

FLORIDA ONSITE SEWAGE NITROGEN REDUCTION STRATEGIES (FOSNRS) STUDY

RRAC Meeting Presentation
July 1, 2009



OTIS
ENVIRONMENTAL
CONSULTANTS

Agenda

- Proposed Year 1 Scope and Schedule Revisions
- PNRS II
- Next Steps
- Tour of the GCREC Facility

Scope – Task A

Task	Current Year 1	Proposed Year 1
A.1 Draft Lit Review	1	1
A.2 Final Lit Review	1	1
A.3 Draft Classification of Tech	1	1
A.4 Draft Tech Ranking Criteria	1	1
A.5 Draft Priority List for Testing	1	1
A.6 Tech Classification, Ranking & Prioritization Workshop	1	1
A.7 Final Classification of Tech	1	1
A.8 Final Tech Ranking Criteria	1	1
A.9 Final Priority List for Testing	1	1
A.10 Draft Innovative Systems Application	2	
A.12 Identification of Test Facility Sites	2	1.8
A.13 Draft QAPP PNRS II	1	1
A.14 Recommendation for Process Forward	1	1
A.15 Final QAPP PNRS II	1	1
A.16 PNRS Specification Reports	2	2
A.17 Test Facility Design 50%	1	1
A.18 Test Facility Design 100%	1	1
A.19 Test Facility Design Final	1	
A.20 Test Facility Accept Bid	1	
A.25 Sample Event Reports		3
A.26 Data Summary Report		3

Scope – Task B

Task	Current Year 1	Proposed Year 1
B.1 Identification of Home Site	10	
B.2 Vendor Agreement Report	8	
B.3 Draft QAPP for Field Testing	1	
B.4 Recommendation for Process Forward	1	
B.5 Final QAPP for Field Testing	1	
B.11 LCAA Template Report	1	

Scope – Task C

Task	Current Year 1	Proposed Year 1
C.1 Draft Literature Review on N Reduction in Soil	1	1
C.2 Final Literature Review on N Reduction in Soil	1	1
C.3 Draft QAPP Evaluation of N Reduction by Soils & Shallow GW	1	1
C.4 Recommendation for Process Forward	1	1
C.5 Final QAPP Evaluation of N Reduction by Soils & Shallow GW	1	1
C.6 Home Site Selection	8	
C.7 Instrumentation of Home Sites	4	1 (GCREC)
C.11 Test Facility Design 50%	1	1
C.12 Test Facility Design 100%	1	1
C.13 Test Facility Design Final		1
C.14 Test Facility Accept Bid		1
C.15 Test Facility Shop Drawing Review		4
C.16 Test Facility Construction		1
C.17 Test Facility Construction Substantial Completion		1
C.18 Test Facility Accept Construction		1
C.19 Monitoring Report		3

Scope – Tasks D & E

Task	Current Year 1	Proposed Year 1
D.1 Draft Lit Review on N Fate & Transport Model	1	1
D.2 Final Lit Review on N Fate & Transport Model	1	1
D.3 Selection of Existing Data Set for Calibration	1	1
D.4 Draft QAPP N Fate & Transport Models	1	1
D.5 Recommendation for Process Forward	1	1
D.6 Final QAPP N Fate & Transport Models	1	1
D.7 Simple Soil Model Development	1	
D.8 Non-Steady State Aquifer Model, Simple Soil Model	1	
D.9 Aquifer Model with Averaged Output, Simple Soil Model	1	
E.1 Project Kick-Off Meeting	1	1
E.2 PM – Project Progress Reports	6	5
E.3 RRAC Meetings	1	1
E.4 PAC Meetings	1	1

Schedule – Task A

Task	June 2009	Jul 2009	Aug 2009	Sept 2009	Oct 2009	Nov 2009	Dec 2009	Jan 2010	Feb 2010	March 2010	April 2010	May 2010	June 2010
A.1 Draft Lit Review	1												
A.2 Final Lit Review	1												
A.3 Draft Classification of Tech	1												
A.4 Draft Tech Ranking Criteria	1												
A.5 Draft Priority List for Testing	1												
A.6 Tech Classification, Ranking & Prioritization Workshop	1												
A.7 Final Classification of Tech		1											
A.8 Final Tech Ranking Criteria			1										
A.9 Final Priority List for Testing				1									
A.12 Iden. of Test Facility Sites	1.8												
A.13 Draft QAPP PNRS II	1												
A.14 Rec. for Process Forward		1											
A.15 Final QAPP PNRS II			1										
A.16 PNRS Specification Reports				1	1								
A.17 Test Facility Design 50%		1											
A.18 Test Facility Design 100%			1										
A.25 Sample Event Reports								1		1		1	
A.26 Data Summary Report									1		1		1

Schedule – Task C

Task	June 2009	Jul 2009	Aug 2009	Sept 2009	Oct 2009	Nov 2009	Dec 2009	Jan 2010	Feb 2010	March 2010	April 2010	May 2010	June 2010
C.1 Draft Literature Review	1												
C.2 Final Literature Review		1											
C.3 Draft QAPP			1										
C.4 Rec. for Process Forward			1										
C.5 Final QAPP				1									
C.7 Instrumentation of Home Sites					1								
C.11 Test Facility Design 50%	1												
C.12 Test Facility Design 100%			1										
C.13 Test Facility Design Final				1									
C.14 Test Facility Accept Bid					1								
C.15 Test Fac Shop Dwg Review						4							
C.16 Test Facility Construction						1							
C.17 Test Facility Construction Substantial Completion							1						
C.18 Test Facility Accept Construction							1						
C.19 Monitoring Report								1		1		1	

Schedule – Tasks D & E

Task	June 2009	Jul 2009	Aug 2009	Sept 2009	Oct 2009	Nov 2009	Dec 2009	Jan 2010	Feb 2010	March 2010	April 2010	May 2010	June 2010
D.1 Draft Lit Review on N Fate & Transport Model	1												
D.2 Final Lit Review on N Fate & Transport Model			1										
D.3 Selection of Existing Data Set for Calibration	1												
D.4 Draft QAPP N Fate & Transport Models					1								
D.5 Recommendation for Process Forward								1					
D.6 Final QAPP N Fate & Transport Models											1		
E.1 Project Kick-Off Meeting	1												
E.2 PM – Project Progress Reports	5			0.5				0.5					
E.3 RRAC Meetings		1											
E.4 PAC Meetings						1							

PNRS II Workplan Overview

Passive Nitrogen Removal Study II

Objectives

- Follow up to PNRS I
- Develop detailed performance data for passive biofiltration
- Produce scalable design data from pilot scale biofilters

PNRS I – AWARD WINNING!



***American Academy of
Environmental Engineers:***

***Excellence in Environmental
Engineering (E3) Award in
Applied Research and Practice***

***Dr. Daniel Smith accepts E3 Award from AAEF
President Dr. Deborah Reinhart of UCF***

HAZEN AND SAWYER
Environmental Engineers & Scientists

Passive Nitrogen Removal Study II

Significant Features

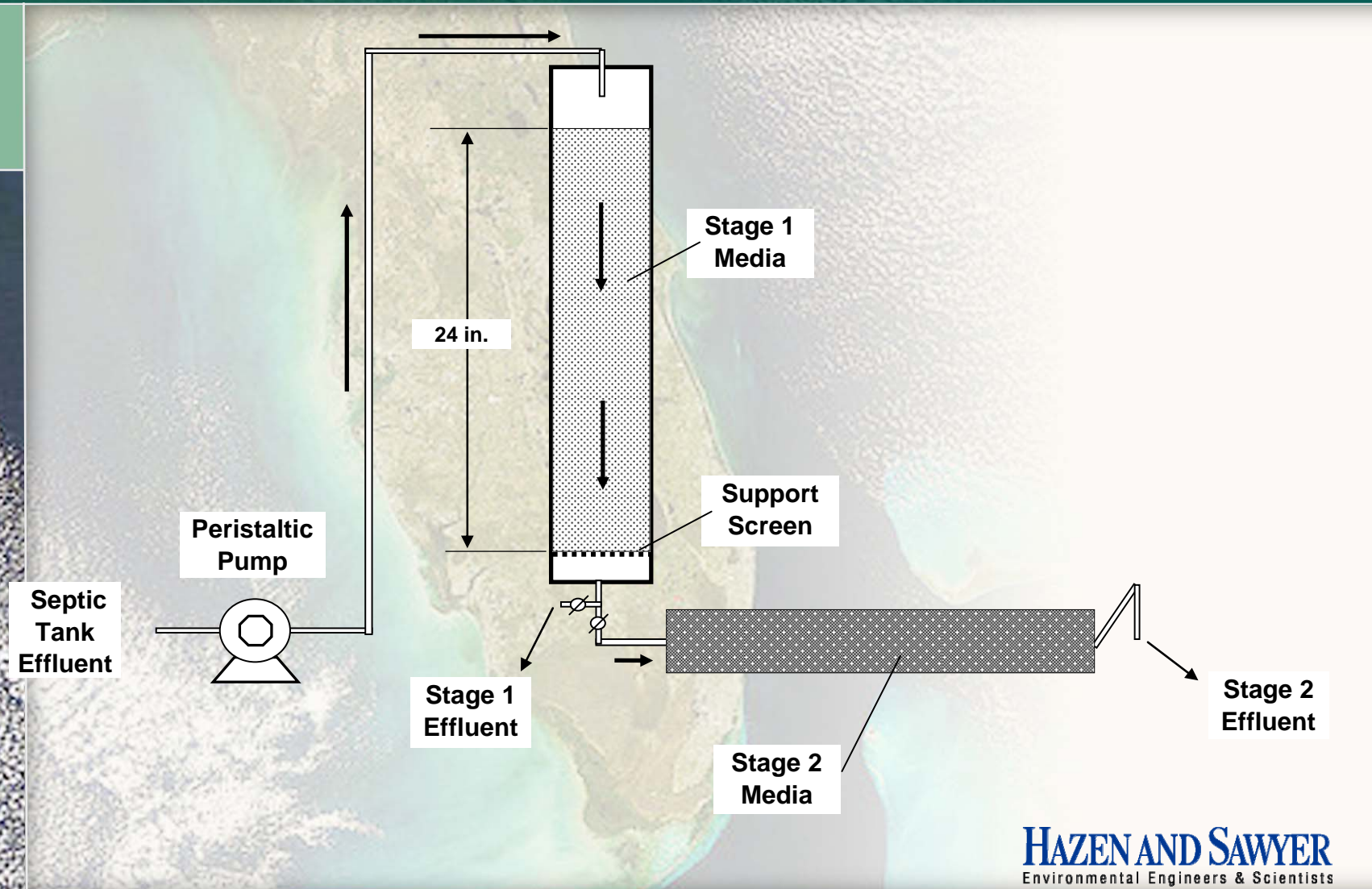
- Couple first stage recycle (mixed biomass) to denitrification (separate stage biomass)
- Unsaturated filter: 2 layer stratification design with 2 media depths
- Evaluate lignocellulosic and sulfur based denitrification biofilters
- Reactive media in in-ground systems

Passive Nitrogen Removal Study II

Approach

- Establish test site at Gulf Coast Education and Research Center (IFAS)
- In-vessel and in-situ pilot systems
- Operate on septic tank effluent for 12 months
- Nitrification and denitrification biofilters

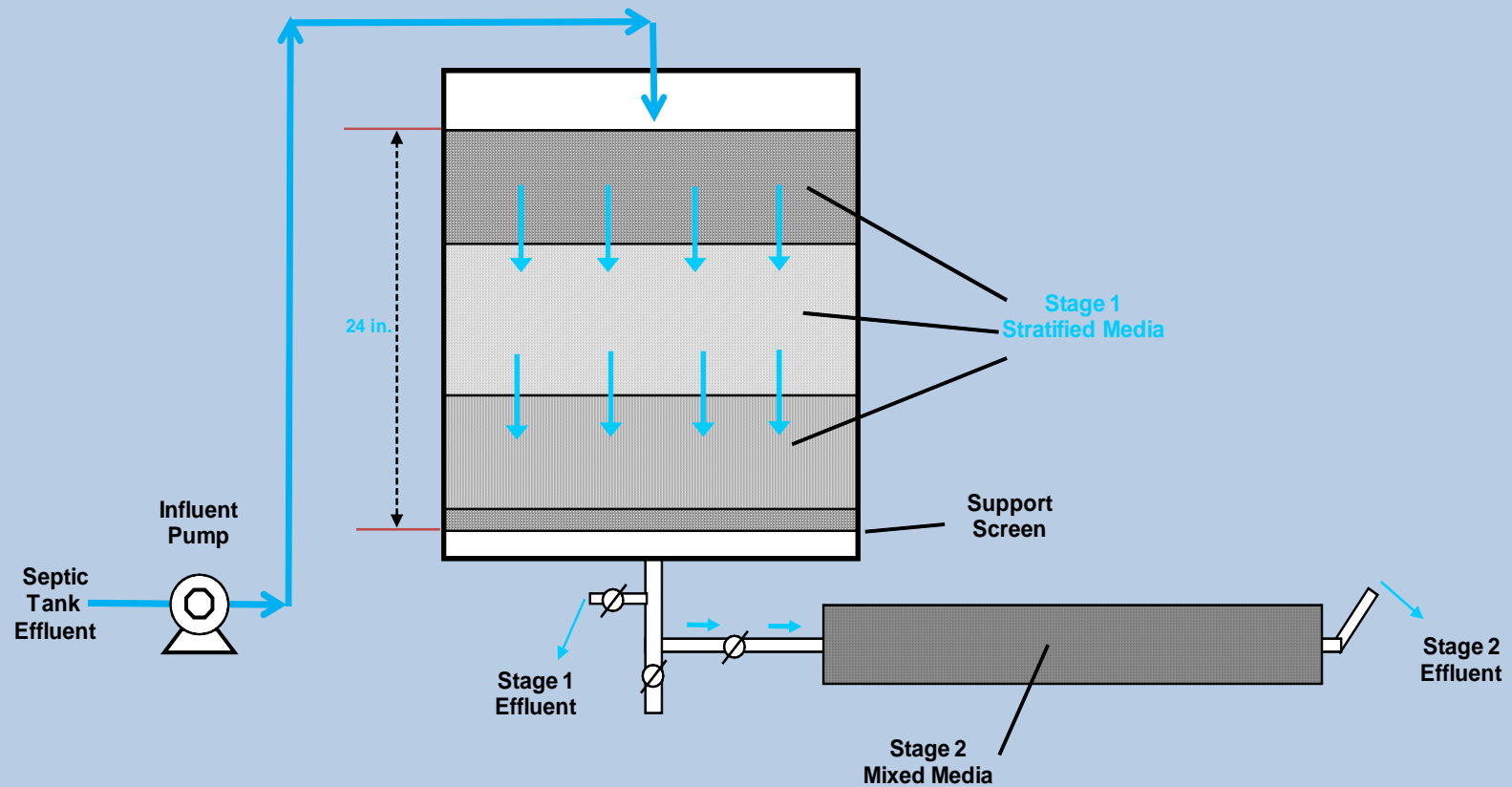
Passive Two Stage Biofiltration PNRS I



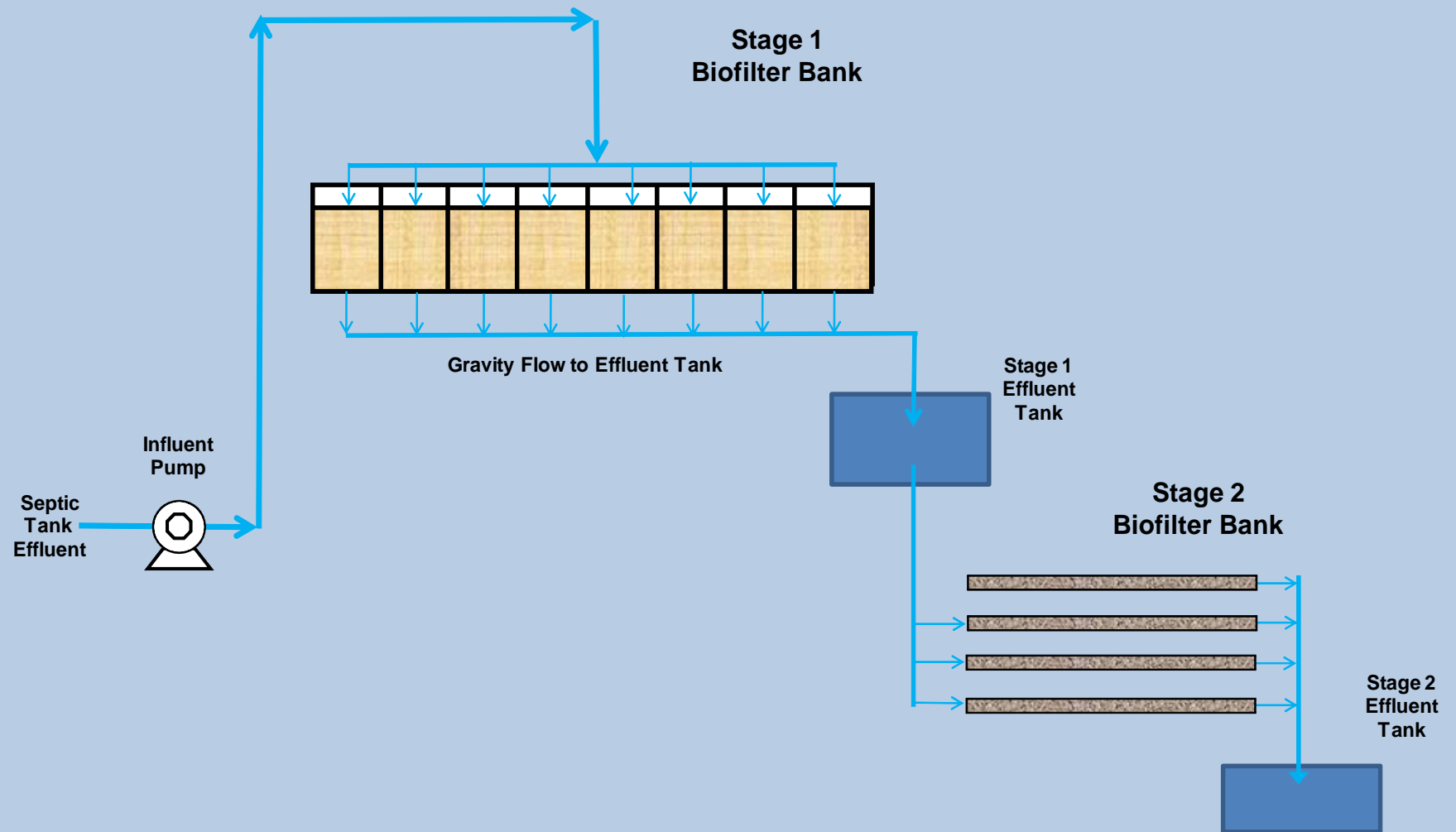
44287-001W-FN

Passive Nitrogen Removal Study II

Pilot Two Stage Biofiltration



Passive Nitrogen Removal Study II



44287-001W-FN

Stage 1 Media (nitrification)



***Zeo-Pure
clinoptilolite***



***Expanded
polystyrene***



Expanded clay

Stage 2 Media (denitrification)



Lignocellulosics



Elemental sulfur



Expanded clay

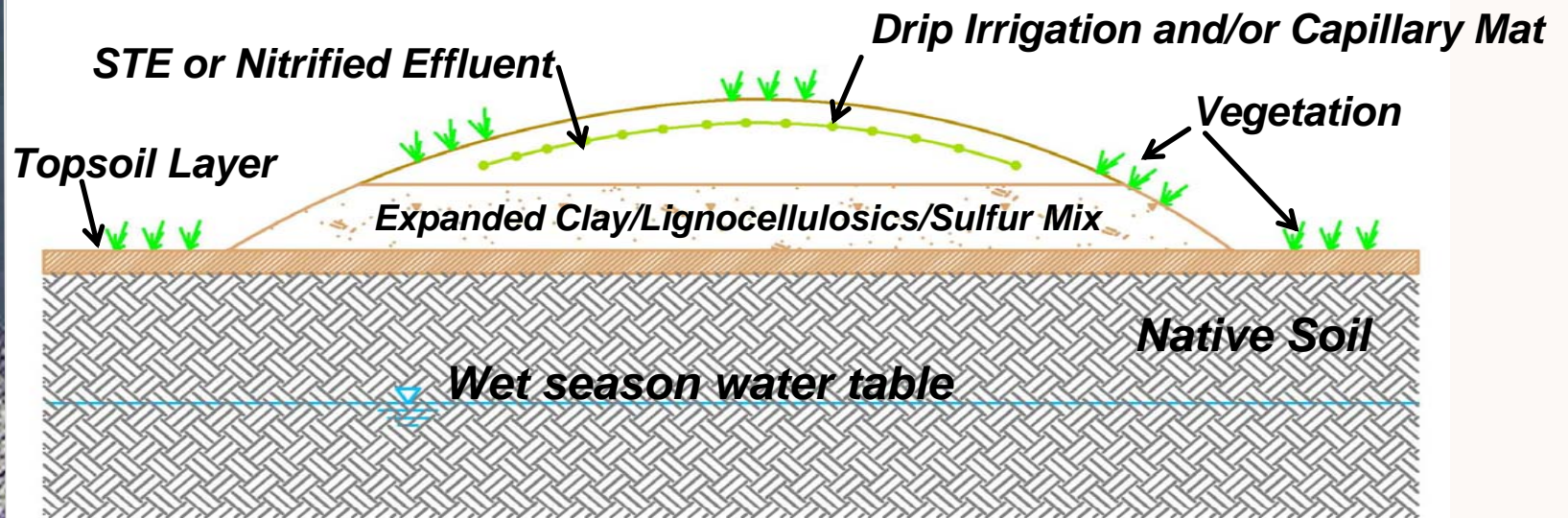
Passive Nitrogen Removal Study II

Two-Stage Biofiltration Pilot Units

- Horizontal configuration
- 10 unsaturated (Stage 1) biofilters
 - expanded clay (4), clinoptilolite (4), polys (2)
 - single pass (5), recycle (5)
 - 15 in. depth (4), 30 in. depth (6)
- 9 denitrification biofilters
 - lignocellulosic (5), sulfur (3), glycerol (1)

Passive Nitrogen Removal Study II

In-Ground Engineered Media



Passive Nitrogen Removal Study II

In-Ground Engineered Media

- 12 - 24 in. unsaturated mixed media above natural soil horizon
- Media: expanded clay/lignocellulosic/sulfur
- Plan area loading rate: ~ 0.50 gal/ft²-day
- Dosing: 24 dose/day
 - STE : subsurface drip tubing
 - Nitrified effluent: SD w capillary seepage matt

Passive Nitrogen Removal Study II

Application of Technologies

	Passive Two Stage Biofiltration	In-Situ Biofiltration	Passive Denitrification
New or replacement systems	X	X	
Retrofit to existing conventional system	X	X	
Addition to existing aerobic treatment system		X	X

FOSNRS Study – Next Steps

- Complete contract amendment for Year 1 with FDoH
- Complete subconsultant contract amendments
- Continue on test facility design and remaining year 1 tasks