Metropolitan Water Reclamation District of Greater Chicago

MONITORING AND RESEARCH DEPARTMENT

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FINAL REPORT ON PHOSPHORUS REDUCTION AT THE JOHN E. EGAN WATER RECLAMATION PLANT

December 2010

Metropolitan Water Reclamation District of Greater Chicago

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FINAL REPORT ON PHOSPHORUS REDUCTION AT THE JOHN E. EGAN WATER RECLAMATION PLANT

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DISCLAIMER

Mention of proprietary equipment and chemicals in this report does not constitute endorsement by the Metropolitan Water Reclamation District of Greater Chicago.

SUMMARY AND CONCLUSIONS

In order to study the effects of phosphorus (P) reduction at the Egan WRP, the Metropolitan Water Reclamation District of Greater Chicago (District) conducted the Salt Creek Phosphorus Reduction Demonstration Project (Project). The mean total phosphorus (TP) concentration in Egan WRP final effluent during 2005 (from daily 24-hour composite samples) was 3.3 mg/L, with a range of 1.0 - 5.9 mg/L, and 3.7 mg/L in 2006, with a range of 0.9 - 8.22 mg/L. Ferric chloride ($FeC1_3$) chemical treatment was employed between February 5, 2007, and December 23, 2008, in order to reduce the final effluent P concentration to approximately 0.5 mg/L. The mean TP concentration between February 6 - December 31, 2007, in Egan WRP final effluent was 0.35 mg/L, and the mean TP concentration during 2008 was 0.43 mg/L.

Effects of Phosphorus Reduction on Receiving Stream

Water and sediment quality, biological, and physical habitat data were collected from Salt Creek during 2005 and 2006 to assess pre-P reduction conditions and to be used as a baseline for subsequent comparisons. These data were also collected in 2007 and 2008 following P reduction at Egan. There were three monitoring stations along Salt Creek, one upstream of the Egan WRP outfall (Busse Lake Dam) and two downstream (J. F. Kennedy [JFK] Boulevard and Thorndale Avenue). Water quality was assessed once per month during the winter and twice per month for the rest of the year. Hourly measurements of dissolved oxygen (DO), temperature, pH, turbidity, and conductivity were logged by continuous water quality monitors installed at the three stations. Biological collections of fish and macroinvertebrates, as well as sediment chemistry and physical habitat assessments, took place once each summer.

Notable findings from the Project with regard to the receiving stream were as follows:

- Mean TP concentrations were lowest at Busse Lake Dam (0.21 mg/L before P reduction and 0.11, mg/L during after). The mean TP concentrations at JFK Boulevard were 2.47 mg/L prior to Egan P reduction and 0.26 mg/L post-P reduction. At Thorndale Avenue, mean TP measured 2.29 mg/L and 0.27 mg/L before and after P reduction, respectively.

- During 2006, continuous DO monitoring indicated that 2.4 and 1.4 percent of hourly measurements at Busse Lake Dam and Thorndale Avenue, respectively, were below the Illinois Pollution Control Board (IPCB) Water Quality Standard of 5.0 mg/L. There were no violations of the IPCB standard for DO at JFK Boulevard during 2006. During 2007, 2.1, 1.3, and 1.6 percent of hourly DO measurements were below 5.0 mg/L at Busse Lake Dam, Thorndale Avenue, and JFK Boulevard, respectively. DO violations occurred 1.3, 0.4, and 0.5 percent of the time at Busse Lake Dam, Thorndale Avenue, and JFK Boulevard, respectively, during 2008.

- Diel fluctuations of DO, indicating the presence of algae, occurred at all three stations before and after the P reduction.

- During all four years, chlorophyll *a* concentrations in the water column were highest upstream of the Egan WRP outfall and were diluted by Egan WRP effluent.

- Before and after Egan P reduction, algae in this system did not appear to be limited by nutrient concentrations but rather by habitat conditions, such as light availability and residence time.

- The total number of fish collected, as well as number of fish species collected, were highest upstream of the Egan WRP and decreased at downstream stations. The Index of Biotic Integrity (IBI) scores were variable between stations and from year to year but were generally in the "fair" range.

- The benthic invertebrate species richness, Ephemeroptera, Plecoptera, and Tricoptera (EPT) taxa richness, and Macroinvertebrate Biotic Index (MBI) varied slightly year to year but were not substantially different before and after P reduction at Egan.

- There was no apparent stream response to lower P in the water column.

Effects of Phosphorus Reduction on Treatment Plant Operation

A full-scale P removal test was separated into two phases with respect to the location of the $FeCl_3$ injection. In Phase I, which was conducted from February 5, 2007, - May 20, 2008, $FeCl_3$ was injected into the end of each aeration tank with P removal taking place primarily in the secondary treatment system. The $FeCl_3$ dosing rate ranged from 1.16 gallons per minute (gpm) - 1.32 gpm and was adjusted four times to optimize the chemical usage while meeting the target effluent TP level. The TP concentration in the final effluent averaged 0.31 mg/L with a range of 0.06 mg/L - 1.28 mg/L, excluding the period of test interruption from July 20 - 30, 2007. The chemical sludge generated during the P removal was withdrawn with the waste-activated sludge (WAS). The quantity of daily sludge withdrawn was quite variable because of the variations of sludge inventory of the system, chemical sludge generation relating to P removal, and the maintenance of sludge retention time (SRT) for operational purposes. The chemical sludge yield due to P removal in this phase was estimated using a mass balance approach.

In Phase II, which was conducted from May 21 - December 23, 2008, $FeCl_3$ was injected into the influent of the primary settling tanks (PSTs), and P removal mainly happened in the primary treatment system. The $FeCl_3$ dosing rate started at 1.0 gpm to avoid causing a potential nutrient deficiency to the secondary treatment system. The dosing rate was increased stepwise from 1.0 gpm - 1.32 gpm over the course of five weeks to meet the target TP level in the final effluent. After the initial testing stage, three different $FeCl_3$ dosing rates were applied, varying from 1.18 gpm - 1.32 gpm, in Phase II. The average TP concentration in the final effluent, excluding the initial testing period and other short interruptions, was 0.46 mg/L with a range of 0.09 mg/L - 1.38 mg/L. The chemical sludge generated during the P removal was withdrawn with the primary sludge, which was thickened in the PSTs and sent to the anaerobic digesters

directly. The chemical sludge yield due to P removal in this phase was estimated by comparing the data in the periods with and without P removal because of the lack of sufficient information for a mass balance approach.

There was no adverse impact of $FeCl_3$ addition for P removal on the effluent quality with respect to meeting the current National Pollutant Discharge Elimination System (NPDES) permit for the final effluent of the Egan WRP during either phase. However, the lowest pH measured at the discharge point was 6.4 during Phase I when $FeCl_3$ was added to the secondary treatment system. The pH value would be out of the NPDES permit range if the permit range were changed to 6.5 to 9.0 from the current range of 6.0 to 9.0. The impurity of $FeCl_3$ caused the daily manganese (Mn) concentration to exceed the ambient water quality standard for Mn, which is 1.0 mg/L for general use waters in Illinois, twice in nearly two years of the P removal test.

The $FeCl_3$ addition for P removal appeared to cause little negative impact on liquid treatment unit processes. Adding $FeCl_3$ to the secondary treatment system for P removal resulted in the accumulation of inorganic solids (IS) in the system, which led to an increase in mixed liquor suspended solids (MLSS) for maintaining a sufficient quantity of volatile solids (VS) for normal operation but did not cause inhibition of nitrification, even though the soluble P (Sol-P) concentration in the system fell as low as 0.15 mg/L. The amount of $FeCl_3$ added for removing P to the target level of 0.5 mg/L of TP did not improve the settling of MLSS in the secondary clarifiers when the chemical was added into the secondary treatment system but increased five-day biochemical oxygen demand (BOD_5) and suspended solids (SS) removal efficiencies in the PSTs when the chemical was added to the primary influent.

After evaluation of the data collected during the P removal tests, the following conclusions can be drawn:

- Removing P to 0.5 mg/L of TP in the final effluent is achievable by adding $FeCl_3$ to either the aeration tank or primary influent if the existing clarifiers or settling tanks have excess capacity with respect to solids loading.

- $FeCl_3$ can be added, at a molar ratio (Fe:Sol-P) of 2.2 to the mixed liquor (ML) using secondary clarifiers or 2.3 to primary influent using PSTs for precipitating particulate P, to achieve effluent TP concentration of 0.5 mg/L. It appeared that if $FeCl_3$ is added to the aeration tanks, slightly less chemical is needed to achieve the target TP level in the final effluent.

- The addition of $FeCl_3$ has little negative impact on effluent quality. Alkalinity was reduced and pH dropped slightly. Impurity of the $FeCl_3$ solution used for P removal may cause the exceedance of the ambient water quality standards for certain metals in the final effluent.

- The inorganic content of the MLSS increased from 16 percent to 37 percent after $FeCl_3$ was added to the aeration tanks, which resulted in maintaining higher than normal MLSS in the aeration tanks. However, when $FeCl_3$ was added to the primary influent, lower than normal MLSS could be used in the aeration tanks because of increased removal of BOD_5 by the PSTs.

- The chemical sludge yield, defined as pounds of IS produced per pound of $FeCl_3$ added (lb IS/lb $FeCl_3$), ranged from 0.68 to 1.01 lb IS/lb $FeCl_3$ for each period of relatively constant $FeCl_3$ dosing rates during Phase I and from 0.81 to 0.87 lb IS/lb $FeCl_3$ during Phase II. Coincidently, the time-weighted average value of chemical sludge yield was 0.83 lb IS/lb $FeCl_3$ in both phases.

Effects of Phosphorus Reduction on Solids Processing

Experimental data for gravity belt thickener (GBT) operations and appropriate plant data for GBT, anaerobic digestion, and dewatering operations were compiled and grouped into four phases:

Phase 0: background data (1/1/06 through 12/31/06 or 1/22/07 through 2/5/07)

Phase I: $FeCl_3$ application in ML (2/6/07 through 5/20/08)

Phase II: $FeCl_3$ application in PSTs (5/21/08 through 12/24/08)

Phase III: post-$FeCl_3$ application (12/25/08 through 3/12/09).

The experimental data were compared against the background data in order to evaluate the impact of $FeCl_3$ addition for P removal on the solids process train.

Addition of $FeCl_3$ did not adversely impact the solids process train, including GBT thickening operations. Average additional solids production of approximately 40 and -29 percent occurred in Egan waste-activated sludge (E-WAS) during Phases I and II, respectively. Average additional solids production of approximately 9 and 38 percent occurred in PS during Phases I and II, respectively.

Additional inorganic solids in digester feed did not cause operational upsets. However, it did impact the performance as measured by the decrease in percent VS reduction and gas production. Decreased VS reduction was observed throughout the study. Significant reduction in gas production occurred, but we could not verify that the reduction in gas production was entirely due to $FeCl_3$ application. A partial reduction in gas production could be attributed due to the change in gas accounting and recording procedure during the experiment.

The addition of $FeCl_3$ in the process had a positive effect on the hydrogen sulfide (H_2S) content of digester gas. The average production of H_2S gas was reduced approximately tenfold from 250 ppm during the background period to 29 ppm during the $FeCl_3$ addition period.

Due to addition of $FeCl_3$ for P removal, polymer consumption in dewatering operations decreased by 16 percent during Phase I and 23 percent during Phase II. Average suspended solids in centrate decreased 36 percent during Phase I and increased 30 percent during Phase II. Cake solids increased by 5 and 10 percent during Phases I and II, respectively.

Overall, no operational problems or concerns with respect to thickening, digestion, or dewatering operations were recorded during the entire project.

Based on the data analysis, the following conclusions were drawn:

1. Addition of $FeCl_3$ did not adversely impact the solids process train, including GBT thickening operations.

2. Average additional solids production of approximately 40 and -29 percent occurred in E-WAS during Phases I and II, respectively. Average additional solids production of approximately 9 and 38 percent occurred in PS during Phases I and II, respectively. Total additional inorganic sludge from PS and GBT draw was found to be 3.01 dry tons (DT) during Phase I, 4.06 DT during Phase II, and -0.10 DT during Phase III.

3. Average TS concentrations in filtrate increased by 28, 3, and 31 percent during Phases I, II, and III, respectively.

4. Additional inorganic solids in digester feed did not cause operational upsets. However, it did impact the performance as measured by the decrease in percent VS reduction and gas production. Decrease in VS reduction occurred throughout the study. Significant reduction in gas production occurred, but we could not verify that the reduction in gas production was entirely due to $FeCl_3$ application.

5. Application of $FeCl_3$ helped curb the production of H_2S, thereby alleviating the odor problem. Average H_2S concentration reduced approximately tenfold from 250 ppm during the background period to 29 ppm during Phases I and II.

6. Polymer consumption decreased by 16 percent during Phase I and 23 percent during Phase II. Average suspended solids in centrate decreased 36 percent during Phase I and increased 30 percent during Phase II. Cake solids increased by 5 percent during Phase I and 10 percent during Phase II.

Effects of Phosphorus Reduction on Biosolids Quality

The Biosolids Utilization and Soils Science Section conducted laboratory analysis, a greenhouse experiment, and a simulated runoff study to evaluate the impact of chemical P removal on plant bioavailability and potential of runoff losses on land amended with the biosolids.

The following conclusions can be drawn about the effects of P reduction on biosolids:

- P reduction increased the P content of biosolids, but the increased P is bound to iron (Fe), which decreases the bioavailability of P and reduces the potential loss through runoff.

- The biosolids generated through $FeCl_3$ P reduction at the Egan WRP could be land applied at rates even higher than that of conventional biosolids without increasing the potential P runoff.

INTRODUCTION

In June 1998, the United States Environmental Protection Agency (USEPA) developed a national strategy for the development of regional nutrient criteria. Since August 2001, the Illinois Environmental Protection Agency (IEPA) has been developing nutrient standards for surface waters in the state of Illinois through a working group consisting of representatives from many agencies and interested parties. To complete this task, the IEPA initiated and coordinated numerous studies to collect scientific data to be used as the foundation for the development of nutrient standards. Based on their discussions with the IEPA, the District agreed to conduct a large-scale P reduction demonstration project that couples a full-scale P removal study at its Egan WRP with a comprehensive water quality monitoring program in Salt Creek, the receiving stream for Egan WRP effluent. The goal of the project was to enhance the understanding of the effects of reducing the P level to 0.5 mg/L at the Egan WRP on water and sediment chemistry and aquatic communities in Salt Creek, as well as the effects on plant operations, solids production, and biosolids quality.

To conduct a demonstration study on its receiving water to assess the impact of TP reduction on biota, the Egan WRP needed to reduce TP concentrations in its final effluent from an average of 3.7 mg/L to a target TP level of 0.5 mg/L. To reduce P concentration in the Egan WRP's effluent consistently to this target level, either a biological or a chemical P removal process would be utilized (Water Environment Federation [WEF], 1998). The plant needed an infrastructure retrofit to adopt the nutrient removal process. With biological methods, a major modification of the aeration tanks, which would incur significant capital cost, would be required, and normal plant operation would be interrupted. To expedite the retrofit, minimize the capital cost of the P removal demonstration project, and prevent interrupting normal plant operations, a chemical P removal process using $FeCl_3$ was selected. $FeCl_3$ would be added to the wastewater to form particulate P, which would be precipitated in the existing settling tanks. The retrofitting for P removal at the plant was complete in 2006, and the P removal process at the Egan WRP started in early February 2007. The P reduction demonstration study lasted nearly two years.

The remainder of this report is separated into four sections:

I. Effects of P Reduction on Receiving Stream

II. Effects of P Reduction on Treatment Plant Operation

III. Effects of P Reduction on Solids Processing

IV. Effects of P Reduction on Bioavailability and Loss Potential of P in Biosolids

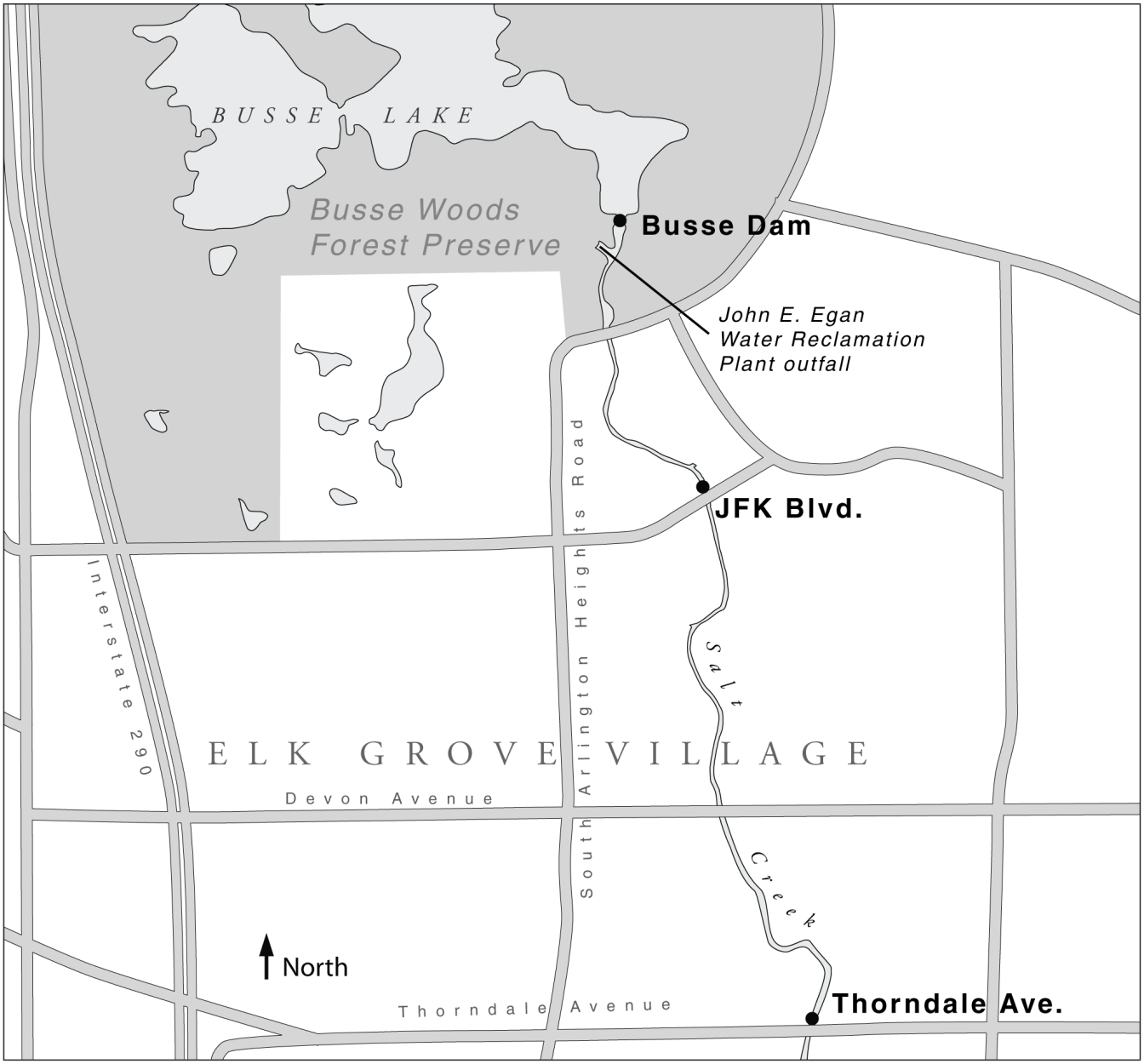
SECTION I: EFFECTS OF PHOSPHORUS REDUCTION ON RECEIVING STREAM

INTRODUCTION

The goal of this study was to enhance understanding of the effects of P reduction to 0.5 mg/L at the Egan WRP on water and sediment chemistry and aquatic communities in Salt Creek (the receiving stream for Egan WRP effluent).

Comprehensive water quality monitoring was implemented in Salt Creek in February 2005 in order to assess baseline conditions prior to P removal. In addition, macroinvertebrate, fish, and sediment samples were assessed once each summer during 2005 - 2008. Three monitoring stations were chosen on Salt Creek (Figure I-1). Station 1 at Busse Reservoir Dam is approximately 0.1 mile upstream of the Egan WRP effluent outfall, Station 2 at JFK Boulevard is approximately 0.7 mile downstream of the outfall, and Station 3 at Thorndale Avenue is approximately 2.4 miles downstream of the outfall. In addition, a 24-hour composite sample of the final effluent from the Egan WRP was collected and analyzed Monday - Friday. Additional water quality and biological data were collected on Salt Creek downstream of the Egan WRP at the District's Ambient Water Quality Monitoring (AWQM) Program sampling stations, including Devon Avenue, Wolf Road, and Brookfield Avenue. This report will generally focus on data from the three Salt Creek Nutrient Demonstration Project stations, although biological data from Devon Avenue was also considered.

FIGURE I-1: SALT CREEK PHOSPHORUS REDUCTION DEMONSTRATION PROJECT SAMPLING STATIONS



MATERIALS AND METHODS

Water Samples

Water grab samples were taken in a clean bucket from the center of the waterway. Samples were poured off into appropriate containers and kept in a dark, ice-packed cooler immediately after collection until delivery to the ALD. Water quality constituents measured, as well as analytical methods utilized, are listed in Table I-1.

Twenty-four hour composite samples of final effluent from the Egan WRP were analyzed for total suspended solids (TSS), BOD_5, carbonaceous biochemical oxygen demand ($CBOD_5$), TP, total Kjeldahl nitrogen (TKN), ammonia-nitrogen (NH_3-N), nitrite-nitrogen (NO_2-N), and nitrate-nitrogen (NO_3-N) at the EAL. An aliquot of the 24-hour composite final effluent sample was obtained from the Egan WRP the day after each scheduled Salt Creek stream sampling event and analyzed for ortho-phosphate and turbidity at the Stickney WRP Analytical Laboratory. During wet weather sampling events that ended on a Friday, Egan WRP final effluent grab samples were obtained for ortho-phosphate and turbidity analysis. However, data for the other constituents were not available for Egan effluent on these days (composite samples are not analyzed on the weekends).

Sampling Frequency. Stream water sampling occurred once per month during December through March and twice per month during April through November. In addition, wet weather event sampling was conducted for four consecutive days following major rain events in July and October of 2005; April, May, and August of 2006; and April through May, June, and August of 2007. Due to scheduling problems, only one rain event was sampled in 2008 during April and May.

Sediment Samples

Sediment samples were collected once each summer during 2005 - 2008 using a 6- x 6-inch petite ponar grab sampler. Samples were taken from the side and center of Salt Creek at each station and homogenized before being scooped into a glass quart bottle. Bottles were kept on ice before delivery to the Stickney Analytical Laboratory for analysis. Chemical constituents measured in sediments were as follows: TS, total VS, NH_3-N, NO_3-N and NO_2-N, TKN, and TP.

Sediment samples during 2006 - 2008 had to be taken downstream of the Egan WRP outfall due to difficulty in obtaining ponar samples at the Busse Lake Dam. While this excludes the use of the Busse Lake Dam sediment chemistry data for an upstream control, we can consider the data as another source of information on the effects of P reduction downstream of the Egan WRP.

TABLE I-1: SALT CREEK NUTRIENT DEMONSTRATION PROJECT WATER QUALITY CONSTITUENTS MEASURED AND ANALYTICAL METHODS

Water Quality Constituent	Analytical Method	Method Reference
Water Temperature	Electrode[1]	SM 2550 B
Total Phosphorus	Colorimetric	EPA 365.4
Ortho-Phosphate	Colorimetric	EPA 365.1
Ammonia-Nitrogen	Colorimetric	EPA 350.1
Nitrate-Nitrogen	Colorimetric	EPA 353.2
Nitrite-Nitrogen	Colorimetric	EPA 353.2
Total Kjeldahl Nitrogen	Colorimetric	EPA 351.2
Turbidity	Nephelometric[2]	SM 2130 B
Carbonaceous BOD_5	Membrane Electrode	SM 5210 B
Chemical Oxygen Demand	Colorimetric	SM 5220 D
Total Suspended Solids	Gravimetric	SM 2540 D
Volatile Suspended Solids	Gravimetric	SM 2540 E
Chlorophyll *a*	Spectrophotometric	SM 10200-H
pH	Electrode[1]	SM 4500-H B
Dissolved Oxygen	Iodometric[2]	SM 4500-O C

[1]Field measurement taken during water sampling events and continuously monitored since installation of water quality monitor.
[2]Method used prior to continuous water quality monitoring installation.

Biological Parameters

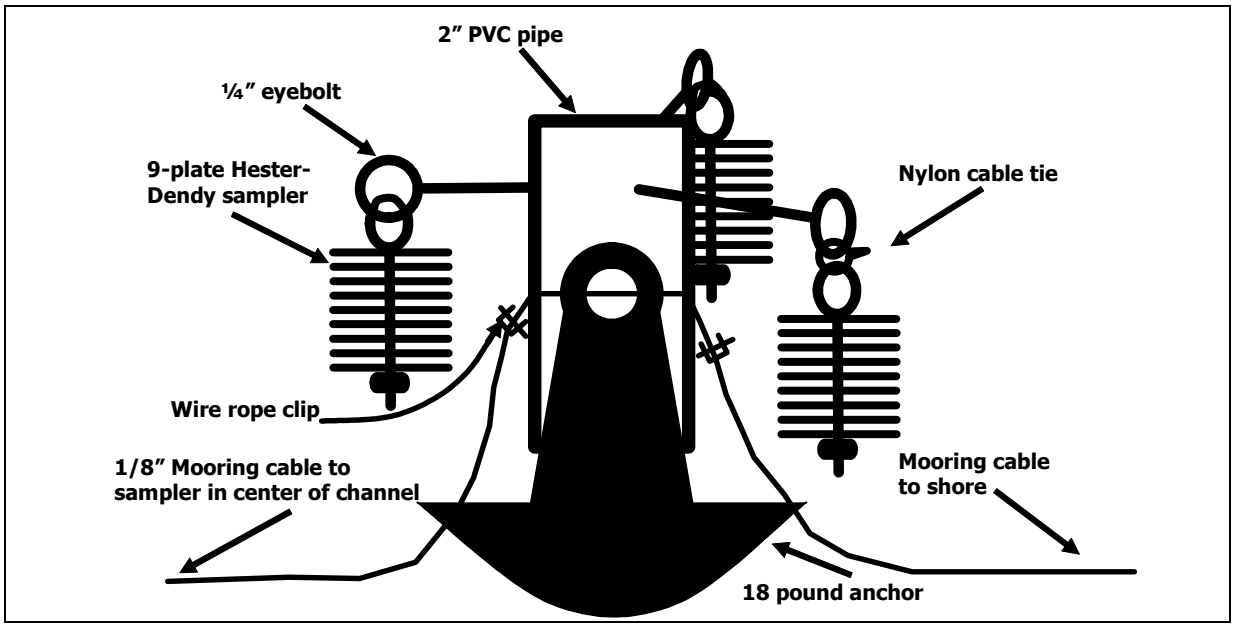
Fish. Backpack electrofishing and seining were performed in the upstream direction along a 40-meter stretch on each bank of the three sampling stations during 2005 - 2008. At JFK Boulevard and Thorndale Avenue, fishing began at the street bridge; at Busse Lake Dam, the fishing range was downstream of the dam. A Smith-Root LR-24 model backpack electrofisher and a 15-foot seine net with a 3-foot nylon bag and 3/16-inch mesh were employed. Whenever possible, fish were identified, weighed, and measured in the field by an Aquatic Ecology and Water Quality Section (AEWQ) Biologist and subsequently released. Minnows and unique specimens were fixed in 10 percent formalin and brought back to the laboratory for identification and measurement. All fish were checked for abnormalities and diseases, which were recorded on field data sheets.

Index of Biotic Integrity. Biological integrity of aquatic ecosystems has been defined as the ability to support and maintain a balanced, integrated, and adaptive community having a species composition, diversity, and a functional organization comparable to that of a natural habitat (Karr et al., 1986). Karr's 1986 IBI was used to analyze fish data from Salt Creek. The limitations of using this tool when catch numbers are very low should be recognized. Karr's IBI integrates information from 12 fish community metrics that fall into three major categories: (1) species richness and composition; (2) trophic composition; and (3) fish abundance and condition. Each metric is scored as a 1, 3, or 5 based on whether its evaluation deviates strongly, deviates somewhat, or approximates expectations, respectively, as compared to an undisturbed site located in a similar geographical region and on a stream of comparable size. Individual metrics are added to calculate a total IBI score. A high IBI indicates high biological integrity or health and low disturbance or lack of perturbations. A low IBI indicates low biological integrity and high disturbance or degradation. Separate IBI metric scores were determined based on the relative abundance of fish collected with each fishing gear. IBI categories of good (IBI 41-60), fair (IBI 21-40) or poor (IBI <21), as derived by the IEPA (IEPA, 1996), were determined and reported.

Benthic Invertebrates. Benthic invertebrate communities were assessed during the summers of 2005 - 2008 using grab sediment samples as well as Hester Dendy larval plate samples. Three samples were taken from the side and center of the waterway with a 6- x 6-inch petite ponar grab sampler and sieved in buckets with #60 screens. The remaining sample was collected in a plastic gallon bottle, filled with river water, and fixed to a final concentration of 10 percent formalin and bicarbonate. Hester Dendy larval plates were assembled and attached to an 18-pound river anchor (Figure I-2). Sample set-ups were located in the side and center of the waterway and attached to on-shore trees by a cable. Samplers remained in place for at least six weeks before being removed from the anchor and placed in a leak-proof gallon container (filled with river water and fixed to final concentration of 10 percent formalin and bicarbonate).

Hester Dendy larval samplers were not installed at the JFK Boulevard station because of previous vandalism at that site. Larval invertebrate community data from the Devon Avenue AWQM Program station, which is approximately one mile downstream of JFK Boulevard on Salt Creek, were substituted. During the summer of 2005, Hester Dendy larval samplers were

FIGURE I-2: CONFIGURATION OF HESTER DENDY LARVAL PLATE SAMPLER



stolen from the Busse Lake Dam station. Because of lack of concealed areas in which to place the Hester Dendy samplers, as well as difficulty obtaining ponar samples at the Busse Lake Dam, benthic invertebrate samples during 2006 - 2008 had to be taken downstream of the Egan WRP outfall. While this excludes us from using the Busse Lake Dam invertebrate data as an upstream control, we can consider the data as another source of information on the effects of P reduction downstream of the Egan WRP.

Taxonomic identification of benthic invertebrates was performed to species (when possible) by EA Engineering, Science and Technology, with the exception of oligochaetes, which were counted by trained AEWQ personnel.

The total number of benthic invertebrate species (species richness) was tallied along with EPT taxa richness. EPT refers to three relatively intolerant taxonomic orders of benthic invertebrates: Ephemeroptera (mayflies), Plecoptera (stoneflies), and Trichoptera (caddisflies). In addition, the MBI, which reflects taxon tolerance weighted by abundance, was calculated for each sampling event and sampling method as follows:

$$MBI = \sum (n_1 * t_1) / N$$

Where,

n = Number of individuals of a specific taxon

t = Tolerance value assigned to taxon

N = Total number of individuals in sample

Tolerance values representing an organism's tolerance to deoxygenating conditions were obtained from Appendix A of an IEPA draft document, "Computation of the Macroinvertebrate IBI," and utilized for this calculation. MBI scores range from 0 - 11, with zero indicating relatively pristine conditions and eleven the most degraded.

Physical Habitat

Field data sheets describing physical habitat conditions at the stations were completed once each year concurrent with the fish sampling (Figure I-3). Data sheets were completed for the side and center of the waterway at the beginning and end of the fishing area (40-meter stretch). Algal and macrophytic coverage was assessed at this time, along with sediment composition, riparian coverage, erosion conditions, canopy coverage, and other physical characterizations.

FIGURE I-3: METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO PHYSICAL HABITAT ASSESSMENT

Date _____ **Time** _____ **Station Number** _____

Station Name _____ **Latitude** _____

Waterbody _____ **Longitude** _____

Assessment Observer (s) _____

Weather Conditions SUNNY CLOUDY RAIN (circle one)

Stream Order _____ **Assessment Location** BEGINNING END (circle one)

Assessment Location Facing Upstream LEFT CENTER RIGHT (circle one)

Channel Habitat POOL RUN RIFFLE (circle one)

Water Depth (ft) _____ **Channel Width** (ft) _____

Water Level LOW NORMAL HIGH FLOODED (circle one)

Man-made Structures DAM RIPRAP BRIDGE LEVEE ISLAND OUTFALL SHEET PILING OTHER _____ (Specify) (circle all applicable)

Channelization YES NO (circle one)

Bank Erosion NONE SLIGHT MODERATE SEVERE (circle one)

Floatable Materials YES ⇩ NO (circle one)
If YES, characterize (circle all applicable)

STREET LITTER SANITARY SEWAGE VEGETATIVE MATERIAL

Aquatic Vegetation YES ⇩ NO (circle one)
If YES, is vegetation (circle all applicable)

ROOTED EMERGENT ROOTED SUBMERGENT ROOTED FLOATING

ATTACHED ALGAE FLOATING ALGAE OTHER _____ (Specify)

Instream Cover for Fish (circle all applicable)

AQUATIC VEGETATION BOULDERS BRUSH-DEBRIS JAMS LOGS

SUBMERGED TREE ROOTS SUBMERGED TERRESTRIAL VEGETATION

UNDER CUT BANK ROCK LEDGE OTHER _____ (Specify)

Canopy Cover OPEN PARTLY SHADED SHADED (circle one)

Immediate Shore Cover		**Riparian Land Use**	
DENUDED	_____ %	GRASSLAND	_____ %
GRASSES	_____ %	URBAN RESIDENTIAL	_____ %
SHRUBS	_____ %	URBAN COMMERCIAL/INDUSTRIAL	_____ %
TREES	_____ %	WETLAND	_____ %
OTHER (Specify)		FOREST	_____ %
_____	_____ %	ROW CROPS	_____ %
		OTHER _____ (Specify)	_____ %

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FIGURE I-3 (Continued): METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO PHYSICAL HABITAT ASSESSMENT

Station Number _____

Sediment Compostion			
	Plant Debris	_____	%
	Clay	_____	%
	Inorganic Silt	_____	%
	Organic Sludge	_____	%
	Sand (0.06 mm to 2 mm diameter)	_____	%
	Gravel (>2 mm to 64 mm diameter)	_____	%
	Cobble (>64 mm to 256 mm diameter)	_____	%
	Boulder (>256 mm diameter)	_____	%
	Bedrock or Concrete	_____	%

Sediment Color _____ **Sediment Odor** _____

Oil in Sediment NONE LIGHT MODERATE HEAVY (circle one)

Embeddedness NONE NORMAL MODERATE EXTENSIVE (circle one)

Sinuosity NONE LOW MODERATE HIGH (circle one)

Depth of Fines (In feet using 1 inch diameter probe) _____

Photo Numbers Looking Upstream _____ Looking Downstream _____

Site Location/Map (Draw a map of the site and indicate the area assessed)

Additional Remarks _____

(Complete both sides of page) Page 2

Continuous Dissolved Oxygen Monitoring

YSI Model 6920 or Model 6600 water quality monitors have been installed and continuously monitor (hourly) DO at JFK Boulevard and Thorndale Avenue since August of 2005 and at Busse Lake Dam since October of 2005. Prior to continuous monitoring, grab water samples were analyzed for DO in accordance with the aforementioned water-sampling schedule. Water quality monitors also measured turbidity, conductivity, water temperature, and pH. Field monitors were replaced weekly with calibrated, cleaned, and serviced monitors. Monitor maintenance and data review followed an approved quality assurance project plan and are outlined in the report entitled, "Continuous Dissolved Oxygen Monitoring in the Chicago Waterway System During 2004" (Minarik *et al*., 2005).

RESULTS AND DISCUSSION

Water Quality

Average and range values for water quality constituents measured during scheduled sampling events before and after P reduction are shown in Tables I-2 - I-5. Upstream of the Egan WRP at Busse Lake Dam, high TP and ortho-phosphate values on August 17 caused the 2005 means to be much higher than in other years. Excluding this data point results in mean TP and ortho-phosphorus concentrations of 0.13 and 0.069 mg/L, respectively. The complete water chemistry data can be found in Appendix AI, Tables AI-1 - AI-3.

During 2005, several samples from Busse Lake Dam and, to a lesser extent, the other two sampling stations exhibited higher ortho-phosphorus than TP concentrations. This was likely due to the fact that in August of 2005 the Stickney Analytical Laboratory at the District began using more sensitive equipment to analyze these parameters. Prior to this time, there was a higher method detection limit, resulting in a higher analytical error.

Rain Event Sampling. Water quality data from rain event sampling during 2005 - 2008 are presented in Appendix AII, Tables AII-1 - AII-8. TP and total nitrogen (TN) concentrations during the four consecutive days of rain event sampling at Busse Lake Dam were variable and did not exhibit any pattern. Egan WRP effluent concentrations showed that prior to P reduction, both TP and TN usually showed higher concentrations on the latter two days of rain event sampling, while only TN exhibited this pattern following P reduction. At JFK Boulevard TP concentrations before P reduction at Egan WRP were generally higher during the third and fourth days of sampling than the first and second days, but after P reduction there was no identifiable pattern. TN concentrations were generally higher on the last two rain event sampling days at JFK Boulevard both before and after P reduction at Egan WRP. TP and TN concentrations at Thorndale Avenue were generally higher during the last two days of rain event sampling before P reduction. However, following P reduction at Egan WRP, only TN showed this pattern.

Nutrient (TP and TN) concentrations during rain event sampling events were variable and did not show any particular pattern compared to scheduled sampling data. Since rain event sampling dates did not usually start until the day after it began raining, sampling did not likely reflect the "first flush," or the initial surface runoff.

Dissolved Oxygen. During 2006, 2007, and 2008, 97.6, 97.9, and 98.7 percent of the hourly readings, respectively, showed compliance with the standard at Busse Lake Dam. The JFK Boulevard station was in 100 percent compliance with the 5.0 mg/L DO standard during 2006, 98.7 percent compliance during 2007, and 99.6 percent compliance during 2008. Hourly DO readings from Thorndale Avenue were in compliance 98.6, 98.4, and 99.5 percent of the time with the standard during 2006, 2007, and 2008, respectively.

Continuous DO monitoring has revealed that all three Salt Creek monitoring stations are prone to wide diel DO fluctuations, which is a signature response to algae or aquatic plants, since

TABLE I-2: SUMMARY OF WATER QUALITY IN SALT CREEK AT BUSSE LAKE DAM BEFORE AND FOLLOWING PHOSPHORUS REDUCTION[1]

Constituents[2]	Pre-P Reduction Feb., 2005 - Jan., 2007 Range	Pre-P Reduction Feb., 2005 - Jan., 2007 Average	Post-P Reduction Feb., 2007 - Dec., 2008 Range	Post-P Reduction Feb., 2007 - Dec., 2008 Average
Water Temperature (°C)[3]	1.9 – 33.5	16.8	0.1 – 32.7	15.9
pH (units)[3]	7.1 – 8.7	7.9	5.4 – 8.9	7.9
TSS	<3 – 35	14	2 – 33	17
VSS	<3 – 24	8	0 – 13	6
Turbidity (NTU)	5 – 41	14	5 – 33	16
Dissolved Oxygen (DO)[4]	0.3 – 17.6	11.0	1.2 – 18.3	10.1
BOD_5	<2 – 8	4	<2 – 10	4
$CBOD_5$	<2 – 6	4	<2 – 6	3
COD	16 – 55	33	17 – 66	35
TP	<0.05 – 3.15[5]	0.21	<0.05 – 0.36	0.11
Ortho-Phosphate	0.003 – 2.727[5]	0.141	<0.005 – 0.047	0.019
TKN	0.70 – 1.92	1.21	0.77 – 2.14	1.14
Ammonia-N	<0.02 – 0.34	0.11	<0.02 – 0.38	0.11
NO_3-N	<0.005 – 11.436	0.658	<0.005 – 0.817	0.188
NO_2-N	<0.004 – 0.047	0.015	<0.004 – 0.052	0.015
TN	0.74 – 12.80	1.88	0.79 – 2.25	1.34
Chlorophyll *a* (µg/L)	7 – 82	29	5 – 78	28

[1]During scheduled sampling. Not including rain event data.
[2]Expressed in mg/L except where noted.
[3]Field measurement.
[4]From hourly continuous monitoring data.
[5]On August 17, 2005, both TP and ortho-phosphate concentrations were very high. Without these high values, the average TP is 0.13 mg/L and 0.069 mg/L ortho-phosphate for the pre-P reduction portion of the study.

TABLE I-3: SUMMARY OF WATER QUALITY IN SALT CREEK AT J. F. KENNEDY BOULEVARD BEFORE AND FOLLOWING PHOSPHORUS REDUCTION[1]

Constituents[2]	Pre-P Reduction Feb, 2005 - Jan, 2007 Range	Pre-P Reduction Feb, 2005 - Jan, 2007 Average	Post-P Reduction Feb, 2007 - Dec, 2008 Range	Post-P Reduction Feb, 2007 - Dec, 2008 Average
Water Temperature (°C)[3]	1.1 – 28.1	16.9	1.0 – 25.1	15.6
pH (units)[3]	6.9 – 8.1	7.6	6.9 – 8.0	7.5
TSS	<3 – 32	9	<3 – 20	11
VSS	<3 – 18	5	<3 – 11	4
Turbidity (NTU)	3 – 41	8	2 – 30	10
Dissolved Oxygen (DO)[4]	3.4 – 13.9	8.7	3.1 – 13.4	9.1
BOD_5	<2 – 6	3	<2 – 12	3
$CBOD_5$	<2 – 6	3	<2 – 7	2
COD	17 – 43	28	12 – 60	29
TP	0.22 – 5.49	2.47	0.05 – 0.76	0.26
Ortho-Phosphate	0.099 – 4.663	2.144	0.013 – 0.668	0.163
TKN	0.77 – 1.70	1.25	0.82 – 1.44	1.09
Ammonia-N	<0.02 – 0.43	0.11	<0.02 – 0.37	0.09
NO_3-N	0.936 – 20.832	10.257	1.341 – 19.783	8.483
NO_2-N	0.005 – 0.072	0.023	<0.004 – 0.110	0.019
TN	2.07 – 22.21	11.53	2.38 – 20.97	9.59
Chlorophyll *a* (µg/L)	2 – 42	13	2 – 38	13

[1]During scheduled sampling. Not including rain event data.
[2]Expressed in mg/L except where noted.
[3]Field measurement.
[4]From hourly continuous monitoring data.

TABLE I-4: SUMMARY OF WATER QUALITY IN SALT CREEK AT THORNDALE AVENUE BEFORE AND FOLLOWING PHOSPHORUS REDUCTION[1]

Constituents[2]	Pre-P Reduction Feb., 2005 - Jan., 2007 Range	Pre-P Reduction Feb., 2005 - Jan., 2007 Average	Post-P Reduction Feb., 2007 - Dec., 2008 Range	Post-P Reduction Feb., 2007 - Dec., 2008 Average
Water Temperature (°C)[3]	4.8 – 28.5	16.7	2.0 – 26.3	15.5
pH (units)[3]	6.7 – 8.4	7.6	6.8 – 8.0	7.4
TSS	3 – 32	13	4 – 25	14
VSS	<3 – 18	6	<3 – 14	5
Turbidity (NTU)	3 – 40	10	3 – 30	10
Dissolved Oxygen (DO)[4]	2.8 – 16.0	8.8	1.4 – 15.7	9.2
BOD_5	<2 – 11	3	<2 – 9	3
$CBOD_5$	<2 – 5	3	<2 – 5	2
COD	19 – 40	29	12 – 44	29
TP	<0.05 – 5.30	2.29	0.10 – 0.97	0.27
Ortho-Phosphate	0.035 – 4.506	2.034	0.012 – 0.840	0.169
TKN	0.88 – 1.96	1.30	0.80 – 1.47	1.09
Ammonia-N	<0.02 – 0.35	0.13	<0.02 – 0.28	0.10
NO_3-N	0.041 – 19.642	9.623	1.302 – 17.878	8.239
NO_2-N	<0.004 – 0.087	0.028	<0.004 – 0.066	0.021
TN	1.01 – 20.90	10.95	2.31 – 19.01	9.35
Chlorophyll *a* (µg/L)	3 – 42	14	2 – 38	14

[1]During scheduled sampling. Not including rain event data.
[2]Expressed in mg/L except where noted.
[3]Field measurement.
[4]From hourly continuous monitoring data.

TABLE I-5: SUMMARY OF WATER QUALITY AT JOHN E. EGAN OUTFALL BEFORE AND FOLLOWING PHOSPHORUS REDUCTION[1]

Constituents[2]	Pre-P Reduction Feb., 2005 - Jan., 2007 Range	Average	Post-P Reduction Feb., 2007 - Dec., 2008 Range	Average
TSS	<2 – 2	2	<2 – 3	2
Turbidity (NTU)	<1 – 5	1	<1 – 3	1
BOD_5	<2 – 2	<2	<2 – <2	<2
$CBOD_5$	<2 – <2	<2	<2 – <2	<2
TP	1.52 – 5.61	3.54	0.14 – 1.22	0.42
Ortho-Phosphate	1.443 – 5.256	3.315	<0.025 – 0.883	0.292
TKN	0.82 – 2.16	1.26	0.12 – 1.29	0.83
Ammonia-N	<0.04 – 0.24	0.08	<0.04 – 0.31	0.08
NO_3-N	11.207 – 20.770	16.061	10.654 – 22.069	16.132
NO_2-N	<0.004 – 0.111	0.016	<0.004 – 0.100	0.013
TN	12.49 – 23.01	17.26	11.03 – 23.36	16.98

[1]Statistics only include Egan effluent data from regularly scheduled Salt Creek sampling days; not all daily samples. Not including rain event data.
[2]Expressed in mg/L except where noted.

they photosynthesize during the day and respire at night. Example graphs of DO during summer months in 2006 - 2008 are provided in Figures I-4 - I-6 for Busse Dam, JFK, and Thorndale, respectively. At each of the stations, some nighttime DO values fell below the standard during July 2007. Upstream of the Egan WRP at Busse Lake Dam (Figure I-4), DO fluctuations were less uniform, and there were some daytime concentrations which also fell below the DO standard. Diel fluctuation occurred to a lesser magnitude during the winter months at the JFK Boulevard and Thorndale Avenue sampling stations. For example, Figure I-7 displays the hourly DO concentrations at JFK Boulevard during January of 2007 that are typical for both sites in the winter.

The continuous DO monitoring results were similar during 2006 - 2008, pre- and post-P reduction. Tables I-6 - I-8 show the number and percentage of total observations in which DO fluctuation (DO maximum - DO minimum within 24 hours) was less than 2, between 2 - 3, between 3 - 4, between 4 - 5, or greater than 5 mg/L before and after P reduction at each of the three sampling stations. Theoretically, if P enrichment is the cause of algal blooms, decreasing P to a point in which it begins to limit algae growth would, in turn, lower the magnitude of diel DO fluctuation.

Decreasing P to 0.5 mg/L in Egan WRP effluent did not eliminate diel DO fluctuation at the downstream stations in Salt Creek, nor did it appear to have a dampening effect on the magnitude of these fluctuations. Notably, mean ortho-phosphate concentration (estimate of bioavailable P level) was only 0.011 mg/L at Busse Lake Dam during 2007, and large diel DO fluctuations still occurred.

While most of the diel fluctuations throughout the year did not result in the nighttime DO concentrations falling below the IPCB standard, there are studies that suggest the sheer magnitude of a daily DO flux may have a negative impact on stream biota, irrespective of the DO minima (Heiskary, 2007 and Miltner, 2007). However, the causal mechanisms of these observations are unknown.

Sediment Quality

Sediment chemistry from the three sampling stations during 2005 - 2008 is shown in Table I-9. Chemical constituents in the sediment, including P, were extremely variable between stations and years. This variability can be expected from grab sediment samples since contaminants are not uniformly distributed throughout the channel bed, and there can be “hot spots,” or areas with higher concentrations of deposited contaminants.

Biological Quality

Chlorophyll and Algae. Sestonic algae, or phytoplankton, is estimated by analyzing the chlorophyll *a* concentration in the water column. These data are included in the water quality tables (Tables I-2 - I-5). Chlorophyll *a* concentrations were highest upstream of the Egan WRP

FIGURE I-4: COMPARISON OF CONTINUOUS DISSOLVED OXYGEN GRAPHS DURING SUMMER MONTHS IN 2006, 2007, AND 2008 AT BUSSE LAKE DAM

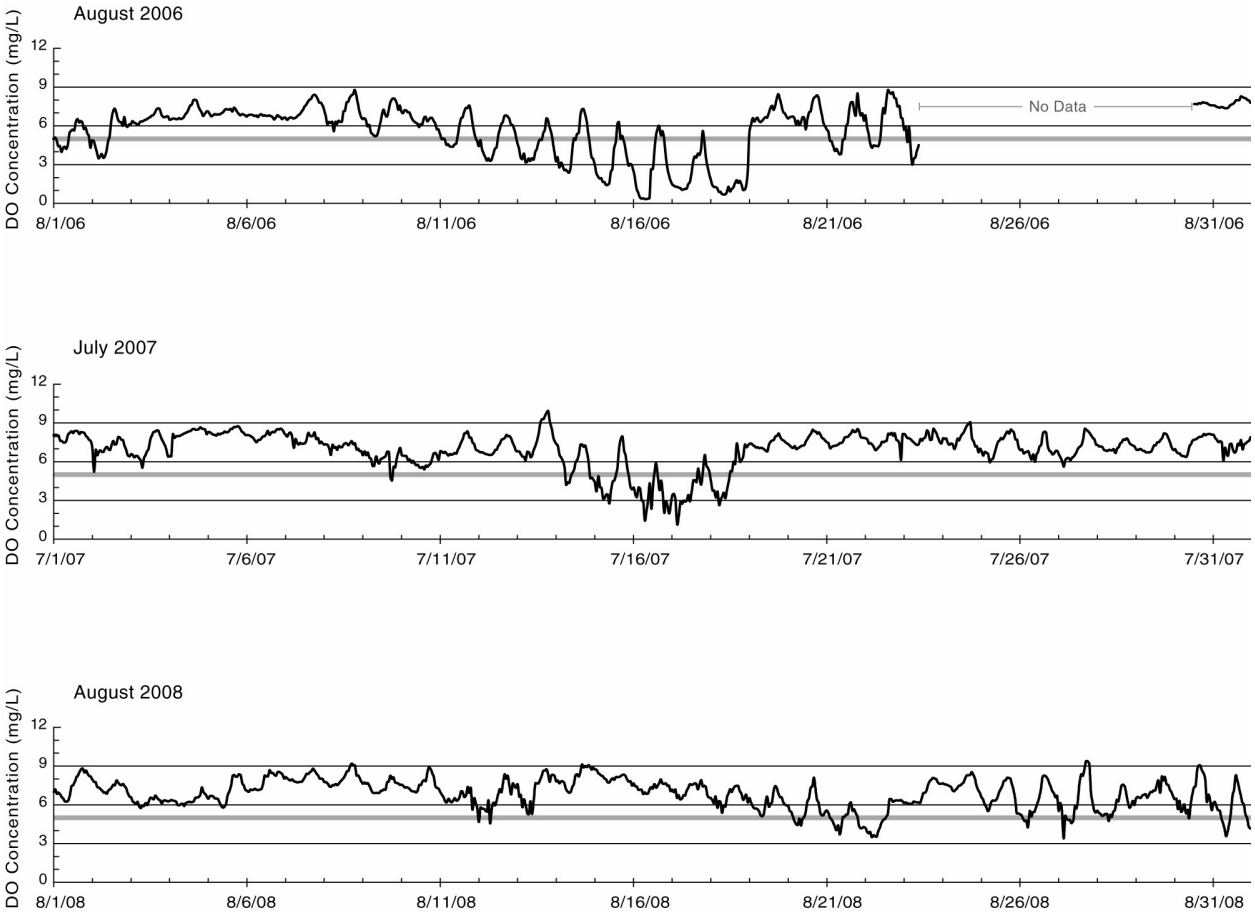

FIGURE I-5: COMPARISON OF CONTINUOUS DISSOLVED OXYGEN GRAPHS DURING SUMMER MONTHS IN 2006, 2007, AND 2008 AT J. F. KENNEDY BOULEVARD

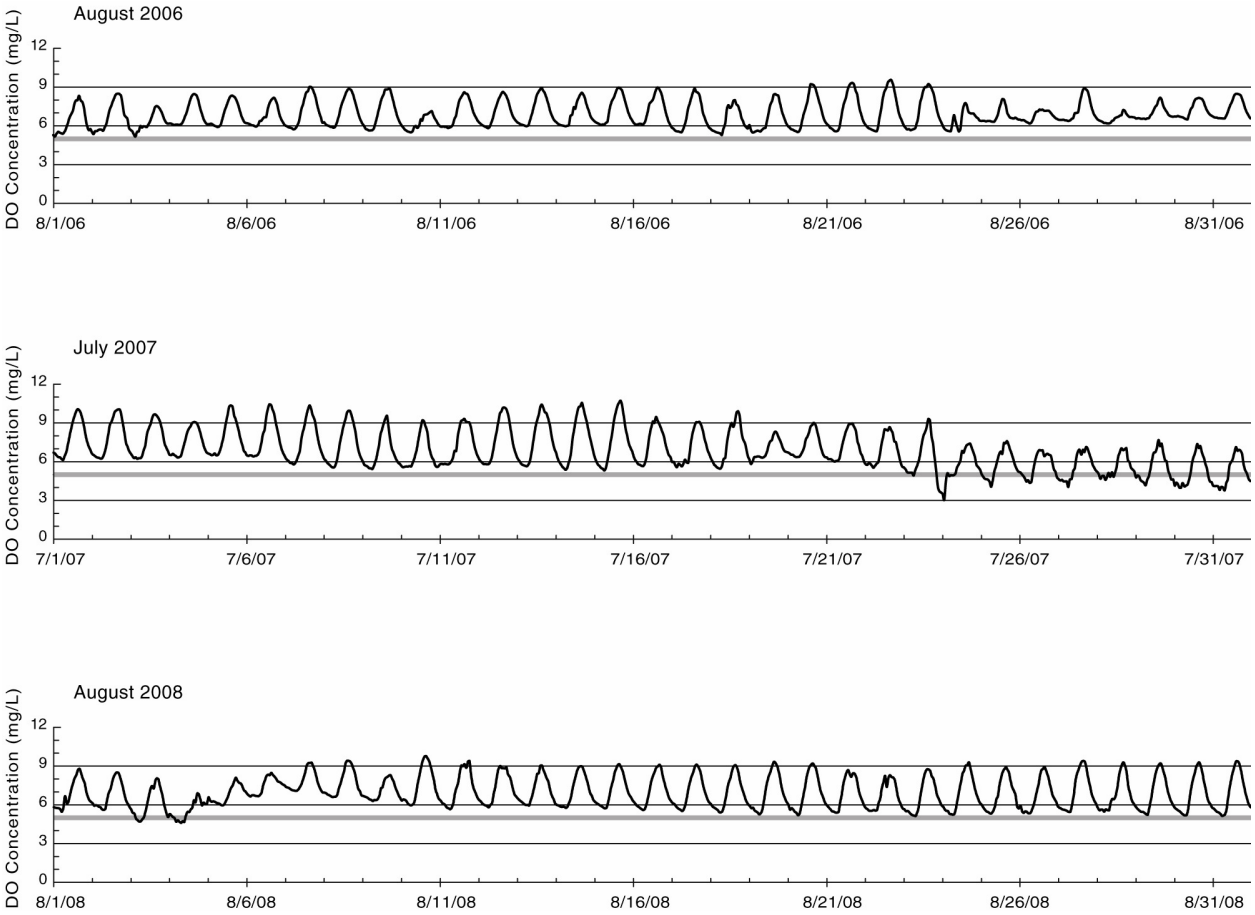

FIGURE I-6: COMPARISON OF CONTINUOUS DISSOLVED OXYGEN GRAPHS DURING SUMMER MONTHS IN 2006, 2007, AND 2008 AT THORNDALE AVENUE

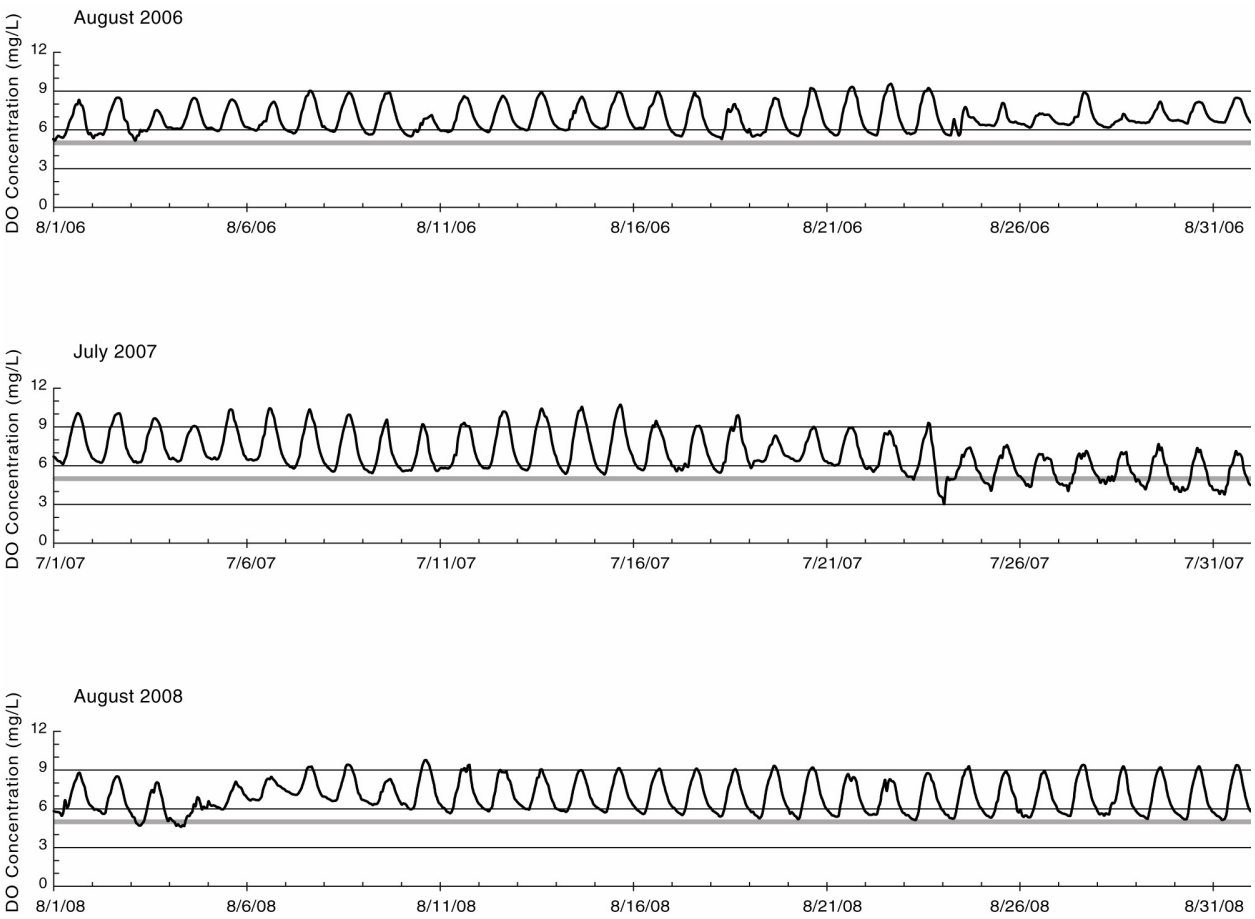

FIGURE I-7: DISSOLVED OXYGEN CONCENTRATION MEASURED
HOURLY AT J. F. KENNEDY BOULEVARD IN SALT CREEK
JANUARY 1, 2007, THROUGH JANUARY 31, 2007

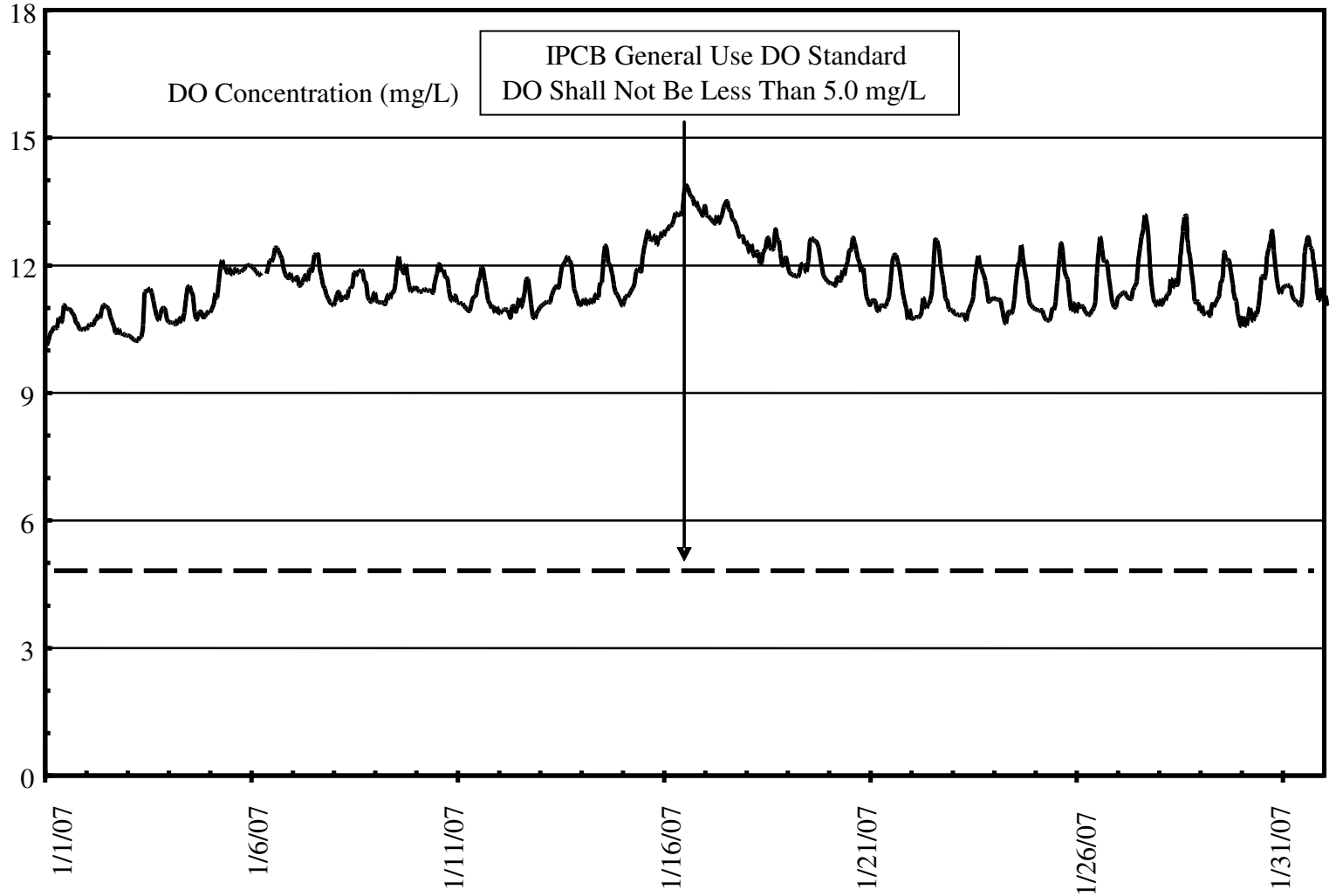

TABLE I-6: DISSOLVED OXYGEN FLUCTUATION AT BUSSE LAKE DAM BEFORE AND AFTER PHOSPHORUS REDUCTION AT THE JOHN E. EGAN WATER RECLAMATION PLANT

Dissolved Oxygen Fluctuation in 24-Hour Period	February 2006 through January 2007		February 5, 2007, through December 31, 2008	
	No. of Observations	Percentage of Total	No. of Observations	Percentage of Total
< 2	321	89.4	570	88.8
2 - <3	22	6.1	45	7.0
3 - <4	8	2.2	13	2.0
4 - <5	6	1.7	10	1.6
>= 5	2	0.6	4	0.6
Total of all Intervals	359	100.0	642	100.0

TABLE I-7: DISSOLVED OXYGEN FLUCTUATION AT J. F. KENNEDY BOULEVARD BEFORE AND AFTER PHOSPHORUS REDUCTION AT THE JOHN E. EGAN WATER RECLAMATION PLANT

Dissolved Oxygen Fluctuation in 24-Hour Period	February 2006 through January 2007		February 5, 2007, through December 31, 2008	
	No. of Observations	Percentage of Total	No. of Observations	Percentage of Total
< 2	192	52.6	428	62.0
2 - <3	99	27.1	135	19.6
3 - <4	54	14.8	83	12.0
4 - <5	15	4.1	33	4.8
>= 5	5	1.4	11	1.6
Total of all Intervals	365	100.0	690	100.0

TABLE I-8: DISSOLVED OXYGEN FLUCTUATION AT THORNDALE AVENUE BEFORE AND AFTER PHOSPHORUS REDUCTION AT THE JOHN E. EGAN WATER RECLAMATION PLANT

Dissolved Oxygen Fluctuation in 24-Hour Period	February 2006 through January 2007		February 5, 2007, through December 31, 2008	
	No. of Observations	Percentage of Total	No. of Observations	Percentage of Total
< 2	96	30.8	257	39.4
2 - <3	60	19.2	151	23.2
3 - <4	62	19.9	100	15.3
4 - <5	46	14.7	59	9.0
>= 5	48	15.4	85	13.0
Total of all Intervals	312	100.0	652	100.0

TABLE I-9: CHEMICAL CHARACTERISTICS OF SEDIMENT COLLECTED AT BUSSE LAKE DAM, J. F. KENNEDY BOULEVARD, AND THORNDALE AVENUE IN SALT CREEK BEFORE AND AFTER PHOSPHORUS REDUCTION AT THE JOHN E. EGAN WATER RECLAMATION PLANT

Station Name	Location in Waterway	Sample Date	Constituents (Expressed on a dry weight basis)							
			Total Solids (%)	Total Volatile Solids (% of Total)	Total Phosphorus (mg/kg)	Ammonia Nitrogen (mg/kg)	Total Kjeldahl Nitrogen (mg/kg)	Nitrite + Nitrate Nitrogen (mg/kg)	Total Cyanide (mg/kg)	Phenols (µg/kg)
Busse Lake Dam	Center	8/04/05	72	2	84	5	217	2	0.012	38
Busse Lake Dam	Side	8/04/05	68	3	141	5	223	1	0.015	81
Busse Lake Dam	Center	6/28/06	80	2	46	2	86	6	<0.003	21
Busse Lake Dam	Side	6/28/06	75	2	94	2	244	5	0.013	15
Busse Lake Dam	Center	6/25/07	77	3	4	9	8	5	0.006	35
Busse Lake Dam	Side	6/25/07	76	3	6	5	8	6	0.007	25
Busse Lake Dam	Center	8/20/08	83	2	189	3	275	6	0.014	51
Busse Lake Dam	Side	8/20/08	81	3	251	16	363	12	0.011	32
JFK Boulevard	Center	8/03/05	81	2	218	4	238	4	0.022	42
JFK Boulevard	Side	8/03/05	84	2	222	16	423	3	<0.003	34
JFK Boulevard	Center	7/06/06	69	2	37	6	65	2	<0.003	32
JFK Boulevard	Side	7/06/06	78	2	11	1	27	8	<0.003	113
JFK Boulevard	Center	6/27/07	65	3	382	7	655	3	0.035	210
JFK Boulevard	Side	6/27/07	63	4	705	7	895	4	0.086	67
JFK Boulevard	Center	9/25/08	68	3	424	12	505	3	0.050	29
JFK Boulevard	Side	9/25/08	72	3	338	4	377	2	0.038	14

TABLE I-9 (Continued): CHEMICAL CHARACTERISTICS OF SEDIMENT COLLECTED AT BUSSE LAKE DAM, J. F. KENNEDY BOULEVARD, AND THORNDALE AVENUE IN SALT CREEK BEFORE AND AFTER PHOSPHORUS REDUCTION AT THE JOHN E. EGAN WATER RECLAMATION PLANT

Station Name	Location in Waterway	Sample Date	Constituents (Expressed on a dry weight basis)							
			Total Solids (%)	Total Volatile Solids (% of Total)	Total Phosphorus (mg/kg)	Ammonia Nitrogen (mg/kg)	Total Kjeldahl Nitrogen (mg/kg)	Nitrite + Nitrate Nitrogen (mg/kg)	Total Cyanide (mg/kg)	Phenols (µg/kg)
Thorndale Avenue	Center	8/04/05	30	14	1,205	14	1,255	4	0.170	143
Thorndale Avenue	Side	8/04/05	69	2	460	3	282	3	0.014	69
Thorndale Avenue	Center	7/05/06	76	1	11	<1	24	7	0.013	43
Thorndale Avenue	Side	7/05/06	68	4	42	3	266	3	0.007	35
Thorndale Avenue	Center	6/27/07	75	2	336	2	471	5	0.056	72
Thorndale Avenue	Side	6/27/07	68	3	557	11	1,017	8	0.041	70
Thorndale Avenue	Center	9/25/08	69	4	218	10	570	3	0.063	28
Thorndale Avenue	Side	9/25/08	79	2	113	6	354	5	0.017	7

at the Busse Lake Dam sampling station, with means of 29 and 28 µg/L before and after P reduction, respectively. These elevated concentrations were likely due to the high residence time and slow-moving water in the wide upstream area of Busse Lake. At JFK Boulevard, mean chlorophyll *a* concentration was 13 µg/L both before and after P reduction. Similarly, mean chlorophyll *a* concentration was 14 µg/L at Thorndale Avenue during both sampling periods. The evident decrease in algae between Busse Lake Dam and JFK Boulevard represents dilution by the Egan WRP effluent discharged into Salt Creek.

A statistical comparison of the data shows there was no difference in water column chlorophyll *a* concentrations pre- and post-P reduction at Egan, despite the substantial decrease in stream P (Table I-10).

Generally, algae are limited by either nutrients (Nitrogen [N] or P), light, or habitat (substrate in the case of periphyton). In Illinois, analyses of several water quality surveys have failed to show a significant correlation between any form of nutrients and chlorophyll *a* measured either in the water column or extracted from a substrate (Terrio, 2007). This indicates the lack of nutrient limitation in most Illinois streams and suggests that phytoplankton are light limited, since nutrients are generally available in high concentrations. Various threshold concentrations for TP limitation of algae have been reported in the literature, some as low as 0.05 mg/L (Dodds *et al*. 2000, Stevenson 2006, and Hill et al. 2007).

Fish. Tables I-11 and I-12 identify the number of fish collected and species percentage composition for each station, as well as for Devon Avenue on Salt Creek, before and after P reduction. Fish sampling is performed annually at Devon Avenue as part of the District's AWQM Program. Total number of fish collected and number of species collected were highest at Busse Lake Dam and lowest at Devon Avenue both before and after P reduction at the Egan WRP. During 2005 and 2006 combined, 402 fish were collected of 13 species. Nine species and 263 of these fish were collected downstream of the Egan WRP.

Along the entire sampling reach, a total of 1,028 fish of 19 species were collected following Egan WRP P reduction. Only 326 of these fish and 12 species were collected downstream of the Egan WRP.

IBI scores (Karr et al. 1986) for sample collections at each of the stations between 2005-2008 can be found in Table I-13. However, with such small numbers of fish collected, scores calculated using this index can be misleading. For instance, if only one fish is collected in a particular sampling haul and an IBI is computed, as long as the fish was non-diseased and not a green sunfish (tolerant species), these metrics will receive the highest score. Therefore, the score may be artificially higher than another station where more individuals were caught and the incidence of disease, as well as the proportion of green sunfish, was higher. For this reason, it may be prudent to avoid using IBI scores when there are a low number of individuals caught.

Since the Salt Creek fish collection methods almost always result in a catch number of less than 50 individuals, this might preclude using the IBI for these sampling stations. Rather than exclude the use of the IBI altogether, Table I-13 reports the number of fish caught using each sampling method, along with the IBI scores, so that this issue can be considered. For the

TABLE I-10: STATISTICAL COMPARISON OF CHLORPHYLL *a* VALUES AT BUSSE LAKE DAM, J. F. KENNEDY BOULEVARD, AND THORNDALE AVENUE BEFORE[1] AND AFTER[2] PHOSPHORUS REDUCTION AT THE JOHN E. EGAN WATER RECLAMATION PLANT

Station	Statistics								Significance Probability[3]	
	No. of Obs.		Mean		Standard Deviation		H_0: Normal		H_0: $\sigma_1=\sigma_2$	H_0: $\mu_1=\mu_2$
	Pre	Post	Pre (µg/L)	Post (µg/L)	Pre s_1	Post s_2	Pre p_1	Post p_2		
Busse Lake Dam	57	53	33.8	31.3	16.4	16.8	0.527	0.640	0.428	0.432
JFK Boulevard	58	54	16.9	16.6	13.0	10.9	0.398	0.391	0.096	0.895
Thorndale Avenue	58	54	17.2	17.5	12.5	11.2	0.346	0.274	0.208	0.894

[1]February 1, 2005 - January 31, 2007.
[2]February 5, 2007 - December 31, 2008.
[3]Significance probability greater than 0.05 indicates that the null hypothesis (H_0) should be accepted.

TABLE I-11: NUMBER OF FISH COLLECTED (N) AND SPECIES PERCENTAGE COMPOSITION (%) FROM SALT CREEK DURING 2007 and 2008

Fish Species	Salt Creek Sample Stations									
	Busse Lake Dam		JFK Boulevard		Devon Avenue		Thorndale Road		Total Collections	
	N	%	N	%	N	%	N	%	N	%
Bigmouth shiner	9	1.3	0	0.0	0	0.0	0	0.0	9	0.9
Black crappie[1]	61	8.7	0	0.0	0	0.0	0	0.0	61	5.9
Blackstripe topminnow	2	0.3	9	4.1	1	3.8	7	8.9	19	1.8
Bluegill[1]	188	26.8	7	3.2	1	3.8	2	2.5	198	19.3
Bluntnose minnow	0	0.0	3	1.4	4	15.4	0	0.0	7	0.7
Brook silverside	15	2.1	1	0.5	0	0.0	0	0.0	16	1.6
Carp	1	0.1	0	0.0	0	0.0	2	2.5	3	0.3
Fathead minnow	13	1.9	0	0.0	0	0.0	0	0.0	13	1.3
Gizzard shad	2	0.3	0	0.0	0	0.0	0	0.0	2	0.2
Golden shiner	26	3.7	0	0.0	0	0.0	0	0.0	26	2.5
Green sunfish[1]	26	3.7	70	31.7	15	57.7	54	68.4	165	16.1
Green sunfish x Bluegill[2]	1	0.1	0	0.0	0	0.0	0	0.0	1	0.1
Green sunfish x Orangespotted sunfish[2]	0	0.0	8	3.6	0	0.0	0	0.0	8	0.8
Largemouth bass[1]	77	11.0	2	0.9	1	3.8	4	5.1	84	8.2
Orangespotted sunfish[1]	85	12.1	57	25.8	0	0.0	3	3.8	145	14.1
Orangespotted sunfish x Bluegilll[2]	1	0.1	0	0.0	0	0.0	0	0.0	1	0.1
Pumpkinseed sunfish[1]	10	1.4	1	0.5	0	0.0	0	0.0	11	1.1
Spotfin shiner	182	25.9	1	0.5	0	0.0	2	2.5	185	18.0
Walleye[1]	2	0.3	0	0.0	0	0.0	0	0.0	2	0.2

TABLE I-11 (continued): NUMBER OF FISH COLLECTED (N) AND SPECIES PERCENTAGE COMPOSITION (%) FROM SALT CREEK DURING 2007 AND 2008

Fish Species	Salt Creek Sample Stations									
	Busse Lake Dam		JFK Boulevard		Devon Avenue		Thorndale Road		Total Collections	
	N	%	N	%	N	%	N	%	N	%
White sucker	0	0.0	1	0.5	0	0.0	0	0.0	1	0.1
Yellow bullhead[1]	0	0.0	61	27.6	4	15.4	5	6.3	70	6.8
Yellow perch[1]	1	0.1	0	0.0	0	0.0	0	0.0	1	0.1
Total Fish	702		221		26		79		1,028	
Total Game fish	8		6		4		5		9	
Total Species	16		11		6		8		19	

[1]Game fish.
[2]Hybrid species not included in total species count.

TABLE I-12: NUMBER OF FISH COLLECTED (N) AND SPECIES PERCENTAGE COMPOSITION (%) FROM SALT CREEK DURING 2005 AND 2006

Fish Species	Salt Creek Sample Stations									
	Busse Dam		JFK Boulevard		Devon Avenue		Thorndale Road		Total Collections	
	N	%	N	%	N	%	N	%	N	%
Black bullhead	1	0.7	0	0.0	0	0.0	0	0.0	1	0.2
Black crappie[1]	2	1.4	0	0.0	2	2.4	0	0.0	4	1.0
Blackstripe topminnow	37	26.6	1	0.9	1	1.2	25	40.3	64	15.9
Bluegill[1]	45	32.4	29	24.8	23	27.4	12	19.4	109	27.1
Bluntnose minnow	0	0.0	7	6.0	1	1.2	0	0.0	8	2.0
Carp	2	1.4	0	0.0	6	7.1	0	0.0	8	2.0
Green sunfish[1]	15	10.8	53	45.3	30	35.7	22	35.5	120	29.9
Largemouth bass[1]	3	2.2	4	3.4	2	2.4	1	1.6	10	2.5
Orangespotted sunfish[1]	5	3.6	13	11.1	0	0.0	0	0.0	18	4.5
Pumpkinseed sunfish[1]	3	2.2	0	0.0	0	0.0	0	0.0	3	0.7
Spotfin shiner	25	18.0	6	5.1	13	15.5	0	0.0	44	10.9
Yellow bullhead[1]	1	0.7	3	2.6	6	7.1	2	3.2	12	3.0
White sucker	0	0.0	1	0.9	0	0.0	0	0.0	1	0.2
Total Fish	139		117		84		62		402	
Total Game Fish	7		5		5		4		7	
Total Species	11		9		9		5		13	

[1]Game fish.

TABLE I-13: CATCH NUMBERS, INDEX OF BIOTIC INTEGRITY SCORES AND CATEGORIES FOR BUSSE LAKE DAM, J. F. KENNEDY BOULEVARD, DEVON AVENUE, AND THORNDALE AVENUE IN SALT CREEK DURING 2005 - 2008

Location	Year	Sampling Gear	Number of Individuals in Catch	IBI Score	IBI Category
Busse Lake Dam	2005	BP	49	34	Fair
Pre P Reduction		Seine	56	30	Fair
	2006	BP	34	30	Fair
		Seine	ND	ND	ND
Busse Lake Dam	2007	BP	52	22	Fair
Post P Reduction		Seine	206	46	Good
	2008	BP	344	40	Fair
		Seine	100	34	Fair
Devon Avenue	2005	BP	33	24	Fair
Pre P Reduction		Seine	16	34	Fair
	2006	BP	63	24	Fair
		Seine	1	28	Fair
Devon Avenue	2007	BP	20	20	Poor
Post P Reduction		Seine	0	NA	NA
	2008	BP	6	26	Fair
		Seine	0	NA	NA
JFK Boulevard	2005	BP	22	26	Fair
Pre P Reduction		Seine	15	32	Fair
	2006	BP	103	22	Fair
		Seine	33	30	Fair
JFK Boulevard	2007	BP	36	28	Fair
Post P Reduction		Seine	3	34	Fair
	2008	BP	175	22	Fair
		Seine	7	26	Fair
Thorndale Avenue	2005	BP	31[1]	30	Fair
Pre P Reduction		Seine	3	28	Fair
	2006	BP	31[1]	26	Fair
		Seine	7	28	Fair
Thorndale Avenue	2007	BP	31[1]	22	Fair
Post P Reduction		Seine	0	NA	NA
	2008	BP	43	30	Fair
		Seine	5	34	Fair

BP = Backpack Electrofisher.
NA = No fish were caught so IBI could not be calculated.
ND = No seine haul due to unfavorable conditions.
[1]Coincidentally, 31 fish were caught at Thorndale Avenue with the backpack electrofisher each of the three years.

most part, IBI scores for Salt Creek during 2005-2008 were in the "fair" range of the narrative IBI classifications set forth by IEPA (IEPA 1996).

Studies have shown a negative correlation between TP and IBI and a positive correlation with tolerant taxa (Miltner and Rankin, 1998 and Robertson et al. 2006). The threshold for TP affecting fish IBI was reported to be as low as 0.06 mg/L (Robertson et al. 2006). However, the causal mechanism between the correlations is unclear from this study. Theoretically, the effect on fish would be mediated through algal effects on DO. Since DO has not been affected by the P reduction at the Egan WRP, any variation in fish data between pre- and post-year collections is not expected to have resulted from the decreased stream TP concentration.

Benthic Invertebrates. Benthic invertebrate densities, species, and EPT taxa richness, as well as MBI metric scores obtained from 2005 - 2008 collections, are exhibited in Tables I-14 - I-21. While there is some annual variation at each station, there is no clear pattern showing community improvement following P reduction at the Egan WRP. Differences in exact sampling location from year to year were likely to be the main cause of this variability.

At Busse Lake Dam, the highest species and EPT taxa richness both occurred in the 2005 ponar sample (28 and six species, respectively), which was the only sample during the four years that was actually taken upstream of the Egan WRP. Due to field problems during 2006 - 2008, samples were actually taken just downstream of the Egan WRP. MBI metric scores remained fairly uniform throughout 2005 - 2008, however, ranging from 6.13 - 6.87.

The highest species and EPT taxa richness from benthic samples at Devon Avenue (representing JFK Boulevard) were in the 2006 Hester Dendy sample (49 species) and the 2008 Hester Dendy sample (seven species), respectively. The MBI metric scores varied more widely, ranging from 5.39 - 9.26. The higher scores generally resulted from elevated numbers of pollution-tolerant Oligochaete worms counted in certain samples.

At Thorndale Avenue, both species and EPT taxa richness occurred in the 2008 Hester Dendy sample (49 and 14 species, respectively). MBI metric scores in the Hester Dendy samples, however, remained quite constant throughout the study period (6.01 - 6.18). MBI scores in the ponar samples ranged from 7.16 - 9.81. The high MBI score calculated for the 2006 ponar sample was due to 170,359 Oligochaete worms being counted. This was the highest number of tolerant Oligochaetes enumerated at any station during the four-year sampling period.

Physical Habitat Quality

Busse Lake Dam is located approximately 500 feet upstream of the Egan WRP outfall. The dam marks the end of a wide, slow-moving, two-mile segment of Salt Creek known as Busse Lake. Channel width was about 50 feet in the sampling reach. Water depth within the 130-foot sampling reach at Busse Lake Dam was between 1 - 2 feet under normal conditions and would be characterized as "run" stream habitat. Aquatic macrophytes, such as Eurasian watermilfoil, leafy pondweed, and water grasses, covered approximately 20 percent of the sampling area. Canopy cover ranged from completely shaded to wide open, and immediate shore cover

TABLE I-14: BENTHIC INVERTEBRATE DENSITIES FROM HESTER DENDY SAMPLES AT DEVON AVENUE AND THORNDALE AVENUE IN SALT CREEK DURING 2005

Taxa	Devon Avenue # Organisms/ m^2	Devon Avenue % of Sample	Thorndale Avenue # Organisms/ m^2	Thorndale Avenue % of Sample
Hydra	55.6	0.68	26.9	0.57
Turbellaria	495.2	6.06	147.1	3.12
Oligochaeta	1,919.6	23.51	200.9	4.26
Desserobdella phalera	1.8	0.02		
Helobdella triserialis	32.3	0.40	5.4	0.11
Caecidotea	497.0	6.09		
Hydracarina			1.8	0.04
Baetis intercalaris[1]	12.6	0.15	105.8	2.24
Stenacron[1]			3.6	0.08
Stenonema femoratum[1]			1.8	0.04
Tricorythodes[1]	1.8	0.02	43.1	0.91
Argia			32.3	0.68
Enallagma	5.4	0.07	3.6	0.08
Cyrnellus fraternus[1]	26.9	0.33	71.8	1.52
Cheumatopsyche[1]	430.6	5.27	710.4	15.06
Hydropsyche betteni[1]			23.3	0.49
Ceratopsyche morosa[1]			5.4	0.11
Hydroptila[1]	484.4	5.93	186.6	3.96
Oecetis[1]	1.8	0.02		
Dubiraphia	9.0	0.11	7.2	0.15
Stenelmis	5.4	0.07		
Ceratopogonidae			5.4	0.11
Tanypus			17.9	0.38
Procladius	148.9	1.82	145.3	3.08
Ablabesmyia janta	285.3	3.49	147.1	3.12
Ablabesmyia mallochi			41.3	0.87
Thienemannimyia group	520.3	6.37	502.3	10.65
Thienemanniella xena			281.7	5.97
Cricotopus tremulus group	35.9	0.44		
Cricotopus bicinctus group	35.9	0.44	53.8	1.14
Cricotopus sylvestris group	44.9	0.55		
Nanocladius	62.8	0.77		
Nanocladius distinctus	44.9	0.55	30.8	0.65
Nanocladius crassicornus			12.6	0.27
Cryptochironomus	17.9	0.22	53.8	1.14
Dicrotendipes modestus	9.0	0.11		
Dicrotendipes neomodestus	410.8	5.03	502.3	10.65

TABLE I-14 (Continued): BENTHIC INVERTEBRATE DENSITIES FROM HESTER DENDY SAMPLES AT DEVON AVENUE AND THORNDALE AVENUE IN SALT CREEK DURING 2005

Taxa	Devon Avenue # Organisms/ m^2	Devon Avenue % of Sample	Thorndale Avenue # Organisms/ m^2	Thorndale Avenue % of Sample
Dicrotendipes fumidus	349.8	4.28	41.3	0.87
Dicrotendipes simpsoni	224.3	2.75	25.1	0.53
Endochironomus nigricans	89.7	1.10	12.6	0.27
Glyptotendipes	9.0	0.11	170.4	3.61
Harnischia	17.9	0.22	17.9	0.38
Microtendipes	9.0	0.11		
Parachironomus	35.9	0.44	30.5	0.65
Phaenopsectra obediens group	17.9	0.22		
Polypedilum flavum	482.6	5.91	148.9	3.16
Polypedilum illinoense	516.7	6.33	287.0	6.09
Polypedilum scalaenum group	52.0	0.64	43.1	0.91
Pseudochironomus	44.9	0.55	30.5	0.65
Stenochironomus	44.9	0.55	30.5	0.65
Cladotanytarsus mancus group	9.0	0.11	17.9	0.38
Paratanytarsus	285.3	3.49	131.0	2.78
Tanytarsus	17.9	0.22		
Tanytarsus glabrescens group			66.4	1.41
Tanytarsus guerlus group	53.8	0.66	220.7	4.68
Hemerodromia	10.8	0.13		
Helisoma	118.4	1.45		
Ferrissia	172.2	2.11	53.8	1.14
Corbicula fluminea	5.4	0.07	17.9	0.38
Pisidium	1.8	0.02		
Total Individual Benthos	8,164.7		4,716.5	
Total Taxa Richness	47		46	
EPT Taxa Richness	6		9	
MBI Score	6.72		6.01	

[1]EPT Taxon.

TABLE I-15: BENTHIC INVERTEBRATE DENSITIES FROM PETITE PONAR SAMPLES AT BUSSE LAKE DAM, DEVON AVENUE, AND THORNDALE AVENUE IN SALT CREEK DURING 2005

Taxa	Busse Lake Dam		Devon Avenue		Thorndale Avenue	
	# Organisms/ m^2	% of Sample	# Organisms/ m^2	% of Sample	# Organisms/ m^2	% of Sample
Turbellaria					7.2	0.06
Oligochaeta	3,186.4	7.72	6,487.7	41.28	1,464.0	13.25
Hydracarina	14.4	0.03				
Baetis intercalaris[1]					35.9	0.32
Centroptilum[1]	14.4	0.03				
Tricorythodes[1]					7.2	0.06
Caenis[1]	437.8	1.06				
Enallagma	28.7	0.07	21.5	0.14		
Cheumatopsyche[1]	7.2	0.02			7.2	0.06
Hydroptila[1]	251.2	0.61	7.2	0.05	14.4	0.13
Oxyethira[1]	43.1	0.10				
Oecetis[1]	100.5	0.24	7.2	0.05		
Dubiraphia	14.4	0.03	7.2	0.05	21.5	0.19
Stenelmis					28.7	0.26
Berosus	7.2	0.02				
Ceratopogonidae	136.4	0.33	21.5	0.14		
Procladius	4,686.3	11.35	1,184.1	7.53	122.0	1.10
Ablabesmyia janta			7.2	0.05		
Ablabesmyia mallochi	287.1	0.70				
Labrundinia neopilosella	337.3	0.82				
Larsia	107.6	0.26				
Thienemannimyia group	660.3	1.60			724.8	6.56
Chironomus			7.2	0.05		
Cryptochironomus	5,368.1	13.00	1,205.7	7.67	3,423.3	30.97
Cryptotendipes	50.2	0.12				

TABLE I-15 (Continued): BENTHIC INVERTEBRATE DENSITIES FROM PETITE PONAR SAMPLES AT BUSSE LAKE DAM, DEVON AVENUE, AND THORNDALE AVENUE IN SALT CREEK DURING 2005

Taxa	Busse Lake Dam # Organisms/ m^2	Busse Lake Dam % of Sample	Devon Avenue # Organisms/ m^2	Devon Avenue % of Sample	Thorndale Avenue # Organisms/ m^2	Thorndale Avenue % of Sample
Dicrotendipes modestus	50.2	0.12	100.5	0.64		
Dicrotendipes neomodestus			7.2	0.05	545.4	4.94
Dicrotendipes fumidus					100.5	0.91
Dicrotendipes simpsoni	50.2	0.12				
Harnischia			7.2	0.05	14.4	0.13
Paratendipes			14.4	0.09		
Phaenopsectra			93.3	0.59		
Polypedilum halterale group	3,832.3	9.28	1,995.1	12.69	186.6	1.69
Polypedilum illinoense			7.2	0.05	7.2	0.06
Polypedilum scalaenum group			724.8	4.61	179.4	1.62
Pseudochironomus	16,671.3	40.37			100.5	0.91
Stenochironomus	50.2	0.12				
Stictochironomus			107.6	0.68	93.3	0.84
Cladotanytarsus mancus group	3,545.3	8.59	3,373.0	21.46	3,588.3	32.47
Tanytarsus					93.3	0.84
Tanytarsus guerlus group	854.0	2.07	265.5	1.69	179.4	1.62
Physa	21.5	0.05				
Corbicula fluminea	480.8	1.16	64.6	0.41	107.6	0.97
Total Individual Benthos	41,294.4		15,716.8		11,052.0	
Total Taxa Richness	28		22		23	
EPT Taxa Richness	6		2		4	
MBI Score	6.24		7.90		7.45	

[1]EPT Taxon.

TABLE I-16: BENTHIC INVERTEBRATE DENSITIES FROM HESTER DENDY SAMPLES AT BUSSE LAKE DAM, DEVON AVENUE, AND THORNDALE AVENUE IN SALT CREEK DURING 2006

Taxa	Busse Lake Dam		Devon Avenue		Thorndale Avenue	
	# Organisms/ m^2	% of Sample	# Organisms/ m^2	% of Sample	# Organisms/ m^2	% of Sample
Hydra	17.9	0.11	64.6	0.30	62.8	0.42
Turbellaria	950.8	5.61	213.5	0.99	269.1	1.81
Plumatella					1.8	0.01
Oligochaeta	915.0	5.40	13,433.8	62.20	502.3	3.38
Helobdella triserialis			37.7	0.17		
Ostracoda	35.9	0.21	39.5	0.18		
Caecidotea	17.9	0.11	61.0	0.28	80.7	0.54
Orconectes			5.4	0.02		
Baetis intercalaris[1]	17.9	0.11	1.8	0.01		
Tricorythodes[1]			3.6	0.02	71.8	0.48
Caenis[1]			1.8	0.01		
Argia	35.9	0.21	3.6	0.02	17.9	0.12
Enallagma			10.8	0.05		
Cyrnellus fraternus[1]	17.9	0.11				
Cheumatopsyche[1]	789.4	4.66	726.6	3.36	4,861.9	32.69
Hydropsyche[1]					9.0	0.06
Ceratopsyche morosa[1]					53.8	0.36
Hydroptila[1]	89.7	0.53	154.3	0.71	53.8	0.36
Nectopsyche diarina[1]			3.6	0.02		
Dubiraphia			5.4	0.02	17.9	0.12
Stenelmis			7.2	0.03	35.9	0.24
Ceratopogonidae			3.6	0.02		
Procladius			70.0	0.32		
Ablabesmyia janta			87.9	0.41	98.7	0.66

TABLE I-16 (Continued): BENTHIC INVERTEBRATE DENSITIES FROM HESTER DENDY SAMPLES AT BUSSE LAKE DAM, DEVON AVENUE, AND THORNDALE AVENUE IN SALT CREEK DURING 2006

Taxa	Busse Lake Dam		Devon Avenue		Thorndale Avenue	
	# Organisms/ m^2	% of Sample	# Organisms/ m^2	% of Sample	# Organisms/ m^2	% of Sample
Ablabesmyia mallochi			52.0	0.24	53.8	0.36
Thienemannimyia group	71.8	0.42	156.1	0.72	618.9	4.16
Thienemanniella xena	71.8	0.42	17.9	0.08	35.9	0.24
Thienemanniella similis					71.8	0.48
Cricotopus bicinctus group	2,134.9	12.59	276.3	1.28	71.8	0.48
Cricotopus sylvestris group	448.5	2.65	364.2	1.69	53.8	0.36
Nanocladius					206.3	1.39
Nanocladius distinctus	71.8	0.42	694.3	3.21	915.0	6.15
Rheocricotopus robacki			52.0	0.24		
Chironomus			70.0	0.32	35.9	0.24
Cladopelma			52.0	0.24		
Cryptochironomus	71.8	0.42	17.9	0.08	71.8	0.48
Dicrotendipes modestus			157.9	0.73	71.8	0.48
Dicrotendipes neomodestus					215.3	1.45
Dicrotendipes fumidus	2,475.8	14.60	52.0	0.24		
Dicrotendipes simpsoni			156.1	0.72	287.0	1.93
Endochironomus nigricans			70.0	0.32		
Glyptotendipes	376.7	2.22	983.1	4.55	565.1	3.80
Harnischia			52.0	0.24		
Parachironomus			400.1	1.85	89.7	0.60
Phaenopsectra obediens group	663.8	3.92	17.9	0.08	71.8	0.48
Polypedilum flavum	376.7	2.22	364.2	1.69	4,242.9	28.52
Polypedilum illinoense	7,032.7	41.48	1,135.6	5.26	574.1	3.86
Polypedilum scalaenum group	71.8	0.42	52.0	0.24	71.8	0.48

TABLE I-16 (Continued): BENTHIC INVERTEBRATE DENSITIES FROM HESTER DENDY SAMPLES AT BUSSE LAKE DAM, DEVON AVENUE, AND THORNDALE AVENUE IN SALT CREEK DURING 2006

Taxa	Busse Lake Dam # Organisms/ m^2	Busse Lake Dam % of Sample	Devon Avenue # Organisms/ m^2	Devon Avenue % of Sample	Thorndale Avenue # Organisms/ m^2	Thorndale Avenue % of Sample
Cladotanytarsus mancus group					35.9	0.24
Paratanytarsus	71.8	0.42	959.8	4.44	107.6	0.72
Rheotanytarsus					53.8	0.36
Tanytarsus			70.0	0.32	125.6	0.84
Hemerodromia			3.6	0.02		
Physa	17.9	0.11	1.8	0.01		
Helisoma	71.8	0.42	172.2	0.80	17.9	0.12
Ferrissia	35.9	0.21	116.6	0.54	71.8	0.48
Corbicula fluminea			107.6	0.50		
Musculium			35.9	0.17		
Total Individual Benthos	16,953.7		21,596.7		14,874.4	
Total Taxa Richness	26		49		39	
EPT Taxa Richness	4		6		5	
MBI Score	6.33		8.65		6.06	

[1]EPT Taxon.

TABLE I-17: BENTHIC INVERTEBRATE DENSITIES FROM PETITE PONAR SAMPLES AT BUSSE LAKE DAM, DEVON AVENUE, AND THORNDALE AVENUE IN SALT CREEK DURING 2006

Taxa	Busse Lake Dam		Devon Avenue		Thorndale Avenue	
	# Organisms/ m^2	% of Sample	# Organisms/ m^2	% of Sample	# Organisms/ m^2	% of Sample
Hydra	71.8	0.17				
Turbellaria	71.8	0.17			143.5	0.08
Oligochaeta	6,387.2	14.71	5,554.7	77.40	170,358.9	95.13
Helobdella triserialis					71.8	0.04
Ostracoda					71.8	0.04
Caecidotea					14.4	0.01
Tricorythodes[1]					71.8	0.04
Cheumatopsyche[1]			14.4	0.20	2,052.5	1.15
Hydroptila[1]	143.5	0.33			143.5	0.08
Dubiraphia			43.1	0.60	71.8	0.04
Stenelmis					645.9	0.36
Procladius			21.5	0.30		
Thienemannimyia group			7.2	0.10	21.5	0.01
Thienemanniella xena	179.4	0.41			143.5	0.08
Thienemanniella lobapodema					7.2	0.00
Cricotopus bicinctus group	2,942.4	6.78	35.9	0.50	43.1	0.02
Cricotopus sylvestris group	179.4	0.41	7.2	0.10	71.8	0.04
Nanocladius distinctus					7.2	0.00
Chironomus	430.6	0.99	35.9	0.50		
Cladopelma			7.2	0.10		
Cryptochironomus	179.4	0.41	423.4	5.90	638.7	0.36
Dicrotendipes modestus			7.2	0.10	7.2	0.00
Dicrotendipes neomodestus					7.2	0.00
Dicrotendipes fumidus	14,568.6	33.55	7.2	0.10		

TABLE I-17 (Continued): BENTHIC INVERTEBRATE DENSITIES FROM PETITE PONAR SAMPLES AT BUSSE LAKE DAM, DEVON AVENUE, AND THORNDALE AVENUE IN SALT CREEK DURING 2006

Taxa	Busse Lake Dam # Organisms/ m^2	Busse Lake Dam % of Sample	Devon Avenue # Organisms/ m^2	Devon Avenue % of Sample	Thorndale Avenue # Organisms/ m^2	Thorndale Avenue % of Sample
Glyptotendipes			7.2	0.10		
Harnischia			28.7	0.40		
Parachironomus			7.2	0.10		
Phaenopsectra obediens group	825.3	1.90	7.2	0.10	7.2	0.00
Polypedilum flavum			7.2	0.10	674.6	0.38
Polypedilum halterale group			50.2	0.70	445.0	0.25
Polypedilum illinoense	10,693.2	24.63	57.4	0.80	35.9	0.02
Polypedilum scalaenum group	538.2	1.24	78.9	1.10	509.5	0.28
Pseudochironomus	1,040.6	2.40	14.4	0.20	7.2	0.00
Stictochironomus			71.8	1.00	71.8	0.04
Cladotanytarsus mancus group	4,880.1	11.24	466.5	6.50	1,320.5	0.74
Paratanytarsus			28.7	0.40		
Tanytarsus					315.8	0.18
Simulium					71.8	0.04
Physa					71.8	0.04
Helisoma	143.5	0.33	21.5	0.30		
Ferrissia			7.2	0.10	358.8	0.20
Corbicula fluminea	143.5	0.33	150.7	2.10	602.8	0.34
Pisidium			7.2	0.10		
Total Individual Benthos	43,418.6		7,176.6		179,085.7	
Total Taxa Richness	17		28		32	
EPT Taxa Richness	1		1		3	
MBI Score	6.70		9.26		9.81	

[1]EPT Taxon.

TABLE I-18: BENTHIC INVERTEBRATE DENSITIES FROM HESTER DENDY SAMPLES AT BUSSE LAKE DAM, DEVON AVENUE, AND THORNDALE AVENUE IN SALT CREEK DURING 2007

Taxa	Busse Lake Dam		Devon Avenue		Thorndale Avenue	
	# Organisms/ m^2	% of Sample	# Organisms/ m^2	% of Sample	# Organisms/ m^2	% of Sample
Hydra	21.5	0.27	152.5	1.15	134.6	1.25
Turbellaria	120.2	1.53	744.5	5.62	161.5	1.49
Oligochaeta	479.0	6.08	2,430.9	18.36	726.6	6.73
Helobdella triserialis			9.0	0.07		
Ostracoda	26.9	0.34				
Caecidotea			80.7	0.61	9.0	0.08
Hyalella azteca					5.4	0.05
Baetis intercalaris[1]			17.9	0.14	5.4	0.05
Stenacron[1]			9.0	0.07	9.0	0.08
Tricorythodes[1]	9.0	0.11	116.6	0.88	143.5	1.33
Argia					17.9	0.17
Enallagma			9.0	0.07		
Cheumatopsyche[1]	1,367.1	17.35	3,704.7	27.98	3,261.6	30.19
Ceratopsyche morosa[1]			9.0	0.07	14.4	0.13
Hydroptila[1]			224.3	1.69	35.9	0.33
Dubiraphia			9.0	0.07	17.9	0.17
Stenelmis			17.9	0.14		
Ablabesmyia janta	95.1	1.21	53.8	0.41	39.5	0.37
Ablabesmyia mallochi			26.9	0.20		
Thienemannimyia group	9.0	0.11	349.8	2.64	358.8	3.32
Thienemanniella xena					209.9	1.94
Cricotopus tremulus group			53.8	0.41	93.3	0.86
Cricotopus bicinctus group	557.9	7.08	89.7	0.68	249.4	2.31
Cricotopus sylvestris group	491.6	6.24	89.7	0.68	116.6	1.08
Nanocladius	95.1	1.21				
Nanocladius distinctus			610.0	4.61	906.0	8.39

TABLE I-18 (Continued): BENTHIC INVERTEBRATE DENSITIES FROM HESTER DENDY SAMPLES AT BUSSE LAKE DAM, DEVON AVENUE, AND THORNDALE AVENUE IN SALT CREEK DURING 2007

Taxa	Busse Lake Dam # Organisms/ m^2	Busse Lake Dam % of Sample	Devon Avenue # Organisms/ m^2	Devon Avenue % of Sample	Thorndale Avenue # Organisms/ m^2	Thorndale Avenue % of Sample
Chironomus	48.4	0.61	62.8	0.47		
Cryptochironomus			179.4	1.36		
Dicrotendipes neomodestus	143.5	1.82	520.3	3.93	974.2	9.02
Dicrotendipes fumidus	43.1	0.55			43.1	0.40
Dicrotendipes lucifer			161.5	1.22		
Dicrotendipes simpsoni	192.0	2.44	107.6	0.81	136.3	1.26
Endochironomus nigricans			89.7	0.68	78.9	0.73
Glyptotendipes	95.1	1.21	466.5	3.52	206.3	1.91
Parachironomus	48.4	0.61	116.6	0.88	170.4	1.58
Polypedilum flavum	1,873.0	23.78	843.2	6.37	1,745.6	16.16
Polypedilum halterale group					14.4	0.13
Polypedilum illinoense	2,039.8	25.89	1,022.6	7.72	226.0	2.09
Polypedilum scalaenum group			80.7	0.61	28.7	0.27
Cladotanytarsus mancus group			170.4	1.29	14.4	0.13
Paratanytarsus	95.1	1.21	421.6	3.18	53.8	0.50
Tanytarsus sepp					43.1	0.40
Simulium			9.0	0.07	44.9	0.42
Hemerodromia			17.9	0.14		
Physa	9.0	0.11				
Menetus					5.4	0.05
Ferrissia	17.9	0.23	161.5	1.22	502.3	4.65
Total Individual Benthos	7,877.6		13,240.0		10,803.7	
Total Taxa Richness	22		37		36	
EPT Taxa Richness	2		6		6	
MBI Score	6.45		6.73		6.18	

[1]EPT Taxon

TABLE I-19: BENTHIC INVERTEBRATE DENSITIES FROM PETITE PONAR SAMPLES AT BUSSE LAKE DAM, DEVON AVENUE, AND THORNDALE AVENUE IN SALT CREEK DURING 2007

Taxa	Busse Lake Dam		Devon Avenue		Thorndale Avenue	
	# Organisms/ m^2	% of Sample	# Organisms/ m^2	% of Sample	# Organisms/ m^2	% of Sample
Hydra					35.9	0.14
Oligochaeta	1,779.8	4.28	1,241.6	4.85	3,688.8	14.49
Ostracoda					28.7	0.11
Caecidotea	107.6	0.26				
Tricorythodes[1]			7.2	0.03		
Cheumatopsyche[1]	610.0	1.47	57.4	0.22	904.3	3.55
Hydroptila[1]					35.9	0.14
Nectopsyche[1]			7.2	0.03		
Oecetis[1]					35.9	0.14
Dubiraphia	71.8	0.17	21.5	0.08	129.2	0.51
Stenelmis					143.5	0.56
Thienemannimyia group					157.9	0.62
Thienemanniella xena			28.7	0.11	157.9	0.62
Cricotopus tremulus group					373.2	1.47
Cricotopus bicinctus group	861.2	2.07	129.2	0.50		
Cricotopus sylvestris group			208.1	0.81		
Nanocladius distinctus	78.9	0.19	50.2	0.20		
Chironomus	78.9	0.19				
Cryptochironomus	1,241.6	2.99	2,145.8	8.39	2,597.9	10.21
Dicrotendipes neomodestus	2,124.3	5.11	416.2	1.63	940.1	3.69
Dicrotendipes fumidus	3,825.1	9.21	28.7	0.11		
Dicrotendipes lucifer	244.0	0.59				
Einfeldia natchitocheae	552.6	1.33				
Endochironomus nigricans					430.6	1.69

TABLE I-19 (Continued): BENTHIC INVERTEBRATE DENSITIES FROM PETITE PONAR SAMPLES AT BUSSE LAKE DAM, DEVON AVENUE, AND THORNDALE AVENUE IN SALT CREEK DURING 2007

Taxa	Busse Lake Dam # Organisms/ m^2	Busse Lake Dam % of Sample	Devon Avenue # Organisms/ m^2	Devon Avenue % of Sample	Thorndale Avenue # Organisms/ m^2	Thorndale Avenue % of Sample
Glyptotendipes	2,676.9	6.44				
Harnischia					114.8	0.45
Parachironomus	78.9	0.19	28.7	0.11		
Paratendipes	165.1	0.40				
Polypedilum flavum	1,858.7	4.47	107.6	0.42	430.6	1.69
Polypedilum halterale group			50.2	0.20	1,492.7	5.86
Polypedilum illinoense	1,456.9	3.51	78.9	0.31		
Polypedilum scalaenum group	495.2	1.19	287.1	1.12	552.6	2.17
Pseudochironomus	3,172.1	7.64	78.9	0.31	57.4	0.23
Cladotanytarsus mancus group	19,018.1	45.78	20,259.6	79.19	12,939.5	50.83
Paratanytarsus	739.2	1.78	236.8	0.93	57.4	0.23
Simulium			7.2	0.03	71.8	0.28
Ferrissia	71.8	0.17	7.2	0.03		
Corbicula fluminea	229.7	0.55	100.5	0.39	78.9	0.31
Total Individual Benthos	41,538.4		25,584.7		25,455.5	
Total Taxa Richness	23		23		23	
EPT Taxa Richness	1		3		3	
MBI Score	6.96		5.39		7.16	

[1]EPT Taxon.

TABLE I-20: BENTHIC INVERTEBRATE DENSITIES FROM HESTER DENDY SAMPLES AT BUSSE LAKE DAM, DEVON AVENUE, AND THORNDALE AVENUE IN SALT CREEK DURING 2008

Taxa	Busse Lake Dam		Devon Avenue		Thorndale Avenue	
	# Organisms/ m^2	% of Sample	# Organisms/ m^2	% of Sample	# Organisms/ m^2	% of Sample
Hydra	2,215.6	10.89	776.8	5.77	84.3	1.18
Turbellaria	62.8	0.31	2,068.5	15.37	10.8	0.15
Oligochaeta	305.0	1.50	807.3	6.00	136.3	1.91
Helobdella papillata			1.8	0.01		
Helobdella triserialis			1.8	0.01		
Caecidotea					52.0	0.73
Baetis intercalaris[1]			19.7	0.15	5.4	0.08
Stenacron[1]					1.8	0.03
Maccaffertium terminatum[1]			1.8	0.01	10.8	0.15
Tricorythodes[1]			405.5	3.01	376.7	5.28
Argia			1.8	0.01	1.8	0.03
Cyrnellus fraternus[1]			26.9	0.20	21.5	0.30
Cheumatopsyche[1]	4,843.9	23.81	4,013.3	29.81	3,268.7	45.79
Hydropsyche betteni[1]			1.8	0.01	7.2	0.10
Hydropsyche orris[1]					7.2	0.10
Hydropsyche simulans[1]					10.8	0.15
Hydropsyche bidens[1]					1.8	0.03
Ceratopsyche morosa[1]					14.4	0.20
Hydroptila[1]			100.5	0.75	14.4	0.20
Nectopsyche[1]					12.6	0.18
Oecetis[1]					3.6	0.05
Dubiraphia			3.6	0.03	17.9	0.25
Stenelmis			37.7	0.28	91.5	1.28
Ceratopogonidae					1.8	0.03

TABLE I-20 (Continued): BENTHIC INVERTEBRATE DENSITIES FROM HESTER DENDY SAMPLES AT BUSSE LAKE DAM, DEVON AVENUE, AND THORNDALE AVENUE IN SALT CREEK DURING 2008

Taxa	Busse Lake Dam		Devon Avenue		Thorndale Avenue	
	# Organisms/ m^2	% of Sample	# Organisms/ m^2	% of Sample	# Organisms/ m^2	% of Sample
Procladius			10.8	0.08	26.9	0.38
Ablabesmyia janta	125.6	0.62	480.8	3.57	84.3	1.18
Thienemannimyia group	35.9	0.18	430.6	3.20	497.0	6.96
Thienemanniella xena	601.0	2.95	244.0	1.81	16.1	0.23
Cricotopus tremulus group					16.1	0.23
Cricotopus bicinctus group	995.7	4.89	10.8	0.08	43.1	0.60
Cricotopus sylvestris group	484.4	2.38	10.8	0.08		
Nanocladius distinctus	188.4	0.93	159.7	1.19	77.1	1.08
Nanocladius crassicornus					12.6	0.18
Rheocricotopus robacki			35.9	0.27	16.1	0.23
Chironomus			21.5	0.16	12.6	0.18
Cryptochironomus			43.1	0.32	26.9	0.38
Dicrotendipes neomodestus			333.7	2.48	254.8	3.57
Dicrotendipes fumidus	574.1	2.82				
Dicrotendipes lucifer					59.2	0.83
Glyptotendipes	448.5	2.20	181.2	1.35	172.2	2.41
Parachironomus			35.9	0.27		
Phaenopsectra obediens group			139.9	1.04	12.6	0.18
Polypedilum flavum	5,920.3	29.10	2,203.1	16.36	1,435.2	20.11
Polypedilum halterale group			10.8	0.08	12.6	0.18
Polypedilum illinoense	2,601.4	12.79	123.8	0.92	52.0	0.73
Polypedilum scalaenum group			57.4	0.43		
Stenochironomus			10.8	0.08		
Stictochironomus			10.8	0.08		

TABLE I-20 (Continued): BENTHIC INVERTEBRATE DENSITIES FROM HESTER DENDY SAMPLES AT BUSSE LAKE DAM, DEVON AVENUE, AND THORNDALE AVENUE IN SALT CREEK DURING 2008

Taxa	Busse Lake Dam # Organisms/ m^2	Busse Lake Dam % of Sample	Devon Avenue # Organisms/ m^2	Devon Avenue % of Sample	Thorndale Avenue # Organisms/ m^2	Thorndale Avenue % of Sample
Cladotanytarsus mancus group			75.3	0.56	12.6	0.18
Paratanytarsus	62.8	0.31	35.9	0.27	12.6	0.18
Rheotanytarsus	843.2	4.14	197.3	1.47	12.6	0.18
Tanytarsus			21.5	0.16	43.1	0.60
Tanytarsus glabrescens group					16.1	0.23
Simulium			226.0	1.68	9.0	0.13
Hemerodromia	26.9	0.13	37.7	0.28	10.8	0.15
Helisoma			16.1	0.12		
Ferrissia	9.0	0.04	25.1	0.19	39.5	0.55
Corbicula fluminea			3.6	0.03	1.8	0.03
Total Individual Benthos	20,344.5		13,462.5		7,138.5	
Total Taxa Richness	18		44		49	
EPT Taxa Richness	1		7		14	
MBI Score	6.13		6.18		6.11	

[1]EPT Taxon.

TABLE I-21: BENTHIC INVERTEBRATE DENSITIES FROM PETITE PONAR SAMPLES AT BUSSE LAKE DAM, DEVON AVENUE, AND THORNDALE AVENUE IN SALT CREEK DURING 2008

Taxa	Busse Lake Dam		Devon Avenue		Thorndale Avenue	
	# Organisms/ m^2	% of Sample	# Organisms/ m^2	% of Sample	# Organisms/ m^2	% of Sample
Oligochaeta	1,090.8	11.59	3,538.1	55.08	997.6	34.66
Hyalella azteca	14.4	0.15				
Tricorythodes[1]	7.2	0.08	28.7	0.45		
Cheumatopsyche[1]	28.7	0.30	93.3	1.45	43.1	1.50
Oecetis[1]	21.5	0.23				
Stenelmis			21.5	0.34		
Procladius	43.1	0.46			86.1	2.99
Ablabesmyia janta					7.2	0.25
Ablabesmyia mallochi					21.5	0.75
Thienemannimyia group	43.1	0.46	114.8	1.79	14.4	0.50
Cricotopus bicinctus group	43.1	0.46			21.5	0.75
Cricotopus sylvestris group	78.9	0.84				
Nanocladius crassicornus			21.5	0.34		
Chironomus			14.4	0.22	43.1	1.50
Cryptochironomus	1,729.6	18.37	818.1	12.74	330.1	11.47
Cryptotendipes					7.2	0.25
Dicrotendipes neomodestus	86.1	0.91	143.5	2.23	315.8	10.97
Dicrotendipes fumidus	674.6	7.16	35.9	0.56		
Dicrotendipes lucifer					14.4	0.50
Glyptotendipes	78.9	0.84				
Paracladopelma					57.4	2.00
Paralauterborniella nigrohateralis			71.8	1.12		

TABLE I-21 (Continued): BENTHIC INVERTEBRATE DENSITIES FROM PETITE PONAR SAMPLES AT BUSSE LAKE DAM, DEVON AVENUE, AND THORNDALE AVENUE IN SALT CREEK DURING 2008

Taxa	Busse Lake Dam		Devon Avenue		Thorndale Avenue	
	# Organisms/ m^2	% of Sample	# Organisms/ m^2	% of Sample	# Organisms/ m^2	% of Sample
Paratendipes			14.4	0.22	50.2	1.75
Polypedilum flavum	122.0	1.30	272.7	4.25	21.5	0.75
Polypedilum halterale group	344.5	3.66	150.7	2.35	57.4	2.00
Polypedilum illinoense	43.1	0.46			43.1	1.50
Polypedilum scalaenum group	344.5	3.66	552.6	8.60	409.1	14.21
Pseudochironomus	1,995.1	21.19	21.5	0.34		
Stictochironomus	43.1	0.46	7.2	0.11	57.4	2.00
Cladotanytarsus mancus group	2,526.2	26.83	179.4	2.79	150.7	5.24
Tanytarsus sepp					28.7	1.00
Hemerodromia	7.2	0.08				
Ferrissia			7.2	0.11	14.4	0.50
Corbicula fluminea	50.2	0.53	244.0	3.80	86.1	2.99
Musculium			7.2	0.11		
Pisidium			64.6	1.01		
Total Individual Benthos	9,415.7		6,423.1		2,877.8	
Total Taxa Richness	22		22		23	
EPT Taxa Richness	3		2		1	
MBI Score	6.87		8.34		7.62	

[1]EPT Taxon.

consisted of grasses, shrubs, and trees. Bank erosion throughout the study reach was slight to moderate. Riparian land use in the area is "forest" managed by the Forest Preserve District of Cook County.

Depth of fines in the streambed sediment ranged from <1 - 3 feet, with deeper sediment in the center of the creek. Sediment was comprised of sand, gravel, and silt, with a normal amount of embeddedness.

The JFK Boulevard sampling station is located approximately 0.7 mile from the Egan WRP outfall. Channel width ranged from 30 - 60 feet in the sampling reach. Water depth within the 130-foot sampling reach was between 1 - 3 feet under normal conditions and would be characterized as "pool" stream habitat near the JFK Boulevard Bridge and "run" stream habitat upstream of the bridge. Eurasian watermilfoil, leafy pondweed, duckweed, and filamentous algae covered 45 - 75 percent of the sampling area during 2005 and 2006 sampling events and <10 - 50 percent of the sampling area during 2007 and 2008 sampling events. There was little canopy cover, and the immediate shore cover consisted of maintained grass. Bank erosion is controlled throughout the study reach with interlocking concrete bank stabilizers. Riparian land use in the area is urban residential. Depth of fines in the streambed sediment was as deep as 5 feet near the JFK Boulevard Bridge in the side and center of the creek. Sediment was comprised mostly of sand, with silt, plant debris, gravel, and boulders in localized areas, and there was a normal amount of embeddedness.

The Thorndale Avenue sampling station is located approximately 2.4 miles from the Egan WRP outfall. Channel depth was approximately 40 feet in this sampling reach. Water depth within the 130-foot sampling reach was between 1 - 3 feet under normal conditions and would be characterized as a "run" stream habitat. Eurasian watermilfoil and leafy pondweed covered approximately 20 - 35 percent of the sampling area during 2005 and 2006 sampling events and 5 - 10 percent of the sampling area during 2007 and 2008 sampling events. Canopy cover throughout the reach was open to shaded, and immediate shore cover consisted of grasses, shrubs, and trees. Bank erosion throughout the study reach was moderate, and riparian land use in the area was primarily urban industrial. Depth of fines in the streambed sediment ranged from <1 - 2 feet in the sampling reach. Sediment was comprised mostly of sand, with silt, gravel and plant debris, and normal embeddedness.

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SECTION II: EFFECTS OF PHOSPHORUS REDUCTION ON TREATMENT PLANT OPERATION

INTRODUCTION

This section covers the full-scale P reduction test methods with respect to the locations of chemical addition, tests on the chemical dosing rates applied to achieve the predetermined target level, influence on the effluent water quality during the chemical P removal, impact on unit liquid treatment processes, and chemical sludge yield.

OBJECTIVES

The main objectives of removing P from the liquid stream at the Egan WRP were as follows:

1. Demonstrate that adding $FeCl_3$ to existing treatment facilities could reduce TP in the final effluent to 0.5 mg/L.

2. Explore whether the chemical usage for P removal could be decreased with different dosing locations.

3. Evaluate the potential impact on final effluent quality during chemical P removal.

4. Examine the potential impact on the operation of unit processes in the plant during chemical P removal.

5. Estimate the quantity of chemical sludge generation due to P removal.

MATERIALS AND METHODS

Ferric Chloride Addition for Phosphorus Removal

Single-point $FeCl_3$ addition for P removal at the Egan WRP was selected for its simplicity. The primary location for $FeCl_3$ addition was the aeration tanks. P removal was accomplished by adding $FeCl_3$ to the ML at the exit end of the aeration tanks and simultaneously settling the MLSS and particulate P in the secondary clarifiers. Mixing is an important factor that affects the efficiency of chemical P removal (Szabo et al., 2008). Without adding mixing tanks, mixing of $FeCl_3$ with wastewater was achieved through the turbulence at the end of the aeration tank and the drop of ML over the aeration tank effluent weirs. For operational flexibility, one set of $FeCl_3$ storage tanks and metering pumps was designed and constructed for each of the two parallel aeration batteries. Polyvinyl chloride (PVC) pipes were routed to the end of Pass 3 of each aeration tank just a couple of feet before the overflow weir. A perforated PVC pipe was used to inject $FeCl_3$ into the ML from the top. The metering pump was used to control the $FeCl_3$ dosing rate. A relatively constant dosing rate was chosen, as the target effluent concentration was considered a mean concentration over a season. Since various dosing locations were tested, adding $FeCl_3$ to the secondary treatment system for P removal is referred to as Phase I in this report.

The second location for $FeCl_3$ addition was the effluent chamber of the aerated grit tanks before the PSTs. In this approach, $FeCl_3$ was injected into the primary influent, and particulate P was removed in the PSTs. Mixing of $FeCl_3$ with wastewater occurred naturally by the agitation of wastewater in the grit tank effluent chamber and turbulence generated by the flow of wastewater exiting the chamber. A relatively constant dosing rate was chosen, and periodical adjustment of the dosing rate was made to meet the target TP concentration in the final effluent with an optimal amount of chemical. $FeCl_3$ addition to the primary treatment system for P removal is referred to as Phase II in this report.

Simultaneous multiple-point addition of $FeCl_3$ was tested briefly to evaluate whether chemical savings could be achieved during Phase II of the test. In this trial, $FeCl_3$ was simultaneously added to the effluent chamber of the aeration grit tanks before the PSTs and to the secondary effluent channel before the sand filters. The majority of the chemical was dosed to the effluent chamber of aeration grit tanks before the PSTs during the trial. As the trial was very brief, it is not categorized as a separate phase of the test in this report.

Performance Monitoring

As part of the routine plant monitoring program, 24-hour composite samples are collected from raw sewage, primary effluent, combined secondary effluent, final effluent, ML, and return sludge from each aeration battery, as well as other samples from the solids processing train. Table II-1 presents the parameters routinely monitored for plant operation and performance. For

TABLE II-1: PARAMETERS ROUTINELY MONITORED FOR PLANT OPERATION AND PERFORMANCE

Parameter	Raw Sewage	Primary Effluent	Secondary Effluent	Final Effluent	Return Sludge
BOD_5	Daily	Daily	--[1]	5/week	--
$CBOD_5$	Daily	--	--	5/week	--
TSS	Daily	Daily	Daily	5/week	Daily
VSS	--	Daily	--	--	Daily
TP	Daily	Daily	Daily	5/week	--
Sol-P	Weekly	--	--	5/week	--
TKN	Daily	Daily	Daily	5/week	--
NH_3-N	Daily	Daily	Daily	5/week	--
NO_3-N	Daily	Daily	Daily	5/week	--
NO_2-N	Daily	Daily	Daily	5/week	--
pH	Daily	Daily	Daily	5/week	--
Tot-Fe	Weekly	--	--	5/week	--
Sol-Fe	Weekly	--	--	Weekly	--

[1]-- = Not analyzed at all.

this study, alkalinity in the primary and secondary effluents, Tot-Fe and soluble iron (Sol-Fe) in the secondary effluent, orthophosphate P (Ortho-P) in the secondary and final effluent, and others were added into the list of parameters to be analyzed to collect additional information on the P removal process and performance. The additional parameters are listed in Table II-2.

Profile Sampling

Grab samples along each aeration tank were collected to profile the N and P concentration distribution in the aeration tank. This analysis was performed to ensure that the biological treatment system was not negatively impacted by the chemical addition for P removal. The measurements of N and P profiles were typically made immediately after the adjustment of chemical dosing rates or when the secondary treatment had potential problems, such as foaming or poor settling of ML.

Data Analysis Methods

An average value over a specific period is typically calculated using an arithmetic mean of all available daily values in the period. In the calculation, the report limit is used if a daily value is reported as less than the report limit. For example, the report limit for NH_3-N is 0.03 mg/L. Some daily NH_3-N concentrations are reported as <0.03 mg/L. To calculate the average value for a period, 0.03 mg/L is used wherever there is <0.03 mg/L. The same convention is also used in the calculation of the standard deviation of the daily values for the period.

A derived average value is defined as the result of a calculation using the average values of different parameters over the same time period. For example, the P content in the SS of the secondary effluent was calculated using the difference of the average values of TP and Sol-P concentrations in the secondary effluent divided by the average value of SS in the secondary effluent over the same period. The derived average method is commonly used in the calculations when daily values are extremely variable, such as solids mass in and out of the primary and secondary treatment systems.

TABLE II-2: PARAMETERS ADDED FOR PHOSPHORUS REMOVAL TEST

Parameter	Raw Sewage	Primary Effluent	Secondary Effluent	Final Effluent	Return Sludge
$CBOD_5$	A/R[1]	--[2]	Daily[3]	A/R	--
VSS	--	A/R	Daily	--	A/R
TP	A/R	A/R	A/R	A/R	Daily[3]
Sol-P	Daily	Daily	Daily	A/R	Daily[3]
Ortho-P	--	--	Weekly	Weekly	--
Turbidity	--	--	--	Weekly	--
Alkalinity	--	Daily[3]	Daily[3]	Daily[3]	--
Tot-Fe	A/R	--	Daily[4]	A/R	--
Sol-Fe	A/R	--	Daily[4]	Daily[4]	--

[1]A/R = analyzed routinely.
[2]-- = Not analyzed at all.
[3]Analysis was reduced to three times per week from November 2007 to the middle of January 2009.
[4]Analysis was reduced to twice per week from November 2007 to the middle of January 2009.

RESULTS AND DISCUSSION

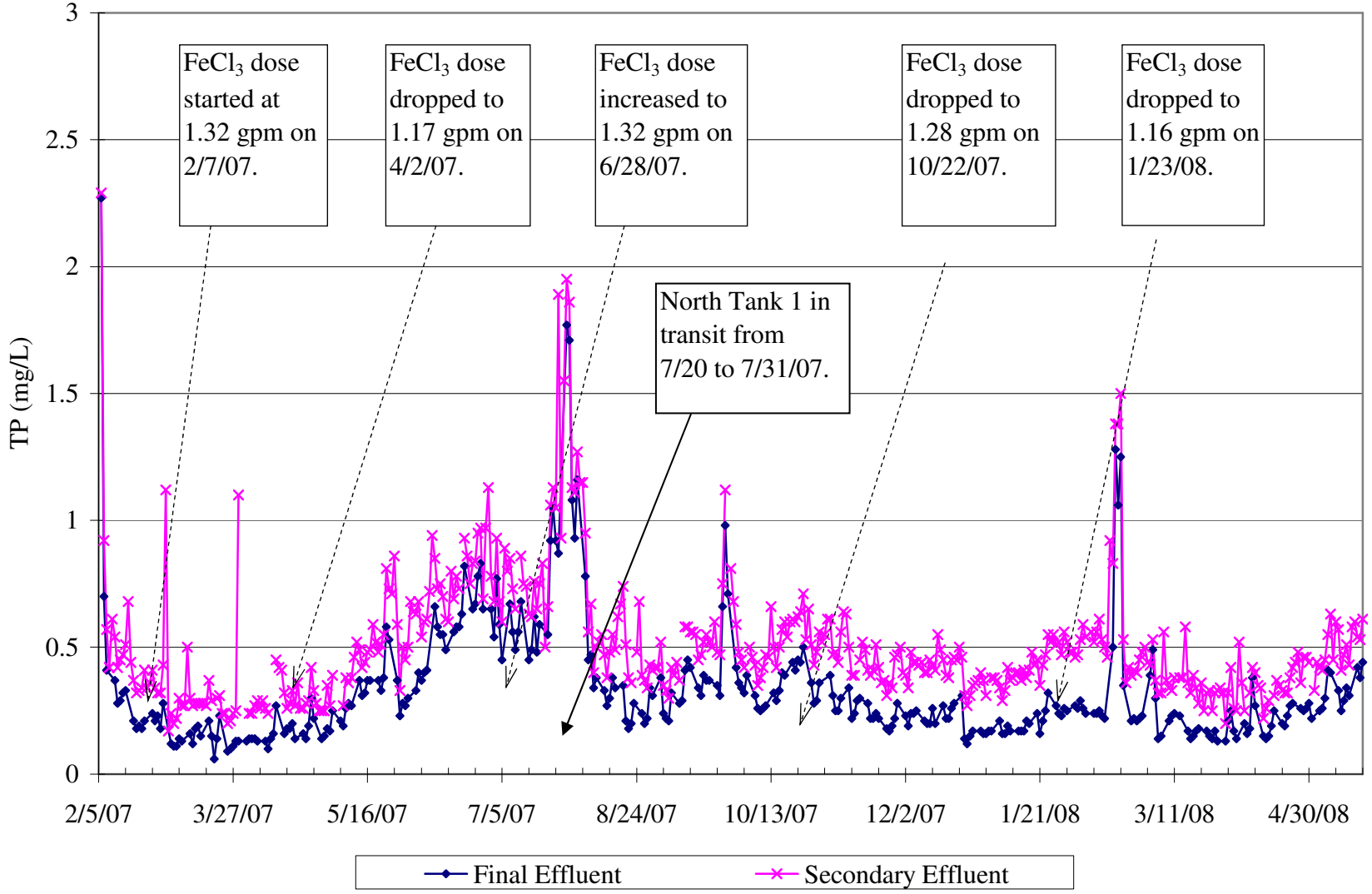
Removing Phosphorus to the Target Level

Adding Ferric Chloride to the Secondary Treatment System (Phase I). According to the results from a previous short-term, pilot-scale chemical P removal study at the Egan WRP (Zhang et al., 2006), the initial $FeCl_3$ dosing rate was 1.32 gpm. This dosing rate corresponds to approximately 36 mg/L of $FeCl_3$ assuming a wastewater inflow rate of 24 million gallons per day (MGD) and a 33 percent $FeCl_3$ solution. The dosing rate was to remain relatively constant regardless of potential fluctuation in influent P loads. It is believed that the activated-sludge inventory in the aeration tanks and the accumulation of ferric particles in the activated sludge would provide a buffer to the fluctuation of influent P loads. The operational control of the secondary treatment system, such as ML return rate and SRT, would not be changed because of the introduction of chemical P removal.

The $FeCl_3$ addition to the end of aeration tanks commenced on February 5, 2007, and reached the targeted initial dosing rate of 1.32 gpm on February 7, 2007, because the $FeCl_3$ feedline to the south aeration battery, which had two aeration tanks in service and was treating two thirds of the plant flow, was initially frozen. The P level in the final effluent dropped immediately after the target chemical dosing rate was reached; the TP concentration decreased from 3.38 mg/L on February 5, 2007, to 0.41 mg/L on February 8, 2007. The TP concentration remained well below the target level of 0.5 mg/L in the next seven weeks, which indicated that the dosing rate was too high. In order to optimize the $FeCl_3$ usage, the dosing rate was reduced to 1.17 gpm on April 2, 2007, and was further adjusted three times between April 2, 2007, and May 20, 2008, which was the last date $FeCl_3$ was added to the aeration tanks. The major events relating to chemical P removal at the Egan WRP are presented in Table AIII-1 of Appendix III.

TP concentrations in the secondary and final effluents of the Egan WRP during the addition of $FeCl_3$ to the secondary treatment system for P removal are presented in Figure II-1. As can be seen in the figure, TP concentrations in the secondary and final effluent of the Egan WRP remained close to or below the target level of 0.5 mg/L except for three distinct peaks. The spike in TP concentrations in the secondary and final effluents in late July 2007 was due to the operational interruption of chemical P removal when the north aeration tank was put back in service and received no $FeCl_3$ during the transitional period from July 20 - 30, 2007. The second and third spikes of TP concentration on September 25 - 27, 2007, and February 18 - 20, 2008, were primarily caused by spikes in influent P loading, which are discussed in the following paragraph. In the period of February 7, 2007, to May 20, 2008, excluding July 20 - 30, 2007, the average TP concentrations in the secondary and final effluent were 0.49 mg/L and 0.31 mg/L, respectively. The corresponding average Sol-P concentrations in the secondary and final effluent were 0.284 mg/L and 0.267 mg/L, respectively. The sand filters at the Egan WRP removed 0.18 mg/L of TP, which is a derived average value in this period, while the mean SS concentrations decreased from 6.4 mg/L in the secondary effluent to below 2 mg/L in the final effluent. The average P content in the particles removed by the filters in this period was about 3.2 percent, which is

FIGURE II-1: DAILY TOTAL PHOSPHORUS CONCENTRATIONS IN THE SECONDARY AND FINAL EFFLUENTS AT THE JOHN E. EGAN WATER RECLAMATION PLANT DURING FERRIC CHLORIDE ADDITION TO AERATION TANKS IN THE PHOSPHORUS REDUCTION DEMONSTRATION STUDY



also a derived average value. The monitoring data for the Egan WRP final effluent and secondary effluent during the P removal study periods are presented in Tables AIV-1 and AIV-2 of Appendix AIV, respectively.

The $FeCl_3$ dose rate was adjusted after the TP concentrations in the final effluent were trending down or up, as shown in Figure II-1, to optimize the use of chemical. The main reason that the final effluent P concentration increased or decreased is the change of influent P loads while the amount of $FeCl_3$ addition is relatively constant. Figure II-2 shows the daily TP and Sol-P loads in the primary effluent, the daily TP concentrations in the final effluent, and the $FeCl_3$ dosing rates in gallons per day (gal/d) over the period of February 5, 2007, to May 20, 2008. As can be seen in the figure, both TP and Sol-P loads in the primary effluent varied day to day, and the two TP spikes in the final effluent occurred when both TP and Sol-P loads peaked. Excluding these two spikes, the final effluent TP concentrations did not vary swiftly compared to the influent P loads. Colding, et al. (2000) found that Fe oxides or hydroxides could immobilize Sol-P in soils through adsorption. Although the P removal rate by ferric hydroxide [$Fe(OH)_3$] was much lower compared to $FeCl_3$, Denham (2007) found that $Fe(OH)_3$ could reduce P in the solution given sufficient contact and time. Apparently, the accumulated ferric particles in the ML of the aeration tanks provided buffering capacity that could smooth the P load variations.

Ortho-P is typically used as a design parameter for chemical P removal (WEF, 1998). In case the orthophosphate is not measured, Sol-P may be used as a substitute. In this study, TP and Sol-P concentrations in the primary effluent were measured daily, but Ortho-P was not measured at all. The monitoring data for the primary effluent of the Egan WRP in 2007 and 2008 are provided in Table AIV-3 of Appendix AIV. Table II-3 presents the average molar ratios of the amount of Fe added to the Sol-P load in the primary effluent (Fe:Sol-P) for the five periods. In each of these periods, the $FeCl_3$ dosing rate was held relatively constant. Table 3 also includes the corresponding Sol-P concentrations in the secondary effluent, along with the weight ratios of Fe to TP load (Fe:TP) and BOD_5 loads in the primary effluent. In the calculations, it was assumed that the daily $FeCl_3$ dosing rate remained constant for a given period, and the average content of $FeCl_3$ and specific weight of the $FeCl_3$ solution used in the study were 34.4 percent and 11.7 pounds per gallon, respectively. The Sol-P concentration in the secondary effluent was used because it is considered as the residual P concentration after the chemical reaction between $FeCl_3$ and phosphate. As can be seen in the table, the relationship between the average molar ratios of Fe:Sol-P and Sol-P concentrations in the secondary effluent was poor. This is likely because organic-bound P is released after the organics in the wastewater are degraded by the microbial community, and the amount of P that is assimilated by the biological community varies with the BOD_5 load. The TP and BOD_5 loads in the primary effluent may not have the same variation as the Sol-P loads, as evidenced in Table II-3. Figure II-3 shows the daily molar ratios of Fe to Sol-P in the primary effluent versus Sol-P concentrations in the secondary effluent for the period of February 7, 2007, to May 20, 2008, excluding the period of July 20 - 30, 2007. The relationship between the daily molar ratios of Fe to Sol-P and Sol-P concentrations in the secondary effluent also appears to be poor based on the R-square value for the fitted equation using the Trendline program in Microsoft Excel, as shown in Figure II-3. Therefore, Sol-P, or even Ortho-P if measured, in the influent may not be a reliable control parameter for chemical P removal through simultaneous precipitation in an activated sludge system, as the amounts of organic-bound P and BOD_5 in the influent affect the effluent P concentrations as well.

FIGURE II-2: DAILY TOTAL PHOSPHORUS AND SOLUBLE PHOSPHORUS LOADS IN THE PRIMARY EFFLUENT, TOTAL PHOSPHORUS CONCENTRATIONS IN THE FINAL EFFLUENT, AND FERRIC CHLORIDE DOSING RATE BETWEEN FEBRUARY 5, 2007, TO MAY 20, 2008

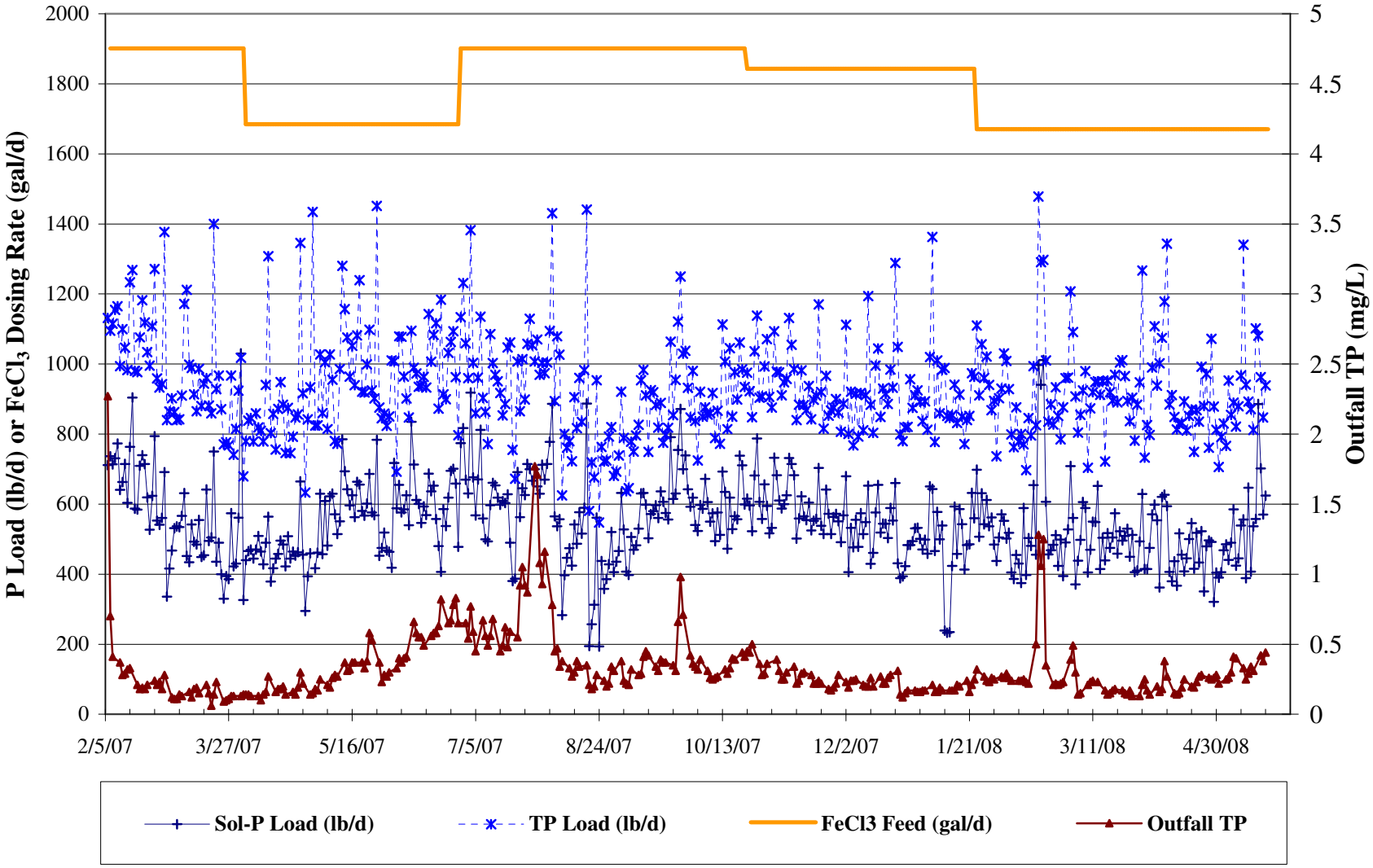
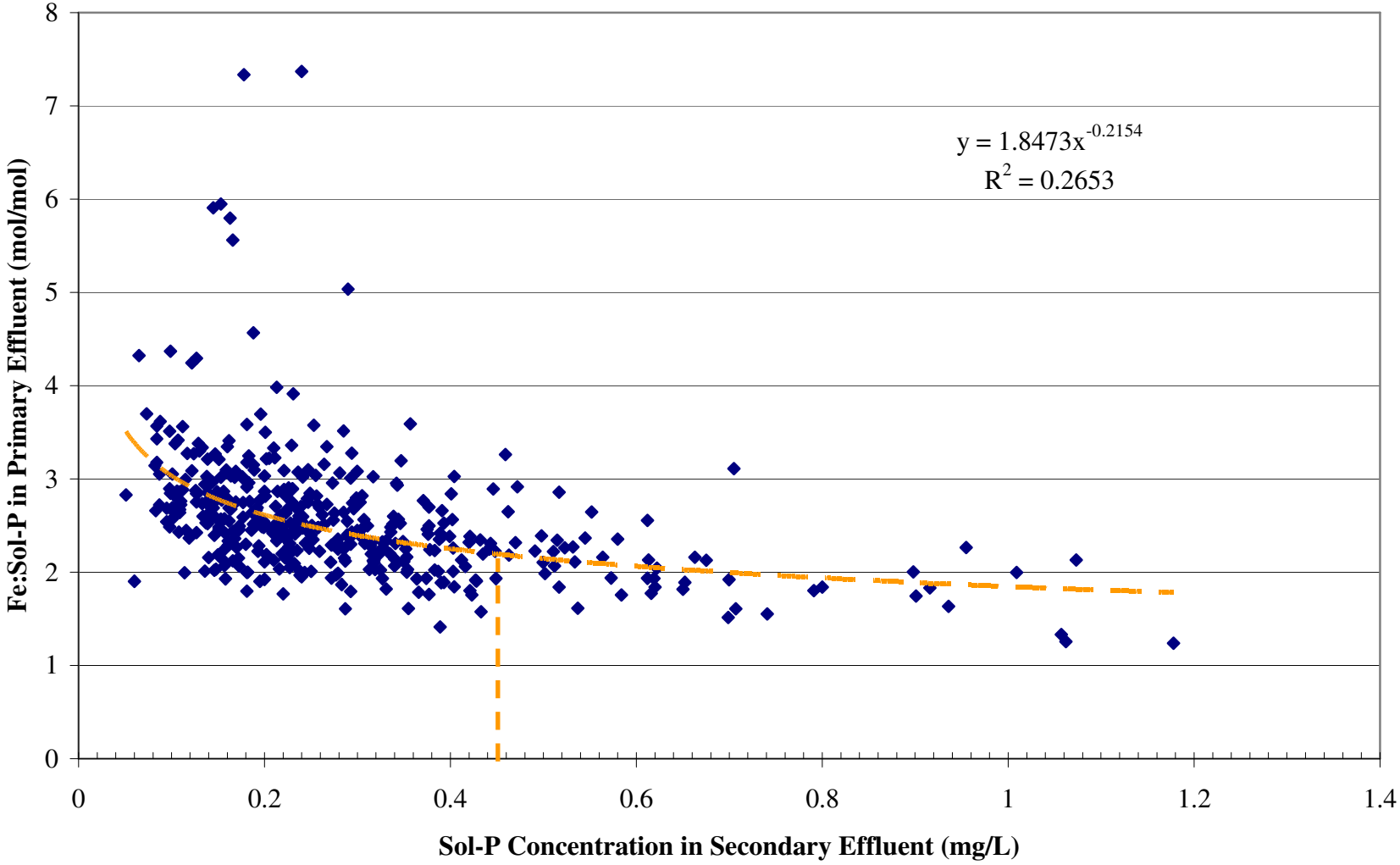


TABLE II-3: AVERAGE MOLAR RATIO OF IRON TO SOLUBLE PHOSPHORUS AND THE CORRESPONDING SOLUBLE PHOSPHORUS CONCENTRATIONS IN THE SECONDARY EFFLUENT AND OTHER RELATED VARIABLES DURING PHASE I OF THE TEST

Time Period	02/07/07 – 04/01/07	04/02/07 – 06/27/07	06/28/07 – 10/21/07[1]	10/22/07 – 01/22/08	01/23/08 – 05/20/08
$FeCl_3$ Dosing Rate (gpm)	1.32	1.17	1.32	1.28	1.16
Sol-P Loads in Prim Eff (lb/d)	578	547	575	546	513
TP Loads in Prim Eff (lb/d)	996	947	905	925	922
BOD_5 Load in Prim Eff (lb/d)	24,842	20,687	17,908	21,206	19,355
Ratio of TP to BOD_5 (w/w)	0.040	0.046	0.051	0.044	0.048
Ratio of Fe:TP (w/w)	2.64	2.47	2.93	2.73	2.50
Ratio of Fe:Sol-P (mol/mol)	2.62	2.41	2.67	2.65	2.55
Mean Sol-P in 2nd Eff (mg/L)	0.173	0.331	0.411	0.226	0.236

[1]Period of July 20 - 30, 2007, was excluded in the calculations.

FIGURE II-3: DAILY MOLAR RATIOS OF IRON TO SOLUBLE PHOSPHORUS IN THE PRIMARY EFFLUENT VERSUS SOLUBLE PHOSPHORUS CONCENTRATIONS IN THE SECONDARY EFFLUENT OVER THE PERIOD OF FEBRUARY 7, 2007, TO MAY 20, 2008, EXCLUDING JULY 20 - 30, 2007



Adding Ferric Chloride to the Primary Treatment System (Phase II). The location of the $FeCl_3$ dosing point was moved from the end of the aeration tanks to the effluent chamber of the aerated grit tanks at the Egan WRP on May 21, 2008, to evaluate the potential impact of different dosing locations for chemical P removal on chemical usage, plant operations, and performance. The target TP concentration in the final effluent remained 0.5 mg/L. To ensure there was not a P deficiency for biological treatment in the subsequent aeration tanks, the $FeCl_3$ dosing rate was initially 1.00 gpm and was increased stepwise if the TP concentration in the final effluent was consistently above the target level of 0.5 mg/L. Figure II-4 presents the $FeCl_3$ dosing rates and TP concentrations in the secondary and final effluent in the first six weeks after the dosing point was moved. As can be seen in the figure, the TP concentrations in the final effluent were above 0.5 mg/L most of the time, indicating that the amount of $FeCl_3$ added was not sufficient to remove P to the target level during this period. The $FeCl_3$ dosing rate was increased to 1.32 gpm on June 27, 2008, which was the highest dosing rate used in Phase I of the test. The $FeCl_3$ dosing rate remained at 1.32 gpm for the next three and one-half months, except for a few interruptions, and then dropped to 1.19 gpm on October 14, 2008. After a two-day interruption of the $FeCl_3$ dosing system on October 29 and 30, 2008, the dosing rate resumed to 1.18 gpm and remained at this level until the end of the test on December 23, 2009, as noted in Table AIV-1 of Appendix AIV.

Figure II-5 presents the $FeCl_3$ dosing rates and TP concentrations in the primary and final effluent from June 27 through December 23, 2008, excluding August 10 - 11 and October 29 - 30, 2008, due to a problem with the $FeCl_3$ feeding system, and July 22 - 24 and August 18 - 20, 2008, because simultaneous multiple-point $FeCl_3$ addition was being tested during those periods. The trials on simultaneous multiple-point $FeCl_3$ addition will be discussed in the next section. As can be seen in the figure, the daily TP concentrations in the final effluent varied widely during these periods. However, the average TP concentrations in the final effluent in this period were 0.46 mg/L, which met the target level of 0.5 mg/L of TP for the study despite many daily TP concentrations being above the target level. The removal of particulate P by the sand filters in this period was comparable to that for the period when $FeCl_3$ was added to the secondary treatment system. The sand filters reduced the average SS concentration from 4.8 mg/L to less than 2 mg/L, which resulted in an average TP reduction of 0.14 mg/L, which is a derived average. The average P content in the SS removed by the sand filters in this period, which is also a derived average, was 3.2 percent by weight, which is similar to that in the Phase I period.

Figure II-5 shows that many spikes in Sol-P concentration in the primary effluent did not result in corresponding spikes in TP concentration in the final effluent, although the TP concentrations in the final effluent appeared to follow the general trend of Sol-P concentrations in the primary effluent. Sol-P concentrations in the primary effluent are typically related to the incoming Sol-P load and the amount of $FeCl_3$ added for chemical P removal in the primary settling process (WEF, 1998). Figure II-6 presents the $FeCl_3$ dosing rates, Sol-P load in the raw sewage, and Sol-P concentrations in the primary effluent between May 21 and December 23, 2008, excluding August 10 - 11 and October 29 - 30, 2008, due to a problem with the $FeCl_3$ feeding system. As can be seen, the spikes in Sol-P concentration in the primary effluent did not correlate well with the incoming Sol-P load even during the period when the $FeCl_3$ dosing rate remained constant. This is possibly due to the instantaneous fluctuation of incoming Sol-P loads. Unlike dosing $FeCl_3$ to the activated sludge system in which ferric particles could have more

FIGURE II-4: FERRIC CHLORIDE DOSING RATES AND TOTAL PHOSPHORUS CONCENTRATIONS IN THE SECONDARY AND FINAL EFFLUENTS IN THE FIRST SIX WEEKS OF PHASE II

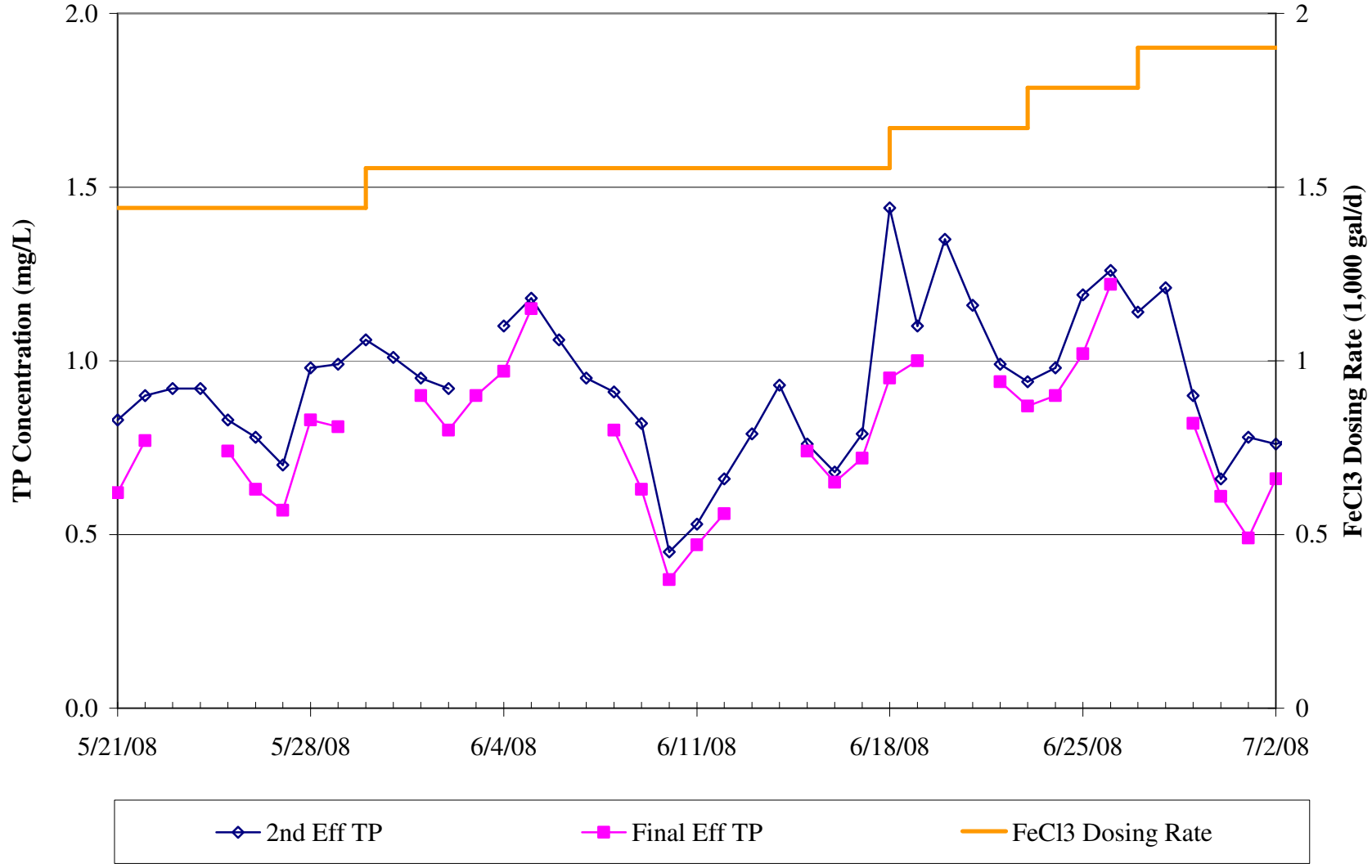


FIGURE II-5: FERRIC CHLORIDE DOSING RATES AND TOTAL PHOSPHORUS CONCENTRATIONS IN THE SECONDARY AND FINAL EFFLUENTS BETWEEN JUNE 27 AND DECEMBER 23, 2008

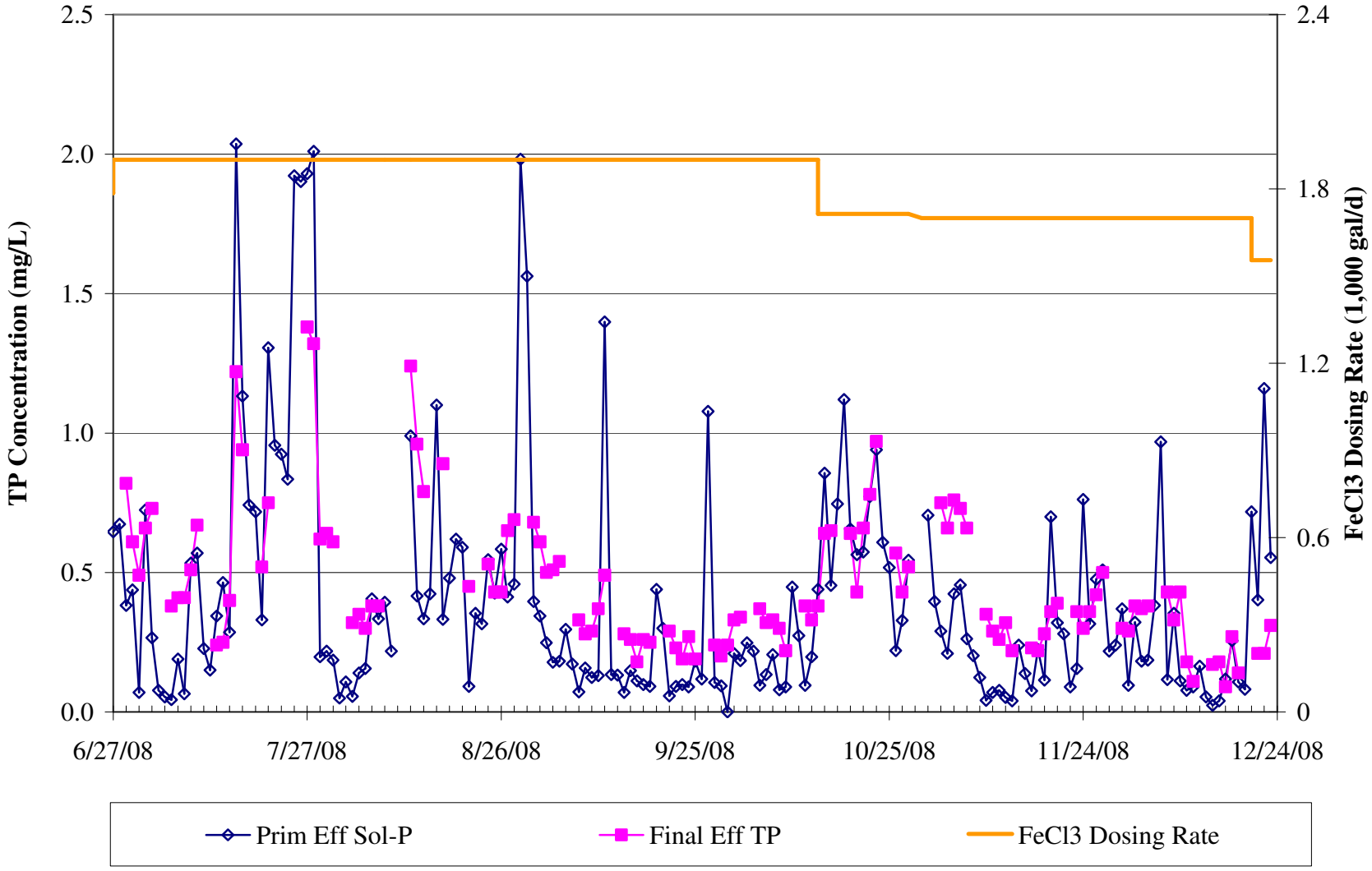
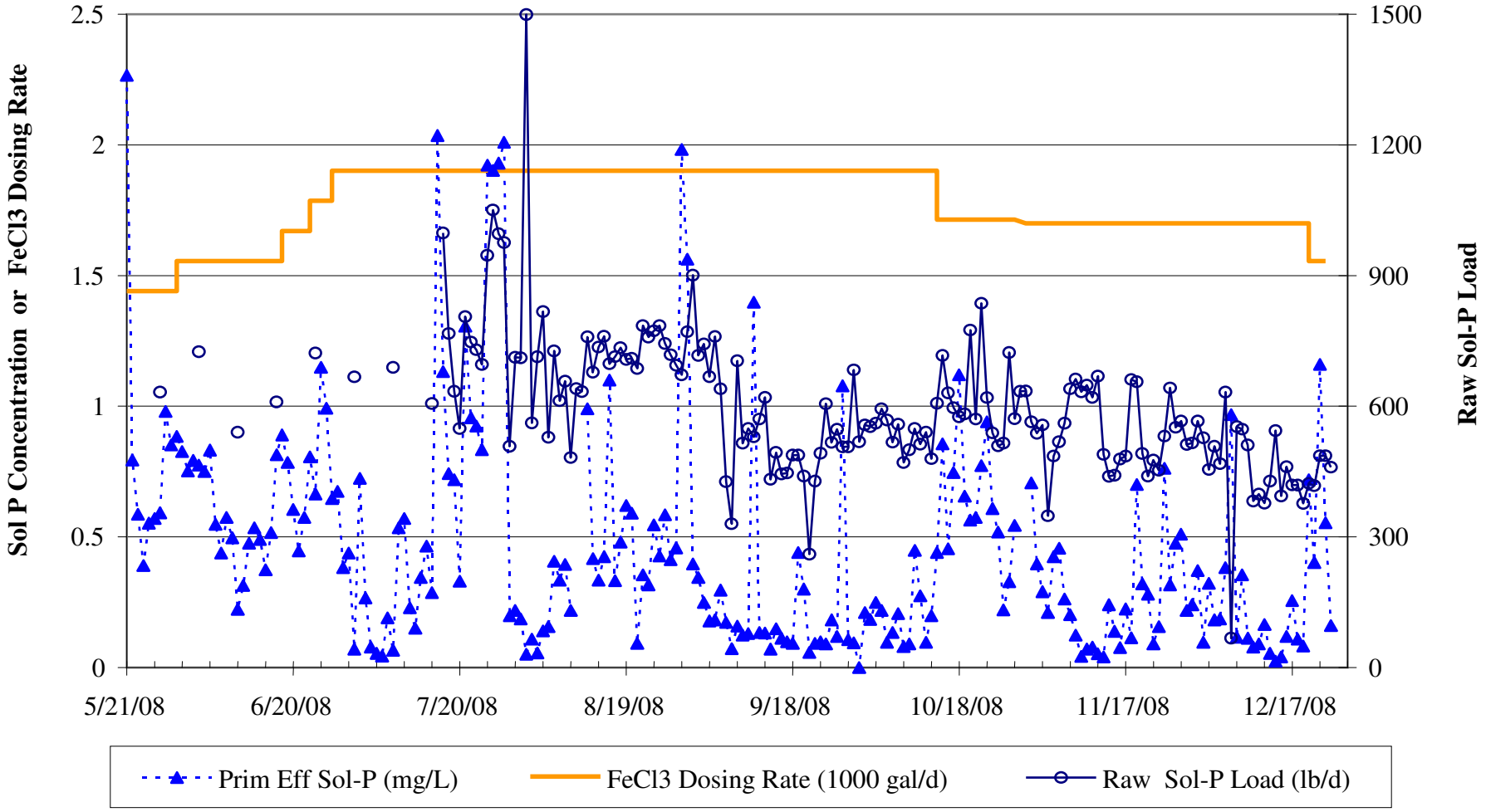


FIGURE II-6: FERRIC CHLORIDE DOSING RATES, SOLUBLE PHOSPHORUS LOADS IN THE RAW SEWAGE, AND SOLUBLE PHOSPHORUS CONCENTRATIONS IN THE PRIMARY EFFLUENT BETWEEN MAY 21 AND DECEMBER 23, 2008



contact opportunity with P, the addition of $FeCl_3$ before the PSTs resulted in a one-time contact between $FeCl_3$ and P in the wastewater. Therefore, instantaneous fluctuation of incoming Sol-P loads would have a negative impact on the removal efficiency when the chemical dosing rate was held constant.

The organic-bound P and BOD_5 loads in the raw sewage could have some impact on the TP concentrations in the final effluent, as discussed in the previous section. Table II-4 presents the average values of $FeCl_3$ dosing rates, Sol-P loads in the influent, ratio of Fe to Sol-P, TP and BOD_5 loads in the primary effluent, ratio of TP to BOD_5 loads, Sol-P concentrations in the primary and final effluent, and TP concentrations in the final effluent for the selected periods. As can be seen in the table, the average Sol-P concentrations in the final effluent were different than the corresponding ones in the primary effluent. The difference could be caused by the release or uptake of P from the degradation of organics in the secondary treatment system. However, the correlation between the ratio of TP to BOD_5 loads and change of Sol-P from the primary effluent to the final effluent was poor based on the average values presented in Table II-4.

It appears that the molar ratios of Fe to Sol-P in the influent, which is measured before the $FeCl_3$ dosing point, correlated well with the corresponding Sol-P concentrations in the final effluent during Phase II of the test according to the average values presented in Table II-4. Figure II-7 shows the relationship between the molar ratios of Fe to Sol-P in the influent and Sol-P concentrations in the secondary effluent using the average values for the five periods listed in Table II-4. The main reason for using the Sol-P concentrations in the secondary effluent rather than those in the final effluent in this figure was that the results could be compared with those in Figure II-3, which presents the data from Phase I of the test. The data points in Figure II-7 were fitted with a power equation using the Trendline program in Microsoft Excel. As shown in the figure, the R-square value for the equation is very close to 1, indicating a strong correlation between the molar ratios of Fe to Sol-P and Sol-P concentrations in the secondary effluent.

Adding Ferric Chloride to Two Locations Simultaneously. Two trials were made to simultaneously add $FeCl_3$ to two locations for P removal. One location was before the PSTs, and the other was before the sand filters. The first trial started on July 22, 2008. $FeCl_3$ solution from a trailer tank was pumped at a rate of 0.25 gpm to the influent channel of the sand filter in the vicinity of the filter building, while at the same time $FeCl_3$ was also added before the PSTs at a rate of 1.07 gpm with the sum being the same as 1.32 gpm. A small air compressor was used to inject compressed air into the channel before the sand filters at the $FeCl_3$ dosing point for mixing. Table II-5 presents the daily mean values of major parameters related to P removal during two-point $FeCl_3$ addition from July 22 - 24, 2008. As can be seen, the target TP concentration in the final effluent was achieved during these days, even though the influent Sol-P loads were relatively high compared to the values reported in Table II-4. As can be seen in Table II-4, the target TP concentration in the final effluent could not be achieved when the influent Sol-P load was at the same level, and the total amount of $FeCl_3$ added was the same at one-point application before the PSTs. The test of adding $FeCl_3$ simultaneously at the two locations had to stop after three days because brown foaming in the receiving water adjacent to the plant outfall was observed.

TABLE II-4: AVERAGE VALUES OF MAJOR PARAMETERS INFLUENCING THE TOTAL PHOSPHORUS CONCENTRATIONS IN THE FINAL EFFLUENT IN THE SELECTED PERIODS OF FERRIC CHLORIDE ADDITION TO THE PRIMARY INFLUENT

Time Period	05/30/08 – 06/17/08	06/28/08 – 09/05/08[1]	09/06/08 – 10/13/08	10/14/08 – 10/28/08	10/31/08 – 12/23/08
$FeCl_3$ Dosing Rate (gpm)	1.08	1.32	1.32	1.19	1.18
Sol-P Loads in Raw (lb/d)	625	747	513	624	502
Ratio of Fe:Sol-P in Raw (mol/mol)	1.89	1.99	2.87	2.10	2.56
Mean Sol-P in Prim Eff (mg/L)	0.60	0.55	0.21	0.62	0.28
TP Loads in Prim Eff (lb/d)	417	484	442	421	375
BOD_5 Loads in Prim Eff (lb/d)	11,815	14,409	14,463	11,579	13,623
Ratio of TP to BOD_5 (w/w)	0.035	0.034	0.031	0.036	0.028
Mean Sol-P in Final Eff (mg/L)	0.68	0.57	0.26	0.57	0.31
Mean TP in Final Eff (mg/L)	0.74	0.62	0.29	0.61	0.35

[1]Periods of no $FeCl_3$ addition and two-point dosing were excluded in the calculations.

FIGURE II-7: RELATIONSHIP BETWEEN RATIO OF IRON TO SOLUBLE PHOSPHORUS IN RAW SEWAGE AND SOLUBLE PHOSPHORUS CONCENTRATION IN THE SECONDARY EFFLUENT DURING PHASE II TEST BASED ON THE AVERAGE VALUES FOR THE FIVE PERIODS LISTED IN TABLE II-4

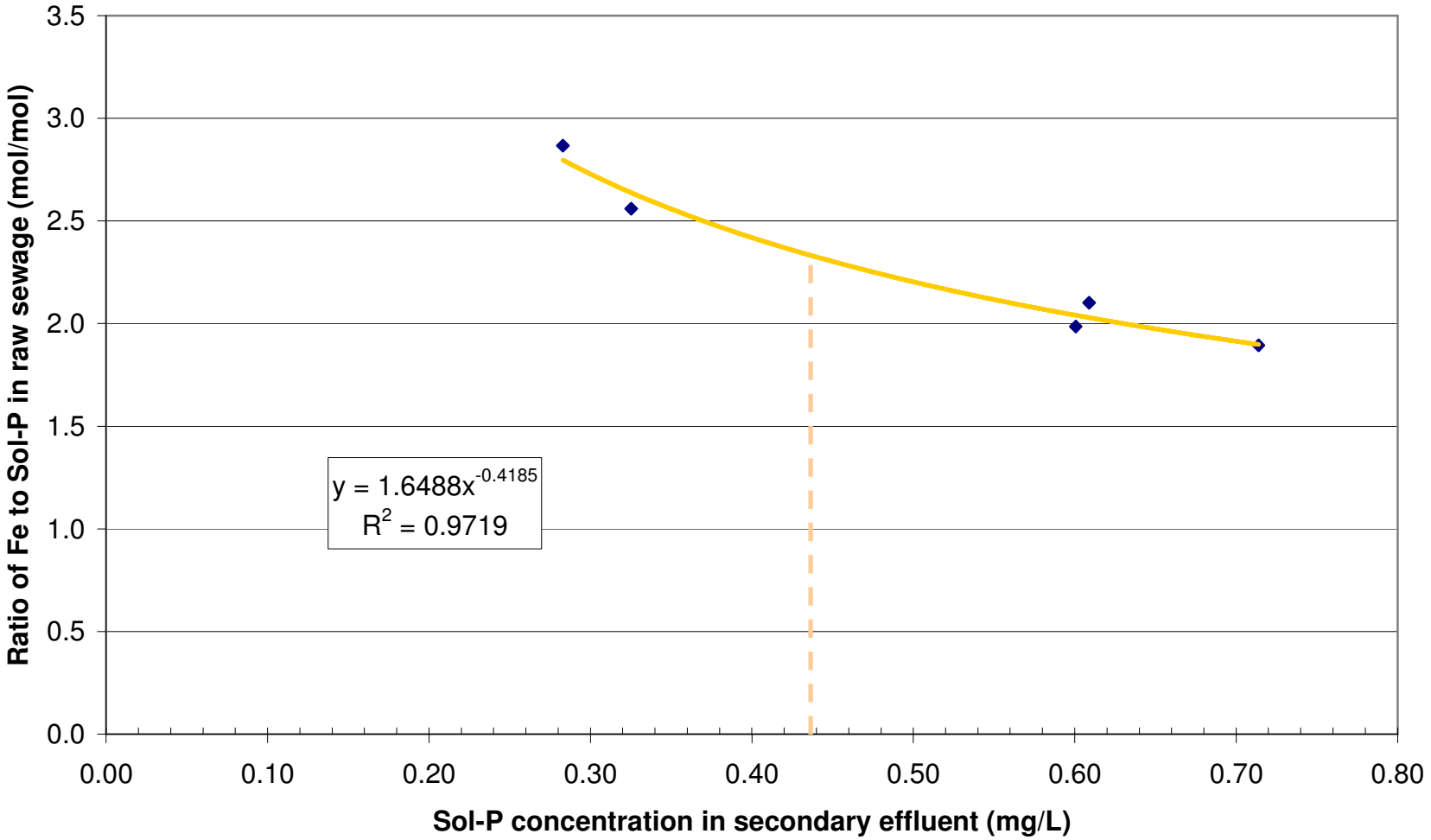


TABLE II-5: DAILY MEAN VALUES OF MAJOR PARAMETERS COLLECTED DURING TWO-POINT FERRIC CHLORIDE ADDITION FROM JULY 22 - JULY 24, 2008

Parameter	7/22/08	7/23/08	7/24/08
Sol-P load in plant influent (lb/d)	747	729	696
$FeCl_3$ dosing rate to primary influent (gpm)	1.07	1.07	1.07
Fe to Sol-P ratio (mol/mol)	1.55	1.58	1.66
Sol-P concentration in primary effluent (mg/L)	0.96	0.92	0.83
TP Load in primary effluent (lb/d)	460	549	485
BOD_5 Loads in primary effluent (lb/d)	7,498	12,730	11,009
TP to BOD_5 ratio (lb/lb)	0.061	0.043	0.044
$FeCl_3$ dosing rate prior to sand filters (gpm)	0.25	0.25	0.25
Sol-P concentration in final effluent (mg/L)	0.47	0.37	0.30
TP concentration in final effluent (mg/L)	0.50	0.42	0.33
Total iron concentration in final effluent (mg/L)	0.10	2.52	0.27

The second trial of dosing $FeCl_3$ simultaneously at two locations was made on August 18 - 20, 2008. The $FeCl_3$ dosing point before the filters was moved upstream to a manhole next to one of the secondary clarifiers. The $FeCl_3$ dosing rate was reduced to 0.15 gpm at the second dosing point, while 1.20 gpm of $FeCl_3$ was added at the first dosing point before the PSTs. The Sol-P loads in the influent were as high as in the first attempt, ranging from 708 to 734 pounds per day. The corresponding Sol-P concentrations in primary effluent and TP concentrations in the final effluent in these three days varied from 0.48 to 0.62 mg/L and from 0.49 to 0.65 mg/L, respectively. These results were not as good as in the first attempt. Again, the test had to stop immediately after brown foaming was observed in the receiving water adjacent to the plant outfall. Therefore, the duration of these two tests was not long enough to collect credible data. The question of whether chemical is being saved by simultaneous two-point addition needs to be answered with further long-term investigation.

Optimal Ferric Chloride Dose for Removing Phosphorus to the Target Level. The optimal $FeCl_3$ dose for removing P to the target level of 0.5 mg/L TP in the final effluent may be estimated using the fitted equations presented in Figures II-3 and II-7 for Phase I and Phase II, respectively. As both equations were derived using Sol-P concentrations in the secondary effluent, a Sol-P concentration of 0.44 mg/L in the secondary effluent was used in the calculations. The difference between Sol-P concentrations in the secondary effluent and the corresponding TP concentrations in the final effluent varied daily but were relatively small because of very low SS in the final effluent after tertiary treatment. An attempt to correlate the TP concentrations in the final effluent with the Sol-P concentrations in the secondary effluent was not made. The particulate P in the final effluent was estimated to be 0.06 mg/L using 3.2 percent P content by weight in the SS exiting the plant and SS of 2 mg/L in the final effluent.

The calculation results showed that slightly less chemical was required to remove P to the target value of 0.5 mg/L of TP in the final effluent if $FeCl_3$ was added to the secondary treatment system. It was reported that by providing sufficient contact between the metal hydroxide flocs and the phosphate in the water, more P removal could be achieved with less chemicals (Szabo et al., 2008). Apparently, ferric particles had a much longer retention time in the system when $FeCl_3$ was added to the secondary treatment system. The optimal molar ratio of Fe to Sol-P for removing P to the target level was 2.2 in Phase I, obtained using the equation in Figure II-3 and a Sol-P concentration of 0.44 mg/L, while the ratio was 2.3 in Phase II using the equation in Figure II-7 and the same Sol-P concentration of 0.44 mg/L. However, the estimation of the optimal $FeCl_3$ dose for Phase I of the test was weak because of the poor R-square value for the equation in Figure II-3. Further investigation and analysis are required to examine whether adding $FeCl_3$ to the secondary treatment system for P removal uses less chemical compared to adding it to the primary treatment system if the target TP concentration in the final effluent is the same.

Impact on Effluent Quality

The comparison of key quality parameters in the final effluent for the periods with and without $FeCl_3$ addition for P removal showed that the addition of $FeCl_3$ to either the ML or the primary influent for removing P to the 0.5 mg/L level had a minimal adverse impact on the quality of the final effluent at the Egan WRP. Table II-6 shows the statistical summary of

TABLE II-6: STATISTICAL SUMMARY OF SELECT PARAMETERS IN THE FINAL EFFLUENT FOR PERIODS WITH AND WITHOUT FERRIC CHLORIDE ADDITION

Period	Parameter[1]	Flow (MGD)	pH (unit)	$CBOD_5$ (mg/L)	SS (mg/L)	TKN (mg/L)	NH_3-N (mg/L)	NO_3-N (mg/L)	TP (mg/L)	Sol-P (mg/L)
2006[2]	Mean	26.3	7.1	<2	<2	1.30	<0.076	15.1	3.72	3.29
	Minimum	18.5	6.8	<2	<2	0.10	<0.03	8.7	0.92	0.80
	Maximum	59.8	7.3	4	9	2.50	0.580	20.5	8.22	7.67
	Std. Dev.	6.5	0.1	0	1.0	0.30	0.064	2.29	1.08	1.02
	Observation	365	261	261	261	261	261	261	261	260
Phase I[3]	Mean	28.0	7.04	<2	<2	0.94	<0.090	14.6	0.31	0.27
	Minimum	18.8	6.4	<2	<2	0.10	<0.03	7.4	0.06	0.03
	Maximum	57.6	7.5	2	9	3.00	1.650	19.2	1.28	1.11
	Std. Dev.	7.4	0.1	0	0.9	0.23	0.137	2.5	0.19	0.18
	Observation	458	331	326	326	326	326	326	326	326
Phase II[4]	Mean	27.6	7.08	<2	<2	1.08	<0.076	17.6	0.52	0.47
	Minimum	20.7	6.8	<2	<2	0.70	<0.03	5.7	0.09	0.08
	Maximum	57.3	7.4	2	4	1.90	1.01	26.6	1.38	1.33
	Std. Dev.	6.3	0.1	0	0.3	0.21	0.10	3.2	0.28	0.26
	Observation	206	146	145	145	145	145	145	145	145

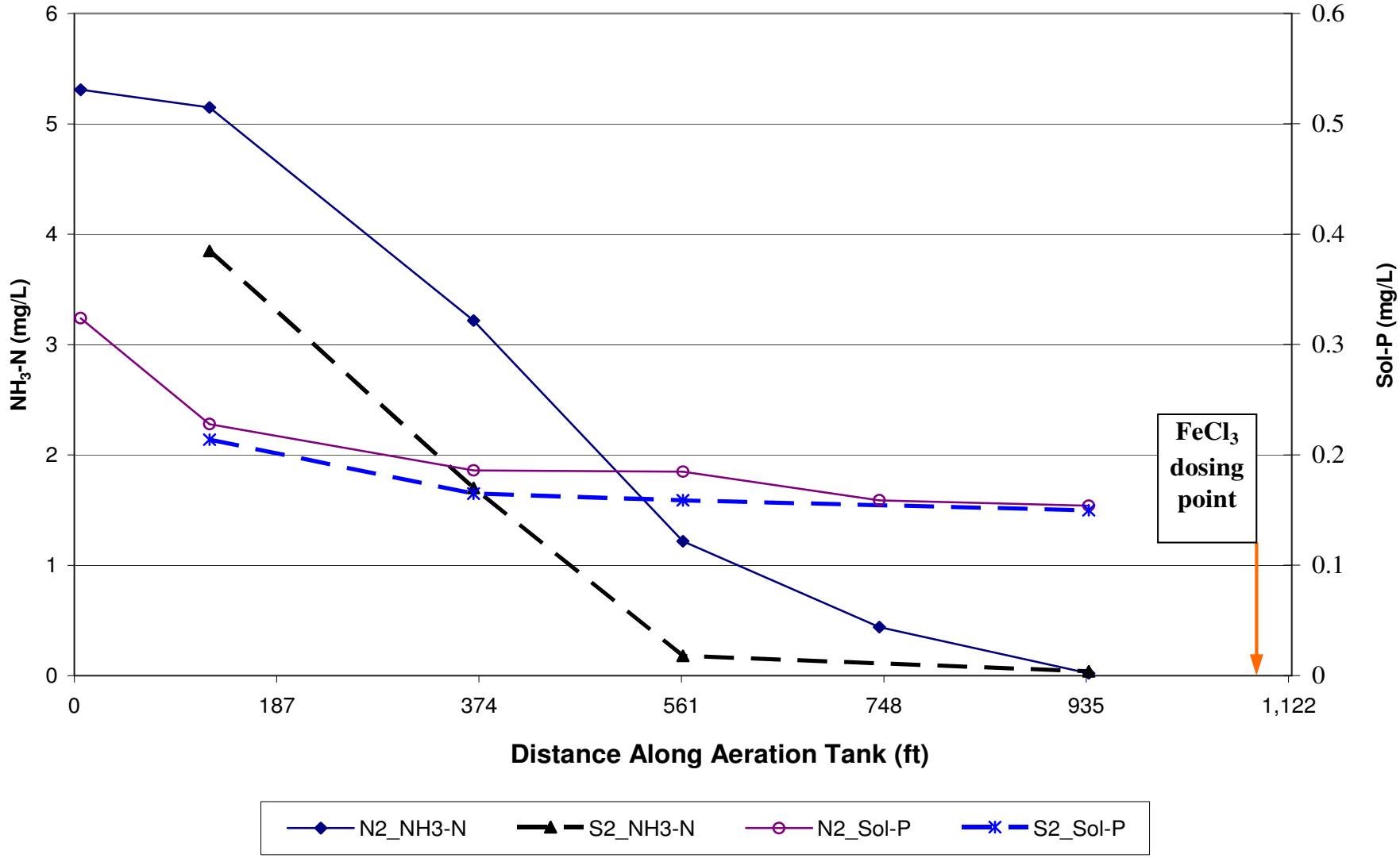
[1]The parameters are measured five times per week except for flow. All water quality parameters are analyzed from 24-hour composite effluent samples except for pH, which is measured from grab samples once per day.
[2]Without $FeCl_3$ addition.
[3]With $FeCl_3$ addition. The period used for calculation is from February 7, 2007, to May 20, 2008, excluding July 20 - 30, 2007.
[4]With $FeCl_3$ addition. The period used for calculation is from May 21 to December 23, 2008, excluding July 22 - 24, August 9 - 11, August 18 - 20, and October 29 - 30, 2008.

conventional parameters, which are routinely monitored and are common indicators of water quality, for the periods of 2006 in which no $FeCl_3$ was used for P removal; Phase I of the test from February 7, 2007, to May 20, 2008, except for July 20 - 30, 2007; and Phase II of the test from May 21 to December 23, 2008, except for July 22 - 24, August 9 - 11, August 18 - 20, and October 29 - 30, 2008. The periods excluded in the calculation were the times when short interruptions in the P removal occurred due to various reasons, which are reported in Table AIII-1 of Appendix AIII. As can be seen in Table II-6, the average values of most parameters were similar before and during the P removal test. The average pH of the final effluent was reduced slightly from 7.1 in 2006 before the P removal test to 7.04 in Phase I of the test and 7.08 in Phase II of the test. It appears that the pH change in Phase I of the test was greater, varying from 6.4 to 7.5. The low end pH was possibly due to a relatively higher dose of $FeCl_3$ with respect to the incoming P loads, since the average Sol-P in the final effluent, which was 0.27 mg/L as shown in Table II-6, was the lowest in the three periods reported.

The nitrification in the aeration tanks was not affected by the addition of $FeCl_3$ to the ML, despite the fact that the alkalinity, pH, and Sol-P levels in the ML were reduced. Figure II-8 presents the results of profile sampling along the aeration tanks in both secondary treatment batteries defined in the table during the P removal study. Although $FeCl_3$ was added to the end of the aeration tanks, Sol-P in the ML was significantly reduced at the beginning of the aeration tanks. Nitrification was nearly complete in the first two passes of the three-pass aeration tanks, whereas Sol-P dropped to below 0.2 mg/L at the end of Pass 1. The nitrification in the secondary treatment system was also not affected by the addition of $FeCl_3$ to the primary influent for removing P to the target level of 0.5 mg/L. As shown in Figure II-5, the Sol-P concentrations in the primary effluent between September 12 - 26, 2009, ranged from 0.06 to 0.44 mg/L with a mean concentration of 0.14 mg/L, and the corresponding TP concentrations in the final effluent ranged from 0.18 to 0.29 mg/L with a mean concentration of 0.24 mg/L. The average NH_3-N concentration in the final effluent for the same time period was 0.04 mg/L. Apparently, nitrification in the secondary treatment system was not influenced by the low Sol-P concentrations in this two-week period. The particulate P, some of which could be hydrolyzed in the secondary treatment system, may have played a role in providing sufficient nutrients for the microbial community. The particulate P, which is defined as the difference between TP and Sol-P, averaged 1.28 mg/L with a range of 0.84 to 2.32 mg/L for the same time period.

Industrial grade $FeCl_3$ may contain other substances that can compromise the final effluent quality. Table II-7 presents the statistical summary of some parameters of interest, which include metals, chloride (Cl), and sulfate, for the periods of 2006 in which no $FeCl_3$ was used for P removal; Phase I of the test from February 7, 2007, to May 20, 2008, except for July 20 - 30, 2007; and Phase II of the test from May 21 to December 23, 2008, except for July 22 - 24, August 9 - 11, August 18 - 20, and October 29 - 30, 2008. As a result of using $FeCl_3$ for P removal, Cl and Tot-Fe concentrations in the final effluent increased noticeably during the chemical P removal. However, Cl concentrations vary from season to season and are influenced by the infiltration of road-deicing salts into the sewer system. This could explain why the maximum Cl concentration in 2006 is greater than that in Phase II of the test, which took place in relatively warm seasons. The average Tot-Fe concentrations during the P removal periods are clearly higher than in 2006. Sol-Fe concentrations in the three periods were similar, probably due to the solubility of iron.

FIGURE II-8: AMMONIA NITROGEN AND SOLUBLE PHOSPHORUS ALONG AERATION TANKS MEASURED DURING PHASE I OF THE PHOSPHORUS REMOVAL TEST



Note: N2 = aeration tank 2 of the north aeration battery.
S2 = aeration tank 2 of the south aeration battery.

TABLE II-7: STATISTICAL SUMMARY OF SELECT PARAMETERS OF INTEREST IN THE FINAL EFFLUENT FOR THE PERIODS WITH AND WITHOUT FERRIC CHLORIDE ADDITION

Period	Parameter	Cl^{1} (mg/L)	$SO_4{}^{1}$ (mg/L)	As^{2} (mg/L)	Cu^{3} (mg/L)	Total Fe^{2} (mg/L)	Sol-Fe^{1} (mg/L)	Mn^{2} (mg/L)	Ni^{2} (mg/L)	Zn^{2} (mg/L)
2006[4]	Mean	175.8	84.0	<0.013	0.008	<0.07	0.060	<0.0057	0.005	0.039
	Minimum	108.1	65.4	<0.004	0.002	<0.04	0.011	<0.0007	0.002	0.020
	Maximum	322.1	129.0	0.033	0.013	0.16	0.120	0.0265	0.070	0.092
	Std. Dev.	48.7	11.7	0.005	0.003	0.02	0.023	0.0036	0.004	0.010
	Observation	52	52	261	12	261	52	261	261	261
Phase I[5]	Mean	247.3	80.4	<0.015	0.010	<0.16	0.063	<0.0466	<0.007	<0.026
	Minimum	147.3	62.1	<0.004	0.002	<0.04	0.012	<0.0007	<0.002	<0.007
	Maximum	567.3	99.5	0.042	0.120	1.55	0.116	1.7970	0.059	0.052
	Std. Dev.	84.7	8.3	0.006	0.017	0.11	0.021	0.1022	0.004	0.007
	Observation	66	66	325	44	326	66	326	326	326
Phase II[6]	Mean	192.7	72.2	<0.014	0.009	<0.11	0.071	<0.0060	<0.009	<0.020
	Minimum	152.5	63.3	<0.004	0.002	<0.04	0.006	<0.0007	<0.002	<0.007
	Maximum	259.9	83.7	0.032	0.031	1.22	0.255	0.2024	0.052	0.042
	Std. Dev.	23.8	4.9	0.006	0.006	0.10	0.042	0.0170	0.005	0.005
	Observation	29	29	145	29	145	29	145	145	145

[1]Chloride (Cl), sulfate (SO_4) and soluble iron (Sol-Fe) are measured once per week.
[2]Arsenic (As), total iron (Total Fe), manganese (Mn), nickel (Ni) and zinc (Zn) are measured 5 times per week.
[3]Copper (Cu) is measured once per month.
[4]Without $FeCl_3$ addition.
[5]With $FeCl_3$ addition. The period used in calculation is from February 7, 2007, to May 20, 2008, excluding July 20 - 30, 2007.
[6]With $FeCl_3$ addition. The period used in calculation is from May 21 to December 23, 2008, excluding July 22 - 24, August 9 - 11, August 18 - 20, and October 29 - 30, 2008.

It is worth noting that after chemical P removal commenced, Mn concentrations in the final effluent increased significantly, which is likely an impurity in the $FeCl_3$ solution. During $FeCl_3$ addition, the daily maximum Mn concentration exceeded the ambient water quality standard for Mn, which is 1.0 mg/L for general use waters in Illinois twice during nearly two years of testing. It was noticed that the Mn concentrations dropped to normal levels starting in early May 2008. Therefore, the relatively lower Mn concentrations during Phase II were related to the change of $FeCl_3$ solution, not to the change of the dosing location. The concentrations of other metals were not elevated during the addition of $FeCl_3$.

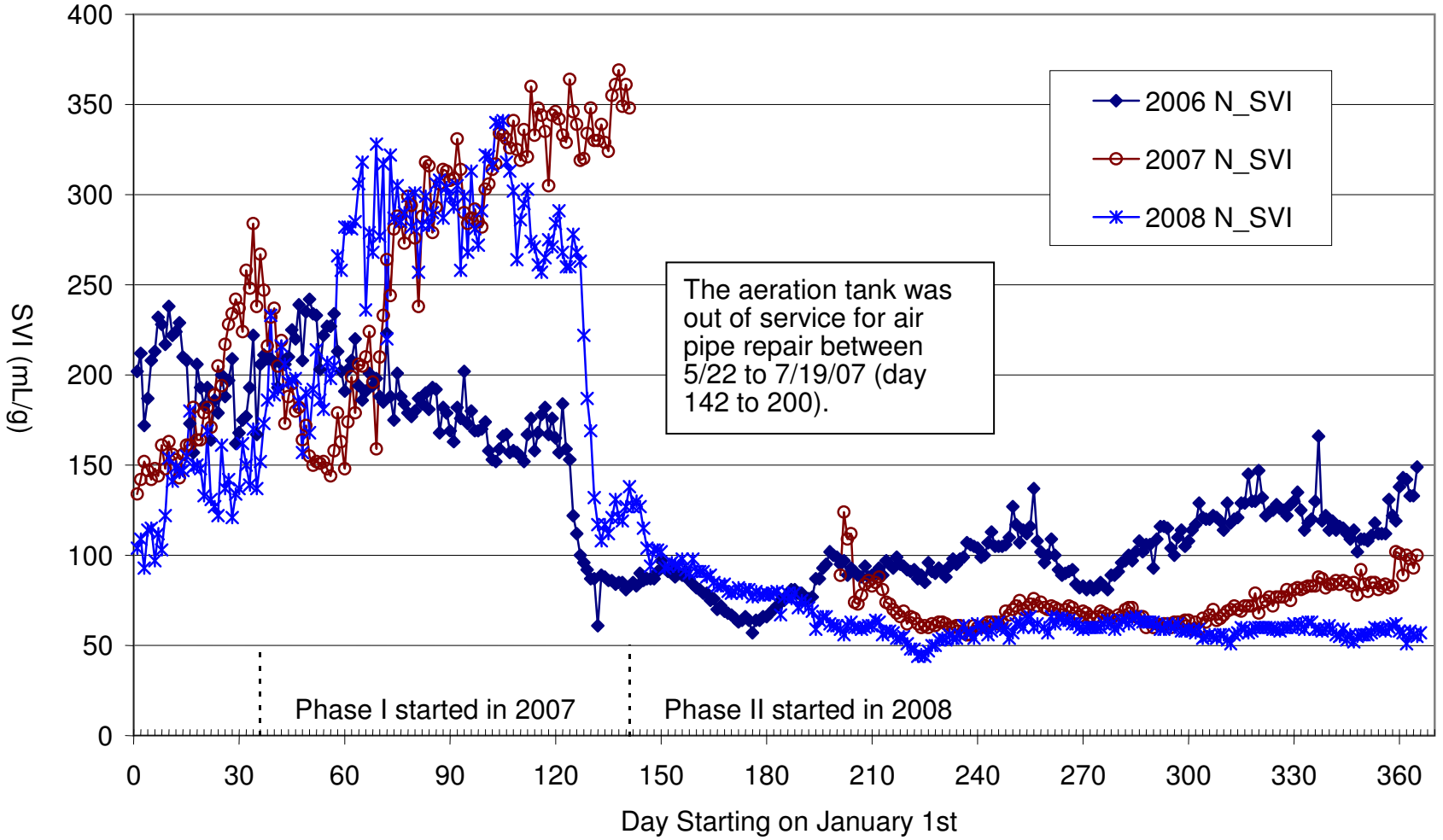
Influence on Liquid Treatment Unit Processes

Impact on Unit Processes During Phase I. One of the main consequences of adding $FeCl_3$ to ML for P removal in the secondary treatment system is the accumulation of chemical solids in the ML, which reduces the ratio of volatile suspended solids (VSS) to SS. During Phase I of the test, in order to maintain the same level of MLVSS for BOD_5 removal and nitrification, MLSS had to increase because the ratio of VSS to SS decreased from 0.83 before $FeCl_3$ addition to approximately 0.6 at the steady state during Phase I. This ratio varied slightly with $FeCl_3$ dosing rates and SRTs. The elevated MLSS in the aeration tanks resulted in higher solids loading to the secondary clarifiers, which was up to 38 percent higher than the solids load under average conditions before the P removal. Fortunately, the secondary clarifiers at the Egan WRP could handle the increased solids load during the P removal. The calculated solids load to the secondary clarifiers for an MLSS concentration of 3,500 mg/L and a practical maximum flow of 60 MGD is 0.81 pounds per square foot per hour ($lb/ft^2/h$), which is within the recommended range of 0.8 to 1.2 $lb/ft^2/h$ (Metcalf & Eddy, Inc, 1991) when all eight clarifiers are in service.

As a result of the reduced VS content in WAS due to chemical P removal, the VS reduction through anaerobic sludge digestion was reduced, even dropping below 38 percent in the summer months, which did not happen prior to the P removal. However, the impact on thickening of WAS and dewatering of digested sludge appeared to be minimal (details will be provided in a separate report).

Contrary to a common expectation, the addition of $FeCl_3$ to the ML did not improve solids settling in the secondary clarifiers in general. In particular, the injection of $FeCl_3$ at the level used for P removal failed to improve settling in the north aeration battery when the sludge volume indexes (SVIs) were elevated, and the settling in the secondary clarifiers was worse. Since the aeration tanks of the north aeration battery were put into service in 2002 after a major rehabilitation of the aeration diffuser system, the north aeration battery has experienced a chronic problem of elevated SVIs in winter and early spring. This problem usually disappears in later spring and summer. It has since been determined that this problem was mainly caused by overgrowth of the filamentous bacterium *Microthrix parvicella*. During the P removal study, only one aeration tank in the north aeration battery was in service, and the other aeration tank was out of service for repair starting in May 2006. Figure II-9 presents the comparison of daily mean

FIGURE II-9: DAILY MEAN SLUDGE VOLUME INDEXES OF THE NORTH AERATION BATTERY AT THE JOHN E. EGAN WATER RECLAMATION PLANT IN 2006 - 2008

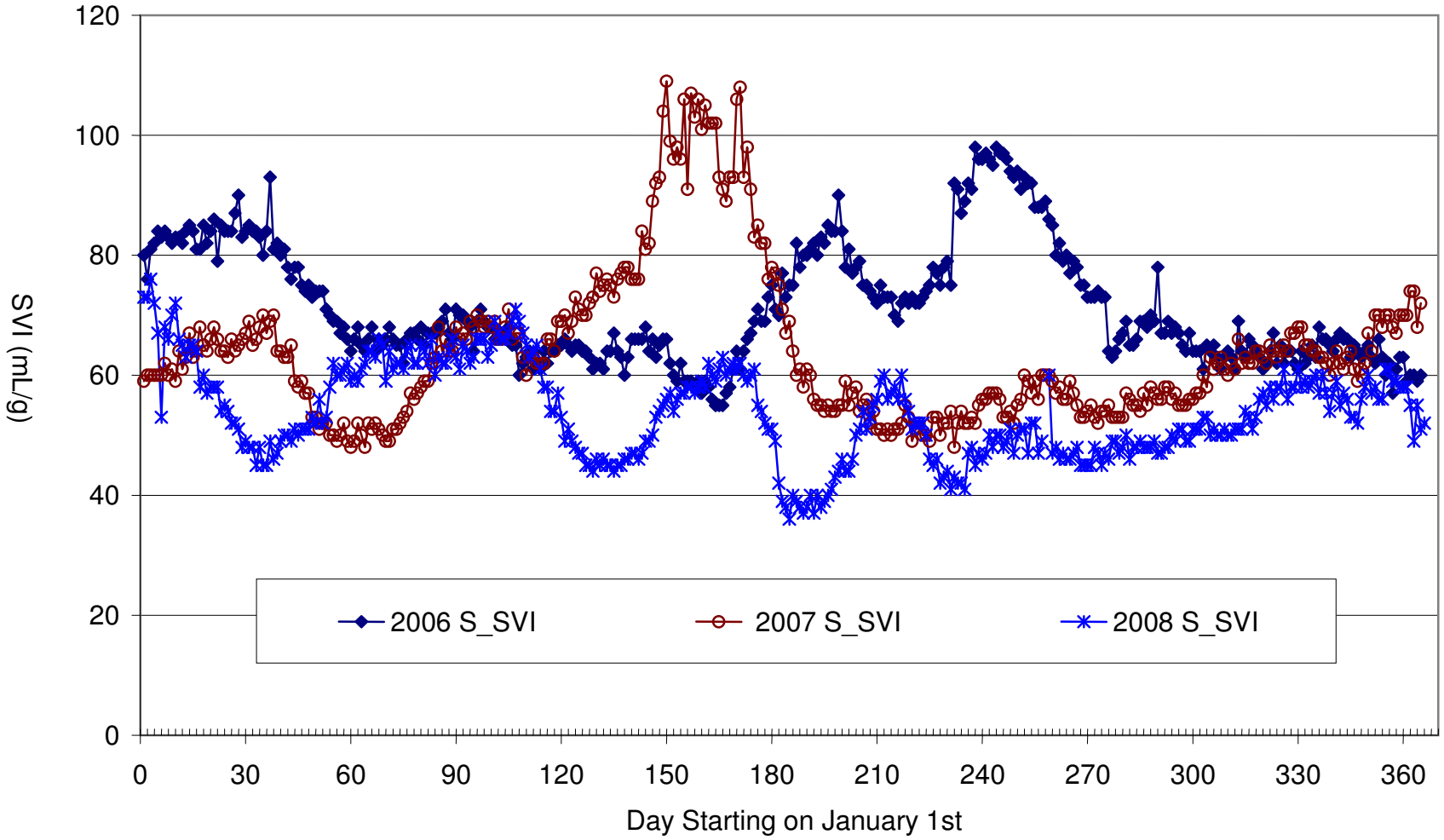


SVIs in the north aeration battery of the Egan WRP in 2006 - 2008. As shown, SVI in this battery started to decrease in later April and May after elevated levels in the winter months in 2006. However, SVI in this battery increased to a much higher level in the same time period in 2007 and 2008, despite the fact that MLSS concentrations were higher in 2007 and 2008, due to the accumulation of chemical solids in the ML, than those in 2006. It appears that the addition of $FeCl_3$ into the ML of the north aeration battery exacerbated the settling problem. The initial drop in SVI immediately after the P removal in 2007 was likely due to the increase in MLSS concentration. The north aeration battery was taken out of service in late May 2007 for air diffuser pipe repair. After the air pipe was repaired, the battery was reseeded in July 2007. The relatively lower SVI in the second half of 2007 compared to the same period in 2006 was likely due to higher MLSS concentrations.

However, the ML settling problem that occurred in the north aeration battery of the Egan WRP, which was possibly exacerbated by the addition of $FeCl_3$, is unique. The same problem of elevated SVIs in winter and early spring does not occur in the south aeration battery, which receives similar primary effluent. Figure II-10 shows the comparison of daily mean SVIs in the south aeration battery in 2006 - 2008. As shown in the figure, the addition of $FeCl_3$ into the ML of the south aeration battery did not result in a significant change in SVI. The spike in SVI in the south aeration battery between Day 143 and Day 178 in 2007, which took place immediately after the ML of the north aeration battery was drained to the wet well for air pipe repair, was mainly due to the influence of *Microthrix parvicella* from the north aeration battery. The duration of the spike was approximately three SRTs, which averaged around ten days during the time period. The spike in SVIs in this time of the year did not occur in 2008. The physical dimensions of the two aeration batteries (North vs. South) are identical. However, there are a few physical differences between the two aeration batteries. These differences are (1) that the north has full-floor coverage, fine-bubble diffuser systems in the aeration tanks, whereas the south has a semi-spiral roll, fine-bubble diffuser system; (2) that the north uses centrifugal pumps for the return sludge, whereas the south uses air lifts; and (3) each aeration tank in the north has an 88-foot-long zone separated by baffle walls at the beginning of the tank, which can be used as either an anoxic zone or aerobic zone, whereas the south does not have this type of zone. Nevertheless, it is unclear at this time that these physical differences could result in a significant difference in ML settling characteristics in the winter and early spring months. A study is underway to investigate the causes of such a difference.

Another noticeable incident that occurred during the P removal test was the formation and accumulation of *Nocardia* foaming in the aeration tank of the north aeration battery in the fall of 2007 through the spring of 2008. In nearly 30 years of operation of the Egan WRP, *Nocardia* foaming in the aeration tanks never happened prior to 2007. It has been reported in the literature that low pH in the aeration tanks might promote the growth of *Nocardia* (Jenkins, Richard and Daigger, 1993*)*. As the incident coincided with the addition of $FeCl_3$, which reduced the alkalinity and pH of the wastewater, perhaps the addition of $FeCl_3$ to the aeration tank for P removal could be one of the contributing factors. The other factors that may have contributed to the formation and accumulation of *Nocardia* foaming were the introduction of *Nocardia* from the seed sludge, which was from the Kirie WRP that has no PSTs, and the tripping of the *Nocardia* foaming in the aeration tank with relatively weak mixing (compared to that in the aeration tanks of the south aeration battery).

FIGURE II-10: DAILY MEAN SLUDGE VOLUME INDEXES OF THE SOUTH AERATION BATTERY AT THE JOHN E. EGAN WATER RECLAMATION PLANT IN 2006 - 2008



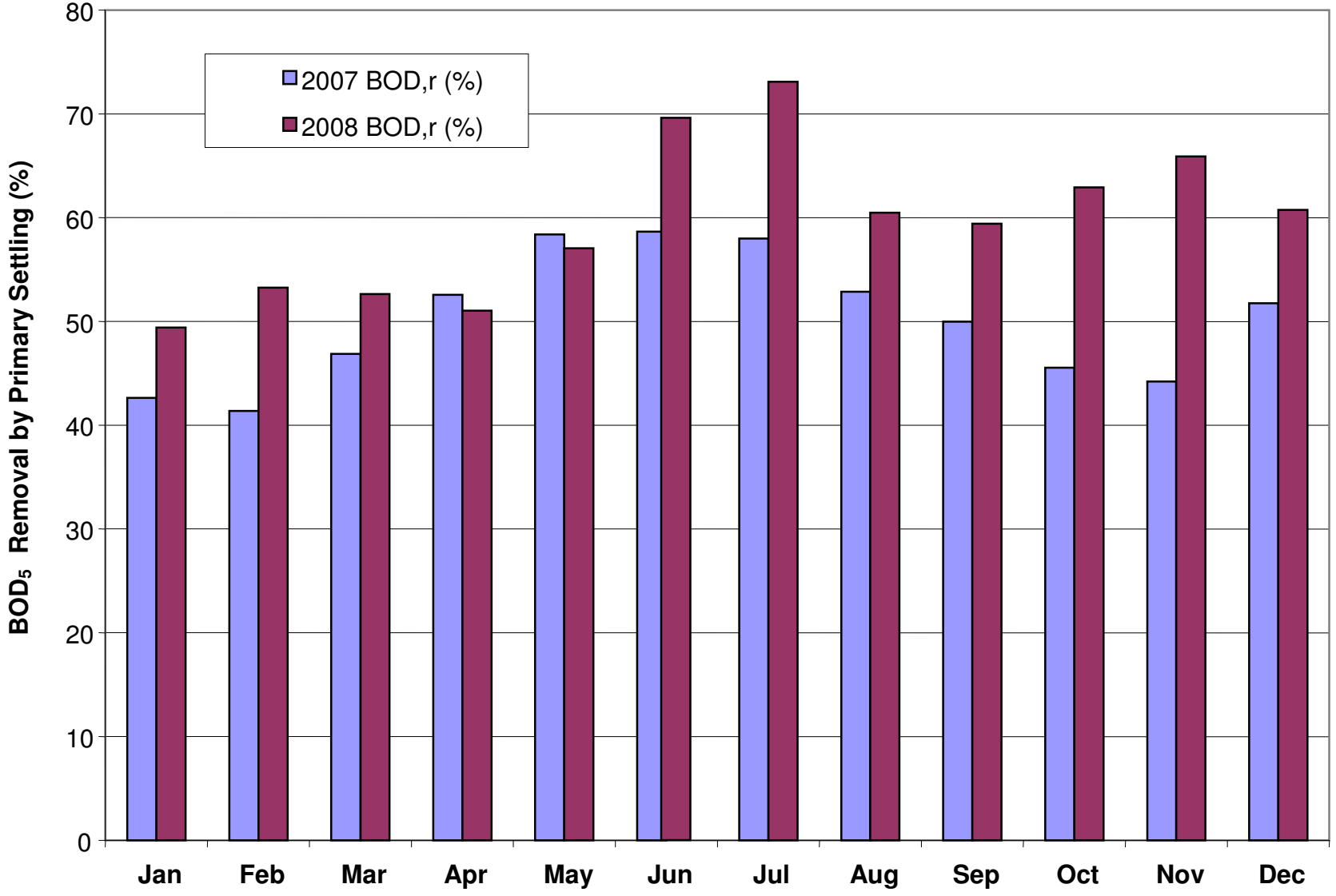
Impact on Unit Processes During Phase II. The impact on unit processes during Phase II mainly resulted from the characteristic change of the primary effluent. $FeCl_3$ is an effective flocculent for enhancing the settling of discrete particles even though the impact of $FeCl_3$ on the ML settling in the secondary clarifiers was negligible at the $FeCl_3$ dosing range needed for achieving the target P removal, which was from 1.16 to 1.32 gpm. The laboratory-scale bench tests conducted before Phase II of the test showed that at a $FeCl_3$ concentration of 27.8 mg/L, the average BOD_5 and SS removal increased from 79 percent and 63 percent in the control reactor to 89 percent and 76 percent in the $FeCl_3$-added reactor, respectively. The BOD_5 and SS removal efficiencies through the primary settling with $FeCl_3$ addition were slightly higher at a higher $FeCl_3$ concentration, such as 36 mg/L, which was required for achieving the target P removal.

Since the location of the $FeCl_3$ injection was moved from the end of the aeration tanks to the primary influent on May 21, 2008, not only were P concentrations in the primary effluent decreased, but also the BOD_5, SS, pH, and alkalinity. Figures II-11 and II-12 present the monthly average percent removal of BOD_5 and SS, respectively, by the primary treatment process at the Egan WRP in 2007 and 2008. As can be seen in the figure, likely due to the addition of $FeCl_3$ to the primary effluent, the monthly average removal efficiencies of BOD_5 and SS in June through December were higher in 2008 than in 2007 except for SS removal in September. Other factors, such as influent characteristics and flow rates, affect the BOD_5 and SS removal efficiencies in a primary settling process. The differences in monthly average percent removal in the first four months of 2007 and 2008 were likely caused by these factors. These factors may also have resulted in a lower SS removal efficiency in September 2008 when the monthly average flow was 34.6 MGD compared to 22.4 MGD in September 2007. On the other hand, the mixing and flocculation of $FeCl_3$ in the full-scale facilities were affected by influent flow rates and limited by the existing condition of the facilities, which may affect the removal efficiencies as well.

Alkalinity of the primary effluent at the Egan WRP was measured specifically for the P reduction demonstration project daily from February 2007 to October 2007 and three times per week from November 2007 to January 2009, and pH was measured daily as one of the routine monitoring parameters for plant operations. For the purpose of comparison, the daily averages and standard deviations of alkalinity and pH in the primary effluent over the period of May 22 – December 23 were calculated for 2007 and 2008, respectively. The daily average values in 2007 were 244 mg/L for alkalinity, with a standard deviation of 18.3 mg/L, and 7.54 for pH, with a standard deviation of 0.13, while in 2008 the daily average values were 225 mg/L for alkalinity, with a standard deviation of 18.3 mg/L, and 7.36 for pH, with a standard deviation of 0.21. The results of the statistical analysis, using the Microsoft Excel function TTEST, indicated that the values of both alkalinity and pH in 2008 when $FeCl_3$ was added to the primary influent were statistically significantly lower than those for the same period in 2007.

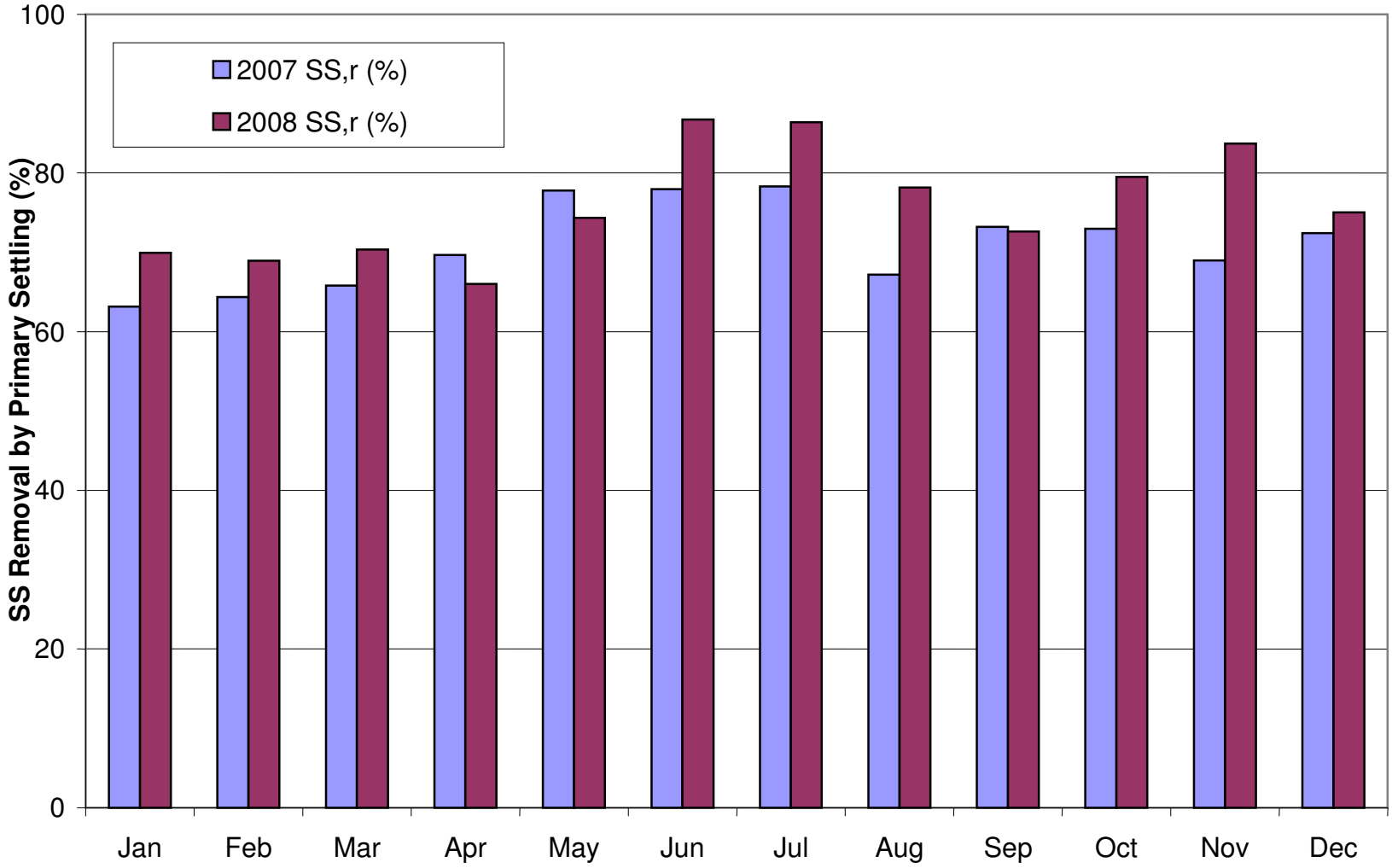
The potential impact of $FeCl_3$ addition on the primary effluent characteristics on the secondary treatment process is the reduction of organic loading. As a result of the BOD_5 and SS reduction, TKN concentrations in the primary effluent were likely reduced during Phase II of the test. Figure II-13 presents the monthly average percent removal of TKN by the primary treatment process at the Egan WRP in 2007 and 2008. The higher TKN removal efficiencies in June through November 2008 compared to the same period in 2007 were at least partially attributed to the addition of $FeCl_3$ to the primary influent for P removal. With reduced BOD_5 and TKN

FIGURE II-11: MONTHLY MEAN PERCENT REMOVAL OF FIVE-DAY BIOCHEMICAL OXYGEN DEMAND BY THE PRIMARY SETTLING TANKS AT THE JOHN E. EGAN WATER RECLAMATION PLANT IN 2007 AND 2008



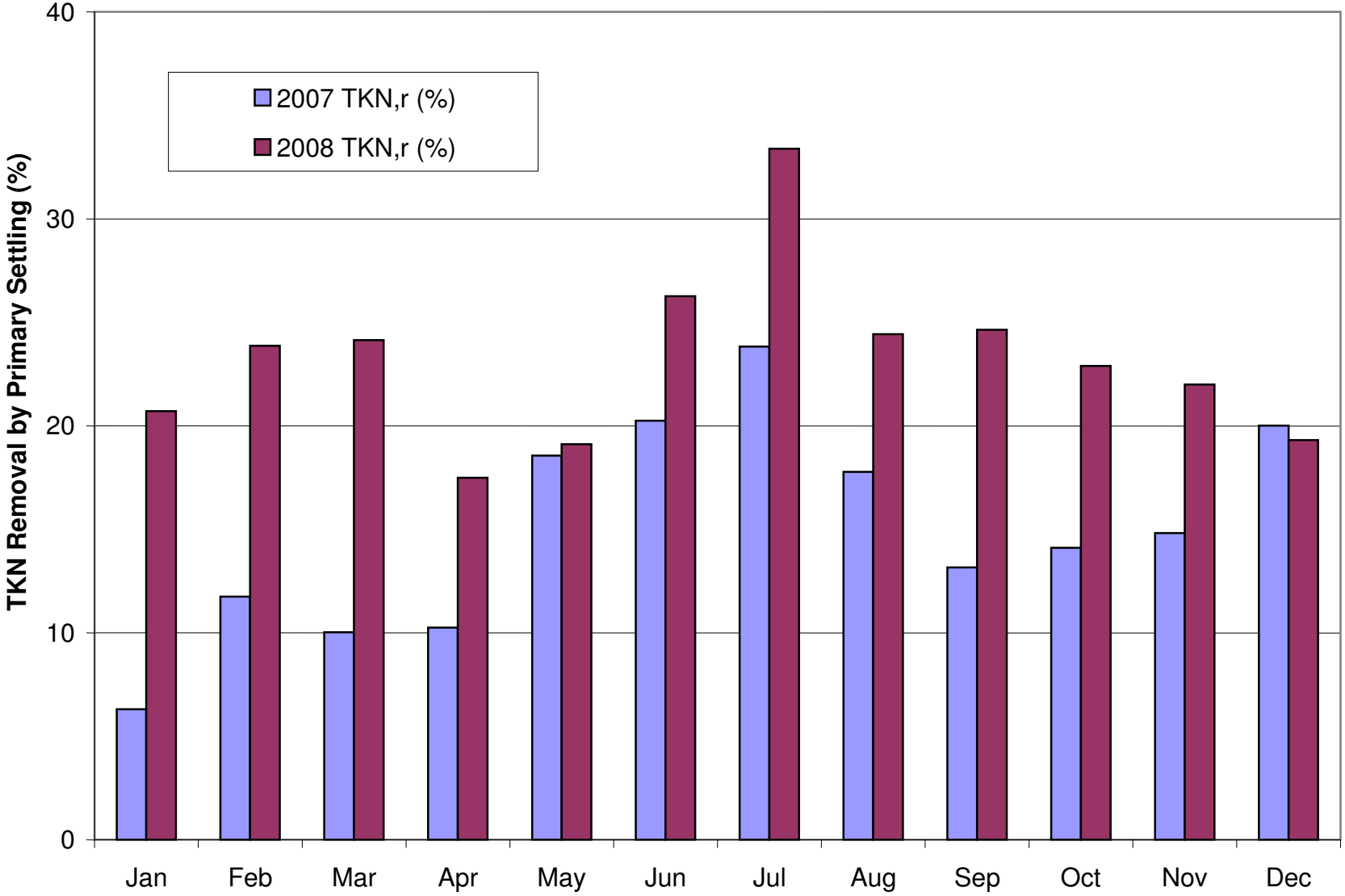
Note: "BOD,r" stands for five-day biochemical oxygen demand removal.

FIGURE II-12: MONTHLY MEAN PERCENT REMOVAL OF SUSPENDED SOLIDS BY THE PRIMARY SETTLING TANKS AT THE JOHN E. EGAN WATER RECLAMATION PLANT IN 2007 AND 2008



Note: "SS,r" stands for suspended solids removal.

FIGURE II-13: MONTHLY MEAN PERCENT REMOVAL OF TOTAL KJELDAHL NITROGEN BY THE PRIMARY SETTLING TANKS AT THE JOHN E. EGAN WATER RECLAMATION PLANT IN 2007 AND 2008



Note: "TKN,r" stands for total Kjeldahl nitrogen removal.

loading to the aeration tanks, the demand for DO for BOD_5 degradation and nitrification should theoretically be reduced, the amount of MLVSS could be lowered for maintaining the desired ratio of food to microorganisms in the aeration tanks, and WAS production would be decreased. A reduced oxygen demand typically translates to less air for aeration. Potential energy savings can be achieved for reducing air supply for aeration and handling less WAS. However, evaluating potential energy savings achieved by adding $FeCl_3$ to the primary influent for P removal was not a main objective of this study, and the detailed evaluation is not included in this report.

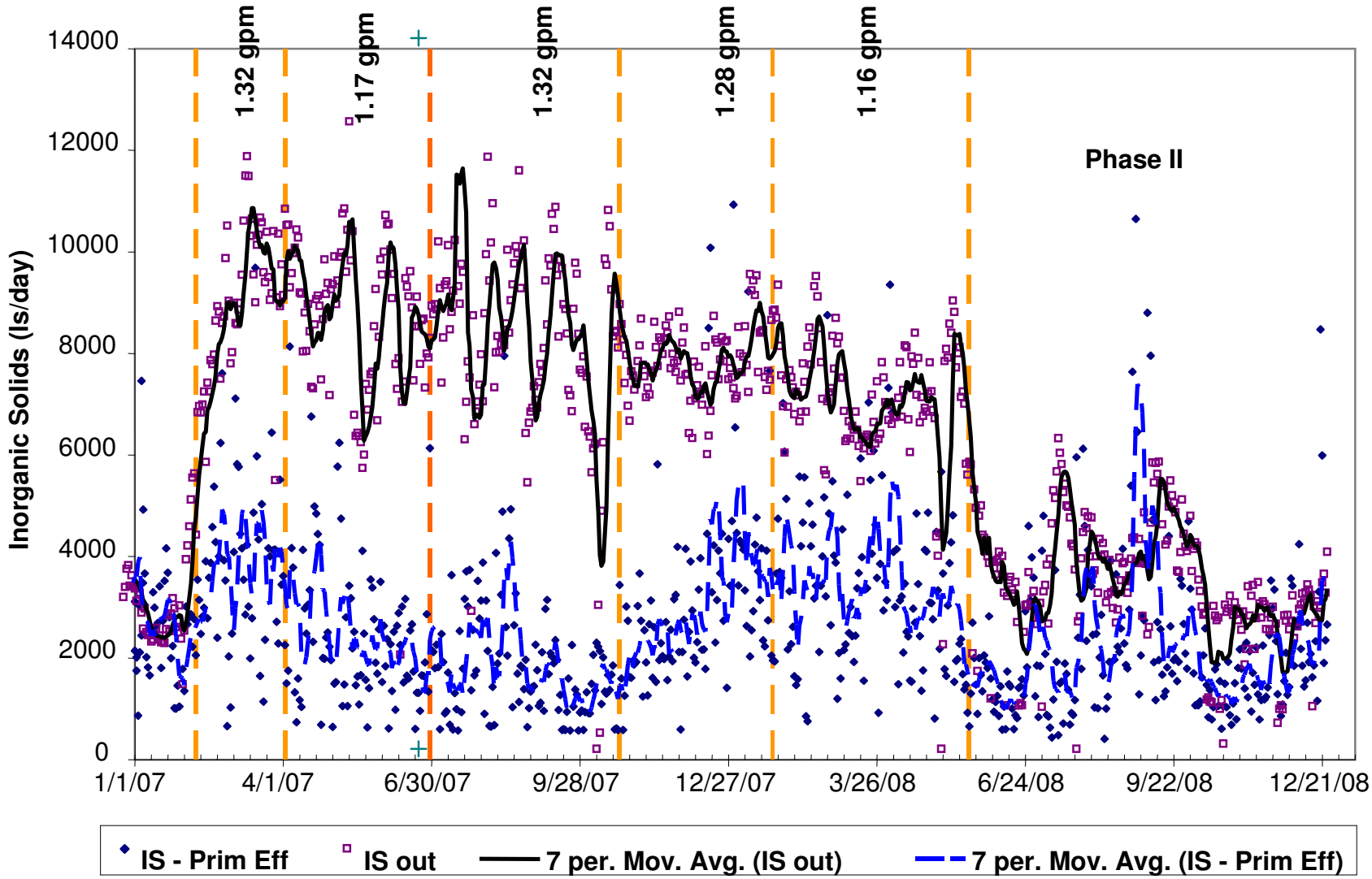
Relatively lower alkalinity and pH resulting from the addition of $FeCl_3$ to the ML were considered to partially contribute to the *Nocardia* foaming in the north aeration tank at the Egan WRP in the fall of 2007, as described in the previous section. However, the *Nocardia* foaming did not occur in the same aeration tank in the fall of 2008 even though the alkalinity and pH in the primary effluent were also significantly lower during this period. It appears that other factors may have also played a key role in the formation and sustaining of the *Nocardia* foaming in the north aeration tank in the fall of 2007 through the spring of 2008.

Estimation of Chemical Sludge Yield Due to Phosphorus Removal

The chemical sludge produced during P removal by $FeCl_3$ addition was removed from the processes mainly through WAS when $FeCl_3$ was injected before the secondary clarifiers (Phase I) and through PS when $FeCl_3$ was added before the PSTs (Phase II). The quantity of chemical sludge generated due to the addition of $FeCl_3$ to the secondary treatment system is estimated using the IS mass balance. Theoretically, if there is no chemical addition to the system, the IS exiting the secondary treatment system, including the IS in WAS and secondary effluent, is equal to the IS entering the system, which is the IS in the primary effluent, because of the conservation of mass. After the addition of $FeCl_3$ to the aeration tanks and precipitation of particulate ferric phosphate ($FePO_4$) and $Fe(OH)_3$ in the secondary clarifiers, chemical sludge is produced and removed from the system as the additional IS. However, the mass balance approach cannot be applied to the primary settling system to estimate the quantity of chemical sludge generated due to P removal because (1) the influent is sampled before the grit tanks, and IS exiting through grit removal cannot be accounted for, and (2) IS of the influent is not directly or indirectly measured. A comparison of IS in PS for the same time periods before and after the addition of $FeCl_3$ for P removal was made, and the difference was considered the chemical sludge produced due to P removal.

Figure II-14 presents the daily mean quantity of IS into and out of the secondary treatment system at the Egan WRP in 2007 and 2008. As can be seen in the figure, the daily mean values varied widely because of the daily fluctuation of IS in the primary effluent, influent P loads, sludge inventory in the secondary treatment system, and amount of WAS withdrawn. Seven-day moving averages for the total IS into and out of the secondary treatment system are presented in the figure as the dashed and solid lines, respectively. The amount of incoming and outgoing IS was similar, as shown in the figure, before the addition of $FeCl_3$ in January 2007. After the addition of $FeCl_3$ starting on February 5, 2007, the IS going out of the secondary treatment system began to increase, as shown in the figure. However, the initial increase of outgoing

FIGURE II-14: DAILY MEAN QUANTITY OF INORGANIC SOLIDS AND THEIR SEVEN-DAY MOVING AVERAGE TREND LINES ENTERING AND EXITING THE SECONDARY TREATMENT SYSTEMS AT THE JOHN E. EGAN WATER RECLAMATION PLANT IN 2007 AND 2008



IS was gradual because of the accumulation of IS in the sludge inventory, which was dictated by MLSS concentrations in the aeration tanks and SRT in the system. The steady state seems to be reached one month after the $FeCl_3$ addition. Because of the large variations in daily mass, the estimation of chemical sludge yield, which is defined as the amount of chemical sludge produced per pound of $FeCl_3$ added, was made with the derived average method, which used the ratio of average values of IS produced and $FeCl_3$ added over a specific period of time. Table II-8 presents the summary of chemical sludge yield estimations for the five periods with different $FeCl_3$ dosing rates during Phase I of the chemical P removal study at the Egan WRP. It appears that the chemical sludge yield, ranging from 0.68 to 1.01 lb IS per lb of $FeCl_3$ applied, does not correlate well with the amounts of $FeCl_3$ added and P removed possibly due to the variation of sludge inventory in the system, SRT, WAS withdrawal, and characteristics of WAS.

The monthly average values of IS in DT per day in the PS produced at the Egan WRP from 2003 - 2008 are presented in Figure II-15 to show the increase of IS as a result of chemical sludge generation due to P removal in May through December 2008. The addition of $FeCl_3$ to the primary influent commenced on May 21, 2008, and ended on December 23, 2008. During the period from May 21 to June 27, 2008, as shown in Table AIII-1 of Appendix III, the $FeCl_3$ dosing rate gradually increased from 1.0 gpm to 1.32 gpm. As seen in the figure, the monthly average quantity of IS in the PS is more variable in May and June over the five-year period of 2003 - 2007, possibly due to the variation of the amounts of solids during high flow conditions in these months. In the period of July 10 - 23, 2008, as presented in Table AIII-1 of Appendix AIII, because primary tanks 1 and 2 were out of service for contract work, the raw sewage was directly sent to the north aeration tanks without passing through the PSTs, which accounted for about one third of the flow at the Egan WRP. Given the potential influences discussed above affecting the estimation of chemical sludge yield using the comparison method, the data from May 21 to July 24, 2008, are not used in the calculation. The data from July 25 to December 23, 2008, has been divided into three groups based on the $FeCl_3$ dosing rates. The average quantity of IS in the PS for the previous five years (2003 - 2007), in which no $FeCl_3$ was added to the primary influent over the same period, was used as the base for comparison. The excess IS, which is a derived average, was computed by subtracting the base from the average quantity of IS in the PS for the 2008 period. The excess IS was considered the chemical sludge due to the P removal and, thus, chemical sludge yield was calculated using the excess IS and amount of $FeCl_3$ added, which is shown in Table II-9. The chemical sludge yield for the P removal in the primary treatment system varied from 0.81 to 0.87 pounds of IS per pound of $FeCl_3$ added, which is in the middle of the range estimated for the chemical sludge yield during the P removal in the secondary treatment system.

TABLE II-8: SUMMARY OF CHEMICAL SLUDGE YIELD ESTIMATIONS DURING PHASE I OF THE CHEMICAL PHOSPHORUS REMOVAL AT THE JOHN E. EGAN WATER RECLAMATION PLANT

Time Period	Sol-P Load in Prim. Eff. (lb/d)	Sol-P in 2nd Eff (mg/L)	$FeCl_3$ Dose (gpm)	IS Produced (lb/d)	IS Yield (lb IS/lb $FeCl_3$)
3/6 - 4/2/07[1]	511	0.11	1.32	6,469	0.87
4/3 - 6/29/07	552	0.33	1.17	6,680	1.01
6/30 - 10/22/07[2]	574	0.41	1.32	6,748	0.90
10/23/07 - 1/23/08	545	0.23	1.28	5,456	0.75
1/24 - 5/21/08	513	0.24	1.16	4,471	0.68

[1]The first month from 2/5/07 - 3/5/07 after $FeCl_3$ addition was excluded from the calculation due to the accumulation of chemical solids in the mixed liquor during this period.

[2]Period of July 20 - 30, 2007, was excluded from the calculations due to the interruption of $FeCl_3$ addition to the north aeration battery.

FIGURE II-15: MONTHLY AVERAGE VALUES OF INORGANIC SOLIDS IN THE PRIMARY SLUDGE PRODUCED AT THE JOHN E. EGAN WATER RECLAMATION PLANT FROM 2003 - 2008

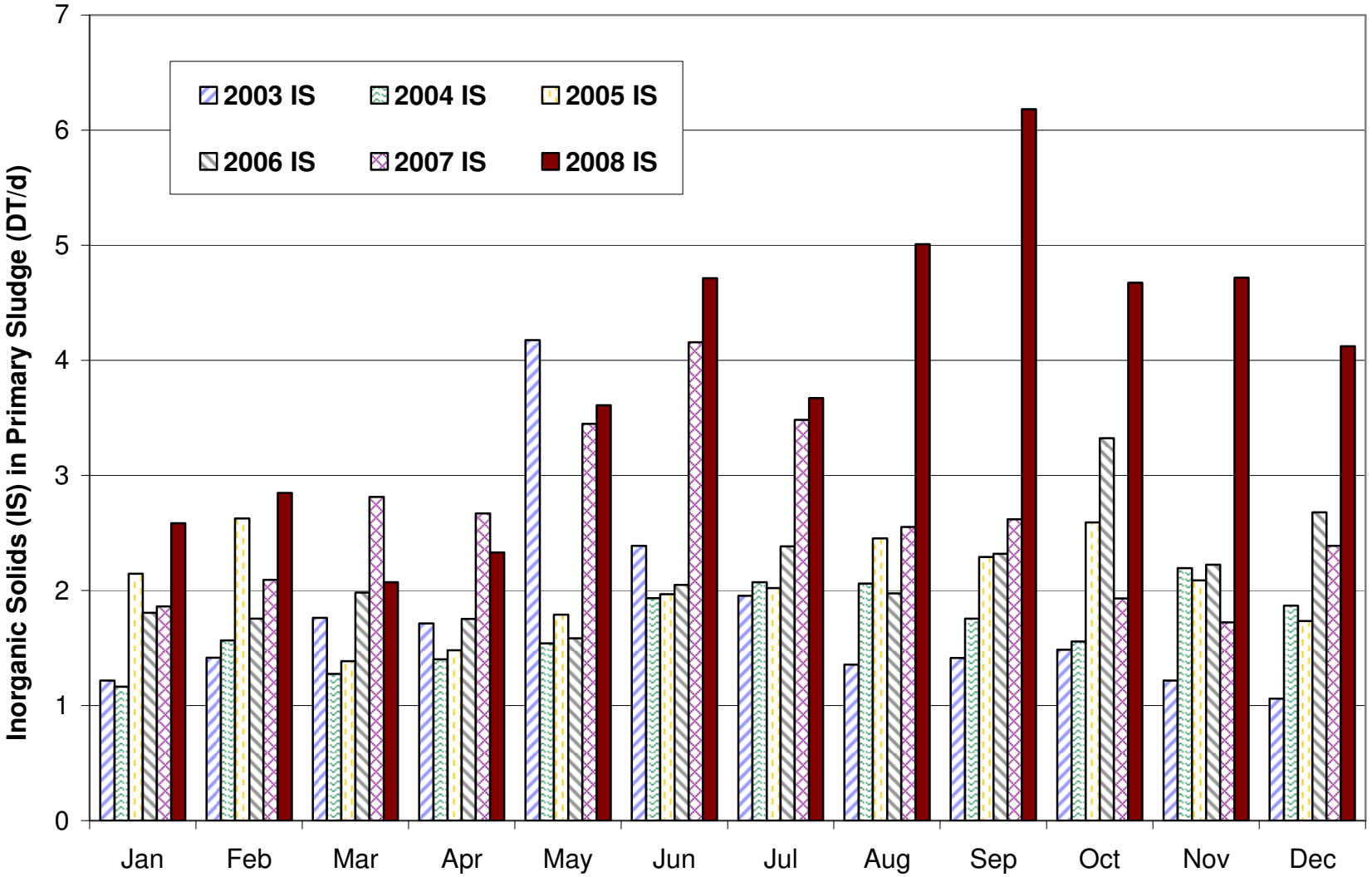


TABLE II-9: SUMMARY OF CHEMICAL SLUDGE YIELD ESTIMATIONS DURING PHASE II OF THE CHEMICAL PHOSPHORUS REMOVAL AT THE JOHN E. EGAN WATER RECLAMATION PLANT

Time Period	Mean IS (03-07) (lb/d)	2008 IS (lb/d)	Excess IS (lb/d)	$FeCl_3$ Dose (gpm)	IS Yield (lb IS/lb $FeCl_3$)
07/25 - 10/13	4,220	10,479	6,259	1.32	0.84
10/14 - 10/28	4,238	10,072	5,834	1.19	0.87
10/31 - 12/23	3,823	9,220	5,396	1.18	0.81

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SECTION III: EFFECTS OF PHOSPHORUS REDUCTION ON SOLIDS PROCESSING

OBJECTIVE

The purpose of this work was to evaluate the impact of $FeCl_3$ addition for P removal on the solids process train at the Egan WRP, which includes gravity belt thickening, anaerobic digestion, and centrifuge dewatering operations.

OVERVIEW OF SOLIDS PROCESSING AND MONITORING

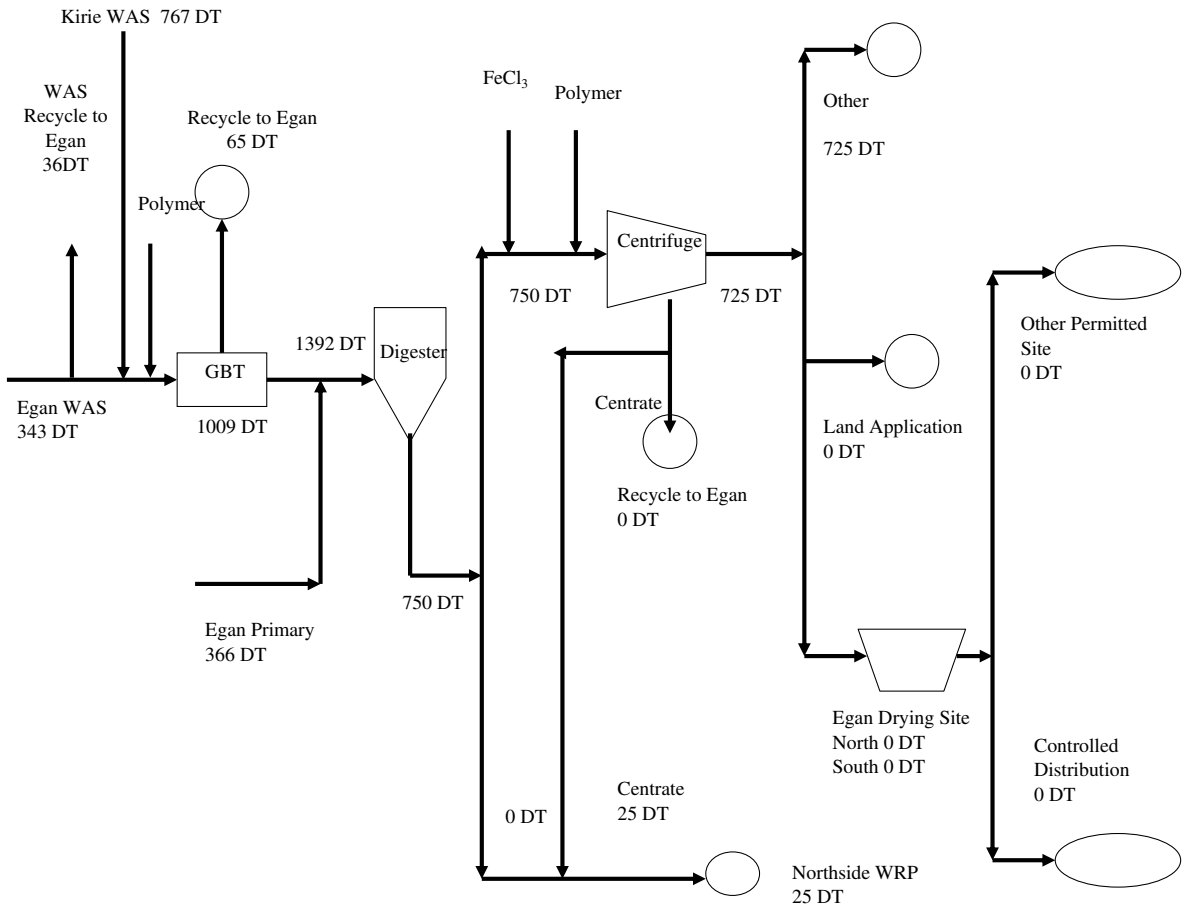
Solids processing at the Egan WRP begins with thickening of waste-activated sludge (WAS) from both the Egan and the Kirie WRPs. The WAS is thickened from 0.5 to approximately 5 percent TS using GBTs and combined with Egan WRP's PS prior to anaerobic digestion. The digested solids are centrifuge dewatered prior to biosolids utilization. Centrifugal dewatering is aided by $FeCl_3$ conditioning before polymer injection. A flow diagram of solids processes at the Egan WRP is depicted in Figure III-1. It contains actual data for the month of March 2009 for illustration.

The Egan WRP has two aeration batteries, North and South. The WAS from the North Aeration Battery (N-WAS) and the South Aeration Battery (S-WAS) is combined with Kirie WRP WAS (K-WAS) before it is equalized in a wet well and fed to the GBTs. E-WAS refers to the combined stream from N-WAS and S-WAS, and GBT feed refers to the stream that is comprised of E-WAS and K-WAS.

The TS, Tot-Fe and TP in N-WAS, S-WAS, K-WAS, GBT feed, thickened sludge cake, and filtrate were monitored daily for each of the GBTs. GBT operations were closely monitored because of operational and performance problems that occurred with the GBTs during $FeCl_3$ addition during the Water Environment Research Foundation's (WERF) Nutrient Removal Pilot Test Project in 2005. Any two of three GBTs are operated for sludge thickening at a given time seven days a week. Mannich polymers manufactured by Polydyne, Inc., CE-659, CE-770, CE-1100, and CE-1142, were used for sludge thickening and dewatering during this experiment. Table III-1 provides the dates that each polymer was used during the study. The gravity belts in each GBT were replaced at the start of this study. The belt replacements over two and one-half years for each machine were in proportion to the usage and are presented in Table III-2. The shortest belt life was 93 days for GBT 1, while GBT 2 and 3 had 123 and 125 days, respectively. All the belts were made of polyester monofilament fiber, type 8065, with a mesh opening of 47 microns and weight of 35.25 ounces per square yard.

Solids operations following thickening were monitored and compared with operational parameters prior to $FeCl_3$ addition. The M&O's plant operations data recorded before, during, and after $FeCl_3$ addition were used to assess the performance of the anaerobic digesters and centrifuge dewatering operations.

FIGURE III-1: FLOW DIAGRAM OF SOLIDS PROCESSES AT THE JOHN E. EGAN WATER RECLAMATION PLANT



Note: Solids processed in dry tons (DT) during March 2009

TABLE III-1: POLYMERS USED FOR SLUDGE THICKENING AND DEWATERING AT THE JOHN E. EGAN WATER RECLAMATION PLANT FROM JANUARY 1, 2007, THROUGH MARCH 12, 2009

Brand of Mannich Polymer	Season	Dates of Use	
		GBT Thickening	Centrifuge Dewatering
CE-659	Winter	1/1/07 - 5/17/07	1/1/07 - 5/20/07
CE-770	Summer	5/18/07 - 11/5/07	5/21/07 - 11/6/07
CE-659	Winter	11/6/07 - 5/5/08	11/7/07 - 5/2/08
CE-770	Summer	5/6/08 - 8/28/08	5/3/08 - 9/15/08
CE-1100	Summer	8/29/08 - 11/21/08	9/16/08 - 11/29/08
CE-1142	Winter	11/22/08 - 3/12/09	11/30/08 - 3/12/09

Note: All polymers were manufactured and supplied by Polydyne Inc.

TABLE III-2: BELT USAGE FOR INDIVIDUAL GRAVITY BELT THICKENERS FROM AUGUST 2006 THROUGH MARCH 2009

	Machine Number		
Date	1	2	3
8/9/06			X
12/12/06		X	
12/21/06	X		
1/10/07			X
4/26/07	X		
5/23/07		X	
7/30/07			X
10/3/07		X	
10/16/07	X		
1/8/08		X	
8/13/08			X
12/19/08		X	
2/11/08	X		
2/23/09			X
Total Belts Used over Approximately 2.5 Years	4	5	5
No. of Days in Operation (January 1, 2007 - March 12, 2009)	373	615	625

Note: Improved washwater system installed on October 29, 2007, dramatically extended belt life from 2000 hours to 7000 hours.

MATERIALS AND METHODS

Sample Collection, Transportation and Preservation

Background sample collection began January 22, 2007. Sampling continued during application of $FeCl_3$, which commenced February 5, 2007, and ended December 24, 2008. Sampling was continued during the post-$FeCl_3$ application period, December 25, 2008, through March 12, 2009, in order to monitor Tot-Fe and TP levels and to evaluate the effects of residual $FeCl_3$ on the solids processes. The $FeCl_3$ application locations, rates, and plant maintenance activities that affected $FeCl_3$ application are summarized in Table AIII-1.

M&O personnel collected and transported samples to the EAL in accordance with the sampling protocol for GBT operations, as presented in Table III-3.

Daily composite samples were prepared from three grab samples collected during three shifts. Three grab samples were collected from N-WAS, S-WAS, K-WAS, and GBT feed streams. Thus, a total of four composite samples were prepared daily for analysis from 12 grab samples.

Similarly, daily thickened sludge cake and filtrate composite samples were prepared from three grab samples collected over three shifts from each GBT. Generally, two of the three GBTs are operated at the Egan WRP at any given time, and therefore, a maximum of two cake and two filtrate samples were composited daily from six cake and six filtrate grab samples. Effective May 1, 2008, all six sludge cake samples were composited into one cake sample. However, there was no change in filtrate sampling protocol.

Grab samples of dilute polymer from two polymer preparation tanks were collected during each shift. Dilute polymer samples were individually analyzed. Raw polymer and dilution water grab samples were also collected on a daily basis. This makes a total of six dilute polymer samples, one raw polymer sample, and one dilution water sample for analysis.

Sample collection, transportation, handling, and storage were carried out in compliance with the EAL's quality assurance program.

Methods

The TS, total dissolved solids (TDS), TP, and Tot-Fe analyses were performed using *Standard Methods for the Examination of Water and Wastewater, 20th Edition, 1998* (Standard Methods*)* and the USEPA methods. A brief summary of the specifics for TS, TP and Tot-Fe is given below.

Total Solids. This is a gravimetric analysis to determine the TS in environmental samples. The procedure utilized by the EAL is Method 2540G from Standard Methods. A sample

TABLE III-3: GRAVITY BELT THICKENER SAMPLING LOCATIONS, SAMPLE TYPES, FREQUENCY, AND PARAMETERS

Sampling Location	Sample Type,	Frequency	Parameter
Egan WAS	Composite[1]	Daily	%TS, Fe, TP
Kirie WAS	Composite[1]	Daily	%TS, Fe, TP
GBT Feed	Composite[1]	Daily	%TS, Fe, TP
Cake	Composite[1]	Daily	%TS, Fe, TP
Filtrate	Composite[1]	Daily	%TS, Fe, TP
Dilute Polymer	6 Grab samples[2]	Daily	% TS
Raw Polymer	1 Grab sample	Daily	% TS
Dilution Water	1 Grab sample	Daily	% TS, TDS

[1]Composite of three grab samples collected per shift.
[2]Both polymer dilution tanks were sampled once a shift and analyzed separately.

aliquot of about 2 to 25 g is (in case of cake samples) dried at 104 ± 1ºC for two - four hours. A sample volume up to 100 mL is chosen (in case of liquid sludge) to yield a residue between 10 to 200 mg. Samples are dried at 104ºC ± 1ºC for 3.5 hours.

The TS in the filtrate and dilution water was determined using Method 2540B from Standard Methods.

The TS in the polymer samples was determined using Method 2540G from Standard Methods. Samples are dried in an oven at 70 ± 2ºC for 24 ± 2 hours.

Total Phosphorous. The TP determination employed Method 365.4, *USEPA Methods for Chemical Analysis of Water and Wastes*, EPA-600/4-79-020, revised March 1983. This method has been automated via the Lachat QuickChem 8500 flow injection autoanalyzer using Lachat Method 10-115-01-1-C.

Total Iron. Sludge and thickened sludge cake samples were air dried at 60ºC to complete dryness in the drying oven following some natural air drying. Dried samples were ground to fine powder in an electric grinder. The standard operating procedure detailed in USEPA Method 3051, "SW-846 On-Line Test Methods for Evaluating Solid Waste Physical/Chemical Methods," September 1994 was followed to acid-digest samples. Digested samples were analyzed for Tot-Fe using ICP instrument (Method 3120 of Standard Methods).

RESULTS AND DISCUSSION

Raw Analytical and Plant Operating Database

The TS, Tot-Fe, and TP analyses were performed daily on N-WAS, S-WAS, K-WAS, GBT feed, thickened sludge, and filtrate samples. The TS analyses were also performed on dilute and raw polymer samples collected from each tank during each shift. The TS and TDS analyses were performed on dilution water samples. Results will be presented for four phases of the study: Phase 0 (No $FeCl_3$ application - 1/1/06 to 12/31/06 or 1/22/07 through 2/5/07), Phase I ($FeCl_3$ application in ML - 2/6/07 to 5/20/08), Phase II ($FeCl_3$ application in PSTs - 5/21/08 to 12/24/08), and Phase III (post-$FeCl_3$ application - 12/25/08 to 3/12/09). Experimental data on Tot-Fe and TP were collected only for this study, and such data were not available for the background period during 2006. The background data period in such cases was limited to 1/22/07 through 2/5/07.

Statistical Analysis of Raw Data

The Analysis of Variance (ANOVA) methodology was used for statistical analysis. In case of a sample size of 30 or greater, we assumed the normality of data in order to validate the ANOVA approach. If the sample size was less than 30, then normality was tested using the Kolmogorov-Smirnov method. All data were found to be normally distributed.

Homogeneity of variances was also examined for all comparative data sets using Bartlett's test. In almost every scenario, the homogeneity of variances was found to be unequal. In such an instance, we did not perform the standard ANOVA, but instead we performed the t-test.

All significance of probabilities (p-values) are interpreted and discussed in this report with a significance level of 5 percent. If the p-value is greater than 0.05, then it indicates that two variances or means are equal; and if it is equal to or less than 0.05, then two means or variances of two subgroups are significantly different.

Monitoring of Polymer Addition for Gravity Belt Thickening Process

Both $FeCl_3$ and polymer are used to thicken sludge. In order to determine the impact of $FeCl_3$ on solids thickening, the polymer dose was monitored and maintained at a constant level so that any performance variation could be attributed to the $FeCl_3$. It was important to establish that the polymer dosage was similar prior to and during $FeCl_3$ application periods before assessing the effects of $FeCl_3$. As necessary, the polymer dose was adjusted to maintain thickened sludge quality at approximately 5 percent TS, and such adjustments were documented.

Effect of Ferric Chloride Addition on Solids Thickening Process Performance

It should be noted that K-WAS contributed roughly 70 percent to GBT flow throughout the study. Table III-4 shows the average concentrations of TS in various sludge streams, thickened sludge, and filtrate during various phases of the study and includes the percent changes between phases. TS in N-WAS increased by 27 and -1 percent during Phases I and II, respectively, and in S-WAS by 47 and 11 percent during Phases I and II, respectively. Table III-4 also shows the calculated and measured values for GBT feed, which were found to be within one standard deviation range. TS in GBT feed are not routinely measured, and therefore, enough background data were not available for comparison against similar experimental data. Using a weighted-average approach, TS values in GBT feed were calculated and compared against the measured values.

Table III-4 shows that thickened cake TS increased by 2 and 17 percent during Phases I and II, respectively. This increase was heavily dominated by the 24 and 35 percent increase in TS in K-WAS during Phases I and II, respectively. TS in filtrate increased by 28 and 3 percent during Phases I and II, respectively. It is worth noting that addition of $FeCl_3$ to PST resulted in a decrease of TS in filtrate compared to the addition of $FeCl_3$ to ML.

As noted in Section II of this report, chemical sludge in the form of particulate $FePO_4$ and $Fe(OH)_3$ was produced at an average of 0.83 pound, per pound addition of $FeCl_3$ to the aeration tanks and PST and was removed from primary and secondary clarifiers. Table III-5 shows the average solids production in GBT feed streams, GBT feed, GBT draw, and filtrate and includes the percent change between phases. Table III-6 shows the average solids production in GBT draw and PS and includes the percent change between phases. It also includes the inorganic portion in solids. Average increase of TS in the GBT feed was calculated to be 8.93, 5.35, and 4.11 DT per day during Phases I, II, and III, respectively, compared to Phase 0; 3.12, -0.15, and 0.58 DT per day in GBT draw; and 1.20, 4.90, and -1.90 DT per day in PS. Average inorganic solids increase was calculated at 4.26, 3.06, and 0.97 DT per day in GBT feed during Phases I, II, and III, respectively; 2.50, 1.43, and 0.16 DT per day in GBT draw; and 0.51, 2.63, and -0.26 DT per day in PS, respectively. The digester feed received a total additional inorganic sludge from PS and GBT draw in the amount of 3.01, 4.06, and -0.10 DT per day during Phases I, II, and III, respectively.

Effect of Ferric Chloride Addition on the Solids Digestion Process Performance

Egan operates four anaerobic digesters. Digesters A and C are primary digesters, while Digesters B and D are secondary digesters. The digester feed to the primary digesters is a combined stream consisting of GBT draw and PS. The draw from the primary digesters is fed to the secondary digesters.

The two primary digesters showed a very similar pattern, and select average performance data from Digester A is presented in Table III-7 and from Digester C in Table III-8. Average solids content of the digester feed during Phases 0, I, II, and III was calculated to be 200, 215, 236, and 215 DT per million gallons, respectively. This reflects the relative presence of additional inorganic solids upon $FeCl_3$ addition.

TABLE III-4: AVERAGE CONCENTRATONS OF TOTAL SOLIDS IN DIFFERENT SLUDGE STREAMS, THICKENED SLUDGE, AND FILTRATE DURING STUDY PHASES AND PERCENT CHANGES BETWEEN PHASES

	Total Solids, mg/kg						
Stream	N-WAS	S-WAS	K-WAS	GBT Feed (Calculated)[1]	GBT Feed (Measured)	Thickened Sludge Cake	Filtrate
Phase 0 – No $FeCl_3$ Application (1/1/06-12/31/06)							
Average	6,279	5,513	6,685	6,435	-	63,300	1,017
Std. Dev.	1,091	869	843	-	-	9,300	1,045
Phase I - $FeCl_3$ Application in ML (2/6/07-5/20/08)							
Average	7,969	8,087	8,273	8,202	7,389	64,775	1,299
Std. Dev.	1,271	4,425	1,771	-	2,119	7,546	538
Phase II - $FeCl_3$ Application in PST (5/21/08-12/24/08)							
Average	6,191	6,105	8,998	8,324	8,013	74,365	1,045
Std. Dev.	1,079	967	1,881	-	3,337	13,167	356
Phase III - Post $FeCl_3$ Application (12/25-3/12/09)							
Average	7,440	6,548	9,004	8,361	7,512	71,070	1,327
Std. Dev.	1,547	734	2,239	-	2,008	11,044	752
PERCENT CHANGE BETWEEN							
Phase 0 - I	27	47	24	15	-	2	28
Phase 0 - II	-1	11	35	25	-	17	3
Phase 0 - III	18	19	35	17	-	12	31
Phase I - II	-22	-25	9	8	15	15	-20

[1]GBT Feed TS is calculated by weighted average calculations: e.g., for phase 0: (0.8 MGD * 6685 + 0.1 MGD * 6279 + 0.2 MGD * 5513) / 1.1 = 6435 mg/L. These calculations used plant records for flow data and sample results from this study.

TABLE III-5: AVERAGE SOLIDS PRODUCTION IN DIFFERENT SLUDGE STREAMS, THICKENED SLUDGE, AND FILTRATE DURING DIFFERENT PHASES OF THE STUDY AND PERCENT CHANGE BETWEEN PHASES

	SOLIDS, DRY TONS PER DAY							
Phase	N-WAS[1]	S-WAS[1]	K-WAS[1]	GBT Feed (Plant Data)	GBT Feed[2] (Calculated)	GBT Feed[3] (Measured)	Thickened Sludge or GBT Draw (Plant Data)	Filtrate (Plant Data)
Phase 0 - No $FeCl_3$ Application (1/1/06-12/31/06)								
0	3.61	4.57	21.87	30.05	30.06	-	28.24	4.31
Phase I - $FeCl_3$ Application in ML (2/6/07-5/20/08)								
I	4.06	7.36	22.44	33.86	38.99	35.13	31.36	3.02
Phase II - $FeCl_3$ Application in PST (5/21/08-12/24/08)								
II	1.86	3.92	22.66	28.44	35.41	34.08	28.09	2.31
Phase III - Post $FeCl_3$ Application (12/25-3/12/09)								
III	3.30	4.66	23.63	31.59	34.17	30.70	28.82	1.47
PERCENT CHANGE BETWEEN								
0 – I	12	61	3	13	13	-	11	-30
0 – II	-48	-14	4	-5	-5	-	-1	-46
0 – III	-9	2	8	+5	5	-	2	-66
I – II	-54	-47	1	-16	-16	-13	-10	-24

[1]From plant operating data, which was calculated based on suspended solids by M&O.
[2]GBT feed TS was calculated by weighted average using actual measured data on tributaries shown in Table III 4 and plant reported flows.
[3]GBT Feed TS is actual measured data shown in Table III-4 multiplied with GBT feed flow.

TABLE III-6: AVERAGE SOLIDS PRODUCTION IN GRAVITY BELT THICKENER DRAW AND PRIMARY SLUDGE DURING VARIOUS PHASES OF THE STUDY AND PERCENT CHANGE BETWEEN PHASES

Phase	GBT Draw, DT/D	%VS	Inorganic Solids in GBT Draw, DT/D	Primary Sludge, DT/D	%VS	Inorganic Solids in Primary Sludge, DT/D	Total Sludge From GBT Draw and Primary Sludge, DT/D	Total Inorganic Solids From GBT Draw and Primary Sludge, DT/D
Phase 0 - No $FeCl_3$ Application (1/1/06 - 12/31/06)								
0	28.24	77.2	6.44	13.0	83.5	2.15	41.24	8.58
Phase I - $FeCl_3$ Application in ML (2/6/07 - 5/20/08)								
I	31.36	71.5	8.94	14.2	81.3	2.66	45.56	11.59
Phase II - $FeCl_3$ Application in PST (5/21/08 - 12/24/08)								
II	28.09	72.0	7.87	17.9	73.3	4.78	45.99	12.64
Phase III - Post $FeCl_3$ Application (12/25 - 3/12/09)								
III	28.82	77.1	6.60	11.1	83.0	1.89	39.92	8.49
PERCENT CHANGE BETWEEN								
0 - I	11	-7	39	9	-3	24	10	35
0 – II	-1	-7	22	38	-12	123	12	47
0 – III	2	0	3	-15	-1	-12	-3	-1
I – II	-10	1	-12	26	-10	80	1	9

TABLE III-7: AVERAGE PERFORMANCE OF PRIMARY DIGESTER "A" DURING VARIOUS STUDY PHASES

Parameter	Phase 0 No $FeCl_3$ Application 01/01/06 - 12/31/06	Phase 1 $FeCl_3$ Application in ML 02/06/07 - 05/20/08	Phase II $FeCl_3$ Application in PST 05/21/08 - 12/24/08	Phase III Post-$FeCl_3$ Application 12/25/08 - 03/12/09
Feed Solids, MGD	0.10	0.11	0.10	0.09
Feed Solids, DT/D	20.7	22.9	22.9	19.0
Draw Solids, DT/D	11.6	13.4	13.9	10.7
Percent Solids Reduction	44	42	39	44
Dig. Gas produced x 1000 CF/D	329	224	196	169
pH, pH unit	7.4	7.5	7.5	7.4
Alkalinity, mg/L as $CaCO_3$	4,541	5,043	5,149	5,281
Volatile Acids, mg/L	15	32	31	33
Temperature, Deg F	96.3	96.7	97.3	97.7
Feed Percent VS	80	76	73	80
Draw Percent VS	68	63	59	64
Percent VS Reduction	48	46	46	55
Dig. Gas produced/lb Percent VS destroyed	19	13	12	10
Detention Time, days	26	25	28	30

TABLE III-8: AVERAGE PERFORMANCE OF PRIMARY DIGESTER "C" DURING VARIOUS STUDY PHASES

Parameter	Phase 0 No $FeCl_3$ Application 01/01/06 - 12/31/06	Phase 1 $FeCl_3$ Application in ML 02/06/07 - 05/20/08	Phase II $FeCl_3$ Application in PST 05/21/08 - 12/24/08	Phase III Post-$FeCl_3$ Application 12/25/08 - 03/12/09
Feed Solids, MGD	0.10	0.11	0.10	0.10
Feed Solids, DT/D	20.5	22.6	23.0	20.9
Draw Solids, DT/D	11.7	13.6	13.5	11.3
Percent Solids Reduction	43	40	41	46
Dig. Gas produced x 1000 CF/D	367	234	195	169
pH, pH unit	7.4	7.6	7.5	7.5
Alkalinity, mg/L as $CaCO_3$	4,626	5,013	5,016	5,052
Volatile Acids, mg/L	16	37	40	42
Temperature, Deg F	96.1	96.8	98.0	97.3
Feed Percent VS	80	76	73	80
Draw Percent VS	68	63	59	64
Percent VS Reduction	48	46	46	55
Dig. Gas produced/lb Percent VS destroyed	22	14	11	9
Detention Time, days	25	25	27	27

With the increase in inorganic solids during Phase I, the feed rate increased from 20.7 DT to 22.9 DT per day. An increase of 2.2 DT per day in Digester A and 2.1 DT per day in Digester C made a total of 4.3 DT per day of additional sludge input to primary digesters, as shown in Tables III-7 and 8. The additional 4.3 DT of sludge is consistent with 3.1 DT of additional sludge from GBT draw plus 1.2 DT of additional sludge from PS, as presented in Table III-6. Average sludge increase during Phase II was 4.75 DT per day: -0.15 DT per day from GBT draw and 4.90 DT per day from PS. During Phase III, a 1.32 DT per day reduction in solids occurred mainly in PS. Additional inorganic solids during Phases I, II, and III was found to be 3.01, 4.06, and -0.10 DT, respectively. After 26 days (average detention time) of $FeCl_3$ application under steady state operation, approximately 78 DT of additional inorganic solids was accumulated in primary digesters. This 78 DT of additional inorganic solids would occupy 0.36 MG volume in the digesters. This volume represents approximately 7.5 percent of the 4.70 MG capacity of the primary digesters. Though the input of additional inorganic solids did not cause operational upsets throughout the study, digester performance was carefully examined to evaluate its impact and is described in the following paragraphs.

Average percent solids reduction was calculated to be 44, 42, 39, and 44 for Phases 0, I, II, and III, respectively. A comparison of VSR during phases of the study did not reveal a significant difference, as shown in Table III-9. In order to consider seasonal fluctuations in VSR, monthly average VSR is presented in Figure III-2. During 2007 in Phase I, VSR decreased every month, except for September and October 2007, compared to 2006. Similarly, during 2008 in Phase I, VSR decreased every month, except for March 2008, compared to March 2007. During Phase II, June, July, August, November, and December 2008 showed an increase in VSR compared to the same months during 2007. Thus, during 2008, six months showed higher VSR compared to 2007. However, VSR during 2008 was generally lower than 2006 for most of the months.

Decrease in VSR could be due to many factors, but the role of factors, such as VS portion in feed, temperature, detention time, alkalinity, pH, and concentration of volatile acids, are discussed in the following paragraphs.

The decrease in volatile portion in the feed sludge during the $FeCl_3$ addition period appeared to have caused a proportional decrease in VSR. As an illustration, volatile portion in feed sludge decreased from 80 percent to 76 percent during Phase I compared to Phase 0. This was due to a reduction in percent VS from 83.5 to 81.3 during Phase I in PS and a reduction of percent VS from 77.2 to 71.5 during Phase I in GBT draw (as presented in Table III-6).

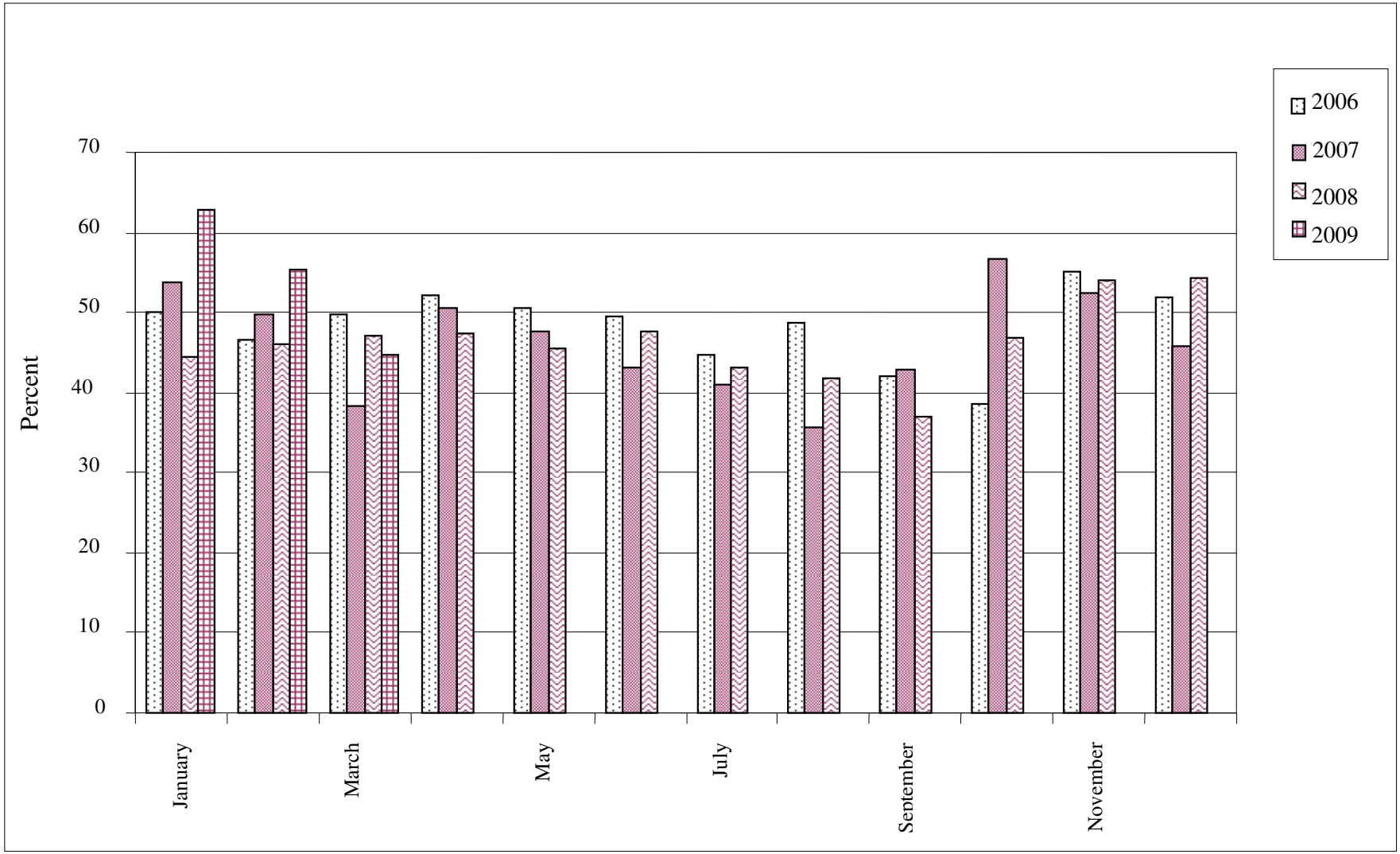
The average temperature values in the primary digesters were observed to be in a very narrow range during all phases and did not cause a reduction in VSR during the $FeCl_3$ addition period. The average temperatures in Digester A were 96.3º, 96.7º, 97.3º, and 97.7ºF during Phases 0, I, II, and III, respectively.

The average detention time in the primary digesters was calculated using the average digester draw volume and was found to be 26, 25, 28, and 30 days in Digester A during Phases 0, I, II, and III, respectively. Table III-9 shows that detention times were similar during all phases of the experiment and hence did not cause reduction in VSR.

TABLE III-9: STATISTICS ON MONTHLY AVERAGE DETENTION TIMES AND PERCENT VOLATILE SOLID REDUCTIONS IN PRIMARY DIGESTERS

	Digester A		Digester C	
	Detention Time, Days	%VS Reduction	Detention Time, Days	%VS Reduction
Phase 0 - No $FeCl_3$ Application (1/1/06 – 1/1/07)				
No. of Months	13	13	13	13
Average	26.5	48.7	27.0	48.8
Std. Dev.	2.6	4.7	2.6	4.4
Phases I and II Combined - $FeCl_3$ Application (2/6/07 - 12/24/08)				
No. of Months	23	23	23	23
Average	26.0	45.9	26.0	46.2
Std. Dev.	2.6	5.5	1.9	5.2
p-values - No $FeCl_3$ and $FeCl_3$ Application Periods	0.575	0.135	0.200	0.145
Phase III - Post-$FeCl_3$ Application (12/25/08 - 3/12/09)				
No. of Months	3	3	3	3
Average	29.5	54.3	26.8	54.6
Std. Dev.	4.1	9.2	3.0	7.8
p-values - No $FeCl_3$ and Post-$FeCl_3$ Application Periods	0.132	0.136	0.904	0.094

FIGURE III-2: MONTHLY AVERAGE PERCENT VOLATILE SOLIDS REDUCTION



Note: No $FeCl_3$ Addition: 1/1/06 – 2/5/07.
$FeCl_3$ Addition: 2/6/07 – 12/24/08.
Post-$FeCl_3$ Addition: 12/25/08 – 3/12/09.

No significant change occurred in alkalinity or pH. Volatile acid concentrations in both digesters doubled after addition of $FeCl_3$ from approximately 15 to 30 mg/L and remained at elevated levels during the rest of the study. This change, however, did not affect the digestion process performance because the influence of volatile acid concentrations at this level on digestion is minimal.

Decrease in VSR may cause a reduction in gas production in both primary digesters regardless of the phase of the experiment. Reduction in average daily gas production was found to be 32, 40, and 49 percent during Phases I, II, and III, respectively. It is not clear, however, if such reduction during Phases I, II, and III was entirely due to accumulation of inorganic solids. We believe that a change in protocols used for gas production measurement during the experiment may also have played a significant role. This change in protocols made it difficult for us to evaluate the impact of $FeCl_3$ addition on gas production. Gas production was overestimated prior to implementing a new accounting procedure in May 2007. This made gas production records until April 2007 appear to be much higher than actual gas production, and hence, comparison of gas production during other phases against Phase 0 would show a bigger drop than actual. It is also possible that gas-metering devices may not have been routinely calibrated during the entire study period.

Iron (Fe) serves as a micronutrient to the microbial community in the digesters. No evidence was found that it reached the toxic threshold level. This was based on the iron levels measured in GBT draw and an assumption that Tot-Fe in biomass is estimated at 1 percent by volatile mass weight (Metcalf-Eddy).

Effect of Ferric Chloride Addition on Hydrogen Sulfide Levels in Digester Gas

Plant personnel measured H_2S concentrations in the gas pipeline using a permanent monitoring instrument placed in the compressor room, which is about 100 feet away from the digesters. This gas pipeline carries the digester gas from all four digesters. Therefore, H_2S results shown in this report represent the entire digestion system as opposed to only primary digesters. The statistics of raw data collected for the period of January 2005 through May 2009 is presented in Table III-10.

Average H_2S concentration in the gas phase was reduced approximately tenfold from 250 ppm during the background period to 29 ppm during the $FeCl_3$ addition period. This effect on H_2S concentration is likely due to the residual Tot-Fe precipitated sulfide into ferrous and ferric sulfide precipitates in the digesters during the $FeCl_3$ addition period. The average H_2S concentration during the post-$FeCl_3$ addition period increased steadily to 151 ppm. Based on the data, it is clear that application of $FeCl_3$ helped in curbing the production of H_2S, a corrosive and nuisance gas.

Effect of Ferric Chloride Addition on the Solids Dewatering Process

It should be noted that $FeCl_3$ is injected into the digester draw pipeline to enhance the performance of dewatering operations. It is thoroughly mixed in the pipeline by the time it

TABLE III-10: HYDROGEN SULFIDE CONCENTRATIONS
DURING VARIOUS STUDY PHASES[1]

	No $FeCl_3$ Application (1/22/07 - 2/5/07)	$FeCl_3$ Application (2/6/07 - 12/24/08)	Post-$FeCl_3$ Application (12/25/08 - 3/12/09)
No. of Observations	25	23	4
Average	250	29	151
Max.	595	172	160
Min.	83	9	140
Std. Dev.	118	33	10

[1]Measurements made in gas pipeline using a permanent monitoring instrument in the compressor room which is about 100 feet from digesters.

reaches the centrifuge machines. The centrifuge feed pre-conditioned with $FeCl_3$ is dual-conditioned with dilute mannich polymer. No alteration to this dual-conditioning operation was made during the P removal study.

Table III-11 shows the select parameters for centrifuge dewatering operations for all phases of the experiment. Table III-11 shows that solids in the centrifuge feed during Phases 0, I, II, and III was 87, 99, 119, and 99 DT per million gallons, respectively, which is approximately 50 percent lower than those of digester feed due to solids reduction during the digestion process. The trend of average solids content in digester feed and centrifuge feed, either by volume or by weight basis, followed a similar pattern.

The $FeCl_3$ and polymer dosages decreased by 15 percent and 16 percent during Phase I and 32 and 23 percent during Phase II, respectively, compared to Phase 0. Monthly average dosages of $FeCl_3$ and polymer for the period from January 2006 through March 2009 are depicted in Figures III-3 and 4, respectively. Figure III-3 shows savings in $FeCl_3$ demand throughout the study, except for February through April 2007 and March, September, and October 2008. It also shows that from March 2009 $FeCl_3$ demand began to increase. In order to realize the savings in $FeCl_3$ demand, approximately three months of lag time was observed at the beginning and cessation of $FeCl_3$ addition for P removal. Figure III-4 shows that polymer savings were realized during 2007, except for the months of November and December, and during 2008, except for the months of February, March and August. The summer months showed better savings for both conditioning agents because conditioning demands usually increase during winter.

Average suspended solids in centrate decreased 36 percent during Phase I and increased 30 percent during Phase II compared to Phase 0. This indicates that dual conditioning dosages reached optimum level during Phase I. Cake solids increased by 5 percent during Phase I and 10 percent during Phase II. It decreased to background level at 24.5 percent during Phase III.

Discussion of Persistence of Residual Ferric Chloride and Dual Conditioning and Its Role in Thickening and Dewatering Processes

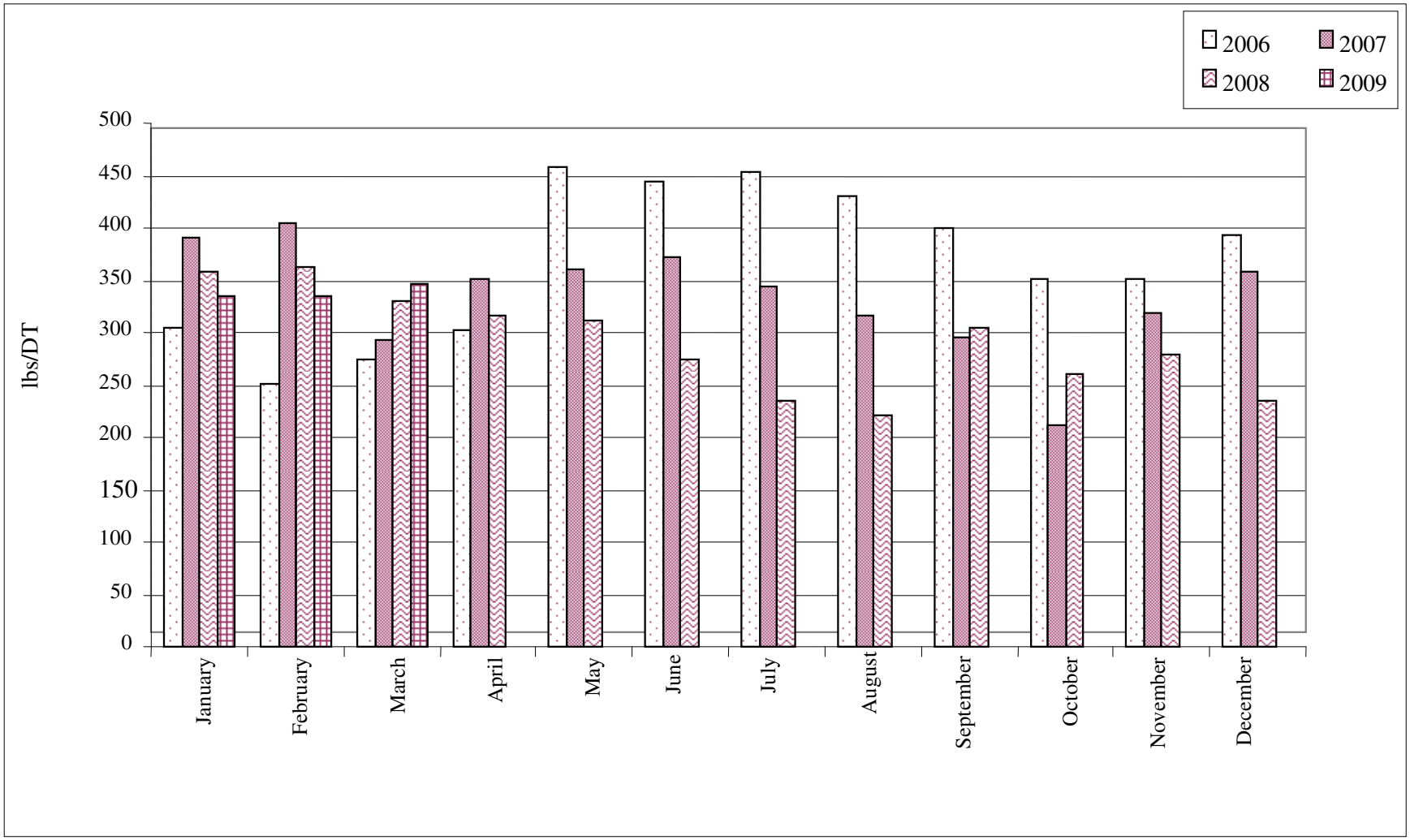
Based on the foregoing, it appears that the addition of $FeCl_3$ at a constant rate produced varying amounts of residual Tot-Fe concentrations in PS, WAS, GBT feed, and thickened sludge, as well as centrifuge feed. Even after cessation of $FeCl_3$ addition, residual Tot-Fe persisted in the solids processing train. In our estimation, Tot-Fe may have persisted in the GBT system for one to two SRT periods of activated sludge system, while approximately less than two months in digesters and the centrifuge system. This estimated persistence, however, depended on many factors, such as the $FeCl_3$ dosage and its addition point in the treatment train, SRT in the activated sludge process, and TP loadings in raw sewage.

During Phase III, residual Tot-Fe caused unintentional dual conditioning resulting in precipitation of TP in aeration tanks, precipitation of sulfides in digesters, and conditioning of sludge in thickening and dewatering processes. The addition of $FeCl_3$ for P removal in the aeration tanks causes unintentional dual conditioning in solids processes because conventionally, either organic or inorganic conditioners are used for thickening and dewatering operations. If

TABLE III-11: DATA ON PERFORMANCE OF CENTRIFUGE DEWATERING OPERATIONS DURING VARIOUS STUDY PHASES

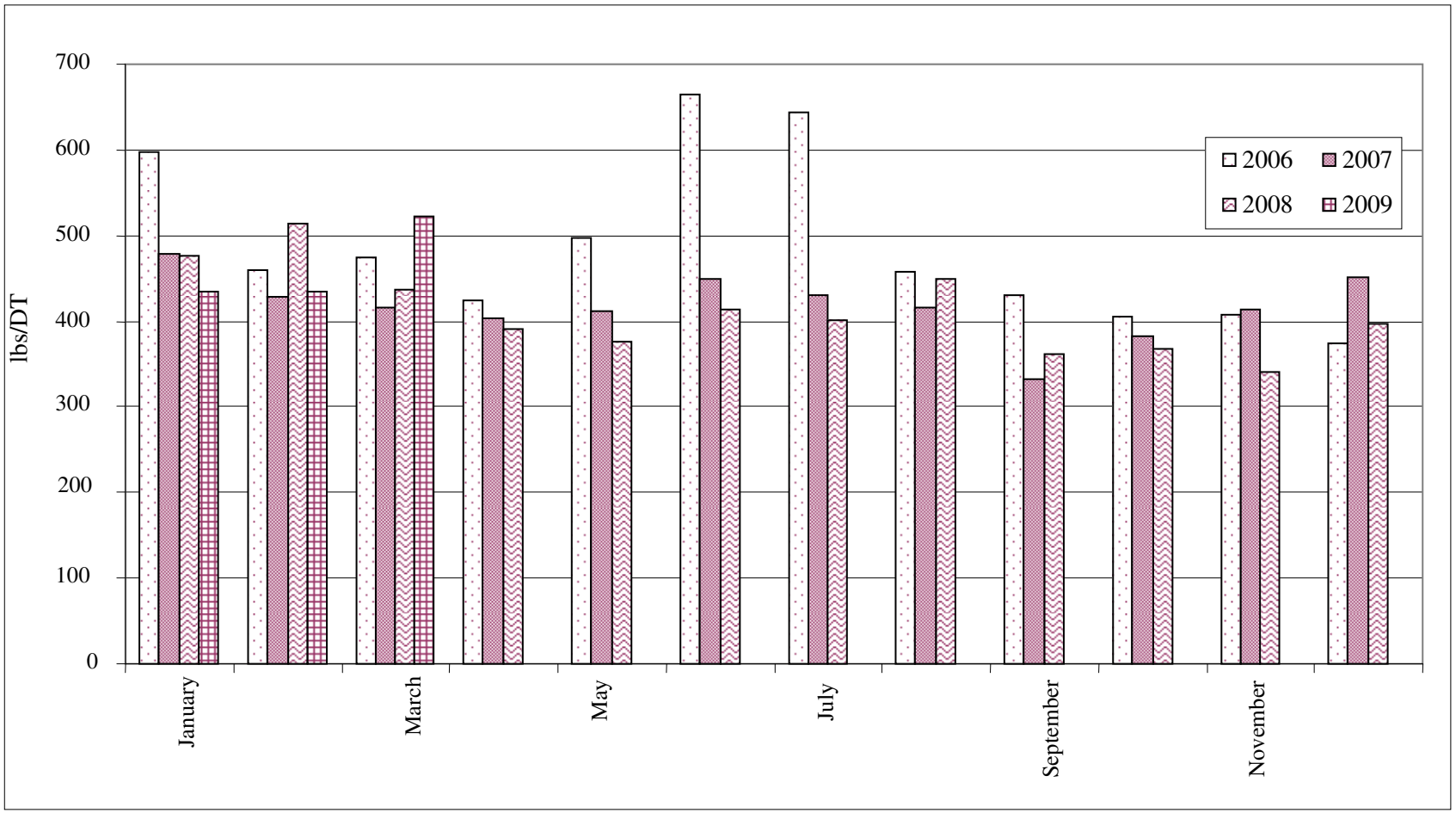
Parameter	Period Total	Average	Max	Min	Std. Dev.
Phase 0 - No $FeCl_3$ Application (1/1/06 - 12/31/06)					
Sludge Feed, MGD	82 (MG)	0.2	0.4	0	0.1
Sludge Feed, DT/D	7,091 (DT)	19.4	40.3	0	12.2
Polymer Dose, lbs/DT	n/a	501	2,055	0	254
Ferric Dose, lbs/DT	n/a	382	1,921	0	224
Centrate SS, mg/L	n/a	3,505	18,670	85	3402
Sludge Cake, Percent TS	n/a	24.6	30.8	17.0	2.0
Phase I - $FeCl_3$ Application in ML (2/6/07 - 5/20/08)					
Sludge Feed, MGD	110 (MG)	0.2	0.4	0	0.1
Sludge Feed, DT/D	10,870 (DT)	23.1	52.5	0	14.8
Polymer Dose, lbs/DT	n/a	420	2,381	0	228
Ferric Dose, lbs/DT	n/a	327	1,238	0	165
Centrate SS, mg/L	n/a	2241	14,510	100	2262
Sludge Cake, Percent TS	n/a	25.9	33.0	17.7	2.2
Phase II - $FeCl_3$ Application in PST (5/21/08 - 12/24/08)					
Sludge Feed, MGD	45 (MG)	0.2	0.5	0	0.2
Sludge Feed, DT/D	5,349 (DT)	24.5	67.9	0	19.7
Polymer Dose, lbs/DT	n/a	384	884	0	150
Ferric Dose, lbs/DT	n/a	258	710	0	107
Centrate SS, mg/L	n/a	4,567	22,560	117	3,693
Sludge Cake, Percent TS	n/a	27.0	34.0	21.4	1.9
Phase III - Post $FeCl_3$ Application (12/2508 - 3/12/09)					
Sludge Feed, MGD	16 (MG)	0.2	0.5	0	0.2
Sludge Feed, DT/D	1,541 (DT)	19.8	52.3	0	19.1
Polymer Dose, lbs/DT	n/a	450	821	0	165
Ferric Dose, lbs/DT	n/a	331	799	0	129
Centrate SS, mg/L	n/a	1,897	11,330	170	2,481
Sludge Cake, Percent TS	n/a	24.5	34.2	18.7	2.1

FIGURE III-3: MONTHLY AVERAGE FERRIC CHLORIDE DOSAGES FOR CENTRIFUGE DEWATERING OPERATIONS



Note: No $FeCl_3$ Addition: 1/1/06 - 2/5/07.
$FeCl_3$ Addition: 2/6/07 - 12/24/08.
Post-$FeCl_3$ Addition: 12/25/08 - 3/12/09.

FIGURE III-4: MONTHLY AVERAGE POLYMER DOSAGES FOR CENTRIFUGE DEWATERING OPERATIONS



Note: No $FeCl_3$ Addition: 1/1/06 - 2/5/07
$FeCl_3$ Addition: 2/6/07 - 12/24/08
Post-$FeCl_3$ Addition 1/25/08 - 3/12/09

$FeCl_3$ is added for nutrient removal purposes, the conditioning demand in thickening and dewatering operations is altered, as $FeCl_3$ also functions as an inorganic sludge conditioner.

The precipitated orthophosphates and hydroxides in the resulting WAS may or may not perform harmoniously with a second conditioner used in a subsequent thickening or dewatering process. Available free ferric (Fe^{3+}) and positively charged hydroxyl-ferric complexes can flocculate sludge through charge neutralization of the organic particles and provide a comparatively porous, incompressible structure that is advantageous for thickening (Dentel, 2001). However, in most activated sludge plants, organic cationic polymers are used for conditioning sludge for thickening and dewatering processes. Polymers have ionizable groups that bind with reactive sites on sludge particles. Several particles may be bound to a single polymer molecule to form a bridging structure to enhance sludge thickening (Reynolds and Richards, 1996; Dentel, 2001).

Many studies have shown that dual conditioning of sludge with $FeCl_3$ and polymer achieved better thickening than using a single conditioner (Chitkela and Dentel, 1998; Poon and Chu, 1999; Abu-Orb et al., 2001; Wang et al., 2005). Generally, these studies indicate that $FeCl_3$ may be used as a partial substitute to the polymer dose. In most cases, increasing either the $FeCl_3$ or polymer dose in the dual-conditioning experiments did not seem to affect thickening. However, with all conditioning agents, there is an optimum dose to achieve the highest filterability or dewaterability of a given sludge. If the optimum dose is not met or exceeded, the treated sludge's thickening ability suffers. Krishnamurthy and Viraraghavan (2005) investigated single and dual conditioning of wastewater treatment plant sludge with $FeCl_3$, Percol 755, and Percol 757 (both emulsion polymers manufactured by Degussa). As $FeCl_3$ concentrations increased and Percol concentrations decreased, filterability of the treated sludge declined (Krishnamurthy and Viraraghavan, 2005). Though dual conditioning has become more commonplace in solids treatment, the dual conditioning effect should be examined on a case-by-case basis; also, the effects of aging sludge or sludge with prolonged contact with one of the conditioners due to the application of $FeCl_3$ for nutrient removal have yet to be examined.

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SECTION IV

EFFECTS OF PHOSPHORUS REDUCTION ON BIOAVAILABILITY AND LOSS POTENTIAL OF PHOSPHORUS IN BIOSOLIDS

INTRODUCTION

The chemical P removal involves the precipitation of P by added Fe. As the Fe bound P in soil tends to be least soluble, P removal may result in the reduced bioavailability of biosolids P to plants and P loss through surface runoff from biosolids-amended fields. In January 2007, the P removal project was started at the District's Egan WRP in which the secondary effluent was dosed with a 38 percent ferric chloride solution (3.3 gal/hr/MGD) to attain a target effluent concentration of 0.5 mg P/L.

The Biosolids Utilization and Soils Science Section conducted the laboratory analysis, greenhouse experiment, and simulated runoff study to evaluate the impact of chemical P removal on plant bioavailability and potential of loss runoff losses on land amended with the resulting biosolids.

MATERIALS AND METHODS

Biosolids Phosphorus Content

Centrifuge-dewatered cake biosolids were collected before (Pre) and following (Post) the ferric chloride treatment. The P content in the biosolids samples was analyzed to estimate three forms of P in the biosolids. Total P content was extracted by acid digestion method. The plant available P was extracted by the Bray-1 P soil test method. Water soluble P was extracted using a 1:10 biosolids to water ratio shaken for 30 minutes. Phosphorus concentration in all the extracts was determined by the Molybdate blue method.

Greenhouse Study

A greenhouse study was conducted to compare the plant availability of P in the Pre- and Post-biosolids. In this study, 8 kg of an Immokalee sandy soil was amended with the Pre-biosolids, Post-biosolids, and triple superphosphate fertilizer P (TSP) to supply six rates of total P ranging from 0 to 264 mg P/kg. The treated soils were moistened, left to equilibrate, and then placed in pots. Ryegrass (*Lolium perenne* var. Pleasure) was sown as the test crop and grew in the pots for 30 days. The ryegrass foliage was clipped at 30 days after germination and analyzed for total P concentration.

Simulated Runoff Study

A simulated runoff study was conducted to compare the potential for P runoff from soil amended with the Pre- and Post-P reduction biosolids. The simulated runoff was conducted according to the equipment and protocol established by the U.S. Department of Agriculture SERA-17 Workgroup. In this study, the biosolids were mixed with 10 kg soil and packed in a 100 cm long by 15 cm wide by 5 cm deep metal tray. The rate of biosolids added to the metal tray was calculated on the basis that added biosolids will provide the corn with agronomic N rate. The N in biosolids was assumed to be 20 percent available to corn.

RESULTS AND DISCUSSION

Biosolids Phosphorus Content

The results of the analysis of the Pre- and Post-biosolids are presented in Table IV-1. The data in Table IV-1 show that the P removal process increased total P in biosolids by 23 percent but decreased the Bray-1 P in biosolids by 77 percent and water soluble P by 30 percent. As the Bray-1 P is related to P availability to plant, water soluble P to potential P loss from biosolids-amended soil, the data indicate that the addition of $FeCl_3$ to reduce P concentration in effluents reduces the biosolids P bioavailability and potential for runoff losses, even though there is an increase in total P content in biosolids. The magnitude of changes following P removal appears to be greater for biosolids P bioavailability than their total P.

Greenhouse Study

The slope of the linear response of relative foliage P concentration to P addition was used as the index for P availability. The data in Figure IV-1 shows that the P concentration response to P addition increased linearly with P rate. The slope of the linear response curve was in the order TSP > Pre-biosolids > Post-biosolids. These data therefore indicate that the P removal greatly decreases the P agronomical availability of biosolids.

Simulated Runoff Study

The biosolids N content was 40.8 g N/kg in Pre-biosolids and 33.2 g N/kg in Post-biosolids. As a result, the rates of biosolids application was 26.8 Mg/ha for Pre-biosolids and 32.9 Mg/ha for Post-biosolids. The corresponding P addition to the soil in the simulation tray was nearly two times higher from Post-biosolids (682 mg P/kg soil) than Pre-biosolids (380 mg P/kg soil). The trays were placed under three simulated rainfall events at intervals of days 0, 2, and 4 and at an intensity of 100 mm/hr. The soil was covered during the interval between each rainfall event. In each event, simulated runoff was generated for a period of 30 minutes from each tray. The total P was analyzed in the unfiltered runoff sample, and Molybdate-reactive P (MRP) and total soluble P in the filtered (0.2 μ) runoff sample.

At the first rainfall event, the concentrations of all three types of P in runoff were lower with Post-biosolids than those with Pre-biosolids (Table IV-2). The similar trend was observed at the second and third rainfall events, though the differences between two biosolids sources were not statistically significant (Table IV-2). The data suggest that the potential P loss for the chemical P removal biosolids would be lower than that for conventional biosolids in land application, even though the P addition to field from P removal biosolids is much greater.

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TABLE IV-1: IMPACT OF CHEMICAL PHOSPHORUS REMOVAL ON THE TOTAL AND EXTRACTABLE PHOSPHORUS IN BIOSOLIDS

	Total P mg/kg	Water Soluble-P mg/kg	Bray-1 P mg/kg
Pre-biosolids	23,601	11.7	118
Post-biosolids	29,050	8.2	27.2
Sig. of diff. at $P < 0.05$	yes	yes	yes

FIGURE IV-1: PHOSPHORUS CONCENTRATION RESPONSE TO PHOSPHORUS ADDITION

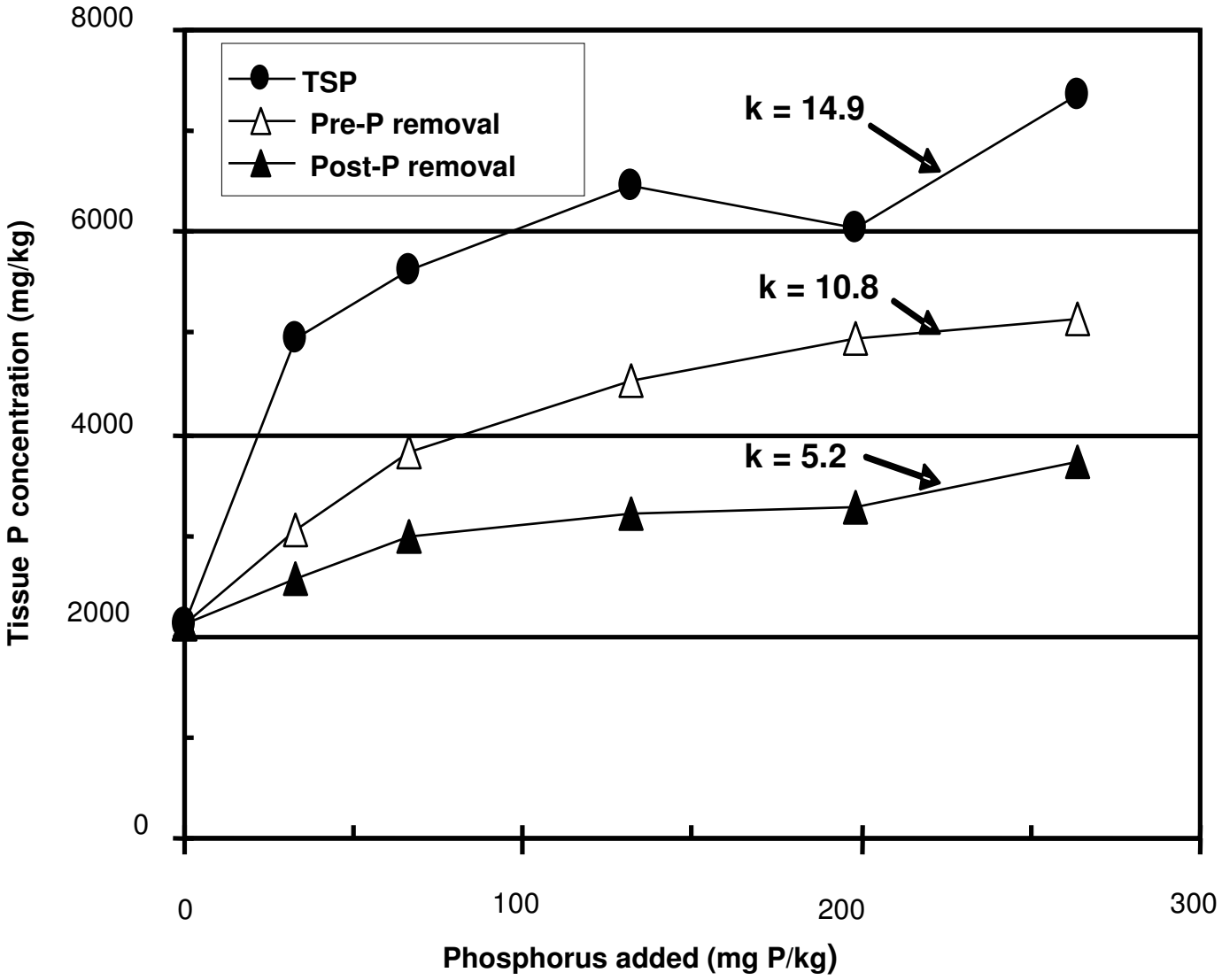

TABLE IV-2: CONCENTRATION (mg/L) OF VARIOUS PHOSPHORUS IN RUNOFF COLLECTED UNDER RAINFALL SIMULATOR AS AFFECTED BY PHOSPHORUS REMOVAL TREATMENT

	MRP			Total Soluble P			Total P		
Rain event	First	Second	Third	First	Second	Third	First	Second	Third
Pre-biosolids	0.27	0.20	0.20	0.35	0.37	0.28	3.88	2.36	2.21
Post-biosolids	0.17	0.13	0.11	0.26	0.31	0.19	2.98	1.87	1.52
Sig. of diff. at $P < 0.05$	Yes	No	No	Yes	No	No	Yes	No	No

The results of this study show that although the chemical P removal process increases the P content of biosolids, the increased P is bound to Fe, which decreases the biosolids P availability to plants and potential loss through runoff. Therefore, the biosolids generated through the chemical P wastewater treatment process can be land applied at rates even higher than rates of conventional biosolids without increasing the potential P runoff.

APPENDIX AI: WATER CHEMISTRY DATA IN SALT CREEK BEFORE AND AFTER PHOSPHORUS REDUCTION AT THE EGAN WATER RECLAMATION PLANT

TABLE AI-1: WATER CHEMISTRY AT BUSSE LAKE DAM IN SALT CREEK DURING 2005 - 2008 BEFORE AND AFTER PHOSPHORUS REDUCTION AT THE JOHN E. EGAN WATER RECLAMATION PLANT

Constituents in mg/L except where noted

Date	Water Temp (°C)	pH (units)	TSS	VSS	Turbidity (NTU)	DO	BOD	CBOD	COD	TP	Ortho-Phos	TKN	NH3-N	NO3-N	NO2-N	TN	Chl-a (µg/L)
Pre-Phosphorus Reduction - 2005																	
03/02/05	3.9	7.3	7	4	10	13.5	6	4	25	0.07	0.360	1.24	0.08	0.834	0.023	2.10	17
04/06/05	14.2	7.9	24	12	12	10.9	6	5	39	<0.05	0.020	1.09	0.04	0.275	0.017	1.38	40
04/20/05	13.6	8.4	11	5	9	9.4	6	5	38	<0.05	0.500	1.04	0.12	0.020	<0.004	1.06	25
05/04/05	13.5	8.0	28	12	13	7.7	5	4	34	<0.05	0.160	0.79	0.11	0.008	<0.004	0.80	34
05/18/05	15.4	7.6	18	9	8	9.7	3	3	30	<0.05	0.130	0.96	0.10	0.027	0.005	0.99	22
06/01/05	27.5	7.8	<3	<3	5	10.5	<2	<2	36	<0.05	0.190	0.70	0.20	0.031	0.008	0.74	7
06/15/05	23.3	7.1	6	<3	5	5.0	ND	ND	32	<0.05	0.090	0.79	0.33	0.136	0.013	0.94	15
07/06/05	33.5	8.3	23	15	14	8.8	4	5	34	<0.05	0.030	1.24	0.20	0.032	0.007	1.28	56
07/20/05	27.5	8.4	3	<3	9	7.4	4	4	38	0.06	0.032	1.08	0.18	0.075	0.010	1.17	20
08/03/05	27.7	7.5	12	8	7	3.7	4	<2	55	0.13	0.197	1.04	0.10	0.072	0.013	1.13	25
08/17/05	25.3	7.6	21	16	10	5.6	<2	<2	36	3.15	2.727	1.34	0.03	11.436	0.020	12.80	10
09/07/05	24.4	8.2	34	23	19	9.3	6	4	46	0.18	0.102	1.32	0.14	0.368	0.047	1.74	24
09/21/05	22.7	7.5	12	<3	23	7.9	5	5	43	0.09	0.037	1.33	0.04	0.029	0.024	1.38	63
10/05/05	23.0	8.3	16	8	12	8.1	3	4	36	0.08	0.012	1.20	<0.02	<0.005	0.010	1.21	42
10/19/05	14.7	7.6	21	12	19	8.0	4	4	38	0.05	0.012	1.08	0.02	0.010	0.010	1.10	42
11/02/05	12.8	8.1	5	<3	11	9.7	8	5	34	0.05	0.005	0.87	<0.02	0.033	0.008	0.91	32
11/16/05	7.1	7.3	<3	<3	15	10.5	4	4	30	0.13	0.026	1.47	0.34	0.060	0.015	1.55	36
12/07/05	1.9	7.9	3	3	9	ND	3	3	36	0.16	0.105	1.32	0.22	0.268	0.018	1.61	20
Pre-Phosphorus Reduction – 2006																	
01/04/06	4.6	7.5	6	5	8	ND	4	4	37	0.02	0.051	1.43	0.19	0.368	0.021	1.819	22
02/01/06	6.6	7.1	25	6	17	ND	<2	<2	46	0.80	0.010	1.13	0.06	5.673	0.027	6.83	16
03/01/06	5.1	7.3	<3	<3	10	ND	4	3	19	0.06	0.158	1.22	<0.02	1.037	0.016	2.27	19
04/19/06	15.8	7.4	12	<3	15	ND	6	6	42	0.10	0.051	1.48	0.02	0.290	<0.004	1.77	58
05/17/06	16.4	8.6	13	10	20	ND	4	4	24	0.87	0.007	1.74	0.14	0.017	0.004	1.76	29
06/07/06	23.6	8.5	ND	ND	10	ND	3	2	29	0.07	0.017	1.14	<0.02	0.010	0.006	1.16	18
06/21/06	20.5	8.0	10	6	11	ND	3	3	29	0.08	0.021	1.13	0.05	0.028	0.010	1.17	19

TABLE AI-1 (Continued): WATER CHEMISTRY AT BUSSE LAKE DAM IN SALT CREEK DURING 2005 - 2008 BEFORE AND AFTER PHOSPHORUS REDUCTION AT THE JOHN E. EGAN WATER RECLAMATION PLANT

Constituents in mg/L except where noted

Date	Water Temp (°C)	pH (units)	TSS	VSS	Turbidity (NTU)	DO	BOD	CBOD	COD	TP	Ortho-Phos	TKN	NH3-N	NO3-N	NO2-N	TN	Chl-a (µg/L)
Pre-Phosphorus Reduction – 2006 (Continued)																	
07/05/06	24.5	8.3	9	5	13	ND	3	3	29	0.06	0.006	1.12	<0.02	0.018	0.007	1.15	24
07/19/06	25.6	7.9	3	<3	13	ND	4	3	29	0.11	0.035	1.21	0.23	0.012	0.007	1.23	23
08/02/06	30.1	8.3	8	5	13	ND	3	3	33	0.16	0.012	1.32	0.10	0.059	0.011	1.39	29
08/16/06	24.7	8.0	13	7	10	ND	4	3	33	0.15	0.022	1.92	0.33	0.070	0.025	2.02	27
09/06/06	23.5	8.7	20	15	22	ND	3	3	31	0.09	0.003	1.55	<0.02	<0.005	0.005	1.56	82
09/20/06	17.4	8.3	35	20	32	ND	6	5	40	0.17	0.022	1.87	0.04	0.115	0.026	2.01	57
10/04/06	18.1	8.3	32	24	41	ND	4	3	20	0.11	0.012	1.16	0.23	0.499	0.039	1.70	31
10/18/06	12.7	8.2	10	7	16	ND	3	3	16	0.08	0.009	1.16	0.04	0.341	0.035	1.54	22
11/01/06	7.2	8.3	7	<3	16	ND	4	4	27	0.10	0.008	0.97	<0.02	0.320	0.017	1.31	22
11/15/06	6.4	8.4	8	7	10	ND	4	3	19	0.08	0.009	1.36	<0.02	0.329	0.014	1.70	23
12/06/06	3.6	8.0	11	6	14	ND	3	3	37	0.11	0.011	1.02	0.11	0.554	0.014	1.59	15
Post-Phosphorus Reduction - 2007																	
01/03/07	5.0	8.1	13	4	14	ND	3	<2	26	0.07	0.016	0.89	0.13	0.882	0.011	1.78	7
02/07/07	5.0	7.3	18	<3	15	ND	6	5	38	0.06	0.011	0.98	<0.02	0.701	0.007	1.69	16
03/07/07	1.2	8.0	33	7	33	ND	3	4	55	0.10	0.016	1.60	0.38	0.621	0.024	2.25	11
04/04/07	10.0	8.2	33	11	27	ND	4	3	66	0.09	0.008	1.25	0.16	0.530	0.016	1.80	34
04/18/07	10.1	8.2	17	4	18	ND	3	3	37	0.08	0.011	0.98	0.02	0.463	0.052	1.50	23
05/16/07	19.2	8.4	13	<3	13	ND	4	3	26	0.11	0.007	1.09	0.05	<0.005	0.005	1.10	17
06/20/07	22.9	7.5	18	11	14	ND	3	<2	50	0.10	0.016	1.09	<0.02	0.017	<0.004	1.11	27
07/05/07	26.7	8.5	15	10	13	ND	10	3	37	0.14	0.005	1.38	<0.02	<0.005	<0.004	1.38	32
07/18/07	23.6	7.6	26	13	21	ND	6	5	42	0.18	0.020	1.86	0.02	0.028	0.008	1.90	78
08/01/07	32.7	8.5	9	7	11	ND	4	4	25	0.36	<0.001	1.16	0.02	0.014	0.005	1.18	13
08/15/07	ND	ND	12	8	15	ND	6	4	33	0.12	0.010	1.19	0.14	0.078	0.022	1.29	55
09/05/07	26.3	7.4	17	7	14	ND	6	5	27	0.11	0.012	1.21	<0.02	0.021	0.007	1.24	74
09/19/07	20.1	7.9	21	8	ND	ND	<2	<2	27	0.10	0.015	0.93	0.08	0.062	0.019	1.01	20
10/03/07	19.4	8.2	23	5	25	ND	3	3	28	0.09	0.016	1.12	0.08	0.037	0.005	1.16	19

TABLE AI-1 (Continued): WATER CHEMISTRY AT BUSSE LAKE DAM IN SALT CREEK DURING 2005 - 2008 BEFORE AND AFTER PHOSPHORUS REDUCTION AT THE JOHN E. EGAN WATER RECLAMATION PLANT

Constituents in mg/L except where noted

Date	Water Temp (°C)	pH (units)	TSS	VSS	Turbidity (NTU)	DO	BOD	CBOD	COD	TP	Ortho-Phos	TKN	NH3-N	NO3-N	NO2-N	TN	Chl-a (µg/L)
Post-Phosphorus Reduction – 2007 (Continued)																	
10/17/07	17.1	7.1	18	5	22	ND	<2	<2	23	0.07	0.022	1.04	0.19	0.025	0.011	1.08	17
11/07/07	5.5	8.6	17	6	10	ND	4	3	26	0.07	0.008	1.11	<0.02	0.025	0.005	1.14	27
11/20/07	7.8	8.1	12	4	12	ND	6	5	17	0.08	0.008	1.16	<0.02	0.067	0.004	1.23	35
12/05/07	1.9	8.1	<3	<3	9	ND	6	6	23	0.07	0.003	0.81	0.02	0.135	0.014	0.96	23
Post-Phosphorus Reduction – 2008																	
01/02/08	0.1	7.1	7	3	15	ND	<2	<2	37	0.07	<0.025	1.10	0.21	0.689	0.029	1.82	8
03/05/08	3.2	7.5	21	3	28	ND	3	3	37	0.11	<0.025	0.94	0.31	0.817	0.033	1.79	7
04/02/08	7.0	7.3	19	3	25	ND	3	3	25	0.07	<0.025	0.97	0.16	0.581	0.020	1.57	14
04/16/08	10.7	8.1	23	6	31	ND	4	4	46	0.11	<0.025	1.18	0.04	0.703	0.027	1.91	22
05/07/08	16.0	7.9	18	10	15	ND	7	6	34	0.09	<0.025	1.27	0.04	0.020	0.010	1.30	51
05/21/08	16.2	8.9	24	10	15	ND	6	5	24	0.08	<0.025	1.13	<0.02	<0.005	0.005	1.14	27
06/04/08	22.3	7.6	4	<3	5	ND	<2	<2	33	0.04	<0.025	0.77	0.29	0.019	0.004	0.79	5
06/18/08	22.7	8.2	8	5	10	ND	4	3	30	0.07	<0.025	1.07	0.29	0.089	0.024	1.18	18
07/09/08	24.9	8.4	14	8	9	ND	3	3	38	0.10	<0.025	1.20	0.06	0.018	0.008	1.23	22
07/16/08	24.8	8.6	15	10	12	ND	8	6	47	0.12	<0.025	1.27	0.05	0.007	0.005	1.28	49
08/06/08	24.9	8.5	19	11	14	ND	6	5	43	0.35	<0.025	2.14	0.12	0.070	0.015	2.23	50
08/20/08	25.4	8.1	14	7	12	ND	5	3	37	0.13	<0.025	1.00	0.08	0.053	0.011	1.06	35
09/03/08	24.9	8.7	13	7	11	ND	6	4	<30	0.07	<0.025	1.16	0.04	0.060	0.009	1.23	23
09/17/08	19.2	7.2	21	5	24	ND	<2	<2	39	0.09	0.047	0.81	0.19	0.443	0.035	1.29	8
10/01/08	18.2	8.1	28	7	24	ND	3	3	41	0.13	<0.025	1.09	0.27	0.066	0.017	1.17	21
10/15/08	16.1	8.0	17	7	11	ND	4	4	40	0.04	<0.025	0.91	<0.02	0.097	0.026	1.03	39
11/05/08	19.6	7.4	16	5	13	ND	9	3	36	0.05	<0.025	1.01	0.10	0.055	0.015	1.08	26
11/19/08	8.4	5.4	8	4	6	ND	6	5	<30	0.04	<0.025	0.84	<0.02	0.060	0.009	0.91	30
12/03/08	2.8	8.0	7	5	6	ND	4	4	33	0.17	<0.025	1.23	0.05	0.076	0.011	1.32	30

TABLE AI-2: WATER CHEMISTRY AT J. F. KENNEDY BOULEVARD IN SALT CREEK DURING 2005 - 2008 BEFORE AND AFTER PHOSPHORUS REDUCTION AT THE JOHN E. EGAN WATER RECLAMATION PLANT

Constituents in mg/L except where noted

Date	Water Temp (°C)	pH (units)	TSS	VSS	Turbidity (NTU)	DO	BOD	CBOD	COD	TP	Ortho-Phos	TKN	NH3-N	NO3-N	NO2-N	TN	Chl-a (µg/L)
Pre-Phosphorus Reduction - 2005																	
02/02/05	1.1	7.6	10	<3	16	10.3	<2	<2	23	2.29	2.300	1.07	0.25	10.575	0.022	11.67	7
03/02/05	6.4	7.2	10	7	4	11.8	4	4	29	0.97	1.140	0.94	0.14	6.096	0.022	7.06	11
04/06/05	14.9	7.9	15	6	6	9.8	4	4	37	0.88	0.720	1.00	0.09	4.678	0.032	5.71	29
04/20/05	15.0	7.8	10	3	7	8.8	4	3	34	1.42	1.410	1.16	0.11	9.516	0.005	10.68	17
05/04/05	13.0	7.9	4	3	4	6.6	3	<2	25	2.37	2.440	1.02	0.13	13.303	0.010	14.33	7
05/18/05	17.6	7.4	9	<3	4	9.2	<2	<2	27	2.54	2.500	1.30	0.17	12.230	0.020	13.55	7
06/01/05	27.4	8.0	6	4	3	7.3	<2	<2	32	3.13	3.090	0.77	0.18	13.888	0.019	14.68	4
06/15/05	21.0	7.3	26	6	11	5.5	ND	ND	17	3.87	4.280	1.00	0.43	16.703	0.024	17.73	8
07/06/05	28.1	7.8	3	<3	3	8.8	<2	2	27	2.78	2.400	1.33	0.23	9.349	0.034	10.71	15
07/20/05	23.5	7.8	<3	<3	4	7.5	4	6	25	3.85	3.488	1.66	0.17	16.686	0.037	18.38	3
08/03/05	23.9	7.6	<3	<3	3	7.7	<2	<2	43	3.55	3.014	1.09	0.08	16.136	0.024	17.25	5
08/17/05	23.4	7.4	9	11	4	7.0	3	<2	30	3.21	2.836	1.15	<0.02	12.413	0.013	13.58	7
09/07/05	23.5	7.5	6	4	9	7.9	<2	<2	26	3.33	2.872	1.61	0.05	13.936	0.024	15.57	6
09/21/05	21.7	7.1	<3	<3	7	7.4	<2	4	23	3.24	2.995	1.16	0.06	12.271	0.021	13.45	12
10/05/05	23.2	7.9	11	4	8	5.9	<2	2	30	1.14	1.068	1.17	0.04	6.933	0.016	8.12	23
10/19/05	17.7	7.7	10	8	5	7.1	<2	3	36	3.49	3.084	1.32	0.10	17.167	0.028	18.52	4
11/02/05	17.9	7.5	<3	<3	8	8.2	<2	3	26	4.64	4.217	1.31	0.07	20.832	0.072	22.21	4
11/16/05	11.7	ND	4	<3	7	9.2	3	4	23	2.35	1.985	1.50	0.18	8.986	0.042	10.53	20
12/07/05	6.7	7.6	5	<3	10	ND	<2	<2	26	3.47	3.323	1.39	0.07	15.164	0.025	16.58	5
Pre-Phosphorus Reduction – 2006																	
01/04/06	7.7	7.4	<3	<3	4	ND	4	3	26	0.73	0.616	1.28	0.13	3.505	0.018	4.803	14
02/01/06	7.3	6.9	18	<3	12	ND	<2	<2	36	ND	0.696	1.10	0.10	0.936	0.035	2.07	12
03/01/06	10.1	7.2	5	7	5	ND	<2	<2	27	2.88	1.703	1.34	0.02	11.698	0.008	13.05	7
04/19/06	15.2	7.5	4	<3	9	ND	6	5	33	0.92	0.707	1.40	0.04	4.523	0.071	5.99	36
05/17/06	16.2	7.9	14	10	7	ND	4	2	27	1.15	0.939	1.59	0.18	5.109	0.011	6.71	28
06/07/06	22.4	7.4	ND	ND	4	ND	3	3	24	3.81	3.325	1.28	0.05	15.891	0.022	17.19	4

TABLE AI-2 (Continued): WATER CHEMISTRY AT J. F. KENNEDY BOULEVARD IN SALT CREEK DURING 2005 - 2008 BEFORE AND AFTER PHOSPHORUS REDUCTION AT THE JOHN E.EGAN WATER RECLAMATION PLANT

Constituents in mg/L except where noted

Date	Water Temp (°C)	pH (units)	TSS	VSS	Turbidity (NTU)	DO	BOD	CBOD	COD	TP	Ortho-Phos	TKN	NH3-N	NO3-N	NO2-N	TN	Chl-a (µg/L)
Pre-Phosphorus Reduction – 2006 (Continued)																	
06/21/06	20.8	7.4	8	5	4	ND	3	<2	31	4.30	3.594	1.36	0.05	16.029	0.021	17.41	6
07/05/06	22.4	7.7	11	5	8	ND	3	2	29	1.65	1.377	1.07	<0.02	6.341	0.012	7.42	13
07/19/06	25.1	7.4	10	<3	11	ND	4	3	29	2.33	1.250	1.31	0.19	7.264	0.014	8.59	18
08/02/06	25.2	7.3	4	<3	14	ND	<2	<2	31	3.85	3.310	1.29	0.07	16.703	0.013	18.01	4
08/16/06	22.3	7.4	6	<3	3	ND	3	3	22	5.49	4.663	1.70	0.16	19.945	0.019	21.66	2
09/06/06	24.4	7.7	9	7	12	ND	<2	<2	29	2.09	1.892	1.48	0.13	7.319	0.006	8.81	42
09/20/06	17.7	7.7	15	12	10	ND	<2	<2	31	2.88	2.578	1.41	0.04	8.422	0.016	9.85	28
10/04/06	18.6	8.0	32	18	41	ND	3	<2	18	0.22	0.099	1.26	0.19	1.399	0.038	2.70	26
10/18/06	13.0	7.9	12	6	16	ND	3	3	25	0.64	0.487	1.30	0.03	2.493	0.029	3.82	18
11/01/06	11.5	7.8	7	3	11	ND	3	4	23	1.98	1.772	1.13	<0.02	7.103	0.019	8.25	15
11/15/06	10.7	7.8	4	<3	7	ND	<2	<2	28	1.43	1.228	1.44	0.10	5.678	0.021	7.14	11
12/06/06	5.6	7.9	9	5	11	ND	3	3	34	1.10	0.865	1.07	0.08	5.164	0.011	6.25	10
Post-Phosphorus Reduction - 2007																	
01/03/07	7.7	8.1	6	3	9	ND	3	<2	28	1.32	1.226	0.88	0.09	7.388	0.005	8.27	7
02/07/07	6.5	7.6	13	4	9	ND	3	3	21	0.74	0.668	0.98	0.00	13.369	<0.004	14.35	4
03/07/07	4.8	7.5	7	<3	14	ND	3	3	50	0.10	0.025	1.26	0.25	4.595	0.013	5.87	8
04/04/07	10.3	7.8	20	10	16	ND	3	2	33	0.11	0.013	1.15	0.17	3.888	0.011	5.05	26
04/18/07	11.1	7.7	11	5	13	ND	3	3	22	0.10	0.025	0.86	0.03	4.716	0.014	5.59	16
05/16/07	18.1	7.8	17	3	9	ND	4	3	30	0.21	0.118	1.36	0.02	5.922	0.009	7.29	28
06/20/07	22.1	7.7	9	7	8	ND	<2	<2	39	0.30	0.225	1.07	0.03	9.213	0.012	10.30	13
07/05/07	23.8	7.8	8	3	10	ND	<2	<2	37	0.25	0.123	1.30	<0.02	5.020	0.015	6.34	25
07/18/07	22.7	7.4	8	5	4	ND	<2	2	21	0.45	0.336	1.22	0.04	16.940	0.014	18.17	10
08/01/07	24.4	7.3	7	3	5	ND	3	2	14	0.76	0.582	1.10	0.06	13.143	0.013	14.26	7
08/15/07	ND	ND	12	11	11	ND	3	<2	26	0.17	0.050	1.30	0.14	3.408	0.021	4.73	38
09/05/07	24.3	7.6	13	4	11	ND	3	3	32	0.16	0.047	1.24	0.03	5.460	0.010	6.71	25
09/19/07	21.9	7.2	4	4	10	ND	<2	<2	14	0.40	0.302	0.96	0.07	15.321	0.013	16.29	2

TABLE AI-2 (Continued): WATER CHEMISTRY AT J. F. KENNEDY BOULEVARD IN SALT CREEK DURING 2005 - 2008 BEFORE AND AFTER PHOSPHORUS REDUCTION AT THE JOHN E. EGAN WATER RECLAMATION PLANT

Constituents in mg/L except where noted

Date	Water Temp (°C)	pH (units)	TSS	VSS	Turbidity (NTU)	DO	BOD	CBOD	COD	TP	Ortho-Phos	TKN	NH3-N	NO3-N	NO2-N	TN	Chl-a (µg/L)
Post-Phosphorus Reduction – 2007 (Continued)																	
10/03/07	20.1	7.7	16	<3	12	ND	3	<2	19	0.32	0.126	1.03	0.07	7.114	0.005	8.15	10
10/17/07	17.2	7.4	14	5	13	ND	<2	<2	17	0.16	0.096	1.09	0.12	6.195	0.009	7.29	10
11/07/07	10.2	7.2	8	<3	3	ND	<2	<2	12	0.23	0.167	1.14	0.06	12.681	0.017	13.84	4
11/20/07	16.0	7.2	<3	<3	7	ND	4	4	12	0.23	0.139	1.18	0.04	14.683	0.027	15.89	4
12/05/07	6.0	7.5	8	5	9	ND	5	5	21	0.17	0.056	0.95	<0.02	5.824	0.015	6.79	3
Post-Phosphorus Reduction – 2008																	
01/02/08	1.0	7.0	10	3	11	ND	<2	<2	23	0.14	0.062	0.95	0.11	7.315	0.021	8.29	8
03/05/08	5.2	7.1	11	5	7	ND	12	4	46	0.13	0.044	0.98	0.1	3.741	0.021	4.74	9
04/02/08	3.0	7.3	15	3	30	ND	3	3	33	0.13	0.031	0.87	0.27	2.099	0.030	3.00	7
04/16/08	7.3	7.6	18	3	21	ND	3	3	27	0.09	<0.025	0.82	0.14	2.56	0.022	3.40	14
05/07/08	10.5	7.8	16	4	17	ND	4	3	35	0.10	<0.025	1.01	0.03	2.192	0.019	3.22	19
05/21/08	12.6	7.7	13	8	13	ND	4	4	29	0.14	<0.025	0.81	0.1	3.482	0.016	4.31	37
06/04/08	11.6	7.8	17	7	12	ND	4	4	29	0.14	<0.025	0.91	<0.02	3.124	0.012	4.05	30
06/18/08	13.7	7.6	12	5	8	ND	4	4	34	0.13	0.028	0.97	0.02	5.332	0.008	6.31	31
07/09/08	14.2	7.8	16	5	10	ND	5	5	32	0.18	<0.025	1.13	0.05	5.453	0.030	6.61	39
07/16/08	15.7	7.5	15	7	12	ND	5	5	29	0.19	0.064	1.2	0.08	7.410	0.017	8.63	24
08/06/08	16.0	7.7	11	5	7	ND	4	4	33	0.30	0.144	1.25	<0.02	8.620	0.008	9.88	19
08/20/08	19.5	7.8	8	3	6	ND	3	2	42	0.31	0.22	0.94	0.08	5.070	0.008	6.02	4
09/03/08	21.3	7.5	4	3	5	ND	3	3	22	0.52	0.416	0.92	0.15	11.338	0.018	12.28	6
09/17/08	21.3	7.0	8	4	4	ND	<2	<2	32	0.31	0.2	1.15	0.17	15.863	0.022	17.04	6
10/01/08	24.9	7.8	10	6	6	ND	6	4	45	0.29	0.137	1.32	0.04	7.791	0.021	9.13	25
10/15/08	25.1	8.0	18	9	9	ND	5	4	30	0.12	0.029	1.02	0.13	1.341	0.015	2.38	36
11/05/08	22.8	7.4	5	<3	2	ND	<2	<2	22	0.34	0.245	0.9	0.07	18.640	0.017	19.56	4
11/19/08	22.3	7.1	<3	<3	2	ND	<2	<2	<30	0.42	0.379	1.17	0.08	19.783	0.016	20.97	2
12/03/08	19.3	6.9	18	4	21	ND	<2	<2	30	0.11	0.058	0.88	0.18	1.638	0.032	2.55	7

TABLE AI-3: WATER CHEMISTRY AT THORNDALE AVENUE IN SALT CREEK DURING 2005 - 2008 BEFORE AND AFTER PHOSPHORUS REDUCTION AT THE JOHN E. EGAN WATER RECLAMATION PLANT

Constituents in mg/L except where noted

Date	Water Temp (°C)	pH (units)	TSS	VSS	Turbidity (NTU)	DO	BOD	CBOD	COD	TP	Ortho-Phos	TKN	NH3-N	NO3-N	NO2-N	TN	Chl-a (µg/L)
Pre-Phosphorus Reduction - 2005																	
02/02/05	8.2	8.2	22	18	15	10.2	<2	<2	21	2.22	2.190	0.94	0.32	10.422	0.022	11.38	6
03/02/05	4.9	7.4	9	<3	9	12.6	4	4	35	0.83	0.950	1.23	0.14	5.357	0.030	6.62	7
04/06/05	14.6	7.9	19	6	9	8.4	4	4	33	0.84	0.730	1.31	0.35	4.658	0.045	6.01	30
04/20/05	15.3	7.7	10	<3	8	7.4	3	<2	32	1.51	1.480	1.16	0.34	9.750	0.015	10.93	15
05/04/05	13.4	8.2	13	4	6	4.8	3	<2	30	2.42	2.380	1.13	0.15	12.598	0.014	13.74	9
05/18/05	16.7	7.5	12	3	7	7.8	<2	<2	23	2.47	2.430	1.17	0.17	11.600	0.031	12.80	8
06/01/05	28.5	8.4	6	5	3	6.6	<2	<2	27	3.13	3.090	1.02	0.34	13.473	0.035	14.53	4
06/15/05	19.6	7.3	<3	<3	6	4.9	ND	ND	23	3.71	4.470	1.42	0.20	15.024	0.041	16.49	4
07/06/05	27.3	7.9	13	3	7	6.6	<2	<2	36	2.48	2.330	1.29	0.09	8.686	0.064	10.04	10
07/20/05	22.8	7.7	3	<3	7	5.8	11	3	23	3.66	3.258	1.69	0.11	15.491	0.054	17.24	6
08/03/05	23.9	7.4	16	3	8	6.3	<2	<2	36	3.53	3.062	1.19	0.09	15.729	0.033	16.95	9
08/17/05	22.9	7.3	17	11	12	7.0	9	4	40	<0.05	0.035	0.97	0.25	0.041	<0.004	1.01	34
09/07/05	23.0	7.6	4	<3	7	7.1	<2	<2	22	3.30	2.707	1.25	0.04	12.300	0.028	13.58	3
09/21/05	21.4	7.4	19	<3	13	6.2	<2	<2	27	2.96	2.769	1.25	0.07	11.475	0.027	12.75	15
10/05/05	23.0	7.9	24	5	12	6.8	<2	2	34	1.06	0.963	1.42	0.10	6.627	0.020	8.07	22
10/19/05	13.6	7.6	14	6	10	5.9	<2	<2	30	3.30	3.085	1.36	0.17	16.242	0.036	17.64	4
11/02/05	16.3	7.5	11	<3	6	7.3	<2	3	21	4.45	3.986	1.17	0.08	19.642	0.087	20.90	4
11/16/05	13.1	7.0	10	6	12	8.5	3	3	28	2.37	2.046	1.55	0.15	8.510	0.046	10.11	22
12/07/05	6.7	7.7	24	6	20	ND	3	<2	34	3.33	3.226	1.73	0.31	14.338	0.031	16.10	6
Pre-Phosphorus Reduction – 2006																	
01/04/06	7.7	7.3	3	<3	5	ND	4	3	19	0.81	0.708	1.28	0.12	3.747	0.019	5.046	12.9
02/01/06	6.6	6.7	22	<3	16	ND	<2	<2	40	0.68	0.515	1.26	0.08	4.621	0.028	5.91	15
03/01/06	9.0	6.9	10	12	11	ND	<2	<2	27	2.87	2.085	1.19	<0.02	11.527	0.009	12.73	9
04/19/06	14.8	7.5	8	<3	7	ND	5	5	33	0.88	0.601	1.67	<0.02	4.110	0.021	5.80	42
05/17/06	15.5	7.8	16	10	9	ND	5	<2	22	1.17	1.047	1.96	0.06	5.704	0.010	7.67	35
06/07/06	23.2	7.4	10	6	9	ND	<2	<2	40	3.68	3.133	1.39	0.08	14.881	0.030	16.30	4

TABLE AI-3 (Continued): WATER CHEMISTRY AT THORNDALE AVENUE IN SALT CREEK DURING 2005 - 2008 BEFORE AND AFTER PHOSPHORUS REDUCTION AT THE JOHN E. EGAN WATER RECLAMATION PLANT

Constituents in mg/L except where noted

Date	Water Temp (°C)	pH (units)	TSS	VSS	Turbidity (NTU)	DO	BOD	CBOD	COD	TP	Ortho-Phos	TKN	NH3-N	NO3-N	NO2-N	TN	Chl-a (µg/L)
Pre-Phosphorus Reduction – 2006 (Continued)																	
06/21/06	20.3	7.4	12	3	6	ND	3	2	29	4.28	3.532	1.42	0.08	15.296	0.031	16.75	9
07/05/06	21.8	7.6	18	6	12	ND	<2	<2	33	1.72	1.348	1.06	0.04	6.659	0.023	7.74	15
07/19/06	24.9	7.5	10	<3	13	ND	3	3	33	2.29	1.047	1.29	0.34	6.823	0.021	8.13	17
08/02/06	25.3	7.5	11	4	12	ND	<2	<2	31	3.96	3.306	1.37	0.10	16.521	0.027	17.92	4
08/16/06	23.5	7.4	12	<3	7	ND	3	3	28	5.30	4.506	1.65	0.13	18.849	0.024	20.52	3
09/06/06	21.6	7.6	23	13	14	ND	<2	4	24	2.07	1.888	1.52	0.04	6.978	0.010	8.51	41
09/20/06	17.9	7.7	16	11	12	ND	<2	<2	27	2.98	2.645	1.40	0.06	8.558	0.020	9.98	23
10/04/06	18.4	7.9	32	13	40	ND	5	3	27	0.27	0.145	1.27	0.18	1.992	0.036	3.30	29
10/18/06	13.5	7.9	15	11	14	ND	3	3	23	0.69	0.511	1.17	0.06	2.666	0.034	3.87	18
11/01/06	11.5	7.8	7	<3	8	ND	4	4	25	2.01	1.795	1.22	<0.02	7.073	0.019	8.31	13
11/15/06	10.6	7.9	5	3	8	ND	3	<2	19	1.43	1.234	1.18	<0.02	5.593	0.022	6.80	15
12/06/06	4.8	7.8	6	3	10	ND	3	3	34	1.02	0.788	1.01	0.07	4.782	0.011	5.80	10
Post-Phosphorus Reduction – 2007																	
01/03/07	7.6	7.9	8	3	8	ND	<2	<2	30	1.30	1.265	0.88	0.10	7.331	0.006	8.22	6
02/07/07	5.0	7.5	19	5	11	ND	<2	<2	27	0.97	0.840	1.20	<0.02	12.936	<0.004	14.14	4
03/07/07	5.0	7.2	11	<3	14	ND	4	3	42	0.10	0.025	1.28	0.26	4.387	0.013	5.68	9
04/04/07	11.1	7.8	19	10	13	ND	9	3	31	0.13	0.012	1.19	0.17	4.134	0.010	5.33	24
04/18/07	11.0	7.6	18	10	13	ND	3	3	24	0.13	0.035	0.88	0.06	5.641	0.015	6.54	14
05/16/07	17.1	7.1	15	3	10	ND	4	4	22	0.22	0.111	1.19	0.06	5.796	0.017	7.00	19
06/20/07	21.3	7.5	24	14	6	ND	3	<2	23	0.32	0.222	1.13	0.04	8.822	0.021	9.97	13
07/05/07	23.6	7.4	22	10	12	ND	<2	<2	37	0.31	0.164	1.35	<0.02	6.247	0.016	7.61	25
07/18/07	22.1	7.5	9	<3	5	ND	<2	<2	21	0.52	0.395	1.15	0.06	15.677	0.023	16.85	11
08/01/07	23.7	7.1	15	4	5	ND	3	2	21	0.75	0.579	1.11	0.11	12.793	0.022	13.93	15
08/15/07	ND	ND	15	10	12	ND	3	<2	31	0.17	0.060	1.30	0.12	3.370	0.026	4.70	33
09/05/07	25.6	7.5	20	6	8	ND	4	3	27	0.20	0.045	1.19	0.02	6.008	0.013	7.21	30
09/19/07	21.6	8.0	10	4	6	ND	<2	<2	12	0.35	0.273	0.87	0.10	14.058	0.019	14.95	2

TABLE AI-3 (continued): WATER CHEMISTRY AT THORNDALE AVENUE IN SALT CREEK DURING 2005 - 2008 BEFORE AND AFTER PHOSPHORUS REDUCTION AT THE JOHN E. EGAN WATER RECLAMATION PLANT

Constituents in mg/L except where noted

Date	Water Temp (°C)	pH (units)	TSS	VSS	Turbidity (NTU)	DO	BOD	CBOD	COD	TP	Ortho-Phos	TKN	NH3-N	NO3-N	NO2-N	TN	Chl-a (µg/L)
Post-Phosphorus Reduction – 2007 (Continued)																	
10/03/07	19.1	7.8	21	7	18	ND	<2	<2	23	0.22	0.105	1.23	0.07	5.497	0.008	6.74	12
10/17/07	17.4	7.2	17	4	15	ND	<2	<2	23	0.18	0.102	1.15	0.13	6.084	0.012	7.25	10
11/07/07	9.8	7.3	12	<3	6	ND	<2	<2	15	0.22	0.157	1.24	0.05	11.660	0.020	12.92	5
11/20/07	15.5	7.3	8	<3	6	ND	4	3	15	0.25	0.145	1.13	0.03	13.288	0.031	14.45	5
12/05/07	6.6	7.6	6	<3	7	ND	5	4	30	0.14	0.057	0.97	<0.02	5.664	0.017	6.65	17
Post-Phosphorus Reduction – 2008																	
01/02/08	2.0	7.3	10	3	8	ND	3	<2	23	0.13	0.059	0.9	0.11	6.856	0.022	7.78	7
02/06/08	4.3	7.6	9	<3	11	ND	4	4	39	0.11	0.038	0.87	0.12	3.353	0.022	4.25	10
03/05/08	6.4	7.1	18	3	30	ND	4	4	37	0.13	0.034	0.93	0.28	2.100	0.031	3.06	7
04/02/08	7.0	7.5	18	3	22	ND	4	3	44	0.13	<0.025	0.8	0.13	2.153	0.024	2.98	27
04/16/08	11.8	7.5	17	6	15	ND	5	3	44	0.13	<0.025	1.04	0.03	2.942	0.016	4.00	20
05/07/08	15.6	7.7	18	6	11	ND	5	4	25	0.20	0.034	1.04	0.05	6.747	0.016	7.80	31
05/21/08	15.0	7.6	10	4	6	ND	4	5	24	0.30	0.136	1.29	<0.02	8.725	0.013	10.03	18
06/04/08	21.3	7.9	17	5	8	ND	3	3	37	0.32	0.231	0.92	0.26	5.428	0.012	6.36	4
06/18/08	22.0	7.2	11	4	7	ND	3	3	30	0.52	0.388	1.06	0.19	11.119	0.025	12.20	5
07/09/08	21.7	7.0	13	4	5	ND	4	3	32	0.29	0.18	1.07	0.13	14.47	0.032	15.57	7
07/16/08	24.0	7.4	14	6	9	ND	7	4	37	0.30	0.151	1.29	0.10	9.116	0.029	10.44	25
08/06/08	25.4	7.7	25	8	13	ND	5	4	32	0.12	0.033	0.99	0.19	1.302	0.015	2.31	38
08/20/08	26.3	7.0	12	4	5	ND	3	2	22	0.32	0.243	0.81	0.08	17.389	0.027	18.23	4
09/03/08	22.4	7.2	14	3	7	ND	<2	<2	30	0.47	0.424	1.1	0.15	17.878	0.029	19.01	4
09/17/08	13.5	6.8	20	5	19	ND	5	4	37	0.11	0.067	0.82	0.17	1.568	0.036	2.42	7
10/01/08	17.7	7.8	21	5	12	ND	3	2	37	0.13	0.051	0.98	0.25	3.386	0.018	4.38	12
10/15/08	12.9	7.3	9	3	5	ND	4	<2	42	0.26	0.179	0.99	<0.02	11.773	0.017	12.78	11
11/05/08	16.7	7.5	9	4	13	ND	4	3	34	0.56	0.43	1.47	0.09	14.824	0.037	16.33	7
11/19/08	9.6	7.3	4	<3	4	ND	3	3	<30	0.15	0.092	1.2	0.06	11.94	0.066	13.21	10
12/03/08	6.2	7.4	5	3	3	ND	<2	<2	30	0.19	0.112	1.15	0.02	9.728	0.016	10.89	15

APPENDIX AII: WATER QUALITY DATA DURING RAIN EVENTS

TABLE AII-1: WATER QUALITY DATA AT BUSSE DAM IN SALT CREEK DURING RAIN EVENTS BEFORE PHOSPHORUS REDUCTION AT THE JOHN E. EGAN WATER RECLAMATION PLANT

Constituents[1]	2005 Rain Event Dates			
	7/26/05	7/27/05	7/28/05	7/29/05
Water Temperature (°C)[2]	27.2	25.3	25.6	25.3
pH (units)[2]	6.5	7.5	8.2	7.6
TSS	16	22	16	19
VSS	8	9	6	16
Turbidity (NTU)	13	21	16	15
Dissolved Oxygen (DO)	5.2	5.7	6.5	7.1
BOD_5	<2	3	3	5
$CBOD_5$	<2	<2	<2	4
COD	49	49	47	47
TP	0.06	0.11	0.01	0.07
Ortho-P	0.028	0.141	0.075	0.048
TKN	0.88	1.36	1.06	1.24
Ammonia-N	0.04	0.05	0.03	0.14
NO_3-N	0.048	<0.005	<0.005	0.010
NO_2-N	0.005	0.016	0.010	0.010
TN	0.93	1.38	1.07	1.26
Chlorophyll *a* (µg/L)	38	51	50	61
	10/25/05	10/26/05	10/27/05	10/28/05
Water Temperature (°C)[b]	10.9	10.5	10.8	10.0
pH (units)[b]	8.1	8.1	7.5	7.6
TSS	18	21	21	17
VSS	9	5	7	9
Turbidity (NTU)	17	17	16	16
Dissolved Oxygen (DO)	10.0	6.3	10.0	9.7
BOD_5	3	3	6	3
$CBOD_5$	4	4	4	3
COD	36	34	40	40
TP	0.01	0.06	0.06	0.05
Ortho-P	0.009	0.011	0.065	0.006
TKN	1.04	1.14	1.11	1.07
Ammonia-N	0.03	<0.02	0.07	0.04
NO_3-N	0.043	0.040	0.044	0.022
NO_2-N	0.014	0.010	0.009	0.011
TN	1.10	1.19	1.16	1.10
Chlorophyll *a* (µg/L)	38	42	40	37

TABLE AII-1 (Continued): WATER QUALITY DATA AT BUSSE DAM IN SALT CREEK DURING RAIN EVENTS BEFORE PHOSPHORUS REDUCTION AT THE JOHN E. EGAN WATER RECLAMATION PLANT

Constituents[1]	2006 Rain Event Dates			
	4/4/06	4/5/06	4/6/06	4/7/06
Water Temperature (°C)[2]	9.1	10.0	12.1	10.4
pH (units)[2]	8.3	8.3	8.2	8.1
TSS	18	21	16	26
VSS	6	8	5	12
Turbidity (NTU)	19	17	21	16
Dissolved Oxygen (DO) [3]	ND	ND	ND	ND
BOD_5	2	4	5	4
$CBOD_5$	3	4	5	3
COD	40	48	44	35
TP	0.08	0.11	0.08	0.10
Ortho-P	0.019	0.022	0.022	0.032
TKN	1.22	1.20	1.31	1.33
Ammonia-N	0.19	0.33	0.05	0.04
NO_3-N	0.906	0.869	0.829	0.816
NO_2-N	0.032	0.028	0.026	0.027
TN	2.16	2.10	2.17	2.17
Chlorophyll *a* (µg/L)	30	29	26	33
	5/2/06	5/3/06	5/4/06	5/5/06
Water Temperature (°C)[b]	14.9	16.6	16.6	15.8
pH (units)[b]	8.5	8.5	8.3	9.1
TSS	17	21	13	19
VSS	10	11	10	9
Turbidity (NTU)	18	15	10	11
Dissolved Oxygen (DO) [c]	ND	ND	ND	ND
BOD_5	4	4	6	7
$CBOD_5$	3	4	5	6
COD	38	35	44	57
TP	0.11	0.19	0.14	0.10
Ortho-P	0.013	0.042	0.036	0.120
TKN	1.56	1.39	1.62	1.36
Ammonia-N	0.04	0.02	0.02	0.02
NO_3-N	0.032	0.058	0.017	0.015
NO_2-N	0.009	0.008	0.004	0.004
TN	1.60	1.46	1.64	1.38
Chlorophyll *a* (µg/L)	61	60	63	59

TABLE AII-1 (Continued): WATER QUALITY DATA AT BUSSE DAM IN SALT CREEK DURING RAIN EVENTS BEFORE PHOSPHORUS REDUCTION AT THE JOHN E. EGAN WATER RECLAMATION PLANT

Constituents[1]	2006 Rain Event Dates			
	8/29/06	8/30/06	8/31/06	9/1/06
Water Temperature (°C)[2]	22.9	20.8	22.5	22.0
pH (units)[2]	7.9	8.1	8.0	8.2
TSS	17	16	18	18
VSS	4	12	11	3
Turbidity (NTU)	20	19	21	26
Dissolved Oxygen (DO) [3]	ND	ND	ND	ND
BOD_5	2	2	2	3
$CBOD_5$	2	2	2	2
COD	20	24	26	26
TP	0.13	0.11	0.11	0.27
Ortho-P	0.013	0.017	0.016	0.016
TKN	1.49	1.35	1.36	1.51
Ammonia-N	0.43	0.43	0.21	0.23
NO_3-N	0.045	0.044	0.052	0.067
NO_2-N	0.012	0.004	0.016	0.020
TN	1.55	1.39	1.43	1.60
Chlorophyll *a* (µg/L)	39	33	32	32

ND=No Data
[1]Expressed in mg/L except where noted.
[2]Field measurement.
[3]Continuous monitoring data implemented in 2006. No grab sample taken for DO.

TABLE AII-2: WATER QUALITY DATA AT BUSSE LAKE DAM IN SALT CREEK DURING RAIN EVENTS FOLLOWING PHOSPHORUS REDUCTION AT THE JOHN E. EGAN WATER RECLAMATION PLANT

Constituents[1]	2007 Rain Event Dates			
	4/30/07	5/1/07	5/2/07	5/3/07
Water Temperature (°C)[2]	16.5	15.9	17.1	16.2
pH (units)[2]	8.5	8.0	8.7	7.2
TSS	13	14	18	15
VSS	4	7	7	6
Turbidity (NTU)	8	11	12	11
Dissolved Oxygen (DO)[3]	ND	ND	ND	ND
BOD_5	4	3	5	4
$CBOD_5$	4	3	4	4
COD	28	28	26	11
TP	0.08	0.08	0.10	0.12
Ortho-Phosphate	0.007	0.006	0.011	0.010
TKN	1.57	1.82	1.19	1.29
Ammonia-N	0.04	0.02	0.07	0.05
NO_3-N	0.181	0.138	0.074	0.038
NO_2-N	0.012	0.013	0.012	0.014
TN	1.76	1.97	1.28	1.34
Chlorophyll *a* (µg/L)	40	43	44	55
	6/05/07	6/6/07	6/7/07	6/8/07
Water Temperature (°C)[2]	21.8	20.8	21.2	22.3
pH (units)[2]	8.3	8.1	8.1	8.2
TSS	17	22	33	21
VSS	2	7	6	15
Turbidity (NTU)	21	23	31	19
Dissolved Oxygen (DO)[3]	ND	ND	ND	ND
BOD_5	4	<2	3	3
$CBOD_5$	3	<2	3	<2
COD	34	38	36	34
TP	0.12	0.15	0.12	0.08
Ortho-Phosphate	0.006	0.012	0.012	0.010
TKN	1.41	1.15	1.16	1.20
Ammonia-N	<0.02	0.06	0.15	0.12
NO_3-N	0.008	0.023	0.025	0.003
NO_2-N	0.005	0.003	0.004	0.007
TN	1.42	1.18	1.19	1.21
Chlorophyll *a* (µg/L)	33	15	16	24

TABLE AII-2 (Continued): WATER QUALITY DATA AT BUSSE LAKE DAM IN SALT CREEK DURING RAIN EVENTS FOLLOWING PHOSPHORUS REDUCTION AT THE JOHN E. EGAN WATER RECLAMATION PLANT

Constituents[1]	2007 Rain Event Dates			
	8/7/07	8/8/07	8/9/07	8/10/07
Water Temperature (°C)[2]	23.2	27.0	26.7	26.7
pH (units)[2]	7.8	7.7	7.7	7.9
TSS	17	23	21	16
VSS	2	4	4	7
Turbidity (NTU)	18	29	28	24
Dissolved Oxygen (DO)[3]	ND	ND	ND	ND
BOD_5	3	3	3	3
$CBOD_5$	2	3	2	4
COD	27	32	32	29
TP	0.10	0.11	0.11	0.15
Ortho-Phosphate	0.009	0.005	0.012	0.004
TKN	1.27	1.16	1.20	1.24
Ammonia-N	0.19	0.24	0.21	0.08
NO_3-N	0.064	0.226	0.283	0.287
NO_2-N	0.014	0.029	0.030	0.031
TN	1.35	1.42	1.51	1.56
Chlorophyll *a* (µg/L)	32	30	27	55

TABLE AII-2 (Continued): WATER QUALITY DATA AT BUSSE LAKE DAM IN SALT CREEK DURING RAIN EVENTS FOLLOWING PHOSPHORUS REDUCTION AT THE JOHN E. EGAN WATER RECLAMATION PLANT

Constituents[1]	2008 Rain Event Dates			
	4/29/08	4/30/08	5/1/08	5/2/08
Water Temperature (°C)[2]	12.5	10.9	12.4	13.4
pH (units)[2]	8.0	8.4	8.1	8.5
TSS	20	24	19	17
VSS	6	9	8	5
Turbidity (NTU)	14	20	13	11
Dissolved Oxygen (DO)[3]	ND	ND	ND	ND
BOD_5	5	5	7	6
$CBOD_5$	5	5	5	5
COD	38	36	44	36
TP	0.08	0.11	0.07	0.11
Ortho-Phosphate	<0.025	<0.025	<0.025	<0.025
TKN	0.68	0.93	1.1	1.17
Ammonia-N	0.04	<0.02	0.04	0.03
NO_3-N	0.181	0.183	0.15	0.116
NO_2-N	0.021	0.015	0.015	0.034
TN	0.88	1.13	1.27	1.32
Chlorophyll *a* (µg/L)	58	48	45	56

ND=No Data.
[1]Expressed in mg/L except where noted.
[2]Field measurement.
[3]Continuous monitoring data implemented in 2005. No grab sample taken for DO.

TABLE AII-3: WATER QUALITY DATA AT J. F. KENNEDY BOULEVARD IN SALT CREEK DURING RAIN EVENTS BEFORE PHOSPHORUS REDUCTION AT THE JOHN E. EGAN WATER RECLAMATION PLANT

Constituents[1]	2005 Rain Event Dates			
	7/26/05	7/27/05	7/28/05	7/29/05
Water Temperature (°C)[2]	24.8	23.6	23.2	22.7
pH (units)[2]	6.3	7.5	7.6	7.5
TSS	7	12	11	5
VSS	4	4	<3	5
Turbidity (NTU)	6	8	7	7
Dissolved Oxygen (DO)	6.6	7.0	7.4	7.5
BOD_5	3	3	<2	3
$CBOD_5$	3	<2	<2	<2
COD	45	38	40	34
TP	2.17	2.15	2.64	3.17
Ortho-P	1.870	1.751	2.181	2.585
TKN	1.46	1.48	1.43	1.25
Ammonia-N	0.32	0.09	0.05	0.16
NO_3-N	8.366	8.580	10.214	12.893
NO_2-N	0.080	0.027	0.022	0.025
TN	9.91	10.09	11.67	14.17
Chlorophyll *a* (µg/L)	17	28	27	21
	10/25/05	10/26/05	10/27/05	10/28/05
Water Temperature (°C)[2]	15.9	17.2	17.6	11.0
pH (units)[2]	7.5	7.8	7.2	7.4
TSS	41	7	3	3
VSS	13	4	<3	<3
Turbidity (NTU)	14	5	7	7
Dissolved Oxygen (DO)	7.6	8.3	8.0	7.8
BOD_5	<2	<2	<2	<2
$CBOD_5$	<2	3	<2	<2
COD	45	27	23	28
TP	3.73	4.82	5.07	5.31
Ortho-P	3.361	3.855	4.008	4.172
TKN	1.76	1.20	1.27	1.09
Ammonia-N	0.08	0.03	0.25	0.08
NO_3-N	16.118	19.593	19.929	19.830
NO_2-N	0.020	0.013	0.014	0.015
TN	17.90	20.81	21.21	20.94
Chlorophyll *a* (µg/L)	15	3	3	2

TABLE AII-3 (Continued): WATER QUALITY DATA AT J. F. KENNEDY BOULEVARD IN SALT CREEK DURING RAIN EVENTS BEFORE PHOSPHORUS REDUCTION AT THE JOHN E. EGAN WATER RECLAMATION PLANT

Constituents[1]	2006 Rain Event Dates			
	4/4/06	4/5/06	4/6/06	4/7/06
Water Temperature (°C)[2]	10.0	10.2	11.1	11.1
pH (units)[2]	8.0	7.9	8.1	7.8
TSS	13	18	13	18
VSS	7	10	3	4
Turbidity (NTU)	15	13	12	12
Dissolved Oxygen (DO)[3]	ND	ND	ND	ND
BOD_5	3	4	5	3
$CBOD_5$	2	4	4	3
COD	31	27	33	31
TP	0.39	0.57	0.73	0.96
Ortho-P	0.238	0.361	0.594	0.779
TKN	1.37	1.28	1.13	1.36
Ammonia-N	0.21	0.27	0.04	0.06
NO_3-N	3.019	3.887	4.832	5.605
NO_2-N	0.029	0.024	0.019	0.023
TN	4.42	5.19	5.98	6.99
Chlorophyll *a* (µg/L)	28	22	21	23
	5/2/06	5/3/06	5/4/06	5/5/06
Water Temperature (°C)[2]	15.2	17.7	16.4	16.8
pH (units)[2]	8.1	8.0	7.8	8.1
TSS	21	23	9	7
VSS	6	9	9	7
Turbidity (NTU)	16	17	8	10
Dissolved Oxygen (DO)[3]	ND	ND	ND	ND
BOD_5	2	5	6	7
$CBOD_5$	2	4	5	6
COD	33	55	38	42
TP	0.63	1.00	0.99	1.52
Ortho-P	0.453	0.745	0.820	1.215
TKN	1.67	1.83	1.32	1.62
Ammonia-N	0.05	0.02	0.02	0.02
NO_3-N	2.785	4.136	4.086	6.613
NO_2-N	0.010	0.013	0.007	0.015
TN	4.47	5.98	5.41	8.25
Chlorophyll *a* (µg/L)	46	44	64	38

TABLE AII-3 (Continued): WATER QUALITY DATA AT J. F. KENNEDY BOULEVARD IN SALT CREEK DURING RAIN EVENTS BEFORE PHOSPHORUS REDUCTION AT THE JOHN E. EGAN WATER RECLAMATION PLANT

Constituents[1]	2006 Rain Event Dates			
	8/29/06	8/30/06	8/31/06	9/1/06
Water Temperature (°C)[2]	22.3	21.7	20.3	21.5
pH (units)[2]	7.7	7.9	7.7	7.5
TSS	16	12	9	10
VSS	3	3	7	10
Turbidity (NTU)	12	17	10	9
Dissolved Oxygen (DO)[3]	ND	ND	ND	ND
BOD_5	2	2	2	2
$CBOD_5$	2	3	2	2
COD	26	16	20	13
TP	1.88	2.66	3.11	4.04
Ortho-P	1.693	2.418	2.897	3.583
TKN	1.55	1.37	1.38	1.32
Ammonia-N	0.42	0.28	0.11	0.07
NO_3-N	5.221	5.100	8.355	10.943
NO_2-N	0.012	0.011	0.013	0.014
TN	6.78	6.48	9.75	12.28
Chlorophyll *a* (µg/L)	28	22	17	13

[1]Expressed in mg/L except where noted.
[2]Field measurement.
[3]Continuous monitoring data implemented in 2006. No grab sample taken for DO.

TABLE AII-4: WATER QUALITY DATA AT J. F. KENNEDY BOULEVARD IN SALT CREEK DURING RAIN EVENTS FOLLOWING PHOSPHORUS REDUCTION AT THE JOHN E. EGAN WATER RECLAMATION PLANT

Constituents[1]	2007 Rain Event Dates			
	4/30/07	5/1/07	5/2/07	5/3/07
Water Temperature (°C)[2]	18.4	15.7	16.4	15.6
pH (units)[2]	7.9	8.0	8.2	8.1
TSS	12	10	14	12
VSS	2	5	5	4
Turbidity (NTU)	13	10	7	8
Dissolved Oxygen (DO)[3]	ND	ND	ND	ND
BOD_5	3	3	3	3
$CBOD_5$	3	3	3	3
COD	50	22	20	4
TP	0.14	0.12	0.15	0.18
Ortho-Phosphate	0.018	0.017	0.017	0.023
TKN	1.13	1.45	1.13	1.09
Ammonia-N	0.05	0.03	0.10	0.08
NO_3-N	3.408	3.940	4.708	6.215
NO_2-N	0.009	0.007	0.009	0.011
TN	4.55	5.40	5.85	7.32
Chlorophyll *a* (µg/L)	23	27	24	29
	6/05/07	6/6/07	6/7/07	6/8/07
Water Temperature (°C)[2]	18.0	19.9	20.8	21.0
pH (units)[2]	7.8	7.9	7.7	7.7
TSS	13	21	19	13
VSS	4	8	4	7
Turbidity (NTU)	12	17	18	13
Dissolved Oxygen (DO)[3]	ND	ND	ND	ND
BOD_5	3	3	3	0
$CBOD_5$	<2	2	3	<2
COD	29	36	29	34
TP	0.19	0.18	0.24	0.28
Ortho-Phosphate	0.098	0.066	0.108	0.141
TKN	1.56	1.24	1.26	1.33
Ammonia-N	0.04	0.05	0.12	0.05
NO_3-N	3.666	2.851	4.487	6.679
NO_2-N	0.007	0.002	0.005	0.007
TN	5.23	4.09	5.75	8.02
Chlorophyll *a* (µg/L)	16	11	13	13

TABLE AII-4 (Continued): WATER QUALITY DATA AT J. F. KENNEDY BOULEVARD IN SALT CREEK DURING RAIN EVENTS FOLLOWING PHOSPHORUS REDUCTION AT THE JOHN E. EGAN WATER RECLAMATION PLANT

Constituents[1]	2007 Rain Event Dates			
	8/7/07	8/8/07	8/9/07	8/10/07
Water Temperature (°C)[2]	25.3	26.7	26.2	26.3
pH (units)[2]	7.4	7.7	7.5	7.7
TSS	32	22	19	15
VSS	13	4	4	5
Turbidity (NTU)	27	26	23	21
Dissolved Oxygen (DO)[3]	ND	ND	ND	ND
BOD_5	19	3	3	3
$CBOD_5$	15	3	<2	4
COD	60	27	25	27
TP	0.82	0.14	0.14	0.14
Ortho-Phosphate	0.365	0.021	0.042	0.031
TKN	4.29	1.24	1.12	1.23
Ammonia-N	1.79	0.20	0.19	0.10
NO_3-N	2.007	0.831	1.159	1.548
NO_2-N	0.076	0.024	0.027	0.028
TN	6.37	2.10	2.31	2.81
Chlorophyll *a* (µg/L)	19	29	30	35

TABLE AII-4 (Continued): WATER QUALITY DATA AT J. F. KENNEDY BOULEVARD IN SALT CREEK DURING RAIN EVENTS FOLLOWING PHOSPHORUS REDUCTION AT THE JOHN E. EGAN WATER RECLAMATION PLANT

Constituents[1]	2008 Rain Event Dates			
	4/29/08	4/30/09	5/1/08	5/2/08
Water Temperature (°C)[2]	12.6	11.6	13.7	14.2
pH (units)[2]	7.7	7.8	7.6	7.8
TSS	13	17	12	16
VSS	8	7	5	5
Turbidity (NTU)	13	12	8	10
Dissolved Oxygen (DO)[3]	ND	ND	ND	ND
BOD_5	4	4	4	5
$CBOD_5$	4	4	4	5
COD	29	29	34	32
TP	0.14	0.14	0.13	0.18
Ortho-Phosphate	<0.025	<0.025	0.028	<0.025
TKN	0.81	0.91	0.97	1.13
Ammonia-N	0.10	<0.02	0.02	0.05
NO_3-N	3.482	3.124	5.332	5.453
NO_2-N	0.016	0.012	0.008	0.03
TN	4.31	4.05	6.31	6.61
Chlorophyll *a* (µg/L)	37	30	31	39

ND=No Data.
[1]Expressed in mg/L except where noted.
[2]Field measurement.
[3]Continuous monitoring data implemented in 2005. No grab sample taken for DO.

TABLE AII-5: WATER QUALITY DATA AT THORNDALE AVENUE IN SALT CREEK DURING RAIN EVENTS BEFORE PHOSPHORUS REDUCTION AT THE JOHN E. EGAN WATER RECLAMATION PLANT

Constituents[1]	2005 Rain Event Dates			
	7/26/05	7/27/05	7/28/05	7/29/05
Water Temperature (°C)[2]	23.9	23.4	22.6	23.8
pH (units)[2]	6.3	7.5	7.7	7.6
TSS	13	17	21	14
VSS	5	5	5	4
Turbidity (NTU)	9	11	11	12
Dissolved Oxygen (DO)	5.6	6.2	7.1	6.4
BOD_5	3	3	<2	3
$CBOD_5$	<2	<2	<2	<2
COD	38	49	40	36
TP	2.86	2.14	2.44	3.23
Ortho-P	2.364	1.689	1.932	2.652
TKN	1.46	1.55	1.56	1.36
Ammonia-N	0.25	0.14	0.06	0.06
NO_3-N	10.475	8.393	9.582	12.064
NO_2-N	0.062	0.034	0.028	0.032
TN	12.00	9.98	11.17	13.46
Chlorophyll *a* (µg/L)	16	33	36	24
	10/25/05	10/26/05	10/27/05	10/28/05
Water Temperature (°C)[2]	14.3	15.4	15.4	10.2
pH (units)[2]	7.7	7.7	7.5	7.5
TSS	26	12	14	8
VSS	20	<3	<3	<3
Turbidity (NTU)	7	8	7	6
Dissolved Oxygen (DO)	7.2	7.2	7.8	6.6
BOD_5	<2	<2	<2	<2
$CBOD_5$	3	2	2	2
COD	25	25	23	23
TP	3.58	4.58	4.89	5.11
Ortho-P	3.224	3.765	4.087	4.407
TKN	1.26	1.25	1.36	1.00
Ammonia-N	0.04	0.04	0.26	0.12
NO_3-N	15.150	18.104	18.628	19.503
NO_2-N	0.025	0.027	0.024	0.023
TN	16.44	19.38	20.01	20.53
Chlorophyll *a* (µg/L)	3	3	3	4

TABLE AII-5 (Continued): WATER QUALITY DATA AT THORNDALE AVENUE IN SALT CREEK DURING RAIN EVENTS BEFORE PHOSPHORUS REDUCTION AT THE JOHN E. EGAN WRP

Constituents[1]	2006 Rain Event Dates			
	4/4/06	4/5/06	4/6/06	4/7/06
Water Temperature (°C)[2]	9.4	10.1	10.1	10.7
pH (units)[2]	8.1	8.1	8.1	7.9
TSS	18	16	15	13
VSS	6	14	6	4
Turbidity (NTU)	19	13	12	14
Dissolved Oxygen (DO)[3]	ND	ND	ND	ND
BOD_5	3	4	4	3
$CBOD_5$	3	4	4	3
COD	40	31	29	35
TP	0.37	0.44	0.66	0.86
Ortho-P	0.182	0.298	0.534	0.649
TKN	1.44	1.59	1.40	1.38
Ammonia-N	0.18	0.31	0.02	0.06
NO_3-N	2.619	3.581	4.520	5.067
NO_2-N	0.031	0.026	0.020	0.030
TN	4.09	5.20	5.94	6.48
Chlorophyll *a* (µg/L)	27	24	22	23
	5/2/06	5/3/06	5/4/06	5/5/06
Water Temperature (°C)[2]	14.4	18.8	16.2	16.3
pH (units)[2]	8.1	8.1	7.6	8.0
TSS	25	20	16	12
VSS	11	12	7	6
Turbidity (NTU)	18	14	10	8
Dissolved Oxygen (DO)[3]	ND	ND	ND	ND
BOD_5	4	5	4	6
$CBOD_5$	3	4	4	5
COD	31	40	42	44
TP	0.60	0.82	0.95	1.51
Ortho-P	0.404	0.613	0.765	1.140
TKN	1.93	1.77	1.28	1.29
Ammonia-N	0.05	0.08	0.02	0.02
NO_3-N	2.461	3.449	4.090	6.938
NO_2-N	0.012	0.010	0.011	0.069
TN	4.40	5.23	5.38	8.30
Chlorophyll *a* (µg/L)	42	47	41	36

TABLE AII-5 (Continued): WATER QUALITY DATA AT THORNDALE AVENUE IN SALT CREEK DURING RAIN EVENTS BEFORE PHOSPHORUS REDUCTION AT THE JOHN E. EGAN WATER RECLAMATION PLANT

Constituents[1]	2006 Rain Event Dates			
	8/29/06	8/30/06	8/31/06	9/1/06
Water Temperature (°C)[2]	22.1	21.1	21.8	21.1
pH (units)[2]	7.6	7.8	7.6	7.6
TSS	28	17	90	10
VSS	3	5	24	3
Turbidity (NTU)	23	16	11	14
Dissolved Oxygen (DO)[3]	ND	ND	ND	ND
BOD_5	2	2	3	2
$CBOD_5$	2	2	2	2
COD	18	18	22	18
TP	1.89	3.14	3.25	3.38
Ortho-P	1.690	2.595	2.933	3.022
TKN	1.51	1.65	1.49	1.48
Ammonia-N	0.21	0.32	0.10	0.08
NO_3-N	6.075	5.792	8.019	9.547
NO_2-N	0.024	0.018	0.020	0.019
TN	7.61	7.46	9.53	11.05
Chlorophyll *a* (µg/L)	24	22	23	18

[1]Expressed in mg/L except where noted.
[2]Field measurement.
[3]Continuous monitoring data implemented in 2006. No grab sample taken for DO.

TABLE AII-6: WATER QUALITY DATA AT THORNDALE AVENUE IN SALT CREEK DURING RAIN EVENTS FOLLOWING PHOSPHORUS REDUCTION AT THE JOHN E. EGAN WATER RECLAMATION PLANT

Constituents[1]	2007 Rain Event Dates			
	4/30/07	5/1/07	5/2/07	5/3/07
Water Temperature (ºC)[2]	19.9	15.4	16.1	16.5
pH (units)[2]	7.7	7.6	7.8	8.6
TSS	18	17	13	20
VSS	5	8	3	8
Turbidity (NTU)	12	13	6	6
Dissolved Oxygen (DO)[3]	ND	ND	ND	ND
BOD_5	4	3	3	3
$CBOD_5$	3	3	2	3
COD	26	24	22	6
TP	0.14	0.14	0.13	0.17
Ortho-Phosphate	0.021	0.012	0.015	0.018
TKN	1.18	1.16	1.14	1.12
Ammonia-N	0.12	0.04	0.14	0.11
NO_3-N	3.835	3.270	4.857	6.016
NO_2-N	0.011	0.0008	0.010	0.013
TN	5.03	4.44	6.01	7.15
Chlorophyll *a* (µg/L)	22	27	20	21
	6/05/07	6/6/07	6/7/07	6/8/07
Water Temperature (ºC)[2]	21.0	20.4	21.5	21.3
pH (units)[2]	7.4	7.8	7.6	7.5
TSS	21	28	26	21
VSS	5	8	8	8
Turbidity (NTU)	17	19	20	16
Dissolved Oxygen (DO)[3]	ND	ND	ND	ND
BOD_5	4	<2	4	5
$CBOD_5$	4	<2	3	<2
COD	32	27	36	34
TP	0.21	0.18	0.23	0.23
Ortho-Phosphate	0.097	0.060	0.102	0.127
TKN	1.37	1.25	1.43	1.26
Ammonia-N	0.08	0.05	0.28	0.09
NO_3-N	3.102	2.371	4.130	6.101
NO_2-N	0.015	0.004	0.007	0.012
TN	4.49	3.63	5.57	7.37
Chlorophyll *a* (µg/L)	15	13	15	13

TABLE AII-6 (Continued): WATER QUALITY DATA AT THORNDALE AVENUE IN SALT CREEK DURING RAIN EVENTS FOLLOWING PHOSPHORUS REDUCTION AT THE JOHN E. EGAN WATER RECLAMATION PLANT

Constituents[1]	2007 Rain Event Dates			
	8/7/07	8/8/07	8/9/07	8/10/07
Water Temperature (ºC)[2]	24.5	26.7	26.0	26.3
pH (units)[2]	7.5	7.6	7.5	7.5
TSS	42	19	23	22
VSS	10	8	8	7
Turbidity (NTU)	22	23	23	24
Dissolved Oxygen (DO)[3]	ND	ND	ND	ND
BOD_5	3	5	3	<2
$CBOD_5$	<2	3	<2	3
COD	32	32	25	23
TP	0.21	0.24	0.14	0.19
Ortho-Phosphate	0.096	0.025	0.046	0.042
TKN	1.58	1.31	1.22	1.30
Ammonia-N	0.22	0.17	0.19	0.11
NO_3-N	2.545	0.778	0.969	1.592
NO_2-N	0.014	0.025	0.031	0.028
TN	4.14	2.11	2.22	2.92
Chlorophyll *a* (µg/L)	35	44	32	38

TABLE AII-6 (Continued): WATER QUALITY DATA AT THORNDALE AVENUE IN SALT CREEK DURING RAIN EVENTS FOLLOWING PHOSPHORUS REDUCTION AT THE JOHN E. EGAN WATER RECLAMATION PLANT

Constituents[1]	2008 Rain Event Dates			
	4/29/08	4/30/09	5/1/08	5/2/08
Water Temperature (°C)[2]	12.4	10.6	13.2	14.3
pH (units)[2]	7.6	7.4	7.8	7.5
TSS	19	16	14	15
VSS	6	6	5	4
Turbidity (NTU)	17	11	8	12
Dissolved Oxygen (DO)[3]	ND	ND	ND	ND
BOD_5	6	4	4	5
$CBOD_5$	5	5	4	4
COD	29	36	34	29
TP	0.14	0.14	0.13	0.18
Ortho-Phosphate	<0.025	<0.025	<0.025	<0.025
TKN	0.85	0.94	1.06	1.08
Ammonia-N	0.02	0.02	0.03	0.05
NO_3-N	3.157	2.952	3.767	4.725
NO_2-N	0.017	0.012	0.011	0.03
TN	4.02	3.90	4.84	5.84
Chlorophyll *a* (µg/L)	39	29	27	36

ND=No Data.
[1]Expressed in mg/L except where noted.
[2]Field measurement.
[3]Continuous monitoring data implemented in 2005. No grab sample taken for DO.

TABLE AII-7: WATER QUALITY DATA FROM JOHN E. EGAN WATER RECLAMATION PLANT EFFLUENT DURING RAIN EVENTS BEFORE PHOSPHORUS REDUCTION

Constituents[1]	2005 Rain Event Dates			
	7/26/05	7/27/05	7/28/05	7/29/05[2]
TSS	2	3	2	ND
Turbidity (NTU)	1	2	2	ND
BOD_5	2	2	<2	ND
$CBOD_5$	<2	<2	<2	ND
TP	3.25	3.51	3.65	ND
Ortho-P	3.22	3.19	3.28	ND
TKN	1.66	1.21	1.07	ND
Ammonia-N	0.39	0.14	0.09	ND
NO_3-N	16.242	17.245	16.787	ND
NO_2-N	0.091	0.021	0.009	ND
TN	17.99	18.48	17.87	ND
	10/25/05	10/26/05	10/27/05	10/28/05[2]
TSS	<2	<2	<2	ND
Turbidity (NTU)	<1	1	3	1
BOD_5	<2	<2	<2	ND
$CBOD_5$	<2	<2	<2	ND
TP	3.94	4.84	5.29	ND
Ortho-P	3.94	4.44	5.04	4.53
TKN	1.55	1.53	1.63	ND
Ammonia-N	0.08	0.17	0.15	ND
NO_3-N	18.832	19.729	22.054	ND
NO_2-N	<0.005	0.005	0.006	ND
TN	20.39	21.26	23.69	ND

TABLE AII-7 (Continued): WATER QUALITY DATA FROM JOHN E. EGAN WATER RECLAMATION PLANT EFFLUENT DURING RAIN EVENTS BEFORE PHOSPHORUS REDUCTION

Constituents[1]	2006 Rain Event Dates			
	4/4/06	4/5/06	4/6/06	4/7/06[2]
TSS	3	2	2	ND
Turbidity (NTU)	<1	2	2	1
BOD_5	3	2	2	ND
$CBOD_5$	2	2	2	ND
TP	1.28	1.75	1.50	ND
Ortho-P	1.209	1.474	2.026	2.430
TKN	0.97	0.99	0.08	ND
Ammonia-N	0.04	0.07	0.04	ND
NO_3-N	10.724	12.934	14.376	ND
NO_2-N	0.021	0.010	0.032	ND
TN	11.72	13.93	14.49	ND
	5/2/06	5/3/06	5/4/06	5/5/06[2]
TSS	2	2	2	ND
Turbidity (NTU)	3	1	1	<1
BOD_5	2	2	2	ND
$CBOD_5$	2	2	2	ND
TP	2.30	2.96	3.36	ND
Ortho-P	2.182	2.207	2.960	3.265
TKN	1.43	1.51	1.50	ND
Ammonia-N	0.04	0.04	0.06	ND
NO_3-N	11.573	13.064	ND	ND
NO_2-N	0.005	0.005	ND	ND
TN	13.01	14.58	ND	ND

TABLE AII-7 (Continued): WATER QUALITY DATA FROM JOHN E. EGAN WATER RECLAMATION PLANT EFFLUENT DURING RAIN EVENTS BEFORE PHOSPHORUS REDUCTION

Constituents[1]	2006 Rain Event Dates			
	8/29/06	8/30/06	8/31/06	9/1/06[2]
TSS	2	2	2	ND
Turbidity (NTU)	1	1	2	<1
BOD_5	2	2	2	ND
$CBOD_5$	2	2	2	ND
TP	ND	ND	ND	ND
Ortho-P	7.400	7.982	6.028	7.047
TKN	1.35	1.22	1.59	ND
Ammonia-N	0.06	0.04	0.08	ND
NO_3-N	16.242	16.925	17.450	ND
NO_2-N	0.005	0.010	0.008	ND
TN	17.60	18.16	19.05	ND

ND = No Data.
[1]Expressed in mg/L except where noted.
[2]24-hour composite samples not analyzed on weekends.

TABLE AII-8: WATER QUALITY DATA FROM JOHN E. EGAN WATER RECLAMATION PLANT EFFLUENT DURING RAIN EVENTS FOLLOWING PHOSPHORUS REDUCTION

Constituents[1]	2007 Rain Event Dates			
	4/30/07	5/1/07	5/2/07	5/3/07
TSS	2	2	<2	<2
Turbidity (NTU)	0.43	0.31	0.5	0.05
BOD_5	<2	<2	<2	<2
$CBOD_5$	<2	<2	<2	<2
TP	0.15	0.18	0.17	0.25
Ortho-Phosphate	0.099	0.095	0.101	0.117
TKN	1.17	1.13	0.66	1.06
Ammonia-N	0.07	0.07	0.03	0.04
NO_3-N	12.381	13.626	14.624	15.403
NO_2-N	0.006	0.004	0.002	0.001
TN	13.56	14.76	15.29	16.46
	6/05/07	6/6/07	6/7/07	6/8/07[2]
TSS	<2	3	<2	ND
Turbidity (NTU)	1.02	1.94	1.6	0.77
BOD_5	<2	<2	<2	ND
$CBOD_5$	<2	<2	<2	ND
TP	0.37	0.40	0.41	ND
Ortho-Phosphate	0.337	0.325	0.359	0.399
TKN	1.22	0.57	0.79	ND
Ammonia-N	0.24	0.11	0.07	ND
NO_3-N	11.353	12.773	14.896	ND
NO_2-N	0.019	0.007	0.009	ND
TN	12.59	13.35	15.70	ND
	8/7/07	8/8/07	8/9/07	8/10/07[2]
TSS	3	<2	2	ND
Turbidity (NTU)	1.50	0.77	0.89	0.79
BOD_5	<2	<2	<2	ND
$CBOD_5$	<2	<2	<2	ND
TP	0.47	0.34	0.38	ND
Ortho-Phosphate	0.388	0.262	0.294	0.281
TKN	1.07	0.85	1.13	ND
Ammonia-N	0.11	0.08	0.06	ND
NO_3-N	11.927	9.793	9.389	ND
NO_2-N	0.025	0.028	0.006	ND
TN	13.02	10.67	10.53	ND

TABLE AII-8 (Continued): WATER QUALITY DATA FROM JOHN E. EGAN WATER RECLAMATION PLANT EFFLUENT DURING RAIN EVENTS FOLLOWING PHOSPHORUS REDUCTION

Constituents[1]	2008 Rain Event Dates			
	4/29/08	4/30/09	5/1/08	5/2/08[2]
TSS	<2	<2	2	ND
Turbidity (NTU)	1.15	<1.00	<1.00	ND
BOD_5	<2	<2	<2	ND
$CBOD_5$	<2	<2	<2	ND
TP	0.26	0.28	0.22	ND
Ortho-Phosphate	<0.025	<0.025	<0.025	ND
TKN	0.93	0.76	1.1	ND
Ammonia-N	0.05	0.10	0.04	ND
NO_3-N	12.500	12.466	14.134	ND
NO_2-N	0.002	0.006	0.005	ND
TN	13.43	13.23	15.24	ND

ND = No Data.

[1]Expressed in mg/L except where noted.

[2]24-hour composite samples not analyzed on weekends.

APPENDIX AIII

MAJOR PLANT OPERATION EVENTS DURING THE PHOSPHORUS REDUCTION STUDY

TABLE AIII-1: MAJOR EVENTS RELATED TO CHEMICAL PHOSPHORUS REDUCTION AT THE JOHN E. EGAN WATER RECLAMATION PLANT

Time	Event
2/5/2007	$FeCl_3$ dosing started in one battery only due to a frozen line to the other battery.
2/7/2007	$FeCl_3$ dosing started in both batteries at 1.32 gpm.
4/2/2007	$FeCl_3$ dosing dropped to 1.17 gpm.
5/22/2007	North Aeration Tank 2 was put out of service.
6/28/2007	$FeCl_3$ dosing increased to 1.32 gpm.
7/20/2007	North Aeration Tank 2 was put back in service. $FeCl_3$ was not added to this tank till 7/30/08.
9/3/2007	South Aeration Tank 2 was put out of service, but South Aeration Tank 1 remained in service.
10/17/2007	South Aeration Tank 2 was put back in service.
10/22/2007	$FeCl_3$ dosing dropped to 1.28 gpm.
1/23/2008	$FeCl_3$ dosing dropped to 1.16 gpm.
5/21/2008	$FeCl_3$ dosing point was changed to before primary tanks. Dosing rate was 1.0 gpm.
5/30/2008	$FeCl_3$ dosing increased to 1.08 gpm.
6/18/2008	$FeCl_3$ dosing increased to 1.16 gpm.
6/23/2008	$FeCl_3$ dosing increased to 1.24 gpm.
6/27/2008	$FeCl_3$ dosing increased to 1.32 gpm.
7/10/2008	Primary Tank 1 and 2 out of service. Raw sewage fed to North Battery directly.
7/22/2008	$FeCl_3$ dose to primary at 1.07 gpm and to filters at 0.25 gpm.

Table AIII-1 (Continued): MAJOR EVENTS RELATED TO CHEMICAL PHOSPHORUS REDUCTION AT THE JOHN E. EGAN WATER RECLAMATION PLANT

Time	Event
7/23/2008	Primary Tank 1 and/or 2 back in service. Primary-treated sewage fed to North Battery.
7/24/2008	$FeCl_3$ dose to filters stopped due to outfall foaming. Resume 1.32 gpm before primary tanks.
8/9/2008	$FeCl_3$ pipe broken. Dosing stopped.
8/11/2008	$FeCl_3$ pipe fixed and dosing resumed in the afternoon.
8/18/2008	$FeCl_3$ dose to primary at 1.20 gpm and to filters at 0.15 gpm.
8/20/2008	$FeCl_3$ dose to filters stopped due to outfall foaming. Resume 1.32 gpm before primary tanks.
10/14/2008	$FeCl_3$ dosing decreased from 1.32 gpm to 1.19 gpm.
10/29/2008	$FeCl_3$ dosing stopped due to electric problem.
10/30/2008	$FeCl_3$ dosing system went back in service at 1.18 gpm.
11/5/2008	Primary Tank 1 and 2 out of service. Raw sewage fed to North Battery directly.
11/13/2008	Primary Tank 1 and 2 back in service. Primary-treated sewage fed to North Battery.
12/21/2008	$FeCl_3$ dosing decreased from 1.18 gpm to 1.08 gpm.
12/22/2008	$FeCl_3$ dosing increased from 1.08 gpm to 1.19 gpm.
12/23/2008	$FeCl_3$ dosing decreased from 1.19 gpm to 1.06 gpm.
12/24/2008	$FeCl_3$ dosing to Primary stopped.
12/24/2008	Leak in $FeCl_3$ for sludge dewatering started. $FeCl_3$ was drained to wet well.
12/25/2008	$FeCl_3$ tank leak stopped. Approximately 3750 gallons of ferric drained to wet well.

APPENDIX AIV

MONITORING RESULTS FOR THE PRIMARY, SECONDARY, AND FINAL EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING THE PHOSPHORUS REDUCTION STUDY

TABLE AIV-1: MONITORING RESULTS FOR THE FINAL EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH unit	ALKALINITY mg/L	$CBOD_5$ mg/L	SS mg/L	TP mg/L	Sol-P mg/L	Ortho-P mg/L	TKN mg/L	NH_3_N mg/L	NO_3_N mg/L	Tot-Fe mg/L	Sol-Fe mg/L	TURBIDITY NTU
1/1/2007	-----	-----	0	1	3.21	3.090	-----	1.07	0.02	13.633	0.065	-----	-----
1/2/2007	-----	-----	0	1	3.14	2.685	-----	1.01	0.04	13.864	0.038	0.043	-----
1/3/2007	-----	-----	0	1	3.07	3.055	3.009	1.06	0.03	15.199	0.095	-----	5.10
1/4/2007	-----	-----	0	1	3.44	3.432	-----	1.25	0.04	16.256	0.070	-----	-----
1/7/2007	-----	-----	0	1	3.59	2.777	-----	1.47	0.05	13.611	0.058	-----	-----
1/8/2007	-----	-----	0	2	2.78	2.683	-----	1.17	0.03	13.305	0.053	-----	-----
1/9/2007	-----	-----	0	1	2.68	2.725	-----	1.01	0.01	14.401	0.061	0.068	-----
1/10/2007	-----	-----	0	1	2.81	2.960	-----	1.01	0.07	15.742	0.059	-----	-----
1/11/2007	-----	-----	0	1	3.47	3.437	-----	1.05	0.03	17.078	0.074	-----	-----
1/14/2007	-----	-----	0	1	3.85	3.345	-----	1.36	0.03	14.946	0.064	-----	-----
1/15/2007	-----	-----	0	1	2.99	2.944	-----	1.03	0.06	13.584	0.051	-----	-----
1/16/2007	7.88	179	0	1	2.37	2.247	-----	0.85	0.02	12.036	0.192	0.048	-----
1/17/2007	7.83	180	0	1	2.45	2.455	2.468	1.05	0.03	14.446	0.065	-----	-----
1/18/2007	7.69	170	0	1	2.74	2.800	-----	1.07	0.00	15.819	0.074	-----	-----
1/21/2007	7.75	161	0	1	3.51	3.185	-----	1.16	0.01	14.809	0.075	-----	-----
1/22/2007	7.67	162	0	1	3.23	3.086	-----	1.20	0.02	14.550	0.061	-----	-----
1/23/2007	7.92	166	0	2	2.92	3.118	-----	0.76	0.05	14.959	0.068	0.070	-----
1/24/2007	7.71	152	0	1	3.56	3.320	3.203	1.20	0.05	16.147	0.098	-----	-----
1/25/2007	7.66	143	0	1	3.74	3.626	-----	1.11	0.32	16.747	0.098	-----	-----
1/28/2007	7.43	147	0	1	4.06	3.830	-----	1.25	0.05	14.372	0.062	-----	-----
1/29/2007	7.79	148	0	1	3.38	3.127	-----	1.20	0.05	13.320	0.056	-----	-----
1/30/2007	7.82	146	0	1	3.01	2.899	-----	0.88	0.02	13.545	0.056	0.036	-----
1/31/2007	7.65	147	0	1	3.18	2.709	3.396	1.11	0.04	15.446	0.066	-----	-----
2/1/2007	7.57	141	0	1	3.47	3.262	-----	1.12	0.02	17.142	0.067	-----	-----
2/4/2007	7.69	142	0	0	3.79	3.559	-----	1.14	0.05	15.595	0.081	-----	-----
2/5/2007	7.56	140	0	2	3.38	3.357	-----	1.33	0.03	13.798	0.066	-----	-----
2/6/2007	7.48	122	0	1	2.27	2.278	-----	1.16	0.38	15.175	0.102	0.066	-----
2/7/2007	6.98	102	0	1	0.70	0.633	0.551	0.84	0.08	16.826	0.145	-----	1.26
2/8/2007	7.17	96	0	1	0.41	0.390	-----	1.08	0.02	17.007	0.280	-----	-----
2/11/2007	7.26	90	0	1	0.37	0.325	-----	1.15	0.07	16.781	0.207	-----	-----
2/12/2007	7.37	94	0	2	0.28	0.232	-----	1.30	0.05	14.943	0.240	-----	-----

TABLE AIV-1 (Continued): MONITORING RESULTS FOR THE FINAL EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH unit	ALKALINITY mg/L	$CBOD_5$ mg/L	SS mg/L	TP mg/L	Sol-P mg/L	Ortho-P mg/L	TKN mg/L	NH_3_N mg/L	NO_3_N mg/L	Tot-Fe mg/L	Sol-Fe mg/L	TURBIDITY NTU
2/13/2007	7.43	91	0	1	0.29	0.264	-----	1.10	0.08	15.098	0.225	0.075	-----
2/14/2007	7.1	83	0	1	0.32	0.275	0.154	0.96	0.05	16.985	0.220	-----	-----
2/15/2007	7	80	0	2	0.33	0.296	-----	1.17	0.03	18.071	0.224	-----	-----
2/18/2007	7.06	76	0	1	0.21	0.181	-----	1.06	0.05	16.949	0.224	-----	-----
2/19/2007	7.26	77	0	2	0.18	0.140	-----	1.01	0.05	17.055	0.230	-----	-----
2/20/2007	7.07	82	0	1	0.19	0.151	-----	1.16	0.03	16.494	0.248	0.061	-----
2/21/2007	7.28	86	0	1	0.18	0.148	0.111	0.88	0.03	16.531	0.258	-----	-----
2/22/2007	7.21	95	0	2	0.21	0.162	-----	1.14	0.00	17.008	0.266	-----	-----
2/25/2007	7.74	120	0	3	0.24	0.148	-----	1.63	0.58	15.969	0.373	-----	-----
2/26/2007	7.35	111	0	2	0.21	0.142	-----	1.38	0.56	11.908	0.298	-----	-----
2/27/2007	7.7	117	0	1	0.23	0.166	-----	1.00	0.03	14.877	0.178	0.030	-----
2/28/2007	7.41	117	0	2	0.18	0.144	0.086	0.62	0.02	16.295	0.196	-----	-----
3/1/2007	7.25	120	0	4	0.28	0.169	-----	1.80	0.62	14.970	0.457	-----	-----
3/4/2007	7.11	139	0	2	0.12	0.095	-----	0.65	0.08	12.609	0.149	-----	-----
3/5/2007	7.42	135	0	1	0.11	0.098	-----	1.01	0.12	12.963	0.138	-----	-----
3/6/2007	7.35	128	0	1	0.11	0.083	-----	0.80	0.05	15.062	0.178	0.045	-----
3/7/2007	7.25	125	0	1	0.14	0.114	0.057	0.61	0.07	17.137	0.171	-----	0.67
3/8/2007	7.15	121	0	1	0.13	0.105	-----	1.17	0.10	16.587	0.180	-----	-----
3/11/2007	7.73	165	0	1	0.16	0.126	-----	0.92	0.20	9.727	0.153	-----	-----
3/12/2007	7.55	172	0	2	0.12	0.095	-----	1.05	0.08	10.281	0.136	-----	-----
3/13/2007	7.48	187	0	3	0.18	0.132	-----	1.17	0.25	11.020	0.235	0.040	-----
3/14/2007	7.61	186	0	2	0.19	0.208	0.056	0.91	0.17	11.859	0.182	-----	-----
3/15/2007	7.51	177	0	2	0.15	0.112	-----	1.07	0.06	13.894	0.168	-----	-----
3/18/2007	7.65	150	0	1	0.21	0.181	-----	0.81	0.08	15.600	0.126	-----	-----
3/19/2007	7.45	146	0	1	0.15	0.120	-----	1.10	0.06	14.486	0.124	-----	-----
3/20/2007	7.37	142	0	1	0.06	0.033	-----	1.09	0.16	15.387	0.145	0.037	-----
3/21/2007	7.26	136	0	3	0.14	0.062	0.077	1.43	0.58	15.750	0.258	-----	-----
3/22/2007	7.49	179	0	4	0.23	0.129	-----	1.69	0.38	9.542	0.306	-----	-----
3/25/2007	7.72	182	0	1	0.09	0.068	-----	0.86	0.22	11.182	0.094	-----	-----
3/26/2007	7.61	172	0	2	0.10	0.071	-----	0.99	0.05	11.491	0.122	-----	-----
3/27/2007	7.46	169	0	2	0.11	0.085	-----	0.87	0.05	12.694	0.152	0.046	-----
3/28/2007	7.25	158	0	1	0.13	0.103	0.070	0.67	0.12	13.974	0.135	-----	-----
3/29/2007	7.32	160	0	1	0.13	0.120	-----	1.08	0.13	13.939	0.117	-----	-----
4/1/2007	7.54	160	0	2	0.13	0.110	-----	1.08	0.13	11.931	0.128	-----	-----

TABLE AIV-1 (Continued): MONITORING RESULTS FOR THE FINAL EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH unit	ALKALINITY mg/L	$CBOD_5$ mg/L	SS mg/L	TP mg/L	Sol-P mg/L	Ortho-P mg/L	TKN mg/L	NH_3_N mg/L	NO_3_N mg/L	Tot-Fe mg/L	Sol-Fe mg/L	TURBIDITY NTU
4/2/2007	7.52	183	0	2	0.14	0.113	-----	1.03	0.05	9.733	0.109	-----	-----
4/3/2007	7.49	181	0	2	0.14	0.113	-----	0.91	0.10	11.313	0.135	0.037	-----
4/4/2007	7.5	170	0	1	0.14	0.110	0.068	0.56	0.09	13.845	0.168	-----	0.50
4/5/2007	7.51	159	0	2	0.13	0.105	-----	1.00	0.02	16.071	0.136	-----	-----
4/8/2007	7.66	142	0	1	0.13	0.108	-----	1.09	0.06	13.239	0.105	-----	-----
4/9/2007	7.34	140	0	2	0.10	0.081	-----	1.02	0.04	12.924	0.098	-----	-----
4/10/2007	7.02	133	0	2	0.14	0.110	-----	1.14	0.03	15.602	0.296	0.053	-----
4/11/2007	7.19	131	0	2	0.16	0.126	0.084	0.80	0.08	17.008	0.172	-----	0.51
4/12/2007	7.44	156	0	4	0.27	0.179	-----	1.32	0.08	12.260	0.241	-----	-----
4/15/2007	7.67	191	0	3	0.16	0.135	-----	1.00	0.10	10.251	0.089	-----	-----
4/16/2007	7.13	183	0	1	0.18	0.157	-----	0.96	0.08	12.049	0.092	-----	-----
4/17/2007	7.09	168	0	1	0.18	0.142	-----	1.19	0.03	13.437	0.102	0.043	-----
4/18/2007	7.15	157	0	1	0.20	0.180	0.087	0.92	0.14	15.330	0.109	-----	2.74
4/19/2007	7.15	147	0	1	0.14	0.119	-----	1.25	0.05	16.194	0.099	-----	-----
4/22/2007	7.31	134	0	2	0.16	0.123	-----	1.18	0.08	14.817	0.140	-----	-----
4/23/2007	7.16	132	0	3	0.14	0.109	-----	1.53	0.43	14.338	0.143	-----	-----
4/24/2007	7.16	128	0	1	0.19	0.151	-----	1.35	0.13	14.971	0.144	0.052	-----
4/25/2007	6.97	129	0	3	0.30	0.193	0.146	0.88	0.09	14.535	0.330	-----	-----
4/26/2007	7.23	156	0	2	0.22	0.158	-----	1.29	0.16	11.552	0.232	-----	-----
4/29/2007	7.1	167	0	1	0.14	0.110	-----	1.10	0.03	12.237	0.112	-----	-----
4/30/2007	7.21	164	0	2	0.15	0.125	0.099	1.17	0.07	12.381	0.111	-----	0.43
5/1/2007	7.21	155	0	2	0.18	0.152	0.095	1.13	0.07	13.626	0.134	0.060	0.31
5/2/2007	7.05	147	0	1	0.17	0.137	0.101	0.66	0.03	14.624	0.112	-----	0.50
5/3/2007	7.01	138	0	1	0.25	0.225	0.117	1.06	0.04	15.403	0.113	-----	0.05
5/6/2007	6.78	127	0	2	0.21	0.191	-----	0.90	0.07	14.714	0.124	-----	-----
5/7/2007	6.79	125	0	1	0.19	0.160	-----	1.25	0.06	14.625	0.122	-----	-----
5/8/2007	6.97	115	0	1	0.26	0.216	-----	1.27	0.04	15.353	0.125	0.046	-----
5/9/2007	6.75	110	0	3	0.28	0.240	0.212	0.89	0.07	16.438	0.142	-----	-----
5/10/2007	7.02	114	0	1	0.27	0.227	-----	1.09	0.09	16.754	0.180	-----	-----
5/13/2007	7.27	102	0	1	0.37	0.331	-----	1.11	0.06	15.850	0.146	-----	-----
5/14/2007	6.96	100	0	1	0.31	0.279	-----	1.08	0.09	15.717	0.133	-----	-----
5/15/2007	6.93	99	0	0	0.32	0.267	-----	1.10	0.05	15.908	0.148	0.078	-----
5/16/2007	6.97	101	0	1	0.37	0.305	0.295	0.78	0.11	15.966	0.156	-----	0.43

TABLE AIV-1 (Continued): MONITORING RESULTS FOR THE FINAL EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH unit	ALKALINITY mg/L	$CBOD_5$ mg/L	SS mg/L	TP mg/L	Sol-P mg/L	Ortho-P mg/L	TKN mg/L	NH_3_N mg/L	NO_3_N mg/L	Tot-Fe mg/L	Sol-Fe mg/L	TURBIDITY NTU
5/17/2007	7.08	103	0	1	0.37	0.321	-----	1.14	0.09	16.018	0.144	-----	-----
5/20/2007	7.61	103	0	1	0.37	0.312	-----	0.99	0.08	15.712	0.144	-----	-----
5/21/2007	7.21	101	0	1	0.33	0.326	-----	0.99	0.05	16.060	0.159	-----	-----
5/22/2007	7.23	91	0	1	0.38	0.322	-----	1.21	0.06	17.534	0.195	0.062	-----
5/23/2007	7.2	89	0	2	0.58	0.438	0.444	0.98	0.08	18.107	0.318	-----	-----
5/24/2007	7.08	87	0	2	0.53	0.445	-----	1.14	0.07	17.853	0.249	-----	-----
5/27/2007	7.34	121	0	1	0.37	0.306	-----	1.05	0.06	10.855	0.154	-----	-----
5/28/2007	7.35	118	0	1	0.23	0.184	-----	1.05	0.05	12.563	0.113	-----	-----
5/29/2007	7.28	112	0	1	0.28	0.234	-----	1.12	0.09	13.615	0.133	0.060	-----
5/30/2007	7.23	97	0	1	0.27	0.238	0.234	1.00	0.08	15.318	0.134	-----	-----
5/31/2007	7.25	93	0	2	0.30	0.252	-----	0.91	0.06	16.441	0.136	-----	-----
6/3/2007	7.67	98	0	1	0.33	0.290	-----	1.01	0.17	14.713	0.136	-----	-----
6/4/2007	7.26	99	0	1	0.40	0.316	-----	1.64	0.42	14.279	0.160	-----	-----
6/5/2007	7.32	117	0	0	0.37	0.310	0.337	1.22	0.24	11.353	0.188	0.094	1.02
6/6/2007	7.42	129	0	3	0.40	0.348	0.325	0.57	0.11	12.773	0.172	-----	1.94
6/7/2007	7.32	117	0	1	0.41	0.384	0.359	0.79	0.07	14.896	0.123	-----	1.60
6/10/2007	7.37	91	0	1	0.66	0.624	-----	1.11	0.09	15.886	0.167	-----	-----
6/11/2007	7.16	89	0	1	0.58	0.499	-----	0.98	0.09	16.662	0.141	-----	-----
6/12/2007	7.32	84	0	2	0.55	0.485	-----	1.06	0.10	17.274	0.171	0.083	-----
6/13/2007	7.37	85	0	1	0.55	0.466	0.465	0.75	0.08	16.772	0.178	-----	-----
6/14/2007	7.22	81	0	1	0.49	0.407	-----	1.04	0.07	16.757	0.171	-----	-----
6/17/2007	7.37	84	0	1	0.56	0.469	-----	0.86	0.05	15.775	0.172	-----	-----
6/18/2007	7.22	84	0	1	0.58	0.543	-----	1.05	0.09	14.951	0.156	-----	-----
6/19/2007	7.24	86	0	0	0.58	0.538	-----	1.15	0.14	14.697	0.198	0.096	-----
6/20/2007	7.37	87	0	2	0.63	0.518	0.455	1.17	0.11	15.709	0.204	-----	0.43
6/21/2007	7.26	81	0	2	0.82	0.733	-----	1.30	0.14	16.397	0.211	-----	-----
6/24/2007	7.35	70	0	1	0.65	0.612	-----	0.90	0.07	17.944	0.190	-----	-----
6/25/2007	7.3	71	0	1	0.67	0.640	-----	1.05	0.12	16.805	0.164	-----	-----
6/26/2007	7.24	69	0	2	0.78	0.727	-----	1.08	0.04	17.358	0.201	0.099	-----
6/27/2007	7.26	71	0	1	0.83	0.629	0.751	1.03	0.06	18.765	0.210	-----	-----
6/28/2007	7.25	74	0	1	0.65	0.594	-----	0.87	0.07	18.407	0.175	-----	-----
7/1/2007	7.31	70	0	1	0.65	0.623	-----	1.05	0.08	17.145	0.165	-----	-----
7/2/2007	7.19	61	0	1	0.54	0.497	-----	1.06	0.08	16.978	0.135	-----	-----
7/3/2007	7.4	60	0	1	0.77	0.739	-----	1.13	0.09	18.168	0.157	0.073	-----

TABLE AIV-1 (Continued): MONITORING RESULTS FOR THE FINAL EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH unit	ALKALINITY mg/L	$CBOD_5$ mg/L	SS mg/L	TP mg/L	Sol-P mg/L	Ortho-P mg/L	TKN mg/L	NH_3_N mg/L	NO_3_N mg/L	Tot-Fe mg/L	Sol-Fe mg/L	TURBIDITY NTU
7/4/2007	7.2	64	0	2	0.59	0.439	-----	0.64	0.07	18.912	0.172	-----	-----
7/5/2007	7.22	74	0	1	0.45	0.425	0.376	0.85	0.08	17.063	0.187	-----	0.35
7/8/2007	7.24	70	0	1	0.67	0.615	-----	0.83	0.04	18.302	0.164	-----	-----
7/9/2007	7.06	66	0	2	0.56	0.503	-----	0.91	0.07	18.863	0.174	-----	-----
7/10/2007	7.06	70	0	2	0.49	0.448	-----	0.81	0.07	18.252	0.192	0.094	-----
7/11/2007	7.1	81	0	2	0.56	0.494	0.497	0.98	0.04	18.154	0.221	-----	-----
7/12/2007	7.06	82	0	1	0.68	0.588	-----	1.12	0.07	19.225	0.220	-----	-----
7/15/2007	7.25	66	0	1	0.45	0.407	-----	1.16	0.00	18.504	0.191	-----	-----
7/16/2007	7.01	63	0	2	0.49	0.439	-----	1.05	0.06	17.956	0.188	-----	-----
7/17/2007	7.05	65	0	2	0.62	0.549	-----	1.23	0.07	17.752	0.205	0.096	-----
7/18/2007	7.23	66	0	2	0.48	0.445	0.405	1.16	0.09	18.884	0.189	-----	0.23
7/19/2007	7.38	101	0	3	0.59	0.428	-----	2.96	1.65	12.068	0.361	-----	-----
7/22/2007	7.34	83	0	1	0.55	0.489	-----	1.37	0.26	18.143	0.226	-----	-----
7/23/2007	7.21	72	0	2	0.92	0.825	-----	1.17	0.18	18.036	0.194	-----	-----
7/24/2007	7.26	74	0	1	1.05	0.944	-----	1.55	0.17	17.986	0.214	0.101	-----
7/25/2007	7.33	81	0	3	0.92	0.793	0.830	1.07	0.14	15.464	0.176	-----	-----
7/26/2007	7.24	73	0	2	0.87	0.804	-----	1.31	0.09	18.078	0.171	-----	-----
7/29/2007	7.41	88	0	2	1.77	1.647	-----	1.12	0.07	14.149	0.120	-----	-----
7/30/2007	7.52	90	2	7	1.71	1.445	-----	1.04	0.08	15.800	0.127	-----	-----
7/31/2007	7.28	74	0	1	1.08	1.043	-----	1.16	0.09	17.286	0.132	0.054	-----
8/1/2007	7.23	71	0	2	0.93	0.910	0.883	0.83	0.06	18.063	0.162	-----	2.47
8/2/2007	7.3	73	0	2	1.16	1.113	-----	1.10	0.07	18.437	0.146	-----	-----
8/5/2007	7.47	83	0	2	0.78	0.708	-----	1.05	0.07	15.295	0.217	-----	-----
8/6/2007	7.46	102	0	2	0.45	0.403	-----	1.03	0.07	11.282	0.124	-----	-----
8/7/2007	7.57	113	0	3	0.47	0.389	0.388	1.07	0.11	11.927	0.282	0.054	1.50
8/8/2007	7.66	153	0	1	0.34	0.287	0.262	0.85	0.08	9.793	0.149	-----	0.77
8/9/2007	7.88	162	0	2	0.38	0.343	0.294	1.13	0.06	9.389	0.109	-----	0.89
8/12/2007	7.67	122	0	2	0.33	0.292	-----	0.87	0.06	13.998	0.137	-----	-----
8/13/2007	7.52	115	0	2	0.27	0.233	-----	1.01	0.03	13.752	0.124	-----	-----
8/14/2007	7.43	106	0	1	0.30	0.260	-----	1.04	0.05	14.831	0.128	0.072	-----
8/15/2007	7.56	114	0	1	0.38	0.362	0.291	0.75	0.04	14.562	0.135	-----	0.70
8/16/2007	7.49	113	0	1	0.34	0.300	-----	0.84	0.05	14.796	0.114	-----	-----
8/19/2007	7.65	123	0	2	0.35	0.314	-----	0.99	0.06	12.331	0.174	-----	-----
8/20/2007	7.85	189	0	3	0.21	0.172	-----	0.89	0.10	7.441	0.119	-----	-----

TABLE AIV-1 (Continued): MONITORING RESULTS FOR THE FINAL EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH unit	ALKALINITY mg/L	$CBOD_5$ mg/L	SS mg/L	TP mg/L	Sol-P mg/L	Ortho-P mg/L	TKN mg/L	NH_3_N mg/L	NO_3_N mg/L	Tot-Fe mg/L	Sol-Fe mg/L	TURBIDITY NTU
8/21/2007	7.5	210	0	2	0.18	0.153	-----	0.86	0.04	9.322	0.096	0.031	-----
8/22/2007	7.91	202	0	1	0.20	0.178	0.148	0.75	0.04	10.059	0.079	-----	-----
8/23/2007	7.94	185	0	1	0.28	0.261	-----	0.94	0.09	10.657	0.108	-----	-----
8/26/2007	7.48	234	0	1	0.24	0.220	-----	0.90	0.02	8.782	0.064	-----	-----
8/27/2007	7.49	189	0	1	0.20	0.188	-----	0.89	0.02	10.460	0.070	-----	-----
8/28/2007	6.88	172	0	2	0.22	0.212	-----	0.83	0.04	12.610	0.074	0.048	-----
8/29/2007	7.59	158	0	1	0.34	0.298	0.273	0.61	0.04	14.177	0.077	-----	-----
8/30/2007	7.54	143	0	1	0.31	0.281	-----	0.97	0.05	14.951	0.078	-----	-----
9/2/2007	7.63	124	0	2	0.38	0.343	-----	0.81	0.11	15.445	0.095	-----	-----
9/3/2007	7.63	114	0	1	0.24	0.220	-----	0.90	0.02	15.572	0.091	-----	-----
9/4/2007	7.38	107	0	1	0.22	0.204	-----	0.92	0.06	15.708	0.058	0.064	-----
9/5/2007	7.55	97	0	1	0.21	0.196	0.162	0.58	0.10	15.764	0.099	-----	3.06
9/6/2007	7.39	100	0	2	0.32	0.298	-----	0.77	0.06	16.211	0.115	-----	-----
9/9/2007	7.53	108	0	1	0.28	0.259	-----	0.74	0.05	14.102	0.104	-----	-----
9/10/2007	7.47	104	0	2	0.29	0.271	-----	0.81	0.06	14.704	0.101	-----	-----
9/11/2007	7.59	109	0	1	0.41	0.370	-----	0.85	0.00	14.340	0.104	0.070	-----
9/12/2007	7.56	116	0	2	0.45	0.380	0.356	0.67	0.07	14.882	0.133	-----	-----
9/13/2007	7.72	111	0	1	0.42	0.393	-----	0.91	0.04	16.037	0.100	-----	-----
9/16/2007	7.83	93	0	1	0.34	0.331	-----	0.74	0.05	16.263	0.127	-----	-----
9/17/2007	7.44	91	0	2	0.31	0.295	-----	0.87	0.05	15.482	0.102	-----	-----
9/18/2007	7.49	90	0	2	0.39	0.385	-----	0.99	0.01	16.764	0.107	0.079	-----
9/19/2007	7.3	87	0	0	0.37	0.321	0.378	0.12	0.00	16.039	0.141	-----	1.38
9/20/2007	7.38	87	0	0	0.37	0.324	-----	0.85	0.00	16.260	0.151	-----	-----
9/23/2007	7.47	95	0	1	0.35	0.318	-----	0.74	0.06	14.516	0.125	-----	-----
9/24/2007	7.21	86	0	1	0.31	0.280	-----	1.01	0.07	14.672	0.119	-----	-----
9/25/2007	7.46	90	0	2	0.66	0.614	-----	0.73	0.13	15.747	0.118	0.083	-----
9/26/2007	7.42	88	0	1	0.98	0.937	1.025	0.59	0.00	16.078	0.118	-----	-----
9/27/2007	7.33	87	0	0	0.71	0.649	-----	1.09	0.22	16.633	0.105	-----	-----
9/30/2007	7.28	80	0	2	0.42	0.402	-----	0.83	0.07	16.117	0.111	-----	-----
10/1/2007	7.21	84	0	1	0.36	0.362	-----	0.90	0.13	14.269	0.110	-----	-----
10/2/2007	7.45	92	0	1	0.34	0.313	-----	1.03	0.06	14.792	0.096	0.061	-----
10/3/2007	7.11	89	0	1	0.32	0.289	0.289	0.60	0.07	16.393	0.104	-----	0.72
10/4/2007	7.04	86	0	1	0.39	0.366	-----	0.94	0.07	16.866	0.106	-----	-----
10/7/2007	7.08	88	0	2	0.31	0.289	-----	0.84	0.15	14.618	0.120	-----	-----

TABLE AIV-1 (Continued): MONITORING RESULTS FOR THE FINAL EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH unit	ALKALINITY mg/L	$CBOD_5$ mg/L	SS mg/L	TP mg/L	Sol-P mg/L	Ortho-P mg/L	TKN mg/L	NH_3_N mg/L	NO_3_N mg/L	Tot-Fe mg/L	Sol-Fe mg/L	TURBIDITY NTU
10/8/2007	7.19	89	0	1	0.26	0.239	-----	1.29	0.34	13.316	0.103	-----	-----
10/9/2007	7.29	82	0	0	0.25	0.236	-----	0.85	0.09	14.809	0.101	0.086	-----
10/10/2007	7.21	82	0	0	0.26	0.247	0.213	0.80	0.05	16.496	0.146	-----	-----
10/11/2007	7.21	75	0	0	0.27	0.252	-----	0.88	0.05	18.448	0.134	-----	-----
10/14/2007	6.96	78	0	1	0.32	0.296	-----	1.16	0.27	15.338	0.084	-----	-----
10/15/2007	7.24	81	0	1	0.29	0.242	-----	1.08	0.12	14.504	0.131	-----	-----
10/16/2007	7.12	79	0	1	0.33	0.266	-----	0.81	0.06	15.867	0.177	0.059	-----
10/17/2007	7.11	88	0	1	0.40	0.337	0.243	0.84	0.15	14.929	0.000	-----	0.27
10/18/2007	7.2	94	0	2	0.39	0.331	-----	0.95	0.09	14.540	0.060	-----	-----
10/21/2007	7.06	90	0	1	0.44	0.399	-----	0.92	0.05	15.309	0.128	-----	-----
10/22/2007	6.98	86	0	0	0.41	0.387	-----	0.99	0.07	14.553	0.125	-----	-----
10/23/2007	7.23	86	0	0	0.45	0.407	-----	1.02	0.07	15.297	0.102	0.072	-----
10/24/2007	6.94	75	0	0	0.44	0.401	0.291	0.60	0.07	18.428	0.126	-----	-----
10/25/2007	7.34	83	0	1	0.50	0.449	-----	0.95	0.05	19.158	0.132	-----	-----
10/28/2007	7.18	89	0	1	0.36	0.314	-----	1.01	0.04	15.119	0.126	-----	-----
10/29/2007	7.27	86	0	1	0.28	0.242	-----	1.03	0.09	15.307	0.122	-----	-----
10/30/2007	7.21	80	0	1	0.29	0.264	-----	0.98	0.06	16.465	0.107	0.076	-----
10/31/2007	7.27	80	0	1	0.36	0.318	0.282	0.80	0.09	17.581	0.149	-----	-----
11/4/2007	7.11	88	0	1	0.39	0.348	-----	1.10	0.05	15.806	0.146	-----	-----
11/5/2007	7.22	-----	0	0	0.31	0.276	-----	0.92	0.05	15.403	0.128	-----	-----
11/6/2007	7.21	82	0	1	0.25	0.222	-----	0.98	0.05	15.840	0.128	0.070	-----
11/7/2007	7.07	-----	0	2	0.25	0.227	0.208	1.00	0.08	17.414	0.114	-----	1.45
11/8/2007	7.09	78	0	1	0.30	0.273	-----	1.18	0.07	16.884	0.106	-----	-----
11/11/2007	7.11	84	0	2	0.34	0.325	-----	1.19	0.46	15.195	0.108	-----	-----
11/12/2007	7.18	-----	0	1	0.22	0.175	-----	0.95	0.16	15.548	0.129	-----	-----
11/13/2007	6.98	80	0	1	0.24	0.223	-----	1.06	0.08	16.152	0.101	0.075	-----
11/14/2007	7.02	-----	0	0	0.29	0.271	0.198	0.90	0.17	17.631	0.107	-----	0.40
11/15/2007	7.06	75	0	1	0.30	0.288	-----	0.95	0.09	17.949	0.143	-----	-----
11/18/2007	6.98	82	0	1	0.28	0.265	-----	0.89	0.06	14.808	0.128	-----	-----
11/19/2007	7.02	-----	0	1	0.22	0.198	-----	1.04	0.07	14.170	0.126	-----	-----
11/20/2007	7.16	74	0	1	0.22	0.194	-----	0.91	0.06	14.922	0.117	0.087	-----
11/21/2007	7.52	-----	0	1	0.24	0.203	-----	1.01	0.06	16.227	0.165	-----	-----
11/22/2007	7.53	97	0	1	0.22	0.190	-----	0.93	0.03	12.180	0.136	-----	-----
11/25/2007	7.56	85	0	2	0.18	0.159	-----	0.84	0.20	15.320	0.098	-----	-----

TABLE AIV-1 (Continued): MONITORING RESULTS FOR THE FINAL EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH unit	ALKALINITY mg/L	$CBOD_5$ mg/L	SS mg/L	TP mg/L	Sol-P mg/L	Ortho-P mg/L	TKN mg/L	NH_3_N mg/L	NO_3_N mg/L	Tot-Fe mg/L	Sol-Fe mg/L	TURBIDITY NTU
11/26/2007	7.13	-----	0	2	0.17	0.145	-----	0.98	0.03	15.411	0.109	-----	-----
11/27/2007	7.12	79	0	1	0.19	0.178	-----	0.85	0.18	15.998	0.099	0.078	-----
11/28/2007	7.24	-----	0	1	0.22	0.239	0.199	0.92	0.04	16.880	0.118	-----	-----
11/29/2007	7.33	80	0	1	0.28	0.289	-----	1.03	0.04	16.902	0.100	-----	-----
12/2/2007	7.72	85	0	1	0.23	0.210	-----	1.01	0.04	15.700	0.131	-----	-----
12/3/2007	7.16	-----	0	2	0.19	0.164	-----	1.02	0.03	12.076	0.103	-----	-----
12/4/2007	7.77	102	0	3	0.24	0.215	-----	0.89	0.04	14.638	0.102	0.057	-----
12/5/2007	7.33	-----	0	1	0.24	0.220	0.191	0.70	0.05	16.090	0.114	-----	0.83
12/6/2007	7.41	97	0	2	0.25	0.233	-----	1.05	0.04	16.433	0.137	-----	-----
12/9/2007	7.43	87	0	2	0.21	0.193	-----	0.81	0.04	15.926	0.133	-----	-----
12/10/2007	7.08	-----	0	2	0.20	0.181	-----	1.07	0.10	14.896	0.115	-----	-----
12/11/2007	7.06	86	0	3	0.20	0.171	-----	0.84	0.08	15.855	0.165	0.116	-----
12/12/2007	7.63	-----	0	1	0.26	0.221	0.187	0.78	0.03	12.284	0.138	-----	-----
12/13/2007	7.29	124	0	2	0.20	0.168	-----	0.74	0.01	13.041	0.103	-----	-----
12/16/2007	7.09	111	0	2	0.27	0.238	-----	0.80	0.03	14.265	0.129	-----	-----
12/17/2007	7	-----	0	2	0.22	0.185	-----	0.96	0.03	14.630	0.123	-----	-----
12/18/2007	7.62	100	0	1	0.22	0.199	-----	0.88	0.01	15.168	0.127	0.100	-----
12/19/2007	7.09	-----	0	2	0.26	0.235	0.222	0.82	0.06	15.987	0.146	-----	-----
12/20/2007	7.05	92	0	2	0.28	0.251	-----	0.89	0.04	16.481	0.154	-----	-----
12/23/2007	7.29	142	0	7	0.31	0.155	-----	0.81	0.03	9.088	0.084	-----	-----
12/24/2007	7.59	-----	0	3	0.14	0.110	-----	0.81	0.01	9.064	0.079	-----	-----
12/25/2007	7.51	148	0	2	0.12	0.098	-----	0.70	0.00	10.086	0.075	0.044	-----
12/26/2007	7.13	-----	0	1	0.15	0.128	-----	0.56	0.05	12.588	0.075	-----	-----
12/27/2007	7.21	138	0	2	0.17	0.156	-----	0.83	0.01	13.278	0.098	-----	-----
12/30/2007	7.35	121	0	2	0.17	0.155	-----	0.52	0.11	13.566	0.099	-----	-----
12/31/2007	7.45	-----	0	2	0.16	0.147	-----	0.70	0.02	13.519	0.101	-----	-----
1/1/2008	7.41	113	0	1	0.16	0.150	-----	0.75	0.00	13.327	0.105	0.091	-----
1/2/2008	6.99	-----	0	2	0.17	0.146	0.129	0.64	0.02	13.984	0.103	-----	1.08
1/3/2008	7.08	107	0	1	0.17	0.148	-----	0.63	0.01	15.644	0.098	-----	-----
1/6/2008	7.29	123	0	2	0.21	0.192	-----	0.76	0.07	12.680	0.098	-----	-----
1/7/2008	7.32	-----	0	3	0.16	0.146	-----	0.81	0.11	9.718	0.139	-----	-----
1/8/2008	7.17	154	0	1	0.16	0.139	-----	0.77	0.07	11.012	0.110	0.051	-----
1/9/2008	7.62	-----	0	2	0.19	0.179	0.134	0.63	0.06	10.910	0.101	-----	-----
1/10/2008	7.24	166	0	2	0.17	0.154	-----	0.96	0.03	12.451	0.102	-----	-----

TABLE AIV-1 (Continued): MONITORING RESULTS FOR THE FINAL EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH unit	ALKALINITY mg/L	$CBOD_5$ mg/L	SS mg/L	TP mg/L	Sol-P mg/L	Ortho-P mg/L	TKN mg/L	NH_3_N mg/L	NO_3_N mg/L	Tot-Fe mg/L	Sol-Fe mg/L	TURBIDITY NTU
1/13/2008	7.76	176	0	2	0.17	0.146	-----	0.78	0.17	11.328	0.278	-----	-----
1/14/2008	7	-----	0	2	0.17	0.149	-----	0.88	0.02	11.297	0.131	-----	-----
1/15/2008	7.03	141	0	2	0.17	0.158	-----	0.81	0.02	13.263	0.093	0.062	-----
1/16/2008	7.3	-----	0	1	0.21	0.181	0.136	0.47	0.02	14.995	0.090	-----	1.67
1/17/2008	7.12	125	0	3	0.20	0.185	-----	0.69	0.02	15.597	0.100	-----	-----
1/20/2008	7.35	101	0	2	0.24	0.217	-----	0.77	0.05	17.076	0.115	-----	-----
1/21/2008	7.1	-----	0	1	0.16	0.141	-----	0.96	0.05	18.060	0.115	-----	-----
1/22/2008	6.91	95	0	0	0.21	0.200	-----	0.87	0.04	17.066	0.102	0.053	-----
1/23/2008	6.89	-----	0	1	0.25	0.236	0.167	0.71	0.04	16.905	0.169	-----	-----
1/24/2008	6.93	101	0	2	0.32	0.295	-----	0.55	0.07	17.474	0.115	-----	-----
1/27/2008	6.99	95	0	1	0.27	0.258	-----	0.70	0.05	17.637	0.124	-----	-----
1/28/2008	6.84	-----	0	2	0.24	0.228	-----	0.82	0.04	17.917	0.136	-----	-----
1/29/2008	6.77	96	0	1	0.23	0.210	-----	1.00	0.03	17.764	0.148	0.071	-----
1/30/2008	6.77	-----	0	2	0.26	0.241	0.207	0.69	0.06	18.154	0.133	-----	-----
1/31/2008	7.06	100	0	1	0.25	0.224	-----	0.95	0.06	18.933	0.162	-----	-----
2/3/2008	7.25	107	0	2	0.27	0.235	-----	0.73	0.02	17.473	0.128	-----	-----
2/4/2008	7.23	-----	0	2	0.26	0.230	-----	0.62	0.02	14.542	0.126	-----	-----
2/5/2008	7.02	114	0	2	0.29	0.249	-----	0.89	0.04	13.191	0.139	0.038	-----
2/6/2008	7.62	-----	0	3	0.26	0.226	0.189	0.59	0.06	13.484	0.130	-----	1.45
2/7/2008	7.04	140	0	2	0.24	0.194	-----	0.94	0.01	14.079	0.116	-----	-----
2/10/2008	6.94	139	0	1	0.24	0.194	-----	0.66	0.04	15.157	0.147	-----	-----
2/11/2008	7.13	-----	0	1	0.24	0.151	-----	0.92	0.04	15.455	0.120	-----	-----
2/12/2008	6.94	129	0	1	0.25	0.218	-----	0.82	0.00	16.727	0.135	0.060	-----
2/13/2008	7.01	-----	0	2	0.23	0.172	0.160	0.71	0.06	18.245	0.108	-----	-----
2/14/2008	7.06	121	0	1	0.22	0.214	-----	0.93	0.05	18.336	0.124	-----	-----
2/17/2008	7.23	116	0	6	0.50	0.314	-----	0.92	0.08	14.582	0.554	-----	-----
2/18/2008	7.1	-----	0	8	1.28	1.048	-----	1.08	0.03	8.151	0.779	-----	-----
2/19/2008	7.24	166	0	2	1.06	1.021	-----	0.75	0.04	10.697	0.170	0.012	-----
2/20/2008	8.04	-----	0	1	1.25	1.091	0.088	0.86	0.07	13.028	0.122	-----	-----
2/21/2008	7.07	160	0	2	0.35	0.318	-----	0.95	0.03	15.086	0.113	-----	-----
2/24/2008	6.97	138	0	<15.000	0.21	0.175	-----	0.83	0.05	14.843	0.135	-----	-----
2/25/2008	7.08	-----	0	<15.00	0.22	0.180	-----	0.83	0.02	13.441	0.134	-----	-----
2/26/2008	6.93	130	0	<15.00	0.21	0.178	-----	0.97	0.22	15.242	0.138	0.044	-----
2/27/2008	6.81	-----	0	<15.00	0.22	0.197	0.123	0.65	0.11	16.293	0.293	-----	-----

TABLE AIV-1 (Continued): MONITORING RESULTS FOR THE FINAL EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH unit	ALKALINITY mg/L	$CBOD_5$ mg/L	SS mg/L	TP mg/L	Sol-P mg/L	Ortho-P mg/L	TKN mg/L	NH_3_N mg/L	NO_3_N mg/L	Tot-Fe mg/L	Sol-Fe mg/L	TURBIDITY NTU
2/28/2008	7.16	119	0	<15.00	0.23	0.178	-----	0.96	0.03	16.869	0.136	-----	-----
3/2/2008	7.17	121	0	<15.00	0.39	0.213	-----	0.94	0.14	13.883	0.486	-----	-----
3/3/2008	7.26	-----	0	<15.00	0.49	0.215	-----	1.23	0.17	7.906	0.863	-----	-----
3/4/2008	7.23	156	0	<15.00	0.30	0.132	-----	0.75	0.01	7.673	0.481	0.031	-----
3/5/2008	7.25	-----	0	<15.00	0.14	0.099	-----	0.37	0.02	10.654	0.138	-----	-----
3/6/2008	7.24	169	0	<15.00	0.15	0.098	-----	0.79	0.07	12.780	0.171	-----	-----
3/9/2008	7.29	158	0	<15.00	0.21	0.195	-----	0.61	0.08	11.566	0.142	-----	-----
3/10/2008	7.26	-----	0	<15.00	0.23	0.181	-----	0.92	0.04	11.493	0.149	-----	-----
3/11/2008	7.16	141	0	<15.00	0.24	0.182	-----	0.83	0.04	13.161	0.161	0.056	-----
3/13/2008	7.13	154	0	1	0.23	0.188	-----	1.04	0.12	12.916	0.153	-----	-----
3/16/2008	7.32	167	0	2	0.17	0.132	-----	0.89	0.05	11.246	0.113	-----	-----
3/17/2008	7.24	-----	0	1	0.14	0.119	-----	1.02	0.02	11.545	0.117	-----	-----
3/18/2008	7.24	155	0	1	0.15	0.109	-----	1.04	0.11	12.737	0.122	0.067	-----
3/19/2008	7.12	-----	0	1	0.17	0.132	0.112	0.80	0.03	13.553	0.126	-----	-----
3/20/2008	7.24	153	0	2	0.18	0.141	-----	0.74	0.01	14.570	0.122	-----	-----
3/23/2008	7.21	149	0	1	0.17	0.124	-----	1.05	0.01	11.150	0.134	-----	-----
3/24/2008	7.36	-----	0	2	0.15	0.120	-----	0.90	0.01	11.114	0.126	-----	-----
3/25/2008	7.22	165	0	1	0.14	0.103	-----	0.81	0.01	10.329	0.140	0.062	-----
3/26/2008	7.38	-----	0	2	0.17	0.138	0.100	0.87	0.00	11.127	0.129	-----	-----
3/27/2008	7.35	170	0	2	0.13	0.100	-----	0.78	0.02	11.907	0.122	-----	-----
3/30/2008	7.24	173	0	1	0.13	0.096	-----	0.80	0.00	10.886	0.126	-----	-----
3/31/2008	7.14	-----	0	3	0.21	0.114	-----	1.18	0.05	11.085	0.337	-----	-----
4/1/2008	7.09	176	0	9	0.25	0.121	-----	1.13	0.04	11.134	0.216	0.031	-----
4/2/2008	7.32	-----	0	1	0.17	0.136	0.098	0.68	0.06	10.826	0.123	-----	1.26
4/3/2008	7.27	181	0	1	0.14	0.107	-----	0.81	0.02	12.378	0.122	-----	-----
4/6/2008	7.15	164	0	1	0.20	0.148	-----	0.88	0.00	12.000	0.123	-----	-----
4/7/2008	7.22	-----	0	2	0.16	0.152	-----	0.96	0.04	12.503	0.125	-----	-----
4/8/2008	7.17	147	0	1	0.18	0.137	-----	0.87	0.30	14.223	0.132	0.073	-----
4/9/2008	7.34	-----	0	7	0.38	0.099	0.089	0.96	0.21	15.404	1.552	-----	-----
4/10/2008	7	175	0	1	0.27	0.216	-----	0.99	0.16	11.461	0.164	-----	-----
4/13/2008	7.15	192	0	1	0.15	0.103	-----	0.66	0.06	8.604	0.104	-----	-----
4/14/2008	7.04	-----	0	2	0.14	0.108	-----	0.83	0.03	8.863	0.109	-----	-----
4/15/2008	7.16	189	0	1	0.15	0.111	-----	0.89	0.08	10.639	0.113	0.040	-----
4/16/2008	7.25	-----	0	1	0.19	0.146	0.115	0.78	0.04	12.690	0.115	-----	<1.00

TABLE AIV-1 (Continued): MONITORING RESULTS FOR THE FINAL EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH unit	ALKALINITY mg/L	$CBOD_5$ mg/L	SS mg/L	TP mg/L	Sol-P mg/L	Ortho-P mg/L	TKN mg/L	NH_3_N mg/L	NO_3_N mg/L	Tot-Fe mg/L	Sol-Fe mg/L	TURBIDITY NTU
4/17/2008	7.12	173	0	2	0.25	0.211	-----	0.91	0.04	14.497	0.104	-----	-----
4/20/2008	7.48	149	0	1	0.20	0.172	-----	0.83	0.02	14.151	0.101	-----	-----
4/21/2008	7	-----	0	1	0.19	0.167	-----	1.00	0.03	13.785	0.098	-----	-----
4/22/2008	7.26	139	0	1	0.23	0.201	-----	0.93	0.04	15.003	0.118	0.078	-----
4/23/2008	7.26	-----	0	1	0.27	0.224	<0.025	0.90	0.04	15.350	0.142	-----	-----
4/24/2008	7.23	130	0	1	0.28	0.237	-----	1.05	0.08	16.281	0.162	-----	-----
4/27/2008	7.29	135	0	2	0.26	0.214	-----	0.91	0.05	13.516	0.116	-----	-----
4/28/2008	7.19	-----	0	1	0.25	0.213	-----	1.12	0.09	14.591	0.119	-----	-----
4/29/2008	7.5	147	0	0	0.26	0.216	<0.025	0.93	0.05	12.500	0.133	0.059	1.15
4/30/2008	7.07	-----	0	1	0.28	0.244	<0.025000000	0.76	0.10	12.466	0.138	-----	<1.00
5/1/2008	7.25	149	0	2	0.22	0.190	<0.025000000	1.10	0.04	14.134	0.140	-----	<1.00
5/4/2008	7.36	153	0	2	0.25	0.210	-----	0.72	0.11	12.665	0.120	-----	-----
5/5/2008	7.59	-----	0	1	0.26	0.236	-----	1.09	0.06	13.122	0.126	-----	-----
5/6/2008	7.12	134	0	3	0.30	0.276	-----	1.07	0.03	15.123	0.153	0.066	-----
5/7/2008	7.2	-----	0	2	0.41	0.380	<0.025000000	0.71	0.06	17.247	0.181	-----	2.53
5/8/2008	7.33	140	0	2	0.40	0.370	-----	1.23	0.04	13.820	0.174	-----	-----
5/11/2008	7.39	148	0	1	0.33	0.246	-----	0.75	0.09	14.132	0.143	-----	-----
5/12/2008	7.46	-----	0	1	0.25	0.225	-----	0.98	0.06	9.703	0.125	-----	-----
5/13/2008	7.47	168	0	1	0.29	0.246	-----	0.93	0.02	12.403	0.105	0.041	-----
5/14/2008	7.26	-----	0	2	0.34	0.306	0.233	0.77	0.09	14.698	0.155	-----	-----
5/15/2008	7.27	148	0	1	0.31	0.270	-----	1.17	0.05	15.038	0.130	-----	-----
5/18/2008	7.27	125	0	1	0.42	0.359	-----	0.96	1.26	16.289	0.155	-----	-----
5/19/2008	7.27	-----	0	1	0.38	0.328	-----	1.25	0.09	16.678	0.185	-----	-----
5/20/2008	7.2	120	0	1	0.44	0.363	-----	1.16	0.03	16.884	0.185	0.102	-----
5/21/2008	7.17	-----	0	1	0.62	0.513	0.459	0.91	0.03	16.771	0.170	-----	<1.00
5/22/2008	7.46	117	0	1	0.77	0.656	-----	1.29	0.07	17.933	0.171	-----	-----
5/25/2008	7.24	99	0	0	0.74	0.679	-----	1.05	0.05	18.633	0.170	-----	-----
5/26/2008	7.26	-----	0	2	0.63	0.550	-----	1.34	0.17	17.376	0.127	-----	-----
5/27/2008	7.22	119	0	1	0.57	0.486	-----	1.17	0.06	14.638	0.110	0.070	-----
5/28/2008	7.38	-----	0	1	0.83	0.755	0.641	1.03	0.08	17.603	0.125	-----	-----
5/29/2008	6.99	105	0	1	0.81	0.795	-----	0.95	0.04	19.376	0.191	-----	-----
6/1/2008	7.31	113	0	1	0.90	0.792	-----	1.01	0.05	16.898	0.107	-----	-----
6/2/2008	7.25	-----	0	1	0.80	0.745	-----	1.33	0.13	17.382	0.101	-----	-----
6/3/2008	6.83	98	0	3	0.90	0.815	-----	1.20	0.07	18.398	0.118	0.100	-----

TABLE AIV-1 (Continued): MONITORING RESULTS FOR THE FINAL EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH unit	ALKALINITY mg/L	$CBOD_5$ mg/L	SS mg/L	TP mg/L	Sol-P mg/L	Ortho-P mg/L	TKN mg/L	NH_3_N mg/L	NO_3_N mg/L	Tot-Fe mg/L	Sol-Fe mg/L	TURBIDITY NTU
6/4/2008	7.04	-----	0	2	0.97	0.881	0.793	0.89	0.07	17.278	0.134	-----	<1.00
6/5/2008	7.41	125	0	1	1.15	1.036	-----	1.17	0.03	17.315	0.088	-----	-----
6/8/2008	7.28	101	0	1	0.80	0.723	-----	0.88	0.10	16.184	0.108	-----	-----
6/9/2008	7.23	-----	0	1	0.63	0.557	-----	1.13	0.04	12.342	0.113	-----	-----
6/10/2008	7.32	173	0	0	0.37	0.315	-----	0.84	0.05	11.267	0.084	0.057	-----
6/11/2008	7.42	-----	0	1	0.47	0.421	0.366	0.86	0.05	14.706	0.099	-----	-----
6/12/2008	7.12	148	0	0	0.56	0.504	-----	1.01	0.03	17.025	0.088	-----	-----
6/15/2008	7.2	121	0	1	0.74	0.690	-----	1.07	0.05	17.238	0.077	-----	-----
6/16/2008	6.9	-----	0	1	0.65	0.612	-----	1.04	0.04	17.638	0.081	-----	-----
6/17/2008	6.73	108	0	1	0.72	0.685	-----	1.02	0.03	18.776	0.084	0.062	-----
6/18/2008	7	-----	0	3	0.95	0.903	0.764	1.05	0.09	19.618	0.116	-----	<1.00
6/19/2008	6.98	103	0	1	1.00	0.965	-----	0.98	0.02	19.635	0.104	-----	-----
6/22/2008	7.11	94	0	2	0.94	0.889	-----	0.89	0.03	19.542	0.083	-----	-----
6/23/2008	6.89	-----	0	1	0.87	0.834	-----	0.89	0.10	19.071	0.087	-----	-----
6/24/2008	6.89	77	0	1	0.90	0.828	-----	1.20	0.06	20.258	0.100	0.047	-----
6/25/2008	6.74	-----	0	2	1.02	0.965	0.897	1.00	0.07	23.520	0.126	-----	-----
6/26/2008	6.98	84	0	1	1.22	1.176	-----	1.42	0.02	23.190	0.107	-----	-----
6/29/2008	6.89	79	0	1	0.82	0.762	-----	1.16	0.05	19.598	0.130	-----	-----
6/30/2008	6.96	-----	0	1	0.61	0.556	-----	1.47	0.03	18.798	0.137	-----	-----
7/1/2008	7.21	74	0	2	0.49	0.395	-----	1.33	0.09	23.247	0.189	0.118	-----
7/2/2008	7.17	-----	0	2	0.66	0.518	0.445	1.32	0.15	26.609	0.266	-----	-----
7/3/2008	7.05	94	0	1	0.73	0.627	-----	1.45	0.10	21.779	0.216	-----	-----
7/6/2008	7.05	85	0	1	0.38	0.331	-----	1.07	0.13	18.567	0.106	-----	-----
7/7/2008	7.26	-----	0	2	0.41	0.345	-----	1.34	0.11	19.823	0.105	-----	-----
7/8/2008	7.32	84	0	1	0.41	0.365	-----	1.41	0.10	20.524	0.134	0.076	-----
7/9/2008	7.23	-----	0	2	0.51	0.453	0.355	1.28	0.16	22.069	0.136	-----	<1.00
7/10/2008	7.35	93	0	2	0.67	0.618	-----	1.91	0.45	21.958	0.188	-----	-----
7/13/2008	7.45	127	0	1	0.24	0.179	-----	1.31	0.00	12.201	0.138	-----	-----
7/14/2008	7.17	-----	0	4	0.25	0.201	-----	1.59	0.26	15.111	0.128	-----	-----
7/15/2008	7.14	108	0	2	0.40	0.346	-----	1.49	0.18	16.999	0.142	0.089	-----
7/16/2008	7.08	-----	0	3	1.22	1.159	0.495	1.29	0.16	17.430	0.154	-----	1.41
7/17/2008	7.36	107	0	1	0.94	0.887	-----	1.61	0.13	17.975	0.142	-----	-----
7/20/2008	7.61	183	0	1	0.52	0.480	-----	1.05	0.14	7.576	0.095	-----	-----
7/21/2008	7.86	-----	0	1	0.75	0.728	-----	1.10	0.07	8.752	0.077	-----	-----

TABLE AIV-1 (Continued): MONITORING RESULTS FOR THE FINAL EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH unit	ALKALINITY mg/L	$CBOD_5$ mg/L	SS mg/L	TP mg/L	Sol-P mg/L	Ortho-P mg/L	TKN mg/L	NH_3_N mg/L	NO_3_N mg/L	Tot-Fe mg/L	Sol-Fe mg/L	TURBIDITY NTU
7/22/2008	7.78	161	0	0	0.50	0.466	-----	1.00	0.04	13.181	0.104	0.048	-----
7/23/2008	7.41	-----	0	1	0.42	0.374	0.062	0.73	0.05	15.576	2.524	-----	-----
7/24/2008	7.42	128	0	0	0.33	0.298	-----	1.14	0.03	17.073	0.265	-----	-----
7/27/2008	7.51	101	0	2	1.38	1.330	-----	1.17	0.08	18.487	0.100	-----	-----
7/28/2008	6.95	-----	0	1	1.32	1.269	-----	1.11	0.05	18.211	0.092	-----	-----
7/29/2008	7.23	96	0	1	0.62	0.595	-----	1.09	1.01	19.625	0.098	0.061	-----
7/30/2008	7.2	-----	0	2	0.64	0.603	0.513	1.07	0.04	19.671	0.093	-----	-----
7/31/2008	7.23	77	0	3	0.61	0.597	-----	0.96	0.06	19.813	0.091	-----	-----
8/3/2008	6.77	88	0	2	0.32	0.303	-----	1.04	0.04	17.762	0.091	-----	-----
8/4/2008	7.13	-----	0	2	0.35	0.328	-----	1.30	0.12	17.925	0.123	-----	-----
8/5/2008	7.47	125	0	2	0.30	0.241	-----	1.33	0.31	11.303	0.139	0.047	-----
8/6/2008	7.66	-----	0	2	0.38	0.327	0.197	0.66	0.02	11.720	0.116	-----	<1.00
8/7/2008	7.4	128	0	2	0.38	0.356	-----	1.13	0.03	14.770	0.094	-----	-----
8/10/2008	7.23	116	0	2	0.89	0.792	-----	1.12	0.04	16.924	0.088	-----	-----
8/11/2008	7.61	-----	0	1	1.20	1.075	-----	1.05	0.03	16.101	0.084	-----	-----
8/12/2008	7.58	114	0	1	1.24	1.120	-----	1.05	0.04	18.031	1.223	0.073	-----
8/13/2008	7.13	-----	0	1	0.96	0.911	0.729	1.01	0.04	19.637	0.104	-----	-----
8/14/2008	7.77	81	0	1	0.79	0.728	-----	1.09	0.07	21.485	0.110	-----	-----
8/17/2008	6.93	81	0	1	0.89	0.787	-----	0.91	0.05	19.437	0.109	-----	-----
8/18/2008	7.2	-----	0	2	0.65	0.602	-----	1.13	0.08	20.531	0.083	-----	-----
8/19/2008	7.08	63	0	1	0.49	0.443	-----	1.06	0.03	21.182	0.106	0.088	-----
8/20/2008	6.74	-----	0	1	0.56	0.516	0.313	0.99	0.10	20.808	0.121	-----	<1.00
8/21/2008	6.95	68	0	1	0.45	0.414	-----	1.03	0.06	20.101	0.115	-----	-----
8/24/2008	6.74	64	0	1	0.53	0.470	-----	0.92	0.04	18.478	0.096	-----	-----
8/25/2008	7.14	-----	0	1	0.43	0.398	-----	1.07	0.07	18.458	0.090	-----	-----
8/26/2008	6.96	69	0	1	0.43	0.396	-----	1.11	0.11	18.246	0.105	0.071	-----
8/27/2008	6.69	-----	0	0	0.65	0.552	0.445	0.98	0.05	19.564	0.095	-----	-----
8/28/2008	7.03	63	0	1	0.69	0.651	-----	1.05	0.02	19.213	0.097	-----	-----
8/31/2008	7.58	62	0	0	0.68	0.651	-----	1.09	0.07	19.738	0.093	-----	-----
9/1/2008	6.77	-----	0	1	0.61	0.559	-----	1.31	0.08	19.268	0.089	-----	-----
9/2/2008	7.56	56	0	2	0.50	0.453	-----	1.08	0.08	19.181	0.090	0.078	-----
9/3/2008	7.23	-----	0	2	0.51	0.466	0.425	1.23	0.08	19.042	0.132	-----	1.18
9/4/2008	7.3	63	0	2	0.54	0.483	-----	1.32	0.08	19.406	0.131	-----	-----
9/7/2008	7.35	119	0	1	0.33	0.297	-----	0.99	0.06	14.817	0.063	-----	-----

TABLE AIV-1 (Continued): MONITORING RESULTS FOR THE FINAL EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH unit	ALKALINITY mg/L	$CBOD_5$ mg/L	SS mg/L	TP mg/L	Sol-P mg/L	Ortho-P mg/L	TKN mg/L	NH_3_N mg/L	NO_3_N mg/L	Tot-Fe mg/L	Sol-Fe mg/L	TURBIDITY NTU
9/8/2008	7.5	-----	0	1	0.28	0.239	-----	1.06	0.09	18.154	0.090	-----	-----
9/9/2008	7.69	119	0	0	0.29	0.258	-----	1.25	0.15	14.362	0.080	0.071	-----
9/10/2008	7.53	-----	0	0	0.37	0.334	0.256	0.97	0.12	16.402	0.072	-----	-----
9/11/2008	7.96	132	0	1	0.49	0.440	-----	1.36	0.12	17.886	0.093	-----	
9/14/2008	8.06	196	0	2	0.28	0.235	-----	0.82	0.05	5.720	0.090	-----	-----
9/15/2008	7.92	-----	0	2	0.26	0.234	-----	0.95	0.03	7.589	0.083	-----	-----
9/16/2008	7.96	214	0	1	0.18	0.156	-----	0.89	0.03	9.671	0.056	0.030	-----
9/17/2008	7.9	-----	0	0	0.26	0.233	0.164	0.76	0.04	11.854	0.091	-----	<1.00
9/18/2008	7.82	182	0	1	0.25	0.237	-----	0.94	0.04	13.508	0.084	-----	-----
9/21/2008	7.68	131	0	1	0.29	0.239	-----	1.09	0.04	15.557	0.121	-----	-----
9/22/2008	7.69	-----	0	1	0.23	0.214	-----	0.84	0.02	16.065	0.098	-----	-----
9/23/2008	7.53	112	0	1	0.19	0.171	-----	0.98	0.03	17.585	0.071	0.076	-----
9/24/2008	7.41	-----	0	0	0.27	0.239	0.161	0.75	0.03	19.041	0.283	-----	-----
9/25/2008	7.45	117	0	0	0.19	0.217	-----	1.32	0.03	17.709	0.120	-----	-----
9/28/2008	7.23	111	0	1	0.24	0.220	-----	1.12	0.20	18.211	0.154	-----	-----
9/29/2008	7.08	-----	0	0	0.20	0.179	-----	1.15	0.04	17.633	0.090	-----	-----
9/30/2008	7.13	130	0	2	0.24	0.217	-----	1.05	0.03	14.180	0.066	0.050	-----
10/1/2008	7.12	-----	0	1	0.33	0.309	0.193	0.71	0.04	16.049	0.069	-----	<1.00
10/2/2008	7.12	128	0	1	0.34	0.314	-----	1.18	0.04	17.006	0.079	-----	-----
10/5/2008	7.16	101	0	1	0.37	0.337	-----	0.77	0.11	18.625	0.048	-----	-----
10/6/2008	7.22	-----	0	1	0.32	0.350	-----	1.24	0.04	18.421	0.071	-----	-----
10/7/2008	7.51	97	0	2	0.33	0.293	-----	1.19	0.05	19.483	0.075	0.059	-----
10/8/2008	7.08	-----	0	1	0.30	0.281	0.216	0.71	0.04	15.338	0.109	-----	-----
10/9/2008	7.42	149	0	1	0.22	0.200	-----	0.99	0.01	12.363	0.068	-----	-----
10/12/2008	7.48	119	0	1	0.38	0.344	-----	0.88	0.10	17.632	0.094	-----	-----
10/13/2008	7.64	-----	0	0	0.33	0.312	-----	1.19	0.03	17.769	0.090	-----	-----
10/14/2008	7.27	101	0	1	0.38	0.351	-----	1.09	0.00	17.812	0.124	0.065	-----
10/15/2008	7.25	-----	0	1	0.64	0.591	0.404	0.91	0.05	19.287	0.085	-----	<1.00
10/16/2008	7.36	98	0	0	0.65	0.606	-----	0.96	0.00	19.091	0.077	-----	-----
10/19/2008	7.47	107	0	1	0.64	0.616	-----	1.11	0.06	18.050	0.100	-----	-----
10/20/2008	7.34	-----	0	1	0.43	0.423	-----	1.04	0.04	17.583	0.110	-----	-----
10/21/2008	7.38	98	0	1	0.66	0.634	-----	1.01	0.03	18.292	0.103	0.083	-----
10/22/2008	7.3	-----	0	0	0.78	0.729	0.632	0.77	0.01	19.067	0.101	-----	-----
10/23/2008	7.52	90	0	0	0.97	0.857	-----	1.30	0.03	19.485	0.100	-----	-----

TABLE AIV-1 (Continued): MONITORING RESULTS FOR THE FINAL EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH unit	ALKALINITY mg/L	$CBOD_5$ mg/L	SS mg/L	TP mg/L	Sol-P mg/L	Ortho-P mg/L	TKN mg/L	NH_3_N mg/L	NO_3_N mg/L	Tot-Fe mg/L	Sol-Fe mg/L	TURBIDITY NTU
10/26/2008	7.7	122	0	1	0.57	0.545	-----	0.95	0.00	15.951	0.003	-----	-----
10/27/2008	7.83	-----	0	2	0.43	0.393	-----	1.08	0.02	17.122	0.070	-----	-----
10/28/2008	7.31	93	0	3	0.52	0.502	-----	1.14	0.02	18.802	0.089	0.054	-----
10/29/2008	7.27	-----	0	2	0.69	0.665	0.611	0.88	0.05	19.497	0.089	-----	-----
10/30/2008	7.33	112	0	1	1.38	1.318	-----	1.21	0.04	19.432	0.115	-----	-----
11/2/2008	7.23	86	0	1	0.75	0.688	-----	1.07	0.08	20.294	0.096	-----	-----
11/3/2008	7.51	-----	0	0	0.66	0.592	-----	1.03	0.06	20.560	0.082	-----	-----
11/4/2008	7.3	84	0	0	0.76	0.661	-----	1.19	0.13	20.761	0.104	0.084	-----
11/5/2008	6.97	-----	0	0	0.73	0.690	0.617	1.22	0.31	21.596	0.107	-----	<1.00
11/6/2008	6.76	77	0	1	0.66	0.558	-----	1.34	0.05	21.738	0.112	-----	-----
11/9/2008	7.05	89	0	1	0.35	0.317	-----	0.90	0.01	18.937	0.079	-----	-----
11/10/2008	7.4	-----	0	1	0.29	0.262	-----	0.96	0.12	19.110	0.073	-----	-----
11/11/2008	7.06	83	0	1	0.26	0.235	-----	1.11	0.03	19.968	0.079	0.063	-----
11/12/2008	6.3	-----	0	1	0.32	0.274	0.224	0.79	0.04	18.538	0.084	-----	-----
11/13/2008	7.55	112	0	1	0.22	0.202	-----	1.04	0.00	16.000	0.072	-----	-----
11/16/2008	7.01	111	0	0	0.23	0.206	-----	0.97	0.03	17.734	0.079	-----	-----
11/17/2008	7.03	-----	0	1	0.22	0.217	-----	0.93	0.02	18.214	0.079	-----	-----
11/18/2008	7.97	100	0	1	0.28	0.242	-----	0.89	0.08	18.218	0.117	0.077	-----
11/19/2008	7.97	-----	0	1	0.36	0.342	0.177	0.74	0.10	19.140	0.133	-----	1.67
11/20/2008	7.72	93	0	1	0.39	0.345	-----	1.32	0.11	19.972	0.118	-----	-----
11/23/2008	7.02	87	0	1	0.36	0.344	-----	0.93	0.00	19.548	0.080	-----	-----
11/24/2008	6.95	-----	0	1	0.30	0.254	-----	0.85	0.03	19.248	0.075	-----	-----
11/25/2008	7.24	83	0	1	0.36	0.353	-----	1.06	0.02	19.222	0.096	0.051	-----
11/26/2008	7.39	-----	0	1	0.42	0.241	-----	0.67	0.00	19.962	0.252	-----	-----
11/27/2008	7.83	86	0	2	0.50	0.443	0.380	1.01	0.00	19.916	0.109	-----	-----
11/30/2008	7.11	77	0	1	0.30	0.316	-----	1.27	0.00	20.112	0.090	-----	-----
12/1/2008	7.27	-----	0	2	0.29	0.238	-----	1.18	0.00	18.876	0.069	-----	-----
12/2/2008	6.98	96	0	1	0.38	0.348	-----	1.01	0.07	18.170	0.070	0.055	-----
12/3/2008	6.96	-----	0	0	0.37	0.334	0.253	0.69	0.07	19.726	0.079	-----	1.62
12/4/2008	6.9	96	0	1	0.38	0.347	-----	1.01	0.00	20.354	0.125	-----	-----
12/7/2008	6.93	92	0	1	0.43	0.400	-----	0.91	0.02	20.047	0.086	-----	-----
12/8/2008	6.98	-----	0	1	0.33	0.300	-----	1.18	0.17	20.071	0.106	-----	-----
12/9/2008	7	106	0	4	0.43	0.343	-----	1.47	0.19	17.707	0.349	0.255	-----
12/10/2008	7.62	-----	0	2	0.18	0.170	0.110	0.89	0.00	11.363	0.102	-----	-----

TABLE AIV-1 (Continued): MONITORING RESULTS FOR THE FINAL EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH unit	ALKALINITY mg/L	$CBOD_5$ mg/L	SS mg/L	TP mg/L	Sol-P mg/L	Ortho-P mg/L	TKN mg/L	NH_3_N mg/L	NO_3_N mg/L	Tot-Fe mg/L	Sol-Fe mg/L	TURBIDITY NTU
12/11/2008	7.66	167	0	1	0.11	0.089	-----	0.98	0.00	13.230	0.055	-----	-----
12/14/2008	6.89	151	0	2	0.17	0.117	-----	0.91	0.02	13.776	0.101	-----	-----
12/15/2008	7.17	-----	0	3	0.18	0.076	-----	1.01	0.00	8.757	0.133	-----	-----
12/16/2008	7.67	197	0	2	0.09	0.086	-----	0.89	0.00	11.858	0.047	0.023	-----
12/17/2008	7.66	-----	0	1	0.27	0.221	0.071	0.79	0.00	15.020	0.059	-----	-----
12/18/2008	7.72	168	0	1	0.14	0.106	-----	1.30	0.00	16.670	0.059	-----	-----
12/21/2008	7.48	137	0	1	0.21	0.160	-----	1.02	0.02	18.202	0.066	-----	-----
12/22/2008	7.42	-----	0	1	0.21	0.228	-----	1.27	0.00	18.042	0.054	-----	-----
12/23/2008	7.36	134	0	1	0.31	0.280	-----	1.06	0.00	18.232	0.055	0.006	-----
12/24/2008	7.83	-----	0	1	0.26	0.241	-----	0.86	0.00	18.681	0.081	-----	-----
12/25/2008	7.78	134	0	1	0.47	0.432	-----	1.41	0.00	18.013	0.070	-----	-----
12/28/2008	7.79	173	2	6	0.47	0.368	-----	1.23	0.02	6.929	0.175	-----	-----
12/29/2008	7.96	-----	0	1	0.50	0.438	-----	0.87	0.01	8.804	0.059	-----	-----
12/30/2008	8.02	226	0	2	0.60	0.540	-----	0.97	0.00	9.850	0.048	0.040	-----
12/31/2008	7.69	-----	0	1	0.86	0.790	-----	0.74	0.00	11.214	0.052	-----	-----
1/1/2009	7.85	205	0	1	1.03	0.996	-----	1.20	0.02	12.067	0.063	-----	-----
1/4/2009	7.72	179	0	1	2.05	1.961	-----	1.25	0.00	15.618	0.046	-----	-----
1/5/2009	7.77	-----	0	1	1.99	2.014	-----	1.49	0.00	14.986	0.047	-----	-----
1/6/2009	7.56	164	0	2	2.35	2.216	-----	1.17	0.05	16.808	0.064	0.059	-----
1/7/2009	7.51	-----	0	1	2.68	2.515	-----	1.04	0.03	17.465	0.071	-----	-----
1/8/2009	7.57	153	0	1	2.75	2.502	-----	1.13	0.03	18.425	0.068	-----	-----
1/11/2009	7.68	142	0	1	2.77	2.646	-----	1.47	0.03	18.347	0.053	-----	-----
1/12/2009	7.46	-----	0	1	2.98	2.853	-----	1.36	0.01	17.893	0.045	-----	-----
1/13/2009	7.4	136	0	2	3.03	2.816	-----	1.23	0.01	18.268	0.072	0.035	-----
1/14/2009	7.55	-----	0	1	3.49	2.989	-----	0.98	0.01	18.796	0.065	-----	-----
1/15/2009	-----	-----	0	2	3.43	3.255	-----	1.23	0.03	18.931	0.057	-----	-----

TABLE AIV-2: MONITORING RESULTS FOR THE SECONDARY EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH unit	ALKALINITY mg/L	$CBOD_5$ mg/L	SS mg/L	VSS mg/L	TP mg/L	Sol-P mg/L	Ortho-P mg/L	TKN mg/L	NH_3-N mg/L	NO_2-N mg/L	NO_3-N mg/L	Tot-Fe mg/L	Sol-Fe mg/L
1/1/2007	7.63	-----	-----	5	4	3.25	-----	-----	1.36	0.05	0.032	13.7	-----	-----
1/2/2007	7.74	-----	-----	5	4	3.16	-----	-----	1.45	0.12	0.030	13.9	-----	-----
1/3/2007	7.7	-----	-----	5	4	3.23	-----	-----	1.45	0.06	0.029	15.2	-----	-----
1/4/2007	7.72	-----	-----	6	5	3.56	-----	-----	1.75	0.09	0.068	16.3	-----	-----
1/5/2007	7.87	-----	-----	6	4	2.91	-----	-----	1.39	0.06	0.143	14.1	-----	-----
1/6/2007	7.89	-----	-----	6	4	2.75	-----	-----	1.49	0.03	0.027	14.2	-----	-----
1/7/2007	7.77	-----	-----	6	5	3.00	-----	-----	1.53	0.02	0.029	13.4	-----	-----
1/8/2007	7.98	-----	-----	6	5	2.81	-----	-----	1.38	0.09	0.102	13.2	-----	-----
1/9/2007	7.72	-----	-----	6	5	2.81	-----	-----	1.44	0.05	0.023	14.5	-----	-----
1/10/2007	7.72	-----	-----	6	5	3.04	-----	-----	1.50	0.08	0.125	15.8	-----	-----
1/11/2007	7.63	-----	-----	6	5	3.50	-----	-----	1.52	0.08	0.040	17.1	-----	-----
1/12/2007	-----	-----	-----	5	4	3.91	-----	-----	0.99	0.05	0.037	17.5	-----	-----
1/13/2007	7.77	-----	-----	6	4	3.94	-----	-----	1.55	0.04	0.034	16.7	-----	-----
1/14/2007	7.68	-----	-----	5	3	3.46	-----	-----	1.66	0.05	0.030	14.9	-----	-----
1/15/2007	7.65	-----	-----	6	5	1.51	-----	-----	0.89	0.09	0.041	13.5	-----	-----
1/16/2007	7.71	-----	-----	6	5	2.50	-----	-----	1.39	0.05	0.025	12.0	-----	-----
1/17/2007	7.7	-----	-----	6	5	2.61	-----	-----	1.46	0.06	0.017	14.4	-----	-----
1/18/2007	7.63	-----	-----	5	4	2.94	-----	-----	1.41	0.05	0.016	15.8	-----	-----
1/19/2007	7.88	-----	-----	5	3	3.99	-----	-----	1.43	0.11	0.351	15.7	-----	-----
1/20/2007	7.8	-----	-----	5	4	3.76	-----	-----	1.43	0.06	0.029	15.8	-----	-----
1/21/2007	7.63	-----	-----	4	3	3.45	-----	-----	1.43	0.06	0.042	14.5	-----	-----
1/22/2007	7.56	-----	-----	4	2	3.07	-----	-----	1.20	0.05	0.032	14.5	-----	-----
1/23/2007	7.79	-----	-----	4	3	3.27	-----	-----	1.34	0.06	0.032	14.9	-----	-----
1/24/2007	7.58	-----	-----	4	4	3.34	-----	-----		0.11	0.034	16.1	-----	-----
1/25/2007	7.61	-----	-----	5	4	3.70	-----	-----	1.52	1.17	0.033	16.7	-----	-----
1/26/2007	7.99	-----	-----	5	3		-----	-----	1.68	0.09	0.035	15.9	-----	-----
1/27/2007	7.76	-----	-----	4	3		-----	-----	1.41	0.09	0.035	15.7	-----	-----
1/28/2007	7.67	-----	-----	5	3	-----	-----	-----	-----	0.07	0.030	14.2	-----	-----
1/29/2007	7.72	-----	-----	4	3	3.07	-----	-----	1.22	0.12	0.000	13.3	-----	-----

TABLE AIV-2 (Continued): MONITORING RESULTS FOR THE SECONDARY EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH unit	ALKALINITY mg/L	$CBOD_5$ mg/L	SS mg/L	VSS mg/L	TP mg/L	Sol-P mg/L	Ortho-P mg/L	TKN mg/L	NH_3-N mg/L	NO_2-N mg/L	NO_3-N mg/L	Tot-Fe mg/L	Sol-Fe mg/L
1/30/2007	7.58	-----	-----	4	3	3.11	-----	-----	1.32	0.15	0.000	13.6	-----	-----
1/31/2007	7.5	142	3	4	3	3.22	2.366	3.317	1.34	0.05	0.025	15.6	0.047	0.073
2/1/2007	7.48	139	2	3	3	3.28	3.067	-----	1.20	0.12	0.027	17.3	0.056	0.083
2/2/2007	7.85	140	0	3	3	4.07	3.829	-----	1.47	0.18	0.027	18.3	0.064	0.108
2/3/2007	7.75	146	0	3	3	4.05	3.658	-----	1.20	0.09	0.021	17.4	0.103	0.135
2/4/2007	7.7	144	0	3	3	3.95	3.622	-----	1.35	0.06	0.025	15.3	0.072	0.107
2/5/2007	7.54	135	2	5	5	3.35	-----	-----		0.08	0.049	13.6	0.043	0.108
2/6/2007	7.37	121	0	4	4	2.29	2.081	-----	1.38	2.09	0.032	15.2	0.056	0.230
2/7/2007	7.17	104	0	6	4	0.92	0.612	0.459	1.15	0.19	0.000	17.1	0.077	0.440
2/8/2007	7.08	95	0	5	4	0.57	0.353	-----	1.54	0.06	0.024	17.3	0.084	0.558
2/9/2007	7.49	93	2	6	4	0.42	0.240	-----	1.36	0.08	0.028	16.8	0.084	0.594
2/10/2007	7.39	90	2	6	4	0.61	0.404	-----	1.62	0.81	0.022	17.3	0.083	0.606
2/11/2007	7.26	95	0	6	4	0.54	0.324	-----	1.72	0.34	0.024	15.4	0.085	0.621
2/12/2007	7.31	94	2	7	4	0.42	0.222	-----		0.09	0.033	14.9	0.079	0.707
2/13/2007	7.31	90	0	5	3	0.45	0.243	-----	1.31	0.08	0.023	15.0	0.066	0.722
2/14/2007	7.09	83	0	6	4	0.47	0.291	0.147		0.12	0.021	17.2	0.082	0.728
2/15/2007	6.96	80	0	6	4	0.51	0.283	-----	1.40	0.04	0.020	18.2	0.088	0.738
2/16/2007	7.42	79	0	7	4	0.68	0.433	-----	1.51	0.05	0.023	18.1	0.102	0.702
2/17/2007	7.21	75	2	5	3	0.44	0.294	-----	1.52	0.24	0.039	18.1	0.107	0.543
2/18/2007	7.06	76	3	6	3	0.37	0.166	-----	1.57	0.19	0.021	16.8	0.090	0.244
2/19/2007	7.27	77	0	5	3	0.32	0.136	-----	1.22	0.06	0.024	17.2	0.076	0.783
2/20/2007	7.01	83	0	6	4	0.33	0.158	-----	1.38	0.10	0.053	16.3	0.076	0.743
2/21/2007	7.12	86	0	6	4	0.34	0.181	0.112	1.24	0.10	0.031	16.5	0.093	0.886
2/22/2007	7.15	97	2	7	4	0.41	0.166	-----	1.49	0.08	0.147	16.9	0.062	0.818
2/23/2007	7.52	98	0	7	4	0.34	0.141	-----	1.28	0.08	0.022	17.4	0.054	0.551
2/24/2007	7.57	105	0	8	5	0.36	0.161	-----	1.42	0.20	0.030	18.3	0.059	0.000
2/25/2007	7.81	120	2	8	5	0.41	0.181	-----	2.08	0.71	0.224	15.5	0.058	-----
2/26/2007	7.3	113	3	6	4	0.34	0.148	-----	1.61	0.56	0.166	11.8	0.028	0.680
2/27/2007	-----	113	2	6	4	0.32	0.187	-----	1.18	0.13	0.034	14.8	0.037	0.743

TABLE AIV-2 (Continued): MONITORING RESULTS FOR THE SECONDARY EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH unit	ALKALINITY mg/L	$CBOD_5$ mg/L	SS mg/L	VSS mg/L	TP mg/L	Sol-P mg/L	Ortho-P mg/L	TKN mg/L	NH_3-N mg/L	NO_2-N mg/L	NO_3-N mg/L	Tot-Fe mg/L	Sol-Fe mg/L
2/28/2007	7.28	116	0	6	3	0.32	0.139	0.087		0.20	0.051	16.1	0.033	0.813
3/1/2007	7.26	118	3	9	5	0.43	0.173	-----	2.08	0.64	0.248	14.8	0.051	1.006
3/2/2007	7.46	128	4	8	5	1.12	0.122	-----	4.63	0.25	0.087	10.5	0.023	0.880
3/3/2007	7.31	133	0	7	4	0.17	0.084	-----	0.83	0.10	0.029	12.5	0.019	0.709
3/4/2007	6.98	136	3	5	3	0.24	0.087	-----	1.23	0.16	0.072	12.4	0.035	0.659
3/5/2007	7.36	132	3	5	3	0.20	0.095	-----	1.06	0.13	0.042	12.9	0.038	0.589
3/6/2007	7.34	128	2	6	4	0.22	0.083	-----	1.09	0.17	0.056	15.0	0.059	0.693
3/7/2007	7.3	122	0	5	3	0.30	0.109	0.052	0.78	0.15	0.095	17.1	0.068	0.666
3/8/2007	7.06	-----	0	5	4	0.27	-----	-----		0.30	0.043	16.6	0.073	0.627
3/9/2007	7.63	-----	2	6	4	0.27	-----	-----		0.31	0.096	17.0	0.085	0.675
3/10/2007	7.41	-----	0	6	4	0.50	0.264	-----	2.62	1.52	0.338	10.5	0.062	0.688
3/11/2007	8.2	-----	0	6	3	0.30	-----	-----		0.27	0.107	9.6	0.029	0.667
3/12/2007	7.45	-----	2	8	5	0.27	0.104	-----	1.28	0.14	0.048	10.2	0.025	0.645
3/13/2007	7.3	-----	2	8	5	0.28	0.098	-----	1.46	0.40	0.144	10.9	0.033	0.638
3/14/2007	7.45	-----	0	7	4	0.28	0.136	0.055	1.12	0.24	0.079	11.8	0.078	0.626
3/15/2007	7.28	-----	0	7	5	0.28	0.101	-----	1.28	0.12	0.018	13.9	0.077	0.626
3/16/2007	7.7	-----	2	7	5	0.28	0.084	-----	1.23	0.17	0.061	14.8	0.085	0.725
3/17/2007	7.65	-----	2	7	4	0.27	0.082	-----	0.92	0.12	0.000	16.0	0.062	0.638
3/18/2007	7.34	-----	2	6	4	0.37	0.193	-----	1.31	0.14	0.028	15.2	0.047	0.599
3/19/2007	7.23	-----	3	5	4	0.29	0.112	-----	1.28	0.21	0.040	14.4	0.043	0.500
3/20/2007	7.14	-----	0	5	3	-----	0.051	-----	-----	0.30	0.190	15.1	0.038	0.495
3/21/2007	7.14	-----	0	6	4	0.30	0.060	0.08	1.42	0.78	0.227	15.4	0.047	0.771
3/22/2007	7.31	174	2	8	6	0.31	0.117	-----	1.73	0.44	0.106	9.4	0.021	0.615
3/23/2007	7.73	189	0	8	4	0.24	-----	-----	1.35	0.27	0.071	11.6	0.028	0.540
3/24/2007	7.82	187	0	7	5	0.24	0.084	-----	1.32	0.16	0.059	11.9	0.021	0.539
3/25/2007	7.47	182	0	5	3	0.20	0.065	-----	1.24	0.16	0.038	10.9	0.009	0.495
3/26/2007	7.38	177	0	5	3	0.21	0.088	-----	1.04	0.12	0.028	11.4	0.014	0.494
3/27/2007	7.19	165	0	5	2	0.24	0.073	-----	1.25	0.09	0.023	12.6	0.039	0.444
3/28/2007	7.11	158	0	5	4	0.25	0.098	0.068	1.02	0.21	0.052	13.9	0.048	0.519

TABLE AIV-2 (Continued): MONITORING RESULTS FOR THE SECONDARY EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH unit	ALKALINITY mg/L	$CBOD_5$ mg/L	SS mg/L	VSS mg/L	TP mg/L	Sol-P mg/L	Ortho-P mg/L	TKN mg/L	NH_3-N mg/L	NO_2-N mg/L	NO_3-N mg/L	Tot-Fe mg/L	Sol-Fe mg/L
3/29/2007	7.13	157	0	5	4	1.10	0.104	-----	1.30	0.16	0.033	13.8	0.034	0.475
3/30/2007	7.8	160	0	5	3	-----	-----	-----	-----	0.20	0.005	14.1	0.038	0.567
3/31/2007	7.56	154	0	5	3		0.240	-----		0.13	0.015	14.6	0.033	0.589
4/1/2007	7.39	163	0	5	3	-----	-----	-----	-----	0.25	0.080	11.7	0.041	0.664
4/2/2007	7.27	180	0	6	3	0.24	0.099	-----	1.18	0.18	0.030	9.5	0.025	0.541
4/3/2007	7.25	178	0	5	4	0.24	0.126	-----	1.33	0.22	0.048	11.2	0.055	0.580
4/4/2007	7.25	169	0	7	4	0.27	0.108	0.065	0.78	0.28	0.012	13.9	0.072	0.716
4/5/2007	7.35	161	2	7	5	0.29	0.101	-----	1.28	0.11	0.014	16.0	0.053	0.739
4/6/2007	7.86	152	2	7	4	0.26	0.099	-----	1.34	0.17	0.065	15.9	0.041	0.606
4/7/2007	7.69	145	0	6	4	0.29	-----	-----	1.73	0.12	0.016	14.6	0.064	0.614
4/8/2007	7.43	147	0	6	3	0.26	-----	-----	1.27	0.21	0.015	13.0	0.055	0.576
4/9/2007	7.23	141	0	6	4	0.24	0.087	-----	1.38	0.08	0.000	12.9	0.054	0.578
4/10/2007	7	138	0	7	4		-----	-----	1.21	0.13	0.028	15.6	0.061	0.610
4/11/2007	7.13	129	0	7	5		-----	0.079	1.19	0.16	0.023	16.9	0.063	0.869
4/12/2007	7.28	151	3	9	6	0.45	0.157	-----	1.49	0.18	0.075	12.3	0.055	0.837
4/13/2007	7.69	183	0	8	5	0.42	0.133	-----	1.37	-----	0.009	9.2	0.022	0.692
4/14/2007	7.64	195	0	7	4	0.41	0.200	-----	1.17	-----	0.010	10.0	0.026	0.740
4/15/2007	7.44	188	0	5	3	0.32	0.128	-----	1.24	0.16	0.010	10.1	0.020	0.697
4/16/2007	7.06	177	2	5	4	0.26	0.110	-----	1.16	0.09	0.012	11.8	0.011	0.651
4/17/2007	7.14	168	0	5	3	0.28	0.162	-----	1.29	0.06	0.018	14.0	0.044	0.527
4/18/2007	7.14	159	0	6	4	0.33	0.140	0.085	1.17	0.13	0.016	15.3	0.050	0.683
4/19/2007	7.07	147	0	5	3	0.27	0.115	-----	1.48	0.10	0.019	16.1	0.056	0.569
4/20/2007	7.68	141	0	7	4	0.36	0.197	-----	1.45	0.13	0.021	17.4	0.074	0.541
4/21/2007	7.42	135	0	6	4	0.26	0.127	-----	1.33	0.08	0.021	17.0	0.065	0.505
4/22/2007	7.26	130	0	6	4	0.26	0.110	-----	1.55	0.12	0.016	14.7	0.063	0.537
4/23/2007	6.96	132	3	6	4	0.28	0.106	-----	1.31	0.19	0.007	13.9	0.037	0.484
4/24/2007	7	128	4	6	4	0.29	0.133	-----	1.56	0.09	0.001	15.0	0.048	0.534
4/25/2007	6.86	129	4	7	5	0.42	0.195	0.145	0.94	0.10	0.005	14.3	0.045	0.815
4/26/2007	7.16	156	4	7	4	0.33	0.154	-----	1.31	0.07	0.001	11.3	0.039	0.629

TABLE AIV-2 (Continued): MONITORING RESULTS FOR THE SECONDARY EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH unit	ALKALINITY mg/L	$CBOD_5$ mg/L	SS mg/L	VSS mg/L	TP mg/L	Sol-P mg/L	Ortho-P mg/L	TKN mg/L	NH_3-N mg/L	NO_2-N mg/L	NO_3-N mg/L	Tot-Fe mg/L	Sol-Fe mg/L
4/27/2007	7.51	173	3	5	3	0.28	0.127	-----	0.92	0.02	0.004	11.0	0.045	0.541
4/28/2007	7.1	173	0	5	2	0.25	0.139	-----	1.23	0.07	0.005	12.4	0.061	0.589
4/29/2007	7.06	171	2	5	2	0.25	0.127	-----	1.22	0.02	0.004	12.1	0.045	0.534
4/30/2007	7.06	162	3	4	3	0.25	0.128	-----	1.15	0.09	0.002	12.4	0.031	0.519
5/1/2007	7.07	157	3	5	3	0.35	0.164	-----	1.33	0.08	0.000	13.7	0.051	0.516
5/2/2007	6.89	148	3	5	4	0.27	0.143	0.101	0.85	0.00	0.000	14.6	0.039	0.480
5/3/2007	6.88	140	0	4	3	0.39	0.250	-----	1.12	0.04	0.000	15.5	0.048	0.412
5/4/2007	7.16	137	0	4	3		-----	-----	1.35	0.05	0.003	16.1	0.045	0.414
5/5/2007	6.89	132	0	4	3		-----	-----	1.42	0.05	0.003	16.2	0.066	0.501
5/6/2007	-----	126	0	4	3		-----	-----	1.32	0.07	0.001	14.4	0.060	0.458
5/7/2007	-----	121	0	5	3	0.27	0.148	-----	1.29	0.11	0.007	14.7	0.038	0.500
5/8/2007	6.88	118	0	4	2	0.38	0.238	-----	1.29	0.04	0.000	15.4	0.057	0.419
5/9/2007	6.65	112	3	3	2	0.36	0.229	0.216	1.02	0.11	0.005	16.4	0.062	0.412
5/10/2007	6.9	-----	3	3	2	0.38	0.232	-----	1.12	0.06	0.003	16.7	0.078	0.488
5/11/2007	7.4	112	0	5	2	0.46	0.293	-----	1.32	0.03	0.002	16.7	0.110	0.546
5/12/2007	7.32	107	0	4	1	0.52	0.355	-----	1.49	0.03	0.038	16.3	0.105	0.497
5/13/2007	7.15	102	0	5	2	0.49	0.331	-----	1.38	0.03	0.001	15.8	0.072	0.537
5/14/2007	6.86	102	0	4	2	0.42	0.277	-----	1.17	0.09	0.000	15.5	0.062	0.456
5/15/2007	6.78	102	2	4	3	0.44	0.287	-----	1.22	0.00	0.000	15.8	0.068	0.469
5/16/2007	6.93	100	3	4	3	0.48	0.325	0.297	0.95	0.13	0.003	15.4	0.050	0.515
5/17/2007	7.01	103	3	4	3	0.49	0.326	-----	1.19	0.09	0.002	15.7	0.050	0.498
5/18/2007	7.62	104	0	5	3	0.59	0.428	-----	1.01	0.09	0.006	16.6	0.057	0.492
5/19/2007	7.4	100	0	5	3	0.52	0.364	-----	1.39	0.12	0.005	16.8	0.047	0.503
5/20/2007	7.36	103	2	4	2	0.48	0.322	-----	1.27	0.00	-----	-----	0.064	0.491
5/21/2007	7.01	102	3	6	3	0.51	0.383	-----	1.20	0.06	0.000	15.9	0.053	0.581
5/22/2007	6.95	89	3	5	3	0.55	0.318	-----	1.48	0.00	0.005	17.3	0.059	0.774
5/23/2007	6.92	86	4	8	5	0.81	0.517	0.442	1.14	0.13	0.015	17.8	0.063	0.942
5/24/2007	6.84	87	3	6	4	0.73	0.435	-----	1.39	0.09	0.004	17.7	0.079	0.876
5/25/2007	7.31	88	2	5	3	0.71	0.491	-----	1.55	0.14	0.000	17.7	0.077	0.749

TABLE AIV-2 (Continued): MONITORING RESULTS FOR THE SECONDARY EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH unit	ALKALINITY mg/L	$CBOD_5$ mg/L	SS mg/L	VSS mg/L	TP mg/L	Sol-P mg/L	Ortho-P mg/L	TKN mg/L	NH_3-N mg/L	NO_2-N mg/L	NO_3-N mg/L	Tot-Fe mg/L	Sol-Fe mg/L
5/26/2007	7.22	94	3	7	5	0.86	0.537	-----	1.63	0.09	0.004	16.1	0.073	0.918
5/27/2007	7.11	122	0	7	4	0.59	0.299	-----	1.46	0.12	0.003	10.8	0.046	0.822
5/28/2007	7.14	120	3	8	6	0.33	0.191	-----	1.14	0.04	0.001	12.6	0.050	0.775
5/29/2007	7	113	3	6	4	0.50	0.247	-----	1.58	0.08	0.003	13.7	0.061	0.766
5/30/2007	6.96	97	0	6	4	0.45	0.239	0.228	1.16	0.11	0.003	15.2	0.081	0.682
5/31/2007	6.96	92	3	8	5	0.50	0.257	-----	1.04	0.05	0.001	16.2	0.060	0.790
6/1/2007	7.5	90	0	8	5	0.68	0.404	-----	1.36	0.10	0.105	17.5	0.062	0.797
6/2/2007	7.63	94	2	7	5	0.64	0.377	-----	1.64	0.19	0.010	16.3	0.097	0.822
6/3/2007	7.42	98	0	1	1	0.63	0.286	-----	1.48	0.15	0.003	14.6	0.073	0.925
6/4/2007	7.13	99	4	9	6	0.68	0.327	-----	2.38	0.43	0.055	14.2	0.057	0.855
6/5/2007	7.22	119	4	6	4	0.54	0.315	-----	1.33	0.17	0.007	11.3	0.078	0.662
6/6/2007	7.3	129	4	8	5	0.60	0.353	0.33	0.97	0.10	0.000	12.9	0.046	0.825
6/7/2007	7.07	116	3	6	4	0.61	0.383	-----	1.02	0.19	0.005	15.0	0.052	0.700
6/8/2007	7.66	105	3	6	3	0.72	0.515	-----	1.30	0.04	0.003	15.5	0.081	0.611
6/9/2007	7.4	93	3	7	4	0.94	0.699	-----	1.44	0.06	0.006	16.6	0.115	0.763
6/10/2007	7.25	92	3	7	4	0.85	0.616	-----	1.46	0.06	0.005	16.0	0.078	0.773
6/11/2007	6.99	90	3	5	4	0.73	0.512	-----	1.19	0.13	0.012	16.7	0.070	0.668
6/12/2007	7.16	86	0	6	4	0.75	0.500	-----	1.30	0.13	0.012	17.2	0.089	0.739
6/13/2007	7.16	85	3	5	3	0.70	0.470	0.455	1.03	0.09	0.129	16.6	0.076	0.622
6/14/2007	7.04	81	0	5	4	0.61	0.412	-----	1.16	0.09	0.018	16.7	0.099	0.603
6/15/2007	7.46	82	2	6	4	0.60	0.448	-----	1.12	0.06	0.014	17.8	0.087	0.607
6/16/2007	7.39	80	2	5	3	0.80	0.620	-----	1.11	-----	0.024	17.1	0.128	0.622
6/17/2007	7.07	84	2	5	3	0.69	0.502	-----	1.28	0.06	0.014	15.6	0.112	0.562
6/18/2007	6.92	84	3	5	4	0.78	0.573	-----	1.18	0.08	0.008	14.8	0.098	0.655
6/19/2007	7.08	86	3	6	4	0.73	0.532	-----	1.33	0.14	0.009	14.6	0.093	0.755
6/20/2007	7.14	84	3	6	4	-----	-----	0.473	-----	0.09	0.007	15.7	0.092	0.639
6/21/2007	7.51	84	3	6	4	0.93	0.705	-----	1.26	0.11	0.005	16.3	0.086	0.611
6/22/2007	7.38	78	3	5	4	0.86	0.663	-----	1.07	0.06	0.004	17.7	0.067	0.590
6/23/2007	7.42	72	0	6	4	0.75	0.580	-----	1.41	0.05	0.014	18.1	0.110	0.616

TABLE AIV-2 (Continued): MONITORING RESULTS FOR THE SECONDARY EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH unit	ALKALINITY mg/L	$CBOD_5$ mg/L	SS mg/L	VSS mg/L	TP mg/L	Sol-P mg/L	Ortho-P mg/L	TKN mg/L	NH_3-N mg/L	NO_2-N mg/L	NO_3-N mg/L	Tot-Fe mg/L	Sol-Fe mg/L
6/24/2007	7.06	70	2	6	4	0.83	0.622	-----	1.24	0.05		17.8	0.136	0.606
6/25/2007	7.07	73	0	5	3	0.84	0.650	-----	1.22	0.06	0.002	16.7	0.090	0.483
6/26/2007	7.03	70	3	5	3	0.95	0.791	-----	1.29	0.05	0.000	17.3	0.097	0.569
6/27/2007	7.11	73	3	3	3	0.97	0.700	0.703	1.28	0.02	0.016	18.3	0.117	0.548
6/28/2007	7.15	71	3	4	3	0.69	0.552	-----	0.92	0.04	0.002	18.2	0.079	0.489
6/29/2007	7.48	71	3	4	3	0.97	0.800	-----	1.28	0.05	0.001	18.5	0.078	0.538
6/30/2007	7.46	65	2	4	3	1.13	0.901	-----	1.45	0.04	0.000	18.2	0.077	0.503
7/1/2007	7.22	69	0	4	3	0.78	0.613	-----	1.19	0.04	0.002	17.0	0.086	0.587
7/2/2007	7.08	62	2	5	4	0.68	0.523	-----	1.06	0.06	0.000	17.0	0.062	0.561
7/3/2007	7.26	59	3	5	4	0.93	0.741	-----	1.18	0.06	0.000	18.3	0.083	0.568
7/4/2007	7.06	66	3	6	4	0.68	0.534	-----	0.79	0.04	0.005	18.6	0.059	0.413
7/5/2007	7.02	75	3	5	3	0.60	0.338	-----	0.98	0.05	0.003	16.9	0.056	0.585
7/6/2007	7.3	70	3	5	3	0.89	0.675	-----	1.12	0.09	0.006	18.3	0.074	0.601
7/7/2007	7.2	66	3	6	4	0.80	0.584	-----	1.07	0.03	0.000	18.9	0.086	0.684
7/8/2007	7.1	69	2	6	4	0.85	0.612	-----	1.20	0.01	0.000	18.0	0.086	0.682
7/9/2007	6.94	66	3	5	3	0.73	0.517	-----	1.18	0.10	0.005	18.9	0.067	0.579
7/10/2007	6.89	71	3	5	4	0.65	0.446	-----	1.03	0.05	0.000	17.9	0.074	0.637
7/11/2007	7.03	83	0	7	5		0.498	0.5	1.16	0.07	0.004	17.7	0.066	0.823
7/12/2007	6.99	77	0	6	4	0.86	0.564	-----	1.25	0.05	0.003	18.9	0.071	0.809
7/13/2007	7.47	67	0	6	4	0.75	0.463	-----	1.24	0.00	0.004	19.2	0.076	0.826
7/14/2007	7.33	61	0	7	5	0.74	0.443	-----	1.47	0.13	0.003	18.6	0.089	0.922
7/15/2007	7.18	64	0	6	3	0.63	0.399	-----	1.41	0.00	0.002	18.3	0.075	0.804
7/16/2007	6.89	62	0	7	5	0.62	0.432	-----	1.20	-----	0.000	18.0	0.064	0.749
7/17/2007	6.83	64	0	7	5	0.76	0.545	-----	1.32	0.06	0.012	17.5	0.082	0.723
7/18/2007	7.09	68	0	7	4	0.65	0.443	0.384	1.35	0.02	0.003	18.4	0.093	0.713
7/19/2007	7.3	103	0	8	6	0.75	0.472	-----	2.71	1.60	0.149	12.3	0.079	0.962
7/20/2007	7.71	102	3	5	4	0.83	0.602	-----	1.62	0.30	0.027	14.8	0.090	0.620
7/21/2007	7.53	91	0	5	4	0.50	0.363	-----	1.51	0.76	0.015	17.0	0.126	0.517
7/22/2007	7.22	82	3	3	2	0.66	0.503	-----	1.46	0.29	0.011	18.0	0.124	0.537

TABLE AIV-2 (Continued): MONITORING RESULTS FOR THE SECONDARY EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH unit	ALKALINITY mg/L	$CBOD_5$ mg/L	SS mg/L	VSS mg/L	TP mg/L	Sol-P mg/L	Ortho-P mg/L	TKN mg/L	NH_3-N mg/L	NO_2-N mg/L	NO_3-N mg/L	Tot-Fe mg/L	Sol-Fe mg/L
7/23/2007	7.17	74	3	5	4	1.06	0.916	-----	1.36	0.15	0.010	18.2	0.087	0.539
7/24/2007	7.09	76	3	4	3	1.13	0.954	-----	1.55	0.14	0.007	17.8	0.086	0.540
7/25/2007	7.27	85	3	4	3	1.05	0.926	0.847	1.40	0.09	0.011	18.1	0.093	0.454
7/26/2007	7.1	75	3	5	4	1.89	0.773	-----	3.04	0.08	0.005	18.0	0.089	0.262
7/27/2007	7.47	83	3	5	4	0.93	0.796	-----	1.36	0.06	0.002	15.7	0.074	0.448
7/28/2007	7.49	97	3	5	4	1.55	1.397	-----	1.28	0.06	0.110	13.6	0.072	0.430
7/29/2007	7.32	90	3	5	4	1.95	1.657	-----	1.22	0.03	0.000	14.1	0.065	0.505
7/30/2007	7.3	91	4	6	4	1.86	1.653	-----	1.25	0.07	0.000	15.8	0.061	0.577
7/31/2007	7.24	74	3	5	4	1.13	0.955	-----	1.24	0.07	0.000	17.0	0.047	0.613
8/1/2007	7.11	72	4	5	3	1.11	0.898	0.865	1.27	0.04	0.006	18.0	0.110	0.582
8/2/2007	7.11	69	3	6	4	1.27	1.073	-----	1.16	0.03	0.003	18.3	0.101	0.525
8/3/2007	7.52	75	3	4	3	1.15	1.009	-----	1.17	0.04	0.004	17.8	0.195	0.535
8/4/2007	7.46	75	3	6	4	1.15	0.916	-----	1.32	0.05	0.009	17.6	0.102	0.641
8/5/2007	7.36	86	3	8	5	0.95	0.707	-----	1.17	0.04	0.000	15.3	0.100	0.837
8/6/2007	7.29	103	3	7	4	0.56	0.393	-----	1.09	0.07	0.000	11.1	0.077	0.578
8/7/2007	7.36	115	4	10	6	0.67	0.391	-----	1.24	0.07	0.007	11.9	0.066	0.858
8/8/2007	7.6	155	0	8	4	0.40	0.307	0.261	0.51	0.08	0.021	9.8	0.060	0.720
8/9/2007	7.61	162	3	6	4	0.50	0.290	-----	1.12	0.03	0.002	9.4	0.049	0.542
8/10/2007	7.9	157	3	6	4	0.52	0.357	-----	1.32	0.11	0.003	12.1	0.048	0.504
8/11/2007	7.69	136	3	5	3	0.55	0.347	-----	1.39	0.03	0.002	13.8	0.069	0.566
8/12/2007	7.51	124	0	6	4	0.47	0.293	-----	1.13	0.02	0.002	13.9	0.070	0.387
8/13/2007	7.4	115	3	6	4	0.38	0.229	-----	1.05	0.04	0.003	13.6	0.066	0.599
8/14/2007	7.34	107	3	7	4	0.48	0.275	-----	1.17	0.06	0.003	14.8	0.074	0.664
8/15/2007	7.38	116	3	6	4	0.55	0.343	0.287	1.00	0.04	0.004	14.3	0.049	0.708
8/16/2007	7.26	114	3	7	5	0.49	0.306	-----	0.67	0.08	0.042	14.9	0.058	0.687
8/17/2007	7.79	110	3	7	5	0.62	0.371	-----	1.20	0.03	0.001	15.3	0.066	0.818
8/18/2007	7.65	105	2	9	6	0.67	0.389	-----	1.39	0.03	0.004	15.5	0.085	0.901
8/19/2007	7.59	122	3	13	8	0.74	0.287	-----	1.42	0.03	0.003	12.1	0.066	1.429
8/20/2007	7.67	193	3	10	7	0.51	0.178	-----	1.19	0.07	0.004	7.4	0.010	0.803

TABLE AIV-2 (Continued): MONITORING RESULTS FOR THE SECONDARY EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH unit	ALKALINITY mg/L	$CBOD_5$ mg/L	SS mg/L	VSS mg/L	TP mg/L	Sol-P mg/L	Ortho-P mg/L	TKN mg/L	NH_3-N mg/L	NO_2-N mg/L	NO_3-N mg/L	Tot-Fe mg/L	Sol-Fe mg/L
8/21/2007	7.72	217	3	8	6	0.38	0.166	-----	1.23	0.03	0.002	8.2	0.017	0.702
8/22/2007	7.73	201	3	6	4	0.36	0.188	-----	0.93	0.03	0.004	10.0	0.020	0.610
8/23/2007	7.76	185	3	8	5	-----		-----	-----	0.05	0.004	10.6	0.046	0.755
8/24/2007	8.09	209	3	6	4	0.48	0.240	-----	1.18	0.00	0.003	7.6	0.018	0.428
8/25/2007	8.19	291	0	6	4	0.68	0.459	-----	1.10	0.01	0.002	7.9	0.016	0.582
8/26/2007	8.13	198	2	7	4	0.39	0.213	-----	1.16	0.03	0.007	8.6	0.028	0.821
8/27/2007	7.28	191	3	7	4	0.37	0.196	-----	1.10	0.03	0.001	10.5	0.034	0.759
8/28/2007	6.71	172	3	6	4	0.34	0.210	-----	0.95	0.07	0.000	12.6	0.032	0.534
8/29/2007	7.37	157	0	4	3	0.43	0.295	0.273	0.77	0.03	0.017	14.2	0.059	0.340
8/30/2007	7.46	142	0	4	2	0.41	0.285	-----	0.98	0.05	0.016	15.0	0.070	0.169
8/31/2007	7.82	137	0	4	3	0.42	0.294	-----	0.98	0.10	0.000	15.8	0.113	0.489
9/1/2007	7.8	129	0	5	3	0.42	0.281	-----	0.97	0.09	0.000	16.2	0.091	0.507
9/2/2007	7.52	125	2	6	4	0.52	0.328	-----	0.90	0.04	0.000	15.3	0.069	0.603
9/3/2007	7.36	114	0	5	4	0.35	0.212	-----	1.04	0.13		13.6	0.076	0.431
9/4/2007	7.24	108	3	5	3	0.33	0.201	-----	1.04	0.04	0.002	15.4	0.063	0.435
9/5/2007	7.39	99	0	4	3	0.30	0.181	0.151	0.81	0.04	0.004	15.7	0.065	0.471
9/6/2007	7.21	102	0	6	4	0.42	0.305	-----	1.00	0.03		16.2	0.077	0.445
9/7/2007	7.66	103	2	6	4	0.39	0.255	-----	1.01	0.06		15.6	0.079	0.423
9/8/2007	7.6	109	2	5	4	0.44	0.273	-----	0.99	0.05		15.0	0.071	0.501
9/9/2007	7.4	109	0	5	3	0.37	0.259	-----	0.79	0.07	0.004	14.1	0.095	0.425
9/10/2007	7.37	105	2	5	2	-----	-----	-----	-----	0.03	0.040	14.6	0.065	0.191
9/11/2007	7.55	115	3	5	3	0.58	0.403	-----	1.03	0.00	0.003	14.3	0.082	0.577
9/12/2007	7.45	125	0	5	3	0.58	0.421	0.36	0.81	0.05	0.004	14.8	0.075	0.629
9/13/2007	7.43	113	2	5	4	0.56	0.401	-----	0.94	0.00	0.001	16.1	0.095	0.606
9/14/2007	7.91	106	3	5	3	0.56	0.377	-----	1.03	0.00	0.003	16.7	0.089	0.536
9/15/2007	7.75	98	2	5	3	0.55	0.375	-----	1.02	0.00	0.004	17.2	0.137	0.679
9/16/2007	7.7	94	2	6	3	0.45	0.303	-----	0.87	0.01		16.1	0.113	0.654
9/17/2007	7.22	94	0	5	3	0.47	0.289	-----	0.97	0.04	0.002	15.3	0.083	0.568
9/18/2007	7.24	90	3	6	3	0.52	0.378	-----	1.03	0.02	0.003	16.4	0.092	0.535

TABLE AIV-2 (Continued): MONITORING RESULTS FOR THE SECONDARY EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH unit	ALKALINITY mg/L	$CBOD_5$ mg/L	SS mg/L	VSS mg/L	TP mg/L	Sol-P mg/L	Ortho-P mg/L	TKN mg/L	NH_3-N mg/L	NO_2-N mg/L	NO_3-N mg/L	Tot-Fe mg/L	Sol-Fe mg/L
9/19/2007	6.98	89	0	4	2	0.55	0.388	0.367	0.67	0.01		16.2	0.120	0.558
9/20/2007	7.14	88	0	5	2	0.52	0.336	-----	0.86	0.00	0.005	16.2	0.130	0.663
9/21/2007	7.3	87	0	5	3	0.50	0.344	-----	1.00	0.30	0.006	17.0	0.128	0.571
9/22/2007	7.29	91	2	6	4	0.60	0.421	-----	1.13	0.09	0.005	16.3	0.109	0.555
9/23/2007	7.27	96	3	5	4	0.48	0.316	-----	1.07	0.04	0.000	14.3	0.095	0.668
9/24/2007	7.02	90	0	6	4	0.47	0.287	-----	1.19	0.05	0.004	14.5	0.093	0.519
9/25/2007	7.12	88	0	5	3	0.75	0.652	-----	0.81	0.07		15.8	0.087	0.486
9/26/2007	7.21	89	0	-----	-----	1.12	0.936	1.018	0.86	0.04	0.005	16.0	0.087	0.234
9/27/2007	7.03	89	0	4	3	0.84	0.656	-----	1.14	0.53	0.002	16.5	0.061	0.553
9/28/2007	7.31	84	2	6	4	0.81	0.619	-----	1.13	0.00	0.002	17.3	0.089	0.511
9/29/2007	7.17	80	0	6	4	0.68	0.511	-----	1.14	0.00	0.002	17.3	0.085	0.608
9/30/2007	6.79	81	0	6	4	0.59	0.376	-----	0.97	0.00	0.003	16.6	0.088	0.325
10/1/2007	7.02	85	0	4	3	0.48	0.341	-----	0.99	0.16	0.002	14.2	0.080	0.505
10/2/2007	7.18	90	0	4	3	0.45	0.285	-----	1.21	0.05	0.001	14.8	0.066	0.485
10/3/2007	6.89	90	0	4	3	0.42	0.267	0.28	0.45	0.07	0.002	16.4	0.076	0.506
10/4/2007	6.88	91	2	5	4			-----	1.05	0.09	0.003	16.9	0.064	0.493
10/5/2007	7.23	93	0	4	3	0.50	0.336	-----	1.05	0.09	0.000	16.8	0.054	0.493
10/6/2007	7.01	87	3	4	3	0.46	0.317	-----	1.22	0.07	0.000	16.6	0.072	0.423
10/7/2007	6.92	95	0	4	3	0.43	0.279	-----	1.00	0.06	0.000	14.2	0.086	0.508
10/8/2007	6.97	91	2	3	0	0.35	0.241	-----	1.20	0.20	0.012	13.2	0.093	0.521
10/9/2007	7.09	89	3	4	2	0.38	0.238	-----	0.96	-----	0.001	15.2	0.084	0.527
10/10/2007	7.02	80	0	4	3	0.42	0.221	-----	0.91	0.04	0.002	16.8	0.099	0.763
10/11/2007	7.06	78	0	5	3	0.47	0.257	-----	1.08	0.06	0.000	18.3	0.101	0.793
10/12/2007	7.11	75	3	6	4	0.46	0.246	-----	1.27	0.18	0.004	17.7	0.070	0.741
10/13/2007	7.13	78	3	7	4	0.66	0.416	-----	1.57	0.21	0.021	16.6	0.076	0.765
10/14/2007	6.95	80	2	7	4	0.50	0.279	-----	1.42	0.23	0.021	14.9	0.076	0.826
10/15/2007	7.07	78	0	5	3	0.42	0.241	-----	1.13	0.09	0.009	14.0	0.052	0.649
10/16/2007	7.04	78	2	6	4	0.50	0.308	-----	1.04	0.05	0.003	15.5	0.050	0.672
10/17/2007	7	92	3	8	4	0.57	0.377	0.239	1.00	0.08	0.004	15.1	0.038	0.563

TABLE AIV-2 (Continued): MONITORING RESULTS FOR THE SECONDARY EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH unit	ALKALINITY mg/L	$CBOD_5$ mg/L	SS mg/L	VSS mg/L	TP mg/L	Sol-P mg/L	Ortho-P mg/L	TKN mg/L	NH_3-N mg/L	NO_2-N mg/L	NO_3-N mg/L	Tot-Fe mg/L	Sol-Fe mg/L
10/18/2007	7.03	93	2	7	5	0.60	0.346	-----	1.24	0.07	0.006	14.6	0.077	0.549
10/19/2007	7.22	93	3	6	4	0.54	0.402	-----	1.15	0.10	0.001	15.3	0.094	0.538
10/20/2007	7.12	89	0	7	4	0.60	0.449	-----	1.22	0.05	0.004	16.2	0.092	0.668
10/21/2007	6.91	90	3	5	3	0.61	0.403	-----	1.19	0.09	0.005	15.1	0.103	0.679
10/22/2007	6.93	88	2	4	3	0.60	0.391	-----	1.26	0.07		14.6	0.093	0.561
10/23/2007	7.14	93	0	5	4	0.62	0.442	-----	1.22	0.05	0.002	15.9	0.076	0.441
10/24/2007	6.83	78	0	6	4	0.64	0.420	-----	1.07	0.50	0.001	18.5	0.057	0.763
10/25/2007	7.27	84	3	6	4	0.71	0.462	-----	1.20	0.06	0.001	18.9	0.127	0.783
10/26/2007	7.35	83	2	4	4	0.53	0.313	-----	1.03	0.02	0.000	18.2	0.054	0.676
10/27/2007	7.23	89	2	5	4	0.65	0.423	-----	1.18	0.04	0.000	16.9	0.091	0.699
10/28/2007	7.08	89	2	5	4	0.51	0.314	-----	1.19	0.04	0.000	15.0	0.090	0.602
10/29/2007	7.18	90	2	6	4	0.43	0.258	-----	1.13	0.04	0.000	15.3	0.062	0.488
10/30/2007	7.08	83	0	5	4	0.48	0.271	-----	1.09	0.05	0.000	16.6	0.078	0.592
10/31/2007	7.12	82	2	5	4	0.56	0.327	0.272	0.92	-----	0.002	17.6	0.032	0.862
11/1/2007	7.15	83	2	5	3	0.52	0.296	-----	1.36	0.12	0.011	17.5	-----	-----
11/2/2007	7.3	-----	0	7	4	0.55	0.339	-----	0.93	0.11	0.015	18.1	-----	-----
11/3/2007	7.16	-----	0	6	4	0.61	0.390	-----	1.05	0.07	0.025	17.8	-----	-----
11/4/2007	7.02	88	0	6	3	0.61	0.354	-----	1.26	0.06	0.024	15.9	-----	-----
11/5/2007	7.15	-----	-----	5	3	0.47	0.283	-----	1.14	0.08	0.025	15.3	0.091	0.619
11/6/2007	7.1	82	0	5	3	0.48	0.223	-----	1.20	0.06	0.016	15.9	-----	-----
11/7/2007	6.97	-----	-----	7	4	0.44	0.227	0.204	1.22	0.07	0.017	17.0	0.034	0.613
11/8/2007	7.14	85	0	6	3	0.56	0.317	-----	1.43	0.06	0.017	17.5	-----	-----
11/9/2007	7.27	-----	-----	7	4	0.64	0.393	-----	1.26	0.05	0.015	17.3	-----	-----
11/10/2007	7.16	-----	-----	7	3	0.63	0.374	-----	1.63	0.23	0.035	16.9	-----	-----
11/11/2007	7.02	85	0	6	4	0.50	0.319	-----	1.54	0.43	0.043	15.3	-----	-----
11/12/2007	7.17	-----	-----	5	3	0.39	0.184	-----	1.16	0.11		15.6	0.068	0.742
11/13/2007	6.93	77	0	6	3	0.39	0.205	-----	1.24	0.08	0.014	16.3	-----	-----
11/14/2007	6.93	-----	-----	5	3	-----	0.259	0.209	-----	0.08	0.021	18.1	0.123	0.756
11/15/2007	7.02	74	0	6	4	0.45	0.300	-----	1.37	0.11	0.015	18.2	-----	0.146

TABLE AIV-2 (Continued): MONITORING RESULTS FOR THE SECONDARY EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH unit	ALKALINITY mg/L	$CBOD_5$ mg/L	SS mg/L	VSS mg/L	TP mg/L	Sol-P mg/L	Ortho-P mg/L	TKN mg/L	NH_3-N mg/L	NO_2-N mg/L	NO_3-N mg/L	Tot-Fe mg/L	Sol-Fe mg/L
11/16/2007	7.14	-----	-----	8	5	0.52	0.311	-----	0.97	0.06	0.012	17.1	-----	-----
11/17/2007	7.03	-----	-----	8	5	0.49	0.272	-----	1.16	0.08	0.014	16.8	-----	-----
11/18/2007	6.91	76	0	7	5	0.41	0.223	-----	1.13	0.06	0.015	15.7	-----	-----
11/19/2007	7.06	-----	-----	6	4	0.39	0.211	-----	1.31	0.06	0.020	14.1	0.076	0.479
11/20/2007	7.13	73	0	6	4	0.41	0.199	-----	1.31	0.07	0.023	14.9	-----	-----
11/21/2007	7.54	-----	-----	7	4	0.51	0.238	-----	1.26	0.05	0.018	16.2	0.052	0.916
11/22/2007	7.26	101	0	7	5	0.42	0.157	-----	1.25	0.03	0.013	11.9	-----	-----
11/23/2007	7.44	-----	-----	7	4	0.36	0.145	-----	1.17	0.18	0.015	11.9	-----	-----
11/24/2007	7.28	-----	-----	6	4	0.37	0.140	-----	1.31	0.17	0.017	15.4	-----	-----
11/25/2007	7.23	85	0	7	4	0.31	0.158	-----	1.22	0.18	0.017	15.4	-----	-----
11/26/2007	7.17	-----	-----	6	4	0.36	0.162	-----	1.25	0.05	0.015	15.3	0.084	0.615
11/27/2007	7.07	78	0	6	4	0.34	0.173	-----	1.15	0.06	0.018	16.1	-----	-----
11/28/2007	7.23	-----	-----	6	4	0.46	0.229	0.206	1.06	0.07	0.018	17.2	0.063	1.097
11/29/2007	7.26	80	0	7	4	0.47	0.264	-----	1.36	0.06	0.015	17.0	-----	-----
11/30/2007	7.73	-----	-----	-----	-----	0.50	0.256	-----	1.28	0.05	0.030	17.9	-----	-----
12/1/2007	7.71	-----	-----	7	4	0.40	0.232	-----	1.55	0.05	0.014	17.3	-----	-----
12/2/2007	7.69	85	0	12	9	0.39	0.216	-----	1.36	0.03	0.010	15.6	-----	-----
12/3/2007	7.1	-----	-----	6	4	0.34	0.162	-----	1.22	0.06	0.010	12.1	0.039	0.720
12/4/2007	7.7	104	0	7	5	0.48	0.237	-----	1.30	0.07	0.014	14.8	-----	-----
12/5/2007	7.09	-----	-----	5	4	0.44	0.226	0.192	1.08	0.06	0.014	16.1	0.099	0.843
12/6/2007	7.39	94	4	7	4	0.44	0.220	-----		0.07	0.014	16.5	-----	-----
12/7/2007	7.47	-----	-----	8	4	0.43	0.230	-----	1.22	0.06	0.020	17.1	-----	-----
12/8/2007	7.39	-----	-----	7	4	0.44	0.233	-----	1.37	0.05	0.022	17.3	-----	-----
12/9/2007	7.36	88	0	6	1	0.40	0.192	-----	1.29	0.06	0.018	15.8	-----	-----
12/10/2007	7.05	-----	-----	8	4	0.40	0.194	-----	1.44	0.16	0.040	14.9	0.085	0.582
12/11/2007	7.05	86	0	7	5	0.45	0.166	-----	1.20	0.09	0.033	15.9	-----	-----
12/12/2007	7.53	-----	-----	6	4	0.43	0.205	0.18	1.06	0.05	0.031	12.2	0.060	0.759
12/13/2007	7.19	123	0	7	5	0.41	0.177	-----	0.91	0.03	0.014	13.1	-----	-----
12/14/2007	7.34	-----	-----	8	5	0.55	0.289	-----	1.20	0.04	0.010	14.2	-----	-----

TABLE AIV-2 (Continued): MONITORING RESULTS FOR THE SECONDARY EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH unit	ALKALINITY mg/L	$CBOD_5$ mg/L	SS mg/L	VSS mg/L	TP mg/L	Sol-P mg/L	Ortho-P mg/L	TKN mg/L	NH_3-N mg/L	NO_2-N mg/L	NO_3-N mg/L	Tot-Fe mg/L	Sol-Fe mg/L
12/15/2007	7.08	-----	-----	9	6	0.49	0.350	-----	1.13	0.06	0.014	14.8	-----	-----
12/16/2007	7.05	111	0	6	4	0.45	0.224	-----	1.25	0.06	0.099	14.2	-----	-----
12/17/2007	6.98	-----	-----	7	4	0.39	0.191	-----	1.17	0.06	0.007	14.6	0.068	0.730
12/18/2007	7.02	99	0	6	4	0.38	0.199	-----	1.08	0.03	0.010	15.3	-----	-----
12/19/2007	7.05	-----	-----	6	4	0.45	0.247	0.217	1.13	0.12	0.017	16.0	0.067	0.767
12/20/2007	7.03	92	0	7	5	0.46	0.252	-----	1.20	0.07	0.017	16.5	-----	-----
12/21/2007	7.21	-----	-----	6	3	0.45		-----	1.05	0.07	0.016	16.2	-----	-----
12/22/2007	7.18	-----	-----	5	2	0.50	0.229	-----	1.67	0.06	0.048	14.0	-----	-----
12/23/2007	7.35	144	3	9	5	0.46	0.151	-----	1.14	0.03	0.024	8.9	-----	-----
12/24/2007	7.48	-----	-----	8	6	0.31	0.112	-----	0.92	0.06	0.006	9.2	0.037	0.593
12/25/2007	7.5	147	0	7	5	0.27	0.098	-----	0.99	0.05	0.010	10.2	-----	-----
12/26/2007	7.14	-----	-----	6	4	0.31	0.124	-----	0.79	0.05	0.007	12.7	0.024	0.607
12/27/2007	7.19	137	0	7	4	0.35	0.156	-----	1.07	0.00	0.007	13.3	-----	-----
12/28/2007	7.41	-----	-----	6	3	0.36	0.149	-----	0.95	0.05	0.014	13.7	-----	-----
12/29/2007	7.31	-----	-----	6	3	0.37	0.156	-----	1.01	-----	0.014	13.8	-----	-----
12/30/2007	7.21	122	0	7	3	0.40	0.143	-----	1.00	0.43	0.012	13.4	-----	-----
12/31/2007	7.38	-----	-----	8	6	0.37	0.134	-----	0.95	0.03	0.011	13.5	0.126	0.751
1/1/2008	7.49	114	0	7	5	0.31	0.139	-----	0.93	0.03	0.011	13.2	-----	-----
1/2/2008	6.98	-----	-----	6	4		0.141	0.128	0.96	0.00	0.014	14.0	0.033	0.685
1/3/2008	7.11	109	0	8	5	0.38	0.145	-----	0.89	0.04	0.013	15.6	-----	-----
1/4/2008	7.54	-----	-----	8	4	0.38	0.153	-----	1.14	0.06	0.013	16.7	-----	-----
1/5/2008	7.4	-----	-----	8	6	0.37	0.156	-----	1.18	0.09	0.017	16.8	-----	-----
1/6/2008	7.3	126	0	6	3	0.34	0.172	-----	0.95	0.08	0.015	12.5	-----	-----
1/7/2008	7.32	-----	-----	6	4	0.29	0.144	-----	0.99	0.14	0.000	9.8	0.035	0.589
1/8/2008	7.21	156	0	8	5	0.33	0.146	-----	1.22	0.08	0.011	11.2	-----	-----
1/9/2008	-----	-----	-----	8	5	0.42	0.195	0.134	0.97	0.13	0.009	11.0	0.028	0.830
1/10/2008	7.29	164	0	8	5	0.37	0.153	-----	1.27	0.06	0.009	12.5	-----	-----
1/11/2008	-----	-----	-----	9	6	0.38	0.163	-----	1.01	0.07	0.009	11.7	-----	-----
1/12/2008	7.83	-----	-----	8	6	0.40	0.153	-----	1.31	0.06	0.008	11.7	-----	-----

TABLE AIV-2 (Continued): MONITORING RESULTS FOR THE SECONDARY EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH unit	ALKALINITY mg/L	$CBOD_5$ mg/L	SS mg/L	VSS mg/L	TP mg/L	Sol-P mg/L	Ortho-P mg/L	TKN mg/L	NH_3-N mg/L	NO_2-N mg/L	NO_3-N mg/L	Tot-Fe mg/L	Sol-Fe mg/L
1/13/2008	7.76	174	0	8	5	0.40	0.145	-----	1.28	0.20	0.009	11.2	-----	-----
1/14/2008	7.04	-----	-----	7	5	0.37	0.147	-----	1.15	0.03	0.008	11.3	0.042	0.807
1/15/2008	6.96	140	6	8	5	0.41	0.161	-----	1.19	0.07	0.010	13.4	-----	-----
1/16/2008	7.28	-----	-----	7	5	0.38	0.176	0.135	0.87	0.07		15.2	0.019	0.708
1/17/2008	7.16	124	0	8	5	0.41	0.168	-----	0.81	-----	0.012	15.7	-----	-----
1/18/2008	7.55	-----	-----	8	4	0.48	0.235	-----	1.23	0.05	0.042	16.6	-----	-----
1/19/2008	7.35	-----	-----	9	4	0.43	0.267	-----	0.72	0.17	0.019	18.7	-----	-----
1/20/2008	7.39	99	0	9	5	0.45	0.200	-----	1.12	0.05	0.041	17.1	-----	-----
1/21/2008	7.05	-----	-----	7	4	0.35	-----	-----	1.35	0.06	0.054	18.1	0.046	0.814
1/22/2008	6.87	96	0	7	4	0.43	0.202	-----	1.29	0.10	0.012	17.0	-----	-----
1/23/2008	6.95	-----	-----	8	5	0.47	0.241	-----	0.94	0.07	0.015	16.7	0.059	0.838
1/24/2008	6.97	101	0	8	5	0.55	0.293	-----	1.46	0.09	0.013	17.5	-----	-----
1/25/2008	7.2	-----	-----	9	6	0.52	0.241	-----	1.03	0.06		17.3	-----	-----
1/26/2008	7.17	-----	-----	9	6	0.55	0.279	-----	0.70	0.05		17.8	-----	-----
1/27/2008	6.99	94	0	8	4	0.51	0.244	-----	1.32	0.08		17.4	-----	-----
1/28/2008	6.82	-----	-----	11	7	0.52	0.227	-----	1.40	0.08	0.009	18.0	0.068	1.092
1/29/2008	6.82	97	0	8	5	0.47	0.213	-----	1.29	0.07	0.009	17.8	-----	-----
1/30/2008	6.82	-----	-----	9	6	0.56	0.235	0.205	1.39	0.08	0.012	18.3	0.081	1.005
1/31/2008	7.04	100	0	10	6	0.52	0.216	-----	1.32	0.05	0.012	18.9	-----	-----
2/1/2008	7.45	-----	-----	8	6	0.48	0.214	-----	1.25	0.06	0.014	19.4	-----	-----
2/2/2008	7.44	-----	-----	8	5	0.48	0.216	-----	0.93	0.06	0.014	19.6	-----	-----
2/3/2008	7.3	104	0	8	5	0.46	0.219	-----	0.82	0.06	0.012	17.3	-----	-----
2/4/2008	7.2	-----	-----	8	5	0.47	0.226	-----	1.25	-----	0.017	14.6	0.064	0.829
2/5/2008	7.02	115	3	10	6	0.53	0.251	-----	1.27	0.05	0.009	13.6	-----	-----
2/6/2008	6.93	-----	-----	11	7	0.59	0.223	0.188	1.11	0.06	0.006	13.6	0.058	0.245
2/7/2008	7.08	139	0	11	6	0.54	0.189	-----	1.44	0.10	0.003	14.2	-----	-----
2/8/2008	7.17	-----	-----	8	6	-----	0.183	-----	-----	0.10	0.014	15.4	-----	-----
2/9/2008	7.05	-----	-----	11	7	0.56	0.229	-----	1.09	0.07	0.013	16.0	-----	-----
2/10/2008	6.9	139	0	11	7	0.52	0.181	-----	1.03	0.04	0.010	15.3	-----	-----

TABLE AIV-2 (Continued): MONITORING RESULTS FOR THE SECONDARY EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH unit	ALKALINITY mg/L	$CBOD_5$ mg/L	SS mg/L	VSS mg/L	TP mg/L	Sol-P mg/L	Ortho-P mg/L	TKN mg/L	NH_3-N mg/L	NO_2-N mg/L	NO_3-N mg/L	Tot-Fe mg/L	Sol-Fe mg/L
2/11/2008	7.09	-----	-----	11	6	0.56	0.160	-----	1.60	0.06	0.012	15.5	0.055	0.499
2/12/2008	6.95	128	0	10	6	0.61	0.210	-----	1.39	0.04	0.015	17.2	-----	-----
2/13/2008	7.08	-----	-----	10	7	0.53	0.188	-----	1.17	0.15	0.020	18.3	0.062	0.706
2/14/2008	7.11	122	0	10	7	0.50	0.173	-----	1.67	0.07	0.021	18.4	-----	-----
2/15/2008	7.53	-----	-----	12	7	0.46	0.217	-----	1.45	0.07	0.033	17.6	-----	-----
2/16/2008	7.37	-----	-----	13	8	0.92	0.427	-----	1.27	0.08	0.028	17.7	-----	-----
2/17/2008	7.24	116	0	13	8	0.83	0.303	-----	1.21	0.14	0.200	14.2	-----	-----
2/18/2008	7.22	-----	-----	9	6	1.38	1.062	-----	1.27	0.05	0.043	8.3	0.004	0.990
2/19/2008	7.69	167	0	10	7	1.38	1.057	-----	1.29	0.06	0.015	10.8	-----	-----
2/20/2008	7.06	-----	-----	8	6	1.50	1.178	0.093	1.04	0.11	0.036	13.2	0.002	1.055
2/21/2008	6.98	160	0	10	6	0.53	0.340	-----	1.25	0.05	0.015	15.3	-----	-----
2/22/2008	7.28	-----	-----	10	7	0.36	0.177	-----	1.22	0.12	0.019	15.6	-----	-----
2/23/2008	7.13	-----	-----	9	6	0.42	0.164	-----	1.17	0.08	0.019	16.3	-----	-----
2/24/2008	6.99	137	0	8	5	0.39	0.177	-----	1.15	0.08	0.021	14.6	-----	-----
2/25/2008	7.11	-----	-----	8	5	0.41	0.186	-----	1.16	0.08	0.019	13.4	0.035	0.667
2/26/2008	7.13	129	0	7	4	0.40	0.183	-----	1.44	0.31	0.017	15.4	-----	-----
2/27/2008	6.83	-----	-----	7	5	0.45	0.188	0.125	0.96	0.16	0.019	16.3	0.028	0.670
2/28/2008	7.05	120	0	7	5	0.48	0.181	-----	1.37	0.08	0.016	16.9	-----	-----
2/29/2008	7.28	-----	-----	12	7	0.50	0.197	-----	1.48	0.08	0.019	16.8	-----	-----
3/1/2008	7.24	-----	-----	8	5	0.44	0.216	-----	1.20	0.05	0.019	16.2	-----	-----
3/2/2008	7.13	121	0	7	4	0.43	0.220	-----	1.19	0.11	0.202	14.2	-----	-----
3/3/2008	7.3	-----	-----	9	6	0.53	0.226	-----	1.36	0.22	0.441	8.1	0.031	0.720
3/4/2008	7.38	165	0	8	5	0.37	0.129	-----	0.95	0.07	0.066	8.4	-----	-----
3/5/2008	7.21	-----	-----	8	5	0.32	0.108	-----	0.69	0.03	0.014	10.8	0.013	0.664
3/6/2008	7.18	169	0	7	5	0.32	0.139	-----	0.92	0.13	0.026	13.0	-----	-----
3/7/2008	7.48	-----	-----	7	5	0.56	0.157	-----	1.04	0.07	0.017	12.9	-----	-----
3/8/2008	7.42	-----	-----	7	5	0.37	0.318	-----	1.24	0.07	0.030	12.5	-----	-----
3/9/2008	7.28	156	0	7	4	0.34	0.159	-----	0.88	0.04	0.035	11.4	-----	-----
3/10/2008	7.23	-----	-----	7	5	0.33	0.191	-----	0.92	0.13	0.089	11.5	0.044	0.342

TABLE AIV-2 (Continued): MONITORING RESULTS FOR THE SECONDARY EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH unit	ALKALINITY mg/L	$CBOD_5$ mg/L	SS mg/L	VSS mg/L	TP mg/L	Sol-P mg/L	Ortho-P mg/L	TKN mg/L	NH_3-N mg/L	NO_2-N mg/L	NO_3-N mg/L	Tot-Fe mg/L	Sol-Fe mg/L
3/11/2008	7.12	140	0	6	5	0.38	0.194	-----	1.08	0.06	0.020	13.4	-----	-----
3/13/2008	7.1	156	0	13	8	0.38	0.200	-----	1.36	0.22	0.462	12.9	-----	-----
3/14/2008	7.47	-----	-----	7	4	0.38	0.317	-----	1.26	0.12	0.110	12.3	-----	-----
3/15/2008	7.39	-----	-----	7	5	0.58	0.250	-----	1.58	0.05	0.064	11.8	-----	-----
3/16/2008	7.24	166	2	7	4	0.36	0.139	-----	1.20	0.04	0.047	11.3	-----	-----
3/17/2008	7.23	-----	-----	8	5	0.32	0.127	-----	1.16	0.06	0.032	11.6	0.042	0.458
3/18/2008	7.2	158	0	6	4	0.39	0.141	-----	1.38	0.16	0.012	12.8	-----	-----
3/19/2008	7.17	-----	-----	6	4	0.34	0.151	0.113	1.08	0.06	0.014	13.6	0.054	0.684
3/20/2008	7.14	152	0	7	5	0.28	0.150	-----	0.91	0.06	0.016	14.7	-----	-----
3/21/2008	7.39	-----	-----	7	4	0.36	0.144	-----	1.26	0.05	0.015	15.5	-----	-----
3/22/2008	7.26	-----	-----	7	4	0.25		-----	1.09	-----	0.016	13.6	-----	-----
3/23/2008	7.22	150	0	5	3	0.32	0.137	-----	1.08	0.03	0.014	10.9	-----	-----
3/24/2008	7.43	-----	-----	5	3	0.33	0.151	-----	1.03	0.00	0.014	10.8	0.040	0.603
3/25/2008	7.23	166	0	6	4	0.25	0.119	-----	0.92	0.03	0.012	11.8	-----	-----
3/26/2008	7.36	-----	-----	6	4	0.32	0.160	0.119	0.88	0.40	0.012	11.1	0.070	0.603
3/27/2008	7.45	172	0	7	5	0.33	0.116	-----	1.13	0.00	0.011	11.9	-----	-----
3/28/2008	7.44	-----	-----	7	4	0.34	0.122	-----	1.16	0.00	0.014	12.6	-----	-----
3/29/2008	7.42	-----	-----	8	5	0.32	0.101	-----	1.24	0.00	0.022	12.2	-----	-----
3/30/2008	7.23	174	0	7	4	0.20	0.095	-----	1.04	0.02	0.017	10.9	-----	-----
3/31/2008	7.26	-----	-----	6	4	0.32	0.114	-----	1.18	0.14	0.063	10.8	0.057	0.657
4/1/2008	7.4	180	0	9	6	0.42		-----	1.26	0.03	0.085	8.6	-----	-----
4/2/2008	7.32	-----	-----	6	4	0.26	0.138	0.101	0.87	0.04	0.035	10.7	0.012	0.476
4/3/2008	7.34	178	0	6	4	0.25	0.109	-----	0.99	0.00	0.020	12.4	-----	-----
4/4/2008	7.49	-----	-----	7	4	0.52	0.323	-----	1.17	0.09	0.062	12.2	-----	-----
4/5/2008	7.3	-----	-----	6	4	0.36	0.232	-----	1.14	0.10	0.013	12.5	-----	-----
4/6/2008	7.19	163	0	6	3	0.25	0.170	-----	1.12	0.10	0.014	11.7	-----	-----
4/7/2008	7.09	-----	-----	5	3			-----	1.12	0.03	0.015	12.6	0.077	0.503
4/8/2008	7.21	147	0	6	4	0.32	0.146	-----	1.12	0.20	0.014	14.2	-----	-----
4/9/2008	7.53	-----	-----	6	4	0.42	0.182	0.166	1.15	0.16		11.4	0.039	0.603

TABLE AIV-2 (Continued): MONITORING RESULTS FOR THE SECONDARY EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH unit	ALKALINITY mg/L	$CBOD_5$ mg/L	SS mg/L	VSS mg/L	TP mg/L	Sol-P mg/L	Ortho-P mg/L	TKN mg/L	NH_3-N mg/L	NO_2-N mg/L	NO_3-N mg/L	Tot-Fe mg/L	Sol-Fe mg/L
4/10/2008	7.17	176	0	8	4	0.40	0.200	-----	1.08	0.11	0.108	11.2	-----	-----
4/11/2008	7.52	-----	-----	7	4	0.35	0.169	-----	1.03	0.07	0.034	8.3	-----	-----
4/12/2008	7.44	-----	-----	5	4	0.34	0.130	-----	1.23	0.10	0.016	9.7	-----	-----
4/13/2008	7.33	192	0	5	3	0.22	0.106	-----	0.89	0.04	0.009	8.5	-----	-----
4/14/2008	7.23	-----	-----	5	3	0.26	0.107	-----	1.03	0.06	0.010	8.9	0.035	0.510
4/15/2008	7.23	185	0	5	3	0.29	0.108	-----	1.17	0.04	0.019	10.6	-----	-----
4/16/2008	6.94	-----	-----	5	3		0.169	0.132	1.13	0.07	0.029	12.8	0.056	0.679
4/17/2008	7.08	172	0	5	3	0.31	0.236	-----	0.99	0.08	0.061	14.5	-----	-----
4/18/2008	7.61	-----	-----	5	3	0.37	0.201	-----	1.32	0.07	0.019	15.3	-----	-----
4/19/2008	7.59	-----	-----	5	3	0.35	0.191	-----	1.23	0.05	0.019	15.7	-----	-----
4/20/2008	7.42	148	0	4	3	0.33	0.180	-----	1.26	0.12	0.015	13.7	-----	-----
4/21/2008	7.2	-----	-----	4	3	0.32	0.168	-----	1.07	0.04	0.019	13.7	0.055	0.615
4/22/2008	7.1	139	0	5	3	0.32	0.209	-----	1.00	0.05		15.0	-----	-----
4/23/2008	7	-----	-----	4	3	0.38	0.230	<0.025000000	0.93	0.06	0.007	15.3	0.082	0.426
4/24/2008	6.98	131	0	6	3	0.42	0.250	-----	1.45	0.21	0.003	16.3	-----	-----
4/25/2008	7.4	-----	-----	-----	-----	0.44	0.253	-----	1.39	0.00	0.004	17.1	-----	-----
4/26/2008	7.45	-----	-----	9	5	0.48	0.262	-----	1.34	0.03	0.004	14.9	-----	-----
4/27/2008	7.3	174	0	-----	-----	0.36	0.228	-----	1.18	0.05	0.000	13.2	-----	-----
4/28/2008	7.21	-----	-----	6	4	0.46	0.216	-----	1.16	0.05	0.003	14.6	0.039	0.852
4/29/2008	7.48	149	0	5	4	0.46	0.231	-----	1.10	0.12	0.001	12.4	-----	-----
4/30/2008	7.02	-----	-----	6	4	0.44	0.247	<0.025000000	1.00	0.40	0.004	12.5	0.075	0.662
5/1/2008	7.13	150	0	7	4		0.202	-----	1.17	0.06	0.000	14.2	-----	-----
5/2/2008	7.44	-----	-----	6	3	0.33	0.221	-----	1.40	-----	0.000	15.3	-----	-----
5/3/2008	7.42	-----	-----	6	3	0.44	0.235	-----	1.23	0.11	0.002	13.4	-----	-----
5/4/2008	7.1	149	0	6	3	0.42	0.193	-----	1.03	0.10	0.000	12.8	-----	-----
5/5/2008	7.39	-----	-----	5	4	0.41	0.249	-----	1.07	0.05	0.002	13.0	0.045	0.441
5/6/2008	7.3	134	0	8	5	0.45	0.274	-----	1.20	0.00	0.000	15.2	-----	-----
5/7/2008	7.08	-----	-----	6	4	0.55	0.340	0.08	1.00	0.06	0.004	17.3	0.072	0.606
5/8/2008	7.02	141	0	8	5	0.63	0.342	-----	1.49	0.06	0.000	13.7	-----	-----

TABLE AIV-2 (Continued): MONITORING RESULTS FOR THE SECONDARY EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH unit	ALKALINITY mg/L	$CBOD_5$ mg/L	SS mg/L	VSS mg/L	TP mg/L	Sol-P mg/L	Ortho-P mg/L	TKN mg/L	NH_3-N mg/L	NO_2-N mg/L	NO_3-N mg/L	Tot-Fe mg/L	Sol-Fe mg/L
5/9/2008	7.5	-----	-----	6	4	0.45	0.223	-----	1.25	0.08	0.001	14.3	-----	-----
5/10/2008	7.39	-----	-----	6	4	0.60	0.349	-----	1.36	0.07	0.001	15.6	-----	-----
5/11/2008	7.22	148	3	8	5	0.57	0.248	-----	1.38	0.13	0.003	13.9	-----	-----
5/12/2008	7.28	-----	-----	-----	-----	0.41	0.211	-----	1.12	0.01	0.002	9.7	0.029	0.780
5/13/2008	7.35	171	3	7	4	0.47	0.272	-----	1.05	0.01	0.000	12.5	-----	-----
5/14/2008	7.07	-----	-----	5	4	0.51	0.300	0.235	0.84	0.06	0.002	14.8	0.053	0.633
5/15/2008	7.15	149	0	6	4	0.43	0.331	-----	1.28	0.03	0.002	15.0	-----	-----
5/16/2008	7.45	-----	-----	6	3	0.58	0.352	-----	1.33	0.07	0.001	15.7	-----	-----
5/17/2008	7.24	-----	-----	6	3	0.60	0.389	-----	1.34	0.05	0.003	15.7	-----	-----
5/18/2008	7.03	126	3	6	3	0.54	0.366	-----	1.31	0.05	0.003	16.2	-----	-----
5/19/2008	7.04	-----	-----	7	4	0.53	0.335	-----	1.34	-----	0.003	16.7	0.093	0.732
5/20/2008	7.05	121	4	6	4	0.61	0.387	-----	0.22	0.12	0.000	16.9	-----	-----
5/21/2008	7.01	-----	-----	8	4	0.83	0.531	0.472	1.10	0.05		16.8	0.097	0.717
5/22/2008	7.21	117	3	6	4	0.90	0.678	-----	0.09	0.05	0.003	17.5	-----	-----
5/23/2008	7.34	-----	-----	6	4	0.92	0.683	-----	1.30	0.06	0.005	19.4	-----	-----
5/24/2008	7.29	-----	-----	5	3	0.92	0.682	-----	1.43	0.05	0.000	19.7	-----	-----
5/25/2008	7.14	101	0	5	3	0.83	0.627	-----	1.33	0.05	0.000	18.2	-----	-----
5/26/2008	7.03	-----	-----	5	3	0.78	0.563	-----	1.40	0.10	0.004	17.3	0.092	0.404
5/27/2008	7.01	120	0	4	3	0.70	0.486	-----	1.35	0.03	0.000	14.6	-----	-----
5/28/2008	7.09	-----	-----	4	3	0.98	0.783	0.682	1.17	0.08	0.000	18.1	0.165	0.508
5/29/2008	6.79	103	0	5	3	0.99	0.834	-----	1.31	0.02	0.000	19.4	-----	-----
5/30/2008	7.34	-----	-----	4	3	1.06	0.843	-----	1.26	0.04	0.002	19.1	-----	-----
5/31/2008	7.27	-----	-----	5	2	1.01	0.859	-----	1.37	0.17	0.001	18.3	-----	-----
6/1/2008	7.17	111	0	4	2	0.95	0.887	-----	1.32	0.04	0.000	16.7	-----	-----
6/2/2008	7.23	-----	-----	4	2	0.92	0.751	-----	1.28	0.05	0.001	17.4	0.094	0.321
6/3/2008	6.78	97	0	4	2	-----	-----	-----	-----	0.08	0.000	18.5	-----	-----
6/4/2008	6.87	-----	-----	5	3	1.10	0.897	-----	1.05	0.19	0.004	17.2	0.095	0.389
6/5/2008	7.07	176	0	4	3	1.18	0.997	-----	1.25	0.03		17.3	-----	-----
6/6/2008	7.43	-----	-----	4	3	1.06	0.883	-----	1.06	0.05	0.000	17.5	-----	-----

TABLE AIV-2 (Continued): MONITORING RESULTS FOR THE SECONDARY EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH unit	ALKALINITY mg/L	$CBOD_5$ mg/L	SS mg/L	VSS mg/L	TP mg/L	Sol-P mg/L	Ortho-P mg/L	TKN mg/L	NH_3-N mg/L	NO_2-N mg/L	NO_3-N mg/L	Tot-Fe mg/L	Sol-Fe mg/L
6/7/2008	7.24	-----	-----	3	2	0.95	0.791	-----	1.22	0.05	0.000	16.9	-----	-----
6/8/2008	7.02	101	0	4	3	0.91	0.709	-----	1.25	0.06	0.033	15.9	-----	-----
6/9/2008	7.04	-----	-----	5	3	0.82	0.552	-----	1.41	0.06	0.013	12.4	0.076	0.521
6/10/2008	7.03	171	0	3	2	0.45	0.309	-----	0.94	0.04	0.003	11.4	-----	-----
6/11/2008	7.18	-----	-----	4	3	0.53	0.409	0.368	0.94	0.03	0.001	15.0	0.051	0.268
6/12/2008	6.89	148	0	2	2	0.66	0.495	-----	1.19	0.05	0.000	17.2	-----	-----
6/13/2008	7.4	-----	-----	2	2	0.79	0.679	-----	1.02	0.06	0.000	18.0	-----	-----
6/14/2008	7.33	-----	-----	2	2	0.93	0.820	-----	1.47	0.09	0.000	17.1	-----	-----
6/15/2008	6.9	119	0	3	2	0.76	0.662	-----	1.10	0.06	0.000	17.1	-----	-----
6/16/2008	6.85	-----	-----	3	2	0.68	0.614	-----	0.95	0.05		17.6	0.056	0.205
6/17/2008	6.93	107	0	2	2	0.79	0.692	-----	1.09	0.04	0.000	18.9	-----	-----
6/18/2008	6.9	-----	-----	3	2	1.44	0.459	0.786	1.41	0.13	0.001	19.6	0.097	0.284
6/19/2008	6.83	101	0	3	2	1.10	1.027	-----	0.91	0.07	0.000	20.0	-----	-----
6/20/2008	7.1	-----	-----	4	3	1.35	1.126	-----	1.13	0.08	0.000		-----	-----
6/21/2008	7.08	-----	-----	4	2	1.16	0.994	-----	1.10	0.03	0.000		-----	-----
6/22/2008	6.92	91	0	3	2	0.99	0.860	-----	0.94	0.05	0.000	19.4	-----	-----
6/23/2008	6.77	-----	-----	4	3	0.94	0.818	-----	0.77	0.10	0.000		0.032	0.264
6/24/2008	6.83	76	0	4	3	0.98	0.830	-----	1.20	0.05	0.000		-----	-----
6/25/2008	6.73	-----	-----	4	3	1.19	1.018	0.934	1.29	0.15	0.000	23.9	0.109	0.348
6/26/2008	6.9	89	0	4	2	1.26	1.258	-----	1.40	0.01	0.003	22.5	-----	-----
6/27/2008	7.29	-----	-----	4	2	1.14	0.980	-----	1.28	0.04	-----	-----	-----	-----
6/28/2008	7.18	-----	-----	4	3	1.21	0.977	-----	1.46	0.08	0.002		-----	-----
6/29/2008	6.82	76	0	4	3	0.90	0.705	-----	1.41	0.13	0.002		-----	-----
6/30/2008	6.79	-----	-----	5	3	0.66	0.467	-----	1.52	0.02	0.002	19.0	0.063	0.463
7/1/2008	7.35	115	0	6	4	0.78	0.487	-----	1.55	0.06	0.002		-----	-----
7/2/2008	7.06	-----	-----	6	4	0.76	0.511	0.457	1.64	0.14	0.023		0.138	0.681
7/3/2008	6.89	-----	0	6	4	0.79	0.570	-----	1.64	0.07	0.011		-----	-----
7/4/2008	7.38	-----	-----	5	3	0.62	0.459	-----	1.20	0.03	0.002	19.5	-----	-----
7/5/2008	7.17	-----	-----	4	2	0.56	0.427	-----	1.38	0.04	0.001	18.8	-----	-----

TABLE AIV-2 (Continued): MONITORING RESULTS FOR THE SECONDARY EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH unit	ALKALINITY mg/L	$CBOD_5$ mg/L	SS mg/L	VSS mg/L	TP mg/L	Sol-P mg/L	Ortho-P mg/L	TKN mg/L	NH_3-N mg/L	NO_2-N mg/L	NO_3-N mg/L	Tot-Fe mg/L	Sol-Fe mg/L
7/6/2008	6.89	-----	0	3	2	0.46	0.303	-----	1.32	0.08	0.001	19.1	-----	-----
7/7/2008	7.14	-----	-----	5	4	0.46	0.319	-----	1.36	0.08	0.005	19.9	0.046	0.380
7/8/2008	7.19	-----	0	4	3	0.53	0.366	-----	1.29	0.06	0.004		-----	-----
7/9/2008	7.21	-----	-----	4	3	0.63	0.507	0.378	1.39	0.20	0.010		0.107	0.364
7/10/2008	7.11	76	0	5	3	0.69	0.549	-----	1.98	0.54	0.094		-----	-----
7/11/2008	7.48	-----	-----	4	3	0.69	0.517	-----	2.14	0.69	0.181	19.1	-----	-----
7/12/2008	7.31	-----	-----	6	4	0.57	0.331	-----	2.33	0.52	0.176	14.9	-----	-----
7/13/2008	7.22	126	0	5	3	0.32	0.167	-----	1.57	0.21	0.052	12.3	-----	-----
7/14/2008	7.08	-----	-----	5	4	0.42	0.317	-----	1.46	0.19	0.086	15.4	0.061	0.351
7/15/2008	7.01	108	10	5	4	0.58	0.353	-----	1.60	0.15	0.020	17.0	-----	-----
7/16/2008	7.14	-----	-----	5	3	1.43	1.258	0.534	1.61	0.11	0.009	17.4	0.094	0.412
7/17/2008	6.98	91	0	4	4	0.98	0.826	-----	1.62	0.10	0.008	17.9	-----	-----
7/18/2008	7.24	-----	-----	5	4	0.88	0.711	-----	1.54	0.10	0.014	19.3	-----	-----
7/19/2008	7.31	-----	-----	9	7	0.87	0.782	-----	2.09	0.45	0.099	12.0	-----	-----
7/20/2008	7.47	187	0	6	4	0.67	0.497	-----	1.25	0.12	0.000	7.5	-----	-----
7/21/2008	7.74	-----	-----	4	4	0.85	0.747	-----	1.07	0.06	0.003	9.1	0.047	0.261
7/22/2008	7.64	163	0	6	3	0.67	0.458	-----	1.03	0.04	0.003	13.3	-----	-----
7/23/2008	7.21	-----	-----	10	4	0.71	0.355	0.06	0.98	0.06	0.002	15.8	0.041	2.561
7/24/2008	7.33	133	0	5	3	0.61	0.408	-----	1.22	0.01	0.001	17.0	-----	-----
7/25/2008	7.68	-----	-----	3	2	1.45	1.393	-----	1.18	0.03	0.003	18.9	-----	-----
7/26/2008	7.62	-----	-----	3	2	1.45	1.418	-----	1.22	0.03	0.004	18.5	-----	-----
7/27/2008	7.33	97	0	3	2	1.40	1.336	-----	0.99	0.03	0.003	18.3	-----	-----
7/28/2008	6.96	-----	-----	2	1	1.39	1.279	-----	1.08	0.08	0.003	18.4	0.077	0.229
7/29/2008	7.05	88	0	2	2	0.63	0.534	-----	1.19	0.00	0.002	19.3	-----	-----
7/30/2008	7.26	-----	-----	4	3	0.72	0.600	-----	1.07	0.00	0.004	19.5	0.083	0.255
7/31/2008	7.19	80	0	3	1	0.67	0.560	-----	1.26	0.06	0.033	19.7	-----	-----
8/1/2008	7.24	-----	-----	5	4	0.42	0.286	-----	1.22	0.02	0.003	18.2	-----	-----
8/2/2008	7.1	-----	-----	6	0	0.37	0.277	-----	1.17	0.05	0.002	16.7	-----	-----
8/3/2008	6.67	87	6	6	4	0.41	0.286	-----	1.24	0.00	0.001	17.7	-----	-----

TABLE AIV-2 (Continued): MONITORING RESULTS FOR THE SECONDARY EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH unit	ALKALINITY mg/L	$CBOD_5$ mg/L	SS mg/L	VSS mg/L	TP mg/L	Sol-P mg/L	Ortho-P mg/L	TKN mg/L	NH_3-N mg/L	NO_2-N mg/L	NO_3-N mg/L	Tot-Fe mg/L	Sol-Fe mg/L
8/4/2008	7.09	-----	-----	5	3	0.47	0.338	-----	1.39	0.10	0.004	17.7	0.054	0.374
8/5/2008	7.45	131	0	6	4	-----	-----	-----	-----	0.19	0.014	11.3	-----	-----
8/6/2008	7.57	-----	-----	6	4	0.49	0.329	0.198	0.98	0.02	0.000	11.9	0.087	0.402
8/7/2008	7.58	130	0	6	4	0.52	0.374	-----	1.30	0.02	0.000	15.0	-----	-----
8/8/2008	7.45	-----	-----	6	4	0.70	0.512	-----	1.24	0.03	0.001	17.9	-----	-----
8/9/2008	7.21	-----	-----	8	5	0.70	0.502	-----	1.27	0.04	0.000	18.3	-----	-----
8/10/2008	7.21	121	0	6	4	1.09	0.826	-----	1.39	0.03	0.000	17.1	-----	-----
8/11/2008	7.51	-----	-----	6	5	1.41	1.143	-----	1.28	0.02	0.001	16.2	0.073	0.314
8/12/2008	7.36	104	0	5	3	1.26	1.007	-----	1.30	-----	0.001	18.3	-----	-----
8/13/2008	7.11	-----	-----	5	3	1.09	0.887	0.696	1.11	0.07	0.001	19.6	0.075	0.327
8/14/2008	-----	71	0	5	4	0.85	0.652	-----	1.35	0.14	0.000		-----	-----
8/15/2008	7.06	-----	-----	5	3	0.84	0.645	-----	1.22	0.04	0.001		-----	-----
8/16/2008	6.99	-----	-----	5	3	1.22	0.993	-----	1.28	0.05	0.000	19.5	-----	-----
8/17/2008	6.87	76	0	4	3	0.88	0.704	-----	1.20	0.03	0.000	19.4	-----	-----
8/18/2008	7.09	-----	-----	5	4	0.73	0.521	-----	1.21	0.05	0.000		0.062	0.762
8/19/2008	7.05	67	0	6	3	0.71	0.450	-----	1.15	0.00	0.001		-----	-----
8/20/2008	6.77	-----	-----	6	3	0.76	0.523	0.323	1.04	0.05	0.000	22.3	0.039	1.012
8/21/2008	7.06	72	0	5	3	0.56	0.422	-----	1.28	0.15	0.000	21.9	-----	-----
8/22/2008	7.04	-----	-----	4	3	0.70	0.550	-----	1.23	0.03	-----	-----	-----	-----
8/23/2008	6.92	-----	-----	4	3	0.65	0.515	-----	1.19	0.04	0.000	19.3	-----	-----
8/24/2008	6.76	70	0	4	3	0.61	0.485	-----	1.33	0.01	0.000	18.6	-----	-----
8/25/2008	7.06	-----	-----	4	3	0.55	0.383	-----	1.30	0.09	0.001	18.3	0.075	0.371
8/26/2008	6.95	69	0	4	3	0.55	0.397	-----	1.27	0.06	0.001	18.4	-----	-----
8/27/2008	6.69	-----	-----	4	3	0.72	0.580	-----	0.99	0.14	0.002	19.6	0.090	0.251
8/28/2008	-----	65	0	5	4	0.79	0.638	-----	1.28	0.03	0.000	19.3	-----	-----
8/29/2008	7.47	-----	-----	4	2	0.84	0.845	-----	1.39	0.07	0.002		-----	-----
8/30/2008	7.43	-----	-----	5	3	0.92	0.934	-----	1.24	0.04	0.000	19.9	-----	-----
8/31/2008	7.38	61	0	4	2	0.74	0.631	-----	1.12	0.04	0.002	19.5	-----	-----
9/1/2008	6.72	-----	-----	4	3	0.69	0.548	-----	1.24	0.04	0.000	19.4	0.070	0.291

TABLE AIV-2 (Continued): MONITORING RESULTS FOR THE SECONDARY EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH unit	ALKALINITY mg/L	$CBOD_5$ mg/L	SS mg/L	VSS mg/L	TP mg/L	Sol-P mg/L	Ortho-P mg/L	TKN mg/L	NH_3-N mg/L	NO_2-N mg/L	NO_3-N mg/L	Tot-Fe mg/L	Sol-Fe mg/L
9/2/2008	7.46	59	0	5	5	0.58	0.446	-----	1.35	0.03	0.001	19.1	-----	-----
9/3/2008	7.12	-----	-----	5	1	0.62	0.478	0.439	1.29	0.09	0.000	19.2	0.067	0.334
9/4/2008	7.19	60	2	9	6	0.75	0.464	-----	1.76	0.06	0.002	19.3	-----	-----
9/5/2008	7.49	-----	-----	7	5	0.45	0.254	-----	1.35	0.09	0.002	9.5	-----	-----
9/6/2008	7.52	-----	-----	5	3	0.47	0.330	-----	1.10	0.12	0.000	12.3	-----	-----
9/7/2008	7.2	115	0	3	3	0.40	0.274	-----	0.95	0.07	0.000	14.6	-----	-----
9/8/2008	7.33	-----	-----	6	5	0.44	0.260	-----	1.19	0.12	0.010		0.070	0.372
9/9/2008	7.58	118	0	3	2	0.37	0.243	-----	1.31	0.03	0.001		-----	-----
9/10/2008	7.43	-----	-----	4	3	0.45	0.325	0.258	0.59	0.04	0.001	16.5	0.084	0.267
9/11/2008	7.55	112	0	4	3	0.57	0.360	-----	1.49	0.08	0.004	17.9	-----	-----
9/12/2008	7.9	-----	-----	4	3	0.49	0.378	-----	1.21	0.09	0.000	18.9	-----	-----
9/13/2008	7.94	-----	-----	6	4	0.61	0.419	-----	1.29	0.04	0.001	15.4	-----	-----
9/14/2008	8.09	203	4	9	7	0.44	0.246	-----	0.98	0.03	0.000	5.6	-----	-----
9/15/2008	7.96	-----	-----	7	4	0.39	0.223	-----	1.13	0.00	0.002	7.9	0.024	0.415
9/16/2008	7.92	221	0	3	2	0.31	0.192	-----	0.99	0.03	0.001	9.8	-----	-----
9/17/2008	7.86	-----	-----	3	2	0.35	0.262	0.175	0.76	0.09		12.1	0.060	0.261
9/18/2008	7.88	193	0	3	3	0.38	0.289	-----	1.11	0.04	0.000	13.5	-----	-----
9/19/2008	7.87	-----	-----	3	2	0.42	0.385	-----	0.95	0.03	0.002	14.6	-----	-----
9/20/2008	7.72	-----	-----	3	1	0.48	0.369	-----	1.00	0.06	0.000	15.4	-----	-----
9/21/2008	7.65	134	0	4	2	0.37	-----	-----	1.08	0.03	0.000	15.3	-----	-----
9/22/2008	7.52	-----	-----	3	2	0.24	0.170	-----	0.91	0.02	0.002	16.5	0.072	0.236
9/23/2008	7.43	113	0	3	2	0.30	0.164	-----	2.69	0.00	0.000	17.8	-----	-----
9/24/2008	7.35	-----	-----	3	3	0.33	0.235	0.158	0.92	0.02	0.001	18.8	0.082	0.100
9/25/2008	7.39	115	0	2	2	0.28	0.201	-----	1.47	0.02	0.000	17.4	-----	-----
9/26/2008	7.5	-----	-----	3	2	0.29	0.207	-----	1.05	0.02	0.000	17.6	-----	-----
9/27/2008	7.41	-----	-----	4	3	0.29	0.223	-----	1.12	0.00	0.002	18.2	-----	-----
9/28/2008	7.17	112	0	4	3	0.30	0.235	-----	1.23	0.02	0.002	18.1	-----	-----
9/29/2008	7.08	-----	-----	5	3	0.31	0.188	-----	1.23	0.07	0.000	17.1	0.025	0.238
9/30/2008	7.03	127	0	4	3	0.29	0.187	-----	1.09	0.04	0.000	14.0	-----	-----

TABLE AIV-2 (Continued): MONITORING RESULTS FOR THE SECONDARY EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH unit	ALKALINITY mg/L	$CBOD_5$ mg/L	SS mg/L	VSS mg/L	TP mg/L	Sol-P mg/L	Ortho-P mg/L	TKN mg/L	NH_3-N mg/L	NO_2-N mg/L	NO_3-N mg/L	Tot-Fe mg/L	Sol-Fe mg/L
10/1/2008	7.03	-----	-----	4	3	0.38	0.283	0.198	0.79	0.01	0.000	16.1	0.030	0.227
10/2/2008	7.07	127	0	4	3			-----	1.22	0.04	0.000	17.2	-----	-----
10/3/2008	7.61	-----	-----	3	2	0.49	0.391	-----	1.14	0.03	0.003	18.5	-----	-----
10/4/2008	7.61	-----	-----	4	2	0.58	0.460	-----	1.06	0.01	0.003	19.0	-----	-----
10/5/2008	7.05	100	0	3	3	0.42	0.359	-----	1.30	0.01	0.002	18.6	-----	-----
10/6/2008	7.08	-----	-----	3	2	0.38	0.285	-----	1.19	0.05	0.002	18.4	0.040	0.198
10/7/2008	7.4	95	3	5	4	0.39	0.282	-----	1.27	0.02	0.000	19.6	-----	-----
10/8/2008	7.04	-----	-----	5	4	0.41	0.274	0.205	1.20	0.00	0.002	14.6	0.083	0.591
10/9/2008	7.33	150	0	3	2	0.29	0.195	-----	1.11	0.00	0.001	12.5	-----	-----
10/10/2008	7.73	-----	-----	4	2	0.38	0.289	-----	1.18	0.03	0.002	15.4	-----	-----
10/11/2008	7.56	-----	-----	3	2	0.45	0.374	-----	0.99	0.04	0.003	17.0	-----	-----
10/12/2008	7.31	-----	0	3	2	-----	0.331	-----	-----	0.16	0.003	17.6	-----	-----
10/13/2008	7.5	-----	-----	2	1	0.38	0.299	-----	1.11	0.00	0.002	17.7	0.089	0.234
10/14/2008	7.19	-----	0	3	2	0.43	0.349	-----	1.22	0.00	0.001	17.9	-----	-----
10/15/2008	7.21	-----	-----	4	3	0.76	0.619	0.419	1.17	0.00	0.000	19.3	0.091	0.247
10/16/2008	7.3	-----	3	2	1	0.87	0.676	-----	1.78	0.00	0.000	19.0	-----	-----
10/17/2008	7.66	-----	-----	3	2	0.87	0.692	-----	1.48	0.02	0.000	19.0	-----	-----
10/18/2008	7.68	-----	-----	4	2	0.98	0.854	-----	1.16	0.03	0.004	18.5	-----	-----
10/19/2008	7.42	109	3	3	2	0.69	0.596	-----	1.19	0.04	0.003	17.9	-----	-----
10/20/2008	7.33	-----	-----	4	3	0.56	0.441	-----	1.16	0.05	0.003	17.6	0.070	0.249
10/21/2008	7.3	95	4	4	2	0.73	0.617	-----	1.25	0.02	0.002	18.1	-----	-----
10/22/2008	7.23	-----	-----	4	3	0.91	0.734	0.652	0.91	0.00	0.002	19.2	0.078	0.292
10/23/2008	7.41	90	3	2	3	1.17	0.947	-----	1.97	0.00	0.002	19.5	-----	-----
10/24/2008	7.5	-----	-----	5	3	0.94	0.709	-----	1.52	0.00	0.003	19.1	-----	-----
10/25/2008	7.53	-----	-----	5	4	0.87	0.687	-----	1.21	0.00	0.004	17.0	-----	-----
10/26/2008	7.44	111	3	4	2	0.64	0.448	-----	1.22	0.00	0.004	16.0	-----	-----
10/27/2008	7.67	-----	-----	5	4	0.55	0.383	-----	1.14	0.00	0.004	17.2	0.055	0.390
10/28/2008	7.33	99	3	5	4	0.73	0.381	-----	1.62	0.03	0.006	18.8	-----	-----
10/29/2008	7.23	-----	-----	6	4	0.89	0.674	0.646	1.12	0.17	0.005	19.5	0.066	0.449

TABLE AIV-2 (Continued): MONITORING RESULTS FOR THE SECONDARY EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH unit	ALKALINITY mg/L	$CBOD_5$ mg/L	SS mg/L	VSS mg/L	TP mg/L	Sol-P mg/L	Ortho-P mg/L	TKN mg/L	NH_3-N mg/L	NO_2-N mg/L	NO_3-N mg/L	Tot-Fe mg/L	Sol-Fe mg/L
10/30/2008	7.24	111	3	6	5	1.69	1.432	-----	1.60	0.04	0.005	19.4	-----	-----
10/31/2008	7.65	-----	-----	4	3	1.26	1.062	-----	1.35	0.05	0.003		-----	-----
11/1/2008	7.53	-----	-----	6	4	1.15	0.837	-----	1.27	0.06	0.030		-----	-----
11/2/2008	7.03	82	4	5	3	0.77	0.676	-----	1.42	0.06	0.029		-----	-----
11/3/2008	7.47	-----	-----	5	4	0.89	0.599	-----	1.68	0.06	0.031		0.073	0.352
11/4/2008	7.26	87	0	5	4	0.90	0.723	-----	1.49	0.09	0.034		-----	-----
11/5/2008	6.94	-----	-----	6	4	0.91	0.672	0.609	1.23	0.06	0.031		0.096	0.446
11/6/2008	6.83	78	0	7	5	0.84	0.581	-----	1.59	0.05	0.031		-----	-----
11/7/2008	7.59	-----	-----	6	5	0.82	0.582	-----	1.43	0.00	0.024		-----	-----
11/8/2008	7.24	-----	-----	8	6	0.68	0.432	-----	1.37	0.01	0.040	19.4	-----	-----
11/9/2008	7	88	0	9	6	0.54	0.284	-----	1.43	0.04	0.044	18.7	-----	-----
11/10/2008	7.38	-----	-----	10	7	0.48	0.239	-----	1.45	0.07	0.044	19.1	0.055	0.517
11/11/2008	7.02	82	2	7	6	0.51	0.205	-----	1.65	0.10	0.044	20.1	-----	-----
11/12/2008	6.76	-----	-----	9	7	0.55	0.271	0.217	1.38	0.00	0.036	18.5	0.059	0.540
11/13/2008	7.56	113	0	7	6	0.40	0.193	-----	1.43	0.06	0.046	16.2	-----	-----
11/14/2008	7.57	-----	-----	6	6	0.37	0.188	-----	1.30	0.06	0.036	17.3	-----	-----
11/15/2008	6.85	-----	-----	6	4	0.40	0.224	-----	1.36	0.07	0.036	17.2	-----	-----
11/16/2008	6.94	108	0	5	4	0.38	0.200	-----	1.37	0.08	0.050	17.4	-----	-----
11/17/2008	7.12	-----	-----	4	4	0.34	0.218	-----	1.21	0.01	0.025	18.3	0.056	0.301
11/18/2008	7.93	102	0	6	5	0.37	0.230	-----	1.03	0.10	0.049	18.6	-----	-----
11/19/2008	7.97	-----	-----	4	3	0.48	0.341	-----	0.95	0.15	0.088	19.3	0.087	0.322
11/20/2008	7.62	91	0	4	3	0.47	0.345	-----	1.90	0.02	0.028	20.2	-----	-----
11/21/2008	6.92	-----	-----	4	3	0.44	0.301	-----	1.49	0.02	0.020	20.8	-----	-----
11/22/2008	6.89	-----	-----	3	2	0.47	0.363	-----	1.12	0.04	0.028	20.4	-----	-----
11/23/2008	6.77	87	0	4	2	0.42	0.306	-----	1.19	0.03	0.030	19.1	-----	-----
11/24/2008	6.91	-----	-----	3	3	0.34	0.240	-----	0.97	0.09	0.032	19.1	0.043	0.237
11/25/2008	7.2	83	0	4	3	0.45	0.330	-----	0.95	0.00	0.030	19.2	-----	-----
11/26/2008	7.3	-----	-----	5	3	0.60	0.427	-----	1.09	0.00	0.016	20.1	0.077	0.093
11/27/2008	7.62	89	0	7	5	0.58	0.439	-----	1.30	0.00	0.030	19.8	-----	-----

TABLE AIV-2 (Continued): MONITORING RESULTS FOR THE SECONDARY EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH unit	ALKALINITY mg/L	$CBOD_5$ mg/L	SS mg/L	VSS mg/L	TP mg/L	Sol-P mg/L	Ortho-P mg/L	TKN mg/L	NH_3-N mg/L	NO_2-N mg/L	NO_3-N mg/L	Tot-Fe mg/L	Sol-Fe mg/L
11/28/2008	7.62	-----	-----	5	4	0.44	0.349	-----	1.46	0.01	0.012	18.4	-----	-----
11/29/2008	7.27	-----	-----	5	3	0.47	0.364	-----	1.50	0.00	0.018	20.5	-----	-----
11/30/2008	7.09	80	0	7	4	0.44	0.317	-----	1.76	0.00	0.016	19.8	-----	-----
12/1/2008	7.32	-----	-----	6	5	0.41	0.241	-----	1.59	0.00		19.0	0.045	0.251
12/2/2008	6.99	92	4	6	5	0.48	0.285	-----	1.12	0.00		18.3	-----	-----
12/3/2008	7.09	-----	-----	5	4	0.51	0.340	0.245	0.93	0.04	0.018	20.0	0.059	0.209
12/4/2008	6.95	95	0	5	5	0.50	0.338	-----	1.36	0.00	0.022	20.3	-----	-----
12/5/2008	7.04	-----	-----	6	5	0.48	0.303	-----	1.41	0.01	0.022	20.4	-----	-----
12/6/2008	7	-----	-----	5	4	0.72	0.545	-----	1.54	0.02	0.026	20.4	-----	-----
12/7/2008	6.85	93	0	6	4	0.57	0.370	-----	1.29	0.03	0.027	20.4	-----	-----
12/8/2008	6.94	-----	-----	6	5	0.49	0.307	-----	1.05	0.00	0.015		0.077	0.271
12/9/2008	7	96	4	11	8	0.56	0.279	-----	1.78	0.23	0.104	18.1	-----	-----
12/10/2008	7.58	-----	-----	9	7	0.36	0.150	0.117	1.08	0.11		11.4	0.075	0.376
12/11/2008	7.65	169	0	7	5	0.29	0.127	-----	1.33	0.00	0.016	13.2	-----	-----
12/12/2008	7.34	-----	-----	7	6	0.30	0.182	-----	1.55	0.06	0.018	15.0	-----	-----
12/13/2008	7.21	-----	-----	5	4	0.33	0.131	-----	0.75	0.00	0.013	15.4	-----	-----
12/14/2008	6.99	150	0	10	9	0.15	0.105	-----	1.54	0.02	0.025	13.5	-----	-----
12/15/2008	7.15	-----	-----	7	6	0.27	0.093	-----	1.23	0.00	0.009	8.7	0.042	0.258
12/16/2008	7.58	195	3	6	5	0.21	0.079	-----	1.07	0.00	0.011	11.9	-----	-----
12/17/2008	7.67	-----	-----	5	4	0.40	0.228	0.073	1.37	0.04	0.017	15.1	0.053	0.227
12/18/2008	7.67	167	0	4	4	0.23	0.116	-----	1.00	0.01	0.016	16.8	-----	-----
12/19/2008	7.58	-----	-----	5	4	0.26	0.154	-----	1.80	0.43	0.091	16.3	-----	-----
12/20/2008	7.58	-----	-----	3	2	0.22	0.135	-----	1.72	0.39	0.085	16.7	-----	-----
12/21/2008	7.4	139	0	5	4	0.34	0.206	-----	1.25	0.02	0.015	18.4	-----	-----
12/22/2008	7.34	-----	-----	4	4	0.30	0.232	-----	1.26	0.00	0.010	18.1	0.000	0.213
12/23/2008	7.34	138	0	4	3	0.39	0.081	-----	1.35	0.02	0.013	18.2	-----	-----
12/24/2008	7.79	-----	-----	4	4	0.37	0.233	-----	0.76	0.02	0.019	18.7	0.059	0.232
12/25/2008	7.74	135	0	5	4	0.59	0.489	-----	1.59	0.02	0.019	17.9	-----	-----
12/26/2008	7.64	-----	-----	5	4	0.49	0.434	-----	1.07	0.09	0.020	19.1	-----	-----

TABLE AIV-2 (Continued): MONITORING RESULTS FOR THE SECONDARY EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH unit	ALKALINITY mg/L	$CBOD_5$ mg/L	SS mg/L	VSS mg/L	TP mg/L	Sol-P mg/L	Ortho-P mg/L	TKN mg/L	NH_3-N mg/L	NO_2-N mg/L	NO_3-N mg/L	Tot-Fe mg/L	Sol-Fe mg/L
12/27/2008	7.65	-----	-----	8	6	0.70	0.520	-----	1.32	0.06	0.088	12.4	-----	-----
12/28/2008	7.73	179	4	11	8	0.59	0.342	-----	1.19	0.03	0.006	7.0	-----	-----
12/29/2008	7.88	-----	-----	7	5	0.58	0.440	-----	1.02	0.00	0.013	8.8	0.017	0.197
12/30/2008	7.84	215	3	5	5	0.67	0.525	-----	1.32	0.01	0.015	9.9	-----	-----
12/31/2008	7.67	-----	-----	6	6	0.97	0.754	-----	1.08	0.00	0.019	11.3	0.258	0.115
1/1/2009	7.77	200	0	6	4	1.22	1.009	-----	1.45	0.00	0.022	12.1	-----	-----
1/2/2009	7.87	-----	-----	5	4	1.38	1.238	-----	1.80	0.01	0.025	13.5	-----	-----
1/3/2009	7.76	-----	-----	5	4	1.86	1.704	-----	1.37	0.04	0.028	15.2	-----	-----
1/4/2009	7.59	172	0	5	3	2.14	1.893	-----	1.56	0.00	0.031	15.6	-----	-----
1/5/2009	7.7	-----	-----	5	4	2.20	1.988	-----	1.83	0.00	0.033	15.6	0.039	0.137
1/6/2009	7.47	161	3	5	4	2.52	2.138	-----	1.17	0.05	0.060	16.8	-----	-----
1/7/2009	7.45	-----	-----	6	4	2.81	2.523	-----	1.13	0.05	0.037	17.5	0.050	0.122
1/8/2009	7.53	154	2	5	4	2.87	2.624	-----	1.34	0.12	0.034	18.5	-----	-----
1/9/2009	7.89	-----	-----	5	5	2.72	2.711	-----	1.79	0.09	0.036	18.7	-----	-----
1/10/2009	7.78	-----	-----	5	1	3.13	2.851	-----	1.50	0.05	0.036	18.7	-----	-----
1/11/2009	7.63	144	2	6	4	3.08	2.817	-----	1.50	0.04	0.036	18.2	-----	-----
1/12/2009	7.42	-----	-----	6	4	3.11	2.670	-----	1.44	0.02	0.036	17.8	0.037	0.112
1/13/2009	7.34	138	3	6	4	3.01	2.838	-----	1.48	0.05	0.038	18.3	-----	-----
1/14/2009	7.48	-----	-----	5	4	3.56	2.961	-----	1.38	0.03	0.036	18.8	0.064	0.153
1/15/2009	7.32	-----	-----	6	4	3.55	-----	-----	1.49	0.04	0.033	18.9	-----	-----

TABLE AIV-3: MONITORING RESULTS FOR THE PRIMARY EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH pH_unit	ALKALINITY mg/L	BOD_5 mg/L	SS mg/L	VSS mg/L	TP mg/L	Sol-P mg/L	TKN mg/L	Sol-TKN mg/L	NH_3-N mg/L	NO_2-N mg/L	NO_3-N mg/L
1/1/2007	7.64	-----	109	54	44	5.01	3.110	22.07	14.398	14.10	0.030	0.000
1/2/2007	7.52	-----	116	50	42	5.13	4.236	25.21	18.784	16.92	0.043	0.002
1/3/2007	7.53	-----	113	56	52	4.98	3.378	25.40	18.568	17.69	0.035	0.000
1/4/2007	7.62	-----	89	52	44	5.13	3.436	24.30	17.366	15.72	0.045	0.020
1/5/2007	7.68	-----	106	92	66	4.21	2.298	18.88	11.508	11.52	0.031	0.000
1/6/2007	7.77	-----	105	72	54	4.23	2.570	18.76	12.416	12.13	0.316	0.020
1/7/2007	7.65	-----	97	50	36	4.70	3.130	19.77	13.698	13.58	0.036	0.000
1/8/2007	7.62	-----	107	58	46	4.50	2.816	20.78	13.930	14.02	0.032	0.000
1/9/2007	7.55	-----	102	60	52	4.52	2.696	22.59	15.352	15.18	0.048	0.006
1/10/2007	7.66	-----	89	50	38	4.66	3.228	21.50	15.884	16.13	0.030	0.000
1/11/2007	7.7	-----	90	62	50	5.19	3.574	24.62	16.370	16.56	0.043	0.025
1/12/2007	7.65	-----	94	64	54	5.40	3.964	23.30	18.256	16.17	0.029	0.000
1/13/2007	7.53	-----	102	56	42	4.95	3.092	22.11	14.618	15.09	0.028	0.030
1/14/2007	7.56	-----	109	52	40	4.97	3.320	22.67	16.430	14.94	0.032	0.029
1/15/2007	7.51	-----	104	58	52	4.74	2.870	21.77	14.380	13.88	0.023	0.000
1/16/2007	7.32	265	86	48	42	4.16	2.404	19.22	12.826	12.09	0.044	0.000
1/17/2007	7.61	275	85	52	46	4.16	2.650	21.03	14.446	13.73	0.512	0.050
1/18/2007	7.63	279	83	60	50	4.35	2.920	19.89	14.366	13.63	0.807	0.019
1/19/2007	7.66	282	86	66	52	5.64	3.152	21.60	15.096	14.71	0.075	0.000
1/20/2007	7.73	271	98	62	50	5.00	3.836	22.86	15.438	14.20	0.025	0.015
1/21/2007	7.52	267	111	58	46	4.99	3.442	22.16	16.092	15.09	0.032	0.014
1/22/2007	7.52	265	110	48	36	4.78	3.268	24.44	17.616	16.39	0.032	0.011
1/23/2007	7.68	264	105	58	42	4.90	2.990	24.12	16.302	17.11	0.049	0.017
1/24/2007	7.56	260	94	52	44	5.29	3.470	25.13	17.710	17.82	0.034	0.000
1/25/2007	7.62	258	111	58	46	5.34	3.890	23.63	19.200	18.11	0.054	0.014
1/26/2007	7.59	258	94	72	56	5.22	3.182	23.73	15.636	16.95	0.029	0.000
1/27/2007	7.58	267	109	72	54	5.90	4.000	23.88	17.202	17.01	0.030	0.006
1/28/2007	7.51	260	117	56	40	5.40	3.988	23.95	18.338	17.24	0.034	0.004
1/29/2007	7.7	248	121	56	44	5.01	3.250	23.50	16.100	16.32	0.000	0.008

TABLE AIV-3 (Continued): MONITORING RESULTS FOR THE PRIMARY EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH pH_unit	ALKALINITY mg/L	BOD_5 mg/L	SS mg/L	VSS mg/L	TP mg/L	Sol-P mg/L	TKN mg/L	Sol-TKN mg/L	NH_3-N mg/L	NO_2-N mg/L	NO_3-N mg/L
1/30/2007	7.67	254	117	70	60	5.18	2.146	23.87	9.818	17.43	0.012	0.050
1/31/2007	7.56	262	110	58	48	5.22	0.206	25.15	51.280	18.73	0.038	0.000
2/1/2007	7.65	266	104	48	44	5.36	3.618	24.32	18.312	18.12	0.090	0.031
2/2/2007	7.7	266	110	64	60	5.75	4.096	25.05	18.754	18.49	0.171	0.022
2/3/2007	7.58	266	121	74	68	5.82	3.658	24.88	16.548	17.62	0.000	0.048
2/4/2007	7.53	260	128	60	56	6.03	4.028	26.83	18.754	17.85	0.049	0.000
2/5/2007	7.52	249	145	72	60	5.61	4.054	23.78	18.190	18.39	0.039	0.000
2/6/2007	7.62	264	113	54	46	5.75	3.614	27.24	17.542	18.67	0.054	0.016
2/7/2007	7.55	265	116	58	52	5.76	3.874	26.50	20.276	18.92	0.041	0.000
2/8/2007	7.56	256	116	70	56	5.57	3.564	29.40	22.316	19.36	0.059	0.039
2/9/2007	7.56	256	124	88	76	5.65	3.578	29.27	21.338	19.04	0.029	0.000
2/10/2007	7.67	258	118	84	70	6.29	4.174	27.76	19.808	18.30	0.041	0.037
2/11/2007	7.56	244	129	62	48	5.25	3.384	26.30	19.232	17.48	0.029	0.051
2/12/2007	7.52	244	144	60	50	5.47	3.298	26.30	17.632	18.40	0.045	0.000
2/13/2007	7.59	250	145	58	44	5.73	3.912	26.06	20.518	18.38	0.046	0.044
2/14/2007	7.62	252	101	56	46	5.33	3.274	26.47	18.380	19.27	0.033	0.000
2/15/2007	7.55	252	272	182	164	6.66	4.122	30.72	21.190	19.75	0.082	0.035
2/16/2007	7.57	247	124	86	70	6.91	4.928	28.13	21.940	19.15	0.044	0.062
2/17/2007	7.55	240	119	76	64	5.20	3.116	25.58	18.180	17.77	0.030	0.209
2/18/2007	7.54	243	145	64	50	5.25	3.144	27.58	19.898	19.09	0.033	0.069
2/19/2007	7.42	238	146	68	54	5.42	3.574	26.66	20.936	18.69	0.025	0.000
2/20/2007	7.36	241	192	128	110	5.76	3.604	28.28	20.680	18.74	0.041	0.009
2/21/2007	7.49	255	106	60	48	5.22	3.332	25.90	21.184	18.64	0.039	0.000
2/22/2007	7.44	246	99	62	48	4.29	2.568	21.80	16.504	16.23	1.406	0.057
2/23/2007	7.62	252	111	88	70	4.89	2.588	22.82	15.582	15.18	0.000	0.065
2/24/2007	7.6	261	100	78	58	5.07	2.854	25.78	17.000	17.49	0.032	0.057
2/25/2007	7.8	249	121	72	54	4.43	2.766	21.93	16.148	14.84	0.042	0.011
2/26/2007	7.38	222	109	64	48	3.77	2.172	18.66	13.472	12.61	0.020	0.000
2/27/2007	7.66	259	95	58	48	4.27	2.474	20.83	15.454	14.72	0.045	0.000

TABLE AIV-3 (Continued): MONITORING RESULTS FOR THE PRIMARY EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH pH_unit	ALKALINITY mg/L	BOD_5 mg/L	SS mg/L	VSS mg/L	TP mg/L	Sol-P mg/L	TKN mg/L	Sol-TKN mg/L	NH_3-N mg/L	NO_2-N mg/L	NO_3-N mg/L
2/28/2007	7.72	254	96	62	46	3.98	2.366	20.24	16.540	14.68	0.031	0.016
3/1/2007	7.36	221	82	58	44	3.20	1.606	16.85	12.034	10.88	1.914	1.273
3/2/2007	7.39	221	81	78	56	2.50	1.000	12.84	8.324	7.54	0.677	2.170
3/3/2007	7.29	251	88	66	52	3.26	1.568	17.33	11.740	11.14	0.978	0.075
3/4/2007	7.3	252	102	52	38	3.81	1.974	19.98	14.262	13.47	0.038	0.007
3/5/2007	7.47	254	100	46	44	3.86	2.376	21.46	17.390	14.66	0.025	0.000
3/6/2007	7.47	256	83	52	44	3.69	2.356	20.80	16.568	14.85	0.570	0.017
3/7/2007	7.86	266	85	50	46	4.14	2.624	22.51	18.164	16.15	0.029	0.000
3/8/2007	7.49	281	79	52	42	4.01	2.496	22.85	18.734	16.22	0.121	0.009
3/9/2007	7.53	269	100	74	60	4.23	2.280	21.71	16.904	13.66	0.036	0.000
3/10/2007	7.54	226	63	62	46	2.81	1.048	13.84	8.586	7.01	0.590	1.850
3/11/2007	7.57	253	93	62	46	2.85	1.240	15.97	10.390	9.16	0.709	0.981
3/12/2007	7.46	270	79	64	48	2.85	1.562	16.31	12.364	10.33	0.388	0.002
3/13/2007	7.38	273	81	52	40	2.59	1.396	14.79	10.204	8.72	1.010	1.790
3/14/2007	7.46	284	69	56	42	3.07	1.720	16.46	13.252	10.27	1.380	1.320
3/15/2007	7.42	293	83	52	40	3.55	1.996	18.52	14.332	11.80	1.710	0.940
3/16/2007	7.61	286	84	60	50	3.33	1.698	19.19	13.594	11.93	1.150	0.030
3/17/2007	7.54	286	96	70	54	3.76	1.808	21.49	13.652	12.56	1.350	0.030
3/18/2007	7.58	282	88	48	36	4.11	2.748	20.53	16.034	13.24	1.150	0.040
3/19/2007	7.45	270	113	50	42	3.96	2.222	23.48	17.066	15.92	0.027	0.000
3/20/2007	7.54	279	97	32	20	4.01	2.354	24.11	19.118	15.99	0.066	0.000
3/21/2007	7.49	263	101	48	36	3.61	1.934	20.87	17.120	14.72	1.530	0.150
3/22/2007	7.41	238	50	54	34	1.96	0.920	11.01	7.614	6.07	0.253	3.557
3/23/2007	7.65	284	63	56	38	3.02	1.528	15.49	9.928	9.39	0.761	1.259
3/24/2007	7.69	283	94	50	36	2.96	1.358	16.64	11.738	10.85	1.160	0.120
3/25/2007	7.51	284	83	42	36	3.22	1.378	18.98	12.568	12.08	0.033	0.018
3/26/2007	7.46	278	70	62	42	3.22	1.636	18.64	12.884	12.25	0.024	0.019
3/27/2007	7.46	283	71	34	30	3.31	1.664	19.30	13.624	12.92	0.036	0.038
3/28/2007	7.47	281	80	52	44	3.60	2.138	19.99	15.876	14.15	0.029	0.019

TABLE AIV-3 (Continued): MONITORING RESULTS FOR THE PRIMARY EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH pH_unit	ALKALINITY mg/L	BOD_5 mg/L	SS mg/L	VSS mg/L	TP mg/L	Sol-P mg/L	TKN mg/L	Sol-TKN mg/L	NH_3-N mg/L	NO_2-N mg/L	NO_3-N mg/L
3/29/2007	7.43	280	67	38	40	3.16	1.802	18.67	14.392	12.64	1.052	0.274
3/30/2007	7.71	287	72	64	48	3.30	1.742	19.91	15.156	12.70	0.496	0.070
3/31/2007	7.68	287	84	62	46	3.90	2.368	22.16	17.038	14.42	0.053	0.000
4/1/2007	7.53	258	112	84	66	2.94	2.976	17.50	12.714	11.16	0.166	0.000
4/2/2007	7.56	273	68	50	36	2.43	1.168	14.26	10.680	9.37	0.393	0.052
4/3/2007	7.48	285	70	50	36	2.78	1.570	16.81	12.890	12.21	0.450	0.040
4/4/2007	7.51	280	70	52	42	3.35	1.862	20.09	15.692	13.92	1.107	0.294
4/5/2007	7.53	278	75	54	46	3.26	1.812	21.71	15.582	14.53	1.232	2.163
4/6/2007	7.84	281	79	72	50	3.23	1.844	19.97	15.016	14.36	1.623	0.120
4/7/2007	7.62	277	110	72	58	3.72	2.036	22.82	16.508	14.92	0.031	0.025
4/8/2007	7.93	267	117	56	40	3.85	2.392	23.13	18.114	16.16	0.037	0.017
4/9/2007	7.44	266	112	54	44	3.96	2.274	24.07	17.244	16.43	0.036	0.000
4/10/2007	7.47	277	89	58	52	3.62	1.988	22.15	17.342	17.62	1.309	0.123
4/11/2007	7.49	269	96	54	48	3.66	1.906	22.73	16.458	16.67	1.810	0.092
4/12/2007	7.58	236	90	74	56	2.97	1.280	16.36	11.100	9.64	1.767	1.385
4/13/2007	7.56	262	78	56	46	2.03	0.958	12.00	8.652	7.50	0.363	2.004
4/14/2007	7.54	283	71	52	40	2.88	1.400	14.88	9.216	8.81	0.657	1.972
4/15/2007	7.55	283	91	38	34	2.72	1.600	16.28	13.352	11.29	0.747	0.023
4/16/2007	7.54	275	88	40	38	3.33	1.748	18.85	13.176	12.41	0.023	0.022
4/17/2007	7.44	291	74	46	40	4.12	2.154	22.69	15.916	14.72	0.027	0.021
4/18/2007	7.48	284	79	50	46	3.68	2.016	21.86	16.848	15.23	0.022	0.044
4/19/2007	7.48	283	75	44	40	3.62	2.050	22.91	17.032	16.66	0.025	0.051
4/20/2007	7.69	273	78	66	48	4.02	2.334	22.30	15.566	14.55	0.956	0.064
4/21/2007	7.62	277	75	60	46	3.77	2.250	22.65	16.634	15.33	0.028	0.014
4/22/2007	7.6	271	66	36	26	3.49	2.046	21.67	15.862	15.11	0.039	0.022
4/23/2007	7.35	255	112	64	50	4.18	2.234	23.79	16.422	16.11	0.032	0.011
4/24/2007	7.45	264	94	64	50	3.83	2.068	24.05	16.720	15.55	0.019	0.019
4/25/2007	7.29	253	91	74	56	3.70	1.828	19.52	14.070	13.11	0.594	0.027
4/26/2007	7.4	253	66	50	44	2.61	1.298	15.13	10.344	9.46	0.846	1.521

TABLE AIV-3 (Continued): MONITORING RESULTS FOR THE PRIMARY EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH pH_unit	ALKALINITY mg/L	BOD_5 mg/L	SS mg/L	VSS mg/L	TP mg/L	Sol-P mg/L	TKN mg/L	Sol-TKN mg/L	NH_3-N mg/L	NO_2-N mg/L	NO_3-N mg/L
4/27/2007	7.47	266	64	54	38	2.12	0.986	13.73	9.716	8.67	0.526	0.655
4/28/2007	7.36	279	79	56	40	2.91	1.360	17.74	11.982	11.42	0.506	0.047
4/29/2007	7.4	272	99	46	30	3.53	1.738	21.43	14.630	13.57	0.061	0.031
4/30/2007	7.45	270	92	50	36	5.00	0.068	34.09	0.000	13.78	0.028	0.000
5/1/2007	7.33	273	85	42	40	3.48	1.760	20.95	14.456	13.46	0.555	0.033
5/2/2007	7.26	279	75	52	44	3.69	2.064	22.67	17.076	16.15	0.026	0.029
5/3/2007	7.31	276	89	54	46	4.63	2.838	23.43	17.808	15.64	0.035	0.052
5/4/2007	7.39	273	87	66	56	3.92	2.084	22.99	15.940	14.76	0.024	0.030
5/5/2007	7.27	265	107	64	54	4.38	2.656	22.32	15.752	14.87	0.027	0.021
5/6/2007	7.12	264	106	48	38	4.05	2.394	23.88	16.816	15.73	0.028	0.013
5/7/2007	7.19	267	124	58	50	4.70	2.848	27.48	19.732	17.75	0.049	0.008
5/8/2007	7.31	260	83	32	30	4.44	2.928	25.52	19.190	17.23	0.048	0.043
5/9/2007	7.18	251	68	38	32	3.64	2.662	17.93	16.048	14.18	0.032	0.006
5/10/2007	7.54	254	62	34	28	3.52	2.346	20.43	15.416	14.24	0.053	0.051
5/11/2007	7.7	246	76	54	32	3.90	2.178	21.49	14.612	13.45	0.503	0.086
5/12/2007	7.55	253	106	66	40	5.52	3.384	25.82	18.136	17.57	0.032	0.021
5/13/2007	7.4	256	130	56	36	5.10	3.058	27.67	19.520	17.84	0.031	0.003
5/14/2007	7.34	257	133	58	54	5.12	3.056	28.04	2.618	19.13	0.034	0.018
5/15/2007	7.34	253	97	48	42	4.55	2.816	25.52	19.224	18.68	0.050	0.021
5/16/2007	7.38	257	106	56	44	4.87	2.896	24.49	18.478	18.51	0.034	0.000
5/17/2007	7.5	248	89	44	40	4.47	2.678	23.52	16.728	16.41	0.056	0.038
5/18/2007	7.64	261	105	82	66	5.38	3.302	28.05	19.614	18.28	0.029	0.041
5/19/2007	7.61	256	99	66	52	5.85	3.096	32.29	20.040	18.29	0.031	0.019
5/20/2007	7.63	258	100	44	34	4.66	2.936	25.47	18.430	17.28	0.034	0.017
5/21/2007	7.47	248	122	48	36	4.79	2.954	25.92	18.334	17.95	0.033	0.000
5/22/2007	7.51	240	94	34	28	4.79	2.886	24.33	18.714	17.51	0.042	0.078
5/23/2007	7.59	238	102	50	44	4.62	2.888	23.99	18.424	17.38	0.000	0.101
5/24/2007	7.5	232	91	56	52	4.23	2.638	21.85	15.392	16.43	0.483	0.106
5/25/2007	7.61	247	84	56	48	4.96	3.124	25.86	19.852	17.26	0.044	0.026

TABLE AIV-3 (Continued): MONITORING RESULTS FOR THE PRIMARY EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH pH_unit	ALKALINITY mg/L	BOD_5 mg/L	SS mg/L	VSS mg/L	TP mg/L	Sol-P mg/L	TKN mg/L	Sol-TKN mg/L	NH_3-N mg/L	NO_2-N mg/L	NO_3-N mg/L
5/26/2007	7.57	236	98	76	62	5.21	2.812	24.68	17.224	15.75	0.031	0.198
5/27/2007	7.51	235	77	42	32	3.86	1.994	19.18	13.664	12.55	0.051	0.048
5/28/2007	7.44	241	78	42	36	3.74	2.100	19.30	12.954	13.03	0.023	0.025
5/29/2007	7.51	241	78	36	34	4.07	2.458	21.09	14.802	14.63	0.026	0.026
5/30/2007	7.56	240	74	42	36	4.13	2.346	22.87	17.060	16.15	0.038	0.021
5/31/2007	7.52	244	72	48	32	4.08	2.224	24.94	17.890	17.64	0.044	0.034
6/1/2007	7.61	248	87	74	58	5.09	2.106	24.98	23.480	18.11	0.031	0.018
6/2/2007	7.57	241	86	70	58	4.74	3.374	22.90	18.852	16.43	0.035	0.022
6/3/2007	7.55	248	99	54	46	3.27	2.776	32.23	17.538	17.75	0.035	0.012
6/4/2007	7.47	238	106	48	42	4.37	2.652	24.41	17.282	17.57	0.027	0.027
6/5/2007	7.46	235	87	50	42	3.66	1.958	19.21	12.538	13.18	0.094	0.041
6/6/2007	7.55	250	84	58	44	4.10	2.488	19.18	13.814	13.95	0.647	0.741
6/7/2007	7.59	255	79	48	42	4.11	2.850	20.72	16.936	15.82	0.039	0.026
6/8/2007	7.69	328	70	60	48	4.20	2.674	22.51	16.458	15.35	0.028	0.041
6/9/2007	7.68	247	60	44	36	5.38	4.102	21.80	16.626	15.02	0.045	0.042
6/10/2007	7.65	236	69	38	28	4.58	3.300	21.30	16.224	15.01	0.057	0.033
6/11/2007	7.54	248	105	52	50	4.84	3.046	25.85	18.214	18.82	0.031	0.013
6/12/2007	7.55	235	77	54	44	4.54	2.916	25.26	15.338	16.62	0.042	0.027
6/13/2007	7.49	245	97	60	54	4.93	2.872	25.40	18.478	19.14	0.030	0.024
6/14/2007	7.46	246	102	60	48	5.02	3.094	24.58	16.958	18.85	0.040	0.020
6/15/2007	7.56	239	89	60	56	4.84	2.952	24.21	17.268	16.52	0.038	0.038
6/16/2007	7.55	249	112	68	56	5.66	3.404	26.29	17.706	17.77	0.037	0.028
6/17/2007	7.46	243	116	56	42	5.27	3.334	25.94	19.142	18.69	0.040	0.027
6/18/2007	7.45	239	127	62	52	5.30	3.194	25.84	19.636	18.92	0.047	0.018
6/19/2007	7.38	242	133	70	56	5.58	2.784	29.50	18.928	21.45	0.057	0.021
6/20/2007	7.45	242	110	64	56	5.34	2.938	25.38	23.280	17.50	0.058	0.044
6/21/2007	7.15	243	94	56	42	5.61	1.927	27.84	10.362	18.94	0.053	0.024
6/22/2007	7.59	234	77	66	58	5.07	3.252	23.18	17.242	15.52	0.035	0.014
6/23/2007	7.55	244	97	76	68	5.21	3.110	26.08	25.766	18.34	0.034	0.025

TABLE AIV-3 (Continued): MONITORING RESULTS FOR THE PRIMARY EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH pH_unit	ALKALINITY mg/L	BOD_5 mg/L	SS mg/L	VSS mg/L	TP mg/L	Sol-P mg/L	TKN mg/L	Sol-TKN mg/L	NH_3-N mg/L	NO_2-N mg/L	NO_3-N mg/L
6/24/2007	7.51	240	121	66	54	5.31	3.184	26.78	24.396	18.62	0.036	0.010
6/25/2007	7.45	242	125	68	54	6.07	3.968	28.43	21.408	20.93	0.036	0.007
6/26/2007	7.49	233	96	64	56	5.75	3.686	25.44	18.136	18.05	0.042	0.025
6/27/2007	7.62	226	83	46	44	4.89	3.346	23.14	19.356	17.19	0.049	0.015
6/28/2007	7.68	216	81	54	48	4.32	2.594	21.22	13.542	15.55	1.014	0.773
6/29/2007	7.57	246	108	74	68	6.18	4.218	28.06	21.594	19.67	0.029	0.040
6/30/2007	7.65	244	102	66	62	6.59	4.374	26.56	22.508	18.30	0.037	0.034
7/1/2007	7.52	247	120	66	58	5.85	3.700	28.06	25.270	19.57	0.038	0.015
7/2/2007	7.46	239	128	72	64	5.35	3.518	24.94	18.390	20.97	0.031	0.030
7/3/2007	7.59	242	109	80	72	6.50	4.318	27.18	20.340	20.53	0.043	0.046
7/4/2007	7.54	216	72	62	50	4.54	3.060	19.30	15.432	15.12	0.036	0.019
7/5/2007	7.49	228	87	52	46	4.58	3.024	20.41	14.802	15.71	0.038	0.021
7/6/2007	7.57	234	90	70	38	5.19	3.620	20.87	17.730	16.60	0.035	0.025
7/7/2007	7.57	236	96	54	44	5.84	4.178	20.72	19.800	16.02	0.032	0.023
7/8/2007	7.61	224	80	52	42	4.73	2.924	19.34	17.302	14.85	0.053	0.034
7/9/2007	7.58	227	82	54	46	4.35	2.516	21.59	19.584	16.39	0.042	2.020
7/10/2007	7.53	212	86	66	56	3.76	2.404	18.11	13.652	13.99	0.050	0.032
7/11/2007	7.42	251	104	72	64	5.40	2.972	25.96	19.556	19.25	0.093	2.992
7/12/2007	7.44	246	97	50	48	5.16	3.400	23.68	17.694	18.90	0.083	2.757
7/13/2007	7.63	246	94	78	66	5.14	3.468	26.08	21.112	18.39	0.089	2.386
7/14/2007	7.64	248	98	66	56	5.56	3.618	27.71	24.578	20.21	0.087	2.313
7/15/2007	7.5	245	99	50	46	5.26	3.432	26.95	25.772	19.04	0.087	2.491
7/16/2007	7.47	228	80	48	44	4.63	3.302	21.70	17.730	16.49	0.078	2.148
7/17/2007	7.47	223	95	44	36	4.72	3.214	22.05	17.514	17.01	0.103	2.910
7/18/2007	7.48	228	83	52	50	4.42	2.652	22.25	17.466	16.44	0.043	0.019
7/19/2007	7.36	220	99	72	60	3.72	1.716	19.92	13.462	15.58	0.045	0.006
7/20/2007	7.57	247	93	62	60	3.97	2.000	23.17	17.320	15.68	0.028	0.022
7/21/2007	7.67	251	90	68	62	3.68	2.120	22.56	22.368	16.53	0.031	0.025
7/22/2007	7.48	252	95	50	46	5.16	3.544	25.43	27.028	18.39	0.034	0.023

TABLE AIV-3 (Continued): MONITORING RESULTS FOR THE PRIMARY EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH pH_unit	ALKALINITY mg/L	BOD_5 mg/L	SS mg/L	VSS mg/L	TP mg/L	Sol-P mg/L	TKN mg/L	Sol-TKN mg/L	NH_3-N mg/L	NO_2-N mg/L	NO_3-N mg/L
7/23/2007	7.48	236	86	46	44	4.78	3.110	23.53	17.112	17.47	0.035	0.010
7/24/2007	7.43	232	92	46	34	5.24	3.336	26.22	20.598	18.43	0.045	0.025
7/25/2007	7.44	236	85	46	42	4.99	3.474	23.17	18.486	17.85	0.033	0.011
7/26/2007	7.42	241	101	54	46	5.35	3.616	25.53	19.306	19.47	0.040	0.011
7/27/2007	7.66	221	93	74	62	4.59	2.844	20.69	15.926	14.99	0.045	0.581
7/28/2007	7.58	230	84	68	52	4.82	3.052	18.54	20.526	12.81	0.047	0.575
7/29/2007	7.44	238	104	62	48	5.03	3.496	22.04	16.394	15.72	0.048	0.686
7/30/2007	7.34	236	143	84	66	5.46	3.320	25.35	17.978	18.12	0.014	0.026
7/31/2007	7.47	223	90	34	28	5.03	3.270	21.96	16.206	16.30	0.017	0.063
8/1/2007	7.46	230	91	48	36	5.14	3.650	20.26	16.684	16.18	0.043	0.005
8/2/2007	7.54	223	83	50	42	5.38	3.702	20.75	16.418	15.51	0.056	0.016
8/3/2007	7.6	236	99	64	56	5.21	3.710	21.97	18.386	16.75	0.045	0.015
8/4/2007	7.7	233	103	70	54	5.29	3.760	21.90	21.586	16.42	0.042	0.008
8/5/2007	7.44	233	121	64	54	5.57	3.452	23.49	23.748	16.86	0.043	0.002
8/6/2007	7.47	217	89	50	36	4.29	2.710	18.10	13.586	13.32	0.086	0.008
8/7/2007	7.38	213	69	48	38	2.94	1.462	13.46	8.872	9.54	0.068	0.019
8/8/2007	7.52	248	64	56	54	2.98	1.616	12.76	14.056	9.82	0.036	0.018
8/9/2007	7.58	225	44	52	42	2.14	0.970	9.56	6.474	5.12	1.850	0.297
8/10/2007	7.79	258	60	48	40	3.32	1.648	14.87	10.396	8.86	0.025	0.022
8/11/2007	7.79	244	58	38	36	3.38	1.982	15.88	14.264	10.64	0.027	0.018
8/12/2007	7.51	242	73	44	42	3.58	2.178	17.48	15.432	11.84	0.029	0.022
8/13/2007	7.52	238	69	40	34	3.55	2.086	17.79	12.544	11.94	0.034	0.021
8/14/2007	7.47	233	83	48	46	3.85	2.302	20.87	15.508	14.37	0.040	0.007
8/15/2007	7.58	237	106	66	48	3.81	2.270	17.82	14.222	12.66	0.040	0.022
8/16/2007	7.47	255	106	56	48	4.57	2.744	22.09	15.914	15.68	0.035	0.008
8/17/2007	7.58	252	88	70	60	4.45	2.748	22.04	16.456	15.27	0.033	0.021
8/18/2007	7.51	251	88	76	62	4.53	2.720	23.50	19.934	16.65	0.037	0.038
8/19/2007	7.58	240	84	66	54	3.70	2.278	19.58	17.436	13.18	0.034	0.019
8/20/2007	7.63	244	28	46	30	1.20	0.402	6.61	3.754	3.30	0.521	2.286

TABLE AIV-3 (Continued): MONITORING RESULTS FOR THE PRIMARY EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH pH_unit	ALKALINITY mg/L	BOD_5 mg/L	SS mg/L	VSS mg/L	TP mg/L	Sol-P mg/L	TKN mg/L	Sol-TKN mg/L	NH_3-N mg/L	NO_2-N mg/L	NO_3-N mg/L
8/21/2007	7.61	288	43	52	46	1.80	0.642	9.55	5.690	4.86	0.763	1.283
8/22/2007	7.62	277	47	48	42	2.21	1.020	11.77	8.576	6.96	0.864	0.103
8/23/2007	7.63	262	47	48	38	2.30	1.354	12.18	9.604	8.41	0.042	0.016
8/24/2007	8.13	287	25	34	24	1.16	0.410	6.39	4.564	3.14	0.247	2.690
8/25/2007	8.19	211	33	24	22	1.86	1.066	9.05	8.580	5.70	0.962	0.157
8/26/2007	8.13	228	56	42	34	2.37	1.176	13.13	9.600	7.68	0.022	0.017
8/27/2007	7.25	276	62	56	44	2.84	1.512	15.18	11.402	9.27	0.029	0.012
8/28/2007	7.04	277	67	46	40	3.21	1.734	15.96	12.308	11.08	0.034	0.021
8/29/2007	7.47	271	67	46	42	3.55	2.252	15.46	13.572	12.83	0.047	0.008
8/30/2007	7.58	272	64	36	28	3.33	1.986	19.94	15.716	14.40	0.048	0.005
8/31/2007	7.79	263	60	48	40	3.46	2.176	20.65	16.432	14.14	0.024	0.038
9/1/2007	7.77	262	79	56	50	3.77	2.376	20.80	16.906	14.91	0.023	0.028
9/2/2007	7.59	253	87	46	38	4.20	2.880	19.83	15.890	14.51	0.029	0.009
9/3/2007	7.58	250	74	40	38	3.68	2.460	19.63	16.260	14.48	0.034	0.053
9/4/2007	7.54	237	69	38	34	3.18	2.036	17.75	13.612	12.95	0.039	0.014
9/5/2007	7.53	242	75	42	36	3.44	2.120	20.17	15.048	14.95	0.036	0.009
9/6/2007	7.61	246	72	40	34	3.84	2.496	19.94	15.224	15.10	0.035	0.005
9/7/2007	7.74	242	62	50	44	3.64	2.280	20.60	16.350	16.36	0.036	0.021
9/8/2007	7.79	244	73	62	52	3.88	2.352	18.35	13.550	14.70	0.034	0.020
9/9/2007	7.52	244	89	52	44	4.27	2.738	21.38	15.866	16.21	0.036	0.001
9/10/2007	7.49	248	101	46	42	4.52	2.988	24.30	18.340	19.54	0.031	0.015
9/11/2007	7.61	244	75	42	38	4.35	2.796	20.38	14.508	15.86	0.034	0.015
9/12/2007	7.55	257	70	52	42	4.79	3.148	22.02	16.834	14.97	0.034	0.000
9/13/2007	7.64	254	65	40	36	4.01	2.690	20.20	15.810	15.60	0.033	0.007
9/14/2007	7.89	259	83	66	52	4.70	2.902	25.13	18.184	17.31	0.034	0.010
9/15/2007	7.71	260	90	70	54	5.01	3.162	24.43	17.692	17.01	0.037	0.026
9/16/2007	7.62	246	99	56	48	4.79	3.238	24.26	18.782	17.03	0.033	0.003
9/17/2007	7.59	241	102	52	42	4.34	2.972	23.94	18.326	16.59	0.022	0.002
9/18/2007	7.55	250	74	46	36	4.89	3.500	24.57	19.416	17.85	0.032	0.007

TABLE AIV-3 (Continued): MONITORING RESULTS FOR THE PRIMARY EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH pH_unit	ALKALINITY mg/L	BOD_5 mg/L	SS mg/L	VSS mg/L	TP mg/L	Sol-P mg/L	TKN mg/L	Sol-TKN mg/L	NH_3-N mg/L	NO_2-N mg/L	NO_3-N mg/L
9/19/2007	7.5	251	120	62	52	4.60	3.602	17.60	19.102	17.60	0.032	0.001
9/20/2007	7.56	252	79	40	28	4.47	3.220	22.92	18.330	17.37	0.045	0.005
9/21/2007	7.63	253	77	58	48	4.67	3.174	23.87	18.478	18.44	0.034	0.015
9/22/2007	7.63	255	99	54	50	5.57	4.140	23.08	17.878	17.75	0.029	0.002
9/23/2007	7.55	245	112	50	44	4.83	3.476	21.71	17.056	17.46	0.031	0.001
9/24/2007	7.38	245	112	52	50	5.13	3.388	26.88	20.328	20.67	0.036	0.004
9/25/2007	7.46	241	103	60	58	5.77	3.882	23.96	16.940	18.23	0.053	0.015
9/26/2007	7.45	240	92	48	46	6.75	4.708	21.37	15.674	17.25	0.033	0.010
9/27/2007	7.5	254	105	32	28	5.66	3.846	24.87	18.620	20.06	0.033	0.000
9/28/2007	7.53	252	91	60	52	5.98	4.258	24.23	18.504	18.62	0.032	0.027
9/29/2007	7.52	245	95	62	60	5.15	3.548	22.83	17.456	17.52	0.035	0.008
9/30/2007	7.45	238	115	54	42	4.98	3.484	23.53	17.960	17.50	0.036	0.007
10/1/2007	7.36	235	109	46	42	4.70	2.966	24.23	17.804	18.53	0.051	0.003
10/2/2007	7.51	245	95	58	52	4.29	2.768	24.51	18.672	18.16	0.039	0.026
10/3/2007	7.51	249	84	34	28	4.06	2.930	19.02	16.910	18.08	0.030	0.004
10/4/2007	7.48	253	79	50	48	5.11	3.318	23.53	17.008	17.42	0.044	0.021
10/5/2007	7.56	253	83	54	50	4.76	3.288	25.09	19.242	17.74	0.032	0.022
10/6/2007	7.49	255	89	54	50	4.65	3.566	24.25	19.576	18.01	0.027	0.012
10/7/2007	7.39	231	112	46	44	4.60	3.258	23.06	18.126	16.16	0.032	0.017
10/8/2007	7.37	234	121	38	34	4.75	3.038	24.48	17.832	18.53	0.036	0.006
10/9/2007	7.45	250	122	42	36	4.93	3.086	27.03	19.734	21.25	0.041	0.004
10/10/2007	7.49	254	98	44	40	4.48	2.808	24.96	19.722	19.81	0.041	0.032
10/11/2007	7.54	259	92	36	32	4.97	3.306	27.32	20.662	21.07	0.053	0.004
10/12/2007	7.51	256	103	58	50	4.82	3.196	26.35	19.674	19.54	0.034	0.008
10/13/2007	7.48	260	113	68	58	6.01	3.742	27.59	18.360	21.72	0.031	0.006
10/14/2007	7.38	244	132	60	54	5.25	3.310	27.47	20.364	22.03	0.047	0.004
10/15/2007	7.45	236	111	48	36	4.67	2.710	25.12	17.048	18.56	0.031	0.440
10/16/2007	7.53	249	112	52	42	5.20	3.076	27.01	18.722	20.75	0.049	0.004
10/17/2007	7.46	255	86	40	30	4.41	2.744	23.81	17.390	18.01	0.038	0.022

TABLE AIV-3 (Continued): MONITORING RESULTS FOR THE PRIMARY EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH pH_unit	ALKALINITY mg/L	BOD_5 mg/L	SS mg/L	VSS mg/L	TP mg/L	Sol-P mg/L	TKN mg/L	Sol-TKN mg/L	NH_3-N mg/L	NO_2-N mg/L	NO_3-N mg/L
10/18/2007	7.43	243	101	38	34	4.42	2.558	23.81	16.610	18.30	0.047	0.014
10/19/2007	7.46	255	89	58	48	4.99	3.088	23.97	17.060	17.35	0.032	0.026
10/20/2007	7.42	248	87	56	50	5.63	3.918	23.59	17.558	17.48	0.031	0.022
10/21/2007	7.38	253	118	36	30	5.44	3.928	25.21	19.808	19.26	0.034	0.006
10/22/2007	7.45	239	115	50	42	5.14	3.296	26.25	18.628	19.36	0.029	0.001
10/23/2007	7.54	244	98	34	28	5.04	3.182	27.07	19.924	20.99	0.039	0.018
10/24/2007	7.4	244	100	54	46	5.05	3.264	26.53	19.834	20.36	0.043	0.020
10/25/2007	7.58	252	106	62	52	5.16	3.180	26.92	19.242	19.73	0.050	0.010
10/26/2007	7.61	84	106	56	54	5.40	3.554	28.48	21.892	20.59	0.038	0.016
10/27/2007	7.61	245	107	64	62	5.64	3.902	25.97	20.096	18.46	0.036	0.007
10/28/2007	7.47	241	114	38	36	4.88	3.276	24.55	19.214	17.98	0.042	0.000
10/29/2007	7.45	242	123	56	38	5.06	3.110	26.41	18.912	18.71	0.037	0.000
10/30/2007	7.55	251	102	48	40	5.75	3.802	27.37	20.384	19.44	0.048	0.016
10/31/2007	7.51	251	115	50	48	5.76	3.200	28.58	17.908	20.02	0.038	0.000
11/1/2007	7.53	250	94	34	28	5.20	2.962	27.37	17.296	20.00	0.051	0.000
11/2/2007	7.55	-----	85	66	50	5.00	3.038	26.20	18.762	18.39	0.033	0.025
11/3/2007	7.54	-----	109	72	58	6.07	4.066	27.13	20.374	18.53	0.033	0.022
11/4/2007	7.43	238	131	50	42	5.53	3.860	27.30	21.168	19.39	0.037	0.004
11/5/2007	7.42	-----	125	52	44	5.57	3.486	29.17	20.686	21.54	0.041	0.000
11/6/2007	7.54	243	115	48	38	5.25	3.388	28.55	22.032	21.56	0.049	0.000
11/7/2007	7.49	-----	113	48	38	5.68	3.596	28.02	21.208	21.85	0.040	0.001
11/8/2007	7.52	257	112	48	38	5.60	3.656	30.01	22.148	21.47	0.052	0.000
11/9/2007	7.58	-----	113	80	64	6.43	4.158	29.15	20.702	20.42	0.044	0.022
11/10/2007	7.49	-----	128	86	66	6.11	4.140	29.78	22.190	21.15	0.041	0.004
11/11/2007	7.45	238	138	50	36	5.47	3.788	27.75	21.644	20.53	0.038	0.002
11/12/2007	7.45	-----	136	62	56	4.89	2.918	26.69	18.240	20.56	0.032	0.005
11/13/2007	7.46	249	126	60	46	5.30	3.352	28.88	21.224	22.41	0.035	0.007
11/14/2007	7.49	-----	122	68	58	5.77	3.658	28.74	21.832	22.05	0.035	0.001
11/15/2007	7.55	249	109	48	42	5.04	3.226	25.61	19.100	19.93	0.055	0.034

TABLE AIV-3 (Continued): MONITORING RESULTS FOR THE PRIMARY EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH pH_unit	ALKALINITY mg/L	BOD_5 mg/L	SS mg/L	VSS mg/L	TP mg/L	Sol-P mg/L	TKN mg/L	Sol-TKN mg/L	NH_3-N mg/L	NO_2-N mg/L	NO_3-N mg/L
11/16/2007	7.58	-----	113	80	66	4.96	3.164	26.23	19.514	19.97	0.035	0.032
11/17/2007	7.54	-----	117	86	70	5.13	3.308	27.08	19.586	21.26	0.034	0.016
11/18/2007	7.37	236	137	52	44	4.81	2.996	25.37	18.210	20.25	0.034	0.006
11/19/2007	7.4	-----	143	60	46	5.25	3.230	28.95	20.786	21.30	0.037	0.008
11/20/2007	7.49	250	130	60	52	5.51	3.378	31.42	22.422	22.80	0.044	0.022
11/21/2007	7.7	-----	108	80	56	5.01	3.010	26.69	20.278	19.75	0.039	0.000
11/22/2007	7.57	224	104	50	42	4.21	2.462	21.36	15.206	14.08	0.041	0.000
11/23/2007	7.54	-----	111	80	68	4.70	2.966	25.63	19.084	17.85	0.026	0.000
11/24/2007	7.71	-----	114	78	68	5.29	3.512	29.24	22.360	20.71	0.028	0.000
11/25/2007	7.45	249	113	56	46	4.82	3.238	27.68	21.364	19.34	0.040	0.000
11/26/2007	7.49	-----	115	64	50	4.86	2.882	27.08	19.430	19.50	0.029	0.000
11/27/2007	7.47	253	112	52	44	5.17	3.326	29.03	22.212	22.11	0.043	0.000
11/28/2007	7.57	-----	120	58	48	4.95	3.148	27.41	21.928	22.71	0.036	0.000
11/29/2007	7.58	256	118	54	40	5.14	3.286	29.51	22.126	21.76	0.038	0.010
11/30/2007	7.72	-----	99	64	54	4.67	2.846	27.95	21.326	20.93	0.038	0.015
12/1/2007	7.74	-----	115	80	64	4.81	3.082	27.70	21.740	20.20	0.037	0.018
12/2/2007	7.61	230	127	60	48	4.40	2.690	25.78	19.714	18.97	0.049	0.005
12/3/2007	7.47	-----	99	66	48	3.62	1.836	21.98	15.134	15.23	0.039	0.024
12/4/2007	7.67	262	97	48	38	4.82	2.784	26.44	18.930	17.31	0.042	0.015
12/5/2007	8.14	-----	87	34	32	4.00	2.484	23.21	18.708	18.98	0.043	0.018
12/6/2007	7.58	260	113	64	54	4.79	2.908	28.73	22.152	19.47	0.048	0.011
12/7/2007	7.6	-----	103	72	58	4.36	2.630	26.94	20.220	19.19	0.038	0.024
12/8/2007	7.57	-----	106	80	60	4.66	2.918	28.07	21.762	19.16	0.039	0.010
12/9/2007	7.52	239	117	58	50	4.54	2.880	26.30	20.448	18.32	0.042	0.000
12/10/2007	7.46	-----	124	50	38	4.75	2.860	28.10	20.620	19.48	0.032	0.000
12/11/2007	7.46	238	91	66	52	4.53	2.476	26.49	18.568	18.05	0.045	0.015
12/12/2007	7.66	-----	75	60	50	3.24	1.574	18.24	12.984	11.61	0.066	0.033
12/13/2007	7.68	255	83	48	40	3.58	2.052	20.74	15.004	14.79	0.031	0.012
12/14/2007	7.56	-----	90	68	60	4.68	2.710	22.37	15.706	15.14	0.031	0.015

TABLE AIV-3 (Continued): MONITORING RESULTS FOR THE PRIMARY EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH pH_unit	ALKALINITY mg/L	BOD_5 mg/L	SS mg/L	VSS mg/L	TP mg/L	Sol-P mg/L	TKN mg/L	Sol-TKN mg/L	NH_3-N mg/L	NO_2-N mg/L	NO_3-N mg/L
12/15/2007	7.52	-----	91	62	52	4.97	3.116	23.96	17.402	16.57	0.028	0.010
12/16/2007	7.41	249	116	66	50	4.33	2.646	24.58	18.708	17.11	0.037	0.000
12/17/2007	7.42	-----	115	56	38	4.46	2.610	25.26	18.498	18.55	0.035	0.016
12/18/2007	7.46	254	118	58	48	4.69	2.786	26.44	18.980	19.18	0.035	0.014
12/19/2007	7.58	-----	75	56	46	4.52	2.566	23.82	17.134	17.35	0.038	0.014
12/20/2007	7.52	255	93	62	54	5.00	2.992	27.58	19.954	19.71	0.039	0.023
12/21/2007	7.92	-----	105	68	48	4.40	2.610	23.94	17.092	17.98	0.026	0.035
12/22/2007	7.5	-----	102	72	48	3.73	1.912	20.27	13.944	14.38	0.027	0.020
12/23/2007	7.41	225	82	76	52	2.55	1.048	14.11	9.052	8.81	1.233	0.239
12/24/2007	7.57	-----	80	58	46	3.11	1.512	17.18	11.230	11.54	0.033	0.022
12/25/2007	7.51	267	92	58	40	3.50	1.768	20.14	13.276	14.12	0.029	0.023
12/26/2007	7.53	-----	79	54	44	3.91	2.020	21.30	15.476	15.32	0.029	0.039
12/27/2007	7.51	265	80	50	36	3.92	2.306	22.44	16.602	16.02	0.023	0.029
12/28/2007	7.57	-----	96	68	50	4.41	2.228	23.62	15.624	15.50	0.024	0.013
12/29/2007	7.56	-----	104	66	50	4.05	2.286	22.98	16.634	15.36	0.025	0.013
12/30/2007	7.85	258	107	66	46	4.30	2.506	24.27	18.146	16.91	0.031	0.014
12/31/2007	7.58	-----	92	72	60	4.40	2.532	22.41	16.350	17.04	0.031	0.022
1/1/2008	8.04	249	103	56	60	4.42	2.480	23.32	17.566	16.27	0.031	0.021
1/2/2008	7.47	-----	102	52	46	4.18	2.354	22.85	16.674	16.55	0.029	0.020
1/3/2008	7.55	258	95	64	44	4.32	2.410	23.87	16.632	17.21	0.038	0.015
1/4/2008	7.6	-----	94	76	60	4.04	2.278	25.56	18.966	18.22	0.029	0.024
1/5/2008	7.59	-----	99	72	54	4.09	2.608	24.62	18.980	17.55	0.030	0.043
1/6/2008	7.42	248	95	94	66	3.56	1.682	21.43	14.474	13.83	0.046	0.065
1/7/2008	7.55	-----	61	62	40	2.70	1.624	15.93	12.418	10.68	0.501	0.048
1/8/2008	7.48	257	61	50	38	2.85	1.632	16.80	12.518	11.21	0.925	0.185
1/9/2008	7.74	-----	60	46	36	2.67	1.548	14.23	11.478	10.06	0.931	1.455
1/10/2008	7.56	272	72	60	46	3.36	1.842	18.26	13.704	11.45	1.398	0.720
1/11/2008	7.83	-----	76	70	58	2.94	0.712	16.89	5.702	10.90	0.802	0.229
1/12/2008	7.6	-----	72	60	46	3.04	0.832	18.19	6.552	12.00	0.899	0.791

TABLE AIV-3 (Continued): MONITORING RESULTS FOR THE PRIMARY EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH pH_unit	ALKALINITY mg/L	BOD_5 mg/L	SS mg/L	VSS mg/L	TP mg/L	Sol-P mg/L	TKN mg/L	Sol-TKN mg/L	NH_3-N mg/L	NO_2-N mg/L	NO_3-N mg/L
1/13/2008	7.57	279	82	58	46	3.25	0.899	19.32	7.099	13.19	0.055	0.020
1/14/2008	7.41	-----	92	66	56	3.53	1.750	19.71	13.094	13.20	0.226	0.019
1/15/2008	7.41	272	88	56	20	3.76	2.372	23.15	18.308	16.28	0.071	0.012
1/16/2008	7.57	-----	89	62	54	3.65	2.012	23.14	17.882	17.51	0.814	0.498
1/17/2008	7.59	272	82	46	36	3.91	2.514	19.74	10.330	17.01	0.039	0.018
1/18/2008	7.68	-----	81	58	46	3.76	2.402	20.49	19.812	17.84	0.123	0.043
1/19/2008	7.63	-----	81	68	50	3.45	1.846	23.08	17.682	17.78	1.579	0.320
1/20/2008	7.84	261	115	76	56	3.69	2.116	21.71	14.806	18.57	0.755	0.133
1/21/2008	7.4	-----	103	70	54	3.90	2.222	23.82	20.788	19.98	0.034	0.028
1/22/2008	7.53	257	110	60	46	4.65	3.018	20.39	18.734	18.30	0.056	0.028
1/23/2008	7.46	-----	105	62	44	4.39	2.550	18.35	14.236	17.85	0.034	0.006
1/24/2008	7.4	266	101	64	54	5.20	3.270	21.99	17.212	20.00	0.048	0.026
1/25/2008	7.42	-----	107	86	76	4.51	2.508	22.10	18.502	19.04	0.038	0.021
1/26/2008	7.42	-----	117	78	60	4.87	2.910	24.64	17.872	18.55	0.039	0.037
1/27/2008	7.45	254	104	72	60	4.55	2.574	24.77	16.594	20.88	0.039	0.046
1/28/2008	7.32	-----	103	80	48	4.39	2.634	20.99	20.374	18.83	0.656	0.000
1/29/2008	7.38	253	84	62	54	4.10	2.342	23.68	17.886	19.06	0.048	0.012
1/30/2008	7.31	-----	80	50	42	3.99	2.584	22.01	17.330	19.41	0.615	0.015
1/31/2008	7.44	253	81	64	56	4.16	2.252	19.81	13.730	16.96	1.067	0.000
2/1/2008	7.74	-----	82	78	60	3.84	2.275	21.68	20.752	20.81	0.173	0.036
2/2/2008	7.65	-----	97	86	64	4.38	2.448	26.56	18.504	20.45	0.032	0.019
2/3/2008	7.53	256	110	66	50	4.27	2.618	22.13	15.038	18.41	0.033	0.017
2/4/2008	7.31	-----	111	68	54	4.29	2.296	22.99	16.396	16.86	0.026	0.032
2/5/2008	7.2	221	68	68	46	3.26	1.618	12.09	10.662	11.81	1.895	0.527
2/6/2008	7.23	-----	74	70	50	3.17	1.774	13.41	10.410	13.57	1.624	0.931
2/7/2008	7.27	239	70	54	36	2.92	1.480	13.02	8.820	11.49	1.015	2.933
2/8/2008	7.59	-----	65	52	44	3.12	1.584	14.55	10.486	12.60	1.256	0.293
2/9/2008	7.28	-----	72	60	48	3.39	1.758	18.51	11.490	13.47	1.336	1.023
2/10/2008	7.22	262	75	46	38	3.02	1.668	14.49	7.618	12.91	1.183	1.870

TABLE AIV-3 (Continued): MONITORING RESULTS FOR THE PRIMARY EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH pH_unit	ALKALINITY mg/L	BOD_5 mg/L	SS mg/L	VSS mg/L	TP mg/L	Sol-P mg/L	TKN mg/L	Sol-TKN mg/L	NH_3-N mg/L	NO_2-N mg/L	NO_3-N mg/L
2/11/2008	7.33	-----	78	56	46	3.33	1.562	19.29	13.098	13.64	1.304	0.898
2/12/2008	7.37	277	53	20	14	3.23	2.470	17.74	15.416	16.03	1.637	1.034
2/13/2008	7.31	-----	63	48	42	3.33	1.900	15.25	12.290	14.80	1.817	1.393
2/14/2008	7.35	265	75	56	50	3.70	2.202	18.46	13.878	15.53	1.757	0.021
2/15/2008	7.64	-----	78	78	54	3.56	2.152	17.75	15.666	14.49	1.378	0.047
2/16/2008	7.54	-----	86	72	54	4.48	2.950	21.83	16.524	15.39	0.963	0.007
2/17/2008	7.27	217	84	56	38	3.33	1.836	15.38	9.756	11.24	1.680	0.000
2/18/2008	7.26	-----	60	60	46	3.87	2.614	10.54	7.692	6.81	0.169	2.934
2/19/2008	7.32	245	61	40	38	4.02	2.930	11.30	8.472	8.22	0.253	4.064
2/20/2008	7.76	-----	56	36	34	4.77	3.722	16.45	13.210	11.45	1.024	2.891
2/21/2008	7.26	277	86	76	58	3.76	2.262	18.61	14.112	12.30	1.770	1.982
2/22/2008	7.36	-----	76	72	56	3.35	1.828	19.38	14.364	13.24	1.305	0.565
2/23/2008	7.24	-----	85	84	66	3.61	1.906	20.41	14.678	13.85	0.453	0.023
2/24/2008	7.12	254	74	48	36	3.35	1.956	18.93	13.956	12.89	1.288	0.024
2/25/2008	7.3	-----	86	74	60	4.07	2.228	22.16	15.776	14.61	0.027	0.004
2/26/2008	7.38	265	77	54	40	3.70	1.842	23.25	15.212	16.12	0.907	0.126
2/27/2008	7.23	-----	64	40	32	3.29	2.090	20.18	17.120	15.66	1.248	0.052
2/28/2008	7.22	263	74	56	42	3.82	1.718	22.24	12.184	14.93	1.968	0.436
2/29/2008	7.5	-----	86	76	60	4.05	2.072	23.01	14.844	15.18	0.398	0.032
3/1/2008	7.44	-----	77	64	44	3.88	2.130	21.74	15.034	14.83	0.763	0.063
3/2/2008	7.36	241	83	50	40	4.02	2.362	21.37	14.534	14.24	0.033	0.014
3/3/2008	7.32	-----	58	60	42	2.30	1.178	10.96	7.832	6.90	0.424	1.380
3/4/2008	7.45	242	71	58	46	2.35	0.958	12.09	6.980	7.04	0.207	2.349
3/5/2008	7.39	-----	66	56	48	2.64	1.438	12.70	10.402	9.57	0.504	1.632
3/6/2008	7.34	265	66	60	42	2.92	1.698	15.09	11.232	10.81	1.128	2.384
3/7/2008	7.48	-----	74	72	58	3.40	2.232	17.26	11.820	10.98	1.212	0.801
3/8/2008	7.44	-----	76	76	62	3.74	2.254	18.65	13.526	12.33	0.466	0.034
3/9/2008	7.44	262	72	38	34	2.85	1.644	17.66	13.376	12.71	0.588	0.026
3/10/2008	7.41	-----	84	52	44	3.70	1.992	19.27	15.560	13.29	0.024	0.010

TABLE AIV-3 (Continued): MONITORING RESULTS FOR THE PRIMARY EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH pH_unit	ALKALINITY mg/L	BOD_5 mg/L	SS mg/L	VSS mg/L	TP mg/L	Sol-P mg/L	TKN mg/L	Sol-TKN mg/L	NH_3-N mg/L	NO_2-N mg/L	NO_3-N mg/L
3/11/2008	7.54	266	85	50	44	3.98	2.380	22.56	16.568	14.74	0.053	0.020
3/12/2008	7.33	-----	73	64	48	3.51	2.028	21.81	17.528	13.17	1.495	0.113
3/13/2008	7.28	258	61	42	36	2.93	2.006	18.45	15.930	11.34	1.573	1.345
3/14/2008	7.65	-----	67	52	46	2.66	1.210	14.90	10.196	9.06	0.688	2.529
3/15/2008	7.42	-----	67	58	42	3.04	1.612	16.34	11.254	9.57	0.634	2.038
3/16/2008	7.4	260	45	24	16	2.53	1.542	17.00	11.686	10.83	1.467	0.646
3/17/2008	7.34	-----	73	54	44	3.41	1.850	18.49	13.280	11.65	1.144	0.079
3/18/2008	7.22	261	66	44	36	3.31	1.710	20.78	13.378	12.33	1.685	0.645
3/19/2008	7.33	-----	66	48	42	3.14	1.768	17.53	13.326	12.48	1.004	1.482
3/20/2008	7.36	266	73	50	42	3.48	2.056	19.92	13.772	12.56	1.646	1.204
3/21/2008	7.51	-----	80	70	58	3.38	1.738	21.64	15.340	13.23	1.172	0.115
3/22/2008	7.43	-----	82	62	50	3.48	1.812	19.91	13.068	12.21	0.141	0.021
3/23/2008	7.32	249	77	58	40	3.18	1.556	18.73	11.682	10.78	0.796	0.042
3/24/2008	7.38	-----	72	58	46	3.07	1.622	17.97	12.452	11.20	1.204	0.215
3/25/2008	7.33	260	57	34	30	2.67	1.578	16.78	12.204	10.74	0.843	1.027
3/26/2008	7.51	-----	56	50	40	2.66	1.432	14.96	11.326	9.73	0.627	1.904
3/27/2008	7.54	269	54	50	40	2.86	1.618	16.34	11.894	10.99	0.920	1.679
3/28/2008	7.5	-----	57	60	40	2.29	1.194	14.31	11.136	9.70	0.439	2.428
3/29/2008	7.37	-----	61	66	50	2.67	1.244	16.06	10.448	9.62	0.764	2.576
3/30/2008	7.4	267	76	48	36	2.96	1.536	17.43	12.556	10.89	0.102	1.308
3/31/2008	7.25	-----	74	58	44	3.02	1.500	16.56	11.300	9.83	1.045	0.718
4/1/2008	7.41	249	42	28	18	1.66	0.938	10.86	8.620	7.70	0.191	2.774
4/2/2008	7.39	-----	61	52	42	2.45	1.226	13.75	10.882	9.42	0.282	3.127
4/3/2008	7.42	275	42	22	20	2.25	1.340	15.12	10.578	11.54	1.173	1.987
4/4/2008	7.53	-----	83	68	56	3.26	1.884	16.08	11.808	10.64	1.128	1.243
4/5/2008	7.4	-----	73	72	54	3.70	2.000	17.04	11.372	10.63	1.864	0.304
4/6/2008	7.35	267	74	50	40	3.44	2.032	19.88	14.438	12.38	0.074	0.003
4/7/2008	7.26	-----	79	60	48	3.65	1.324	20.09	10.342	13.39	0.519	0.069
4/8/2008	7.38	267	70	42	32	3.67	2.120	22.43	16.228	14.26	1.635	0.188

TABLE AIV-3 (Continued): MONITORING RESULTS FOR THE PRIMARY EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH pH_unit	ALKALINITY mg/L	BOD_5 mg/L	SS mg/L	VSS mg/L	TP mg/L	Sol-P mg/L	TKN mg/L	Sol-TKN mg/L	NH_3-N mg/L	NO_2-N mg/L	NO_3-N mg/L
4/9/2008	7.46	-----	50	60	44	2.65	1.406	15.92	11.960	10.52	0.813	1.943
4/10/2008	7.38	278	59	62	42	2.94	1.298	17.09	9.414	10.26	0.671	2.193
4/11/2008	7.63	-----	43	54	40	1.87	0.860	10.30	6.690	5.86	0.265	2.181
4/12/2008	7.43	-----	78	64	54	2.35	0.984	13.69	9.716	7.79	0.387	2.025
4/13/2008	7.55	267	62	44	36	2.43	1.246	14.97	10.286	8.13	0.541	1.219
4/14/2008	7.3	-----	51	48	36	2.48	1.124	13.63	7.786	8.70	0.314	1.600
4/15/2008	7.32	280	43	24	20	2.60	1.622	16.52	11.674	10.92	0.960	1.478
4/16/2008	7.33	-----	55	42	32	2.85	1.564	15.47	10.508	10.38	1.230	1.338
4/17/2008	7.38	285	66	52	40	3.57	1.634	19.46	10.080	12.53	1.531	1.330
4/18/2008	7.57	-----	70	56	48	3.42	1.878	20.54	14.288	13.21	1.413	0.168
4/19/2008	7.58	-----	70	60	46	3.66	2.152	20.48	15.542	13.01	0.882	0.000
4/20/2008	7.44	261	78	52	42	3.78	2.374	19.85	14.700	12.05	0.041	0.000
4/21/2008	7.42	-----	66	46	36	3.39	1.878	18.50	11.816	11.76	0.029	0.015
4/22/2008	7.44	259	73	48	42	3.87	2.308	20.08	14.310	13.32	1.222	0.052
4/23/2008	7.47	-----	67	34	28	3.78	1.956	19.83	12.742	14.51	0.048	0.001
4/24/2008	7.45	267	74	50	38	4.31	2.268	22.40	14.230	15.03	0.045	0.007
4/25/2008	7.58	-----	55	60	50	3.54	1.408	21.98	10.360	14.53	0.042	0.012
4/26/2008	7.57	-----	70	68	50	3.77	1.862	20.52	14.134	12.52	0.436	0.041
4/27/2008	7.42	259	67	38	24	3.28	2.142	19.88	15.796	13.80	0.042	0.005
4/28/2008	7.37	-----	85	52	44	3.86	1.770	21.41	11.902	13.92	0.032	0.003
4/29/2008	7.44	247	70	50	46	3.07	1.116	16.61	8.034	9.92	1.042	1.753
4/30/2008	7.3	-----	55	34	28	3.15	1.568	16.84	11.324	12.49	0.723	0.058
5/1/2008	7.4	268	54	42	26	2.88	1.592	16.29	11.310	12.18	2.454	0.564
5/2/2008	7.66	-----	55	46	32	2.85	1.460	17.60	10.654	12.18	1.567	0.757
5/3/2008	7.59	-----	61	68	50	3.21	1.808	17.02	12.650	10.84	1.354	0.849
5/4/2008	7.42	257	61	44	32	3.19	2.022	18.87	13.970	12.27	0.036	0.007
5/5/2008	7.51	-----	79	68	56	3.98	1.840	19.09	9.152	12.13	0.039	0.010
5/6/2008	7.45	252	46	40	30	3.35	1.924	19.19	11.074	12.80	1.451	1.694
5/7/2008	7.36	-----	43	24	22	2.98	1.964	16.54	12.450	13.00	1.104	2.537

TABLE AIV-3 (Continued): MONITORING RESULTS FOR THE PRIMARY EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH pH_unit	ALKALINITY mg/L	BOD_5 mg/L	SS mg/L	VSS mg/L	TP mg/L	Sol-P mg/L	TKN mg/L	Sol-TKN mg/L	NH_3-N mg/L	NO_2-N mg/L	NO_3-N mg/L
5/8/2008	7.44	241	57	54	40	2.69	1.386	16.00	10.958	10.09	0.514	2.247
5/9/2008	7.61	-----	83	62	50	3.38	1.714	18.74	12.914	11.55	1.244	1.695
5/10/2008	7.5	-----	76	56	48	3.93	2.192	18.37	12.334	11.52	1.599	1.659
5/11/2008	7.41	255	93	74	58	3.93	1.628	20.81	12.902	12.00	0.689	0.061
5/12/2008	7.43	-----	78	72	60	3.27	1.350	16.71	9.936	9.99	1.169	0.133
5/13/2008	7.5	274	52	32	26	3.41	2.472	17.37	13.126	12.27	0.735	0.080
5/14/2008	7.43	-----	63	42	36	3.64	1.698	17.35	10.444	12.86	1.091	0.115
5/15/2008	7.46	273	54	34	22	3.45	2.280	19.37	14.608	13.30	0.209	0.028
5/16/2008	7.64	-----	75	66	50	4.82	2.442	25.45	14.820	13.70	0.034	0.020
5/17/2008	7.54	-----	84	68	50	4.78	3.924	24.64	18.318	15.66	0.031	0.021
5/18/2008	7.46	267	85	60	40	4.18	3.050	24.95	18.510	16.04	0.055	0.017
5/19/2008	7.42	-----	83	36	30	3.85	2.594	21.43	16.090	15.26	0.037	0.000
5/20/2008	7.5	263	70	36	28	4.33	2.880	21.92	16.070	15.18	0.047	0.016
5/21/2008	7.36	-----	72	44	36	3.90	2.266	22.67	18.310	16.04	0.048	0.009
5/22/2008	7.34	227	53	36	26	2.00	0.794	20.14	13.784	14.47	2.755	0.586
5/23/2008	7.45	-----	66	48	38	2.43	0.586	25.56	17.248	17.44	0.994	0.169
5/24/2008	7.45	-----	63	30	23	1.81	0.390	22.45	16.102	15.91	2.280	1.556
5/25/2008	7.31	226	68	33	27	1.77	0.552	22.18	15.732	15.51	0.334	0.060
5/26/2008	7.31	-----	49	31	26	1.47	0.570	21.63	17.008	14.32	0.041	0.016
5/27/2008	7.19	219	54	18	15	1.59	0.592	20.46	15.806	14.11	1.549	0.295
5/28/2008	7.35	-----	48	19	17	2.15	0.980	21.18	17.608	15.98	1.804	0.340
5/29/2008	7.16	231	51	23	18	2.09	0.852	22.96	17.362	15.91	1.831	1.715
5/30/2008	7.5	-----	66	42	31	2.41	0.884	23.86	17.472	17.15	1.698	0.486
5/31/2008	7.47	-----	57	27	19	2.10	0.826	21.70	17.558	16.56	1.625	0.177
6/1/2008	7.23	214	60	21	15	1.95	0.752	20.26	17.082	14.89	0.040	0.005
6/2/2008	7.27	-----	51	18	15	1.72	0.792	19.67	12.854	13.88	0.530	0.074
6/3/2008	7.14	215	50	24	17	1.87	0.774	20.92	15.910	15.05	0.633	0.103
6/4/2008	7.16	-----	50	25	19	1.70	0.750	14.55	15.644	13.44	1.703	0.682
6/5/2008	7.35	232	45	19	14	1.82	0.832	19.06	15.790	13.86	1.061	0.137

TABLE AIV-3 (Continued): MONITORING RESULTS FOR THE PRIMARY EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH pH_unit	ALKALINITY mg/L	BOD_5 mg/L	SS mg/L	VSS mg/L	TP mg/L	Sol-P mg/L	TKN mg/L	Sol-TKN mg/L	NH_3-N mg/L	NO_2-N mg/L	NO_3-N mg/L
6/6/2008	7.63	-----	48	40	32	1.81	0.548	21.72	17.160	15.22	0.091	0.028
6/7/2008	7.46	-----	56	37	29	1.85	0.438	21.42	16.096	15.38	0.036	0.008
6/8/2008	7.25	223	59	31	25	1.92	0.574	22.73	16.806	15.95	0.036	0.006
6/9/2008	7.26	-----	39	27	21	1.56	0.496	12.74	9.932	8.38	0.320	2.313
6/10/2008	7.2	240	34	23	18	1.14	0.222	12.71	9.058	8.34	0.241	1.594
6/11/2008	7.26	-----	33	19	15	1.45	0.314	14.98	12.546	10.96	1.142	1.169
6/12/2008	7.16	246	43	23	20	1.52	0.476	17.99	15.128	12.37	1.399	0.523
6/13/2008	7.6	-----	41	24	20	1.57	0.534	18.82	14.516	12.69	1.373	0.170
6/14/2008	7.5	-----	39	22	17	1.44	0.490	17.83	13.122	12.43	0.299	0.034
6/15/2008	7.21	219	36	18	15	1.31	0.374	17.90	13.444	12.21	0.310	0.016
6/16/2008	6.81	-----	74	32	26	1.94	0.516	22.01	17.836	15.68	0.035	0.002
6/17/2008	7.05	234	71	23	21	2.29	0.814	24.98	19.088	17.20	0.038	0.005
6/18/2008	7.08	-----	51	16	12	1.89	0.890	21.13	18.784	16.28	0.450	0.013
6/19/2008	7.04	227	50	17	15	1.91	0.784	22.07	17.584	16.30	0.033	0.008
6/20/2008	7.42	-----	46	27	20	1.72	0.604	20.15	16.454	15.13	0.840	0.245
6/21/2008	7.32	-----	43	26	20	1.62	0.446	17.79	12.220	13.38	2.080	1.635
6/22/2008	7.14	208	48	18	12	1.69	0.574	19.62	15.568	14.49	1.271	0.011
6/23/2008	7.01	-----	54	17	13	1.78	0.806	22.12	19.316	17.09	0.034	0.009
6/24/2008	7.09	217	55	16	14	1.80	0.664	23.23	18.790	16.84	0.037	0.011
6/25/2008	7.08	-----	57	22	19	2.46	1.148	23.69	21.308	18.79	0.044	0.011
6/26/2008	7.17	226	49	15	12	2.37	0.992	21.64	18.206	16.39	0.963	0.288
6/27/2008	7.62	-----	44	25	19	1.75	0.646	21.02	17.060	15.93	0.364	0.058
6/28/2008	7.52	-----	52	25	19	2.01	0.674	21.52	14.796	16.10	1.874	0.137
6/29/2008	7.14	203	68	25	19	1.96	0.382	23.26	17.732	17.61	0.033	0.016
6/30/2008	6.99	-----	64	25	20	1.89	0.438	23.68	18.964	17.02	0.042	0.015
7/1/2008	7.2	246	88	42	29	2.33	0.070	36.19	28.132	28.38	0.489	0.007
7/2/2008	7.33	-----	56	31	24	2.44	0.724	28.49	21.122	23.25	0.047	0.018
7/3/2008	7.03	216	82	71	52	3.19	0.266	21.33	14.590	14.23	0.537	0.046
7/4/2008	7.47	-----	64	50	35	2.32	0.078	21.73	17.144	15.07	0.032	0.013

TABLE AIV-3 (Continued): MONITORING RESULTS FOR THE PRIMARY EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH pH_unit	ALKALINITY mg/L	BOD_5 mg/L	SS mg/L	VSS mg/L	TP mg/L	Sol-P mg/L	TKN mg/L	Sol-TKN mg/L	NH_3-N mg/L	NO_2-N mg/L	NO_3-N mg/L
7/5/2008	7.3	-----	64	59	40	2.14	0.054	18.62	12.430	12.48	2.472	0.046
7/6/2008	7.06	203	58	50	33	2.16	0.044	18.90	13.562	13.31	1.291	0.016
7/7/2008	7.33	-----	45	34	29	1.95	0.190	22.66	16.666	15.34	0.039	0.013
7/8/2008	7.32	189	45	27	20	1.50	0.066	18.61	14.310	13.69	2.194	0.079
7/9/2008	7.41	-----	45	20	17	1.75	0.534	19.69	17.900	15.52	1.926	0.134
7/10/2008	7.31	213	50	24	17	1.81	0.570	21.00	17.952	16.57	0.045	0.014
7/11/2008	7.71	-----	70	47	32	1.86	0.228	21.49	16.646	14.75	0.038	0.016
7/12/2008	7.51	-----	67	49	33	2.41	0.150	18.72	13.718	12.53	0.039	0.010
7/13/2008	7.36	226	56	28	20	1.83	0.344	18.82	14.426	12.78	0.034	0.011
7/14/2008	7.19	-----	47	22	19	1.35	0.464	15.65	12.946	11.75	2.120	0.444
7/15/2008	7.18	210	45	22	19	1.10	0.286	18.24	14.626	13.35	0.420	0.037
7/16/2008	7.36	-----	42	16	14	3.16	2.036	18.89	16.616	14.40	0.035	0.019
7/17/2008	7.45	220	39	16	15	2.08	1.132	17.05	15.608	14.12	0.042	0.023
7/18/2008	7.74	-----	52	28	24	1.86	0.742	20.21	14.238	14.26	0.028	0.027
7/19/2008	7.46	-----	33	31	23	1.81	0.718	14.05	9.822	9.68	0.433	1.710
7/20/2008	7.4	229	N/A	19	15	0.97	0.330	8.17	5.864	5.12	0.202	1.985
7/21/2008	7.66	-----	25	15	14	1.88	1.306	9.93	7.620	7.02	0.342	1.058
7/22/2008	7.57	258	29	17	12	1.78	0.956	14.31	10.620	9.86	0.687	0.318
7/23/2008	7.33	-----	48	25	20	2.07	0.924	16.43	13.158	12.58	1.154	1.095
7/24/2008	7.43	244	44	16	14	1.94	0.834	18.51	14.402	13.51	1.164	0.109
7/25/2008	7.75	-----	37	24	17	2.57	1.922	17.16	13.630	13.69	0.863	0.121
7/26/2008	7.71	-----	43	21	15	2.84	1.902	18.56	15.500	14.94	0.027	0.013
7/27/2008	7.4	213	55	19	14	3.03	1.930	19.25	16.086	15.42	0.032	0.012
7/28/2008	7.23	-----	44	15	13	2.91	2.010	18.06	14.076	13.91	0.035	0.013
7/29/2008	7.26	216	42	16	13	0.94	0.198	18.09	14.448	14.13	0.659	0.085
7/30/2008	7.48	-----	38	17	14	1.10	0.218	18.37	16.060	15.18	0.557	0.069
7/31/2008	7.15	203	40	15	11	1.34	0.186	21.02	16.876	16.05	0.940	0.104
8/1/2008	7.45	-----	66	62	41	1.47	0.050	19.59	14.342	13.81	0.041	0.023
8/2/2008	7.42	-----	36	30	20	1.07	0.108	17.19	13.482	12.69	0.341	0.056

TABLE AIV-3 (Continued): MONITORING RESULTS FOR THE PRIMARY EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH pH_unit	ALKALINITY mg/L	BOD_5 mg/L	SS mg/L	VSS mg/L	TP mg/L	Sol-P mg/L	TKN mg/L	Sol-TKN mg/L	NH_3-N mg/L	NO_2-N mg/L	NO_3-N mg/L
8/3/2008	6.91	205	73	42	28	2.17	0.056	20.01	15.214	14.50	0.042	0.013
8/4/2008	7.36	-----	48	30	24	1.73	0.140	20.42	15.578	14.96	0.043	0.021
8/5/2008	7.38	221	66	63	47	2.17	0.156	14.76	8.954	9.32	1.069	0.097
8/6/2008	7.26	-----	64	57	41	2.72	0.406	16.60	12.562	12.03	0.051	0.043
8/7/2008	7.28	249	64	38	28	2.01	0.334	20.07	15.810	14.72	0.222	0.036
8/8/2008	7.59	-----	66	61	43	2.51	0.394	21.03	16.088	15.27	0.102	0.036
8/9/2008	7.35	-----	63	59	43	2.50	0.218	21.44	15.432	15.48	0.728	0.028
8/10/2008	7.33	252	97	62	46	4.93	2.042	21.80	14.492	14.91	0.035	0.007
8/11/2008	7.5	-----	104	61	50	5.28	2.598	22.17	14.024	14.92	0.037	0.004
8/12/2008	7.34	225	61	21	17	2.28	0.990	20.51	15.310	16.20	0.036	0.031
8/13/2008	7.08	-----	72	36	25	2.05	0.416	21.16	17.356	16.85	0.286	0.008
8/14/2008	7.73	211	59	20	16	1.61	0.334	21.16	16.564	16.69	0.039	0.021
8/15/2008	7.43	-----	50	27	18	1.54	0.424	19.17	14.344	14.84	3.180	0.324
8/16/2008	7.26	-----	82	58	44	3.09	1.100	22.75	16.966	17.13	0.030	0.013
8/17/2008	7.04	204	77	36	29	1.72	0.332	20.58	15.892	15.97	1.960	0.148
8/18/2008	7.17	-----	60	16	15	1.58	0.480	21.34	17.272	16.79	1.048	0.135
8/19/2008	7.13	214	66	22	18	2.20	0.620	23.33	17.754	17.53	0.945	0.132
8/20/2008	7.05	-----	57	20	15	2.03	0.590	20.00	17.216	16.67	1.353	0.192
8/21/2008	7.04	204	61	35	26	1.96	0.092	20.80	15.812	15.78	2.868	1.074
8/22/2008	7.31	-----	59	55	37	2.16	0.354	20.58	15.604	15.84	0.500	0.094
8/23/2008	7.02	-----	80	48	32	2.94	0.316	23.21	16.514	17.35	0.079	0.027
8/24/2008	6.96	209	88	32	23	2.56	0.546	21.77	16.602	17.20	1.037	1.535
8/25/2008	7.14	-----	83	59	41	3.44	0.426	23.23	16.682	18.08	0.338	0.097
8/26/2008	7.09	217	87	39	29	3.04	0.584	24.55	20.524	21.55	0.044	0.021
8/27/2008	7.03	-----	95	40	30	2.78	0.412	23.31	16.104	18.88	2.148	0.320
8/28/2008	7.23	211	80	57	45	3.07	0.458	26.06	19.838	20.57	1.652	0.161
8/29/2008	7.5	-----	76	74	53	3.35	1.982	25.14	19.108	17.65	0.026	0.016
8/30/2008	7.52	-----	66	36	25	2.48	1.562	24.17	18.686	17.37	0.040	0.005
8/31/2008	7.61	194	79	34	25	2.23	0.396	24.30	19.232	18.43	1.807	0.148

TABLE AIV-3 (Continued): MONITORING RESULTS FOR THE PRIMARY EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH pH_unit	ALKALINITY mg/L	BOD_5 mg/L	SS mg/L	VSS mg/L	TP mg/L	Sol-P mg/L	TKN mg/L	Sol-TKN mg/L	NH_3-N mg/L	NO_2-N mg/L	NO_3-N mg/L
9/1/2008	6.87	-----	72	33	24	1.69	0.344	21.89	17.424	17.51	3.048	0.499
9/2/2008	7.32	179	74	42	28	1.93	0.248	21.15	16.546	16.19	2.930	0.458
9/3/2008	7.23	-----	68	68	42	2.14	0.178	23.81	19.330	18.90	0.042	0.012
9/4/2008	7.26	195	77	57	32	2.09	0.182	23.87	18.968	18.24	2.280	0.701
9/5/2008	7.32	-----	187	196	153	1.63	0.296	16.57	12.274	11.57	0.688	0.189
9/6/2008	7.52	-----	57	85	39	1.91	0.172	18.63	13.550	13.27	0.236	0.061
9/7/2008	7.12	222	70	53	21	1.59	0.072	20.48	15.478	15.63	0.283	0.073
9/8/2008	7.23	-----	62	27	23	1.49	0.158	18.75	14.124	15.04	2.445	0.349
9/9/2008	7.72	209	47	39	32	1.45	0.124	14.43	10.592	10.19	1.180	1.594
9/10/2008	7.53	-----	54	38	27	1.86	0.130	17.61	14.420	14.20	0.693	0.054
9/11/2008	7.51	252	89	60	48	3.13	1.398	25.91	19.934	20.77	0.045	0.018
9/12/2008	7.69	-----	64	62	45	1.95	0.134	21.79	15.510	15.29	0.026	0.043
9/13/2008	7.66	-----	49	62	44	1.55	0.132	10.95	7.190	6.92	0.035	0.015
9/14/2008	7.74	225	18	35	27	0.99	0.070	5.57	3.344	2.68	0.231	1.061
9/15/2008	7.52	-----	40	48	31	1.14	0.148	7.99	5.274	4.61	0.233	1.889
9/16/2008	7.44	280	41	37	23	1.16	0.112	10.28	7.022	6.80	1.515	0.000
9/17/2008	7.47	-----	30	27	21	1.15	0.098	10.75	9.100	8.90	0.681	0.179
9/18/2008	7.45	264	48	30	26	1.85	0.092	19.44	12.298	12.09	0.019	0.020
9/19/2008	7.7	-----	39	31	20	1.50	0.440	16.00	10.612	12.16	0.023	0.021
9/20/2008	7.63	-----	44	25	17	1.34	0.300	15.42	12.484	12.20	0.027	0.013
9/21/2008	7.4	225	42	24	14	1.00	0.058	15.83	11.708	12.25	0.028	0.025
9/22/2008	7.34	-----	70	33	26	1.22	0.092	17.34	12.676	14.14	0.023	0.001
9/23/2008	7.8	226	56	25	20	1.26	0.098	19.07	14.448	15.22	0.523	0.000
9/24/2008	7.35	-----	58	28	23	1.78	0.090	19.11	15.290	15.46	0.102	0.017
9/25/2008	7.33	228	41	26	19	1.02	0.182	18.45	13.608	13.39	1.373	0.010
9/26/2008	7.54	-----	73	76	56	2.44	0.118	20.44	14.994	14.45	0.030	0.014
9/27/2008	7.41	-----	62	50	38	1.66	1.078	18.46	14.322	13.35	0.180	0.016
9/28/2008	7.2	232	75	34	27	1.59	0.106	21.77	15.824	16.77	0.031	0.006
9/29/2008	7.27	-----	75	24	17	1.83	0.094	20.70	17.962	16.13	0.027	0.007

TABLE AIV-3 (Continued): MONITORING RESULTS FOR THE PRIMARY EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH pH_unit	ALKALINITY mg/L	BOD_5 mg/L	SS mg/L	VSS mg/L	TP mg/L	Sol-P mg/L	TKN mg/L	Sol-TKN mg/L	NH_3-N mg/L	NO_2-N mg/L	NO_3-N mg/L
9/30/2008	7.06	232	50	35	28	1.82	0.000	17.49	12.648	12.09	0.510	0.009
10/1/2008	7.01	-----	64	65	59	2.31	0.210	19.08	15.450	15.23	0.531	0.000
10/2/2008	7.11	243	64	37	29	2.12	0.184	24.53	19.808	16.98	0.187	0.000
10/3/2008	7.54	-----	55	54	38	1.93	0.248	19.13	13.928	14.54	0.842	0.008
10/4/2008	7.57	-----	70	55	40	1.99	0.218	24.22	18.174	17.67	0.035	0.000
10/5/2008	7.23	224	82	39	27	2.02	0.096	21.47	14.690	16.40	0.369	0.000
10/6/2008	7.13	-----	76	42	33	2.03	0.134	19.85	13.344	14.85	2.644	0.159
10/7/2008	7.36	241	76	35	28	2.35	0.206	26.48	19.806	17.73	1.400	0.000
10/8/2008	7.09	-----	60	47	33	1.85	0.080	14.03	10.122	11.23	1.099	0.000
10/9/2008	7.17	240	59	42	29	1.96	0.090	18.02	11.618	11.61	0.799	0.000
10/10/2008	7.63	-----	55	47	35	2.35	0.448	22.41	13.746	13.78	0.608	0.030
10/11/2008	7.61	-----	50	27	20	1.48	0.274	18.84	15.568	14.36	0.026	0.009
10/12/2008	7.39	224	48	19	15	1.16	0.096	18.97	14.328	14.11	0.028	0.009
10/13/2008	7.47	-----	59	17	13	1.51	0.198	18.10	13.348	14.71	0.030	0.008
10/14/2008	7.29	229	57	26	22	1.84	0.440	22.17	17.584	16.85	0.032	0.011
10/15/2008	7.43	-----	51	23	19	2.19	0.856	21.04	17.478	16.75	0.034	0.002
10/16/2008	7.38	228	45	23	17	1.77	0.454	20.67	16.078	15.87	0.630	0.005
10/17/2008	7.73	-----	53	32	24	2.22	0.746	20.71	16.194	16.69	0.174	0.021
10/18/2008	7.69	-----	70	45	33	3.03	1.120	20.61	14.324	15.83	0.078	0.013
10/19/2008	7.34	230	69	26	20	2.23	0.656	23.13	16.538	17.47	0.040	0.000
10/20/2008	7.34	-----	57	20	17	1.83	0.564	16.97	14.020	16.69	0.038	0.000
10/21/2008	7.38	222	53	21	15	1.94	0.574	21.99	16.550	17.17	0.036	0.007
10/22/2008	7.41	-----	55	19	16	2.14	0.772	21.03	16.642	17.31	0.037	0.008
10/23/2008	7.55	229	52	17	13	2.29	0.940	23.08	15.842	18.53	0.068	0.035
10/24/2008	7.68	-----	51	30	23	2.12	0.608	21.58	15.614	15.95	0.782	0.214
10/25/2008	7.65	-----	53	26	19	1.76	0.518	18.92	14.110	14.63	0.876	0.062
10/26/2008	7.49	227	49	16	12	1.22	0.220	17.18	12.714	15.01	0.029	0.009
10/27/2008	7.7	-----	52	21	15	1.43	0.328	17.94	14.884	15.53	0.035	0.006
10/28/2008	7.42	220	47	17	15	1.62	0.544	21.77	16.632	16.64	0.650	0.025

TABLE AIV-3 (Continued): MONITORING RESULTS FOR THE PRIMARY EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH pH_unit	ALKALINITY mg/L	BOD_5 mg/L	SS mg/L	VSS mg/L	TP mg/L	Sol-P mg/L	TKN mg/L	Sol-TKN mg/L	NH_3-N mg/L	NO_2-N mg/L	NO_3-N mg/L
10/29/2008	7.52	-----	57	19	15	2.01	0.848	21.08	18.314	17.72	0.038	0.009
10/30/2008	7.62	263	79	43	37	4.05	2.036	25.14	17.110	17.53	0.048	0.018
10/31/2008	7.62	-----	52	22	18	1.82	0.706	21.04	16.758	15.93	1.166	0.077
11/1/2008	7.6	-----	63	32	24	1.72	0.396	23.84	18.512	18.16	0.040	0.026
11/2/2008	7.29	199	42	17	14	1.29	0.290	20.28	15.894	15.39	2.620	0.136
11/3/2008	7.5	-----	59	15	13	1.52	0.210	20.68	16.548	17.37	0.047	0.014
11/4/2008	7.51	216	54	20	16	1.70	0.424	21.42	16.498	16.61	1.964	0.120
11/5/2008	7.24	-----	60	25	19	1.93	0.456	21.86	17.282	17.15	1.540	0.059
11/6/2008	7.07	225	60	27	24	1.68	0.262	25.76	19.184	18.73	0.434	0.028
11/7/2008	7.69	-----	61	37	30	1.77	0.202	22.19	16.540	16.94	1.720	0.080
11/8/2008	7.57	-----	62	43	35	1.58	0.124	20.98	15.372	14.85	1.735	2.696
11/9/2008	7.12	202	53	28	21	1.37	0.042	21.66	16.350	15.96	1.098	2.942
11/10/2008	7.34	-----	77	33	25	1.62	0.070	21.55	17.068	17.37	2.328	0.417
11/11/2008	7.25	214	65	24	19	1.53	0.078	22.77	17.526	17.03	2.704	0.356
11/12/2008	7.02	-----	56	27	20	1.39	0.052	17.52	13.044	13.62	1.700	1.750
11/13/2008	7.44	230	46	23	19	1.26	0.040	19.85	13.628	14.47	1.795	0.046
11/14/2008	7.67	-----	64	41	34	1.78	0.240	19.29	14.488	14.25	1.677	0.073
11/15/2008	7.37	-----	57	32	29	1.32	0.138	19.26	14.120	14.80	0.850	0.038
11/16/2008	7.28	230	55	27	21	1.34	0.076	20.18	15.204	15.79	1.657	0.022
11/17/2008	7.19	-----	62	22	17	1.67	0.224	18.05	12.920	15.31	2.382	0.183
11/18/2008	7.81	220	60	32	23	1.47	0.114	20.02	15.424	15.74	1.651	0.401
11/19/2008	7.77	-----	59	30	25	2.18	0.700	20.70	16.742	16.81	0.890	0.070
11/20/2008	7.57	223	51	17	14	1.34	0.320	23.25	19.784	18.27	0.848	0.062
11/21/2008	7.38	-----	63	30	25	1.80	0.280	23.31	15.694	17.50	2.106	0.484
11/22/2008	7.37	-----	48	33	23	1.45	0.090	23.51	17.460	18.22	0.042	0.046
11/23/2008	7.18	213	64	20	15	1.55	0.156	22.31	16.566	17.28	0.038	0.020
11/24/2008	7.24	-----	67	27	22	2.01	0.762	20.98	17.142	17.75	0.046	0.052
11/25/2008	7.31	220	49	22	16	1.69	0.316	21.79	16.388	17.50	0.042	0.054
11/26/2008	7.4	-----	55	32	21	1.78	0.476	21.80	17.142	17.87	0.039	0.029

TABLE AIV-3 (Continued): MONITORING RESULTS FOR THE PRIMARY EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH pH_unit	ALKALINITY mg/L	BOD_5 mg/L	SS mg/L	VSS mg/L	TP mg/L	Sol-P mg/L	TKN mg/L	Sol-TKN mg/L	NH_3-N mg/L	NO_2-N mg/L	NO_3-N mg/L
11/27/2008	7.51	221	66	37	22	1.93	0.510	22.79	17.234	16.26	0.044	0.027
11/28/2008	7.48	-----	76	48	34	1.79	0.218	22.95	15.370	16.61	0.030	0.038
11/29/2008	7.52	-----	75	48	32	1.87	0.240	27.74	20.688	20.93	0.038	0.030
11/30/2008	7.44	225	71	27	17	1.97	0.370	24.82	18.270	17.98	0.042	0.032
12/1/2008	7.48	-----	60	32	27	1.55	0.096	22.19	17.392	17.06	0.033	0.015
12/2/2008	7.17	220	56	26	22	1.62	0.322	21.74	16.340	16.06	1.288	0.000
12/3/2008	7.16	-----	59	25	22	1.72	0.182	21.00	16.122	16.56	1.046	0.000
12/4/2008	6.96	221	53	23	19	1.39	0.186	21.78	16.602	15.43	2.260	0.092
12/5/2008	7.26	-----	58	47	41	1.67	0.382	21.64	14.526	15.27	1.385	0.000
12/6/2008	7.25	-----	73	50	41	2.85	0.968	24.36	18.094	17.14	0.050	0.022
12/7/2008	7.06	215	62	30	25	1.56	0.116	22.41	16.198	15.87	0.812	0.000
12/8/2008	7.15	-----	65	28	22	1.99	0.354	22.70	17.852	17.35	0.387	0.019
12/9/2008	7.11	213	62	39	30	1.72	0.112	19.92	14.516	13.66	0.037	0.011
12/10/2008	7.47	-----	50	41	30	1.36	0.078	15.11	11.336	10.31	0.183	1.821
12/11/2008	7.47	254	46	26	20	1.00	0.090	15.72	12.146	10.76	0.573	1.178
12/12/2008	7.39	-----	68	54	43	1.76	0.164	18.40	12.510	12.39	0.569	0.827
12/13/2008	7.34	-----	60	49	38	1.88	0.054	21.46	14.688	13.82	0.904	0.052
12/14/2008	7.05	234	54	37	27	1.35	0.024	14.15	9.982	9.31	0.724	1.232
12/15/2008	7.14	-----	37	20	15	0.69	0.040	7.92	6.366	7.43	0.129	1.914
12/16/2008	7.49	267	46	28	22	1.19	0.118	15.54	11.250	10.28	0.255	2.254
12/17/2008	7.57	-----	49	28	23	1.53	0.256	16.15	13.040	11.27	0.399	3.011
12/18/2008	7.53	272	54	29	23	1.36	0.108	20.24	15.108	13.69	0.914	1.750
12/19/2008	7.54	-----	64	49	37	1.51	0.082	22.27	15.118	15.26	1.056	0.309
12/20/2008	7.63	-----	60	35	27	1.39	0.718	22.49	14.284	14.94	1.476	0.101
12/21/2008	7.42	261	58	37	28	1.77	0.402	24.49	17.546	16.42	0.870	0.039
12/22/2008	7.43	-----	81	49	42	2.98	1.160	24.86	13.696	16.33	0.493	0.030
12/23/2008	7.26	247	61	33	25	1.58	0.554	22.54	1.992	16.52	0.778	0.033
12/24/2008	7.73	-----	73	45	35	2.00	0.160	20.83	16.462	16.01	1.102	0.061
12/25/2008	7.59	236	57	33	28	1.63	0.346	22.90	17.112	16.55	0.119	0.000

TABLE AIV-3 (Continued): MONITORING RESULTS FOR THE PRIMARY EFFLUENT OF THE JOHN E. EGAN WATER RECLAMATION PLANT DURING PHOSPHORUS REDUCTION STUDY

Date	pH pH_unit	ALKALINITY mg/L	BOD_5 mg/L	SS mg/L	VSS mg/L	TP mg/L	Sol-P mg/L	TKN mg/L	Sol-TKN mg/L	NH_3-N mg/L	NO_2-N mg/L	NO_3-N mg/L
12/26/2008	7.64	-----	82	60	46	2.68	0.958	25.52	18.886	18.51	0.025	0.006
12/27/2008	7.59	-----	51	48	32	1.70	0.460	11.69	7.018	6.80	0.442	1.242
12/28/2008	7.67	243	51	49	34	1.56	0.508	9.56	5.504	4.97	0.152	2.332
12/29/2008	7.65	-----	57	37	32	2.04	0.790	11.52	4.856	7.23	0.209	1.799
12/30/2008	7.71	288	59	35	28	2.29	1.030	15.02	9.732	9.40	0.969	0.366
12/31/2008	7.65	-----	84	61	52	3.09	1.138	17.08	9.848	10.79	0.473	0.018
1/1/2009	7.61	290	77	51	41	3.10	1.174	19.14	10.926	12.81	0.036	0.005
1/2/2009	7.64	-----	82	54	45	3.37	1.770	22.06	15.040	14.20	0.025	0.013
1/3/2009	7.57	-----	95	60	50	3.89	2.118	22.67	15.090	14.81	0.028	0.008
1/4/2009	7.58	280	81	42	36	3.89	2.252	22.79	14.630	14.81	0.038	0.003
1/5/2009	7.64	-----	92	50	44	4.04	2.354	22.52	12.798	15.52	0.219	0.032
1/6/2009	7.58	276	87	63	50	4.22	2.694	23.31	15.380	14.83	0.711	0.062
1/7/2009	7.64	-----	77	51	43	4.46	2.586	22.83	16.272	16.22	0.040	0.007
1/8/2009	7.64	278	77	41	34	4.04	2.384	21.69	16.426	15.92	0.046	0.009
1/9/2009	7.78	-----	91	61	55	4.49	2.560	24.73	18.108	16.55	0.029	0.024
1/10/2009	7.65	-----	98	71	57	4.78	2.660	26.17	19.038	17.37	0.035	0.013
1/11/2009	7.57	272	95	54	48	4.43	2.746	26.84	18.178	17.14	0.050	0.008
1/12/2009	7.52	-----	92	63	48	5.09	2.846	23.58	13.228	17.04	0.039	0.003
1/13/2009	7.59	278	82	50	43	4.91	3.084	24.87	17.424	17.35	0.049	0.007
1/14/2009	7.71	-----	80	55	46	5.31	2.888	25.26	17.518	17.29	0.158	0.019
1/15/2009	7.57	-----	80	52	39	5.08	-----	26.21	-----	17.66	0.723	0.052