



Town of Bourne - Water Resources Nitrogen Loading and Mitigation Worksheet

See Cape Cod Commission Technical Bulletin 91-001 for further details:
https://capecodcommission.org/resource-library/files/ra1=depl/commission/learn/Website_Resources/regulatory/NitrogenLoadTechBulletin.pdf

Proposed Wastewater

1. Project Title-5 wastewater flows: gpd (a)

Actual wastewater flows: * (b)

Average wastewater flows: gpd (a)+(b) *2= (A)

* Actual water use flows per unit in Bourne

Place V In applicable box:

Yes No

Will the project be connected to sewer?

Is project Title-5 wastewater flow 10,000 gpd or greater?

Place V In applicable box and multiply unsewered wastewater flow by applicable conversion factor:

<input checked="" type="checkbox"/>	Standard Title-5 System (35-ppm-N)	x	0.048359	} Type of system: _____
<input type="checkbox"/>	DEP-approved I/A System (25-ppm-N)	x	0.034542	
<input type="checkbox"/>	DEP-approved I/A System (19-ppm-N)	x	0.028252	
<input type="checkbox"/>	DEP-approved Enhanced I/A (12-ppm-N)	x	0.016580	

Wastewater nitrogen load (Title-5 flows) = kg-N/yr (B)

Wastewater nitrogen load (Actual flows) = kg-N/yr (C)

Stormwater Runoff

Recharge rate for Bourne (inches; for natural areas from Technical Bulletin 91-001): (RECH)

Project site area: acres (D)

Project site wetland area: acres (E)

Project site upland area: acres (F)

Previous unpaired upland: acres (G)

Paved area: s.f. (H)

Factor may be adjusted for employment or LID → LID = low impact development

Roof area: s.f. (J)

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

Fertilizer

Previous unpaired upland - roof area = s.f.

Managed turf/ lawn area x = kg-N/yr (L)

Total Nitrogen Load

Total project nitrogen load (Title-5 flows): kg-N/yr (M) = (B)+(D)+(K)+(L)

Total project nitrogen load (Actual flows): kg-N/yr (N) = (C)+(F)+(K)+(L)

Nitrogen load per acre (Average): kg-N/yr/acre (O) = (M)+(N) *2 *(D)

Proposed Nitrogen Loading Concentration

Project nitrogen loading concentration (Title-5 flows): ppm-N (P) = (a)+723.76 + (G)/(RECH)-9.7286 + (H)-10.594 + (K)-0.75

Project nitrogen loading concentration (Actual flows): ppm-N (Q) = (b)+723.76 + (G)/(RECH)-9.7286 + (H)-10.594 + (K)-0.75

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 V 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

Wastewater offsets

kg-N/yr (B)

kg-N/yr (C)

Project site area: acres (D)

Project site wetland area: acres (E)

Project site upland area: acres (F)

Previous unpaired 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: s.f. (L)

Fertilizer offset: kg-N/yr (L)

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

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

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

Existing nitrogen loading concentrations:

Title-5 flows ppm-N (P)

Actual flows ppm-N (Q)

Facility/ Address: 9 POCAHONTAS ROAD
Preparer's Name: G. HARRINGTON, R.S.
Date:
Watershed:

next page -> Project nitrogen loading concentration (Average): **17.98** ppm-N (R) = (P)+(Q) +2 Average **17.98** ppm-N (R*)

Marine Water Recharge Areas / Coastal Embayments

2. Yes No
 Is the project located in any of the following watersheds: Buttermilk Bay Basins, Phinneys Harbor / Back River / Fiel Pond, Pocasset River Basin, Pocasset Harbor / Hen Cove / Red Brook Harbor, Moganett / Squeague Harbors** ?
 (If No, then go to line 3.)

Name of Watershed
 (from Regional Policy Plan Data Viewer):

Critical Nitrogen-loading limit** : **0.000** kg-N/year/acre (S)

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

Excess project nitrogen load to be mitigated: kg-N/yr (T) = LESSER OF (O)(S) x(F) AND (O')(O') x(F)

** When a nitrogen-loading limit has been determined through either a Total Maximum Daily Load (TMDL), a Massachusetts Estuaries Project-accepted technical report, or specified by a Commission-approved comprehensive wastewater management plan pursuant to Objective WR3, or if impaired water quality has been documented for the receiving coastal waters, the nitrogen loading limit shall be 0 kg-N/yr per acre pursuant to Objective WR3.

Groundwater Quality

3. Yes No
 Does the project's nitrogen loading concentration in groundwater (R) exceed the greater of 5 ppm or the existing concentration (R') ?
 (If Yes, the project will need to provide an alternative strategy for meeting these thresholds by using another watershed)

Potential Public Water Supply Areas

4. Yes No
 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 the existing concentration (R') ?
 (If Yes, the project must provide an alternative strategy for meeting Objective WR1)
 Does the project use, treat, generate, store or dispose of hazardous materials in excess of the greater of a) household quantities or b) existing quantities ?
 (If Yes, the project must provide an alternative strategy for meeting Objective WR1)

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 the existing concentration (R') ?
 (If Yes, the project must provide an alternative strategy for meeting Objective WR1)
 Does the project use, treat, generate, store or dispose of hazardous materials in excess of the greater of a) household quantities or b) existing quantities ?
 (If Yes, the project must provide an alternative strategy for meeting Objective WR1)

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 a stream or fresh surface water body?
 (If Yes, the project must provide an alternative strategy for meeting Objective WR2)

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 will not be significant impacts to water levels, surface waters and wetlands)

8. **The project must demonstrate compliance with Objective WR4, including use of Low Impact Development to mitigate impacts of stormwater runoff and O & M plans for maintaining stormwater infrastructure and landscaping.**



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See Cape Cod Commission Technical Bulletin 91-001 for further details:
https://capcodcommission.org/resource-library/files/2017/01/depl/commission/leann/Website_Resources/regulatory/nitrogenloadtechbulletin.pdf

New Construction/Increases in Flow, Raze & Rebuild, or Repair/Upgrades

Facility Address: 9 POCAHONTAS ROAD
 Preparer's Name: G. HARRINGTON, R.S.
 Date:
 Watershed:

Existing Conditions

1. Project Title-5 wastewater flows: gpd (a)
 Actual wastewater flows: * (b)
 Average wastewater flows: gpd (a)+(b) ÷ 2= (A)
 * Actual water use flows per unit in Bourne

Calculate (A) through (P) as w/ (a) through (P):
 Title-5 wastewater flows: gpd
 Actual wastewater flows: *
 Avg. wastewater flows: gpd (A)

Place Yes No
 Will the project be connected to sewer?
 Is project Title-5 wastewater flow 10,000 gpd or greater?

Place Yes No
 Is existing development on sewer?
 (if 'Yes', then go to line 2.)

Place Standard Title-5 System (35-ppm-N)
 DEP-approved I/A System (25-ppm-N)
 DEP-approved I/A System (19-ppm-N)
 DEP-approved Enhanced I/A (12-ppm-N)

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

Wastewater nitrogen load (Title-5 flows) = kg-N/yr (B)
 Wastewater nitrogen load (Actual flows) = kg-N/yr (C)

kg-N/yr (B)
 kg-N/yr (C)
 Wastewater effluent

Stormwater Runoff
 Town of Bourne Recharge rate for Bourne (Inches) for natural areas from Technical Bulletin 91-001: (RECH)

Project site area: acres (D)
 Project site wetland area: acres (E)
 Project site upland area: acres (F)
 Pervious unpaired upland: acres (G)
 Paved area: s.f. (H)
 Pavement runoff offset: kg-N/yr (I)
 Roof area: s.f. (J)
 Roof runoff offset: kg-N/yr (K)

Project site area: acres (D)
 Project site wetland area: acres (E)
 Project site upland area: acres (F)
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 Paved area: s.f. (H)
 Pavement runoff offset: kg-N/yr (I)
 Roof area: s.f. (J)
 Roof runoff offset: kg-N/yr (K)

Fertilizer
 Previous unpaired upland - roof area = s.f.
 Managed turf/ lawn area x kg-N/yr (L)

Managed Turf/ lawn area: s.f. (L)
 Fertilizer offset: kg-N/yr (L)

Total Nitrogen Load
 Total project nitrogen load (Title-5 flows): kg-N/yr (M)
 Total project nitrogen load (Actual flows): kg-N/yr (N)
 Nitrogen load per acre (Average): kg-N/yr/acre (O)

Existing nitrogen load (Title-5 flows): kg-N/yr (M)
 Existing nitrogen load (Actual flows): kg-N/yr (N)
 Nitrogen offset per acre: kg-N/yr/acre (O)

Proposed Nitrogen Loading Concentration
 Project nitrogen loading concentration (Title-5 flows): ppm-N (P)
 Project nitrogen loading concentration (Actual flows): ppm-N (Q)

Existing nitrogen loading concentrations:
 Title-5 flows ppm-N (P)
 Actual flows ppm-N (Q)

$$(M) \frac{(a)+723.76 + (G)(RECH)-8.7286 + (I)-10.594 + (K)+0.75}{(N)}$$

$$(b)+723.76 + (G)(RECH)-8.7286 + (I)-10.594 + (K)+0.75$$

next page -> Project nitrogen loading concentration (Average): **10.55** ppm-N (R) = (P)+(Q) +2 Average **17.98** ppm-N (R)

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, Plimneys Harbor / Back River / Eel Pond, Pocommet River Basin, Pocommet Harbor / Hen Cove / Red Brook Harbor, Megansett / Squeteague Harbors** ?
 (If No, then go to line 3.)

Name of Watershed
 (from Regional Policy / Plan Data Viewer):

Critical Nitrogen-loading limit** : **0.000** kg-N/year/acre (S)

Does project's nitrogen load (O) exceed the existing load (OT) AND the critical nitrogen load (S) ?
 (If No, then go to line 3.)

Excess project nitrogen load to be mitigated: kg-N/yr (T) = LESSER OF (O)-(S) x(F) AND (O)-(OT) x(F)

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Groundwater Quality

3. Yes No
 Does the project's nitrogen loading concentration in groundwater (R) exceed the greater of 5 ppm or the existing concentration (R) ?
 (If Yes, the project will need to provide an alternative strategy for meeting these thresholds by using another watershed)

Potential Public Water Supply Areas

4. Yes No
 Is project in a Potential Public Water Supply Area (PPWSA) ?
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Does the project's nitrogen loading concentration (R) exceed the greater of 1 ppm or the existing concentration (R) ?
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Does the project use, treat, generate, store or dispose of hazardous materials in excess of the greater of a) household quantities or b) existing quantities ?
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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 the existing concentration (R) ?
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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 (WRA) hydraulically upgradient of a stream or fresh surface water body?
 (If Yes, the project must provide an alternative strategy for meeting Objective WR2)

Other Potential Impacts

Yes No

7. Will the project withdraw more than 20,000 gallons of water per day?
(If Yes, then the project must provide documentation demonstrating that there will not be significant impacts to water levels, surface waters and wetlands)

8. The project must demonstrate compliance with Objective W/R4, including use of Low Impact Development to mitigate impacts of stormwater runoff and O & M plans for maintaining stormwater Infrastructure and landscaping.