APPENDIX J

WATER RESOURCES-RELATED DOCUMENTS

APPENDIX J-1

SONIR COMPUTER MODEL RESULTS

SIMULATION OF NITROGEN IN RECHARGE (SONIR)

NELSON, POPE & VOORHIS, LLC MICROCOMPUTER MODEL

NAME OF PROJECT **Indian Hills - Proposed Project - Final EIS**

Fort Salonga, NY **12/10/2020**

DATA INPUT FIELD

A	*Site Recharge Parameters*	*Value*	*Units*
1	Area of Site	154.56	acres
2	Precipitation Rate	49.90	inches
3	Acreage of Fertilized Landscaping	31.70	acres
4	Fraction of Land in above	0.205	fraction
5	Evapotranspiration from above	21.20	inches
6	Runoff from above	0.50	inches
7	Acreage of Unfertilized Landscaping	75.77	acres
8	Fraction of above	0.490	fraction
9	Evapotranspiration from above	21.20	inches
10	Runoff from above	0.50	inches
11	Acreage of Unvegetated/Dirt Roads	5.35	acres
12	Fraction of above	0.035	fraction
13	Evapotranspiration from above	21.20	inches
14	Runoff from above	0.00	inches
15	Acreage of Water/Ponds	9.75	acres
16	Fraction of Site in above	0.063	fraction
17	Evaporation from above	30.00	inches
18	Makeup Water (if applicable)	0.00	inches
19	Acreage of Natural	17.04	acres
20	Fraction of above	0.110	fraction
21	Evapotranspiration from above	21.20	inches
22	Runoff from above	0.50	inches
23	Acreage of Impervious/Paved/Bldgs	14.95	acres
24	Fraction of Land in above	0.097	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	31.70	acres
28	Fraction of Land Irrigated	0.205	fraction
29	Irrigation Rate	27.74	inches
30	Number of Dwellings	86	units
31	Water Use per Dwelling	300	gal/day
32	Wastewater Design Flow (clubhouse)	29,750	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	31.70	acres
5	Fertilizer Application Rate (for above)	1.67	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	31.70	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	19.00	mg/l

C	*Comments*
1)	Please refer to user manual for data input instructions; updated per LINAP.

Total Acreage Check 154.6 100%

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SIMULATION OF NITROGEN IN RECHARGE (SONIR)

NELSON, POPE & VOORHIS, LLC MICROCOMPUTER MODEL

Indian Hills - Proposed Project - Final EIS

SITE RECHARGE COMPUTATIONS

A	*Fertilized Landscaping*	*Value*	*Units*
1	A = Fraction of Land in Cover Type	0.205	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	5.78	inches

B	*Unfertilized Landscaping*	*Value*	*Units*
1	A = Fraction of Land in Cover Type	0.490	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	13.82	inches

C	*Unvegetated/Dirt Roads*	*Value*	*Units*
1	A = Fraction of Land in Cover Type	0.035	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	0.99	inches

D	*Water/Ponds*		
1	A = Fraction of Site in Water	0.063	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	1.26	inches

E	*Natural*		
1	A = Fraction of Land in Cover Type	0.110	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	3.11	inches

F	*Impervous/Paved/Roads*	*Value*	*Units*
1	A = Fraction of Land in Cover Type	0.097	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	4.34	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	0.205	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	1.30	inches

I	*Wastewater Recharge*		
1	WDF = Wastewater Design Flow	29,750	gal/day
2	WDF = Wastewater Design Flow	1,451,815	cu ft/yr
3	A = Area of Site	6,732,634	sq ft
4	R(j) = WDF/A	0.22	feet
5	R(I) = Wastewater Recharge	2.59	inches

J	*Runoff Recharge*		
1	Q(A) = Runoff from Landscaped	0.103	inches
2	Q(B) = Runoff from Unfertilized Landscaping	0.245	inches
3	Q(C) = Runoff from Unvegetated	0.000	inches
4	Q(E) = Runoff from Natural	0.055	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)	0.40	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) =	**33.60 inches**

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SIMULATION OF NITROGEN IN RECHARGE (SONIR)

NELSON, POPE & VOORHIS, LLC MICROCOMPUTER MODEL

Indian Hills - Proposed Project - Final EIS

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)	16	cats
3	Cat Waste Nitrogen Load	3.22	lbs/cat/year
4	N(p) = AR x cats x Adjustment (if applicable)	51.23	lbs/year
5	LR = Leaching Rate	25%	percent
6	N(P) = N(p) x LR	12.81	lbs
7	N = (loss/removed)	38.42	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)	30	dogs
3	Dog Waste Nitrogen Load	4.29	lbs/dog/year
4	N(p) = AR x dogs x Adjustment (if applicable)	129.13	lbs/year
5	LR = Leaching Rate	25%	percent
6	N(P) = N(p) x LR	32.28	lbs
7	N = (loss/removed)	96.85	lbs

C	*Sanitary Nitrogen (Wastewater Design Flow)*		
1	CF = Commercial/STP Flow	29,750	gal/day
2	CF = Commercial/STP Flow	41,100,369	liters/yr
5	N =Nitrogen	19.00	mg/l
6	N = Nitrogen	1721.90	lbs
7	LR = Leaching Rate	100%	percent
8	N(S) = CF x N x LR	780,907,006	milligrams
9	N(S) = Sanitary Nitrogen	1721.90	lbs
10	N = loss/removed	0.00	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	19.00	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	1,380,852	sq ft
2	AR = Application Rate	1.67	lbs/1000 sf
3	N(T) = Nitrogen (total applied)	2304.86	lbs
4	LR = Leaching Rate	10%	percent
5	N(F1) = A x AR x LR	230.49	lbs
6	N = loss/removed	2074.38	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	4,468	1000 sf
3	Leaching Rate	25%	percent
4	Atmos. N Load-1 (natural/wetlands)	45.79	lbs/year
5	Area of turf/landscaped/1000 sf	1,381	1000 sf
6	Leaching Rate	20%	percent
7	Atmos. N Load-2 (golf/turf)	11.32	lbs/year
8	Area of Impervious/Agricult/1000 sf	651	1000 sf
9	Leaching Rate	40%	percent
10	Atmos. N Load-3 (ag; imperv; other)	10.68	lbs/year
11	N(at) = N Load 1 + 2 +3	67.80	lbs
12	N = loss/removed	198.69	lbs

H	*Irrigation Nitrogen*		
1	R = Irrigation Recharge (inches)	1.30	inches
2	R = Irrigation Rate (feet)	0.1084	feet
3	A = Area of Land Irrigated	1,208,354	sq ft
4	R(I) = R(irr) x A	130,938	cu ft
5	R(I) = Site Irrigation (liters)	3,708,154	liters
6	N = Nitrogen in Water Supply	2.00	mg/l
7	N(T) = Nitrogen (total applied)	16.35	lbs
8	LR = Leaching Rate	10%	percent
9	N(irr) = R(I) x N x LR	741,631	milligrams
10	N(irr) = Irrigation Nitrogen	1.64	lbs
11	N = loss/removed	14.72	lbs

Total Site Nitrogen		
N=	N(S) + N(P) + N(WW) + N(F1) + N(F2) + N(ppt) + N(irr)	
N=	**2,066.91**	lbs

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NELSON, POPE & VOORHIS, LLC MICROCOMPUTER MODEL

NAME OF PROJECT **Indian Hills - Proposed Project - Final EIS**

Fort Salonga, NY

FINAL COMPUTATIONS

A	*Nitrogen in Recharge (concentr.)*	*Value*	*Units*
1	N = Total Nitrogen (lbs)	2,066.91	lbs
2	N = Total Nitrogen (milligrams)	938,375,523	milligrams
3	R(T) = Total Recharge (inches)	33.60	inches
4	R(T) = Total Recharge (feet)	2.80	feet
5	A = Area of Site	6,732,634	sq ft
6	R = R(T) x A	18,851,819	cu ft
7	R = Site Recharge Volume	533,883,507	liters
9	NR = N/R	1.76	mg/l

CONCENTRATION OF
NITROGEN IN RECHARGE

1.76

A	*Nitrogen in Recharge*	*Value*	*Units*
1	N = Total Nitrogen (lbs)	2,066.91	lbs
2	N = Total Nitrogen (milligrams)	938,375,523	milligrams
3	R(T) = Total Recharge (inches)	33.60	inches
4	R(T) = Total Recharge (feet)	2.80	feet
5	A = Area of Site	6,732,634	sq ft
6	R = R(T) x A	18,851,819	cu ft
7	R = Site Recharge Volume	533,883,507	liters
9	NR = N/R	1.76	mg/l

B	*Site Recharge Summary*	*Value*	*Units*
1	R(T) = Total Site Recharge	33.60	inches/yr
2	R = Site Recharge Volume	18,851,819	cu ft/yr
3	R = Site Recharge Volume	141,021,407	gal/yr
4	R = Site Recharge Volume	141.02	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)	1,721.90	83.31%
Fertilized Landscaping	230.49	11.15%
Dog Waste Nitrogen	32.28	1.56%
Cat Waste Nitrogen	12.81	0.62%
Atmospheric Nitrogen	67.80	3.28%
Irrigation Nitrogen	1.64	0.08%
Total Pounds Nitrogen	2,066.91	100.00%

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