

**SIMULATION OF NITROGEN IN RECHARGE (SONIR)**

NELSON, POPE & VOORHIS, LLC MICROCOMPUTER MODEL

NAME OF PROJECT

Hampton Bays Downtown Overlay District - Proposed Conditions  
Hampton Bays, NY

**DATA INPUT FIELD**

<b>A</b>	<b>Site Recharge Parameters</b>	<b>Value</b>	<b>Units</b>	<b>B</b>	<b>Nitrogen Budget Parameters</b>	<b>Value</b>	<b>Units</b>
1	Area of Site	54.85	acres	1	Persons per Dwelling	2.53	persons
2	Precipitation Rate	50.10	inches	2	Nitrogen per Person per Year	10.0	lbs
3	Acreage of Fertilized Landscaping	6.92	acres	3	a. Sanitary Nitrogen Leaching Rate	84%	percent
4	Fraction of Land in above	0.126	fraction	3	b. Treated Sanitary Nitrogen Leaching Rate	100%	percent
5	Evapotranspiration from above	21.20	inches	4	Fertilized Landscaping	6.92	acres
6	Runoff from above	0.50	inches	5	Fertilizer Application Rate (for above)	3.00	lbs/1000 sq ft
7	Acreage of Unfertilized Landscaping	0.00	acres	6	Fertilizer Nitrogen Leaching Rate (for above)	30%	percent
8	Fraction of above	0.000	fraction	7	Fertilized Land (other, if applicable)	0.00	acres
9	Evapotranspiration from above	21.20	inches	8	Fertilizer Application Rate (for above)	0.00	lbs/1000 sq ft
10	Runoff from above	0.50	inches	9	Fertilizer Nitrogen Leaching Rate (for above)	0%	percent
11	Acreage of Unvegetated/Dirt Roads	0.56	acres	10	Outdoor Cat Population	0.19	pets/dwelling
12	Fraction of above	0.010	fraction	11	Cat Waste Nitrogen Load	3.22	lbs/pet/year
13	Evapotranspiration from above	21.20	inches	12	Outdoor Dog Population	0.35	pets/dwelling
14	Runoff from above	0.00	inches	13	Dog Waste Nitrogen Load	4.29	lbs/pet/year
15	Acreage of Water/Ponds	0.00	acres	14	Pet Waste Nitrogen Leaching Rate	25%	percent
16	Fraction of Site in above	0.000	fraction	15	Area of Land Irrigated	6.92	acres
17	Evaporation from above	30.00	inches	16	Irrigation Rate	24.00	inches
18	Makeup Water (if applicable)	0.00	inches	17	Irrigation Nitrogen Leaching Rate	10%	percent
19	Acreage of Natural	9.17	acres	18	Atmospheric Nitrogen Application/Load	0.04	lbs/1000 sq ft
20	Fraction of above	0.167	fraction	19	Atmos. N Leaching Rate (Natural/Wetlands)	25%	percent
21	Evapotranspiration from above	21.20	inches	20	Atmos. N Leaching Rate (Turf/Landscaped)	20%	percent
22	Runoff from above	0.50	inches	21	Atmos. N. Leaching Rate (Ag; Imperv; Other)	40%	percent
23	Acreage of Impervious/Paved/Bldgs	38.20	acres	22	Nitrogen in Water Supply	2.00	mg/l
24	Fraction of Land in above	0.696	fraction	23	Nitrogen in Sanitary Flow	10.00	mg/l
25	Evapotrans. from above	5.01	inches				
26	Runoff from Impervious	0.00	inches				
27	Acreage of Other	0.00	acres				
28	Fraction of Land in above	0.000	fraction				
29	Evapotrans. from above	21.20	inches				
30	Runoff from above	0.00	inches				
31	Acreage of Land Irrigated	6.92	acres				
32	Fraction of Land Irrigated	0.126	fraction				
33	Irrigation Rate	24.00	inches				
34	Number of Dwellings	248	units				
35	Water Use per Dwelling	225	gal/day				
36	Wastewater Design Flow (units)	128,829	gal/day				

  

<b>C</b>	<b>Comments</b>
1)	Please refer to user manual for data input instructions; updated per LINAP.
	Developed Area 45.68 83%
	Natural/Unvegetated/Revegetated Area 9.17 17%
	Total Acreage Check 54.85 100%



**Hampton Bays Downtown Overlay District - Proposed Conditions**

**SITE RECHARGE COMPUTATIONS**

<b>A Fertilized Landscaping</b>			<b>B Unfertilized Landscaping</b>				
	<i>Value</i>	<i>Units</i>		<i>Value</i>	<i>Units</i>		
1	A = Fraction of Land in Cover Type	0.126	fraction	1	A = Fraction of Land in Cover Type	0.000	fraction
2	P = Precipitation Rate	50.10	inches	2	P = Precipitation Rate	50.10	inches
3	E = Evapotranspiration Rate	21.20	inches	3	E = Evapotranspiration Rate	21.20	inches
4	Q = Runoff Rate	0.50	inches	4	Q = Runoff Rate	0.50	inches
5	R(a) = P - (E + Q)	28.40	inches	5	R(b) = P - (E + Q)	28.40	inches
6	R(A) = R(a) x A	3.58	inches	6	R(B) = R(b) x A	0.00	inches

<b>C Unvegetated/Dirt Roads</b>			<b>D Water/Ponds</b>				
	<i>Value</i>	<i>Units</i>		<i>Value</i>	<i>Units</i>		
1	A = Fraction of Land in Cover Type	0.010	fraction	1	A = Fraction of Site in Water	0.000	fraction
2	P = Precipitation Rate	50.10	inches	2	P = Precipitation Rate	50.10	inches
3	E = Evapotranspiration Rate	21.20	inches	3	E = Evaporation Rate	30.00	inches
4	Q = Runoff Rate	0.00	inches	4	Q = Runoff Rate	0.00	inches
5	R(c) = P - (E + Q)	28.90	inches	5	M = Makeup Water	0.00	inches
6	R(C) = R(c) x A	0.30	inches	6	R(d) = {P - (E+Q)} - M	20.10	inches
				7	R(D) = R(d) x A	0.00	inches

<b>E Natural</b>			<b>F Impervious/Paved/Roads</b>				
	<i>Value</i>	<i>Units</i>		<i>Value</i>	<i>Units</i>		
1	A = Fraction of Land in Cover Type	0.167	fraction	1	A = Fraction of Land in Cover Type	0.696	fraction
2	P = Precipitation Rate	50.10	inches	2	P = Precipitation Rate	50.10	inches
3	E = Evapotranspiration Rate	21.20	inches	3	E = Evapotranspiration Rate	5.01	inches
4	Q = Runoff Rate	0.50	inches	4	Q = Runoff Rate	0.00	inches
5	R(e) = P - (E + Q)	28.40	inches	5	R(f) = P - (E + Q)	45.09	inches
6	R(E) = R(e) x A	4.75	inches	6	R(F) = R(f) x A	31.40	inches

<b>G Other</b>			<b>H Irrigation Recharge</b>				
	<i>Value</i>	<i>Units</i>		<i>Value</i>	<i>Units</i>		
1	A = Fraction of Land in Cover Type	0.000	fraction	1	A = Fraction of Land Irrigated	0.126	fraction
2	P = Precipitation Rate	50.10	inches	2	I = Irrigation Rate	24.00	inches
3	E = Evapotranspiration Rate	21.20	inches	3	E = Evaptranspiration Rate	21.40	inches
4	Q = Runoff Rate	0.00	inches	4	Q = Runoff Rate	0.00	inches
5	R(g) = P - (E + Q)	28.90	inches	5	R(h) = I - (E + Q)	2.60	inches
6	R(G) = R(g) x A	0.00	inches	6	R(H) = R(h) x A	0.33	inches

<b>I Wastewater Recharge</b>			<b>J Runoff Recharge</b>				
	<i>Value</i>	<i>Units</i>		<i>Value</i>	<i>Units</i>		
1	WDF = Wastewater Design Flow	128,829	gal/day	1	Q(A) = Runoff from Landscaped	0.063	inches
2	WDF = Wastewater Design Flow	6,286,920	cu ft/yr	2	Q(B) = Runoff from Unfertilized Landscaping	0.000	inches
3	A = Area of Site	2,389,266	sq ft	3	Q(C) = Runoff from Unvegetated	0.000	inches
4	R(j) = WDF/A	2.63	feet	4	Q(E) = Runoff from Natural	0.084	inches
5	R(I) = Wastewater Recharge	31.58	inches	5	Q(H) = Runoff from Other	0.000	inches
				6	Q(I) = Runoff from Irrigation	0.00	inches
				7	Q(tot) = Q(A)+Q(B)+Q(C)+Q(E)+Q(H)+Q(I)	0.15	inches

<b>Total Site Recharge</b>		
R(T) =	R(A)+R(B)+R(C)+R(D)+R(E)+R(F)+R(G)+R(H)+R(I)+R(J)+Q(tot)	
<b>R(T) =</b>	<b>72.08</b>	<b>inches</b>



**Hampton Bays Downtown Overlay District - Proposed Conditions**

**SITE NITROGEN BUDGET**

<b>A</b>	<b>Sanitary Nitrogen-Residential</b>	<b>Value</b>	<b>Units</b>
1	Number of Dwellings	0	units
2	Persons per Dwelling	2.53	capita
3	P = Population	0.00	capita
4	N = Nitrogen per person	10	lbs
6	N = (total; pre loss/removal)	0	lbs
7	LR = Leaching Rate	84%	percent
8	N(S) = P x N x LR	0.00	lbs
9	N = loss/removal	0.00	lbs

<b>C</b>	<b>Sanitary Nitrogen (Wastewater Design Flow)</b>		
1	CF = Commercial/STP Flow	128,829	gal/day
2	CF = Commercial/STP Flow	177,980,484	liters/yr
5	N =Nitrogen	10.00	mg/l
6	N = Nitrogen	3924.47	lbs
7	LR = Leaching Rate	100%	percent
8	N(S) = CF x N x LR	1,779,804,842	milligrams
9	N(S) = Sanitary Nitrogen	3924.47	lbs
10	N = loss/removal	0.00	lbs

<b>E</b>	<b>Fertilized Land (Fertilized Landscaping)</b>		
1	A = Area of Land Fertilized	301,435	sq ft
2	AR = Application Rate	3.00	lbs/1000 sf
3	N(T) = Nitrogen (total applied)	904.31	lbs
4	LR = Leaching Rate	30%	percent
5	N(F1) = A x AR x LR	271.29	lbs
6	N = loss/removal	633.01	lbs

<b>G</b>	<b>Atmospheric Nitrogen (existing condition)</b>		
1	Application Load	0.041	lbs/1000 sf
2	Area of Natural/Wetlands/1000 sf	399	1000 sf
3	Leaching Rate	25%	percent
4	Atmos. N Load-1 (natural/wetlands)	4.09	lbs/year
5	Area of turf/landscaped/1000 sf	301	1000 sf
6	Leaching Rate	20%	percent
7	Atmos. N Load-2 (golf/turf)	2.47	lbs/year
8	Area of Impervious/Agricult/1000 sf	1,664	1000 sf
9	Leaching Rate	40%	percent
10	Atmos. N Load-3 (ag; imperv; other)	27.29	lbs/year
11	N(at) = N Load 1 + 2 +3	33.86	lbs
12	N = loss/removal	63.10	lbs

<b>B</b>	<b>Cat Waste Nitrogen</b>	<b>Value</b>	<b>Units</b>
1	Number of Cats per Dwelling	0.19	cats/dwelling
2	Number of Cats (Cats/dwelling x dwellings)	46	cats
3	Cat Waste Nitrogen Load	3.22	lbs/cat/year
4	N(p) = AR x cats x Adjustment (if applicable)	147.73	lbs/year
5	LR = Leaching Rate	25%	percent
6	N(P) = N(p) x LR	36.93	lbs
7	N = (loss/removal)	110.80	lbs

<b>B'</b>	<b>Dog Waste Nitrogen</b>	<b>Value</b>	<b>Units</b>
1	Number of Dogs per Dwelling	0.35	dogs/dwelling
2	Number of Dogs (Dogs/dwelling x dwellings)	87	dogs
3	Dog Waste Nitrogen Load	4.29	lbs/dog/year
4	N(p) = AR x dogs x Adjustment (if applicable)	372.37	lbs/year
5	LR = Leaching Rate	25%	percent
6	N(P) = N(p) x LR	93.09	lbs
7	N = (loss/removal)	279.28	lbs

<b>D</b>	<b>Water Supply Nitrogen (other than wastewater, if applicable)</b>		
1	WDF = Wastewater Design Flow	0	gal/day
2	WDF = Wastewater Design Flow	0	liters/yr
3	N = Nitrogen in Water Supply	10.00	mg/l
4	N(WW) = WDF x N	0	milligrams
5	N(WW) = Wastewater Nitrogen	0.00	lbs

<b>F</b>	<b>Fertilized Land (Unfertilized Landscaping)</b>		
1	A = Area of Land Fertilized 2	0	sq ft
2	AR = Application Rate	0.00	lbs/1000 sf
3	N(T) = Nitrogen (total applied)	0.00	lbs
4	LR = Leaching Rate	0%	percent
5	N(F2) = A x AR x LR	0.00	lbs
6	N = loss/removal	0.00	lbs

<b>H</b>	<b>Irrigation Nitrogen</b>		
1	R = Irrigation Recharge (inches)	0.33	inches
2	R = Irrigation Rate (feet)	0.0273	feet
3	A = Area of Land Irrigated	1,045,440	sq ft
4	R(I) = R(irr) x A	28,577	cu ft
5	R(I) = Site Irrigation (liters)	809,308	liters
6	N = Nitrogen in Water Supply	2.00	mg/l
7	N(T) = Nitrogen (total applied)	3.57	lbs
8	LR = Leaching Rate	10%	percent
9	N(irr) = R(I) x N x LR	161,862	milligrams
10	N(irr) = Irrigation Nitrogen	0.36	lbs
11	N = loss/removal	3.21	lbs

<b>Total Site Nitrogen</b>	
N=	N(S) + N(P) + N(WW) + N(F1) + N(F2) + N(ppt) + N(irr)
<b>N=</b>	<b>4,360.00</b> lbs



# SIMULATION OF NITROGEN IN RECHARGE (SONIR)

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NAME OF PROJECT

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Hampton Bays, NY

**FINAL COMPUTATIONS**

A	<i>Nitrogen in Recharge (concentr.)</i>	<i>Value</i>	<i>Units</i>
1	N = Total Nitrogen (lbs)	4,360.00	lbs
2	N = Total Nitrogen (milligrams)	1,979,440,097	milligrams
3	R(T) = Total Recharge (inches)	72.08	inches
4	R(T) = Total Recharge (feet)	6.01	feet
5	A = Area of Site	2,389,266	sq ft
6	R = R(T) x A	14,351,382	cu ft
7	R = Site Recharge Volume	406,431,140	liters
9	NR = N/R	4.87	mg/l

CONCENTRATION OF NITROGEN IN RECHARGE	
Pre-Mitigation	<b>4.87</b>

B	<i>Site Recharge Summary</i>	<i>Value</i>	<i>Units</i>
1	R(T) = Total Site Recharge	72.08	inches/yr
2	R = Site Recharge Volume	14,351,382	cu ft/yr
3	R = Site Recharge Volume	107,355,801	gal/yr
4	R = Site Recharge Volume	107.36	MG/yr

**Nitrogen Load Summary - On-Site**

	<u>Load</u>	<u>Percent</u>
Sanitary Nitrogen (On-Site Wastewater)	3,924.47	90.01%
Fertilized Landscaping	271.29	6.22%
Dog Waste Nitrogen	93.09	2.14%
Cat Waste Nitrogen	36.93	0.85%
Atmospheric Nitrogen	33.86	0.78%
Irrigation Nitrogen	0.36	0.01%
Total Pounds Nitrogen	4,360.00	100.00%

<i>Conversions used in SONIR</i>	
Acres x 43,560 = Square Feet	Gallons x 0.1337 = Cubic Feet
Cubic Feet x 7.48052 = Gallons	Gallons x 3.785 = Liters
Cubic Feet x 28.32 = Liters	Grams / 1,000 = Milligrams
Days x 365 = Years	Grams x 0.002205 = Pounds
Feet x 12 = Inches	Milligrams / 1,000 = Grams

