C-43 West Basin Storage Reservoir
Water Quality Feasibility Study

Deliverable 4.3.1: *Final* Feasibility Study Update

Prepared for

South Florida Water Management District

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Acronyms and Abbreviations

ac	Acre
ADS	Air Diffusion System
Alum	Aluminum sulfate
ASR	Aquifer storage and recovery
BOD	Biochemical oxygen demand
CERP	Comprehensive Everglades Restoration Plan
cfs	Cubic feet per second
cm/d	Centimeter per day
CRE	Caloosahatchee River Estuary
DAF	Dissolved air flotation
DEP	Florida Department of Environmental Protection
EAA	Everglades Agricultural Area
EAV	Emergent aquatic vegetation
FAV	Floating aquatic vegetation
floc	flocculant
FTW	Floating treatment wetland
gpm/ft^2	Gallon per minute per square foot
HAB	Harmful algal bloom
HDPE	High-density polyethylene
hp	Horsepower
HWTT	Hybrid wetlands treatment technology
J-Tech	Jacobs Engineering and Tetra Tech, Inc.
kWh	Kilowatt-hour
lbs/yr	pounds per year
LF	Linear foot
MFL	Minimum flow and level
MG	Million gallons
MGD	Million gallons per day
mg/L	Milligrams per liter
NPV	Net present value
NTU	Nephelometric turbidity units
O&M	Operation and maintenance
ppb	Parts per billion
SAV	Submerged aquatic vegetation
SCADA	Supervisory Control and Data Acquisition System
SFWMD	South Florida Water Management District
STA	Stormwater treatment area
Study	C-43 West Basin Storage Reservoir Water Quality Feasibility Study
TN	Total nitrogen
TP	Total phosphorus
TSS	Total suspended solids
UV	Ultraviolet
WBSR	C-43 West Basin Storage Reservoir
Working Group	C-43 Water Quality Feasibility Study Working Group

WQATT	C-43 Water Quality Alternative Treatment Technology
WQC	Water Quality Component
WQTTP	Water Quality Treatment and Testing Project
WSI	Wetland Solutions, Inc.

Executive Summary

On January 10, 2019, Governor Ron DeSantis signed Executive Order 19-12, calling for greater protection of Florida's environment and water quality. The Executive Order directed the state's agencies to take an aggressive approach to address some of the environmental issues plaguing the state, with a significant emphasis on south Florida and recent harmful algal blooms (HABs) associated with blue-green algae. Specifically, the Executive Order directed the Florida Department of Environmental Protection (DEP) to "work with the South Florida Water Management District [SFWMD] to add stormwater treatment to the C-43 Reservoir to provide additional treatment and improve the quality of water leaving this important storage component" of the Comprehensive Everglades Restoration Plan.

To examine conventional and innovative biological, physical, and chemical technologies available and applicable to treating water entering and discharging from the C-43 West Basin Storage Reservoir (WBSR) or reducing potential algal biomass within the C-43 WBSR, SFWMD, DEP, and local governments have partnered to develop the C-43 WBSR Water Quality Feasibility Study (Study). Collectively, representatives of SFWMD, DEP, Hendry County, Lee County, City of Cape Coral, City of Sanibel, and Lehigh Acres Municipal Services Improvement District make up the C-43 Study Working Group (Working Group). The Working Group provides guidance to the SFWMD Project Manager, who is responsible for administering the contract and acting as the liaison between the Working Group and C-43 Study consultant, J-Tech (Jacobs Engineering and Tetra Tech, Inc.), who was selected to complete the Study.

The first step in the Study process was to prepare an Information Collection Summary Report, which provided a summary of available, technically feasible, conventional, and innovative biological, chemical, and physical treatment technologies for water quality improvement for eventual pre-treatment, in-reservoir treatment, and/or post-treatment application to the C-43 WBSR. The conventional water quality treatment alternatives were predominantly gathered from the DEP Accepted Water Technologies Library (DEP, 2020) but also include information submitted directly to J-Tech and Working Group members from additional technology vendors. The summary of available conventional and natural treatment technologies described in this report indicates that a wide range of approaches are available. A total of 38 technologies were gathered and assessed for their applicability to the Study. Technologies were removed from further consideration if they could not be scaled up to the flow rates that will be necessary at the C-43 WBSR, were meant for an urban watershed scale, were better suited for removal of pollutants from a conventional stormwater system, or if the vendor did not provide enough details to fully evaluate the technology's applicability to C-43 WBSR treatment. The Information Collection Summary Report recommended 25 technologies for further evaluation.

After the completion of the Information Collection Summary Report, the remaining 25 technologies were further evaluated to reduce the list of technologies to 10, for detailed analysis. The technologies that did not have Florida case studies or had insufficient vendor-provided data were removed from further evaluation. Technologies that could not be scaled to the expected flows and nutrient concentrations at the C-43 WBSR were also removed. In addition, technologies with very high costs, large amounts of residuals, and/or the potential to harm the ecosystem were also removed. The 10 technologies evaluated as part of this Study included:

- Treatment wetlands
- Sand filtration
- Air diffusion system (ADS)
- MPC-Buoy
- Alum treatment
- Hybrid Wetlands Treatment Technology (HWTT)
- ElectroCoagulation
- AquaLutions®™
- Bold & Gold®
- NutriGone™

Additional information about these 10 technologies was developed by J-Tech and gathered from the vendors. J-Tech requested additional detailed information from the vendors about technology sizing and performance for a system that treats flows within a range of 300–600 cubic feet per second (cfs) that could be applied to the C-43 WBSR. Additionally, to directly compare the technologies' ability to reduce nutrients, specific water quality targets were provided. The water quality targets proposed included reducing total nitrogen (TN) from 1.5 milligrams per liter (mg/L) to 1.0 mg/L, total phosphorus (TP) from 0.16 mg/L to 0.08 mg/L, and total suspended solids (TSS) from 20 mg/L to 10 mg/L. These targets were based on specific percentiles of measured water quality data in the river, chosen by J-Tech, and were intended to provide a standard of comparison across technologies. These targets were not intended to set final design criteria for the future water quality project.

Each of the 10 technologies was then evaluated and ranked against a series of attributes and for cost effectiveness to determine which technologies would work best to provide water quality treatment for the C-43 WBSR. The first step in the ranking process was to evaluate the technologies based on key attributes that were separate from the ability of each technology to attain the prescribed nutrient removal. **Table ES-1** summarizes these attributes, the weight assigned, and the justification for that weight. In the table, attributes are grouped by color, i.e., cells with attributes of the highest importance are green, cells with attributes of medium importance are yellow, and cells with attributes of lower importance are orange. Attributes that are more important to the success of the project were given a greater weight. The highest weight, which indicates the most important attribute, is a 5. The lowest weight, which indicates a less important attribute, is a 1.

Table ES-1. Ranking Attributes and Assigned Weights

Attribute	Weight	Justification
Scalable	5	Experience with technology at a similar scale
Confidence in Performance Estimates	5	Must have a high confidence in removal estimates provided
Available Florida Case Study	4	Reduced risk based on reliability of data with Florida case studies; however, this Study supports innovation
Residuals Production	4	Preference for technology that does not produce residuals or require management
Habitat	3	Ancillary benefits to fish and wildlife by providing habitat

Attribute	Weight	Justification
Ecosystem Services	2	Ancillary benefits to humans by provisioning services, regulating services, cultural services, and supporting services
Energy Efficiency	2	Preference for technology with lower carbon footprint
Land Requirements	2	Relative footprint area needed to provide for water quality treatment
O&M	2	Preference for technologies with less complexity of operations and less operator involvement
Schedule of Implementation	1	Time needed to construct and implement the treatment technology

The next step in the process was to evaluate cost effectiveness. The capital and operations and maintenance (O&M) costs were either based on estimates developed by J-Tech or provided by the vendors. These costs were used to calculate the net present value (NPV) costs over a 20-year period. The NPV costs were then divided by the TN, TP, and TSS (used as a proxy for algae) mass removals (in pounds per year) to determine the cost effectiveness (dollar per pound removed). The most cost-effective option was given a score of 1 and the least cost-effective was assigned a score of 10, with the remaining options scaled proportionately. For a few technologies, TN and/or TP reductions were not provided by the vendor; therefore, the TN and/or TP cost-effectiveness was given the lowest score.

The final step was to determine composite ranking using the scores by attribute and cost-effectiveness. Of the total weight, 50% was assigned to the attributes scoring and 50% was assigned to the cost-effectiveness scoring. For the cost-effectiveness scores, TN and TP cost-effectiveness values were weighted two times more than the TSS values. This higher weight was intended to reflect the importance of nutrient reduction for protection of downstream estuarine resources. The final score and ranking are summarized in **Table ES-2**.

Table ES-2. Final Composite Ranking

Technology	Cost Effectiveness Ranking			Attribute Ranking	Weighted Score	Final Ranking Based on Weighed Score
	TP	TN	TSS			
Weight -->	0.4	0.4	0.2	1.0		
Alum Treatment	1.0	2.3	2.5	2	1.9	1
Treatment Wetland	2.1	3.3	3.6	1	1.9	2
HWTT	1.4	2.9	3.2	2	2.2	3
Bold & Gold	2.9	4.1	4.5	5	4.3	4
Sand Filtration	4.0	5.1	5.7	4	4.4	5
ADS	10.0	1.0	1.0	6	5.3	6
Electrocoagulation	3.0	4.2	4.6	8	5.9	7
NutriGone™	3.0	4.2	4.7	10	6.9	8
AquaLutions	8.0	9.0	10.0	7	7.9	9
MPC Buoy	10.0	10.0	1.3	8	8.1	10

Based on this evaluation, the highest ranked technologies were treatment wetlands, alum treatment, and HWTT. The next highest ranked technologies included Bold & Gold®, sand filtration, ADS, and ElectroCoagulation. The lowest ranked technologies were NutriGone™, AquaLutions, and MPC-Buoy. The lowest ranked technologies were removed from further consideration in identifying alternatives. In addition, ADS was removed from further evaluation as the relative lack of information provided for TN, TP, and TSS removal did not support further consideration of this technology.

The higher ranked technologies from the composite ranking were further evaluated for implementation for treatment either as individual components or as part of a treatment train. Treatment trains were developed considering compatibility between treatments. The alternatives that were identified for the detailed cost-benefit analysis included:

- Alum treatment – both as an offline treatment facility and online, in-reservoir treatment system
- Full scale treatment wetland
- HWTT
- Smaller treatment wetland with parallel Bold & Gold® treatment
- Sand filter with parallel Bold & Gold® treatment
- ElectroCoagulation

In addition to the capital costs to construct these systems, estimated costs for the infrastructure to connect the treatment facility, O&M, and monitoring were included for designs that would produce nutrient reductions based upon those used for the purpose of this Study comparison. A detailed cost-benefit analysis was conducted to evaluate these six alternatives and the results are presented in **Figure ES-1**. Based on this evaluation the following alternatives are recommended for further evaluation:

- Alum treatment – both as an offline treatment facility and online, in-reservoir treatment system
- 1,000-ac treatment wetland with parallel 104-ac Bold & Gold® treatment
- 668-ac HWTT
- 200-ac sand filter with parallel 104-ac Bold & Gold® treatment

Based on the cost benefit analysis, the offline alum treatment system resulted in the lowest cost per pound for nutrient removal, to the levels used for this Study comparison, as well as the smallest land requirements. In-reservoir alum treatment was also evaluated and found to be even more cost effective with no additional land requirements. For these reasons, online alum injection is recommended to be included as a component of the ultimate C-43 WBSR water quality treatment. However, while alum injection provides a measure of control over nutrient concentrations and algal production within the reservoir, the duration of water storage may lead to changes in the water quality in the WBSR. Additional treatment capacity of the reservoir discharge is recommended, given the primary objective of the C-43 WBRS water quality component is to ensure that water released from the reservoir does not contribute to impairments of downstream water quality compared to existing conditions in the Caloosahatchee River Basin. The parallel treatment system that combines a smaller STA with Bold & Gold®, either as a pre-storage or post-storage system, was the next most cost-effective alternative. The parallel treatments provide flexibility in the volumes of flows that can be treated prior to discharge, where one technology is used for lower flows and the other is on standby for higher flow conditions. For example, the STA may be sized to receive a continuous baseflow during discharge while media filtration may be sized to treat the remainder of flow from the reservoir, which is expected to vary. Further technology evaluation may determine that a smaller and less expensive system could treat similar flow volumes. The HWTT system, the third most cost-effective alternative, is well studied in Florida systems and this Study confirmed that it is cost effective for removing nutrients. The parallel treatment system that combines a smaller sand filter with Bold & Gold® was the fourth most cost-effective alternative.

The next phase of the project will be the C- 43 WBSR Water Quality Component (WQC) Siting Evaluation. The top recommended alternatives from this Study will be evaluated as viable alternatives based on a more in-depth analysis of expected water quality and chemistry to more specifically evaluate project performance and identify target TN, TP, and TSS removal rates; identify maximum water quality treatment efficiencies for each alternative; optimize conceptual costs; and develop a siting study to determine land availability and specific infrastructure needs to select an alternative as the WQC Plan. The WQC Plan will be the basis for the Statement of Work for detailed design with the goal of project construction to be completed and online concurrently with full operation of the reservoir.

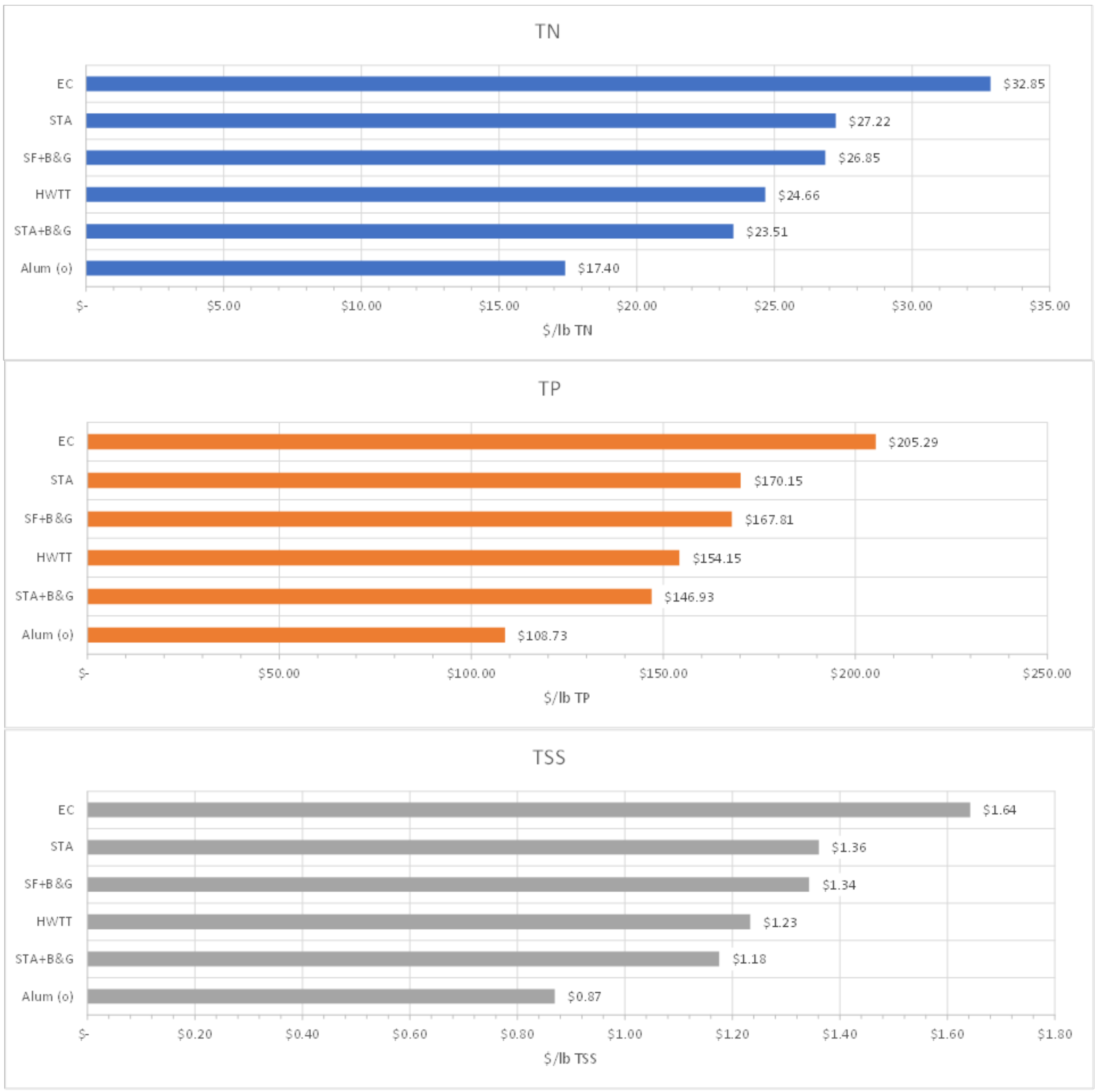


Figure ES-1. Unit Costs of Water Quality Benefits by Alternative for TN (top), TP (middle), and TSS (bottom)

J-Tech currently recommends that the final WQC Plan include both in-reservoir treatment with alum to help prevent algal blooms within the reservoir itself, as well as a post-storage water quality component to treat reservoir discharges that can be closely monitored prior to being returned to the Caloosahatchee River and Estuary.

1.0 Background/Introduction

On January 10, 2019, Governor Ron DeSantis signed Executive Order 19-12, calling for greater protection of Florida's environment and water quality. The Executive Order directed the state agencies to take a more aggressive approach to address some of the environmental issues plaguing the state, with a significant emphasis on south Florida and the harmful algal blooms (HABs) associated with blue-green algae. Specifically, the Executive Order directed the Florida Department of Environmental Protection (DEP) to "work with the South Florida Water Management District (SFWMD) to add stormwater treatment to the C-43 Reservoir to provide additional treatment and improve the quality of water leaving this important storage component" of the Comprehensive Everglades Restoration Plan (CERP).

The C-43 West Basin Storage Reservoir (WBSR) project is designed to capture and store water from Lake Okeechobee and the C-43 basin during Florida's rainy season. The reservoir is under construction on a 10,700-acre (ac) parcel owned by SFWMD in Hendry County (**Figure 1-1**) and is a 50-50 cost-share between SFWMD and the United States Army Corps of Engineers. Fully constructed, the C-43 WBSR will store approximately 57 billion gallons of water (approximately 170,000 acre-feet), for the congressionally authorized CERP project. The project, expected to be completed in 2023, will include construction of two 5,000-ac reservoir storage cells (Cells 1 and 2), three pump stations, a perimeter canal along with associated water control structures, and required improvements to the State Road 80 Bridge and the Townsend Canal, which ultimately connects to the Caloosahatchee River.

The C-43 WBSR project's goal is to work in conjunction with other regional projects and efforts to reduce the frequency and intensity of harmful freshwater discharges and provide beneficial freshwater during periods of reduced inflows into the Caloosahatchee River Estuary (CRE). Once completed, the project is anticipated to provide immediate environmental restoration benefits by:

- Capturing and storing stormwater runoff from the C-43 basin and regulatory discharges from Lake Okeechobee, thus reducing excess freshwater flows to the estuary.
- Helping to maintain a desirable salinity balance by controlling peak flows during the wet season and providing essential freshwater flows during the dry season.
- Helping to sustain a healthy estuarine nursery that supports recreational and commercial fisheries.
- Reducing nutrient loading to the CRE, an incidental benefit resulting from settling of nutrient-rich particulate matter in the reservoir.
- Providing beneficial freshwater during periods of reduced inflows to the CRE.

Depending on storage needs, water depth in the reservoir will range from 15 to 25 feet. Water stored in the reservoir is protected for the environment by a water reservation rule and will be released on a regulated schedule to help achieve minimum flow requirements at the S-79 structure (Franklin Lock and Dam) during dry season low-flow conditions. The water reservations rule for the Caloosahatchee River (C-43) WBSR is defined in subsection 40E-10.041(3), Florida Administrative Code. This project is one component of a larger restoration project for the Caloosahatchee River and Estuary and will comprise a large portion of the overall water storage requirement for the Caloosahatchee River Watershed.

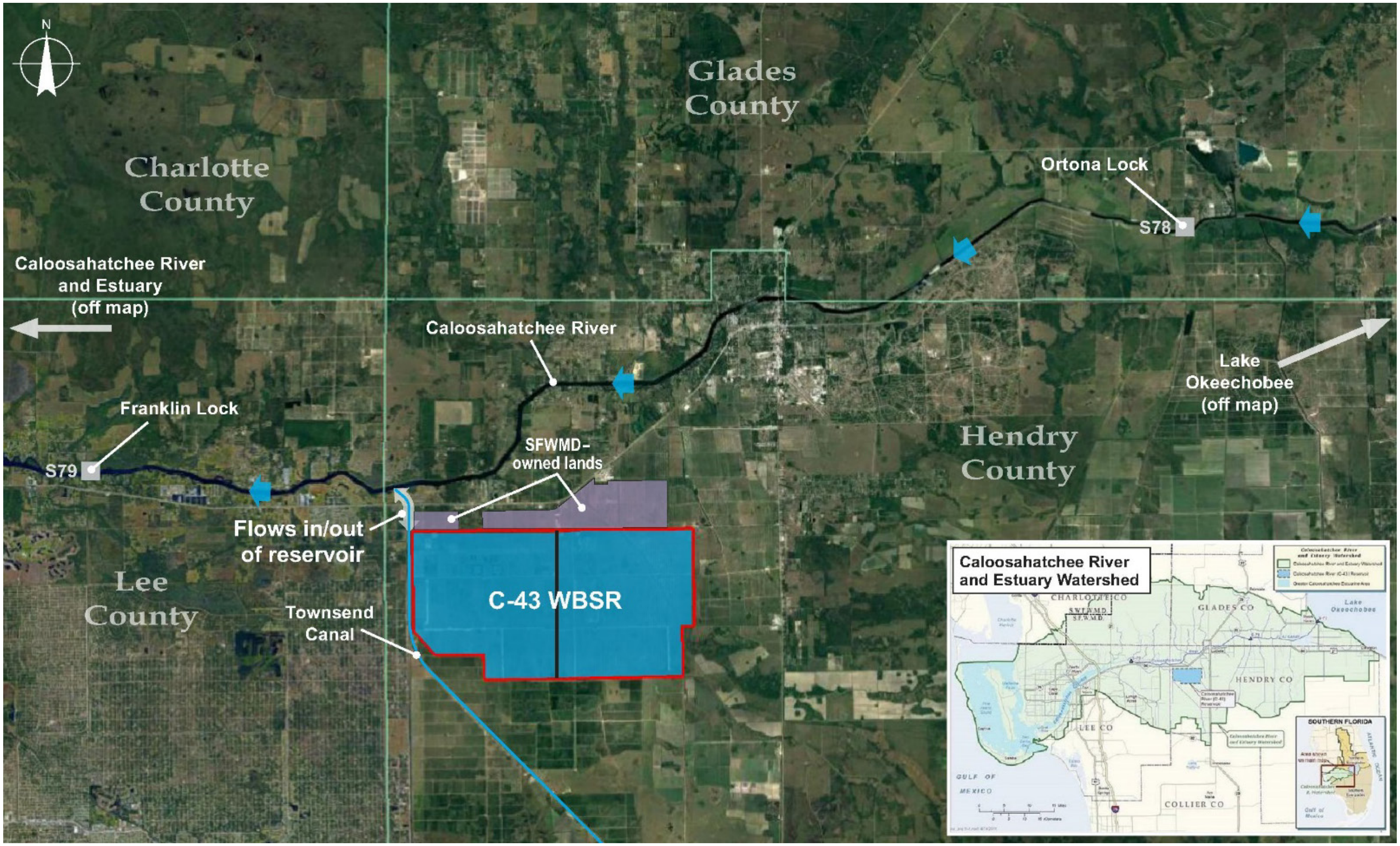


Figure 1-1. Location Map of C-43 West Basin Reservoir

The C-43 WBSR will serve multiple purposes. It is intended to support CRE restoration by helping to attenuate peak stormwater flows during the wet season and to provide additional base flow to the estuary during the dry season. The reservoir will capture and store a portion of both the watershed runoff and regulatory releases from Lake Okeechobee, reducing the frequency and volume of discharges to the CRE during the wet season. In addition, it is envisioned to provide public access and recreational opportunities, and the perimeter canal is intended to maintain allocated water supply to the local agricultural areas adjacent to the reservoir.

The purpose of this C-43 WBSR Water Quality Feasibility Study (Study) is to identify cost-effective, available, technically feasible, conventional and innovative biological, chemical, and physical treatment technologies that will improve the quality of water leaving the C-43 WBSR. DEP identified the CRE to be impaired for total nitrogen (TN) and established a total maximum daily load for the estuary that was approved by the Environmental Protection Agency. DEP has not identified the CRE to be impaired for total phosphorus (TP); however, DEP has identified TP impairments in tributaries throughout the Caloosahatchee River Watershed. Therefore, this nutrient is considered for reduction, as well, in this Study. It should be noted that the selected water quality treatment component is not intended to achieve compliance with the total maximum daily loads within the watershed. The purpose of the water quality treatment component is to ensure that water released from the reservoir does not contribute to impairments of downstream water quality compared to existing conditions in the Caloosahatchee River Basin. The reduction of nutrient concentrations and loads to the CRE is required by the Northern Everglades and Estuary Protection Program passed by the Florida Legislature and signed into law in 2007 and amended in 2016, and by the Caloosahatchee River and Estuary Basin Management Action Plan, adopted in 2012 and amended in 2020. Technologies to improve water quality leaving the C-43 WBSR are evaluated as part of this Study. It is imperative that any treatment technologies considered not affect the congressionally approved C-43 WBSR project purposes, infrastructure, construction schedule, or operation.

SFWMD, DEP, and local governments have partnered to develop this Study to examine conventional and innovative biological, physical, and chemical technologies available and applicable to treating water entering and discharging from the C-43 WBSR or reducing potential algal biomass within the C-43 WBSR. Collectively, representatives of SFWMD, DEP, Hendry County, Lee County, City of Cape Coral, City of Sanibel, and Lehigh Acres Municipal Services Improvement District make up the C-43 Study Working Group (Working Group). The Working Group provides guidance to the SFWMD Project Manager, who is responsible for administering the contract and acting as the liaison between the Working Group and the Study consultant, J-Tech (Jacobs Engineering and Tetra Tech, Inc.).

1.1 Methods for Technology Identification

The initial tasks for the Study included review of available water quality treatment technologies and several public meetings. The Final Information Collection Summary is provided in **Appendix A**. J-Tech reviewed information on available, technically feasible, conventional, and innovative biological, chemical, and physical treatment technologies for water quality improvement for eventual pre-treatment, in-reservoir treatment, and/or post-treatment application to the C-43 WBSR. Technologies considered included physical methods, chemical methods, and biological treatment systems.

J-Tech identified technologies for evaluation by reviewing the DEP Accepted Water Technologies Library. As of January 16, 2020, when the Information Collection Summary Report for this Feasibility Study was being prepared, there were 30 accepted technologies in this library. These included 15 physical, 7 chemical, and 8 biological technologies. In addition, J-Tech and Working Group members received technology information directly from 8 technology vendors, which included 5 physical, 2 chemical, and 1 biological treatment technologies. J-Tech also gathered additional information on all 38 technologies through vendor interviews, internet searches, and evaluating studies and projects that used these technologies.

Details about each of the technologies evaluated are included in the Information Collection Summary Report in **Appendix A**. Additional details were requested from the vendors as part of this Study and are outlined in **Section 3.1**.

1.2 Qualitative Assessment

In the Information Collection Summary Report, details about each of the technologies are provided along with examples of locations where each technology has been applied, if applicable. All 38 technologies were reviewed and assessed for their applicability to the Study. The technology evaluation found that a wide range of approaches are available to provide water quality treatment with the C-43 WBSR. All technologies are constrained to varying degrees by limitations on the scale of operation that will be necessary to provide effective treatment for the C-43 WBSR. Technologies were removed from further consideration if they could not be scaled up to the flow rates that will be present at the C-43 WBSR, could not be implemented at a large enough scale for the C-43 WBSR, were meant for an urban watershed scale, were better suited for removal of pollutants from a stormwater system, or the vendor did not provide enough details to fully evaluate the technology's applicability to C-43 WBSR treatment. Additional information on the technologies removed from further evaluation is available in the Information Collection Summary Report in **Appendix A**.

1.3 Results of Information Collection Summary Report

The list of potentially applicable technologies was reduced from 38 to 25 technologies recommended for further evaluation. Key criteria for this initial step included the following:

- Available knowledge base from Florida studies and other literature
- Performance within appropriate concentration ranges for the key water quality parameters
- Scalable to flows within project range
- Applicable Florida case studies
- Availability of unit capital and operational cost information or preliminary estimates of full-scale cost

A technology was retained if 4 or more of these qualitative criteria were met. **Table 1-1** summarizes the list, presented in alphabetical order. For purposes of this evaluation, terms are defined as follows:

- "Long history" means more than 20 years of technology application
- "High flows" means treated flows exceeding 100 cfs
- "Low TN and TP concentrations" means outflow TN concentrations less than 1 milligrams per liter (mg/L) and outflow TP concentrations less than 0.05 mg/L

- "High TSS removal" means a removal efficiency greater than 85%

Additional details are included in the Information Collection Summary Report in **Appendix A**.

Table 1-1. List of 25 Technologies Recommended for Further Evaluation

Technology	Technology Summary
Advanced Wastewater Treatment	▪ Long history of application treating wastewater ▪ Capable of achieving low TN and TP concentrations ▪ Proven capacity to function at high flows ▪ Applicable Florida case studies ▪ Cost information available
Air Diffusion Systems (ADS)	▪ Aeration is a well-established technology ▪ Capable of achieving low TN and TP concentrations ▪ Can be scaled to large volume reservoirs ▪ No Florida case study but multiple case studies available other states ▪ Vendor has provided plans and costs to treat C-43 WBSR
Aluminum Chloride	▪ Long history of application treating wastewater, stormwater and surface water ▪ Capable of achieving low TN and TP concentrations ▪ Proven capacity to function at high flows ▪ Applicable Florida case studies ▪ Cost information available
Aluminum Sulfate (Alum)	▪ Long history of application treating wastewater, stormwater and surface water ▪ Capable of achieving low TN and TP concentrations ▪ Proven capacity to function at high flows ▪ Applicable Florida case studies ▪ Cost information available
AquaLutions®™	▪ Recent application treating surface water ▪ Capable of achieving low TN and TP concentrations ▪ Vendor confident of capacity to function at high flows ▪ Applicable Florida case studies ▪ Cost information available
Aqua-Swirl®	▪ Common application treating stormwater ▪ Capable of achieving high TSS (total suspended solids, algae) removal ▪ Vendor confident of capacity to configure function at high flows ▪ No documented Florida case studies provided ▪ Cost will need to be estimated specific to application
Bold & Gold®	▪ Recent history of application treating stormwater ▪ Capable of achieving low TN and TP concentrations ▪ Capable of scaling treatment up to desired flow ▪ Applicable Florida case studies ▪ Cost information available
Ciba Krysalis FA/FC	▪ Used to treat Miami River, Port Manatee, and Tampa Bay ▪ Capable of achieving high TSS (algae) removal ▪ Capable of scaling treatment up to desired flow ▪ Applicable Florida case studies ▪ Cost will need to be estimated specific to application
Denitrifying Bioreactor	▪ Long history of application treating stormwater and groundwater ▪ Capable of achieving low TN and TP concentrations ▪ Proven capacity to function at high flows ▪ Applicable Florida case studies ▪ Cost will need to be estimated specific to application
Downstream Defender®	▪ Recent history of application treating stormwater ▪ Exhibits high removal rates of TSS, likely removal of algae ▪ Capable of treating a stream of the total flow to reduce overall concentration ▪ Florida case study not available ▪ Cost will need to be estimated specific to application

Technology	Technology Summary
Dredgeclear 53	▪ Used to treat North Palm Beach Waterway and interior residential canals ▪ Exhibits high removal rates of TSS, likely removal of algae ▪ Capable of scaling treatment up to desired flow ▪ Applicable Florida case studies ▪ Cost will need to be estimated specific to application
ElectroCoagulation	▪ Long history of application treating wastewater ▪ Capable of achieving low TN and TP concentrations and remove algae ▪ Vendor confident of capacity to configure function at high flows ▪ Applicable Florida case studies ▪ Vendor has provided plans and costs to treat C-43 WBSR
Floating Wetlands (Biohaven)	▪ Increasing application in Florida waters ▪ Capable of achieving measurable TN and TP concentrations ▪ Scaling to large reservoir areas may be difficult ▪ Applicable Florida case studies ▪ Cost information available
FLOPAMTM EM 230	▪ Used before to treat the Gator Sand Mine ▪ Exhibits high removal rates of TSS, likely removal of algae ▪ Capable of scaling treatment up to desired flow ▪ Applicable Florida case studies ▪ Cost information available
Hybrid Wetlands Treatment Technology (HWTT)	▪ Recent history of application treating surface water ▪ Capable of achieving low TN and TP concentrations ▪ Capable of scaling treatment up to desired flow ▪ Applicable Florida case studies ▪ Unit cost data available based on flow
Managed Recirculation	▪ Experimental approach but based on reservoir circulation studies ▪ Capable of achieving low TN and TP concentrations ▪ Capable of scaling treatment up to desired volume ▪ Florida case study information unavailable ▪ Cost information unavailable
Microbe-Lift	▪ Recent history of application treating surface water ▪ Capacity to achieve low TN and TP concentrations not demonstrated ▪ Capacity to function at similarly large volumes not demonstrated ▪ Applicable Florida case studies ▪ Unit cost information available
MPC-Buoy	▪ Recent history of application treating surface water ▪ Capable of treating algae populations ▪ Capacity to function at similarly large volumes not demonstrated ▪ Applicable Florida case studies just beginning ▪ Unit cost information available
NutriGone™	▪ Recent history of application treating surface water ▪ Capable of achieving low TN and TP concentrations ▪ Capable of scaling treatment up to desired flow ▪ Applicable Florida case studies ▪ Cost will need to be estimated specific to application
Optimer 7194 Plus	▪ Used before to treat eutrophic Lake Maggiore ▪ Exhibits high removal rates of TSS, likely removal of algae ▪ Capable of scaling treatment up to desired flow ▪ Applicable Florida case studies ▪ Cost will need to be estimated specific to application
Sand Filtration	▪ Long history of application treating wastewater ▪ Exhibits high removal rates of TSS, likely removal of algae ▪ Proven capacity to function at high flows ▪ Applicable Florida case studies ▪ Unit cost data available based on flow

Technology	Technology Summary
SciCLONE™	▪ Recent history of stormwater treatment ▪ Exhibits high removal rates of TSS, likely removal of algae ▪ Capable of scaling treatment up to desired flow ▪ No Florida case study information available ▪ Cost information available
Southern Algae Control	▪ Long history of application treating wastewater ▪ Capable of achieving low TN and TP concentrations ▪ Capable of scaling treatment up to desired flow ▪ Applicable Florida case studies unavailable but Okeechobee applications investigated ▪ Vendor has provided plans and costs to treat C-43 WBSR
StormPro®	▪ Long history of application treating wastewater ▪ Exhibits high removal rates of TSS, likely removal of algae ▪ Capable of scaling treatment up to desired flow ▪ No Florida case study information available
Treatment Wetlands	▪ Long history of application treating stormwater and groundwater ▪ Capable of achieving low TN and TP concentrations ▪ Proven capacity to function at high flows ▪ Applicable Florida case studies ▪ Cost information available

Note: Technologies are listed in alphabetical order

1.3.1 Other Treatment Options

During the first three public meetings held to present the Study, comments were received regarding several other water quality improvement technologies, which were not evaluated as part of the Information Collection Summary Report (additional details on the public meetings are included in **Appendix B**). The reasons these technologies were not included in this Study are described in the subsections below.

1.3.1.1 Aquifer Storage and Recovery

Aquifer storage and recovery (ASR) facilities inject and recover treated and untreated groundwater, partially treated surface water, and reclaimed wastewater. ASR provides the ability to store large volumes of water, which can help increase water supplies, and the ability to pump water back up when needed in drought conditions. In 2005, SFWMD conducted a hydrogeologic study to gather data on the potential for ASR wells in conjunction with the C-43 WBSR. This study gathered data on the confinement, hydraulic properties, lithology, and stratigraphic information for the Floridan Aquifer system. The study found that the Floridan Aquifer near the C-43 WBSR was composed of loose, unconsolidated sand, which is not favorable for the high-capacity ASR wells that would need to produce up to 5 million gallons per day (MGD) of water. The option to screen the ASR wells was explored, which would have allowed the wells to produce about 1 MGD of water at a very high cost (SFWMD, 2005). Based on this previous information, ASR was not further evaluated as part of this Study as a water quality treatment option for the C-43 WBSR.

1.3.1.2 Vallisneria americana

Vallisneria americana (*Vallisneria*) is a submerged aquatic plant common to many freshwater and estuarine systems. It is valued for its positive effects on water quality and provides critical nursery habitat for a diverse assemblage of freshwater and estuarine species. *Vallisneria* presence and survivability is controlled by salinity tolerance, light limitation, sediment composition, and grazing by herbivores such as turtles and manatee (SFWMD, 2017b). *Vallisneria* was common in the CRE west of the S-79 (Franklin Lock) structure until about 2000. After 2000, a series of droughts and resulting salinity increases dramatically reduced cover of *Vallisneria* in the C-43 Canal and the CRE (SFWMD, 2017b). Since that time, various groups have promoted efforts to re-establish *Vallisneria* in the C-43, and some success has been achieved using exclosure devices to minimize herbivory (Ceilley and Everham, 2013).

While the restoration of *Vallisneria* can provide benefits to the Caloosahatchee River and Estuary, and *Vallisneria* can be included in the submerged aquatic vegetation plan for a treatment wetland alternative, it was not evaluated further as a stand-alone treatment technology for the following reasons:

- Insufficient data are available from which to develop water quality performance expectations and full-scale implementation cost estimates.
- The selected water quality project will likely need to demonstrate a net improvement in water quality leaving the reservoir. Reliance upon a restoration approach in the C-43 Canal, such as re-establishing *Vallisneria*, will not provide the operational flexibility to ensure that project water quality goals are achieved.
- In-reservoir planting would be challenging to maintain due to operational ranges (fluctuating water levels and dry-out/empty periods) and routine reservoir maintenance requirements.

1.3.1.3 Floating Treatment Wetlands

Floating treatment wetlands (FTWs) are a variant of the treatment wetlands technology that consist of emergent aquatic vegetation (EAV) supported by a raft constructed from a range of synthetic materials. The roots of the vegetation penetrate the raft and extend into the water column below, providing attachment sites for nutrient-removing microbial populations and structure that can physically filter or trap particulate pollutants. In addition, FTWs shade the water column and have been shown to help reduce algal concentrations. FTWs can function over a wider range of water depths than conventional treatment wetlands but require an anchoring system to keep them in place. Design criteria for FTWs are limited with vendors typically recommending covering between 1% and 10% of the surface area of the system in which they are placed.

The scale of the C-43 WBSR raises several concerns with respect to the area requirements, anchoring, and operations and maintenance (O&M) for FTWs. FTW area requirements for the C-43 WBSR are expected to range from 100 to 1,000 ac, which would likely be deployed as multiple units of smaller individual size. There is no precedent for the successful design, deployment, and management of FTW systems of comparable scale. The potential effects of wind and wave action across the surface of the C-43 WBSR during a tropical weather event would likely damage the FTWs or require their removal prior to landfall. For these reasons, FTWs were not considered further.

1.4 Process to Determine the Highest Ranking (10) Technologies for Evaluation

After the completion of the Information Collection Summary Report, the remaining 25 technologies were further evaluated to reduce the list of technologies to 10. The technologies that did not have Florida case studies or for which vendors provided limited data were removed from further evaluation. Technologies that could not be scaled to the expected flows and nutrient concentrations at the C-43 WBSR were also removed. In addition, technologies with very high costs, large amounts of residuals, and/or the potential to harm the ecosystem were also removed. **Table 1-2** summarizes the reasons technologies were not carried forward for further consideration. The remaining technologies had higher levels of nutrient removal and lower amounts of residuals, and some technologies were more natural or provided algae removal in addition to nutrient removal.

Table 1-2. Summary of Technologies Removed from Consideration

Technology	Justification for Removal from Further Consideration
Advanced Wastewater Treatment	▪ Extensive operations and maintenance (O&M) requirements ▪ Full-time staff required to operate the facility ▪ Most flows currently treated by AWT are significantly less than design rates ▪ High residual processing
Aluminum Chloride	▪ Less common for treatment than aluminum sulfate ▪ Typically more expensive than aluminum sulfate ▪ Similar to performance of aluminum sulfate
Aqua-Swirl®	▪ No documented Florida case studies ▪ Limited data on removing algae ▪ No cost information provided
Ciba Krysalis FA/FC	▪ Extensive O&M requirements ▪ Large quantities of coagulant would be needed to treat the reservoir
Denitrifying Bioreactor	▪ No case studies for treatment at the size required ▪ No cost information provided for treatment at this scale
Downstream Defender®	▪ No documented Florida case studies ▪ Large amounts of residuals that would need to be addressed
Dredgeclear 53	▪ Extensive O&M requirements ▪ Large quantities of coagulant would be needed to treat the reservoir
Floating Wetlands (Biohaven)	▪ Large area of the reservoir would need to be covered ▪ Anchoring would be difficult with the design of the reservoir ▪ Extensive O&M requirements to maintain vegetation
FLOPAMTM EM 230	▪ Extensive O&M requirements ▪ Large quantities of coagulant would be needed to treat the reservoir
Managed Recirculation	▪ No documented Florida case studies ▪ Difficulty in managing recirculation within the current reservoir design
Microbe-Lift	▪ Capacity to achieve low TN and TP concentrations not demonstrated ▪ Capacity to function at similarly large volumes not demonstrated ▪ Concerns with introducing microbes into the system
Optimer 7194 Plus	▪ Extensive O&M requirements ▪ Large quantities of coagulant would be needed to treat the reservoir
SciCLONE™	▪ No documented Florida case studies ▪ Large amounts of residuals that would need to be addressed ▪ No cost information available
Southern Algae Control	▪ No documented Florida case studies ▪ Extensive O&M requirements
StormPro®	▪ No documented Florida case studies ▪ Extensive O&M requirements

Note: Technologies are listed in alphabetical order.

The remaining technologies, which are further evaluated in this Study, are as follows:

- Treatment wetlands
- Sand filtration
- Air diffusion system
- MPC-Buoy

- Alum treatment
- HWTT
- ElectroCoagulation
- AquaLutions®™
- Bold & Gold®
- NutriGone™

Additional details about each of these technologies are included in **Section 3.1**.

2.0 Identify Problems, Constraints, and Opportunities

In evaluating alternatives for water quality treatment, J-Tech considered the existing water quality, reservoir constraints, available lands, and conveyance and connectivity opportunities. Each of these considerations is described in this section.

2.1 Existing Water Quality

To compare the treatment technology's ability to reduce nutrients, specific water quality targets were selected by J-Tech by evaluating the existing water quality of the Caloosahatchee River downstream of the discharge location of the C-43 WBSR. The intent of the water quality evaluation was to allow direct comparison of technology removal efficiency and cost effectiveness. Therefore, resulting conceptual designs and facility sizes for the technologies were based to achieve these selected nutrient reduction targets specific to this Study. The following water quality evaluation is not intended to set the water quality targets for the future treatment facility. The C-43 WBSR and the selected water quality treatment technologies are not intended to achieve compliance with the Caloosahatchee River and Estuary Total Maximum Daily Load. The purpose of the selected water quality treatment component(s) is to improve the quality of water delivered to the River from the C-43 WBSR.

Available water quality data from the Ortona Lock (S-78), Franklin Lock (S-79), and Townsend Canal were downloaded from the SFWMD DBHYDRO database (https://www.sfwmd.gov/science-data/dbhydro) for the period of January 1, 2010 through March 16, 2020 (data that had been uploaded at the time of the data pull) (**Appendix C**). Data for the Townsend Canal station were only available in 2011, 2014, and 2015. All data used in the evaluation were from grab samples and not any continuous data. Negative values were removed from the evaluation of the water quality concentrations. Before June 2014, TN was not directly measured at these stations. Therefore, TN was calculated by summing the measured total Kjeldahl nitrogen and nitrate + nitrite. Starting in June 2014 through the end of the data period, direct-measure TN values were used.

The S-78 is located on the river upstream of the C-43 WBSR, and the S-79 is located on the river downstream of the reservoir. The Townsend Canal is to the west of the C-43 WBSR, and the water entering the reservoir will be a combination of water from the river and Townsend Canal (**Figure 1-1**).

Figure 2-1 through **Figure 2-6** provide cumulative frequency distribution curves for TN and TP at each of the three locations. These curves provide information on how many of the measured data points occur at different concentrations. For instance, in **Figure 2-1**, approximately 60% of the measured TN concentrations at S-78 were 1.5 mg/L or lower.

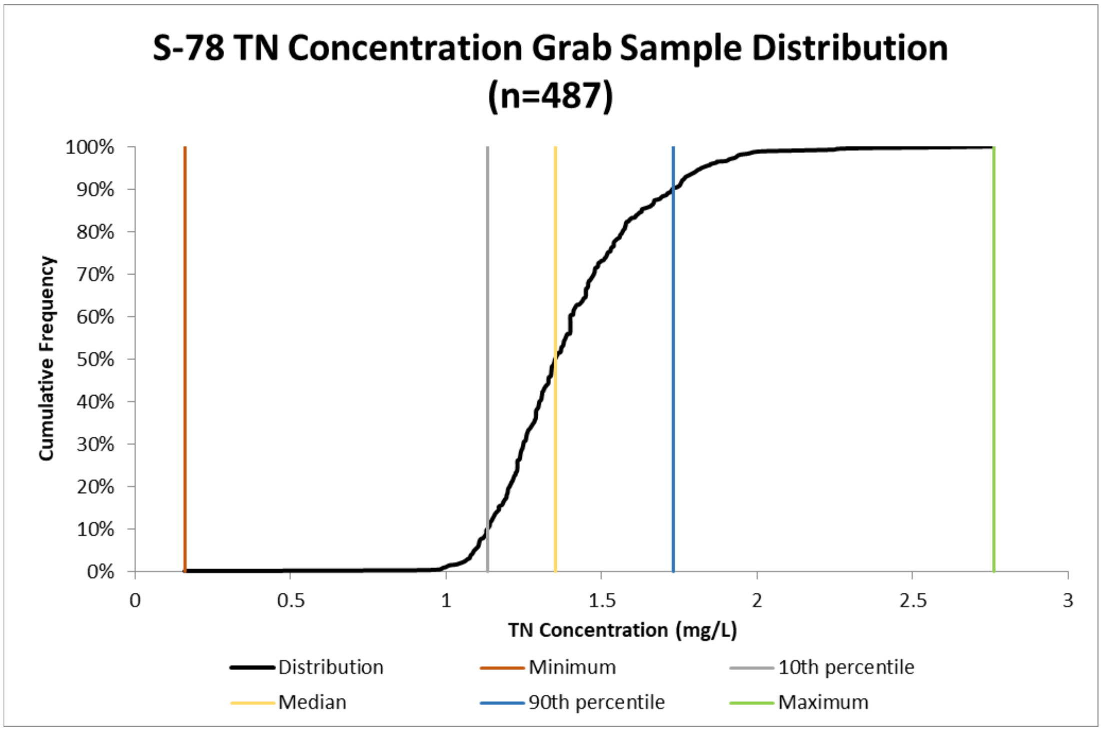


Figure 2-1. **Cumulative Frequency Distribution for the TN Concentrations at S-78**

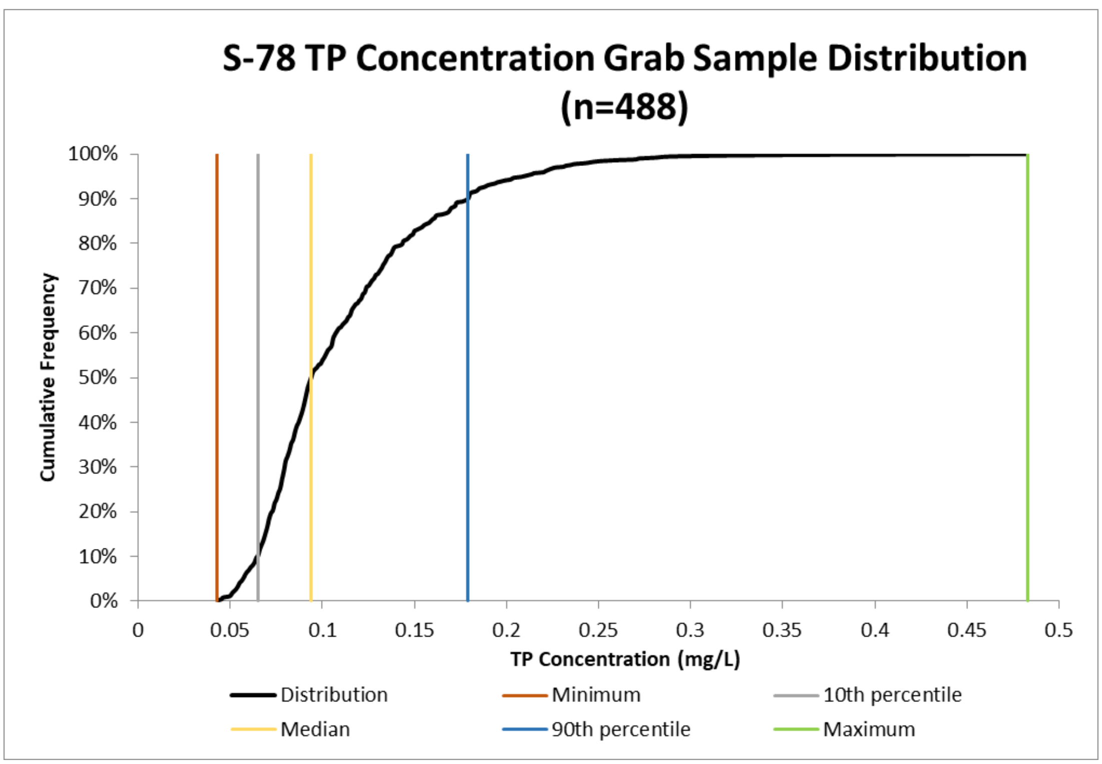


Figure 2-2. **Cumulative Frequency Distribution for the TP Concentrations at S-78**

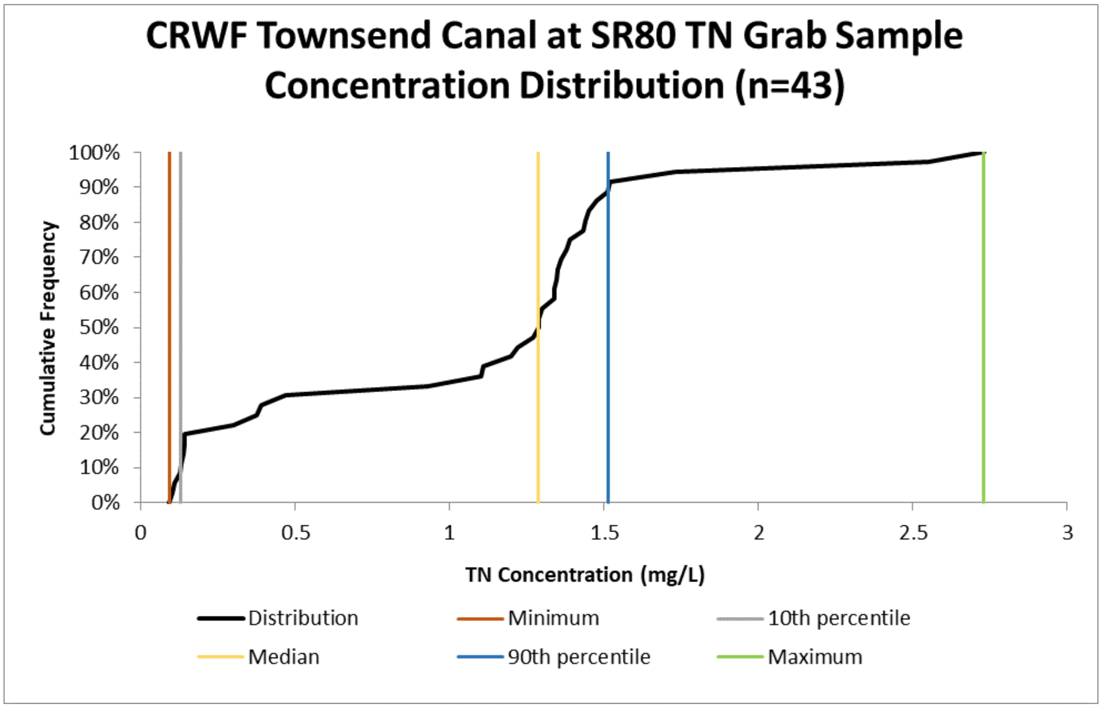


Figure 2-3. Cumulative Frequency Distribution for the TN Concentrations at Townsend Canal

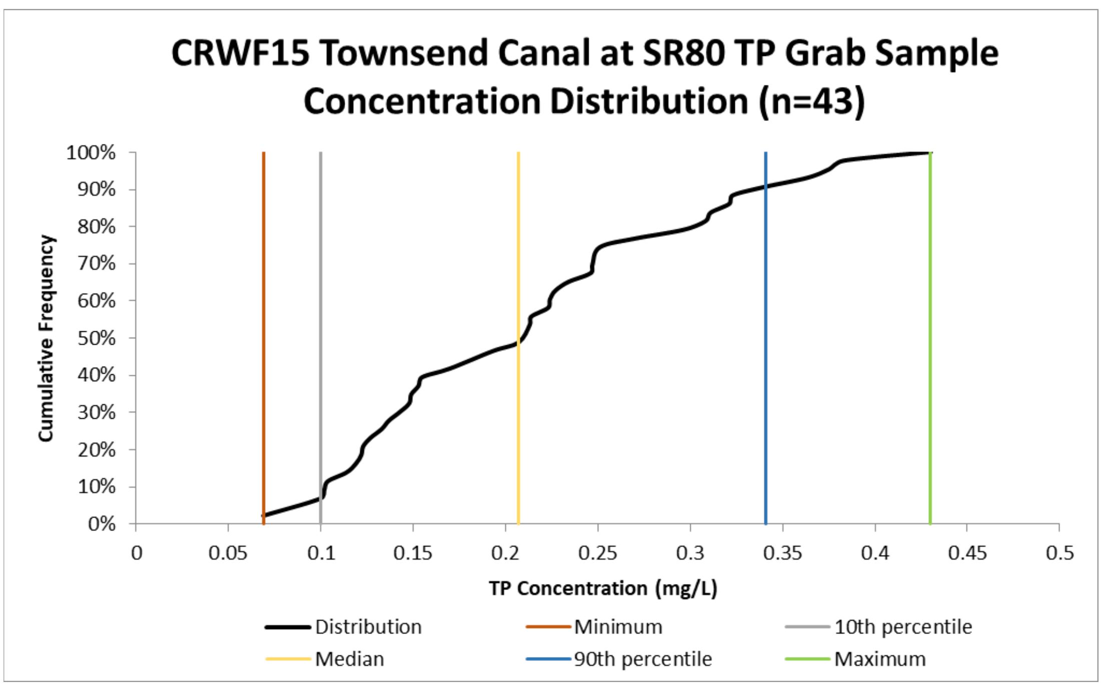


Figure 2-4. Cumulative Frequency Distribution for the TP Concentrations at Townsend Canal

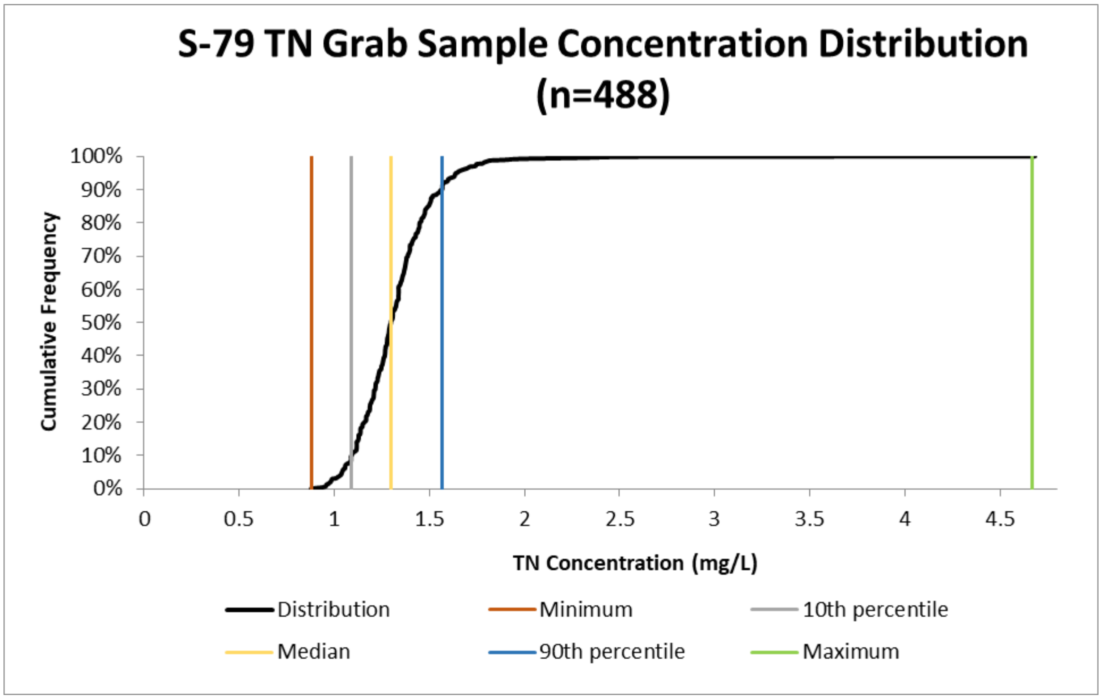


Figure 2-5. Cumulative Frequency Distribution for the TN Concentrations at S-79

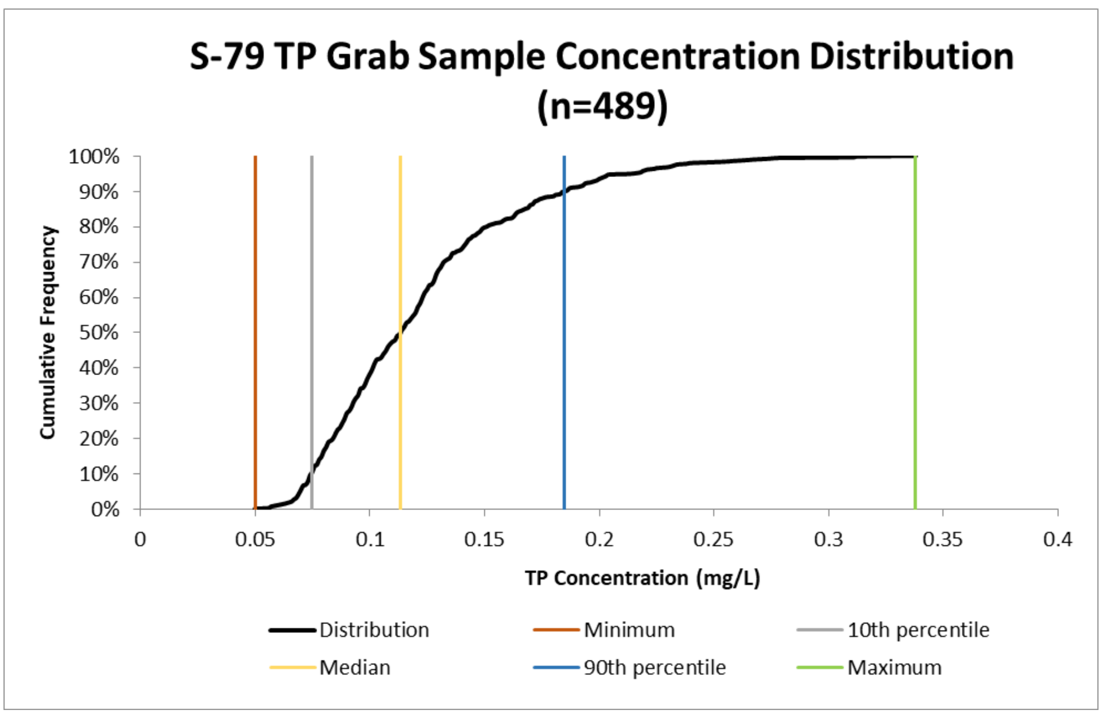


Figure 2-6. Cumulative Frequency Distribution for the TP Concentrations at S-79

These measured data were used to evaluate each technology's ability to treat the concentrations expected at the C-43 WBSR. Based on the data analysis, the average values from the upstream stations at S-78 and Townsend Canal were used to estimate the inflow concentrations to the treatment system. The average values of 1.5 mg/L (± 0.5 mg/L) of TN and 0.16 mg/L (± 0.05 mg/L) of TP were given to the vendors to assist in estimating a cost for their treatment system. Vendors were asked to estimate the cost to achieve an average TN concentration of 1.0 mg/L (± 0.5 mg/L) and an average TP concentration of 0.08 mg/L (± 0.05 mg/L), which correspond with the 10th percentile of measured data from the downstream station at S-79. The 10th percentile represents the lower 10% of the concentrations that were observed at S-79. **Figure 2-7** and **Figure 2-8** show the typical range of TN and TP values during the period of record used for this analysis. The 10th percentile values correspond to concentrations typically observed during the February through April. As the reservoir will generally be discharging during this time, this target was selected for the comparison to ensure that the water quality in the reservoir discharges would be at least the same as, if not better than, the ambient water quality concentrations in the river. These targets are based on the measured water quality in the river and were not intended to set criteria for the future water quality project. The information received from this request allowed for a direct comparison between the technologies.

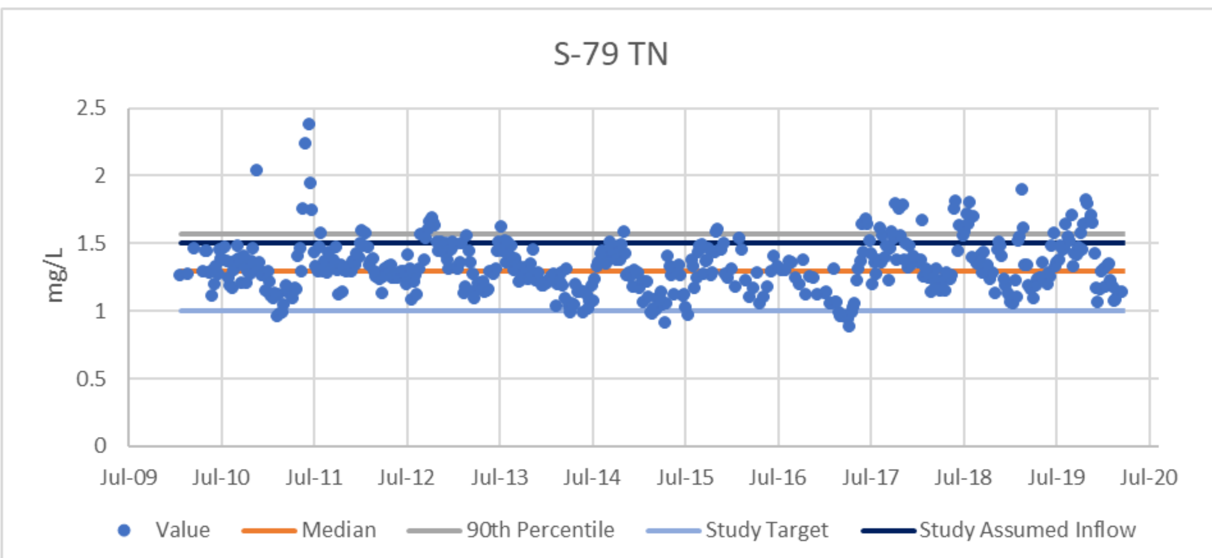


Figure 2-7. Time Series for TN Concentrations at S-79

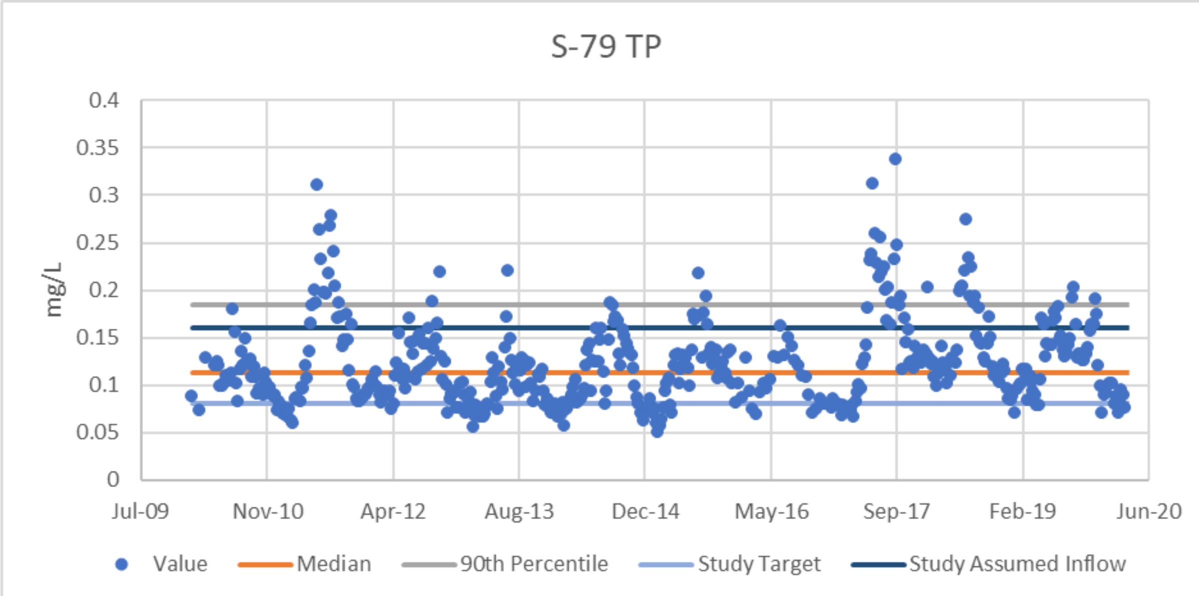


Figure 2-8. Time Series for TP Concentrations at S-79

2.2 Reservoir Constraints

When the Study was initiated in July 2019, J-Tech identified several constraints that would limit the flexibility of establishing a water quality treatment facility associated with the C-43 WBSR. These constraints include location in the landscape, available public lands, existing infrastructure surrounding the C-43 WBSR, and the limitations related to the federally authorized CERP project. These constraints are important to understand as the alternatives were being developed.

2.2.1 CERP – Infrastructure, Operation, and Construction

The C-43 WBSR is part of the congressionally authorized CERP project, with SFWMD as the local sponsor. SFWMD has moved forward with construction of the reservoir, which is scheduled for completion in 2023. Because the project is part of CERP, the selected water quality treatment component cannot affect the congressionally approved C-43 WBSR project purposes, infrastructure, construction schedule, or operation.

Effectively this means that the water quality treatment features may not impact or change any of the infrastructure that has already been designed as part of the C-43 WBSR including the earthen dams, pump stations, water control structures, ditches, conveyance canals, or other structures associated with the facility. Additionally, the implementation of a water quality treatment system cannot affect the operations of the reservoir or planned recreation at the site. A draft operational plan was developed as part of the Project Implementation Report in 2008 (**Appendix D**). As the operational plan for the reservoir is further developed, the operational intent of providing minimum flows to the Caloosahatchee Estuary and storing excess water to attenuate flows must remain intact (see **Section 2.2.2**). Lastly, the addition of the water quality feature must not affect the construction schedule of the reservoir that is currently underway. The Study evaluates the technologies based on the ability to implement the technology prior to completion of construction of the reservoir (see **Section 3.2**).

2.2.2 Water Balance

SFWMD has adopted a minimum flows and minimum water levels (MFL) rule for the Caloosahatchee River. An MFL can be defined as a flow rate or water level and is intended to identify the point at which further withdrawals or reductions in flow or level cause significant harm to the water resources or ecology of the resource. The MFL for the Caloosahatchee is the 30-day moving average flow of 457 cubic feet per second (cfs) at S-79 (the structure just downstream of the C-43 WBSR). An MFL exceedance occurs during a 365-day period when the 30-day moving average flow at S-79 is below 457 cfs. An MFL violation occurs when an MFL exceedance occurs more than once in a 5-year period. The flow, combined with tributary contributions below S-79, shall be sufficient to maintain a salinity gradient that prevents significant harm to mobile and immobile indicator species within the Caloosahatchee River. If significant harm occurs once the Caloosahatchee MFL recovery strategy is fully implemented and operational, the recovery strategy and MFL will be reviewed in accordance with Rule 40E-8.421, Florida Administrative Code. Mobile and immobile species shall be monitored as described in the recovery strategy (Chapter 40E-8.22, Florida Administrative Code).

Accordingly, the selection of a treatment technology for the C-43 WBSR must consider potential effects on the MFL that could result from construction and operation of the treatment system. Depending on the type of treatment system that is implemented, effects on the MFL, while anticipated to be small, could be either negative (water losses) or positive (water gains). Water losses from a treatment system could include evapotranspiration from open water or vegetated impoundments, seepage from unlined impoundments, or losses associated with residuals processing (passive or active drying or hauling of wet material). Water gains could primarily result from the accumulation of direct rainfall over the treatment facility infrastructure. Basin runoff will not directly enter the treatment facility and is not anticipated to affect the system capacity.

A water budget approach, which is an accounting of the various gains and losses, can be used to estimate the net effects of the various technologies on the MFL. It should be noted that some losses, such as seepage, may not ultimately have a measurable impact on the MFL. For example, if an unlined impoundment loses water through its banks or bottom area, the normal direction of groundwater flow is toward the Caloosahatchee River and the shallow groundwater flow is intercepted by the river channel; therefore, at least a portion of the water that appears to be lost from the treatment facility is not removed from the river system and may be partially treated before it returns to the system. On an annual basis, regional rainfall normally slightly exceeds or balances evapotranspiration (Zhao and Piccone, 2020). Further, the current land use of the property used for construction of these larger treatment systems must be considered. Most of the land would likely be in some form of agriculture use that would have existing irrigation demands and evapotranspiration losses that affect the local water budget. The net effect of converting these lands to a treatment system with a large wet footprint, such as a treatment wetland or HWTT, would likely not have a negative effect to flows measured at S-79, and direct rainfall captured is treated and not further enriched with nutrients as run off.

The impact of the water budget for the selected treatment technology on the MFL depends on the system boundary that is being considered. If the “system” includes the Caloosahatchee River between S-78 and S-79, the C-43 WBSR, and the selected treatment technology footprint, then the placement of the treatment facility upstream or downstream from the C-43 WBSR (to treat either C-43 WBSR inflows or outflows) does not change the net effect of the treatment technology on the ability to meet the MFL. To maximize the opportunity to meet the MFL, the selected technology would be constructed with the ability to be bypassed. As implied above, implementation of a treatment technology is not expected to reduce the ability to meet the MFL and may result in a net increase in flow.

2.3 Available Lands

The focus of the Study is to evaluate water quality treatment technologies that have the capacity to improve water quality leaving the C-43 WBSR. At the onset of the Study, it was determined that availability of public lands within the project vicinity should not direct the results of the Study, but rather the Study should proceed independent of available lands. J-Tech coordinated with the Working Group and has included relative land requirements in the attribute ranking evaluation described in **Section 3.3** to reflect that land acquisition would be required for some technologies, such as treatment wetlands, but not for others that offer a smaller footprint. Therefore, project lands have not been specifically identified for the Study and technologies have been evaluated independent of land availability and cost.

Although available lands and land costs are not included in the technology evaluation, it is important to recognize that a siting study will need to be included in the next phase of evaluation of the top recommended alternatives from this Study to select an alternative as the Water Quality Component (WQC) Plan for detailed design. SFWMD owns approximately 1,900 ac immediately north of the C-43 WBSR footprint and south of State Road 80 (see **Figure 2-7**). For the purpose of the conveyance assessment, J-Tech assumed that these lands could be used in part or in whole for the potential alternatives, while land for larger projects and infrastructure may require the purchase, or lease, of additional land. The land value for agricultural lands within the vicinity of the reservoir is estimated at $10,000 per acre while commercial lands are estimated up to $150,000 per ac (LandAndFarm.com, 2020).

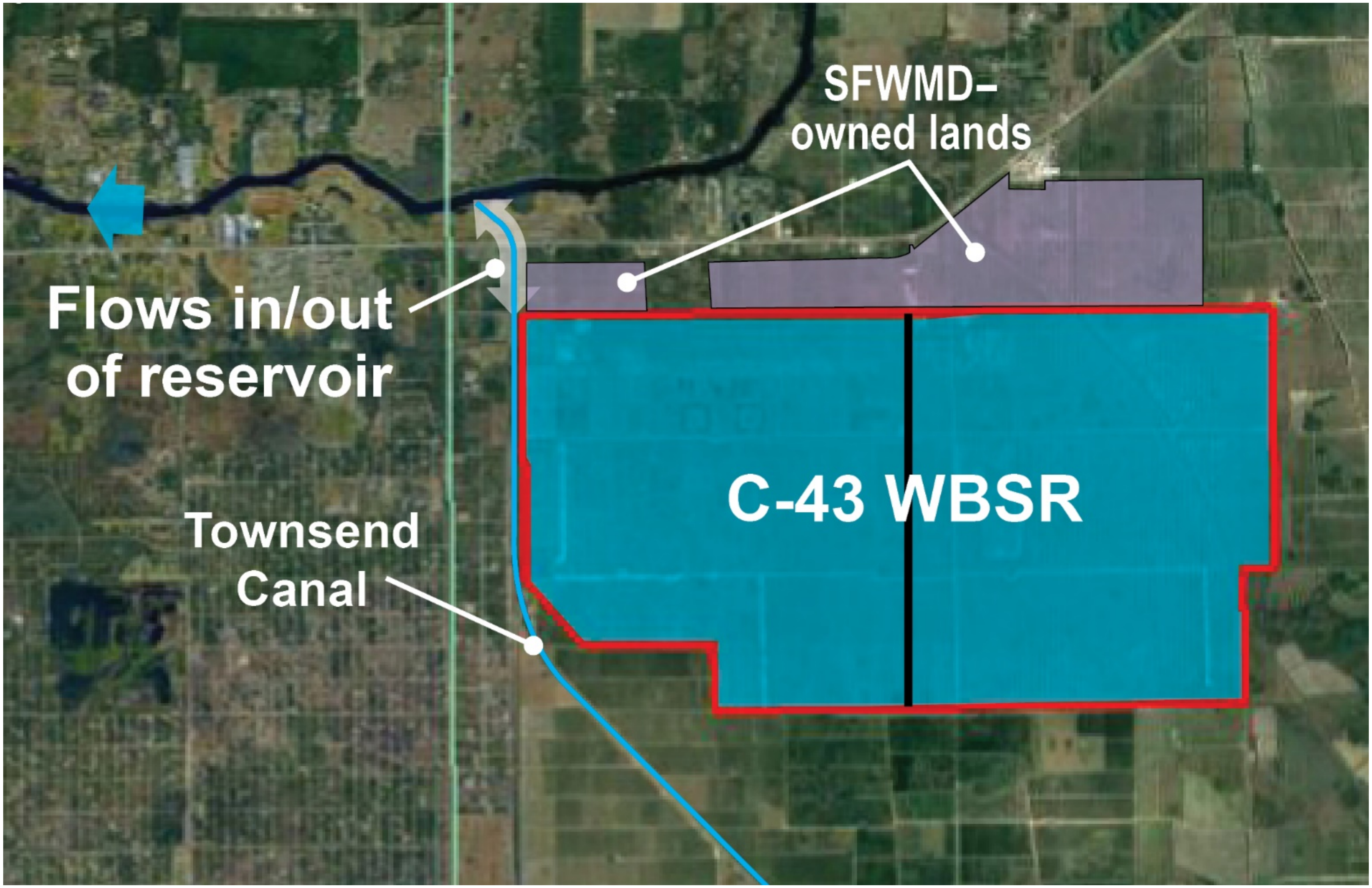


Figure 2-9. Caloosahatchee River (C-43) West Basin Storage Reservoir Available Lands Parcel Map

2.4 Conveyance and Connectivity

J-Tech evaluated how a water quality treatment component could be integrated with the C-43 WBSR to ensure that flow volumes could be delivered to a water quality treatment facility and eventually returned to the Townsend Canal or Caloosahatchee River. Additional evaluation of the future project location, water deliveries, and discharges will need to be performed for the final selected alternative and to evaluate the potential to maximize water quality improvements. However, for the purposes of this Study, J-Tech evaluated the need for additional conveyance features, pump stations, and access roads to confirm the feasibility of a treatment facility within and adjacent to the existing infrastructure, as closely as possible to the C-43 WBSR. The estimated costs associated with this infrastructure were used in the evaluation of the water quality treatment alternatives (see **Section 5.0**).

The Townsend Canal is an irrigation supply canal that runs north-south along the western side of the reservoir. The reservoir project is connected to Townsend Canal, and the S-470 pump station (1,500 cfs, currently under construction) will pump water into the reservoir. The reservoir project also consists of a perimeter canal system to direct reservoir discharges back to the Townsend Canal. As indicated earlier, direct structural connections to the reservoir structure and dam embankments are not consistent with the authorized CERP project and therefore not permitted.

Conveyance of water to a water quality treatment system, operational requirements of the system, and the final selected discharge location will need to be further evaluated and must consider multiple factors including available lands, topography, subsurface conditions, other legal users, etc. The project location will need to be selected in order to evaluate opportunities and constraints related to conveyance and connectivity. Depending on the water quality treatment system that is selected, different operational opportunities will need to be evaluated. Connection of the selected water quality component to the reservoir and discharge location will be dependent on feasibility of new infrastructure requirements in relation to existing features of the reservoir and other existing land use. These details will be further evaluated in the siting and design phase of the project to optimize water quality improvements. In addition, there is an opportunity to add an in-reservoir water quality treatment component to manage water quality during storage.

In the next phase of evaluation of the top recommended alternatives from this Study to select an alternative as the WQC Plan, various flow configurations will be analyzed so that the most effective delivery of treated water to the river can occur while maintaining water availability from the canal for permitted users. This may include separating the treated water flows from the Townsend Canal, as the canal water is multipurpose and used for agricultural water supply in the dry season. The WQC Plan and detailed design must also ensure that the overall intent of sending treated water to the Caloosahatchee River and Estuary is maintained without interfering with the designated purpose or construction schedule of the reservoir.

2.5 Pre-storage , Post-storage, and In-reservoir Treatment

The J-Tech team was tasked with evaluating three different forms of treatment: pre-storage, post-storage, and in-reservoir. Pre-storage treatment includes treating the water from the Townsend Canal or Caloosahatchee River prior to being stored within the reservoir. The advantage of this option is that pre-treatment will help to reduce nutrient concentrations, which would reduce the potential for algae blooms within the reservoir during the summer months. In-reservoir treatment includes technologies that will reduce nutrients and suspended solids in the water that is stored within the reservoir. While there are advantages to this method of treatment, the operations of the reservoir cannot be affected by the selected alternative and, therefore, structural considerations excluded some technologies. Additionally, there is a general understanding that as the water is stored, particulates and nutrients will settle out of the water column providing some amount of water quality improvement; however, that cannot be quantified at this early stage of the evaluation. Post-storage treatment would treat water flows leaving the reservoir and prior to discharge back to the Caloosahatchee River. This scenario provides the most control of the water quality being returned as the system could be closely monitored at the point of discharge.

Table 2-1 summarizes which of the 10 technologies can be used either pre-/post-storage or in-reservoir for treatment. The potential location of each technology and the connection to the reservoir were considered when developing the alternatives evaluated in this Study.

Table 2-1. List of Technology Connectivity with the C-43 WBSR

Technology	Treatment Location		
	Pre-Storage	In-Reservoir	Post-Storage
Treatment Wetlands	X	-	X
Sand Filtration	X	-	X
Air Diffusion System	-	X	-
MPC-Buoy	-	X	-
Alum Treatment	X	X	X
HWTT	X	-	X
ElectroCoagulation	X	-	X
AquaLutions®™	X	-	X
Bold & Gold®	X	-	X
NutriGone™	X	-	X

3.0 Alternative Formulation

3.1 Highest Ranking Technologies (10)

Additional information about the highest ranking (10) technologies was developed by J-Tech and gathered from the vendors. J-Tech sent an email request to the vendors to collect additional information about technology sizing and performance for a system that treats flows within a range of 300-600 cfs, reducing TN from 1.5 mg/L to 1.0 mg/L, TP from 0.16 mg/L to 0.08 mg/L, and TSS from 20 mg/L to 10 mg/L (see **Section 2.1** for additional details on water quality). The information received from this request allowed a direct comparison between the technologies. A summary of the additional technology information is included in the sections below, and the detailed responses from the vendors are attached in **Appendix E**.

3.1.1 Treatment Wetlands

Treatment wetlands have been used throughout Florida to reduce nutrient concentrations in reclaimed water, industrial wastewater, stormwater runoff, and surface water. Treatment wetland projects are sometimes referred to as marsh flow-ways, filter marshes, or stormwater treatment areas (STAs). In south Florida, treatment wetland projects have most often been employed to reduce the concentration of phosphorus in agricultural runoff (such as the Everglades Agricultural Area [EAA] STAs) but have also been implemented more generally to reduce nitrogen, phosphorus, TSS, and algal biomass. In general, treatment wetland plant communities (**Figure 3-1**) have been installed in a hierarchical manner, based on inflow nutrient concentrations, beginning with floating aquatic vegetation (FAV) at the highest inflow concentrations and progressing through EAV, submerged aquatic vegetation (SAV), and an attached algal community, called periphyton, for the lowest concentrations as inflow concentrations are reduced by each successive treatment compartment.

Floating Aquatic Vegetation (FAV)

Emergent Aquatic Vegetation (EAV)

Submerged Aquatic Vegetation (SAV)

Periphyton

Figure 3-1. Treatment Wetland Vegetation Community Types

As part of earlier efforts to select treatment technologies for the C-43 basin, Wetland Solutions, Inc. (WSI) (2012) analyzed data from a variety of Florida treatment wetlands and summarized key findings and performance drivers. The primary objective of that effort was to evaluate whether there were correlations between lower nutrient concentrations and specific vegetation or soil types. There is considerable evidence that TP is most effectively removed by SAV-dominated wetlands at intermediate TP concentrations in the range between 50 and 300 parts per billion (ppb; Walker, 2010). Emergent wetlands were found to likely be more effective for TP removal at higher inlet concentrations (greater than 300 ppb) and periphyton-dominated wetlands were more effective than SAV systems at lower inlet TP concentrations (less than 50 ppb).

Of particular importance for the C-43 basin, where nitrogen is the primary nutrient of concern, the lowest TN concentrations occurred at wetland sites with EAV and sandy soils and in open water systems over sandy soils (the C-43 Storage Reservoir Test Cells). The C-43 Water Quality Treatment and Testing Project – Phase I Mesocosm Study confirmed that EAV wetlands on sandy soils could achieve low TN outlet concentrations with C-43 inflow water and that similar performance was achievable using SAV over sandy soils (J-Tech and WSI, 2019).

The lowest TSS concentration typically attained by Florida treatment wetlands was about 1 mg/L. For TSS reduction, periphyton and EAV were the most effective plant communities, followed by SAV, with open water and FAV least favorable. There was essentially no observed effect of substrate type on TSS reduction effectiveness (WSI, 2012). Details for the wetland treatment sites summarized by WSI (2012) are provided in **Appendix A**, Section 3.2.

3.1.1.1 Facility Details and Project Costs

As further described in **Section 4.2.1**, it has been estimated that a 5,000-ac treatment wetland will be required to meet the nutrient reduction goals, set for the purpose of this Study and technology comparison, at an average design flow of 457 cfs. A system of this scale was estimated to cost $121.4 million for construction and about $1.1 million to operate and monitor annually. The net present value (NPV) cost was estimated to be $136 million for a 20-year period using a discount rate of 4%. It should be noted that land acquisition costs were not included in the estimate. Combining the estimated performance with the NPV cost yields cost-effectiveness values of approximately $20.69 per pound of TN, $128.03 per pound of TP, and $1.02 per pound of TSS.

3.1.2 Sand Filtration

Sand filters have been used for treatment of wastewater beginning in the 1800s. Sand filters are multi-chamber structures, composed of a sediment forebay, a sand bed, and typically an underdrain collection system. The mechanisms for pollution removal are dominated by filtration with gravitational settling and adsorption providing additional treatment. Microbial communities in the upper depths of a sand filter provide additional assimilation of nitrogen and phosphorus beyond simply physical filtration. Reported reductions for sand filters are 48% for TP, 51% for TN, and 84% for TSS. Treatment capacity can be affected with continuous operation requiring a drying period. One aspect of a sand filter that may be favorable to the C-43 WBSR application is the potential for water treatment during the discharge from the reservoir and then allowing it to remain dry for storage and filling periods (Bays et al., 2019).

Case studies for large-scale sand filters include water treatment of phosphate mines in Florida. One case study located in Hardee County treated phosphorus mine water for 2–3 years. The sand filter was operated following constructed wetland treatment and received up to 2 MGD. The demonstration system was approximately 4 ac in size (Bays et al., 2019). **Figure 3-2** shows the phosphorus mine wastewater sand filter treatment system. Inflow TP concentrations ranged from 0.14 mg/L to 1.1 mg/L, averaging 0.45 mg/L. The outflow concentrations averaged 0.23 mg/L with an average TP reduction of 48%. Inflow turbidity averaged 30 nephelometric turbidity units (NTU) and outflow turbidity averaged 4.5 NTU. The average reduction was 85% for turbidity. It was determined that a 2-ac sand filter is needed to treat 1 MGD (Bays et al., 2019).

Based on monitoring of sand filter capacity, replacement of the top layer every 3 to 5 years is recommended. Maintenance of the top layer requires periodic scarification to overcome biological clogging of the pore spaces. Sand removed from the system requires collection and handling, which may include hauling and disposal (Bays et al., 2019). Sand filtration is a passive treatment of TSS and TP that does not require any external energy for the treatment process, other than power and pumping cost to convey water to and from a site (Bays et al., 2019).

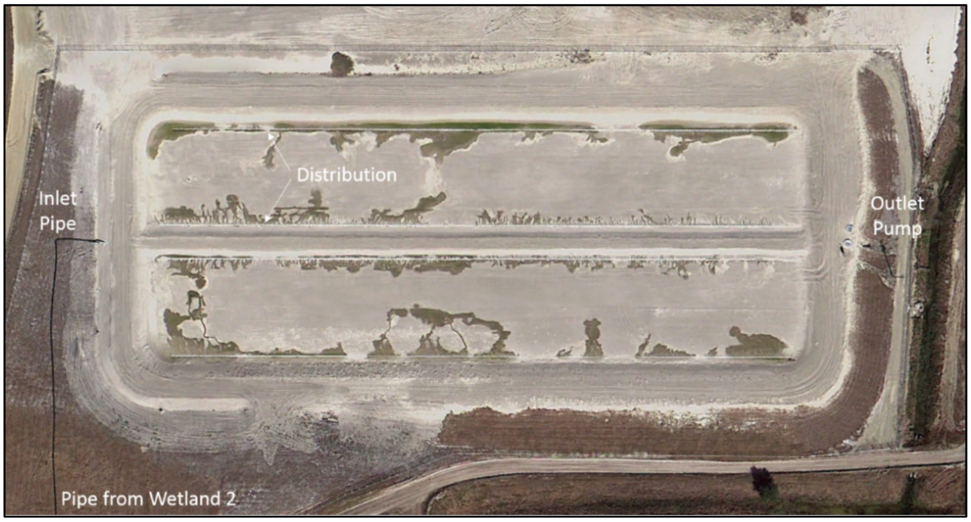


Figure 3-2. Sand Filters for Treatment of Phosphorus Mine Wastewater (Bays et al., 2019)

3.1.2.1 Facility Details and Project Costs

A 1,000-ac sand filter was estimated to be required to meet the nutrient reduction goals set for this Study at an average design flow of 457 cfs. A system of this scale was estimated to cost $210 million for construction and about $2.7 million to operate and monitor annually. The NPV cost was estimated to be $247 million for a 20-year period using a discount rate of 4%. It should be noted that land acquisition costs were not included in the estimates. Combining the estimated performance with the NPV cost yields cost-effectiveness values of approximately $37.19 per pound of TN, $232.42 per pound of TP, and $1.86 per pound of TSS.

3.1.3 Air Diffusion System

Air Diffusion Systems' (ADS) technology includes a fine bubble aeration system designed for domestic and industrial installations. Information from ADS states that they have a clog-free design that requires minimal power input to provide aeration within the reservoir with little maintenance required. The fine bubble aerators create mixing and oxygen diffusion within the reservoir (ADS, 2020a). ADS case studies include applications in Havana, Florida and proposals for work in the St. Lucie River, Florida. Large reservoir system studies include Wisconsin, Massachusetts, Delaware, Maine, Illinois, and Colorado, with international work in India and Samoa.

Performance data provided by ADS indicate a 90% biochemical oxygen demand (BOD) reduction and 50% to 75% reduction of TN and TP. Aeration is a well-established technology with a long history of application treating reservoirs at many scales. **Figure 3-3** shows the proposed layout to treat the C-43 WBSR.

3.1.3.1 Facility Details and Project Costs

ADS technology is best designed for in-reservoir treatment and does not produce residuals. System lifespan is estimated at 20 years, and some systems have been fully functioning after 40 years of operation. ADS also reported successfully retrofitting legacy systems to improve performance and reduce electricity costs with minimal capital re-investment, implying future optimizations for the C-43 WBSR. Maintenance includes checks of compressors, air leak testing of supply piping, and visual inspection of disk modules (ADS, 2020b). System operation is automated, and there are also monthly onsite maintenance inspections and water quality sampling to monitor system performance.

ADS proposed a system (**Appendix E**) incorporating the use of 128 disk modules for fine bubble aeration of the C-43 WBSR, which would mix approximately 3,963 MGD with a turnover of approximately 15 days (ADS, 2020b). The 128 disks are paired with eight 30-horsepower (hp) compressors (ADS, 2020b). Assuming the 30-hp compressors are working 24-hours a day, the yearly cost of running eight 30-hp compressors would be approximately $120,000 a year for electricity with a motor efficiency of 95% and a cost of $0.10 per kilowatt-hour (kWh). Cost of an aeration system designed for the C-43 WBSR is approximately $6.75 million including aeration disks, feeder tubing, compressors and all other hardware, delivery, installation, and 5 years of O&M (ADS, 2020b). It will cost about $124,000 to operate and monitor annually. The NPV cost was estimated to be $8.44 million for a 20-year period using a discount rate of 4%. It should be noted that land acquisition costs were not included in the estimates. The ADS proposal does not provide a quantitative projection of TP or TSS reduction. ADS estimated a reduction in TN consistent with the requested performance criterion, assuming all nitrogen present is in the form of ammonia-nitrogen that is nitrified within the aerated water column. This performance projection may be optimistic given the predominance of organic nitrogen.

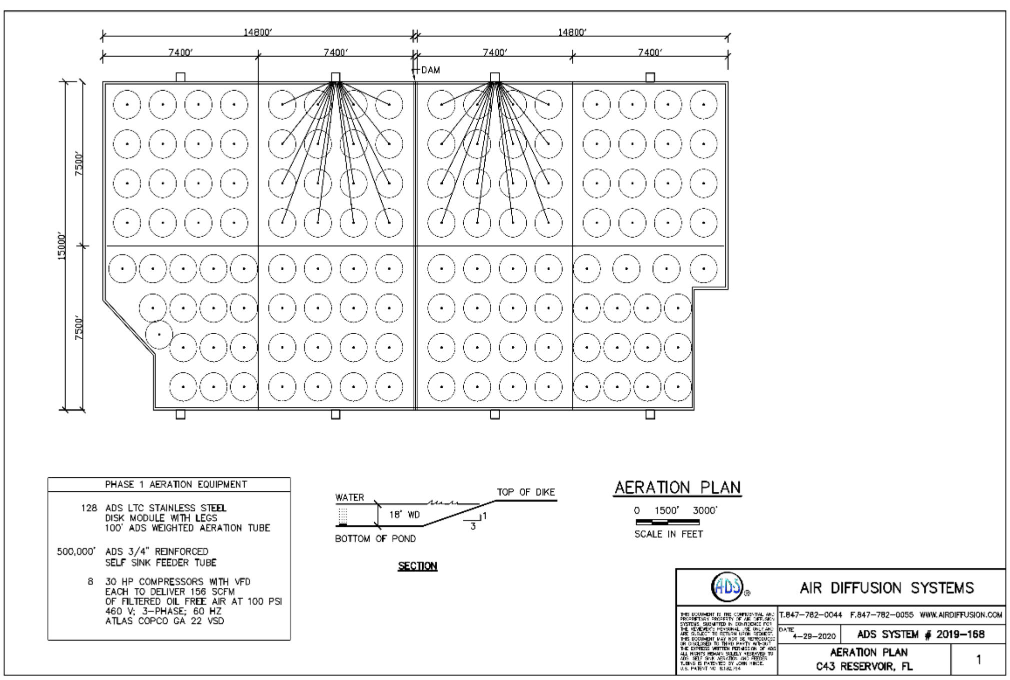


Figure 3-3. ADS Proposed System to Treat C-43 WBSR

3.1.4 MPC-Buoy

The MPC-Buoy is a solar-powered floating system that emits various ultrasonic frequencies to treat algae. The MPC-Buoy uses a three-step process to control algae. The first step involves monitoring of water quality by collecting water quality parameters every 10 minutes. Monitored parameters include chlorophyll *a* (green algae), phycocyanin (blue-green algae), pH, turbidity, dissolved oxygen, and temperature. The data are delivered to a web-based software that predicts algal blooms based on water quality parameters and maps algal distribution in large waterbodies. Based on the prediction, ultrasonic transmitters are activated to create a sound layer at the water's surface to prevent the algae from receiving sunlight (LG Sonic, 2020a). **Figure 3-4** provides a visual representation of the MPC-Buoy system. There are no documented case studies in Florida. However, a detailed study funded by DEP and administered through Florida Gulf Coast University began in 2020 and is expected to provide a full characterization of the benefits and effects of the technology on the development of algal blooms. Case studies include a drinking water reservoir in Dominican Republic that treated a 2.7-square-mile reservoir to reduce approximately 87% chlorophyll *a*. The MPC-Buoy has been used in New Jersey to reduce algae concentrations in a raw water reservoir (LG Sonic, 2020b).

Material provided by the vendor indicated that the MPC-Buoy suppresses algal growth, yielding a reduction of up 90% of algae with the use of specific ultrasonic sound waves and reduces TSS, BOD, and nutrients in the reservoir. MPC-Buoy is capable of treating areas up to 1,600 feet in diameter (approximately 46 ac) (LG Sonic, 2020a). This technology does not create additional residuals, which would reduce TSS in the reservoir discharge. Prior studies (e.g., Lürling and Tolman, 2014) have indicated that commercial ultrasonic treatment was lethal to zooplankton (Daphnia magna) but studies described by the vendor indicate that the technology is safe for wildlife (LG Sonic, 2018; LG Sonic, 2020b).

3.1.4.1 Facility Details and Project Costs

LG Sonic prepared a proposal (included in **Appendix E**) that proposes an array of 200 MPC-Buoys using solar-powered ultrasonic treatments to suppress phytoplankton and reduce algal TSS (LG Sonic, 2020c). MPC-Buoy technology is for in-reservoir treatment and does not produce additional residuals. The MPC-Buoy system is data-driven, using on-board real-time water quality monitoring to optimize the ultrasound treatment among all network-connected MPC-Buoys based on the water conditions. The vendor proposes that 40 MPC-Buoys be "Pro" models with the onboard water quality monitoring equipment, and the remaining 160 MPC-Buoys be "Lite" models without onboard water quality monitoring. The energy required to power each buoy is approximately 5 to 20 watts, which is supplied by the onboard solar panels. Technology includes three 195-watt peak solar panels and a 40-amp battery to provide power year-round, with an energy-saving program applied during periods of low sun radiation. Cost information provided by the vendor estimates a capital cost of $10.4 million to treat the entire C-43 WBSR (LG Sonic, 2020a). Annual O&M cost for the 200 MPC-Buoys is $441,500, plus up to $540,400 for annual replacement parts (estimated maximum). Water quality data collection at the buoys does not reflect conditions at the reservoir input and output, and additional monitoring may be needed to assess success in meeting treatment objectives at an approximate cost of $50,000 annually (LG Sonic, 2020c). The NPV cost was estimated to be $23.9 million for a 20-year period using a discount rate of 4%. It should be noted that land acquisition costs were not included in the estimates. The proposal did not provide a specific projection that the system would meet the treatment objectives for phosphorus and nitrogen but because algal dry weight composition of nitrogen is approximately 1-7% nitrogen (Kadlec and Knight, 1996; Hampel, 2013) and 0.5-3% phosphorus (DeLaune and Reddy 2008), reductions in each would be expected through reduction in algal biomass.

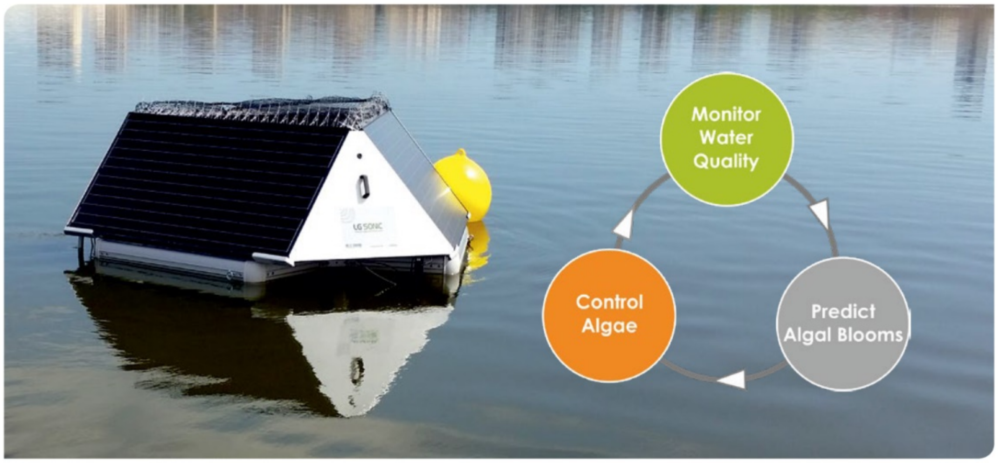


Figure 3-4. MPC-Buoy Technology and Three-Step Process (LG Sonic, 2020a)

3.1.5 Alum Treatment

Alum is a cationic flocculant (floc) used generally for coagulation treatment, especially in wastewater treatment plants, with applications in Florida for surface water treatment implemented since the 1980s (Harper, 2015). The technology has been investigated by SFWMD in Taylor Creek with the objective of confirming suitability for use in Class III freshwater systems. Watershed Technologies, LLC implemented the system (DEP, 2020). Alum addition is a process that has been used in many applications. Applications typically fall under one of three types of applications: sediment separation, injection into the inflow, and in-reservoir treatment.

One example of sediment separation is the Nutrient Reduction Facility, located in Lake County, which is a large-scale sediment separation facility that applies aluminum compounds for nutrient reduction. The process pumps water from Lake Apopka into the facility where alum is injected into the flow to bind with pollutants. The flow is then distributed into settling ponds where floc settles out of the flow. The clean water is collected at the opposite end of the settling ponds where it is returned to the lake. The Nutrient Reduction Facility has demonstrated the ability to treat up to 250 cfs while removing nearly two-thirds of the TP. The site requires extensive dewatering of the floc, which requires a large centrifuge to prepare the floc for transport off site. The estimated cost of the project was $7.3 million with an annual operating budget averaging approximately $1.5 million with alum as the primary expense (Florida Lake Management Society, 2010).

Other configurations of alum treatment systems inject alum into the flow based on a flow-proportioned basis. This ensures that the same dose of alum is added regardless of the discharge rate. A variable-speed chemical metering pump is used along with a flow meter to administer the dose of alum. Injection of alum is carefully monitored to ensure toxic concentrations of aluminum do not accumulate in the reservoir. Cost varies depending on the size of the metering pump and amount of alum needed for treatment (Bottcher et al., 2009).

Alum treatment is also achieved through in-reservoir application. This is usually preferred when a major source of phosphorus is from sediment phosphorus release within the reservoir. The longevity of in-reservoir treatment is important because legacy phosphorus release in the reservoir can lead to increased algal blooms. Longevity of phosphorus in the sediment is based on many water parameters, but the average for deeper, stratified lakes, which resemble the characteristics of the C-43 WBSR, is approximately 21 years (Huser et al., 2016). Since 2000, Florida lakes treated with alum for phosphorus concentration reduction include Anderson Lake, Gatlin Lake, and Tyler Lake (Huser et al., 2016). For the C-43 WBSR, given its large size, the primary objective of in-line treatment, for the purpose of this Study, is to provide a management tool to control algal growth within the reservoir. Alum treatment has been shown to reduce algal density and cyanobacteria blooms significantly with annual applications (e.g., Wagner et al., 2017).

3.1.5.1 Offline Alum Treatment System

Alum treatment, offline, is similar to the HWTT approach detailed below. Alum is a well-established chemical treatment approach shown to achieve more than 50% reductions of TP, TN, and TSS in Florida’s surface waters (e.g., Harper, 2015). The footprint of the alum treatment trains would require approximately 50 ac, consisting of 28 ac of settling ponds and approximately 20 ac for mixing, centrifugation, chemical storage facilities, and related administrative and access infrastructure. Water conveyed by pump to the flocculation tanks and secondary clarifiers would be dosed with alum and discharged to the settling basins. Residuals would be pumped from settling ponds to centrifuge for dewatering and stored in above-ground drying basins.

The initial capital costs are approximately $25.1 million. Estimated annual O&M costs are approximately $4.34 million, and chemicals (mostly alum) represent the majority of that total. The NPV cost was estimated to be $84.1 million for a 20-year period using a discount rate of 4%. It should be noted that land acquisition costs were not included in the estimates. Cost-effectiveness estimates are approximately $12.67 per pound of TN, $79.17 per pound of TP, and $0.63 per pound TSS.

3.1.5.2 In-reservoir Alum Treatment System

In-reservoir alum treatment is a method that could be combined with other methods. In-reservoir treatment is usually preferred when a major source of phosphorus is from sediment phosphorus release within the reservoir. For the C-43 WBSR, alum could be injected directly into the formed suction intake of the inflow pump station (S-470) and mixing of the alum would occur with the discharge of the pump station into the reservoir. However, without rapid mix and flocculation basins, the mixing efficiency will be reduced by approximately 50%, and the alum dosing would be doubled relative to the offline system to achieve the same amount of nutrient removal. Furthermore, the amount of sludge produced will also double. It is assumed that the residuals would be captured and retained in the reservoir bottom without immediate need for removal. Given the estimated rate of sludge production for the offline alum treatment system of 0.12 MGD at 4% solids, and assuming that both a doubling of the sludge production rate as well as a 90-day reservoir filling duration, the annual deposition of alum within Cell 1 of the reservoir is on the order of 0.02 feet/year. At this rate, the time required to accumulate 1 foot of alum sludge over the reservoir bottom would be 50 years. For the purpose of this conceptual assessment, the reservoir will function as a settling basin for 50 years depending on inflow water quality.

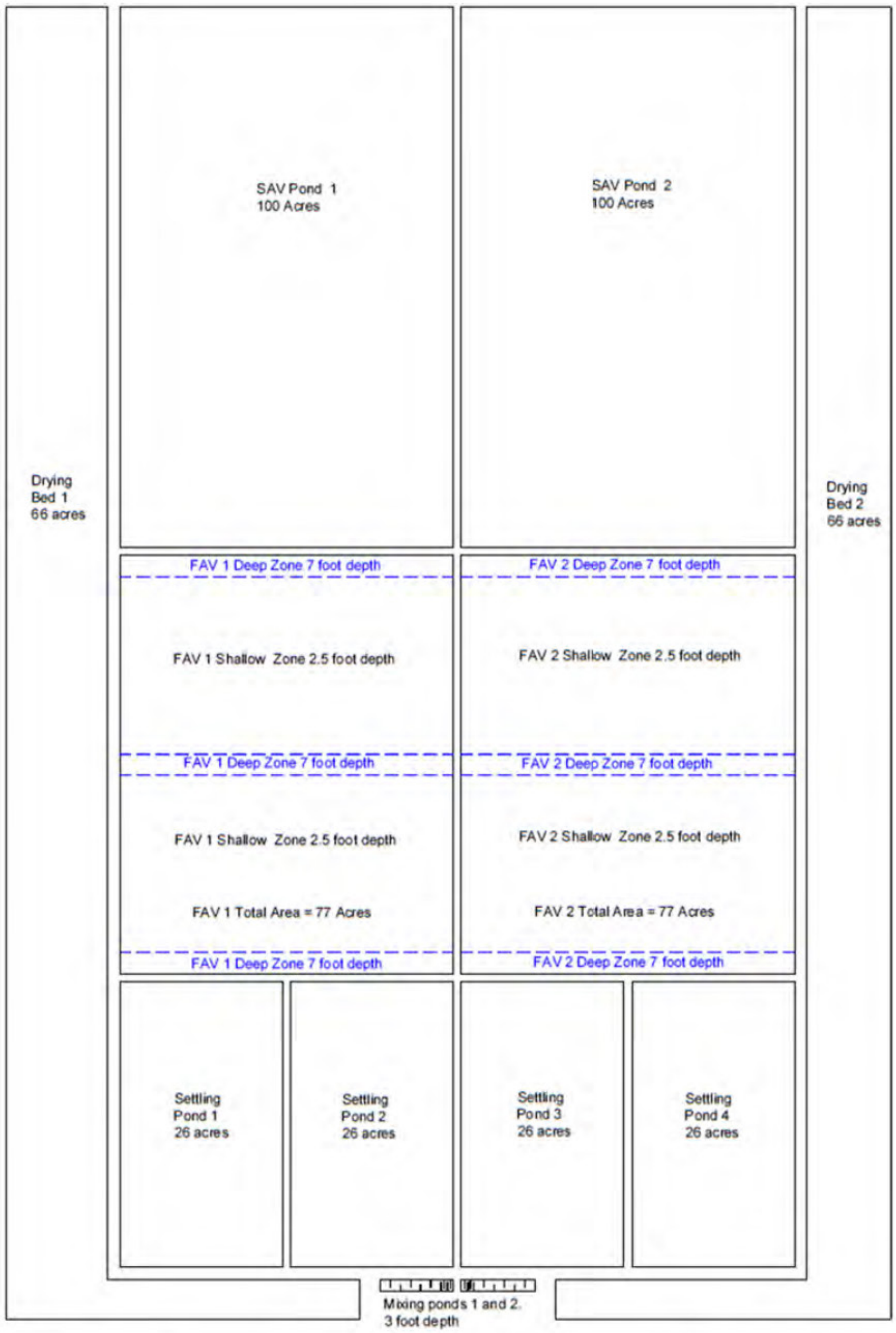
The capital cost for an alum storage and feed system including new electrical building, as well as non-construction costs (e.g., permitting, engineering, services during construction, and startup) is estimated to be $2.19 million. Annual O&M and monitoring costs are estimated to be $695,000. The NPV cost was estimated to be $11.63 million for a 20-year period using a discount rate of 4%. It should be noted that land acquisition costs were not included in the estimates. This system is intended to provide a control on algal production in the reservoir. Twenty-year unit cost-effectiveness estimates for treating an average flow of 457 cfs during a reservoir filling period (assumed to be 90 days) are approximately $5.25 per pound of TN, $32.84 per pound of TP, and $0.26 per pound TSS.

3.1.6 Hybrid Wetland Treatment Technology

HWTT includes design, construction, and operation of a facility that combines wetland and chemical treatment approaches to reduce phosphorus (DeBusk, 2009). The treatment uses chemical coagulants added to the front end of a wetland treatment system, containing one or more deep-water zones to capture the resulting floc material. The passive treatment of the wetlands partnered with the active coagulant sorption results in the reduction of phosphorus. The coagulant used for the HWTT is alum (Watershed Technologies, 2014). Other forms of alum (e.g., polyaluminum chloride and sodium aluminate) were used in previous studies (Watershed Technologies, 2014). Additional features of the technology include pumped recirculation of alum floc or reusing floc to extend the functional life of the coagulant for reduction of phosphorus in the water column or to minimize phosphorus remobilization from sediment. The reuse of the dried, stable floc helps reduce the residual management efforts. Case studies of the technology have occurred at multiple locations in the Northern Everglades in basins S-65D, S-65E, S-154, and S-191. DeBusk (2009) states the HWTT is effective at removing phosphorus and improving water quality at each system. A key recommendation was to use FAV and SAV to reduce the nitrogen concentration. No specific flow rates were reported. Watershed Technologies (2014) characterized TN removal as effective at multiple sites, showing a range of TN reductions of 18% to 57%, depending upon inflow concentration, with systems achieving outflow concentrations ranging from 1.09 mg/L to 2.81 mg/L. The use of SAV was found to improve nitrogen removal.

3.1.6.1 Facility Details and Project Costs

An HWTT facility combines wetland and chemical treatments to achieve more than 50% reductions of TP, TN, and TSS. The combined footprint of two identical HWTT treatment trains requires approximately 668 ac, of which 198 ac should not be routinely flooded (the 132-ac drying beds and 66-ac supporting facilities). **Figure 3-5** provides a conceptual plan of the HWTT system. Residuals will be pumped from settling ponds to the drying beds. Residual management will be minimal given proper design, and opportunistically deposited within FAV cells during routine maintenance of ponds or within the reservoir if it sufficiently dries. This conceptual residual management can be considered given the continuing strong bond of alum with phosphate over time (Harper 2015)., Energy is needed to power the alum feed pump and other pumping requirements, but the total consumption for utilities and fuel is less than 1% of the operations budget. Alum addition, the major operating cost, is highly dependent on the concentration and flow into the HWTT (DeBusk, 2009). The vendor estimates initial capital costs of approximately $21.2 million (excluding contingency, engineering design, and post-construction surveys/certification). Estimated annual O&M costs are approximately $7.2 million, and chemicals (mostly alum) represent 92% of that total. The NPV cost was estimated to be $119 million for a 20-year period using a discount rate of 4%. It should be noted that land acquisition costs were not included in the estimates. Cost-effectiveness estimates are approximately $18.11 per pound of TN, $100.83 per pound of TP, and $0.90 per pound of TSS.



Component	Number of Ponds	Pond Area (each)	Pond Running Depth	Design Flow (each)	HRT at Design Flow
Mixing Area	2	0.5 acre	3 feet	180 cfs	6 minutes
Settling Pond	4	26 acre	12 feet	180 cfs	15 hours
FAV Pond	2	77 acre	2.5 & 7 feet	300 cfs	10 hours
SAV Pond	2	100 acre	2.5 feet	300 cfs	10 hours
Drying Bed	2	66 acre	4 feet		

Figure 3-5. Offline HWTT Process Flow Diagram Depicting Primary HWTT Facility Infrastructure

3.1.7 ElectroCoagulation

ElectroCoagulation removes contaminants from the water by passing an electrical current through the water between an anode and cathode plate. The plates release charged metal ions that neutralize suspended particles and create dense flocs that settle rapidly. ElectroCoagulation is capable of removing multiple contaminants, hardness, color, heavy metals, organics, suspended and colloidal solids, fats, oil, bacteria, viruses, and more. Water is passed between metal plates that transmit the electricity through the water before the coagulated contaminants are filtered and removed. In Florida, ElectroCoagulation has been evaluated at Lake Jesup for the removal of TP and proposed for the St. Lucie River and Lake Okeechobee (Gerber Pumps International, Inc., 2016). There are many industrial applications nationwide.

The Lake Jesup case study report showed a nutrient removal performance of approximately 64% to 91% for TN and 87% to 99% TP (Gerber Pumps International, Inc., 2016). Algae removal has been achieved with ElectroCoagulation at a rate of approximately 99% (Gerber Pumps International, Inc., 2020a). Residuals include TSS removed from the treated water with a 90% to 99% removal. The vendor states that the residuals are produced in a dry powder form, which simplifies removal and disposal (Gerber Pumps International, Inc., 2020a). Additionally, ElectroCoagulation produces approximately 83% less solids than alum treatment (Dole, 2019). The vendor suggests the residuals can be used for fertilizer or soil amendments (Gerber Pumps International, Inc., 2020a). Other researchers have found that ElectroCoagulation sludge can be incorporated into building block materials, providing suitable structural strength (Adyel et al., 2013). As with all coagulation technologies, residual disposal is a continuing concern. A favorable aspect of ElectroCoagulation application on this point is the relatively fewer residuals produced compared to alum treatment (Kabdasli et al., 2012).

3.1.7.1 Facility Details and Project Costs

ElectroCoagulation technology uses direct current to combine suspended particles and create dense flocs that settle rapidly. Removal of TP, TN, and TSS is generally greater than 90% with no added chemicals and no waste brine stream. Additionally, the method removes organics, color, pesticides, and many other contaminants. The facility footprint totals approximately 17 ac, spread among several units. The proposed ElectroCoagulation system will provide treatment to 53% of the average 457 cfs flow and blend the treated water with the balance of the of the untreated water to meet the target removal rates and discharge limits. The total capital cost is $148.4 million, which includes the cost of the 36 units, metal building, clarifier, thickeners and dewatering, electrical components, and site work and plumbing. The annual O&M cost is $3.16 million, which is mostly for power and for sacrificial plate replacement (Gerber Pumps International, Inc., 2020b). The NPV cost was estimated to be $191.4 million for a 20-year period using a discount rate of 4%. It should be noted that land acquisition costs were not included in the estimates. Cost-effectiveness estimates for treating an average flow of 457 cfs are approximately $28.81 per pound of TN, $180.08 per pound of TP, and $1.44 per pound TSS. It is noted for this Study that these costs are based on the initial submittal by the vendor. At the voluntary suggestion of the vendor, a subsequent round of tests by the vendor on water from Lake Jesup confirmed similar treatment performance with reduced residence times in the EC unit, which yielded a lower estimated number of EC units and associated costs by the vendor. The reduced capital and O&M costs yielded a 20-year NPV of $167.1 million. The unit costs were reduced proportionately but were insufficient to change the overall EC ranking in sixth place. This additional vendor information is provided in Appendix F.

3.1.8 AquaLutions®™

AquaLutions®™ is a water quality restoration technology designed to harvest algae and cyanobacteria from the water column at a commercial scale using a modified dissolved air flotation (DAF) system. By removing the algae and cyanobacteria, the nutrients and pollutants bound to the algae are also effectively and efficiently removed from the water column. DAF uses dissolved air bubbles to float the algae to the surface of the water column where they are collected and removed. The clean water is then returned to the source free of algae, with reduced nutrients and a heightened oxygen saturation (Eggers, 2019).

AquaLutions®™ has been deployed in Florida to improve water quality in several locations (Caloosahatchee River, St. Lucie Canal, and Banana River Lagoon). The prominent case study for AquaLutions®™ in Florida was at Lake Jesup where the DAF process was used to remove TP from the lake through a 5-year contract with the St. Johns River Water Management District. The project removed more than 6,500 pounds of TP, 90,000 pounds of TN, and 1.1-million pounds of dry weight algae from the lake (Eggers et al., 2014). **Figure 3-6** shows an overhead visual of an AquaFiber's®™ AquaLutions®™ project site.

Figure 3-6. Overhead View of an AquaFiber AquaLutions Project Site (Eggers, 2020)

AquaLutions®™ removes up to 90% TP, 65% TN, and 80% TSS (Eggers, 2019). AquaLutions®™ treatment produces residuals including algae and TSS. Collected algae is then made into fertilizer pellets or destroyed. Post-processing of the algae depends on the need for fertilizer in the surrounding communities. Providing fertilizer pellets to the farmers may reduce the transport of nutrients into the watershed by recycling nutrients that ran off the watershed. TSS removal would require dewatering and disposal (Eggers, 2019).

The AquaLutions®™ technology requires electricity to power the air blowers that produce the micro-air bubbles. The Lake Jesup project site required 0.9 to 1.0 kWh per 1,000 gallons (greater than 6-MGD facility), but the vendor suggests that a facility at the C-43 WBSR would require less energy depending on many factors including available head, pumps used to achieve the desired flow, and ability to create electricity onsite (e.g., renewable energy techniques, fluidized gas bed, vapor recovery) (Eggers, 2020).

3.1.8.1 Facility Details and Project Costs

AquaLutions®™ facilities are scalable based on the number of treatment basins. Each basin would be capable of flowing approximately 20 MGD (30 cfs) for a maximum system capacity of 20 basins flowing up to approximately 400 MGD (600 cfs). The influent flow rate necessary to produce the desired effluent concentration would determine the number of basins that are online at any one time, and the speed of bringing basins online can match the pace of forecasted flow dynamics into the C-43 WBSR. The overall footprint of the largest implementation would require approximately 227 ac, for an approximately 400 MGD (600 cfs) capacity. The proposed facility at C-43 WBSR would achieve a minimum 75% reduction in TP and a minimum 50% reduction in TN. Residuals would comprise mostly biomass, and this TSS removal would require dewatering and either disposal or beneficial re-use (Eggers, 2019).

The vendor proposed three system capacities for C-43 WBSR, and the costs and efficiencies are approximately linear among the options (e.g., the 300 cfs system is approximately half the 600 cfs system). Capital costs for the maximum approximately 400 MGD (600 cfs) AquaLutions®™ facility were projected to be approximately $98.0 million including design, permitting, and construction of the treatment plant. Estimated annual O&M costs are $27.3 million for the maximum 400 MGD (600 cfs) facility. Power consumption for the maximum facility is estimated to be 58,000,000 kWh/yr, totaling approximately $5,800,000 for electricity at $0.10 per kWh. The NPV cost was estimated to be $468.3 million for a 20-year period using a discount rate of 4%. It should be noted that land acquisition costs were not included in the estimates. Cost-effectiveness estimates are approximately $71.22 per pound of TN, $440.66 per pound of TP, and $3.53 per pound of TSS. Unit O&M costs are lower with increased flow and greater system capacity.

3.1.9 Bold & Gold®

Bold & Gold® is a biosorption activated media formulated to remove nitrogen species, phosphorus species, algal toxins, algal mass, Escherichia coli, and per- and poly-fluoroalkyl substances (University of Central Florida, 2019). The media can be used in many different applications including upflow filters, side-bank filters within wet detention ponds, dry detention systems, infiltration basins, rain gardens, pervious pavers, vegetated filter strips, drainfields, and rapid infiltration basins. Bold & Gold® is a mixture consisting of primarily mineral (Florida-based sand and Florida mined clay) and relatively slow degradable recycled materials (tire crumb) (Bogdan, 2020).

Bold & Gold® has been used in more than 200 locations across Florida with various applications for the reduction of both phosphorus and nitrogen. Recently, the University of Central Florida requested a grant to treat the water upstream of the St. Lucie River and Estuary. The project proposed building a filter with a size of approximately 2 ac to treat 0.05 gallons per minute per square foot (gpm/ft^2) flow with an average annual nitrogen concentration of about 1.5 mg/L. Target volume of flow was about 750 million gallons (MG) treated over 250 days (University of Central Florida, 2019).

In wastewater treatment with nitrate input of 3.61 mg/L, the removal of nitrate was approximately 83%. This application included a period where the filter was not saturated (University of Central Florida, 2019). The filters are estimated to be in service for 15 years with a treatment rate of 0.05 gpm/ft^2 (University of Central Florida, 2019).

Performance data in applications treating stormwater state a nitrogen removal rate of approximately 75% to 95%. For a recent stormwater application of Bold & Gold®, Valencia et al. (2017) observed a 60% TN reduction from 1.5 mg/L to 0.6 mg/L, with a reduction in dissolved organic nitrogen from 1.0 mg/L to 0.4 mg/L. The vendor indicates that 60% reduction is reasonably expected for the C-43 application (ECS 2020c).

3.1.9.1 Facility Details and Project Costs

A Bold & Gold® installation at C-43 WBSR is scalable based on the number of filter cells. A single 5-ac filter cell could treat approximately 12.2 cfs and the vendor proposes to construct 24 filter cells for a total maximum system capacity of approximately 292 cfs, which would be blended with untreated reservoir water to achieve the total target of 457 cfs (296 MGD), which is the flow needed to achieve the provided water quality treatment targets. The filter cells would occupy 120 ac, and additional supporting facilities bring the total land requirements to 175 ac. Bold & Gold® filter cells do not need to be co-located, or in any particular location relative to the reservoir or the river. Residuals are minimal, and the Bold & Gold® media is expected to have a 50-year service life, and the technology has continuous validation studies of 15-year lifespans (University of Central Florida, 2019). Capital costs for the Bold & Gold® facility were projected to be approximately $179 million. Estimated annual O&M costs are $540,000 between labor, electricity, and monitoring. The NPV cost was estimated to be $186.3 million for a 20-year period using a discount rate of 4%. It should be noted that land acquisition costs were not included in the estimates. Cost-effectiveness estimates are approximately $28.06 per pound of TN, $175.35 per pound of TP, and $1.40 per pound of TSS.

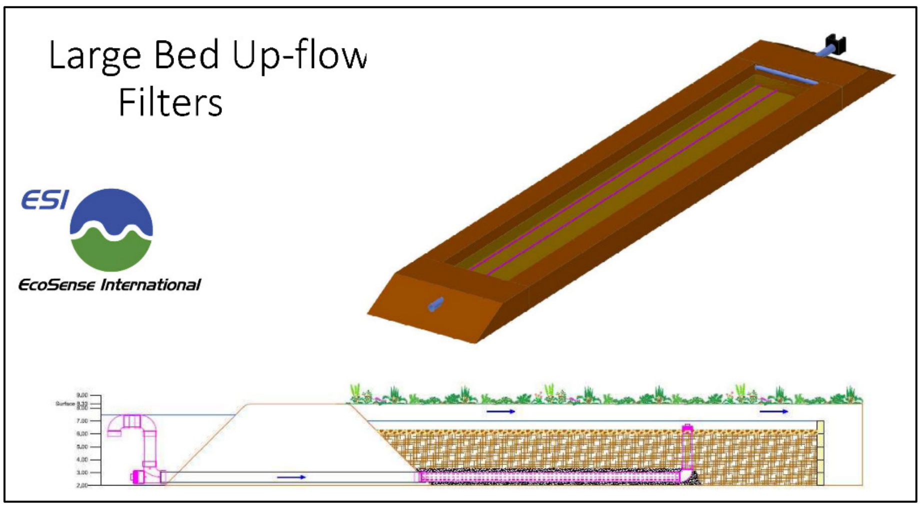
3.1.10 NutriGone™

NutriGone™, developed by EcoSense International, is a media mixture of inorganic carbon, organic carbon, and ion adsorption mineral. NutriGone™ is primarily used in the removal of nutrients from stormwater prior to discharge, intercepting groundwater near surface water interfaces and filtering surface water from ponds and swales. NutriGone™ is capable of being used in multiple different applications but EcoSense International has developed 2 technologies to house the media for stormwater filtration (EcoSense International, 2019).

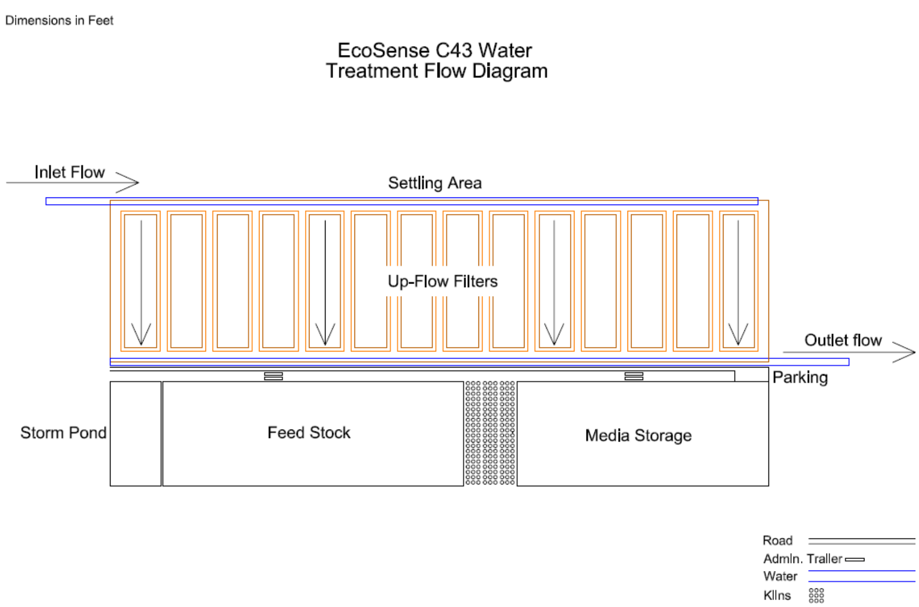
NutriGone™ has a stormwater project located in Brevard County, Florida. The Micco I Stormwater Improvement project researched the treatment efficiency of NutriGone™ as a best management practice (Schmidt and Housley, 2016). Data from the Micco I project indicated inflow concentrations of 1.17 mg/L TN, comprised of 0.91 mg/L total Kjeldahl nitrogen, 0.38 mg/L ammonia-nitrogen, and 0.21 mg/L oxidized nitrogen. Outflow nitrogen concentrations averaged 0.95 mg/L TN (19% reduction), comprising 0.8 mg/L total Kjeldahl nitrogen, 0.4 mg/L ammonia-nitrogen, and 0.21 mg/L oxidized nitrogen. Inflow TP averaged 0.11 mg/L and 0.08 mg/L, respectively. Monitoring of this site showed average TN and TP mass removal rates of 35% and 22 %, respectively.

NutriGone™ media sorbs the nutrients to the media. The vendor expects the media will last 353 days before being at maximum capacity for phosphorus. The media will need to be removed and new media added. The vendor suggests construction of a media production facility near the filter site. Vendor materials indicate that the media is capable of being sold as a soil amendment after being used in the filter at roughly 50% of the original price (Burden, 2020).

Figure 3-7 provides a visual representation of the suggested technology configuration to use NutriGone™.



a)



b)

Figure 3-7. (a) Example of NutriGone^{TM} Large Bed Up-Flow Filters (EcoSense International, 2019); (b) Proposed Implementation Diagram at C-43

3.1.10.1 Facility Details and Project Costs

A NutriGone™ installation at C-43 WBSR is scalable based on the number of filter cells. A single 1-ac filter cell could treat a maximum of approximately 43 cfs (approximately 28 MGD) and the vendor proposes to construct 14 filter cells for a total maximum system capacity of approximately 602 cfs (392 MGD). The filter cells would occupy 15 ac, and additional supporting facilities bring the total land requirements to 22 ac. Residuals processing includes removal and replacement of used filter media from the filter cell every 14-21 months (depending on loading as determined by monitoring), transported via dump truck or conveyor to the production facility where it would be allowed to dewater before transport to a secondary use facility. Preferred secondary use is a soil amendment at a livestock farming facility. Capital costs for the NutriGone™ media sorption installation were projected to be approximately $19.6 million. Estimated annual O&M costs are approximately $12.9 million. Approximately 94% of this O&M total is the materials cost of renewed filter media. The NPV cost was estimated to be $195.5 million for a 20-year period using a discount rate of 4%. It should be noted that land acquisition costs were not included in the estimates. Cost-effectiveness estimates are approximately $29.43 per pound of TN, $183.94 per pound of TP, and $1.47 per pound of TSS (Burden, 2020).

3.2 Technology Matrix

The information on each technology that was gathered from the vendors and described in **Section 3.1** was summarized in a matrix to assist with the technology evaluation and alternatives formulation. The matrix is presented in **Table 3-1**.

Table 3-1. Summary of the 10 Technologies for Water Quality Treatment

Technology	Florida Case Study/Data Quality[1]	Nutrient Reduction	General Land Area[2]	Operation & Maintenance	Residuals	Energy Requirements	Cost[3]	Potential Habitat and Ecosystem Services
Treatment Wetlands • Constructed wetlands for passive nutrient removal through sedimentation, biological uptake, sorption to organic and inorganic surfaces, and chemical precipitation.	• Multiple large-scale applications in Florida (e.g., STA, Orlando). • Data quality: Good	• Predicted reductions: ○ 32% TN ○ 47% TP ○ 85% TSS • Reported reductions: ○ 20-40% TN ○ 75-90% TP ○ >90% algae ○ >90% TSS	• 5,000 ac wetted area • 5,400 ac total site area	• Hydraulic structures and pump stations. • Water quality monitoring. • Vegetation management to maintain composition.	• Long-term residual accumulation (50-years)	• Pump station operation. • Electrical actuators for flow control structures. • Power for SCADA system, autosamplers, and control building.	• Capital cost: $121,400,000 • O&M cost: $1,077,800/yr • NPV cost: $136,000,000 • Cost-effectiveness: ○ TN = $20.69/lb ○ TP = $128.03/lb ○ TSS = $1.02/lb	• Semeraro et al. (2015): Sustain "wildlife habitats and biodiversity at local and global scales." Potential role in recreational and educational opportunities. • Ghermandi and Fichtman (2015): Support educational tours and recreation, such as birdwatching. Provide environmental habitats.
Sand Filtration • Large-scale application of accepted sand filter technology to separate particles from liquid media through vertical filtration through a sand layer.	• Case studies include water treatment of phosphate mines in Florida. • Data quality: Moderate	• Predicted reductions: ○ 50% TP ○ 50% TN ○ 50% TSS • Reported reductions: ○ 48% TP ○ 51% TN ○ 84% TSS	• 1,000 ac technology area • Large infrastructure area	• Replacement of the top layer every 5 years. • Monthly scarification to prevent biological clogging and manage non-native plants.	• Sand requires collection and handling, which may include hauling and disposal. • Could be used for an agricultural soil amendment.	• No energy required to operate technology, using gravity.	• Capital cost: $210,385,000 • O&M cost: $2,692,000/yr • NPV cost: $246,972,000 • Cost-effectiveness: ○ TN = $37.19/lb ○ TP = $232.42/lb ○ TSS = $1.86/lb	• Large treatment area would be open and accessible for wildlife use year-round.
Air Diffusion System • Fine bubble aeration of water column delivered by 8, 30-hp Atlas Copco GA22VSD compressors. 0.10 parts per million of beneficial bacteria applied daily with automated liquid delivery system into the incoming flow.	• Applications in Florida with proposals to work in St. Lucie River. • Large reservoir studies in Wisconsin, Massachusetts, Delaware, Maine, Illinois and Colorado. • Data quality: Moderate	• Predicted reductions: ○ 50% TN ○ System sized for 1.5 mg/L TN (as ammonia) reduction • Reported reductions: ○ 90% BOD ○ 50–75% TN and TP	• 2,000 square feet technology area • Small infrastructure area • All diffusers, feeder tubes below water surface	• Weekly check of compressors. • Record discharge pressure and temperature. • Compressor filters visually inspected monthly. • Annual air leak testing. • Clean disk modules once a year.	• None.	• System will require 8, 30-hp compressors. • Estimated daily electrical costs are $452 per day.	• Capital cost: $6,752,000 • O&M cost: $124,000/yr for power, labor and maintenance costs not included • NPV cost: $8,437,200 • Cost-effectiveness ○ TN = $1.27/lb ○ TSS = $0.06/lb	• Aerated water column would minimize fish kills, especially in winter months, and increased stocking densities. • Improves overall reservoir water quality and prevents harmful algal blooms.
MPC-Buoy • Emits ultrasound wavelengths to disrupt algal buoyancy and maintain algae in deeper low light layers. 40 MPC-Buoy Pro and 60 MPC-Buoy Lite systems are proposed. Only the Pro systems have water quality monitoring systems.	• No documented applications in Florida (studies underway). • Data quality: Low–Moderate	• Predicted reductions: ○ 50% TSS ○ Reduces BOD • Examples: ○ 73% blue-green algae reduction ○ 50% chlorophyll reduction ○ 50% algae reduction within two months	• 100 square feet of technology area • Small infrastructure area • 100 square foot storage space	• Payment for water quality testing after first year. • 10-year lifespan.	• None.	• Each buoy is equipped with 3 solar panels of 195 Wp and 40-amp lithium batteries for autonomous power supply. • Power consumption of 5–20 watts. • Provides power year round. • Automatically powers off the ultrasonic transmitters during low battery charge. • Automatically switches to an energy-saving program during low sun radiation times.	• Capital cost: $10,432,500 • O&M cost: $989,900/yr • NPV Cost: $23,885,600 • Cost effectiveness: ○ TSS = $0.18/lb	• Improves overall reservoir water quality and prevents harmful algal blooms. • Website https://www.lgsonic.com/: "eliminates up to 90% of existing algae and prevents the growth of new algae. The cell wall of the algae remains intact, preventing the release of toxins from the algae into the water. The ultrasound used by LG Sonic is safe for fish, plants, zooplankton, and insects. Our devices use of low power (5–20 watts), wherefore no high voltage is transmitted into the water."

Technology	Florida Case Study/Data Quality[1]	Nutrient Reduction	General Land Area[2]	Operation & Maintenance	Residuals	Energy Requirements	Cost[3]	Potential Habitat and Ecosystem Services
Alum Treatment • Lagoon-based alum application and solids retention for high rate nutrient removal.	• Nutrient Reduction Facility in Lake County, large-scale sediment separation Lake Lafayette, Tallahassee • Data quality: Good	• Predicted reductions: ○ 50% TP ○ 50% TN ○ 50% TSS • Reported reductions: ○ 66% TP ○ 51% TN ○ 84% TSS	• 500-ac technology area • Medium infrastructure area	• Remove floc from settling ponds. • Alum addition.	• Floc accumulated in settling pond, which requires drying and disposal.	• No information provided on energy requirement.	• Capital cost: $25,131,700 • O&M cost: $4,341,000/yr • NPV cost: $84,131,000 • Cost-effectiveness: ○ TN = $12.67/lb ○ TP = $79.17/lb ○ TSS = $0.63/lb	• Open settling basins and drying beds create wildlife habitat. • Ackerman (2018, article): Makes "swimming safer nationwide and could one day stem the red tide that plague's Florida's coast." • Harper (article): Dried alum floc is chemically inert and "has no restrictions for use as fill material or cover."
Hybrid Wetland Treatment Technology • Application of aluminum compounds to constructed wetlands designed for rapid nutrient coagulation and passive solids separation.	• Multiple projects in Northern Everglades that remove TP to improve water quality. • Data quality: Good	• Predicted reductions: ○ 50% TP ○ 50% TN ○ 50% TSS • Reported reductions: ○ Average TP removal of 86%. ○ Up to 96% of TP removal (with the larger sites). ○ Up to 68% of TN removal.	• 668-ac technology area • Large infrastructure area	• Alum injection system to ensure proper dosage.	• Residuals are captured within deep zones of wetland, so no residual management needed.	• Wetland is passive treatment. • Alum injection pump requires power, but no information was provided.	• Capital cost: $21,197,000 • O&M cost: $7,200,000/yr • NPV cost: $119,047,000 • Cost-effectiveness ○ TN = $18.11/lb ○ TP = $100.83/lb ○ TSS = $0.90/lb	• Wetland habitat created. • Open settling basins and drying areas create wildlife habitat. • Website (http://www.watershedtechnologiesllc.com/benefits/): "environmental benefits via wetland and wildlife habitat restoration and creation."
ElectroCoagulation • Application of a direct current to water through metal electrodes to neutralize particle charge, coagulate nutrient and metal ions, and sediment residuals.	• Lake Jesup case study. • Data quality: Good	• Predicted reductions: ○ 50% TP ○ 50% TN ○ 50% TSS • Reported reductions: ○ 95 – 99% TP ○ 60 – 80% TN ○ Algae cells (3–5 micron size) ○ Cyanotoxins ○ 53% of average flow (457 cfs) of treated water blended with untreated water will meet water quality targets.	• 10-ac technology area • Small infrastructure area • 6-ac metal building • 1-ac clarifier	• Removal of residuals and replacement of blades. • Estimated time for replacement of plates: 8.5 months (270 days).	• Used electrodes. • TSS and algae residuals.	• 0.6 kWh per 1,000 gal • 93,267 kWh per day for 155 MGD flow (53% blended to meet target design criteria) • KWh/yr: 34,042,548	• Capital cost: $148,355,00 • O&M: $3,164,000/yr • NPV cost: $191,357,000 • Cost-effectiveness ○ TN = $28.81/lb ○ TP = $180.08/lb ○ TSS = $1.44/lb	• Solids drying bed creates some habitat.
AquaLutions®™ • Combines chemical coagulation with fine-bubble dissolved air flotation for nutrient reduction and solids separation to harvestable and reusable biological solid.	• Several Florida locations (St. Lucie River, Caloosahatchee River). • Data quality: Good	• 65% TN • 90% TP • 80% TSS • Removes algae • 75% TP (minimum) • 50% TN (minimum)	• Technology area: ○ 168 ac for 300 cfs ○ 188 ac for 457 ac ○ 227 ac for 600 cfs • Medium infrastructure area	• Periodic maintenance of blowers is needed. • Facility operated 24 hours for 7 days each week except for routine maintenance and power outages	• Residuals include algae biomass and TSS. • Algae is collected and made into fertilizer pellets or destroyed. • TSS removal would require dewatering and disposal	• Energy required to power air blowers for flotation. ○ 0.9–1.0 kWh per 1,000 gal. ○ 30,000,000 kWh/yr (300 cfs) ○ 45,000,000 kWh/yr (457 cfs) ○ 58,000,000 kWh/yr (600 cfs)	• Capital cost: $97,967,000 • O&M costs: $27,247,000 • NPV cost: $468,262,500 • Cost-effectiveness ○ TN = $71.22/lb ○ TP = $440.66/lb ○ TSS = $3.53/lb	• Open treatment basins and drying areas create wildlife habitat. • Website (http://www.aquafiber.com/florida.html), the technology cleans "surface waters to support healthy aquatic ecosystems. Recreational fishing provides a good example of the potential economic threat from water quality decline."
Bold & Gold® • Sorption media comprised of proprietary mix of inorganic sand, clay, and tire crumbs for passive chemical bonding of phosphate and ammonia to media surface and enhanced denitrification.	• More than 200 locations across Florida. • Data quality: Good	• 64% of flow treated and then blended to meet water quality target	• 130-ac technology area • Medium infrastructure area	• Filters estimated to be in service for 15 years with treatment rate of 0.05 gpm/square foot. • Filter Bold & Gold® media is expected to have a service life of 50 years.	• Media will need to be disposed of after 50-year service lifetime. • Filter material is mainly sand and may even be left on site after 50 years.	• Materials discuss need to run pumps and aeration of top sand layer. • No detailed information provided.	• Capital cost: $179,000,000 • O&M cost: $540,000/yr for labor • NPV cost: $186,336,000 • Cost-effectiveness: ○ TN = $28.06/lb ○ TP = $175.35/lb ○ TSS = $1.40/lb	• Open treatment basins and drying areas create wildlife habitat. • Website (https://ecs-water.com/bold-and-gold-frequently-asked-questions/): "Bold & Gold Filtration Media is an inert material with no biological toxic effects." • Removes algal toxin and perfluoroalkyl and polyfluoroalkyl substances.

Notes:

[1] Data quality definition – Good data quality includes availability of peer-reviewed papers and reports prepared for water management districts or public utilities. Moderate quality includes data provided by vendor but reported by outside or third-party laboratory. This characteristic differs from confidence in performance estimates, which is meant to capture a cumulative assessment of data quality, case histories, and similarity to C-43 site conditions.

[2] Estimated area based on nutrient reduction criteria set for the purpose of this Study comparison.

[3] Cost effectiveness calculated based upon NPV/total mass removed.

3.3 Methodology for Alternatives Formulation

Each of the 10 technologies was evaluated and ranked against a series of attributes and for cost effectiveness to determine which technologies would work best to provide water quality treatment for the C-43 WBSR.

The first step in the ranking process was to evaluate the technologies based on key attributes. **Table 3-2** summarizes these attributes, the weight assigned, and the justification for that weight. In the table, attributes are grouped by color, i.e., cells with attributes of the highest importance are green, cells with attributes of medium importance are yellow, and cells with attributes of low importance are orange. Attributes that are more important to the success of the project were given a greater weight. The highest weight, which indicates the most important attribute, is a 5. The lowest weight, which indicates the least important attribute, is a 1. Attributes evaluated, in order of weight, include:

- **Scalable** – This attribute was given the highest weight, and it evaluates whether the technology has been used and proven at a similar scale. Technologies were assessed for their ability to handle the expected flows and nutrient concentrations at the C-43 WBSR (e.g., 457 cfs flows and a 10,000-ac reservoir). Lower scores were assigned to technologies without examples of large-scale implementation comparable to the C-43 WBSR.
- **Confidence in performance estimates** – This attribute evaluates whether reliable and reasonable performance data are available for nutrient and algae removal efficiencies. Technologies with peer-reviewed nutrient removal data or studies prepared for water management districts or public utilities were preferred.
- **Available Florida case study** – This attribute assesses whether Florida case studies existed for the reviewed technologies and whether these case studies demonstrated favorable results for studies conducted in Florida. Technologies with multiple Florida case studies were ranked higher than those with few or no Florida case studies.
- **Residuals production** – Residuals are the waste product, typically in a solid form, that remain after a treatment process has occurred. For chemical treatment, this is typically a precipitate, while for biological treatment, this is typically an organic solid produced by plant or microbial growth. This attribute assesses whether residuals are produced and how they are handled as a result of the use of the technology. Handling, treatment, and storage of residuals is costly and time intensive and requires permitting and additional infrastructure.
- **Habitat** – This attribute evaluates the benefits and potential harm to fish and wildlife as a result of the technology. Technologies that provide habitat for fish and wildlife, such as treatment wetlands that create valuable habitat for wading and nesting birds as well as fish and other aquatic species, receive a higher score than technologies that do not provide habitat benefits.
- **Ecosystem services** – This attribute assess ecosystem services, which are the benefits that ecosystems provide to people. These services can be divided into four inter-related categories. (1) Provisioning services, which provide goods such as food; freshwater; timber, fiber, fuel, and other raw materials; genetic materials for resistance to plant pathogens; biochemical products and medicinal resources; ornamental species and/or resources for direct human use; (2) Regulating services, which include air quality regulation, climate regulation, natural hazard regulation, disease regulation, erosion protection, soil formation and regeneration, biological

regulation, and water purification; (3) Cultural services, which provide opportunities and inspiration for education, science, recreation, spiritual, religious, and aesthetic activities; and (4) Supporting services, which include nutrient cycling, nursery habitat, soil formation, and primary production (Brauman et al., 2007; de Groot et al., 2010).

- **Energy efficiency** – This attribute focuses on the energy requirements for the reviewed technologies. The use of more environmentally friendly energy with lower carbon footprint is preferred, and therefore ranked higher, than more energy intensive technologies. The energy costs are not included in this attribute but are included in the cost-effectiveness evaluation.
- **Land requirements** – This attribute assesses the relative amount of land needed to properly implement the reviewed technologies. For ranking, the land requirements were grouped into three categories—low (small, less than 100 ac), medium (greater than 100 ac and less than 1,000 ac), and large (greater than 1,000 ac). Higher ranking was assigned to technologies with smaller land requirements. As noted in **Section 2.3**, some technologies may fit on available land while others, such as a full-scale treatment wetland, will require the acquisition of additional property. This attribute partially accounts for potential land availability challenges without requiring the completion of a siting evaluation.
- **O&M** – This attribute assesses the day-to-day complexity of operations and staff involvement needed to keep the technology functioning properly. Higher ranking was assigned to technologies with less complexity and human resource needs. The O&M costs are not included in this attribute but are included in the cost-effectiveness evaluation.
- **Schedule of implementation** – This attribute was given the lowest weight with regards to importance. The timeline associated with implementation and completion of the technologies were assessed, and a higher score was given to technologies that could be implemented by 2023 when reservoir construction is complete.

Table 3-2. Ranking Attributes and Assigned Weights

Attribute	Weight	Justification
Scalable	5	Experience with technology at a similar scale
Confidence in Performance Estimates	5	Must have a high confidence in removal estimates provided
Available Florida Case Study	4	Reduced risk based on reliability of data with Florida case studies; however, this Study supports innovation
Residuals Production	4	Preference for technology that does not produce residuals or require management
Habitat	3	Ancillary benefits to fish and wildlife by providing habitat
Ecosystem Services	2	Ancillary benefits to humans by provisioning services, regulating services, cultural services, and supporting services
Energy Efficiency	2	Preference for technology with lower carbon footprint
Land Requirements	2	Relative footprint area needed to provide for water quality treatment
O&M	2	Preference for technologies with less complexity of operations and less operator involvement
Schedule of Implementation	1	Time needed to construct and implement the treatment technology

As discussed above, each of these attributes was scored for each technology. Assigned scores were 0, 1, or 2, with a higher score being better. The criteria used to assign the score for each attribute are summarized in **Table 3-3**. The scores were multiplied by the weight for each attribute and then added together to determine a total score. The technologies were then ranked from 1 to 10 with 1 assigned to the highest (best) score and 10 assigned to the lowest (worst) score. The scoring and rank for each attribute are shown in **Table 3-4**.

The formula to calculate the total attribute score for each technology is:

> Technology total score = (Scalable score x 5) + (Confidence in Performance Estimates score x 5) + (Available Florida Case Studies score x 4) + (Residuals Production score x 4) + (Habitat Value score x 3) + (Ecosystem Services score x 2) + (Energy Efficiency score x 2) + (Land Requirements score x 2) + (O&M score x 2) + (Schedule of Implementation score x 1).

The next step in the process was to evaluate cost-effectiveness. The capital and O&M costs were either developed by J-Tech or provided by the vendors. The O&M costs include items such as power consumption, replaceable parts, and water quality monitoring. These costs were used to calculate the NPV costs over a 20-year period. The NPV was estimated using the Microsoft Excel spreadsheet function for NPV. The mathematical formula for calculating the NPV of an individual cash flow is:

> NPV = F/[(1 + i)^n], where
>
> F = Future payment (cash flow)
>
> i = Discount rate (or interest rate)
>
> n = the number of periods in the future the cash flow is projected

The NPV was estimated for each year for a 20-year series of future O&M values (representing cash flow). The capital cost was added to the NPV to represent the total investment in the project over the 20-year period. The NPV costs were then divided by the TN, TP, and TSS (used to represent algae) removals to determine the cost effectiveness. The ADS vendor did not provide a TP efficiency and the MPC-Buoy vendor did not provide TP or TN efficiencies; therefore, for these parameters, these technologies received a score of 10, which is the lowest score.

Table 3-3. Scoring for Each Attribute

Technology Scoring	Scalable	Confidence in Performance Estimates	Available Florida Case Studies	Residuals Production	Habitat Value	Ecosystem Services	Energy Efficiency	Land Requirements	O&M	Schedule of Implementation
2	Proven at similar scale	High	More than 5	No residual management	High	High	High	Low	Low	Short
1	Proven at moderate scale	Medium	Between 1 and 5	Moderate residual management	Medium	Medium	Moderate	Moderate	Moderate	Moderate
0	Proven at small scale	Low	None	Large residual management	Low or None	Low or None	Low	High	Intensive	Long

Table 3-4. Technology Ranking by Attribute

Technology Scoring	Attribute										Total Score	Rank
	Scalable	Confidence in Performance Estimates	Available Florida Case Studies	Residuals Production	Habitat Value	Ecosystem Services	Energy Efficiency	Land Requirements	O&M	Schedule of Implementation		
Weight -->	**5**	**5**	**4**	**4**	**3**	**2**	**2**	**2**	**2**	**1**		
Treatment Wetland	2	2	2	2	2	2	2	0	2	0	54	1
Sand Filtration	1	1	1	2	1	0	2	0	2	1	34	4
Air Diffusion System	1	0	1	2	0	0	1	2	2	2	29	6
MPC-Buoy	1	0	0	2	0	0	2	2	2	2	27	8
Alum Treatment	1	2	2	0	1	0	1	2	1	1	35	2
HWTT	0	2	2	1	1	2	1	1	1	0	35	2
ElectroCoagulation	0	2	1	2	0	0	0	2	0	1	27	8
AquaLutions	1	2	1	1	0	0	1	1	0	1	28	7
Bold & Gold®	0	1	2	2	0	0	1	1	2	1	30	5
NutriGone™	0	0	1	2	0	0	1	1	0	1	17	10

Note: The score times the weight for each attribute were added together to determine a total score for each technology. The highest total score received a rank of 1, which is the highest (best) ranking. The lowest total score received a rank of 10, which is the lowest (worst) ranking.

The scores were assigned on a scaled metric. For each cost category, the technology with the lowest cost received a score of 1, and the technology with the highest cost received a score of 10. The other technologies received a scaled score based on their costs in comparison to the lowest and highest cost technologies. For each cost-effectiveness category, the most cost-effective technology received a score of 1, and the least cost-effective technology received a score of 10. The other technologies received a scaled score based on their cost-effectiveness in comparison to the most and least cost-effective technologies. The rankings by cost and cost-effectiveness are shown in **Table 3-5**.

The final step was to determine composite ranking using the scores by attribute and cost-effectiveness. Of the total weight, 50% was assigned to the attributes scoring from **Table 3-4** and 50% was assigned to the cost-effectiveness scoring from **Table 3-5**. For the cost-effectiveness scores, a higher weight was applied to the TP and TN cost-effectiveness values than to the TSS values, given the understanding that a technology designed for nutrient reduction will be expected to reduce solids within the same system. This higher weight was intended to reflect the importance of nutrient reduction for protection of downstream estuarine resources. A summary of the process used to determine the treatment technologies ranking is shown in **Figure 3-8**. The final score and ranking are summarized in **Table 3-6**, and are shown in **Figure 3-9** through **Figure 3-11** for TN, TP, and TSS, respectively. The formula for calculating the final score is:

Final score = (Attribute Score x 50%) + (Cost-effectiveness Score x 50%), where

Cost-effectiveness score = (TN score x 40%) + (TP score x 40%) + (TSS score x 20%)

Based on this evaluation, the highest ranked technologies are treatment wetlands, alum treatment, and HWTT. The next highest ranked technologies include Bold & Gold®, sand filtration, ADS, and ElectroCoagulation. The lowest ranked technologies were NutriGone™, AquaLutions, and MPC-Buoy. The lowest ranked technologies were removed from further consideration in identifying alternatives.

Adjusting the weight to emphasize TN or TP removal does not significantly affect the rank of the technologies. **Table 3-7** compares the rankings of four alternative weighting scenarios: baseline (with 40% weight for TP and TN removal each and 20% TSS removal), 100% weight on TN removal, 100% weight on TP removal, and 100% weight on TSS removal. The top three alternatives consisted of treatment wetlands, alum treatment, and HWTT, which were the same in all scenarios. Bold & Gold® and ADS were each ranked fourth in at least one of the four scenarios. J-Tech conducted additional sensitivity analysis of the ranking weights, and the results of this analysis are summarized in **Appendix F**. Results support the same general conclusion that treatment wetlands, alum treatment, and HWTT remain the top three ranked technologies, with sand filtration and Bold & Gold® providing fourth and fifth ranked alternatives.

Table 3-5. Ranking by Cost and Removal Effectiveness

Technology	Cost Summary (Technology Only, $ millions)			Cost Effectiveness ($/lb)			Cost Effectiveness Ranking		
	Capital	O&M	NPV	TP	TN	TSS	TP	TN	TSS
Treatment Wetland	$121.40	$1.08	$136.05	$128.03	$20.69	$1.02	1.95	3.22	3.50
Sand Filtration	$210.39	$2.69	$246.97	$232.42	$37.19	$1.86	3.97	5.11	5.67
Air Diffusion System	$6.75	$0.12	$8.44	-	$1.27	$0.06	10.00*	1.00	1.00
MPC-Buoy	$10.43	$0.99	$23.89	-	-	$0.18	10.00*	10.00*	1.30
Alum Treatment	$25.13	$4.34	$84.13	$79.17	$12.67	$0.63	1.00	2.30	2.48
HWTT	$21.20	$7.20	$119.05	$100.83	$18.11	$0.90	1.42	2.93	3.16
ElectroCoagulation	$148.36	$3.16	$191.36	$180.08	$28.81	$1.44	2.95	4.15	4.58
AquaLutions	$97.97	$27.25	$468.26	$440.66	$71.22	$3.53	8.00	9.00	10.00
Bold & Gold®	$179.10	$0.54	$186.34	$175.35	$28.06	$1.40	2.86	4.06	4.48
NutriGone™	$19.60	$12.94	$195.46	$183.94	$29.43	$1.47	3.03	4.22	4.66

* TP and TN reductions were not provided by the vendor; therefore, the TP and TN cost-effectiveness was given the lowest score.

Table 3-6. Final Composite Ranking

Technology	Cost Effectiveness Ranking			Attribute Ranking	Weighted Score	Final Ranking Based on Weighed Score
	TP	TN	TSS			
Weight -->	0.4	0.4	0.2	1.0		
Alum Treatment	1.0	2.3	2.5	2	1.9	1
Treatment Wetland	2.1	3.3	3.6	1	1.9	2
HWTT	1.4	2.9	3.2	2	2.2	3
Bold & Gold	2.9	4.1	4.5	5	4.3	4
Sand Filtration	4.0	5.1	5.7	4	4.4	5
Air Diffusion	10.0	1.0	1.0	6	5.3	6
Electrocoagulation	3.0	4.2	4.6	8	5.9	7
NutriGone™	3.0	4.2	4.7	10	6.9	8
AquaLutions	8.0	9.0	10.0	7	7.9	9
MPC Buoy	10.0	10.0	1.3	8	8.1	10

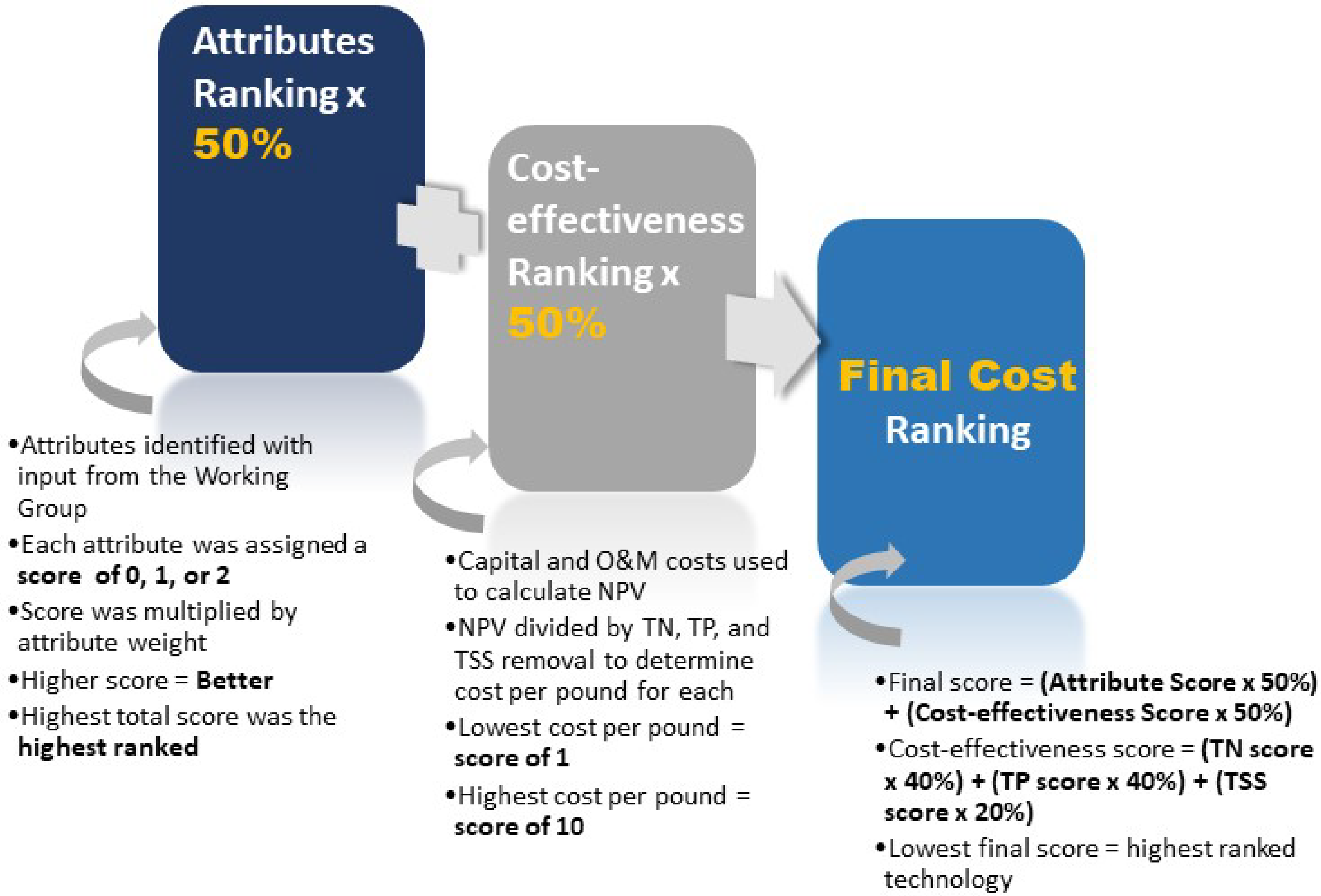


Figure 3-8. Process Used to Rank the Treatment Technologies

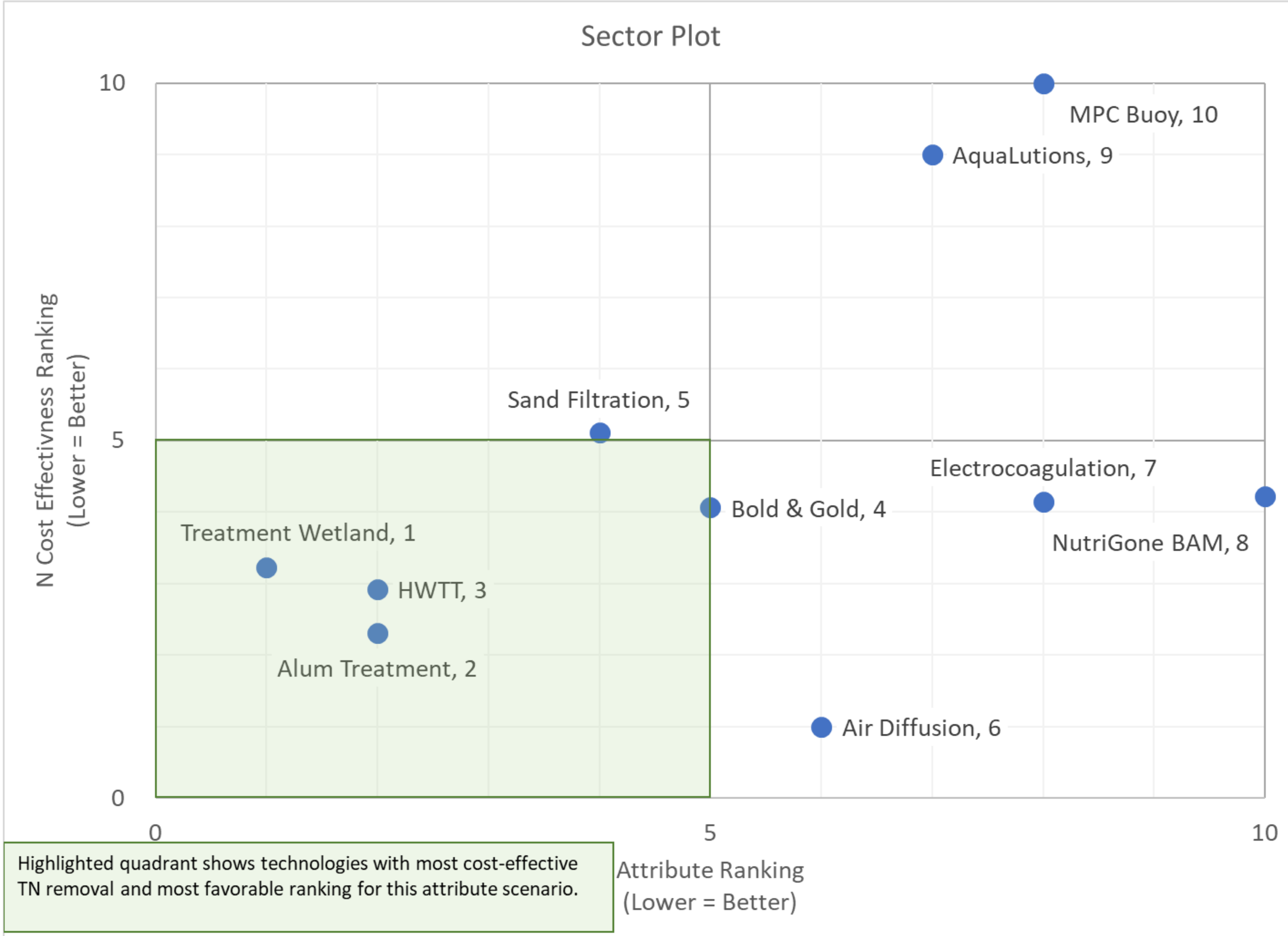


Figure 3-9. Comparative Plot for the TN Effectiveness Ranking

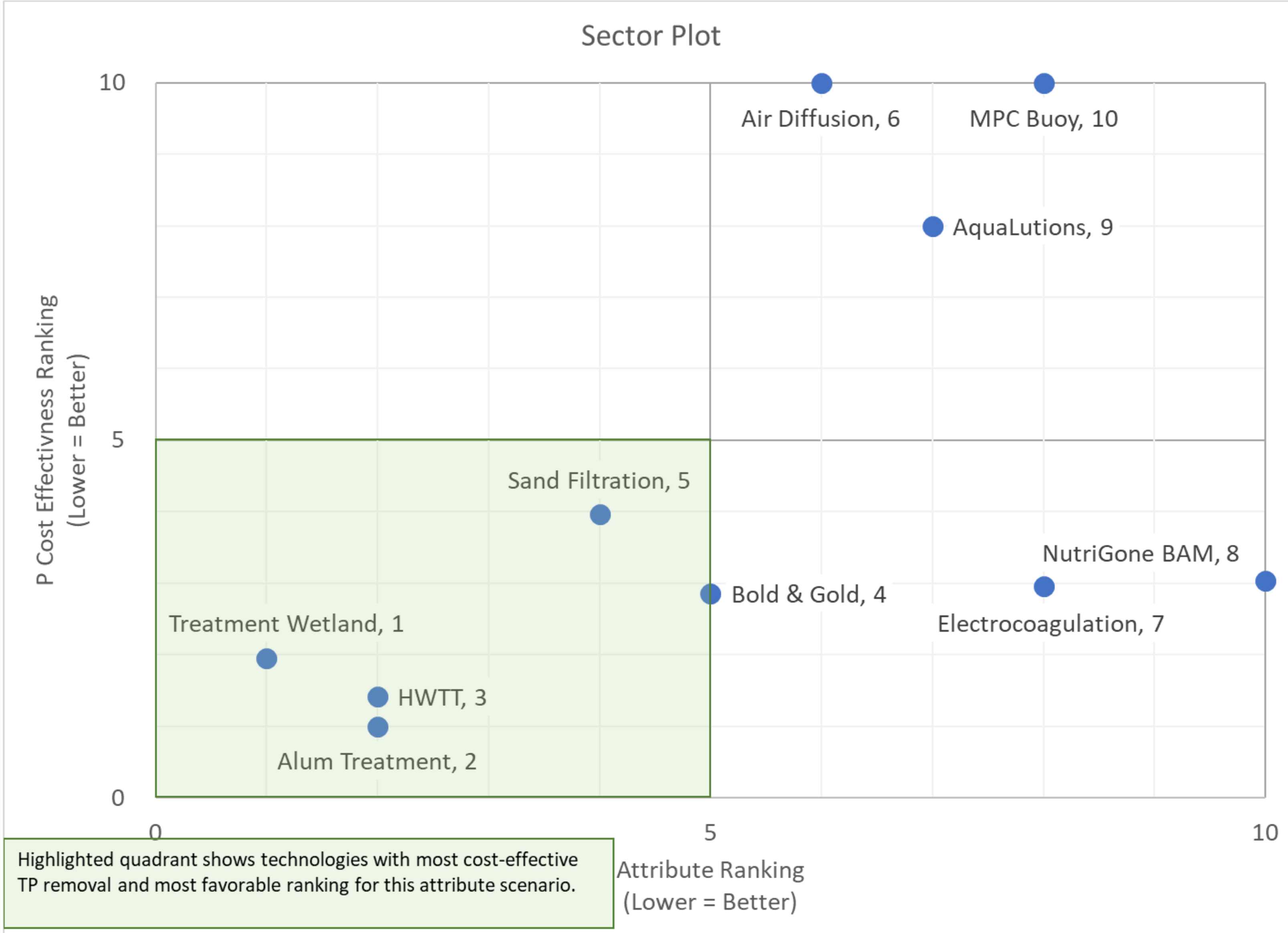


Figure 3-10. Comparative Plot for the TP Effectiveness Ranking

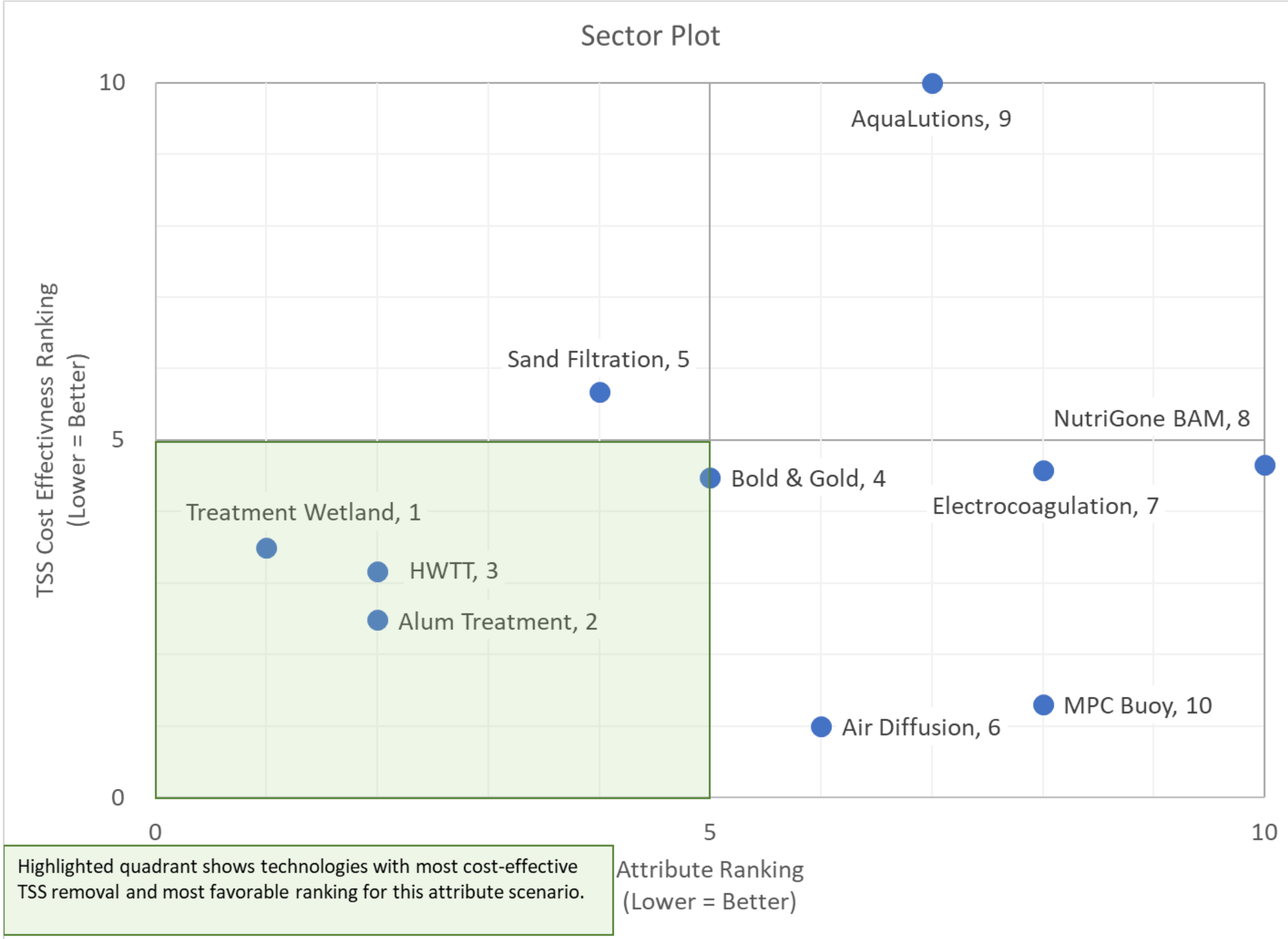


Figure 3-11. Comparative Plot for the TSS Effectiveness Ranking

Table 3-7. Comparison of Composite Ranking by Weighting Scenario

Technology	4-4-2	0-10-0	10-0-0	0-0-10
Alum Treatment	1	1	1	1
Treatment Wetland	2	2	2	2
HWTT	3	3	3	3
Bold & Gold®	4	5	4	6
Sand Filtration	5	6	5	7
Air Diffusion	6	4	9	4
Electrocoagulation	7	7	6	8
NutriGone™	8	8	7	9
AquaLutions	9	9	8	10
MPC Buoy	10	10	10	5

Scenario Notes:

- 4-4-2: Baseline scenario, with ranking consisting of 40%, 40% and 20% preference for removal of TP, TN and TSS, respectively.
- 0-10-0: 100% weight on TN removal effectiveness.
- 10-0-0: 100% weight on TP removal effectiveness
- 0-0-10: 100% weight on TSS removal effectiveness

4.0 Evaluate and Compare Alternatives

4.1 Selection and Identification of Project Alternatives

The ranking of the technologies provided in **Section 3.3** identifies treatment wetlands, alum, and HWTT as having the highest scores (1–3, respectively). These three technologies will be evaluated for further consideration. Additionally, Bold & Gold®, sand filtration, ADS, and ElectroCoagulation ranked next highest in the evaluation (4–7, respectively) and should be evaluated as potential alternatives, or as part of a project in combination with other technologies or treatment trains.

4.1.1 Treatment Trains and Combinations

Each technology was initially sized to achieve a prescribed level of water quality improvement target set for the purpose of this Study. This approach was taken to facilitate the direct technology-to-technology comparisons described in **Sections 3.1.10.1** and **3.3**. However, there may be performance or cost benefits to implementing a project that combines one or more technologies, particularly when land areas are limited. Technologies could be combined for series or parallel operation (**Figure 4-1**). In a series mode of operation, the inflow passes through one technology and then through the next. In parallel operation, the inflow splits between two technologies and the outflows combine again. A series configuration might be considered if two technologies excel at reducing concentrations of different water quality parameters of interest. A parallel configuration might be considered if there are clear benefits to using one type of treatment system for low flows and another type of treatment system for higher flows.

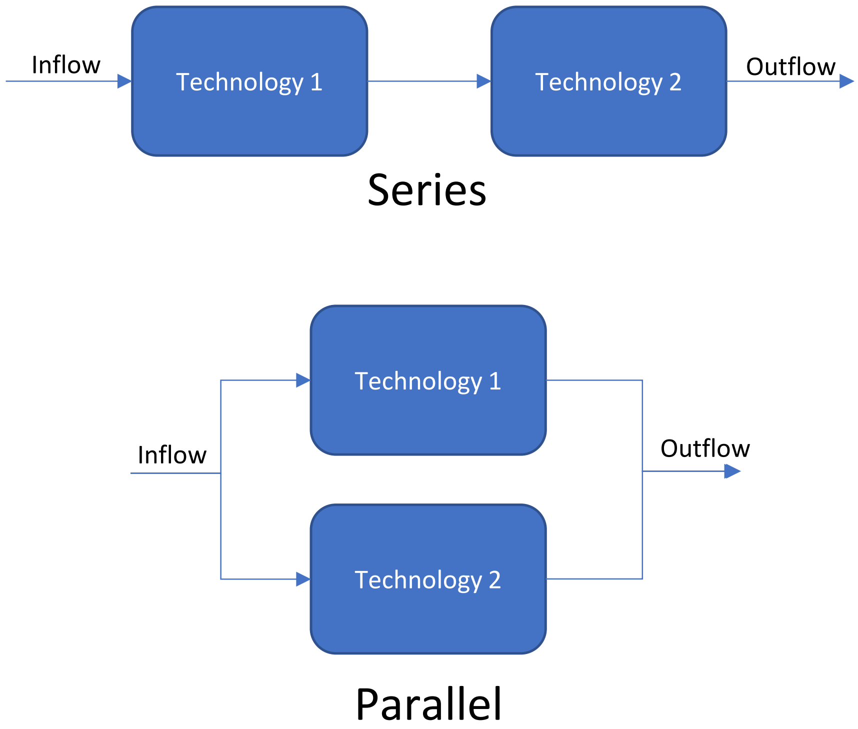


Figure 4-1. Conceptual Flow Diagram for Series and Parallel Technology Configurations

In combining technologies, the following factors should be considered:

- The removal efficiency for a unit process or technology is dependent upon the inflow concentration and flow rate. Most technologies have a lowest achievable concentration (limits of the technology) that can be attained, which is independent of the inflow concentration or loading rate. Accordingly, as the inflow concentration decreases, the removal efficiency typically decreases. For instance, a technology that can reduce an inflow TN concentration of 1.5 mg/L by 30% will likely not be able to reduce an inflow TN concentration of 1.0 mg/L by 30%.
- Treatment efficiencies for units in a treatment train (series configuration) are likely not additive. If each of two technologies can remove TN with an efficiency of 30%, placing those technologies in series will likely not yield a combined removal efficiency of 60%.
- The overall treatment efficiency for parallel technologies is calculated as the flow-weighted average of the individual treatment efficiencies.
- Technologies operated in series must be complementary. The first process cannot produce an effluent that negatively impacts the second process. Preferably, the first process provides an improvement in water quality for one parameter (TN, for example) while the second treats another parameter (TP, for example). Ideally, the first process also transforms (pre-treats) compounds from their form at the system inflow to an altered form that is more readily removed by the second process.

The ranking methodology described in **Section 3.3** identified the MPC-Buoy, AquaLutions®™, and NutriGone™ as the lowest scoring technologies; therefore, these technologies were not evaluated for treatment trains or combinations. The remaining technologies, in order of ranking, include:

1. Treatment Wetlands
2. Alum Treatment
3. HWTT
4. Bold & Gold®
5. Sand Filtration
6. ADS
7. ElectroCoagulation

Any of these technologies could be implemented as parallel systems without creating significant technical or water quality compatibility issues associated with the comingling of the effluents. The same is not necessarily the case for series operation of combined treatment systems. For example, if alum floc settled poorly in either the alum or HWTT systems and that effluent was routed to a sand filter or Bold & Gold® filter, it would be possible to blind the surface of the filter and cause that process to fail. Some technologies may be better suited as either the upstream or downstream process. **Table 4-1** shows the ways pairs of the seven remaining technologies could be combined and indicates whether any given pair produces compatible intermediate effluent quality.

Table 4-1. Compatibility of Seven Technologies for Series Operation

Downstream Technology	Upstream Technology						
	Treatment Wetland	Sand Filtration	Alum Treatment	HWTT	Bold & Gold®	ADS	ElectroCoagulation
Treatment Wetland	--	N	Y	Y	Y	Y	N
Sand Filtration	Y	--	N	N	Y	Y	N
Alum Treatment	N	N	--	N	Y	Y	N
HWTT	N	N	Y	--	Y	Y	N
Bold & Gold®	Y	Y	N	N	--	Y	N
ADS	N	N	N	N	N	--	N
ElectroCoagulation	Y	Y	Y	Y	Y	Y	--

N = No (not compatible); Y = Yes (compatible)

Treatment wetlands could be used as an upstream process and be followed by sand filtration, Bold & Gold®, or ElectroCoagulation. While either alum or the HWTT could provide additional water quality benefits, they would more likely be constructed as the upstream system when combined with treatment wetlands. ADS would not be expected to provide any additional improvement to post-treatment wetland effluent. Treatment wetlands could follow Bold & Gold® or ADS as a downstream technology.

Sand filtration could be followed by Bold & Gold® or ElectroCoagulation as it may provide pretreatment for particulate pollutants with the downstream technologies providing treatment for dissolved pollutants. Sand filtration could also serve as a polishing process for treatment wetlands, Bold & Gold®, or ADS by removing particulate pollutants that may not be removed by the upstream units.

As an upstream process, alum could be followed by treatment wetlands, HWTT, or ElectroCoagulation. Alum followed by treatment wetlands is essentially the same process as HWTT. ElectroCoagulation would remove remaining TN and TP that might not be fully removed by the alum application process. Alum should not be followed by filtration processes such as sand filtration or Bold & Gold® as the media effectiveness could be impacted if alum floc settling is not consistently effective, unless additional routine maintenance is included to scrape the surface layers. An alum process could be placed downstream of either Bold & Gold® or ADS.

Similar to the alum system, HWTT could be followed by treatment wetlands or ElectroCoagulation. Both downstream systems would be expected to provide additional polishing for the HWTT effluent. HWTT should not precede sand filtration or Bold & Gold® for the same reasons (media blinding) that conventional alum treatment is not recommended before filtration systems. HWTT could be used as a downstream process to polish the effluents from alum, Bold & Gold®, or ADS.

Bold & Gold® is marketed primarily for denitrification (removal of oxidized nitrogen) and phosphorus adsorption. As such, it could be used as a pretreatment process prior to any of the remaining processes except ADS, which would nitrify organic nitrogen to the oxidized form that would then require removal. However, there may be some potential for a treatment wetland to fix nitrogen following pretreatment by Bold & Gold®. As a downstream unit, Bold & Gold® could follow treatment wetlands, sand filtration, or ADS as it may provide additional nutrient removal. Bold & Gold® would not be recommended to follow either the alum or HWTT systems due to the risk of unsettled floc blinding the media.

ADS was reported to provide treatment for oxidized nitrogen, but not for other forms of nitrogen or phosphorus. Accordingly, ADS could be used as an upstream process for any of the remaining technologies. The other processes are all expected to provide adequate treatment for oxidized nitrogen as well as other constituents so air diffusion may not be expected to provide any added benefit if placed as a downstream unit behind another process. Therefore, due to this fact and the relative lack of information provided for TN, TP, and TSS removal, ADS was removed from further consideration when developing alternatives.

The performance data indicate that ElectroCoagulation is highly effective at reducing both TN and TP to very low levels, so there would not be a strong reason to follow it with any other technology, except perhaps sand filtration as a mechanism to capture the solids generated by the ElectroCoagulation process. However, ElectroCoagulation could follow any of the other technologies and be expected to provide additional water quality improvement.

4.2 Results of the Alternatives Analysis

4.2.1 Treatment Wetland

As noted in **Section 3.1.1**, treatment wetlands, or STAs, are a proven technology for nutrient removal in southwest Florida. A treatment wetland system was sized to treat inflows or outflows from the C-43 WBSR based on relevant, regional operational performance data. To meet the performance objectives set for the purpose of this Study (reducing TN by 33% from 1. 5 mg/L to 1.0 mg/L, reducing TP by 50% from 0.16 mg/L to 0.08 mg/L, and reducing TSS by 50% from 20 mg/L to 10 mg/L) at flow rates consistent with the MFL (457 cfs), a treatment wetland area of approximately 5,000 ac was determined to be necessary. The area requirement was estimated based on recent performance of the SFWMD's C-43 Water Quality and Treatment Testing Project (C-43 WQTTP) (J-Tech and WSI, 2019), other treatment wetlands in Florida (**Appendix A**, Section 3.2), and analysis using wetland performance modeling techniques described by Kadlec and Wallace (2009). It is assumed that the 5,000-ac system would be constructed at a site with predominantly sandy soils. The 5,000-ac system results in an average hydraulic loading rate of about 5.5 centimeters per day (cm/d) at the MFL flow of 457 cfs, which is consistent with operational experience at the C-43 WQTTP that saw TN concentrations reduced from about 1.5 mg/L to 1.1 mg/L and TP from 0.16 mg/L to less than 0.04 mg/L at loading rates up to 6 cm/d (J-Tech and WSI, 2019).

A conceptual layout for a 5,000-ac treatment wetland is shown on **Figure 4-2**. For planning purposes, it was assumed that the wetland would be compartmentalized into three cells, each with an effective treatment area of about 1,667 ac. The construction of cell embankments and supply and discharge canals would increase the total project footprint to about 5,400 ac. Estimated performance of the 5,000-ac system at an average flow of 457 cfs is summarized in **Table 4-2**. Over a 20-year planning period, the wetland system was estimated to remove over 8.6 million pounds of TN, 1.3 million pounds of TP, and 305 million pounds of TSS.

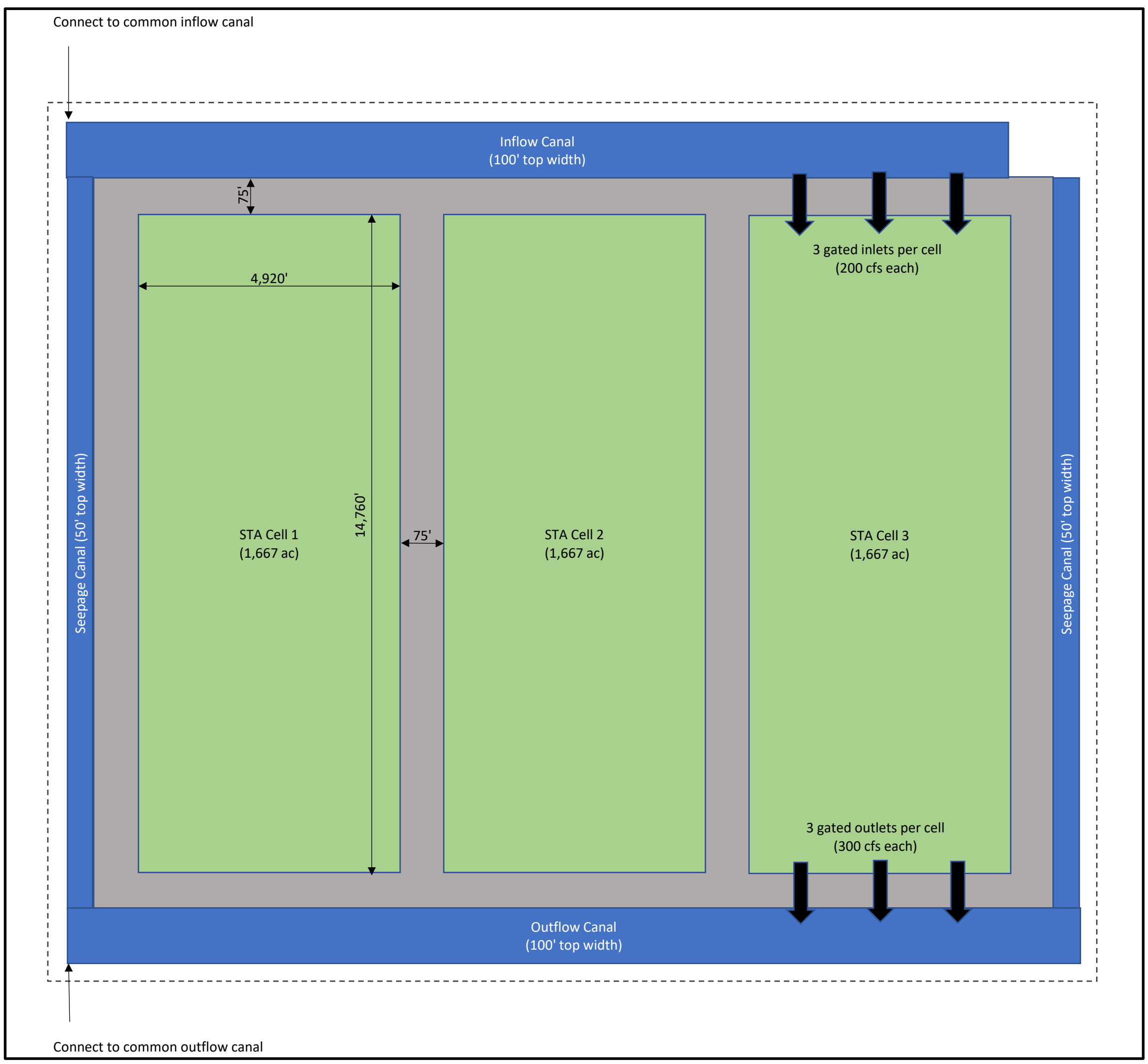


Figure 4-2. Conceptual Layout for C-43 WBSR Treatment Wetland System

Table 4-2. Estimated Performance for a 5,000-ac Treatment Wetland System

Parameter	TN	TP	TSS
Inflow Concentration (mg/L)	1.5	0.16	20
Outflow Concentration (mg/L)	1.02	0.085	3
Reduction (mg/L)	0.48	0.075	17
Efficiency	32%	47%	85%
Mass Removal (lbs/yr)	431,644	67,444	15,287,403
20-yr Mass Removal (lbs)	8,632,887	1,348,889	305,748,066

For cost-estimating purposes, it was assumed that embankments and canals would be constructed to typical SFWMD standards, similar to the existing STAs that have been constructed in the EAA and northern Lake Okeechobee watershed. Estimated capital costs were dominated by earthwork (cell grading, embankment construction, canal excavation) and were assumed to be $15/cubic yard of material. Costs for annual O&M were estimated from data provided by SFWMD for operation of the EAA STAs in 2017 and 2018. Non-pumping O&M costs averaged $215.57 per acre and included approximately $440,000/year for compliance monitoring. These O&M costs do not include pumping which is discussed in **Section 5.1**. Estimated capital and O&M costs are summarized in **Table 4-3**. The total estimated capital cost was $121.4 million, and the estimated annual O&M cost was $1.08 million. The NPV cost was estimated to be $136.0 million for a 20-year period using a discount rate of 4%. It should be noted that land acquisition costs were not included in the estimates.

Table 4-3. Estimated Capital and O&M Costs for a 5,000-ac Treatment Wetland

Activity/Element	Units	Quantity	Unit Cost	Extended Cost	Notes
Clearing and Grubbing	AC	5,400	$1,500	$8,100,000	
STA Grading	AC	5,000	$5,000	$25,000,000	Move 1 foot of material at $3/cy
STA Embankment	LF	90,000	$250	$22,500,000	440 ft^2 xsec = 16 cy/LF @ $15/cy
Inflow Canal	LF	15,000	$360	$5,400,000	640 ft^2 xsec = 24 cy/LF @ $15/cy
Outflow Canal	LF	15,000	$360	$5,400,000	640 ft^2 xsec = 24 cy/LF @ $15/cy
Seepage Canal	LF	30,000	$110	$3,300,000	200 ft^2 xsec = 7.5 cy/LF @ $15/cy
Gated Structures (200 cfs)	EA	9	$600,000	$5,400,000	$3,000/cfs
Gated Structures (300 cfs)	EA	9	$1,000,000	$9,000,000	$3,000/cfs
SCADA	LS	1	$1,000,000	$1,000,000	
Control Building	LS	1	$1,000,000	$1,000,000	
Construction Subtotal				***$86,100,000***	
Engineering	%	15		$12,915,000	
Permitting	%	1		$861,000	
Contingency	%	25		$21,525,000	
Total				**$121,401,000.00**	
Capital Cost per Acre				$24,280.20	
O&M	AC	5,000	$215.57	$1,077,835.00	
Net Present Worth				$136,048,124.00	

LF = linear foot; AC = acre; LS = lump sum; cy = cubic yard

4.2.2 Alum Treatment

Two alum treatment conceptual alternatives are proposed for treating C-43 WBSR water: an offline system to treat discharge from the WBSR and an online system designed to inject alum into the reservoir inlet during loading cycles. This section provides a brief overview of the components and costs of each.

4.2.2.1 Offline Alum Treatment System

A conceptual alternative for an offline alum treatment system is shown in **Figure 4-3**. Water from the WBSR would be pumped at an average flow of 457 cfs from the reservoir's north perimeter canal to an inflow canal of approximately 1,100 linear feet (LF) and then flow by gravity to a treatment area of approximately 50 ac. Alum for nutrient removal would be fed to the facilities inflow canal via a liquid alum feed system from a storage tank yard. The liquid alum feed system would consist of three 8,000-gallon exterior alum storage tanks with ultraviolet (UV) protection and secondary containment and two metering pumps with a control panel that a canopy protects from UV exposure.

Water from the inflow canal would then be split to flow to two parallel concrete rapid mix basins to provide flash mixing of the alum with paddle mixers. Each rapid mix basin holds approximately 102,000 gallons. The water from the rapid mix basins flows by gravity to two parallel earthen flocculation basins with high-density polyethylene (HDPE) liners via a conveyance canal of approximately 608 LF. The flocculation basins will be approximately 3 MG each and the entire flocculation zone will be aerated with a diffused air system via two 200 hp blowers to provide an airflow of approximately 6,500 standard cubic feet per minute. After the flocculation basins, flow will be directed over a submerged weir, 250 feet in length, in each basin to provide hydraulic separation between the flocculation basins and sedimentation basins. The earthen sedimentation basins will be HDPE lined and hold approximately 25 MG each.

The sedimentation basins are designed based on a surface loading rate of 0.40 gpm/ft^2 to settle out solids created by the alum treatment system during peak flow conditions. After sedimentation, the final treated effluent flow is discharged by gravity to a collection canal of approximately 457 LF that sends flow to the Townsend Canal. The alum treatment system has been sized to yield average outflow concentrations of 0.08 mg TP/L and 1.0 mg TN/L. These concentrations have been shown to be achievable at other full-scale alum facilities in Florida. For example, similar ranges of performance have been noted for the Upper Lake Lafayette Nutrient Reduction Facility in Tallahassee, where the inflow TP range of 0.05-0.3 mg/L is reduced by 74% to a range of less than 0.01-0.1 mg/L (City of Tallahassee, 2018). Similarly, a 68% reduction in TN was measured, where inflow TN is reduced from a range of 0.3-0.8 mg/L to 0.05-0.4 mg/L.

Settled solids that accumulate in the sedimentation basins will be pumped to a centrifuge dewatering facility. The following assumptions were applied to develop a conceptual plan for the dewatering facility:

1. 0.12 MGD of sludge flow (alum floc, algae, and biological matter) = 120,000 gallons per day (given)
2. 120,000 gallons per day @ 4% solids = 40,057 dry lb/day
3. From a centrifuge manufacturer (Alfa Laval), the maximum capacity of G3-125 centrifuge for this type of WTP alum sludge is 4,000 pounds per hour or 200 gpm.
4. Operating 5 days per week, 13 hours per day, two operating units would be needed. If operated 7 days per week, 16 hours per day, 1 operating and 1 standby = 2 units would be assumed to save significant amount of money for equipment and dewatering building space.
5. One standby redundant centrifuge unit (a typical practice) for a total of three installed centrifuge units
6. Three (3) centrifuge sludge feed pumps

7. Three (3) emulsion polymer systems
8. Three (3) cake screw conveyor systems
9. 67-foot X 60-foot dewatering building with centrifuges on mezzanine above cake conveyors that includes footprint for electrical room

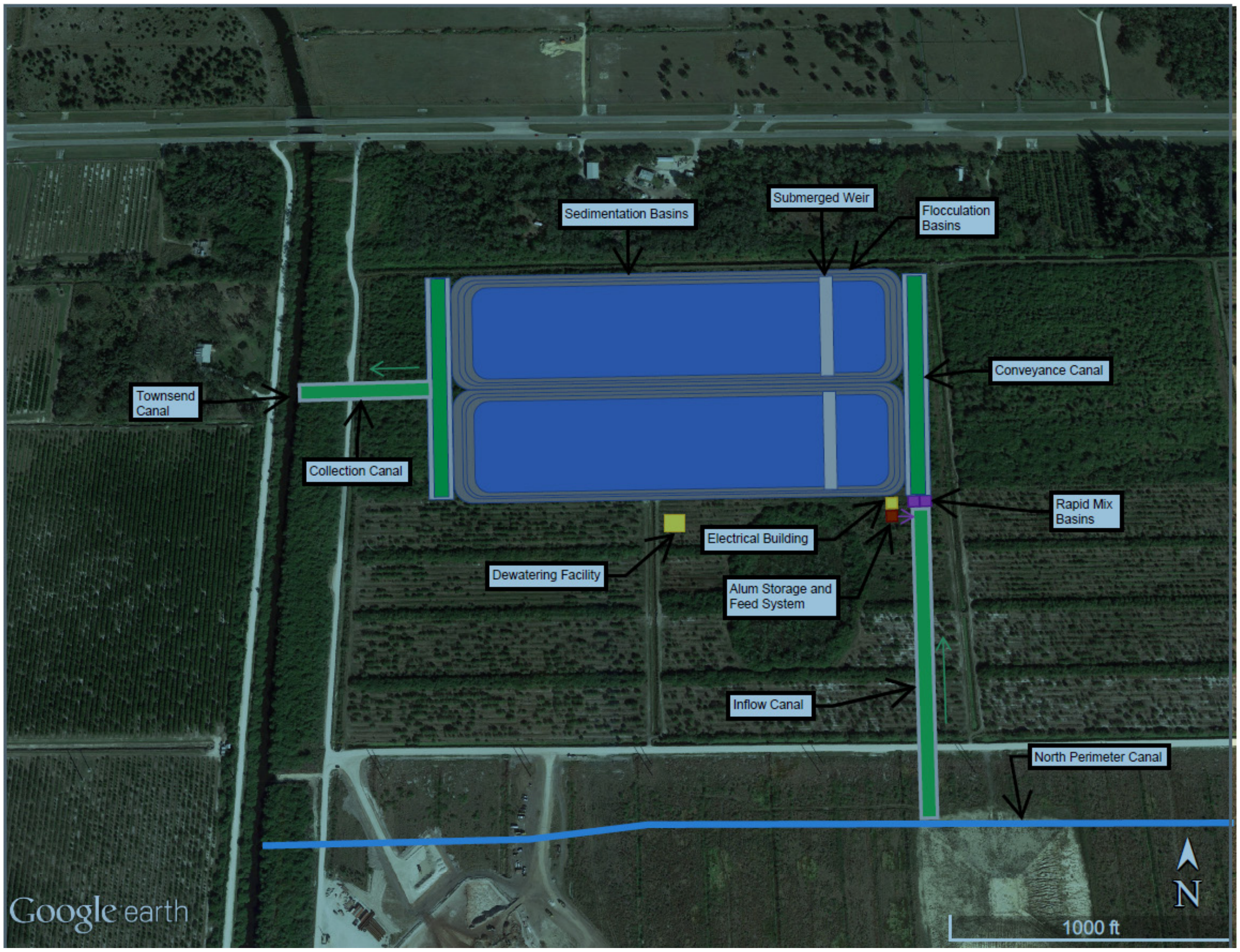


Figure 4-3. Conceptual Layout for C-43 WBSR Offline Alum Treatment System

For cost-estimating purposes, capital costs were estimated for the alum injection system, including rapid mixing chamber, flocculation basin, and settling basins, as well as the dewatering and solids management system. Annual operating costs for the alum injection system totaled $1,310,000 and $1,400,000 for the dewatering system. Floc pumping was estimated to cost $1,200,000 and compliance monitoring was $440,000. The total estimated capital cost was $25.13 million, and the estimated annual O&M cost was $4.34 million. The NPV cost was estimated to be $84.13 million for a 20-year period using a discount rate of 4%. It should be noted that land acquisition costs were not included in the estimates.

4.2.2.2 Online Alum Injection System

As a more simplistic treatment alternative for adding liquid alum for phosphorus removal treatment, alum can be injected directly into the formed suction intake of the inflow pump station to the C-43 reservoir and some mixing of the alum will occur with the discharge of the pump station to the reservoir. The mixing of this type of alum introduction would operate at a 50% efficiency compared to the rapid mix basins for the offline system and alum dosing rates would have to be doubled to achieve the same amount of phosphorus removal. Furthermore, the amount of sludge produced will also double. Given the size of the reservoir, the assumption is that the floc would be retained in the sediments without need for removal for at least 50 years or longer.

Although the liquid alum storage and feed system would be sized to treat up to the peak inflow to the reservoir of 1,500 cfs, the liquid alum storage and feed system will on average dose to treat 457 cfs of inflow to conserve on the average alum consumption and is sufficient to maintain control on algal growth in the reservoir. The liquid alum feed system consists of six 30,000-gallon exterior alum storage tanks with UV protection and secondary containment and two metering pumps with a control panel that a canopy protects from UV exposure. A small electrical building that has a footprint 102 square feet is also included to house the motor control centers and variable frequency drives for the alum feed pumps.

The capital cost is estimated to be $2,187,000 and annual operating costs are estimated to be $695,000. The NPV cost was estimated to be $11.63 million for a 20-year period using a discount rate of 4%. It should be noted that land acquisition costs were not included in the estimates.

4.2.3 HWTT

As summarized in **Section 3.1.6**, the HWTT treatment area uses 459 ac, consisting of two treatment trains with multiple treatment ponds in series. The mixing pond where alum is mixed with water from the reservoir will require approximately 1 ac of land in total (two 0.5-ac ponds). The water will move through four settling ponds to allow for floc (alum and nutrients) to settle out to the bottom of the cell. The wetland treatment facility will include FAV and SAV ponds. The estimated total acreage for the settling, FAV, and SAV ponds is 104 ac, 154 ac, and 200 ac, respectively, for a total pond treatment land area of 459 ac.

Supporting facilities are considered to be the areas required for access (internal access roads, perimeter access road, and embankments), chemical storage/dosing facilities, and miscellaneous areas such as those used for storage, parking, pump station pads, and other similar uses. The total land area for supporting facilities for the HWTT alternative is anticipated to be approximately 77 ac.

Solids will be pumped to the drying beds after accumulating in the settling ponds. The drying beds allow for passive dewatering of the solids material that is a byproduct of the treatment process through evapotranspiration and seepage. The drying beds are sized based on an assumed solids accumulation rate in the settling ponds. Based on the anticipated flows to be treated, two beds will be required sized at 66 ac each. The total land area for residuals handling and solids storage is therefore 132 ac. The total project area needed is 668 ac and would treat the 457 cfs needed to meet the MFL.

The vendor estimates initial capital costs of approximately $21,197,000 (excluding contingency, engineering design, and post-construction surveys/certification). Estimated annual O&M costs are approximately $7,200,000, and chemicals (mostly alum) represent 92% of that total. The NPV cost was estimated to be $119 million for a 20-year period using a discount rate of 4%. It should be noted that land acquisition costs were not included in the estimates.

Additional details provided by Watershed Technologies, LLC regarding this alternative can be found in **Appendix E.**

4.2.4 Treatment Wetland with Bold & Gold®

A potential combined system could include a 1,000-ac treatment wetland with a 104-ac Bold & Gold® media filtration system. The individual areas were derived under the assumption that the land area available would support a 1,000-ac wetland, which would be expected to provide consistent treatment for 20% of the average flow (about 91 cfs), commensurate with the reduction in area from a full-scale 5,000-ac STA. A 104-ac Bold & Gold® filter would treat 235 cfs, with the expectation that the water would be treated to lower concentrations than specified. The outflow from the treatment wetland and Bold & Gold® filter would be blended with untreated water in the reservoir discharge and still meet the water quality objective set for the purpose of this Study. The total flow treated by the combined technologies would be 325 cfs.

The capital, O&M, and NPV costs were estimated by proportion to the flow treated. The total capital cost was estimated to be $115.9 million, with annual O&M costs of $0.65 million. The 20-year NPV cost was estimated to be $124.7 million. It should be noted that land acquisition costs were not included in the estimates.

4.2.5 Sand Filtration with Bold & Gold®

As a conceptual alternative for treatment of the C-43 WBSR discharge, the combination of a full-scale sand filter and a parallel media filtration facility was investigated and is described in this section. The sand filter would provide a sustainable alternative to implementing a full-scale treatment wetland but at a reduced area. The sand filter hydraulic loading rate appropriate for the range of TP and TN reduction required for this application is on the order of one foot/day. Similarly, the media filtration beds using Bold & Gold® media are capable of a significantly greater hydraulic throughput of 5 inches/hour (Environmental Conservation Solutions, 2020). Both systems offer the benefit of a simpler operational approach consisting primarily of hydraulic flow maintenance and site vegetation management.

As a system with a total reduced footprint, the key working assumption for the sand filter and Bold & Gold® facility is that, on average, 20% (91 cfs) of the average daily flow of 457 cfs would be routed to a 200-ac sand filter. As detailed in the Bold and Gold® submittal (Environmental Conservation Solutions, 2020), because the media is expected to treat to lower concentrations than the study objectives, 64% (234 cfs) of the remaining 80% of the average daily flow would be treated through the media filtration beds. As a result, the total flow treated by the sand filter and media system would be 325 cfs. The combined flows from both components would yield average outflow concentrations of 0.08 mg/L of TP and 1.0 mg/L of TN.

The total Bold & Gold® treatment area is estimated to be 104 ac, based upon the proportion (80%) of total system flow treated and the projected full-scale Bold & Gold® treatment area of 130 ac. Of this total area, 60 ac would consist of twelve 5-ac ponds. Access roads and drainage infrastructure and stormwater management would comprise the remaining 44 ac.

Water from the C-43 WBSR would be pumped from the perimeter canal to the sand filter through an open distribution channel. Water would flow by gravity through parallel discharges to the distribution channel of the sand filter and the distributed piping of the Bold & Gold® system. Water filtering through the sand filter and the Bold & Gold® beds would be collected by underdrains and be routed by gravity to collector channels and then to the discharge channel for an outflow to the C-43.

The capital, O&M, and NPV costs were estimated by proportion to the flow treated. The total capital cost was estimated to be $133.7 million with an O&M cost of $0.97 million. The 20-year NPV cost was estimated to be $146.9 million. It should be noted that land acquisition costs were not included in the estimates.

4.2.6 ElectroCoagulation

The ElectroCoagulation vendor proposed a full-scale system sized to treat the average flow of 457 cfs by blending 53% of treated water with untreated water to arrive at the desired reduction target for TP, TN, and TSS for this Study. This would be implemented with a 10-second hydraulic retention time in the ElectroCoagulation chamber. The facility would receive pumped flow from the C-43 WBSR through the inlet conveyance channel.

The equipment sizing and number of units required was based on a 20-hour per day operating cycle for each ElectroCoagulation unit to allow for tank acid cleaning and periodic plate replacement. Thirty-six of the units would treat 240.5 cfs. The 36 units would be housed in a hurricane rated covered metal building approximately 1,850 feet in length by 140 feet in width and approximately 24 feet in height. Each unit is mounted on 18-foot by 17-foot skids. The units would be elevated on a structural steel mezzanine to allow for gravity flow for cleaning and free flow of the treated water to the next process phase of solids separation.

Each ElectroCoagulation unit would include the following equipment:

1. Atmospheric reaction chamber up to 140 degrees Fahrenheit
2. 1/8-inch screen filter (customer must prescreen to 1/32 of an inch)
3. System supply pump
4. Air purge
5. 480-volt alternating current to direct current power supply with current control, programmable logic controller, and polarity reversing
6. Steel and aluminum 217 blade set with 2,229,000 square inches per set
7. Automated drain back cleaning

For solids handling, the facility would include a 250-foot-diameter clarifier, gravity belt thickeners, and dewatering centrifuges. The facility would include access roads, power, and electrical supply. A slurry of solids would be pumped to the dewatering facility. Treated water would overflow by gravity to the outlet channel for blending and conveyance to the C-43.

The capital, O&M, and 20-year NPV costs are $148.4 million, $3.16 million, and $191.4 million, respectively.

5.0 Cost-Benefit Analysis for Alternatives

Cost-benefit analysis is a tool used to examine the net economic benefits of a project or policy decision (Boardman et al., 1996). It has been widely used to examine the economic feasibility of public investments in a variety of areas including water resources, transportation, agriculture, and energy projects. The cost-benefit analysis is performed by comparing in present dollar terms the value of the total costs of a project to the value of its total benefits (Eisen-Hecht and Kramer, 2002). For this Study, the cost-benefit analysis indicates which alternative yields the highest water quality improvements and ancillary benefits to the affected stakeholders as compared to the total project costs that would be incurred. This section summarizes the costs of water conveyance infrastructure, treatment system capital and O&M costs, and the water quality benefits of each of the six project alternatives to support selection of the top treatment technology alternatives that will be further evaluated during the next phase of the project. Because this section is intended to provide a conceptual comparison of alternatives, it does not address the location and costs of highly specific project features, such as land parcels, intake or discharge locations, and site-specific infrastructure. The top recommended alternatives from this Study will be evaluated as viable alternatives based on maximum water quality treatment efficiencies, preliminary cost optimization, and a project siting study to select an alternative as the WQC Plan. The WQC Plan will be the basis for the Statement of Work for detailed design.

5.1 Infrastructure Costs

The costs presented in **Section 3.1** did not include delivery of water to each technology because the specific locations where the technologies might be implemented have not been fully identified. Some technologies proposed treating side-stream flows that would reduce their water delivery infrastructure needs when compared to systems that treat 457 cfs. For this Study, three facility sizes are being considered to identify an approximate estimate of costs needed for infrastructure including canals, roads, and pump station capacity. The final alternatives identified above have been designated small, medium, and large based on flow capacity and land requirements.

A small site was assumed to consist of a 50-ac area used to construct a technology-based water treatment system, which could be located near the northwest corner of the C-43 WBSR adjacent to the Townsend Canal. Water would be pumped using a new 250 cfs pump station, from the C-43 WBSR's north perimeter canal into a 1,100 LF inflow canal. Water from this inflow canal would be treated within the facility and then discharged by gravity into the adjacent Townsend Canal via a 400 LF discharge canal. The infrastructure required for this concept includes a pump station, 1,600 LF of canals, a single-barrel gravity discharge structure, and 1,600 LF of access/ maintenance base-rock roads (see **Figure 5-1**).

A medium sized project site was assumed to consist of a 1,000-ac area used for a HWTT facility. This area would be situated just north of the C-43 WBSR's northeast boundary and would receive inflows from the perimeter canal via a newly constructed 300 cfs pump station and 800 LF canal. Once the water has been successfully treated, it would be released into an 800 LF discharge canal ultimately discharging back into the perimeter canal. The infrastructure required for this concept would include a 300 cfs pump station, 1,600 LF of canals, a single-barrel gravity discharge structure, and 1,600 LF of access/maintenance road paralleling both sides of the inflow and discharge canals (see **Figure 5-2**).

The large project option was assumed to consist of a 5,000-ac area that would be used as a series of treatment wetland cells. Inflows would be provided by a 450 cfs pump station and 800 LF canal located on the east side of the C-43 WBSR. Discharge would be provided by a 400 LF outflow canal with a gravity discharge structure draining back into the perimeter canal. The infrastructure required for this system would include a 450 cfs pump station, 1,200 LF of canals, a single barrel gravity discharge structure, and 1,200 LF of access/maintenance roads on both sides of the inflow and outflow canals (see **Figure 5-3**).

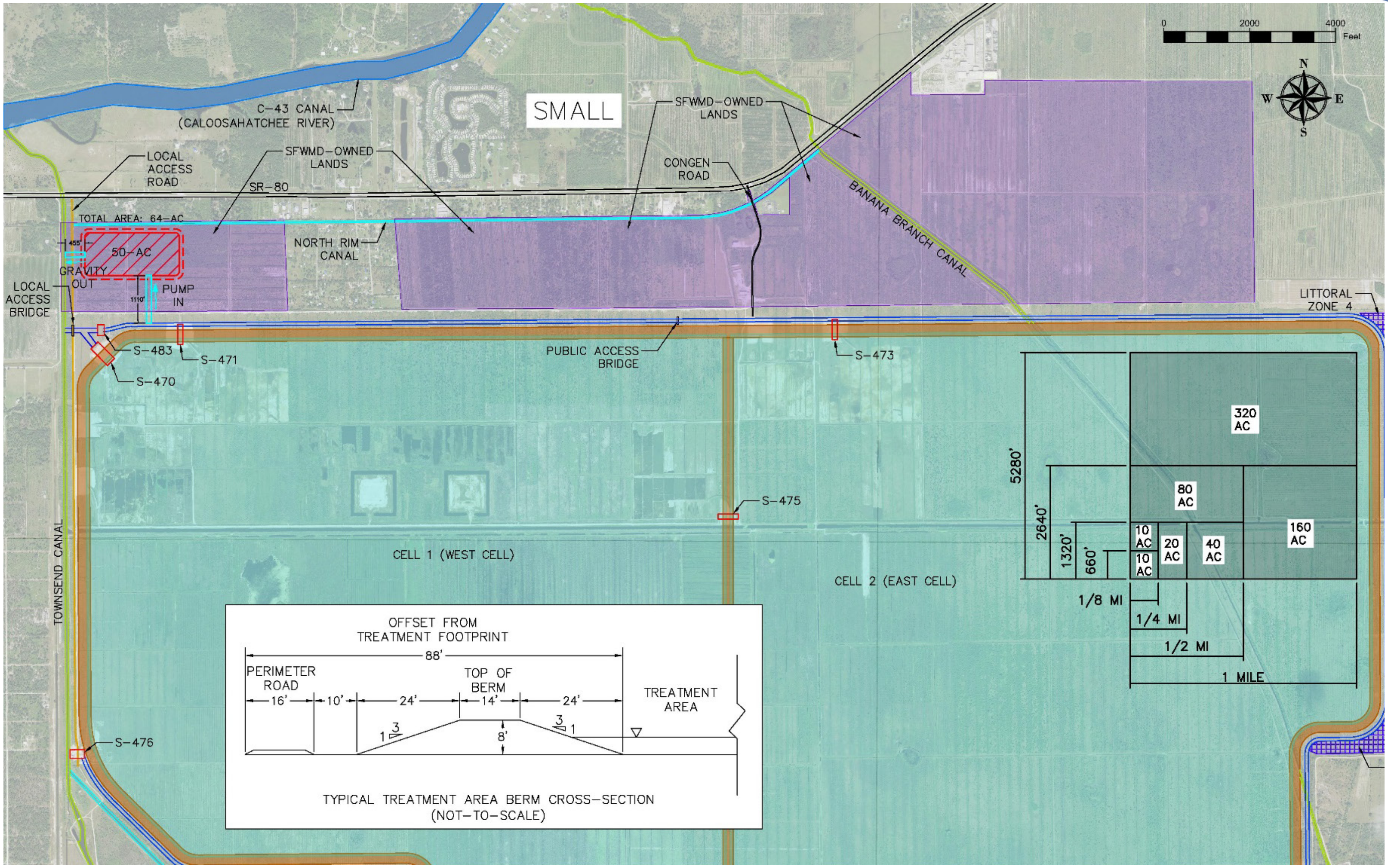


Figure 5-1. Example Infrastructure for a Small Treatment Facility

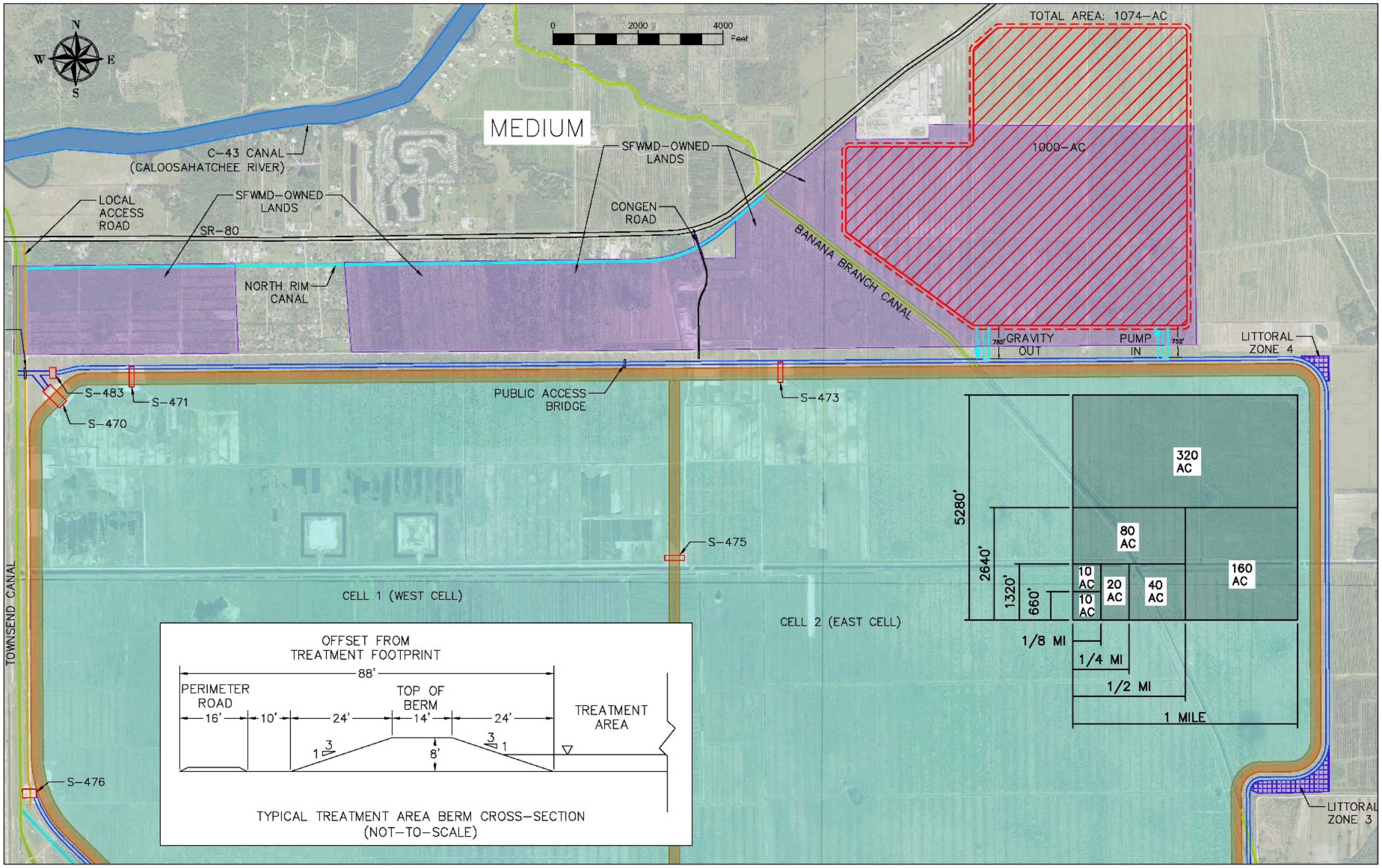


Figure 5-2. Example Infrastructure for a Medium Treatment Facility

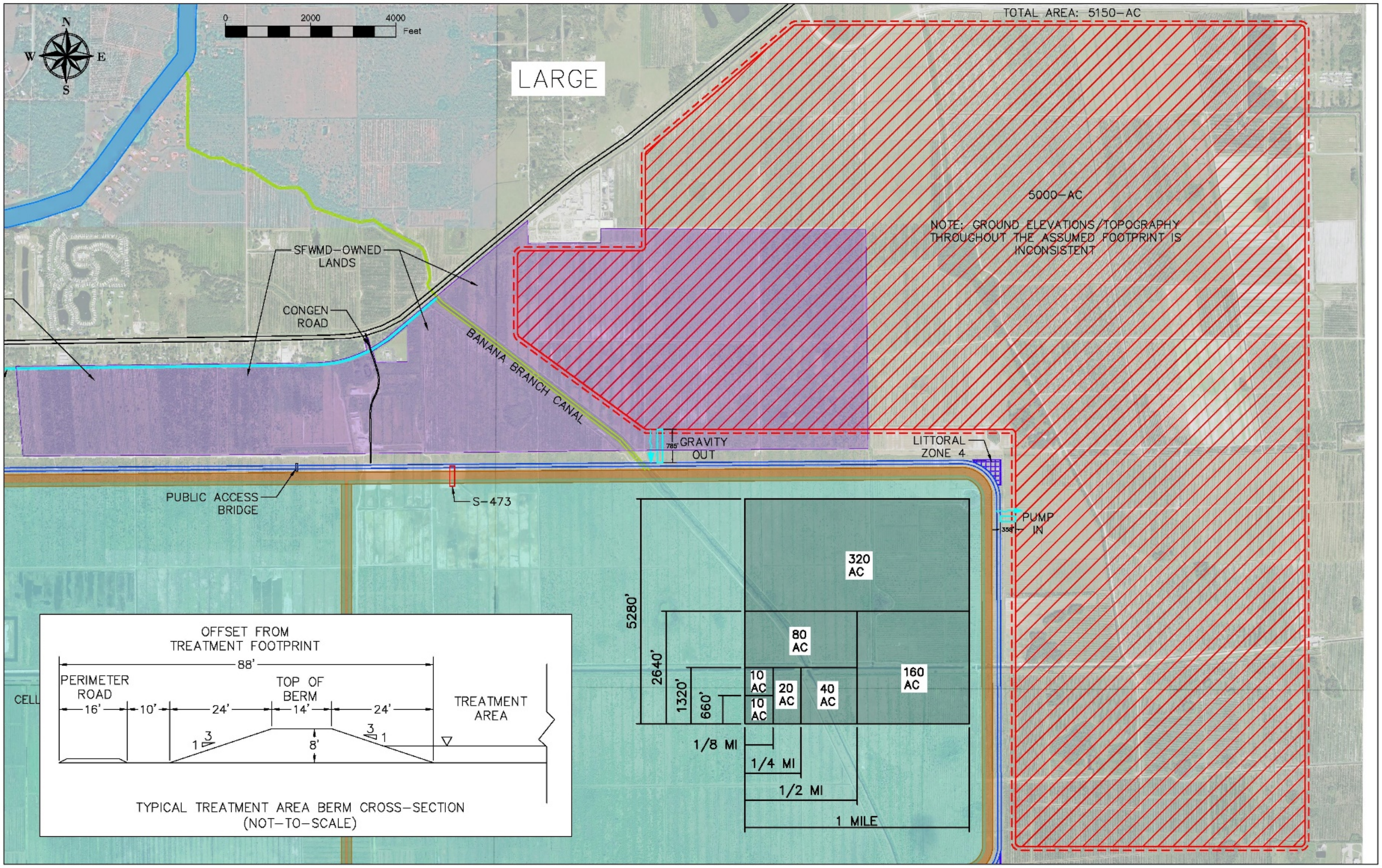


Figure 5-3. Example Infrastructure for a Large Treatment Facility

These preliminary infrastructure cost estimates are intended to be used for comparative purposes only (**Table 5-1**). Design constraints based on site-specific conditions will ultimately define the final infrastructure costs. These estimates are based on average prices for similar types of work extrapolated to accommodate the facilities sizes shown in these preliminary sketches. They use the same unit costs for each item of work. The only changes from small, medium, and large are the size of the proposed pump station and the approximate length of inflow and outflow facilities. Canal and road widths are assumed to be the same for all three conditions. The discharge structure is assumed to be a single bay for all three project sizes.

Table 5-1. Preliminary Estimate of Infrastructure Costs

SMALL				
Feature	**No.**	**Unit**	**Unit Cost**	**Total**
Pump Station	250	cfs	55,000	13,750,000
Canals & Roads	1,600	LF	750	1,200,000
Discharge Structure	1	EA	1,000,000	1,000,000
			Total:	**$15,950,000**
MEDIUM				
Feature	**No.**	**Unit**	**Unit Cost**	**Total**
Pump Station	300	cfs	55,000	16,500,000
Canals & Roads	1,600	LF	750	1,200,000
Discharge Structure	1	EA	1,000,000	1,000,000
			Total:	**$18,700,000**
LARGE				
Feature	**No.**	**Unit**	**Unit Cost**	**Total**
Pump Station	450	cfs	55,000	24,750,000
Canals & Roads	1,200	LF	750	900,000
Discharge Structure	1	EA	1,000,000	1,000,000
			Total:	**$26,650,000**

5.2 Capital and O&M Costs

The capital and O&M costs for HWTT, Bold & Gold®, and ElectroCoagulation were provided by the vendors. The construction and O&M costs for the treatment wetland, sand filtration, and alum treatment were developed by J-Tech. The annual O&M cost for the conveyance infrastructure was assumed to be 5% of the construction cost. This assumption captures the replacement maintenance and power cost for the pump station, maintenance of the hydraulic control structures, and maintenance of the conveyance channels. The total capital and O&M costs were combined to derive a project life cycle cost for 20 years for each alternative. The capital, O&M, and NPV costs are summarized in **Table 5-2**.

Table 5-2. Summary of Capital, O&M, and NPV Costs for the Alternatives

Alternative	Capital Cost ($ millions)	Annual O&M Costs ($ millions/yr)	NPV 20-year ($ millions)
Treatment Wetland	$148.1	$2.41	$180.8
Alum Treatment	$51.8	$5.67	$115.5
HWTT	$47.8	$8.53	$163.8
Treatment Wetland with Bold & Gold®	$134.6	$1.58	$156.1
Sand Filtration with Bold & Gold®	$152.4	$1.91	$178.3
ElectroCoagulation	$164.3	$3.96	$218.1

5.3 Monitoring Costs

Monitoring falls into two general categories: (1) compliance monitoring and (2) process control monitoring. For purposes of this Study, it is assumed that the water quality performance of the selected technology would be routinely measured to demonstrate a net improvement in water quality. The requirements of the compliance monitoring program are not currently known, but it can be assumed that they will be independent of the size or complexity of the selected technology. Compliance monitoring costs are anticipated to be low in comparison to capital and other O&M costs. Process control monitoring includes the testing and instrumentation needed to operate each technology successfully and efficiently. The monitoring costs are built into the construction and O&M costs described above in **Sections 3.1** and **4.2**, respectively.

5.4 Project Benefits by Alternative

For this Study, the benefits evaluated include water quality improvement including TN and TP removal, as well as algal suspended solids (TSS, which was also used as proxy for algae removal). It is recognized that some water quality benefits are expected to occur during water storage within the C-43 WBSR. TN and TP would be retained and buried in sediments, and TSS would settle out of the water column. The Study focuses on additional nutrient and TSS removal technologies to ensure that the water returning to the C-43 and ultimately to the CRE has improved water quality compared to the ambient condition. Water quality monitoring to be performed during operation of the water quality treatment system would be used to characterize the quality of water from the WBSR and to the C-43 . Additional monitoring during reservoir filling and storage could characterize the quality of water being sent to and stored in the reservoir.

Each of the final technologies has been evaluated for its ability to treat flows and improve water quality. The benefits provided by each alternative are described in **Table 5-3** and shown in **Figure 5-4**.

Table 5-3. Water Quality Treatment Alternatives: Unit Cost by Parameter Removed

Alternative	Area (ac)[1]	Treated Flow (cfs)	Unit Cost TN Removed (20-year)	Unit Cost TP Removed (20-year)	Unit Cost TSS Removed (20-year)
Treatment Wetland	5,000	457	$27.22	$170.15	$1.36
Alum Treatment (offline)	50	457	$17.40	$108.73	$0.87
HWTT	668	457	$24.66	$154.15	$1.23
Treatment Wetland with Bold & Gold®	1,000 Wetland 104 Bold & Gold®	91 Wetland 234 Bold & Gold® 325 Total	$23.51	$146.93	$1.18
Sand Filtration with Bold & Gold®	200 Sand Filter 104 Bold & Gold®	91 Sand Filter 234 Bold & Gold® 325 Total	$26.85	$167.81	$1.34
ElectroCoagulation	150	229	$32.85	$205.29	$1.64

[1] Based on nutrient removals set for the purpose of this study.

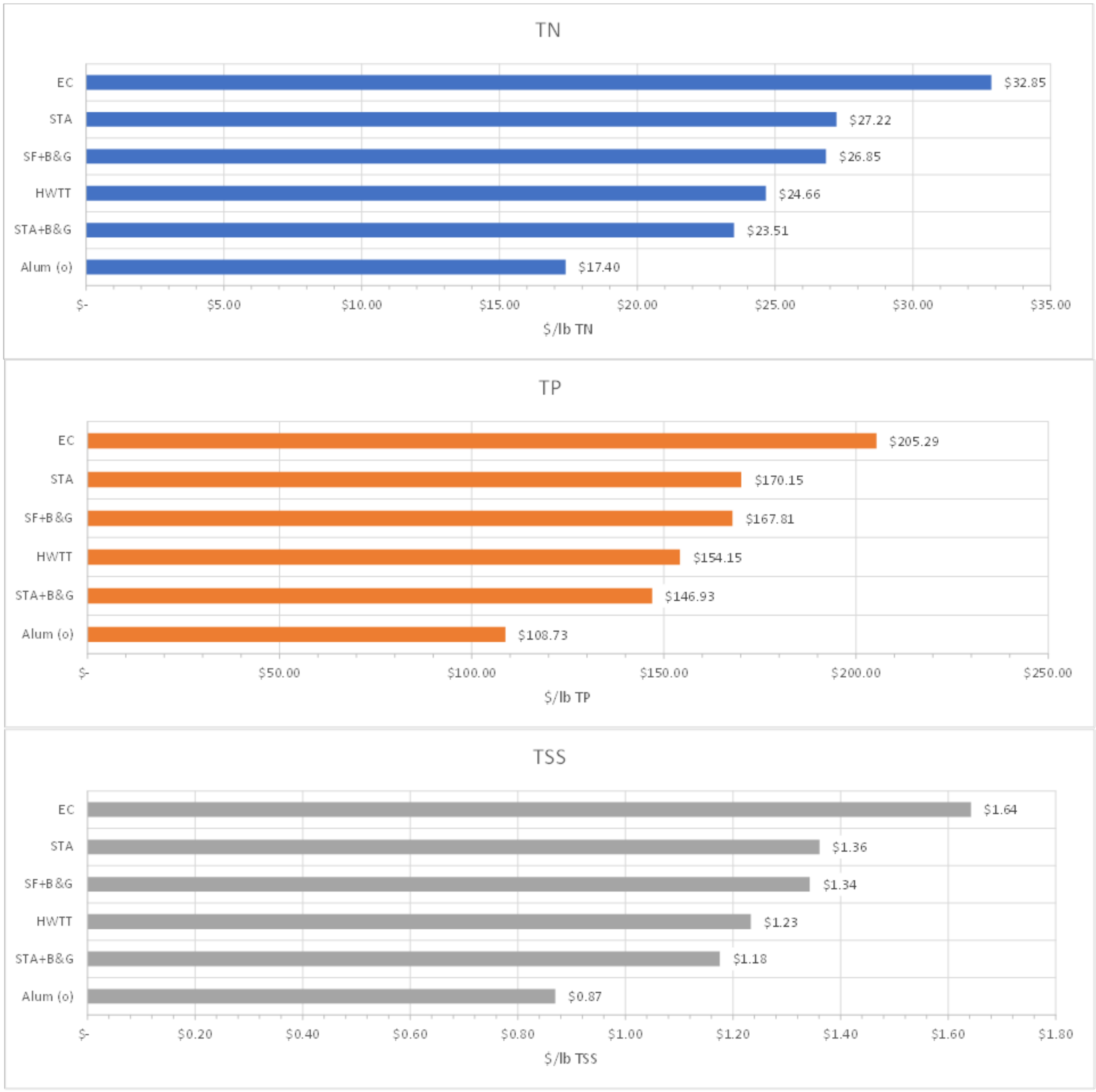


Figure 5-4. Unit Costs of Alternatives by Water Quality Benefits for TN (top), TP (middle), and TSS (bottom)

The results of this conceptual comparative analysis indicate that alum treatment technologies afford the most cost-effective nutrient reduction relative to other alternatives. The estimated unit cost by offline alum treatment is estimated to be $17 per pound of TN removed and $109 per pound of TP removed. These estimates agree well with reported unit cost ranges of $6-$32 per pound of TN and $40-$115 per pound of TP for full-scale alum injection facilities in Florida (Bottcher et al., 2009). The HWTT unit costs are also within range of these observed unit costs, given the preliminary nature of all costs presented here, while including the ancillary benefit of significant wetland habitat and flexibility in adjusting alum dose based upon seasonal variation in nutrient concentration or flow rate.

The treatment wetland and Bold & Gold® and sand filter and Bold & Gold® would each create a significant area of wetland habitat and associated ecological benefits. The treatment wetland alternative land area is large relative to existing SFWMD land holdings but would not require the use of chemicals to achieve the objectives. The ElectroCoagulation alternative may offer the greatest adjustable control over outflow concentration of all technologies.

One beneficial aspect of the offline alum treatment system alternative, as well as the HWTT alternative (Watershed Technologies, 2020b), is the potential to include an online system to inject alum directly into the reservoir for algal bloom control and enhanced nutrient retention. Based upon the preliminary evaluation in this Study, the unit costs of this mode of operation are significantly lower than the offline facility (**Table 5-4**).

Table 5-4. Unit Cost Comparison of Online and Offline Alum Treatment Alternatives

Alternative	TN (cost per pound)	TP (cost per pound)	TSS (cost per pound)
Online	$5.25	$32.84	$0.26
Offline	$17.40	$108.73	$0.87

6.0 Recommendations and Next Steps

The next phase of the project will be the C- 43 WBSR WQC Siting Evaluation. The top recommended alternatives from this Study will be evaluated as viable alternatives based on maximum water quality treatment efficiencies, preliminary cost optimization, and a project siting study to select an alternative as the WQC Plan. The WQC Plan will be the basis for the Statement of Work for detailed design. J-Tech recommends that the final WQC Plan include both in-reservoir treatment with alum to help prevent algal blooms within the reservoir itself, as well as a post-storage water quality component to treat reservoir discharges that can be closely monitored prior to being returned to the Caloosahatchee River and Estuary. The technologies identified are cost-effective options that reduce the discharge of nutrients that may contribute to algal blooms to the downstream CRE. It is imperative that the current C-43 WBSR construction schedule and all project purposes are not impacted by the recommendations ultimately provided in the Study. Based on the technologies reviewed in the Information Collection Summary Report (**Appendix A**), the attribute ranking evaluation, alternatives formulation and analysis, and the cost-benefit analysis, the final recommendations are presented in **Section 6.1**.

6.1 Recommended Alternatives

With input from the Working Group and feedback from four public meetings, including two virtual meetings, the following alternatives are recommended for further evaluation for project implementation in the next phase:

- Alum treatment – both as an offline treatment facility and online, in-reservoir injection system
- Smaller treatment wetland with parallel Bold & Gold® treatment
- HWTT
- Sand filter with parallel Bold & Gold® treatment

Based on the cost benefit analysis, the offline alum treatment system resulted in the lowest cost per pound for nutrient removal, as well as the smallest land requirements. In-reservoir alum treatment was also evaluated and found to be even more cost effective with no additional land requirements. For these reasons, online alum injection is recommended to be included as a component of the ultimate C-43 water quality treatment system. However, while alum injection provides a measure of control over nutrient concentrations and algal production within the reservoir, the duration of storage may lead to changes in the water quality in the WBSR. Additional treatment of the reservoir discharge is recommended, given the primary objective of the C-43 water quality treatment system to ensure that water discharged to the canal does not contribute to impairments of downstream water quality compared to existing conditions in the Caloosahatchee River Basin. The parallel treatment system that combines a smaller STA or sand filter with Bold & Gold®, either as a pre-treatment or post-treatment system, was the next most cost-effective technology. The parallel treatments provide flexibility in the volumes of flows that can be treated prior to discharge, where one technology is used for lower flows and the other is on standby for higher flow conditions. For example, the STA may be sized to receive a continuous baseflow during discharge while media filtration may be sized to treat the remainder of flow, which is expected to vary. Further technology evaluation may determine that a smaller and less expensive system could treat similar flow volumes. The HWTT system, the third most cost-effective alternative, is well studied in Florida systems and this Study confirmed that it is cost effective for removing nutrients. The parallel treatment system that combines a smaller sand filter with Bold & Gold® was the fourth most cost-effective alternative.

The full-scale (5,000-ac) treatment wetland alternative ranked fifth based on water quality cost-effectiveness; however, the capital cost used for the analysis did not include the acquisition of additional land that would be needed for project implementation. With land costs considered, the cost per pound for nutrient removal for the full-scale treatment wetland would further increase the separation between the wetland alternative and higher ranked alternatives. Despite the higher total cost that would be expected for the treatment wetland alternative, J-Tech and the Working Group received several stakeholder comments supporting the continued consideration of this alternative based on the proven history of success across South Florida, magnitude of ancillary benefits these systems offer to humans and wildlife, provision of additional storage volume, and avoidance of chemical application to meet water quality improvement objectives. It should be noted that a full-scale treatment wetland was not considered in conjunction with the design of the C-43 WBSR, which may add complications related to topographic variations between the C-43 WBSR and a potential treatment wetland site. A thorough investigation to identify potential land acquisition opportunities that would supplement the approximately 1,900 acres owned by SFWMD located directly adjacent to the C-43 WBSR and south of State Road 80 may result in a revised total cost for the treatment wetland alternative that is lower than currently anticipated. For these reasons, SFWMD may choose to retain the treatment wetland alternative for further evaluation.

6.2 Next Steps

The next phase of the project will be the C- 43 WBSR WQC Siting Evaluation. The top recommended alternatives from this Study will be evaluated as viable alternatives based on a more in-depth analysis of expected water quality and chemistry to more specifically evaluate project performance and identify target TN, TP, and TSS removal rates; maximum water quality treatment efficiencies; conceptual cost optimization; and a siting study to determine land availability and specific infrastructure needs to select an alternative as the WQC Plan. The WQC Plan will be the basis for the Statement of Work for detailed design with the goal of project construction to be completed and online concurrently with full operation of the reservoir.

J-Tech currently recommends that the final WQC Plan include both in-reservoir treatment with alum to help prevent algal blooms within the reservoir itself, as well as a post-storage water quality component to treat reservoir discharges that can be closely monitored prior to being returned to the Caloosahatchee River.

6.3 C-43 Water Quality Alternative Treatment Technology Pilot Study

As noted in **Section 6.1**, the top four alternatives include either alum treatment or Bold & Gold® media. The Working Group and public raised some questions about the efficiency of these technologies to treat the chemical composition of the water found within the C-43 basin. To help address these questions, SFWMD initiated the C-43 Water Quality Alternative Treatment Technology (WQATT) Pilot Study. The preliminary results from the first month of the Pilot Study are attached in **Appendix G**. SFWMD is extending the study to evaluate the treatment efficiencies during the wet and dry seasons and to allow the Bold & Gold® media to reach its full treatment capacity. The results from both the preliminary and expanded pilot studies will be used in the WQC Siting Evaluation to assist in analyzing the alternatives in greater detail.

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Appendix A: Information Collection Summary Report

Appendix B: Public Meeting Summary and Materials

Appendix C: Water Quality Data

The following tables show the data used in the water quality evaluation.

Table C-1. S-78 Water Quality Data

Collection Date	Collection Method	Test Name	Value (mg/L)
1/26/2010 12:30	Grab	KJELDAHL NITROGEN, TOTAL	1.12
1/26/2010 12:30	Grab	NITRATE+NITRITE-N	0.085
1/26/2010 12:30	Grab	PHOSPHATE, TOTAL AS P	0.055
2/23/2010 10:15	Grab	KJELDAHL NITROGEN, TOTAL	1.23
2/23/2010 10:15	Grab	NITRATE+NITRITE-N	0.246
2/23/2010 10:15	Grab	PHOSPHATE, TOTAL AS P	0.059
3/23/2010 10:37	Grab	KJELDAHL NITROGEN, TOTAL	1.26
3/23/2010 10:37	Grab	NITRATE+NITRITE-N	0.334
3/23/2010 10:37	Grab	PHOSPHATE, TOTAL AS P	0.132
4/27/2010 11:05	Grab	KJELDAHL NITROGEN, TOTAL	1.34
4/27/2010 11:05	Grab	NITRATE+NITRITE-N	0.117
4/27/2010 11:05	Grab	PHOSPHATE, TOTAL AS P	0.139
5/4/2010 11:37	Grab	KJELDAHL NITROGEN, TOTAL	1.99
5/4/2010 11:37	Grab	NITRATE+NITRITE-N	0.256
5/4/2010 11:37	Grab	PHOSPHATE, TOTAL AS P	0.203
5/11/2010 11:01	Grab	KJELDAHL NITROGEN, TOTAL	1.36
5/11/2010 11:01	Grab	NITRATE+NITRITE-N	0.085
5/11/2010 11:01	Grab	PHOSPHATE, TOTAL AS P	0.099
5/18/2010 11:40	Grab	KJELDAHL NITROGEN, TOTAL	1.41
5/18/2010 11:40	Grab	NITRATE+NITRITE-N	0.07
5/18/2010 11:40	Grab	PHOSPHATE, TOTAL AS P	0.091
5/25/2010 11:50	Grab	KJELDAHL NITROGEN, TOTAL	1.3
5/25/2010 11:50	Grab	NITRATE+NITRITE-N	0.041
5/25/2010 11:50	Grab	PHOSPHATE, TOTAL AS P	0.088
6/1/2010 11:45	Grab	KJELDAHL NITROGEN, TOTAL	1.23
6/1/2010 11:45	Grab	NITRATE+NITRITE-N	0.007
6/1/2010 11:45	Grab	PHOSPHATE, TOTAL AS P	0.076
6/8/2010 11:22	Grab	KJELDAHL NITROGEN, TOTAL	1.25
6/8/2010 11:22	Grab	NITRATE+NITRITE-N	0.035
6/8/2010 11:22	Grab	PHOSPHATE, TOTAL AS P	0.102
6/15/2010 11:00	Grab	KJELDAHL NITROGEN, TOTAL	1.55
6/15/2010 11:00	Grab	NITRATE+NITRITE-N	0.027
6/15/2010 11:00	Grab	PHOSPHATE, TOTAL AS P	0.086
6/22/2010 12:08	Grab	KJELDAHL NITROGEN, TOTAL	1.36
6/22/2010 12:08	Grab	NITRATE+NITRITE-N	0.04
6/22/2010 12:08	Grab	PHOSPHATE, TOTAL AS P	0.082
6/29/2010 10:40	Grab	KJELDAHL NITROGEN, TOTAL	1.61
6/29/2010 10:40	Grab	NITRATE+NITRITE-N	0.019
6/29/2010 10:40	Grab	PHOSPHATE, TOTAL AS P	0.085
7/6/2010 11:20	Grab	KJELDAHL NITROGEN, TOTAL	1.48
7/6/2010 11:20	Grab	NITRATE+NITRITE-N	0.085
7/6/2010 11:20	Grab	PHOSPHATE, TOTAL AS P	0.103
7/13/2010 10:53	Grab	KJELDAHL NITROGEN, TOTAL	1.55

Table C-1. S-78 Water Quality Data

Collection Date	Collection Method	Test Name	Value (mg/L)
7/13/2010 10:53	Grab	NITRATE+NITRITE-N	0.163
7/13/2010 10:53	Grab	PHOSPHATE, TOTAL AS P	0.13
7/20/2010 10:44	Grab	KJELDAHL NITROGEN, TOTAL	1.48
7/20/2010 10:44	Grab	NITRATE+NITRITE-N	0.006
7/20/2010 10:44	Grab	PHOSPHATE, TOTAL AS P	0.079
7/27/2010 11:46	Grab	KJELDAHL NITROGEN, TOTAL	1.33
7/27/2010 11:46	Grab	NITRATE+NITRITE-N	0.007
7/27/2010 11:46	Grab	PHOSPHATE, TOTAL AS P	0.068
8/3/2010 11:07	Grab	KJELDAHL NITROGEN, TOTAL	1.19
8/3/2010 11:07	Grab	NITRATE+NITRITE-N	0.006
8/3/2010 11:07	Grab	PHOSPHATE, TOTAL AS P	0.064
8/10/2010 10:25	Grab	KJELDAHL NITROGEN, TOTAL	1.36
8/10/2010 10:25	Grab	NITRATE+NITRITE-N	0.012
8/10/2010 10:25	Grab	PHOSPHATE, TOTAL AS P	0.085
8/17/2010 10:54	Grab	KJELDAHL NITROGEN, TOTAL	1.22
8/17/2010 10:54	Grab	NITRATE+NITRITE-N	0.014
8/17/2010 10:54	Grab	PHOSPHATE, TOTAL AS P	0.077
8/24/2010 11:20	Grab	KJELDAHL NITROGEN, TOTAL	1.8
8/24/2010 11:20	Grab	NITRATE+NITRITE-N	0.102
8/24/2010 11:20	Grab	PHOSPHATE, TOTAL AS P	0.194
8/31/2010 11:11	Grab	KJELDAHL NITROGEN, TOTAL	1.57
8/31/2010 11:11	Grab	NITRATE+NITRITE-N	0.134
8/31/2010 11:11	Grab	PHOSPHATE, TOTAL AS P	0.157
9/7/2010 11:54	Grab	KJELDAHL NITROGEN, TOTAL	1.28
9/7/2010 11:54	Grab	NITRATE+NITRITE-N	0.097
9/7/2010 11:54	Grab	PHOSPHATE, TOTAL AS P	0.128
9/13/2010 11:20	Grab	KJELDAHL NITROGEN, TOTAL	1.22
9/13/2010 11:20	Grab	NITRATE+NITRITE-N	0.041
9/13/2010 11:20	Grab	PHOSPHATE, TOTAL AS P	0.132
9/21/2010 11:25	Grab	KJELDAHL NITROGEN, TOTAL	1.2
9/21/2010 11:25	Grab	NITRATE+NITRITE-N	0.257
9/21/2010 11:25	Grab	PHOSPHATE, TOTAL AS P	0.143
9/28/2010 11:20	Grab	KJELDAHL NITROGEN, TOTAL	1.17
9/28/2010 11:20	Grab	NITRATE+NITRITE-N	0.327
9/28/2010 11:20	Grab	PHOSPHATE, TOTAL AS P	0.126
10/5/2010 10:50	Grab	KJELDAHL NITROGEN, TOTAL	1.27
10/5/2010 10:50	Grab	NITRATE+NITRITE-N	0.398
10/5/2010 10:50	Grab	PHOSPHATE, TOTAL AS P	0.123
10/12/2010 11:05	Grab	KJELDAHL NITROGEN, TOTAL	1.21
10/12/2010 11:05	Grab	NITRATE+NITRITE-N	0.365
10/12/2010 11:05	Grab	PHOSPHATE, TOTAL AS P	0.124
10/19/2010 11:35	Grab	KJELDAHL NITROGEN, TOTAL	1.08
10/19/2010 11:35	Grab	NITRATE+NITRITE-N	0.012
10/19/2010 11:35	Grab	PHOSPHATE, TOTAL AS P	0.058
10/26/2010 11:28	Grab	KJELDAHL NITROGEN, TOTAL	1.12
10/26/2010 11:28	Grab	NITRATE+NITRITE-N	0.093
10/26/2010 11:28	Grab	PHOSPHATE, TOTAL AS P	0.092

Table C-1. S-78 Water Quality Data

Collection Date	Collection Method	Test Name	Value (mg/L)
11/2/2010 11:05	Grab	KJELDAHL NITROGEN, TOTAL	1.19
11/2/2010 11:05	Grab	NITRATE+NITRITE-N	0.252
11/2/2010 11:05	Grab	PHOSPHATE, TOTAL AS P	0.097
11/9/2010 11:58	Grab	KJELDAHL NITROGEN, TOTAL	1.16
11/9/2010 11:58	Grab	NITRATE+NITRITE-N	0.248
11/9/2010 11:58	Grab	PHOSPHATE, TOTAL AS P	0.093
11/16/2010 10:31	Grab	KJELDAHL NITROGEN, TOTAL	1.14
11/16/2010 10:31	Grab	NITRATE+NITRITE-N	0.142
11/16/2010 10:31	Grab	PHOSPHATE, TOTAL AS P	0.068
11/22/2010 11:35	Grab	KJELDAHL NITROGEN, TOTAL	1.08
11/22/2010 11:35	Grab	NITRATE+NITRITE-N	0.025
11/22/2010 11:35	Grab	PHOSPHATE, TOTAL AS P	0.049
11/30/2010 13:07	Grab	KJELDAHL NITROGEN, TOTAL	1.12
11/30/2010 13:07	Grab	NITRATE+NITRITE-N	0.05
11/30/2010 13:07	Grab	PHOSPHATE, TOTAL AS P	0.066
12/7/2010 11:30	Grab	KJELDAHL NITROGEN, TOTAL	1.17
12/7/2010 11:30	Grab	NITRATE+NITRITE-N	0.076
12/7/2010 11:30	Grab	PHOSPHATE, TOTAL AS P	0.089
12/14/2010 11:00	Grab	KJELDAHL NITROGEN, TOTAL	1.05
12/14/2010 11:00	Grab	NITRATE+NITRITE-N	0.06
12/14/2010 11:00	Grab	PHOSPHATE, TOTAL AS P	0.055
12/21/2010 12:11	Grab	KJELDAHL NITROGEN, TOTAL	1.06
12/21/2010 12:11	Grab	NITRATE+NITRITE-N	0.016
12/21/2010 12:11	Grab	PHOSPHATE, TOTAL AS P	0.066
12/28/2010 11:42	Grab	KJELDAHL NITROGEN, TOTAL	1.1
12/28/2010 11:42	Grab	NITRATE+NITRITE-N	0.024
12/28/2010 11:42	Grab	PHOSPHATE, TOTAL AS P	0.053
1/5/2011 11:21	Grab	KJELDAHL NITROGEN, TOTAL	1.07
1/5/2011 11:21	Grab	NITRATE+NITRITE-N	-0.005
1/5/2011 11:21	Grab	PHOSPHATE, TOTAL AS P	0.058
1/12/2011 11:57	Grab	KJELDAHL NITROGEN, TOTAL	1.08
1/12/2011 11:57	Grab	NITRATE+NITRITE-N	0.061
1/12/2011 11:57	Grab	PHOSPHATE, TOTAL AS P	0.074
1/19/2011 11:55	Grab	KJELDAHL NITROGEN, TOTAL	1.09
1/19/2011 11:55	Grab	NITRATE+NITRITE-N	0.095
1/19/2011 11:55	Grab	PHOSPHATE, TOTAL AS P	0.09
1/26/2011 12:02	Grab	KJELDAHL NITROGEN, TOTAL	1.11
1/26/2011 12:02	Grab	NITRATE+NITRITE-N	0.096
1/26/2011 12:02	Grab	PHOSPHATE, TOTAL AS P	0.088
2/2/2011 11:41	Grab	KJELDAHL NITROGEN, TOTAL	1.31
2/2/2011 11:41	Grab	NITRATE+NITRITE-N	0.022
2/2/2011 11:41	Grab	PHOSPHATE, TOTAL AS P	0.071
2/9/2011 11:59	Grab	KJELDAHL NITROGEN, TOTAL	1.17
2/9/2011 11:59	Grab	NITRATE+NITRITE-N	0.074
2/9/2011 11:59	Grab	PHOSPHATE, TOTAL AS P	0.08
2/16/2011 11:40	Grab	KJELDAHL NITROGEN, TOTAL	1.26
2/16/2011 11:40	Grab	NITRATE+NITRITE-N	0.111

Table C-1. S-78 Water Quality Data			
Collection Date	Collection Method	Test Name	Value (mg/L)
2/16/2011 11:40	Grab	PHOSPHATE, TOTAL AS P	0.079
2/23/2011 11:30	Grab	KJELDAHL NITROGEN, TOTAL	1.14
2/23/2011 11:30	Grab	NITRATE+NITRITE-N	0.063
2/23/2011 11:30	Grab	PHOSPHATE, TOTAL AS P	0.076
3/2/2011 11:54	Grab	KJELDAHL NITROGEN, TOTAL	1.11
3/2/2011 11:54	Grab	NITRATE+NITRITE-N	0.073
3/2/2011 11:54	Grab	PHOSPHATE, TOTAL AS P	0.069
3/9/2011 11:23	Grab	KJELDAHL NITROGEN, TOTAL	1.1
3/9/2011 11:23	Grab	NITRATE+NITRITE-N	0.129
3/9/2011 11:23	Grab	PHOSPHATE, TOTAL AS P	0.08
3/16/2011 11:24	Grab	KJELDAHL NITROGEN, TOTAL	1.29
3/16/2011 11:24	Grab	NITRATE+NITRITE-N	-0.005
3/16/2011 11:24	Grab	PHOSPHATE, TOTAL AS P	0.091
3/23/2011 11:50	Grab	KJELDAHL NITROGEN, TOTAL	1.13
3/23/2011 11:50	Grab	NITRATE+NITRITE-N	0.011
3/23/2011 11:50	Grab	PHOSPHATE, TOTAL AS P	0.08
3/30/2011 11:36	Grab	KJELDAHL NITROGEN, TOTAL	1.11
3/30/2011 11:36	Grab	NITRATE+NITRITE-N	0.023
3/30/2011 11:36	Grab	PHOSPHATE, TOTAL AS P	0.071
4/6/2011 11:40	Grab	KJELDAHL NITROGEN, TOTAL	1.13
4/6/2011 11:40	Grab	NITRATE+NITRITE-N	0.02
4/6/2011 11:40	Grab	PHOSPHATE, TOTAL AS P	0.093
4/13/2011 11:54	Grab	KJELDAHL NITROGEN, TOTAL	1.21
4/13/2011 11:54	Grab	NITRATE+NITRITE-N	0.018
4/13/2011 11:54	Grab	PHOSPHATE, TOTAL AS P	0.101
4/20/2011 12:56	Grab	KJELDAHL NITROGEN, TOTAL	1.18
4/20/2011 12:56	Grab	NITRATE+NITRITE-N	-0.005
4/20/2011 12:56	Grab	PHOSPHATE, TOTAL AS P	0.078
4/27/2011 12:42	Grab	KJELDAHL NITROGEN, TOTAL	1.25
4/27/2011 12:42	Grab	NITRATE+NITRITE-N	-0.005
4/27/2011 12:42	Grab	PHOSPHATE, TOTAL AS P	0.091
5/4/2011 11:58	Grab	KJELDAHL NITROGEN, TOTAL	1.23
5/4/2011 11:58	Grab	NITRATE+NITRITE-N	-0.005
5/4/2011 11:58	Grab	PHOSPHATE, TOTAL AS P	0.094
5/11/2011 11:08	Grab	KJELDAHL NITROGEN, TOTAL	1.22
5/11/2011 11:08	Grab	NITRATE+NITRITE-N	-0.005
5/11/2011 11:08	Grab	PHOSPHATE, TOTAL AS P	0.093
5/18/2011 12:22	Grab	KJELDAHL NITROGEN, TOTAL	1.13
5/18/2011 12:22	Grab	NITRATE+NITRITE-N	0.016
5/18/2011 12:22	Grab	PHOSPHATE, TOTAL AS P	0.118
5/25/2011 11:46	Grab	KJELDAHL NITROGEN, TOTAL	1.58
5/25/2011 11:46	Grab	NITRATE+NITRITE-N	-0.005
5/25/2011 11:46	Grab	PHOSPHATE, TOTAL AS P	0.098
6/1/2011 12:26	Grab	KJELDAHL NITROGEN, TOTAL	1.45
6/1/2011 12:26	Grab	NITRATE+NITRITE-N	-0.005
6/1/2011 12:26	Grab	PHOSPHATE, TOTAL AS P	0.144
6/8/2011 11:37	Grab	KJELDAHL NITROGEN, TOTAL	1.4

Table C-1. S-78 Water Quality Data

Collection Date	Collection Method	Test Name	Value (mg/L)
6/8/2011 11:37	Grab	NITRATE+NITRITE-N	-0.005
6/8/2011 11:37	Grab	PHOSPHATE, TOTAL AS P	0.123
6/15/2011 11:58	Grab	KJELDAHL NITROGEN, TOTAL	1.4
6/15/2011 11:58	Grab	NITRATE+NITRITE-N	-0.005
6/15/2011 11:58	Grab	PHOSPHATE, TOTAL AS P	0.139
6/22/2011 12:03	Grab	KJELDAHL NITROGEN, TOTAL	1.47
6/22/2011 12:03	Grab	NITRATE+NITRITE-N	-0.005
6/22/2011 12:03	Grab	PHOSPHATE, TOTAL AS P	0.073
6/29/2011 12:11	Grab	KJELDAHL NITROGEN, TOTAL	1.48
6/29/2011 12:11	Grab	NITRATE+NITRITE-N	0.008
6/29/2011 12:11	Grab	PHOSPHATE, TOTAL AS P	0.173
7/6/2011 11:57	Grab	KJELDAHL NITROGEN, TOTAL	1.54
7/6/2011 11:57	Grab	NITRATE+NITRITE-N	0.018
7/6/2011 11:57	Grab	PHOSPHATE, TOTAL AS P	0.197
7/13/2011 12:11	Grab	KJELDAHL NITROGEN, TOTAL	1.42
7/13/2011 12:11	Grab	NITRATE+NITRITE-N	0.057
7/13/2011 12:11	Grab	PHOSPHATE, TOTAL AS P	0.212
7/20/2011 13:10	Grab	KJELDAHL NITROGEN, TOTAL	1.42
7/20/2011 13:10	Grab	NITRATE+NITRITE-N	0.045
7/20/2011 13:10	Grab	PHOSPHATE, TOTAL AS P	0.222
7/27/2011 12:03	Grab	KJELDAHL NITROGEN, TOTAL	1.49
7/27/2011 12:03	Grab	NITRATE+NITRITE-N	0.025
7/27/2011 12:03	Grab	PHOSPHATE, TOTAL AS P	0.212
8/3/2011 12:00	Grab	KJELDAHL NITROGEN, TOTAL	1.68
8/3/2011 12:00	Grab	NITRATE+NITRITE-N	0.031
8/3/2011 12:00	Grab	PHOSPHATE, TOTAL AS P	0.27
8/10/2011 11:54	Grab	KJELDAHL NITROGEN, TOTAL	1.5
8/10/2011 11:54	Grab	NITRATE+NITRITE-N	0.016
8/10/2011 11:54	Grab	PHOSPHATE, TOTAL AS P	0.364
8/17/2011 11:58	Grab	KJELDAHL NITROGEN, TOTAL	1.3
8/17/2011 11:58	Grab	NITRATE+NITRITE-N	0.069
8/17/2011 11:58	Grab	PHOSPHATE, TOTAL AS P	0.25
8/24/2011 11:42	Grab	KJELDAHL NITROGEN, TOTAL	1.23
8/24/2011 11:42	Grab	NITRATE+NITRITE-N	0.012
8/24/2011 11:42	Grab	PHOSPHATE, TOTAL AS P	0.154
8/31/2011 12:18	Grab	KJELDAHL NITROGEN, TOTAL	1.33
8/31/2011 12:18	Grab	NITRATE+NITRITE-N	0.12
8/31/2011 12:18	Grab	PHOSPHATE, TOTAL AS P	0.18
9/7/2011 11:29	Grab	KJELDAHL NITROGEN, TOTAL	1.25
9/7/2011 11:29	Grab	NITRATE+NITRITE-N	0.208
9/7/2011 11:29	Grab	PHOSPHATE, TOTAL AS P	0.185
9/14/2011 12:13	Grab	KJELDAHL NITROGEN, TOTAL	1.36
9/14/2011 12:13	Grab	NITRATE+NITRITE-N	-0.005
9/14/2011 12:13	Grab	PHOSPHATE, TOTAL AS P	0.132
9/21/2011 11:23	Grab	KJELDAHL NITROGEN, TOTAL	1.37
9/21/2011 11:23	Grab	NITRATE+NITRITE-N	0.039
9/21/2011 11:23	Grab	PHOSPHATE, TOTAL AS P	0.144

Table C-1. S-78 Water Quality Data			
Collection Date	**Collection Method**	**Test Name**	**Value (mg/L)**
9/28/2011 12:01	Grab	KJELDAHL NITROGEN, TOTAL	1.22
9/28/2011 12:01	Grab	NITRATE+NITRITE-N	0.253
9/28/2011 12:01	Grab	PHOSPHATE, TOTAL AS P	0.208
10/5/2011 11:36	Grab	KJELDAHL NITROGEN, TOTAL	1.41
10/5/2011 11:36	Grab	NITRATE+NITRITE-N	0.129
10/5/2011 11:36	Grab	PHOSPHATE, TOTAL AS P	0.199
10/12/2011 12:02	Grab	KJELDAHL NITROGEN, TOTAL	1.26
10/12/2011 12:02	Grab	NITRATE+NITRITE-N	0.197
10/12/2011 12:02	Grab	PHOSPHATE, TOTAL AS P	0.173
10/19/2011 12:10	Grab	KJELDAHL NITROGEN, TOTAL	1.14
10/19/2011 12:10	Grab	NITRATE+NITRITE-N	0.289
10/19/2011 12:10	Grab	PHOSPHATE, TOTAL AS P	0.115
10/26/2011 11:30	Grab	KJELDAHL NITROGEN, TOTAL	1.23
10/26/2011 11:30	Grab	NITRATE+NITRITE-N	0.219
10/26/2011 11:30	Grab	PHOSPHATE, TOTAL AS P	0.106
11/2/2011 12:50	Grab	KJELDAHL NITROGEN, TOTAL	1.33
11/2/2011 12:50	Grab	NITRATE+NITRITE-N	0.366
11/2/2011 12:50	Grab	PHOSPHATE, TOTAL AS P	0.103
11/9/2011 12:04	Grab	KJELDAHL NITROGEN, TOTAL	1.36
11/9/2011 12:04	Grab	NITRATE+NITRITE-N	0.333
11/9/2011 12:04	Grab	PHOSPHATE, TOTAL AS P	0.109
11/16/2011 11:55	Grab	KJELDAHL NITROGEN, TOTAL	1.26
11/16/2011 11:55	Grab	NITRATE+NITRITE-N	0.362
11/16/2011 11:55	Grab	PHOSPHATE, TOTAL AS P	0.127
11/22/2011 11:32	Grab	KJELDAHL NITROGEN, TOTAL	1.32
11/22/2011 11:32	Grab	NITRATE+NITRITE-N	0.345
11/22/2011 11:32	Grab	PHOSPHATE, TOTAL AS P	0.129
11/30/2011 12:12	Grab	KJELDAHL NITROGEN, TOTAL	1.1
11/30/2011 12:12	Grab	NITRATE+NITRITE-N	0.364
11/30/2011 12:12	Grab	PHOSPHATE, TOTAL AS P	0.122
12/7/2011 12:12	Grab	KJELDAHL NITROGEN, TOTAL	1.18
12/7/2011 12:12	Grab	NITRATE+NITRITE-N	0.374
12/7/2011 12:12	Grab	PHOSPHATE, TOTAL AS P	0.133
12/14/2011 12:17	Grab	KJELDAHL NITROGEN, TOTAL	1.07
12/14/2011 12:17	Grab	NITRATE+NITRITE-N	0.419
12/14/2011 12:17	Grab	PHOSPHATE, TOTAL AS P	0.146
12/21/2011 11:16	Grab	KJELDAHL NITROGEN, TOTAL	1.27
12/21/2011 11:16	Grab	NITRATE+NITRITE-N	0.367
12/21/2011 11:16	Grab	PHOSPHATE, TOTAL AS P	0.106
12/28/2011 11:25	Grab	KJELDAHL NITROGEN, TOTAL	1.28
12/28/2011 11:25	Grab	NITRATE+NITRITE-N	0.243
12/28/2011 11:25	Grab	PHOSPHATE, TOTAL AS P	0.113
1/4/2012 12:11	Grab	KJELDAHL NITROGEN, TOTAL	1.32
1/4/2012 12:11	Grab	NITRATE+NITRITE-N	0.288
1/4/2012 12:11	Grab	PHOSPHATE, TOTAL AS P	0.135
1/11/2012 12:16	Grab	KJELDAHL NITROGEN, TOTAL	1.26
1/11/2012 12:16	Grab	NITRATE+NITRITE-N	0.151

Table C-1. S-78 Water Quality Data

Collection Date	Collection Method	Test Name	Value (mg/L)
1/11/2012 12:16	Grab	PHOSPHATE, TOTAL AS P	0.1
1/18/2012 11:33	Grab	KJELDAHL NITROGEN, TOTAL	1.34
1/18/2012 11:33	Grab	NITRATE+NITRITE-N	0.127
1/18/2012 11:33	Grab	PHOSPHATE, TOTAL AS P	0.098
1/25/2012 12:06	Grab	KJELDAHL NITROGEN, TOTAL	1.23
1/25/2012 12:06	Grab	NITRATE+NITRITE-N	0.092
1/25/2012 12:06	Grab	PHOSPHATE, TOTAL AS P	0.072
2/1/2012 10:32	Grab	KJELDAHL NITROGEN, TOTAL	1.28
2/1/2012 10:32	Grab	NITRATE+NITRITE-N	0.064
2/1/2012 10:32	Grab	PHOSPHATE, TOTAL AS P	0.085
2/8/2012 11:23	Grab	KJELDAHL NITROGEN, TOTAL	1.2
2/8/2012 11:23	Grab	NITRATE+NITRITE-N	0.105
2/8/2012 11:23	Grab	PHOSPHATE, TOTAL AS P	0.083
2/15/2012 11:53	Grab	KJELDAHL NITROGEN, TOTAL	1.22
2/15/2012 11:53	Grab	NITRATE+NITRITE-N	0.075
2/15/2012 11:53	Grab	PHOSPHATE, TOTAL AS P	0.086
2/22/2012 11:49	Grab	KJELDAHL NITROGEN, TOTAL	1.34
2/22/2012 11:49	Grab	NITRATE+NITRITE-N	-0.005
2/22/2012 11:49	Grab	PHOSPHATE, TOTAL AS P	0.072
2/29/2012 11:17	Grab	KJELDAHL NITROGEN, TOTAL	1.38
2/29/2012 11:17	Grab	NITRATE+NITRITE-N	-0.005
2/29/2012 11:17	Grab	PHOSPHATE, TOTAL AS P	0.083
3/7/2012 11:20	Grab	KJELDAHL NITROGEN, TOTAL	1.28
3/7/2012 11:20	Grab	NITRATE+NITRITE-N	0.031
3/7/2012 11:20	Grab	PHOSPHATE, TOTAL AS P	0.104
3/14/2012 11:26	Grab	KJELDAHL NITROGEN, TOTAL	1.45
3/14/2012 11:26	Grab	NITRATE+NITRITE-N	-0.005
3/14/2012 11:26	Grab	PHOSPHATE, TOTAL AS P	0.091
3/21/2012 10:53	Grab	KJELDAHL NITROGEN, TOTAL	1.34
3/21/2012 10:53	Grab	NITRATE+NITRITE-N	-0.005
3/21/2012 10:53	Grab	PHOSPHATE, TOTAL AS P	0.078
3/28/2012 10:59	Grab	KJELDAHL NITROGEN, TOTAL	1.29
3/28/2012 10:59	Grab	NITRATE+NITRITE-N	0.005
3/28/2012 10:59	Grab	PHOSPHATE, TOTAL AS P	0.094
4/4/2012 11:19	Grab	KJELDAHL NITROGEN, TOTAL	1.24
4/4/2012 11:19	Grab	NITRATE+NITRITE-N	-0.005
4/4/2012 11:19	Grab	PHOSPHATE, TOTAL AS P	0.083
4/11/2012 12:40	Grab	KJELDAHL NITROGEN, TOTAL	1.3
4/11/2012 12:40	Grab	NITRATE+NITRITE-N	-0.005
4/11/2012 12:40	Grab	PHOSPHATE, TOTAL AS P	0.085
4/18/2012 12:20	Grab	KJELDAHL NITROGEN, TOTAL	1.17
4/18/2012 12:20	Grab	NITRATE+NITRITE-N	-0.005
4/18/2012 12:20	Grab	PHOSPHATE, TOTAL AS P	0.079
4/25/2012 11:54	Grab	KJELDAHL NITROGEN, TOTAL	1.31
4/25/2012 11:54	Grab	NITRATE+NITRITE-N	-0.005
4/25/2012 11:54	Grab	PHOSPHATE, TOTAL AS P	0.069
5/2/2012 11:36	Grab	KJELDAHL NITROGEN, TOTAL	1.28

Table C-1. S-78 Water Quality Data			
Collection Date	Collection Method	Test Name	Value (mg/L)
5/2/2012 11:36	Grab	NITRATE+NITRITE-N	0.009
5/2/2012 11:36	Grab	PHOSPHATE, TOTAL AS P	0.06
5/9/2012 12:14	Grab	KJELDAHL NITROGEN, TOTAL	1.23
5/9/2012 12:14	Grab	NITRATE+NITRITE-N	-0.005
5/9/2012 12:14	Grab	PHOSPHATE, TOTAL AS P	0.059
5/15/2012 12:00	Grab	KJELDAHL NITROGEN, TOTAL	1.31
5/15/2012 12:00	Grab	NITRATE+NITRITE-N	-0.005
5/15/2012 12:00	Grab	PHOSPHATE, TOTAL AS P	0.081
5/23/2012 11:27	Grab	KJELDAHL NITROGEN, TOTAL	1.2
5/23/2012 11:27	Grab	NITRATE+NITRITE-N	-0.005
5/23/2012 11:27	Grab	PHOSPHATE, TOTAL AS P	0.072
5/30/2012 12:13	Grab	KJELDAHL NITROGEN, TOTAL	1.4
5/30/2012 12:13	Grab	NITRATE+NITRITE-N	-0.005
5/30/2012 12:13	Grab	PHOSPHATE, TOTAL AS P	0.106
6/6/2012 12:37	Grab	KJELDAHL NITROGEN, TOTAL	1.61
6/6/2012 12:37	Grab	NITRATE+NITRITE-N	-0.005
6/6/2012 12:37	Grab	PHOSPHATE, TOTAL AS P	0.183
6/13/2012 12:05	Grab	KJELDAHL NITROGEN, TOTAL	1.35
6/13/2012 12:05	Grab	NITRATE+NITRITE-N	-0.005
6/13/2012 12:05	Grab	PHOSPHATE, TOTAL AS P	0.071
6/21/2012 11:48	Grab	KJELDAHL NITROGEN, TOTAL	1.33
6/21/2012 11:48	Grab	NITRATE+NITRITE-N	-0.005
6/21/2012 11:48	Grab	PHOSPHATE, TOTAL AS P	0.095
6/27/2012 10:51	Grab	KJELDAHL NITROGEN, TOTAL	1.22
6/27/2012 10:51	Grab	NITRATE+NITRITE-N	0.045
6/27/2012 10:51	Grab	PHOSPHATE, TOTAL AS P	0.108
7/3/2012 11:10	Grab	KJELDAHL NITROGEN, TOTAL	1.28
7/3/2012 11:10	Grab	NITRATE+NITRITE-N	0.008
7/3/2012 11:10	Grab	PHOSPHATE, TOTAL AS P	0.085
7/10/2012 11:55	Grab	KJELDAHL NITROGEN, TOTAL	1.31
7/10/2012 11:55	Grab	NITRATE+NITRITE-N	0.005
7/10/2012 11:55	Grab	PHOSPHATE, TOTAL AS P	0.061
7/18/2012 11:52	Grab	KJELDAHL NITROGEN, TOTAL	1.26
7/18/2012 11:52	Grab	NITRATE+NITRITE-N	-0.005
7/18/2012 11:52	Grab	PHOSPHATE, TOTAL AS P	0.094
7/25/2012 10:46	Grab	KJELDAHL NITROGEN, TOTAL	1.24
7/25/2012 10:46	Grab	NITRATE+NITRITE-N	0.023
7/25/2012 10:46	Grab	PHOSPHATE, TOTAL AS P	0.095
8/1/2012 11:55	Grab	KJELDAHL NITROGEN, TOTAL	1.28
8/1/2012 11:55	Grab	NITRATE+NITRITE-N	0.007
8/1/2012 11:55	Grab	PHOSPHATE, TOTAL AS P	0.079
8/8/2012 9:42	Grab	KJELDAHL NITROGEN, TOTAL	1.37
8/8/2012 9:42	Grab	NITRATE+NITRITE-N	-0.005
8/8/2012 9:42	Grab	PHOSPHATE, TOTAL AS P	0.078
8/15/2012 11:28	Grab	KJELDAHL NITROGEN, TOTAL	1.28
8/15/2012 11:28	Grab	NITRATE+NITRITE-N	0.011
8/15/2012 11:28	Grab	PHOSPHATE, TOTAL AS P	0.105

Table C-1. S-78 Water Quality Data			
Collection Date	Collection Method	Test Name	Value (mg/L)
8/22/2012 10:38	Grab	KJELDAHL NITROGEN, TOTAL	1.32
8/22/2012 10:38	Grab	NITRATE+NITRITE-N	0.005
8/22/2012 10:38	Grab	PHOSPHATE, TOTAL AS P	0.12
8/29/2012 11:42	Grab	KJELDAHL NITROGEN, TOTAL	1.25
8/29/2012 11:42	Grab	NITRATE+NITRITE-N	0.409
8/29/2012 11:42	Grab	PHOSPHATE, TOTAL AS P	0.129
9/5/2012 13:09	Grab	KJELDAHL NITROGEN, TOTAL	1.65
9/5/2012 13:09	Grab	NITRATE+NITRITE-N	0.102
9/5/2012 13:09	Grab	PHOSPHATE, TOTAL AS P	0.165
9/12/2012 10:30	Grab	KJELDAHL NITROGEN, TOTAL	1.52
9/12/2012 10:30	Grab	NITRATE+NITRITE-N	0.133
9/12/2012 10:30	Grab	PHOSPHATE, TOTAL AS P	0.144
9/19/2012 12:53	Grab	KJELDAHL NITROGEN, TOTAL	1.58
9/19/2012 12:53	Grab	NITRATE+NITRITE-N	0.269
9/19/2012 12:53	Grab	PHOSPHATE, TOTAL AS P	0.159
9/26/2012 10:46	Grab	KJELDAHL NITROGEN, TOTAL	1.85
9/26/2012 10:46	Grab	NITRATE+NITRITE-N	0.021
9/26/2012 10:46	Grab	PHOSPHATE, TOTAL AS P	0.226
10/3/2012 11:11	Grab	KJELDAHL NITROGEN, TOTAL	1.91
10/3/2012 11:11	Grab	NITRATE+NITRITE-N	0.009
10/3/2012 11:11	Grab	PHOSPHATE, TOTAL AS P	0.18
10/10/2012 10:46	Grab	KJELDAHL NITROGEN, TOTAL	2.07
10/10/2012 10:46	Grab	NITRATE+NITRITE-N	0.073
10/10/2012 10:46	Grab	PHOSPHATE, TOTAL AS P	0.15
10/17/2012 10:45	Grab	KJELDAHL NITROGEN, TOTAL	1.8
10/17/2012 10:45	Grab	NITRATE+NITRITE-N	0.017
10/17/2012 10:45	Grab	PHOSPHATE, TOTAL AS P	0.106
10/24/2012 11:13	Grab	KJELDAHL NITROGEN, TOTAL	1.67
10/24/2012 11:13	Grab	NITRATE+NITRITE-N	0.018
10/24/2012 11:13	Grab	PHOSPHATE, TOTAL AS P	0.097
11/1/2012 11:19	Grab	KJELDAHL NITROGEN, TOTAL	1.65
11/1/2012 11:19	Grab	NITRATE+NITRITE-N	0.075
11/1/2012 11:19	Grab	PHOSPHATE, TOTAL AS P	0.106
11/7/2012 10:24	Grab	KJELDAHL NITROGEN, TOTAL	1.38
11/7/2012 10:24	Grab	NITRATE+NITRITE-N	0.062
11/7/2012 10:24	Grab	PHOSPHATE, TOTAL AS P	0.076
11/14/2012 10:40	Grab	KJELDAHL NITROGEN, TOTAL	1.32
11/14/2012 10:40	Grab	NITRATE+NITRITE-N	0.079
11/14/2012 10:40	Grab	PHOSPHATE, TOTAL AS P	0.075
11/20/2012 10:08	Grab	KJELDAHL NITROGEN, TOTAL	1.46
11/20/2012 10:08	Grab	NITRATE+NITRITE-N	0.07
11/20/2012 10:08	Grab	PHOSPHATE, TOTAL AS P	0.095
11/28/2012 11:05	Grab	KJELDAHL NITROGEN, TOTAL	1.29
11/28/2012 11:05	Grab	NITRATE+NITRITE-N	0.057
11/28/2012 11:05	Grab	PHOSPHATE, TOTAL AS P	0.069
12/5/2012 10:28	Grab	KJELDAHL NITROGEN, TOTAL	1.37
12/5/2012 10:28	Grab	NITRATE+NITRITE-N	0.084

Table C-1. S-78 Water Quality Data			
Collection Date	Collection Method	Test Name	Value (mg/L)
12/5/2012 10:28	Grab	PHOSPHATE, TOTAL AS P	0.077
12/12/2012 10:43	Grab	KJELDAHL NITROGEN, TOTAL	1.42
12/12/2012 10:43	Grab	NITRATE+NITRITE-N	0.109
12/12/2012 10:43	Grab	PHOSPHATE, TOTAL AS P	0.09
12/19/2012 11:00	Grab	KJELDAHL NITROGEN, TOTAL	1.46
12/19/2012 11:00	Grab	NITRATE+NITRITE-N	0.186
12/19/2012 11:00	Grab	PHOSPHATE, TOTAL AS P	0.135
12/27/2012 10:24	Grab	KJELDAHL NITROGEN, TOTAL	1.28
12/27/2012 10:24	Grab	NITRATE+NITRITE-N	0.102
12/27/2012 10:24	Grab	PHOSPHATE, TOTAL AS P	0.065
1/3/2013 10:03	Grab	KJELDAHL NITROGEN, TOTAL	1.26
1/3/2013 10:03	Grab	NITRATE+NITRITE-N	0.104
1/3/2013 10:03	Grab	PHOSPHATE, TOTAL AS P	0.067
1/9/2013 10:22	Grab	KJELDAHL NITROGEN, TOTAL	1.23
1/9/2013 10:22	Grab	NITRATE+NITRITE-N	0.099
1/9/2013 10:22	Grab	PHOSPHATE, TOTAL AS P	0.064
1/16/2013 10:21	Grab	KJELDAHL NITROGEN, TOTAL	1.36
1/16/2013 10:21	Grab	NITRATE+NITRITE-N	0.236
1/16/2013 10:21	Grab	PHOSPHATE, TOTAL AS P	0.097
1/23/2013 10:58	Grab	KJELDAHL NITROGEN, TOTAL	1.35
1/23/2013 10:58	Grab	NITRATE+NITRITE-N	0.128
1/23/2013 10:58	Grab	PHOSPHATE, TOTAL AS P	0.098
1/30/2013 12:22	Grab	KJELDAHL NITROGEN, TOTAL	1.19
1/30/2013 12:22	Grab	NITRATE+NITRITE-N	0.005
1/30/2013 12:22	Grab	PHOSPHATE, TOTAL AS P	0.061
2/6/2013 10:33	Grab	KJELDAHL NITROGEN, TOTAL	1.14
2/6/2013 10:33	Grab	NITRATE+NITRITE-N	-0.005
2/6/2013 10:33	Grab	PHOSPHATE, TOTAL AS P	0.043
2/13/2013 10:04	Grab	KJELDAHL NITROGEN, TOTAL	1.19
2/13/2013 10:04	Grab	NITRATE+NITRITE-N	-0.005
2/13/2013 10:04	Grab	PHOSPHATE, TOTAL AS P	0.054
2/21/2013 11:06	Grab	KJELDAHL NITROGEN, TOTAL	1.37
2/21/2013 11:06	Grab	NITRATE+NITRITE-N	0.205
2/21/2013 11:06	Grab	PHOSPHATE, TOTAL AS P	0.081
2/27/2013 10:36	Grab	KJELDAHL NITROGEN, TOTAL	1.17
2/27/2013 10:36	Grab	NITRATE+NITRITE-N	0.028
2/27/2013 10:36	Grab	PHOSPHATE, TOTAL AS P	0.066
3/6/2013 10:37	Grab	KJELDAHL NITROGEN, TOTAL	1.2
3/6/2013 10:37	Grab	NITRATE+NITRITE-N	0.052
3/6/2013 10:37	Grab	PHOSPHATE, TOTAL AS P	0.066
3/13/2013 11:11	Grab	KJELDAHL NITROGEN, TOTAL	1.21
3/13/2013 11:11	Grab	NITRATE+NITRITE-N	0.005
3/13/2013 11:11	Grab	PHOSPHATE, TOTAL AS P	0.063
3/20/2013 10:30	Grab	KJELDAHL NITROGEN, TOTAL	1.09
3/20/2013 10:30	Grab	NITRATE+NITRITE-N	-0.005
3/20/2013 10:30	Grab	PHOSPHATE, TOTAL AS P	0.053
3/27/2013 10:38	Grab	KJELDAHL NITROGEN, TOTAL	1.11

Table C-1. S-78 Water Quality Data			
Collection Date	Collection Method	Test Name	Value (mg/L)
3/27/2013 10:38	Grab	NITRATE+NITRITE-N	0.011
3/27/2013 10:38	Grab	PHOSPHATE, TOTAL AS P	0.078
4/3/2013 10:53	Grab	KJELDAHL NITROGEN, TOTAL	1.1
4/3/2013 10:53	Grab	NITRATE+NITRITE-N	0.01
4/3/2013 10:53	Grab	PHOSPHATE, TOTAL AS P	0.046
4/10/2013 11:14	Grab	KJELDAHL NITROGEN, TOTAL	1.25
4/10/2013 11:14	Grab	NITRATE+NITRITE-N	-0.005
4/10/2013 11:14	Grab	PHOSPHATE, TOTAL AS P	0.064
4/17/2013 9:36	Grab	KJELDAHL NITROGEN, TOTAL	1.1
4/17/2013 9:36	Grab	NITRATE+NITRITE-N	-0.005
4/17/2013 9:36	Grab	PHOSPHATE, TOTAL AS P	0.067
4/24/2013 10:40	Grab	KJELDAHL NITROGEN, TOTAL	1.2
4/24/2013 10:40	Grab	NITRATE+NITRITE-N	0.024
4/24/2013 10:40	Grab	PHOSPHATE, TOTAL AS P	0.119
5/1/2013 10:23	Grab	KJELDAHL NITROGEN, TOTAL	1.28
5/1/2013 10:23	Grab	NITRATE+NITRITE-N	0.005
5/1/2013 10:23	Grab	PHOSPHATE, TOTAL AS P	0.078
5/8/2013 11:33	Grab	KJELDAHL NITROGEN, TOTAL	1.2
5/8/2013 11:33	Grab	NITRATE+NITRITE-N	0.007
5/8/2013 11:33	Grab	PHOSPHATE, TOTAL AS P	0.08
5/15/2013 10:33	Grab	KJELDAHL NITROGEN, TOTAL	1.28
5/15/2013 10:33	Grab	NITRATE+NITRITE-N	-0.005
5/15/2013 10:33	Grab	PHOSPHATE, TOTAL AS P	0.078
5/22/2013 12:39	Grab	KJELDAHL NITROGEN, TOTAL	1.47
5/22/2013 12:39	Grab	NITRATE+NITRITE-N	0.005
5/22/2013 12:39	Grab	PHOSPHATE, TOTAL AS P	0.108
5/29/2013 10:55	Grab	KJELDAHL NITROGEN, TOTAL	1.45
5/29/2013 10:55	Grab	NITRATE+NITRITE-N	0.057
5/29/2013 10:55	Grab	PHOSPHATE, TOTAL AS P	0.071
6/5/2013 10:10	Grab	KJELDAHL NITROGEN, TOTAL	1.28
6/5/2013 10:10	Grab	NITRATE+NITRITE-N	0.095
6/5/2013 10:10	Grab	PHOSPHATE, TOTAL AS P	0.069
6/12/2013 10:04	Grab	KJELDAHL NITROGEN, TOTAL	1.38
6/12/2013 10:04	Grab	NITRATE+NITRITE-N	0.152
6/12/2013 10:04	Grab	PHOSPHATE, TOTAL AS P	0.149
6/19/2013 10:38	Grab	KJELDAHL NITROGEN, TOTAL	1.43
6/19/2013 10:38	Grab	NITRATE+NITRITE-N	0.064
6/19/2013 10:38	Grab	PHOSPHATE, TOTAL AS P	0.179
6/26/2013 10:22	Grab	KJELDAHL NITROGEN, TOTAL	1.68
6/26/2013 10:22	Grab	NITRATE+NITRITE-N	0.08
6/26/2013 10:22	Grab	PHOSPHATE, TOTAL AS P	0.231
7/3/2013 10:47	Grab	KJELDAHL NITROGEN, TOTAL	1.44
7/3/2013 10:47	Grab	NITRATE+NITRITE-N	0.147
7/3/2013 10:47	Grab	PHOSPHATE, TOTAL AS P	0.172
7/10/2013 10:30	Grab	KJELDAHL NITROGEN, TOTAL	1.59
7/10/2013 10:30	Grab	NITRATE+NITRITE-N	0.076
7/10/2013 10:30	Grab	PHOSPHATE, TOTAL AS P	0.154

Table C-1. S-78 Water Quality Data			
Collection Date	**Collection Method**	**Test Name**	**Value (mg/L)**
7/17/2013 10:18	Grab	KJELDAHL NITROGEN, TOTAL	1.72
7/17/2013 10:18	Grab	NITRATE+NITRITE-N	0.09
7/17/2013 10:18	Grab	PHOSPHATE, TOTAL AS P	0.168
7/24/2013 10:44	Grab	KJELDAHL NITROGEN, TOTAL	1.63
7/24/2013 10:44	Grab	NITRATE+NITRITE-N	0.134
7/24/2013 10:44	Grab	PHOSPHATE, TOTAL AS P	0.125
7/31/2013 10:14	Grab	KJELDAHL NITROGEN, TOTAL	1.52
7/31/2013 10:14	Grab	NITRATE+NITRITE-N	0.045
7/31/2013 10:14	Grab	PHOSPHATE, TOTAL AS P	0.126
8/7/2013 11:23	Grab	KJELDAHL NITROGEN, TOTAL	1.69
8/7/2013 11:23	Grab	NITRATE+NITRITE-N	0.05
8/7/2013 11:23	Grab	PHOSPHATE, TOTAL AS P	0.138
8/14/2013 10:55	Grab	KJELDAHL NITROGEN, TOTAL	1.5
8/14/2013 10:55	Grab	NITRATE+NITRITE-N	0.033
8/14/2013 10:55	Grab	PHOSPHATE, TOTAL AS P	0.09
8/21/2013 11:03	Grab	KJELDAHL NITROGEN, TOTAL	1.46
8/21/2013 11:03	Grab	NITRATE+NITRITE-N	0.053
8/21/2013 11:03	Grab	PHOSPHATE, TOTAL AS P	0.086
8/28/2013 11:09	Grab	KJELDAHL NITROGEN, TOTAL	1.24
8/28/2013 11:09	Grab	NITRATE+NITRITE-N	0.067
8/28/2013 11:09	Grab	PHOSPHATE, TOTAL AS P	0.084
9/4/2013 10:19	Grab	KJELDAHL NITROGEN, TOTAL	1.43
9/4/2013 10:19	Grab	NITRATE+NITRITE-N	0.042
9/4/2013 10:19	Grab	PHOSPHATE, TOTAL AS P	0.131
9/11/2013 10:01	Grab	KJELDAHL NITROGEN, TOTAL	1.28
9/11/2013 10:01	Grab	NITRATE+NITRITE-N	0.07
9/11/2013 10:01	Grab	PHOSPHATE, TOTAL AS P	0.081
9/18/2013 10:43	Grab	KJELDAHL NITROGEN, TOTAL	1.28
9/18/2013 10:43	Grab	NITRATE+NITRITE-N	0.071
9/18/2013 10:43	Grab	PHOSPHATE, TOTAL AS P	0.115
9/25/2013 10:20	Grab	KJELDAHL NITROGEN, TOTAL	1.65
9/25/2013 10:20	Grab	NITRATE+NITRITE-N	0.072
9/25/2013 10:20	Grab	PHOSPHATE, TOTAL AS P	0.136
10/2/2013 10:25	Grab	KJELDAHL NITROGEN, TOTAL	1.28
10/2/2013 10:25	Grab	NITRATE+NITRITE-N	0.047
10/2/2013 10:25	Grab	PHOSPHATE, TOTAL AS P	0.08
10/9/2013 11:08	Grab	KJELDAHL NITROGEN, TOTAL	1.23
10/9/2013 11:08	Grab	NITRATE+NITRITE-N	0.059
10/9/2013 11:08	Grab	PHOSPHATE, TOTAL AS P	0.07
10/16/2013 10:58	Grab	KJELDAHL NITROGEN, TOTAL	1.21
10/16/2013 10:58	Grab	NITRATE+NITRITE-N	0.054
10/16/2013 10:58	Grab	PHOSPHATE, TOTAL AS P	0.084
10/23/2013 9:51	Grab	KJELDAHL NITROGEN, TOTAL	1.21
10/23/2013 9:51	Grab	NITRATE+NITRITE-N	0.052
10/23/2013 9:51	Grab	PHOSPHATE, TOTAL AS P	0.103
10/30/2013 10:00	Grab	KJELDAHL NITROGEN, TOTAL	1.22
10/30/2013 10:00	Grab	NITRATE+NITRITE-N	0.082

Table C-1. S-78 Water Quality Data			
Collection Date	Collection Method	Test Name	Value (mg/L)
10/30/2013 10:00	Grab	PHOSPHATE, TOTAL AS P	0.105
11/6/2013 10:04	Grab	KJELDAHL NITROGEN, TOTAL	1.15
11/6/2013 10:04	Grab	NITRATE+NITRITE-N	0.064
11/6/2013 10:04	Grab	PHOSPHATE, TOTAL AS P	0.062
11/14/2013 10:17	Grab	KJELDAHL NITROGEN, TOTAL	1.19
11/14/2013 10:17	Grab	NITRATE+NITRITE-N	0.124
11/14/2013 10:17	Grab	PHOSPHATE, TOTAL AS P	0.071
11/20/2013 10:56	Grab	KJELDAHL NITROGEN, TOTAL	1.19
11/20/2013 10:56	Grab	NITRATE+NITRITE-N	0.094
11/20/2013 10:56	Grab	PHOSPHATE, TOTAL AS P	0.063
11/26/2013 11:17	Grab	KJELDAHL NITROGEN, TOTAL	1.2
11/26/2013 11:17	Grab	NITRATE+NITRITE-N	0.097
11/26/2013 11:17	Grab	PHOSPHATE, TOTAL AS P	0.074
12/4/2013 10:10	Grab	KJELDAHL NITROGEN, TOTAL	1.12
12/4/2013 10:10	Grab	NITRATE+NITRITE-N	0.11
12/4/2013 10:10	Grab	PHOSPHATE, TOTAL AS P	0.078
12/11/2013 9:56	Grab	KJELDAHL NITROGEN, TOTAL	1.06
12/11/2013 9:56	Grab	NITRATE+NITRITE-N	0.138
12/11/2013 9:56	Grab	PHOSPHATE, TOTAL AS P	0.057
12/18/2013 11:23	Grab	KJELDAHL NITROGEN, TOTAL	1.09
12/18/2013 11:23	Grab	NITRATE+NITRITE-N	0.257
12/18/2013 11:23	Grab	PHOSPHATE, TOTAL AS P	0.095
12/23/2013 10:36	Grab	KJELDAHL NITROGEN, TOTAL	1.08
12/23/2013 10:36	Grab	NITRATE+NITRITE-N	0.115
12/23/2013 10:36	Grab	PHOSPHATE, TOTAL AS P	0.045
12/31/2013 10:20	Grab	KJELDAHL NITROGEN, TOTAL	1.09
12/31/2013 10:20	Grab	NITRATE+NITRITE-N	0.137
12/31/2013 10:20	Grab	PHOSPHATE, TOTAL AS P	0.054
1/8/2014 12:23	Grab	KJELDAHL NITROGEN, TOTAL	1.14
1/8/2014 12:23	Grab	NITRATE+NITRITE-N	0.167
1/8/2014 12:23	Grab	PHOSPHATE, TOTAL AS P	0.07
1/15/2014 9:48	Grab	KJELDAHL NITROGEN, TOTAL	1.08
1/15/2014 9:48	Grab	NITRATE+NITRITE-N	0.103
1/15/2014 9:48	Grab	PHOSPHATE, TOTAL AS P	0.051
1/22/2014 9:58	Grab	KJELDAHL NITROGEN, TOTAL	1.09
1/22/2014 9:58	Grab	NITRATE+NITRITE-N	0.166
1/22/2014 9:58	Grab	PHOSPHATE, TOTAL AS P	0.046
1/29/2014 11:04	Grab	KJELDAHL NITROGEN, TOTAL	1.08
1/29/2014 11:04	Grab	NITRATE+NITRITE-N	0.113
1/29/2014 11:04	Grab	PHOSPHATE, TOTAL AS P	0.055
2/5/2014 10:48	Grab	KJELDAHL NITROGEN, TOTAL	1.21
2/5/2014 10:48	Grab	NITRATE+NITRITE-N	0.105
2/5/2014 10:48	Grab	PHOSPHATE, TOTAL AS P	0.072
2/12/2014 10:19	Grab	KJELDAHL NITROGEN, TOTAL	1.09
2/12/2014 10:19	Grab	NITRATE+NITRITE-N	0.119
2/12/2014 10:19	Grab	PHOSPHATE, TOTAL AS P	0.067
2/19/2014 9:58	Grab	KJELDAHL NITROGEN, TOTAL	1.36

Table C-1. S-78 Water Quality Data

Collection Date	Collection Method	Test Name	Value (mg/L)
2/19/2014 9:58	Grab	NITRATE+NITRITE-N	0.254
2/19/2014 9:58	Grab	PHOSPHATE, TOTAL AS P	0.145
2/26/2014 10:03	Grab	KJELDAHL NITROGEN, TOTAL	1.17
2/26/2014 10:03	Grab	NITRATE+NITRITE-N	0.071
2/26/2014 10:03	Grab	PHOSPHATE, TOTAL AS P	0.086
3/5/2014 10:47	Grab	KJELDAHL NITROGEN, TOTAL	1.11
3/5/2014 10:47	Grab	NITRATE+NITRITE-N	0.114
3/5/2014 10:47	Grab	PHOSPHATE, TOTAL AS P	0.094
3/12/2014 10:09	Grab	KJELDAHL NITROGEN, TOTAL	1.18
3/12/2014 10:09	Grab	NITRATE+NITRITE-N	0.061
3/12/2014 10:09	Grab	PHOSPHATE, TOTAL AS P	0.1
3/19/2014 10:09	Grab	KJELDAHL NITROGEN, TOTAL	1
3/19/2014 10:09	Grab	NITRATE+NITRITE-N	0.084
3/19/2014 10:09	Grab	PHOSPHATE, TOTAL AS P	0.073
3/26/2014 12:28	Grab	KJELDAHL NITROGEN, TOTAL	1.12
3/26/2014 12:28	Grab	NITRATE+NITRITE-N	0.065
3/26/2014 12:28	Grab	PHOSPHATE, TOTAL AS P	0.075
4/2/2014 10:16	Grab	KJELDAHL NITROGEN, TOTAL	1.24
4/2/2014 10:16	Grab	NITRATE+NITRITE-N	0.06
4/2/2014 10:16	Grab	PHOSPHATE, TOTAL AS P	0.06
4/9/2014 9:12	Grab	KJELDAHL NITROGEN, TOTAL	1.09
4/9/2014 9:12	Grab	NITRATE+NITRITE-N	0.013
4/9/2014 9:12	Grab	PHOSPHATE, TOTAL AS P	0.061
4/16/2014 10:40	Grab	KJELDAHL NITROGEN, TOTAL	1.11
4/16/2014 10:40	Grab	NITRATE+NITRITE-N	0.02
4/16/2014 10:40	Grab	PHOSPHATE, TOTAL AS P	0.088
4/23/2014 9:41	Grab	KJELDAHL NITROGEN, TOTAL	1.04
4/23/2014 9:41	Grab	NITRATE+NITRITE-N	0.064
4/23/2014 9:41	Grab	PHOSPHATE, TOTAL AS P	0.066
4/30/2014 10:48	Grab	KJELDAHL NITROGEN, TOTAL	1.14
4/30/2014 10:48	Grab	NITRATE+NITRITE-N	0.006
4/30/2014 10:48	Grab	PHOSPHATE, TOTAL AS P	0.058
5/7/2014 10:03	Grab	KJELDAHL NITROGEN, TOTAL	1.14
5/7/2014 10:03	Grab	NITRATE+NITRITE-N	-0.005
5/7/2014 10:03	Grab	PHOSPHATE, TOTAL AS P	0.085
5/14/2014 9:44	Grab	KJELDAHL NITROGEN, TOTAL	1.08
5/14/2014 9:44	Grab	NITRATE+NITRITE-N	0.057
5/14/2014 9:44	Grab	PHOSPHATE, TOTAL AS P	0.078
5/21/2014 10:48	Grab	KJELDAHL NITROGEN, TOTAL	1.05
5/21/2014 10:48	Grab	NITRATE+NITRITE-N	0.013
5/21/2014 10:48	Grab	PHOSPHATE, TOTAL AS P	0.051
5/28/2014 10:40	Grab	KJELDAHL NITROGEN, TOTAL	1.03
5/28/2014 10:40	Grab	NITRATE+NITRITE-N	-0.005
5/28/2014 10:40	Grab	PHOSPHATE, TOTAL AS P	0.052
6/4/2014 11:17	Grab	NITRATE+NITRITE-N	0.018
6/4/2014 11:17	Grab	PHOSPHATE, TOTAL AS P	0.102
6/4/2014 11:17	Grab	TOTAL NITROGEN	0.98

Table C-1. S-78 Water Quality Data			
Collection Date	Collection Method	Test Name	Value (mg/L)
6/11/2014 10:41	Grab	NITRATE+NITRITE-N	-0.005
6/11/2014 10:41	Grab	PHOSPHATE, TOTAL AS P	0.076
6/11/2014 10:41	Grab	TOTAL NITROGEN	0.99
6/18/2014 11:05	Grab	NITRATE+NITRITE-N	0.009
6/18/2014 11:05	Grab	PHOSPHATE, TOTAL AS P	0.091
6/18/2014 11:05	Grab	TOTAL NITROGEN	1.13
6/25/2014 10:38	Grab	NITRATE+NITRITE-N	-0.005
6/25/2014 10:38	Grab	PHOSPHATE, TOTAL AS P	0.057
6/25/2014 10:38	Grab	TOTAL NITROGEN	1.12
7/2/2014 10:08	Grab	NITRATE+NITRITE-N	0.013
7/2/2014 10:08	Grab	PHOSPHATE, TOTAL AS P	0.08
7/2/2014 10:08	Grab	TOTAL NITROGEN	1.07
7/9/2014 10:22	Grab	NITRATE+NITRITE-N	0.013
7/9/2014 10:22	Grab	PHOSPHATE, TOTAL AS P	0.092
7/9/2014 10:22	Grab	TOTAL NITROGEN	0.99
7/16/2014 10:09	Grab	NITRATE+NITRITE-N	0.085
7/16/2014 10:09	Grab	PHOSPHATE, TOTAL AS P	0.074
7/16/2014 10:09	Grab	TOTAL NITROGEN	1.42
7/23/2014 11:30	Grab	NITRATE+NITRITE-N	0.134
7/23/2014 11:30	Grab	PHOSPHATE, TOTAL AS P	0.226
7/23/2014 11:30	Grab	TOTAL NITROGEN	1.94
7/30/2014 10:21	Grab	NITRATE+NITRITE-N	0.147
7/30/2014 10:21	Grab	PHOSPHATE, TOTAL AS P	0.16
7/30/2014 10:21	Grab	TOTAL NITROGEN	1.57
8/6/2014 10:53	Grab	NITRATE+NITRITE-N	0.119
8/6/2014 10:53	Grab	PHOSPHATE, TOTAL AS P	0.232
8/6/2014 10:53	Grab	TOTAL NITROGEN	1.76
8/13/2014 10:15	Grab	NITRATE+NITRITE-N	0.094
8/13/2014 10:15	Grab	PHOSPHATE, TOTAL AS P	0.144
8/13/2014 10:15	Grab	TOTAL NITROGEN	1.41
8/20/2014 11:11	Grab	NITRATE+NITRITE-N	0.025
8/20/2014 11:11	Grab	PHOSPHATE, TOTAL AS P	0.114
8/20/2014 11:11	Grab	TOTAL NITROGEN	1.42
8/27/2014 9:19	Grab	NITRATE+NITRITE-N	0.081
8/27/2014 9:19	Grab	PHOSPHATE, TOTAL AS P	0.129
8/27/2014 9:19	Grab	TOTAL NITROGEN	1.51
9/3/2014 10:34	Grab	NITRATE+NITRITE-N	0.118
9/3/2014 10:34	Grab	PHOSPHATE, TOTAL AS P	0.179
9/3/2014 10:34	Grab	TOTAL NITROGEN	1.68
9/10/2014 10:30	Grab	NITRATE+NITRITE-N	0.139
9/10/2014 10:30	Grab	PHOSPHATE, TOTAL AS P	0.118
9/10/2014 10:30	Grab	TOTAL NITROGEN	1.56
9/17/2014 10:25	Grab	NITRATE+NITRITE-N	0.149
9/17/2014 10:25	Grab	PHOSPHATE, TOTAL AS P	0.19
9/17/2014 10:25	Grab	TOTAL NITROGEN	1.38
9/24/2014 10:22	Grab	NITRATE+NITRITE-N	0.236
9/24/2014 10:22	Grab	PHOSPHATE, TOTAL AS P	0.124

Table C-1. S-78 Water Quality Data			
Collection Date	Collection Method	Test Name	Value (mg/L)
9/24/2014 10:22	Grab	TOTAL NITROGEN	1.58
10/1/2014 10:37	Grab	NITRATE+NITRITE-N	0.216
10/1/2014 10:37	Grab	PHOSPHATE, TOTAL AS P	0.181
10/1/2014 10:37	Grab	TOTAL NITROGEN	1.63
10/8/2014 10:45	Grab	NITRATE+NITRITE-N	0.273
10/8/2014 10:45	Grab	PHOSPHATE, TOTAL AS P	0.169
10/8/2014 10:45	Grab	TOTAL NITROGEN	1.63
10/15/2014 11:53	Grab	NITRATE+NITRITE-N	0.326
10/15/2014 11:53	Grab	PHOSPHATE, TOTAL AS P	0.138
10/15/2014 11:53	Grab	TOTAL NITROGEN	1.54
10/22/2014 10:53	Grab	NITRATE+NITRITE-N	0.45
10/22/2014 10:53	Grab	PHOSPHATE, TOTAL AS P	0.154
10/22/2014 10:53	Grab	TOTAL NITROGEN	1.77
10/29/2014 10:20	Grab	NITRATE+NITRITE-N	0.204
10/29/2014 10:20	Grab	PHOSPHATE, TOTAL AS P	0.108
10/29/2014 10:20	Grab	TOTAL NITROGEN	1.53
11/5/2014 10:54	Grab	NITRATE+NITRITE-N	0.04
11/5/2014 10:54	Grab	PHOSPHATE, TOTAL AS P	0.075
11/5/2014 10:54	Grab	TOTAL NITROGEN	1.2
11/12/2014 10:06	Grab	NITRATE+NITRITE-N	0.072
11/12/2014 10:06	Grab	PHOSPHATE, TOTAL AS P	0.08
11/12/2014 10:06	Grab	TOTAL NITROGEN	1.24
11/19/2014 10:12	Grab	NITRATE+NITRITE-N	0.063
11/19/2014 10:12	Grab	PHOSPHATE, TOTAL AS P	0.058
11/19/2014 10:12	Grab	TOTAL NITROGEN	1.16
11/26/2014 10:35	Grab	NITRATE+NITRITE-N	0.056
11/26/2014 10:35	Grab	PHOSPHATE, TOTAL AS P	0.056
11/26/2014 10:35	Grab	TOTAL NITROGEN	1.04
12/3/2014 10:35	Grab	NITRATE+NITRITE-N	0.11
12/3/2014 10:35	Grab	PHOSPHATE, TOTAL AS P	0.069
12/3/2014 10:35	Grab	TOTAL NITROGEN	1.28
12/10/2014 10:13	Grab	NITRATE+NITRITE-N	0.193
12/10/2014 10:13	Grab	PHOSPHATE, TOTAL AS P	0.063
12/10/2014 10:13	Grab	TOTAL NITROGEN	1.35
12/17/2014 11:09	Grab	NITRATE+NITRITE-N	0.102
12/17/2014 11:09	Grab	PHOSPHATE, TOTAL AS P	0.057
12/17/2014 11:09	Grab	TOTAL NITROGEN	1.34
12/23/2014 10:33	Grab	NITRATE+NITRITE-N	0.083
12/23/2014 10:33	Grab	PHOSPHATE, TOTAL AS P	0.068
12/23/2014 10:33	Grab	TOTAL NITROGEN	1.31
12/30/2014 9:52	Grab	NITRATE+NITRITE-N	0.084
12/30/2014 9:52	Grab	PHOSPHATE, TOTAL AS P	0.065
12/30/2014 9:52	Grab	TOTAL NITROGEN	1.25
1/7/2015 11:22	Grab	NITRATE+NITRITE-N	0.153
1/7/2015 11:22	Grab	PHOSPHATE, TOTAL AS P	0.09
1/7/2015 11:22	Grab	TOTAL NITROGEN	1.25
1/14/2015 10:55	Grab	NITRATE+NITRITE-N	0.142

Table C-1. S-78 Water Quality Data

Collection Date	Collection Method	Test Name	Value (mg/L)
1/14/2015 10:55	Grab	PHOSPHATE, TOTAL AS P	0.059
1/14/2015 10:55	Grab	TOTAL NITROGEN	1.16
1/21/2015 10:21	Grab	NITRATE+NITRITE-N	0.121
1/21/2015 10:21	Grab	PHOSPHATE, TOTAL AS P	0.052
1/21/2015 10:21	Grab	TOTAL NITROGEN	1
1/28/2015 10:26	Grab	NITRATE+NITRITE-N	0.07
1/28/2015 10:26	Grab	PHOSPHATE, TOTAL AS P	0.051
1/28/2015 10:26	Grab	TOTAL NITROGEN	1.11
2/4/2015 11:08	Grab	NITRATE+NITRITE-N	0.062
2/4/2015 11:08	Grab	PHOSPHATE, TOTAL AS P	0.066
2/4/2015 11:08	Grab	TOTAL NITROGEN	1.19
2/11/2015 11:01	Grab	NITRATE+NITRITE-N	0.041
2/11/2015 11:01	Grab	PHOSPHATE, TOTAL AS P	0.056
2/11/2015 11:01	Grab	TOTAL NITROGEN	1.08
2/18/2015 10:39	Grab	NITRATE+NITRITE-N	0.03
2/18/2015 10:39	Grab	PHOSPHATE, TOTAL AS P	0.062
2/18/2015 10:39	Grab	TOTAL NITROGEN	1.06
2/25/2015 10:12	Grab	NITRATE+NITRITE-N	0.022
2/25/2015 10:12	Grab	PHOSPHATE, TOTAL AS P	0.071
2/25/2015 10:12	Grab	TOTAL NITROGEN	1.1
3/4/2015 10:53	Grab	NITRATE+NITRITE-N	0.055
3/4/2015 10:53	Grab	PHOSPHATE, TOTAL AS P	0.079
3/4/2015 10:53	Grab	TOTAL NITROGEN	1.11
3/11/2015 10:20	Grab	NITRATE+NITRITE-N	0.097
3/11/2015 10:20	Grab	PHOSPHATE, TOTAL AS P	0.093
3/11/2015 10:20	Grab	TOTAL NITROGEN	1.16
3/18/2015 10:29	Grab	NITRATE+NITRITE-N	0.144
3/18/2015 10:29	Grab	PHOSPHATE, TOTAL AS P	0.104
3/18/2015 10:29	Grab	TOTAL NITROGEN	1.22
3/25/2015 10:08	Grab	NITRATE+NITRITE-N	0.098
3/25/2015 10:08	Grab	PHOSPHATE, TOTAL AS P	0.091
3/25/2015 10:08	Grab	TOTAL NITROGEN	1.14
4/1/2015 10:27	Grab	NITRATE+NITRITE-N	0.148
4/1/2015 10:27	Grab	PHOSPHATE, TOTAL AS P	0.093
4/1/2015 10:27	Grab	TOTAL NITROGEN	1.26
4/8/2015 10:29	Grab	NITRATE+NITRITE-N	0.039
4/8/2015 10:29	Grab	PHOSPHATE, TOTAL AS P	0.089
4/8/2015 10:29	Grab	TOTAL NITROGEN	1.12
4/15/2015 11:35	Grab	NITRATE+NITRITE-N	0.037
4/15/2015 11:35	Grab	PHOSPHATE, TOTAL AS P	0.082
4/15/2015 11:35	Grab	TOTAL NITROGEN	1.08
4/22/2015 10:15	Grab	NITRATE+NITRITE-N	0.27
4/22/2015 10:15	Grab	PHOSPHATE, TOTAL AS P	0.133
4/22/2015 10:15	Grab	TOTAL NITROGEN	1.61
4/29/2015 10:37	Grab	NITRATE+NITRITE-N	0.238
4/29/2015 10:37	Grab	PHOSPHATE, TOTAL AS P	0.134
4/29/2015 10:37	Grab	TOTAL NITROGEN	1.45

Table C-1. S-78 Water Quality Data			
Collection Date	**Collection Method**	**Test Name**	**Value (mg/L)**
5/6/2015 10:33	Grab	NITRATE+NITRITE-N	0.113
5/6/2015 10:33	Grab	PHOSPHATE, TOTAL AS P	0.117
5/6/2015 10:33	Grab	TOTAL NITROGEN	1.39
5/13/2015 10:48	Grab	NITRATE+NITRITE-N	0.038
5/13/2015 10:48	Grab	PHOSPHATE, TOTAL AS P	0.101
5/13/2015 10:48	Grab	TOTAL NITROGEN	1.33
5/20/2015 10:14	Grab	NITRATE+NITRITE-N	0.031
5/20/2015 10:14	Grab	PHOSPHATE, TOTAL AS P	0.095
5/20/2015 10:14	Grab	TOTAL NITROGEN	1.58
5/27/2015 11:29	Grab	NITRATE+NITRITE-N	0.113
5/27/2015 11:29	Grab	PHOSPHATE, TOTAL AS P	0.092
5/27/2015 11:29	Grab	TOTAL NITROGEN	1.4
6/3/2015 10:21	Grab	NITRATE+NITRITE-N	0.055
6/3/2015 10:21	Grab	PHOSPHATE, TOTAL AS P	0.079
6/3/2015 10:21	Grab	TOTAL NITROGEN	1.31
6/10/2015 10:13	Grab	NITRATE+NITRITE-N	0.024
6/10/2015 10:13	Grab	PHOSPHATE, TOTAL AS P	0.082
6/10/2015 10:13	Grab	TOTAL NITROGEN	1.2
6/17/2015 10:15	Grab	NITRATE+NITRITE-N	0.054
6/17/2015 10:15	Grab	PHOSPHATE, TOTAL AS P	0.106
6/17/2015 10:15	Grab	TOTAL NITROGEN	1.29
6/24/2015 9:30	Grab	NITRATE+NITRITE-N	0.007
6/24/2015 9:30	Grab	PHOSPHATE, TOTAL AS P	0.101
6/24/2015 9:30	Grab	TOTAL NITROGEN	1.21
7/1/2015 10:05	Grab	NITRATE+NITRITE-N	0.009
7/1/2015 10:05	Grab	PHOSPHATE, TOTAL AS P	0.169
7/1/2015 10:05	Grab	TOTAL NITROGEN	1.11
7/8/2015 11:26	Grab	NITRATE+NITRITE-N	0.016
7/8/2015 11:26	Grab	PHOSPHATE, TOTAL AS P	0.17
7/8/2015 11:26	Grab	TOTAL NITROGEN	1.54
7/15/2015 10:00	Grab	NITRATE+NITRITE-N	0.009
7/15/2015 10:00	Grab	PHOSPHATE, TOTAL AS P	0.134
7/15/2015 10:00	Grab	TOTAL NITROGEN	0.92
7/29/2015 9:26	Grab	NITRATE+NITRITE-N	0.021
7/29/2015 9:26	Grab	PHOSPHATE, TOTAL AS P	0.111
7/29/2015 9:26	Grab	TOTAL NITROGEN	1.09
8/5/2015 11:39	Grab	NITRATE+NITRITE-N	0.01
8/5/2015 11:39	Grab	PHOSPHATE, TOTAL AS P	0.116
8/5/2015 11:39	Grab	TOTAL NITROGEN	1.31
8/12/2015 12:25	Grab	NITRATE+NITRITE-N	0.018
8/12/2015 12:25	Grab	PHOSPHATE, TOTAL AS P	0.124
8/12/2015 12:25	Grab	TOTAL NITROGEN	1.33
8/19/2015 10:40	Grab	NITRATE+NITRITE-N	0.145
8/19/2015 10:40	Grab	PHOSPHATE, TOTAL AS P	0.124
8/19/2015 10:40	Grab	TOTAL NITROGEN	1.36
8/26/2015 10:08	Grab	NITRATE+NITRITE-N	0.03
8/26/2015 10:08	Grab	PHOSPHATE, TOTAL AS P	0.181

Table C-1. S-78 Water Quality Data			
Collection Date	**Collection Method**	**Test Name**	**Value (mg/L)**
8/26/2015 10:08	Grab	TOTAL NITROGEN	1.99
9/2/2015 10:45	Grab	NITRATE+NITRITE-N	0.173
9/2/2015 10:45	Grab	PHOSPHATE, TOTAL AS P	0.092
9/2/2015 10:45	Grab	TOTAL NITROGEN	1.62
9/9/2015 9:57	Grab	NITRATE+NITRITE-N	0.21
9/9/2015 9:57	Grab	PHOSPHATE, TOTAL AS P	0.089
9/9/2015 9:57	Grab	TOTAL NITROGEN	1.57
9/16/2015 10:29	Grab	NITRATE+NITRITE-N	0.112
9/16/2015 10:29	Grab	PHOSPHATE, TOTAL AS P	0.131
9/16/2015 10:29	Grab	TOTAL NITROGEN	1.48
9/23/2015 9:50	Grab	NITRATE+NITRITE-N	0.137
9/23/2015 9:50	Grab	PHOSPHATE, TOTAL AS P	0.136
9/23/2015 9:50	Grab	TOTAL NITROGEN	1.77
9/30/2015 9:40	Grab	NITRATE+NITRITE-N	0.257
9/30/2015 9:40	Grab	PHOSPHATE, TOTAL AS P	0.147
9/30/2015 9:40	Grab	TOTAL NITROGEN	1.59
10/7/2015 10:11	Grab	NITRATE+NITRITE-N	0.366
10/7/2015 10:11	Grab	PHOSPHATE, TOTAL AS P	0.158
10/7/2015 10:11	Grab	TOTAL NITROGEN	1.62
10/14/2015 10:35	Grab	NITRATE+NITRITE-N	0.386
10/14/2015 10:35	Grab	PHOSPHATE, TOTAL AS P	0.15
10/14/2015 10:35	Grab	TOTAL NITROGEN	1.55
10/21/2015 9:27	Grab	NITRATE+NITRITE-N	0.434
10/21/2015 9:27	Grab	PHOSPHATE, TOTAL AS P	0.14
10/21/2015 9:27	Grab	TOTAL NITROGEN	1.63
10/28/2015 11:18	Grab	NITRATE+NITRITE-N	0.128
10/28/2015 11:18	Grab	PHOSPHATE, TOTAL AS P	0.094
10/28/2015 11:18	Grab	TOTAL NITROGEN	1.33
11/4/2015 10:01	Grab	NITRATE+NITRITE-N	0.131
11/4/2015 10:01	Grab	PHOSPHATE, TOTAL AS P	0.113
11/4/2015 10:01	Grab	TOTAL NITROGEN	1.57
11/10/2015 9:40	Grab	NITRATE+NITRITE-N	0.236
11/10/2015 9:40	Grab	PHOSPHATE, TOTAL AS P	0.113
11/10/2015 9:40	Grab	TOTAL NITROGEN	1.49
11/18/2015 9:51	Grab	NITRATE+NITRITE-N	0.181
11/18/2015 9:51	Grab	PHOSPHATE, TOTAL AS P	0.1
11/18/2015 9:51	Grab	TOTAL NITROGEN	1.39
11/24/2015 10:37	Grab	NITRATE+NITRITE-N	0.27
11/24/2015 10:37	Grab	PHOSPHATE, TOTAL AS P	0.102
11/24/2015 10:37	Grab	TOTAL NITROGEN	1.34
12/2/2015 9:29	Grab	NITRATE+NITRITE-N	0.377
12/2/2015 9:29	Grab	PHOSPHATE, TOTAL AS P	0.084
12/2/2015 9:29	Grab	TOTAL NITROGEN	1.58
12/9/2015 10:06	Grab	NITRATE+NITRITE-N	0.206
12/9/2015 10:06	Grab	PHOSPHATE, TOTAL AS P	0.088
12/9/2015 10:06	Grab	TOTAL NITROGEN	1.34
12/21/2015 10:40	Grab	NITRATE+NITRITE-N	0.161

Table C-1. S-78 Water Quality Data

Collection Date	Collection Method	Test Name	Value (mg/L)
12/21/2015 10:40	Grab	PHOSPHATE, TOTAL AS P	0.151
12/21/2015 10:40	Grab	TOTAL NITROGEN	1.45
1/4/2016 11:56	Grab	NITRATE+NITRITE-N	0.14
1/4/2016 11:56	Grab	PHOSPHATE, TOTAL AS P	0.114
1/4/2016 11:56	Grab	TOTAL NITROGEN	1.38
1/19/2016 10:47	Grab	NITRATE+NITRITE-N	0.43
1/19/2016 10:47	Grab	PHOSPHATE, TOTAL AS P	0.092
1/19/2016 10:47	Grab	TOTAL NITROGEN	1.78
2/1/2016 11:11	Grab	NITRATE+NITRITE-N	0.922
2/1/2016 11:11	Grab	PHOSPHATE, TOTAL AS P	0.202
2/1/2016 11:11	Grab	TOTAL NITROGEN	2.36
2/15/2016 9:44	Grab	NITRATE+NITRITE-N	0.154
2/15/2016 9:44	Grab	PHOSPHATE, TOTAL AS P	0.155
2/15/2016 9:44	Grab	TOTAL NITROGEN	1.67
2/29/2016 10:41	Grab	NITRATE+NITRITE-N	0.046
2/29/2016 10:41	Grab	PHOSPHATE, TOTAL AS P	0.116
2/29/2016 10:41	Grab	TOTAL NITROGEN	1.73
3/14/2016 11:13	Grab	NITRATE+NITRITE-N	0.043
3/14/2016 11:13	Grab	PHOSPHATE, TOTAL AS P	0.074
3/14/2016 11:13	Grab	TOTAL NITROGEN	1.17
3/28/2016 9:30	Grab	NITRATE+NITRITE-N	0.084
3/28/2016 9:30	Grab	PHOSPHATE, TOTAL AS P	0.09
3/28/2016 9:30	Grab	TOTAL NITROGEN	1.16
4/11/2016 10:14	Grab	NITRATE+NITRITE-N	0.114
4/11/2016 10:14	Grab	PHOSPHATE, TOTAL AS P	0.092
4/11/2016 10:14	Grab	TOTAL NITROGEN	1.26
4/25/2016 11:26	Grab	NITRATE+NITRITE-N	0.072
4/25/2016 11:26	Grab	PHOSPHATE, TOTAL AS P	0.091
4/25/2016 11:26	Grab	TOTAL NITROGEN	1.15
5/9/2016 11:35	Grab	NITRATE+NITRITE-N	0.15
5/9/2016 11:35	Grab	PHOSPHATE, TOTAL AS P	0.116
5/9/2016 11:35	Grab	TOTAL NITROGEN	1.38
5/23/2016 9:32	Grab	NITRATE+NITRITE-N	0.187
5/23/2016 9:32	Grab	PHOSPHATE, TOTAL AS P	0.186
5/23/2016 9:32	Grab	TOTAL NITROGEN	1.42
6/7/2016 10:10	Grab	NITRATE+NITRITE-N	0.064
6/7/2016 10:10	Grab	PHOSPHATE, TOTAL AS P	0.116
6/7/2016 10:10	Grab	TOTAL NITROGEN	1.44
6/20/2016 10:01	Grab	NITRATE+NITRITE-N	0.122
6/20/2016 10:01	Grab	PHOSPHATE, TOTAL AS P	0.188
6/20/2016 10:01	Grab	TOTAL NITROGEN	1.91
7/5/2016 11:01	Grab	NITRATE+NITRITE-N	0.095
7/5/2016 11:01	Grab	PHOSPHATE, TOTAL AS P	0.15
7/5/2016 11:01	Grab	TOTAL NITROGEN	1.66
7/18/2016 10:01	Grab	NITRATE+NITRITE-N	0.085
7/18/2016 10:01	Grab	PHOSPHATE, TOTAL AS P	0.12
7/18/2016 10:01	Grab	TOTAL NITROGEN	1.4

Table C-1. S-78 Water Quality Data

Collection Date	Collection Method	Test Name	Value (mg/L)
8/1/2016 10:26	Grab	NITRATE+NITRITE-N	0.085
8/1/2016 10:26	Grab	PHOSPHATE, TOTAL AS P	0.16
8/1/2016 10:26	Grab	TOTAL NITROGEN	1.48
8/15/2016 12:09	Grab	NITRATE+NITRITE-N	0.132
8/15/2016 12:09	Grab	PHOSPHATE, TOTAL AS P	0.12
8/15/2016 12:09	Grab	TOTAL NITROGEN	1.36
9/12/2016 9:32	Grab	KJELDAHL NITROGEN, TOTAL	1.38
9/12/2016 9:32	Grab	NITRATE+NITRITE-N	0.257
9/12/2016 9:32	Grab	PHOSPHATE, TOTAL AS P	0.126
9/12/2016 9:32	Grab	TOTAL NITROGEN	1.57
9/26/2016 10:11	Grab	NITRATE+NITRITE-N	0.131
9/26/2016 10:11	Grab	PHOSPHATE, TOTAL AS P	0.102
9/26/2016 10:11	Grab	TOTAL NITROGEN	1.26
10/10/2016 11:33	Grab	KJELDAHL NITROGEN, TOTAL	1.56
10/10/2016 11:33	Grab	NITRATE+NITRITE-N	0.172
10/10/2016 11:33	Grab	PHOSPHATE, TOTAL AS P	0.121
10/10/2016 11:33	Grab	TOTAL NITROGEN	1.8
10/24/2016 10:04	Grab	NITRATE+NITRITE-N	0.082
10/24/2016 10:04	Grab	PHOSPHATE, TOTAL AS P	0.05
10/24/2016 10:04	Grab	TOTAL NITROGEN	1.09
11/7/2016 10:13	Grab	KJELDAHL NITROGEN, TOTAL	1.01
11/7/2016 10:13	Grab	NITRATE+NITRITE-N	0.101
11/7/2016 10:13	Grab	PHOSPHATE, TOTAL AS P	0.055
11/7/2016 10:13	Grab	TOTAL NITROGEN	1.13
11/21/2016 10:03	Grab	NITRATE+NITRITE-N	0.121
11/21/2016 10:03	Grab	PHOSPHATE, TOTAL AS P	0.07
11/21/2016 10:03	Grab	TOTAL NITROGEN	1.34
12/7/2016 10:35	Grab	NITRATE+NITRITE-N	0.145
12/7/2016 10:35	Grab	PHOSPHATE, TOTAL AS P	0.074
12/7/2016 10:35	Grab	TOTAL NITROGEN	1.11
1/5/2017 10:55	Grab	KJELDAHL NITROGEN, TOTAL	0.98
1/5/2017 10:55	Grab	NITRATE+NITRITE-N	0.164
1/5/2017 10:55	Grab	PHOSPHATE, TOTAL AS P	0.068
1/5/2017 10:55	Grab	TOTAL NITROGEN	1.07
1/11/2017 10:18	Grab	NITRATE+NITRITE-N	0.18
1/11/2017 10:18	Grab	PHOSPHATE, TOTAL AS P	0.076
1/11/2017 10:18	Grab	TOTAL NITROGEN	1.13
1/19/2017 9:40	Grab	PHOSPHATE, TOTAL AS P	0.08
1/25/2017 10:12	Grab	NITRATE+NITRITE-N	0.128
1/25/2017 10:12	Grab	PHOSPHATE, TOTAL AS P	0.067
1/25/2017 10:12	Grab	TOTAL NITROGEN	1.06
2/1/2017 9:45	Grab	NITRATE+NITRITE-N	0.205
2/1/2017 9:45	Grab	PHOSPHATE, TOTAL AS P	0.083
2/1/2017 9:45	Grab	TOTAL NITROGEN	1.16
2/8/2017 10:34	Grab	NITRATE+NITRITE-N	0.153
2/8/2017 10:34	Grab	PHOSPHATE, TOTAL AS P	0.086
2/8/2017 10:34	Grab	TOTAL NITROGEN	1.2

Table C-1. S-78 Water Quality Data			
Collection Date	Collection Method	Test Name	Value (mg/L)
2/15/2017 10:11	Grab	NITRATE+NITRITE-N	0.093
2/15/2017 10:11	Grab	PHOSPHATE, TOTAL AS P	0.069
2/15/2017 10:11	Grab	TOTAL NITROGEN	1.06
2/22/2017 9:07	Grab	NITRATE+NITRITE-N	0.091
2/22/2017 9:07	Grab	PHOSPHATE, TOTAL AS P	0.072
2/22/2017 9:07	Grab	TOTAL NITROGEN	1.03
3/1/2017 10:02	Grab	NITRATE+NITRITE-N	0.079
3/1/2017 10:02	Grab	PHOSPHATE, TOTAL AS P	0.072
3/1/2017 10:02	Grab	TOTAL NITROGEN	1.01
3/8/2017 10:10	Grab	NITRATE+NITRITE-N	0.138
3/8/2017 10:10	Grab	PHOSPHATE, TOTAL AS P	0.078
3/8/2017 10:10	Grab	TOTAL NITROGEN	1.09
3/15/2017 13:09	Grab	NITRATE+NITRITE-N	0.087
3/15/2017 13:09	Grab	PHOSPHATE, TOTAL AS P	0.083
3/15/2017 13:09	Grab	TOTAL NITROGEN	1.14
3/22/2017 9:39	Grab	NITRATE+NITRITE-N	0.246
3/22/2017 9:39	Grab	PHOSPHATE, TOTAL AS P	0.089
3/22/2017 9:39	Grab	TOTAL NITROGEN	1.28
3/29/2017 9:28	Grab	NITRATE+NITRITE-N	0.03
3/29/2017 9:28	Grab	PHOSPHATE, TOTAL AS P	0.068
3/29/2017 9:28	Grab	TOTAL NITROGEN	1.08
4/5/2017 10:04	Grab	NITRATE+NITRITE-N	-0.005
4/5/2017 10:04	Grab	PHOSPHATE, TOTAL AS P	0.07
4/5/2017 10:04	Grab	TOTAL NITROGEN	1.11
4/12/2017 9:30	Grab	NITRATE+NITRITE-N	0.239
4/12/2017 9:30	Grab	PHOSPHATE, TOTAL AS P	0.082
4/12/2017 9:30	Grab	TOTAL NITROGEN	1.34
4/19/2017 10:16	Grab	NITRATE+NITRITE-N	0.067
4/19/2017 10:16	Grab	PHOSPHATE, TOTAL AS P	0.083
4/19/2017 10:16	Grab	TOTAL NITROGEN	1.34
4/26/2017 9:44	Grab	NITRATE+NITRITE-N	0.044
4/26/2017 9:44	Grab	PHOSPHATE, TOTAL AS P	0.085
4/26/2017 9:44	Grab	TOTAL NITROGEN	1.22
5/3/2017 9:38	Grab	NITRATE+NITRITE-N	-0.005
5/3/2017 9:38	Grab	PHOSPHATE, TOTAL AS P	0.074
5/3/2017 9:38	Grab	TOTAL NITROGEN	1.25
5/10/2017 10:50	Grab	NITRATE+NITRITE-N	-0.005
5/10/2017 10:50	Grab	PHOSPHATE, TOTAL AS P	0.089
5/10/2017 10:50	Grab	TOTAL NITROGEN	1.39
5/17/2017 10:23	Grab	NITRATE+NITRITE-N	0.006
5/17/2017 10:23	Grab	PHOSPHATE, TOTAL AS P	0.087
5/17/2017 10:23	Grab	TOTAL NITROGEN	1.41
5/24/2017 10:18	Grab	NITRATE+NITRITE-N	0.048
5/24/2017 10:18	Grab	PHOSPHATE, TOTAL AS P	0.083
5/24/2017 10:18	Grab	TOTAL NITROGEN	1.24
5/31/2017 10:09	Grab	NITRATE+NITRITE-N	-0.005
5/31/2017 10:09	Grab	PHOSPHATE, TOTAL AS P	0.054

Table C-1. S-78 Water Quality Data			
Collection Date	**Collection Method**	**Test Name**	**Value (mg/L)**
5/31/2017 10:09	Grab	TOTAL NITROGEN	1.1
6/7/2017 10:11	Grab	NITRATE+NITRITE-N	0.082
6/7/2017 10:11	Grab	PHOSPHATE, TOTAL AS P	0.091
6/7/2017 10:11	Grab	TOTAL NITROGEN	1.24
6/14/2017 10:35	Grab	NITRATE+NITRITE-N	0.187
6/14/2017 10:35	Grab	PHOSPHATE, TOTAL AS P	0.31
6/14/2017 10:35	Grab	TOTAL NITROGEN	1.8
6/21/2017 10:42	Grab	NITRATE+NITRITE-N	0.145
6/21/2017 10:42	Grab	PHOSPHATE, TOTAL AS P	0.287
6/21/2017 10:42	Grab	TOTAL NITROGEN	1.79
6/28/2017 10:48	Grab	NITRATE+NITRITE-N	0.074
6/28/2017 10:48	Grab	PHOSPHATE, TOTAL AS P	0.221
6/28/2017 10:48	Grab	TOTAL NITROGEN	1.4
7/6/2017 9:44	Grab	NITRATE+NITRITE-N	0.011
7/6/2017 9:44	Grab	PHOSPHATE, TOTAL AS P	0.215
7/6/2017 9:44	Grab	TOTAL NITROGEN	1.52
7/12/2017 10:03	Grab	NITRATE+NITRITE-N	0.027
7/12/2017 10:03	Grab	PHOSPHATE, TOTAL AS P	0.226
7/12/2017 10:03	Grab	TOTAL NITROGEN	1.56
7/19/2017 9:56	Grab	NITRATE+NITRITE-N	0.31
7/19/2017 9:56	Grab	PHOSPHATE, TOTAL AS P	0.281
7/19/2017 9:56	Grab	TOTAL NITROGEN	1.85
7/26/2017 10:11	Grab	NITRATE+NITRITE-N	0.033
7/26/2017 10:11	Grab	PHOSPHATE, TOTAL AS P	0.179
7/26/2017 10:11	Grab	TOTAL NITROGEN	1.52
8/2/2017 9:49	Grab	NITRATE+NITRITE-N	0.118
8/2/2017 9:49	Grab	PHOSPHATE, TOTAL AS P	0.204
8/2/2017 9:49	Grab	TOTAL NITROGEN	1.67
8/9/2017 10:14	Grab	NITRATE+NITRITE-N	0.279
8/9/2017 10:14	Grab	PHOSPHATE, TOTAL AS P	0.192
8/9/2017 10:14	Grab	TOTAL NITROGEN	1.82
8/14/2017 9:36	Grab	NITRATE+NITRITE-N	0.233
8/14/2017 9:36	Grab	PHOSPHATE, TOTAL AS P	0.214
8/14/2017 9:36	Grab	TOTAL NITROGEN	1.71
8/21/2017 10:16	Grab	NITRATE+NITRITE-N	0.16
8/21/2017 10:16	Grab	PHOSPHATE, TOTAL AS P	0.162
8/21/2017 10:16	Grab	TOTAL NITROGEN	1.55
8/28/2017 10:03	Grab	NITRATE+NITRITE-N	0.225
8/28/2017 10:03	Grab	PHOSPHATE, TOTAL AS P	0.15
8/28/2017 10:03	Grab	TOTAL NITROGEN	1.54
9/5/2017 11:11	Grab	NITRATE+NITRITE-N	0.14
9/5/2017 11:11	Grab	PHOSPHATE, TOTAL AS P	0.116
9/5/2017 11:11	Grab	TOTAL NITROGEN	1.44
9/13/2017 12:05	Grab	NITRATE+NITRITE-N	0.095
9/13/2017 12:05	Grab	PHOSPHATE, TOTAL AS P	0.272
9/13/2017 12:05	Grab	TOTAL NITROGEN	1.32
9/18/2017 10:33	Grab	NITRATE+NITRITE-N	0.02

Table C-1. S-78 Water Quality Data			
Collection Date	Collection Method	Test Name	Value (mg/L)
9/18/2017 10:33	Grab	PHOSPHATE, TOTAL AS P	0.483
9/18/2017 10:33	Grab	TOTAL NITROGEN	1.81
9/25/2017 9:54	Grab	NITRATE+NITRITE-N	0.04
9/25/2017 9:54	Grab	PHOSPHATE, TOTAL AS P	0.246
9/25/2017 9:54	Grab	TOTAL NITROGEN	1.75
10/2/2017 10:51	Grab	NITRATE+NITRITE-N	0.028
10/2/2017 10:51	Grab	PHOSPHATE, TOTAL AS P	0.235
10/2/2017 10:51	Grab	TOTAL NITROGEN	2.26
10/9/2017 10:28	Grab	NITRATE+NITRITE-N	0.094
10/9/2017 10:28	Grab	PHOSPHATE, TOTAL AS P	0.189
10/9/2017 10:28	Grab	TOTAL NITROGEN	1.93
10/16/2017 10:16	Grab	NITRATE+NITRITE-N	0.08
10/16/2017 10:16	Grab	PHOSPHATE, TOTAL AS P	0.117
10/16/2017 10:16	Grab	TOTAL NITROGEN	2.61
10/23/2017 10:24	Grab	NITRATE+NITRITE-N	0.099
10/23/2017 10:24	Grab	PHOSPHATE, TOTAL AS P	0.139
10/23/2017 10:24	Grab	TOTAL NITROGEN	1.67
10/30/2017 10:15	Grab	NITRATE+NITRITE-N	0.22
10/30/2017 10:15	Grab	PHOSPHATE, TOTAL AS P	0.124
10/30/2017 10:15	Grab	TOTAL NITROGEN	1.55
11/6/2017 10:50	Grab	NITRATE+NITRITE-N	0.138
11/6/2017 10:50	Grab	PHOSPHATE, TOTAL AS P	0.109
11/6/2017 10:50	Grab	TOTAL NITROGEN	1.39
11/13/2017 10:33	Grab	NITRATE+NITRITE-N	0.116
11/13/2017 10:33	Grab	PHOSPHATE, TOTAL AS P	0.114
11/13/2017 10:33	Grab	TOTAL NITROGEN	1.36
11/20/2017 10:38	Grab	NITRATE+NITRITE-N	0.131
11/20/2017 10:38	Grab	PHOSPHATE, TOTAL AS P	0.116
11/20/2017 10:38	Grab	TOTAL NITROGEN	1.35
11/27/2017 10:05	Grab	NITRATE+NITRITE-N	0.173
11/27/2017 10:05	Grab	PHOSPHATE, TOTAL AS P	0.134
11/27/2017 10:05	Grab	TOTAL NITROGEN	1.42
12/4/2017 9:45	Grab	NITRATE+NITRITE-N	0.216
12/4/2017 9:45	Grab	PHOSPHATE, TOTAL AS P	0.124
12/4/2017 9:45	Grab	TOTAL NITROGEN	1.32
12/11/2017 9:44	Grab	NITRATE+NITRITE-N	0.181
12/11/2017 9:44	Grab	PHOSPHATE, TOTAL AS P	0.111
12/11/2017 9:44	Grab	TOTAL NITROGEN	1.28
12/18/2017 10:15	Grab	NITRATE+NITRITE-N	0.25
12/18/2017 10:15	Grab	PHOSPHATE, TOTAL AS P	0.128
12/18/2017 10:15	Grab	TOTAL NITROGEN	1.39
12/27/2017 9:41	Grab	NITRATE+NITRITE-N	0.231
12/27/2017 9:41	Grab	PHOSPHATE, TOTAL AS P	0.122
12/27/2017 9:41	Grab	TOTAL NITROGEN	1.34
1/3/2018 9:51	Grab	NITRATE+NITRITE-N	0.215
1/3/2018 9:51	Grab	PHOSPHATE, TOTAL AS P	0.114
1/3/2018 9:51	Grab	TOTAL NITROGEN	1.26

Table C-1. S-78 Water Quality Data			
Collection Date	**Collection Method**	**Test Name**	**Value (mg/L)**
1/8/2018 9:36	Grab	NITRATE+NITRITE-N	0.303
1/8/2018 9:36	Grab	PHOSPHATE, TOTAL AS P	0.136
1/8/2018 9:36	Grab	TOTAL NITROGEN	1.33
1/18/2018 11:00	Grab	NITRATE+NITRITE-N	0.352
1/18/2018 11:00	Grab	PHOSPHATE, TOTAL AS P	0.122
1/18/2018 11:00	Grab	TOTAL NITROGEN	1.37
1/22/2018 9:34	Grab	NITRATE+NITRITE-N	0.336
1/22/2018 9:34	Grab	PHOSPHATE, TOTAL AS P	0.138
1/22/2018 9:34	Grab	TOTAL NITROGEN	1.4
1/29/2018 9:45	Grab	NITRATE+NITRITE-N	0.249
1/29/2018 9:45	Grab	PHOSPHATE, TOTAL AS P	0.108
1/29/2018 9:45	Grab	TOTAL NITROGEN	1.19
2/5/2018 11:08	Grab	NITRATE+NITRITE-N	0.146
2/5/2018 11:08	Grab	PHOSPHATE, TOTAL AS P	0.091
2/5/2018 11:08	Grab	TOTAL NITROGEN	1.18
2/12/2018 9:59	Grab	NITRATE+NITRITE-N	0.167
2/12/2018 9:59	Grab	PHOSPHATE, TOTAL AS P	0.122
2/12/2018 9:59	Grab	TOTAL NITROGEN	1.25
2/19/2018 10:07	Grab	NITRATE+NITRITE-N	0.084
2/19/2018 10:07	Grab	PHOSPHATE, TOTAL AS P	0.103
2/19/2018 10:07	Grab	TOTAL NITROGEN	1.16
2/26/2018 10:08	Grab	NITRATE+NITRITE-N	0.106
2/26/2018 10:08	Grab	PHOSPHATE, TOTAL AS P	0.117
2/26/2018 10:08	Grab	TOTAL NITROGEN	1.17
3/5/2018 10:35	Grab	NITRATE+NITRITE-N	0.186
3/5/2018 10:35	Grab	PHOSPHATE, TOTAL AS P	0.127
3/5/2018 10:35	Grab	TOTAL NITROGEN	1.36
3/12/2018 9:32	Grab	NITRATE+NITRITE-N	0.252
3/12/2018 9:32	Grab	PHOSPHATE, TOTAL AS P	0.135
3/12/2018 9:32	Grab	TOTAL NITROGEN	1.01
3/19/2018 10:38	Grab	NITRATE+NITRITE-N	0.179
3/19/2018 10:38	Grab	PHOSPHATE, TOTAL AS P	0.118
3/19/2018 10:38	Grab	TOTAL NITROGEN	1.3
3/26/2018 10:34	Grab	NITRATE+NITRITE-N	0.19
3/26/2018 10:34	Grab	PHOSPHATE, TOTAL AS P	0.106
3/26/2018 10:34	Grab	TOTAL NITROGEN	1.2
4/2/2018 10:29	Grab	NITRATE+NITRITE-N	0.036
4/2/2018 10:29	Grab	PHOSPHATE, TOTAL AS P	0.087
4/2/2018 10:29	Grab	TOTAL NITROGEN	1.08
4/9/2018 9:35	Grab	NITRATE+NITRITE-N	0.148
4/9/2018 9:35	Grab	PHOSPHATE, TOTAL AS P	0.109
4/9/2018 9:35	Grab	TOTAL NITROGEN	1.26
4/16/2018 10:29	Grab	NITRATE+NITRITE-N	0.323
4/16/2018 10:29	Grab	PHOSPHATE, TOTAL AS P	0.135
4/16/2018 10:29	Grab	TOTAL NITROGEN	1.41
4/23/2018 10:59	Grab	NITRATE+NITRITE-N	0.292
4/23/2018 10:59	Grab	PHOSPHATE, TOTAL AS P	0.129

Table C-1. S-78 Water Quality Data			
Collection Date	**Collection Method**	**Test Name**	**Value (mg/L)**
4/23/2018 10:59	Grab	TOTAL NITROGEN	1.39
4/30/2018 9:25	Grab	NITRATE+NITRITE-N	0.155
4/30/2018 9:25	Grab	PHOSPHATE, TOTAL AS P	0.108
4/30/2018 9:25	Grab	TOTAL NITROGEN	1.29
5/7/2018 9:38	Grab	NITRATE+NITRITE-N	0.07
5/7/2018 9:38	Grab	PHOSPHATE, TOTAL AS P	0.106
5/7/2018 9:38	Grab	TOTAL NITROGEN	1.24
5/14/2018 10:05	Grab	NITRATE+NITRITE-N	0.123
5/14/2018 10:05	Grab	PHOSPHATE, TOTAL AS P	0.111
5/14/2018 10:05	Grab	TOTAL NITROGEN	1.31
5/21/2018 9:49	Grab	NITRATE+NITRITE-N	0.386
5/21/2018 9:49	Grab	PHOSPHATE, TOTAL AS P	0.138
5/21/2018 9:49	Grab	TOTAL NITROGEN	1.75
5/30/2018 10:49	Grab	NITRATE+NITRITE-N	0.318
5/30/2018 10:49	Grab	PHOSPHATE, TOTAL AS P	0.18
5/30/2018 10:49	Grab	TOTAL NITROGEN	1.78
6/4/2018 12:59	Grab	NITRATE+NITRITE-N	0.395
6/4/2018 12:59	Grab	PHOSPHATE, TOTAL AS P	0.237
6/4/2018 12:59	Grab	TOTAL NITROGEN	1.94
6/11/2018 9:43	Grab	NITRATE+NITRITE-N	0.181
6/11/2018 9:43	Grab	PHOSPHATE, TOTAL AS P	0.243
6/11/2018 9:43	Grab	TOTAL NITROGEN	1.79
6/18/2018 9:41	Grab	NITRATE+NITRITE-N	0.176
6/18/2018 9:41	Grab	PHOSPHATE, TOTAL AS P	0.258
6/18/2018 9:41	Grab	TOTAL NITROGEN	2.02
7/5/2018 10:21	Grab	NITRATE+NITRITE-N	0.223
7/5/2018 10:21	Grab	PHOSPHATE, TOTAL AS P	0.22
7/5/2018 10:21	Grab	TOTAL NITROGEN	1.91
7/9/2018 10:43	Grab	NITRATE+NITRITE-N	0.182
7/9/2018 10:43	Grab	PHOSPHATE, TOTAL AS P	0.185
7/9/2018 10:43	Grab	TOTAL NITROGEN	1.87
7/16/2018 10:30	Grab	NITRATE+NITRITE-N	0.103
7/16/2018 10:30	Grab	PHOSPHATE, TOTAL AS P	0.184
7/16/2018 10:30	Grab	TOTAL NITROGEN	1.76
7/23/2018 10:22	Grab	NITRATE+NITRITE-N	0.115
7/23/2018 10:22	Grab	PHOSPHATE, TOTAL AS P	0.159
7/23/2018 10:22	Grab	TOTAL NITROGEN	1.52
7/30/2018 10:30	Grab	NITRATE+NITRITE-N	0.106
7/30/2018 10:30	Grab	PHOSPHATE, TOTAL AS P	0.18
7/30/2018 10:30	Grab	TOTAL NITROGEN	1.95
8/6/2018 10:13	Grab	NITRATE+NITRITE-N	0.196
8/6/2018 10:13	Grab	PHOSPHATE, TOTAL AS P	0.173
8/6/2018 10:13	Grab	TOTAL NITROGEN	1.58
8/13/2018 10:19	Grab	NITRATE+NITRITE-N	0.121
8/13/2018 10:19	Grab	PHOSPHATE, TOTAL AS P	0.137
8/13/2018 10:19	Grab	TOTAL NITROGEN	1.42
8/20/2018 10:15	Grab	NITRATE+NITRITE-N	0.112

Table C-1. S-78 Water Quality Data

Collection Date	Collection Method	Test Name	Value (mg/L)
8/20/2018 10:15	Grab	PHOSPHATE, TOTAL AS P	0.147
8/20/2018 10:15	Grab	TOTAL NITROGEN	1.44
8/27/2018 9:45	Grab	NITRATE+NITRITE-N	0.105
8/27/2018 9:45	Grab	PHOSPHATE, TOTAL AS P	0.131
8/27/2018 9:45	Grab	TOTAL NITROGEN	1.35
9/6/2018 10:10	Grab	NITRATE+NITRITE-N	0.191
9/6/2018 10:10	Grab	PHOSPHATE, TOTAL AS P	0.133
9/6/2018 10:10	Grab	TOTAL NITROGEN	1.54
9/10/2018 10:12	Grab	NITRATE+NITRITE-N	0.159
9/10/2018 10:12	Grab	PHOSPHATE, TOTAL AS P	0.143
9/10/2018 10:12	Grab	TOTAL NITROGEN	1.42
9/17/2018 13:28	Grab	NITRATE+NITRITE-N	0.122
9/17/2018 13:28	Grab	PHOSPHATE, TOTAL AS P	0.161
9/17/2018 13:28	Grab	TOTAL NITROGEN	1.49
9/24/2018 10:15	Grab	NITRATE+NITRITE-N	0.1
9/24/2018 10:15	Grab	PHOSPHATE, TOTAL AS P	0.148
9/24/2018 10:15	Grab	TOTAL NITROGEN	1.3
10/1/2018 9:36	Grab	NITRATE+NITRITE-N	0.083
10/1/2018 9:36	Grab	PHOSPHATE, TOTAL AS P	0.106
10/1/2018 9:36	Grab	TOTAL NITROGEN	1.32
10/8/2018 9:58	Grab	NITRATE+NITRITE-N	0.087
10/8/2018 9:58	Grab	PHOSPHATE, TOTAL AS P	0.087
10/8/2018 9:58	Grab	TOTAL NITROGEN	1.31
10/15/2018 10:04	Grab	NITRATE+NITRITE-N	0.098
10/15/2018 10:04	Grab	PHOSPHATE, TOTAL AS P	0.087
10/15/2018 10:04	Grab	TOTAL NITROGEN	1.3
10/22/2018 10:21	Grab	NITRATE+NITRITE-N	0.028
10/22/2018 10:21	Grab	PHOSPHATE, TOTAL AS P	0.086
10/22/2018 10:21	Grab	TOTAL NITROGEN	1.24
10/29/2018 10:04	Grab	NITRATE+NITRITE-N	0.09
10/29/2018 10:04	Grab	PHOSPHATE, TOTAL AS P	0.089
10/29/2018 10:04	Grab	TOTAL NITROGEN	1.55
11/5/2018 9:55	Grab	NITRATE+NITRITE-N	0.086
11/5/2018 9:55	Grab	PHOSPHATE, TOTAL AS P	0.108
11/5/2018 9:55	Grab	TOTAL NITROGEN	1.84
11/14/2018 11:25	Grab	NITRATE+NITRITE-N	0.223
11/14/2018 11:25	Grab	PHOSPHATE, TOTAL AS P	0.121
11/14/2018 11:25	Grab	TOTAL NITROGEN	1.69
11/19/2018 9:21	Grab	NITRATE+NITRITE-N	0.155
11/19/2018 9:21	Grab	PHOSPHATE, TOTAL AS P	0.081
11/19/2018 9:21	Grab	TOTAL NITROGEN	1.4
11/26/2018 9:45	Grab	NITRATE+NITRITE-N	0.071
11/26/2018 9:45	Grab	PHOSPHATE, TOTAL AS P	0.083
11/26/2018 9:45	Grab	TOTAL NITROGEN	1.4
12/3/2018 9:55	Grab	NITRATE+NITRITE-N	0.024
12/3/2018 9:55	Grab	PHOSPHATE, TOTAL AS P	0.092
12/3/2018 9:55	Grab	TOTAL NITROGEN	1.46

Table C-1. S-78 Water Quality Data			
Collection Date	Collection Method	Test Name	Value (mg/L)
12/10/2018 10:06	Grab	NITRATE+NITRITE-N	0.031
12/10/2018 10:06	Grab	PHOSPHATE, TOTAL AS P	0.097
12/10/2018 10:06	Grab	TOTAL NITROGEN	1.49
12/17/2018 9:18	Grab	NITRATE+NITRITE-N	0.011
12/17/2018 9:18	Grab	PHOSPHATE, TOTAL AS P	0.086
12/17/2018 9:18	Grab	TOTAL NITROGEN	1.36
12/26/2018 9:47	Grab	NITRATE+NITRITE-N	0.021
12/26/2018 9:47	Grab	PHOSPHATE, TOTAL AS P	0.078
12/26/2018 9:47	Grab	TOTAL NITROGEN	1.27
1/3/2019 9:46	Grab	NITRATE+NITRITE-N	-0.005
1/3/2019 9:46	Grab	PHOSPHATE, TOTAL AS P	0.064
1/3/2019 9:46	Grab	TOTAL NITROGEN	1.23
1/7/2019 10:07	Grab	NITRATE+NITRITE-N	0.029
1/7/2019 10:07	Grab	PHOSPHATE, TOTAL AS P	0.067
1/7/2019 10:07	Grab	TOTAL NITROGEN	1.26
1/14/2019 10:10	Grab	NITRATE+NITRITE-N	0.037
1/14/2019 10:10	Grab	PHOSPHATE, TOTAL AS P	0.074
1/14/2019 10:10	Grab	TOTAL NITROGEN	1.24
1/23/2019 12:05	Grab	NITRATE+NITRITE-N	0.043
1/23/2019 12:05	Grab	PHOSPHATE, TOTAL AS P	0.084
1/23/2019 12:05	Grab	TOTAL NITROGEN	1.29
1/28/2019 10:49	Grab	NITRATE+NITRITE-N	0.093
1/28/2019 10:49	Grab	PHOSPHATE, TOTAL AS P	0.079
1/28/2019 10:49	Grab	TOTAL NITROGEN	1.16
2/4/2019 10:15	Grab	NITRATE+NITRITE-N	0.477
2/4/2019 10:15	Grab	PHOSPHATE, TOTAL AS P	0.092
2/4/2019 10:15	Grab	TOTAL NITROGEN	1.76
2/11/2019 9:55	Grab	NITRATE+NITRITE-N	1.222
2/11/2019 9:55	Grab	PHOSPHATE, TOTAL AS P	0.139
2/11/2019 9:55	Grab	TOTAL NITROGEN	2.76
2/18/2019 10:18	Grab	NITRATE+NITRITE-N	0.175
2/18/2019 10:18	Grab	PHOSPHATE, TOTAL AS P	0.08
2/18/2019 10:18	Grab	TOTAL NITROGEN	1.34
2/25/2019 10:15	Grab	NITRATE+NITRITE-N	0.067
2/25/2019 10:15	Grab	PHOSPHATE, TOTAL AS P	0.09
2/25/2019 10:15	Grab	TOTAL NITROGEN	1.39
3/4/2019 9:27	Grab	NITRATE+NITRITE-N	0.081
3/4/2019 9:27	Grab	PHOSPHATE, TOTAL AS P	0.092
3/4/2019 9:27	Grab	TOTAL NITROGEN	1.36
3/11/2019 10:07	Grab	NITRATE+NITRITE-N	0.189
3/11/2019 10:07	Grab	PHOSPHATE, TOTAL AS P	0.085
3/11/2019 10:07	Grab	TOTAL NITROGEN	1.28
3/18/2019 9:51	Grab	NITRATE+NITRITE-N	0.062
3/18/2019 9:51	Grab	PHOSPHATE, TOTAL AS P	0.088
3/18/2019 9:51	Grab	TOTAL NITROGEN	1.37
3/25/2019 9:59	Grab	NITRATE+NITRITE-N	0.153
3/25/2019 9:59	Grab	PHOSPHATE, TOTAL AS P	0.07

Table C-1. S-78 Water Quality Data			
Collection Date	**Collection Method**	**Test Name**	**Value (mg/L)**
3/25/2019 9:59	Grab	TOTAL NITROGEN	1.33
4/1/2019 9:54	Grab	NITRATE+NITRITE-N	0.022
4/1/2019 9:54	Grab	PHOSPHATE, TOTAL AS P	0.08
4/1/2019 9:54	Grab	TOTAL NITROGEN	1.23
4/8/2019 9:50	Grab	NITRATE+NITRITE-N	0.042
4/8/2019 9:50	Grab	PHOSPHATE, TOTAL AS P	0.076
4/8/2019 9:50	Grab	TOTAL NITROGEN	1.25
4/15/2019 10:36	Grab	NITRATE+NITRITE-N	-0.005
4/15/2019 10:36	Grab	PHOSPHATE, TOTAL AS P	0.076
4/15/2019 10:36	Grab	TOTAL NITROGEN	1.33
4/22/2019 10:32	Grab	NITRATE+NITRITE-N	0.065
4/22/2019 10:32	Grab	PHOSPHATE, TOTAL AS P	0.105
4/22/2019 10:32	Grab	TOTAL NITROGEN	1.59
4/29/2019 9:59	Grab	NITRATE+NITRITE-N	0.113
4/29/2019 9:59	Grab	PHOSPHATE, TOTAL AS P	0.082
4/29/2019 9:59	Grab	TOTAL NITROGEN	1.48
5/6/2019 9:41	Grab	NITRATE+NITRITE-N	0.024
5/6/2019 9:41	Grab	PHOSPHATE, TOTAL AS P	0.108
5/6/2019 9:41	Grab	TOTAL NITROGEN	1.38
5/13/2019 9:46	Grab	NITRATE+NITRITE-N	-0.005
5/13/2019 9:46	Grab	PHOSPHATE, TOTAL AS P	0.075
5/13/2019 9:46	Grab	TOTAL NITROGEN	1.26
5/20/2019 10:48	Grab	NITRATE+NITRITE-N	0.01
5/20/2019 10:48	Grab	PHOSPHATE, TOTAL AS P	0.081
5/20/2019 10:48	Grab	TOTAL NITROGEN	1.34
5/29/2019 9:39	Grab	NITRATE+NITRITE-N	-0.005
5/29/2019 9:39	Grab	PHOSPHATE, TOTAL AS P	0.094
5/29/2019 9:39	Grab	TOTAL NITROGEN	1.73
6/3/2019 10:07	Grab	NITRATE+NITRITE-N	-0.005
6/3/2019 10:07	Grab	PHOSPHATE, TOTAL AS P	0.074
6/3/2019 10:07	Grab	TOTAL NITROGEN	1.54
6/10/2019 9:49	Grab	NITRATE+NITRITE-N	0.016
6/10/2019 9:49	Grab	PHOSPHATE, TOTAL AS P	0.09
6/10/2019 9:49	Grab	TOTAL NITROGEN	1.47
6/17/2019 9:13	Grab	NITRATE+NITRITE-N	0.01
6/17/2019 9:13	Grab	PHOSPHATE, TOTAL AS P	0.08
6/17/2019 9:13	Grab	TOTAL NITROGEN	1.4
6/24/2019 9:23	Grab	NITRATE+NITRITE-N	0.016
6/24/2019 9:23	Grab	PHOSPHATE, TOTAL AS P	0.088
6/24/2019 9:23	Grab	TOTAL NITROGEN	1.5
7/1/2019 9:24	Grab	NITRATE+NITRITE-N	-0.005
7/1/2019 9:24	Grab	PHOSPHATE, TOTAL AS P	0.127
7/1/2019 9:24	Grab	TOTAL NITROGEN	1.53
7/8/2019 10:11	Grab	NITRATE+NITRITE-N	-0.005
7/8/2019 10:11	Grab	PHOSPHATE, TOTAL AS P	0.09
7/8/2019 10:11	Grab	TOTAL NITROGEN	1.31
7/15/2019 9:28	Grab	NITRATE+NITRITE-N	0.037

Table C-1. S-78 Water Quality Data

Collection Date	Collection Method	Test Name	Value (mg/L)
7/15/2019 9:28	Grab	PHOSPHATE, TOTAL AS P	0.113
7/15/2019 9:28	Grab	TOTAL NITROGEN	1.48
7/22/2019 9:22	Grab	NITRATE+NITRITE-N	0.017
7/22/2019 9:22	Grab	PHOSPHATE, TOTAL AS P	0.122
7/22/2019 9:22	Grab	TOTAL NITROGEN	1.52
7/29/2019 10:20	Grab	NITRATE+NITRITE-N	0.011
7/29/2019 10:20	Grab	PHOSPHATE, TOTAL AS P	0.11
7/29/2019 10:20	Grab	TOTAL NITROGEN	1.41
8/5/2019 9:42	Grab	NITRATE+NITRITE-N	0.156
8/5/2019 9:42	Grab	PHOSPHATE, TOTAL AS P	0.172
8/5/2019 9:42	Grab	TOTAL NITROGEN	1.76
8/12/2019 10:02	Grab	NITRATE+NITRITE-N	0.151
8/12/2019 10:02	Grab	PHOSPHATE, TOTAL AS P	0.17
8/12/2019 10:02	Grab	TOTAL NITROGEN	1.98
8/19/2019 9:38	Grab	NITRATE+NITRITE-N	0.172
8/19/2019 9:38	Grab	PHOSPHATE, TOTAL AS P	0.155
8/19/2019 9:38	Grab	TOTAL NITROGEN	1.94
8/26/2019 10:02	Grab	NITRATE+NITRITE-N	0.238
8/26/2019 10:02	Grab	PHOSPHATE, TOTAL AS P	0.195
8/26/2019 10:02	Grab	TOTAL NITROGEN	1.84
9/4/2019 9:55	Grab	NITRATE+NITRITE-N	0.356
9/4/2019 9:55	Grab	PHOSPHATE, TOTAL AS P	0.18
9/4/2019 9:55	Grab	TOTAL NITROGEN	1.81
9/9/2019 9:41	Grab	NITRATE+NITRITE-N	0.321
9/9/2019 9:41	Grab	PHOSPHATE, TOTAL AS P	0.162
9/9/2019 9:41	Grab	TOTAL NITROGEN	1.56
9/16/2019 9:26	Grab	NITRATE+NITRITE-N	0.415
9/16/2019 9:26	Grab	PHOSPHATE, TOTAL AS P	0.173
9/16/2019 9:26	Grab	TOTAL NITROGEN	1.77
9/23/2019 10:12	Grab	NITRATE+NITRITE-N	0.471
9/23/2019 10:12	Grab	PHOSPHATE, TOTAL AS P	0.17
9/23/2019 10:12	Grab	TOTAL NITROGEN	1.76
9/30/2019 9:37	Grab	NITRATE+NITRITE-N	0.492
9/30/2019 9:37	Grab	PHOSPHATE, TOTAL AS P	0.176
9/30/2019 9:37	Grab	TOTAL NITROGEN	1.86
10/7/2019 10:09	Grab	NITRATE+NITRITE-N	0.55
10/7/2019 10:09	Grab	PHOSPHATE, TOTAL AS P	0.157
10/7/2019 10:09	Grab	TOTAL NITROGEN	1.97
10/14/2019 9:39	Grab	NITRATE+NITRITE-N	0.329
10/14/2019 9:39	Grab	PHOSPHATE, TOTAL AS P	0.148
10/14/2019 9:39	Grab	TOTAL NITROGEN	1.84
10/21/2019 10:16	Grab	NITRATE+NITRITE-N	0.34
10/21/2019 10:16	Grab	PHOSPHATE, TOTAL AS P	0.133
10/21/2019 10:16	Grab	TOTAL NITROGEN	1.72
10/28/2019 9:54	Grab	NITRATE+NITRITE-N	0.392
10/28/2019 9:54	Grab	PHOSPHATE, TOTAL AS P	0.162
10/28/2019 9:54	Grab	TOTAL NITROGEN	1.73

Table C-1. S-78 Water Quality Data			
Collection Date	Collection Method	Test Name	Value (mg/L)
11/4/2019 9:32	Grab	NITRATE+NITRITE-N	0.449
11/4/2019 9:32	Grab	PHOSPHATE, TOTAL AS P	0.168
11/4/2019 9:32	Grab	TOTAL NITROGEN	1.76
11/13/2019 10:22	Grab	NITRATE+NITRITE-N	0.231
11/13/2019 10:22	Grab	PHOSPHATE, TOTAL AS P	0.1
11/13/2019 10:22	Grab	TOTAL NITROGEN	1.38
11/18/2019 10:13	Grab	NITRATE+NITRITE-N	0.173
11/18/2019 10:13	Grab	PHOSPHATE, TOTAL AS P	0.095
11/18/2019 10:13	Grab	TOTAL NITROGEN	1.29
11/25/2019 10:42	Grab	NITRATE+NITRITE-N	0.146
11/25/2019 10:42	Grab	PHOSPHATE, TOTAL AS P	0.082
11/25/2019 10:42	Grab	TOTAL NITROGEN	1.27
12/2/2019 9:37	Grab	NITRATE+NITRITE-N	0.047
12/2/2019 9:37	Grab	PHOSPHATE, TOTAL AS P	0.065
12/2/2019 9:37	Grab	TOTAL NITROGEN	1.22
12/9/2019 9:33	Grab	NITRATE+NITRITE-N	0.005
12/9/2019 9:33	Grab	PHOSPHATE, TOTAL AS P	0.077
12/9/2019 9:33	Grab	TOTAL NITROGEN	1.23
12/16/2019 9:27	Grab	NITRATE+NITRITE-N	-0.005
12/16/2019 9:27	Grab	PHOSPHATE, TOTAL AS P	0.093
12/16/2019 9:27	Grab	TOTAL NITROGEN	1.51
12/23/2019 9:12	Grab	NITRATE+NITRITE-N	0.105
12/23/2019 9:12	Grab	PHOSPHATE, TOTAL AS P	0.079
12/23/2019 9:12	Grab	TOTAL NITROGEN	1.44
12/30/2019 9:10	Grab	NITRATE+NITRITE-N	0.162
12/30/2019 9:10	Grab	PHOSPHATE, TOTAL AS P	0.077
12/30/2019 9:10	Grab	TOTAL NITROGEN	1.46
1/6/2020 9:05	Grab	NITRATE+NITRITE-N	0.227
1/6/2020 9:05	Grab	PHOSPHATE, TOTAL AS P	0.077
1/6/2020 9:05	Grab	TOTAL NITROGEN	1.44
1/13/2020 11:02	Grab	NITRATE+NITRITE-N	0.2
1/13/2020 11:02	Grab	PHOSPHATE, TOTAL AS P	0.07
1/13/2020 11:02	Grab	TOTAL NITROGEN	1.3
1/21/2020 9:45	Grab	NITRATE+NITRITE-N	0.121
1/21/2020 9:45	Grab	PHOSPHATE, TOTAL AS P	0.069
1/21/2020 9:45	Grab	TOTAL NITROGEN	1.28
1/27/2020 9:53	Grab	NITRATE+NITRITE-N	0.056
1/27/2020 9:53	Grab	PHOSPHATE, TOTAL AS P	0.071
1/27/2020 9:53	Grab	TOTAL NITROGEN	1.22
2/3/2020 9:56	Grab	NITRATE+NITRITE-N	0.202
2/3/2020 9:56	Grab	PHOSPHATE, TOTAL AS P	0.073
2/3/2020 9:56	Grab	TOTAL NITROGEN	1.29
2/10/2020 9:45	Grab	NITRATE+NITRITE-N	0.139
2/10/2020 9:45	Grab	PHOSPHATE, TOTAL AS P	0.07
2/10/2020 9:45	Grab	TOTAL NITROGEN	1.3
2/17/2020 9:36	Grab	NITRATE+NITRITE-N	0.082
2/17/2020 9:36	Grab	PHOSPHATE, TOTAL AS P	0.071

Table C-1. S-78 Water Quality Data

Collection Date	Collection Method	Test Name	Value (mg/L)
2/17/2020 9:36	Grab	TOTAL NITROGEN	1.29
2/24/2020 9:53	Grab	NITRATE+NITRITE-N	0.091
2/24/2020 9:53	Grab	PHOSPHATE, TOTAL AS P	0.066
2/24/2020 9:53	Grab	TOTAL NITROGEN	1.15
3/2/2020 9:38	Grab	NITRATE+NITRITE-N	0.099
3/2/2020 9:38	Grab	PHOSPHATE, TOTAL AS P	0.071
3/2/2020 9:38	Grab	TOTAL NITROGEN	1.21
3/9/2020 10:35	Grab	NITRATE+NITRITE-N	0.142
3/9/2020 10:35	Grab	PHOSPHATE, TOTAL AS P	0.079
3/9/2020 10:35	Grab	TOTAL NITROGEN	1.25
3/16/2020 9:40	Grab	NITRATE+NITRITE-N	0.02
3/16/2020 9:40	Grab	PHOSPHATE, TOTAL AS P	0.064
3/16/2020 9:40	Grab	TOTAL NITROGEN	1.29

Table C-2. Townsend Canal Water Quality Data			
Collection Date	Collection Method	Test Name	Value (mg/L)
6/29/2011 10:01	Grab	KJELDAHL NITROGEN, TOTAL	1.47
6/29/2011 10:01	Grab	NITRATE+NITRITE-N	0.301
6/29/2011 10:01	Grab	PHOSPHATE, TOTAL AS P	0.43
7/13/2011 10:04	Grab	KJELDAHL NITROGEN, TOTAL	1.39
7/13/2011 10:04	Grab	NITRATE+NITRITE-N	0.109
7/13/2011 10:04	Grab	PHOSPHATE, TOTAL AS P	0.363
7/20/2011 10:07	Grab	KJELDAHL NITROGEN, TOTAL	1.21
7/20/2011 10:07	Grab	NITRATE+NITRITE-N	0.085
7/20/2011 10:07	Grab	PHOSPHATE, TOTAL AS P	0.213
7/27/2011 9:41	Grab	KJELDAHL NITROGEN, TOTAL	1.37
7/27/2011 9:41	Grab	NITRATE+NITRITE-N	0.113
7/27/2011 9:41	Grab	PHOSPHATE, TOTAL AS P	0.223
8/3/2011 10:07	Grab	KJELDAHL NITROGEN, TOTAL	1.27
8/3/2011 10:07	Grab	NITRATE+NITRITE-N	0.068
8/3/2011 10:07	Grab	PHOSPHATE, TOTAL AS P	0.234
8/10/2011 9:53	Grab	KJELDAHL NITROGEN, TOTAL	1.34
8/10/2011 9:53	Grab	NITRATE+NITRITE-N	0.117
8/10/2011 9:53	Grab	PHOSPHATE, TOTAL AS P	0.308
8/17/2011 9:38	Grab	KJELDAHL NITROGEN, TOTAL	1.35
8/17/2011 9:38	Grab	NITRATE+NITRITE-N	0.136
8/17/2011 9:38	Grab	PHOSPHATE, TOTAL AS P	0.321
8/24/2011 9:32	Grab	KJELDAHL NITROGEN, TOTAL	1.15
8/24/2011 9:32	Grab	NITRATE+NITRITE-N	0.142
8/24/2011 9:32	Grab	PHOSPHATE, TOTAL AS P	0.341
8/31/2011 10:14	Grab	KJELDAHL NITROGEN, TOTAL	1.14
8/31/2011 10:14	Grab	NITRATE+NITRITE-N	0.162
8/31/2011 10:14	Grab	PHOSPHATE, TOTAL AS P	0.251
9/7/2011 9:04	Grab	KJELDAHL NITROGEN, TOTAL	1.33
9/7/2011 9:04	Grab	NITRATE+NITRITE-N	0.102
9/7/2011 9:04	Grab	PHOSPHATE, TOTAL AS P	0.311
9/14/2011 9:59	Grab	KJELDAHL NITROGEN, TOTAL	1.19
9/14/2011 9:59	Grab	NITRATE+NITRITE-N	0.157
9/14/2011 9:59	Grab	PHOSPHATE, TOTAL AS P	0.224
9/28/2011 9:44	Grab	KJELDAHL NITROGEN, TOTAL	1.07
9/28/2011 9:44	Grab	NITRATE+NITRITE-N	0.187
9/28/2011 9:44	Grab	PHOSPHATE, TOTAL AS P	0.193
10/12/2011 9:54	Grab	KJELDAHL NITROGEN, TOTAL	1.14
10/12/2011 9:54	Grab	NITRATE+NITRITE-N	0.129
10/12/2011 9:54	Grab	PHOSPHATE, TOTAL AS P	0.251
10/19/2011 9:34	Grab	KJELDAHL NITROGEN, TOTAL	1.19
10/19/2011 9:34	Grab	NITRATE+NITRITE-N	0.098
10/19/2011 9:34	Grab	PHOSPHATE, TOTAL AS P	0.213
10/26/2011 9:07	Grab	KJELDAHL NITROGEN, TOTAL	0.95
10/26/2011 9:07	Grab	NITRATE+NITRITE-N	0.146
10/26/2011 9:07	Grab	PHOSPHATE, TOTAL AS P	0.149
11/2/2011 10:18	Grab	KJELDAHL NITROGEN, TOTAL	1.14

Table C-2. Townsend Canal Water Quality Data			
Collection Date	Collection Method	Test Name	Value (mg/L)
11/2/2011 10:18	Grab	NITRATE+NITRITE-N	0.198
11/2/2011 10:18	Grab	PHOSPHATE, TOTAL AS P	0.214
11/2/2011 10:30	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
11/2/2011 10:30	Grab	NITRATE+NITRITE-N	-0.005
11/2/2011 10:30	Grab	PHOSPHATE, TOTAL AS P	-0.002
11/9/2011 10:07	Grab	KJELDAHL NITROGEN, TOTAL	1.01
11/9/2011 10:07	Grab	NITRATE+NITRITE-N	0.135
11/9/2011 10:07	Grab	PHOSPHATE, TOTAL AS P	0.122
11/16/2011 10:04	Grab	KJELDAHL NITROGEN, TOTAL	1.08
11/16/2011 10:04	Grab	NITRATE+NITRITE-N	0.388
11/16/2011 10:04	Grab	PHOSPHATE, TOTAL AS P	0.1
12/8/2011 10:13	Grab	KJELDAHL NITROGEN, TOTAL	0.97
12/8/2011 10:13	Grab	NITRATE+NITRITE-N	0.474
12/8/2011 10:13	Grab	PHOSPHATE, TOTAL AS P	0.1
12/8/2011 10:22	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
12/8/2011 10:22	Grab	NITRATE+NITRITE-N	-0.005
12/8/2011 10:22	Grab	PHOSPHATE, TOTAL AS P	-0.002
5/1/2014 11:23	Grab	KJELDAHL NITROGEN, TOTAL	1.04
5/1/2014 11:23	Grab	NITRATE+NITRITE-N	0.012
5/1/2014 11:23	Grab	PHOSPHATE, TOTAL AS P	0.102
5/15/2014 10:51	Grab	KJELDAHL NITROGEN, TOTAL	0.99
5/15/2014 10:51	Grab	NITRATE+NITRITE-N	0.049
5/15/2014 10:51	Grab	PHOSPHATE, TOTAL AS P	0.123
5/29/2014 12:03	Grab	KJELDAHL NITROGEN, TOTAL	1.01
5/29/2014 12:03	Grab	NITRATE+NITRITE-N	-0.005
5/29/2014 12:03	Grab	PHOSPHATE, TOTAL AS P	0.069
6/12/2014 11:02	Grab	NITRATE+NITRITE-N	0.029
6/12/2014 11:02	Grab	TOTAL NITROGEN	0.93
6/12/2014 11:02	Grab	PHOSPHATE, TOTAL AS P	0.127
6/26/2014 10:41	Grab	NITRATE+NITRITE-N	-0.005
6/26/2014 10:41	Grab	TOTAL NITROGEN	1.27
6/26/2014 10:41	Grab	PHOSPHATE, TOTAL AS P	0.143
7/14/2014 10:28	Grab	NITRATE+NITRITE-N	0.156
7/14/2014 10:28	Grab	TOTAL NITROGEN	1.22
7/14/2014 10:28	Grab	PHOSPHATE, TOTAL AS P	0.148
7/28/2014 10:34	Grab	NITRATE+NITRITE-N	0.178
7/28/2014 10:34	Grab	TOTAL NITROGEN	1.36
7/28/2014 10:34	Grab	PHOSPHATE, TOTAL AS P	0.137
8/11/2014 10:30	Grab	NITRATE+NITRITE-N	0.193
8/11/2014 10:30	Grab	TOTAL NITROGEN	1.44
8/11/2014 10:30	Grab	PHOSPHATE, TOTAL AS P	0.323
8/25/2014 10:34	Grab	NITRATE+NITRITE-N	0.109
8/25/2014 10:34	Grab	TOTAL NITROGEN	1.45
8/25/2014 10:34	Grab	PHOSPHATE, TOTAL AS P	0.383
9/8/2014 10:09	Grab	NITRATE+NITRITE-N	0.22
9/8/2014 10:09	Grab	TOTAL NITROGEN	1.34
9/8/2014 10:09	Grab	PHOSPHATE, TOTAL AS P	0.207

Table C-2. Townsend Canal Water Quality Data			
Collection Date	Collection Method	Test Name	Value (mg/L)
9/22/2014 10:10	Grab	NITRATE+NITRITE-N	0.219
9/22/2014 10:10	Grab	TOTAL NITROGEN	1.39
9/22/2014 10:10	Grab	PHOSPHATE, TOTAL AS P	0.193
10/6/2014 10:45	Grab	NITRATE+NITRITE-N	0.241
10/6/2014 10:45	Grab	TOTAL NITROGEN	1.35
10/6/2014 10:45	Grab	PHOSPHATE, TOTAL AS P	0.247
10/20/2014 10:27	Grab	NITRATE+NITRITE-N	0.332
10/20/2014 10:27	Grab	TOTAL NITROGEN	1.38
10/20/2014 10:27	Grab	PHOSPHATE, TOTAL AS P	0.153
5/11/2015 11:05	Grab	NITRATE+NITRITE-N	0.03
5/11/2015 11:05	Grab	TOTAL NITROGEN	1.2
5/11/2015 11:05	Grab	PHOSPHATE, TOTAL AS P	0.104
5/26/2015 10:51	Grab	NITRATE+NITRITE-N	0.154
5/26/2015 10:51	Grab	TOTAL NITROGEN	1.35
5/26/2015 10:51	Grab	PHOSPHATE, TOTAL AS P	0.133
6/8/2015 10:21	Grab	NITRATE+NITRITE-N	-0.005
6/8/2015 10:21	Grab	TOTAL NITROGEN	1.2
6/8/2015 10:21	Grab	PHOSPHATE, TOTAL AS P	0.119
6/22/2015 10:19	Grab	NITRATE+NITRITE-N	-0.005
6/22/2015 10:19	Grab	TOTAL NITROGEN	1.1
6/22/2015 10:19	Grab	PHOSPHATE, TOTAL AS P	0.114
7/6/2015 10:01	Grab	NITRATE+NITRITE-N	0.005
7/6/2015 10:01	Grab	TOTAL NITROGEN	1.11
7/6/2015 10:01	Grab	PHOSPHATE, TOTAL AS P	0.17
7/20/2015 10:10	Grab	NITRATE+NITRITE-N	0.421
7/20/2015 10:10	Grab	TOTAL NITROGEN	1.73
7/20/2015 10:10	Grab	PHOSPHATE, TOTAL AS P	0.296
8/3/2015 10:37	Grab	NITRATE+NITRITE-N	0.164
8/3/2015 10:37	Grab	TOTAL NITROGEN	1.22
8/3/2015 10:37	Grab	PHOSPHATE, TOTAL AS P	0.155
8/17/2015 10:06	Grab	NITRATE+NITRITE-N	0.337
8/17/2015 10:06	Grab	TOTAL NITROGEN	1.52
8/17/2015 10:06	Grab	PHOSPHATE, TOTAL AS P	0.375
9/1/2015 9:54	Grab	NITRATE+NITRITE-N	0.243
9/1/2015 9:54	Grab	TOTAL NITROGEN	1.51
9/1/2015 9:54	Grab	PHOSPHATE, TOTAL AS P	0.246
9/14/2015 9:51	Grab	NITRATE+NITRITE-N	0.191
9/14/2015 9:51	Grab	TOTAL NITROGEN	1.36
9/14/2015 9:51	Grab	PHOSPHATE, TOTAL AS P	0.227
9/28/2015 10:07	Grab	NITRATE+NITRITE-N	0.187
9/28/2015 10:07	Grab	TOTAL NITROGEN	1.3
9/28/2015 10:07	Grab	PHOSPHATE, TOTAL AS P	0.27

Table C-3. S-79 Water Quality Data			
Collection Date	**Collection Method**	**Test Name**	**Value (mg/L)**
2/8/2000 13:40	Grab	KJELDAHL NITROGEN, TOTAL	0.924
2/8/2000 13:40	Grab	NITRATE+NITRITE-N	0.543
2/8/2000 13:40	Grab	PHOSPHATE, TOTAL AS P	0.11
4/5/2000 13:40	Grab	KJELDAHL NITROGEN, TOTAL	0.855
4/5/2000 13:40	Grab	NITRATE+NITRITE-N	0.37
4/5/2000 13:40	Grab	PHOSPHATE, TOTAL AS P	0.121
6/1/2000 13:25	Grab	KJELDAHL NITROGEN, TOTAL	1.303
6/1/2000 13:25	Grab	NITRATE+NITRITE-N	0.264
6/1/2000 13:25	Grab	PHOSPHATE, TOTAL AS P	0.178
9/7/2000 13:35	Grab	KJELDAHL NITROGEN, TOTAL	1.027
9/7/2000 13:35	Grab	NITRATE+NITRITE-N	0.241
9/7/2000 13:35	Grab	PHOSPHATE, TOTAL AS P	0.173
10/19/2000 14:15	Grab	KJELDAHL NITROGEN, TOTAL	1.051
10/19/2000 14:15	Grab	NITRATE+NITRITE-N	0.429
10/19/2000 14:15	Grab	PHOSPHATE, TOTAL AS P	0.151
12/14/2000 14:00	Grab	KJELDAHL NITROGEN, TOTAL	1.421
12/14/2000 14:00	Grab	NITRATE+NITRITE-N	0.726
12/14/2000 14:00	Grab	PHOSPHATE, TOTAL AS P	0.174
1/5/2001 12:35	Grab	KJELDAHL NITROGEN, TOTAL	1.163
1/5/2001 12:35	Grab	NITRATE+NITRITE-N	0.843
1/5/2001 12:35	Grab	PHOSPHATE, TOTAL AS P	0.123
2/12/2001 15:00	Grab	KJELDAHL NITROGEN, TOTAL	1.273
2/12/2001 15:00	Grab	NITRATE+NITRITE-N	0.454
2/12/2001 15:00	Grab	PHOSPHATE, TOTAL AS P	0.098
6/11/2001 14:30	Grab	KJELDAHL NITROGEN, TOTAL	1.707
6/11/2001 14:30	Grab	NITRATE+NITRITE-N	0.008
6/11/2001 14:30	Grab	PHOSPHATE, TOTAL AS P	0.213
8/1/2001 10:50	Grab	KJELDAHL NITROGEN, TOTAL	1.456
8/1/2001 10:50	Grab	NITRATE+NITRITE-N	0.278
8/1/2001 10:50	Grab	PHOSPHATE, TOTAL AS P	0.287
10/31/2001 14:00	Grab	KJELDAHL NITROGEN, TOTAL	1.068
10/31/2001 14:00	Grab	NITRATE+NITRITE-N	0.415
10/31/2001 14:00	Grab	PHOSPHATE, TOTAL AS P	0.144
10/31/2001 14:15	Grab	KJELDAHL NITROGEN, TOTAL	-0.5
10/31/2001 14:15	Grab	NITRATE+NITRITE-N	0.004
10/31/2001 14:15	Grab	PHOSPHATE, TOTAL AS P	-0.004
12/27/2001 13:10	Grab	KJELDAHL NITROGEN, TOTAL	0.84
12/27/2001 13:10	Grab	NITRATE+NITRITE-N	0.556
12/27/2001 13:10	Grab	PHOSPHATE, TOTAL AS P	0.099
12/27/2001 13:15	Grab	KJELDAHL NITROGEN, TOTAL	-0.1
12/27/2001 13:15	Grab	NITRATE+NITRITE-N	0.004
12/27/2001 13:15	Grab	PHOSPHATE, TOTAL AS P	-0.004
2/27/2002 13:50	Grab	KJELDAHL NITROGEN, TOTAL	1.05
2/27/2002 13:50	Grab	NITRATE+NITRITE-N	0.276
2/27/2002 13:50	Grab	PHOSPHATE, TOTAL AS P	0.091
4/22/2002 12:20	Grab	KJELDAHL NITROGEN, TOTAL	-0.1

Table C-3. S-79 Water Quality Data			
Collection Date	**Collection Method**	**Test Name**	**Value (mg/L)**
4/22/2002 12:20	Grab	NITRATE+NITRITE-N	0.008
4/22/2002 12:20	Grab	PHOSPHATE, TOTAL AS P	-0.004
4/22/2002 12:35	Grab	KJELDAHL NITROGEN, TOTAL	1.19
4/22/2002 12:35	Grab	NITRATE+NITRITE-N	0.269
4/22/2002 12:35	Grab	PHOSPHATE, TOTAL AS P	0.147
4/22/2002 12:50	Grab	KJELDAHL NITROGEN, TOTAL	-0.1
4/22/2002 12:50	Grab	NITRATE+NITRITE-N	0.007
4/22/2002 12:50	Grab	PHOSPHATE, TOTAL AS P	-0.004
6/13/2002 12:30	Grab	KJELDAHL NITROGEN, TOTAL	1.61
6/13/2002 12:30	Grab	NITRATE+NITRITE-N	-0.004
6/13/2002 12:30	Grab	PHOSPHATE, TOTAL AS P	0.142
7/17/2002 13:30	Grab	KJELDAHL NITROGEN, TOTAL	1.87
7/17/2002 13:30	Grab	NITRATE+NITRITE-N	0.28
7/17/2002 13:30	Grab	PHOSPHATE, TOTAL AS P	0.263
8/1/2002 13:55	Grab	KJELDAHL NITROGEN, TOTAL	1.5
8/1/2002 13:55	Grab	NITRATE+NITRITE-N	0.232
8/1/2002 13:55	Grab	PHOSPHATE, TOTAL AS P	0.23
10/15/2002 12:20	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
10/15/2002 12:20	Grab	NITRATE+NITRITE-N	-0.004
10/15/2002 12:20	Grab	PHOSPHATE, TOTAL AS P	-0.002
12/18/2002 11:25	Grab	KJELDAHL NITROGEN, TOTAL	1.25
12/18/2002 11:25	Grab	NITRATE+NITRITE-N	0.309
12/18/2002 11:25	Grab	PHOSPHATE, TOTAL AS P	0.073
4/28/2003 13:32	Grab	KJELDAHL NITROGEN, TOTAL	1.22
4/28/2003 13:32	Grab	NITRATE+NITRITE-N	0.303
4/28/2003 13:32	Grab	PHOSPHATE, TOTAL AS P	0.125
6/25/2003 13:32	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
6/25/2003 13:32	Grab	NITRATE+NITRITE-N	-0.004
6/25/2003 13:32	Grab	PHOSPHATE, TOTAL AS P	-0.002
8/25/2003 14:16	Grab	KJELDAHL NITROGEN, TOTAL	1.21
8/25/2003 14:16	Grab	NITRATE+NITRITE-N	0.202
8/25/2003 14:16	Grab	PHOSPHATE, TOTAL AS P	0.121
10/28/2003 14:30	Grab	KJELDAHL NITROGEN, TOTAL	1.14
10/28/2003 14:30	Grab	NITRATE+NITRITE-N	0.12
10/28/2003 14:30	Grab	PHOSPHATE, TOTAL AS P	0.068
12/22/2003 15:20	Grab	KJELDAHL NITROGEN, TOTAL	1.08
12/22/2003 15:20	Grab	NITRATE+NITRITE-N	0.196
12/22/2003 15:20	Grab	PHOSPHATE, TOTAL AS P	0.065
2/23/2004 12:55	Grab	KJELDAHL NITROGEN, TOTAL	1.12
2/23/2004 12:55	Grab	NITRATE+NITRITE-N	0.118
2/23/2004 12:55	Grab	PHOSPHATE, TOTAL AS P	0.086
4/12/2004 12:46	Grab	KJELDAHL NITROGEN, TOTAL	1.01
4/12/2004 12:46	Grab	NITRATE+NITRITE-N	0.121
4/12/2004 12:46	Grab	PHOSPHATE, TOTAL AS P	0.079
4/12/2004 13:00	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
4/12/2004 13:00	Grab	NITRATE+NITRITE-N	-0.004
4/12/2004 13:00	Grab	PHOSPHATE, TOTAL AS P	-0.002

Table C-3. S-79 Water Quality Data			
Collection Date	**Collection Method**	**Test Name**	**Value (mg/L)**
6/14/2004 12:30	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
6/14/2004 12:30	Grab	NITRATE+NITRITE-N	-0.004
6/14/2004 12:30	Grab	PHOSPHATE, TOTAL AS P	0.002
6/14/2004 12:40	Grab	KJELDAHL NITROGEN, TOTAL	1.2
6/14/2004 12:40	Grab	NITRATE+NITRITE-N	0.117
6/14/2004 12:40	Grab	PHOSPHATE, TOTAL AS P	0.16
8/30/2004 12:08	Grab	KJELDAHL NITROGEN, TOTAL	1.75
8/30/2004 12:08	Grab	NITRATE+NITRITE-N	0.153
8/30/2004 12:08	Grab	PHOSPHATE, TOTAL AS P	0.214
11/1/2004 11:38	Grab	KJELDAHL NITROGEN, TOTAL	0.99
11/1/2004 11:38	Grab	NITRATE+NITRITE-N	0.206
11/1/2004 11:38	Grab	PHOSPHATE, TOTAL AS P	0.086
1/10/2005 11:52	Grab	KJELDAHL NITROGEN, TOTAL	0.98
1/10/2005 11:52	Grab	NITRATE+NITRITE-N	0.367
1/10/2005 11:52	Grab	PHOSPHATE, TOTAL AS P	0.095
3/30/2005 12:02	Grab	KJELDAHL NITROGEN, TOTAL	1.22
3/30/2005 12:02	Grab	NITRATE+NITRITE-N	0.457
3/30/2005 12:02	Grab	PHOSPHATE, TOTAL AS P	0.148
3/30/2005 12:13	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
3/30/2005 12:13	Grab	NITRATE+NITRITE-N	-0.006
3/30/2005 12:13	Grab	PHOSPHATE, TOTAL AS P	-0.002
5/18/2005 13:45	Grab	KJELDAHL NITROGEN, TOTAL	1.33
5/18/2005 13:45	Grab	NITRATE+NITRITE-N	0.527
5/18/2005 13:45	Grab	PHOSPHATE, TOTAL AS P	0.149
7/13/2005 11:47	Grab	KJELDAHL NITROGEN, TOTAL	1.14
7/13/2005 11:47	Grab	NITRATE+NITRITE-N	0.139
7/13/2005 11:47	Grab	PHOSPHATE, TOTAL AS P	0.121
11/28/2005 9:25	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
11/28/2005 9:25	Grab	NITRATE+NITRITE-N	-0.006
11/28/2005 9:25	Grab	PHOSPHATE, TOTAL AS P	0.002
11/28/2005 9:34	Grab	KJELDAHL NITROGEN, TOTAL	1.15
11/28/2005 9:34	Grab	NITRATE+NITRITE-N	0.339
11/28/2005 9:34	Grab	PHOSPHATE, TOTAL AS P	0.118
1/10/2006 10:02	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
1/10/2006 10:02	Grab	NITRATE+NITRITE-N	-0.006
1/10/2006 10:02	Grab	PHOSPHATE, TOTAL AS P	-0.002
1/10/2006 10:15	Grab	KJELDAHL NITROGEN, TOTAL	1.01
1/10/2006 10:15	Grab	NITRATE+NITRITE-N	0.509
1/10/2006 10:15	Grab	PHOSPHATE, TOTAL AS P	0.13
3/13/2006 11:32	Grab	KJELDAHL NITROGEN, TOTAL	1.03
3/13/2006 11:32	Grab	NITRATE+NITRITE-N	0.397
3/13/2006 11:32	Grab	PHOSPHATE, TOTAL AS P	0.131
5/1/2006 9:14	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
5/1/2006 9:14	Grab	NITRATE+NITRITE-N	-0.006
5/1/2006 9:14	Grab	PHOSPHATE, TOTAL AS P	-0.002
5/1/2006 9:22	Grab	KJELDAHL NITROGEN, TOTAL	0.99
5/1/2006 9:22	Grab	NITRATE+NITRITE-N	0.391

Table C-3. S-79 Water Quality Data			
Collection Date	Collection Method	Test Name	Value (mg/L)
5/1/2006 9:22	Grab	PHOSPHATE, TOTAL AS P	0.127
7/17/2006 11:15	Grab	KJELDAHL NITROGEN, TOTAL	1.71
7/17/2006 11:15	Grab	NITRATE+NITRITE-N	-0.006
7/17/2006 11:15	Grab	PHOSPHATE, TOTAL AS P	0.154
9/19/2006 9:42	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
9/19/2006 9:42	Grab	NITRATE+NITRITE-N	-0.006
9/19/2006 9:42	Grab	PHOSPHATE, TOTAL AS P	-0.002
9/19/2006 9:50	Grab	KJELDAHL NITROGEN, TOTAL	1.14
9/19/2006 9:50	Grab	NITRATE+NITRITE-N	0.276
9/19/2006 9:50	Grab	PHOSPHATE, TOTAL AS P	0.213
11/29/2006 10:24	Grab	KJELDAHL NITROGEN, TOTAL	0.97
11/29/2006 10:24	Grab	NITRATE+NITRITE-N	0.666
11/29/2006 10:24	Grab	PHOSPHATE, TOTAL AS P	0.13
11/29/2006 10:45	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
11/29/2006 10:45	Grab	NITRATE+NITRITE-N	-0.006
11/29/2006 10:45	Grab	PHOSPHATE, TOTAL AS P	-0.002
1/29/2007 13:42	Grab	KJELDAHL NITROGEN, TOTAL	0.91
1/29/2007 13:42	Grab	NITRATE+NITRITE-N	0.334
1/29/2007 13:42	Grab	PHOSPHATE, TOTAL AS P	0.107
3/12/2007 13:27	Grab	KJELDAHL NITROGEN, TOTAL	1.19
3/12/2007 13:27	Grab	NITRATE+NITRITE-N	-0.006
3/12/2007 13:27	Grab	PHOSPHATE, TOTAL AS P	0.09
5/29/2007 13:40	Grab	KJELDAHL NITROGEN, TOTAL	1.3
5/29/2007 13:40	Grab	NITRATE+NITRITE-N	-0.006
5/29/2007 13:40	Grab	PHOSPHATE, TOTAL AS P	0.201
7/10/2007 11:04	Grab	KJELDAHL NITROGEN, TOTAL	1.4
7/10/2007 11:04	Grab	NITRATE+NITRITE-N	-0.005
7/10/2007 11:04	Grab	PHOSPHATE, TOTAL AS P	0.27
7/10/2007 11:20	Grab	KJELDAHL NITROGEN, TOTAL	0.06
7/10/2007 11:20	Grab	NITRATE+NITRITE-N	-0.005
7/10/2007 11:20	Grab	PHOSPHATE, TOTAL AS P	-0.002
9/5/2007 13:46	Grab	KJELDAHL NITROGEN, TOTAL	1.13
9/5/2007 13:46	Grab	NITRATE+NITRITE-N	0.299
9/5/2007 13:46	Grab	PHOSPHATE, TOTAL AS P	0.263
11/27/2007 12:52	Grab	KJELDAHL NITROGEN, TOTAL	0.89
11/27/2007 12:52	Grab	NITRATE+NITRITE-N	0.589
11/27/2007 12:52	Grab	PHOSPHATE, TOTAL AS P	0.154
1/7/2008 11:30	Grab	KJELDAHL NITROGEN, TOTAL	1.14
1/7/2008 11:30	Grab	NITRATE+NITRITE-N	0.598
1/7/2008 11:30	Grab	PHOSPHATE, TOTAL AS P	0.158
3/13/2008 13:11	Grab	KJELDAHL NITROGEN, TOTAL	0.91
3/13/2008 13:11	Grab	NITRATE+NITRITE-N	0.316
3/13/2008 13:11	Grab	PHOSPHATE, TOTAL AS P	0.178
5/12/2008 12:27	Grab	KJELDAHL NITROGEN, TOTAL	0.96
5/12/2008 12:27	Grab	NITRATE+NITRITE-N	0.005
5/12/2008 12:27	Grab	PHOSPHATE, TOTAL AS P	0.261
7/14/2008 1:46	Grab	KJELDAHL NITROGEN, TOTAL	1.53

Table C-3. S-79 Water Quality Data

Collection Date	Collection Method	Test Name	Value (mg/L)
7/14/2008 1:46	Grab	NITRATE+NITRITE-N	0.132
7/14/2008 1:46	Grab	PHOSPHATE, TOTAL AS P	0.226
9/8/2008 13:57	Grab	KJELDAHL NITROGEN, TOTAL	2
9/8/2008 13:57	Grab	NITRATE+NITRITE-N	0.143
9/8/2008 13:57	Grab	PHOSPHATE, TOTAL AS P	0.272
11/12/2008 11:54	Grab	KJELDAHL NITROGEN, TOTAL	1.08
11/12/2008 11:54	Grab	NITRATE+NITRITE-N	0.467
11/12/2008 11:54	Grab	PHOSPHATE, TOTAL AS P	0.15
1/5/2009 11:18	Grab	KJELDAHL NITROGEN, TOTAL	1.3
1/5/2009 11:18	Grab	NITRATE+NITRITE-N	0.204
1/5/2009 11:18	Grab	PHOSPHATE, TOTAL AS P	0.101
3/16/2009 10:47	Grab	KJELDAHL NITROGEN, TOTAL	1.37
3/16/2009 10:47	Grab	NITRATE+NITRITE-N	0.043
3/16/2009 10:47	Grab	PHOSPHATE, TOTAL AS P	0.099
5/5/2009 11:20	Grab	KJELDAHL NITROGEN, TOTAL	1.31
5/5/2009 11:20	Grab	NITRATE+NITRITE-N	0.016
5/5/2009 11:20	Grab	PHOSPHATE, TOTAL AS P	0.118
5/18/2009 10:00	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
5/18/2009 10:00	Grab	NITRATE+NITRITE-N	-0.005
5/18/2009 10:00	Grab	PHOSPHATE, TOTAL AS P	-0.002
5/18/2009 10:20	Grab	KJELDAHL NITROGEN, TOTAL	1.29
5/18/2009 10:20	Grab	NITRATE+NITRITE-N	0.073
5/18/2009 10:20	Grab	PHOSPHATE, TOTAL AS P	0.125
5/18/2009 10:40	Grab	KJELDAHL NITROGEN, TOTAL	1.32
5/18/2009 10:40	Grab	NITRATE+NITRITE-N	0.071
5/18/2009 10:40	Grab	PHOSPHATE, TOTAL AS P	0.126
5/18/2009 10:55	Grab	KJELDAHL NITROGEN, TOTAL	1.25
5/18/2009 10:55	Grab	NITRATE+NITRITE-N	0.07
5/18/2009 10:55	Grab	PHOSPHATE, TOTAL AS P	0.125
6/1/2009 13:35	Grab	KJELDAHL NITROGEN, TOTAL	1.29
6/1/2009 13:35	Grab	NITRATE+NITRITE-N	0.028
6/1/2009 13:35	Grab	PHOSPHATE, TOTAL AS P	0.141
6/15/2009 14:21	Grab	KJELDAHL NITROGEN, TOTAL	1.72
6/15/2009 14:21	Grab	NITRATE+NITRITE-N	-0.005
6/15/2009 14:21	Grab	PHOSPHATE, TOTAL AS P	0.244
7/6/2009 13:12	Grab	KJELDAHL NITROGEN, TOTAL	1.31
7/6/2009 13:12	Grab	NITRATE+NITRITE-N	0.13
7/6/2009 13:12	Grab	PHOSPHATE, TOTAL AS P	0.178
7/20/2009 13:22	Grab	KJELDAHL NITROGEN, TOTAL	1.27
7/20/2009 13:22	Grab	NITRATE+NITRITE-N	0.19
7/20/2009 13:22	Grab	PHOSPHATE, TOTAL AS P	0.172
7/20/2009 13:29	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
7/20/2009 13:29	Grab	NITRATE+NITRITE-N	-0.005
7/20/2009 13:29	Grab	PHOSPHATE, TOTAL AS P	-0.002
8/3/2009 13:26	Grab	KJELDAHL NITROGEN, TOTAL	1.67
8/3/2009 13:26	Grab	NITRATE+NITRITE-N	0.161
8/3/2009 13:26	Grab	PHOSPHATE, TOTAL AS P	0.221

Table C-3. S-79 Water Quality Data			
Collection Date	Collection Method	Test Name	Value (mg/L)
8/3/2009 13:35	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
8/3/2009 13:35	Grab	NITRATE+NITRITE-N	-0.005
8/3/2009 13:35	Grab	PHOSPHATE, TOTAL AS P	-0.002
8/17/2009 13:25	Grab	KJELDAHL NITROGEN, TOTAL	1.29
8/17/2009 13:25	Grab	NITRATE+NITRITE-N	0.194
8/17/2009 13:25	Grab	PHOSPHATE, TOTAL AS P	0.152
9/8/2009 13:35	Grab	KJELDAHL NITROGEN, TOTAL	1.2
9/8/2009 13:35	Grab	NITRATE+NITRITE-N	0.156
9/8/2009 13:35	Grab	PHOSPHATE, TOTAL AS P	0.149
9/21/2009 13:12	Grab	KJELDAHL NITROGEN, TOTAL	1.14
9/21/2009 13:12	Grab	NITRATE+NITRITE-N	0.201
9/21/2009 13:12	Grab	PHOSPHATE, TOTAL AS P	0.151
10/26/2009 10:40	Grab	KJELDAHL NITROGEN, TOTAL	0.93
10/26/2009 10:40	Grab	NITRATE+NITRITE-N	0.455
10/26/2009 10:40	Grab	PHOSPHATE, TOTAL AS P	0.137
10/26/2009 10:55	Grab	KJELDAHL NITROGEN, TOTAL	0.91
10/26/2009 10:55	Grab	NITRATE+NITRITE-N	0.455
10/26/2009 10:55	Grab	PHOSPHATE, TOTAL AS P	0.139
10/26/2009 11:05	Grab	KJELDAHL NITROGEN, TOTAL	0.92
10/26/2009 11:05	Grab	NITRATE+NITRITE-N	0.455
10/26/2009 11:05	Grab	PHOSPHATE, TOTAL AS P	0.136
10/26/2009 11:15	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
10/26/2009 11:15	Grab	NITRATE+NITRITE-N	-0.005
10/26/2009 11:15	Grab	PHOSPHATE, TOTAL AS P	-0.002
11/23/2009 9:40	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
11/23/2009 9:40	Grab	NITRATE+NITRITE-N	0.007
11/23/2009 9:57	Grab	KJELDAHL NITROGEN, TOTAL	1
11/23/2009 9:57	Grab	NITRATE+NITRITE-N	0.502
11/23/2009 9:57	Grab	PHOSPHATE, TOTAL AS P	0.118
11/23/2009 10:13	Grab	KJELDAHL NITROGEN, TOTAL	1
11/23/2009 10:13	Grab	NITRATE+NITRITE-N	0.501
11/23/2009 10:27	Grab	KJELDAHL NITROGEN, TOTAL	0.96
11/23/2009 10:27	Grab	NITRATE+NITRITE-N	0.5
11/23/2009 10:35	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
11/23/2009 10:35	Grab	NITRATE+NITRITE-N	-0.005
11/23/2009 10:35	Grab	PHOSPHATE, TOTAL AS P	-0.002
12/22/2009 11:10	Grab	KJELDAHL NITROGEN, TOTAL	0.96
12/22/2009 11:10	Grab	NITRATE+NITRITE-N	0.328
12/22/2009 11:10	Grab	PHOSPHATE, TOTAL AS P	0.118
12/22/2009 11:25	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
12/22/2009 11:25	Grab	NITRATE+NITRITE-N	-0.005
12/22/2009 11:25	Grab	PHOSPHATE, TOTAL AS P	-0.002
1/26/2010 10:22	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
1/26/2010 10:22	Grab	NITRATE+NITRITE-N	-0.005
1/26/2010 10:22	Grab	PHOSPHATE, TOTAL AS P	-0.002
1/26/2010 10:37	Grab	KJELDAHL NITROGEN, TOTAL	0.98
1/26/2010 10:37	Grab	NITRATE+NITRITE-N	0.281

Table C-3. S-79 Water Quality Data			
Collection Date	**Collection Method**	**Test Name**	**Value (mg/L)**
1/26/2010 10:37	Grab	PHOSPHATE, TOTAL AS P	0.088
1/26/2010 10:58	Grab	KJELDAHL NITROGEN, TOTAL	0.99
1/26/2010 10:58	Grab	NITRATE+NITRITE-N	0.281
1/26/2010 10:58	Grab	PHOSPHATE, TOTAL AS P	0.086
1/26/2010 11:11	Grab	KJELDAHL NITROGEN, TOTAL	0.99
1/26/2010 11:11	Grab	NITRATE+NITRITE-N	0.278
1/26/2010 11:11	Grab	PHOSPHATE, TOTAL AS P	0.086
1/26/2010 11:25	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
1/26/2010 11:25	Grab	NITRATE+NITRITE-N	-0.005
1/26/2010 11:25	Grab	PHOSPHATE, TOTAL AS P	-0.002
2/23/2010 11:11	Grab	KJELDAHL NITROGEN, TOTAL	1.12
2/23/2010 11:11	Grab	NITRATE+NITRITE-N	0.147
2/23/2010 11:11	Grab	PHOSPHATE, TOTAL AS P	0.073
2/23/2010 11:20	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
2/23/2010 11:20	Grab	NITRATE+NITRITE-N	-0.005
2/23/2010 11:20	Grab	PHOSPHATE, TOTAL AS P	-0.002
3/23/2010 9:24	Grab	KJELDAHL NITROGEN, TOTAL	1.03
3/23/2010 9:24	Grab	NITRATE+NITRITE-N	0.429
3/23/2010 9:24	Grab	PHOSPHATE, TOTAL AS P	0.129
3/23/2010 9:46	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
3/23/2010 9:46	Grab	NITRATE+NITRITE-N	-0.005
3/23/2010 9:46	Grab	PHOSPHATE, TOTAL AS P	-0.002
4/27/2010 9:30	Grab	KJELDAHL NITROGEN, TOTAL	1.14
4/27/2010 9:30	Grab	NITRATE+NITRITE-N	0.146
4/27/2010 9:30	Grab	PHOSPHATE, TOTAL AS P	0.121
4/27/2010 10:00	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
4/27/2010 10:00	Grab	NITRATE+NITRITE-N	-0.005
4/27/2010 10:00	Grab	PHOSPHATE, TOTAL AS P	-0.002
5/4/2010 10:14	Grab	KJELDAHL NITROGEN, TOTAL	1.3
5/4/2010 10:14	Grab	NITRATE+NITRITE-N	0.144
5/4/2010 10:14	Grab	PHOSPHATE, TOTAL AS P	0.125
5/11/2010 9:52	Grab	KJELDAHL NITROGEN, TOTAL	1.29
5/11/2010 9:52	Grab	NITRATE+NITRITE-N	0.152
5/11/2010 9:52	Grab	PHOSPHATE, TOTAL AS P	0.121
5/11/2010 10:05	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
5/11/2010 10:05	Grab	NITRATE+NITRITE-N	-0.005
5/11/2010 10:05	Grab	PHOSPHATE, TOTAL AS P	-0.002
5/18/2010 10:12	Grab	KJELDAHL NITROGEN, TOTAL	1.19
5/18/2010 10:12	Grab	NITRATE+NITRITE-N	0.093
5/18/2010 10:12	Grab	PHOSPHATE, TOTAL AS P	0.099
5/25/2010 9:41	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
5/25/2010 9:41	Grab	NITRATE+NITRITE-N	-0.005
5/25/2010 9:41	Grab	PHOSPHATE, TOTAL AS P	-0.002
5/25/2010 9:50	Grab	KJELDAHL NITROGEN, TOTAL	1.2
5/25/2010 9:50	Grab	NITRATE+NITRITE-N	0.09
5/25/2010 9:50	Grab	PHOSPHATE, TOTAL AS P	0.099
5/25/2010 9:55	Grab	KJELDAHL NITROGEN, TOTAL	1.23

Table C-3. S-79 Water Quality Data			
Collection Date	Collection Method	Test Name	Value (mg/L)
5/25/2010 9:55	Grab	NITRATE+NITRITE-N	0.1
5/25/2010 9:55	Grab	PHOSPHATE, TOTAL AS P	0.1
5/25/2010 10:00	Grab	KJELDAHL NITROGEN, TOTAL	1.23
5/25/2010 10:00	Grab	NITRATE+NITRITE-N	0.097
5/25/2010 10:00	Grab	PHOSPHATE, TOTAL AS P	0.102
5/25/2010 10:10	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
5/25/2010 10:10	Grab	NITRATE+NITRITE-N	-0.005
5/25/2010 10:10	Grab	PHOSPHATE, TOTAL AS P	-0.002
6/1/2010 10:06	Grab	KJELDAHL NITROGEN, TOTAL	1.06
6/1/2010 10:06	Grab	NITRATE+NITRITE-N	0.05
6/1/2010 10:06	Grab	PHOSPHATE, TOTAL AS P	0.102
6/8/2010 9:27	Grab	KJELDAHL NITROGEN, TOTAL	1.12
6/8/2010 9:27	Grab	NITRATE+NITRITE-N	0.074
6/8/2010 9:27	Grab	PHOSPHATE, TOTAL AS P	0.109
6/8/2010 10:12	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
6/8/2010 10:12	Grab	NITRATE+NITRITE-N	-0.005
6/8/2010 10:12	Grab	PHOSPHATE, TOTAL AS P	-0.002
6/15/2010 9:45	Grab	KJELDAHL NITROGEN, TOTAL	1.22
6/15/2010 9:45	Grab	NITRATE+NITRITE-N	0.111
6/15/2010 9:45	Grab	PHOSPHATE, TOTAL AS P	0.109
6/15/2010 10:00	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
6/15/2010 10:00	Grab	NITRATE+NITRITE-N	-0.005
6/15/2010 10:00	Grab	PHOSPHATE, TOTAL AS P	-0.002
6/22/2010 10:37	Grab	KJELDAHL NITROGEN, TOTAL	1.23
6/22/2010 10:37	Grab	NITRATE+NITRITE-N	0.043
6/22/2010 10:37	Grab	PHOSPHATE, TOTAL AS P	0.104
6/29/2010 9:30	Grab	KJELDAHL NITROGEN, TOTAL	1.44
6/29/2010 9:30	Grab	NITRATE+NITRITE-N	0.009
6/29/2010 9:30	Grab	PHOSPHATE, TOTAL AS P	0.112
6/29/2010 9:45	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
6/29/2010 9:45	Grab	NITRATE+NITRITE-N	-0.005
6/29/2010 9:45	Grab	PHOSPHATE, TOTAL AS P	-0.002
7/6/2010 9:55	Grab	KJELDAHL NITROGEN, TOTAL	1.24
7/6/2010 9:55	Grab	NITRATE+NITRITE-N	0.141
7/6/2010 9:55	Grab	PHOSPHATE, TOTAL AS P	0.18
7/6/2010 10:05	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
7/6/2010 10:05	Grab	NITRATE+NITRITE-N	-0.005
7/6/2010 10:05	Grab	PHOSPHATE, TOTAL AS P	-0.002
7/13/2010 9:26	Grab	KJELDAHL NITROGEN, TOTAL	1.26
7/13/2010 9:26	Grab	NITRATE+NITRITE-N	0.12
7/13/2010 9:26	Grab	PHOSPHATE, TOTAL AS P	0.155
7/13/2010 9:45	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
7/13/2010 9:45	Grab	NITRATE+NITRITE-N	-0.005
7/13/2010 9:45	Grab	PHOSPHATE, TOTAL AS P	-0.002
7/20/2010 9:30	Grab	KJELDAHL NITROGEN, TOTAL	1.4
7/20/2010 9:30	Grab	NITRATE+NITRITE-N	0.071
7/20/2010 9:30	Grab	PHOSPHATE, TOTAL AS P	0.102

Table C-3. S-79 Water Quality Data

Collection Date	Collection Method	Test Name	Value (mg/L)
7/20/2010 9:50	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
7/20/2010 9:50	Grab	NITRATE+NITRITE-N	-0.005
7/20/2010 9:50	Grab	PHOSPHATE, TOTAL AS P	-0.002
7/27/2010 10:00	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
7/27/2010 10:00	Grab	NITRATE+NITRITE-N	-0.005
7/27/2010 10:00	Grab	PHOSPHATE, TOTAL AS P	-0.002
7/27/2010 10:15	Grab	KJELDAHL NITROGEN, TOTAL	1.37
7/27/2010 10:15	Grab	NITRATE+NITRITE-N	-0.005
7/27/2010 10:15	Grab	PHOSPHATE, TOTAL AS P	0.083
7/27/2010 10:34	Grab	KJELDAHL NITROGEN, TOTAL	1.28
7/27/2010 10:34	Grab	NITRATE+NITRITE-N	-0.005
7/27/2010 10:34	Grab	PHOSPHATE, TOTAL AS P	0.087
7/27/2010 10:46	Grab	KJELDAHL NITROGEN, TOTAL	1.37
7/27/2010 10:46	Grab	NITRATE+NITRITE-N	-0.005
7/27/2010 10:46	Grab	PHOSPHATE, TOTAL AS P	0.085
7/27/2010 10:58	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
7/27/2010 10:58	Grab	NITRATE+NITRITE-N	-0.005
7/27/2010 10:58	Grab	PHOSPHATE, TOTAL AS P	-0.002
8/3/2010 9:45	Grab	KJELDAHL NITROGEN, TOTAL	1.24
8/3/2010 9:45	Grab	NITRATE+NITRITE-N	0.005
8/3/2010 9:45	Grab	PHOSPHATE, TOTAL AS P	0.116
8/3/2010 10:05	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
8/3/2010 10:05	Grab	NITRATE+NITRITE-N	-0.005
8/3/2010 10:05	Grab	PHOSPHATE, TOTAL AS P	-0.002
8/10/2010 9:20	Grab	KJELDAHL NITROGEN, TOTAL	1.13
8/10/2010 9:20	Grab	NITRATE+NITRITE-N	0.059
8/10/2010 9:20	Grab	PHOSPHATE, TOTAL AS P	0.135
8/10/2010 9:30	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
8/10/2010 9:30	Grab	NITRATE+NITRITE-N	-0.005
8/10/2010 9:30	Grab	PHOSPHATE, TOTAL AS P	-0.002
8/17/2010 9:40	Grab	KJELDAHL NITROGEN, TOTAL	1.15
8/17/2010 9:40	Grab	NITRATE+NITRITE-N	0.019
8/17/2010 9:40	Grab	PHOSPHATE, TOTAL AS P	0.12
8/17/2010 9:52	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
8/17/2010 9:52	Grab	NITRATE+NITRITE-N	-0.005
8/17/2010 9:52	Grab	PHOSPHATE, TOTAL AS P	-0.002
8/24/2010 9:55	Grab	KJELDAHL NITROGEN, TOTAL	1.2
8/24/2010 9:55	Grab	NITRATE+NITRITE-N	0.097
8/24/2010 9:55	Grab	PHOSPHATE, TOTAL AS P	0.149
8/24/2010 10:10	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
8/24/2010 10:10	Grab	NITRATE+NITRITE-N	-0.005
8/24/2010 10:10	Grab	PHOSPHATE, TOTAL AS P	-0.002
8/31/2010 9:50	Grab	KJELDAHL NITROGEN, TOTAL	1.19
8/31/2010 9:50	Grab	NITRATE+NITRITE-N	0.175
8/31/2010 9:50	Grab	PHOSPHATE, TOTAL AS P	0.124
8/31/2010 10:00	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
8/31/2010 10:00	Grab	NITRATE+NITRITE-N	-0.005

Table C-3. S-79 Water Quality Data			
Collection Date	**Collection Method**	**Test Name**	**Value (mg/L)**
8/31/2010 10:00	Grab	PHOSPHATE, TOTAL AS P	-0.002
9/7/2010 10:05	Grab	KJELDAHL NITROGEN, TOTAL	1.23
9/7/2010 10:05	Grab	NITRATE+NITRITE-N	0.247
9/7/2010 10:05	Grab	PHOSPHATE, TOTAL AS P	0.122
9/7/2010 10:36	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
9/7/2010 10:36	Grab	NITRATE+NITRITE-N	-0.005
9/7/2010 10:36	Grab	PHOSPHATE, TOTAL AS P	-0.002
9/13/2010 9:28	Grab	KJELDAHL NITROGEN, TOTAL	1.2
9/13/2010 9:28	Grab	NITRATE+NITRITE-N	0.187
9/13/2010 9:28	Grab	PHOSPHATE, TOTAL AS P	0.127
9/13/2010 10:21	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
9/13/2010 10:21	Grab	NITRATE+NITRITE-N	-0.005
9/13/2010 10:21	Grab	PHOSPHATE, TOTAL AS P	-0.002
9/21/2010 10:00	Grab	KJELDAHL NITROGEN, TOTAL	0.99
9/21/2010 10:00	Grab	NITRATE+NITRITE-N	0.218
9/21/2010 10:00	Grab	PHOSPHATE, TOTAL AS P	0.108
9/21/2010 10:15	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
9/21/2010 10:15	Grab	NITRATE+NITRITE-N	-0.005
9/21/2010 10:15	Grab	PHOSPHATE, TOTAL AS P	-0.002
9/28/2010 9:45	Grab	KJELDAHL NITROGEN, TOTAL	0.95
9/28/2010 9:45	Grab	NITRATE+NITRITE-N	0.389
9/28/2010 9:45	Grab	PHOSPHATE, TOTAL AS P	0.119
9/28/2010 10:00	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
9/28/2010 10:00	Grab	NITRATE+NITRITE-N	-0.005
9/28/2010 10:00	Grab	PHOSPHATE, TOTAL AS P	-0.002
10/5/2010 9:45	Grab	KJELDAHL NITROGEN, TOTAL	1.07
10/5/2010 9:45	Grab	NITRATE+NITRITE-N	0.33
10/5/2010 9:45	Grab	PHOSPHATE, TOTAL AS P	0.108
10/5/2010 10:00	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
10/5/2010 10:00	Grab	NITRATE+NITRITE-N	-0.005
10/5/2010 10:00	Grab	PHOSPHATE, TOTAL AS P	-0.002
10/12/2010 9:50	Grab	KJELDAHL NITROGEN, TOTAL	1.05
10/12/2010 9:50	Grab	NITRATE+NITRITE-N	0.159
10/12/2010 9:50	Grab	PHOSPHATE, TOTAL AS P	0.091
10/12/2010 10:10	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
10/12/2010 10:10	Grab	NITRATE+NITRITE-N	-0.005
10/12/2010 10:10	Grab	PHOSPHATE, TOTAL AS P	-0.002
10/19/2010 10:03	Grab	KJELDAHL NITROGEN, TOTAL	0.95
10/19/2010 10:03	Grab	NITRATE+NITRITE-N	0.345
10/19/2010 10:03	Grab	PHOSPHATE, TOTAL AS P	0.096
10/19/2010 10:18	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
10/19/2010 10:18	Grab	NITRATE+NITRITE-N	-0.005
10/19/2010 10:18	Grab	PHOSPHATE, TOTAL AS P	-0.002
10/26/2010 10:05	Grab	KJELDAHL NITROGEN, TOTAL	1
10/26/2010 10:05	Grab	NITRATE+NITRITE-N	0.272
10/26/2010 10:05	Grab	PHOSPHATE, TOTAL AS P	0.093
10/26/2010 10:20	Grab	KJELDAHL NITROGEN, TOTAL	-0.05

Table C-3. S-79 Water Quality Data			
Collection Date	Collection Method	Test Name	Value (mg/L)
10/26/2010 10:20	Grab	NITRATE+NITRITE-N	-0.005
10/26/2010 10:20	Grab	PHOSPHATE, TOTAL AS P	-0.002
11/2/2010 9:53	Grab	KJELDAHL NITROGEN, TOTAL	1.06
11/2/2010 9:53	Grab	NITRATE+NITRITE-N	0.307
11/2/2010 9:53	Grab	PHOSPHATE, TOTAL AS P	0.09
11/2/2010 10:03	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
11/2/2010 10:03	Grab	NITRATE+NITRITE-N	-0.005
11/2/2010 10:03	Grab	PHOSPHATE, TOTAL AS P	-0.002
11/9/2010 10:25	Grab	KJELDAHL NITROGEN, TOTAL	1.04
11/9/2010 10:25	Grab	NITRATE+NITRITE-N	0.423
11/9/2010 10:25	Grab	PHOSPHATE, TOTAL AS P	0.113
11/9/2010 10:40	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
11/9/2010 10:40	Grab	NITRATE+NITRITE-N	-0.005
11/9/2010 10:40	Grab	PHOSPHATE, TOTAL AS P	-0.002
11/16/2010 9:26	Grab	KJELDAHL NITROGEN, TOTAL	1.01
11/16/2010 9:26	Grab	NITRATE+NITRITE-N	0.315
11/16/2010 9:26	Grab	PHOSPHATE, TOTAL AS P	0.103
11/16/2010 9:40	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
11/16/2010 9:40	Grab	NITRATE+NITRITE-N	-0.005
11/16/2010 9:40	Grab	PHOSPHATE, TOTAL AS P	-0.002
11/22/2010 10:20	Grab	KJELDAHL NITROGEN, TOTAL	1.03
11/22/2010 10:20	Grab	NITRATE+NITRITE-N	0.287
11/22/2010 10:20	Grab	PHOSPHATE, TOTAL AS P	0.095
11/22/2010 10:40	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
11/22/2010 10:40	Grab	NITRATE+NITRITE-N	-0.005
11/22/2010 10:40	Grab	PHOSPHATE, TOTAL AS P	-0.002
11/30/2010 10:30	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
11/30/2010 10:30	Grab	NITRATE+NITRITE-N	-0.005
11/30/2010 10:30	Grab	PHOSPHATE, TOTAL AS P	-0.002
11/30/2010 10:45	Grab	KJELDAHL NITROGEN, TOTAL	1.07
11/30/2010 10:45	Grab	NITRATE+NITRITE-N	0.282
11/30/2010 10:45	Grab	PHOSPHATE, TOTAL AS P	0.098
11/30/2010 10:58	Grab	KJELDAHL NITROGEN, TOTAL	1.07
11/30/2010 10:58	Grab	NITRATE+NITRITE-N	0.285
11/30/2010 10:58	Grab	PHOSPHATE, TOTAL AS P	0.098
11/30/2010 11:10	Grab	KJELDAHL NITROGEN, TOTAL	1.07
11/30/2010 11:10	Grab	NITRATE+NITRITE-N	0.281
11/30/2010 11:10	Grab	PHOSPHATE, TOTAL AS P	0.099
11/30/2010 11:22	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
11/30/2010 11:22	Grab	NITRATE+NITRITE-N	-0.005
11/30/2010 11:22	Grab	PHOSPHATE, TOTAL AS P	-0.002
12/7/2010 9:58	Grab	KJELDAHL NITROGEN, TOTAL	0.97
12/7/2010 9:58	Grab	NITRATE+NITRITE-N	0.316
12/7/2010 9:58	Grab	PHOSPHATE, TOTAL AS P	0.091
12/7/2010 10:10	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
12/7/2010 10:10	Grab	NITRATE+NITRITE-N	-0.005
12/7/2010 10:10	Grab	PHOSPHATE, TOTAL AS P	-0.002

Table C-3. S-79 Water Quality Data			
Collection Date	**Collection Method**	**Test Name**	**Value (mg/L)**
12/14/2010 9:56	Grab	KJELDAHL NITROGEN, TOTAL	0.98
12/14/2010 9:56	Grab	NITRATE+NITRITE-N	0.281
12/14/2010 9:56	Grab	PHOSPHATE, TOTAL AS P	0.088
12/21/2010 10:22	Grab	KJELDAHL NITROGEN, TOTAL	1.01
12/21/2010 10:22	Grab	NITRATE+NITRITE-N	0.266
12/21/2010 10:22	Grab	PHOSPHATE, TOTAL AS P	0.089
12/21/2010 10:52	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
12/21/2010 10:52	Grab	NITRATE+NITRITE-N	-0.005
12/21/2010 10:52	Grab	PHOSPHATE, TOTAL AS P	-0.002
12/28/2010 10:05	Grab	KJELDAHL NITROGEN, TOTAL	0.95
12/28/2010 10:05	Grab	NITRATE+NITRITE-N	0.199
12/28/2010 10:05	Grab	PHOSPHATE, TOTAL AS P	0.073
12/28/2010 10:25	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
12/28/2010 10:25	Grab	NITRATE+NITRITE-N	-0.005
12/28/2010 10:25	Grab	PHOSPHATE, TOTAL AS P	-0.002
1/5/2011 9:56	Grab	KJELDAHL NITROGEN, TOTAL	1.05
1/5/2011 9:56	Grab	NITRATE+NITRITE-N	0.238
1/5/2011 9:56	Grab	PHOSPHATE, TOTAL AS P	0.082
1/12/2011 9:47	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
1/12/2011 9:47	Grab	NITRATE+NITRITE-N	-0.005
1/12/2011 9:47	Grab	PHOSPHATE, TOTAL AS P	-0.002
1/12/2011 10:04	Grab	KJELDAHL NITROGEN, TOTAL	0.97
1/12/2011 10:04	Grab	NITRATE+NITRITE-N	0.247
1/12/2011 10:04	Grab	PHOSPHATE, TOTAL AS P	0.079
1/12/2011 10:15	Grab	KJELDAHL NITROGEN, TOTAL	0.96
1/12/2011 10:15	Grab	NITRATE+NITRITE-N	0.245
1/12/2011 10:15	Grab	PHOSPHATE, TOTAL AS P	0.08
1/12/2011 10:24	Grab	KJELDAHL NITROGEN, TOTAL	0.97
1/12/2011 10:24	Grab	NITRATE+NITRITE-N	0.249
1/12/2011 10:24	Grab	PHOSPHATE, TOTAL AS P	0.078
1/12/2011 10:35	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
1/12/2011 10:35	Grab	NITRATE+NITRITE-N	-0.005
1/12/2011 10:35	Grab	PHOSPHATE, TOTAL AS P	-0.002
1/19/2011 10:25	Grab	KJELDAHL NITROGEN, TOTAL	0.93
1/19/2011 10:25	Grab	NITRATE+NITRITE-N	0.183
1/19/2011 10:25	Grab	PHOSPHATE, TOTAL AS P	0.07
1/26/2011 10:15	Grab	KJELDAHL NITROGEN, TOTAL	0.95
1/26/2011 10:15	Grab	NITRATE+NITRITE-N	0.142
1/26/2011 10:15	Grab	PHOSPHATE, TOTAL AS P	0.069
2/2/2011 9:37	Grab	KJELDAHL NITROGEN, TOTAL	1.12
2/2/2011 9:37	Grab	NITRATE+NITRITE-N	0.005
2/2/2011 9:37	Grab	PHOSPHATE, TOTAL AS P	0.075
2/2/2011 10:03	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
2/2/2011 10:03	Grab	NITRATE+NITRITE-N	-0.005
2/2/2011 10:03	Grab	PHOSPHATE, TOTAL AS P	-0.002
2/9/2011 10:21	Grab	KJELDAHL NITROGEN, TOTAL	0.94
2/9/2011 10:21	Grab	NITRATE+NITRITE-N	0.017

Table C-3. S-79 Water Quality Data

Collection Date	Collection Method	Test Name	Value (mg/L)
2/9/2011 10:21	Grab	PHOSPHATE, TOTAL AS P	0.066
2/9/2011 10:50	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
2/9/2011 10:50	Grab	NITRATE+NITRITE-N	-0.005
2/9/2011 10:50	Grab	PHOSPHATE, TOTAL AS P	-0.002
2/16/2011 10:05	Grab	KJELDAHL NITROGEN, TOTAL	1.12
2/16/2011 10:05	Grab	NITRATE+NITRITE-N	-0.005
2/16/2011 10:05	Grab	PHOSPHATE, TOTAL AS P	0.074
2/23/2011 10:07	Grab	KJELDAHL NITROGEN, TOTAL	0.97
2/23/2011 10:07	Grab	NITRATE+NITRITE-N	0.007
2/23/2011 10:07	Grab	PHOSPHATE, TOTAL AS P	0.063
3/2/2011 10:05	Grab	KJELDAHL NITROGEN, TOTAL	0.98
3/2/2011 10:05	Grab	NITRATE+NITRITE-N	0.005
3/2/2011 10:05	Grab	PHOSPHATE, TOTAL AS P	0.06
3/9/2011 9:40	Grab	KJELDAHL NITROGEN, TOTAL	1.03
3/9/2011 9:40	Grab	NITRATE+NITRITE-N	0.011
3/9/2011 9:40	Grab	PHOSPHATE, TOTAL AS P	0.085
3/16/2011 10:09	Grab	KJELDAHL NITROGEN, TOTAL	1.17
3/16/2011 10:09	Grab	NITRATE+NITRITE-N	0.019
3/16/2011 10:09	Grab	PHOSPHATE, TOTAL AS P	0.087
3/23/2011 10:06	Grab	KJELDAHL NITROGEN, TOTAL	1.14
3/23/2011 10:06	Grab	NITRATE+NITRITE-N	-0.005
3/23/2011 10:06	Grab	PHOSPHATE, TOTAL AS P	0.085
3/23/2011 10:22	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
3/23/2011 10:22	Grab	NITRATE+NITRITE-N	-0.005
3/23/2011 10:22	Grab	PHOSPHATE, TOTAL AS P	-0.002
3/30/2011 9:51	Grab	KJELDAHL NITROGEN, TOTAL	1.13
3/30/2011 9:51	Grab	NITRATE+NITRITE-N	0.039
3/30/2011 9:51	Grab	PHOSPHATE, TOTAL AS P	0.082
3/30/2011 10:04	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
3/30/2011 10:04	Grab	NITRATE+NITRITE-N	-0.005
3/30/2011 10:04	Grab	PHOSPHATE, TOTAL AS P	-0.002
4/6/2011 10:02	Grab	KJELDAHL NITROGEN, TOTAL	1.12
4/6/2011 10:02	Grab	NITRATE+NITRITE-N	0.022
4/6/2011 10:02	Grab	PHOSPHATE, TOTAL AS P	0.097
4/6/2011 10:25	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
4/6/2011 10:25	Grab	NITRATE+NITRITE-N	-0.005
4/6/2011 10:25	Grab	PHOSPHATE, TOTAL AS P	-0.002
4/13/2011 10:29	Grab	KJELDAHL NITROGEN, TOTAL	1.08
4/13/2011 10:29	Grab	NITRATE+NITRITE-N	0.009
4/13/2011 10:29	Grab	PHOSPHATE, TOTAL AS P	0.096
4/13/2011 10:45	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
4/13/2011 10:45	Grab	NITRATE+NITRITE-N	-0.005
4/13/2011 10:45	Grab	PHOSPHATE, TOTAL AS P	-0.002
4/20/2011 10:44	Grab	KJELDAHL NITROGEN, TOTAL	1.17
4/20/2011 10:44	Grab	NITRATE+NITRITE-N	-0.005
4/20/2011 10:44	Grab	PHOSPHATE, TOTAL AS P	0.121
4/20/2011 11:29	Grab	KJELDAHL NITROGEN, TOTAL	-0.05

Table C-3. S-79 Water Quality Data

Collection Date	Collection Method	Test Name	Value (mg/L)
4/20/2011 11:29	Grab	NITRATE+NITRITE-N	-0.005
4/20/2011 11:29	Grab	PHOSPHATE, TOTAL AS P	-0.002
4/27/2011 11:10	Grab	KJELDAHL NITROGEN, TOTAL	1.16
4/27/2011 11:10	Grab	NITRATE+NITRITE-N	-0.005
4/27/2011 11:10	Grab	PHOSPHATE, TOTAL AS P	0.107
5/4/2011 9:49	Grab	KJELDAHL NITROGEN, TOTAL	1.4
5/4/2011 9:49	Grab	NITRATE+NITRITE-N	-0.005
5/4/2011 9:49	Grab	PHOSPHATE, TOTAL AS P	0.135
5/4/2011 10:05	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
5/4/2011 10:05	Grab	NITRATE+NITRITE-N	-0.005
5/4/2011 10:05	Grab	PHOSPHATE, TOTAL AS P	-0.002
5/11/2011 9:45	Grab	KJELDAHL NITROGEN, TOTAL	1.46
5/11/2011 9:45	Grab	NITRATE+NITRITE-N	-0.005
5/11/2011 9:45	Grab	PHOSPHATE, TOTAL AS P	0.165
5/11/2011 10:06	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
5/11/2011 10:06	Grab	NITRATE+NITRITE-N	-0.005
5/11/2011 10:06	Grab	PHOSPHATE, TOTAL AS P	-0.002
5/18/2011 10:01	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
5/18/2011 10:01	Grab	NITRATE+NITRITE-N	-0.005
5/18/2011 10:01	Grab	PHOSPHATE, TOTAL AS P	-0.002
5/18/2011 10:15	Grab	KJELDAHL NITROGEN, TOTAL	1.27
5/18/2011 10:15	Grab	NITRATE+NITRITE-N	0.023
5/18/2011 10:15	Grab	PHOSPHATE, TOTAL AS P	0.184
5/18/2011 10:41	Grab	KJELDAHL NITROGEN, TOTAL	1.28
5/18/2011 10:41	Grab	NITRATE+NITRITE-N	0.025
5/18/2011 10:41	Grab	PHOSPHATE, TOTAL AS P	0.192
5/18/2011 10:54	Grab	KJELDAHL NITROGEN, TOTAL	1.28
5/18/2011 10:54	Grab	NITRATE+NITRITE-N	0.02
5/18/2011 10:54	Grab	PHOSPHATE, TOTAL AS P	0.187
5/18/2011 11:11	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
5/18/2011 11:11	Grab	NITRATE+NITRITE-N	-0.005
5/18/2011 11:11	Grab	PHOSPHATE, TOTAL AS P	-0.002
5/25/2011 9:58	Grab	KJELDAHL NITROGEN, TOTAL	1.75
5/25/2011 9:58	Grab	NITRATE+NITRITE-N	-0.005
5/25/2011 9:58	Grab	PHOSPHATE, TOTAL AS P	0.2
5/25/2011 10:25	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
5/25/2011 10:25	Grab	NITRATE+NITRITE-N	-0.005
5/25/2011 10:25	Grab	PHOSPHATE, TOTAL AS P	-0.002
6/1/2011 10:46	Grab	KJELDAHL NITROGEN, TOTAL	2.24
6/1/2011 10:46	Grab	NITRATE+NITRITE-N	-0.005
6/1/2011 10:46	Grab	PHOSPHATE, TOTAL AS P	0.186
6/1/2011 11:00	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
6/1/2011 11:00	Grab	NITRATE+NITRITE-N	-0.005
6/1/2011 11:00	Grab	PHOSPHATE, TOTAL AS P	-0.002
6/8/2011 9:47	Grab	KJELDAHL NITROGEN, TOTAL	4.67
6/8/2011 9:47	Grab	NITRATE+NITRITE-N	0.015
6/8/2011 9:47	Grab	PHOSPHATE, TOTAL AS P	0.311

Table C-3. S-79 Water Quality Data			
Collection Date	Collection Method	Test Name	Value (mg/L)
6/8/2011 10:17	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
6/8/2011 10:17	Grab	NITRATE+NITRITE-N	-0.005
6/8/2011 10:17	Grab	PHOSPHATE, TOTAL AS P	-0.002
6/15/2011 10:21	Grab	KJELDAHL NITROGEN, TOTAL	2.37
6/15/2011 10:21	Grab	NITRATE+NITRITE-N	0.008
6/15/2011 10:21	Grab	PHOSPHATE, TOTAL AS P	0.264
6/22/2011 10:18	Grab	KJELDAHL NITROGEN, TOTAL	1.83
6/22/2011 10:18	Grab	NITRATE+NITRITE-N	0.11
6/22/2011 10:18	Grab	PHOSPHATE, TOTAL AS P	0.233
6/22/2011 10:37	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
6/22/2011 10:37	Grab	NITRATE+NITRITE-N	-0.005
6/22/2011 10:37	Grab	PHOSPHATE, TOTAL AS P	-0.002
6/29/2011 10:35	Grab	KJELDAHL NITROGEN, TOTAL	1.58
6/29/2011 10:35	Grab	NITRATE+NITRITE-N	0.164
6/29/2011 10:35	Grab	PHOSPHATE, TOTAL AS P	0.198
6/29/2011 10:45	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
6/29/2011 10:45	Grab	NITRATE+NITRITE-N	-0.005
6/29/2011 10:45	Grab	PHOSPHATE, TOTAL AS P	-0.002
7/6/2011 10:17	Grab	KJELDAHL NITROGEN, TOTAL	1.43
7/6/2011 10:17	Grab	NITRATE+NITRITE-N	-0.005
7/6/2011 10:17	Grab	PHOSPHATE, TOTAL AS P	0.197
7/6/2011 10:32	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
7/6/2011 10:32	Grab	NITRATE+NITRITE-N	-0.005
7/6/2011 10:32	Grab	PHOSPHATE, TOTAL AS P	-0.002
7/13/2011 10:36	Grab	KJELDAHL NITROGEN, TOTAL	1.31
7/13/2011 10:36	Grab	NITRATE+NITRITE-N	0.016
7/13/2011 10:36	Grab	PHOSPHATE, TOTAL AS P	0.196
7/13/2011 10:53	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
7/13/2011 10:53	Grab	NITRATE+NITRITE-N	-0.005
7/13/2011 10:53	Grab	PHOSPHATE, TOTAL AS P	-0.002
7/20/2011 10:38	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
7/20/2011 10:38	Grab	NITRATE+NITRITE-N	-0.005
7/20/2011 10:38	Grab	PHOSPHATE, TOTAL AS P	-0.002
7/20/2011 11:04	Grab	KJELDAHL NITROGEN, TOTAL	1.29
7/20/2011 11:04	Grab	NITRATE+NITRITE-N	-0.005
7/20/2011 11:04	Grab	PHOSPHATE, TOTAL AS P	0.218
7/20/2011 11:20	Grab	KJELDAHL NITROGEN, TOTAL	1.29
7/20/2011 11:20	Grab	NITRATE+NITRITE-N	-0.005
7/20/2011 11:20	Grab	PHOSPHATE, TOTAL AS P	0.218
7/20/2011 11:48	Grab	KJELDAHL NITROGEN, TOTAL	1.38
7/20/2011 11:48	Grab	NITRATE+NITRITE-N	-0.005
7/20/2011 11:48	Grab	PHOSPHATE, TOTAL AS P	0.231
7/20/2011 12:05	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
7/20/2011 12:05	Grab	NITRATE+NITRITE-N	-0.005
7/20/2011 12:05	Grab	PHOSPHATE, TOTAL AS P	-0.002
7/27/2011 10:16	Grab	KJELDAHL NITROGEN, TOTAL	1.45
7/27/2011 10:16	Grab	NITRATE+NITRITE-N	0.024

Table C-3. S-79 Water Quality Data			
Collection Date	Collection Method	Test Name	Value (mg/L)
7/27/2011 10:16	Grab	PHOSPHATE, TOTAL AS P	0.268
7/27/2011 10:33	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
7/27/2011 10:33	Grab	NITRATE+NITRITE-N	-0.005
7/27/2011 10:33	Grab	PHOSPHATE, TOTAL AS P	-0.002
8/3/2011 10:37	Grab	KJELDAHL NITROGEN, TOTAL	1.41
8/3/2011 10:37	Grab	NITRATE+NITRITE-N	0.16
8/3/2011 10:37	Grab	PHOSPHATE, TOTAL AS P	0.278
8/3/2011 10:53	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
8/3/2011 10:53	Grab	NITRATE+NITRITE-N	-0.005
8/3/2011 10:53	Grab	PHOSPHATE, TOTAL AS P	-0.002
8/10/2011 10:22	Grab	KJELDAHL NITROGEN, TOTAL	1.04
8/10/2011 10:22	Grab	NITRATE+NITRITE-N	0.251
8/10/2011 10:22	Grab	PHOSPHATE, TOTAL AS P	0.24
8/10/2011 10:35	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
8/10/2011 10:35	Grab	NITRATE+NITRITE-N	-0.005
8/10/2011 10:35	Grab	PHOSPHATE, TOTAL AS P	-0.002
8/17/2011 10:13	Grab	KJELDAHL NITROGEN, TOTAL	1.12
8/17/2011 10:13	Grab	NITRATE+NITRITE-N	0.242
8/17/2011 10:13	Grab	PHOSPHATE, TOTAL AS P	0.204
8/17/2011 10:29	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
8/17/2011 10:29	Grab	NITRATE+NITRITE-N	-0.005
8/17/2011 10:29	Grab	PHOSPHATE, TOTAL AS P	-0.002
8/24/2011 10:04	Grab	KJELDAHL NITROGEN, TOTAL	1.13
8/24/2011 10:04	Grab	NITRATE+NITRITE-N	0.153
8/24/2011 10:04	Grab	PHOSPHATE, TOTAL AS P	0.171
8/24/2011 10:20	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
8/24/2011 10:20	Grab	NITRATE+NITRITE-N	-0.005
8/24/2011 10:20	Grab	PHOSPHATE, TOTAL AS P	-0.002
8/31/2011 10:41	Grab	KJELDAHL NITROGEN, TOTAL	1.19
8/31/2011 10:41	Grab	NITRATE+NITRITE-N	0.239
8/31/2011 10:41	Grab	PHOSPHATE, TOTAL AS P	0.187
8/31/2011 11:07	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
8/31/2011 11:07	Grab	NITRATE+NITRITE-N	-0.005
8/31/2011 11:07	Grab	PHOSPHATE, TOTAL AS P	-0.002
9/7/2011 9:48	Grab	KJELDAHL NITROGEN, TOTAL	1.1
9/7/2011 9:48	Grab	NITRATE+NITRITE-N	0.25
9/7/2011 9:48	Grab	PHOSPHATE, TOTAL AS P	0.172
9/7/2011 10:03	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
9/7/2011 10:03	Grab	NITRATE+NITRITE-N	-0.005
9/7/2011 10:03	Grab	PHOSPHATE, TOTAL AS P	-0.002
9/14/2011 10:23	Grab	KJELDAHL NITROGEN, TOTAL	1.12
9/14/2011 10:23	Grab	NITRATE+NITRITE-N	0.219
9/14/2011 10:23	Grab	PHOSPHATE, TOTAL AS P	0.141
9/14/2011 10:46	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
9/14/2011 10:46	Grab	NITRATE+NITRITE-N	-0.005
9/14/2011 10:46	Grab	PHOSPHATE, TOTAL AS P	-0.002
9/21/2011 9:38	Grab	KJELDAHL NITROGEN, TOTAL	1.14

Table C-3. S-79 Water Quality Data			
Collection Date	**Collection Method**	**Test Name**	**Value (mg/L)**
9/21/2011 9:38	Grab	NITRATE+NITRITE-N	0.24
9/21/2011 9:38	Grab	PHOSPHATE, TOTAL AS P	0.148
9/21/2011 10:08	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
9/21/2011 10:08	Grab	NITRATE+NITRITE-N	-0.005
9/21/2011 10:08	Grab	PHOSPHATE, TOTAL AS P	-0.002
9/28/2011 10:14	Grab	KJELDAHL NITROGEN, TOTAL	1.12
9/28/2011 10:14	Grab	NITRATE+NITRITE-N	0.352
9/28/2011 10:14	Grab	PHOSPHATE, TOTAL AS P	0.174
9/28/2011 10:37	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
9/28/2011 10:37	Grab	NITRATE+NITRITE-N	-0.005
9/28/2011 10:37	Grab	PHOSPHATE, TOTAL AS P	-0.002
10/5/2011 9:47	Grab	KJELDAHL NITROGEN, TOTAL	0.97
10/5/2011 9:47	Grab	NITRATE+NITRITE-N	0.334
10/5/2011 9:47	Grab	PHOSPHATE, TOTAL AS P	0.147
10/5/2011 10:04	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
10/5/2011 10:04	Grab	NITRATE+NITRITE-N	-0.005
10/5/2011 10:04	Grab	PHOSPHATE, TOTAL AS P	-0.002
10/12/2011 10:27	Grab	KJELDAHL NITROGEN, TOTAL	0.82
10/12/2011 10:27	Grab	NITRATE+NITRITE-N	0.3
10/12/2011 10:27	Grab	PHOSPHATE, TOTAL AS P	0.115
10/12/2011 10:48	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
10/12/2011 10:48	Grab	NITRATE+NITRITE-N	-0.005
10/12/2011 10:48	Grab	PHOSPHATE, TOTAL AS P	-0.002
10/19/2011 10:06	Grab	KJELDAHL NITROGEN, TOTAL	0.97
10/19/2011 10:06	Grab	NITRATE+NITRITE-N	0.37
10/19/2011 10:06	Grab	PHOSPHATE, TOTAL AS P	0.164
10/19/2011 10:35	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
10/19/2011 10:35	Grab	NITRATE+NITRITE-N	-0.005
10/19/2011 10:35	Grab	PHOSPHATE, TOTAL AS P	-0.002
10/26/2011 9:37	Grab	KJELDAHL NITROGEN, TOTAL	0.95
10/26/2011 9:37	Grab	NITRATE+NITRITE-N	0.189
10/26/2011 9:37	Grab	PHOSPHATE, TOTAL AS P	0.1
10/26/2011 9:50	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
10/26/2011 9:50	Grab	NITRATE+NITRITE-N	-0.005
10/26/2011 9:50	Grab	PHOSPHATE, TOTAL AS P	-0.002
11/2/2011 10:43	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
11/2/2011 10:43	Grab	NITRATE+NITRITE-N	0.007
11/2/2011 10:43	Grab	PHOSPHATE, TOTAL AS P	-0.002
11/2/2011 10:58	Grab	KJELDAHL NITROGEN, TOTAL	1.07
11/2/2011 10:58	Grab	NITRATE+NITRITE-N	0.232
11/2/2011 10:58	Grab	PHOSPHATE, TOTAL AS P	0.098
11/2/2011 11:11	Grab	KJELDAHL NITROGEN, TOTAL	1.05
11/2/2011 11:11	Grab	NITRATE+NITRITE-N	0.234
11/2/2011 11:11	Grab	PHOSPHATE, TOTAL AS P	0.097
11/2/2011 11:30	Grab	KJELDAHL NITROGEN, TOTAL	1.06
11/2/2011 11:30	Grab	NITRATE+NITRITE-N	0.228
11/2/2011 11:30	Grab	PHOSPHATE, TOTAL AS P	0.101

Table C-3. S-79 Water Quality Data

Collection Date	Collection Method	Test Name	Value (mg/L)
11/2/2011 11:51	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
11/2/2011 11:51	Grab	NITRATE+NITRITE-N	0.007
11/2/2011 11:51	Grab	PHOSPHATE, TOTAL AS P	-0.002
11/9/2011 10:34	Grab	KJELDAHL NITROGEN, TOTAL	1.02
11/9/2011 10:34	Grab	NITRATE+NITRITE-N	0.272
11/9/2011 10:34	Grab	PHOSPHATE, TOTAL AS P	0.085
11/9/2011 10:53	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
11/9/2011 10:53	Grab	NITRATE+NITRITE-N	-0.005
11/9/2011 10:53	Grab	PHOSPHATE, TOTAL AS P	-0.002
11/16/2011 10:34	Grab	KJELDAHL NITROGEN, TOTAL	0.99
11/16/2011 10:34	Grab	NITRATE+NITRITE-N	0.331
11/16/2011 10:34	Grab	PHOSPHATE, TOTAL AS P	0.082
11/16/2011 10:49	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
11/16/2011 10:49	Grab	NITRATE+NITRITE-N	0.007
11/16/2011 10:49	Grab	PHOSPHATE, TOTAL AS P	-0.002
11/22/2011 9:45	Grab	KJELDAHL NITROGEN, TOTAL	0.96
11/22/2011 9:45	Grab	NITRATE+NITRITE-N	0.349
11/22/2011 9:45	Grab	PHOSPHATE, TOTAL AS P	0.082
11/22/2011 10:09	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
11/22/2011 10:09	Grab	NITRATE+NITRITE-N	-0.005
11/22/2011 10:09	Grab	PHOSPHATE, TOTAL AS P	-0.002
11/30/2011 10:32	Grab	KJELDAHL NITROGEN, TOTAL	0.88
11/30/2011 10:32	Grab	NITRATE+NITRITE-N	0.413
11/30/2011 10:32	Grab	PHOSPHATE, TOTAL AS P	0.085
11/30/2011 10:52	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
11/30/2011 10:52	Grab	NITRATE+NITRITE-N	-0.005
11/30/2011 10:52	Grab	PHOSPHATE, TOTAL AS P	-0.002
12/7/2011 11:03	Grab	KJELDAHL NITROGEN, TOTAL	0.92
12/7/2011 11:03	Grab	NITRATE+NITRITE-N	0.443
12/7/2011 11:03	Grab	PHOSPHATE, TOTAL AS P	0.09
12/7/2011 11:17	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
12/7/2011 11:17	Grab	NITRATE+NITRITE-N	-0.005
12/7/2011 11:17	Grab	PHOSPHATE, TOTAL AS P	-0.002
12/14/2011 10:37	Grab	KJELDAHL NITROGEN, TOTAL	0.81
12/14/2011 10:37	Grab	NITRATE+NITRITE-N	0.53
12/14/2011 10:37	Grab	PHOSPHATE, TOTAL AS P	0.09
12/14/2011 11:04	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
12/14/2011 11:04	Grab	NITRATE+NITRITE-N	-0.005
12/14/2011 11:04	Grab	PHOSPHATE, TOTAL AS P	-0.002
12/21/2011 9:22	Grab	KJELDAHL NITROGEN, TOTAL	0.9
12/21/2011 9:22	Grab	NITRATE+NITRITE-N	0.525
12/21/2011 9:22	Grab	PHOSPHATE, TOTAL AS P	0.092
12/21/2011 9:55	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
12/21/2011 9:55	Grab	NITRATE+NITRITE-N	-0.005
12/21/2011 9:55	Grab	PHOSPHATE, TOTAL AS P	-0.002
12/28/2011 9:58	Grab	KJELDAHL NITROGEN, TOTAL	0.9
12/28/2011 9:58	Grab	NITRATE+NITRITE-N	0.493

Table C-3. S-79 Water Quality Data			
Collection Date	Collection Method	Test Name	Value (mg/L)
12/28/2011 9:58	Grab	PHOSPHATE, TOTAL AS P	0.096
12/28/2011 10:14	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
12/28/2011 10:14	Grab	NITRATE+NITRITE-N	-0.005
12/28/2011 10:14	Grab	PHOSPHATE, TOTAL AS P	-0.002
1/4/2012 10:36	Grab	KJELDAHL NITROGEN, TOTAL	0.96
1/4/2012 10:36	Grab	NITRATE+NITRITE-N	0.542
1/4/2012 10:36	Grab	PHOSPHATE, TOTAL AS P	0.099
1/4/2012 10:49	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
1/4/2012 10:49	Grab	NITRATE+NITRITE-N	-0.005
1/4/2012 10:49	Grab	PHOSPHATE, TOTAL AS P	-0.002
1/11/2012 10:05	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
1/11/2012 10:05	Grab	NITRATE+NITRITE-N	-0.005
1/11/2012 10:05	Grab	PHOSPHATE, TOTAL AS P	-0.002
1/11/2012 10:27	Grab	KJELDAHL NITROGEN, TOTAL	1.02
1/11/2012 10:27	Grab	NITRATE+NITRITE-N	0.573
1/11/2012 10:27	Grab	PHOSPHATE, TOTAL AS P	0.106
1/11/2012 10:36	Grab	KJELDAHL NITROGEN, TOTAL	1.01
1/11/2012 10:36	Grab	NITRATE+NITRITE-N	0.573
1/11/2012 10:36	Grab	PHOSPHATE, TOTAL AS P	0.108
1/11/2012 10:53	Grab	KJELDAHL NITROGEN, TOTAL	1.01
1/11/2012 10:53	Grab	NITRATE+NITRITE-N	0.569
1/11/2012 10:53	Grab	PHOSPHATE, TOTAL AS P	0.109
1/11/2012 11:13	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
1/11/2012 11:13	Grab	NITRATE+NITRITE-N	-0.005
1/11/2012 11:13	Grab	PHOSPHATE, TOTAL AS P	-0.002
1/18/2012 10:04	Grab	KJELDAHL NITROGEN, TOTAL	0.99
1/18/2012 10:04	Grab	NITRATE+NITRITE-N	0.493
1/18/2012 10:04	Grab	PHOSPHATE, TOTAL AS P	0.1
1/25/2012 10:26	Grab	KJELDAHL NITROGEN, TOTAL	1.27
1/25/2012 10:26	Grab	NITRATE+NITRITE-N	0.301
1/25/2012 10:26	Grab	PHOSPHATE, TOTAL AS P	0.114
1/25/2012 10:55	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
1/25/2012 10:55	Grab	NITRATE+NITRITE-N	-0.005
1/25/2012 10:55	Grab	PHOSPHATE, TOTAL AS P	-0.002
2/1/2012 9:12	Grab	KJELDAHL NITROGEN, TOTAL	1.12
2/1/2012 9:12	Grab	NITRATE+NITRITE-N	0.347
2/1/2012 9:12	Grab	PHOSPHATE, TOTAL AS P	0.098
2/1/2012 9:25	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
2/1/2012 9:25	Grab	NITRATE+NITRITE-N	-0.005
2/1/2012 9:25	Grab	PHOSPHATE, TOTAL AS P	-0.002
2/8/2012 10:00	Grab	KJELDAHL NITROGEN, TOTAL	1.04
2/8/2012 10:00	Grab	NITRATE+NITRITE-N	0.299
2/8/2012 10:00	Grab	PHOSPHATE, TOTAL AS P	0.089
2/15/2012 10:24	Grab	KJELDAHL NITROGEN, TOTAL	1.09
2/15/2012 10:24	Grab	NITRATE+NITRITE-N	0.277
2/15/2012 10:24	Grab	PHOSPHATE, TOTAL AS P	0.081
2/15/2012 10:48	Grab	KJELDAHL NITROGEN, TOTAL	-0.05

Table C-3. S-79 Water Quality Data

Collection Date	Collection Method	Test Name	Value (mg/L)
2/15/2012 10:48	Grab	NITRATE+NITRITE-N	0.017
2/15/2012 10:48	Grab	PHOSPHATE, TOTAL AS P	-0.002
2/22/2012 10:25	Grab	KJELDAHL NITROGEN, TOTAL	1.12
2/22/2012 10:25	Grab	NITRATE+NITRITE-N	0.261
2/22/2012 10:25	Grab	PHOSPHATE, TOTAL AS P	0.09
2/22/2012 10:40	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
2/22/2012 10:40	Grab	NITRATE+NITRITE-N	-0.005
2/22/2012 10:40	Grab	PHOSPHATE, TOTAL AS P	-0.002
2/29/2012 9:45	Grab	KJELDAHL NITROGEN, TOTAL	1.04
2/29/2012 9:45	Grab	NITRATE+NITRITE-N	0.251
2/29/2012 9:45	Grab	PHOSPHATE, TOTAL AS P	0.093
3/7/2012 9:50	Grab	KJELDAHL NITROGEN, TOTAL	1.04
3/7/2012 9:50	Grab	NITRATE+NITRITE-N	0.214
3/7/2012 9:50	Grab	PHOSPHATE, TOTAL AS P	0.089
3/7/2012 10:12	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
3/7/2012 10:12	Grab	NITRATE+NITRITE-N	-0.005
3/7/2012 10:12	Grab	PHOSPHATE, TOTAL AS P	-0.002
3/14/2012 9:45	Grab	KJELDAHL NITROGEN, TOTAL	1.05
3/14/2012 9:45	Grab	NITRATE+NITRITE-N	0.201
3/14/2012 9:45	Grab	PHOSPHATE, TOTAL AS P	0.09
3/14/2012 10:05	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
3/14/2012 10:05	Grab	NITRATE+NITRITE-N	-0.005
3/14/2012 10:05	Grab	PHOSPHATE, TOTAL AS P	-0.002
3/21/2012 9:23	Grab	KJELDAHL NITROGEN, TOTAL	1.02
3/21/2012 9:23	Grab	NITRATE+NITRITE-N	0.212
3/21/2012 9:23	Grab	PHOSPHATE, TOTAL AS P	0.093
3/21/2012 9:39	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
3/21/2012 9:39	Grab	NITRATE+NITRITE-N	-0.005
3/21/2012 9:39	Grab	PHOSPHATE, TOTAL AS P	-0.002
3/28/2012 9:32	Grab	KJELDAHL NITROGEN, TOTAL	1.13
3/28/2012 9:32	Grab	NITRATE+NITRITE-N	-0.005
3/28/2012 9:32	Grab	PHOSPHATE, TOTAL AS P	0.075
3/28/2012 9:46	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
3/28/2012 9:46	Grab	NITRATE+NITRITE-N	-0.005
3/28/2012 9:46	Grab	PHOSPHATE, TOTAL AS P	-0.002
4/4/2012 9:37	Grab	KJELDAHL NITROGEN, TOTAL	1.25
4/4/2012 9:37	Grab	NITRATE+NITRITE-N	-0.005
4/4/2012 9:37	Grab	PHOSPHATE, TOTAL AS P	0.08
4/4/2012 9:59	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
4/4/2012 9:59	Grab	NITRATE+NITRITE-N	-0.005
4/4/2012 9:59	Grab	PHOSPHATE, TOTAL AS P	-0.002
4/11/2012 10:01	Grab	KJELDAHL NITROGEN, TOTAL	1.31
4/11/2012 10:01	Grab	NITRATE+NITRITE-N	-0.005
4/11/2012 10:01	Grab	PHOSPHATE, TOTAL AS P	0.109
4/11/2012 10:34	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
4/11/2012 10:34	Grab	NITRATE+NITRITE-N	0.012
4/11/2012 10:34	Grab	PHOSPHATE, TOTAL AS P	-0.002

Table C-3. S-79 Water Quality Data			
Collection Date	**Collection Method**	**Test Name**	**Value (mg/L)**
4/18/2012 10:33	Grab	KJELDAHL NITROGEN, TOTAL	1.32
4/18/2012 10:33	Grab	NITRATE+NITRITE-N	-0.005
4/18/2012 10:33	Grab	PHOSPHATE, TOTAL AS P	0.123
4/18/2012 10:58	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
4/18/2012 10:58	Grab	NITRATE+NITRITE-N	-0.005
4/18/2012 10:58	Grab	PHOSPHATE, TOTAL AS P	-0.002
4/25/2012 10:23	Grab	KJELDAHL NITROGEN, TOTAL	1.33
4/25/2012 10:23	Grab	NITRATE+NITRITE-N	-0.005
4/25/2012 10:23	Grab	PHOSPHATE, TOTAL AS P	0.154
4/25/2012 10:40	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
4/25/2012 10:40	Grab	NITRATE+NITRITE-N	-0.005
4/25/2012 10:40	Grab	PHOSPHATE, TOTAL AS P	-0.002
5/2/2012 9:41	Grab	KJELDAHL NITROGEN, TOTAL	1.34
5/2/2012 9:41	Grab	NITRATE+NITRITE-N	-0.005
5/2/2012 9:41	Grab	PHOSPHATE, TOTAL AS P	0.118
5/2/2012 9:56	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
5/2/2012 9:56	Grab	NITRATE+NITRITE-N	-0.005
5/2/2012 9:56	Grab	PHOSPHATE, TOTAL AS P	-0.002
5/9/2012 10:23	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
5/9/2012 10:23	Grab	NITRATE+NITRITE-N	-0.005
5/9/2012 10:23	Grab	PHOSPHATE, TOTAL AS P	-0.002
5/9/2012 10:35	Grab	KJELDAHL NITROGEN, TOTAL	1.24
5/9/2012 10:35	Grab	NITRATE+NITRITE-N	-0.005
5/9/2012 10:35	Grab	PHOSPHATE, TOTAL AS P	0.106
5/9/2012 10:48	Grab	KJELDAHL NITROGEN, TOTAL	1.27
5/9/2012 10:48	Grab	NITRATE+NITRITE-N	-0.005
5/9/2012 10:48	Grab	PHOSPHATE, TOTAL AS P	0.104
5/9/2012 10:59	Grab	KJELDAHL NITROGEN, TOTAL	1.28
5/9/2012 10:59	Grab	NITRATE+NITRITE-N	-0.005
5/9/2012 10:59	Grab	PHOSPHATE, TOTAL AS P	0.106
5/9/2012 11:09	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
5/9/2012 11:09	Grab	NITRATE+NITRITE-N	-0.005
5/9/2012 11:09	Grab	PHOSPHATE, TOTAL AS P	-0.002
5/15/2012 10:17	Grab	KJELDAHL NITROGEN, TOTAL	1.24
5/15/2012 10:17	Grab	NITRATE+NITRITE-N	-0.005
5/15/2012 10:17	Grab	PHOSPHATE, TOTAL AS P	0.116
5/15/2012 10:31	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
5/15/2012 10:31	Grab	NITRATE+NITRITE-N	-0.005
5/15/2012 10:31	Grab	PHOSPHATE, TOTAL AS P	-0.002
5/23/2012 9:29	Grab	KJELDAHL NITROGEN, TOTAL	1.27
5/23/2012 9:29	Grab	NITRATE+NITRITE-N	-0.005
5/23/2012 9:29	Grab	PHOSPHATE, TOTAL AS P	0.096
5/23/2012 9:43	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
5/23/2012 9:43	Grab	NITRATE+NITRITE-N	-0.005
5/23/2012 9:43	Grab	PHOSPHATE, TOTAL AS P	-0.002
5/30/2012 10:16	Grab	KJELDAHL NITROGEN, TOTAL	1.24
5/30/2012 10:16	Grab	NITRATE+NITRITE-N	-0.005

Table C-3. S-79 Water Quality Data			
Collection Date	Collection Method	Test Name	Value (mg/L)
5/30/2012 10:16	Grab	PHOSPHATE, TOTAL AS P	0.108
5/30/2012 10:38	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
5/30/2012 10:38	Grab	NITRATE+NITRITE-N	-0.005
5/30/2012 10:38	Grab	PHOSPHATE, TOTAL AS P	-0.002
6/6/2012 10:59	Grab	KJELDAHL NITROGEN, TOTAL	1.25
6/6/2012 10:59	Grab	NITRATE+NITRITE-N	0.01
6/6/2012 10:59	Grab	PHOSPHATE, TOTAL AS P	0.17
6/6/2012 11:21	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
6/6/2012 11:21	Grab	NITRATE+NITRITE-N	-0.005
6/6/2012 11:21	Grab	PHOSPHATE, TOTAL AS P	-0.002
6/13/2012 10:47	Grab	KJELDAHL NITROGEN, TOTAL	1.29
6/13/2012 10:47	Grab	NITRATE+NITRITE-N	-0.005
6/13/2012 10:47	Grab	PHOSPHATE, TOTAL AS P	0.145
6/13/2012 11:03	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
6/13/2012 11:03	Grab	NITRATE+NITRITE-N	-0.005
6/13/2012 11:03	Grab	PHOSPHATE, TOTAL AS P	-0.002
6/21/2012 9:45	Grab	KJELDAHL NITROGEN, TOTAL	1.24
6/21/2012 9:45	Grab	NITRATE+NITRITE-N	0.055
6/21/2012 9:45	Grab	PHOSPHATE, TOTAL AS P	0.132
6/21/2012 9:59	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
6/21/2012 9:59	Grab	NITRATE+NITRITE-N	-0.005
6/21/2012 9:59	Grab	PHOSPHATE, TOTAL AS P	-0.002
6/27/2012 9:20	Grab	KJELDAHL NITROGEN, TOTAL	1.02
6/27/2012 9:20	Grab	NITRATE+NITRITE-N	0.242
6/27/2012 9:20	Grab	PHOSPHATE, TOTAL AS P	0.146
7/3/2012 9:59	Grab	KJELDAHL NITROGEN, TOTAL	1.2
7/3/2012 9:59	Grab	NITRATE+NITRITE-N	-0.005
7/3/2012 9:59	Grab	PHOSPHATE, TOTAL AS P	0.106
7/3/2012 10:12	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
7/3/2012 10:12	Grab	NITRATE+NITRITE-N	-0.005
7/3/2012 10:12	Grab	PHOSPHATE, TOTAL AS P	-0.002
7/10/2012 9:57	Grab	KJELDAHL NITROGEN, TOTAL	1.41
7/10/2012 9:57	Grab	NITRATE+NITRITE-N	-0.005
7/10/2012 9:57	Grab	PHOSPHATE, TOTAL AS P	0.114
7/10/2012 10:19	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
7/10/2012 10:19	Grab	NITRATE+NITRITE-N	-0.005
7/10/2012 10:19	Grab	PHOSPHATE, TOTAL AS P	-0.002
7/18/2012 9:59	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
7/18/2012 9:59	Grab	NITRATE+NITRITE-N	-0.005
7/18/2012 9:59	Grab	PHOSPHATE, TOTAL AS P	-0.002
7/18/2012 10:18	Grab	KJELDAHL NITROGEN, TOTAL	1.21
7/18/2012 10:18	Grab	NITRATE+NITRITE-N	0.104
7/18/2012 10:18	Grab	PHOSPHATE, TOTAL AS P	0.153
7/18/2012 10:30	Grab	KJELDAHL NITROGEN, TOTAL	1.19
7/18/2012 10:30	Grab	NITRATE+NITRITE-N	0.103
7/18/2012 10:30	Grab	PHOSPHATE, TOTAL AS P	0.154
7/18/2012 10:40	Grab	KJELDAHL NITROGEN, TOTAL	1.2

Table C-3. S-79 Water Quality Data

Collection Date	Collection Method	Test Name	Value (mg/L)
7/18/2012 10:40	Grab	NITRATE+NITRITE-N	0.102
7/18/2012 10:40	Grab	PHOSPHATE, TOTAL AS P	0.156
7/18/2012 10:52	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
7/18/2012 10:52	Grab	NITRATE+NITRITE-N	-0.005
7/18/2012 10:52	Grab	PHOSPHATE, TOTAL AS P	-0.002
7/25/2012 9:25	Grab	KJELDAHL NITROGEN, TOTAL	1.02
7/25/2012 9:25	Grab	NITRATE+NITRITE-N	0.061
7/25/2012 9:25	Grab	PHOSPHATE, TOTAL AS P	0.116
8/1/2012 10:30	Grab	KJELDAHL NITROGEN, TOTAL	1.21
8/1/2012 10:30	Grab	NITRATE+NITRITE-N	-0.005
8/1/2012 10:30	Grab	PHOSPHATE, TOTAL AS P	0.143
8/1/2012 10:56	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
8/1/2012 10:56	Grab	NITRATE+NITRITE-N	-0.005
8/1/2012 10:56	Grab	PHOSPHATE, TOTAL AS P	-0.002
8/8/2012 10:48	Grab	KJELDAHL NITROGEN, TOTAL	1.26
8/8/2012 10:48	Grab	NITRATE+NITRITE-N	-0.005
8/8/2012 10:48	Grab	PHOSPHATE, TOTAL AS P	0.143
8/15/2012 10:19	Grab	KJELDAHL NITROGEN, TOTAL	1.1
8/15/2012 10:19	Grab	NITRATE+NITRITE-N	0.018
8/15/2012 10:19	Grab	PHOSPHATE, TOTAL AS P	0.121
8/15/2012 10:31	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
8/15/2012 10:31	Grab	NITRATE+NITRITE-N	-0.005
8/15/2012 10:31	Grab	PHOSPHATE, TOTAL AS P	-0.002
8/22/2012 12:01	Grab	KJELDAHL NITROGEN, TOTAL	1.3
8/22/2012 12:01	Grab	NITRATE+NITRITE-N	0.007
8/22/2012 12:01	Grab	PHOSPHATE, TOTAL AS P	0.159
8/29/2012 10:03	Grab	KJELDAHL NITROGEN, TOTAL	1.38
8/29/2012 10:03	Grab	NITRATE+NITRITE-N	0.189
8/29/2012 10:03	Grab	PHOSPHATE, TOTAL AS P	0.124
8/29/2012 10:20	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
8/29/2012 10:20	Grab	NITRATE+NITRITE-N	-0.005
8/29/2012 10:20	Grab	PHOSPHATE, TOTAL AS P	-0.002
9/5/2012 11:44	Grab	KJELDAHL NITROGEN, TOTAL	1.37
9/5/2012 11:44	Grab	NITRATE+NITRITE-N	0.197
9/5/2012 11:44	Grab	PHOSPHATE, TOTAL AS P	0.188
9/12/2012 11:54	Grab	KJELDAHL NITROGEN, TOTAL	1.25
9/12/2012 11:54	Grab	NITRATE+NITRITE-N	0.121
9/12/2012 11:54	Grab	PHOSPHATE, TOTAL AS P	0.138
9/19/2012 11:20	Grab	KJELDAHL NITROGEN, TOTAL	1.28
9/19/2012 11:20	Grab	NITRATE+NITRITE-N	0.261
9/19/2012 11:20	Grab	PHOSPHATE, TOTAL AS P	0.149
9/19/2012 11:35	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
9/19/2012 11:35	Grab	NITRATE+NITRITE-N	-0.005
9/19/2012 11:35	Grab	PHOSPHATE, TOTAL AS P	-0.002
9/26/2012 12:15	Grab	KJELDAHL NITROGEN, TOTAL	1.4
9/26/2012 12:15	Grab	NITRATE+NITRITE-N	0.2
9/26/2012 12:15	Grab	PHOSPHATE, TOTAL AS P	0.165

Table C-3. S-79 Water Quality Data			
Collection Date	Collection Method	Test Name	Value (mg/L)
10/3/2012 12:15	Grab	KJELDAHL NITROGEN, TOTAL	1.56
10/3/2012 12:15	Grab	NITRATE+NITRITE-N	0.095
10/3/2012 12:15	Grab	PHOSPHATE, TOTAL AS P	0.219
10/10/2012 12:04	Grab	KJELDAHL NITROGEN, TOTAL	1.62
10/10/2012 12:04	Grab	NITRATE+NITRITE-N	0.069
10/10/2012 12:04	Grab	PHOSPHATE, TOTAL AS P	0.13
10/17/2012 12:04	Grab	KJELDAHL NITROGEN, TOTAL	1.57
10/17/2012 12:04	Grab	NITRATE+NITRITE-N	0.082
10/17/2012 12:04	Grab	PHOSPHATE, TOTAL AS P	0.106
10/17/2012 12:39	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
10/17/2012 12:39	Grab	NITRATE+NITRITE-N	-0.005
10/17/2012 12:39	Grab	PHOSPHATE, TOTAL AS P	-0.002
10/24/2012 12:34	Grab	KJELDAHL NITROGEN, TOTAL	1.56
10/24/2012 12:34	Grab	NITRATE+NITRITE-N	0.073
10/24/2012 12:34	Grab	PHOSPHATE, TOTAL AS P	0.124
11/1/2012 9:10	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
11/1/2012 9:10	Grab	NITRATE+NITRITE-N	-0.005
11/1/2012 9:10	Grab	PHOSPHATE, TOTAL AS P	-0.002
11/1/2012 9:20	Grab	KJELDAHL NITROGEN, TOTAL	1.39
11/1/2012 9:20	Grab	NITRATE+NITRITE-N	0.12
11/1/2012 9:20	Grab	PHOSPHATE, TOTAL AS P	0.1
11/1/2012 9:36	Grab	KJELDAHL NITROGEN, TOTAL	1.4
11/1/2012 9:36	Grab	NITRATE+NITRITE-N	0.12
11/1/2012 9:36	Grab	PHOSPHATE, TOTAL AS P	0.098
11/1/2012 9:47	Grab	KJELDAHL NITROGEN, TOTAL	1.4
11/1/2012 9:47	Grab	NITRATE+NITRITE-N	0.12
11/1/2012 9:47	Grab	PHOSPHATE, TOTAL AS P	0.094
11/1/2012 10:16	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
11/1/2012 10:16	Grab	NITRATE+NITRITE-N	-0.005
11/1/2012 10:16	Grab	PHOSPHATE, TOTAL AS P	-0.002
11/7/2012 11:31	Grab	KJELDAHL NITROGEN, TOTAL	1.32
11/7/2012 11:31	Grab	NITRATE+NITRITE-N	0.124
11/7/2012 11:31	Grab	PHOSPHATE, TOTAL AS P	0.07
11/14/2012 11:47	Grab	KJELDAHL NITROGEN, TOTAL	1.33
11/14/2012 11:47	Grab	NITRATE+NITRITE-N	0.176
11/14/2012 11:47	Grab	PHOSPHATE, TOTAL AS P	0.086
11/20/2012 11:33	Grab	KJELDAHL NITROGEN, TOTAL	1.16
11/20/2012 11:33	Grab	NITRATE+NITRITE-N	0.292
11/20/2012 11:33	Grab	PHOSPHATE, TOTAL AS P	0.091
11/28/2012 12:45	Grab	KJELDAHL NITROGEN, TOTAL	1.13
11/28/2012 12:45	Grab	NITRATE+NITRITE-N	0.302
11/28/2012 12:45	Grab	PHOSPHATE, TOTAL AS P	0.093
12/5/2012 11:55	Grab	KJELDAHL NITROGEN, TOTAL	1.21
12/5/2012 11:55	Grab	NITRATE+NITRITE-N	0.292
12/5/2012 11:55	Grab	PHOSPHATE, TOTAL AS P	0.092
12/12/2012 12:29	Grab	KJELDAHL NITROGEN, TOTAL	1.12
12/12/2012 12:29	Grab	NITRATE+NITRITE-N	0.252

Table C-3. S-79 Water Quality Data

Collection Date	Collection Method	Test Name	Value (mg/L)
12/12/2012 12:29	Grab	PHOSPHATE, TOTAL AS P	0.076
12/19/2012 12:17	Grab	KJELDAHL NITROGEN, TOTAL	1.05
12/19/2012 12:17	Grab	NITRATE+NITRITE-N	0.26
12/19/2012 12:17	Grab	PHOSPHATE, TOTAL AS P	0.076
12/19/2012 12:32	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
12/19/2012 12:32	Grab	NITRATE+NITRITE-N	-0.005
12/19/2012 12:32	Grab	PHOSPHATE, TOTAL AS P	-0.002
12/27/2012 11:31	Grab	KJELDAHL NITROGEN, TOTAL	1.14
12/27/2012 11:31	Grab	NITRATE+NITRITE-N	0.314
12/27/2012 11:31	Grab	PHOSPHATE, TOTAL AS P	0.102
1/3/2013 11:12	Grab	KJELDAHL NITROGEN, TOTAL	1.19
1/3/2013 11:12	Grab	NITRATE+NITRITE-N	0.316
1/3/2013 11:12	Grab	PHOSPHATE, TOTAL AS P	0.103
1/9/2013 11:42	Grab	KJELDAHL NITROGEN, TOTAL	1.23
1/9/2013 11:42	Grab	NITRATE+NITRITE-N	0.255
1/9/2013 11:42	Grab	PHOSPHATE, TOTAL AS P	0.09
1/16/2013 11:33	Grab	KJELDAHL NITROGEN, TOTAL	1.09
1/16/2013 11:33	Grab	NITRATE+NITRITE-N	0.232
1/16/2013 11:33	Grab	PHOSPHATE, TOTAL AS P	0.07
1/23/2013 12:32	Grab	KJELDAHL NITROGEN, TOTAL	1.06
1/23/2013 12:32	Grab	NITRATE+NITRITE-N	0.251
1/23/2013 12:32	Grab	PHOSPHATE, TOTAL AS P	0.073
1/30/2013 9:48	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
1/30/2013 9:48	Grab	NITRATE+NITRITE-N	-0.005
1/30/2013 9:48	Grab	PHOSPHATE, TOTAL AS P	-0.002
1/30/2013 10:18	Grab	KJELDAHL NITROGEN, TOTAL	1.14
1/30/2013 10:18	Grab	NITRATE+NITRITE-N	0.221
1/30/2013 10:18	Grab	PHOSPHATE, TOTAL AS P	0.082
1/30/2013 10:39	Grab	KJELDAHL NITROGEN, TOTAL	1.13
1/30/2013 10:39	Grab	NITRATE+NITRITE-N	0.211
1/30/2013 10:39	Grab	PHOSPHATE, TOTAL AS P	0.079
1/30/2013 10:50	Grab	KJELDAHL NITROGEN, TOTAL	1.13
1/30/2013 10:50	Grab	NITRATE+NITRITE-N	0.211
1/30/2013 10:50	Grab	PHOSPHATE, TOTAL AS P	0.08
1/30/2013 11:03	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
1/30/2013 11:03	Grab	NITRATE+NITRITE-N	-0.005
1/30/2013 11:03	Grab	PHOSPHATE, TOTAL AS P	-0.002
2/6/2013 11:42	Grab	KJELDAHL NITROGEN, TOTAL	1.22
2/6/2013 11:42	Grab	NITRATE+NITRITE-N	0.28
2/6/2013 11:42	Grab	PHOSPHATE, TOTAL AS P	0.092
2/13/2013 11:42	Grab	KJELDAHL NITROGEN, TOTAL	1.1
2/13/2013 11:42	Grab	NITRATE+NITRITE-N	0.03
2/13/2013 11:42	Grab	PHOSPHATE, TOTAL AS P	0.056
2/21/2013 9:39	Grab	KJELDAHL NITROGEN, TOTAL	1.09
2/21/2013 9:39	Grab	NITRATE+NITRITE-N	0.085
2/21/2013 9:39	Grab	PHOSPHATE, TOTAL AS P	0.068
2/21/2013 10:03	Grab	KJELDAHL NITROGEN, TOTAL	-0.05

Table C-3. S-79 Water Quality Data			
Collection Date	**Collection Method**	**Test Name**	**Value (mg/L)**
2/21/2013 10:03	Grab	NITRATE+NITRITE-N	-0.005
2/21/2013 10:03	Grab	PHOSPHATE, TOTAL AS P	-0.002
2/27/2013 11:46	Grab	KJELDAHL NITROGEN, TOTAL	1.41
2/27/2013 11:46	Grab	NITRATE+NITRITE-N	0.146
2/27/2013 11:46	Grab	PHOSPHATE, TOTAL AS P	0.079
3/6/2013 12:02	Grab	KJELDAHL NITROGEN, TOTAL	1.19
3/6/2013 12:02	Grab	NITRATE+NITRITE-N	0.255
3/6/2013 12:02	Grab	PHOSPHATE, TOTAL AS P	0.071
3/13/2013 12:33	Grab	KJELDAHL NITROGEN, TOTAL	1.22
3/13/2013 12:33	Grab	NITRATE+NITRITE-N	0.135
3/13/2013 12:33	Grab	PHOSPHATE, TOTAL AS P	0.067
3/13/2013 12:55	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
3/13/2013 12:55	Grab	NITRATE+NITRITE-N	-0.005
3/13/2013 12:55	Grab	PHOSPHATE, TOTAL AS P	-0.002
3/20/2013 11:55	Grab	KJELDAHL NITROGEN, TOTAL	1.2
3/20/2013 11:55	Grab	NITRATE+NITRITE-N	0.069
3/20/2013 11:55	Grab	PHOSPHATE, TOTAL AS P	0.075
3/27/2013 12:30	Grab	KJELDAHL NITROGEN, TOTAL	1.05
3/27/2013 12:30	Grab	NITRATE+NITRITE-N	0.037
3/27/2013 12:30	Grab	PHOSPHATE, TOTAL AS P	0.066
4/3/2013 12:41	Grab	KJELDAHL NITROGEN, TOTAL	1.15
4/3/2013 12:41	Grab	NITRATE+NITRITE-N	-0.005
4/3/2013 12:41	Grab	PHOSPHATE, TOTAL AS P	0.069
4/10/2013 12:25	Grab	KJELDAHL NITROGEN, TOTAL	1.17
4/10/2013 12:25	Grab	NITRATE+NITRITE-N	0.034
4/10/2013 12:25	Grab	PHOSPHATE, TOTAL AS P	0.08
4/17/2013 10:43	Grab	KJELDAHL NITROGEN, TOTAL	1.17
4/17/2013 10:43	Grab	NITRATE+NITRITE-N	-0.005
4/17/2013 10:43	Grab	PHOSPHATE, TOTAL AS P	0.079
4/24/2013 11:56	Grab	KJELDAHL NITROGEN, TOTAL	1.17
4/24/2013 11:56	Grab	NITRATE+NITRITE-N	0.039
4/24/2013 11:56	Grab	PHOSPHATE, TOTAL AS P	0.103
5/1/2013 11:53	Grab	KJELDAHL NITROGEN, TOTAL	1.13
5/1/2013 11:53	Grab	NITRATE+NITRITE-N	0.081
5/1/2013 11:53	Grab	PHOSPHATE, TOTAL AS P	0.129
5/8/2013 12:49	Grab	KJELDAHL NITROGEN, TOTAL	1.09
5/8/2013 12:49	Grab	NITRATE+NITRITE-N	0.049
5/8/2013 12:49	Grab	PHOSPHATE, TOTAL AS P	0.112
5/15/2013 11:48	Grab	KJELDAHL NITROGEN, TOTAL	1.15
5/15/2013 11:48	Grab	NITRATE+NITRITE-N	-0.005
5/15/2013 11:48	Grab	PHOSPHATE, TOTAL AS P	0.088
5/22/2013 10:06	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
5/22/2013 10:06	Grab	NITRATE+NITRITE-N	-0.005
5/22/2013 10:06	Grab	PHOSPHATE, TOTAL AS P	-0.002
5/22/2013 10:20	Grab	KJELDAHL NITROGEN, TOTAL	1.15
5/22/2013 10:20	Grab	NITRATE+NITRITE-N	0.012
5/22/2013 10:20	Grab	PHOSPHATE, TOTAL AS P	0.075

Table C-3. S-79 Water Quality Data			
Collection Date	Collection Method	Test Name	Value (mg/L)
5/22/2013 10:30	Grab	KJELDAHL NITROGEN, TOTAL	1.18
5/22/2013 10:30	Grab	NITRATE+NITRITE-N	0.012
5/22/2013 10:30	Grab	PHOSPHATE, TOTAL AS P	0.076
5/22/2013 10:40	Grab	KJELDAHL NITROGEN, TOTAL	1.2
5/22/2013 10:40	Grab	NITRATE+NITRITE-N	0.012
5/22/2013 10:40	Grab	PHOSPHATE, TOTAL AS P	0.081
5/22/2013 11:15	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
5/22/2013 11:15	Grab	NITRATE+NITRITE-N	-0.005
5/22/2013 11:15	Grab	PHOSPHATE, TOTAL AS P	-0.002
5/29/2013 12:14	Grab	KJELDAHL NITROGEN, TOTAL	1.29
5/29/2013 12:14	Grab	NITRATE+NITRITE-N	-0.005
5/29/2013 12:14	Grab	PHOSPHATE, TOTAL AS P	0.119
6/5/2013 11:44	Grab	KJELDAHL NITROGEN, TOTAL	1.23
6/5/2013 11:44	Grab	NITRATE+NITRITE-N	0.06
6/5/2013 11:44	Grab	PHOSPHATE, TOTAL AS P	0.103
6/12/2013 11:17	Grab	KJELDAHL NITROGEN, TOTAL	1.16
6/12/2013 11:17	Grab	NITRATE+NITRITE-N	0.107
6/12/2013 11:17	Grab	PHOSPHATE, TOTAL AS P	0.095
6/19/2013 12:09	Grab	KJELDAHL NITROGEN, TOTAL	1.26
6/19/2013 12:09	Grab	NITRATE+NITRITE-N	0.049
6/19/2013 12:09	Grab	PHOSPHATE, TOTAL AS P	0.14
6/19/2013 12:34	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
6/19/2013 12:34	Grab	NITRATE+NITRITE-N	-0.005
6/19/2013 12:34	Grab	PHOSPHATE, TOTAL AS P	-0.002
6/26/2013 11:49	Grab	KJELDAHL NITROGEN, TOTAL	1.28
6/26/2013 11:49	Grab	NITRATE+NITRITE-N	0.159
6/26/2013 11:49	Grab	PHOSPHATE, TOTAL AS P	0.172
7/3/2013 12:10	Grab	KJELDAHL NITROGEN, TOTAL	1.27
7/3/2013 12:10	Grab	NITRATE+NITRITE-N	0.238
7/3/2013 12:10	Grab	PHOSPHATE, TOTAL AS P	0.22
7/3/2013 12:33	Grab	KJELDAHL NITROGEN, TOTAL	1.3
7/3/2013 12:33	Grab	NITRATE+NITRITE-N	0.239
7/3/2013 12:33	Grab	PHOSPHATE, TOTAL AS P	0.216
7/3/2013 12:51	Grab	KJELDAHL NITROGEN, TOTAL	1.3
7/3/2013 12:51	Grab	NITRATE+NITRITE-N	0.238
7/3/2013 12:51	Grab	PHOSPHATE, TOTAL AS P	0.217
7/3/2013 13:12	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
7/3/2013 13:12	Grab	NITRATE+NITRITE-N	-0.005
7/3/2013 13:12	Grab	PHOSPHATE, TOTAL AS P	-0.002
7/10/2013 12:11	Grab	KJELDAHL NITROGEN, TOTAL	1.46
7/10/2013 12:11	Grab	NITRATE+NITRITE-N	0.16
7/10/2013 12:11	Grab	PHOSPHATE, TOTAL AS P	0.149
7/17/2013 11:33	Grab	KJELDAHL NITROGEN, TOTAL	1.32
7/17/2013 11:33	Grab	NITRATE+NITRITE-N	0.124
7/17/2013 11:33	Grab	PHOSPHATE, TOTAL AS P	0.126
7/24/2013 12:30	Grab	KJELDAHL NITROGEN, TOTAL	1.34
7/24/2013 12:30	Grab	NITRATE+NITRITE-N	0.177

Table C-3. S-79 Water Quality Data			
Collection Date	**Collection Method**	**Test Name**	**Value (mg/L)**
7/24/2013 12:30	Grab	PHOSPHATE, TOTAL AS P	0.112
7/31/2013 11:39	Grab	KJELDAHL NITROGEN, TOTAL	1.24
7/31/2013 11:39	Grab	NITRATE+NITRITE-N	0.112
7/31/2013 11:39	Grab	PHOSPHATE, TOTAL AS P	0.1
8/7/2013 10:13	Grab	KJELDAHL NITROGEN, TOTAL	1.39
8/7/2013 10:13	Grab	NITRATE+NITRITE-N	0.116
8/7/2013 10:13	Grab	PHOSPHATE, TOTAL AS P	0.119
8/14/2013 12:57	Grab	KJELDAHL NITROGEN, TOTAL	1.3
8/14/2013 12:57	Grab	NITRATE+NITRITE-N	0.108
8/14/2013 12:57	Grab	PHOSPHATE, TOTAL AS P	0.094
8/14/2013 13:28	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
8/14/2013 13:28	Grab	NITRATE+NITRITE-N	-0.005
8/14/2013 13:28	Grab	PHOSPHATE, TOTAL AS P	-0.002
8/21/2013 12:14	Grab	KJELDAHL NITROGEN, TOTAL	1.36
8/21/2013 12:14	Grab	NITRATE+NITRITE-N	0.115
8/21/2013 12:14	Grab	PHOSPHATE, TOTAL AS P	0.115
8/28/2013 12:47	Grab	KJELDAHL NITROGEN, TOTAL	1.18
8/28/2013 12:47	Grab	NITRATE+NITRITE-N	0.119
8/28/2013 12:47	Grab	PHOSPHATE, TOTAL AS P	0.129
9/4/2013 11:43	Grab	KJELDAHL NITROGEN, TOTAL	1.27
9/4/2013 11:43	Grab	NITRATE+NITRITE-N	0.113
9/4/2013 11:43	Grab	PHOSPHATE, TOTAL AS P	0.126
9/11/2013 11:21	Grab	KJELDAHL NITROGEN, TOTAL	1.22
9/11/2013 11:21	Grab	NITRATE+NITRITE-N	0.125
9/11/2013 11:21	Grab	PHOSPHATE, TOTAL AS P	0.098
9/11/2013 11:40	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
9/11/2013 11:40	Grab	NITRATE+NITRITE-N	-0.005
9/11/2013 11:40	Grab	PHOSPHATE, TOTAL AS P	-0.002
9/18/2013 12:06	Grab	KJELDAHL NITROGEN, TOTAL	1.08
9/18/2013 12:06	Grab	NITRATE+NITRITE-N	0.137
9/18/2013 12:06	Grab	PHOSPHATE, TOTAL AS P	0.12
9/25/2013 11:41	Grab	KJELDAHL NITROGEN, TOTAL	1.09
9/25/2013 11:41	Grab	NITRATE+NITRITE-N	0.136
9/25/2013 11:41	Grab	PHOSPHATE, TOTAL AS P	0.123
10/2/2013 11:52	Grab	KJELDAHL NITROGEN, TOTAL	1.16
10/2/2013 11:52	Grab	NITRATE+NITRITE-N	0.121
10/2/2013 11:52	Grab	PHOSPHATE, TOTAL AS P	0.101
10/9/2013 12:24	Grab	KJELDAHL NITROGEN, TOTAL	1.2
10/9/2013 12:24	Grab	NITRATE+NITRITE-N	0.121
10/9/2013 12:24	Grab	PHOSPHATE, TOTAL AS P	0.083
10/9/2013 12:45	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
10/9/2013 12:45	Grab	NITRATE+NITRITE-N	-0.005
10/9/2013 12:45	Grab	PHOSPHATE, TOTAL AS P	-0.002
10/23/2013 11:08	Grab	KJELDAHL NITROGEN, TOTAL	1.01
10/23/2013 11:08	Grab	NITRATE+NITRITE-N	0.219
10/23/2013 11:08	Grab	PHOSPHATE, TOTAL AS P	0.094
10/30/2013 11:16	Grab	KJELDAHL NITROGEN, TOTAL	0.95

Table C-3. S-79 Water Quality Data			
Collection Date	**Collection Method**	**Test Name**	**Value (mg/L)**
10/30/2013 11:16	Grab	NITRATE+NITRITE-N	0.344
10/30/2013 11:16	Grab	PHOSPHATE, TOTAL AS P	0.111
11/6/2013 11:29	Grab	KJELDAHL NITROGEN, TOTAL	0.95
11/6/2013 11:29	Grab	NITRATE+NITRITE-N	0.401
11/6/2013 11:29	Grab	PHOSPHATE, TOTAL AS P	0.108
11/14/2013 11:34	Grab	KJELDAHL NITROGEN, TOTAL	1.01
11/14/2013 11:34	Grab	NITRATE+NITRITE-N	0.437
11/14/2013 11:34	Grab	PHOSPHATE, TOTAL AS P	0.116
11/20/2013 12:11	Grab	KJELDAHL NITROGEN, TOTAL	0.9
11/20/2013 12:11	Grab	NITRATE+NITRITE-N	0.369
11/20/2013 12:11	Grab	PHOSPHATE, TOTAL AS P	0.094
11/20/2013 12:15	Grab	KJELDAHL NITROGEN, TOTAL	0.94
11/20/2013 12:15	Grab	NITRATE+NITRITE-N	0.369
11/20/2013 12:15	Grab	PHOSPHATE, TOTAL AS P	0.092
11/20/2013 12:22	Grab	KJELDAHL NITROGEN, TOTAL	0.97
11/20/2013 12:22	Grab	NITRATE+NITRITE-N	0.353
11/20/2013 12:22	Grab	PHOSPHATE, TOTAL AS P	0.093
11/20/2013 12:27	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
11/20/2013 12:27	Grab	NITRATE+NITRITE-N	-0.005
11/20/2013 12:27	Grab	PHOSPHATE, TOTAL AS P	-0.002
11/26/2013 12:34	Grab	KJELDAHL NITROGEN, TOTAL	0.9
11/26/2013 12:34	Grab	NITRATE+NITRITE-N	0.32
11/26/2013 12:34	Grab	PHOSPHATE, TOTAL AS P	0.079
12/4/2013 11:33	Grab	KJELDAHL NITROGEN, TOTAL	0.92
12/4/2013 11:33	Grab	NITRATE+NITRITE-N	0.358
12/4/2013 11:33	Grab	PHOSPHATE, TOTAL AS P	0.085
12/11/2013 11:30	Grab	KJELDAHL NITROGEN, TOTAL	0.94
12/11/2013 11:30	Grab	NITRATE+NITRITE-N	0.286
12/11/2013 11:30	Grab	PHOSPHATE, TOTAL AS P	0.076
12/11/2013 11:40	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
12/11/2013 11:40	Grab	NITRATE+NITRITE-N	-0.005
12/11/2013 11:40	Grab	PHOSPHATE, TOTAL AS P	-0.002
12/18/2013 9:54	Grab	KJELDAHL NITROGEN, TOTAL	0.93
12/18/2013 9:54	Grab	NITRATE+NITRITE-N	0.257
12/18/2013 9:54	Grab	PHOSPHATE, TOTAL AS P	0.075
12/23/2013 11:48	Grab	KJELDAHL NITROGEN, TOTAL	0.97
12/23/2013 11:48	Grab	NITRATE+NITRITE-N	0.219
12/23/2013 11:48	Grab	PHOSPHATE, TOTAL AS P	0.071
12/31/2013 11:45	Grab	KJELDAHL NITROGEN, TOTAL	0.92
12/31/2013 11:45	Grab	NITRATE+NITRITE-N	0.286
12/31/2013 11:45	Grab	PHOSPHATE, TOTAL AS P	0.074
1/8/2014 10:05	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
1/8/2014 10:05	Grab	NITRATE+NITRITE-N	-0.005
1/8/2014 10:05	Grab	PHOSPHATE, TOTAL AS P	-0.002
1/8/2014 10:18	Grab	KJELDAHL NITROGEN, TOTAL	0.89
1/8/2014 10:18	Grab	NITRATE+NITRITE-N	0.311
1/8/2014 10:18	Grab	PHOSPHATE, TOTAL AS P	0.08

Table C-3. S-79 Water Quality Data

Collection Date	Collection Method	Test Name	Value (mg/L)
1/8/2014 10:49	Grab	KJELDAHL NITROGEN, TOTAL	0.87
1/8/2014 10:49	Grab	NITRATE+NITRITE-N	0.312
1/8/2014 10:49	Grab	PHOSPHATE, TOTAL AS P	0.08
1/8/2014 11:01	Grab	KJELDAHL NITROGEN, TOTAL	0.87
1/8/2014 11:01	Grab	NITRATE+NITRITE-N	0.313
1/8/2014 11:01	Grab	PHOSPHATE, TOTAL AS P	0.081
1/8/2014 11:14	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
1/8/2014 11:14	Grab	NITRATE+NITRITE-N	-0.005
1/8/2014 11:14	Grab	PHOSPHATE, TOTAL AS P	-0.002
1/15/2014 10:54	Grab	KJELDAHL NITROGEN, TOTAL	0.94
1/15/2014 10:54	Grab	NITRATE+NITRITE-N	0.284
1/15/2014 10:54	Grab	PHOSPHATE, TOTAL AS P	0.067
1/22/2014 11:17	Grab	KJELDAHL NITROGEN, TOTAL	0.95
1/22/2014 11:17	Grab	NITRATE+NITRITE-N	0.305
1/22/2014 11:17	Grab	PHOSPHATE, TOTAL AS P	0.074
1/29/2014 12:11	Grab	KJELDAHL NITROGEN, TOTAL	0.95
1/29/2014 12:11	Grab	NITRATE+NITRITE-N	0.298
1/29/2014 12:11	Grab	PHOSPHATE, TOTAL AS P	0.069
2/5/2014 12:08	Grab	KJELDAHL NITROGEN, TOTAL	1.15
2/5/2014 12:08	Grab	NITRATE+NITRITE-N	0.122
2/5/2014 12:08	Grab	PHOSPHATE, TOTAL AS P	0.081
2/12/2014 11:25	Grab	KJELDAHL NITROGEN, TOTAL	0.95
2/12/2014 11:25	Grab	NITRATE+NITRITE-N	0.083
2/12/2014 11:25	Grab	PHOSPHATE, TOTAL AS P	0.057
2/12/2014 11:43	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
2/12/2014 11:43	Grab	NITRATE+NITRITE-N	-0.005
2/12/2014 11:43	Grab	PHOSPHATE, TOTAL AS P	-0.002
2/19/2014 11:13	Grab	KJELDAHL NITROGEN, TOTAL	1.02
2/19/2014 11:13	Grab	NITRATE+NITRITE-N	0.172
2/19/2014 11:13	Grab	PHOSPHATE, TOTAL AS P	0.074
2/26/2014 11:14	Grab	KJELDAHL NITROGEN, TOTAL	1.09
2/26/2014 11:14	Grab	NITRATE+NITRITE-N	0.121
2/26/2014 11:14	Grab	PHOSPHATE, TOTAL AS P	0.077
3/5/2014 12:20	Grab	KJELDAHL NITROGEN, TOTAL	1.18
3/5/2014 12:20	Grab	NITRATE+NITRITE-N	0.101
3/5/2014 12:20	Grab	PHOSPHATE, TOTAL AS P	0.086
3/5/2014 12:42	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
3/5/2014 12:42	Grab	NITRATE+NITRITE-N	-0.005
3/5/2014 12:42	Grab	PHOSPHATE, TOTAL AS P	-0.002
3/12/2014 11:31	Grab	KJELDAHL NITROGEN, TOTAL	1.12
3/12/2014 11:31	Grab	NITRATE+NITRITE-N	0.064
3/12/2014 11:31	Grab	PHOSPHATE, TOTAL AS P	0.089
3/19/2014 11:30	Grab	KJELDAHL NITROGEN, TOTAL	0.97
3/19/2014 11:30	Grab	NITRATE+NITRITE-N	0.12
3/19/2014 11:30	Grab	PHOSPHATE, TOTAL AS P	0.098
3/26/2014 10:58	Grab	KJELDAHL NITROGEN, TOTAL	1.14
3/26/2014 10:58	Grab	NITRATE+NITRITE-N	0.166

Table C-3. S-79 Water Quality Data			
Collection Date	**Collection Method**	**Test Name**	**Value (mg/L)**
3/26/2014 10:58	Grab	PHOSPHATE, TOTAL AS P	0.105
3/26/2014 11:27	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
3/26/2014 11:27	Grab	NITRATE+NITRITE-N	-0.005
3/26/2014 11:27	Grab	PHOSPHATE, TOTAL AS P	-0.002
4/2/2014 12:00	Grab	KJELDAHL NITROGEN, TOTAL	0.98
4/2/2014 12:00	Grab	NITRATE+NITRITE-N	0.058
4/2/2014 12:00	Grab	PHOSPHATE, TOTAL AS P	0.081
4/9/2014 10:22	Grab	KJELDAHL NITROGEN, TOTAL	0.96
4/9/2014 10:22	Grab	NITRATE+NITRITE-N	0.03
4/9/2014 10:22	Grab	PHOSPHATE, TOTAL AS P	0.082
4/9/2014 10:35	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
4/9/2014 10:35	Grab	NITRATE+NITRITE-N	-0.005
4/9/2014 10:35	Grab	PHOSPHATE, TOTAL AS P	-0.002
4/16/2014 11:45	Grab	KJELDAHL NITROGEN, TOTAL	1.04
4/16/2014 11:45	Grab	NITRATE+NITRITE-N	0.018
4/16/2014 11:45	Grab	PHOSPHATE, TOTAL AS P	0.086
4/23/2014 11:08	Grab	KJELDAHL NITROGEN, TOTAL	1.04
4/23/2014 11:08	Grab	NITRATE+NITRITE-N	-0.005
4/23/2014 11:08	Grab	PHOSPHATE, TOTAL AS P	0.088
4/30/2014 12:35	Grab	KJELDAHL NITROGEN, TOTAL	1.2
4/30/2014 12:35	Grab	NITRATE+NITRITE-N	-0.005
4/30/2014 12:35	Grab	PHOSPHATE, TOTAL AS P	0.096
5/7/2014 11:43	Grab	KJELDAHL NITROGEN, TOTAL	1.14
5/7/2014 11:43	Grab	NITRATE+NITRITE-N	-0.005
5/7/2014 11:43	Grab	PHOSPHATE, TOTAL AS P	0.121
5/7/2014 12:02	Grab	KJELDAHL NITROGEN, TOTAL	1.12
5/7/2014 12:02	Grab	NITRATE+NITRITE-N	-0.005
5/7/2014 12:02	Grab	PHOSPHATE, TOTAL AS P	0.121
5/7/2014 12:15	Grab	KJELDAHL NITROGEN, TOTAL	1.13
5/7/2014 12:15	Grab	NITRATE+NITRITE-N	-0.005
5/7/2014 12:15	Grab	PHOSPHATE, TOTAL AS P	0.123
5/7/2014 12:34	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
5/7/2014 12:34	Grab	NITRATE+NITRITE-N	-0.005
5/7/2014 12:34	Grab	PHOSPHATE, TOTAL AS P	-0.002
5/14/2014 10:54	Grab	KJELDAHL NITROGEN, TOTAL	1.09
5/14/2014 10:54	Grab	NITRATE+NITRITE-N	0.047
5/14/2014 10:54	Grab	PHOSPHATE, TOTAL AS P	0.136
5/21/2014 11:57	Grab	KJELDAHL NITROGEN, TOTAL	1.04
5/21/2014 11:57	Grab	NITRATE+NITRITE-N	0.111
5/21/2014 11:57	Grab	PHOSPHATE, TOTAL AS P	0.144
5/28/2014 11:45	Grab	KJELDAHL NITROGEN, TOTAL	0.99
5/28/2014 11:45	Grab	NITRATE+NITRITE-N	-0.005
5/28/2014 11:45	Grab	PHOSPHATE, TOTAL AS P	0.093
6/4/2014 12:32	Grab	NITRATE+NITRITE-N	0.125
6/4/2014 12:32	Grab	TOTAL NITROGEN	1.14
6/4/2014 12:32	Grab	PHOSPHATE, TOTAL AS P	0.126
6/11/2014 12:14	Grab	NITRATE+NITRITE-N	-0.005

Table C-3. S-79 Water Quality Data			
Collection Date	**Collection Method**	**Test Name**	**Value (mg/L)**
6/11/2014 12:14	Grab	TOTAL NITROGEN	1.12
6/11/2014 12:14	Grab	PHOSPHATE, TOTAL AS P	0.125
6/18/2014 12:47	Grab	NITRATE+NITRITE-N	0.091
6/18/2014 12:47	Grab	TOTAL NITROGEN	1.02
6/18/2014 12:47	Grab	PHOSPHATE, TOTAL AS P	0.16
6/25/2014 11:58	Grab	NITRATE+NITRITE-N	0.045
6/25/2014 11:58	Grab	TOTAL NITROGEN	1.07
6/25/2014 11:58	Grab	PHOSPHATE, TOTAL AS P	0.125
7/2/2014 11:28	Grab	NITRATE+NITRITE-N	0.086
7/2/2014 11:28	Grab	TOTAL NITROGEN	1.19
7/2/2014 11:28	Grab	PHOSPHATE, TOTAL AS P	0.147
7/9/2014 11:34	Grab	NITRATE+NITRITE-N	0.118
7/9/2014 11:34	Grab	TOTAL NITROGEN	1.07
7/9/2014 11:34	Grab	PHOSPHATE, TOTAL AS P	0.159
7/9/2014 11:45	Grab	NITRATE+NITRITE-N	0.117
7/9/2014 11:45	Grab	TOTAL NITROGEN	1.1
7/9/2014 11:45	Grab	PHOSPHATE, TOTAL AS P	0.164
7/9/2014 11:52	Grab	NITRATE+NITRITE-N	0.118
7/9/2014 11:52	Grab	TOTAL NITROGEN	1.08
7/9/2014 11:52	Grab	PHOSPHATE, TOTAL AS P	0.163
7/16/2014 11:14	Grab	NITRATE+NITRITE-N	0.052
7/16/2014 11:14	Grab	TOTAL NITROGEN	1.23
7/16/2014 11:14	Grab	PHOSPHATE, TOTAL AS P	0.114
7/23/2014 13:04	Grab	NITRATE+NITRITE-N	0.052
7/23/2014 13:04	Grab	TOTAL NITROGEN	1.33
7/23/2014 13:04	Grab	PHOSPHATE, TOTAL AS P	0.08
7/30/2014 11:59	Grab	NITRATE+NITRITE-N	0.103
7/30/2014 11:59	Grab	TOTAL NITROGEN	1.36
7/30/2014 11:59	Grab	PHOSPHATE, TOTAL AS P	0.093
8/6/2014 11:58	Grab	NITRATE+NITRITE-N	0.275
8/6/2014 11:58	Grab	TOTAL NITROGEN	1.42
8/6/2014 11:58	Grab	PHOSPHATE, TOTAL AS P	0.147
8/13/2014 11:22	Grab	NITRATE+NITRITE-N	0.237
8/13/2014 11:22	Grab	TOTAL NITROGEN	1.44
8/13/2014 11:22	Grab	PHOSPHATE, TOTAL AS P	0.186
8/13/2014 11:45	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
8/13/2014 11:45	Grab	NITRATE+NITRITE-N	-0.005
8/13/2014 11:45	Grab	TOTAL NITROGEN	-0.02
8/13/2014 11:45	Grab	PHOSPHATE, TOTAL AS P	-0.002
8/20/2014 12:29	Grab	NITRATE+NITRITE-N	0.262
8/20/2014 12:29	Grab	TOTAL NITROGEN	1.4
8/20/2014 12:29	Grab	PHOSPHATE, TOTAL AS P	0.184
8/27/2014 10:40	Grab	NITRATE+NITRITE-N	0.167
8/27/2014 10:40	Grab	TOTAL NITROGEN	1.35
8/27/2014 10:40	Grab	PHOSPHATE, TOTAL AS P	0.166
9/3/2014 11:59	Grab	NITRATE+NITRITE-N	0.311
9/3/2014 11:59	Grab	TOTAL NITROGEN	1.39

Table C-3. S-79 Water Quality Data			
Collection Date	**Collection Method**	**Test Name**	**Value (mg/L)**
9/3/2014 11:59	Grab	PHOSPHATE, TOTAL AS P	0.172
9/10/2014 12:01	Grab	NITRATE+NITRITE-N	0.349
9/10/2014 12:01	Grab	TOTAL NITROGEN	1.51
9/10/2014 12:01	Grab	PHOSPHATE, TOTAL AS P	0.168
9/10/2014 12:16	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
9/10/2014 12:16	Grab	NITRATE+NITRITE-N	-0.005
9/10/2014 12:16	Grab	TOTAL NITROGEN	-0.02
9/10/2014 12:16	Grab	PHOSPHATE, TOTAL AS P	-0.002
9/17/2014 11:48	Grab	NITRATE+NITRITE-N	0.335
9/17/2014 11:48	Grab	TOTAL NITROGEN	1.45
9/17/2014 11:48	Grab	PHOSPHATE, TOTAL AS P	0.132
9/24/2014 11:49	Grab	NITRATE+NITRITE-N	0.327
9/24/2014 11:49	Grab	TOTAL NITROGEN	1.42
9/24/2014 11:49	Grab	PHOSPHATE, TOTAL AS P	0.121
10/1/2014 11:46	Grab	NITRATE+NITRITE-N	0.256
10/1/2014 11:46	Grab	TOTAL NITROGEN	1.42
10/1/2014 11:46	Grab	PHOSPHATE, TOTAL AS P	0.158
10/8/2014 12:00	Grab	NITRATE+NITRITE-N	0.267
10/8/2014 12:00	Grab	TOTAL NITROGEN	1.38
10/8/2014 12:00	Grab	PHOSPHATE, TOTAL AS P	0.152
10/15/2014 9:51	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
10/15/2014 9:51	Grab	NITRATE+NITRITE-N	-0.005
10/15/2014 9:51	Grab	TOTAL NITROGEN	-0.02
10/15/2014 9:51	Grab	PHOSPHATE, TOTAL AS P	-0.002
10/15/2014 10:04	Grab	NITRATE+NITRITE-N	0.316
10/15/2014 10:04	Grab	TOTAL NITROGEN	1.48
10/15/2014 10:04	Grab	PHOSPHATE, TOTAL AS P	0.144
10/15/2014 10:15	Grab	NITRATE+NITRITE-N	0.319
10/15/2014 10:15	Grab	TOTAL NITROGEN	1.47
10/15/2014 10:15	Grab	PHOSPHATE, TOTAL AS P	0.143
10/15/2014 10:26	Grab	NITRATE+NITRITE-N	0.318
10/15/2014 10:26	Grab	TOTAL NITROGEN	1.54
10/15/2014 10:26	Grab	PHOSPHATE, TOTAL AS P	0.146
10/15/2014 10:37	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
10/15/2014 10:37	Grab	NITRATE+NITRITE-N	-0.005
10/15/2014 10:37	Grab	TOTAL NITROGEN	-0.02
10/15/2014 10:37	Grab	PHOSPHATE, TOTAL AS P	-0.002
10/22/2014 12:06	Grab	NITRATE+NITRITE-N	0.375
10/22/2014 12:06	Grab	TOTAL NITROGEN	1.38
10/22/2014 12:06	Grab	PHOSPHATE, TOTAL AS P	0.138
10/29/2014 11:49	Grab	NITRATE+NITRITE-N	0.411
10/29/2014 11:49	Grab	TOTAL NITROGEN	1.49
10/29/2014 11:49	Grab	PHOSPHATE, TOTAL AS P	0.134
11/5/2014 12:00	Grab	NITRATE+NITRITE-N	0.513
11/5/2014 12:00	Grab	TOTAL NITROGEN	1.58
11/5/2014 12:00	Grab	PHOSPHATE, TOTAL AS P	0.131
11/12/2014 11:09	Grab	NITRATE+NITRITE-N	0.445

Table C-3. S-79 Water Quality Data

Collection Date	Collection Method	Test Name	Value (mg/L)
11/12/2014 11:09	Grab	TOTAL NITROGEN	1.42
11/12/2014 11:09	Grab	PHOSPHATE, TOTAL AS P	0.118
11/19/2014 11:57	Grab	NITRATE+NITRITE-N	0.225
11/19/2014 11:57	Grab	TOTAL NITROGEN	1.26
11/19/2014 11:57	Grab	PHOSPHATE, TOTAL AS P	0.099
11/26/2014 11:53	Grab	NITRATE+NITRITE-N	0.25
11/26/2014 11:53	Grab	TOTAL NITROGEN	1.28
11/26/2014 11:53	Grab	PHOSPHATE, TOTAL AS P	0.087
12/3/2014 11:45	Grab	NITRATE+NITRITE-N	0.247
12/3/2014 11:45	Grab	TOTAL NITROGEN	1.25
12/3/2014 11:45	Grab	PHOSPHATE, TOTAL AS P	0.08
12/10/2014 11:40	Grab	NITRATE+NITRITE-N	0.24
12/10/2014 11:40	Grab	TOTAL NITROGEN	1.18
12/10/2014 11:40	Grab	PHOSPHATE, TOTAL AS P	0.071
12/10/2014 11:48	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
12/10/2014 11:48	Grab	NITRATE+NITRITE-N	-0.005
12/10/2014 11:48	Grab	TOTAL NITROGEN	-0.02
12/10/2014 11:48	Grab	PHOSPHATE, TOTAL AS P	-0.002
12/17/2014 12:33	Grab	NITRATE+NITRITE-N	0.252
12/17/2014 12:33	Grab	TOTAL NITROGEN	1.3
12/17/2014 12:33	Grab	PHOSPHATE, TOTAL AS P	0.069
12/23/2014 14:01	Grab	NITRATE+NITRITE-N	0.188
12/23/2014 14:01	Grab	TOTAL NITROGEN	1.28
12/23/2014 14:01	Grab	PHOSPHATE, TOTAL AS P	0.063
12/30/2014 11:02	Grab	NITRATE+NITRITE-N	0.139
12/30/2014 11:02	Grab	TOTAL NITROGEN	1.28
12/30/2014 11:02	Grab	PHOSPHATE, TOTAL AS P	0.074
1/7/2015 12:38	Grab	NITRATE+NITRITE-N	0.212
1/7/2015 12:38	Grab	TOTAL NITROGEN	1.17
1/7/2015 12:38	Grab	PHOSPHATE, TOTAL AS P	0.074
1/14/2015 12:21	Grab	NITRATE+NITRITE-N	0.283
1/14/2015 12:21	Grab	TOTAL NITROGEN	1.21
1/14/2015 12:21	Grab	PHOSPHATE, TOTAL AS P	0.086
1/14/2015 12:40	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
1/14/2015 12:40	Grab	NITRATE+NITRITE-N	-0.005
1/14/2015 12:40	Grab	TOTAL NITROGEN	-0.02
1/14/2015 12:40	Grab	PHOSPHATE, TOTAL AS P	-0.002
1/21/2015 12:08	Grab	NITRATE+NITRITE-N	0.226
1/21/2015 12:08	Grab	TOTAL NITROGEN	1.06
1/21/2015 12:08	Grab	PHOSPHATE, TOTAL AS P	0.077
1/28/2015 12:17	Grab	NITRATE+NITRITE-N	0.237
1/28/2015 12:17	Grab	TOTAL NITROGEN	1.21
1/28/2015 12:17	Grab	PHOSPHATE, TOTAL AS P	0.07
1/28/2015 12:34	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
1/28/2015 12:34	Grab	NITRATE+NITRITE-N	-0.005
1/28/2015 12:34	Grab	TOTAL NITROGEN	-0.02
1/28/2015 12:34	Grab	PHOSPHATE, TOTAL AS P	-0.002

Table C-3. S-79 Water Quality Data			
Collection Date	Collection Method	Test Name	Value (mg/L)
2/4/2015 12:47	Grab	NITRATE+NITRITE-N	0.211
2/4/2015 12:47	Grab	TOTAL NITROGEN	1.21
2/4/2015 12:47	Grab	PHOSPHATE, TOTAL AS P	0.074
2/11/2015 12:30	Grab	NITRATE+NITRITE-N	0.15
2/11/2015 12:30	Grab	TOTAL NITROGEN	1.1
2/11/2015 12:30	Grab	PHOSPHATE, TOTAL AS P	0.06
2/11/2015 12:48	Grab	NITRATE+NITRITE-N	0.152
2/11/2015 12:48	Grab	TOTAL NITROGEN	1.11
2/11/2015 12:48	Grab	PHOSPHATE, TOTAL AS P	0.062
2/11/2015 12:57	Grab	NITRATE+NITRITE-N	0.15
2/11/2015 12:57	Grab	TOTAL NITROGEN	1.07
2/11/2015 12:57	Grab	PHOSPHATE, TOTAL AS P	0.06
2/11/2015 13:10	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
2/11/2015 13:10	Grab	NITRATE+NITRITE-N	-0.005
2/11/2015 13:10	Grab	TOTAL NITROGEN	-0.02
2/11/2015 13:10	Grab	PHOSPHATE, TOTAL AS P	-0.002
2/18/2015 12:54	Grab	NITRATE+NITRITE-N	0.059
2/18/2015 12:54	Grab	TOTAL NITROGEN	0.984
2/18/2015 12:54	Grab	PHOSPHATE, TOTAL AS P	0.05
2/25/2015 11:39	Grab	NITRATE+NITRITE-N	-0.005
2/25/2015 11:39	Grab	TOTAL NITROGEN	0.975
2/25/2015 11:39	Grab	PHOSPHATE, TOTAL AS P	0.057
3/4/2015 12:26	Grab	NITRATE+NITRITE-N	0.043
3/4/2015 12:26	Grab	TOTAL NITROGEN	1.02
3/4/2015 12:26	Grab	PHOSPHATE, TOTAL AS P	0.064
3/11/2015 11:49	Grab	NITRATE+NITRITE-N	0.08
3/11/2015 11:49	Grab	TOTAL NITROGEN	1.01
3/11/2015 11:49	Grab	PHOSPHATE, TOTAL AS P	0.076
3/11/2015 12:08	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
3/11/2015 12:08	Grab	NITRATE+NITRITE-N	-0.005
3/11/2015 12:08	Grab	TOTAL NITROGEN	-0.02
3/11/2015 12:08	Grab	PHOSPHATE, TOTAL AS P	-0.002
3/18/2015 11:45	Grab	NITRATE+NITRITE-N	0.133
3/18/2015 11:45	Grab	TOTAL NITROGEN	1.09
3/18/2015 11:45	Grab	PHOSPHATE, TOTAL AS P	0.093
3/25/2015 11:32	Grab	NITRATE+NITRITE-N	0.172
3/25/2015 11:32	Grab	TOTAL NITROGEN	1.09
3/25/2015 11:32	Grab	PHOSPHATE, TOTAL AS P	0.102
3/25/2015 11:51	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
3/25/2015 11:51	Grab	NITRATE+NITRITE-N	-0.005
3/25/2015 11:51	Grab	TOTAL NITROGEN	-0.02
3/25/2015 11:51	Grab	PHOSPHATE, TOTAL AS P	-0.002
4/1/2015 11:38	Grab	NITRATE+NITRITE-N	0.148
4/1/2015 11:38	Grab	TOTAL NITROGEN	1.14
4/1/2015 11:38	Grab	PHOSPHATE, TOTAL AS P	0.107
4/8/2015 11:44	Grab	NITRATE+NITRITE-N	0.087
4/8/2015 11:44	Grab	TOTAL NITROGEN	1.04

Table C-3. S-79 Water Quality Data			
Collection Date	Collection Method	Test Name	Value (mg/L)
4/8/2015 11:44	Grab	PHOSPHATE, TOTAL AS P	0.078
4/15/2015 9:36	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
4/15/2015 9:36	Grab	NITRATE+NITRITE-N	-0.005
4/15/2015 9:36	Grab	TOTAL NITROGEN	-0.02
4/15/2015 9:36	Grab	PHOSPHATE, TOTAL AS P	-0.002
4/15/2015 9:51	Grab	NITRATE+NITRITE-N	0.026
4/15/2015 9:51	Grab	TOTAL NITROGEN	0.908
4/15/2015 9:51	Grab	PHOSPHATE, TOTAL AS P	0.071
4/15/2015 10:03	Grab	NITRATE+NITRITE-N	0.024
4/15/2015 10:03	Grab	TOTAL NITROGEN	0.926
4/15/2015 10:03	Grab	PHOSPHATE, TOTAL AS P	0.076
4/15/2015 10:14	Grab	NITRATE+NITRITE-N	0.023
4/15/2015 10:14	Grab	TOTAL NITROGEN	0.882
4/15/2015 10:14	Grab	PHOSPHATE, TOTAL AS P	0.074
4/15/2015 10:24	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
4/15/2015 10:24	Grab	NITRATE+NITRITE-N	-0.005
4/15/2015 10:24	Grab	TOTAL NITROGEN	-0.02
4/15/2015 10:24	Grab	PHOSPHATE, TOTAL AS P	-0.002
4/22/2015 11:38	Grab	NITRATE+NITRITE-N	0.082
4/22/2015 11:38	Grab	TOTAL NITROGEN	1.05
4/22/2015 11:38	Grab	PHOSPHATE, TOTAL AS P	0.12
4/29/2015 11:47	Grab	NITRATE+NITRITE-N	0.345
4/29/2015 11:47	Grab	TOTAL NITROGEN	1.4
4/29/2015 11:47	Grab	PHOSPHATE, TOTAL AS P	0.131
5/6/2015 11:46	Grab	NITRATE+NITRITE-N	0.3
5/6/2015 11:46	Grab	TOTAL NITROGEN	1.33
5/6/2015 11:46	Grab	PHOSPHATE, TOTAL AS P	0.133
5/13/2015 12:23	Grab	NITRATE+NITRITE-N	0.062
5/13/2015 12:23	Grab	TOTAL NITROGEN	1.26
5/13/2015 12:23	Grab	PHOSPHATE, TOTAL AS P	0.101
5/20/2015 12:11	Grab	NITRATE+NITRITE-N	-0.005
5/20/2015 12:11	Grab	TOTAL NITROGEN	1.12
5/20/2015 12:11	Grab	PHOSPHATE, TOTAL AS P	0.117
5/20/2015 12:20	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
5/20/2015 12:20	Grab	NITRATE+NITRITE-N	-0.005
5/20/2015 12:20	Grab	TOTAL NITROGEN	-0.02
5/20/2015 12:20	Grab	PHOSPHATE, TOTAL AS P	-0.002
5/27/2015 13:07	Grab	NITRATE+NITRITE-N	0.13
5/27/2015 13:07	Grab	TOTAL NITROGEN	1.3
5/27/2015 13:07	Grab	PHOSPHATE, TOTAL AS P	0.131
6/3/2015 11:46	Grab	NITRATE+NITRITE-N	0.148
6/3/2015 11:46	Grab	TOTAL NITROGEN	1.31
6/3/2015 11:46	Grab	PHOSPHATE, TOTAL AS P	0.123
6/10/2015 11:32	Grab	NITRATE+NITRITE-N	-0.005
6/10/2015 11:32	Grab	TOTAL NITROGEN	1.34
6/10/2015 11:32	Grab	PHOSPHATE, TOTAL AS P	0.128
6/17/2015 11:32	Grab	NITRATE+NITRITE-N	-0.005

Table C-3. S-79 Water Quality Data			
Collection Date	**Collection Method**	**Test Name**	**Value (mg/L)**
6/17/2015 11:32	Grab	TOTAL NITROGEN	1.26
6/17/2015 11:32	Grab	PHOSPHATE, TOTAL AS P	0.118
6/24/2015 10:39	Grab	NITRATE+NITRITE-N	-0.005
6/24/2015 10:39	Grab	TOTAL NITROGEN	1.11
6/24/2015 10:39	Grab	PHOSPHATE, TOTAL AS P	0.099
7/1/2015 11:33	Grab	NITRATE+NITRITE-N	-0.005
7/1/2015 11:33	Grab	TOTAL NITROGEN	1.12
7/1/2015 11:33	Grab	PHOSPHATE, TOTAL AS P	0.137
7/1/2015 11:45	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
7/1/2015 11:45	Grab	NITRATE+NITRITE-N	-0.005
7/1/2015 11:45	Grab	TOTAL NITROGEN	-0.02
7/1/2015 11:45	Grab	PHOSPHATE, TOTAL AS P	-0.002
7/8/2015 13:02	Grab	NITRATE+NITRITE-N	0.014
7/8/2015 13:02	Grab	TOTAL NITROGEN	1.03
7/8/2015 13:02	Grab	PHOSPHATE, TOTAL AS P	0.175
7/15/2015 10:59	Grab	NITRATE+NITRITE-N	0.051
7/15/2015 10:59	Grab	TOTAL NITROGEN	0.971
7/15/2015 10:59	Grab	PHOSPHATE, TOTAL AS P	0.169
7/15/2015 11:18	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
7/15/2015 11:18	Grab	NITRATE+NITRITE-N	-0.005
7/15/2015 11:18	Grab	TOTAL NITROGEN	-0.02
7/15/2015 11:18	Grab	PHOSPHATE, TOTAL AS P	-0.002
7/29/2015 10:33	Grab	NITRATE+NITRITE-N	0.227
7/29/2015 10:33	Grab	TOTAL NITROGEN	1.38
7/29/2015 10:33	Grab	PHOSPHATE, TOTAL AS P	0.218
7/29/2015 10:40	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
7/29/2015 10:40	Grab	NITRATE+NITRITE-N	-0.005
7/29/2015 10:40	Grab	TOTAL NITROGEN	-0.02
7/29/2015 10:40	Grab	PHOSPHATE, TOTAL AS P	-0.002
8/5/2015 13:05	Grab	NITRATE+NITRITE-N	0.063
8/5/2015 13:05	Grab	TOTAL NITROGEN	1.33
8/5/2015 13:05	Grab	PHOSPHATE, TOTAL AS P	0.173
8/5/2015 13:24	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
8/5/2015 13:24	Grab	NITRATE+NITRITE-N	-0.005
8/5/2015 13:24	Grab	TOTAL NITROGEN	-0.02
8/5/2015 13:24	Grab	PHOSPHATE, TOTAL AS P	-0.002
8/12/2015 10:05	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
8/12/2015 10:05	Grab	NITRATE+NITRITE-N	-0.005
8/12/2015 10:05	Grab	TOTAL NITROGEN	-0.02
8/12/2015 10:05	Grab	PHOSPHATE, TOTAL AS P	-0.002
8/12/2015 10:18	Grab	NITRATE+NITRITE-N	0.037
8/12/2015 10:18	Grab	TOTAL NITROGEN	1.17
8/12/2015 10:18	Grab	PHOSPHATE, TOTAL AS P	0.129
8/12/2015 10:30	Grab	NITRATE+NITRITE-N	0.034
8/12/2015 10:30	Grab	TOTAL NITROGEN	1.24
8/12/2015 10:30	Grab	PHOSPHATE, TOTAL AS P	0.139
8/12/2015 10:48	Grab	NITRATE+NITRITE-N	0.045

Table C-3. S-79 Water Quality Data			
Collection Date	Collection Method	Test Name	Value (mg/L)
8/12/2015 10:48	Grab	TOTAL NITROGEN	1.16
8/12/2015 10:48	Grab	PHOSPHATE, TOTAL AS P	0.131
8/12/2015 11:05	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
8/12/2015 11:05	Grab	NITRATE+NITRITE-N	-0.005
8/12/2015 11:05	Grab	TOTAL NITROGEN	-0.02
8/12/2015 11:05	Grab	PHOSPHATE, TOTAL AS P	-0.002
8/19/2015 12:08	Grab	NITRATE+NITRITE-N	0.116
8/19/2015 12:08	Grab	TOTAL NITROGEN	1.24
8/19/2015 12:08	Grab	PHOSPHATE, TOTAL AS P	0.176
8/26/2015 11:22	Grab	NITRATE+NITRITE-N	0.154
8/26/2015 11:22	Grab	TOTAL NITROGEN	1.43
8/26/2015 11:22	Grab	PHOSPHATE, TOTAL AS P	0.194
9/2/2015 11:47	Grab	NITRATE+NITRITE-N	0.16
9/2/2015 11:47	Grab	TOTAL NITROGEN	1.48
9/2/2015 11:47	Grab	PHOSPHATE, TOTAL AS P	0.164
9/9/2015 11:05	Grab	NITRATE+NITRITE-N	0.178
9/9/2015 11:05	Grab	TOTAL NITROGEN	1.49
9/9/2015 11:05	Grab	PHOSPHATE, TOTAL AS P	0.132
9/16/2015 11:48	Grab	NITRATE+NITRITE-N	0.171
9/16/2015 11:48	Grab	TOTAL NITROGEN	1.27
9/16/2015 11:48	Grab	PHOSPHATE, TOTAL AS P	0.139
9/23/2015 11:23	Grab	NITRATE+NITRITE-N	0.17
9/23/2015 11:23	Grab	TOTAL NITROGEN	1.37
9/23/2015 11:23	Grab	PHOSPHATE, TOTAL AS P	0.122
9/30/2015 10:45	Grab	NITRATE+NITRITE-N	0.291
9/30/2015 10:45	Grab	TOTAL NITROGEN	1.38
9/30/2015 10:45	Grab	PHOSPHATE, TOTAL AS P	0.13
10/7/2015 11:32	Grab	NITRATE+NITRITE-N	0.352
10/7/2015 11:32	Grab	TOTAL NITROGEN	1.46
10/7/2015 11:32	Grab	PHOSPHATE, TOTAL AS P	0.136
10/14/2015 11:56	Grab	NITRATE+NITRITE-N	0.361
10/14/2015 11:56	Grab	TOTAL NITROGEN	1.26
10/14/2015 11:56	Grab	PHOSPHATE, TOTAL AS P	0.107
10/14/2015 12:06	Grab	NITRATE+NITRITE-N	0.371
10/14/2015 12:06	Grab	TOTAL NITROGEN	1.26
10/14/2015 12:06	Grab	PHOSPHATE, TOTAL AS P	0.107
10/14/2015 12:12	Grab	NITRATE+NITRITE-N	0.361
10/14/2015 12:12	Grab	TOTAL NITROGEN	1.26
10/14/2015 12:12	Grab	PHOSPHATE, TOTAL AS P	0.107
10/14/2015 12:19	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
10/14/2015 12:19	Grab	NITRATE+NITRITE-N	-0.005
10/14/2015 12:19	Grab	TOTAL NITROGEN	-0.02
10/14/2015 12:19	Grab	PHOSPHATE, TOTAL AS P	-0.002
10/21/2015 10:23	Grab	NITRATE+NITRITE-N	0.373
10/21/2015 10:23	Grab	TOTAL NITROGEN	1.28
10/21/2015 10:23	Grab	PHOSPHATE, TOTAL AS P	0.113
10/28/2015 12:33	Grab	NITRATE+NITRITE-N	0.456

Table C-3. S-79 Water Quality Data			
Collection Date	Collection Method	Test Name	Value (mg/L)
10/28/2015 12:33	Grab	TOTAL NITROGEN	1.43
10/28/2015 12:33	Grab	PHOSPHATE, TOTAL AS P	0.12
11/4/2015 11:22	Grab	NITRATE+NITRITE-N	0.458
11/4/2015 11:22	Grab	TOTAL NITROGEN	1.58
11/4/2015 11:22	Grab	PHOSPHATE, TOTAL AS P	0.125
11/4/2015 11:31	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
11/4/2015 11:31	Grab	NITRATE+NITRITE-N	-0.005
11/4/2015 11:31	Grab	TOTAL NITROGEN	-0.02
11/4/2015 11:31	Grab	PHOSPHATE, TOTAL AS P	-0.002
11/10/2015 10:49	Grab	NITRATE+NITRITE-N	0.496
11/10/2015 10:49	Grab	TOTAL NITROGEN	1.6
11/10/2015 10:49	Grab	PHOSPHATE, TOTAL AS P	0.112
11/18/2015 11:17	Grab	NITRATE+NITRITE-N	0.418
11/18/2015 11:17	Grab	TOTAL NITROGEN	1.45
11/18/2015 11:17	Grab	PHOSPHATE, TOTAL AS P	0.107
11/18/2015 11:38	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
11/18/2015 11:38	Grab	NITRATE+NITRITE-N	-0.005
11/18/2015 11:38	Grab	TOTAL NITROGEN	-0.02
11/18/2015 11:38	Grab	PHOSPHATE, TOTAL AS P	-0.002
11/24/2015 11:58	Grab	NITRATE+NITRITE-N	0.415
11/24/2015 11:58	Grab	TOTAL NITROGEN	1.45
11/24/2015 11:58	Grab	PHOSPHATE, TOTAL AS P	0.134
12/2/2015 10:34	Grab	NITRATE+NITRITE-N	0.403
12/2/2015 10:34	Grab	TOTAL NITROGEN	1.5
12/2/2015 10:34	Grab	PHOSPHATE, TOTAL AS P	0.136
12/2/2015 10:46	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
12/2/2015 10:46	Grab	NITRATE+NITRITE-N	0.021
12/2/2015 10:46	Grab	TOTAL NITROGEN	-0.02
12/2/2015 10:46	Grab	PHOSPHATE, TOTAL AS P	-0.002
12/9/2015 11:17	Grab	NITRATE+NITRITE-N	0.304
12/9/2015 11:17	Grab	TOTAL NITROGEN	1.27
12/9/2015 11:17	Grab	PHOSPHATE, TOTAL AS P	0.102
12/21/2015 9:25	Grab	NITRATE+NITRITE-N	0.315
12/21/2015 9:25	Grab	TOTAL NITROGEN	1.24
12/21/2015 9:25	Grab	PHOSPHATE, TOTAL AS P	0.081
12/21/2015 9:32	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
12/21/2015 9:32	Grab	NITRATE+NITRITE-N	-0.005
12/21/2015 9:32	Grab	TOTAL NITROGEN	-0.02
12/21/2015 9:32	Grab	PHOSPHATE, TOTAL AS P	-0.002
1/4/2016 10:17	Grab	NITRATE+NITRITE-N	0.281
1/4/2016 10:17	Grab	TOTAL NITROGEN	1.31
1/4/2016 10:17	Grab	PHOSPHATE, TOTAL AS P	0.102
1/19/2016 9:14	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
1/19/2016 9:14	Grab	NITRATE+NITRITE-N	-0.005
1/19/2016 9:14	Grab	TOTAL NITROGEN	-0.02
1/19/2016 9:14	Grab	PHOSPHATE, TOTAL AS P	-0.002
1/19/2016 9:20	Grab	NITRATE+NITRITE-N	0.225

Table C-3. S-79 Water Quality Data			
Collection Date	Collection Method	Test Name	Value (mg/L)
1/19/2016 9:20	Grab	TOTAL NITROGEN	1.18
1/19/2016 9:20	Grab	PHOSPHATE, TOTAL AS P	0.087
1/19/2016 9:37	Grab	NITRATE+NITRITE-N	0.222
1/19/2016 9:37	Grab	TOTAL NITROGEN	1.17
1/19/2016 9:37	Grab	PHOSPHATE, TOTAL AS P	0.086
1/19/2016 9:49	Grab	NITRATE+NITRITE-N	0.224
1/19/2016 9:49	Grab	TOTAL NITROGEN	1.18
1/19/2016 9:49	Grab	PHOSPHATE, TOTAL AS P	0.089
1/19/2016 9:59	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
1/19/2016 9:59	Grab	NITRATE+NITRITE-N	-0.005
1/19/2016 9:59	Grab	TOTAL NITROGEN	-0.02
1/19/2016 9:59	Grab	PHOSPHATE, TOTAL AS P	-0.002
2/1/2016 9:27	Grab	NITRATE+NITRITE-N	0.47
2/1/2016 9:27	Grab	TOTAL NITROGEN	1.54
2/1/2016 9:27	Grab	PHOSPHATE, TOTAL AS P	0.128
2/15/2016 8:29	Grab	NITRATE+NITRITE-N	0.244
2/15/2016 8:29	Grab	TOTAL NITROGEN	1.45
2/15/2016 8:29	Grab	PHOSPHATE, TOTAL AS P	0.094
2/29/2016 9:37	Grab	NITRATE+NITRITE-N	0.111
2/29/2016 9:37	Grab	TOTAL NITROGEN	1.22
2/29/2016 9:37	Grab	PHOSPHATE, TOTAL AS P	0.074
3/14/2016 10:10	Grab	NITRATE+NITRITE-N	0.064
3/14/2016 10:10	Grab	TOTAL NITROGEN	1.1
3/14/2016 10:10	Grab	PHOSPHATE, TOTAL AS P	0.069
3/28/2016 8:23	Grab	NITRATE+NITRITE-N	0.142
3/28/2016 8:23	Grab	TOTAL NITROGEN	1.17
3/28/2016 8:23	Grab	PHOSPHATE, TOTAL AS P	0.092
4/11/2016 8:45	Grab	NITRATE+NITRITE-N	0.282
4/11/2016 8:45	Grab	TOTAL NITROGEN	1.28
4/11/2016 8:45	Grab	PHOSPHATE, TOTAL AS P	0.102
4/25/2016 9:44	Grab	NITRATE+NITRITE-N	0.104
4/25/2016 9:44	Grab	TOTAL NITROGEN	1.05
4/25/2016 9:44	Grab	PHOSPHATE, TOTAL AS P	0.096
5/9/2016 9:27	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
5/9/2016 9:27	Grab	NITRATE+NITRITE-N	-0.005
5/9/2016 9:27	Grab	TOTAL NITROGEN	-0.02
5/9/2016 9:27	Grab	PHOSPHATE, TOTAL AS P	-0.002
5/9/2016 9:32	Grab	NITRATE+NITRITE-N	0.096
5/9/2016 9:32	Grab	TOTAL NITROGEN	1.1
5/9/2016 9:32	Grab	PHOSPHATE, TOTAL AS P	0.106
5/9/2016 9:41	Grab	NITRATE+NITRITE-N	0.096
5/9/2016 9:41	Grab	TOTAL NITROGEN	1.07
5/9/2016 9:41	Grab	PHOSPHATE, TOTAL AS P	0.108
5/9/2016 9:54	Grab	NITRATE+NITRITE-N	0.096
5/9/2016 9:54	Grab	TOTAL NITROGEN	1.1
5/9/2016 9:54	Grab	PHOSPHATE, TOTAL AS P	0.111
5/9/2016 10:07	Grab	KJELDAHL NITROGEN, TOTAL	-0.05

Table C-3. S-79 Water Quality Data			
Collection Date	Collection Method	Test Name	Value (mg/L)
5/9/2016 10:07	Grab	NITRATE+NITRITE-N	-0.005
5/9/2016 10:07	Grab	TOTAL NITROGEN	-0.02
5/9/2016 10:07	Grab	PHOSPHATE, TOTAL AS P	-0.002
5/23/2016 10:35	Grab	NITRATE+NITRITE-N	0.136
5/23/2016 10:35	Grab	TOTAL NITROGEN	1.18
5/23/2016 10:35	Grab	PHOSPHATE, TOTAL AS P	0.13
6/7/2016 11:17	Grab	NITRATE+NITRITE-N	0.167
6/7/2016 11:17	Grab	TOTAL NITROGEN	1.29
6/7/2016 11:17	Grab	PHOSPHATE, TOTAL AS P	0.128
6/20/2016 9:05	Grab	NITRATE+NITRITE-N	0.18
6/20/2016 9:05	Grab	TOTAL NITROGEN	1.4
6/20/2016 9:05	Grab	PHOSPHATE, TOTAL AS P	0.162
7/5/2016 10:05	Grab	KJELDAHL NITROGEN, TOTAL	1.19
7/5/2016 10:05	Grab	NITRATE+NITRITE-N	0.178
7/5/2016 10:05	Grab	TOTAL NITROGEN	1.33
7/5/2016 10:05	Grab	PHOSPHATE, TOTAL AS P	0.131
7/18/2016 8:26	Grab	NITRATE+NITRITE-N	0.254
7/18/2016 8:26	Grab	TOTAL NITROGEN	1.3
7/18/2016 8:26	Grab	PHOSPHATE, TOTAL AS P	0.15
8/1/2016 9:29	Grab	NITRATE+NITRITE-N	0.306
8/1/2016 9:29	Grab	TOTAL NITROGEN	1.3
8/1/2016 9:29	Grab	PHOSPHATE, TOTAL AS P	0.141
8/15/2016 11:32	Grab	NITRATE+NITRITE-N	0.181
8/15/2016 11:32	Grab	TOTAL NITROGEN	1.37
8/15/2016 11:32	Grab	PHOSPHATE, TOTAL AS P	0.126
8/29/2016 10:02	Grab	NITRATE+NITRITE-N	0.343
8/29/2016 10:02	Grab	TOTAL NITROGEN	1.36
8/29/2016 10:02	Grab	PHOSPHATE, TOTAL AS P	0.121
9/12/2016 8:20	Grab	KJELDAHL NITROGEN, TOTAL	1.08
9/12/2016 8:20	Grab	NITRATE+NITRITE-N	0.206
9/12/2016 8:20	Grab	TOTAL NITROGEN	1.24
9/12/2016 8:20	Grab	PHOSPHATE, TOTAL AS P	0.11
9/26/2016 9:18	Grab	NITRATE+NITRITE-N	0.174
9/26/2016 9:18	Grab	TOTAL NITROGEN	1.2
9/26/2016 9:18	Grab	PHOSPHATE, TOTAL AS P	0.108
10/10/2016 9:47	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
10/10/2016 9:47	Grab	NITRATE+NITRITE-N	-0.005
10/10/2016 9:47	Grab	TOTAL NITROGEN	-0.02
10/10/2016 9:47	Grab	PHOSPHATE, TOTAL AS P	-0.002
10/10/2016 9:50	Grab	KJELDAHL NITROGEN, TOTAL	1.16
10/10/2016 9:50	Grab	NITRATE+NITRITE-N	0.2
10/10/2016 9:50	Grab	TOTAL NITROGEN	1.38
10/10/2016 9:50	Grab	PHOSPHATE, TOTAL AS P	0.089
10/10/2016 10:06	Grab	KJELDAHL NITROGEN, TOTAL	1.13
10/10/2016 10:06	Grab	NITRATE+NITRITE-N	0.2
10/10/2016 10:06	Grab	TOTAL NITROGEN	1.38
10/10/2016 10:06	Grab	PHOSPHATE, TOTAL AS P	0.092

Table C-3. S-79 Water Quality Data			
Collection Date	**Collection Method**	**Test Name**	**Value (mg/L)**
10/10/2016 10:14	Grab	KJELDAHL NITROGEN, TOTAL	1.1
10/10/2016 10:14	Grab	NITRATE+NITRITE-N	0.204
10/10/2016 10:14	Grab	TOTAL NITROGEN	1.33
10/10/2016 10:14	Grab	PHOSPHATE, TOTAL AS P	0.087
10/10/2016 10:26	Grab	KJELDAHL NITROGEN, TOTAL	-0.05
10/10/2016 10:26	Grab	NITRATE+NITRITE-N	-0.005
10/10/2016 10:26	Grab	TOTAL NITROGEN	-0.02
10/10/2016 10:26	Grab	PHOSPHATE, TOTAL AS P	-0.002
10/24/2016 11:14	Grab	NITRATE+NITRITE-N	0.148
10/24/2016 11:14	Grab	TOTAL NITROGEN	1.12
10/24/2016 11:14	Grab	PHOSPHATE, TOTAL AS P	0.07
11/7/2016 9:13	Grab	KJELDAHL NITROGEN, TOTAL	1.04
11/7/2016 9:13	Grab	NITRATE+NITRITE-N	0.192
11/7/2016 9:13	Grab	TOTAL NITROGEN	1.25
11/7/2016 9:13	Grab	PHOSPHATE, TOTAL AS P	0.074
11/21/2016 11:19	Grab	NITRATE+NITRITE-N	0.312
11/21/2016 11:19	Grab	TOTAL NITROGEN	1.24
11/21/2016 11:19	Grab	PHOSPHATE, TOTAL AS P	0.086
12/7/2016 11:37	Grab	NITRATE+NITRITE-N	0.311
12/7/2016 11:37	Grab	TOTAL NITROGEN	1.12
12/7/2016 11:37	Grab	PHOSPHATE, TOTAL AS P	0.08
1/5/2017 12:39	Grab	KJELDAHL NITROGEN, TOTAL	0.86
1/5/2017 12:39	Grab	NITRATE+NITRITE-N	0.267
1/5/2017 12:39	Grab	TOTAL NITROGEN	1.13
1/5/2017 12:39	Grab	PHOSPHATE, TOTAL AS P	0.076
1/11/2017 11:18	Grab	NITRATE+NITRITE-N	0.29
1/11/2017 11:18	Grab	TOTAL NITROGEN	1.14
1/11/2017 11:18	Grab	PHOSPHATE, TOTAL AS P	0.086
1/11/2017 11:40	Grab	NITRATE+NITRITE-N	-0.005
1/19/2017 10:42	Grab	PHOSPHATE, TOTAL AS P	0.081
1/25/2017 11:21	Grab	NITRATE+NITRITE-N	0.268
1/25/2017 11:21	Grab	TOTAL NITROGEN	1.05
1/25/2017 11:21	Grab	PHOSPHATE, TOTAL AS P	0.078
2/1/2017 10:43	Grab	NITRATE+NITRITE-N	0.243
2/1/2017 10:43	Grab	TOTAL NITROGEN	1.05
2/1/2017 10:43	Grab	PHOSPHATE, TOTAL AS P	0.08
2/8/2017 11:41	Grab	NITRATE+NITRITE-N	0.15
2/8/2017 11:41	Grab	TOTAL NITROGEN	1.31
2/8/2017 11:41	Grab	PHOSPHATE, TOTAL AS P	0.078
2/15/2017 11:28	Grab	NITRATE+NITRITE-N	0.12
2/15/2017 11:28	Grab	TOTAL NITROGEN	1.06
2/15/2017 11:28	Grab	PHOSPHATE, TOTAL AS P	0.068
2/22/2017 10:01	Grab	NITRATE+NITRITE-N	0.16
2/22/2017 10:01	Grab	TOTAL NITROGEN	1.06
2/22/2017 10:01	Grab	PHOSPHATE, TOTAL AS P	0.078
3/1/2017 11:05	Grab	NITRATE+NITRITE-N	0.065
3/1/2017 11:05	Grab	TOTAL NITROGEN	0.983

Table C-3. S-79 Water Quality Data			
Collection Date	Collection Method	Test Name	Value (mg/L)
3/1/2017 11:05	Grab	PHOSPHATE, TOTAL AS P	0.072
3/8/2017 11:34	Grab	NITRATE+NITRITE-N	0.091
3/8/2017 11:34	Grab	TOTAL NITROGEN	0.962
3/8/2017 11:34	Grab	PHOSPHATE, TOTAL AS P	0.076
3/15/2017 12:02	Grab	NITRATE+NITRITE-N	0.049
3/15/2017 12:02	Grab	TOTAL NITROGEN	0.962
3/15/2017 12:02	Grab	PHOSPHATE, TOTAL AS P	0.076
3/15/2017 12:13	Grab	NITRATE+NITRITE-N	-0.005
3/15/2017 12:13	Grab	TOTAL NITROGEN	-0.02
3/15/2017 12:13	Grab	PHOSPHATE, TOTAL AS P	-0.002
3/22/2017 10:37	Grab	NITRATE+NITRITE-N	0.063
3/22/2017 10:37	Grab	TOTAL NITROGEN	0.957
3/22/2017 10:37	Grab	PHOSPHATE, TOTAL AS P	0.073
3/29/2017 10:18	Grab	NITRATE+NITRITE-N	-0.005
3/29/2017 10:18	Grab	TOTAL NITROGEN	0.959
3/29/2017 10:18	Grab	PHOSPHATE, TOTAL AS P	0.078
4/5/2017 11:09	Grab	NITRATE+NITRITE-N	0.014
4/5/2017 11:09	Grab	TOTAL NITROGEN	0.939
4/5/2017 11:09	Grab	PHOSPHATE, TOTAL AS P	0.067
4/12/2017 10:33	Grab	NITRATE+NITRITE-N	0.012
4/12/2017 10:33	Grab	TOTAL NITROGEN	0.88
4/12/2017 10:33	Grab	PHOSPHATE, TOTAL AS P	0.082
4/19/2017 11:44	Grab	NITRATE+NITRITE-N	-0.005
4/19/2017 11:44	Grab	TOTAL NITROGEN	0.988
4/19/2017 11:44	Grab	PHOSPHATE, TOTAL AS P	0.092
4/26/2017 10:46	Grab	NITRATE+NITRITE-N	0.033
4/26/2017 10:46	Grab	TOTAL NITROGEN	1.03
4/26/2017 10:46	Grab	PHOSPHATE, TOTAL AS P	0.1
5/3/2017 10:46	Grab	NITRATE+NITRITE-N	-0.005
5/3/2017 10:46	Grab	TOTAL NITROGEN	1.05
5/3/2017 10:46	Grab	PHOSPHATE, TOTAL AS P	0.096
5/10/2017 12:19	Grab	NITRATE+NITRITE-N	-0.005
5/10/2017 12:19	Grab	TOTAL NITROGEN	1.22
5/10/2017 12:19	Grab	PHOSPHATE, TOTAL AS P	0.122
5/17/2017 11:29	Grab	NITRATE+NITRITE-N	-0.005
5/17/2017 11:29	Grab	TOTAL NITROGEN	1.31
5/17/2017 11:29	Grab	PHOSPHATE, TOTAL AS P	0.129
5/24/2017 11:20	Grab	NITRATE+NITRITE-N	-0.005
5/24/2017 11:20	Grab	TOTAL NITROGEN	1.37
5/24/2017 11:20	Grab	PHOSPHATE, TOTAL AS P	0.142
5/31/2017 11:28	Grab	NITRATE+NITRITE-N	0.048
5/31/2017 11:28	Grab	TOTAL NITROGEN	1.64
5/31/2017 11:28	Grab	PHOSPHATE, TOTAL AS P	0.181
6/7/2017 11:08	Grab	NITRATE+NITRITE-N	0.125
6/7/2017 11:08	Grab	TOTAL NITROGEN	1.43
6/7/2017 11:08	Grab	PHOSPHATE, TOTAL AS P	0.231
6/14/2017 11:51	Grab	NITRATE+NITRITE-N	0.353

Table C-3. S-79 Water Quality Data			
Collection Date	**Collection Method**	**Test Name**	**Value (mg/L)**
6/14/2017 11:51	Grab	TOTAL NITROGEN	1.68
6/14/2017 11:51	Grab	PHOSPHATE, TOTAL AS P	0.238
6/21/2017 11:48	Grab	NITRATE+NITRITE-N	0.26
6/21/2017 11:48	Grab	TOTAL NITROGEN	1.64
6/21/2017 11:48	Grab	PHOSPHATE, TOTAL AS P	0.312
6/28/2017 12:15	Grab	NITRATE+NITRITE-N	0.194
6/28/2017 12:15	Grab	TOTAL NITROGEN	1.52
6/28/2017 12:15	Grab	PHOSPHATE, TOTAL AS P	0.259
7/6/2017 10:46	Grab	NITRATE+NITRITE-N	0.062
7/6/2017 10:46	Grab	TOTAL NITROGEN	1.42
7/6/2017 10:46	Grab	PHOSPHATE, TOTAL AS P	0.229
7/12/2017 8:55	Grab	NITRATE+NITRITE-N	0.142
7/12/2017 8:55	Grab	TOTAL NITROGEN	1.2
7/12/2017 8:55	Grab	PHOSPHATE, TOTAL AS P	0.213
7/12/2017 9:00	Grab	NITRATE+NITRITE-N	-0.005
7/12/2017 9:00	Grab	TOTAL NITROGEN	-0.02
7/12/2017 9:00	Grab	PHOSPHATE, TOTAL AS P	-0.002
7/19/2017 11:56	Grab	NITRATE+NITRITE-N	0.272
7/19/2017 11:56	Grab	TOTAL NITROGEN	1.36
7/19/2017 11:56	Grab	PHOSPHATE, TOTAL AS P	0.255
7/26/2017 11:48	Grab	NITRATE+NITRITE-N	0.054
7/26/2017 11:48	Grab	TOTAL NITROGEN	1.27
7/26/2017 11:48	Grab	PHOSPHATE, TOTAL AS P	0.219
8/2/2017 10:57	Grab	NITRATE+NITRITE-N	0.193
8/2/2017 10:57	Grab	TOTAL NITROGEN	1.38
8/2/2017 10:57	Grab	PHOSPHATE, TOTAL AS P	0.224
8/9/2017 11:32	Grab	NITRATE+NITRITE-N	0.106
8/9/2017 11:32	Grab	TOTAL NITROGEN	1.61
8/9/2017 11:32	Grab	PHOSPHATE, TOTAL AS P	0.2
8/14/2017 10:39	Grab	NITRATE+NITRITE-N	0.213
8/14/2017 10:39	Grab	TOTAL NITROGEN	1.36
8/14/2017 10:39	Grab	PHOSPHATE, TOTAL AS P	0.168
8/21/2017 11:27	Grab	NITRATE+NITRITE-N	0.369
8/21/2017 11:27	Grab	TOTAL NITROGEN	1.56
8/21/2017 11:27	Grab	PHOSPHATE, TOTAL AS P	0.203
8/28/2017 8:58	Grab	NITRATE+NITRITE-N	0.279
8/28/2017 8:58	Grab	TOTAL NITROGEN	1.39
8/28/2017 8:58	Grab	PHOSPHATE, TOTAL AS P	0.163
8/28/2017 9:17	Grab	NITRATE+NITRITE-N	0.02
8/28/2017 9:17	Grab	TOTAL NITROGEN	0.053
8/28/2017 9:17	Grab	PHOSPHATE, TOTAL AS P	-0.002
9/5/2017 12:22	Grab	NITRATE+NITRITE-N	0.229
9/5/2017 12:22	Grab	TOTAL NITROGEN	1.48
9/5/2017 12:22	Grab	PHOSPHATE, TOTAL AS P	0.187
9/13/2017 13:32	Grab	NITRATE+NITRITE-N	0.11
9/13/2017 13:32	Grab	TOTAL NITROGEN	1.22
9/13/2017 13:32	Grab	PHOSPHATE, TOTAL AS P	0.232

Table C-3. S-79 Water Quality Data			
Collection Date	Collection Method	Test Name	Value (mg/L)
9/18/2017 11:38	Grab	NITRATE+NITRITE-N	0.011
9/18/2017 11:38	Grab	TOTAL NITROGEN	1.46
9/18/2017 11:38	Grab	PHOSPHATE, TOTAL AS P	0.338
9/25/2017 10:56	Grab	NITRATE+NITRITE-N	0.071
9/25/2017 10:56	Grab	TOTAL NITROGEN	1.58
9/25/2017 10:56	Grab	PHOSPHATE, TOTAL AS P	0.248
10/2/2017 12:22	Grab	NITRATE+NITRITE-N	0.089
10/2/2017 12:22	Grab	TOTAL NITROGEN	1.54
10/2/2017 12:22	Grab	PHOSPHATE, TOTAL AS P	0.184
10/9/2017 12:10	Grab	NITRATE+NITRITE-N	0.195
10/9/2017 12:10	Grab	TOTAL NITROGEN	1.79
10/9/2017 12:10	Grab	PHOSPHATE, TOTAL AS P	0.194
10/16/2017 11:29	Grab	NITRATE+NITRITE-N	0.139
10/16/2017 11:29	Grab	TOTAL NITROGEN	1.38
10/16/2017 11:29	Grab	PHOSPHATE, TOTAL AS P	0.117
10/23/2017 11:58	Grab	NITRATE+NITRITE-N	0.164
10/23/2017 11:58	Grab	TOTAL NITROGEN	1.75
10/23/2017 11:58	Grab	PHOSPHATE, TOTAL AS P	0.17
10/30/2017 11:23	Grab	NITRATE+NITRITE-N	0.191
10/30/2017 11:23	Grab	TOTAL NITROGEN	1.56
10/30/2017 11:23	Grab	PHOSPHATE, TOTAL AS P	0.145
11/6/2017 12:20	Grab	NITRATE+NITRITE-N	0.223
11/6/2017 12:20	Grab	TOTAL NITROGEN	1.78
11/6/2017 12:20	Grab	PHOSPHATE, TOTAL AS P	0.158
11/13/2017 12:19	Grab	NITRATE+NITRITE-N	0.169
11/13/2017 12:19	Grab	TOTAL NITROGEN	1.38
11/13/2017 12:19	Grab	PHOSPHATE, TOTAL AS P	0.123
11/20/2017 12:00	Grab	NITRATE+NITRITE-N	0.217
11/20/2017 12:00	Grab	TOTAL NITROGEN	1.5
11/20/2017 12:00	Grab	PHOSPHATE, TOTAL AS P	0.124
11/27/2017 11:08	Grab	NITRATE+NITRITE-N	0.168
11/27/2017 11:08	Grab	TOTAL NITROGEN	1.32
11/27/2017 11:08	Grab	PHOSPHATE, TOTAL AS P	0.118
12/4/2017 10:55	Grab	NITRATE+NITRITE-N	0.23
12/4/2017 10:55	Grab	TOTAL NITROGEN	1.48
12/4/2017 10:55	Grab	PHOSPHATE, TOTAL AS P	0.141
12/11/2017 10:59	Grab	NITRATE+NITRITE-N	0.258
12/11/2017 10:59	Grab	TOTAL NITROGEN	1.34
12/11/2017 10:59	Grab	PHOSPHATE, TOTAL AS P	0.129
12/18/2017 11:22	Grab	NITRATE+NITRITE-N	0.261
12/18/2017 11:22	Grab	TOTAL NITROGEN	1.4
12/18/2017 11:22	Grab	PHOSPHATE, TOTAL AS P	0.13
12/27/2017 10:44	Grab	NITRATE+NITRITE-N	0.291
12/27/2017 10:44	Grab	TOTAL NITROGEN	1.38
12/27/2017 10:44	Grab	PHOSPHATE, TOTAL AS P	0.123
1/3/2018 10:49	Grab	NITRATE+NITRITE-N	0.291
1/3/2018 10:49	Grab	TOTAL NITROGEN	1.38

Table C-3. S-79 Water Quality Data

Collection Date	Collection Method	Test Name	Value (mg/L)
1/3/2018 10:49	Grab	PHOSPHATE, TOTAL AS P	0.128
1/8/2018 10:33	Grab	NITRATE+NITRITE-N	0.347
1/8/2018 10:33	Grab	TOTAL NITROGEN	1.36
1/8/2018 10:33	Grab	PHOSPHATE, TOTAL AS P	0.136
1/18/2018 12:10	Grab	NITRATE+NITRITE-N	0.435
1/18/2018 12:10	Grab	TOTAL NITROGEN	1.38
1/18/2018 12:10	Grab	PHOSPHATE, TOTAL AS P	0.132
1/22/2018 10:48	Grab	NITRATE+NITRITE-N	0.424
1/22/2018 10:48	Grab	TOTAL NITROGEN	1.67
1/22/2018 10:48	Grab	PHOSPHATE, TOTAL AS P	0.203
1/29/2018 11:08	Grab	NITRATE+NITRITE-N	0.418
1/29/2018 11:08	Grab	TOTAL NITROGEN	1.25
1/29/2018 11:08	Grab	PHOSPHATE, TOTAL AS P	0.129
2/5/2018 9:30	Grab	NITRATE+NITRITE-N	0.45
2/5/2018 9:30	Grab	TOTAL NITROGEN	1.31
2/5/2018 9:30	Grab	PHOSPHATE, TOTAL AS P	0.122
2/5/2018 9:42	Grab	NITRATE+NITRITE-N	-0.005
2/5/2018 9:42	Grab	TOTAL NITROGEN	-0.02
2/5/2018 9:42	Grab	PHOSPHATE, TOTAL AS P	-0.002
2/12/2018 11:02	Grab	NITRATE+NITRITE-N	0.367
2/12/2018 11:02	Grab	TOTAL NITROGEN	1.27
2/12/2018 11:02	Grab	PHOSPHATE, TOTAL AS P	0.124
2/19/2018 11:13	Grab	NITRATE+NITRITE-N	0.253
2/19/2018 11:13	Grab	TOTAL NITROGEN	1.24
2/19/2018 11:13	Grab	PHOSPHATE, TOTAL AS P	0.108
2/26/2018 11:44	Grab	NITRATE+NITRITE-N	0.196
2/26/2018 11:44	Grab	TOTAL NITROGEN	1.14
2/26/2018 11:44	Grab	PHOSPHATE, TOTAL AS P	0.099
3/5/2018 11:55	Grab	NITRATE+NITRITE-N	0.186
3/5/2018 11:55	Grab	TOTAL NITROGEN	1.24
3/5/2018 11:55	Grab	PHOSPHATE, TOTAL AS P	0.111
3/12/2018 10:35	Grab	NITRATE+NITRITE-N	0.205
3/12/2018 10:35	Grab	TOTAL NITROGEN	1.17
3/12/2018 10:35	Grab	PHOSPHATE, TOTAL AS P	0.114
3/19/2018 9:37	Grab	NITRATE+NITRITE-N	0.267
3/19/2018 9:37	Grab	TOTAL NITROGEN	1.31
3/19/2018 9:37	Grab	PHOSPHATE, TOTAL AS P	0.141
3/19/2018 9:47	Grab	NITRATE+NITRITE-N	-0.005
3/19/2018 9:47	Grab	TOTAL NITROGEN	-0.02
3/19/2018 9:47	Grab	PHOSPHATE, TOTAL AS P	-0.002
3/26/2018 11:33	Grab	NITRATE+NITRITE-N	0.201
3/26/2018 11:33	Grab	TOTAL NITROGEN	1.22
3/26/2018 11:33	Grab	PHOSPHATE, TOTAL AS P	0.123
4/2/2018 9:22	Grab	NITRATE+NITRITE-N	0.179
4/2/2018 9:22	Grab	TOTAL NITROGEN	1.15
4/2/2018 9:22	Grab	PHOSPHATE, TOTAL AS P	0.115
4/9/2018 10:30	Grab	NITRATE+NITRITE-N	0.112

Table C-3. S-79 Water Quality Data			
Collection Date	**Collection Method**	**Test Name**	**Value (mg/L)**
4/9/2018 10:30	Grab	TOTAL NITROGEN	1.22
4/9/2018 10:30	Grab	PHOSPHATE, TOTAL AS P	0.101
4/16/2018 11:21	Grab	NITRATE+NITRITE-N	0.217
4/16/2018 11:21	Grab	TOTAL NITROGEN	1.22
4/16/2018 11:21	Grab	PHOSPHATE, TOTAL AS P	0.123
4/23/2018 12:34	Grab	NITRATE+NITRITE-N	0.077
4/23/2018 12:34	Grab	TOTAL NITROGEN	1.15
4/23/2018 12:34	Grab	PHOSPHATE, TOTAL AS P	0.11
4/30/2018 10:20	Grab	NITRATE+NITRITE-N	0.182
4/30/2018 10:20	Grab	TOTAL NITROGEN	1.28
4/30/2018 10:20	Grab	PHOSPHATE, TOTAL AS P	0.129
5/7/2018 10:44	Grab	NITRATE+NITRITE-N	0.258
5/7/2018 10:44	Grab	TOTAL NITROGEN	1.26
5/7/2018 10:44	Grab	PHOSPHATE, TOTAL AS P	0.124
5/14/2018 11:06	Grab	NITRATE+NITRITE-N	0.244
5/14/2018 11:06	Grab	TOTAL NITROGEN	1.23
5/14/2018 11:06	Grab	PHOSPHATE, TOTAL AS P	0.123
5/21/2018 10:55	Grab	NITRATE+NITRITE-N	0.215
5/21/2018 10:55	Grab	TOTAL NITROGEN	1.26
5/21/2018 10:55	Grab	PHOSPHATE, TOTAL AS P	0.136
5/30/2018 12:00	Grab	NITRATE+NITRITE-N	0.479
5/30/2018 12:00	Grab	TOTAL NITROGEN	1.75
5/30/2018 12:00	Grab	PHOSPHATE, TOTAL AS P	0.199
6/4/2018 11:32	Grab	NITRATE+NITRITE-N	-0.005
6/4/2018 11:32	Grab	TOTAL NITROGEN	-0.02
6/4/2018 11:32	Grab	PHOSPHATE, TOTAL AS P	-0.002
6/4/2018 11:50	Grab	NITRATE+NITRITE-N	0.414
6/4/2018 11:50	Grab	TOTAL NITROGEN	1.81
6/4/2018 11:50	Grab	PHOSPHATE, TOTAL AS P	0.203
6/11/2018 10:36	Grab	NITRATE+NITRITE-N	0.286
6/11/2018 10:36	Grab	TOTAL NITROGEN	1.44
6/11/2018 10:36	Grab	PHOSPHATE, TOTAL AS P	0.204
6/18/2018 10:49	Grab	NITRATE+NITRITE-N	0.319
6/18/2018 10:49	Grab	TOTAL NITROGEN	1.63
6/18/2018 10:49	Grab	PHOSPHATE, TOTAL AS P	0.221
6/18/2018 11:02	Grab	NITRATE+NITRITE-N	-0.005
6/18/2018 11:02	Grab	TOTAL NITROGEN	-0.02
6/18/2018 11:02	Grab	PHOSPHATE, TOTAL AS P	-0.002
6/25/2018 12:33	Grab	NITRATE+NITRITE-N	0.136
6/25/2018 12:33	Grab	TOTAL NITROGEN	2.52
6/25/2018 12:33	Grab	PHOSPHATE, TOTAL AS P	0.274
7/5/2018 11:30	Grab	NITRATE+NITRITE-N	0.196
7/5/2018 11:30	Grab	TOTAL NITROGEN	1.56
7/5/2018 11:30	Grab	PHOSPHATE, TOTAL AS P	0.234
7/5/2018 11:40	Grab	NITRATE+NITRITE-N	0.023
7/5/2018 11:40	Grab	TOTAL NITROGEN	-0.02
7/5/2018 11:40	Grab	PHOSPHATE, TOTAL AS P	-0.002

Table C-3. S-79 Water Quality Data			
Collection Date	Collection Method	Test Name	Value (mg/L)
7/9/2018 12:00	Grab	NITRATE+NITRITE-N	0.233
7/9/2018 12:00	Grab	TOTAL NITROGEN	1.58
7/9/2018 12:00	Grab	PHOSPHATE, TOTAL AS P	0.193
7/9/2018 12:15	Grab	NITRATE+NITRITE-N	0.013
7/9/2018 12:15	Grab	TOTAL NITROGEN	-0.02
7/9/2018 12:15	Grab	PHOSPHATE, TOTAL AS P	-0.002
7/16/2018 11:42	Grab	NITRATE+NITRITE-N	0.228
7/16/2018 11:42	Grab	TOTAL NITROGEN	1.72
7/16/2018 11:42	Grab	PHOSPHATE, TOTAL AS P	0.225
7/23/2018 12:07	Grab	NITRATE+NITRITE-N	0.269
7/23/2018 12:07	Grab	TOTAL NITROGEN	1.64
7/23/2018 12:07	Grab	PHOSPHATE, TOTAL AS P	0.187
7/23/2018 12:22	Grab	NITRATE+NITRITE-N	-0.005
7/23/2018 12:22	Grab	TOTAL NITROGEN	-0.02
7/23/2018 12:22	Grab	PHOSPHATE, TOTAL AS P	-0.002
7/30/2018 11:40	Grab	NITRATE+NITRITE-N	0.284
7/30/2018 11:40	Grab	TOTAL NITROGEN	1.8
7/30/2018 11:40	Grab	PHOSPHATE, TOTAL AS P	0.194
8/6/2018 11:25	Grab	NITRATE+NITRITE-N	0.221
8/6/2018 11:25	Grab	TOTAL NITROGEN	1.39
8/6/2018 11:25	Grab	PHOSPHATE, TOTAL AS P	0.152
8/13/2018 11:37	Grab	NITRATE+NITRITE-N	0.383
8/13/2018 11:37	Grab	TOTAL NITROGEN	1.7
8/13/2018 11:37	Grab	PHOSPHATE, TOTAL AS P	0.181
8/20/2018 11:12	Grab	NITRATE+NITRITE-N	0.273
8/20/2018 11:12	Grab	TOTAL NITROGEN	1.37
8/20/2018 11:12	Grab	PHOSPHATE, TOTAL AS P	0.145
8/20/2018 11:23	Grab	NITRATE+NITRITE-N	-0.005
8/20/2018 11:23	Grab	TOTAL NITROGEN	-0.02
8/20/2018 11:23	Grab	PHOSPHATE, TOTAL AS P	-0.002
8/27/2018 10:53	Grab	NITRATE+NITRITE-N	0.217
8/27/2018 10:53	Grab	TOTAL NITROGEN	1.35
8/27/2018 10:53	Grab	PHOSPHATE, TOTAL AS P	0.143
9/6/2018 11:17	Grab	NITRATE+NITRITE-N	0.236
9/6/2018 11:17	Grab	TOTAL NITROGEN	1.39
9/6/2018 11:17	Grab	PHOSPHATE, TOTAL AS P	0.128
9/10/2018 11:51	Grab	NITRATE+NITRITE-N	0.281
9/10/2018 11:51	Grab	TOTAL NITROGEN	1.41
9/10/2018 11:51	Grab	PHOSPHATE, TOTAL AS P	0.124
9/17/2018 11:05	Grab	NITRATE+NITRITE-N	-0.005
9/17/2018 11:05	Grab	TOTAL NITROGEN	-0.02
9/17/2018 11:05	Grab	PHOSPHATE, TOTAL AS P	-0.002
9/17/2018 11:17	Grab	NITRATE+NITRITE-N	0.214
9/17/2018 11:17	Grab	TOTAL NITROGEN	1.28
9/17/2018 11:17	Grab	PHOSPHATE, TOTAL AS P	0.143
9/17/2018 11:41	Grab	NITRATE+NITRITE-N	0.218
9/17/2018 11:41	Grab	TOTAL NITROGEN	1.28

Table C-3. S-79 Water Quality Data

Collection Date	Collection Method	Test Name	Value (mg/L)
9/17/2018 11:41	Grab	PHOSPHATE, TOTAL AS P	0.147
9/17/2018 11:55	Grab	NITRATE+NITRITE-N	0.221
9/17/2018 11:55	Grab	TOTAL NITROGEN	1.26
9/17/2018 11:55	Grab	PHOSPHATE, TOTAL AS P	0.146
9/17/2018 12:10	Grab	NITRATE+NITRITE-N	-0.005
9/17/2018 12:10	Grab	TOTAL NITROGEN	0.03
9/17/2018 12:10	Grab	PHOSPHATE, TOTAL AS P	-0.002
9/24/2018 11:23	Grab	NITRATE+NITRITE-N	0.244
9/24/2018 11:23	Grab	TOTAL NITROGEN	1.43
9/24/2018 11:23	Grab	PHOSPHATE, TOTAL AS P	0.172
9/24/2018 11:35	Grab	NITRATE+NITRITE-N	-0.005
9/24/2018 11:35	Grab	TOTAL NITROGEN	-0.02
9/24/2018 11:35	Grab	PHOSPHATE, TOTAL AS P	-0.002
10/1/2018 10:33	Grab	NITRATE+NITRITE-N	0.28
10/1/2018 10:33	Grab	TOTAL NITROGEN	1.33
10/1/2018 10:33	Grab	PHOSPHATE, TOTAL AS P	0.15
10/1/2018 10:45	Grab	NITRATE+NITRITE-N	-0.005
10/1/2018 10:45	Grab	TOTAL NITROGEN	-0.02
10/1/2018 10:45	Grab	PHOSPHATE, TOTAL AS P	-0.002
10/8/2018 11:07	Grab	NITRATE+NITRITE-N	0.297
10/8/2018 11:07	Grab	TOTAL NITROGEN	1.34
10/8/2018 11:07	Grab	PHOSPHATE, TOTAL AS P	0.119
10/8/2018 11:15	Grab	NITRATE+NITRITE-N	-0.005
10/8/2018 11:15	Grab	TOTAL NITROGEN	0.036
10/8/2018 11:15	Grab	PHOSPHATE, TOTAL AS P	-0.002
10/15/2018 11:14	Grab	NITRATE+NITRITE-N	0.245
10/15/2018 11:14	Grab	TOTAL NITROGEN	1.23
10/15/2018 11:14	Grab	PHOSPHATE, TOTAL AS P	0.11
10/22/2018 11:29	Grab	NITRATE+NITRITE-N	0.29
10/22/2018 11:29	Grab	TOTAL NITROGEN	1.27
10/22/2018 11:29	Grab	PHOSPHATE, TOTAL AS P	0.114
10/29/2018 11:11	Grab	NITRATE+NITRITE-N	0.288
10/29/2018 11:11	Grab	TOTAL NITROGEN	1.28
10/29/2018 11:11	Grab	PHOSPHATE, TOTAL AS P	0.114
10/29/2018 11:23	Grab	NITRATE+NITRITE-N	0.006
10/29/2018 11:23	Grab	TOTAL NITROGEN	-0.02
10/29/2018 11:23	Grab	PHOSPHATE, TOTAL AS P	-0.002
11/5/2018 11:09	Grab	NITRATE+NITRITE-N	0.172
11/5/2018 11:09	Grab	TOTAL NITROGEN	1.13
11/5/2018 11:09	Grab	PHOSPHATE, TOTAL AS P	0.103
11/5/2018 11:18	Grab	NITRATE+NITRITE-N	-0.005
11/5/2018 11:18	Grab	TOTAL NITROGEN	-0.02
11/5/2018 11:18	Grab	PHOSPHATE, TOTAL AS P	-0.002
11/14/2018 12:41	Grab	NITRATE+NITRITE-N	0.225
11/14/2018 12:41	Grab	TOTAL NITROGEN	1.45
11/14/2018 12:41	Grab	PHOSPHATE, TOTAL AS P	0.112
11/19/2018 10:20	Grab	NITRATE+NITRITE-N	0.393

Table C-3. S-79 Water Quality Data

Collection Date	Collection Method	Test Name	Value (mg/L)
11/19/2018 10:20	Grab	TOTAL NITROGEN	1.51
11/19/2018 10:20	Grab	PHOSPHATE, TOTAL AS P	0.122
11/26/2018 10:51	Grab	NITRATE+NITRITE-N	0.441
11/26/2018 10:51	Grab	TOTAL NITROGEN	1.48
11/26/2018 10:51	Grab	PHOSPHATE, TOTAL AS P	0.115
11/26/2018 11:08	Grab	NITRATE+NITRITE-N	-0.005
11/26/2018 11:08	Grab	TOTAL NITROGEN	-0.02
11/26/2018 11:08	Grab	PHOSPHATE, TOTAL AS P	-0.002
12/3/2018 11:04	Grab	NITRATE+NITRITE-N	0.4
12/3/2018 11:04	Grab	TOTAL NITROGEN	1.4
12/3/2018 11:04	Grab	PHOSPHATE, TOTAL AS P	0.096
12/3/2018 11:17	Grab	NITRATE+NITRITE-N	-0.005
12/3/2018 11:17	Grab	TOTAL NITROGEN	-0.02
12/3/2018 11:17	Grab	PHOSPHATE, TOTAL AS P	-0.002
12/10/2018 11:21	Grab	NITRATE+NITRITE-N	0.148
12/10/2018 11:21	Grab	TOTAL NITROGEN	1.23
12/10/2018 11:21	Grab	PHOSPHATE, TOTAL AS P	0.085
12/10/2018 11:36	Grab	NITRATE+NITRITE-N	-0.005
12/10/2018 11:36	Grab	TOTAL NITROGEN	-0.02
12/10/2018 11:36	Grab	PHOSPHATE, TOTAL AS P	-0.002
12/17/2018 10:19	Grab	NITRATE+NITRITE-N	0.079
12/17/2018 10:19	Grab	TOTAL NITROGEN	1.19
12/17/2018 10:19	Grab	PHOSPHATE, TOTAL AS P	0.084
12/17/2018 10:32	Grab	NITRATE+NITRITE-N	-0.005
12/17/2018 10:32	Grab	TOTAL NITROGEN	-0.02
12/17/2018 10:32	Grab	PHOSPHATE, TOTAL AS P	-0.002
12/26/2018 10:57	Grab	NITRATE+NITRITE-N	0.033
12/26/2018 10:57	Grab	TOTAL NITROGEN	1.13
12/26/2018 10:57	Grab	PHOSPHATE, TOTAL AS P	0.088
1/3/2019 10:52	Grab	NITRATE+NITRITE-N	-0.005
1/3/2019 10:52	Grab	TOTAL NITROGEN	1.06
1/3/2019 10:52	Grab	PHOSPHATE, TOTAL AS P	0.071
1/7/2019 11:25	Grab	NITRATE+NITRITE-N	0.035
1/7/2019 11:25	Grab	TOTAL NITROGEN	1.1
1/7/2019 11:25	Grab	PHOSPHATE, TOTAL AS P	0.095
1/14/2019 11:57	Grab	NITRATE+NITRITE-N	0.074
1/14/2019 11:57	Grab	TOTAL NITROGEN	1.05
1/14/2019 11:57	Grab	PHOSPHATE, TOTAL AS P	0.096
1/23/2019 13:46	Grab	NITRATE+NITRITE-N	0.124
1/23/2019 13:46	Grab	TOTAL NITROGEN	1.22
1/23/2019 13:46	Grab	PHOSPHATE, TOTAL AS P	0.1
1/28/2019 11:50	Grab	NITRATE+NITRITE-N	0.141
1/28/2019 11:50	Grab	TOTAL NITROGEN	1.1
1/28/2019 11:50	Grab	PHOSPHATE, TOTAL AS P	0.101
2/4/2019 11:39	Grab	NITRATE+NITRITE-N	0.425
2/4/2019 11:39	Grab	TOTAL NITROGEN	1.52
2/4/2019 11:39	Grab	PHOSPHATE, TOTAL AS P	0.116

Table C-3. S-79 Water Quality Data

Collection Date	Collection Method	Test Name	Value (mg/L)
2/11/2019 10:54	Grab	NITRATE+NITRITE-N	0.422
2/11/2019 10:54	Grab	TOTAL NITROGEN	1.55
2/11/2019 10:54	Grab	PHOSPHATE, TOTAL AS P	0.112
2/11/2019 11:05	Grab	NITRATE+NITRITE-N	-0.005
2/11/2019 11:05	Grab	TOTAL NITROGEN	-0.02
2/11/2019 11:05	Grab	PHOSPHATE, TOTAL AS P	-0.002
2/18/2019 11:51	Grab	NITRATE+NITRITE-N	0.66
2/18/2019 11:51	Grab	TOTAL NITROGEN	1.9
2/18/2019 11:51	Grab	PHOSPHATE, TOTAL AS P	0.116
2/25/2019 11:17	Grab	NITRATE+NITRITE-N	0.425
2/25/2019 11:17	Grab	TOTAL NITROGEN	1.61
2/25/2019 11:17	Grab	PHOSPHATE, TOTAL AS P	0.084
2/25/2019 11:30	Grab	NITRATE+NITRITE-N	-0.005
2/25/2019 11:30	Grab	TOTAL NITROGEN	-0.02
2/25/2019 11:30	Grab	PHOSPHATE, TOTAL AS P	-0.002
3/4/2019 10:25	Grab	NITRATE+NITRITE-N	0.107
3/4/2019 10:25	Grab	TOTAL NITROGEN	1.34
3/4/2019 10:25	Grab	PHOSPHATE, TOTAL AS P	0.109
3/4/2019 10:40	Grab	NITRATE+NITRITE-N	-0.005
3/4/2019 10:40	Grab	TOTAL NITROGEN	-0.02
3/4/2019 10:40	Grab	PHOSPHATE, TOTAL AS P	-0.002
3/11/2019 11:08	Grab	NITRATE+NITRITE-N	0.244
3/11/2019 11:08	Grab	TOTAL NITROGEN	1.34
3/11/2019 11:08	Grab	PHOSPHATE, TOTAL AS P	0.103
3/11/2019 11:28	Grab	NITRATE+NITRITE-N	-0.005
3/11/2019 11:28	Grab	TOTAL NITROGEN	-0.02
3/11/2019 11:28	Grab	PHOSPHATE, TOTAL AS P	-0.002
3/18/2019 11:05	Grab	NITRATE+NITRITE-N	0.195
3/18/2019 11:05	Grab	TOTAL NITROGEN	1.19
3/18/2019 11:05	Grab	PHOSPHATE, TOTAL AS P	0.094
3/18/2019 11:35	Grab	NITRATE+NITRITE-N	0.006
3/18/2019 11:35	Grab	TOTAL NITROGEN	-0.02
3/18/2019 11:35	Grab	PHOSPHATE, TOTAL AS P	-0.002
3/25/2019 11:07	Grab	NITRATE+NITRITE-N	0.102
3/25/2019 11:07	Grab	TOTAL NITROGEN	1.16
3/25/2019 11:07	Grab	PHOSPHATE, TOTAL AS P	0.089
3/25/2019 11:20	Grab	NITRATE+NITRITE-N	-0.005
3/25/2019 11:20	Grab	TOTAL NITROGEN	-0.02
3/25/2019 11:20	Grab	PHOSPHATE, TOTAL AS P	-0.002
4/1/2019 10:54	Grab	NITRATE+NITRITE-N	-0.005
4/1/2019 10:54	Grab	TOTAL NITROGEN	1.18
4/1/2019 10:54	Grab	PHOSPHATE, TOTAL AS P	0.078
4/8/2019 10:46	Grab	NITRATE+NITRITE-N	0.03
4/8/2019 10:46	Grab	TOTAL NITROGEN	1.09
4/8/2019 10:46	Grab	PHOSPHATE, TOTAL AS P	0.078
4/8/2019 11:03	Grab	NITRATE+NITRITE-N	0.024
4/8/2019 11:03	Grab	TOTAL NITROGEN	1.08

Table C-3. S-79 Water Quality Data			
Collection Date	**Collection Method**	**Test Name**	**Value (mg/L)**
4/8/2019 11:03	Grab	PHOSPHATE, TOTAL AS P	0.078
4/8/2019 11:12	Grab	NITRATE+NITRITE-N	0.056
4/8/2019 11:12	Grab	TOTAL NITROGEN	1.16
4/8/2019 11:12	Grab	PHOSPHATE, TOTAL AS P	0.081
4/8/2019 11:23	Grab	NITRATE+NITRITE-N	-0.005
4/8/2019 11:23	Grab	TOTAL NITROGEN	-0.02
4/8/2019 11:23	Grab	PHOSPHATE, TOTAL AS P	-0.002
4/15/2019 11:54	Grab	NITRATE+NITRITE-N	0.138
4/15/2019 11:54	Grab	TOTAL NITROGEN	1.19
4/15/2019 11:54	Grab	PHOSPHATE, TOTAL AS P	0.105
4/15/2019 12:08	Grab	NITRATE+NITRITE-N	-0.005
4/15/2019 12:08	Grab	TOTAL NITROGEN	0.04
4/15/2019 12:08	Grab	PHOSPHATE, TOTAL AS P	-0.002
4/22/2019 12:01	Grab	NITRATE+NITRITE-N	0.085
4/22/2019 12:01	Grab	TOTAL NITROGEN	1.23
4/22/2019 12:01	Grab	PHOSPHATE, TOTAL AS P	0.17
4/29/2019 11:06	Grab	NITRATE+NITRITE-N	0.018
4/29/2019 11:06	Grab	TOTAL NITROGEN	1.24
4/29/2019 11:06	Grab	PHOSPHATE, TOTAL AS P	0.164
4/29/2019 11:19	Grab	NITRATE+NITRITE-N	-0.005
4/29/2019 11:19	Grab	TOTAL NITROGEN	-0.05
4/29/2019 11:19	Grab	PHOSPHATE, TOTAL AS P	-0.002
5/6/2019 10:42	Grab	NITRATE+NITRITE-N	-0.005
5/6/2019 10:42	Grab	TOTAL NITROGEN	1.24
5/6/2019 10:42	Grab	PHOSPHATE, TOTAL AS P	0.13
5/13/2019 11:14	Grab	NITRATE+NITRITE-N	-0.005
5/13/2019 11:14	Grab	TOTAL NITROGEN	1.36
5/13/2019 11:14	Grab	PHOSPHATE, TOTAL AS P	0.143
5/20/2019 9:30	Grab	NITRATE+NITRITE-N	-0.005
5/20/2019 9:30	Grab	TOTAL NITROGEN	1.22
5/20/2019 9:30	Grab	PHOSPHATE, TOTAL AS P	0.142
5/29/2019 10:54	Grab	NITRATE+NITRITE-N	-0.005
5/29/2019 10:54	Grab	TOTAL NITROGEN	1.2
5/29/2019 10:54	Grab	PHOSPHATE, TOTAL AS P	0.142
6/3/2019 11:17	Grab	NITRATE+NITRITE-N	-0.005
6/3/2019 11:17	Grab	TOTAL NITROGEN	1.28
6/3/2019 11:17	Grab	PHOSPHATE, TOTAL AS P	0.168
6/10/2019 11:00	Grab	NITRATE+NITRITE-N	-0.005
6/10/2019 11:00	Grab	TOTAL NITROGEN	1.25
6/10/2019 11:00	Grab	PHOSPHATE, TOTAL AS P	0.177
6/17/2019 10:08	Grab	NITRATE+NITRITE-N	0.19
6/17/2019 10:08	Grab	TOTAL NITROGEN	1.48
6/17/2019 10:08	Grab	PHOSPHATE, TOTAL AS P	0.17
6/24/2019 10:44	Grab	NITRATE+NITRITE-N	-0.005
6/24/2019 10:44	Grab	TOTAL NITROGEN	1.57
6/24/2019 10:44	Grab	PHOSPHATE, TOTAL AS P	0.183
6/24/2019 11:00	Grab	NITRATE+NITRITE-N	-0.005

Table C-3. S-79 Water Quality Data			
Collection Date	Collection Method	Test Name	Value (mg/L)
6/24/2019 11:00	Grab	TOTAL NITROGEN	-0.05
6/24/2019 11:00	Grab	PHOSPHATE, TOTAL AS P	-0.002
7/1/2019 10:28	Grab	NITRATE+NITRITE-N	0.076
7/1/2019 10:28	Grab	TOTAL NITROGEN	1.33
7/1/2019 10:28	Grab	PHOSPHATE, TOTAL AS P	0.148
7/8/2019 11:28	Grab	NITRATE+NITRITE-N	0.123
7/8/2019 11:28	Grab	TOTAL NITROGEN	1.36
7/8/2019 11:28	Grab	PHOSPHATE, TOTAL AS P	0.151
7/15/2019 10:29	Grab	NITRATE+NITRITE-N	0.103
7/15/2019 10:29	Grab	TOTAL NITROGEN	1.38
7/15/2019 10:29	Grab	PHOSPHATE, TOTAL AS P	0.136
7/15/2019 10:41	Grab	NITRATE+NITRITE-N	0.104
7/15/2019 10:41	Grab	TOTAL NITROGEN	1.36
7/15/2019 10:41	Grab	PHOSPHATE, TOTAL AS P	0.143
7/15/2019 10:48	Grab	NITRATE+NITRITE-N	0.107
7/15/2019 10:48	Grab	TOTAL NITROGEN	1.35
7/15/2019 10:48	Grab	PHOSPHATE, TOTAL AS P	0.137
7/15/2019 11:04	Grab	NITRATE+NITRITE-N	-0.005
7/15/2019 11:04	Grab	TOTAL NITROGEN	-0.05
7/15/2019 11:04	Grab	PHOSPHATE, TOTAL AS P	-0.002
7/22/2019 10:48	Grab	NITRATE+NITRITE-N	0.101
7/22/2019 10:48	Grab	TOTAL NITROGEN	1.48
7/22/2019 10:48	Grab	PHOSPHATE, TOTAL AS P	0.13
7/22/2019 11:00	Grab	NITRATE+NITRITE-N	-0.005
7/22/2019 11:00	Grab	TOTAL NITROGEN	-0.05
7/22/2019 11:00	Grab	PHOSPHATE, TOTAL AS P	-0.002
7/29/2019 12:07	Grab	NITRATE+NITRITE-N	0.024
7/29/2019 12:07	Grab	TOTAL NITROGEN	1.45
7/29/2019 12:07	Grab	PHOSPHATE, TOTAL AS P	0.132
8/5/2019 10:38	Grab	NITRATE+NITRITE-N	0.014
8/5/2019 10:38	Grab	TOTAL NITROGEN	-0.05
8/5/2019 10:38	Grab	PHOSPHATE, TOTAL AS P	-0.002
8/5/2019 10:49	Grab	NITRATE+NITRITE-N	0.157
8/5/2019 10:49	Grab	TOTAL NITROGEN	1.46
8/5/2019 10:49	Grab	PHOSPHATE, TOTAL AS P	0.142
8/12/2019 11:01	Grab	NITRATE+NITRITE-N	0.254
8/12/2019 11:01	Grab	TOTAL NITROGEN	1.64
8/12/2019 11:01	Grab	PHOSPHATE, TOTAL AS P	0.149
8/19/2019 10:40	Grab	NITRATE+NITRITE-N	0.196
8/19/2019 10:40	Grab	TOTAL NITROGEN	1.55
8/19/2019 10:40	Grab	PHOSPHATE, TOTAL AS P	0.192
8/26/2019 11:13	Grab	NITRATE+NITRITE-N	0.298
8/26/2019 11:13	Grab	TOTAL NITROGEN	1.52
8/26/2019 11:13	Grab	PHOSPHATE, TOTAL AS P	0.203
9/4/2019 11:04	Grab	NITRATE+NITRITE-N	0.396
9/4/2019 11:04	Grab	TOTAL NITROGEN	1.71
9/4/2019 11:04	Grab	PHOSPHATE, TOTAL AS P	0.163

Table C-3. S-79 Water Quality Data			
Collection Date	**Collection Method**	**Test Name**	**Value (mg/L)**
9/9/2019 10:43	Grab	NITRATE+NITRITE-N	0.334
9/9/2019 10:43	Grab	TOTAL NITROGEN	1.33
9/9/2019 10:43	Grab	PHOSPHATE, TOTAL AS P	0.129
9/16/2019 10:24	Grab	NITRATE+NITRITE-N	0.412
9/16/2019 10:24	Grab	TOTAL NITROGEN	1.42
9/16/2019 10:24	Grab	PHOSPHATE, TOTAL AS P	0.132
9/23/2019 11:35	Grab	NITRATE+NITRITE-N	0.455
9/23/2019 11:35	Grab	TOTAL NITROGEN	1.41
9/23/2019 11:35	Grab	PHOSPHATE, TOTAL AS P	0.133
9/30/2019 10:47	Grab	NITRATE+NITRITE-N	0.463
9/30/2019 10:47	Grab	TOTAL NITROGEN	1.47
9/30/2019 10:47	Grab	PHOSPHATE, TOTAL AS P	0.126
9/30/2019 11:00	Grab	NITRATE+NITRITE-N	-0.005
9/30/2019 11:00	Grab	TOTAL NITROGEN	-0.05
9/30/2019 11:00	Grab	PHOSPHATE, TOTAL AS P	-0.002
10/7/2019 11:14	Grab	NITRATE+NITRITE-N	0.556
10/7/2019 11:14	Grab	TOTAL NITROGEN	1.57
10/7/2019 11:14	Grab	PHOSPHATE, TOTAL AS P	0.126
10/14/2019 10:46	Grab	NITRATE+NITRITE-N	0.49
10/14/2019 10:46	Grab	TOTAL NITROGEN	1.45
10/14/2019 10:46	Grab	PHOSPHATE, TOTAL AS P	0.133
10/21/2019 11:26	Grab	NITRATE+NITRITE-N	0.559
10/21/2019 11:26	Grab	TOTAL NITROGEN	1.64
10/21/2019 11:26	Grab	PHOSPHATE, TOTAL AS P	0.14
10/28/2019 11:08	Grab	NITRATE+NITRITE-N	0.513
10/28/2019 11:08	Grab	TOTAL NITROGEN	1.82
10/28/2019 11:08	Grab	PHOSPHATE, TOTAL AS P	0.157
11/4/2019 10:41	Grab	NITRATE+NITRITE-N	0.52
11/4/2019 10:41	Grab	TOTAL NITROGEN	1.79
11/4/2019 10:41	Grab	PHOSPHATE, TOTAL AS P	0.163
11/4/2019 10:55	Grab	NITRATE+NITRITE-N	-0.005
11/4/2019 10:55	Grab	TOTAL NITROGEN	-0.05
11/4/2019 10:55	Grab	PHOSPHATE, TOTAL AS P	-0.002
11/13/2019 11:33	Grab	NITRATE+NITRITE-N	0.472
11/13/2019 11:33	Grab	TOTAL NITROGEN	1.67
11/13/2019 11:33	Grab	PHOSPHATE, TOTAL AS P	0.164
11/18/2019 11:20	Grab	NITRATE+NITRITE-N	0.518
11/18/2019 11:20	Grab	TOTAL NITROGEN	1.71
11/18/2019 11:20	Grab	PHOSPHATE, TOTAL AS P	0.191
11/25/2019 9:24	Grab	NITRATE+NITRITE-N	0.493
11/25/2019 9:24	Grab	TOTAL NITROGEN	1.65
11/25/2019 9:24	Grab	PHOSPHATE, TOTAL AS P	0.174
12/2/2019 10:39	Grab	NITRATE+NITRITE-N	0.298
12/2/2019 10:39	Grab	TOTAL NITROGEN	1.42
12/2/2019 10:39	Grab	PHOSPHATE, TOTAL AS P	0.121
12/2/2019 10:55	Grab	NITRATE+NITRITE-N	-0.005
12/2/2019 10:55	Grab	TOTAL NITROGEN	-0.05

Table C-3. S-79 Water Quality Data			
Collection Date	**Collection Method**	**Test Name**	**Value (mg/L)**
12/2/2019 10:55	Grab	PHOSPHATE, TOTAL AS P	-0.002
12/9/2019 10:36	Grab	NITRATE+NITRITE-N	0.139
12/9/2019 10:36	Grab	TOTAL NITROGEN	1.17
12/9/2019 10:36	Grab	PHOSPHATE, TOTAL AS P	0.099
12/9/2019 10:48	Grab	NITRATE+NITRITE-N	-0.005
12/9/2019 10:48	Grab	TOTAL NITROGEN	-0.05
12/9/2019 10:48	Grab	PHOSPHATE, TOTAL AS P	-0.002
12/16/2019 10:31	Grab	NITRATE+NITRITE-N	0.065
12/16/2019 10:31	Grab	TOTAL NITROGEN	1.06
12/16/2019 10:31	Grab	PHOSPHATE, TOTAL AS P	0.071
12/16/2019 10:45	Grab	NITRATE+NITRITE-N	-0.005
12/16/2019 10:45	Grab	TOTAL NITROGEN	-0.05
12/16/2019 10:45	Grab	PHOSPHATE, TOTAL AS P	-0.002
12/23/2019 10:13	Grab	NITRATE+NITRITE-N	0.049
12/23/2019 10:13	Grab	TOTAL NITROGEN	1.16
12/23/2019 10:13	Grab	PHOSPHATE, TOTAL AS P	0.09
12/23/2019 10:25	Grab	NITRATE+NITRITE-N	-0.005
12/23/2019 10:25	Grab	TOTAL NITROGEN	-0.05
12/23/2019 10:25	Grab	PHOSPHATE, TOTAL AS P	-0.002
12/30/2019 10:21	Grab	NITRATE+NITRITE-N	0.013
12/30/2019 10:21	Grab	TOTAL NITROGEN	1.29
12/30/2019 10:21	Grab	PHOSPHATE, TOTAL AS P	0.093
1/6/2020 10:08	Grab	NITRATE+NITRITE-N	0.04
1/6/2020 10:08	Grab	TOTAL NITROGEN	1.31
1/6/2020 10:08	Grab	PHOSPHATE, TOTAL AS P	0.099
1/6/2020 10:22	Grab	NITRATE+NITRITE-N	-0.005
1/6/2020 10:22	Grab	TOTAL NITROGEN	-0.05
1/6/2020 10:22	Grab	PHOSPHATE, TOTAL AS P	-0.002
1/13/2020 12:13	Grab	NITRATE+NITRITE-N	0.199
1/13/2020 12:13	Grab	TOTAL NITROGEN	1.18
1/13/2020 12:13	Grab	PHOSPHATE, TOTAL AS P	0.102
1/13/2020 12:37	Grab	NITRATE+NITRITE-N	-0.005
1/13/2020 12:37	Grab	TOTAL NITROGEN	-0.05
1/13/2020 12:37	Grab	PHOSPHATE, TOTAL AS P	-0.002
1/21/2020 11:06	Grab	NITRATE+NITRITE-N	0.286
1/21/2020 11:06	Grab	TOTAL NITROGEN	1.34
1/21/2020 11:06	Grab	PHOSPHATE, TOTAL AS P	0.101
1/27/2020 11:05	Grab	NITRATE+NITRITE-N	0.33
1/27/2020 11:05	Grab	TOTAL NITROGEN	1.35
1/27/2020 11:05	Grab	PHOSPHATE, TOTAL AS P	0.101
2/3/2020 11:04	Grab	NITRATE+NITRITE-N	0.149
2/3/2020 11:04	Grab	TOTAL NITROGEN	1.22
2/3/2020 11:04	Grab	PHOSPHATE, TOTAL AS P	0.08
2/10/2020 10:57	Grab	NITRATE+NITRITE-N	0.074
2/10/2020 10:57	Grab	TOTAL NITROGEN	1.18
2/10/2020 10:57	Grab	PHOSPHATE, TOTAL AS P	0.088
2/17/2020 11:09	Grab	NITRATE+NITRITE-N	0.025

Table C-3. S-79 Water Quality Data			
Collection Date	**Collection Method**	**Test Name**	**Value (mg/L)**
2/17/2020 11:09	Grab	TOTAL NITROGEN	1.07
2/17/2020 11:09	Grab	PHOSPHATE, TOTAL AS P	0.07
2/17/2020 11:21	Grab	NITRATE+NITRITE-N	-0.005
2/17/2020 11:21	Grab	TOTAL NITROGEN	-0.05
2/17/2020 11:21	Grab	PHOSPHATE, TOTAL AS P	-0.002
2/24/2020 10:58	Grab	NITRATE+NITRITE-N	0.046
2/24/2020 10:58	Grab	TOTAL NITROGEN	1.08
2/24/2020 10:58	Grab	PHOSPHATE, TOTAL AS P	0.084
2/24/2020 11:14	Grab	NITRATE+NITRITE-N	-0.005
2/24/2020 11:14	Grab	TOTAL NITROGEN	-0.05
2/24/2020 11:14	Grab	PHOSPHATE, TOTAL AS P	-0.002
3/2/2020 10:46	Grab	NITRATE+NITRITE-N	-0.005
3/2/2020 10:46	Grab	TOTAL NITROGEN	1.14
3/2/2020 10:46	Grab	PHOSPHATE, TOTAL AS P	0.095
3/2/2020 10:56	Grab	NITRATE+NITRITE-N	-0.005
3/2/2020 10:56	Grab	TOTAL NITROGEN	-0.05
3/2/2020 10:56	Grab	PHOSPHATE, TOTAL AS P	-0.002
3/9/2020 11:49	Grab	NITRATE+NITRITE-N	-0.005
3/9/2020 11:49	Grab	TOTAL NITROGEN	1.14
3/9/2020 11:49	Grab	PHOSPHATE, TOTAL AS P	0.09
3/16/2020 10:41	Grab	NITRATE+NITRITE-N	-0.005
3/16/2020 10:41	Grab	TOTAL NITROGEN	1.14
3/16/2020 10:41	Grab	PHOSPHATE, TOTAL AS P	0.076

Appendix D: C-43 WBSR 2008 Draft Operations Plan

Appendix E: Vendor Responses

[Vendor cost summary from April 2020 request]

Appendix F: Ranking Sensitivity Analysis

A sensitivity analysis was conducted on the weights used in the attribute ranking to evaluate the impacts of modifying the weights on the technology ranking results. The attribute ranking was assessed against the total nitrogen (TN) cost-effectiveness in a series of plots for the sensitivity analysis. The TN cost-effectiveness value remained the same since it was based on the information provided by the vendors for each technology. The highest ranked, most cost-effective technologies fall in the lower left (LL) portion of the plots. The goal of the sensitivity analysis was to determine if changing the attribute scores or weights affected which technologies were the highest ranked (in other words, falling within the LL plot sector).

F.1. Sector Plot Analysis

Figure F-1 shows the original ranking that was discussed in **Section 3.3**. As described in **Section 4.0**, the technologies with greatest cost-effectiveness and performance attributes occurring in the LL sector included treatment wetlands (STA), alum treatment (offline), Hybrid Wetlands Treatment Technology (HWTT), sand filtration, and Bold & Gold®.

Figure F-2 shows the alternatives ranked only by their scalability score. This ranking shows treatment wetlands, alum treatment, and sand filtration remaining in the LL sector, with the addition of Air Diffusion Systems (ADS), and the movement of HWTT and Bold & Gold® out to the lower right (LR) sector. The change in ranking for ADS is attributed to the proven ability and technical feasibility to install air diffusion systems in large reservoirs. The movement of HWTT and Bold & Gold® out of the LL sector is attributed to the smaller scale of existing installations.

Figure F-3 shows the alternatives ranked by their performance confidence scores. Systems with prior, long-term applications resulting in proven nutrient reductions, either in the history of Florida surface water treatment, such as treatment wetlands, HWTT, and alum treatment, or global water management, such as sand filtration, remained in the LL sector. ElectroCoagulation was present also in the LL sector, reflecting the high level of control of TN and TP anticipated with its application. Bold & Gold® moved to the LR sector, which is attributed to the need for additional performance information for nitrogen removal. ADS scored low on this attribute given the relative lack of information on nutrient reduction using this technology in Florida and elsewhere.

Figure F-4 shows the alternatives ranked by their relative abundance of case histories in Florida. Treatment wetlands, HWTT, alum treatment, sand filtration, Bold & Gold®, and ADS were in the LL sector. Other technologies moved towards this sector. Notably, MPC-Buoy, with no current Florida applications, remained in the upper right sector.

Figure F-5 shows the alternative ranked by the expected production of residuals and need for residuals management. In this scenario, treatment wetlands, sand filtration, and ADS remained in the LL sector. Bold & Gold® and HWTT moved to the border of the LL and LR sectors, as alum treatment moved to the LR sector, reflecting the expected need to manage a significant quantity of residuals. ElectroCoagulation and NutriGone™ showed lower scores on the x-axis, reflecting the lower amount of residuals to be produced (ElectroCoagulation) or an expected market for the residuals (NutriGone™).

These comparisons yielded results that indicate that the scoring and comparison technology is sensitive to input but the technologies that ranked highest in the initial ranking (i.e., treatment wetlands, HWTT, alum treatment) retained a favorable ranking consistently under different scoring emphases. Of the other technologies, Bold & Gold®, sand filtration, and ADS were more likely to enter the preferred LL sector.

F.2. Weighting Comparison

As another test of the method sensitivity, the original ranking was weighted differently in accordance with emphasis on TN, TP, or TSS removal (**Table F-1).** The original ranking is shown with a balanced emphasis for TN, TP, and TSS removal, in this case assigned a 40%-40%-20% weight (abbreviated here as 4-4-2). Adjacent to that, the rankings vary based upon a complete emphasis for TN removal (0-10-0), TP removal (10-0-0), and TSS removal (0-0-10). A review of the findings indicates that alum treatment, treatment wetland, and HWTT rankings were little changed based upon nutrient removal emphasis. Sand filtration, Bold & Gold®, and ADS maintained middle rankings, and the remaining technologies showed little variation from their relatively lower rankings.

F.3. Sensitivity Analysis Conclusion

Taken together, the two approaches to the sensitivity analysis of the scoring and ranking methodology show that the consistently top-ranked technologies for this application at the C-43 WBSR are alum treatment, treatment wetland, and HWTT. Sand filtration, Bold & Gold®, and ADS show potential as potentially complementary technologies.

Table F-1. Comparison of Composite Ranking by Weighting Scenario

Technology	4-4-2	0-10-0	10-0-0	0-0-10
Alum Treatment	1	1	1	1
Treatment Wetland	2	2	2	2
HWTT	3	3	3	3
Bold & Gold®	4	5	4	6
Sand Filtration	5	6	5	7
Air Diffusion	6	4	9	4
Electrocoagulation	7	7	6	8
NutriGone™	8	8	7	9
AquaLutions	9	9	8	10
MPC Buoy	10	10	10	5

Scenario Notes:

- 4-4-2: Baseline scenario, with ranking consisting of 40%, 40% and 20% preference for removal of TP, TN and TSS, respectively.
- 0-10-0: 100% weight on TN removal effectiveness.
- 10-0-0: 100% weight on TP removal effectiveness.
- 0-0-10: 100% weight on TSS removal effectiveness.

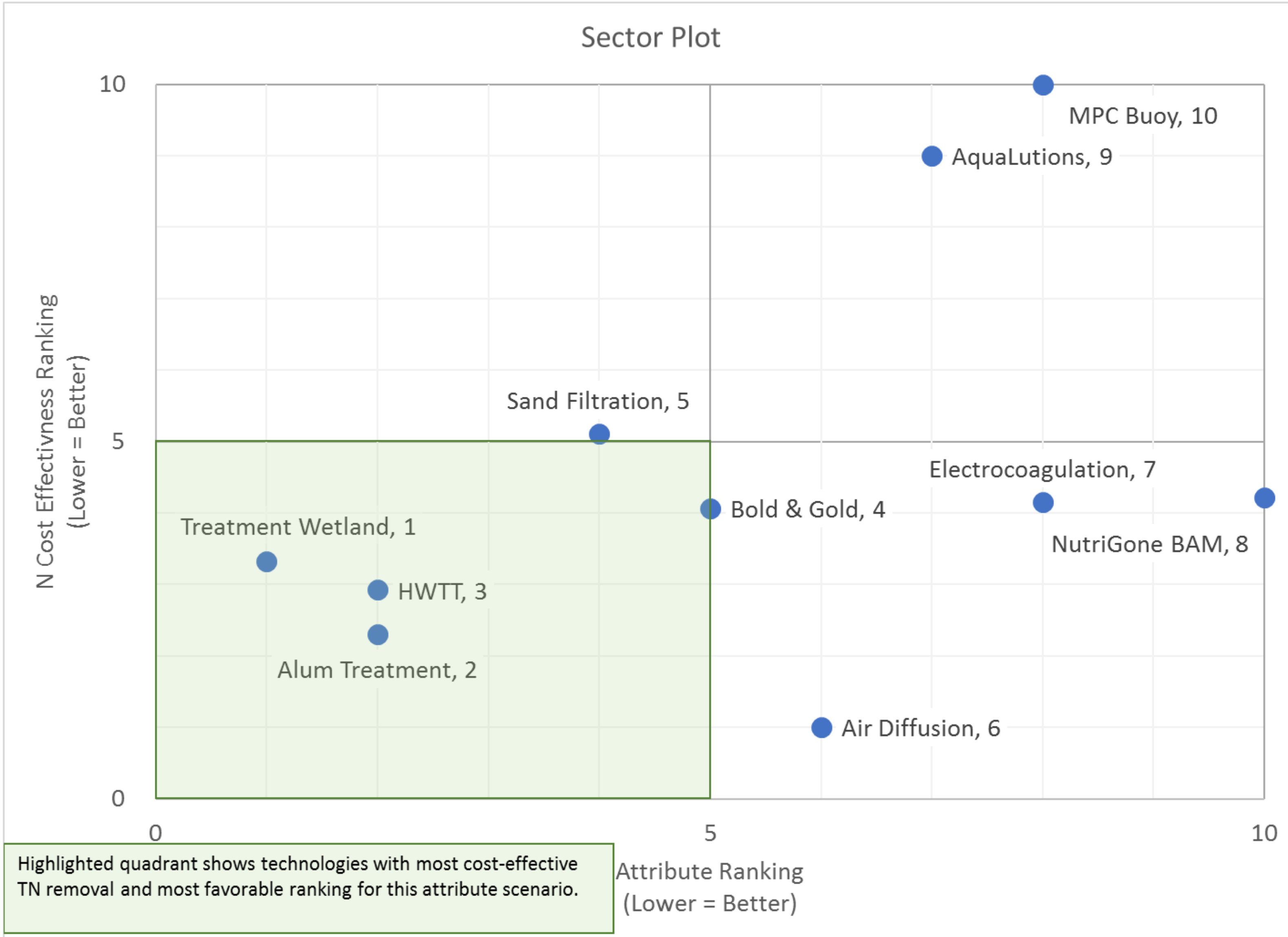

Figure F-1. Original Ranking

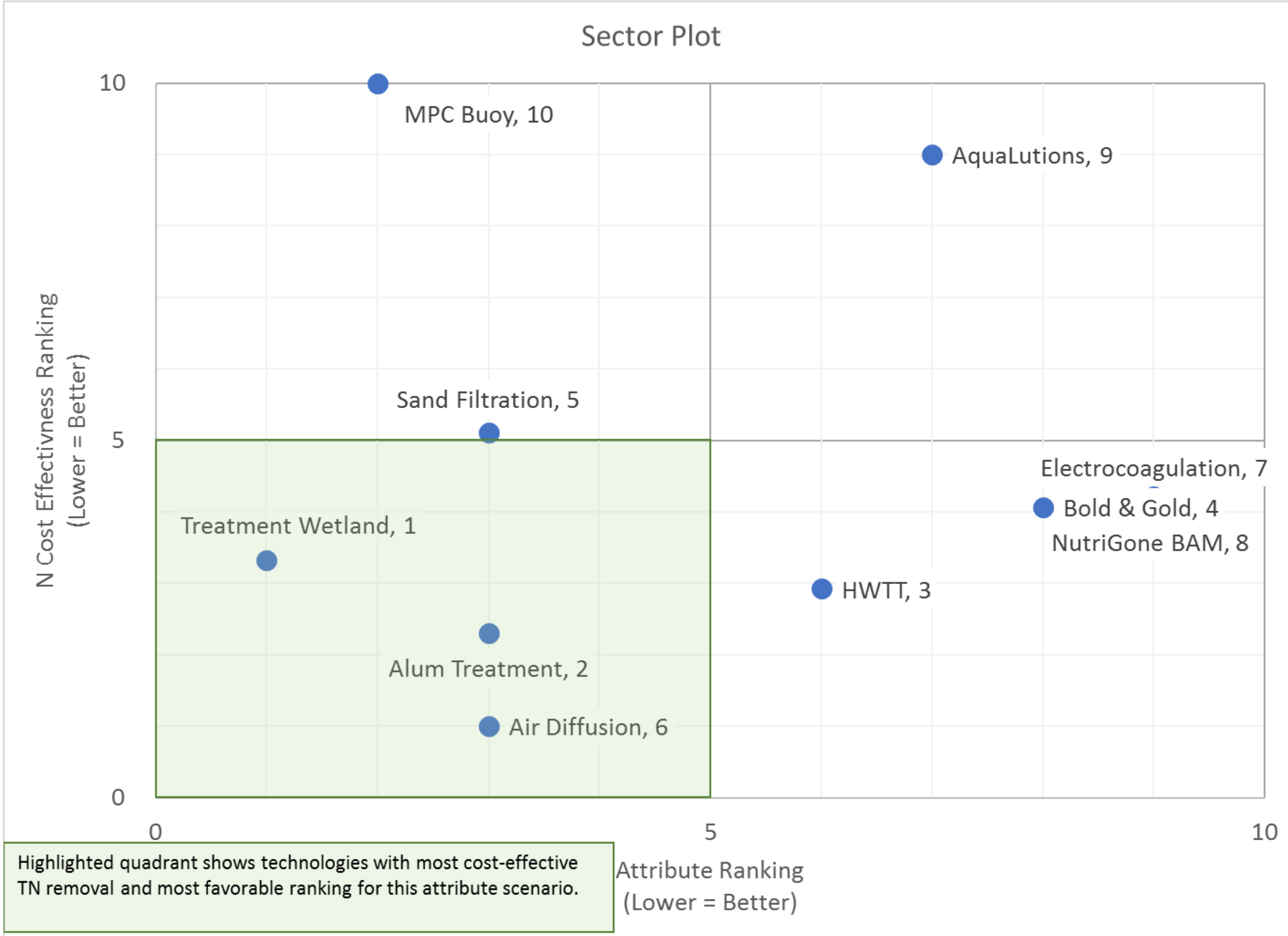

Figure F-2. Ranking Based Solely on Scalability Score

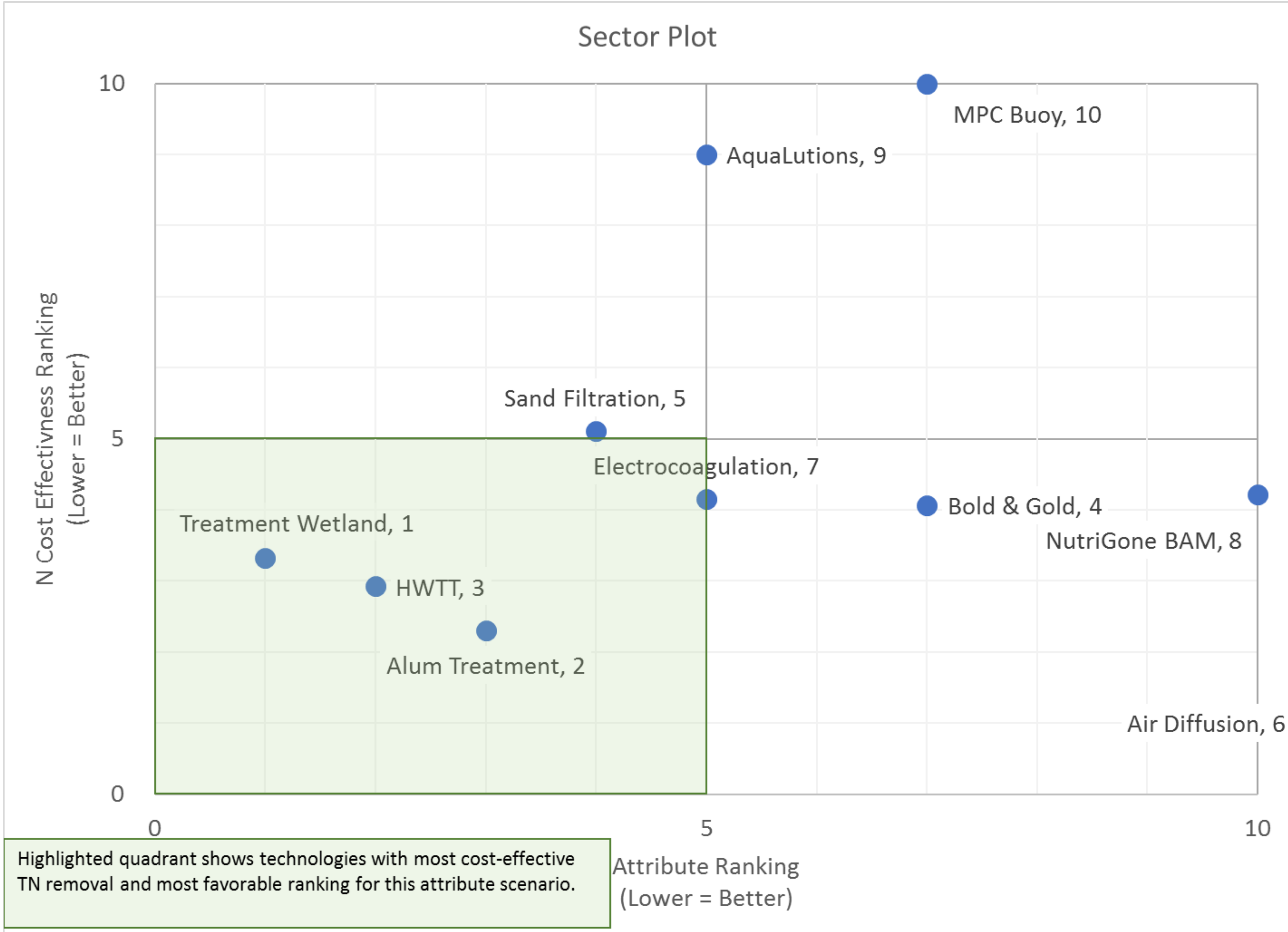

Figure F-3. Ranking Based Solely on Confidence Score

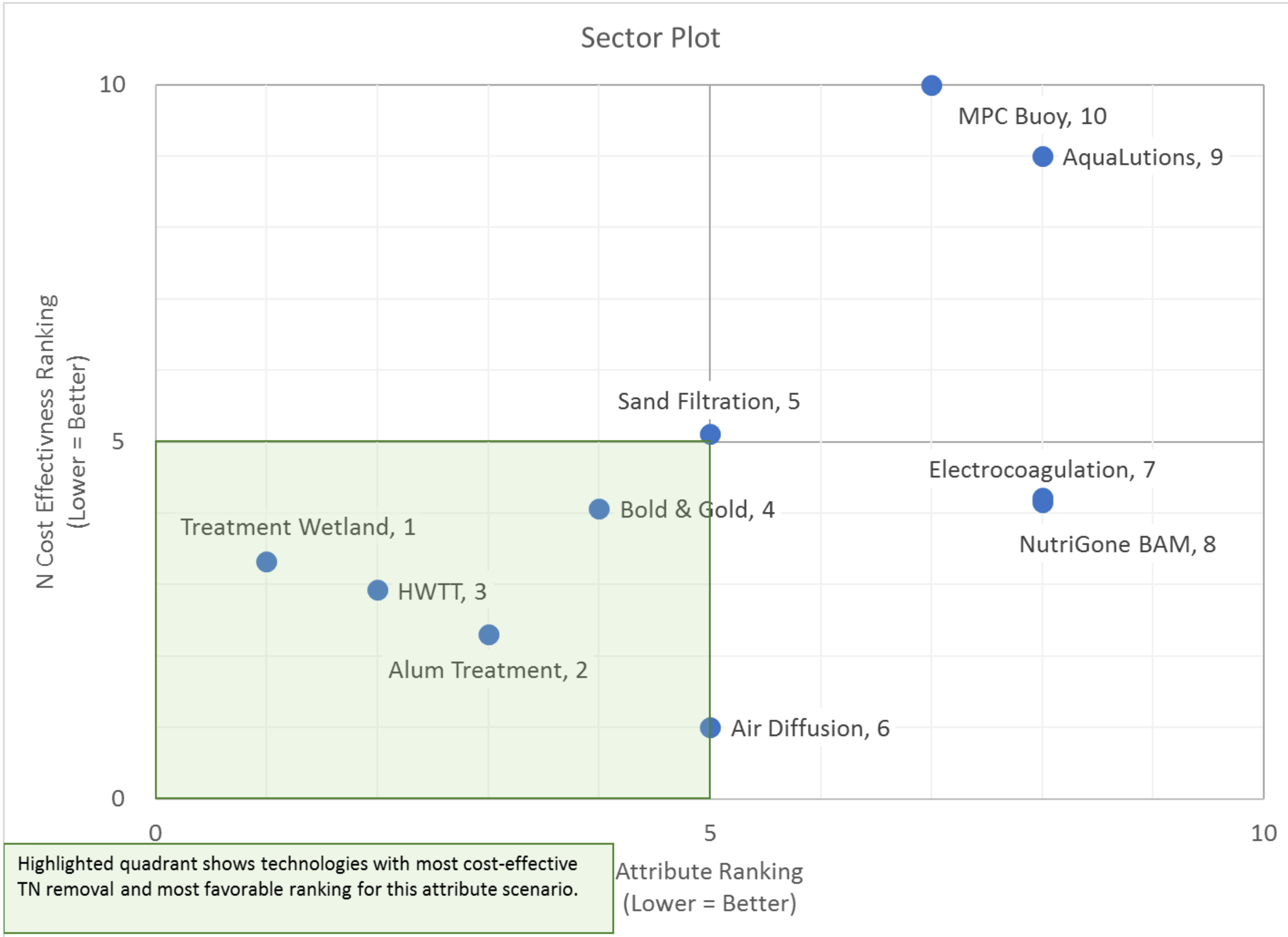

Figure F-4. Ranking Based Solely on Case History Score

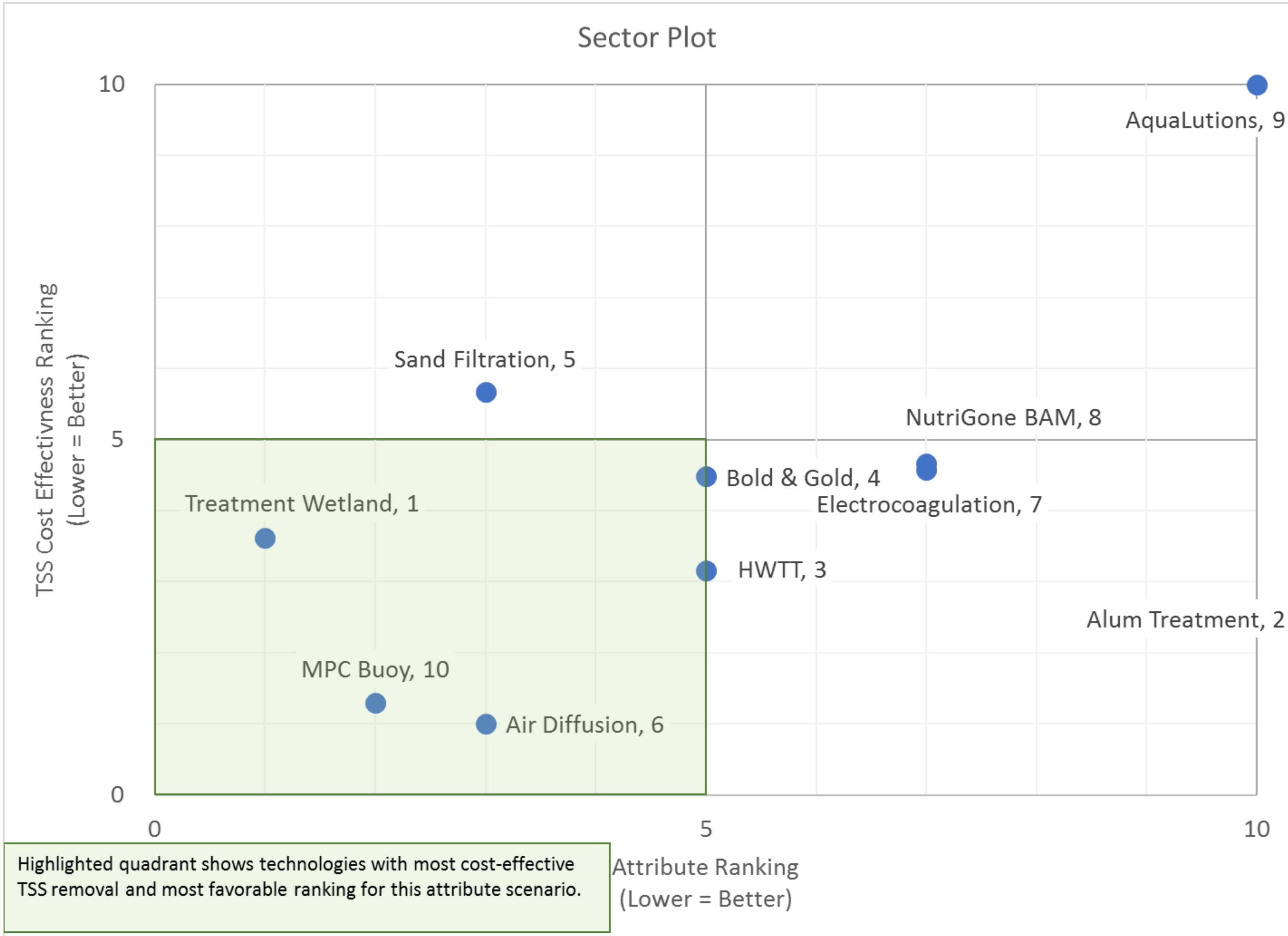

Figure F-5. **Ranking Based Solely on Residual Management Score**

Appendix G: C-43 Water Quality Alternative Treatment Technology – Pilot Study Preliminary Results