Appendix G-4
SONIR Model Results, Alternatives 2a & 2b

SIMULATION OF NITROGEN IN RECHARGE (SONIR)

NELSON, POPE & VOORHIS, LLC MICROCOMPUTER MODEL

NAME OF PROJECT

The Hills at Southampton
Alternative 2a - Existing Zoning PRD

DATA INPUT FIELD

A	Site Recharge Parameters	Value	Units
1	Area of Site	591.00	acres
2	Precipitation Rate	49.90	inches
3	Acreage of Landscaping	80.26	acres
4	Fraction of Land in above	0.136	fraction
5	Evapotranspiration from above	23.00	inches
6	Runoff from above	0.35	inches
7	Acreage of Unfertilized Landscape	0.00	acres
8	Fraction of above	0.000	fraction
9	Evapotranspiration from above	23.90	inches
10	Runoff from above	0.35	inches
11	Acreage of Unvegetated/Dirt Roads	1.18	acres
12	Fraction of above	0.002	fraction
13	Evapotranspiration from above	21.20	inches
14	Runoff from above	1.05	inches
15	Acreage of Water/Ponds/Wetlands	28.45	acres
16	Fraction of Site in above	0.048	fraction
17	Evaporation from above	30.00	inches
18	Makeup Water (if applicable)	0.00	inches
19	Acreage of Natural/Natural Reveg	431.63	acres
20	Fraction of above	0.730	fraction
21	Evapotranspiration from above	23.00	inches
22	Runoff from above	0.35	inches
23	Acreage of Impervious/Paved/Bldgs	46.68	acres
24	Fraction of Land in above	0.079	fraction
25	Evapotrans. from above	4.99	inches
26	Runoff from Impervious	0.00	inches
23	Acreage of Wetlands	1.40	acres
24	Fraction of Land in above	0.061	fraction
25	Evapotrans. from above	30.00	inches
26	Runoff from above	0.00	inches
27	Acreage of Land Irrigated	80.26	acres
28	Fraction of Land Irrigated	0.136	fraction
29	Irrigation Rate	24.00	inches
30	Number of Dwellings	118	units
31	Water Use per Dwelling	300	gal/day
32	Wastewater Design Flow (units)	0	gal/day
33	Wastewater Design Flow (total)	35,400	gal/day
34	Adjusted WW Design Flow (total)	35,400	gal/day

B	Nitrogen Budget Parameters	Value	Units
1	Persons per Dwelling	2.50	persons
2	Nitrogen per Person per Year	10.0	lbs
3	a. Sanitary Nitrogen Leaching Rate	50%	percent
3	b. Treated Sanitary Nitrogen Leaching Rate	90%	percent
4	Fertilized Land (Golf Rough/Res/Golf Landsc.)	80.26	acres
5	Fertilizer Application Rate (for above)	2.30	lbs/1000 sq ft
6	Fertilizer Nitrogen Leaching Rate (for above)	15%	percent
7	Fertilized Land (Greens/Tees/Fairways)	0.00	acres
8	Fertilizer Application Rate (for above)	0.00	lbs/1000 sq ft
9	Fertilizer Nitrogen Leaching Rate (for above)	15%	percent
10	Pet Waste Application Rate	3.19	lbs/pet
11	Pet Waste Nitrogen Leaching Rate	50%	percent
12	Area of Land Irrigated	80.26	acres
13	Irrigation Rate	24.00	inches
14	Irrigation Nitrogen Leaching Rate	15%	percent
15	Nitrogen in Precipitation	0.75	mg/l
16	Precipitation Nitrogen Leaching Rate	15%	percent
17	Nitrogen in Water Supply	2.00	mg/l
18	Nitrogen in Sanitary Flow -1	50.00	mg/l
19	Nitrogen in Sanitary Flow -2	19.00	mg/l

C	Comments
1)	Please refer to SONIR User Manual for data input instructions.

Developed Area	155.39	26%
Natural/Unvegetated/Revegetated Area	435.61	74%
Total Acreage Check	589.60	100%

NELSON, POPE & VOORHIS, LLC MICROCOMPUTER MODEL

Alternative 2a - Existing Zoning PRD

SITE RECHARGE COMPUTATIONS

A	Landscaping	Value	Units		B	Unfertilized Landscape	Value	Units
1	A = Fraction of Land in Cover Type	0.136	fraction		1	A = Fraction of Land in Cover Type	0.000	fraction
2	P = Precipitation Rate	49.90	inches		2	P = Precipitation Rate	49.90	inches
3	E = Evapotranspiration Rate	23.00	inches		3	E = Evapotranspiration Rate	23.90	inches
4	Q = Runoff Rate	0.35	inches		4	Q = Runoff Rate	0.35	inches
5	R(a) = P - (E + Q)	26.55	inches		5	R(b) = P - (E + Q)	25.65	inches
6	R(A) = R(a) x A	3.61	inches		6	R(B) = R(b) x A	0.00	inches

C	Unvegetated/Dirt Roads	Value	Units		D	Water/Ponds	Value	Units
1	A = Fraction of Land in Cover Type	0.002	fraction		1	A = Fraction of Site in Water	0.048	fraction
2	P = Precipitation Rate	49.90	inches		2	P = Precipitation Rate	49.90	inches
3	E = Evapotranspiration Rate	21.20	inches		3	E = Evaporation Rate	30.00	inches
4	Q = Runoff Rate	1.05	inches		4	Q = Runoff Rate	0.00	inches
5	R(c) = P - (E + Q)	27.65	inches		5	M = Makeup Water	0.00	inches
6	R(C) = R(c) x A	0.06	inches		6	R(d) = { P - (E+Q)} - M	19.90	inches
					7	R(D) = R(d) x A	0.96	inches

E	Natural/Natural Revegetation				F	Impervous/Paved/Roads	Value	Units
1	A = Fraction of Land in Cover Type	0.730	fraction		1	A = Fraction of Land in Cover Type	0.079	fraction
2	P = Precipitation Rate	49.90	inches		2	P = Precipitation Rate	49.90	inches
3	E = Evapotranspiration Rate	23.00	inches		3	E = Evapotranspiration Rate	4.99	inches
4	Q = Runoff Rate	0.35	inches		4	Q = Runoff Rate	0.00	inches
5	R(e) = P - (E + Q)	26.55	inches		5	R(f) = P - (E + Q)	44.91	inches
6	R(E) = R(e) x A	19.39	inches		6	R(F) = R(f) x A	3.55	inches

F	Rain Gardens/Wetlands				H	Irrigation Recharge		
1	A = Fraction of Land in Cover Type	0.061	fraction		1	A = Fraction of Land Irrigated	0.136	fraction
2	P = Precipitation Rate	49.90	inches		2	I = Irrigation Rate	24.00	inches
3	E = Evapotranspiration Rate	30.00	inches		3	E = Evaptranspiration Rate	20.54	inches
4	Q = Runoff Rate	0.00	inches		4	Q = Runoff Rate	0.35	inches
5	R(g) = P - (E + Q)	19.90	inches		5	R(h) = I - (E + Q)	3.11	inches
6	R(G) = R(g) x A	1.21	inches		6	R(H) = R(H) x A	0.42	inches

I	Wastewater Recharge				J	Runoff Recharge		
1	WDF = Wastewater Design Flow	35,400	gal/day		1	Q(A) = Runoff from Rough/Landscaped	0.047	inches
2	WDF = Wastewater Design Flow	1,727,538	cu ft/yr		2	Q(B) = Runoff from Tees/Fairways	0.000	inches
3	A = Area of Site	25,743,960	sq ft		3	Q(C) = Runoff from Unvegetated	0.002	inches
4	R(j) = WDF/A	0.07	feet		4	Q(E) = Runoff from Natural	0.255	inches
5	R(I) = Wastewater Recharge	0.81	inches		5	Q(H) = Runoff from Rain Gardens	0.000	inches
					6	Q(I) = Runoff from Irrigation	0.05	inches
					7	Q(tot) = Q(A)+Q(B)+Q(C)+Q(E)+Q(H)+Q(I)	0.35	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) =	**30.35**	**inches**

SIMULATION OF NITROGEN IN RECHARGE (SONIR)

SHEET 3

NELSON, POPE & VOORHIS, LLC MICROCOMPUTER MODEL

Alternative 2a - Existing Zoning PRD

SITE NITROGEN BUDGET

A	Sanitary Nitrogen-Residential	Value	Units
1	Number of Dwellings	0	units
2	Persons per Dwelling	2.50	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	50%	percent
8	N(S) = P x N x LR	0.00	lbs
9	N = loss/removed	0.00	lbs

B	Pet Waste Nitrogen	Value	Units
1	AR = Application Rate	3.19	lbs/pet
2	Human Population	49	capita
3	Pets = 17 percent of capita	8	pets
4	N(p) = AR x pets	26.66	lbs
5	LR = Leaching Rate	50%	percent
6	N(P) = N(p) x LR	13.33	lbs
7	N = (loss/removed)	13.33	lbs

C	Sanitary Nitrogen (Wastewater Design Flow)	Value	Units
1	CF = Commercial/STP Flow	35,400	gal/day
2	CF = Commercial/STP Flow	48,905,985	liters/yr
3	N = Nitrogen (1)	50.00	mg/l
4	N = Nitrogen (1)	5391.88	lbs
5	N =Nitrogen (2)	50.00	mg/l
6	N = Nitrogen (2)	5391.88	lbs
7	LR = Leaching Rate	50%	percent
8	N(S) = CF x N x LR	1,222,649,625	milligrams
9	N(S) = Sanitary Nitrogen	2695.94	lbs
10	N = loss/removed	2695.94	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	2.00	mg/l
4	N(WW) = WDF x N	0	milligrams
5	N(WW) = Wastewater Nitrogen	0.00	lbs

E	Fertilized Landscaping	Value	Units
1	A = Area of Land Fertilized 1	3,496,126	sq ft
2	AR = Application Rate	2.30	lbs/1000 sf
3	N(T) = Nitrogen (total applied)	8041.09	lbs
4	LR = Leaching Rate	15%	percent
5	N(F1) = A x AR x LR	1206.16	lbs
6	N = loss/removed	6834.93	lbs

F	Unfertilized Landscape	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	15%	percent
5	N(F2) = A x AR x LR	0.00	lbs
6	N = loss/removed	0.00	lbs

G	Precipitation Nitrogen (existing condition)	Value	Units
1	R(n) = Natural Recharge (feet)	1.67	feet
2	A = Area of Site (sq ft)	25,743,960	sq ft
3	R(N) = R(n) x A	43,021,426	cu ft
4	R(N) = Natural Recharge (liters)	1,218,366,771	liters
5	N = Nitrogen in Precipitation	0.75	mg/l
6	N(T) = Nitrogen (total)	2,015	lbs
7	LR = Leaching Rate	15%	percent
8	N(ppt) = R(N) x N x LR	137,066,261.73	milligrams
10	N(irr) = Irrigation Nitrogen	302.23	lbs
9	N = loss/removed	1712.64	lbs

H	Irrigation Nitrogen	Value	Units
1	R = Irrigation Recharge (inches)	0.42	inches
2	R = Irrigation Rate (feet)	0.04	feet
3	A = Area of Land Irrigated	3,496,126	sq ft
4	R(I) = R(irr) x A	0	cu ft
5	R(I) = Site Precipitation (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	15%	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

Total Site Nitrogen	
N=	N(S) + N(P) + N(WW) + N(F1) + N(F2) + N(ppt) + N(irr)
N=	4,217.67 lbs

SIMULATION OF NITROGEN IN RECHARGE (SONIR)

NELSON, POPE & VOORHIS, LLC MICROCOMPUTER MODEL

NAME OF PROJECT

The Hills at Southampton
Alternative 2a - Existing Zoning PRD

FINAL COMPUTATIONS

A	Nitrogen in Recharge	Value	Units
1	N = Total Nitrogen (lbs)	4,217.67	lbs
2	N = Total Nitrogen (milligrams)	1,914,821,455	milligrams
3	R(T) = Total Recharge (inches)	30.35	inches
4	R(T) = Total Recharge (feet)	2.53	feet
5	A = Area of Site	25,743,960	sq ft
6	R = R(T) x A	65,106,762	cu ft
7	R = Site Recharge Volume	1,843,823,486	liters
9	NR = N/R	1.04	mg/l

CONCENTRATION OF
NITROGEN IN RECHARGE   1.04

B	Site Recharge Summary	Value	Units
1	R(T) = Total Site Recharge	30.35	inches/yr
2	R = Site Recharge Volume	65,106,762	cu ft/yr
3	R = Site Recharge Volume	487,032,432	gal/yr
4	R = Site Recharge Volume	487.03	MG/yr

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

SIMULATION OF NITROGEN IN RECHARGE (SONIR)

NELSON, POPE & VOORHIS, LLC MICROCOMPUTER MODEL

NAME OF PROJECT

The Hills at Southampton
Alternative 2b - Existing Zoning PRD

DATA INPUT FIELD

A	Site Recharge Parameters	Value	Units
1	Area of Site	591.00	acres
2	Precipitation Rate	49.90	inches
3	Acreage of Landscaping	88.65	acres
4	Fraction of Land in above	0.150	fraction
5	Evapotranspiration from above	23.00	inches
6	Runoff from above	0.35	inches
7	Acreage of Unfertilized Landscape	7.21	acres
8	Fraction of above	0.012	fraction
9	Evapotranspiration from above	23.90	inches
10	Runoff from above	0.35	inches
11	Acreage of Unvegetated/Dirt Roads	1.18	acres
12	Fraction of above	0.002	fraction
13	Evapotranspiration from above	21.20	inches
14	Runoff from above	1.05	inches
15	Acreage of Water/Ponds/Wetlands	21.97	acres
16	Fraction of Site in above	0.037	fraction
17	Evaporation from above	30.00	inches
18	Makeup Water (if applicable)	0.00	inches
19	Acreage of Natural/Natural Reveg	433.39	acres
20	Fraction of above	0.733	fraction
21	Evapotranspiration from above	23.00	inches
22	Runoff from above	0.35	inches
23	Acreage of Impervious/Paved/Bldgs	37.20	acres
24	Fraction of Land in above	0.063	fraction
25	Evapotrans. from above	4.99	inches
26	Runoff from Impervious	0.00	inches
23	Acreage of Wetlands	1.40	acres
24	Fraction of Land in above	0.061	fraction
25	Evapotrans. from above	30.00	inches
26	Runoff from above	0.00	inches
27	Acreage of Land Irrigated	88.65	acres
28	Fraction of Land Irrigated	0.150	fraction
29	Irrigation Rate	24.00	inches
30	Number of Dwellings	118	units
31	Water Use per Dwelling	300	gal/day
32	Wastewater Design Flow (units)	0	gal/day
33	Wastewater Design Flow (total)	35,400	gal/day
34	Adjusted WW Design Flow (total)	35,400	gal/day

B	Nitrogen Budget Parameters	Value	Units
1	Persons per Dwelling	2.50	persons
2	Nitrogen per Person per Year	10.0	lbs
3	a. Sanitary Nitrogen Leaching Rate	50%	percent
3	b. Treated Sanitary Nitrogen Leaching Rate	90%	percent
4	Fertilized Land (Golf Rough/Res/Golf Landsc.)	88.65	acres
5	Fertilizer Application Rate (for above)	2.30	lbs/1000 sq ft
6	Fertilizer Nitrogen Leaching Rate (for above)	15%	percent
7	Fertilized Land (Greens/Tees/Fairways)	7.21	acres
8	Fertilizer Application Rate (for above)	0.00	lbs/1000 sq ft
9	Fertilizer Nitrogen Leaching Rate (for above)	15%	percent
10	Pet Waste Application Rate	3.19	lbs/pet
11	Pet Waste Nitrogen Leaching Rate	50%	percent
12	Area of Land Irrigated	88.65	acres
13	Irrigation Rate	24.00	inches
14	Irrigation Nitrogen Leaching Rate	15%	percent
15	Nitrogen in Precipitation	0.75	mg/l
16	Precipitation Nitrogen Leaching Rate	15%	percent
17	Nitrogen in Water Supply	2.00	mg/l
18	Nitrogen in Sanitary Flow -1	50.00	mg/l
19	Nitrogen in Sanitary Flow -2	19.00	mg/l

C	Comments
1)	Please refer to SONIR User Manual for data input instructions.

Developed Area		155.03	26%
Natural/Unvegetated/Revegetated Area		435.97	74%
Total Acreage Check		591.00	100%

SIMULATION OF NITROGEN IN RECHARGE (SONIR)

NELSON, POPE & VOORHIS, LLC MICROCOMPUTER MODEL

Alternative 2b - Existing Zoning PRD

SITE RECHARGE COMPUTATIONS

A	Landscaping	Value	Units		B	Unfertilized Landscape	Value	Units
1	A = Fraction of Land in Cover Type	0.150	fraction		1	A = Fraction of Land in Cover Type	0.012	fraction
2	P = Precipitation Rate	49.90	inches		2	P = Precipitation Rate	49.90	inches
3	E = Evapotranspiration Rate	23.00	inches		3	E = Evapotranspiration Rate	23.90	inches
4	Q = Runoff Rate	0.35	inches		4	Q = Runoff Rate	0.35	inches
5	R(a) = P - (E + Q)	26.55	inches		5	R(b) = P - (E + Q)	25.65	inches
6	R(A) = R(a) x A	3.98	inches		6	R(B) = R(b) x A	0.31	inches

C	Unvegetated/Dirt Roads	Value	Units		D	Water/Ponds	Value	Units
1	A = Fraction of Land in Cover Type	0.002	fraction		1	A = Fraction of Site in Water	0.037	fraction
2	P = Precipitation Rate	49.90	inches		2	P = Precipitation Rate	49.90	inches
3	E = Evapotranspiration Rate	21.20	inches		3	E = Evaporation Rate	30.00	inches
4	Q = Runoff Rate	1.05	inches		4	Q = Runoff Rate	0.00	inches
5	R(c) = P - (E + Q)	27.65	inches		5	M = Makeup Water	0.00	inches
6	R(C) = R(c) x A	0.06	inches		6	R(d) = { P - (E+Q)} - M	19.90	inches
					7	R(D) = R(d) x A	0.74	inches

E	Natural/Natural Revegetation	Value	Units		F	Impervous/Paved/Roads	Value	Units
1	A = Fraction of Land in Cover Type	0.733	fraction		1	A = Fraction of Land in Cover Type	0.063	fraction
2	P = Precipitation Rate	49.90	inches		2	P = Precipitation Rate	49.90	inches
3	E = Evapotranspiration Rate	23.00	inches		3	E = Evapotranspiration Rate	4.99	inches
4	Q = Runoff Rate	0.35	inches		4	Q = Runoff Rate	0.00	inches
5	R(e) = P - (E + Q)	26.55	inches		5	R(f) = P - (E + Q)	44.91	inches
6	R(E) = R(e) x A	19.47	inches		6	R(F) = R(f) x A	2.83	inches

F	Rain Gardens/Wetlands	Value	Units		H	Irrigation Recharge	Value	Units
1	A = Fraction of Land in Cover Type	0.061	fraction		1	A = Fraction of Land Irrigated	0.150	fraction
2	P = Precipitation Rate	49.90	inches		2	I = Irrigation Rate	24.00	inches
3	E = Evapotranspiration Rate	30.00	inches		3	E = Evaptranspiration Rate	20.54	inches
4	Q = Runoff Rate	0.00	inches		4	Q = Runoff Rate	0.35	inches
5	R(g) = P - (E + Q)	19.90	inches		5	R(h) = I - (E + Q)	3.11	inches
6	R(G) = R(g) x A	1.21	inches		6	R(H) = R(H) x A	0.47	inches

I	Wastewater Recharge	Value	Units		J	Runoff Recharge	Value	Units
1	WDF = Wastewater Design Flow	35,400	gal/day		1	Q(A) = Runoff from Rough/Landscaped	0.052	inches
2	WDF = Wastewater Design Flow	1,727,538	cu ft/yr		2	Q(B) = Runoff from Tees/Fairways	0.004	inches
3	A = Area of Site	25,743,960	sq ft		3	Q(C) = Runoff from Unvegetated	0.002	inches
4	R(j) = WDF/A	0.07	feet		4	Q(E) = Runoff from Natural	0.256	inches
5	R(I) = Wastewater Recharge	0.81	inches		5	Q(H) = Runoff from Rain Gardens	0.000	inches
					6	Q(I) = Runoff from Irrigation	0.05	inches
					7	Q(tot) = Q(A)+Q(B)+Q(C)+Q(E)+Q(H)+Q(I)	0.37	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) =	**30.24**	**inches**

SIMULATION OF NITROGEN IN RECHARGE (SONIR)

NELSON, POPE & VOORHIS, LLC MICROCOMPUTER MODEL

Alternative 2b - Existing Zoning PRD

SITE NITROGEN BUDGET

A	Sanitary Nitrogen-Residential	Value	Units
1	Number of Dwellings	0	units
2	Persons per Dwelling	2.50	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	50%	percent
8	N(S) = P x N x LR	0.00	lbs
9	N = loss/removed	0.00	lbs

B	Pet Waste Nitrogen	Value	Units
1	AR = Application Rate	3.19	lbs/pet
2	Human Population	49	capita
3	Pets = 17 percent of capita	8	pets
4	N(p) = AR x pets	26.66	lbs
5	LR = Leaching Rate	50%	percent
6	N(P) = N(p) x LR	13.33	lbs
7	N = (loss/removed)	13.33	lbs

C	Sanitary Nitrogen (Wastewater Design Flow)	Value	Units
1	CF = Commercial/STP Flow	35,400	gal/day
2	CF = Commercial/STP Flow	48,905,985	liters/yr
3	N = Nitrogen (1)	50.00	mg/l
4	N = Nitrogen (1)	5391.88	lbs
5	N =Nitrogen (2)	50.00	mg/l
6	N = Nitrogen (2)	5391.88	lbs
7	LR = Leaching Rate	50%	percent
8	N(S) = CF x N x LR	1,222,649,625	milligrams
9	N(S) = Sanitary Nitrogen	2695.94	lbs
10	N = loss/removed	2695.94	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	2.00	mg/l
4	N(WW) = WDF x N	0	milligrams
5	N(WW) = Wastewater Nitrogen	0.00	lbs

E	Fertilized Landscaping	Value	Units
1	A = Area of Land Fertilized 1	3,861,594	sq ft
2	AR = Application Rate	2.30	lbs/1000 sf
3	N(T) = Nitrogen (total applied)	8881.67	lbs
4	LR = Leaching Rate	15%	percent
5	N(F1) = A x AR x LR	1332.25	lbs
6	N = loss/removed	7549.42	lbs

F	Unfertilized Landscape	Value	Units
1	A = Area of Land Fertilized 2	314,068	sq ft
2	AR = Application Rate	0.00	lbs/1000 sf
3	N(T) = Nitrogen (total applied)	0.00	lbs
4	LR = Leaching Rate	15%	percent
5	N(F2) = A x AR x LR	0.00	lbs
6	N = loss/removed	0.00	lbs

G	Precipitation Nitrogen (existing condition)	Value	Units
1	R(n) = Natural Recharge (feet)	1.68	feet
2	A = Area of Site (sq ft)	25,743,960	sq ft
3	R(N) = R(n) x A	43,191,053	cu ft
4	R(N) = Natural Recharge (liters)	1,223,170,611	liters
5	N = Nitrogen in Precipitation	0.75	mg/l
6	N(T) = Nitrogen (total)	2,023	lbs
7	LR = Leaching Rate	15%	percent
8	N(ppt) = R(N) x N x LR	137,606,693.71	milligrams
10	N(irr) = Irrigation Nitrogen	303.42	lbs
9	N = loss/removed	1719.40	lbs

H	Irrigation Nitrogen	Value	Units
1	R = Irrigation Recharge (inches)	0.47	inches
2	R = Irrigation Rate (feet)	0.04	feet
3	A = Area of Land Irrigated	3,861,594	sq ft
4	R(I) = R(irr) x A	0	cu ft
5	R(I) = Site Precipitation (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	15%	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

Total Site Nitrogen	
N=	N(S) + N(P) + N(WW) + N(F1) + N(F2) + N(ppt) + N(irr)
N=	4,344.95 lbs

SIMULATION OF NITROGEN IN RECHARGE (SONIR)

NELSON, POPE & VOORHIS, LLC MICROCOMPUTER MODEL

NAME OF PROJECT

The Hills at Southampton
Alternative 2b - Existing Zoning PRD

FINAL COMPUTATIONS

A	Nitrogen in Recharge	Value	Units
1	N = Total Nitrogen (lbs)	4,344.95	lbs
2	N = Total Nitrogen (milligrams)	1,972,605,781	milligrams
3	R(T) = Total Recharge (inches)	30.24	inches
4	R(T) = Total Recharge (feet)	2.52	feet
5	A = Area of Site	25,743,960	sq ft
6	R = R(T) x A	64,870,178	cu ft
7	R = Site Recharge Volume	1,837,123,453	liters
9	NR = N/R	1.07	mg/l

CONCENTRATION OF
NITROGEN IN RECHARGE   1.07

B	Site Recharge Summary	Value	Units
1	R(T) = Total Site Recharge	30.24	inches/yr
2	R = Site Recharge Volume	64,870,178	cu ft/yr
3	R = Site Recharge Volume	485,262,667	gal/yr
4	R = Site Recharge Volume	485.26	MG/yr

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

NP&V