

82 Captains Row, Bourne, MA

Water Resources Nitrogen Loading and Mitigation Worksheet

See Technical Bulletin 91-001 for further details: <http://www.capecodcommission.org/regulatory/NitrogenLoadTechbulletin.pdf>

Project Nitrogen Load	Wastewater	Proposed development
1.	Project Title-5 wastewater flows:	<input type="text" value="330.0"/> gpd (a)
	Actual wastewater flows:	<input type="text" value="137.5"/> * (b)
	Average wastewater flows:	<input type="text" value="233.8"/> gpd (a)+(b) ÷ 2= (A)
Place <input checked="" type="checkbox"/> in applicable box:		* Title-5 flows prescribed by TB91-001 for commercial use
<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Will the project be connected to sewer ?
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Is project Title-5 wastewater flow 10,000 gpd or greater ?
<i>(If 'Yes', then the project must be reviewed for consistency with Additional Methods under Objective WR1)</i>		
Place <input checked="" type="checkbox"/> in applicable box and multiply unsewered wastewater flow by applicable conversion factor:		
<input type="checkbox"/>	Standard Title-5 System (35-ppm-N)	x 0.048359
<input type="checkbox"/>	DEP-approved I/A System (25-ppm-N)	x 0.034542
<input checked="" type="checkbox"/>	DEP-approved I/A System (19-ppm-N)	x 0.026252
<input type="checkbox"/>	Groundwater Discharge (10-ppm-N)	x 0.013817
		} Type of system: _____
Wastewater nitrogen load (Title-5 flows) =		<input type="text" value="8.66"/> kg-N/yr (B)
Wastewater nitrogen load (Actual flows) =		<input type="text" value="3.61"/> kg-N/yr (C)
Stormwater Runoff		
Town: _____	Recharge rate for town (inches; for natural areas from Technical Bulletin 91-001):	<input type="text" value="21"/> (RECH)
Project site area:	<input type="text" value="0.259"/> acres	(D)
Project site wetland area:	<input type="text" value="0.132"/> acres	(E)
Project site upland area:	<input type="text" value="0.127"/> acres	(F)
Pervious unpaved upland:	<input type="text" value="0.053"/> acres	(G)
<input type="text" value="0"/> % using LID	Paved area: <input type="text" value="2,092"/> s.f.	(H)
Factor may be adjusted for employment of LID →	x 1.4158E-04	= <input type="text" value="0.29619373"/> kg-N/yr (I)
Roof area:	<input type="text" value="1,122"/> s.f.	(J)
	x 7.0792E-05	= <input type="text" value="0.0794"/> kg-N/yr (K)
Fertilizer		
Managed turf:	<input type="text" value="2,225"/> s.f.	
	x 3.4019E-04	= <input type="text" value="0.757"/> kg-N/yr (L)
Total Nitrogen Load		
Total project nitrogen load (Title-5 flows):	<input type="text" value="9.80"/> kg-N/yr	(M)=
Total project nitrogen load (Actual flows):	<input type="text" value="4.74"/> kg-N/yr	(N)=
Nitrogen load per acre (Average):	<input type="text" value="28.07"/> kg-N/yr/acre	(O)=
Nitrogen Loading Concentration		
Project nitrogen loading concentration (Title-5 flows):	<input type="text" value="11.21"/> ppm-N	(P)=
Project nitrogen loading concentration (Actual flows):	<input type="text" value="7.80"/> ppm-N	(Q)=
Project nitrogen loading concentration (Average):	<input type="text" value="9.50"/> ppm-N	(R)=

Existing (if redevelopment)

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

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

Place \checkmark 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)
- Wastewater Treatment Facility (GWDP)

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: s.f.

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

(B)+(I)+(K)+(L)

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

(C)+(I)+(K)+(L)

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

(M)+(N) ÷ 2 ÷ (F)

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

(M)
 (a) ÷ 723.76 + (G)x(RECH) ÷ 9.7286 + (H) ÷ 10,594 + (K) ÷ 0.75

(N)
 (b) ÷ 723.76 + (G)x(RECH) ÷ 9.7286 + (H) ÷ 10,594 + (K) ÷ 0.75

(P)+(Q) ÷ 2

Existing nitrogen loading concentrations:

Title-5 flows ppm-N (P')

Actual flows ppm-N (Q')

Average ppm-N (R')

Resource/ Impact Based Criteria

Marine Water Recharge Areas

2. Yes No Is the project in Marine Water Recharge Area (MWRA) with a nitrogen-loading limit OR in a MWRA that discharges to coastal (If 'No', then go to line 3.)

Name of Marine Water Recharge Area sub-embayment (from RPP Data Viewer):

Nitrogen-loading limit** : 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)=
x \$8,290 /kg/yr
= \$ (U)

Place ✓ in box if applicant intends to make this payment (S) (If not checked, then the project must provide an alternative strategy for meeting its nitrogen load requirement 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)

** When a nitrogen-loading limit has been determined through either a Total Maximum Daily Load (TMDL), a Massachusetts Estuaries Project 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

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' and the project is not located in an Impaired Area, the project will need to provide an alternative strategy for meeting Objective WR1)

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 quantity or b) 100 lbs of hazardous materials in excess of the greater of a) household quantity or b) 100 lbs of hazardous materials? (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) ? (If 'No', then go to line 6.)

Does the project's nitrogen loading concentration (R) exceed the greater of 5 ppm or the existing concentration (R') ? (If 'Yes' and the project is not located in an Impaired Area, 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 quantity or b) 100 lbs of hazardous materials? (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 resources)

8. The project must demonstrate compliance with Objective WR4, including use of Low Impact Development to mitigate impacts of stormwater runoff