Facility Address:
Preparer's Name:
Date:
Watershed:

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/file/?url=/dept/commission/team/Website_Resources/regulatory/NitrogenLoadTechbulletin.pdf

Project Nitrogen Load — ***Wastewater*** — ***Proposed development***

1.

Project Title-5 wastewater flows:	220.0 gpd		**(a)**
Actual wastewater flows:	175.0 *		**(b)**
Average wastewater flows:	197.5 gpd	**(a)+(b) ÷2=**	**(A)**

* Title-5 flows prescribed by TB91-001 for commercial uses

Place √ in applicable box:

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

(If 'Yes', then the project must be reviewed for consistency with Additional Methods under Objective WR1)

Place √ in applicable box and multiply unsewered wastewater flow by applicable conversion factor:

☐	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

} Type of system: _____

Wastewater nitrogen load **(Title-5 flows)** = 5.78 kg-N/yr **(B)**

Wastewater nitrogen load **(Actual flows)** = 4.59 kg-N/yr **(C)**

Stormwater Runoff

Town of Bourne

Recharge rate for Bourne (inches; for natural areas from Technical Bulletin 91-001): : 21 **(RECH)**

Project site area:	0.188 acres		**(D)**
Project site wetland area:	0.000 acres		**(E)**
Project site upland area:	0.188 acres		**(F)**
Pervious unpaved upland:	0.141 acres		**(G)**
0 % using LID — Paved area:	832 s.f.		**(H)**
Factor may be adjusted for employment of LID →	x 1.4158E-04		
	= 0.11779789 kg-N/yr		**(I)**
Roof area:	1,201 s.f.		**(J)**
	x 7.0792E-05		
	= 0.0850 kg-N/yr		**(K)**

Fertilizer

Lawn / Managed turf area:	0 s.f.		
	x 3.4019E-04		
	= 0.000 kg-N/yr		**(L)**

Total Nitrogen Load

Total project nitrogen load **(Title-5 flows)**:	5.98 kg-N/yr	**(M)=**	**(B)+(I)+(K)+(L)**
Total project nitrogen load **(Actual flows)**:	4.80 kg-N/yr	**(N)=**	**(C)+(I)+(K)+(L)**
Nitrogen load per acre **(Average)**:	**28.66** kg-N/yr/acre	**(O)=**	**(M)+(N) ÷2 ÷(F)**

Nitrogen Loading Concentration

Existing (if redevelopment)

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

Title-5 wastewater flows:	220.0 gpd	
Actual wastewater flows:	175.0 *	
Ave. wastewater flows:	197.5 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

10.64 kg-N/yr **(B')**

8.46 kg-N/yr **(C')** wastewater offsets

Project site area:	0.188 acres	**(D)**
Project site wetland area:	0.000 acres	**(E)**
Project site upland area:	0.188 acres	**(F)**
Pervious unpaved upland:	0.141 acres	**(G')**
Paved area:	832 s.f.	**(H')**
Paving runoff offset:	0.1178 kg-N/yr	**(I')**
Roof area:	1,201 s.f.	**(J')**
Roof runoff offset:	0.0850 kg-N/yr	**(K')**
Managed turf:	0 s.f.	
Fertilizer offset:	0.000 kg-N/yr	**(L')**
Existing nitrogen load (Title-5 flows):	10.84 kg-N/yr	**(M')**
Existing nitrogen load (Actual flows):	8.67 kg-N/yr	**(N')**
Nitrogen offset per acre:	**51.88** kg-N/yr/acre	**(O')**

Existing nitrogen loading concentrations:

Project nitrogen loading concentration (**Title-5 flows**):	**7.46**	ppm-N	**(P)=**	$\frac{\textbf{(M)}}{\textbf{(a)÷723.76 + (G)x(RECH)÷9.7286 + (H)÷10,594 + (K)÷0.75}}$	Title-5 flows	**13.54**	ppm-N	**(P')**
Project nitrogen loading concentration (**Actual flows**):	**6.49**	ppm-N	**(Q)=**	$\frac{\textbf{(N)}}{\textbf{(b)÷723.76 + (G)x(RECH)÷9.7286 + (H)÷10,594 + (K)÷0.75}}$	Actual flows	**11.73**	ppm-N	**(Q')**
Project nitrogen loading concentration (**Average**):	**6.98**	ppm-N	**(R)=**	**(P)+(Q) ÷2**	Average	**12.63**	ppm-N	**(R')**

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Resource/ Impact Based Criteria

Marine Water Recharge Areas / Coastal Embayments

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

Name of Marine Water Recharge Area sub-embayment
(*from Regional Policy Plan Data Viewer*):

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

	X	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: 0.00 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

	Yes	No	
3.	X		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 Objective WR1)***

Potential Public Water Supply Areas

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

	Yes	No	
5.		X	Is project in a Wellhead Protection Area (WHPA) ?
	X		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)***
		X	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

	Yes	No	
6.	☐	☒	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

	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 WR4, including use of Low Impact Development to mitigate impacts of stormwater runoff and O & M plans for maintaining stormwater infrastructure and landscaping.***