

PUBLIC WORKS DEPARTMENT

CITY OF PORTSMOUTH

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January 30, 2013

Mark Pollins
USEPA Region One
Post Office Square, Suite 100
Boston, MA 02109-3912

Re: Consent Decree 09-cv-283-PB
Quarterly Report No. 13
Portsmouth, New Hampshire

Dear Mr Pollins.:

In accordance with Consent Decree 09-cv-283-PB, Section V, item paragraph 20, dated August 12, 2009, and as amended by Consent Decree Modification filed July 2, 2012, the City of Portsmouth is submitting this quarterly status report.

The modified Consent Decree requires the filing of quarterly reports as follows:

Within 30 days after the end of each calendar quarter (i.e., by April 30, July 30, October 30, and January 30) after the Effective Date of this Consent Decree, until termination of this Decree pursuant to Section XVI, the City shall submit a written report for the preceding calendar quarter that shall include a description of the following: i) the status of any construction or compliance measures, including whether any such construction or compliance measure could be completed prior to relevant milestones contained herein consistent with sound engineering practice and normal construction practices; ii) the status of all Consent Decree milestones, including whether any have been achieved prior to the date for doing so; iii) any problems encountered or anticipated, together with the proposed or implemented solutions; iv) the status of permit applications; v) operation and maintenance operations; and vi) reports to State agencies.

The following is the list of compliance requirements listed in Section IV of the Consent Decree including additional requirement listed in the Consent Decree Modification which was filed July 2, 2012. For clarity the requirements are listed in plain text and the status of the item is shown in ***Bold Italics***.

8. Nine Minimum Controls Compliance Plan. Attached (*in the referenced CD*) as Appendix A is the Nine Minimum Controls Compliance Plan. The City shall implement the Nine Minimum Controls Compliance Plan in accordance with the schedule specified in Appendix A.

i) There are no construction related activities with this item. The compliance measures associated with this item are on-going.

ii) There is no Consent Decree milestone associated with this item.

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- iii) There have been no problems encountered or anticipated with this item.*
- iv) There are no permit applications associated with this item.*
- v) Operation and maintenance is on-going*
- vi) There are no reports to State Agencies associated with this item.*

9. Wastewater Master Plan. Attached as Appendix B is the WMP SOW dated May 17, 2007. The City shall implement the WMP in Appendix B, and comply with all milestones and schedules in Appendix B.1.

The Schedule listed in Appendix B.1 has been modified by the July 2, 2012 Consent Decree Modification to include additional tasks and a revised schedule. The Consent Decree Modification includes a schedule for completion of secondary treatment upgrades at the Peirce Island Treatment Plant as well as adjustments to the Long Term Control Plan project schedule. Final completion for the wastewater treatment plant upgrades, including compliance with permit requirements, is scheduled for May 2017. The additional requirements of the amended Consent Decree are listed below as items g through n:

g. By June 30, 2012, the City shall complete pilot testing of potential treatment technologies for achieving secondary treatment, including, but not necessarily limited to: Biologically Aerated Filters (BAF), BioMag, Moving Bed Biofilm Reactors (MBBR) w/ Dissolved Air Flotation (DAF), and Conventional Activated Sludge with BioMag. By July 30, 2012, the City shall complete a data summary relative to the pilot testing.

This milestone has been met. No further action required.

h. By October 1, 2012, the City shall submit a Piloting Technical Memorandum that includes data from piloting and a recommendation on the design and capacity of secondary treatment facilities.

This milestone has been met. The final engineering report was submitted September 28, 2012 to State Agencies concurrent with submission to the EPA as part of the milestone deadlines. The results of this work were presented to representatives of EPA and NHDES on December 18, 2012. No further action is required of the City but the City is awaiting timely response to the recommendations from the EPA and DES.

i. By July 1, 2013, the City shall commence final design of secondary treatment facilities.

- i) The City received Statement of Qualifications for selection of Preliminary and Final Design Engineering Services on January 17, 2013 and has scheduled interviews for early February. No construction activities with this item.*
- ii) The City anticipates that this Consent Decree milestone will be met provided that the terms of a final NPDES permit are issued in a timely manner so the basis of design can be finalized (see item iii).*
- iii) The City does not anticipate any problems meeting this Consent Decree milestone provided that the terms of a final NPDES permit are issued so the basis of design can be finalized.*

The Piloting Technical Memorandum provides a recommendation on the design and capacity of a secondary treatment facility with the ability to treat to a total nitrogen of 8 mg/L. However, this basis of design was made with certain assumptions that need to be confirmed in the final NPDES permit limits and conditions. A draft permit has not yet been received.

- iv) The Peirce Island WWTF NPDES permit reapplication was submitted in December, 2011. A draft permit has not yet been received.*
- v) There are no operation and maintenance activities with this item.*
- vi) There is no report associated with this milestone to be submitted to State Agencies.*

j. By August 31, 2014, the City shall complete design of secondary treatment facilities.

- i) The City received Statement of Qualifications for selection of Preliminary and Final Design Engineering Services on January 17, 2013 and has scheduled interviews for early February. No construction activities with this item.*
- ii) The City anticipates that this Consent Decree milestone will be met provided that the terms of a final NPDES permit are issued in a timely manner so the basis of design can be finalized (see item iii).*
- iii) The City does not anticipate any problems meeting this Consent Decree milestone provided that the terms of a final NPDES permit are issued in a timely manner so the basis of design can be finalized. The Piloting Technical Memorandum provides a recommendation on the design and capacity of a secondary treatment facility with the ability to treat to total nitrogen of 8 mg/L. However, this basis of design was made with certain assumptions that need to be confirmed in the final NPDES permit. A draft permit has not yet been received.*
- iv) The Peirce Island WWTF NPDES permit reapplication was submitted in December, 2011. A draft permit has not yet been received. Additional permitting related activities will include a review of the National Register of Historic Places as required per Section 106 of the National Historic Preservation Act. Since all current upgrade options are outside the limits of the existing fence, the City will need to reconcile Land and Water Conservation Funds and Coastal Zone Management Funds used in development of recreational facilities on the island. Additional natural resource type permits will be required and will be defined as the final layout is developed and finalized.*
- v) There are no operation and maintenance activities with this item.*
- vi) There is no report associated with this milestone to be submitted to State Agencies.*

k. By March 1, 2015, the City shall commence construction of secondary treatment facilities.

- i) No construction activities with this item yet. Construction schedule will be finalized as part of Consent Decree requirement j above.*
- ii) The construction schedule may be impacted by any delays in completion of final design due to the timing of issuance of a final NPDES permit. Assuming timely issuance of the terms of a final NPDES permit, the City anticipates that the construction schedule will be met. This task may be completed earlier if possible and will be consistent with sound engineering practice and normal construction practices.*
- iii)) The construction schedule may be impacted by any delays in completion of final design due to issuance of a final NPDES permit*

- iv) The Peirce Island WWTF NPDES permit reapplication was submitted in December, 2011. A draft permit has not yet been received.*
- v) There are no operation and maintenance activities with this item.*
- vi) There is no report associated with this milestone to be submitted to State Agencies.*

l. By March 1, 2017, the City shall complete construction of secondary treatment facilities.

- i) No construction activities with this item yet. Construction schedule will be finalized as part of Consent Decree requirement j above.*
- ii) The construction schedule may be impacted by any delays in completion of final design due to the timing of issuance of a final NPDES permit. Assuming timely issuance of the terms of a final NPDES permit, the City anticipates that the construction schedule will be met. This task may be completed earlier if possible and will be consistent with sound engineering practice and normal construction practices.*
- iii)) The construction schedule may be impacted by any delays in completion of final design due to issuance of a final NPDES permit.*
- iv) The Peirce Island WWTF NPDES permit reapplication was submitted in December, 2011. A draft permit has not yet been received.*
- v) There are no operation and maintenance activities with this item.*
- vi) There is no report associated with this milestone to be submitted to State Agencies.*

m. By May 1, 2017, the City shall achieve compliance with secondary treatment limits in the Permit.

- i) No construction activities with this item yet. Construction schedule will be finalized as part of Consent Decree requirement j above.*
- ii) The construction schedule may be impacted by any delays in completion of final design due to the timing of issuance of a final NPDES permit. Assuming timely issuance of the terms of a final NPDES permit, the City anticipates that the construction schedule will be met. This task may be completed earlier if possible and will be consistent with sound engineering practice and normal construction practices.*
- iii)) The construction schedule may be impacted by any delays in completion of final design due to issuance of a final NPDES permit.*
- iv) The Peirce Island WWTF NPDES permit reapplication was submitted in December, 2011. A draft permit has not been received.*
- v) There are no operation and maintenance activities with this item.*
- vi) There is no report associated with this milestone to be submitted to State Agencies.*

n. Whenever feasible, the City shall commence work in advance of milestones and complete such work as expeditiously as practicable consistent with sound engineering practice and normal construction practices.

The City understands this measure and when consistent with sound engineering practice and normal construction practices will strive to meet its intent.

10. Combined Sewer Overflow Facility Upgrades. The City shall implement its April 2005 Final CSO Long Term Control Plan in accordance with the following schedule and shall complete all construction for implementation of the 2005 LTCP by October, 2012:

A revised schedule was included with the Consent Decree Modification which was filed on July 2, 2012.

Planning Area I.D.	Contract I.D.	Project Start Date	Project Completion Date
Lincoln 3	Phase I	In Progress	10/1/2011
Lincoln 3	Phase II	In Progress	10/1/2012
Lincoln 3	Phase III	In Progress	10/1/2013
Court/State	Court #3	1/1/2008	1/1/2012
Islington	Islington #1	Under Design	10/1/2010
Islington	Islington #2	Under Design	1/1/2012

*Revised LTCP Schedule **

<i>Planning Area I.D.</i>	<i>Contract I.D.</i>	<i>Project Status</i>	<i>Project Completion Date</i>
<i>Lincoln 3</i>	<i>Phase I</i>	<i>Substantially Complete</i>	<i>6/1/2012</i>
<i>Lincoln 3</i>	<i>Phase II</i>	<i>In Design</i>	<i>10/1/2014</i>
<i>Lincoln 3</i>	<i>Phase III</i>	<i>Under Construction</i>	<i>10/1/2013</i>
<i>Islington</i>	<i>Islington #2</i>	<i>Under Construction</i>	<i>6/1/2013</i>

* As filed July 2, 2012 Consent Decree Modification.

- i) *The construction related activities with this item are shown on the table above. The compliance measures associated with this item are on-going. With the exception of the Islington #2 project, Construction on these projects is anticipated to be completed on schedule. As required by paragraphs 36 and 37 of Consent Decree the City notified the EPA by letter dated November 16, 2012 that the Islington #2 project may be delayed as a result of petroleum contaminated soils encountered during construction. Since that letter the City has received notice from the contractor, Albanese, D&S that they are requesting a time extension due to delays related to the contaminated soils. The City has been using its best efforts to keep the Islington #2 Project on schedule, but both the Contractor and the City's consulting engineer have clearly communicated their view that the Project deadline for the sewer separation completion needs to be adjusted due to the unforeseen conditions. The City received a Change Order request from the Contractor for a 30 day extension of the substantial completion date. The City is currently reviewing this request. The Construction on the other projects will be completed earlier if possible and consistent with sound engineering practice and normal construction practices.*
- ii) *The Consent Decree milestones associated with this item will meet the adjusted schedule and earlier if possible and consistent with sound engineering practice and normal construction practices.*
- iii) *There are no problems encountered or anticipated with this item.*

- iv) Wetland and Shore-land permit applications for Lincoln Area Contract 3 Phase III are completed and approved.*
- v) There are no operation and maintenance activities with this item.*
- vi) There are no reports to State Agencies associated with this item.*

11. Interim Emissions/Effluent Limits. Until the City completes construction of and achieves full operation of secondary treatment facilities in accordance with the schedule contained in this Consent Decree, the City shall comply with the interim limits and measures set forth in Appendix C. (See Current AO effluent limits). Thereafter, the City shall comply with the applicable NPDES permit limits then in effect.

The Peirce Island WWTF has met the interim permit limits for the Quarter covered by this report with the exception of BOD₅ effluent concentration and percent removal. The permit limits for BOD₅ effluent concentration and percent removal have been exceeded as summarized below:

<i>Month</i>	<i>BOD₅ Concentration (Permit Limit 150 mg/l)</i>	<i>BOD₅ Percent Removal (Permit Limit 30%)</i>
<i>October 2012</i>	<i>172.2</i>	<i>Met permit</i>
<i>November 2012</i>	<i>Met permit</i>	<i>Met permit</i>
<i>December 2012</i>	<i>Met permit</i>	<i>Met permit</i>

Wastewater Treatment Facility Staff performed additional BOD₅ sampling in accordance with an action plan developed in conjunction with Wes Ripple of the NHDES to investigate the potential causes. The data collection was suspended at the end of December 2012 to redirect resources toward the WWTF upgrade project. The City's consultant, AECOM analyzed the data and summarized the potential causes of BOD₅ exceedances at the WWTF (see attached letter dated 1/30/13). The City concurs with AECOM's conclusions and intends to work toward design and construction of a secondary WWTF.

- i) There are no construction related activities with this item. The compliance measures associated with this item are on-going.*
- ii) There are no Consent Decree milestones associated with this item.*
- iii) The wastewater BOD₅ strength coming to Peirce Island appears to increase in the soluble form during periods of low flow and high temperature as occurred this past summer of 2012 (see Quarterly Report 12). The soluble component passes through the physical CEPT process and makes it difficult to meet permit limits. The City and its consultant reviewed additional BOD₅ sampling data and attached a summary of the analysis to this quarterly report.*
- iv) There is no permit application pending associated with this item. However, the Peirce Island WWTF upgrade to a biological treatment process will allow the soluble waste to be removed from the wastewater.*
- v) There have been no exceptional operation and maintenance activities outside of routine wastewater treatment facility operation associated with this item.*
- vi) There are no reports to State Agencies associated with this item that have not also been submitted to the EPA as part of the milestone deadlines.*

12. Post Construction Monitoring Plan:

This item was submitted as part of the June 4, 2010 Wastewater Master Plan Draft submission. The implementation schedule will be adjusted to reflect the new schedule listed in item 10 above.

- i) There are no construction related activities or compliance measure associated with this item.*
- ii) The Consent Decree milestones associated with this item will be met subject to the concerns raised above under paragraph 9, item iii.*
- iii) The Consent Decree milestones associated with this item will be met subject to the concerns raised above under paragraph 9, item iii.*
- iv) There is no permit application pending associated with this item.*
- v) There are no operation and maintenance activities associated with this item.*
- vi) There are no reports to State Agencies associated with this item.*

As required by the Consent Decree:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Please call me at 603-766-1416 if you have any questions or require additional information.

Very truly yours,



Peter H. Rice, P.E.
Deputy Director of Public Works

Encl.

cc: Chief, Environmental Enforcement Section w/encl.
Joy Hilton, USEPA Region 1 w/encl.
Tracy L. Wood, P.E., NHDES Wastewater Engineering Bureau w/encl.
Allen Brooks, Esq., Department of Justice, Environmental Protection Bureau w/encl.
Mr. John P. Bohenko, City Manager, City of Portsmouth w/o encl.
Robert P. Sullivan, City Attorney w/encl.
Suzanne Woodland, Assistant City Attorney w/encl.
David S. Allen, P.E., Assistant City Manager w/o encl.
E. Tupper Kinder, Esquire Nelson Kinder & Mosseau PC, w/encl.



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J-60223731

January 30, 2013

Mr. Terry Desmarais, P.E.
City Engineer
Department of Public Works
680 Peverly Hill Road
Portsmouth, NH 03801

Subject: Wastewater Master Plan (WWMP) Phase 2 Initial Piloting
Peirce Island Wastewater Treatment Facility
BOD₅ Exceedances

Dear Mr. Desmarais:

As requested, we have reviewed the operating data and other information you forwarded regarding the BOD₅ exceedances earlier this year at the Peirce Island Wastewater Treatment Facility (WWTF). This letter presents a summary of our review of the data and offers an opinion as to the causes of recent BOD₅ exceedances at the Peirce Island Wastewater Treatment Facility (WWTF). The permit requirements for effluent BOD₅ at the Peirce Island WWTF limit the effluent to a maximum monthly average concentration of 150 mg/L and a minimum monthly average BOD removal of 30 percent. Over the past year, both of these permit requirements have been exceeded, as shown in the table below.

Table 1. Peirce Island BOD₅ Exceedance Summary

Month	BOD ₅ Concentration	BOD ₅ Percent Removal
	(Permit Limit 150 mg/l)	(Permit Limit 30%)
Jan-12	Met permit	Met permit
Feb-12	Met permit	Met permit
Mar-12	Met permit	29.5
Apr-12	160.6	26.1
May-12	Met permit	Met permit
Jun-12	Met permit	Met permit
Jul-12	157.6	Met permit
Aug-12	172.9	Met permit
Sep-12	203.1	Met permit
Oct-12	172.2	Met permit
Nov-12	Met permit	Met permit
Dec-12	Met permit	Met permit



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Based on the table above, there appear to be two distinct time periods when BOD₅ permit requirements were exceeded. During the late winter and early spring, there appears to be a period when the plant did not meet the requirements for percent removal and occasionally concentration. During the summer and early fall, the plant exceeded its permit limitation for concentration, but not percent removal.

The Monthly Operating Report (MOR) data was reviewed in an effort to identify what caused these exceedances. The effluent BOD₅ concentration and percent removal during 2012 were compared to a number of other potential operating factors, including:

- Flow
- Wastewater temperature
- Influent BOD₅ concentration
- Influent soluble BOD₅ concentration
- Influent percent soluble BOD₅
- Influent TSS
- Effluent TSS
- pH
- Ferric dose
- Polymer dose

Based on a review of the available data, it appears that low influent BOD₅ in combination with low ferric chloride doses may have resulted in the exceedances in March and April. During this time period, influent BOD₅ averaged 205.5 mg/L, roughly 20% below the annual average. We believe that one factor contributing to the exceedance is the fact that it is more difficult to remove 30% of a dilute influent than it is to remove 30% of a concentrated influent particularly when using gravity sedimentation such as chemically enhanced primary treatment (CEPT). This situation is analogous to the occasional difficulty secondary treatment plants treating wastewater from a combined sewer system during extended high flows have in meeting the 85% removal requirement. A second contributing factor may have been low ferric chloride dose. As seen in Figure 1 attached, ferric chloride dose in March and April was lower than the remainder of the year. When the dose was increased, percent removal increased.

During the summer and early fall, the cause of the BOD₅ exceedances appear to be related to wastewater temperature, as seen in Figure 2. As wastewater temperature increases, so does the effluent BOD₅ concentration. It is believed that the increase in wastewater temperature results in increased biological activity in the sewer system. The increased biological activity can deplete dissolved oxygen resulting in the solubilization of BOD₅ and creation of volatile acids by facultative bacteria, similar to the first step in the anaerobic digestion process. Because soluble BOD₅ is extremely difficult for the CEPT system to remove, the effluent BOD₅ increases. This theory is supported by the ORP measurements made by NHDES in July and August. The measurements show that the influent wastewater ORP is on the order of -200 mV which indicates a strongly anoxic environment.



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Since this condition appears to be related to temperature and detention time within the collection system, the low flows in the system experienced last summer and fall were also likely a contributing factor. The City's continuing sewer separation efforts could also have an effect on the frequency of occurrence of this condition in the future.

As the conditions that led to the occurrence of this situation are a function of the wastewater and the collection system characteristics which cannot easily be corrected, expediting the design and construction of the secondary treatment process would allow the City to be able to treat the incoming BOD₅, regardless of whether it is in a highly soluble form or not. In the short term prior to the secondary treatment plant becoming operational, if this problem re-appears a possible solution to the increase in influent soluble BOD is to prechlorinate the influent. Prechlorination will oxidize some of the organic matter and will therefore remove some of the soluble BOD₅. BOD₅ will first be converted to intermediate oxygenated molecules followed by breakdown to carbon dioxide and water. AECOM suggests that plant staff start this process by dosing the influent with roughly 5 to 7 mg/L as chlorine.

If you should have any questions, please feel free to contact us.

Very truly yours,

A handwritten signature in black ink that reads 'Jon R. Pearson'. The signature is fluid and cursive, with a long horizontal stroke at the end.

Jon R. Pearson, P.E.
Vice President
AECOM

Att.

JRP/jrp

Figure 1: BOD % Removal & Ferric Chloride Dose

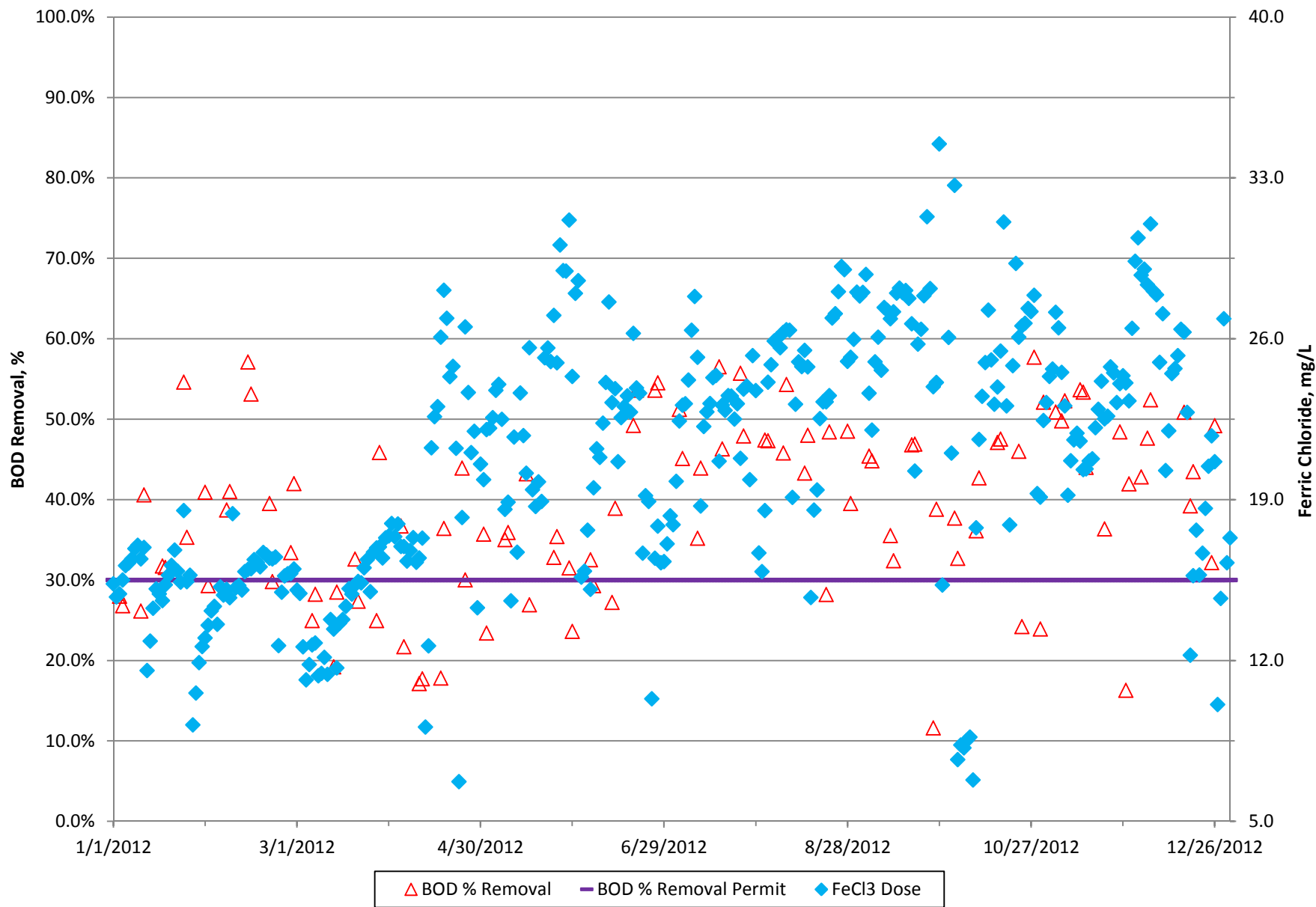


Figure 2: BOD & Temperature

