

MAR 13 2023



Town of Bourne - Water Resources Nitrogen Loading a

Bourne Health Department
Bourne Buzzards Bay MA02532

See Cape Cod Commission Technical Bulletin 91-001 for further details:

<https://capecodcommission.org/resource-library/file/?url=/dept/commission/team/Website>

Project Nitrogen Load	Proposed Wastewater	New Construct
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1.	Project Title-5 wastewater flows:	440.0
	Actual wastewater flows:	175.0*
	Average wastewater flows:	307.5

* Actual water

Place \checkmark in applicable box:

Yes	No
<input type="checkbox"/>	<input checked="" type="checkbox"/>

Will the project be connected to sewer ?

<input type="checkbox"/>	<input checked="" type="checkbox"/>
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Is project Title-5 wastewater flow 10,000 gpd or greater ?

Place \checkmark in applicable box and multiply unsewered wastewater flow by applicable conversion fac

<input type="checkbox"/>
<input type="checkbox"/>
<input checked="" type="checkbox"/>
<input type="checkbox"/>

Standard Title-5 System (35-ppm-N)	x	0.048359
DEP-approved I/A System (25-ppm-N)	x	0.034542
DEP-approved I/A System (19-ppm-N)	x	0.026252
DEP-approved Enhanced I/A (12-ppm-N)	x	0.016580

0 Wastewater nitrogen load (**Title-5 flows**) =

0 Wastewater nitrogen load (**Actual flows**) =

Stormwater Runoff

Town of Bourne

Recharge rate for Bourne (inches; for from Technical Bul

Project site area:

Project site wetland area:

Project site upland area:

Pervious unpaved upland:

% using LID

Paved area:

Factor may be adjusted for employment of LID → x 1.4137E-04 =

LID = low impact development

Roof area:

x 7.0792E-05 =

Fertilizer

Previous unpaved upland - roof area =

Managed turf/ lawn area
x 3.4019E-04
=

Total Nitrogen Load

Total project nitrogen load (**Title-5 flows**):

Total project nitrogen load (**Actual flows**):

Nitrogen load per acre (**Average**):

Proposed Nitrogen Loading Concentration

Project nitrogen loading concentration (**Title-5 flows**):

Project nitrogen loading concentration (**Actual flows**):

Project nitrogen loading concentration (**Average**):

next page -->

Resource/ Impact Based Criteria

Marine Water Recharge Areas / Coastal Embayments

2. Yes No
Is the project located in any of the following watersheds: **Buttermilk Bay Basins, Phi**
(If 'No', then go to line 3.)

Name of Watershed

(from Regional Policy Plan Data Viewer): _____

Critical Nitrogen-loading limit** :

Yes No
Does project's nitrogen load (**O**) exceed the existing load (**O'**) AND the critical nitroge
(If 'No', then go to line 3.)

Excess project nitrogen load to be mitigated:

** When a nitrogen-loading limit has been determined through either a Total Maximum Daily Load (T
pursuant to Objective WR3, or if impaired water quality has been documented for the re

Groundwater Quality

3. Yes No
Does the project's nitrogen loading concentration in groundwater (**R**) exceed the gre

(If 'Yes', the project will need to provide an alternative strategy for meeting these)

4.

Yes No

Potential Public Water Supply Areas

Is project in a Potential Public Water Supply Area (PPWSA) ?
(If 'No', then go to line 5.)

Does the project's nitrogen loading concentration (R) exceed the greater of 1 ppm or
(If 'Yes', the project must provide an alternative strategy for meeting Objective VI)

Does the project use, treat, generate, store or dispose of hazardous materials in excess
(If 'Yes', the project must provide an alternative strategy for meeting Objective VI)

Wellhead Protection Areas

5.

Yes No

Is project in a Wellhead Protection Area (WHPA) ?

Does the project's nitrogen loading concentration (R) exceed the greater of 5 ppm or
(If 'Yes', the project must provide an alternative strategy for meeting Objective VI)

Does the project use, treat, generate, store or dispose of hazardous materials in excess
(If 'Yes', the project must provide an alternative strategy for meeting Objective VI)

Fresh Water Recharge Areas

6.

Yes No

Is project wastewater disposed of within 300 feet of a stream or fresh surface water body
(If 'No', then go to line 7.)

Is the project located in a freshwater recharge area (FWRA) hydraulically upgradient of
(If 'Yes', the project must provide an alternative strategy for meeting Objective VI)

Other Potential Impacts

7.

Yes No

Will the project withdraw more than 20,000 gallons of water per day ?
(If 'Yes', then the project must provide documentation demonstrating that there is no

8.

The project must demonstrate compliance with Objective WR4, including use of Low Impact

Load Mitigation Worksheet

Resources/regulatory/NitrogenLoadTechbulletin.pdf
 Reduction/ Increases in Flow, Raze & Rebuild, or Repairs/ Upgrades

gpd (a)
 (b)
 gpd (a)+(b) ÷ 2= (A)
 Average flows per unit in Bourne

Factor:

} Type of system: _____

kg-N/yr (B)

kg-N/yr (C)

natural areas
 Section 91-001): (RECH)

acres (D)

acres (E)

acres (F)

acres (G)

s.f. (H)

kg-N/yr (I)

s.f. (J)

kg-N/yr (K)

s.f.

6.064 kg-N/yr (L)

17.89 kg-N/yr (M) = (B)+(I)+(K)+(L)

10.94 kg-N/yr (N) = (C)+(I)+(K)+(L)

11.35 kg-N/yr/acre (O) = (M)+(N) ÷ 2 ÷ (D)

5.08 ppm-N (P) = (a) ÷ 723.76 + (L)

3.46 ppm-N (Q) = (b) ÷ 723.76 + (L)

4.27 ppm-N (R) = (P)+(Q) ÷ 2

nnneys Harbor / Back River / Eel Pond, Pocasset River Basin, Poca

0.000 kg-N/year/acre (S)

in load (S) ?

0.00 kg-N/yr (T) = LESSER OF (O)-(S) x(F)

*MDL), a Massachusetts Estuaries Project-accepted technical repo
ceiving coastal waters, the nitrogen loading limit shall be 0 kg-N/y*

water of **5 ppm** or the existing concentration (R') ?

Facility Address: 140 Wings Neck Road

Preparer's Name: Earl Lantery, PE

Date:

Watershed:

Existing Conditions

Calculate (A') through (P') as w/ (A) through (P):

Title-5 wastewater flows: gpd
Actual wastewater flows: *
Avg. wastewater flows: gpd (A')

Place ✓ in applicable box:

Yes

No

Is existing development on sewer?
(If 'Yes', then go to line 2.)

Standard Title-5 System
DEP-approved I/A System (commercial)
DEP-approved I/A System (residential)
DEP-approved enhanced I/A

kg-N/yr (B')

kg-N/yr (C')
wastewater offsets

Project site area: acres (D)

Project site wetland area: acres (E)

Project site upland area: acres (F)

Pervious unpaved upland: acres (G')

Paved area: s.f. (H')

Paving runoff offset: kg-N/yr (I')

Roof area: s.f. (J')

Roof runoff offset: kg-N/yr (K')

Managed Turf/ lawn area: **17,825** s.f.

Fertilizer offset: **6.064** kg-N/yr (L')

Existing nitrogen load (Title-5 flows): **27.62** kg-N/yr (M')

Existing nitrogen load (Actual flows): **14.81** kg-N/yr (N')

Nitrogen offset per acre: **16.71** kg-N/yr/acre (O')

		<u>Existing nitrogen loading concentrations:</u>	
$\frac{(M)}{(G) \times (RECH) \div 9.7286 + (H) \div 10,594 + (K) \div 0.75}$	Title-5 flows	7.84 ppm-N	(P')
$\frac{(N)}{(G) \times (RECH) \div 9.7286 + (H) \div 10,594 + (K) \div 0.75}$	Actual flows	4.69 ppm-N	(Q')
	Average	6.26 ppm-N	(R')

isset Harbor / Hen Cove / Red Brook Harbor, Megansett / Squeteague Harbors** ?

;) AND (O)-(O') x(F)

rt, or specified by a Commission-approved comprehensive wastewater management plan
r per acre pursuant to Objective WR3.