

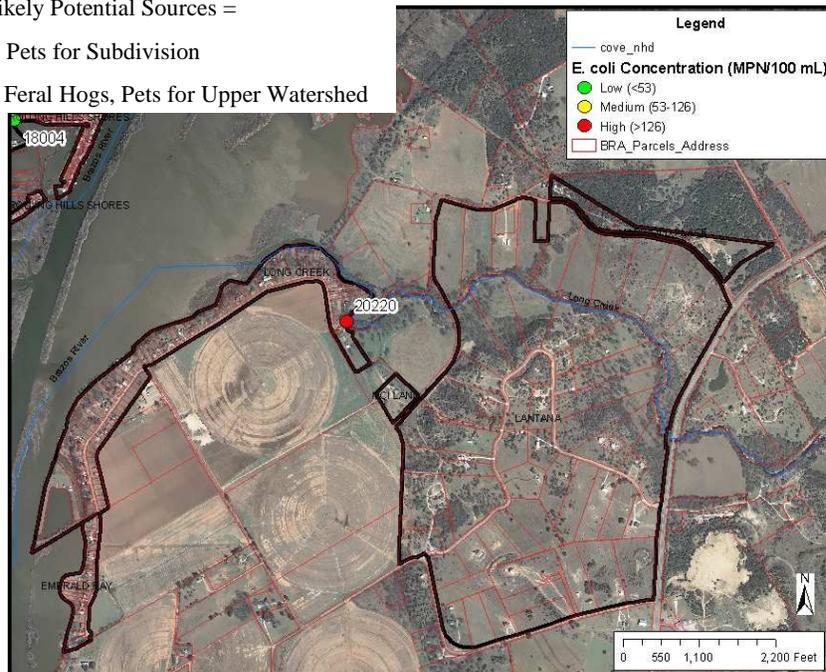
Site-specific development of Alternatives:

Long Creek

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1

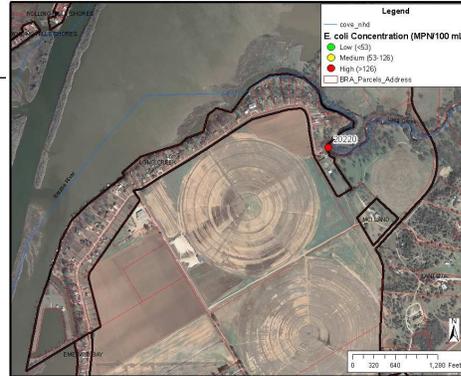
Most likely Potential Sources =
Septic, Pets for Subdivision
Cattle, Feral Hogs, Pets for Upper Watershed



Long Creek Subdivision

OWTS

- ❑ Avg build year 1980
- ❑ 61 permits
- ❑ Average Lot ~26,000 ft²
- ❑ Spray Application
 - Septic or Aerobic Tanks
- ❑ Drip Emitters
 - Aerobic Tanks
- ❑ 25 year life cycle
- ❑ Equivalent Annual Cost Index
 - 0.36



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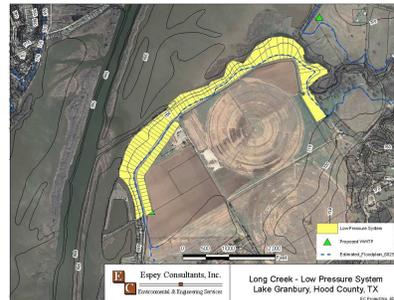
3

Long Creek Subdivision

Centralized local wastewater treatment

Low Pressure System + Local WWTP Package Plant

- ❑ 95 residential lots (95 grinder pumps)
- ❑ Average lot size = 0.6 acres
- ❑ Volume treated 0.029 MGD
- ❑ WWTP discharge into lake
- ❑ 25 year life cycle
- ❑ Potential Load Reduction = 100 %
- ❑ EAC Index = 0.77



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4

Long Creek Subdivision

Alternatives Ranking

BMP Alternative	Not Calculated		In Progress		Equivalent Annual Cost index	Score	Feasibility (Constraints/ Considerations)	Funding
	Watershed % Reduction	Time to Implement	Watershed % Reduction	Time to Implement				
Septic System Replacement	75%	4 <1 yr	100%	5	0.36	1	10	[Blue Box]
Local Centralized Wastewater Treatment - Independent	100%	5 2-5 yrs	100%	3	0.28	2	10	
Regional Wastewater Treatment	100%	5 5-10 yrs	100%	2				
Vegetative Filter Strips		<1 yr	100%	5				

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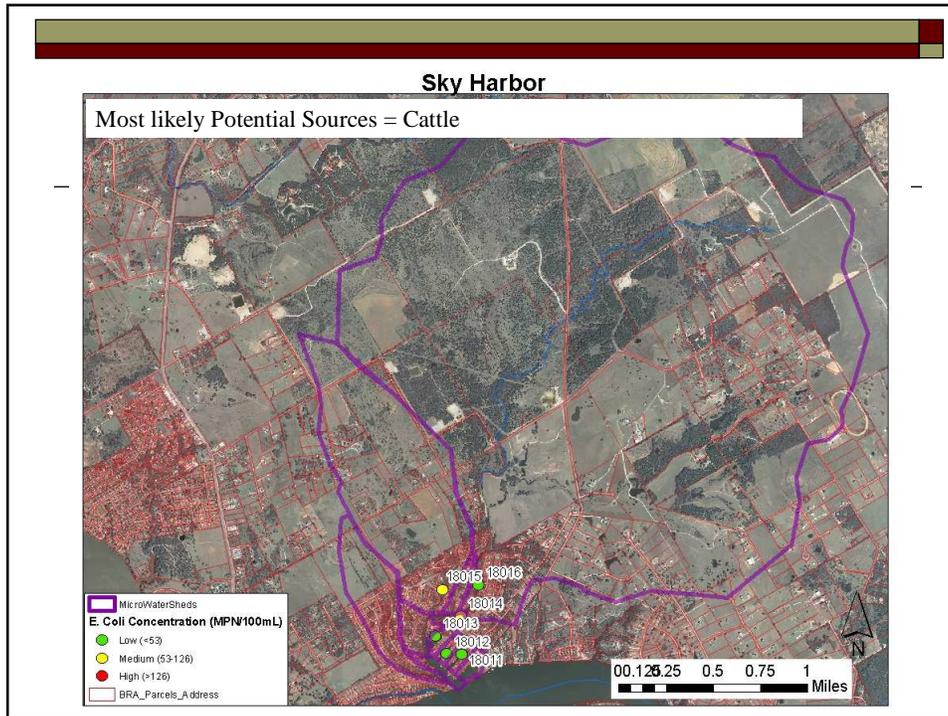
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Site-specific development of Alternatives:

Sky Harbor

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6



Sky Harbor Subdivision

OWTS

- 271 Permits, 753 parcels;
Avg. year for subdivision 1981
Avg. Lot Size 15,250 ft²
- Repair/Replace
 - Significant land could be suitable for conventional drainfields and leaching chambers
 - Large lots suitable for spray irrigation
 - 25% conventional, 12.5% leaching chambers, 12.5% drip emitters, 50% spray application
- 25 year life cycle
- Equivalent Annual Cost Index
 - 0.26

Minimum Depth to Restrictive Layer (cm)

Legend

- BRA_Parcels_Address
- Hood County Soil
- restrictions_redept_cm
- 13
- 16
- 21
- 26
- 31
- 36
- 41
- 46
- 51
- 56
- 57

0 500 1,100 2,000 Feet

- Pollutant Load Reduction
 - 13%

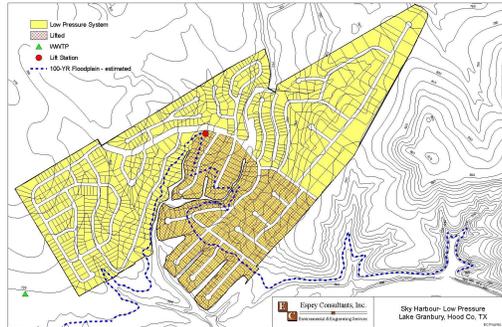
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Sky Harbor Subdivision

Centralized Wastewater Treatment

Low Pressure System + Local WWTP Package Plant

- 754 lots (754 grinder pump units)
- 1 Lift Station
- Average lot size = 0.35 acres
- Volume treated 0.226 MGD
- WWTP discharge into lake
- 25 year life cycle
- Potential load reduction = 13%
- EAC Index = 0.27



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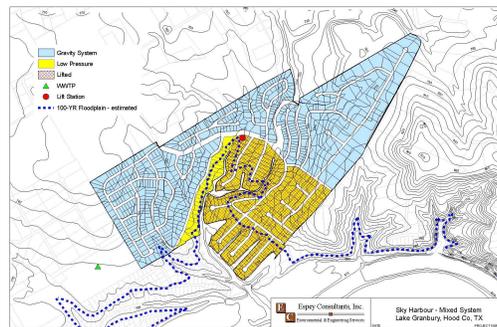
9

Sky Harbor Subdivision

Centralized Wastewater Treatment

Mixed System + Local WWTP Package Plant

- Low Pressure
 - 242 lots
- Gravity
 - 512 lots
- 1 Lift Station
- Avg lot size 0.35 acres
- Volume treated 0.226 MGD
- WWTP discharge into lake
- 25 year life cycle
- Potential load reduction = 13%
- EAC Index = 0.18



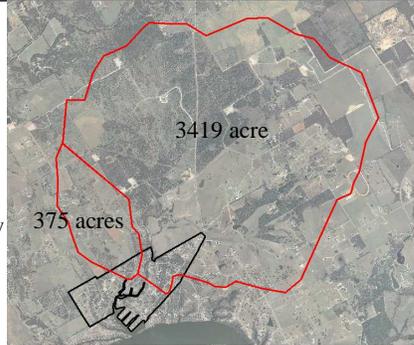
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10

Sky Harbor Subdivision

Wet Ponds

- TCEQ Guidelines for Wet Ponds:
 - Design to remove 80% of total suspended solids (TSS)
 - Drainage size limits 10 acres – 640 acres
 - Continuous base flow must be available or make up water provided
- Contributing watersheds to Sky Harbor
 - Bee Creek Tributary (375 acres)
 - Produces 6,714 lbs of TSS annually
 - Requires 1.6 acre surface area to remove 80% TSS (assume 3ft depth)
 - Bee Creek (3419 acres)
 - Produces 61,496 lbs of TSS annually
 - Requires 15 acres surface area to remove 80% TSS (assume 3ft depth)



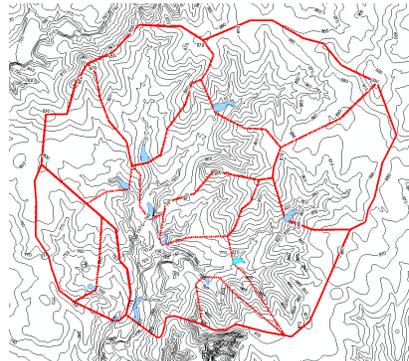
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11

Sky Harbor Subdivision

Wet Ponds

- To treat both watersheds for 80% TSS removal:
 - 12 wet ponds
 - Sizes: 0.5 acres-2.5 acres
 - 10 of 12 ponds may need make up water source and development
- Costs include excavation and haul, outfall structure, maintenance items, erosion and sedimentation controls, vegetation, make up water
- 754 lots in subdivision
- 25 year life cycle
- Potential concentration reduction = 65%
- EAC Index = 0.48



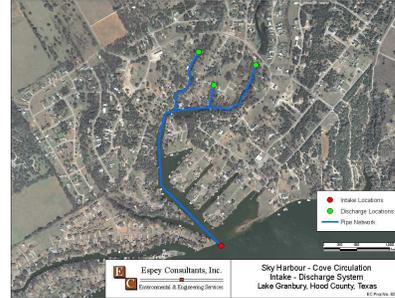
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12

Sky Harbor Subdivision Cove Circulation Systems

Intake-Discharge Circulation System

- 4 day water turnover rate
- 3 discharge points
- 64 hp pump
- PVC pipe
 - 5,590 linear feet
 - 12"-24" diameter
- 754 lots in subdivision
- 15 year life cycle
- Potential concentration reduction = 39%
- EAC index = 0.11



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13

Sky Harbor Subdivision Alternatives Ranking

BMP Alternative	Not Calculated		In Progress			Score	Feasibility (Constraints/ Considerations)	Funding
	Watershed % Reduction	Time to Implement	Equivalent Annual Cost index	Score	Feasibility (Constraints/ Considerations)			
Septic System Replacement	9%	<1 yr	5	0.26	3	9		
Local Centralized Wastewater Treatment - Independent	13%	1-2-5 yrs	3	0.18	4	8	SW mixed	
Regional Wastewater Treatment	13%	1-10-15 yrs	1		1			
Cove Circulation Systems (Fountains, etc)	39%	2-1-2 yrs	4	0.11	4	10		
Catchment Basin	65%	4-2-5 yrs	3	0.48	1	8	2 acre pond	

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14

Site-specific development of Alternatives:

Port Ridglea East

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15



Port Ridglea East Subdivision Summary - OWTS

- 231 permits (all conventional); 248 parcels
- Avg. lot 10,900 ft²
- Soil survey
 - “Null” for both depth to bedrock and depth to restrictive layer
 - Septic tank absorption field suitability “Very Limited”
- Repair/Replace
 - Conventional systems with drip emitters
- 25 year life cycle
- Equivalent Annual Cost Index
 - 0.45
- Pollutant Load Reduction = 75%

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17

Port Ridglea East Subdivision Centralized Wastewater Treatment

Low Pressure System + Local WWTP Package Plant

- 248 residential lots (248 grinder pumps)
- Avg. size 0.25 acres
- Volume treated 0.074 MGD
- WWTP discharge into lake
- 25 year life cycle
- Potential load reduction = 100%
- EAC Index = 0.28



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18

Port Ridglea East Subdivision Cove Circulation Systems

Intake-Discharge Circulation System

- 4 day water turnover rate
- 10 discharge points
- 18 hp pump & 10 hp pump
- PVC pipe
 - 7,010 linear feet
 - 6"-18" diameter
- 248 lots in subdivision
- 15 year life cycle
- Potential concentration reduction = 30%
- EAC Index = 0.14



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19

Port Ridglea East & Nassau Bay II Regional (Centralized) Wastewater Treatment-Aggregation 1

- 371 lots served
- 1.5 mi interceptor
 - Layout represents broad location potential for infrastructure
- Assume no lift stations
- Volume treated 0.111 MGD
- 25 year life cycle
- Potential load reduction = 98%
- EAC Index = 0.28



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20

Port Ridglea East & Nassau Bay II

Regional (Centralized) Wastewater Treatment - Aggregation 2

- 953 lots served
- 1.5 mi interceptor
 - Layout represents broad location potential for infrastructure
- Assume 2 lift stations
- Volume treated 0.286 MGD
- 25 year life cycle
- Potential load reduction = 98%
- EAC Index = 0.33



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21

Port Ridglea East Subdivision

Alternatives Ranking

BMP Alternative	Not Calculated		In Progress		Equivalent Annual Cost index	Score	Feasibility (Constraints/ Considerations)	Funding
	Watershed % Reduction	Time to Implement	Watershed % Reduction	Time to Implement				
Weighting ->	1	1	1	1				
Septic System Replacement	75%	4 <1 yr	5	0.45	1	10	ET bed only recommended disposal method due to lot sizes	
Septic Maintenance Pump-out pilot program	0%	<1 yr	5					
Local Centralized Wastewater Treatment - Independent	100%	5 2-5 yrs	3	0.28	2	10		
Local Centralized Wastewater Treatment - Aggregate	100%	5 5-10 yrs	2	0.28	2	9		
Regional Wastewater Treatment	100%	5 10-15 yrs	1					
Cove Circulation Systems (Fountains, etc)	30%	2 1-2 yrs	4	0.14	4	10		

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22

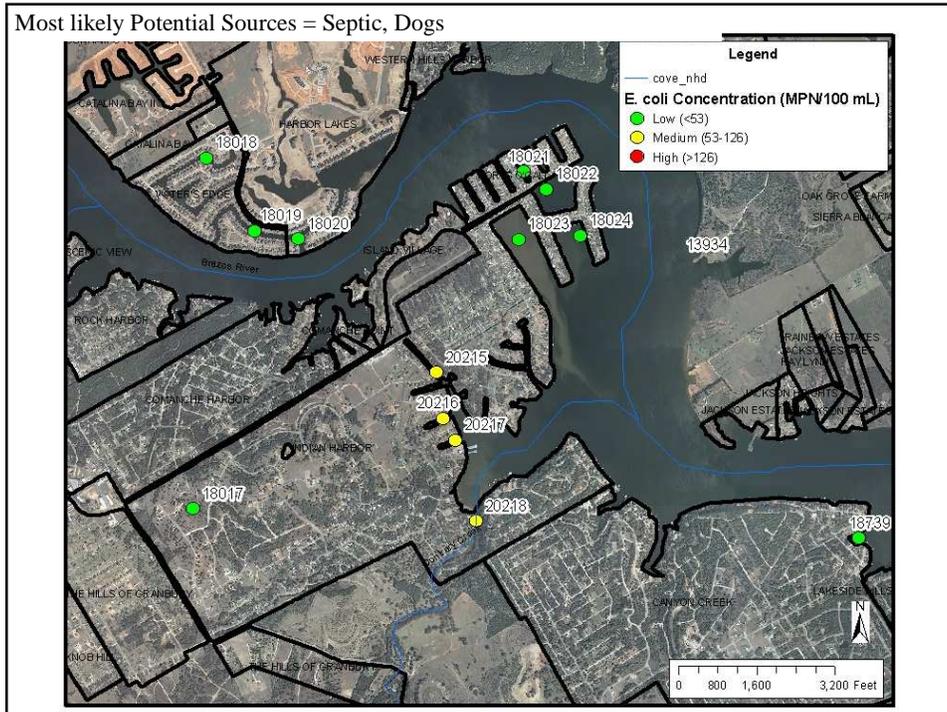
Site-specific development of Alternatives:

Indian Harbor

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23

Most likely Potential Sources = Septic, Dogs

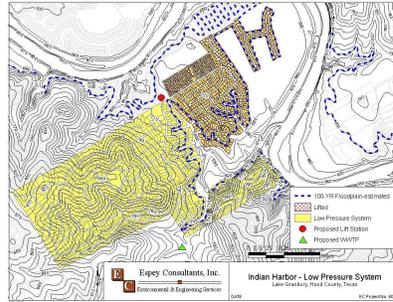


Indian Harbor

Centralized Wastewater Treatment

Low Pressure System + Package Plant

- 1909 residential lots (1909 grinder pumps)
- Avg. lot size 0.36 acres
- 1 Lift station
- Volume treated 0.573 MGD
- 25 year life cycle
- Potential load reduction = 100%
- EAC Index = 0.25



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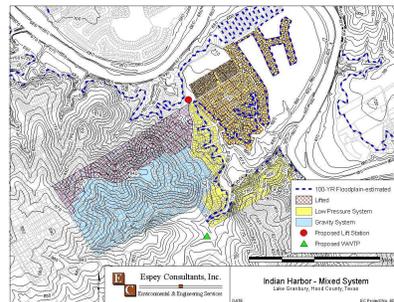
25

Indian Harbor

Centralized Wastewater Treatment

Mixed System + Package Plant

- Low Pressure
 - 1119 lots
- Gravity System
 - 790 lots
- 1 Lift Station
- Volume treated 0.573 MGD
- WWTP discharged into lake
- 25 year life cycle
- Potential load reduction = 100%
- EAC Index = 0.24



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26

Indian Harbor

Cove Circulation

Intake-Discharge Circulation System

- ❑ 4 day turnover rate
- ❑ 6 discharge points
- ❑ 27 hp pump
- ❑ PVC Pipe
 - 5,060 linear feet
 - 9" to 24" diameter
- ❑ 1909 lots in subdivision
- ❑ 15 year life cycle
- ❑ Potential concentration reduction = 33%
- ❑ EAC index = 0.10



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27

Indian Harbor Subdivision

Alternatives Ranking

BMP Alternative	Not Calculated		In Progress			Score	Feasibility/ (Constraints/ Considerations)	Funding
	Watershed % Reduction	Time to Implement	Equivalent Annual Cost index					
Weighting ->	1	1	1					
Local Centralized Wastewater Treatment - Independent	100%	5 2-5 yrs	3	0.24	3	11		
Regional Wastewater Treatment	100%	5 10-15 yrs	1		5	11		
Cove Circulation Systems (Fountains, etc)	33%	2 1-2 yrs	4	0.10	4	10		

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28

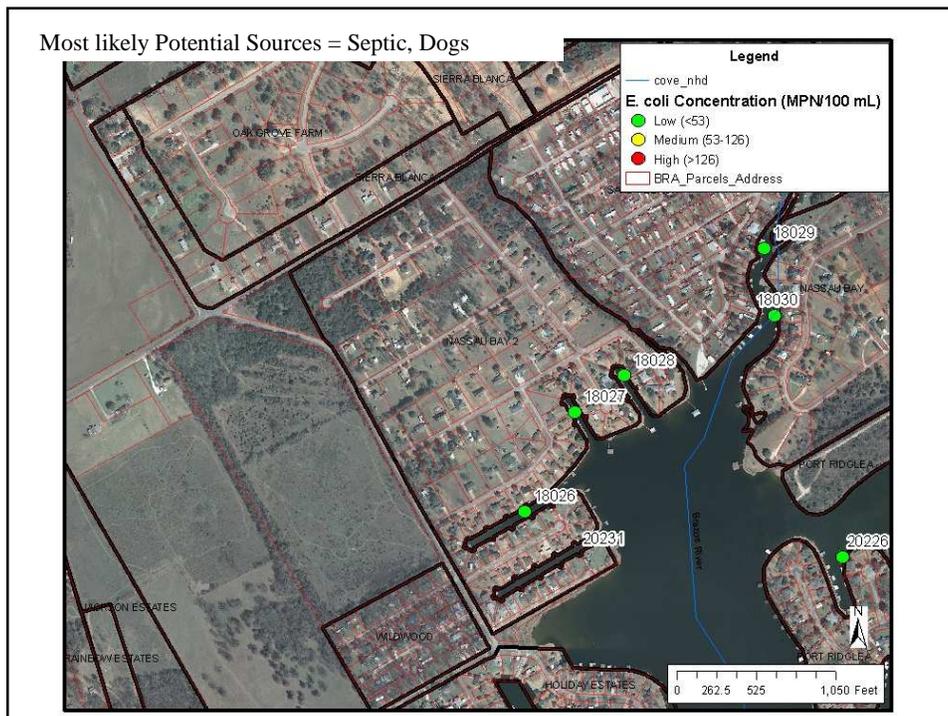
Site-specific development of Alternatives:

Nassau Bay II

Most likely Potential Sources = Septic, Dogs

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29

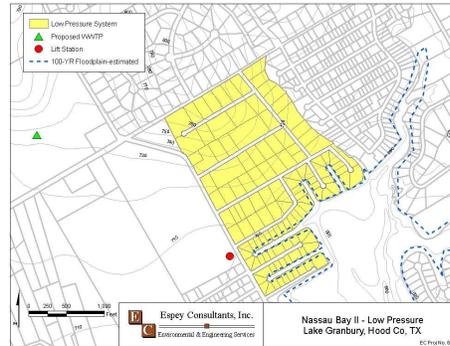


Nassau Bay II

Centralized Wastewater Treatment

Low Pressure System + Local WWTP Package Plant

- 123 residential lots (123 grinder pum
- Avg lot size 0.6 acres
- Lift station
- Volume treated 0.037 MGD
- WWTP discharge into lake
- 25 year life cycle
- Potential load reduction = 98%
- EAC Index = 0.28



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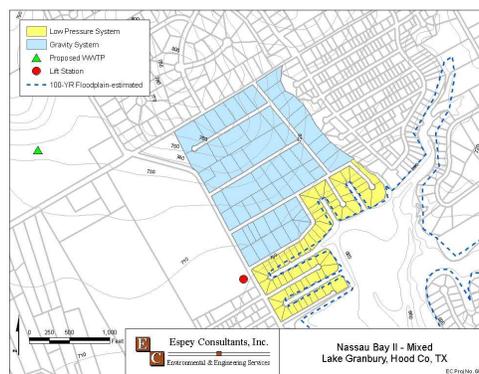
31

Nassau Bay II

Centralized Wastewater Treatment

Mixed System + Local WWTP Package Plant

- Low Pressure
 - 65 lots
- Gravity
 - 58 lots
- 1 Lift station
- Volume treated 0.037 MGD
- WWTP discharged into lake
- 25 year life cycle
- Potential load reduction = 98%
- EAC Index = 0.34



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32

Nassau Bay II Subdivision

Alternatives Ranking

BMP Alternative	Not Calculated		In Progress		Score	Feasibility (Constraints/ Considerations)	Funding
	Watershed % Reduction	Time to Implement	Equivalent Annual Cost index				
Weighting ->	1	1	1				
Local Centralized Wastewater Treatment - Independent	98%	5 2-5 yrs	3 0.28	2	10		
Local Centralized Wastewater Treatment - Aggregate	98%	5 5-10 yrs	2 0.28	2	9		
Regional Wastewater Treatment	98%	5 10-15 yrs	1				

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33