CITY OF POST FALLS

NPDES Permit Compliance Report



Prepared by:

J-U-B ENGINEERS, INC.

November 2015

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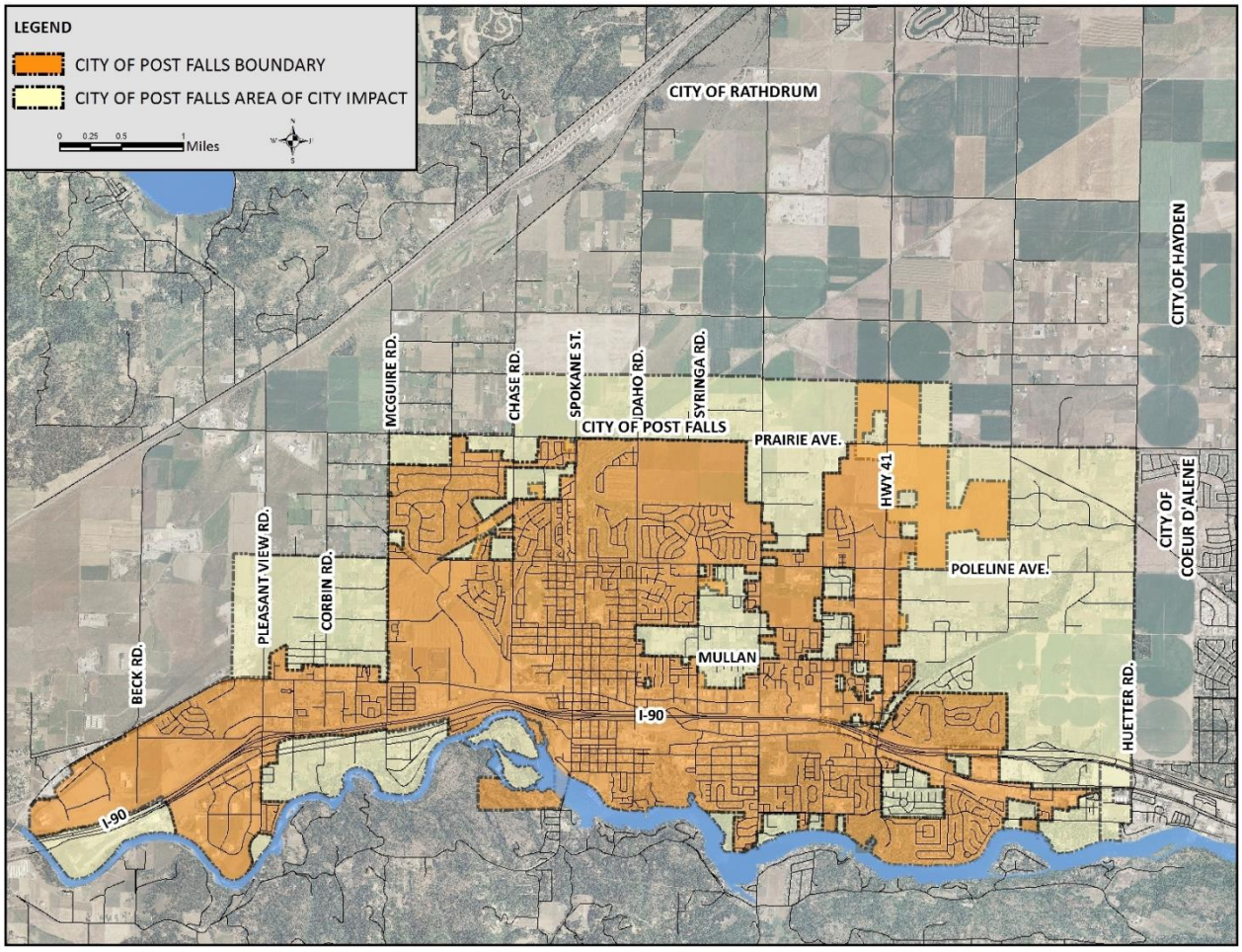
Section 1 Introduction and Objectives

The City of Post Falls, Idaho (the City) owns and operates a Water Reclamation Facility (WRF) to treat municipal wastewater generated within its boundaries. It also treats the wastewater pumped through an 8-mile-long force main from the City of Rathdrum, Idaho. **Figure 1** shows the City limits and general service territory. Reclaimed water is discharged year-round to the Spokane River under the National Pollutant Discharge Elimination System (NPDES) Permit #ID002585 issued by the U.S. Environmental Protection Agency (EPA) for December 1, 2014 through November 30, 2019. This report is required for compliance with the City's NPDES permit.

In June 2013, after several public hearings, the City adopted the Water Reclamation Facility Plan prepared by J-U-B ENGINEERS, Inc. (J-U-B). The Facility Plan outlined several options for the City to continue to meet its anticipated NPDES permit for the WRF which was not finalized until late 2014. The range of options included capital, operating and maintenance costs, as well as the implementation schedules for meeting the anticipated permit conditions. Funding approaches for the selected Alternative 3 was also detailed.

Figure 1 – City of Post Falls



The purpose of this 2015 NPDES Permit Report is to review the previous 2013 Facility Planning effort and to review current planning criteria against newly available information. That information may include advances in technology, growth estimates, changes to flows and loads experienced at the WRF, anticipated NPDES permit conditions, and implementation strategies as they relate to the City's NPDES compliance schedule. This report will review Facility Planning assumptions and revise previous guidance as necessary for providing future improvements at its WRF for the next 10 years as it relates to the NPDES Permit Compliance Schedule. The goals of this report as identified in the NPDES Permit are *"by November 30, 2015, the permittee must provide a preliminary engineering report to EPA and DEQ outlining estimated costs and schedules for completing capacity expansion and implementation of technologies to achieve final effluent limitations. This schedule must include a time line for pilot testing and results of any testing conducted to date."*

This report is organized into the following sections with specific contents to comply with the NPDES preliminary engineer's report as follows:

Section 1: Introduction and Objectives: Section 1 provides a description of the basis and need for the planning document, review of facility plan history, and pending regulatory/compliance schedule milestones.

Section 2: Regulatory and Permitting Review: Section 2 includes a summary and review of the 2013 Preliminary NPDES Permit used to develop the 2013 Facility Plan and current 2014 Final Permit monitoring conditions. This review will identify whether any permit changes will have substantive impacts to the planned improvements.

Section 3: Existing Conditions and Systems Review: Section 3 provides a description of the historic flows and loads experienced at the WRF and utilized for capacity projections during facility planning and a review against current, existing WRF flows and loads from 2011 to current. This review includes a description of any observed changes and whether modifications to the anticipated flow/load projections are warranted.

Section 4: Flow and Wasteload Projections: Section 4 provides a description of the Facility Plan projected flow and load increases anticipated at the WRF during the 10-year Compliance Schedule planning period, and any modifications to the 10-year anticipated flow/load projections identified in Section 2.

Section 5: Facility Plan Alternative Review and Update: This section includes a brief summary of each of the major treatment alternatives evaluated during the facility plan. A detailed review of the Alternative 3 individual unit process improvement recommendations, reclaimed effluent reuse, and associated capital and O&M costs developed during the Facility Plan is also included.

Section 6: Compliance Schedule Activities and Financial Planning: The final section includes design criteria for the proposed improvements, budget and financial updates for compliance schedule projects, and preliminary plan of operational philosophy for the proposed compliance schedule treatment system.

In addition to the November 30, 2015 compliance deadline for this report, Appendix A-2 shows the Interim Requirements for Schedule of Compliance which includes:

November 30, 2017	Pilot testing report or report in lieu of pilot testing for technology to meet final permit limits for the total phosphorus and 5-day carbonaceous biochemical oxygen demand ($CBOD_5$).

November 30, 2019	Provide written notice that design is complete (TP) and bids awarded for improvements to meet final limits.
November 30, 2022	Provide written notice that construction is complete to meet final limits.
November 30, 2024	Submit report detailing completed start-up and optimization of improvements with two years of data.
November 30 of All Intermediate Years	Submit progress reports toward achieving final limits for total phosphorus and $CBOD_5$.

Section 2 Regulatory and Permitting Overview

The primary impetus of facility planning and the subsequent financing, design, and construction efforts is to meet the increasingly stringent NPDES discharge limits in the Spokane River. The NPDES limits and schedule of compliance are being driven by a concern for diminished dissolved oxygen. Watershed-side heavy metals and organic compounds have permit limits and/or added water quality monitoring, but are not pertinent to this report for compliance with final permit limits.

The Spokane River and Lake Spokane Dissolved Oxygen Total Maximum Daily Load (DO TMDL) was prepared by the Washington Department of Ecology (WDOE) and approved by the EPA in July 2010. The TMDL was developed to address water quality concerns in Lake Spokane (Long Lake), the upstream impoundment behind the Long Lake Dam. The TMDL restricts discharge of oxygen-demanding substances to among the lowest levels in the United States, including ammonia-nitrogen, total phosphorus, and $CBOD_5$. According to EPA, as a matter of equity, Idaho permits cannot cause the violation of a downstream water quality standard. NPDES Permits issued in 2014 were consistent with those issued by WDOE in 2010 and 2011. Concentration limits will decrease proportionally to increasing flows in the future. The permit included a Compliance Schedule of up to ten years to fully meet the new requirements for total phosphorus and $CBOD_5$.

The most stringent part of the final limits require discharging no more than 255 lb/day of $CBOD_5$ and 3.19 lbs/day of total phosphorus as a seasonal average from February 1 through October 31. Concentration limits for $CBOD_5$ are also listed year-round at secondary treatment levels, but do not require a schedule of compliance. The seasonal average approach was specifically negotiated between dischargers and regulatory agencies to provide necessary flexibility to meet final permit limits that are arguably some of the most stringent in the nation. Seasonal limits allow Post Falls to manage internal processes and discharge options to protect the environment and ratepayers through the most effective approaches available to the City at any given time.

At the time the 2013 Facility Plan was being developed, permit negotiations between the City, IDEQ and EPA were still on-going and a 2013 Preliminary Permit was developed. This permit underwent an IDEQ Section 401 Water Quality Certification and was finalized on September 30, 2014. This permit became effective December 1, 2014. A comparison of the 2013 Preliminary Permit and the 2014 Final Permit are included as **Appendix A-1.** Areas with identified changes in the 2014 Final permit are shaded. As can be seen in the table, very little changed between the two permits. The primary changes are a less restrictive chlorine monitoring schedule, a mass-based limit for lead and zinc has been added, and a slightly less onerous monitoring schedule for effluent PCB congeners.

These changes do not appear to warrant any changes to the Facility Planning assumptions.

As previously noted, the final permit included a compliance schedule for achieving full permit compliance. The schedule and milestones are included on the attached **Appendix A-2**. Additionally, anticipated activities including testing, studies, design, award of contracts and construction have been added with likely timelines required for to complete the work.

Section 3 Existing Conditions and Systems Review

The Post Falls WRF is a secondary extended aeration activated sludge wastewater treatment plant. Wastewater flow is measured, screened and de-gritted during preliminary treatment in the headworks portion of the plant. Flow is then split between two portions of the plant–one half is currently capable of biological phosphorus reduction (BPR) and the second side (2011 Upgrades) is designed for biological nutrient reduction (BNR). Secondary treatment is performed through oxidation ditches and circular clarifiers. Flows from each side of the plant are then re-combined and disinfected with intense ultraviolet light. Reclaimed water currently discharges to the Spokane River downstream of the Post Falls Dam. Settled solids from the secondary clarifiers are either recycled to the BPR and BNR processes or removed as biosolids. Biosolids wasted from the secondary processes are dewatered utilizing belt filter presses and are trucked off site for composting by a licensed third party contractor.

The headworks is currently being relocated to accommodate flow equalization and future upgrades. Influent flow equalization is being constructed to attenuate peak influent flows and supplement off-peak low flows. The current $14.8 million construction project is the first in a phased approach and targeted for completion by the end of 2016.

Figure 2 shows the treatment processes in schematic form and **Figure 3** shows an aerial photograph of the existing facility.

Influent flows and loads analyzed and developed during the Facility Plan (2007 through July 2011) can now be compared against current trends (August 2011 to August 2015). The review determines whether anticipated increases in flows/loads are still valid, or whether 10-year and 20-year loading projections should be modified for phased improvement planning.

The influent flow and load items reviewed include:

- Flow (combined Rathdrum and Post Falls)
- 5 –day carbonaceous biochemical oxygen demand (BOD_5 / $CBOD_5$)
- Total suspended solids (TSS)
- Ammonia-nitrogen (NH_3-N or NH_4-N)
- Total phosphorus (TP)
- Actual oxygen required per million gallons treated (AOR and AOR/Mgal)

Tables comparing Facility Planning values versus current data are included in **Appendix B.** As can be seen in these tables, the previous Facility Plan projections for flows and wasteloads are slightly conservative for most influent parameters except for Ammonia-N as discussed in the following sections.

Figure 2 – Post Falls WRF Process Schematic

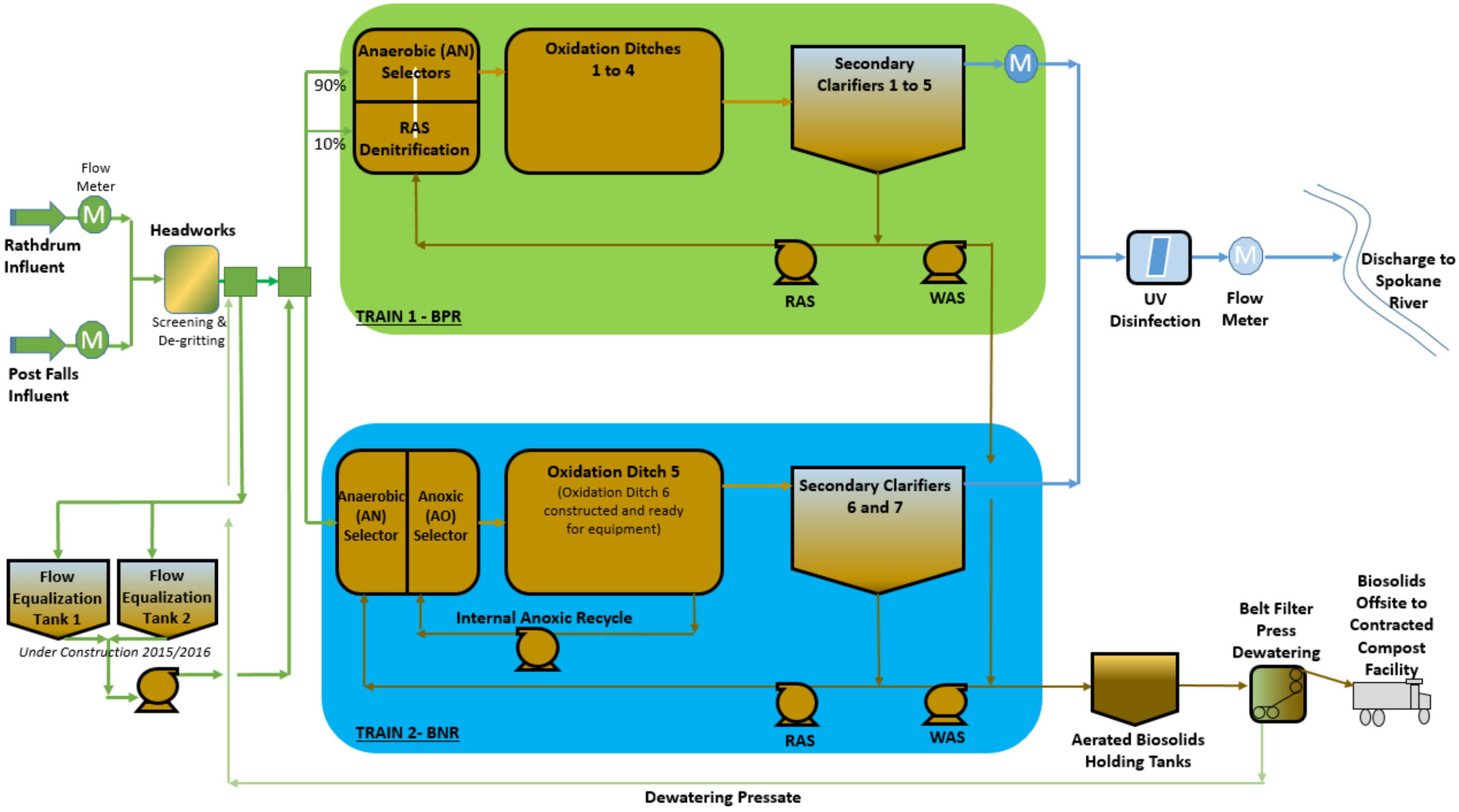


Figure 3 – Existing (circa 2014) Post Falls WRF Aerial Photo and Site Layout

N1 OPERATIONS CONTROL BUILDING.

N2 HEADWORKS; FLOW MEASUREMENT, SCREENING AND GRIT REMOVAL.

N3 INFLUENT SPLITTER BOX S1.

N4 ANAEROBIC SELECTOR FOR OXIDATION DITCHES 1–4.

N5 OXIDATION DITCH 1.

N6 OXIDATION DITCH 2.

N7 OXIDATION DITCH 3.

N8 OXIDATION DITCH 4.

N9 CLARIFIER SPLITTER BOX FOR CLARIFIERS 1 THOUGH 5.

N10 CLARIFIER 1.

N11 CLARIFIER 2.

N12 CLARIFIER 3.

N13 CLARIFIER 4.

N14 CLARIFIER 5.

N15 ANEROBIC AND ANOXIC SELECTOR FOR OD5

N16 OXIDATION DITCH 5.

N17 ANEROBIC AND ANOXIC SELECTOR FOR OD6

N18 OXIDATION DITCH 6.

N19 CLARIFIER SPLITTER BOX FOR CLARIFIERS 6 AND 7.

N20 CLARIFIER 6.

N21 CLARIFIER 7.

N22 INTERMEDIATE EFFLUENT PARSHALL FLUME

N23 CHLORINE CONTACT TANK 1 (UNDERGROUND).

N24 CHLORINE CONTACT TANK 2 (UNDERGROUND).

N25 CHLORINE CONTACT TANK 3.

N26 ULTRAVIOLET DISINFECTION.

N27 FINAL EFFLUENT PARSHALL FLUME

N28 UTILITY WATER PUMP STATION.

N29 UTILITY BUILDING NO. 1.

N30 UTILITY BUILDING NO. 2.

N31 RAS FLOW CONTROL VALVES

N32 RAS SPLITTER BOX FOR OD 5 AND OD 6

N33 SLUDGE DEWATERING BUILDING.

N34 DEWATERED SLUDGE STORAGE CANOPY

N35 VACTOR DUMP PAD.

N36 PLANT DRAIN PUMP STATION.

N37 BACKUP GENERATORS.

N38 BIOSOLIDS HOLDING TANK NO.1

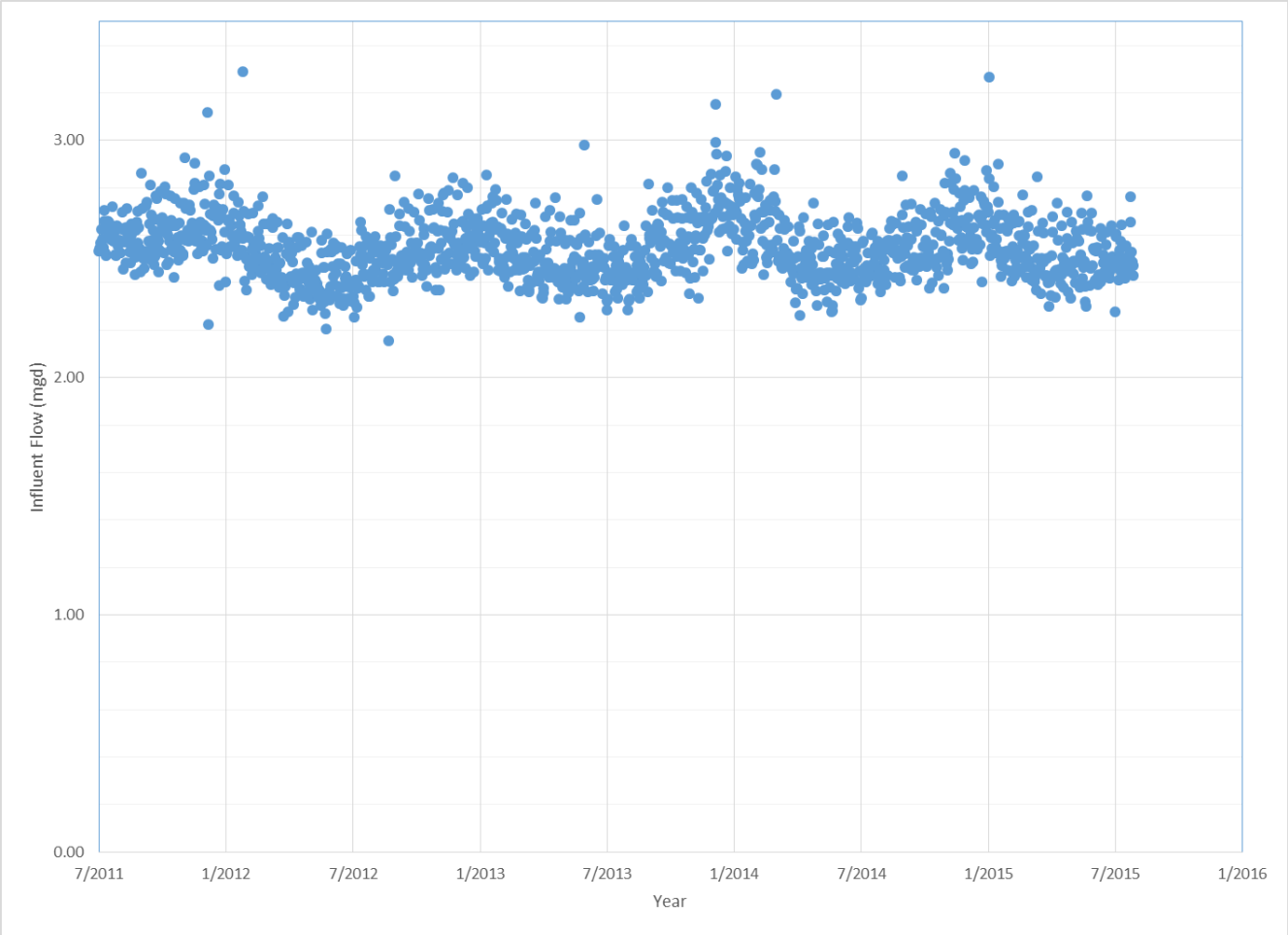
N39 BIOSOLIDS HOLDING TANK NO.2

N40 OFFICES AND SHOP (WATER DEPARTMENT)

3.1 Influent Flows

Flows have increased modestly over the past four years since the Facility Plan data was developed, by 5.4% total increase at average conditions and 5.0% total increase at max-month conditions, with no increase in peak day flows during that time period. **Figure 4** shows current influent flows from August 2011 to August 2015. Comparisons are similar between Facility Planning values and current flow updates as discussed in Section 4 and shown in **Appendix B**.

Figure 4 - Current (2011 to 2015) Influent Flows



3.2 Influent BOD_5 / $CBOD_5$ and TSS Loading

BOD_5 has increased similarly to flow, 6.7% total at average conditions, 7.5% at max-month, and 4.8% at peak day conditions. TSS has seen growth at average and max-month conditions comparable to flows and BOD_5, but a significant decrease in peak day conditions (-34%) from 13,098 lbs/day to an observed peak of 8,590 lbs/day in the 2011 to 2015 data update. It is noteworthy that influent data from December 2014 to current is being gathered as $CBOD_5$ (carbonaceous BOD_5) in compliance with the

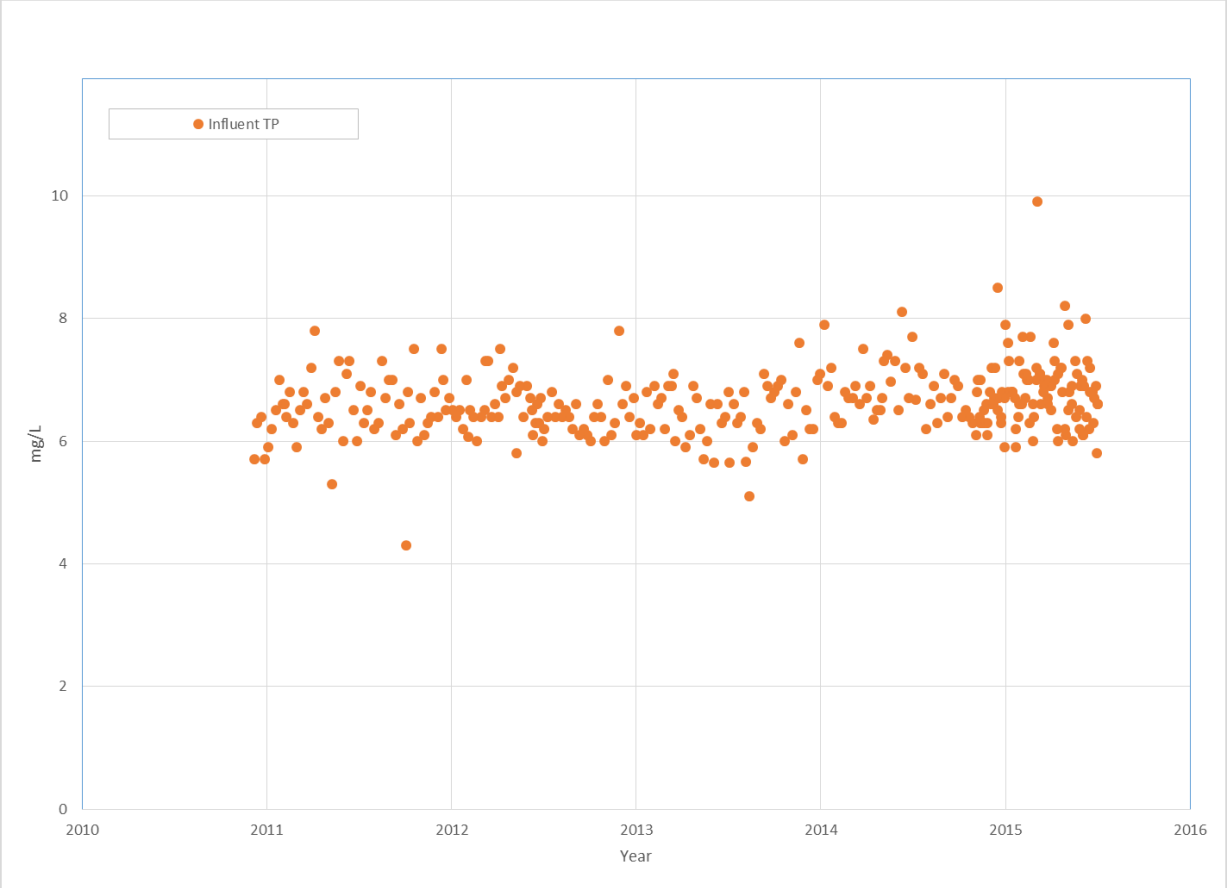
City's current NPDES permit. Previously the data was BOD_5 analyses, which also includes nitrogenous oxygen demands. To compare this current data to previous data sets, $CBOD_5$ was converted to BOD_5 using a conversion factor. A set of paired $CBOD_5$/ BOD_5 data (32 split samples from 2013 to current) provided by the City show an average $CBOD_5$:BOD_5 ratio of 0.829 for influent samples. The ratio drops to 0.694 for effluent samples.

Again, comparisons are similar between Facility Planning values and updated projections for BOD_5 and TSS as discussed in Section 4 and **Appendix B**.

3.3 Influent Total Phosphorus (TP) Loading

Influent total phosphorus has continued to see slight downward trends observed during the facility planning with decreases in average daily, max-month and peak day conditions. These reductions are likely due to continued efforts by the City related to industrial pre-treatment and public policy decisions related to reduction of phosphorus in cleaning supplies and detergents. **Figure 5** shows current influent total phosphorus from August 2011 to August 2015. Comparisons between Facility Planning values versus current conditions for influent total phosphorus conditions are shown in **Appendix B** and discussed in Section 4.

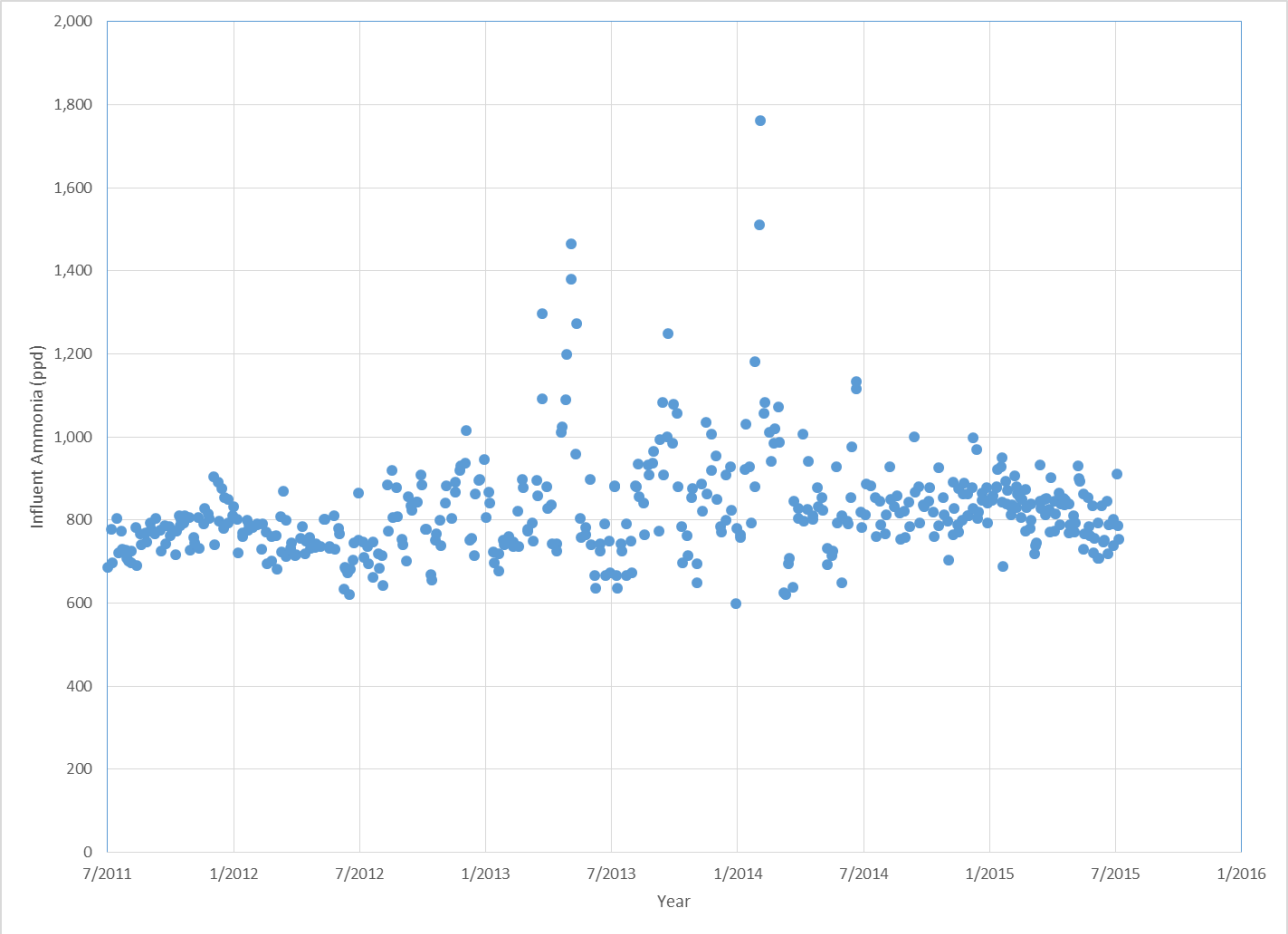
Figure 5 – Current (2011 to 2015) Influent Total Phosphorus



3.4 Influent Ammonia (and AOR) Loading

Ammonia mass loading has increased on "average conditions" as projected in the Facility Plan. However, peak influent ammonia was considerably higher than anticipated in 2013 and 2014. This is not a significant concern in the short-term however, it may accelerate the need for secondary aeration and clarification expansion. In reviewing the data, there is no indication for the source of short-term ammonia spikes. Post Falls is continuing to refine its Industrial Pretreatment program and will incorporate ammonia loading as appropriate for moderating these effects. **Figure 6** shows current influent ammonia from August 2011 to August 2015. Comparisons between Facility Planning values and updated projections for Ammonia-N are shown in **Appendix B** and discussed in Section 4.

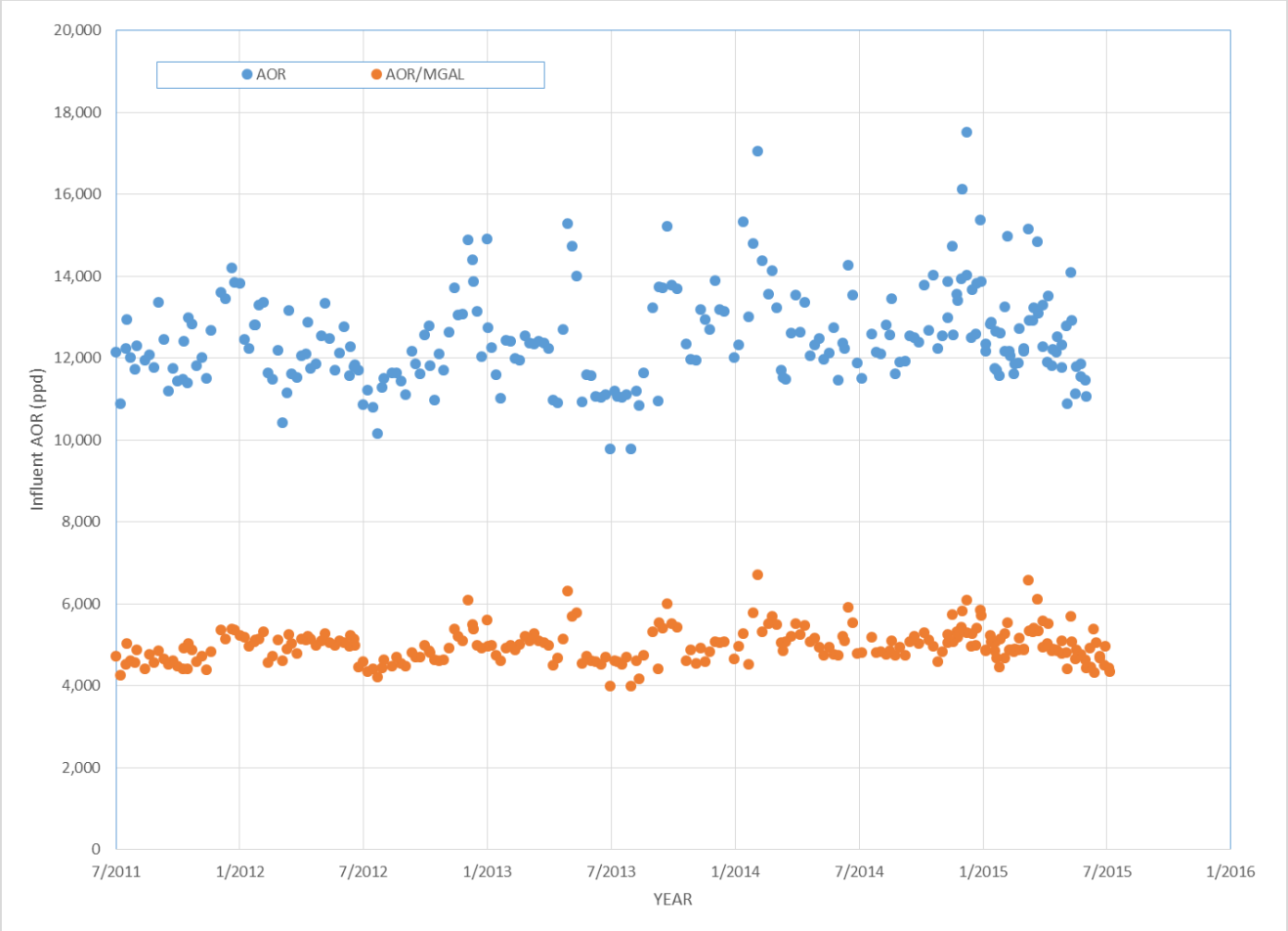
Figure 6 - Current (2011 to 2015) Influent Ammonia



The primary impact of ammonia load is on aeration capacity and basin volume which relates to solids residence time (SRT). These two capacity items are the primary factors for ammonia conversion to nitrate and conversion to BOD_5 through solids aerobic respiration. An indicator that was evaluated and projected in the 2013 Facility Plan was AOR and AOR/Mgal. AOR is the "Actual Oxygen Required" for BOD_5 and ammonia conversion and indicates how much oxygen is necessary to maintain process stability.

AOR has grown from 2011 to 2015 within expected Facility Plan projections (3.5% per year) for average day, max-month, and max-week conditions. However, peak day loading has grown at a rate of approximately 6.5% annually and can be attributed to increases in peak influent ammonia loading. **Figure 7** shows current influent AOR and AOR/Mgal from August 2011 to August 2015. Comparisons between Facility Planning values, versus current conditions for AOR are shown in **Appendix B**.

Figure 7 - Current (2011 to 2015) Influent AOR and AOR/Mgal



AOR/Mgal was also reviewed to determine if any long-term shifts in the waste strength have been observed. Data from 2007 through 2011 (Facility Plan) show an average AOR/Mgal of approximately 4,808 lbs O2/Mgal. Compared to 4,888 lbs O2/Mgal from August 2011 through April 2015, the overall trend is only a 1.7% increase and does not appear to be statistically significant.

Influent ammonia (and impacts to AOR) should be monitored annually to determine if the trend is increasing, or leveling. If the peak influent ammonia continues to rise as has been seen in 2011 through 2015, the timing of the improvements may need to be advanced, and revisions to the anticipated project scheduling should be revisited. If the current rate is maintained the need for expansion of the secondary treatment system could be accelerated by approximately three years.

Section 4 Flow and Wasteload Projections

4.1 Flow Projections

During the 2013 Facility Plan development, flows and influent wasteloads were reviewed in conjunction with historic population growth rates to determine past and likely projected future growth. Based on this review, 3.5 percent annual growth was selected as a reasonable projection between the commonly-referenced values ranging from 1.5 percent to 9.5 percent per year. Utilizing the 3.5 percent annual growth rate, projected average daily flow and loads through the 20-year planning period were developed and are shown in **Table 1**. To provide a conservative estimate, peaking factors relative to average daily flows were assumed to remain consistent and re-applied to the projected average conditions. Additionally, flows from August 2011 to August 2015 were evaluated and compared to the facility planning efforts. As discussed previously, flows have not been increasing as quickly as anticipated in the Facility Plan. For the purposes of this NPDES Compliance Report, projected flows have been revised and projected using the current 2015 conditions as a baseline. Projections have been made using the 3.5% growth rate and peaking factors determined during the Facility Plan development to maintain a conservative approach to anticipated flow and load growth. If flow peaking factors continue to moderate downward, flow equalization facilities being built today will serve beyond previous projections. Revised flow projections for the 10 year compliance window and through 2031 (previous Facility Planning period) have been revised as shown in **Table 2**.

Table 1 – Projected Influent Flows and Data Set Comparison

	Facility Plan (2007 to 2011 data)			2015 Update (2011 to 2015 data)	
	2031 Projected Flows (mgd)	2007 to 2011 Flows (mgd)	2007 to 2011 Peaking Factor [a]	2011 to 2015 Flows (mgd)	2011 to 2015 Peaking Factor
Peak Hour Flow (Max Instantaneous)	12.0	5.54	2.30	No change	No change
Observed Maximum Day	8.7	4.05	1.68	3.29	1.30
Statistical Maximum Day	6.5	3.04	1.26	3.12	1.23
Statistical Maximum Week	6.0	2.76	1.15	2.85	1.12
Statistical Maximum Month	5.6	2.61	1.08	2.74	1.08
Average Daily Flow	5.2	2.41	---	2.54	---
Statistical Minimum Month	4.8	2.23	0.92	2.38	0.94
Actual Minimum Day	3.9	1.84	0.76	2.16	0.85

Table 2 - 2015 NPDES Report – Revised Projected Influent Flows

	2007 to 2011 (Facility Planning)	2015 Update	
	Peaking Factor	2024 (Compliance Schedule) Revised Projected Influent Flows (mgd)	2031 (Facility Planning Period) Revised Projected Influent Flows (mgd)
Peak Hour Flow (Max Instantaneous)	2.3	8.28	9.82
Observed Maximum Day	1.68	6.05	7.17
Statistical Maximum Day	1.26	4.54	5.38
Statistical Maximum Week	1.15	4.14	4.91
Statistical Maximum Month	1.08	3.89	4.61
Average Daily Flow (2015)	---	3.60	4.27
Statistical Minimum Month	0.92	3.31	3.93
Actual Minimum Day	0.76	2.74	3.25

4.2 Wasteload Projections

Influent wasteloads were also projected through the 20-year planning period during Facility Planning and are shown in **Table 3**. As discussed previously in this report, these projections remain valid based on current data analysis from 2011 to 2015. The only exception is potentially for ammonia spikes observed in 2013 and 2014. Flow equalization and industrial pretreat may help to attenuate spikes if they persist in the future. Aeration upgrades may have to be made more quickly if the ammonia spikes return in future years. Wasteloads anticipated to occur through the Compliance Schedule period (2024) have been updated utilizing the Facility Planning data and projection method and are included in **Table 4**.

Table 3 - Projected 2031 Influent Wasteloads (Facility Plan)

	Projected BOD_5 Load (lbs/day)	Projected TSS Load (lbs/day)	Projected NH3-N Load (lbs/day)	Projected TP Load (lbs/day)	Projected AOR Load (lbs/day)
Actual Maximum Day	16,360	26,062	1,931	449	27,172
Statistical Maximum Day	15,726	19,707	1,900	398	26,847
Statistical Maximum Week	13,844	13,944	1,770	359	26,360
Statistical Maximum Month	12,574	12,080	1,650	331	25,536
Average Daily Load	10,973	10,202	1,436	297	22,578
Statistical Minimum Month	9,577	8,706	1,277	256	20,199
Actual Minimum Day	6,341	6,363	1,074	212	16,203

Table 4 - Projected 2024 Influent Wasteloads (Utilizing Facility Plan Projections)

	Projected BOD_5 Load (lbs/day)	Projected TSS Load (lbs/day)	Projected NH3-N Load (lbs/day)	Projected TP Load (lbs/day)	Projected AOR Load (lbs/day)
Actual Maximum Day	12,852	20,447	1,513	352	21,295
Statistical Maximum Day	12,334	15,476	1,491	312	21,118
Statistical Maximum Week	10,868	10,985	1,389	282	20,763
Statistical Maximum Month	9,919	9,462	1,299	261	20,053
Average Daily Load	8,625	8,018	1,129	233	17,746
Statistical Minimum Month	7,504	6,816	1,005	200	15,794
Actual Minimum Day	5,003	4,971	847	168	12,777

Section 5 Facility Plan Alternative Review and Update

5.1 Alternative Summary

In order to meet the permitting and treatment objectives identified in the 2013 Facility Plan, as well as provide for continued growth to its member entities through the 20-year planning period, the City of Post Falls considered four general improvement alternatives during the facility planning process. They were:

- Alternative 1: No action alternative
- Alternative 2: Additional treatment with seasonal river discharge and future partial reuse system with a capacity up to 3.2 mgd on existing land. (No new land except for purchasing the City of Rathdrum's 314 acres.)
- Alternative 3: Additional treatment for seasonal river discharge similar to Alternative 2 combined with expanded full seasonal reuse (expansion of reuse land to 5.2 mgd)
- Alternative 4: Modifications to existing treatment system for full seasonal reuse (no river discharge during the entire growing season) and non-growing season winter storage (emergency river discharge only).

Each of these alternatives (as well as the potential environmental impacts, advantages, disadvantages, and 20-year life cycle costs) was discussed in more detail in Technical Memorandum 6 of the Facility Plan. Necessary improvements to the WRF facility were similar for Alternatives 2 and 3. Potential site layout for the WRF improvements (as well as potential reuse expansion alternatives) was considered for the 20-year planning period. Ultimately the City selected Alternative 3 - Additional treatment for seasonal river discharge combined with future full seasonal reuse (during growing season to 5.2 mgd). A summary of the identified improvements under Alternative 3, follows.

5.2 Detailed Discussion of Recommended Alternative 3

For this alternative, the existing BNR and oxidation ditch treatment system would be utilized for treatment of the wastewater combined with in-plant improvements. In addition to these improvements, the system would develop and expand the seasonal reuse activities to match the average daily flow conditions for the 20-year period.

During the non-growing season, reclaimed water will continue to be discharged to the Spokane River, approximately October through April. During the growing season, but beyond the current compliance schedule, recycled water would be pumped to new storage lagoons where it would be held until it could be applied on a reuse site for irrigation of crops under a new Reuse Permit through the Idaho DEQ. The following were recommended improvements under this alternative from the Facility Plan:

- Preliminary Treatment: Add flow equalization to plant influent to decrease impacts of peak flows on downstream unit processes. Relocate and expand headworks with flow equalization.
    - *Under Construction 2015/2016*

- Biological Treatment: Increase biological capacity by improving/adding mechanical equipment to oxidation ditch 6 (OD 6), additional Secondary Clarifier No. 8.
- Effluent Filtration: Provide coagulation/settling and filtration to meet more stringent river discharge effluent requirements.
- Disinfection System: Increase reliability of existing UV disinfection system.
- Outfall: Increase capacity of river outfall pipeline.
    - *Under Design for permitting in 2015 and Construction in 2016*
- Laboratory/SCADA: Improve laboratory and process control systems for increased analytical requirements.
- Solids Handling: Expand and improve solids handling and processing systems to handle increased chemical sludge generation from advanced phosphorous removal systems.
    - *Solids Storage and Odor Control Improvements under construction 2015/2016.*
- Reuse Site: The system will need to be improved with pipelines and irrigation equipment. Additional land will be required to provide the necessary irrigated acreage. An additional 582 acres will be required for 5.2 mgd ADF.
- Irrigation Pump Station: A new irrigation pump station would be required to irrigate the expanded reuse site. The pump station would likely consist of a new building, with multiple irrigation pumps with a combined capacity of 5,500 gpm (peak day equalized flow of 7.7 mgd); piping, fittings, controls, and flow meters for distribution to the reuse site irrigation system.
- Miscellaneous Improvements: Additional improvements required for this alternative include:
    - Site fencing around the storage lagoon and land application site to keep wildlife, debris, and unauthorized personnel from entering the site.
    - Extension of power to the new storage lagoon site for irrigation pump station.
    - Site piping for the transmission lines to the lagoon, irrigation pump station, and land application site.
    - Groundwater monitoring wells around the land application site to monitor potential impacts on the surrounding aquifer.
    - Wheel line, drip, or center pivot irrigation system for the new land application site.
    - A gravel access road to the new storage lagoon and/or land application site.
- Metals:

  It is crucial for the Idaho dischargers including the City of Post Falls to stay actively involved in working with IDEQ to address the issue of lead, cadmium, and zinc concentrations in the Spokane River. This Facility Plan currently anticipates that the water quality standards for the Spokane River can be addressed through coordination and negotiation with IDEQ (likely will include a TMDL process). The objective of that effort is to document how the City of Post Falls discharge materially improves metals water quality due to the inherent hardness characteristics and thereby avoid an expensive quaternary (fourth level) process that would provide no demonstrateable benefit.

A summary of the likely costs and projects associated with Alternative 3 as developed in the Facility Plan is presented in **Table 5**. The projects have been reviewed to determine their need for meeting the NPDES Compliance Schedule and identified as noted in **Table 5** below. Dates and "trigger" for when each project would be implemented are also identified. As can be seen, many of the projects identified in the Facility Plan for the 20-year planning period are not necessary to meet the final permit seasonal wasteload allocations listed in the NPDES Compliance Schedule. Further, as was noted previously, the updated projected flows and loads indicate the timing and need for projects allow the City flexibility to phase implementation of the necessary improvements.

Table 5 - Facility Plan Opinion of Probable Project Costs and Compliance Schedule Projects

		2013 FACILITY PLAN			2015 NPDES REPORT		
Item for Capital Costs	***Description of Project***	***Targeted Year to begin Project***	**Improvement Alternative 3: Additional Treatment combined with 5.2 MGD Seasonal Reuse (expansion of reuse)**	**Alt 3 (20-year O&M)**	**Comments**	***Revised Target Year to begin Project***	***Condition Triggering Need for Project Improvement***
Tertiary Treatment Pilot Study or Engineering Report	$2M Project in current FY 2013 City Budget	2013				2016	Pilot Study or Engineering Report to be Completed by Nov. 30, 2017
Class C Reuse (Demonstration Project)	Reuse on WRF and adjacent land	2013	$ 167,600	$ 140,000	Not Required for Compliance Schedule		NA
Outfall Improvements - Phase I	South of I-90 to River	2013	$ 1,620,000	$ -	Not Required for Compliance Schedule	2013	NA
Laboratory and Control Building Improvements	Lab, Admin and control improvements	2014	$ 662,500	$ -	**Compliance Schedule Project**	2017	To be completed prior to, or with Tertiary Project
Preliminary Treatment - Equalization Tank	New EQ	2015	$ 7,528,168	$ 880,000	**Compliance Schedule Project - Under Construction 2015/2016**	2015	-
Preliminary Treatment - Headworks	Relocate Headworks	2015	$ 2,645,032	$ -			
Tertiary Treatment (Phase 1) [1]	Tertiary (assumes microfiltration)	2015	$ 19,230,000	$ 5,540,000	**Compliance Schedule Project**	2018	Construction to be Completed Prior to Nov 30, 2022
Tertiary Treatment (Phase 2)					Not Required for Compliance Schedule		Project Design to begin when Phase 1 Tertiary System is operating at 85% of rated capacity.
Disinfection - Improvements to Existing UV	Mitigate deficiencies and reliability	2017	$ 550,500	$ -	**Compliance Schedule Project**	2018	To be completed with Tertiary Project
Biosolids Treatment Improvements (Digestion) [1]	Digestion Improvements	2017	$ 9,971,800	$ (4,100,000)	Not Required for Compliance Schedule	2019	NA
Biosolids Improvements (Handling)					**Compliance Schedule Project - Under Construction 2015/2016**	2015	-
Utility Water Pump Station		2017	$ 743,400	$ -	**Compliance Schedule Project**	2018	To be completed with Tertiary Project
Secondary Treatment Improvements	Expand BNR Eqpt into OD 6, add Clarifier 8	2019	$ 3,730,000	$ 1,100,000	**Compliance Schedule Project**	2019	Project Needed when existing AOR (Required) = 22,805 ppd at Peak Day Conditions (85% of available firm aeration capacity)
Disinfection Improvements - Class A UV	Necessary for Class A Reuse	2022	$ 1,943,000	$ 800,000	Not Required for Compliance Schedule	2025	NA
Phase 1 -Class A Seasonal Reuse, 3.2 MGD Capacity, 618 Acre Existing Site, retain river outfall for non-growing season. Purchase 314 acres from City of Rathdrum.	Necessary for Class A Reuse	2022	$ 17,800,000	$ 982,000	Not Required for Compliance Schedule	2025	NA
Expanded Reuse to 5.2 MGD (Seasonal Reuse)	Seasonal Reuse with no winter storage. Non-growing season discharge to River.	2022	$ 10,090,000	$ 565,000	Not Required for Compliance Schedule	2025	NA
Maintenance Shop		2023	$ 757,400	$ -	Not Required for Compliance Schedule	2023	NA
Outfall Improvements - Phase II (Pipeline for I-90 Crossing)	South of I-90 to WRF	2025	$ 280,000	$ -	Not Required for Compliance Schedule	2025	NA
Full Reuse to 5.2 MGD (Year Round)	Full Reuse, no river discharge (assumes river discharge only for non Class A water compliance)	2027			Not Required for Compliance Schedule	2027	NA
TOTAL			**$ 77,700,000**	**$ 5,900,000**			
Total Capital + O&M				$ 83,600,000			

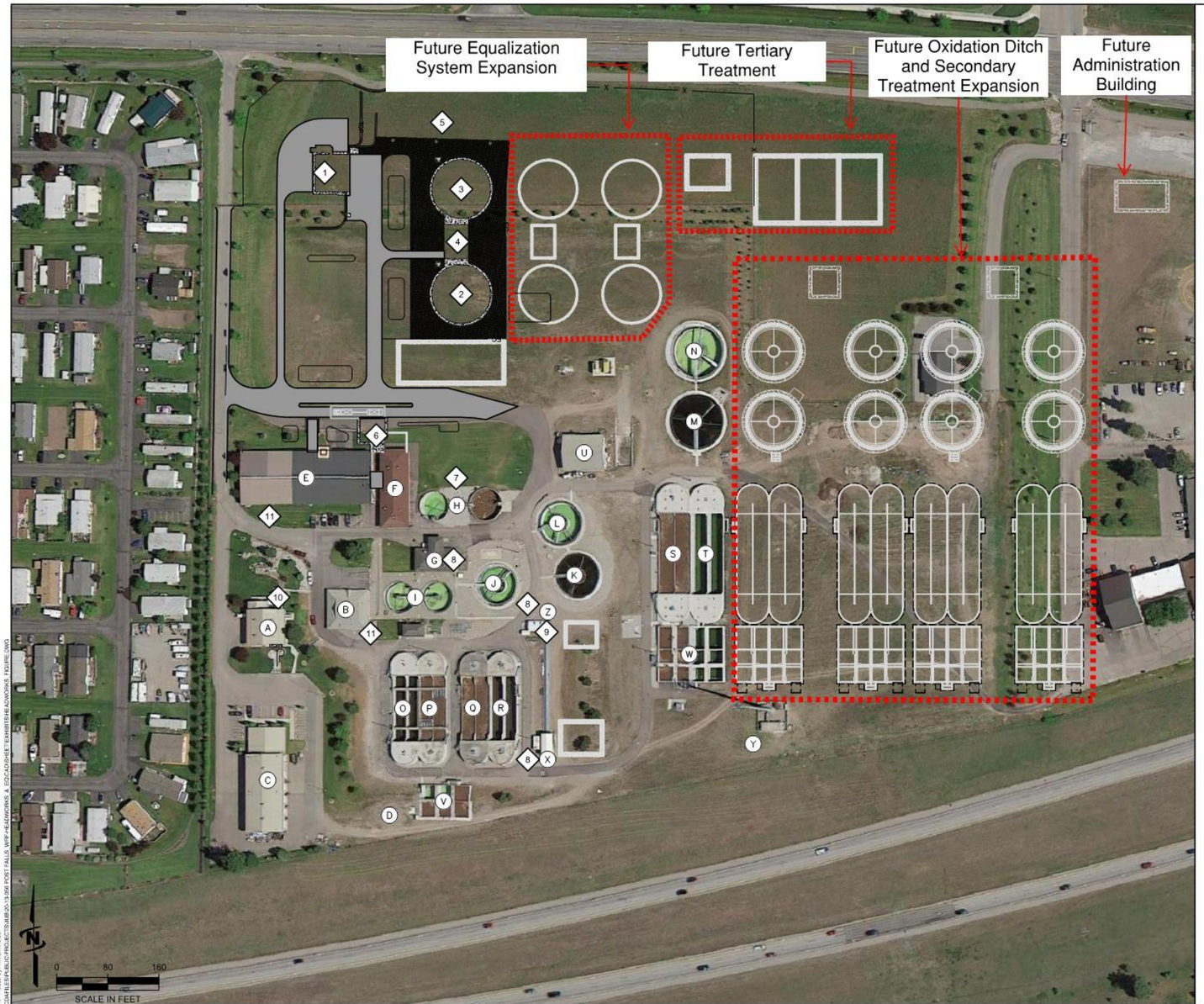
1 - O&M Costs (additional or deduction) begin at time of project implementation

5.3 Potential Build-Out Site Plan

A wide range of alternatives was considered during the development of this plan for meeting the City's wastewater treatment and disposal requirements. Alternative No. 3 was selected as the preferred alternative as recommended by J-U-B, City staff, and the City Council. The final selected alternative was determined by the City Council after receiving input from the public and regulatory agencies for all alternatives. The recommended alternative provides a flexible, long-term management approach for the City while identifying a phased implementation program to meet capacity and treatment requirements for the next 20 years.

Figure 8 provides a general layout for Alternative No. 3 (WRF capacity to 5.2 MGD) facilities at the City's WRF site and adjacent City-owned vacant parcels. It also shows how these facilities may be expanded over time to serve the projected build-out of the WRF (17.8 MGD). This figure was revised and updated during development of the 2015 Headworks, Equalization and Solids Loading Improvements.

Figure 8 – Build-Out Aerial Photo of Site Layout



EXISTING FACILITIES	
A	EXISTING HEADWORKS
B	EXISTING LABORATORY/CONTROL BUILDING
C	WATER DEPT. BUILDING
D	SPLITTER BOX S-1
E	SLUDGE STORAGE BUILDING
F	DEWATERING BUILDING
G	UTILITY BUILDING 1
H	SLUDGE HOLDING TANKS
I	SECONDARY CLARIFIERS 1 AND 2
J	SECONDARY CLARIFIER 3
K	SECONDARY CLARIFIER 4
L	SECONDARY CLARIFIER 5
M	SECONDARY CLARIFIER 6
N	SECONDARY CLARIFIER 7
O	OXIDATION DITCH 1
P	OXIDATION DITCH 2
Q	OXIDATION DITCH 3
R	OXIDATION DITCH 4
S	OXIDATION DITCH 5
T	OXIDATION DITCH 6
U	UTILITY BUILDING 2
V	OD 1 TO 4 SELECTOR BASINS
W	OD 5 AND 6 SELECTOR BASINS
X	UV DISINFECTION
Y	EFFLUENT PARSHALL FLUME
Z	UTILITY WATER PUMP STATION

NEW OR MODIFIED FACILITIES (2015)	
1	NEW HEADWORKS
2	EQUALIZATION TANK 1
3	EQUALIZATION TANK 2
4	EQUALIZATION PUMP STATION
5	BIOFILTER SYSTEMS
6	SLUDGE LOADING FACILITY
7	PLANT DRAIN PUMP STATION
8	STANDBY DISINFECTION IMPROVEMENTS
9	UTILITY WATER PUMP STATION
10	EXISTING HEADWORKS MODIFICATIONS
11	PLANT DRAIN PUMP IMPROVEMENTS

LAST UPDATED: 10/27/2015
PLOT DATE: 11/2/2015
FILE: HEADWORKS_FIGURE

J-U-B ENGINEERS, INC.

CITY OF POST FALLS
HEADWORKS, EQUALIZATION, AND SLUDGE LOADING IMPROVEMENTS
SITE EXHIBIT

Section 6 Compliance Schedule Activities and Financial Planning

In order to meet the permitting and treatment objectives identified in the NPDES Permit Compliance Schedule through the 10-year Compliance Schedule planning period, the City of Post Falls is planning for a series of projects as identified in the 2013 Facility Plan and updated in Table 5. These projects were reviewed and costs and schedules have been updated for financial planning and implementation.

6.1 Anticipated Timing and Costs for Projects

The projects/activities identified as critical elements to meeting NPDES permit conditions during the compliance schedule are identified in **Table 6** below (adapted from Table 5). Costs associated with these projects were reviewed and updated to reflect:

- Changes to funding conditions, specifically requirements for American Iron and Steel products for State Revolving Loan Fund (SRF) projects,
- Revised phasing and improvement sizing based on anticipated flows and loads developed in Section 4 of this report, and
- Revised equipment quotes provided by vendors.

The costs were updated to 2015 dollars, and then adjusted at 3.19% inflation rate to 2012 dollars to they can be utilized and compared back to original budgets and the financial plan model developed during the 2013 Facility Plan.

The revised Opinion of Probable Costs for the Compliance Schedule Projects are shown in **Table 6** below. The list has been organized by the anticipated start date for each project or activity. Detailed planning level cost opinions for the various projects are included in **Appendix C**.

Table 6 - Compliance Schedule Projects - Opinion of Probable Costs

		2015 NPDES REPORT			
Item for Capital Costs	***Description of Project***	***Revised Target Year to begin Project***	***Condition Triggering Need for Project Improvement***	**2024 Compliance Schedule Projects (Capital Costs)[2]**	**2024 Compliance Schedule Projects (20-year O&M)[2]**
Preliminary Treatment - Equalization Tank	New EQ	2015	-	$ 12,913,000	$ 880,000
Preliminary Treatment - Headworks	Relocate Headworks				
Biosolids Improvements (Handling)		2015	-	$ 1,920,000	
Tertiary Treatment Pilot Study or Engineering Report	$2M Project in current FY 2013 City Budget	2016	Pilot Study or Engineering Report to be Completed by Nov. 30, 2017	$ 2,000,000	$ -
Laboratory and Control Building Improvements	Lab, Admin and control improvements	2017	To be completed prior to, or with Tertiary Project	$ 662,500	$ -
Tertiary Treatment (Phase 1) [1]	Tertiary (assumes microfiltration)	2018	Construction to be Completed Prior to Nov 30, 2022	$ 18,650,000	$ 5,426,000
Disinfection - Improvements to Existing UV [3]	Mitigate deficiencies and reliability	2018	To be completed with Tertiary Project	$ 550,500	$ -
Utility Water Pump Station		2018	To be completed with Tertiary Project	$ 759,000	$ -
Secondary Treatment Improvements	Expand BNR Eqpt into OD 6, add Clarifier 8	2019	Project Needed when existing AOR (Required) = 22,805 ppd at Peak Day Conditions (85% of available firm aeration capacity)	$ 3,730,000	$ 1,100,000
TOTAL				**$ 41,200,000**	**$ 7,400,000**
Total Capital + O&M					$ 48,600,000

1 - O&M Costs (additional or deduction) begin at time of project implementation

2 - Costs have been adjusted from 2015 to 2012 dollars at 3.19% inflation rate.

3 - Costs presented are based on 2013 Facility Plan costs for identified UV improvements. City may pursue a more extensive UV upgrade based on the available useful life of the existing equipment at the time of the project. A revised budget example for full UV equipment replacement is included in Appendix C for comparison purposes.

6.2 Proposed System Configuration for Compliance

The proposed system will meet the compliance schedule and NPDES permit limitations through a phased implementation of the necessary improvements. Later phases of improvements will expand the system as additional capacity is needed beyond the compliance schedule. Tertiary filtration of the existing secondary BNR/BPR system effluent will be utilized as the primary tool for meeting effluent total phosphorus and $CBOD_5$. The current system already provides fully nitrified effluent to meet the ammonia-nitrogen requirement and will be expanded as necessary to meet capacity requirements.

Other projects identified in Table 6 provide either ancillary support to the existing systems, are being relocated or modified to improve operations, or are systems that are near the end of their useful life. The 2015 project will provide headworks, influent flow equalization, and solid loading improvements that are directly related to the tertiary improvements. In particular, influent flow equalization will level out organic loads and reduce peak hydraulic surges through the facility to reduce the size of the tertiary facilities to be constructed.

The proposed system will utilize the existing BNR/BPR treatment system combined with tertiary filtration for a portion of the BNR/BPR effluent to meet the effluent requirements. Utilizing the existing BNR minimizes chemicals needed and reduces overall oxygen demand. The system will be sized and implemented in phases as necessary for capacity requirements. It is anticipated that the initial Phase 1 of tertiary filtration necessary for meeting the Compliance Schedule will include design criteria parameters as shown in **Table 7** below.

Table 7 - Design Criteria for Phase 1 Tertiary Filtration

	2024 (Compliance Schedule) Revised Projected Influent Flows (mgd)	Design Criteria Phase 1 Tertiary Improvements (mgd)
Peak Hour Flow (Max Instantaneous)	8.28	7.0 mgd (reduced to peak day with Influent Flow Equalization)
Observed Maximum Day	6.05	7.0
Maximum Week	4.14	4.8
Maximum Month	3.89	4.5
Average Daily Flow	3.60	4.2

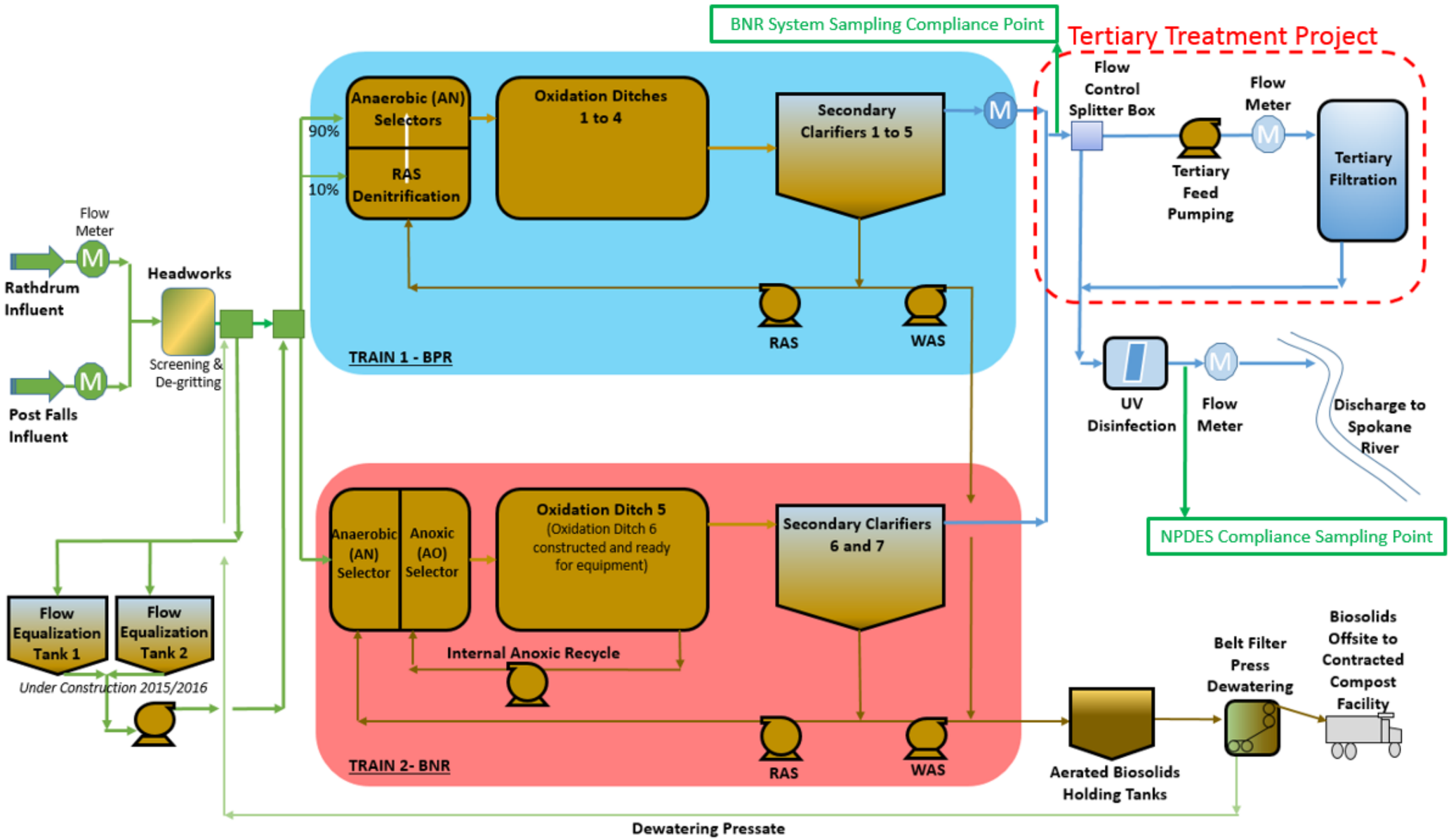
6.3 Tertiary Filtration (Treatment) Operations for NPDES Compliance

Tertiary filtration of the entire plant flow will likely not be necessary in the early years following construction to meet the effluent TP wasteload allocation of 3.19 lb/day. It is likely that only a portion of the flow will need to be passed through the tertiary filtration system when combined with the current high-quality nutrient reduced secondary effluent. Under this operating scenario, the City will utilize sampling and analysis protocols from the NPDES permit to monitor effluent and adjust the portion of

flow being filtered to maintain permit compliance while balancing costs associated with chemicals and energy required for tertiary filtration. This process will utilize an accounting system that monitors daily effluent wasteload and adjusts the level of treatment needed moving forward to meet the long-term seasonal average wasteload allocation. This provides operational flexibility while maintaining permit compliance.

Further, during the non-critical phosphorus period, the City may elect to take the filtration system off-line to reduce energy usage and chemical consumption further. The filtration system would be put into a standby configuration and stand idle until needed. A proposed schematic configuration of the new expanded tertiary system and flow routing is shown in **Figure 9**.

Figure 9 –Proposed WRF Schematic with Tertiary Filtration to Meet Compliance Schedule



APPENDIX A-1

NPDES Permit Comparison Table

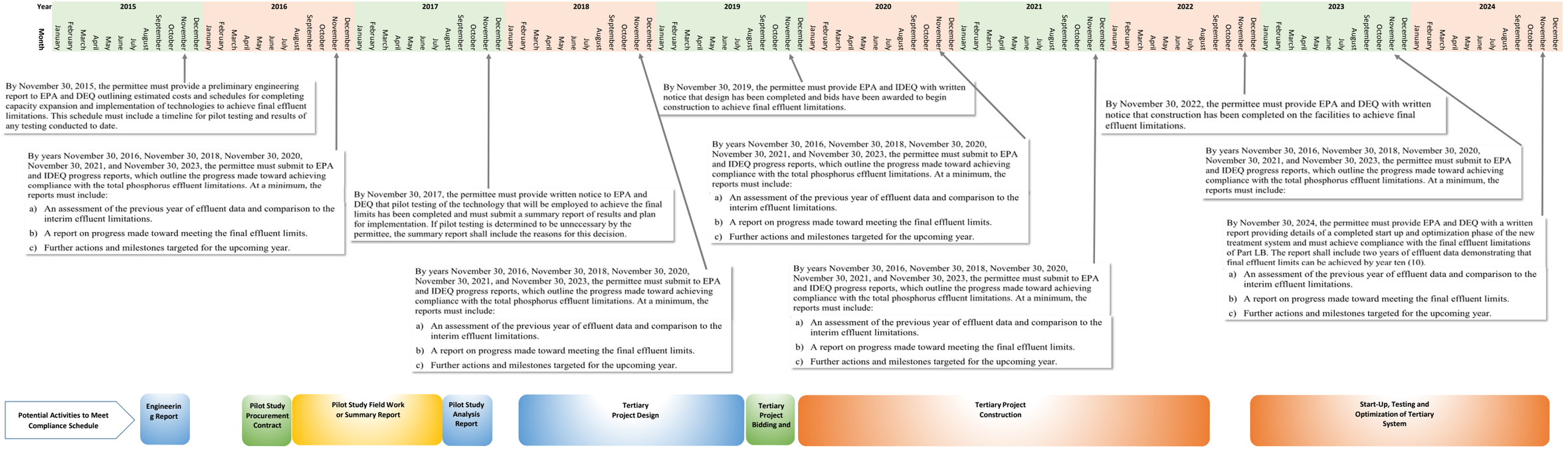
Appendix A-1: NPDES Permit Comparison

Parameter	Units	2014 FINAL PERMIT (Effective Dec 1, 2014)						2013 Preliminary					
		Effluent Limits			Monitoring Requirements			Effluent Limits			Monitoring Requirements		
		Average Monthly Limit	Average Weekly Limit	Max. Daily Limit	Location	Frequency	Sample Type	Average Monthly Limit	Average Weekly Limit	Max. Daily Limit	Location	Frequency	Sample Type
Flow	mgd	Report	-	Report	Effluent	Continuous	Recording	Report	-	Report	Effluent	Continuous	Recording
Five-day carbonaceous biochemical oxygen demand (CBOD5) November – January	mg/L	25	40	-	Influent and Effluent	1/week	24-Hour Composite	25	40	-	Influent and Effluent	1/week	24-Hour Composite
	lb/day	1043	1668	-			Calculation	1043	1668	-			Calculation
	% removal	85% (min.)	-	-	% removal	1/month	Calculation	85% (min.)	-	-	% removal	1/month	Calculation
$CBOD_5$ February – October	mg/L	25	40	-	Influent and Effluent	3/week	24-Hr. Comp.	25	40	-	Influent and Effluent	3/week	24-Hr. Comp.
	lb/day	Seasonal Average Limit: 255 lb/day					Calculation	Seasonal Average Limit: 255 lb/day					Calculation
	% removal	85% (min.)	-	-	% removal	1/month	Calculation	85% (min.)	-	-	% removal	1/month	Calculation
Total Suspended Solids	mg/L	30	45	-	Influent and Effluent	1/week	24-Hr. Comp.	30	45	-	Influent and Effluent	1/week	24-Hr. Comp.
	lb/day	1251	1877	-			Calculation	1251	1877	-			Calculation
	% removal	85% (min.)	-	-	% removal	1/month	Calculation	85% (min.)	-	-	% removal	1/month	Calculation
pH (October – June)	s.u.	6.3 - 9.0 at all times			Effluent	5/week	Grab	6.3 - 9.0 at all times			Effluent	5/week	Grab
pH (July – September)	s.u.	6.4 - 9.0 at all times			Effluent	5/week	Grab	6.4 - 9.0 at all times			Effluent	5/week	Grab
E. coli	#/100 ml	126[4] (geometric mean)	-	406 (inst. max.)	Effluent	5/month	Grab	126[4] (geometric mean)	-	406 (inst. max.)	Effluent	5/month	Grab
Total Residual Chlorine	µg/L	127	-	294	Effluent	5/week	Grab	127	-	294	Effluent	5/week	Grab
July – September	lb/day	5.3	-	13.6			Calculation	5.3	-	13.6			Calculation
Total Residual Chlorine	µg/L	244	-	565	Effluent	1/day	Grab	244	-	565	Effluent	1/day	Grab
October – June if chlorine is used for disinfection	lb/day	10.2	-	23.6			Calculation	10.2	-	23.6			Calculation
Total Residual Chlorine October – June if chlorine is not used for disinfection or elsewhere in the treatment process	µg/L	No monitoring or reporting required.						Report	-	Report	Effluent	1/month	Grab
Chlorine Usage	lb/day	-	-	Report	Chlorine Contact Chamber	1/day	Measure						
Total Ammonia as N	mg/L	Report		Report	Effluent	3/week	24-Hr. Comp.	Report		Report	Effluent	3/week	24-Hr. Comp.
February – October	lb/day	Seasonal Average Limit: 255 lb/day. See I.B.10					Calculation	Seasonal Average Limit: 255 lb/day					Calculation
Total Ammonia as N	mg/L	8.2	-	29.5	Effluent	3/week	24-Hr. Comp.	8.2	-	29.5	Effluent	3/week	24-Hr. Comp.
July – September	lb/day	342	-	1230			Calculation	342	-	1230			Calculation
Total Ammonia as N	mg/L	25.4	-	91.7	Effluent	1/month	24-Hr. Comp.	25.4	-	91.7	Effluent	1/month	24-Hr. Comp.
November – January	lb/day	1059	-	3824			Calculation	1059	-	3824			Calculation
Total Phosphorus as P	µg/L	Report	Report	-	Effluent	3/week	24-Hr. Comp.	Report	Report	-	Effluent	3/week	24-Hr. Comp.
February – October	lb/day	Report	Report	-			Calculation	Report	Report	-			Calculation
	lb/day	Seasonal Average Limit: 3.19 lb/day. See I.B.10						Seasonal Average Limit: 3.19 lb/day. See I.B.11					
Total Phosphorus as P November – January	µg/L	Report	Report	-	Effluent	1/week	24 Hr. Comp.	Report	Report	-	Effluent	1/week	24 Hr. Comp.
Copper	µg/L	13.8	-	27.7	Effluent	1/month	24-Hr. Comp.	13.8	-	27.7	Effluent	1/month	24-Hr. Comp.
(July – September)	lb/day	0.58	-	1.16			Calculation	0.58	-	1.16			Calculation
Copper (Oct. – June)	µg/L	Report	-	Report	Effluent	1/month	24-Hr. Comp.	Report	-	Report	Effluent	1/month	24-Hr. Comp.
Lead	µg/L	2.05	-	3.79	Effluent	1/month	24-Hr. Comp.	2.05	-	3.79	Effluent	1/month	24-Hr. Comp.
	lb/day	0.0855	-	0.158			Calculation		-				Calculation
Zinc	µg/L	84.3	-	115	Effluent	1/month	24-Hr. Comp.	84.3	-	115	Effluent	1/month	24-Hr. Comp.
	lb/day	3.52	-	4.8			Calculation		-				Calculation
Temperature	°C	Report	-	Report	Effluent	5/week	Grab	Report	-	Report	Effluent	5/week	Grab
Cadmium	µg/L	Report	-	Report	Effluent	1/month	24-Hr. Comp.	Report	-	Report	Effluent	1/month	24-Hr. Comp.
Silver	µg/L	Report	-	Report	Effluent	1/month	24-Hr. Comp.	Report	-	Report	Effluent	1/month	24-Hr. Comp.
Alkalinity	mg/L as $CaCO_3$	Report	-	Report	Effluent	1/month	24-Hr. Comp.	Report	-	Report	Effluent	1/month	24-Hr. Comp.
Hardness	mg/L as $CaCO_3$	Report	-	Report	Effluent	1/month	24-Hr. Comp.	Report	-	Report	Effluent	1/month	24-Hr. Comp.
Oil and Grease	mg/L	Report	-	Report	Effluent	1/quarter	Grab	Report	-	Report	Effluent	1/quarter	Grab
Total Dissolved Solids	mg/L	Report	-	Report	Effluent	1/quarter	24-Hr. Comp.	Report	-	Report	Effluent	1/quarter	24-Hr. Comp.
Polychlorinated Biphenyls Congeners (PCBs)	pg/L	Report	-	Report	Influent	1/2 months	24-Hr. Comp.	Report	-	Report	Influent and Effluent	1/2 months	24-Hr. Comp.
PCB Congeners	pg/L	Report	-	Report	Effluent	1/quarter	24-Hr. Comp.						
2,3,7,8 tetrachloro-dibenzo-p-dioxin (TCDD)	pg/L	Report	-	Report	Influent and Effluent	1/quarter	24-Hr. Comp.	Report	-	Report	Influent and Effluent	1/quarter	24-Hr. Comp.
Orthophosphate as P	µg/L	Report	-	Report	Effluent	1/month	24-Hr. Comp.	Report	-	Report	Effluent	1/month	24-Hr. Comp.
Total Kjeldahl Nitrogen	mg/L	Report	-	Report	Effluent	1/month	24-Hr. Comp.	Report	-	Report	Effluent	1/month	24-Hr. Comp.
Nitrate + Nitrite as N	mg/L	Report	-	Report	Effluent	1/month	24-Hr. Comp.	Report	-	Report	Effluent	1/month	24-Hr. Comp.
Dissolved Oxygen	mg/L	Report minimum and average			Effluent	5/week	Grab	Report minimum and average			Effluent	1/month	Grab
NPDES Application Form 2A Effluent Testing	See I.B.10	See I.B.10			Effluent	3x/5 years	-	See I.B.10			Effluent	3x/5 years	-
Whole Effluent Toxicity	TU_c	See I.E.			Effluent	2/year	24-Hr. Comp.	See I.C.			Effluent	2/year	24-Hr. Comp.

APPENDIX A-2

Compliance Schedule Timeline

Appendix A-2 - Compliance Schedule Activities



APPENDIX B

Flow and Load Comparison

Appendix B: Influent Flow and Load Comparisons

Facility Planning Data

Data Range: (2007 through July 2011)

vs.

2015 NPDES Permit Report Update

Data Range: (August 2011 to August 2015)

CITY OF POST FALLS
INFLUENT FLOW
COMPARISON (FACILITY PLAN VS. AUGUST 2011 TO AUGUST 2015)

	Facility Plan		2015 Update				
	"2007-2011"	2011	NPDES Permit Report				
	Historical Flow	Peaking Factor [a]	Historical Flow	Peaking Factor [c]	Flow (mgd)	Peaking Factor	Comment/Discussion
	(mgd)		(mgd)		% Change	% Change	
Peak Hour Flow (Max Instantaneous)	5.54	2.3	*No Data*	*No Data*			
Observed Maximum Day	4.05	1.68	3.29	1.30	-18.8%	-22.9%	Within Facility Plan projections
Statistical Maximum Day	3.04	1.26	3.12	1.23	2.6%	-2.5%	Within Facility Plan projections
Statistical Maximum Week	2.76	1.15	2.85	1.12	3.3%	-2.4%	Within Facility Plan projections
Statistical Maximum Month	2.61	1.08	2.74	1.08	5.0%	-0.1%	Within Facility Plan projections
Average Daily Flow (analysis period)	2.41	---	2.54	1.00	5.4%		Within Facility Plan projections
Current Year Average	2.62[b]		2.54[d]				Within Facility Plan projections
Statistical Minimum Month	2.23	0.92	2.38	0.94	6.7%	1.8%	Peaking Factor Higher (but Facility Plan is conservative for projections)
Actual Minimum Day	1.84	0.76	2.16	0.85	17.4%	11.9%	Lower Minimum day, but within Facility Plan Projections

[a] *Relative to Average Daily Flow 2007-2011.*
[b] *Current 2011 average to be used as baseline for projections.*
[c] *Relative to Average Daily Flow 2011 through August 2015*
[d] *Current May 2014 through August 2015 Average*

CITY OF POST FALLS

INFLUENT BOD-5

COMPARISON (FACILITY PLAN VS. AUGUST 2011 TO AUGUST 2015)

	2007 to 2011		2015 Update				Comment/Discussion
	Facility Plan		NPDES Permit Report		lbs/day	Peaking Factor	
	(lbs/day)	Peaking Factor	(lbs/day)	Peaking Factor	% Change	% Change	
Observed Maximum Day	8222	1.49	8619	1.46	4.8%	-1.7%	Within Facility Plan projections
Statistical Maximum Day	7903	1.43	8225	1.40	4.1%	-2.3%	Within Facility Plan projections
Statistical Maximum Week	6957	1.26	7397	1.26	6.3%	-0.3%	Within Facility Plan projections
Statistical Maximum Month	6319	1.15	6792	1.15	7.5%	0.3%	Within Facility Plan projections
Average Daily (analysis period)	5515	1	5886	1.00	6.7%	0.0%	Within Facility Plan projections
Statistical Minimum Month	4813	0.87	5231	0.89	8.7%	2.2%	Within Facility Plan projections
Actual Minimum Day	3187	0.58	3273	0.56	2.7%	-4.1%	Within Facility Plan projections

CITY OF POST FALLS
INFLUENT TSS
COMPARISON (FACILITY PLAN VS. AUGUST 2011 TO AUGUST 2015)

	2007 to 2011 Facility Plan		2015 Update NPDES Permit Report		lbs/day	Peaking Factor	Comment/Discussion
	(lbs/day)	Peaking Factor	(lbs/day)	Peaking Factor	% Change	% Change	
Observed Maximum Day	13098	2.55	8590	1.59	-34.4%	-37.5%	Within Facility Plan projections, however significant decrease observed
Statistical Maximum Day	9904	1.93	8145	1.51	-17.8%	-21.7%	Within Facility Plan projections, however significant decrease observed
Statistical Maximum Week	7008	1.37	7031	1.30	0.3%	-4.8%	Within Facility Plan projections
Statistical Maximum Month	6071	1.18	6254	1.16	3.0%	-1.7%	Within Facility Plan projections
Average Daily (analysis period)	5127	1.00	5391	1.00	5.1%	0.0%	Within Facility Plan projections
Statistical Minimum Month	4375	0.85	4618	0.86	5.6%	0.8%	Within Facility Plan projections
Actual Minimum Day	3198	0.62	3882	0.72	21.4%	16.1%	Peaking Factor Lower (but comparable to Facility Plan for projections)

CITY OF POST FALLS
INFLUENT TOTAL PHOSPHORUS
COMPARISON (FACILITY PLAN VS. AUGUST 2011 TO AUGUST 2015)

	2007 to 2011 Facility Plan		2015 Update NPDES Permit Report		lbs/day	Peaking Factor	Comment/Discussion
	(lbs/day)	Peaking Factor	(lbs/day)	Peaking Factor	% Change	% Change	
Observed Maximum Day	226	1.51	202	1.39	-10.7%	-7.8%	Within Facility Plan projections, however significant decrease observed
Statistical Maximum Day	200	1.34	194	1.34	-3.0%	-0.2%	Within Facility Plan Projections
Statistical Maximum Week	180	1.21	178	1.23	-1.1%	1.4%	Within Facility Plan Projections
Statistical Maximum Month	166	1.12	160	1.10	-3.6%	-1.5%	Within Facility Plan Projections
Average Daily (analysis period)	149	1.00	145	1.00	-2.7%	0.0%	Within Facility Plan Projections
Statistical Minimum Month	129	0.86	130	0.90	1.1%	4.6%	Within Facility Plan Projections
Actual Minimum Day	107	0.72	93	0.64	-13.0%	-10.8%	Within Facility Plan projections, however significant decrease observed

CITY OF POST FALLS
INFLUENT AMMONIA-N
COMPARISON (FACILITY PLAN VS. AUGUST 2011 TO AUGUST 2015)

	2007 to 2011 Facility Plan		2015 Update NPDES Permit Report		lbs/day	Peaking Factor	Comment/Discussion
	(lbs/day)	Peaking Factor	(lbs/day)	Peaking Factor	% Change	% Change	
Observed Maximum Day	971	1.34	1762	2.14	81.5%	60.0%	2012-2015 Update has seen much higher peak Influent Ammonia.
Statistical Maximum Day	955	1.32	1500	1.82	57.1%	38.2%	2012-2015 Update has seen much higher peak Influent Ammonia.
Statistical Maximum Week	890	1.23	1149	1.40	29.1%	13.6%	2012-2015 Update has seen much higher peak Influent Ammonia.
Statistical Maximum Month	829	1.15	974	1.18	17.5%	3.0%	2012-2015 Update has seen much higher Influent Ammonia, and increasing faster than anticipated growth of 3.5% per year.
Average Daily (analysis period)	722	1.00	822	1.00	13.9%	0.0%	Within 3.5% per year increase projected in Facility Plan
Statistical Minimum Month	642	0.89	702	0.85	9.3%	-4.0%	Within Facility Plan Projections
Actual Minimum Day	540	0.75	599	0.73	11.0%	-2.8%	Within Facility Plan Projections

CITY OF POST FALLS
INFLUENT AOR
COMPARISON (FACILITY PLAN VS. AUGUST 2011 TO AUGUST 2015)

	2007 to 2011		2015 Update				Comment/Discussion
	Facility Plan		NPDES Permit Report		lbs/day	Peaking Factor	
	(lbs/day)	Peaking Factor	(lbs/day)	Peaking Factor	% Change	% Change	
Observed Maximum Day	13656	1.20	17517	1.40	28.3%	17.0%	2012-2015 Update has seen much higher peak AOR likely due to increased influent Ammonia.
Statistical Maximum Day	13493	1.19	17191	1.38	27.4%	15.8%	2012-2015 Update has seen much higher peak AOR likely due to increased influent Ammonia.
Statistical Maximum Week	13248	1.17	15288	1.23	15.4%	4.7%	Within Facility Plan Projections
Statistical Maximum Month	12833	1.13	14098	1.13	9.9%	0.0%	Within Facility Plan Projections
Average Daily (analysis period)	11347	1.00	12475	1.00	9.9%	0.0%	Within Facility Plan Projections
Statistical Minimum Month	10151	0.89	11077	0.89	9.1%	-0.2%	Within Facility Plan Projections
Actual Minimum Day	8143	0.72	9782	0.78	20.1%	8.9%	Within Facility Plan Projections

APPENDIX C

Compliance Schedule Projects
Cost Opinion 2015 Update

Appendix C - Detailed Planning Level Cost Opinions

Master date for all sheets
October 30, 2015

City of Post Falls WRF: 2015 NPDES Report

"Master" for all capital cost sheets:

Construction Contingency:	*20.0%*	*yes*
American Iron and Steel:	*2.5%*	*yes*
Prevailing Wages:	*7.5%*	*yes*
State Sales Tax:	*N/A*	*no*
Design / CMS:	*20.0%*	*yes*
Legal and Administrative:	*1.0%*	*yes*

Project: 2015 NPDES Report
Client: City of Post Falls

STATUS: PLANNING

No.	Link to Detailed Sheet	Capital Cost 2015 Construction	Capital Cost: 2015 Eng'g	Total Capital Cost (2015$)	20 Yr Present Worth O&M Cost (2015$)	2015 Update Capital Cost (Deflated at 3.19%/yr to 2012$)
1	Tertiary Feed Pump Station	$883,000	$175,000	$1,058,000	$262,000	$962,881
2	Tertiary Filtration System	$18,768,350	$642,000	$19,410,350	$5,164,000	$17,665,280
3	Plant Water Pump Station	$696,000	$138,000	$834,000	$675,000	$759,020
4	UV Disinfection System - Secondary System	$1,890,500	$374,000	$2,264,500	$1,170,000	$3,535,768
5	Additional Cost for UV to Class A	$1,352,550	$268,000	$1,620,550	NA	
6						
		$23,590,400	$1,597,000	$25,187,400	$7,271,000	$22,922,950

Note: Initial phase of UV improvements identified in the 2013 Facility Plan provided improved reliability only. Revised UV budgets shown here are for planning purposes only and represent costs for a complete replacement of the UV system and the additional costs to expand the UV system to Class A requirements.

ENGINEER'S OPINION OF PROBABLE COST

PLANNING

PROJECT: 2015 NPDES Report

DATE: 10/30/2015

PROJECT DESCRIPTION: Tertiary Feed System Pump Station

CLIENT: City of Post Falls

P/N: 20-15-051

ITEM NO.	DESCRIPTION	SCHEDULE OF VALUES			
		QNTY	UNIT	UNIT PRICE	TOTAL COST
1	**Pumps**				
2	Pumps	3	EA	$40,000	$120,000
3	Mark-up and installation			25.0%	$30,000
4	**Mechanical**				
5	Discharge Piping	3	EA	$10,000	$30,000
6	Discharge Isolation Valves	3	EA	$5,000	$15,000
7	Discharge Check Valves	3	EA	$5,000	$15,000
8	Coating pipes and valves	1	LS	$20,000	$20,000
9	**Structure**				
10	Wetwell (20' x 30' x 12' deep)				
11	Floor	22	CY	$600	$13,333
12	Walls	44	CY	$900	$40,000
13	Top Slab	22	CY	$1,100	$24,444
14	Block Building Above	600	SF	$150	$90,000
15	**Yard Piping**				
16	Gate and Diverstion Structure (to PS)	1	LS	$15,000	$15,000
17	42" Gravity Pipe to PS	50	LF	$375	$18,750
18					
19					
20	Additional Elements (estimated % of above)				
21	Contractor mobilization and administration			5.0%	$22,000
22	Yard Piping			1.0%	$4,000
23	Site Civil			5.0%	$22,000
24	Electrical and instrumentation			30.0%	$129,000
25	Bonding			2.5%	$11,000
26	Contractor overhead and profit			10.0%	$43,000

SUBTOTAL	**$**	**663,000**
Construction Contingency: 20%	$	133,000
American Iron and Steel: 2.5%	$	17,000
Prevailing Wages: 7.5%	$	61,000
State Sales Tax: N/A		-
Design / CMS: 20%	$	175,000
Legal and Administrative: 1%	$	9,000
TOTAL PROBABLE COST (2015 DOLLARS)	**$**	**1,058,000**

ENGINEER'S OPINION OF PROBABLE COST - Operation and Maintenance

PLANNING

PROJECT: 2015 NPDES Report

DATE: 10/30/2015

PROJECT DESCRIPTION: Tertiary Feed System Pump Station

CLIENT: City of Post Falls

P/N: 20-15-051

	Equipment Maintenance		Labor		Electrical Use		Chemical Use		Other	Present Worth	
	Capital Cost	$120,000	Hours per day	0.5	Year 1: HP demand	13.69	Year 1 Cost				
	Maintenance / yr	1.0%	Cost per hour	$45	Cost per kW-hr	$0.09					
	Increased use / yr	0.0%	Salary adjustment / yr	3.0%	Increased use / yr	0.0%	Increased use / yr	0.0%			Discount Rate
					Electric increase / yr	3.0%	Chemical increase / yr	3.0%			4.375%
Year	**Cost in Year *i***		**Cost in Year *i***		**Cost in Year *i***		**Cost in Year *i***		**Cost in Year *i***	**Total by Year**	**Present Worth**
1	$1,200		$5,850		$8,048		$0		$0	$15,098	$15,098
2	$1,200		$6,026		$8,290		$0		$0	$15,515	$14,865
3	$1,200		$6,206		$8,539		$0		$0	$15,945	$14,636
4	$1,200		$6,392		$8,795		$0		$0	$16,387	$14,412
5	$1,200		$6,584		$9,059		$0		$0	$16,843	$14,192
6	$1,200		$6,782		$9,330		$0		$0	$17,312	$13,976
7	$1,200		$6,985		$9,610		$0		$0	$17,796	$13,764
8	$1,200		$7,195		$9,899		$0		$0	$18,293	$13,556
9	$1,200		$7,411		$10,196		$0		$0	$18,806	$13,351
10	$1,200		$7,633		$10,501		$0		$0	$19,334	$13,151
11	$1,200		$7,862		$10,816		$0		$0	$19,878	$12,954
12	$1,200		$8,098		$11,141		$0		$0	$20,439	$12,761
13	$1,200		$8,341		$11,475		$0		$0	$21,016	$12,572
14	$1,200		$8,591		$11,819		$0		$0	$21,610	$12,385
15	$1,200		$8,849		$12,174		$0		$0	$22,223	$12,202
16	$1,200		$9,114		$12,539		$0		$0	$22,853	$12,023
17	$1,200		$9,388		$12,915		$0		$0	$23,503	$11,846
18	$1,200		$9,669		$13,303		$0		$0	$24,172	$11,673
19	$1,200		$9,959		$13,702		$0		$0	$24,861	$11,502
20	$1,200		$10,258		$14,113		$0		$0	$25,571	$11,335
NET PRESENT WORTH - TOTAL O&M (2015 DOLLARS)											**$ 262,000**

ENGINEER'S OPINION OF PROBABLE COST

PLANNING

PROJECT: 2015 NPDES Report

DATE: 10/30/2015

PROJECT DESCRIPTION: Tertiary Filtration System

CLIENT: City of Post Falls

P/N: 20-15-051

ITEM NO.	DESCRIPTION	SCHEDULE OF VALUES			
		QNTY	UNIT	UNIT PRICE	TOTAL COST
1	**Structure**				
2	Influent Channel and Floc Basin				
3	20 x 10 x 12' deep channel (Influent)	1	LS	$ 24,444	$24,444
4	20 x 10 x 12' deep channel (Floc)	1	LS	$ 24,444	$24,444
5	Feed Channel				
6	50 x 10 x 12' deep channel (Train Feed)	1	LS	$ 55,111	$55,111
7	Membrane Tanks (5)				
8	30 x 9 x 11' deep (common wall)	1	LS	$ 865,333	$865,333
9	Backpulse (finished water storage tank)				
10	50 x 10 x 12' deep channel (storage)	1	LS	$ 55,111	$55,111
11	CIP Neutralization Tank				
12	50 x 10 x 12' deep tank	1	LS	$ 38,667	$38,667
13	BW EQ Tank				
14	50 x 10 x 12' deep tank	1	LS	$ 38,667	$38,667
15					
16	MF Tank Coatings	1	LS	$ 200,000	$200,000
17					
18	Building (80 x 110)	8800	SF	$ 150	$1,320,000
19					
20	**Equipment**				
21	2mm Screening Equipment (Bandscreen or SP Kinney)	2	LS	$200,000	$400,000
22	Floc Mixer	2	LS	$25,000	$50,000
23	Filtration/Support Eqpt for 4.2 mgd ADF	1	LS	$3,340,975	$3,340,975
24	Installation and Markup	1	LS	10%	$334,098
25	Poly Tanks (chem storage)	5	LS	$7,500	$37,500
26	5 Ton Bridge Crane	1	LS	$100,000	$100,000
27	Plant Drain Pumps (backwash waste to EQ)	2	LS	$50,000	$100,000
28	**Mechanical Piping**				
29	Air Scour Piping (SS)	130	LS	$200	$26,000
30	Permeate and Backpulse Piping (SS)	500	LF	$400	$200,000
31	CIP Piping (PVC)	400	LF	$250	$100,000
32	Chem Neutrailzation Piping	200	LF	$250	$50,000
33	Chem Feed Piping (5 systems)	5	EA	$25,000	$125,000
34	Compressed Air Piping (insturment/valves)	1	LS	$75,000	$75,000
35	Plant Drain Piping	1	LS	$50,000	$50,000
19	**Yard Piping**				
18	30" Forcemain (from PS to Tertiary)	640	LF	$325	$208,000
19	Connections at ends	2	EA	$5,000	$10,000
20	Forcemain flow meter				
21	Flow meter (mag meter)	1	EA	$20,000	$20,000
22	Vault	1	EA	$10,000	$10,000
23	42" Gravity out from Tertiary to Outfall	800	LF	$400	$320,000
24	Connections at ends	2	EA	$5,000	$10,000
25	Gate and Diversion Structure (into outfall)	1	LS	$15,000	$15,000
36					
37	Additional Elements (estimated % of above)				
38	Contractor mobilization and administration			5.0%	$410,000
39	Yard Piping			1.0%	$82,000
40	Site Civil			5.0%	$410,000
41	Electrical and instrumentation			25.0%	$2,051,000
42	Bonding			2.5%	$205,000
43	Contractor overhead and profit			10.0%	$820,000

SUBTOTAL	**$**	**12,181,350**
Construction Contingency: 20%	$	2,436,000
American Iron and Steel: 2.5%	$	305,000
Prevailing Wages: 7.5%	$	1,119,000
State Sales Tax: N/A		-
Preliminary Design / Procurement: 4%	$	642,000
Final Design/CMS: 16%	$	2,567,000
Legal and Administrative: 1%	$	160,000
TOTAL PROBABLE COST (2015 DOLLARS)	**$**	**19,410,350**

ENGINEER'S OPINION OF PROBABLE COST - Operation and Maintenance

PLANNING

PROJECT: 2015 NPDES Report

DATE: 10/30/2015

PROJECT DESCRIPTION: Tertiary Filtration System

CLIENT: City of Post Falls

P/N: 20-15-051

	Equipment Maintenance		Labor		Electrical Use		Chemical Use (MF)		Chemical Use (Floc/pH Adjust)		Present Worth	
	Capital Cost	$3,828,475	Hours per day	3	Year 1: HP demand	78	Year 1 Cost	$18,000	Year 1 Cost	$129,200		
	Maintenance / yr	3.0%	Cost per hour	$45	Cost per kW-hr	$0.09						
	Increased use / yr	0.0%	Salary adjustment / yr	2.0%	Increased use / yr	0.5%	Increased use / yr	0.0%	Increased use / yr	3.5%		Discount Rate
					Electric increase / yr	0.0%	Chemical increase / yr	0.0%	Chemical increase / yr	0.0%		5.000%
Year		**Cost in Year *i***		**Cost in Year *i***		**Cost in Year *i***		**Cost in Year *i***		**Cost in Year *i***	**Total by Year**	**Present Worth**
1		$114,854		$35,100		$45,789		$18,000		$129,200	$342,944	$342,944
2		$114,854		$35,802		$46,018		$18,000		$133,722	$348,397	$331,806
3		$114,854		$36,518		$46,248		$18,000		$138,402	$354,023	$321,109
4		$114,854		$37,248		$46,480		$18,000		$143,246	$359,829	$310,833
5		$114,854		$37,993		$46,712		$18,000		$148,260	$365,820	$300,961
6		$114,854		$38,753		$46,946		$18,000		$153,449	$372,002	$291,473
7		$114,854		$39,528		$47,180		$18,000		$158,820	$378,383	$282,355
8		$114,854		$40,319		$47,416		$18,000		$164,378	$384,968	$273,589
9		$114,854		$41,125		$47,653		$18,000		$170,132	$391,765	$265,162
10		$114,854		$41,948		$47,892		$18,000		$176,086	$398,780	$257,057
11		$114,854		$42,787		$48,131		$18,000		$182,249	$406,021	$249,262
12		$114,854		$43,642		$48,372		$18,000		$188,628	$413,496	$241,763
13		$114,854		$44,515		$48,614		$18,000		$195,230	$421,213	$234,547
14		$114,854		$45,406		$48,857		$18,000		$202,063	$429,180	$227,603
15		$114,854		$46,314		$49,101		$18,000		$209,135	$437,404	$220,919
16		$114,854		$47,240		$49,346		$18,000		$216,455	$445,896	$214,483
17		$114,854		$48,185		$49,593		$18,000		$224,031	$454,663	$208,286
18		$114,854		$49,148		$49,841		$18,000		$231,872	$463,716	$202,318
19		$114,854		$50,131		$50,090		$18,000		$239,988	$473,064	$196,568
20		$114,854		$51,134		$50,341		$18,000		$248,387	$482,716	$191,027
										NET PRESENT WORTH - TOTAL O&M (2015 DOLLARS)		**$ 5,164,000**

ENGINEER'S OPINION OF PROBABLE COST

PLANNING

PROJECT: 2015 NPDES Report

DATE: 10/30/2015

PROJECT DESCRIPTION: UV Disinfection (Open Channel)- Capital Costs for New Secondary Discharge UV System

CLIENT: City of Post Falls

P/N: 20-15-051

ITEM NO.	DESCRIPTION	SCHEDULE OF VALUES			
		QNTY	UNIT	UNIT PRICE	TOTAL COST
1	**Structure**				
2	Additional Structure				
3	30 x 60	1800	SF	$ 150	$270,000
4	Concrete Channels/Structure (4 Channels)	1	LS	$ 124,533	$124,500
5	**Equipment**				
6	UV System Equipment for 9 mgd peak, Secondary Discharge	1	LS	$250,000	$250,000
7	Installation	1	LS	20%	$50,000
8	Bridge Crane	1	LS	$50,000	$50,000
9	**Mechanical Piping**				
10	Gates/Actuators	8	EA	$15,000	$120,000
11	Channel Baffles	4	EA	$2,500	$10,000
12	Additional Elements (estimated % of above)				
13	Contractor mobilization and administration			5.0%	$44,000
14	Yard Piping			10.0%	$87,000
15	Site Civil			5.0%	$44,000
16	Electrical and instrumentation			30.0%	$262,000
17	Bonding			2.5%	$22,000
18	Contractor overhead and profit			10.0%	$87,000

SUBTOTAL	**$**	**1,420,500**
Construction Contingency: 20%	$	284,000
American Iron and Steel: 2.5%	$	36,000
Prevailing Wages: 7.5%	$	131,000
State Sales Tax: N/A		-
Design / CMS: 20%	$	374,000
Legal and Administrative: 1%	$	19,000
TOTAL PROBABLE COST (2015 DOLLARS)	**$**	**2,264,500**

ENGINEER'S OPINION OF PROBABLE COST

PLANNING

PROJECT: 2015 NPDES Report

DATE: 10/30/2015

PROJECT DESCRIPTION: UV Disinfection (Open Channel)- Capital Costs: Expansion of New UV System to Class A

CLIENT: City of Post Falls

P/N: 20-15-051

ITEM NO.	DESCRIPTION	SCHEDULE OF VALUES			
		QNTY	UNIT	UNIT PRICE	TOTAL COST
1	**Structure**				
2	Additional Structure				
3	30 x 60		SF		$0
4	Concrete Channels/Structure (4 Channels)		LS		$0
5	**Equipment**				
6	UV System Equipment for 9 mgd peak, Class A (Add'l Equipment)	1	LS	$500,450	$500,450
7	Installation and Markup	1	LS	25%	$125,100
8	Bridge Crane	1	LS		$0
9	**Mechanical Piping**				
10	Gates/Actuators		EA		$0
11	Channel Baffles		EA		$0
12	Additional Elements (estimated % of above)				
13	Contractor mobilization and administration			5.0%	$31,000
14	Yard Piping			10.0%	$63,000
15	Site Civil			5.0%	$31,000
16	Electrical and instrumentation			30.0%	$188,000
17	Bonding			2.5%	$16,000
18	Contractor overhead and profit			10.0%	$63,000

SUBTOTAL	**$**	**1,017,550**
Construction Contingency: 20%	$	204,000
American Iron and Steel: 2.5%	$	25,000
Prevailing Wages: 7.5%	$	93,000
State Sales Tax: N/A		-
Design / CMS: 20%	$	268,000
Legal and Administrative: 1%	$	13,000
TOTAL PROBABLE COST (2015 DOLLARS)	**$**	**1,620,550**

ENGINEER'S OPINION OF PROBABLE COST - Operation and Maintenance

PLANNING

PROJECT: 2015 NPDES Report

DATE: 10/30/2015

PROJECT DESCRIPTION: UV O&M

CLIENT: City of Post Falls

P/N: 20-15-051

	Equipment Maintenance		Labor		Electrical Use		Chemical		Other		Present Worth	
	Capital Cost	$250,000	Hours per day	1	Year 1: HP demand	82	Year 1 Cost	$0	Year 1 Cost	$0		
	Maintenance / yr	2.0%	Cost per hour	$45	Cost per kW-hr	$0.09						
	Increased use / yr	0.0%	Salary adjustment / yr	3.0%	Increased use / yr	0.5%	Increased use / yr	0.0%	Increased use / yr	0.5%		Discount Rate
					Electric increase / yr	3.0%	Chemical increase / yr	3.0%	Chemical increa	3.0%		4.375%
Year		**Cost in Year *i***		**Cost in Year *i***		**Cost in Year *i***		**Cost in Year *i***		**Cost in Year *i***	**Total by Year**	**Present Worth**
1		$5,000		$11,700		$48,308		$0		$0	$65,008	$65,008
2		$5,000		$12,051		$50,006		$0		$0	$67,057	$64,247
3		$5,000		$12,413		$51,764		$0		$0	$69,177	$63,499
4		$5,000		$12,785		$53,584		$0		$0	$71,368	$62,765
5		$5,000		$13,168		$55,467		$0		$0	$73,636	$62,044
6		$5,000		$13,564		$57,417		$0		$0	$75,980	$61,336
7		$5,000		$13,970		$59,435		$0		$0	$78,405	$60,641
8		$5,000		$14,390		$61,524		$0		$0	$80,914	$59,958
9		$5,000		$14,821		$63,687		$0		$0	$83,508	$59,286
10		$5,000		$15,266		$65,925		$0		$0	$86,191	$58,626
11		$5,000		$15,724		$68,242		$0		$0	$88,966	$57,978
12		$5,000		$16,196		$70,641		$0		$0	$91,837	$57,340
13		$5,000		$16,681		$73,124		$0		$0	$94,806	$56,712
14		$5,000		$17,182		$75,695		$0		$0	$97,876	$56,095
15		$5,000		$17,697		$78,355		$0		$0	$101,053	$55,488
16		$5,000		$18,228		$81,109		$0		$0	$104,338	$54,890
17		$5,000		$18,775		$83,960		$0		$0	$107,735	$54,302
18		$5,000		$19,338		$86,912		$0		$0	$111,250	$53,723
19		$5,000		$19,918		$89,967		$0		$0	$114,885	$53,153
20		$5,000		$20,516		$93,129		$0		$0	$118,645	$52,592
										NET PRESENT WORTH - TOTAL O&M (2015 DOLLARS)		**$ 1,170,000**

ENGINEER'S OPINION OF PROBABLE COST

PLANNING

PROJECT: 2015 NPDES Report

DATE: 10/30/2015

PROJECT DESCRIPTION: Plant Water Pump Station (Capital)

CLIENT: City of Post Falls

P/N: 20-15-051

ITEM NO.	DESCRIPTION	SCHEDULE OF VALUES			
		QNTY	UNIT	UNIT PRICE	TOTAL COST
1	**Structure**				
2	Additional Structure				
3	24 x 20	480	SF	200	$96,000
4	**Equipment**				
5	Boosterpaq Skid	1	LS	$200,000	$200,000
6	Installation	1	LS	10%	$20,000
7					
8	**Mechanical Piping**				
9	Permeate (SS) and Valves	100	LF	$250	$25,000
10					
11	Additional Elements (estimated % of above)				
12	Contractor mobilization and administration			5.0%	$17,000
13	Yard Piping			1.0%	$3,000
14	Site Civil			5.0%	$17,000
15	Electrical and instrumentation			30.0%	$102,000
16	Bonding			2.5%	$9,000
17	Contractor overhead and profit			10.0%	$34,000

SUBTOTAL	**$**	**523,000**
Construction Contingency: 20%	$	105,000
American Iron and Steel: 2.5%	$	13,000
Prevailing Wages: 7.5%	$	48,000
State Sales Tax: N/A		-
Design / CMS: 20%	$	138,000
Legal and Administrative: 1%	$	7,000
TOTAL PROBABLE COST (2015 DOLLARS)	**$**	**834,000**

ENGINEER'S OPINION OF PROBABLE COST - Operation and Maintenance

PLANNING

PROJECT: 2015 NPDES Report

DATE: 10/30/2015

PROJECT DESCRIPTION: Plant Water PS O&M

CLIENT: City of Post Falls

P/N: 20-15-051

	Equipment Maintenance		Labor		Electrical Use		Chemical		Other		Present Worth	
	Capital Cost	$200,000	Hours per day	0.5	Year 1: HP demand	50	Year 1 Cost	$0	Year 1 Cost	$0		
	Maintenance / yr	1.0%	Cost per hour	$45	Cost per kW-hr	$0.09						
	Increased use / yr	0.0%	Salary adjustment / yr	3.0%	Increased use / yr	0.5%	Increased use / yr	0.0%	Increased use / yr	0.5%		Discount Rate
					Electric increase / yr	3.0%	Chemical increase / yr	3.0%	Chemical increa	3.0%		4.375%
Year	**Cost in Year *i***		**Cost in Year *i***		**Cost in Year *i***		**Cost in Year *i***			**Cost in Year *i***	**Total by Year**	**Present Worth**
1	$2,000		$5,850		$29,395		$0			$0	$37,245	$37,245
2	$2,000		$6,026		$30,429		$0			$0	$38,454	$36,842
3	$2,000		$6,206		$31,498		$0			$0	$39,705	$36,446
4	$2,000		$6,392		$32,605		$0			$0	$40,998	$36,056
5	$2,000		$6,584		$33,752		$0			$0	$42,336	$35,672
6	$2,000		$6,782		$34,938		$0			$0	$43,720	$35,293
7	$2,000		$6,985		$36,166		$0			$0	$45,151	$34,921
8	$2,000		$7,195		$37,437		$0			$0	$46,632	$34,555
9	$2,000		$7,411		$38,753		$0			$0	$48,164	$34,194
10	$2,000		$7,633		$40,115		$0			$0	$49,748	$33,838
11	$2,000		$7,862		$41,525		$0			$0	$51,387	$33,488
12	$2,000		$8,098		$42,985		$0			$0	$53,083	$33,143
13	$2,000		$8,341		$44,496		$0			$0	$54,837	$32,803
14	$2,000		$8,591		$46,060		$0			$0	$56,651	$32,468
15	$2,000		$8,849		$47,679		$0			$0	$58,528	$32,137
16	$2,000		$9,114		$49,355		$0			$0	$60,469	$31,812
17	$2,000		$9,388		$51,090		$0			$0	$62,477	$31,490
18	$2,000		$9,669		$52,886		$0			$0	$64,555	$31,174
19	$2,000		$9,959		$54,744		$0			$0	$66,704	$30,861
20	$2,000		$10,258		$56,669		$0			$0	$68,927	$30,553
										NET PRESENT WORTH - TOTAL O&M (2015 DOLLARS)	**$ 675,000**	

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