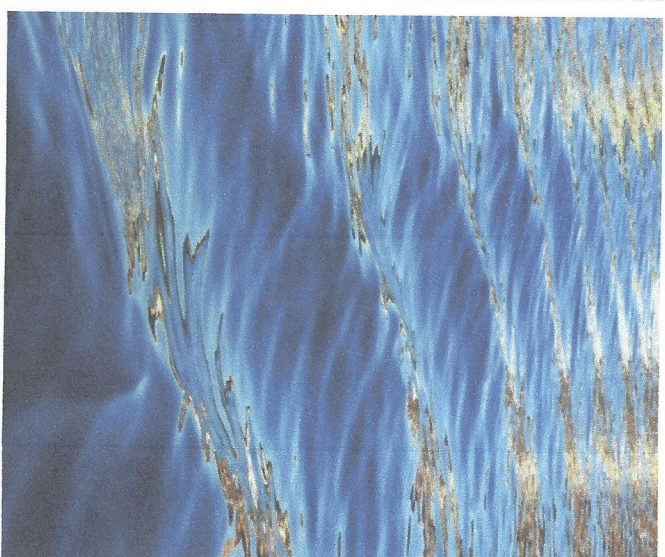
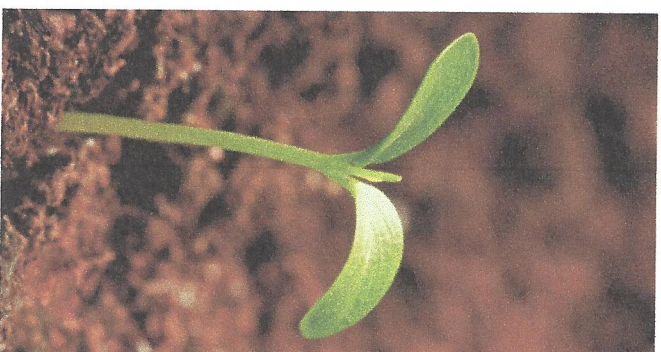




SRS Project Options

Jeff S. Landers, P.E.



Moore+Bruggink
Consulting Engineers

Creating Community Since 1956

Background

- Project Goals
 1. Capture a revenue stream that is currently leaving the Township
 2. Eliminate septage land application which can potentially be harmful to the lakes
- Wastewater Lagoon Basis of Design
 - Hydraulic Capacity – Fluid Volume
 - Organic Loading – Stuff needing treatment
- MDEQ Discussions concerning septage land-app elimination

Part 117 allows for Twp or Co ordinances to have supremacy. [The Township] can write an ordinance that would prohibit land application of septage in the Twp or the Co, but in order for the ordinance to be enforceable, [They] would have to have the capacity to take all the septage generated within the Twp or Co, and get DEQ approval of the ordinance.

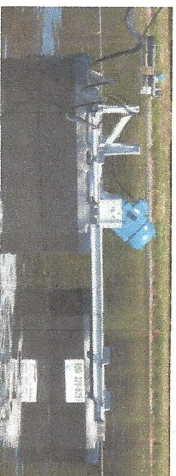
Two Potential Projects

1. Build a smaller SRS without creating an Ordinance.
 - Lower capital costs
 - Captures revenue
 - Doesn't eliminate land application of septage around the lakes
2. Build a larger SRS and create an Ordinance
 - Higher capital costs
 - Higher revenue capture
 - Eliminates land application of septage around the lakes

Aeration Technologies to meet organic loading



Aire-O₂® Aspirator Aerator



Tornado®

SURFACE ASPIRATING AERATOR



Project 1

Aeration Technologies Cost Analysis - Original Plan

Aeration Industries	
Surface Aerators	
System Cost	\$ 431,845.80 Capital Costs \$ 80,389.18 Installation Costs (20%) \$ 30,000.00 Slewwork \$ 103,086.88 Electrical (20%) \$ 130,400.39 Contingency (20%) \$ 782,402.34 Total Capital Cost \$ 117,380.35 Engineering Cost \$ 899,762.69 System Cost
20-yr Energy Cost	12 units 10 HP/Unit 24 Hrs/d 0.9 Operating Efficiency 2582 BHP-h/d 0.75 (kWh)/(HP-h/d) 1944 kWh-d 385 d/yr 20 years 14,191,200 kWh/20 years 0.10 \$/kWh \$ 1,419,120.00 20-year Energy Cost
20-yr Maintenance and Replacement Cost	10 Design Life in years 2.00 Full system replacements \$ 2,542,781.26 20-year Replacement costs \$ 254,278.12 General maintenance (10%) \$ 2,797,059.37 Total M&R Cost
20-yr System Cost	\$ 5,115,942.06 20-yr OM&R
Total HP	120

Fluence Corporation	
Surface Aerators	
System Cost	\$ 203,100.00 Capital Costs \$ 40,620.00 Installation Costs (20%) \$ 30,000.00 Slewwork \$ 48,744.00 Electrical (20%) \$ 84,492.80 Contingency (20%) \$ 389,856.80 Total Capital Cost \$ 88,043.52 Engineering Cost \$ 445,000.32 System Cost
20-yr Energy Cost	18 units 7.5 HP/Unit 24 Hrs/d 0.9 Operating Efficiency 2916 BHP-h/d 0.75 (kWh)/(HP-h/d) 2187 kWh-d 385 d/yr 20 years 15,985,100 kWh/20 years 0.10 \$/kWh \$ 1,598,510.00 20-year Energy Cost
20-yr Maintenance and Replacement Cost	10 Design Life in years 2.00 Full system replacements \$ 1,207,064.08 20-year Replacement costs \$ 120,706.41 General maintenance (10%) \$ 1,327,769.49 Total M&R Cost
20-yr System Cost	\$ 3,369,269.81 20-yr OM&R
Total HP	136

Triplepoint MARS	
Subsurface Aerators	
System Cost	\$ 286,700.00 Capital Costs \$ 59,340.00 Installation Costs (20%) \$ 30,000.00 Slewwork \$ 71,208.00 Electrical (20%) \$ 91,448.00 Contingency (20%) \$ 548,697.00 Total Capital Cost \$ 87,791.02 Engineering Cost \$ 636,489.22 System Cost
20-yr Energy Cost	3 units 60 HP 24 Hrs/d 0.9 Operating Efficiency 3240 BHP-h/d 0.75 (kWh)/(HP-h/d) 2430 kWh-d 385 d/yr 20 years 17,739,000 kWh/20 years 0.10 \$/kWh \$ 1,773,900.00 20-year Energy Cost
20-yr Maintenance and Replacement Cost	20 Design Life in years 1.00 Full system replacements \$ 887,063.23 20-year Replacement costs \$ 88,706.32 General maintenance (10%) \$ 975,429.56 Total M&R Cost
20-yr System Cost	\$ 3,386,818.77 20-yr OM&R
Total HP	160

Project 2

Aeration Technologies Cost Analysis - Full Township

Aeration Industries	
Surface Aerators	
System Cost	\$ 431,945.80 Capital Costs
	\$ 86,389.16 Installation Costs (20%)
	\$ 30,000.00 Silework
	\$ 103,866.99 Electrical (20%)
	\$ 130,400.39 Contingency (20%)
	\$ 782,402.34 Total Capital Cost
	\$ 117,360.35 Engineering Cost
	\$ 899,762.69 System Cost
20-yr Energy Cost	15 units
	10 HP/Unit
	24 Hrs/d
	0.9 Operating Efficiency
	3240 BHP-h/d
	0.75 (kWh)/(HP-h/d)
	2430 kWh-d
	365 dy
	20 years
	17,739,000 kWh/20 years
	\$ 0.10 \$/kWh
	\$ 1,773,900.00 20-year Energy Cost
20-yr Maintenance and Replacement Cost	
	10 Design Life in years
	2.00 Full system replacements
	\$ 2,542,781.25 20-year Replacement costs
	\$ 254,278.12 General maintenance (10%)
	\$ 2,797,059.37 Total M&R Cost
20-yr System Cost	\$ 5,470,722.06 20-yr OM&R
Total HP	150

Fluence Corporation	
Surface Aerators	
System Cost	\$ 236,950.00 Capital Costs
	\$ 47,390.00 Installation Costs (20%)
	\$ 30,000.00 Silework
	\$ 56,868.00 Electrical (20%)
	\$ 74,241.60 Contingency (20%)
	\$ 445,449.60 Total Capital Cost
	\$ 66,817.44 Engineering Cost
	\$ 512,267.04 System Cost
20-yr Energy Cost	20 units
	7.5 HP/Unit
	24 Hrs/d
	0.9 Operating Efficiency
	3240 BHP-h/d
	0.75 (kWh)/(HP-h/d)
	2430 kWh-d
	365 dy
	20 years
	17,739,000 kWh/20 years
	\$ 0.10 \$/kWh
	\$ 1,773,900.00 20-year Energy Cost
20-yr Maintenance and Replacement Cost	
	10 Design Life in years
	2.00 Full system replacements
	\$ 1,404,629.76 20-year Replacement costs
	\$ 140,462.98 General maintenance (10%)
	\$ 1,545,092.74 Total M&R Cost
20-yr System Cost	\$ 3,831,259.78 20-yr OM&R
Total HP	150

Triplepoint MARS	
Subsurface Aerators	
System Cost	\$ 445,050.00 Capital Costs
	\$ 89,010.00 Installation Costs (20%)
	\$ 30,000.00 Silework
	\$ 106,812.00 Electrical (20%)
	\$ 134,174.40 Contingency (20%)
	\$ 805,046.40 Total Capital Cost
	\$ 128,807.42 Engineering Cost
	\$ 933,853.82 System Cost
20-yr Energy Cost	2 units
	75 HP
	24 Hrs/d
	0.9 Operating Efficiency
	3240 BHP-h/d
	0.75 (kWh)/(HP-h/d)
	2430 kWh-d
	365 dy
	20 years
	17,739,000 kWh/20 years
	\$ 0.10 \$/kWh
	\$ 1,773,900.00 20-year Energy Cost
20-yr Maintenance and Replacement Cost	
	20 Design Life in years
	1.00 Full system replacements
	\$ 1,325,734.85 20-year Replacement costs
	\$ 132,573.48 General maintenance (10%)
	\$ 1,458,308.33 Total M&R Cost
20-yr System Cost	\$ 4,166,062.16 20-yr OM&R
Total HP	150

Project Costs

Project 1: FRP Tank, Existing Pump, 10,000 Gal of Septage Air Treatment \$675,200

Project 1 (Alternate): FRP Tank, Suction Lift Packaged Station, 10,000 Gal of Septage Treatment \$766,000

Project 2: Full Township Septage Treatment – 25,000 Gal of Septage Treatment \$980,000

Conclusion

- The only option meeting all the goals is Project 2
- Need to average about 5,500 gallons per day (20 day/month) to cover the payments on a 20 year loan at 3.125% (\$66,630/yr.)
- Taking in septage creates the potential for odors
- Recommend discussions of ordinance with an attorney

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Questions



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