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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/NitrogenLoadTechbul

Project Nitrogen Load ***Proposed Wastewater*** ***New Construction/ Increases in Flow, Raze & Rebuild,***

1.

Project Title-5 wastewater flows:	440.0	gpd		**(a)**
Actual wastewater flows:	175.0 *			**(b)**
Average wastewater flows:	307.5	gpd	**(a)+(b) ÷2=**	**(A)**

* Actual water use flows per unit in Bourne

Place √ in applicable box:

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

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	
x	DEP-approved I/A System (19-ppm-N)	x	0.026252	} Type of system: _____
☐	DEP-approved Enhanced I/A (12-ppm-N)	x	0.016580	

Wastewater nitrogen load **(Title-5 flows)** = 11.55 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: 0.500 acres **(D)**

Project site wetland area: 0.150 acres **(E)**

	Project site upland area:	0.350	acres		**(F)**
	Pervious unpaved upland:	0.270	acres		**(G)**
10 % using LID	Paved area:	1,707	s.f.		**(H)**
Factor may be adjusted for employment of LID →	x	1.3804E-04			
LID = low impact development	=	0.23564179	kg-N/yr		**(I)**
	Roof area:	1,776	s.f.		**(J)**
	x	7.0792E-05			
	=	0.1257	kg-N/yr		**(K)**
Fertilizer	Previous unpaved upland - roof area =				
	Managed turf/ lawn area	6,000	s.f.		
	x	3.4019E-04			
	=	2.041	kg-N/yr		**(L)**
Total Nitrogen Load					
	Total project nitrogen load **(Title-5 flows)**:		13.95	kg-N/yr	**(M)=**
	Total project nitrogen load **(Actual flows)**:		7.00	kg-N/yr	**(N)=**
	Nitrogen load per acre **(Average)**:		**20.95**	kg-N/yr/acre	**(O)=**
Proposed Nitrogen Loading Concentration					
	Project nitrogen loading concentration (**Title-5 flows**):		**9.18**	ppm-N	**(P)=**
	Project nitrogen loading concentration (**Actual flows**):		**6.07**	ppm-N	**(Q)=**
	Project nitrogen loading concentration (**Average**):		**7.62**	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, Poca**

(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)**

	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: kg-N/yr **(T)=**

*** When a nitrogen-loading limit has been determined through either a Total Maximum Daily Load (TMDL), a Massachusetts Estuaries Project-ac pursuant to Objective WR3, or if impaired water quality has been documented for the receiving coastal waters, the nitrogen loading*

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

(If 'Yes' , the project will need to provide an alternative strategy for meeting these thresholds by using another worksheet

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 ***(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 ***(If 'Yes', the project must provide an alternative strategy for meeting Objective WR1)***

Fresh Water Recharge Areas

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

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

Facility Addres 89 Bellavista Drive
Preparer's Nar Carmen Shay
Date:
Watershed:

Existing Conditions

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

Title-5 wastewater flows:	440.0	gpd	
Actual wastewater flows:	175.0	*	
Avg. wastewater flows:	307.5	gpd	**(A')**

Place √ in applicable box:

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

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

	11.55	kg-N/yr	**(B')**
	4.59	kg-N/yr	**(C')**
		wastewater offsets	

Project site area:	0.500	acres	**(D)**
Project site wetland area:	0.150	acres	**(E)**

	Project site upland area:	0.350	acres	**(F)**
	Pervious unpaved upland:	0.270	acres	**(G')**
	Paved area:	1,707	s.f.	**(H')**
	Paving runoff offset:	0.2417	kg-N/yr	**(I')**
	Roof area:	1,776	s.f.	**(J')**
	Roof runoff offset:	0.1257	kg-N/yr	**(K')**
	Managed Turf/ lawn area:	6,000	s.f.	
	Fertilizer offset:	2.041	kg-N/yr	**(L')**
(B)+(I)+(K)+(L)	Existing nitrogen load (Title-5 flows):	13.96	kg-N/yr	**(M')**
(C)+(I)+(K)+(L)	Existing nitrogen load (Actual flows):	7.00	kg-N/yr	**(N')**
(M)+(N) ÷2 ÷(D)	Nitrogen offset per acre:	**20.96**	kg-N/yr/acre	**(O')**

Existing nitrogen loading concentrations:

$\frac{(M)}{(a)\div 723.76 + (G)x(RECH)\div 9.7286 + (H)\div 10,594 + (K)\div 0.75}$	Title-5 flows	**9.19**	ppm-N **(P')**
$\frac{(N)}{(b)\div 723.76 + (G)x(RECH)\div 9.7286 + (H)\div 10,594 + (K)\div 0.75}$	Actual flows	**6.07**	ppm-N **(Q')**
(P)+(Q) ÷2	Average	**7.63**	ppm-N **(R')**

sset River Basin, Pocasset Harbor / Hen Cove / Red Brook Harbor, Megansett / Squeteague Harbors** ?

LESSER OF **(O)-(S) x(F)** AND **(O)-(O') x(F)**

cepted technical report, or specified by a Commission-approved comprehensive wastewater management plan
limit shall be 0 kg-N/yr per acre pursuant to Objective WR3.

(R') ?
)

; or b) existing quantities ?

; or b) existing quantities ?

vels, surface waters and wetlands)

nwater runoff and O & M plans for maintaining stormwater infrastructure and landscaping.