

Lake Granbury WPP Alternatives Analysis

7 – FINAL EVALUATION OF MANAGEMENT
MEASURES, CONSTRAINTS AND INPUT

Stakeholder meeting

October 14, 2009

Espey Consultants, Inc.
4801 Southwest Parkway
Parkway 2, Suite 150
Austin, TX 78735
512.326.5659



2009-10-14

Incorporating stakeholder inputs to identify area-specific management measures

- 4 PREVIOUS MEETINGS (Jun, Jul, Aug, Sep)
 - Discuss and evaluate potential management measures
 - Gather input and comments
- INTERIM
 - Revise materials per input and comments
- **TODAY**
 - **Discuss final evaluation matrices for each area**
 - **Prioritize management measures**
 - **Prioritize areas**
- NEXT MEETING – November 17 (proposed)
 - Gather comments on Preliminary Draft WPP report
 - Milestones/monitoring

2009-10-14

2

Summary of Areas, with lot counts

- Long Creek
 - 95 units
- Rolling Hills Shores
 - 196 uphill + 103 floodplain units
- Arrowhead Shores
 - 354 units
- Oak Trail Shores and Lake Granbury Estates
 - 1,895 units (1578 + 317)
- Sky Harbor
 - **629 units**
- Indian Harbor
 - 1,243 units
- Nassau Bay II
 - 123 units
- Port Ridglea East
 - **236 units**
- Walnut Creek (DeCordova)
 - 1,573 units
- Blue Water Shores
 - 357 units

2009-10-14

3

Arrowhead Shores - Lots

- BRA count (354):
 - Single Lots with Homes: 172
 - Double Lots with Homes: 57
 - Lots used for storage (barns or sheds only): 6
 - Undeveloped Lots: 119
- CAD parcels
 - 744
- **USE 354**

2009-10-14

4

Oak Trail Shores - Lots

- Larry Perry (HOA):
 - We currently have 1,269 lots with water connections and septic systems.
 - We have another 716 lots that may be developed in the future.
 - Total = 1,895
 - Total includes Lake Granbury Estates
- ***USE 1,895***

2009-10-14

5

Indian Harbor - Lots

- The Appraisal District indicated that they have 1913 tax accounts in IH, and that some of the accounts have multiple addresses in IH.
- AMUD data base indicates 1243 water taps have been paid in all.
- ***USE 1243***

2009-10-14

6

Summary Evaluation Matrices by Area

2009-10-14

7

Most likely bacteria sources

Subdivision	Most likely potential sources	
	Lake	Watershed
Rolling Hills Shores	Septic + NPS	62% Septic, 38% Cattle, <1% Dog, <1% Deer
Arrowhead Shores	Septic + NPS	99% Septic, <1% Dog, <1% Deer
Oak Trail Shores	Septic + NPS	54% Septic, 46% Dog
Sky Harbor	NPS	82% Cattle, 13% Septic, 4% Dog, 2% Feral Hog
Nassau Bay II	Septic + NPS	98% Septic, 2% Dog
Waters Edge	No problem exhibited; NPS	Very low potential; Dog
Ports O' Call	Septic	>99% Septic, <1% Dog
Indian Harbor Cove	Septic	99% Septic, 1% Dog
Indian Harbor Canal	Septic + NPS	>99% Septic, <1% Dog
Port Ridglea East	Septic	Dogs
Blue Water Shores	Septic	62% Septic, 38% Cattle, <1% Dog, <1% Deer
Long Creek		99% Septic, <1% Dog, <1% Deer
Walnut Creek		54% Septic, 46% Dog

2009-10-14

8

Lake-wide measures

Area	BMP Alternative	% Reduction Bacteria	Time to Implement	Equivalent Annual Cost Index	Cost/Reduction Ratio	Feasibility (Constraints/Considerations)	Stake-holder Priority
Lake Wide	Regional Wastewater Treatment	varies	10-15 yrs	varies	varies		
	Vegetative Filter Strips		<1 yr				
	Septic Maintenance and Education		<1 yr				
	Urban Education on Fertilizer Application		1-2 yrs				
	Pet Waste Education		<1 yr				
	Livestock/Range Management Education		1-2 yrs				
	Feral Hog Education Program/Bounty		2-5 yrs				
	Waterfowl Breeding Control Program		1-2 yrs				
	Waterfowl and Wildlife Feeding Ordinances		1-2 yrs				

2009-10-14

9

Long Creek

Area	BMP Alternative	% Reduction Bacteria	Time to Implement	Equivalent Annual Cost Index	Cost/Reduction Ratio	Feasibility (Constraints/Considerations)	Stake-holder Priority
Long Creek and Long Creek Subdivision 95 units	Local Centralized Wastewater Treatment - Independent ¹	99%	2-5 yrs	0.59	0.59	Subdivision below monitoring point	
	Regional Wastewater Treatment ¹	99%	10-15 yrs			inefficient considering distance and number of lots	
	Septic System Replacement ¹	75%	<1 yr	0.80	1.06	Subdivision below monitoring point	
	Vegetative Filter Strips		<1 yr			Site specific	
	Septic Maintenance and Education		<1 yr				
	Pet Waste Education		<1 yr				
	Area Conservation Plan and Education for small acreage land owners		2-5 yrs				
	Livestock/Range Management Education		1-2 yrs				
	Waterfowl Breeding Control Program		1-2 yrs				
	Waterfowl and Wildlife Feeding Ordinances		1-2 yrs				

¹ - Long Creek Subdivision Only, does not consider upper watershed

2009-10-14

10

Rolling Hills Shores

Area	BMP Alternative	% Reduction Bacteria	Time to Implement	Equivalent Annual Cost Index	Cost/Reduction Ratio	Feasibility (Constraints/Considerations)	Stake-holder Priority
Rolling Hills Shores 196 uphill + 103 floodplain units	Cove Dynamics: Dredge, Partial Fill, Add Outlet	86%	2-5 yrs	0.91	1.06	Does not address source(s)	
	Regional Wastewater Treatment (include neighboring areas)	62%	10-15 yrs	0.26	0.42		
	Local Centralized Wastewater Treatment-Aggregate	62%	5-10 yrs	0.34	0.54		
	Property Buy-Out	62%	1-2 yrs	0.35	0.57	Removal of tanks	
	Regional Wastewater Treatment	62%	10-15 yrs	0.37	0.60		
	Local Centralized Wastewater Treatment - Independent	62%	2-5 yrs	0.67	1.08		
	Septic System Replacement Uphill	46%	<1 yr	0.49	1.06	future repairs	
	Catchment for Upper Watershed	30%	2-5 yrs	0.32	1.07		
	Vegetative Filter Strips	5%	<1 yr	0.05	0.90		
	Cove Dynamics: Dredge	4%	1-2 yrs	0.28	6.99	Does not address source(s)	
	Cove Dynamics: Partial Fill	0%	1-2 yrs	0.53	-	Does not address source(s)	
	Cove Dynamics: Fill	-	1-2 yrs	0.62	-	Does not address source(s)	
	Cove Dynamics: Partial Fill & Dredge	0%	2-5 yrs	0.76	-	Does not address source(s)	
	Septic Maintenance and Education			<1 yr			
	Pet Waste Education			<1 yr			
	Septic Management (records, inspectors)			1-2 yrs			
	Livestock/Range Management Education			1-2 yrs			
	Waterfowl Breeding Control Program			1-2 yrs			

2009-10-14

11

Arrowhead Shores

Area	BMP Alternative	% Reduction Bacteria	Time to Implement	Equivalent Annual Cost Index	Cost/Reduction Ratio	Feasibility (Constraints/Considerations)	Stake-holder Priority
Arrowhead Shores 354 units	Regional Wastewater Treatment (include neighboring areas)	99%	10-15 yrs	0.26			
	Septic Maintenance and Education		<1 yr				
	Pet Waste Education		<1 yr				
	Urban Education on Fertilizer Application		1-2 yrs				
	Waterfowl and Wildlife Feeding Ordinances		1-2 yrs				

2009-10-14

12

Oak Trail Shores

Area	BMP Alternative	% Reduction Bacteria	Time to Implement	Equivalent Annual Cost Index	Cost/Reduction Ratio	Feasibility (Constraints/Considerations)	Stake-holder Priority	
Oak Trail Shores 1,895 units (incl. Lake Granbury Estates)	Regional Wastewater Treatment (include neighboring areas)	99%	10-15 yrs	0.26	0.26			
	Regional Wastewater Treatment	99%	10-15 yrs	0.37	0.37			
	Cove Dynamics: Dredge, Add Outlet	65%	2-5 yrs	0.84	1.29	Does not address source(s);		
	Local Centralized Wastewater Treatment - Aggregate	54%	5-10 yrs	0.34	0.62			
	Local Centralized Wastewater Treatment - Independent	54%	2-5 yrs	0.39	0.72			
	Drainage Re-route	51%	<1 yr	0.07	0.14			
	Septic System Replacement	Section 1			0.38	0.94		
		Section 3			0.73	1.81		
		Section 2	41%	<1 yr	0.50	1.24		
	Cove Circulation: Intake/Discharge					Infrastructure may impede navigation; Does not address source(s)		
			39%	1-2 yrs	0.20	0.51		
	Cove Dynamics: Dredge	30%	1-2 yrs	0.57	1.91	Does not address source(s)		
	Septic Maintenance and Education		<1 yr					
	Pet Waste Education		<1 yr					
	Septic Management (records, inspectors)		1-2 yrs					
Waterfowl and Wildlife Feeding Ordinances		1-2 yrs						

2009-10-14

13

Sky Harbor

Area	BMP Alternative	% Reduction Bacteria	Time to Implement	Equivalent Annual Cost Index	Cost/Reduction Ratio	Feasibility (Constraints/Considerations)	Stake-holder Priority
Sky Harbor 629 units	Catchment Basins	65%	2-5 yrs	0.82	1.25		
	Cove Circulation Systems (Fountains, etc)	39%	1-2 yrs	0.25	0.64	May impede navigation	
	Regional Wastewater Treatment	13%	10-15 yrs	0.30	2.37		
	Local Centralized Wastewater Treatment - Independent	13%	2-5 yrs	0.42	3.33		
	Septic System Replacement	9%	<1 yr	0.57	6.03		
	Septic Maintenance and Education		<1 yr				
	Pet Waste Education		<1 yr				
	Livestock/Range Management Education		1-2 yrs				
	Waterfowl and Wildlife Feeding Ordinances		1-2 yrs				
	Area Conservation Plan and Education for small acreage land owners		2-5 yrs				

2009-10-14

14

Water's Edge

Area	BMP Alternative	% Reduction Bacteria	Time to Implement	Equivalent Annual Cost Index	Cost/Reduction Ratio	Feasibility (Constraints/Considerations)	Stake-holder Priority
Water's Edge	Urban Education on Fertilizer Application		1-2 yrs				
	Pet Waste Education		<1 yr				
	Waterfowl and Wildlife Feeding Ordinances		1-2 yrs				

2009-10-14

15

Indian Harbor

Area	BMP Alternative	% Reduction Bacteria	Time to Implement	Equivalent Annual Cost Index	Cost/Reduction Ratio	Feasibility (Constraints/Considerations)	Stake-holder Priority
Indian Harbor 1,243 units	Regional Wastewater Treatment	99%	10-15 yrs	0.60	0.61		
	Cove Circulation Systems (Fountains, etc)	33%	1-2 yrs	0.21	0.65	May impede navigation	
	Septic Maintenance and Education		<1 yr				
	Pet Waste Education		<1 yr				
	Urban Education on Fertilizer Application		1-2 yrs				
	Waterfowl and Wildlife Feeding Ordinances		1-2 yrs				

2009-10-14

16

Nassau Bay II

Area	BMP Alternative	% Reduction Bacteria	Time to Implement	Equivalent Annual Cost Index	Cost/Reduction Ratio	Feasibility (Constraints/Considerations)	Stake-holder Priority
Nassau Bay II 123 units	Regional Wastewater Treatment	98%	10-15 yrs	0.54	0.55		
	Regional Wastewater Treatment (include neighboring areas)	98%	10-15 yrs	0.65	0.66		
	Septic Maintenance and Education		<1 yr				
	Pet Waste Education		<1 yr				
	Urban Education on Fertilizer Application		1-2 yrs				
	Waterfowl and Wildlife Feeding Ordinances		1-2 yrs				

2009-10-14

17

Port Ridglea East

Area	BMP Alternative	% Reduction Bacteria	Time to Implement	Equivalent Annual Cost Index	Cost/Reduction Ratio	Feasibility (Constraints/Considerations)	Stake-holder Priority
Port Ridglea East 238 units	Regional Wastewater Treatment (include neighboring areas)	99%	10-15 yrs	0.54	0.54		
	Regional Wastewater Treatment	99%	10-15 yrs	0.65	0.65		
	Septic System Replacement	75%	<1 yr	1.00	1.34	Small lots, large number of homes with waterfront property	
	Cove Circulation Systems (Fountains, etc)	30%	1-2 yrs	0.30	1.00	Navigation	
	Septic Maintenance Pump-out pilot program		<1 yr				
	Septic Maintenance and Education		<1 yr				
	Pet Waste Education		<1 yr				
	Urban Education on Fertilizer Application		1-2 yrs				
	Waterfowl and Wildlife Feeding Ordinances		1-2 yrs				
	Area Conservation Plan and Education for small acreage land owners		2-5 yrs				

2009-10-14

18

Walnut Creek – Possible Alternatives Matrix

Area	BMP Alternative	% Reduction Bacteria	Time to Implement	Equivalent Annual Cost Index	Cost/Reduction Ratio	Feasibility (Constraints/Considerations)	Stake-holder Priority
Walnut Creek and DeCordova Estates 1,573 units	Catchment Basin	2%	2-5 yrs	0.16	7.88	Work with golf course to redesign pond features; may not address source(s) Site specific	
	Vegetative Filter Strips		<1 yr				
	Septic Maintenance and Education		<1 yr				
	Pet Waste Education		<1 yr				
	Area Conservation Plan and Education for small acreage land owners		2-5 yrs				
	Livestock/Range Management Education		1-2 yrs				
	Feral Hog Education Program/Bounty		2-5 yrs				

2009-10-14

19

Blue Water Shores

Area	BMP Alternative	% Reduction Bacteria	Time to Implement	Equivalent Annual Cost Index	Cost/Reduction Ratio	Feasibility (Constraints/Considerations)	Stake-holder Priority
Blue Water Shores 357 units	Cove Dynamics: Dredge 8 ft	45%	1-2 yrs	0.96	2.13		
	Cove Circulation System: Intake/Discharge	38%	1-2 yrs	0.20	0.54		
	Cove Dynamics: Dredge 6ft	30%	1-2 yrs	0.50	1.68		
	Septic Maintenance and Education (Neighboring Communities)		<1 yr				
	Pet Waste Education		<1 yr				
	Waterfowl and Wildlife Feeding Ordinances		1-2 yrs				
	Collection System Sewage Line - Maintenance		1-2 yrs				

2009-10-14

20

Prioritizing Areas

2009-10-14

21

Priority Areas - September 2009 Subdivisions

Area	Actual Values			Ranking Score			Rank	Stakeholder Priority
	Geometric Mean	% Samples Below 53	% Samples Below 126	Geometric Mean	% of Samples Below 53	% of Samples Below 126		
Indian Harbor	78	42	67	3	5	5	13	
Port Ridglea East	76	40	67	3	5	5	13	
Oak Trail Shores	60	51	67	3	5	5	13	
Sky Harbor	58	49	72	3	5	4	12	
Blue Water Shores	28	60	74	1	2	4	7	
Nassau Bay II	33	60	82	1	2	3	6	
Rolling Hills Shores	27	64	76	1	2	4	7	
Holiday Estates	23	68	85	1	2	2	5	
Lambert Branch	21	70	89	1	2	2	5	
Port Ridglea West	29	70	86	1	2	2	5	
Mallard Pointe	8	83	89	1	1	2	4	
Waters Edge	18	77	88	1	1	2	4	
Arrowhead Shores	14	81	93	1	1	1	3	
Canyon Creek Cove	7	91	96	1	1	1	3	
Granbury at 51	5	92	94	1	1	1	3	
Granbury at Business 377	5	94	96	1	1	1	3	
Granbury Dam	3	98	98	1	1	1	3	
Ports O' Call	8	92	98	1	1	1	3	
Rough Creek Cove	8	92	95	1	1	1	3	

<53 = 1 >74 = 1 >89 = 1
 53-126 = 3 60-74 = 2 85-89 = 2
 >126 = 5 55-59 = 3 80-84 = 3
 50-54 = 4 75-79 = 4
 <50 = 5 <75 = 5

2009-10-14

22

Priority Areas - September 2009 Creeks

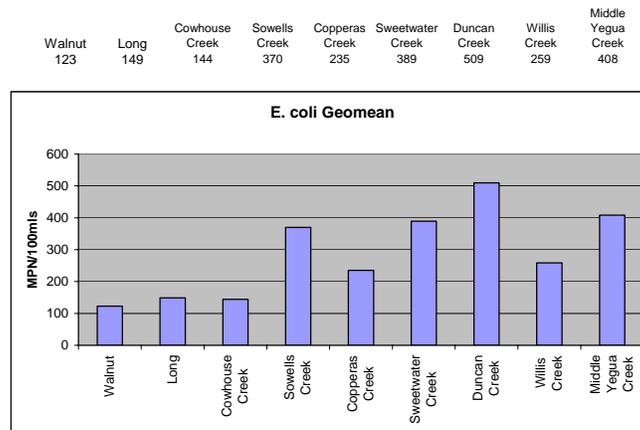
Area	Actual Values		Ranked Values		Rank	Stakeholder Priority
	Geometric Mean	% Samples Below 126	Geometric Mean	% of Samples Below 126		
Long Creek	149	56	5	5	10	
Walnut Creek	123	56	3	5	8	
Rucker Creek	97	67	3	4	7	
Robinson Creek	76	72	3	3	6	
Strouds Creek	94	72	3	3	6	
Brazos River at Lake Country Acres	23	78	1	3	4	

<53 =1 >89 =1
 53-126 =3 80-89 = 2
 >126 = 5 70-79 = 3
 60-69 =4
 <60 =5

2009-10-14

23

Priority Areas - September 2009 Comparison – Similar Creeks



2009-10-14

24

Concentration distribution - Indian Harbor



Concentration distribution - Port Ridglea East



Concentration distribution - Oak Trail Shores



2009-10-14

27

Concentration distribution - Sky Harbor



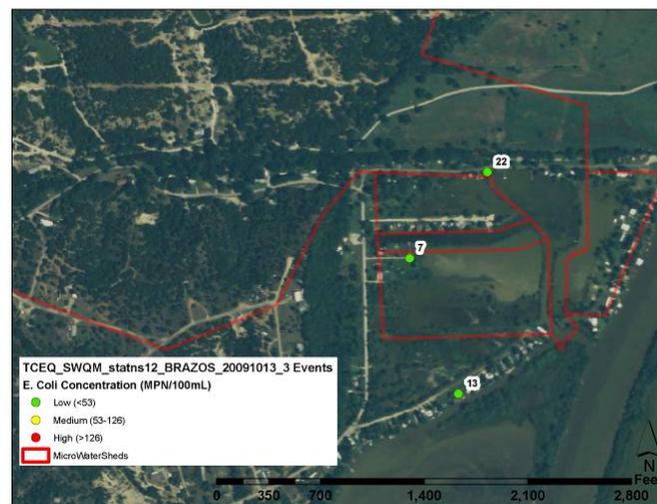
2009-10-14

28

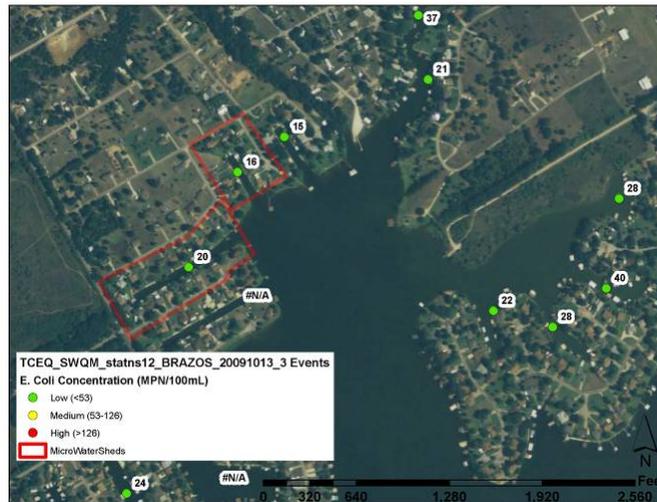
Concentration distribution - Blue Water Shores



Concentration distribution - Rolling Hills Shores



Concentration distribution - Port Ridglea West and Nassau Bay II



31

Next Steps – Wrapping up!

- Draft Final WPP report
 - Goal: March 31, 2010
 - Distribute Final Draft for acceptance and approval
- Draft #1 WPP document – November 2, 2009
- Meeting 1 – November 17, 2009
 - Discuss comments on source identification sections
 - Continue prioritization (if necessary)
 - Milestones/monitoring/implementation schedule

2009-10-14

32

Next Steps

- Draft #2 WPP - November 30, 2009
- Meeting 2 - December 15?, 2009 meeting
 - Discuss comments on priority measures and monitoring sections
 - Schedule, milestones/monitoring
 - Funding opportunities
- Draft #3 WPP – February 1
- Meeting 3 –February 11?, 2010
 - Discuss comments on priority measures
- Draft Final WPP report – March 31, 2010

2009-10-14

33

Questions or Comments?

- EC Contacts
 - Phone 512-326-5659
 - Tim Osting tosting@espeyconsultants.com
 - David Harkins
 - Kendra Riebschleager
 - Chris Stewart

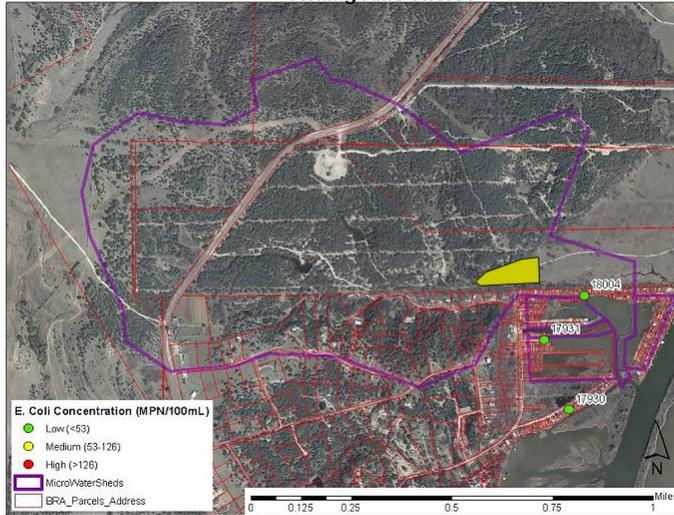
2009-10-14

Espey Consultants, Inc.
4801 Southwest Parkway
Parkway 2, Suite 150
Austin, TX 78735



Rolling Hills Shores – Catchment Basin

Rolling Hills Shores

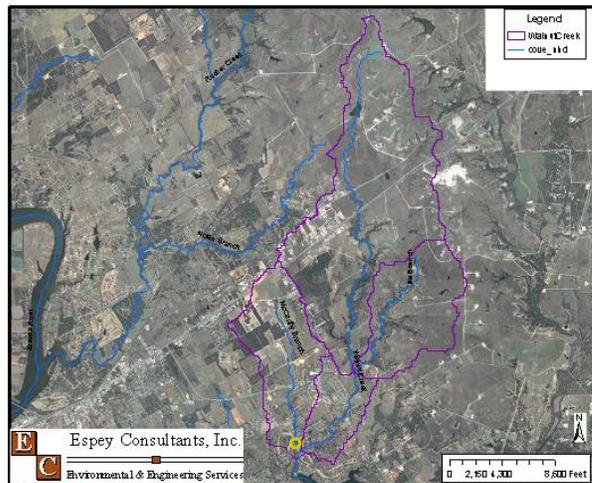


2009-10-14

35

Walnut Creek Catchment Basin

- Whole watershed – 7,821 acre
 - Lower Watershed
 - 670.8 acres
 - McCarthy Branch
 - 1478 acres



2009-10-14

Walnut Creek McCarthy Branch - Catchment Basin

