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## APPENDIX I-2

# SONIR-EXISTING CONDITIONS

Prepared by Nelson, Pope & Voorhis, LLC - June 15<sup>th</sup> 2024

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

NELSON, POPE & VOORHIS, LLC MICROCOMPUTER MODEL

Suffolk Technology Park

**SITE RECHARGE COMPUTATIONS**

<b>A Fertilized Landscaping</b>				<b>B Unfertilized Landscaping</b>			
		Value	Units			Value	Units
1	A = Fraction of Land in Cover Type	0.000	fraction	1	A = Fraction of Land in Cover Type	0.012	fraction
2	P = Precipitation Rate	38.28	inches	2	P = Precipitation Rate	38.28	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)	12.68	inches	5	R(b) = P - (E + Q)	16.58	inches
6	R(A) = R(a) x A	0.00	inches	6	R(B) = R(b) x A	0.21	inches

<b>C Unvegetated/Dirt Roads</b>				<b>D Water/Ponds</b>			
		Value	Units			Value	Units
1	A = Fraction of Land in Cover Type	0.023	fraction	1	A = Fraction of Site in Water	0.000	fraction
2	P = Precipitation Rate	38.28	inches	2	P = Precipitation Rate	38.28	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)	15.88	inches	5	M = Makeup Water	0.00	inches
6	R(C) = R(c) x A	0.36	inches	6	R(d) = {P - (E+Q)} - M	8.28	inches
				7	R(D) = R(d) x A	0.00	inches

<b>E Natural</b>				<b>F Impervious/Paved/Roads</b>			
		Value	Units			Value	Units
1	A = Fraction of Land in Cover Type	0.965	fraction	1	A = Fraction of Land in Cover Type	0.000	fraction
2	P = Precipitation Rate	38.28	inches	2	P = Precipitation Rate	38.28	inches
3	E = Evapotranspiration Rate	23.00	inches	3	E = Evapotranspiration Rate	3.83	inches
4	Q = Runoff Rate	99.99	inches	4	Q = Runoff Rate	0.00	inches
5	R(e) = P - (E + Q)	-84.71	inches	5	R(f) = P - (E + Q)	34.45	inches
6	R(E) = R(e) x A	-81.74	inches	6	R(F) = R(f) x A	0.00	inches

<b>G Other</b>				<b>H Irrigation Recharge</b>			
		Value	Units			Value	Units
1	A = Fraction of Land in Cover Type	0.000	fraction	1	A = Fraction of Land Irrigated	0.000	fraction
2	P = Precipitation Rate	38.28	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)	17.08	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	0.00	inches

<b>I Wastewater Recharge</b>				<b>J Runoff Recharge</b>			
		Value	Units			Value	Units
1	WDF = Wastewater Design Flow	0	gal/day	1	Q(A) = Runoff from Landscaped	0.000	inches
2	WDF = Wastewater Design Flow	0	cu ft/yr	2	Q(B) = Runoff from Unfertilized Landscaping	0.006	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	96.484	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)	96.49	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>15.32</b>	<b>inches</b>

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

NELSON, POPE & VOORHIS, LLC MICROCOMPUTER MODEL

**Suffolk Technology Park**

**SITE NITROGEN BUDGET**

<b>A Sanitary Nitrogen-Residential</b>			
	Value	Units	
1	Number of Dwellings	0	units
2	Persons per Dwelling	2.95	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

<b>C Sanitary Nitrogen (Wastewater Design Flow)</b>			
	Value	Units	
1	CF = Commercial/STP Flow	0	gal/day
2	CF = Commercial/STP Flow	0	liters/yr
5	N = Nitrogen	50.00	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

<b>E Fertilized Land (Fertilized Landscaping)</b>			
	Value	Units	
1	A = Area of Land Fertilized	0	sq ft
2	AR = Application Rate	2.04	lbs/1000 sf
3	N(T) = Nitrogen (total applied)	0.00	lbs
4	LR = Leaching Rate	30%	percent
5	N(F1) = A x AR x LR	0.00	lbs
6	N = loss/removed	0.00	lbs

<b>G Atmospheric Nitrogen (existing condition)</b>			
	Value	Units	
1	Application Load	0.041	lbs/1000 sf
2	Area of Natural/Wetlands/1000 sf	4,262	1000 sf
3	Leaching Rate	25%	percent
4	Atmos. N Load-1 (natural/wetlands)	43.69	lbs/year
5	Area of turf/landscaped/1000 sf	0	1000 sf
6	Leaching Rate	30%	percent
7	Atmos. N Load-2 (golf/turf)	0.00	lbs/year
8	Area of Impervious/Agriculture/1000 sf	0	1000 sf
9	Leaching Rate	40%	percent
10	Atmos. N Load-3 (ag; imperv; other)	0.00	lbs/year
11	N(at) = N Load 1 + 2 + 3	43.69	lbs
12	N = loss/removed	131.07	lbs

<b>B Cat Waste Nitrogen</b>			
	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>B' Dog Waste Nitrogen</b>			
	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

<b>D Water Supply Nitrogen (other than wastewater, if applicable)</b>			
	Value	Units	
1	WDF = Wastewater Design Flow	0	gal/day
2	WDF = Wastewater Design Flow	0	liters/yr
3	N = Nitrogen in Water Supply	50.00	mg/l
4	N(WW) = WDF x N	0	milligrams
5	N(WW) = Wastewater Nitrogen	0.00	lbs

<b>F Fertilized Land (Unfertilized Landscaping)</b>			
	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

<b>H Irrigation Nitrogen</b>			
	Value	Units	
1	R = Irrigation Recharge (inches)	0.00	inches
2	R = Irrigation Rate (feet)	0.0000	feet
3	A = Area of Land Irrigated	1,045,440	sq ft
4	R(I) = R(irr) x A	0	cu ft
5	R(I) = Site Irrigation (liters)	0	liters
6	N = Nitrogen in Water Supply	2.00	mg/l
7	N(T) = Nitrogen (total applied)	0.00	lbs
8	LR = Leaching Rate	30%	percent
9	N(irr) = R(I) x N x LR	0	milligrams
10	N(irr) = Irrigation Nitrogen	0.00	lbs
11	N = loss/removed	0.00	lbs

<b>Total Site Nitrogen</b>		
N=	N(S) + N(P) + N(WW) + N(F1) + N(F2) + N(ppt) + N(irr)	
N=	43.69	lbs

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

NELSON, POPE & VOORHIS, LLC MICROCOMPUTER MODEL

NAME OF PROJECT

Suffolk Technology Park

Existing Conditions

**FINAL COMPUTATIONS**

A	Nitrogen in Recharge (concentr.)	Value	Units
1	N = Total Nitrogen (lbs)	43.69	lbs
2	N = Total Nitrogen (milligrams)	19,834,827	milligrams
3	R(T) = Total Recharge (inches)	15.32	inches
4	R(T) = Total Recharge (feet)	1.28	feet
5	A = Area of Site	4,360,792	sq ft
6	R = R(T) x A	5,565,831	cu ft
7	R = Site Recharge Volume	157,624,336	liters
9	NR = N/R	0.13	mg/l

<p>CONCENTRATION OF NITROGEN IN RECHARGE</p> <p><b>0.13</b></p>
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A	Nitrogen in Recharge	Value	Units
1	N = Total Nitrogen (lbs)	43.69	lbs
2	N = Total Nitrogen (milligrams)	19,834,827	milligrams
3	R(T) = Total Recharge (inches)	15.32	inches
4	R(T) = Total Recharge (feet)	1.28	feet
5	A = Area of Site	4,360,792	sq ft
6	R = R(T) x A	5,565,831	cu ft
7	R = Site Recharge Volume	157,624,336	liters
9	NR = N/R	0.13	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	15.32	inches/yr
2	R = Site Recharge Volume	5,565,831	cu ft/yr
3	R = Site Recharge Volume	41,635,311	gal/yr
4	R = Site Recharge Volume	41.64	MG/yr

Nitrogen Load Summary - On-Site	Load	Percent
Sanitary Nitrogen (On-Site Wastewater)	0.00	0.00%
Fertilized Landscaping	0.00	0.00%
Dog Waste Nitrogen	0.00	0.00%
Cat Waste Nitrogen	0.00	0.00%
Atmospheric Nitrogen	43.69	100.00%
Irrigation Nitrogen	0.00	0.00%
Total Pounds Nitrogen	43.69	100.00%