Appendix J-3
SONIR Model Results: Existing Conditions/Alternatives 1 & 7

SIMULATION OF NITROGEN IN RECHARGE (SONIR)

NELSON, POPE & VOORHIS, LLC MICROCOMPUTER MODEL

NAME OF PROJECT

Indian Hills - Existing Conditions/Alternatives 1 & 7
Fort Salonga, NY

DATA INPUT FIELD

A	*Site Recharge Parameters*	*Value*	*Units*
1	Area of Site	145.32	acres
2	Precipitation Rate	49.90	inches
3	Acreage of Fertilized Landscaping	28.11	acres
4	Fraction of Land in above	0.193	fraction
5	Evapotranspiration from above	21.20	inches
6	Runoff from above	0.50	inches
7	Acreage of Unfertilized Landscaping	67.52	acres
8	Fraction of above	0.465	fraction
9	Evapotranspiration from above	21.20	inches
10	Runoff from above	0.50	inches
11	Acreage of Unvegetated/Dirt Roads	1.77	acres
12	Fraction of above	0.012	fraction
13	Evapotranspiration from above	21.20	inches
14	Runoff from above	0.00	inches
15	Acreage of Water/Ponds	3.70	acres
16	Fraction of Site in above	0.025	fraction
17	Evaporation from above	30.00	inches
18	Makeup Water (if applicable)	0.00	inches
19	Acreage of Natural	37.43	acres
20	Fraction of above	0.258	fraction
21	Evapotranspiration from above	21.20	inches
22	Runoff from above	0.50	inches
23	Acreage of Impervious/Paved/Bldgs	6.78	acres
24	Fraction of Land in above	0.047	fraction
25	Evapotrans. from above	4.99	inches
26	Runoff from Impervious	0.00	inches
23	Acreage of Other	0.00	acres
24	Fraction of Land in above	0.000	fraction
25	Evapotrans. from above	21.20	inches
26	Runoff from above	0.00	inches
27	Acreage of Land Irrigated	28.11	acres
28	Fraction of Land Irrigated	0.193	fraction
29	Irrigation Rate	27.74	inches
30	Number of Dwellings	0	units
31	Water Use per Dwelling	0	gal/day
32	Wastewater Design Flow (clubhouse)	3,950	gal/day

B	*Nitrogen Budget Parameters*	*Value*	*Units*
1	Persons per Dwelling	1.50	persons
2	Nitrogen per Person per Year	10.0	lbs
3	a. Sanitary Nitrogen Leaching Rate	84%	percent
3	b. Treated Sanitary Nitrogen Leaching Rate	100%	percent
4	Fertilized Landscaping	28.11	acres
5	Fertilizer Application Rate (for above)	1.66	lbs/1000 sq ft
6	Fertilizer Nitrogen Leaching Rate (for above)	10%	percent
7	Fertilized Land (other, if applicable)	0.00	acres
8	Fertilizer Application Rate (for above)	0.00	lbs/1000 sq ft
9	Fertilizer Nitrogen Leaching Rate (for above)	0%	percent
10	Outdoor Cat Population	0.19	pets/dwelling
11	Cat Waste Nitrogen Load	3.22	lbs/pet/year
12	Outdoor Dog Population	0.35	pets/dwelling
13	Dog Waste Nitrogen Load	4.29	lbs/pet/year
14	Pet Waste Nitrogen Leaching Rate	25%	percent
15	Area of Land Irrigated	28.11	acres
16	Irrigation Rate	27.74	inches
17	Irrigation Nitrogen Leaching Rate	10%	percent
18	Atmospheric Nitrogen Application/Load	0.04	lbs/1000 sq ft
19	Atmos. N Leaching Rate (Natural/Wetlands)	25%	percent
20	Atmos. N Leaching Rate (Turf/Landscaped)	20%	percent
21	Atmos. N. Leaching Rate (Ag; Imperv; Other)	40%	percent
22	Nitrogen in Water Supply	2.00	mg/l
23	Nitrogen in Sanitary Flow	50.00	mg/l

C	*Comments*		
1)	Please refer to user manual for data input instructions; updated per LINAP.		
	Total Acreage Check	145.3	100%

SIMULATION OF NITROGEN IN RECHARGE (SONIR)

NELSON, POPE & VOORHIS, LLC MICROCOMPUTER MODEL

Indian Hills - Existing Conditions/Alternatives 1 & 7

SITE RECHARGE COMPUTATIONS

A	*Fertilized Landscaping*	*Value*	*Units*
1	A = Fraction of Land in Cover Type	0.193	fraction
2	P = Precipitation Rate	49.90	inches
3	E = Evapotranspiration Rate	21.20	inches
4	Q = Runoff Rate	0.50	inches
5	R(a) = P - (E + Q)	28.20	inches
6	R(A) = R(a) x A	5.45	inches

B	*Unfertilized Landscaping*	*Value*	*Units*
1	A = Fraction of Land in Cover Type	0.465	fraction
2	P = Precipitation Rate	49.90	inches
3	E = Evapotranspiration Rate	21.20	inches
4	Q = Runoff Rate	0.50	inches
5	R(b) = P - (E + Q)	28.20	inches
6	R(B) = R(b) x A	13.10	inches

C	*Unvegetated/Dirt Roads*	*Value*	*Units*
1	A = Fraction of Land in Cover Type	0.012	fraction
2	P = Precipitation Rate	49.90	inches
3	E = Evapotranspiration Rate	21.20	inches
4	Q = Runoff Rate	0.00	inches
5	R(c) = P - (E + Q)	28.70	inches
6	R(C) = R(c) x A	0.35	inches

D	*Water/Ponds*		
1	A = Fraction of Site in Water	0.025	fraction
2	P = Precipitation Rate	49.90	inches
3	E = Evaporation Rate	30.00	inches
4	Q = Runoff Rate	0.00	inches
5	M = Makeup Water	0.00	inches
6	R(d) = {P - (E+Q)} - M	19.90	inches
7	R(D) = R(d) x A	0.51	inches

E	*Natural*		
1	A = Fraction of Land in Cover Type	0.258	fraction
2	P = Precipitation Rate	49.90	inches
3	E = Evapotranspiration Rate	21.20	inches
4	Q = Runoff Rate	0.50	inches
5	R(e) = P - (E + Q)	28.20	inches
6	R(E) = R(e) x A	7.26	inches

F	*Impervous/Paved/Roads*	*Value*	*Units*
1	A = Fraction of Land in Cover Type	0.047	fraction
2	P = Precipitation Rate	49.90	inches
3	E = Evapotranspiration Rate	4.99	inches
4	Q = Runoff Rate	0.00	inches
5	R(f) = P - (E + Q)	44.91	inches
6	R(F) = R(f) x A	2.10	inches

G	*Other*		
1	A = Fraction of Land in Cover Type	0.000	fraction
2	P = Precipitation Rate	49.90	inches
3	E = Evapotranspiration Rate	21.20	inches
4	Q = Runoff Rate	0.00	inches
5	R(g) = P - (E + Q)	28.70	inches
6	R(G) = R(g) x A	0.00	inches

H	*Irrigation Recharge*		
1	A = Fraction of Land Irrigated	0.193	fraction
2	I = Irrigation Rate	27.74	inches
3	E = Evaptranspiration Rate	21.40	inches
4	Q = Runoff Rate	0.00	inches
5	R(h) = I - (E + Q)	6.34	inches
6	R(H) = R(H) x A	1.23	inches

I	*Wastewater Recharge*		
1	WDF = Wastewater Design Flow	3,950	gal/day
2	WDF = Wastewater Design Flow	192,762	cu ft/yr
3	A = Area of Site	6,330,139	sq ft
4	R(j) = WDF/A	0.03	feet
5	R(I) = Wastewater Recharge	0.37	inches

J	*Runoff Recharge*		
1	Q(A) = Runoff from Landscaped	0.097	inches
2	Q(B) = Runoff from Unfertilized Landscaping	0.232	inches
3	Q(C) = Runoff from Unvegetated	0.000	inches
4	Q(E) = Runoff from Natural	0.129	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)	0.46	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) =	**30.82**	**inches**

SIMULATION OF NITROGEN IN RECHARGE (SONIR)

NELSON, POPE & VOORHIS, LLC MICROCOMPUTER MODEL

Indian Hills - Existing Conditions/Alternatives 1 & 7

SITE NITROGEN BUDGET

A	*Sanitary Nitrogen-Residential*	*Value*	*Units*
1	Number of Dwellings	0	units
2	Persons per Dwelling	1.50	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	*Cat Waste Nitrogen*	*Value*	*Units*
1	Number of Cats per Dwelling	0.19	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	0.35	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

C	*Sanitary Nitrogen (Wastewater Design Flow)*		
1	CF = Commercial/STP Flow	3,950	gal/day
2	CF = Commercial/STP Flow	5,457,024	liters/yr
5	N =Nitrogen	50.00	mg/l
6	N = Nitrogen	601.64	lbs
7	LR = Leaching Rate	84%	percent
8	N(S) = CF x N x LR	229,194,998	milligrams
9	N(S) = Sanitary Nitrogen	505.37	lbs
10	N = loss/removed	96.26	lbs

D	*Water Supply Nitrogen (other than wastewater, if applicable)*		
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

E	*Fertilized Land (Fertilized Landscaping)*		
1	A = Area of Land Fertilized	1,224,472	sq ft
2	AR = Application Rate	1.66	lbs/1000 sf
3	N(T) = Nitrogen (total applied)	2036.65	lbs
4	LR = Leaching Rate	10%	percent
5	N(F1) = A x AR x LR	203.66	lbs
6	N = loss/removed	1832.98	lbs

F	*Fertilized Land (Unfertilized Landscaping)*		
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

G	*Atmospheric Nitrogen (existing condition)*		
1	Application Load	0.041	lbs/1000 sf
2	Area of Natural/Wetlands/1000 sf	4,733	1000 sf
3	Leaching Rate	25%	percent
4	Atmos. N Load-1 (natural/wetlands)	48.51	lbs/year
5	Area of turf/landscaped/1000 sf	1,224	1000 sf
6	Leaching Rate	20%	percent
7	Atmos. N Load-2 (golf/turf)	10.04	lbs/year
8	Area of Impervious/Agricult/1000 sf	295	1000 sf
9	Leaching Rate	40%	percent
10	Atmos. N Load-3 (ag; imperv; other)	4.84	lbs/year
11	N(at) = N Load 1 + 2 +3	63.40	lbs
12	N = loss/removed	192.96	lbs

H	*Irrigation Nitrogen*		
1	R = Irrigation Recharge (inches)	1.23	inches
2	R = Irrigation Rate (feet)	0.1022	feet
3	A = Area of Land Irrigated	1,208,354	sq ft
4	R(I) = R(irr) x A	123,492	cu ft
5	R(I) = Site Irrigation (liters)	3,497,285	liters
6	N = Nitrogen in Water Supply	2.00	mg/l
7	N(T) = Nitrogen (total applied)	15.42	lbs
8	LR = Leaching Rate	10%	percent
9	N(irr) = R(I) x N x LR	699,457	milligrams
10	N(irr) = Irrigation Nitrogen	1.54	lbs
11	N = loss/removed	13.88	lbs

Total Site Nitrogen		
N=	N(S) + N(P) + N(WW) + N(F1) + N(F2) + N(ppt) + N(irr)	
N=	**773.98**	lbs

SIMULATION OF NITROGEN IN RECHARGE (SONIR)

NELSON, POPE & VOORHIS, LLC MICROCOMPUTER MODEL

NAME OF PROJECT **Indian Hills - Existing Conditions/Alternatives 1 & 7**
Fort Salonga, NY

FINAL COMPUTATIONS

A	*Nitrogen in Recharge (concentr.)*	*Value*	*Units*
1	N = Total Nitrogen (lbs)	773.98	lbs
2	N = Total Nitrogen (milligrams)	351,385,731	milligrams
3	R(T) = Total Recharge (inches)	30.82	inches
4	R(T) = Total Recharge (feet)	2.57	feet
5	A = Area of Site	6,330,139	sq ft
6	R = R(T) x A	16,258,990	cu ft
7	R = Site Recharge Volume	460,454,604	liters
9	NR = N/R	0.76	mg/l

CONCENTRATION OF
NITROGEN IN RECHARGE **0.76**

A	*Nitrogen in Recharge*	*Value*	*Units*
1	N = Total Nitrogen (lbs)	773.98	lbs
2	N = Total Nitrogen (milligrams)	351,385,731	milligrams
3	R(T) = Total Recharge (inches)	30.82	inches
4	R(T) = Total Recharge (feet)	2.57	feet
5	A = Area of Site	6,330,139	sq ft
6	R = R(T) x A	16,258,990	cu ft
7	R = Site Recharge Volume	460,454,604	liters
9	NR = N/R	0.76	mg/l

B	*Site Recharge Summary*	*Value*	*Units*
1	R(T) = Total Site Recharge	30.82	inches/yr
2	R = Site Recharge Volume	16,258,990	cu ft/yr
3	R = Site Recharge Volume	121,625,702	gal/yr
4	R = Site Recharge Volume	121.63	MG/yr

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

Nitrogen Load Summary - On-Site	**Load**	**Percent**
Sanitary Nitrogen (On-Site Wastewater)	505.37	65.30%
Fertilized Landscaping	203.66	26.31%
Dog Waste Nitrogen	0.00	0.00%
Cat Waste Nitrogen	0.00	0.00%
Atmospheric Nitrogen	63.40	8.19%
Irrigation Nitrogen	1.54	0.20%
Total Pounds Nitrogen	773.98	100.00%