTAL estimated fees	\$148,550.00
-----------------------------	---------------------

ATTACHMENT 5
MEPA DOCUMENTS



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

Kathleen A. Theoharides
SECRETARY

Tel: (617) 626-1000
Fax: (617) 626-1181
<http://www.mass.gov/eca>

December 30, 2020

CERTIFICATE OF THE SECRETARY OF ENERGY AND ENVIRONMENTAL AFFAIRS
ON THE
SINGLE SUPPLEMENTAL ENVIRONMENTAL IMPACT REPORT

PROJECT NAME : Bourne Integrated Solid Waste Management Facility
PROJECT MUNICIPALITY : Bourne
PROJECT WATERSHED : Cape Cod
EOEA NUMBER : 11333
PROJECT PROPONENT : Town of Bourne
DATE NOTICED IN MONITOR : November 23, 2020

Pursuant to the Massachusetts Environmental Policy Act (MEPA; M.G. L. c. 30, ss. 61-62I) and Section 11.08 of the MEPA regulations (301 CMR 11.00), I have reviewed the Single Supplemental Environmental Impact Report (Single Supplemental EIR) and hereby determine that it **adequately and properly complies** with MEPA and its implementing regulations.

Project Description

As described in the Single Supplemental EIR, the project consists of the phased expansion (Phases 7, 8 and 9) of the Bourne Integrated Solid Waste Management Facility (ISWMF) project. Specifically, the Town of Bourne is proposing a vertical and horizontal landfill expansion and the relocation of the solid waste handling facility and other offices and facilities on the property. The three phase 25.0-acre expansion will provide a total of 5,175,000 cubic yards (cy) of disposal capacity which will extend the life of the landfill through 2040.

The horizontal expansion of the landfill (Phase 7 and 8) will require the development of new lined landfill cells in an area located south of Phase 6. These new cells will incorporate leachate collection and landfill gas management infrastructure. Phases 7 and 8 will provide approximately 3,920,000 cy of disposal capacity. The horizontal expansion will be located within a 25-acre parcel that is currently site assigned for solid waste handling and contains a residential recycling area, transfer

station, office building, and other appurtenant structures. The development of Phases 7 and 8 will require the relocation of the transfer station and other structures to an adjacent 12-acre parcel which was acquired by the Town in 2016 and abuts the residential recycling center at the southern boundary of the site. The vertical expansion (Phase 9) is proposed over uncapped areas of the landfill and areas that have been capped with a final cover system. Phase 9 will increase the maximum height of the landfill by 40 feet (from 185 ft to 225 ft) and will provide approximately 1,255,000 cy of disposal capacity which could extend the life of the landfill up to four and a half years.

The Certificate on the Final Environmental Impact Report (FEIR), issued November 29, 1999, acknowledged that certain aspects of the landfill project, including future phases, were conceptual and required that the Town submit Notice of Project Changes (NPCs) to the MEPA Office to address development of subsequent phases. The Town submitted an Expanded NPC in February 2020 that provided an updated site development plan for the landfill and described the development of Phase 7, Phase 8 and Phase 9 of the landfill expansion. The Town was allowed to submit a Single Supplemental EIR in lieu of the usual two-stage Draft and Final EIR process.

Procedural History

The full procedural history for this project was reviewed in the Certificate on the Expanded NPC. Review of the Bourne ISWMF project was initiated with the submission of an Environmental Notification Form (ENF) in 1997. Several Notices of Project Change (NPC) were filed thereafter, including the Expanded NPC on this project change filed in February 2020. All prior phases through Phase 6 were previously reviewed, and the most recent Certificate on Phase 6 was issued on June 26, 2018.

Project Site

The Bourne ISWMF, located at 201 MacArthur Boulevard (Route 28), is comprised of a 74-acre site-assigned parcel which contains the landfill operations and facilities. In 2001, a 25-acre parcel immediately abutting the landfill to the south was purchased and has been used for recycling and transfer operations. The landfill contains lined and unlined waste disposal areas. Phases 1A, 1B, 1C, and 1D are unlined cells that comprise the oldest portion of the landfill. Phases 1A, 1B, and 1C are closed and capped. Phase 1D was part of a pilot landfill reclamation project with the Massachusetts Department of Environmental Protection (MassDEP) that removed the solid waste in this area in order to create additional landfill space. Phases 2 and Phase 3 are both lined and are closed and capped with leachate collection systems. Phase 4, an active landfill cell, is located in the area previously occupied by Phase 1D. Phase 5 consists of a vertical expansion proposed over Phases 1A, 1B, and 1C. MassDEP issued an Authorization to Construct (ATC) and ATO Permit in 2019 for Phase 6 which is currently under construction.

Permits and Jurisdiction

The development of Phases 7, 8 and 9 is undergoing MEPA review and requires an NPC because it consists of a material change to the project prior to the taking of all Agency Actions. The project change exceeds the mandatory EIR threshold at 301 CMR 11.03 (1)(a)(2) because it will result in the creation of ten or more acres of impervious area. The project change also exceeds the Solid Waste ENF

threshold at 301 CMR 11.03(9)(b)(1) because it will result in new capacity or expansion in capacity for combustion or disposal of any quantity of solid waste, or storage, treatment or processing of 50 or more tpd of solid waste. Because it requires an EIR, the project change is subject to review in accordance with the MEPA Greenhouse Gas (GHG) Emissions Policy and Protocol (“GHG Policy”).

The proposed landfill expansion will require the following Permits from MassDEP: Site Suitability Report for a Major Modification of an Existing Site Assignment (BWP SW 38), Authorization to Construct (ATC) a Large Landfill Expansion (BWP SW 26), and Authorization to Operate (ATO) (BWP SW 10). Relocation of the transfer station to the 12-acre parcel will require the following Permits from MassDEP: Site Suitability Report for a New Site Assignment (BWP SW 01), ATC a Large Handling Facility (BWP SW 05), and ATO a Large Handling Facility (BWP SW 06). The project will likely require a Conservation Management Permit (CMP) from the Division of Fisheries and Wildlife’s (DFW) Natural Heritage and Endangered Species Program (NHESP).

The project will require a Development of Regional Impact (DRI) Modification from the Cape Cod Commission (CCC), Site Assignment Approval from the Bourne Board of Health, and a National Pollutant Discharge Elimination System (NPDES) Construction General Permit from the U.S. Environmental protection Agency (EPA).

Because the project is not seeking Financial Assistance from the Commonwealth, MEPA jurisdiction extends to those aspects of the project that are within the subject matter of required, or potentially required, State Agency Actions and that may cause Damage to the Environment as defined in the MEPA regulations. The subject matter of the Site Assignment regulations is sufficiently broad to confer the equivalent of broad scope jurisdiction over the potential environmental impacts of the project. Therefore, MEPA jurisdiction is broad in scope and extends to all aspects of a project that are likely, directly or indirectly, to cause Damage to the Environment, as defined in the MEPA regulations.

Environmental Impacts and Mitigation

Potential environmental impacts of the project change will include alteration of 38 acres of land (112 total acres) and creation of 16.23 acres of impervious area. Measures to avoid, minimize, and mitigate project impacts include: construction period Best Management Practices (BMPs), permanent protection of rare species habitat, dust control measures, erosion and sedimentation controls, leachate management, and measures to maximize LFG (landfill gas) collection efficiency.

Review of Single Supplemental EIR

The Single Supplemental EIR was generally responsive to the Scope provided in the Certificate on the Expanded NPC. It described the project, identified existing conditions, and described potential environmental impacts and mitigation measures. It provided a brief description of applicable statutory and regulatory standards and requirements, and described how the project will meet those standards. The Single Supplemental EIR provided a list of required local, state, and federal permits and provided an update on the status of each of these actions. It also contained a response to comments received on the Expanded NPC and draft section 61 findings.

The primary emphasis of the Single Supplemental EIR was to demonstrate that the project’s

design and operational measures will comply with solid waste regulations and applicable policies and provide sufficient information for MassDEP to use in making its permitting decisions and associated Section 61 Findings. Comments from MassDEP indicate that the Single Supplemental EIR has provided information to support subsequent permitting where compliance with solid waste regulations and applicable policies will be determined. In addition, MassDEP's comments indicate that the Draft Section 61 Findings are in general compliance with solid waste compliance requirements.

The Single Supplemental EIR includes an update on the Cape Cod Commission (CCC) review process and a discussion of the project's compliance with the pertinent goals and objectives from the Cape Cod Regional Policy Plan.

I have received a comment from the Conservation Law Foundation (CLF) on behalf of Beyond Plastics, Clean Water Action, Community Action Works, the Global Alliance for Incinerator Alternatives, Massachusetts Rivers Alliance, MASSPIRG, Saugus Action Volunteers for the Environment, the Saugus River Watershed Council, Sierra Club, and Sustainable Practices. The comment letter is in opposition to the Town's Phase 7, 8, and 9 Integrated Solid Waste Management Facility expansion as proposed in the Single Supplemental EIR. CLF's comment indicates that the expansion would be a threat to public health and the environment and would continue to undermine the need to responsibly manage waste through source reduction, recycling, and composting.

CLF's comment letter also states that meaningful opportunities for public review of the expansion's potential environmental impacts have not been provided, because it is not possible for the public to access the majority of the historical project documents. As noted above, however, the FEIR Certificate issued in 1999 acknowledged that certain aspects of the landfill project, including future phases, were conceptual and required that the Town submit future NPC filings to disclose the impacts associated with those components. The Expanded NPC filed in February 2020 therefore was the operative document that contained all relevant details (*not* available in historic project filings) related to the phases at issue here, and members of the public have had full access to information and materials associated with this NPC filing. I am also aware that this Office responded to a public records request filed by CLF, and provided the historic files that were sought.

I note that the project will require extensive permitting after the conclusion of MEPA review, and such permitting procedures will include opportunities for public review. The proposed expansion will require the following solid waste permits:

- a. For the proposed landfill expansion:
 - Site Suitability Report for a Major Modification of an Existing Site Assignment (BWP SW 38).
 - Authorization to Construct a Large Landfill Expansion (BMP SW 26), and
 - Authorization to Operate (BWP SW 10).
- b. For the proposed solid waste transfer station:
 - Site Suitability Report for a New Site Assignment (BWP SW 01).
 - Authorization to Construct a Large Handling Facility (BWP SW 05); and
 - Authorization to Operate a Large Handling Facility (BWP SW 06).

Prior the submission of a BWP SW 38 or BWP SW 01 application, MassDEP requires a preapplication meeting to discuss comments received from the public on the Supplemental Single EIR

and to ensure the facility design and operational measures will comply with solid waste regulations and applicable policies with an emphasis on odor, noise, and traffic mitigation. In addition, the following permit applications have public comment periods or public hearing requirements:

- a. BWP SW 01 applications: There is a 21-day public comment period.
- b. BWP SW 38 applications: There is a 21-day public comment period.
- c. Board of Health Site Assignment Decisions: The Board of Health must hold a public hearing in accordance with 310 CMR 16.20.
- d. BWP SW 05 applications: There is a minimum 30-day public comment period.
- e. BWP SW 26 applications: There is a minimum 30-day public comment period.
- f. BWP SW 06 or BWP SW 10 applications: Public comments are not required prior to issuing a decision, but MassDEP comments indicate MassDEP may issue provisional approval with a deferred effective date to allow for 21-day public notice/comment period.

MEPA review is not a permitting process, nor does it serve as an appeal for local decisions. It does not pass judgment on whether a project is or is not beneficial, or whether a project can or should receive a particular permit. Rather, the MEPA process requires public disclosure of a project's environmental impacts as well as the measures that the proponent will undertake to avoid, minimize and mitigate these impacts. MEPA review occurs before public agencies act to issue permits and approvals for a proposed project to ensure that those agencies are fully cognizant of the environmental consequences of their actions. I have examined the record before me, including but not limited to the Scope issued on the Expanded NPC; the Supplemental Single EIR filed in response; and the numerous comments entered into the record. Given the long history of review of this project as detailed in the Certificate on the Expanded NPC, and the comprehensive information provided in response to the Scope and additional pre-filing consultations with Agencies, I do not find that further review is warranted on this project change.

Solid Waste

The project will be regulated under MassDEP's Site Assignment Regulations for Solid Waste Facilities and Solid Waste Regulations. The Town will be required to modify its Site Assignment with the Board of Health prior to development of Phases 7, 8 or 9. The Single Supplemental EIR included a narrative that addressed the project's consistency with the applicable regulatory approval criteria.

Leachate and Landfill Gas Collection

As required by the Scope, the Single Supplemental EIR provided information on the existing monitoring wells and leachate and landfill gas collection systems. It also provided plans and described how leachate and landfill gas will be collected and managed within Phase 7-9. The existing landfill operations include leachate collection and storage facilities, landfill gas collection and treatment systems and an environmental monitoring system that is sampled and evaluated for impacts to groundwater and soil gas conditions in the vicinity of the landfill. These systems will be expanded and maintained for the proposed expansions to the facilities. The leachate collection and storage systems include double composite liner system with primary and secondary leachate collection and monitoring capacity. The double composite liner system consists of 12 inches of low permeable soil, upon which multiple layers of geosynthetic liner materials are installed. MassDEP comments indicate that the double composite

liner system is consistent with systems used for hazardous waste sites.¹ As described in the Single Supplemental Certificate, the layers include primary and secondary geosynthetic clay liners (GCL) and geomembranes, with a leak detection/drainage layer material that drains to a secondary sump and allows for the measurement of leachate that might leak through the primary liner system. On top of the primary geomembrane is a leachate collection system consisting of a network of pipes and 18-inches of drainage sand which allows for the collection and discharge of leachate to the primary leachate sump. There are pumps installed in both the primary and secondary leachate sumps, which pump the collected leachate through a force main to one of two leachate storage tanks. The stored leachate is transferred to tanker trucks and hauled to licensed wastewater treatment plants for treatment and disposal. The leachate collection system will be expanded to Phase 7 by extending the existing Phase 6 leachate collection system. It is anticipated that Phase 8 will be designed and constructed with its own collection system and leachate sump. Phase 9 will be developed by removing any final or intermediate cover systems onto which it will be built, so that leachate will flow vertically into the existing landfill phases and collection system.

Phase 9 will be a vertical expansion of landfilling over existing double composite lined landfill phases. Some of the phase areas have final cap installations that will require the removal of those cap components, including geomembrane barriers. Other areas upon which Phase 9 will be developed (Phase 4, Stage 2 and Phase 5) are currently not capped, because they have just recently stopped operating, having reached their current approved final subgrades. The other portion of the Phase 9 overfill area will be constructed over the future plateau area of the active Phase 6 Landfill, when those approved grades are achieved. The Town plans to develop Phase 9 in stages. The first stage will be to fill the area that is over the Phase 5 Landfill. This will allow the final closure of the northwest corner of the landfill, which includes the currently uncapped Phase 5 sideslopes. The second stage would be to fill over the currently uncapped Phase 4, Stage 2 plateau and the completed Phase 6 plateau. This sequence will allow the postponement of removal of the existing final cap over the remainder of the Phase 9 footprint and will allow for the progressive modification to the existing gas collection system that underlays the Phase 9 Landfill. The completion of the Phase 9 overfill will require sequentially removing stages of the existing final caps of the Phase 2, Phase 2A/3A, Phase 3 and Phase 4, Stage 1 landfills. The sequential cap removal work will be done to minimize the area of open landfill surface at any one time. The Single Sup. EIR contained a Figure 4 in Attachment 3 that shows the anticipated sequential development of the Phase 9 Landfill. There will be areas that remain uncovered for several years before the Phase 9 filling occurs on them. In order to mitigate any impacts from occurring because of this, there will be an intermediate cover layer installed over these areas upon achieving the currently approved subgrades. The intermediate cover will be an application of soil materials meeting the requirements of 310 CMR 19.130(15)(d) Intermediate Cover. Because of the possible long-term exposure of the intermediate cover material until Phase 9 is constructed, the cover soils material will be applied across the subgrade surface, so as to form an intermediate cover that is at least twelve inches (12") thick.

MassDEP comments indicate that the Single Supplemental EIR addressed MassDEP's prior comments regarding the use of a long-term intermediate cover system. MassDEP will evaluate the plan for the long-term intermediate cover at solid waste permitting. MassDEP's decision on the use of long-term intermediate cover and the proposed capping schedule will depend on the waste stream (i.e. mainly ash in the "preferred alternative" or MSW only). If the Proponent decides to accept only MSW, the plan for a long-term intermediate cover system may not be feasible according to MassDEP. Comments from

¹ Supplemental information provided by MassDEP on December 29, 2020.

MassDEP make clear that MassDEP may require the Proponent to revise the proposed schedule for capping if there are issues with leachate management, nuisance conditions, or as necessary to ensure compliance with 310 CMR 19.000.

The current landfill facilities include an existing gas collection and treatment system. The system for the management of gas generated within the landfill includes vertical extraction wells and horizontal gas collectors. There is also a network of piping to collect generated landfill gases and convey them to a flare station for treatment. The existing flare station is located to the northeast of the Phase 2 landfill area and prevents the occurrence of odors and the off-site migration of landfill gas. The landfill gas collection system will be expanded by modifying the existing header system, by relocating portions of it to the perimeter sideslopes to prevent them from being buried by the Phase 9 vertical expansion. Existing gas extraction wells located within the proposed footprint of Phase 9 will be modified by converting the wells to having remote wellheads, also along the perimeter sideslopes. The Phase 7 and 8, as well as the Phase 9 overfill waste will have new extraction wells installed and operated in the same manner as the existing extraction wells.

Potential impact from the landfill to the environment has been monitored for several decades by a groundwater and soil gas monitoring program. The monitoring program has consisted of quarterly sampling that began in the 1990s. This program has contributed to the development and approval of a Comprehensive Site Assessment (CSA) for the site. The scope of the current monitoring program was established in MassDEP's approval of the CSA in 2017. According to the Single Supplemental EIR, the facility anticipates that MassDEP approvals for Phases 7 and 8 will include the placement of additional groundwater and gas monitoring wells along their perimeter.

Traffic Assessment

The Single Supplemental EIR included a traffic assessment memorandum (dated July 16, 2020) which indicated that traffic generation has decreased since 2015 when municipal combustor ash, delivered in large trailers, became the primary waste stream. The Single Supplemental EIR also described that if the MSW (municipal solid waste) Alternative were to occur and the facility were to operate at daily capacity, more truck traffic would be needed to deliver such waste to the facility. The Single Supplemental EIR concludes that even if the MSW alternative were adopted, the maximum level of traffic would be the same level that existed as of 2015. However, this is the operational scenario that existed at the facility prior to accepting ash even if the facility returned to receiving MSW waste (which is not the Preferred Alternative). Therefore, the Single EIR concludes that even if MSW alternative were adopted, the maximum traffic would be the same level that existed as of 2015. The Single Supplemental EIR indicated that the project does not otherwise require an increase to the permitted tonnage the site can accept and therefore will not generate new traffic or impact traffic patterns due to an increase in permitted tonnage limits. The traffic assessment memorandum concluded that if the facility runs at daily capacity through its life, the landfill will operate until approximately September 2041 under the Preferred Alternative of accepting ash, while the MSW Alternative will only operate until approximately January 2036. The Single Supplemental EIR also included crash data from the Massachusetts Department of Transportation (MassDOT) from January 1, 2013 to June 4, 2020 for locations near the facility. Analysis of the data confirms that traffic operations of the facility will not constitute a danger to public safety.

Land Use and Water Resources

As required by the Scope, the Single Supplemental EIR presented the Preferred Alternative with both a Land Use Plan and a Water Resources Plan in accordance with the Site Assignment. The Single Supplemental EIR also included plans that show the limits of site assignment and waste handling, the conceptual site plans for the proposed landfill expansion and relocation of the large handling facility as requested by MassDEP during the review of the Expanded NPC. The Single Supplemental EIR included a groundwater contour map which delineates where the nearest public drinking water supply is located.

The Single Supplemental EIR presented a detailed assessment of compliance with site suitability criteria for both the landfill and waste handling facility components of the project. The filing did not indicate that the Proponent would seek a waiver of any site suitability criteria by MassDEP. The Bourne Landfill is located over the Cape Cod Sole Source Aquifer, as designated by the EPA. However, the Single Supplemental EIR has established that there are no existing or potential public or private drinking water supplies downgradient from the Landfill. The Single EIR includes a letter from the Bourne Board of Health confirming that all previously identified downgradient water supply wells have been replaced with connections to the public water supply system. The Proponent also indicates that the project will comply with the 310 CMR 16.40(4)(a) related to agricultural lands. MassDEP indicates United States Department of Agriculture (USDA) mapping shows the presence of soil types associated with Prime, Unique, or State and Local Importance farmland designations on the property. The Single EIR included a site specific soil survey as attachment 12 which included test pits and an evaluation by a certified soil scientist to determine whether the USDA mapping is correct. MassDEP allows site specific soil surveys since the USDA soil surveys are based on soil examinations at 100-150 foot intervals. The site specific soil survey in the Single EIR did find some areas of agricultural lands, however as proposed all waste handling areas meet the agricultural land setback requirements of 310 CMR 16.40(4)(a). Therefore, MassDEP concludes that no waiver is required.² Compliance with site suitability criteria will be determined in subsequent permitting by the local board of health and MassDEP.

Emergency Authorization

According to the Single Supplemental EIR, the landfill is anticipated to play a leading role in responding to future emergency conditions on Cape Cod in order to ensure that the public health and the environment are protected. The Single Supplemental EIR included a request that MEPA review be waived for such emergencies such that deference is afforded to MassDEP for any technical oversight. Specifically, the Single Supplemental EIR requests presumptive approval to operate any or all of its facilities 24 hours per day, with a total inbound tonnage not to exceed 1,500 tons in any 24 hour period, for a minimum of five consecutive days, or 120 hours. The Single Supplemental EIR did not describe the anticipated future emergency conditions nor provide additional details on what may trigger the need for implementation of this scenario. I note the MEPA regulations already include provisions that address review of emergency actions necessary to avoid or eliminate an imminent threat to environmental resources or quality or public health or safety (301 CMR 11.13), though these provisions would be premised on the need for Agency Action by MassDEP.

Land Alteration/Stormwater

² Supplemental information provided by MassDEP dated December 29, 2020.

The new liner areas and area required for new structures and associated pavement will create 15.86 total acres of impervious area. The Single Supplemental EIR included both a graphic and narrative description of the impervious areas. The expansion of new impervious area on the 25-acre parcel will be for the landfill expansion and will be the portion of that parcel that is not currently paved or covered by a building. This area consists of approximately 10.28 acres. The expansion of new impervious area on the 12-acre parcel, which is currently undeveloped, will be for pavement, buildings and infrastructure to support the Large Handling Facility (LHF). The conceptual design of new impervious area is approximately 5.58 acres.

According to the Single Supplemental EIR, stormwater will be managed onsite through the use of diversion berms, swales, culverts, retention basins, and infiltration basins. The landfill has an established Stormwater Management Plan (SMP), which has evolved as the site has been developed. The current stormwater management facilities consist of a series of engineered runoff water quality diversion berms, let-down channels, perimeter swales, culverts and sedimentation/retention basins. The site is divided into three drainage basins. Generally, the northern two thirds of the western side of the site, which includes the site's access road and the northern and western sides of the landfill, drain to Stormwater Basin # 1 as tributary flows to a drainage swale along the western side of the landfill. The eastern side of the landfill and southern third of the site drains to Stormwater Basin #2. The interceptor is designed to collect flow at critical phase points at the toe of the eastern sideslope for Phases 6, 7 and 8 landfills. The Town is permitted to accept both fly ash and bottom ash for disposal, however the majority of ash they accept is bottom ash. All stormwater that comes into contact with solid waste including fly ash and bottom ash and/or daily cover is collected and controlled as leachate.³ According to the Single Supplemental EIR, all site runoff from developed areas of the site drains to either of these two basins. Each basin completely discharges to groundwater. The Single Supplemental EIR contains a SMP that takes into account the proposed full site buildout and provides details on stormwater management during the construction period.

Rare Species

According to the Single Supplemental EIR, portions of the project site are located within mapped habitat of the Eastern Box Turtle (*Terrapene carolina*), which is state-listed as a species of Special Concern. This species and its habitat are protected pursuant to the Massachusetts Endangered Species Act (MESA; MGL c.131A) and its implementing regulations (321 CMR 10.00). Comments from NHESP indicate that the project is anticipated to result in a Take and, therefore, will require a CMP pursuant to 321 CMR 10.23. Projects resulting in a Take of state-listed species may be permitted only if they meet the performance standards for a CMP. In order for a project to qualify for a CMP, the Town must demonstrate that the project has avoided, minimized and mitigated impacts to state-listed species consistent with the following performance standards: (a) adequately assess alternatives to both temporary and permanent impacts to the state-listed species, (b) demonstrate that an insignificant portion of the local population will be impacted, and (c) develop and agree to carry out a conservation and management plan that provides a long-term net benefit to the conservation of the state-listed species. The Single Supplemental EIR indicated the Town intends to meet these performance standards by permanently protecting off-site land in the vicinity of the site as open space and state-listed species habitat. NHESP anticipates that the project will provide a suitable long-term net benefit and meet the

³ Supplemental information provided by MassDEP dated December 29, 2020

performance standards for issuance of a CMP.

The Single Supplemental EIR provided an update on consultation with the NHESP and included additional details on how the project will provide a suitable long-term net benefit and meet the performance standards for issuance of a CMP. The Town has researched parcels in the nearby area that would provide suitable mitigation and could be placed under permanent protection. This research has yielded a candidate parcel. The Town is preparing an assessment of the parcels for NHESP review to ensure that they are suitable. Comments from NHESP indicate that the Town intends to meet the performance standards of a CMP by permanently protecting off-site land as open space and state-listed species habitat through fee conveyance to the Town of Bourne Conservation Commission. According to NHESP the Town has identified a candidate parcel in the vicinity of the property which should provide an acceptable option to address the required long-term net benefit for Eastern Box Turtle associated with the project. The Town may also propose to permanently protect portions of the property, as shown on the “Conceptual Site Buildout Plan” included in the Single Supplemental EIR. Although the exact details of the long-term net benefit required under a CMP have not yet been finalized, NHESP anticipates that a suitable long-term net benefit can be achieved through the protection of high quality off- and on-site habitat and that the project should be able to meet the performance standards of a CMP.

Climate Change and GHG Emissions

Adaptation and Resiliency

The Town is a participant in the Commonwealth’s Municipal Vulnerability Preparedness (MVP) program. The MVP program is a community-driven process to define natural and climate-related hazards, identify existing and future vulnerabilities and strengths of infrastructure, environmental resources and vulnerable populations, and develop, prioritize and implement specific actions the Town can take to reduce risk and build resilience.

To aid in this assessment, the Town consulted resilientMA.org which contains a report entitled, Massachusetts Climate Change Projections - Statewide and for Major Drainage Basins Temperature, Precipitation, and Sea Level Rise Projections, prepared by the Northeast Climate Adaptation Science Center at the University of Massachusetts Amherst. The Single Supplemental EIR indicated that the Town has reviewed the prediction for sea level change noted in the report. The “Extreme”, or maximum physically plausible case, sea level rise scenario for as far into the future as the year 2100, predicts a maximum rise of 10.3 feet above current (or mean) sea level. Phase 9 will increase the maximum height of the Landfill from elevation 185 feet mean sea level (MSL) to elevation 225 feet MSL over previously lined and filled areas of the landfill including Phases 2, 2A/3A, 3, 4, 5 and 6. The Single Supplemental EIR concluded that the designs for the expansion of the Bourne Landfill and associated waste management and handling facilities would not be directly affected by this change because the facility is located on one of the highest points on Cape Cod and has elevations ranging from approximately 144 feet MSL to 90 feet MSL along the perimeter of the facility. The maximum predicted sea level rise of 10.3 feet MSL is well below this level as contained Massachusetts Climate Change Projections.

In addition to sea level rise, the Town considered predictive modeling regarding increases in precipitation during the design of its stormwater management systems. The model shows for the Buzzards Bay basin that by the end of the century in the 2090s, the maximum increase in annual

precipitation is predicted to be between 0.3 and 6.8 inches from the observed baseline amount of 47.8 inches per year. The model also shows predictions in the 2090s for the Cape Cod Basin, which is to the north of the facility, ranging from a decrease of 0.8 inches to an increase of 5.5 inches from the observed baseline amount of 44.9 inches per year. The Single Supplemental EIR states that the SMS systems at the ISWM facility are capable of handling this projected increase with available capacity and proposed drainage basins above the current 100-year storm event.

Greenhouse Gas Emissions (GHG)

This project is subject to review under the May 5, 2010 MEPA GHG Policy. The Policy requires Proponents to quantify carbon dioxide (CO₂) emissions and identify measures to avoid, minimize or mitigate such emissions. As previously disclosed in the Expanded NPC, a major reduction in the production of GHGs has been achieved by shifting the waste the Town accepts. As required by the Scope, the Town provided an update on its contract with SEMASS and an analysis of alternative scenarios, should this contract be suspended and the landfill returned to acceptance of MSW waste. Approximately 86 percent of its annual tonnage is in the form of municipal combustor ash (MCA) which does not produce gases. The Town's 10-year contract to accept MCA from SEMASS will terminate at the end of 2021. The Town intends to extend the contract and to continue accepting up to 189,000 tpy of MCA and 30,000 tpy of biodegradable MSW from Bourne and Falmouth (Scenario 1). However, if the contract is not extended, the Town will return to accepting up to 219,000 tpy of biodegradable municipal solid waste (MSW) (Scenario 2). The Single Supplemental EIR reiterated from the Expanded NPC that Scenario 2 would generate a total of 815,844 tons of GHG emissions over this period. The Town's preferred scenario (Scenario 1), representing continued acceptance of MCA, would decrease GHG emissions by 425,138 total tons over the 40 year period (2021 through 2041) compared to Scenario 2. This represents an approximate 52 percent reduction in GHG emissions compared to Scenario 2.

The Single EIR included a commitment to explore various options to utilize landfill gas as an energy source and identified the possibility of the installation of a solar photovoltaic array on the Landfill under both Scenario 1 and Scenario 2. Comments from MassDEP indicate any of the landfill gas use options that are described in the Single Supplemental EIR will require air permitting by MassDEP. The Single Supplemental EIR did not identify any additional measures which will be implemented to reduce GHG emissions should Scenario 2 occur if the SEMASS contract were not renewed. However, the Proponent indicates that the existing landfill gas collection is designed to capture and reuse 95% of gas emissions, and this rate will be maintained in either scenario. The Proponent reiterates that several other measures will continue to be explored to further GHG emissions, including, in particular: recovering thermal energy; operation of an animal crematory that would use the LFG as a fuel; vertical axis wind turbines; use of compressed natural gas for trucks; and, regional composting.

Construction Period

The Single Supplemental EIR identified construction period impacts including increases in construction related truck traffic, dust, noise, stormwater runoff, and construction waste. Mitigation measures identified in the Single Supplemental EIR include implementation of a traffic control and construction management plan, dust suppression measures, and construction waste management and recycling.

All construction and demolition activities will be managed in accordance with applicable MassDEP's regulations regarding Air Pollution Control (310 CMR 7.01, 7.09-7.10), and Solid Waste Facilities (310 CMR 16.00 and 310 CMR 19.00, including the waste ban provision at 310 CMR 19.017). The project will include measures to reduce construction period impacts (e.g., noise, dust, odor, solid waste management) and emissions of air pollutants from equipment, including anti-idling measures in accordance with the Air Quality regulations (310 CMR 7.11). The Town plans to require that its contractors use construction equipment with engines manufactured to Tier 4 federal emission standards, or select project contractors that have installed retrofit emissions control devices or vehicles that use alternative fuels to reduce emissions of volatile organic compounds (VOCs), carbon monoxide (CO) and particulate matter (PM) from diesel-powered equipment. If oil and/or hazardous materials are found during construction, the Town will notify MassDEP in accordance with the Massachusetts Contingency Plan (310 CMR 40.00). All construction activities should be undertaken in compliance with the conditions of all State and local permits.

Mitigation and Draft Section 61 Findings

The Single Supplemental EIR contained a separate chapter on mitigation measures and draft Section 61 Findings for each Agency taking action on the project. It described mitigation measures and contained a table demonstrating the responsible party for implementing mitigation, monetary amounts where applicable, and a schedule for implementation. The draft Section 61 Findings will serve as the primary template for State Agency Permit conditions, and should be revised or updated as appropriate based on comments received and further consultation with Agencies after issuance of this Certificate. As described in the Single Supplemental EIR and prior MEPA documents, the Proponent has committed to implement the following measures to avoid, minimize, and mitigate environmental impacts:

MITIGATION MEASURE	IMPLEMENTATION SCHEDULE	COST ESTIMATE
Phased construction of Phase 7 & 8 double composite liner and leachate collection systems.	Starting in 2027	\$8,000,000
Continue on-going environmental monitoring of groundwater quality and landfill gas migration.	Until 30 years after the close of the landfill.	\$80,000/yr
Phased construction of final closure caps, including gas collections system extension, starting with Phase 9 and continuing as areas reach final subgrades.	Starting in 2022	\$12,000,000
Construct stormwater management facilities, as part of the construction of the Large Handling Facility (LHF).	Starting in 2024	\$800,000

Mitigate GHG by continuing to operate gas collection & treatment system, install solar photovoltaic arrays and evaluate other GHG mitigation measures. As heavy equipment is replaced purchase EPA air quality compliant equipment.	Ongoing operations with solar arrays added following area closure completions.	\$ 1,000,000
Enforce noise mitigation measures during construction and operations.	For the life of the Facility	\$1,000/yr
Enforce dust mitigation measures during construction and operations, including road sweeping and water applications.	For the life of the Facility	\$10,000/yr
Enforce odor mitigation measures during construction and operations, including continued operation of gas collection and treatment system, as included above.	For the life of the Facility	\$50,000/yr
Enforce vermin mitigation measures during construction and operations, including proper cover placement and maintaining exterminator services.	For the life of the Facility	\$30,000/yr
Enforce litter mitigation measures during operations, including maintenance of fencing, cover application and litter patrols.	For the life of the Facility	\$70,000/yr

For Rare Species:

MITIGATION MEASURE	IMPLEMENTATION SCHEDULE	COST ESTIMATE
Prepare and negotiate a Conservation Management Plan with NHESP.	Starting in 2020	\$75,000
Purchase proposed compensatory, mitigation properties.	2021	\$250,000

For Construction Period:

The measures that will be undertaken include:

- compliance with MassDEP regulations regarding air pollution control;
- designating areas for storage of equipment and supplies;
- ensuring that contractors keep all work areas neat and free from unsecured supplies such as gasoline, diesel fuel and other petroleum products;
- dust control measures such as regular road sweeping and watering as needed;

- requirement of a site-specific Health and Safety Plan by all contractors;
- installation of stormwater control structures to manage all stormwater on-site;
- requirement of a site-specific Erosion Control Plan by all contractors;
- requirement to follow anti-idling requirements;
- use of ultra-low sulfur diesel fuel (ULSD);
- use of and purchase of equipment with current low-emission engine types or other control mechanisms, including Tier 4 standards for engines (file maintained on-site); and
- coordination of on-site disposal and diversion of waste with the Town management to comply with waste bans and encourage recycling and diversion.

The Town will provide a GHG self-certification document to the MEPA Office that is signed by an appropriate professional (e.g., engineer, architect, transportation planner, general contractor) and indicates that all of the required mitigation measures, or their equivalents, have been completed.

Conclusion

Based on a review of the Single Supplemental EIR, comment letters, and consultation with State Agencies, I find that the Single Supplemental EIR adequately and properly complies with MEPA and its implementing regulations. State Agencies shall forward their final Section 61 Findings for publication in the Environmental Monitor.

December 30, 2020
Date

K. Theoharides

Kathleen A. Theoharides

Comments received:

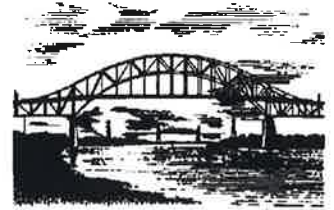
- | | |
|------------|---|
| 12/17/2020 | Natural Heritage & Endangered Species Program (NHESP), Massachusetts Division of Fisheries & Wildlife |
| 12/23/2020 | Conservation Law Foundation (CLF) in behalf of Beyond Plastics, Clean Water Action, Community Action Works, the Global Alliance for Incinerator Alternatives, Massachusetts Rivers Alliance, MASSPIRG, Saugus Action Volunteers for the Environment, the Saugus River Watershed Council, Sierra Club, and Sustainable Practices |
| 12/23/2020 | Cape Cod Commission (CCC) |
| 12/23/2020 | Massachusetts Department of Environmental Protection (MassDEP) – Southeast Regional Office (SERO) |

KAT/ACC/acc

ATTACHMENT 6
WATER RESOURCES CORRESPONDENCE



**TOWN OF BOURNE
BOARD OF HEALTH**
24 Perry Avenue
Buzzards Bay, MA 02532



Terri A. Guarino
Health Agent

June 6, 2020

C/O Mr. Phil Goddard
Manager of Facility Compliance & Technology Development
Town of Bourne Dept. of Integrated Solid Waste Management
201 MacArthur Blvd.
Bourne, MA 02532

Dear Mr. Goddard:

Section 5.3 of the existing local Health Regulations indicates that "No well, private or public, will be allowed to be constructed, for human consumption, if its placement is hydraulically down-gradient of the Bourne Integrated Solid Waste Management Facility consisting of approximately 103 acres located at 201 MacArthur Boulevard, Bourne, as delineated on the Town of Bourne Assessor's maps as map 28, parcel 13 and map 32, parcel 9. Said down-gradient area shall be delineated by the particle tracking maps created by the United States Geological Survey (USGS) on file with the Board of Health office."

The Bourne Health Department does not permit the construction of potable wells downgradient from the Bourne Landfill and these areas are connected to the public water system. If you have any concerns please feel free to contact me at 508-759-0600 ext. 1513.

Sincerely,

Terri Guarino

Terri Guarino, RS, CHO
Health Agent

C.C. Board of Health



BOURNE WATER DISTRICT

211 Barlow's Landing Road. P.O. Box 1447
Pocasset, Massachusetts 02559
508-563-2294 FAX Number 508-564-4661

26 May, 2020

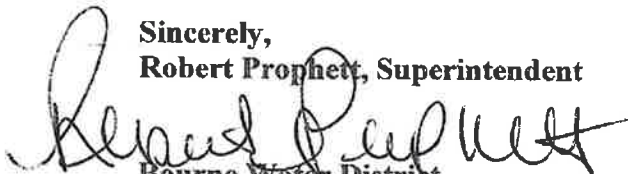
To: Phil Goddard
Manager of Facility Compliance and Technology Development
Town of Bourne, ISWM Department
24 Perry Avenue
Buzzards Bay, MA 02532
p. 508-759-0600, ext. 4241

Re: Bourne Landfill build-out

Gentlemen:

Bourne Water District does not have a wellfield downgradient from the Bourne Sanitary Landfill. Bourne Water District would not be permitted by Mass Department of Environmental Protection to put a new production well downgradient of a Landfill. Bourne Water District has no objection to the build – out proposed by the I.S.W.M. Dept... If you have any questions or concerns please feel free to contact me at 508-563-2294.

**Sincerely,
Robert Prophet, Superintendent**


Bourne Water District

BOURNE WATER DISTRICT
211 BARLOWS LANDING RD.
P.O. BOX 1447
POCASSET, MA 02559-1447



SOUTH
SAGAMORE



THE BOURNE WATER DISTRICT'S WATER QUALITY REPORT FOR 2019

(PWS ID # 4036000)

Dear Customer,

We are pleased to present a summary of the quality of the drinking water provided to you during 2019. We conducted over 950 tests for more than 84 contaminants. This report is a snapshot of last year's water quality. The Bourne Water District is committed to providing you with a reliable water supply. **We believe informed customers are our best allies.** You are welcome to attend the Board of Water Commissioners meetings held at the Bourne Water District's office, at 211 Barlow's Landing Road in Pocasset. The board's meetings are scheduled for the second Tuesday of the month at 8:30 AM, and the Annual District meeting is scheduled on the fourth Monday in April.

WATER SOURCES AND TREATMENT

The Bourne Water District is supplied by 10 different sources, 7 of our own gravel packed well sites and 3 gravel packed well sites from the Upper Cape Regional Water Supply Cooperative. Four of our well sites are in the Monument Beach area of the Town Forest. The other two wells are in the Cataumet area of the Town of Bourne. One well is on Joint Base Cape Cod and we have one transfer station on Connery Ave. The Bourne Water District treats all supplies with lime slurry for corrosion control. The lime slurry is used to raise the pH of the water. This makes the water less aggressive to the copper pipe and lead joints in your homes to prevent exposure to lead and copper.

WHAT DOES THE FOLLOWING TABLE MEAN?

Action Level (AL) The concentration of a contaminant which if exceeded triggers treatment or other requirements.

Maximum Contaminant Level (MCL) The highest level of a contaminant that is allowed in the drinking water. The MCL is set as close to the MCLG as feasible using the best available treatment technology.

Maximum Contaminant Level Goal (MCLG) The level of a contaminant in the drinking water below which there is no known or expected risk to health. The MCLG allow for a margin of safety.

90th Percentile Out of every 10 houses sampled, 9 were below this level.

KEY TO TABLE

AL = Action Level

MCL = Maximum Contaminant Level

MCLG = Maximum Contaminant Level Goal

MFL = million fibers per liter

Mrem/year = millirems per year (a measure of radiation absorbed by the body)

NTU = Nephelometric Turbidity Units

pci/l = picocuries per liter (a measurement of radioactivity)

ppm = parts per million, or milligrams per liter (mg/l)

ppb = parts per billion, or micrograms per liter (ug/l)

ppt = parts per trillion, or nanograms per liter

ppq = parts per quadrillion, or picograms per liter

TT = Treatment Technique

DISTRIBUTION SYSTEM WATER QUALITY This report summarizes only those items detected during Sampling-not all contaminants that are monitored

Microbial Results	Highest Detected	Range Detected	MCL	MCLG	Violation	Possible Source of Contamination
Total Coliform Bacteria**	0	0	0	0	No	Naturally present in the environment
Fecal Coliform or E. Coli	0	0	0	0	No	Human and Animal Fecal Waste

*Compliance with the Fecal Coliform/E.Coli MCL is determined upon additional repeat testing

**Total Coliform:Coliform are bacteria that are naturally present in the environment and are used as an indicator that other potentially harmful bacteria may be present

Lead and Copper	Dates collected	90th Percentile	Action Level	MCGL	# of sites sampled	# Sites above Action Level	Violation	Possible Source of Contamination
Lead (ppb)	9/1/2019 thru 12/31/2019	0.0028	15	0	30	0	No	Corrosion of household plumbing systems; Erosion of natural deposits
Copper (ppm)	9/1/2019 thru 12/31/2019	0.179	1.3	1.3	30	0	No	Corrosion of household plumbing systems; Erosion of natural deposits

TESTING FOR LEAD - If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. Bourne Water District is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information about lead in drinking water, testing methods and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at <http://www.epa.gov/safewater/lead>.

SUMMARY OF FINISHED WATER CHARACTERISTICS

Regulated Contaminants	Date(s) collected	Highest Detect Value	Range Detected	MCL	MCGL	Violation
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Inorganic Contaminants:

Barium (ppm)	2018	0.009	0.002-0.009	2	2	No	Discharge of drilling waste; discharge from metal refineries; erosion of natural deposits
Nitrate * (ppm)	2019 2018	0.71 0.35	0.06-0.71 0.08-0.35	10	10	No	Runoff from fertilizer use; leaching from septic tanks; sewage; erosion of natural deposits
Perchlorate ** (ppb)	2019 2018	0 0.23	0 0-0.23	2	-	No	Rocket propellants, fireworks, munitions, flares, blasting agents* (see note below)

Nitrate in drinking water at levels above 10ppm is a health risk for infants of less than six months of age. High nitrate levels in drinking water can cause blue baby syndrome. Nitrate levels may rise quickly for short periods of time because of rainfall or agricultural activity. If you are caring for an infant, you should ask advise from your health care provider.

**Perchlorate (Various Chemical Abstract Service Registry Numbers (CASRN) for different chemical species) Perchlorate interferes with the normal function of the thyroid gland and thus has the potential to affect growth and development, causing brain damage and other adverse effects, particularly in fetuses and infants. Pregnant women, the fetus, infants and children up to the age of 12, and people with hypothyroid condition are particularly susceptible to perchlorate toxicity. "J" values are required when the results are above the MDL(0.012) and below the MRL(0.05)

Organic Contaminants

Tetrachloroethylene(PCE)(ppb)	2019	1.64	0-1.64	5	-	No	Discharge from factories and dry cleaners
Chloroform (ppb)	2019	1.21	0-1.21	ORSG 70	NA	No	By-product of drinking water chlorination
CIS-3,2 Dichloroethylene (ppb)	2019	1.26	0-1.26	70	NA	No	Runoff from fertilizer use; leaching from septic tanks; sewage; erosion of natural deposits

Secondary Contaminants	Date(s) collected	Highest Detect Value	Range Detected	SMCL	OSRG	Possible Source of Contamination
Magnesium (ppm)	2019	3	1.1-3.0	-	-	Natural Mineral and Organic Matter
Chloride (ppm)	2019	40	7.2-40	250	NA	Natural Mineral, Road Salt
Calcium (ppm)	2019	14	3.0-14	-	-	Natural Mineral and Organic Matter
Iron (ppb)	2019	0.08	0-0.08	300	NA	Erosion of Natural Deposits and oxidation of iron components
Manganese (ppb)*	2019	0.012	0-0.012	50	NA	Erosion of Natural Deposits
Sodium (ppm)**	2019	28**	5.7-28	-	20	Road Salting; erosion of natural deposits
Potassium (ppm)	2019	1.2	0.6-1.2	-	-	Natural Mineral and Organic Matter
Sulfate (ppm)	2019	7.2	5.1-7.2	250	250	Natural Sources
Zinc (ppm)	2019	0.014	0-0.014	5	NA	Erosion of Natural Deposits, and industrial discharge

*EPA has established a lifetime health advisory (HA) for Manganese at 300ppb and an acute at 1000ppb

**Sodium is a naturally-occurring element found in soil and water. It is necessary for the normal functioning of regulating fluids in human systems. Some people, however, have difficulty regulating fluid volumes as a result of several diseases, including congestive heart failure and hypertension. The guideline of 20mg/L for sodium represents a level in water that physicians and sodium sensitive individuals should be aware of in cases where sodium exposures are being carefully controlled. For additional information, contact your health care provider, your local Board of Health or the Massachusetts Dept. of Public Health, Bureau of Environmental Health Assessment at 617-624-5757.

NATIONAL PRIMARY DRINKING WATER REGULATION COMPLIANCE

The Total Coliform rule requires water systems to meet a stricter limit for Coliform bacteria. Coliform bacteria are harmless, but the presence in water can be an indication of disease-causing bacteria. When Coliform bacteria is found, special follow up tests are done to determine if harmful bacteria are present in the water supply. Over 500 Coliform samples were taken throughout the Bourne Water District in the year 2019.

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead and copper in drinking water is primarily from materials and components associated with service lines and home plumbing. The Bourne Water District is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead and copper exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead and copper in your water, you may wish to have your water tested. Information on lead and copper in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at <http://www.epa.gov/safewater/lead>.

Sodium; ORSG = 20 Sodium sensitive individuals, such as those experiencing hypertension, kidney failure or congestive heart failure, should be aware of the levels of sodium in their drinking water where exposures are carefully being controlled. Massachusetts Office of Research and Standard Guidelines (ORSG): This is the concentration of a chemical in drinking water, at or below which, adverse health effects are likely to occur after chronic (lifetime) exposure, with a margin of safety. If exceeded, it serves as an indicator of the potential need for further action.

If you are interested in a more detailed report, contact Robert Prophett at 508-563-2294.

REQUIRED ADDITIONAL HEALTH INFORMATION:

To insure that tap water is safe to drink, Department of Environmental Protection (DEP) and Environmental Protection Agency (EPA) prescribes limits on the amounts of certain contaminants in water provided by public water systems. Food and Drug Administration (FDA) and the Massachusetts Department of Public Health regulations establish limits for contaminants in bottled water. Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency Safe Drinking Water Hotline (1-800-426-4791). The sources of drinking water (both tap and bottled) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and radioactive material and can pick up substances resulting from the presence of animals or from human activity. Contaminants that may be present in the sources include:

- (A) Microbial contaminants such as viruses and bacteria which may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife.
- (B) Inorganic contaminants such as salts and metals which can be naturally-occurring or result from urban storm runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming.
- (C) Pesticides and herbicides, which may come from a variety of sources such as agriculture, storm water runoff and residential uses.
- (D) Organic chemical contaminants, including synthetic and volatile organics which are by-products of industrial processes and petroleum production and can also come from gas stations, urban storm water runoff and septic systems.
- (E) Radioactive contaminants, which can be naturally occurring or be the results of oil and gas production and mining activities. In order to ensure that tap water is safe to drink, EPA prescribes regulations which limit the amount of certain contaminants in water provided by public water systems. FDA regulations establish limits for contaminants in bottled water which must provide the same protection for public health.

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infections by *Cryptosporidium* are available from the Safe Drinking Water Hotline (1-800-426-4791).

SOURCE WATER ASSESSMENT

The Bourne Water District had a source water assessment performed by the MA. Department of Environmental Protection in 2002. The Source Water Assessment and Protection (SWAP) program, established under the Federal Safe Drinking Water Act requires every state to:

- Inventory land uses within the recharge areas of all public water supply sources.
- Assess the susceptibility of drinking water sources to contamination from these land uses.
- Publicize the results to provide support for improved protection.

A susceptibility ranking of high was assigned to the Bourne Water District using the information collected during the assessment by the DEP. The high ranking was due to the potential contamination from land uses such as auto repair shops, truck terminal, furniture refinishing, auto salvage operation, an industrial park and activities in the recharge area (Zone II's) of some of the wells. The complete SWAP report is available at the Bourne Water District's office. For more information contact Robert Prophett at 508-563-2294.

CROSS CONNECTION

A cross connection is a connection between a drinking water pipe and a polluted source. The pollution can come from your own home. For instance, you're going to spray fertilizer on your lawn, and you hook up your hose to the sprayer that contains the fertilizer. If the water pressure drops (say because of a fire hydrant being used or water main break) when the hose is connected to the fertilizer sprayer, the fertilizer may be sucked back into the drinking water pipes through your hose. Using an anti-siphon backflow-prevention device on your sprayer or hose bib can prevent this problem.

The Bourne Water District recommends using devices with an anti-siphon feature or equipping hose bibs with hose bib vacuum breakers to prevent against back flow. For additional information on cross connections and on the status of your water system's cross connection program, please contact Robert Prohett at 508-563-2294.

UPPER CAPE REGIONAL WATER SUPPLY COOPERATIVE 2019 Consumer Confidence Report (PWS ID # 4261024)

The Upper Cape Regional Drinking Water Supply Cooperative consists of three groundwater supply wells located in Sandwich, MA on Joint Base Cape Cod (JBCC). A Board of Managers representing four-member public water supply systems manages the Cooperative. The Cooperative has the capacity to provide a supplemental supply of water to its member public water systems, which include the Town of Falmouth, the Bourne Water District, the Mashpee Water District and the Sandwich Water District. The Cooperative also supplies water to the Otis Air National Guard public water system on JBCC and the Barnstable County Jail.

Wells #1, #2 and #3 are located in a forested area of the northeastern portion of the JBCC. In July 2004, the Department of Environmental Protection completed a source water assessment (SWAP) report for the Cooperative water supply wells. A SWAP report is a planning tool to support local and state efforts to improve water supply protection by identifying land uses within water supply protection areas that may be potential sources of contamination. The report identifies potential sources of contamination including a gas station, a medical facility and a military facility, and helps focus protection efforts on appropriate Best Management Practices. A susceptibility ranking of high was assigned to the Cooperative using information that was collected during the assessment. A copy of the report is available, upon request, from the Cooperative. JBCC has adopted a Groundwater Protection Plan to prohibit inappropriate activities on JBCC property within the Zone II areas of community public water supply wells. In addition, the Environmental Management Commission provides oversight over activities on the northern portion of the JBCC. For information regarding the Groundwater Protection Plan call Elizabeth Kirkpatrick at 508-968-6487. For information regarding the Environmental Management Commission call Len Pinaud at 508-946-2871. For questions regarding SWAP or other information contained within this document call Marisa Picone-Devine at 508-888-7262.

Our system, out of an abundance of caution and concerns about PFAS, sampled for PFAS compounds (PFBS, PFHpA, PFHxS, PFNA, PFOA, and PFOS) at all three wells in 2019; there were no detections of any of the analytes in any of the samples.

2019 WATER QUALITY DATA

Listed below are the substances detected in water samples collected during the most recent sampling period from the three (3) wells that comprise the Upper Cape Drinking Water Supply Cooperative.

Inorganic Contaminants	Year Sampled	Highest Result	Range of Detections	MCL	MCLG	Violation (Y / N)	Possible Sources
Nitrate	2019	0.08 ppm	0.08 ppm	10 ppm	10 ppm	No	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits
Radioactive Contaminants	Year Sampled	Amount Detected	Range of Detections	MCL	MCLG	Violation	Possible Sources
Radium 228	2015	0.623 pCi/L	NA	5 pCi/L	0	No	Erosion of natural deposits
Combined Radium	2015	0.623 pCi/L	NA	5 pCi/L	0	No	Erosion of natural deposits
Unregulated and Secondary Contaminants	Year Sampled	Amount Detected	Range of Detections	SMCL	ORSG	Violation	Possible Sources
Chloroform	2019	2.08 ppb	1.09 - 2.08 ppb	NA	70 ppb	No	Trihalomethane: by-product of drinking water chlorination. In non-chlorinated sources, chloroform may be naturally occurring
Chloride	2019	9.1 ppm	8.0 - 9.1 ppm	250 ppm	--	NO	Runoff and leaching from natural deposits; seawater influence
Copper	2019	0.015 ppm	.009 ppm - 0.015 ppm	1 ppm	--	No	Internal corrosion of household plumbing; erosion of natural deposits
Iron	2019	10 ppb	ND - 10 ppb	300 ppb	--	No	Natural and industrial sources as well as aging and corroding distribution systems and household pipes
Sodium	2018	5.8 ppm	5.8 ppm	--	20 ppm	No	Natural erosion, road salt
Sulfate	2019	5.6 ppm	5.1 - 5.6 ppm	250 ppm	--	No	Runoff and leaching from natural deposits; industrial wastes



Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

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Secretary

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Commissioner

March 6, 2017

Mr. Dan Mahoney, Chairman
Upper Cape Regional Water Supply Cooperative
P.O. Box 373
Mashpee, MA 02649

Town: Sandwich
PWS ID: 4261024
Program: Water Management Act
WMA Permit #: 9P2-4-22-261.03
Action: Final Permit Renewal

Dear Mr. Mahoney,

Please find attached the following:

- Findings of Fact in Support of the Permit Renewal Decision; and,
- Final Water Management Act Permit #9P2-4-22-261.03 for the Upper Cape Regional Water Supply Cooperative, Sandwich, Massachusetts.

If you have any questions regarding this information, please contact Julie Butler at 617-292-5552.

Sincerely,

Rebecca Weidman
Division of Watershed Management
Bureau of Water Resources

Enclosures: UCRWSC Hydraulic Monitoring Program of the June 2002 Baseline Monitoring Report, Section 3.0

ecc: Jennifer Pederson, Massachusetts Water Works Association
Donald Rugg, UCRWSC Primary Distribution Operator
Maura Callahan, Callahan Consulting
Tom Cambareri, Cape Cod Commission
Emily Holt, MassDFG Division of Fisheries and Wildlife

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Findings of Fact in Support of the Permit Renewal Decision Water Management Permit #9P2-4-22-261.03

The Department of Environmental Protection (“MassDEP” or “the Department”) has completed its review of the Upper Cape Regional Water Supply Cooperative’s Water Management Act (WMA) permit renewal application. This review was conducted in regard to the permit for the Upper Cape Regional Water Supply Cooperative (UCRWSC) to withdraw water from the Cape Cod Basin. The Department hereby **proposes to renew** the Water Management Permit #9P2-4-22-261.03 (the “Permit”) in accordance with the Water Management Act (M.G.L. 21G). The Department makes the following Findings of Fact in support of the attached Permit, and includes herewith its reasons for renewing the Permit and for the conditions of approval imposed, as required by M.G.L. c.21G, s. 11 and 310 CMR 36.00. The Permit is being issued since such action is necessary for the promotion of the purposes of M.G.L. c. 21G. The Department may modify, suspend or terminate the Permit, after notice and hearing, for violations of its conditions, of M.G.L. c. 21G, or of regulations adopted or orders issued by the Department, and when deemed necessary for the promotion of the purposes of the Water Management Act.

The Department adopted revised Water Management Regulations at 310 CMR 36.00 on November 7, 2014, (described in greater detail below). Since that time, the Department has been working closely with each Water Management Act (WMA) permittee to fully consider all aspects of their individual situations and ensure thoughtful and implementable permits.

UCRWSC Water Withdrawal History

UCRWSC is authorized to withdraw from the Cape Cod Basin a total of 3.0 million gallons per day (MGD). The system currently operates three sources: Wells 1, 2, and 3 (4261024-01G, -02G, and -03G). The original permit was issued on June 8, 2001 to the Falmouth Department of Public Works, and later transferred on December 26, 2002 to UCRWSC. The system volume was not intended to increase overall water use in the area but instead was based upon the projected need of the neighboring water systems to supplement existing sources, to provide redundancy to existing source capacity potentially impacted by contamination emanating from the Massachusetts Military Reservation, and to replace the capacity of proposed sources already lost to contamination.

A permit amendment was issued by MassDEP in April 2016 in response to a permit amendment application submitted by the UCRWSC to eliminate a special condition (Special Condition 5). Under the Water Management Act, permittees must obtain a permit amendment for changes to permit conditions.

This Permit does not authorize an increase in water withdrawal volume, nor does it add a new withdrawal source. UCRWSC’s authorized withdrawal volume under its WMA Permit will continue to be an annual average daily volume of 3.0 MGD from the Cape Cod Basin.

The Permit Extensions

WMA permits issued during the first 20-year permitting cycle for the Cape Cod Basin expired on November 30, 2010. All permittees seeking to renew their Water Management permit were required to file a renewal application on or before August 31, 2010. UCRWSC filed a timely renewal application and the Department published notice of the permit renewal application in the Environmental Monitor on September 30, 2010. No public comment was received concerning UCRWSC's Water Management Permit Renewal Application.

Subsequently, the expiration dates for all Water Management permits were extended for four years by Chapter 240 of the Acts of 2010 as amended by Chapter 238 of the Acts of 2012, collectively known as the Permit Extension Act. In addition, in a letter of September 25, 2015, the Department informed UCRWSC that the Department would need additional time before making a determination on the application in order to ensure that all permit renewal applicants in the Cape Cod Basin fully understood the new Water Management Regulations (discussed below), and to give proper consideration to all permit renewal applications within the basin. Pursuant to M.G.L. c. 30A, § 13, and 310 CMR 36.18(7), UCRWSC's permit continues in force and effect until the Department issues a final decision on the permit renewal application.

The expiration date for all permits going forward in the Cape Cod Basin will be November 30, 2030, in order to restore the staggered permitting schedule set forth in the regulations.

The Water Management Act

The WMA requires the Department to issue permits that balance a variety of factors including without limitation:

- Impact of the withdrawal on other water sources;
- Water available within the safe yield of the water source;
- Reasonable protection of existing water uses, land values, investments and enterprises;
- Proposed use of the water and other existing or projected uses of water from the water source;
- Municipal and Massachusetts Water Resources Commission (WRC) water resource management plans;
- Reasonable conservation consistent with efficient water use;
- Reasonable protection of public drinking water supplies, water quality, wastewater treatment capacity, waste assimilation capacity, groundwater recharge areas, navigation, hydropower resources, water-based recreation, wetland habitat, fish and wildlife, agriculture, flood plains; and
- Reasonable economic development and job creation.

Sustainable Water Management Initiative (SWMI) and Water Management Regulation Revisions

In 2010 the Executive Office of Energy and Environmental Affairs (EEA) convened the Sustainable Water Management Initiative (SWMI) for the purpose of incorporating the best available science into the management of the Commonwealth's water resources. SWMI was a multi-year process that included a wide range of stakeholders and support from the Departments of Environmental Protection, Fish and Game, and Conservation and Recreation. In November 2012 the *Massachusetts Sustainable Water Management Initiative Framework Summary* (<http://www.mass.gov/eea/docs/eea/water/swmi-framework-nov-2012.pdf>) was released.

On November 7, 2014, the Department adopted revised Water Management Regulations at 310 CMR 36.00 that incorporate elements of the SWMI framework and the Water Conservation Standards adopted

by the Massachusetts WRC. The regulations reflect a carefully developed balance to protect the health of Massachusetts' water bodies while meeting the needs of businesses and communities for water.

Without limitation, the Department has incorporated the following into Water Management permitting on Cape Cod:

- Safe yield determinations for the major river basins based on a new methodology developed through SWMI (see the Safe Yield in the Cape Cod Basin section of this document);
- Water needs forecasts for public water suppliers developed by the Department of Conservation and Recreation, Office of Water Resources (DCR), using a methodology reviewed and approved by the Massachusetts WRC;
- Water supply protection measures for public water supplies including Zone II delineations for groundwater sources, and wellhead and surface water protection measures as required by Massachusetts Drinking Water Regulations (310 CMR 22.00);
- Water conservation and performance standards reviewed and approved by the WRC in July 2006 and revised in June 2012 (<http://www.mass.gov/eea/docs/eea/wrc/water-conservation-standards-rev-june-2012.pdf>), including without limitation:
 - performance standard of 10% or less unaccounted-for-water;
 - seasonal limits on nonessential outdoor water use;
 - a water conservation program that includes leak detection and repair, full metering of the system and proper maintenance of the meters, periodic review of pricing, and education and outreach to residents and industrial and commercial water users; and
- Environmental protections developed through SWMI, including without limitation:
 - protection for coldwater fish resources;
 - minimization of withdrawal impacts in areas stressed by groundwater use;
 - mitigation of the impacts of increasing withdrawals.

Safe Yield in the Cape Cod Basin

This permit is being issued under the safe yield methodology adopted by the Department on November 7, 2014, and described in the regulations at 310 CMR 36.13. As of the date of the issuance of this permit, the safe yield for the Cape Cod Basin is 266.00 million gallons per day (MGD), and total registered and permitted withdrawals are 51.87 MGD, leaving 214.13 MGD potentially available. The maximum withdrawals that will be authorized in this permit, and all other permits currently under review by the Department within the Cape Cod Basin, will be within the safe yield and may be further conditioned as outlined in the regulations. Also as noted this renewed permit does not allocate any increase in withdrawals volumes over those previously allocated so there is no change to the volumes available under safe yield.

Findings of Fact for Special Permit Conditions in the UCRWSC's Water Management Act Permit Renewal

The following Findings of Fact for the special conditions included in the permit generally describe the rationale and background for each special condition in the permit. This summary of permit special conditions is not intended to, and should not be construed as, modifying any of the permit special conditions. In the event of any ambiguity between this summary and the actual permit conditions, the permit language shall control.

Special Condition 1, Maximum Authorized Annual Average Withdrawal Volume, reflects the permitted withdrawal volume of 3.0 MGD. UCRWSC's actual water use has been substantially below this value. The average daily withdrawal volumes for the system for 2013, 2014, and 2015 were 1.06, 1.36, and 1.03 MGD, respectively.

Although actual withdrawal volumes have been significantly below those allocated, the Department has not changed the volumes authorized in this Permit. This system is expected to have largely varying demands based on the status of its interconnected systems, and its role in replacing sources lost due to contamination.

Special Condition 2, Maximum Authorized Daily Withdrawal Volumes from Each Withdrawal Point, reflects the volume of groundwater withdrawal expressed as a maximum daily rate for each source included in the Permit, according to Department-approved Zone II rates.

Special Condition 3, Zone of Contribution (Zone II or Zone III Delineations)
The requirement has been met and no further delineations are required as a condition of this Permit.

Special Condition 4, Wellhead Protection
The requirement has been met and no further wellhead protection measures are required as a condition of this Permit.

Special Condition 5, Shawme Lakes Long-Term Monitoring Plan
In the original Permit, the Department required monthly groundwater level monitoring in six wells located between the three UCRWSC water-supply wells and Shawme Lakes. The purpose of the monitoring was to evaluate the potential withdrawal impacts of Wells 1-3 on Shawme Lakes. Monitoring was conducted consistent with the plan included in Section 3.0 of the Hydraulic Monitoring Program of the June 2002 Baseline Monitoring Report and related updates. A detailed assessment of the monitoring results was required annually by the Department. Water-level monitoring continued through 2015.

Due to a lack of observed impacts over the monitoring period, an April 2016 Permit Amendment suspended the condition provided that UCRWSC's annual average withdrawal remains below 2.5 MGD (authorized annual average withdrawal volume of 3.0 MGD). If UCRWSC's annual average withdrawal volume reaches or exceeds 2.5 MGD in the future, the monitoring shall recommence to reevaluate the withdrawal impacts of Wells 1-3 on Shawme Lakes. Note that the suspension of Special Condition 5 has no effect on UCRWSC's water-quality monitoring requirements, which fall under the Department's Drinking Water Program.

Special Condition 6, Water Conservation and Reporting Requirements
UCRWSC's Annual Statistical Report shall provide an explanation of any difference between the total volumes reported to be withdrawn from the wells and the total volumes reportedly sold to neighboring systems. Should the volume withdrawn exceed the volumes sold by 10% or more, UCRWSC must provide a plan to the Department within 3 months to address this unaccounted-for water loss.

UCRWSC is required to provide a monthly breakdown of the volumes sold to each individual supplier with the Annual Statistical Report filed each year with the Department.

Special Condition 7, Chapter 30 Section 61 Permit Findings
The Department hereby finds that, with implementation by the proponent of the appropriate conditions described above, all practicable and feasible means and measures will be taken to avoid or minimize adverse water withdrawal and related impacts to the environment associated with the three water supply wells.

Minimization of Groundwater Withdrawal Impacts in Stressed Subbasins, requires permittees with permitted groundwater sources in subbasins¹ with net groundwater depletion of 25% or more during August to minimize their withdrawal impacts on those subbasins to the greatest extent feasible.

Because the UCRWSC's permitted sources are located on Cape Cod where August net depletion has not been established, minimization measures are not required in permits issued on the Cape at this time.

Coldwater Fish Resource Protection was incorporated into the Water Management Regulations in November 2014. Coldwater Fish Resource Protection is not a condition of this permit because the UCRWSC's withdrawals do not impact any waters that MA Division of Fisheries and Wildlife has identified as supporting coldwater fish at this time.

Mitigation of the Impacts of Increasing Withdrawals

Because UCRWSC acts as a wholesaler of water to other systems, mitigation was not applied to this Permit but is expected to be included as appropriate in the permits of Public Water Suppliers purchasing water from UCRWSC.

Nonessential Use Restrictions

Because UCRWSC acts as a wholesaler of water to other systems, the requirement to restrict nonessential seasonal uses has not been applied to this Permit but is expected to be included as appropriate in the permits of Public Water Suppliers purchasing water from UCRWSC.

¹ Subbasins used for WMA permitting are the 1,395 subbasins delineated by the U.S. Geological Survey in *Indicators of Streamflow Alteration, Habitat Fragmentation, Impervious Cover, and Water Quality for Massachusetts Stream Basins* (Weiskel et al., 2010, USGS SIR 2009-5272).



Department of Environmental Protection

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WATER WITHDRAWAL PERMIT MGL c 21G

This permit is issued pursuant to the Massachusetts Water Management Act for the sole purpose of authorizing the withdrawal of a volume of water as stated below and subject to the following special and general conditions. This permit conveys no right in or to any property.

PERMIT NUMBER: 9P2-4-22-261.03 **RIVER BASIN:** Cape Cod

PERMITTEE: Upper Cape Regional Water Supply Cooperative
P.O. Box 373
Mashpee, MA 02649

EFFECTIVE DATE: March 6, 2017

EXPIRATION DATE: November 30, 2030

TYPE AND NUMBER OF WITHDRAWAL POINTS:

Groundwater: 3
Surface Water: 0

USE: Public Water Supply

DAYS OF OPERATION: 365

LOCATION(S):

Table 1: Withdrawal Point Identification

<u>Source</u>	<u>Source Code</u>	<u>Latitude</u>	<u>Longitude</u>
Well #1	4261024-01G	40 43 14	70 29 35
Well #2	4261024-02G	41 44 00	70 30 27
Well #3	4261024-03G	41 44 10	70 30 45

SPECIAL CONDITIONS

1. Maximum Authorized Annual Average Withdrawal Volume

This permit authorizes UCRWSC to withdraw water from the Cape Cod Basin at the rate described below (Table 2). The permitted volume is expressed in millions of gallons, both as an average daily withdrawal rate per year (MGD) and as a total annual withdrawal volume (MGY) for each of the five-year periods of the permit term.

The Department will use the raw water withdrawal volume from all authorized withdrawal points to assess compliance with the registered and permitted withdrawal volumes.

Table 2: Maximum Authorized Average Annual Withdrawal Volume

Permit Periods	Daily Average (MGD)	Total Annual (MGY)
3/6/2017 to 11/30/2020	3.0	1095.00
12/1/2020 to 11/30/2025	3.0	1095.00
12/1/2025 to 11/30/2030	3.0	1095.00

2. Maximum Authorized Daily Withdrawal Volume

Withdrawals from individual withdrawal points are not to exceed the approved maximum daily volume listed below (Table 3) without specific advance written approval from the Department. The authorized maximum daily volume is the approved rate of each source. In no event shall the combined withdrawals from the individual withdrawal points exceed the withdrawal volumes authorized above in Special Condition 1.

Table 3. Maximum Authorized Daily Withdrawal Volumes

<u>Source</u>	<u>Source Code</u>	Maximum Daily Rate (MGD)
Well #1	4261024-01G	1.5
Well #2	4261024-02G	1.5
Well #3	4261024-03G	1.5

3. Zone of Contribution (Zone II or Zone III) Delineations

Department records show that all three wells have MassDEP approved Zones of Contribution. Therefore, no further Zone of Contribution work is required as a condition of this permit.

4. **Wellhead Protection**

UCRWSC's records indicate that UCRWSC has adopted land use controls and water supply protection measures meeting the requirements of 310 CMR 22.21(2) in the Zone IIs of Wells 1, 2, and 3. These controls are authorized through the "*Groundwater Protection Policy*" and the "*Groundwater Resources Performance Standards*" established by the state's Environmental Management Commission in the Final Environmental Impact Report (EOEA #12277), which was found to have adequately and properly complied with the Massachusetts Environmental Policy Act in the Secretary's Certificate issued on April 1, 2002. The "*Groundwater Protection Policy*" was established as a Memorandum of Agreement (MOA), in 1997 by the MMR Environmental Quality Control Committee. The MOA includes controls for areas off the Camp Edwards Training area that are not covered in the "*Groundwater Resources Performance Standards*". Should the MOA expire and not be renewed, UCRWSC will need to demonstrate to the Department's satisfaction a "Best Effort" in encouraging the Town of Sandwich to amend the Sandwich Water Resources District Map (dated March 1995) to include the Zone II(s) for Wells 1-3. Provided either the MOA remains in place or the "Best Effort" standard is met, the Upper Cape Regional Water Supply Cooperative is in compliance with State Wellhead Protection requirements. Continued compliance with 310 CMR 22.21(2) is required as condition of this permit.

5. **Shawme Lakes Long-Term Monitoring Plan**

In the April 2016 Permit Amendment, the Department approved a suspension of the groundwater-level monitoring required by Special Condition 5, provided that UCRWSC's annual average withdrawal volume remains below 2.5 MGD of their authorized annual average withdrawal volume of 3.0 MGD. If UCRWSC's annual average withdrawal volume reaches or exceeds 2.5 MGD in the future, the monitoring shall recommence to reevaluate the withdrawal impacts of Wells 1-3 on Shawme Lakes. The monitoring shall be consistent with the plan included in Section 3.0 of the Hydraulic Monitoring Program of the June 2002 Baseline Monitoring Report (attached) and related updates. A detailed assessment of the monitoring results for the prior calendar year must be filed on or before April 15th with: MassDEP, Attn: Water Management Program, One Winter St, 5th floor, Boston, MA 02108.

6. **Water Conservation & Reporting Requirements**

UCRWSC's Annual Statistical Report shall provide an explanation of any difference between the total volumes reported to be withdrawn from the wells and the total volumes reportedly sold to neighboring systems. Should the volume withdrawn exceed the volumes sold by 10% or more, the Cooperative must provide a plan to the Department within three months to address this unaccounted-for water loss.

UCRWSC is required to provide a monthly breakdown of the volumes sold to each individual supplier with the Annual Statistical Report filed each year with the Department.

7. **Chapter 30 Section 61 Permit Findings**

The Department hereby finds that, with implementation by the proponent of the appropriate conditions described above, all practicable and feasible means and measures will be taken to avoid or minimize adverse water withdrawal and related impacts to the environment associated with the three water supply wells.

GENERAL CONDITIONS (applicable to all permittees)

No withdrawal in excess of 100,000 gallons per day shall be made following the expiration of this Permit, unless before that date the Department has received a renewal permit application pursuant to 310 CMR 36.00.

1. **Duty to Comply** The permittee shall comply at all times with the terms and conditions of this Permit, the Water Management Act and all applicable State and Federal statutes and regulations.
2. **Operation and Maintenance** The permittee shall at all times properly operate and maintain all facilities and equipment installed or used to withdraw water so as not to impair the purposes and interests of the Act.
3. **Entry and Inspections** The permittee or the permittee's agent shall allow personnel or authorized agents or employees of the Department to enter and examine any property over which the Permittee has authority, title or control, for the purpose of determining compliance with this Permit, the Act or the regulations published pursuant thereto, upon presentation of proper identification and an oral statement of purpose.
4. **Water Emergency** Withdrawal volumes authorized by this Permit are subject to restriction in any water emergency declared by the Department pursuant to M.G.L. c. 21G ss 15-17, M.G.L. c. 150 ss 111, or any other enabling authority.
5. **Transfer of Permits** This Permit shall not be transferred in whole or in part unless and until the Department approves such transfer in writing, pursuant to a transfer application on forms provided by the Department requesting such approval and received by the Department at least thirty (30) days before the effective date of the proposed transfer. No transfer application shall be deemed filed unless it is accompanied by the applicable transfer fee established by 310 CMR 36.33 and 310 CMR 4.00.
6. **Duty to Report** The permittee shall complete and electronically submit annually, via eDEP available through the Department's website, all of the information required by the electronic Annual Statistical Report (eASR) including, without limitation, a certified statement of the withdrawal. Such report shall be received each year by the Department by the date specified on the eASR.
7. **Duty to Maintain Records** The permittee shall maintain withdrawal and all other records and other information in sufficient detail to demonstrate compliance with this Permit.
8. **Metering** All withdrawal points included within the Permit shall be metered within one year of the date of issuance of the Permit. Meters shall be maintained and replaced as necessary to ensure the accuracy of the withdrawal records.
9. **Right to Amend, Suspend or Terminate** The Department may amend, suspend, or terminate the permit in accordance with M.G.L. c. 21G and 310 CMR 36.29.

APPEAL RIGHTS AND TIME LIMITS

This Permit is a decision of the Department. Any person aggrieved by this decision may request an adjudicatory hearing as described herein and in accordance with the procedures described at 310 CMR 36.37. Any such request must be made in writing, by certified mail or hand delivered and received by the Department within twenty-one (21) days of the date of receipt of this permit. The hearing request, including proof of payment of the filing fee, must be mailed to:

Case Administrator
MassDEP Office of Appeals and Dispute Resolution
One Winter Street
Boston, MA 02108

No request for an appeal of this permit shall be validly filed unless a copy of the request is sent by certified mail or delivered by hand to the local water resources management official in the city or town in which the withdrawal point(s) is located; and for any person appealing this decision, who is not the applicant, unless such person notifies the permit applicant of the appeal in writing by certified mail or by hand within five (5) days of mailing the appeal to the Department.

CONTENTS OF HEARING REQUEST

310 CMR 1.01(6)(b) requires the request to include a clear and concise statement of the facts which are the grounds for the request and the relief sought. In addition, the request must include a statement of the reasons why the decision of the Department is not consistent with applicable rules and regulations, and for any person appealing this decision who is not the applicant, a clear and concise statement of how that person is aggrieved by the issuance of this Permit.

FILING FEE AND ADDRESS

The Department's fee transmittal form, together with a valid check, payable to the Commonwealth of Massachusetts in the amount of \$100 must be mailed to:

Commonwealth of Massachusetts
Department of Environmental Protection
P.O. Box 4062
Boston, MA 02211

The request shall be dismissed if the filing fee is not paid, unless the appellant is exempt or granted a waiver as described below.

EXEMPTIONS

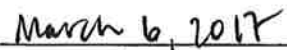
The filing fee is not required if the appellant is a city or town (or municipal agency), county, district of the Commonwealth of Massachusetts, or a municipal housing authority.

WAIVER

The Department may waive the adjudicatory hearing filing fee for any person who demonstrates to the satisfaction of the Department that the fee will create an undue financial hardship. A person, seeking a waiver must file, together with the hearing request, an affidavit setting forth the facts, which support the claim of undue hardship.



Rebecca Weidman
Director of the Division of Watershed Management



Date

3.0 HYDRAULIC MONITORING PROGRAM

3.1 Introduction

A detailed analysis of Upper and Lower Shawme Lakes conducted as part of the New Source Approval process indicated no effect on surface water elevations although the potential exists that at non-stop higher withdrawal rates groundwater entering the Lakes may be intercepted. To ensure protection of the resource, hydrogeologic monitoring of the lake system was incorporated into the LTMP. The program includes measurement of stream discharge leaving the lake system and monitoring of six existing and one newly installed well on a monthly basis to record groundwater levels. The combined water level will be compared to historical data from USGS well SDW-253.

SDW-253 is located far enough from the production wells that it is not affected by pumping. Data collected over approximately 40 years by the USGS will be used to differentiate normal seasonal fluctuations from potential impacts from the project. Seasonal fluctuation can not be accounted for in the numerical groundwater flow model.

A monitoring well couplet will be installed on the northern shore of Upper Shawme Lake, by the Sandwich Water Department during the summer of 2002. Water table elevation, as well as a vertical hydraulic gradient will be recorded from this location on a monthly basis by the members of the Shawme Ponds Association and provided to the Cooperative.

The data from the monitoring program will allow the system operators and regulators to verify results from groundwater modeling and provide a better understanding of the groundwater aquifer.

3.2 Baseline Conditions at Shawme Lakes

The Army Corps of Engineers contracted the USGS establish baseline conditions at Shawme Lakes. The USGS installed staff gauges and developed rating curves in both Upper and Lower Shawme Lakes early this fall at Shawme Lakes under non-pumping conditions.

The USGS installed a staff gauge at the discharge of Lower Shawme Lake, on the upstream side of Main Street above a small wooden weir. Flow in Mill Creek was measured weekly to establish a rating curve for this gauge and was shown to fluctuate from 8 cubic feet per second (cfs) in the spring months and 5 cfs during the summer. These measurements will be used to relate stage to discharge in Mill Creek for long term monitoring. Another staff gauge was installed at the canoe launch on Lower Shawme Lake, which will be used to record lake levels.

A third staff gauge was installed on Cook's Dam on Upper Shawme Lake. Here the USGS is attempting to relate lake stage at the dam to the discharge over the dam. However, the configuration and condition of the dam makes obtaining an accurate measurement difficult. The spillway over the dam is very narrow, steep, turbulent and short in length. These factors create an insensitive rating in which a small change in lake levels result in a large change in discharge. Thus, the USGS is attempting to measure flow below the spillway in an area where the flow enters the lake.

The initial USGS report is included in Appendix F. The report indicates that the discharge at Mill Creek can be adequately monitored. The report also states that the discharge at Lower Shawme Lake is largely controlled by the release of water through the gristmill located at the

northern end of Lower Shawme Lake, The discharge has been shown to almost double when the grist mill is operated and has been recorded at up to 13 cfs or almost double the average discharge when not running. It also indicates that the leaks in the Upper Shawme Lakes dam make it difficult to get accurate reading, between the Lakes.

The staff gauges will continue to be recorded on a weekly basis by members of the Shawme Ponds Watershed Association, through September of 2002.

3.3 Baseline Groundwater Monitoring

The baseline monitoring of six existing wells has been accomplished by recording groundwater levels in the proposed wells except well S-7, which has not yet been located. Water levels have also not been recorded in well P-1, as it has not yet been installed. Background water levels are reported in Table 3-1 below for May and July of 2000 and for March of 2002. Based on this initial data it appears that water table fluctuation throughout the aquifer is currently fairly consistent.

**Table 3-1
Groundwater Level Data**

Well	Northing	Easting	TOC Elevation (ft msl)	Water Elevation (May 2000)	Water Elevation (July 2000)	Water Elevation (March 2002)
LRWS3-1	270414.96	873298.00	69.05	44.22	44.30	43.29
MW-101	271387.50	874847.60	121.2	NM	42.07	40.93
MW103S	272746.60	874895.90	NA	38.44	NM	37.44
S-7	NA	NA	NA	NM	NM	NM
SDW-263	277154.00	866866.00	NA	36.04	36.35	35.03
SM-5	273317.78	869850.18	115.26	40.69	40.81	39.63
P-1	TBD	TBD	NA	NM	NM	NM

The water levels in SDW-253 have been compared to historical data from USGS well SDW-253 and it appears that the groundwater fluctuation recorded in this well are similar to what has been observed to date in the selected wells.

As discussed earlier, seasonal groundwater fluctuations can not be accounted for in the numerical groundwater flow model nor can seasonal variation in recharge (precipitation). As part of this baseline evaluation rainfall data provided by the Sandwich Water District was reviewed and is attached in Appendix G.

The rainfall data which has been collected since 1989 indicates that the average yearly rainfall in Sandwich is approximately 48 inches, which is higher than the 44 inches that is normally referred to for Cape Cod. How this increase effects recharge of the groundwater

system is beyond the scope of this report, however it indicates that the groundwater modeling effort may have conservatively under-estimated recharge.

The seasonal rainfall data indicates that the majority of the recharge is in March and April when almost 20 percent of the rainfall occurs. Therefore it would be expected that seasonal groundwater highs as in most of Massachusetts would occur during this time. However, it appears that in the Sandwich area this is not true based upon USGS water level records.

The water levels in SDW-253 have been recorded for forty years and are tabulated in Appendix G. A graph of this data presented in Figure 3-1 indicates that highest water levels seen in the aquifer are in July although they have also been recorded at the end of June or in August. The highest level ever recorded was on July 30, 1973, while the lowest level was on February 28, 1967. Resulting in a maximum water table fluctuation of over nine feet.

Based on the graph there appears to be a lag time between the high recharge events of March and April and the high water levels of June, July and August. The lower recharge period of July and August cause a lower water table in the fall months. This pattern appears to be consistent in almost every recorded year, even in years of drought.

Comparison of discharge data and water levels recorded in the five monitoring wells currently installed within the aquifer indicate that as water levels in the aquifer drop the discharge from the lake system is effected. Further collection of data through the spring summer of 2002 by the USGS and Sandwich Water Department will allow for a more detailed evaluation of this relationship.



MAHONEY & DOUGLAS, LTD.

SCANNED

ENVIRONMENTAL SERVICES

P.O. Box 473 • FALMOUTH, MA 02540 • TEL (508) 457-1788

February 3, 2003

Ms. Julie Hutchison

DEP/BWSC/ER

20 Riverside Drive

Lakeville, MA 02347

RE: Town Of Bourne
County Road @ Marion Lane, Bourne
RTN 4-17333
Request for Information - Interim Deadline



Dear Ms. Hutchison:

In response to the *Request for Information with Enforceable Interim Deadline*, dated January 8, 2003, Mahoney & Douglas, Ltd. (M&D), on behalf of the Town of Bourne, is pleased to provide the following information with respect to the release of hazardous material at the above-referenced location ("the site").

On May 8, 2002, laboratory results of a groundwater sample collected from the deep well of a well couplet installed on County Road, designated MW24D, were reported with 8.5 parts per billion (ppb) 1,2-Dichloroethane (1,2-DCE). On June 6, 2002, laboratory results of a duplicate groundwater sample collected from MW24D (designated MW24D-duplicate) was reported with 9.5 ppb 1,2-DCE. The well couplet was installed as part of a Hydrogeological Study being conducted by Bourne Integrated Solid Waste Management (ISWM), located on MacArthur Boulevard, Bourne, MA, as part of the ISWM facility's Solid Waste Permit and in cooperation with the Cape Cod Commission (CCC) Joint Review Process Application.

On January 27, 2003 and per your request, M&D spoke with Mr. Mark Dakers of the Solid Waste Division to discuss the findings of the Hydrogeological Study and the site-specific conditions at the release location. Key points of our discussion included:

The "site" is within the mapped "Impaired Area" as designated by Cape Cod Commission's Regional Policy Plan (RPP).

All private drinking water wells within the Impaired Area have been connected to town water. Therefore, there are currently no human receptors.

The Bourne Water District has provided an analysis of their current and future drinking water supply needs which they have stated are, and will be, met without water supply development in the area downgradient of the landfill - the Impaired Area. In addition, the Impaired Area is anticipated to be designated as Non-Potable by the Bourne Board of Health eliminating any possible future private water supply development. In response to these changes, the Town of Bourne intends to seek to have the area designated as a "Non-Potential Drinking Water Source Area (NPDWSA). Once the designation is applied to the area, and the site, the GWI standard will no longer apply and a condition of no significant risk (NSR) will be met.

Although GW2 and GW3 standards will apply to the site, the concentration of 1,2-DCE is below the applicable standards. Therefore, there are no human or environmental receptors.

Plans to excavate the remaining unlined portion of the landfill are pending; the excavated material will be emplaced into the newly lined area once the Authorization To Construct (ATC) is issued. The previous excavation of refuse and the installation of lined cells has mitigated the impact from the former landfill on groundwater quality downgradient from the landfill. Groundwater quality will continue to improve based upon the former and planned lined cell installations.

The site is 4,687 feet from the landfill.

One (1) other location was found with 1,2-DCE during the Hydrogeological Study; MW25D, located on County Road at 0.8 ppb. No locations at the ISWM facility or between the ISWM facility and County Road were found with any 1,2-DCE during the quarterly sampling event in April 2002. The highest reported level of 1,2-DCE at the landfill was 10 ppb in MW7 in August 1986.

Potential sources of the 1,2-DCE located downgradient of the landfill include:

- Former un-permitted stump dump known as "the Nightingale Property" located in the vicinity of Brookside Golf Association
- A Gravel Pit on Great Rock Road
- Sel's Foreign Auto - Colonel Drive
- Great Rock Tractor - Colonel Drive
- O'Brien & Co Printers - Colonel Drive
- Bourne Bridge Rental - Colonel Drive
- Pro's Finishing - Colonel Drive
- Donovan Construction - Colonel Drive
- Dean's Carpets - Colonel Drive
- Quadrant-MA Automation - Colonel Drive

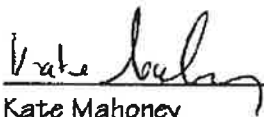
Based upon the historic data from the landfill, the distance of the site from the landfill, the field screening data from the well couplet installations, and the lack of 1,2-DCE in other wells at or between the ISWM facility and the site, M&D determined that the site is not within the area defined as "adequately regulated" under the Solid Waste Division. Furthermore, M&D determined that it is more likely than not that the potential source of 1,2-DCE is from other sources situated upgradient of the site and downgradient of the landfill (noted above).

The identification of 1,2-DCE in MW24D above the applicable reportable concentration, RCGW-1, was reported to the Department of Environmental Protection (DEP), Bureau of Waste Site Clean-up (BWSC) per the 120-Day notification requirements on September 5, 2002. The reporting was completed with the Release Notification Form (RNF), BWSC #103 according to the Massachusetts Contingency Plan (MCP) 310 CMR 40.0315(1). The attached USGS Topographic Quadrangle of Pocasset, MA (7.5 min Series) indicates the locations of the well couplets installed during the Hydrogeological Study conducted for Bourne ISWM.

According to Mr. Dakers, if his analysis of the Hydrogeological Study finds that the site is within the adequately regulated area of the landfill, then it will be regulated under the Solid Waste Division and not under Waste Site Clean-up. The issue of regulatory jurisdiction will be resolved upon the submittal of the Hydrogeological Study Report anticipated to be completed sometime in February 2003.

Should you have any questions, comments, or concerns, please do not hesitate to contact me.

Sincerely,



Kate Mahoney
Project Manager

encl: USGS Topographic Quadrangle of Pocasset showing well couplet locations installed in 10/01 and 1/02

cc: William R. Griffin, Town Administrator
Brent Goins, General Manager ISWM
Dick Keller, P.E.
Mark Dakers, DEP/Solid Waste



Figure 9 Monitoring Well Locations
Of New Well Couplets
H.I. Study Area

Bourne Integrated Solid Waste Management Facility
201 MacArthur Blvd.
Bourne, Massachusetts 02532



MAHONEY & DOUGLAS, LTD.
P. O. Box 473
Falmouth, Massachusetts 02541



BOURNE WATER DISTRICT

211 Barlow's Landing Road, P.O. Box 1447
Pocasset, Massachusetts 02559
508-563-2294 FAX Number 508-564-4661

November 4, 2002

Phil Goddard, Environmental Manager
I.S.W.M. Dept.
24 Perry Ave.
Buzzards Bay, 02532

Gentlemen,

First, I would like to state that the Bourne Water District does not have any water supplies downgradient of the present Bourne Landfill, or any plans to look for potential supplies in that area. The Bourne Water District presently has 6 water supply wells. 3 of the wells are presently shutdown as a precaution to a perchlorate issue. The MCL for perchlorate has yet to be set. The EPA is working on this issue and looks to set a MCL in the near future.

The Bourne Water District is a member of the Upper Cape Water Supply Cooperative and can and has bought water from the Cooperative. We are also looking at a potential water source on the MMR known as WS-4 for a future emergency water supply with the potential for a permanent site in the future.

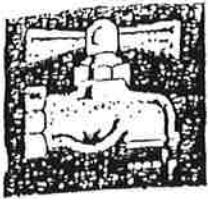
In conclusion, we have no intention of looking in the Bourne Water District boundaries for new well sites. We will be looking at different treatment processes for our affected wells if we must treat for the perchlorate. We will continue to use Cooperative water as needed with our 3 other sources to meet our daily demands.

If you have any questions please contact me at 508-563-2294

Sincerely,

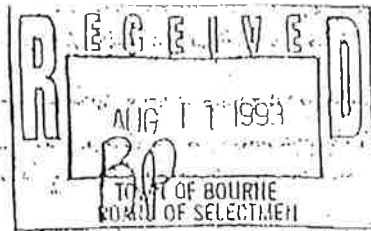
A handwritten signature in black ink, appearing to read "R. M. Marks". The signature is written in a cursive style and is positioned above the typed name of the sender.

Ralph M. Marks
Superintendent of Operations



BOURNE WATER DISTRICT

211 Barlow's Landing Road, P.O. Box 1447
Pocasset, Massachusetts 02559
508-563-2294 FAX Number: 508-564-4661



August 6, 1993.

Town of Bourne
Office of the Selectmen
24 Perry Avenue
Buzzards Bay MA 02532

Re: Re-permit for the Bourne Sanitary Landfill

Gentlemen:

The Bourne Water District does not have a wellfield downgradient from the Bourne Sanitary landfill and although we are beginning to look for additional wellfield sites the State Department of Environmental Protection would not permit us to use a site that is downgradient of the landfill.

The District has no objection to the renewal of the landfill permit.

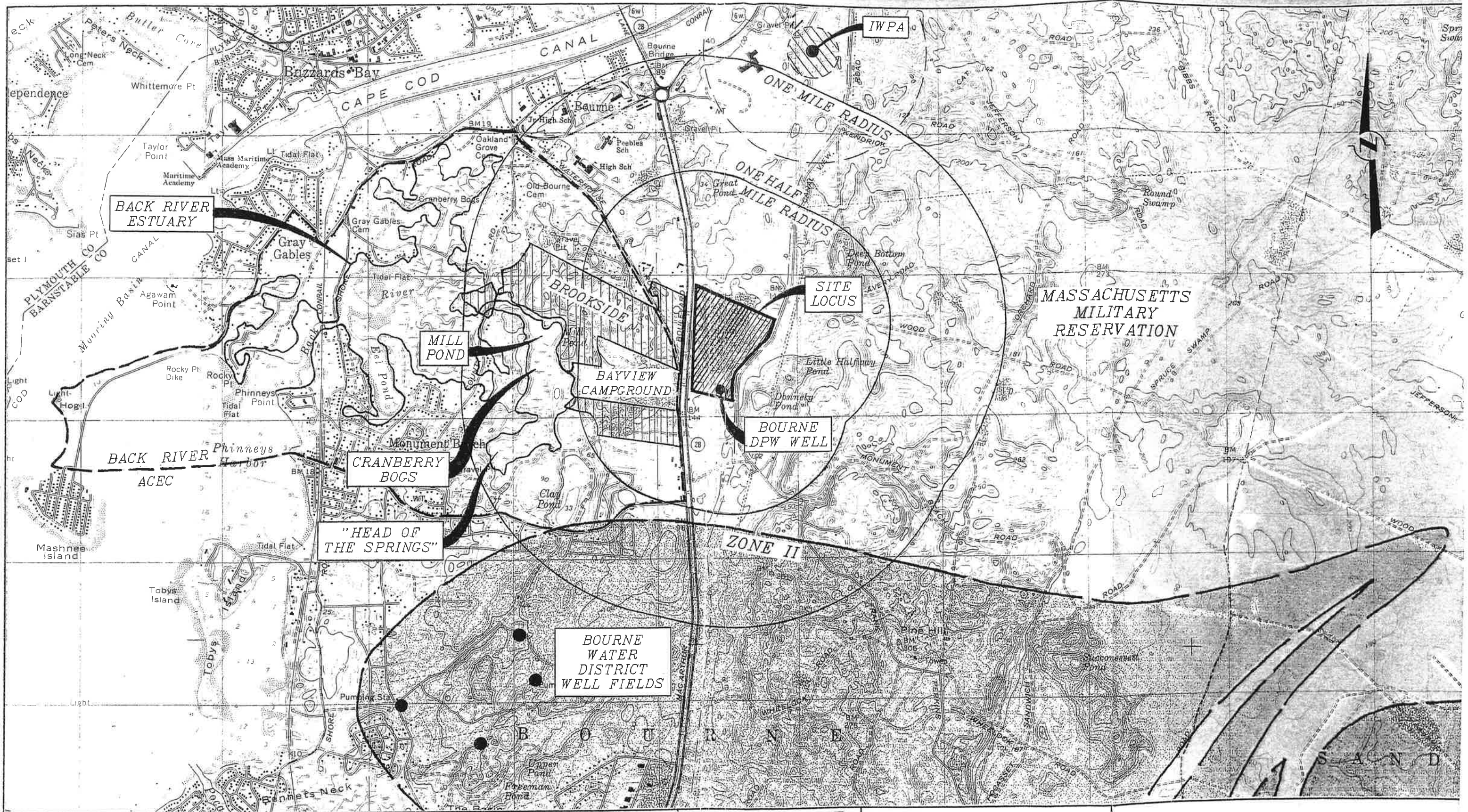
Sincerely,

Ann C. Candrilli

Ann C. Candrilli
Treasurer

DEIR Dec 88

FIGURES



REFERENCES:

1. MASS GIS, PRIORITY RESOURCES MAP, NOVEMBER 4, 1998.
2. USGS 7 1/2 MINUTE QUADRANGLES: POCASSET (1979), ONSET (1967).

**INTEGRATED
SOLID WASTE
MANAGEMENT
FACILITY**

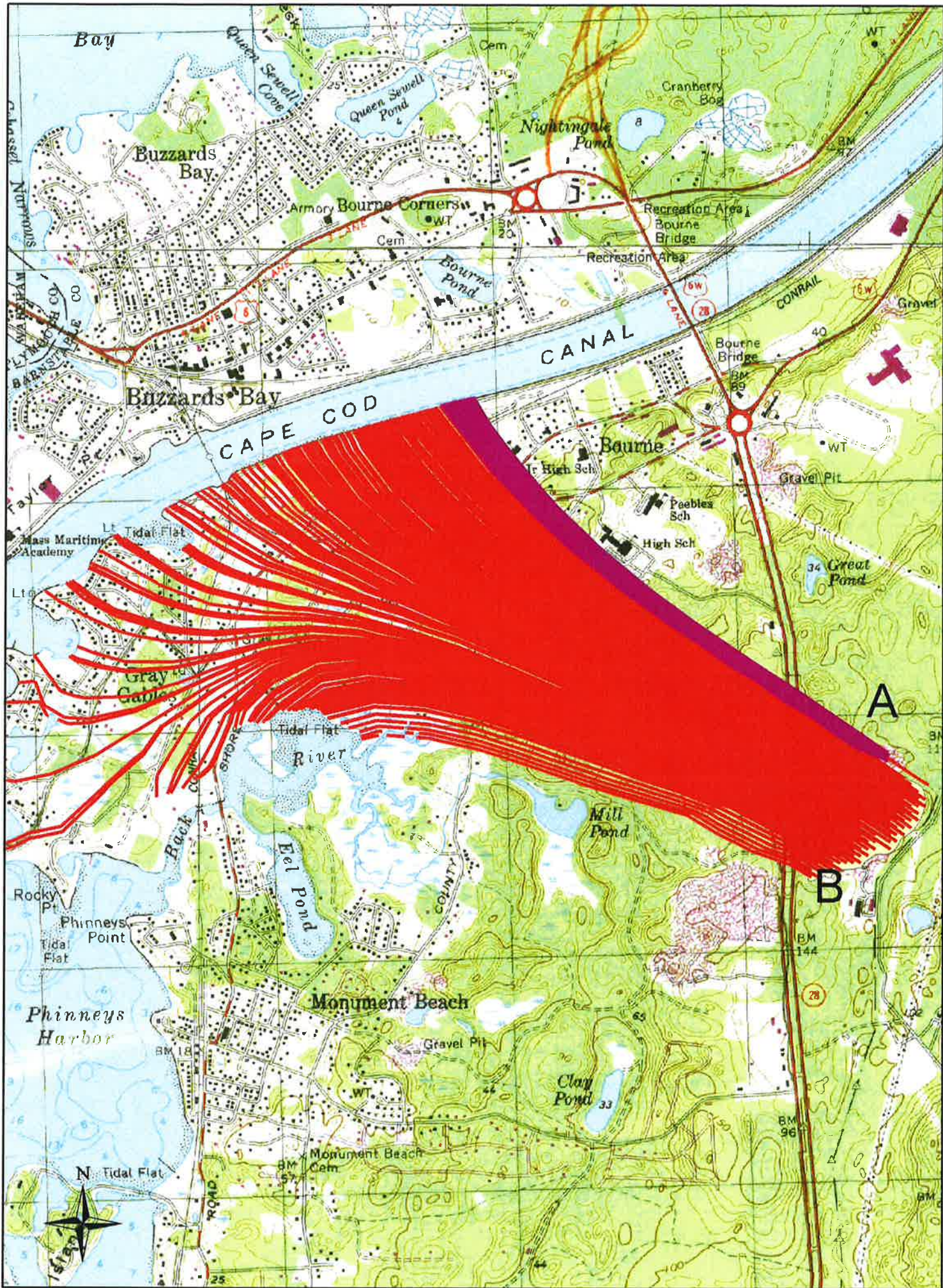
BOURNE, MASSACHUSETTS

SCALE: 1:25,000

**WATER
RESOURCES
PLAN**

FIGURE 14

Cushing, Goins & Kirschner, Inc
 422 West Grove Street
 Middleborough, Massachusetts 02348
 Phone Number: (508) 923-0879 Fax Number: (508) 923-085



ATTACHMENT 7

**A CUSTOM SOIL RESOURCE REPORT FOR BARNSTABLE COUNTY,
MASSACHUSETTS, TOWN OF BOURNE, ISWM DEPARTMENT –
U.S.D.A.**



United States
Department of
Agriculture

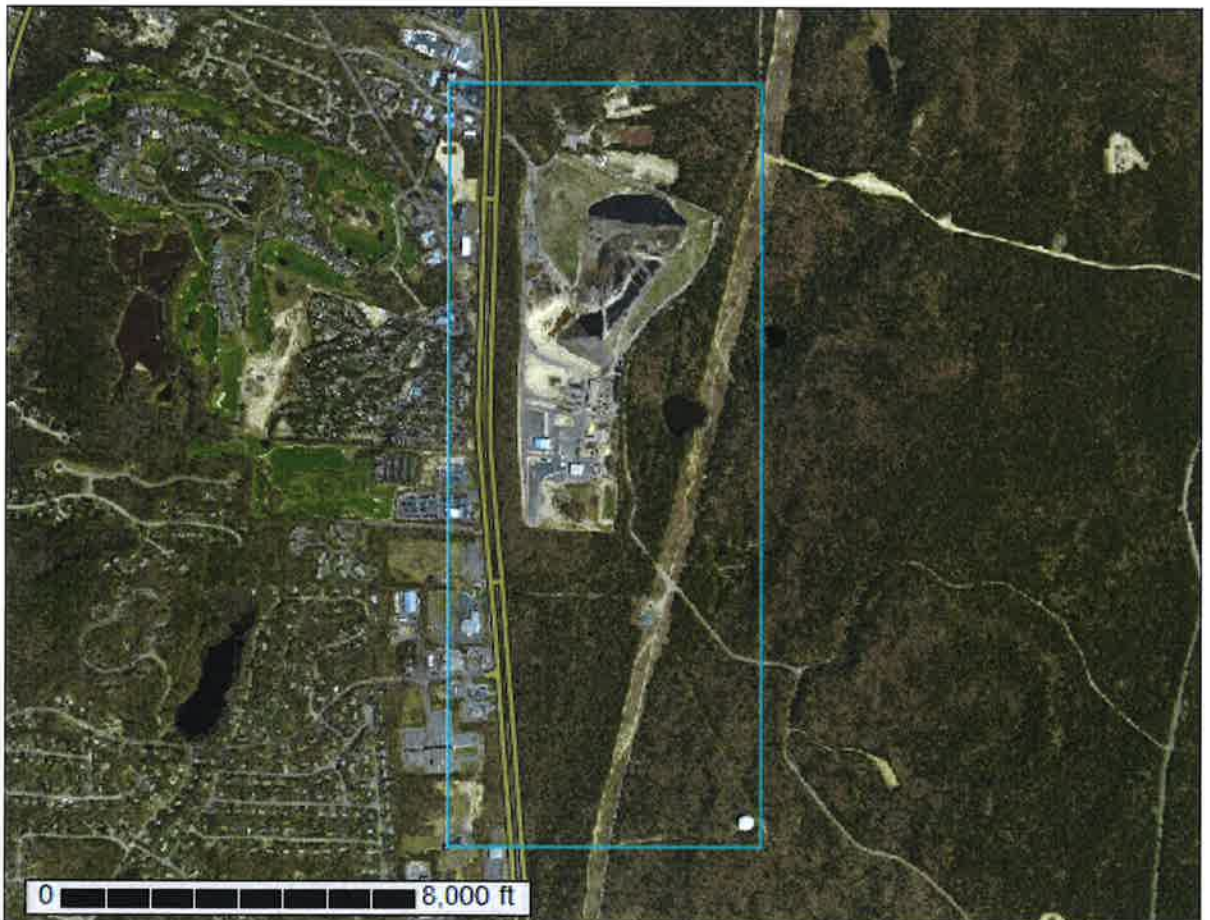
NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for Barnstable County, Massachusetts

**Town of Bourne, ISWM
Department**



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<http://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means

for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the

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individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:7,280 if printed on B portrait (11" x 17") sheet

0 100 200 400 600 Meters

0 350 700 1400 2100 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge ticks: UTM Zone 19N WGS84

MAP LEGEND

- Area of Interest (AOI)
- Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points
- Special Point Features**
 - Blowout
 - Borrow Pit
 - Clay Spot
 - Closed Depression
 - Gravel Pit
 - Gravelly Spot
 - Landfill
 - Lava Flow
 - Marsh or swamp
 - Mine or Quarry
 - Miscellaneous Water
 - Perennial Water
 - Rock Outcrop
 - Saline Spot
 - Sandy Spot
 - Severely Eroded Spot
 - Sinkhole
 - Slide or Slip
 - Sodic Spot
- Water Features
 - Streams and Canals
- Transportation**
 - Rails
 - Interstate Highways
 - US Routes
 - Major Roads
 - Local Roads
- Background**
 - Aerial Photography
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Barnstable County, Massachusetts
 Survey Area Data: Version 12, Sep 28, 2015

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 30, 2011—Oct 8, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map-unit boundaries may be evident.

Map Unit Legend

Barnstable County, Massachusetts (MA001)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
1	Water	1.9	0.4%
254A	Merrimac fine sandy loam, 0 to 3 percent slopes	20.8	4.3%
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	33.4	7.0%
254C	Merrimac fine sandy loam, 8 to 15 percent slopes	4.5	0.9%
430B	Barnstable sandy loam, 3 to 8 percent slopes	31.5	6.6%
430C	Barnstable sandy loam, 8 to 15 percent slopes	9.4	2.0%
431B	Barnstable sandy loam, 3 to 8 percent slopes, very stony	72.2	15.1%
431C	Barnstable sandy loam, 8 to 15 percent slopes, very stony	42.5	8.9%
431D	Barnstable sandy loam, 15 to 25 percent slopes, very stony	6.8	1.4%
435B	Plymouth loamy coarse sand, 3 to 8 percent slopes	100.4	21.0%
435C	Plymouth loamy coarse sand, 8 to 15 percent slopes	11.3	2.4%
435D	Plymouth loamy coarse sand, 15 to 35 percent slopes	25.7	5.4%
483C	Plymouth-Barnstable complex, rolling, very bouldery	0.8	0.2%
484C	Plymouth-Barnstable complex, rolling, extremely bouldery	24.1	5.0%
484D	Plymouth-Barnstable complex, hilly, extremely bouldery	34.7	7.3%
600	Pits, sand and gravel	15.6	3.3%
652	Dumps, landfill	29.3	6.1%
665	Udipsamments, smoothed	13.2	2.8%
Totals for Area of Interest		478.1	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

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A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

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An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Barnstable County, Massachusetts

1—Water

Map Unit Setting

National map unit symbol: 98s8
Frost-free period: 120 to 220 days
Farmland classification: Not prime farmland

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

254A—Merrimac fine sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2tyqr
Elevation: 0 to 1,100 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Merrimac and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Merrimac

Setting

Landform: Kames, outwash plains, outwash terraces, moraines, eskers
Landform position (two-dimensional): Summit, shoulder, footslope, backslope
Landform position (three-dimensional): Crest, side slope, tread, riser
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy glaciofluvial deposits derived from granite, schist, and gneiss over sandy and gravelly glaciofluvial deposits derived from granite, schist, and gneiss

Typical profile

Ap - 0 to 10 inches: fine sandy loam
Bw1 - 10 to 22 inches: fine sandy loam
Bw2 - 22 to 26 inches: stratified gravel to gravelly loamy sand
2C - 26 to 65 inches: stratified gravel to very gravelly sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Runoff class: Very low

Custom Soil Resource Report

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum in profile: 2 percent

Salinity, maximum in profile: Nonsaline (0.0 to 1.4 mmhos/cm)

Sodium adsorption ratio, maximum in profile: 1.0

Available water storage in profile: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2s

Hydrologic Soil Group: A

Minor Components

Sudbury

Percent of map unit: 5 percent

Landform: Terraces, outwash plains, deltas

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Tread, dip

Down-slope shape: Concave

Across-slope shape: Linear

Hinckley

Percent of map unit: 5 percent

Landform: Deltas, kames, eskers, outwash plains

Landform position (two-dimensional): Backslope, shoulder, summit

Landform position (three-dimensional): Head slope, crest, side slope, nose slope, rise

Down-slope shape: Convex

Across-slope shape: Convex, linear

Agawam

Percent of map unit: 3 percent

Landform: Eskers, kames, stream terraces, outwash terraces, outwash plains, moraines

Landform position (three-dimensional): Rise

Down-slope shape: Convex

Across-slope shape: Convex

Windsor

Percent of map unit: 2 percent

Landform: Dunes, deltas, outwash terraces, outwash plains

Landform position (two-dimensional): Summit

Landform position (three-dimensional): Tread, riser

Down-slope shape: Convex, linear

Across-slope shape: Convex, linear

254B—Merrimac fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2tyqs
Elevation: 0 to 1,290 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Merrimac and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Merrimac

Setting

Landform: Outwash terraces, moraines, eskers, kames, outwash plains
Landform position (two-dimensional): Shoulder, summit, footslope, backslope
Landform position (three-dimensional): Crest, side slope, tread, riser
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy glaciofluvial deposits derived from granite, schist, and gneiss over sandy and gravelly glaciofluvial deposits derived from granite, schist, and gneiss

Typical profile

Ap - 0 to 10 inches: fine sandy loam
Bw1 - 10 to 22 inches: fine sandy loam
Bw2 - 22 to 26 inches: stratified gravel to gravelly loamy sand
2C - 26 to 65 inches: stratified gravel to very gravelly sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline (0.0 to 1.4 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 1.0
Available water storage in profile: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified

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Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A

Minor Components

Sudbury

Percent of map unit: 5 percent
Landform: Deltas, terraces, outwash plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Linear

Hinckley

Percent of map unit: 5 percent
Landform: Eskers, outwash plains, deltas, kames
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Head slope, crest, side slope, nose slope, rise
Down-slope shape: Convex
Across-slope shape: Convex, linear

Windsor

Percent of map unit: 3 percent
Landform: Deltas, outwash plains, outwash terraces, dunes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Riser, tread
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex

Agawam

Percent of map unit: 2 percent
Landform: Eskers, kames, outwash plains, outwash terraces, moraines, stream terraces
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Convex

254C—Merrimac fine sandy loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2tyqt
Elevation: 0 to 1,030 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Merrimac and similar soils: 85 percent
Minor components: 15 percent

Custom Soil Resource Report

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Merrimac

Setting

Landform: Eskers, outwash plains, moraines, kames, outwash terraces
Landform position (two-dimensional): Footslope, backslope, shoulder, summit
Landform position (three-dimensional): Side slope, crest, tread, riser
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy glaciofluvial deposits derived from granite, schist, and gneiss over sandy and gravelly glaciofluvial deposits derived from granite, schist, and gneiss

Typical profile

Ap - 0 to 10 inches: fine sandy loam
Bw1 - 10 to 22 inches: fine sandy loam
Bw2 - 22 to 26 inches: stratified gravel to gravelly loamy sand
2C - 26 to 65 inches: stratified gravel to very gravelly sand

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline (0.0 to 1.4 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 1.0
Available water storage in profile: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A

Minor Components

Hinckley

Percent of map unit: 5 percent
Landform: Deltas, kames, eskers, outwash plains
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Head slope, crest, side slope, nose slope, rise
Down-slope shape: Convex
Across-slope shape: Convex, linear

Sudbury

Percent of map unit: 5 percent
Landform: Outwash plains, deltas, terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave

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Across-slope shape: Linear

Windsor

Percent of map unit: 5 percent

Landform: Outwash plains, dunes, deltas, outwash terraces

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Tread, riser

Down-slope shape: Linear, convex

Across-slope shape: Linear, convex

430B—Barnstable sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 98ps

Elevation: 0 to 1,000 feet

Mean annual precipitation: 40 to 50 inches

Mean annual air temperature: 48 to 54 degrees F

Frost-free period: 160 to 240 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Barnstable and similar soils: 75 percent

Minor components: 25 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Barnstable

Setting

Landform: Ground moraines

Landform position (two-dimensional): Shoulder

Landform position (three-dimensional): Side slope

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Friable loamy ablation till over reworked sandy glaciofluvial deposits

Typical profile

H1 - 0 to 1 inches: sandy loam

H2 - 1 to 23 inches: sandy loam

H3 - 23 to 64 inches: coarse sand

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Low (about 4.0 inches)

Custom Soil Resource Report

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2s

Hydrologic Soil Group: A

Minor Components

Plymouth

Percent of map unit: 8 percent

Nantucket

Percent of map unit: 7 percent

Merrimac

Percent of map unit: 5 percent

Carver

Percent of map unit: 5 percent

430C—Barnstable sandy loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 98pt

Elevation: 0 to 1,000 feet

Mean annual precipitation: 40 to 50 inches

Mean annual air temperature: 48 to 54 degrees F

Frost-free period: 160 to 240 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Barnstable and similar soils: 70 percent

Minor components: 30 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Barnstable

Setting

Landform: Ground moraines

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Linear

Across-slope shape: Convex

Parent material: Friable loamy ablation till over reworked sandy glaciofluvial deposits; loamy ablation till over reworked sandy outwash

Typical profile

H1 - 0 to 1 inches: sandy loam

H2 - 1 to 23 inches: sandy loam

H3 - 23 to 64 inches: coarse sand

Properties and qualities

Slope: 8 to 15 percent

Custom Soil Resource Report

Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A

Minor Components

Nantucket

Percent of map unit: 10 percent

Plymouth

Percent of map unit: 10 percent

Carver

Percent of map unit: 5 percent

Merrimac

Percent of map unit: 5 percent

431B—Barnstable sandy loam, 3 to 8 percent slopes, very stony

Map Unit Setting

National map unit symbol: 98pv
Elevation: 0 to 1,000 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 48 to 54 degrees F
Frost-free period: 160 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Barnstable and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Barnstable

Setting

Landform: Ground moraines
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex

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Parent material: Friable loamy ablation till over reworked sandy glaciofluvial deposits; loamy ablation till over reworked sandy outwash

Typical profile

H1 - 0 to 1 inches: sandy loam
H2 - 1 to 23 inches: sandy loam
H3 - 23 to 64 inches: coarse sand

Properties and qualities

Slope: 3 to 8 percent
Percent of area covered with surface fragments: 2.0 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A

Minor Components

Plymouth

Percent of map unit: 10 percent

Nantucket

Percent of map unit: 8 percent

Carver

Percent of map unit: 7 percent

431C—Barnstable sandy loam, 8 to 15 percent slopes, very stony

Map Unit Setting

National map unit symbol: 98pw
Elevation: 0 to 1,000 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 48 to 54 degrees F
Frost-free period: 160 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Barnstable and similar soils: 70 percent
Minor components: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Custom Soil Resource Report

Description of Barnstable

Setting

Landform: Ground moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Friable loamy ablation till over reworked sandy glaciofluvial deposits; loamy ablation till over reworked sandy outwash

Typical profile

H1 - 0 to 1 inches: sandy loam
H2 - 1 to 23 inches: sandy loam
H3 - 23 to 64 inches: coarse sand

Properties and qualities

Slope: 8 to 15 percent
Percent of area covered with surface fragments: 2.0 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A

Minor Components

Nantucket

Percent of map unit: 10 percent

Plymouth

Percent of map unit: 10 percent

Carver

Percent of map unit: 10 percent

431D—Barnstable sandy loam, 15 to 25 percent slopes, very stony

Map Unit Setting

National map unit symbol: 98px
Elevation: 0 to 1,000 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 45 to 55 degrees F

Custom Soil Resource Report

Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Barnstable and similar soils: 65 percent
Minor components: 35 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Barnstable

Setting

Landform: Ground moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Friable loamy ablation till over reworked sandy glaciofluvial deposits; loamy ablation till over reworked sandy outwash

Typical profile

H1 - 0 to 1 inches: sandy loam
H2 - 1 to 23 inches: sandy loam
H3 - 23 to 64 inches: coarse sand

Properties and qualities

Slope: 15 to 25 percent
Percent of area covered with surface fragments: 2.0 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A

Minor Components

Plymouth

Percent of map unit: 10 percent

Nantucket

Percent of map unit: 9 percent

Carver

Percent of map unit: 8 percent

Hinckley

Percent of map unit: 8 percent

435B—Plymouth loamy coarse sand, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 98rs
Elevation: 0 to 1,000 feet
Mean annual precipitation: 35 to 50 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Plymouth and similar soils: 70 percent
Minor components: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Plymouth

Setting

Landform: Outwash plains
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Riser
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loose sandy glaciofluvial deposits and/or loose sandy ablation till; loose sandy ablation till and/or loose sandy glaciofluvial deposits; loose sandy ablation till and/or loose sandy glaciofluvial deposits

Typical profile

H1 - 0 to 3 inches: loamy coarse sand
H2 - 3 to 29 inches: gravelly loamy coarse sand
H3 - 29 to 64 inches: gravelly coarse sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Excessively drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A

Custom Soil Resource Report

Minor Components

Hinckley

Percent of map unit: 8 percent

Carver

Percent of map unit: 8 percent

Barnstable

Percent of map unit: 6 percent

Nantucket

Percent of map unit: 6 percent

Merrimac

Percent of map unit: 2 percent

435C—Plymouth loamy coarse sand, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 98rt

Elevation: 0 to 1,000 feet

Mean annual precipitation: 35 to 50 inches

Mean annual air temperature: 45 to 55 degrees F

Frost-free period: 140 to 240 days

Farmland classification: Not prime farmland

Map Unit Composition

Plymouth and similar soils: 65 percent

Minor components: 35 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Plymouth

Setting

Landform: Ice-contact slopes

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Riser

Down-slope shape: Linear

Across-slope shape: Convex

Parent material: Loose sandy glaciofluvial deposits and/or loose sandy ablation till;
loose sandy ablation till and/or loose sandy glaciofluvial deposits

Typical profile

H1 - 0 to 3 inches: loamy coarse sand

H2 - 3 to 29 inches: gravelly loamy coarse sand

H3 - 29 to 64 inches: gravelly coarse sand

Properties and qualities

Slope: 8 to 15 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Excessively drained

Custom Soil Resource Report

Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4s

Hydrologic Soil Group: A

Minor Components

Carver

Percent of map unit: 15 percent

Hinckley

Percent of map unit: 8 percent

Barnstable

Percent of map unit: 6 percent

Nantucket

Percent of map unit: 6 percent

435D—Plymouth loamy coarse sand, 15 to 35 percent slopes

Map Unit Setting

National map unit symbol: 98rv

Elevation: 0 to 1,000 feet

Mean annual precipitation: 35 to 50 inches

Mean annual air temperature: 45 to 55 degrees F

Frost-free period: 140 to 240 days

Farmland classification: Not prime farmland

Map Unit Composition

Plymouth and similar soils: 65 percent

Minor components: 35 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Plymouth

Setting

Landform: Ice-contact slopes

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Riser

Down-slope shape: Linear

Across-slope shape: Convex

Parent material: Loose sandy glaciofluvial deposits and/or loose sandy ablation till;
loose sandy glaciofluvial deposits and/or loose sandy ablation till

Custom Soil Resource Report

Typical profile

H1 - 0 to 3 inches: loamy coarse sand
H2 - 3 to 29 inches: gravelly loamy coarse sand
H3 - 29 to 64 inches: gravelly coarse sand

Properties and qualities

Slope: 15 to 35 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Excessively drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A

Minor Components

Carver

Percent of map unit: 15 percent

Hinckley

Percent of map unit: 10 percent

Barnstable

Percent of map unit: 5 percent

Nantucket

Percent of map unit: 5 percent

483C—Plymouth-Barnstable complex, rolling, very bouldery

Map Unit Setting

National map unit symbol: 98rz
Elevation: 0 to 1,000 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Plymouth and similar soils: 55 percent
Barnstable and similar soils: 20 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Custom Soil Resource Report

Description of Plymouth

Setting

Landform: Moraines

Landform position (two-dimensional): Shoulder

Landform position (three-dimensional): Side slope

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Loose sandy glaciofluvial deposits and/or loose sandy ablation till;
loose sandy glaciofluvial deposits and/or loose sandy ablation till

Typical profile

H1 - 0 to 3 inches: loamy coarse sand

H2 - 3 to 29 inches: gravelly loamy coarse sand

H3 - 29 to 64 inches: gravelly coarse sand

Properties and qualities

Slope: 8 to 15 percent

Percent of area covered with surface fragments: 2.0 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Excessively drained

Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00
to 20.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6s

Hydrologic Soil Group: A

Description of Barnstable

Setting

Landform: Moraines

Landform position (two-dimensional): Shoulder

Landform position (three-dimensional): Side slope

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Friable loamy ablation till over reworked sandy glaciofluvial
deposits; loamy ablation till over reworked sandy outwash

Typical profile

H1 - 0 to 1 inches: sandy loam

H2 - 1 to 23 inches: sandy loam

H3 - 23 to 64 inches: coarse sand

Properties and qualities

Slope: 8 to 15 percent

Percent of area covered with surface fragments: 1.6 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained

Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)

Custom Soil Resource Report

Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A

Minor Components

Carver

Percent of map unit: 10 percent

Hinckley

Percent of map unit: 10 percent

Nantucket

Percent of map unit: 5 percent

484C—Plymouth-Barnstable complex, rolling, extremely bouldery

Map Unit Setting

National map unit symbol: 98s1
Elevation: 0 to 1,000 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Plymouth and similar soils: 55 percent
Barnstable and similar soils: 20 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Plymouth

Setting

Landform: Moraines
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loose sandy glaciofluvial deposits and/or loose sandy ablation till;
loose sandy glaciofluvial deposits and/or loose sandy ablation till

Typical profile

H1 - 0 to 3 inches: loamy coarse sand
H2 - 3 to 29 inches: gravelly loamy coarse sand

Custom Soil Resource Report

H3 - 29 to 64 inches: gravelly coarse sand

Properties and qualities

Slope: 8 to 15 percent

Percent of area covered with surface fragments: 9.0 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Excessively drained

Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: A

Description of Barnstable

Setting

Landform: Moraines

Landform position (two-dimensional): Shoulder

Landform position (three-dimensional): Side slope

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Friable loamy ablation till over reworked sandy glaciofluvial deposits; loamy ablation till over reworked sandy outwash

Typical profile

H1 - 0 to 1 inches: sandy loam

H2 - 1 to 23 inches: sandy loam

H3 - 23 to 64 inches: coarse sand

Properties and qualities

Slope: 8 to 15 percent

Percent of area covered with surface fragments: 9.0 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained

Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: A

Minor Components

Carver

Percent of map unit: 10 percent

Custom Soil Resource Report

Hinckley

Percent of map unit: 10 percent

Nantucket

Percent of map unit: 5 percent

484D—Plymouth-Barnstable complex, hilly, extremely bouldery

Map Unit Setting

National map unit symbol: 98s2

Elevation: 0 to 1,000 feet

Mean annual precipitation: 40 to 50 inches

Mean annual air temperature: 45 to 55 degrees F

Frost-free period: 140 to 240 days

Farmland classification: Not prime farmland

Map Unit Composition

Plymouth and similar soils: 55 percent

Barnstable and similar soils: 20 percent

Minor components: 25 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Plymouth

Setting

Landform: Moraines

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Linear

Across-slope shape: Convex

Parent material: Loose sandy glaciofluvial deposits and/or loose sandy ablation till;
loose sandy glaciofluvial deposits and/or loose sandy ablation till

Typical profile

H1 - 0 to 3 inches: loamy coarse sand

H2 - 3 to 29 inches: gravelly loamy coarse sand

H3 - 29 to 64 inches: gravelly coarse sand

Properties and qualities

Slope: 15 to 25 percent

Percent of area covered with surface fragments: 9.0 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Excessively drained

Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00
to 20.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Custom Soil Resource Report

Available water storage in profile: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: A

Description of Barnstable

Setting

Landform: Moraines

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Linear

Across-slope shape: Convex

Parent material: Friable loamy ablation till over reworked sandy glaciofluvial deposits; loamy ablation till over reworked sandy outwash

Typical profile

H1 - 0 to 1 inches: sandy loam

H2 - 1 to 23 inches: sandy loam

H3 - 23 to 64 inches: coarse sand

Properties and qualities

Slope: 15 to 25 percent

Percent of area covered with surface fragments: 9.0 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained

Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: A

Minor Components

Nantucket

Percent of map unit: 10 percent

Hinckley

Percent of map unit: 5 percent

Carver

Percent of map unit: 5 percent

Merrimac

Percent of map unit: 5 percent

600—Pits, sand and gravel

Map Unit Setting

National map unit symbol: 98rq
Frost-free period: 120 to 220 days
Farmland classification: Not prime farmland

Map Unit Composition

Pits: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pits

Setting

Parent material: Loose sandy and gravelly glaciofluvial deposits

652—Dumps, landfill

Map Unit Setting

National map unit symbol: 98qm
Frost-free period: 120 to 220 days
Farmland classification: Not prime farmland

Map Unit Composition

Dumps: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

665—Udipsamments, smoothed

Map Unit Setting

National map unit symbol: 98s6
Mean annual precipitation: 41 to 48 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 160 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Udipsamments and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Custom Soil Resource Report

Description of Udipsamments

Setting

Landform position (two-dimensional): Summit

Landform position (three-dimensional): Tread

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Sandy excavated or filled land

Properties and qualities

Depth to restrictive feature: More than 80 inches

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

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ATTACHMENT 8

SITE SPECIFIC SOIL SURVEY REPORT – L.E.C.



August 9, 2018

Email (rquinn@sitecenv.com)

Raymond Quinn, PE
SITEC Environmental, Inc.
769 Plain Street, Unit C
Marshfield, MA 02050

**Re: Site Specific Soil Survey Report
Bourne Landfill
Department of Integrated Solid Waste Management
201 MacArthur Boulevard
Bourne, Massachusetts**

[LEC File #: SITEC \17-395.01]

Dear Mr. Quinn:

On July 17, 2018, LEC Environmental Consultants, Inc. (LEC) performed a soil survey on approximately twenty acres of land at the solid waste disposal facility in Bourne Massachusetts. This soil survey was performed in accordance with USDA, Natural Resources Conservation Service (NRCS) National Cooperative Soil Survey standards.

The purpose of the survey was to identify the boundaries of soil types at a more detailed level than the published NRCS Web Soil Survey¹. The end-product is a Site-Specific Soil Survey for the purpose of determining the classification as Massachusetts prime, important, and unique farm land. The Farmland Classification is from the USDA-NRCS Field Office Technical Guide, Version 12, September 28, 2015 (Web source).

The base map used in the field for the site-specific soil survey consists of an existing conditions plan, with topography at two-foot contours overlaid by a color aerial photograph. The base map was produced by SITEC Environmental, Inc. and the Bourne Department of Integrated Solid Waste Management at a scale of 1" = 40'. This report and the site-specific soil map are two parts of the Site-Specific Soil Survey and are intended to be used together.

In the course of our field investigation, we collected twenty soil profile descriptions that represent the primary map units and additional data from hand-borings throughout the site that represent the various map units. The detailed soil descriptions are included in Appendix A. The survey area consists of the three principal soil map units described below.

¹ Soil Survey of Barnstable County Massachusetts, Web Soil Survey, July 27, 2018

Soil Map Unit Descriptions

Barnstable sandy loam, 3 to 8 percent (431B) consists of very deep, well drained soils formed in loamy glacial till overlying loose, sandy glacial-fluvial material. They are on nearly level to moderately steep soils of moraines. In this survey, these soils occur along the western and southern boundaries of the active landfill work area. Slopes range from 0 to 4 percent. Saturated hydraulic conductivity is moderately high or high in the solum and high or very high in the substratum. The seasonal, high water table is greater than 60 inches from the surface. Mean annual precipitation is about 43 inches (1092



millimeters) and mean annual temperature is about 48 degrees F (9 degrees C). These soils are classified as Coarse-loamy over sandy or sandy-skeletal, mixed, active, mesic Typic Dystrudepts.

Included within this map unit are large areas that do not have stones on the surface. The A and B horizon (solum) textures range from very fine sandy loam to sandy loam. Coarse fragment content is less than 5 percent throughout the solum. Textures in the substratum are medium sand, coarse sand, very coarse sand. Coarse fragments, including gravel and small cobbles, make up less than 15 percent. No contrasting inclusions were encountered in this map unit and similar inclusions make up less than 5 percent of the map unit. Seven detailed soil profile descriptions (TP-3, TP-4, TP-16, TP-17, TP-18, TP-19, TP-20) were collected where this soil occurs and are included in Appendix A.

Urban Land (602). This nearly level to gently sloping unit dominates the survey area and consists of impervious surfaces including pavement (primarily asphalt) and buildings. Underlying soils are unknown



but are most likely dominated by coarse sand from prior excavations of cutting and filling. This map unit supports the principal daily landfill activities of recycling, transport, and storage of useable soil and non-soil material.

Included with this unit in mapping are small areas of Udipsamments, smoothed and storage piles of non-soil debris including undecomposed yard waste, chipped woody debris, building rubble, stones and boulder piles, recycled material such as crushed glass, piles of crushed stone and rip-rap. The piles of non-soil material are constantly changing in size, distribution, and elevation as a result of machine handling. This Site-Specific Soil map identifies some of the non-soil areas as they existed at the time of this survey, adjusted from aerial photography taken in January of 2018.

Udipsammments, smoothed (655). These gently sloping to very steep areas consist of excavated, filled and re-graded soil, originating from the underlying substrata or manufactured on-site. Slopes range from



2 to 70 percent. The nearly level areas make up portions of the site where equipment is traveling. The remaining areas are dominated by steep side slopes (40 to 70 percent) of stored soil material and landscaped side slopes adjacent to some buildings. The soil textures are dominantly coarse and very coarse sand, excavated from a newly constructed land fill cell to the north of the survey area. Other stored piles contain various blends of

“topsoil” constructed from mixing sand with organic material and compost. The topsoil storage piles have soil textures that range from very coarse sand to loamy sand and their gravelly analogs.



Included with this unit in mapping are small areas of non-soil debris, areas with extremely stony and boulder surfaces and areas where textures range to coarse sandy loam. The soil storage piles periodically change in size, distribution, and elevation, as a result of machine handling. This Site-Specific Soil map identifies the boundary of these areas as they existed at the time of this survey and based on aerial photography taken in

January of 2018. Seven detailed soil profile descriptions (TP-1, TP-2, TP-5, TP-6, TP-7, TP-8, TP-9, TP-10, TP-11, TP-12, TP-13, TP-14, TP-15) were collected where this soil occurs and are included in Appendix A.

Non-soil Areas



*Chipped Woody Debris (foreground)
Yard Waste background*



Asphalt, Brick, and Concrete Rubble



Soil Map Legend

The Soil Map Legend is correlated with the Barnstable County Soil Survey legend, referenced to the USDA-NRCS Web Soil Survey, July 27, 2018. The Farmland Classification is from the USDA-NRCS Field Office Technical Guide, Version 12, September 28, 2015 (Web). A number of non-soil areas are shown on the map and are considered to be map unit inclusions.

MA Statewide Numeric Symbol	Barnstable County Alpha-Numeric Symbol	Map Unit Name	Farmland Classification
431B	BbB	Barnstable sandy loam, 3 to 8 percent slopes, very stony	Farmland of Statewide Importance
602	Ur	Urban Land	None
665	Ud	Udipsamments, smoothed	None
Non-soil Areas			
1	W	Water (Sediment Pond)	None
N/A	N/A	Yard Waste	None
N/A	N/A	Woody Debris (chipped)	None
N/A	N/A	Asphalt, brick and concrete rubble	None

Conclusion

The re-surveyed area of this site is currently mapped Barnstable sandy loam, 3 to 8 percent slopes, very stony (431B) and classified as Farmland of Statewide Importance on the current NRCS Barnstable County Web Soil Survey. Based on our field investigation, the Barnstable map unit (431B) does not exist in most of the Bourne landfill work area. This area consists of soil and non-soil material that has been disturbed by human activity, related to the operation of the landfill. This Site-Specific Soil Survey redefines most of this area as Urban Land (602) and Udipsamments, smoothed (655), which are not Prime, Important or Unique Farmland in Massachusetts.

Thank you for the opportunity to assist the Bourne Department of Integrated Solid Waste Management with re-mapping of the solid waste disposal facility. Should you have any questions or need additional information I may be contacted in our Rindge, New Hampshire Office.

Sincerely,

LEC Environmental Consultants, Inc.

Thomas A. Peragallo, CPSS/SC
Certified Professional Soil Scientist/Soil Classifier

Attachments

Appendix A

Soil Profile Descriptions

Soil Profile Description

Observation Hole Number: TP-1		Date: 7-17-18			
Location: Bourne Landfill, Rte. 28, Bourne, MA					
Requested by: SITEC Environmental, Inc. & Bourne Dept. of Integrated Solid Waste Management					
Described by: Thomas A. Peragallo, LEC Environmental Consultants, Inc.					
Time: AM		Weather: Cloudy, 70's			
Landform, Landscape Position & Parent Material: Sand storage pile, removed from recently excavated cell (north)					
Slope: 8-70 %		Aspect: north		Stoniness: none	
Soil Drainage: ED		Soil Classification: Udipsamments (Great Group) Depth to Bedrock: >20'			
Horizon	Depth (inches)	Soil Texture	Moist Color	Redoximorphic Features	Other Features (structure, consist.)
^C	0-60	Gravelly Coarse Sand (Gr CoS)	2.5Y 5/4	None	20% Gravel, loose, single grain



Landscape Setting



Soil Profile

Soil Profile Description

Observation Hole Number: TP-2	Date: 7-17-18
Location: Bourne Landfill, Rte. 28, Bourne, MA	
Requested by: SITEC Environmental, Inc. & Bourne Dept. of Integrated Solid Waste Management	
Described by: Thomas A. Peragallo, LEC Environmental Consultants, Inc.	
Time: AM	Weather: Cloudy, 70's
Landform, Landscape Position & Parent Material: "Topsoil" storage pile, manufactured on-site from sand and composted yard waste	
Slope: 4-60 %	Aspect: south Stoniness: none
Soil Drainage Class: ED	Soil Series: Udipsamments (Great Group) Depth to Bedrock: >25'

Horizon	Depth (inches)	Soil Texture	Moist Color	Redoximorphic Features	Other Features (structure, consist.)
^C1	0-72	Loamy Coarse Sand (LCoS)	10YR 2/3 and 2/3 - mixed	None	10% woody debris 10% gravel, massive, mvfr buried log



Soil Profile

Soil Profile Description

Observation Hole Number: TP-3	Date: 7-17-18
Location: Bourne Landfill, Rte. 28, Bourne, MA	
Requested by: SITEC Environmental, Inc. & Bourne Dept. of Integrated Solid Waste Management	
Described by: Thomas A. Peragallo, LEC Environmental Consultants, Inc.	
Time: AM	Weather: Cloudy, 70's
Landform, Landscape Position & Parent Material: Aeolian material over glacial fluvial material	
Access way at the southern edge of the disturbed area, adjacent to undisturbed forest boundary	
Slope: 4 %	Aspect: south Stoniness: none
Soil Drainage Class: WD	Soil Classification: Barnstable (Series) Depth to Bedrock: >5'

Horizon	Depth (inches)	Soil Texture	Moist Color	Redoximorphic Features	Other Features (structure, consist.)
A	0-8	Very fine sandy loam (VFSL)	10YR 2/2	None	Mcopl, mfi compacted from machinery traffic
Bw	8-25	Very fine sandy loam (VFSL)	10YR 4/6	None	Imbsk, mfr
2C	25-48	Gravelly Coarse Sand (GrCoS)	2.5Y 5/6	None	20% gravel, loose, single grain



Soil Profile

Soil Profile Description

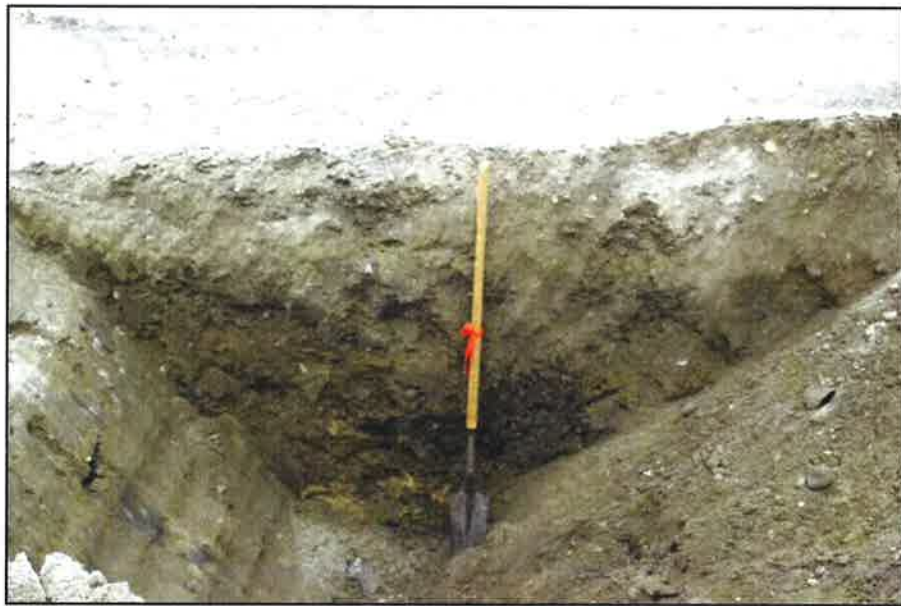
Observation Hole Number: TP-5		Date: 7-17-18			
Location: Bourne Landfill, Rte. 28, Bourne, MA					
Requested by: SITEC Environmental, Inc. & Bourne Dept. of Integrated Solid Waste Management					
Described by: Thomas A. Peragallo, LEC Environmental Consultants, Inc.					
Time: AM		Weather: Cloudy, 70's			
Landform, Landscape Position & Parent Material: Fill and non-soil debris overlying glacial fluvial material. On access way at the southern edge of the disturbed area, adjacent to undisturbed forest boundary					
Slope: 4 %		Aspect: south		Stoniness: none	
Soil Drainage: ED		Soil Classification: Udipsamments (Great Group)		Depth to Bedrock: 4'	
Horizon	Depth (inches)	Soil Texture	Moist Color	Redoximorphic Features	Other Features (structure, consist.)
C [^]	0-34	Loamy coarse sand (LCoS)	10YR 3/2 (mixed)	None	Massive, mfr 50% foreign debris: tailings, stones, wood, stumps
2C	34-48	Coarse Sand (CoS)	2.5Y 5/4	None	5% gravel, loose, single grain



Soil Profile

Soil Profile Description

Observation Hole Number: TP-6		Date: 7-17-18			
Location: Bourne Landfill, Rte. 28, Bourne, MA					
Requested by: SITEC Environmental, Inc. & Bourne Dept. of Integrated Solid Waste Management					
Described by: Thomas A. Peragallo, LEC Environmental Consultants, Inc.					
Time: AM		Weather: Cloudy, 70's			
Landform, Landscape Position & Parent Material: Sandy fill storage pile					
Slope: 40%		Aspect: north		Stoniness: none	
Soil Drainage: ED		Soil Classification: Udipsamments (Great Group)		Depth to Bedrock: >20'	
Horizon					
Horizon	Depth (inches)	Soil Texture	Moist Color	Redoximorphic Features	Other Features (structure, consist.)
^C1	0-14	Very gravelly loamy sand (VGrLS)	2.5Y 4/4	None	Massive, mfr 25% gravel
^C2	14-60	Coarse Sand & Loamy Sand (CoS & LS)	2.5Y 5/4 & 10YR 5/2	None	massive, mvfr, 10% gravel,



Soil Profile

Soil Profile Description

Observation Hole Number: TP-7		Date: 7-17-18			
Location: Bourne Landfill, Rte. 28, Bourne, MA					
Requested by: SITEC Environmental, Inc. & Bourne Dept. of Integrated Solid Waste Management					
Described by: Thomas A. Peragallo, LEC Environmental Consultants, Inc.					
Time: AM		Weather: Cloudy, 70's			
Landform, Landscape Position & Parent Material: Re-graded sandy fill in work area					
Slope: 2%		Aspect: south		Stoniness: none	
Soil Drainage: ED Soil Classification: Udipsamments (Great Group) Depth to Bedrock: >20'					
Horizon	Depth (inches)	Soil Texture	Moist Color	Redoximorphic Features	Other Features (structure, consist.)
^C	0-48	Loamy coarse sand (LCoS)	10YR 3/2	None	Massive, mfr About 25% asphalt, stone, bricks, steel debris



Landscape Setting



Soil Profile

Soil Profile Description

Observation Hole Number: TP-8	Date: 7-17-18
Location: Bourne Landfill, Rte. 28, Bourne, MA	
Requested by: SITEC Environmental, Inc. & Bourne Dept. of Integrated Solid Waste Management	
Described by: T. A. Peragallo, LEC Environmental Consultants, Inc.	
Time: AM	Weather: Cloudy, 70's
Landform, Landscape Position & Parent Material: Re-graded sandy fill in work area	
Slope: 2%	Aspect: south Stoniness: none
Soil Drainage: ED	Soil Classification: Udipsamments (Great Group) Depth to Bedrock: >20'

Horizon	Depth (inches)	Soil Texture	Moist Color	Redoximorphic Features	Other Features (structure, consist.)
^C1	0-32	Loamy coarse sand (LCoS)	10YR 3/2	None	Massive, mfr About 25% asphalt, stone, bricks, steel debris
^C2	32-50	Coarse sand (CoS)	2.5Y 5/4	None	Loose, single grain Refusal-boulder



Soil Profile

Soil Profile Description

Observation Hole Number: TP-9		Date: 7-17-18			
Location: Bourne Landfill, Rte. 28, Bourne, MA					
Requested by: SITEC Environmental, Inc. & Bourne Dept. of Integrated Solid Waste Management					
Described by: Thomas A. Peragallo, LEC Environmental Consultants, Inc.					
Time: AM		Weather: Cloudy, 70's			
Landform, Landscape Position & Parent Material: Re-graded sandy fill in work area -access road					
Slope: 2%		Aspect: south		Stoniness: none	
Soil Drainage: ED		Soil Classification: Udipsamments (Great Group)		Depth to Bedrock: >20'	
Horizon	Depth (inches)	Soil Texture	Moist Color	Redoximorphic Features	Other Features (structure, consist.)
^C1	0-60	Gravelly Loamy coarse sand (GrLCoS), coarse sand (CoS) and sandy loam (SL) – Mixed	10YR 3/2 10YR 2/2 2.5Y5/3 2.5Y 5/4 (Mixed)	None	Massive, mfr 15% gravel About 10% asphalt, stone, bricks, rubble
Note: GrLCoS dominates the upper 12 inches					



Landscape Setting



Soil Profile

Soil Profile Description

Observation Hole Number: TP-12		Date: 7-17-18			
Location: Bourne Landfill, Rte. 28, Bourne, MA					
Requested by: SITEC Environmental, Inc. & Bourne Dept. of Integrated Solid Waste Management					
Described by: Thomas A. Peragallo, LEC Environmental Consultants, Inc.					
Time: AM		Weather: Cloudy, 70's			
Landform, Landscape Position & Parent Material: Smooth re-graded area between soil storage piles					
Slope: 3 %		Aspect: north		Stoniness: none	
Soil Drainage: ED		Soil Classification: Udipsamments (Great Group)		Depth to Bedrock: N/A	
Horizon					
Horizon	Depth (inches)	Soil Texture	Moist Color	Redoximorphic Features	Other Features (structure, consist.)
^C1	0-10	Coarse Sand (CoS)	2.5Y 5/3 and 5/4 - mixed	None	5% cobbles, loose, single grain Extremely cobbly surface
^C2	10-40	Coarse Sand (CoS)	2.5Y 5/4	None	10% Gravel, loose, single grain



Landscape Setting

Soil Profile Description

Observation Hole Number: TP-14	Date: 7-17-18
Location: Bourne Landfill, Rte. 28, Bourne, MA	
Requested by: SITEC Environmental, Inc. & Bourne Dept. of Integrated Solid Waste Management	
Described by: Thomas A. Peragallo, LEC Environmental Consultants, Inc.	
Time: AM	Weather: Cloudy, 70's
Landform, Landscape Position & Parent Material: Fill on landscaped slope	
Slope: 30%	Aspect: east Stoniness: none
Soil Drainage: ED	Soil Classification: Udipsamments (Great Group) Depth to Bedrock: >15'

Horizon	Depth (inches)	Soil Texture	Moist Color	Redoximorphic Features	Other Features (structure, consist.)
^A	0-3	Loamy sand (LS)	10YR 3/2 (variable)	None	Massive, mvfr
^C1	3-20	Loamy coarse and very coarse sand (LCoS & LVCoS)	2.5Y 5/6	None	Massive, mvfr
^C2	20-48	Coarse sand (CoS)	2.5Y 6/4	None	Loose, single grain



Landscape Setting



Soil Profile

Soil Profile Description

Observation Hole Number: TP-17 & TP-18	Date: 7-17-18
Location: Bourne Landfill, Rte. 28, Bourne, MA	
Requested by: SITEC Environmental, Inc. & Bourne Dept. of Integrated Solid Waste Management	
Described by: Thomas A. Peragallo, LEC Environmental Consultants, Inc.	
Time: PM	Weather: Cloudy, 70's
Landform, Landscape Position & Parent Material: Aeolian material overlying glacial fluvial material, along the western boundary of the landfill, east of Route 28. Natural soil in forested area.	
Slope: 3 %	Aspect: south Stoniness: none
Soil Drainage Class: WD	Soil Classification: Barnstable (Series) Depth to Bedrock: >4'

TP-17:

Horizon	Depth (inches)	Soil Texture	Moist Color	Redoximorphic Features	Other Features (structure, consist.)
Oe	2-0	Mpt	5YR 2.5/2	None	Hemic
A	0-1	Very fine sandy loam (VFSL)	10YR 2/2	None	wfgr, mvfr, CS
E	1-4	Loamy sand (LS)	10YR 5/2	None	Massive, mvfr, CS
Bs	4-18	Fine sandy loam (FSL)	7.5YR 4/6	None	Massive, mfr, GW
Bw	18-28	Loam sand (LS)	10YR 5/6	None	Massive, mvfr, CW
2C	28-40+	Coarse sand (CoS)	2.5Y 4/6	None	Loose, single grain

TP-18:

Horizon	Depth (inches)	Soil Texture	Moist Color	Redoximorphic Features	Other Features (structure, consist.)
Oe	2-0	Mpt	5YR 2.5/2	None	Hemic
A	0-1	Very fine sandy loam (VFSL)	10YR 2/1	None	wfgr, mvfr, CS
E	1-5	Loamy sand (LS)	10YR 5/2	None	Loose, s.g., CS
Bs	5-14	Fine sandy loam (FSL)	7.5YR 4/6	None	Massive, mvfr, GW
Bw	14-24	Very fine sandy loam (VFSL)	10YR 5/6	None	Massive, mfr, GW
C	24-36	Fine sandy loam (FSL)	2.5Y 5/4	None	Massive, mfr, CW
2C	36-40+	Loamy sand (LS)	2.5Y 6/4	None	Loose, single grain

Soil Profile Description

Observation Hole Number: TP-19	Date: 7-17-18
Location: Bourne Landfill, Rte. 28, Bourne, MA	
Requested by: SITEC Environmental, Inc. & Bourne Dept. of Integrated Solid Waste Management	
Described by: Thomas A. Peragallo, LEC Environmental, Inc.	
Time: PM	Weather: Cloudy, 70's
Landform, Landscape Position & Parent Material: Aeolian material overlying glacial fluvial material, along the western boundary of the landfill, east of Route 28. Natural soil in forested area.	
Slope: 4 %	Aspect: south Stoniness: stony - 50' apart
Soil Drainage Class: WD	Soil Classification: Barnstable (Series) Depth to Bedrock: >4'

Horizon	Depth (inches)	Soil Texture	Moist Color	Redoximorphic Features	Other Features (structure, consist.)
Oc	2-0	Mpt	10YR 2/2	None	Hemic
A	0-1	Loamy sand (LS)	10YR 2/2	None	Massive, mvfr, CS
E	1-2	Loamy sand (LS)	2.5Y 5/3	None	Loose, single grain, CS
Bs	2-20	Very fine sandy loam (VFSL)	7.5YR 4/6	None	Imsbk, mfr, GW
Bw	20-23	Sandy loam (SL)	10YR 4/6	None	Massive, mfr, CW
2C	23-40+	Medium & Coarse sand (MS & CoS)	2.5Y 4/6	None	Loose, single grain



Soil Profile

Appendix B

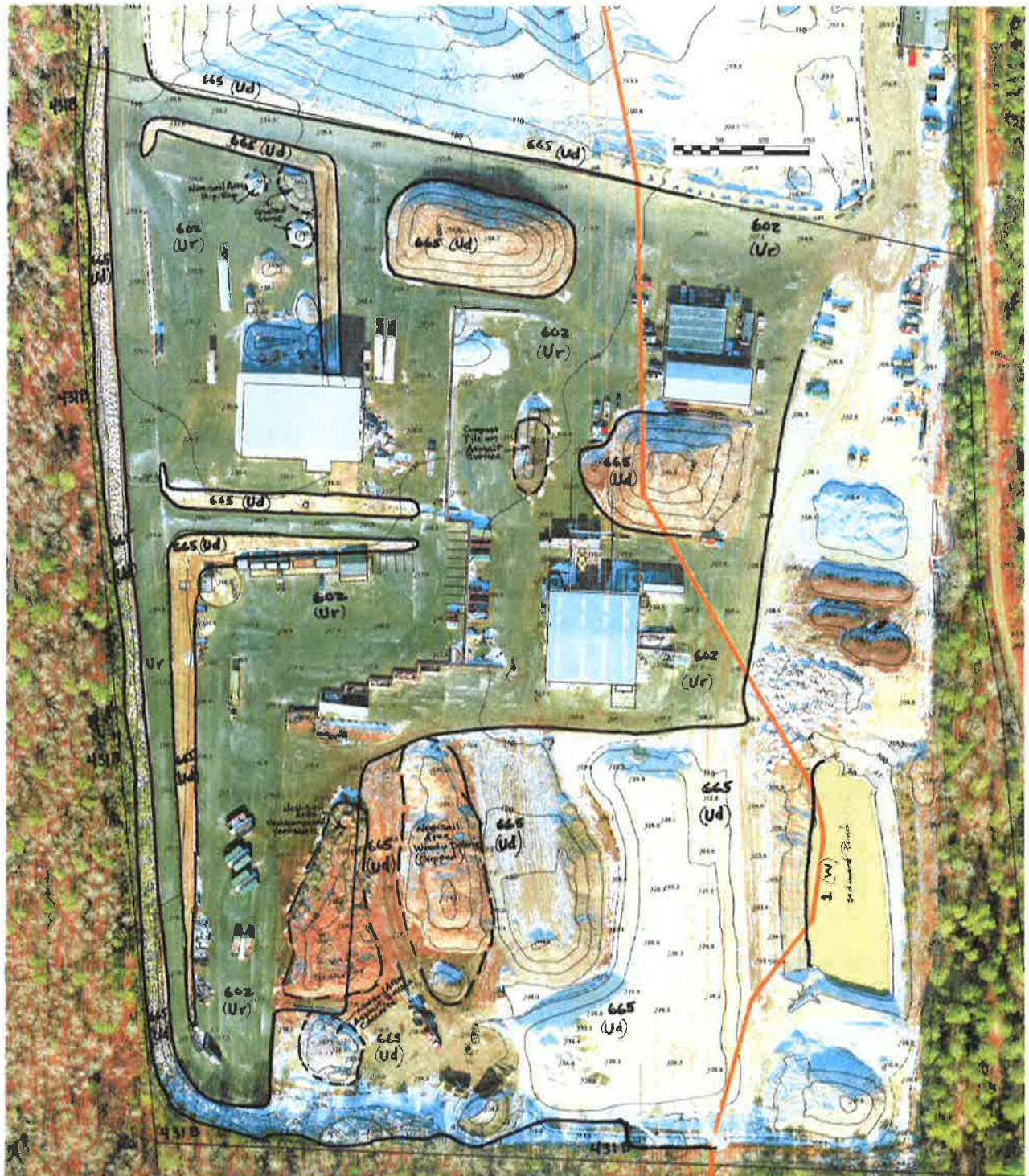
Detailed Soil Profile Description Locations

Detailed Soil Profile Description Locations



Appendix C

Site Specific Soil Survey Map



LEC

Sitespecific Soil Survey

This Soil Survey Map conforms to the standards of the USDA National Cooperative Soil Survey. It was conducted on site on July 17, 2018 by Thomas A. Bergquist, CSPS, CPCS #2318. A narrative report accompanies this report and is considered part of the map. The narrative report includes map soil descriptions and detail soil profile descriptions to specialized locations.

Soil Map Legend

The Soil Map Legend is consistent with the Hampshire County Soil Survey legend, authorized by the USDA-NRCS Web Soil Survey, July 27, 2018. The Landmark Classification is from the USDA-NRCS Field Office Labeled Guide, Version 12, September 28, 2013 V12.0. A portion of soil soil codes are shown on the map and are considered to be map soil inclusions.

MA Statewide Numeric Symbol	Hampshire County Alphanumeric Symbol	Map Soil Name	Farmland Classification
610	10A	Humidic sandy loam, 1 to 8 percent slopes, very cherty (10A) and 1 (10A) - 1 (10A) - 1 (10A)	Foreland of Statewide Importance None
645	45	Very cherty, 1 to 8 percent slopes	None
Non-soil Areas			
1	1	Water	None
2	2	Clearland Pond	None
3	3	Yard Waste	None
4	4	Wetland (Water)	None
5	5	Asphalt, rock and concrete rubble	None

ATTACHMENT 9
TRAFFIC IMPACT ASSESSMENT DOCUMENTS

MEMORANDUM

93 Stiles Road, Suite 201, Salem, New Hampshire 03079 USA
800 Turnpike Street, Suite 300, North Andover, Massachusetts 01845 USA
Phone (603) 212-9133 and Fax (603) 226-4108
Email tepp@teppllc.com and Web www.teppllc.com

Ref: 789
Subject: Traffic Assessment
Integrated Solid Waste Management Facility
Bourne, Massachusetts
From: Kim Eric Hazarvartian, Ph.D., P.E., PTOE
Principal
Date: July 16, 2020

**INTRODUCTION**

TEPP LLC has prepared this traffic-assessment memorandum (TAM) at the request of the Town of Bourne Department of Integrated Solid Waste Management (ISWM). ISWM and TEPP LLC have thoroughly considered traffic safety and operations of the ISWM in conjunction with multiple permitting processes that have involved the Town, the Cape Cod Commission and the Commonwealth of Massachusetts.

These efforts have led to the following findings:

- substantial infrastructure improvements completed during 2012, including the driveway and gate area, have significantly enhanced traffic safety and operations
- traffic management has been significantly improved at the site since 1999
- waste delivery has shifted to denser materials being delivered in larger-capacity vehicles, resulting in less truck traffic per ton
- traffic operations and safety are appropriate for multiple operations scenarios, including ash waste and solid waste
- crash history near the ISWMF facility, for January 1, 2013 to June 4, 2020, confirms that traffic operations will not constitute a danger to public safety

TEPP LLC and staff have been involved with ISWMF since the 1990s and has prepared a number of documents and analysis regarding traffic safety, operations and design. TEPP LC has reviewed this body of work and confirms its validity and applicability going forward. This is especially so considering the substantial infrastructure improvements and significantly improved traffic management.

In conclusion:

- traffic safety and operations have been considered over many years
- substantial infrastructure improvements have enhanced traffic safety and operations
- crash history confirms that traffic operations will not constitute a danger to public safety

TEPP LLC INVOLVEMENT WITH THE ISWMF

TEPP LLC has for many years:

- been involved with transportation engineering for the Integrated Solid Waste Management Facility (ISWMF)
- analyzed traffic operations related to the ISWMF
- participated in the development of extensive infrastructure improvements at the ISWMF

COMPLETED INFRASTRUCTURE IMPROVEMENTS

Substantial on-site infrastructure improvements were completed in 2012. SITEC Environmental, Inc. has prepared a graphic, attached to this memorandum, which shows site infrastructure configurations at the driveway and scale area both before and after the improvements.

The infrastructure improvements include:

- eliminating opposing-traffic conflicts inside and outside the scale area
- designing and constructing a new residential recycling center in a new location
- designing and constructing new incoming and outgoing landfill-truck scales in new locations
- designing and constructing a new central scale house in a new location
- providing about 1,000 feet of inbound driveway length from MacArthur Boulevard northbound to the scale
- providing one landfill-truck lane each, for both incoming and outgoing directions
- providing one landfill-truck surge lane to accommodate additional queuing each, for both incoming and outgoing directions
- providing one residential drop-off/employee traffic lane each, that bypasses the scales, for both incoming and outgoing directions

These infrastructure improvements have made the driveway and scale area significantly more safe, efficient, simple and attractive. A graphic is attached that shows the traffic layout before and after the improvements were made.

The infrastructure improvements provide for operations of at least 1,500 tons per day (TPD). However, ISWM is limiting operation to 825 TPD, with the reserve capacity enhancing operational flexibility and quality.

IMPETUS FOR THE INFRASTRUCTURE IMPROVEMENTS

The ISWMF was permitted during 1999 by the Commonwealth of Massachusetts to operate at 825 TPD. The permitting process did not require the infrastructure improvements described above.

The infrastructure improvements came after the permitting process, at the volition of ISWM. ISWM recognized the potential benefits of infrastructure improvement and took proactive advantage of the opportunity for infrastructure improvements that was created by:

- acquiring the abutting 25-acre parcel located south of the landfill in 2001
- relocating the residential recycling center from just inside the scale area onto that parcel
- completion of the Phase 1D landfill reclamation, part of which was underneath the former residential recycling center, in 2011

OPERATIONAL SCENARIO 1—EXISTING MUNICIPAL-COMBUSTOR ASH AND MUNICIPAL-SOLID WASTE

In recent years, ISWM has changed the incoming waste stream for deposition into the landfill. As a result of a contract with Covanta SEMASS, located in Rochester, Massachusetts, ISWM now accepts approximately 85 percent of its permitted annual tonnage at the landfill as municipal-waste combustor ash. The ash is delivered via 30-ton transfer trailers, as opposed to municipal-solid waste (MSW), which is delivered in packer trucks that have a capacity of 12 to 15 tons. This results in less truck traffic per ton delivered. ISWM intends to continue this arrangement through 2021 and is considering the possibility of extending the arrangement further.

OPERATIONAL SCENARIO 2—ALL MSW

The Town has also considered an incoming waste scenario whereby it no longer has a contract for municipal-combustor ash and instead envisions utilizing 100 percent of its permitted capacity for MSW deposition. For many years dating to 1999, the ISWMF received MSW, which required a greater number of truck-trips per ton than waste ash, as described above.

POTENTIAL FUTURE LEACHATE

In addition, ISWM is evaluating options for processing and treating leachate from the landfill at an on-site wastewater-treatment works. The clean, treated effluent would be then discharged to a

pipeline and associated infrastructure located at the abutting Joint Base Cape Cod, as further described in another section of this filing. Currently, ISWM has a contractor remove leachate by tanker truck to a variety of off-site treatment facilities. Constructing the on-site treatment facility could, depending on annual precipitation, reduce the number of truckloads by approximately 1,000 to 2,000 per year.

CRASH HISTORY

TEPP LLC obtained crash data from the Massachusetts Department of Transportation (MassDOT) from January 1, 2013 to June 4, 2020 for locations near the facility. Analysis of the data confirms that traffic operations of the facility will not constitute a danger to public safety. The locations were:

- the driveway
- the MacArthur Boulevard northbound/driveway intersection
- the MacArthur Boulevard northbound/U-turn intersection
- the MacArthur Boulevard southbound/U-turn intersection

Table 1 shows relevant crash history:

- about 67 percent of crashes were property-damage only
- the remainder involved personal injury
- no crash showed a fatality
- each location showed an average of less than one crash per year
- each intersection showed a crash rate below MassDOT averages
- one crash involved a heavy vehicle

CONCLUSION

TEPP LLC and staff have been involved with ISWMF since the 1990s and has prepared a number of documents and analysis regarding traffic safety, operations and design. TEPP LC has reviewed this body of work and confirms its validity and applicability going forward. This is especially so considering the substantial infrastructure improvements and significantly improved traffic management.

TEPP LLC concludes that:

- traffic safety and operations have been considered over many years
- substantial infrastructure improvements have enhanced traffic safety and operations

- crash history confirms that traffic operations will not constitute a danger to public safety

attachments: table, SITEC Environmental, Inc. graphic

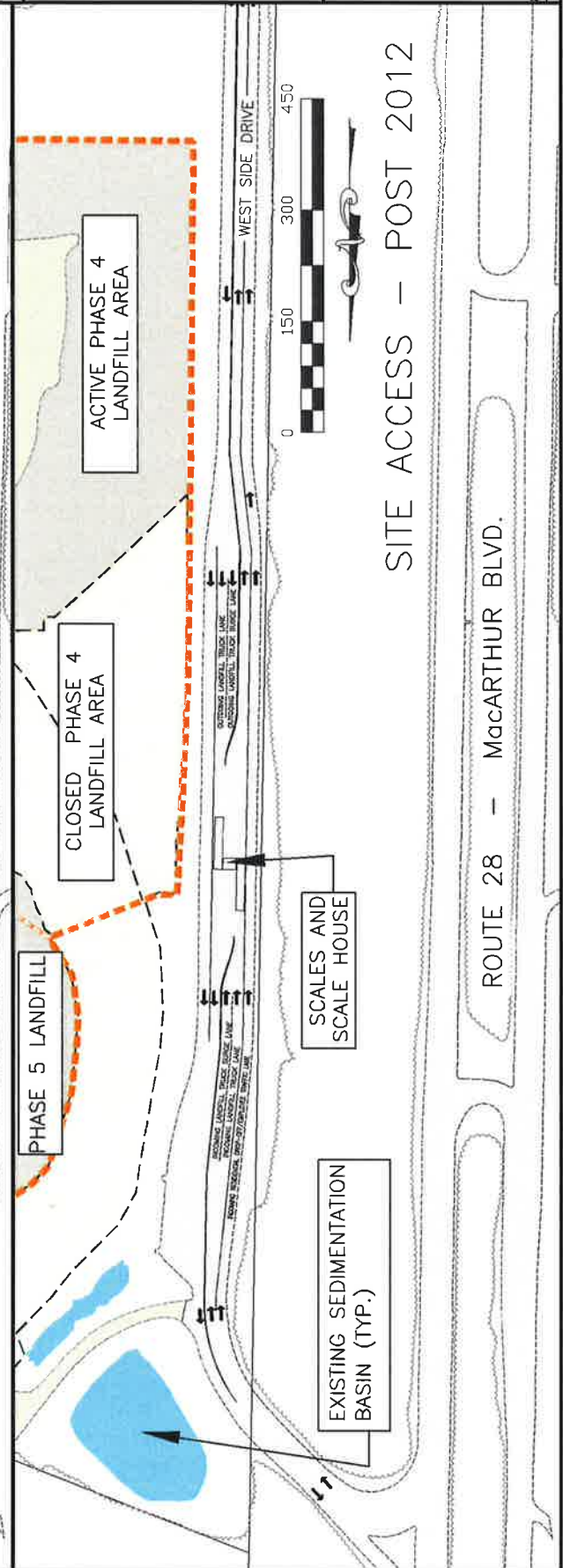
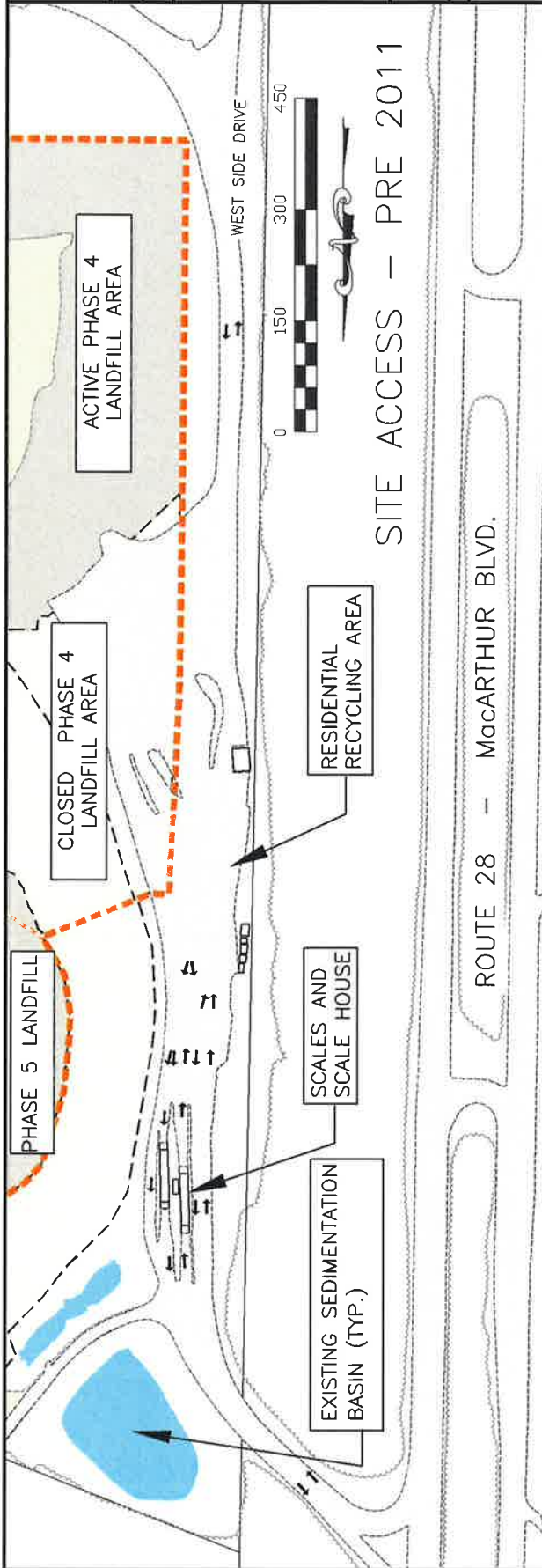
Table 1. Crash history.

	Number of Crashes ^a and Crash Rates			
	Driveway	MacArthur Boulevard Northbound Driveway Intersection	MacArthur Boulevard Northbound/ U-Turn Intersection	MacArthur Boulevard Southbound/ U-Turn Intersection
Years	0	0	0	0
2013	0	0	0	0
2014	1	0	0	0
2015	1	1	0	0
2016	0	2	0	0
2017	0	0	1	0
2018	0	1	1	0
2019	0	0	1	0
2020	0	0	0	0
Total	2	4	3	0
Average Per Year	0.31	0.62	0.47	0
Crash Rates				
This Location ^b	---	0.17	0.13	0
MassDOT District 5 Average ^c	---	0.57	0.57	0.57
MassDOT State Average ^c	---	0.57	0.57	0.57
Severity				
Property-Damage Only	1	3	2	0
Personal Injury	1	1	1	0
Type				
Angle	0	0	2	0
Rear-End	0	4	1	0
Single-Vehicle	2	0	0	0
Road Surface				
Dry	1	4	3	0
Wet	1	0	0	0
Weather				
Clear	0	3	3	0
Cloudy	1	0	0	0
Rain	1	0	0	0
Light				
Not Reported	0	1	0	0
Daylight	2	4	1	0
Dusk	0	0	2	0
Heavy Vehicle				
Yes	0	1	0	0
No	2	3	3	0

^a From MassDOT, accessed June 4, 2020. For January 1, 2013 to June 4, 2020. Crash information after December 31, 2017 is subject to change, per MassDOT.

^b Estimated entering vehicles = 10,000 per day. MEV = 1,000,000 entering vehicles.

^c From <https://www.mass.gov/service-details/intersection-and-roadway-crash-rate-data-five-analysis>, accessed June 8, 2020. MEV = 1,000,000 entering vehicles.



ATTACHMENT 10
CUMULATIVE IMPACT ASSESSMENT

May 19, 2003

Greg Smith, Planner
Cape Cod Commission
3225 Main Street
Barnstable, MA 02630

Dear Mr. Smith,

Enclosed please find our report "Interim Risk Evaluation and Cumulative Impact Assessment of the Proposed Phased Landfill Development of the Town of Bourne Integrated Solid Waste Management Facility." The report is more extensive in scope than previous Risk Evaluations and Impact Assessments for similar facilities in order to account for a variety of development plans for the future of the site. This approach was approved in concept by Carol Rowan West and Barbara Kwetz of DEP who visited the site (see attached letter dated May 7, 2002) and agreed that it made sense to look at reviewing the entire 103 acre site and potential operations in an expanded CIA. This should avoid the need for numerous future submittals for upcoming cell development beyond Phase 3, Stage 3 and for site assignment of the recently acquired 25-acre parcel to the south.

We understand that DEP/SERO is currently holding approval of the Authorization to Construct (ATC) for Phase 3, Stage 3 pending acceptance of our CIA by the DEP's Office of Research and Standards. It is critical for the continuing operation of the ISWM Facility that construction begin on this stage so that airspace will be available this fall when Phase 3, Stages 1 and 2 are expected to be filled. Therefore, we ask DEP/ORS to consider granting conditional approval for our CIA so that DEP/SERO can issue us an ATC as soon as possible. Any unresolved issues can be addressed as conditions of approval for an Authorization to Operate (ATO). To facilitate this process, we recommend meeting with DEP as soon as is practical to determine the initial response to the draft CIA.

Thank you in advance for your time and consideration in reviewing this report.

Sincerely,



Michael Ames, Sc.D.
Associate Engineer

Cambridge Environmental Inc

58 Charles Street Cambridge, Massachusetts 02141
617-225-0810 FAX: 617-225-0813 www.CambridgeEnvironmental.com



TOWN OF BOURNE
Department of
Integrated Solid Waste Management



Mailing:
24 Perry Avenue
Buzzards Bay, MA 02532
(508) 759-0651

Location:
201 MacArthur Blvd.
Bourne, MA 02532
Fax: (508) 759-0652

May 7, 2002

Ms. Carol Rowan West, MSPH
Director, Office of Research & Standards, MA DEP
One Winter Street
Boston, MA 02108

RE: Cumulative Impact Assessment (CIA) and Potentially Productive Aquifer (PPA) at the Bourne ISWMF.

Dear Ms. Rowan West,

Thank you for taking the time to visit the Bourne Integrated Solid Waste Management Facility (ISWMF) recently to discuss how we can work with you and Barbara Kwetz regarding implementation of tasks in the Interim Risk Evaluation Guidance Document. This is especially helpful to us as we move through the development of our landfill and site assignment of recently acquired land.

We have hired Cambridge Environmental, Inc. (Steve Zemba) to assist us with preparing a draft scope for our Cumulative Impact Assessment (CIA) for our entire facility and anticipate meeting with you and Barbara Kwetz in Boston to discuss our approach sometime this spring.

During your site visit in March, at which Dave Ellis from the SERO was in attendance, the issue of Cape Cod being listed as a Potentially Productive Aquifer (PPA) was raised and how this would affect the development of the ISWMF. We feel, as was echoed by Mr. Ellis, that since our landfill has always been considered for full build-out as a phased development from the very beginning, and that our newly acquired land is intended to be used for solid waste handling only, the PPA issue is not applicable to our facility. Additionally, the Bourne Water District (BWD) is not interested in developing any public drinking water supplies downgradient of the ISWMF, we are in the final stages of connecting the last downgradient private drinking water well to BWD water, and our quarterly groundwater monitoring program has not shown any significant groundwater impacts.

Once you have had a chance to discuss this issue with your internal DEP water working group, we would be happy to meet with you to discuss how we could formally address this issue during our CIA or other permitting processes. In the meantime, you may contact me, or Phil Goddard, at 508-759-0651 if you have any questions.

Sincerely,

Brent T. Goins
General Manager

Cc: Dave Ellis, MA DEP/SERO
Barbara Kwetz, MA DEP/Boston

**Interim Risk Evaluation and
Cumulative Impact Assessment
of the Proposed Phased Landfill
Development of the Town of Bourne
Integrated Solid Waste Management
Facility**

Prepared for:

Town of Bourne

by:

Michael Ames, Sc.D. and Stephen G. Zemba, Ph.D., P.E.

Cambridge Environmental Inc.

May 2003

Cambridge Environmental Inc

58 Charles Street Cambridge, Massachusetts 02141
617-225-0810 FAX: 617-225-0813 E-mail: info@CambridgeEnvironmental.com

1 Executive summary

The Town of Bourne, Department of Integrated Solid Waste Management (ISWM) has proposed a phased development of its Integrated Solid Waste Management Facility (ISWMF). As the proposed development will accept more than 150 tons of waste a day, an interim risk evaluation has been performed for the proposed development in accordance with Massachusetts Department of Environmental Protection's (DEP) interim guidance (DEP, 2001a). This evaluation includes a Level II quantitative estimation of potential risks to human health, and a qualitative cumulative impact assessment that considers other sources of VOCs in the vicinity of the proposed development.

Massachusetts' solid waste regulations continue to evolve, and there is some uncertainty concerning the manner in which the Bourne ISWM will be developed. By estimating potential risks due to a wide range of possible waste disposal and waste handling scenarios, potential risks due to any combination of scenarios can be considered.

The ISWM is currently a non-Municipal Solid Waste (non-MSW) landfill. The facility accepts construction and demolition materials (C&D), bulky items and various other waste streams, but not MSW or household trash. The ISWM provides solid waste management services such as recycling, composting, waste processing, and landfilling to Bourne, as well as surrounding communities and businesses on Cape Cod and southeastern MA. As part of the proposed multi-phase development, some MSW that was previously placed in closed and capped (but unlined) areas of the ISWM property may be relocated into newer lined sections of the landfill. Therefore this risk evaluation examines potential emissions from the newly accepted non-MSW materials as well as the relocated MSW. In order for this risk evaluation to cover other possible development scenarios, full quantitative risk estimates were also performed for the disposal of MSW in the future development stages, and for the increase of waste acceptance rates from the current 146,000 tons per year to 365,000 tons per year. A screening-level methodology for examining risks associated with the disposal of special wastes that could be emitted as fugitive dust is also set forth and applied to the possible disposal of municipal waste combustor (MWC) ash residue at the landfill.

To identify constituents of concern, composition profile for the gaseous decay products of the non-MSW materials was constructed using recent site-specific sampling data. For evaluating risks due to gaseous products of MSW decay AP-42 (the U.S. EPA's 'Compilation of Air Pollutant Emission Factors') default concentrations for chemicals of concern (COCs) in landfill gas (AP-42 Table 2.4-1) were used. The composition of the landfill gas from the older MSW

material is thus assumed to match the AP-42 default concentrations.

Landfill gas generation rates from the proposed development were estimated using U.S. EPA's LandGEM (Landfill Gas Emissions Model). Gas generation rates for the non-MSW portions of the landfill were calculated using generation potential and rate parameters specifically developed to model the decay of such material (Commonwealth, 2000). Parameters to describe the decay of the previously placed MSW were taken as the AP-42 default values. Landfill gas collection efficiencies judged appropriate for the proposed gas control systems were applied to estimate the net amount of landfill gas likely to be released to the atmosphere from the proposed development phases.

The dispersion of emitted landfill gas was calculated using the ISCST3 (Industrial Source Complex — Short Term) model. The landfill emission sources were configured to match each of the proposed development phases, and regional meteorological data were used to characterize transport patterns within the vicinity of the landfill. Area-specific land use was considered to identify the locations of current and foreseeable residences and businesses. Concentrations of COCs were predicted at the residential and commercial/industrial locations that are expected to experience the greatest impacts from emissions of the proposed landfill developments.

Potential non-carcinogenic (both chronic and sub-chronic) and carcinogenic risks were then calculated for both residential and commercial/industrial receptors using DEP's Risk Assessment Spreadsheet (DEP, 2001b). Non-cancer risks are assessed using Hazard Indices (HIs) designed to appraise the potential for all health effects endpoints except cancer that potentially could be caused by COCs emitted by the facility over both an intermediate, or sub-chronic, period (1 year), and over a lengthy, or chronic, period (up to 30 years). Cancer risks are assessed as Excess (or incremental) Lifetime Cancer Risks (ELCRs). These are an individual's incremental risk of getting cancer (above and beyond the background cancer incidence) due to long-term exposure (for 30 years) to COCs emitted by the facility.

These risk estimates are compared with two sets of criteria levels defined by the DEP (2001a). The Massachusetts Contingency Plan (MCP) target risk management criteria are Total Facility Hazard Indices (chronic and sub-chronic) of 1, and an Excess Lifetime Cancer Risk of 1×10^{-5} . Absent any other significant factors, these risk management criteria apply to a proposed facility. The *de minimis* risk criteria are defined as total facility Hazard Indices (chronic and sub-chronic) of 0.1, and an Excess Lifetime Cancer Risk of 1×10^{-6} . Proposed facilities that pose a *de minimis* risk are generally approvable at any location. A *de minimis* risk is generally considered an insignificant risk (DEP, 2001a).

Table 1.1 presents HI and ELCR results for all of the MSW and non-MSW disposal scenarios. These include all of the combinations disposal of MSW and non-MSW materials, whether or not MSW currently in the older sections of the ISWMF is relocated, and for the current waste disposal rate and an increased disposal rate. Table 1.2 provides the risk estimates for the

screening-level assessment of ash disposal at the ISWFMF. The risk estimates in these tables apply to an individual either living or working at the specific receptor location that is expected to experience the highest average concentrations of gases from the landfill for the specified waste scenario. The values are also based on the risk assessment baseline values of various parameters such as the landfill gas composition and the landfill gas collection system efficiency. Estimates using other sets of assumptions are described in section 3.5 of this report as uncertainty and sensitivity analyses.

As can be seen in Tables 1.1 and 1.2, all of the cancer risk estimates fall well below the Massachusetts *de minimis* or insignificant criteria, as do all of the Hazard Indices for the disposal of MSW or ash residues. For the disposal of non-MSW materials some chronic effect Hazard Indices are equal to the criteria level of 1 (to a single significant digit), and the sub-chronic HIs are 0.2 and 0.3. The magnitude of these values are almost entirely due to the presence of significant levels of hydrogen sulfide (H₂S) in recently sampled gas from the non-MSW sections of the landfill.

However, based on an analysis of current conditions at the ISWFMF, the concentrations of ambient H₂S estimated in the risk evaluation for these scenarios are likely to be significantly higher than those that will actually occur, and hence the potential for health effects to be caused by H₂S at these levels is likely overestimated. The portion of the modeling of H₂S that contains the greatest uncertainty is the estimation of landfill gas generation rates due to the decomposition of non-MSW materials. It is believed that the modeling of landfill gas generation contained in the risk evaluation significantly overestimates the actual rate based on (1) the amount of gas collected from the current phase of the landfill that contains non-MSW materials, and (2) because, if the modeling were accurate for the current conditions, there would be a much higher level of odors presently at the landfill. This suggests that either the actual gas generation rates are well below the estimates or that the gas collection efficiency is greater than what is assumed in the modeling. Uncertainty regarding the health effects of chronic exposure to H₂S also led to the likely overestimation of risk in these scenarios.

The extremely high H₂S concentrations measured in the non-MSW landfill gas emphasizes the need for comprehensive, efficient gas collection and control. These needs are being accomplished at present at the landfill. The accuracy of future non-MSW landfill gas generation estimates can be gauged either formally through on-site sampling, and/or informally through the monitoring and observation odor levels. Best Management Practices (BMPs) to manage and control gas emissions are imperative for the disposal of non-MSW materials. These issues are discussed more fully in the Uncertainty and Sensitivity section and the Conclusions of this report.

For perspective, it should be noted that DEP's acceptable risk criteria correspond to very small levels of risk — levels that are much smaller than everyday risks faced by people from a variety of sources. As an example, consider the *de minimis* and target risk criteria for incremental cancer risk, which represent the additional chance of getting cancer above and beyond the risk that

already exists from other causes (*i.e.*, the background risk). The chances of getting cancer in one's lifetime are about 1 in 2 for men and 1 in 3 for women. Expressed as the number of chances per million, the comparative risks of getting cancer, and the additional chances of getting cancer that correspond to DEP's risk criteria are:

	<i>Chances per 1,000,000</i>
Lifetime chance of getting cancer from everyday living (men)	500,000
Lifetime chance of getting cancer from everyday living (women)	333,333
Additional chance of getting cancer allowed by DEP's target criterion	10
Additional chance of getting cancer at DEP's <i>de minimis</i> criterion	1

It should also be noted that risk estimates are designed to overestimate actual risk. Where there are engineering and scientific uncertainties in the modeling and estimation of emissions, exposures, and health effects, the assumed values for various factors in the calculations are selected to overestimate hazards and risks. For example, the primary toxicologic data used to evaluate risks associated with exposure to COCs are often modified by uncertainty factors that may result in greatly overestimated potential hazards and risks. Thus, the actual incremental cancer risks and potential for non-cancerous health effects due to emission from the ISWM are likely to be lower the values in Table 1.1 and 1.2 may indicate. All of the quantitative hazard and risk estimates produced as part of this risk assessment may be viewed as being conservative, or as, more likely than not, being overly protective of human health.

DEP's interim guidance also requires a qualitative cumulative impact assessment to identify significant sources of VOC emissions already present in the vicinity of the proposed development (DEP, 2001a). Based on data from the MA DEP's Stationary Source Emission Inventory System (SSEIS) database, there are no off-site sources of volatile organic compounds (VOCs) within one mile of the landfill. Potential emissions of 1 ton per year from the existing portions of the Bourne Landfill are contained in the DEP database for the year 2000. The two nearest sources of VOCs listed in the database are the Massachusetts Maritime Academy with emissions of 8 tons per year (2001), located approximately 2.4 miles from the landfill; and the OTIS Air National Guard Base at the Massachusetts Military Reservation with emissions of 2 tons per year (2001), located approximately 3 miles from the landfill. Because total potential VOC emissions within one mile of the facility do not exceed 50 tons per year, the suitability of the development may be judged based solely on the facility-specific and site-related factors.

In addition, DEP's interim guidance (2001a) requires an assessment of groundwater and surface water quality near the existing landfill, and an assessment of the potential impacts of the development on groundwater and surface water quality. The Bourne ISWMF is located in the Sagamore lens area of a sole source aquifer that provides drinking water to Upper Cape Cod. Areas directly down-gradient of the landfill, however, have been exempted as sources of potential drinking water. There are no active wells down-gradient of the landfill whose safety are adversely affected by facility related contamination.

Table 1.1 Risk assessment baseline maximum^a estimated total Hazard Indices (HIs) and Excess Incremental Lifetime Cancer Risks (ECLRs) due to landfill gas emissions

Scenario			Residential Receptors			Commercial/Industrial Receptors		
disposal rate	waste relocation	waste type	Sub-chronic HI ^b	Chronic HI ^b	ECLR ^c	Sub-chronic HI	Chronic HI	ECLR
Current Disposal Rate	no	non-MSW	0.2	1	5×10^{-9}	0.2	0.8	4×10^{-9}
	no	MSW	0.003	0.005	1×10^{-7}	0.003	0.004	7×10^{-8}
	yes	non-MSW	0.3	1	6×10^{-9}	0.2	1	5×10^{-9}
	yes	MSW	0.004	0.006	1×10^{-7}	0.003	0.004	9×10^{-8}
Increased Disposal Rate	no	non-MSW	0.3	1	5×10^{-9}	0.2	0.8	4×10^{-9}
	no	MSW	0.004	0.005	9×10^{-8}	0.003	0.004	7×10^{-8}
	yes	non-MSW	0.3	1	6×10^{-9}	0.2	0.9	5×10^{-9}
	yes	MSW	0.005	0.005	1×10^{-7}	0.004	0.004	8×10^{-8}

^a Hazard Indices should be compared with the applicable MA DEP risk criteria for potential non-cancer effects, which is a Hazard Index of 1. Hazard Indices equal to or less than 0.1 are considered *de minimis* or insignificant, and are generally approvable at any location.

^b Excess Lifetime Cancer Risks should be compared with the applicable MA DEP risk criteria for cancer effects, which is an excess risk of 1×10^{-5} . Excess Lifetime Cancer Risk equal to or less than 1×10^{-6} are considered *de minimis* or insignificant, and are generally approvable at any location.

^c Risks are evaluated at receptor locations in the vicinity of the landfill where the highest impacts from the landfill development are estimated to occur.

Table 1.2 Screening-level total Hazard Indices (HIs) and Excess Incremental Lifetime Cancer Risks (ECLRs) due to fugitive dust emissions from the disposal of MSW ash residues

Scenario		Residential receptor scenario			Commercial industrial receptor scenario		
disposal rate	waste relocation	Sub-chronic HR	Chronic HR	ECLR	Sub-chronic HR	Chronic HR	ECLR
Current rate	no	0.002	0.0007	2×10^{-9}	0.002	0.0005	2×10^{-9}
	yes	0.002	0.0007	3×10^{-9}	0.002	0.0006	2×10^{-9}
Increased rate	no	0.005	0.0007	2×10^{-9}	0.005	0.0005	2×10^{-9}
	yes	0.005	0.0008	3×10^{-9}	0.005	0.0006	2×10^{-9}



COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
ONE WINTER STREET, BOSTON, MA 02108 617-292-5500

MITT ROMNEY
Governor

ELLEN ROY HERZFELDER
Secretary

KERRY HEALEY
Lieutenant Governor

EDWARD P. KUNCE
Acting Commissioner

TO: Dan Connick, BWP, SERO

THROUGH: Carol Rowan West, Director, ORS *CRW*
Glenn Keith, Planning and Evaluation Division, BWP, Boston *AK For Glenn Keith*

FROM: Diane Manganaro, ^{DMR} ORS
Steve Dennis, BWP. *SD*

DATE: July 1, 2003

SUBJECT: Review of the Interim Risk Assessment and Cumulative Impact Assessment of the Proposed Phased Landfill Development of the Town of Bourne Integrated Solid Waste Management Facility

The Office of Research and Standards (ORS) and the Bureau of Waste Prevention (BWP) have reviewed the "Interim Risk Assessment and Cumulative Impact Assessment of the Proposed Phased Landfill Development of the Town of Bourne Integrated Solid Waste Management Facility" report dated May 2003. This report, prepared by Cambridge Environmental, Inc., was submitted in support of the Town of Bourne's request to build a phased development of the existing Bourne Integrated Solid Waste Management Facility (ISWMF). This facility is currently a non-municipal solid waste landfill that accepts construction and demolition debris (C&D), bulky items and various other waste streams but not municipal solid waste (MSW) or household trash. The ISWMF provides recycling, composting, waste processing and landfilling capacities. The facility-based impact evaluation submitted by the applicants examines a number of scenarios, involving the disposal of additional non-MSW waste (including municipal waste combustor (MWC) ash), the relocation to a lined area of some MSW that was historically placed in an unlined section of the landfill, and the potential future disposal of MSW considering both current and increased waste acceptance rates.

In accordance with the Massachusetts Department of Environmental Protection (MADEP's) "Interim Risk-Evaluation Guidance Document for Solid Waste Facility Site Assignment and Permitting in Support of 310 CMR 16.00 & 19.000" (hereafter referenced as the Interim Guidance Document), this report includes a Level 2 impact evaluation to address the proposed expansion request. Our review addresses the consistency of this report with the requirements of the Interim Guidance Document. Our conclusions and recommendations are presented below:

Conclusions

The modeling analysis contained in the cumulative impact assessment provides a reasonable estimate of concentrations of air contaminants of concern emitted from the subject landfill. The general risk assessment approach used by the consultants is also consistent with MADEP guidance. The report indicates that for scenarios in which the landfill only accepts MSW, estimated risks are below *de minimis* risks for both non-cancer and cancer endpoints. However, for scenarios in which the landfill accepts non-MSW waste, non-cancer risks exceed MADEP risk limits, mainly attributed to H₂S that is generated from C&D waste. In addition for the non-MSW scenarios, a comparison of predicted 30-year ambient concentrations of H₂S to maximally exposed receptors also indicates that these levels exceed the MADEP allowable ambient limit (AAL) for H₂S.

The exceedance of MADEP risk limits is determined based on site-specific landfill gas testing results taken in October and December 2002, from an existing portion of the landfill that accepted non-MSW. Additional testing, conducted in May 2003, resulted in concentration estimates of H₂S that were of half the magnitude of the previous testing rounds. There is a question as to the comparability of the more recent data to the older data since two different analytical methods were used and the differences in the precision and accuracy of these methods is unknown. An analysis of the May 2003 landfill gas testing data results in non-cancer risk estimates that meet MADEP risk limits although predicted ambient concentrations are still predicted to exceed the MADEP AAL for non-MSW scenarios.

These data indicate that continued disposal of non-MSW in the manner that has been used in the past poses an unacceptable health risk to receptors in the area of the ISWMF. This is in contrast to a scenario in which the landfill only accepts MSW, which results in minimal risks to receptors. ORS believes that a comprehensive waste acceptance and processing strategy that integrates acceptance of MSW and processed non-MSW waste can be developed which may limit emissions of H₂S to levels that meet MADEP risk limits. We recommend that the Town of Bourne work with SERO regional staff to develop such an approach.

Finally, the evaluation of groundwater resources required to be submitted as part of this evaluation indicates an exceedance of two compounds in off-site monitoring wells. The report indicates a general improvement in groundwater quality over time, attributed by SERO staff to the fact that the older, unlined portions of the landfill that were the source of groundwater contamination, have been mined and capped.

SERO staff has completed its review of the Comprehensive Risk Assessment (CSA) (December 1999) and will be issuing a technical review letter in the near future. They will determine whether additional remedial actions will be required and will finalize the environmental monitoring plan for the entire site.

We therefore recommend that this Facility-Based Impact evaluation be approved with the caveats discussed above and detailed below.

Modeling Issues

See attached memo dated June 26, 2003 from Steve Dennis entitled "Review of the Cumulative Impact Analysis for the Proposed Phased Landfill Development of the Town of Bourne Integrated Solid Waste Management Facility, dated May 2003".

Risk Assessment Issues

1.) The consultants conducted the risk assessment using site-specific information (collected in October and December, 2002) at the Bourne ISWMP Phase 2. Phase 2 of the landfill has accepted only non-MSW since it opened in May 1999 and has been capped and equipped with a landfill gas collection system. The applicants used site-specific information for this facility since gas produced by non-MSW can differ significantly from gas produced by MSW, particularly in the amount of hydrogen sulfide (H₂S) generated from such materials as gypsum wallboard, a large component of C&D waste. The consultants took two samples of landfill gas in both October and December 2002. They used site-specific data for detected chemicals that are on the default AP-42 list, a value of ND for compounds that were not detected on either sampling date, and a value of one-half the method detection limit for compounds not detected in one sample that were detected in at least another sample. In addition, AP-42 COCs that were not analyzed in the site-specific data (i.e., mercury and t-1,2-dichloroethylene) were assumed to be present at the default AP-42 levels.

The Interim Guidance Document specifies that AP-42 default values should be used although site-specific data may be used at the discretion of the regional office. Given that these data were taken from an area which contains no MSW, ORS agrees that use of the site-specific data is appropriate. MADEP's policy in the past has been that when site-specific data are used, the higher of either the AP-42 value or the site-specific value should be used as the default. Although the consultants did not take this approach, ORS agrees that site-specific landfill gas results are much more representative of actual gas emissions than are AP-42 values. AP-42 values were developed to apply to MSW facilities while the site-specific data are representative of non-MSW waste. For non-cancer risks, given the fact that exposures and resulting risks to these gases are clearly driven by H₂S by a number of orders of magnitude, use of the higher value as described above would be both irrelevant and of minimal impact to final risk estimates for this facility. However, to account for possible additional cancer risk from MSW, it is suggested that at least the higher of the AP-42 or site-specific values for carcinogenic chemicals be included in this evaluation to estimate Excess Lifetime Cancer Risk (ELCR) or alternatively that an uncertainty analysis be done to compare ELCR from site-specific, or non-MSW emissions versus AP-42, or MSW emissions at this facility to demonstrate any differences.

2.) The consultants assume a landfill gas capture efficiency of 75% in active landfill cells and 90% post-closure. They provide correspondence from the Waste Industry Air Coalition and SCS Engineers addressing the efficiency of landfill gas collection systems as documentation for their assumed collection efficiency of 90% for a post-closure landfill. While we acknowledge that landfill gas collection efficiencies are likely to have improved over time, MADEP maintains its position that this estimate should not be used unless additional, more quantitative documentation is submitted that demonstrates that the 90% value is representative for this

facility. In the absence of this information, we request that the 75% value also be used for the post-closure scenario. The sensitivity analysis presented in Tables 3.51-3.54, which incorporates the 75% post-closure scenario, adequately addresses this issue. ORS will consider the risks incorporating a 75% post-closure assumption in its evaluation of this report. In terms of landfill gas collection efficiency for the active cell, MADEP is proposing in its revision of the Interim Guidance Document to recommend a 0% efficiency for landfill cells that are still operating. The proponent should work with SERO staff to identify the landfill gas collection efficiency for active cells that is appropriate for this facility.

3.) Final risk estimates calculated using the 75%/75% pre- and post-closure assumption and the data from the October and December 2002 site-specific landfill gas monitoring results indicate that chronic Hazard Indices (HI) exceed MADEP risk limits for non-cancer risk for scenarios A and C at both current and increased waste acceptance rates for all residential and all but one commercial receptor. This exceedance is clearly driven by the concentration of H₂S at this facility.

Additional sampling results were submitted to us by the consultants in a memo dated June 17, 2003 with an attached memo from SITEC Environmental (dated June 3, 2003) containing the data. Two landfill gas samples were taken on two days (i.e., May 23rd and May 30th 2003) using a Drager tube fitted with a pump apparatus. The submitted results included the quantified values along with pictures of the exposed Drager tubes:

The method used to collect the May 2003 data is very different from the method used in the October and December 2003 sampling rounds. The first two sampling rounds were collected and analyzed using published EPA methods including analysis by gas chromatography/mass spectrometry GC/MS. There was no information on the precision and accuracy of the Drager tube method. It is difficult to assess from the information submitted whether the difference in results can be attributed to actual changes in the data or if this difference may be reflect differences in the accuracy of the two methods.

We recommend that additional samples be taken be conducted using EPA-recommended methodologies as approved by MADEP to allow for direct comparison to the original October/December 2003 data.

4.) A comparison of the risk assessment baseline values of COC_{air} (μg/m³) estimated in the consultants' May 2003 report for a 30-year exposure indicates that the calculated values exceed the ORS chronic allowable ambient limit (AAL) for H₂S in air of 1 μg/m³ for a number of residential and commercial receptors in scenarios A and C, the non-MSW scenarios. These values range from about 1-4 μg/m³ in the May 2003 report. Assuming, as the information from the June 3, 2003 SITEC memo indicates, that a more recent estimate of these values is one-half of the values in May 2003 report, then these values would fall into the range of 0.5-2 μg/m³. The estimated values for the A and C scenarios for the commercial/industrial receptor would still exceed the H₂S AAL.

5.) As part of the uncertainty and sensitivity analysis section at the end of this report, the consultants cite information that seemingly lessens the perceived hazard of H₂S. Most of the

information cited addresses animal and human studies in which subjects were exposed to very high concentrations. While it is true that H₂S can be extremely acutely toxic as an asphyxiant and an irritant at high concentrations, this compound is reported to be toxic at low concentrations as well. Effects from H₂S exposure are reported to occur at levels as low as 0.13-2.8 mg/m³. Reported effects are on the respiratory system, the nervous system and the heart. Symptoms include eye and throat irritation, headache and nausea. The proposed mechanism of toxicity, as with cyanide, is inhibition of cellular oxidative metabolism. Direct inhibition of cellular enzymes, in particular cytochrome oxidase, an enzyme involved in cellular oxidative process and energy production has been implicated. Nervous and cardiac tissues, which have the highest oxygen demand, are especially sensitive to the disruption of oxidative metabolism by H₂S (MADEP, 2001).

6.) Table 3.30 which lists the toxicity data used in DEP risk calculations (and referenced as the DEP Risk Assessment Spreadsheet in Support of the Interim Guidance Document) excluded the subchronic and chronic Reference Concentrations (RfCs) for ethane based on the consultants' opinion that use of the hexane value overestimates risk for ethane. In the absence of a quantitative toxicity value for ethane, the ORS Risk Assessment Spreadsheet designates the toxicity value for hexane as a surrogate for ethane. As the consultants state in their discussion of uncertainty in Section 3.7 of their report, in their opinion the use of the hexane value to account for ethane toxicity results in an overestimate of the risk. As a result of the consultants' omission, risks from estimated ethane emissions were not included in the evaluation for this facility. Due to the fact that H₂S clearly drives the non-cancer risk estimates for this facility, the risk contribution from ethane for this facility is not expected to significantly impact the final non-cancer risk estimate.

Groundwater Issues

ORS defers to the MADEP southeast regional office (SERO) hydrogeology staff for issues pertaining to water resources evaluation. The adequacy of this evaluation to characterize the extent of contamination at this site is subject to the opinion of SERO hydrogeology staff. SERO staff is reviewing the status of the CSA for this facility. SERO will determine whether additional remedial actions will be required and will finalize the environmental monitoring plan for the entire site.

7.) Upon consultation with the SERO hydrogeology staff, ORS is considering the groundwater in the vicinity of the Bourne ISWMF to be classified as GW-1. As such, there were two exceedances seen in deep, off-site wells in this area, including one exceedance of the GW-1 standard for lead and one exceedance of the GW-1 standard for 1,2-dichloroethane. Upon review of the Hydrogeologic Investigation for Bourne Integrated Solid Waste Management Facility compiled by Mahoney and Douglas for the consultants (hereafter referred to the hydrogeologic report) and consultation with the SERO hydrogeology staff, ORS concurs that monitored levels to date have appeared to decrease over time. This decrease has been attributed by SERO staff to the fact that the older, unlined portions of the landfill that were the source of groundwater contamination, have been mined and capped. The progress of this contamination should continue to be monitored on a periodic basis.

8.) In section 4.2 of the hydrogeologic report, the proponents note that a number of private drinking water wells not originally covered by the original USGS particle tracking map, are vacant lots. This section does not address any measures or safeguards that the Town of Bourne will take to ensure that private wells will not be installed at these vacant lots once these lots are developed. This issue should be addressed by the proponents.

Best Management Practices

9.) The applicant has committed to ongoing use of Best Management Practices (BMPs). However, the section on diesel emissions only commits to a pilot project to test two technologies on two pieces of equipment. MADEP does not require such testing of technologies. The applicant should consult with MADEP/SERO to establish a clear commitment for retrofitting specific pieces of frequently used equipment.

References

ATSDR (Agency for Toxic Substances and Disease Registry). July 1999. Toxicological Profile for Hydrogen Sulfide. U.S. Department of Health and Human Services. Public Health Service.

MADEP (Massachusetts Department of Environmental Protection). July 1995. Guidance for Disposal Site Risk Characterization in Support of the Massachusetts Contingency Plan. Office of Research and Standards.

MADEP (Massachusetts Department of Environmental Protection). December 5, 2001. Hydrogen Sulfide: Proposed Chronic, Subchronic and Acute Inhalation Exposure Guidelines – Draft Document. Office of Research and Standards.



COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
ONE WINTER STREET, BOSTON, MA 02108 617-292-5500

MITT ROMNEY
Governor

KERRY HEALEY
Lieutenant Governor

ELLEN ROY HERZFELDER
Secretary

EDWARD P. KUNCE
Acting Commissioner

MEMORANDUM

TO: Glenn Keith

FROM: Steve Dennis

DATE: July 1, 2003

SUBJECT: Review of the Cumulative Impact Analysis for the Proposed Phased Landfill Development of the Town of Bourne Integrated Solid Waste Management Facility, dated May 2003

The modeling analysis contained in the Cumulative Impact Analysis for the subject landfill facility provides a reasonable estimate of maximum air quality impacts of contaminants of concern (COC) emitted from the proposed landfill phases. The ICS3 model was used with EPA regulatory default options to estimate maximum air quality impacts at nearby residential and commercial receptor points of concern. Five years of surface meteorological data (Green airport in Rhode Island) and five years of upper air data (Chatham, Massachusetts) were employed for the analysis. Following are my comments.

1. Site-specific landfill gas data was used to determine concentrations for a number of COCs. According to the 2001 Interim Solid Waste Guidance, use of site-specific data needs to be approved by the DEP before that data's incorporation into a risk assessment. Because the site-specific data was not pre-approved by DEP for use in the risk assessment, risks may have to be recalculated those chemicals having an AP-42 emission rate values higher than the site-specific landfill gas emission rate measurements.
2. The uncertainty analysis in Section 3.5 indicated that a 75%/75% collection efficiency (before and after closure) would result in Hazard Index (HI) values of up to 2 at residential receptors for scenarios using non-MWS materials (the DEP Hazard Index criteria is 1). The maximum Excess Cancer Lifetime Risk (ECLT) would be 2×10^{-7} , well below the DEP *de minimus* ECLT criteria of 1×10^{-6} .
3. The uncertainty analysis in Section 3.5 indicated that with a 75%/75% collection efficiency, all scenarios using MSW materials would never exceed the DEP *de minimus*

This information is available in alternate format. Call April McCabe, ADA Coordinator at 1-617-556-1171. TDD Service - 1-800-298-2207.

HI criteria of 0.1 or the DEP *de minimus* ECLT criteria of 1×10^{-6} at any residential receptor point of concern.

4. Maximum off-site air quality impacts occur at and near the northeast property line. Impacts there are 2-3 times the maximum predicted impacts calculated for residential receptor points. Presumably, no residences would ever be allowed in this area.
5. Landfill gases are collected and burned by a flare with an assumed destruction efficiency of 98%. The unburned COCs were distributed over the landfill as an area source emission, instead of being treated a discreet point source of emissions. Previous analyses by Cambridge Environmental (reviewed and approved by DEP) indicated that modeling the flare emissions as an area source was a conservative and acceptable way of estimating air quality impacts from a landfill gas collection system.

December 10, 2003

Diane Manganaro
Massachusetts Department of Environmental Protection
One Winter Street
Boston, MA 02108

Dear Ms. Manganaro:

On May 19, 2003 we submitted to your office the "Interim Risk Evaluation and Cumulative Impact Assessment of the Proposed Phased Landfill Development of the Town of Bourne Integrated Solid Waste Management Facility" (the report). An addendum to the report was submitted on June 17, 2003 describing additional testing of the landfill gas's hydrogen sulfide (H₂S) content and revised risk estimates based on this newer data. The DEP Office of Research and Standards and Bureau of Waste Prevention reviewed these documents and issued a memorandum on July 1, 2003 outlining their conclusions and recommendations regarding the report and addendum's methods and findings. With this letter we provide the results and health estimate impacts of a complete re-analysis of the landfill gas and of other developments that have occurred since the DEP's review.

In brief, the most recent analysis of the landfill gas found approximately 40% as much H₂S in the undiluted gas as was measured for the original risk assessment, confirming the data presented in the addendum. Also, as was anticipated in the uncertainty section of the report, the U.S. EPA has *increased* its chronic RfC for H₂S from 1 µg/m³ to 2 µg/m³. When these changes are included in the health risk assessment calculations, it results in a factor of 5 reduction in the estimated potential for H₂S emissions from the ISWMF to cause adverse health effects.

Another recent development related to groundwater issues raised by the DEP is that the Bourne Board of Health has amended its regulations to prevent installation of any water wells down-gradient of the IWSMF, addressing an additional DEP concern.

Please feel free to contact me by phone, fax, or e-mail if you have any questions or comments about these issues.

Sincerely,



Michael Ames, Sc.D.
Associate Engineer

encl: Recent developments and health assessment impacts, laboratory analysis report, letter from Bourne Board of Health

cc: Carol Rowan West, Steve Dennis, Dave Ellis, Dan Connick, Greg Smith, Phil Goddard, William Griffin, Bourne Board of Health

Cambridge Environmental Inc

58 Charles Street Cambridge, Massachusetts 02141
617-225-0810 FAX: 617-225-0813 E-mail: info@CambridgeEnvironmental.com

Recent developments that impact the findings of the Interim Risk Evaluation and Cumulative Impact Assessment of the Proposed Phased Landfill Development of the Town of Bourne Integrated Solid Waste Management Facility

Following the May 19, 2003 submission to the Massachusetts DEP of our risk evaluation of the Phased Development of the Bourne ISWMF (the report), the June 17, 2003 submission of an addendum to the report, and the DEP's memorandum on July 1, 2003, two significant developments have occurred relating to the estimation of health effects of the facilities H₂S emissions. In addition, the Bourne Board of Health has amended its regulations to address a DEP concern regarding groundwater quality in the area.

Results of recent sampling and analyses of the ISWMF landfill gas

A primary finding of the original risk evaluation report was that baseline estimates of potential non-cancer health risks due to long-term emissions from the ISWMF were at the DEP risk management criteria Hazard Index (HI) of 1, and some results in the uncertainty and sensitivity section of the report exceeded this value. These risk estimates were almost entirely due to hydrogen sulfide (H₂S). However, it was believed that the H₂S levels that had been measured in the gas were probably not representative of what would be present under long-term future conditions because the gas collection system was in a startup condition when the samples were taken. Therefore a supplemental set of H₂S measurements were taken in May 2003, after the gas extraction system began operating in the manner expected for future operations. The details of this re-analysis effort and its impact on the health risk estimates were described in the June 17, 2003 addendum to the original report. The average H₂S concentration that was originally measured in the undiluted landfill gas was 19,800 mg/m³, while the subsequent measurements reported in the addendum averaged 9,600 mg/m³.

However, as commented on by the DEP (detailed point #3 in its July 1, 2003 memo), the analytical method used for these measurements was not identical to the method used originally, and the latter measurements were not based on an EPA-recommended, DEP-approved methodology. The DEP therefore advised that additional samples be taken using the original methods so that the current concentrations could be reliably compared with the earlier values. In November 2003 the landfill gas was again sampled and analyzed using the same methods (and laboratory) as the original tests. Based on these measurements the concentration of H₂S in the

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58 Charles Street Cambridge, Massachusetts 02141
617-225-0810 FAX: 617-225-0813 E-mail: info@CambridgeEnvironmental.com

undiluted landfill gas is 8,200 mg/m³ or approximately 40% of the original value. This measurement confirms the assertion in the report and addendum that the concentration of H₂S in the landfill gas would decrease as the gas collection system became fully operational. A copy of the laboratory analysis report is attached to this letter. The impact of employing this new measurement in the risk estimates is presented in Table 1.

Updated value and basis for the reference concentration for hydrogen sulfide

As part of the uncertainty and sensitivity section of the original report (pages 3-117 through 3-122), we noted that the U.S. EPA was in the process of revising the Reference Concentration (RfC) for H₂S, and that the value was likely to be raised from 1 µg/m³ to 2 µg/m³. The revised standard of 2 µg/m³ was issued on July 28, 2003 (IRIS, 2003). The previous RfC was based on a 1983 subchronic inhalation mouse study that used inflammation of the nasal mucosa as the critical endpoint. The newer RfC is based on a 2000 subchronic inhalation rat study where lesions of the olfactory mucosa was the critical endpoint. The EPA determined that the latter study was the most applicable for deriving an inhalation RfC for the following reasons. First, the critical effect had been reported by other investigators; second, the effect is consistent with the irritant properties of H₂S; third, the neurological and respiratory systems have been reported as target organs of H₂S toxicity by numerous researchers; and fourth, the study's No-Observed-Adverse-Effect and Lowest-Observed-Adverse-Effect levels (NOAEL and LOAEL) are at lower concentrations than those observed in the other studies.

Because the potential for non-cancerous health effects to result from an inhalation exposure to a compound is estimated by dividing the exposure point concentration by the compound's RfC, a doubling of the RfC results in a *halving* of the estimated potential for the same exposure to cause harm. The impact of employing EPA's updated RfC for H₂S in the chronic non-cancer risk estimates is presented in Table 1.

In its review of the risk evaluation (comment #4), DEP compares ambient concentrations of H₂S estimated in the risk evaluation with the DEP's Allowable Ambient Limit (AAL) for H₂S of 1 µg/m³. Because this value is based directly on the EPA's former RfC (DEP, 1995), it will presumably be revised to 2 µg/m³ to be consistent with EPA's updated value. Although AALs are not recommended as applicable standards in DEP's Interim Guidance Document (DEP, 2001) they are potentially relevant guidelines. We note that making the comparison described in comment #4, but employing the updated landfill gas data and an AAL revised to match the RfC, would find the ambient concentrations below the guideline. Revised ratios of the estimated ambient H₂S levels to an updated AAL are effectively one-fifth the original ratio rather than one-half the original as anticipated in comment #4.

Amended Bourne Board of Health regulations for down-gradient water wells

DEP's comment #8 notes that vacant lots exist in the region that is hydraulically down-gradient from the ISWMF. This region is shown on the US Geological Survey tracking maps that were included as figures in Appendix F of the risk evaluation. The DEP advised the Town of Bourne to take the necessary measures to ensure that private wells not be installed at these lots. On September 24, 2003 the Bourne Board of Health addressed this concern by amending its regulations to prohibit installation of any private or public well to be used for drinking water consumption which is hydraulically down-gradient of the ISWMF. A copy of the letter from the Board of Health to the ISWM describing the amendment is attached to this letter.

Conclusions

The chronic hazard indices (HIs) calculated using the original and revised landfill and health effects modeling parameters are shown in Table 1. The long-term waste disposal scenario that these values represent is the one that generally produced the highest HIs in the initial risk evaluation: the disposal of non-MSW materials at an increased annual rate, and with the relocation of waste from the completed ISWMF Phase 1ABC (identified in the original risk evaluation as Scenario C-high). The effects of the revised modeling parameters on other scenarios are similar to the ones shown here but the values are generally lower. As described above, the combined effect of including the updated landfill gas composition measurements and EPA's revised H₂S reference concentration is to lower the estimation of the potential health effects by a factor of five; and results in chronic HIs below the DEP risk management criteria of 1 for both receptor scenarios and all assumed landfill gas collection efficiencies. In fact, using *either* the updated landfill gas composition data *or* EPA's updated RfC in the calculations results in chronic HIs at or below 1. Although not discussed herein, employing changes to the landfill gas composition and toxicity data in the risk evaluation (assuming a change in the subchronic RfC) would lower subchronic risk estimates to a similar degree.



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Table 1 Changes in the calculated hazard index for the ISWMF based on former and revised hydrogen sulfide RfCs, former and revised landfill gas compositions, different assumed landfill gas collection efficiencies, and for residential and commercial/industrial receptors. The modeled scenario is for non-MSW disposal with waste relocation (referred to as scenario C-high in the risk evaluation), at the increased waste acceptance rate.

Hydrogen sulfide Reference Concentration for Chronic Exposure	Gas Collection Efficiency Pre-closure / Post-closure	2002 gas composition data		2003 gas composition data	
		Residential Receptor	Comm./Ind. Receptor	Residential Receptor	Comm./Ind. Receptor
1 $\mu\text{g}/\text{m}^3$	75% / 75%	2	2	0.9	0.7
	75% / 90%	1	0.9	0.5	0.4
	90% / 90%	1	0.8	0.4	0.3
2 $\mu\text{g}/\text{m}^3$	75% / 75%	1	0.9	0.4	0.3
	75% / 90%	0.6	0.5	0.2	0.2
	90% / 90%	0.5	0.4	0.2	0.2

References

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Diane Manganaro
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<http://www.epa.gov/iris/subst/0061.htm>, December 5, 2003.



Cambridge Environmental Inc

58 Charles Street Cambridge, Massachusetts 02141
617-225-0810 FAX: 617-225-0813 E-mail: info@CambridgeEnvironmental.com



TOWN OF BOURNE BOARD OF HEALTH

24 Perry Avenue
Buzzards Bay, MA 02532



Cynthia A. Coffin
Health Agent

COPY

October 17, 2003

Brent Goins and Phil Goddard
General Manager and Environmental Manager
ISWM

Dear Brent and Phil,

At its regular meeting on September 24, 2003, the Bourne Board of Health voted to amend its well regulation, originally adopted on February 23, 2000, by adding a new subsection 3 to Section 5.0 Well Location And Setback Requirements and renumbering the previous subsection 3 to a new subsection 4. The new subsection will prohibit the installation of any private or public well, to be used for human consumption, which is hydraulically down-gradient of the Bourne Integrated Solid Waste Management Facility, as shown on particle tracking maps created by the United States Geologic Survey (USGS) and which are on file with the Bourne Board of Health.

We have requested that a summary of the amended regulation be posted in the Bourne Enterprise and then an attested copy of the new regulation will be sent to DEP. This has to be done to make a legally enforceable regulation. We had sent the article to the paper last week, but somehow they didn't run it properly so we are trying again for next week. A copy of the amended regulation is attached. If you have any questions, please contact this office at 508-759-0615 ext. 513.

Sincerely,

Cynthia A. Coffin, R.S., C.H.O.
Health Agent

c.c. Board of Health



COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
ONE WINTER STREET, BOSTON, MA 02108 617-292-5600

MITT ROMNEY
Governor

KERRY HEALEY
Lieutenant Governor

ELLEN ROY HERZFELDER
Secretary

ROBERT W. GOLLEDGE, Jr.
Commissioner

January 26, 2004

Michael Ames, ScD.
Associate Engineer
Cambridge Environmental Inc.
58 Charles Street
Cambridge, Massachusetts 02141

Dear Mr. Ames:

Thank you for submitting your letter and enclosures, (dated December 10, 2003) to us containing updated information for the Town of Bourne Integrated Solid Waste Management Facility (ISWMF). With this letter you provide the results of the most recent analysis of landfill gas at this site, a recalculation of risks associated with these newer data, a summary of recent developments at the Town of Bourne Board of Health and information on the U.S. Environmental Protection Agency's (EPA's) revised toxicity value for hydrogen sulfide.

Your report indicates that revised risks calculated using the results of the recent landfill gas analysis and associated with scenario C-high (which the report predicts to be associated with the highest non-MSW risks) all meet the risk limits specified in the Massachusetts Department of Environmental Protection (MADEP)'s "Guidance for Conducting Facility-Based Impact Evaluation for Solid Waste Facility Site Assignment and Permitting in Support of 310 CMR 16.00 & 19.000" (hereafter referred to as the MADEP Guidance Document):

The recalculated risks considered a range of pre-closure and post-closure landfill gas collection efficiencies. MADEP risk limits were not exceeded at any of the collection efficiencies considered, including at the most conservative of these efficiencies (i.e., 75% pre- and post-closure as recommended in the MADEP Guidance Document). It is noted that a proposed change to the MADEP Guidance Document recommends use of a pre-collection efficiency of 0 and a post-collection efficiency of 75%. While this recommendation is still only a proposal at this stage, it is not clear that risk limits for the Bourne ISWMF would meet the MADEP criteria using this assumption. As the Bourne ISWMF was assessed based on existing guidance, this proposed change will not impact the status of this facility. However, the possibility is raised that future landfill risk assessments may be subject to this revised collection efficiency assumption.

This information is available in alternate format. Call Debra Doherty, ADA Coordinator at 617-292-5565. TDD Service - 1-800-298-2307.

DEP on the World Wide Web: <http://www.mass.gov/dep>

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Your letter notes that the U.S. EPA revised their inhalation Reference Concentration (RfC) for hydrogen sulfide on July 28, 2003 from $1 \mu\text{g}/\text{m}^3$ to $2 \mu\text{g}/\text{m}^3$ and presumes that since the MADEP Allowable Ambient Limit (AAL) for hydrogen sulfide is based directly on the U.S. EPA value, that MADEP AAL will also be revised to $2 \mu\text{g}/\text{m}^3$ to be consistent with this value. To date, we have not taken any action to revise our hydrogen sulfide AAL and cannot comment on our intention to do so in the future. Unless and until such time as this value is revised, the existing value of $1 \mu\text{g}/\text{m}^3$ should be used in conducting risk assessments in accordance with Guidance Document specifications.

MADEP is currently working to address the issue of hydrogen sulfide emissions from non-MSW landfills, especially facilities that take in construction and demolition material. As part of this policy, MADEP will be issuing updated toxicity values and a risk management approach for addressing problem hydrogen sulfide emissions from solid waste facilities. These components will be integrated into a guidance policy for assessing and mitigating the impacts of hydrogen sulfide emissions from these facilities.

Sincerely,



Diane Manganaro
Environmental Analyst

cc: Carol Rowan-West, DEP/ORS, Boston
Barbara Kwetz, DEP/BWP, Boston
Dan Connick, DEP/BWP, SERO

ATTACHMENT 11

**CORRESPONDENCE WITH THE
NATIONAL HERITAGE AND ENDANGERED SPECIES PROGRAM**



Natural Heritage & Endangered Species Program

www.mass.gov/nhesp

Massachusetts Division of Fisheries & Wildlife

Eastern Box Turtle *Terrapene carolina*

State Status: **Special Concern**
Federal Status: **None**

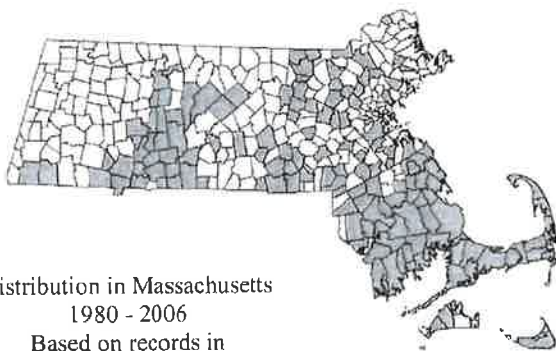
DESCRIPTION: The Eastern Box Turtle is a small terrestrial turtle ranging from 11.4–16.5 cm (4.5–6.6 in.) in length. It is so named because a hinge on the lower shell (plastron) allows it to enclose head, legs, and tail completely within the upper (carapace) and lower shells. The adult box turtle has an oval, high-domed shell with variable coloration and markings. The carapace is usually dark brown or black with numerous irregular yellow, orange, or reddish blotches. The plastron typically has a light and dark variable pattern, but some may be completely tan, brown, or black. The head, neck, and legs also vary in color and markings, but are generally dark with orange or yellow mottling. The Eastern Box Turtle has a short tail and an upper jaw ending in a down-turned beak. The male box turtle almost always has red eyes, and females have yellowish-brown or sometimes dark red eyes. Males have a moderately concave plastron (females' are flat), the claws on the hind legs are longer, and the tail is both longer and thicker than the females. Hatchlings have a brownish-gray carapace with a yellow spot on each scute (scale or plate), and a distinct light-colored mid-dorsal keel (ridge). The plastron is yellow with a black central blotch, and the hinge is poorly developed.



Photo by Liz Willey

SIMILAR SPECIES: The Blanding's Turtle (*Emydoidea blandingii*) may be confused with the Eastern Box Turtle. Often referred to as the "semi-box turtle," the Blanding's Turtle has a hinged plastron enabling the turtle to pull into its shell, but with less closure than in the Eastern Box Turtle. Both may have yellow markings on the carapace; however, the markings on a Blanding's Turtle are spots or flecks rather than blotches. An adult Blanding's Turtle is larger than the box turtle (15-23 cm; 6-9 in. in shell length). While both will be found nesting in similar habitat, the Blanding's Turtle is essentially aquatic whereas the Eastern Box Turtle is terrestrial. Eastern Box Turtle hatchlings could be confused with Spotted Turtle hatchlings, because both have spots on each scute. However, the Spotted Turtle lacks a mid-dorsal keel.

RANGE: The range of the Eastern Box Turtle is from southeastern Maine; south to northern Florida; and west to Michigan, Illinois, and Tennessee. Although Eastern Box Turtles occur in many towns in Massachusetts, they are more heavily concentrated in the southeastern section of the state.



Distribution in Massachusetts
1980 - 2006
Based on records in
Natural Heritage Database

A Species of Greatest Conservation Need in the Massachusetts State Wildlife Action Plan

Massachusetts Division of Fisheries & Wildlife

1 Rabbit Hill Rd., Westborough, MA; tel: 508-389-6300; fax: 508-389-7890; www.mass.gov/dfw

Please allow the Natural Heritage & Endangered Species Program to continue to conserve the biodiversity of Massachusetts with a contribution for 'endangered wildlife conservation' on your state income tax form, as these donations comprise a significant portion of our operating budget.

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HABITAT IN MASSACHUSETTS: The Eastern Box Turtle is a terrestrial turtle, inhabiting many types of habitats. It is found in both dry and moist woodlands, brushy fields, thickets, marsh edges, bogs, swales, fens, stream banks, and well-drained bottomland.

LIFE CYCLE & BEHAVIOR: The Eastern Box Turtle hibernates in the northern parts of its range from late October or November until mid-March or April depending on the weather. Box turtles overwinter in upland forest, a few inches under the soil surface, typically covered by leaf litter or woody debris. As soil temperatures drop, the turtles burrow into soft ground. Overwintering is usually not communal, although several may overwinter within close proximity of one another. Some individuals may emerge prematurely during warm spells in winter and early spring. When this occurs, they may perish from exposure if there is a sudden cold snap. During the spring, Box Turtles start to forage and mate in the forest and fields.

In summer, adult Box Turtles are most active in the morning and evening, particularly after a rainfall. To avoid the heat of the day, they often seek shelter under rotting logs or masses of decaying leaves, in mammal burrows, or in mud. They often scoop out a “form” (a small domelike space) in leaf litter, grasses, ferns, or mosses where they spend the night. These forms may be used on more than one occasion over a period of weeks. Though known as “land turtles”, in the hottest weather they frequently enter shaded shallow pools and puddles and remain there for periods varying from a few hours to a few days. In the cooler temperatures of spring and fall, box turtles forage at any daylight hour.

The Eastern Box Turtle is omnivorous, feeding on animal matter such as slugs, insects, earthworms, snails, and even carrion. Box Turtles also have a fondness for mushrooms, berries, fruits, leafy vegetables, roots, leaves, and seeds.

Females reach sexual maturity at approximately 13 years of age. Mating is opportunistic and may take place anytime between April and October. Courtship begins with the male circling, biting, and shoving the female. Afterward, the premounting and copulatory phases take place. Females can store sperm and lay fertile eggs up to four years after mating.

Females nest in June or early July and can travel great distances to find appropriate nesting habitat. They may travel up to approximately 1600 m (1 mile), many of them crossing roads during their journey. Nesting areas may be in early successional fields, meadows, utility right of ways, woodland openings, roadsides, cultivated gardens, residential lawns, mulch piles, beach dunes, and abandoned gravel pits. Females sometimes exhibit nest site fidelity, laying eggs in close proximity to the previous years’ nest. Females typically start nesting in the late afternoon or early evening and continue for up to five hours.

THREATS: There are several reasons the Eastern Box Turtle is under threat in Massachusetts: habitat destruction resulting from residential and industrial development; road mortality; collection by individuals for pets; mowing of fields and early successional habitat during the active season; unnaturally inflated rates of predation in suburban and urban areas; disturbance of nest sites by ATVs; and genetic degradation due to the release of non-native (pet store) turtles. The release of non-native species could also transmit disease, which may become an issue in Massachusetts, but is not currently a problem.

MANAGEMENT RECOMMENDATIONS: Using NHESP records, Eastern Box Turtle habitat needs to be assessed and prioritized for protection based on the extent, quality, and juxtaposition of habitats and their predicted ability to support self-sustaining populations of box turtles. Other considerations should include the size and lack of fragmentation of habitat and proximity and connectivity to other relatively unfragmented habitats, especially within existing protected open space.

Given limited conservation funds, alternatives to outright purchase of conservation land is an important component to the conservation strategy. These can include Conservation Restrictions (CRs) and Agricultural Preservation Restrictions (APRs).

Habitat management and restoration guidelines should be developed and implemented in order to create and/or maintain consistent access to nesting habitat at key sites. This is most practical on state-owned conservation lands (i.e. DFW, DCR). However, educational materials should be made available to guide private landowners on the best management practices for box turtle habitat.

A Species of Greatest Conservation Need in the Massachusetts State Wildlife Action Plan

Please allow the Natural Heritage & Endangered Species Program to continue to conserve the biodiversity of Massachusetts with a contribution for ‘endangered wildlife conservation’ on your state income tax form, as these donations comprise a significant portion of our operating budget.

www.mass.gov/nhesp

Alternative wildlife corridor structures should be considered at strategic sites on existing roads. In particular, appropriate wildlife corridor structures should be considered for bridge and culvert upgrades and road-widening projects within box turtle habitat. Efforts should be made to inform local regulatory agencies of key locations where these measures would be most effective for turtle conservation.

Educational materials need to be developed and distributed to the public in reference to the detrimental effects of keeping our native box turtles as pets (an illegal activity that slows reproduction in the population), releasing pet store turtles (which could spread disease), leaving cats and dogs outdoors unattended (particularly during the nesting season), mowing of fields and shrubby areas, feeding suburban wildlife (which increases numbers of natural predators on turtles), and driving ATVs in nesting areas from June to October. People should be encouraged, when safe to do so, to help box turtles cross roads (always in the direction the animal was heading); however, turtles should never be transported to “better” locations. They will naturally want to return to their original location and likely need to traverse roads to do so.

Increased law enforcement is needed to protect our wild populations, particularly during the nesting season when poaching is most frequent and ATV use is common and most damaging.

Forestry Conservation Management Practices should be applied on state and private lands to avoid direct turtle mortality. Motorized vehicle access to timber harvesting sites in box turtle habitat should be restricted to the times when box turtles are inactive during the winter, preferably when the ground is frozen. Motorized vehicles should not be used for soil scarification.

Finally, a statewide monitoring program is needed to track long-term population trends in Eastern Box Turtles.

Active Period

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

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Updated 2015

A Species of Greatest Conservation Need in the Massachusetts State Wildlife Action Plan

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MASSWILDLIFE

DIVISION OF
FISHERIES & WILDLIFE

1 Rabbit Hill Road, Westborough, MA 01581
p: (508) 389-6300 | f: (508) 389-7890
MASS.GOV/MASSWILDLIFE

Jack Buckley, *Director*

January 19, 2018

Town of Bourne, ISWM Department
c/o Phil Goddard
24 Perry Avenue
Buzzards Bay, MA 02532

RE: Project Location: 201 MacArthur Boulevard, Bourne, MA
Project Description: Phase 6 Landfill Expansion
NHESP Tracking No.: 17-36534

Dear Applicant:

Thank you for submitting the project plans (dated January 10, 2018) and supporting documentation to the Natural Heritage and Endangered Species Program of the MA Division of Fisheries & Wildlife (the "Division") for review pursuant to the Massachusetts Endangered Species Act (MESA) (MGL c.131A) and its implementing regulations (321 CMR 10.00).

Based on a review of the information that was provided, the Division has determined that this project, as currently proposed, appears to be **exempt from a MESA review** pursuant to 321 CMR 10.14. Any changes to the proposed project or any additional work beyond that provided may require a filing with the Division pursuant to the MESA regulations. If the project site is within Estimated Habitat and a Notice of Intent (NOI) is required, then a copy of the NOI must be submitted to the Division so that it is received at the same time as the local conservation commission.

Please note that this determination addresses only the matter of state-listed species and their habitats. If you have any questions about this letter, please contact Melany Cheeseman, Endangered Species Review Assistant, at melany.cheeseman@state.ma.us or 508-389-6357.

Sincerely,

A handwritten signature in black ink that reads "Thomas W. French".

Thomas W. French, Ph.D.
Assistant Director

cc: Amy Ball, Horsley Witten Group, Inc.

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DIVISION OF FISHERIES & WILDLIFE

1 Rabbit Hill Road, Westborough, MA 01581
p: (508) 389-6300 | f: (508) 389-7890
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February 5, 2020

Town of Bourne, ISWM Department
c/o Phil Goddard, Manager of Facility Compliance and Technology Development
24 Perry Avenue
Buzzards Bay, MA 02532

RE: Project Location: 201 MacArthur Boulevard, Bourne, MA
Project Description: Phases 7-9 Landfill Expansion
NHESP Tracking No.: **17-36534**

Dear Applicant:

Thank you for submitting the project plans entitled "Schematic Site Buildout Plan" (dated February 4, 2020) and supporting documentation to the Natural Heritage and Endangered Species Program of the MA Division of Fisheries & Wildlife (the "Division") for review pursuant to the Massachusetts Endangered Species Act (MESA) (MGL c.131A) and its implementing regulations (321 CMR 10.00).

The project, as currently proposed, includes the expansion of an existing landfill in three phases (Phases 7, 8 and 9). All work associated with Phases 7-9 of the project shall occur within areas already disturbed by existing landfill operations and, in particular, shall occur outside of the "Limit of Box Turtle Habitat" shown on the project plans. Any future work proposed within the "Limit of Box Turtle Habitat" shown on the project plans shall require a direct filing with the Division for compliance with the MESA.

Based on a review of the information that was provided, the Division has determined that Phases 7, 8 and 9 of this project, as currently proposed, appear to be **exempt from a MESA review** pursuant to 321 CMR 10.14. Any changes to the proposed project or any additional work beyond that provided may require a filing with the Division pursuant to the MESA regulations. If the project site is within Estimated Habitat and a Notice of Intent (NOI) is required, then a copy of the NOI must be submitted to the Division so that it is received at the same time as the local conservation commission.

Please note that this determination addresses only the matter of state-listed species and their habitats. If you have any questions about this letter, please contact Melany Cheeseman, Endangered Species Review Assistant, at melany.cheeseman@mass.gov or 508-389-6357.

Sincerely,

A handwritten signature in cursive script that reads "Everose Schlüter".

Everose Schlüter, Ph.D.
Assistant Director

cc: Amy Ball, Horsley Witten Group, Inc.

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DIVISION OF FISHERIES & WILDLIFE

1 Rabbit Hill Road, Westborough, MA 01581
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April 9, 2020

Kathleen A. Theoharides, Secretary
Executive Office of Environmental Affairs
Attention: MEPA Office
Anne Canaday, EEA No. 11333
100 Cambridge Street
Boston, Massachusetts 02114

Project Name: Bourne Integrated Solid Waste Management Facility
Proponent: Town of Bourne, Dept. of Integrated Solid Waste Management (ISWM)
Location: 201 MacArthur Boulevard, Bourne, MA
Project Description: Landfill Expansion – Phases 7, 8 and 9
Document Reviewed: Expanded Notice of Project Change
EEA File Number: 11333
NHESP Tracking No.: 17-36534

Dear Secretary Theoharides:

The Natural Heritage & Endangered Species Program of the Massachusetts Division of Fisheries & Wildlife (the Division) has reviewed the *Expanded Notice of Project Change* (ENPC) for the Town of Bourne ISWM's proposed Phase 7, 8 and 9 Landfill Expansion Project and would like to offer the following comments regarding state-listed species and their habitats.

According to the information provided in the ENPC, portions of the Project site are mapped as Priority Habitat for the Eastern Box Turtle (*Terrapene carolina*), a species state-listed as Special Concern according to the *Massachusetts Natural Heritage Atlas* (14th Edition). This species and its habitats are protected pursuant to the Massachusetts Endangered Species Act (MGL c.131A) and its implementing regulations (MESA; 321 CMR 10.00). A Fact Sheet for this species can be found on our website, www.mass.gov/nhesp.

All projects or activities proposed within Priority Habitat, which are not otherwise exempt pursuant to 321 CMR 10.14, require review through a direct filing with the Division for compliance with the MESA (321 CMR 10.18). The Division determined (letter dated February 5, 2020) that Phases 7, 8 and 9 of the Project, as currently proposed, appear to be exempt from MESA review pursuant to 321 CMR 10.14.

As noted in the Division's previous comments (dated June 19, 2018) on the Supplemental Single Environmental Impact Report, future development of the proposed Future Handling Area and proposed effluent connection projects will require a direct filing with the Division for compliance with the MESA. This includes any work within the "Limit of Box Turtle Habitat" shown on the site plans entitled "Conceptual Site Buildout Plan Through Phase 9 To Elevation 225" (ENPC, Attachment 3). The Proponent has initiated pre-filing consultations with the Division to discuss conceptual development plans associated with the Future Handling Area. In advance of a formal MESA filing, the Division anticipates –

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based on ongoing consultations with the Proponent and information submitted to date – that future development of the Future Handling Area, as proposed, will likely result in a Take (321 CMR 10.18 (2)(b)) of the Eastern Box Turtle.

Projects resulting in a Take of state-listed species may only be permitted if they meet the performance standards for a Conservation and Management Permit (CMP; 321 CMR 10.23). In order for a project to qualify for a CMP, the applicant must demonstrate that the project has avoided, minimized and mitigated impacts to state-listed species consistent with the following performance standards: (a) adequately assess alternatives to both temporary and permanent impacts to the state-listed species; (b) demonstrate that an insignificant portion of the local population will be impacted; and (c) develop and agree to carry out a conservation and management plan that provides a long-term net benefit to the conservation of the state-listed species.

The Proponent has continued to proactively consult with the Division on a pre-filing basis to avoid, minimize and mitigate impacts to state-listed species and their habitats associated with potential development of the Future Handling Area. Based on ongoing consultations and information submitted to date, we understand that the Proponent intends to meet the performance standards of a CMP by permanently protecting off-site land in the vicinity of the site as open space and state-listed species habitat. Although the exact details of the long-term net benefit required under a CMP have not yet been finalized, the Division anticipates that a suitable long-term net benefit can be achieved through the protection of suitable, high quality off-site habitat and that the Project should be able to meet the performance standards of a CMP.

The Division will not render a final decision regarding the Future Handling Area until the MEPA review process and its associated comment period is complete, and until all required MESA filing materials are submitted to the Division. No work associated with the Future Handling Area or proposed effluent connection projects shall occur on the property until the MESA review process is complete.

If you have any questions about this letter, please contact Jesse Leddick, Chief of Regulatory Review, at (508) 389-6386 or jesse.leddick@mass.gov. We appreciate the opportunity to comment on this project.

Sincerely,



Everose Schlüter, Ph.D.
Assistant Director

cc: Daniel T. Barrett, Town of Bourne ISWM Department
Phil Goddard, Town of Bourne ISWM Department
Town of Bourne Board of Selectmen
Town of Bourne Conservation Commission
Town of Bourne Planning Department
DEP Southeast Regional Office
Amy Ball, Horsley Witten Group, Inc.

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1 Rabbit Hill Road, Westborough, MA 01581
p: (508) 389-6300 | f: (508) 389-7890
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December 17, 2020

Kathleen A. Theoharides, Secretary
Executive Office of Environmental Affairs
Attention: MEPA Office
Anne Canaday, EEA No. 11333
100 Cambridge Street
Boston, Massachusetts 02114

Project Name: Bourne Integrated Solid Waste Management Facility
Proponent: Town of Bourne, Dept. of Integrated Solid Waste Management (ISWM)
Location: 201 MacArthur Boulevard, Bourne, MA
Project Description: Landfill Expansion
Document Reviewed: Single Supplemental Environmental Impact Report
EEA File Number: 11333
NHESP Tracking No.: 17-36534

Dear Secretary Theoharides:

The Natural Heritage & Endangered Species Program of the Massachusetts Division of Fisheries & Wildlife (the Division) has reviewed the *Single Supplemental Environmental Impact Report* (SSEIR; dated November 13, 2020) for the Town of Bourne ISWM's Landfill Expansion Project (the Project) and would like to offer the following comments regarding state-listed species and their habitats.

According to the information provided in the SSEIR, portions of the Project site are mapped as Priority Habitat for the Eastern Box Turtle (*Terrapene carolina*), a species state-listed as Special Concern according to the *Massachusetts Natural Heritage Atlas* (14th Edition). This species and its habitats are protected pursuant to the Massachusetts Endangered Species Act (MGL c.131A) and its implementing regulations (MESA; 321 CMR 10.00). A Fact Sheet for this species can be found on our website, www.mass.gov/nhesp.

All projects or activities proposed within Priority Habitat, which are not otherwise exempt pursuant to 321 CMR 10.14, require review through a direct filing with the Division for compliance with the MESA (321 CMR 10.18). The Division determined (letter dated February 5, 2020) that Phases 7, 8 and 9 of the Project, as currently proposed, appear to be exempt from MESA review pursuant to 321 CMR 10.14. However, as noted in the Division's previous comments to MEPA on the Project (dated June 19, 2018), development of the proposed Future Handling Area – and specifically, any work within the "Limit of Box Turtle Habitat" shown on the site plans (SSEIR, Attachment 3, Figures 2, 3 and 6) – will require a direct filing with the Division for compliance with MESA.

The Proponent has been working with the Division on a pre-filing basis to evaluate impacts associated with development of the Future Handling Area. In advance of a formal MESA filing, the Division anticipates – based on ongoing consultations with the Proponent and information submitted to date – that development of the Future Handling Area, as proposed, will likely result in a Take (321 CMR 10.18 (2)(b)) of Eastern Box Turtle.

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Projects resulting in a Take of state-listed species may only be permitted if they meet the performance standards for a Conservation and Management Permit (CMP; 321 CMR 10.23). In order for a project to qualify for a CMP, the applicant must demonstrate that the project has avoided, minimized and mitigated impacts to state-listed species consistent with the following performance standards: (a) adequately assess alternatives to both temporary and permanent impacts to the state-listed species; (b) demonstrate that an insignificant portion of the local population will be impacted; and (c) develop and agree to carry out a conservation and management plan that provides a long-term net benefit to the conservation of the state-listed species.

The Proponent has also proactively consulted with the Division on a pre-filing basis to avoid, minimize and mitigate impacts to state-listed species and their habitats associated with development of the Future Handling Area. Based on ongoing consultations and information submitted to date, we understand that the Proponent intends to meet the performance standards of a CMP by permanently protecting off-site land as open space and state-listed species habitat through fee conveyance to the Town of Bourne Conservation Commission. The Proponent has identified a candidate parcel in the vicinity of the property which should provide an acceptable option to address the required long-term net benefit for Eastern Box Turtle associated with the Project. The Division understands that the Proponent may also propose to permanently protect portions of the property, as shown on the "Conceptual Site Buildout Plan (SSEIR, Attachment 3, Figure 6). Although the exact details of the long-term net benefit required under a CMP have not yet been finalized, the Division anticipates that a suitable long-term net benefit can be achieved through the protection of suitable, high quality off- and on-site habitat and that the Project should be able to meet the performance standards of a CMP.

The Division will not render a final decision regarding the Future Handling Area until the MEPA review process and its associated comment period is complete, and until all required MESA filing materials are submitted to the Division. No work associated with the Future Handling Area shall occur on the property until the MESA review process is complete.

If you have any questions about this letter, please contact Jesse Leddick, Chief of Regulatory Review, at (508) 389-6386 or jesse.leddick@mass.gov. We appreciate the opportunity to comment on the Project.

Sincerely,



Everose Schlüter, Ph.D.
Assistant Director

cc: Phil Goddard, Town of Bourne ISWM Department
Daniel T. Barrett, Town of Bourne ISWM Department
Town of Bourne Board of Selectmen
Town of Bourne Conservation Commission
Town of Bourne Planning Department
DEP Southeast Regional Office
Amy Ball, Horsley Witten Group, Inc.

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ATTACHMENT 12
SOUND LEVEL SURVEY

CAVANAUGH
TOCCI
ASSOCIATES, INCORPORATED

327 F BOSTON POST ROAD, SUDBURY, MA 01776-3027 TEL: (978) 443-7871 FAX: (978) 443-7873 e-MAIL: cta@cavtocci.com

SENIOR PRINCIPALS

WILLIAM J. CAVANAUGH, FASA
GREGORY C. TOCCI, PE, FASA, PRESIDENT

PRINCIPALS

DOUGLAS H. BELL, INCE
LINCOLN B. BERRY, ASA
TIMOTHY J. FOULKES, INCE, Bd. Cert.
K. ANTHONY HOOVER, INCE, Bd. Cert.

SENIOR AND STAFF CONSULTANTS

ALEX U. CASE
MARC G. COTE
BRION G. KONING
MATTHEW J. MOORE
PATRICK E. MURPHY
ERIC L. REUTER

MARKETING MANAGER
PATRICIA A. CASASANTO

ASSOCIATED CONSULTANTS

NICHOLAS BROWSE, SMPTA
RICHARD G. CANN, PE
DAVID H. KAYE, FASA, FAES
THOMAS N. STEIN

ADMINISTRATOR
DONNA L. RAFUS

September 7, 2001

Mr. Richard W. Keller, P.E.
P.O. Box 1265
Middleboro, MA 02346

SUBJECT: ISWM - Bourne, MA
Sound Level Survey

Dear Mr. Keller,

The following letter summarizes our sound level survey for the development of a parcel of land immediately south of the existing Town of Bourne landfill facility. This development includes a construction and demolition materials processing facility. Operations at the temporary open-air processing facility on the existing landfill will be transitioned to the facility on the new parcel and will chiefly be contained within the proposed building. Therefore, we expect that sound emissions from the new facility will be less than from the current operation. Nevertheless the MDEP interim risk-evaluation guidance document for Solid Waste Facility Site Assignments requires that sound level surveys be conducted prior to and after construction of solid waste facilities. This letter summarizes our sound level survey.



SOUND LEVEL SURVEY

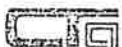
A sound level survey was conducted to quantify and characterize the existing noise environment in the vicinity of the proposed development of the new parcel. For this study, environmental sounds were monitored at three locations surrounding the new parcel. The monitoring locations were selected on the basis of where the potential for sound impact from the new facility was anticipated to be greatest. In addition, the three measurement locations were selected to obtain an adequate spatial representation of the ambient noise environment. These locations are indicated in Figure 1. A brief description of each monitoring location follows:

- **Location 1** – At property line between Bayview Camp Grounds Inc. at 260 MacArthur Boulevard and Brookside Golf Club at 1 Brigadoone Road. This location is representative of receptors located west of the new parcel across MacArthur Boulevard (Route 28),
- **Location 2** – At northeast corner of new parcel
- **Location 3** – At southeast corner of new parcel

Please note that the exact location for monitor location 1 is beyond the extents of the site plan. It is located further west of MacArthur Road approximately 100 feet north of the clubhouse at the Brookside Golf Club.

Sound levels are quantified in decibels (dB). Human hearing is restricted to the frequency range of 20 Hz to 20,000 Hz. However, the human ear is most sensitive to sound in the 500 Hz to 5,000 Hz frequency range. Above and below this range, the ear becomes progressively less sensitive. To account for this feature of human hearing, sound level meters incorporate a filtering of acoustic signals that corresponds to the varying frequency sensitivity of the human ear. This filtering is called A-weighting. Sound level measurements that are obtained using this filtering are referred to as A-weighted sound levels and are signified by the identifier dBA.

Percentile sound levels (L_{90} , L_{50} , L_{10} , and L_{01}) are the statistical descriptors of the A-weighted sound levels exceeded 90, 50, 10 and 1 percent of each time interval monitored. The L_{90} represents the nominally lowest levels reached during the monitoring interval. The L_{90} is typically influenced by sound of relatively low level, but nearly constant duration, such as distant traffic or continuously operating industrial equipment. The L_{90} is often used in standards to quantify the existing background or residual sound level. Conversely, the L_{10} represents the nominally highest sound levels reached during a monitoring interval. The L_{10} is typically influenced by sound of high level, but short duration, such as that produced by vehicles passing by on a nearby road. The L_{10} is sometimes called the intrusive sound level. By using percentile sound levels, it is possible to characterize the sound environment in terms of the steady-state background sound (L_{90}) and occasional transient sound (L_{10}).



The equivalent sound level (L_{eq}) is the energy average sound level. Sounds of low level and long duration, as well as sounds of high level and short duration influence this sound level descriptor. Because of the sensitivity of this descriptor to the temporal characteristics of sound, the L_{eq} has become widely accepted for use in environmental noise regulations and criteria. Among the federal agencies using energy average sound levels are the U.S. Environmental Protection Agency, the Federal Highway Administration, the U.S. Department of Housing and Urban Development, the Federal Aviation Administration, and the Department of Defense.

To document the time-varying characteristics of environmental sounds at the selected monitoring locations, sound levels were monitored using Larson-Davis model 700 environmental noise monitors outfitted with 1/2-inch electret microphones, and windscreens. The environmental noise monitors were calibrated before and after the measurement period using a Larson-Davis CA-250 sound level calibrator. The monitors, microphones, and signal processing conform to ANSI S1.4 for Type 1 precision sound measurement instrumentation. For this study, the monitors were programmed to record the following hourly A-weighted environmental noise descriptors.

- Maximum sound level (L_{max}),
- Minimum sound level (L_{min}),
- Percentile sound levels (L_{90} , L_{50} , L_{10} , and L_{01}),
- Equivalent sound level (L_{eq}).

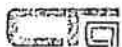
A complete listing of measured descriptors is provided in Appendix A of this report. Figures 2-4 plot the hourly L_{90} , L_{eq} , and L_{01} sound levels for each monitoring location. These figures convey the variability of environmental sound at each location.

DISCUSSION

Based on the preliminary design documents that we have reviewed, we expect that the sound levels in the areas surrounding the new parcel will not significantly increase and will remain similar to the levels measured in our pre-construction survey. The background sound levels summarized in this letter can be used during the design process to ensure that facility operation will be in compliance with the MDEP Policy 90-001 on Community Noise.

The Commonwealth of Massachusetts Department of Environmental Protection policy on noise produced by facilities at adjacent properties (MDEP Policy 90-001) is as follows:

1. A facility may not increase ambient sound by more than 10 dBA above the previously existing background sound level.
2. A facility may not produce a pure-tone condition.



Background sound level is defined as the sound level exceeded 90% of the quietest operating period. A pure-tone condition is defined to exist when the sound level in any octave band exceeds the sound level in both adjacent octave bands by 3 dB or more.

We would be pleased to assist you with the facility design to ensure that the sound emissions from the completed facility satisfy the above criteria. We will provide you with a separate proposal for these services summarizing the project components that we would recommend for study based on our document review and sound survey.

Please call if you have any questions.

Sincerely,
CAVANAUGH TOCCI ASSOCIATES, INC.



Marc G. Cote
MGC/GCT/mgc/01326ISWM BourneMA soundlevelsurvey.doc

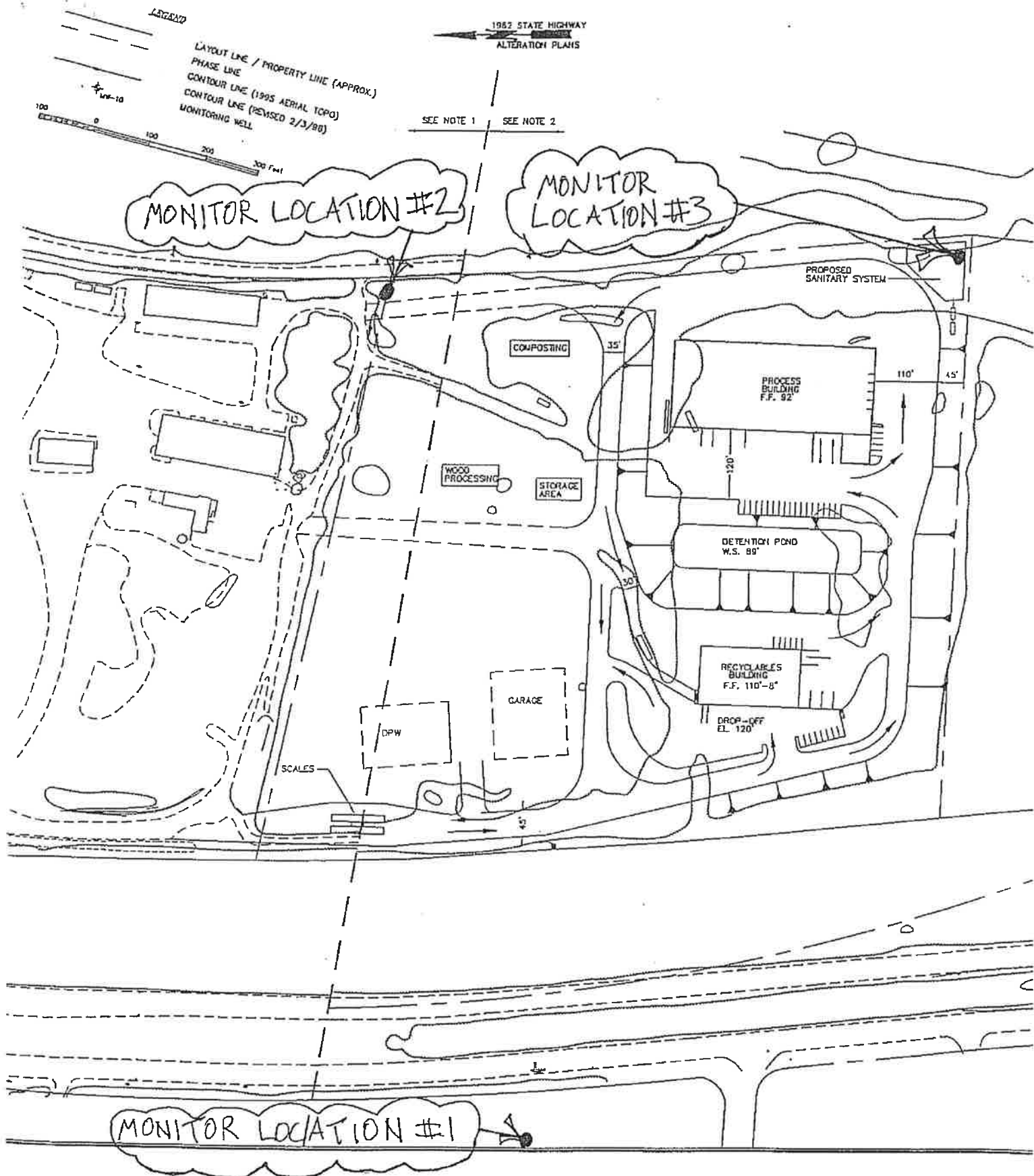


FIGURE 1 SITE PLAN SHOWING MONITOR LOCATIONS

ISWM - Bourne, MA - Sound Survey - Measurement Location 2

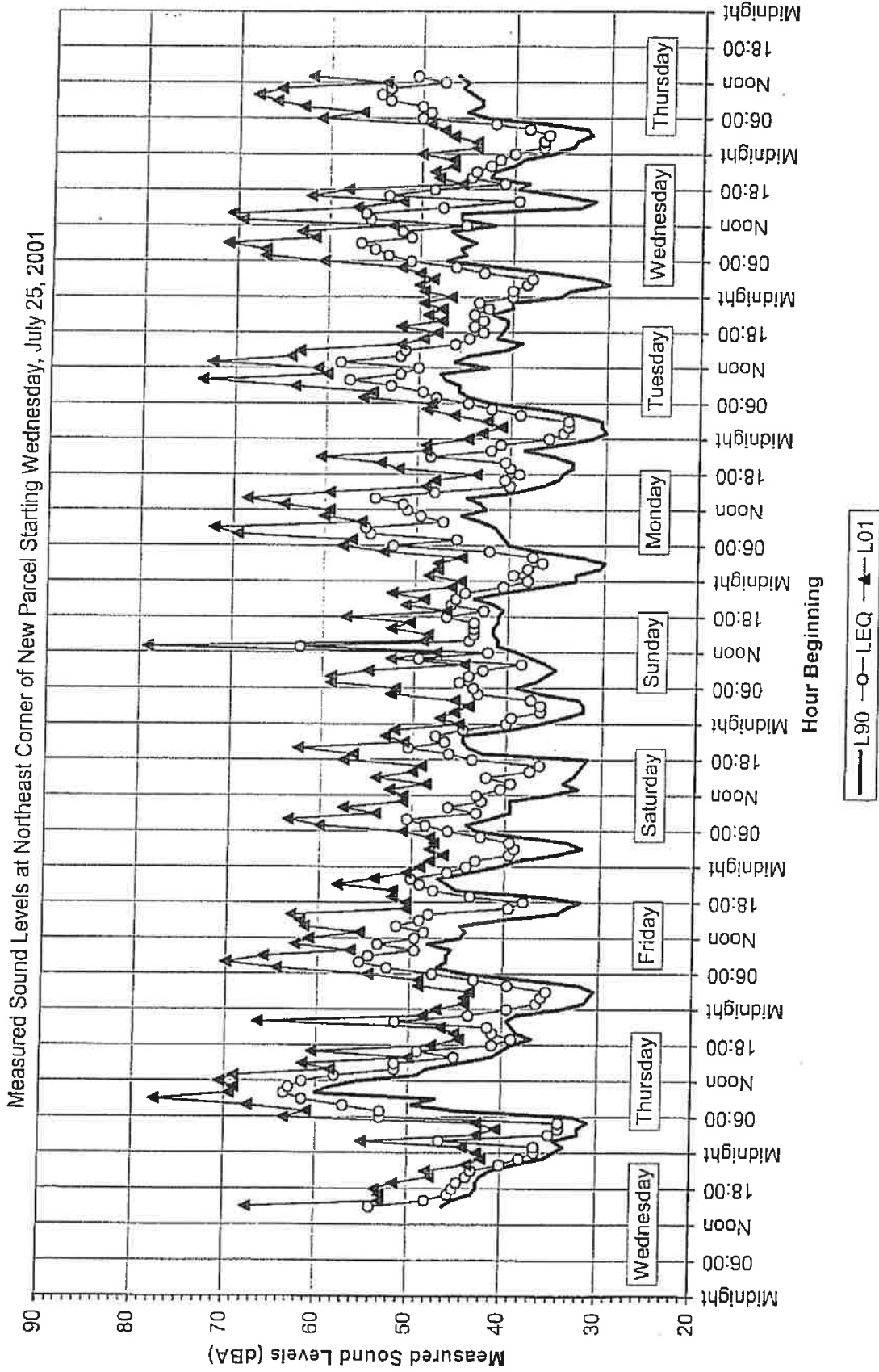


Figure 3

APPENDIX A

Sound Level Survey Data

INTERVAL REPORT LARSON-DAVIS LABORATORIES MODEL 700 SN B1364
DATA FROM: ISWMLD5.xls

Richard W. Keller, P.E.
ISWM Bourne, MA - Sound Level Survey

Measurement Location: Location 1 Brookside Golf Club/Bayview Camp Ground
Date: Monday, July 30, 2001 Period: 01:00

Time	Leq	Lmin	L90	L50	L10	L01	Lmax	Lpk
00:00	52.0	35.5	40.5	49.0	56.0	60.5	67.0	78.5
01:00	51.0	33.5	39.0	46.5	55.0	60.0	68.5	80.0
02:00	49.5	32.0	34.5	43.5	53.0	61.0	68.5	86.0
03:00	50.0	32.0	36.0	43.0	52.5	62.5	71.0	92.0
04:00	52.0	34.0	42.0	48.0	54.5	64.5	71.0	86.5
05:00	58.0	45.0	50.5	55.0	60.5	67.5	76.5	89.0
06:00	61.5	52.0	57.0	61.0	64.5	69.0	72.5	85.5
07:00	62.5	53.0	57.5	61.0	64.5	69.5	81.0	93.0
08:00	64.0	52.0	57.0	60.5	64.5	74.5	86.5	103.0
09:00	62.5	51.5	56.0	59.5	63.5	75.5	80.5	95.0
10:00	60.5	49.5	55.5	59.0	63.0	68.5	75.5	89.0
11:00	60.5	51.0	56.0	59.5	63.0	68.5	76.0	90.0
12:00	60.5	50.5	55.5	59.0	62.0	69.0	76.5	90.5
13:00	60.0	48.5	56.0	59.0	62.5	68.0	71.0	84.0
14:00	61.0	50.0	56.0	59.5	62.5	69.0	78.5	97.0
15:00	60.5	53.0	57.0	59.5	62.5	68.0	76.0	90.0
16:00	61.0	52.0	57.0	60.5	63.0	67.5	71.5	83.5
17:00	61.0	52.0	57.0	60.5	63.0	67.5	76.5	94.0
18:00	60.5	49.0	56.0	60.0	63.0	66.0	72.5	84.0
19:00	59.0	47.5	54.0	58.0	62.0	65.5	71.0	83.5
20:00	58.0	47.0	52.0	57.0	61.0	64.5	71.0	84.5
21:00	57.5	42.5	50.0	56.0	60.5	65.5	74.5	90.0
22:00	56.0	43.0	48.5	54.0	59.5	64.0	70.0	82.0
23:00	54.5	34.0	45.0	51.0	58.0	63.0	70.5	83.0



Richard W. Keller, P.E.
ISWM Bourne, MA - Sound Level Survey

Measurement Location: Location 1 Brookside Golf Club/Bayview Camp Ground
Date: Tuesday, July 31, 2001 Period: 01:00

Time	Leq	Lmin	L90	L50	L10	L01	Lmax	Lpk
00:00	52.0	32.5	38.5	46.0	56.5	63.0	70.0	82.5
01:00	49.5	30.5	33.0	40.5	53.5	60.5	69.5	83.0
02:00	50.0	32.5	34.0	39.5	51.5	61.5	76.0	93.0
03:00	47.0	31.5	34.0	38.0	48.5	60.5	69.0	82.5
04:00	52.0	33.5	37.5	45.0	54.5	65.0	70.0	83.0
05:00	57.0	40.0	46.5	53.0	60.5	68.0	73.0	84.5
06:00	61.5	49.5	55.0	60.0	64.5	69.0	73.5	95.5
07:00	62.0	51.5	57.0	61.0	65.0	69.0	72.0	96.0
08:00	61.5	50.0	56.0	60.0	63.5	69.0	78.0	91.5
09:00	60.5	50.0	55.5	59.0	62.5	68.5	73.5	90.0
10:00	60.5	47.5	55.0	59.0	62.5	68.5	80.5	99.5
11:00	60.0	49.5	55.0	58.5	62.5	68.5	72.0	86.5
12:00	60.0	49.0	55.5	59.0	62.5	67.5	74.0	87.0
13:00	61.5	49.5	55.0	59.0	63.0	73.0	79.5	95.5
14:00	60.0	49.0	54.5	58.5	62.0	67.5	74.0	86.5
15:00	59.5	47.5	55.0	58.5	62.0	67.0	70.5	84.0
16:00	60.5	48.5	55.5	59.0	62.0	67.5	79.0	93.5
17:00	60.5	52.0	57.0	60.0	62.5	65.5	70.0	88.0
18:00	60.5	52.0	57.0	60.0	63.0	66.0	70.5	86.0
19:00	59.5	50.0	55.5	59.0	62.0	65.5	75.0	88.0
20:00	58.5	49.0	54.0	58.0	61.0	65.0	70.0	86.5
21:00	58.0	47.0	52.5	57.5	60.5	63.5	71.0	86.0
22:00	56.0	43.0	49.0	54.5	59.0	62.0	66.5	79.5
23:00	54.5	42.0	47.5	52.5	58.0	62.0	66.0	78.5

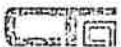


INTERVAL REPORT LARSON-DAVIS LABORATORIES MODEL 700 SN B0905
DATA FROM: ISWMLD2.xls

Richard W. Keller, P.E.
ISWM Bourne, MA - Sound Level Survey

Measurement Location: Location 2 - NE Corner of New Parcel
Date: Wednesday, July 25, 2001 Period: 01:00

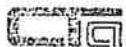
Time	Leq	Lmin	L90	L50	L10	L01	Lmax	Lpk
15:00	54.0	43.5	46.0	48.0	52.0	67.5	76.5	96.5
16:00	48.0	43.0	45.0	46.5	48.5	53.0	71.5	87.0
17:00	45.5	41.0	43.0	44.5	46.5	53.0	62.5	93.0
18:00	45.0	41.5	42.5	44.0	46.0	53.5	58.5	70.5
19:00	44.5	40.5	42.5	44.0	46.0	51.5	54.5	74.0
20:00	43.5	40.0	42.0	43.0	44.5	47.5	57.0	71.0
21:00	43.0	39.0	41.0	42.5	44.5	48.0	51.5	69.0
22:00	40.0	36.5	38.5	40.0	41.5	43.5	46.0	69.0
23:00	38.0	33.5	35.5	37.5	39.5	42.0	43.5	69.5



Richard W. Keller, P.E.
ISWM Bourne, MA - Sound Level Survey

Measurement Location: Location 2 - NE Corner of New Parcel
Date: Thursday, July 26, 2001 Period: 01:00

Time	Leq	Lmin	L90	L50	L10	L01	Lmax	Lpk
00:00	36.5	32.5	34.5	36.0	38.0	42.5	46.0	64.5
01:00	36.5	32.0	33.5	34.5	38.5	44.0	55.0	72.5
02:00	46.5	32.5	34.5	38.0	50.0	55.0	72.5	104.0
03:00	35.0	30.0	32.0	34.0	36.5	42.5	53.0	93.0
04:00	34.0	30.5	32.0	33.0	35.5	40.5	45.0	75.0
05:00	34.0	29.5	31.0	32.5	35.5	42.5	51.0	78.0
06:00	53.0	31.0	32.5	48.5	57.5	63.5	64.5	95.5
07:00	53.0	43.0	44.5	47.5	57.5	61.0	70.5	90.5
08:00	57.0	47.5	49.5	52.5	60.5	67.5	72.5	98.5
09:00	61.5	45.0	47.0	51.0	59.0	77.5	86.0	106.0
10:00	63.5	57.5	60.0	63.0	66.5	69.5	76.0	101.0
11:00	63.0	56.0	58.5	62.0	66.0	69.0	73.0	101.0
12:00	61.5	52.5	55.5	58.5	65.5	70.5	77.5	112.5
13:00	58.0	46.5	49.0	54.5	60.0	69.0	78.5	113.0
14:00	51.5	46.5	48.0	50.0	54.0	58.5	64.5	103.5
15:00	51.5	42.5	44.5	47.0	50.0	61.5	77.0	111.5
16:00	45.0	39.0	41.0	43.0	46.5	50.0	73.5	111.0
17:00	49.0	38.0	40.0	41.5	50.0	60.5	74.0	100.0
18:00	41.0	36.5	39.0	40.5	43.0	47.5	52.5	76.5
19:00	39.0	35.0	37.0	38.5	40.5	44.5	49.5	70.5
20:00	41.0	35.5	38.5	40.5	42.5	45.0	53.5	69.5
21:00	41.5	35.0	39.0	41.0	44.0	46.5	48.5	71.5
22:00	51.5	35.0	39.5	42.5	45.5	66.5	74.5	91.5
23:00	43.5	33.5	38.5	42.5	45.5	48.5	61.5	77.5

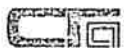


DATA FROM: ISWMLD2.xls

Richard W. Keller, P.E.
ISWM Bourne, MA - Sound Level Survey

Measurement Location: Location 2 - NE Corner of New Parcel
Date: Sunday, July 29, 2001 Period: 01:00

Time	Leq	Lmin	L90	L50	L10	L01	Lmax	Lpk
00:00	40.0	33.5	36.5	39.5	42.5	45.0	48.0	66.5
01:00	39.5	31.0	34.0	38.0	42.5	47.0	55.5	67.0
02:00	36.5	30.0	32.0	34.5	39.5	45.5	53.0	66.0
03:00	36.5	29.5	32.0	35.5	39.5	44.0	47.5	62.5
04:00	37.5	29.0	32.5	36.0	41.0	45.5	48.5	71.5
05:00	43.0	33.0	36.5	40.0	47.0	52.5	56.5	77.5
06:00	43.5	35.5	39.0	41.0	44.0	52.0	69.5	84.0
07:00	45.0	33.5	37.0	40.5	44.0	59.0	69.0	78.5
08:00	44.0	33.5	36.0	38.0	42.0	59.0	66.5	82.5
09:00	42.5	34.0	35.0	37.0	42.0	55.0	68.0	89.5
10:00	38.5	34.5	36.0	38.0	40.0	44.5	50.5	69.5
11:00	49.5	34.5	37.5	40.0	43.5	52.5	80.5	102.0
12:00	42.0	37.0	39.0	40.5	43.5	47.5	61.5	79.0
13:00	62.5	39.5	41.0	42.5	47.0	79.0	84.0	97.5
14:00	44.0	39.0	41.0	42.5	44.5	49.0	64.5	77.5
15:00	43.5	39.5	41.5	43.0	45.0	48.5	53.5	70.5
16:00	43.5	39.0	41.5	43.0	44.5	52.5	57.5	72.0
17:00	43.5	37.5	41.0	43.0	45.0	50.5	55.0	69.5
18:00	46.5	38.5	41.0	42.5	44.5	57.5	71.5	95.0
19:00	42.5	36.5	40.5	42.0	44.0	46.5	50.5	70.5
20:00	46.0	38.0	41.5	45.5	48.5	51.0	57.0	77.5
21:00	45.5	38.5	43.5	45.5	47.0	49.0	51.5	64.5
22:00	44.5	36.5	40.5	43.5	46.0	52.5	61.5	82.5
23:00	40.5	32.0	36.5	39.5	43.0	46.0	54.0	73.0

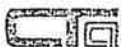


INTERVAL REPORT LARSON-DAVIS LABORATORIES MODEL 700 SN B0905
DATA FROM: ISWMLD2.xls

Richard W. Keller, P.E.
ISWM Bourne, MA - Sound Level Survey

Measurement Location: Location 2 - NE Corner of New Parcel
Date: Wednesday, August 1, 2001 Period: 01:00

Time	Leq	Lmin	L90	L50	L10	L01	Lmax	Lpk
00:00	40.0	32.0	35.0	39.0	43.5	46.5	49.0	70.5
01:00	40.0	30.5	34.0	37.5	43.0	49.5	53.5	71.0
02:00	38.5	29.0	30.0	34.5	41.5	50.0	54.5	67.5
03:00	38.0	29.5	31.5	35.0	41.0	48.5	52.0	70.0
04:00	43.0	31.0	36.0	40.0	47.0	50.0	54.5	73.5
05:00	46.0	37.0	41.5	45.5	48.5	52.0	55.5	71.0
06:00	51.0	43.0	47.0	49.0	51.5	60.5	71.5	87.5
07:00	53.5	43.5	45.0	47.5	55.0	67.0	73.0	93.5
08:00	55.0	43.0	45.5	49.5	57.5	67.0	71.5	93.5
09:00	56.5	42.0	44.0	46.5	53.0	71.0	74.5	92.0
10:00	51.0	43.0	45.5	48.0	54.5	61.5	69.5	88.0
11:00	52.0	45.0	46.5	49.0	54.5	63.0	66.5	82.0
12:00	45.0	41.0	42.0	43.5	46.5	53.0	60.0	77.5
13:00	55.5	42.5	45.5	48.5	53.5	69.5	76.5	92.0
14:00	56.0	43.0	45.5	49.5	54.5	70.5	77.5	93.0
15:00	47.5	31.5	33.0	45.0	49.0	57.0	71.0	94.5
16:00	39.5	30.5	31.5	32.5	39.0	52.0	63.0	81.5
17:00	53.5	31.0	35.0	38.5	42.5	62.0	82.5	97.0
18:00	48.5	37.5	39.5	42.0	46.5	58.0	73.0	88.5
19:00	41.0	36.5	38.5	40.5	43.0	45.5	49.0	73.5
20:00	44.5	40.5	42.5	44.0	45.5	48.0	52.0	65.5
21:00	44.0	40.0	42.0	43.5	45.5	48.5	54.0	71.0
22:00	42.5	38.0	40.0	42.0	44.5	46.5	49.0	68.5
23:00	41.5	36.5	39.0	41.0	43.5	46.5	56.5	70.0

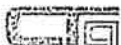


INTERVAL REPORT LARSON-DAVIS LABORATORIES MODEL 700 SN B1335
DATA FROM: ISWMLD7.xls

Richard W. Keller
ISWM Bourne, MA - Sound Level Survey

Measurement Location: Location 3 - SE Corner of New Parcel
Date: Wednesday, July 25, 2001 Period: 01:00

Time	Leq	Lmin	L90	L50	L10	L01	Lmax	Lpk
14:00	55.0	41.0	48.0	49.5	53.5	69.5	74.5	95.5
15:00	54.5	46.0	48.0	50.0	53.0	68.5	73.0	91.5
16:00	50.5	45.0	47.5	49.5	52.0	56.0	68.0	81.5
17:00	49.0	44.0	46.0	48.0	50.5	56.5	65.5	81.5
18:00	48.0	43.5	45.5	47.0	50.0	55.5	60.5	79.0
19:00	47.5	43.0	45.0	46.5	49.0	54.0	60.0	72.5
20:00	46.0	42.0	44.0	45.5	47.5	51.0	57.0	73.0
21:00	45.5	39.5	43.0	45.0	47.0	50.5	54.5	72.5
22:00	43.0	37.5	41.0	43.0	44.5	47.5	52.0	70.0
23:00	41.5	35.0	39.5	41.0	43.0	46.5	50.0	66.0



Richard W. Keller
ISWM Bourne, MA - Sound Level Survey

Measurement Location: Location 3 - SE Corner of New Parcel
Date: Saturday, July 28, 2001 Period: 01:00

Time	Leq	Lmin	L90	L50	L10	L01	Lmax	Lpk
00:00	46.0	36.5	40.5	44.5	49.0	52.0	61.0	74.5
01:00	44.0	34.5	39.0	43.0	46.5	53.0	56.5	72.0
02:00	40.5	29.5	33.5	39.0	43.5	49.0	54.0	66.5
03:00	41.0	29.0	32.0	37.5	44.0	52.0	56.5	69.5
04:00	41.0	30.5	33.5	38.0	45.5	49.5	52.0	70.5
05:00	47.0	37.5	41.0	44.5	49.5	58.0	64.5	82.5
06:00	47.0	39.5	43.0	46.0	49.5	53.0	60.0	74.0
07:00	45.0	37.5	40.0	43.5	48.0	51.5	65.5	83.5
08:00	49.0	36.0	38.5	43.0	48.0	63.0	69.5	93.0
09:00	43.5	33.5	35.5	39.5	45.0	56.0	63.5	79.0
10:00	42.5	31.0	33.5	39.0	46.5	52.0	56.0	73.0
11:00	42.5	30.0	33.5	39.5	45.5	52.5	58.5	75.0
12:00	44.5	32.0	34.0	38.5	47.0	54.5	66.0	86.5
13:00	43.0	29.5	33.5	39.5	46.0	52.5	58.0	75.0
14:00	42.0	30.5	33.5	39.5	46.0	49.5	55.0	76.5
15:00	43.0	29.5	33.0	38.5	45.0	53.5	64.5	81.5
16:00	39.5	28.0	30.5	34.5	43.0	49.5	54.5	72.5
17:00	41.0	28.0	30.0	36.0	45.0	50.5	56.5	74.0
18:00	45.0	27.5	30.0	39.5	47.0	57.5	64.5	83.5
19:00	46.5	38.0	42.5	44.0	48.0	57.5	65.0	77.0
20:00	49.0	42.0	44.5	46.0	49.5	61.0	67.5	83.0
21:00	46.5	40.5	44.5	46.5	48.0	51.5	54.5	73.5
22:00	46.0	41.0	43.5	45.5	47.5	51.5	62.0	80.5
23:00	45.0	35.0	41.0	44.0	47.0	51.5	57.5	75.0

