

**Utah Division of Water Quality
Statement of Basis
ADDENDUM
Wasteload Analysis and Antidegradation Level I Review**

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Facility: Jordanelle Special Service District, Jordanelle Water Reclamation Facility
UPDES No. UT0025747

Receiving water: Provo River (1C, 2B, 3A, 4)

This addendum summarizes the wasteload analysis that was performed to determine water quality based effluent limits (WQBEL) for this discharge. Wasteload analyses are performed to determine point source effluent limitations necessary to maintain designated beneficial uses by evaluating projected effects of discharge concentrations on in-stream water quality. The wasteload analysis also takes into account downstream designated uses (UAC R317-2-8). Projected concentrations are compared to numeric water quality standards to determine acceptability. The numeric criteria in this wasteload analysis may be modified by narrative criteria and other conditions determined by staff of the Division of Water Quality.

Discharge

1.0 MGD design flow rate.

Discharge 001 Timpanogos Canal
Discharge 002 Wasatch Canal
Discharge 003 Provo River Return Canal
Discharge 004 Provo River

Receiving Water

The ultimate receiving water for the JSSD discharge is the Provo River.

Per UAC R317-2-13.5(b), the designated beneficial uses of Provo River are 1C, 2B, 3A, 4.

- *Class 1C -Protected for domestic purposes with prior treatment by treatment processes as required by the Utah Division of Drinking Water.*
- *Class 2B - Protected for infrequent primary contact recreation. Also protected for secondary contact recreation where there is a low likelihood of ingestion of water or a low degree of bodily contact with the water. Examples include, but are not limited to, wading, hunting, and fishing.*

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- *Class 3A - Protected for cold water species of game fish and other cold-water aquatic life, including the necessary aquatic organisms in their food chain.*
- *Class 4 - Protected for agricultural uses including irrigation of crops and stock watering.*

Receiving Water Body

Ambient water quality for the receiving water for discharge was characterized using data from DWQ Monitoring Station #4997330, PROVO R BL JORDANELLE RES. ON OLD US40 XING, from the period 2012-2023.

Flow

Typically, the critical flow for the wasteload analysis is considered the lowest stream flow for seven consecutive days with a ten-year return frequency (7Q10). In the case of the Provo River, streamflow is controlled by Jordanelle Dam. The federal Central Utah Project Completion Act (CUPCA), section 303(c)(2), requires minimum flows in Provo River of 125 cfs from Jordanelle Dam to Deer Creek Reservoir. As a result, 125 cfs was considered the critical low flow for this analysis.

TMDL

According to DWQ's 2022 303(d) Assessment, Provo River from Deer Creek Reservoir to Jordanelle Reservoir (Provo River-4, UT16020203-004_00) was listed as impaired for pH.

Deer Creek Reservoir (Deer Creek Reservoir, UT-L-16020203-001_00), located just downstream of the treatment facility, is listed on Utah's 2022 303(d) Water Quality Assessment as impaired for temperature and dissolved oxygen.

A TMDL study addressing the dissolved oxygen impairment through the control of phosphorus loading to the watershed was completed September 9, 2002. The approved TMDL set the following wasteload-related endpoints:

- In-stream phosphorus concentration of 0.030 mg/l total phosphorus (TP), and
- In-stream phosphorus concentration 0.020 mg/l dissolved total phosphorus (DTP).

Protection of Downstream Uses

Per UAC R317-2-8, *all actions to control waste discharges under these rules shall be modified as necessary to protect downstream designated uses.* For this discharge, 3A numeric aquatic life use criteria apply to the immediate receiving water (Provo River).

Mixing Zone

The maximum allowable mixing zone is 15 minutes of travel time for acute conditions, not to exceed 50% of stream width, and 2,500 feet for chronic conditions, per UAC R317-2-5. Water quality standards must be met at the end of the mixing zone. Modeling determined the length of the mixing zone to remain within the maximum allowable dimensions for both the chronic and acute conditions. Acute limits were calculated using 50% of the seasonal critical low flow.

Parameters of Concern

The potential parameters of concern identified for the discharge/receiving water are phosphorus, pH, dissolved oxygen and temperature as a result of the impairment status of the receiving waters. Additional parameters of concern may become apparent as a result of reasonable potential analysis, technology-based standards, or other factors as determined by the UPDES Permit Writer.

WET Limits

The percent of effluent in the receiving water in a fully mixed condition, and acute and chronic dilution in a not fully mixed condition are calculated in the WLA in order to generate WET limits. The LC₅₀ (lethal concentration, 50%) percent effluent for acute toxicity and the IC₂₅ (inhibition concentration, 25%) percent effluent for chronic toxicity, as determined by the WET test, needs to be below the WET limits, as determined by the WLA. The WET limit for LC₅₀ is typically 100% effluent and does not need to be determined by the WLA.

IC₂₅ WET limits for Outfalls 001 should be based on 1.22% effluent.

Wasteload Allocation Methods

Effluent limits were determined for conservative constituents using a simple mass balance mixing analysis (UDWQ 2012). The mass balance analysis is summarized in the Wasteload Addendums.

The water quality standard for chronic ammonia toxicity is dependent on temperature and pH, and the water quality standard for acute ammonia toxicity is dependent on pH. The AMMTOX Model developed by University of Colorado and adapted by Utah DWQ and EPA Region VIII was used to determine ammonia effluent limits (Lewis et al. 2002). The analysis is summarized in the Wasteload Addendum.

Models and supporting documentation are available for review upon request.

Antidegradation Level I Review

The objective of the Level I ADR is to ensure the protection of existing uses, defined as the beneficial uses attained in the receiving water on or after November 28, 1975. No evidence is known that the existing uses deviate from the designated beneficial uses for the receiving water. Therefore, the beneficial uses will be protected if the discharge remains below the WQBELs presented in this wasteload.

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A Level II Antidegradation Review (ADR) is not required for this facility. The proposed permit is a simple renewal, with no increase in flow or concentration over that which was approved in the existing permit

Documents:

WLA Document: *JSSD_WWTP_WLADoc_2023.docx*

Wasteload Analysis and Addendums: *JSSD_WWTP_SOB_WLA_2023.pdf*

References:

Utah Division of Water Quality. 2022. *Final 2022 Integrated Report on Water Quality*

Utah Division of Water Quality. 2021. *Utah Wasteload Analysis Procedures Version 2.0*

Utah Division of Water Quality. 1992. *Deer Creek Reservoir TMDL Study*