

**Appendix R-7**  
**Nitrogen Load Comparison Chart and Off-Site Benefit Analysis**

**Nitrogen Load Comparison  
Development Scenarios with Various Nitrogen Reductions as Applicable**

NP&V Analysis  
June 29, 2017 version

Development Scenario	PDD; 10% LR; STP 60-day occupancy <sup>1</sup>	PDD; 10% LR; STP 183-day occupancy <sup>2</sup>	PDD; 20% LR; STP 60-day occupancy <sup>3</sup>	Existing Conditions <sup>4</sup>	GEE Equestrian; no STP; no turf <sup>5</sup>	Existing Zoning; I/A; 75% seas; 10% turf <sup>6</sup>	Existing Zoning I/A Systems <sup>7</sup>	Existing Zoning Seasonal Adjustment <sup>8</sup>	GEE Equestrian; No STP; 10% turf <sup>9</sup>	Existing Zoning Standard Sanitary <sup>10</sup>	Existing Zoning Maximum Density <sup>11</sup>
Project Nitrogen Load <sup>a</sup>	1,164.23	1,673.08	1,817.24	995.09	2,908.28	3,984.65	4,942.91	4,987.99	5,368.57	5,768.48	7,013.18
Fertigation/Mitigation Reduction <sup>b</sup>	-1,876.41	-1,876.41	-1,876.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sanitary System Upgrade Reduction <sup>c</sup>	-1,050.96	-1,050.96	-1,050.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pine Barrens Credit Reduction <sup>d</sup>	-706.44	-706.44	-706.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33 acre Land Purchase Reduction <sup>e</sup>	-706.44	-706.44	-706.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Total</b>	<b>-3,176.02</b>	<b>-2,667.17</b>	<b>-2,523.01</b>	<b>995.09</b>	<b>2,908.28</b>	<b>3,984.65</b>	<b>4,942.91</b>	<b>4,987.99</b>	<b>5,368.57</b>	<b>5,768.48</b>	<b>7,013.18</b>

Notes:

Abbreviations - PDD (Planned Development District; LR (Leaching Rate); STP (Sewage Treatment Plant)

All values based on SONIR model updated based on LBG memo and LINAP assumptions

Golf fertilization application rate based on ITHMP; leaching rates for PDD varied per A.M. Petrovic and LINAP

Nitrogen Load/Reductions:

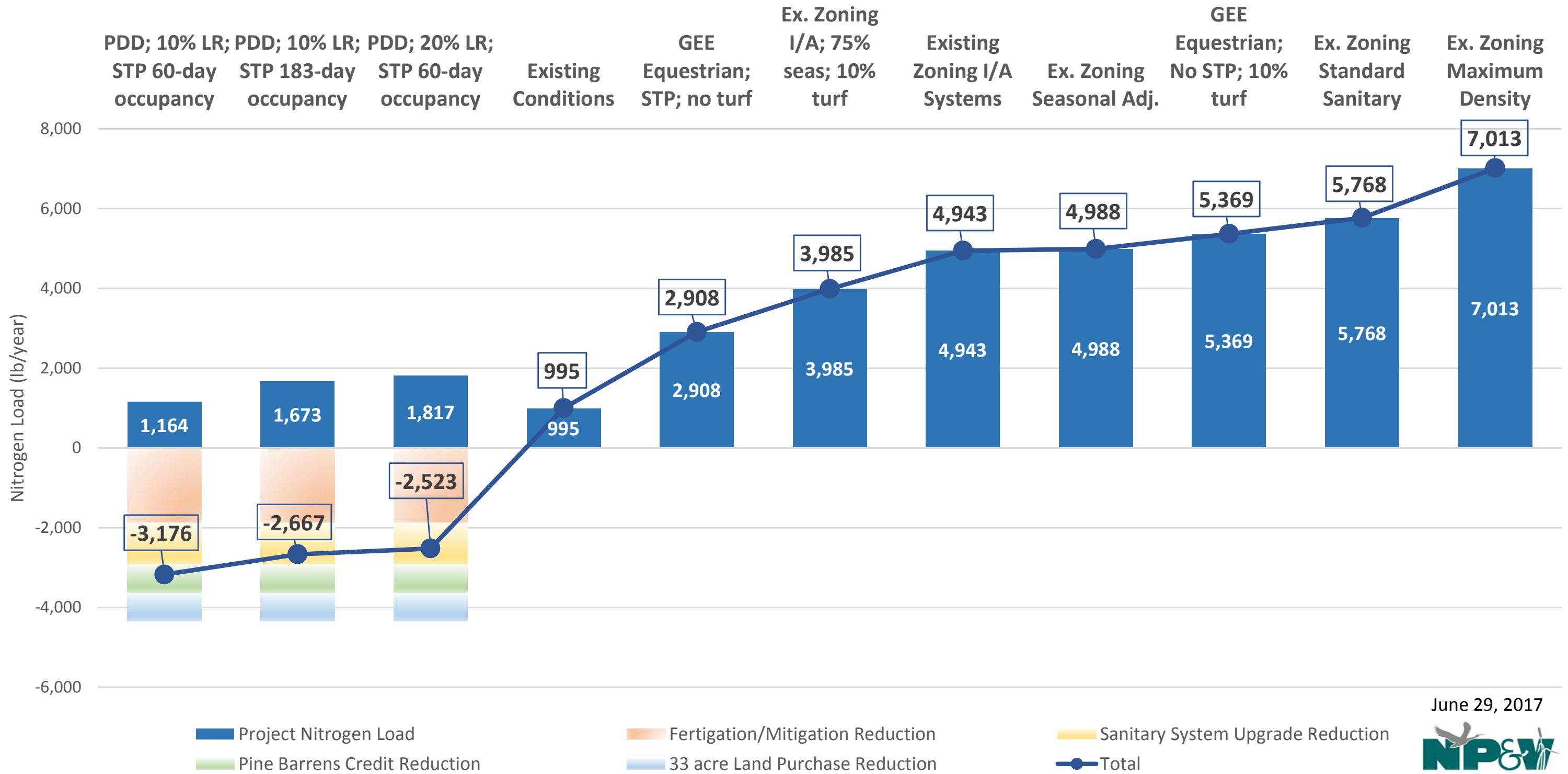
- a Project Nitrogen Load determined by SONIR model
- b Fertigation/Mitigation Reduction determined using 10 mg/l source well nitrogen; other mitigation includes lined greens and rain gardens
- c Sanitary System Upgrade Reduction is based on "Nitrogen Reduction Computation - Sanitary System Upgrade Funding;" including East Quogue School
- d Pine Barrens Credit Reduction is based on "Nitrogen Reduction Computation - Pine Barrens Credits and Land Acquisition"
- e 33 acre Land Purchase Reduction is based on "Nitrogen Reduction Computation - Pine Barrens Credits and Land Acquisition"

Development Scenarios:

- 1 The Hills PDD; Most likely scenario in terms of occupancy and leaching rate; Discovery Land Company projects have actual occupancy in the range of 60 days per year
- 2 The Hills PDD; Covenanted to not exceed 183 days per year
- 3 The Hills PDD; Expected occupancy, but with 20% leaching rate per LINAP
- 4 Existing Conditions assumes that farms on Kracke and Parlato are active
- 5 Group for the East End Equestrian Alternative; With 1.5 horses per unit; STP; no turf
- 6 Existing Zoning PRD (Alt 2); With Innovative/Alternative (I/A) Systems (not currently required); seasonal adjustment of 75%; and 10% turf limit (not required; 15% allowed)
- 7 Existing Zoning PRD (Alt 2); With I/A systems (not currently required)
- 8 Existing Zoning PRD (Alt 2); With seasonal adjustment of minus 25%
- 9 Group for the East End Equestrian Alternative; With 1 horse per unit; no STP; 10% turf limit (not required; 15% allowed)
- 10 Existing Zoning PRD (Alt 2); With standard sanitary (similar to what was analyzed in DEIS)
- 11 Existing Zoning PRD (Alt 2); With Maximum Density through transfer of 35 Pine Barrens Credits and affordable housing increase to permit 165 homes as a feasible alternative



# Nitrogen Load Comparison Accounting for Reductions



# Nitrogen Reduction Computation Sanitary System Upgrade Funding

NP&V Analysis  
June 29, 2017 version

Scenario - 50 mg/l to 19 mg/l

Calc of Available Flow to Treat:	Parameter	Comments/Notes
Initial Dollars in Year 1	\$1,000,000	Once method is established, apply to perpetual funding
Cost Per System	\$20,000	Approximate System Replacement Cost
Number of Systems	50.00	Divide dollars by system cost (if 100% of replacement cost is funded)
Gallons Per Day Per System	300	SCDHS design flow
Gallons Per Day Total	15,000	Resultant flow

Calc of N Removal - untreated:	Parameter	Comments/Notes
Gallons Per Day Total	15,000	Resultant flow
Liters Per year	20,722,875	Convert to annual/liters
Nitrogen in Effluent (mg/l)	50.00	Use 50 mg/l; per SC General Guidance Memo 28
Nitrogen in Effluent (lbs)	2284.70	Convert to pounds
Leaching Rate	84%	LINAP Leaching Rate
Nitrogen Load (milligrams)	870,360,750	Annual load in mg
Nitrogen Load (lbs)	1919.15	Annual load in lbs
Nitrogen Lost/Removed	365.55	Removed

Calc of N Removal - treated:	Parameter	Comments/Notes
Gallons Per Day Total	15,000	Resultant flow
Liters Per year	20,722,875	Convert to annual/liters
Nitrogen in Effluent (mg/l)	19.00	Alternative system expected concentration
Nitrogen in Effluent (lbs)	868.18	Convert to pounds
Leaching Rate	100%	Treated effluent is stable, therefore, no additional removal
Nitrogen Load (milligrams)	393,734,625	Annual load in mg
Nitrogen Load (lbs)	868.18	Annual load in lbs
Nitrogen Lost/Removed	0.00	Treated effluent is stable, therefore, no additional removal

Reduction in Nitrogen Load (lbs)	1050.96	Difference in load for 50 systems
Nitrogen Removal/Efficiency Rate	55%	Calculated removal efficiency; reduction/load of untreated



**Nitrogen Reduction Computation  
Pine Barrens Credits and Land Acquisition**

*NP&V Analysis  
June 29, 2017 version*

**PDD Scenario**

A	Sanitary Nitrogen-Residential	Value	Units
1	Acres of Golf Course (Max)	132.55	acres
2	Divided by 200,000 SF factor	200,000	factor
3	Number of Pine Barrens Credits	29	credits
4	Persons per Dwelling	2.90	capita
5	P = Population	84.10	capita
6	N = Nitrogen per person	10	lbs
7	N = (total; pre loss/removal)	841	lbs
8	LR = Leaching Rate	84%	percent
9	N(S) = P x N x LR	706.44	lbs
10	N = loss/removed	134.56	lbs

<b>Total Benefit/Reduction</b>	<b>706.44</b>	lbs
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**Computation of Nitrogen Reduction from  
Purchase/Sterilization of 33 acres of land**

A	Sanitary Nitrogen-Residential	Value	Units
3	Number of Units/Lots	29	units
4	Persons per Dwelling	2.90	capita
5	P = Population	84.10	capita
6	N = Nitrogen per person	10	lbs
7	N = (total; pre loss/removal)	841	lbs
8	LR = Leaching Rate	84%	percent
9	N(S) = P x N x LR	706.44	lbs
10	N = loss/removed	134.56	lbs

<b>Total Benefit/Reduction</b>	<b>706.44</b>	lbs
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