



Town of Mashpee

Planning Board

16 Great Neck Road North
Mashpee, Massachusetts 02649

Meeting of the Mashpee Planning Board
Wednesday, December 19, 2018
Waquoit Meeting Room, 7:00 P.M.

Call Meeting to Order: 7:00 p.m. – Waquoit Meeting Room – Mashpee Town Hall

- Pledge of Allegiance

Approval of Minutes

- Review and approval of meeting minutes from December 5, 2018.

Public Hearing

7:10 PM – Road Renaming – Shields Road and Santuit Lane to Santuit Lane

This is the only roadway extending down the peninsula extending into Santuit Pond found on Assessor's Map 30. The Mashpee Fire Department has requested the road have a single name and retain its current one-way direction. This change will also change the address of houses along the renamed road.

7:20 PM – Bennett Environmental Associates for Windchime Condominium Trust

Consider an application to modify a special permit issued February 4, 1987 and recorded at the Barnstable County Registry of Deeds in Book 5734, Pages 225-269. Such application was made for consideration of the release of the escrow funds held under the Special Permit to make improvements to the on-site wastewater treatment system through the BRP WP 68 "Treatment Works Plan Approval" permitting process; and to seek reduction in the Wastewater Treatment Monitoring Plan as commensurate to the environmental monitoring requirements specified under the Groundwater Discharge Permit 263-3M1

New Business

- Sign release of security held for 35 Fox Hill Road, LRME LLC.
- Report from Consulting Engineer for 33 Trinity Place.
- APA Group Membership Dues Invoice

Old Business

- Proposed revisions to the Light Industry Overlay District
- Proposals from the Town Planner on zoning by-law amendments: Temporary/Seasonal Signs and Donation Bins.
- Recission of vote of a minor modification to a special permit for a shared driveway at 659, 673, and 687 Main Street originally issued to Brett Field and Z&J Realty Trust on August 6, 2010 and recorded in Book 24822 Page 220 at the Barnstable County Registry of Deeds.
- Process to submit comments and materials to Planning Board for residents and local organizations.

Chairman's Report

- Selectmen's Discussion of Mashpee
- Guest Speakers

Board Member Committee Reports

- Cape Cod Commission, Community Preservation Committee, Design Review, Plan Review, Environmental Oversight Committee, Greenways/Quashnet Footbridge, Historic District Commission, MMR Military Civilian Community Council.

Updates from Town Planner

- Administrative Secretary hiring
- Evergreen Subdivision conservation restriction

Additional Topics (not reasonably anticipated by Chair)

Adjournment

MASHPEE TOWN CLERK

DEC 14 2018

RECEIVED BY us

Daniel Marsters
10 Pleasantwood Drive
Forestdale, MA 02644

December 11, 2018

Mary Waygan, Chair
C/O Town Planner
16 Great Neck Road
Mashpee, MA 02649

RE: 583 Great Hay Road

Dear Ms. Waygan:

My name is Daniel Marsters and I am representing Anthony J. LaCava, Jr., Tr., owner of a vacant lot located at 583 Great Hay Road. I currently have the lot under agreement to purchase. During my research to determine buildability, I discovered that the Special Permit creating the lot had been modified because of a road layout change, thus changing the layout and size of the lot. A new plan was approved by the Planning Board on July 15, 1998, and recorded at the Town Clerk's Office on August 5, 1998. However, the plan was never recorded at the Registry of Deeds and the original plan cannot be located at any town office. I am seeking the Planning Board's guidance and assistance in remedying this situation.

Thank you for your time and consideration in this matter.

Sincerely,



Daniel Marsters

MASHPEE TOWN CLERK

DEC 11 2018

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contacted his civil engineer who said they could redraw plan to have it endorsed by the current board.


The information collected by my client clearly demonstrates that the modification to the original Special Permit Plan was approved by all appropriate town boards but was failed to be recorded, and no original was retained by any town board or staff.

Based on these facts, we are requesting that the current Planning Board endorse a new plan drawn by my client's civil engineer to be recorded at the Registry of Deeds. We are seeking the Planning Board's approval to do so before we incur the expense of drawing the plan.

My client, Mr. Marsters, is highly qualified to represent himself at the Board's meeting. He has been building and developing property in Mashpee for thirty years and has been a member and is a former Chairman of the Planning Board in the town of Sandwich. His breadth of knowledge and expertise in this area is unsurpassed.

Please place this matter on the Agenda for the next meeting on December 19, 2018.

Sincerely,



Bryan W. Reardon, Esq.

MASHPEE TOWN CLERK

DEC 12 2018

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**Mashpee Planning Board
Public Hearing Notice**

Under the provisions of M.G.L. Chapter 85, Sections 3A and 3B, the Mashpee Planning Board will hold a public hearing on Wednesday, December 19, 2018 at 7:10 PM at the Mashpee Town Hall, 16 Great Neck Road North, Mashpee, MA to approve changing the names of SHIELDS AVENUE and SANTUIT LANE to SANTUIT LANE. This is the only roadway extending down the peninsula that extends into Santuit Pond found on Assessor's Map 30. The Mashpee Fire Department has requested the road have a single name and retain its current one-way direction. This change will also change the address of houses along the renamed road.

Per Order of

Mary E. Waygan, *Chair*
Mashpee Planning Board

Publication Dates

Friday, November 30th
Friday, December 7th



Town of Mashpee

16 Great Neck Road North
Mashpee, Massachusetts 02649

NOTICE OF PUBLIC HEARING TO CONSIDER RENAMING SANTUIT LANE AND SHIELDS AVENUE TO SANTUIT LANE

November 30, 2018

Dear Mashpee Property Owner,

As the registered owner of a property located with a SANTUIT LANE or SHIELDS AVENUE address, you are being notified that the Mashpee Planning Board is holding a public hearing on **Wednesday, December 19, 2018 at 7:10 PM in the Waquoit Meeting Room, Mashpee Town Hall, 1st Floor, 16 Great Neck Road North, 02649** to solicit comments regarding the following case:

Under the provisions of M.G.L. Chapter 85, Sections 3A and 3B, the Mashpee Planning Board will hold a public hearing to consider changing the names of SHIELDS AVENUE and SANTUIT LANE to SANTUIT LANE. This is the only roadway extending down the peninsula that extends into Santuit Pond found on Assessor's Map 30. The Mashpee Fire Department has requested the road have a single name and retain its current one-way direction. This change will also change the address of houses along the renamed road.

If you wish to provide comment but you are unable to appear before the Board you may submit comments to me in writing via the contact information provided below. Your comments will be entered into the public record for the Board's consideration. A map is attached to this letter for your consideration.

If you require any accommodations please submit requests to me via email, snail mail, or telephone prior to the specified date and time of the public hearing indicated herein, in legal advertisements in the Mashpee Enterprise, and posted in Town Hall.

Please do not hesitate to contact me by phone, email, or in person should you have questions about why you are receiving this notification.

Sincerely,

Evan R. Lehrer, Town Planner
elehrer@mashpeeema.gov
(508) 539-1400 x. 8521



Town of Mashpee

16 Great Neck Road North
Mashpee, Massachusetts 02649

NOTICE OF PUBLIC HEARING TO CONSIDER MODIFICATION OF SPECIAL PERMIT FOR THE CLUSTER SUBDIVISION KNOWN AS WINDCHIME CONDOMINIUMS

November 30, 2018

Dear Mashpee Property Owner,

As the registered owner of a property located within 300' of the property identified above, you are being notified that the Mashpee Planning Board is holding a public hearing on **Wednesday, December 19, 2018 at 7:20 PM in the Waquoit Meeting Room, Mashpee Town Hall, 1st Floor, 16 Great Neck Road North, 02649** to solicit comments regarding the following case:

Pursuant to Massachusetts General Laws Chapter 40A the Mashpee Planning Board will hold a public hearing on Wednesday, December 19, 2018 at 7:20 PM to consider an application made by Bennett Environmental Associates on behalf of Windchime Condominium Trust to modify a special permit issued February 4, 1987 and recorded at the Barnstable County Registry of Deeds in Book 5734, Pages 225-269. Such application was made for consideration of the release of the escrow funds held under the Special Permit to make improvements to the on-site wastewater treatment system through the BRP WP 68 "Treatment Works Plan Approval" permitting process; and to seek reduction in the Wastewater Treatment Monitoring Plan as commensurate to the environmental monitoring requirements specified under the Groundwater Discharge Permit 263-3M1

If you wish to provide comment but you are unable to appear before the Board you may submit comments to me in writing via the contact information provided below. Your comments will be entered into the public record for the Board's consideration.

If you require any accommodations please submit requests to me via email, snail mail, or telephone prior to the specified date and time of the public hearing indicated herein, in legal advertisements in the Mashpee Enterprise, and posted in Town Hall.

Please do not hesitate to contact me by phone, email, or in person should you have questions about why you are receiving this notification.

Sincerely,

Evan R. Lehrer, Town Planner
elehrer@mashpeeema.gov
(508) 539-1400 x. 8521

**Mashpee Planning Board
Public Hearing Notice**

Pursuant to Massachusetts General Laws Chapter 40A the Mashpee Planning Board will hold a public hearing on Wednesday, December 19, 2018 at 7:20 PM to consider an application made by Bennett Environmental Associates on behalf of Windchime Condominium Trust to modify a special permit issued February 4, 1987 and recorded at the Barnstable County Registry of Deeds in Book 5734, Pages 225-269. Such application was made for consideration of the release of the escrow funds held under the Special Permit to make improvements to the on-site wastewater treatment system through the BRP WP 68 "Treatment Works Plan Approval" permitting process; and to seek reduction in the Wastewater Treatment Monitoring Plan as commensurate to the environmental monitoring requirements specified under the Groundwater Discharge Permit 263-3M1

Per Order of

Mary E. Waygan, *Chair*
Mashpee Planning Board

Publication Dates

Friday, November 30th
Friday, December 7th

Received by BOA:



**TOWN OF MASHPEE BOARD
OF ASSESSORS**

16 Great Neck Rd North, Mashpee, MA 02649
Phone # (508) 539-1404
Fax # (508) 539-1142
e-mail: assessing@mashpeema.gov

RECEIVED
NOV 19 2018

BOARD OF ASSESSORS
OF MASHPEE
Updated: 3/7/2013

REQUEST FOR ABUTTERS LIST

Please note that the Assessing Dept. will respond to this request within ten (10) business days.

ABUTTERS TO: MAP 75 PARCEL 11 EXT

ADDRESS OF SUBJECT PARCEL: 90 Great Neck Rd. S 300'

*All condo units
plus parcels within
300'*

PLEASE CHECK THE TYPE OF ABUTTERS LIST THAT YOU ARE REQUESTING:
(Refer to requirements of the regulating authority requiring abutters list.)

- ☐ DIRECT ABUTTERS Check box if this abutters list is for the Cape Cod Commission: ☐
- ☐ ALL PARCELS WITHIN A 100 FOOT RADIUS OF SUBJECT (usual for Conservation Commission & Historical Commission)
- ☒ ALL PARCELS WITHIN A 300 FOOT RADIUS OF SUBJECT
- ☐ ABUTTERS TO THE ABUTTERS WITHIN A 300 FOOT RADIUS OF SUBJECT
- ☐ OTHER (SPECIFY)

◀ ALL ABUTTERS LISTS ARE PRINTED WITH A MAP ON 8 ½ x 11 PAPER ▶

•Standard mailing labels of abutters are available for an extra charge of \$1.00 per page. (full or partial)

LABELS yes (YES or NO) NUMBER OF SETS OF LABELS 3

REQUESTED BY:
(PLEASE PRINT)

NAME:

TOWN OF MASHPEE
PLANNING DEPARTMENT
16 GREAT NECK ROAD NO.
MASHPEE MA 02649

ADDRESS:

PHONE:

DATE: 11/19/2018

SIGNATURE: *[Signature]*

FEES: BASIC ABUTTERS LIST (one subject parcel)

MAILING LABELS

COMPLEX ABUTTERS LIST (multiple subject parcels)

QUANTITY

1

\$5.00

18

\$1.00 PER PAGE

\$10.00 - \$50.00 (varies by processing time)

To Charge Per JRS
TOTAL AMOUNT DUE: \$ 23.00

Fee structure based on state guidelines for record production and copy costs.

Key	Parcel ID	Owner	Location	Mailing Street	Mailing City	ST	ZipCd/Country
5560	75-11-7-R	BAGGETT, WALTER O & SHORTRIDGE BAGGETT, LILLIE M	7 BOBWHITE CRESCENT	7 BOBWHITE CRESCENT	MASHPEE	MA	02649-3560
5561	75-11-8-R	DREA, NANCY A TR DREA FAMILY REALTY TRUST	8 BOBWHITE CRESCENT	8 BOBWHITE CRESCENT	MASHPEE	MA	02649
5562	75-11-9-R	CHRISTMAN, KATHERINE	9 BOBWHITE CRESCENT	PO BOX 471	FALMOUTH	MA	02541
5563	75-11-10-R	PROOS, EILEEN	10 BOBWHITE CRESCENT	10 BOBWHITE CRESCENT	MASHPEE	MA	02649
5564	75-11-11-R	TRACZYK, ARTHUR P TR APT REALTY TRUST	11 BOBWHITE CRESCENT	11 BOBWHITE CRESCENT	MASHPEE	MA	02649
5565	75-11-12-R	JONAH, MICHAEL H & SHERYL J	12 BOBWHITE CRESCENT	229 MILLBROOK DRIVE	EAST LONGMEADOW	MA	01028
5566	75-11-13-R	LAGRIFFE, ANNE M	13 BOBWHITE CRESCENT	13 BOBWHITE CRESCENT	MASHPEE	MA	02649
5567	75-11-14-R	DEBARROS, DOMINGO K & DIOSA A	14 BOBWHITE CRESCENT	14 BOBWHITE CRESCENT	MASHPEE	MA	02649
16405	75-11-15-R	HARTNETT, GAIL C C/O HARTNETT, GAIL C ET AL TRS	84 BLUE SPRUCE WAY	84 BLUE SPRUCE WAY	MASHPEE	MA	02649
16406	75-11-16-R	ELD, ALICE R LIFE ESTATE	82 BLUE SPRUCE WAY	82 BLUE SPRUCE WAY	MASHPEE	MA	02649
16407	75-11-17-R	SAVIOLI, FRANCES M	80 BLUE SPRUCE WAY	PO BOX 2293	MASHPEE	MA	02649
16408	75-11-18-R	CONNOLLY, FRANK R & SHEILA C LIFE ESTATE	78 BLUE SPRUCE WAY	78 BLUE SPRUCE WAY	MASHPEE	MA	02649
16409	75-11-19-R	FEBEO, KAREN L	76 BLUE SPRUCE WAY	53 GLENHAM STREET	WEST ROXBURY	MA	02132
16410	75-11-20-R	JAYES, ROBERT L & DOROTHY J TR C/O SHULTZ, DIANE M ET AL	74 BLUE SPRUCE WAY	322 LOCUST LANE	MOUNT JOY	PA	17552
16411	75-11-21-R	HOPKINS, CALOGERA L TR JOHN E HOPKINS REVOCABLE TRUST	72 BLUE SPRUCE WAY	72 BLUE SPRUCE WAY	MASHPEE	MA	02649
16412	75-11-22-R	APFEL, PAUL & BEATRICE	70 BLUE SPRUCE WAY	70 BLUE SPRUCE WAY	MASHPEE	MA	02649
16413	75-11-23-R	LYON, JANET L	68 BLUE SPRUCE WAY	68 BLUE SPRUCE WAY	MASHPEE	MA	02649
16437	75-11-24-R	BOLAND, MICHAEL & PATRICIA	66 BLUE SPRUCE WAY	66 BLUE SPRUCE WAY	MASHPEE	MA	02649
16438	75-11-25-R	CONWAY, JUDITH	64 BLUE SPRUCE WAY	64 BLUE SPRUCE WAY	MASHPEE	MA	02649
17102	75-11-26-R	SPEROUL, CHALAT T	89 BLUE SPRUCE WAY	57 BRIDLE PATH	SUDBURY	MA	02271
17107	75-11-27-R	DICK, JOHN W & NANCY J C/O DICK, JOHN W & NANCY J TRS	87 BLUE SPRUCE WAY	2330 E MONTROSE CANYON DR	ORO VALLEY	AZ	85755
17112	75-11-28-R	CAMPBELL, ISABEL M TRUSTEE LIFE ESTATE	85 BLUE SPRUCE WAY	85 BLUE SPRUCE WAY	MASHPEE	MA	02649
16414	75-11-30-R	PRINCIPE, MICHAEL J JR & PRINCIPE, MARY ELLEN	2 GOLD LEAF LN	2 GOLD LEAF LN	MASHPEE	MA	02649
16415	75-11-31-R	BAKER, MARION & KILGROW MARY ANN	4 GOLD LEAF LN	4 GOLD LEAF LN	MASHPEE	MA	02649
16416	75-11-32-R	YATES, SHEILA M	6 GOLD LEAF LN	6 GOLD LEAF LN	MASHPEE	MA	02649
16417	75-11-33-R	BROWN, J LORRAINE & BROWN, VINCENT G (EST OF)	8 GOLD LEAF LN	8 GOLD LEAF LN	MASHPEE	MA	02649
16418	75-11-34-R	HARDWICK, JEANNE L LIFE ESTATE	10 GOLD LEAF LN	10 GOLD LEAF LN	MASHPEE	MA	02649
16419	75-11-35-R	HAVALOTTI, JUANITA M	12 GOLD LEAF LN	PO BOX 801	MASHPEE	MA	02649
17101	75-11-36-R	YAFFE, ELLEN & EGAN, KATHLEEN M	14 GOLD LEAF LN	14 GOLD LEAF LN	MASHPEE	MA	02649
17106	75-11-37-R	PAIMBLANC, JEAN JACQUES & PAIMBLANC, ARLETTE D	16 GOLD LEAF LN	16 GOLD LEAF LN	MASHPEE	MA	02649
17111	75-11-38-R	ROSS, JOHN C TR C/O DYER, ARNOLD W JR	18 GOLD LEAF LN	9 TORR STREET	ANDOVER	MA	01810-4021
17103	75-11-39-R	WILCOX, ELLEN S	20 GOLD LEAF LN	320 VENICE GOLD CLUB DRIVE	VENICE	FL	34444
17108	75-11-40-R	MCCANN, JAMES W & ANN MARIE TR MCCAN TRUSTS	22 GOLD LEAF LN	22 GOLD LEAF LN	MASHPEE	MA	02649
17113	75-11-41-R	BARNICOAT, LORRAINE TRUSTEE LORRAINE BARNICOAT REVOC TRUST	24 GOLD LEAF LN	24 GOLD LEAF LN	MASHPEE	MA	02649
17104	75-11-42-R	HOLTEEN, LARUE S	29 GOLD LEAF LN	29 GOLD LEAF LN	MASHPEE	MA	02649
17109	75-11-43-R	BATTS, RICHARD M & BARBARA A	27 GOLD LEAF LN	27 GOLD LEAF LN	MASHPEE	MA	02649
17114	75-11-44-R	STOGEL, SUSAN D	25 GOLD LEAF LN	25 GOLD LEAF LN	MASHPEE	MA	02649
17105	75-11-45-R	HAWKINS, STEPHEN & MARTHA TRS HAWKINS LIVING TRUST	23 GOLD LEAF LN	250 SEA MARSH DRIVE	KIAWAH ISLAND	SC	29455
17110	75-11-46-R	MCLAUGHLIN, WILLIAM & ANN	21 GOLD LEAF LN	21 GOLD LEAF LN	MASHPEE	MA	02649
17115	75-11-47-R	VERROS, ZACHARY & JEANNINE A T VERROS REVOCABLE TRUST	19 GOLD LEAF LN	19 GOLD LEAF LN	MASHPEE	MA	02649-3483
17121	75-11-49-R	MONARCH, MARY K TR KAIPAINEN DAUGHTERS RLTY TRUST	11 GOLD LEAF LN	11 GOLD LEAF LN	MASHPEE	MA	02649

Key	Parcel ID	Owner	Location	Mailing Street	Mailing City	ST	ZipCd/Country
17301	75-11-91-R	LATTANZI, LINDA M TR LATTANZI REALTY TRUST OF 2009	62 GOLD LEAF LN	160 WINTHROP AVENUE	REVERE	MA	02151
17269	75-11-92-R	BARDIS, JAMES M & ELIZABETH J	64 GOLD LEAF LN	64 GOLD LEAF LN	MASHPEE	MA	02649
17286	75-11-93-R	WILLIAMS, WILLIAM P & KELLY WILLIAMS DONNA	66 GOLD LEAF LN	110 MARY STREET	ARLINGTON	MA	02474
17316	75-11-94-R	VIGNEAU, MARY JEAN	68 GOLD LEAF LN	68 GOLD LEAF LN	MASHPEE	MA	02649
17270	75-11-95-R	BERNIER, RITA J	70 GOLD LEAF LN	70 GOLD LEAF LN	MASHPEE	MA	02649
17287	75-11-96-R	HASKIN, BRUCE & CAROL	72 GOLD LEAF LN	49 CLIFTON AVENUE	MARBLEHEAD	MA	01945
17303	75-11-97-R	RAELIN, JOSEPH A & ABBY P TRS ABBY P RAEIN TRUST 2008	74 GOLD LEAF LN	294 NEHOLDEN STREET	NEEDHAM	MA	02492
17271	75-11-98-R	FITZPATRICK, EDWIN R & DONNA M	76 GOLD LEAF LN	76 GOLD LEAF LN	MASHPEE	MA	02649
17288	75-11-99-R	HARVEY, JOHN J & LYNN S	78 GOLD LEAF LN	78 GOLD LEAF LN	MASHPEE	MA	02649
17304	75-11-100-R	DEPAUL, ARTHUR W & DIANE	80 GOLD LEAF LN	80 GOLD LEAF LN	MASHPEE	MA	02649
17277	75-11-101-R	SULLIVAN, MARJORIE G C/O GINNS, DANIEL P & HEATHER	73 GOLD LEAF LN	73 GOLD LEAF LN	MASHPEE	MA	02649
17291	75-11-102-R	HABERLIN, THOMAS & KATHERINE	71 GOLD LEAF LN	71 GOLD LEAF LN	MASHPEE	MA	02649
17308	75-11-103-R	STONE, JOHN W JR & EILEEN	69 GOLD LEAF LN	69 GOLD LEAF LN	MASHPEE	MA	02649
17314	75-11-104-R	KRUG, JOHN J & NANCY TRS KRUG 2013 REVOC LIVING TRUSTS	77 GOLD LEAF LN	77 GOLD LEAF LN	MASHPEE	MA	02649
17315	75-11-105-R	MARTIN, WILLIAM C JR & JOANNA	75 GOLD LEAF LN	6 N 372 SPLITRAIL LANE	SAINT CHARLES	IL	60175-6966
17278	75-11-106-R	HOOP, LESLIE C/O HOOP, LESLIE D TR	35 RED CEDAR RD	4 LASDEN BROTHERS WAY	FRANKLIN	MA	02038
17289	75-11-107-R	MURPHY, MICHAEL A & KATHLEEN K	33 RED CEDAR RD	33 RED CEDAR RD	MASHPEE	MA	02649
17305	75-11-108-R	WEEKS, C WALLACE	31 RED CEDAR RD	31 RED CEDAR RD	MASHPEE	MA	02649
17279	75-11-109-R	HAYES, GERALD WILLIAM & HAYES, MAUREEN CARNEY	71 BLUE SPRUCE WAY	71 BLUE SPRUCE WAY	MASHPEE	MA	02649
17290	75-11-110-R	SKINNER, LEWIS H & CYNTHIA P T SKINNER CAPE COD NOMINEE TRUST	39 RED CEDAR RD	39 RED CEDAR RD	MASHPEE	MA	02649
17306	75-11-111-R	BROWN, FRANK A III & DONNA D	37 RED CEDAR RD	37 RED CEDAR RD	MASHPEE	MA	02649
17276	75-11-112-R	TROOP, ANDREW M & SUSSMAN, ANDREA L	65 GOLD LEAF LN	12 DEER POND ROAD	SUDBURY	MA	01776
17292	75-11-113-R	BILIA, LINDA A	67 GOLD LEAF LN	16210 MARSILEA PLACE	NAPLES	FL	34110
17313	75-11-114-R	GOUDREAU, GEORGE V & GOUDREAU, CATHERINE M	9 GREEN IVY LN	7951 KILKENNY WAY	NAPLES	FL	34112
14336	75-11-122-R	HOOVER, ROBERT J & ANN BRITT C/O HOOVER, ROBERT J & ANN BRIT	69 BLUE SPRUCE WAY	2 CROWNDRIDGE ROAD	WESTBOROUGH	MA	01581
14337	75-11-123-R	SCHAIER, VINCENT E	40 RED CEDAR RD	266 SHINING ROCK DRIVE	NORTHBRIDGE	MA	01534
14338	75-11-124-R	WORTH, JANET M	38 RED CEDAR RD	38 RED CEDAR RD	MASHPEE	MA	02649
14339	75-11-125-R	KERRIGAN, CHRISTINE	36 RED CEDAR RD	36 RED CEDAR RD	MASHPEE	MA	02649
14340	75-11-126-R	ROVNER, SIDNEY & SHARON H LIFE ESTATE	34 RED CEDAR RD	34 RED CEDAR RD	MASHPEE	MA	02649
14341	75-11-127-R	GAGE, JANET N TR C/O GAGE, JANET N TR	32 RED CEDAR RD	32 RED CEDAR RD	MASHPEE	MA	02649
14342	75-11-128-R	RICE, RONALD TR HAMPSTEAD NOMINEE RLTY TRUST	30 RED CEDAR RD	297 NORTH ST	HYANNIS	MA	02601
14328	75-11-130-R	GRAHAME, ROSE & TROPEANO, CONNIE	2 RED CEDAR RD	2 RED CEDAR RD	MASHPEE	MA	02649
14329	75-11-131-R	TOMASETTI, RAYMOND & KATHLEEN	4 RED CEDAR RD	4 DENISE DRIVE	ASHLAND	MA	01721-2117
14330	75-11-132-R	MITCHELL, SUSAN F	6 RED CEDAR RD	6 RED CEDAR RD	MASHPEE	MA	02649
14331	75-11-133-R	SLESINSKI, ROBERT F TR REV ROBERT F SLESINSKI PH D TR	8 RED CEDAR RD	8 RED CEDAR RD	MASHPEE	MA	02649
14332	75-11-134-R	KASTNER, WARREN F & ELLIOTT, TAHIA	10 RED CEDAR RD	10 RED CEDAR RD	MASHPEE	MA	02649
14333	75-11-135-R	TUTTLE, ALICE M & JOHN E	12 RED CEDAR RD	12 RED CEDAR RD	MASHPEE	MA	02649
14334	75-11-136-R	MALONE, ANNE	14 RED CEDAR RD	14 RED CEDAR RD	MASHPEE	MA	02649
14335	75-11-137-R	GLENER, ELINOR	16 RED CEDAR RD	16 RED CEDAR RD	MASHPEE	MA	02649
14344	75-11-138-R	CLARK, JEAN F & LAWRENCE, DEBORAH L	61 BLUE SPRUCE WAY	61 BLUE SPRUCE WAY	MASHPEE	MA	02649
14345	75-11-139-R	SHLYAKHTER, DINA	63 BLUE SPRUCE WAY	55 BROADLAWN PARK APT 20B	CHESTNUT HILL	MA	02467-3514

or other negative water quality conditions as outlined by the applicable criteria in Massachusetts Surface Water Quality Standards for Class SA or Class B waters (see 314 CMR 4.00) the applicant will be required to improve, within a reasonable time period, (unless the Windchime Point sewage treatment plant is proven a non-contributor) to the best management practice and/or best available technology (whichever combination will provide the highest level of sewage treatment) the level of sewage treatment at the "Windchime Point" plant. All responsibility to prove any lack of contribution to applicable water quality problems shall be on the applicant. Definition of water quality problems, discussion of best management practices, best available technology, and proposed solutions, will be determined at a Planning Board public hearing, to be held at its request. Liability incurred by the applicant stemming from this agreement does not force payment or action upon other responsible parties, heretofore not restricted by similar agreements.

To secure the provisions of this special permit agreement, the applicant agrees to post a performance bond, in the form of a fund of \$125,000, payable to the Town of Mashpee, to be used expressly for purposes of improving the level of sewage treatment at the "Windchime Point" plant. This fund shall be established by the applicant within six months of the start of construction of the project, and shall be set aside to accrue interest. The fund shall remain as long term performance guarantee, and is to be used only if the applicant defaults on the liability to improve the level of sewage treatment at the "Windchime Point" plant. Nothing in this agreement limits the applicant's liability to \$125,000 plus interest accrued in the fund. It is understood that the total liability of the applicant is limited to the best management practices and/or best available technology improvements (at time of identified water quality problems) which might include, but are not limited to, denitrification, spray irrigation, or phosphorus removal.

X. Other Provisions

The Town of Mashpee, acting through its offices, reserves the right to enter the applicant's property to take independent samples from all monitoring points and stations. It is further understood that the applicant reserves the right to enter upon and construct well stations on the adjacent property owned by the Trustees of Reservation, for the purposes of fulfilling this agreement. This permission is expressly granted by the provisions of the conservation restriction between Sandcastle-Mashpee Inc. and the Trustees of Reservation. Should the Town of Mashpee form a municipal wastewater treatment commission (or equivalent governmental entity) and request in writing that ownership of the Windchime Point plant be transferred to the Town, all requirements of this monitoring plan placed upon the applicant shall become null and void. Should any portion of this agreement be held void, other portions shall remain unaffected.

(+) "The Fund"
replace w/
FAM

**Mashpee Planning Board
Minutes of Meeting
December 5, 2018 at 7:00 p.m.
Waquoit Meeting Room, Mashpee Town Hall**

Present: Chairman Mary Waygan, Dennis Balzarini, Joe Cummings, David Weeden, Robert (Rob) Hansen (Alt.), David Kooharian
Also: Evan Lehrer-Town Planner; Charles Rowley-Consulting Engineer

CALL TO ORDER

The Town of Mashpee Planning Board meeting was opened with a quorum in the Waquoit Meeting Room at Mashpee Town Hall by the Chair at 7:00 p.m. on Wednesday, December 5, 2018. The Chair stated that the meeting was being videographed and recorded and asked that speakers state their name, address and comment. The Pledge of Allegiance was recited. The Chair acknowledged everyone's attendance at the meeting on this day of mourning for President Bush.

APPROVAL OF MINUTES—September 27, 2018, November 7, 2018 and November 21, 2018

MOTION: Mr. Balzarini made a motion to approve all as presented. Mr. Cummings seconded the motion. All approved unanimously, Mr. Kooharian abstained from the November 21 minutes.

PUBLIC HEARING

**7:10 p.m. Road Renaming-Shields Road and Santuit Lane to Shields Avenue Extension
(continued from 11/7/18)**

The appointed time having arrived, the Chair read for the record the Public Hearing Notice. The Chair reported that an email had been received from 911 Coordinator Clay Nicholson requesting that the item be withdrawn. A recent meeting occurred amongst the interested parties to identify a numbering scheme and a new Public Hearing would be scheduled to rename the road to Santuit Lane.

MOTION: Mr. Balzarini made a motion to accept the withdrawal of this matter from the petitioner. Mr. Kooharian seconded the motion. All voted unanimously.

MOTION: Mr. Balzarini made a motion to close the Public Hearing. Mr. Kooharian seconded the motion. All approved unanimously.

NEW BUSINESS

Discussion and Vote on reopening the Blue Sky Towers II, LLC's Public Hearing on January 2, 2019 at 7:10 pm Regarding Application to Erect a Personal Wireless Service Facility at 101 Red Brook Road, Mashpee Fire Station #2- The Chair noted that the item had been added to the agenda at the last meeting, but was not voted on by roll call vote, so it has again been placed on the agenda.

MOTION: Mr. Balzarini made a motion to reopen the Public Hearing regarding the Blue Sky Towers II, LLC's application for a personal wireless service facility at 101 Red Brook Road, Mashpee Fire Station #2 on January 2, 2019 at 7:10 pm. Mr. Kooharian seconded the motion. All voted unanimously.

Vote on Public Hearing Date and Time for Road Naming of Willow Park Townhomes-Mr. Lehrer stated that January 2 would be the earliest date available to provide adequate notice and that the matter was a request from the 911 Coordinator. Mr. Lehrer had not yet received a formal proposal. The Chair suggested review of the request on January 16th at 7:10 p.m.

MOTION: Mr. Balzarini made a motion to schedule a Public Hearing on the Road Naming of Willow Park Townhomes on January 16, 2019 at 7:10 pm. Mr. Kooharian seconded the motion. All voted unanimously.

C. Rowley Billing for November 2018 Services-An invoice was received in the amount of \$845 for November services. The Chair inquired about the budget for consulting services. Mr. Rowley responded that he had been busy for some portions of the year and less busy at other parts of the year. Mr. Rowley anticipated that January would be quieter due to lessened construction. Mr. Lehrer confirmed that Planning Board expenses totaled 60.3% of the total annual budget.

MOTION: Mr. Balzarini made a motion to approve payment of \$845 to Charles Rowley. Mr. Kooharian seconded the motion. All voted unanimously.

Request for Release of Funds Held in Escrow, 33 Trinity Place-The Chair reported that a letter had been received from Conrad Geyser regarding road construction for Trinity Place, confirming that it had been completed per the requirements of the Planning Board. There was consensus to request Mr. Rowley complete an inspection.

MOTION: Mr. Balzarini made a motion to send Mr. Rowley to conduct an inspection. Mr. Kooharian seconded the motion. All voted unanimously.

Discussion of Request to Make a Minor Modification to a Special Permit for a Shared Driveway at 659, 673 and 687 Main Street Originally Issued to Brett Field and Z&J Realty Trust on August 6, 2010 and Recorded in Book 24822 Page 220 at the Barnstable County Registry of Deeds and Vote to Determine if the Request Qualifies as a Minor Modification-The Chair read the request. John Jordan, 673 Main Street owner and resident of 659 Main Street, reported that he removed trees on both sides, resulting in a washout, but was awaiting the building permit to begin construction of the new home ahead of the cold weather, requesting to address drainage concerns at the end of the project.

Mr. Rowley reported that he had inspected the existing road from Route 130 to the driveway located at the current house. Mr. Rowley confirmed that the first portion was 20 feet, but the edges could be better dressed to result in a complete 20 feet. There was a good shoulder on the left side. At the base of the hill, the roadway narrowed and required additional material and widening and could be raised to address puddling and prevent flooding of the common driveway. The current material was in good condition. There was little erosion, but boundaries were not clear between the first and second lots. The lot has been cleared. Mr. Jordan requested an exception to address outstanding issues at the time of acquiring an occupancy permit.

MOTION: Mr. Balzarini made a motion that the matter was a Minor Modification as long as the project proponent consulted with Mr. Rowley. Mr. Kooharian seconded the motion. All approved unanimously.

The project proponent wished to have the Special Permit modified in order to receive a Building Permit. Mr. Lehrer indicated that the Project Proponent wished to pour the foundation ahead of the cold weather and inquired whether the Board would consider a strategy to allow them to obtain a Building Permit without posting a security, making the Occupancy Permit contingent upon the completion of the Special Permit Conditions. Mr. Lehrer confirmed that the Building Inspector had previously questioned the legality of linking a condition to an Occupancy Permit. It was Mr. Lehrer's opinion that the issues in Mr. Rowley's report were minor. Mr. Balzarini inquired about the amount of the bond. Mr. Rowley responded that it was his belief that the project proponent hoped to use the funds to begin construction. Mr. Rowley suggested the possibility of conditioning it with a time limit. Mr. Jordan responded that the home would take a year to complete. The Chair inquired whether, if the work was not completed within 12 months, could a bond be required. There was consensus.

Mr. Rowley stated that Item 3 could not be waived with the Planning Board and would have to be addressed with the Zoning Board of Appeals. Mr. Lehrer confirmed that he would draft the Special Permit Modification and would follow up regarding recording because the Project Proponent wished to begin work. The Chair stated that she wished to review the draft Modification prior to it being forwarded to the Building Inspector. Mr. Rowley confirmed that the document would need to be recorded and would be subject to a 20 day appeal period. There was consensus to take a vote on adding the Condition to the Modification.

MOTION: Mr. Balzarini made a motion to authorize the Chair to sign the Modification. Mr. Kooharian seconded the motion. All approved unanimously.

Mr. Rowley recommended addressing the #3 Condition, requiring that a building be located within 150 feet of a paved road. Mr. Jordan inquired how he could pave another person's property and there was discussion about the common right to use the driveway. Mr. Balzarini suggested that the neighbors may be willing to chip in. The Chair recommended discussing the matter with the Building Commissioner. Mr. Rowley stated that he could speak with the Building Commissioner if there were additional questions.

Proposed Clarification of Process to Submit Comments and Materials to Planning Board for Residents and Local Organizations-The Chair suggested adding a process to the website to provide clarification as to the way in which comments and materials should be forwarded to the Planning Board. The Chair indicated that comments have been provided to staff, intended for the Planning Board, stating that those comments should be in written form to avoid miscommunication and provided directly to the Planning Board. Items being added to the agenda, beyond project proponents, should be a request in writing for Chair review. The Chair inquired about an email address and Mr. Lehrer suggested asking the IT Department to create a Planning Board email address that could be funneled to another email address. Mr. Lehrer will work on having the email address created.

MOTION: Mr. Balzarini made a motion to approve this and post it on the website. Mr. Kooharian seconded the motion. All approved unanimously.

Mr. Lehrer confirmed that the email address should be able to be added quickly to the website.

Proposals from the Town Planner on Zoning Bylaw Amendments: Temporary/Seasonal Signs and Donation Bins-Mr. Lehrer reported that the language for Seasonal Signs was drafted following recent discussion suggesting that it could be improved and drawing from a previously drafted Bylaw at his previous job. Mr. Lehrer worked to simplify the seasonal sign question while empowering the Building Commissioner, a regulatory document using design guidelines provided by the Planning Board. Notes that appeared on the draft were provided by the EDIC, who requested a built-in timeline. It was Mr. Lehrer's opinion that this draft was more functional than the prior version proposed for Town Meeting.

Mr. Hansen inquired about notes on the draft regarding the timeframe for removal of specific event signage and Mr. Lehrer responded that removal was changed to one day after rather than 7 days after the event. The Chair confirmed that the old one was approved by Design Review and this one would be approved by the Planning Board. Mr. Lehrer responded that the guidelines would be developed in the Design Review Committee and then presented to the Planning Board. The design guidelines could offer greater detail. Mr. Lehrer confirmed that sandwich signs would be separate. The signs under discussion would be anything non-permanent. Mr. Lehrer explained that temporary signs could be no larger than 12 square feet. Mr. Lehrer suggested that it would be best to establish design criteria and what was not permitted but the Chair stated her preference for the structure of the older version. Mr. Lehrer did not recommend the older version. Mr. Lehrer explained that a temporary sign would receive a permit and an A-frame sign would be treated separately, but still considered temporary. Mr. Lehrer explained that an A-frame sign communicated differently to the passer by and would not be an impediment and should be allowable as long as they conformed to the design guidelines and be removed when the business was closed. A-frame signs would not be along the roadway because its audience would be pedestrians, not drivers. Concern was expressed that the specificity should appear in the Bylaw but Mr. Lehrer stated it should be in the design guidelines. The design guidelines were in the process of being drafted. Mr. Lehrer stated that there were multiple types of signs that could be regulated by design guidelines and suggested that this proposed Bylaw was more straightforward than what was considered for October Town Meeting. Mr. Lehrer indicated that the Design Review Committee would first define neighborhoods and then craft the design guidelines and establish criteria for approval. The Building Commissioner would then be able to use the guidelines to make determinations. Mr. Lehrer explained that the guidelines would assist in limiting sign pollution around Mashpee.

The Chair inquired whether signage areas would be determined by use and Mr. Lehrer responded that signage style would be determined by location and the need to communicate different messaging to their clientele. Mr. Lehrer noted that temporary signs were not the best way to communicate the location of a business at the end of a street, but instead a structure such as a placard. The Chair inquired whether all businesses would be able to use temporary/seasonal signs and Mr. Lehrer confirmed that anyone demonstrating a need and conforming to the design guidelines could, the goal of which would be to remove visual clutter but still add value to a business. The Chair felt that the draft bylaw could be perceived as allowing too many additional signs and suggested a cap. Mr. Lehrer suggested one per store front, but the Chair felt it would still be too many. The Chair stated that some people disliked sandwich board signs but Mr. Lehrer stated that the A-frame signs were only appropriate in Mashpee Commons, due to its walkability, and not along a roadway. Mr. Lehrer did not recommend regulation that gave some business owners rights and others no rights. Mr. Hansen suggested that a permit fee would guide whether businesses found it profitable to have a temporary sign and Mr. Lehrer agreed, adding that it would also be a means of tracking.

Mr. Rowley suggested that "adequate access," under C, was a subjective term requiring more definition, adding that sandwich signs could not diminish accessibility. The Chair recommended the addition of illustrations to the guidelines. The Chair also suggested that sandwich boards could be an opportunity to brand the Town, for example using the Town's motto "live, work, play." Mr. Lehrer responded that it could be considered in the way finding project. Mr. Weeden suggested consideration of securing the signage and Mr. Lehrer confirmed that most temporary sign bylaws required that signage be constructed of durable material.

Regarding donation bins located around Mashpee, Mr. Lehrer stated that they were frequently cluttered and located in inappropriate places and suggested that they be addressed more appropriately. Donation bins could not be prohibited but could be placed in better locations. Mr. Lehrer referenced bins located on Main Street with garbage everywhere, adding that when the contents were picked up, the roadway was blocked by the truck. Bins should not be located on major thoroughfares and should provide a pull off for safety reasons. Due to the garbage and safety issues, Mr. Lehrer suggested regulating the bins so that people could have safe access without traffic being blocked. Mr. Lehrer would like the Board to draft language to be considered at Town Meeting. The Chair inquired whether anyone had been in touch with the property owners and Mr. Lehrer responded that it was the first issue that the Building Commissioner brought to Mr. Lehrer's attention. Mr. Lehrer believed that the Building Commissioner had been in contact with property owners. The Chair asked that Mr. Lehrer find out whether the property owners had been contacted by the Town and whether they had been asked to fix the problems on their own, before consideration of a bylaw that would end up in citation. Mr. Hansen suggested the addition of cameras. Mr. Lehrer noted that there are better locations for the bins.

Signature on October 15, 2018 Town Meeting Approved Road Taking Plans-Board members signed the plans approved at the October 3 meeting.

Cape Cod Commission Public Comment Period on Technical Bulletins-Mr. Weeden reported that comments were posted on the Cape Cod Commission website for the draft Regional Policy Plan, which appears in the Resource Center. The Chair will forward the Board a link and Mr. Weeden noted that December 29 was the deadline for comments to be received. The Chair inquired whether the Board wished to submit comments, as many of the minimum performance standards had been removed from the RPP, replaced with regional goals and objectives carried over to the technical bulletins. The Chair would review what was removed and noted the example of Open Space requirements that had been removed. Mr. Weeden stated that this RPP was a new approach and the Chair added that there were different requirements in different place types. Mr. Balzarini stated that it sounded similar to form-based code. Mr. Lehrer stated that the technical bulletins were specific to DRI review, adding that Eastham or Truro development was different than Hyannis, noting that the standards for development should be different for different places. Removal of thresholds allowed the Commission to review projects specific to the place type. Mr. Balzarini expressed concern about the removal of affordable housing needed all over the Cape. The Chair noted that some towns relied on the Cape Cod Commission for some of the performance standards, such as affordable housing or open space. Mr. Weeden suggested that the intent was likely to allow towns more flexibility. Mr. Balzarini felt that the Cape Cod Commission should serve in an advisory role, assisting towns. The Chair inquired who would determine the place types and Mr. Weeden responded that they were defined but not yet mapped. Mr. Lehrer stated that growth centers, like Mashpee Commons, were established. The Chair inquired whether towns were asked about place types and Mr. Weeden responded that he believed they had been and that Ernie Virgilio served as the Mashpee liaison. Mr. Lehrer stated that certain districts would meet certain criteria. Mr. Weeden suggested the possibility of a Cape Cod

Commission presentation and Mr. Lehrer confirmed that Heather Harper would be willing to come to the Planning Board to discuss the technical bulletins.

OLD BUSINESS

Sign Ockway Highlands's Special Permit Modification #1 Following the Lapse of the Appeal Period on November 27, 2018-Mr. Lehrer confirmed that no appeals were received. Planning Board members signed the modification. Mr. Balzarini reported that the area looked good, though there was some runoff. Mr. Rowley reported that the sedimentation basin had blown out two weeks ago and he had asked the developer to protect the basins. The loam washed out with recent rain. Mr. Rowley also asked for additional stone to be added to the shoulders along Blue Castle Drive.

Proposed Revisions to the Light Industry Overlay District-The Chair offered comments and suggested consideration of the draft at the next meeting.

CHAIRMAN'S REPORT

Town Manager Correspondence-The Chair referenced correspondence from the Town Manager in member packets, regarding a meeting with Town Counsel. The Chair stated that she would not facilitate Board members meeting with Town Counsel but encouraged anyone interested to contact Mr. Collins to discuss the matter.

Meeting with Chamber of Commerce-The Chair reported that she, Mr. Hansen and Selectman John Cotton attended a meeting with Mary Lou Palumbo, Patrice Pemental of the Chamber regarding communications and the missions of the Planning Board and the Chamber. Ms. Palumbo had submitted a letter to the Town Clerk. There was consensus that there was a better understanding between the two parties.

Selectmen's Discussion of Mashpee Commons-The Chair reported that meetings for January and February were being planned with the Board of Selectmen, initially to discuss Mashpee Commons, but now extended to include the rotary area. Invitees would include the memberships of the Planning Board, Zoning Board of Appeals, Health Department, Conservation Commission, EDIC and Sewer Commission. Mr. Balzarini inquired why the Tribe was not invited. Mr. Weeden suggested that it appeared to be a town based initiative. Mr. Balzarini felt that the Tribe should be included early in the discussions. The Chair stated that four meetings were being planned to include visionary questions, housing issues, preservation of community character and wastewater. A Comprehensive Wastewater Management Plan presentation would take place on January 14/15. Due to Board member availability, it may be necessary to rotate meeting attendees.

Guest Speakers-The Chair has invited Dr. Brian Howes to deliver the same presentation he gave to the Board of Selectmen and Leslie Richards from the Cape Cod Commission regarding the Economic Development Department, who also indicated that Heather Harper would want to attend. The Chair suggested presentations beginning at 6 p.m.

BOARD MEMBER COMMITTEE UPDATES

Cape Cod Commission-As discussed

Community Preservation Committee-The Chair reported that the deadline for applications had been extended and additional applications received. The Committee will be meeting tomorrow night.

Design Review Committee-Mr. Cummings reported that a sign had been considered for Fit Company for Women. There was discussion about the inability to read the sign with the blue background. A change would also be made to the tagging of the "Cape Cod's Only Women's Club."

Mr. Cummings also inquired about placement of the street number. The matter would be further reviewed by the Building Commissioner.

Plan Review-Mr. Lehrer reported that there was discussion regarding Christmas tree sales at Ken Marster's building and he believed it was approved.

Environmental Oversight Committee-No meeting

Greenway Project & Quashnet Footbridge-No meeting

Historic District Commission-No meeting

MMR Military Civilian Community Council-MMR Joint Land Use Study-No meeting

PLANNING STAFF UPDATES

Evergreen Subdivision Conservation Restriction-Mr. Lehrer reported that he had been contacted by the Conservation Agent regarding violations found in the Evergreen Subdivision. In consultation with Town maps, Mr. McManus discovered a growing clearing, approximately 4 acres, in an area that was under a conservation restriction, as required by the Planning Board as part of the approval. A cease and desist order has been issued by the Conservation Department and the ZBA has continued its hearings. Mr. Lehrer consulted with Mr. Rowley regarding whether the Planning Board could withhold the lot release for Evergreen and would be looking into the matter further.


ADDITIONAL TOPICS

None at this time

ADJOURNMENT

MOTION: Mr. Balzarini made a motion to adjourn. Mr. Koocharian seconded the motion. All voted unanimously. The meeting ended at 8:45 p.m.

Respectfully submitted,



Jennifer M. Clifford
Board Secretary

LIST OF DOCUMENTS PROVIDED

- 12/4/18 Charles Rowley Invoice
- 12/5/18 Clay Nicholson Packet Regarding Santuit Lane Matter
- 11/8/18 Conrad Geyser Letter Regarding 33 Trinity Place
- 11/29/18 Rodney Collins Email & Correspondence Regarding Blue Sky Towers, LLC
- Guidance on How to Submit Written Comments to the Planning Board
- Draft Temporary/Seasonal Signs Bylaw
- 12/5/18 Drew McManus Memo Regarding Evergreen Subdivision
- Evergreen Energy, LLC Conservation Restriction
- Images of Evergreen Energy Cluster Subdivision

30-12C-0-R

30-132-0-E

SCHMIDT, GEORGE C III
17 SANTUIT LN
MASHPEE, MA 02649

MASHPEE, TOWN OF
CONSERVATION COMMISSION
16 GREAT NECK ROAD NORTH
MASHPEE, MA 02649

RCN Webmail**geoschmidt@rcn.com**

Re: Road name and numbering system

From : Michael Campbell
<mikeatcamp@yahoo.com>

Thu, Nov 08, 2018 07:39 AM

Subject : Re: Road name and
numbering system

To : George Schmidt
<geoschmidt@rcn.com>

I am in favor of George, as representative of BNA, working out the numbering (re)assignments with the town. Thanks.

Mike

On Nov 8, 2018, at 7:26 AM, George Schmidt
<geoschmidt@rcn.com> wrote:

Greetings:

I am using an old distribution list so please forward to any name that you might see that is missing.

Planning Board meeting last evening ~ in a nutshell no one has a problem with retaining the name Santuit Lane (Planning Board, Fire Department, CIS coordinator, or the residents that were present.) The CIS coordinator is in charge of emergency response. Numbering is the issue. Seems the FD couldn't find # 1 when there was an emergency with Tina's mom. It brought up the #138 being across the street from #1 which led into etc, etc, etc. The CIS

RCN Webmail

geoschmidt@rcn.com

Re: Road name and numbering system

From : Maura Harway <mharway@gmail.com> Thu, Nov 08, 2018 07:51 AM
Subject : Re: Road name and numbering system
To : George Schmidt <geoschmidt@rcn.com>
Cc : Richard Mark <rwmarkhome@gmail.com>, fairzee@aol.com, Ann Rothstein <Ann.Rothstein@umassmed.edu>, Sue Greenberg <s.greenberg@neu.edu>, Rita & Dick Gollin <Gollin@aol.com>, Idabрила <Idabрила@veitas.com>, Dennis Shields <denshields@gmail.com>, soulsearcher soulsearcher <soulsearcher_soulsearcher@yahoo.com>, kdavid <kdavid@websterfirst.com>, gregbush007 <gregbush007@comcast.net>, colleenwebb <colleenwebb@yahoo.com>, Jacques R. Fresco <jrfresco@princeton.edu>, rovermp@aol.com, Michael Campbell <mikeatcamp@yahoo.com>, alingertat@aol.com, Kathy Marshak <kmarshak2@gmail.com>, victor romanul <victorromanul@comcast.net>, lisaromanul@comcast.net, Teagan <teaganannebokanovich@gmail.com>

Hi George -

That's great! Richard and I are completely in favor of the plan you describe, and glad you will take on the project of getting a better numbering system for the new Santuit Lane which encompasses the whole unpaved part of the road. In this email meeting of the Briant's Neck Association we vote yes on your proposal as described in your email.

Thank you very much for doing this!

RCN Webmail**geoschmidt@rcn.com**

RE: Road name and numbering system

From : Linas Dabrila <ldabrila@veitas.com> Thu, Nov 08, 2018 07:56 AM
Subject : RE: Road name and numbering system
To : Maura Harway <mharway@gmail.com>,
George Schmidt <geoschmidt@rcn.com>
Cc : Richard Mark <rwmarkhome@gmail.com>,
fairzee@aol.com, Ann Rothstein
<Ann.Rothstein@umassmed.edu>, Sue
Greenberg <s.greenberg@neu.edu>, Rita
& Dick Gollin <Gollin@aol.com>, Dennis
Shields <denshields@gmail.com>,
soulsearcher soulsearcher
<soulsearcher_soulsearcher@yahoo.com>,
kdavid <kdavid@websterfirst.com>,
gregbush007
<gregbush007@comcast.net>,
colleenwebb <colleenwebb@yahoo.com>,
Jacques R. Fresco
<jrfresco@princeton.edu>,,
rovermp@aol.com, Michael Campbell
<mikeatcamp@yahoo.com>,
alingertat@aol.com, Kathy Marshak
<kmarshak2@gmail.com>, victor romanul
<victorromanul@comcast.net>,
lisaromanul@comcast.net, Teagan
<teaganannebokanovich@gmail.com>

The Dabrila Family also votes yes to your proposal.
Thanks George

Linas J Dabrila PE, SECB
Associate Principal

Veitas & Veitas Engineers

RCN Webmail**geoschmidt@rcn.com****RE: Santuit Lane**

From : Kevin M. David
<kdavid@websterfirst.com>

Thu, Nov 08, 2018 07:55 AM

1 attachment

Subject : RE: Santuit Lane

To : George Schmidt
<geoschmidt@rcn.com>

Yes it will and I am good with the renaming to Santuit Lane
Will probably screw up my engineering plans with ZBA hearings but I
will cross that bridge when I have to

Kevin M. David, Esquire

General Counsel

Webster First Federal Credit Union

271 Greenwood St, Worcester MA, 01607

Phone: 508-671-5030 | Fax: 774.823.1830

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RCN Webmail

geoschmidt@rcn.com

Re: Road name and numbering system

From : Suzanne Greenberg
<s.greenberg@northeastern.edu>

Thu, Nov 08, 2018 07:57 AM

Subject : Re: Road name and numbering system

To : George Schmidt <geoschmidt@rcn.com>

Cc : Richard Mark <rwmarkhome@gmail.com>, fairzee@aol.com, Ann Rothstein <Ann.Rothstein@umassmed.edu>, Dick Gollin <Gollin@aol.com>, Idabrila <Idabrila@veitas.com>, Dennis <denshields@gmail.com>, soulsearcher soulsearcher <soulsearcher_soulsearcher@yahoo.com>, kdavid <kdavid@websterfirst.com>, gregbush007 <gregbush007@comcast.net>, colleenwebb <colleenwebb@yahoo.com>, MHarway <MHarway@gmail.com>, Jacques R. Fresco <jrfresco@princeton.edu>, rovermp@aol.com, Michael Campbell <mikeatcamp@yahoo.com>, alingertat@aol.com, kmarshak2 <kmarshak2@gmail.com>, victor romanul <victorromanul@comcast.net>, lisaromanul@comcast.net, Teagan <teaganannebokanovich@gmail.com>

Hi George,

Thanks for the update. I am supportive of the proposed actions. Sounds like a great resolution.

Best wishes for the holidays and new year.

Sue

RCN Webmail

geoschmidt@rcn.com

Re: Road name and numbering system

From : Teagan Bokanovich
<teaganannebokanovich@gmail.com>

Thu, Nov 08, 2018 08:19 AM

Subject : Re: Road name and numbering system

To : Suzanne Greenberg
<s.greenberg@northeastern.edu>

Cc : George Schmidt <geoschmidt@rcn.com>, Richard Mark <rwmarkhome@gmail.com>, fairzee@aol.com, Ann Rothstein <Ann.Rothstein@umassmed.edu>, Dick Gollin <Gollin@aol.com>, ldabrila <ldabrila@veitas.com>, Dennis <denshields@gmail.com>, soulsearcher soulsearcher <soulsearcher_soulsearcher@yahoo.com>, kdavid <kdavid@websterfirst.com>, gregbush007 <gregbush007@comcast.net>, colleenwebb <colleenwebb@yahoo.com>, MHarway <MHarway@gmail.com>, Jacques R. Fresco <jrfresco@princeton.edu>, rovermp@aol.com, Michael Campbell <mikeatcamp@yahoo.com>, alingertat@aol.com, kmarshak2 <kmarshak2@gmail.com>, victor romanul <victorromanul@comcast.net>, lisaromanul@comcast.net

Hello!

I'm sorry I couldn't make it to the discussion last night! Thank you for taking control of this!

I really love Santuit so I'm happy to keep it. While I would love to still be 34 I am flexible and can go with whatever works!!!

Thank you,
Teagan :)

RCN Webmail

geoschmidt@rcn.com

Re: Road name and numbering system

From : Ann Rothstein
<Ann.Rothstein@umassmed.edu>

Thu, Nov 08, 2018 08:31 AM

1 attachment

Subject : Re: Road name and numbering system

To : George Schmidt <geoschmidt@rcn.com>

Cc : Richard Mark <rwmarkhome@gmail.com>, fairzee@aol.com, S Greenberg <s.greenberg@neu.edu>, Dick Gollin <Gollin@aol.com>, Idabrila <Idabrila@veitas.com>, Dennis <denshields@gmail.com>, soulsearcher soulsearcher <soulsearcher_soulsearcher@yahoo.com>, kdavid <kdavid@websterfirst.com>, gregbush007 <gregbush007@comcast.net>, colleenwebb <colleenwebb@yahoo.com>, MHarway <MHarway@gmail.com>, Jacques R. Fresco <jrfresco@princeton.edu>, rovermp@aol.com, Michael Campbell <mikeatcamp@yahoo.com>, alingertat@aol.com, kmarshak2 <kmarshak2@gmail.com>, victor romanul <victorromanul@comcast.net>, lisaromanul@comcast.net, Teagan <teaganannebokanovich@gmail.com>

Your proposal is also fine with me – thanks so much for serving as our representative!

From: Schmidt George <geoschmidt@rcn.com>

Date: Thursday, November 8, 2018 at 7:26 AM

To: Schmidt George <geoschmidt@rcn.com>

Cc: Richard Mark <rwmarkhome@gmail.com>, "fairzee@aol.com"

<fairzee@aol.com>, Ann Rothstein <ann.rothstein@umassmed.edu>, S Greenberg

RCN Webmail

geoschmidt@rcn.com

Re: Road name and numbering system

From : Victor Romanul
<victorromanul@comcast.net>

Thu, Nov 08, 2018 09:00 AM

Subject : Re: Road name and numbering system

To : George Schmidt <geoschmidt@rcn.com>

Cc : Richard Mark <rwmarkhome@gmail.com>, fairzee@aol.com, Ann Rothstein <Ann.Rothstein@umassmed.edu>, S Greenberg <s.greenberg@neu.edu>, Dick Gollin <Gollin@aol.com>, Idabrila <Idabrila@veitas.com>, Dennis <denshields@gmail.com>, soulsearcher soulsearcher <soulsearcher_soulsearcher@yahoo.com>, kdavid <kdavid@websterfirst.com>, gregbush007 <gregbush007@comcast.net>, colleenwebb <colleenwebb@yahoo.com>, MHarway <MHarway@gmail.com>, Jacques R. Fresco <jrfresco@princeton.edu>, rovermp@aol.com, Michael Campbell <mikeatcamp@yahoo.com>, alingertat@aol.com, kmarshak2 <kmarshak2@gmail.com>, lisaromanul@comcast.net, Teagan <teaganannebokanovich@gmail.com>

Thank you George. Sounds like a great plan. Very much in support!
Victor

Sent from my iPhone

On Nov 8, 2018, at 7:26 AM, George Schmidt <geoschmidt@rcn.com> wrote:

Greetings:

Re: Road name and numbering system

From : Susan Lindsay
<soulsearcher_soulsearcher@yahoo.com>

Thu, Nov 08, 2018 09:40 AM

Subject : Re: Road name and numbering system

To : Victor Romanul
<victorromanul@comcast.net>

Cc : George Schmidt <geoschmidt@rcn.com>, Richard Mark
<rwmarkhome@gmail.com>, fairzee@aol.com, Ann Rothstein
<Ann.Rothstein@umassmed.edu>, S Greenberg <s.greenberg@neu.edu>, Dick Gollin <Gollin@aol.com>, Idabrila
<Idabrila@veitas.com>, Dennis <denshields@gmail.com>, kdavid
<kdavid@websterfirst.com>, gregbush007
<gregbush007@comcast.net>, colleenwebb <colleenwebb@yahoo.com>, MHarway <MHarway@gmail.com>, Jacques R. Fresco
<jrfresco@princeton.edu>, rovermp@aol.com, Michael Campbell
<mikeatcamp@yahoo.com>, alingertat@aol.com, kmarshak2
<kmarshak2@gmail.com>, lisaromanul@comcast.net, Teagan
<teaganannebokanovich@gmail.com>

Hey George,

The meeting last night was very productive and I believe our arguments for retaining the name Santuit Lane were compelling.

Even the FD didn't particularly care for the name Shields Extension.

Also, valid points regarding safety were made that require revamping the numbering system which makes perfect sense.

I'm definitely on board!

Thank you George, Mike and Donna for your input last night as well.

Re: Road name and numbering system

From : gollin@aol.com

Thu, Nov 08, 2018 01:14 PM

Subject : Re: Road name and numbering system**To :** soulsearcher soulsearcher
<soulsearcher_soulsearcher@yahoo.com>,
victorromanul@comcast.net,
jgollin@angelicafoundation.org**Cc :** geoschmidt@rcn.com,
rwmarkhome@gmail.com,
fairzee@aol.com, Ann Rothstein
<Ann.Rothstein@umassmed.edu>, s
greenberg <s.greenberg@neu.edu>,
ldabrila@veitas.com,
denshields@gmail.com,
kdavid@websterfirst.com,
gregbush007@comcast.net,
colleenwebb@yahoo.com,
MHarway@gmail.com,
jrfresco@princeton.edu,
rovermp@aol.com,
mikeatcamp@yahoo.com,
alingertat@aol.com,
kmarshak2@gmail.com,
lisaromanul@comcast.net,
teaganannebokanovich@gmail.com

Making the whole of "the dirt road" (as we call it, whatever the different sections' official titles) into "Santuit Lane" will be a vast improvement. Numbering the houses in rising sequence as anyone proceeds down the dirt road (sorry, I mean, "Santuit Lane") might be even more so. If odd numbers to the left and even numbers to the right as one proceeds, more so still, because that's customary in most built-up areas. But I expect the FD, the PD, and other emergency services know what's most sensible, so whatever they propose! We'll be happy to consign our present "27" sign to Memory Lane and get a new one for a sensibly renumbered Santuit Lane house.

It may be that any independently maintained buildable lots should have their

RCN Webmail

geoschmidt@rcn.com

RE: Road name and numbering system

From : Jacques R. Fresco
<jrfresco@Princeton.EDU>

Thu, Nov 08, 2018 05:47 PM

Subject : RE: Road name and numbering system

To : gollin@aol.com, soulsearcher soulsearcher
<soulsearcher_soulsearcher@yahoo.com>,
victorromanul@comcast.net,
jgollin@angelicafoundation.org

Cc : geoschmidt@rcn.com,
rwmarkhome@gmail.com,
fairzee@aol.com, Ann Rothstein
<Ann.Rothstein@umassmed.edu>, s
greenberg <s.greenberg@neu.edu>,
ldabrila@veitas.com,
denshields@gmail.com,
kdavid@websterfirst.com,
gregbush007@comcast.net,
colleenwebb@yahoo.com,
MHarway@gmail.com, rovermp@aol.com,
mikeatcamp@yahoo.com,
alingertat@aol.com,
kmarshak2@gmail.com,
lisaromanul@comcast.net,
teaganannebokanovich@gmail.com

We very much like the idea of retaining the name Santuit Lane. The name Shields
Extention sounds foreign and irrelevant.

Jacques and Rosalie Fresco

From: gollin@aol.com [mailto:gollin@aol.com]

Sent: Thursday, November 08, 2018 1:14 PM

To: soulsearcher_soulsearcher@yahoo.com; victorromanul@comcast.net;
jgollin@angelicafoundation.org

Cc: geoschmidt@rcn.com; rwmarkhome@gmail.com; fairzee@aol.com;
Ann.Rothstein@umassmed.edu; s.greenberg@neu.edu; ldabrila@veitas.com;
denshields@gmail.com; kdavid@websterfirst.com; gregbush007@comcast.net;

Call for Mashpee Zoning Bylaw Correction

Mary Mary

Wed 12/19/2018, 6:23 PM

To: Rodney C. Collins <rccollins@mashpeema.gov>

Cc: Evan Lehrer <ELehrer@mashpeema.gov>; Wayne E. Taylor <wtaylor@mashpeema.gov>;

David Kooharian <davidkoo@comcast.net>; David Weeden <David.Weeden@mwtribe-nsn.gov>;

Joseph P. Cummings (cummingsj3@msn.com) <cummingsj3@msn.com>; Dennis Balzarini <dhbalz@yahoo.com>;

robhansen00@msn.com <robhansen00@msn.com>; Charles Rowley <crsr63@verizon.net>; Jen EOC <capecodjcliff@aol.com>;

Debbie Dami <ddami@mashpeema.gov>; Mary Waygan <waygan@hotmail.com>

Bcc Mo Fahd <mohamadf@hotmail.com>

📎 5 attachments (4 MB)

1998 Mashpee Annual Report.pdf; AG Letters.pdf; Email TF September 24 2018.pdf; PB Minutes September 16 1998.pdf; Wireless Facility Overlay District.pdf;

Dear Rodney,

Thank you for your time on the phone today.

I formally call for the currently published Town of Mashpee Zoning Bylaw to be corrected in order to properly reflect the vote by October 5, 1998 Town Meeting which approved Article 35 as amended on the floor. Article 35 as amended excludes the R-3 and R-5 Zoning Districts from the Wireless Facility Overlay District. The following portion of the amendment is not correctly incorporated into the Zoning Bylaw:

add the phrase " , within the R-3 or R-5 Zoning Districts" after the phrase "Otis A.N.G.B. Accident Prevention Zone" in Subsection 174-5.C.

Attached please find the following:

1. The Wireless Facility Overlay District map approved by the Attorney General on Jan 7, 1999;
2. Letters from the Massachusetts Attorney General's Office approving zoning article 35 as amended;
3. Town of Mashpee Annual Report for the year 1998 documenting the October 5, 1998 Town Meeting vote on Article 35 as amended;
4. Planning Board Minutes of Meeting for September 16, 1998 (the discussion on Article 35 and amendment starts on page 4 and ends on page 7);
5. Email from Mr. Thomas Fudala dated September 24, 2018 re: Wireless Overlay District Article etc. (as way of background).

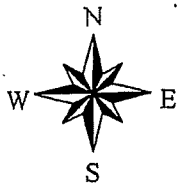
I respectfully request the corrected Zoning Bylaw is forwarded to all Planning Board members and all current petitioners and applicants to the Planning Board as soon as possible, but in no case later than Thursday December 27, 2018.

I apologize for the timing of this request. I had hope to submit this to you sooner, but there have been some unexpected matters which have dominated my time.

Yours,

Mary Waygan, Chair

WIRELESS FACILITY OVERLAY DISTRICT



Katherine B. Palmer
Jan. 7, 1999
35

10/5/98

- Otis ANGB Accident Prevention Zone
- Mashpee NWR Boundary
- Great Ponds 1000 FT Buffer
- Tidal Water 1000 FT Buffer
- State Historic Register Site
- Historic Register 1000 FT Buffer
- Com Electric Power Line Easement
- Wireless Facility Overlay District

1 0 1 2 Miles



SCOTT HARSHBARGER
ATTORNEY GENERAL

The Commonwealth of Massachusetts
Office of the Attorney General
One Ashburton Place
Boston, MA 02108-1698

REPLY TO:
DEPT. OF THE ATTORNEY GENERAL
WESTERN MASS. DIVISION
436 DWIGHT STREET
SPRINGFIELD, MASSACHUSETTS 01103-1317
(413) 784-1240

November 23, 1998

Deborah F. Dami, Town Clerk
Town of Mashpee
16 Great Neck Road North
Mashpee, MA 02649

Re: Fall Annual Town Meeting
Case #347E

Date of Town Meeting October 5, 1998

Date By-law amendments received by AG October 13, 1998

90th Day January 11, 1999

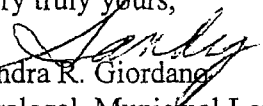
Dear Ms. Dami:

Thank you for submitting the by-laws adopted at Mashpee's recent Fall Annual Town Meeting. We received your packet on 10/13/98. Assuming the packet is complete and additional information is not requested in the interim by this Office, you may expect our review to be completed within ninety (90) days from the date of receipt.

If the 90th day falls on a weekend or holiday, final action shall be extended to the next business day. The review period may also be extended if the Attorney General, in writing, requests additional information or documents which are deemed essential to a complete review of the by-law amendments. In this case the 90 day review period will be deemed to commence upon the date on which the additional information or documentation is received.

Please feel free to contact us if you have any questions during this process.

Very truly yours,


Sandra R. Giordano
Paralegal, Municipal Law Unit
Springfield: (413) 784-1240 x 17

F:\USERS\RITCHIE\WP61\DOCS\TOWNS\MASHPEE\981005PR.FA1



SCOTT HARSHBARGER
ATTORNEY GENERAL
(617) 727-2200

The Commonwealth of Massachusetts
Office of the Attorney General
One Ashburton Place
Boston, MA 02108-1698

January 4, 1999

Deborah F. Dami, Town Clerk
16 Great Neck Road North
Mashpee MA 02649

Re: General Articles 17, 18 and 25 and Zoning Articles 26, 27, 29, 31, 32, 33,
34, 35 and 37, Mashpee Fall Annual Town Meeting 10/5/98, # 347

Dear Ms. Dami:

I return the amendments to the general by-laws adopted under articles 17, 18 and 25, as well as the amendments to the zoning by-laws adopted under articles 26, 27, 29, 31, 32, 34 and 37, all of the warrant for the "fall annual" town meeting, which first convened on October 5, 1998, with our approval.

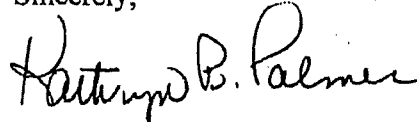
In so approving the aforementioned articles, I would like to also warn the Town that the town meeting which took place on October 5 and 6, according to our records, was not an "annual" meeting under G.L. c. 39, § 9, but, rather, was actually a special town meeting. This is because the "fall annual" town meeting was created by by-law amendment instead of by special legislation or change to the town charter. While it appears that no harm was done this time in calling the town meeting an "annual" (with regard to the length of the notice, etc.), this should be cause for concern for future "fall annual" town meetings. In addition, in approving general article 18, I would like to remind the Town that, while, under G.L. c. 40, § 21D, certain of the "enforcing person's" administrative duties may be delegated to the Town Clerk, all notices issued pursuant to this statute must be "signed by the enforcing person" and not the Town Clerk.

Zoning articles 33 and 35 were also submitted with the same warrant. However, I have

TOWN OF MASHPEE
TOWN CLERK
99 JAN - 7 PM 12:30

been in contact with the Town Clerk, and I am awaiting receipt of maps with regard to those two articles before commencing our review of them.

Sincerely,

A handwritten signature in cursive script, appearing to read "Kathryn B. Palmer".

Kathryn B. Palmer
Assistant Attorney General
Coordinator, Municipal Law Unit
One Ashburton Place, Room 2019
Boston, MA 02108

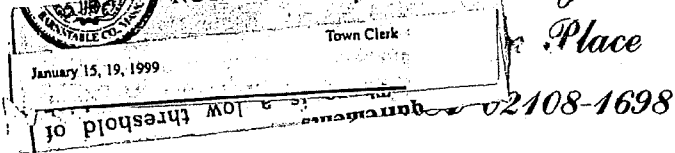
Encl.

cc: Kopelman and Paige, P.C., 31 St. James Ave., Boston, MA 02116



SCOTT HARSHBARGER
ATTORNEY GENERAL
(617) 727-2200

The Commonwealth of Massachusetts
Office of the Attorney General



January 7, 1999

Deborah F. Dami, Town Clerk
16 Great Neck Road North
Mashpee MA 02649

Re: Zoning Articles 33 and 35
Mashpee Fall Annual Town Meeting 10/5/98, # 347

Dear Ms. Dami:

I return the amendments to the zoning by-laws adopted under articles 33 and 35 of the warrant for the "fall annual" town meeting, which first convened on October 5, 1998, and the maps that pertain to each of those articles, with the approval of this Office.

Sincerely,

Kathryn B. Palmer
Assistant Attorney General
Coordinator, Municipal Law Unit
One Ashburton Place, Room 2019
Boston, MA 02108

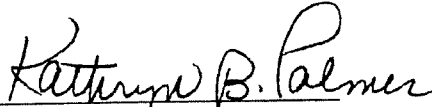
Encl.

cc: Kopelman and Paige, P.C., 31 St. James Ave., Boston, MA 02116

Boston, Massachusetts

The foregoing amendments to the zoning by-laws adopted under articles 33 and 35 of the warrant for the fall annual town meeting of October 5, 1998, and the maps that pertain to each of those articles are approved.

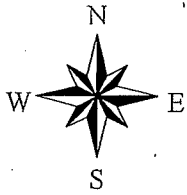
SCOTT HARSHBARGER
ATTORNEY GENERAL


By: Kathryn B. Palmer
Assistant Attorney General









Dated: January 7, 1999

TOWN OF MASHPEE
TOWN CLERK
99 JAN 12 PM 12:55

WIRELESS FACILITY OVERLAY DISTRICT



Kathryn B. Palmer
Jan. 7, 1999
35 10/5/98

-  Otis ANGB Accident Prevention Zone
-  Mashpee NWR Boundary
-  Great Ponds 1000 FT Buffer
-  Tidal Water 1000 FT Buffer
-  State Historic Register Site
-  Historic Register 1000 FT Buffer
-  Com Electric Power Line Easement
-  Wireless Facility Overlay District

1 0 1 2 Miles



One Hundred and Twenty-Sixth

ANNUAL REPORT

of the

TOWN OFFICERS

of the Town of



MASHPEE

MASSACHUSETTS

for the year

1998

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Motion made by Nancy Caffyn.

Motion: I move Article 34 be approved as printed in the warrant with the exception of the phrase, "or take any other action related thereto."

Planning Board voted at the Public Hearing held on August 19, 1998 4 to 0 for approval.

Motion passes unanimously at 9:12pm.

Article 35

To see if the Town will vote to amend the zoning bylaw by adding the following new sections and subsections:

Add the following to the listing of zoning districts contained in Section 174-4:

"Wireless Facility Overlay District".

Add the following new Subsection C. to Section 174-5 Establishment of Zoning Map:

"C. The Wireless Facility Overlay District shall include 1) the area within the 210 foot wide Commonwealth Electric Company transmission line easement running generally east-west between the Falmouth town line and the Barnstable town line, 2) all other lands in the Town which are not located within the boundaries of the Mashpee National Wildlife Refuge, within 1000 feet of the mean high water line of a Great Pond or a tidal water body, within Historic Districts, within 1000 feet of a Historic District or of structures or places listed in the 1997 Massachusetts State Register of Historic Places, within the Otis A.N.G.B. Accident Prevention Zone or within 300 feet of the right of way of any designated scenic roadway."

Add the following new Subsection H.(8) to Section 174-25. Table of Use Regulations:

"(8) Personal wireless service facilities, subject to the provisions of Section 174-45.2."

and indicate by inserting the letters "SP" in all columns of the Table of Use Regulations that such use is allowed by special permit in all zoning districts.

Add the following new Section 174-45.2:

"174-45.2. Personal Wireless Service Facilities.

A. Purpose and intent.

For the purpose of minimizing the visual and environmental impacts, as well as any potential deleterious impact on property values, of personal wireless service facilities, no personal wireless service facility shall be placed, constructed or modified within the town except in conformance with the requirements of this section, in conjunction with other regulations adopted by the Town,

including historic district regulations, design review and other bylaws and regulations designed to encourage appropriate land use, environmental protection, and provision of adequate infrastructure development.

The regulation of personal wireless service facilities is consistent with the purposes of the Mashpee zoning bylaw and the planning efforts of the town through its comprehensive plan, including those intended to further the conservation and preservation of developed, natural and undeveloped areas, wildlife, flora and habitats for endangered species, the preservation of coastal resources, protection of natural resources, balanced economic growth, the provision of adequate capital facilities, the coordination of the provision of adequate capital facilities with the achievement of other goals and the preservation of historical, cultural, archaeological, architectural and recreational values.

In accordance with the requirements of 47 U.S.C. s332(c)(7)(B), and until these requirements are modified, amended or repealed, in regulating the placement, construction and modification of personal wireless service facilities, the administration of this bylaw shall not be undertaken in a manner which unreasonably discriminates among providers of functionally equivalent services or prohibits, or has the effect of prohibiting, the provision of personal wireless services. Any decision to deny a request to place, construct or modify personal wireless service facilities shall be in writing and supported by substantial evidence contained in a written record. Furthermore, this bylaw may not regulate the placement, construction and modification of personal wireless service facilities on the basis of the environmental effects of radio frequency emissions to the extent that such facilities comply with the Federal Communications Commission's regulations concerning such emissions.

B. Definitions.

In addition to the definitions contained in Section 174-3, the following shall apply to Personal Wireless Service Facilities:

ABOVE GROUND LEVEL (AGL) - A measurement of height from the natural grade of a site to the highest point of a structure.

ANTENNA - The surface from which wireless radio signals are sent and received by a personal wireless service facility.

CAMOUFLAGED - A personal wireless service facility that is disguised, hidden, part of an exist-

ing or proposed structure or placed within an existing or proposed structure is considered "camouflaged."

CARRIER - A company that provides wireless services.

CO-LOCATION - The use of a single mount on the ground by more than one carrier (vertical co-location) and/or several mounts on an existing building or structure by more than one carrier.

CROSS-POLARIZED (OR DUAL-POLARIZED) ANTENNA - A low mount that has three panels flush mounted or attached very close to the shaft.

ELEVATION - The measurement of height above mean sea level.

ENVIRONMENTAL ASSESSMENT (EA) - An EA is the document required by the Federal Communications Commission (FCC) and the National Environmental Policy Act (NEPA) when a personal wireless service facility is placed in certain designated areas.

EQUIPMENT SHELTER - An enclosed structure, cabinet, shed or box at the base of the mount within which are housed batteries and electrical equipment.

FALL ZONE - The area on the ground within a prescribed radius from the base of a personal wireless service facility. The fall zone is the area within which there is a potential hazard from falling debris (such as ice) or collapsing material.

FUNCTIONALLY EQUIVALENT SERVICES - Cellular, Personal Communication Services (PCS), Enhanced Specialized Mobile Radio, Specialized Mobile Radio and Paging.

GUYED TOWER - A monopole or lattice tower that is tied to the ground or other surface by diagonal cables.

LATTICE TOWER - A type of mount that is self-supporting with multiple legs and cross-bracing of structural steel.

LICENSED CARRIER - A company authorized by the FCC to construct and operate a commercial mobile radio services system.

MONOPOLE - The type of mount that is self-supporting with a single shaft of wood, steel or concrete and a platform (or racks) for panel antennas arrayed at the top and/or along its length.

MOUNT - The structure or surface upon which antennas are mounted, including the following

four types of mounts:

- (1) Roof-mounted. Mounted on the roof of a building.
- (2) Side-mounted. Mounted on the side of a building.
- (3) Ground-mounted. Mounted on the ground.
- (4) Structure-mounted. Mounted on a structure other than a building.

OMNIDIRECTIONAL (WHIP) ANTENNA - A thin rod that beams and receives a signal in all directions.

PANEL ANTENNA - A flat surface antenna, usually developed in multiples.

PERSONAL WIRELESS SERVICE FACILITY - Facility for the provision of personal wireless services, as defined by the Telecommunications Act, including towers, poles, antennae and appurtenant structures.

PERSONAL WIRELESS SERVICES - The three types of services regulated by this bylaw: commercial mobile radio services, unlicensed wireless services and common carrier wireless exchange access services.

RADIOFREQUENCY (RF) ENGINEER - An engineer specializing in electrical or microwave engineering, especially the study of radiofrequencies.

RADIOFREQUENCY RADIATION (RFR) - The emissions from personal wireless service facilities. (Regulated by the FCC "Guidelines for Evaluating the Environmental Effects of Radiofrequency Radiation").

SECURITY BARRIER - A locked, impenetrable wall, fence or berm that completely seals an area from unauthorized entry or trespass.

SEPARATION - The distance between one carrier's array of antennas and another carrier's array.

C. Permit process.

A personal wireless service facility shall require a building permit in all cases and may be permitted as follows:

- (1) A personal wireless service facility may be located on any existing guyed tower, lattice tower, monopole, electric utility transmission tower, fire tower or water tower, provided that the installation of the new facility does not increase the height of the existing structure except as provided in Subsection E.(5) below. Such installations shall not require a special permit but shall

require plan review (PR) approval by the town under the provisions of Subsection 174-24B.

- (2) Otherwise, no personal wireless service facility involving construction of one or more ground or building (roof or side) mounts shall be located in the town except upon issuance of a special permit by the Planning Board under the provisions of Subsection 174-24(C) and of this section.
- (3) A personal wireless service facility that exceeds the height restrictions of Subsections E.(1) through (5) may be permitted by special permit, as specified in Subsection C.(2), in a designated Wireless Service Overlay District provided that the proposed facility complies with the height restrictions of Section E.(6), and all of the setback and other regulations set forth in this section.
- (4) Any applicant must demonstrate that the proposed facility is necessary in order to provide adequate service to the public.

D. Location.

Applicants seeking approval for personal wireless service facilities shall comply with the following:

- (1) If feasible, personal wireless service facilities shall be located on existing structures, including but not limited to buildings, water towers, existing telecommunications facilities, utility poles and towers, and related facilities, provided that such installation preserves the character and integrity of those structures. In particular, applicants are urged to consider use of existing telephone and electric utility structures as sites for one or more personal wireless service facilities. The applicant shall have the burden of proving that there are no feasible existing structures upon which to locate.
- (2) If the applicant demonstrates that it is not feasible to locate on an existing structure, personal wireless service facilities shall be designed so as to be camouflaged to the greatest extent possible, including but not limited to: use of compatible building materials and colors, screening, landscaping and placement within trees.
- (3) The applicant shall submit documentation of the legal right to install and use the proposed facility mount at the time of application for plan review or special permit.

E. Dimensional requirements.

Personal wireless service facilities shall comply with the following requirements:

- (1) Height, General: Regardless of the type of mount, personal wireless service facilities shall be no higher than ten feet above the average height of buildings within 300 feet of the proposed facility. In addition, the height of a personal wireless service facility shall not exceed by more than ten feet the height limits of the zoning district in which the facility is proposed to be located, unless the facility is completely camouflaged such as within a flagpole, steeple, chimney, or similar structure. Personal wireless service facilities may be located on a building that is legally non-conforming with respect to height, or has received a height variance, provided that the facilities do not project above the existing building height.
- (2) Height, Ground-Mounted Facilities: Ground-mounted personal wireless service facilities shall not project higher than ten feet above the average building height or, if there are no buildings within 300 feet, these facilities shall not project higher than ten feet above the average tree canopy height, measured from ground level (AGL). If there are no buildings within 300 feet of the proposed site of the facility, all ground-mounted personal wireless service facilities shall be surrounded by dense tree growth to screen views of the facility in all directions. These trees may be existing on the subject property or planted on site.
- (3) Height, Side- and Roof-Mounted Facilities: Side- and roof-mounted personal wireless service facilities shall not project more than ten feet above the height of an existing building nor project more than ten feet above the height limit of the zoning district within which the facility is located. Personal wireless service facilities may be located on an existing building that is legally nonconforming with respect to height, or has received a height variance, provided that the facilities do not project above the existing building height.
- (4) Height, Existing Structures: New antennas located on any of the following structures existing on the effective date of this bylaw shall be exempt from the height restrictions of this bylaw provided that there is no increase in height of the existing structure as a result of the installation of a personal

wireless service facility: water towers, guyed towers, lattice towers, fire towers and monopoles.

- (5) Height, Existing Structures, (Utility): New antennas located on any of the following existing structures shall be exempt from the height restrictions of this bylaw, provided that there is no more than a twenty (20) foot increase in the height of the existing structure as a result of the installation of a personal wireless service facility: electric transmission and distribution towers, telephone poles and similar existing utility structures. This exemption shall not apply in Historic Districts, within 300 feet of structures or places listed in the Massachusetts State Register of Historic Places, within 150 feet of the right-of-way of any designated scenic roadway, or within 300 feet of any Great Pond or tidal water body.
- (6) Height, Wireless Facility Overlay District: Within the Wireless Facility Overlay District (as described in Subsection 174-5.C.), personal wireless service facilities of up to 100 feet in height may be permitted by Special Permit, except that the Planning Board may grant a waiver to allow a height of up to 200 feet where circumstances warrant (e.g. no serious impact on neighboring properties, residential areas, historic districts, historic places or scenic vistas, along with the opportunity to eliminate a larger number of towers of lower height which might result in such impacts). Monopoles are the preferred type of mount for such taller structures. Such structures shall comply with all setback and Special Permit Regulations set forth in this Bylaw.
- (7) Setbacks: All personal wireless service facilities and their equipment shelters shall comply with the building setback provisions of the zoning district in which the facilities are located. In addition, the following setbacks shall be observed:
 - (a) In order to ensure public safety and prevent hazards to people and neighboring property from potential facility collapse or falling ice or other debris, the minimum distance from the base of any ground-mounted personal wireless service facility to any property line, road, habitable dwelling, business or institutional use, or public recreational area shall be the height of the facility/mount, including any

antennas or other appurtenances. This setback is considered a "fall zone".

- (b) In the event that an existing structure is proposed as a mount for a personal wireless service facility, a fall zone shall not be required, but the setback provisions of the zoning district shall apply. In the case of pre-existing non-conforming structures, personal wireless service facilities and their equipment shelters shall not increase any non-conformities, except as provided in Subsection (8) below.
- (8) Flexibility: In reviewing a special permit application for a personal wireless service facility, the Planning Board may reduce the required fall zone and/or setback distance of the zoning district by as much as 50% of the required distance if it finds that a substantially better design will result from such reduction. In making such a finding, the Planning Board shall consider both the visual and safety impacts of the proposed use.

F. Design standards.

The design of a personal wireless service facility determines its visibility and its impact on community character. Height and fall zone/setback standards will have an impact on the visibility of personal wireless service facilities, but they may still be visible from public areas and surrounding residential properties. All personal wireless service facilities shall comply with the following design standards in order to limit negative visual impacts from these facilities through effective design:

- (1) Visibility/Camouflage: Personal wireless service facilities shall be camouflaged as follows:
 - (a) Camouflage by Existing Buildings or Structures:

When a personal wireless service facility extends above the roof height of a building on which it is mounted, every effort shall be made to conceal the facility within or behind existing architectural features to limit its visibility from public ways. Facilities mounted on a roof shall be stepped back from the front facade in order to limit their impact on the building's silhouette.
 - (b) Personal wireless service facilities that are side mounted shall blend with

the existing building's architecture and, if over 5 square feet, shall be painted or shielded with material which is consistent with the design features and materials of the building.

(c) Camouflage by Vegetation:

If personal wireless service facilities are not camouflaged from public viewing areas by existing buildings or structures, or are not located on existing structures or along a high tension power line right of way, they shall be surrounded by buffers of dense tree growth and understory vegetation in all directions to create an effective year-round visual buffer. Ground-mounted personal wireless service facilities shall have a vegetated buffer of 50 feet or more, and of sufficient height to effectively screen the facility. Trees and vegetation may be existing on the subject property or installed as part of the proposed facility or a combination of both. The Planning Board shall determine the types of trees and plant materials and depth of the needed buffer based on site conditions and the height of the proposed tower.

(d) Color:

Personal wireless service facilities that are side-mounted on buildings shall be painted or constructed of materials to match the color of the building material directly behind them.

To the extent that any personal wireless service facility extends above the height of the vegetation immediately surrounding it, it shall be painted in a light gray or light blue hue that blends with sky and clouds.

(2) Equipment Shelters: Equipment shelters for personal wireless service facilities shall be designed consistent with one of the following design standards:

- (a) Equipment shelters shall be located in underground vaults; or
- (b) Equipment shelters shall be designed consistent with traditional Cape Cod architectural styles and materials, with a roof pitch of at least 10/12 and wood clapboard or shingle siding; or

- (c) Equipment shelters shall be camouflaged behind an effective year-round landscape buffer, equal to the height of the proposed building, and/or wooden fence. The Planning Board shall determine if the style of fencing and/or landscape buffer proposed is compatible with the neighborhood.

(3) Lighting and signage.

- (a) Personal wireless service facilities shall be lighted only if required by the Federal Aviation Administration (FAA). Lighting of equipment shelters and any other facilities on site shall be shielded from abutting properties. There shall be total cutoff of all light at the property lines of the parcel to be developed, and footcandle measurements at the property line shall be 0.0 initial footcandles when measured at grade.
- (b) Signs shall be limited to those needed to identify the property and the owner and warn of any danger. All signs shall comply with the requirements of Article X of this bylaw.
- (c) All ground mounted personal wireless service facilities shall be surrounded by a security barrier.

(4) Historic buildings and districts.

- (a) Any personal wireless service facilities located on or within an historic structure shall not alter the character defining features, distinctive construction methods, or original historic materials of the building.
- (b) Any alteration made to an historic structure to accommodate a personal wireless service facility shall be fully reversible.
- (c) Personal wireless service facilities within an historic district shall be concealed within or behind existing architectural features, such as towers, cupolas or spires, or shall be located so that they are not visible from public roads and viewing areas within the district.
- (d) Copies of all plans for any personal wireless service facility proposed in a historic district, or within 1000 feet of a historic district or a structure or place listed on the Massachusetts

State Register of Historic Places, shall be provided to the Mashpee Historical Commission before or at the same time that they are submitted to the Town for approval, in order to facilitate their review and comment on the proposal. Applicants are encouraged to meet with the Commission to solicit their input and advice prior to seeking permit approvals.

(5) Scenic roads and vistas.

- (a) Except along an existing cleared high tension power line right-of-way, personal wireless service facilities shall not be located within open areas that are visible from public roads, recreational areas or residential development. As required in Section F.(1) above, all ground-mounted personal wireless service facilities that are not camouflaged by existing buildings or structures shall be surrounded by a buffer of dense tree growth.
- (b) Any personal wireless service facility that is located within 300 feet of a scenic road as designated by the town shall not exceed the height of vegetation at the proposed location. If the facility is located farther than 300 feet from the scenic road, the height regulations described elsewhere in this bylaw will apply.

G. Environmental standards.

- (1) Personal wireless service facilities shall not be located in wetlands, within 100 feet of wetlands or within 200 feet of rivers.
- (2) No hazardous waste shall be discharged on the site of any personal wireless service facility. If any hazardous materials are to be used on site, there shall be provisions for full containment of such materials. An enclosed containment area shall be provided with a sealed floor, designed to contain at least 110% of the volume of the hazardous materials stored or used on the site.
- (3) Stormwater run-off shall be contained on-site.
- (4) Ground-mounted equipment for personal wireless service facilities shall not generate noise in excess of 50 db at the property line.
- (5) Roof-mounted or side-mounted equipment for personal wireless service facilities shall not generate noise in excess of 50 db at

ground level at the base of the building closest to the antenna.

H. Radiofrequency Radiation (RFR) Standards.

All equipment proposed for a personal wireless service facility shall be authorized per the FCC Guidelines for Evaluating the Environmental Effects of Radiofrequency Radiation (FCC Guidelines). Any application for approval of a personal wireless service facility shall include documentation that the FCC Guidelines are being met and a copy of the letter of approval by the Massachusetts Department of Public Health required by 105 CMR 122.000. The Planning Board may require that the applicant fund the services of an RF Engineer to review the documentation regarding the FCC Guidelines.

I. Application procedures.

(1) Pre-application conference.

Prior to the submission of an application for a special permit under this regulation, the applicant is strongly encouraged to meet with the Planning Board at a public meeting to discuss the proposed personal wireless service facility in general terms and to clarify the filing requirements.

The purpose of the conference is to inform the Board as to the preliminary nature of the proposed personal wireless service facility. As such, no formal filings are required for the pre-application conference. However, the applicant is encouraged to prepare sufficient preliminary architectural and/or engineering drawings to inform the Board of the location of the proposed facility, as well as its scale and overall design.

(2) Application filing requirements.

In addition to those items required by Subsection 174-24C.(5), other applicable portions of this chapter or the regulations of the Planning Board, the following shall be included in any special permit application for personal wireless service facilities:

- (a) Name, address and telephone number of the landowner of the property and of the applicant and any co-applicants as well as any agents for the applicant or co-applicants. Co-applicants may include licensed carriers and tenants for the personal wireless service facility. A licensed carrier shall either be an applicant or a co-applicant.

- (b) Original signatures for the landowner, applicant and all co-applicants applying for the Special Permit. If the landowner, applicant or co-applicant will be represented by an agent, original signature authorizing the agent to represent the applicant and/or co-applicant. Photo reproductions of signatures will not be accepted.
- (c) Location of the subject property, including the name of the nearest road or roads, the property's location relative to those roads, the street address, if any, and the Tax map and block number of the subject property.
- (d) Zoning district designation for the subject parcel.
- (e) A line map to scale showing the lot lines of the subject property and all properties within 300 feet and the location of all buildings, including accessory structures, on all properties shown.
- (f) A town-wide map showing the other existing personal wireless service facilities in the Town and outside the Town within one mile of its corporate limits.
- (g) The proposed locations of all future personal wireless service facilities in the Town on a Town-wide map for this carrier.
- (h) A one-inch-equals-40 feet vicinity plan showing the following:
 - 1) Property lines for the subject property.
 - 2) Property lines of all properties adjacent to the subject property within 300 feet.
 - 3) Tree cover on the subject property and adjacent properties within 300 feet, by dominant species and average height, as measured by or available from a verifiable source.
 - 4) Outline of all existing buildings, including purpose (e.g. residential buildings, garages, accessory structures, etc.) on subject property and all adjacent properties within 300 feet.
- 5) Proposed location of antenna, mount and equipment shelter(s).
- 6) Proposed security barrier, indicating type and extent as well as point of controlled entry.
- 7) Location of all roads, public and private, on the subject property and on all adjacent properties within 300 feet including drive-ways proposed to serve the personal wireless service facility.
- 8) Distances, at grade, from the proposed personal wireless service facility to each building on the vicinity plan.
- 9) Contours, at each two feet AMSL, for the subject property and adjacent properties within 300 feet.
- 10) All proposed changes to the existing property, including grading, vegetation removal and temporary or permanent roads and driveways.
- 11) Representations, dimensioned and to scale, of the proposed mount, antennas, equipment shelters, cable runs, parking areas and any other construction or development attendant to the personal wireless service facility.
- 12) Lines representing the sight line showing viewpoint (point from which view is taken) and visible point (point being viewed) from "Sight Lines" subsection below.
 - (i) Sight lines and photographs as described below:
 - 1) Sight line representation. A sight line representation shall be drawn from any public road within 300 feet and the closest facade of each residential building (viewpoint) within 300 feet to the highest point (visible point) of the personal wireless service facility. Each sight line shall be depicted in profile, drawn at one-inch equals 40 feet. The profiles shall show all intervening trees and buildings. In the event there is only one (or

- more) residential building within 300 feet there shall be at least two sight lines from the closest habitable structures or public roads, if any.
- 2) Existing (before condition) photographs. Each sight line shall be illustrated by one four-inch by six-inch color photograph of what can currently be seen from any public road within 300 feet.
 - 3) Proposed (after condition). Each of the existing condition photographs shall have the proposed personal wireless service facility superimposed on it to show what will be seen from public roads if the proposed personal wireless service facility is built.
- (j) Siting elevations, or views at-grade from the north, south, east and west for a 50-foot radius around the proposed personal wireless service facility plus from all existing public and private roads that serve the subject property. Elevations shall be at either one-quarter inch equals one foot or one-eighth inch equals one foot scale and show the following:
- 1) Antennas, mounts and equipment shelter(s), with total elevation dimensions and AGL of the highest point.
 - 2) Security barrier. If the security barrier will block views of the personal wireless service facility, the barrier drawing shall be cut away to show the view behind the barrier.
 - 3) Any and all structures on the subject property.
 - 4) Existing trees and shrubs at current height and proposed trees and shrubs at proposed height at time of installation, with approximate elevations dimensioned.
 - 5) Grade changes, or cuts and fills, to be shown as original grade and new grade line, with two-foot contours above mean sea level.
- (k) Equipment brochures for the proposed personal wireless service facility, such as manufacturer's specifications or trade journal reprints, shall be provided for the antennas, mounts, equipment shelters, cables as well as cable runs and security barrier, if any.
 - (l) Materials of the proposed personal wireless service facility specified by generic type and specific treatment (e.g., anodized aluminum, stained wood, painted fiberglass, etc.). These shall be provided for the antennas, mounts, equipment shelters, cables as well as cable runs, and security barrier, if any.
 - (m) Colors of the proposed personal wireless service facility represented by a color board showing actual colors proposed. Colors shall be provided for the antennas, mounts, equipment shelters, cables as well as cable runs, and security barrier, if any.
 - (n) Dimensions of the personal wireless service facility specified for all three directions: height, width and breadth. These shall be provided for the antennas, mounts, equipment shelters and security barrier, if any.
 - (o) Appearance shown by at least two photographic superimpositions of the personal wireless service facility within the subject property. The photographic superimpositions shall be provided for the antennas, mounts, equipment shelters, cables as well as cable runs, and security barrier, if any, for the total height, width and breadth.
 - (p) Landscape plan including existing trees and shrubs and those proposed to be added, identified by size of specimen at installation and species.
 - (q) If lighting of the site is proposed, the applicant shall submit a manufacturer's computer-generated point-to-point printout, indicating the horizontal footcandle levels at grade, within the property to be developed and twenty-five (25) feet beyond the property lines. The printout shall indicate the location and types of luminaires proposed.
 - (r) The applicant shall list location, type and amount (including trace ele-

ments) of any materials proposed for use within the personal wireless service facility that are considered hazardous by the federal, state or local government.

(s) Noise filing requirements.

The applicant shall provide a statement listing the existing and maximum future projected measurements of noise from the proposed personal wireless service facilities, measured in decibels Ldn (logarithmic scale, accounting for greater sensitivity at night), for the following: 1) Existing, or ambient: the measurements of existing noise. 2) Existing plus proposed personal wireless service facilities: maximum estimate of noise from the proposed personal wireless service facility plus the existing noise environment.

Such statement shall be certified and signed by an acoustical engineer, stating that noise measurements are accurate and meet the Noise Standards of this Bylaw.

(t) Radiofrequency Radiation (RFR) filing requirements.

The applicant shall provide a statement listing the existing and maximum future projected measurements of RFR from the proposed personal wireless service facility, for the following situations: 1) Existing, or ambient: the measurements of existing RFR. 2) Existing plus proposed personal wireless service facilities: maximum estimate of RFR from the proposed personal wireless service facility plus the existing RFR environment.

The applicant shall also provide a certification, signed by a RF engineer, stating that RFR measurements are accurate and meet FCC Guidelines as specified in the Radiofrequency Radiation Standards sub-section of this Bylaw.

(u) Federal environmental filing requirements.

The National Environmental Policy Act (NEPA) applies to all applications for personal wireless service facilities. NEPA is administered by the

FCC via procedures adopted as Subpart 1, Section 1.1301 et seq. (47 Ch. I). The FCC requires that an environmental assessment (EA) be filed with the FCC prior to beginning operations for any personal wireless service facility proposed in, or involving any of, the following: a) wilderness areas, b) wildlife preserves, c) endangered species habitat, d) historical site, e) Native American religious site, f) flood plain, g) wetlands, h) high intensity white lights in residential neighborhoods or i) excessive radiofrequency radiation exposure.

At the time of application filing, an EA that meets FCC requirements shall be submitted to the Town for each personal wireless service facility site that requires such an EA to be submitted to the FCC.

(3) Balloon or crane test.

Within 30 days of the pre-application conference, or within 21 days of filing an application for a Special Permit, the applicant shall arrange for a balloon or crane test at the proposed site to illustrate the height of the proposed facility. The date, time and location of such test shall be advertised in a newspaper of general circulation in the Town at least 14 days, but not more than 21 days prior to the test.

(4) Waiver of filing requirements.

The Board may waive one or more of the application filing requirements of this section if it finds that such information is not needed for a thorough review of the proposed personal wireless service facility.

J. Co-location.

(1) Licensed carriers shall share personal wireless service facilities and sites where feasible and appropriate, thereby reducing the number of personal wireless service facilities that are stand-alone facilities. All applicants for a special permit for a personal wireless service facility shall demonstrate a good faith effort to co-locate with other carriers. Such good faith effort includes:

- (a) A survey of all existing structures that may be feasible sites for co-locating personal wireless service facilities;
- (b) Contact with all the other licensed carriers for commercial mobile radio

services operating in Mashpee and each of the adjoining towns; and

- (c) Sharing information necessary to determine if co-location is feasible under the design configuration most accommodating to co-location.

- (2) In the event that co-location is found to be not feasible, a written statement of the reasons for the infeasibility shall be submitted to the Board. The Board may retain a technical expert in the field of RF engineering to verify if co-location at the site is not feasible or is feasible given the design configuration most accommodating to co-location. The cost for such a technical expert will be at the expense of the applicant. The Board may deny a special permit to an applicant that has not demonstrated a good faith effort to provide for co-location.

- (3) If the applicant does intend to co-locate or to permit co-location, the Board shall request drawings and studies that show the ultimate appearance and operation of the personal wireless service facility at full build-out.

- (4) If the Board approves co-location for a personal wireless service facility site, the special permit shall indicate how many facilities of what type shall be permitted on that site. Facilities specified in the special permit approval shall require no further zoning approval. However, the addition of any facilities not specified in the approved special permit shall require a new special permit. Estimates of RFR emissions will be required for all facilities, including proposed and future facilities.

K. Modifications.

A modification of a personal wireless service facility will be considered equivalent to an application for a new personal wireless service facility and will require a special permit when the following events apply:

- (1) The applicant and/or co-applicant wants to alter the terms of the special permit by changing the personal wireless service facility in one or more of the following ways: a change in the number of facilities permitted on the site or a change in technology used for the personal wireless service facility.
- (2) The applicant and/or co-applicant wants to add any equipment or additional height not specified in the original design filing.

L. Monitoring and maintenance.

- (1) After the personal wireless service facility is operational, the applicant shall submit, within 90 days of beginning operations, and at annual intervals from the date of issuance of the special permit, existing measurements of RFR from the personal wireless service facility. Such measurements shall be signed and certified by a RF engineer, stating that RFR measurements are accurate and meet FCC Guidelines as specified in Section H. of this bylaw.
- (2) After the personal wireless service facility is operational, the applicant shall submit, within 90 days of the issuance of the Special Permit, and at annual intervals from the date of issuance of the Special Permit, existing measurements of noise from the personal wireless service facility. Such measurements shall be signed by an acoustical engineer, stating that noise measurements are accurate and meet the Noise Standards sub-section of this Bylaw.
- (3) The applicant and co-applicant shall maintain the personal wireless service facility in good condition. Such maintenance shall include, but shall not be limited to, painting, structural integrity of the mount and security barrier and maintenance of the buffer areas and landscaping.

M. Abandonment or discontinuation of use.

- (1) At such time that a licensed carrier plans to abandon or discontinue operation of a personal wireless service facility, such carrier will notify the Town by certified U.S. mail of the proposed date of abandonment or discontinuation of operations. Such notice shall be given no less than 30 days prior to abandonment or discontinuation of operations. In the event that a licensed carrier fails to give such notice, the personal wireless service facility shall be considered abandoned upon such discontinuation of operations.
- (2) Upon abandonment or discontinuation of use, the carrier shall physically remove the personal wireless service facility within 90 days from the date of abandonment or discontinuation of use. "Physically remove" shall include, but not be limited to:
 - (a) Removal of abandoned antennas, mount, equipment shelters and security barriers from the subject property.

- (b) Proper disposal of the waste materials from the site in accordance with local and state solid waste disposal regulations.
 - (c) Restoring the location of the personal wireless service facility to its natural or original condition, except that any landscaping and grading shall remain as-is.
- (3) If a carrier fails to remove a personal wireless service facility in accordance with this section of this Bylaw, the Town shall have the authority to enter the subject property and physically remove the facility. The Planning Board may require the applicant to post a bond at the time of construction in an appropriate amount to cover all costs for the removal of the personal wireless service facility in the event the Town must remove the facility.

N. Reconstruction or replacement of existing towers and monopoles.

Guyed towers, lattice towers, utility towers and monopoles in existence at the time of adoption of this bylaw may be reconstructed, altered, extended or replaced on the same site by special permit, provided that the Planning Board finds that such reconstruction, alteration, extension or replacement will not be substantially more detrimental to the neighborhood and/or the Town than the existing structure. In making such a determination, the Planning Board shall consider whether the proposed reconstruction, alteration, extension or replacement will create public benefits such as opportunities for co-location, improvements in public safety, and/or reduction in visual and environmental impacts. No reconstruction, alteration, extension or replacement shall exceed the height of the existing facility by more than twenty (20) feet.

O. Term of special permit.

A Special Permit issued for any personal wireless service facility over fifty (50) feet in height shall be valid for fifteen (15) years. At the end of that time period, the personal wireless service facility shall be removed by the carrier or a new special permit shall be required."

or take any other action relating thereto.

Submitted by Planning Board

Explanation: This article would establish regulations and a special permit process for "personal wireless service facilities" (wireless phone services, etc., usually involving towers), whose providers have recently

been determined to be public service corporations (public utilities) by the Massachusetts Department of Telecommunications and Energy and which were the subject of specific land use control restraints enacted by the U.S. Congress as part of the Telecommunications Act passed in 1996. The Town may not prohibit their development under the Telecommunications Act but may adopt reasonable guidelines on their location and other characteristics. The article is based on a model bylaw prepared for the Cape Cod Commission in response to the provisions of the Telecommunications Act, along with recommendations and copies of bylaws from other Massachusetts towns provided by Town Counsel.

It would restrict the height of such facilities to approximately 45 feet except within a Wireless Facility Overlay District, within which towers of 100 to 200 feet would be allowed. That overlay district includes the land within the Commonwealth Electric high tension power line easement as well as all other parts of the town except lands within the National Wildlife Refuge boundaries, within 1000 feet of the mean high water line of a Great Pond or tidal water body, within a Historic District, within 1000 feet of a Historic District or of a place listed in the 1997 Massachusetts State register of Historic places, within the Otis A.N.G.B. Accident Prevention Zone or within 300 feet of the right of way of any designated scenic roadway. Co-location and location of such facilities on existing towers, water towers, steeples etc. is encouraged. Visual buffers, camouflage techniques and setbacks ("fall zone") are required and noise and lighting are restricted in order to minimize impacts on neighboring properties.

Motion made by David Leveille.

Motion: I move that Article 35 be approved as printed in the warrant, except to delete the date "1997" before the phrase "Massachusetts State Register of Historic Places" in Subsection 174-5.C:

Add the phrase ", within the R-3 or R-5 Zoning Districts" after the phrase "Otis A.N.G.B. Accident Prevention Zone" in Subsection 174-5.C.;

Replace the phrase "Subsection H.(8)" with "Subsection H.(9)" and replace "(8)" with "(9)" in said Subsection;

Replace "174-45.2" with "174-45.3" where it appears

Amend the definition of "ABOVE GROUND LEVEL (AGL)" in Subsection 174-45.3B by replacing it with the following: "A measurement of height from the natural grade at the structure location to the highest point of the structure;"

Delete the last sentence of Subsection 174-45.3(7)(a)

Replace the acronym "AML" with the acronym "MSL" in Subsection 174-45.3.I.(2)(h)(9);

Replace the third sentence in Subsection 174-45.3.I.(2)(i)(1) with the following: "The profiles shall show the building façade, all the intervening trees buildings and the the personal wireless service facility.";

Replace the reference "(47 Ch.I)" with the reference "(47CFR Ch. I)"

And delete the phrase "or take any action relating thereto".

Planning Board voted at the Public Hearing held on September 16, 1998 4 to 0 for approval.

Motion passes 151 to 2 at 9:19pm.

Article 36

To see if the Town will vote to authorize and empower the Board of Selectmen to prepare a plan laying out and defining Back Road and to accomplish said purpose and for expenses incidental and related thereto, the Town vote to raise and appropriate or transfer from available funds \$9,000 to the Back Road Account, or take any other action relating thereto.

Submitted by the Board of Selectmen

Explanation: This article seeks to prepare a layout for the purpose of making Back Road a Town Road. Improvements to bring Back Road up to Town Road standards are estimated at approximately \$200,000 to be funded at a future Town Meeting.

Recommendation: The Finance Committee recommends approval.

Motion made by Nancy Caffyn.

Motion: I move the Town vote to authorize and empower the Board of Selectmen to prepare a plan laying out and defining Back Road and to accomplish said purpose and for expenses incidental and related thereto, the Town vote to appropriate and transfer from Revenue Available for Appropriation \$9,000 to the Back Road Account.

Motion passes at 9:35pm.

Article 37

To see if the Town will vote to amend the zoning bylaw by adding the words "or Commonwealth of Massachusetts" after the phrase "is acquired by the town" in the first sentence of Subsection 174-28.C., or take any other action relating thereto.

Submitted by the Board of Selectmen

Explanation: This subsection currently provides that land is taken by the Town, or donated to the Town, for roadway or utility purposes, the parcel from which the land is acquired will be treated, for the purpose of calculating lot size, setbacks, allowed lot coverage, etc., as if the parcel still included the land that was

acquired. This amendment would extend that provision to lands acquired in the same fashion by the state. The intent of the bylaw and amendment is to reduce the costs associated with land acquisition for roadway improvements.

Recommendation: The Finance Committee recommends approval.

Motion made by Curtis Frye.

Motion: I move the Town vote to amend the zoning bylaw by adding the words "or Commonwealth of Massachusetts" after the phrase "is acquired by the town" in the first sentence of Subsection 174-28.C.

Planning Board voted at the Public Hearing held on September 16, 1998 4 to 0 for approval.

Motion passes unanimously at 9:37pm.

Article 38

To see if the Town will vote to authorize and empower the Board of Selectmen to prepare a plan laying out and defining Trout Brook Road, Yellow Perch Circle, Alewife Road, Bass Cove Circle and to accomplish said purpose and for expenses incidental and related thereto, the Town vote to raise and appropriate or transfer from available funds for appropriation a sum of money to the Account and to raise said appropriation the Treasurer with the approval of the Board of Selectmen be authorized to borrow at one time, or from time to time, a sum of money under and pursuant to Chapter 44, Section 7 or 8 or any other enabling authority and to issue bonds and notes of the Town therefor, and further, to see if the Town will vote to raise and appropriate or transfer from available funds a sum of money to the Roadways Account to provide interest and debt issuance expenses, or take any other action relating thereto.

By execution of this Petition, the undersigned property owners hereby release all damage claims against the Town of Mashpee resulting from construction or eminent domain taking of any land necessary for laying out of Trout Brook Road, Yellow Perch Circle, Alewife Road, Bass Cove Circle.

Submitted by Petition

Motion made by Richard Kiernan.

Motion: I move the Town vote to authorize and empower the Board of Selectmen to prepare a plan laying out and defining Trout Brook Road, Yellow Perch Circle, Alewife Road, Bass Cove Circle and to accomplish said purpose and for expenses incidental and related thereto, the Town appropriate and transfer from Revenue Available for Appropriation the sum of \$5,000 to the Trout Brook et.al. Roads Account.

Motion passes at 9:39pm.

Town of Mashpee
Planning Board
Minutes of Meeting

September 16, 1998

The Town of Mashpee Planning Board Meeting was called to order in Conference Room #1, Mashpee Town Hall, 16 Great Neck Road North, Mashpee, Massachusetts at 7:05 p.m. on Wednesday, September 16, 1998. The Chairman presided over a portion of the Meeting.

Planning Board Members present: Patrick Coffey, Chairman; Dennis Balzarini, Vice Chairman (7:17 p.m.); John Kuchinski, Clerk; James Dorgan; Chance Reichel; and Scott Mitchell, Associate Member.

Also present: F. Thomas Fudala, Town Planner; Eric Twarog, Assistant Town Planner; and Charles Rowley, Consulting Engineer.

A quorum being present, the Chairman called the Meeting to order and addressed a non-agenda item.

Plan Submission
Applicant-Chris Costa

Chris Costa submitted a Plan entitled, "Plan of Land in Mashpee being an Abandonment of Village Way and Lots 5-6, 8, and 13-21, as shown on Land Court Plan #27901D, Dated 4/24/98, prepared for Chris Costa and Associates."

References were being made to Lots 22 and 23. The Town Planner explained Lot 22 does not have the required frontage on Route 130, which makes it necessary to retain Oakwood Road.

The Chairman informed Applicant a cul-de-sac turn around is required for dead-end roads, and that a written request for waiver would be required if it is his intention to not provide for one. Applicant agreed and understood.

The Chairman inquired as to the issues of filing and fee payment.

Applicant requested the Board approve a waiver of the required review fee.

There was some discussion. The Town Planner noted the property is located within a Commercial Zone, and that Lot 7 is not a buildable lot. He also pointed out the fee under discussion is required for services provided by the Consulting Engineer.

The Chairman deferred to Mr. Rowley, who asked if it is the intention of Applicant to construct Oakwood Road. Applicant

stated it was his intent to construct Oakwood Road under the original requirements and up to the center of Lot 22.

Mr. Rowley determined said construction would require a review of the details of construction and an inspection. The Town Planner stated construction would have to meet current Regulations.

The Town Planner inquired about the intersection located at Oakwood Road with regard to drainage issues. Mr. Rowley commented it would be helpful to have a copy of the original profile.

The Chairman determined Applicant might be entitled to build "as shown", but if less construction is being proposed, the Board would require turn-around safety procedures, drainage, and a profile of what is being proposed.

Mr. Rowley suggested Applicant's submittal include his intent to construct a portion of the road, if that is what is being proposed, for Board review.

With regard to the matter of a waiver/reduction of fees, the Board determined this was not a matter of hardship or non-profit situation and that fees would be required as outlined in the fee schedule.

Applicant filed several copies of the Plan, an Abutters List, and a Fee in the amount of Five Hundred Thirty (\$530.00) Dollars.

The Town Planner noted the submission was for a Definitive Plan, there being no filing of a Preliminary, and suggested a request/approval to waive the Preliminary was in order.

The Chairman entertained a motion be made in this regard.

MOTION: Chance Reichel made a Motion to approve the request to submit a Definitive Plan without having submitted a Preliminary; which Motion was seconded by Dennis Balzarini and so voted unanimously.

MOTION: John Kuchinski made a Motion to schedule a Public Hearing in this matter for October 21, 1998, at 7:15 p.m.; which Motion was seconded by Dennis Balzarini and so voted unanimously. (This matter concluded at 7:23 p.m.)

Board Items Reorganization of Planning Board

Prior to any nominations for Officers, the Chairman informed Board Members that he would be unavailable to attend Planning Board Meetings until the first of December-1998.

He also stated he had pressing personal business this evening and suggested the Vote be taken with regard to reorganization as it was necessary for him to leave the Meeting early.

Likewise, the Vice Chairman informed the Board of his heavy work schedule, and of the fact that he may not be able to arrive at Meetings on time in the upcoming months.

The Chairman then opened nominations for the positions of Chairman, Vice Chairman, and Clerk.

Dennis Balzarini nominated Patrick Coffey to retain the Office of Chairman; John Kuchinski be nominated for the Office of Vice Chairman; and Chance Reichel be nominated for the Office of Clerk of the Town of Mashpee Planning Board.

There being no further nominations put forward, Patrick Coffey accepted the nomination of Chairman, as did John Kuchinski for Vice Chairman and Chance Reichel for Clerk.

MOTION: James Dorgan made a Motion to elect Patrick Coffey as Planning Board Chairman; John Kuchinski as Planning Board Vice Chairman; and Chance Reichel as Planning Board Clerk; which Motion was seconded by Dennis Balzarini and so voted unanimously.

At this point, Mr. Rowley inquired as to his position as Consulting Engineer being terminated as of the first of the new year.

The Chairman reported there has been very little discussion of this situation, and that the time frame for phase-in is going to be longer than initially anticipated. The Chairman then stated his personal preference would be to have Mr. Rowley remain in his position as Consulting Engineer. It was the general consensus of the Planning Board that Mr. Rowley should plan on continuing his position until mid-summer (1999).

Discussion
Carl Grasseti-Northland-Stratford Ponds
Final Plans for Bishops Park

The Chairman recognized Mr. Grasseti who submitted information requested by the Board at the time of the Site Visit to Stratford Ponds on June 3, 1998.

The Chairman read from letter addressed to Bill Hauck, from the Planning Board, dated September of 1996, regarding Stratford Pond Condominiums in a previous matter: "Writing to let you know that the Planning Board reviewed the drawing entitled Site Plan, Bishops Park...submitted by Mr. Grasseti at our September 4th Meeting...drawing depicts the location of the buildings that the Board previously agreed to allow the Applicant to revise from their originally approved multi-family configurations to duplex

configurations...Board agreed to this revision provided there is no increase in bedroom or dwelling unit quantities from the originally approved configurations and that the revised buildings are configured and located in conformance with this drawing...any questions or comments, do not hesitate to contact. Signed by the Chairman."

Mr. Grasseti stated Plans have been submitted on several occasions to the Consulting Engineer, subject to changes made at his request, final Plans having been submitted in early August. (This matter was recessed at this point.)

The Town Planner took this opportunity to inform the Chairman of the status of the proposed Zoning Articles submitted for publication on the Town Meeting Warrant. He stated the Selectmen have deleted two sections of the Development Agreement Bylaw, which essentially eliminates Planning Board involvement in the process and placing them in control. The Town Planner noted the original proposed Article is that which has been advertised for the Public Hearing this date; and that the change is to be considered radical in terms of the concept.

The Town Planner also informed the Board that the Stormwater Article had also been deleted from the Warrant.

The Chairman left the Meeting at this point, appointing the Vice Chairman, John Kuchinski, to preside over the remainder of the Meeting.

Public Hearing
Four Zoning Articles for October Town Meeting

The appointed hour having arrived, the Vice Chairman called the 7:00 Public Hearing to order.

Article #35 - Wireless Facility Overlay District. The Town Planner reviewed said Overlay Map, suggesting those places listed on the 1997 Massachusetts State Register of Historic Places be included.

The Town Planner noted those areas shown in red to be those areas where towers could exceed forty-five (45) feet in height. There was discussion regarding overlay districts located in heavily residential areas of the Town. The Town Planner explained that presently, without regulation, towers could be constructed anywhere within the Town.

There was some discussion relative to restricting the construction of such towers to commercially zoned areas.

The Town Planner noted the Purpose and Intent Sections of the Bylaw, as well as the Definitions Section. He also informed the Board the proposed Bylaw has been reviewed by Town Counsel,

who has strongly advised the Town adopt a bylaw in this regard.

The Town Planner reviewed the Permit Process, Height Restrictions/Regulations, Location and Dimensional Requirements, and Exemptions.

There was some discussion regarding the issue of Fall Zones/Setbacks. It was agreed to delete the final sentence of (7) (a) page -34-.

James Dorgan suggested revising the proposed Bylaw to limit areas to commercial property exclusively, as a means of protecting the residential areas. It was noted that there are areas of commercial/industrial zones adjacent to residential areas.

The Town Planner continued to review Flexibility, Design Standards, Visibility/Camouflage, Camouflage by Vegetation, Color, Equipment Shelters, Lighting and Signage, Historic Buildings and Districts, Scenic Roads and Vistas, Environmental Standards, Radiofrequency Radiation Standards; Application Procedures, and Application Filing Requirements.

There was some discussion regarding profile elevations.

The Town Planner continued to review the remainder of the proposed Bylaw, Balloon or Crane Testing, Co-location, Modifications, Monitoring and Maintenance, Abandonment or Discontinuation of Use, Reconstruction or Replacement of Existing Towers and Monopolies, and Term of Special Permit.

MOTION: Chance Reichel made a Motion to table discussion on the Wireless Facility Bylaw in order to reconvene the matter of Discussion-Carl Grassetti/Northland-Stratford Ponds-Final Plans for Bishops Park; which Motion was seconded by Dennis Balzarini and so voted unanimously.

The Vice Chairman recognized Carl Grassetti, who stated he has provided Mr. Rowley with drawings. The Vice Chairman read into the Record a copy of letter received from Charles L. Rowley, PE, RLS, dated September 2, 1998, to the Attention of Patrick Coffey, Chairman, Regarding Stratford Ponds: "I have reviewed the plans submitted for the revisions to the Stratford Ponds project, namely Mayfair Court and Windsor Point. It is my opinion that the adjustments that have been made are not significant and that there are no major engineering issues in this case. The applicant's engineer, David Thulin, PE has indicated that he is working on a grading solution to the area around the flaired end section FES-1 so that erosion will not be a problem. It would also be advisable that during the construction phase, the proposed sewer cleanouts be cross-ties to building corners as a permanent written record for future use. PVC pipe is to be used for the cleanouts which will be grass

covered. Finding them without some reference measurements will be difficult."

There was brief discussion of this matter. Mr. Grasseti stated he would respond to Mr. Rowley's letter and that he would also submit as-built drawings.

MOTION: Chance Reichel made a Motion that the Town Planner prepare a similar letter to that which was prepared for the Building Inspector by Anthony E. Ferragamo, A.I.A., dated September 10, 1996, Regarding Stratford Ponds Condominiums, for signature by the Vice Chairman; which Motion was seconded by James Dorgan and so voted unanimously.

MOTION: Chance Reichel made a further Motion to reconvene the Public Hearing-Wireless Facility Overlay District with the intent to finalize discussion of this matter; which Motion was seconded by James Dorgan and so voted unanimously.

James Dorgan stated he would not be able to support the proposed Bylaw if areas of consideration are located within residential zones. He further suggested the overlay district be located strictly in commercial and industrial areas.

The Town Planner suggested he include all Residential Zoning Districts to page -29- C., pending approval of Town Counsel.

MOTION: Chance Reichel made a Motion to approve the proposed Article #35, as amended this evening, to include the limitation to commercial and industrial areas, and all other amendments discussed; which Motion was seconded by Dennis Balzarini. (No Vote was taken at this point.)

After brief discussion as to whether or not Town Counsel would advise including all Residential areas be eliminated from the Overlay District, the following Board Members voted to approve the proposed Article be presented at Town Meeting as a means of having some type of Regulation in place, which could be amended at a future date (May Town Meeting) if deemed necessary.

Voting in favor: John Kuchinski, Chance Reichel, and Dennis Balzarini. Opposed: James Dorgan.

Amendments:

1. Page -29- C. - Delete "1997";
2. Include Residential Zoning Districts as areas designated to be outside of the Wireless District, if approved by Town Counsel;
3. Page -30- B. Definitions - "A measurement of height from the natural grade at the structure location to the highest point of the structure."
4. Page -34- (7) Setbacks (a) - The last sentence is to be deleted in its entirety.
5. Page -39- 9) - Delete the "A" to read "MSL";
6. Page -39- (i) 1) - "The profiles shall show the building

facade, all intervening trees, buildings, and personal wireless service facility; and
7. Amended Map.

Development Agreement Bylaw

The Vice Chairman read aloud the Hearing Notice: "Pursuant to Massachusetts General Laws C.40A the Mashpee Planning Board will hold a Public Hearing on Wednesday, September 16, 1998, at 7:00 p.m. at the Mashpee Town Hall, 16 Great Neck Road North to review the following Zoning Amendment Articles for action at the October 5, 1998 Annual Town Meeting.

Summaries of the Articles are as follows: This Article, which is based on a model Bylaw prepared by the Cape Cod Commission would authorize the Town to prepare and enter into long-term development agreements with Developers, the Cape Cod Commission, adjacent Towns and State Agencies. Agreements would be negotiated by the Planning Board, but would require approval by the Selectmen. Such Agreements would be binding contracts spelling out the terms under which the project could be completed over a number of years, (inaudible) structure or other Town facilities and programs of open space and other benefits to the Town would be provided by the Developer, what impact fees would be paid, what protections Developer might obtain from subsequent zoning and regulatory changes, what streamline permitting process procedures might be established to (inaudible) construction done under terms of the Agreement, other items of mutual interest between the parties to this Agreement. The Town's ability to enter into such Agreements is predicated upon the Town having a Local Comprehensive Plan certified by the Cape Cod Commission, as being consistent with the County's Regional Policy Plan.

Article 37-This Article would amend the Zoning Bylaws by adding the words, "or Commonwealth of Massachusetts" after the phrase "...is acquired by the Town..." in the first sentence of subsection 174-28.C. This subsection currently provides that if lands taken by the Town, or donated to the Town, for roadway or utility purposes, the parcel from which the land is acquired will be treated, for the purpose of calculating lot size, setbacks, allowed lot coverage, etc., as if the parcel still included the land that was acquired. This amendment would extend that provision to lands acquired in the same fashion by the State.

MOTION: Dennis Balzarini made a Motion to recommend approval of the proposed Article 37 as submitted; which Motion was seconded by Chance Reichel and so voted unanimously.

Development Agreement Bylaw - The Town Planner informed the Board that the Notice, as previously read by the Vice Chairman, indicates the Planning Board as the negotiating authority. The Article has been changed to delete the Planning Board and name the Board of Selectmen. He suggested contacting Town Counsel in

this matter in order to determine whether or not the Notice was legally advertised.

The Town Planner read page -21- being the original Cape Cod Commission model, Sections (3) and (4) of which have been eliminated by the Board of Selectmen.

After lengthy discussion the following Motion was made:

MOTION: Chance Reichel made a Motion that the Planning Board make no recommendation on the proposed Article 30 - Development Agreements; which Motion was seconded by Dennis Balzarini and so voted unanimously.

Article 33-Stormwater Management - The Town Planner informed the Board of the Board of Selectmen's decision to delete this Article.

Minor amendments to Zoning Articles suggested by Town Counsel were deemed acceptable to the Board.

Proposed Land Acquisition-Property adjacent to Town Hall. The Board determined that it would be to the Town's advantage to purchase said property, but that it does not endorse any particular roadway improvement thereto.

MOTION: Chance Reichel made a Motion to this effect, stating the Board is in favor of the land purchase, however, it does not endorse any particular roadway improvement thereto; which Motion was seconded by Dennis Balzarini and so voted unanimously.

Public Hearing
Amendment to Planning Board Rules and Regulations
Governing the Subdivision of Land

The appointed hour having arrived, the Vice Chairman called the 7:30 Public Hearing to order.

He read the Notice aloud: "Pursuant to the Massachusetts General Laws C.41 Section 81-Q, the Mashpee Planning Board will hold a Public Hearing on Wednesday, September 16, 1998 at 7:30 p.m., at Mashpee Town Hall, 16 Great Neck Road North, on the following proposed Amendment for the Rules and Regulations governing the Subdivision of Land.

Amendment to Article 12-Fee Schedule - Change "Special Permit - Commercial" to "Special Permit Non - Residential", made by Patrick J. Coffey, Chairman, Mashpee Planning Board.

The Town Planner clarified that at present there is no fee for Industrial Special Permits.

MOTION: James Dorgan made a Motion to approve the Amendment to Rules and Regulations governing the Subdivision of Land, amendment to Section 12, Fee Schedule, change "Special Permit - Commercial" to "Special Permit - Non-Residential"; which Motion was seconded by Dennis Balzarini and so voted unanimously.

Covenant Release
Lipnosky Family Trust-Ed Govoni - Three Ponds Subdivision

The Town Planner noted the lots listed on the Agenda for Release of Covenant are incorrect (#1-#11); there are however, eleven (11) Lots to be released.

The Vice Chairman read into the Record letter dated September 16, 1998, to the Town of Mashpee Planning Board, from Charles L. Rowley, PE, RLS, Regarding Three Ponds Subdivision-Covenant Release: "Dear Chairman Coffey, I have inspected the construction of Preakness Land at the Three Ponds Subdivision off Pimlico Pond Road and find that the construction has not been completed. The base course of pavement has been placed. Grass along the road shoulders is up and in good condition. Storm drainage has been completed along the road but there are some corrections that need to be made. At the entrance to Preakness Lane on Pimlico Pond road there is a catch basin which is much lower than the surrounding pavement. Instead of blending in the pavement on Preakness to the pavement on Pimlico Pond Road, the existing 12" berm was left in place. This makes for a very abrupt transition in the road surface as well as a dangerous situation with the catch basin grate. the road intersection does not include the customary 20' radius at the edge of pavement. No street monumentation was observed and I have no letter indicating that bounds have been set. It is my recommendation that the request for release of lots should not be granted until a proper form of security for the remainder of construction has been presented and approved by the Planning Board. I also notice that the request is for Lots 1-11. Many of the lots requested do not front on Preakness Lane but front instead on Cove Road. A full inspection of this road has not been completed."

After brief discussion it was agreed upon by all Board Members to forward a copy of the Consulting Engineer's letter to the Applicant, ask him to contact the Consulting Engineer directly for any further comment, and to continue this matter to the October 7, 1998 Meeting.

MOTION: Dennis Balzarini made a Motion to that effect, stating the Consulting Engineer's letter is to be forwarded to the Applicant with instructions to contact the Consulting Engineer directly for further comments, and to continue this matter to October 7, 1998; which Motion was seconded by Chance Reichel and so voted unanimously.

Covenant Release
Anthony LaCava-Baxter & Nye - Quashnet Valley
Release of Covenant 2-Lots on New Great Hay Road

The Town Planner determined Applicant has not provided a Covenant Release form. The Vice Chairman suggested deleting this matter from the Agenda, having the Planning Department contact Applicant to request Release form, and remove this matter from the Agenda until further contact from Applicant. All Board Members were in agreement.

Non-Agenda Items
Asher's Heights Subdivision

The Vice Chairman informed Board Members of a report from the Consulting Engineer regarding the Asher's Heights Subdivision in which Mr. Rowley suggested the remaining funds in the amount of Seven Thousand Two Hundred Eighteen (\$7,218.00) Dollars not be released until such time as the drainage problem at the intersection is rectified, based upon inspection made at the direction of the Planning Board during the September 2, 1998 Meeting.

After some discussion, the Town Planner suggested the Board approve release of said \$7,218.00 subject to the Consulting Engineer's final satisfactory inspection of the drainage/repaving. Planning Board Members were asked to sign the Release form, which is to be held in escrow by the Town Planner until such time as the Consulting Engineer makes a final inspection and signs the Release form as well.

MOTION: Chance Reichel made a Motion to approve Planning Board signatures on the Release form, which form is to be held in escrow by the Town Planner until such time as the Consulting Engineer completes a satisfactory inspection of the drainage in question; which Motion was seconded by Dennis Balzarini and so voted unanimously.

Shoestring Bay Estates

The Vice Chairman read into the Record letter dated September 16, 1998, from Charles L. Rowley, PE, RLS, Regarding Shoestring Bay Estates, Plan Revisions: "Dear Chairman Coffey, I have reviewed the submittal for the changes which were requested for the connecting roadway between Shoestring Bay Estates and Willowbend. Stormwater calculations and a revised plan were prepared by Earth Tech and my concerns have been satisfied with regard to this item. With regard to the construction of Shoestring Bay Estates, if wording can be included within the modification of the special permit to include the appropriate repaving of the roadways, this would seem sufficient."

Correspondence

At this point, the Town Planner reviewed amendments he intends to make on Town Meeting floor as they pertain to the Commercial Center Bylaw, as advised by Town Counsel.

The Town Planner advised Board Members of a Public Hearing, Mashpee Commons DRI, Mashpee Town Hall, at 7:00 p.m. the following evening.

Approval of Minutes

MOTION: Dennis Balzarini made a Motion to approve the revised Minutes of the August 5, 1998 Meeting as submitted by the Board Secretary; which Motion was duly seconded and so voted unanimously.

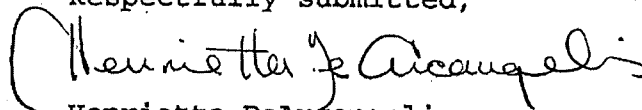
Adjournment

There being no further Planning Board business to address, the Vice Chairman entertained a motion be made to adjourn the Meeting.

MOTION: Chance Reichel made a Motion to adjourn the Meeting; which Motion was seconded by Dennis Balzarini and so voted unanimously.

(The September 16, 1998 Mashpee Planning Board Meeting was thereupon dissolved at 10:12 p.m.)

Respectfully submitted,


Henrietta DeArcangelis
Board Secretary

Wireless Overlay District Article etc.

THOMAS FUDALA <tomfudala@comcast.net>

Mon 9/24/2018, 5:26 PM

To: Wayne E. Taylor <wtaylor@mashpeema.gov>

Cc: rccollins@mashpeema.gov <rccollins@mashpeema.gov>;

mwaygan@yarmouth.ma.us <mwaygan@yarmouth.ma.us>; Mary Waygan <waygan@hotmail.com>;

Evan Lehrer <ELehrer@mashpeema.gov>

📎 5 attachments (1 MB)

Form 7 Maura Healy.doc; Wireless Article 35 as adopted 10-5-98.doc; Wireless Article 35 Motion per Town Moderator.doc; PB Report on 10-5-98 Zoning Articles.doc; Wireless Overlay District.pdf;

Wayne:

Following up on the Wireless Facility Overlay District expansion article I wrote for you, that the Selectmen voted to place on the October warrant:

1) It is my understanding that the Planning Board hearing will be held on October 3 and that proper advertising will be placed in the Cape Cod Times.

2) Please make sure, if it already hasn't been done, that a formal submission memo, with the article attached, is transmitted to the Planning Board, as was done for the previous zoning articles. When the Town Clerk has to submit "Form 7" (see attached) to the Attorney General for her approval of the articles, the date of that memo will be part of the required information, along with other dates of advertising, required mailing of notices of all the proposed zoning amendments to DHCD, the Cape Cod Commission and the Planning Boards of the surrounding towns, along with copies of many of the documents, including the original articles as submitted to the Planning Board for their review. I'm hoping Evan is familiar with these requirements and has taken care of them.

3) With regard to the current extent of the Overlay District, also attached is the current by-law as adopted (article 35) at the October 5, 1998 Town Meeting. The article was amended on the floor to, among other things, exclude the R-3 and R-5 Zoning Districts from the Overlay District (floor motion attached), apparently based on testimony at the Planning Board's public hearing and the recommendation of the Planning Board (also attached). The map I gave you, of which copies remain in the Planning Office, was apparently done by Assistant Planner Eric Smith, who wrote the article, prior to the Town Meeting amendment to the extent of the Overlay District. That is why, as I indicated when I gave a copy to you, it looked like it covered too much of the town (but in any case, NOT the Town's property on Red Brook Road, which was originally excluded because it lies within the boundaries of the Mashpee National Wildlife Refuge (drawn by me with guidance from the US Fish & Wildlife Service and Congressman Studds' office and adopted by legislation approved by the Congress and signed by President Clinton) and further excluded by the floor amendment at Town Meeting which excluded lands in the R-3 District. It should be noted that the boundaries of the National Wildlife Refuge, as referenced in the By-law, are just that, and have no relation to whether or not lands within the boundary have been subsequently protected as conservation land. I have found and attached a correct map of the Wireless Overlay District as based on the amended article as adopted at the 10-5-98 Town Meeting.

Just as a heads up, when the Form 7 and attached Planning Board public hearing notices go to the Attorney General, there could be a problem, as the notices, which were published on September 7 and 14, do not all reflect the correct warrant article numbers (which is why I never included warrant article

numbers in previous zoning hearing notices, just simple numerical listing, as warrant article numbers often tend to change after zoning articles are submitted to the Planning Board) which could be found to have mislead voters. Evan's original article, on which the notice was based, has been significantly (though for the better) changed as it was re-submitted as a Selectmen's article at their September 11 meeting and the article description is no longer completely accurate (keep in mind that the published notice on September 7 said the complete text of all the zoning articles could be viewed by voters at the offices of the Town Clerk and Town Planner - text which has now been changed). There are also descriptions of some of the ZBA articles which say absolutely nothing about the actual content of the articles and the changes proposed to be made to the By-laws, which the AG may also find to have been inadequate notice to the voters. I would strongly suggest that Pat Costello be asked to review the notices and opine on their adequacy.

Let me know if you need any additional information or have questions.

Tom Fudala, AICP

Mashpee Citizen

Article 35 Motion per Town Moderator Ruling

I move that article 35 be approved as printed in the warrant, except to

delete the date "1997" before the phrase "Massachusetts State Register of Historic Places" in Subsection 174-5.C.;

—→ add the phrase ", within the R-3 or R-5 Zoning Districts" after the phrase "Otis A.N.G.B. Accident Prevention Zone" in Subsection 174-5.C.;

replace the phrase "Subsection H.(8)" with "Subsection H.(9)" and replace "(8)" with "(9)" in said Subsection;

replace "174-45.2" with "174-45.3" where it appears;

amend the definition of "ABOVE GROUND LEVEL (AGL)" in Subsection 174-45.3.B. by replacing it with the following: "A measurement of height from the natural grade at the structure location to the highest point of the structure.";

delete the last sentence of Subsection 174-45.3.E.(7)(a);

replace the acronym "AMSL" with the acronym "MSL" in Subsection 174-45.3.I.(2)(h)9);

replace the third sentence of in Subsection 174-45.3.I.(2)(i)1) with the following: "The profiles shall show the building façade, all intervening trees and buildings and the personal wireless service facility.";

replace the reference "(47 Ch. I)" with the reference "(47CFR Ch. I)"

and delete the phrase "or take any other action relating thereto".



**October 5, 1998 Town Meeting
Planning Board Report and Recommendations on Zoning Articles**

Article 26 (Campground Expansion)

At August 19 Public Hearing voted 3-1 to recommend approval.

Article 27 (Cluster filing process)

At August 19 Public Hearing voted 4-0 to recommend approval.

Article 28 (Cluster lot size and open space %)

At August 19 Public Hearing voted 4-0 to recommend approval.

Article 29 (Commercial Centers)

At August 19 Public Hearing voted 3-0 to recommend approval.

Article 30 (Development Agreements)

At September 16 Public Hearing voted 4-0 to make no report.

As 21 days have not passed since the Board's public hearing on this article, and the Board makes no report, Town Meeting may not vote to adopt this article per Chapter 40A, Section 5 of Mass. General Laws. *The Planning Board vote was based on the fact that two paragraphs of the article were removed from the warrant after the Board had advertised its public hearing and that the removal of those paragraphs eliminated the requirement for Planning Board approval of such agreements. Removal of those paragraphs effectively substituted the Board of Selectmen for the Planning Board as the board primarily responsible for development of such agreements, conflicting with the Planning Board's statutory authority over special permit and subdivision review and approval of such development projects.*

Article 31 (OSID Bedroom Definition)

At August 19 Public Hearing voted 3-0 to recommend approval.

Article 32 (OSID "Technical Amendments")

At August 19 Public Hearing voted 3-0 to recommend approval.

Article 33 (OSIP Map Change)

At August 19 Public Hearing voted 3-0 to recommend approval.

Article 34 (Special Permit requirement for public utilities)

At August 19 Public Hearing voted 4-0 to recommend approval.

Article 35 (Wireless Facilities)

At September 16 Public Hearing voted 4-0 to recommend approval if amendment reducing area of overlay district is allowed on the floor, and 3-1 to recommend approval if such an amendment is not allowed.

Article 37 (ROW credit for state highways)

At September 16 Public Hearing voted 4-0 to recommend approval.

Article 35 as approved by 10-5-98 ATM

To see if the Town will vote to amend the zoning bylaw by adding the following new sections and subsections:

Add the following to the listing of zoning districts contained in Section 174-4:

"Wireless Facility Overlay District".

Add the following new Subsection C. to Section 174-5 Establishment of Zoning Map:

"C. The Wireless Facility Overlay District shall include 1) the area within the 210 foot wide Commonwealth Electric Company transmission line easement running generally east-west between the Falmouth town line and the Barnstable town line, 2) all other lands in the Town which are not located within the boundaries of the Mashpee National Wildlife Refuge, within 1000 feet of the mean high water line of a Great Pond or a tidal water body, within Historic Districts, within 1000 feet of a Historic District or of structures or places listed in the ~~1997~~ Massachusetts State Register of Historic Places, within the Otis A.N.G.B. Accident Prevention Zone, **within the R-3 or R-5 Zoning Districts** or within 300 feet of the right of way of any designated scenic roadway."

Add the following new Subsection H.~~(8)~~(9) to Section 174-25. Table of Use Regulations:

"~~(8)~~(9) Personal wireless service facilities, subject to the provisions of Section 174-45.2."

and indicate by inserting the letters "SP" in all columns of the Table of Use Regulations that such use is allowed by special permit in all zoning districts.

Add the following new Section 174-45.~~2-3~~:

"174-45.~~2-3~~. Personal Wireless Service Facilities.

A. Purpose and intent.

For the purpose of minimizing the visual and environmental impacts, as well as any potential deleterious impact on property values, of personal wireless service facilities, no personal wireless service facility shall be placed, constructed or modified within the town except in conformance with the requirements of this section, in conjunction with other regulations adopted by the Town, including historic district regulations, design review and other bylaws and regulations designed to encourage appropriate land use, environmental protection, and provision of adequate infrastructure development.

The regulation of personal wireless service facilities is consistent with the purposes of the Mashpee zoning bylaw and the planning efforts of the town through its

comprehensive plan, including those intended to further the conservation and preservation of developed, natural and undeveloped areas, wildlife, flora and habitats for endangered species, the preservation of coastal resources, protection of natural resources, balanced economic growth, the provision of adequate capital facilities, the coordination of the provision of adequate capital facilities with the achievement of other goals and the preservation of historical, cultural, archaeological, architectural and recreational values.

In accordance with the requirements of 47 U.S.C. s332(c)(7)(B), and until these requirements are modified, amended or repealed, in regulating the placement, construction and modification of personal wireless service facilities, the administration of this bylaw shall not be undertaken in a manner which unreasonably discriminates among providers of functionally equivalent services or prohibits, or has the effect of prohibiting, the provision of personal wireless services. Any decision to deny a request to place, construct or modify personal wireless service facilities shall be in writing and supported by substantial evidence contained in a written record. Furthermore, this bylaw may not regulate the placement, construction and modification of personal wireless service facilities on the basis of the environmental effects of radio frequency emissions to the extent that such facilities comply with the Federal Communications Commission's regulations concerning such emissions.

B. Definitions.

In addition to the definitions contained in Section 174-3, the following shall apply to Personal Wireless Service Facilities:

ABOVE GROUND LEVEL (AGL) - A measurement of height from the natural grade **at the structure location of a site** to the highest point of **a the** structure.

ANTENNA - The surface from which wireless radio signals are sent and received by a personal wireless service facility.

CAMOUFLAGED - A personal wireless service facility that is disguised, hidden, part of an existing or proposed structure or placed within an existing or proposed structure is considered "camouflaged."

CARRIER - A company that provides wireless services.

CO-LOCATION - The use of a single mount on the ground by more than one carrier (vertical co-location) and/or several mounts on an existing building or structure by more than one carrier.

CROSS-POLARIZED (OR DUAL-POLARIZED) ANTENNA - A low mount that has three panels flush mounted or attached very close to the shaft.

ELEVATION - The measurement of height above mean sea level.

ENVIRONMENTAL ASSESSMENT (EA) - An EA is the document required by the Federal Communications Commission (FCC) and the National Environmental Policy Act (NEPA) when a personal wireless service facility is placed in certain designated areas.

EQUIPMENT SHELTER - An enclosed structure, cabinet, shed or box at the base of the mount within which are housed batteries and electrical equipment.

FALL ZONE - The area on the ground within a prescribed radius from the base of a personal wireless service facility. The fall zone is the area within which there is a potential hazard from falling debris (such as ice) or collapsing material.

FUNCTIONALLY EQUIVALENT SERVICES - Cellular, Personal Communication Services (PCS), Enhanced Specialized Mobile Radio, Specialized Mobile Radio and Paging.

GUYED TOWER - A monopole or lattice tower that is tied to the ground or other surface by diagonal cables.

LATTICE TOWER - A type of mount that is self-supporting with multiple legs and cross-bracing of structural steel.

LICENSED CARRIER - A company authorized by the FCC to construct and operate a commercial mobile radio services system.

MONOPOLE - The type of mount that is self-supporting with a single shaft of wood, steel or concrete and a platform (or racks) for panel antennas arrayed at the top and/or along its length.

MOUNT - The structure or surface upon which antennas are mounted, including the following four types of mounts:

- (1) Roof-mounted. Mounted on the roof of a building.
- (2) Side-mounted. Mounted on the side of a building.
- (3) Ground-mounted. Mounted on the ground.
- (4) Structure-mounted. Mounted on a structure other than a building.

OMNIDIRECTIONAL (WHIP) ANTENNA - A thin rod that beams and receives a signal in all directions.

PANEL ANTENNA - A flat surface antenna, usually developed in multiples.

PERSONAL WIRELESS SERVICE FACILITY - Facility for the provision of personal wireless services, as defined by the Telecommunications Act, including towers, poles, antennae and appurtenant structures.

PERSONAL WIRELESS SERVICES - The three types of services regulated by this bylaw: commercial mobile radio services, unlicensed wireless services and common carrier wireless exchange access services.

RADIOFREQUENCY (RF) ENGINEER - An engineer specializing in electrical or microwave engineering, especially the study of radiofrequencies.

RADIOFREQUENCY RADIATION (RFR) - The emissions from personal wireless service facilities. (Regulated by the FCC "Guidelines for Evaluating the Environmental Effects of Radiofrequency Radiation").

SECURITY BARRIER - A locked, impenetrable wall, fence or berm that completely seals an area from unauthorized entry or trespass.

SEPARATION -The distance between one carrier's array of antennas and another carrier's array.

C. Permit process.

A personal wireless service facility shall require a building permit in all cases and may be permitted as follows:

- (1) A personal wireless service facility may be located on any existing guyed tower, lattice tower, monopole, electric utility transmission tower, fire tower or water tower, provided that the installation of the new facility does not increase the height of the existing structure except as provided in Subsection E.(5) below. Such installations shall not require a special permit but shall require plan review (PR) approval by the town under the provisions of Subsection 174-24B.
- (2) Otherwise, no personal wireless service facility involving construction of one or more ground or building (roof or side) mounts shall be located in the town except upon issuance of a special permit by the Planning Board under the provisions of Subsection 174-24(C) and of this section.
- (3) A personal wireless service facility that exceeds the height restrictions of Subsections E.(1) through (5) may be permitted by special permit, as specified in Subsection C.(2), in a designated Wireless Service Overlay District provided that the proposed facility complies with the height restrictions of Section E.(6), and all of the setback and other regulations set forth in this section.
- (4) Any applicant must demonstrate that the proposed facility is necessary in order to provide adequate service to the public.

D. Location.

Applicants seeking approval for personal wireless service facilities shall comply with the following:

- (1) If feasible, personal wireless service facilities shall be located on existing structures, including but not limited to buildings, water towers, existing telecommunications facilities, utility poles and towers, and related facilities, provided that such installation preserves the character and integrity of those structures. In particular,

applicants are urged to consider use of existing telephone and electric utility structures as sites for one or more personal wireless service facilities. The applicant shall have the burden of proving that there are no feasible existing structures upon which to locate.

- (2) If the applicant demonstrates that it is not feasible to locate on an existing structure, personal wireless service facilities shall be designed so as to be camouflaged to the greatest extent possible, including but not limited to: use of compatible building materials and colors, screening, landscaping and placement within trees.
- (3) The applicant shall submit documentation of the legal right to install and use the proposed facility mount at the time of application for plan review or special permit.

E. Dimensional requirements.

Personal wireless service facilities shall comply with the following requirements:

- (1) Height, General: Regardless of the type of mount, personal wireless service facilities shall be no higher than ten feet above the average height of buildings within 300 feet of the proposed facility. In addition, the height of a personal wireless service facility shall not exceed by more than ten feet the height limits of the zoning district in which the facility is proposed to be located, unless the facility is completely camouflaged such as within a flagpole, steeple, chimney, or similar structure. Personal wireless service facilities may be located on a building that is legally non-conforming with respect to height, or has received a height variance, provided that the facilities do not project above the existing building height.
- (2) Height, Ground-Mounted Facilities: Ground-mounted personal wireless service facilities shall not project higher than ten feet above the average building height or, if there are no buildings within 300 feet, these facilities shall not project higher than ten feet above the average tree canopy height, measured from ground level (AGL). If there are no buildings within 300 feet of the proposed site of the facility, all ground-mounted personal wireless service facilities shall be surrounded by dense tree growth to screen views of the facility in all directions. These trees may be existing on the subject property or planted on site.
- (3) Height, Side- and Roof-Mounted Facilities: Side- and roof-mounted personal wireless service facilities shall not project more than ten feet above the height of an existing building nor project more than ten feet above the height limit of the zoning district within which the facility is located. Personal wireless service facilities may be located on an existing building that is legally nonconforming with respect to height, or has received a height variance, provided that the facilities do not project above the existing building height.
- (4) Height, Existing Structures: New antennas located on any of the following structures existing on the effective date of this bylaw shall be exempt from the height restrictions of this bylaw provided that there is no increase in height of the existing

structure as a result of the installation of a personal wireless service facility: water towers, guyed towers, lattice towers, fire towers and monopoles.

- (5) Height, Existing Structures, (Utility): New antennas located on any of the following existing structures shall be exempt from the height restrictions of this bylaw, provided that there is no more than a twenty (20) foot increase in the height of the existing structure as a result of the installation of a personal wireless service facility: electric transmission and distribution towers, telephone poles and similar existing utility structures. This exemption shall not apply in Historic Districts, within 300 feet of structures or places listed in the Massachusetts State Register of Historic Places, within 150 feet of the right-of-way of any designated scenic roadway, or within 300 feet of any Great Pond or tidal water body.
- (6) Height, Wireless Facility Overlay District: Within the Wireless Facility Overlay District (as described in Subsection 174-5.C.), personal wireless service facilities of up to 100 feet in height may be permitted by Special Permit, except that the Planning Board may grant a waiver to allow a height of up to 200 feet where circumstances warrant (e.g. no serious impact on neighboring properties, residential areas, historic districts, historic places or scenic vistas, along with the opportunity to eliminate a larger number of towers of lower height which might result in such impacts). Monopoles are the preferred type of mount for such taller structures. Such structures shall comply with all setback and Special Permit Regulations set forth in this Bylaw.
- (7) Setbacks: All personal wireless service facilities and their equipment shelters shall comply with the building setback provisions of the zoning district in which the facilities are located. In addition, the following setbacks shall be observed:
 - (a) In order to ensure public safety and prevent hazards to people and neighboring property from potential facility collapse or falling ice or other debris, the minimum distance from the base of any ground-mounted personal wireless service facility to any property line, road, habitable dwelling, business or institutional use, or public recreational area shall be the height of the facility/mount, including any antennas or other appurtenances. ~~This setback is considered a "fall zone".~~

- (b) In the event that an existing structure is proposed as a mount for a personal wireless service facility, a fall zone shall not be required, but the setback provisions of the zoning district shall apply. In the case of pre-existing non-conforming structures, personal wireless service facilities and their equipment shelters shall not increase any non-conformities, except as provided in Subsection (8) below.
- (8) Flexibility: In reviewing a special permit application for a personal wireless service facility, the Planning Board may reduce the required fall zone and/or setback distance of the zoning district by as much as 50% of the required distance if it finds that a substantially better design will result from such reduction. In making such a finding, the Planning Board shall consider both the visual and safety impacts of the proposed use.

F. Design standards.

The design of a personal wireless service facility determines its visibility and its impact on community character. Height and fall zone/setback standards will have an impact on the visibility of personal wireless service facilities, but they may still be visible from public areas and surrounding residential properties. All personal wireless service facilities shall comply with the following design standards in order to limit negative visual impacts from these facilities through effective design:

(1) Visibility/Camouflage: Personal wireless service facilities shall be camouflaged as follows:

(a) Camouflage by Existing Buildings or Structures:

When a personal wireless service facility extends above the roof height of a building on which it is mounted, every effort shall be made to conceal the facility within or behind existing architectural features to limit its visibility from public ways. Facilities mounted on a roof shall be stepped back from the front facade in order to limit their impact on the building's silhouette.

(b) Personal wireless service facilities that are side mounted shall blend with the existing building's architecture and, if over 5 square feet, shall be painted or shielded with material which is consistent with the design features and materials of the building.

(c) Camouflage by Vegetation:

If personal wireless service facilities are not camouflaged from public viewing areas by existing buildings or structures, or are not located on existing structures or along a high tension power line right of way, they shall be surrounded by buffers of dense tree growth and understory vegetation in all directions to create an effective year-round visual buffer. Ground-mounted personal wireless service facilities shall have a vegetated buffer of 50 feet or more, and of sufficient height to effectively screen the facility. Trees and vegetation may be existing on the

subject property or installed as part of the proposed facility or a combination of both. The Planning Board shall determine the types of trees and plant materials and depth of the needed buffer based on site conditions and the height of the proposed tower.

(d) Color:

Personal wireless service facilities that are side-mounted on buildings shall be painted or constructed of materials to match the color of the building material directly behind them.

To the extent that any personal wireless service facility extends above the height of the vegetation immediately surrounding it, it shall be painted in a light gray or light blue hue that blends with sky and clouds.

(2) Equipment Shelters: Equipment shelters for personal wireless service facilities shall be designed consistent with one of the following design standards:

- (a) Equipment shelters shall be located in underground vaults; or
- (b) Equipment shelters shall be designed consistent with traditional Cape Cod architectural styles and materials, with a roof pitch of at least 10/12 and wood clapboard or shingle siding; or
- (c) Equipment shelters shall be camouflaged behind an effective year-round landscape buffer, equal to the height of the proposed building, and/or wooden fence. The Planning Board shall determine if the style of fencing and/or landscape buffer proposed is compatible with the neighborhood.

(3) Lighting and signage.

- (a) Personal wireless service facilities shall be lighted only if required by the Federal Aviation Administration (FAA). Lighting of equipment shelters and any other facilities on site shall be shielded from abutting properties. There shall be total cutoff of all light at the property lines of the parcel to be developed, and footcandle measurements at the property line shall be 0.0 initial footcandles when measured at grade.
- (b) Signs shall be limited to those needed to identify the property and the owner and warn of any danger. All signs shall comply with the requirements of Article X of this bylaw.
- (c) All ground mounted personal wireless service facilities shall be surrounded by a security barrier.

(4) Historic buildings and districts.

- (a) Any personal wireless service facilities located on or within an historic structure shall not alter the character-defining features, distinctive construction methods, or original historic materials of the building.
 - (b) Any alteration made to an historic structure to accommodate a personal wireless service facility shall be fully reversible.
 - (c) Personal wireless service facilities within an historic district shall be concealed within or behind existing architectural features, such as towers, cupolas or spires, or shall be located so that they are not visible from public roads and viewing areas within the district.
 - (d) Copies of all plans for any personal wireless service facility proposed in a historic district, or within 1000 feet of a historic district or a structure or place listed on the Massachusetts State Register of Historic Places, shall be provided to the Mashpee Historical Commission before or at the same time that they are submitted to the Town for approval, in order to facilitate their review and comment on the proposal. Applicants are encouraged to meet with the Commission to solicit their input and advice prior to seeking permit approvals.
- (5) Scenic roads and vistas.
- (a) Except along an existing cleared high tension power line right-of-way, personal wireless service facilities shall not be located within open areas that are visible from public roads, recreational areas or residential development. As required in Section F.(1) above, all ground-mounted personal wireless service facilities that are not camouflaged by existing buildings or structures shall be surrounded by a buffer of dense tree growth.
 - (b) Any personal wireless service facility that is located within 300 feet of a scenic road as designated by the town shall not exceed the height of vegetation at the proposed location. If the facility is located farther than 300 feet from the scenic road, the height regulations described elsewhere in this bylaw will apply.

G. Environmental standards.

- (1) Personal wireless service facilities shall not be located in wetlands, within 100 feet of wetlands or within 200 feet of rivers.
- (2) No hazardous waste shall be discharged on the site of any personal wireless service facility. If any hazardous materials are to be used on site, there shall be provisions for full containment of such materials. An enclosed containment area shall be provided with a sealed floor, designed to contain at least 110% of the volume of the hazardous materials stored or used on the site.
- (3) Stormwater run-off shall be contained on-site.

- (4) Ground-mounted equipment for personal wireless service facilities shall not generate noise in excess of 50 db at the property line.
- (5) Roof-mounted or side-mounted equipment for personal wireless service facilities shall not generate noise in excess of 50 db at ground level at the base of the building closest to the antenna.

H. Radiofrequency Radiation (RFR) Standards.

All equipment proposed for a personal wireless service facility shall be authorized per the FCC *Guidelines for Evaluating the Environmental Effects of Radiofrequency Radiation* (FCC Guidelines). Any application for approval of a personal wireless service facility shall include documentation that the FCC Guidelines are being met and a copy of the letter of approval by the Massachusetts Department of Public Health required by 105 CMR 122.000. The Planning Board may require that the applicant fund the services of an RF Engineer to review the documentation regarding the FCC Guidelines.

I. Application procedures.

(1) Pre-application conference.

Prior to the submission of an application for a special permit under this regulation, the applicant is strongly encouraged to meet with the Planning Board at a public meeting to discuss the proposed personal wireless service facility in general terms and to clarify the filing requirements.

The purpose of the conference is to inform the Board as to the preliminary nature of the proposed personal wireless service facility. As such, no formal filings are required for the pre-application conference. However, the applicant is encouraged to prepare sufficient preliminary architectural and/or engineering drawings to inform the Board of the location of the proposed facility, as well as its scale and overall design.

(2) Application filing requirements.

In addition to those items required by Subsection 174-24C.(5), other applicable portions of this chapter or the regulations of the Planning Board, the following shall be included in any special permit application for personal wireless service facilities:

- (a) Name, address and telephone number of the landowner of the property and of the applicant and any co-applicants as well as any agents for the applicant or co-applicants. Co-applicants may include licensed carriers and tenants for the personal wireless service facility. A licensed carrier shall either be an applicant or a co-applicant.
- (b) Original signatures for the landowner, applicant and all co-applicants applying for the Special Permit. If the landowner, applicant or co-applicant will be represented by an agent, original signature authorizing the agent to

represent the applicant and/or co-applicant. Photo reproductions of signatures will not be accepted.

- (c) Location of the subject property, including the name of the nearest road or roads, the property's location relative to those roads, the street address, if any, and the Tax map and block number of the subject property.
- (d) Zoning district designation for the subject parcel.
- (e) A line map to scale showing the lot lines of the subject property and all properties within 300 feet and the location of all buildings, including accessory structures, on all properties shown.
- (f) A town-wide map showing the other existing personal wireless service facilities in the Town and outside the Town within one mile of its corporate limits.
- (g) The proposed locations of all future personal wireless service facilities in the Town on a Town-wide map for this carrier.
- (h) A one-inch-equals-40 feet vicinity plan showing the following:
 - 1) Property lines for the subject property.
 - 2) Property lines of all properties adjacent to the subject property within 300 feet.
 - 3) Tree cover on the subject property and adjacent properties within 300 feet, by dominant species and average height, as measured by or available from a verifiable source.
 - 4) Outline of all existing buildings, including purpose (e.g. residential buildings, garages, accessory structures, etc.) on subject property and all adjacent properties within 300 feet.
 - 5) Proposed location of antenna, mount and equipment shelter(s).
 - 6) Proposed security barrier, indicating type and extent as well as point of controlled entry.
 - 7) Location of all roads, public and private, on the subject property and on all adjacent properties within 300 feet including driveways proposed to serve the personal wireless service facility.
 - 8) Distances, at grade, from the proposed personal wireless service facility to each building on the vicinity plan.

9) Contours, at each two feet ~~A~~MSL, for the subject property and adjacent properties within 300 feet.

10) All proposed changes to the existing property, including grading, vegetation removal and temporary or permanent roads and driveways.

11) Representations, dimensioned and to scale, of the proposed mount, antennas, equipment shelters, cable runs, parking areas and any other construction or development attendant to the personal wireless service facility.

12) Lines representing the sight line showing viewpoint (point from which view is taken) and visible point (point being viewed) from "Sight Lines" subsection below.

(i) Sight lines and photographs as described below:

1) Sight line representation. A sight line representation shall be drawn from any public road within 300 feet and the closest facade of each residential building (viewpoint) within 300 feet to the highest point (visible point) of the personal wireless service facility. Each sight line shall be depicted in profile, drawn at one inch equals 40 feet. The profiles shall show **the building façade**, all intervening trees and buildings **and the personal wireless service facility**. In the event there is only one (or more) residential building within 300 feet there shall be at least two sight lines from the closest habitable structures or public roads, if any.

2) Existing (before condition) photographs. Each sight line shall be illustrated by one four-inch by six-inch color photograph of what can currently be seen from any public road within 300 feet.

3) Proposed (after condition). Each of the existing condition photographs shall have the proposed personal wireless service facility superimposed on it to show what will be seen from public roads if the proposed personal wireless service facility is built.

(j) Siting elevations, or views at-grade from the north, south, east and west for a 50-foot radius around the proposed personal wireless service facility plus from all existing public and private roads that serve the subject property. Elevations shall be at either one-quarter inch equals one foot or one-eighth inch equals one foot scale and show the following:

1) Antennas, mounts and equipment shelter(s), with total elevation dimensions and AGL of the highest point.

2) Security barrier. If the security barrier will block views of the personal wireless service facility, the barrier drawing shall be cut away to show the view behind the barrier.

3) Any and all structures on the subject property.

- 4) Existing trees and shrubs at current height and proposed trees and shrubs at proposed height at time of installation, with approximate elevations dimensioned.
- 5) Grade changes, or cuts and fills, to be shown as original grade and new grade line, with two-foot contours above mean sea level.
- (k) Equipment brochures for the proposed personal wireless service facility, such as manufacturer's specifications or trade journal reprints, shall be provided for the antennas, mounts, equipment shelters, cables as well as cable runs and security barrier, if any.
- (l) Materials of the proposed personal wireless service facility specified by generic type and specific treatment (e.g., anodized aluminum, stained wood, painted fiberglass, etc.). These shall be provided for the antennas, mounts, equipment shelters, cables as well as cable runs, and security barrier, if any.
- (m) Colors of the proposed personal wireless service facility represented by a color board showing actual colors proposed. Colors shall be provided for the antennas, mounts, equipment shelters, cables as well as cable runs, and security barrier, if any.
- (n) Dimensions of the personal wireless service facility specified for all three directions: height, width and breadth. These shall be provided for the antennas, mounts, equipment shelters and security barrier, if any.
- (o) Appearance shown by at least two photographic superimpositions of the personal wireless service facility within the subject property. The photographic superimpositions shall be provided for the antennas, mounts, equipment shelters, cables as well as cable runs, and security barrier, if any, for the total height, width and breadth.
- (p) Landscape plan including existing trees and shrubs and those proposed to be added, identified by size of specimen at installation and species.
- (q) If lighting of the site is proposed, the applicant shall submit a manufacturer's computer-generated point-to-point printout, indicating the horizontal footcandle levels at grade, within the property to be developed and twenty-five (25) feet beyond the property lines. The printout shall indicate the location and types of luminaires proposed.
- (r) The applicant shall list location, type and amount (including trace elements) of any materials proposed for use within the personal wireless service facility that are considered hazardous by the federal, state or local government.
- (s) Noise filing requirements.

The applicant shall provide a statement listing the existing and maximum future projected measurements of noise from the proposed personal wireless service facilities, measured in decibels Ldn (logarithmic scale, accounting for greater sensitivity at night), for the following: 1) Existing, or ambient: the measurements of existing noise. 2) Existing plus proposed personal wireless service facilities: maximum estimate of noise from the proposed personal wireless service facility plus the existing noise environment.

Such statement shall be certified and signed by an acoustical engineer, stating that noise measurements are accurate and meet the Noise Standards of this Bylaw.

(t) Radiofrequency Radiation (RFR) filing requirements.

The applicant shall provide a statement listing the existing and maximum future projected measurements of RFR from the proposed personal wireless service facility, for the following situations: 1) Existing, or ambient: the measurements of existing RFR. 2) Existing plus proposed personal wireless service facilities: maximum estimate of RFR from the proposed personal wireless service facility plus the existing RFR environment.

The applicant shall also provide a certification, signed by a RF engineer, stating that RFR measurements are accurate and meet FCC Guidelines as specified in the Radiofrequency Radiation Standards sub-section of this Bylaw.

(u) Federal environmental filing requirements.

The National Environmental Policy Act (NEPA) applies to all applications for personal wireless service facilities. NEPA is administered by the FCC via procedures adopted as Subpart 1, Section 1.1301 et seq. (47CFR Ch. I). The FCC requires that an environmental assessment (EA) be filed with the FCC prior to beginning operations for any personal wireless service facility proposed in, or involving any of, the following: a) wilderness areas, b) wildlife preserves, c) endangered species habitat, d) historical site, e) Native American religious site, f) flood plain, g) wetlands, h) high intensity white lights in residential neighborhoods or i) excessive radiofrequency radiation exposure.

At the time of application filing, an EA that meets FCC requirements shall be submitted to the Town for each personal wireless service facility site that requires such an EA to be submitted to the FCC.

(3) Balloon or crane test.

Within 30 days of the pre-application conference, or within 21 days of filing an application for a Special Permit, the applicant shall arrange for a balloon or crane test at the proposed site to illustrate the height of the proposed facility. The date, time and location of such test shall be advertised in a newspaper of general circulation in the Town at least 14 days, but not more than 21 days prior to the test.

(4) Waiver of filing requirements.

The Board may waive one or more of the application filing requirements of this section if it finds that such information is not needed for a thorough review of the proposed personal wireless service facility.

J. Co-location.

- (1) Licensed carriers shall share personal wireless service facilities and sites where feasible and appropriate, thereby reducing the number of personal wireless service facilities that are stand-alone facilities. All applicants for a special permit for a personal wireless service facility shall demonstrate a good faith effort to co-locate with other carriers. Such good faith effort includes:
 - (a) A survey of all existing structures that may be feasible sites for co-locating personal wireless service facilities;
 - (b) Contact with all the other licensed carriers for commercial mobile radio services operating in Mashpee and each of the adjoining towns; and
 - (c) Sharing information necessary to determine if co-location is feasible under the design configuration most accommodating to co-location.
- (2) In the event that co-location is found to be not feasible, a written statement of the reasons for the infeasibility shall be submitted to the Board. The Board may retain a technical expert in the field of RF engineering to verify if co-location at the site is not feasible or is feasible given the design configuration most accommodating to co-location. The cost for such a technical expert will be at the expense of the applicant. The Board may deny a special permit to an applicant that has not demonstrated a good faith effort to provide for co-location.
- (3) If the applicant does intend to co-locate or to permit co-location, the Board shall request drawings and studies that show the ultimate appearance and operation of the personal wireless service facility at full build-out.
- (4) If the Board approves co-location for a personal wireless service facility site, the special permit shall indicate how many facilities of what type shall be permitted on that site. Facilities specified in the special permit approval shall require no further zoning approval. However, the addition of any facilities not specified in the approved special permit shall require a new special permit. Estimates of RFR emissions will be required for all facilities, including proposed and future facilities.

K. Modifications.

A modification of a personal wireless service facility will be considered equivalent to an application for a new personal wireless service facility and will require a special permit when the following events apply:

- (1) The applicant and/or co-applicant wants to alter the terms of the special permit by changing the personal wireless service facility in one or more of the following ways: a change in the number of facilities permitted on the site or a change in technology used for the personal wireless service facility.
- (2) The applicant and/or co-applicant wants to add any equipment or additional height not specified in the original design filing.

L. Monitoring and maintenance.

- (1) After the personal wireless service facility is operational, the applicant shall submit, within 90 days of beginning operations, and at annual intervals from the date of issuance of the special permit, existing measurements of RFR from the personal wireless service facility. Such measurements shall be signed and certified by a RF engineer, stating that RFR measurements are accurate and meet FCC Guidelines as specified in Section H. of this bylaw.
- (2) After the personal wireless service facility is operational, the applicant shall submit, within 90 days of the issuance of the Special Permit, and at annual intervals from the date of issuance of the Special Permit, existing measurements of noise from the personal wireless service facility. Such measurements shall be signed by an acoustical engineer, stating that noise measurements are accurate and meet the Noise Standards sub-section of this Bylaw.
- (3) The applicant and co-applicant shall maintain the personal wireless service facility in good condition. Such maintenance shall include, but shall not be limited to, painting, structural integrity of the mount and security barrier and maintenance of the buffer areas and landscaping.

M. Abandonment or discontinuation of use.

- (1) At such time that a licensed carrier plans to abandon or discontinue operation of a personal wireless service facility, such carrier will notify the Town by certified U.S. mail of the proposed date of abandonment or discontinuation of operations. Such notice shall be given no less than 30 days prior to abandonment or discontinuation of operations. In the event that a licensed carrier fails to give such notice, the personal wireless service facility shall be considered abandoned upon such discontinuation of operations.
- (2) Upon abandonment or discontinuation of use, the carrier shall physically remove the personal wireless service facility within 90 days from the date of abandonment or discontinuation of use. "Physically remove" shall include, but not be limited to:
 - (a) Removal of abandoned antennas, mount, equipment shelters and security barriers from the subject property.
 - (b) Proper disposal of the waste materials from the site in accordance with local and state solid waste disposal regulations.

- (c) Restoring the location of the personal wireless service facility to its natural or original condition, except that any landscaping and grading shall remain as-is.
- (3) If a carrier fails to remove a personal wireless service facility in accordance with this section of this Bylaw, the Town shall have the authority to enter the subject property and physically remove the facility. The Planning Board may require the applicant to post a bond at the time of construction in an appropriate amount to cover all costs for the removal of the personal wireless service facility in the event the Town must remove the facility.

N. Reconstruction or replacement of existing towers and monopoles.

Guyed towers, lattice towers, utility towers and monopoles in existence at the time of adoption of this bylaw may be reconstructed, altered, extended or replaced on the same site by special permit, provided that the Planning Board finds that such reconstruction, alteration, extension or replacement will not be substantially more detrimental to the neighborhood and/or the Town than the existing structure. In making such a determination, the Planning Board shall consider whether the proposed reconstruction, alteration, extension or replacement will create public benefits such as opportunities for co-location, improvements in public safety, and/or reduction in visual and environmental impacts. No reconstruction, alteration, extension or replacement shall exceed the height of the existing facility by more than twenty (20) feet.

O. Term of special permit.

A Special Permit issued for any personal wireless service facility over fifty (50) feet in height shall be valid for fifteen (15) years. At the end of that time period, the personal wireless service facility shall be removed by the carrier or a new special permit shall be required."

or take any other action relating thereto.

Submitted by Planning Board

Explanation: This article would establish regulations and a special permit process for "personal wireless service facilities" (wireless phone services, etc., usually involving towers), whose providers have recently been determined to be public service corporations (public utilities) by the Massachusetts Department of Telecommunications and Energy and which were the subject of specific land use control restraints enacted by the U.S. Congress as part of the Telecommunications Act passed in 1996. The Town may not prohibit their development under the Telecommunications Act but may adopt reasonable guidelines on their location and other characteristics. The article is based on a model bylaw prepared for the Cape Cod Commission in response to the provisions of the Telecommunications Act, along with recommendations and copies of bylaws from other Massachusetts towns provided by Town Counsel.

It would restrict the height of such facilities to approximately 45 feet except within a Wireless Facility Overlay District, within which towers of 100 to 200 feet would be allowed. That overlay district includes the land within the Commonwealth Electric high tension power line easement as well as all other parts of the town except lands within the National Wildlife Refuge boundaries, within 1000 feet of the mean high water line of a Great Pond or tidal water body, within a Historic District, within 1000 feet of a Historic District or of a place listed in the 1997 Massachusetts State register of Historic places, within the Otis A.N.G.B. Accident Prevention Zone or within 300 feet of the right of way of any designated scenic roadway. Co-location and location of such facilities on existing towers, water towers, steeples etc. is encouraged. Visual buffers, camouflage techniques and setbacks ("fall zone") are required and noise and lighting are restricted in order to minimize impacts on neighboring properties.

BENNETT ENVIRONMENTAL ASSOCIATES, INC.

LICENSED SITE PROFESSIONALS, ENVIRONMENTAL SCIENTISTS, GEOLOGISTS, ENGINEERS

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LETTER OF TRANSMITTAL

TO:

Ms. Mary Waygan, Chairman
c/o Evan Lehrner, Town Planner
TOWN OF MASHPEE – PLANNING BOARD
16 Great Neck Road
Mashpee, MA 02649

DATE:

10/25/18

JOB NUMBER:

BEA08-2252

SHIPPING METHOD:

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Priority Mail	<input type="checkbox"/>	Hand Deliver	<input checked="" type="checkbox"/>
Express Mail	<input type="checkbox"/>	Other _____	<input type="checkbox"/>
Certified Mail	<input type="checkbox"/>	Green Card/RR	<input type="checkbox"/>

REGARDING:

Windchime Condominiums Trust:
Request for Special Permit Modification
Sandcastle Mashpee, Inc. (5/21/87) and
Windchime Point Development Group, LP (10/30/98)

90 Great Neck Road South
Mashpee, MA
[Parcel ID 75-11-0]

COPIES	DATE	DESCRIPTION
1		Application for Special Permit Modification (as referenced above) with Check #10387 in the amount of \$230.00 as filing fee
1	10/24/18	BEA Request for SP Modification cover letter, with Enclosures as noted [One hard-copy, one electronic copy via PDF on CD]

For review and comment: ☐ For approval: ☐ As requested: ☐ For your use: ☐

REMARKS:

CC (Application and Cover Letter only*): Windchime Condominium Trust c/o Joseph Mooney, Chairman – Board of Directors
John Schaffer, Esquire - Marcus, Errico, Emmer & Brooks, P.C.
Ed Goodwin, Property Manager – American Properties team, Inc.
Glen Harrington, Director – Mashpee Health Department

[*Please note, Enclosures totals 343 pages and full PDF file is too large to email; to request an electronic copy, contact BEA Administrative Assistant, at LRowell@bennett-ea.com, for a link to download complete application package via third-party file-sharing service]

FROM: David C. Bennett, LPG., CGWP., RS (WWTO 5C) / Lezli Rowell, Administrative Assistant

If enclosures are not as noted, kindly notify us at once



Town of Mashpee

Planning Board

16 Great Neck Road North
Mashpee, Massachusetts 02649

APPLICATION FOR SPECIAL PERMIT MODIFICATION

Date received by Town Clerk: _____ Town Clerk Signature / Seal: _____

The undersigned hereby applies for a Modification of the Special Permit approved by the Mashpee Planning Board on April 22, 1987 for a project entitled Sandcastle Mashpee, Inc.

The original Special Permit and any Modifications have been recorded in the Barnstable County Registry of Deeds at the following Book(s) and Page(s):
5734/225-244, 5910/190-191, 6405/268-269, 6047/003-004

Name of Applicant Bennett Environmental Associates, Inc. Phone 508-896-1706

Address P.O. Box 1743, 1573 Main Street - Brewster, MA 02631 David Bennett, President

Owner, if different Joseph Mooney, Chairman - Board of Directors Phone 610-283-1983

Address Windchime Condominium Trust - 90 Great Neck Road South - Mashpee, MA

Attach copies of (a) most recent recorded deed and (b) tax bill or Assessors' certification.

Deed of property recorded in Barnstable County Registry Book 26347 Page 153-269B
or Land Court Certificate of Title No. _____

Location and description of property: Windchime Condominiums: 90 Great Neck Road South

Multi-Unit Condominium: 156 Units on 38.6 acres of land in cluster configuration with surrounding open space

Mashpee Assessors Map(s) and Block(s): Map 75, Parcel 11

Zoning District(s) in which property is located: R3

How long have you owned the property? 30 years

Section(s) of the Zoning Bylaw which require(s) the permit you seek: Section 9.383(d)

Present use of property: Residential

Description of proposed modification (*attach plans and documents as required by the Zoning By-law and Special Permit Regulations*): 1) Seek release of funds held by as reserved under the Special Permit for wastewater treatment improvements under BRP WP 68 Permit (Section IX, Page 5: Book 5734, page 242). [Rationale: Redundant to Financial Assurance Mechanism required under the Groundwater Discharge Permit. Offset cost to private homeowners for aging treatment plant upgrade as to benefit of public health, safety and the environment].

2) Seek reduction in Wastewater Treatment Monitoring Program as consistent with the GWDP Permit 263-3M1 Requirements (Exhibit B, pages 1-5, Book 5734, pages 238-243). [Rationale: Program is unique to property with larger sources/loads with co-mingled plumes. Focused study is poorly designed and has limited value to intended regional evaluation, wherein Windchime source is a minor contributor].

Signature of Owner or Authorized Representative _____

Attach written authorization signed by owner.

BENNETT ENVIRONMENTAL ASSOCIATES, INC.

LICENSED SITE PROFESSIONALS ♡ ENVIRONMENTAL SCIENTISTS ♡ GEOLOGISTS ♡ ENGINEERS

1573 Main Street - P.O. Box 1743, Brewster, MA 02631 ♡ 508-896-1706 ♡ Fax 508-896-5109 ♡ www.bennett-ea.com

BEA08-2252

October 24, 2018

Ms. Mary Waygan, Chairman
C/o Evan Lehrer, Town Planner
TOWN OF MASHPEE – PLANNING BOARD
16 Great Neck Road
Mashpee, MA 02649

RE: Windchime Condominiums Trust
Request for Special Permit Modification
Sandcastle Mashpee, Inc. (5/21/87) and
Windchime Point Development Group, LP (10/30/98)
90 Great Neck Road South [Parcel ID 75-11-0]
Mashpee, MA.

Dear Chairman Waygan and Honorable Planning Board Members,

The Windchime Board of Directors and Homeowners Association (herein referred to as “Windchime”) would like to thank you for the opportunity to speak to you about wastewater treatment and planned improvements at the facility, in the context of the Special Permit and Modification process. After consultation with the Planning Board in meetings attended, and with the assistance of the Town Planner Evan Lehrer, Windchime has been advised to make application for a Modification of the Special Permit under the provisions of the Town of Mashpee Special Permit Regulations (11/15/2017). As such, Bennett Environmental Associates, Inc. (BEA) on behalf of the Windchime Condominium Trust, hereby requests a public hearing with the Mashpee Planning Board and makes application for Special Permit Modification.

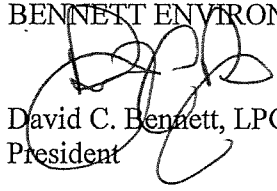
Such application is made for consideration of: 1) the release of the escrow funds held under the Special Permit to make improvements to the on-site wastewater treatment system through the BRP WP 68 “Treatment Works Plan Approval” permitting process; and 2) to seek a reduction in the Wastewater Treatment Monitoring Plan as commensurate to the environmental monitoring requirements specified under the Groundwater Discharge Permit 263-3M1. It is BEA’s position that granting such Modifications reduces redundancy of overlapping jurisdictions, does not compromise the underlying environmental interests, and enhances protection of the groundwater and Mashpee River surface water resources through reduction of nutrients and other pollutants by some 85%, as compared to conventional septic systems, the primary source of controllable nitrogen entering the groundwater and eventually discharged to surface waters.

Based on the nature of the Special Permit Modification being sought, and the existence of plans, deeds, reports and other records already part of the Town of Mashpee public record, the applicant seeks waivers for all provisions under Section IV “Form and Content of Applications”

with the exception of Sections B1, B5, B13, B14 and B19, wherein these documents are attached with the minimum application fee of \$200, and \$30 for advertising, towards a public hearing on November 21, 2018.

Subject to your review and consideration of the application, please contact me directly with any questions or need for additional information in advance of the public hearing to best be prepared to discuss any topic the Mashpee Planning Board anticipates in the consideration of such Special Permit Modification.

Sincerely,
BENNETT ENVIRONMENTAL ASSOCIATES, INC.


David C. Bennett, LPG., CGWP., RS (WWTO 5C)
President

- Cc. Windchime Condominium Trust c/o Joseph Mooney, Chairman – Board of Directors
John Schaffer, Esquire - Marcus, Errico, Emmer & Brooks, P.C.
Ed Goodwin, Property Manager – American Properties team, Inc.
Glen Harrington, Director – Mashpee Health Department
- Encl. Town of Mashpee Planning Board Permit Application for Special Permit Modification
Check# \$ 230.00
Copy of Most Recent Recorded Deed/Recorded Special Permit and Modifications/Tax Bill
Site Locus Plan: MassGIS Priority Resource Overlay
Plan Set entitled “Windchime Point, Mashpee, MA” Prepared by Eldredge Surveying and Engineering – Chatham, MA., Dated June 1996 [Reduced to 11” x 17”].
Report entitled “Water Quality Monitoring Program Annual Report – Windchime Point Condominiums...”, Prepared by Bennett Environmental Associates, Inc. – Brewster, MA, Dated May 11, 2018.
Windchime Condominiums Financial Assurance Mechanism
Windchime Condominiums Groundwater Discharge Permit

ENCLOSURES

BENNETT ENVIRONMENTAL ASSOCIATES, INC.

10387

Date	Type	Reference	Original Amt.	Balance Due	10/25/2018 Discount	Payment
10/25/2018	Bill	App. for SP Mod.	230.00	230.00		230.00
				Check Amount		230.00

Cape Cod Five Check Parcel: 75-11-0 Req. to Modify 5/21/87 Special

230.00

PRODUCT SSL/T04

USE WITH 31693 ENVELOPE

Deluxe Corporation 1-800-328-0304 or www.deluxe.com/shop

DD050F STK0K04 02/01/2018 11:00 -366-

4494189601





TOWN OF MASHPEE
Office of the Tax Collector
16 Great Neck Road North
Mashpee, MA 02649

Fiscal Year 2019 Preliminary Real Estate Tax Bill



4702 *****AUTO**5-DIGIT 02632
MOONEY, JOSEPH J JR & MARION G
60 Gold Leaf Ln
Mashpee MA 02649-3557

COLLECTOR'S COPY
1st Quarter Payment

Return This Portion With Your Payment

Bill Date	7/1/2018	Bill No.	7900
PROPERTY DESCRIPTION	60 GOLD LEAF LN		
Parcel ID	075-0011-0090		
AMOUNT DUE 8/1/2018	\$877.22		

Payments made after 06/07/2018 may not be reflected on this bill.

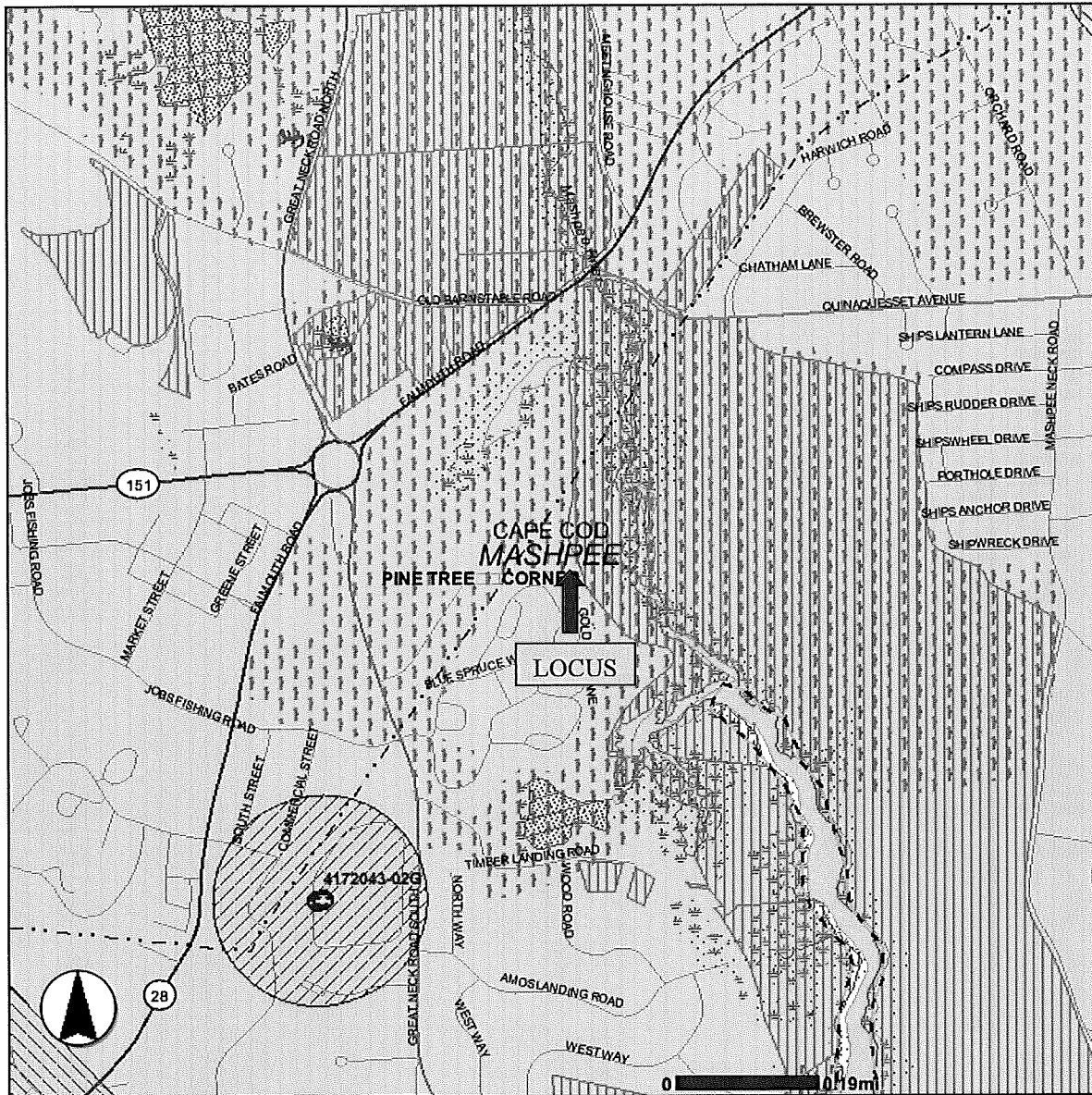
Make Check Payable and Mail To:

TOWN OF MASHPEE
OFFICE OF TAX COLLECTOR LOCKBOX
PO BOX 728
MEDFORD, MA 02155-0008

AUGUST REMIT

319420820198000007900400000877225

JOSEPH J MOONEY MARION MOONEY 60 GOLD LEAF LN MASHPEE, MA 02649-3557		2545 30-7426/3140
PAY to the Order of <u>Town of Mashpee</u>		Date <u>08-01-18</u>
<u>Eight hundred seventy-seven 22/100</u>		\$ <u>877.22</u>
USAA FEDERAL SAVINGS BANK 10750 MODERNWATT Fwy SAN ANTONIO, TEXAS 78268-0544 (210) 455-8000 1-800-832-3724		Dollars
For <u>1st Quarter - 60 Gold Leaf Lane</u>	<u>Marion Mooney</u>	
		2545



SITE LOCUS PLAN: A review of the MA DEP BWSC GIS Priority Resource Overlay mapping program shows the site as mapped within the recharge area of the Mashpee River some 300-600' (+/-) east of the Windchime Condominium Trust and Field's Point wastewater treatment facilities. The majority of the Windchime property is further mapped by NHESP as "Estimated Habitat of Rare Wetlands Wildlife", inclusive of the areas of the two WWTFs. The site is not within any defined Interim or Zone II Wellhead Protection Area for a public water supply (PWS). One non-community public water supply well is located within one-half of a mile southwest and an additional community public water supply is located within one mile to the north-northeast in apparent cross-gradient positions to the site. As such, based on the hydrogeologic position of the public water supplies and proximity of groundwater, no impact to any existing water supply is expected and no human receptors are considered aside from the recreational value of the Mashpee River.

WINDCHIME POINT

MASHPEE, MASSACHUSETTS

June, 1996

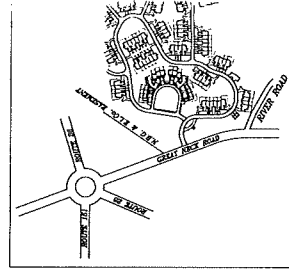
Legal Counsel
Architectural Design
Landscape Design
Sanitary Engineering
Site Planning and Surveying
Applicant

Patrick M. Butler, Esq.; Nutter, McClellan & Fish
Peter F. Dimeo; R.A.; Peter F. Dimeo Associates, Inc.
Allen W. Abrahamson, R.L.A.; Abrahamson & Associates, Inc.
Todd Chaplin, P.E.; Mount Hope Engineering
Terry W. Eldredge, L.S.; Eldredge Surveying & Engineering

Stuart Bornstein, The Bornstein Companies

DRAWING INDEX

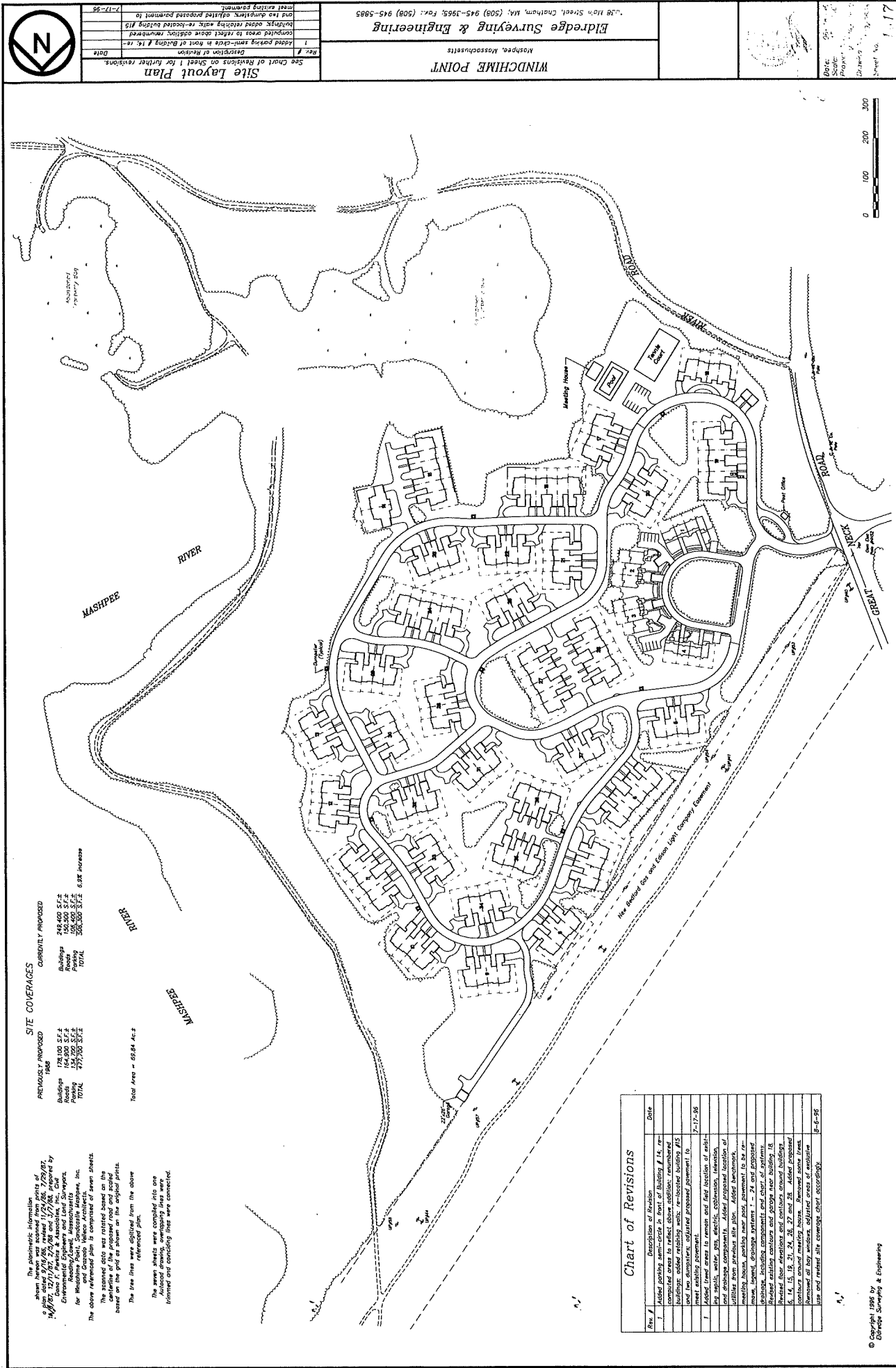
DRAWING NUMBER	DRAWING TITLE	WITH PREVIOUSLY APPROVED INFORMATION SCREENED
1	SITE LAYOUT PLAN	100 SCALE
2	SITE LAYOUT PLAN	60 SCALE
3	SITE GRADING AND DRAINAGE PLAN	100 SCALE
4	SITE GRADING AND DRAINAGE PLAN	60 SCALE
5	SITE GRADING AND DRAINAGE PLAN	40 SCALE
6	SITE GRADING AND DRAINAGE PLAN	40 SCALE
7	SITE UTILITIES PLAN by Dana F. Perkins, & Assoc., Inc.	SHEET X8 40 SCALE
8	SITE UTILITIES PLAN by Dana F. Perkins, & Assoc., Inc.	SHEET X9 40 SCALE
9	SITE UTILITIES PLAN by Dana F. Perkins, & Assoc., Inc.	SHEET X10 40 SCALE
10	SITE UTILITIES PLAN by Dana F. Perkins, & Assoc., Inc.	SHEET X11 40 SCALE
11	SITE UTILITIES PLAN by Dana F. Perkins, & Assoc., Inc.	SHEET X12 40 SCALE
12	SITE UTILITIES PLAN by Dana F. Perkins, & Assoc., Inc.	SHEET X13 40 SCALE
13	SITE UTILITIES PLAN by Dana F. Perkins, & Assoc., Inc.	SHEET X13 40 SCALE
14	TYPICAL LANDSCAPE PLAN by Abrahamson & Associates, Inc.	
15	NOTES AND SPECIFICATIONS (Copied from a plan by Dana F. Perkins & Assoc., Inc.)	
16	DETAILS (Sheet X23 of a plan by Dana F. Perkins & Assoc., Inc.)	
17	WASTEWATER TREATMENT FACILITY FLOW SCHEMATIC	
S-1	WASTEWATER TREATMENT FACILITY FLOW SCHEMATIC	
S-2	WASTEWATER TREATMENT FACILITY HYDRAULIC PROFILE	
S-3	WASTEWATER TREATMENT FACILITY EXISTING CONCRETE TANKAGE	
S-4	WASTEWATER TREATMENT FACILITY AMPHIDROME REACTOR DETAILS	
S-5	WASTEWATER TREATMENT FACILITY PROPOSED CLEARWELLS AND DENITE FILTER	
S-6	WASTEWATER TREATMENT FACILITY BLOWER DETAILS AND MISC. SPECS	
S-7	WASTEWATER TREATMENT FACILITY SPECIFICATIONS	
S-8	FOUR-PLEX FIRST FLOOR, FRONT AND RIGHT SIDE ELEVATIONS 1/8 SCALE	
A-1	FOUR-PLEX SECOND FLOOR, REAR AND LEFT SIDE ELEVATIONS 1/8 SCALE	
A-2	SIX-PLEX FIRST FLOOR AND FRONT ELEVATION 1/8 SCALE	
A-3	SIX-PLEX SECOND FLOOR AND REAR ELEVATION 1/8 SCALE	
A-4	FOUR-PLEX FIRST FLOOR 1/4 SCALE	
A-5	FOUR-PLEX SECOND FLOOR 1/4 SCALE	
A-6	FOUR-PLEX FRONT ELEVATIONS WITH STEPPED FOUNDATIONS 1/8 SCALE	
A-7	FOUR-PLEX FRONT ELEVATIONS WITH STEPPED FOUNDATIONS 1/8 SCALE	



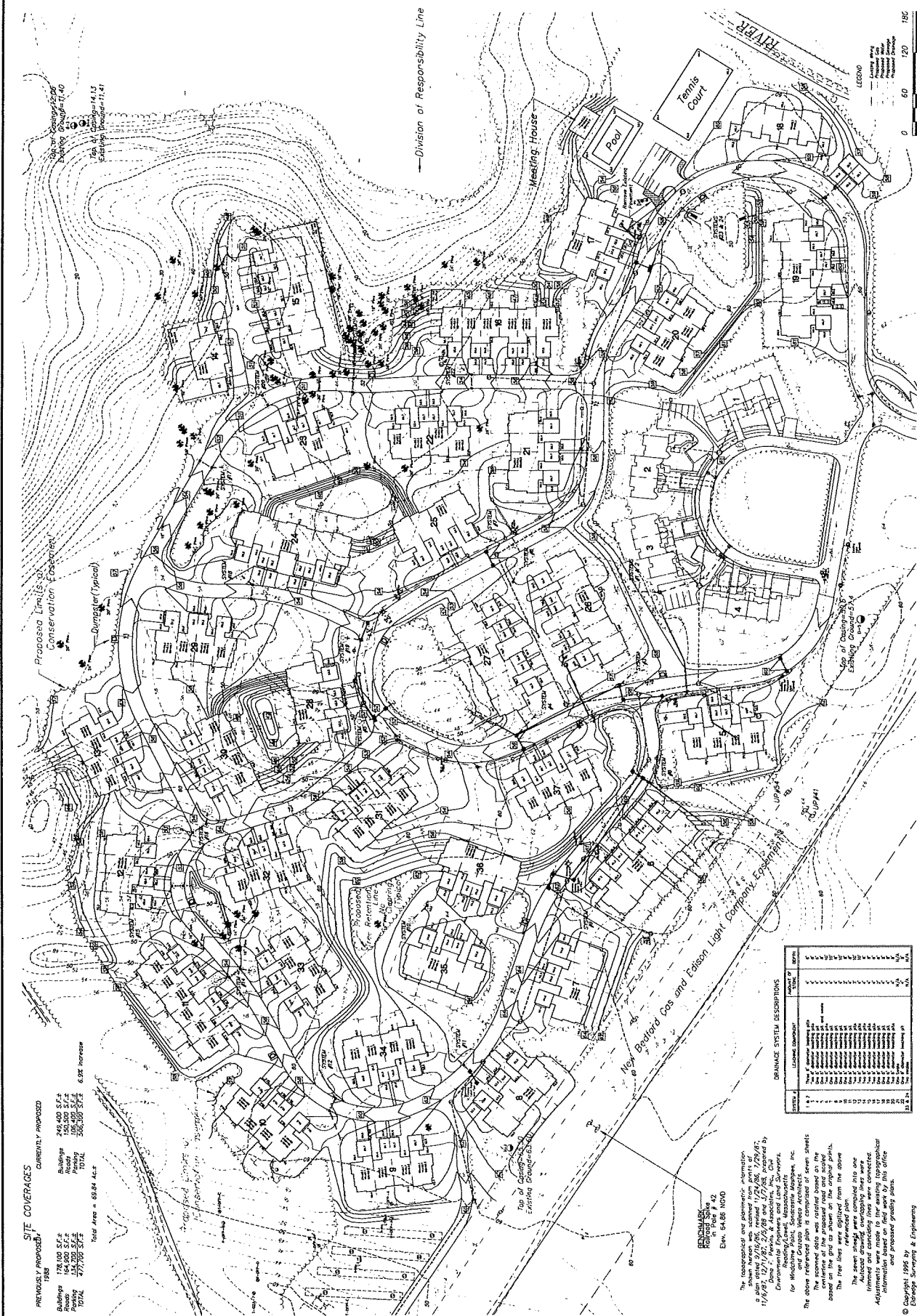
SITE LOCUS

ELDREDGE SURVEYING & ENGINEERING

1038 MAIN STREET
CHATHAM, MASSACHUSETTS 02633
(508) 945-3965
(508) 945-5885 (FAX)



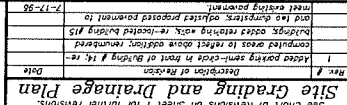




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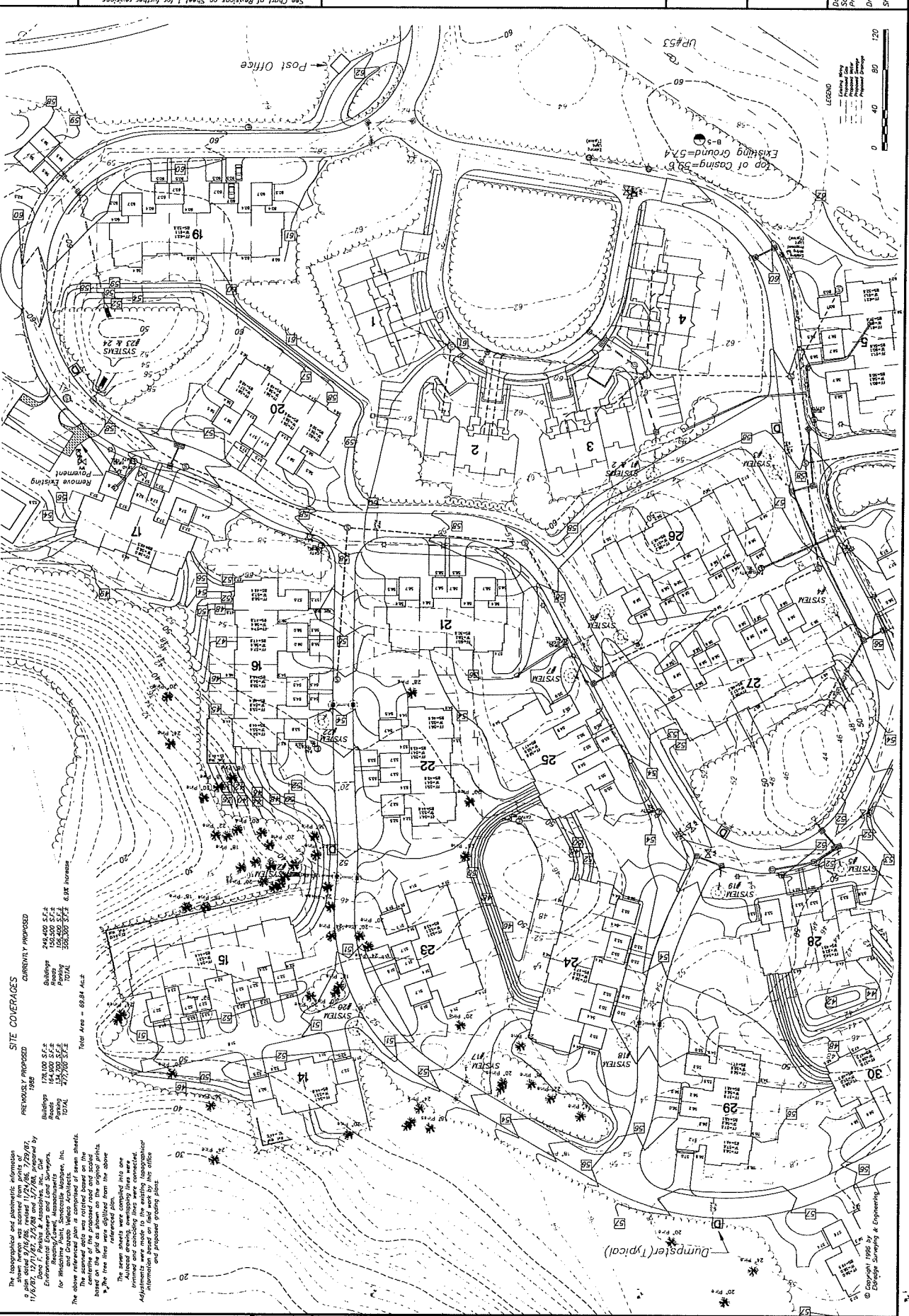
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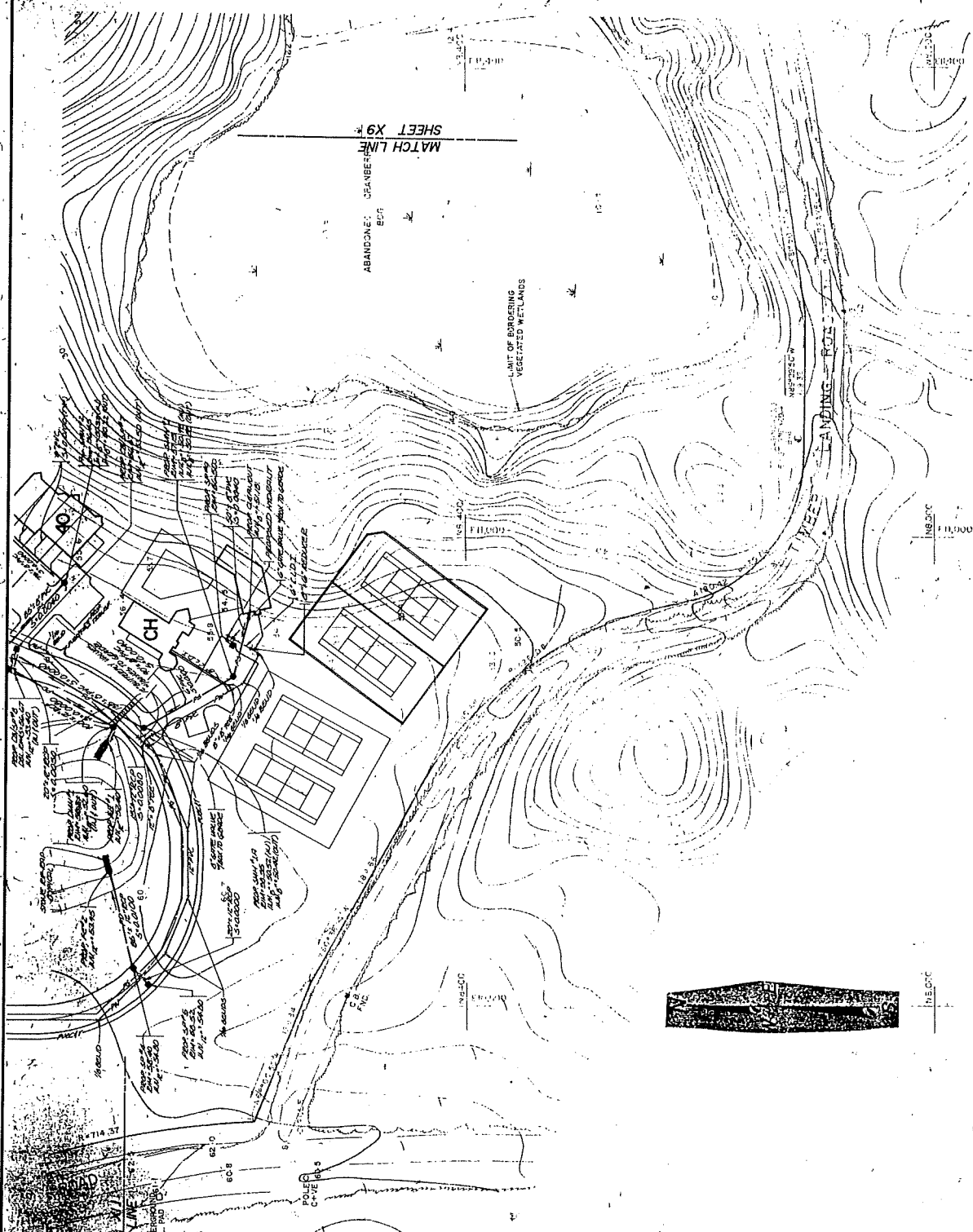
© Copyright 1996 by
Elsevier Surveying & Engineering



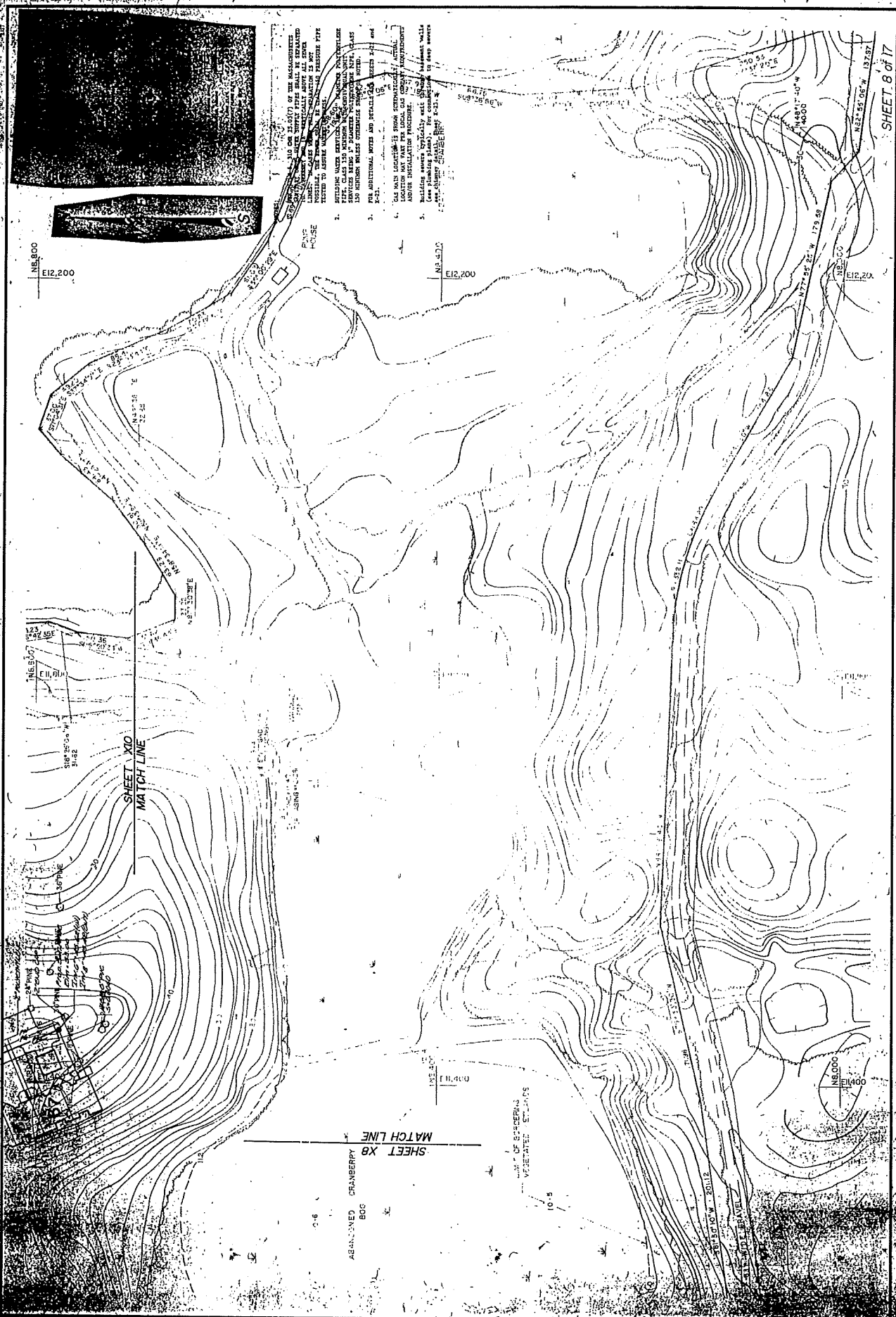
WINDCHIME POINT
Moscow, Massachusetts
Eldredge Surveying & Engineering
1038 Main Street, Chatham, MA; (508) 945-3965; Fax: (508) 945-5885

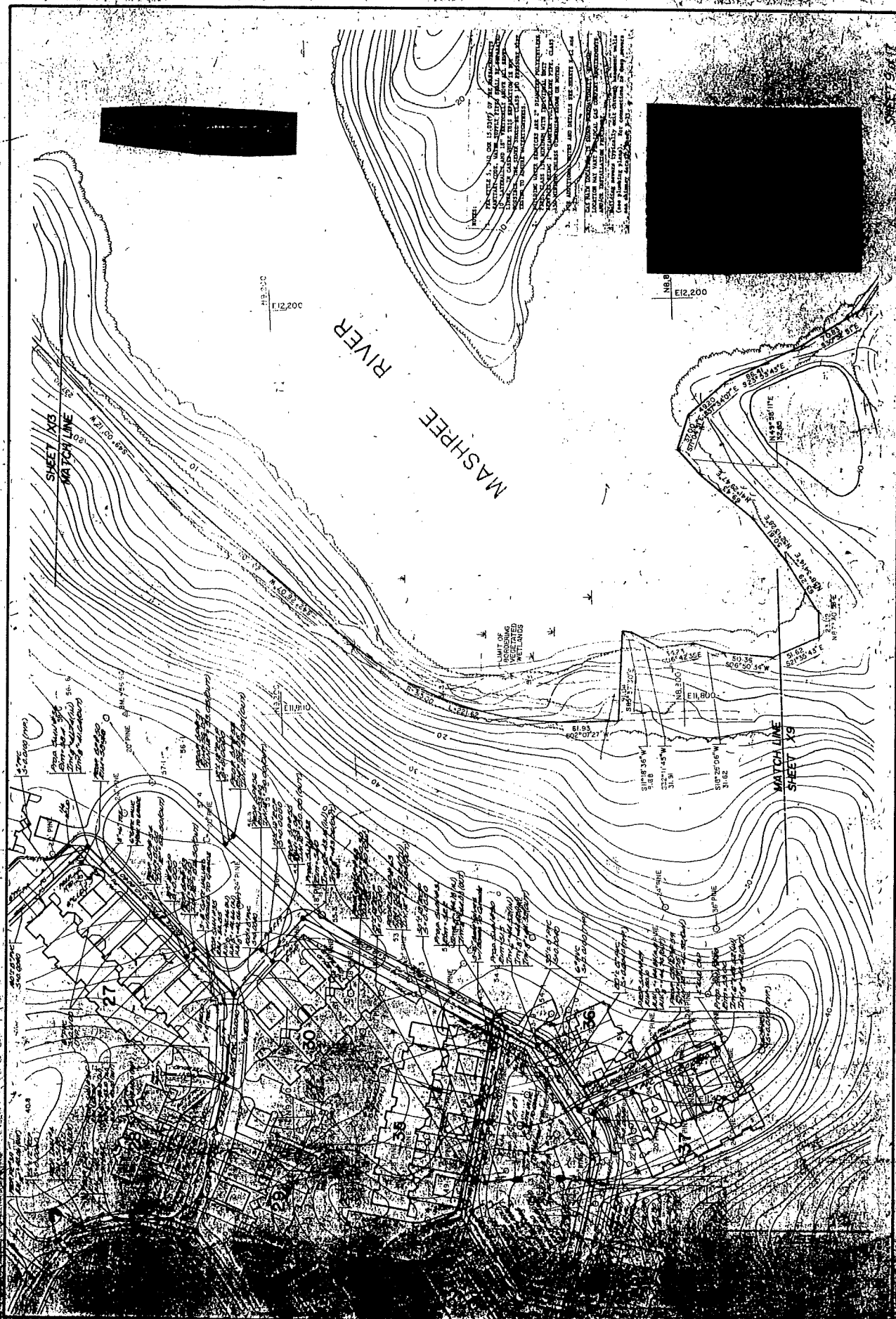
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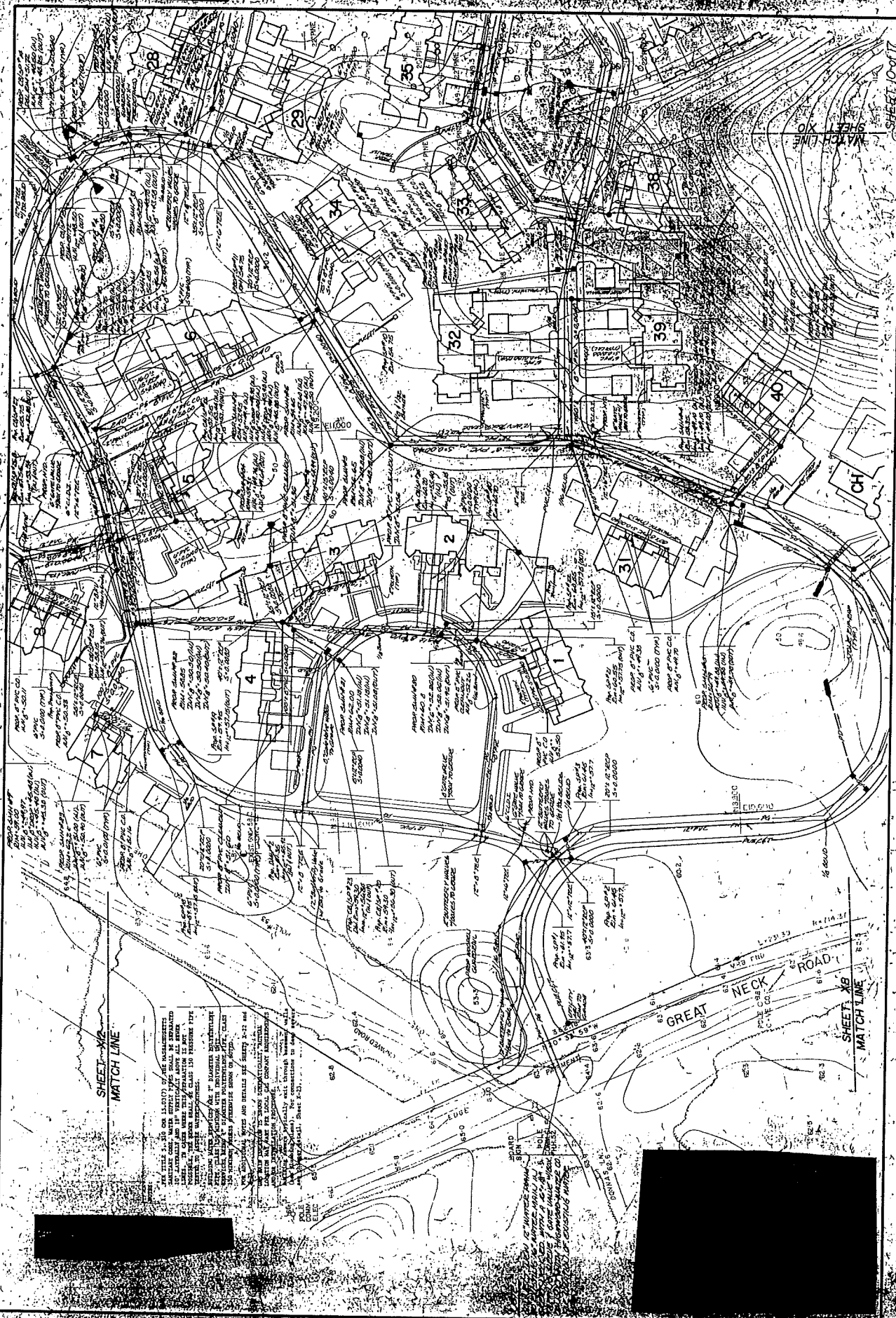




THESE DATA ARE THE PROPERTY OF THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. THEY ARE NOT TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM, WITHOUT PERMISSION IN WRITING FROM THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. THESE DATA ARE NOT TO BE USED FOR ANY PURPOSE OTHER THAN THAT FOR WHICH THEY WERE ORIGINALLY PREPARED. THESE DATA ARE NOT TO BE USED FOR ANY PURPOSE OTHER THAN THAT FOR WHICH THEY WERE ORIGINALLY PREPARED. THESE DATA ARE NOT TO BE USED FOR ANY PURPOSE OTHER THAN THAT FOR WHICH THEY WERE ORIGINALLY PREPARED.







1. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION, AS APPLICABLE TO THE STATE OF NEW YORK, AND THE LATEST EDITION OF THE STANDARD SPECIFICATIONS FOR WATER SUPPLY SYSTEMS, AS APPLICABLE TO THE STATE OF NEW YORK.

2. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION, AS APPLICABLE TO THE STATE OF NEW YORK, AND THE LATEST EDITION OF THE STANDARD SPECIFICATIONS FOR WATER SUPPLY SYSTEMS, AS APPLICABLE TO THE STATE OF NEW YORK.

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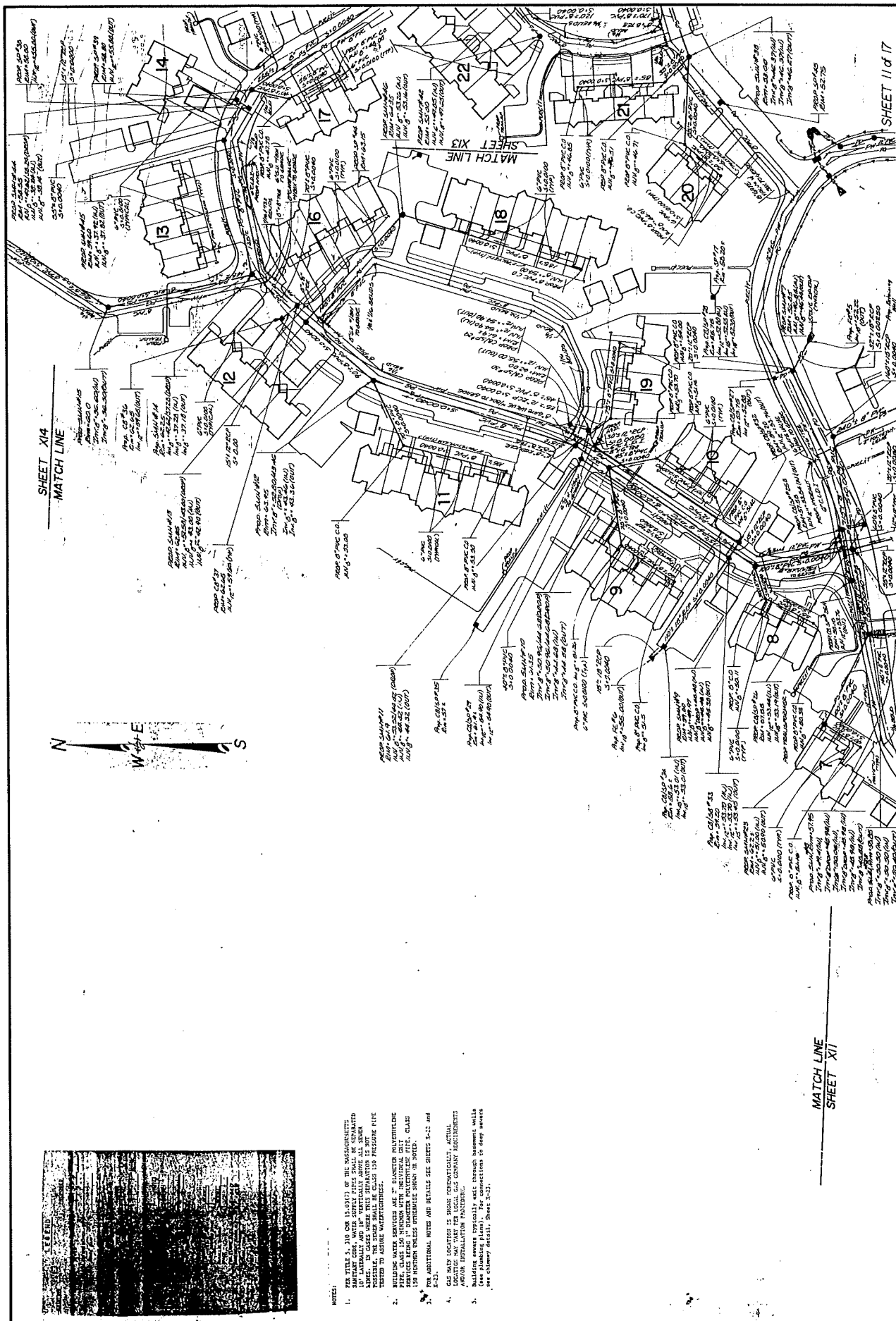
6. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION, AS APPLICABLE TO THE STATE OF NEW YORK, AND THE LATEST EDITION OF THE STANDARD SPECIFICATIONS FOR WATER SUPPLY SYSTEMS, AS APPLICABLE TO THE STATE OF NEW YORK.

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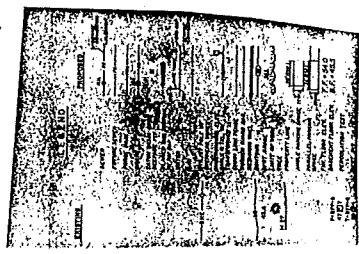
8. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION, AS APPLICABLE TO THE STATE OF NEW YORK, AND THE LATEST EDITION OF THE STANDARD SPECIFICATIONS FOR WATER SUPPLY SYSTEMS, AS APPLICABLE TO THE STATE OF NEW YORK.

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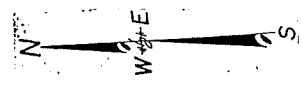


- NOTES:
1. SEE TITLE 3, 310 CMR 15.01(7) OF THE MASSACHUSETTS REGULATION. THE SEWER SHALL BE CLASS 150 PRESSURE PIPE, 18\"/>



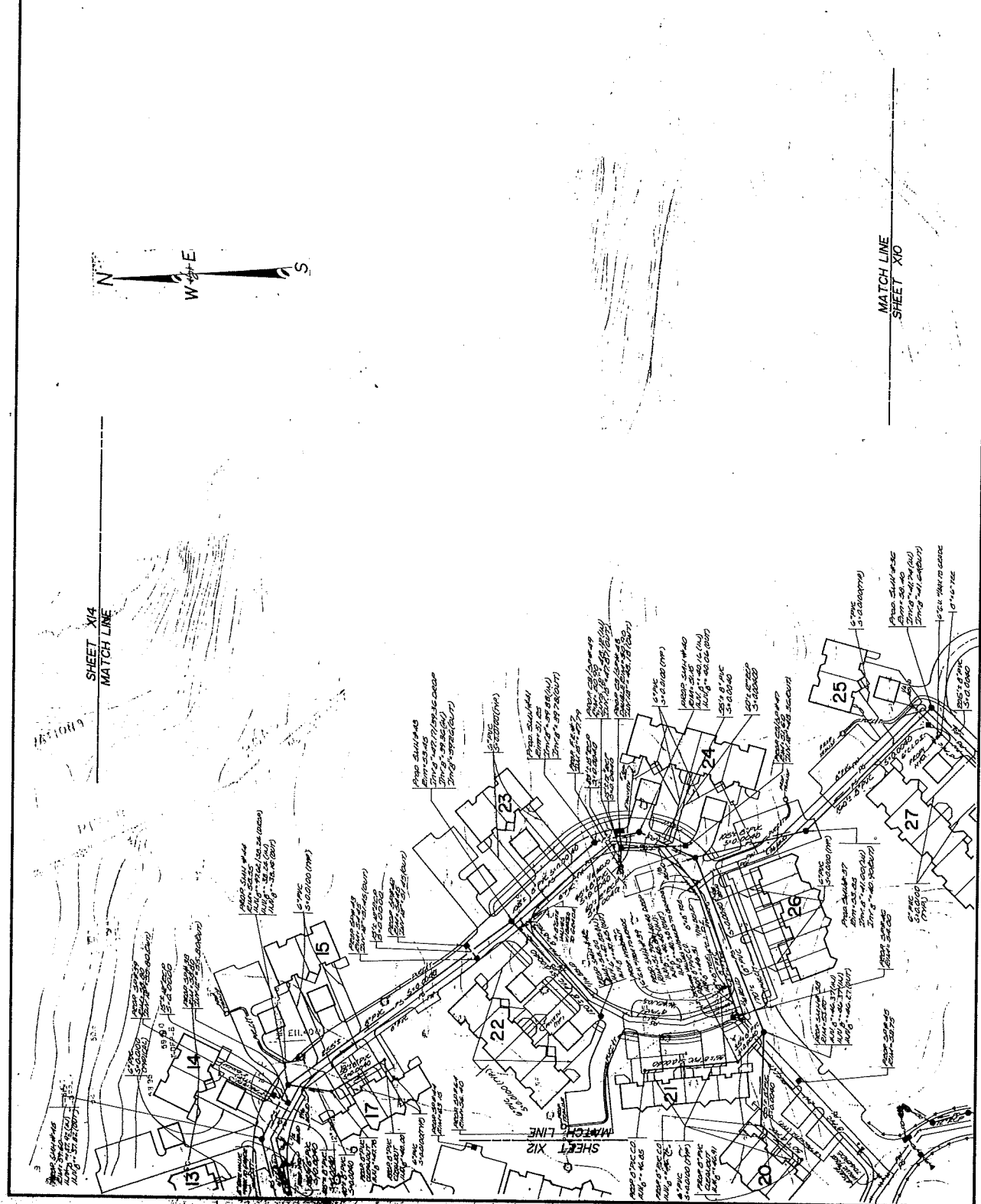
NOTES:

1. PER TITLE 1, 110 CMR 1.02(17) OF THE MASSACHUSETTS REGULATION, ALL NEWLY INSTALLED SEWERS SHALL BE INSTALLED 18" LATERALLY AND 18" VERTICALLY ABOVE ALL EXISTING SEWERS. IN CASES WHERE THIS SEPARATION IS NOT POSSIBLE, THE SEWERS SHALL BE INSTALLED 18" VERTICALLY ABOVE THE EXISTING SEWERS AND THE EXISTING SEWERS SHALL BE TESTED TO ASSURE WATER-TIGHTNESS.
2. BUILDING WATER SERVICES ARE 2" DIAMETER POLYETHYLENE GLASS REINFORCED PLASTIC (PE) PIPE. EXCEPT WHERE NOTED OTHERWISE, ALL SEWERS SHALL BE 18" DIAMETER UNLESS OTHERWISE SHOWN ON NOTES.
3. FOR ADDITIONAL NOTES AND DETAILS SEE SHEETS 1-12 AND 13-17.
4. ALL NEW SEWERS SHALL BE 18" DIAMETER POLYETHYLENE GLASS REINFORCED PLASTIC (PE) PIPE. EXCEPT WHERE NOTED OTHERWISE, ALL SEWERS SHALL BE 18" DIAMETER UNLESS OTHERWISE SHOWN ON NOTES.
5. BUILDING SEWERS SHALL BE 18" DIAMETER POLYETHYLENE GLASS REINFORCED PLASTIC (PE) PIPE. EXCEPT WHERE NOTED OTHERWISE, ALL SEWERS SHALL BE 18" DIAMETER UNLESS OTHERWISE SHOWN ON NOTES.



SHEET X14
MATCH LINE

MATCH LINE
SHEET X10



LEGEND

AIRPORT **HARBOR** **CITY** **STATE** **COUNTRY** **OCEAN** **MOUNTAIN** **RIVER** **LAKE** **SEA** **BAY** **GULF** **STRAIT** **CHANNEL** **TUNNEL** **BRIDGE** **ROAD** **RAILROAD** **CANAL** **DAM** **DITCH** **WATERWAY** **WATER** **LAND** **ISLAND** **PENINSULA** **HEADLAND** **NECK** **Isthmus** **Strait** **Channel** **Tunnel** **Bridge** **Road** **Railroad** **Canal** **Dam** **Ditch** **Waterway** **Water** **Land** **Island** **Peninsula** **Headland** **Neck** **Isthmus** **Strait** **Channel** **Tunnel** **Bridge** **Road** **Railroad** **Canal** **Dam** **Ditch** **Waterway** **Water** **Land** **Island** **Peninsula** **Headland** **Neck** **Isthmus** **Strait** **Channel** **Tunnel** **Bridge** **Road** **Railroad** **Canal** **Dam** **Ditch** **Waterway** **Water** **Land** **Island** **Peninsula** **Headland** **Neck** **Isthmus** **Strait** **Channel** **Tunnel** **Bridge** **Road** **Railroad** **Canal** **Dam** **Ditch** **Waterway** **Water** **Land** **Island** **Peninsula** **Headland** **Neck** **Isthmus** **Strait** **Channel** **Tunnel** **Bridge** **Road** **Railroad** **Canal** **Dam** **Ditch** **Waterway** **Water** **Land** **Island** **Peninsula** **Headland** **Neck** **Isthmus** **Strait** **Channel** **Tunnel** **Bridge** **Road** **Railroad** **Canal** **Dam** **Ditch** **Waterway** **Water** **Land** **Island** **Peninsula** **Headland** **Neck** **Isthmus** **Strait** **Channel** **Tunnel** **Bridge** **Road** **Railroad** **Canal** **Dam** **Ditch** **Waterway** **Water** **Land** **Island** **Peninsula** **Headland** **Neck** **Isthmus** **Strait** **Channel** **Tunnel** **Bridge** **Road** **Railroad** **Canal** **Dam** **Ditch** **Waterway** **Water** **Land**

[illegible]

2.0' bentonite fill
 or equivalent seal above sand filter
 Occure sand filter to extend one foot
 above top of well screen
 Minimum 3" of well screen placed above
 sand filter
 Minimum 10' of well screen placed
 below the unconsolidated water table
 Unconsolidated water table
 Minimum 2.0' ± 11.0' well
 screen above and below
 unconsolidated water table
 may be MC-2000 type screen
 preferred well screen size =
 0.025" (15 slot)

2" O" nesting tube.
All joints to be threaded. No
use of PVC glue

NOTES:

- 1) FOR LEACHING AREA ELEVATIONS / DETAILS, SEE SHEET X-23
- 2) 4" PVC DISTRIBUTION LINES (TYP) FIRST 2 FT. (MINIMUM) OF OUTLET DISTRIBUTION LINES TO BE Laid FLAT (S=0.000).
S_{min} = 0.0050

As-Built Record Plan
11-23-88

HEIGHT OF LENS PITS VARY FROM 8" TO 12" AS SHOWN IN PHOTO. TOP AND BOTTOM OF PITS VARY FROM 13 TO 17 FEET.

MATCH LINE
SHEET XL3

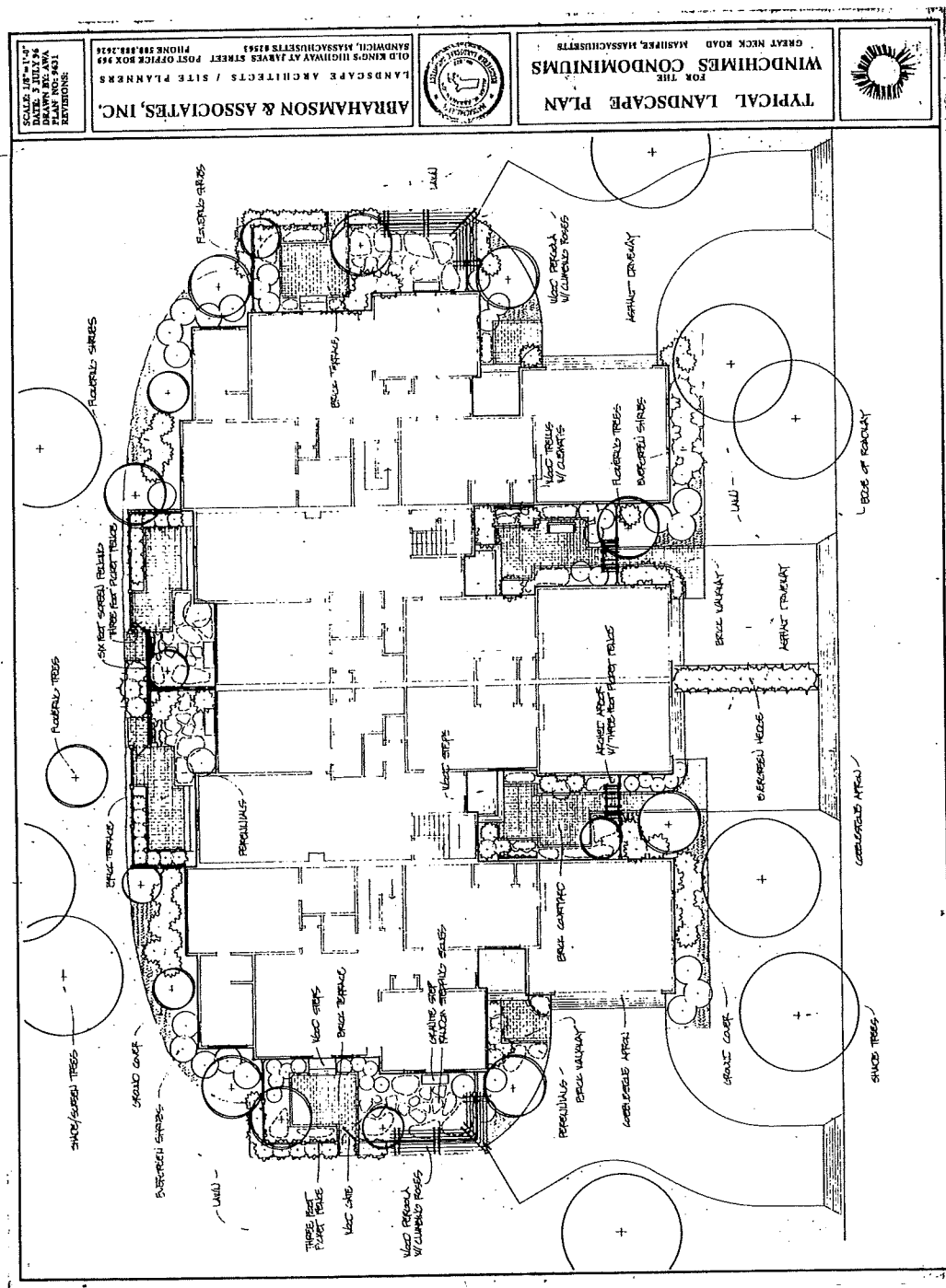
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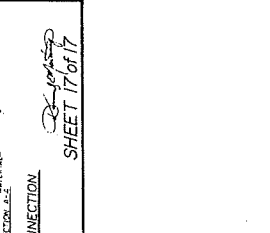
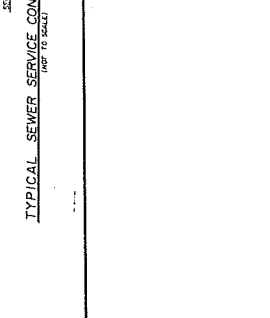
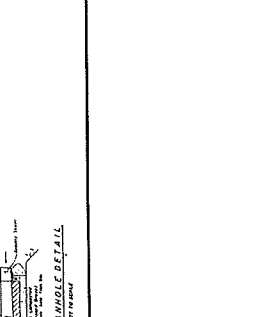
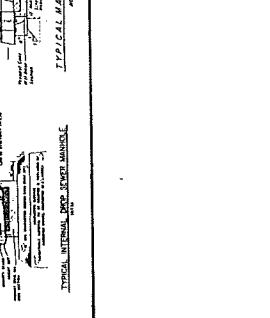
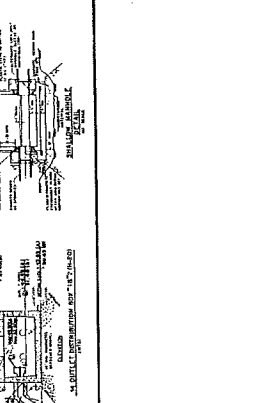
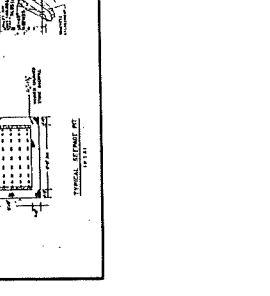
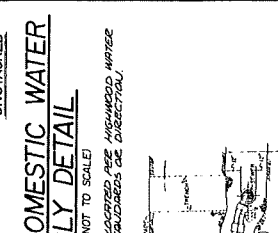
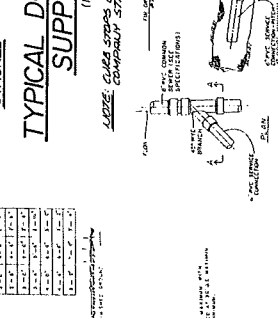
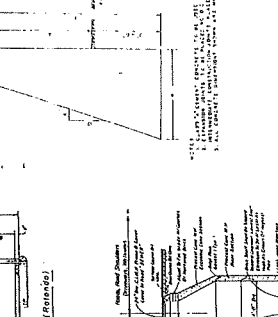
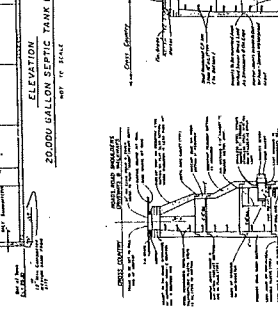
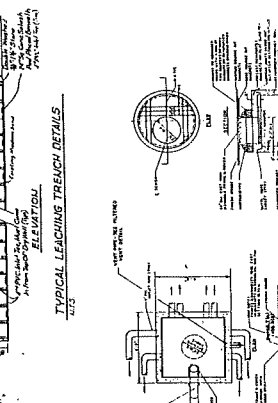
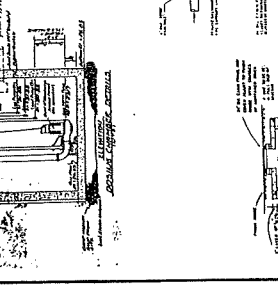
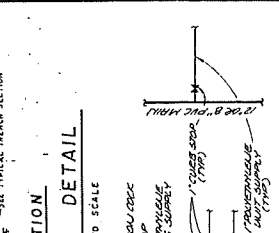
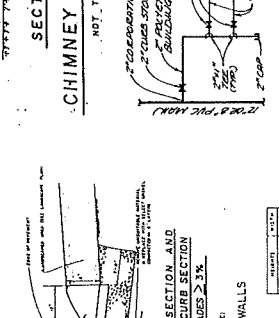
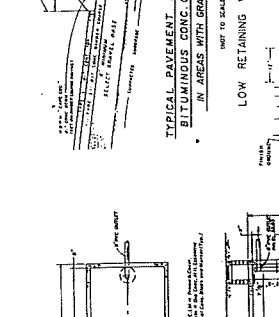
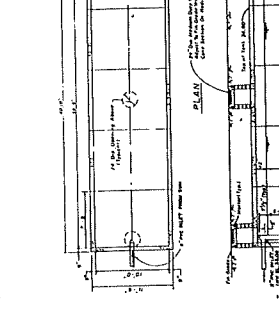
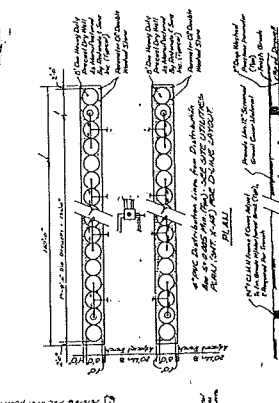
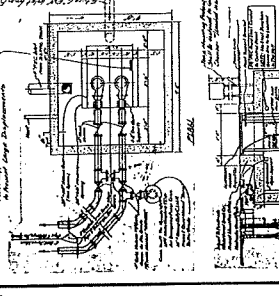
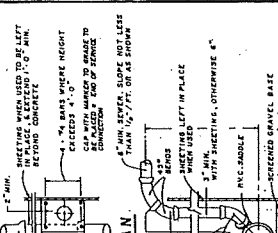
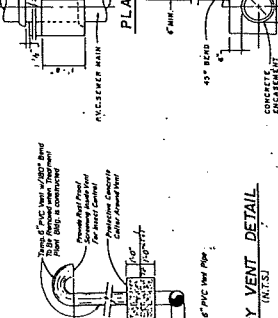
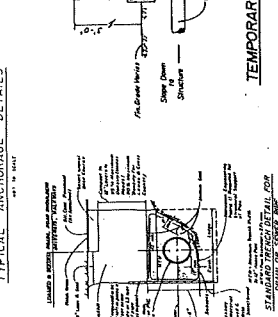
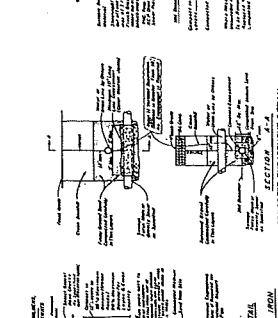
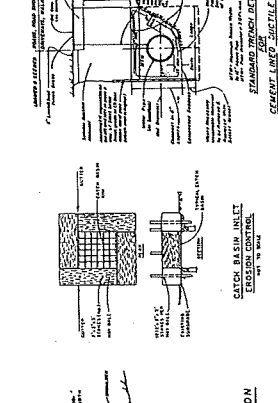
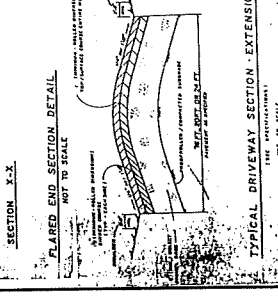
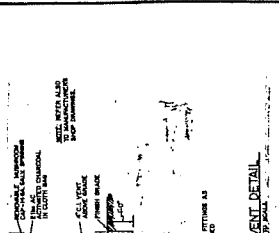
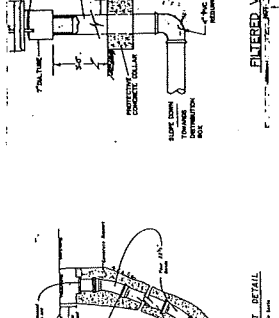
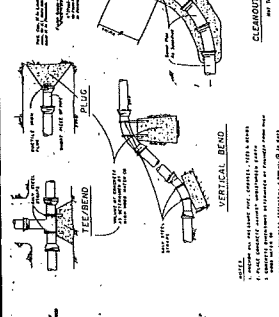
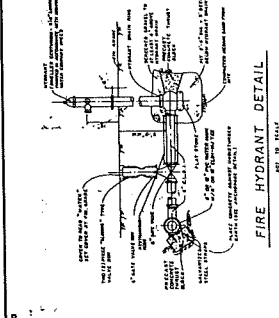
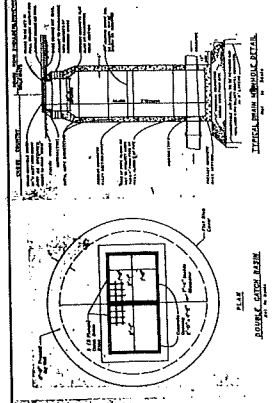
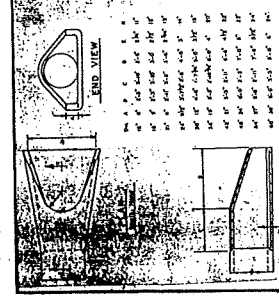
1000

MATCH LINE
SHEET 112

✓ 44905 (indoor)

1. *Argemone* *Albiflora*
(the *Fl. Gracilis*)

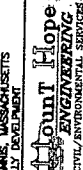


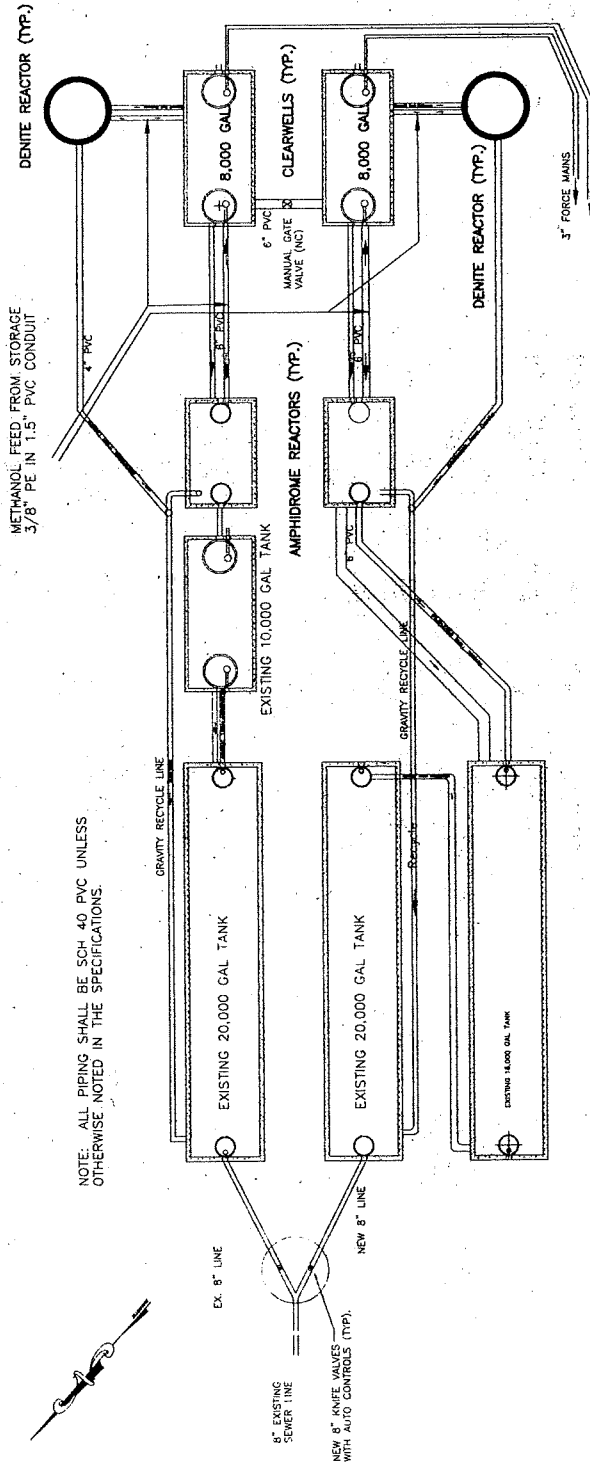




GENERAL NOTES:

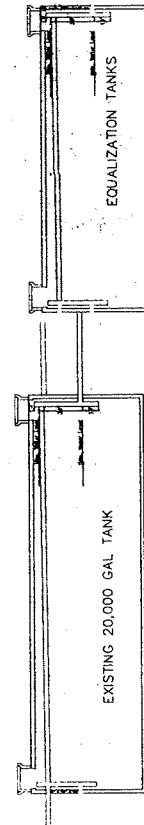
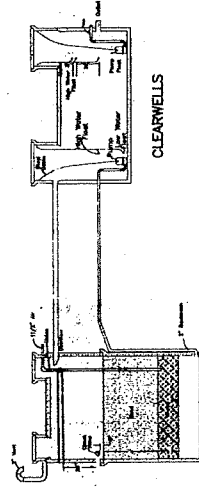
1. THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION, PLANS, AND ELEVATIONS SHOWN ON THESE PLANS ARE BASED ON RECORDS OF THE FIELD. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE ACCURACY OF THE RECORDS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DISCREPANCIES OR CONFLICTS THAT MAY ARISE.
2. ALL UTILITIES AND STRUCTURES SHALL BE INSTALLED AT THE ELEVATIONS SHOWN ON THE PLANS. ANY CHANGES MUST BE APPROVED BY THE ENGINEER.
3. ALL PROPOSED UTILITIES AND IMPROVEMENTS TO BE CONSTRUCTED SHALL BE INSTALLED IN ACCORDANCE WITH THE LATEST EDITIONS OF THE STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES, AND THE LATEST EDITIONS OF THE STANDARD SPECIFICATIONS FOR WATERWAYS AND HARBORS.
4. THE PLAN SHOULD NOT BE USED FOR CONSTRUCTION UNTIL ALL REQUIRED PERMITS HAVE BEEN OBTAINED AND ALL NECESSARY REGULATIONS HAVE BEEN OBTAINED.
5. UPON COMPLETION OF WORK, THE CONTRACTOR SHALL CONDUCT A "CLOSED" TEST OF THE SYSTEM. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COST OF THE TEST. THE APPROVED PARTIES SHALL BE PRESENT FOR THE TEST AND SHALL SIGN A "TEST REPORT" WHICH SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE FAILURE OF THE CONTRACTOR OR THE ENGINEER FOR PROPER AND/OR REQUIRED INSPECTION DURING CONSTRUCTION.
7. SURVEY, WATER, AND UTILITY RECORDS SHALL BE APPROVED BY THE ENGINEER PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COST OF THE SURVEY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COST OF THE WATER AND UTILITY RECORDS.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COST OF THE SURVEY, WATER, AND UTILITY RECORDS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COST OF THE SURVEY, WATER, AND UTILITY RECORDS.

SITE PLAN	
PREPARED FOR: JOLLY DEVELOPMENT	DATE: 12/1/19
PROJECT NO.: 6-13	DATE: 12/1/19
 Mount Hope Engineering CIVIL/ENVIRONMENTAL SERVICES Portsmouth, Rhode Island 02871 (401) 883-1331	
SHEET NO. 8 OF 8	



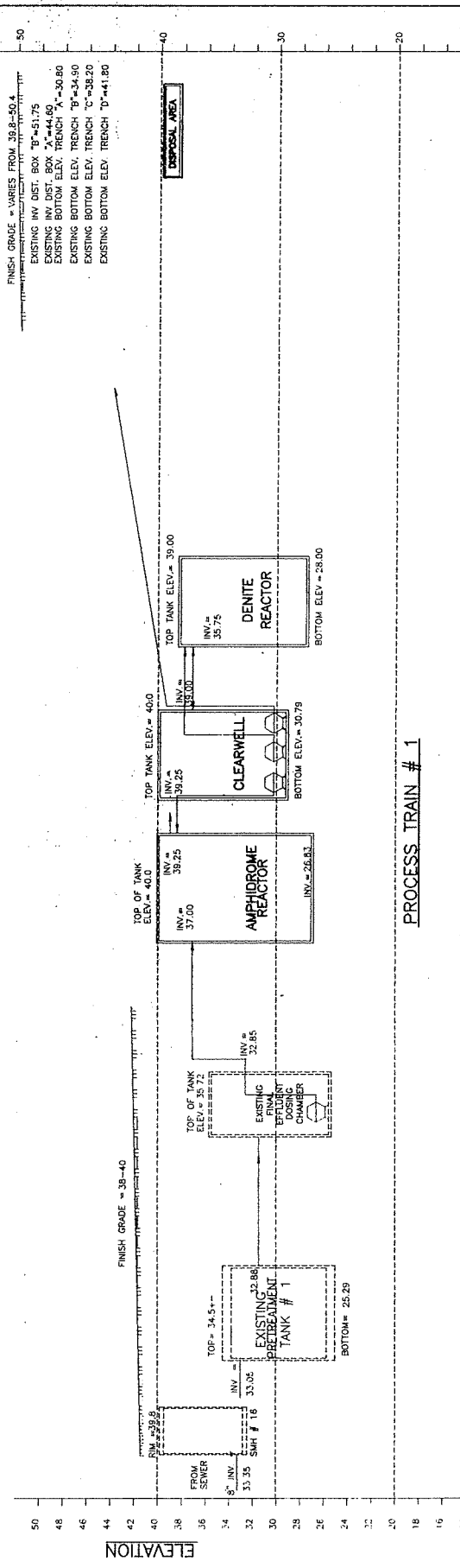
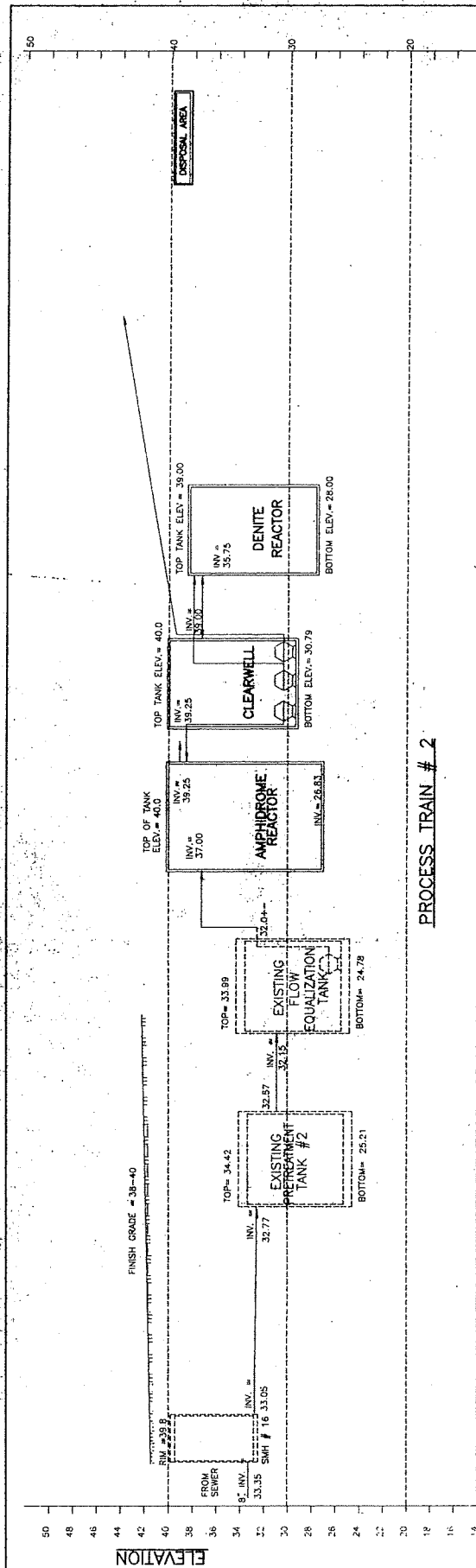
PLAN

DENITE REACTOR NOT SHOWN FOR CLARITY



PROFILE

FLOW SCHEMATIC PREPARED FOR: HOLLY DEVELOPMENT 2700 NORTH STREET WYOMING, MASSACHUSETTS HOLLY DEVELOPMENT PROJECT NO. 8-13 SHEET NO. S2 OF 8 DATE: 03/07/01 DRAWN BY: J. H. H.	
Mount Hope ENGINEERING CIVIL/ENVIRONMENTAL SERVICES 1000 NORTH STREET WYOMING, MASSACHUSETTS 01986 (508) 853-1324	



HYDRAULIC PROFILE

PREPARED FOR: HOLY DEVELOPMENT
207 NORTH STREET
HYANNIS, MASSACHUSETTS
OWNED BY: HOLY DEVELOPMENT

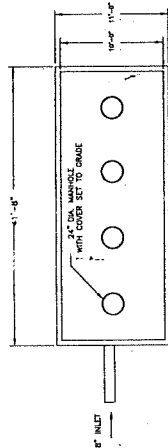
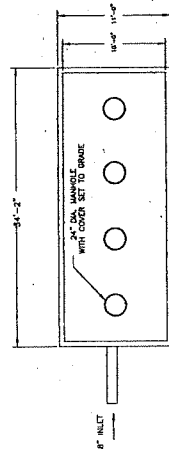
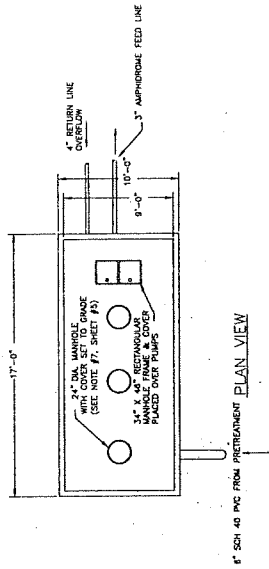
PROJECT NO.: 6-13
SHEET NO.: 8-3 OF 8

DATE: 12/27/18
SCALE: AS SHOWN
DESIGNED BY: [Signature]
CHECKED BY: [Signature]

Mount Hope
CIVIL/ENVIRONMENTAL SERVICES
Post Office Box 943
Hyannis, MA 02601
(508) 983-1934

HYDRAULIC PROFILE

SCALE: VERTICAL: 1" = 4'
HORIZONTAL: NO SCALE



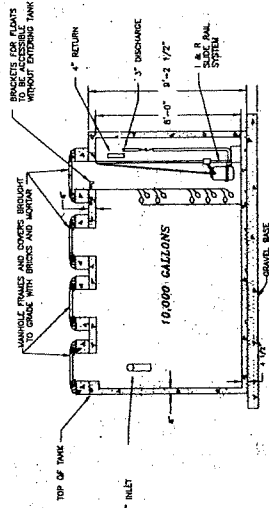
PLAN VIEW

PLAN VIEW

PLAN VIEW

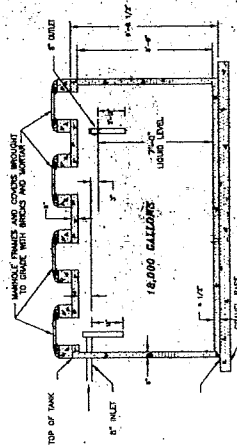
TANK MODIFICATIONS

1. **PIPING**
EXISTING PIPING SHALL BE AS SHOWN ON THE DRAWINGS AND REQUIRED WITHIN THE TANKS. ALL NEW PIPING SHALL BE APPROVED EQUAL TO THAT SHOWN. APPROVED EQUAL TO THAT SHOWN. APPROVED EQUAL TO THAT SHOWN. APPROVED EQUAL TO THAT SHOWN.
2. **DISTRIBUTION OF SERVICE**
THE TANKS SHALL BE APPROVED SUCH THAT DISTRIBUTION TO EXISTING SERVICE IS MAINTAINED. ALL NEW PIPING SHALL BE APPROVED EQUAL TO THAT SHOWN. APPROVED EQUAL TO THAT SHOWN. APPROVED EQUAL TO THAT SHOWN.



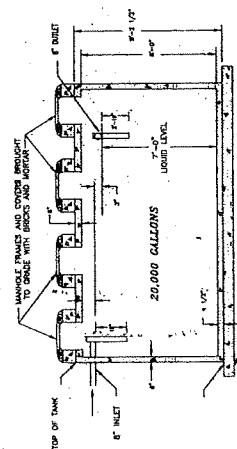
PROFILE

EXISTING DOSING TANK
PROPOSED EQUALIZATION TANK #1




PROFILE

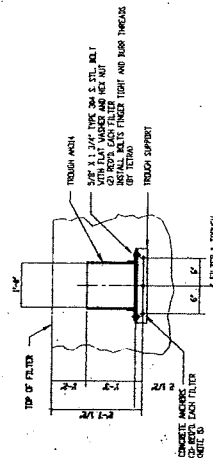
EXISTING EQUALIZATION TANK
PROPOSED EQUALIZATION TANK #2



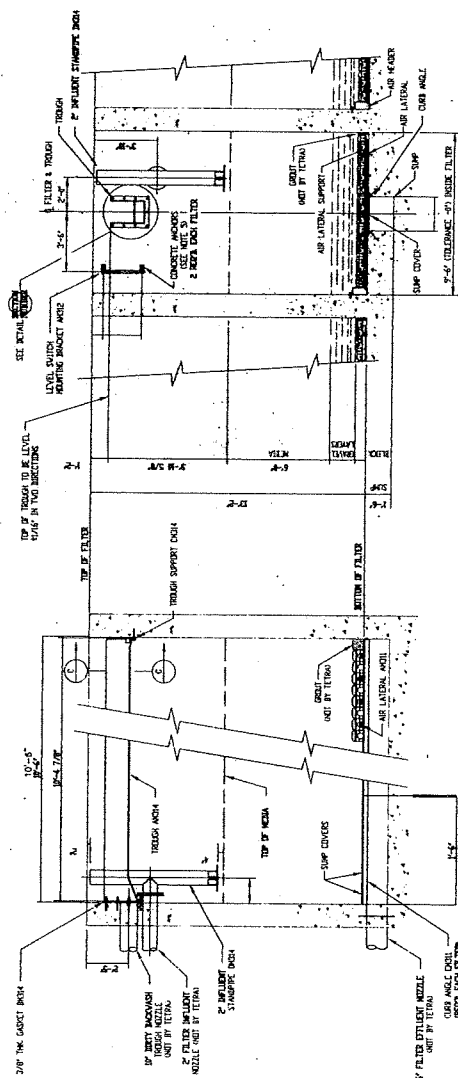
PROFILE

EXISTING PRETREATMENT TANKS #1 & #2
PROPOSED PRETREATMENT TANKS #1 & #2

EXISTING CONCRETE TANKAGE			
PREPARED FOR	HALLY DEVELOPMENT	PROJECT NO.	6-13
DESIGNED BY	JOHN J. HOPE	SHEET NO.	5-4 OF 8
CHECKED BY	JOHN J. HOPE	DATE	10/1/88
APPROVED BY	JOHN J. HOPE	SCALE	AS SHOWN
 Mount Hope Engineering CIVIL/ENVIRONMENTAL SERVICES 1000 ROUTE 1A, SUITE 100 WILMINGTON, MA 01897 (617) 552-1524			

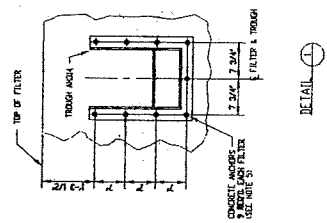


LOWER PLAN



100

SECTION

[illegible]

<p>AMPHIDROME REACTOR DETAILS</p> <p>PREPARED FOR HOLLY DEVELOPMENT 2074 NORTH STREET HOLLYWOOD, FL 33021</p> <p>OWNER: INC.</p>		<p>DATE: 04/20/90 BY: J. H. H. H. CHECKED: J. H. H. H. CADD: J. H. H. H.</p>
<p>Mount Hope ENGINEERING</p> <p>CIVIL/MECHANICAL SERVICES 10000 N. W. 11th Ave. Fort Lauderdale, FL 33304 (407) 681-1346</p>		<p>PROJECT NO. 6-13</p> <p>SHEET NO. 5-5 OF 8</p>



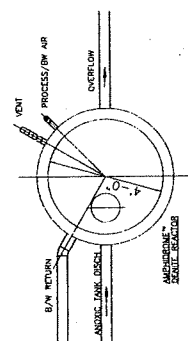
3" SCH 40 PVC FROM AMPHIDROME



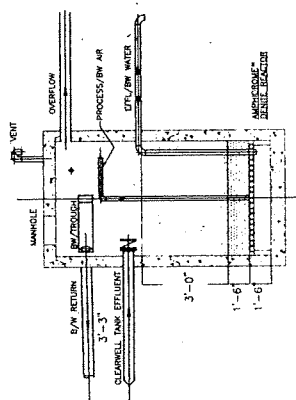
CLEARWELL/DOSING TANKS

TANK SPECIFICATIONS

- [illegible]




PLAN VIEW



ELEVATION VIEW

AMPHIDROME PLUS DENITE FILTER

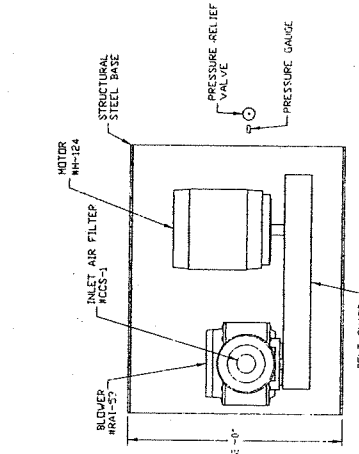
NEW CLEARWELLS & DENTITE FILTER	
PREPARED FOR	2017 NORTH STREET HYANNIS, MASSACHUSETTS HOLLY DEVELOPMENT
OWNED BY	
SCALE: NONE	
DATE: 5/27/75	
DRAWN BY	02054-10
CHECKED BY	02054-10
PROJECT NO.	5-13
SHEET NO.	5-6 OF 8
 Mount Hope ENGINEERING CIVIL/ENVIRONMENTAL SERVICES Post Office Box 84 Portland, ME 04101 (407) 885-1324	

GENERAL

GENERAL

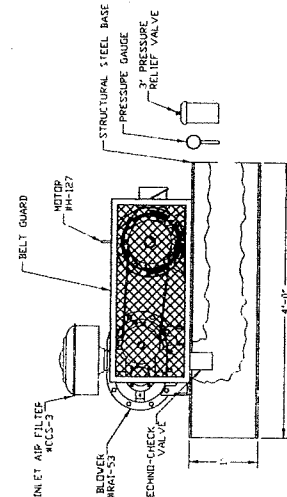
-
- A schematic diagram of the test apparatus. It shows a motor (MH-127) mounted on a structural steel base. Below the motor is a blower (MPP-15). To the left of the blower is an inlet air filter (ACGS-3). A pressure gauge is connected to a pressure relief valve. The diagram includes a dimension line indicating a height of 2'-6" from the base to the motor. Labels with leader lines identify the motor, structural steel base, inlet air filter, blower, and pressure gauge.

ELEVATION

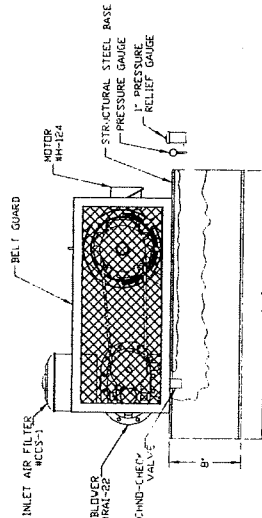


ELEVATION

BACKWASH AIR BLOWERS



PLAN




PLAN

PROCESS AIR BLOWERS





BLOWER DETAILS & MISC. SPECS

PREPARED FOR: HOLLY DEVELOPMENT
237 NORTH STREET
HYANNIS, MASSACHUSETTS
HOLLY DEVELOPMENT

OWNED BY:

red check

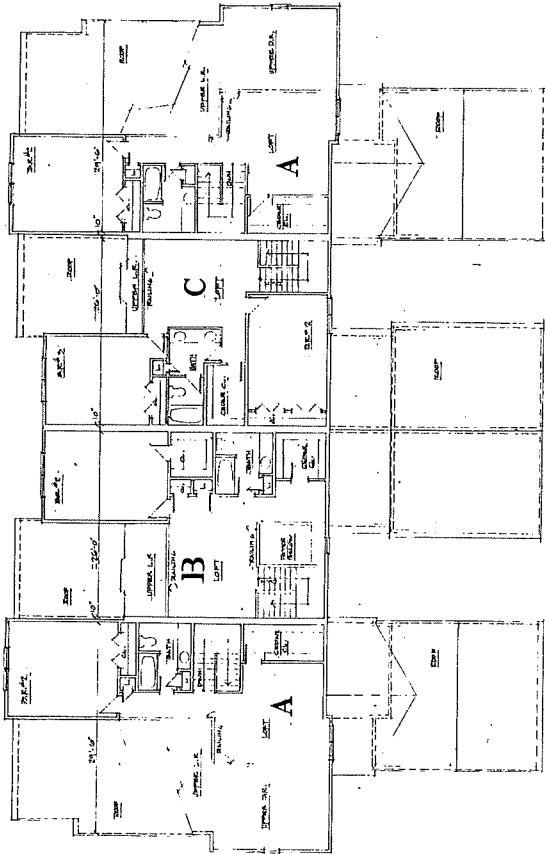
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JOB NO.: 03-00000000
SHEET NO.: 6-13
PROJECT NO.:
SHEET NO.:
S-7 OF 8
CHECKED: 12/28/03

**Mount Hope
ENGINEERING**
CIVIL/ENVIRONMENTAL SERVICES
Post Office Box 944
Terminus, Rhode Island 02871

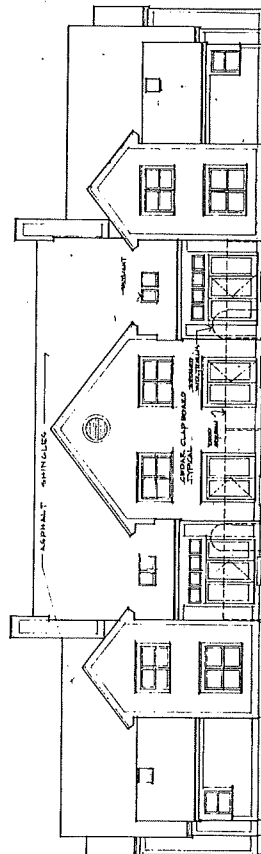
				DWG NO. A-2
				DATE 5/1

PROJECT WINDHAM HILLS COMMUNITY WINDHAM, VT
ARCHITECTS-ENGINEERS PETER F. DIMBO ASSOCIATES, INC. 100 MAIN STREET STOKESMAN MASSACHUSETTS 01570-0000

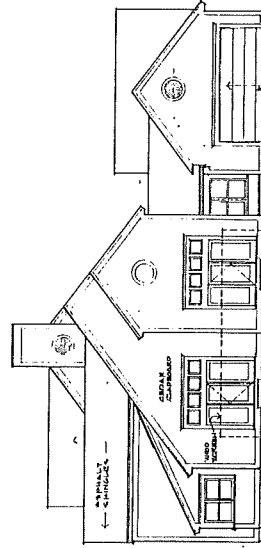
NO.	DESCRIPTION	DATE



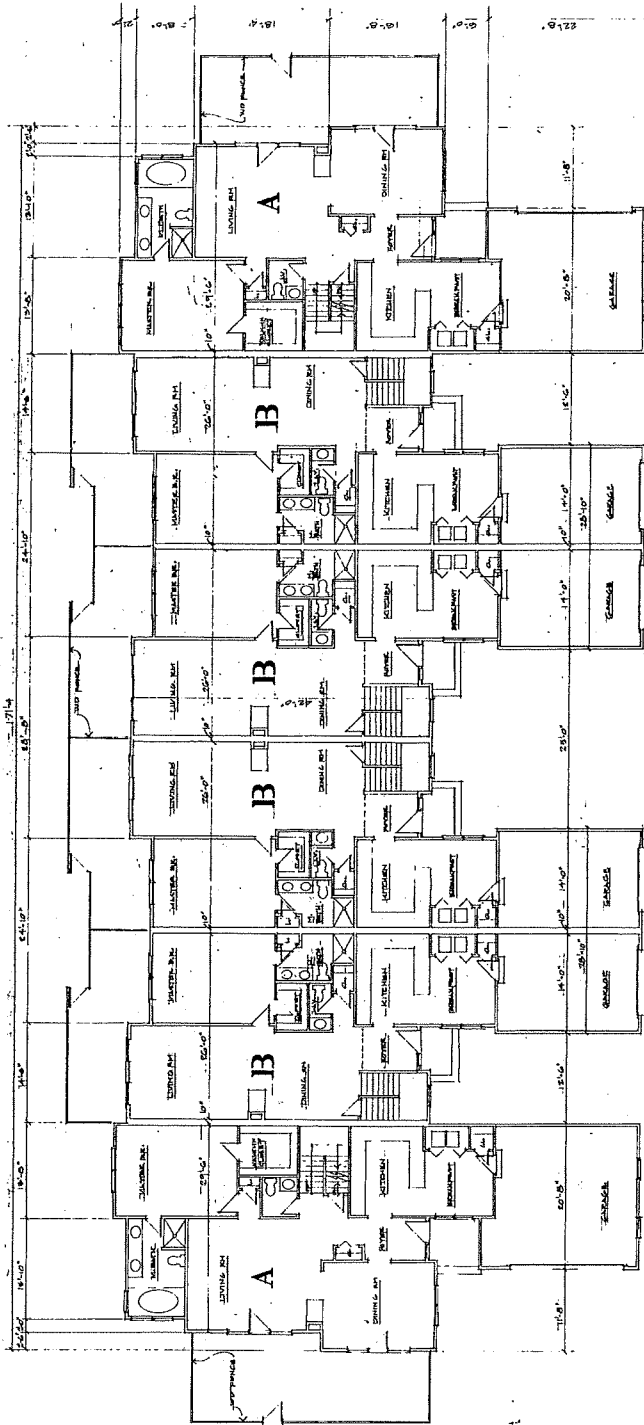
SECOND FLOOR PLAN - (FOURPLEX)
SCALE: 1/8"=1'-0"



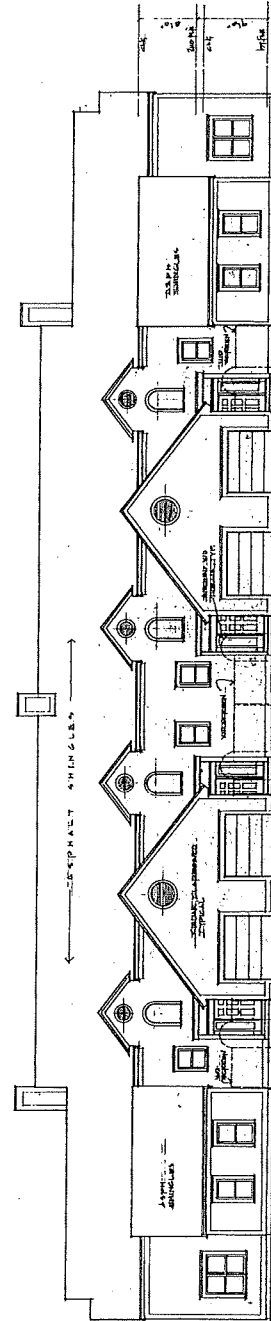
REAR ELEVATION - (FOURPLEX)
SCALE: 1/8"=1'-0"



LEFTSIDE ELEVATION - (FOURPLEX)
SCALE: 1/8"=1'-0"



FIRST FLOOR PLAN - (SIXPLEX)
SCALE: 1/8" = 1'-0"



FRONT ELEVATION - (SIXPLEX)
SCALE: 1/8" = 1'-0"

NO.	REVISIONS	DESCRIPTION	DATE
1			
2			
3			
4			
5			

PROJECT: WINDCHIMES CONDOMINIUM
ARCHITECT: PETER F. DIMBO ASSOCIATES, INC.
DATE: 8/2/84
BY: [Signature]

PETER F. DIMBO ASSOCIATES, INC.
ARCHITECTS-ENGINEERS
1000 WASHINGTON STREET
ST. LOUIS, MO 63101
TEL: 434-1111

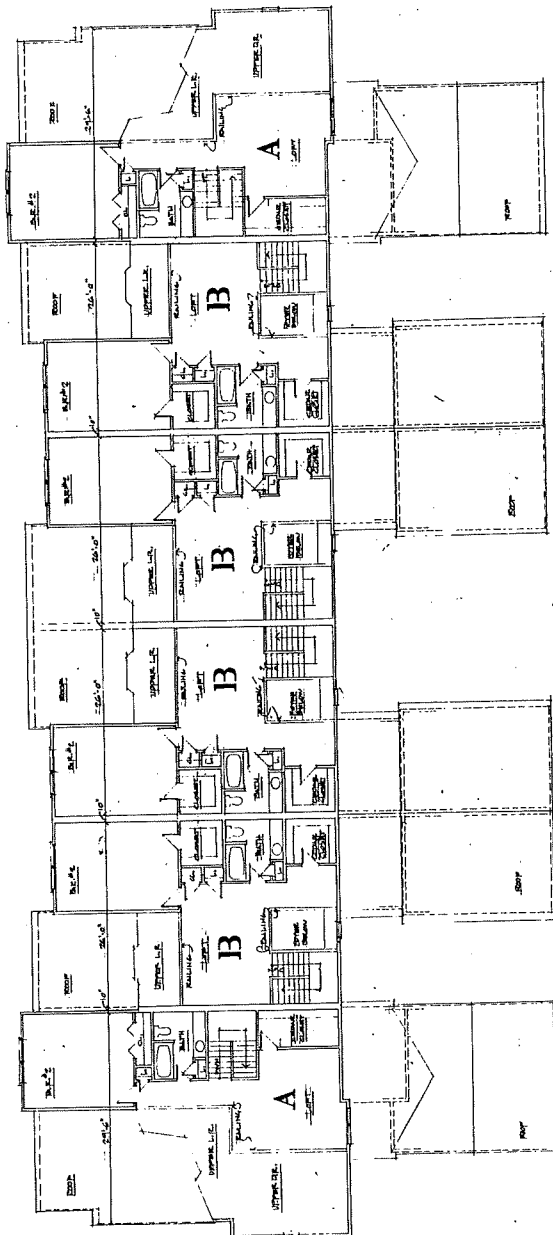
DATE: 8/2/84

BY: [Signature]

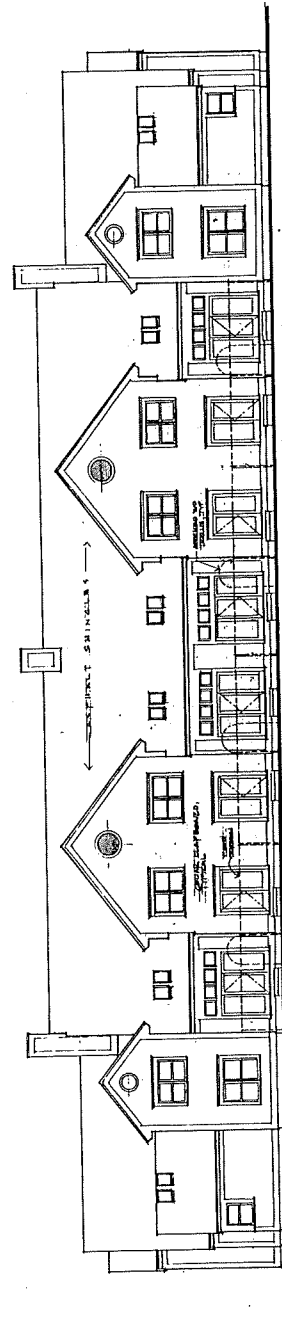
PROJECT: WINDCHIMES CONDOMINIUM

ARCHITECT: PETER F. DIMBO ASSOCIATES, INC.

PROJECT: 1 SHEET: 1 OF 1 DATE: 10/1/80		PETER F. DIMEO ARCHITECTS-ENGINEERS 1500 KENNESAW AVENUE SEATTLE, WASHINGTON 98148	
REVISIONS: NO. DESCRIPTION DATE 1. 10/1/80		WINTERBURN CONDOMINIUM 1000 1ST AVENUE SEATTLE, WASHINGTON 98101	



SECOND FLOOR PLAN (SIX-PLEX)
SCALE: 1/8"=1'-0"



REAR ELEVATION (SIX-PLEX)
SCALE: 1/8"=1'-0"

REVISIONS:

NO.	DESCRIPTION	DATE
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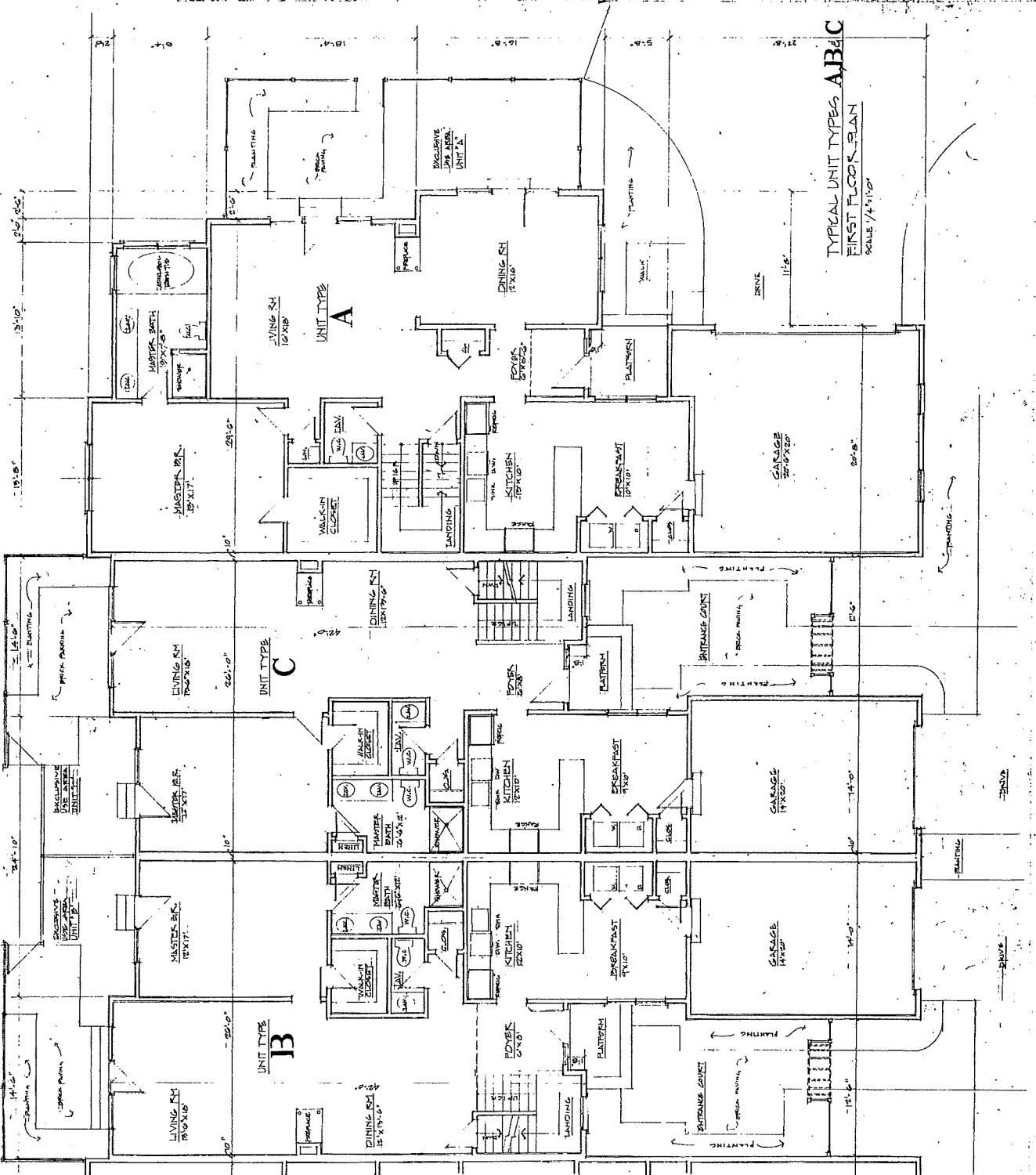
WILSON JONES CONSULTANTS

ARCHITECTS

PETER F. DIMIO

PROJECT: TYPICAL UNIT TYPES A, B & C

CONDOMINIUM



TYPICAL UNIT TYPES A, B & C
FIRST FLOOR PLAN
SCALE: 1/4" = 1'-0"

GROSS FLOOR LIVING AREA SCHEDULE

UNIT TYPE	1ST FLOOR	2ND FLOOR	TOTAL AREA
A	1435 SF	623 SF	2058 SF
B	1169 SF	662 SF	1831 SF
C	1169 SF	795 SF	1964 SF

REVISIONS:

NO.	DESCRIPTION	DATE
1	ISSUED FOR PERMIT	10/1/83

WINCHAMPTON CONDOMINIUM

PROJECT 120000

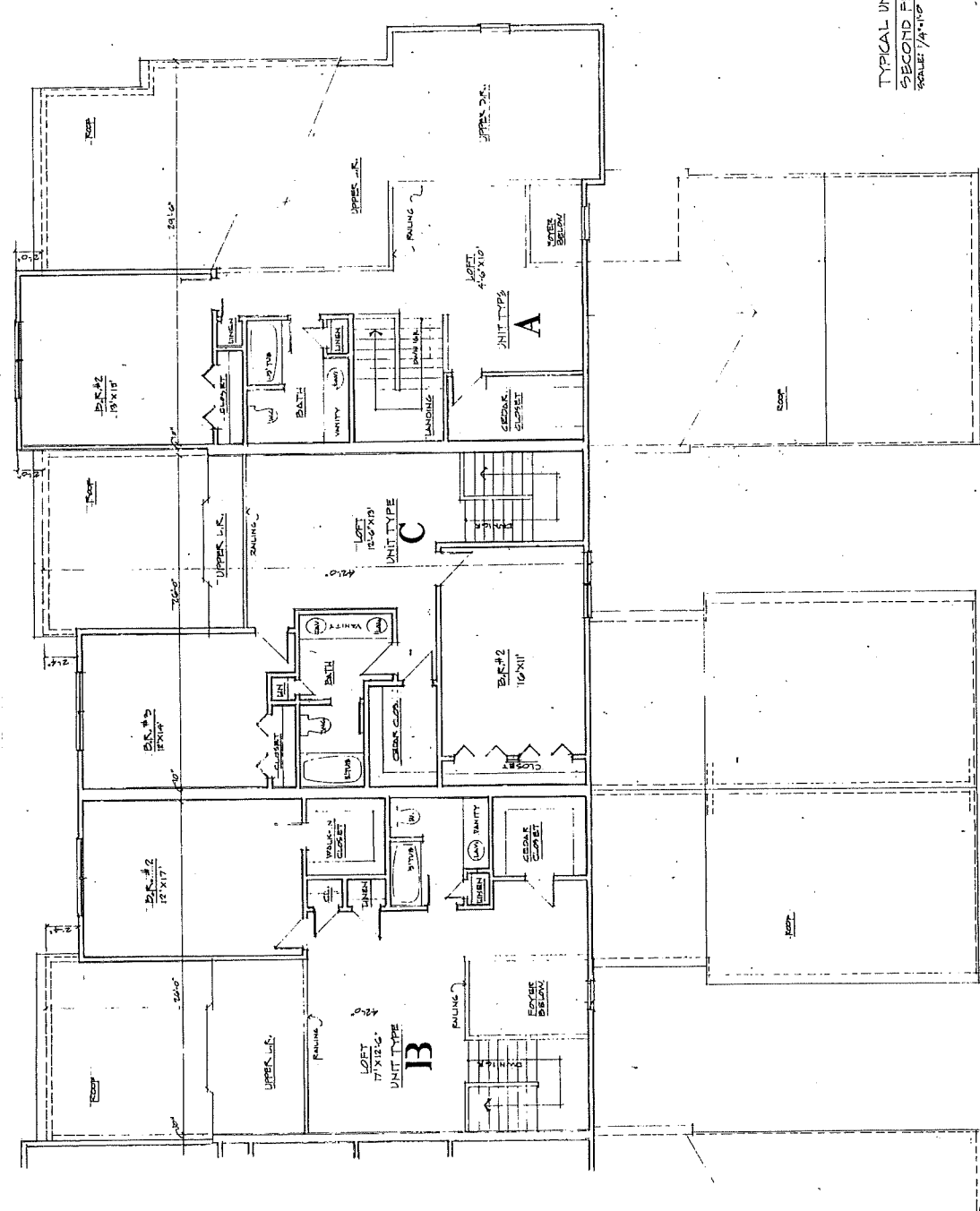
PETER F. DIMEO
ARCHITECTS, INC.
1000 W. 10TH STREET
ANN ARBOR, MI 48106
TEL: 734-769-4444

SWITCHES

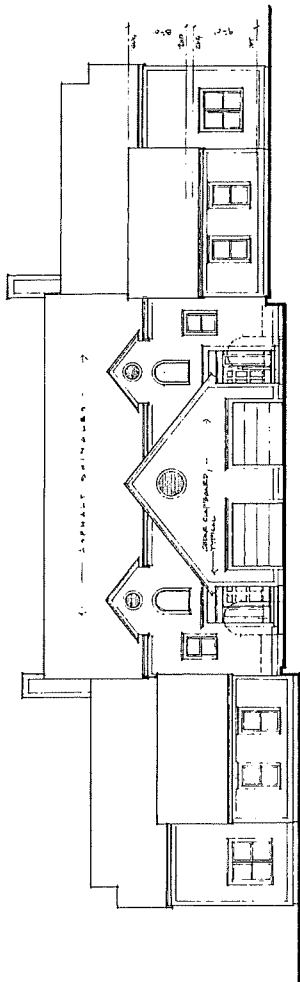
A-6

UNIT TYPE A

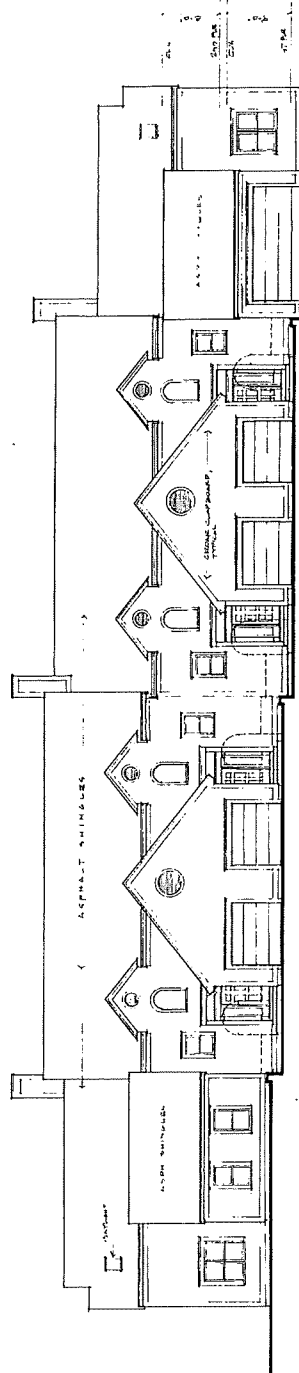
UNIT TYPE B



TYPICAL UNIT TYPES A,B & C
SECOND FLOOR PLAN
SCALE: 1/4" = 1'-0"



FRONT ELEVATION (STEPPED FOUNDATION - FOUR FLX)
SCALE: 1/8"=1'-0"



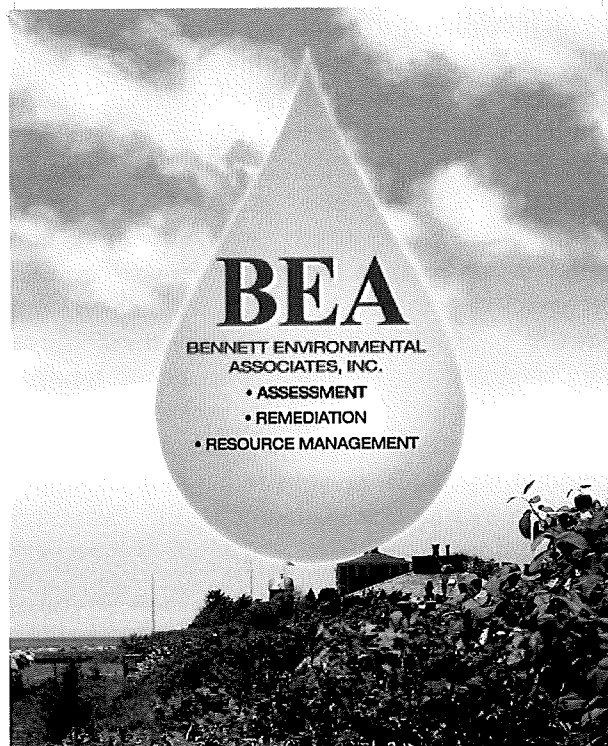
FRONT ELEVATION (STEPPED FOUNDATION - SIX FLX)
SCALE: 1/8"=1'-0"

PROJECT: WINDCHIMES CONDOMINIUM MAPPER: M.A.		PETER F. DIMEO ASSOCIATES, INC. ARCHITECTS-ENGINEERS 100 MAIN STREET BOSTON, MASSACHUSETTS 02101 TEL: 617-452-1100 FAX: 617-452-1101		DATE: 5/1/93	DWG NO: A-7
REVISIONS: NO. DESCRIPTION DATE					

WATER QUALITY MONITORING PROGRAM ANNUAL REPORT WINDCHIME POINT CONDOMINIUMS

90 Great Neck Road South
Mashpee, MA

MAY 11, 2018



1573 Main Street - P.O. Box 1743, Brewster, MA 02631 & 508-896-1706 & Fax 508-896-5109
www.bennett-ea.com

BENNETT ENVIRONMENTAL ASSOCIATES, INC.

LICENSED SITE PROFESSIONALS ♡ ENVIRONMENTAL SCIENTISTS ♡ GEOLOGISTS ♡ ENGINEERS

1573 Main Street - P.O. Box 1743, Brewster, MA 02631 ♡ 508-896-1706 ♡ Fax 508-896-5109 ♡ www.bennett-ea.com

BEA99-2252

May 11, 2018

TOWN OF MASHPEE PLANNING BOARD
C/o Evan Lehrer, Town Planner
Mashpee Town Offices
16 Great Neck Road North
Mashpee, MA 02649

RE: WATER QUALITY MONITORING PROGRAM REPORT
Groundwater Discharge Permit #263-2: Windchime Condominium Trust
Great Neck Road South - Mashpee, MA

Dear Mr. Lehrer,

On behalf of the Windchime Condominium Trust, BENNETT ENVIRONMENTAL ASSOCIATES, INC. (BEA) has prepared the following annual report on the water quality monitoring of surface water and groundwater at the above referenced property, consistent with Exhibit C, Sections V and VI of the Special Permit recorded at the Barnstable County Registry of Deeds [Book 5734, Page 239-240] as conditions established during the initial approval of site development. The following report has been prepared to summarize the results of the March/June/September/December 2017 quarterly water quality sampling conducted at the Windchime Condominium Trust property in Mashpee, MA (herein referred to as "Windchime" or the "site"). This report serves to compare the most recent annual sampling results to previous filings, relative to water quality parameters, to evaluate impact specific to the development of the Windchime Condominium complex and on-site discharge of treated sewage at the site as distinguished from other wastewater and storm water discharges in an area that has experienced significant growth over the past 20 years since this investigation started. The quarterly sampling and analysis of select monitoring wells is consistent with Section B of the Groundwater Discharge Permit # 263-3 I(B)(2) Special Conditions for "Monitoring and Reporting" as established in prior annual reporting.

SITE DESCRIPTION

The subject Windchime Condominium Trust property is located some 3,000' southeast of the Mashpee Rotary, on Great Neck Road South [Refer to Figure 1]. The site contains some 70 acres of land area, the majority of which is upland. The Mashpee River defines the eastern boundary of the site, with associated fringe wetlands. The western boundary is defined by the road layout of Great Neck Road South, beyond which is a vacant property owned as part of Mashpee Commons with the Mashpee Commons complex further west off Falmouth Road.

Southwest of the property is another shopping plaza (Roche Bros) and south additional multi residential housing complexes (Sea Meadow Condominiums, New Seabury). Some 250' north of the site is the Mashpee Commons Wastewater Treatment Facility (MC WWTF) and leaching beds associated with the Mashpee Commons commercial development along the Mashpee Rotary (intersection of Routes 28 and 151). Further to the north and east are the large undeveloped tracks of conservation lands owned by the Trustees of the Reservations.

The Windchime Condominium Trust Wastewater Treatment Facility (WWTF) is located approximately 375' from the edge of the vegetated wetland associated with the Mashpee River. Further, the Mashpee Commons (MC) WWTF is located within 500' of the Windchime WWTF, complicating interpretation of individual groundwater impacts to both groundwater and the Mashpee River with intermingled plumes of treated sewage solute. The MC WWTF is presently permitted for 180,000 gallons per day (gpd) and receives sewage from the Mashpee Commons commercial development at the Mashpee Rotary [Refer to Appendix C]. The Windchime WWTF is permitted for 40,000 gpd, a fraction (1/5) of the total treated wastewater permitted for discharge between these abutting facilities, discounting other abutting sources of treated and untreated sewage and directed storm water discharge from Route 28. Based on the estimated discharges and proximity of the Mashpee Commons leaching facilities to the Windchime leaching galleries, potential groundwater impact is expected to be cumulative of those impacts, with the Windchime WWTF potentially contributing some 22% of the treated wastewater discharged in this discrete area to the aquifer, eventually received by the Mashpee River. The baseline monitoring of historic groundwater and surface water quality at the site since 1991 provides an opportunity to evaluate cumulative impacts and to extrapolate and approximate individual impacts.

Monitoring wells B-2R, MW-3R and MC MW-2 are clearly up-gradient of the Windchime sewage treatment plant, but down-gradient/cross-gradient of the Mashpee Commons facility. Based on historic water quality relative to the location of select monitoring wells, down-gradient groundwater impacts are clearly attributed to treated wastewater discharge at both the Windchime and Mashpee Commons WWTFs in the finite study area. Notwithstanding, any such focused interpretation of the data is clearly a stated limitation of this report in the understanding of other significant regional impacts to the Mashpee River and Popponesset Bay estuary beyond the study area. Efforts continue to work with the Town of Mashpee to revise the Special Permit and participate in a larger and more comprehensive study, shared with abutters, within the Comprehensive Wastewater Planning activities presently underway.

SITE ENVIRONMENTAL/HYDROGEOLOGIC CONDITIONS

Groundwater exists within 40-50' of ground surface in the area of the WWTF leaching gallery as subject to seasonal variation. Regional groundwater contours indicate an easterly groundwater flow as consistent with site-specific groundwater level measurements made at the existing monitoring wells, which have been benchmarked to a common vertical datum [Refer to Figure 2]. Groundwater flow in this area is strongly influenced by the Mashpee River, some 500'

to the east of the site. The Mashpee River represents a regional groundwater discharge area (gaining stream), and has been identified as the primary down-gradient environmental receptor.

A review of the MA DEP BWSC GIS mapping program [Figure 3] shows the site as mapped within the recharge area of the Mashpee River approximately 300-600' (+/-) east of the Windchime Condominium Trust and Mashpee Commons wastewater treatment facilities. The majority of the Windchime property is further mapped by NHESP as "Estimated Habitat of Rare Wetlands Wildlife", inclusive of the areas of the two WWTFs. A significant buffer of naturally wooded area is maintained between the Windchime Development, the wastewater plant, and the Mashpee River. The site is not within any defined Interim or Zone II Wellhead Protection Area for a public water supply (PWS). One non-community public water supply well is located within one-half mile southwest, and an additional community public water supply is located within one mile to the north-northeast in apparent cross-gradient positions to the site. As such, based on the hydrogeologic position of the public water supplies and proximity of groundwater, no impact to any existing water supply is expected, and no human receptors are considered, aside from the ecologic and recreational value of the Mashpee River.

GROUNDWATER ANALYSIS

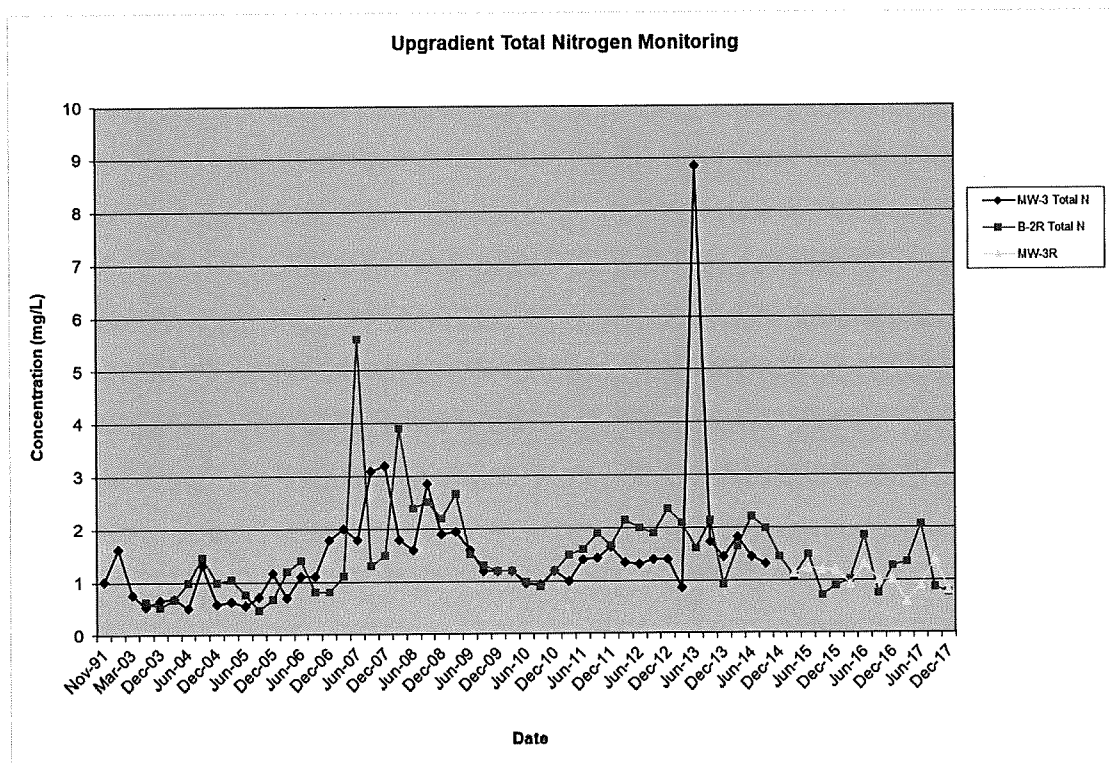
As a requirement of the original Special Permit, four (4) supplemental monitoring wells and three (3) piezometers were installed by IEP, Inc., for the specified water quality-monitoring program (WQMP) in, or around, 1987. Since that time, several of these wells have been replaced due to damage or destruction. Monitoring wells MW-1, MW-2 and MW-4 are located along River Road some 150-300' down-gradient of the Windchime leaching galleries and intermediate to the Mashpee River. Monitoring well MW-3R is located some 200' (+/-) up-gradient of the Windchime leaching galleries, and 100' (+/-) cross-gradient of the Mashpee Commons leaching beds. An additional down-gradient monitoring well B-1 (formerly MW-5) exists on the Windchime Condominium property, also associated with the initial site development. Additional monitoring wells exist on the abutting property to the north, associated with the groundwater discharge permit monitoring program for the Mashpee Commons WWTF, including a well also identified as MW-2 (herein referred to as MC MW-2) [Refer to Site Plan - Appendix A].

Static groundwater level measurements continue to demonstrate a general easterly groundwater flow direction. As such, monitoring wells MC MW-2, MW-3, and B-2R are representative of the specific contribution of wastewater impacts to groundwater from the MC WWTF [Refer to Site Sketch Plan – Appendix A]. Monitoring wells MW-1, MW-2 and MW-4, as well as piezometers PZ-2R and PZ-3R are down-gradient of both the Windchime Wastewater Treatment Facility (WWTF) and the Mashpee Commons Wastewater Treatment Facility (MC WWTF). The effects of treated wastewater effluent discharge at these monitoring locations are expected to be cumulative.

On March 16, June 30, September 13 and December 7, 2017, the depth to groundwater was measured in each monitoring well and piezometer prior to sampling, to determine standing water and well volume, and to qualify any seasonal variations in site-specific groundwater flow

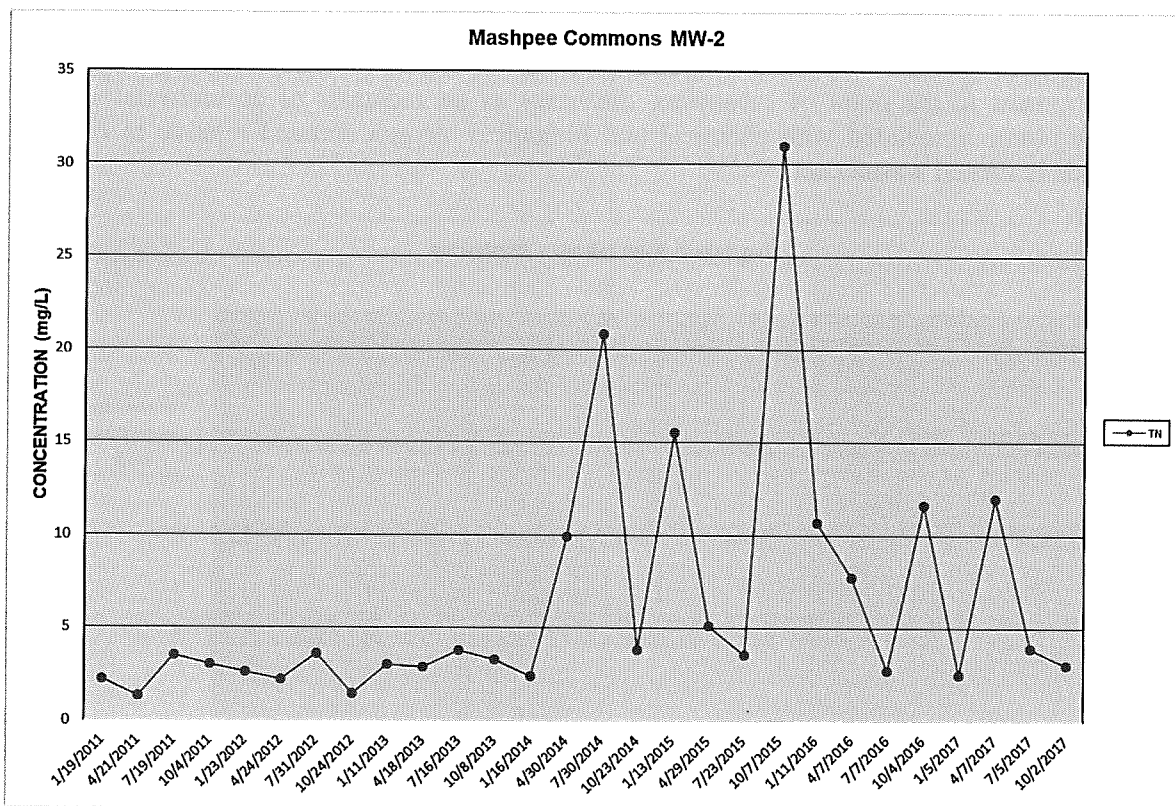
direction. Field measurements of temperature, conductivity, dissolved oxygen and pH were recorded in all quarters [Refer to Monitor Well Sampling Logs - Appendix B]. BEA subsequently collected groundwater samples from five groundwater monitoring wells and three piezometers. Groundwater samples were preserved on ice in a cooler, and sent to Alpha Analytical in Westborough, MA for certified analyses of wet chemistry. In addition, on September 13, 2017 groundwater samples were collected from monitoring wells MW-1, MW-2, MW-3R and MW-4 and properly preserved in appropriate containers for volatile organic compounds (VOCs) analyses by specified EPA 624 method, required annually by the GWDP. Laboratory analytical results of historic analyses and quarterly groundwater samples collected in March through December 2017 are enclosed as part of the water quality tracking charts in Appendix D.

The concentrations of sewage indicators, such as nitrate and sodium, with associated field measurements of low dissolved oxygen and elevated conductivity, are used to evaluate the influence of treated wastewater effluent discharge on groundwater quality, and to identify and define the solute plume of influence. In general, the concentrations of sodium, nitrate and conductivity will be highest immediately down-gradient of wastewater discharge points in the treated effluent plume, and may be expected to decrease away from the point source, associated with dispersion, dilution and natural attenuation. Likewise, decreased dissolved oxygen is expected closest to the point of subsurface discharge as an indicator of groundwater impact inside the plume associated with chemical and biological oxygen demand relative to organic compounds in treated wastewater.



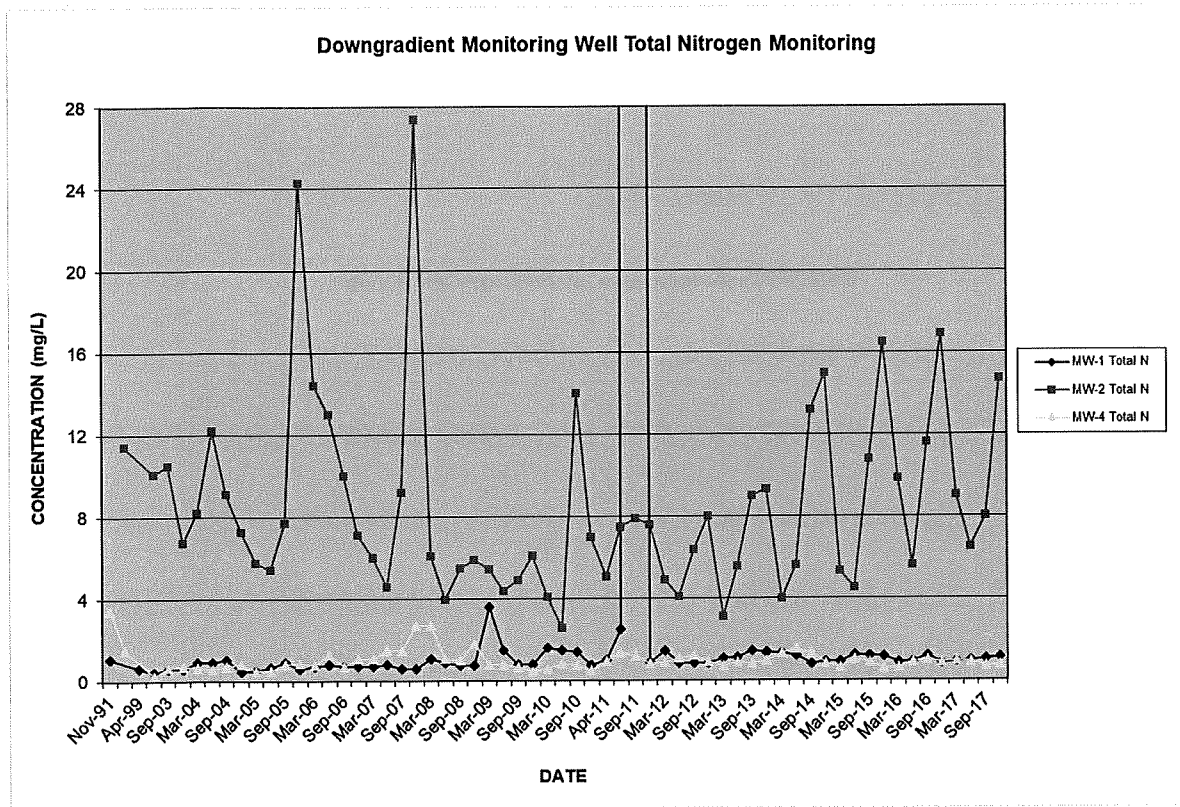
In the majority of groundwater sampling events conducted from 1991 through the present, up-gradient monitoring wells B-2R and MW-3/MW-3R report total nitrogen between 1-3 mg/L. Periodic fluctuation is noted, and clear spikes in total nitrogen concentrations are observed in B-2R in June 2007 and MW-3 in June 2013, as outliers to observed trends. No total nitrogen concentrations exceeding 10 mg/L have been reported in testing conducted since 1991 although a general increasing trend in background conditions shows that total nitrogen has increased from 0.5 +/- mg/L to 1.5 +/- mg/L from the 2003 baseline.

Moderate concentrations of sodium, and low to moderate concentrations of dissolved oxygen and conductivity were recorded during the reporting period. These results are consistent with the ambient groundwater quality conditions documented in previous groundwater sampling events, including the original sampling results reported in November 1991. Throughout the project history, the overall increasing trend of nutrient concentrations and site-specific groundwater flow computations indicate that these up-gradient monitoring wells are influenced by up-gradient development.



The monitoring well referred to as MC MW-2 is associated with the Mashpee Commons WWTF and prescribed for quarterly sampling as part of that facility's groundwater discharge permit as a location specifically down-gradient of the MC WWTF leaching field, and not under

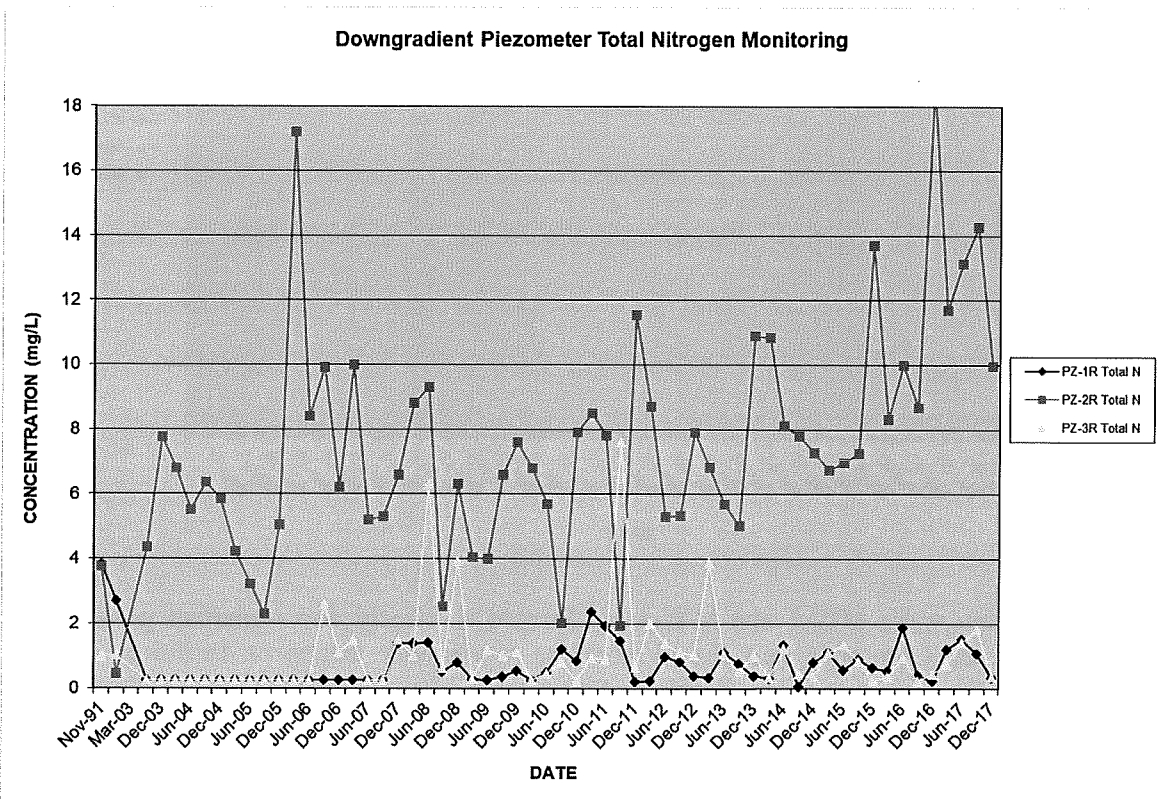
influence of discharge from the WC WWTF. MC MW-2 is a location of particular interest in review of groundwater quality in this area as it is up-gradient of the Windchime WWTF leaching field and is located in the area where the greatest nutrient impact has routinely been identified since testing began in 1991. This area of greatest impact also includes monitoring wells MW-2 and PZ-2. MC MW-2 has shown elevated nutrient concentrations with a distinctive increasing trend following the MC WWTF 2014 plant expansion. Historic data from MC MW-2 was only available as part of this study intermittently, but elevated concentrations were identified at this well location in November 1991 (nitrate 21.7 mg/L), in October 2005 (nitrate 8.31 mg/L and total nitrogen 9.15 mg/L), and in the fourth quarter of 2008 (total nitrogen 8.8 mg/L).



Monitoring wells MW-1 and MW-4 are located in clearly down-gradient positions to both the Mashpee Commons and the Windchime wastewater treatment facilities, directly intermediate to the Mashpee River [Refer to Site Sketch Plan – Appendix A]. Groundwater samples at these locations have generally reported nitrate and total nitrogen concentrations as less than background concentrations identified in the B-2R and MW-3 up-gradient wells. Concentrations of total nitrogen in down-gradient MW-1 and MW-4 monitoring wells remain consistent with those established as baseline in November 1991. These test results indicate low-level nutrient impact from on-site wastewater discharge to down-gradient groundwater quality at these locations. Although these wells are clearly in the mapped solute plume, it appears that

there is likely preferential travel of the solute within the stratified sands that make up the shallow unconfined aquifer.

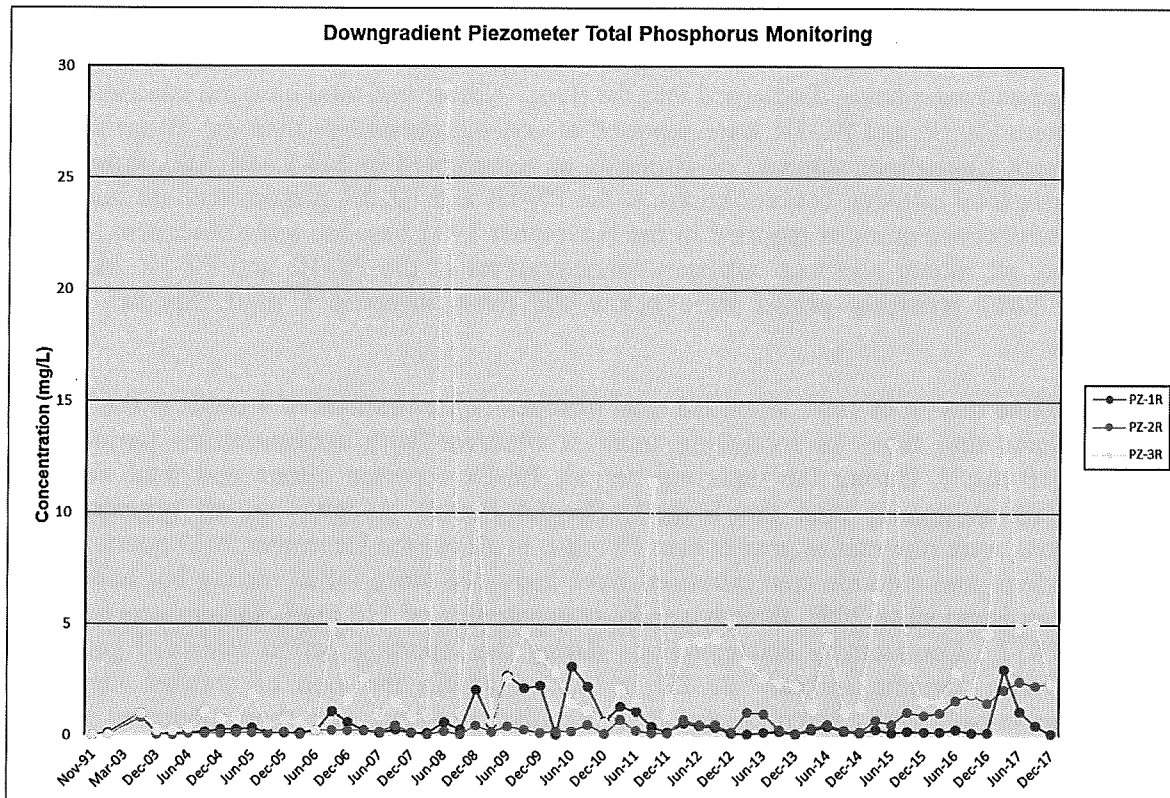
Groundwater sampled from down-gradient monitoring well MW-2, located within the area where greatest groundwater impacts have been observed, has demonstrated significant nutrient impact dating back to baseline testing conducted in 1991, pre-dating WWTF construction and treated effluent discharge at the subject property. From a 1991 baseline of approximately 12 mg/L, nitrate and total nitrogen concentrations in MW-2 have fluctuated to below 10 mg/L generally from March 2008 through June 2014, then demonstrated an increasing trend with concentrations periodically above 10 mg/L through December 2017. The volatility of these measurements with periodic spikes typically in December sampling, some three (3) months beyond peak seasonal flow, is likely an effect of seasonal increased flow as a function of groundwater flow velocity and the travel time from the leaching fields to the down-gradient monitoring wells. Conductivity, sodium, and chloride concentrations in 2017 were reported as consistent with historic concentrations, indicative of solute impact from treated wastewater at this location. This same volatility in total nitrogen is also seen in the further downgradient piezometers along the edge of the Mashpee River.



Since the Mashpee River empties into Popponesset Bay, the concentrations of nitrate/total nitrogen at the piezometers along the Mashpee River provide information about the quality of groundwater being discharged into the river. Nitrate and total nitrogen concentrations at piezometers PZ-1R and PZ-3R were reported at concentrations less than the Water Quality Based Effluent Limitations standard of 10 mg/L, as represented in 314 CMR 5.00, throughout 2017. Nitrate/total nitrogen concentrations at the PZ-1R and PZ-3R piezometers are generally consistent with concentrations reported in the November 1991 baseline and subsequent testing. Furthermore, all nitrate and total nitrogen concentrations at the PZ-1R and PZ-3R locations during the 2017 reporting period were below the most stringent 5 mg/L Special Permit guidelines.

Baseline testing in 1991 identified total nitrogen concentrations of 4 mg/L at the PZ-2R location. Since that time, an increasing trend is observed with concentrations periodically exceeding 10 mg/L. During the reporting period, PZ-2R reported nitrate and total nitrogen concentrations as greater than the 5 mg/L Special Permit guideline in all quarters, and concentrations were reported as greater than 10 mg/L in all but the December 2017 quarter (9.97 mg/L). Sodium and chloride concentrations have increased since initial testing but have been relatively consistent since 2003, though a spike concentration of 110 mg/L sodium was reported in March 2017. Conductivity concentrations during the reporting period remained generally consistent, with periodic spikes. PZ-2R is located within the area of greatest identified groundwater impact, and concentrations are generally consistent with those observed in MC MW-2 and MW-2, representing the movement of the treated wastewater plume toward the Mashpee River. These locations appear to be the axis of the solute plume influence by the combined treated sewage discharge.

Consideration of loading rates (lbs/day) from average flow and analytical results is used to show the effects of wastewater treatment and natural attenuation, in consideration of cumulative impacts to the Mashpee River as the identified receptor. The total nitrogen loading rates were calculated for select wells within the central plume area; MC MW-2, MW-2 and PZ-2R as a conservative, positively biased measure wherein "worse case" wells are considered. Calculations were made using the average annual water usage in million gallons per day (MGD) from the MC WWTF for MC MW-2, located up-gradient of the Windchime WWTF, and using the average annual water usage in MGD from the Windchime WWTF for MW-2 and PZ-2R, located down-gradient of the Windchime WWTF. Loading rates were calculated as 1.89 lbs. per day, 0.95 lbs. per day, and 1.21 lbs. per day, respectively.



Monitoring of total phosphorus at the PZ-1R and PZ-2R locations has shown concentrations below 5 mg/L since testing began in 1991. From December 2008 through September 2010, as well as in March 2017, PZ-1R total phosphorus concentrations increased to between approximately 2-3 mg/L. PZ-2R also showed increased total phosphorus concentrations in the 2-3 mg/L range throughout the 2017 reporting period. This trend may indicate an increase in total phosphorus impact from upstream sources. PZ-3R is located in the southern-most, down-stream position at the base of the Mashpee River. PZ-3R has consistently demonstrated the greatest total phosphorus concentrations, with an increasing trend greater than the other two piezometers observed since June 2004. These increasing trends likely represent breakthrough of phosphorus, which is naturally adsorbed in sands with high iron content as typical of the glacial outwash sands that are predominant in the area. Presently under the MA DEP GWDP, phosphorus is not a parameter for which treatment is required.

The down-gradient monitoring wells MW-1, MW-2 and MW-4, as well as the up-gradient MW-3R, were sampled for volatile organic compounds (VOCs, Method 624) in September 2017, as required by the Groundwater Discharge Permit for the Windchime WWTF. Laboratory analysis of groundwater samples reported all VOCs tested as Non-Detect (ND) in each of the four monitoring wells. As such, no volatile organic impact to groundwater is apparent, associated with either the Windchime or Mashpee Commons WWTF treated effluent discharges. The laboratory report for VOCs analysis is included in Appendix D.

SURFACE WATER ANALYSIS

Quarterly surface water samples were also collected by BEA as part of the water quality monitoring program. Water samples were collected from the Mashpee River at locations up-stream (SW-1), mid-stream (SW-2), and down-stream (SW-3) of the Windchime Condominium Trust WWTF and leaching gallery, as roughly corresponding with the piezometer locations [Refer to Site Plan]. Field measurements of dissolved oxygen, conductivity, pH and temperature were recorded at each location. Surface water samples were collected from mid-depth in the river and stored on ice until transferred under a proper chain-of-custody to Alpha Analytical. Laboratory analytical results of historic surface water sampling and surface water samples collected during the reporting period by BEA are presented in Appendix D. Based on baseline findings reported by IEP, Inc., increasing conductivity values in down-stream samples are associated with tidal influence and saltwater feeding into the estuary at high tides. It is suspected that such tidal effect influences other chemical and physical properties. As such, surface water quality sampling by BEA is consistently conducted on a low or ebbing tide wherein groundwater is likely being discharged to the River, to normalize data and exclude saltwater interference and associated dilution.

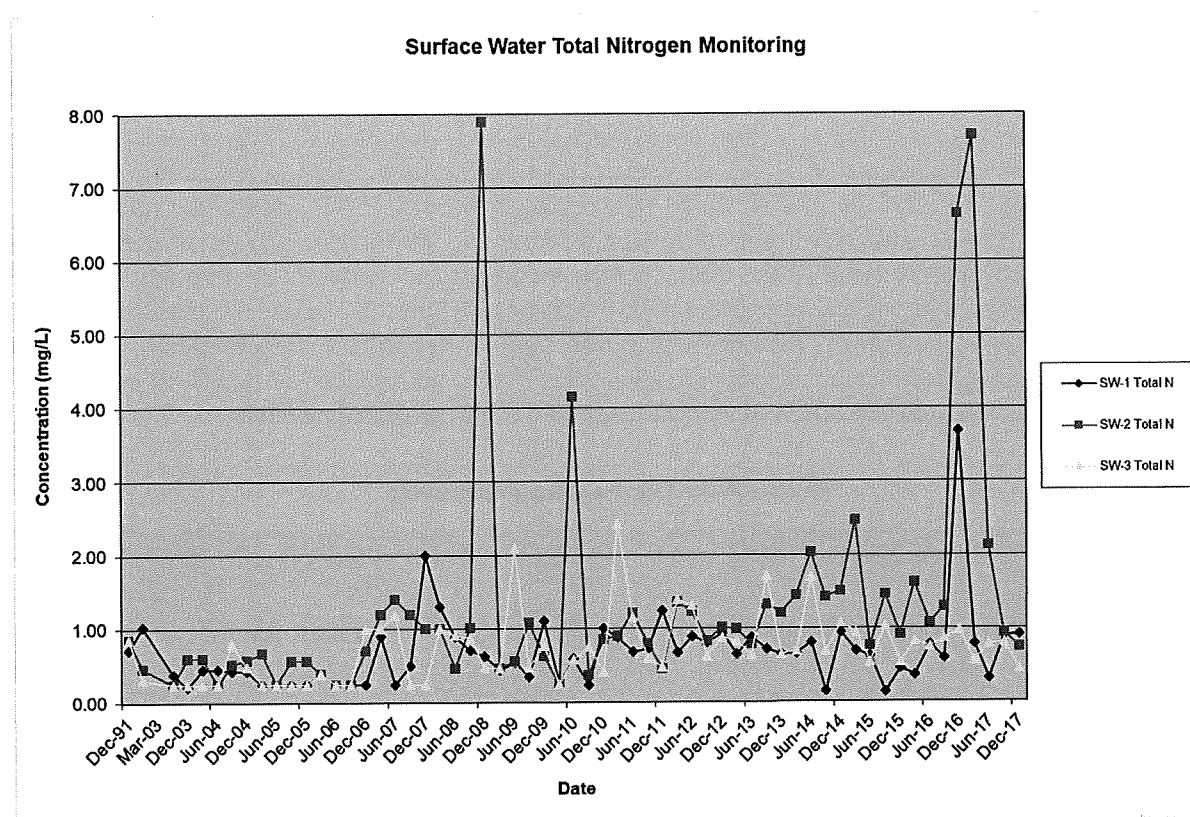
The Mashpee River is considered a coastal/marine Class SA Outstanding Resource Water (ORW), in accordance with the provisions of 314 CMR 4.00. These waters are designated an excellent habitat for fish, other aquatic life and wildlife, and for primary and secondary contact recreation, and are generally suitable for shellfish harvesting without depuration. Nutrient thresholds vary from basin to basin, largely dependent on size, bathymetry and flushing capacity. Nitrogen is generally identified as the limiting factor in saltwater eutrophication associated with coastal waters. Elevated nitrogen concentrations serve as nutrients for potential congestive plant and algae growth. Elevated temperatures increase the rate of plant and algae decomposition. High decomposition rates demand increased dissolved oxygen, thereby limiting the oxygen available to aquatic life and bacteria necessary for maintaining ecological balance. Per 314 CMR 4.05(4), dissolved oxygen shall not be less than 6.0 mg/L, temperature shall not exceed 85° F, and pH shall be in the range of 6.5 - 8.5 for Class SA - ORW coastal waters.

Dissolved oxygen was recorded at or above the 6 mg/L limitation in all surface water measurements throughout 2017, meeting the Class SA – ORW standard. Temperature was reported within the standard at all locations as well. The temperature and dissolved oxygen measurements reported limit the rate of potential decomposition, which indicates that the Mashpee River is not presently eutrophic. Observations made during sampling events relative to the clarity of water and a lack of congestive plant and algae growth support this conclusion. Further, based on this particular fluvial environment wherein tidal influence is exhibited, the continuous surface water flow and marine flushing effect may limit the potential for eutrophication.

Measurements of pH were reported below the 6.5 threshold periodically throughout 2017 at the three monitoring locations. Wherein the elevation of the Mashpee River is similar to the

elevation of groundwater, and groundwater is discharged as a gaining stream at the time of testing on an outgoing tide, the low pH is attributed to naturally acidic groundwater conditions, rather than as a function of wastewater influence as would tend to be a buffer, and increase pH. Surface water sampling throughout 2017 was conducted around ebb-to-low tides. Conductivity values at the SW-1 up-stream and SW-3 down-stream locations were consistent with baseline and historic testing. It is noted that SW-3 has reported moderate to high conductivity values since baseline testing conducted in 1991 and 1999. At the SW-2 mid-stream location, conductivity values were higher than baseline testing but generally consistent with testing conducted since 2003. The Mashpee River is tidal by nature and the highest conductivity readings generally are found at the SW-3 location, as furthest down-stream and closest to the mouth of the river.

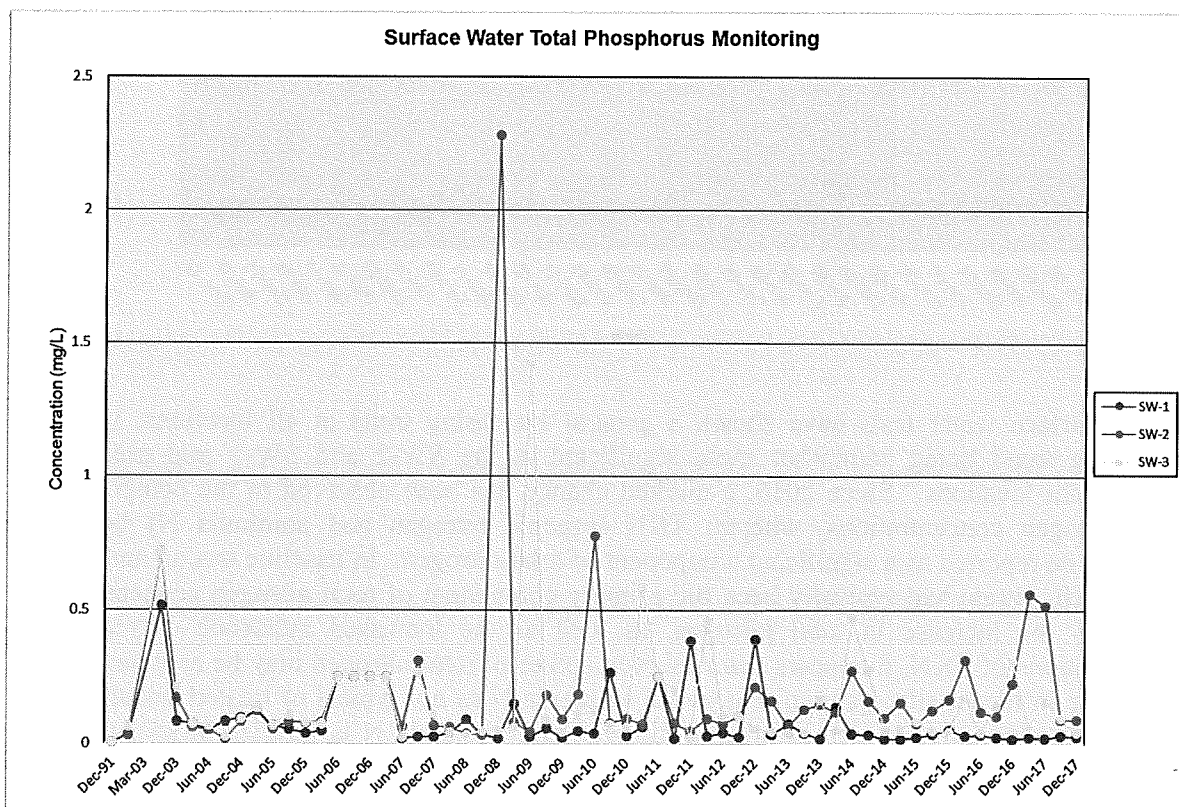
Nitrogen is generally identified as the limiting factor in saltwater eutrophication associated with coastal waters. As such, review of nitrate/total nitrogen in the surface water within the Mashpee River is also critical in the review of surface water impairment and the potential for environmental impact. The Mashpee River is subject to the promulgated standards for Class SA Outstanding Resource Water (ORW) for coastal marine waters, in accordance with the provisions of 314 CMR 4.00. According to the Massachusetts Estuaries Project, "Linked Watershed-Embayment Model to Determine Critical Nitrogen Loading Thresholds for Popponesset Bay, Mashpee and Barnstable, Massachusetts", a total nitrogen threshold of 0.38 mg/L has been established for the Popponesset Bay system as a target, wherein achieving this concentration at a sentinel station within Popponesset Bay would be supportive of a high-quality infauna habitat. Based on the "Linked Watershed-Embayment Model..." the 0.38 mg/L target concentration in Popponesset Bay corresponds to a total nitrogen range of 0.525 - 0.422 mg/L along the mid to lower Mashpee River, respectively. As such, based on the relative position along the Mashpee River, the 0.525 ppm (mg/L) background is considered as a threshold in review of a potential eutrophication impacts associated with total nitrogen measured at the Windchime surface water stations.



Surface water tests have shown a general increasing trend at all locations, with the increasing trend being somewhat more significant at the SW-2 and SW-3 mid-stream and downstream locations. Since 2010, a marked change has been observed in the component of total nitrogen concentrations, wherein TKN (organic nitrogen and ammonia N) began to routinely be reported as a significant component of total nitrogen. In baseline testing and testing up to 2010, nitrate had typically been the primary component of total nitrogen concentrations. Based on the increase in total nitrogen, as well as the increased incidence of reportable concentrations of TKN, it appears that observed spikes of total nitrogen may be associated with an outside influence of organic nitrogen and ammonia N as not typical of treated sewage. The most likely alternative source of organic nitrogen and ammonia N is fertilizer associated with storm water run-off. A storm water culvert was previously reported to the north of PZ-1, SW-1 and an inventory of direct and indirect storm water discharges is being investigated by BEA through the Mashpee Department of Public Works.

Total nitrogen was reported as greater than the 0.525 ppm threshold in all quarterly testing conducted at the three surface water monitoring locations. At the upstream SW-1 location, total nitrogen was reported below the 0.525 ppm threshold in June 2017, and total nitrogen was reported below 0.525 ppm at the downstream SW-3 location in December 2017. The remaining testing at these locations, as well as all testing at the SW-2 location during 2017, were reported as greater than the threshold.

The SW-1 location is considered reflective of background conditions up-stream of the study area, outside the influence of the MC and WC treated wastewater discharges. The SW-2 and SW-3 locations are noted as within the Projected Solute Transport Pathway of both the MC WWTF and the Windchime WWTF. However, wherein surface water samples are collected from the Mashpee River, the marine outlet of a regional drainage basin, additional natural and anthropogenic off-site sources of nutrient impact represent a significant contribution and a noted limitation to the interpretation of the data. In fact, a comparison between the upgradient SW-1 sampling location and the downgradient SW-3 locations shows an actual reduction in total nitrogen concentration from 0.729 mg/L to 0.648 mg/L. Regardless, concentrations of total nitrogen taken in surface water samples are above the TMDL eutrophication threshold indicating a net contribution to nutrient levels in Popponesset Bay from the Mashpee River.



Phosphorus is generally identified as the limiting factor in freshwater eutrophication. Preliminary research indicates that no critical phosphorous load has been established for the Mashpee River. Phosphorous concentrations typically vary from season to season, and total phosphorous measurements are directly proportional to turbidity and suspended solids. Phosphorus concentrations in surface water result from various sources, such as surface runoff of rainwater and stormwater direct discharge from roadway conveyance systems, as well as discharge of treatment wastewater to groundwater. Historic, elevated phosphorus concentrations

reported in the Mashpee River were generally associated with high antecedent groundwater levels and greater precipitation, contributing to increased surface water runoff. The most effective control against increasing phosphorous loads is to provide subsurface discharge of stormwater from roadway runoff in order to reduce runoff discharge to the river, as well as to locate sewage leaching galleries outside a 200' buffer from the river, as established by the Rivers Act. Further evaluation of phosphorus data developed would be facilitated by a TMDL for critical phosphorus nutrient loads for the estuary wherein only nitrogen is considered the limiting factor in saltwater estuaries.

Phosphorus concentrations in samples collected from the Mashpee River were considered as an indicator of potential eutrophication to the Mashpee River as a tidal estuary and subject to periodic brackish conditions. Total phosphorus concentrations spiked at the SW-2 and SW-3 locations between December 2008 and June 2009, and concentrations since that time have been declining to concentrations generally consistent with baseline and testing conducted through September 2008. In the 2017 reporting period, the difference between average concentrations at the down-stream SW-3 location and the up-stream SW-1 location was nominal (0.064 mg/L), indicative of the contributions from the MC and Windchime WWTFs. In the absence of a TMDL for phosphorus and based on observations other readings made in the river contrary to eutrophic conditions, further evaluation of this data is beyond the scope of the monitoring program.

EVALUATION OF WASTEWATER TREATMENT

Through 2017, laboratory analysis of total nitrogen concentrations in the effluent discharge from the MC WWTF remained below the 10 mg/L discharge limit. A spike in total nitrogen concentration (47.06 mg/L) was reported in April 2014, potentially related to loss of treatment capacity during the up-grade of the treatment facility. That spike likely influenced the elevated concentration of total nitrogen identified in MC MW-2 in October 2015 (31 mg/L), with the effects of that discharge probable to be observed in MW-2 and PZ-2R, as the plume of groundwater moves eastward toward Mashpee River.

At the Windchime WWTF, laboratory analysis of total nitrogen concentrations in the effluent discharge was reported as greater than 10 mg/L throughout 2017. The greatest concentration reported over the year was 44.29 mg/L in November 2017. These concentrations will also contribute to elevated nutrient concentration in MW-2 and PZ-2R over the 1-2-year time of solute travel from the point of treated effluent discharge to the MW-2 monitoring well and eastward toward Mashpee River. BEA is presently conducting a comprehensive review of treatment plant function and recommendations for upgrades in consideration of facility age, outdated design and obsolescence of software on half of the Windchime Board of Directors. This work is intended as a proactive measure ahead of the Groundwater Discharge Permit regulatory requirements. BEA has considered reconfigured of the Amphidrome plant as a "continuous feed" from the earlier "side stream" configuration which would enhance treatment capacity as operations control adjustments have been exhausted. Such conversions are cost effective and have been found to be reliable in meeting GWDP requirements. Notwithstanding,

the actual technology employed and design will be based on a review of alternatives in the context of both state and local requirements.

SUMMARY AND CONCLUSIONS

Based on more than a decade of quarterly environmental testing of groundwater and surface water conditions at the Windchime Condominium property, sufficient data exists to document impacts associated with wastewater discharge from area development, inclusive of the Windchime Condominiums as a fractional contributor. Since the 1991 baseline testing, substantial development has resulted in additional wastewater generation and stormwater runoff being discharged into the Mashpee River. Evaluation of groundwater and surface water quality under this investigation has shown a clear area of most significant impact identified at the up-gradient MC MW-2 location and traveling towards the Mashpee River, with elevated total nitrogen concentrations subsequently seen in down-gradient wells MW-2 and PZ-2R. Elevated nutrient concentrations have been documented in these areas since baseline testing, and while concentrations have fluctuated, they have generally remained elevated. The presence of the impact up-gradient of the Windchime WWTF clearly demonstrates the contribution of off-site sources to nutrient concentrations in the area, while the fluctuation and continued elevated nutrient concentrations support the conclusion that concentrations of nutrients in groundwater and impact to surface water is the results of co-mingling wastewater plumes, as well as off-site point and non-point sources.

In general, concentrations of nutrients in the piezometers and within surface water have demonstrated an increasing trend since historic testing. It is noted that the measured total nitrogen and phosphorus concentrations would indicate nutrient loads within and along the Mashpee River are sufficient to cause eutrophication in a freshwater environment. However, based on measured pH, temperature and dissolved oxygen concentrations, and observed clarity of water and lack of congestive plant/algae growth, the Mashpee River appears to be relatively healthy and not presently eutrophic in nature. Impact is attributed to area development and the cumulative effect of co-mingling wastewater plumes, as well as off-site point and non-point sources. Based on the respective Groundwater Discharge Permit approved daily flows for the facilities, Windchime would contribute to the nutrient load from these named sources, as a fraction of the total load.

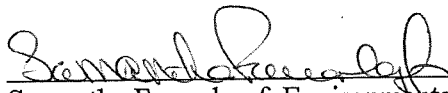
Based on the complexity in the interpretation of the targeted data under this investigation relative to regional issues of nutrient loading in the Mashpee River watershed it is the recommendation of BEA that future water quality monitoring by the Windchime Condominium Trust be reconsidered by the Mashpee Planning Board, and coordinated with municipal wastewater management efforts.

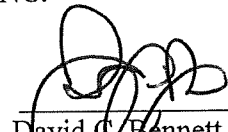
BENNETT ENVIRONMENTAL ASSOCIATES, INC. (BEA) as successor operator of the Windchime WWTF has made process control adjustments and targeted repairs and maintenance to better review the treatment capacities of the system over the past two years. It is recognized that the WC WWTF, as designed and configured, is reaching an age of planned

obsolescence and that from a regulatory standpoint, is unable to consistently meet nitrogen/nitrate requirements. Presently BEA is conducting a comprehensive review of the treatment plant towards upgrade to consistently meet nitrogen/nitrate requirements in the backdrop of the Town of Mashpee Watershed Nitrogen Management Plan and unique Special Permit requirements.

Should you have any questions regarding this work, or the findings of the annual report, please contact our office.

Sincerely yours,
BENNETT ENVIRONMENTAL ASSOCIATES, INC.


Samantha Farrenkopf, Environmental Scientist
Project Manager


David C. Bennett, LPG., CGWP., LSP
Hydrogeologist - President

Encl. Supporting Documentation [Appendices A-E]

CC (via electronic copy): Anthony Colletti – American Properties Team
 Glen Harrington - Mashpee Board of Health
 Andrew McManus - Mashpee Conservation Commission

**WATER QUALITY MONITORING PROGRAM
WINDCHIME POINT CONDOMINIUMS
90 Great Neck Road South - Mashpee, MA**

MAY 11, 2018

Prepared For:

MASHPEE PLANNING BOARD
c/o Evan Lehrer, Town Planner
Mashpee Town Offices
16 Great Neck Road North - Mashpee, MA 02649

On Behalf Of:

Windchime Condominium Trust
c/o Anthony Coletti, Property Manager
American Properties Team
500 West Cummings Park - Woburn, MA 01801

Prepared By:

BENNETT ENVIRONMENTAL ASSOCIATES, INC.
1573 Main Street - P.O. Box 1743
Brewster, MA 02631

APPENDIX A: Reference Plans

- Figure 1: Site Locus Plan [USGS Topographic Quad., Cotuit, MA. 1999] (Excerpt)
- Figure 2: Ground-Water Resources of Cape Cod, Massachusetts [LeBlanc et al, 1986] (Excerpt)
- Figure 3: MA DEP BWSC GIS MAP [Sandwich Quad., 1999] (Excerpt)
- Site Sketch Plan entitled, "Groundwater and Surface Water Quality Program", prepared by BENNETT ENVIRONMENTAL ASSOCIATES, INC., dated 6/02/99 [Revised 4/10/18]

APPENDIX B: Field Reports

- Monitor Well/Surface Water Sample Logs [3/16/17, 6/30/17, 9/13/17, 12/07/17]

APPENDIX C: Reference Literature

- MA DEP Permitted Treated Effluent Discharge Limits
- "Linked Watershed-Embayment Model to Determine Critical Nitrogen Loading Thresholds for Popponesset Bay, Mashpee and Barnstable, Massachusetts" - Executive Summary

APPENDIX D: Laboratory Analysis

- Effluent Discharge Monitoring [Windchime Point WWTF, Mashpee Commons WWTF]
- Historic Laboratory Analytical Spreadsheets
- Laboratory Analysis: Groundwater, Surface Water [Alpha Analytical, 3/23/17 ID L1708191]
- Laboratory Analysis: Groundwater, Surface Water [Alpha Analytical, 7/10/17 ID L1722512]
- Laboratory Analysis: Groundwater, Surface Water [Alpha Analytical, 9/21/17 ID L1732637]
- Laboratory Analysis: Groundwater, Surface Water [Alpha Analytical, 12/15/17 ID L1745363]

APPENDIX E: Quality Assurance/Quality Control

APPENDIX A

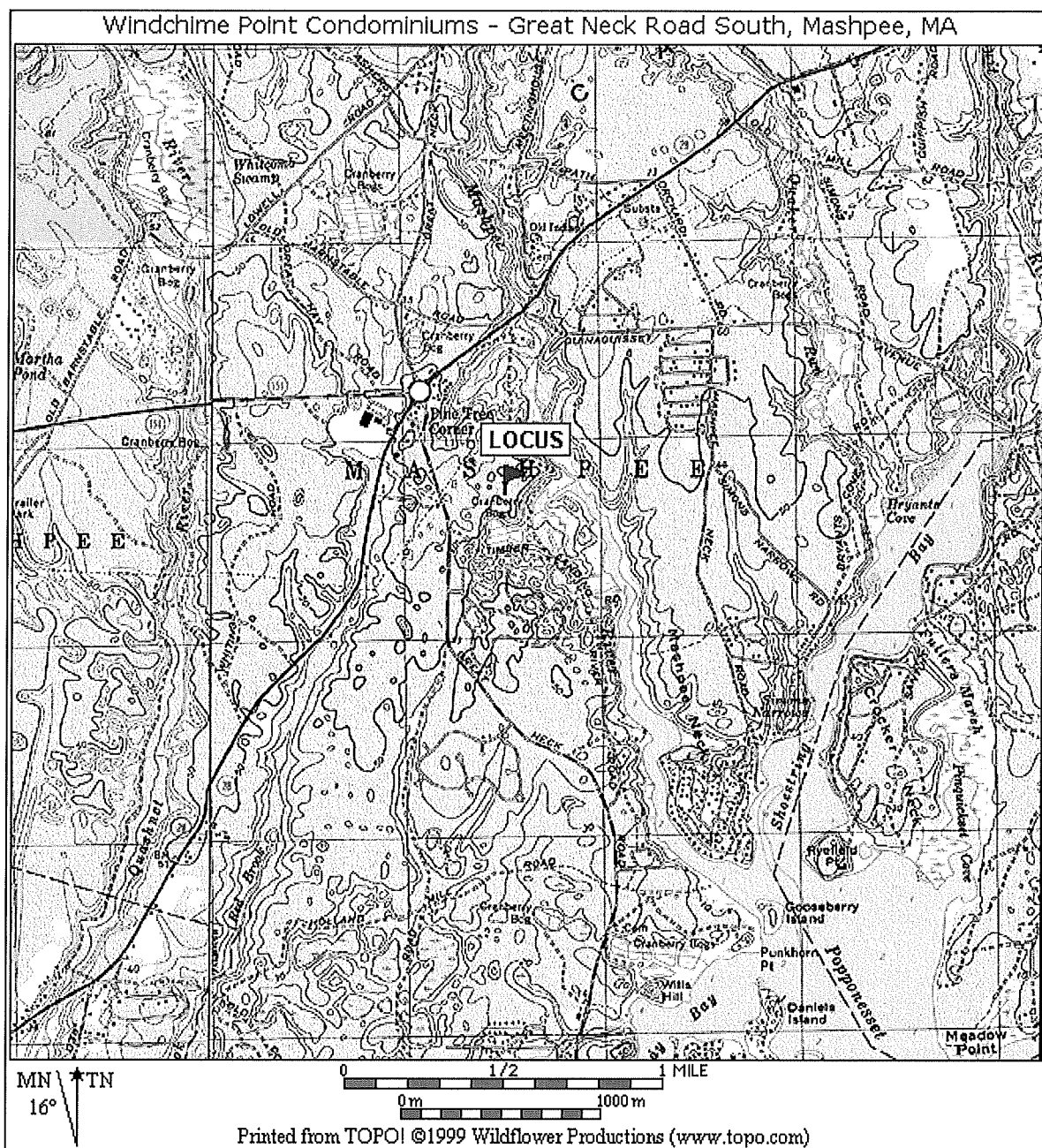


FIGURE 1: The subject site is located some 3,000' southeast of the Mashpee Rotary, on Great Neck Road South. The Site contains 70 acres, the majority of which is upland. The Mashpee River defines the eastern boundary of the Site, with associated fringe wetlands. The western boundary is defined by the road layout of Great Neck Road South, beyond which are upland woodlands. South of the site are similar upland wooded areas with light residential development. Some 250' north of the site is the Mashpee Commons Wastewater Treatment Facility and leaching beds associated with the Mashpee Commons commercial development along the Mashpee Rotary (intersection of Routes 28 and 151).

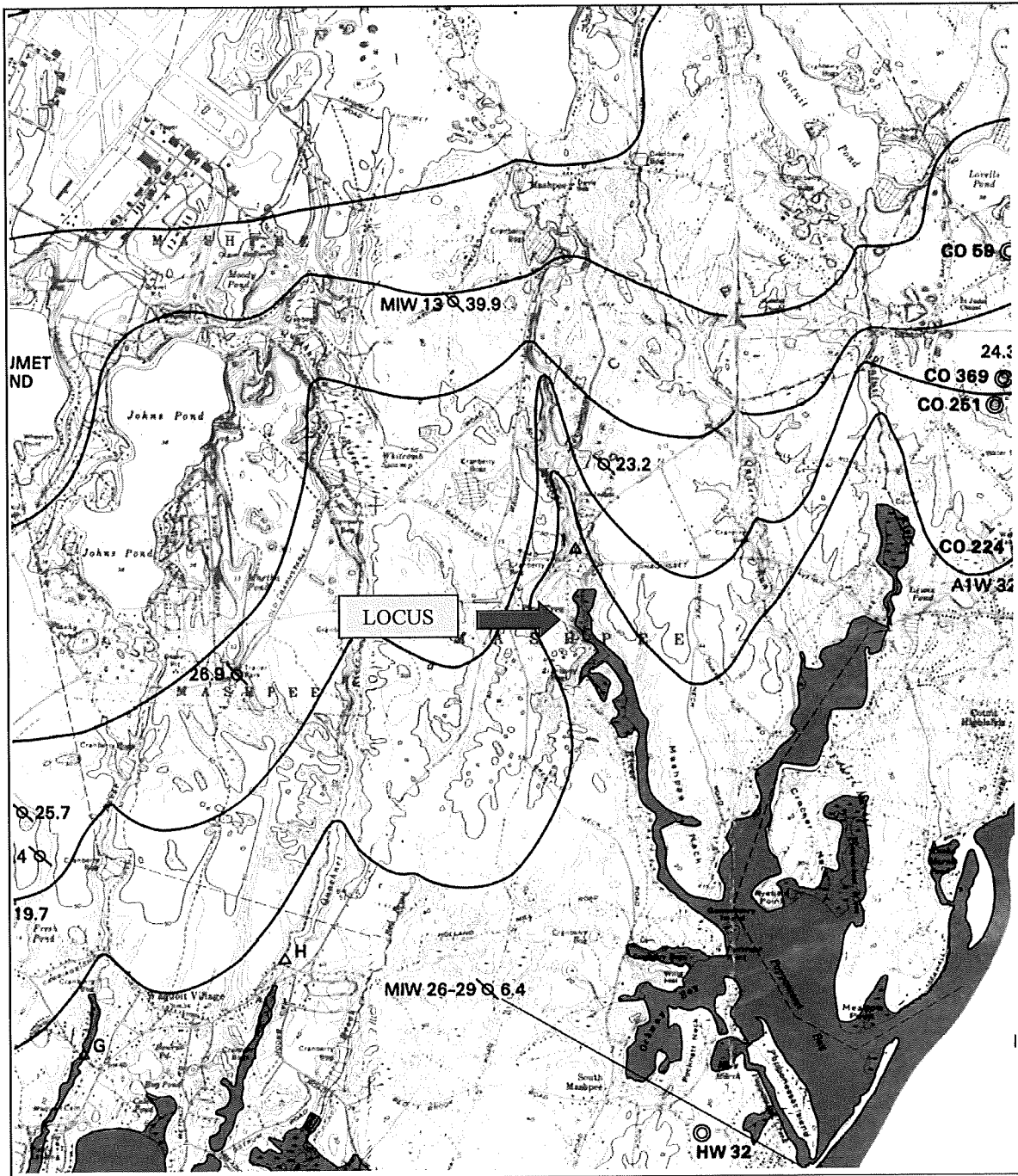


FIGURE 2: Groundwater exists within 40-50' of ground surface in the area of the WWTF leaching gallery as subject to seasonal variation. Regional groundwater contours indicate an easterly groundwater flow as consistent with site-specific groundwater level measurements made at the existing monitoring wells. Groundwater flow in this area is strongly influenced by the Mashpee River, some 500' to the east of the site. The Mashpee River represents a regional groundwater discharge area and has been identified as the primary downgradient environmental receptor.

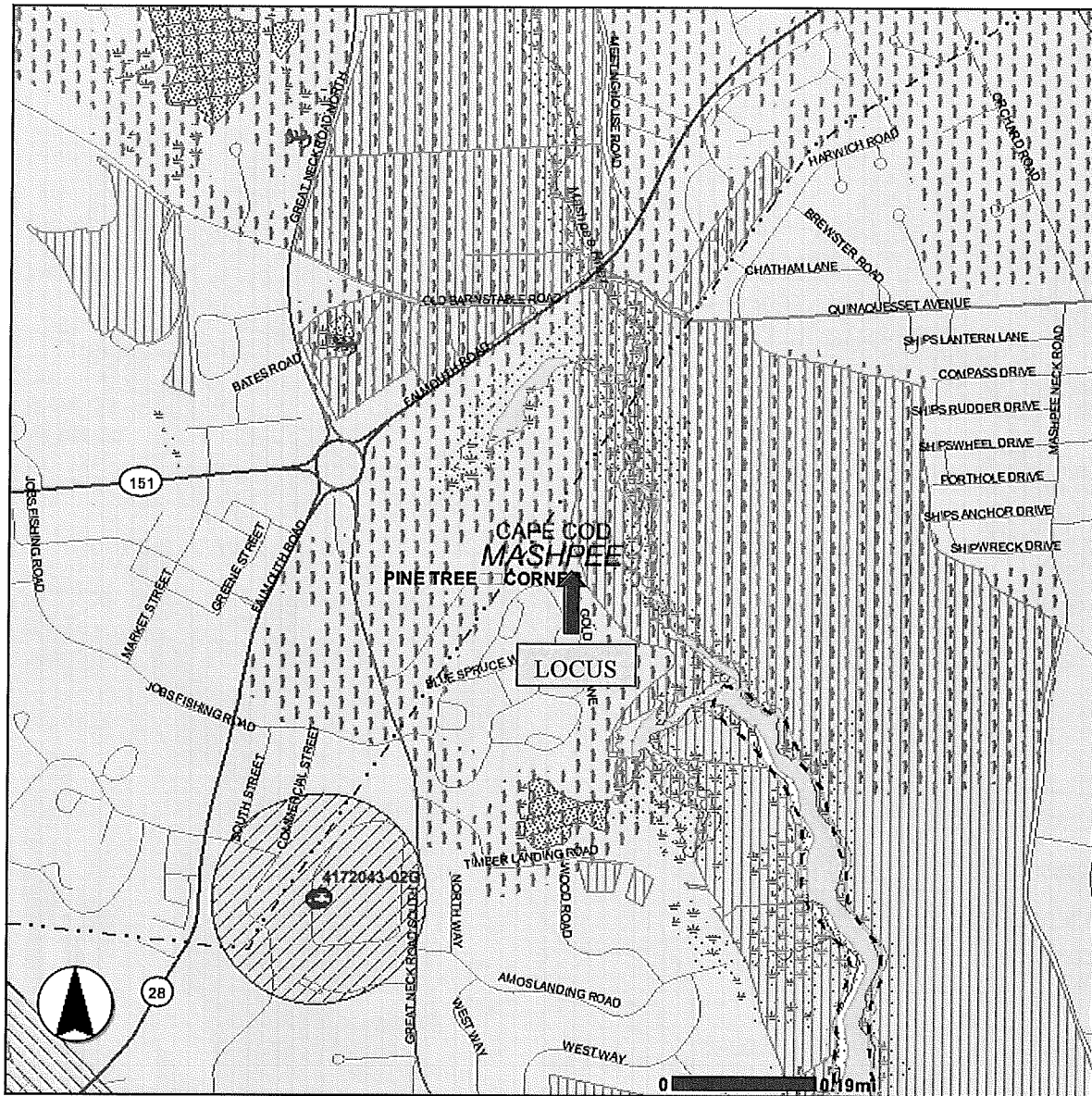
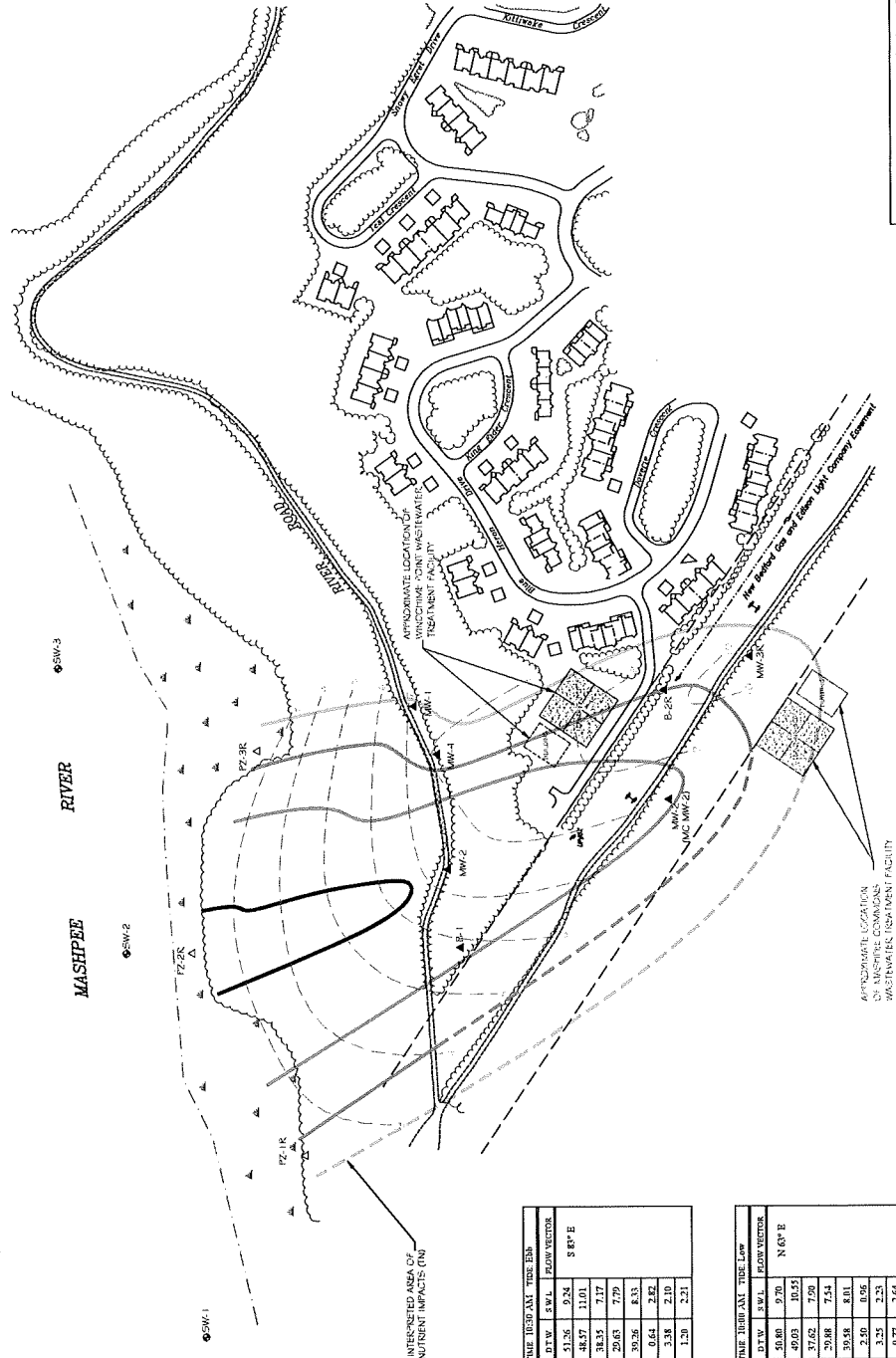


FIGURE 3: A review of the MA DEP BWSC GIS mapping program shows the site as mapped within the recharge area of the Mashpee River some 300-600' (+/-) east of the Windchime Condominium Trust and Field's Point wastewater treatment facilities. The majority of the Windchime property is further mapped by NHESP as "Estimated Habitat of Rare Wetlands Wildlife", inclusive of the areas of the two WWTFs. The site is not within any defined Interim or Zone II Wellhead Protection Area for a public water supply (PWS). One non-community public water supply well is located within one-half of a mile southwest and an additional community public water supply is located within one mile to the north-northeast in apparent cross-gradient positions to the site. As such, based on the hydrogeologic position of the public water supplies and proximity of groundwater, no impact to any existing water supply is expected and no human receptors are considered aside from the recreational value of the Mashpee River.

[illegible][illegible]

DATE 4/1/79 TIME 0:45 AM TIDE LOW				DATE 4/2/79 TIME 0:40 AM TIDE LOW			
WELL	60 IN	50 IN	30 IN	WELL	60 IN	50 IN	30 IN
W10C	25.2	25.2	25.2	W10C	25.2	25.2	25.2
W10B	25.2	25.2	25.2	W10B	25.2	25.2	25.2
W10A	25.2	25.2	25.2	W10A	25.2	25.2	25.2
W10D	25.2	25.2	25.2	W10D	25.2	25.2	25.2
W10E	25.2	25.2	25.2	W10E	25.2	25.2	25.2
W10F	25.2	25.2	25.2	W10F	25.2	25.2	25.2
W10G	25.2	25.2	25.2	W10G	25.2	25.2	25.2
W10H	25.2	25.2	25.2	W10H	25.2	25.2	25.2
W10I	25.2	25.2	25.2	W10I	25.2	25.2	25.2
W10J	25.2	25.2	25.2	W10J	25.2	25.2	25.2
W10K	25.2	25.2	25.2	W10K	25.2	25.2	25.2
W10L	25.2	25.2	25.2	W10L	25.2	25.2	25.2
W10M	25.2	25.2	25.2	W10M	25.2	25.2	25.2
W10N	25.2	25.2	25.2	W10N	25.2	25.2	25.2
W10O	25.2	25.2	25.2	W10O	25.2	25.2	25.2
W10P	25.2	25.2	25.2	W10P	25.2	25.2	25.2
W10Q	25.2	25.2	25.2	W10Q	25.2	25.2	25.2
W10R	25.2	25.2	25.2	W10R	25.2	25.2	25.2
W10S	25.2	25.2	25.2	W10S	25.2	25.2	25.2
W10T	25.2	25.2	25.2	W10T	25.2	25.2	25.2
W10U	25.2	25.2	25.2	W10U	25.2	25.2	25.2
W10V	25.2	25.2	25.2	W10V	25.2	25.2	25.2
W10W	25.2	25.2	25.2	W10W	25.2	25.2	25.2
W10X	25.2	25.2	25.2	W10X	25.2	25.2	25.2
W10Y	25.2	25.2	25.2	W10Y	25.2	25.2	25.2
W10Z	25.2	25.2	25.2	W10Z	25.2	25.2	25.2
W10A	25.2	25.2	25.2	W10A	25.2	25.2	25.2
W10B	25.2	25.2	25.2	W10B	25.2	25.2	25.2
W10C	25.2	25.2	25.2	W10C	25.2	25.2	25.2
W10D	25.2	25.2	25.2	W10D	25.2	25.2	25.2
W10E	25.2	25.2	25.2	W10E	25.2	25.2	25.2
W10F	25.2	25.2	25.2	W10F	25.2	25.2	25.2
W10G	25.2	25.2	25.2	W10G	25.2	25.2	25.2
W10H	25.2	25.2	25.2	W10H	25.2	25.2	25.2
W10I	25.2	25.2	25.2	W10I	25.2	25.2	25.2
W10J	25.2	25.2	25.2	W10J	25.2	25.2	25.2
W10K	25.2	25.2	25.2	W10K	25.2	25.2	25.2
W10L	25.2	25.2	25.2	W10L	25.2	25.2	25.2
W10M	25.2	25.2	25.2	W10M	25.2	25.2	25.2
W10N	25.2	25.2	25.2	W10N	25.2	25.2	25.2
W10O	25.2	25.2	25.2	W10O	25.2	25.2	25.2
W10P	25.2	25.2	25.2	W10P	25.2	25.2	25.2
W10Q	25.2	25.2	25.2	W10Q	25.2	25.2	25.2
W10R	25.2	25.2	25.2	W10R	25.2	25.2	25.2
W10S	25.2	25.2	25.2	W10S	25.2	25.2	25.2
W10T	25.2	25.2	25.2	W10T	25.2	25.2	25.2
W10U	25.2	25.2	25.2	W10U	25.2	25.2	25.2
W10V	25.2	25.2	25.2	W10V	25.2	25.2	25.2
W10W	25.2	25.2	25.2	W10W	25.2	25.2	25.2
W10X	25.2	25.2	25.2	W10X	25.2	25.2	25.2
W10Y	25.2	25.2	25.2	W10Y	25.2	25.2	25.2
W10Z	25.2	25.2	25.2	W10Z	25.2	25.2	25.2

1.) The Site Sketch Plan was not prepared from any instrument survey and under no circumstances should the distances and/or site features shown be used to establish property lines. This plan was compiled from the IFR County Water Contour and Flood Dissection map dated January 19, 1992, and the Elurdedges, Quigley, & Clark Site Plan dated January 19, 1993.

2.) Quarterly Groundwater Flow Vectors based on static water level measurements at MW-1, MW-2, and MW-3RD. Groundwater contours based on averaged static water level measurements from March 2017 through December 2017.

APPENDIX B

1573 Main Street, P.O. Box 1743
Brewster, MA 02631

Phone: (508) 896-1706
Fax: (508) 896-5109

BENNETT ENVIRONMENTAL ASSOCIATES, INC.
LICENSED SITE PROFESSIONALS, ENVIRONMENTAL SCIENTISTS, GEOLOGISTS, ENGINEERS

MONITORING WELL SAMPLING LOG

Job Name: Windchime Condominiums

Date(s): 3/16/17

Time: 9:15 AM

Tide: Low

Location: 90 Great Neck Road South, Mashpee

Job Number: BEA99-2252

Sampler: Carly Brady & Greg Brehm

Measuring Point:

Ground Surface or T.O.C

TOC

Well Number	Elev. of reference point (feet)	Total Depth of Well (feet)	Depth to Water (feet)	Standing Water Height (feet)	Water Table Elevation (feet)	Static Volume (gallons)	Volume Purged (gallons)	HNU Pt-101 (ppm)	pH	Dissolved Oxygen (mg/L)	Conductivity	Temperature (F)	Comments:
B-2R	60.50	59.00	51.03	7.97	9.47	1.28	4.0	NT	5.10	6.37	137	46.21	TDS = 0.204
MW-3R	59.58	59.47	49.31	10.16	10.27	1.63	5.0	NT	5.32	3.06	210	46.73	TDS = 0.215
MW-1	45.52	50.70	38.85	11.85	6.67	1.90	6.0	NT	5.69	5.05	160	46.61	TDS = 0.236
MW-2	37.42	36.20	30.03	6.17	7.39	0.99	3.0	NT	6.50	5.85	305	49.40	TDS = 0.305
MW-4	47.59	47.50	39.74	7.76	7.85	1.24	4.0	NT	4.90	8.78	150	47.46	TDS = 0.219
PZ-1R	3.46	4.00	1.06	2.94	2.40	0.47	1.5	NT	6.25	6.83	41	38.73	TDS = 0.069
PZ-2R	5.48	5.50	3.39	2.11	2.09	0.34	1.0	NT	6.12	11.55	235	41.92	TDS = 0.373
PZ-3R	3.41	5.00	1.21	3.79	2.20	0.61	2.0	NT	6.65	6.49	75	37.79	TDS = 0.129
SW-1	NA	NA	NA	NA	NA	NA	NA	NT	3.31	13.66	65	33.38	TDS = 0.12
SW-2	NA	NA	NA	NA	NA	NA	NA	NT	6.21	11.30	285	39.41	TDS = 0.474
SW-3	NA	NA	NA	NA	NA	NA	NA	NT	6.51	11.13	335	38.51	TDS = 0.406

NOTES: NA = Not Applicable; NE = Not Established; NT = Not Taken

Samples collected upon completion of purge requirements and stabilization of field parameters.

1573 Main Street, P.O. Box 1743
Brewster, MA 02631

BENNETT ENVIRONMENTAL ASSOCIATES, INC.
LICENSED SITE PROFESSIONALS, ENVIRONMENTAL SCIENTISTS, GEOLOGISTS, ENGINEERS

Phone: (508) 896-1706
Fax: (508) 896-5109

MONITORING WELL SAMPLING LOG

Job Name: Windchime Condominiums Date(s): 6/30/17 Time: 10:30 AM Tide: Ebb
Location: 90 Great Neck Road South, Mashpee Job Number: BEA99-2252
Sampler: Carly Brady & Greg Brehm Measuring Point: Ground Surface or T.O.C TOC

Well Number	Elev. of reference point (feet)	Total Depth of Well (feet)	Depth to Water (feet)	Standing Water Height (feet)	Water Table Elevation (feet)	Static Volume (gallons)	Volume Purged (gallons)	HNU PI-101 (ppm)	pH	Dissolved Oxygen (mg/L)	Conductivity	Temperature (F)	Comments:
B-2R	60.50	59.00	51.26	7.74	9.24	1.24	4.0	NT	6.37	6.76	302	55.87	TDS = 0.253
MW-3R	59.58	59.47	48.57	10.90	11.01	1.74	5.5	NT	6.42	1.06	225	53.78	TDS = 0.194
MW-1	45.52	50.70	38.35	12.35	7.17	1.98	6.0	NT	6.26	4.65	244	53.48	TDS = 0.212
MW-2	37.42	36.20	29.63	6.57	7.79	1.05	3.0	NT	6.42	8.12	225	56.22	TDS = 0.187
MW-4	47.59	47.50	39.26	8.24	8.33	1.32	4.0	NT	6.27	8.97	219	53.65	TDS = 0.189
PZ-1R	3.46	4.00	0.64	3.36	2.82	0.54	1.5	NT	6.55	4.20	70	63.47	TDS = 0.083
PZ-2R	5.48	5.50	3.38	2.12	2.10	0.34	1.5	NT	6.58	6.30	406	67.35	TDS = 0.294
PZ-3R	3.41	5.00	1.20	3.80	2.21	0.61	2.0	NT	6.42	4.45	74	60.47	TDS = 0.089
SW-1	NA	NA	NA	NA	NA	NA	NA	NT	6.86	6.86	137	69.80	TDS = 0.097
SW-2	NA	NA	NA	NA	NA	NA	NA	NT	6.80	7.94	305	68.15	TDS = 0.219
SW-3	NA	NA	NA	NA	NA	NA	NA	NT	6.70	7.36	702	68.81	TDS = 0.500

NOTES: NA = Not Applicable; NE = Not Established; NT = Not Taken

Samples collected upon completion of purge requirements and stabilization of field parameters.

1573 Main Street, P.O. Box 1743
Brewster, MA 02631

BENNETT ENVIRONMENTAL ASSOCIATES, INC.
LICENSED SITE PROFESSIONALS, ENVIRONMENTAL SCIENTISTS, GEOLOGISTS, ENGINEERS

Phone: (508) 896-1706
Fax: (508) 896-5109

MONITORING WELL SAMPLING LOG

Job Name: Windchime Condominiums

Date(s): 9/13/17

Time: 9:45 AM

Tide: Low

Location: 90 Great Neck Road South, Mashpee

Job Number: BEA99-2252

Sampler: Greg Brehm & Diane Caliri

Measuring Point:

Ground Surface or T.O.C TOC

Well Number	Elev. of reference point (feet)	Total Depth of Well (feet)	Depth to Water (feet)	Standing Water Height (feet)	Water Table Elevation (feet)	Static Volume (gallons)	Volume Purged (gallons)	HNU PI-101 (ppm)	pH	Dissolved Oxygen (mg/L)	Conductivity	Temperature (F)	Comments:
B-2R	60.50	59.00	50.67	8.33	9.83	1.33	4.0	NT	5.50	6.35	218	53.82	TDS = 0.188 g/l
MW-3R	59.58	59.47	48.86	10.61	10.72	1.70	5.5	NT	5.37	1.86	257	53.85	TDS = 0.222 g/l
MW-1	45.52	50.70	38.38	12.32	7.14	1.97	6.0	NT	5.81	5.19	223	53.30	TDS = 0.194 g/l
MW-2	37.42	36.20	29.86	6.34	7.56	1.01	3.0	NT	5.81	7.29	266	56.01	TDS = 0.222 g/l
MW-4	47.59	47.50	39.47	8.03	8.12	1.28	4.0	NT	5.50	6.88	183	53.41	TDS = 0.159 g/l
PZ-1R	3.46	4.00	0.75	3.25	2.71	0.52	2.0	NT	5.41	3.85	57	60.49	TDS = 0.045 g/l
PZ-2R	5.48	5.50	3.42	2.08	2.06	0.33	1.0	NT	5.37	3.16	176	65.99	TDS = 0.273 g/l
PZ-3R	3.41	5.00	0.46	4.54	2.95	0.73	2.5	NT	5.20	4.58	204	65.01	TDS = 0.067 g/l
SW-1	NA	NA	NA	NA	NA	NA	NA	NT	5.93	8.13	70	68.12	TDS = 0.50 g/l
SW-2	NA	NA	NA	NA	NA	NA	NA	NT	5.84	7.03	342	68.48	TDS = 0.244 g/l
SW-3	NA	NA	NA	NA	NA	NA	NA	NT	6.42	6.00	1313	73.87	TDS = 0.882 g/l

NOTES: NA = Not Applicable; NE = Not Established; NT = Not Taken

Samples collected upon completion of purge requirements and stabilization of field parameters.

1573 Main Street, P.O. Box 1743
Brewster, MA 02631

BENNETT ENVIRONMENTAL ASSOCIATES, INC.
LICENSED SITE PROFESSIONALS, ENVIRONMENTAL SCIENTISTS, GEOLOGISTS, ENGINEERS

Phone: (508) 896-1706
Fax: (508) 896-5109

MONITORING WELL SAMPLING LOG

Job Name: Windchime Condominiums

Date(s): 12/7/17 [12/21/17]

Time: 10:00 AM

Tide: Low

Location: 90 Great Neck Road South, Mashpee

Job Number: BEA99-2252

Sampler: Cameron Houdlette

Measuring Point: Ground Surface or T.O.C

TOC

Well Number	Elev. of reference point (feet)	Total Depth of Well (feet)	Depth to Water (feet)	Standing Water Height (feet)	Water Table Elevation (feet)	Static Volume (gallons)	Volume Purged (gallons)	HNU PI-101 (ppm)	pH	Dissolved Oxygen (mg/L)	Conductivity	Temperature (F)	Comments:
B-2R	60.50	59.00	50.80	8.20	9.70	1.31	5.5	NT	5.23	5.95	248	53.3	TDS = 0.1495 g/l
MW-3R	59.58	59.47	49.03	10.44	10.55	1.67	6.0	NT	5.48	1.84	171	53.2	TDS = 0.1378 g/l
MW-1	45.52	50.70	37.62	13.08	7.90	2.09	3.0	NT	5.86	5.25	204	53.1	TDS = 0.1489 g/l
MW-2	37.42	36.20	29.88	6.32	7.54	1.01	4.0	NT	6.05	6.13	302	55.4	TDS = 0.2132 g/l
MW-4	47.59	47.50	39.58	7.92	8.01	1.27	4.0	NT	5.52	6.60	166	53.5	TDS = 0.1261 g/l
PZ-1R	3.46	4.00	2.50	1.50	0.96	0.24	2.0	NT	6.54	4.15	82	47.8	TDS = 0.0507 g/l
PZ-2R	5.48	5.50	3.25	2.25	2.23	0.36	2.0	NT	6.29	4.75	294	50.5	TDS = 0.2145 g/l
PZ-3R	3.41	5.00	0.77	4.23	2.64	0.68	2.0	NT	6.89	4.55	73	51.4	TDS = 0.0455 g/l
SW-1	NA	NA	NA	NA	NA	NA	NA	NA	6.52	6.21	293	47.3	TDS = 0.0722 g/l
SW-2	NA	NA	NA	NA	NA	NA	NA	NA	6.62	7.40	241	47.8	TDS = 0.1911 g/l
SW-3	NA	NA	NA	NA	NA	NA	NA	NA	6.51	7.74	122	48.1	TDS = 0.3335 g/l

NOTES: NA = Not Applicable; NE = Not Established; NT = Not Taken

APPENDIX C

Groundwater Discharge Permit list

Permit Per Issued	Permit Expires:	Reg Town	Project Name / Location	Flow	Applicant	Contact:
179 08/25/2009	8/25/2018	SE CARVER	OCEAN SPRAY CRANBERRIES 60 FEDERAL ROAD	75000	OCEAN SPRAY CRANBERRIES, INC. 152 BRIDGE STREET MIDDLEBORO, MA 02346	PATRICIA GALLAGHER
184 08/29/2013	8/29/2018	SE HANOVER	HANOVER MALL WWTF 1775 WASHINGTON ST	85000	1775 WASHINGTON STREET HOLDINGS, LLC c/o CW Capital Asset Management 2600 Michelson Drive, suite 1700 IRVINE, CA 92612	MICHAEL MILLER
187 12/20/2007	12/20/2016	SE ORLEANS	TRI-TOWN SEPTAGE 29 OVERLAND WAY	45000	ORLEANS BREWSTER EASTHAM GWPD 29 OVERLAND WAY/P.O. BOX 2773 ORLEANS, MA 02653	JAMES BURGESS
188 12/05/2003	12/5/2012	W HANCOCK	JIMINY PEAK COREY ROAD	100000	JIMINY PEAK INC. 37 COREY ROAD HANCOCK, MA 01237	BRIAN FAIRBANK
191 06/03/2008	6/3/2017	SE KINGSTON	TOWN & COUNTRY MOBILE HOMES, INC SUMMER STREET	31400	TOWN & COUNTRY MOBILE HOMES, INC 216 SUMMER STREET KINGSTON, MA 02360	LINDA BENEA
200 06/15/2006	6/15/2015	SE NANTUCKET	SURFSIDE WWTP SOUTHSHORE ROAD	5800000	Nantucket Department of Public Works 188 Madaket Road Nantucket, MA 02554	Kara Buzanoski
201 09/07/2001	9/7/2006	SE NANTUCKET	SIASCONSET WWTP 1 LOW BEACH ROAD	220000	TOWN OF NANTUCKET 188 MADAKET ROAD NANTUCKET, MA 02554	Board of Selectmen
221 03/19/2009	3/19/2018	SE PLYMOUTH	PLYMOUTH SOUTH HIGH SCHOOL 490 LONG POND ROAD	40000	TOWN OF PLYMOUTH PUBLIC SCHOOLS 10 OAK STREET PLYMOUTH, MA 02360	ARTHUR MONTROND
226 02/17/2009	2/17/2018	SE PLYMOUTH	SUMMER HILL CONDO. SUMMER ST	48970	c/o THE DOLBEN COMPANY 25 CORPORATE DRIVE/SUITE 210 BURLINGTON, MA 01803	JAMES BROWN
249 12/17/2007	12/17/2016	CE STURBRIDGE	PILOT TRAVEL CENTER 400 HAYNES STREET, ROUTE 15	37000	PILOT TRAVEL CENTERS, LLC 5508 LONAS ROAD KNOXVILLE, TN 37909	Joey Cupp
250 06/02/2009	6/2/2018	NE MIDDLETON	FULLER POND VILLAGE STONY BROOK LANE	48000	Fuller Pond Condominium Trust 8 Meeting House Square Middlebn, MA 01949	Marcia Good
258 10/15/2013	10/15/2018	SE PLYMOUTH	WHITE CLIFFS CONDO. STATE ROAD	80000	WHITE CLIFFS COMMUNITY ASSOC. ONE EAST CLIFFS DRIVE PLYMOUTH, MA 02360	DAVID MASTROIANNI
259 11/25/2009	11/25/2018	CE ACTON	GREAT ROAD CONDOMINIUMS GREAT ROAD	27720	GREAT ROAD CONDO. ASSOCIATION 380 C GREAT ROAD ACTON, MA 01718	EDIE FUSCIONE
263 04/10/2007	4/10/2016	SE WASHPEE	WINDCHIME POINT GREAT NECK ROAD	40000	WINDCHIME POINT CONDOMINIUM TRUST CO MERCANTILE PROPERTY MGM:PO BOX 790 BUZZARDS BAY, MA 02532	WILLIAM MACKEY
265 11/30/1992	11/30/1997	SE CARVER	CARVER HIGH WWTF SOUTH MEADOW ROAD	30000	CARVER HIGH SCHOOL SOUTH MEADOW ROAD CARVER, MA 02330	Paul MacDonald

Groundwater Discharge Permit list

Permit Per Issued	Permit Expires:	Reg Town	Project Name / location	Flow	Applicant	Contact:
272	05/12/2006	5/12/2015 SE MASHPEE	SOUTHPORT ON CAPE COD RTE 151 AND OLD BARNSTABLE RD	172000	SOUTHPORT ON CAPE COD CONDO. A 42 MEADOW BROOK ROAD MASHPEE, MA 02649	
288	08/28/2006	8/28/2015 CE ACTON	ACORN PARK CONDO. TRUST OFF ACORN PARK DRIVE	39750	HEAD TRUSTEE ACORN PARK CONDO 5 PALMER LANE ACTON, MA 01720	JAMES RUSSELL
299	08/07/2006	8/7/2015 CE STOW	BOSE CORPORATION 40 OLD BOLTON ROAD	48000	BOSE CORPORATION THE MOUNTAIN FRAMINGHAM, MA 01701	Gary Christenson
304	02/28/2007	2/28/2016 SE PLYMOUTH	OCEAN POINT CONDOS. TAYLOR AVE	30000	C/O BROOKS MANAGEMENT 1017 TURNPIKE STREET CANTON, MA 02021	DAVID AXBERG
305	03/15/2011	3/15/2020 SE YARMOUTH	MAYFLOWER PLACE 579 BUCK ISLAND ROAD	25000	West Yarmouth Property I, LLC c/o Aviv Reit, Inc 303 West Madison Street, suite 2400 Chicago, IL 60606	Steven J Insoff, President
306	07/14/2009	7/14/2018 SE MASHPEE	MASHPEE COMMONS GREAT NECK ROAD	180000	MASHPEE COMMONS LTD PARTNSHIP P.O. BOX 1530 MASHPEE, MA 02649	DOUG STORRS
307	07/21/2008	7/21/2017 SE YARMOUTH	KING'S WAY CONDOMINIUM 10 KING'S CIRCUIT	165000	KING'S WAY TRUST 10 KING'S CIRCUIT YARMOUTHPORT, MA 02675	RICHARD OMUNDSEN
312	10/29/2007	10/29/2016 SE SEEKONK	SHIVA, LLC 213 TAUNTON AVENUE	29000	JOHNSON & WALES UNIVERSITY 213 TAUNTON AVENUE SEEKONK, MA 02771	KATHY KAVANAGH
324	02/25/2009	2/25/2018 SE HARWICH	SNOW INN 23 SNOW INN ROAD	80000	WYCHIMERE HOLDINGS CORP. TRUSTEE WYCHIMERE SHORES CONDOMINIUM TRUST 23 SNOW INN ROAD HARWICH, MA 02645	
344	04/21/2009	4/21/2018 SE YARMOUTH	THIRWOOD PLACE 237 NORTH MAIN STREET	24000	FLAX POND NOMINEE TRUST 20 NORTH MAIN STREET SOUTH YARMOUTH, MA 02664	GERALD STREET
350	02/10/2009	2/10/2018 W LANESBORO	BERKSHIRE MALL WWTF ROUTE 8 AND OLD STATE ROAD	70000	BERKSHIRE MALL GROUP P.O. BOX 1-3 LANESBOROUGH, MA 01237	JOSEPH SCELISI
350	02/10/2009	2/10/2018 W LANESBORO	BERKSHIRE MALL WWTF ROUTE 8 AND OLD STATE ROAD	70000	U.S. Bank National Association	
357	05/15/2009	5/15/2018 SE HARWICH	CRANBERRY POINT @ HARWICH 111 HEADWATERS DRIVE	12800	EPOCH SL VII, INC. 111 HEADWATERS DRIVE HARWICH, MA 02845	DAVID WISNIEWSKI
362	07/21/2008	7/21/2017 CE LUNENBURG	LAKE SHORE VILWOODLANDS ROYAL FERN DRIVE	12500	C/O HODAN MANAGEMENT LTD P.O. BOX 8397 BOSTON, MA 02114	RANDALL SPEARE
363	03/27/2007	3/27/2016 SE BRIDGEWATER	NICE N' CLEAN CAR WASH 812 BEDFORD STREET (RTE. 18)	14625	NICE N' CLEAN CAR WASH P.O. BOX 387 W BRIDGEWATER, MA 02379	MICHAEL DEEB



University of Massachusetts Dartmouth

The School for Marine Science and Technology

Massachusetts
Department of
Environmental
Protection



Massachusetts Estuaries Project

Linked Watershed-Embayment Model to Determine Critical Nitrogen Loading Thresholds for Popponesset Bay, Mashpee and Barnstable, Massachusetts

Executive Summary

1. Background

This report presents the results generated from the implementation of the Massachusetts Estuaries Project's Linked Watershed-Embayment Approach to the Popponesset Bay System a coastal embayment within the Towns of Mashpee and Barnstable, Massachusetts. Analyses of the Popponesset Bay System was performed to assist the Towns with up-coming nitrogen management decisions associated with the Towns' current and future wastewater planning efforts, as well as wetland restoration, anadromous fish runs, shell fishery, open-space, and harbor maintenance programs. As part of the MEP approach, habitat assessment was conducted on the embayment based upon available water quality monitoring data, historical changes in eelgrass distribution, time-series water column oxygen measurements, and benthic community structure. Nitrogen loading thresholds for use as goals for watershed nitrogen management are the major product of the MEP effort. In this way, the MEP offers a science-based management approach to support the Towns of Mashpee and Barnstable resource planning and decision-making process. The primary products of this effort are: (1) a current quantitative assessment of the nutrient related health of the Popponesset Bay System, (2) identification of all nitrogen sources (and their respective N loads) to Bay waters, (3) nitrogen threshold levels for maintaining Massachusetts Water Quality Standards within embayment waters, (4) analysis of watershed nitrogen loading reduction to achieve the N threshold concentrations in Bay waters, and (5) a functional calibrated and validated Linked Watershed-Embayment modeling tool that can be readily used for evaluation of nitrogen management alternatives (to be developed by the Towns) for the restoration of the Popponesset Bay System.

Wastewater Planning: As increasing numbers of people occupy coastal watersheds, the associated coastal waters receive increasing pollutant loads. Coastal embayments throughout the Commonwealth of Massachusetts (and along the U.S. eastern seaboard) are becoming nutrient enriched. The elevated nutrients levels are primarily related to the land use impacts associated with the increasing population within the coastal zone over the past half-century.

The regional effects of both nutrient loading and bacterial contamination span the spectrum from environmental to socio-economic impacts and have direct consequences to the culture, economy, and tax base of Massachusetts's coastal communities. The primary nutrient causing the increasing impairment of our coastal embayments is nitrogen, with its primary sources being wastewater disposal, and nonpoint source runoff that carries nitrogen (e.g. fertilizers) from a range of other sources. Nitrogen related water quality decline represents one of the most serious threats to the ecological health of the nearshore coastal waters. Coastal embayments, because of their shallow nature and large shoreline area, are generally the first coastal systems to show the effect of nutrient pollution from terrestrial sources.

In particular, the Popponesset Bay System within the Towns of Mashpee and Barnstable is at risk of eutrophication (over enrichment) from enhanced nitrogen loads entering through groundwater and surface water from its increasingly developed watersheds. Eutrophication is a process that occurs naturally and gradually over a period of tens or hundreds of years. However, human-related (anthropogenic) sources of nitrogen may be introduced into ecosystems at an accelerated rate that cannot be easily absorbed, resulting in a phenomenon known as cultural eutrophication. In both marine and freshwater systems, cultural eutrophication results in degraded water quality, adverse impacts to ecosystems, and limits on the use of water resources.

The Town of Mashpee has recognized the severity of the problem of eutrophication and the need for watershed nutrient management and is currently developing a Comprehensive Wastewater Management Plan, which it plans to rapidly implement. The Town of Barnstable has already completed and implemented wastewater planning in other regions of the Town not associated with Popponesset Bay. Both Towns have nutrient management activities related to their tidal embayments, which have been associated with the MEP effort in Popponesset Bay. These groups have recognized that a rigorous scientific approach yielding site-specific nitrogen loading targets was required for decision-making and alternatives analysis. The completion of this multi-step process has taken place under the programmatic umbrella of the Massachusetts Estuaries Project, which is a partnership effort between all MEP collaborators and the Towns. The modeling tools developed as part of this program provide the quantitative information necessary for the Towns' nutrient management groups to predict the impacts on water quality from a variety of proposed management scenarios.

Nitrogen Loading Thresholds and Watershed Nitrogen Management: Realizing the need for scientifically defensible management tools has resulted in a focus on determining the aquatic system's assimilative capacity for nitrogen. The highest-level approach is to directly link the watershed nitrogen inputs with embayment hydrodynamics to produce water quality results that can be validated by water quality monitoring programs. This approach when linked to state-of-the-art habitat assessments yields accurate determination of the "allowable N concentration increase" or "threshold nitrogen concentration". These determined nitrogen concentrations are then directly relatable to the watershed nitrogen loading, which also accounts for the spatial distribution of the nitrogen sources, not just the total load. As such, changes in nitrogen load from differing parts of the embayment watershed can be evaluated relative to the degree to which those load changes drive embayment water column nitrogen concentrations toward the "threshold" for the embayment system. To increase certainty, the "Linked" Model is independently calibrated and validated for each embayment.

Massachusetts Estuaries Project Approach: The Massachusetts Department of Environmental Protection (DEP), the University of Massachusetts – Dartmouth School of Marine Science and Technology (SMST), and others including the Cape Cod Commission (CCC)

have undertaken the task of providing a quantitative tool to communities throughout southeastern Massachusetts (the Linked Watershed-Embayment Management Model) for nutrient management in their coastal embayment systems. Ultimately, use of the Linked Watershed-Embayment Management Model tool by municipalities in the region results in effective screening of nitrogen reduction approaches and eventual restoration and protection of valuable coastal resources. The MEP provides technical guidance in support of policies on nitrogen loading to embayments, wastewater management decisions, and establishment of nitrogen Total Maximum Daily Loads (TMDLs). A TMDL represents the greatest amount of a pollutant that a waterbody can accept and still meet water quality standards for protecting public health and maintaining the designated beneficial uses of those waters for drinking, swimming, recreation and fishing. The MEP modeling approach assesses available options for meeting selected nitrogen goals that are protective of embayment health and achieve water quality standards.

The core of the Massachusetts Estuaries Project analytical method is the Linked Watershed-Embayment Management Modeling Approach, which links watershed inputs with embayment circulation and nitrogen characteristics.

The Linked Model builds on well-accepted basic watershed nitrogen loading approaches such as those used in the Buzzards Bay Project, the CCC models, and other relevant models. However, the Linked Model differs from other nitrogen management models in that it:

- requires site-specific measurements within each watershed and embayment;
- uses realistic "best-estimates" of nitrogen loads from each land-use (as opposed to loads with built-in "safety factors" like Title 5 design loads);
- spatially distributes the watershed nitrogen loading to the embayment;
- accounts for nitrogen attenuation during transport to the embayment;
- includes a 2D or 3D embayment circulation model depending on embayment structure;
- accounts for basin structure, tidal variations, and dispersion within the embayment;
- includes nitrogen regenerated within the embayment;
- is validated by both independent hydrodynamic, nitrogen concentration, and ecological data;
- is calibrated and validated with field data prior to generation of "what if" scenarios.

The Linked Model Approach's greatest assets are its ability to be clearly calibrated and validated, and its utility as a management tool for testing "what if" scenarios for evaluating watershed nitrogen management options.

For a comprehensive description of the Linked Model, please refer to the *Full Report: Nitrogen Modeling to Support Watershed Management: Comparison of Approaches and Sensitivity Analysis*, available for download at <http://www.state.ma.us/dep/smerp/smerp.htm>. A more basic discussion of the Linked Model is also provided in Appendix F of the *Massachusetts Estuaries Project Embayment Restoration Guidance for Implementation Strategies*, available for download at <http://www.state.ma.us/dep/smerp/smerp.htm>. The Linked Model suggests which management solutions will adequately protect or restore embayment water quality by enabling towns to test specific management scenarios and weigh the resulting water quality impact against the cost of that approach. In addition to the management scenarios modeled for this report, the Linked Model can be used to evaluate additional management scenarios and may be updated to reflect future changes in land-use within an embayment watershed or changing embayment characteristics. In addition, since the Model uses a holistic approach (the entire watershed, embayment and tidal source waters), it can be used to evaluate all projects as they

relate directly or indirectly to water quality conditions within its geographic boundaries. Unlike many approaches, the Linked Model accounts for nutrient sources, attenuation, and recycling and variations in tidal hydrodynamics and accommodates the spatial distribution of these processes. For an overview of several management scenarios that may be employed to restore embayment water quality, see *Massachusetts Estuaries Project Embayment Restoration Guidance for Implementation Strategies*, available for download at <http://www.state.ma.us/dep/smerp/smerp.htm>.

Application of MEP Approach: The Linked Model was applied to the Popponesset Bay embayment system using site-specific data collected by the MEP and water quality data from the Popponesset Bay Water Quality Monitoring Program (see Chapter 2). Evaluation of upland nitrogen loading was conducted by the MEP, data was provided by the Town of Mashpee Planning Department and Town of Barnstable, and watershed boundaries delineated by USGS. This land-use data was used to determine watershed nitrogen loads within Popponesset Bay and its sub-embayments (current and build-out loads are summarized in Table IV-3). Water quality within each sub-embayment is the integration of nitrogen loads with the site-specific estuarine circulation. Therefore, water quality modeling of these tidally influenced estuaries included a thorough evaluation of the hydrodynamics of the estuarine system. Estuarine hydrodynamics control a variety of coastal processes including tidal flushing, pollutant dispersion, tidal currents, sedimentation, erosion, and water levels. Once the hydrodynamics of the system was quantified, transport of nitrogen was evaluated from tidal current information developed by the numerical models.

A two-dimensional depth-averaged hydrodynamic model based upon the tidal currents and water elevations was employed for the Popponesset Bay embayment system. Once the hydrodynamic properties of the estuarine system was computed, two-dimensional water quality model simulations were used to predict the dispersion of the nitrogen at current loading rates. Using standard dispersion relationships for estuarine systems of this type, the water quality model and the hydrodynamic model was then integrated in order to generate estimates regarding the spread of total nitrogen from the site-specific hydrodynamic properties. The distributions of nitrogen loads from watershed sources were determined from land-use analysis while nitrogen entering Mashpee's coastal embayment was quantified by direct measurement of stream nutrient concentrations and freshwater flow, predominantly groundwater, in streams discharging directly to the embayment. Boundary nutrient concentrations in Nantucket Sound source waters were taken from water quality monitoring data. Measurements of current salinity distributions throughout the estuarine waters of Popponesset Bay were used to calibrate the water quality model, with validation using measured nitrogen concentrations (under existing loading conditions). The underlying hydrodynamic model was calibrated and validated independently using water elevations measured in time series throughout the embayment.

MEP Nitrogen Thresholds Analysis: The threshold nitrogen level for an embayment represents the average water column concentration of nitrogen that will support the habitat quality being sought. The water column nitrogen level is ultimately controlled by the watershed nitrogen load and the nitrogen concentration in the inflowing tidal waters (boundary condition). The water column nitrogen concentration is modified by the extent of sediment regeneration. Threshold nitrogen levels for the embayment systems in this study were developed to restore or maintain SA waters or high habitat quality. High habitat quality was defined as supportive of eelgrass and infaunal communities. Dissolved oxygen and chlorophyll *a* were also considered in the assessment.

The tidally averaged total nitrogen thresholds derived in Section VIII-2 of this report were used to adjust the calibrated constituent transport model developed in Section V of this report. Watershed nitrogen loads were sequentially lowered, using reductions in septic effluent discharges only, until the nitrogen levels reached the threshold levels in each sentinel system within the embayment of interest. Water quality modeling results help to analyze whether a nutrient reduction approach will be effective in meeting a nutrient threshold for a specific embayment. However, the approach for any specific embayment discussed in this report serves as only one manner of achieving the selected threshold level for the sentinel sub-embayment within the estuarine system. The specific examples presented herein do not represent the only method for achieving this goal. It is certain that a more targeted nitrogen reduction program that incorporates more localized wastewater treatment and use of natural attenuation processes will result in the most cost-effective plan for restoring the Popponesset Bay embayment.

The Massachusetts Estuaries Project's thresholds analysis, as presented in this technical report, provides the site-specific nitrogen reduction guidelines for nitrogen management of the Popponesset Bay embayment in the Towns of Mashpee and Barnstable. Future water quality modeling scenarios should be run which incorporate the spectrum of strategies that result in nitrogen loading reduction to the embayment. The MEP analysis has initially focused upon nitrogen loads from on-site septic systems as a test of the potential for achieving the level of total nitrogen reduction for restoration of each embayment system. The concept was that since septic system nitrogen loads generally represent 75%-80% of the watershed load to the Popponesset Bay System and are more manageable than other of the nitrogen sources, the ability to achieve needed reductions through this source is a good gauge of the feasibility for restoration of these systems.

2. Problem Assessment (Current Conditions)

Habitat assessments were conducted on each sub-embayment to Popponesset Bay based upon available water quality monitoring data, historical changes in eelgrass distribution, time-series water column oxygen measurements, and benthic community structure. The Popponesset Bay System and its sub-embayments (Pinquickset Cove, Ockway Bay, Shoestring Bay, Mashpee River, Popponesset Bay central basin) showed variations in habitat quality, both between sub-embayments and along the longitudinal axis of the larger sub-embayments such as Shoestring Bay. In general, sub-embayments show declining habitat quality moving from the inlet to the inland-most tidal reach. This trend is seen in both the nitrogen levels (highest inland), eelgrass distribution, infaunal community stress indicators and community properties, as well as summer dissolved oxygen and chlorophyll a records. The following is a brief synopsis of the present habitat quality within each of the sub-embayments. The underlying quantitative data is presented on nitrogen (Section VI.1.3), oxygen and chlorophyll a (Section VII.2), eelgrass (Section VII.3), and benthic infauna (Section VII.4).

Combining the dissolved oxygen and chlorophyll a data yields a clear pattern of nutrient related habitat quality (based on these parameters only). At present, the central basin of Popponesset Bay supports relatively healthy habitat conditions, with consistently high bottom water dissolved oxygen and only modest phytoplankton blooms during summer. In contrast, the other regions of the System have moderate to high levels of nitrogen related impairment. Shoestring Bay shows both periodic oxygen declines and significant phytoplankton blooms, while Ockway Bay has similar oxygen declines, but apparently less phytoplankton biomass. Farther along the gradient in nutrient enrichment is the estuarine region of the Mashpee River, which has extreme oxygen excursions and night-time oxygen depletion on a consistent basis and significant phytoplankton blooms. The major issue with the Mashpee River is the extent to

which, its structure as a salt marsh system ameliorates the impact of these water quality features. However, even as a salt marsh these levels of chlorophyll a and oxygen excursion indicate a moderate level of impairment. Based upon the dissolved oxygen and chlorophyll data the ranking of the Popponneset Bay System components is as follows:

- Popponneset Bay Central Basin -- high quality
- Popponneset Bay upper/confluence, Shoestring & Ockway Bays
--significantly impaired
- Mashpee River
-- significantly impaired to degraded (relative to embayments)
-- moderately to significantly impaired (relative to salt marshes)

At present, the Popponneset Bay System does not support eelgrass. In addition, to the DEP mapping, this has been confirmed during the various MEP surveys for infauna and sediment sampling and the moored instrument studies. The current lack of eelgrass is expected, given the high chlorophyll a and low dissolved oxygen levels and the watercolumn nitrogen concentrations within this system. However, it appears that a substantial area of the central basin did support an extensive eelgrass bed in 1951. In addition, there were smaller beds within the upper region of the main basin, at the mouth to Shoestring Bay. The spatial distribution of these beds is consistent with the pattern of nitrogen related habitat quality, which is currently observed within the System. However, the 1951 nitrogen levels would have been much lower than present levels given the difference in projected watershed nitrogen loading from 1951 versus 2003 population. It appears that as the Bay became nutrient enriched, that the Popponneset Bay basin could no longer support eelgrass. However, it is likely that if nitrogen loading were to decrease that eelgrass could first be restored in the lower portion of the main basin and with further reductions, be restored to the 1951 pattern.

It is significant that eelgrass was not detected Shoestring Bay and Ockway Bay in the 1951 data. It appears that these sub-embayments are not supportive of this type of habitat. Given the structure of these sub-embayments and their sediment types, it appears that they are natural depositional basins and may not be conducive to supporting rooted macrophytes. The lack of eelgrass in the Mashpee River is consistent with its role as a salt marsh system, which drains completely at low tide in some regions and which is "naturally" organic rich. For these reasons, salt marshes typically do not support eelgrass beds within their main channels.

The Infauna Study indicated that all areas but the lower station within the central basin of Popponneset Bay are presently moderately to severely degraded (Table VII-5). Upper Ockway Bay was found to support the poorest infaunal communities within the System. This is based upon the very low number of species and individuals observed in the sediments of Ockway Bay. Although the 2 species that were found (compared to 31 in the central basin) were indicative of healthy conditions, the low numbers (20's compared to 400-500 typically) indicated that this system is not presently supporting a viable community. The Mashpee River sites supported a higher quality habitat related to its function as a riverine salt marsh. The stress indicator species present were dominated by *Cyathura polita*, which is tolerant of the natural salinity stress that helps to define this marsh system. However, the total numbers of individuals and diversity was low, indicative of a significantly impaired resource, even as a salt marsh. Shoestring Bay and the uppermost portion of the Popponneset Bay central basin both showed a resource between moderate and significant impairment. The numbers of individuals was generally high (500-600 per 0.018 m²) representing a moderate number of species. Diversity was also moderate to high and distributed between indicators of healthy and stressed conditions (Table VII-6), again indicative of moderate impairment. In contrast the Lower Popponneset Bay station

supports a relatively healthy infaunal community, with nearly double the species of other sites and high numbers of individuals (~500 per 0.018 m²). The high diversity (H') and general evenness (E) are consistent with a healthy community. The indication of moderate impairment stems from the presence of stress indicator species. The overall results indicate a system capable of supporting diverse healthy communities in the region nearest the tidal inlet with most of the system having infaunal habitat that is significantly impaired under present nitrogen loading conditions.

3. Conclusions of the Analysis

The threshold nitrogen level for an embayment represents the average watercolumn concentration of nitrogen that will support the habitat quality being sought. The watercolumn nitrogen level is ultimately controlled by the integration of the watershed nitrogen load, the nitrogen concentration in the inflowing tidal waters (boundary condition) and dilution and flushing via tidal flows. The water column nitrogen concentration is modified by the extent of sediment regeneration and by direct atmospheric deposition.

Threshold nitrogen levels for each of the sub-embayment systems in this study were developed to restore or maintain SA waters or high habitat quality. In these systems, high habitat quality was defined as supportive of eelgrass and diverse benthic benthos animal communities. Dissolved oxygen and chlorophyll *a* were also considered in the assessment.

Watershed nitrogen loads (Tables ES-1 and ES-2) for the Towns of Mashpee and Barnstable Popponesset Bay embayment system was comprised primarily of wastewater nitrogen. Land-use and wastewater analysis found that generally about 75%-80% of the watershed nitrogen load to an embayment was from wastewater.

A major finding of the MEP is clearly not a single total nitrogen threshold that can be applied to Massachusetts' estuaries, based upon the results of the Popponesset Bay System and the Pleasant Bay and Nantucket Sound embayments associated with the Town of Chatham. This is almost certainly going to be true for the other embayments within the MEP area, as well.

The threshold nitrogen levels for the Popponesset Bay embayment system was determined as follows:

- The target nitrogen concentration for restoration of eelgrass in this system was determined to be 0.38 mg TN L⁻¹. The value stems from (1) the analysis of Stage Harbor, Chatham which also exchanges tidal water with Nantucket Sound and for which a MEP target has already been set), (2) analysis of nitrogen levels within the vestigial eelgrass bed in adjacent Waquoit Bay, near the inlet (measured TN of 0.395 mg N L⁻¹, tidally corrected <0.38 mg N L⁻¹), and (3) a similar analysis in West Falmouth Harbor. Threshold values relating to eelgrass restoration was based upon these other Cape Cod systems with similar nitrogen dynamics, since there are presently no remaining eelgrass beds within Popponesset Bay (or even adjacent Three Bays).
- The sentinel station was located within the upper region of the central basin to Popponesset Bay and the mouth of Shoestring Bay, at the uppermost eelgrass bed detected in the 1951 data. Under present loading conditions the sentinel station supports a measured nitrogen level at mid-ebb tide of 0.581 mg TN L⁻¹ and a tidally corrected average concentration of 0.451 mg TN L⁻¹. This location was selected as a

sentinel station because: (1) it was the upper extent of the eelgrass coverage in 1951, (2) restoration of nitrogen conditions supportive of eelgrass at this location will necessarily result in even higher quality conditions throughout the whole of the central basin, and (3) restoration of nitrogen concentrations at this site should result in conditions similar to 1951 within Shoestring and Ockway Bays. Shoestring Bay and Ockway Bay should then be supportive of high quality habitat for benthic infaunal communities

- Based upon sequential reductions in watershed nitrogen loading in the analysis described in the Section VIII-3, the sentinel station achieved an average TN level of 0.371 mg L^{-1} , the mouth of Ockway Bay, $0.376 \text{ mg TN L}^{-1}$ and the whole of the Popponesset Bay basin $<0.331 \text{ mg TN L}^{-1}$.

The data suggest that there is likely a range of total nitrogen which can support healthy infauna within this system. Since Shoestring and Ockway Bays did not support eelgrass in the 1951 data, evaluation was based upon benthic animal habitat.

- Based upon current conditions, the infaunal analysis (Chapter VII) coupled with the nitrogen data (measured and modeled), indicated that nitrogen levels on the order of 0.4 to 0.5 mg TN L^{-1} are supportive of high quality infauna habitat within the Popponesset Bay System.
- The results of the Linked Watershed-Embayment modeling indicated that when the nitrogen threshold level is attained at the sentinel station (Section VIII-3), TN levels in Shoestring and Ockway Bays are consistent with high quality infauna habitat; upper to lower Shoestring Bay, 0.522 to $0.412 \text{ mg TN L}^{-1}$; upper Ockway Bay, $0.421 \text{ mg TN L}^{-1}$; and mid to lower Mashpee River, 0.525 to $0.422 \text{ mg TN L}^{-1}$.
- It appears that achieving the nitrogen target at the sentinel station will be restorative of eelgrass habitat throughout the Popponesset Bay central basin and restorative of infaunal habitat throughout Shoestring and Ockway Bays and the lower portion of the Mashpee River.

It is important to note that the analysis of future nitrogen loading to the Popponesset Bay Estuarine system focuses upon additional shifts in land-use from forest/grasslands to residential and commercial development. However, the MEP analysis indicates that significant increases in nitrogen loading can occur under present land-uses, due to shifts in occupancy, shifts from seasonal to year-round useage and increasing use of fertilizers (presently less than half of the parcels use lawn fertilizers). Therefore, watershed-estuarine nitrogen management must include management approaches to prevent increased nitrogen loading from both shifts in land-uses (new sources) and from loading increases of current land-uses. The overarching conclusion of the MEP analysis of the Popponesset Bay Estuarine System is that restoration will necessitate a reduction in the present (2002) nitrogen inputs and management options to negate additional future nitrogen inputs.

Table ES-1. Existing total and sub-embayment nitrogen loads to the estuarine waters of the Popponesset Bay System, observed nitrogen concentrations, and sentinel system threshold nitrogen concentrations. Loads to estuarine waters of Mashpee River and Shoestring Bay include both upper watershed regions contributing to the major rivers (Mashpee River, Santuit River, Quaker Run) and groundwater dominated lower regions.

Sub-embayments	Natural (unaltered) Watershed Load ¹ (kg/day)	Present Land Use Load ² (kg/day)	Present Septic System Load (kg/day)	Present WWTF Load ³ (kg/day)	Present Watershed Load ⁴ (kg/day)	Present Atmospheric Deposition ⁵ (kg/day)	Present Benthic Flux (kg/day)	Present Total Load ⁶ (kg/day)	Observed TN Conc. ⁷ (mg/L)	Threshold TN Conc. (mg/L)
POPPONESSET BAY SYSTEM										
Mashpee River ^a	5.30	8.01	19.51	0.15	27.67	0.66	11.47	39.80	0.958-	
Shoestring Bay ^a	1.85	7.54	23.00	0.23	30.77	2.23	-11.85	21.15	0.627	--
Ockway Bay	0.24	0.76	2.39	0	3.15	1.09	1.78	6.02	0.690-	--
Pinquicket Cove	0.11	0.19	0.58	0	0.76	0.29	-0.33	0.72	0.677-	--
Popponesset Bay	0.18	1.19	5.57	0	6.76	4.01	-5.04	5.73	0.527	--
System Total	7.68	17.68	51.05	0.38	69.11	8.28	-3.97	73.42	0.485-	0.422
¹ assumes entire watershed is forested (i.e., no anthropogenic sources) ² composed of non-wastewater loads, e.g. fertilizer, runoff, present-day natural surfaces and atmospheric deposition to lakes ³ existing wastewater treatment facility discharges to groundwater ⁴ composed of combined present-day natural surfaces, fertilizer, runoff, and septic system loadings ⁵ atmospheric deposition to embayment surface only ⁶ composed of natural background, fertilizer, runoff, septic system atmospheric deposition and benthic flux loadings ⁷ average of 1997 – 2003 data, ranges show the upper to lower regions (highest-lowest) of an sub-embayment ⁸ Individual yearly means and standard deviations in Table ⁹ Threshold for sentinel site located at the upper portion of Popponesset Bay and Mouth of Shoestring Bay (PBh), infaunal "targets" for Shoestring and Ockway Bays in the range of 0.400 – 0.500 were used to "check" the validity of the sentinel threshold value.										
^a Loads to Shoestring Bay and Mashpee River include loads from rivers.										

Table ES-2. Present Watershed Loads, Thresholds Loads, and the percent reductions necessary to achieve the Thresholds Loads for the Popponesset Bay embayment system, Towns of Mashpee and Barnstable, Massachusetts.

Embayment Systems and Sub-Embayments	Present Watershed Load (1) (kg/day)	Target Threshold Watershed Load (2) (kg/day)	Atmospheric Deposition (kg/day)	Benthic Flux (3) (kg/day)	TMDL (4) (kg/day)	Percent watershed load reductions needed to achieve threshold loads
Popponesset Bay System						
Mashpee River	27.67	13.95	0.66	9.47	24.08	-49.5%
Shoestring Bay	30.77	19.71	2.23	-8.73	13.21	-35.9%
Ockway Bay	3.15	0.76	1.09	1.11	2.96	-75.9%
Pinquisset Cove	0.76	0.76	0.29	-0.33	0.72	0.0%
Popponesset Bay	6.76	2.77	4.01	-4.91	1.87	-59.0%
<p>(1) Composed of combined present-day natural surfaces, fertilizer, runoff, and septic system</p> <p>(2) Target threshold watershed load is the load from the watershed needed to meet the embayment threshold concentration identified in Table ES-1.</p> <p>(3) Projected future flux (present rates reduced approximately proportional to watershed load reductions).</p> <p>(4) Sum of target threshold watershed load, atmospheric deposition load, and benthic flux load.</p>						

APPENDIX D

Mashpee Commons Waste-Water Treatment Facility

Groundwater Discharge Permit #306-4

BEA99-2252

Last Updated: 4/9/2018

EFFLUENT DISCHARGE MONITORING

	Ammonia	Nitrate	Nitrite	TKN	Total N	Avg. Flow
Oct-03	0.5	0.08	BRL	1.6	1.68	14,195
Nov-03	1.0	7.7	0.06	4.10	11.86	12,993
Dec-03	0.5	0.19	0.03	1.20	1.42	12,363
Jan-04	0.1	0.03	0.03	1.8	1.86	14,668
Feb-04	0.1	1.4	0.03	2.9	4.33	14,776
Mar-04	0.2	1.6	0.05	3.1	4.8	14,988
Apr-04	0.4	0.27	0.05	4.0	4.3	14,269
May-04	0.90	0.80	0.09	2.7	3.59	16,486
Jun-04	0.5	0.12	0.07	2.5	2.8	23,165
Jul-04	4.4	2.9	0.08	8.9	11.88	27,134
Aug-04	3.7	2.5	0.09	7.3	9.89	NA
Sep-04	0.1	0.1	0.1	1.5	1.5	NA
	NA	NA	NA	NA	NA	NA
Nov-04	1.70	1.6	0.26	6.9	8.76	NA
Dec-04	1.4	2.1	0.07	3.2	5.4	18,204
Jan-05	0.1	4.6	0.08	5.3	9.8	20,626
Feb-05	0.1	4.5	0.07	3.5	7.9	19,060
Mar-05	0.2	4.1	0.06	4.7	8.8	19,148
Apr-05	0.1	4.2	0.12	3.6	7.9	18,268
May-05	0.4	0.03	0.01	5.9	5.9	21,169
Jun-05	1.4	0.03	0.01	4.6	4.7	27,624
Jul-05	0.5	1.8	0.11	2.4	4.3	29,473
Aug-05	1.2	2.5	0.12	4.4	7.0	31,523
Sep-05	0.6	3.6	0.23	2.8	6.6	19,467
Oct-05	0.3	1.7	0.14	2.0	3.7	19,344
Nov-05	0.1	0.10	0.03	1.8	1.9	17,841
Dec-05	0.4	0.06	0.02	1.3	1.4	4,338
Jan-06	0.3	0.53	0.04	4.1	4.8	18,623
Feb-06	0.5	0.52	0.04	3	3.6	17,653
Mar-06	0.3	3.1	0.03	2.2	5.9	17,115
Apr-06	0.25	5.66	0.01	2.8	8.5	17,326
May-06	0.3	4.5	0.03	5.5	10.03	25,382
Jun-06	0.1	2.7	0.01	3.3	6	29,307
Jul-06	0.5	6.4	0.01	2.8	9.2	38,209
Aug-06	0.1	7.1	0.06	2.5	9.6	32,070
Sep-06	0.1	1.5	0.03	2	3.5	26,914
Oct-06	0.1	0.05	0.02	1.4	1.4	21,605
Nov-06	0.1	0.11	0.01	2	2.1	22,635
Dec-06	0.3	0.78	0.03	2.4	3.2	19,770

	Ammonia	Nitrate	Nitrite	TKN	Total N	Avg. Flow
Jan-07						
Feb-07	0.2	2	0.03	8.9	11	16,750
Mar-07	0.1	3.1	0.03	4	7.1	19,184
Apr-07	0.1	2.2	0.05	2.6	4.8	13,460
May-07	0.3	0.23	0.06	1.5	1.7	20,466
Jun-07	0.1	0.001	0.003	1.5	1.5	26,570
Jul-07	0.1	9.7	0.07	2.1	12	37,930
Aug-07	0.6	2.1	0.03	1.6	3.73	37,513
Sep-07						
Oct-07						
Nov-07	0.5	2.3	0.07	1.9	4.3	28,177
Dec-07	0.7	0.41	0.06	1.7	2.17	28,272

Jan-08	0.39	0.11	0.03	3.11	3.3	24,452
Feb-08	0.7	0.24	0.04	3.1	3.4	20,877
Mar-08	0.1	0.27	0.04	3.5	3.81	16,130
Apr-08	0.3	0.94	0.04	4	4.98	16,083
May-08	0.9	0.78	0.07	7.7	8.55	16,966
Jun-08	0.4	1.5	0.12	2.7	4.32	24,212
Jul-08	0.1	0.87	0.07	3.5	4.44	29,487
Aug-08	23	0.01	0.11	30	30.11	26,741
Sep-08	0.6	0.08	0.04	2.8	2.92	19,452
Oct-08	0.6	0.23	0.05	2.8	3.08	19,312
Nov-08	0.3	1.8	0.05	2.4	4.25	14,419
Dec-08	0.5	0.03	0.01	1.5	0.03	16,793

Jan-09	1.26	0.8	0.03	4.6	5.24	15,313
Feb-09	1.6	0.29	0.03	2.8	3.12	15,447
Mar-09	1.7	4.6	0.03	0.7	5.33	14,303
Apr-09						
May-09	0.1	0.41	0.05	2.6	3.06	16,779
Jun-09	0.5	1.4	0.11	4.9	6.3	19,002
Jul-09	1.2	3.6	0.1	3.4	7.1	23,958
Aug-09		1.1			3.1	25,841
Sep-09		0.01			0.25	20,137
Oct-09		0.01			2.2	15,095
Nov-09		0.01			1	14,613
Dec-09		0.01			1.6	12,151

Jan-10						
Feb-10		0.09			2.2	18,015
Mar-10		0.12			0.15	17,747
Apr-10		0.01			3	16,825
May-10		0.01			2	19,867
Jun-10		0.01			1	24,640
Jul-10		2			3	31,753
Aug-10		0.01			2	25,561
Sep-10		0.01			0.1	24,781
Oct-10		0			1	24,079
Nov-10		0.31			2	22,162
Dec-10		0.36			2.12	21,179

	Ammonia	Nitrate	Nitrite	TKN	Total N	Avg. Flow
Jan-11		0.57			4.67	19,125
Feb-11		0.07			1	16,883
Mar-11		0.73			3	20,651
Apr-11		2.2			4	22,455
May-11		0.47			3	20,865
Jun-11		0.07			1.4	25,867
Jul-11		0.33			2.4	35,123
Aug-11		2.3			3.9	32,315
Sep-11		0.76			5.1	26,812
Oct-11		0.74			2.1	20,371
Nov-11		0.2			2.6	22,715
Dec-11		1.2			2.9	21,042

Jan-12		0.2	0.005	1.8	2	19,441
Feb-12		0.54	0.005	1.9	2.44	16,589
Mar-12		2.3	0.005	2.1	4.4	18,966
Apr-12		1.2	0.005	1.6	2.8	22,208
May-12		2.6	0.005	2.3	4.9	28,877
Jun-12		2.6	0.005	2.1	4.7	29,919
Jul-12		0.08	0.005	2.1	2.18	39,296
Aug-12		0.07	0.005	1.2	1.27	32,862
Sep-12		0.005	0.005	1.3	1.3	25,854
Oct-12		2.6	0.005	1.4	4	21,012
Nov-12		1.2	0.005	1.2	2.4	22,704
Dec-12		2.7	0.005	1.8	4.5	20,670

Jan-13		3.9	0.005	1.8	5.7	20,742
Feb-13		0.82	0.005	1.9	2.72	20,189
Mar-13		2.3	0.005	1.6	3.9	19,711
Apr-13		2.2	0.005	1.7	3.9	21,528
May-13		1.8	0.005	2	3.8	24,827
Jun-13		1	0.005	2.1	3.1	27,971
Jul-13		3.2	0.025	2.5	5.7	35,676
Aug-13		0.44	0.025	2	2.44	34,787
Sep-13		0.23	0.025	1.6	1.83	25,027
Oct-13		0.71	0.025	2.1	2.81	24,532
Nov-13		0.94	0.025	1.7	2.64	18,211
Dec-13		1.1	0.025	1.5	2.6	17,848

Jan-14		1.3	0.025	1.5	2.8	15,459
Feb-14		4.8	0.025	4.1	8.9	21,194
Mar-14		2.5	0.025	4.6	7.1	20,066
Apr-14		0.06	0.025	47	47.06	18,893
May-14		0.025	0.025	14	14	23,476
Jun-14		5.3	0.025	1	6.3	35,638
Jul-14		5.1	0.025	1.1	6.2	37,757
Aug-14		3.7	0.025	1.1	4.8	42,772
Sep-14		3.4	0.025	1	4.4	33,686
Oct-14		1.2	0.025	0.94	2.14	27,478
Nov-14		3.7	0.025	1.2	4.9	32,989
Dec-14		1.9	0.025	0.74	2.64	34,421

	Ammonia	Nitrate	Nitrite	TKN	Total N	Avg. Flow
Jan-15		5.6	0.025	0.73	6.33	32,450
Feb-15		4.1	0.025	1.2	5.3	25,862
Mar-15		1.7	0.025	1.1	2.8	31,941
Apr-15		3.3	0.025	1.6	4.9	31,947
May-15		3.3	0.025	1.5	4.8	33,530
Jun-15		2.6	0.025	1	3.6	31,843
Jul-15		3	0.025	0.93	3.93	38,000
Aug-15		4.2	0.025	1.1	5.3	41,157
Sep-15		2.4	0.025	0.86	3.26	32,576
Oct-15		2.5	0.1	0.78	3.28	33,527
Nov-15		3.2	0.1	1.3	4.5	34,706
Dec-15		2.1	0.1	1	3.1	32,948

Jan-16		1.1	0.1	0.98	2.08	30,757
Feb-16		0.96	0.125	1.9	2.86	28,537
Mar-16		0.5	0.125	1.3	1.8	28,088
Apr-16		0.44	0.125	0.74	1.18	32,191
May-16		0.39	0.125	1.1	1.49	35,379
Jun-16		1.6	0.125	0.95	2.55	38,255
Jul-16		1.1	0.125	0.93	2.03	50,066
Aug-16		2.8	0.125	0.95	3.75	51,243
Sep-16		1.2	0.125	1	2.2	45,517
Oct-16		1	0.125	0.89	1.89	41,489
Nov-16		0.69	0.125	0.89	1.58	37,863
Dec-16		0.98	0.28	2.14	2.14	43,324

Jan-17		0.125	0.125	0.84	0.84	39,885
Feb-17		1	0.125	0.84	1.84	43,599
Mar-17		0.125	0.125	0.83	0.83	39,455
Apr-17		1.3	0.125	1.2	2.5	40,313
May-17		1.1	0.125	0.81	1.91	36,156
Jun-17		0.99	0.125	1	1.99	41,918
Jul-17		0.28	0.125	0.84	1.12	56,938
Aug-17		2.2	0.125	0.95	3.15	50,461
Sep-17		1.5	0.125	1.1	2.6	43,657
Oct-17		0.78	0.125	1.5	2.28	38,762
Nov-17		2.4			3.8	35,760
Dec-17						

- Notes:
1. NT = not tested
 2. NA = not available
 3. Blue indicates value reported as below reporting limit, listed as half of reporting limit.
 4. Green highlight indicates data not available at the Mashpee Board of Health

Windchime Point Condominiums Waste-Water Treatment Facility
Groundwater Discharge Permit #263-3

BEA99-2252

Last Updated: 4/9/2018

EFFLUENT DISCHARGE MONITORING

	Ammonia	Nitrate	Nitrite	TKN	Total N	Total Phos	Avg. Flow
10/24/2003	1.68	2.33	0.01	3.64	5.97		NA
11/25/2003	0.56	1.84	0.01	2.24	4.08		NA
12/11/2003	0.25	6.54	0.01	1.40	7.94		NA
1/15/2004	1.12	4.56	0.01	3.08	7.64		NA
2/24/2004	1.40	3.59	0.01	2.80	6.39		NA
3/19/2004	0.56	4.66	0.01	3.08	7.74		NA
4/27/2004	7.28	0.68	0.01	11.7	12.40		NA
5/26/2004	2.80	0.84	0.01	5.04	5.88		NA
6/24/2004	2.52	0.46	0.01	4.48	4.94		NA
7/28/2004	1.12	4.33	0.01	3.36	7.69		NA
8/26/2004	1.68	0.30	0.01	2.80	3.10		NA
9/28/2004	1.96	1.84	0.01	3.64	5.48		NA
10/22/2004	1.68	1.94	0.01	2.24	4.18		NA
11/23/2004	1.12	1.46	0.01	1.96	3.42		NA
12/22/2004	1.40	1.31	0.01	2.80	4.11		10,332
1/30/2005	1.12	3.42	0.01	1.40	4.82		9,011
2/18/2005	1.12	2.44	0.01	2.80	5.24		8,751
3/24/2005	1.68	1.77	0.01	3.08	4.85		8,877
4/27/2005	0.25	1.68	0.01	3.64	5.32		8,568
5/18/2005	2.80	0.56	0.01	3.92	4.48		10,078
6/30/2005	1.40	0.025	0.01	5.04	5.04		11,031
7/21/2005	3.08	0.025	0.01	6.72	6.72		14,170
9/1/2005	4.76	0.20	0.01	7.84	8.04		11,625
9/28/2005	0.56	5.38	0.840	3.64	9.86		10,177
10/18/2005	0.25	8.40	0.460	3.64	12.50		10,842
11/18/2005	1.4	21.40	0.340	3.08	24.80		8,850
11/30/2005	NT	2.17	0.150	1.68	4.00		A/A
12/22/2005	0.84	7.02	0.120	4.20	11.30		10,940
1/26/2006	1.12	4.88	0.130	3.64	8.65		3,121
2/16/2006	0.25	5.22	0.175	3.36	8.76		8,661
3/23/2006	0.25	7.76	0.200	4.76	12.80		
4/27/2006	2.24	1.66	0.01	6.72	8.40		
5/31/2006	3.92	1.58	0.01	8.68	10.30		
6/29/2006	4.2	0.025	0.01	9.52	9.50		
7/27/2006	2.8	0.43	0.01	7.28	7.70		
8/31/2006	4.2	4.20	0.300	6.72	11.20		
9/25/2006	1.96	2.38	0.210	5.32	7.90		
10/24/2006	3.1	10.40	0.01	5.04	15.40		
11/21/2006	2.2	7.30	0.165	5.2	12.70		
12/19/2006	2.8	5.10	0.085	5.8	11.00		

	Ammonia	Nitrate	Nitrite	TKN	Total N	Total Phos	Avg. Flow
1/30/2007	1.8	9.09	0.155	3.90	13.20	7.37	
2/15/2007	2.4	2.88	0.235	4.50	7.60	7.53	
3/27/2007	2	2.34	0.01	3.80	6.10	6.17	
4/24/2007	2.7	4.95	0.01	3.40	8.40	4.6	
5/22/2007	2.7	4.70	0.175	5.00	9.90	8.8	
6/28/2007	3.1	0.025	0.140	4.48	4.60	9.2	
7/19/2007	6	1.330	0.450	10.20	11.90	9.77	
8/30/2007	3.8	0.025	0.915	7.56	8.50	8.08	
9/26/2007	3.4	1.66	0.74	6.86	9.30	6	
10/31/2007	1.4	6.03	0.33	2.5	8.80	6.16	
11/21/2007	1.1	3.42	0.01	2.8	6.20	8.3	
12/27/2007	1.26	7.44	0.01	6.2	13.60	5.55	

1/31/2008	0.6	0.74	0.01	3.6	4.30	5.93	16,944
2/26/2008	0.98	3.72	0.01	5.2	8.90	6.77	16,155
3/20/2008	1.3	0.56	0.01	5.3	5.90	7	15,705
4/1/2008	1.5	0.62	0.01	4.8	5.40	7.12	17,260
5/20/2008	2.5	4.58	0.01	6.3	10.90	9.83	20,150
6/24/2008	3.4	4.02	0.735	8.4	13.10	7.83	23,575
7/24/2008	2.8	0.025	0.01	6.4	6.40	8.53	26,584
8/26/2008	1.4	1.9	1.08	4.5	7.50	11.7	25,686
9/27/2008	1.8	2.16	0.835	4.62	7.60	7.73	20,959
10/23/2008	0.7	1.32	0.01	3.08	4.40	8.81	18,594
11/26/2008	0.7	0.63	0.01	3.36	4.00	6.7	15,944
12/16/2008	0.98	13.1	0.01	3.08	16.20	7.47	16,408

1/19/2009	1.26	0.80	0.01	4.90	5.70	6.41	14,996
2/16/2009		2.37	0.01	4.90	7.30	7.67	14,392
3/23/2009		1.46	0.065	3.36	5.00	6.8	13,299
4/15/2009		13.90	0.090	4.62	18.60	8.4	15,371
5/26/2009		8.84	0.270	5.74	14.80	7.38	16,538
6/24/2009		5.42	0.250	1.12	6.70	8.8	20,192
7/27/2009		8.30	0.120	9.38	17.80	9.43	23,294
8/27/2009		8.83	0.175	4.20	13.20	7.87	25,297
9/30/2009		4.70	0.155	2.66	7.60	10.4	20,083
10/28/2009		1.47	0.205	2.38	4.10	10	18,565
11/23/2009		0.88	0.110	3.22	4.20	7.65	15,699
12/16/2009		1.42	0.125	3.92	5.40	6.16	17,735

1/26/2010		7.30	0.01	3.50	10.80	6.95	15,848
2/23/2010		1.10	0.01	4.90	6.00	10.6	13,627
3/23/2010		9.50	0.231	6.58	16.30	6.67	14,172
4/27/2010		0.75	0.01	8.40	9.20	6.55	14,618
5/26/2010		0.025	0.01	21.70	21.70	7.73	13,942
6/1/2010		1.76	0.190	9.10	11.10	7.2	15,793
7/27/2010		3.63	0.158	7.00	10.80	7.17	20,548
8/25/2010		1.64	0.129	12.30	14.00	8.6	18,042
9/28/2010		1.47	0.01	5.74	7.20	5.83	20,477
10/26/2010		2.32	0.090	4.90	7.30	6.83	
11/23/2010		2.23	0.119	6.16	8.50	7.47	13,991
12/21/2010		1.75	0.087	8.26	10.20	4.32	16,204

	Ammonia	Nitrate	Nitrite	TKN	Total N	Total Phos	Avg. Flow
1/25/2011		3.70	0.280	5.46	9.50	5.49	
2/22/2011		2.29	0.255	8.40	11.00	5.93	14,445
3/24/2011		3.98	0.270	10.20	14.50	7.1	12,633
4/19/2011		1.32	0.250	4.20	5.70	5.23	14,676
5/17/2011		3.99	0.120	3.78	7.90	8.33	17,441
6/1/2011		6.92	0.240	7.14	14.20	7.83	19,215
7/27/2011		8.24	0.360	10.60	19.20	7.78	26,517
8/25/2011		4.06	0.220	5.46	9.80	6.8	26,679
9/13/2011		6.28	0.220	4.34	10.80	5.97	22,971
10/21/2011		2.40	0.500	2.66	5.60	6.83	21,424
11/29/2011		2.24	0.490	2.87	5.60	5.93	19,378
12/22/2011		0.025	0.01	2.73	2.73	5.13	17,153

1/25/2012		3.53	0.220	2.23	5.90	5.62	16,382
2/21/2012		4.60	0.220	4.30	9.10	5.53	14,879
3/29/2012		4.02	0.310	3.00	7.30	5.8	15,408
4/24/2012		1.65	0.340	4.80	6.70	5.73	15,641
5/30/2012		2.89	0.450	8.10	11.40	5.73	18,059
6/26/2012		1.00	0.210	8.00	9.20	7	20,102
7/27/2012		0.49	0.010	8.10	8.60	8.02	21,570
8/29/2012		0.68	0.260	3.90	4.90	6.69	19,562
9/26/2012		0.78	0.400	3.80	5.00	6.4	20,485
10/16/2012		0.50	0.240	3.30	4.00	7.64	17,771
11/28/2012		0.70	0.190	3.60	4.50	5.39	16,130
12/15/2012		1.23	0.260	3.40	4.90	5.12	18,026

1/31/2013		0.81	0.190	3.70	4.70	5.46	14,189
2/26/2013		3.65	0.240	7.50	11.30	4.57	14,518
3/26/2013		4.50	0.160	7.50	12.20	4.9	14,493
4/25/2013		1.08	0.010	7.30	8.40	5.67	17,274
5/31/2013		3.52	0.170	7.20	10.90	6.66	18,035
6/27/2013		1.25	0.260	9.60	11.10	7.78	19,929
7/26/2013		1.41	0.370	11.10	12.90	7.73	22,694
8/28/2013		0.51	0.010	6.90	7.40	5.19	24,653
9/27/2013		1.16	0.210	6.60	8.00	6.57	
10/31/2013		3.40	0.230	5.70	9.30	4.13	15,304
11/27/2013		6.21	0.200	3.50	9.90	5.6	13,522
12/20/2013		2.37	0.180	5.50	8.10	7.77	14,113

1/31/2014		2.90	0.160	5.70	8.80	4.58	14,263
2/27/2014		0.48	0.010	11.00	11.50	4.08	14,561
3/28/2014		0.42	0.010	11.00	11.40	5.43	10,970
4/29/2014		0.41	0.010	16.10	16.50	5.38	13,190
5/29/2014		0.95	0.210	18.00	19.20	7.32	12,578
6/27/2014		0.62	0.230	12.70	13.60	5.55	16,503
7/31/2014		0.34	0.010	10.00	10.30	6.28	24,572
8/29/2014		1.51	0.290	7.10	8.90	7	21,794
9/30/2014		1.17	0.530	6.40	8.10	6	18,441
10/30/2014		0.46	0.180	5.30	5.90	5.18	17,118
11/25/2014		3.31	0.260	7.70	11.30	6.01	14,500
12/31/2014		0.56	0.100	11.70	12.40	5.64	15,153

	Ammonia	Nitrate	Nitrite	TKN	Total N	Total Phos	Avg. Flow
1/31/2015		3.86	0.085	4.00	7.90	5.45	14,585
2/22/2015		5.04	0.150	6.20	11.40	6.15	15,004
3/26/2015		0.39	0.150	10.20	10.70	5.05	10,229
4/28/2015		0.31	0.003	12.20	12.50	5.31	14,557
5/22/2015		4.93	0.210	7.10	12.20	5.13	16,050
6/23/2015		11.20	0.200	8.30	19.70	7.49	13,515
7/31/2015		2.68	0.200	18.30	21.30	7.56	14,814
8/25/2015		2.94	0.210	17.90	21.10	6.19	12,132
9/26/2015		3.50	0.210	11.50	15.20	6.11	9,602
10/23/2015		5.96	0.199	3.40	9.60	6.18	12,458
11/24/2015		8.41	0.219	5.90	14.50	5.33	13,594
12/18/2015		6.72	0.190	3.30	10.20	6.32	13,570
1/27/2016		3.89	0.003	7.20	11.10	6.36	11,782
2/17/2016		4.11	0.003	6.80	10.60	5.88	12,092
3/25/2016		7.53	0.003	9.90	17.40	3.98	13,162
4/30/2016		3.86	0.130	8.30	12.30	5.33	12,675
5/1/2016							
6/30/2016		4.30	0.083	16.20	20.58	7.11	12,602
7/28/2016		7.00	0.076	12.80	19.88		15,248
8/30/2016		13.00	0.150	1.86	15.01		16,511
9/29/2016		6.30	0.075	5.47	11.85		11,998
10/27/2016		9.50	0.025	10.10	19.60		10,836
11/29/2016		3.80	0.025	8.56	12.36		10,991
12/29/2016		29.00	0.058	13.60	42.66		12,291
1/26/2017		12.00	0.053	6.98	19.03		10,794
2/23/2017		15.00	0.025	28.90	43.90		9,080
3/30/2017		19.00	0.025	8.00	27.00		8,825
4/27/2017		14.00	0.025	15.60	29.60		8,823
5/31/2017		10.00	0.300	7.75	18.05		11,974
6/29/2017		8.10	0.050	5.94	14.09	6.73	13,293
7/27/2017		11.00	0.025	8.22	19.22		15,514
8/30/2017		9.30	0.240	13.10	22.64		14,893
9/28/2017		9.90	0.052	2.44	12.39		12,382
10/26/2017		12.00	0.064	2.88	14.94		11,756
11/28/2017		10.00	0.093	34.20	44.29		13,169
12/28/2017		8.60	0.120	8.23	16.95		11,811

- Notes:
1. NT = not tested
 2. NA = not available
 3. Blue indicates value reported as below reporting limit, listed as half of reporting limit.

UP GRADIENT MONITORING POINTS

<u>Monitoring Well B-2 (destroyed)</u>											
	pH	Conductivity	DO	Sodium	Chloride	Nitrate	Nitrite	Ammonia	TKN	Total N	Total Phos.
Nov-91	5.30	112		15.8	27.0	1.59		0.39	0.67	2.26	0.05
Apr-99	5.92	116	6.4	22.1	29.3	0.73		2.09	2.79	3.52	0.103

	Monitoring Well B-2R											
	pH	Conductivity	DO	Sodium	Chloride	Nitrate	Nitrite	Ammonia	TKN	Total N	Total Phos.	Ortho Phos.
Nov-91												
Apr-99												
Mar-03												
Sep-03	5.8	78	8.5	9.1	17.3	0.63		0.25	0.25	0.63	0.767	
Dec-03	8.88	110	6.31	13.6	23.0	0.52	0.01	0.25	0.25	0.52	0.047	
Mar-04	5.76	109	7.42	17.9	33.7	0.67	0.002	0.25	0.25	0.67	0.025	
Jun-04	5.47	133	7.2	18.9	34.8	0.98	0.002	0.25	0.25	0.98	0.133	
Sep-04	5.48	127	6.45	18.5	30.1	1.47	0.002	0.25	0.25	1.47	0.600	
Dec-04	6.67	119	5.63	19.4	27.2	0.99	0.01	0.25	0.25	0.99	0.147	
Mar-05	6.85	104	7.05	15.2	29.8	1.05	0.002	0.25	0.25	1.05	0.223	
Jun-05	6.92	144	7.62	19.1	31.4	0.76	0.002	0.25	0.25	0.76	0.292	
Sep-05	6.96	121	7.86	17.6	36.5	0.46	0.002	0.25	0.25	0.46	0.147	
Dec-05	6.55	153	12.5	7.7	51.4	0.67	0.002	0.25	0.25	0.67	0.183	
Mar-06	5.42	135	7.16	22.5	43.6	1.16	0.01	0.25	0.25	1.2	0.048	
Jun-06	5.43	153	7.37	31	50.0	1.4	0.01	0.1	0.25	1.4	0.25	
Sep-06				29	35.0	0.72	0.01	0.1	0.25	0.8	0.25	
Dec-06	5.71	172	11.06	26	54.0	0.84	0.01	0.1	0.25	0.8	0.25	
Mar-07	5.9	144	11.01	30	47.0	1.1	0.02	0.1	0.25	1.1	0.60	
Jun-07	5.41	172	6.67	23.9	46.9	2.04	0.01	0.25	3.64	5.6	0.272	
Sep-07	6.07	151	7.39	15.9	37	1.28	0.01	0.25	0.25	1.3	0.027	
Dec-07	5.85	203	7.76	22.3	42.3	1.52	0.01	0.25	0.25	1.5	0.082	0.068
Mar-08	5.23	122	8.71	28.3	47.2	3.89	0.01	0.25	0.25	3.9	0.112	0.003
Jun-08	6.02	198	6.77	33	52	2.4	0.05	0.2	0.25	2.4	0.436	0.008
Sep-08	5.33	294	7.25	40	64	1.9	0.01	0.0375	0.62	2.52	0.258	0.0025
Dec-08	5.94	142	7.01	27	40	1.7	0.025	0.0375	0.5	2.2	0.23	0.006
Mar-09	5.23	155	7.6	31.5	54.9	1.97	0.01	0.25	0.7	2.67	0.16	0.013
Jun-09	5.48	234	5.89	41	75	1.4	0.11	0.0375	0.25	1.51	0.114	0.0025
Sep-09	5.79	219	4.4	38	55	1.3	0.025	0.104	0.15	1.3	0.078	0.0025
Dec-09	5.43	181	4.6	36	55	1.2	0.025	0.0375	0.15	1.2	0.165	0.008
Mar-10	5.63	199	4.24	27.5	56.8	1.21	0.01	0.25	0.25	1.2	0.300	0.005
Jun-10	5.31	180	6.56	36	46	0.99	0.025	0.0375	0.15	0.99	0.164	0.0025
Sep-10	6.26	111	7.1	38	57	0.9	0.025	0.0375	0.15	0.9	0.126	0.0025
Dec-10	5.96	151	8.55	40	53	1.2	0.025	0.077	0.15	1.2	0.08	0.0025
Apr-11	6.16	165	6.07	30	44	1.5	0.025	0.0375	0.15	1.5	0.062	0.0025
Jun-11	5.88	225		33	64.6	1.6	0.01	0.1	0.25	1.6	0.25	0.05
Sep-11	6.31	171	0.12	37	41	1.5	0.025	0.166	0.4	1.9	0.393	0.0025
Dec-11	5.53	127	5.27	25	41	1.2	0.01	0.0375	0.48	1.68	0.32	0.0025
Mar-12	5.99	166	4.7	33	51	2	0.025	0.0375	0.15	2.15	0.005	0.00025
Jun-12	5.38	188	9.33	37	58	2	0.025	0.0375	0.15	2	0.005	0.0025
Sep-12	5.72	185	5.35	41	56	1.9	0.025	0.182	0.15	1.9	0.011	0.0025
Dec-12	5.86	166	3.9	39	69	2	0.025	0.408	0.36	2.36	0.005	0.0025
Mar-13	4.82	239	3.23	46	70	1.58	0.025	0.493	0.508	2.088	0.015	0.019
Jun-13	6.27	224	8.44	44	72	1.62	0.025	0.202	0.15	1.62	0.005	0.0025
Sep-13	4.73	170	5.18	36	53	1.13	0.01	0.083	1.01	2.14	0.005	0.0025
Dec-13		383	6.07	33	69	0.922	0.025	0.0375	0.15	0.922	0.005	0.0025
Mar-14	4.81	165	6.87	37	55	1.64	0.01	0.0375	0.15	1.64	0.005	0.006
Jun-14	4.63	287	5.88	59	89	2.21	0.025	0.0375	0.15	2.21	0.005	0.0025
Sep-14	3.01	241	6.27	52	91	1.6	0.025	0.134	0.391	1.991	0.005	0.0025
Dec-14	5.5	176	7.81	38	57	1.45	0.025	0.0375	0.15	1.45	0.005	0.005
Mar-15	4.62	155	5.03	37	53	1.08	0.025	0.0375	0.15	1.08	0.005	0.007
Jun-15	4.61	240	8.61	58	87	1.49	0.025	0.0375	0.15	1.49	0.005	0.006
Sep-15	4.23	210	6.68	42	77	0.724	0.025	0.0375	0.15	0.724	0.005	0.0025
Dec-15	4.46	379	6.5	43	73.4	0.892	0.025	0.096	0.15	0.892	0.005	0.011
Mar-16	3.61	185	9.91	40	63	1.02	0.025	0.0375	0.15	1.02	0.005	0.007
Jun-16	3.91	281	15.21	62	90	1.2	0.025	0.11	0.662	1.862	0.005	0.007
Sep-16	5.17	287	5.99	30	46	0.748	0.025	0.0375	0.15	0.748	0.005	0.0025
Dec-16	5.05	157	8.12	39	53	1.27	0.025	0.0375	0.15	1.27	0.005	0.011

Mar-17	5.1	137	6.37	39	53	1.34	0.025	0.0375	0.15	1.34	0.005	0.009
Jun-17	6.37	302	6.76	54.7	100	1.69	0.025	0.0375	0.375	2.065	0.005	0.014
Sep-17	5.5	218	6.35	44.2	71	0.873	0.025	0.0375	0.15	0.873	0.005	0.0025
Dec-17	5.35	248	5.66	41.6	70	0.763	0.025	0.154	0.15	0.763	0.005	0.0025

Monitoring Well MW-3 (Destroyed)

	pH	Conductivity	DO	Sodium	Chloride	Nitrate	Nitrite	Ammonia	TKN	Total N	Total Phos.	Ortho Phos.
Nov-91	5.20	111		15.7	26.7	0.58		0.025	0.44	1.02	0.02	
Apr-99	5.61	57	3.1	13.0	13.0	0.32		0.61	1.31	1.63	0.031	
Mar-03	5.9	120		12.3	19.8	0.76		0.25	0.25	0.76	0.072	
Sep-03	6.6	107	6.1	14.8	24.0	0.54		0.25	0.25	0.54	0.55	
Dec-03	7.34	92	5.39	14.0	23.5	0.66	0.01	0.25	0.25	0.66	0.182	
Mar-04	5.68	90	6.21	15.2	28.4	0.68	0.002	0.25	0.25	0.68	0.025	
Jun-04	5.82	143	5.15	20.0	32.4	0.51	0.002	0.25	0.25	0.51	0.1	
Sep-04	5.24	101	5.98	14.9	24.5	1.31	0.002	0.25	0.25	1.31	0.233	
Dec-04	5.86	97	5.02	14.0	23.1	0.58	0.01	0.25	0.25	0.58	0.314	
Mar-05	6.15	95	5.19	14.3	30.9	0.63	0.002	0.25	0.25	0.63	0.112	
Jun-05	6.21	154	7.11	20.5	40.5	0.56	0.002	0.25	0.25	0.56	0.104	
Sep-05	6.45	116	7.43	16	29.8	0.71	0.002	0.25	0.25	0.71	0.135	
Dec-05	6.06	129	11.1	17.7	39.8	1.17	0.002	0.25	0.25	1.17	0.147	
Mar-06	5.56	150	6.19	20.6	39.6	0.72	0.01	0.25	0.25	0.7	0.373	
Jun-06	5.58	133	7.81	24	35	1	0.05	0.1	0.25	1.1	0.25	
Sep-06				22	29	1.1	0.01	0.1	0.25	1.1	1	
Dec-06	5.48	138	9.82	21	34	1.7	0.01	0.1	0.25	1.8	0.25	
Mar-07	7.6	131	11.61	21	40	1.3	0.02	0.1	0.8	2	0.9	
Jun-07	5.65	228	6.24	26.9	55.2	1.22	0.01	0.25	0.56	1.8	0.17	
Sep-07	5.68	294	6.99	33.4	75.9	3.1	0.01	0.25	0.25	3.1	0.38	
Dec-07	7.42	235	6.94	36.6	70.8	3.18	0.01	0.25	0.25	3.2	0.116	0.055
Mar-08	5.49	175	9.8	17.6	35.3	1.81	0.01	0.25	0.25	1.8	0.06	0.003
Jun-08	6.8	191	5.2	32	53.0	1.6	0.05	0.2	0.25	1.6	0.601	0.008
Sep-08	5.5	300	7.89	53	77.0	2.5	0.01	0.0375	0.36	2.86	0.809	0.0025
Dec-08	5.99	172	5.1	26	50.0	1.9	0.025	0.0375	0.25	1.9	1.07	0.005
Mar-09	5.33	112	5.31	18.5	31.4	0.82	0.01	0.25	1.12	1.94	0.209	0.02
Jun-09	5.67	131	5.77	22	35.0	1.5	0.1	0.0375	0.25	1.6	0.616	0.0025
Sep-09	5.77	154	4.8	24	34	1.2	0.025	0.0375	0.15	1.2	0.389	0.0025
Dec-09	5.44	125	4.58	26	37	1.2	0.025	0.0375	0.15	1.2	0.378	0.01
Mar-10	6.04	266	6.33	24.5	49.2	1.25	0.01	0.25	0.25	1.2	0.487	0.018
Jun-10	5.63	197	6.61	36	61	0.95	0.025	0.082	0.15	0.95	0.538	0.0025
Sep-10	6.28	146	5.96	24	36	0.94	0.025	0.0375	0.15	0.94	0.328	0.0025
Dec-10	5.7	223	7	48	79	1.2	0.025	0.0375	0.15	1.2	0.229	0.009
Apr-11	5.64	205	5.69	37	64	1	0.025	0.0375	0.015	1	0.237	0.0025
Jun-11	5.67	159		27	41.3	1.4	0.01	0.1	0.25	1.4	0.25	0.05
Sep-11	6.61	156	0.1	23	34	1.1	0.025	0.25	0.33	1.43	0.592	0.0025
Dec-11	5.52	114	4.64	22	38	1.3	0.01	0.194	0.34	1.64	0.461	0.0025
Mar-12	5.28	150	2.89	28	47	1.2	0.11	0.206	0.15	1.35	0.011	0.00025
Jun-12	4.33	128	4.57	25	41	1	0.025	0.15	0.31	1.31	0.01	0.0025
Sep-12	6.58	134	5.55	24	35	1.4	0.025	0.0375	0.15	1.4	0.05	0.007
Dec-12	5.91	111	2.53	23	39	1.4	0.025	0.0375	0.15	1.4	0.037	0.007
Mar-13	5.24	128	3.9	20	29	0.87	0.025	0.0375	0.15	0.87	0.01	0.008
Jun-13	6.34	193	6.41	38	63	1.31	0.025	0.0375	7.55	8.86	0.01	0.0025
Sep-13	4.85	166	3.13	34	52	1.25	0.01	0.0375	0.487	1.737	0.005	0.006
Dec-13		287	2.51	24	45	1.45	0.025	0.086	0.15	1.45	0.01	0.0025
Mar-14	4.95	149	7.01	28	51	1.51	0.01	0.082	0.318	1.828	0.005	0.006
Jun-14	4.92	244	10.86	50	78	1.45	0.025	0.0375	0.15	1.45	0.012	0.0025
Sep-14	3.8	143	6.02	28	47	1.32	0.025	0.0375	0.15	1.32	0.01	0.005

Monitoring Well MW-3R

	pH	Conductivity	DO	Sodium	Chloride	Nitrate	Nitrite	Ammonia	TKN	Total N	Total Phos.	Ortho Phos.
Mar-15	5.08	130	3.59	24	44	1.13	0.025	0.0375	0.15	1.13	0.019	0.009
Jun-15	4.9	157	4.87	36	54	1.24	0.025	0.0375	0.15	1.24	0.018	0.008
Sep-15	5.28	188	5.11	37	66	1.21	0.025	0.0375	0.15	1.21	0.005	0.0025
Dec-15	4.96	338	3.36	37	58.9	1.2	0.025	0.0375	0.15	1.2	0.005	0.013
Mar-16	4.7	175	10.62	36	60	0.934	0.025	0.0375	0.15	0.934	0.005	0.009
Jun-16	4.38	241	6.53	46	79	1.01	0.025	0.0375	0.308	1.318	0.058	0.008
Sep-16	5.42	282	2.89	29	46	0.998	0.025	0.0375	0.15	0.998	0.01	0.0025
Dec-16	5.19	155	4	34	52	1.02	0.025	0.0375	0.15	1.02	0.005	0.014
Mar-17	5.32	210	3.06	35	58	0.594	0.025	0.0375	0.15	0.594	0.005	0.0045
Jun-17	6.42	225	1.06	42.1	69	0.91	0.025	0.0375	0.15	0.91	0.005	0.012
Sep-17	5.37	257	1.86	52	82	0.867	0.025	0.0375	0.521	1.388	0.005	0.0025
Dec-17	5.55	171	1.51	40.7	57	0.8	0.025	0.0375	0.15	0.8	0.005	0.01

Notes:

1. 1991 testing performed by N/F IEP, Inc.
2. Blank cell = not tested / not applicable
3. Blue indicates value reported as below reporting limit, listed as half of reporting limit.
4. Green indicates value reported as less than (<), listed as half the reported value.

DOWN GRADIENT MONITORING POINTS

	Monitoring Well MW-1											
	pH	Conductivity	DO	Sodium	Chloride	Nitrate	Nitrite	Ammonia	TKN	Total N	Total Phos.	Ortho Phos.
Nov-91	5.94	104		10.8	21.7	0.57		0.025	0.50	1.07	0.005	
Dec-91												
Apr-99	6.0	72	2.8	12.2	10.8	0.19		0.05	0.44	0.63	0.062	
Mar-03				10.9	17.0	0.43		0.25	0.25	0.43	0.047	
Sep-03	5.8	87	5.4	12.6	19.4	0.59		0.25	0.25	0.59	0.917	
Dec-03	6.07	82	4.73	12.7	20.0	0.59	0.01	0.25	0.25	0.59	0.041	
Mar-04	5.62	91	3.88	13.6	25.6	0.91	0.002	0.25	0.25	0.91	0.041	
Jun-04	5.29	99	3.93	14.9	23.7	0.92	0.002	0.25	0.25	0.92	0.15	
Sep-04	5.46	99	4.30	13.8	23.6	1.03	0.002	0.25	0.25	1.03	0.083	
Dec-04	5.42	81	3.95	13.5	20.6	0.46	0.01	0.25	0.25	0.46	0.083	
Mar-05	5.76	85	3.86	12.8	20.6	0.52	0.002	0.25	0.25	0.52	0.092	
Jun-05	6.46	102	6.69	14.6	19.9	0.66	0.002	0.25	0.25	0.66	0.144	
Sep-05	6.38	113	5.16	13.5	24.7	0.93	0.002	0.25	0.25	0.93	0.095	
Dec-05	5.5	77	5.45	9.3	18.4	0.6	0.002	0.25	0.25	0.6	0.152	
Mar-06	5.84	92	3.80	12	22.4	0.71	0.01	0.25	0.25	0.7	0.081	
Jun-06	5.82	95	4.23	15	22	0.74	0.01	0.1	0.25	0.8	0.25	
Sep-06				12	15	0.66	0.01	0.1	0.25	0.7	0.25	
Dec-06	5.72	93	6.7	13	24	0.68	0.01	0.1	0.25	0.7	0.25	
Mar-07	6.28	148	6.04	16	24	0.62	0.01	0.1	0.25	0.7	0.25	
Jun-07	5.65	94	3.39	11.2	22.2	0.77	0.01	0.25	0.25	0.8	0.021	
Sep-07	5.66	117	3.26	8.6	19.1	0.6	0.01	0.25	0.25	0.6	0.042	
Dec-07	5.91	88	3.21	9.6	20	0.65	0.01	0.25	0.25	0.6	0.027	0.014
Mar-08	5.58	131	4.97	14.8	35.9	1.1	0.01	0.25	0.25	1.1	0.06	0.003
Jun-08	5.94	188	3.77	23	31	0.9	0.05	0.2	0.25	0.9	0.021	0.016
Sep-08	5.87	116	4.01	19	28	0.74	0.01	0.0375	0.15	0.74	0.021	0.012
Dec-08	6.45	311	3.63	14	26	0.75	0.025	0.0375	0.25	0.75	0.526	0.011
Mar-09	5.75	156	5.33	22.3	42.6	1.08	0.01	0.25	2.52	3.6	0.056	0.02
Jun-09	5.82	164	4.72	28	42	1.4	0.08	0.0375	0.25	1.48	0.371	0.01
Sep-09	5.96	151	4.11	23	40	0.78	0.025	0.103	0.15	0.78	1.04	0.006
Dec-09	6.04	132	5.24	21	34	0.8	0.025	0.0375	0.15	0.8	0.259	0.015
Mar-10	5.85	240	3.98	25.5	72.5	1.56	0.01	0.25	0.25	1.6	0.227	0.005
Jun-10	5.88	167	7.28	29	49	1.5	0.025	0.0375	0.15	1.5	0.284	0.007
Sep-10	7.65	207	5.1	35	59	1.4	0.025	0.0375	0.15	1.4	0.967	0.0025
Dec-10	6.17	134	6.24	27	31	0.74	0.025	0.0375	0.15	0.74	0.196	0.014
Apr-11	4.87	172	0.6	32	50	1	0.025	0.084	0.15	1	0.882	0.0025
Jun-11	5.38	172	4.55	29	49.2	1.8	0.01	0.1	0.7	2.5	1.4	0.05
Sep-11	6.49	164	0.13	26	42	470	0.025	0.0375	1.5	470	0.337	0.035
Dec-11	5.88	128	3.87	25	38	0.89	0.01	0.0375	0.15	0.89	0.01	0.01
Mar-12	5.78	140	4.32	28	43	1.3	0.025	0.0375	0.15	1.45	0.005	0.007
Jun-12	5.86	136	6.37	27	33	0.85	0.025	0.0375	0.15	0.85	0.283	0.0025
Sep-12	6.86	118	5.81	23	28	0.84	0.025	0.0375	0.15	0.84	0.016	0.007
Dec-12	6.31	109	3.47	21	33	0.84	0.025	0.0375	0.15	0.84	0.067	0.01
Mar-13	5.26	141	7.91	26	41	1.07	0.025	0.0375	0.15	1.07	0.081	0.007
Jun-13	6.39	135	8.54	27	40	1.12	0.025	0.0375	0.15	1.12	0.01	0.007
Sep-13	5.47	164	5.71	31	46	1.47	0.01	0.0375	0.15	1.47	0.005	0.007
Dec-13		360	4.09	32	60	1.38	0.025	0.122	0.15	1.38	0.01	0.0025
Mar-14	6.46	163	5.31	30	54	1.33	0.01	0.0375	0.15	1.33	0.005	0.009
Jun-14	5.36	314	7.77	56	98	1.22	0.025	0.0375	0.15	1.22	0.014	0.008
Sep-14	3.96	156	4.7	29	48	0.781	0.025	0.0375	0.15	0.781	0.005	0.01
Dec-14	6	150	3.94	28	44	0.937	0.025	0.0375	0.15	0.937	0.005	0.012
Mar-15	5.47	158	4.37	29	53	0.905	0.025	0.0375	0.15	0.905	0.005	0.011
Jun-15	5.69	176	5.57	39	58	1.24	0.025	0.0375	0.15	1.24	0.005	0.012
Sep-15	5.56	216	4.61	42	66	1.21	0.025	0.0375	0.15	1.21	0.005	0.0025
Dec-15	5.44	367	5.01	39	63.7	1.15	0.025	0.0375	0.15	1.15	0.005	0.015
Mar-16	4.86	178	6.38	36	57	0.873	0.025	0.873	0.15	0.873	0.005	0.007
Jun-16	4.31	185	8.56	34	53	0.92	0.025	0.0375	0.15	0.92	0.067	0.012
Sep-16	3.76	309	7.93	43	71	1.19	0.025	0.0375	0.15	1.19	0.005	0.008
Dec-16	5.61	161	4.32	35	54	0.822	0.025	0.0375	0.15	0.822	0.005	0.017
Mar-17	5.69	160	5.05	39	64	0.936	0.025	0.0375	0.15	0.936	0.005	0.009
Jun-17	6.26	244	4.65	44.6	72	0.948	0.025	0.0375	0.15	0.948	0.005	0.017
Sep-17	5.81	223	5.19	44.4	68	1.06	0.025	0.0375	0.15	1.06	0.005	0.011
Dec-17	5.86	204	4.30	39.2	62	1.13	0.025	0.0375	0.15	1.13	0.01	0.011

	Monitoring Well MW-2										
	pH	Conductivity	DO	Sodium	Chloride	Nitrate	Nitrite	Ammonia	TKN	Total N	Total Phos. Ortho Phos.
Nov-91											
Dec-91	7.03	362	0.4	17.8	15.0	7.62		3.31	3.83	11.45	0.041
Apr-99											
Mar-03	5.8	302		23.7	25.7	10.1		0.25	0.25	10.1	0.087
Sep-03	5.7	249	8.0	36	34.1	10.5		0.25	0.25	10.5	0.60
Dec-03	6.22	249	4.73	13.5	29.5	6.74	0.01	0.25	0.25	6.74	0.085
Mar-04	6.34	241	3.95	22.3	21.6	8.21	0.002	0.25	0.25	8.21	0.041
Jun-04	5.84	231	3.41	25.1	24.9	11.6	0.002	0.25	0.56	12.2	0.1
Sep-04	5.42	256	4.77	38	35.0	9.13	0.002	0.25	0.25	9.13	0.100
Dec-04	5.53	204	3.95	30.5	22.0	7.30	0.01	0.25	0.25	7.3	0.111
Mar-05	5.79	154	5.45	16.7	16.5	5.78	0.002	0.25	0.25	5.78	0.131
Jun-05	6.22	175	9.12	19.4	18.4	5.44	0.002	0.25	0.25	5.44	0.096
Sep-05	6.40	247	7.65	33.6	34.3	7.73	0.002	0.25	0.25	7.73	0.133
Dec-05	5.70	454	3.6	33	39.8	10.20	0.067	14	14	24.3	0.070
Mar-06	6.09	262	1.66	20.4	26.4	7.44	0.01	7	7	14.4	0.069
Jun-06	6.08	261	2.31	15	25	5.0	0.02	8.2	8.1	13	0.25
Sep-06				33	28	10.0	0.01	0.1	0.25	10	0.25
Dec-06	5.71	325	4.62	33	35	7.1	0.01	0.1	0.25	7.1	0.25
Mar-07	5.70	214	5.97	10	13	6.0	0.01	0.1	0.25	6	0.25
Jun-07	5.38	121	5.28	7.5	13.6	4.56	0.01	0.25	0.25	4.6	0.004
Sep-07	5.71	246	3.44	37.2	28.8	9.25	0.01	0.25	0.25	9.2	0.95
Dec-07	6.00	325	2.49	35.4	26.6	26.6	0.01	0.25	0.8	27.4	0.041 0.027
Mar-08	5.62	186	6.33	11.6	16.6	6.1	0.01	0.25	0.25	6.1	0.033 0.003
Jun-08	5.60	187	4.96	13	15	4	0.05	0.2	0.25	4	0.01 0.009
Sep-08	5.44	210	5.67	33	30	5.5	0.01	0.0375	0.15	5.5	0.005 0.0025
Dec-08	6.25	267	3.66	36	32	5.9	0.025	0.0375	0.25	5.9	0.104 0.0025
Mar-09	5.92	205	5.45	20.2	23.2	5.44	0.01	0.25	0.25	5.44	0.084 0.044
Jun-09	5.94	170	5.61	21	23	4.3	0.08	0.386	0.25	4.38	0.309 0.216
Sep-09	6.09	214	5.51	33	28	4.9	0.025	0.0375	0.15	4.9	0.47 0.281
Dec-09	5.63	223	4.14	20	20	6.1	0.025	0.0375	0.15	6.1	0.623 0.359
Mar-10	5.67	178	4.52	21	22.9	4.13	0.01	0.25	0.25	4.1	1.27 0.907
Jun-10	6.05	175	7.02	14	24	2.6	0.025	0.0375	0.15	2.6	0.55 0.84
Sep-10	5.82	304	6.17	45	34	14	0.025	0.0375	0.3	14	0.841 0.872
Dec-10	5.96	240	6.55	41	32	7	0.025	0.0375	0.15	7	1.55 1.46
Apr-11	3.35	188	1.12	24	20	5.1	0.025	0.107	0.015	5.1	0.715 0.795
Jun-11	5.46	203	4.3	22	24.6	6.7	0.01	0.1	0.8	7.5	1.1 0.4
Sep-11	6.19	260	0.12	35	34	7.5	0.025	0.0375	0.38	7.88	1.2 0.75
Dec-11	5.73	186	3.78	26	28	7.6	0.01	0.0375	0.15	7.6	0.574 0.521
Mar-12	5.71	199	4.46	26	26	4.9	0.025	0.0375	0.15	4.9	1.05 0.982
Jun-12	5.87	183	12.35	24	27	4.1	0.025	0.0375	0.15	4.1	0.909 0.848
Sep-12	6.43	242	6.64	34	36	6.4	0.025	0.0375	0.15	6.4	0.01 1.12
Dec-12	6.26	218	5.36	35	43	8	0.025	0.0375	0.3	8	1.22 1.38
Mar-13	5.85	151	6.06	15	18	3.12	0.025	0.0375	0.15	3.12	1.02 1.18
Jun-13	6.22	192	10.95	25	35	5.57	0.025	0.0375	0.15	5.57	0.714 0.627
Sep-13	5.65	239	6.51	29	28	9	0.01	0.0375	0.15	9	0.819 0.788
Dec-13		574	3.31	33	42	9.32	0.025	0.0375	0.3	9.32	0.942 0.986
Mar-14	5.75	185	8.19	22	30	3.98	0.01	0.0375	0.15	3.98	0.936 0.917
Jun-14	5.54	253	10.98	42	45	5.6	0.025	0.0375	0.3	5.6	1.05 1.15
Sep-14	4.46	304	8.31	38	50	13.2	0.0025	0.0375	0.75	13.2	0.874 0.915
Dec-14	6.00	309	4.54	41	47	15	0.025	0.0375	0.15	15	0.834 0.882
Mar-15	5.72	233	8.79	29	42	5.34	0.025	0.0375	0.3	5.34	1.28 1.18
Jun-15	5.81	261	5.62	33	60	4.51	0.025	0.094	0.15	4.51	1.02 0.955
Sep-15	5.60	263	4.16	44	42	9.98	0.025	0.166	0.79	10.77	1.26 1.48
Dec-15	5.70	608	4.36	40	42.8	16.5	0.025	0.0375	0.75	16.5	0.874 0.887
Mar-16	5.50	221	9.5	25	36	5.25	0.025	0.0375	0.3	9.85	1.04 1.02
Jun-16	5.42	261	10.87	35	44	5.63	0.025	0.0375	0.3	5.63	1.6 1.39
Sep-16	4.25	267	8.37	34	42	11.6	0.025	0.075	0.3	11.6	1.42 1.4
Dec-16	5.79	283	6.61	45	46	16.9	0.025	0.0375	0.15	16.9	1.35 1.26
Mar-17	6.50	305	5.85	37	47	9.05	0.025	0.0375	0.3	9.05	1.43 1.41
Jun-17	6.42	225	8.12	26.4	34	6.52	0.025	0.0375	0.15	6.52	1.56 1.43
Sep-17	5.81	266	7.29	40	38	8.02	0.025	0.0375	0.15	8.02	1.56 1.48
Dec-17	6.1	302	5.39	47.5	34	14.7	0.025	0.0375	0.3	14.7	1.7 1.68

Monitoring Well MW-4

	pH	Conductivity	DO	Sodium	Chloride	Nitrate	Nitrite	Ammonia	TKN	Total N	Total Phos.	Ortho Phos.
Nov-91	5.32	111		13.8	23.0	2.65		0.69	0.78	3.43	0.005	
Dec-91	5.45	106	5.0	14.9	17.3	0.56		0.35	0.96	1.52	0.021	
Apr-99												
Mar-03	5.9	107		12	20.1	0.48		0.25	0.25	0.25	0.042	
Sep-03	5.1	149	8.7	26.2	54.0	0.66		0.25	0.25	0.66	0.80	
Dec-03	5.86	130	7.19	22	30.0	0.72	0.01	0.25	0.25	0.72	0.031	
Mar-04	5.36	80	6.58	10.7	21.1	0.68	0.002	0.25	0.25	0.68	0.065	
Jun-04	4.87	87	7.2	12	18.9	0.59	0.002	0.25	0.25	0.59	0.15	
Sep-04	5.53	90	6.73	13.5	20.6	0.73	0.002	0.25	0.25	0.73	0.067	
Dec-04	5.28	99	7.60	15.3	29.3	0.86	0.01	0.25	0.25	0.86	0.067	
Mar-05	5.67	107	7.08	13.3	34.5	0.5	0.002	0.25	0.25	0.5	0.100	
Jun-05	6.22	86	8.70	11	17.9	0.51	0.002	0.25	0.25	0.51	0.070	
Sep-05	6.44	97	7.77	12.6	23.1	0.86	0.002	0.25	0.25	0.86	0.037	
Dec-05	5.36	95	9.28	11.3	21.3	0.89	0.002	0.25	0.25	0.89	0.139	
Mar-06	5.34	73	8.12	9.1	16.0	0.75	0.01	0.25	0.25	0.8	0.048	
Jun-06	5.26	156	8.27	19	30	1.3	0.01	0.1	0.25	1.3	0.25	
Sep-06				15	23	0.73	0.01	0.1	0.25	0.7	0.25	
Dec-06	5.26	108	11.01	15	32	1.1	0.01	0.1	0.25	1.1	0.25	
Mar-07	5.57	87	11.47	13	17	1.1	0.01	0.1	0.25	1.1	0.25	
Jun-07	5.05	81	7.5	8.3	18.1	0.84	0.01	0.25	0.7	1.5	0.013	
Sep-07	5.12	181	7.66	15.5	35.8	1.47	0.01	0.25	0.25	1.5	0.048	
Dec-07	5.43	122	7.95	23.1	22.2	2.66	0.01	0.25	0.25	2.7	0.034	0.014
Mar-08	5.7	156	9.25	29.5	30.2	2.73	0.01	0.25	0.25	2.7	0.042	0.008
Jun-08	5.41	151	6.62	20	29	1.1	0.05	0.2	0.25	1.1	0.005	0.0025
Sep-08	5.27	130	8.15	22	34	1	0.01	0.0375	0.15	1	0.005	0.0025
Dec-08	6.06	139	8.1	20	31	1.8	0.025	0.0375	0.25	1.8	0.563	0.0025
Mar-09	5.05	99	7.77	14.6	30.7	0.81	0.01	0.25	0.25	0.81	0.035	0.016
Jun-09	5.49	103	7.5	16	25	0.69	0.09	0.0375	0.25	0.78	0.537	0.0025
Sep-09	6.58	101	5.75	15	18	0.69	0.025	0.0375	0.15	0.69	0.37	0.0025
Dec-09	5.3	78	5.73	11	19	0.48	0.025	0.0375	0.15	0.48	0.5	0.0025
Mar-10	5.14	98	7.03	12	29.6	0.6	0.01	0.25	0.25	0.6	0.23	0.005
Jun-10	5.84	100	10.17	18	27	0.84	0.025	0.0375	0.15	0.84	0.66	0.0025
Sep-10	5.81	127	7.53	20	33	0.76	0.025	0.0375	0.15	0.76	0.25	0.0025
Dec-10	5.77	82	9	14	18	0.52	0.025	0.0375	0.15	0.52	0.177	0.005
Apr-11	4.8	85	1.1	11	21	0.59	0.025	0.099	0.38	0.97	0.307	0.0025
Jun-11	4.89	97	5.11	14	25.9	0.67	0.01	0.1	0.7	1.37	0.25	0.05
Sep-11	6.03	184	0.12	23	41	1.2	0.025	0.0375	0.15	1.2	0.189	0.0025
Dec-11	5.29	96	5.19	17	31	0.85	0.01	0.0375	0.15	0.85	0.005	0.0025
Mar-12	4.98	101	7.14	17	30	0.9	0.025	0.0375	0.15	0.9	0.005	0.0025
Jun-12	4.95	127	12.81	22	37	1.1	0.025	0.0375	0.15	1.1	0.028	0.0025
Sep-12	6.34	133	6.61	26	36	1.2	0.025	0.0375	0.15	1.2	0.148	0.0025
Dec-12	5.92	112	5.67	22	39	0.92	0.025	0.0375	0.15	0.92	0.005	0.0025
Mar-13	5.1	112	7.65	19	29	0.738	0.025	0.0375	0.15	0.738	0.005	0.0025
Jun-13	6.06	118	10.62	22	37	0.879	0.025	0.0375	0.15	0.879	0.005	0.0025
Sep-13	4.91	130	6.82	22	34	0.826	0.01	0.0375	0.15	0.826	0.005	0.0025
Dec-13		304	6.54	24	46	0.959	0.025	0.0375	0.15	0.959	0.005	0.0025
Mar-14	4.89	153	10.91	29	51	1.32	0.01	0.0375	0.15	1.32	0.005	0.0025
Jun-14	4.95	168	15.45	30	51	1.1	0.025	0.0375	0.426	1.526	0.05	0.0025
Sep-14	3.8	199	10.21	37	66	1.35	0.025	0.0375	0.15	1.35	0.005	0.0025
Dec-14	6	141	9.26	28	42	0.849	0.025	0.137	0.15	0.849	0.005	0.006
Mar-15	5.05	133	7.93	24	46	0.649	0.025	0.0375	0.15	0.649	0.005	0.007
Jun-15	5.2	193	7.33	43	71	1.05	0.025	0.0375	0.15	1.05	0.005	0.006
Sep-15	4.98	181	7.17	34	59	0.864	0.025	0.0375	0.15	0.864	0.005	0.006
Dec-15	5.01	265	10.59	27	44.6	0.613	0.025	0.0375	0.15	0.613	0.005	0.007
Mar-16	4.47	145	13.36	26	48	0.649	0.025	0.129	0.15	0.649	0.005	0.0025
Jun-16	4.18	214	12	40	71	0.932	0.025	0.0375	0.15	0.932	0.011	0.006
Sep-16	4.14	272	9.4	38	59	0.984	0.025	0.0375	0.15	0.984	0.005	0.0025
Dec-16	5.2	186	9.7	40	68	0.864	0.025	0.0375	0.15	0.864	0.005	0.01
Mar-17	4.9	150	8.78	36	57	0.952	0.025	0.0375	0.15	0.952	0.005	0.005
Jun-17	6.27	219	8.97	42	70	0.905	0.025	0.0375	0.15	0.905	0.005	0.01
Sep-17	5.5	183	6.88	36.5	56	0.716	0.025	0.0375	0.15	0.716	0.005	0.0025
Dec-17	5.58	166	7.11	31.7	52	0.769	0.025	0.0375	0.15	0.769	0.005	0.0025

Monitoring Well B-1(former MW-5)											
	pH	Conductivity	DO	Sodium	Chloride	Nitrate	Nitrite	Ammonia	TKN	Total N	Total Phos. Ortho Phos.
Nov-91	5.07	166		17.8	19.7	7.70		0.025	0.46	8.14	0.05
Apr-99				19.2	16.0	8.22		4.18	4.53	12.75	0.062
Mar-03	5.8	55		4.4	7.8	0.025		0.25	0.25	0.25	0.04
Jun-06	5.46	389	6.1	73	110	1.3	0.05	0.1	0.25	1.3	0.25
Sep-06				10	15	0.05	0.03	0.1	4.3	4.3	6.1
Dec-06	5.65	63	5.39	12	12	0.1	0.03	0.1	1.7	1.8	2.2
Mar-07	5.79	45	9.79	4	5.8	0.05	0.02	0.1	3.6	3.7	4.1
Jun-07	5.32	42	4.66	3.6	4.8	0.025	0.01	0.25	0.98	1	0.0015
Sep-07	5.87	222	0.13	26.8	21.5	0.025	0.01	0.25	0.25	0.25	0.029
Dec-07	6.36	138	5.4	11.7	27.1	0.025	0.01	0.25	1	1	0.003 0.003
Mar-08	5.97	115	6.34	12.4	21.7	0.31	0.01	0.25	0.25	0.25	0.003
Jun-08	6.15	97	3.25	16	23	0.71	0.05	0.2	0.25	0.71	0.005 0.008
Sep-08	6.02	202	2.54	48	42	0.14	0.01	0.08	0.15	0.14	0.005 0.006
Dec-08	6.09	69	2.11	4.2	4.4	0.27	0.05	0.13	0.25	0.32	0.005 0.0025
Mar-09	5.87	50	6.61	4.3	11.8	0.29	0.01	0.25	0.25	0.29	0.035 0.015
Jun-09	5.73	36	2.58	3.3	6.2	0.29	0.07	0.0375	0.25	0.36	0.005 0.0025
Sep-09	6.07	0.85	2.22	12	7.8	0.1	0.05	0.0375	0.15	0.15	0.005 0.0025
Dec-09	5.66	36	3.49	3.3	3.3	0.44	0.025	0.0375	0.15	0.44	0.005 0.0025
Mar-10	5.06	32	3.76	3	7.9	0.09	0.01	0.25	0.25	0.25	0.015 0.005
Jun-10	4.78	30	3.41	2.9	4.7	0.3	0.025	0.0375	0.15	0.3	0.024 0.0025
Sep-10	5.25	90	2.43	6.3	6.8	0.05	0.025	0.0375	0.15	0.225	0.01 0.0025
Dec-10	5.31	44	3.7	4	5.1	0.14	0.025	0.0375	0.15	0.14	0.005 0.007
Apr-11	4.25	41	5.35	4.8	9.2	0.11	0.025	0.0375	0.15	0.11	0.005 0.0025
Jun-11	4.84	42	4.29	5	8.4	0.08	0.01	0.1	0.5	0.58	0.25 0.05
Sep-11	5.38	181	4.08	10	8.6	0.05	0.025	0.0375	0.15	0.225	0.005 0.0025
Dec-11	5.17	58	2.67	4.6	6.8	0.19	0.01	0.0375	0.15	0.19	0.005 0.0025
Mar-12	5.47	65	3.56	7.2	15	0.3	0.025	0.0375	0.15	0.3	0.005 0.0025
Jun-12	4.43	89	5.76	14	23	0.36	0.025	0.0375	0.15	0.36	0.005 0.0025
Sep-12	7.03	246	1.37	63	62	0.13	0.025	0.0375	0.15	0.13	1.94 0.0025
Dec-12	6.31	201	2.19	48	62	0.4	0.025	0.0375	0.15	0.4	0.0005 0.0025
Mar-13	5.95	132	6.51	6.6	12	0.132	0.025	0.0375	0.15	0.132	0.005 0.0025
Jun-13	5.81	48	4.33	3.5	7.8	0.402	0.025	0.0375	0.15	0.402	0.005 0.0025
Sep-13	5.36	82	0.45	5.3	9.9	0.05	0.01	0.0375	0.15	0.21	0.005 0.0025
Dec-13		204	4.37	7.1	14	0.05	0.025	0.0375	0.15	0.225	0.005 0.0025
Mar-14	5.43	68	8.09	12	14	0.205	0.01	0.0375	0.15	0.205	0.005 0.0025

Piezometer PZ-1R											
	pH	Conductivity	DO	Sodium	Chloride	Nitrate	Nitrite	Ammonia	TKN	Total N	Total Phos. Ortho Phos.
Nov-91	6.13	156		17	31.3	0.14		3.6	3.70	3.84	0.005
Apr-99	7.58	306	6.4	44.5	60.4	1.57		1.13	1.13	2.7	0.123
Mar-03											
Sep-03	6.63	59	3.8	7	9.8	0.025		0.25	0.25	0.25	0.983
Dec-03	6.34	56	3.19	8.9	13.5	0.025	0.01	0.25	0.25	0.25	0.036
Mar-04	6.36	63	2.26	10.3	19.7	0.09	0.002	0.25	0.25	0.25	0.09
Jun-04	6.26	66	3.38	7.9	11.3	0.005	0.002	0.25	0.25	0.25	0.133
Sep-04	6.46	51	1.85	6.5	8.9	0.005	0.002	0.25	0.25	0.25	0.150
Dec-04	6.29	40	2.85	6.6	12.4	0.025	0.01	0.25	0.25	0.25	0.254
Mar-05	6.37	38	3.3	5.2	8.6	0.005	0.002	0.25	0.25	0.25	0.255
Jun-05	6.61	47	4.55	6.3	8.4	0.01	0.002	0.25	0.25	0.25	0.363
Sep-05	6.49	77	3.54	6.5	16.5	0.005	0.002	0.25	0.25	0.25	0.107
Dec-05	5.99	41	4.75	5.8	9	0.005	0.002	0.25	0.25	0.25	0.121
Mar-06	6.33	38	6.95	5.9	8.4	0.04	0.01	0.25	0.25	0.25	0.125
Jun-06	6.45	50	6.71	7	9	0.01	0.01	0.1	0.25	0.25	0.25
Sep-06				8	7	0.06	0.01	0.1	0.25	0.25	1.1
Dec-06	6.17	42	8.25	8	10	0.03	0.02	0.1	0.25	0.25	0.6
Mar-07	6.53	43	6.52	7	9	0.01	0.01	0.1	0.25	0.25	0.25
Jun-07	5.99	61	2.15	5.8	10.3	0.025	0.01	0.25	0.25	0.25	0.126
Sep-07	6.09	86	1.53	6.5	23.5	0.025	0.01	0.25	0.25	0.25	0.283
Dec-07	6.02	81	2.62	39.5	50.7	0.09	0.01	0.25	1.3	1.4	0.115 0.042
Mar-08	5.53	105	1.93	44.7	36.8	0.025	0.01	0.25	1.4	1.4	0.128 0.007
Jun-08	6	124	2.09	19	33	0.13	0.05	0.2	1.3	1.43	0.608 0.008
Sep-08	6.03	81	2.11	13	20	0.05	0.001	0.0375	0.51	0.51	0.273 0.0025
Dec-08	5.81	53	2.71	6.8	11	0.05	0.025	0.0375	0.79	0.79	2.07 0.005
Mar-09	6.51	40	2.55	7.6	13.1	0.025	0.01	0.25	0.285	0.527	0.033
Jun-09	6.2	53	2.87	8	10	0.17	0.09	0.097	0.25	0.26	2.68 0.007
Sep-09	6.37	53	3.14	7.9	7.8	0.05	0.025	0.0375	0.36	0.36	2.13 0.022
Dec-09	5.94	48	4.14	7.5	7.8	0.05	0.025	0.0375	0.53	0.53	2.24 0.014
Mar-10	6.07	52	3.36	6	10	0.1	0.01	0.25	0.25	0.25	0.047 0.018

Jun-10	6.2	58	4.22	7.2	8.4	0.05	0.025	0.0375	0.48	0.48	3.09	0.024
Sep-10	5.99	69	3.68	7.7	8.5	0.05	0.025	0.0375	1.2	1.2	2.21	0.014
Dec-10	6.31	48	6.9	7.9	8.8	0.05	0.025	0.0375	0.86	0.86	0.641	0.019
Apr-11	5.51	61	0.12	8	11	0.16	0.025	0.092	2.2	2.36	1.3	0.012
Jun-11	5.5	57	7.9	7	11.4	0.04	0.01	0.1	1.9	1.94	1.1	0.05
Sep-11	6.81	55	0.08	7.5	9.6	0.36	0.025	0.0375	1.1	1.46	0.415	0.008
Dec-11	5.64	39	4.1	6.9	9.4	0.05	0.01	0.0375	0.15	0.21	0.172	0.008
Mar-12	5.3	130	4.56	7.1	9.5	0.05	0.025	0.0375	0.15	0.225	0.581	0.005
Jun-12	4.71	44	6.45	7.4	9.5	0.05	0.025	0.0375	0.97	0.97	0.466	0.0025
Sep-12	4.94	47	3.56	7.3	9	0.11	0.025	0.0375	0.71	0.82	0.4	0.007
Dec-12	5.45	46	3.19	7.2	10	0.05	0.025	0.0375	0.38	0.38	0.112	0.014
Mar-13	5.98	45	5.5	7.1	9	0.05	0.025	0.0375	0.349	0.349	0.068	0.053
Jun-13	6.26	46	8.37	6.4	8	0.149	0.025	0.0375	0.959	1.108	0.172	0.01
Sep-13	5.97	39	6.26	6.7	8.2	0.05	0.01	0.0375	0.764	0.764	0.193	0.014
Dec-13		95	4.12	7.4	9.6	0.05	0.025	0.0375	0.395	0.395	0.099	0.011
Mar-14	5.07	258	8.72	7.6	12	0.05	0.01	0.0375	0.3	0.3	0.259	0.012
Jun-14	5.4	195	6.92	7.4	8.2	0.05	0.025	0.0375	1.33	1.33	0.429	0.013
Sep-14	5.15	42	9.79	5.8	7.9	0.05	0.054	0.0375	0.15	0.054	0.209	0.006
Dec-14	6.5	38	8.32	6.7	7.3	0.05	0.025	0.0375	0.792	0.792	0.109	0.012
Mar-15	6.07	36	8.84	5.7	7.9	0.05	0.025	0.375	1.11	1.11	0.27	0.01
Jun-15	6.09	38	8.91	6.8	7.3	0.05	0.025	0.0375	0.56	0.56	0.134	0.014
Sep-15	5.97	44	5.76	6.8	8.3	0.05	0.025	0.0375	0.906	0.906	0.181	0.011
Dec-15	5.91	84	5.5	7.2	9.34	0.05	0.025	0.0375	0.648	0.648	0.146	0.016
Mar-16	5.54	54	5.11	7.3	8.9	0.05	0.025	0.0375	0.548	0.548	0.151	0.013
Jun-16	3.88	66	6.47	7.5	9.2	0.171	0.025	0.0375	1.7	1.871	0.258	0.012
Sep-16	6.18	112	2.56	7.1	9.2	0.05	0.025	0.0375	0.423	0.423	0.109	0.0025
Dec-16	6.15	54	5.99	9	9.3	0.05	0.025	0.0375	0.15	0.225	0.119	0.01
Mar-17	6.25	41	6.83	7.9	8.8	0.05	0.025	0.0375	1.2	1.2	2.99	0.022
Jun-17	6.55	70	4.2	7.62	9.3	0.05	0.025	0.0375	1.51	1.51	1.1	0.019
Sep-17	5.41	57	3.85	8.19	9.4	0.05	0.025	0.0375	1.09	1.09	0.453	0.009
Dec-17	6.27	82	3.40	9.35	13	0.05	0.025	0.0375	0.336	0.336	0.083	0.0025

	Piezometer PZ-2R											
	pH	Conductivity	DO	Sodium	Chloride	Nitrate	Nitrite	Ammonia	TKN	Total N	Total Phos.	Ortho Phos.
Nov-91	5.42	120		12	27.0	2.98		0.025	0.78	3.76	0.005	
Apr-99	5.82	880	5.4	10.1	11.0	0.15		0.05	0.29	0.44	0.031	
Mar-03												
Sep-03	5.75	208	4.32	32.1	31.8	4.36		0.25	0.25	4.36	0.80	
Dec-03	5.84	226	4.57	34	33.5	7.74	0.01	0.25	0.25	7.74	0.07	
Mar-04	5.82	230	4.72	42.2	42.2	6.80	0.002	0.25	0.25	6.8	0.0015	
Jun-04	6.01	278	2.6	39.4	41.2	5.51	0.002	0.25	0.25	5.51	0.1	
Sep-04	6.14	284	3.88	38.9	40.8	6.36	0.002	0.25	0.25	6.36	0.067	
Dec-04	5.81	266	5.31	46.1	36.3	5.84	0.01	0.25	0.25	5.84	0.085	
Mar-05	5.89	209	4.1	35.4	36.7	4.23	0.002	0.25	0.25	4.23	0.111	
Jun-05	6.32	268	5.29	34	30.5	3.21	0.002	0.25	0.25	3.21	0.134	
Sep-05	6.80	254	3.55	29.4	31.4	2.29	0.002	0.25	0.25	2.29	0.068	
Dec-05	5.91	230	6.5	31.8	39.5	5.04	0.002	0.25	0.25	5.04	0.149	
Mar-06	6.28	342	5.48	41.6	38.7	17.2	0.01	0.25	0.25	17.2	0.063	
Jun-06	6.3	387	3.93	35	35	8.4	0.02	0.1	0.25	8.4	0.25	
Sep-06				46	31	9.9	0.03	0.1	0.25	9.9	0.25	
Dec-06	6.12	245	6.66	38	38	5.7	0.01	0.1	0.6	6.2	0.25	
Mar-07	6.39	254	13.85	45	39	7.1	0.02	0.1	3.2	10	0.25	
Jun-07	6.16	334	4.01	46.9	34.3	5.18	0.01	0.25	0.25	5.2	0.155	
Sep-07	6.36	415	3.15	44.1	36.4	4.68	0.01	0.25	0.56	5.3	0.443	
Dec-07	6.45	276	7.39	54	42.6	5.9	0.01	0.25	0.7	6.6	0.133	0.033
Mar-08	6.31	306	6.22	12.9	36.6	7.48	0.01	0.25	1.3	8.8	0.047	0.008
Jun-08	6.33	460	3.48	64	36	5.6	0.05	0.2	3.7	9.3	0.193	0.005
Sep-08	6.23	318	3.73	47	37	1.8	0.01	0.0375	0.72	2.52	0.034	0.005
Dec-08	6.37	310	3.71	40	42	4.4	0.025	0.0375	1.9	6.3	0.444	0.005
Mar-09	6.37	274	6.59	48.5	34	4.04	0.01	0.25	0.25	4.04	0.141	0.024
Jun-09	6.4	299	2.59	41	40	2.5	0.1	0.075	1.4	4	0.424	0.0025
Sep-09	6.48	52	2.89	44	35	5.3	0.025	0.0375	1.3	6.6	0.289	0.007
Dec-09	6.01	52	4.11	40	36	6	0.025	0.0375	1.6	7.6	0.127	0.0025
Mar-10	6.14	274	4.83	36	33.4	5.78	0.01	0.25	0.98	6.8	0.188	0.005
Jun-10	6.77	111	4.01	43	36	4.4	0.025	0.0375	1.3	5.7	0.215	0.007
Sep-10	8.67	853	4.48	31	23	0.91	0.025	0.0375	1.1	2.01	0.512	0.0025
Dec-10	6.11	269	6.01	48	40	7.9	0.025	0.0375	0.15	7.9	0.074	0.007
Apr-11	4.81	274	5.4	43	35	6.2	0.025	0.0375	2.3	8.5	0.729	0.0025
Jun-11	5.95	303	5.2	39	44.2	6.3	0.01	0.1	1.5	7.8	0.25	0.05
Sep-11	7	68	0.12	25	33	0.84	0.025	0.0375	1.1	1.94	0.11	0.012

Dec-11	6.03	248	3.24	42	42	11	0.1	0.0375	0.53	11.53	0.138	0.0025
Mar-12	6.05	212	3.12	37	35	6.2	0.025	0.0375	2.5	8.7	0.731	0.0025
Jun-12	5.75	243	4.76	35	36	3.5	0.025	0.0375	1.8	5.3	0.496	0.0025
Sep-12	4.08	295	6.69	38	39	4.7	0.025	0.0375	0.64	5.34	0.509	0.019
Dec-12	6.41	215	3.09	42	50	6.7	0.025	0.0375	1.2	7.9	0.155	0.0025
Mar-13	6.22	230	5.68	37	43	3.22	0.025	0.0375	3.61	6.83	1.06	0.007
Jun-13	6.65	194	5.53	28	27	2.79	0.025	0.075	2.91	5.7	0.995	0.0025
Sep-13	6.02	240	3.49	31	35	3.59	0.03	0.0375	1.4	5.02	0.279	0.0025
Dec-13		302	2.13	30	34	10.9	0.025	0.0375	0.75	10.9	0.095	0.0025
Mar-14	5.97	214	6.94	39	44	8.38	0.02	0.187	2.46	10.84	0.35	0.0025
Jun-14	5.95	353	5.4	48	53	5.33	0.025	0.75	2.77	8.1	0.489	0.019
Sep-14	5	286	4.22	49	53	6.06	0.025	0.0375	1.75	7.81	0.245	0.06
Dec-14	6	257	3.14	37	41	6.96	0.025	0.145	0.337	7.297	0.152	0.104
Mar-15	5.8	201	7.23	35	40	4	0.025	0.075	2.74	6.74	0.697	0.194
Jun-15	6.81	214	7.96	45	60	5.91	0.025	0.075	1.08	6.99	0.509	0.307
Sep-15	6.16	282	5.93	42	43	5.81	0.054	0.0375	1.39	7.254	1.04	0.659
Dec-15	5.84	579	3.2	43	45.2	13.7	0.025	0.0375	0.75	13.7	0.913	0.694
Mar-16	5.55	283	5.39	36	42	8.31	0.025	0.0375	0.15	8.31	1	1.05
Jun-16	5.83	308	9.99	40	44	8.05	0.025	0.77	1.93	9.98	1.57	1.04
Sep-16	5.89	385	6.68	34	45	8.67	0.025	0.075	0.3	8.67	1.83	0.052
Dec-16	5.86	228	5.42	39	44	18.6	0.025	0.077	0.15	18.6	1.46	1.18
Mar-17	6.12	235	11.55	110	79	9.72	0.025	0.0375	1.96	11.68	2.05	1.2
Jun-17	6.58	406	6.3	40.8	47	9.86	0.025	0.0375	3.28	13.14	2.45	1.48
Sep-17	5.37	176	3.16	43.4	44	12.7	0.025	0.0375	1.55	14.25	2.25	1.97
Dec-17	6.39	294	7.52	51.4	46	9.16	0.025	0.0375	0.807	9.967	2.35	2.16

Piezometer PZ-3R												
	pH	Conductivity	DO	Sodium	Chloride	Nitrate	Nitrite	Ammonia	TKN	Total N	Total Phos.	Ortho Phos.
Nov-91	6.33	74		6.6	10.7	0.05		0.025	0.94	0.99	0.005	
Apr-99	7.0	673	2.6	5.2	7.3	0.28		0.05	0.73	1.01	0.051	
Mar-03												
Sep-03	6.5	65	3.5	7	8.0	0.025		0.25	0.25	0.25	0.967	
Dec-03	6.65	55	4.28	7.6	10.0	0.025	0.01	0.25	0.25	0.25	0.185	
Mar-04	6.46	57	3.85	7.3	8.3	0.005	0.002	0.25	0.25	0.25	0.212	
Jun-04	6.39	69	3.32	7.9	8.5	0.005	0.002	0.25	0.25	0.25	0.317	
Sep-04	7.06	300	4.99	7.4	8.4	0.005	0.002	0.25	0.25	0.25	1.00	
Dec-04	6.29	97	3.07	7.9	11.8	0.025	0.01	0.25	0.25	0.25	0.767	
Mar-05	6.07	56	3.9	6.5	8.2	0.005	0.002	0.25	0.25	0.25	0.790	
Jun-05	6.87	68	5.31	7.6	8.0	0.02	0.002	0.25	0.25	0.25	1.830	
Sep-05	6.84	65	3.98	7	8.7	0.005	0.002	0.25	0.25	0.25	0.470	
Dec-05	6.21	98	6.51	6.2	8.2	0.02	0.002	0.25	0.25	0.25	0.673	
Mar-06	6.71	61	5.01	7.2	8.5	0.025	0.01	0.25	0.25	0.25	0.573	
Jun-06	6.79	65	5.01	8	9	0.07	0.01	0.1	0.25	0.25	0.25	
Sep-06				9	7	0.04	0.01	0.1	2.6	2.6	5	
Dec-06	6.65	192	10.24	8	9	0.05	0.01	0.1	1.1	1.1	1.6	
Mar-07	6.53	56	12.48	9	91	0.02	0.02	0.2	1.5	1.5	2.6	
Jun-07	6.98	70	3.64	6.1	8.5	0.025	0.01	0.25	0.25	0.25	0.93	
Sep-07	6.72	71	3.55	4.4	11.7	0.025	0.01	0.25	0.25	0.25	1.5	
Dec-07	6.5	57	4.44	6	8.2	0.025	0.01	0.25	1.5	1.5	0.861	0.014
Mar-08	6.66	124	5.11	6	8.6	0.4	0.01	0.25	0.56	1	0.96	0.4
Jun-08	6.6	74	3.66	8.8	8.1	1.1	0.02	0.2	5.2	6.3	29.1	0.269
Sep-08	6.73	92	4.44	8.2	9	0.05	0.01	0.0375	0.62	0.62	0.969	0.121
Dec-08	6.51	66	3.91	7.4	20	0.15	0.025	0.075	3.8	3.95	10.2	0.141
Mar-09	6.62	59	4.04	7.5	12.3	0.025	0.01	0.25	0.25	0.285	0.597	0.195
Jun-09	6.7	63	4.63	7.4	8.9	0.15	0.06	0.0375	0.98	1.19	2.61	0.138
Sep-09	6.66	66	3.26	8.4	7.4	0.05	0.025	0.0375	1	1	4.65	0.168
Dec-09	6.09	55	5.16	7.6	7.1	0.05	0.025	0.1875	1.1	1.1	3.56	0.223
Mar-10	6.63	66	4.58	6.5	8.8	0.1	0.01	0.25	0.25	0.25	2.83	0.305
Jun-10	6.86	61	4.47	7.8	7.9	0.11	0.025	0.0375	0.35	0.46	1.45	0.172
Sep-10	7.34	102	4.19	8.6	8.2	0.05	0.025	0.0375	0.81	0.81	1.16	0.161
Dec-10	6.29	55	6.03	8.8	7.9	0.05	0.025	0.0375	0.15	0.225	0.6	0.16
Apr-11	4.95	72	0.66	7.8	8.2	0.18	0.025	0.0375	0.75	0.93	2.06	0.121
Jun-11	5.7	68	4.37	7	8.6	0.01	0.01	0.1	0.9	0.9	1.5	0.2
Sep-11	6.91	165	0.08	7.3	8.5	0.2	0.025	0.0375	7.4	7.6	11.4	0.141
Dec-11	6.21	54	2.86	8	9.1	0.05	0.01	0.0375	0.65	0.65	0.893	0.084
Mar-12	6.4	56	4.41	8.3	8.8	0.05	0.025	0.0375	2	2	4.19	0.121
Jun-12	5.96	63	4.83	8.2	8.7	0.05	0.025	0.0375	1.4	1.4	4.27	0.127
Sep-12	6.53	67	2.36	8.7	8.5	0.05	0.025	0.0375	1.1	1.1	4.37	0.138
Dec-12	5.35	86	2.19	8.5	9.8	0.1	0.025	0.075	0.94	1.04	5.16	0.149

Mar-13	6.62	62	5.17	8.1	17	3.05	0.025	0.0375	0.85	3.9	3.31	1.02
Jun-13	5.85	68	6.47	7.6	7.7	0.05	0.025	0.0375	1.07	1.07	2.62	0.124
Sep-13	6.69	60	4.22	7.9	7.8	0.05	0.01	0.0375	0.512	0.512	2.41	0.131
Dec-13		114	3.62	7.4	7.6	0.05	0.025	0.0375	0.994	0.994	2.3	0.122
Mar-14	6.23	53	6.65	8.5	12	0.05	0.01	0.0375	0.332	0.332	1.2	0.108
Jun-14	6.4	68	5.04	9.5	7.9	0.05	0.025	0.0375	1.25	1.25	4.47	0.146
Sep-14	5.37	64	4.27	7.3	8.2	0.05	0.025	0.0375	0.44	0.44	1.11	0.167
Dec-14	6.5	55	4.28	7.1	7.4	0.05	0.025	0.088	0.373	0.373	1.3	0.13
Mar-15	3.26	46	19.92	7.4	8.2	0.05	0.025	0.0375	1.12	1.12	6.31	0.089
Jun-15	6.62	47	12.04	8.7	7.4	0.05	0.025	0.1875	1.33	1.33	13.1	0.132
Sep-15	6.32	60	3.74	8.8	8	0.05	0.025	0.0375	0.851	0.851	3.05	0.154
Dec-15	6.27	118	3.65	8.1	9.28	0.05	0.025	0.0375	0.15	0.225	1.54	0.151
Mar-16	6.21	66	5.96	8	8.3	0.05	0.025	0.0375	0.3	0.375	1.55	0.129
Jun-16	5.7	80	6.36	8.5	8.3	0.05	0.025	0.0375	0.956	0.956	2.87	0.16
Sep-16	6.68	124	2.4	8.1	8.2	0.05	0.025	0.0375	0.15	0.225	1.92	0.12
Dec-16	6.5	55	7.06	8.4	7.9	0.05	0.025	0.0375	0.431	0.431	4.63	0.114
Mar-17	6.65	75	6.49	13	15	0.328	0.025	0.0375	0.424	0.752	13.8	0.137
Jun-17	6.42	74	4.45	8.51	8.6	0.125	0.025	0.0375	1.41	1.41	4.9	0.122
Sep-17	5.2	204	4.58	9.33	8.5	0.05	0.025	0.0375	1.84	1.84	5.06	0.139
Dec-17	6.83	73	5.61	7.97	7.7	0.05	0.025	0.0375	0.355	0.355	2.38	0.154

Notes:

1. 1991 testing performed by N/F IEP, Inc.
2. Blank cell = not tested / not applicable
3. Blue indicates value reported as below reporting limit, listed as half of reporting limit.
4. Green indicates value reported as less than (<), listed as half the reported value.

SURFACE WATER MONITORING POINTS

	Surface Water SW-1											
	pH	Conductivity	DO	Sodium	Chloride	Nitrate	Nitrite	Ammonia	TKN	Total N	Total Phos.	Ortho Phos.
Dec-91	6.46	111	11.8			0.41		0.16	0.31	0.72	0.005	
May-99	7.42	111	8.7			0.30		0.05	0.73	1.03	0.031	
Mar-03												
Sep-03	6.52	89	9.05			0.39		0.25	0.25	0.39	0.517	
Dec-03	7.09	78	9.27			0.21	0.01	0.25	0.25	0.21	0.083	
Mar-04	6.49	82	8.63			0.45	0.002	0.25	0.25	0.45	0.073	
Jun-04	6.54	61	7.49			0.45	0.002	0.25	0.25	0.45	0.05	
Sep-04	6.13	89	7.55			0.43	0.02	0.25	0.25	0.43	0.083	
Dec-04	6.30	83	8.6			0.43	0.01	0.25	0.25	0.43	0.095	
Mar-05	6.36	68	9			0.29	0.002	0.25	0.25	0.25	0.119	
Jun-05	6.73	102	6.69			0.23	0.002	0.25	0.25	0.25	0.066	
Sep-05	6.68	92	8.52			0.37	0.002	0.25	0.25	0.25	0.053	
Dec-05	6.67	70	11.55			0.36	0.002	0.25	0.25	0.25	0.038	
Mar-06	6.74	74	10.76			0.38	0.01	0.25	0.25	0.40	0.049	
Jun-06	6.85	87	10.2			0.36	0.01	0.1	0.25	0.25	0.25	
Sep-06	NT	NT	NT			0.31	0.01	0.1	0.25	0.25	0.25	
Dec-06	6.08	80	14.89			0.34	0.01	0.1	0.25	0.25	0.25	
Mar-07	6.33	66	16		180	0.29	0.02	0.1	0.6	0.90	0.25	
Jun-07	6.35	90	6.15			0.36	0.01	0.25	0.25	0.25	0.02	
Sep-07	6.27	93	7.31			0.53	0.01	0.25	0.25	0.50	0.027	
Dec-07	6.12	250	7.38			0.56	0.01	0.25	1.4	2.00	0.027	0.014
Mar-08	6.05	166	10.65			0.7	0.01	0.25	0.56	1.30	0.04	0.003
Jun-08	6.43	257	5.28			0.26	0.05	0.2	0.63	0.89	0.088	0.005
Sep-08	6.35	257	7.01			0.24	0.01	0.107	0.46	0.70	0.036	0.0025
Dec-08	5.75	170	9.01			0.63	0.025	0.214	0.25	0.63	0.019	0.0025
Mar-09	6.62	73	10.79			0.44	0.01	0.25	0.25	0.44	0.149	0.016
Jun-09	6.16	209	6.47			0.47	0.08	0.162	0.25	0.55	0.025	0.0025
Sep-09	6.03	208	4.14			0.05	0.025	0.0375	0.35	0.35	0.056	0.0025
Dec-09	5.63	156	6.22			0.56	0.025	0.217	0.55	1.11	0.023	0.0025
Mar-10	6.11	70	10.61			0.30	0.01	0.25	0.25	0.25	0.047	0.005
Jun-10	6.47	81	8.08			0.27	0.025	0.0375	0.32	0.59	0.038	0.0025
Sep-10	6.46	1003	5.51			0.23	0.025	0.105	0.15	0.23	0.266	0.0025
Dec-10	5.86	160	12.25			0.68	0.05	0.21	0.32	1.00	0.029	0.005
Apr-11	5.31	226	5.81			0.23	0.025	0.0375	0.65	0.88	0.064	0.0025
Jun-11	5.42	84	5.87			0.08	0.01	0.1	0.6	0.68	0.25	0.05
Sep-11	6.64	96	0.08			0.34	0.025	0.0375	0.38	0.72	0.018	0.0025
Dec-11	5.65	64	5.04			0.25	0.01	0.0375	1	1.25	0.384	0.0025
Mar-12	5.86	70	6.7			0.26	0.025	0.0375	0.41	0.67	0.03	0.0025
Jun-12	5.67	83	4.9			0.05	0.025	0.096	0.89	0.89	0.042	0.0025
Sep-12	6.24	86	2.94			0.36	0.025	0.0375	0.45	0.81	0.027	0.007
Dec-12	5.24	158	3.94			0.22	0.025	0.0375	0.72	0.94	0.389	0.538
Mar-13	6.36	97	10.48			0.283	0.025	0.097	0.363	0.65	0.031	0.0025
Jun-13	6.46	81	5.7			0.5	0.025	0.0375	0.376	0.88	0.073	0.008
Sep-13	6.05	90	5.62			0.324	0.01	0.0375	0.389	0.71	0.038	0.008
Dec-13		128	10.07			0.315	0.025	0.08	0.33	0.65	0.017	0.0025
Mar-14	5.59	62	13.99			0.276	0.01	0.082	0.382	0.66	0.135	0.007
Jun-14	6.23	113	8.42			0.43	0.025	0.0375	0.381	0.81	0.036	0.0025
Sep-14	5.30	84	6.6			0.145	0.025	0.0375	0.15	0.15	0.031	0.006
Dec-14	6.00	81	9.87			0.511	0.025	0.114	0.438	0.95	0.016	0.008
Mar-15	6.11	79	10.47			0.364	0.025	0.0375	0.331	0.70	0.015	0.007
Jun-15	6.39	100	7.23			0.326	0.025	0.0375	0.303	0.63	0.022	0.011
Sep-15	5.49	96	3.56			0.135	0.025	0.0375	0.15	0.14	0.034	0.006
Dec-15	6.14	185	9.06			0.456	0.025	0.0375	0.15	0.46	0.051	0.009
Mar-16	6.20	108	9.53			0.365	0.025	0.0375	0.15	0.37	0.029	0.0025
Jun-16	5.36	135	9.97			0.474	0.025	0.0375	0.301	0.78	0.033	0.009
Sep-16	6.46	250	3.98			0.596	0.025	0.0375	0.15	0.60	0.023	0.0025
Dec-16	6.01	86	12.4			3.69	0.025	0.0375	0.15	3.69	0.015	0.054
Mar-17	3.31	65	13.66			0.44	0.025	0.0375	0.345	0.79	0.024	0.006
Jun-17	6.86	137	6.86			0.317	0.025	0.0375	0.15	0.32	0.018	0.012
Sep-17	5.93	70	8.13			0.466	0.025	0.0375	0.436	0.90	0.029	0.0025
Dec-17	6.29	293	10.91			0.458	0.025	0.0375	0.454	0.91	0.025	0.012

	Surface Water SW-2										
	pH	Conductivity	DO	Sodium	Chloride	Nitrate	Nitrite	Ammonia	TKN	Total N	Total Phos. Ortho Phos.
Dec-91	6.52	114	12.8			0.38		0.15	0.48	0.86	0.005
May-99	8.12	138	9.0			0.46		0.05	0.1	0.46	0.031
Mar-03											
Sep-03	7.4	98	9.58			0.35		0.25	0.25	0.25	0.717
Dec-03	6.84	131	9.64			0.60	0.01	0.25	0.25	0.60	0.167
Mar-04	6.25	139	9.13			0.60	0.002	0.25	0.25	0.60	0.061
Jun-04	6.51	159	7.25			0.28	0.002	0.25	0.25	0.25	0.05
Sep-04	6.14	401	7.37			0.52	0.02	0.25	0.25	0.52	0.017
Dec-04	6.13	112	8.63			0.58	0.01	0.25	0.25	0.58	0.083
Mar-05	6.09	145	9.3			0.67	0.002	0.25	0.25	0.67	0.119
Jun-05	6.63	105	7.83			0.26	0.002	0.25	0.25	0.25	0.054
Sep-05	6.83	202	9.59			0.57	0.002	0.25	0.25	0.57	0.078
Dec-05	6.55	435	11.34			0.57	0.002	0.25	0.25	0.57	0.075
Mar-06	6.72	76	10.79			0.45	0.01	0.25	0.25	0.40	0.078
Jun-06	6.87	88	10.34			0.36	0.01	0.1	0.25	0.25	0.25
Sep-06	NT	NT	NT			0.35	0.01	0.1	0.25	0.25	0.25
Dec-06	6.63	250	14.99			0.67	0.01	0.1	0.25	0.70	0.25
Mar-07	6.8	85	15.67		250	0.45	0.01	0.1	0.7	1.20	0.25
Jun-07	6.84	163	6.44			0.60	0.01	0.25	0.84	1.40	0.063
Sep-07	6.99	322	8.92			1.20	0.01	0.25	0.25	1.20	0.309
Dec-07	6.54	431	7.43			1.04	0.01	0.25	0.25	1.00	0.068 0.055
Mar-08	6.81	950	11.76			0.34	0.01	0.25	0.7	1.00	0.06 0.003
Jun-08	6.81	147	6.9			0.46	0.05	0.2	0.25	0.46	0.039 0.012
Sep-08	6.71	127	9.67			0.53	0.01	0.0375	0.49	1.02	0.033 0.011
Dec-08	6.39	259	8.91			1.30	0.025	0.075	6.6	7.90	2.28 0.07
Mar-09	6.75	215	12.01			0.47	0.01	0.25	0.25	0.47	0.079 0.017
Jun-09	6.94	143	6.73			0.50	0.06	0.0375	0.25	0.56	0.046 0.006
Sep-09	6.43	201	4.85			0.52	0.025	0.0375	0.56	1.08	0.18 0.04
Dec-09	6.06	209	6.83			0.63	0.025	0.085	0.15	0.63	0.09 0.053
Mar-10	6.15	71	10.02			0.31	0.01	0.25	0.25	0.25	0.182 0.005
Jun-10	6.31	92	9.11			0.76	0.025	0.0375	3.4	4.16	0.775 0.045
Sep-10	6.59	281	7.26			0.37	0.025	0.0375	0.15	0.37	0.077 0.012
Dec-10	6.38	130	11.49			0.86	0.025	0.0375	0.15	0.86	0.091 0.036
Apr-11	5.39	131	4.8			0.48	0.025	0.0375	0.42	0.90	0.073 0.0025
Jun-11	6.07	181	4.3			0.41	0.01	0.1	0.8	1.21	0.25 0.05
Sep-11	6.9	146	0.08			0.41	0.025	0.0375	0.39	0.80	0.075 0.0025
Dec-11	6.38	73	6.32			0.45	0.01	0.0375	0.15	0.45	0.048 0.0025
Mar-12	6.31	260	6.99			1.00	0.025	0.0375	0.36	1.36	0.093 0.012
Jun-12	6.23	190	5.56			0.45	0.025	0.0375	0.78	1.23	0.073 0.0025
Sep-12	6.75	175	3.52			0.52	0.025	0.0375	0.31	0.83	0.1 0.028
Dec-12	6.41	215	3.09			0.63	0.025	0.0375	0.39	1.02	0.212 0.0025
Mar-13	6.46	166	11.12			0.575	0.0025	0.0375	0.421	1.00	0.158 0.052
Jun-13	6.82	138	6.74			0.44	0.025	0.0375	0.345	0.79	0.062 0.043
Sep-13	6.53	186	6.42			0.822	0.01	0.0375	0.498	1.32	0.126 0.045
Dec-13		239	9.41			0.777	0.025	0.091	0.43	1.21	0.145 0.053
Mar-14	6.24	159	14.09			1.03	0.01	0.0375	0.419	1.45	0.118 0.08
Jun-14	6.4	415	8.88			0.701	0.025	0.0375	1.33	2.03	0.27 0.051
Sep-14	5.37	96	7.49			1.02	0.025	0.0375	0.412	1.43	0.157 0.102
Dec-14	6	438	8.84			0.869	0.025	0.099	0.634	1.50	0.094 0.041
Mar-15	5.98	174	11.31			2.11	0.025	0.0375	0.365	2.48	0.152 0.119
Jun-15	6.13	353	3.67			0.768	0.025	0.0375	0.15	0.77	0.072 0.058
Sep-15	6.43	304	7.42			0.979	0.025	0.0375	0.479	1.46	0.124 0.086
Dec-15	6.03	587	9.24			0.917	0.025	0.109	0.15	0.92	0.163 0.138
Mar-16	6.25	193	9.16			1.07	0.025	0.0375	0.547	1.62	0.313 0.083
Jun-16	6.49	279	9.8			0.58	0.025	0.0375	0.497	1.08	0.116 0.074
Sep-16	6.72	64	3.54			0.624	0.025	0.0375	0.671	1.30	0.101 0.02
Dec-16	6.27	803	13.08			6.29	0.025	0.0375	0.341	6.63	0.225 0.105
Mar-17	6.21	285	11.3			5.79	0.025	0.0375	1.91	7.70	0.56 0.096
Jun-17	6.8	305	7.94			0.859	0.025	0.0375	1.27	2.13	0.516 0.102
Sep-17	5.84	342	7.03			0.566	0.025	0.0375	0.366	0.93	0.087 0.04
Dec-17	6.88	241	11.48			0.742	0.025	0.0375	0.15	0.74	0.09 0.066

Surface Water SW-3											
	pH	Conductivity	DO	Sodium	Chloride	Nitrate	Nitrite	Ammonia	TKN	Total N	Total Phos. Ortho Phos.
Dec-91	6.78	1,945	13.0			0.40		0.10	0.48	0.86	0.005
May-99	7.98	220	8.5			0.32		0.05	0.1	0.32	0.062
Mar-03											
Sep-03	7.07	93	9.45			0.38		0.25	0.25	0.25	0.717
Dec-03	6.98	95	9.95			0.26	0.01	0.25	0.25	0.25	0.207
Mar-04	6.14	109	10.2			0.45	0.002	0.25	0.25	0.25	0.073
Jun-04	6.04	359	7.59			0.44	0.002	0.25	0.25	0.25	0.067
Sep-04	5.19	1,587	7.25			0.02	0.02	0.25	0.84	0.80	0.025
Dec-04	5.14	2,400	9.55			0.49	0.01	0.25	0.25	0.49	0.092
Mar-05	5.93	96	9.2			0.46	0.002	0.25	0.25	0.25	0.131
Jun-05	6.84	118	8.21			0.24	0.002	0.25	0.25	0.25	0.068
Sep-05	6.76	118	7.86			0.38	0.002	0.25	0.25	0.25	0.105
Dec-05	6.13	807	10.25			0.13	0.002	0.25	0.25	0.25	0.078
Mar-06	6.75	80	10.71			0.42	0.01	0.25	0.25	0.40	0.073
Jun-06	6.89	91	10.33			0.36	0.01	0.1	0.25	0.25	0.25
Sep-06	NT	NT	NT			0.32	0.01	0.1	0.25	0.25	0.25
Dec-06	6	1,810	15.1			0.31	0.01	0.1	0.7	1.00	0.25
Mar-07	6.76	79	15		330	0.37	0.01	0.1	0.6	1.00	0.25
Jun-07	6.11	158	6.05			0.46	0.01	0.25	0.7	1.20	0.023
Sep-07	6.85	162	7.11			0.44	0.01	0.25	0.25	0.25	0.263
Dec-07	6.69	154	3.88			0.4	0.01	0.25	0.25	0.25	0.109
Mar-08	6.66	998	12.66			0.4	0.01	0.25	0.56	1.00	0.043
Jun-08	6.57	78	3.74			0.39	0.05	0.2	0.52	0.91	0.031
Sep-08	6.6	412	10.15			0.49	0.01	0.0375	0.39	0.88	0.049
Dec-08	6.53	224	9.11			0.48	0.025	0.0375	0.25	0.48	0.051
Mar-09	6.36	105	10.58			0.47	0.01	0.25	0.25	0.47	0.056
Jun-09	6.78	110	5.11			0.63	0.07	0.0375	1.4	2.10	1.42
Sep-09	6.55	311	5.58			0.48	0.025	0.0375	0.15	0.48	0.087
Dec-09	6.1	281	6.89			0.3	0.025	0.084	0.46	0.76	0.044
Mar-10	6.11	115	9.26			0.36	0.01	0.25	0.25	0.25	0.105
Jun-10	6.52	111	8.34			0.58	0.025	0.0375	0.15	0.58	0.117
Sep-10	6.53	122	7.37			0.35	0.025	0.0375	0.4	0.75	0.07
Dec-10	6.12	119	12.94			0.42	0.025	0.084	0.15	0.42	0.06
Apr-11	6.21	122	0.09			0.32	0.025	0.0375	2.1	2.42	0.582
Jun-11	5.35	240	3.85			0.25	0.01	0.1	0.9	1.15	0.25
Sep-11	6.39	2,410	0.08			0.05	0.025	0.0375	0.6	0.60	0.198
Dec-11	6.35	133	6.24			0.48	0.01	0.0375	0.15	0.48	0.022
Mar-12	6.02	797	6.53			0.49	0.025	0.0375	0.9	1.39	0.458
Jun-12	6.12	601	4.78			0.21	0.025	0.0375	1.1	1.31	0.101
Sep-12	7.03	331	6.33			0.22	0.025	0.103	0.4	0.62	0.1
Dec-12	5.35	86	2.19			0.55	0.025	0.0375	0.33	0.88	0.056
Mar-13	6.26	108	8.08			0.388	0.025	0.0375	0.445	0.83	0.046
Jun-13	6.87	116	6.19			0.31	0.025	0.0375	0.327	0.64	0.037
Sep-13	6.38	126	7.48			1.72	0.01	0.0375	0.15	1.72	0.042
Dec-13		650	8.47			0.172	0.025	0.084	0.475	0.65	0.165
Mar-14	6.23	522	12.76			0.366	0.01	0.077	0.326	0.69	0.049
Jun-14	6.35	973	8.01			0.397	0.025	0.174	1.31	1.71	0.465
Sep-14	5.71	2,068	6.34			0.366	0.025	0.0375	0.332	0.70	0.274
Dec-14	5.5	880	9.62			0.611	0.025	0.123	0.465	1.08	0.048
Mar-15	6.17	92	10.79			0.393	0.025	0.0375	0.548	0.94	0.051
Jun-15	6.65	210	9.13			0.234	0.025	0.0375	0.316	0.55	0.082
Sep-15	6.77	677	7.12			0.531	0.025	0.375	0.512	1.04	0.048
Dec-15	6.14	29	10.03			0.53	0.025	0.0375	0.15	0.53	0.045
Mar-16	6.59	190	8.57			0.282	0.025	0.0375	0.551	0.83	0.167
Jun-16	6.42	217	11.46			0.452	0.025	0.0375	0.305	0.76	0.042
Sep-16	7.97	2,205	7			0.217	0.025	0.0375	0.648	0.87	0.14
Dec-16	6.67	490	12.58			0.462	0.025	0.0375	0.515	0.98	0.31
Mar-17	6.51	335	11.13			0.551	0.025	0.0375	0.15	0.55	0.064
Jun-17	6.7	702	7.36			0.182	0.025	0.0375	0.6	0.78	0.151
Sep-17	6.42	1,313	6			0.302	0.025	0.0375	0.507	0.81	0.096
Dec-17	6.86	122	11.39			0.451	0.025	0.0375	0.15	0.45	0.042

- Notes:
1. 1991 testing performed by N/F IEP, Inc.
 2. Blank cell = not tested / not applicable
 3. Blue indicates value reported as below reporting limit, listed as half of reporting limit.
 4. Green indicates value reported as less than (<), listed as half the reported value.



ANALYTICAL REPORT

Lab Number:	L1708191
Client:	Bennett Environmental Associates 1573 Main Street Brewster, MA 02631
ATTN:	David Bennett
Phone:	(508) 896-1706
Project Name:	WINDCHIME
Project Number:	BEA99-2252
Report Date:	03/23/17

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Certifications & Approvals: MA (M-MA086), NH NELAP (2064), NJ NELAP (MA935), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-14-00197).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com



Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1708191
Report Date: 03/23/17

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1708191-01	B-2R	WATER	MASHPEE, MA	03/16/17 14:25	03/17/17
L1708191-02	MW-3R	WATER	MASHPEE, MA	03/16/17 13:50	03/17/17
L1708191-03	MW-1	WATER	MASHPEE, MA	03/16/17 12:15	03/17/17
L1708191-04	MW-2	WATER	MASHPEE, MA	03/16/17 13:15	03/17/17
L1708191-05	MW-4	WATER	MASHPEE, MA	03/16/17 12:40	03/17/17
L1708191-06	PZ-1R	WATER	MASHPEE, MA	03/16/17 09:30	03/17/17
L1708191-07	PZ-2R	WATER	MASHPEE, MA	03/16/17 10:30	03/17/17
L1708191-08	PZ-3R	WATER	MASHPEE, MA	03/16/17 10:15	03/17/17
L1708191-09	SW-1	WATER	MASHPEE, MA	03/16/17 09:40	03/17/17
L1708191-10	SW-2	WATER	MASHPEE, MA	03/16/17 10:25	03/17/17
L1708191-11	SW-3	WATER	MASHPEE, MA	03/16/17 10:45	03/17/17

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1708191
Report Date: 03/23/17

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY

For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

Project Name: WINDCHIME
Project Number: BEA99-2252

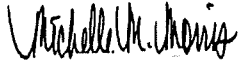
Lab Number: L1708191
Report Date: 03/23/17

Case Narrative (continued)

Nitrogen, Total Kjeldahl

L1708191-04: The sample has an elevated detection limit due to the dilution required by the sample matrix.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:  Michelle M. Morris

Title: Technical Director/Representative

Date: 03/23/17

METALS

Project Name: WINDCHIME

Lab Number: L1708191

Project Number: BEA99-2252

Report Date: 03/23/17

SAMPLE RESULTS

Lab ID: L1708191-01

Date Collected: 03/16/17 14:25

Client ID: B-2R

Date Received: 03/17/17

Sample Location: MASHPEE, MA

Field Prep: Not Specified

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Sodium, Total	39		mg/l	2.0	--	1	03/21/17 11:55	03/21/17 21:27	EPA 3005A	1,6010C	AB



Serial_No:03231719:19

Project Name: WINDCHIME

Lab Number: L1708191

Project Number: BEA99-2252

Report Date: 03/23/17

SAMPLE RESULTS

Lab ID: L1708191-02

Date Collected: 03/16/17 13:50

Client ID: MW-3R

Date Received: 03/17/17

Sample Location: MASHPEE, MA

Field Prep: Not Specified

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Sodium, Total	35		mg/l	2.0	--	1	03/21/17 11:55	03/21/17 21:45	EPA 3005A	1,6010C	AB



Serial_No:03231719:19

Project Name: WINDCHIME

Project Number: BEA99-2252

Lab Number: L1708191

Report Date: 03/23/17

SAMPLE RESULTS

Lab ID: L1708191-03

Client ID: MW-1

Sample Location: MASHPEE, MA

Matrix: Water

Date Collected: 03/16/17 12:15

Date Received: 03/17/17

Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Sodium, Total	39		mg/l	2.0	--	1	03/21/17 11:55	03/21/17 21:49	EPA 3005A	1,6010C	AB



Serial_No:03231719:19

Project Name: WINDCHIME

Project Number: BEA99-2252

Lab Number: L1708191

Report Date: 03/23/17

SAMPLE RESULTS

Lab ID: L1708191-04

Client ID: MW-2

Sample Location: MASHPEE, MA

Matrix: Water

Date Collected: 03/16/17 13:15

Date Received: 03/17/17

Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Sodium, Total	37		mg/l	2.0	--	1	03/21/17 11:55	03/21/17 21:54	EPA 3005A	1,6010C	AB



Project Name: WINDCHIME

Lab Number: L1708191

Project Number: BEA99-2252

Report Date: 03/23/17

SAMPLE RESULTS

Lab ID: L1708191-05

Date Collected: 03/16/17 12:40

Client ID: MW-4

Date Received: 03/17/17

Sample Location: MASHPEE, MA

Field Prep: Not Specified

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Sodium, Total	36		mg/l	2.0	--	1	03/21/17 11:55	03/21/17 21:58	EPA 3005A	1,6010C	AB



Serial_No:03231719:19

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1708191
Report Date: 03/23/17

SAMPLE RESULTS

Lab ID: L1708191-06
Client ID: PZ-1R
Sample Location: MASHPEE, MA
Matrix: Water

Date Collected: 03/16/17 09:30
Date Received: 03/17/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Sodium, Total	7.9		mg/l	2.0	--	1	03/21/17 11:55	03/21/17 22:03	EPA 3005A	1,6010C	AB



Project Name: WINDCHIME

Lab Number: L1708191

Project Number: BEA99-2252

Report Date: 03/23/17

SAMPLE RESULTS

Lab ID: L1708191-07

Date Collected: 03/16/17 10:30

Client ID: PZ-2R

Date Received: 03/17/17

Sample Location: MASHPEE, MA

Field Prep: Not Specified

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Sodium, Total	110		mg/l	2.0	--	1	03/21/17 11:55	03/21/17 22:07	EPA 3005A	1,6010C	AB



Project Name: WINDCHIME

Lab Number: L1708191

Project Number: BEA99-2252

Report Date: 03/23/17

SAMPLE RESULTS

Lab ID: L1708191-08

Date Collected: 03/16/17 10:15

Client ID: PZ-3R

Date Received: 03/17/17

Sample Location: MASHPEE, MA

Field Prep: Not Specified

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Sodium, Total	13		mg/l	2.0	--	1	03/21/17 11:55	03/21/17 22:12	EPA 3005A	1,6010C	AB



Serial_No:03231719:19

Project Name: WINDCHIME

Lab Number: L1708191

Project Number: BEA99-2252

Report Date: 03/23/17

Method Blank Analysis Batch Quality Control

Parameter	Result Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-08 Batch: WG986952-1									
Sodium, Total	ND	mg/l	2.0	--	1	03/21/17 11:55	03/21/17 18:12	1,6010C	AB

Prep Information

Digestion Method: EPA 3005A



Lab Control Sample Analysis
Batch Quality Control

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1708191
Report Date: 03/23/17

Parameter	LCS %Recovery	Qual	LCS %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-08 Batch: WG986952-2								
Sodium, Total	100		-		80-120	-		

Matrix Spike Analysis
Batch Quality Control

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1708191
Report Date: 03/23/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Found	MSD %Recovery	Recovery Limits	RPD Qual	RPD Limits
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Total Metals - Mansfield Lab Associated sample(s): 01-08 QC Batch ID: WG986952-3 QC Sample: L1708148-01 Client ID: MS Sample

Sodium, Total	42	10	50	80	-	-	75-125	-	20
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Lab Duplicate Analysis
Batch Quality Control

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1708191
Report Date: 03/23/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-08 QC Batch ID: WG986952-4 QC Sample: L1708148-01 Client ID: DUP Sample						
Sodium, Total	42	42	mg/l	0		20



INORGANICS & MISCELLANEOUS

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1708191
Report Date: 03/23/17

SAMPLE RESULTS

Lab ID: L1708191-01
Client ID: B-2R
Sample Location: MASHPEE, MA
Matrix: Water

Date Collected: 03/16/17 14:25
Date Received: 03/17/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chloride	53.		mg/l	1.0	--	1	-	03/20/17 20:00	121,4500CL-E	ML
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	03/20/17 12:02	03/20/17 22:35	121,4500NH3-BH	AT
Nitrogen, Nitrite	ND		mg/l	0.050	--	1	-	03/17/17 21:09	121,4500NO3-F	CW
Nitrogen, Nitrate	1.34		mg/l	0.100	--	1	-	03/17/17 21:09	121,4500NO3-F	CW
Nitrogen, Total Kjeldahl	ND		mg/l	0.300	--	1	03/20/17 12:17	03/20/17 21:58	121,4500NH3-H	AT
Phosphorus, Total	ND		mg/l	0.010	--	1	03/20/17 11:00	03/20/17 15:56	121,4500P-E	SD
Phosphorus, Orthophosphate	0.009		mg/l	0.005	--	1	-	03/18/17 07:14	121,4500P-E	VB



Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1708191
Report Date: 03/23/17

SAMPLE RESULTS

Lab ID: L1708191-02
Client ID: MW-3R
Sample Location: MASHPEE, MA
Matrix: Water

Date Collected: 03/16/17 13:50
Date Received: 03/17/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chloride	58.		mg/l	1.0	--	1	-	03/20/17 19:16	121,4500CL-E	ML
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	03/20/17 12:02	03/20/17 22:36	121,4500NH3-BH	AT
Nitrogen, Nitrite	ND		mg/l	0.050	--	1	-	03/17/17 21:10	121,4500NO3-F	CW
Nitrogen, Nitrate	0.594		mg/l	0.100	--	1	-	03/17/17 21:10	121,4500NO3-F	CW
Nitrogen, Total Kjeldahl	ND		mg/l	0.300	--	1	03/20/17 12:17	03/20/17 22:00	121,4500NH3-H	AT
Phosphorus, Total	ND		mg/l	0.010	--	1	03/20/17 11:00	03/20/17 15:57	121,4500P-E	SD
Phosphorus, Orthophosphate	0.009		mg/l	0.005	--	1	-	03/18/17 07:15	121,4500P-E	VB



Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1708191
Report Date: 03/23/17

SAMPLE RESULTS

Lab ID: L1708191-03
Client ID: MW-1
Sample Location: MASHPEE, MA
Matrix: Water

Date Collected: 03/16/17 12:15
Date Received: 03/17/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chloride	64.		mg/l	1.0	--	1	-	03/20/17 19:16	121,4500CL-E	ML
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	03/20/17 12:02	03/20/17 22:36	121,4500NH3-BH	AT
Nitrogen, Nitrite	ND		mg/l	0.050	--	1	-	03/17/17 21:12	121,4500NO3-F	CW
Nitrogen, Nitrate	0.936		mg/l	0.100	--	1	-	03/17/17 21:12	121,4500NO3-F	CW
Nitrogen, Total Kjeldahl	ND		mg/l	0.300	--	1	03/20/17 12:17	03/20/17 22:01	121,4500NH3-H	AT
Phosphorus, Total	ND		mg/l	0.010	--	1	03/20/17 11:00	03/20/17 16:00	121,4500P-E	SD
Phosphorus, Orthophosphate	0.009		mg/l	0.005	--	1	-	03/18/17 07:16	121,4500P-E	VB



Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1708191
Report Date: 03/23/17

SAMPLE RESULTS

Lab ID: L1708191-04
Client ID: MW-2
Sample Location: MASHPEE, MA
Matrix: Water

Date Collected: 03/16/17 13:15
Date Received: 03/17/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chloride	47.		mg/l	1.0	--	1	-	03/20/17 19:17	121,4500CL-E	ML
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	03/20/17 12:02	03/20/17 22:37	121,4500NH3-BH	AT
Nitrogen, Nitrite	ND		mg/l	0.050	--	1	-	03/17/17 21:13	121,4500NO3-F	CW
Nitrogen, Nitrate	9.05		mg/l	0.500	--	5	-	03/17/17 22:07	121,4500NO3-F	CW
Nitrogen, Total Kjeldahl	ND		mg/l	0.600	--	2	03/20/17 12:17	03/20/17 22:05	121,4500NH3-H	AT
Phosphorus, Total	1.43		mg/l	0.050	--	5	03/20/17 11:00	03/20/17 16:29	121,4500P-E	SD
Phosphorus, Orthophosphate	1.41		mg/l	0.010	--	2	-	03/18/17 07:16	121,4500P-E	VB



Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1708191
Report Date: 03/23/17

SAMPLE RESULTS

Lab ID: L1708191-05
Client ID: MW-4
Sample Location: MASHPEE, MA
Matrix: Water

Date Collected: 03/16/17 12:40
Date Received: 03/17/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chloride	57.		mg/l	1.0	--	1	-	03/20/17 19:18	121,4500CL-E	ML
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	03/20/17 12:02	03/20/17 22:41	121,4500NH3-BH	AT
Nitrogen, Nitrite	ND		mg/l	0.050	--	1	-	03/17/17 21:14	121,4500NO3-F	CW
Nitrogen, Nitrate	0.952		mg/l	0.100	--	1	-	03/17/17 22:09	121,4500NO3-F	CW
Nitrogen, Total Kjeldahl	ND		mg/l	0.300	--	1	03/20/17 12:17	03/20/17 22:05	121,4500NH3-H	AT
Phosphorus, Total	ND		mg/l	0.010	--	1	03/20/17 11:00	03/20/17 16:02	121,4500P-E	SD
Phosphorus, Orthophosphate	0.005		mg/l	0.005	--	1	-	03/18/17 07:17	121,4500P-E	VB



Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1708191
Report Date: 03/23/17

SAMPLE RESULTS

Lab ID: L1708191-06
Client ID: PZ-1R
Sample Location: MASHPEE, MA
Matrix: Water

Date Collected: 03/16/17 09:30
Date Received: 03/17/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chloride	8.8		mg/l	1.0	--	1	-	03/20/17 19:19	121,4500CL-E	ML
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	03/20/17 12:02	03/20/17 22:42	121,4500NH3-BH	AT
Nitrogen, Nitrite	ND		mg/l	0.050	--	1	-	03/17/17 21:16	121,4500NO3-F	CW
Nitrogen, Nitrate	ND		mg/l	0.100	--	1	-	03/17/17 21:16	121,4500NO3-F	CW
Nitrogen, Total Kjeldahl	1.20		mg/l	0.300	--	1	03/20/17 12:17	03/20/17 22:06	121,4500NH3-H	AT
Phosphorus, Total	2.99		mg/l	0.050	--	5	03/20/17 11:00	03/20/17 16:30	121,4500P-E	SD
Phosphorus, Orthophosphate	0.022		mg/l	0.005	--	1	-	03/18/17 07:18	121,4500P-E	VB



Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1708191
Report Date: 03/23/17

SAMPLE RESULTS

Lab ID: L1708191-07
Client ID: PZ-2R
Sample Location: MASHPEE, MA
Matrix: Water

Date Collected: 03/16/17 10:30
Date Received: 03/17/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chloride	79.		mg/l	1.0	--	1	-	03/20/17 19:20	121,4500CL-E	ML
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	03/20/17 12:02	03/20/17 22:42	121,4500NH3-BH	AT
Nitrogen, Nitrite	ND		mg/l	0.050	--	1	-	03/17/17 21:21	121,4500NO3-F	CW
Nitrogen, Nitrate	9.72		mg/l	0.500	--	5	-	03/17/17 22:11	121,4500NO3-F	CW
Nitrogen, Total Kjeldahl	1.96		mg/l	0.600	--	2	03/20/17 12:17	03/20/17 22:07	121,4500NH3-H	AT
Phosphorus, Total	2.05		mg/l	0.050	--	5	03/20/17 11:00	03/20/17 16:31	121,4500P-E	SD
Phosphorus, Orthophosphate	1.20		mg/l	0.010	--	2	-	03/18/17 07:18	121,4500P-E	VB



Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1708191
Report Date: 03/23/17

SAMPLE RESULTS

Lab ID: L1708191-08
Client ID: PZ-3R
Sample Location: MASHPEE, MA
Matrix: Water

Date Collected: 03/16/17 10:15
Date Received: 03/17/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chloride	15.		mg/l	1.0	--	1	-	03/20/17 19:20	121,4500CL-E	ML
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	03/20/17 12:02	03/20/17 22:43	121,4500NH3-BH	AT
Nitrogen, Nitrite	ND		mg/l	0.050	--	1	-	03/17/17 21:22	121,4500NO3-F	CW
Nitrogen, Nitrate	0.328		mg/l	0.100	--	1	-	03/17/17 22:13	121,4500NO3-F	CW
Nitrogen, Total Kjeldahl	0.424		mg/l	0.300	--	1	03/20/17 12:17	03/20/17 22:08	121,4500NH3-H	AT
Phosphorus, Total	13.8		mg/l	0.250	--	25	03/20/17 11:00	03/20/17 16:51	121,4500P-E	SD
Phosphorus, Orthophosphate	0.137		mg/l	0.005	--	1	-	03/18/17 07:19	121,4500P-E	VB



Serial_No:03231719:19

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1708191
Report Date: 03/23/17

SAMPLE RESULTS

Lab ID: L1708191-09
Client ID: SW-1
Sample Location: MASHPEE, MA
Matrix: Water

Date Collected: 03/16/17 09:40
Date Received: 03/17/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	03/20/17 12:02	03/20/17 22:44	121,4500NH3-BH	AT
Nitrogen, Nitrite	ND		mg/l	0.050	--	1	-	03/17/17 21:23	121,4500NO3-F	CW
Nitrogen, Nitrate	0.440		mg/l	0.100	--	1	-	03/17/17 21:23	121,4500NO3-F	CW
Nitrogen, Total Kjeldahl	0.345		mg/l	0.300	--	1	03/20/17 12:17	03/20/17 22:09	121,4500NH3-H	AT
Phosphorus, Total	0.024		mg/l	0.010	--	1	03/20/17 11:00	03/20/17 16:07	121,4500P-E	SD
Phosphorus, Orthophosphate	0.006		mg/l	0.005	--	1	-	03/18/17 07:23	121,4500P-E	VB



Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1708191
Report Date: 03/23/17

SAMPLE RESULTS

Lab ID: L1708191-10
Client ID: SW-2
Sample Location: MASHPEE, MA
Matrix: Water

Date Collected: 03/16/17 10:25
Date Received: 03/17/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	03/20/17 12:02	03/20/17 22:45	121,4500NH3-BH	AT
Nitrogen, Nitrite	ND		mg/l	0.050	--	1	-	03/17/17 21:25	121,4500NO3-F	CW
Nitrogen, Nitrate	5.79		mg/l	0.100	--	1	-	03/17/17 21:25	121,4500NO3-F	CW
Nitrogen, Total Kjeldahl	1.91		mg/l	0.600	--	2	03/20/17 12:17	03/20/17 22:10	121,4500NH3-H	AT
Phosphorus, Total	0.560		mg/l	0.010	--	1	03/20/17 11:00	03/20/17 16:08	121,4500P-E	SD
Phosphorus, Orthophosphate	0.096		mg/l	0.005	--	1	-	03/18/17 07:24	121,4500P-E	VB



Serial_No:03231719:19

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1708191
Report Date: 03/23/17

SAMPLE RESULTS

Lab ID: L1708191-11
Client ID: SW-3
Sample Location: MASHPEE, MA
Matrix: Water

Date Collected: 03/16/17 10:45
Date Received: 03/17/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	03/20/17 12:02	03/20/17 22:46	121,4500NH3-BH	AT
Nitrogen, Nitrite	ND		mg/l	0.050	--	1	-	03/17/17 21:26	121,4500NO3-F	CW
Nitrogen, Nitrate	0.551		mg/l	0.100	--	1	-	03/17/17 21:26	121,4500NO3-F	CW
Nitrogen, Total Kjeldahl	ND		mg/l	0.300	--	1	03/20/17 12:17	03/20/17 22:10	121,4500NH3-H	AT
Phosphorus, Total	0.064		mg/l	0.010	--	1	03/20/17 11:00	03/20/17 16:09	121,4500P-E	SD
Phosphorus, Orthophosphate	0.006		mg/l	0.005	--	1	-	03/18/17 07:26	121,4500P-E	VB



Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1708191
Report Date: 03/23/17

Method Blank Analysis
Batch Quality Control

Parameter	Result Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab for sample(s): 01-11 Batch: WG986274-1									
Nitrogen, Nitrate	ND	mg/l	0.100	--	1	-	03/17/17 19:26	121,4500NO3-F	CW
General Chemistry - Westborough Lab for sample(s): 01-11 Batch: WG986279-1									
Nitrogen, Nitrite	ND	mg/l	0.050	--	1	-	03/17/17 19:29	121,4500NO3-F	CW
General Chemistry - Westborough Lab for sample(s): 01-11 Batch: WG986378-1									
Phosphorus, Orthophosphate	ND	mg/l	0.005	--	1	-	03/18/17 07:14	121,4500P-E	VB
General Chemistry - Westborough Lab for sample(s): 01-11 Batch: WG986612-1									
Phosphorus, Total	ND	mg/l	0.010	--	1	03/20/17 11:00	03/20/17 14:47	121,4500P-E	SD
General Chemistry - Westborough Lab for sample(s): 01-11 Batch: WG986692-1									
Nitrogen, Total Kjeldahl	ND	mg/l	0.300	--	1	03/20/17 12:17	03/20/17 21:45	121,4500NH3-H	AT
General Chemistry - Westborough Lab for sample(s): 01-11 Batch: WG986693-1									
Nitrogen, Ammonia	ND	mg/l	0.075	--	1	03/20/17 12:02	03/20/17 22:18	121,4500NH3-BH	AT
General Chemistry - Westborough Lab for sample(s): 01-08 Batch: WG986747-1									
Chloride	ND	mg/l	1.0	--	1	-	03/20/17 18:55	121,4500CL-E	ML



Lab Control Sample Analysis Batch Quality Control

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1708191
Report Date: 03/23/17

Parameter	LCS %Recovery	Qual	LCS %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab	Associated sample(s): 01-11		Batch: WG986274-2					
Nitrogen, Nitrate	101		-		90-110	-		
General Chemistry - Westborough Lab	Associated sample(s): 01-11		Batch: WG986279-2					
Nitrogen, Nitrite	103		-		90-110	-		
General Chemistry - Westborough Lab	Associated sample(s): 01-11		Batch: WG986378-2					
Phosphorus, Orthophosphate	97		-		90-110	-		
General Chemistry - Westborough Lab	Associated sample(s): 01-11		Batch: WG986612-2					
Phosphorus, Total	101		-		80-120	-		
General Chemistry - Westborough Lab	Associated sample(s): 01-11		Batch: WG986692-2					
Nitrogen, Total Kjeldahl	100		-		78-122	-		
General Chemistry - Westborough Lab	Associated sample(s): 01-11		Batch: WG986693-2					
Nitrogen, Ammonia	99		-		80-120	-		20
General Chemistry - Westborough Lab	Associated sample(s): 01-08		Batch: WG986747-2					
Chloride	97		-		90-110	-		

Matrix Spike Analysis

Batch Quality Control

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1708191
Report Date: 03/23/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Found	MSD %Recovery	Recovery Limits	RPD Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-11 QC Batch ID: WG986274-4 QC Sample: L1708065-29 Client ID: MS Sample									
Nitrogen, Nitrate	0.124	4	4.02	97	-	-	83-113	-	17
General Chemistry - Westborough Lab Associated sample(s): 01-11 QC Batch ID: WG986279-4 QC Sample: L1708065-29 Client ID: MS Sample									
Nitrogen, Nitrite	ND	4	3.95	99	-	-	80-120	-	20
General Chemistry - Westborough Lab Associated sample(s): 01-11 QC Batch ID: WG986378-3 QC Sample: L1708191-08 Client ID: PZ-3R									
Phosphorus, Orthophosphate	0.137	0.5	0.620	97	-	-	80-120	-	20
General Chemistry - Westborough Lab Associated sample(s): 01-11 QC Batch ID: WG986612-4 QC Sample: L1708191-02 Client ID: MW-3R									
Phosphorus, Total	ND	0.5	0.516	103	-	-	75-125	-	20
General Chemistry - Westborough Lab Associated sample(s): 01-11 QC Batch ID: WG986692-4 QC Sample: L1708191-01 Client ID: B-2R									
Nitrogen, Total Kjeldahl	ND	8	7.30	91	-	-	77-111	-	24
General Chemistry - Westborough Lab Associated sample(s): 01-11 QC Batch ID: WG986693-4 QC Sample: L1708144-02 Client ID: MS Sample									
Nitrogen, Ammonia	1.33	4	5.31	100	-	-	80-120	-	20
General Chemistry - Westborough Lab Associated sample(s): 01-08 QC Batch ID: WG986747-4 QC Sample: L1708191-01 Client ID: B-2R									
Chloride	53	20	70	85	-	-	58-140	-	7

Lab Duplicate Analysis

Batch Quality Control

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1708191
Report Date: 03/23/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab	Associated sample(s): 01-11	QC Batch ID: WG986274-3	QC Sample: L1708065-29	Client ID: DUP Sample		
Nitrogen, Nitrate	0.124	0.126	mg/l	2		17
General Chemistry - Westborough Lab	Associated sample(s): 01-11	QC Batch ID: WG986279-3	QC Sample: L1708065-29	Client ID: DUP Sample		
Nitrogen, Nitrite	ND	ND	mg/l	NC		20
General Chemistry - Westborough Lab	Associated sample(s): 01-11	QC Batch ID: WG986378-4	QC Sample: L1708191-01	Client ID: B-2R		
Phosphorus, Orthophosphate	0.009	0.009	mg/l	0		20
General Chemistry - Westborough Lab	Associated sample(s): 01-11	QC Batch ID: WG986612-3	QC Sample: L1708059-01	Client ID: DUP Sample		
Phosphorus, Total	7.46	7.33	mg/l	2		20
General Chemistry - Westborough Lab	Associated sample(s): 01-11	QC Batch ID: WG986692-3	QC Sample: L1708191-01	Client ID: B-2R		
Nitrogen, Total Kjeldahl	ND	ND	mg/l	NC		24
General Chemistry - Westborough Lab	Associated sample(s): 01-11	QC Batch ID: WG986693-3	QC Sample: L1708144-02	Client ID: DUP Sample		
Nitrogen, Ammonia	1.33	1.29	mg/l	3		20
General Chemistry - Westborough Lab	Associated sample(s): 01-08	QC Batch ID: WG986747-3	QC Sample: L1708191-01	Client ID: B-2R		
Chloride	53	53	mg/l	0		7



Project Name: WINDCHIME

Lab Number: L1708191

Project Number: BEA99-2252

Report Date: 03/23/17

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information Custody Seal

Cooler

A Absent

Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1708191-01A	Plastic 250ml unpreserved	A	7	3.8	Y	Absent	OPHOS-4500(2),CL-4500(28),NO3-4500(2),NO2-4500NO3(2)
L1708191-01B	Plastic 250ml HNO3 preserved	A	<2	3.8	Y	Absent	NA-TI(180)
L1708191-01C	Plastic 500ml H2SO4 preserved	A	<2	3.8	Y	Absent	TKN-4500(28),TPHOS-4500(28),NH3-4500(28)
L1708191-02A	Plastic 250ml unpreserved	A	7	3.8	Y	Absent	OPHOS-4500(2),CL-4500(28),NO3-4500(2),NO2-4500NO3(2)
L1708191-02B	Plastic 250ml HNO3 preserved	A	<2	3.8	Y	Absent	NA-TI(180)
L1708191-02C	Plastic 500ml H2SO4 preserved	A	<2	3.8	Y	Absent	TKN-4500(28),TPHOS-4500(28),NH3-4500(28)
L1708191-03A	Plastic 250ml unpreserved	A	7	3.8	Y	Absent	OPHOS-4500(2),CL-4500(28),NO3-4500(2),NO2-4500NO3(2)
L1708191-03B	Plastic 250ml HNO3 preserved	A	<2	3.8	Y	Absent	NA-TI(180)
L1708191-03C	Plastic 500ml H2SO4 preserved	A	<2	3.8	Y	Absent	TKN-4500(28),TPHOS-4500(28),NH3-4500(28)
L1708191-04A	Plastic 250ml unpreserved	A	7	3.8	Y	Absent	OPHOS-4500(2),CL-4500(28),NO3-4500(2),NO2-4500NO3(2)
L1708191-04B	Plastic 250ml HNO3 preserved	A	<2	3.8	Y	Absent	NA-TI(180)
L1708191-04C	Plastic 500ml H2SO4 preserved	A	<2	3.8	Y	Absent	TKN-4500(28),TPHOS-4500(28),NH3-4500(28)
L1708191-05A	Plastic 250ml unpreserved	A	7	3.8	Y	Absent	OPHOS-4500(2),CL-4500(28),NO3-4500(2),NO2-4500NO3(2)
L1708191-05B	Plastic 250ml HNO3 preserved	A	<2	3.8	Y	Absent	NA-TI(180)
L1708191-05C	Plastic 500ml H2SO4 preserved	A	<2	3.8	Y	Absent	TKN-4500(28),TPHOS-4500(28),NH3-4500(28)
L1708191-06A	Plastic 250ml unpreserved	A	7	3.8	Y	Absent	OPHOS-4500(2),CL-4500(28),NO3-4500(2),NO2-4500NO3(2)
L1708191-06B	Plastic 250ml HNO3 preserved	A	<2	3.8	Y	Absent	NA-TI(180)
L1708191-06C	Plastic 500ml H2SO4 preserved	A	<2	3.8	Y	Absent	TKN-4500(28),TPHOS-4500(28),NH3-4500(28)
L1708191-07A	Plastic 250ml unpreserved	A	7	3.8	Y	Absent	OPHOS-4500(2),CL-4500(28),NO3-4500(2),NO2-4500NO3(2)
L1708191-07B	Plastic 250ml HNO3 preserved	A	<2	3.8	Y	Absent	NA-TI(180)

*Values in parentheses indicate holding time in days



Project Name: WINDCHIME

Project Number: BEA99-2252

Lab Number: L1708191

Report Date: 03/23/17

Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1708191-07C	Plastic 500ml H2SO4 preserved	A	<2	3.8	Y	Absent	TKN-4500(28),TPHOS-4500(28),NH3-4500(28)
L1708191-08A	Plastic 250ml unpreserved	A	7	3.8	Y	Absent	OPHOS-4500(2),CL-4500(28),NO3-4500(2),NO2-4500NO3(2)
L1708191-08B	Plastic 250ml HNO3 preserved	A	<2	3.8	Y	Absent	NA-TI(180)
L1708191-08C	Plastic 500ml H2SO4 preserved	A	<2	3.8	Y	Absent	TKN-4500(28),TPHOS-4500(28),NH3-4500(28)
L1708191-09A	Plastic 250ml unpreserved	A	7	3.8	Y	Absent	OPHOS-4500(2),NO3-4500(2),NO2-4500NO3(2)
L1708191-09B	Plastic 500ml H2SO4 preserved	A	<2	3.8	Y	Absent	TKN-4500(28),TPHOS-4500(28),NH3-4500(28)
L1708191-10A	Plastic 250ml unpreserved	A	7	3.8	Y	Absent	OPHOS-4500(2),NO3-4500(2),NO2-4500NO3(2)
L1708191-10B	Plastic 500ml H2SO4 preserved	A	<2	3.8	Y	Absent	TKN-4500(28),TPHOS-4500(28),NH3-4500(28)
L1708191-11A	Plastic 250ml unpreserved	A	7	3.8	Y	Absent	OPHOS-4500(2),NO3-4500(2),NO2-4500NO3(2)
L1708191-11B	Plastic 500ml H2SO4 preserved	A	<2	3.8	Y	Absent	TKN-4500(28),TPHOS-4500(28),NH3-4500(28)

*Values in parentheses indicate holding time in days

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1708191
Report Date: 03/23/17

GLOSSARY

Acronyms

EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCS D	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Total: With respect to Organic analyses, a "Total" result is defined as the summation of results for individual isomers or Aroclors. If a "Total" result is requested, the results of its individual components will also be reported. This is applicable to "Total" results for methods 8260, 8081 and 8082.

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Data Qualifiers

- A** - Spectra identified as "Aldol Condensation Product".
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the

Report Format: Data Usability Report



Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1708191
Report Date: 03/23/17

Data Qualifiers

reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- J** - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).
- ND** - Not detected at the reporting limit (RL) for the sample.

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1708191
Report Date: 03/23/17

REFERENCES

- 1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IV, 2007.
- 121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at its own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



The following analytes are not included in our Primary NELAP Scope of Accreditation:

EPA 624: m/p-xylene, o-xylene

EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), Methyl methacrylate, 1,2,4,5-

EPA 8270D: NPW: Dimethylnaphthalene, 1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene, 1,4-Diphenylhydrazine.
EPA 300: DW: Bromide

EPA 6860: NPW and SCM; Perchlorate

EPA 9010: NPW and SCM: Amenable Cyanide Distillation

EPA 9012B: NPW: Total Cyanide

EPA 9050A: NPW: Specific Conductance

SM3500: NPW: Ferrous Iron

SM4500: NPW: Amenable Cyanide, Dissolved Oxygen; SCM: Total Phosphorus, TKN, NO₂, NO₃.
SM5310C: DW: Dissolved Organic Carbon

SM55 TOC: DWV: Dissolved Organic Carbon

SM 2540D: TSS

EPA 3005A NPW

EPA 8082A: NPW: PCB: 1, 5, 31, 87, 101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2-pentene

EPA 10-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene,
3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2-Dimethylindene

Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Drinking Water

EPA 300.0: Nitrate-N, Fluoride, Sulfate; EPA 353.2: Nitrate-N, Nitrite-N; SM4500NO3-F: Nitrate-N, Nitrite-N; SM4500F-
SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H₂P

FBA 222; Deraklan 1000; FBA 220

Microbiology: SM9215B; SM9232; BIA; SM9235

Microbiology: SM9215B; SM9223-P/A, SM9223B-Colilert-QT, SM9222D.

SM4500H,B, EPA 12

06-1-B: Ammonia-N, SM4500NO3-F, EPA 353.2; Nitrate-N, EPA 351.1, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, E, EPA 624; Volatile Halocarbons, SM2540D.

EPA 624: Volatile Halocarbons & Aromatics.

EPA 608: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs

EPA 625: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045:** PCB-Oil.

Microbiology: SM9223B-Colilert-QT; Enterolert-QT, SM9221E.

Drinking Water
EPA 200.7: Ba, Be, Cd, Cr, Cu, Ni, Na, Ca. **EPA 200.8:** Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Ni, Se, TL. **EPA 245.1** Hg.

EPA 200.7: Al, Sb, A

EPA 215.1 Hg

EPA 245.1 Hg.

SM2340B

0112340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.



ANALYTICAL REPORT

Lab Number:	L1722512
Client:	Bennett Environmental Associates 1573 Main Street Brewster, MA 02631
ATTN:	David Bennett
Phone:	(508) 896-1706
Project Name:	WINDCHIME
Project Number:	BEA99-2252
Report Date:	07/10/17

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Certifications & Approvals: MA (M-MA086), NH NELAP (2064), NJ NELAP (MA935), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-14-00197).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com



Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1722512
Report Date: 07/10/17

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1722512-01	B-2R	WATER	MASHPEE, MA	06/30/17 15:40	06/30/17
L1722512-02	MW-3R	WATER	MASHPEE, MA	06/30/17 15:15	06/30/17
L1722512-03	MW-1	WATER	MASHPEE, MA	06/30/17 13:10	06/30/17
L1722512-04	MW-2	WATER	MASHPEE, MA	06/30/17 14:15	06/30/17
L1722512-05	MW-4	WATER	MASHPEE, MA	06/30/17 13:45	06/30/17
L1722512-06	PZ-1R	WATER	MASHPEE, MA	06/30/17 10:50	06/30/17
L1722512-07	PZ-2R	WATER	MASHPEE, MA	06/30/17 12:10	06/30/17
L1722512-08	PZ-3R	WATER	MASHPEE, MA	06/30/17 12:00	06/30/17
L1722512-09	SW-1	WATER	MASHPEE, MA	06/30/17 10:55	06/30/17
L1722512-10	SW-2	WATER	MASHPEE, MA	06/30/17 12:00	06/30/17
L1722512-11	SW-3	WATER	MASHPEE, MA	06/30/17 12:40	06/30/17

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1722512
Report Date: 07/10/17

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY

For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1722512
Report Date: 07/10/17

Case Narrative (continued)

Phosphorus, Total

L1722512-01, -02, -03 and -05: The Orthophosphate result is slightly higher than the Total Phosphorus result; however, the sample result is less than five times the reporting limit. Therefore, no further action was taken.

Nitrogen, Nitrate

L1722512-08: The sample has an elevated detection limit due to the dilution required by the sample matrix.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:

 Melissa Cripps

Title: Technical Director/Representative

Date: 07/10/17

METALS

Serial_No:07101714:05

Project Name: WINDCHIME

Lab Number: L1722512

Project Number: BEA99-2252

Report Date: 07/10/17

SAMPLE RESULTS

Lab ID: L1722512-01

Date Collected: 06/30/17 15:40

Client ID: B-2R

Date Received: 06/30/17

Sample Location: MASHPEE, MA

Field Prep: Not Specified

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Sodium, Total	54.7		mg/l	2.00	--	1	07/07/17 16:00	07/08/17 10:44	EPA 3005A	1,6010C	AM



Project Name: WINDCHIME

Lab Number: L1722512

Project Number: BEA99-2252

Report Date: 07/10/17

SAMPLE RESULTS

Lab ID: L1722512-02

Date Collected: 06/30/17 15:15

Client ID: MW-3R

Date Received: 06/30/17

Sample Location: MASHPEE, MA

Field Prep: Not Specified

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Sodium, Total	42.1		mg/l	2.00	--	1	07/07/17 16:00	07/08/17 11:00	EPA 3005A	1,6010C	AM



Serial_No:07101714:05

Project Name: WINDCHIME

Lab Number: L1722512

Project Number: BEA99-2252

Report Date: 07/10/17

SAMPLE RESULTS

Lab ID: L1722512-03

Date Collected: 06/30/17 13:10

Client ID: MW-1

Date Received: 06/30/17

Sample Location: MASHPEE, MA

Field Prep: Not Specified

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Sodium, Total	44.6		mg/l	2.00	--	1	07/07/17 16:00	07/08/17 11:05	EPA 3005A	1,6010C	AM



Project Name: WINDCHIME

Lab Number: L1722512

Project Number: BEA99-2252

Report Date: 07/10/17

SAMPLE RESULTS

Lab ID: L1722512-04

Date Collected: 06/30/17 14:15

Client ID: MW-2

Date Received: 06/30/17

Sample Location: MASHPEE, MA

Field Prep: Not Specified

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Sodium, Total	26.4		mg/l	2.00	--	1	07/07/17 16:00	07/08/17 11:09	EPA 3005A	1,6010C	AM



Serial_No:07101714:05

Project Name: WINDCHIME

Lab Number: L1722512

Project Number: BEA99-2252

Report Date: 07/10/17

SAMPLE RESULTS

Lab ID: L1722512-05

Date Collected: 06/30/17 13:45

Client ID: MW-4

Date Received: 06/30/17

Sample Location: MASHPEE, MA

Field Prep: Not Specified

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Sodium, Total	42.0		mg/l	2.00	--	1	07/07/17 16:00	07/08/17 11:52	EPA 3005A	1,6010C	AM



Project Name: WINDCHIME

Lab Number: L1722512

Project Number: BEA99-2252

Report Date: 07/10/17

SAMPLE RESULTS

Lab ID: L1722512-06

Date Collected: 06/30/17 10:50

Client ID: PZ-1R

Date Received: 06/30/17

Sample Location: MASHPEE, MA

Field Prep: Not Specified

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Sodium, Total	7.62		mg/l	2.00	--	1	07/07/17 16:00	07/08/17 11:56	EPA 3005A	1,6010C	AM



Serial_No:07101714:05

Project Name: WINDCHIME

Lab Number: L1722512

Project Number: BEA99-2252

Report Date: 07/10/17

SAMPLE RESULTS

Lab ID: L1722512-07

Date Collected: 06/30/17 12:10

Client ID: PZ-2R

Date Received: 06/30/17

Sample Location: MASHPEE, MA

Field Prep: Not Specified

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Sodium, Total	40.8		mg/l	2.00	--	1	07/07/17 16:00	07/08/17 12:00	EPA 3005A	1,6010C	AM



Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1722512
Report Date: 07/10/17

SAMPLE RESULTS

Lab ID: L1722512-08
Client ID: PZ-3R
Sample Location: MASHPEE, MA
Matrix: Water

Date Collected: 06/30/17 12:00
Date Received: 06/30/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Sodium, Total	8.51		mg/l	2.00	--	1	07/07/17 16:00	07/08/17 12:17	EPA 3005A	1,6010C	AM



Serial_No:07101714:05

Project Name: WINDCHIME

Lab Number: L1722512

Project Number: BEA99-2252

Report Date: 07/10/17

Method Blank Analysis Batch Quality Control

Parameter	Result Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-08 Batch: WG1020558-1									
Sodium, Total	ND	mg/l	2.00	--	1	07/07/17 16:00	07/08/17 10:35	1,6010C	AM

Prep Information

Digestion Method: EPA 3005A



Lab Control Sample Analysis

Batch Quality Control

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1722512
Report Date: 07/10/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-08 Batch: WG1020558-2								
Sodium, Total	105	-	-	-	80-120	-	-	-



Matrix Spike Analysis Batch Quality Control

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1722512
Report Date: 07/10/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-08 QC Batch ID: WG1020558-3 QC Sample: L1722512-01 Client ID: B-2R												
Sodium, Total	54.7	10	64.3	96		-	-	-	75-125	-	-	20

Lab Duplicate Analysis

Batch Quality Control

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1722512
Report Date: 07/10/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-08	QC Batch ID: WG1020558-4	QC Sample: L1722512-01	Client ID: B-2R			
Sodium, Total	54.7	56.6	mg/l	3		20

INORGANICS & MISCELLANEOUS

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1722512
Report Date: 07/10/17

SAMPLE RESULTS

Lab ID: L1722512-01
Client ID: B-2R
Sample Location: MASHPEE, MA
Matrix: Water

Date Collected: 06/30/17 15:40
Date Received: 06/30/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chloride	100		mg/l	5.0	--	5	-	07/06/17 18:33	121,4500CL-E	ML
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	07/06/17 12:30	07/06/17 17:12	121,4500NH3-BH	JO
Nitrogen, Nitrite	ND		mg/l	0.050	--	1	-	07/01/17 01:42	121,4500NO3-F	MR
Nitrogen, Nitrate	1.69		mg/l	0.100	--	1	-	07/01/17 01:42	121,4500NO3-F	MR
Nitrogen, Total Kjeldahl	0.375		mg/l	0.300	--	1	07/06/17 15:00	07/07/17 14:56	121,4500NH3-H	JO
Phosphorus, Total	ND		mg/l	0.010	--	1	07/05/17 11:15	07/06/17 09:54	121,4500P-E	SD
Phosphorus, Orthophosphate	0.014		mg/l	0.005	--	1	-	07/01/17 01:54	121,4500P-E	KA



Serial_No:07101714:05

Project Name: WINDCHIME

Project Number: BEA99-2252

Lab Number: L1722512

Report Date: 07/10/17

SAMPLE RESULTS

Lab ID: L1722512-02

Client ID: MW-3R

Sample Location: MASHPEE, MA

Matrix: Water

Date Collected: 06/30/17 15:15

Date Received: 06/30/17

Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chloride	69.		mg/l	1.0	--	1	-	07/06/17 18:34	121,4500CL-E	ML
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	07/06/17 12:30	07/06/17 17:13	121,4500NH3-BH	JO
Nitrogen, Nitrite	ND		mg/l	0.050	--	1	-	07/01/17 01:48	121,4500NO3-F	MR
Nitrogen, Nitrate	0.910		mg/l	0.100	--	1	-	07/01/17 01:48	121,4500NO3-F	MR
Nitrogen, Total Kjeldahl	ND		mg/l	0.300	--	1	07/06/17 15:00	07/07/17 14:57	121,4500NH3-H	JO
Phosphorus, Total	ND		mg/l	0.010	--	1	07/05/17 11:15	07/06/17 09:58	121,4500P-E	SD
Phosphorus, Orthophosphate	0.012		mg/l	0.005	--	1	-	07/01/17 01:56	121,4500P-E	KA



Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1722512
Report Date: 07/10/17

SAMPLE RESULTS

Lab ID: L1722512-03
Client ID: MW-1
Sample Location: MASHPEE, MA
Matrix: Water

Date Collected: 06/30/17 13:10
Date Received: 06/30/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chloride	72.		mg/l	1.0	--	1	-	07/06/17 17:41	121,4500CL-E	ML
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	07/06/17 12:30	07/06/17 17:16	121,4500NH3-BH	JO
Nitrogen, Nitrite	ND		mg/l	0.050	--	1	-	07/01/17 01:53	121,4500NO3-F	MR
Nitrogen, Nitrate	0.948		mg/l	0.100	--	1	-	07/01/17 01:53	121,4500NO3-F	MR
Nitrogen, Total Kjeldahl	ND		mg/l	0.300	--	1	07/06/17 10:57	07/06/17 17:51	121,4500NH3-H	JO
Phosphorus, Total	ND		mg/l	0.010	--	1	07/05/17 11:15	07/06/17 09:59	121,4500P-E	SD
Phosphorus, Orthophosphate	0.017		mg/l	0.005	--	1	-	07/01/17 01:57	121,4500P-E	KA



Serial_No:07101714:05

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1722512
Report Date: 07/10/17

SAMPLE RESULTS

Lab ID: L1722512-04
Client ID: MW-2
Sample Location: MASHPEE, MA
Matrix: Water

Date Collected: 06/30/17 14:15
Date Received: 06/30/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chloride	34.		mg/l	1.0	--	1	-	07/06/17 17:48	121,4500CL-E	ML
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	07/06/17 12:30	07/06/17 17:17	121,4500NH3-BH	JO
Nitrogen, Nitrite	ND		mg/l	0.050	--	1	-	07/01/17 01:54	121,4500NO3-F	MR
Nitrogen, Nitrate	6.52		mg/l	0.100	--	1	-	07/01/17 01:54	121,4500NO3-F	MR
Nitrogen, Total Kjeldahl	ND		mg/l	0.300	--	1	07/06/17 15:00	07/07/17 14:58	121,4500NH3-H	JO
Phosphorus, Total	1.56		mg/l	0.050	--	5	07/05/17 11:15	07/06/17 11:17	121,4500P-E	SD
Phosphorus, Orthophosphate	1.43		mg/l	0.010	--	2	-	07/01/17 01:58	121,4500P-E	KA



Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1722512
Report Date: 07/10/17

SAMPLE RESULTS

Lab ID: L1722512-05
Client ID: MW-4
Sample Location: MASHPEE, MA
Matrix: Water

Date Collected: 06/30/17 13:45
Date Received: 06/30/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chloride	70.		mg/l	1.0	--	1	-	07/06/17 17:49	121,4500CL-E	ML
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	07/06/17 12:30	07/06/17 17:18	121,4500NH3-BH	JO
Nitrogen, Nitrite	ND		mg/l	0.050	--	1	-	07/01/17 01:56	121,4500NO3-F	MR
Nitrogen, Nitrate	0.905		mg/l	0.100	--	1	-	07/01/17 01:56	121,4500NO3-F	MR
Nitrogen, Total Kjeldahl	ND		mg/l	0.300	--	1	07/06/17 15:00	07/07/17 14:59	121,4500NH3-H	JO
Phosphorus, Total	ND		mg/l	0.010	--	1	07/05/17 11:15	07/06/17 10:05	121,4500P-E	SD
Phosphorus, Orthophosphate	0.010		mg/l	0.005	--	1	-	07/01/17 01:59	121,4500P-E	KA



Serial_No:07101714:05

Project Name: WINDCHIME

Lab Number: L1722512

Project Number: BEA99-2252

Report Date: 07/10/17

SAMPLE RESULTS

Lab ID: L1722512-06

Date Collected: 06/30/17 10:50

Client ID: PZ-1R

Date Received: 06/30/17

Sample Location: MASHPEE, MA

Field Prep: Not Specified

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chloride	9.3		mg/l	1.0	--	1	-	07/06/17 17:49	121,4500CL-E	ML
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	07/06/17 12:30	07/06/17 17:18	121,4500NH3-BH	JO
Nitrogen, Nitrite	ND		mg/l	0.050	--	1	-	07/01/17 01:57	121,4500NO3-F	MR
Nitrogen, Nitrate	ND		mg/l	0.100	--	1	-	07/01/17 01:57	121,4500NO3-F	MR
Nitrogen, Total Kjeldahl	1.51		mg/l	0.300	--	1	07/06/17 15:00	07/07/17 15:00	121,4500NH3-H	JO
Phosphorus, Total	1.10		mg/l	0.050	--	5	07/05/17 11:15	07/06/17 11:19	121,4500P-E	SD
Phosphorus, Orthophosphate	0.019		mg/l	0.005	--	1	-	07/01/17 02:00	121,4500P-E	KA



Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1722512
Report Date: 07/10/17

SAMPLE RESULTS

Lab ID: L1722512-07
Client ID: PZ-2R
Sample Location: MASHPEE, MA
Matrix: Water

Date Collected: 06/30/17 12:10
Date Received: 06/30/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chloride	47.		mg/l	1.0	--	1	-	07/06/17 17:50	121,4500CL-E	ML
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	07/06/17 12:30	07/06/17 17:19	121,4500NH3-BH	JO
Nitrogen, Nitrite	ND		mg/l	0.050	--	1	-	07/01/17 01:58	121,4500NO3-F	MR
Nitrogen, Nitrate	9.86		mg/l	0.500	--	5	-	07/01/17 02:36	121,4500NO3-F	MR
Nitrogen, Total Kjeldahl	3.28		mg/l	0.600	--	2	07/06/17 15:00	07/07/17 15:01	121,4500NH3-H	JO
Phosphorus, Total	2.45		mg/l	0.100	--	10	07/05/17 11:15	07/06/17 11:20	121,4500P-E	SD
Phosphorus, Orthophosphate	1.48		mg/l	0.010	--	2	-	07/01/17 02:02	121,4500P-E	KA



Serial_No:07101714:05

Project Name: WINDCHIME

Project Number: BEA99-2252

Lab Number: L1722512

Report Date: 07/10/17

SAMPLE RESULTS

Lab ID: L1722512-08

Client ID: PZ-3R

Sample Location: MASHPEE, MA

Matrix: Water

Date Collected: 06/30/17 12:00

Date Received: 06/30/17

Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chloride	8.6		mg/l	1.0	--	1	-	07/06/17 17:51	121,4500CL-E	ML
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	07/06/17 12:30	07/06/17 17:23	121,4500NH3-BH	JO
Nitrogen, Nitrite	ND		mg/l	0.050	--	1	-	07/01/17 02:00	121,4500NO3-F	MR
Nitrogen, Nitrate	ND		mg/l	0.250	--	2.5	-	07/01/17 02:43	121,4500NO3-F	MR
Nitrogen, Total Kjeldahl	1.41		mg/l	0.300	--	1	07/06/17 15:00	07/07/17 15:01	121,4500NH3-H	JO
Phosphorus, Total	4.90		mg/l	0.050	--	5	07/05/17 11:15	07/06/17 11:22	121,4500P-E	SD
Phosphorus, Orthophosphate	0.122		mg/l	0.005	--	1	-	07/01/17 02:03	121,4500P-E	KA



Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1722512
Report Date: 07/10/17

SAMPLE RESULTS

Lab ID: L1722512-09
Client ID: SW-1
Sample Location: MASHPEE, MA
Matrix: Water

Date Collected: 06/30/17 10:55
Date Received: 06/30/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	07/06/17 12:30	07/06/17 17:24	121,4500NH3-BH	JO
Nitrogen, Nitrite	ND		mg/l	0.050	--	1	-	07/01/17 02:01	121,4500NO3-F	MR
Nitrogen, Nitrate	0.317		mg/l	0.100	--	1	-	07/01/17 02:01	121,4500NO3-F	MR
Nitrogen, Total Kjeldahl	ND		mg/l	0.300	--	1	07/06/17 15:00	07/07/17 15:05	121,4500NH3-H	JO
Phosphorus, Total	0.018		mg/l	0.010	--	1	07/05/17 11:15	07/06/17 10:10	121,4500P-E	SD
Phosphorus, Orthophosphate	0.012		mg/l	0.005	--	1	-	07/01/17 02:04	121,4500P-E	KA



Serial_No:07101714:05

Project Name: WINDCHIME

Project Number: BEA99-2252

Lab Number: L1722512

Report Date: 07/10/17

SAMPLE RESULTS

Lab ID: L1722512-10

Client ID: SW-2

Sample Location: MASHPEE, MA

Matrix: Water

Date Collected: 06/30/17 12:00

Date Received: 06/30/17

Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	07/06/17 12:30	07/06/17 17:24	121,4500NH3-BH	JO
Nitrogen, Nitrite	ND		mg/l	0.050	--	1	-	07/01/17 02:02	121,4500NO3-F	MR
Nitrogen, Nitrate	0.859		mg/l	0.100	--	1	-	07/01/17 02:02	121,4500NO3-F	MR
Nitrogen, Total Kjeldahl	1.27		mg/l	0.300	--	1	07/06/17 15:00	07/07/17 15:06	121,4500NH3-H	JO
Phosphorus, Total	0.516		mg/l	0.010	--	1	07/05/17 11:15	07/06/17 10:11	121,4500P-E	SD
Phosphorus, Orthophosphate	0.102		mg/l	0.005	--	1	-	07/01/17 02:08	121,4500P-E	KA



Serial_No:07101714:05

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1722512
Report Date: 07/10/17

SAMPLE RESULTS

Lab ID: L1722512-11
Client ID: SW-3
Sample Location: MASHPEE, MA
Matrix: Water

Date Collected: 06/30/17 12:40
Date Received: 06/30/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	07/06/17 12:30	07/06/17 17:25	121,4500NH3-BH	JO
Nitrogen, Nitrite	ND		mg/l	0.050	--	1	-	07/01/17 02:04	121,4500NO3-F	MR
Nitrogen, Nitrate	0.182		mg/l	0.100	--	1	-	07/01/17 02:04	121,4500NO3-F	MR
Nitrogen, Total Kjeldahl	0.600		mg/l	0.300	--	1	07/06/17 15:00	07/07/17 15:07	121,4500NH3-H	JO
Phosphorus, Total	0.151		mg/l	0.010	--	1	07/05/17 11:15	07/06/17 10:12	121,4500P-E	SD
Phosphorus, Orthophosphate	0.049		mg/l	0.005	--	1	-	07/01/17 02:09	121,4500P-E	KA



Serial_No:07101714:05

Project Name: WINDCHIME

Lab Number: L1722512

Project Number: BEA99-2252

Report Date: 07/10/17

Method Blank Analysis Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab for sample(s): 01-11 Batch: WG1019018-1										
Nitrogen, Nitrate	ND		mg/l	0.100	--	1	-	07/01/17 01:36	121,4500NO3-F	MR
General Chemistry - Westborough Lab for sample(s): 01-11 Batch: WG1019019-1										
Nitrogen, Nitrite	ND		mg/l	0.050	--	1	-	07/01/17 01:39	121,4500NO3-F	MR
General Chemistry - Westborough Lab for sample(s): 01-11 Batch: WG1019032-1										
Phosphorus, Orthophosphate	ND		mg/l	0.005	--	1	-	07/01/17 01:52	121,4500P-E	KA
General Chemistry - Westborough Lab for sample(s): 01-11 Batch: WG1019641-1										
Phosphorus, Total	ND		mg/l	0.010	--	1	07/05/17 11:15	07/06/17 09:51	121,4500P-E	SD
General Chemistry - Westborough Lab for sample(s): 03 Batch: WG1020064-1										
Nitrogen, Total Kjeldahl	ND		mg/l	0.300	--	1	07/06/17 10:57	07/06/17 17:34	121,4500NH3-H	JO
General Chemistry - Westborough Lab for sample(s): 01-11 Batch: WG1020112-1										
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	07/06/17 12:30	07/06/17 16:43	121,4500NH3-BH	JO
General Chemistry - Westborough Lab for sample(s): 01-02,04-11 Batch: WG1020186-1										
Nitrogen, Total Kjeldahl	ND		mg/l	0.300	--	1	07/06/17 15:00	07/07/17 14:54	121,4500NH3-H	JO
General Chemistry - Westborough Lab for sample(s): 01-08 Batch: WG1020191-1										
Chloride	ND		mg/l	1.0	--	1	-	07/06/17 17:39	121,4500CL-E	ML



Lab Control Sample Analysis

Batch Quality Control

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1722512
Report Date: 07/10/17

Parameter	LCS		LCSD		%Recovery Limits		RPD	Qual	RPD Limits
General Chemistry - Westborough Lab	Associated sample(s): 01-11		Batch: WG1019018-2						
Nitrogen, Nitrate	95	-			90-110		-		
General Chemistry - Westborough Lab	Associated sample(s): 01-11		Batch: WG1019019-2						
Nitrogen, Nitrite	103	-			90-110		-		
General Chemistry - Westborough Lab	Associated sample(s): 01-11		Batch: WG1019032-2						
Phosphorus, Orthophosphate	104	-			90-110		-		
General Chemistry - Westborough Lab	Associated sample(s): 01-11		Batch: WG1019641-2						
Phosphorus, Total	102	-			80-120		-		
General Chemistry - Westborough Lab	Associated sample(s): 03		Batch: WG1020064-2						
Nitrogen, Total Kjeldahl	99	-			78-122		-		
General Chemistry - Westborough Lab	Associated sample(s): 01-11		Batch: WG1020112-2						
Nitrogen, Ammonia	90	-			80-120		-		20
General Chemistry - Westborough Lab	Associated sample(s): 01-02,04-11		Batch: WG1020186-2						
Nitrogen, Total Kjeldahl	94	-			78-122		-		



Lab Control Sample Analysis

Batch Quality Control

Project Name: WINDCHIME

Project Number: BEA99-2252

Lab Number: L1722512

Report Date: 07/10/17

Parameter	LCS %Recovery	LCSD %Recovery	%Recovery Limits	RPD	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-08 Batch: WG1020191-2					
Chloride	103	-	90-110	-	

Matrix Spike Analysis Batch Quality Control

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1722512
Report Date: 07/10/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Found	MSD %Recovery	MSD Qual	Recovery Limits	RPD Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-11 QC Batch ID: WG1019018-4 QC Sample: L1722512-01 Client ID: B-2R										
Nitrogen, Nitrate	1.69	4	5.20	88	-	-	-	83-113	-	17
General Chemistry - Westborough Lab Associated sample(s): 01-11 QC Batch ID: WG1019019-4 QC Sample: L1722512-01 Client ID: B-2R										
Nitrogen, Nitrite	ND	4	3.45	86	-	-	-	80-120	-	20
General Chemistry - Westborough Lab Associated sample(s): 01-11 QC Batch ID: WG1019032-4 QC Sample: L1722512-02 Client ID: MW-3R										
Phosphorus, Orthophosphate	0.012	0.5	0.517	101	-	-	-	80-120	-	20
General Chemistry - Westborough Lab Associated sample(s): 01-11 QC Batch ID: WG1019641-3 QC Sample: L1722512-01 Client ID: B-2R										
Phosphorus, Total	ND	0.5	0.533	107	-	-	-	75-125	-	20
General Chemistry - Westborough Lab Associated sample(s): 03 QC Batch ID: WG1020064-4 QC Sample: L1722512-03 Client ID: MW-1										
Nitrogen, Total Kjeldahl	ND	8	7.17	90	-	-	-	77-111	-	24
General Chemistry - Westborough Lab Associated sample(s): 01-11 QC Batch ID: WG1020112-4 QC Sample: L1722512-02 Client ID: MW-3R										
Nitrogen, Ammonia	ND	4	3.89	97	-	-	-	80-120	-	20
General Chemistry - Westborough Lab Associated sample(s): 01-02,04-11 QC Batch ID: WG1020186-4 QC Sample: L1722512-11 Client ID: SW-3										
Nitrogen, Total Kjeldahl	0.600	8	7.91	91	-	-	-	77-111	-	24
General Chemistry - Westborough Lab Associated sample(s): 01-08 QC Batch ID: WG1020191-4 QC Sample: L1722512-03 Client ID: MW-1										
Chloride	72	20	89	85	-	-	-	58-140	-	7

Lab Duplicate Analysis

Batch Quality Control

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1722512
Report Date: 07/10/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s):	01-11	QC Batch ID: WG1019018-3	QC Sample: L1722512-01	Client ID: B-2R		
Nitrogen, Nitrate	1.69	1.71	mg/l	1		17
General Chemistry - Westborough Lab Associated sample(s):	01-11	QC Batch ID: WG1019019-3	QC Sample: L1722512-01	Client ID: B-2R		
Nitrogen, Nitrite	ND	ND	mg/l	NC		20
General Chemistry - Westborough Lab Associated sample(s):	01-11	QC Batch ID: WG1019032-3	QC Sample: L1722512-02	Client ID: MW-3R		
Phosphorus, Orthophosphate	0.012	0.013	mg/l	8		20
General Chemistry - Westborough Lab Associated sample(s):	01-11	QC Batch ID: WG1019641-4	QC Sample: L1722512-01	Client ID: B-2R		
Phosphorus, Total	ND	ND	mg/l	NC		20
General Chemistry - Westborough Lab Associated sample(s):	03	QC Batch ID: WG1020064-3	QC Sample: L1722512-03	Client ID: MW-1		
Nitrogen, Total Kjeldahl	ND	0.718	mg/l	NC		24
General Chemistry - Westborough Lab Associated sample(s):	01-11	QC Batch ID: WG1020112-3	QC Sample: L1722512-02	Client ID: MW-3R		
Nitrogen, Ammonia	ND	ND	mg/l	NC		20
General Chemistry - Westborough Lab Associated sample(s):	01-02,04-11	QC Batch ID: WG1020186-3	QC Sample: L1722512-11	Client ID: SW-3		
Nitrogen, Total Kjeldahl	0.600	0.746	mg/l	22		24
General Chemistry - Westborough Lab Associated sample(s):	01-08	QC Batch ID: WG1020191-3	QC Sample: L1722512-03	Client ID: MW-1		
Chloride	72	73	mg/l	1		7

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Project Name: WINDCHIME
Project Number: BEA99-2252

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information
Cooler A Custody Seal Absent

Container Information			Initial		Final		Temp		Frozen		Analysis(*)
Container ID	Container Type	Cooler	pH	pH	deg C	Pres	Seal	Date/Time			
L1722512-01A	Plastic 250ml unpreserved	A	7	7	4.5	Y	Absent		OPHOS-4500(2),CL-4500(28),NO3-4500(2),NO2-4500NO3(2)		
L1722512-01B	Plastic 500ml H2SO4 preserved	A	<2	<2	4.5	Y	Absent		TKN-4500(28),TPHOS-4500(28),NH3-4500(28)		
L1722512-01C	Plastic 250ml HNO3 preserved	A	<2	<2	4.5	Y	Absent		NA-Tl(180)		
L1722512-02A	Plastic 250ml unpreserved	A	7	7	4.5	Y	Absent		OPHOS-4500(2),CL-4500(28),NO3-4500(2),NO2-4500NO3(2)		
L1722512-02B	Plastic 500ml H2SO4 preserved	A	<2	<2	4.5	Y	Absent		TKN-4500(28),TPHOS-4500(28),NH3-4500(28)		
L1722512-02C	Plastic 250ml HNO3 preserved	A	<2	<2	4.5	Y	Absent		NA-Tl(180)		
L1722512-03A	Plastic 250ml unpreserved	A	7	7	4.5	Y	Absent		OPHOS-4500(2),CL-4500(28),NO3-4500(2),NO2-4500NO3(2)		
L1722512-03B	Plastic 500ml H2SO4 preserved	A	<2	<2	4.5	Y	Absent		TKN-4500(28),TPHOS-4500(28),NH3-4500(28)		
L1722512-03C	Plastic 250ml HNO3 preserved	A	<2	<2	4.5	Y	Absent		NA-Tl(180)		
L1722512-04A	Plastic 250ml unpreserved	A	7	7	4.5	Y	Absent		OPHOS-4500(2),CL-4500(28),NO3-4500(2),NO2-4500NO3(2)		
L1722512-04B	Plastic 500ml H2SO4 preserved	A	<2	<2	4.5	Y	Absent		TKN-4500(28),TPHOS-4500(28),NH3-4500(28)		
L1722512-04C	Plastic 250ml HNO3 preserved	A	<2	<2	4.5	Y	Absent		NA-Tl(180)		
L1722512-05A	Plastic 250ml unpreserved	A	7	7	4.5	Y	Absent		OPHOS-4500(2),CL-4500(28),NO3-4500(2),NO2-4500NO3(2)		
L1722512-05B	Plastic 500ml H2SO4 preserved	A	<2	<2	4.5	Y	Absent		TKN-4500(28),TPHOS-4500(28),NH3-4500(28)		
L1722512-05C	Plastic 250ml HNO3 preserved	A	<2	<2	4.5	Y	Absent		NA-Tl(180)		
L1722512-06A	Plastic 250ml unpreserved	A	7	7	4.5	Y	Absent		OPHOS-4500(2),CL-4500(28),NO3-4500(2),NO2-4500NO3(2)		
L1722512-06B	Plastic 500ml H2SO4 preserved	A	<2	<2	4.5	Y	Absent		TKN-4500(28),TPHOS-4500(28),NH3-4500(28)		
L1722512-06C	Plastic 250ml HNO3 preserved	A	<2	<2	4.5	Y	Absent		NA-Tl(180)		
L1722512-07A	Plastic 250ml unpreserved	A	7	7	4.5	Y	Absent		OPHOS-4500(2),CL-4500(28),NO3-4500(2),NO2-4500NO3(2)		
L1722512-07B	Plastic 500ml H2SO4 preserved	A	<2	<2	4.5	Y	Absent		TKN-4500(28),TPHOS-4500(28),NH3-4500(28)		
L1722512-07C	Plastic 250ml HNO3 preserved	A	<2	<2	4.5	Y	Absent		NA-Tl(180)		

*Values in parentheses indicate holding time in days



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Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1722512-08A	Plastic 250ml unpreserved	A	7	7	4.5	Y	Absent		OPHOS-4500(2),CL-4500(28),NO3-4500(2),NO2-4500NO3(2)
L1722512-08B	Plastic 500ml H2SO4 preserved	A	<2	<2	4.5	Y	Absent		TKN-4500(28),TPHOS-4500(28),NH3-4500(28)
L1722512-08C	Plastic 250ml HNO3 preserved	A	<2	<2	4.5	Y	Absent		NA-Tl(180)
L1722512-09A	Plastic 250ml unpreserved	A	7	7	4.5	Y	Absent		OPHOS-4500(2),NO3-4500(2),NO2-4500NO3(2)
L1722512-09B	Plastic 500ml H2SO4 preserved	A	<2	<2	4.5	Y	Absent		TKN-4500(28),TPHOS-4500(28),NH3-4500(28)
L1722512-10A	Plastic 250ml unpreserved	A	7	7	4.5	Y	Absent		OPHOS-4500(2),NO3-4500(2),NO2-4500NO3(2)
L1722512-10B	Plastic 500ml H2SO4 preserved	A	<2	<2	4.5	Y	Absent		TKN-4500(28),TPHOS-4500(28),NH3-4500(28)
L1722512-11A	Plastic 250ml unpreserved	A	7	7	4.5	Y	Absent		OPHOS-4500(2),NO3-4500(2),NO2-4500NO3(2)
L1722512-11B	Plastic 500ml H2SO4 preserved	A	<2	<2	4.5	Y	Absent		TKN-4500(28),TPHOS-4500(28),NH3-4500(28)

Project Name: WINDCHIME
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GLOSSARY

Acronyms

EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCS D	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

- A** - Spectra identified as "Aldol Condensation Product".
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related

Report Format: Data Usability Report



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Data Qualifiers

projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- J** - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).
- ND** - Not detected at the reporting limit (RL) for the sample.

Project Name: WINDCHIME
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REFERENCES

- 1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IV, 2007.
- 121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility

EPA 624: m/p-xylene, o-xylene
EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), Methyl methacrylate, 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D: NPW: Dimethylnaphthalene, 1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene, 1,4-Diphenylhydrazine.
EPA 300: DW: Bromide
EPA 6860: NPW and SCM: Perchlorate
EPA 9010: NPW and SCM: Amenable Cyanide Distillation
EPA 9012B: NPW: Total Cyanide
EPA 9050A: NPW: Specific Conductance
SM3500: NPW: Ferrous Iron
SM4500: NPW: Amenable Cyanide, Dissolved Oxygen; SCM: Total Phosphorus, TKN, NO₂, NO₃.
SM5310C: DW: Dissolved Organic Carbon

Mansfield Facility

SM 2540D: TSS
EPA 3005A NPW
EPA 8082A: NPW: PCB: 1, 5, 31, 87, 101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water

EPA 300.0: Nitrate-N, Fluoride, Sulfate; EPA 353.2: Nitrate-N, Nitrite-N; SM4500NO₃-F: Nitrate-N, Nitrite-N; SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B
EPA 332: Perchlorate; EPA 524.2: THMs and VOCs; EPA 504.1: EDB, DBCP.
Microbiology: SM9215B; SM9223-P/A, SM9223B-Collert-QT, SM9222D.

Non-Potable Water

SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH₃-BH, EPA 350.1: Ammonia-N, LACHAT 10-107-06-1-B: Ammonia-N, SM4500NO₃-F, EPA 353.2: Nitrate-N, EPA 351.1, SM4500P-E, SM4500P-B, E, SM4500SO₄-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D.
EPA 624: Volatile Halocarbons & Aromatics,
EPA 608: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625: SVOC (Acid/Base/Neutral Extractables), EPA 600/4-81-045: PCB-Oil.
Microbiology: SM9223B-Collert-QT; Enterolert-QT, SM9221E.

Mansfield Facility:

Drinking Water

EPA 200.7: Ba, Be, Cd, Cr, Cu, Ni, Na, Ca. EPA 200.8: Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Ni, Se, TL. EPA 245.1 Hg.

Non-Potable Water

EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

ALPHA ANALYTICAL

Westborough, MA	Mansfield, MA
TEL: 508-898-9220	TEL: 508-822-9300
FAX: 508-898-9193	FAX: 508-822-3288

Client Information

Client: Bennett Environmental Associates	Project #: BEA99-2252
Address: 1573 Main Street / P.O. Box 1743	Project Manager: David C. Bennett
Brewster, MA 02631	ALPHA Quote #:

Turn-Around Time

Fax: 508-896-5109 ☒ Standard ☐ Rush (ONLY IF PRE-APPROVED)
Email: sfarrenkopf@bennett-ea.com

☐ These samples have been Previously analyzed by Alpha

Other Project Specific Requirements/Comments/Detection Limits:

[illegible]

Container Type	Preservative
----------------	--------------

Relinquished By:

Date/Time

11/10/2008

8

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Payment Terms.



ANALYTICAL REPORT

Lab Number:	L1732637
Client:	Bennett Environmental Associates 1573 Main Street Brewster, MA 02631
ATTN:	David Bennett
Phone:	(508) 896-1706
Project Name:	WINDCHIME
Project Number:	BEA99-2252
Report Date:	09/21/17

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Certifications & Approvals: MA (M-MA086), NH NELAP (2064), NJ NELAP (MA935), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-14-00197).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com



Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1732637
Report Date: 09/21/17

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1732637-01	B-2R	WATER	MASHPEE, MA	09/13/17 10:20	09/14/17
L1732637-02	MW-3R	WATER	MASHPEE, MA	09/13/17 11:00	09/14/17
L1732637-03	MW-1	WATER	MASHPEE, MA	09/13/17 13:05	09/14/17
L1732637-04	MW-2	WATER	MASHPEE, MA	09/13/17 14:25	09/14/17
L1732637-05	MW-4	WATER	MASHPEE, MA	09/13/17 13:55	09/14/17
L1732637-06	PZ-1R	WATER	MASHPEE, MA	09/13/17 11:15	09/14/17
L1732637-07	PZ-2R	WATER	MASHPEE, MA	09/13/17 12:00	09/14/17
L1732637-08	PZ-3R	WATER	MASHPEE, MA	09/13/17 12:00	09/14/17
L1732637-09	SW-1	WATER	MASHPEE, MA	09/13/17 11:20	09/14/17
L1732637-10	SW-2	WATER	MASHPEE, MA	09/13/17 11:55	09/14/17
L1732637-11	SW-3	WATER	MASHPEE, MA	09/13/17 12:25	09/14/17

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1732637
Report Date: 09/21/17

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY

For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1732637
Report Date: 09/21/17

Case Narrative (continued)

Volatile Organics by Method 624

The WG1042186-9 LCS recovery for 1,1,1-trichloroethane (110%), associated with L1732637-02 through -05, is outside Alpha's acceptance criteria, but within the acceptance criteria specified in the method.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:  Cristin Walker

Title: Technical Director/Representative

Date: 09/21/17

ORGANICS

VOLATILES

Project Name: WINDCHIME

Lab Number: L1732637

Project Number: BEA99-2252

Report Date: 09/21/17

SAMPLE RESULTS

Lab ID: L1732637-02
 Client ID: MW-3R
 Sample Location: MASHPEE, MA

Date Collected: 09/13/17 11:00
 Date Received: 09/14/17
 Field Prep: Not Specified

Matrix: Water
 Analytical Method: 5,624
 Analytical Date: 09/15/17 13:36
 Analyst: GT

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methylene chloride	ND		ug/l	5.0	--	1
1,1-Dichloroethane	ND		ug/l	1.5	--	1
Chloroform	ND		ug/l	1.5	--	1
Carbon tetrachloride	ND		ug/l	1.0	--	1
1,2-Dichloropropane	ND		ug/l	3.5	--	1
Dibromochloromethane	ND		ug/l	1.0	--	1
1,1,2-Trichloroethane	ND		ug/l	1.5	--	1
2-Chloroethylvinyl ether	ND		ug/l	10	--	1
Tetrachloroethene	ND		ug/l	1.5	--	1
Chlorobenzene	ND		ug/l	3.5	--	1
Trichlorofluoromethane	ND		ug/l	5.0	--	1
1,2-Dichloroethane	ND		ug/l	1.5	--	1
1,1,1-Trichloroethane	ND		ug/l	2.0	--	1
Bromodichloromethane	ND		ug/l	1.0	--	1
trans-1,3-Dichloropropene	ND		ug/l	1.5	--	1
cis-1,3-Dichloropropene	ND		ug/l	1.5	--	1
Bromoform	ND		ug/l	1.0	--	1
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--	1
Benzene	ND		ug/l	1.0	--	1
Toluene	ND		ug/l	1.0	--	1
Ethylbenzene	ND		ug/l	1.0	--	1
Chloromethane	ND		ug/l	5.0	--	1
Bromomethane	ND		ug/l	5.0	--	1
Vinyl chloride	ND		ug/l	1.0	--	1
Chloroethane	ND		ug/l	2.0	--	1
1,1-Dichloroethene	ND		ug/l	1.0	--	1
trans-1,2-Dichloroethene	ND		ug/l	1.5	--	1
cis-1,2-Dichloroethene ¹	ND		ug/l	1.0	--	1
Trichloroethene	ND		ug/l	1.0	--	1
1,2-Dichlorobenzene	ND		ug/l	5.0	--	1

Serial_No:09211712:11

Project Name: WINDCHIME

Lab Number: L1732637

Project Number: BEA99-2252

Report Date: 09/21/17

SAMPLE RESULTS

Lab ID: L1732637-02

Date Collected: 09/13/17 11:00

Client ID: MW-3R

Date Received: 09/14/17

Sample Location: MASHPEE, MA

Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
1,3-Dichlorobenzene	ND		ug/l	5.0	--	1
1,4-Dichlorobenzene	ND		ug/l	5.0	--	1
p/m-Xylene ¹	ND		ug/l	2.0	--	1
o-xylene ¹	ND		ug/l	1.0	--	1
Xylenes, Total ¹	ND		ug/l	1.0	--	1
Styrene ¹	ND		ug/l	1.0	--	1
Acetone ¹	ND		ug/l	10	--	1
Carbon disulfide ¹	ND		ug/l	5.0	--	1
2-Butanone ¹	ND		ug/l	10	--	1
Vinyl acetate ¹	ND		ug/l	10	--	1
4-Methyl-2-pentanone ¹	ND		ug/l	10	--	1
2-Hexanone ¹	ND		ug/l	10	--	1
Acrolein ¹	ND		ug/l	8.0	--	1
Acrylonitrile ¹	ND		ug/l	10	--	1
Dibromomethane ¹	ND		ug/l	1.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Pentafluorobenzene	96		80-120
Fluorobenzene	101		80-120
4-Bromofluorobenzene	99		80-120

Project Name: WINDCHIME

Lab Number: L1732637

Project Number: BEA99-2252

Report Date: 09/21/17

SAMPLE RESULTS

Lab ID: L1732637-03
 Client ID: MW-1
 Sample Location: MASHPEE, MA

Date Collected: 09/13/17 13:05
 Date Received: 09/14/17
 Field Prep: Not Specified

Matrix: Water
 Analytical Method: 5,624
 Analytical Date: 09/15/17 14:09
 Analyst: GT

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methylene chloride	ND		ug/l	5.0	--	1
1,1-Dichloroethane	ND		ug/l	1.5	--	1
Chloroform	ND		ug/l	1.5	--	1
Carbon tetrachloride	ND		ug/l	1.0	--	1
1,2-Dichloropropane	ND		ug/l	3.5	--	1
Dibromochloromethane	ND		ug/l	1.0	--	1
1,1,2-Trichloroethane	ND		ug/l	1.5	--	1
2-Chloroethylvinyl ether	ND		ug/l	10	--	1
Tetrachloroethene	ND		ug/l	1.5	--	1
Chlorobenzene	ND		ug/l	3.5	--	1
Trichlorofluoromethane	ND		ug/l	5.0	--	1
1,2-Dichloroethane	ND		ug/l	1.5	--	1
1,1,1-Trichloroethane	ND		ug/l	2.0	--	1
Bromodichloromethane	ND		ug/l	1.0	--	1
trans-1,3-Dichloropropene	ND		ug/l	1.5	--	1
cis-1,3-Dichloropropene	ND		ug/l	1.5	--	1
Bromoform	ND		ug/l	1.0	--	1
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--	1
Benzene	ND		ug/l	1.0	--	1
Toluene	ND		ug/l	1.0	--	1
Ethylbenzene	ND		ug/l	1.0	--	1
Chloromethane	ND		ug/l	5.0	--	1
Bromomethane	ND		ug/l	5.0	--	1
Vinyl chloride	ND		ug/l	1.0	--	1
Chloroethane	ND		ug/l	2.0	--	1
1,1-Dichloroethene	ND		ug/l	1.0	--	1
trans-1,2-Dichloroethene	ND		ug/l	1.5	--	1
cis-1,2-Dichloroethene ¹	ND		ug/l	1.0	--	1
Trichloroethene	ND		ug/l	1.0	--	1
1,2-Dichlorobenzene	ND		ug/l	5.0	--	1



Serial_No:09211712:11

Project Name: WINDCHIME

Lab Number: L1732637

Project Number: BEA99-2252

Report Date: 09/21/17

SAMPLE RESULTS

Lab ID: L1732637-03

Date Collected: 09/13/17 13:05

Client ID: MW-1

Date Received: 09/14/17

Sample Location: MASHPEE, MA

Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
1,3-Dichlorobenzene	ND		ug/l	5.0	--	1
1,4-Dichlorobenzene	ND		ug/l	5.0	--	1
p/m-Xylene ¹	ND		ug/l	2.0	--	1
o-xylene ¹	ND		ug/l	1.0	--	1
Xylenes, Total ¹	ND		ug/l	1.0	--	1
Styrene ¹	ND		ug/l	1.0	--	1
Acetone ¹	ND		ug/l	10	--	1
Carbon disulfide ¹	ND		ug/l	5.0	--	1
2-Butanone ¹	ND		ug/l	10	--	1
Vinyl acetate ¹	ND		ug/l	10	--	1
4-Methyl-2-pentanone ¹	ND		ug/l	10	--	1
2-Hexanone ¹	ND		ug/l	10	--	1
Acrolein ¹	ND		ug/l	8.0	--	1
Acrylonitrile ¹	ND		ug/l	10	--	1
Dibromomethane ¹	ND		ug/l	1.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Pentafluorobenzene	95		80-120
Fluorobenzene	101		80-120
4-Bromofluorobenzene	100		80-120

Serial_No:09211712:11

Project Name: WINDCHIME

Lab Number: L1732637

Project Number: BEA99-2252

Report Date: 09/21/17

SAMPLE RESULTS

Lab ID: L1732637-04
 Client ID: MW-2
 Sample Location: MASHPEE, MA

Date Collected: 09/13/17 14:25
 Date Received: 09/14/17
 Field Prep: Not Specified

Matrix: Water
 Analytical Method: 5,624
 Analytical Date: 09/15/17 14:43
 Analyst: GT

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methylene chloride	ND		ug/l	5.0	--	1
1,1-Dichloroethane	ND		ug/l	1.5	--	1
Chloroform	ND		ug/l	1.5	--	1
Carbon tetrachloride	ND		ug/l	1.0	--	1
1,2-Dichloropropane	ND		ug/l	3.5	--	1
Dibromochloromethane	ND		ug/l	1.0	--	1
1,1,2-Trichloroethane	ND		ug/l	1.5	--	1
2-Chloroethylvinyl ether	ND		ug/l	10	--	1
Tetrachloroethene	ND		ug/l	1.5	--	1
Chlorobenzene	ND		ug/l	3.5	--	1
Trichlorofluoromethane	ND		ug/l	5.0	--	1
1,2-Dichloroethane	ND		ug/l	1.5	--	1
1,1,1-Trichloroethane	ND		ug/l	2.0	--	1
Bromodichloromethane	ND		ug/l	1.0	--	1
trans-1,3-Dichloropropene	ND		ug/l	1.5	--	1
cis-1,3-Dichloropropene	ND		ug/l	1.5	--	1
Bromoform	ND		ug/l	1.0	--	1
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--	1
Benzene	ND		ug/l	1.0	--	1
Toluene	ND		ug/l	1.0	--	1
Ethylbenzene	ND		ug/l	1.0	--	1
Chloromethane	ND		ug/l	5.0	--	1
Bromomethane	ND		ug/l	5.0	--	1
Vinyl chloride	ND		ug/l	1.0	--	1
Chloroethane	ND		ug/l	2.0	--	1
1,1-Dichloroethene	ND		ug/l	1.0	--	1
trans-1,2-Dichloroethene	ND		ug/l	1.5	--	1
cis-1,2-Dichloroethene ¹	ND		ug/l	1.0	--	1
Trichloroethene	ND		ug/l	1.0	--	1
1,2-Dichlorobenzene	ND		ug/l	5.0	--	1



Project Name: WINDCHIME
Project Number: BEA99-2252

Serial_No:09211712:11
Lab Number: L1732637
Report Date: 09/21/17

SAMPLE RESULTS

Lab ID: L1732637-04
Client ID: MW-2
Sample Location: MASHPEE, MA

Date Collected: 09/13/17 14:25
Date Received: 09/14/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
1,3-Dichlorobenzene	ND		ug/l	5.0	--	1
1,4-Dichlorobenzene	ND		ug/l	5.0	--	1
p/m-Xylene ¹	ND		ug/l	2.0	--	1
o-xylene ¹	ND		ug/l	1.0	--	1
Xylenes, Total ¹	ND		ug/l	1.0	--	1
Styrene ¹	ND		ug/l	1.0	--	1
Acetone ¹	ND		ug/l	10	--	1
Carbon disulfide ¹	ND		ug/l	5.0	--	1
2-Butanone ¹	ND		ug/l	10	--	1
Vinyl acetate ¹	ND		ug/l	10	--	1
4-Methyl-2-pentanone ¹	ND		ug/l	10	--	1
2-Hexanone ¹	ND		ug/l	10	--	1
Acrolein ¹	ND		ug/l	8.0	--	1
Acrylonitrile ¹	ND		ug/l	10	--	1
Dibromomethane ¹	ND		ug/l	1.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Pentafluorobenzene	97		80-120
Fluorobenzene	102		80-120
4-Bromofluorobenzene	100		80-120

Serial_No:09211712:11

Project Name: WINDCHIME

Lab Number: L1732637

Project Number: BEA99-2252

Report Date: 09/21/17

SAMPLE RESULTS

Lab ID: L1732637-05
 Client ID: MW-4
 Sample Location: MASHPEE, MA

Date Collected: 09/13/17 13:55
 Date Received: 09/14/17
 Field Prep: Not Specified

Matrix: Water
 Analytical Method: 5,624
 Analytical Date: 09/15/17 15:16
 Analyst: GT

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methylene chloride	ND		ug/l	5.0	--	1
1,1-Dichloroethane	ND		ug/l	1.5	--	1
Chloroform	ND		ug/l	1.5	--	1
Carbon tetrachloride	ND		ug/l	1.0	--	1
1,2-Dichloropropane	ND		ug/l	3.5	--	1
Dibromochloromethane	ND		ug/l	1.0	--	1
1,1,2-Trichloroethane	ND		ug/l	1.5	--	1
2-Chloroethylvinyl ether	ND		ug/l	10	--	1
Tetrachloroethene	ND		ug/l	1.5	--	1
Chlorobenzene	ND		ug/l	3.5	--	1
Trichlorofluoromethane	ND		ug/l	5.0	--	1
1,2-Dichloroethane	ND		ug/l	1.5	--	1
1,1,1-Trichloroethane	ND		ug/l	2.0	--	1
Bromodichloromethane	ND		ug/l	1.0	--	1
trans-1,3-Dichloropropene	ND		ug/l	1.5	--	1
cis-1,3-Dichloropropene	ND		ug/l	1.5	--	1
Bromoform	ND		ug/l	1.0	--	1
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--	1
Benzene	ND		ug/l	1.0	--	1
Toluene	ND		ug/l	1.0	--	1
Ethylbenzene	ND		ug/l	1.0	--	1
Chloromethane	ND		ug/l	5.0	--	1
Bromomethane	ND		ug/l	5.0	--	1
Vinyl chloride	ND		ug/l	1.0	--	1
Chloroethane	ND		ug/l	2.0	--	1
1,1-Dichloroethene	ND		ug/l	1.0	--	1
trans-1,2-Dichloroethene	ND		ug/l	1.5	--	1
cis-1,2-Dichloroethene ¹	ND		ug/l	1.0	--	1
Trichloroethene	ND		ug/l	1.0	--	1
1,2-Dichlorobenzene	ND		ug/l	5.0	--	1



Project Name: WINDCHIME
Project Number: BEA99-2252

Serial_No:09211712:11
Lab Number: L1732637
Report Date: 09/21/17

SAMPLE RESULTS

Lab ID: L1732637-05
Client ID: MW-4
Sample Location: MASHPEE, MA

Date Collected: 09/13/17 13:55
Date Received: 09/14/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
1,3-Dichlorobenzene	ND		ug/l	5.0	--	1
1,4-Dichlorobenzene	ND		ug/l	5.0	--	1
p/m-Xylene ¹	ND		ug/l	2.0	--	1
o-xylene ¹	ND		ug/l	1.0	--	1
Xylenes, Total ¹	ND		ug/l	1.0	--	1
Styrene ¹	ND		ug/l	1.0	--	1
Acetone ¹	ND		ug/l	10	--	1
Carbon disulfide ¹	ND		ug/l	5.0	--	1
2-Butanone ¹	ND		ug/l	10	--	1
Vinyl acetate ¹	ND		ug/l	10	--	1
4-Methyl-2-pentanone ¹	ND		ug/l	10	--	1
2-Hexanone ¹	ND		ug/l	10	--	1
Acrolein ¹	ND		ug/l	8.0	--	1
Acrylonitrile ¹	ND		ug/l	10	--	1
Dibromomethane ¹	ND		ug/l	1.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Pentafluorobenzene	97		80-120
Fluorobenzene	101		80-120
4-Bromofluorobenzene	102		80-120

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1732637
Report Date: 09/21/17

Method Blank Analysis Batch Quality Control

Analytical Method: 5,624
Analytical Date: 09/15/17 11:55
Analyst: GT

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 02-05 Batch: WG1042186-10					
Methylene chloride	ND		ug/l	5.0	--
1,1-Dichloroethane	ND		ug/l	1.5	--
Chloroform	ND		ug/l	1.5	--
Carbon tetrachloride	ND		ug/l	1.0	--
1,2-Dichloropropane	ND		ug/l	3.5	--
Dibromochloromethane	ND		ug/l	1.0	--
1,1,2-Trichloroethane	ND		ug/l	1.5	--
2-Chloroethylvinyl ether	ND		ug/l	10	--
Tetrachloroethene	ND		ug/l	1.5	--
Chlorobenzene	ND		ug/l	3.5	--
Trichlorofluoromethane	ND		ug/l	5.0	--
1,2-Dichloroethane	ND		ug/l	1.5	--
1,1,1-Trichloroethane	ND		ug/l	2.0	--
Bromodichloromethane	ND		ug/l	1.0	--
trans-1,3-Dichloropropene	ND		ug/l	1.5	--
cis-1,3-Dichloropropene	ND		ug/l	1.5	--
Bromoform	ND		ug/l	1.0	--
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--
Benzene	ND		ug/l	1.0	--
Toluene	ND		ug/l	1.0	--
Ethylbenzene	ND		ug/l	1.0	--
Chloromethane	ND		ug/l	5.0	--
Bromomethane	ND		ug/l	5.0	--
Vinyl chloride	ND		ug/l	1.0	--
Chloroethane	ND		ug/l	2.0	--
1,1-Dichloroethene	ND		ug/l	1.0	--
trans-1,2-Dichloroethene	ND		ug/l	1.5	--
cis-1,2-Dichloroethene ¹	ND		ug/l	1.0	--
Trichloroethene	ND		ug/l	1.0	--

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1732637
Report Date: 09/21/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 5,624
Analytical Date: 09/15/17 11:55
Analyst: GT

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 02-05 Batch: WG1042186-10					
1,2-Dichlorobenzene	ND		ug/l	5.0	--
1,3-Dichlorobenzene	ND		ug/l	5.0	--
1,4-Dichlorobenzene	ND		ug/l	5.0	--
p/m-Xylene ¹	ND		ug/l	2.0	--
o-xylene ¹	ND		ug/l	1.0	--
Xylenes, Total ¹	ND		ug/l	1.0	--
Styrene ¹	ND		ug/l	1.0	--
Acetone ¹	ND		ug/l	10	--
Carbon disulfide ¹	ND		ug/l	5.0	--
2-Butanone ¹	ND		ug/l	10	--
Vinyl acetate ¹	ND		ug/l	10	--
4-Methyl-2-pentanone ¹	ND		ug/l	10	--
2-Hexanone ¹	ND		ug/l	10	--
Acrolein ¹	ND		ug/l	8.0	--
Acrylonitrile ¹	ND		ug/l	10	--
Dibromomethane ¹	ND		ug/l	1.0	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Pentafluorobenzene	95		80-120
Fluorobenzene	102		80-120
4-Bromofluorobenzene	100		80-120

Lab Control Sample Analysis

Batch Quality Control

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1732637
Report Date: 09/21/17

Parameter	LCS %Recovery	Qual	LCS %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 02-05 Batch: WG1042186-9								
Methylene chloride	105		-		70-111	-		30
1,1-Dichloroethane	110		-		78-116	-		30
Chloroform	110		-		86-111	-		30
Carbon tetrachloride	100		-		60-112	-		30
1,2-Dichloropropane	110		-		83-113	-		30
Dibromochloromethane	95		-		58-129	-		30
1,1,2-Trichloroethane	95		-		80-118	-		30
2-Chloroethylvinyl ether	90		-		69-124	-		30
Tetrachloroethene	105		-		80-126	-		30
Chlorobenzene	105		-		80-126	-		30
Trichlorofluoromethane	100		-		83-128	-		30
1,2-Dichloroethane	100		-		82-110	-		30
1,1,1-Trichloroethane	110	Q	-		72-109	-		30
Bromodichloromethane	100		-		71-120	-		30
trans-1,3-Dichloropropene	95		-		73-106	-		30
cis-1,3-Dichloropropene	100		-		78-111	-		30
Bromoform	90		-		45-131	-		30
1,1,2,2-Tetrachloroethane	90		-		81-122	-		30
Benzene	110		-		84-116	-		30
Toluene	105		-		83-121	-		30
Ethylbenzene	110		-		84-123	-		30
Chloromethane	110		-		70-144	-		30
Bromomethane	110		-		63-141	-		30



Lab Control Sample Analysis Batch Quality Control

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1732637
Report Date: 09/21/17

Parameter	LCS %Recovery	Qual	LCS %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 02-05 Batch: WG1042186-9								
Vinyl chloride	105		-		56-118	-		30
Chloroethane	110		-		74-130	-		30
1,1-Dichloroethene	110		-		77-116	-		30
trans-1,2-Dichloroethene	110		-		81-121	-		30
cis-1,2-Dichloroethene ¹	110		-		85-110	-		30
Trichloroethene	110		-		84-118	-		30
1,2-Dichlorobenzene	95		-		78-128	-		30
1,3-Dichlorobenzene	100		-		77-125	-		30
1,4-Dichlorobenzene	100		-		77-125	-		30
p/m-Xylene ¹	108		-		81-121	-		30
o-xylene ¹	110		-		81-124	-		30
Styrene ¹	110		-		84-133	-		30
Acetone ¹	78		-		40-160	-		30
Carbon disulfide ¹	100		-		54-134	-		30
2-Butanone ¹	80		-		57-116	-		30
Vinyl acetate ¹	95		-		40-160	-		30
4-Methyl-2-pentanone ¹	86		-		79-125	-		30
2-Hexanone ¹	82		-		78-120	-		30
Acrolein ¹	68		-		40-160	-		30
Acrylonitrile ¹	92		-		66-123	-		30
Dibromomethane ¹	100		-		65-126	-		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1732637
Report Date: 09/21/17

Parameter	LCS		LCSD		%Recovery		RPD	
	%Recovery	Qual	%Recovery	Qual	Limits		Qual	Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 02-05 Batch: WG1042186-9								
Surrogate	LCS		LCSD		Acceptance			
	%Recovery	Qual	%Recovery	Qual	Criteria			
Pentafluorobenzene	100				80-120			
Fluorobenzene	104				80-120			
4-Bromofluorobenzene	102				80-120			

Matrix Spike Analysis

Batch Quality Control

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1732637
Report Date: 09/21/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Found	MSD %Recovery	MSD Qual	Recovery Limits	RPD Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 02-05 QC Batch ID: WG1042186-6 QC Sample: L1732200-02 Client ID: MS Sample										
Methylene chloride	ND	200	200	100	-	-	-	70-111	-	30
1,1-Dichloroethane	ND	200	210	105	-	-	-	78-116	-	30
Chloroform	ND	200	210	105	-	-	-	86-111	-	30
Carbon tetrachloride	ND	200	180	90	-	-	-	60-112	-	30
1,2-Dichloropropane	ND	200	210	105	-	-	-	83-113	-	30
Dibromochloromethane	ND	200	180	90	-	-	-	58-129	-	30
1,1,2-Trichloroethane	ND	200	190	95	-	-	-	80-118	-	30
2-Chloroethylvinyl ether	ND	200	190	95	-	-	-	69-124	-	30
Tetrachloroethene	ND	200	200	100	-	-	-	80-126	-	30
Chlorobenzene	ND	200	220	110	-	-	-	80-126	-	30
Trichlorofluoromethane	ND	200	200	100	-	-	-	83-128	-	30
1,2-Dichloroethane	ND	200	200	100	-	-	-	82-110	-	30
1,1,1-Trichloroethane	ND	200	210	105	-	-	-	72-109	-	30
Bromodichloromethane	ND	200	190	95	-	-	-	71-120	-	30
trans-1,3-Dichloropropene	ND	200	180	90	-	-	-	73-106	-	30
cis-1,3-Dichloropropene	ND	200	180	90	-	-	-	78-111	-	30
Bromoform	ND	200	180	90	-	-	-	45-131	-	30
1,1,2,2-Tetrachloroethane	ND	200	180	90	-	-	-	81-122	-	30
Benzene	ND	200	220	110	-	-	-	84-116	-	30
Toluene	ND	200	210	105	-	-	-	83-121	-	30
Ethylbenzene	ND	200	220	110	-	-	-	84-123	-	30
Chloromethane	ND	200	220	110	-	-	-	70-144	-	30
Bromomethane	ND	200	190	95	-	-	-	63-141	-	30
Vinyl chloride	ND	200	190	95	-	-	-	56-118	-	30

Matrix Spike Analysis Batch Quality Control

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1732637
Report Date: 09/21/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Found	MSD %Recovery	Recovery Qual	Recovery Limits	RPD Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 02-05 QC Batch ID: WG1042186-6 QC Sample: L1732200-02 Client ID: MS Sample										
Chloroethane	ND	200	210	105	-	-	-	74-130	-	30
1,1-Dichloroethene	ND	200	210	105	-	-	-	77-116	-	30
trans-1,2-Dichloroethene	ND	200	210	105	-	-	-	81-121	-	30
cis-1,2-Dichloroethene ¹	ND	200	210	105	-	-	-	85-110	-	30
Trichloroethene	ND	200	200	100	-	-	-	84-118	-	30
1,2-Dichlorobenzene	ND	200	190	95	-	-	-	78-128	-	30
1,3-Dichlorobenzene	ND	200	200	100	-	-	-	77-125	-	30
1,4-Dichlorobenzene	ND	200	200	100	-	-	-	77-125	-	30
p/m-Xylene ¹	ND	400	430	108	-	-	-	81-121	-	30
o-Xylene ¹	ND	200	210	105	-	-	-	81-124	-	30
Styrene ¹	ND	200	220	110	-	-	-	84-133	-	30
Acetone ¹	250	500	650	80	-	-	-	40-160	-	30
Carbon disulfide ¹	ND	200	200	100	-	-	-	54-134	-	30
2-Butanone ¹	ND	500	420	84	-	-	-	57-116	-	30
Vinyl acetate ¹	ND	400	400	100	-	-	-	40-160	-	30
4-Methyl-2-pentanone ¹	ND	500	420	84	-	-	-	79-125	-	30
2-Hexanone ¹	ND	500	400	80	-	-	-	78-120	-	30
Acrolein ¹	ND	400	120	30	Q	-	-	40-160	-	30
Acrylonitrile ¹	ND	400	350	88	-	-	-	66-123	-	30
Dibromomethane ¹	ND	200	190	95	-	-	-	65-126	-	30

Matrix Spike Analysis Batch Quality Control

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1732637
Report Date: 09/21/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Found	MSD %Recovery	Recovery Qual	Recovery Limits	RPD Qual	RPD Limits
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Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 02-05 QC Batch ID: WG1042186-6 QC Sample: L1732200-02 Client ID: MS Sample

Surrogate	MS			MSD			Acceptance Criteria		
	% Recovery	Qualifier		% Recovery	Qualifier				
4-Bromofluorobenzene	103						80-120		
Fluorobenzene	104						80-120		
Pentafluorobenzene	98						80-120		

Lab Duplicate Analysis Batch Quality Control

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1732637
Report Date: 09/21/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 02-05 QC Batch ID: WG1042186-5 QC Sample: L1732200-02 Client ID: DUP Sample						
Methylene chloride	ND	ND	ug/l	NC		30
1,1-Dichloroethane	ND	ND	ug/l	NC		30
Chloroform	ND	ND	ug/l	NC		30
Carbon tetrachloride	ND	ND	ug/l	NC		30
1,2-Dichloropropane	ND	ND	ug/l	NC		30
Dibromochloromethane	ND	ND	ug/l	NC		30
1,1,2-Trichloroethane	ND	ND	ug/l	NC		30
2-Chloroethylvinyl ether	ND	ND	ug/l	NC		30
Tetrachloroethene	ND	ND	ug/l	NC		30
Chlorobenzene	ND	ND	ug/l	NC		30
Trichlorofluoromethane	ND	ND	ug/l	NC		30
1,2-Dichloroethane	ND	ND	ug/l	NC		30
1,1,1-Trichloroethane	ND	ND	ug/l	NC		30
Bromodichloromethane	ND	ND	ug/l	NC		30
trans-1,3-Dichloropropene	ND	ND	ug/l	NC		30
cis-1,3-Dichloropropene	ND	ND	ug/l	NC		30
Bromoform	ND	ND	ug/l	NC		30
1,1,2,2-Tetrachloroethane	ND	ND	ug/l	NC		30
Benzene	ND	ND	ug/l	NC		30
Toluene	ND	ND	ug/l	NC		30
Ethylbenzene	ND	ND	ug/l	NC		30



Lab Duplicate Analysis

Batch Quality Control

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1732637
Report Date: 09/21/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 02-05 QC Batch ID: WG1042186-5 QC Sample: L1732200-02 Client ID: DUP Sample						
Chloromethane	ND	ND	ug/l	NC		30
Bromomethane	ND	ND	ug/l	NC		30
Vinyl chloride	ND	ND	ug/l	NC		30
Chloroethane	ND	ND	ug/l	NC		30
1,1-Dichloroethene	ND	ND	ug/l	NC		30
trans-1,2-Dichloroethene	ND	ND	ug/l	NC		30
cis-1,2-Dichloroethene ¹	ND	ND	ug/l	NC		30
Trichloroethene	ND	ND	ug/l	NC		30
1,2-Dichlorobenzene	ND	ND	ug/l	NC		30
1,3-Dichlorobenzene	ND	ND	ug/l	NC		30
1,4-Dichlorobenzene	ND	ND	ug/l	NC		30
p/m-Xylene ¹	ND	ND	ug/l	NC		30
o-Xylene ¹	ND	ND	ug/l	NC		30
Xylene (Total) ¹	ND	ND	ug/l	NC		30
Styrene ¹	ND	ND	ug/l	NC		30
Acetone ¹	250	210	ug/l	17		30
Carbon disulfide ¹	ND	ND	ug/l	NC		30
2-Butanone ¹	ND	ND	ug/l	NC		30
Vinyl acetate ¹	ND	ND	ug/l	NC		30
4-Methyl-2-pentanone ¹	ND	ND	ug/l	NC		30
2-Hexanone ¹	ND	ND	ug/l	NC		30

Lab Duplicate Analysis

Batch Quality Control

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1732637
Report Date: 09/21/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 02-05 QC Batch ID: WG1042186-5 QC Sample: L1732200-02 Client ID: DUP Sample						
Acrolein ¹	ND	ND	ug/l	NC		30
Acrylonitrile ¹	ND	ND	ug/l	NC		30
Dibromomethane ¹	ND	ND	ug/l	NC		30

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Pentafluorobenzene	96		98		80-120
Fluorobenzene	102		103		80-120
4-Bromofluorobenzene	99		110		80-120



METALS

Project Name: WINDCHIME

Lab Number: L1732637

Project Number: BEA99-2252

Report Date: 09/21/17

SAMPLE RESULTS

Lab ID: L1732637-01

Date Collected: 09/13/17 10:20

Client ID: B-2R

Date Received: 09/14/17

Sample Location: MASHPEE, MA

Field Prep: Not Specified

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Sodium, Total	44.2		mg/l	2.00	--	1	09/19/17 15:18	09/20/17 23:18	EPA 3005A	1,6010C	AB



Serial_No:09211712:11

Project Name: WINDCHIME

Lab Number: L1732637

Project Number: BEA99-2252

Report Date: 09/21/17

SAMPLE RESULTS

Lab ID: L1732637-02

Date Collected: 09/13/17 11:00

Client ID: MW-3R

Date Received: 09/14/17

Sample Location: MASHPEE, MA

Field Prep: Not Specified

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Sodium, Total	52.0		mg/l	2.00	--	1	09/19/17 15:18	09/20/17 23:36	EPA 3005A	1,6010C	AB



Project Name: WINDCHIME

Lab Number: L1732637

Project Number: BEA99-2252

Report Date: 09/21/17

SAMPLE RESULTS

Lab ID: L1732637-03

Date Collected: 09/13/17 13:05

Client ID: MW-1

Date Received: 09/14/17

Sample Location: MASHPEE, MA

Field Prep: Not Specified

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Sodium, Total	44.4		mg/l	2.00	--	1	09/19/17 15:18	09/21/17 00:04	EPA 3005A	1,6010C	AB



Serial_No:09211712:11

Project Name: WINDCHIME

Lab Number: L1732637

Project Number: BEA99-2252

Report Date: 09/21/17

SAMPLE RESULTS

Lab ID: L1732637-04

Date Collected: 09/13/17 14:25

Client ID: MW-2

Date Received: 09/14/17

Sample Location: MASHPEE, MA

Field Prep: Not Specified

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Sodium, Total	40.0		mg/l	2.00	--	1	09/19/17 15:18	09/21/17 00:09	EPA 3005A	1,6010C	AB



Project Name: WINDCHIME

Lab Number: L1732637

Project Number: BEA99-2252

Report Date: 09/21/17

SAMPLE RESULTS

Lab ID: L1732637-05

Date Collected: 09/13/17 13:55

Client ID: MW-4

Date Received: 09/14/17

Sample Location: MASHPEE, MA

Field Prep: Not Specified

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Sodium, Total	36.5		mg/l	2.00	--	1	09/19/17 15:18	09/21/17 00:13	EPA 3005A	1,6010C	AB



Serial_No:09211712:11

Project Name: WINDCHIME

Lab Number: L1732637

Project Number: BEA99-2252

Report Date: 09/21/17

SAMPLE RESULTS

Lab ID: L1732637-06

Date Collected: 09/13/17 11:15

Client ID: PZ-1R

Date Received: 09/14/17

Sample Location: MASHPEE, MA

Field Prep: Not Specified

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Sodium, Total	8.19		mg/l	2.00	--	1	09/19/17 15:18	09/21/17 00:18	EPA 3005A	1,6010C	AB



Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1732637
Report Date: 09/21/17

SAMPLE RESULTS

Lab ID: L1732637-07
Client ID: PZ-2R
Sample Location: MASHPEE, MA
Matrix: Water

Date Collected: 09/13/17 12:00
Date Received: 09/14/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Sodium, Total	43.4		mg/l	2.00	--	1	09/19/17 15:18	09/21/17 00:23	EPA 3005A	1,6010C	AB



Serial_No:09211712:11

Project Name: WINDCHIME

Lab Number: L1732637

Project Number: BEA99-2252

Report Date: 09/21/17

SAMPLE RESULTS

Lab ID: L1732637-08

Date Collected: 09/13/17 12:00

Client ID: PZ-3R

Date Received: 09/14/17

Sample Location: MASHPEE, MA

Field Prep: Not Specified

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Sodium, Total	9.33		mg/l	2.00	--	1	09/19/17 15:18	09/21/17 00:28	EPA 3005A	1,6010C	AB



Serial_No:09211712:11

Project Name: WINDCHIME

Lab Number: L1732637

Project Number: BEA99-2252

Report Date: 09/21/17

Method Blank Analysis Batch Quality Control

Parameter	Result Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-08 Batch: WG1043303-1									
Sodium, Total	ND	mg/l	2.00	--	1	09/19/17 15:18	09/20/17 23:09	1,6010C	AB

Prep Information

Digestion Method: EPA 3005A



Lab Control Sample Analysis Batch Quality Control

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1732637
Report Date: 09/21/17

Parameter	LCS		LCSD		%Recovery Limits		RPD	Qual	RPD Limits
	%Recovery	Qual	%Recovery	Qual	%Recovery	Qual			
Total Metals - Mansfield Lab Associated sample(s): 01-08 Batch: WG1043303-2									
Sodium, Total	116		-				-		80-120

Matrix Spike Analysis
Batch Quality Control

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1732637
Report Date: 09/21/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Found	MSD %Recovery	MSD Qual	Recovery Limits	RPD Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-08 QC Batch ID: WG1043303-3 QC Sample: L1732637-01 Client ID: B-2R										
Sodium, Total	44.2	10	53.1	89	-	-	-	75-125	-	20



Lab Duplicate Analysis Batch Quality Control

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1732637
Report Date: 09/21/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-08	QC Batch ID: WG1043303-4	QC Sample: L1732637-01	Client ID: B-2R			
Sodium, Total	44.2	43.8	mg/l	1		20

INORGANICS & MISCELLANEOUS

Serial_No:09211712:11

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1732637
Report Date: 09/21/17

SAMPLE RESULTS

Lab ID: L1732637-01
Client ID: B-2R
Sample Location: MASHPEE, MA
Matrix: Water

Date Collected: 09/13/17 10:20
Date Received: 09/14/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chloride	71.		mg/l	1.0	--	1	-	09/15/17 19:48	121,4500CL-E	ML
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	09/15/17 15:30	09/15/17 18:52	121,4500NH3-BH	AT
Nitrogen, Nitrite	ND		mg/l	0.050	--	1	-	09/14/17 20:58	121,4500NO3-F	MR
Nitrogen, Nitrate	0.873		mg/l	0.100	--	1	-	09/14/17 20:58	121,4500NO3-F	MR
Nitrogen, Total Kjeldahl	ND		mg/l	0.300	--	1	09/18/17 23:30	09/20/17 00:18	121,4500NH3-H	AT
Phosphorus, Total	ND		mg/l	0.010	--	1	09/19/17 12:40	09/19/17 18:36	121,4500P-E	SD
Phosphorus, Orthophosphate	ND		mg/l	0.005	--	1	-	09/15/17 02:23	121,4500P-E	VB



Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1732637
Report Date: 09/21/17

SAMPLE RESULTS

Lab ID: L1732637-02
Client ID: MW-3R
Sample Location: MASHPEE, MA
Matrix: Water

Date Collected: 09/13/17 11:00
Date Received: 09/14/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chloride	82.		mg/l	1.0	--	1	-	09/15/17 19:49	121,4500CL-E	ML
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	09/15/17 15:30	09/15/17 18:53	121,4500NH3-BH	AT
Nitrogen, Nitrite	ND		mg/l	0.050	--	1	-	09/14/17 20:59	121,4500NO3-F	MR
Nitrogen, Nitrate	0.867		mg/l	0.100	--	1	-	09/14/17 20:59	121,4500NO3-F	MR
Nitrogen, Total Kjeldahl	0.521		mg/l	0.300	--	1	09/18/17 23:30	09/20/17 00:21	121,4500NH3-H	AT
Phosphorus, Total	ND		mg/l	0.010	--	1	09/19/17 12:40	09/19/17 18:37	121,4500P-E	SD
Phosphorus, Orthophosphate	ND		mg/l	0.005	--	1	-	09/15/17 02:25	121,4500P-E	VB



Serial_No:09211712:11

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1732637
Report Date: 09/21/17

SAMPLE RESULTS

Lab ID: L1732637-03
Client ID: MW-1
Sample Location: MASHPEE, MA
Matrix: Water

Date Collected: 09/13/17 13:05
Date Received: 09/14/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chloride	68.		mg/l	1.0	--	1	-	09/15/17 19:49	121,4500CL-E	ML
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	09/15/17 15:30	09/15/17 19:02	121,4500NH3-BH	AT
Nitrogen, Nitrite	ND		mg/l	0.050	--	1	-	09/14/17 21:00	121,4500NO3-F	MR
Nitrogen, Nitrate	1.06		mg/l	0.100	--	1	-	09/14/17 21:00	121,4500NO3-F	MR
Nitrogen, Total Kjeldahl	ND		mg/l	0.300	--	1	09/18/17 23:30	09/20/17 00:22	121,4500NH3-H	AT
Phosphorus, Total	ND		mg/l	0.010	--	1	09/19/17 12:40	09/19/17 18:37	121,4500P-E	SD
Phosphorus, Orthophosphate	0.011		mg/l	0.005	--	1	-	09/15/17 02:26	121,4500P-E	VB



Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1732637
Report Date: 09/21/17

SAMPLE RESULTS

Lab ID: L1732637-04
Client ID: MW-2
Sample Location: MASHPEE, MA
Matrix: Water

Date Collected: 09/13/17 14:25
Date Received: 09/14/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chloride	38.		mg/l	1.0	--	1	-	09/15/17 19:50	121,4500CL-E	ML
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	09/15/17 15:30	09/15/17 19:03	121,4500NH3-BH	AT
Nitrogen, Nitrite	ND		mg/l	0.050	--	1	-	09/14/17 21:02	121,4500NO3-F	MR
Nitrogen, Nitrate	8.02		mg/l	0.200	--	2	-	09/14/17 22:40	121,4500NO3-F	MR
Nitrogen, Total Kjeldahl	ND		mg/l	0.300	--	1	09/18/17 23:30	09/20/17 00:23	121,4500NH3-H	AT
Phosphorus, Total	1.56		mg/l	0.050	--	5	09/19/17 12:40	09/19/17 19:13	121,4500P-E	SD
Phosphorus, Orthophosphate	1.48		mg/l	0.010	--	2	-	09/15/17 02:26	121,4500P-E	VB



Serial_No:09211712:11

Project Name: WINDCHIME

Lab Number: L1732637

Project Number: BEA99-2252

Report Date: 09/21/17

SAMPLE RESULTS

Lab ID: L1732637-05

Date Collected: 09/13/17 13:55

Client ID: MW-4

Date Received: 09/14/17

Sample Location: MASHPEE, MA

Field Prep: Not Specified

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chloride	56.		mg/l	1.0	--	1	-	09/15/17 19:51	121,4500CL-E	ML
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	09/15/17 15:30	09/15/17 19:04	121,4500NH3-BH	AT
Nitrogen, Nitrite	ND		mg/l	0.050	--	1	-	09/14/17 21:15	121,4500NO3-F	MR
Nitrogen, Nitrate	0.716		mg/l	0.100	--	1	-	09/14/17 21:15	121,4500NO3-F	MR
Nitrogen, Total Kjeldahl	ND		mg/l	0.300	--	1	09/18/17 23:30	09/20/17 00:24	121,4500NH3-H	AT
Phosphorus, Total	ND		mg/l	0.010	--	1	09/19/17 12:40	09/19/17 18:39	121,4500P-E	SD
Phosphorus, Orthophosphate	ND		mg/l	0.005	--	1	-	09/15/17 02:27	121,4500P-E	VB



Serial_No:09211712:11

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1732637
Report Date: 09/21/17

SAMPLE RESULTS

Lab ID: L1732637-06
Client ID: PZ-1R
Sample Location: MASHPEE, MA
Matrix: Water

Date Collected: 09/13/17 11:15
Date Received: 09/14/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chloride	9.4		mg/l	1.0	--	1	-	09/15/17 19:52	121,4500CL-E	ML
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	09/15/17 15:30	09/15/17 19:05	121,4500NH3-BH	AT
Nitrogen, Nitrite	ND		mg/l	0.050	--	1	-	09/14/17 21:25	121,4500NO3-F	MR
Nitrogen, Nitrate	ND		mg/l	0.100	--	1	-	09/14/17 21:25	121,4500NO3-F	MR
Nitrogen, Total Kjeldahl	1.09		mg/l	0.300	--	1	09/18/17 23:30	09/20/17 00:33	121,4500NH3-H	AT
Phosphorus, Total	0.453		mg/l	0.010	--	1	09/19/17 12:40	09/19/17 18:42	121,4500P-E	SD
Phosphorus, Orthophosphate	0.009		mg/l	0.005	--	1	-	09/15/17 02:27	121,4500P-E	VB



Serial_No:09211712:11

Project Name: WINDCHIME

Project Number: BEA99-2252

Lab Number: L1732637

Report Date: 09/21/17

SAMPLE RESULTS

Lab ID: L1732637-07

Client ID: PZ-2R

Sample Location: MASHPEE, MA

Matrix: Water

Date Collected: 09/13/17 12:00

Date Received: 09/14/17

Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chloride	44.		mg/l	1.0	--	1	-	09/15/17 19:53	121,4500CL-E	ML
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	09/15/17 15:30	09/15/17 19:06	121,4500NH3-BH	AT
Nitrogen, Nitrite	ND		mg/l	0.050	--	1	-	09/14/17 21:26	121,4500NO3-F	MR
Nitrogen, Nitrate	12.7		mg/l	0.500	--	5	-	09/14/17 22:45	121,4500NO3-F	MR
Nitrogen, Total Kjeldahl	1.55		mg/l	0.600	--	2	09/18/17 23:30	09/20/17 00:34	121,4500NH3-H	AT
Phosphorus, Total	2.25		mg/l	0.100	--	10	09/20/17 11:00	09/20/17 18:09	121,4500P-E	SD
Phosphorus, Orthophosphate	1.97		mg/l	0.025	--	5	-	09/15/17 02:28	121,4500P-E	VB



Serial_No:09211712:11

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1732637
Report Date: 09/21/17

SAMPLE RESULTS

Lab ID: L1732637-08
Client ID: PZ-3R
Sample Location: MASHPEE, MA
Matrix: Water

Date Collected: 09/13/17 12:00
Date Received: 09/14/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chloride	8.5		mg/l	1.0	--	1	-	09/15/17 19:53	121,4500CL-E	ML
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	09/15/17 15:30	09/15/17 19:07	121,4500NH3-BH	AT
Nitrogen, Nitrite	ND		mg/l	0.050	--	1	-	09/14/17 21:27	121,4500NO3-F	MR
Nitrogen, Nitrate	ND		mg/l	0.100	--	1	-	09/14/17 22:47	121,4500NO3-F	MR
Nitrogen, Total Kjeldahl	1.84		mg/l	0.300	--	1	09/18/17 23:30	09/20/17 00:35	121,4500NH3-H	AT
Phosphorus, Total	5.06		mg/l	0.250	--	25	09/20/17 11:00	09/20/17 18:40	121,4500P-E	SD
Phosphorus, Orthophosphate	0.139		mg/l	0.005	--	1	-	09/15/17 02:28	121,4500P-E	VB



Serial_No:09211712:11

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1732637
Report Date: 09/21/17

SAMPLE RESULTS

Lab ID: L1732637-09
Client ID: SW-1
Sample Location: MASHPEE, MA
Matrix: Water

Date Collected: 09/13/17 11:20
Date Received: 09/14/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	09/15/17 15:30	09/15/17 19:08	121,4500NH3-BH	AT
Nitrogen, Nitrite	ND		mg/l	0.050	--	1	-	09/14/17 21:29	121,4500NO3-F	MR
Nitrogen, Nitrate	0.466		mg/l	0.100	--	1	-	09/14/17 21:29	121,4500NO3-F	MR
Nitrogen, Total Kjeldahl	0.436		mg/l	0.300	--	1	09/18/17 23:30	09/20/17 00:36	121,4500NH3-H	AT
Phosphorus, Total	0.029		mg/l	0.010	--	1	09/20/17 11:00	09/20/17 16:39	121,4500P-E	SD
Phosphorus, Orthophosphate	ND		mg/l	0.005	--	1	-	09/15/17 02:29	121,4500P-E	VB



Serial_No:09211712:11

Project Name: WINDCHIME

Lab Number: L1732637

Project Number: BEA99-2252

Report Date: 09/21/17

SAMPLE RESULTS

Lab ID: L1732637-10

Date Collected: 09/13/17 11:55

Client ID: SW-2

Date Received: 09/14/17

Sample Location: MASHPEE, MA

Field Prep: Not Specified

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	09/15/17 15:30	09/15/17 19:09	121,4500NH3-BH	AT
Nitrogen, Nitrite	ND		mg/l	0.050	--	1	-	09/14/17 21:30	121,4500NO3-F	MR
Nitrogen, Nitrate	0.566		mg/l	0.100	--	1	-	09/14/17 21:30	121,4500NO3-F	MR
Nitrogen, Total Kjeldahl	0.366		mg/l	0.300	--	1	09/18/17 23:30	09/20/17 00:37	121,4500NH3-H	AT
Phosphorus, Total	0.087		mg/l	0.010	--	1	09/20/17 11:00	09/20/17 16:43	121,4500P-E	SD
Phosphorus, Orthophosphate	0.040		mg/l	0.005	--	1	-	09/15/17 02:29	121,4500P-E	VB



Serial_No:09211712:11

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1732637
Report Date: 09/21/17

SAMPLE RESULTS

Lab ID: L1732637-11
Client ID: SW-3
Sample Location: MASHPEE, MA
Matrix: Water

Date Collected: 09/13/17 12:25
Date Received: 09/14/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	09/15/17 15:30	09/15/17 19:09	121,4500NH3-BH	AT
Nitrogen, Nitrite	ND		mg/l	0.050	--	1	-	09/14/17 21:31	121,4500NO3-F	MR
Nitrogen, Nitrate	0.302		mg/l	0.100	--	1	-	09/14/17 21:31	121,4500NO3-F	MR
Nitrogen, Total Kjeldahl	0.507		mg/l	0.300	--	1	09/19/17 13:00	09/20/17 23:13	121,4500NH3-H	AT
Phosphorus, Total	0.096		mg/l	0.010	--	1	09/20/17 11:00	09/20/17 16:44	121,4500P-E	SD
Phosphorus, Orthophosphate	0.017		mg/l	0.005	--	1	-	09/15/17 02:29	121,4500P-E	VB



Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1732637
Report Date: 09/21/17

Method Blank Analysis
Batch Quality Control

Parameter	Result Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab for sample(s): 01-11 Batch: WG1041892-1									
Nitrogen, Nitrate	ND	mg/l	0.100	--	1	-	09/14/17 21:07	121,4500NO3-F	MR
General Chemistry - Westborough Lab for sample(s): 01-11 Batch: WG1041893-1									
Nitrogen, Nitrite	ND	mg/l	0.050	--	1	-	09/14/17 21:09	121,4500NO3-F	MR
General Chemistry - Westborough Lab for sample(s): 01-11 Batch: WG1041952-1									
Phosphorus, Orthophosphate	ND	mg/l	0.005	--	1	-	09/15/17 02:18	121,4500P-E	VB
General Chemistry - Westborough Lab for sample(s): 01-08 Batch: WG1042215-1									
Chloride	ND	mg/l	1.0	--	1	-	09/15/17 19:31	121,4500CL-E	ML
General Chemistry - Westborough Lab for sample(s): 01-11 Batch: WG1042225-1									
Nitrogen, Ammonia	ND	mg/l	0.075	--	1	09/15/17 15:30	09/15/17 18:29	121,4500NH3-BH	AT
General Chemistry - Westborough Lab for sample(s): 01-10 Batch: WG1043001-1									
Nitrogen, Total Kjeldahl	ND	mg/l	0.300	--	1	09/18/17 23:30	09/20/17 00:15	121,4500NH3-H	AT
General Chemistry - Westborough Lab for sample(s): 01-06 Batch: WG1043112-1									
Phosphorus, Total	ND	mg/l	0.010	--	1	09/19/17 12:40	09/19/17 18:07	121,4500P-E	SD
General Chemistry - Westborough Lab for sample(s): 11 Batch: WG1043205-1									
Nitrogen, Total Kjeldahl	ND	mg/l	0.300	--	1	09/19/17 13:00	09/20/17 23:07	121,4500NH3-H	AT
General Chemistry - Westborough Lab for sample(s): 07-11 Batch: WG1043570-1									
Phosphorus, Total	ND	mg/l	0.010	--	1	09/20/17 11:00	09/20/17 16:31	121,4500P-E	SD



Lab Control Sample Analysis

Batch Quality Control

Project Name: WINDCHIME

Project Number: BEA99-2252

Lab Number: L1732637

Report Date: 09/21/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-11 Batch: WG1041892-2								
Nitrogen, Nitrate	96		-		90-110	-		
General Chemistry - Westborough Lab Associated sample(s): 01-11 Batch: WG1041893-2								
Nitrogen, Nitrite	98		-		90-110	-		
General Chemistry - Westborough Lab Associated sample(s): 01-11 Batch: WG1041952-2								
Phosphorus, Orthophosphate	101		-		90-110	-		
General Chemistry - Westborough Lab Associated sample(s): 01-08 Batch: WG1042215-2								
Chloride	107		-		90-110	-		
General Chemistry - Westborough Lab Associated sample(s): 01-11 Batch: WG1042225-2								
Nitrogen, Ammonia	102		-		80-120	-		20
General Chemistry - Westborough Lab Associated sample(s): 01-10 Batch: WG1043001-2								
Nitrogen, Total Kjeldahl	100		-		78-122	-		
General Chemistry - Westborough Lab Associated sample(s): 01-06 Batch: WG1043112-2								
Phosphorus, Total	101		-		80-120	-		

Lab Control Sample Analysis Batch Quality Control

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1732637
Report Date: 09/21/17

Parameter	LCS %Recovery	LCSD %Recovery	%Recovery Limits	RPD	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 11 Batch: WG1043205-2					
Nitrogen, Total Kjeldahl	98	-	78-122	-	
General Chemistry - Westborough Lab Associated sample(s): 07-11 Batch: WG1043570-2					
Phosphorus, Total	101	-	80-120	-	

Matrix Spike Analysis Batch Quality Control

Project Name: WINDCHIME

Project Number: BEA99-2252

Lab Number: L1732637

Report Date: 09/21/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Qual	MSD %Recovery	Recovery Qual	RPD Limits	RPD Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-11 QC Batch ID: WG1041892-4 QC Sample: L1732637-05 Client ID: MW-4										
Nitrogen, Nitrate	0.716	4	4.34	91	-	-	83-113	-	-	17
General Chemistry - Westborough Lab Associated sample(s): 01-11 QC Batch ID: WG1041893-4 QC Sample: L1732637-05 Client ID: MW-4										
Nitrogen, Nitrite	ND	4	3.35	84	-	-	80-120	-	-	20
General Chemistry - Westborough Lab Associated sample(s): 01-11 QC Batch ID: WG1041952-4 QC Sample: L1732637-02 Client ID: MW-3R										
Phosphorus, Orthophosphate	ND	0.5	0.517	103	-	-	80-120	-	-	20
General Chemistry - Westborough Lab Associated sample(s): 01-08 QC Batch ID: WG1042215-4 QC Sample: L1731919-01 Client ID: MS Sample										
Chloride	1.4	20	22	103	-	-	58-140	-	-	7
General Chemistry - Westborough Lab Associated sample(s): 01-11 QC Batch ID: WG1042225-4 QC Sample: L1732035-02 Client ID: MS Sample										
Nitrogen, Ammonia	ND	4	3.82	96	-	-	80-120	-	-	20
General Chemistry - Westborough Lab Associated sample(s): 01-10 QC Batch ID: WG1043001-4 QC Sample: L1732637-01 Client ID: B-2R										
Nitrogen, Total Kjeldahl	ND	8	7.64	96	-	-	77-111	-	-	24
General Chemistry - Westborough Lab Associated sample(s): 01-06 QC Batch ID: WG1043112-3 QC Sample: L1732034-02 Client ID: MS Sample										
Phosphorus, Total	0.139	0.5	0.630	98	-	-	75-125	-	-	20
General Chemistry - Westborough Lab Associated sample(s): 11 QC Batch ID: WG1043205-4 QC Sample: L1732637-11 Client ID: SW-3										
Nitrogen, Total Kjeldahl	0.507	8	7.86	92	-	-	77-111	-	-	24
General Chemistry - Westborough Lab Associated sample(s): 07-11 QC Batch ID: WG1043570-3 QC Sample: L1732637-07 Client ID: PZ-2R										
Phosphorus, Total	2.25	1	3.33	108	-	-	75-125	-	-	20

Lab Duplicate Analysis

Batch Quality Control

Project Name: WINDCHIME

Lab Number: L1732637

Project Number: BEA99-2252

Report Date: 09/21/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab	Associated sample(s): 01-11	QC Batch ID: WG1041892-3	QC Sample: L1732637-05	Client ID: MW-4		
Nitrogen, Nitrate	0.716	0.769	mg/l	7		17
General Chemistry - Westborough Lab	Associated sample(s): 01-11	QC Batch ID: WG1041893-3	QC Sample: L1732637-05	Client ID: MW-4		
Nitrogen, Nitrite	ND	ND	mg/l	NC		20
General Chemistry - Westborough Lab	Associated sample(s): 01-11	QC Batch ID: WG1041952-3	QC Sample: L1732637-02	Client ID: MW-3R		
Phosphorus, Orthophosphate	ND	ND	mg/l	NC		20
General Chemistry - Westborough Lab	Associated sample(s): 01-08	QC Batch ID: WG1042215-3	QC Sample: L1731919-01	Client ID: DUP Sample		
Chloride	1.4	1.5	mg/l	7		7
General Chemistry - Westborough Lab	Associated sample(s): 01-11	QC Batch ID: WG1042225-3	QC Sample: L1732035-02	Client ID: DUP Sample		
Nitrogen, Ammonia	ND	ND	mg/l	NC		20
General Chemistry - Westborough Lab	Associated sample(s): 01-10	QC Batch ID: WG1043001-3	QC Sample: L1732637-01	Client ID: B-2R		
Nitrogen, Total Kjeldahl	ND	ND	mg/l	NC		24
General Chemistry - Westborough Lab	Associated sample(s): 01-06	QC Batch ID: WG1043112-4	QC Sample: L1732034-02	Client ID: DUP Sample		
Phosphorus, Total	0.139	0.134	mg/l	4		20
General Chemistry - Westborough Lab	Associated sample(s): 11	QC Batch ID: WG1043205-3	QC Sample: L1732637-11	Client ID: SW-3		
Nitrogen, Total Kjeldahl	0.507	0.465	mg/l	9		24
General Chemistry - Westborough Lab	Associated sample(s): 07-11	QC Batch ID: WG1043570-4	QC Sample: L1732637-07	Client ID: PZ-2R		
Phosphorus, Total	2.25	2.37	mg/l	5		20



Project Name: WINDCHIME
Project Number: BEA99-2252

Serial_No:09211712:11
Lab Number: L1732637
Report Date: 09/21/17

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler B
Custody Seal Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1732637-01A	Plastic 250ml unpreserved	B	7	7	3.7	Y	Absent		OPHOS-4500(2), CL-4500(28), NO3-4500(2), NO2-4500NO3(2)
L1732637-01B	Plastic 250ml HNO3 preserved	B	<2	<2	3.7	Y	Absent		NA-Ti(180)
L1732637-01C	Plastic 500ml H2SO4 preserved	B	<2	<2	3.7	Y	Absent		TKN-4500(28), TPHOS-4500(28), NH3-4500(28)
L1732637-02A	Plastic 250ml unpreserved	B	7	7	3.7	Y	Absent		OPHOS-4500(2), CL-4500(28), NO3-4500(2), NO2-4500NO3(2)
L1732637-02B	Plastic 250ml HNO3 preserved	B	<2	<2	3.7	Y	Absent		NA-Ti(180)
L1732637-02C	Plastic 500ml H2SO4 preserved	B	<2	<2	3.7	Y	Absent		TKN-4500(28), TPHOS-4500(28), NH3-4500(28)
L1732637-02D	Vial Na2S2O3 preserved	B	NA		3.7	Y	Absent		624(3)
L1732637-02E	Vial Na2S2O3 preserved	B	NA		3.7	Y	Absent		624(3)
L1732637-02F	Vial Na2S2O3 preserved	B	NA		3.7	Y	Absent		624(3)
L1732637-03A	Plastic 250ml unpreserved	B	7	7	3.7	Y	Absent		OPHOS-4500(2), CL-4500(28), NO3-4500(2), NO2-4500NO3(2)
L1732637-03B	Plastic 250ml HNO3 preserved	B	<2	<2	3.7	Y	Absent		NA-Ti(180)
L1732637-03C	Plastic 500ml H2SO4 preserved	B	<2	<2	3.7	Y	Absent		TKN-4500(28), TPHOS-4500(28), NH3-4500(28)
L1732637-03D	Vial Na2S2O3 preserved	B	NA		3.7	Y	Absent		624(3)
L1732637-03E	Vial Na2S2O3 preserved	B	NA		3.7	Y	Absent		624(3)
L1732637-03F	Vial Na2S2O3 preserved	B	NA		3.7	Y	Absent		624(3)
L1732637-04A	Plastic 250ml unpreserved	B	7	7	3.7	Y	Absent		OPHOS-4500(2), CL-4500(28), NO3-4500(2), NO2-4500NO3(2)
L1732637-04B	Plastic 250ml HNO3 preserved	B	<2	<2	3.7	Y	Absent		NA-Ti(180)
L1732637-04C	Plastic 500ml H2SO4 preserved	B	<2	<2	3.7	Y	Absent		TKN-4500(28), TPHOS-4500(28), NH3-4500(28)
L1732637-04D	Vial Na2S2O3 preserved	B	NA		3.7	Y	Absent		624(3)
L1732637-04E	Vial Na2S2O3 preserved	B	NA		3.7	Y	Absent		624(3)
L1732637-04F	Vial Na2S2O3 preserved	B	NA		3.7	Y	Absent		624(3)

Container Information			Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
Container ID	Container Type									
L1732637-05A	Plastic 250ml unpreserved	B	7	7	3.7	Y	Absent		OPHOS-4500(2),CL-4500(28),NO3-4500(2),NO2-4500NO3(2)	NA-Tl(180)
L1732637-05B	Plastic 250ml HNO3 preserved	B	<2	<2	3.7	Y	Absent			
L1732637-05C	Plastic 500ml H2SO4 preserved	B	<2	<2	3.7	Y	Absent		TKN-4500(28),TPHOS-4500(28),NH3-4500(28)	
L1732637-05D	Vial Na2S2O3 preserved	B	NA		3.7	Y	Absent		624(3)	
L1732637-05E	Vial Na2S2O3 preserved	B	NA		3.7	Y	Absent		624(3)	
L1732637-05F	Vial Na2S2O3 preserved	B	NA		3.7	Y	Absent		624(3)	OPHOS-4500(2),CL-4500(28),NO3-4500(2),NO2-4500NO3(2)
L1732637-06A	Plastic 250ml unpreserved	B	7	7	3.7	Y	Absent			
L1732637-06B	Plastic 250ml HNO3 preserved	B	<2	<2	3.7	Y	Absent		NA-Tl(180)	
L1732637-06C	Plastic 500ml H2SO4 preserved	B	<2	<2	3.7	Y	Absent		TKN-4500(28),TPHOS-4500(28),NH3-4500(28)	
L1732637-07A	Plastic 250ml unpreserved	B	7	7	3.7	Y	Absent		OPHOS-4500(2),CL-4500(28),NO3-4500(2),NO2-4500NO3(2)	
L1732637-07B	Plastic 250ml HNO3 preserved	B	<2	<2	3.7	Y	Absent		NA-Tl(180)	NA-Tl(180)
L1732637-07C	Plastic 500ml H2SO4 preserved	B	<2	<2	3.7	Y	Absent		TKN-4500(28),TPHOS-4500(28),NH3-4500(28)	
L1732637-08A	Plastic 250ml unpreserved	B	7	7	3.7	Y	Absent		OPHOS-4500(2),CL-4500(28),NO3-4500(2),NO2-4500NO3(2)	
L1732637-08B	Plastic 250ml HNO3 preserved	B	<2	<2	3.7	Y	Absent		NA-Tl(180)	
L1732637-08C	Plastic 500ml H2SO4 preserved	B	<2	<2	3.7	Y	Absent		TKN-4500(28),TPHOS-4500(28),NH3-4500(28)	
L1732637-09A	Plastic 250ml unpreserved	B	7	7	3.7	Y	Absent		OPHOS-4500(2),NO3-4500(2),NO2-4500NO3(2)	TKN-4500(28),TPHOS-4500(28),NH3-4500(28)
L1732637-09C	Plastic 500ml H2SO4 preserved	B	<2	<2	3.7	Y	Absent			
L1732637-10A	Plastic 250ml unpreserved	B	7	7	3.7	Y	Absent		OPHOS-4500(2),NO3-4500(2),NO2-4500NO3(2)	
L1732637-10C	Plastic 500ml H2SO4 preserved	B	<2	<2	3.7	Y	Absent		TKN-4500(28),TPHOS-4500(28),NH3-4500(28)	
L1732637-11A	Plastic 250ml unpreserved	B	7	7	3.7	Y	Absent		OPHOS-4500(2),NO3-4500(2),NO2-4500NO3(2)	
L1732637-11C	Plastic 500ml H2SO4 preserved	B	<2	<2	3.7	Y	Absent		TKN-4500(28),TPHOS-4500(28),NH3-4500(28)	

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1732637
Report Date: 09/21/17

GLOSSARY

Acronyms

EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCS D	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

- A** - Spectra identified as "Aldol Condensation Product".
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related

Report Format: Data Usability Report



Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1732637
Report Date: 09/21/17

Data Qualifiers

projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- J** - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).
- ND** - Not detected at the reporting limit (RL) for the sample.

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1732637
Report Date: 09/21/17

REFERENCES

- 1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IV, 2007.
- 5 Methods for the Organic Chemical Analysis of Municipal and Industrial Wastewater. Appendix A, Part 136, 40 CFR (Code of Federal Regulations).
- 121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at its own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



Alpha Analytical, Inc.
 Facility: Company-wide
 Department: Quality Assurance
 Title: Certificate/Approval Program Summary

ID No.:17873
 Revision 10
 Published Date: 1/16/2017 11:00:05 AM
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Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility

EPA 624: m/p-xylene, o-xylene
 EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), Methyl methacrylate, 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
 EPA 8270D: NPW: Dimethylnaphthalene, 1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene, 1,4-Diphenylhydrazine.
 EPA 300: DW: Bromide
 EPA 6860: NPW and SCM: Perchlorate
 EPA 9010: NPW and SCM: Amenable Cyanide Distillation
 EPA 9012B: NPW: Total Cyanide
 EPA 9050A: NPW: Specific Conductance
 SM3500: NPW: Ferrous Iron
 SM4500: NPW: Amenable Cyanide, Dissolved Oxygen; SCM: Total Phosphorus, TKN, NO₂, NO₃.
 SM5310C: DW: Dissolved Organic Carbon

Mansfield Facility

SM 2540D: TSS
 EPA 3005A NPW
 EPA 8082A: NPW: PCB: 1, 5, 31, 87, 101, 110, 141, 151, 153, 180, 183, 187.
 EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
 Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water

EPA 300.0: Nitrate-N, Fluoride, Sulfate; EPA 353.2: Nitrate-N, Nitrite-N; SM4500NO₃-F: Nitrate-N, Nitrite-N; SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500CI-D, SM2320B, SM2540C, SM4500H-B
 EPA 332: Perchlorate; EPA 524.2: THMs and VOCs; EPA 504.1: EDB, DBCP.
 Microbiology: SM9215B; SM9223-P/A, SM9223B-Colilert-QT, SM9222D.

Non-Potable Water

SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH₃-BH, EPA 350.1: Ammonia-N, LACHAT 10-107-06-1-B: Ammonia-N, SM4500NO₃-F, EPA 353.2: Nitrate-N, EPA 351.1, SM4500P-E, SM4500P-B, E, SM4500SO₄-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D.
 EPA 624: Volatile Halocarbons & Aromatics,
 EPA 608: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
 EPA 625: SVOC (Acid/Base/Neutral Extractables), EPA 600/4-81-045: PCB-Oil.
 Microbiology: SM9223B-Colilert-QT; Enterolert-QT, SM9221E.

Mansfield Facility:

Drinking Water

EPA 200.7: Ba, Be, Cd, Cr, Cu, Ni, Na, Ca. EPA 200.8: Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Ni, Se, TL. EPA 245.1 Hg.

Non-Potable Water

EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
 EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn.
 EPA 245.1 Hg.
 SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.



ANALYTICAL REPORT

Lab Number:	L1745363
Client:	Bennett Environmental Associates 1573 Main Street Brewster, MA 02631
ATTN:	David Bennett
Phone:	(508) 896-1706
Project Name:	WINDCHIME
Project Number:	BEA99-2252
Report Date:	12/15/17

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), NJ NELAP (MA935), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-14-00197).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com



Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1745363
Report Date: 12/15/17

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1745363-01	B-2R	WATER	MASHPEE, MA	12/07/17 14:40	12/08/17
L1745363-02	MW-3R	WATER	MASHPEE, MA	12/07/17 13:45	12/08/17
L1745363-03	MW-1	WATER	MASHPEE, MA	12/07/17 11:45	12/08/17
L1745363-04	MW-2	WATER	MASHPEE, MA	12/07/17 13:05	12/08/17
L1745363-05	MW-4	WATER	MASHPEE, MA	12/07/17 12:30	12/08/17
L1745363-06	PZ-1R	WATER	MASHPEE, MA	12/07/17 10:00	12/08/17
L1745363-07	PZ-2R	WATER	MASHPEE, MA	12/07/17 10:40	12/08/17
L1745363-08	PZ-3R	WATER	MASHPEE, MA	12/07/17 10:35	12/08/17
L1745363-09	SW-1	WATER	MASHPEE, MA	12/07/17 10:05	12/08/17
L1745363-10	SW-2	WATER	MASHPEE, MA	12/07/17 10:50	12/08/17
L1745363-11	SW-3	WATER	MASHPEE, MA	12/07/17 11:05	12/08/17

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1745363
Report Date: 12/15/17

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY

For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1745363
Report Date: 12/15/17

Case Narrative (continued)

Sample Receipt

L1745363-07: The collection date and time on the chain of custody was 07-DEC-17 10:40; however, the collection date/time on the container label was 07-DEC-17 10:50. At the client's request, the collection date/time is reported as 07-DEC-17 10:40.

L1745363-10: The collection date and time on the chain of custody was 07-DEC-17 10:50; however, the collection date/time on the container label was 07-DEC-17 10:40. At the client's request, the collection date/time is reported as 07-DEC-17 10:50.

Phosphorus, Total

L1745363-02: The Orthophosphate result is slightly higher than the Total Phosphorous result; however, the sample result is less than five times the reporting limit. Therefore, no further action was taken.

Nitrogen, Total Kjeldahl

L1745363-04: The sample has an elevated detection limit due to the dilution required by the sample matrix.

Nitrogen, Ammonia

The WG1071271-3 Laboratory Duplicate RPD (25%), performed on L1745363-01, is above the acceptance criteria; however, the sample and duplicate results are less than five times the reporting limit. Therefore, the RPD is valid.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:



Kara Soroko

Title: Technical Director/Representative

Date: 12/15/17

METALS

Project Name: WINDCHIME

Lab Number: L1745363

Project Number: BEA99-2252

Report Date: 12/15/17

SAMPLE RESULTS

Lab ID: L1745363-01

Date Collected: 12/07/17 14:40

Client ID: B-2R

Date Received: 12/08/17

Sample Location: MASHPEE, MA

Field Prep: Not Specified

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Sodium, Total	41.6		mg/l	2.00	--	1	12/14/17 11:30	12/14/17 19:32	EPA 3005A	1,6010C	AB



Serial_No:12151712:13

Project Name: WINDCHIME

Lab Number: L1745363

Project Number: BEA99-2252

Report Date: 12/15/17

SAMPLE RESULTS

Lab ID: L1745363-02

Date Collected: 12/07/17 13:45

Client ID: MW-3R

Date Received: 12/08/17

Sample Location: MASHPEE, MA

Field Prep: Not Specified

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Sodium, Total	40.7		mg/l	2.00	--	1	12/14/17 11:30	12/14/17 19:50	EPA 3005A	1,6010C	AB



Serial_No:12151712:13

Project Name: WINDCHIME

Lab Number: L1745363

Project Number: BEA99-2252

Report Date: 12/15/17

SAMPLE RESULTS

Lab ID: L1745363-03

Date Collected: 12/07/17 11:45

Client ID: MW-1

Date Received: 12/08/17

Sample Location: MASHPEE, MA

Field Prep: Not Specified

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Sodium, Total	39.2		mg/l	2.00	--	1	12/14/17 11:30	12/14/17 19:55	EPA 3005A	1,6010C	AB



Serial_No:12151712:13

Project Name: WINDCHIME

Lab Number: L1745363

Project Number: BEA99-2252

Report Date: 12/15/17

SAMPLE RESULTS

Lab ID: L1745363-04

Date Collected: 12/07/17 13:05

Client ID: MW-2

Date Received: 12/08/17

Sample Location: MASHPEE, MA

Field Prep: Not Specified

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Sodium, Total	47.5		mg/l	2.00	--	1	12/14/17 11:30	12/14/17 19:59	EPA 3005A	1,6010C	AB



Project Name: WINDCHIME

Lab Number: L1745363

Project Number: BEA99-2252

Report Date: 12/15/17

SAMPLE RESULTS

Lab ID: L1745363-05

Date Collected: 12/07/17 12:30

Client ID: MW-4

Date Received: 12/08/17

Sample Location: MASHPEE, MA

Field Prep: Not Specified

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Sodium, Total	31.7		mg/l	2.00	--	1	12/14/17 11:30	12/14/17 20:04	EPA 3005A	1,6010C	AB



Serial_No:12151712:13

Project Name: WINDCHIME

Lab Number: L1745363

Project Number: BEA99-2252

Report Date: 12/15/17

SAMPLE RESULTS

Lab ID: L1745363-06

Date Collected: 12/07/17 10:00

Client ID: PZ-1R

Date Received: 12/08/17

Sample Location: MASHPEE, MA

Field Prep: Not Specified

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Sodium, Total	9.35		mg/l	2.00	--	1	12/14/17 11:30	12/14/17 20:09	EPA 3005A	1,6010C	AB



Project Name: WINDCHIME

Lab Number: L1745363

Project Number: BEA99-2252

Report Date: 12/15/17

SAMPLE RESULTS

Lab ID: L1745363-07

Date Collected: 12/07/17 10:40

Client ID: PZ-2R

Date Received: 12/08/17

Sample Location: MASHPEE, MA

Field Prep: Not Specified

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Sodium, Total	51.4		mg/l	2.00	--	1	12/14/17 11:30	12/14/17 20:27	EPA 3005A	1,6010C	AB



Serial_No:12151712:13

Project Name: WINDCHIME

Lab Number: L1745363

Project Number: BEA99-2252

Report Date: 12/15/17

SAMPLE RESULTS

Lab ID: L1745363-08

Date Collected: 12/07/17 10:35

Client ID: PZ-3R

Date Received: 12/08/17

Sample Location: MASHPEE, MA

Field Prep: Not Specified

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Sodium, Total	7.97		mg/l	2.00	--	1	12/14/17 11:30	12/14/17 20:32	EPA 3005A	1,6010C	AB



Serial_No:12151712:13

Project Name: WINDCHIME

Lab Number: L1745363

Project Number: BEA99-2252

Report Date: 12/15/17

Method Blank Analysis Batch Quality Control

Parameter	Result Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-08 Batch: WG1072658-1									
Sodium, Total	ND	mg/l	2.00	--	1	12/14/17 11:30	12/14/17 18:36	1,6010C	AB

Prep Information

Digestion Method: EPA 3005A



Lab Control Sample Analysis Batch Quality Control

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1745363
Report Date: 12/15/17

Parameter	LCS		LCSD		%Recovery Limits		RPD	Qual	RPD Limits
Total Metals - Mansfield Lab	%Recovery	Qual	%Recovery	Qual	%Recovery	Limits			
Associated sample(s): 01-08 Batch: WG1072658-2									
Sodium, Total	102		-		80-120		-		

Matrix Spike Analysis

Batch Quality Control

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1745363
Report Date: 12/15/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Found	MSD %Recovery	MSD Qual	Recovery Limits	RPD Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-08 QC Batch ID: WG1072658-3 QC Sample: L1745363-01 Client ID: B-2R										
Sodium, Total	41.6	10	50.3	87	-	-	-	75-125	-	20

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Duplicate Analysis

Batch Quality Control

Lab Number: L1745363
Report Date: 12/15/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-08	QC Batch ID: WG1072658-4	QC Sample: L1745363-01	Client ID: B-2R			
Sodium, Total	41.6	41.1	mg/l	1		20

INORGANICS & MISCELLANEOUS

Serial_No:12151712:13

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1745363
Report Date: 12/15/17

SAMPLE RESULTS

Lab ID: L1745363-01
Client ID: B-2R
Sample Location: MASHPEE, MA
Matrix: Water

Date Collected: 12/07/17 14:40
Date Received: 12/08/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chloride	70.		mg/l	1.0	--	1	-	12/12/17 23:42	121,4500CL-E	TL
Nitrogen, Ammonia	0.154		mg/l	0.075	--	1	12/11/17 12:08	12/11/17 21:09	121,4500NH3-BH	AT
Nitrogen, Nitrite	ND		mg/l	0.050	--	1	-	12/09/17 01:07	121,4500NO3-F	MR
Nitrogen, Nitrate	0.763		mg/l	0.100	--	1	-	12/09/17 01:53	121,4500NO3-F	MR
Nitrogen, Total Kjeldahl	ND		mg/l	0.300	--	1	12/12/17 13:00	12/14/17 15:32	121,4500NH3-H	JO
Phosphorus, Total	ND		mg/l	0.010	--	1	12/11/17 13:15	12/12/17 12:57	121,4500P-E	SD
Phosphorus, Orthophosphate	ND		mg/l	0.005	--	1	-	12/09/17 03:58	121,4500P-E	UN



Serial_No:12151712:13

Project Name: WINDCHIME

Lab Number: L1745363

Project Number: BEA99-2252

Report Date: 12/15/17

SAMPLE RESULTS

Lab ID: L1745363-02

Date Collected: 12/07/17 13:45

Client ID: MW-3R

Date Received: 12/08/17

Sample Location: MASHPEE, MA

Field Prep: Not Specified

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chloride	57.		mg/l	1.0	--	1	-	12/12/17 23:43	121,4500CL-E	TL
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	12/11/17 12:08	12/11/17 21:12	121,4500NH3-BH	AT
Nitrogen, Nitrite	ND		mg/l	0.050	--	1	-	12/09/17 01:13	121,4500NO3-F	MR
Nitrogen, Nitrate	0.800		mg/l	0.100	--	1	-	12/09/17 01:13	121,4500NO3-F	MR
Nitrogen, Total Kjeldahl	ND		mg/l	0.300	--	1	12/12/17 13:00	12/14/17 15:33	121,4500NH3-H	JO
Phosphorus, Total	ND		mg/l	0.010	--	1	12/11/17 13:15	12/12/17 12:57	121,4500P-E	SD
Phosphorus, Orthophosphate	0.010		mg/l	0.005	--	1	-	12/09/17 03:59	121,4500P-E	UN



Serial_No:12151712:13

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1745363
Report Date: 12/15/17

SAMPLE RESULTS

Lab ID: L1745363-03
Client ID: MW-1
Sample Location: MASHPEE, MA
Matrix: Water

Date Collected: 12/07/17 11:45
Date Received: 12/08/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chloride	62.		mg/l	1.0	--	1	-	12/12/17 23:44	121,4500CL-E	TL
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	12/11/17 12:08	12/11/17 21:13	121,4500NH3-BH	AT
Nitrogen, Nitrite	ND		mg/l	0.050	--	1	-	12/09/17 01:15	121,4500NO3-F	MR
Nitrogen, Nitrate	1.13		mg/l	0.100	--	1	-	12/09/17 01:15	121,4500NO3-F	MR
Nitrogen, Total Kjeldahl	ND		mg/l	0.300	--	1	12/12/17 13:00	12/14/17 15:34	121,4500NH3-H	JO
Phosphorus, Total	0.010		mg/l	0.010	--	1	12/11/17 13:15	12/12/17 12:58	121,4500P-E	SD
Phosphorus, Orthophosphate	0.011		mg/l	0.005	--	1	-	12/09/17 03:59	121,4500P-E	UN



Serial_No:12151712:13

Project Name: WINDCHIME

Lab Number: L1745363

Project Number: BEA99-2252

Report Date: 12/15/17

SAMPLE RESULTS

Lab ID: L1745363-04

Date Collected: 12/07/17 13:05

Client ID: MW-2

Date Received: 12/08/17

Sample Location: MASHPEE, MA

Field Prep: Not Specified

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chloride	34.		mg/l	1.0	--	1	-	12/12/17 23:45	121,4500CL-E	TL
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	12/11/17 12:08	12/11/17 21:14	121,4500NH3-BH	AT
Nitrogen, Nitrite	ND		mg/l	0.050	--	1	-	12/09/17 01:16	121,4500NO3-F	MR
Nitrogen, Nitrate	14.7		mg/l	0.500	--	5	-	12/09/17 01:56	121,4500NO3-F	MR
Nitrogen, Total Kjeldahl	ND		mg/l	0.600	--	2	12/12/17 13:00	12/14/17 15:37	121,4500NH3-H	JO
Phosphorus, Total	1.70		mg/l	0.050	--	5	12/11/17 13:15	12/12/17 13:37	121,4500P-E	SD
Phosphorus, Orthophosphate	1.68		mg/l	0.010	--	2	-	12/09/17 04:00	121,4500P-E	UN



Serial_No:12151712:13

Project Name: WINDCHIME

Project Number: BEA99-2252

Lab Number: L1745363

Report Date: 12/15/17

SAMPLE RESULTS

Lab ID: L1745363-05

Client ID: MW-4

Sample Location: MASHPEE, MA

Matrix: Water

Date Collected: 12/07/17 12:30

Date Received: 12/08/17

Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chloride	52.		mg/l	1.0	--	1	-	12/12/17 23:46	121,4500CL-E	TL
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	12/11/17 12:08	12/11/17 21:18	121,4500NH3-BH	AT
Nitrogen, Nitrite	ND		mg/l	0.050	--	1	-	12/09/17 01:21	121,4500NO3-F	MR
Nitrogen, Nitrate	0.769		mg/l	0.100	--	1	-	12/09/17 01:21	121,4500NO3-F	MR
Nitrogen, Total Kjeldahl	ND		mg/l	0.300	--	1	12/12/17 13:00	12/14/17 15:38	121,4500NH3-H	JO
Phosphorus, Total	ND		mg/l	0.010	--	1	12/11/17 13:15	12/12/17 13:00	121,4500P-E	SD
Phosphorus, Orthophosphate	ND		mg/l	0.005	--	1	-	12/09/17 04:00	121,4500P-E	UN



Serial_No:12151712:13

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1745363
Report Date: 12/15/17

SAMPLE RESULTS

Lab ID: L1745363-06
Client ID: PZ-1R
Sample Location: MASHPEE, MA
Matrix: Water

Date Collected: 12/07/17 10:00
Date Received: 12/08/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chloride	13.		mg/l	1.0	--	1	-	12/12/17 23:46	121,4500CL-E	TL
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	12/13/17 15:00	12/13/17 20:57	121,4500NH3-BH	AT
Nitrogen, Nitrite	ND		mg/l	0.050	--	1	-	12/09/17 01:22	121,4500NO3-F	MR
Nitrogen, Nitrate	ND		mg/l	0.100	--	1	-	12/09/17 01:22	121,4500NO3-F	MR
Nitrogen, Total Kjeldahl	0.336		mg/l	0.300	--	1	12/12/17 13:00	12/14/17 15:41	121,4500NH3-H	JO
Phosphorus, Total	0.083		mg/l	0.010	--	1	12/12/17 11:00	12/13/17 09:56	121,4500P-E	SD
Phosphorus, Orthophosphate	ND		mg/l	0.005	--	1	-	12/09/17 04:01	121,4500P-E	UN



Serial_No:12151712:13

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1745363
Report Date: 12/15/17

SAMPLE RESULTS

Lab ID: L1745363-07
Client ID: PZ-2R
Sample Location: MASHPEE, MA
Matrix: Water

Date Collected: 12/07/17 10:40
Date Received: 12/08/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chloride	46.		mg/l	1.0	--	1	-	12/13/17 00:33	121,4500CL-E	TL
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	12/13/17 15:00	12/13/17 21:00	121,4500NH3-BH	AT
Nitrogen, Nitrite	ND		mg/l	0.050	--	1	-	12/09/17 01:24	121,4500NO3-F	MR
Nitrogen, Nitrate	9.16		mg/l	0.500	--	5	-	12/09/17 01:58	121,4500NO3-F	MR
Nitrogen, Total Kjeldahl	0.807		mg/l	0.600	--	2	12/12/17 13:00	12/14/17 15:42	121,4500NH3-H	JO
Phosphorus, Total	2.35		mg/l	0.025	--	2.5	12/12/17 11:00	12/13/17 09:57	121,4500P-E	SD
Phosphorus, Orthophosphate	2.16		mg/l	0.025	--	5	-	12/09/17 04:02	121,4500P-E	UN



Serial_No:12151712:13

Project Name: WINDCHIME

Lab Number: L1745363

Project Number: BEA99-2252

Report Date: 12/15/17

SAMPLE RESULTS

Lab ID: L1745363-08

Date Collected: 12/07/17 10:35

Client ID: PZ-3R

Date Received: 12/08/17

Sample Location: MASHPEE, MA

Field Prep: Not Specified

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chloride	7.7		mg/l	1.0	--	1	-	12/12/17 23:51	121,4500CL-E	TL
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	12/13/17 15:00	12/13/17 21:01	121,4500NH3-BH	AT
Nitrogen, Nitrite	ND		mg/l	0.050	--	1	-	12/09/17 02:04	121,4500NO3-F	MR
Nitrogen, Nitrate	ND		mg/l	0.100	--	1	-	12/09/17 02:04	121,4500NO3-F	MR
Nitrogen, Total Kjeldahl	0.355		mg/l	0.300	--	1	12/12/17 13:00	12/14/17 15:43	121,4500NH3-H	JO
Phosphorus, Total	2.38		mg/l	0.050	--	5	12/12/17 11:00	12/13/17 11:05	121,4500P-E	SD
Phosphorus, Orthophosphate	0.154		mg/l	0.005	--	1	-	12/09/17 04:03	121,4500P-E	UN



Serial_No:12151712:13

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1745363
Report Date: 12/15/17

SAMPLE RESULTS

Lab ID: L1745363-09
Client ID: SW-1
Sample Location: MASHPEE, MA
Matrix: Water

Date Collected: 12/07/17 10:05
Date Received: 12/08/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	12/13/17 15:00	12/13/17 21:02	121,4500NH3-BH	AT
Nitrogen, Nitrite	ND		mg/l	0.050	--	1	-	12/09/17 01:26	121,4500NO3-F	MR
Nitrogen, Nitrate	0.458		mg/l	0.100	--	1	-	12/09/17 01:26	121,4500NO3-F	MR
Nitrogen, Total Kjeldahl	0.454		mg/l	0.300	--	1	12/12/17 13:00	12/14/17 15:44	121,4500NH3-H	JO
Phosphorus, Total	0.025		mg/l	0.010	--	1	12/12/17 11:00	12/13/17 10:02	121,4500P-E	SD
Phosphorus, Orthophosphate	0.012		mg/l	0.005	--	1	-	12/09/17 04:03	121,4500P-E	UN



Serial_No:12151712:13

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1745363
Report Date: 12/15/17

SAMPLE RESULTS

Lab ID: L1745363-10
Client ID: SW-2
Sample Location: MASHPEE, MA
Matrix: Water

Date Collected: 12/07/17 10:50
Date Received: 12/08/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	12/13/17 15:00	12/13/17 21:02	121,4500NH3-BH	AT
Nitrogen, Nitrite	ND		mg/l	0.050	--	1	-	12/09/17 01:27	121,4500NO3-F	MR
Nitrogen, Nitrate	0.742		mg/l	0.100	--	1	-	12/09/17 01:27	121,4500NO3-F	MR
Nitrogen, Total Kjeldahl	ND		mg/l	0.300	--	1	12/12/17 13:00	12/14/17 15:45	121,4500NH3-H	JO
Phosphorus, Total	0.090		mg/l	0.010	--	1	12/12/17 11:00	12/13/17 10:03	121,4500P-E	SD
Phosphorus, Orthophosphate	0.066		mg/l	0.005	--	1	-	12/09/17 04:04	121,4500P-E	UN



Serial_No:12151712:13

Project Name: WINDCHIME

Project Number: BEA99-2252

Lab Number: L1745363

Report Date: 12/15/17

SAMPLE RESULTS

Lab ID: L1745363-11

Client ID: SW-3

Sample Location: MASHPEE, MA

Matrix: Water

Date Collected: 12/07/17 11:05

Date Received: 12/08/17

Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	12/13/17 15:00	12/13/17 21:03	121,4500NH3-BH	AT
Nitrogen, Nitrite	ND		mg/l	0.050	--	1	-	12/09/17 01:29	121,4500NO3-F	MR
Nitrogen, Nitrate	0.451		mg/l	0.100	--	1	-	12/09/17 01:29	121,4500NO3-F	MR
Nitrogen, Total Kjeldahl	ND		mg/l	0.300	--	1	12/12/17 13:00	12/14/17 15:46	121,4500NH3-H	JO
Phosphorus, Total	0.042		mg/l	0.010	--	1	12/12/17 11:00	12/13/17 10:05	121,4500P-E	SD
Phosphorus, Orthophosphate	0.016		mg/l	0.005	--	1	-	12/09/17 04:05	121,4500P-E	UN



Project Name: WINDCHIME

Lab Number: L1745363

Project Number: BEA99-2252

Report Date: 12/15/17

Method Blank Analysis Batch Quality Control

Parameter	Result Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab for sample(s): 01-11 Batch: WG1070796-1									
Nitrogen, Nitrate	ND	mg/l	0.100	--	1	-	12/08/17 23:59	121,4500NO3-F	MR
General Chemistry - Westborough Lab for sample(s): 01-11 Batch: WG1070797-1									
Nitrogen, Nitrite	ND	mg/l	0.050	--	1	-	12/09/17 00:02	121,4500NO3-F	MR
General Chemistry - Westborough Lab for sample(s): 01-11 Batch: WG1070854-1									
Phosphorus, Orthophosphate	ND	mg/l	0.005	--	1	-	12/09/17 03:56	121,4500P-E	UN
General Chemistry - Westborough Lab for sample(s): 01-05 Batch: WG1071262-1									
Phosphorus, Total	ND	mg/l	0.010	--	1	12/11/17 13:15	12/12/17 12:31	121,4500P-E	SD
General Chemistry - Westborough Lab for sample(s): 01-05 Batch: WG1071271-1									
Nitrogen, Ammonia	ND	mg/l	0.075	--	1	12/11/17 12:08	12/11/17 20:57	121,4500NH3-BH	AT
General Chemistry - Westborough Lab for sample(s): 06-11 Batch: WG1071608-1									
Phosphorus, Total	ND	mg/l	0.010	--	1	12/12/17 11:00	12/13/17 09:34	121,4500P-E	SD
General Chemistry - Westborough Lab for sample(s): 01-11 Batch: WG1071620-1									
Nitrogen, Total Kjeldahl	ND	mg/l	0.300	--	1	12/12/17 13:00	12/14/17 15:28	121,4500NH3-H	JO
General Chemistry - Westborough Lab for sample(s): 01-08 Batch: WG1071861-1									
Chloride	ND	mg/l	1.0	--	1	-	12/12/17 22:46	121,4500CL-E	TL
General Chemistry - Westborough Lab for sample(s): 06-11 Batch: WG1072185-1									
Nitrogen, Ammonia	ND	mg/l	0.075	--	1	12/13/17 15:00	12/13/17 20:43	121,4500NH3-BH	AT

Lab Control Sample Analysis

Batch Quality Control

Project Name: WINDCHIME

Project Number: BEA99-2252

Lab Number: L1745363

Report Date: 12/15/17

Parameter	LCS %Recovery	Qual	LCS %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab	Associated sample(s): 01-11	Batch: WG1070796-2						
Nitrogen, Nitrate	97	-			90-110	-		
General Chemistry - Westborough Lab	Associated sample(s): 01-11	Batch: WG1070797-2						
Nitrogen, Nitrite	104	-			90-110	-		
General Chemistry - Westborough Lab	Associated sample(s): 01-11	Batch: WG1070854-2						
Phosphorus, Orthophosphate	100	-			90-110	-		
General Chemistry - Westborough Lab	Associated sample(s): 01-05	Batch: WG1071262-2						
Phosphorus, Total	96	-			80-120	-		
General Chemistry - Westborough Lab	Associated sample(s): 01-05	Batch: WG1071271-2						
Nitrogen, Ammonia	98	-			80-120	-		20
General Chemistry - Westborough Lab	Associated sample(s): 06-11	Batch: WG1071608-2						
Phosphorus, Total	108	-			80-120	-		
General Chemistry - Westborough Lab	Associated sample(s): 01-11	Batch: WG1071620-2						
Nitrogen, Total Kjeldahl	91	-			78-122	-		

Lab Control Sample Analysis Batch Quality Control

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1745363
Report Date: 12/15/17

Parameter	LCS %Recovery	LCS %Recovery	LCS %Recovery	RPD	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-08 Batch: WG1071861-2					
Chloride	93	-	90-110	-	
General Chemistry - Westborough Lab Associated sample(s): 06-11 Batch: WG1072185-2					
Nitrogen, Ammonia	96	-	80-120	-	20

Matrix Spike Analysis Batch Quality Control

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1745363
Report Date: 12/15/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Qual	MSD Found	%Recovery	MSD Qual	Recovery Limits	RPD Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-11 QC Batch ID: WG1070796-4 QC Sample: L1745363-01 Client ID: B-2R											
Nitrogen, Nitrate	0.763	4	4.52	94	-	-	-	-	83-113	-	17
General Chemistry - Westborough Lab Associated sample(s): 01-11 QC Batch ID: WG1070797-4 QC Sample: L1745363-01 Client ID: B-2R											
Nitrogen, Nitrite	ND	4	3.82	96	-	-	-	-	80-120	-	20
General Chemistry - Westborough Lab Associated sample(s): 01-11 QC Batch ID: WG1070854-4 QC Sample: L1745363-01 Client ID: B-2R											
Phosphorus, Orthophosphate	ND	0.5	0.490	98	-	-	-	-	80-120	-	20
General Chemistry - Westborough Lab Associated sample(s): 01-05 QC Batch ID: WG1071262-3 QC Sample: L1745363-05 Client ID: MW-4											
Phosphorus, Total	ND	0.5	0.487	97	-	-	-	-	75-125	-	20
General Chemistry - Westborough Lab Associated sample(s): 01-05 QC Batch ID: WG1071271-4 QC Sample: L1745363-01 Client ID: B-2R											
Nitrogen, Ammonia	0.154	4	3.69	88	-	-	-	-	80-120	-	20
General Chemistry - Westborough Lab Associated sample(s): 06-11 QC Batch ID: WG1071608-3 QC Sample: L1744276-01 Client ID: MS Sample											
Phosphorus, Total	0.121	0.5	0.624	101	-	-	-	-	75-125	-	20
General Chemistry - Westborough Lab Associated sample(s): 01-11 QC Batch ID: WG1071620-4 QC Sample: L1745363-05 Client ID: MW-4											
Nitrogen, Total Kjeldahl	ND	8	7.17	90	-	-	-	-	77-111	-	24
General Chemistry - Westborough Lab Associated sample(s): 01-08 QC Batch ID: WG1071861-4 QC Sample: L1745253-02 Client ID: MS Sample											
Chloride	10	20	30	100	-	-	-	-	58-140	-	7
General Chemistry - Westborough Lab Associated sample(s): 06-11 QC Batch ID: WG1072185-4 QC Sample: L1745363-06 Client ID: PZ-1R											
Nitrogen, Ammonia	ND	4	3.72	93	-	-	-	-	80-120	-	20

Lab Duplicate Analysis

Batch Quality Control

Project Name: WINDCHIME
Project Number: BEA99-2252

Lab Number: L1745363
Report Date: 12/15/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s):	01-11	QC Batch ID: WG1070796-3	QC Sample: L1745363-01	Client ID: B-2R		
Nitrogen, Nitrate	0.763	0.786	mg/l	3		17
General Chemistry - Westborough Lab Associated sample(s):	01-11	QC Batch ID: WG1070797-3	QC Sample: L1745363-01	Client ID: B-2R		
Nitrogen, Nitrite	ND	ND	mg/l	NC		20
General Chemistry - Westborough Lab Associated sample(s):	01-11	QC Batch ID: WG1070854-3	QC Sample: L1745363-08	Client ID: PZ-3R		
Phosphorus, Orthophosphate	0.154	0.156	mg/l	1		20
General Chemistry - Westborough Lab Associated sample(s):	01-05	QC Batch ID: WG1071262-4	QC Sample: L1745363-05	Client ID: MW-4		
Phosphorus, Total	ND	ND	mg/l	NC		20
General Chemistry - Westborough Lab Associated sample(s):	01-05	QC Batch ID: WG1071271-3	QC Sample: L1745363-01	Client ID: B-2R		
Nitrogen, Ammonia	0.154	0.120	mg/l	25	Q	20
General Chemistry - Westborough Lab Associated sample(s):	06-11	QC Batch ID: WG1071608-4	QC Sample: L1744276-01	Client ID: DUP Sample		
Phosphorus, Total	0.121	0.126	mg/l	4		20
General Chemistry - Westborough Lab Associated sample(s):	01-11	QC Batch ID: WG1071620-3	QC Sample: L1745363-05	Client ID: MW-4		
Nitrogen, Total Kjeldahl	ND	ND	mg/l	NC		24
General Chemistry - Westborough Lab Associated sample(s):	01-08	QC Batch ID: WG1071861-3	QC Sample: L1745253-02	Client ID: DUP Sample		
Chloride	10	10	mg/l	0		7
General Chemistry - Westborough Lab Associated sample(s):	06-11	QC Batch ID: WG1072185-3	QC Sample: L1745363-06	Client ID: PZ-1R		
Nitrogen, Ammonia	ND	ND	mg/l	NC		20



Project Name: WINDCHIME
Project Number: BEA99-2252

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Report Date: 12/15/17

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler C
Custody Seal Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1745363-01A	Plastic 250ml unpreserved	C	7	7	2.5	Y	Absent		OPHOS-4500(2), CL-4500(28), NO3-4500(2), NO2-4500NO3(2) NA-Ti(180)
L1745363-01B	Plastic 250ml HNO3 preserved	C	<2	<2	2.5	Y	Absent		TKN-4500(28), TPHOS-4500(28), NH3-4500(28) OPHOS-4500(2), CL-4500(28), NO3-4500(2), NO2-4500NO3(2) NA-Ti(180)
L1745363-01C	Plastic 500ml H2SO4 preserved	C	<2	<2	2.5	Y	Absent		TKN-4500(28), TPHOS-4500(28), NH3-4500(28) OPHOS-4500(2), CL-4500(28), NO3-4500(2), NO2-4500NO3(2) NA-Ti(180)
L1745363-02A	Plastic 250ml unpreserved	C	7	7	2.5	Y	Absent		TKN-4500(28), TPHOS-4500(28), NH3-4500(28) OPHOS-4500(2), CL-4500(28), NO3-4500(2), NO2-4500NO3(2) NA-Ti(180)
L1745363-02B	Plastic 250ml HNO3 preserved	C	<2	<2	2.5	Y	Absent		TKN-4500(28), TPHOS-4500(28), NH3-4500(28) OPHOS-4500(2), CL-4500(28), NO3-4500(2), NO2-4500NO3(2) NA-Ti(180)
L1745363-02C	Plastic 500ml H2SO4 preserved	C	<2	<2	2.5	Y	Absent		TKN-4500(28), TPHOS-4500(28), NH3-4500(28) OPHOS-4500(2), CL-4500(28), NO3-4500(2), NO2-4500NO3(2) NA-Ti(180)
L1745363-03A	Plastic 250ml unpreserved	C	7	7	2.5	Y	Absent		TKN-4500(28), TPHOS-4500(28), NH3-4500(28) OPHOS-4500(2), CL-4500(28), NO3-4500(2), NO2-4500NO3(2) NA-Ti(180)
L1745363-03B	Plastic 250ml HNO3 preserved	C	<2	<2	2.5	Y	Absent		TKN-4500(28), TPHOS-4500(28), NH3-4500(28) OPHOS-4500(2), CL-4500(28), NO3-4500(2), NO2-4500NO3(2) NA-Ti(180)
L1745363-03C	Plastic 500ml H2SO4 preserved	C	<2	<2	2.5	Y	Absent		TKN-4500(28), TPHOS-4500(28), NH3-4500(28) OPHOS-4500(2), CL-4500(28), NO3-4500(2), NO2-4500NO3(2) NA-Ti(180)
L1745363-04A	Plastic 250ml unpreserved	C	7	7	2.5	Y	Absent		TKN-4500(28), TPHOS-4500(28), NH3-4500(28) OPHOS-4500(2), CL-4500(28), NO3-4500(2), NO2-4500NO3(2) NA-Ti(180)
L1745363-04B	Plastic 250ml HNO3 preserved	C	<2	<2	2.5	Y	Absent		TKN-4500(28), TPHOS-4500(28), NH3-4500(28) OPHOS-4500(2), CL-4500(28), NO3-4500(2), NO2-4500NO3(2) NA-Ti(180)
L1745363-04C	Plastic 500ml H2SO4 preserved	C	<2	<2	2.5	Y	Absent		TKN-4500(28), TPHOS-4500(28), NH3-4500(28) OPHOS-4500(2), CL-4500(28), NO3-4500(2), NO2-4500NO3(2) NA-Ti(180)
L1745363-05A	Plastic 250ml unpreserved	C	7	7	2.5	Y	Absent		TKN-4500(28), TPHOS-4500(28), NH3-4500(28) OPHOS-4500(2), CL-4500(28), NO3-4500(2), NO2-4500NO3(2) NA-Ti(180)
L1745363-05B	Plastic 250ml HNO3 preserved	C	<2	<2	2.5	Y	Absent		TKN-4500(28), TPHOS-4500(28), NH3-4500(28) OPHOS-4500(2), CL-4500(28), NO3-4500(2), NO2-4500NO3(2) NA-Ti(180)
L1745363-05C	Plastic 500ml H2SO4 preserved	C	<2	<2	2.5	Y	Absent		TKN-4500(28), TPHOS-4500(28), NH3-4500(28) OPHOS-4500(2), CL-4500(28), NO3-4500(2), NO2-4500NO3(2) NA-Ti(180)
L1745363-06A	Plastic 250ml unpreserved	C	7	7	2.5	Y	Absent		TKN-4500(28), TPHOS-4500(28), NH3-4500(28) OPHOS-4500(2), CL-4500(28), NO3-4500(2), NO2-4500NO3(2) NA-Ti(180)
L1745363-06B	Plastic 250ml HNO3 preserved	C	<2	<2	2.5	Y	Absent		TKN-4500(28), TPHOS-4500(28), NH3-4500(28) OPHOS-4500(2), CL-4500(28), NO3-4500(2), NO2-4500NO3(2) NA-Ti(180)
L1745363-06C	Plastic 500ml H2SO4 preserved	C	<2	<2	2.5	Y	Absent		TKN-4500(28), TPHOS-4500(28), NH3-4500(28) OPHOS-4500(2), CL-4500(28), NO3-4500(2), NO2-4500NO3(2) NA-Ti(180)
L1745363-07A	Plastic 250ml unpreserved	C	7	7	2.5	Y	Absent		TKN-4500(28), TPHOS-4500(28), NH3-4500(28) OPHOS-4500(2), CL-4500(28), NO3-4500(2), NO2-4500NO3(2) NA-Ti(180)
L1745363-07B	Plastic 250ml HNO3 preserved	C	<2	<2	2.5	Y	Absent		TKN-4500(28), TPHOS-4500(28), NH3-4500(28) OPHOS-4500(2), CL-4500(28), NO3-4500(2), NO2-4500NO3(2) NA-Ti(180)
L1745363-07C	Plastic 500ml H2SO4 preserved	C	<2	<2	2.5	Y	Absent		TKN-4500(28), TPHOS-4500(28), NH3-4500(28) OPHOS-4500(2), CL-4500(28), NO3-4500(2), NO2-4500NO3(2) NA-Ti(180)



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Container Information			Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
Container ID	Container Type									
L1745363-08A	Plastic 250ml unpreserved		C	7	7	2.5	Y	Absent		OPHOS-4500(2), CL-4500(28), NO3-4500(2), NO2-4500NO3(2)
L1745363-08B	Plastic 250ml HNO3 preserved		C	<2	<2	2.5	Y	Absent		NA-Tl(180)
L1745363-08C	Plastic 500ml H2SO4 preserved		C	<2	<2	2.5	Y	Absent		TKN-4500(28), TPHOS-4500(28), NH3-4500(28)
L1745363-09A	Plastic 250ml unpreserved		C	7	7	2.5	Y	Absent		OPHOS-4500(2), NO3-4500(2), NO2-4500NO3(2)
L1745363-09C	Plastic 500ml H2SO4 preserved		C	<2	<2	2.5	Y	Absent		TKN-4500(28), TPHOS-4500(28), NH3-4500(28)
L1745363-10A	Plastic 250ml unpreserved		C	7	7	2.5	Y	Absent		OPHOS-4500(2), NO3-4500(2), NO2-4500NO3(2)
L1745363-10C	Plastic 500ml H2SO4 preserved		C	<2	<2	2.5	Y	Absent		TKN-4500(28), TPHOS-4500(28), NH3-4500(28)
L1745363-11A	Plastic 250ml unpreserved		C	7	7	2.5	Y	Absent		OPHOS-4500(2), NO3-4500(2), NO2-4500NO3(2)
L1745363-11C	Plastic 500ml H2SO4 preserved		C	<2	<2	2.5	Y	Absent		TKN-4500(28), TPHOS-4500(28), NH3-4500(28)



*Values in parentheses indicate holding time in days

Project Name: WINDCHIME
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GLOSSARY

Acronyms

EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCS D	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

- A** - Spectra identified as "Aldol Condensation Product".
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related

Report Format: Data Usability Report



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Data Qualifiers

projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- G** - The concentration may be biased high due to matrix interferences (i.e., co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- J** - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).
- ND** - Not detected at the reporting limit (RL) for the sample.

Project Name: WINDCHIME
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REFERENCES

- 1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IV, 2007.
- 121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility

EPA 624: m/p-xylene, o-xylene
EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), Methyl methacrylate, 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D: NPW: Dimethylnaphthalene, 1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene, 1,4-Diphenylhydrazine.
EPA 300: DW: Bromide
EPA 6860: NPW and SCM: Perchlorate
EPA 9010: NPW and SCM: Amenable Cyanide Distillation
EPA 9012B: NPW: Total Cyanide
EPA 9050A: NPW: Specific Conductance
SM3500: NPW: Ferrous Iron
SM4500: NPW: Amenable Cyanide, Dissolved Oxygen; SCM: Total Phosphorus, TKN, NO₂, NO₃.
SM5310C: DW: Dissolved Organic Carbon

Mansfield Facility

SM 2540D: TSS
EPA 3005A NPW
EPA 8082A: NPW: PCB: 1, 5, 31, 87, 101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water

EPA 300.0: Nitrate-N, Fluoride, Sulfate; EPA 353.2: Nitrate-N, Nitrite-N; SM4500NO₃-F: Nitrate-N, Nitrite-N; SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B
EPA 332: Perchlorate; EPA 524.2: THMs and VOCs; EPA 504.1: EDB, DBCP.
Microbiology: SM9215B; SM9223-P/A, SM9223B-Colilert-QT, SM9222D.

Non-Potable Water

SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH₃-BH, EPA 350.1: Ammonia-N, LACHAT 10-107-06-1-B: Ammonia-N, SM4500NO₃-F, EPA 353.2: Nitrate-N, EPA 351.1, SM4500P-E, SM4500P-B, E, SM4500SO₄-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D.
EPA 624: Volatile Halocarbons & Aromatics,
EPA 608: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625: SVOC (Acid/Base/Neutral Extractables), EPA 600/4-81-045: PCB-Oil.
Microbiology: SM9223B-Colilert-QT; Enterolert-QT, SM9221E.

Mansfield Facility:

Drinking Water

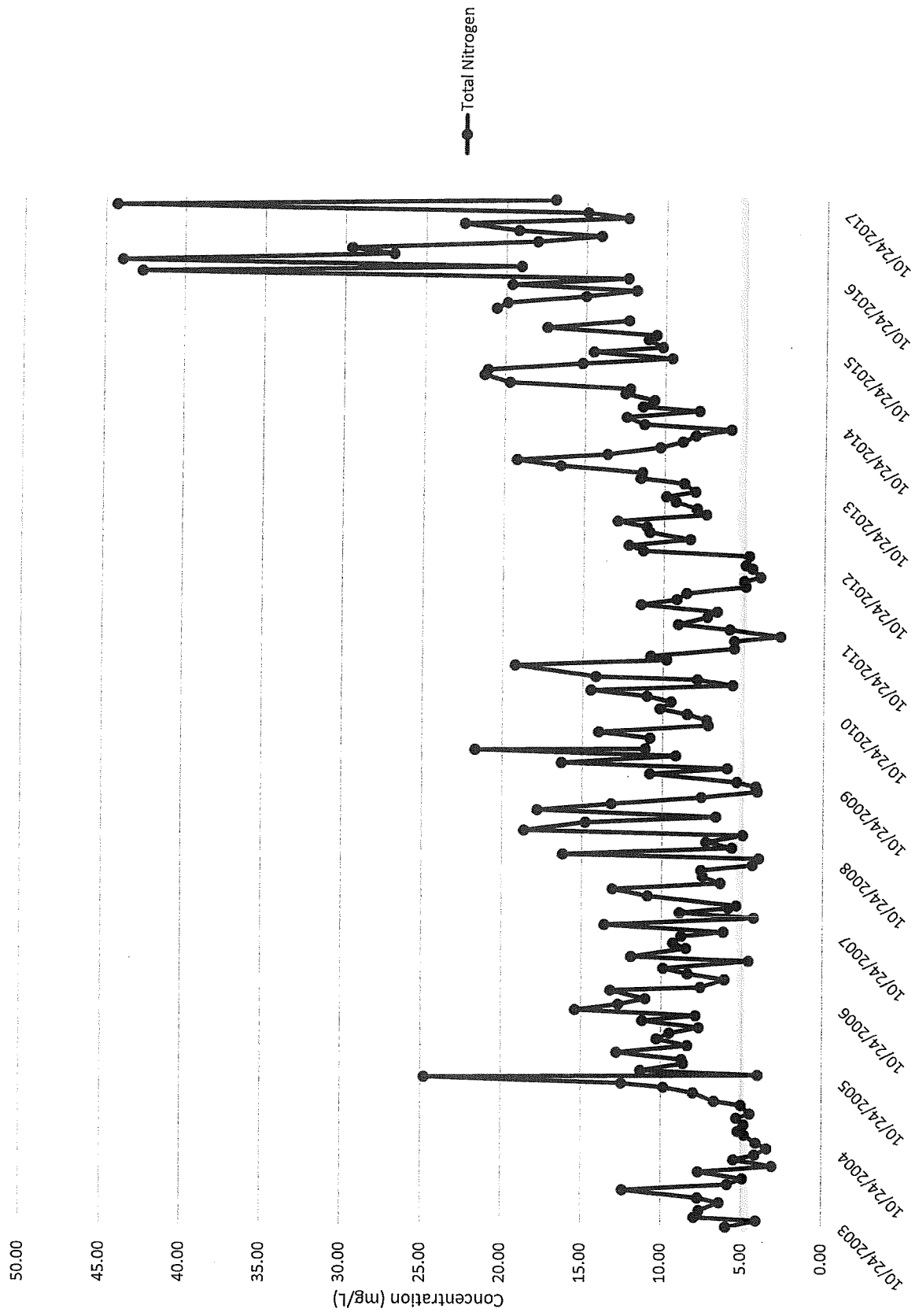
EPA 200.7: Ba, Be, Cd, Cr, Cu, Ni, Na, Ca. EPA 200.8: Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Ni, Se, TL. EPA 245.1 Hg.

Non-Potable Water

EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

Total Nitrogen



APPENDIX E

BENNETT ENVIRONMENTAL ASSOCIATES, INC.

LICENSED SITE PROFESSIONALS • ENVIRONMENTAL SCIENTISTS • GEOLOGISTS • ENGINEERS

1573 Main Street - P.O. Box 1743, Brewster, MA 02631 • 508-896-1706 • Fax 508-896-5109 • www.bennett-ea.com

QUALITY ASSURANCE & QUALITY CONTROL PROGRAM

Quality Assurance & Quality Control Program
For Soil and Groundwater Sampling

INTRODUCTION

The Quality Assurance & Quality Control (QA/QC) Program outlines the purpose, policies, organization and operations to support sampling work conducted by BENNETT ENVIRONMENTAL ASSOCIATES, INC. The procedures and protocols represented herein are consistent with the MA DEP "Standard References for Monitor Wells" [WSC-310-91], the EPA's low-flow SOP [EQASOP-GW001], and the recommendations of a MA certified laboratory. Implementation of this program will help to ensure the validity of data used to provide professional engineering and environmental opinions to clients.

The following definitions are used in the QA/QC Program:

Quality Assurance refers to the concepts used in defining a system for verifying and maintaining a desired level of quality in a product or process.

Quality Control is a specific, step-by-step description of how the Quality Assurance Program will be carried out.

This QA/QC Program guides field sampling activities. Project specific QA/QC Programs are adopted when warranted. Modifications to the QA/QC Program may be made only after specific approval by the QA/QC Officer (Project Manager).

The specific objectives of the QA/QC Program are to:

1. Specify the level of quality of each field procedure used in collecting samples;
2. Identify deficiencies in field procedures which might affect the quality of data; and
3. Require sufficient documentation to verify the credibility of the sampling methods employed.

PROGRAM ORGANIZATION AND RESPONSIBILITY

The Project Manager of BENNETT ENVIRONMENTAL ASSOCIATES, INC. is responsible for the quality of work produced. The Project Manager directs the QA/QC Program to document the control of field efforts and resulting data. In this capacity, the Project Manager is expected to do the following:

1. Prepare detailed QC plans;
2. Obtain analytical and sampling procedures reference materials;
3. Ensure that all field test and measurement equipment is maintained and calibrated properly;
4. Monitor quality assurance activities to ensure conformance with authorized policies and procedures, sound practices and to recommend improvements as necessary;
5. Ensure that all field sampling is conducted in accordance with guidelines contained herein;
6. Oversee all field sampling efforts to detect conditions which might directly or indirectly jeopardize the utility of resulting analytical data, such as improper calibration of equipment or cross-contamination through improper storage of samples;
7. Ensure that sample handling procedures are adequate for the sample types received; and
8. Inspect the quality of purchased sampling materials.

SAMPLE MANAGEMENT, COLLECTION, AND PREPARATION

Introduction

Sample management and stringent documentation are essential for successful quality assurance. The procedures in this section are designed to ensure collection of samples which truly represent the matrix being sampled by eliminating trace levels of contaminants from external sources.

Sample Management

The management of samples, up to the point of delivery to the laboratory either by courier or in person, is under the supervision of the Project Manager, who will ensure that samples are collected, labeled, preserved, stored, and transported according to the prescribed methods. If significant deviations from the sampling protocol occur, resulting in a suspected compromise of the sample integrity, all samples collected during the sampling effort prior to correction of the procedure will be discarded and fresh samples collected.

Sample Collection

Groundwater

Groundwater samples will not be collected immediately following well development. Sufficient time will be allowed for groundwater to stabilize and approach chemical equilibrium with the well construction materials. Monitoring wells will be sampled in accordance with the following sampling procedures:

1. Identify the well and record the well number on the Monitoring Well Sampling Log (attached).
2. Open the well cap and measure total organic volatile (TOV) concentrations at the wellhead with the use of a portable photoionization detector. Record levels detected.
3. Measure groundwater level to the nearest 0.01 feet from the top of the well casing using a water level indicator. The water level measurement will be taken from a permanent reference point on the well casing. The indicator will be lowered into the well casing with care to provide for the least degree of disturbance to the water surface. The measurement of well depth will only be collected after sampling is completed to avoid the suspension of settled solids from the formation. Record water level on a Monitoring Well Sampling Log (attached). Water level indicators will be decontaminated between wells.
4. The volume of standing water in the well casing will be calculated and recorded on the Monitoring Well Sampling Log.
5. Purging and sampling should proceed in progression from least to most contaminated well, if known. A low-flow pump with a flow-through cell is preferred. The pump or tubing should be placed at the appropriate screened interval for the contaminant of concern being sampled. The pump is started at its lowest speed setting and slowly increased until discharge occurs. The water level indicator should be used to monitor drawdown within the well and the pump speed adjusted until there is little or no drawdown ($<0.3'$). Water level and pumping rates will be monitored every three to five minutes.
6. During well purging (at least three (3) well volumes), monitor indicator parameters: temperature, pH, conductivity and dissolved oxygen. These parameters are considered to be stabilized when three consecutive readings taken three to five minutes apart are within ± 0.1 for pH, $\pm 3\%$ for conductivity, and $\pm 10\%$ for dissolved oxygen. Upon stabilization, the concentration will be recorded on the Monitoring Well Sampling Log. Other sampling methods may be used with compound specific parameters used to determine stabilization.
7. Samples will be placed into laboratory sterilized and/or preserved, pre-labeled containers, taking care to minimize agitation of the sample [Refer to attached "Recommended Sample Containers..." Groundwater Analytical]. Volatile organic compound (VOC) samples will be collected first.
8. Samples will be logged in on an appropriate chain-of-custody form.
9. All groundwater samples will be stored in a cooler or refrigerator at approximately 4°C .

The following blanks may be collected as required:

Field blank: One field blank should be collected from each water source used for sampling equipment decontamination or for assisting well development procedures.

Equipment blank: One equipment blank should be collected prior to the commencement of field work from each set of sampling equipment used that day.

Trip blank: A trip blank is required to accompany each volatile sample shipment. These blanks are prepared by filling a 40-mL VOA vial with distilled/deionized water.

When sampling water for volatile compounds, care must be exercised to prevent loss of compound through evaporation and to control susceptibility to outside contamination. Precautionary measures include:

1. Avoiding engine exhaust, gasoline containers, degreasing solvents, solvent-laden rags and noncompatible decontamination agents;
2. Sampling bottles will only be opened at the time of sampling and quickly closed after collecting the sample, preventing aeration of the sample with the atmosphere or any other gas;
3. Slowly filling bottles to capacity with sample and securing cap without entraining air bubbles;
4. Inverting the bottle while tapping lightly to check for air bubbles;
5. Adding additional sample to eliminate air bubbles, if present. Repeating Steps 3 and 4;
6. Placing samples on ice (approximately 4° C) immediately after collection in a dark, dry location;
7. Segregating samples with a secondary barrier such as zip-lock bags, etc.; and
8. Analyzing samples as soon as possible within the specific holding times after collection.

Dedicated equipment is preferred. Where impractical or cost-prohibitive, pump tubing will be decontaminated as follows:

1. Pump non-phosphate detergent solution through system for two minutes.
2. Pump clean hot tap water through system for two minutes or until clear, whichever is longer.
3. Pump analyte-free water through system for two minutes.
4. Seal tubing ends; wrap and label with date of cleaning.

Soils

The procedures to be used when collecting and screening soil samples are outlined below:

1. Prior to sampling surficial soils, surface vegetation, rocks, leaves, and debris will be cleared from the sample point to allow collection of a clean soil sample. If surficial soil samples are to be collected, a hand trowel or shovel will be used. The sampling equipment will be decontaminated as outlined below.
2. Boring samples will be collected via drilling rig-operated split spoon procedures, direct-push shelby tubes, or from a hand held bucket auger. Soil samples collected from excavations or test pits will be collected directly with a decontaminated sampling device.
3. Soil samples collected for TOV screening will be placed in glass soil jars with aluminum foil placed under the screw cap. Samples will be allowed to warm to ambient temperature before screening or will be screened in a heated vehicle after warming. The jar will be shaken for fifteen seconds prior to warming and after warming to ensure proper headspace development. Total organic vapors will be measured via a portable photoionization detector (PID) and their concentration recorded either on a Geological Borehole Log or Field Response Log.
4. Soil samples will be collected into pre-labeled, laboratory sterilized and/or preserved jars and preserved in a cooler or refrigerator at approximately 4° C.
5. Sample containers will be marked to indicate sampling date, time, location, and depth. Samples will be logged in on appropriate chain-of-custody forms.
6. The stratigraphy of each soil boring and test pit excavation, and the construction of each monitoring well will be recorded by the on-site geologist on the appropriate Geologic Borehole Log (copy attached).

When sampling soils for volatile compounds, care must be exercised to prevent loss of compound and to control susceptibility to outside contamination. Precautionary measures include:

1. Avoiding engine exhaust, gasoline containers, degreasing solvents, solvent-laden rags and non-compatible decontamination agents;
2. Opening sampling bottles only at the time of sampling and quickly closing after collecting the sample;
3. Placing samples in appropriately preserved containers on ice (approximately 4° C) immediately after collection in a dark, dry location;
4. Segregating samples with a secondary barrier such as zip-lock bags, etc.; and
5. Analyzing sample as soon as possible within the specific holding times after collection.

Soil sampling equipment (shovel, auger, etc.) will be decontaminated between each sampling location with a potable water rinse, alconox soap wash, and a final potable water rinse.

Drilling and excavating apparatus (augers, rods, casing, core barrels, backhoe bucket, and other equipment coming in contact with the borehole or excavation) will be decontaminated between each boring and excavation. If necessary, an alconox soap wash followed by a steam cleaning will be included.

Sample Preservation

To prevent or retard the degradation/modification of chemicals in samples during transit and storage, the samples will be refrigerated at or below 4° C in appropriately preserved containers. Samples will be delivered to the laboratory by courier or by overnight delivery service.

DATA MANAGEMENT

Logging of Samples

The accountability of a sample begins when the sample is taken from its natural environment. Sample handling (chain-of-custody) records must be completed at the time of sampling. The following chain-of-custody procedure must be implemented by the Field Team Leader to assure sample integrity.

1. The samples are under custody of the Field Team Leader if:
 - a. they are in his (or her) possession;
 - b. they are in view after being in possession;
 - c. they are locked up or sealed securely to prevent tampering; or,
 - d. they are in a designated secure area.
2. The "original" of the sample handling form must accompany the samples at all times after collection. A copy of the sample handling form is kept by the Field Team Leader.
3. When possession of the samples is transferred, the individuals relinquishing and receiving will sign, date, and note the time on the chain-of-custody.

The chain-of-custody will contain information to distinguish each sample from any other sample. This information will include:

1. The project for which sampling is being conducted;
2. The matrix being samples (air, groundwater, soil, etc.);
3. The sampling date and time;

4. Field sample identification number and chain-of-custody identification number;
5. The number and type of containers and the type of preservative used (if any); and,
6. Signature of the person performing the sampling.

Each sample will be assigned a unique identification number or description, which will be marked on the sample container. The chain-of-custody will be forwarded to the laboratory with the samples. As a precaution against this record being lost or altered, the sampling personnel will retain a copy documenting all information up until the first change of sample custody. This record will be filed in the project folder as maintained by the Project Manager.

DISCLAIMER: The Quality Assurance and Quality Control Program outlined herein is intended as a field guidance document only and is not intended to represent techniques and requirements for all sampling procedures. While BENNETT ENVIRONMENTAL ASSOCIATES, INC. makes every effort to keep our QA/QC Program updated, this document should not be relied upon as a guarantee or warranty representing the most recent policies and techniques used. The United States Environmental Protection Agency and the Massachusetts Department of Environmental Protection should be consulted for sampling procedures relative to specific compounds, with specific reference to Policy #WSC-07-350 and Policy #WSC-10-320. All analytical data was generated pursuant to the MA DEP Compendium of Analytical Methods (CAM).

FORM SAMPLES

Phone: (508) 896-1706
Fax: (508) 896-5109

Job Name:	Date(s):	Time:	Title:

Location: _____

Job Number: _____

Sampler: _____

Measuring Point: _____

Ground Surface or T.O.C _____

[illegible]

NOTES: NA = Not Applicable; NE = Not Established; NT = Not Taken

BENNETT ENVIRONMENTAL ASSOCIATES, INC.
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1573 Main Street, P.O. Box 1743
Brewster, MA 02631

508-896-1706
fax 508-896-5109

MONITORING WELLS SAMPLING LOG
RESPIRATION ANALYSIS

Date(s) _____ Job Name _____

Location _____ Job Number _____

Sampler _____

Well Number	Total Depth of Well (feet)	Approx. Depth to Water (feet)	Standing Water Height (feet)	Length of screen above SWL	HNU PI-101 (ppm)	Methane (%CH ₄)	Oxygen (% O ₂)	Carbon Dioxide (%CO ₂)	Comments:

Notes:

Phone: (508) 896-1706
Fax: (508) 896-5109

Date(s): _____ Time: _____ Tide: _____

Job Number:

Measuring Point: Ground Surface or TOC

[illegible]

NOTES: NA = Not Applicable; NE = Not Established; NT = Not Taken

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Brewster, MA 02631

Phone: (508) 896-1706

Fax: (508) 896-5109

INSPECTORS DAILY RECORD OF WORK PROGRESS

Date:

REPORT NUMBER:

Job Name:

Job Number:

Feature:

Contractor: BEA

Type of Work:

Weather Conditions:

Temperature:

Contractor's Work Force (Indicate classification, including subcontractor personnel):

Bennett Environmental Associates:

Equipment in use or idled (Identify which):

Materials or equipment delivered, quantity or pay items placed:

Non-conforming materials or work, field problems, inspections of previously reported deficiencies:

Summary of construction activities:

BENNETT ENVIRONMENTAL ASSOCIATES, INC. 1573 Main St., P.O. Box 1743 Brewster, MA. 02631						Project Name: _____ Project Location: _____ Project Number: _____						Sheet _____ Boring No. _____ Location _____ Surface Elev. _____ Start Date _____ Finish Date _____ Driller _____ Inspector _____							
Groundwater Readings																			
Date				Reading				Type	Casing	Sampler	Core								
1								Size I.D.											
2								Hammer Wt.											
3								Hammer Fall											
Depth	Sample type-No.	Sampling Depth (ft)	Inches Pen	Rec	Blow Count 6"	TOV Reading	Soil Description									Well Specs	Interpreted Geology		
5-ft																			
	10-ft																		
15-ft																			
20-ft																			
25-ft																			
30-ft																			
35-ft																			
40-ft																			
45-ft																			
	Sand	<u>Cohesive Soils</u>				<u>Granular Soils</u>												<u>Sample Type</u>	
	Gravel	< 2 = very soft				< 4 = very loose				SS - split spoon				<u>NOTES:</u>					
	Silt	2-4 = soft				5-10 = loose				ST - shelby tube									
	Top/Sub Soil	4-8 = medium stiff				11-30 = medium				AF - auger flights									
	Clay	8-15 = stiff				30-50 = dense				RC - rock core									
	Peat	15-30 = very stiff				> 50 = very dense				MA - microliners									
	Fill	> 30 = hard								HA - hand auger									

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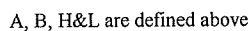
508-896-1706
fax 508-896-5109

Variable - Head Test

Type of Test: _____

Comments: _____

Ho = H-Xo (falling head)
or
xo-H (rising head)
Xo = X at t=0

[illegible]

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1573 Main Street, P.O. Box 1743
 Brewster, MA 02631

(508) 896-1706
 fax (508) 896-5109

SIEVE ANALYSIS DATA AND COMPUTATION SHEET

Date: _____ Sheet _____ of _____
 Job Name: _____ Job Number: _____
 Sample Number: _____
 Sample Collected By: _____ Sample Tested By: _____
 Notes: _____

SIEVE OPENING IN MILLIMETERS	SIEVE MESH	WEIGHT RETAINED IN GRAMS (Cumulative)	PERCENT RETAINED (Cumulative)	CUMULATIVE PERCENT FINER	PROJECT MANUAL SPECIFICATION (USCS)
2.36	8				Fine gravel
2.0	10				V. Fine Gravel
1.0	18				V. Coarse Sand
.5	35				Coarse Sand
.25	60				Medium Sand
.125	100				Fine Sand
.075	200				V. Fine Sand
PAN	PAN				Silty/Clay
PASSED MESH SIEVE TOTAL					

Sample Weight Wet: _____

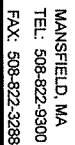
Sample Weight Dry: _____

Percent Moisture: _____

Sample Weight Passed Through Sieves: _____

Job Name:		Job Number:		Date:		
Location:		Weather:		Start Date:		
Witness:						
Pump & Flow Rate:						
Time (sec.)	Time	Location: Depth to Water	TOC: Draw Down	Location: Depth to Water	TOC: Draw Down	NOTES: pH/Cond/Temp.
1	0					
2						
3						
4						
5						
6						
7						
8						
9						
15						
30						
(sec.) 45						
(min.) 1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
20						
30						
40						
50						
60						
70						
80						
90						
100						
190						
280						
370						
460						
550						
640						
730						
820						
910						
1000						

TECHNICAL REFERENCE



PAGE _____ OF _____

ALPHA Job #:

Billing Information

☐ Same as Client info

Project Manager:

Turn-Around Time

☐ Standard ☐ RUSH (only confirmed if pre-approved!)

Time:

Other Project Specific Requirements/Comments/Detection Limits

If MS is required, indicate in Sample Specific Comments which samples and what tests MS to be performed.
(Note: All CAM methods for inorganic analyses require MS every 20 soil samples)

(Note: All *CAM* methods for inorganic analyses require MS every 20 soil samples)

Sample ID

Collection	
Date	Time

Sample Matrix

**Sampler's
Initials**

ANALYSIS

<input type="checkbox"/> Yes	<input type="checkbox"/> No	Are MCP Analytical Methods Required?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Is Matrix Spike (MS) Required on this SDG? (If yes see note in Comments).
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Are CT RCP (Reasonable Confidence Protocols) Required?

MA MCP PRESUMPTIVE CERTAINTY ... CT REASONABLE CONFIDENCE PROTO

State / Fed Program

Criteria

ALPHA Job #:

Billing Information

<input type="checkbox"/> Same as Client info	PO #:
--	-------

PO#:

SAMPLE HANDLING

Filtration_____

☐ Done☐ Not needed

☐ Lab to do

Preservation

☐ Lab to do

(Please specify below)

Sample Specific Comments

ТОТАЛ # БОТТИ

PLEASE ANSWER QUESTIONS ABOVE!

IS YOUR PROJECT MAMCP or CT RCP?

FORM NO: 01-01 (rev. 18-Jan-2010)

Relinquished By:

Date/Time

Received By:

Date/Time

Please print clearly, legibly and com-

pletely. Samples can not be logged

in and turnaround time clock will not

start until any ambiguities are resolved

All samples submitted are subject to

Alpha's Terms and Conditions.

See reverse side.

Aqueous Sample Reference Guide

Analyses	Methods	Container Type	Recommended Quantity	Preservative	Holding Time
INORGANICS					
Alkalinity	310.1, SM2320B	Plastic	250 ml	4° C	14 Days
Ammonia	350.1, SM4500NH ₃ -BH	Plastic	250 ml	H ₂ SO ₄ , pH<2, 4° C	28 Days
Biological Oxy	405.1, SM5210B	Plastic	500 ml	4° C	48 Hours
Chemical Oxygen Demand (COD)	410.4, SM5220D	Plastic	250 ml	H ₂ SO ₄ , pH<2, 4° C	28 Days
Chloride	325.2, 9251, 300.0, SM4500Cl-E	Plastic	250 ml	4° C	28 Days
Cyanide	335.2, 335.1, 9010B, SM4500CN-CE, MADEP	Plastic	250 ml	NaOH, pH>12, 4° C	14 Days
Fluoride	300.0, 340.2, SM4500F-B, BC	Plastic	500 ml	4° C	28 Days
Formaldehyde	8315, PCAM (Mod.)	Amber Glass	1000 ml	4° C	72 Hours
Hexavalent Chromium (Cr ⁺⁶)	7196A, SM3500Cr-D	Plastic	500 ml	4° C	24 Hours
MBAS	425.1, SM5540C	Plastic	1000 ml	4° C	48 Hours
Nitrate	300.0, 353.2, SM4500NO ₃ -F	Plastic	250 ml	4° C	48 Hours
Nitrate/Nitrite	353.2, SM4500NO ₃ -F	Plastic	250 ml	H ₂ SO ₄ , pH<2, 4° C	28 Days
Nitrite	300.0, 353.2, 354.1, SM4500NO ₃ -F, SM4500NO ₂ -B	Plastic	250 ml	4° C	48 Hours
Nitrogen, Total Kjeldahl (TKN)	353.3/1 (Modified), SM4500Norg-C	Plastic	250 ml	H ₂ SO ₄ , pH<2, 4° C	28 Days
Oil & Grease	1664	Amber Glass	(2) 1000 ml	HCl, pH<2, 4° C	28 Days
pH	150.1, 9040B	Plastic	250 ml	4° C	Immediate
Phosphorous, Total	365.2, SM4500P-E	Plastic	250 ml	H ₂ SO ₄ , pH<2, 4° C	28 Days
Solids, Total (TS)	160.3, 2540B	Plastic	250 ml	4° C	7 Days
Solids, Total Dissolved (TDS)	160.1, SM2540C	Plastic	500 ml	4° C	7 Days
Solids, Total Suspended Solids (TSS)	160.2, SM2540D	Plastic	1000 ml	4° C	7 Days
Solids, Total Volatile	160.4, SM2540E	Plastic	500 ml	4° C	7 Days
Sulfate	375.4, 9038, SM4500SO ₄ -E, 300.0	Plastic	250 ml	4° C	28 Days
Sulfide	376.2, 9030B, SM4500S ₂ -AD	Plastic	(2) 250 ml	ZnOAC, NaOH, pH>9, 4° C	7 Days
Total Metals	200.7, 200.8, 6010B, 6020, 7000A	Plastic	500 ml	HNO ₃ , pH<2, 4° C	180 Days, Hg 28 days
Total Organic Carbon (TOC)	415.1, 9060, SM5310C	Amber Glass	(2) 40 ml VOA Vials	H ₂ SO ₄ , pH<2, 4° C	28 Days
Total Phenol	420.1, 9065, SM510ABC	Amber Glass	(2) 1000 ml	H ₂ SO ₄ , pH<2, 4° C	28 Days
Total Residual Chlorine	330.1, SM4500Cl-D	Plastic	500 ml	4° C	24 Hours
Turbidity	180.1, SM2130B	Plastic	500 ml	4° C	48 Hours
VOLATILE ORGANICS BY GC/MS					
Volatile Organics	524.2	Amber Glass Teflon Lined	(2) 40 ml VOA Vials	Ascorbic Acid HCL, pH<2, 4° C	14 Days
Volatile Organics	624	Amber Glass Teflon Lined	(2) 40 ml VOA Vials	Na ₂ S ₂ O ₃ , 4° C	7 Days
Volatile Organics	8260B	Amber Glass Teflon Lined	(2) 40 ml VOA Vials	HCL, pH<2, 4° C	14 Days
EXTRACTABLE ORGANICS BY GC/MS					
Acid/Base Neutral Extractables (ABN)	8270C	Amber Glass Teflon Lined	(2) 1000 ml	4° C	7 Days (Extraction)
Acid/Base Neutral Extractables (ABN)	625	Amber Glass Teflon Lined	(2) 1000 ml	Na ₂ S ₂ O ₃ , 4° C	7 Days (Extraction)
Polynuclear Aromatic Hydrocarbons (PAH)	625	Amber Glass Teflon Lined	(2) 1000 ml	Na ₂ S ₂ O ₃ , 4° C	7 Days (Extraction)
Polynuclear Aromatic Hydrocarbons (PAH)	8270C, 8270C-SIM	Amber Glass Teflon Lined	(2) 1000 ml	4° C	7 Days (Extraction)
EXTRACTABLE ORGANICS BY GC					
Pesticides (Organochlorine)	8081A	Amber Glass Teflon Lined	(2) 1000 ml	4° C	7 Days (Extraction)
Pesticides (Organochlorine)	608	Amber Glass Teflon Lined	(2) 1000 ml	Na ₂ S ₂ O ₃ , 4° C	7 Days (Extraction)
PCBs	8082	Amber Glass Teflon Lined	(2) 1000 ml	4° C	7 Days (Extraction)
PCBs	608	Amber Glass Teflon Lined	(2) 1000 ml	Na ₂ S ₂ O ₃ , 4° C	7 Days (Extraction)
Chlorinated Herbicides	8151A	Amber Glass Teflon Lined	(2) 1000 ml	4° C	7 Days (Extraction)

PETROLEUM HYDROCARBONS

MA-DEP EPH	EPH-04-1	Amber Glass Teflon Lined	(2) 1000 ml	HCl, pH<2, 4° C	14 Days (Extraction)
MA-DEP VPH	VPH-04-1.1	Amber Glass Teflon Lined	(2) 40 ml VOA Vials	HCl, pH<2, 4° C	14 Days
CT ETPH	CT ETPH	Amber Glass Teflon Lined	(2) 1000 ml	4° C	7 Days (Extraction)
TPH - Oil & Grease	EPA 1664	Amber Glass Teflon Lined	(2) 1000 ml	HCl, pH<2, 4° C	28 Days
ME DEP TPH DRO	ME 4.1.25	Amber Glass Teflon Lined	(2) 1000 ml	HCl, pH<2, 4° C	7 Days (Extraction)
ME DEP TPH GRO	ME 4.2.17	Amber Glass Teflon Lined	(2) 40 ml VOA Vials	HCl, pH<2, 4° C	14 Days
TPH-DRO	8015B	Amber Glass Teflon Lined	(2) 1000 ml	4° C	7 Days (Extraction)
TPH-GRO	8015B	Amber Glass Teflon Lined	(2) 40 ml VOA Vials	HCl, pH<2, 4° C	14 Days
TPH GC/FID Quantitation only	8015B (M)	Amber Glass Teflon Lined	(2) 1000 ml	4° C	7 Days (Extraction)
Petroleum Hydrocarbon Identification (PHI)	8015B (M)	Amber Glass Teflon Lined	(2) 1000 ml	4° C	7 Days (Extraction)

Soil/Solid Sample Reference Guide

Analyses	Methods	Container Type	Recommended Quantity	Preservative	Holding Time
INORGANICS					
Cyanide	9010B, SM4500CN-CE, MADEP	Amber Glass	4 oz Container	4° C	14 Days
Hexavalent Chromium (Cr ⁶⁺)	7196A	Amber Glass	4 oz Container	4° C	30 Days
Mercury	7471A	Amber Glass	4 oz Container	4° C	28 Days
Metals	6010B, 6020, 7000A	Amber Glass	8 oz Container	4° C	180 Days
pH	9045C	Amber Glass	4 oz Container	4° C	Immediate
Total Organic Carbon (TOC)	LK (Lloyd Kahn Method)	Amber Glass	4 oz Container	4° C	14 Days
Total Phenol	9065	Amber Glass	4 oz Container	4° C	28 Days
VOLATILE ORGANICS BY GC/MS					
Volatile Organics	8260, 5035, (High Level)	40 ml Amber VOA Vial	15 Grams	MeOH, 4° C	14 Days
Volatile Organics	8260, 5035, (Low Level)	(2) 40 ml Amber VOA	5 Grams	NaSO ₄ , 4° C	14 Days
Volatile Organics	8260, 5035, (Low Level)	(2) 40 ml Amber VOA	5 Grams	Water, 4° C	48 Hours
EXTRACTABLE ORGANICS BY GC/MS					
Acid/Base Neutral Extractables (ABN)	8270C	Amber Glass Teflon Lined	4 oz Container	4° C	14 Days (Extraction)
Polynuclear Aromatic Hydrocarbons (PAH)	8270C, 8270C-SIM	Amber Glass Teflon Lined	4 oz Container	4° C	14 Days (Extraction)
EXTRACTABLE ORGANICS BY GC					
Pesticides (Organochlorine)	8081A	Amber Glass Teflon Lined	4 oz Container	4° C	14 Days (Extraction)
PCBs	8082	Amber Glass Teflon Lined	4 oz Container	4° C	14 Days (Extraction)
Chlorinated Herbicides	8151A	Amber Glass Teflon Lined	4 oz Container	4° C	14 Days (Extraction)
PETROLEUM HYDROCARBONS					
MA-DEP EPH	EPH-04-1	Amber Glass Teflon Lined	4 oz Container	4° C	14 Days (Extraction)
MA-DEP VPH	VPH-04-1.1	40 ml Amber VOA Vial	15 Grams	MeOH, 4° C	28 Days
TPH-8100M	GC-FID Qualitative Fingerprint	Amber Glass Teflon Lined	4 oz Container	4° C	14 Days (Extraction)
CT ETPH	CT ETPH	Amber Glass Teflon Lined	4 oz Container	4° C	14 Days (Extraction)
TPH - Oil & Grease	EPA 1664	Amber Glass Teflon Lined	4 oz Container	4° C	28 Days
ME DEP TPH DRO	ME 4.1.25	Amber Glass Teflon Lined	4 oz Container	4° C	14 Days (Extraction)
ME DEP TPH GRO	ME 4.2.17	40 ml Amber VOA Vial	15 Grams	MeOH, 4° C	14 Days
TPH-DRO	8015B	Amber Glass	4 oz Container	4° C	14 Days (Extraction)
TPH-GRO	8015B	40 ml Amber VOA Vial Amber Glass	15 Grams	MeOH, 4° C	14 Days
TPH GC/FID Quantitation only	8015B (M)	Amber Glass Teflon Lined	4 oz Container	4° C	14 Days (Extraction)
Petroleum Hydrocarbon Identification (PHI)	8015B (M)	Amber Glass Teflon Lined	4 oz Container	4° C	14 Days (Extraction)
TCLP					
Volatiles	1311, 8260B	Large Amber Glass VOA Vial Teflon Lined	8 oz Container	4° C	14 Days (Extraction)
Semivolatiles	1311, 8270C, 8081A, 8151A	Amber Glass Teflon Lined	8 oz Container	4° C	14 Days (Extraction)
Metals	1311, 6010B, 6020, 7000A	Amber Glass	8 oz Container	4° C	180 Days (Extraction)
Mercury	1311, 7470A	Amber Glass	8 oz Container	4° C	28 Days (Extraction)

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STANDARD REFERENCES FOR MONITORING WELLS

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SECTION 1.2 TABLE OF CONTENTS

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U.S. ENVIRONMENTAL PROTECTION AGENCY REGION I

LOW STRESS (low flow) PURGING AND SAMPLING PROCEDURE FOR THE COLLECTION OF GROUNDWATER SAMPLES FROM MONITORING WELLS

Quality Assurance Unit
U.S. Environmental Protection Agency – Region 1
11 Technology Drive
North Chelmsford, MA 01863

The controlled version of this document is the electronic version viewed on-line only. If this is a printed copy of the document, it is an uncontrolled version and may or may not be the version currently in use.

This document contains direction developed solely to provide guidance to U.S. Environmental Protection Agency (EPA) personnel. EPA retains the discretion to adopt approaches that differ from these procedures on a case-by-case basis. The procedures set forth do not create any rights, substantive or procedural, enforceable at law by party to litigation with EPA or the United States.

Prepared by: Charles Porfert 11/19/10
(Charles Porfert, Quality Assurance Unit) Date

Approved by: Gerard Sotolongo 1-19-10
(Gerard Sotolongo, Quality Assurance Unit) Date

EQASOP-GW 001
Region 1 Low-Stress
(Low-Flow) SOP
Revision Number: 3
Date: July 30, 1996
Revised: January 19, 2010
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Revision Page

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Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

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

Charles D. Baker
Governor

Karyn E. Polito
Lieutenant Governor

Matthew A. Beaton
Secretary

Martin Suuberg
Commissioner

September 22, 2017

John E. Shaffer
Marcus, Errico, Emmer & Brooks, P.C.
45 Braintree Hill Office Park
Suite 107
Braintree, Massachusetts 02184

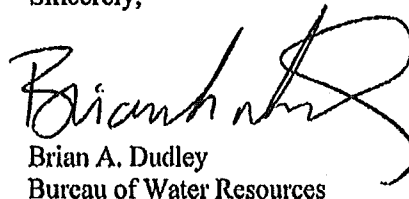
RE: MASHPEE: Windchime Condominium
Wastewater Treatment Facility
Permit No.: 263-3M1
Transmittal No. X267747

Dear Mr. Witter:

In connection with the referenced matter, enclosed is your copy of the fully executed Escrow Agreement.

Should you have any questions regarding this matter, please contact Christos Dimisioris at (508) 946-2736.

Sincerely,



Brian A. Dudley
Bureau of Water Resources

D/CD/
Enclosures

P:\12\263 - 3M1 - Mashpee - Windchime Condominium FAM cover letter.docx

**ESCROW AGREEMENT
FOR THE IMMEDIATE REPAIR AND/OR REPLACEMENT ACCOUNT
GROUNDWATER DISCHARGE PERMIT NO. 263 (3) AND ALL RENEWALS**

This Escrow Agreement is entered into by and between: the Massachusetts Department of Environmental Protection, a duly constituted agency of the Commonwealth of Massachusetts established pursuant to M.G.L. c. 21A, § 7 ("Department") having a principal office located at One Winter Street, Boston, Massachusetts 02108, and a

Southeast Regional Office located at
Regional Office
20 Riverside Drive Lakeville, Massachusetts 02347;
Street Address City/Town, State, Zip Code
Windchime Condominium Trust,
Permittee Name (hereinafter "Permittee")

having a principal place of business located at:

c/o American Properties Team, 500 Cummings Park, Suite 6050
Street Address
Woburn Massachusetts 01801;
City/Town State Zip Code

and A.P.T., having a principal place of business located at:
Escrow Agent

500 Cummings Park, Suite 6050
Street Address
Woburn, MA 01804.
City/Town, State, Zip Code

The Department, the Permittee, and the Escrow Agent are hereinafter collectively referred to as the "Parties."

Recitals

WHEREAS, on August , 1987 (date) the Department issued to the Permittee an individual Ground Water Discharge Permit or granted the Permittee coverage under a General Permit ("Permit");

WHEREAS, the Permit authorizes the Permittee to operate the Privately Owned Wastewater Treatment Facility ("PWTF") located at
Windchime Condominium, Great Neck Road, Mashpee, Massachusetts

and to discharge effluent from the PWTF to the ground water in accordance with the terms and conditions set forth therein;

WHEREAS, the Permit requires the Permittee to use a Department approved form to establish and maintain a financial assurance mechanism that provides for an immediate repair and replacement account to assure that funds will be available when needed for the immediate repair and/or replacement of the PWTF;

WHEREAS, this Escrow Agreement is the Department approved form to establish and maintain a financial assurance mechanism that provides for the immediate repair and replacement account required by the Permit. This Escrow Agreement defines the terms and conditions under which the immediate repair and replacement account will be held and disbursed;

WHEREAS, the Permit and the Ground Water Discharge Regulations established at 314 CMR 5.10(8) (I) and 314 CMR 5.15(5)(a) require that funds equal to 25% of the estimated construction cost of the PWTF be deposited in an interest bearing repair and replacement escrow account;

WHEREAS, the Parties agree that the estimated construction cost of the PWTF, including the treatment plant, the collection system, and associated mechanical equipment, is \$663,000.00;

WHEREAS, the amount required to be placed in the immediate repair and replacement escrow account is \$165,750.00 ("Required Escrow Amount"); and

WHEREAS, the Escrow Agent agrees to accept, hold, and disburse the escrow account funds and the earnings thereon in accordance with the terms of this Escrow Agreement.

NOW, THEREFORE, in consideration of the recitals above, the covenants and agreements set forth herein, and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the Parties agree as follows:

Escrow Account

1. Permittee shall deliver to the Escrow Agent, a third-party acting in a fiduciary capacity, the Required Escrow Amount of \$165,750.00 at least thirty (30) calendar days prior to

_____ date PWTF is expected to commence operation for new facilities or date of renewal or modification of an existing permit for existing facilities

An applicant or permittee may obtain additional time to establish the account, if a request is submitted to the Department providing sufficient justification for the extension and if the Department approves the request in writing.

2. Within two (2) business days of receipt of the Required Escrow Amount or additional funds pursuant to Paragraph 3 below, the Escrow Agent shall place the Required Escrow Amount in an interest bearing account ("Escrow Account") at

Eastern Bank
Name of Institution/Bank

located at Boston, Massachusetts ("Depository Bank").

All funds delivered by the Permittee to the Escrow Agent shall be deposited and held by the Escrow Agent in the Escrow Account # 192513139.

3. Within ninety (90) calendar days of any disbursement from the Escrow Account, the Permittee shall deliver additional funds to the Escrow Agent so that the amount available in the Escrow Account shall be no less than the Required Escrow Amount, provided that at no time may the Escrow Account incur a negative balance. An applicant or permittee may obtain additional time to replenish the account, if a request is submitted to the Department providing sufficient justification for the extension and if the Department approves the request in writing.

4. The Depository Bank shall be entitled to charge the Escrow Account for services related to maintenance of the Escrow Account at a rate not exceeding the Depository Bank's standard charges to other customers for similar services.

5. The Escrow Account shall be opened with the signature of the Escrow Agent indicating that checks drawn against the Escrow Account shall be signed by the Escrow Agent and by no other person. Disbursements shall be made from the Escrow Account only in accordance with the terms of this Agreement.

6. The Escrow Agent shall maintain a record of all deposits, income, disbursements, and other transactions concerning the Escrow Account. On or before January 15th of each year, the Escrow Agent shall provide to each of the Parties a written accounting of the initial and current balance as well as of all transactions that occurred during the prior calendar year. Upon request, the Parties shall have the right to inspect, at reasonable times, all books and records of the Escrow Agent relating to the Escrow Account, including, without limitation, all accounting and bank statements, checks, receipts, and disbursements. The Escrow Agent shall send a copy of such books and records to a Party within thirty (30) calendar days of a request.

7. The Escrow Agent shall keep in its possession all book(s) and records relating to the Escrow Account until such time as they are delivered to a successor Escrow Agent pursuant to Paragraph 16 below or to the Permittee and the Department pursuant to Paragraph 29 below.

Disbursements

8. The Escrow Agent shall make disbursements of the Escrow Account funds including any accrued interest only as follows:

(a) Seven (7) business days following receipt of written direction from the Permittee stating that funds held in the Escrow Account are required to pay for the immediate repair and/or replacement of the PWTF or any of its components, the Escrow Agent shall disburse such funds to the Permittee in accordance with the Permittee's written direction, unless the Department objects in writing to such disbursement prior to the seventh (7th) business day. The Permittee's written direction shall include invoice(s) evidencing the expenditure made or to be made. The Permittee shall simultaneously send a copy of the written direction including invoice(s) to the attention of the Department as set forth in Paragraph 15 below.

(b) The Escrow Agent shall disburse all funds in the Escrow Account to the Permittee within five (5) business days of receipt of a joint written direction from the Department and the Permittee that the Escrow Account funds are no longer required to fund the immediate repair and/or replacement of the PWT/P or any of its components.

(c) Notwithstanding Paragraphs 8(a) and (b) above, the Escrow Agent shall disburse the Escrow Account funds to the Permittee or the Department in accordance with any final order, judgment, or decree of a court of competent jurisdiction from which the Parties do not appeal or from which no further right of appeal exists.

(d) The Escrow Agent shall disburse funds to itself for services rendered in accordance with Paragraph 12 below.

Duties and Liabilities of Escrow Agent

9. The Escrow Agent shall have no liability or obligation with respect to the Escrow Account funds except for the Escrow Agent's willful misconduct, bad faith or gross negligence. The Escrow Agent shall be under no duty to: (a) pass upon the adequacy of any documents; (b) determine whether any of the Parties are complying with the terms and provisions of this Escrow Agreement; or (c) determine the identity or authority of any person purporting to be a signatory authorized by the Permittee or the Department.

10. The Escrow Agent may conclusively rely upon, and shall be protected in acting on, a statement, certificate, notice, requisition, order, approval, or other document believed by the Escrow Agent to be genuine and to have been given, signed and presented by a duly authorized agent of the Permittee or Department. The Escrow Agent shall have no duty or liability to verify any statement, certificate, notice, requisition, order, approval or other document and its sole responsibility shall be to act only as expressly set forth in this Escrow Agreement. The Escrow Agent shall not incur liability for following the instructions contemplated by this Escrow Agreement or expressly provided for in this Escrow Agreement. The Escrow Agent shall be under no obligation to institute or defend any action, suit, or proceeding in connection with this Escrow Agreement, unless first indemnified to its satisfaction. The Escrow Agent may consult with counsel of its choice including shareholders, directors and employees of the Escrow Agent, with respect to any question arising under or in connection with this Escrow Agreement.

11. The Escrow Agent may refrain from taking any action, other than keeping all property held by it in escrow if the Escrow Agent: (a) is uncertain about its duties or rights under this Escrow Agreement; or (b) receives instructions that, in its opinion, are in conflict with any of the terms and provisions of this Escrow Agreement, until it has resolved the conflict to its satisfaction, received a final judgment by a court of competent jurisdiction (if it seems such action necessary or advisable), or received instructions executed by both the Department and the Permittee.

Escrow Agent's Fee

12. The Escrow Agent shall be entitled to compensation from the Permittee for its services under this Escrow Agreement in accordance with the fee schedule attached to this Escrow Agreement as Exhibit A. The attached fee schedule constitutes full compensation to the Escrow Agent for services contemplated by this Escrow Agreement. The Escrow Agent is authorized to compensate itself from Escrow Account funds in accordance with the attached schedule following thirty (30) calendar days prior written notice to Permittee. The Escrow Account shall be replenished by the Permittee as required by Paragraph 3 above.

Investment Risk

13. In no event shall the Escrow Agent have any liability as a result of any loss occasioned by the financial difficulty or failure of any institution, including Depository Bank, or for failure of any banking institution, including Depository Bank, to follow the instructions of the Escrow Agent. Without limiting the generality of the foregoing, in no event shall the Escrow Agent incur any liability as the result of any claim or allegation that the Escrow Agent should have invested the escrow funds in United States Treasury Bills rather than hold same on deposit at the Depository Bank, or visa versa.

Notices

14. All notices, certifications, authorizations, requests, or other communications permitted or required under this Escrow Agreement shall be in writing and shall be deemed duly provided when deposited in the United States mail, postage prepaid, certified or registered mail, return receipt requested to the other Parties at the addresses set forth in Paragraph 15 below. In addition, the Parties may provide notice utilizing the alternate methods of hand delivery, Federal Express, or other recognized overnight courier. Notices provided by hand delivery, Federal Express or other recognized overnight courier shall be deemed duly provided when received at the addresses set forth in Paragraph 15 below.

15. All notices, certifications, authorizations, requests, or other communications permitted or required shall be delivered as follows:

To the Department:

To the Permittee:

Windchime Condominium Trust

c/o American Properties Team, 500 Cummings Park, Suite 6050

Woburn, Massachusetts 01801

To the Escrow Agent:

American Properties Team,

500 Cummings Park, Suite 6050

Woburn, MA 01801

or to such other place or to the attention of such other individual as a Party from time to time may designate by written notice to all other Parties.

Resignation, Removal and Successor Escrow Agent

16. If, for any reason, the Escrow Agent is unable or unwilling to continue to act as Escrow Agent, then it shall give written notice to the other Parties of its intent to resign as Escrow Agent. Within ten (10) business days following receipt of such notice, the Parties shall agree upon a successor escrow agent, formally appoint the successor escrow agent and provide written notification to the Escrow Agent of the subsequent appointment. Upon appointment, such successor escrow agent shall execute and deliver to its predecessor and to the Parties an instrument in writing accepting such appointment. Thereupon, without further action, such successor escrow agent shall be fully vested with all the rights, immunities, and powers, and shall be subject to all the duties and obligations of its predecessor. The predecessor Escrow Agent shall, within three (3) business days following receipt of the written acceptance of subsequent appointment, deliver to the Escrow Agent's successor all books and records, funds, and other property held by the Escrow Agent under the Escrow Agreement. Upon such delivery, all obligations of the Escrow Agent under this Escrow Agreement shall automatically terminate. If no successor Escrow Agent is designated within the prescribed ten (10) business day period, or if written acceptance of subsequent appointment is not received within such period, then the Escrow Agent's obligations under this Escrow Agreement shall continue unless otherwise agreed to by the Parties.

17. The Escrow Agent may be removed at any time by a written instrument or concurrent written instruments signed by the Department and the Permittee and delivered to the Escrow Agent.

18. If at any time the Escrow Agent shall resign, be removed, be dissolved, or otherwise become incapable of acting, or the position of the Escrow Agent shall become vacant for any reason, the Parties shall promptly appoint a successor Escrow Agent.

Interest

19. All interest income accrued on funds in the Escrow Account shall become part of the Escrow Account and shall remain in the Escrow Account. The Permittee shall be solely responsible for the payment of all federal and state taxes on accrued Escrow Account interest.

Miscellaneous

20. This Escrow Agreement constitutes the entire agreement between the Parties relating to the holding, investment, and disbursement of the Escrow Account funds, but not relating to the extension of the establishment of funds covered by Paragraph 1 and the extension of the replenishment of funds covered by paragraph 3 above.

21. This Escrow Agreement shall be binding upon, and shall inure to the benefit of the Parties hereto and their successors and assigns.

22. This Escrow Agreement shall be governed by and be construed and interpreted in accordance with the laws of the Commonwealth of Massachusetts without giving effect to the conflict of laws principles thereof.

23. This Escrow Agreement shall be interpreted as an instrument under seal.

24. This Escrow Agreement may be executed in any number of counterparts each of which shall constitute an original and all counterparts shall constitute one Agreement.

25. This Escrow Agreement may not be assigned, amended, altered, or modified except by written instrument duly executed by all the Parties.

26. The Permittee shall not transfer Groundwater Discharge Permit #263-3, and the Department shall not approve said transfer, unless and until the proposed new permittee establishes a new financial assurance mechanism that meets the requirements of said permit and 314 CMR 5.00, and/or the Permittee, the proposed new permittee, the Department and the Escrow Agent agree to modify this agreement to substitute the proposed new permittee for the Permittee.

27. In the event that any party to this Escrow Agreement commences a lawsuit or other proceeding relating to or arising from this Escrow Agreement, the Parties agree that the courts of the Commonwealth of Massachusetts, excluding any federal court sitting therein, shall have the sole and exclusive jurisdiction over any such proceeding. The Parties agree to: (a) waive any objection to such venue; (b) submit to the jurisdiction of the courts so specified; and (c) accept service of process to vest personal jurisdiction over them in these courts.

28. To the extent any provision of this Escrow Agreement is prohibited by or held invalid under applicable law, such provision shall be ineffective to the extent of such prohibition or invalidity, without invalidating the remainder of such provision or the remaining provisions of this Escrow Agreement.

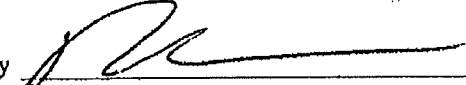
29. This Escrow Agreement shall terminate, and the Escrow Agent shall be relieved of all liability, after: (a) all funds in the Escrow Account have been properly disbursed in accordance with the terms and conditions of this Agreement; (b) the Escrow Agent has provided a final accounting of all transactions hereunder to the Parties; and (c) a copy of all books and records relating to the Escrow Account has been delivered to the Permittee, and, if requested, to the Department.

Effective Date

30. This Agreement shall take effect on the latest date of execution by the Department, Permittee or Escrow Agent.

IN WITNESS WHEREOF, the Parties have caused this Escrow Agreement to be duly executed as set forth below.

FOR THE MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

By 
Signature
David J Johnston
Printed Name
David J. Reginal Duties
Title

9-22-17
Date

FOR THE PERMITTEE

By Joseph J. Mooney for BOT Aug. 15, 2017
Signature Date
Joseph Mooney
Printed Name
BOARD CHAIR
Title

FOR THE ESCROW AGENT

By [Signature] President October 17, 2017
Signature Date
Jeff Ewing
Printed Name
President
Title

EXHIBIT A
Escrow Agent's Fee Schedule

<u>\$600</u>	Fees - escrow maintenance	<u>\$100 /hour</u> additional service as necessary
<u> </u>	Fees -	<u>\$ /hour</u>

To be adjusted every two (2) years.



Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

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

Charles D. Baker
Governor

Karyn E. Polito
Lieutenant Governor

Matthew A. Beaton
Secretary

Martin Suuberg
Commissioner

September 21, 2017

Anthony Colletti
Windchime Point Condominium Trust
c/o American Properties Team, Inc.
500 Cummings Park, Suite 6050
Woburn, Massachusetts 01801

RE: MASHPEE: Windchime Condominium
Wastewater Treatment Facility
Permit No.: 263-3M1
Transmittal No. X267747

Dear Mr. Colletti:

In response to your application for a permit to discharge into the ground a treated effluent from the treatment works at the above referenced location and after due public notice, I hereby issue the attached final permit.

Since no comments were received by the Department during the public comment period related to the terms of the permit, in accordance with 310 CMR 2.08, the permit becomes effective at issuance.

Parties aggrieved by the issuance of this permit are hereby advised of their right to request an Adjudicatory Hearing under the provisions of Chapter 30A of the Massachusetts General Laws and 314 CMR 1.00, Rules for the Conduct of Adjudicatory Proceedings. Unless the person requesting the adjudicatory hearing requests and is granted a stay of the terms and conditions of the permit, the permit shall remain fully effective.

If you should have any questions on any information provided with this letter please contact Christos Dimisioris at (508) 946-2736.

Sincerely,

Brian A. Dudley
Bureau of Water Resources

This information is available in alternate format. Contact Michelle Waters-Ekanem, Director of Diversity/Civil Rights at 617-292-5751.

TTY# MassRelay Service 1-800-439-2370

MassDEP Website: www.mass.gov/dep

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D/CD/
Enclosure

cc: Glen Harrington
Mashpee Board of Health
16 Great Neck Road North
Mashpee, Massachusetts 02649
(with enclosure)

Todd Chaplin
Mount Hope Engineering, Inc.
1788 G.A.R. Highway
Swansea, Massachusetts 02777
(with enclosure)

John E. Shaffer
Marcus Errico Emmer & Brooks, P.C.
45 Braintree Hill Office Park
Braintree, Massachusetts 02184
(with enclosure)

ecc: DEP/Boston
DEP/SERO: Cheryl Bump

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Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

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

Charles D. Baker
Governor

Karyn E. Polito
Lieutenant Governor

Matthew A. Beaton
Secretary

Martin Suuberg
Commissioner

Individual Groundwater Discharge Permit Fact Sheet

I. APPLICANT, FACILITY INFORMATION, and DISCHARGE LOCATION

Name and Address of Applicant:

Windchime Condominium Association, c/o American Properties Inc., 500 West Cummings Pk,
Suite 6050, Woburn, Massachusetts 01801.

Name and Address of Facility where discharge occurs:

Windchime Condominium, Great Neck Road, Mashpee, MA

Discharge Information:

Groundwater Discharge Permit Number: 263 – 3M1

The Groundwater Discharge Permit will allow the applicant to continue to discharge 40,000 gallons per day of treated sanitary wastewater from a 180 unit residential condominium. The discharge is not in a Zone II of a public water supply.

II. LIMITATIONS AND CONDITIONS

Discharge permit limitations are as listed in the ground water permit and are in conformance with 314 CMR 5.00, the Groundwater Discharge Permit Program.

III. PERMIT BASIS AND EXPLANATION OF EFFLUENT LIMITATIONS

An Individual Groundwater Discharge permit is required for this discharge in accordance with the Massachusetts Clean Water Act, M.G.L. c. 21, s. 26-53 and 314 CMR 5.03.

Effluent limitations are based upon the location of the discharge, the level of treatment, consideration of human health protection criteria and protection of the groundwaters of the Commonwealth.

IV. COMMENT PERIOD, HEARING REQUESTS, AND PROCEDURES FOR FINAL DECISIONS

The public comment period for this permit is thirty (30) days following public notice in *The Environmental Monitor*. The public notice for this Individual Groundwater Discharge Permit occurred on July 12, 2017.

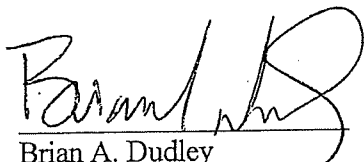
Requests for an adjudicatory hearing must be submitted within thirty (30) days of the issuance/denial of the permit, by any person who is aggrieved by such issuance/denial.

A final decision on the issuance/denial of this permit will be made after the public notice period, and review of any comments received during this period.

V. STATE CONTACT INFORMATION

Additional information concerning the draft permit may be obtained between the hours of 9:00 a.m. and 5:00 p.m. Monday through Friday excluding holidays, from:

Christos Dimisioris
DEP /SERO
20 Riverside Drive
Lakeville, MA 02347
(508) 946-2736


Brian A. Dudley
Bureau of Water Resources

September 21, 2017
Date

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INDIVIDUAL GROUNDWATER DISCHARGE PERMIT

Name and Address of Applicant: *Windchime Condominium Association, c/o American Properties Inc., 500 West Cummings Pk, Suite 6050, Woburn, Massachusetts 01801.*

Date of Application: *December 17, 2015*

Application/Permit No. *263 – 3M1*

Date of Issuance: *May 13, 2016*

Date of Expiration: *May 13, 2021*

Effective Date: *May 13, 2016*

Date Modified: *September 21, 2017*

AUTHORITY FOR ISSUANCE

Pursuant to authority granted by Chapter 21, Sections 26-53 of the Massachusetts General Laws, as amended, 314 CMR 2.00, and 314 CMR 5.00, the Massachusetts Department of Environmental Protection (the Department) hereby issues the following permit to: Windchime Condominium Trust (hereinafter called "the permittee") authorizing discharges from the on-site wastewater treatment facility to the ground located at Windchime Condominium, Great Neck Road, Mashpee, MA (180 unit residential condominium with a total of 363 bedrooms), such authorization being expressly conditional on compliance by the permittee with all terms and conditions of the permit hereinafter set forth.

Brian A. Dudley
Bureau of Water Resources

September 21, 2017
Date

I. SPECIAL CONDITIONS**A. Effluent Limits**

The permittee is authorized to discharge into the ground from the wastewater treatment facilities for which this permit is issued a treated effluent whose characteristics shall not exceed the following values:

Effluent Characteristics	Discharge Limitations
Flow	40,000 GPD
Oil and grease	15 mg/l
Total Suspended Solids (TSS)	30 mg/l
Total Nitrogen (NO ₂ + NO ₃ + TKN)	10 mg/l
Nitrate-Nitrogen	10 mg/l
Biochemical Oxygen Demand, 5-day @20°C (BOD ₅)	30 mg/l

- a) The pH of the effluent shall not be less than 6.5 nor greater than 8.5 at any time or not more than 0.2 standard units outside the naturally occurring range.
- b) The discharge of the effluent shall not result in any demonstrable adverse effect on the groundwater or violate any water quality standards that have been promulgated.
- c) The monthly average concentration of BOD and TSS in the discharge shall not exceed 15 percent of the monthly average concentrations of BOD and TSS in the influent into the permittee's wastewater treatment facility.
- d) When the average annual flow exceeds 80 percent of the permitted flow limitations, the permittee shall submit a report to the Department describing what steps the permittee will take in order to remain in compliance with the permit limitations and conditions, inclusive of the flow limitations established in this permit.

B. Monitoring and Reporting**1) INFLUENT:**

The permittee shall monitor and record the quality of the **influent** waste stream to the facility according to the following schedule and other provisions:

Parameter	Minimum Frequency of Analysis	Sample Type
BOD ₅	Monthly	24-Hour Composite
Total Suspended Solids	Monthly	24-Hour Composite
Total Solids	Monthly	24-Hour Composite
Ammonia Nitrogen	Monthly	24-Hour Composite

EFFLUENT:

The permittee shall monitor and record the quality and quantity of **effluent** according to the following schedule and other provisions:

Parameter	Minimum Frequency of Analysis	Sample Type
Flow	Daily	Meter reading Report: Min – Max - Average
pH	Daily	Grab
Total Suspended Solids	Monthly	24-Hour Composite
Oil & Grease	Monthly	Grab
BOD ₅	Monthly	24-Hour Composite
Nitrate Nitrogen	Monthly	24-Hour Composite
Total Nitrogen (NO ₂ + NO ₃ + TKN)	Monthly	24-Hour Composite
Total Phosphorus (as P)	Annually	Grab
Orthophosphate (as P)	Annually	Grab

Volatile Organic Compounds ¹	Annually	Grab
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¹USEPA Method #624

- a) The Department reserves the right to resume more frequent monitoring of phosphorus if the Department determines that phosphorus levels are impacting downgradient receptors.
- 2) The permittee shall sample the four approved monitoring wells (MW-3 upgradient, MW-1, MW-2, and MW-4 downgradient) as shown on a plan prepared by IEP Inc. and titled "Figure 2, Schematic Site Plan, Windchime Point, Mashpee, Massachusetts" dated April 1990. Labels identifying each monitoring well's identification in accordance with the above-referenced approved plan shall be affixed to the steel protective casing of each monitoring well.

The permittee shall monitor, record and report the quality of water in the monitoring wells according to the following schedule and other provisions:

Parameter	Frequency of Analysis
Static Water Level	Monthly
Specific Conductance	Monthly
pH	Monthly
Total Nitrogen (NO ₂ +NO ₃ +TKN)	Quarterly
Nitrate-Nitrogen	Quarterly
Total Phosphorus (as P)	Annually
Orthophosphate (as P)	Annually
Volatile Organic Compounds ¹	Annually

¹USEPA Method #624

- a) Static Water Level shall be expressed as an elevation and shall be referenced to the surveyed datum established for the site. It shall be calculated by subtracting the depth to the water table from the surveyed elevation of the top of the monitoring well's PVC well casing/riser.
- b) The Department reserves the right to resume more frequent monitoring of phosphorus if the Department determines that phosphorus levels are impacting downgradient receptors.
- 3) Any grab sample or composite sample required to be taken less frequently than daily shall be taken during the period of Monday through Friday inclusive. All composite samples shall be taken over the operating day.

- 4) The permittee shall submit all monitoring reports within 30 days of the last day of the reporting month. Reports shall be on an acceptable form, properly filled and signed and shall be sent to the Department of Environmental Protection, Southeast Regional Office, 20 Riverside Drive, Lakeville, MA 02347, and to the Director of Wastewater Management Program, Department of Environmental Protection, Wastewater Management, One Winter Street, Boston, MA 02108, and to the Board of Health, 16 Great Neck Road North, Mashpee, Massachusetts 02349.
 - a. Submission of monitoring reports in electronic format is available through eDEP and serves as data submission to both the Regional and Boston offices. To register for electronic submission go to:
<http://www.mass.gov/dep/service/compliance/edeponlf.htm>

C. Financial Assurance Mechanisms

- 1) The permittee shall establish and maintain a financial assurance mechanism that provides for the continued availability of an immediate repair and replacement account. The immediate repair and replacement account shall contain adequate funds to correct any unanticipated problem immediately so that any disruption of operation is minimized, and a violation of the terms and conditions contained in the permit does not occur. To create an immediate repair and replacement account, the permittee shall deposit at least 25% of the estimated construction cost of the PWTf into an interest bearing escrow account in accordance with the financial assurance mechanism and 314 CMR 5.15.
 - a) For purpose of the financial assurance mechanism requirement, the estimated construction cost of the wastewater treatment facility shall include the cost of constructing the wastewater treatment plant, collection system, associated mechanical equipment, but not including the land, ground and disposal area.
- 2) The permittee shall meet the obligation to establish the required financial assurance mechanism by using Department-approved form documents and shall submit said Department-approved form documents to the Department for its review and approval as follows:
 - a) A permittee that constructs the wastewater treatment facility after the issuance of the Individual permit may submit the financial assurance mechanism(s) to the Department for its review and approval no later than ninety (90) days prior to the start-up (clear water test) of the facility. Such a permittee shall not operate the facility unless and until the Department has approved the required financial assurance mechanism, the financial assurance mechanism is in full force and effect, and the permittee has made all contributions required thirty (30) days prior to the start-up (clear water test) of the facility; or,
 - b) A permittee with a wastewater treatment facility in existence prior to the submission of the individual permit renewal application may submit the financial assurance mechanism to the Department for its review and approval no later than ninety (90) days from the date of submission of the individual permit renewal application. Said permittee shall be in compliance with the provision of the

approved financial assurance mechanism requiring contributions to the immediate repair and replacement account no later than thirty (30) days prior to the date on which the renewal is issued.

- 3) The permittee shall maintain the current form documents evidencing the required financial assurance mechanism approved by the Department. The permittee shall perform all its obligations under the required financial assurance mechanism as approved by the Department.
- 4) Once established and funded, the permittee shall keep an amount equal to at least 25% of the estimated construction cost of the PWTF in the immediate repair and replacement account and shall replenish the account within 90 days of any disbursement.
- 5) On or before January 31st of each year, the permittee shall submit an annual financial report identifying the initial and current balance in the immediate repair and replacement account and confirming the continuing availability of the funds in said account for the purposes specified in the permit and 314 CMR 5.15. Said report shall be prepared in accordance with generally accepted accounting principles. Reports pertaining to the required financial assurance mechanism(s) shall be sent to the Wastewater Management Section Chief at the appropriate Regional Office.

D. Supplemental Conditions

1. The permittee shall notify the Department at least thirty (30) days in advance of the proposed transfer of ownership of the facility for which this permit is written. Said notification shall include a written agreement between the existing and new permittees containing a specific date for transfer of permit, responsibility, coverage and liability between them.
2. A staffing plan for the facility shall be submitted to the Department once every two years and whenever there are staffing changes. The staffing plan shall include the following components:
 - a. The operator(s)'s name(s), operator grade(s) and operator license number(s);
 - b. The number of operational days per week;
 - c. The number of operational shifts per week;
 - d. The number of shifts per day;
 - e. The required personnel per shift;
 - f. Saturday, Sunday and holiday staff coverage;
 - g. Emergency operating personnel
3. The permittee is responsible for the operation and maintenance of all sewers, pump stations, and treatment units for the permitted facility, which shall be operated and maintained under the direction of a properly certified wastewater operator.
4. Operation and maintenance of the proposed facility must be in accordance with 314 CMR 12.00, "Operation and Maintenance and Pretreatment Standards for Wastewater Treatment

Works and Indirect Discharges", and, 257 CMR 2.00, "Rules and Regulations for Certification of Operators of Wastewater Treatment Facilities".

- a. The facility has been rated (in accordance with 257 CMR 2.00), to be a Grade 4 facility. Therefore, the permittee shall provide for oversight by a Massachusetts Certified Wastewater Treatment plant operator (Chief Operator) Grade 4 or higher. The permittee will also provide for a backup operator who shall possess at least a valid Grade 3 license.
 - b. The date and time of the operator's inspection along with the operator's name and certification shall be recorded in the log book on location at the treatment facility. All daily inspection logs consistent with the O&M Manual requirements shall be kept at the facility for a period of three (3) years.
 - c. Records of operation of wastewater treatment facilities or disposal systems required by the Department shall be submitted on forms supplied by the Department or on other forms approved by the Department for such use. Monthly reports shall be certified by the wastewater treatment plant operator in charge and shall be included in the discharge monitoring reports submitted each month.
5. If the operation and maintenance of the facility is contracted to a private concern, the permittee shall submit a copy of the contract, consistent with what is required by the approved Operation & Maintenance manual and signed only by the contractor, to the appropriate MassDEP Regional Office within thirty (30) days of permit issuance. Along with the contract, a detailed listing of all contract operation obligations of the proposed contractor at other facilities shall also be submitted.
 6. Any additional connections to the sewer system, beyond the facility as described on page 1 of this permit shall be approved by MassDEP and the local Board of Health prior to the connection.
 7. All tests or analytical determinations to determine compliance with permit standards and requirements shall be done using tests and procedures found in the most recent version of *Standard Methods for the Examination of Water and Wastewater* and shall be performed by a Massachusetts Certified laboratory.
 8. The permittee shall notify the appropriate MassDEP Regional Office, in writing, within thirty (30) days of the following events:
 - a. The date of treatment plant start up.
 - b. Any interruption of the treatment system operation, other than routine maintenance.
 - c. Final shutdown of the treatment system.
 9. The permittee shall contract to have any and all solids and sludges generated by the treatment system for which this permit is issued removed off site by a properly licensed waste hauler for disposal at an EPA/MassDEP approved facility. The name and license number of the hauler along with the quantity of wastes removed and the date(s) of removal shall be reported by the permittee in writing to the appropriate MassDEP Regional Office.
 10. Simultaneously with the permit renewal application at year fifteen (2021) following the initiation of plant operations, the permittee shall submit two reports to the Department for its review and approval:

- a. An engineering report, prepared by a registered professional engineer, that outlines in sufficient detail what modifications (if any) to the facility or other changes are required to insure that the facility can remain in compliance with its GWDP and other applicable requirements through the next 5 year permit term (year 2026) and beyond; and
 - b. A financial plan that contains the cost estimates for implementing the facility modifications or other changes identified in the engineering report, and describes and demonstrates, how and when the permittee will finance the needed facility modifications or other changes.
11. In the event that effluent limits are not met, or the discharge is determined to impair groundwater quality in accordance with 314 CMR 5.16(1), the permittee may be obligated to modify, supplement or replace the permitted treatment process so as to ensure that the discharge does not impair the ability of the groundwater to act as an actual or potential source of potable water.
 12. Pursuant to M.G.L. Chapter 21A, section 18(a), and 310 CMR 4.03, holders of this Permit may be subject to annual compliance assurance fees as assessed each year on July 1st and invoiced by MassDEP. Failure of the Permit holder to pay applicable annual compliance assurance fees shall result in the automatic suspension of the permit by operation of law under the statute. If fee non-payment continues for sixty days or more, MassDEP has the statutory option of revoking the Permit, denying any other pending permit applications filed by the Permit holder or taking other enforcement action. Permit holders are required to notify MassDEP in writing if they wish to relinquish or transfer a permit. Failure to do so will result in the continued assessment of fees.

E. Appeal Rights

During the thirty (30) day period following issuance of this permit, a Notice of Claim for an Adjudicatory Appeal may be sent by any person aggrieved (the "Petitioner") by the issuance to:

Case Administrator
Office of Appeals and Dispute Resolution
Department of Environmental Protection
One Winter Street/2nd Floor
Boston, MA 02108

310 CMR 1.01(6)(b) requires the Notice of Claim to: include sufficient facts to demonstrate aggrieved person status; state the facts which are grounds for the appeal specifically, clearly and concisely; and, state relief sought. The permit shall become or remain effective at the end of the 30 day appeal period unless the person filing the Notice of Claim requests, and is granted, a stay of its terms and conditions. If a permit is modified under 314 CMR 2.10, only the modified terms and conditions may be subject to an Adjudicatory Appeal. All other aspects of the existing permit shall remain in effect during any such Adjudicatory Appeal.

Per 310 CMR 4.06, the hearing request to the Commonwealth will be dismissed if the filing fee is not paid. Unless the Petitioner is exempt or granted a waiver, a valid check payable to the Commonwealth to Massachusetts in the amount of \$100.00 must be mailed to:

Commonwealth of Massachusetts
Department of Environmental Protection
P.O. Box 4062
Boston, MA 02211

The filing fee is not required if the Petitioner is a city, town, county, or district of the Commonwealth, federally recognized Indian tribe housing authority effective January 14, 1994, or any municipal housing authority; or, per MGL 161A s. 24, the Massachusetts Bay Transportation Authority. The Department may waive the adjudicatory hearing filing fee for a Petitioner who shows that paying the fee will create an undue financial hardship. A Petitioner seeking a waiver must file, along with the hearing request, an affidavit setting forth the facts believed to support the claim of undue financial hardship.

II. GENERAL PERMIT CONDITIONS

The following conditions apply to all individual and general permits:

(1) No discharge authorized in the permit shall cause or contribute to a violation of the Massachusetts Surface Water Quality Standards (314 CMR 4.00) or any amendments thereto. Upon promulgation of any amended standard, this permit may be revised or amended in accordance with such standard and 314 CMR 2.10 and 3.13 or 5.12. Except as otherwise provided in 314 CMR 5.10 (3)(c), 310 CMR 5.10(4)(a)2 and 314 CMR 5.10(9), no discharge authorized in the permit shall impair the ability of the ground water to act as an actual or potential source of potable water. Evidence that a discharge impairs the ability of the ground water to act as an actual or potential source of potable water includes, without limitation, analysis of samples taken in a downgradient well that shows one or more exceedances of the applicable water quality based effluent limitations set forth in 314 CMR 5.10. In those cases where it is shown that a measured parameter exceeds the applicable water quality based effluent limitations set forth in 314 CMR 5.10 at the upgradient monitoring well, evidence that a discharge impairs the ability of the ground water to act as an actual or potential source of potable water is deemed to exist if a measured parameter in any downgradient well exceeds the level of that same measured parameter in the upgradient well for the same sampling period. A statistical procedure approved by the Department shall be used in determining when a measured parameter exceeds the allowable level.

(2) Duty to comply. The permittee shall comply at all times with the terms and conditions of the permit, 314 CMR 5.00, M.G.L. c. 21, §§ 26 through 53 and all applicable state and federal statutes and regulations.

(3) Standards and prohibitions for toxic pollutants. The permittee shall comply with effluent standards or prohibitions established under § 307(a) of the Federal Act, 33 U.S.C § 1317(a), for toxic pollutants within the time provided in the regulations that establish these standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.

(4) Proper operation and maintenance. The permittee shall at all times properly operate and maintain all facilities and equipment installed or used to achieve compliance with the terms and conditions of the permit, and the regulations promulgated at 314 CMR 12.00 entitled "Operation

and Maintenance and Pretreatment Standards for Wastewater Treatment Works and Indirect Discharges, and 257 CMR 2.00, Rules and Regulations for Certification of Operators of Wastewater Treatment Facilities”.

(5) Duty to halt or reduce activity. Upon reduction, loss, or failure of the treatment facility, the permittee shall, to the extent necessary to maintain compliance with its permit, control production or discharges or both until the facility is restored or an alternative method of treatment is provided. It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of the permit.

(6) Power Failure. In order to maintain compliance with the effluent limitations and prohibitions of this permit, the permittee shall either:

- (a) provide an alternative power source sufficient to operate the wastewater control facilities; or
- (b) halt, reduce or otherwise control production and/or all discharges upon the reduction, loss, or failure of the primary source of power to the wastewater control facilities.

(7) Duty to mitigate. The permittee shall take all reasonable steps to minimize or prevent any adverse impact on human health or the environment resulting from non-compliance with the permit.

(8) Duty to provide information. The permittee shall furnish to the Department within a reasonable time as specified by the Department any information which the Department may request to determine whether cause exists for modifying, revoking and reissuing, or terminating the permit, or to determine whether the permittee is complying with the terms and conditions of the permit.

(9) Inspection and entry. The permittee shall allow the Department or its authorized representatives to:

- (a) Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records required by the permit are kept;
- (b) Have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit;
- (c) Inspect at reasonable times any facilities, equipment, practices, or operations regulated or required under the permit; and
- (d) Sample or monitor at reasonable times for the purpose of determining compliance with the terms and conditions of the permit.

(9A) The permittee shall physically secure the treatment works and monitoring wells and limit access to the treatment works and monitoring wells to those personnel required to operate, inspect and maintain the treatment works and to collect samples.

(9B) The permittee shall identify each monitoring well by permanently affixing to the steel protective casing of the well a tag with the identification number listed in the permit.

(10) Monitoring. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. Monitoring must be conducted according to test

procedures approved under 40 CFR Part 136 unless other test procedures are specified in the permit.

(11) Recordkeeping. The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by the permit, and all records of all data used to complete the application for the permit, for a period of at least three years from the date of the sample, measurement, report or application. This period may be extended by request of the Department at any time. Records of monitoring information shall include:

- (a) The date, exact place, and time of sampling or measurements;
- (b) The individual(s) who performed the sampling or measurement;
- (c) The date(s) analyses were performed;
- (d) The individual(s) who performed the analyses;
- (e) The analytical techniques or methods used; and
- (f) The results of such analyses.

(12) Prohibition of bypassing. Except as provided in 314 CMR 5.16(13), bypassing is prohibited, and the Department may take enforcement action against a permittee for bypassing unless:

- (a) The bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;
- (b) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if the permittee could have installed adequate backup equipment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and
- (c) The permittee submitted notice of the bypass to the Department:
 - 1. In the event of an anticipated bypass, at least ten days in advance, if possible; or
 - 2. In the event of an unanticipated bypass, as soon as the permittee has knowledge of the bypass and no later than 24 hours after its first occurrence.

(13) Bypass not exceeding limitations. The permittee may allow a bypass to occur which does not cause effluent limitations to be exceeded, but only if necessary for the performance of essential maintenance or to assure efficient operation of treatment facilities.

(14) Permit actions. The permit may be modified, suspended, or revoked for cause. The filing of a request by the permittee for a permit modification, reissuance, or termination, or a notification of planned changes or anticipated non-compliance does not stay any permit condition.

(15) Duty to reapply. If the permittee wishes to continue an activity regulated by the permit after the expiration date of the permit, the permittee must apply for and obtain a new permit. The permittee shall submit a new application at least 180 days before the expiration date of the existing permit, unless permission for a later date has been granted by the Department in writing.

(16) Property rights. The permit does not convey any property rights of any sort or any exclusive privilege.

(17) Other laws. The issuance of a permit does not authorize any injury to persons or property or invasion of other private rights, nor does it relieve the permittee of its obligation to comply with any other applicable Federal, State, and local laws and regulations.

(18) Oil and hazardous substance liability. Nothing in the permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under § 311 of the Federal Act, 33 U.S.C. § 1321, and M.G.L. c. 21E.

(19) Removed substances. Solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of wastewaters shall be disposed in a manner consistent with applicable Federal and State laws and regulations including, but not limited to, the Massachusetts Clean Waters Act, M.G.L. c. 21, §§ 26 through 53 and the Federal Act, 33 U.S.C. § 1251 *et seq.*, the Massachusetts Hazardous Waste Management Act, M.G.L. c. 21C, and the Federal Resource Conservation and Recovery Act, 42 U.S.C. § 6901, *et seq.*, 310 CMR 19.000 and 30.000, and other applicable regulations.

(20) Reporting requirements.

(a) Monitoring reports. Monitoring results shall be reported on a Discharge Monitoring Report (DMR) at the intervals specified elsewhere in the permit. If the permittee monitors any pollutant more frequently than required by the permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR.

(b) Compliance schedules. Reports of compliance or non-compliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of the permit shall be submitted no later than 14 days following each schedule date.

(c) Planned changes. The permittee shall give notice to the Department as soon as possible of any planned physical alterations or additions to the permitted facility or activity which could significantly change the nature or increase the quantity of pollutants discharged. Unless and until the permit is modified, any new or increased discharge in excess of permit limits or not specifically authorized by the permit constitutes a violation.

(d) Anticipated non-compliance. The permittee shall give advance notice to the Department of any planned changes in the permitted facility or activity which may result in non-compliance with permit requirements.

(e) 24 hour reporting. The permittee shall report any non-compliance which may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the permittee becomes aware of the circumstances. A written submission shall also be provided within five days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the non-compliance, including exact dates and times, and if the non-compliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the non-compliance. The following shall be included as information which must be reported within 24 hours:

1. Any unanticipated bypass which exceeds any effluent limitation in the permit.
2. Violation of a maximum daily discharge limitation for any of the pollutants listed by the Department in the permit to be reported within 24 hours.

(f) Other non-compliance. The permittee shall report all instances of non-compliance not reported under 314 CMR 5.16(20)(a), (b), or (e) at the time monitoring reports are submitted. The reports shall contain the information listed in 314 CMR 5.16(20)(e).

(g) Toxics. All manufacturing, commercial, mining, or silvicultural dischargers must notify the Department as soon as they know or have reason to believe:

1. That any activity has occurred or will occur which would result in the discharge of any toxic pollutant listed in 314 CMR 3.17 which is not limited in the permit, if that discharge will exceed the highest of the following notification levels:

a. 100 micrograms per liter (100 ug/l);

b. 200 micrograms per liter (200 ug/l) for acrolein and acrylonitrile; 500 micrograms per liter (500 ug/l) for 2,4-dinitrophenol and for 2-methyl-4,6-dinitrophenol; and one milligram per liter (1 mg/l) for antimony;

c. Five times the maximum concentration value reported for that pollutant in the permit application; or

2. That they have begun or expect to begin to use or manufacture as an intermediate or final product or byproduct any toxic pollutant which was not reported in the permit application.

(h) Indirect dischargers. All Publicly Owned Treatment Works shall provide adequate notice to the Department of the following:

1. Any new introduction of pollutants into the POTW from an indirect discharger which would be subject to § 301 or 306 of the Federal Act, 33 U.S.C. § 1311 or 1316, if it were directly discharging those pollutants; and

2. Any substantial change in the volume or character of pollutants being introduced into the POTW by a source introducing pollutants into the POTW at the time of issuance of the permit.

(i) Information. Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Department, it shall promptly submit such facts or information.

(21) Signatory requirement. All applications, reports, or information submitted to the Department shall be signed and certified in accordance with 314 CMR 3.15 and 5.14.

(22) Severability. The provisions of the permit are severable, and if any provision of the permit, or the application of any provision of the permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of the permit, shall not be affected thereby.

(23) Reopener clause. The Department reserves the right to make appropriate revisions to the permit in order to establish any appropriate effluent limitations, schedules of compliance, or other provisions which may be authorized under the Massachusetts Clean Waters Act, M.G.L. c. 21, §§ 26 through 53 or the Federal Act, 33 U.S.C. §1251 *et seq* in order to bring all discharges into compliance with said statutes.

(24) Approval of treatment works. All discharges and associated treatment works authorized herein shall be consistent with the terms and conditions of this permit. Any modification to the approved treatment works shall require written approval of the Department prior to the construction of the modification.

(25) Transfer of Permits.

(a) RCRA facilities. Any permit which authorizes the operation of a RCRA facility which is subject to the requirements of 314 CMR 8.07 shall be valid only for the person to whom it is issued and may not be transferred.

(b) Transfers by modification. Except as provided in 314 CMR 5.16(25)(a) and (c), a permit may be transferred by the permittee to a new owner or operator provided that the permit has been modified or revoked and reissued or a minor modification is made to identify the new permittee in accordance with 314 CMR 5.12(3) and (4).

(c) Automatic transfers. For facilities other than Privately Owned Wastewater Treatment Facilities (PWTFs) that treat at least some sewage from residential uses, hospitals, nursing or personal care facilities, residential care facilities, and/or assisted living facilities, PWTFs that have been required to establish financial assurance mechanism(s) pursuant to 314 CMR 5.15(6), and RCRA facilities subject to the requirements of 314 CMR 8.07, a permit may be automatically transferred in accordance with 314 CMR 5.12(5).

(26) Permit Compliance Fees and Inspection Information. Except as otherwise provided, any permittee required to obtain a surface water or ground water discharge permit pursuant to M.G.L. c. 21, § 43 and 314 CMR 3.00 and 5.00, shall be required to submit the annual compliance assurance fee established in accordance with M.G.L. c. 21A, § 18 and 310 CMR 4.00 as provided in 314 CMR 2.12. The requirement to submit the annual compliance fee does not apply to any local government unit other than an authority. Any permittee required to obtain a surface water or ground water discharge permit pursuant to M.G.L. c. 21, §43 and 314 CMR 3.00 and 5.00 may be required to submit inspection information annually as a condition of the permit as provided in 314 CMR 2.12.

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Massachusetts Department of Environmental Protection
One Winter Street, Boston MA 02108 • Phone: 617-292-5751

Communication For Non-English Speaking Parties - 310 CMR 1.03(5)(a)



1 English:

This document is important and should be translated immediately. If you need this document translated, please contact MassDEP's Diversity Director at the telephone numbers listed below.



2 Español (Spanish):

Este documento es importante y debe ser traducido inmediatamente. Si necesita este documento traducido, por favor póngase en contacto con el Director de Diversidad MassDEP a los números de teléfono que aparecen más abajo.



3 Português (Portuguese):

Este documento é importante e deve ser traduzida imediatamente. Se você precisa deste documento traduzido, por favor, entre em contato com Diretor de Diversidade da MassDEP para os números de telefone listados abaixo.



4(a) 中國 (傳統) (Chinese (Traditional)):

本文件非常重要，應立即翻譯。如果您需要翻譯這份文件，請用下面列出的電話號碼與MassDEP的多樣性總監聯繫。



4(b) 中国 (简体中文) (Chinese (Simplified)):

本文件非常重要，應立即翻譯。如果您需要翻譯這份文件，請用下面列出的電話號碼與MassDEP的多样性总监联系。



5 Ayisyen (franse kreyòl) (Haitian) (French Creole):

Dokiman sa-a se yon bagay enpòtan epi yo ta dwe tradui imedyatman. Si ou bezwen dokiman sa a tradui, tanpri kontakte Divèsite Direktè MassDEP a nan nimewo telefòn ki nan lis pi ba a.



6 Việt (Vietnamese):

Tài liệu này là rất quan trọng và cần được dịch ngay lập tức. Nếu bạn cần dịch tài liệu này, xin vui lòng liên hệ với Giám đốc MassDEP đa dạng tại các số điện thoại được liệt kê dưới đây.



7 ប្រទេសកម្ពុជា (Kmer (Cambodian)):

ឯកសារនេះគឺមានសារៈសំខាន់និងគួរត្រូវបានបកប្រែភ្លាមៗ ប្រសិនបើអ្នកត្រូវបានបកប្រែ ឯកសារនេះសូមទំនាក់ទំនងជាមួយក្រុមការងារ MassDEP នៅលេខទូរស័ព្ទដែលបានរាយនាមខាងក្រោម។



8 Kriolu Kabuverdianu (Cape Verdean):

Es documento é importante e deve ser traduzido imidiatamente. Se bo precisa des documento traduzido, por favor contacta Diretor de Diversidade na MassDEP's pa es numero indicode li d'boche.



9 Русский язык (Russian):

Этот документ должен быть немедленно. Если вам нужна помощь при переводе, свяжитесь пожалуйста с директором по этике и разнообразию в MassDEP по телефону указанному ниже.

**العربية (Arabic):**

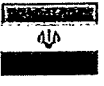
هذه الوثيقة الهامة وينبغي أن تترجم على الفور. إذا كنت بحاجة إلى هذه الوثيقة المترجمة، يرجى الاتصال مدير التنوع في MassDEP على أرقام الهواتف المدرجة أدناه.

**한국어 (Korean):**

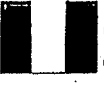
이 문서는 중요하고 즉시 번역해야 합니다. 당신이 번역이 문서가 필요하다면 아래의 전화 번호로 MassDEP의 다양성 감독에 문의하시기 바랍니다.

**հայերեն (Armenian):**

Այս փաստաթուղթը շատ կարևոր է և պետք է թարգմանել անմիջապես. Եթե Ձեզ անհրաժեշտ է այս փաստաթուղթը թարգմանվել դիմել MassDEP բազմազանությունը տնօրեն է հեռախոսահամարների թվարկված են ստորև.

**فارسی (Farsi [Persian]):**

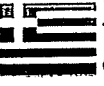
این سند مهم است و باید فوراً ترجمه شده است. اگر شما نیاز به این سند ترجمه شده، لطفاً با ما تماس تنوع مدیر MassDEP در شماره تلفن های ذکر شده در زیر.

**Français (French):**

Ce document est important et devrait être traduit immédiatement. Si vous avez besoin de ce document traduit, s'il vous plaît communiquer avec le directeur de la diversité MassDEP aux numéros de téléphone indiqués ci-dessous.

**Deutsch (German):**

Dieses Dokument ist wichtig und sollte sofort übersetzt werden. Wenn Sie dieses Dokument übersetzt benötigen, wenden Sie sich bitte Diversity Director MassDEP die in den unten aufgeführten Telefonnummern.

**Ελληνική (Greek):**

Το έγγραφο αυτό είναι σημαντικό και θα πρέπει να μεταφραστούν αμέσως. Αν χρειάζεστε αυτό το έγγραφο μεταφράζεται, παρακαλούμε επικοινωνήστε Diversity Director MassDEP κατά τους αριθμούς τηλεφώνου που αναγράφεται πιο κάτω.

**Italiano (Italian):**

Questo documento è importante e dovrebbe essere tradotto immediatamente. Se avete bisogno di questo documento tradotto, si prega di contattare la diversità Direttore di MassDEP ai numeri di telefono elencati di seguito.

**Język Polski (Polish):**

Dokument ten jest ważny i powinien być natychmiast przetłumaczony. Jeśli potrzebujesz tego dokumentu tłumaczony, prosimy o kontakt z Dyrektorem MassDEP w różnorodności na numery telefonów wymienionych poniżej.

**हिन्दी (Hindi):**

यह दस्तावेज महत्वपूर्ण है और तुरंत अनुवाद किया जाना चाहिए. आप अनुवाद इस दस्तावेज की जरूरत है, नीचे सूचीबद्ध फोन नंबरों पर MassDEP की विविधता निदेशक से संपर्क करें.

