
APPENDIX I-3

SONIR-PROPOSED CONDITIONS

Prepared by Nelson, Pope & Voorhis, LLC- June 17th 2024

SIMULATION OF NITROGEN IN RECHARGE (SONIR)

NELSON, POPE & VOORHIS, LLC MICROCOMPUTER MODEL

Suffolk Technology Park

SITE RECHARGE COMPUTATIONS

A Fertilized Landscaping				B Unfertilized Landscaping			
		Value	Units			Value	Units
1	A = Fraction of Land in Cover Type	0.022	fraction	1	A = Fraction of Land in Cover Type	0.123	fraction
2	P = Precipitation Rate	45.30	inches	2	P = Precipitation Rate	45.30	inches
3	E = Evapotranspiration Rate	25.10	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)	19.70	inches	5	R(b) = P - (E + Q)	23.60	inches
6	R(A) = R(a) x A	0.43	inches	6	R(B) = R(b) x A	2.91	inches

C Unvegetated/Dirt Roads				D Water/Ponds			
		Value	Units			Value	Units
1	A = Fraction of Land in Cover Type	0.000	fraction	1	A = Fraction of Site in Water	0.020	fraction
2	P = Precipitation Rate	45.30	inches	2	P = Precipitation Rate	45.30	inches
3	E = Evapotranspiration Rate	22.40	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)	22.90	inches	5	M = Makeup Water	0.00	inches
6	R(C) = R(c) x A	0.00	inches	6	R(d) = {P - (E+Q)} - M	15.30	inches
				7	R(D) = R(d) x A	0.31	inches

E Natural				F Impervious/Paved/Roads			
		Value	Units			Value	Units
1	A = Fraction of Land in Cover Type	0.063	fraction	1	A = Fraction of Land in Cover Type	0.771	fraction
2	P = Precipitation Rate	45.30	inches	2	P = Precipitation Rate	45.30	inches
3	E = Evapotranspiration Rate	21.20	inches	3	E = Evapotranspiration Rate	4.53	inches
4	Q = Runoff Rate	0.50	inches	4	Q = Runoff Rate	0.00	inches
5	R(e) = P - (E + Q)	23.60	inches	5	R(f) = P - (E + Q)	40.77	inches
6	R(E) = R(e) x A	1.49	inches	6	R(F) = R(f) x A	31.45	inches

G Other				H Irrigation Recharge			
		Value	Units			Value	Units
1	A = Fraction of Land in Cover Type	0.000	fraction	1	A = Fraction of Land Irrigated	0.022	fraction
2	P = Precipitation Rate	45.30	inches	2	I = Irrigation Rate	24.00	inches
3	E = Evapotranspiration Rate	21.20	inches	3	E = Evapotranspiration Rate	21.40	inches
4	Q = Runoff Rate	0.00	inches	4	Q = Runoff Rate	0.00	inches
5	R(g) = P - (E + Q)	24.10	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	0.06	inches

I Wastewater Recharge				J Runoff Recharge			
		Value	Units			Value	Units
1	WDF = Wastewater Design Flow	0	gal/day	1	Q(A) = Runoff from Landscaped	0.011	inches
2	WDF = Wastewater Design Flow	0	cu ft/yr	2	Q(B) = Runoff from Unfertilized Landscaping	0.062	inches
3	A = Area of Site	4,360,792	sq ft	3	Q(C) = Runoff from Unvegetated	0.000	inches
4	R(j) = WDF/A	0.00	feet	4	Q(E) = Runoff from Natural	0.032	inches
5	R(I) = Wastewater Recharge	0.00	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)	0.10	inches

Total Site Recharge		
R(T) =	R(A)+R(B)+R(C)+R(D)+R(E)+R(F)+R(G)+R(H)+R(I)+R(J)+Q(tot)	
R(T) =	36.75	inches

SIMULATION OF NITROGEN IN RECHARGE (SONIR)

NELSON, POPE & VOORHIS, LLC MICROCOMPUTER MODEL

Suffolk Technology Park

SITE NITROGEN BUDGET

A Sanitary Nitrogen-Residential			
		Value	Units
1	Number of Dwellings	0	units
2	Persons per Dwelling	4.23	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/removed	0.00	lbs

C Sanitary Nitrogen (Wastewater Design Flow)			
		Value	Units
1	CF = Commercial/STP Flow	0	gal/day
2	CF = Commercial/STP Flow	0	liters/yr
5	N = Nitrogen	19.00	mg/l
6	N = Nitrogen	0.00	lbs
7	LR = Leaching Rate	100%	percent
8	N(S) = CF x N x LR	0	milligrams
9	N(S) = Sanitary Nitrogen	0.00	lbs
10	N = loss/removed	0.00	lbs

E Fertilized Land (Fertilized Landscaping)			
		Value	Units
1	A = Area of Land Fertilized	94,525	sq ft
2	AR = Application Rate	2.04	lbs/1000 sf
3	N(T) = Nitrogen (total applied)	192.83	lbs
4	LR = Leaching Rate	30%	percent
5	N(F1) = A x AR x LR	57.85	lbs
6	N = loss/removed	134.98	lbs

G Atmospheric Nitrogen (existing condition)			
		Value	Units
1	Application Load	0.041	lbs/1000 sf
2	Area of Natural/Wetlands/1000 sf	902	1000 sf
3	Leaching Rate	25%	percent
4	Atmos. N Load-1 (natural/wetlands)	9.25	lbs/year
5	Area of turf/landscaped/1000 sf	95	1000 sf
6	Leaching Rate	30%	percent
7	Atmos. N Load-2 (golf/turf)	1.16	lbs/year
8	Area of Impervious/Agriculture/1000 sf	3,364	1000 sf
9	Leaching Rate	40%	percent
10	Atmos. N Load-3 (ag; imperv; other)	55.17	lbs/year
11	N(at) = N Load 1 + 2 + 3	65.58	lbs
12	N = loss/removed	113.21	lbs

B Cat Waste Nitrogen			
		Value	Units
1	Number of Cats per Dwelling	0.74	cats/dwelling
2	Number of Cats (Cats/dwelling x dwellings)	0	cats
3	Cat Waste Nitrogen Load	3.22	lbs/cat/year
4	N(p) = AR x cats x Adjustment (if applicable)	0.00	lbs/year
5	LR = Leaching Rate	25%	percent
6	N(P) = N(p) x LR	0.00	lbs
7	N = (loss/removed)	0.00	lbs

B' Dog Waste Nitrogen			
		Value	Units
1	Number of Dogs per Dwelling	1.40	dogs/dwelling
2	Number of Dogs (Dogs/dwelling x dwellings)	0	dogs
3	Dog Waste Nitrogen Load	4.29	lbs/dog/year
4	N(p) = AR x dogs x Adjustment (if applicable)	0.00	lbs/year
5	LR = Leaching Rate	25%	percent
6	N(P) = N(p) x LR	0.00	lbs
7	N = (loss/removed)	0.00	lbs

D Water Supply Nitrogen (other than wastewater, if applicable)			
		Value	Units
1	WDF = Wastewater Design Flow	0	gal/day
2	WDF = Wastewater Design Flow	0	liters/yr
3	N = Nitrogen in Water Supply	19.00	mg/l
4	N(WW) = WDF x N	0	milligrams
5	N(WW) = Wastewater Nitrogen	0.00	lbs

F Fertilized Land (Unfertilized Landscaping)			
		Value	Units
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/removed	0.00	lbs

H Irrigation Nitrogen			
		Value	Units
1	R = Irrigation Recharge (inches)	0.06	inches
2	R = Irrigation Rate (feet)	0.0047	feet
3	A = Area of Land Irrigated	1,045,440	sq ft
4	R(I) = R(irr) x A	4,910	cu ft
5	R(I) = Site Irrigation (liters)	139,049	liters
6	N = Nitrogen in Water Supply	2.00	mg/l
7	N(T) = Nitrogen (total applied)	0.61	lbs
8	LR = Leaching Rate	30%	percent
9	N(irr) = R(I) x N x LR	83,429	milligrams
10	N(irr) = Irrigation Nitrogen	0.18	lbs
11	N = loss/removed	0.43	lbs

Total Site Nitrogen		
N=	N(S) + N(P) + N(WW) + N(F1) + N(F2) + N(ppt) + N(irr)	
N=	123.61	lbs

SIMULATION OF NITROGEN IN RECHARGE (SONIR)

NELSON, POPE & VOORHIS, LLC MICROCOMPUTER MODEL

NAME OF PROJECT

Suffolk Technology Park

Proposed Conditions

FINAL COMPUTATIONS

A	Nitrogen in Recharge (concentr.)	Value	Units
1	N = Total Nitrogen (lbs)	123.61	lbs
2	N = Total Nitrogen (milligrams)	56,121,086	milligrams
3	R(T) = Total Recharge (inches)	36.75	inches
4	R(T) = Total Recharge (feet)	3.06	feet
5	A = Area of Site	4,360,792	sq ft
6	R = R(T) x A	13,355,547	cu ft
7	R = Site Recharge Volume	378,229,096	liters
9	NR = N/R	0.15	mg/l

 CONCENTRATION OF
NITROGEN IN RECHARGE

0.15

A	Nitrogen in Recharge	Value	Units
1	N = Total Nitrogen (lbs)	123.61	lbs
2	N = Total Nitrogen (milligrams)	56,121,086	milligrams
3	R(T) = Total Recharge (inches)	36.75	inches
4	R(T) = Total Recharge (feet)	3.06	feet
5	A = Area of Site	4,360,792	sq ft
6	R = R(T) x A	13,355,547	cu ft
7	R = Site Recharge Volume	378,229,096	liters
9	NR = N/R	0.15	mg/l

Conversions used in SONIR

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

B	Site Recharge Summary	Value	Units
1	R(T) = Total Site Recharge	36.75	inches/yr
2	R = Site Recharge Volume	13,355,547	cu ft/yr
3	R = Site Recharge Volume	99,906,438	gal/yr
4	R = Site Recharge Volume	99.91	MG/yr

Nitrogen Load Summary - On-Site

	Load	Percent
Sanitary Nitrogen (On-Site Wastewater)	0.00	0.00%
Fertilized Landscaping	57.85	46.80%
Dog Waste Nitrogen	0.00	0.00%
Cat Waste Nitrogen	0.00	0.00%
Atmospheric Nitrogen	65.58	53.05%
Irrigation Nitrogen	0.18	0.15%
Total Pounds Nitrogen	123.61	100.00%