
DECENTRALIZED TREATMENT NETWORK HELPS MARATHON WIN THE RACE TO MEET FLORIDA ADVANCED WATER TREATMENT REQUIREMENTS

Friday, June 10, 16

Agenda

1 Introduction

2 Background

3 Results

4 Conclusion



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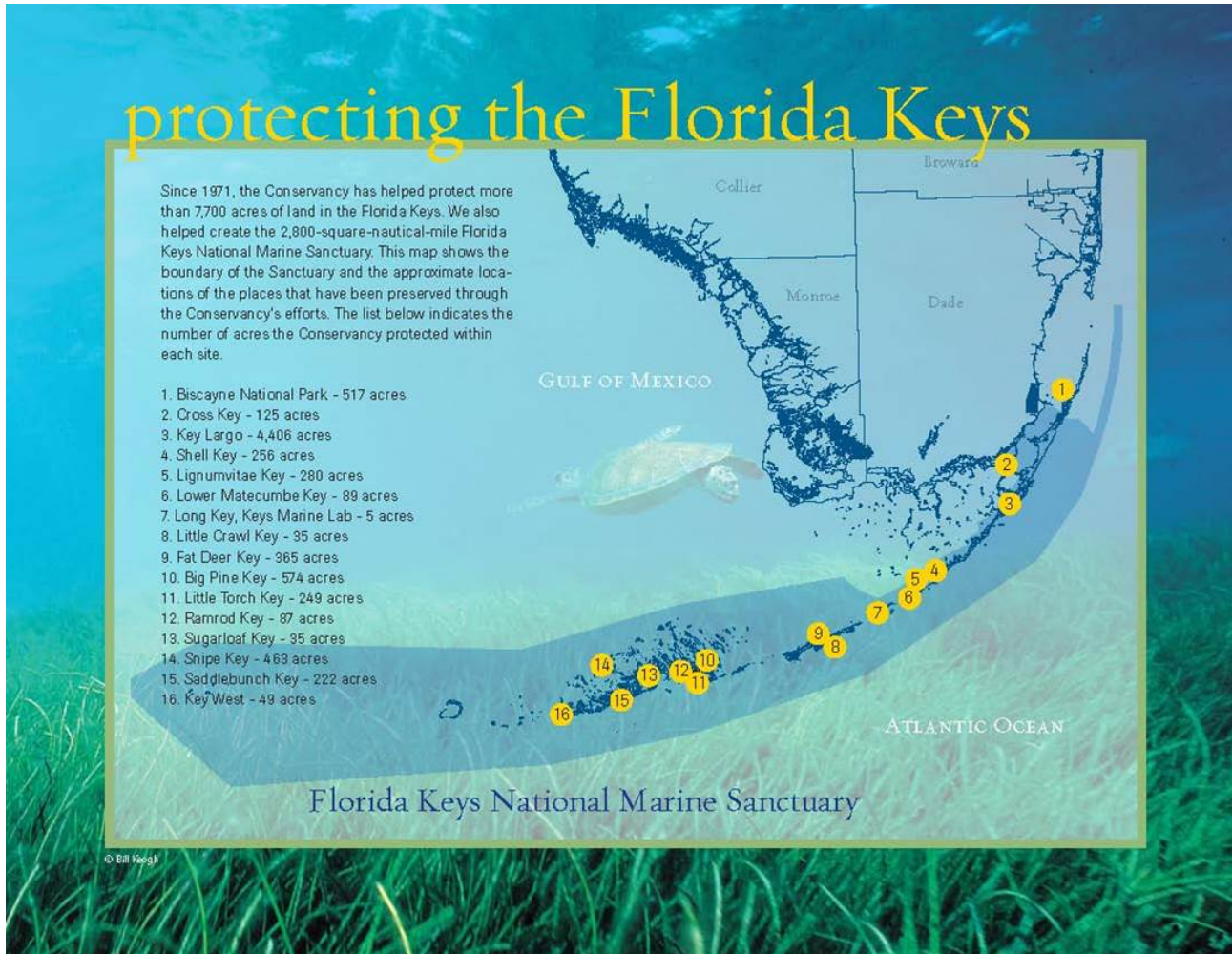
Protection of the Florida Keys Vital to the Region



Location of Marathon, FL



Florida Keys Marine Sanctuary



History of Treatment in Marathon, FL

- At the time of incorporation one secondary treatment plant existed. A majority of the service area utilized septic
- Florida Keys Aquaduct Authority Managed Sewer System
- State of Florida mandated upgrades to Advanced Water Treatment Standards
- Initial proposals came in at \$180 million



Chosen Path Forward

- City took over control of sewer system and hired a consultant
- Broke Marathon into seven service areas
- Chose a decentralized treatment network with a vacuum sewer system
- Implemented a network of package treatment plants to meet the mandated requirements



Marathon Plant Locations



Advantages of Decentralized Treatment

1

Less Land Area Requirement

2

Shorter Runs for Sewer Lines

3

Minimize Constructability Issues

4

Treatment Close to the Source

5

Cost Effective and Economical



Financial Results

- Final wastewater infrastructure cost was \$97 million
- Worked with the State of Florida revolving loan program to provide \$85 million in loans for the project. The remaining cost was covered by grants
- Total assessment per household was \$5700
- Savings of more than \$80 million vs. the centralized treatment option



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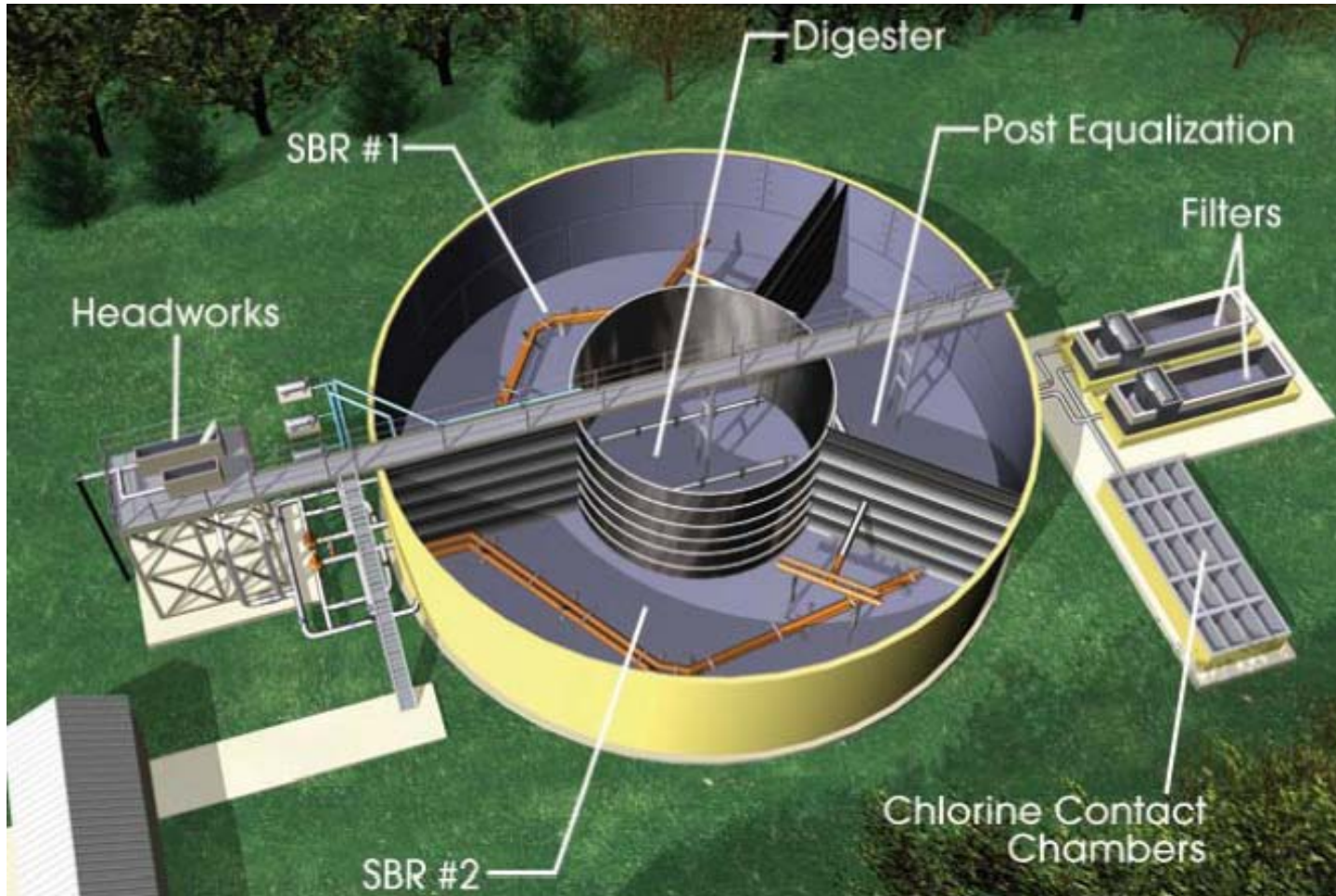
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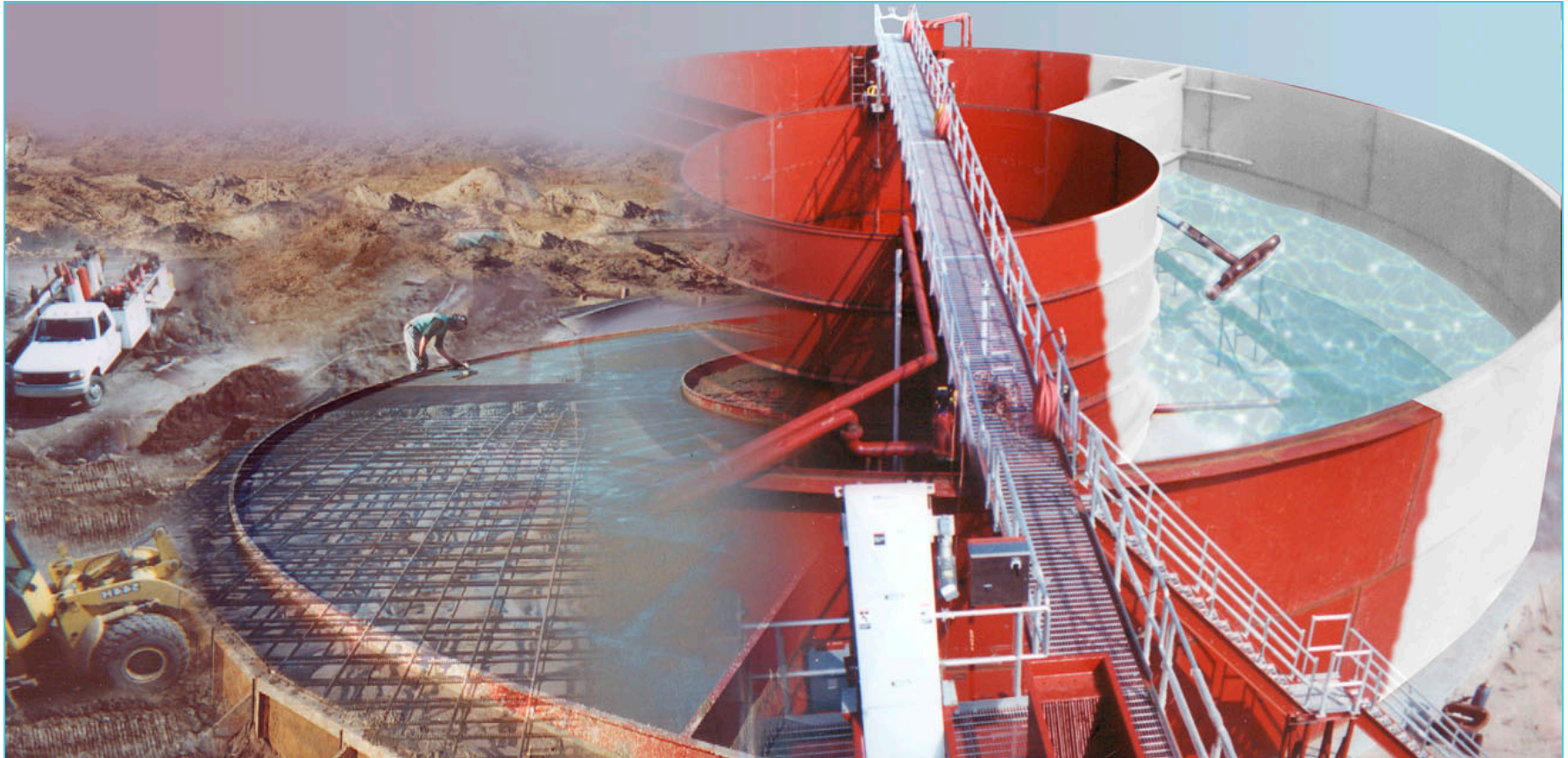
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Omnipac® SBR Overview



OMNIPAC® Field Erected SBR Construction



Field Erect Treatment Plant

- Pre-engineered
- Factory built (pre-fabricated steel rings)
- Can be installed by supplier or local contractor
- Contains inner ring with hydrostatic bulkheads
- Field painted



Concrete Pad and Initial Ring



Pre-Fabricated Steel Rings and Bulkheads



Modular Placement



Manways



Tertiary Filter and Site Construction



Omnipac Internals



Internal Equipment – Jet Aeration



Why Jet Aeration Was Chosen

1 Durability

2 Treatment Flexibility

3 Tank Configuration Flexibility

4 Economical



Wet Test



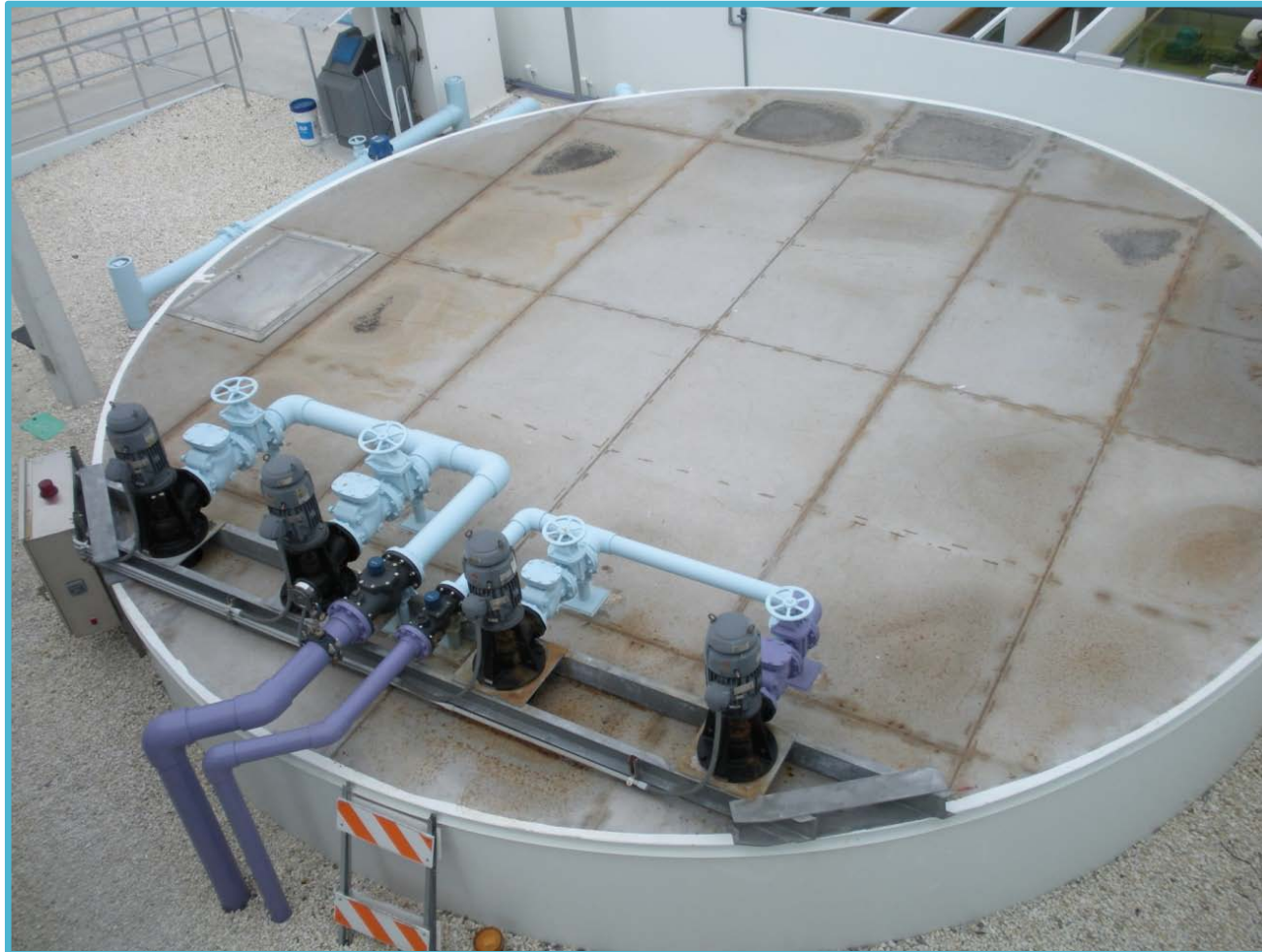
SBR Tank Full



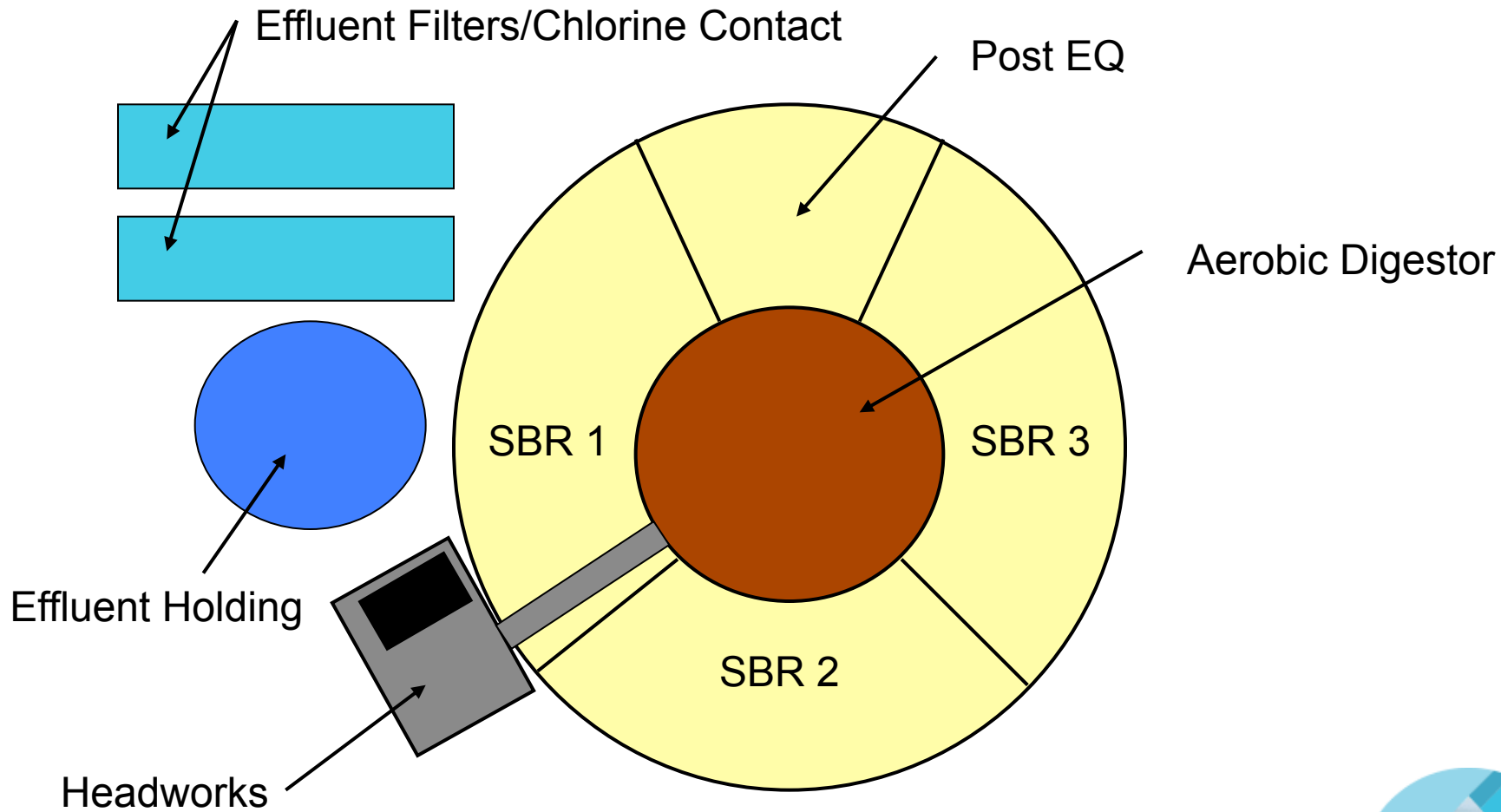
TES Filters



Reclaimed Water



Marathon Omnipac SBR Layout



Advantages of the Omnipac Field Erected SBR

1 Small Footprint

2 Treatment Flexibility

3 Tank Configuration Flexibility

4 Capital, O&M, and Energy Savings



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Process Parameters

Process Parameters (mg/L)			
		SBR	TES Filter
	Influent	Effluent	Effluent
BOD	250	10	5
TSS	250	10	5
TKN	60		
NH4	40	1	
TN		5	3
TP	8	1	1

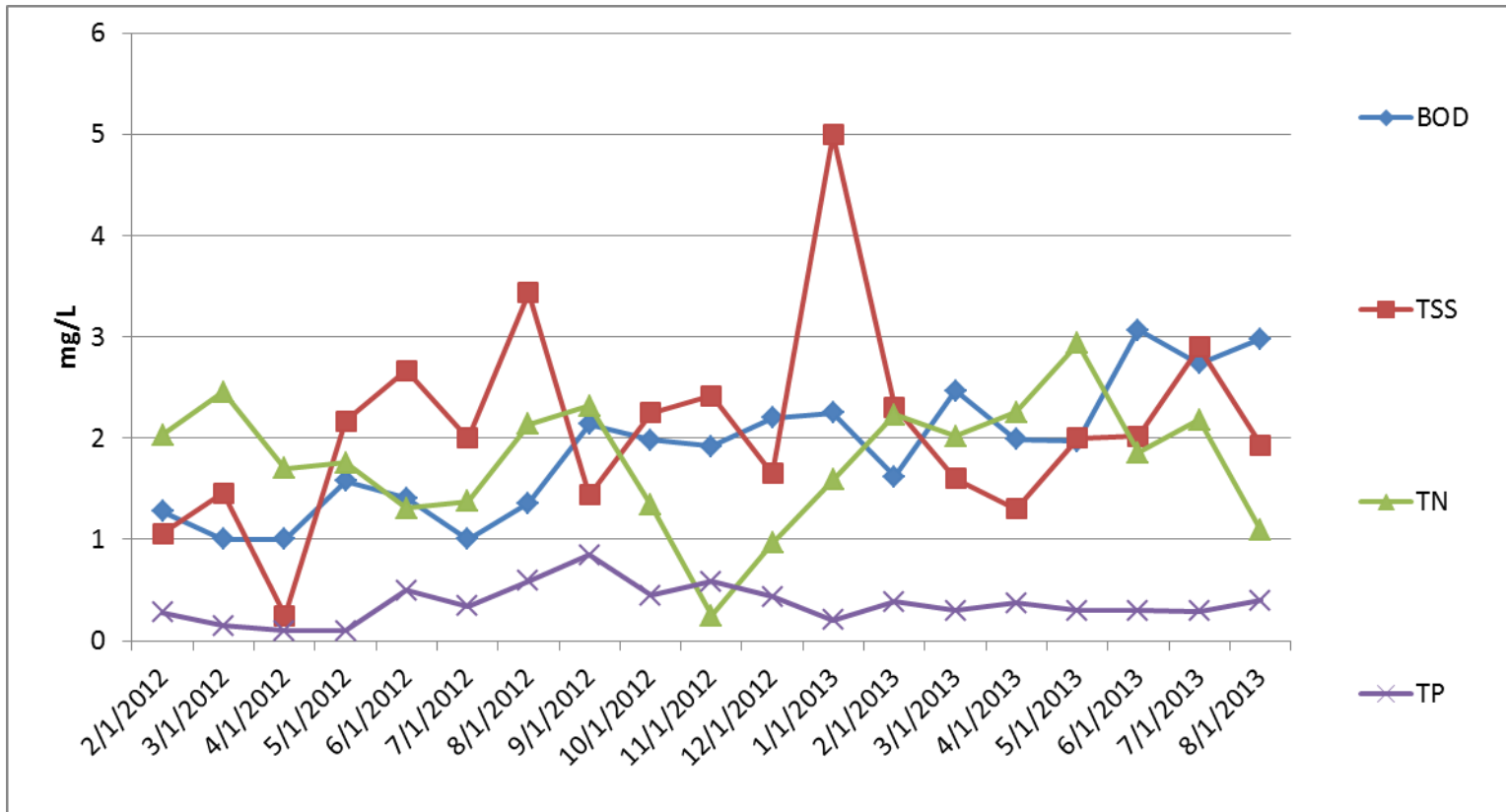


Marathon Flows and Loads

	Design Flow	Peak Design Flow	Design Loading	Current Loading	Current Capacity
	(MGD)	(MGD)	(lbs/day)	(lbs/day)	(%)
Area 3	0.25	0.81	521	324	62
Area 4	0.40	1.30	834	334	40
Area 5	0.45	1.46	938	321	34
Area 6	0.20	0.65	417	172	41
Area 7	0.20	0.65	417	26	6



Area #4 Results



Percent Removal

	% Removal			
	BOD	TSS	TN	TP
Area 3	99.5%	99.7%	98.1%	97.9%
Area 4	99.4%	99.6%	96.9%	96.8%
Area 5	99.5%	99.4%	98.4%	96.7%
Area 6	99.4%	99.7%	98.0%	95.4%
Area 7	99.2%	97.7%	96.6%	96.1%



Marathon Average Effluent Values

	Eff. BOD	Eff. TSS	Eff. TN	Eff. TP	Eff NH3
	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
Area 3	2.59	1.88	1.68	0.34	0.15
Area 4	1.89	2.10	1.78	0.37	0.03
Area 5	1.12	1.63	1.10	0.30	0.02
Area 6	1.83	1.41	1.30	0.53	0.04
Area 7	1.76	3.86	2.92	0.43	0.24



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Study by Florida International University

- **Removal of cesspits and septic systems resulted in 77% removal of fecal coliform 57% removal of enterococci in the adjacent canals 4 years after construction!**



Marathon Sanitary Upgrade Project Awards

- 2008 EPA PISCES AWARD
- 2012 State of Florida Department of Environmental Protection Plant Operations Excellence Award
- 2012 Peak Performance Award from National Association of Clean Water Agencies
- 2013 “Environmental Project of the Year” for projects > \$75 Million by the American Public Works Association (APWA)
- 2013 Weiler Engineering received the “National Consultant of the Year” by the APWA for the Marathon Project



Omnipac® SBR Systems exceed expectations in Marathon, FL













- Turn Key Solution from Single Supplier
- Distributed Treatment Architecture
- Exceeds Florida AWT (5/5/3/1) Effluent Requirements
- Storm Flow Capability
- Short Construction/Delivery Schedule



City of
Marathon Florida

Conclusion

Decentralized facilities compared to single regional facility		
Treatment Capacity		
Storm Flow		
Additional footprint		
Nutrient Removal		
Construction Time		33%
Capital Costs		46%





THANK YOU!

**CITY OF MARATHON, FL
WEILER ENGINEERING**