



Design Review Committee Briefing #24

Subject: Industrial Capacity Purchase Analysis

Date: June 17, 2019

The Issue

The industrial flow and loadings represent a significant portion of the allocated flow and loadings for the Nampa Wastewater Treatment Plant (WWTP), often exceeding 25 percent of the overall committed capacity. The City of Nampa (City) has examined the opportunity to purchase industrial capacity back from local industries as a potential method for reducing the capital cost for the Phase II Upgrades. This capacity purchase could delay the need for additional capital at the Nampa WWTP.

Background and Analysis

DRC Briefing #6 discussed the Nampa WWTP capacity allocated (i.e. permitted) to industries compared to what they actually use. This analysis demonstrated that industries do not utilize their full permitted capacity. Based on this information, the City investigated whether buying back industrial capacity would provide capital investment savings for the Phase II Upgrades. To this end, Brown and Caldwell evaluated the capacity of unit processes that would reduce the capital costs and compared these capacities to the needed industrial flow and load reductions. This analysis is discussed in further detail in the following sections.

Unit Process Capacity Reduction Analysis

BC modeled the reduction in capacity that would be required to reduce overall capital expenditures. Table 1 compares the overall maximum month flow and loading assumption from the *Nampa Wastewater Program Facility Plan (Facility Plan)* (Brown and Caldwell, 2018) to the results of the unit process capacity reduction analysis. As shown in the table, a reduction of the overall loadings needed to reduce capital costs ranges from 29 to 32 percent depending on the constituent. It should be noted that the influent flows were not changed in this analysis given the discrepancy between industrial concentration and domestic concentrations.

Table 1. Results of Industrial Capacity Analysis					
	Flow (mgd)	BOD (ppd)	TSS (ppd)	TKN (ppd)	TP (ppd)
Facility Plan Assumptions	20.1	71,043	65,042	8,389	1,610
Results of Analysis	20.1	50,323	44,321	5,924	1,104
Percent Reduction	0%	29%	32%	29%	31%

mgd = million gallons per day.

The analysis of the Nampa WWTP capacity indicates that the 2040 influent BOD loading would need to be reduced to approximately 51,500 pounds per day (ppd) to see a reduction in the unit processes needed to accommodate growth within the Phase II Upgrades. This represents a reduction of nearly 20,000 ppd of BOD from the original 2040 estimates included in the *Facility Plan*. If this reduction could be achieved, the need for Aeration Basin No. 4 and Final Clarifier No. 4 would be eliminated from the Phase II Upgrades, resulting in a Phase II Upgrades cost reduction of approximately \$14,005,000 (unescalated, 2018 dollars). Given the nature of wastewater flows into the City's system, the only viable approach for reducing these loadings is by modifying industrial discharge permits and future allocated loads, which is discussed in the next section.

Industrial Capacity Reduction Analysis

An equivalent dwelling unit (EDU) describes the flow and loadings that would be expected from a single-family dwelling. Brown and Caldwell modeled the industrial capacity reductions as EDUs and identified when the reductions resulted in capital savings. The number of EDUs assumed in the industrial discharge was incrementally adjusted down until modeling results indicated a reduction in the number of unit processes required for the Phase II Upgrades (see section above). The results of this analysis indicated that a reduction of 28,000 EDUs, which equates to a reduction of 20,720 ppd of BOD, would be necessary to reduce the cost of the Phase II Upgrades by \$14,005,000 (unescalated, 2018 dollars). This reduction in capital cost is a result of no longer needing to construct Aeration Basin No. 4 and Final Clarifier No. 4.

The City considered the potential to purchase capacity back from the two largest industrial dischargers. The discharge characteristics for these two dischargers are presented in Table 2. As shown in Table 2, the discharges from these two industries are insufficient to realize the capital cost savings in the Phase II Upgrades as they are less than 28,000 EDUs in all cases.

Table 2. Current Capacity Allocation and EDU Equivalents

Constituent	Industry 1 - Current Capacity Allocation (maximum month)	Industry 1 - EDU Equivalents	Industry 2 - Current Capacity Allocation (maximum month)	Industry 2 - EDU Equivalents	Total EDU Equivalents
Flow (mgd)	0.9625	3,678	0.629	2,404	6,082
BOD (ppd)	8,600	11,622	7,289	9,850	21,472
TSS (ppd)	3,000	4,054	5,794.8	7,831	11,885
TKN (ppd)	1,225	12,250	625.1	6,251	18,501
TP (ppd)	108	5,400	238.6	11,930	17,330

The combined industrial capacity reductions from two large, existing industrial dischargers alone were insufficient to provide the full capacity reduction needed to realize capital cost savings for the Phase II Upgrades. Therefore, reducing allocations for future industrial capacity would be required, in addition to the existing industrial capacity purchases, to realize capital cost savings. Table 3, below, shows the required reductions in the future industrial capacity allocation that would be required. These loading reductions range from 20 to 76 percent depending on the constituent. It should be noted that these reductions would change if the City cannot purchase the full capacity from existing industrial dischargers.

Table 3. Future Industrial Growth Assumptions

	Flow (mgd)	BOD (ppd)	TSS (ppd)	TKN (ppd)	TP (ppd)
Facility Plan assumptions	1.0	12,518	12,518	1,252	417
Results of analysis	1.0	7,687	593	302	204
Percent reduction	0%	37%	76%	31%	20%

The allocation for future industrial capacity was intended to provide an opportunity for economic development within the City, as described in Section 3.2 of TM T-46 in the *Facility Plan*. Reductions in the available capacity for future industrial customers will constrain the number or types of industries that the City can support without further capital investment. The needed reductions represent a reduction in future industrial capacity equivalent to approximately three to five moderately sized industries. The reductions are also equivalent to approximately 6 to 12 years of residential growth, which would result in a reduction in the potential connection fees from this capacity. Based on the current connection fee rates, the reduction in future industrial capacity is equivalent to \$11,686,378.

Potential Consequences

There are some consequences for the DRC's consideration related to the potential purchase of industrial capacity:

- The allocation for future industrial capacity was intended to provide an opportunity for economic development within the City, as described in Section 3.2 of TM T-46 in the *Facility Plan*. Reductions in the available capacity for future industrial customers will constrain the number or types of industries that the City can support without further capital investment. The needed reductions represent a reduction in future industrial capacity equivalent to approximately three to five moderately sized industries.
- The reductions are also equivalent to approximately 6 to 12 years of residential growth, which would result in a reduction in the potential connection fees from this capacity. Based on the current connection fee rates, the reduction in future industrial capacity is equivalent to \$11,686,378.

Recommendation

The City evaluated the potential to purchase industrial capacity as a means of limiting capital investment in the Nampa WWTP Phase II Upgrades. The results of this analysis indicate that capacity would need to be purchased from the two largest industrial customers. Additionally, the City would need to reduce the capacity allocated to future industrial growth within the City to appreciably change the capital costs of the Nampa WWTP Phase II Upgrades. This approach does not provide sufficient opportunity for industrial growth and does not align with the critical success factors established in the *Facility Plan*. Therefore, it is recommended that the City not pursue the purchase of industrial capacity and proceed with the Phase II Upgrades as planned.